ELECTRONICS and COMMUNICATIONS

DESIGN—MANUFACTURE—ENGINEERING—DISTRIBUTION—APPLICATION

Price $1.00

Sept.-Oct. 1955

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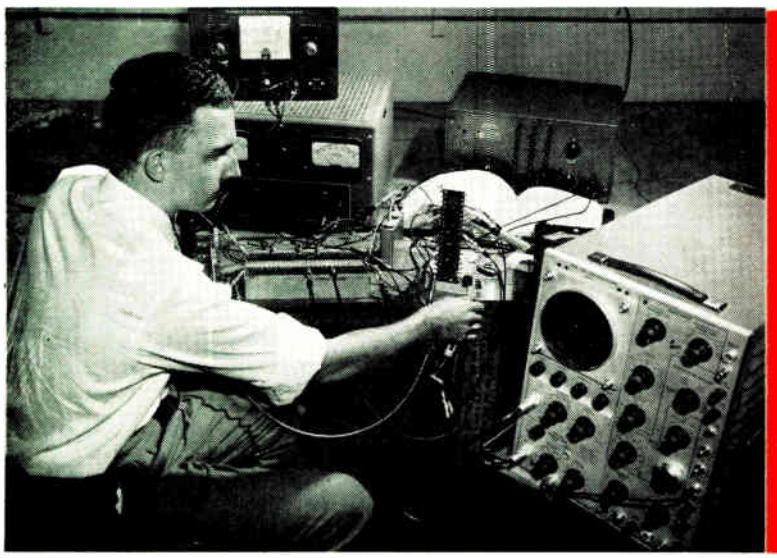
An AGE Publication
Toronto, Canada

1955 DIRECTORY ISSUE and BUYERS' GUIDE

Distribution Of This Issue
Over 10,000 Copies

CROSLEY

INDUSTRIAL ELECTRONICS



ORIGINAL ENGINEERING DESIGN AND DEVELOPMENT IN THE FOLLOWING FIELDS:

- Transistor circuits
- Digital and analogue computer applications
- Servo controls
- Communications

Shown is a corner of the fully equipped Crosley Industrial Electronics lab, with transistor circuit research in progress

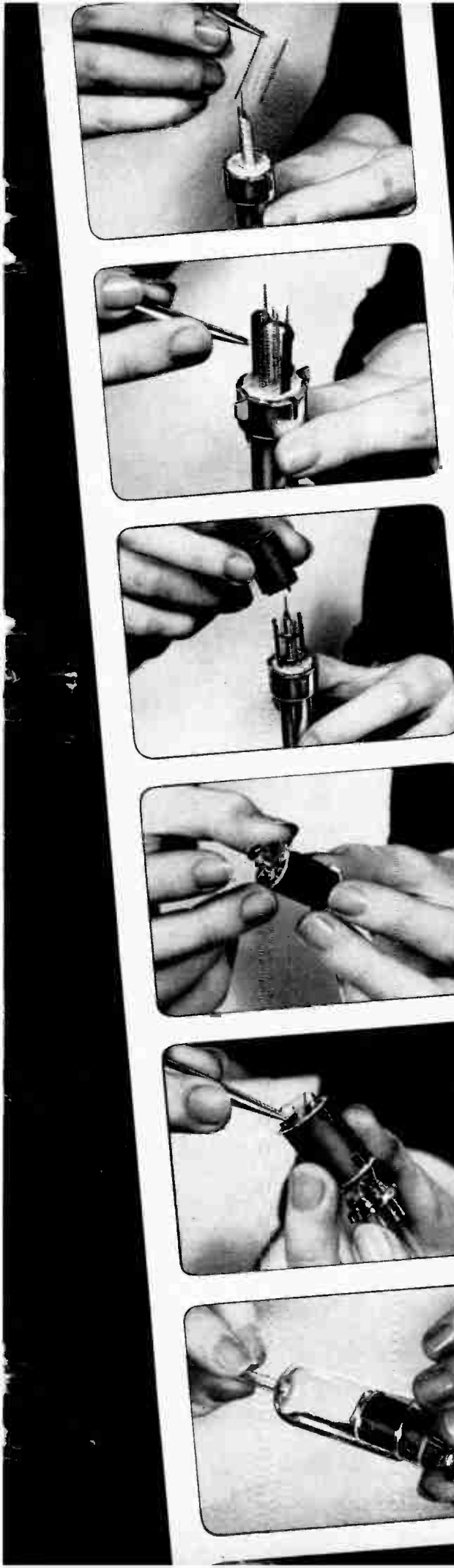
CROSLEY

RADIO AND TELEVISION DIVISION

MOFFATS LIMITED • AN AVCO COMPANY

GIBSON AND WRIGHT AVENUES, WESTON, ONTARIO

For further data on advertised products use page 207.



patiently perfected . . .

Everyone engaged in the making of Marconi tubes keeps one important fact in mind—*each* tube is a piece of equipment on which someone's listening pleasure, convenience or even life is going to depend. So every single Marconi RVC tube is made with as much care as if it had been specially ordered for a particularly important application.

YOUR customers' satisfaction is the dividend Marconi earns by setting higher standards for the industry.

MARCONI RADIOTRONS

Canada's finest radio and television tubes

CANADIAN MARCONI COMPANY

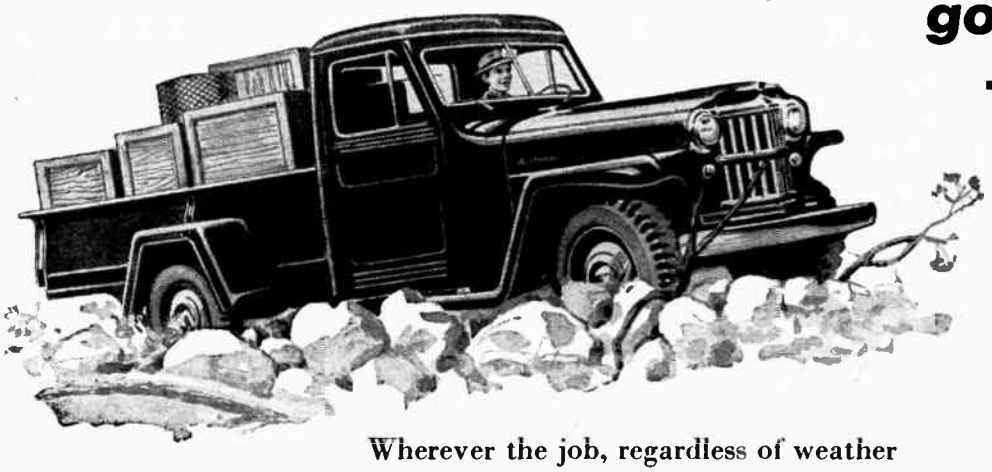
VANCOUVER, WINNIPEG, TORONTO, MONTREAL, HALIFAX, ST. JOHN'S, NFLD.

The nation's work horses!

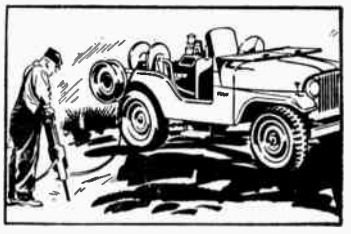
'Jeep'® 4 Wheel-drive VEHICLES

go anywhere —anytime

to the job, on the road or off.



Wherever the job, regardless of weather or ground conditions, a sure-footed 'Jeep' vehicle will get there, with men, equipment or payload. Shifting instantly from 2-wheel drive to the added traction of all four wheels, they go through sand, mud, snow and navigate the steepest grades with ease.



COMPRESSOR

WELDER

DRILL

'JEEP'-A-TRENCH

The most versatile vehicles ever built!

CJ-5 'JEEP'

Every 'Jeep' vehicle has 3 power take-off points available. Each is a mobile power plant, delivers ready auxiliary power anywhere to operate compressors, generators, belt-driven equipment and winches. And there's over fifty pieces of special equipment to make 'Jeep' 4-wheel drive vehicles the handiest, most useful and profitable investment any business could make!

'JEEP' CARGO PERSONNEL CARRIER

'JEEP' SEDAN DELIVERY

For the toughest "impossible" jobs the world automatically thinks of 'Jeep'

KAISER-WILLYS OF CANADA LTD.

KW-262

WINDSOR • ONTARIO

Canada's most useful vehicles

For further data on advertised products use page 207.

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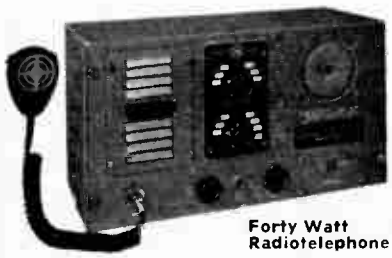
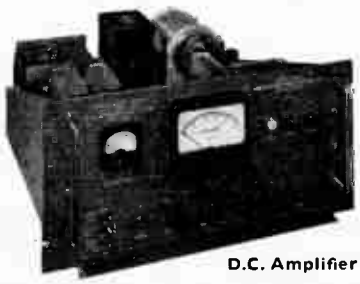
WHAT WE MAKE...

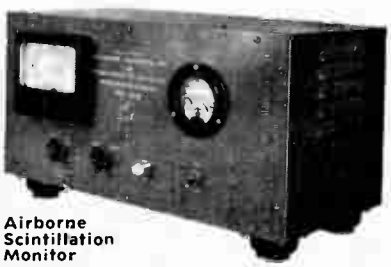
Special Align-ment Generator



Forty Watt Radiotelephone



D.C. Amplifier



Airborne Scintillation Monitor

General Purpose Count Rate Meter

Secondary Frequency Standard

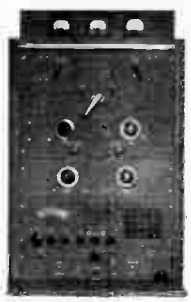
Square Wave Generator

Five K.W. Two Channel Antenna Matching Unit

Line Amplifier

Audio Oscillator

One Hundred Watt Radiotelephone



Marine Beacon Transmitter Receiver

Portable Radiotelephone

TYPICAL PRODUCTS

DESIGNED AND BUILT BY

Measurement Engineering Ltd.

BOXES: Metal Fabricated Transit Cases
CABLES: Harness
CAPACITORS: Transmitter Tuning
CHASSIS: Aluminum, Steel, Brass
COILS: Transmitter, Toroidal
CONDENSERS: Transmitter Tuning
ENGRAVING: Aluminum, Steel Panels, Bakelite and Plastic
FILTERS: Audio, Rejection, Bandpass
FINISHES: Paint to JCNAAF P201, Alodizing of Aluminum
HARDWARE: Handles, Brackets
MACHINE PARTS: Metal, Bakelite, Mycalex, Plastic
PAINTING: Custom MIL SPEC.
PANELS: Aluminum, Steel
RACKS: All Sizes
SHEET METAL FABRICATION TO ORDER
STENCILLING OF CHASSIS • TAG BOARDS
RADIOTELEPHONES FOR: marine, forestry, point-to-point and mobile applications; portable and low power battery operated transceivers.
BEACON TRANSMITTERS for marine and aircraft safety service.
ANTENNAS
ANTENNA MATCHING UNITS, up to 7½ Kw. rating. Antennas for VHF, HF and Whips for portable use. Omni-directional Types. Triangular spreaders for H.F. Folded Dipoles.
MICROWAVE RADIO LIGHTHOUSE
HIGHLY STABLE H.F. EXCITERS
GENERATORS: Audio Frequency, Square Wave, Alignment Sweep, Radio Frequency.
RADIATION INSTRUMENTS: D.C. Amplifiers, Count Rate Meters, Geiger Probe Monitors, Portable Counters, Aerial Survey Meters, Scintillation Meters, Contamination Meters.
TIMERS: Electronic Cycling
APPLIANCE TESTERS
POWER SUPPLIES, regulated variable output, heavy duty
TELEMETERING
MASS SPECTROMETER ELECTRONIC CONTROLS
SECONDARY FREQUENCY STANDARDS
NOISE GENERATORS

Presenting...

An Organization Rendering
A Complete Service As
Consultants, Field Research
Engineers and Equipment
Specialists in Every Phase of
Electronics and Communications.

MEL

Measurement Engineering Ltd.

A SUMMARY OF OUR

FACILITIES • SERVICES
PRODUCTS • HISTORY

Head Office & Plant — ARNPRIOR, ONT.
Tel. Arnprior 400

TORONTO OFFICE — 226 DONLEA DR. — MA. 8860

WHOM WE REPRESENT

KAY ELECTRIC COMPANY

KAY...First For Test From LF to MICROWAVE

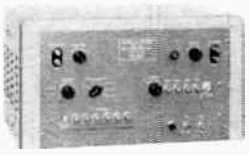
• Noise Figure Measurement • Sweepers • Markers • Pulsers • Transmitters • Color Generators • Signal Generators • Attenuators • Sound Spectographs • Gain and Loss Measure • Spectrum Analyzer • Vibration Analyzers

SWEEPING OSCILLATORS

Inst.	Range	Tuning	Width	Output	Price
Mega-Sweep	50kc - 1000mc	continuous	0 - 40	100mv	$465
Calibr. Mega-Sweep	50kc - 1000mc	single dial	0 - 50	100mv	495
Mega-Sweep 111A	10mc - 950mc 450mc - 900mc	zero level base line	0 - 40	.15v 70ohms .3v 300ohms	575
Mega-Sweep 112A	800mc - 1200mc	single dial	0 - 40	.3v 70ohms	575
Mega-Match*	10kc - 1000mc	single dial	0 - 60	1v open	895

* Displays mismatch. Measures reflected energy.

VIDEO MARKA-SWEEPS: VIDEO SWEEPING OSCILLATORS



Inst.	Range	Tuning	Width	Markers	Output	Price
Keydsweep	Sync, blank used with following sweepers				0 - 1v 75ohms	$395
Model Video	50kc - 20mc	3 ranges 50kc - 5mc 50kc - 10mc 50kc - 20mc	complete range	6 crystals	.3v 72ohms	495
Model Video TTV	50kc - 8mc	cont. variable CW signal	8mc	5 crystals 1 variable	1.5v. RMS 72ohms	695
Model Video GE	50kc - 8mc	contin.	8mc	6 crystals	1.5v. RMS 72ohms	595
Model Vidaligner	50kc - 8mc	3 ranges 50kc - 2mc 50kc - 5mc 50kc - 8mc	complete range	8 crystals 1 variable	1.5v. RMS 70ohms	775

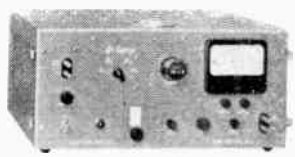
SWEEP MARKER GENERATORS

Inst.	Range	Tuning	Width	Markers	Output	Price
Kilo-Sweep	50kc - 5mc	contin.	contin. to 100kc	6 crystals	.5v 70ohms	$700
Sono-Sweep	5kc - 200kc	contin.	20kc	6 crystals	.5v 70ohms	525
Rada-Sweep	30 & 60mc	centre	20mc or 3mc	9 crystals	.25v 70ohms	395
Radaligner	15 - 169mc	choice of centres	±5mc to ±20mc	8 crystals	.25v 70ohms	795
IF Marka-Sweep	20 - 50mc	3 ranges	500kc - sound 15mc - picture	9 crystals each sound picture	.25v 70ohms	325
RF-P Marka-Sweep	IF + 13 channels	12 ch	15mc		.50v 70ohms	795
Ultra-Sweep	450 - 900mc	contin.	0 - 60mc	———	.3v 75ohms	895

NOISE FIGURE . . . MEASUREMENT AND NOISE GENERATORS

Inst.	Range	Noise Fig. Range	Price
Mega-Node	5 - 220mc	0 - 16db @ 50ohms 0 - 23.8db @ 300ohms	$295
Mega-Node SR.	10 - 3000mc	0 - 20db	$995
Microwave Mega-Nodes	1200 - 60,000mc	Fluorescent Tube 15.8±.25db Inert Gas Tubes 15.2-18db±.1db	$295 - 500 (with power supply
Rada-Node	5 to 26,500mc	0 - 21db±.25db IF strips @ 30 & 60mc	$1,395 covering range 5mc to 400mc

Q - MEASUREMENT

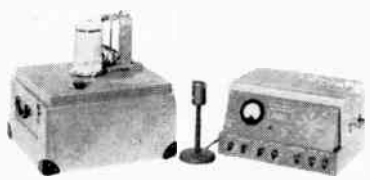


Inst.	Range	Range of Q Measure	Resonating Capacitor Range	Price
Q-Sweep Q-Sweep displays Q-with 5% swept freq.		0 - 125, 0 - 250 0 - 500	7.5 - 100mmf Displayed on Dial.	$990
Kilo-Q	20 - 220mc cont. 20cps - 1mc	0 - 125, 0 - 250 0 - 500	60mmf - .1mf	695

TV PICTURE AND SOUND SIGNAL SOURCES

Inst.	Output Signal	Video-Audio Carrier-Output	Picture Carrier Modulation	Sound Carrier Deviation	Price
Mega-Pix	RF Picture & Sound Channels 2 - 13	30mv across 72ohms	0 - 85% adjustable	0 - 25kc adjustable	$990
Mega-Pix Single Channel	Specified VHF Channel	250mv across 72ohms	0 - 85% adjustable	0 - 25kc adjustable	495
Ultra-Pix	UHF Picture and Sound. Provides 1 VHF and 3 UHF CHANNELS	240mv across 72ohms	0 - 85% adjustable	0 - 25kc adjustable	795

SOUND ANALYSIS



Inst.	Description	Range		Price
Vibralyzer	Vibration Frequency Analyzer	5 - 4400 cps	Displays amplitude vs. frequency vs. time provides permanent record	$2500
Sonograph	Sound spectograph for frequency analysis of audio energy	85 - 8000 cps		
Sonalator	Dynamic translator for visible speech display	100 - 200,000 cps	Records frequency and intensity to time	1995
Echo-Vox, SR.	Provides 3 separate variable periods of time delay at audio frequencies	20-1600 millisecond delay range		1495
		Freq. response 40-1200 cps	Displays relative frequency to time on oscilloscope	1295
Sona-Stretcher	Speech stretcher for slowing speech to ½ of normal tempo	100 - 5,000 cps		950

KAY ELECTRIC COMPANY

14 MAPLE AVENUE PINE BROOK, NEW JERSEY

Naresco Equipment Corporation

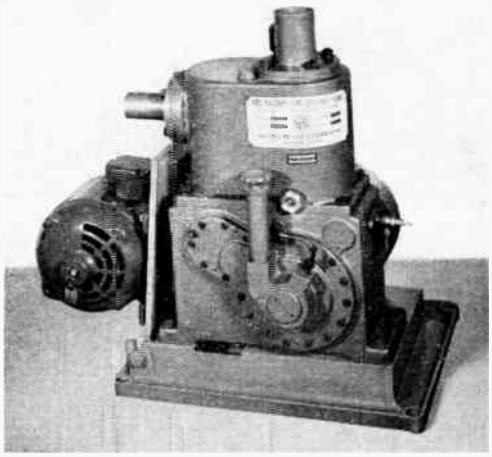
Subsidiary of National Research Corporation

Dept. 75, Charlemont St., Newton Highlands 61, Mass.

CANADIAN REPRESENTATIVE:
Measurement Engineering Limited
Arnprior and Toronto

NRC ROTARY GAS BALLAST PUMPS

— with Unique Capacity to Handle Condensable Vapors



Only NRC Rotary Gas Ballast Pumps have proved, on thousands of installations, that they keep their original high efficiency even when pumping 100% moisture or other troublesome vapors. The reason is that only NRC pumps have been designed around the *gas ballast* principle, which, with other features, keeps vapors from condensing, keeps oil clean, maintains initial fast cycles day after day.

ENGINEERING DATA AND SPECIFICATIONS

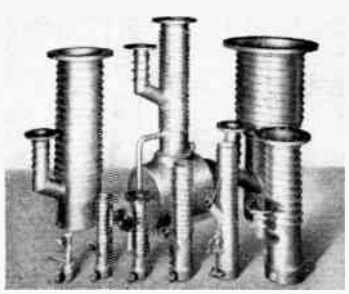
Pump Model	Nominal Rated Capacity (Cubic Feet Per Minute)	Ultimate Vacuum (1) (mm Hg) With Gas Ballast	Ultimate Vacuum (1) (mm Hg) Without Gas Ballast	Rated Pump Shaft Speed (R.P.M.)	Motor (2) Horsepower	Approximate Oil Capacity (Pump)	Connecting Pipe Dimensions: Pump Inlet	Connecting Pipe Dimensions: Pump Exhaust	Overall Dimensions Pump—Motor & Base (Inches): Height	Width	Length	Weight Pump, Motor and Base (Lbs.)
Single Stage												
NRC 2-S	1.25		3×10^{-3}	525	⅓	3½ Fl. Oz.	T19/38(3)	¾(5)	15⅛	11	15¾	68
NRC 4-S	3.3	Less	3×10^{-3}	450	¼	3½ Fl. Oz.	T29/42(3)	¾(5)	18	10¾	18¼	89
NRC 6-S	6.75	Than	3×10^{-2}	400	¾	7 Fl. Oz.	1½ O.D.	1½ O.D.	20¾	12½	23¼	150
NRC 15-S	11.6	One		305	1	2½ Qts.	1½ O.D.	1½ O.D.	21¼	17¾	25	270
NRC 30-S	29.5	Half	3×10^{-3}	400	1½	2 Qts.	2(4)	3 O.D.	28½	18¾	31	441
NRC 100-S	100		3×10^{-3}	335	5	5 Qts.	3(4)	4⅛ O.D.	43	33	49	1430
NRC 200-S	202		1×10^{-2}	340	15	3 Gal.	4(4)	4⅛ O.D.	58	44	54	2750
NRC 400-S	403		5×10^{-3}	340	25	6 Gal.	4(4)	4⅛ O.D.(6)	59	62	65	5775
Compound												
NRC 2-D	1.25	Less	5×10^{-5}	525	¼	3½ Fl. Oz.	T19/38(3)	¾(5)	15⅛	10¾	15¼	84
NRC 4-D	3.3	Than	5×10^{-5}	450	½	24 Fl. Oz.	½ IPS	¾(5)	16¾	14	19½	155
NRC 6-D	6.75		5×10^{-3}	400	¾	14 Fl. Oz.	¾ IPS	1⅛ O.D.	20¼	17⅛	25	265
NRC 15-D	14.75	2.5×10^{-2}		400	1	4¼ Qts.	1½ O.D.	1½ O.D.	21	20	25	290
Combination												
NRC 30-M	29.5		—	400	1½	2 Qts.	2(4)	3(4)	40	21	31	550
NRC 100-M	100	3×10^{-3}	—	335	5	5 Qts.	3(4)	3(4)	56	34	49	1600
NRC 200-M	202		—	340	15	3 Gal.	4(4)	6(4)	78	46	54	3000
NRC 400-M	403		—	340	25	6 Gal.	4(4)	—(6)	79	64	90	6400

(1) McLeod gauge, standard test procedure.
(2) Requirements for average installation.
(3) T indicates a standard taper joint, taper 1:10. First figure is the dia. (mm) of large end, second figure is the length (mm) of the ground zone
(4) Standard 150 pound flange.
(5) Male pipe thread.
(6) NRC 400-S has two exhaust connections NRC 400-M has two 6" and one 3" 150# flanged exhaust connections.

Water Cooling — NRC 100-S, 200-S, 400-S, 100 M, 200-M, and 400-M have water jackets with ½ pipe tap connections

One Source for All Your High Vacuum Equipment Needs

MODEL	TYPE	RANGE MM. HG.	PRICE (Incl. Heads)
701	Thermocouple	10^{-3}–1.0	$120.00
516	Pirani	10^{-3}–1.0	$160.00
515	Logarithmic Alphatron® Ionization	10^{-3}–10.	$225.00
510	Alphatron® Ionization	10^{-3}–10.	$520.00
517	Alphatron® Ionization	10^{-4}–10^{3}	$425.00
710	Thermocouple Ionization	10^{-3}–1.0	$395.50



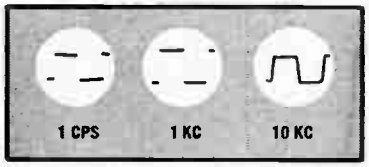
BOOSTER AND DIFFUSION PUMPS — NRC High Vacuum booster and diffusion pumps are noted for high through-put, high fore-pressure tolerance, and low blank-off. They offer exceptionally long, trouble-free life and are easy to maintain.

MODEL	B-1	B-2	B-4	B-6	H-2-P	H-4-P	H-4-SP	H-10-P	H-16-P
Max. Thru-Put (CFM)	18	153	563	1100	147	637	637	3600	8480
Blank-Off MM HG	4×10^{-4}	1.5×10^{-4}	1.5×10^{-4}	2.5×10^{-4}	1.5×10^{-6}	1.0×10^{-6}	1.5×10^{-6}	1×10^{-6}	4×10^{-6}
Max Fore-Pres. MMHG	.20	1.0	1.0	.90	.18	.25	.25	.20	.23
Price	$57	$165	$325	$960	$115	$235	$200	$675	$1200

ALSO . . . Vacuum furnaces . . . vacuum coaters . . . freeze drying, impregnation, vacuum drying, and vacuum analytical equipment; plus specially engineered vacuum systems.

krohn-hite

INTRODUCES 5 NEW INSTRUMENTS



SQUARE WAVE RESPONSE

1 ULTRA-LOW DISTORTION power amplifier

DELIVERING **99.9999999%*** DISTORTION-FREE POWER

MODEL UF-101 SPECIFICATIONS

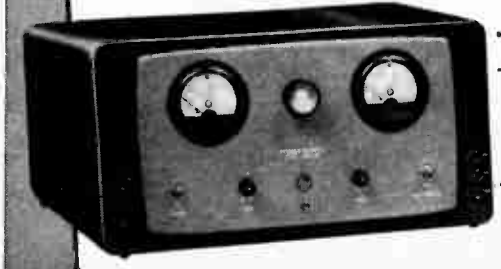
POWER OUTPUT . . 50 watts from 15 cps to 20 kc
FEEDBACK . . . . . 80 db
FREQUENCY RESPONSE
±0.5 db from 0.5 cps to 30 kc
±3 db from 0.03 cps to 70 kc
DYNAMIC RANGE . . . . . 110 db
OUTPUT IMPEDANCE . 2, 4, 8, 16, 225 and 450 ohms
VOLTAGE GAIN . . 14 db or 30 db to 16 ohm output
PRICE $350.00

*Typical harmonic distortion at 1,000 cps is 0.003% in voltage or 0.00000009% in power at 50 watts.

	Model	Voltage	Current	Impedance		Other Outputs		Price
				D.C.	A.C.	Bias	Two Heaters	
2	UHR-220	0-500v	0-200ma	0.01	0.1	0-150v, 0-5ma	6.3v ac, 5a 6.3v ac, 5a	$350.00
3	UHR-225	150-500v	0-200ma	0.02	0.1	—	6.3v ac, 5a 6.3v ac, 5a	$250.00

NEW UHR SERIES power supplies FEATURING ultra-high regulation OVER THE entire OPERATING RANGE

- **Regulation 0.001%**
- **Extremely low dc and ac impedance**
- **Ripple less than 100 microvolts**
- **Transient response 0.001 milliseconds**



	Model	Voltage	Current	Impedance		Other Outputs		Price
				D.C.	A.C.	Bias	Heaters	
4	UHR-240	0-500v	0-500ma	0.005	0.05	0-150v, 0-5ma	6.3v ac, 10a 5-13v dc, 2.5a 6.3v ac, 10a	$550.00
5	UHR-245	150-500v	0-500ma	0.01	0.05	—	6.3v ac, 10a 6.3v ac, 10a	$375.00

For further data on advertised products use page 207.

PRESENTS THIS PROVEN GROUP OF electronic instruments

8 WIDE-RANGE AUDIO oscillators
0.001 cps to 520 kc

MODEL 440-A

Features

- Frequency range, continuous from 0.001 cps. to 100 kc
- Distortion less than 0.1% at any output level
- Excellent frequency stability and resetability
- Amplitude variation less than ±0.25 db
- Frequency calibration ±1%
- Both Sine and Square Waves simultaneously
- Hum less than 0.1% at any output level

Model	Frequency Range	Frequency Accuracy	Output	Distortion	Power Consumption	Price
400-A	.009 cps to 1.1 kc	2%	25 mw/10v	1%	45 watts	$350.00
410-A***	.02 cps to 20 kc	2%	10 mw/5v	1/10%	150 watts	$950.00
420-A	.35 cps to 52 kc	2%	25 mw/10v	1%	45 watts	$290.00
430-AB**	4.5 cps to 520 kc	2%	50 mw/10v	1%	45 watts	$120.00
400-C***	.009 cps to 1.1 kc	2%	100 mw/10v	1%	65 watts	$375.00
420-C***	.35 cps to 52 kc	2%	100 mw/10v	1%	65 watts	$325.00
440-A**	.001 cps to 100 kc	1% *	100 mw/10v	1/10%*	120 watts	$495.00
440-B**	1 cps to 1 kc	1/20%*	100 mw/10v	1/10%	110 watts	$950.00

All oscillators except 430-AB and 440-B have both sine wave and square wave. ***Rack panel construction.

*Higher at end of range **Available for rack mounting at $5.00 additional.

6 VARIABLE ELECTRONIC filters
0.01 cps to 200 kc

MODEL 330

Features

- Unity Pass band gain with 24 db/octave attenuation rates and reduced corner frequency attenuation
- Ultra-low frequency coverage with adjustable center frequency and band width
- Low internally generated noise
- Input and output buffer stages
- Electronic regulated supplies
- Five decade bands

Model	Type	Frequency Range	Frequency Accuracy	Noise & Hum	Power Consumption	Price
310-AB**	Band Pass	20 cps to 200 kc	10%	1 mv	40 watts	$275.00
330-A**	Band Pass	.02 cps to 2 kc	5%	0.1 mv	50 watts	$450.00
330-M**	Band Pass	0.2 cps to 20 kc	5%	0.1 mv	50 watts	$450.00
340-A	Servo	0.1 cps to 100 cps	5%	10 mv	40 watts	$350.00
350-A**	Rejection	.02 cps to 2 kc	5%	0.1 mv	50 watts	$450.00
360-A**	Rejection	20 cps to 200 kc	10%	5 mv	40 watts	$275.00

**Available for rack mounting at $5.00 additional.

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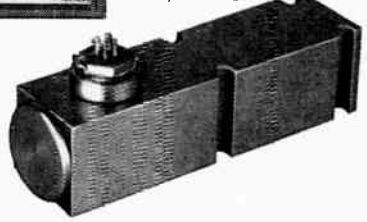
A compact, rugged, high-velocity blower and motor in a 1" cube. Designed for use in guided missiles, aircraft, etc. Rugged construction keeps it spinning at 22,000 RPM through vibration, acceleration and temperature extremes. Wt.: 1oz.; Input: 400 cps, 4 watts; Output: 3 C.F.M.

PHASE COMPARATOR

A versatile, full wave bridge comparator for use as a modulator, demodulator, or switch. Frequency Response: 0-5000 cps; Max. Reference Voltage: 120 V. rms; Max. Output Voltages: ±50 V. DC; Dynamic Range: 46 db. Hermetically sealed.

TRI-PLATE VARIABLE ATTENUATOR

Frequency Range: 1,000 mc to 6,000 mc; Max. Attenuation: linear function of frequency (20 db at 4,000 mc); Insertion Loss: less than 1.5 db over entire frequency range; Max. VSWR: less than 1.25 at 4,000 mc.



HYDRAULIC SERVO-VALVE

Model SA-14 is an advanced design of a 2-stage hydraulic amplifier utilizing the "Bootstrap" principle to develop larger forces with low input power requirements. Flow capabilities up to 200 GPM at 1,000 PSI across the valve, and system pressures up to 3,000 PSI can be provided with this type valve. Model SA-14 has wide frequency response and a flow of 4 GPM. The Sanders self-clearing feature which eliminates jamming is also included.

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SANDERS ASSOCIATES INCORPORATED
NASHUA, NEW HAMPSHIRE

Sanders Associates, Inc.

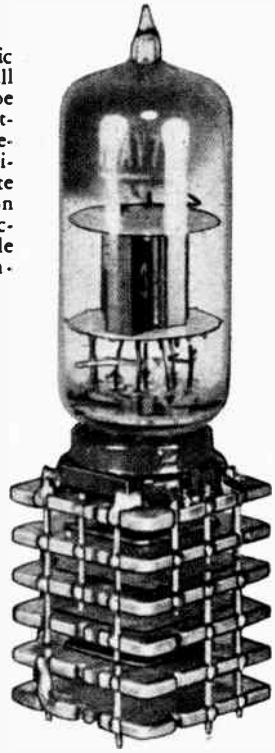
offers a complete engineering service — including departments for systems engineering, research aerodynamics, modular electronics, microwave engineering, electro-mechanics and hydraulics, commercial development, special purpose tubes, and complete type test facilities. Extensive manufacturing facilities available.

AUTOMATION TECHNIQUES

Establishing new automation techniques? Rely on Sanders' design and development experience in miniaturization and mechanized production. Our special work in modular electronics — especially with Reliacubes and printed circuits — is extremely helpful in providing rugged, dependable components that withstand a wide range of extreme environmental conditions.

"RELIACUBE"

This compact electronic module element contains all the components in a tube circuit. It features repeatability, reliability and reduced cost. Sanders Associates, Inc. offers you complete engineering and production experience in modular electronics, and has available module tools and components for lab use.



PRINTED CIRCUITS

Complete design and fabrication facilities enable Sanders to make superior printed circuit baseplates. They're unique — made with new, KEL-F laminates, high insulation characteristics; — multi-layer construction is also available — ideal for military applications! Flexible KEL-F printed wire cables are also available. Sanders also makes the Reliaplate, providing a third dimension for printed circuit miniaturization.

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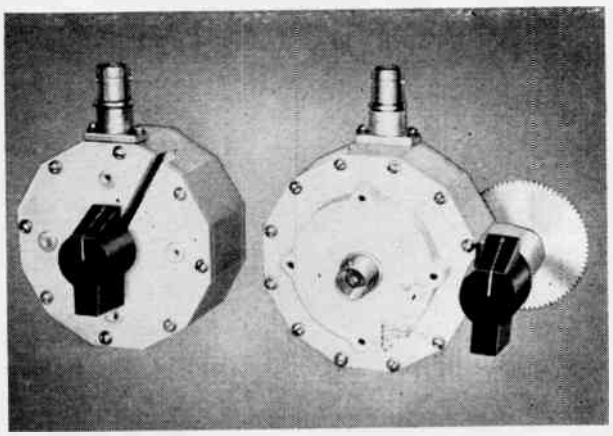
TRAD INSTRUMENTS

STANDARD SIGNAL GENERATOR

Model SG-25

A small, light, rugged signal generator, ideal for field use, preserving all the standards of accuracy and stability of much bulkier laboratory instruments.

Frequency range: 10 kc-50 mc in 8 bands.
Commercial equivalent of AN/URM-25D.

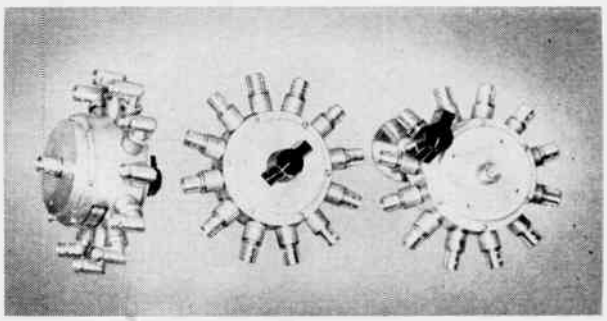


PRECISION R.F. Step Attenuator

The Model AT-120 — is a small ladder attenuator which achieves attenuation accuracy and low VSWR from ac to uhf and is suitable for all signal and sweep generators in this frequency range — adaptable for inclusion in different types of test equipment — as well as in laboratory and production test applications.

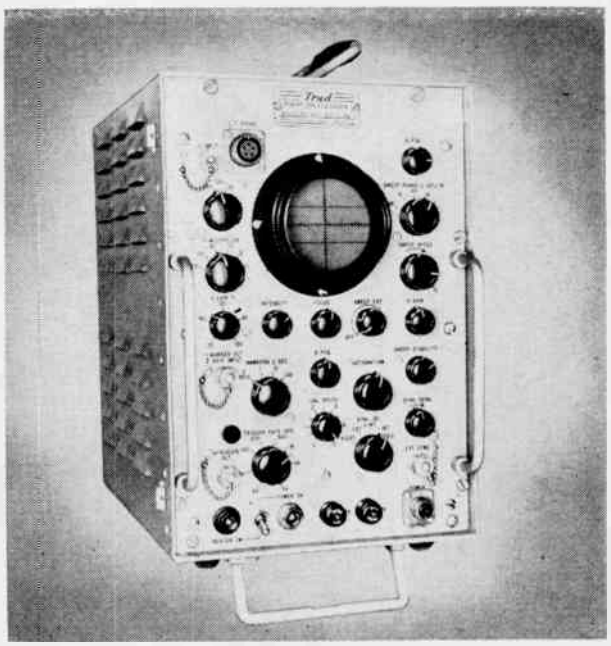
COAXIAL SWITCH CS-200

Series of 12 position coaxial switches meet all requirements of coaxial switching from video frequencies up to 1000 MC for use in centralized signal distribution systems, antenna distribution systems and numerous laboratory and production coaxial switching applications. Small and of rugged construction, they permit flexibility in mounting and drives — available with either direct or geared drive — remote controlled operation possible due to its simple detent drive.



PULSE OSCILLOSCOPE The Trad PO-400

Oscilloscope is a miniature portable precision instrument for analyzing amplitudes and time characteristics of complex electrical wave forms. Transient response, rise time and deflection sensitivity compare with instruments many times its size — $9\frac{3}{16}$" wide by $14\frac{11}{32}$" high and $17\frac{1}{2}$" deep — weight only 41 lbs.
Commercial equivalent of AN/USM-38.



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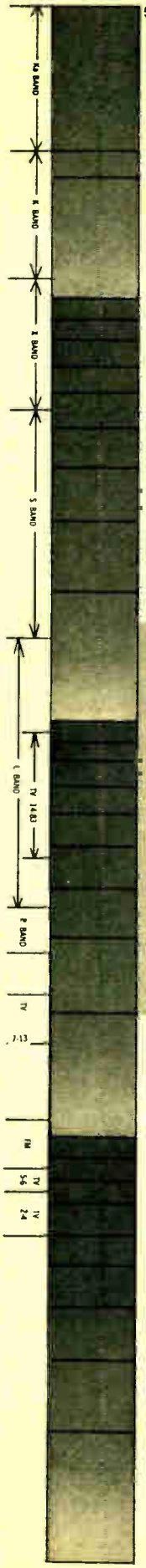
Represented In Canada By: — MEASUREMENT ENGINEERING LTD.



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SPECTRUM ANALYZER, Model TSA, 10 to 44,000 mc

FIELD INTENSITY RECEIVER, Model R, 850 to 11,250 mc

SIGNAL GENERATORS, Models MSG, 890 to 11,500 mc

MULTIPLE PULSE CODE MODULATED SIGNAL GENERATOR, Model B, 950 to 12,750 mc

S-BAND SWEEPER, Model CSL, 2000 to 4000 mc

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GENERAL

POWER METER, Model P-2, DC to 11,000 mc

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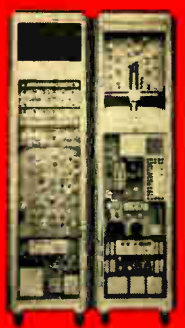
COLOR & B/W TV

COLOR VIDEO MONITOR, Model W-200

STUDIO MONITOR, Model M-120

COLOR BAR GENERATOR, Model PT-202

SYNCHRONIZING GENERATOR, Model PT-201



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Baird Associates
TRANSISTOR TEST SET

The Baird Associates Transistor Test Set is a versatile precision instrument designed to analyze transistors at any frequency from 100 cps to 1 mc in terms of well-known standard parameters. The transistor coefficients thus obtained enable the circuit designer to predict the performance of amplifiers in the AUDIO, INTERMEDIATE and LOW RADIO FREQUENCY ranges. Technical Circular #RD 511-A.

Resistivity Test Set Model JN1

BA-SEMICONDUCTOR RESISTIVITY TEST SET
Simple, direct measurements of germanium in the range of 0.1 — 100 ohm-cm. Adaptable to silicon measurements.
Technical Circular #RD 517.

N.P. Tester Model JR1

BA-SEMICONDUCTOR N-P TESTER
Thermo-electric probe determines N or P type conductivity.
Technical Circular #RD 516.

Minority Carrier Lifetime Test Set Model JJ1

BA-SEMICONDUCTOR MINORITY CARRIER LIFETIME TEST SET
Principle of conductivity modulation stimulated by pulsed light source with decay time of average life of excess carriers on cathode-ray display.
Technical Circular #RD 515.

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Research and Development Facilities available for Consultation, Design and Production of Transistor Test Instrumentation, Transistorized circuitry, Equipment and Devices. Our experience will warrant consideration for your miniaturization and transistorized electronic conversion problems. Similar facilities available to deal with semiconductor materials problems.

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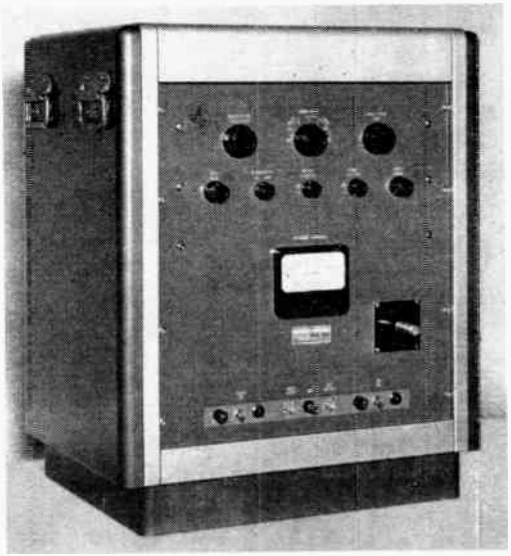
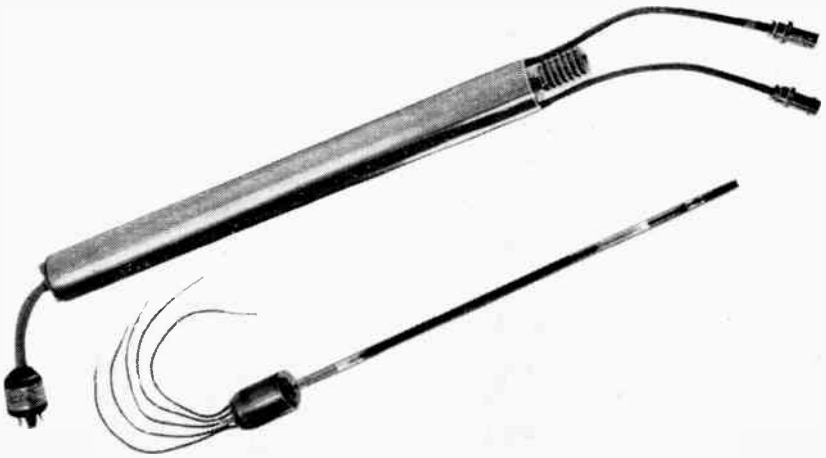
MICROWAVE

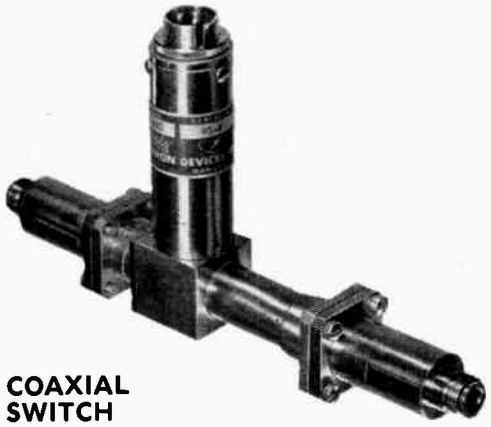


MICROWAVE SWEEP GENERATOR

The versatility and flexibility of this instrument means efficiency and simplicity never before possible in testing the operating characteristics of radar and microwave components.

Complete and continuous information over any desired portion of several waveguide ranges can be obtained in a fraction of a second. The Roger White sweep signal source allows unskilled personnel to adjust, align, and record the performance of waveguide components, microwave tubes and entire microwave systems. The speed and versatility of these devices make them invaluable in laboratory design and development.





COAXIAL SWITCH

When extremely high isolation is required between a transmitter and receiver, or when fast switching rates or times are required at low microwave frequencies, the Roger White coaxial switch is indicated. Switching rates as high as 1000 cps and isolations from 10 to 200 db are available.

TRAVELING WAVE TUBES

These tubes are inherently exceedingly broadband devices and require no tuning adjustments to amplify any signal within their operating bandwidths. These characteristics lead to their use in radars, countermeasure systems, test equipment, communication systems, and a host of other applications.

In addition to the wide selection of microwave tubes, related equipment — including power supplies, magnetic structures and an advanced design ion gauge control unit — is available from Roger White. For an engineering appraisal, contact the Development Section with a brief outline of your requirements.

PRODUCTS OF ROGER WHITE

Microwave Noise Sources
Gas Switching Devices
Gas Attenuators
Traveling Wave Tubes
Traveling Wave Amplifiers
Backward Wave Oscillators
Backward Wave Sweep Generators

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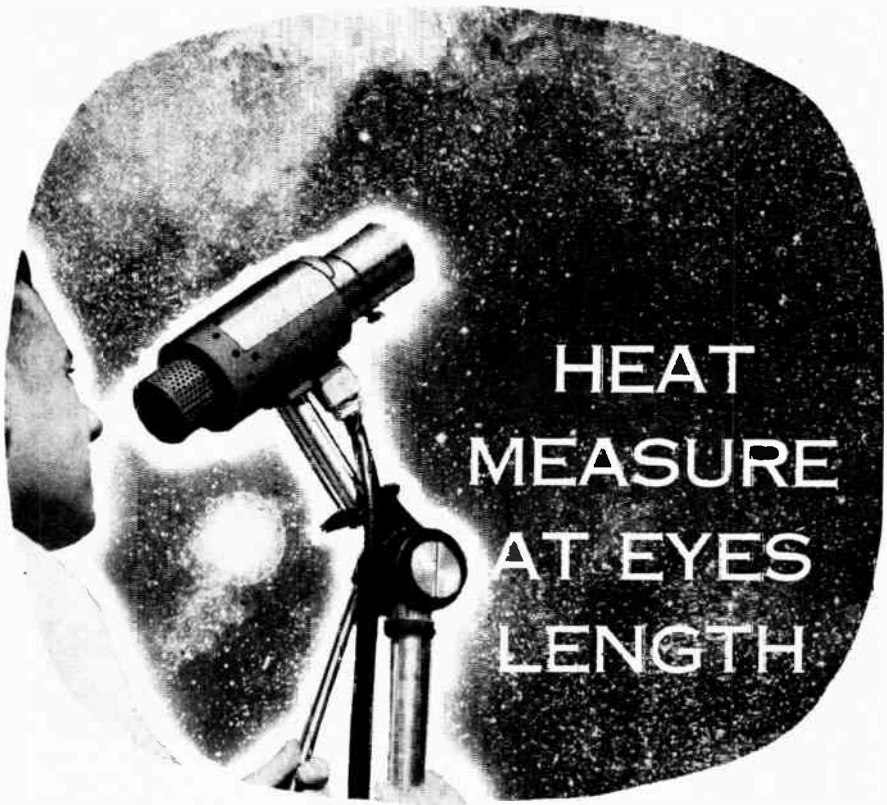

This man is measuring the temperature of the sky with a Servotherm® Radiation Pyrometer System — the same instrument that industry is using for measuring and controlling the temperature of moving objects in process!

Now, for the first time, industry has a low-cost, precision heat-control system for production processes WHERE DIRECT-CONTACT MEASUREMENTS CANNOT BE MADE. Consider the cost-saving advantages of a single remote heat-control system that can measure and control heat emission ranging from near-ambient temperatures to 1000°C.

In addition, Servotherm® Pyrometer Systems provide a fully reliable method for instantly pinpointing critical hot spots in inaccessible equipment. Complete flexibility of installation permits close temperature control at *any* point in your production line.

Here are a few of the many industrial applications of Servotherm® Systems and Components:

Chemical and Process Industries — for quality and production control . . . for measuring emissivity, mixture composition, density and thickness of rolling sheets of films, plastics and textiles.

Petroleum Industry — for measuring the burning *rates* of different fuels.

Engine Design — for measuring fatigue characteristics of cylinder heads.

Railroads—as "Hot Box Detectives" for detecting overheated journal boxes on moving trains.

If you have a heat-control problem, why not write us? We will be glad to advise you on how a standard Servotherm® System can be set up to meet your needs.

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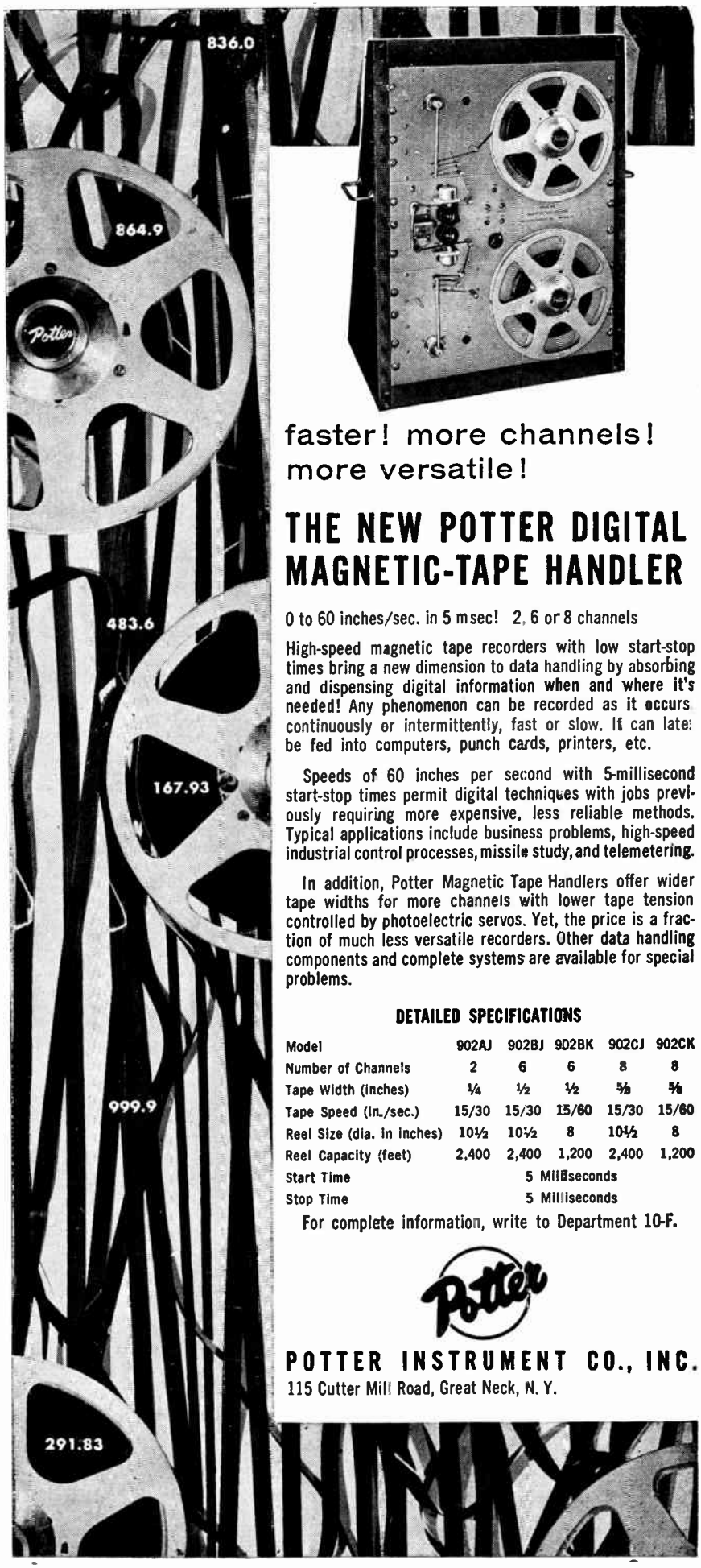
☐ Please send me literature on your Radiation Pyrometer Systems.

☐ I would like further information on the application of your Radiation Pyrometer Systems to a temperature measurement and control problem we have in our manufacturing process. The problem is described on the attached letterhead. E & C - 10

Name _____

Title _____



faster! more channels!
more versatile!

THE NEW POTTER DIGITAL MAGNETIC-TAPE HANDLER

0 to 60 inches/sec. in 5 msec! 2, 6 or 8 channels

High-speed magnetic tape recorders with low start-stop times bring a new dimension to data handling by absorbing and dispensing digital information when and where it's needed! Any phenomenon can be recorded as it occurs continuously or intermittently, fast or slow. It can later be fed into computers, punch cards, printers, etc.

Speeds of 60 inches per second with 5-millisecond start-stop times permit digital techniques with jobs previously requiring more expensive, less reliable methods. Typical applications include business problems, high-speed industrial control processes, missile study, and telemetering.

In addition, Potter Magnetic Tape Handlers offer wider tape widths for more channels with lower tape tension controlled by photoelectric servos. Yet, the price is a fraction of much less versatile recorders. Other data handling components and complete systems are available for special problems.

DETAILED SPECIFICATIONS

Model	902AJ	902BJ	902BK	902CJ	902CK
Number of Channels	2	6	6	8	8
Tape Width (inches)	¼	½	½	⅝	⅝
Tape Speed (in./sec.)	15/30	15/30	15/60	15/30	15/60
Reel Size (dia. in inches)	10½	10½	8	10½	8
Reel Capacity (feet)	2,400	2,400	1,200	2,400	1,200
Start Time	5 Milliseconds				
Stop Time	5 Milliseconds				

For complete information, write to Department 10-F.

Potter

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115 Cutter Mill Road, Great Neck, N. Y.

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THE ONLY CANADIAN JOURNAL DEVOTED SPECIFICALLY TO THE APPLICATIONS OF COMMUNICATIONS AND ELECTRONICS

SEPT. - OCT. - 1955
VOL. 3 No. 5

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Bomac

125 MW REFLEX KLYSTRON

BL-800/6780 FOR X-BAND APPLICATIONS

A new and important addition to Bomac's line of microwave products is the BL-800 6780 Reflex Klystron.

Rugged and reliable the BL-800 6780 klystron offers improved local oscillator performance and dependability for X-band radar systems.

Unexcelled high altitude operation, without pressurization and ease of installation without disrupting associated components or plumbing is now possible.

Controlled manufacturing procedures and rigid testing standards assure the user electrical uniformity and mechanical stability.

FEATURES

1. Light-weight, rugged construction
2. Low microphonics
3. Rapid warm up
4. Lock-nut tuning
5. Viking connector for convenient installation

GENERAL CHARACTERISTICS

Frequency Range	8.5 to 10.0 kmc
Heater Voltage	6.3 v
Heater Current	1.2 amps

MAXIMUM RATINGS

Resonator Voltage	350 v
Resonator Current	42 ma
Reflector Voltage	0 to −1000 v

MECHANICAL CHARACTERISTICS

Output Connection	Bolts to UG-39/U flange or UG-40A/U choke for 1 x ½ x 0.050 inch waveguide
Base	Molded flexible leads. 7 inch leads terminated in Viking Connector (VP5/2AA1 plug — VS7/23C1 hood)
Cooling	Convection
Tuner	Lock-nut

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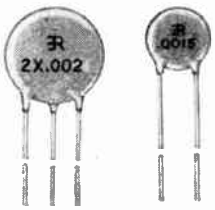

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Single, Dual or Triple Capacity Units.

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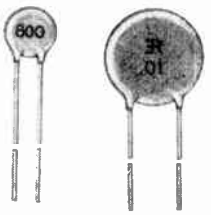
Temperature Compensating, By-Passing, and High Voltage

Are available in the three types, General Purpose, High Voltage, Temperature Compensating, each having a wide range of values. These capacitors consist of flat ceramic dielectrics with fired silver electrodes to which lead wires are firmly soldered. Completed units are given a protective coating of phenolic which is then wax impregnated for moisture protection. Disc Ceramicon sizes from 5/16" max. to 3/4" max. diameter.



Style 831 — Style 811

Up to .04 MFD H.V. Discs, 1000 V to 8000 Volts.

ERIE TUBULAR CERAMICONS

Erie "GP" Dipped Insulated Ceramicons
5 MMF — 5,000 MMF

Temperature Compensating Dipped Insulated Ceramicons.
0.5 MMF — 1,800 MMF

Erie "GP" Non-Insulated Ceramicons
5 MMF — 5,000 MMF

Temperature Compensating Non-Insulated Ceramicons.
0.5 MMF — 1,800 MMF

Erie "GP" Molded Insulated Ceramicons
5MMF — 5,000 MMF

Temperature Compensating Molded Insulated Ceramicons.
0.5 MMF — 550 MMF

ERIE CERAMICON TRIMMERS

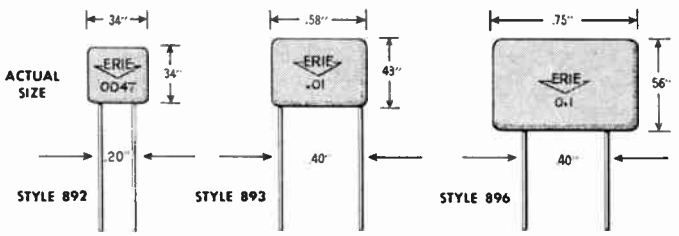
1.5-7	MMF	5-20	MMF
3-12	MMF	4-30	MMF
3-13	MMF	7-45	MMF

Style TS2A - CVII
JAN C81 APPROVED.

Style 535
0.7-3.0 MMF

By employing basically new methods of construction, ERIE is able to offer high capacitance Ceramicons in small size for transistor and other miniaturized circuitry.

Rectangular in shape — for the most capacity in the smallest space — these new ERIE Plate Ceramicons are made in sizes and capacitance ranges through 0.1 mfd as listed below. They have a generous 250 volt rating.



Detailed specifications for the above products are available on request.

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JENNINGS VACUUM TRANSFER RELAYS

with self contained DC coil easily mounted by Aircraft Marine Products in their pulse forming networks

THREE Type RD1 Normally Open Vacuum Relays are soldered to the side of the pulse forming network so that each evacuated contact enclosure is immersed in silicone oil with the rest of the network. The use of these relays therefore results in fewer high voltage bushings, contacts that will not contaminate, and short lead lengths that minimize inductance and stray capacitance. This construction also permits the built-in DC actuating coils to be removed without disturbing the sealed network.

These relays easily meet standard vibration tests of 10 to 55 cps and shock tests of 15 G. Temperature requirements are −55° C. to +85° C. with 30 minute operation at 105° C.

The RD1 is a SPST relay, available with either normally open or normally closed contacts. A similar relay (Type RE2) has SPDT contacts and slightly larger models (Type RM2 and RM4) are made with 2PDT and 4PDT contact arrangements. These units have peak working voltage ratings up to 12,000 volts and continuous RF current ratings of 10 amperes rms at frequencies up to 30 mc. It is also possible to make and break under load with fast break times of less than 10 milliseconds. Switch capacitances are as low as 0.1 mmfd and contact resistances are as low as .005 ohms. As their contacts are sealed in a vacuum, contact resistance does not increase with usage. This factor makes them excellent general purpose relays for DC switching.

Write us regarding your own relay problems.
Literature mailed on request.

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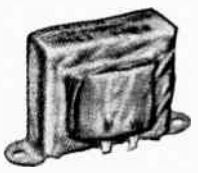
MIL-T-27 GRD-1 CL-C



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MIL-T-27 GRD-1 CL-B

High Fidelity Output Transformer
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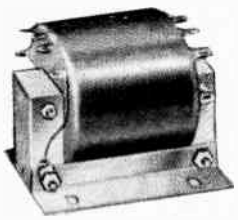
Power Transformer
Fully Enclosed

Power Transformer
400 Cycle
MIL-T-27 GRD-1 CL-A



H.D. Laminated Power Transformer

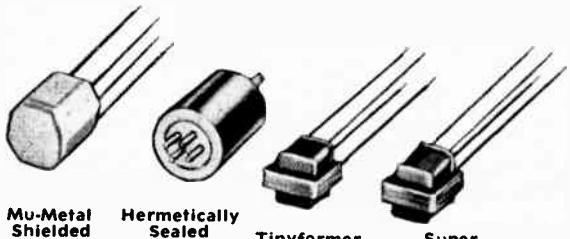
Audio Transformer
MIL-T-27 GRD-1 CL-A

Hypersil Core Transformer

Input Transformer
Mu Metal Shielded

EXACT ELECTRICAL MEASUREMENTS	INSULATION RESISTANCE measured accurately to 2,000,000 Megohms	TEMPERATURE RISE TESTS

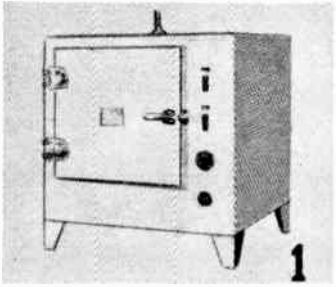
TINYFORMERS *plus*

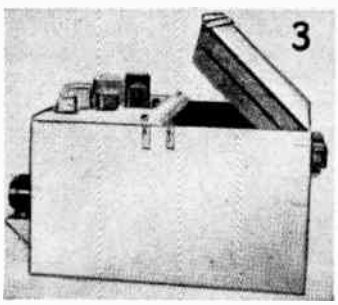


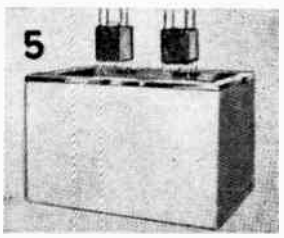
Mu-Metal Shielded Tinyformer
Hermetically Sealed Tinyformer
Tinyformer Open Type
Super Tinyformer

SUB-MINIATURE • MINIATURE • MIDGET • SMALL TRANSFORMERS

TEMPERATURE and IMMERSION CYCLING







FIVE (5) CONTROLLED CYCLES OF 15 MINUTES EACH STEP

Step 1. Oven 185° F.
Step 2. Room Temperature
Step 3. Cold Chamber —67° F.
Step 4. Room Temperature
Step 5. Saturated Salt Bath Total Immersion

WIRE OR PHONE TENATRONICS LIMITED, NEWMARKET, ONTARIO, FOR QUOTATIONS.

GRAMER TRANSFORMER CORPORATION
2734 NORTH PULASKI ROAD · CHICAGO 39, ILLINOIS

Sales and Manufacturing Representatives and Distributors in Canada

TENATRONICS LIMITED
NEWMARKET, ONTARIO

For further data on advertised products use page 207.

business briefs & trends

★ It is reported that the United States House Ways and Means Committee have reached a decision which may lead to the removal of taxes on radio and television equipment which is used for business purposes. The ten per cent federal excise tax on consumer type television sets, however, will remain.

* * *

★ Some idea of the quantity of electronic equipment required for use in guided missiles may be had from the value of a recent contract awarded to Melpar, Inc., for apparatus for the guided missile and drone aircraft program of the United States government. Value of the contract amounted to 27 million dollars.

* * *

★ Fighter aircraft of ten years ago were equipped with about 1,500 pounds of electronic equipment. The latest interceptor aircraft carry 2,400 pounds.

* * *

★ The American electronic industry may now be termed the United States industrial bandwagon. From among five hundred of the largest industrial concerns in the United States no less than 101 of them have taken an active interest in electronics and have jumped on the electronic bandwagon.

* * *

★ What is reported to be the first microwave communications permit in the field of marine radio has been granted to Tug Communications Inc., of San Francisco. The permit authorizes the company to set up a two-hop 960 megacycle system for the remote control of the company's Pacific seaboard stations which provide ship-to-shore 35 mc. communications. Motorola equipment is being used for the microwave link which will include three transmitters.

* * *

★ The production of color tubes for television sets is said to be governed by the production rate of shadow masks which are used in virtually all color tubes. According to figures recently released on the production of these color masks about 80,000 have been turned out. Roughly 50,000 of them have been manufactured for 19 and 21-inch color tubes with the greater portion of the remaining 30,000 being used for the 15-inch tube. So far about 2,000 of the masks have been produced for use in the 22-inch rectangular color tube.

* * *

★ The Provincial Department of Education in Alberta is now using electronic equipment for the marking of school examinations and the printing of results. The two computers used are capable of marking the examinations of 18,000 grade 10 and 11 students' papers and 14,000 grade nine papers in two to four weeks' less time than previously. The machines are also capable of marking certain sections of grade 12 papers, which will speed the issuing of results for this group as well.

* * *

★ The application of transistors in consumer products is on the increase in the United States. Latest applications of the transistors is in a new pocket radio produced by the Mitchell Manufacturing Company of Chicago; a new portable phonograph recently put out by Philco and, perhaps the most novel of all applications, is that of Motorola, who have produced an experimental transistor golf ball to show the possibility of making an unlosable golf ball. A one-transistor transmitter is fitted inside the golf ball and emits a sufficiently strong signal to be picked up by a pocket-sized receiver which is rotated in the manner of a direction-finder and permits the golfer to locate the position of the lost ball.

* * *

★ The American automobile industry is casting an interested eye towards the growing electronics industry in the United States. A recent survey indicates that about ten manufacturers of automobiles and automobile parts have either established their own electronic manufacturing plants or have merged with, or bought out, established electronic manufacturing businesses.

* * *

★ Plans for the enlargement of manufacturing facilities in the United States electrical industry, which embraces the manufacture of electronic equipment, have been estimated in value at 10 per cent higher this year than for 1954. A reported 483 million dollars is to be spent this year compared to an expenditure of 439 million dollars in 1954. About 40 per cent, or roughly 193 million dollars of the total outlay of 483 million to be used in plant expansions in 1955, will be used for the enlargement of electronic manufacturing facilities and plant.

* * *

★ A remote writing device which can produce carbon copies is reported to be the development of a Los Angeles firm, Autron Engineering Inc. The instrument uses two ball point pens, one for the operator to write a message at the transmitting end and the second which transcribes the message at the receiving end. Three models of the unit are reported to have been built by the firm. One for short-range remote use, the second for use with long-distance telephone networks, and the third for application in mobile radio operations.

* * *

★ A complete power line carrier communication system superimposed on a power line carrying as much as 300,000 volts has been supplied and installed for the Kitimat-Kemano Aluminum Co. of Canada development in British Columbia by the General Electric Company of England. It is believed to be the first power line carrier communication system in North America to be superimposed on a power line carrying such a high voltage.

* * *

★ Defense authorities have recently disclosed that the (DEW) Distant Early Warning line being constructed in northern Canada to protect the continent against aerial attack is comprised of 50 radar installations stretching across a 3,000-mile front.

* * *

★ A film depicting the growth and significance of the Canadian electronics industry is expected to be completed this October and shown to the general public. The film is being produced for the Radio Electronics Television Manufacturers' Association.

* * *

★ The British Radio Show held at Earls Court, London, England, from August 24 to September 3rd, opened on the eve of the commencement of commercial television in England. The B.B.C., anxious to keep its audience in the face of this new competition, occupied nearly twice the space previously reserved at the show for B.B.C. exhibits.

The Editor's Space...

Industrial Communications reports that charges of violating the American Communications Act by intercepting police mobile radio calls and dispatching tow trucks to the scene of accidents and thereby realizing personal gain from the interception of the communications were recently lodged against the operators of a Baltimore garage following the arrest of the garage owners by FBI agents.

The investigation which covered a period of several months was touched off by the Baltimore Police who noticed tow trucks operated by the garage consistently turning up at the scene of accidents shortly after police cars had been radio despatched to the scene of the accidents.

So what, may one ask, and when has it become a crime to be enterprising in business? We could be wrong, but it has always been our impression that it definitely is a crime to intercept police radio calls and to use the information gathered therefrom for any unlawful purpose. To use it however, in the manner of the Baltimore garage operators can hardly be regarded as unlawful. It may be assumed that a tow truck would have to be summoned sooner or later and to regard the interception of police messages by a garage operator for the purely business reason of "being the fastest with the mostest" can hardly be considered a crime. In our opinion it's an act of enterprising business management.

* * *

The word automation which has recently been included in the lexicon of the American language, would seem to bear implications destined to instill the fear of Hades into certain sections of society. As most people now know, automation is that form of applied science which makes possible the production of goods by automatic techniques.

By virtue of the fact that automation reduces the necessity of manual assistance in manufacturing processes it has been regarded as a possible scourge that will eventually create a tide of unemployed persons and lead us into a state of misery and want.

And now comes an attack against this 20th century technological advance from a source which, in our opinion, is as surprising as it is alarming considering the intellectual status of the person who has lately spoken out against it.

In a Labor Day speech before a gathering at St. Joseph's Oratory in Montreal, the Archbishop of Montreal, Paul Emile Cardinal Leger, said that automation — the replacement of men by machines in labor — already has arrived and will probably make new advances.

Cardinal Leger went on record to say that, "This means by 1980, if the social structure is not changed, a few men will possess all the power of production, and humanity altogether will become a herd of consumers.

"And if, on the other hand, this humanity of 1980, has adhered to the ideological program of Marx, the mass of people, cut away from God, will be nothing more than a pile of flesh, debased by pleasure and degraded by surrounding weakness.

"The church has decided not to permit this fatal disintegration.

"Modern working conditions are the result of two events," the Cardinal said, "technological innovations and the diffusion of a belief tending to substitute man for God by exalting his (man's) bounty and glorifying his egotism."

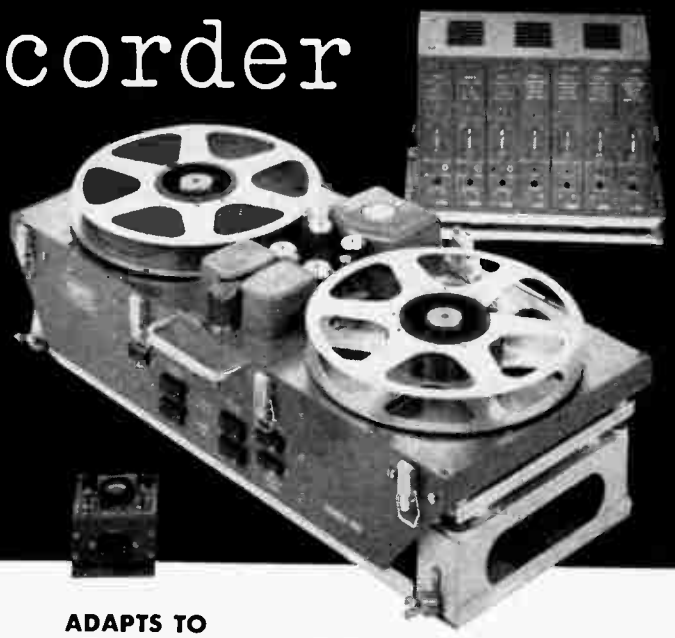
The Cardinal's doleful picture of the results of automation is the first we've read which concerns itself with

(Turn to page 182)

For further data on advertised products use page 207.

For further data on advertised products use page 207.

new versatile data tape recorder



THE MOBILE AMPEX 800

records the broadest combination of data ever obtained concurrently on one magnetic tape—performs with laboratory precision under severe field, airborne, shipboard and vehicular conditions—and furnishes data compatible with the most widely used playback equipment.

The Ampex 800 can provide from 1 to 28 data channels. By interchangeable amplifier units, each one can be adapted to any one of three basic magnetic recording techniques:

Direct recording — 300 to 35,000-cycle response for wide-band data or multiple recording of RDB subcarriers.

FM-carrier type recording — D.C. to 5000 cycles and high instantaneous accuracy suitable for shock and vibration data.

Pulse-width modulation recording — Up to 90 instrument readings commutated on to each tape track with frequency response 0 to 2 cycles/sec. With fewer instrument readings, frequency response is greater.

ADAPTS TO ANY DATA REQUIREMENT The Ampex 800's three available recording techniques can satisfy practically any test requirement by simple insertion of the proper plug-in amplifiers. Separate channels can be assigned to measurements requiring wide-band response or high transient accuracy. And by using pulse-width techniques, many relatively steady instrument readings can be commutated on to a single channel. All will have a common time base.

WITHSTANDS THE RIGORS OF AIRBORNE, SHIPBOARD, VEHICULAR AND GENERAL MOBILE USE The Ampex 800 will perform within specifications under vibrational forces as high as 10G—operates over a temperature range from -65°F. to 130°F.—is unaffected by altitudes to 50,000 feet—and withstands a relative humidity of 100% up to 122°F. The Ampex 800 is light in weight. It operates on 27.5 volts D.C. and 115 volts, 400 cycle, A.C. All operating functions can be remotely controlled.

RETAINS WIDELY ESTABLISHED RECORDER STANDARDS The majority of all magnetic recorders now in instrumentation use are Ampex machines. Their recording characteristics, tape speeds, track widths and other parameters have become standards. The Ampex 800 retains these while greatly extending the environmental and mechanical conditions under which accurate test data can be gathered.

Performance specifications, descriptions and explanations have necessarily been limited by the space on this page. A full description and detailed specifications on the Ampex 800 are available by writing Dept. SS-2328.

AMPEX CORPORATION

FIRST IN MAGNETIC TAPE INSTRUMENTATION

Distributed in Canada by

Electronic Equipment and Tube Department
CANADIAN GENERAL ELECTRIC COMPANY LIMITED
830 Lansdowne Avenue, Toronto 4, Ontario

AUTOMATIC ELECTRIC
NEW TYPE 80 MONOPHONE
NOW IN TWO TONE
COLOURS!

Black Dial Face and Handset Blend With Smartly Coloured Housings To Create Subscriber Enthusiasm and Demand!

Painstaking research shows that these colours are the most popular. They are different, exciting, modern shades that catch the eye and capture the mood of a room . . . to reveal it again in terms of pure colour!

Best of all, when a subscriber asks for a telephone of a different colour, all you do is replace the housing. It's quick and easy! Hand-sets, cords, dial and mounting feet remain in lustrous black . . . presenting a pleasing contrast to the housing.

Type 80 two-tone colours will stay fresh and new for years. They will not chip or fade.

Offer *your* subscribers the luxury, the beauty of two-tone colour. For full details, write to Automatic Electric and ask for Circular 1853.

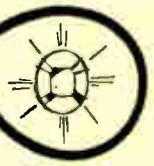
MADE IN CANADA BY

AUTOMATIC ELECTRIC (CANADA) LIMITED

Distributor in Canada

AUTOMATIC ELECTRIC SALES (CANADA) LIMITED
Head Office: 185 Bartley Drive, Toronto 16
MONTREAL • OTTAWA • BROCKVILLE • HAMILTON • WINNIPEG • REGINA • EDMONTON • VANCOUVER

Housings are available in:



TURQUOISE

Harmonizes with drapes, walls, rugs, and furniture in yellow and grey.

GARNET RED

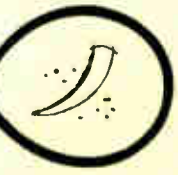
A real sensation for homes, offices, stores! Adds an exciting note to interiors done in dull or somber hues, and in light pastel shades.

SAND BEIGE

Provides a charming complement to decorative schemes featuring modern colours ranging from rose to pink. Beige can accompany either soft or bright colours with equal effectiveness, and is always in exceptionally good taste.

DAWN GREY

Right at home with modern grey metal desks and similarly-finished furniture. Can also be used in the home to set off blonde furniture or to harmonize with dark-coloured walls, drapes and rugs.



CLASSIC IVORY

A "natural" for kitchen or bedroom. Can be used in rooms or offices finished in any colour.

JADE GREEN

A really smart colour that goes well with natural and light-coloured woods, and in rooms done in warm-toned colours or in other shades of green.

5545

For further data on advertised products use page 207.

For further data on advertised products use page 207.

cae* electronics serve

- Agriculture
- Aviation
- Mining
- Manufacturing
- Medicine
- Shipping

Equipment and Systems for:—

Multi-Channel Microwave/Communication Systems

Flight Simulators

Nuclear Instruments

Moisture Meters

Visual Omni-Direction Radio Range

Aviation Communication Systems

Marine Communication Systems

Radar Systems

Search and Rescue and Homing Equipment

Automatic Flight Control Systems

Protection Systems

Hydraulic and Pneumatic Cylinder Systems

Sintered Plate Batteries (Nickel-Cadmium Type)

CAE CONSUMER PRODUCTS

Dumont Television

Sonoramic

Radio-Phono Combinations

with FACILITIES FROM COAST-TO-COAST

The science of electronics is one of the major contributors to Canada's unprecedented economic expansion. Almost daily the electronics industry is discovering and developing more efficient and more economical means of performing many vital functions on land, at sea and in the air. Canadians everywhere are enjoying a higher standard of living and a more secure future through the practical application of electronics to every walk of life.

In skilled personnel, in modern precision equipment and in practical experience, CAE is qualified to undertake a wide variety of assignments in practically every phase of electronics.

cae

cae specialists are readily available for consultation on your electronic problems

***CANADIAN AVIATION ELECTRONICS, LTD.**

MONTREAL • OTTAWA • TORONTO • WINNIPEG • VANCOUVER

3842

THE LARGEST CANADIAN-OWNED ELECTRONICS COMPANY

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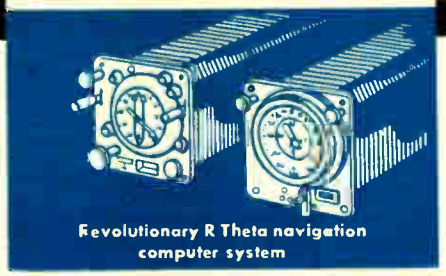
For further data on advertised products use page 207.

STARTING POINT

Automatic ice detection and shedding control system



Revolutionary R Theta navigation computer system

Aircraft rocket-firing control intervalometer

In the research library, around the lunch table, perhaps in a customer's wishful thought—an idea can start anywhere at PSC Applied Research Limited. Some of these ideas, developed with imaginative engineering, ingenuity, precision, dexterity and patience have resulted in some trailblazing aviation instruments like those on the right. A completely equipped manufacturing operation with rigid quality control assures highest equipment efficiency and standards that have met the requirements of the Royal Canadian Air Force and the aerial survey industry. The coupon will bring you our record. In it you may find a starting point for the solution to one of your problems.

PSC APPLIED RESEARCH LTD.
1500 O'CONNOR DRIVE
TORONTO 16, ONTARIO, CANADA
PLYMOUTH 5-3371

PSC Applied Research Limited,
1500 O'Connor Drive, Toronto 16

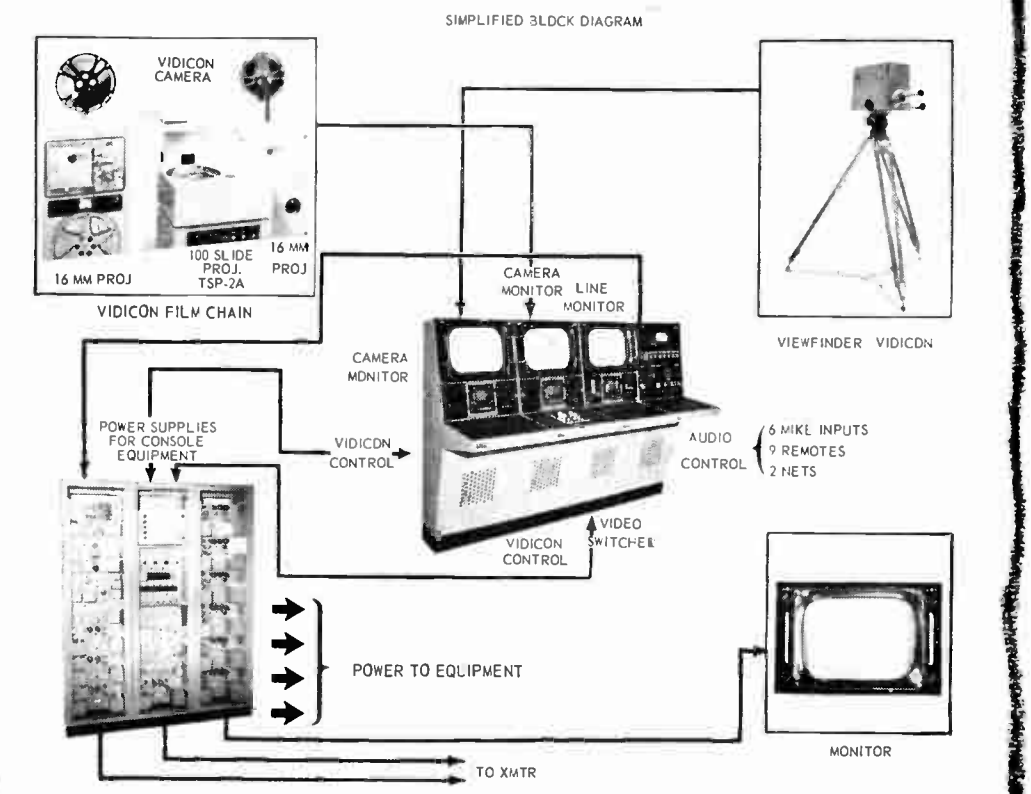
Gentlemen:
I will look forward to receiving your brochure with interest.

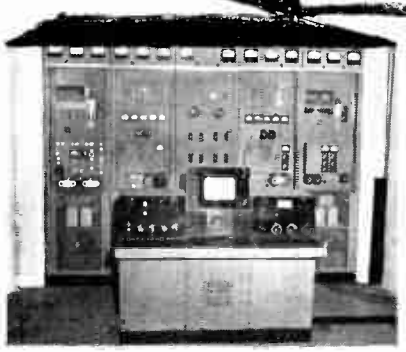
Name.....
Business.....
Street.....
City.....
Position.....

For further data on advertised products use page 207.

NOW! A COMPLETE TV STUDIO PACKAGE FOR LESS THAN $33,000

Sarkes Tarzian, Inc. offers station operators a solution to high-cost television operation. Especially suitable for present AM stations who will be getting into TV.





VHF and UHF Transmitters, low, medium and high power . . . 100W—10KW

There's no need to think—or talk—in terms of hundreds of thousands of dollars to put a television station on the air today.

This minimum package—developed and produced by Sarkes Tarzian, Inc.—is made up of studio equipment required to put live . . . film . . . and slide pictures on the air. Includes all required control facilities. The audio and video equipment is so arranged that expansion to more elaborate operations may be made with minimum cost. No additional control equipment would be needed.

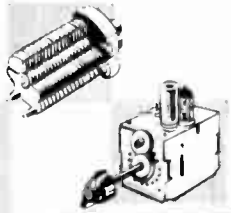
Write for detailed description and price list

Canadian Representatives

McCURDY RADIO INDUSTRIES, LTD.

22 Front Street West
Toronto 1, Canada

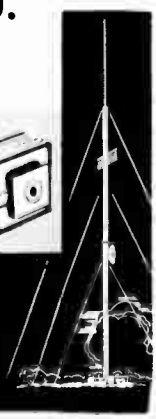
Sarkes Tarzian



SARKES TARZIAN, Inc.—producer of the World's finest television tuner in the World's largest tuner plant . . . 6¾ acres under one roof.

SARKES TARZIAN Rectifier plant (60,000 square feet of floor space) is one of the World's largest users of selenium.

TV Station WTTV and AM Station WTTS—owned and operated by SARKES TARZIAN, Inc.



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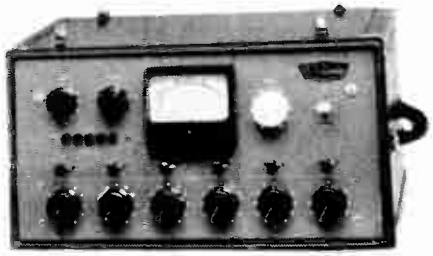
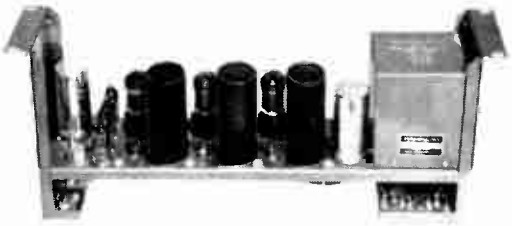


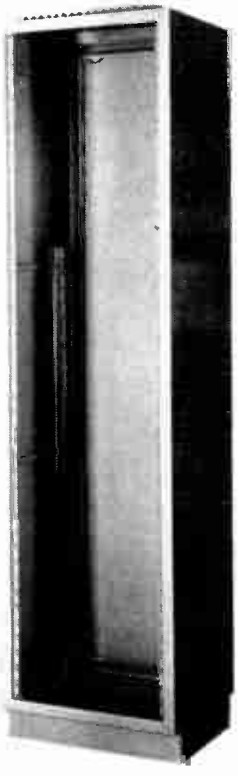
PE 1000 CONSOLE

A completely plug-in console ideal for studio or remote installation. 11 Microphone and 4 Line Inputs. Outputs provided for Program, Monitor, Headsets and Public Address. Power supply available in matching unit or Rack Mounting.



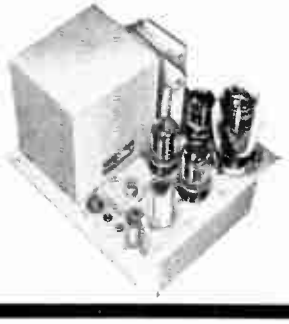
AV 500 VIDEO DISTRIBUTION AMPLIFIER

Will meet the most demanding colour or monochrome requirements. Independent gain adjustment is provided for three isolated outputs.



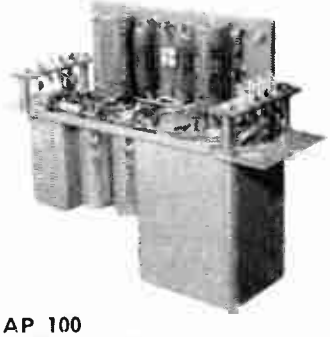
SA 10400 EQUIPMENT RACK

A low cost rack of rugged construction with 77" of equipment mounting space. Complete with two pairs of movable mounting angles, rear door, top and base. Front door available as optional equipment.



PS 841 REGULATED POWER SUPPLY

Provides 250 V to 325 V DC at loads between OMA and 100 MA with low AC ripple (.3 MV to 1.7 MV RMS from no load to full load).

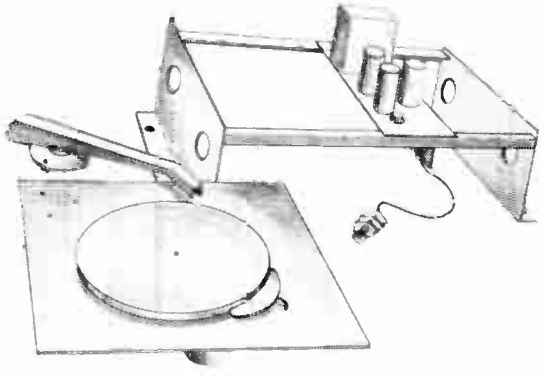


AP 100 MICROPHONE PREAMPLIFIER

May also be used as a Booster Amplifier. Available with input impedance of 50:200 ohms or 150:600 ohms. Small size permits mounting of six units in 8¾" of rack space.

SS 3101 DISC REPRODUCER

Complete 3 speed playback system including equalized preamplifier, remote start unit, cueing amplifier and power supply.



DK 3150 TURNTABLE PACKAGE

- Micro - 16 3 speed Turntable
- Gray 108 C Pick-up Arm
- Equalized Preamplifier
- Mounting Frame
- Wire and Hardware

PACKAGE PRICE

$369.00

fob anywhere in Canada

McCURDY RADIO INDUSTRIES LTD.

22 FRONT ST. W. EMpire 6-6531 TORONTO

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For further data on advertised products use page 207.

VOLUME 3, NUMBER 5 • SEPT.-OCT. 1955

ELECTRONICS & COMMUNICATIONS

A Significant Milestone - - - -

Most Canadians engaged in the electronics and communications industries are aware of the many American conventions which bring together both engineers and businessmen associated with these industries. Such conventions have been held annually in the United States for many years past and their value, both to those interested in the scientific aspect of electronics and to the businessmen whose concern it is to market the products of the engineer, has long past been established as being of paramount benefit to all concerned.

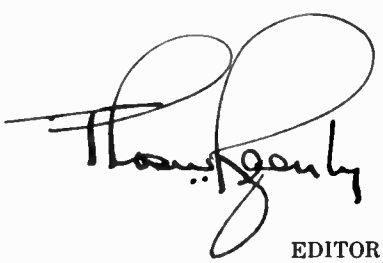
Many of the conventions held in the United States are of a specialized nature. This perhaps, by virtue of the fact that the electronics industry in the United States is an industrial giant the ramifications of which can not be adequately combined to everyone's satisfaction in a single gathering. Perhaps the best known of the American conventions is that of the Institute of Radio Engineers with which is combined the I.R.E. Show. This convention, held annually in New York, attracts hundreds of Canadians whose interests come within the business or professional spheres of electronics. That so many Canadians attend the New York Convention of the Institute of Radio Engineers year after year, as well as the many other conventions south of the border, may be taken as a measure of the requirement for a Canadian sponsored show and convention in the interests of the Canadian electronics industry. Such a Canadian I.R.E. Convention, to be held in Toronto in October, 1956, is now in the planning stage and the forward thinking and initiative of those Canadian members of the Institute of Radio Engineers responsible for the establishment of the convention merits commendation from the entire Canadian electronics and communications industries.

That such a step has been taken on the part of those closely associated with the Canadian electronics industry, persons well informed with respect to its present business tempo, is indicative of the growth and vitality of Canada's youngest and fastest growing industry.

The convention will be by far the largest of its kind ever held in Canada and in addition to the technical sessions at which papers on important subjects in the electronics field will be presented the convention will feature an engineering exhibition with upwards of 200 exhibits. It is anticipated that the convention will draw thousands of engineers from all parts of Canada and the adjacent States.

The convention will be an occasion to mark the growing importance of the electronic industry in the economy of Canada, a beacon to illuminate the ability of our engineers and an opportunity for everyone associated with the Canadian electronic industry to support the undertaking, the result of which is surely destined to be of mutual benefit to all concerned.

Electronics and Communications magazine lends its wholehearted support to the enterprise and extends its best wishes for the success of the convention — a significant milestone in the development of the Canadian electronics industry.



EDITOR

The Protection Of Wire Communications Facilities

By : — G. Y. R. ALLEN

Canadian Engineering Organization Solves Problem Of Wire Communications Facilities Associated With Power Lines . . . . . .

THE protection of wire communications facilities associated with power circuits is a subject which has provoked wide interest, particularly in the last few years and it might be in order to review the situations and needs for such protection. I will use the word "intelligence" to mean the transmission of voice frequency, telephone, telegraph, telemetering, pilot wire relaying, supervisory control, etc. over open wire. I will use the word "wire" to mean the transmission media or lines such as open wire or cable, either supported on structures above, or buried in the ground and which eminate from power stations and/or run adjacent to power transmission lines. These wires may or may not be supported on the same structures as the power transmission lines. I will use the word "plant" to refer to the various types of terminal apparatus.

The lines and plant as we know are subject to electrical hazards as are the persons using these facilities. It is therefore essential to offer protection or install protective devices for the following reasons:

1. To protect employees, customers and others from personal injury.
2. To prevent fires in the plant and buildings.
3. To protect the plant from electrical damage.
4. To permit the transmission of intelligence while the electrical hazards exist.

The relative importance of each of these is determined by many considerations, however, one can never overemphasize the necessity for the safeguarding of human lives.

There are many forms of electrical hazards which may appear and cause high voltage and currents to be present in the plant lines protective devices are employed to limit the voltage and current to predetermine safe values.

Some typical maximum permissible voltage and current levels would be:

1. Line to Line 135 v dc or 120 v ac.
2. Line to Ground 135 v dc or 120 v ac.
3. Line Currents .35 amps dc or 1.35 amps ac.

In some instances even these values could not be tolerated.

With the exception of the power used with certain carrier and remote control equipment the normal operating voltage currents used in wire communications are not dangerous. Protection however is required against lightning and voltage currents impressed on the plant or lines due to induction from, or accidental contact with, other electrical facilities. Protection may be required to eliminate interference caused by corona or transient disturbances on other electrical circuits.

Primarily this article will be concerned with the protection of wire communications facilities when exposed to the influences of electrical power circuits and lightning.

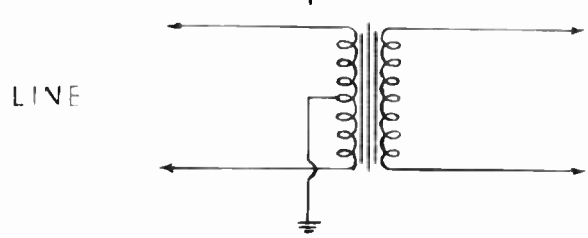
From the protection point of view, communications over wires may be divided into two classes; interruptable and non-interruptable. For instance, service on a rural telephone line could be interrupted for an appreciable period of time without causing trouble. However, a pilot wire relay system controlling a power station, if interrupted particularly under fault conditions, could cause serious damage. Each of these classes may or may not require simple protection whereas the non-interruptable class may require rather elaborate and extensive protective installations. In the case of the latter, since the communication line is exposed to a power line, it is extremely important to have co-ordination between the protection on the power circuits and the communication protection. This particular point will be dealt with later and in more detail.

A communication line is considered to be exposed to a power circuit and lightning under the following conditions:

1. The line parallels a power line.
2. The line is in joint use with the poles or structures supporting a power circuit.
3. There is a possibility of contact between the communication line or plant, with power circuits.
4. The line serves a power station or substation.
5. The line is considered as unshielded from lightning.
6. The line may be subjected to the hazards created by the ground potential rise of the power station.

When a communication line or pair is exposed to a power circuit it is subject to several interfering influences, the

Figure 1



COMBINED DRAINAGE AND ISOLATING TRANSFORMER

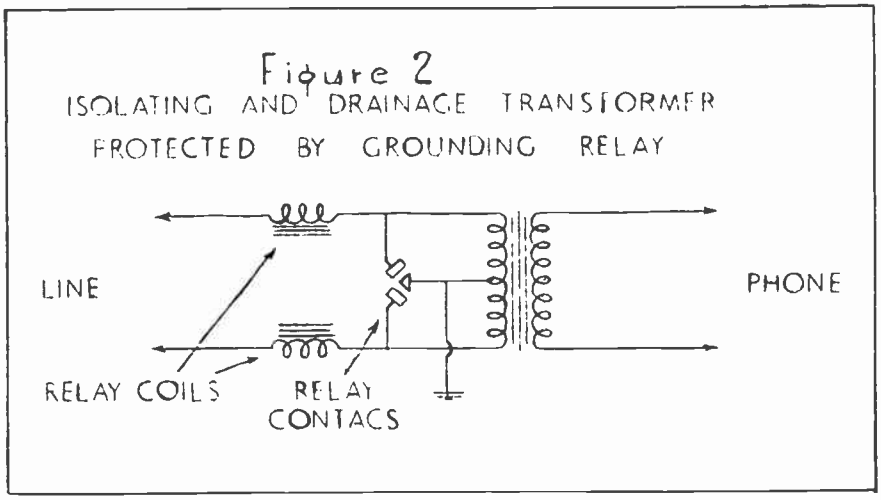


Figure 2
ISOLATING AND DRAINAGE TRANSFORMER PROTECTED BY GROUNDING RELAY

causes of which are summarized as follows, and each will be dealt with in detail.

1. Electro-magnetic induction.
2. Electro Static induction.
3. Corona.
4. Transient disturbances or faults in the power circuits.
5. Power station ground potential rise.
6. Direct crosses or contacts with power circuits.
7. Lightning.
8. Acoustic Shock.
9. The non co-ordination of transpositions of power and communications lines.
10. The non co-ordination of power line and communication line protection.

The extraneous voltages and/or currents in the communication pair due to one or more of the above may be of substantial value. If they are not considered loss of human life and the destruction of valuable equipment may occur.

Electro Magnetic Induction

It will be recognized that it is impossible from a practical standpoint to construct a power transmission line that is perfectly balanced. Such a perfectly balanced line may be defined as one in which the series impedances of the several phases and ground, are exactly the same at every point. The same conditions apply to a single phase power line and to a communication pair.

In actual practice, since the balance of neither the power circuit nor the communication circuit can be made perfect, certain phenomena occur if the communication line parallels or is otherwise exposed to the power circuit. These are termed either electro magnetic induction or electro static induction.

"Electro magnetic induction" may be defined as voltage induced between the two sides of the communications circuit and ground along the circuit and is known as the longtitudinal effect. The longtitudinal induced voltages in addition to raising the communication circuit to a potential with respect to earth which may be dangerous, causes currents in the communications circuit owing to the differences in series impedances and admittances to ground of the two sides of the circuit.

If it were possible to construct a perfectly balanced power circuit, there could theoretically be no voltages induced on a parallel communication circuit provided that a sufficiently large number of exactly spaced transpositions were placed in it so as to expose each phase of the power line equally to the communication pair. In practice however, to minimize such induction, both circuits should be balanced as well as possible and a co-ordinated scheme of transpositions should be used. Unfortunately, the operation of a power line does not lend itself to maintaining balance. Voltages and currents in power circuits causing induction consist of two components.

1. Balanced voltages and current.
2. Residual voltages and currents.

Depending on the type of power system each of the above requires consideration beyond the scope of this discussion. Generally speaking, however, it is the unbalanced or residual or harmonic currents in the power circuit and/or the unbalanced exposure of the communication circuit to the power circuit which result in longtitudinally induced voltage into the communication pair. Power circuit faults, grounds, charging currents or circuit breaker operation, etc., all result in these residual voltages on the power circuit; whereas grounds, faults, unbalance etc. of the communication pair upset the balanced exposure, both of which result in longtitudinal induction. The magnitude of the induced voltage and current may be very large depending on power line voltages and currents both fundamental and harmonic.

Electro Static Induction

"Electro static induction" may be defined as voltage induced between the two sides of the communications circuit and is known as the transverse effect. The transverse voltages regulating through the circuit impedances cause currents in the terminal apparatus. If it were possible to construct a perfectly balanced communication circuit, there could be theoretically no transverse induced voltage, regardless of the magnitude of longtitudinal induced voltage, provided that a sufficiently large number of exactly spaced transpositions were placed in it so as to equalize the induced voltages on each side. Unfortunately, such a condition does not exist, nor does a balanced exposure exist. These effects can only be minimized by co-ordinated transpositions. Communication line faults, grounds, impedance changes etc., all contribute to an unbalanced line. Again, the magnitude of the induced voltage may be very large depending on power line voltages and currents, either fundamental or harmonics and balance.

"Corona" in high voltage transmission lines may cause interference primarily because of the resultant residual currents in the power line, as harmonics, causing both longtitudinal and transverse induction. The voltages cause telephone noises as well as carrier interference.

"Transient disturbances or faults in power circuits" an important point with respect to induction, are the question of abnormal conditions, accidental or otherwise, on the power system. An abnormal short circuit, open circuit or switching operation produces a great increase in the residual voltage or current, or both, of the system, either momentarily or for a considerable period of time. To a great extent, the magnitude of the residual voltage depends on the action and operating time of the power line circuit breakers or fuses as does the magnitude and duration of the fault currents. Therefore, the magnitude and time of the induced voltages and currents into the communication pair are dependent on the unbalanced currents on the power line. The induced voltages and currents may be of a high order depending on the exposure, and the fundamental and harmonic voltages.

"Power station ground potential" rise is an important point. All grounds at power stations have a certain measure of resistance. In some instances this resistance becomes appreciable in value. In the case of a power station having the power transformer neutral grounded, a fault or ground on the power line causes heavy current to flow from the transformer bank at the station over the power line to the fault and back to the station ground. The station ground will therefore rise in potential with respect to a remote point. Due to the resistance of the station ground, the resulting ground voltage gradient seeks equalization with remote grounds through the protective devices and conductors of the communication circuits serving

(Continued on page 70)

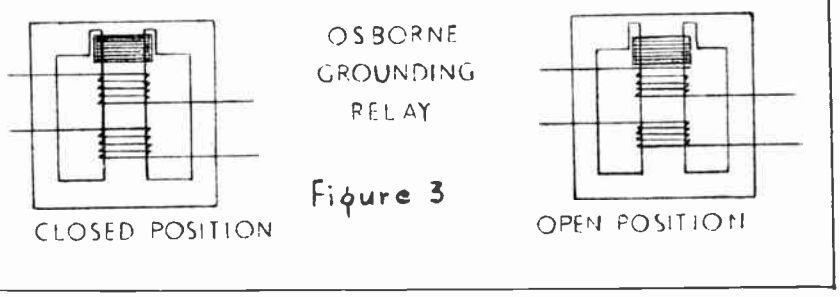


Figure 3

multi tum

Helipot

A *series*

The standard 10-turn model . . . the first helical precision potentiometer . . . still the most popular. Threaded bushing.

AJ *series*

A miniature 10-turn model. Only ⅞" dia. by 1½", yet offers a coil 18" long. Servo or bushing mount.

AN *series*

An ultra-precision 10-turn model. Manufactured to closest tolerances throughout. Servo or bushing.

B *series*

A 15-turn, large diameter model. For extreme accuracy and resolution. Servo or bushing mount.

C *series*

A 3-turn model, combining high setting accuracy with space-saving behind the panel. Threaded bushing mount.

CN *series*

An ultra-precision 3-turn model. Provides extreme accuracy and small size. Servo or bushing mount.

D *series*

A 25-turn model. Provides even greater accuracy and resolution than the B series. Threaded bushing.

E *series*

A 40-turn model. Extremely long coil provides highest accuracy and resolution. Threaded bushing mount.

standard specifications of linear single sections

for information on non-linear versions, ask for Data Sheet 54-72

SERIES	A	AJ	AN	B	C	CN	D	E
Number of turns	10	10	10	15	3	3	25	40
Diameter, inches	1-13/16	7/8	1-13/16	3-5/16	1-13/16	1-13/16	3-5/16	3-5/16
Length of case, inches	2	1-1/2	1-63/64	2-7/8	1-9/64	1-7/64	4-9/64	6-1/64
Shaft diameter, inches (nominal)	1/4	1/8	1/4	1/4	1/4	1/4	1/4	1/4
Coil length, inches (approx.)	46	18	45	140	14	13.5	234	374
Mechanical rotation	+4° 3,600°–0°	+10° 3,600°–0°	+1° 3,600°–0°	+4° 5,400°–0°	+4° 1,080°–0°	+1° 1,080°–0°	+4° 9,000°–0°	+4° 14,400°–0°
Electrical rotation	+4° 3,600°–0°	+10° 3,600°–0°	+1° 3,600°–0°	+4° 5,400°–0°	+4° 1,080°–0°	+1° 1,080°–0°	+4° 9,000°–0°	+4° 14,400°–0°
Resistance range, ohms	25 to 450K	25 to 100K	50 to 400K	40 to 1 meg	5 to 130K	15 to 125K	60 to 1.5 meg	100 to 2.5 meg
Best pract. resist. tol. *(a)*	±1%	±2.5%	±1%	±1%	±1%	±1%	±1%	±1%
Best pract. linearity tol. *(b)*	±0.05% 1K & up	±0.1% 5K & up	±0.025% 5K & up	±0.01% 10K & up	±0.1% 5K & up	±0.05% 20K & up	±0.01% 5K & up	±0.01% 1K & up
Watts, at 25°C ambient *(c)*	6.9	2.8	6.9	13.8	4.1	4.1	20.6	27.5
Watts, at 40°C ambient	5	2	5	10	3	3	15	20
Weight, oz. (approx.)	4.4	1	4.5	13	2.5	2.7	17	21
Max. starting torque, oz. in.	2	1	1.3	2.75	1.8	1.3	3.5	3.5
Max. running torque, oz. in.	1.5	0.5	0.9	2.0	1.3	0.9	2.5	2.5
Moment of inertia, gm. cm.²	18	0.3	22	200	7	7.5	270	400
Max. taps	28	32	28	80	14	14	90	100
Min. distance between taps	20°±1°	45°±2°	20°±1/2°	15°±1°	20°±1°	20°±1/2°	15°±1°	15°±1°
Max. ganged sections	3	no ganging	2	3	3	2	no ganging	no ganging

precision potentiometers

single turn

all models available in both linear and non-linear versions

G *series*

A moderately priced, continuous-rotation model. Small in size, yet extra-rugged. Threaded bushing mount.

J *series*

A two-inch diameter, continuous-rotation model. External clamps for easy phasing. Servo or bushing.

Helipot produces a great variety of standard models, many of which are carried in stock for immediate delivery. Also, many standard features and designs can be readily modified.

An individual data sheet is available for each series. Data sheets on those series of particular interest to you will be sent on request.

L *series*

A three-inch diameter, continuous-rotation model. External clamps for easy phasing. Servo or bushing.

T *series*

An all-metal, continuous-rotation model. Features very low torque . . . very small size. Servo or bushing mount.

V *series*

An all-metal, continuous-rotation model. Features wide choice of non-linear outputs. Servo or two-hole servo mount.

Y *series*

A 1¾" diameter, continuous-rotation model. External clamps for easy phasing. Servo or bushing.

G	J	L	T	V	Y
1	1	1	1	1	1
1-5/16	2	3	7/8	1-3/4	1-3/4
57/64	31/32	1	3/4	0.8	1
1/4	1/4	1/4	1/8	1/4	1/4
3.1	5	8.3	1.9	4	4.5
360° cont.	360° cont.	360° cont.	360° cont.	360° cont.	360° cont.
352°±2°	356°±1°	358°±1°	354°±2°	345° max.	354°±1°
5 to 30K	5 to 75K	5 to 100K	1K to 100K	20 to 130K	5 to 65K
±1%	±1%	±1%	±2%	±1%	±1%
±0.25%	±0.15%	±0.1%	±0.25%	±0.25%	±0.15%
5K & up	5K & up	5K & up		10K & up	10K & up
2.8	5.5	6.9	1.5		3.4
2	4	5	1.2	2.5 (*d*)	2.5
2	4	5.8	0.6	2.75	3
0.75	1	1.5	0.050	1.5	1.5
0.50	0.5	0.6	0.050	1.2	0.8
2.8	14	55	0.12	7.5	2.5
8	21	33	9	13	17
36°±1°	15°±1°	10°±1°	30°±2°	23° ±0.6°	18°±1°
no ganging	8	8	5	25	14

a. Standard resistance tolerance is ±3% for series V, ±5% for all others

b. Standard linearity tolerance is ±0.5% for all series

c. Ambient temperature range is −55° to +105°C for series T, −55° to +90°C for series V, −55° to +80°C for all others

d. At 60°C

Design details subject to change without notice, certified drawings available on request.

Helipot Corporation
a division of Beckman Instruments, Inc.
Factory: No. 3 Six Points Road, Toronto 18, Ont.
Representative: R-O-R Associates, Ltd.
290 Lawrence Avenue West, Toronto 12, Ont.

BECKMAN

Helipot

first in precision potentiometers

Buyer's Guide Of Electronic And Communications Equipment

Address Listing Of Canadian Firms Page 90.

Address Listing Of U.S. And Foreign Firms Page 134.

ACCELERATORS (Linear)
Rogers Majestic Electronics Ltd.

ACCELERATORS (Cascade)
Rogers Majestic Electronics Ltd.

ACCELEROMETERS
Electrodesign.
Rogers Majestic Electronics Ltd.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Servomechanisms, Inc.
Gulton Mfg. Corp.
Endevco Corp.
Sanders Associates, Inc.
Southern Instruments Ltd. (E)
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The Solartron Electronic Group Ltd. (E)
Elliott Brothers (London) Ltd. (E)
Pacific Scientific Co.
Kay Electric Co.
Daystrom Pacific Corp.
Pickering and Co. Inc.
Bourns Laboratories
Titania Electric Corp. of Can. Ltd.
Sperry Gyroscope Co. of Can. Ltd.

ADAPTERS
Prodelin Inc.

ADAPTERS (Battery)
Canadian Electronics Ltd.
John R. Tilton Ltd.
Herman H. Smith Inc.

ADAPTERS (Phase)
Lear, Inc.

ADAPTERS (Test)
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Canadian Research Institute
Diamond Microwave Corp.
Switchcraft, Inc.
Vidaire Electronics Mfg. Corp.
Herman H. Smith, Inc.

ADAPTERS (Tube)
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Amphenol Canada Ltd.
Diamond Microwave Corp.

ADHESIVES
Bakelite Co., Div. of Union Carbide & Carbon Corp.
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AMMETERS
Gulton Mfg. Corp.
The Solartron Electronic Group Ltd.
Elliott Brothers (London) Ltd.
Baldwin Instrument Co. Ltd.
Measuring Instruments (Pullin) Ltd.
The English Electric Co. Ltd.
Electronic Instrument Co. Inc.
Electrodesign
Hackbusch Electronics Ltd.
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Canadian Electronics Ltd.
Burton-Rogers Co.
Precision Apparatus Co. Inc.
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S & T Sales Ltd.
R-O-R Associates Limited
Thermovelt Instruments Ltd.
Canadian Research Institute
H. H. Nichols Ltd.
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DeJur-Amsco Corp.
Sensitive Research Instrument Corp.
Baird Associates Inc.
Telex Inc.
Electro-Voice Inc.
Dynamic Electronics-NY Inc.
Scientific Specialties Corp.
Titania Electric Corp. of Can. Ltd.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
General Precision Industries Ltd.

AMPLIFIERS (Audio Frequency)
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Electrolabs Reg'd.
Bradford J. Wickett
Hackbusch Electronics Ltd.
Electrodesign
Executone Communication Systems Ltd.
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
Canadian Marconi Co.,
Electronic Tube & Components Div.
Soundmaster Equipments
Servomechanisms Inc.
Precision Radiation Instruments Inc.
Electro-Measurements Inc.
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Keithley Instruments
Audio Instrument Co. Inc.
Gulton Mfg. Corp.
Endevco Corp.
Technology Instrument Corp.
The Solartron Electronic Group Ltd.

AMPLIFIERS (Subminiature)
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Specialty Engineering & Electronics Co.
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AMPLIFIERS (High Fidelity)
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Chas. W. Pointon Ltd.
Bayly Engineering Ltd.
Servomechanisms Inc.
Potter Instrument Co. Inc.
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Perkin Engineering Corp.
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Inet Division of Leach Corp.
Titania Electric Corp. of Can. Ltd.
Northern Electric Co. Ltd.
Sperry Gyroscope Co. of Can. Ltd.
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Atlas Radio Corp. Ltd.

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Stark Electronic Instruments Ltd.
Electrolabs, Reg'd.
Wickett, Bradford J.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Krohn-Hite Inst. Co.
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S & T Sales Ltd.
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
Canadian Research Institute
R. H. Nichols Ltd.
Germanium Products Corp., Subsidiary
of Radio Development Research Corp.
Sensitive Research Instrument Corp.
Kay Electric Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Cossor Canada Ltd.
General Precision Industries Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.

ANALYZERS (Frequency)
Stark Electronic Instruments Ltd.
Electrodesign
Back Simpson Ltd.
Canadian Electronics Ltd.
Servo Corp. of America
Canadian Westinghouse Co. Ltd.,
Electronics Division
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Dawe Instruments Ltd.
Airmec Ltd.
Kay Electric Co.
Dynamic Electronics N.Y. Inc.
Sierra Electronic Corp.
Vectron Inc.
General Radio Co.
Northern Electric Co. Ltd.
Sperry Gyroscope Co. of Can. Ltd.
Atlas Radio Corp. Ltd.
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Sensitive Research Instrument Corp.

ANALYZERS (Servo)
Servo Corp. of America
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Solartron Electronic Group Ltd.

ANALYZERS (Spectrum)
Polarad Electronics Corp.

ANALYZERS (Video)
Stark Electronic Instruments Ltd.
Canadian Westinghouse Co. Ltd.,
Electronics Division
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
Kay Electric Co.
Sierra Electronic Corp.
Sperry Gyroscope Co. of Can. Ltd.
Atlas Radio Corp. Ltd.

ANTENNA SYSTEMS
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
General Cement Mfg. Co.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Wind Turbine Co. of Canada Ltd.
Amphenol Canada Ltd.
Redifon (Canada) Ltd.
Bayly Engineering Ltd.
Collins Radio Co. of Canada Ltd.
Diamond Microwave Corp.
Lynmar Engineers Inc.
Telrex Inc.
Prodelin Inc.
Cornell-Dubilier Electric Corp.
Sanders Associates Inc.
Javex
Belling & Lee Ltd.
Specialty Engineering & Electronics Co.
Atlas Radio Corp. Ltd.
Radio Communications Equip. & Eng. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
RCA Victor Co. Ltd.

ANTENNA (Accessories)
Javex

ANTENNA PEDESTALS
Specialty Engineering & Electronics Co.
Northern Electric Co. Ltd.
Canadian Electronics Ltd.
N. H. Speight Laboratories

ANTENNA REFLECTORS
Rogers Majestic Electronics Ltd.
Canadian Electronics Ltd.
Wind Turbine Co. of Canada Ltd.
Canadian Westinghouse Co. of Can. Ltd.,
Electronics Division
Amphenol Canada Ltd.
Collins Radio Co. of Canada Ltd.
Diamond Microwave Corp.
Prodelin Inc.
Sanders Associates Inc.
Texas Instruments Inc.
Specialty Engineering & Electronics Co.
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.

ANTENNA ROTATORS
Stark Electronic Instruments Ltd.
Hackbusch Electronics Ltd.
Tenatronics Ltd.
Alliance Motors (Div. of The Easy
Washing Machine Co. Ltd.)
Canadian Electronics Ltd.
Delhi Metal Products Ltd.
Trio Manufacturing Co.
E. F. Johnson Co.
Wind Turbine Co. of Canada Ltd.
John R. Tilton Ltd.
Harris Pound & Co.
Chas. W. Pointon Ltd.
Cornell-Dubilier Electric Corp.
Texas Instruments Inc.
Specialty Engineering & Electronics Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.

ANTENNA TOWERS
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
General Cement Mfg. Co.
Wind Turgine Co. of Canada Ltd.
Canadian Westinghouse Co. Ltd.,
Electronics Division
N. H. Speight Laboratories
S & T Sales Ltd.
Telequipment Mfg. Co. Ltd.
John R. Tilton Ltd.
Redifon (Canada) Ltd.
Harris Pound & Co.
Prodelin Inc.
Baker Manufacturing Co.
Belling & Lee Ltd.
Specialty Engineering & Electronics Co.
Atlas Radio Corp. Ltd.

ANTENNAS (Airborne)
Hackbusch Electronics Ltd.
Tenatronics Ltd.
Marsland Engineering Ltd.
Canadian Electronics Ltd.
Lear Inc.
Wind Turbine Co. of Canada Ltd.
Amphenol Canada Ltd.
Collins Radio Co. of Canada Ltd.
Diamond Microwave Corp.
Airtron Inc.
Dale Products Inc.
Sanders Associates Inc.
Aircraft Radio Corp.
Belling & Lee Ltd.
Specialty Engineering & Electronics Co.

ANTENNAS (Broadcast)
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Wind Turbine Co. of Canada Ltd.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Amphenol Canada Ltd.
Redifon (Canada) Limited
John R. Tilton Ltd.
Belling & Lee Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.

ANTENNAS (Directional)
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
Pye Canada Ltd.
McCarter Radio & Television Ltd.
Servo Corp. of America

Wind Turbine Co. of Canada Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
N. H. Speight Laboratories
Amphenol Canada Ltd.
Diamond Microwave Corp.
Telrex Inc.
Texas Instruments Inc.
Belling & Lee Ltd.

ANTENNAS (Receiver)
Hackbusch Electronics Ltd.
Tenatronics Ltd.
Stark Electronics Instruments Ltd.
Canadian Electronics Ltd.
McCarter Radio & Television Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Lear Inc.
American Electronics Co.
Wind Turbine Co. of Canada Ltd.
N. H. Speight Laboratories
Amphenol Canada Ltd.
John R. Tilton Ltd.
Redifon (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Diamond Microwave Corp.
Telrex Inc.
Cornell-Dubilier Electric Corp.
Aircraft Radio Corp.
Belling & Lee Ltd.
Atlas Radio Corp. Ltd.
Radio Communications Equip. & Eng. Ltd.
Browning Laboratories Inc.
Vokar Corp.
Superex Electronics Corp.

ANTENNAS (Marine)
Tenatronics Ltd.
Canadian Electronics Ltd.
Pye Canada Ltd.
McCarter Radio & Television Ltd.
Lear Inc.
Wind Turbine Co. of Canada Ltd.
S & T Sales Ltd.
Redifon (Canada) Ltd.
Specialty Engineering & Electronics Co.
Pearce Simpson Inc.
Sperry Gyroscope Co. of Can. Ltd.
Atlas Radio Corp. Ltd.
Radio Communications Equip. & Eng. Ltd.

ANTENNAS
Microwave Associates Inc.
Ohmite Manufacturing Co.
The Solartron Electronic Group Ltd.
Tenna Manufacturing Co.
Specialty Engineering & Electronics Co.
Atlas Radio Corp. Ltd.
Radio Communications Equip. & Eng. Ltd.
J. R. G. McVity & Co.
Polard Electronics Corp.

ANTENNAS (Railroad)
Specialty Engineering & Electronics Co.
Beaconing Optical & Precision Co. Ltd.
Tenatronics Ltd.
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
Wind Turbine Co. of Canada Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division

ANTENNAS (Television)
Tenna Manfg. Co. (formerly Radelco)
Dynamic Electronics N.Y. Inc.
National Electric Products Corp.
Atlas Radio Corp. Ltd.

ALUMINIZERS (TV Tube)
National Research Corp.

ATTENUATORS
Kay Electric Co.
New London Instrument Co. Inc.
Specialty Engineering & Electronics Co.
Empire Devices Products Corp.
Daven Co.
Technicraft Laboratories Inc.
Trad Electronics Corp.
General Radio Co.
Sperry Gyroscope Co. of Can. Ltd.
Atlas Radio Corp. Ltd.
Telewave Laboratories Inc.

BAFFLES (Speaker)
York Woodcraft Ltd.
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Campbell Manufacturing Co. Ltd.
Wickett, Bradford J.
Electro-Vox Inc.
Electronic Enterprises Ltd.
Canadian Electronics Ltd.
Mark Simpson Mfg. Co. Inc.
National Co. Inc.
Altec Lansing Corp.
Gee-Lar Mfg. Co.
H. A. Hartley Co. Inc.
Telequipment Mfg. Co. Ltd.
Copper Wire Products Ltd.
Electronic Communications Ltd.
McCurdy Radio Industries Ltd.
John R. Tilton Ltd.
Chas. W. Pointon Ltd.
Duotone Co. Inc.
Atlas Sound Corp.
Electro-Voice Inc.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Dukane Corp.

BATTERIES (Dry)
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Canadian Electronics Ltd.
Burgess Battery Co.
National Carbon Co.
Division of Union Carbide Canada Ltd.
Sharpe Instruments Ltd.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.

BATTERIES (Storage)
Automatic Electric Sales (Canada) Ltd.
Exide Industrial Division, The Electric Storage Battery Co.
Sonotone Corp.
Gould-National Batteries of Canada Ltd.
Exide Batteries of Canada Ltd.
Nickel Cadmium Battery Corp.
Northern Electric Co. Ltd.
Silvercel of Canada Ltd.

BATTERY (Mercury)
Canadian Electronics Ltd.
National Carbon Co., Div. Union Carbide Canada Ltd.

BATTERY ELIMINATORS
American Television & Radio Co.

BEACONS
Pye Canada Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Redifon (Canada) Ltd.
Specialty Engineering & Electronics Co.
Avion Division of ACF Industries, Inc.
Northern Electric Co. Ltd.
Radio Communications Equip. & Eng. Ltd.

BEADS (Insulating)
Kerr-Machin Associates
Saxon Burg Ceramics

BEARINGS (Jewel)
Canadian Research Institute
Duotone Co. Inc.
Sperry Gyroscope Co. of Can. Ltd.

BINDER (TV Tubes)
Philadelphia Quartz Co.

BLOWERS
Small Motors Inc.
Stanat Manufacturing Co. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Canadian Armature Works Inc.
Leaonard Electric Ltd.
Servomechanisms Inc.
Germanium Products Corp., Sudsidiary of Radio Development & Research Corp.
Ripley Co. Inc.
Eastern Air Devices Inc.
Sanders Associates Inc.
Edwards High Vacuum Ltd.
Dynamic Air Engineering Inc.
Western Gear Works, Electro Products Division
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Cossor Canada Ltd.

BOBBINS (Winding)
Canadian Electronics Ltd.
National Moldite Co.
St. Regis Paper Co. (Canada) Ltd.
Panelyte Division
Canadian Research Institute
The Buckeye Bobbin Co.
Whitely Electrical Radio Co. Ltd.
H. Clarke & Co. (Manchester) Ltd.
Osborne Electric Co. Ltd.
Precision Paper Tube Co.

BOOMS (Microphone)
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Roanwell Corp.
Canadian Westinghouse Co. Ltd., Electronics Division
Chas. W. Pointon Ltd.
Atlas Sound Corp.
Perkins Electric Co. Ltd.

BRACKETS (Television Antenna)
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Canadian Marconi Co. Electronic Tube & Components Div.
McCarter Radio & Television Ltd.
Delhi Metal Products Ltd.
General Cement Mfg. Co.
Telequipment Mfg. Co. Ltd.
John R. Tilton Ltd.
Harris Pound & Co.
National Electric Products Corp.
Atlas Radio Corp. Ltd.

BREAKERS (Circuit)
Stark Electronic Instruments Ltd.
Canadian Line Materials Ltd.
Canadian Electronics Ltd.
Jack & Heintz Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Canadian General Electric Co. Ltd.
Taylor Electric Mfg. Co. Ltd.
Canadian Research Institute
Lab-O Ring Enterprises
Heinemann Electric Company
Northern Electric Co. Ltd.

BRIDGES (Capacitance)
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Electrovert Ltd.
Canadian Electronics Ltd.
Pye Canada Ltd.
Rogers Majestic Electronics Ltd.
H. Tinsley & Co. Ltd.
John R. Tilton Ltd.
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Electro-Measurements Inc.
Cornell-Dubilier Electric Corp.
Shallcross Manufacturing Co.
Boonton Radio Corp.
Industrial Instruments Inc.
Daws Instruments Ltd.
Baldwin Instrument Co. Ltd.
Cinema-Television Ltd.
The Winslow Co. Inc.
Scientific Specialties Corp.
General Radio Co.
Titania Electric Corp. of Can. Ltd.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Cossor Canada Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
General Precision Industries Ltd.

BRIDGES (Impedance)
Electrodesign
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Electrovert Limited
Canadian Electronics Ltd.
Pye Canada Ltd.
Rogers Majestic Electronics Ltd.
H. Tinsley & Co. Ltd.
Waters Manufacturing Inc.
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Electro-Measurements Inc.
Electronic Instrument Co. Inc.
Gulton Mfg. Corp.
Industrial Instruments Inc.
Boonton Radio Corp.
Shallcross Manufacturing Co.
Technology Instrument Corp.
Dawe Instruments Ltd.
The Winslow Co. Inc.
Sierra Electronic Corp.
Scientific Specialties Corp.
General Radio Co.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
General Precision Industries Ltd.

BRIDGES (Inductance)
Electrovert Ltd.
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Electrodesign
Canadian Electronics Ltd.
Pye Canada Ltd.
Rogers Majestic Electronics Ltd.
H. Tinsley & Co. Ltd.
R-O-R Associates Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Bayly Engineering Ltd.
Electro-Measurements Inc.
Industrial Instruments Inc.
Boonton Radio Corp.
Shallcross Manufacturing Co.
Dawe Instruments Ltd.
Cinema-Television Ltd.
Scientific Specialties Corp.
General Radio Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

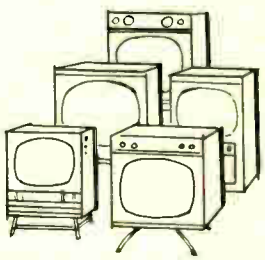
BRIDGES (Electrical)
The Winslow Co. Inc.
Scientific Specialties Corp.
General Radio Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.

BROADCAST EQUIPMENT
Electrovert Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Mark Simpson Mfg. Co. Inc.
Altec Lansing Corp.
Canadian Westinghouse Co. Ltd., Electronics Division
Redifon (Canada) Ltd.
Electronic Communications Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Collins Radio Co. of Canada Ltd.
Audio Instrument Co., Inc.
Cinema Engineering Co., Division Aerovox Corp.
Tel-Instrument Electronics Corp.
Browning Laboratories, Inc.

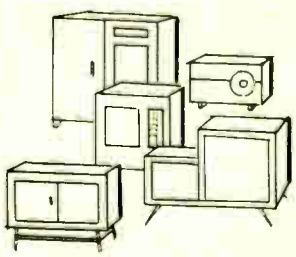
An important member of every smart set!

NOW IN A SMART NEW PACK!

Westinghouse ELECTRONIC TUBES



In Television, high voltages put extra strain on set components. Tubes must be able to take it! That's just one of the reasons why forward-looking manufacturers use Westinghouse as original equipment.



Tonal quality is the vital factor in High Fidelity Amplifiers. All units must be perfectly matched for maximum response.

Westinghouse quality control makes Westinghouse Electronic Tubes top choice for the finest Hi Fi sets.

Just look around! You'll find that more and more of Canada's Radio and Television Manufacturers are using Westinghouse Electronic Tubes in their sets. Westinghouse Electronic Tubes are engineered and manufactured to the rigid specifications that today's Electronics Industry demands . . . they're right for every job!

And in order to supply this increased demand by Manufacturers and Service Men, Westinghouse Plant facilities are being expanded and production schedules set at an all time high. Specify Westinghouse Electronic Tubes when you order from your jobber.

Enjoy Television's Finest Hour.

"STUDIO ONE" *Monday Nights 10 P.M.*

CANADIAN WESTINGHOUSE COMPANY LIMITED • *Electronic Tube Division* • **HAMILTON, CANADA**

For further data on advertised products use page 207.

Gray Research & Development Co., Inc.
Philco Corp., Govmt. & Industrial Division
General Radio Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
RCA Victor Co. Ltd.

BRUSHES (Carbon)
Canadian Electronics Ltd.
The Ohio Carbon Co.
National Carbon Co.
Div. Union Carbide Co. Ltd.

BUS BAR
Canadian Electronics Ltd.
Alpha Wire Corp.
Taylor Electric Mfg. Co. Ltd.
Noranda Copper & Brass Ltd.

CABINETS
General Tire & Rubber Co. of Canada Ltd., Stokes Division.
Dominion Aluminum Fabricating Ltd.
Hammond Manufacturing Co. Ltd.
York Wooderaft Ltd.
Electronic Enterprises Ltd.
Electro-Vox Inc.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Chisholm Industries Ltd.
Altec Lansing Corp.
H. A. Hartley Co., Inc.
S. & T. Sales Ltd.
Copper Wire Products Ltd.
Renfrew Electric & Refrigerator Co. Ltd.
Taylor Electric Mfg. Co. Ltd.
Collins Radio Co. of Canada Ltd.
Computing Devices of Canada Ltd.
Harris Pound & Co.
Peacock Brothers Ltd.
Electronic Instrument Co. Inc.
Whiteley Electrical Radio Co. Ltd.
The Solartron Electronic Group Ltd.
Hallam, Sleigh & Cheston Ltd.
Stratton & Co. Ltd.
Electro-Voice Inc.
Daven Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
RCA Victor Co. Ltd.

CABINETS (Temperature)
Canadian Research Institute.
Peacock Brothers Ltd.
Tenney Engineering Inc.
Conrad Inc.
Precision Scientific Co.
American Research Corp.
McPhar Engineering Co. of Can. Ltd.

CABLE
Copperweld Steel Co.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Cossor Canada Ltd.
Federal Wire and Cable Co. Ltd.

CABLE CLAMPS
Hackbusch Electronics Ltd.
Electrovert Ltd.
Canadian Electronics Ltd.
Atlas E-E Corp.
Adel Precision Products, Div. of General Metals Corp.
Holub Industries Inc.
Gee-Lar Mfg. Co.
General Cement Mfg. Co.
Amphenol Canada Ltd.
British Insulated Callender's Cables
Diamond Microwave Corp.
Trico Fuse Mfg. Co.
Walsco Electronics Corp.
Scintilla Division—Bendix Aviation Corp.
Northern Electric Co. Ltd.

CABLE (Coaxial)
Phalo Plastics Corp.
Microdot Division—Felts Corp.
William Brand & Co. Inc.
Saxton Products Inc.
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Tenatronics Ltd.
Electrolabs Reg'd.
Electro-Vox Inc.
Federal Wire & Cable Co. Ltd.
Alpha Wire Corp.
Canadian Westinghouse Co. Ltd., Electronics Division
Amphenol Canada Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
R-O-R Associates Ltd.
Harris Pound & Co.
Warren Wire Co.
Boston Insulated Wire & Cable Co.
General Radio Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Federal Wire & Cable Co. Ltd.
Cossor Canada Ltd.
Perkins Electric Co. Ltd.

CABLE (Coaxial Rigid)
Tenatronics Ltd.
Electrolabs
Canadian Electronics Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division.
Amphenol Canada Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Musimart of Canada Ltd., Electronic Div.
Diamond Microwave Corp.
Precision Tube Co. Inc.
Northern Electric Co. Ltd.

CABLE (Insulated)
Electrolabs, Reg'd.
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Electro-Vox Inc.
Canadian Electronics Ltd.
Federal Wire & Cable Co. Ltd.
Alpha Wire Corp.
Royal Electric Co. Inc.
Whitney Blake Co.
Canadian General Electric Co. Ltd.
Amphenol Canada Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Musimart of Canada Ltd., Electronic Div.
Phalo Plastics Corp.
William Brand & Co. Inc.
Saxton Products Inc.
Warren Wire Co.
Copperweld Steel Co.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Cables, Conduits and Fittings Ltd.
Federal Wire and Cable Co. Ltd.
Atlas Radio Corp. Ltd.

CABLE (Retractile - Insulated)
Koiled Kords Inc.

CABLE (Microphone-Retractile)
Koiled Kords Inc.

CABLE (Microphone)
Can. Astatic Ltd.
William Brand & Co. Inc.
Phalo Plastics Corp.
Saxton Products Inc.
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Electro-Vox Inc.
Federal Wire & Cable Co. Ltd.
Canadian Electronics Ltd.
Alpha Wire Corp.
Whitney Blake Co.
Canadian Westinghouse Co. Ltd., Electronics Division
Amphenol Canada Ltd.
British Insulated Callender's Cables.
Phillips Electrical Co. Ltd.
Musimart of Canada Ltd., Electronics Div.
Titania Electric Corp. of Can. Ltd.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Federal Wire and Cable Co. Ltd.
Perkins Electric Co. Ltd.

CABLE (Shielded)
Phalo Plastics Corp.
William Brand & Co. Inc.
Electrolabs
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Electro-Vox Inc.
Federal Wire & Cable Co. Ltd.
Canadian Electronics Ltd.
Alpha Wire Corp.
Whitney Blake Co.
Co-Operative Industries Inc.
Canadian General Electric Co. Ltd.
Amphenol Canada Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Musimart of Canada Ltd.
R-O-R Associates Ltd.
Warren Wire Co.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Cables, Conduits and Fittings Ltd.
Federal Wire and Cable Co. Ltd.
Atlas Radio Corp. Ltd.

CABLE (Transmission Line)
Electrolabs Reg'd.
Tenatronics Ltd.
Hackbusch Electronics Ltd.
Federal Wire & Cable Co. Ltd.
Canadian Electronics Ltd.
Alpha Wire Corp.
Whitney Blake Corp.
Canadian Westinghouse Co. Ltd.
Amphenol Canada Ltd.
British Insulated Callender's Cables
R-O-R Associates Ltd.
Phillips Electrical Co. Ltd.
Harris Pound & Co.
Phalo Plastics Corp.
William Brand & Co. Inc.
Saxton Products Inc.
Prodelin Inc.
Copperweld Steel Co.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Federal Wire and Cable Co. Ltd.
Cables, Conduits and Fittings Ltd.
Cossor Canada Ltd.

CABLE (Shielded-Retractile)
Koiled Kords Inc.

CALIBRATORS
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Rogers Majestic Electronics Ltd.
G. F. Kelk & Co.
Jackson Electrical Instrument Co.
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
Canadian Research Institute.
Teletronics Laboratory Inc.
Boston Radio Corp.
Electronic Instrument Co. Inc.
The Solartron Electronic Group Ltd.
Kay Electric Co.
Sensitive Research Instrument Corp.
Technicraft Laboratories Inc.
Electro-Mechanical Research Inc.
Sperry Groscope Co. of Canada Ltd.
Perkins Electric Co. Ltd.
Radio Communications Equipment & Eng. Ltd.
Atlas Radio Corp. Ltd.

CALIBRATORS (Sweep)
New London Instrument Co. Inc.
Dynamic Electronics, N.Y., Inc.
Kay Electric Co.
Browning Laboratories Inc.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Stark Electronic Instruments Ltd.
Canadian Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Ltd.
Computing Devices of Canada Ltd.
Tel-Instrument Electronics Corp.

CALIBRATORS (UHF)
Stark Electronic Instruments Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Jackson Electrical Instrument Co.
Computing Devices of Canada Ltd.
Tel-Instrument Electronics Corp.
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
Atlas Radio Corp. Ltd.

CAMERAS (Oscilloscope)
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Electrodesign
Canadian Electronics Ltd.
Rogers Majestic Electronics Ltd.
Bayly Engineering Ltd.
P. S. C. Applied Research Ltd.
J. Langham Thompson Ltd.
Airmec Ltd.
Kelvin & Hughes (Industrial) Ltd.
Southern Instruments Ltd.
Browning Laboratories Inc.
Fairchild Camera & Instrument Corp.
General Radio Co.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.

CALORIMETERS (Microwave)
Chemalloy Electronics Corp.

CAMERAS (Radar)
Decca Radar (Canada) Ltd.
Fairchild Camera & Instrument Corp.

CAMERAS (Television)
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
RCA Victor Co. Ltd.
Chisholm Industries Ltd.
Rogers Majestic Electronics Ltd.
Canadian Electronics Ltd.
Pye Canada Ltd.
Bern, Lee & Co. Ltd.
Electronic Associates Ltd.
The Telectron Co.
Telequipment Mfg. Co. Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Blonder-Tongue Laboratories Inc.
Standard Electronics Corp.
Cinema-Television Ltd.
Tel-Instrument Electronics Corp.

CAMERAS (X-Ray)
Rogers Majestic Electronics Ltd.
Electrodesign
General Electric Co., X-Ray Dept.

CATHODE FOLLOWERS
Gulton Mfg. Corp.

CERAMICS (Piezo-Electric)
Gulton Mfg. Corp.

CAPACITORS
International Resistance Co.
Pyramid Electric Co.
Cornell-Dublier Electric Corp.
The Gudeman Co.

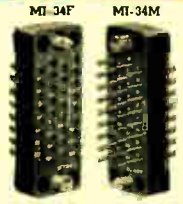
CAPACITORS (Ceramic)
Centralab Canada Ltd.
Dilectron Div. of The Gudeman Co.
Mucon Corp.
Aerovox Canada Ltd.

For further data on advertised products use page 207.

Connectability* by U. S. C.

*Ability to meet exacting electrical and mechanical connector requirements.

Miniature and Sub-Miniature

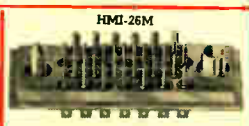


MI SERIES
Plugs—MI-7M, 8-4M, 14M, 18M, 20M, 21M, 26M, 34M, 41M, 50M, 75M
Receptacles—MI-7F, 8-4F, 14F, 18F, 20F, 21F, 26F, 34F, 41F, 50F, 75F

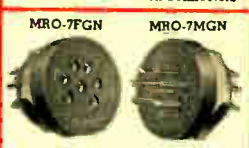
MI-SL SERIES (Double Lead Screw Lock) Available all MI SERIES types
Typical Cat. No.
MI-50HSSL—Side cable entrance hood
MI-50HRSL—Rear cable entrance hood
MI-50M2—Plug used with hood
MI-50F2SL—Receptacle used on chassis
MI-50F2 — Receptacle used with hood
MI-50M2SL—Plug used on chassis

MI-H (Alum. Hoods, Available all MI Series
Typical—MI-14HR (Rear cable entrance)
MI-14HS (Side cable entrance)

MH SERIES
Plugs—MH-4M, 5M, 7M, 9M.
Receptacles—MH-4F, 5F, 7F, 9F



HMI SERIES
(Hermetic Seal Miniature Plug)
Available all MI-M types
Also available HMI-SL SERIES
(Hermetic seal Double Lead Screw Lock Version) used with MI-SL Miniature Screw Lock Connectors



MRO-7MGN (Plug)
Receptacle—MRO-7FGN

HMR-14M Relay Hermetic Seal Plug.
MR-14F—Mating Receptacle

SMI SERIES (Sub-Miniature)
Plugs—SMI-7M, 11M, 14M, 20M, 34M
Receptacles — SMI-7F, 11F, 14F, 20F, 34F

MH SERIES (Hood)
Cat. No. MH-9, 10, 18, 19
Cable Opening 9/64, 10/64, 18/64, 19/64 (add symbol "C" for cable clamp version)

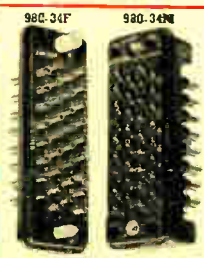
SC (Scope Connectors)
SC-21M—21 Contact, male
SC-21F—21 Contact, female
Other designs to specification

CABLE CLAMPS
Withstanding 100 P.S.I. in cable sizes 3/16" to 21/32"

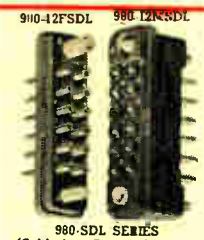
PRESSURE SEALS
to 1000 P.S.I.

ADAPTER ASSEMBLIES

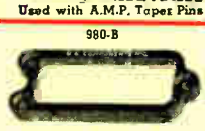
Power



980 SERIES (Spring Ejection)
Plugs—980-12F, 18FS, 24F, 34F
Receptacles—980-12M, 18MS, 24M, 34M



980-SDL SERIES
(Solderless Spring Ejection)
Plugs—980-12FSDL, 18FSDL, 24FSDL, 34FSDL
Receptacles — 980-12MSDL, 18MSDL, 24MSDL, 34MSDL
Used with A.M.P. Taper Pins

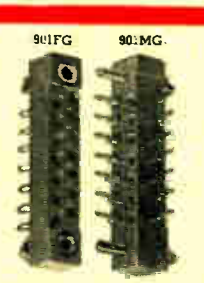


980-B (Alum. Die Cast Mounting Bracket)
Used with 980-Series
Typical Cat. No. 980-12B, 18B, 24B, 34B

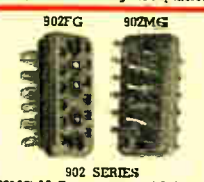
980-34F2
980-SL SERIES
(Double Lead Screw Lock)
Available all 980 types
Typical Cat.
980-34HSSL—Side cable entrance hood
980-34HRSL—Rear cable entrance hood
980-34M2—Receptacle used with hood
980-34F2SL—Plug used on chassis
980-34F2—Plug used with hood
980-34M2SL—Receptacle used on chassis

Remember; twice the speed with Double Lead

980-H (Alum. Hoods)
Available all 980 types
Typical—980-24HR (Rear cable entrance)
—980-24HS (Side cable entrance)

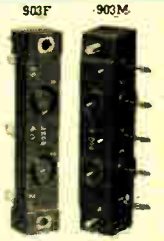


900-901 SERIES 15 Contact Plugs
901MG ("L" Terminals)
901MLG (Loop Terminals)
901MG (Anchor Terminals)
900FG, 901FG Mating Receptacles



902 SERIES
902MG-15 Contact plugs (Gold Pl.)
902MS-15 Contact plugs (Sil. Pl.)
902FG-Mating Recep. (Gold Pl.)
902FS-Mating Recep. (Sil. Pl.)

902 TYPE HOOD
(Used with 902 Series 15 Contact Connectors)
Available—Rear and Side cable entrance Flush and Recessed Assembly



903 TYPE
6 Contact for Hi-voltage application

Power

990-SDL SERIES (Solderless)
Plugs—990-7MSDL, 10MSDL, 15MSDL, 18MSDL
Receptacles—990-7FSDL, 10FSDL, 15FSDL, 18FSDL
Used with A.M.P. Taper Pins

990 SERIES (Long Contacts)
Plugs—990-7M, 10M, 15M, 18M
Receptacles—990-7F, 10F, 15F, 18F
990-S SERIES (Short Contacts)
Plugs—990-7MS, 10MS, 15MS, 18MS
Receptacles—990-7FS, 10FS, 15FS, 18FS

990-H (Alum. Hood)
Available all 990 Series
Typical 990-15HR (Rear cable entrance)
990-15HS (Side cable entrance)

990-BC
(Bracket Cable Clamp)
990-7BC, 10BC, 15BC, 18BC

UPCR SERIES
(Printed Card Receptacle)
Single Row—UPCR—6, 10, 15, 18, 22
Double Row Wire Solder UPCR—D6, D10, D15, D18, D22
Double Row Wire Wrap UPCR—DW6, DW10, DW15, DW18, DW22
Double Row Taper Tab—UPCR—DT6, DT10, DT15, DT18, DT22
Double Row Taper Pin—UPCR—DTP6, DTP10, DTP15, DTP18, DTP22

Applications: • PORTABLE EQUIPMENT • INSTRUMENTATION • COMMUNICATION • TEST APPARATUS • AIRCRAFT • GUIDED MISSILES

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Associated with U. S. Tool and Mfg. Co., Inc.

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For further data on advertised products use page 207.

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Canadian Marconi Co.
Electrodesign
Fraser, D. M., Ltd.
Phillips Electrical Co. (1953) Ltd.
J. R. G. McVity & Co.

CAPACITORS (Paper)
Tobe Deutschmann Corp.
Aerovox Canada Ltd.
Astral Electric Co.
Atlas Radio Corp. Ltd.
Brown Boveri (Canada) Ltd.
Fraser, D. M., Ltd.
Phillips Electrical Co. (1953) Ltd.
Telephone Mfg. Co. Ltd.

CAPACITORS (Fixed)
Arrow Radio Co.
Tobe Deutschmann Corp.

CAPACITORS (Electrolytic)
Daly-Arrow Ltd.
Erie Resistor Corp.
United Electronic Mfg. Corp.
Aerovox Canada Ltd.
Astral Electric Co.
Atlas Radio Corp. Ltd.
Electrodesign
Pointon, Chas. W.

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E. F. Johnson Co.
Radio Condensor Co.
The Hammarlund Mfg. Co. Inc.
Electrodesign
Ellis, J. W., Industries.
Hammond Manufacturing Co. Ltd.
Pointon, Chas. W.
White Radio Ltd.

CAPACITORS (Moulded)
Arrow Radio Co.

CAPACITORS (Oil Filled)
Arrow Radio Co.
Aerovox Canada Ltd.
Astral Electric Co.
Atlas Radio Corp. Ltd.
Brown Boveri (Canada) Ltd.
Canadian General Electric Co. Ltd.
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English Electric Co. of Canada Ltd.
Fraser, D. M., Ltd.
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Oerlikon Canada Ltd.
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Pointon, Chas. W.
Swedish General Electric Ltd.
Thomson Electrical Works Ltd.

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CAPACITORS (Mica)
Aerovox Canada Ltd.
Astral Electric Co.
Atlas Radio Corp. Ltd.
Electrodesign
Glendon Co. Ltd.
Johnson, Matthey & Mallory Ltd.
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Telephone Mfg. Co. Ltd.

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Aircraft-Marine Products of Canada Ltd.

CAPACITORS (High Voltage D.C.)
Aircraft-Marine Products of Canada Ltd.

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Kerr-Machin Associates

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Canadian Westinghouse Co. Ltd.
Herring, John, & Co. Ltd.
Oerlikon Canada Ltd.
Osborne Electric Co. Ltd.
Phillips Electrical Co. (1953) Ltd.
Swedish General Electric Ltd.
Telephone Mfg. Co. Ltd.

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Astral Electric Co.
Atlas Radio Corp. Ltd.
Electrodesign
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Johnson, Matthey & Mallory Ltd.

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Canadian General Electric Co. Ltd.
Canadian Line Materials Ltd.
Canadian Westinghouse Ltd.
English Electric Co. of Canada Ltd.
Fraser, D. M., Ltd.
Oerlikon Canada Ltd.
Swedish General Electric Ltd.

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Canadian Line Materials Ltd.
Canadian Westinghouse Co. Ltd.
English Electric Co. of Canada Ltd.
Fraser, D. M., Ltd.
Oerlikon Canada Ltd.
Phillips Electrical Co. (1953) Ltd.
Sepco Electric Products Corp.
Swedish General Electric Ltd.
Telephone Mfg. Co. Ltd.
Thomson Electrical Works Ltd.

CASES (Instrument)
Stark Electronic Instruments Ltd.
General Tire & Rubber Co. of Canada Ltd., Stokes Division
Renfrew Electric & Refrigerator Co. Ltd.
Canadian Research Institute
The Solartron Electronic Group Ltd.

CELLS (Photoelectric)
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Atlas Radio Corp. Ltd.
Canadian Marconi Co.
Electronic Tube & Components Division.
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Rogers Majestic Electronics Ltd.
Electrodesign.
Electronics Associates Ltd.
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries.
Canadian Westinghouse Co. Ltd., Electronics Division.
Canadian Research Institute.
Bayly Engineering Ltd.
Cinema-Television Ltd.

CELLS (Standard)
Bern, Lee & Co. Ltd.
Electrodesign.
Stark Electronic Instruments Ltd.
H. Tinsley & Co. Ltd.
R. H. Nichols Ltd.
Sensitive Research Instrument Corp.
Northern Electric Co. Ltd.
Cossor Canada Ltd.

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General Cement Mfg. Co.
Ambroid Co.
Chas. W. Pointon Ltd.
United Shoe Machinery Corp.
Minnesota Mining & Mfg. of Canada Ltd.
Walsco Electronics Corp.
Norton Behr-Manning Overseas Inc.
Workman TV Inc.
Atlas Radio Corp. Ltd.
Bakelite Co.

CHAMBERS (Shielded Screen)
Stark Electronic Instruments Ltd.
Erik A. Lindgren & Associates.
Atlas Radio Corp. Ltd.
McPhar Engineering Co. of Canada Ltd.

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Canadian Electronics Ltd.
Stark Electronic Instruments Ltd.
Thermovelt Instruments Ltd.
Conrad Inc.
American Research Corp.

CHECKERS (Diode)
Waters Manufacturing Inc.

CHECKERS (Tube)
Canadian Marconi Co., Electronic Tube & Components Div.
Rogers Majestic Electronics Ltd.
Canadian Electronics Ltd.
Bach-Simpson Ltd.
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Precision Apparatus Co. Inc.
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Cinema-Television Ltd.
Superex Electronics Corp.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Cossor Canada Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
General Precision Industries Ltd.

CHECKERS (Tube, Klystron)
Polarad Electronics Corp.

CHOKES (Audio)
Vokar Corp.
Superex Electronics Corp.
Northern Electric Co. Ltd.
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Triad Transformer Corp.
National Co. Inc.
Altec Lansing Corp.
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Electronic Engineering
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Texas Instruments Inc.
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Wright & Weaire Ltd.
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Goodmans Industries Ltd.
Osborne Electric Co. Ltd.

CHOKES (Filter)
Osborne Electric Co. Ltd.
Goodmans Industries Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Hammond Manufacturing Co. Ltd.
Triad Transformer Corp.
National Co. Inc.
Altec Lansing Corp.
Canadian Westinghouse Co. Ltd., Electronics Division.
Copper Wire Products Ltd.
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Kerr-Machin Associates.
Belling & Lee Ltd.
Wright & Weaire Ltd.
Whiteley Electrical Radio Co. Ltd.
Vokar Corp.
Superex Electronics Corp.
Northern Electric Co. Ltd.

CHOKES (Power)
Superex Electronics Corp.
Northern Electric Co. Ltd.
Hackbusch Electronics Ltd.
Canadian Electronics Ltd.
Hammond Manufacturing Co. Ltd.
Triad Transformer Corp.
Altec Lansing Corp.
Canadian Westinghouse Co. Ltd., Electronics Division.
Aeromotive Engineering Products.
Electronic Engineering.
Standard Electronics Corp.
Kerr-Machin Associates.
Whiteley Electrical Radio Co. Ltd.
Partridge Transformers Ltd.
Osborne Electric Co. Ltd.

CHOKES
Dynamic Electronics, N.Y., Inc.

CHOKES (R.F.)
Ohmite Manufacturing Co.

CHOPPERS
The Bristol Co. of Canada Ltd.
Aeromotive Engineering Products.
Canadian Research Institute.
G. & M. Equipment Co. Inc.
Atlas Radio Corp. Ltd.

CIRCUITS (Potted)
Canadian Electronics Ltd.
Copper Wire Products Ltd.
Amphenol Canada Ltd.
Computing Devices of Canada Ltd.
Dale Products Inc.
Osborne Electric Co. Ltd.
Superex Electronics Corp.
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CIRCUITS (Printed)
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United-Carr Fastener Co. of Can. Ltd.
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CLIPS
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Gee-Lar Mfg. Co.
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CLIPS (Test)
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COATINGS (Conductive)
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Div. of Acheson Industries Inc.
Javex.
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COATINGS (Protective)
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Javex.
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Edwards High Vacuum Ltd.

CLOTHS (Grill)
Stark Electronic Instruments Ltd.
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J. R. Longstaffe Co. Ltd.
Electronics Communications Ltd.
Chas. W. Pointon Ltd.
Walsco Electronics Corp.
Atlas Radio Corp. Ltd.

COILS
Radio Condensor Co.

CODE MARKERS
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Aeromotive Engineering Products.
Northern Electric Co. Ltd.

COMMUNICATION SYSTEMS (Aircraft)
Canadian Electronics Ltd.
Lear Inc.
Collins Radio Co. of Canada Ltd.
Aircraft Radio Corp.
Airmec Ltd.
Specialty Engineering & Electronics Co.
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

COMMUNICATION SYSTEMS (Aircraft Traffic Control)
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Lear Inc.
Redifon (Canada) Ltd.
Collins Radio Company of Canada Ltd.
Avionex Electronics Corp.
Dynamic Electronics, N.Y., Inc.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

COMMUNICATION SYSTEMS (Carrier Current)
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Canadian Line Materials Ltd.
Rogers Majestic Electronics Ltd.
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Canadian Westinghouse Co. Ltd.,
Electronics Division.
Lenkurt Electric Co. of Canada Ltd.
Vocaline Company of America Inc.
Northern Electric Co. Ltd.
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Bludworth Marine, Division of National-Simplex-Bludworth Inc.
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RCA Victor Co. Ltd.

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Electrovert Ltd.
Hackbusch Electronics Ltd.
National Co. Inc.
Canadian Westinghouse Co. Ltd.,
Electronics Division.
Collins Radio Company of Canada Ltd.
Lenkurt Electric Co. of Canada Ltd.
Litton Industries Inc.
Dynamic Electronics, N.Y., Inc.
Philco Corp., Govt. & Industrial Div.
Technicraft Laboratories Inc.
G. & M. Equipment Co. Inc.
Northern Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
RCA Victor Co. Ltd.

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Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

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Aircraft Radio Corp.
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G. & M. Equipment Co. Inc.
Kaar Engineering Corp.
Cossor Canada Ltd.
Radio Communications Equipment & Engineering Ltd.
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Dawe Instruments Ltd.
Fischer & Porter Co.
Atlas Radio Corp. Ltd.

COMPARATORS (Voltage)
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Lab-O Ring Enterprises Ltd.
Canadian Research Institute.

COMPOUNDS (Potting)
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Computing Devices of Canada Ltd.
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Technology Instrument Corp.
The Solartron Electronic Group Ltd. (E)
Elliott Brothers (London) Ltd. (E)
The English Electric Co. Ltd. (E)
Avion Division of ACF Industries Inc.
Cossor Canada Ltd.

COMPUTERS (Digital)
Servo Corporation of America.
Electronics Corporation of America.
Ferranti Electric Ltd.
Computing Devices of Canada Ltd.
Potter Instrument Co. Inc.
Litton Industries Inc.
The Solartron Electronic Group Ltd.
Elliott Brothers (London) Ltd.
The English Electric Co. Ltd.
New London Instrument Co. Inc.
Underwood Corp., Electronic Comp. Div.
Scientific Specialties Corp.
Avion Div. of ACF Industries Inc.
Polarad Electronics Corp.

CONDENSERS (Tuning)
H. McCardle.

CONNECTORS
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CONNECTORS (Anode)
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Garde Manufacturing Co.
General Cement Manufacturing Co.
Herman H. Smith Inc.
Walsco Electronics Corp.
Power Controls Ltd.
Accurate Electronics Corp.
Atlas Radio Corp. Ltd.

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Pye Canada Ltd.
Tenatronics Ltd.
Stark Electronic Instruments Ltd.
Garde Manufacturing Co.
General Cement Manufacturing Co.
Whitney, Blake Co.
Amphenol Canada Ltd.
Koiled Kords Inc.
Switchcraft Inc.
Howard B. Jones Div.
Aircraft Radio Corp.
Power Controls Ltd.

CONNECTORS (Antennae)
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Tenatronics Ltd.
Hackbusch Electronics Ltd.
Garde Manufacturing Co.
General Cement Manufacturing Co.
Gee-Lar Manufacturing Co.
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Electronics Division
Wind Turbine Company of Canada Ltd.
Amphenol Canada Ltd.
John R. Tilton Ltd.
Diamond Microwave Corp.
Herman H. Smith Inc.
Howard B. Jones Division.
Walsco Electronics Corp.
Javex.
Belling & Lee Ltd.
Atlas Radio Corp Ltd.

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Tenatronics Ltd.
Pye Canada Ltd.
Hackbusch Electronics Ltd.
Garde Manufacturing Co.
Gee-Lar Manufacturing Co.
Canadian Westinghouse Co. Ltd.,
Electronics Division.
Wind Turbine Company of Canada Ltd.
Amphenol Canada Ltd.
John R. Tilton Ltd.
R-O-R Associates Ltd.
Diamond Microwave Corp.
Microdot Division—Felts Corp.
Prodelin Inc.
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Blonder-Tongue Laboratories Inc.
Javex.
Power Controls Ltd.
Scintilla Division, Bendix Aviation Corp.
Tenna Manufacturing Co.
General Radio Co.
Titania Electric Corp. of Canada Ltd.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.

CONNECTORS (Diode)
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Diamond Microwave Corp.
Keystone Electronics Corp.
Atlas Radio Corp. Ltd.

CONNECTORS (Waterproof)
Cannon Electric Canada Ltd.
Pye Canada Ltd.
Garde Manufacturing Co.
Whitney, Blake Co.
Wind Turbine Company of Canada Ltd.
Amphenol Canada Ltd.
Microdot Division, Felts Corp.
Koiled Kords Inc.
DeJur-Amsco Corp.
Continental Connector Corp.
Automatic & Precision Mfg. Co.
Scintilla Div., Bendix Aviation Corp.
Northern Electric Co. Ltd.

CONNECTORS (Solderless)
Aircraft-Marine Products of Canada Ltd.

CONES (Speaker)
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H. A. Hartley Co. Inc.
Copper Wire Products Ltd.

CONTACT CLEANER (Liquid)
Workman TV Inc.

CONTACTS (Electrical)
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General Control Co.
Garde Manufacturing Co.
Amphenol Canada Ltd.
Johnson, Matthey & Mallory Ltd.
Davis Automatic Controls Ltd.
Methode Manufacturing Corp.
Continental Connector Corp.
D. E. Makepeace Co., Division of Union Plate & Wire Co.
Javex.
Northern Electric Co. Ltd.
J. R. G. McVity & Co.

CONTROLS (Alarm)
Electrodesign.
Hackbusch Electronics Ltd.
Mack Electric Devices Inc.
Davis Automatic Controls Ltd.

PRECISION INSTRUMENTS

by THOSE that SET the STANDARDS

BOONTON RADIO CORP'N

Q-Meters, Q Standards
FM-AM Signal Generators
Sweep Signal Generators
Wide Band Impedance Measuring Equipment
RF Voltage Standards

ALLEN B. DU MONT LABORATORIES, INC.

Oscillographs, Calibrators, electronic switches
Delay Generators, Cameras, Accessories
Industrial and Radar Type Cathode-ray tubes
Multiplier phototubes

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Research instruments from 2.6 to 90 KMC.
Microwave equipment of advanced design, high precision and ease of operation.

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RF Power and VSWR Instruments
Directional Couplers
Absorption Type RF Wattmeters
RF Load Resistors
Calorimetric Type Standard Wattmeter

WATERS MANUFACTURING, INC.

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Torque Watch Gauges
Test Equipment

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Repair facilities for all precision electronic and indicating instruments.
Advanced design of filters, toroids manufactured to military specifications.

Our staff is available to assist you in the selection, use and repair of your laboratory equipment.

BAYLY ENGINEERING Ltd. – AJAX

For further data on advertised products use page 207.

Bailey Meter Co. Ltd.
Industrial Electronics of Canada Ltd.
Martin Engineering Inc.
The Bristol Company of Canada Ltd.
Collins Radio Company of Canada Ltd.
Canadian Research Institute.
Lab-O Ring Enterprises Ltd.
The Mercoid Corp.
Electronic Control Corp.
United Electric Controls Co.
Elliott Brothers (London) Ltd.
Browning Laboratories Inc.
Wheelco Instruments Div. Barber-Colman Co.
Dynamic Electronics, N.Y., Inc.
Fischer & Porter Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.

CONTROLS (Counting)
Rogers Majestic Electronics Ltd.
Electronic Associates Ltd.
Hackbusch Electronics Ltd.
Electronics Corporation of America
Fielden Instrument Division
General Control Co.
The Autotron Co.
Canadian Westinghouse Co. Ltd., Electronics Division.
Davis Automatic Controls Ltd.
Martin Engineering Inc.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Canadian Research Institute.
Laboratory for Electronics Inc.
Electronic Control Corp.
Potter Instrument Co. Inc.
Ess Instrument Co.
Dawe Instruments Ltd.
Airmec Ltd.
Londex Ltd.
Cinema-Television Ltd. (E)
Fischer & Porter Co.
Sciaky Bros. Inc.
G. C. Wilson & Co.
Atlas Radio Corp. Ltd.

CONTROLS (Regulating)
Canadian Marconi Co., Electronic Tube & Components Division.
Precision Electronic Components Ltd.
G. F. Kelk & Co.
Electronics Corporation of America.
Canadian Westinghouse Co. Ltd., Electronics Division.
The Bristol Co. of Canada Ltd.
Canadian Research Institute.
Chas. W. Pointon Ltd.
United Electric Controls Co.
Askania Regulator Co.
Robotron Corp.
The Superior Electric Co.
Elliott Brothers (London) Ltd.
Fielden Electronics Ltd.
The Solartron Group Ltd.
The English Electric Co. Ltd. (E)
Cinema-Television Ltd. (E)
Sperry Gyroscope Co. of Canada Ltd.
Wheelco Instruments Div. Barber Colman Co.
The Superior Electric Co.
Daystrom Pacific Corp.
Fischer & Porter Co.
Vectron Inc.
Sciaky Bros. Inc.
Inet Division of Leach Corp.

CONTROLS (Electronic)
Martin Engineering Inc.
Musimart of Canada Ltd., Electronic Div.
Industrial Electronics of Canada Ltd.
Canadian Research Institute.
Chas. W. Pointon Ltd.
Lab-O Ring Enterprises Ltd.
R. H. Nichols Ltd.
Peacock Brothers Ltd.
Electronic Control Corp.
Servomechanisms Inc.
DeJur-Amsco Corp.
Cinema Engineering Co., Div. Aerovox Corp.
Robotron Corp.
Dawe Instruments Ltd.
Elliott Brothers (London) Ltd.
Fielden Electronics Ltd.
The Solartron Electronics Group Ltd.
Evershed & Vignoles Ltd.
The English Electric Company Ltd. (E)
Cinema-Television Ltd.
Electrovert Ltd.
Canadian Stackpole Ltd.
Electronic Associates Ltd.
Electrodesign.
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Hackbusch Electronics Ltd.
The Autotron Co.
G. F. Kelk & Co.
Electronics Corp. of America, Fielden Instrument Division.
General Control Co.
Servo Corporation of America
Lear Inc.
Vocaline Company of America.
Canadian Westinghouse Co. Ltd.
Vectron Inc.
Dyastrom Pacific Corp.
Wheelco Instruments Div. Barber-Colman Co.
Dynamic Electronics, N.Y., Inc.
Avion Div. of ACF Industries Inc.
G. C. Wilson & Co.
Sciaky Bros. Inc.
Fischer & Porter Co.
Sperry Gyroscope Co. of Canada Ltd.
Perkins Electric Co. Ltd.

CONTROLS (Frequency)
Electrovert Ltd.
Stark Electronic Instruments Ltd.
R-O-R Associates Ltd.
Leonard Electric Ltd.
Lab-O Ring Enterprises Ltd.
Teletronics Laboratory Inc.
The English Electric Co. Ltd.
Cinema-Television Ltd.
Dyastrom Pacific Corp.
Inet Division of Leach Corp.

CONTROLS (Humidity)
Electrovert Ltd.
Electrodesign.
Rogers Majestic Electronics Ltd.
Canadian General Electric Co. Ltd.
The Bristol Company of Canada Ltd.
Thermovelt Instruments Ltd.
Canadian Research Institute.
Peacock Brothers Ltd.
United Electric Controls Co.
Dawe Instruments Ltd.
Elliott Brothers (London) Ltd.
Sperry Groscope Co. of Canada Ltd.

CONTROLS (Level)
Askania Regulator Co.
Airmec Ltd.
Evershed & Vignoles Ltd.
Fielden Electronics Ltd.
Elliott Brothers (London) Ltd.
Londex Ltd.
Electrovert Ltd.
Electrodesign.
Rogers Majestic Electronics Ltd.
Electronic Associates Ltd.
Fielden Instrument Division, Electronics Corp. of America.
Davis Automatic Controls Ltd.
Bailey Meter Co. Ltd.
International Resistance Co. Ltd.
Thermovelt Instruments Ltd.
The Bristol Company of Canada Ltd.
Martin Engineering Inc.
Peacock Brothers Ltd.
Lab-O Ring Enterprises Ltd.
Electronic Control Corp.
The Mercoid Corp.
United Electric Controls Co.
Fischer & Porter Co.

CONTROLS (Tuning)
Canadian Marconi Co., Electronic Tube & Components Division.
International Resistance Co. Ltd.
Vidaice Electronics Mfg. Corp.

CONTROLS (Electronic-Static)
The Takk Corp.

CONTROLS (Materials Thickness)
Stark Electronic Instruments Ltd.
Electrodesign.
Rogers Majestic Electronics Ltd.
Fielden Instrument Division, Baldwin Instrument Co. Ltd.
Fielden Electronics Ltd.
Elliott Brothers (London) Ltd.
Pratt & Whitney, Div. Niles-Bement-Pond Co.

CONTROLS (Photoelectric)
Baldwin Instrument Co. Ltd.
Airmec Ltd.
Londex Ltd.
Electrovert Ltd.
Electrodesign.
Rogers Majestic Electronics Ltd.
Electronic Associates Ltd.
Electronics Corporation of America.
The Autotron Co.
Canadian Westinghouse Co. Ltd., Electronics Division.
Davis Automatic Controls Ltd.
Electronic Communications Ltd.
Industrial Electronics of Canada Ltd.
Musimart of Canada Ltd., Electronic Div.
Martin Engineering Inc.
Canadian Research Institute.
Electronic Control Corp.
Potter Instrument Co. Inc.
Askania Regulator Co.
Robotron Corp.
Avion Division of ACF Industries Inc.
Fischer & Porter Co.
G. C. Wilson & Co.
Perkins Electric Co. Ltd.

CONTROLS (Power Level)
Bailey Meter Co. Ltd.
Canadian Research Institute.
Electronic Control Corp.
Cinema Engineering Co., Division Aerovox Corp.
Daven Co.

CONTROLS (Radio)
Stark Electronic Instruments Ltd.
Canadian Stackpole Ltd.
Precision Electronics Components Ltd.
Canadian Marconi Co., Electronic Tube & Components Division.
Pye Canada Ltd.
Centralab Canada Ltd.
International Resistance Co. Ltd.
P. J. Heenan Ltd.
Collins Radio Company of Canada Ltd.
International Resistance Co.
Daystrom Pacific Corp.
Dynamic Electronics, N.Y., Inc.

CONTROLS (Servo)
Dyastrom Pacific Corp.
Daven Co.
Fischer & Porter Co.
Sciaky Bros. Inc.
Sperry Gyroscope Co. of Canada Ltd.
Electronic Associates Ltd.
Servo Corporation of America.
Circuit Instruments Inc.
Musimart of Canada Ltd., Electronic Division.
Industrial Electronics of Canada Ltd.
Ferranti Electric Ltd.
R-O-R Associates Ltd.
The Bristol Company of Canada Ltd.
Computing Devices of Canada Ltd.
Servomechanisms Inc.
Askania Regulator Co.
Litton Industries Inc.
Elliott Brothers (London) Ltd.
The English Electric Co. Ltd.

CONTROLS (Smoke, Combustion, Electronic)
Electronic Associates Ltd.
Electrovert Ltd.
Rogers Majestic Electronics Ltd.
Electronics Corporation of America.
The Autotron Co.
Bailey Meter Co. Ltd.
Davis Automatic Controls Ltd.
Canadian Westinghouse Co. Ltd.
The Bristol Co. of Canada Ltd.
Martin Engineering Inc.
Electronic Controls Ltd.
Aeromotive Engineering Products
Electronic Control Corp.
Ess Instrument Co.
Ripley Co. Inc.
Kelvin & Hughes (Industrial) Ltd.
Evershed & Vignoles Ltd.
Wheelco Instruments Div., Barber-Colman Co.
Perkins Electric Co. Ltd.
Electrodesign
Canadian Marconi Co., Electronic Tube & Components Div.
Hackbusch Electronics Ltd.
International Resistance Co. Ltd.
Electronic Communications Ltd.
Canadian Research Institute
Hycor Sales Co.
Cinema Engineering Co., Division Aerovox Corp.

CONTROLS (Temperature—Electronic)
Airmec Ltd.
Fielden Electronics Ltd.
Elliott Brothers (London) Ltd.
Electrodesign
Electrovert Ltd.
Rogers Majestic Electronics Ltd.
Servo Corp. of America
Fielden Instrument Division
Electronics Corp. of America
Bailey Meter Co. Ltd.
The Bristol Co. of Canada Ltd.
Martin Engineering Inc.
Thermovelt Instruments Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Peacock Brothers Ltd.
Aeromotive Engineering Products
Electronic Control Corp.
The Mercoid Corp.
West Instrument Corp.
United Electric Controls Co.
Precision Scientific Co.
Kelvin & Hughes (Industrial) Ltd.
Evershed & Vignoles Ltd.
Wheelco Instruments Div. Barber-Colman Co.
Fischer & Porter Co.
Sciaky Bros. Inc.
Titania Electric Corp. of Can. Ltd.
Perkins Electric Co. Ltd.

CONTROLS (Ultrasonic)
Rogers Majestic Electronics Ltd.
Canadian Research Institute

CONVERTERS (AC-DC)
Canadian Line Materials Ltd.
Burlec Sales Ltd.
R-O-R Associates Ltd.
Industrial Electronics of Canada Limited
Chas. W. Pointon Ltd.
Electronic Controls Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Cornell-Dublier Electric Corp.
American Television & Radio Co.
The Leland Electric Co. Div., American Machine & Foundry Co.
The English Electric Co. Ltd.
Daystrom Pacific Corp.
Western Gear Works, Electro Products Division

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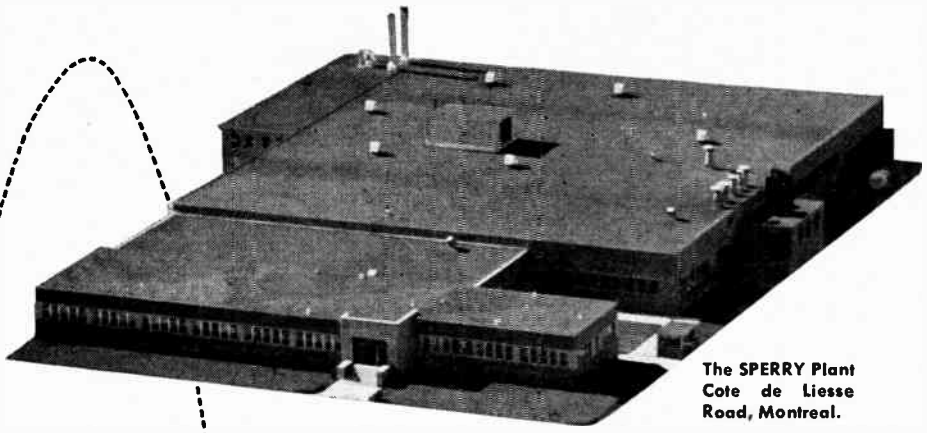
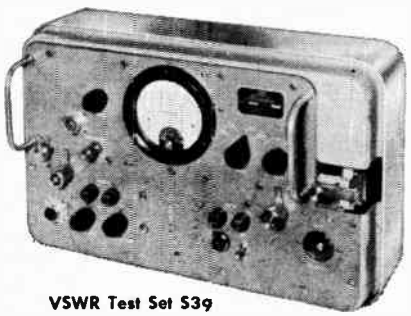
. . . the result of SPERRY research and manufacturing experience. The design, development and manufacture of test equipment for radar and other microwave components is continuing in this modern plant. Behind this program lies the vast experience of the entire SPERRY organization who are pioneers in the field of microwave equipment. In addition to the products illustrated, the SPERRY line also includes those listed opposite.

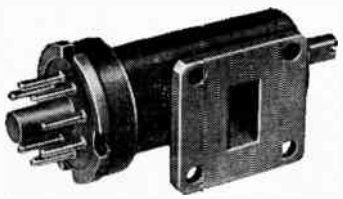
*T.M. Reg. U.S. Pat. Off.



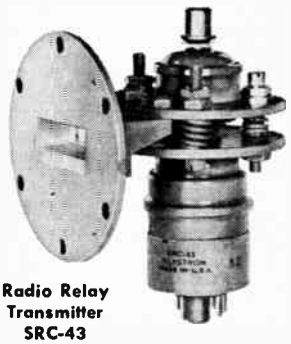
The SPERRY Plant Cote de Liesse Road, Montreal.



VSWR Test Set S39



Local Oscillator SRU-5S



Radio Relay Transmitter SRC-43

Klystrons	Barretter and Thermistor Mounts
Barreter Elements	Thermistor Elements
Impedance Meters	Impedance Transformers
Frequency Meters	Directional Couplers
Attenuators	Terminations
High Power Waveguide Terminations	Wattmeter Bridge
Klystron Power Supply	Microwave Receiver
F.M. Test Set	VSWR Test Set X band
Detectors and Mixers	Adapters
Shorts	Amplifiers (*Subminiature*)
Amplifiers (*Magnetic*)	Calibrators — Sweep
Chokes (*Filter*)	Controls (*Regulating*)
Controls (*Electronic*)	Controls (*Servo*)
Dials (*Precision*)	Filters (*Bond Elimination*)
Filters (*Radio Interference*)	Inductance Windings
Oscillators	Servomechanisms
Telephanes (*Handsets*)	

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SPERRY

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P.O. Box 710 — Montreal, Que.

Sperry Gyroscope Ottawa Limited — Ottawa, Ont.

McColpin-Christie Corp.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.

CONVERTERS (DC-AC)
Burlec Sales Ltd.
Bludworth Marine Division of National-Simplex-Bludworth Inc.
Katolight Corp.
Lear Inc.
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
Chas. W. Pointon Ltd.
Canadian Research Institute
Aeromotive Engineering Products
Cornell-Dublier Electric Corp.
American Television & Radio Co.
The Leland Electric Co. Div., American Machine & Foundry Co.
The English Electric Co. Ltd.
Daystrom Pacific Corp.
Avion Division of ACF Industries Inc.
Western Gear Works, Electro Products Division
Terado Co.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.

CONVERTERS (FM)
Dynamic Electronics N.Y. Inc.
Electro-Mechanical Research Inc.
Bach-Simpson Ltd.
Stratton & Co. Ltd. (E)

CONVERTERS (Magnetic)
Lear Inc.
Potter Instrument Co. Inc.

CONVERTERS (Microwave)
Electrodesign
Hackbusch Electronics Ltd.
R-O-R Associates Ltd.
Bayly Engineering Ltd.
Microwave Associates Inc.
D. E. Makepeace Co., Division of Union Plate & Wire Co.
Microwave Instruments Ltd.
Dynamic Electronics N.Y. Inc.
Vectron Inc.
Atlas Radio Corp. Ltd.

CONVERTERS (Television)
Bach-Simpson Ltd.
John R. Tilton Ltd.
Lynmar Engineers Inc.
Crest Laboratories Inc., Microtan Company Division
Cornell-Dublier Electric Corp.
Blonder-Tongue Laboratories Inc.
Dynamic Electronics N.Y. Inc.

CONVERTERS (Static Electronic)
Vectron Inc.
Avion Division of ACF Industries Inc.
Sciaky Bros. Inc.

CORDS (Line)
General Cement Mfg. Co.
Gee-Lar Mfg. Co.
Whitney Blake Co.
Royal Electric Co. Inc.
Alpha Wire Corp.
Prince & Roberts
R. D. Fleck & Co. Ltd.
Northern Electric Co. Ltd.

CORDS (Line—Retractile)
Koiled Kords Inc.

CORDS (Resistance)
Northern Electric Co. Ltd.
General Cement Mfg. Co.
John R. Tilton Ltd.

CORES (Ceramic)
National Moldite Co.
Aeromotive Engineering Products
Stupakoff Ceramic & Mfg. Co.
Kerr-Machin Associates
Saxon Burg Ceramics
Norton Behr-Manning Overseas Inc.
Superex Electronics Corp.
Titania Electric Corp. of Can. Ltd.

CORES (Magnetic)
Rogers Majestic Electronics Ltd.
National Moldite Co.
Thomas & Skinner Steel Products Co. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Polypenco, Inc.
The English Electric Co. Ltd.
Superex Electronics Corp.

CORES (Iron)
Rogers Majestic Electronics Ltd.
National Moldite Co.
Canadian Westinghouse Co. Ltd., Electronics Division
The English Electric Co. Ltd.

CORES (Powdered Iron)
Radio Components Ltd.
Automatic Electric Sales (Canada) Ltd.
Canadian Stackpole Ltd.
National Moldite Co.
Aerovox Canada Ltd.
Lenkurt Electric Co. of Canada Ltd.
Polypenco Inc.
Workman TV Inc.
H. McCardle
Londex Ltd.
Cinema-Television Ltd.
Rogers Majestic Electronics Ltd.
Electrodesign
Electronic Associates Ltd.
Hackbusch Electronics Ltd.
Prince & Roberts
Computing Devices of Canada Ltd.
Lab-O Ring Enterprises Ltd.
Electronics Controls Ltd.
Canadian Research Institute
Laboratory for Electronics Inc.
Boesch Manufacturing Co. Inc.
Potter Instrument Co. Inc.
The Detectron Corp.
Ripley Co. Inc.
Durant Manufacturing Co.
Endevco Corp.
Dawe Instruments Ltd.
Airmec Ltd.
Sciaky Bros. Inc.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

COUNTERS (Frequency)
Hackbusch Electronics Ltd.
Electronic Associates Ltd.
Burlec Sales Ltd.
Electrodesign
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
Computing Devices of Canada Ltd.
Lab-O Ring Enterprises Ltd.
Aeromotive Engineering Products
Laboratory for Electronics Inc.
Potter Instrument Inc.
The Detectron Corp.
Airmec Limited
Dawe Instruments Ltd.
Cinema-Television Ltd.
Atlas Radio Corp. Ltd.
Rogers Majestic Electronics Ltd.
Electrodesign
Electric Associates Ltd.
Pye Canada Ltd.
John R. Tilton Ltd.
Sharpe Instruments Ltd.
Canadian Research Institute
Computing Devices of Canada Ltd.
Lab-O Ring Enterprises Ltd.
Precision Radiation Instruments Inc.
Electronic Instrument Co. Inc.
The Detectron Corp.
Airmec Limited
Cinema-Television Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
McPhar Engineering Co. of Can. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

COUNTERS (Photoelectric)
Electronic Associates Ltd.
Electrodesign
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
The Autotron Co.
Electronics Corp. of America
Canadian Westinghouse Co. Ltd. Electronic Division
Electronic Communications Ltd.
Martin Engineering Inc.
Canadian Research Institute
Electronic Controls Ltd.
Potter Instrument Co. Inc.
The Detectron Corp.
Ripley Co. Inc.
Ess Instrument Co.
Endevco Corp.
Durant Manufacturing Co.
Airmec Ltd.
Cinema-Television Ltd.
Londex Ltd.
Fischer & Porter Co.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.

CRYSTAL DETECTORS
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
Canadian Marconi Co. Electronic Tube & Components Div.
R-O-R Associates Ltd.
Microwave Associates Inc.
Airtron Inc.
General Electric Co., X-Ray Dept.
General Radio Co.
Atlas Radio Corp. Ltd.
Sperry Gyroscope Co. of Canada Ltd.

CRYSTAL HOLDERS
Quality Hermetics Ltd.

CRYSTALS (Scintillation Counter)
Electrodesign
Computing Devices of Canada Limited
Hackbusch Electronics Ltd.
Electronic Associates Ltd.
Precision Radiation Instruments Inc.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

CRYSTALS (Precision Ground Quartz)
Electronic Tube Co.

CRYSTAL (Quartz Freq. Control)
International Crystal Mfg. Co. Inc.

CRYSTAL SOCKETS
Javex

CYCLOTRONS
Canadian Marconi Co., Electronic Tube & Components Div.
Rogers Majestic Electronics Ltd.
The English Electric Company Ltd.

DECADE BOXES (Capacitance)
The J. W. Ellis Industries
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
H. Tinsley & Co. Ltd.
R-O-R Associates Ltd.
John R. Tilton Ltd.
Industrial Electronics of Canada Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Inc.
Electro-Measurements Inc.
Electronic Instrument Co. Inc.
Cornell-Dublier Electric Corp.
Industrial Instruments Inc.
Shallcross Manufacturing Co.
Electronic Measurements Corp.
Endevco Corporation
Dawe Instruments Ltd.
General Radio Co.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Cossar Canada Ltd.

DECADE BOXES (Resistance)
Ohmite Manufacturing Co.
Electronic Measurements Corp.
Cinema Engineering Co., Division Aerovox Corp.
Endevco Corp.
Dawe Instruments Ltd.
Baldwin Instrument Co. Ltd.
Painton & Co. Ltd.
The J. W. Ellis Industries
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
Canadian Marconi Co., Electronic Tube & Components Div.
H. Tinsley & Co. Ltd.
Bailey Meter Co. Ltd.
International Resistance Co. Ltd.
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
John R. Tilton Ltd.
R. H. Nichols Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Electro-Measurements Inc.
Cornell-Dublier Electric Corp.
Electronic Instrument Co. Inc.
Shallcross Manufacturing Co.
Industrial Instruments Inc.
Telex Inc.
The Winslow Co. Inc.
Fidelity Amplifier Co.
Daven Co.
General Radio Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

DEFLECTION YOKES
Stark Electronic Instruments Ltd.
General Instrument— F. W. Sickles of Canada Ltd.
Hackbusch Electronics Ltd.
The Telectron Co.
Triad Transformer Corp.
Telequipment Mfg. Co. Ltd.
Davis Electric Co.
Whiteley Electrical Radio Co. Ltd.
Cinema-Television Ltd.
Teleradio Engineering Corp.
Cossar Canada Ltd.

DECALCOMANIA TRANSFERS
Canada Decalcomania Co. Ltd.

DELAY LINES
James Millen Mfg. Co. Inc.
R-O-R Associates Limited
Computing Devices of Canada Limited
General Instrument— F. W. Sickles of Canada Limited
Wind Turbine Co. of Canada Ltd.
Laboratory for Electronics Inc.
Gulton Mfg. Corp.
Shallcross Manufacturing Co.
Tobe Deutschmann Corp.
Litton Industries Inc.
Cambridge Thermionic Corp.
Texas Instruments Inc.
Cinema-Television Ltd.
Tel-Instrument Electronics Corp.
The Winslow Co. Inc.
Specialty Engineering & Electronics Co.
Dynamic Electronics N.Y. Inc.
Bel Fuse Inc.
Underwood Corp., Electronic Computer Division
Superex Electronics Corp.
Titania Electric Corp. of Can. Ltd.
Northern Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Atlas Radio Corp. Ltd.

DETECTORS (Fire, Electronic)
Rogers Majestic Electronics Ltd.
Electronic Associates Ltd.
Electronics Corporation of America
Servo Corporation of America
Bailey Meter Co. Ltd.
Walter Kidde & Co. of Canada Ltd.
Electronic Controls Ltd.

Announcing

TYPE HB **UHF**

VARILOAD

POWER METER

200-500 MC/S

● *This meter offers the following unique features!*

Terminating resistance adjustable to any value between 40 ohms and 100 ohms.

Directly reading meter 0 — 60 watts at either 50 ohms or 75 ohms terminating resistance (93 ohms on request).

Rugged construction (no fragile metal film).

Easily replaceable ferrite dissipating element.

Supplied with 50 ohms and 75 ohms Type N Connector, 93 ohm connector available on request.

Power monitoring element Type 21B silicon crystal.

Power dissipating element; ferrite rings.

Calibration at any other terminating resistance (within 40 – 100 ohms range) provided on request.

SPECIFICATIONS

- Frequency range: 200 – 500 Mc/s.
- VSWR at any resistance setting: <1.2
- Resistance range 40 – 100 ohms (these limits vary slightly with frequency).
- Power range 0 – 60 watts single scale (lower values expanded scale, e.g., 4W gives 25% deflection).
- Power reading accuracy (±6%, ±0.2W at either 50 ohms or 75 ohms terminating resistance).
- Input connector type "N" in either 50 ohms or 75 ohms line.

Enjoy Television's Finest Hour
STUDIO ONE Monday Nights

YOU CAN BE SURE. . . IF IT'S Westinghouse

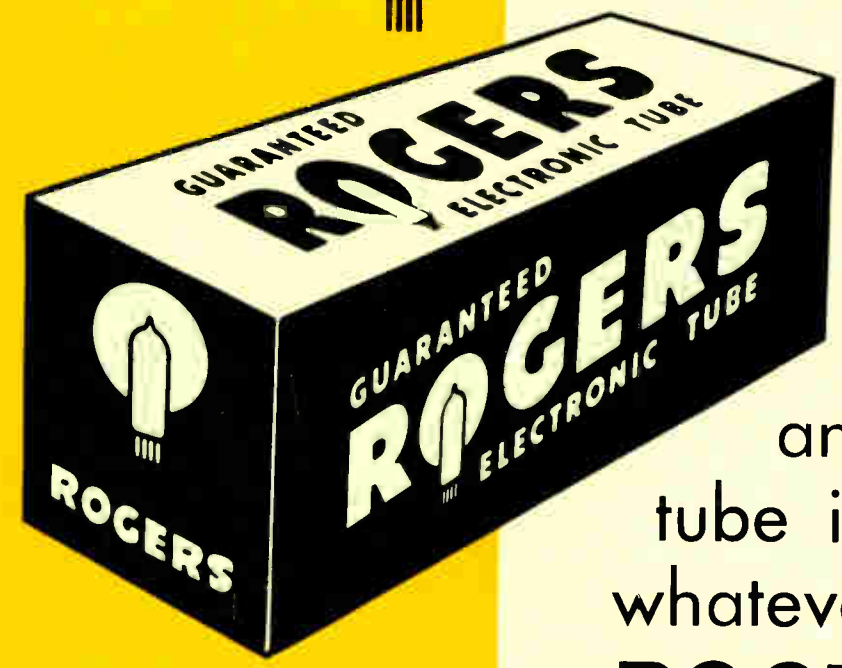
55L745

CANADIAN WESTINGHOUSE COMPANY LIMITED *Electronics Division* **HAMILTON, CANADA**

Halifax • Moncton • Quebec • Montreal • Ottawa • Toronto • Hamilton • London • Windsor
North Bay • Fort William • Winnipeg • Regina • Calgary • Edmonton • Lethbridge • Trail • Vancouver

For further data on advertised products use page 207.

ROGERS



Wherever an electronic tube is used, for whatever purpose ROGERS ELECTRONIC TUBES can supply it!

ROGERS electronic tubes are currently proving their superiority in many fields.

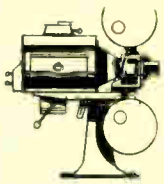
Whether it be an electronic tube for theatre projectors, broadcasting stations or in industry—a subminiature or cathode ray tube — regardless of size, type or application, ROGERS can supply it.

High standards of engineering, rigid inspection and the thorough testing of every completed tube ensure the high quality and long-life performance of ROGERS electronic tubes.

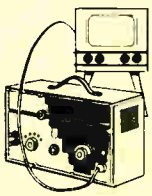
specify guaranteed ROGERS ELECTRONIC TUBES *electronic tubes*

For further data on advertised products use page 207.

for complete electronic tube service!



THEATRE PROJECTORS



TEST EQUIPMENT

MARINE RADIO

COMMUNICATION

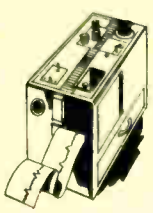
INDUSTRIAL CONTROL

BROADCAST STATION

WELDING

MOBILE RADIO

X-RAY



MEDICAL

BUSINESS MACHINES

COMPUTERS

GEOGRAPHICAL SURVEY

AMATEUR RADIO

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. . . it lists some of the types of electronic tubes used in theatre projectors, test equipment, marine radio, communications, industrial control, broadcasting stations, welding, mobile radio, business machines, computers, geophysical survey, amateur radio, medical and X-Ray.

Wherever an elcctronic tube is used, for whatever purpose . . . ROGERS can supply it.

- Cathode ray tubes
- Receiving tubes
- Power tubes
- Photo cells
- Thyratrons and Ignitrons
- X-Ray tubes
- Reliable and ruggedized tubes
- Radiation counters
- Voltage regulators
- Klystrons — Magnetrons
- Sub-miniature tubes
- Transistors and Diodes
- Industrial rectifiers

ROGERS Technical Consulting Service
If you have a problem relating to electronic tubes, their characteristics or applications, write Dept. DEC: —

ROGERS
ELECTRONIC TUBES

ELECTRONIC TUBE & COMPONENT DIVISION

11-19 Brentcliffe Road, Leaside
Toronto 17, Ontario

Montreal • Toronto • Winnipeg
Vancouver

For further data on advertised products use page 207.

Aeromotive Engineering Products
Ess Instrument Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

DETECTORS (Defect, Electronic)
Electronic Controls Ltd.
Canadian Research Institute
Robotron Corp.
Perkins Electric Co. Ltd.

DETECTORS (Smoke, Electronic)
Electronic Associates Ltd.
Rogers Majestic Electronics Ltd.
Electronics Corporation of America
Bailey Meter Co. Ltd.
Walter Kidde & Co. of Canada Ltd.
Martin Engineering Inc.
Electronic Controls Ltd.
Ess Instrument Co.
McPhar Engineering Co. of Can. Ltd.
Atlas Radio Corporation Ltd.
Perkins Electric Co. Ltd.

DETECTORS (Burglar)
Walter Kidde & Co. of Canada Ltd.

DETECTORS (Metal, Electronic)
Cinema-Television Ltd.

DIALS (Precision)
General Radio Co.
Atlas Radio Corporation Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Hathaway Kraemer Ltd.
National Co. Inc.
James Millen Mfg. Co. Inc.
Canadian Research Institute
The Acromark Co.
Technology Instrument Corp.
Stratton & Co. Ltd.

DIALECTRIC MATERIAL
Aircraft-Marine Products of Canada Ltd.

DIODE (Test Set)
Teletronics Laboratory Inc.

DIODES (Germanium)
Transitron Electronic Corp.
Atlas Radio Corporation Ltd.
Perkins Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Rogers Majestic Electronics Ltd.
Hackbusch Electronics Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
International Resistance Co. Ltd.
Chas. W. Pointon Ltd.
Computing Devices of Canada Ltd.
International Resistance Co.

DIRECTION FINDERS
Pye Canada Ltd.
Rogers Majestic Electronics Ltd.
Servo Corporation of America
Bludworth Marine, Div. of National-Simplex-Bludworth Inc.
Lear Inc.
Redifon (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Aircraft Radio Corp.
Beaconing Optical & Precision Materials Co. Ltd.
RCA Victor Co. Ltd.

DRUMS (Memory, Magnetic Recording)
Hackbusch Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Ferranti Electric Ltd.
Computing Devices of Canada Ltd.
Audio Instrument Co. Inc.
Litton Industries Inc.
Peirce Dictation Systems
Texas Instruments Inc.
Underwood Corp., Electronic Computer Div.
Avion Div. of ACF Industries Inc.
Fischer & Porter Co.
Sperry Gyroscope Co. of Canada Ltd.
Polarad Electronics Corp.

DYNAMOMETERS
Western Gear Works, Electro Prod. Div.

ELECTRODES (High Frequency)
Canadian Research Institute

ELEMENTS (Heating)
Canadian General Electric Co. Ltd.
Renfrew Electric & Refrigerator Co. Ltd.
Precision Scientific Co.
H. Clarke & Co. (Manchester) Ltd.
Norton Behr-Manning Overseas Inc.

ENGRAVING & PROFILING
Hathaway Kraemer Ltd.
Atlas E-E Corp.
Sharpe Instruments Ltd.
Canadian Research Institute
R. H. Nichols Ltd.
Bayly Engineering Ltd.
The Acromark Co.
Cosa Corporation of Canada Ltd.
Osborne Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
H. P. Preis Engraving Machine Co.

EYELETS
United-Carr Fastener Co. of Can. Ltd.
Electrolabs Reg'd
General Cement Mfg. Co.
United Shoe Machinery Corp.

FANS
Western Gear Works, Electro Prod. Div.

FASTENING DEVICES
Audio Tool & Engineering Ltd.
Electrolabs Reg'd
United-Carr Fastener Co. of Can. Ltd.
Anti-Corrosive Metal Products Co. Inc.
Holub Industries Inc.
General Cement Mfg. Co.
The Allen Mfg. Co.
Rawlplug Products (Canada) Ltd.
The Bristol Co. of Canada Ltd.
Aeromotive Engineering Products
Shakeproof, Div. of Illinois Tool Works
Herman H. Smith Inc.
Southco Div., South Chester Corp.
United Shoe Machinery Corp.
Heli-Coil Corp.
Precision Metal Products Co.

FILTERS (Band Elimination)
Krohn-Hite Inst. Co.
Triad Transformer Corp.
Wind Turbine Co. of Canada Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
R-O-R Associates Ltd.
Electronic Communications Ltd.
Bayly Engineering Ltd.
Computing Devices of Canada Ltd.
Polyphase Instrument Co.
Diamond Microwave Corp.
Hycor Sales Co.
J. W. Miller Co.
Tobe Deutschmann Corp.
Blonder-Tongue Laboratories Inc.
Texas Instruments Inc.
Vectron Inc.
Dynamic Electronics, N.Y., Inc.
Scientific Specialties Corp.
Gertsch Products Inc.
General Radio Co.
Atlas Radio Corporation Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

FILTERS (Crystal)
Rogers Majestic Electronics Ltd.
National Co. Inc.
Diamond Microwave Corp.
Vectron Inc.
Titania Electric Corp. of Canada Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

FILTERS (Equalizer)
Altec Lansing Corp.
Triad Transformer Corp.
Blonder-Tongue Laboratories Inc.
Atlas Sound Corp.
Gray Research & Development Co. Inc.

FILTERS (Radio Interference)
Arrow Radio Co.
Radio Components Ltd.
Lear Inc.
R-O-R Associates Ltd.
Aerovox Canada Ltd.
Harris, Pound & Co.
Chas. W. Pointon Ltd.
J. W. Miller Co.
Pyramid Electric Co.
Cornell-Dublier Electric Corp.
Vidaire Electronics Mfg. Corp.
Tobe Deutschmann Corp.
Blonder-Tongue Laboratories Inc.
Standard Electronics Corp.
Texas Instruments Inc.
Kerr-Machin Associates
Balco Research Laboratories Inc.
Belling & Lee Ltd.
Dynamic Electronics, N.Y., Inc.
Specialty Engineering & Electronics Co.
The Gudeman Co.
Superex Electronics Corp.
Atlas Radio Corporation Ltd.
RCA Victor Co. Ltd.

FILTERS (Television)
Radio Components Ltd.
General Instrument, F. W. Sickles of Canada Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
John R. Tilton Ltd.
Harris, Pound & Co.
Pyramid Electric Co.
J. W. Miller Co.
Northeast Scientific Corp.
Cornell-Dublier Electric Corp.
Prodelin Inc.
Vidaire Electronics Mfg. Corp.
Cinema-Television Ltd.
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
Photocircuits Corp.
Superex Electronics Corp.

FILTERS (Electronic)
Krohn-Hite Inst. Co.
Canadian Westinghouse Co. Ltd., Electronics Division
R-O-R Associates Ltd.
Collins Radio Co. of Canada Ltd.
Bayly Engineering Ltd.
Polyphase Instrument Co.
Pyramid Electric Co.
Hycor Sales Co.
Cornell-Dublier Electric Corp.
Dynamic Electronics, N.Y., Inc.
The Gudeman Co.
Vectron Inc.
Scientific Specialties Corp.
Superex Electronics Corp.
Atlas Radio Corporation Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Radio Communications Equipment & Engineering Ltd.
Polarad Electronics Corp.

FILTERS (Low Pass)
Gulton Mfg. Corp.

FILTERS (Mechanical)
Collins Radio Co. of Canada Ltd.

FLUX (Brazing & Soldering)
Electrovert Ltd.
Hackbusch Electronics Ltd.
Linde Air Products Co., Div. Union Carbide Canada Ltd.
General Cement Mfg. Co.
Johnson Mfg. Co. Inc.
The Ohio Carbon Co.
Johnson, Matthey & Mallory Ltd.
British Insulated Callender's Cables
Chas. W. Pointon Ltd.
The Superior Flux & Mfg. Co.
Technicraft Laboratories Inc.
Northern Electric Co. Ltd.
The E. Harris Co. Ltd.

FORMS (Coil)
Radio Components Ltd.
Rogers Corp.
James Millen Mfg. Co. Inc.
National Moldite Co.
National Fibre Co. of Canada Ltd.
J. W. Miller Co.
Cambridge Thermionic Corp.
Stratton & Co. Ltd.
Osborne Electric Co. Ltd.
Precision Paper Tube Co.
Superex Electronics Corp.
Atlas Radio Corp. Ltd.

FIBRE
National Fibre Co. of Canada Ltd.

FUSES
Automatic Electric Sales (Canada) Ltd.
Electrolabs Reg'd.
Gee-Lar Mfg. Co.
Canadian General Electric Co. Ltd.
Royal Electric Co. Inc.
Prince & Roberts
Bussman Mfg. Co.
Trico Fuse Mfg. Co.
Belling & Lee Ltd.
The English Electric Co. Ltd.
Bel Fuse Inc.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.

GAGES (Comparator)
The J. W. Ellis Industries
Roanwell Corp.
Aeromotive Engineering Products
Dawe Instruments Ltd.
The Solartron Electronic Group Ltd.
Fischer & Porter Co.
Pratt & Whitney, Div. Niles-Bement-Pond Co.

GAGES (Electronic)
Hackbusch Electronics Ltd.
Rogers Majestic Electronics Ltd.
Electrodesign
Ultradyne Engineering Labs. Inc.
Fielden Instrument Division
Bailey Meter Co. Ltd.
R-O-R Associates Ltd.
The Bristol Co. of Canada Ltd.
Computing Devices of Canada Ltd.
Canadian Research Institute
The Hickok Electrical Instrument Co.
Boonton Radio Corp.
General Electric Co., X-Ray Dept.
Dawe Instruments Ltd.
Southern Instruments Ltd.
Fischer & Porter Co.
Pratt & Whitney, Div. Niles-Bement-Pond Co.

GAGES (Strain)
Rogers Majestic Electronics Ltd.
Electrovert Ltd.
Electrodesign
The Bristol Co. of Canada Ltd.
R-O-R Associates Ltd.
Peacock Brothers Ltd.
Elliott Brothers (London) Ltd.
Titania Electric Corp. of Canada Ltd.
Pratt & Whitney, Div. Niles-Bement-Pond Co.

GAGES (Tension)
Tenistron Inc.

GAGES (Vacuum)
Central Scientific Co. of Canada Ltd.
Ultradyne Engineering Labs. Inc.
Bailey Meter Co. Ltd.
The Bristol Co. of Canada Ltd.
Thermovelt Instruments Ltd.
Peacock Brothers Ltd.
Edwards High Vacuum Ltd.
Scientific Specialties Corp.
Fischer & Porter Co.
RCA Victor Co. Ltd.
National Research Corp.

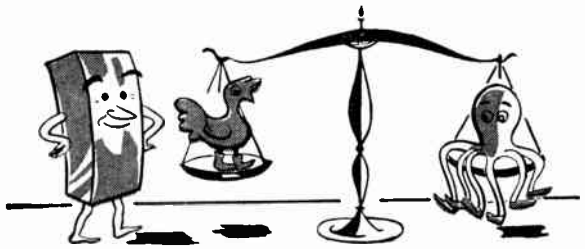
GASKETS
The Garlock Packing Co. of Canada Ltd.
General Tire & Rubber Co. of Can. Ltd., Stokes Division

5 reasons why it pays to use...

FORMEX MAGNET WIRE

For winding or rewinding motors and coils

Ever since C.G.E. introduced Formex Magnet Wire to the motor winding industry, it has been widely adopted by manufacturers and designers, and has proved a money saver for rewind shops. Tough, efficient Formex insulation, has served many years without an equal in the entire industry. Here are five of the many reasons why you should specify and use G-E Formex Magnet Wire:



1 More Footage Per Pound. Thin Formex insulation gives money-saving, additional footage over rolls of fibrous and fibrous enamel wires. It also takes up less space in the Motor, allowing smaller, compact units; or more wire in a given space.

2 Easier To Wind. Formex insulation is a tough polyvinyl-acetal resin that withstands rougher usage, allowing faster winding without physical damage. Its smooth surface slips into place easily, permitting increased production . . . lower assembly costs.

3 Greater Strength. The toughness, adhesion and flexibility of Formex insulation coatings permit flexing and bending without cracking the surface of the insulation or lowering its dielectric strength. You're always sure of complete motor protection.

4 Resists Heat Shock, Heat Aging and Solvents. Formex resists the cracking effect of high heat and shock, and aging in temperatures above ambient for long periods of time. It also resists the destructive effects of practically all commonly used solvents.

5 Moisture Resistance. The tough insulating film of Formex presents a continuous wall of protection against moisture and moisture absorption.

For further information contact your nearest C.G.E. office or: Wire and Cable Department, Canadian General Electric Co. Ltd., 212 King St., West, Toronto, Ontario.

403W-1155

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

For further data on advertised products use page 207.

Renfrew Electric & Refrigerator Co. Ltd.
National Fibre Co. of Canada Ltd.
Canadian Johns-Manville Co. Ltd.
W. H. Brady Co.
Airtron Inc.
Automatic & Precision Mfg. Co.
Crane Packing Co.

GALVANOMETERS
Electrovert Ltd.
The J. W. Ellis Industries
Electrodesign
Stark Electronic Instruments Ltd.
Pye Canada Ltd.
H. Tinsley & Co. Ltd.
Sharpe Instruments Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
R. H. Nichols Ltd.
Shallcross Mfg. Co.
Century Electronics & Instruments Inc.
Texas Instruments Inc.
Technology Instrument Corp.
Baldwin Instrument Co. Ltd.
Kelvin & Hughes (Industrial) Ltd.
Measuring Instruments (Pullin) Ltd.
The Winston Co. Inc.
Sensitive Research Instrument Corp.
Wheelco Instruments,
Div. Barber-Colman Co.
Scientific Specialties Corp.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.

GENERATORS (Electronic)
Hackbusch Electronics Ltd.
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
Jackson Electrical Instrument Co.
Lear Inc.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Sharpe Instruments Ltd.
R-O-R Associates Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
R. H. Nichols Ltd.
Electronic Instrument Co. Inc.
The Hickok Electrical Instrument Co.
Boonton Radio Corp.
Electronic Measurements Corp.
The Solartron Electronic Group Ltd.
Tel-Instrument Electronics Corp.
Vectron Inc.
Specialty Engineering & Electronics Co.
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
New London Instrument Co. Inc.
Avion Div. of ACF Industries Inc.
Trad Electronics Corp.
General Radio Co.
Titania Electric Corp. of Canada Ltd.
General Precision Industries Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
Atlas Radio Corp. Ltd.

GENERATORS (Harmonic Frequency)
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Servo Corporation of America
Electronic Instrument Co. Inc.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Dynamic Electronics, N.Y., Inc.
Kay Electric Co.
Specialty Engineering & Electronics Co.
Scientific Specialties Corp.
General Radio Co.
Northern Electric Co. Ltd.

GENERATORS (Microwave)
Stark Electronic Instruments Ltd.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Decca Radar (Canada) Ltd.
Northeast Scientific Corp.
Microwave Associates Inc.
Litton Industries Inc.
Microwave Instruments Ltd.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Aircraft Radio Corp.
The Solartron Electronic Group Ltd.
Chemalloy Electronics Corp.
New London Instrument Co. Inc.
Vectron Inc.
Dynamic Electronics, N.Y., Inc.
Kay Electric Co.
Empire Devices Products Corp.
General Radio Co.
Beaconing Optical & Precision Materials
Co. Ltd.
Atlas Radio Corp. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Polarad Electronics Corp.

GENERATORS (Pulse)
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
Canadian Research Institute
Teletronics Laboratory Inc.
The Solartron Electronic Group Ltd.
The English Electric Co. Ltd.
Cinema-Television Ltd.
Tel-Instrument Electronics Corp.
Kay Electric Co.
Dynamic Electronic, N.Y., Inc.
Specialty Engineering & Electronics Co.
Empire Devices Products Corp.
Avion Div. of ACF Industries Inc.
General Radio Co.
Sperry Gyroscope Co. of Canada Ltd.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.
Polarad Electronics Corp.

GENERATORS (Variable Frequency)
The Solartron Electronics Group Ltd.
Airmec Ltd.
Cinema-Television Ltd.
Rogers Majestic Electronics Ltd.
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Servo Corporation of America
Jackson Electrical Instrument Co.
Katolight Corp.
Canadian Westinghouse Co. Ltd.,
Electronics Division
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
Computing Devices of Canada Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Aeromotive Engineering Products
The Hickok Electrical Instrument Co.
Electronic Instrument Co. Inc.
Boonton Radio Corp.
Electronic Measurements Corp.
Germanium Products Corp., Subsidiary of
Radio Development & Research Corp.
The Leland Electric Co., Division
American Machine & Foundry Co.
Technology Instrument Corp.
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
Specialty Engineering & Electronics Co.
Vectron Inc.
New London Instrument Co. Inc.
Avion Div. of ACF Industries Inc.
Trad Electronics Corp.
General Radio Co.
Atlas Radio Corp. Ltd.
General Precision Industries Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.

GENERATORS (Waveform)
Dynamic Electronics, N.Y., Inc.
Specialty Engineering & Electronics Co.
New London Instrument Co. Inc.
General Radio Co.
Atlas Radio Corp. Ltd.
Katolight Corp.
Stark Electronic Instruments Ltd.
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
The Hickok Electrical Instrument Co.
Electronic Instrument Co. Inc.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Tel-Instrument Electronics Corp.

GENERATORS (Picture Signal)
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Industrial Electronics of Canada Ltd.
The Hickok Electrical Instrument Co.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Tel-Instrument Electronics Corp.
Dynamic Electronics, N.Y., Inc.
Kay Electric Co.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
Polarad Electronics Corp.

GENERATORS (Square Wave)
Hackbusch Electronics Ltd.
Rogers Majestic Electronics Ltd.
Electrodesign
Stark Electronic Instruments Ltd.
Precision Apparatus Co. Inc.
Servo Corporation of America
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
Computing Devices of Canada Ltd.
The Hickok Electrical Instrument Co.
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
The Solartron Electronic Group Ltd.
Cinema-Television Ltd.
Dynamic Electronics, N.Y., Inc.
Specialty Engineering & Electronics Co.
New London Instrument Co. Inc.
General Radio Co.
Atlas Radio Corp. Ltd.
Cossor Canada Ltd.

GENERATORS (Signal Sweeping)
New London Instrument Co. Inc.
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
Avion Div. of ACF Industries Inc.
Daystrom Electric Corp.
General Radio Co.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
General Precision Industries Ltd.
Polarad Electronics Corp.
Hackbusch Electronics Ltd.
Canadian Marconi Co., Electronic Tube
& Components Div.
Electrodesign
Stark Electronic Instruments Ltd.
Precision Apparatus Co. Inc.
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Ltd.
John R. Tilton Ltd.
Computing Devices of Canada Ltd.
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument Co.
Electronic Instrument Co. Inc.
Boonton Radio Corp.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Cinema-Television Ltd.
Tel-Instrument Electronics Corp.

GENERATORS (Signal, Television Synchronizing)
Kay Electric Co.
Dynamic Electronics, N.Y., Inc.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.
Beaconing Optical & Precision Materials
Co. Ltd.
Polarad Electronics Corp.
General Precision Industries Ltd.
Hackbusch Electronics Ltd.
Rogers Majestic Electronics Ltd.
Pye Canada Ltd.
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Ltd.
R-O-R Associates Ltd.
Lab-O Ring Enterprises Ltd.
Electronic Measurements Corp.
The Hickok Electrical Instrument Co.
Standard Electronics Corp.
The Leland Electric Co. Div.,
American Machine & Foundry Co.
Cinema-Television Ltd.
Tel-Instrument Electronics Corp.

GENERATORS (Impulse)
Rogers Majestic Electronics Ltd.

GEOPHYSICAL EQUIPMENT
Daven Co.
Mueller Electric Co.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
McPhar Engineering Co. of Canada Ltd.
Electrodesign
Sharpe Instruments Ltd.
Computing Devices of Canada Ltd.
P. S. C. Applied Research Ltd.
Harris Pound & Co.
R. H. Nichols Ltd.
Canadian Research Institute
Jarrell-Ash Co.
Precision Radiation Instruments Inc.
Century Electronics & Instruments Inc.
Germanium Products Corp., Subsidiary of
Radio Development & Research Corp.
Texas Instruments Inc.
Evershed & Vignoles Ltd.

GROMMETS
Canadian Marconi Co., Electronic Tube &
Components Div.
Electrolabs Reg'd
United-Carr Fastener Co. of Can. Ltd.
Hathaway Kraemer Ltd.
General Tire & Rubber Co. of Can. Ltd.,
Stokes Division
Tenatronics Ltd.
Stark Electronic Instruments Ltd.
General Cement Mfg. Co.
Anti-Corrosive Metal Products Co. Inc.
Amphenol Canada Ltd.
St. Regis Paper Co. (Canada) Ltd.,
Panelyte Division
National Fibre Co. of Canada Ltd.
Micanite Canada Ltd.
Herman H. Smith Inc.
United Shoe Machinery Corp.
Atlas Radio Corp. Ltd.

GYROSCOPES (Free, Rate & Vertical)
Pacific Scientific Co.

HEADPHONES
Specialty Engineering & Electronics Co.
Superex Electronics Corp.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Canadian Marconi Co., Electronic Tube &
Components Div.
Electrovert Ltd.
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Campbell Manufacturing Co. Ltd.
Sonotone Corp.
Roanwell Corp.
Chas. W. Pointon Ltd.
Automatic & Precision Mfg. Co.
Whiteley Electrical Radio Co. Ltd.

HEADSETS
Specialty Engineering & Electronics Co.
The Winslow Co. Inc.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

TV TWINS

for complete - reliable testing

MODEL TVG-2— The Master of television signal generators. You get more sweep • greater RF output • better stability • increased accuracy • unlimited flexibility • at lower cost! No other instrument has ever equalled it for quality, desirable and necessary alignment features.

Continued use and preference the world over by both industrial and service technicians is proof of the superiority built into the Jackson Television Generator TVG-2 and the 5-inch Oscilloscope CRO-2. As a team for all TV testing they have demonstrated the high quality and adaptability that is typical of all

MODEL CRO-2—The one 5-inch oscilloscope for all TV-FM-AM-PA applications with both HIGH sensitivity and WIDE band response. The CRO-2 gives you visual proof of Jackson superiority. It has more useful features than oscilloscopes selling at greater cost.

JACKSON

"SERVICE ENGINEERED" TEST EQUIPMENT

represented in Canada by

ELECTRONIC TUBE AND COMPONENTS DIVISION

CANADIAN MARCONI COMPANY

830 BAYVIEW AVE., TORONTO 12

Branches: Vancouver • Winnipeg • Montreal • Halifax • St. John's, Nfld.

For further data on advertised products use page 207.

Sperry Gyroscope Co. of Canada Ltd.
Hackbusch Electronics Ltd.
Campbell Manufacturing Co. Ltd.
Stark Electronic Instruments Ltd.
Roanwell Corp.
Lear Inc.
Shure Brothers Inc.
Sharpe Instruments Ltd.
Chas. W. Pointon Ltd.

HEADS (Recording)
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Shure Brothers Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Ferranti Electric Ltd.
Can. Astatic Ltd.
Duotone Co. Inc.
Pierce Dictation Systems

HEADS (Wire & Tape Recording)
Canadian Marconi Co., Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
Shure Brothers Inc.
H. A. Hartley Co. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Pierce Dictation Systems
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.

HEATING (Electronic Induction)
Pye Canada Ltd.
Canadian Westinghouse Co. Ltd. Electronics Division
Industrial Electronics of Canada Ltd.
Canadian Research Institute
Lepel High Frequency Laboratories Inc.
Germanium Products Corp., Subsidiary of Radio Development & Research Corp.
Airmec Ltd.
The English Electric Co. Ltd.
Marion Electrical Instrument Co.

HORNS (Speaker)
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Cossor Canada Ltd.
Dukane Corp.
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
Wickett, Bradford J.
Executone Communication Systems Ltd.
H. A. Hartley Co. Inc.
Altec Lansing Corp.
National Co. Inc.
Copper Wire Products Ltd.
John R. Tilton Ltd.
Musimart of Canada Ltd., Electronics Div.
Dominion Sound Equipments Ltd.
Atlas Sound Corp.

HYDROPHONES
Gulton Mfg. Corp.

IMPREGNATORS (Vacuum)
National Research Corp.

INDICATORS (Volume)
Canadian Research Institute
Revere Corporation of America
The Solartron Electronic Group Ltd.
Measuring Instruments (Pullin) Ltd.
Perkins Electric Co. Ltd.
Rogers Majestic Electronics Ltd.

INDICATORS (Frequency)
Rogers Majestic Electronics Ltd.
Electroverts Ltd.
Stark Electronic Instruments Ltd.
James Millen Mfg. Co. Inc.
Electronics Corporation of America
R-O-R Associates Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Laboratory for Electronics Inc.
Potter Instrument Co. Inc.
Shallcross Manufacturing Co.
Elliott Brothers (London) Ltd.
Cinema-Television Ltd.
The English Electric Co. Ltd.
Measuring Instruments (Pullin) Ltd.
Tel-Instrument Electronics Corp.
The Winslow Co. Inc.
Sensitive Research Instrument Corp.
Browning Laboratories Inc.
Kay Electric Co.
Daven Co.
J-B-T Instruments Inc.
General Radio Co.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Sperry Gyroscope Co. of Canada Ltd.

INDICATORS (Leakage)
Fischer & Porter Co.
Canadian Research Institute
Rogers Majestic Electronics Ltd.
Shallcross Manufacturing Co.
Measuring Instruments (Pullin) Ltd.

INDICATORS (Electronic)
Rogers Majestic Electronics Ltd.
Electrovert Ltd.
Stark Electronic Instruments Ltd.
Pye Canada Ltd.
Electrodesign
Fielden Instrument Division
Canadian Westinghouse Co. Ltd., Electronics Division
R-O-R Associates Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Computing Devices of Canada Ltd.
Electronic Controls Ltd.
The Hickok Electrical Instrument Co.
Laboratory for Electronics Inc.
Shallcross Manufacturing Co.
Texas Instruments Inc.
The Solartron Electronic Group Ltd.
Southern Instruments Ltd.
Measuring Instruments (Pullin) Ltd.
Dynamic Electronics, N.Y., Inc.
Vectron Inc.
Kay Electric Co.
Wheelco Instruments Div. Barber-Colman Co.
Avion Div. of ACF Industries Inc.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.

INDICATOR (Lights)
Hetherington Inc.

INDICATORS (Smoke & Fire, Electronic)
Rogers Majestic Electronics Ltd.
Electrovert Ltd.
Electronic Associates Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Martin Engineering Inc.
Walter Kidde & Co. of Canada Ltd.
Electronic Controls Ltd.
Ess Instrument Co.
Ripley Co. Inc.
Northern Electric Co. Ltd.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.
McPhar Engineering Co. of Canada Ltd.

INDICATORS (Timing)
Daystrom Pacific Corp.
Wheelco Instruments Div., Barber-Colman Co.
J-B-T Instruments Inc.
Rogers Majestic Electronics Ltd.
Computing Devices of Canada Ltd.
Canadian Research Institute
Potter Instrument Co. Inc.
The A. W. Haydon Co.
Measuring Instruments (Pullin) Ltd.

INDICATORS (Vacuum)
Bailey Meter Co. Ltd.
Thermovelt Instruments Ltd.
Peacock Brothers Ltd.
Edwards High Vacuum Ltd.
Bourns Laboratories
Fischer & Porter Co.
National Research Corp.

INDICATORS (Strain)
G. F. Kelke & Co.
The J. W. Ellis Industries
Rogers Majestic Electronics Ltd.
H. Tinsley & Co. Ltd.
Fielden Instrument Division
R-O-R Associates Ltd.
Peacock Brothers Ltd.
Computing Devices of Canada Ltd.
Bayly Engineering Ltd.
Polyphase Instrument Co.
J. Langham Thompson Ltd.
Kelvin & Hughes (Industrial) Ltd.
Elliott Brothers (London) Ltd.

INDICATORS (Volume)
Daven Co.
Fischer & Porter Co.
Northern Electric Co. Ltd.

INDUCTANCE (Windings)
Teleradio Engineering Corp.
Vokar Corp.
Scientific Specialties Corp.
Superex Electronics Corp.
Northern Electric Co. Ltd.
T. S. Farley Ltd.
Radio Components Ltd.
General Instrument, F. W. Sickles of Canada Ltd.
H. Tinsley & Co. Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Copper Wire Products Ltd.
J. W. Miller Co.
Allied Control Co. Inc.
Cambridge Thermionic Corp.
Osborne Electric Co. Ltd.

INDUCTANCES (Electronics)
Vectron Inc.
Teleradio Engineering Corp.
Superex Electronics Corp.
T. S. Farley Ltd.
Radio Components Ltd.
Lear Inc.
James Millen Mfg. Co. Inc.
E. F. Johnson Co.
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corp.
Copper Wire Products Ltd.
Bayly Engineering Ltd.
Computing Devices of Canada Ltd.
Electronic Engineering
J. W. Miller Co.
Hycor Sales Co.
Cambridge Thermionic Corp.
Wright & Weaire Ltd.
Edwards High Vacuum Co. Ltd.

INDUCTANCES (Power Coil Windings)
Altec Lansing Corp.
Canadian Westinghouse Co. Ltd., Electronics Division
Bayly Engineering Ltd.
Electronic Engineering
Allied Control Co. Inc.
Osborne Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.

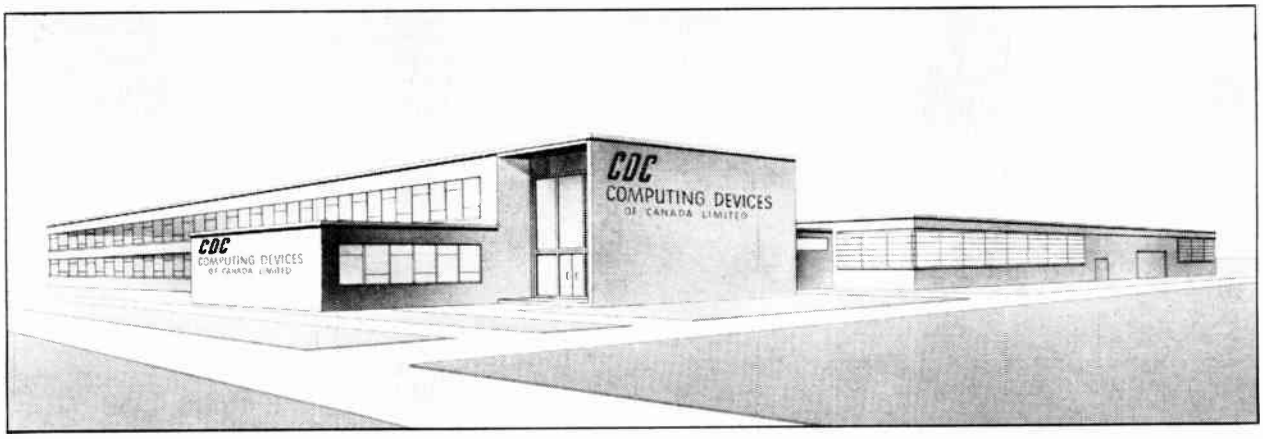
INDUCTANCES (Receiving or Transmitting)
T. S. Farley Ltd.
Radio Components Ltd.
General Instrument, F. W. Sickles of Canada Ltd.
Lear Inc.
James Millen Mfg. Co. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
E. F. Johnson Co.
Electronic Engineering
International Resistance Co.
J. W. Miller Co.
Osborne Electric Co. Ltd.
Stratton & Co. Ltd.
Teleradio Engineering Corp.
Superex Electronics Corp.
Fischer & Porter Co.

INDUCTANCES (Focusing)
General Instrument, F. W. Sickles of Canada Ltd.
Canadian Westinghouse Co. Ltd. Electronics Division
Triad Transformer Corp.
Osborne Electric Co. Ltd.
Cinema-Television Ltd.
Teleradio Engineering Corp.

INDUCTORS (Electronic)
Vectron Inc.
General Instrument, F. W. Sickles of Canada Ltd.
James Millen Mfg. Co. Inc.
CopperWire Products Ltd.
E. F. Johnson Co.
Bayly Engineering Ltd.
J. W. Miller Co.
Lepel High Frequency Laboratories Inc.
Cambridge Thermionic Corp.
Osborne Electric Co. Ltd.

INSTRUMENT (Precision)
Shallcross Manufacturing Co.
The A. W. Haydon Co.
Texas Instruments Inc.
Technology Instrument Corp.
Elliott Brothers (London) Ltd.
Baldwin Instrument Co. Ltd.
Dawe Instruments Ltd.
The English Electric Co. Ltd.
Measuring Instruments (Pullin) Ltd.
Stark Electronic Instruments Ltd.
Pye Canada Ltd.
Electrovert Ltd.
The J. W. Ellis Industries
Rogers Majestic Electronics Ltd.
H. Tinsley & Co. Ltd.
Lear Inc.
Ultradyne Engineering Labs. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
The Gaertner Scientific Corp.
Thermovelt Instruments Ltd.
R-O-R Associates Ltd.
The Bristol Co. of Canada Ltd.
Electronic Communications Ltd.
Canadian Research Institute
Aeromotive Engineering Products
Lab-O Ring Enterprises Ltd.
R. H. Nichols Ltd.
The Hickok Electrical Instrument Co.
Jarrell-Ash Co.
Precision Radiation Instruments Inc.
DeJur Amsco Corp.
Electro-Measurements Inc.
Teletronics Laboratory Inc.
Wheelco Instrument Division, Barber-Colman Co.
The Winslow Co. Inc.
Sensitive Research Instrument Corp.
Browning Laboratories Inc.
New London Instrument Co. Inc.
Scientific Specialties Corp.
Bourns Laboratories
Fischer & Porter Co.
General Radio Co.
Titania Electric Corp. of Can. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
General Precision Industries Ltd.
Cossor Canada Ltd.
Atlas Radio Corp. Ltd.

INSULATING COMPOUNDS
Electrovert Ltd.
Bakelite Co., Div. Union Carbide & Carbon Corp.
Minnesota Mining & Mfg. of Can. Ltd.
General Cement Mfg. Co.
Canadian Westinghouse Co. Ltd., Electronics Division
Dow Corning Silicones Ltd.
Barrett Division,
Canadian Johns-Manville Co. Ltd.
Allied Chemical & Dye Corp.
Sun Chemical Corp.,
Electro Technical Products Division



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is an independent, Canadian owned Company

C.D.C. employs over four hundred people of whom 90 are graduate engineers and mathematicians.

The Company presently occupies three buildings in Ottawa with the Head Office and main plant of the Company on Highway 15 at Bells Corners, Ontario, one mile from the Western City Limits of Ottawa. The combined area of these four buildings is 75,000 square feet and contains well equipped electronic and instrumentation laboratories, electronic digital and analog computers, model shop, electrical test and assembly shops, machine shop, and facilities for electrical assembly and wiring work on electronic equipment.

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DATA PROCESSING SERVICE

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DATA REDUCTION

AUTOMATION

ELECTRONIC INSTRUMENTATION

AVIONICS

ELECTRONIC TEST EQUIPMENT

ELECTRONIC COMPONENTS

SEMI-CONDUCTORS

RESEARCH · DEVELOPMENT · MANUFACTURE · CONSULTING
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COMPUTING DEVICES OF CANADA LIMITED

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For further data on advertised products use page 207.

Polypenco Inc.
Northern Electric Co. Ltd.

INSULATORS
Quality Hermetics Ltd.

INSULATORS (Rubber)
Mechanical Rubber Products Co.
Kerr-Machin Associates

INSULATORS (Thermocouple)
Kerr-Machin Associates
Saxon Burg Ceramics

INSULATORS (Electronic)
E. F. Johnson Co.

ISOLATORS (Vibration & Shock)
Barry Controls Inc.

IMPREGNATORS (Vacuum)
F. J. Stokes Machine Co.

INTERCOMMUNICATION SYSTEMS
Stark Electronic Instruments Ltd.
Pye Canada Ltd.
Executone Communication Systems Ltd.
Electro-Vox Inc.
Electronic Enterprises Ltd.
Electrolabs Reg'd
Electronic Products Co. Ltd.
Hackbusch Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
N. H. Speight Laboratories
Vocaline Co. of America Inc.
Mark Simpson Mfg. Co. Inc.
Electronic Communications Ltd.
Prince & Roberts
Dominion Sound Equipments Ltd.
Electronic Products Co. Ltd.
Bell Sound Systems Inc.
Webster Electric Co.
Dynamic Electronics, N.Y., Inc.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Radio Communications Equipment & Engineering Ltd.
RCA Victor Co. Ltd.
Dukane Corp.

IRONS (Soldering)
Rogers Majestic Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Division
Linde Air Products Co., Div. of Union Carbide Canada Ltd.
Canadian General Electric Co. Ltd.
Renfrew Electric & Refrigerator Co. Ltd.
Wolf Electric Tools Ltd.
Harris Pound & Co.
P. Wall Mfg. Co.
Wassco Electric Products Corp.
Northern Electric Co. Ltd.
Adcola Products Ltd.
Perkins Electric Co. Ltd.
Atlas Radio Corp. Ltd.

INSTRUMENTS (Panel)
Stark Electronic Instruments Ltd.
Electrovert Ltd.
Bach-Simpson Ltd.
Electrodesign
Lear Inc.
Precision Apparatus Co. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Bailey Meter Co. Ltd.
S. & T. Sales Ltd.
Thermovelt Instruments Ltd.
R-O-R Associates Ltd.
Lab-O Ring Enterprises Ltd.
Canadian Research Institute
Peacock Brothers Ltd.
R. H. Nichols Ltd.
Collins Radio Co. of Canada Ltd.
The Hickok Electrical Instrument Co.
DeJur Amsco Corp.
Elliott Brothers (London) Ltd.
Baldwin Instrument Co. Ltd.
Kelvin & Hughes (Industrial) Ltd.
Evershed & Vignoles Ltd.
Measuring Instruments (Pullin) Ltd.
Scientific Specialties Corp.
J-B-T Instruments Inc.
Fischer & Porter Co.
Northern Electric Co. Ltd.
Atlas Radio Corp. Ltd.
Perkins Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
Marion Electrical Instrument Co.
Wheelco Instrument Division, Barber-Colman Co.
Sensitive Research Instrument Corp.

INSULATING MATERIAL
National Fibre Co. of Canada Ltd.

INVERTERS
Bendix Aviation Corp., Red Bank Div.

JACKS (Phone)
Switchcraft Inc.

KNOBS & DIALS
E. F. Johnson Co.

LAMPS (Indicating)
The H. R. Kirkland Co.

LEADS (Test)
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Harris Pound & Co.
Herman H. Smith Inc.
Electronic Instrument Co. Inc.
Electrolabs
Hackbusch Electronics Ltd.
Stark Electronic Instruments Ltd.
General Cement Mfg. Co.
British Insulated Callender's Cables
Workman TV Inc.
Boston Insulated Wire & Cable Co.
Keystone Electronics Corp.
Beaconing Optical & Precision Materials Co. Ltd.
General Precision Industries Ltd.
Atlas Radio Corp. Ltd.
Cossor Canada Ltd.

LINES (Transmission)
Wind Turbine Co. of Canada Ltd.

LORAN SYSTEMS
Stark Electronic Instruments Ltd.
Sperry Gyroscope Company of Canada Ltd.
RCA Victor Company Ltd.
Marsland Engineering Limited
Carbonneau Industries Inc.
Atlas Sound Corp.
Goodmans Industries Limited

LOADS (Water RF)
Chemalloy Electronics Corp.

MAGNETS
H. McCardle

MAGNETS (Laboratory Electromagnet)
Varian Associated of Canada Ltd.

MAGNETOMETERS
Elliott Brothers (London) Limited
New London Instrument Company, Inc.
Scientific Specialties Corporation
G & M Equipment Co. Inc.
Perkins Electric Company Limited

MASKS (Plastic)
J. R. G. McVity & Company

MEGOHMMETERS
Bach-Simpson Ltd.
Electrovert Limited
The J. W. Ellis Industries
Rogers Majestic Electronics Limited
H. Tinsley & Co. Ltd.
Associated Research Inc.
Precision Apparatus Co. Inc.
R-O-R Associates Limited
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
R. H. Nichols Limited
Shallcross Manufacturing Co.
Gulton Mfg. Corp.
Technology Instrument Corporation
Measuring Instruments (Pullin) Limited
Sensitive Research Instrument Corp.
Scientific Specialties Corporation
General Radio Company
Perkins Electric Company Limited

METERS (Field Strength)
Bach-Simpson Ltd.
The J. W. Ellis Industries
Rogers Majestic Electronics Limited
Electrodesign
Stark Electronic Instruments Ltd.
Lear, Incorporated
Lab-O Ring Enterprises Ltd.
Morrow Radio Mfg. Co.
The Hickok Electrical Instrument Company
Dynamic Electronics N.Y. Inc.
Sensitive Research Instrument Corp.
Empire Devices Products Corp.
Perkins Electric Company Limited
Atlas Radio Corporation Ltd.
Polarad Electronics Corp.

METERS (Deviation)
Browning Laboratories, Inc.
Kay Electric Company
New London Instrument Company, Inc.
Sensitive Research Instrument Corp.
General Radio Company
Gertsch Products Inc.
Atlas Radio Corporation Ltd.
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
Canadian Westinghouse Co. Ltd., Electronics Division
The Hickok Electrical Instrument Company
Texas Instruments Incorporated

METERS (Frequency)
Sensitive Research Instrument Corp.
Kay Electric Company
Dynamic Electronics N.Y. Inc.
Specialty Engineering & Electronics Co.
The Winslow Co. Inc.
Vectron, Inc.
Daven Company
J/B-T Instruments Inc.
Scientific Specialties Corporation
Gertsch Products Inc.
General Radio Company
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
Perkins Electric Company Limited
Sperry Gyroscope Company of Canada Ltd.
Polarad Electronics Corp.
Electrodesign
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
Electrovert Limited
James Millen Mfg. Co. Inc.
R-O-R Associates Limited
Lab O Ring Enterprises Ltd.
Canadian Research Institute
R. H. Nichols Limited
The Hickok Electrical Instrument Company
Diamond Microwave Corporation
Microwave Associates Inc.
The Narda Corporation
Elliott Brothers (London) Limited
Dawe Instruments Limited
Airmec Limited
Measuring Instruments (Pullin) Limited
Tel-Instrument Electronics Corporation

MACHINES (Coil Winding)
Northern Electric Co. Ltd.
Bayly Engineering Limited
R. H. Nichols Limited
Boesch Manufacturing Co. Inc.
Cosa Corporation of Canada Ltd.

MACHINES (Disc Recording)
Perkins Electric Company Limited
Atlas Radio Corporation Ltd.
Chas. W. Pointon Ltd.
Presto Recording Corporation

MACHINES (Wire Stripping)
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
Microdot Division-Felts Corporation

MEGAPHONES (Electronic)
Hackbusch Electronics Limited
Electronic Communications Limited
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
Perkins Electronic Company Limited

METAL PARTS
Canadian Marconi Company, Electronic Tube & Components Div.
McCarter Radio & Television Ltd.
Dominion Aluminum Fabricating Limited
United-Carr Fastener Co. of Can. Ltd.
General Cement Mfg. Co.
Anti Corrosive Metal Products Co. Inc.
The Staver Company Inc.
Adel Precision Products, Division of General Metals Corporation
Atlas E-E Corporation
Renfrew Electric & Refrigerator Co. Limited
Thermovelt Instruments Limited
Harris Pound & Co.
United Shoe Machinery Corporation
Javex
Hallam, Sleigh & Cheston Ltd.
Osborne Electric Co. Ltd.
Accurate Electronics Corp.
Precision Metal Products Company
Keystone Electronics Corporation
Sperry Gyroscope Company of Canada Ltd.

METAL PARTS (Metallic)
Chemalloy Electronics Corp.
Anti Corrosive Metal Products Co. Inc.
General Cement Mfg. Co.
Renfrew Electric & Refrigerator Co. Limited
Cambridge Thermionic Corporation
Javex
Osborne Electric Co. Ltd.

METAL PARTS (Tantalum, Tungsten, Molybdenum)
J. R. G. McVity & Company

MICROPHONES
Canadian Marconi Company, Electronic Tube & Components Div.
Hackbusch Electronics Limited
Electrovert Limited
Audio Tool & Engineering Ltd.
Executone Communication Systems Ltd.
Roanwell Corporation
Altec Lansing Corporation
Shure Brothers, Inc.
Lear, Incorporated
Canadian Westinghouse Co. Ltd., Electronics Division
S & T Sales Ltd.
Telequipment Mfg. Co. Ltd.
McCurdy Radio Industries Limited
Chas. W. Pointon Ltd.
Can. Astatic Ltd.
Duotone Company Inc.
Audio Instrument Co. Inc.
The Turner Company
Northern Electric Co. Ltd.
Perkins Electric Company Limited
Beaconing Optical & Precision Materials Company Limited
RCA Victor Company Ltd.

MICROPHONE STANDS
Atlas Sound Corp.

METALLIC PAINTS
General Cement Mfg. Co.
The E. Harris Company Limited

MICROWAVE TRANSMISSION LINES
Tenatronics Limited
Co-Operative Industries, Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
R-O-R Associates Limited
John R. Tilton Limited
Harris Pound & Co.
Bayly Engineering Limited
Prodelin Inc.

Completely Insulated for stability under long, hard operating conditions

There's nothing else like

ISO-KAP*

Centralab's New Molded Disc Ceramic Capacitor

Actual Size

Only one of its kind! The only molded, *completely* insulated, ceramic disc capacitor. Breakdown to ground in excess of 3000 V.D.C.

Strong! Unaffected by extremes of vibration; by ozone, salt water, or any known acid or solvent at room temperature.

Accurate! Thickness, diameter, and lead spacing are always exact. And leads are always on perfect center line—never offset. The answer for automatic assembly.

Dependable! New basic ceramic body. Capacitance characteristics are virtually flat over a wide temperature range.

Leads can't pull out! Lead strength is greater than the tensile strength of No. 22 wire.

Clearly labeled! Stamped with capacity, voltage rating, and tolerance.

Write for engineering bulletin EP-48, for facts and figures on Iso-Kap.

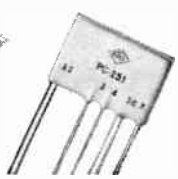
More proof that if it's a job for electronic components, it's a job for Centralab

Centralab's advanced engineering continues to create the prototypes of the components industry

CONTROLS

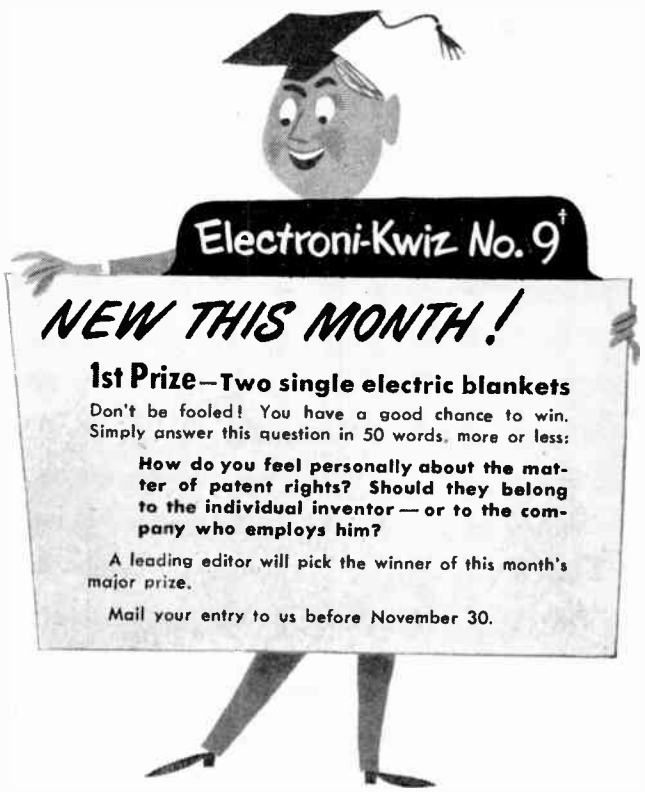
CERAMIC CAPACITORS

SWITCHES



PACKAGED ELECTRONIC CIRCUITS

STEATITE INSULATORS



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Airtron Inc.
The Narda Corporation
D. E. Makepeace Co.,
Div. of Union Plate & Wire Co.
Microwave Instruments Limited
Chemalloy Electronics Corp.
Technicraft Laboratories Inc.
Cascade Research Corp.
Northern Electric Co. Ltd.

MODULATORS
Lear, Incorporated
James Millen Mfg. Co. Inc.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Servomechanisms Inc.
Bradley Laboratories, Inc.
The English Electric Company Limited
Kay Electric Company
Sierra Electronic Corporation
Cascade Research Corporation
General Radio Company
Beaconing Optical & Precision Materials
Company Limited
Atlas Radio Corporation Ltd.

MOUNTINGS
General Cement Mfg. Co.
Harris Pound & Co.
Robinson Aviation Inc.
Baker Manufacturing Company
Hallam Sleigh & Cheston Ltd.
Bel Fuse Inc.
National Electric Products Corp.

MOTORS (Miniature)
Western Gear Works,
Electro Products Division

MOTORS (Fractional H.P.)
Small Motors, Inc.
Bendix Aviation Corporation,
Red Bank Division

NAVIGATION EQUIPMENT
Collins Radio Company of Canada Ltd.

NEEDLES (Cutting)
Atlas Radio Corporation Ltd.
Chas. W. Pointon Ltd.
Duotone Company Inc.
Presto Recording Corporation
Jensen Industries, Inc.

NEEDLES (Playback)
Electronic Enterprises Limited
Permo, Incorporated
Sonotone Corporation
John R. Tilton Limited
Chas. W. Pointon Ltd.
Can. Astatic Ltd.
Duotone Company Inc.
Presto Recording Corporation
Jensen Industries, Inc.
Atlas Radio Corporation Ltd.

NUTS (Self-Locking)
Electrolabs
United-Carr Fastener Co. of Can. Ltd.
Anti Corrosive Metal Products Co. Inc.
Atlas E-E Corporated
National Company Inc.
General Cement Mfg. Co.
Aeromotive Engineering Products
Shakeproof, Division of Illinois
Tool Works
Automatic & Precision Mfg Co.

NETWORKS (Pulse Forming)
Aircraft-Marine Products of Canada Ltd.
Tobe Deutschmann Corporation

PROBES (Microwave)
R-O-R Associates Limited
Bayly Engineering Limited
Diamond Microwave Corporation
Microwave Associates, Inc.
The Narda Corporation
Microwave Instruments Limited
Kelvin & Hughes (Industrial) Limited
Atlas Radio Corporation Ltd.
Sperry Gyroscope Company of Canada
Ltd.
Polarad Electronics Corp.

OSCILLATORS
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Electrodesign
Rogers Majestic Electronics Limited
James Millen Mfg. Co. Inc.
Jackson Electrical Instrument Co.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Krohn-Hite Inst. Co.
Electro-Measurements Inc.
Dawe Instruments Limited
Airmec Limited
The Solartron Electronic Group Ltd.
Cinema-Television Limited
Kay Electric Company
Vectron, Inc.
Dynamic Electronics N.Y. Inc.
New London Instrument Co. Inc.
International Crystal Mfg. Co. Inc.
Electro-Mechanical Research Inc.
General Radio Company
Atlas Radio Corporation Ltd.
Perkins Electric Company Limited

OSCILLATORS (Controlled)
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument
Company
The Solartron Electronic Group Ltd.
Kay Electric Company
Dynamic Electronics N.Y. Inc.
General Radio Company
Perkins Electric Company Limited

OSCILLATORS (Audio Frequency)
The J. W. Ellis Industries
Rogers Majestic Electronics Limited
Electrodesign
Stark Electronic Instruments Ltd.
Canadian Marconi Company,
Electronic Tube & Components Div.
Precision Apparatus Co. Inc.
American Electronics Co.
Jackson Electrical Instrument Co.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Krohn-Hite Inst. Co.
Electronic Communications Limited
Industrial Electronics of Canada Limited
Canadian Research Institute
Computing Devices of Canada Limited
Lab-O Ring Enterprises Ltd.
R. H. Nichols Limited
The Hickok Electrical Instrument
Company
Teletronics Laboratory, Inc.
The Solartron Electronic Group Ltd.
Airmec Limited
Dawe Instruments Limited
Cinema-Television Limited
Kay Electric Company
Vectron, Inc.
Specialty Engineering & Electronics Co.
General Radio Company
Perkins Electric Company Limited
Atlas Radio Corporation Ltd.
Beaconing Optical & Precision Materials
Company Limited
General Precision Industries Limited
Cossor Canada Ltd.

OSCILLATORS (Cavity)
Electrodesign
Canadian Westinghouse Co. Ltd.,
Electronics Division
R-O-R Associates Limited
Diamond Microwave Corporation
The Narda Corporation
New London Instrument Co. Incorporated
Sierra Electronic Corporation
Cavitron-Woodwelder Mfg.
No. 1 Division of Woodwelding Inc.
Vectron, Inc.
Specialty Engineering & Electronics
Company
Kay Electric Company
Atlas Radio Corporation Ltd.
Polarad Electronics Corp.

OSCILLATORS (Radio Frequency)
Electrodesign
The J. W. Ellis Industries
Stark Electronic Instruments Ltd.
Precision Apparatus Co. Inc.
Jackson Electrical Instrument Co.
Canadian Westinghouse Co. Ltd.,
Electronics Division
R-O-R Associates Limited
Industrial Electronics of Canada
Limited
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument
Company
Diamond Microwave Corporation
Technology Instrument Corporation
Airmec Limited
The Solartron Electronic Group Ltd.
Dawe Instruments Limited
Tel-Instrument Electronics Corporation
Chemalloy Electronics Corp.
International Crystal Mfg. Co. Inc.
Dynamic Electronics N.Y. Inc.
Kay Electric Company
New London Instrument Co. Inc.
Sierra Electronic Corporation
Cavitron-Woodwelder Mfg. Plant,
No. 1 Division of Woodwelding Inc.
Specialty Engineering & Electronics
Company
Vokar Corporation
General Radio Company
Atlas Radio Corporation Ltd.
Perkins Electric Company Limited
Beaconing Optical & Precision Materials
Company Limited
General Precision Industries Limited
Polarad Electronics Corp.

OSCILLATORS (Ultrasonic)
Stark Electronic Instruments Ltd.
Rogers Majestic Electronics Limited
Bludworth Marine,
Division of National-Simplex-Bludworth,
Inc.
Krohn-Hite Ins. Co.
Canadian Research Institute
Computing Devices of Canada Limited
The Solartron Electronic Group Ltd.
Dawe Instruments Limited
Cavitron-Woodwelder Mfg. Plant,
No. 1 Division of Woodwelding Inc.
Kay Electric Company
General Radio Company
Titania Electric Corp. of Can. Ltd.
McPhar Engineering Co. of Canada Ltd.
Atlas Radio Corporation Ltd.
Cossor Canada Ltd.

OSCILLOGRAPHS (Direct Writing)
Atlas Radio Corporation Ltd.
Rogers Majestic Electronics Limited
Electrodesign
R-O-R Associates Limited
Lab-O Ring Enterprises Ltd.
Sanborn Company
Technology Instrument Corporation
The Solartron Electronic Group Ltd.
Southern Instruments Ltd.

OSCILLOGRAPHS (Recording)
Rogers Majestic Electronics Limited
R-O-R Associates Limited
Lab-O Ring Enterprises Ltd.
Precision Radiation Instruments Inc.
Century Electronics & Instruments Inc.
Technology Instrument Corporation
Southern Instruments Ltd.
Cinema-Television Limited
Atlas Radio Corporation Ltd.
RCA Victor Company Ltd.

OSCILLOSCOPES (Cathode Ray)
Browning Laboratories Inc.
Specialty Engineering & Electronics
Company
Daystrom Electric Corporation
Trad Electronics Corporation
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
RCA Victor Company Ltd.
Perkins Electric Company Limited
General Precision Industries Limited
Cossor Canada Ltd.
Southern Instruments Ltd.
The Solartron Electronic Group Ltd.
Airmec Limited
Cinema-Television Limited
Rogers Majestic Electronics Limited
Electrodesign
Electrolabs Reg'd.
Canadian Marconi Company,
Electronic Tube & Components Div.
Pye Canada Ltd.
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Precision Apparatus Co. Inc.
Jackson Electrical Instrument Co.
James Millen Mfg. Co. Inc.
Central Scientific Company of Canada,
Ltd.
Industrial Electronics of Canada Limited
Bayly Engineering Limited
Canadian Research Institute
Computing Devices of Canada Limited
The Hickok Electrical Instrument
Company
Laboratory for Electronics Inc.
Electronic Measurements Corp.
Electronic Instrument Co. Inc.

OSCILLOSCOPES (Portable)
Rogers Majestic Electronics Limited
Electrodesign
Canadian Marconi Company,
Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Hackbusch Electronics Limited
James Millen Mfg. Co. Inc.
Industrial Electronics of Canada Limited
Bayly Engineering Limited
Computing Devices of Canada Limited
The Hickok Electrical Instrument
Company
Electronic Instrument Co. Inc.
The Solartron Electronic Group Ltd.
Southern Instruments Ltd.
Browning Laboratories Inc.
Specialty Engineering & Electronics Co.
Northern Electric Co. Ltd.
Cossor Canada Ltd.
Perkins Electric Company Limited
Atlas Radio Corporation Ltd.

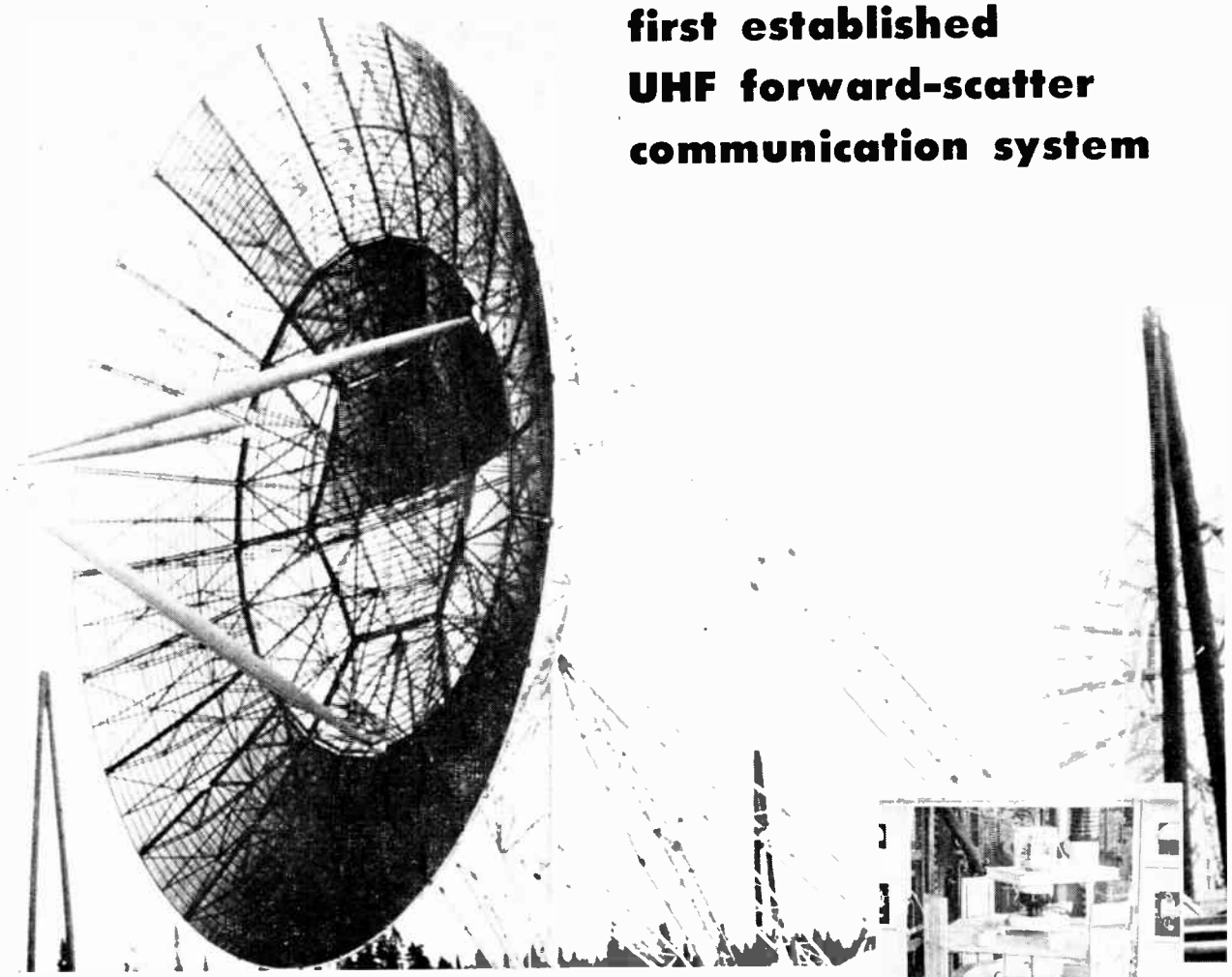
OVENS
Central Scientific Company of Canada,
Ltd.
Thermovelt Instruments Limited
Canadian Research Institute
Aeromotive Engineering Products
Teletronics Laboratory, Inc.
Precision Scientific Company
Grieve-Hendry Company, Inc.
Edwards High Vacuum Ltd.
Atlas Radio Corporation Ltd.

PACKAGING MATERIALS
Minnesota Mining and Manufacturing of
Canada Limited
Stark Electronic Instruments Limited
Robinson Aviation Inc.
Sun Chemical Corporation,
Electro Technical Products Division
Minnesota Mining & Manufacturing of
Canada Limited
Specialty Engineering & Electronics
Company
Dow Chemical of Canada Limited

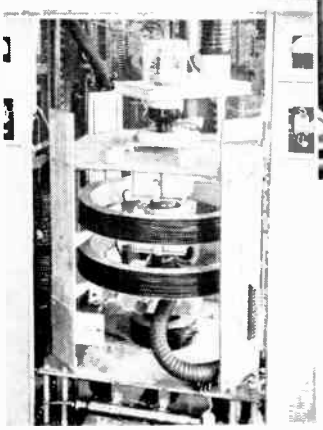
PICKUPS
Shure Brothers, Inc.

PICKUPS (Ceramics & Crystal)
Electro-Voice, Inc.

EIMAC klystrons are used in first established UHF forward-scatter communication system



A link in the northern communication system (photo courtesy of Bell Telephone Company of Canada).



Eimoc high power klystron ond Eimac-developed circuit components in f nol amplifier stoge of forword-scotter transmitter(photo courtesy of Rodio Engineering Loborotories).

In the forward-scatter communication system installed by the Bell Telephone Company of Canada over the rugged terrain of the north, Eimac amplifier klystrons are used exclusively. Eimac amplifier klystrons generate the high power necessary for revolutionary beyond-the-horizon scatter techniques. Their reliability and performance assure outstanding operation and minimize maintenance problems. Their simple, straightforward design, plus high power gain, make transmitter construction easy. All these features contributed to the selection of Eimac klystrons for the vital communication systems of the north. Now in operation for thousands of hours in these communication systems, Eimac klystrons have justified the early faith put in them and have aided substantially in making UHF forward-scatter a reliable method of distant communication.

Eimac

EITEL-McCULLOUGH, INC.

SAN BRUNO, CALIFORNIA

The World's Largest Manufacturer of Transmitting Tubes

For further data on advertised products use page 207.

PICKUPS (Magnetic)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Div.
Ultradyne Engineering Labs, Inc.
S & T Sales Ltd.
Musimart of Canada Limited, Electronics Division
Chas. W. Pointon Ltd.
Can. Astatic Ltd.
Potter Instrument Company Inc.
Presto Recording Corporation
Southern Instruments Ltd.
Pickering and Company Inc.
Atlas Radio Corporation Ltd.
Perkins Electric Company Limited

PICKUPS (Photoelectric)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Div.
Canadian Westinghouse Co. Ltd., Electronics Division
Canadian Research Institute
Potter Instrument Company Inc.
Electronic Control Corporation
Ess Instrument Company
Perkins Electric Company Limited

PICKUPS (Transcription)
Stark Electronic Instruments Ltd.
S & T Sales Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
McCurdy Radio Industries Limited
Chas. W. Pointon Ltd.
Can. Astatic Ltd.
Microlab Devices Ltd.
Presto Recording Corporation
Gray Research & Development Co. Inc.
Pickering and Company, Inc.
Perkins Electric Company Limited

PLASTIC MATERIALS (Laminated)
National Fibre Co. of Canada Limited

PLASTIC MATERIALS
Osborne Electric Co. Ltd.
H. Clarke & Co. (Manchester) Ltd.
Minnesota Mining and Manufacturing of Canada Limited
Hathaway Kraemer Limited
Bakelite Company, Div. of Union Carbide & Carbon Corp.
The Garlock Packing Company of Canada Ltd.
General Cement Mfg. Co.
Gee-Lar Mfg. Co.
Rogers Corporation
The Formica Co.
Garde Manufacturing Company
Dow Corning Silicones Limited
Barrett Division, Allied Chemical & Dye Corporation
Canadian General Company Limited
Micanite Canada Ltd.
Dixon Corporation
Sun Chemical Corporation, Electro Technical Products Division
The Borden Company, Chemical Division, Monomer Department
Polypenco, Inc.
Accurate Electronics Corp.
Crane Packing Company
Synthane Corporation
Keystone Electronics Corporation
Dow Chemical of Canada Ltd.
Bakelite Company

PLUGS
E. F. Johnson Company

PLUGS (Telephone)
Pye Canada Ltd.
Canadian Marconi Company, Electronic Tube & Components Div.
Hackbusch Electronics Limited
Automatic Electric Sales (Canada) Limited
McCurdy Radio Industries Limited
Prince & Roberts
Switchcraft, Inc.
Herman H. Smith, Inc.
Walsco Electronics Corp.
Belling & Lee Ltd.
Specialty Engineering & Electronics Company
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.

PLUGS (Terminal)
Quality Hermetics Limited
United-Carr Fastener Co. of Can. Ltd.
Canadian Marconi Company, Electronic Tube & Components Div.
Hackbusch Electronics Limited
General Cement Mfg. Co.
Garde Manufacturing Company
Amphenol Canada Limited
McCurdy Radio Industries Limited
Herman H. Smith Inc.
Continental Connector Corp.
Howard B. Jones Div.
Automatic & Precision Mfg. Co.
Javex
Painton & Company Limited
Specialty Engineering & Eletronics Company
Accurate Electronics Corp.
Keystone Electronics Corporation
Atlas Radio Corporation Ltd.

POINTERS (Dial)
Canadian Marconi Company, Electronic Tube & Components Div.
United-Carr Fastener Co. of Can. Ltd.
General Cement Mfg. Co.
James Millen Mfg. Co. Inc.
National Company, Inc.
J. R. Longstaffe Ltd.
Herman B. Smith, Inc.
Painton & Company Limited

POTENTIOMETERS (Induction)
Stark Electronic Instruments Ltd.
R-O-R Associates Limited
Sharpe Instruments Limited
Lab-O Ring Enterprises Ltd.
Whiteley Electrical Radio Co. Ltd.
Daystrom Pacific Corp.
Perkins Electric Company Limited

POTENTIOMETERS (Linear & Non-Linear)
Painton & Company Limited
Canadian Marconi Company, Electronic Tube & Components Div.
Pye Canada Ltd.
H. Tinsley & Co. Ltd.
Electrodesign
Radio Components Ltd.
Circuit Instruments Incorporated, Subsidiary — International Resistance Company
Waters Manufacturing Inc.
R-O-R Associates Limited
Musimart of Canada Ltd., Electronics Division
Industrial Electronics of Canada Limited
Lab-O Ring Enterprises Ltd.
Peacock Brothers Limited
Aeromotive Engineering Products
P. J. Heenan Ltd.
International Resistance Co.
Electro-Measurements, Inc.
DeJur-Amsco Corporation
Ohmite Manufacturing Company
Litton Industries, Inc.
Technology Instrument Corporation
Daystrom Pacific Corp.
Vectron, Inc.
Pacific Scientific Company
Bourns Laboratories
Daven Company
General Radio Company
Northern Electric Co. Ltd.
Perkins Electric Company Limited
Atlas Radio Corporation Ltd.
H. McCardle

POTENTIOMETERS (Portable)
The J. W. Ellis Industries
Pye Canada Ltd.
H. Tinsley & Co. Ltd.
Sharpe Instruments Limited
Peacock Brothers Limited Lab-O Ring Enterprises Ltd.
Canadian Research Institute
R. H. Nichols Limited
Technology Instrument Corporation
Elliott Brothers (London) Limited
Daystrom Pacific Corp.
The Winslow Co. Inc.
Daven Company
Bourns Laboratories
Scientific Specialties Corporation
Northern Electric Co. Ltd.
Perkins Electric Company Limited

POTS (Soldering)
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
Canadian Marconi Company, Electronic Tube & Components Div.
Hackbusch Electronics Limited
P. Wall Mfg. Co.

PRE-AMPLIFIERS (Communication)
Canadian Marconi Company, Electronic Tube & Components Div.
Hackbusch Electronics Limited
Stark Electronic Instruments Ltd.
Electro-Vox Inc.
Altec Lansing Corporation
Canadian Westinghouse Co. Ltd.
Mark Simpson Co. Inc.
N. H. Speight Laboratories
McCurdy Radio Industries Limited
Electronic Communications Limited
John R. Tilton Limited
Industrial Electronics of Canada Limited
Electronic Instrument Co. Inc.
Cinema Engineering Company, Division Aerovox Corporation
Whiteley Electrical Radio Co. Ltd.
The Solartron Electronic Group Ltd.
Northern Electric Co. Ltd.
Atlas Radio Corporation Ltd.
Perkins Electric Company Limited
Radio Communications Equipment & Engineering Ltd.
Dynamic Electronics N.Y. Inc.
Pickering and Company Inc.
Specialty Engineering & Electronics Company
Dukane Corporation
Radio Condenser Co. Ltd.

PRE-AMPLIFIERS (Oscilloscopes)
Cossor Canada Ltd.
Rogers Majestic Electronics Limited
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited

COMMUNICATIONS

(Continued from page 41)

such power stations. This accounts for the apparent severe disturbances particularly in some short communications lines radiating from the point of fault and which may not be directly exposed to the faulty power line. The resistances of power station grounds vary from fractions of an ohm to several ohms and with currents of several thousand amperes, potential rises of several thousand volts may be impressed on the communications apparatus.

"Direct crosses or contacts with power circuits" are extremely hazardous. In the case of a contact between the power line and communication line depending on the type of power system, voltages will appear between the conductors of

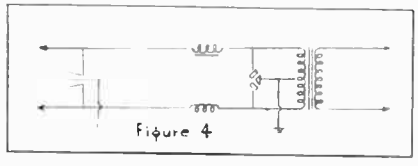


Figure 4

the communications pair or between the pair and ground. Depending on the voltage of the power system and the degree of unbalance as a result of such a cross or contact, the voltages and currents in the communications pair to ground may be very large. Such a condition is particularly hazardous to personnel and equipment. Valuable apparatus often is completely disintegrated and human lives lost when such a fault occurs on high voltage power line.

Protection must be afforded against "lightning". Communications lines parallelling power transmission lines are usually much closer to the ground than the power lines and therefore are fairly well shielded from direct lightning strokes. However, when lightning strikes the power line, again an unbalance occurs and the residual voltages increase which in turn induce voltage into the communication pair. The harmonics are usually high in such a situation. Where shielding is not present the direct lightning strokes are impressed on the protective devices and/or communications

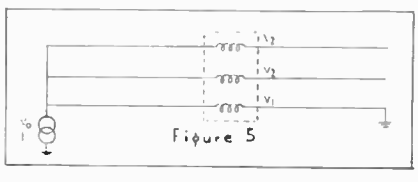


Figure 5

apparatus. Steep wave front voltages appear which are particularly damaging as are the heavy currents.

Protective Devices

The question of "transpositions" was noted with respect to "Electric Magnetic Induction" and "Electric Static Induction". It was shown that if the power line and the communication line was balanced by a sufficient number of transpositions no normal induction would occur. However, it is of utmost importance that the transpositions of the two systems be co-ordinated. The effect of transposing a power circuit is one of neutralization, that is, the inductive effect of the balanced voltages into an untransposed parallel communication circuit is the vector sum of zero.

The effect of transposing the parallel

(Continued on page 94)

Reduce Operator Fatique

for increased, day-long efficiency

CAT. NO. CS-3311

CAT. NO. CS-13307

Install these comfortable chairs with the "personalized" fit

Telephone operator chairs specially built by Harter to Automatic Electric specifications. They reduce fatigue—increase working efficiency!

Improved features of these chairs ensure comfort and improved working efficiency for all operators on all types of switchboards. Seat height is easily changed by the operator. And a simple screw-spindle adjustment and two convenient handwheels provide vertical and horizontal backrest adjustments to suit the individual.

Fully molded foam rubber seat gives permanent comfort and the padded backrest provides firm, day-long support. Seat and back are upholstered in "Tolex" vinyl-coated fabric. This material is tough and water-proof, yet resilient and flexible. It never gets tacky.

Standard upholstery colour is brown. Green and maroon can be supplied if desired. Metal parts on the standard chairs are enamelled, mahogany in colour, except the foot ring, which is chrome-plated. Castors are ball-bearing type with replaceable 2-inch soft rubber treads. The standard chairs are equipped with swivel glides.

Chairs may be equipped with saddle type cane seats on special order.

For further information write or phone:

Exclusive Canadian Distributors

AUTOMATIC ELECTRIC

SALES (CANADA) LIMITED

Head Office: 185 Bartley Drive, Toronto 16

MONTREAL • OTTAWA • BROCKVILLE • HAMILTON • WINNIPEG • REGINA • EDMONTON • VANCOUVER

5556

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James Millen Mfg. Co., Inc.
R-O-R Associates Limited
Keithley Instruments
The Solartron Electronic Group Ltd.
Airmec Limited
Southern Instruments Ltd.
Dynamic Electronics N.Y. Inc.
Specialty Engineering & Electronics Company

PROBES (High Frequency)
Rogers Majestic Electronics Limited
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Div.
Jackson Electrical Instrument Co.
Precision Apparatus Co., Inc.
R-O-R Associates Limited
John R. Tilton Limited
Industrial Electronics of Canada Limited
Bayly Engineering Limited
Harris Pound & Co.
Lab-O Ring Enterprises Ltd.
Canadian Research Institute
Diamond Microwave Corporation
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Browning Laboratories Inc.
Keystone Elecronics Corporation
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Company Limited
RCA Victor Company Ltd.
General Precision Industries Limited
Atlas Radio Corporation Ltd.

PROBES (High Voltage)
Rogers Majestic Electronics Ltd.
Stark Electronic Instruments Ltd.
Hackbusch Electronics Ltd.
Canadian Marconi Co., Electronic Tube and Components Div.
Bach-Simpson Ltd.
Jackson Electrical Instrument Co.
Precision Apparatus Co. Inc.
R-O-R Associates Ltd.
John R. Tilton Ltd.
Industrial Electronics of Canada Ltd.
Lab-O Ring Enterprises Ltd.
Canadian Research Institute
The Hickok Electrical Instrument Co.
Electronic Instrument Co. Inc.
Javex
Measuring Instruments (Pullin) Ltd.
Sensitive Research Instrument Corp.
Keystone Electronics Corp.
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
General Precision Industries Ltd.
Atlas Radio Corp. Ltd.

PROBES (Microwave)
Technicraft Laboratories Inc.

POWER SUPPLIES (Regulated)
Krohn-Hite Inst. Co.

POWER PACKS (Miniaturized)
Electronic Research Associates Inc.

PRINTED CIRCUITY
Corneli-Dubilier Electric Corp.

PUBLIC ADDRESS SYSTEMS
Rogers Majestic Electronics Ltd.
Hackbusch Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Pye Canada Ltd.
Electro-Vox Inc.
Electrolabs Reg'd.
Executone Communications Systems Ltd.
Chisholm Industries Ltd.
Wickett, Bradford J.
Altec Lansing Corp.
Mark Simpson Mfg. Co. Inc.
N. H. Speight Laboratories
John R. Tilton Ltd.
Electronic Communications Ltd.
Dominion Sound Equipments Ltd.
Redifon (Canada) Ltd.
Canadian Research Institute
Chas. W. Pointon Ltd.
Bell Sound Systems Inc.
Whiteley Electrical Radio Co. Ltd.
Electro-Voice Inc.
Specialty Engineering & Electronics Co.
Webster Electric Co.
Northern Electric Co. Ltd.
RCA Victor Co. Ltd.
Atlas Radio Corp. Ltd.
Radio Communications Equipment & Engineering Ltd.
Cossor Canada Ltd.
Perkins Electric Co. Ltd.
Dukane Corp.

RADIOSONDES

QUARTZ (Fused)
Thermal American Fused Quartz Co.

RACKS (Relay)
Texas Instruments Inc.
Whiteley Electrical Radio Co. Ltd.
COSSOR Canada Ltd.
H. McCardle

RADAR EQUIPMENT
Electronic Associates Ltd.
Electrodesign
Rogers Majestic Electronics Ltd.
Servo Corp. of America
Bludworth Marine, Division of National-Simplex-Bludworth Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
S & T Sales Ltd.
Decca Radar (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Microwave Associates Inc.
Litton Industries Inc.
Microwave Instruments Ltd.
Ripley Co. Inc.
Sanders Associates Inc.
Aircraft-Marine Products of Canada Ltd.
Texas Instruments Inc.
Premier Instruments Corp.
The Solartron Electronic Group Ltd.
Elliott Brothers (London) Ltd.
Dynamic Electronics N.Y. Inc.
Specialty Engineering & Electronics Co.
Technicraft Laboratories Inc.
Cascade Research Corp.
Philco Corp., Government & Industrial Division
Northern Electric Co. Ltd.
RCA Victor Co. Ltd.
Cossor Canada Ltd.
Sperry Gyroscope Co. Ltd.
Beaconing Optical & Precision Co. Ltd.
Hammond Manufacturing Co. Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Hackbusch Electronics Ltd.
Altec Lansing Corp.
National Company Inc.
McCurdy Radio Industries Ltd.
J. Langham Thompson Ltd.
Northern Electric Co. Ltd.
Radio Communications Equipment & Engineering Ltd.
Rogers Majestic Electronics Ltd.
Hackbusch Electronics Ltd.
Kelk, G. F. & Co.
Pye Canada Ltd.
National Company Inc.

RECEIVERS (Communication)
Rogers Majestic Electronics Ltd.
Pye Canada Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
Chisholm Industries Ltd.
National Co. Inc.
Lear Inc.
Servo Corp. of America
Canadian Westinghouse Co. Ltd., Electronics Division
S & T Sales Ltd.
Redifon (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Morrow Radio Mfg. Co.
Avionex Electronics Corp.
The Hammarlund Mfg. Co. Inc.
Radio Apparatus Corp. & Regency Division, I.D.E.A. Inc.
Aircraft Radio Corp.
Airmec Ltd.
Stratton & Co. Ltd.
Dynamic Electronics N.Y. Inc.
Electro-Voice Inc.
Browning Laboratories Inc.
Specialty Engineering & Electronics Co.
Radio Apparatus Corp.
Kaar Engineering Corp.
Fischer & Porter Co.
G & M Equipment Co. Inc.
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
Perkins Electric Co. Ltd.
Radio Communications Equipment & Engineering Ltd.
RCA Victor Co. Ltd.
Radio Condenser Co. Ltd.
Dukane Corp.
Polarad Electronics Corp.

RECEIVERS (Amateur)
Canadian Marconi Co., Electronic Tube & Components Div.
National Co. Inc.
Industrial Electronics of Canada Ltd.
Collins Radio Co. of Canada Ltd.
Morrow Radio Mfg. Co.
Stratton & Co. Ltd.
Dynamic Electronics N.Y. Inc.
Electro-Voice Inc.
Perkins Electric Co. Ltd.

RECEIVERS (Loran)
Stark Electronic Instruments Ltd.
Bludworth Marine, Division of National-Simplex-Bludworth Inc.
Sperry Gyroscope Co. of Canada Ltd.

RECEIVERS (Portable & Mobile)
Rogers Majestic Electronics Ltd.
Pye Canada Ltd.
Chisholm Industries Ltd.
Lear Inc.
Canadian Westinghouse Co. Ltd.
S & T Sales Ltd.
Redifon (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Morrow Radio Mfg. Co.
Avionex Electronics Corp.
Radio Apparatus Corp. & Regency Division, I.D.E.A. Inc.
Aircraft Radio Corp.
Dynamic Electronics N.Y. Inc.
G & M Equipment Co. Inc.
Beaconing Optical & Precision Materials Co. Ltd.
Radio Communications Equipment & Engineering Ltd.

RECEIVING EQUIPMENT (General)
National Co. Inc.
Canadian Westinghouse Co. Ltd.
Redifon (Canada) Ltd.
Collins Radio Co. of Canada Ltd.
Morrow Radio Mfg. Co.
Avionex Electronics Corp.
Litton Industries Inc.
Elliott Brothers (London) Ltd.
Dynamic Electronics N.Y. Inc.
G & W Equipment Co. Inc.
Fischer & Porter Co.
Northern Electric Co. Ltd.
Radio Communications Equipment & Engineering Ltd.
Beaconing Optical & Precision Materials Co. Ltd.
Radio Condenser Co. Ltd.

RECEIVERS (Railroad)
Rogers Majestic Electronics Ltd.
Canadian Westinghouse Co. Ltd.

RECORDERS (Disc)
Beaconing Optical & Precision Materials Co. Ltd.
Rek-O-Kut Co.

RECORDERS (Potentiometer)
Electrovert Ltd.
Rogers Majestic Electronics Ltd.
The J. W. Ellis Industries
Fielden Instrument Division
Bailey Meter Co. Ltd.
Varian Associates of Canada Ltd.
The Bristol Co. of Canada Ltd.
R-O-R Associates Ltd.
Peacock Brothers Ltd.
Harris Pound & Co.
Lab-O-Ring Enterprises Ltd.
Aeromotive Engineering Products
West Instrument Corp.
Ess Instrument Co.
Texas Instruments Inc.
Elliott Brothers (London) Ltd.
Fischer & Porter Co.

RECORDERS (Tape)
Audio Tool & Engineering Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Electronic Enterprises Ltd.
Hackbusch Electronics Ltd.
National Co. Inc.
H. A. Hartley Co. Inc.
Magnecord Inc.
The Pentron Corp.
Canadian Westinghouse Co. Ltd.
Mark Simpson Mfg. Co. Inc.
Dominion Sound Equipments Ltd.
Musimart of Canada Ltd., Electronics Division
Chas. W. Pointon Ltd.
Potter Instrument Co. Inc.
Presto Recording Corp.
Peirce Dictation Systems
Bell Sound Systems Inc.
Wright & Weaire Ltd. (E)
Webster Electric Co.
Broadcast Equipment Specialties Corp.
Fischer & Porter Co.
Daystrom Electric Corp.
Titania Electric Corp. of Can. Ltd.
Dukane Corp.
RCA Victor Co. Ltd.

RECORDERS (Telemetering)
Electrodesign
The J. W. Ellis Industries
Electrovert Ltd.
Fielden Instrument Division
The Bristol Co. of Canada Ltd.
Harris Pound & Co.
R. H. Nichols Ltd.
Century Electronics & Instruments Inc.
Elliott Brothers (London) Ltd.
The Solartron Electronic Group Ltd.
Evershed & Vignoles Ltd. (E)
Scientific Specialties Corp.
Electro-Mechanical Research Inc.
Fischer & Porter Co.

RECORDING HEADS
Canadian Marconi Co., Electronic Tube & Components Div.
Shure Brothers Inc.
The Pentron Corp.
Canadian Westinghouse Co. Ltd.
Ferranti Electric Ltd.
Can. Astatic Ltd.
Potter Instrument Co. Inc.
Duotone Company Inc.
Presto Recording Corp.
Peirce Dictation Systems

RECORDERS (Wire)
Canadian Marconi Co., Electronic Tube & Components Div.
Peirce Dictation Systems

you can't match TRIPLETT model 630 VOM

for SPEED ACCURACY DURABILITY CONVENIENCE!

heavy molded case

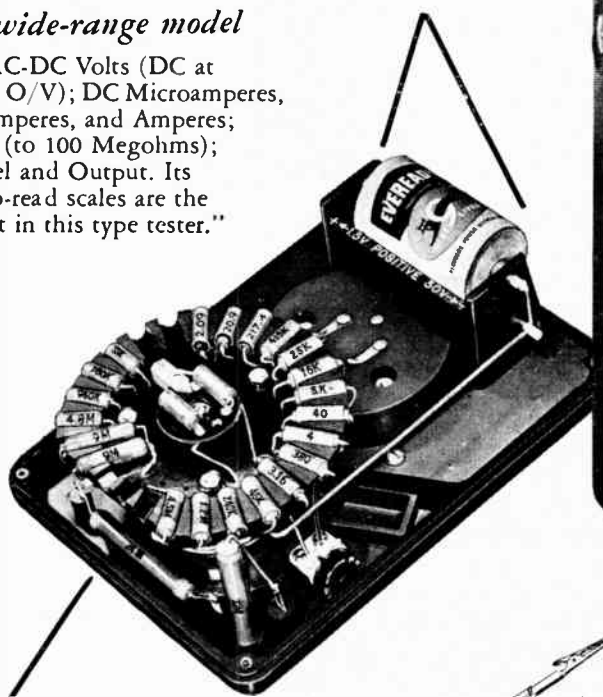
—¼" thick for high impact. Fully insulated.

sure grip battery contacts

Balanced double-spring tension grip assures permanent contact.

"this wide-range model

tests AC-DC Volts (DC at 20,000 O/V); DC Microamperes, Milliamperes, and Amperes; Ohms (to 100 Megohms); Decibel and Output. Its easy-to-read scales are the longest in this type tester."

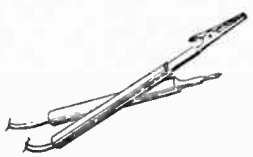


streamlined design

No protruding knobs on switch or ohms control—both are flush with the panel.

king size recessed knob

—Only one switch; (fully enclosed) selects both circuit and range. Just turn the switch and make your reading.



for quick positive connections

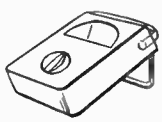
—Banana jacks and plugs on test leads are best. Alligator clips are provided to slip on test prods for extra convenience.

for most efficient meter use

—With every Model 630 you receive complete, simplified instructions on how to use and maintain most efficiently.

advanced engineering

—Molded mounting for resistors and shunts allow direct connections without cabling. No chance for shorts. Longer life and easy-to-replace resistors in their marked positions.



for convenience in reading

—Available as an extra (only 50c), this special stand tilts meter at best angle for easy reading

no slip feature

Four rubber feet furnished as standard equipment fit in back of the case to prevent slipping on smooth surfaces.

MODEL 630

$55.30
Suggested Canadian Dealer Net

TRIPLETT ELECTRICAL INSTRUMENT CO.
Bluffton, Ohio

THE MIGHTY NINE VOM LINE

631 Combination V-O-M—VTVM

630-NA For Best Testing Around The Lab, Production Line or Bench

630 The Popular All-Purpose V-O-M

630-A A Good Lab and Production Line V-O-M

310 The Smallest Complete V-O-M With Switch

630-T For Telephone Service

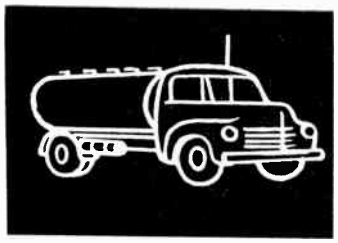
666-HH Medium Size For Field Testing

625-NA The First V-O-M With 10,000 Ohms/Volt AC

666-R Medium Size With 630 Features

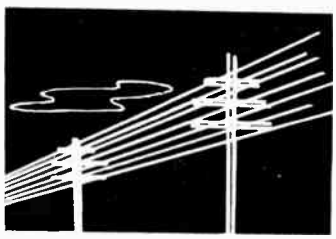
William F. Kelly Co., 2781 Yonge St., Toronto 2, Ont. • C. M. Robinson Co., 207 Scott Block, Winnipeg, Man.; 550 Beatty St., Vancouver, B.C.

CANADA LIMITED Presents a



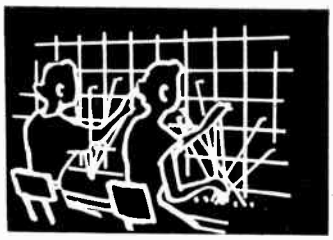
1

VHF FIXED AND MOBILE RADIO
For all applications including Airports and Control Towers.



2

TELEPHONE LINE AND POWER LINE
Carrier Systems of every type.

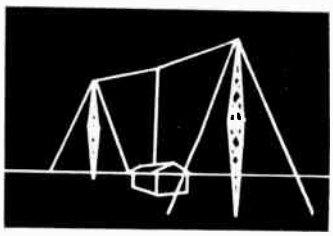


3

TELEPHONE EXCHANGES
A full range of instruments, switchboards and accessories to meet the most exacting requirements of the largest Companies.

4

POINT-TO-POINT RADIO LINKS
VHF, UHF and Microwave, single and multi-channel. For private, commercial and public communication service.



5

HIGH QUALITY STUDIO TRANSMITTER RADIO LINKS
Also radio microphones, radio paging systems, Mobile dispatching systems, Walkie-talkie units.

6

PORTABLE GASOLINE GENERATORS
1 to 3.5 kw.

COMMUNICATIONS DIVISION

CANADA LIMITED

60 FRONT ST. W., TORONTO

Service from coast to coast

193 E. Hastings St. VANCOUVER
1191 University St. MONTREAL
83 Birmingham St. HALIFAX

Plant: Ajax, Ontario

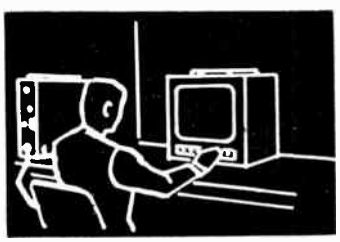
SEND THIS COUPON TODAY FOR FULLY INFORMATIVE BULLETINS ON ANY OF THE ABOVE MENTIONED COMMUNICATION SERVICES

For further data on advertised products use page 207.

Complete Communications Service

7

HF FIXED AND MOBILE EQUIPMENT
For the range 2-10 mcs.

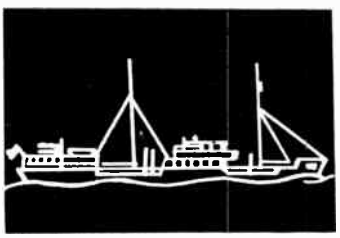


8

INDUSTRIAL TELEVISION EQUIPMENT
Including underwater television cameras.

9

OFFICE INTER-COMMUNICATION SYSTEMS
We especially invite enquiries from dealers.



10

MARINE SHIP-TO-SHORE RADIOTELEPHONES
Also Direction Finders, Fish Finders and Antennas.

11

COMPLETE SERVICE FOR COMMERCIAL TELEVISION BROADCASTING
Studio Equipment, Cameras, Transmitters. Pye Equipment is now used by the CBC, ABC, BBC and most major networks across the world.

12

FREQUENCY DEVIATION METERS
Also RF Wattmeters and Electronic Testing Equipment.

1	2	3
4	5	6
7	8	9
10	11	12

Please tick the numbers you are interested in, and free, descriptive bulletins will be sent to you.

NAME.....POSITION.....

ADDRESS.....

COMPANY.....

RECORDING TAPE
RCA Victor Co. Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Minnesota Mining and Manufacturing Co. of Canada
Permo, Inc.
H. A. Hartley Co. Inc.
Orradio Industries Inc.
Canadian Westinghouse Co. Ltd.
Dominion Sound Equipments Ltd.
McCurdy Radio Industries Ltd.
Duotone Co. Inc.

RECTIFIERS (Germanium)
Canadian Marconi Co., Electronic Tube & Components Div.
Hackbusch Electronics Ltd.
Electrolabs Reg'd.
Rogers Majestic Electronics Ltd.
International Resistance Co. Ltd.
Electronic Controls Ltd.
Bart-Messing Corp.
Texas Instruments Inc.
Perkin Engineering Corp.
Beaconing Optical & Precision Materials Co. Ltd.

RECTIFIERS (Silicon)
Germanium Products Corp., Subsiliary of Radio Development & Research Corp.
Transitron Electronic Corp.

RECTIFIERS (Selenium)
Hackbusch Electronics Ltd.
Electrolabs Reg'd.
Canadian Line Materials Ltd.
Electrodesign
Automatic Electric Sales (Canada) Ltd.
Canadian Westinghouse Co. Ltd.
Industrial Electronics of Canada Ltd.
Chas. W. Pointon Ltd.
R. H. Nichols Ltd.
Computing Devices of Canada Ltd.
Electronic Controls Ltd.
International Resistance Co.
Pyramid Electric Co.
Bart-Messing Corp.
Bradley Laboratories Inc.
Perkin Engineering Corp.
Bradley Laboratories
Osborne Electric Co. Ltd.
J. R. G. McVity & Co.
Electrical Facilities Inc.
Inet Division of Leach Corp.
Northern Electric Co. Ltd.
Sperry Gyroscope Co. of Canada Ltd.
H. McCardle

RECTIFIERS (Tube)
Canadian Marconi Co., Electronic Tube & Components Div.
Hackbusch Electronics Ltd.
Rogers Majestic Electronics Ltd.
Automatic Electric Sales (Canada) Ltd.
Canadian Westinghouse Co. Ltd.
Industrial Electronics of Canada Ltd.
Electronic Controls Ltd.
Osborne Electric Co. Ltd.
The English Electric Co. Ltd.
Dynamic Electronics N.Y. Inc.
Sciaky Bros. Inc.
Northern Electric Co. Ltd.

REGULATORS (Voltage)
The Solartron Electronic Group Ltd.
J. Langham Thompson Ltd.
Fielden Electronics Ltd. (E)
Magnetic Devices Ltd. (E)
The English Electric Co. Ltd.
Cinema-Television Ltd.
Canadian Line Materials Ltd.
Hackbusch Electronics Ltd.
Electrodesign
Rogers Majestic Electronics Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Jack & Heintz Inc.
Bendex Aviation Corp., Red Bank Division
Canadian Westinghouse Co. Ltd.
Computing Devices of Canada Ltd.
Chas. W. Pointon Ltd.
Aeromotive Engineering Products
Lab-O Ring Enterprises Ltd.
Canadian Research Institute
Sola Electric Company
Electronic Controls Ltd.
Universal Electronics Co.
Crest Laboratories Inc., Microtan Co. Division
Electronic Research Associates Inc.
Perkin Engineering Corp.
The Superior Electric Co.
Dynamic Electronics N.Y. Inc.
Inet Division of Leach Corp.
General Radio Corp.
Northern Electric Co. Ltd.

REGULATORS (Voltage & Selium)
Germanium Products Corp., Subsidiary of Radio Development & Research Corp.

RELAYS
Canadian Line Materials Ltd.
Stark Electronic Instruments Ltd.
Jack Heintz, Inc.
Mack Electric Devices Inc.
Struthers-Dunn Inc.
Signal Engineering & Mfg. Co.
Canadian Westinghouse Co. Ltd.
Davis Automatic Controls Ltd.
Precision Scientific Co.
Elliott Brothers (London) Ltd.
Magnetic Devices Ltd. (E)
Osborne Electric Co. Ltd.
The English Electric Co. Ltd.
Londex Ltd.
Measuring Instruments (Pullin) Ltd.
Filters Inc. (Sub-Miniature Relays)
The Adams & Westlake Co.
Hetherington Inc.
Vokar Corp.
Curtiss-Wright Corp., Electronics Div.
Terado Co.

RELAYS (Coaxial)
Lear Inc.
Advance Electric & Relay Co.
Struthers-Dunn Inc.
Signal Engineering & Mfg. Co.
Canadian Westinghouse Co. Ltd.
J. R. Longstaffe Co. Ltd.
Copper Wire Products Ltd.
Diamond Microwave Corp.
Allied Control Co. Inc.
Osborne Electric Co. Ltd.
Londex Ltd.
Marion Electrical Instrument Co.
J. R. G. McVity & Co.
Radio Condenser Co. Ltd.

RELAYS (Differential)
Electrovert Ltd.
Advance Electric & Relay Co.
Struthers-Dunn Inc.
Davis Automatic Controls Ltd.
Canadian Westinghouse Co. Ltd.
J. R. Longstaffe Co. Ltd.
Lab-O Ring Enterprises Ltd.
Allied Control Co. Inc.
Osborne Electric Co. Ltd.
Curtiss-Wright Corp., Electronics Div.

RELAYS (Impulse)
Automatic Electric Sales (Canada) Ltd.
Electrovert Ltd.
X Struthers-Dunn Inc.
J. R. Longstaffe Co. Ltd.
Musimart of Canada Ltd., Electronic Division
Prince & Roberts
Lab-O Ring Enterprises Ltd.
Leonard Electric Ltd.
Guardian Electric Manufacturing Co.
Osborne Electric Co. Ltd.
Londex Ltd.
Curtiss-Wright Corp., Electronics Div.
Radio Condenser Co. Ltd.

RELAYS (High Voltage)
Electrovert Ltd.
Advance Electric & Relay Co.
Struthers-Dunn Inc.
E. F. Johnson Co.
J. R. Longstaffe Co. Ltd.
Allied Controls Co. Inc.
Guardian Electric Manufacturing Co.
Osborne Electric Co. Ltd.
Northern Electric Co. Ltd.

RELAYS (Polarized)
Automatic Electric Sales (Canada) Ltd.
Pye Canada Ltd.
Hackbusch Electronics Ltd.
Advance Electric & Relay Co.
Signal Engineering & Mfg. Co.
Canadian Westinghouse Co. Ltd.
Musimart of Canada Ltd., Electronic Division
Prince & Roberts
Allied Controls Co. Inc.
Guardian Electric Manufacturing Co.
Osborne Electric Co. Ltd.
Wheelco Instruments Division—Barber-Colman Co.
Beaconing Optical & Precision Materials Co. Ltd.

RELAYS (Rotary)
Automatic Electric Sales (Canada) Ltd.
Marsland Engineering Ltd.
Pye Canada Ltd.
Prince & Roberts
Lab-O Ring Enterprises Ltd.
Leonard Electric Ltd.
Aeromotive Engineering Products
Filters Inc.
Allied Controls Co. Inc.
G. H. Leland Inc.
Guardian Electric Manufacturing Co.
Filtors Inc (Sub-Miniature Relays)
Radio Condenser Co. Ltd.

RELAY (Telephone)
Northern Electric Co. Ltd.
Radio Condenser Co. Ltd.
Automatic Electric Sales (Canada) Ltd.
Pye Canada Ltd.
Hackbusch Electronics Ltd.
Advance Electric & Relay Co.
Signal Engineering & Mfg. Co.
Prince & Roberts
Leonard Electric Ltd.
Davis Electric Co.
Ohmite Manufacturing Co.
Allied Control Co. Inc.
Guardian Electric Manufacturing Co.
Magnetic Devices Ltd. (E)
Osborne Electric Co. Ltd.

RELAYS (Time Oelay)
Electrovert Ltd.
Automatic Electric Sales (Canada) Ltd.
Burlec Sales Ltd.
Electrodesign
Advance Electric & Relay Co.
Struthers-Dunn Inc.
Davis Automatic Controls Ltd.
Canadian Westinghouse Co. Ltd.
J. R. Longstaffe Co. Ltd.
Copper Wire Products Ltd.
Lab-O Ring Enterprises Ltd.
Canadian Research Institute
Ebert Electronics Corp.
Industrial Timer Corp.
Dilectron Div. of the Gudeman Co.
Ohmite Manufacturing Co.
Allied Controls Company Inc.
Guardian Electric Manufacturing Co.
The A. W. Haydon Co.
Heinemann Electric Co.
Blonder-Tongue Laboratories Inc.
Osborne Electric Co. Ltd.
Londex Ltd.
The Adams and Westlake Co.
Curtiss-Wright Corp., Electronics Div.
G. C. Wilson & Co.
Northern Electric Co. Ltd.
Radio Condenser Co. Ltd.

RELAYS (Miniature)
Computing Devices of Canada Ltd.

RELAYS (Subminiature)
Filtors Inc.

RELAYS (Hermetically Sealed)
Filtors Inc.

RELAYS (Sequence)
Electrovert Ltd.
Automatic Electric Sales (Canada) Ltd.
Pye Canada Ltd.
Struthers-Dunn Inc.
Davis Automatic Controls Ltd.
J. R. Longstaffe Co. Ltd.
Guardian Electric Manufacturing Co.
The A. W. Haydon Co.

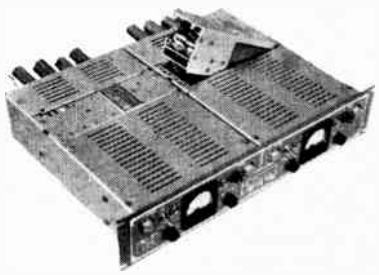
RELAYS (Electronic)
Rogers Majestic Electronics Ltd.

RESISTORS (Fixed)
Shallcross Manufacturing Co.
Continental Carbon Co.
Litton Industries Inc.
Campbell Industries Inc.
Texas Instruments Inc.
Sanders Associates Inc.
Dale Products Inc.
Lectrohm Inc.
Cima Corp.
Painton & Co. Ltd.
Marsland Engineering Ltd.
Electrodesign
Stark Electronic Instruments Ltd.
Canadian Stackpole Ltd.
Bach-Simpson Ltd.
Electrolabs Reg'd.
Canadian Marconi Co., Electronic Tube & Components Div.
General Cement Mfg. Co.
Erie Resistor Corp.
The Ohio Carbon Co.
International Resistance Co. Ltd.
Bayly Engineering Ltd.
R-O-R Associates
Canadian Electric Resistors Ltd.
Aeromotive Engineering Products
Chas. W. Pointon Ltd.
Tru-Ohm Products, Division of Model Eng. & Mfg. Inc.
Electro-Measurements Inc.
Hycor Sales Co.
Ohmite Manufacturing Co.
Sensitive Research Instrument Corp.
Reon Resistor Corp.
Vokar Corp.
Daven Co.
General Radio Co.
Beaconing Optical & Precision Materials Co. Ltd.
Erie Resistor of Canada Ltd.

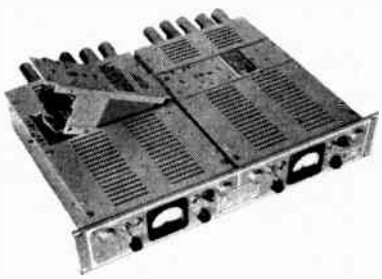
RESISTORS (Low Wattage)
Kerr-Machin Associates
Painton & Co. Ltd.
Canadian Marconi Co., Electronic Tube & Components Div.
Marsland Engineering Ltd.
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Electrolabs Reg'd
General Cement Mfg. Co.
The Ohio Carbon Co.
International Resistance Co. Ltd.
R-O-R Associates Ltd.
Canadian Electric Resistors Ltd.
Chas. W. Pointon Ltd.
Tru-Ohm Products, Division of Model Eng. & Mfg. Inc.
Hycor Sales Co.
Ohmite Manufacturing Co.
Shallcross Manufacturing Co.
Continental Carbon Inc.
Litton Industries Inc.
Cinema Engineering Co., Division Aerovox Corp.
Texas Instruments Inc.
Sanders Associates Inc.

for Better Communications

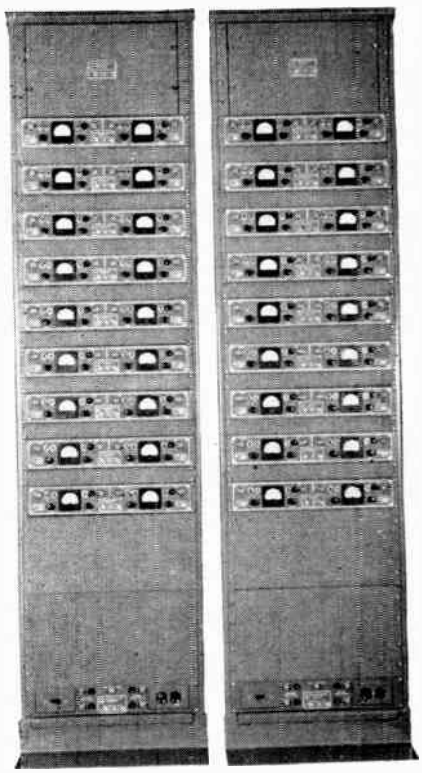
"Northern Radio Multi Channel Telegraph Systems offer a wide range of channel spacings, band width, and telegraph speeds. For further details write for our Catalog No. EC. 1."



The Northern Radio Dual Frequency Shift Tone Converter achieves great simplicity by utilizing a new pulse type discriminator. The discrimination of mark and space frequencies can be made within three cycles. This discriminator, coupled with a high degree of limiting permits a minimum of systems distortion and a maximum of noise interference rejection.



Northern Radio Dual Frequency Shift Tone Keyer embodies a novel design which successfully combines the usually incompatible requirements of transient free frequency shift and a high degree of frequency stability. Its input circuit is capable of accepting almost any form of keying, mechanical or electronic, of high or low impedance characteristics.



Multi Channel Frequency Modulated Telegraph Systems capable of multiplexing such circuits as telephone lines, V.H.F., U.H.F., or Radio Frequency Links, designed to meet any speed requirements, fully electronic, without relays or moving parts to wear.

PACE - SETTERS IN QUALITY COMMUNICATION EQUIPMENT

- RADIO MULTIPLEX SYSTEMS
- MULTI-CHANNEL TONE SYSTEMS
- TWINPLEX EQUIPMENT
- FREQUENCY SHIFT KEYERS
- MONITORS
- DIVERSITY RECEIVERS
- FREQUENCY SHIFT CONVERTERS
- MASTER OSCILLATORS
- TONE KEYERS
- LINE AMPLIFIERS
- DEMODULATORS
- TONE FILTERS

NORTHERN RADIO MANUFACTURING CO. LTD.

1950 BANK ST., OTTAWA, ONT.

In U.S.A. NORTHERN RADIO COMPANY INC., 174 West 22nd St., New York 11, New York

For further data on advertised products use page 207.

Lectrohm Inc.
Daven Co.
General Radio Co.
Titania Electric Corp. of Can. Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

RESISTORS (Low Wattage-Precision)
Monson Manufacturing Corp.

RESISTORS (High Frequency)
Canadian Marconi Co.,
Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
Electrolabs Reg'd.
International Resistance Co. Ltd.
R-O-R Associates Ltd.
Lab-O Ring Enterprises Ltd.
Chas. W. Pointon Ltd.
Tru-Ohm Products,
Division of Model Eng. & Mfg. Inc.
Shallcross Manufacturing Co.
Continental Carbon Inc.
Campbell Industries Inc.
Lectrohm Inc.
Dale Products Inc.
Kerr-Machin Associates
Cima Corp.
Daven Co.
General Radio Co.
Telewave Laboratories Inc.
Beaconing Optical & Precision Materials Co. Ltd.

RESISTORS (High Voltage)
Canadian Marconi Co.,
Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
Electrolabs Reg'd.
The Ohio Carbon Co.
International Resistance Co. Ltd.
Canadian Electric Resistors Ltd.
Lab-O-Ring Enterprises Ltd.
Tru-Ohm Products,
Division of Model Eng. & Mfg. Inc.
Shallcross Manufacturing Co.
Dale Products Inc.
Lectrohm Inc.
Cima Corp.
Kerr-Machin Associates

RESISTORS (High Wattage)
Canadian Marconi Co.,
Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
The Ohio Carbon Co.
International Resistance Co. Ltd.
Canadian Electric Resistors Ltd.
Chas. W. Pointon Ltd.
Tru-Ohm Products,
Division of Model Eng. & Mfg. Inc.
Electronic Engineering
Ohmite Manufacturing Co.
Shallcross Manufacturing Co.
Dale Products Inc.
Lectrohm Inc.
Kerr-Machin Associates
Cima Corp.
Painton & Co. Ltd.

RESISTORS (High Stability)
Bach-Simpson Ltd.

RESISTORS (Fixed—Deposited Carbon)
Allies' Products Corp.

RESISTORS (High Temp Deposited Carbon)
Allies' Products Corp.
Kerr-Machin Associates

RESISTANCE SOLDERING EQUIPMENT
Wassco Electric Products Corp.

RECORD PLAYERS (3 Speed)
Fidelity Amplifier Co.

RHEOSTATS
Canadian Marconi Co.,
Electronic Tube & Components Div.
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
Central Scientific Co. of Canada Ltd.
International Resistance Co. Ltd.
Canadian Electric Resistors Ltd.
Bayly Engineering Ltd.
Lab-O Ring Enterprises Ltd.
Tru-Ohm Products,
Division of Model Eng. & Mfg. Inc.
Electro-Measurements Inc.
DeJur-Amsco Corp.
Ohmite Manufacturing Co.
Vectron Inc.
Daven Co.
General Radio Co.
Northern Electric Co. Ltd.

SCANNERS (Reflected and Transmitted Light)
Beaconing Optical & Precision Materials Company Ltd.
Electronics Corp. of America
Bailey Meter Co. Ltd.
Canadian Westinghouse Co. Ltd.,
Electronics Division
Dawe Instruments Ltd. (E)
Cinema-Television Ltd. (E)

SCREENS (Projection)
Dominion Sound Equipments Ltd.
Beaconing Optical & Precision Materials Co. Ltd.

SEALS (Carbon)
The Garlock Packing Co. of Canada Ltd.,
The Ohio Carbon Co.

SEALS (Hermetic)
Quality Hermetics Ltd.
J. R. G. McVity & Co.
Stark Electronic Instruments Ltd.
Pye Canada Ltd.
Garde Manufacturing Co.
Johnson, Matthey & Mallory Ltd.
Stupakoff Ceramic & Mfg. Co.
Lundey Associates
Automatic & Precision Mfg. Co.

SEALS (High Pressure)
Automatic & Precision Mfg. Co.

SEALS (Switches)
Automatic & Precision Mfg. Co.

SERVOMECHANISMS
G. F. Kelk & Co.
Marsland Engineering Ltd.
Electrodesign
Electronic Associates Ltd.
Lear Inc.
Servo Corp. of America
R-O-R Associates Ltd.
Industrial Electronics of Canada Ltd.
The Bristol Co. of Canada Ltd.
Bayly Engineering Ltd.
Computing Devices of Canada Ltd.
Servomechanisms Inc.
Litton Industries Inc.
Germanium Products Corp., Subsidiary of Radio Development & Research Corp.
Texas Instruments Inc.
Elliott Brothers (London) Ltd.
Fielden Electronics Ltd. (E)
Evershed & Vignoles Ltd. (E)
The English Electric Co. Ltd.
Daystrom Pacific Corp.
Sciaky Bros. Inc.
Sperry Gyroscope Co. of Canada Ltd.

SHIELDING
Co-Operative Industries Inc.
Alpha Wire Corp.
Precision Radiation Instruments Inc.
Airtron Inc.
McPhar Engineering Co. of Can. Ltd.

SHIELDS (Tube)
United-Carr Fastener Co. of Can. Ltd.
Canadian Marconi Co.,
Electronic Tube & Components Div.
E. F. Johnson Co.
The Staver Co. Inc.
Atlas E-E Corp.
James Millen Mfg. Co. Inc.
Amphenol Canada Ltd.
Methode Manufacturing Corp.
Herman H. Smith Inc.

SHIELDS (Coil)
United-Carr Fastener Co. of Can. Ltd.
Canadian Marconi Co.,
Electronic Tube & Components Div.
James Millen Mfg. Inc.
J. W. Miller Co.

SHIELDS (Transformer)
United-Carr Fastener Co. of Can. Ltd.

SHUNTS (Meter)
Stark Electronic Instruments Ltd.
H. Tinsley & Co. Ltd.
The J. W. Ellis Industries
Jack & Heintz Inc., Burton-Rogers Co.
Canadian Research Institute
Bayly Engineering Ltd.
The Hickok Electrical Instrument Co.
Measuring Instruments (Pullin) Ltd.
Sensitive Research Instrument Corp.
The Winslow Co. Inc.
Northern Electric Co. Ltd.

SILICA (Fused)
Thermal American Fused Quartz Co.

SOCKETS (Tube)
United-Carr Fastener Co. of Can. Ltd.
E. F. Johnson Co.
Methode Manufacturing Corp.

SOCKETS (Kinescope)
United-Carr Fastener Co. of Can. Ltd.

SOCKETS (Printed Circuits)
United-Carr Fastener Co. of Can. Ltd.

SOLDER
Northern Electric Co. Ltd.
Chemalloy Electronics Corp.
Hackbusch Electronics Ltd.
Electrovert Ltd.
Johnson Mfg. Co. Inc.
General Cement Mfg. Co.
Johnson, Matthey & Mallory Ltd.
British Insulated Callender's Cables
Chas. W. Pointon Ltd.

SOLENOIDS
Marsland Engineering Ltd.
Electrodesign
Cannon Electric Canada Ltd.
General Instruments
F. W. Sickles of Canada Ltd.
Hammond Manufacturing Co. Ltd.
Adel Precision Products,
Division of General Metals Corp.
Jack & Heintz Inc.
Davis Automatic Controls Ltd.
Copper Wire Products Ltd.
Aeromotive Engineering Products
G. H. Leland Inc.
Guardian Electric Manufacturing Co.
Osborne Electric Co. Ltd.
Electrical Facilities Inc.
Pickering and Co. Inc.
Daystrom Pacific Corp.
Vokar Corp.
Northern Electric Co. Ltd.

SPEAKERS
Atlas Sound Corp.

SPEAKERS (Hi Fi)
H. A. Hartley Co. Inc.

SPLICERS (Recording Tape)
Robins Industries Corp.

SPRINGS
General Cement Mfg. Co.

STRAIGHTENERS (Pin, Tube)
General Cement Mfg. Co.

SUPPRESSORS
Canadian Marconi Co.,
Electronic Tube & Components Div.
General Cement Mfg. Co.
Lear, Inc.
The Ohio Carbon Co.
R-O-R Associates Ltd.
Herman H. Smith Inc.
Tobe Deutschmann Corp.
Belling & Lee Ltd.
Erie Resistor of Canada Ltd.

SWITCHES
J-B-T Instruments Inc.
Switchcraft Inc.

SWITCHES (Automatic)
Hackbusch Electronics Limited
Automatic Electric Sales (Canada) Ltd.
Montgomery Mfg. Co.
Lear Inc.
General Control Co.
Davis Automatic Controls Ltd.
J. R. Longstaffe Co. Ltd.
Prince & Roberts
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
United Electric Controls Co.
The A. W. Haydon Co.
Hetherington Inc.
Daven Co.
General Devices Inc.

SWITCHES (Coaxial Cable)
Canadian Westinghouse Co. Ltd.,
Electronics Division
Diamond Microwave Corp.
Sperry Gyroscope Co. of Canada Ltd.
Hetherington Inc.
Trad Electronics Corp.
J. R. G. McVity & Co.

SWITCHES (Electronic)
Kulka Electric Mfg. Co. Inc.
Cinema Engineering Co.,
Division Aerovox Corp.
Guardian Electric Manufacturing Co.
Fielden Electronics Ltd. (E)
Wright & Weaire Ltd. (E)
Cinema-Television Ltd.
Rogers Majestic Electronics Ltd.
Hackbusch Electronics Ltd.
Electronic Associates Ltd.
Radio Components Ltd.
Gee-Lar Mfg. Co.
General Cement Mfg. Co.
General Control Co.
Electronics Corp. of America
Centralab Canada Ltd.
J. R. Longstaffe Co. Ltd.
Industrial Electronics of Canada Ltd.
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Bayly Engineering Ltd.
Leonard Electric Ltd.
P. J. Heenan Ltd.
Teletronics Laboratory Inc.
Herman H. Smith Inc.
Shallcross Manufacturing Co.
Electronic Instrument Co. Inc.
Hetherington Inc.
Erie Resistor of Canada Ltd.

SWITCHES (Limit)
Pye Canada Ltd.
Lear Inc.
Cherry Electrical Products Corp.
General Control Co.
Davis Automatic Controls Ltd.
J. R. Longstaffe Co. Ltd.
Aeromotive Engineering Products
Unimax Division,
The W. L. Maxson Corp.
United Electrical Controls Co.
Hetherington Inc.
Unimax Division,
The W. L. Maxson Corp.
Daven Co.
Northern Electric Co. Ltd.

SWITCHES (Mercury)
Mack Electric Devices Inc.
Davis Automatic Controls Ltd.
Canadian General Electric Co. Ltd.
Industrial Electronics of Canada Ltd.
Ebert Electronics Corp.
The Mercoid Corp.
Hetherington Inc.
Northern Electric Co. Ltd.

SWITCHES (Rotary Tap)
Ohmite Manufacturing Co.

ANNOUNCING!

IRC CANADA

"PACK-OF-5"

"FACTORY SEALED" — *"MADE IN CANADA"*

• DUSTPROOF! **• WATERPROOF!** **• CONVENIENT HANDLING!**

Popular I.R.C. BTS - ½ Watt Resistors Available in all Standard RTMA Values from 10 ohms to 22.0 megs, ± 10% Tolerance.

MR. DISTRIBUTOR:

A REVOLUTIONARY ADVANCEMENT IN THE MERCHANDISING OF RESISTORS. Cabinet contains 10 packs of 5 of ALL 78 standard RTMA ranges in the already popular ½ watt BTS fixed composition resistor. Ranges clearly marked on cards AND individual packs. Replacements supplied by the card with 10 packs already stapled on. Excellent for dealers by the pack and industrial accounts by the card!

NO MORE FUMBLING IN DRAWERS — NO MORE COUNTING — NO MORE PAPER BAGS.

SUGGESTED DEALER NET **40c** per pkg.

MR. DEALER:

INSIST ON THE IRC PACK-OF-FIVE!! Now at long last, quality, dependable "Made-in-Canada" resistors at a realistic price! Manufactured to meet JCNAAF specifications, IRC ½ watt BTS resistors will cover every circuit requirement.

This is the MOST POPULAR resistor used by end equipment manufacturers — so eliminate costly call-backs by using the resistor designed for the job.

BUY THE VERY BEST — BUY I.R.C.! AND AT THE LOWEST PRICE EVER SUGGESTED — ONLY 8c EACH!!

AVAILABLE AT LEADING DISTRIBUTORS ACROSS CANADA

INTERNATIONAL RESISTANCE CO. LTD.

TORONTO 8, ONT.

349 CARLAW AVE.

1500 St. Catherine St. West
Montreal
Que.

SALES OFFICES:
492 Somerset St. West
Ottawa
Ont.

Radiovision Sales Ltd.
325 Tenth Ave. West
Calgary, Alta.

For further data on advertised products use page 207.

SWITCHES (Vacuum)
Hackbusch Electronics Limited
Mack Electric Devices Inc.
J. R. Longstaffe Co. Ltd.
The Mercoid Corp.
United Electric Controls Inc.
Precision Scientific Co.
Edwards High Vacuum Ltd.
Hetherington Inc.
Northern Electric Co. Ltd.
National Research Corp.

SWITCHES (Key)
Switchcraft, Inc.

SWITCHES (Toggle)
Hetherington, Inc.

SWITCHES (Push-Button)
Hetherington, Inc.

TAPE, LEADER (Recording)
Robins Industries Corp.

TAPE (Recording)
H. McCardle

TAPE SPLICING (Recording)
Robins Industries Corp.

TELEMETERING SYSTEMS
Rogers Majestic Electronics Limited
Hackbusch Electronics Limited
Electrovert Limited
Electrodesign
Lear, Incorporated
Fielden Instrument Division
Ultradyne Engineering Labs. Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
The Bristol Company of Canada Limited
R. H. Nichols Limited
Servomechanisms Inc.
The Hammarlund Mfg. Co. Inc.
Elliott Brothers (London) Limited
J. Langham Thompson Ltd.
Evershed & Vignoles Limited (E)
Cinema-Television Limited
Scientific Specialties Corporation
Electro-Mechanical Research Inc.
Fischer & Porter Company
Beaconing Optical & Precision Materials Company Limited

TELEPHONES (Handsets)
Northern Electric Co. Ltd.
Dukane Corporation
Sperry Gyroscope Company of Canada Ltd.
Automatic Electric Sales (Canada) Ltd.
Electrovox Inc.
Executone Communication Systems Limited
Campbell Manufacturing Company Limited
General Tire & Rubber Co. of Canada Ltd., Stokes Division
Hackbusch Electronics Limited
Roanwell Corporation
Prince & Roberts
Electronic Communications Limited

TERMINALS
Litton Industries, Inc.

TERMINAL BLOCKS
Cambridge Thermionic Corporation
Curtis Development & Mfg. Co.
Javex
Belling & Lee Ltd.
Whiteley Electrical Radio Co. Ltd.
Osborne Electric Co. Ltd.
Hackbusch Electronics Limited
Automatic Electric Sales (Canada) Limited
Electrolabs Reg'd.
General Tire & Rubber Co. of Canada Ltd., Stokes Division
Stark Electronic Instruments Ltd.
Ilsco Corp.
Garde Manufacturing Company
Canadian Westinghouse Co. Ltd., Electronics Division
Renfrew Electric & Refrigerator Co. Limited
Prince & Roberts
McCurdy Radio Industries Limited
St. Regis Paper Company (Canada) Limited, Panelyte Division
National Fibre Co. of Canada Limited
John Spotton Co. Limited
Lenkurt Electric Co. of Canada Ltd.
Stupakoff Ceramic & Mfg. Company
Herman H. Smith, Inc.
Howard B. Jones Div.
Kulka Electric Mfg. Co. Inc.
Accurate Electronics Corp.
Northern Electric Co. Ltd.

TERMINAL BOARDS
Quality Hermetics Limited
Accurate Electronics Corp.
Precision Metal Products Company
Northern Electric Co. Ltd.
Bakelite Company
Dukane Corporation
Hackbusch Electronics Limited
Electrolabs Reg'd.
United-Carr Fastener Co. of Can. Ltd.
James Millen Mfg. Co. Inc.
Garde Manufacturing Company
Prince & Roberts
McCurdy Radio Industries Limited
St. Regis Paper Company (Canada) Limited, Panelyte Division
National Fibre Co. of Canada Limited
J. W. Miller Co.
Herman H. Smith, Inc.
Howard B. Jones Div.
Kulka Electric Mfg. Co. Inc.
Cambridge Thermionic Corporation
Curtis Development & Mfg. Co.
Aircraft Radio Corp.
Osborne Electric Co. Ltd.

TESTERS (Battery)
McColpin — Christie Corporation
Northern Electric Co. Ltd.
RCA Victor Company Ltd.
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
John R. Tilton Limited
Canadian Research Institute
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
Measuring Instruments (Pullin) Limited

TESTERS (Capacitors)
Rogers Majestic Electronics Limited
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Limited
R-O-R Associates Limited
Canadian Research Institute
R. H. Nichols Limited
The Hickok Electrical Instrument Company
Pyramid Electric Company
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
Shallcross Manufacturing Co.
Cornell-Dublier Electric Corporation
Dawe Instruments Limited (E)
Cinema-Television Limited
General Radio Company
RCA Victor Company Ltd.

TESTERS (Continuity)
Rogers Majestic Electronics Limited
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
Canadian Marconi Company, Electronic Tube & Components Division
General Cement Mfg. Co.
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Limited
Canadian Research Institute
R. H. Nichols Limited
The Hickok Electrical Instrument Company
Electro-Measurements Inc.
Electronic Instrument Co. Inc.
Evershed & Vignoles Limited (E)
Measuring Instruments (Pullin) Limited
Northern Electric Co. Ltd.
RCA Victor Company Ltd.
General Precision Industries Limited
Beaconing Optical & Precision Materials Company Limited

TESTERS (Circuit)
Dynamic Electronics N.Y. Inc.
Sensitive Research Instrument Corp.
Keystone Electronics Corporation
Northern Electric Co. Ltd.
RCA Victor Company Ltd.
General Precision Industries Limited
Cossor Canada Ltd.
Beaconing Optical & Precision Materials Company Limited
Sperry Gyroscope Company of Canada Ltd.
Rogers Majestic Electronics Limted
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Lear, Incorporated
Jackon Electrical Instrument Co.
Precision Apparatus Co. Inc.
Industrial Electronics of Canada Limited
Canadian Research Institute
R. H. Nichols Limited
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
Shallcross Manufacturing Co.
Dawe Instruments Limited (E)
Measuring Instruments (Pullin) Limited

TESTERS (Distortion)
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Electronic Associates Ltd.
R-O-R Associates Limited
Canadian Research Institute
Computing Devices of Canada Limited
The Hickok Electrical Instrument Company
Audio Instrument Co. Inc.
Sierra Electronic Corp.
Dynamic Electronics N.Y. Inc.
General Radio Company
RCA Victor Company Ltd.

TESTERS (Insulation)
Electrodesign
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
Associated Research Inc.
R-O-R Associates Limited
Canadian Research Institute
R. H. Nichols Limited
Lab-O Ring Enterprises Ltd.
The Takk Corporation
The Hewson Company Inc.
Shallcross Manufacturing Co.
Industrial Instruments Inc.
Airmec Limited
Evershed & Vignoles Limited (E)
The English Electric Company Limited
Edwards High Vacuum Ltd.
The Winslow Co. Inc.
Dynamic Electronics N.Y. Inc.
General Radio Company
Northern Electric Co. Ltd.
RCA Victor Company Ltd.

TESTERS (Tube)
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
Canadian Marconi Company, Electronic Tube & Components Division
Jackson Electrical Instrument Co.
Precision Apparatus Co., Inc.
Industrial Electronics of Canada Limited
John R. Tilton Limited
Canadian Research Institute
R. H. Nichols Limited
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
Cinema-Television Limited
Sensitive Research Instrument Corp.
General Radio Company
Northern Electric Co. Ltd.
Beaconing Optical & Precision Materials Company Limited
RCA Victor Company Ltd.
General Precision Industries Limited
Cossor Canada Limited

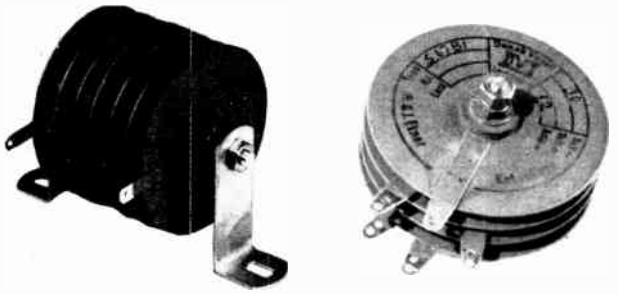
TESTERS (Tube, Kylstron)
Polarad Electronics Corp.

TESTERS (Meter)
Electrovert Limited
Electrodesign
Bach-Simpson Ltd.
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
S & T Sales Ltd.
Canadian Research Institute
R. H. Nichols Institute
Lab-O Ring Enterprises
The Hickok Electrical Instrument Company
Sensitive Research Instrument Corp.
New London Instrument Company Inc.
The Winslow Co. Inc.
Titania Electric Corp. of Can. Ltd.
RCA Victor Company Ltd.
General Precision Industries Limited
Beaconing Optical & Precision Materials Company Limited

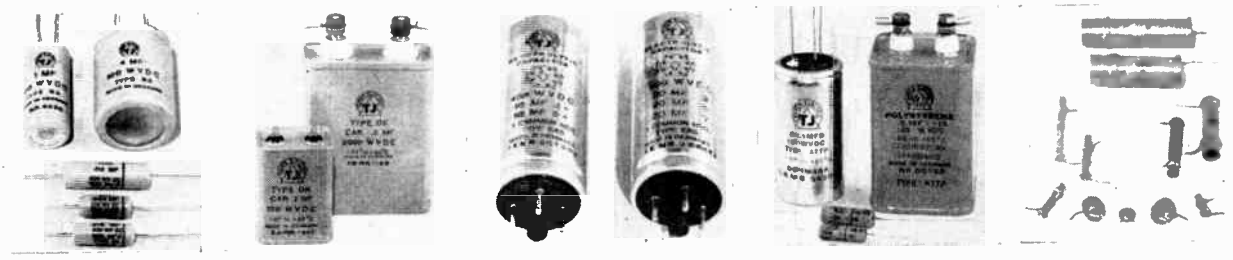
TESTERS (Transistor)
Electronic Research Associates Inc.
Stark Electronic Instruments Ltd.
Canadian Research Institute
Polyphase Instrument Co.
Teletronics Laboratory Inc.
Kay Electric Company
Baird Associates Inc.
Scientific Specialties Corporation
General Radio Company
Northern Electric Co. Ltd.
RCA Victor Company Ltd.

TESTERS (Vacuum Tube)
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Electrodesign
Stark Electronic Instruments Ltd.
Canadian Marconi Company, Electronic Tube & Components Division
Jackson Electrical Instrument Co.
Industrial Electronics of Canada Limited
Canadian Research Institute
Precision Apparatus Co. Inc.
R. H. Nichols Limited
Lab-O Ring Enterprises Ltd.
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Electronic Measurements Corp.
Cinema-Television Limited
Edwards High Vacuum Ltd.
Sensitive Research Instrument Corp.
General Radio Company
Northern Electric Co. Ltd.
RCA Victor Company Ltd.
General Precision Industries Limited
Beaconing Optical & Precision Materials Company Limited

The PEERLESS FACTORIES features a complete line of high quality speakers designed by engineers who are specialists in the art of transforming electrical energy into true, wide range undistorted sound. All PEERLESS Speakers have a special formula cone rim treatment greatly damping the resonance of the cone rim, which attenuates standing waves, reduces distortion, and preserves life of the diaphragm flexible member. —Above is pictured a dual cone 10" high fidelity speaker, a 15" public address speaker and a 12" coaxial type with 5" tweeter for wide range reproduction. — Also available: Dual cone types in 8¼" & 12", 10" & 12" Public Address speakers, 10" & 12" Woofers, 5" & 6½" Tweeters, and a complete range of HEAVY MAGNET & EXTRA HEAVY MAGNET Speakers from 2" to 12".



D.V.I. RECTIFIERS are of the industrial type featuring long life due to conservative design with large safety margins combined with close quality control inspection in every step of production and excellent workmanship. Above is pictured a single stack unit, rated at 130 volt rms. and 250 ma dc. and a full wave bridge rectifier for a max. input of 33 volt rms. and 1.2 amps dc. Many other single stacks, series coupled units for voltage doubler circuits, centertapped stacks and full wave bridges available. Current ratings from a few milliamps to 40 amps for single units. Special instrument rectifiers, full wave bridge type, featuring linear output over a wide frequency range available in ratings from .5 ma. to 10 ma.



PAPER & PAPER OIL - ELECTROLYTICS - PLASTIC FILM - CERAMICS

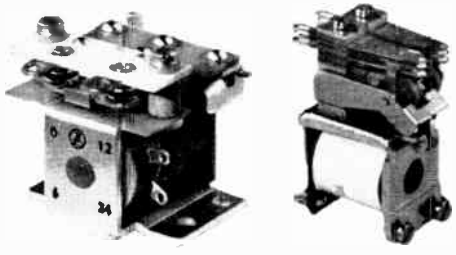
TOBIAS JENSEN CAPACITORS have become known for their high quality. The T. J. Company are manufacturing a complete range of capacitors to meet any application: Tubular hermetically sealed Paper-Oil Capacitors in metal tubing with 100, 200, 400, 600, 1000, 1600, 2000, 3000, 5000 and 7500 Volts rating. Capacities from 100pF. to several MF. — Paper-Oil capacitors in steel cans, hermetically sealed, with ceramic or glass terminals soldered to container. 1% stability, low temperature coefficient. Capacities from .05 MF. to 60 MF. — Voltage ratings to 7500 V. as standard. Special 100 volt units for timing circuits and speaker network. Insulation resistance for both tubular and canned types, min. 5000 meg.ohm/MF.

Electrolytics — Plain or etched foil, polarized or non-polarized in all ratings and styles featuring extremely reliable performance and long life. Miniature types and special photoflash unit with low leakage and power factor.

Plastic Film capacitors — many styles for r.f. applications, tuned filters and critical high impedance circuits featuring insulation resistance in excess of 500,000 meg.-ohm/MF. Min. Q of 2000, high stability, neg. temperature coefficient, non-inductive, standard or special close tolerance. Capacities from 10 pF. to several MF. with 60, 125, 250 450, 600 and 1000 Volts rating. Ceramics — for tuned circuits and by-pass applications, ceramic capacitors for temperature compensation. Capacities from .22 pF., voltages from 100 to 5000 volts.

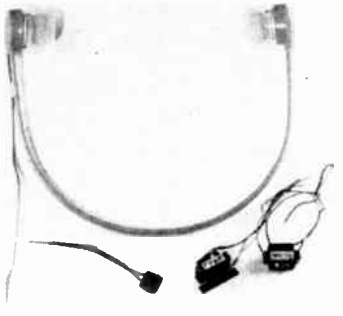
T.S. SWING CONTAINERS

The unit pictured above is designed for handy storage of electrical components. It has two rows of nine trays where each can be divided into four compartments. Other table models with 2 x 6 and 2 x 12 trays, and single stack wall models with 6, 12 and 18 trays available.



ALOIS ZETTLER RELAYS

Above is pictured a dynamotor start relay with special self-aligning contacts capable of handling a 150 amps. inrush current and break 50 amps. for a minimum of one million operations. Universal 6, 12 and 24 volts coil is standard. Also shown a miniature stepping relay with 2C contacts. Height of unit less than 2".—These and many other special or standard, open or hermetically sealed, types of relays of highest quality are available to meet any application. Zettler have been manufacturing since 1877 and are world known for their product.



DANAVOX COMPONENTS

DANAVOX Earphones, Headsets, Microphones, Subminiature and Ultra miniature Transformators are well known for their high quality and excellent workmanship. These units are favoured by most manufacturers of dictating equipment, geiger counters and other miniaturized products.

Associated Electronic Components

37 ROSELAWN AVE., TORONTO 12, ONT., CANADA

HU. 1 - 0144

For further data on advertised products use page 207.

THERMOCOUPLES
Rogers Majestic Electronics Limited
Electrovert Limited
Electrodesign
Stark Electronic Instruments Ltd.
The J. W. Ellis Industries
Davis Automatic Controls Limited
Renfrew Electric & Refrigerator Co. Limited
The Bristol Company of Canada Limited
Thermovelt Instruments Limited
Canadian Research Institute
R. H. Nichols Limited
Aeromotive Engineering Products
Peacock Brothers Limited
West Instrument Corporation
Airtron Inc.
Elliott Brothers (London) Limited
Sensitive Research Instrument Corp.
Wheelco Instruments Division-Barber-Colman Co.
The Winslow Co. Inc.
Cossor Canada Ltd.

THERMOSTATS (Electronic)
Rogers Majestic Electronics Limited
Fielden Instrument Division
Canadian Research Institute
United Electric Controls Co.
Precision Scientific Company
Fielden Electronics Limited (E)
Arthur C. Ruge Associates, Inc.
Curtiss-Wright Corporation, Electronics Division

THERMOSTATS (Electronic) Bimetal
Stevens Manufacturing Co. Inc.

TIMERS (Cycle)
Rogers Majestic Electronics Limited
Electrovert Limited
Automatic Electric Sales (Canada) Limited
The J. W. Ellis Industries
Montgomery Mfg. Co.
Struthers-Dunn Inc.
General Control Company
Electronics Corporation of America
Davis Automatic Controls Limited
J. R. Longstaffe Co. Ltd.
The Bristol Company of Canada Limited
Canadian Research Institute
Peacock Brothers Limited
P.S.C. Applied Research Limited
Industrial Timer Corporation
Robotron Corporation
The A. W. Haydon Company
Osborne Electric Co. Ltd.
Londex Limited
Daystrom Pacific Corp.
Wheelco Instruments Division-Barber-Colman Co.
Fidelity Amplifier Company
Fischer & Porter Co.
G. C. Wilson & Company
Sciaky Bros. Inc.

TIMERS (Interval)
Airmec Limited
Cinema-Television Limited
Osborne Electric Co. Ltd.
Londex Limited
Rogers Majestic Electronics Limited
Electrovert Limited
Electrodesign
Automatic Electric Sales (Canada) Limited
The J. W. Ellis Industries
Pye Canada Ltd.
Struthers-Dunn Inc.
General Control Company
Electronics Corporation of America
Davis Automatic Controls Limited
J. R. Longstaffe Co. Ltd.
Johnson, Matthey & Mallory Limited
Canadian Research Institute
P.S.C. Applied Research Institute
Lab-O Ring Enterprises Ltd.
Industrial Timer Corporation
Potter Instrument Company Inc.
DeJur-Amsco Corporation
The Detectron Corporation
Robotron Corporation
Farmer Electric Products Co. Inc.
General Electric Company, X-Ray Department
The A. W. Haydon Company
Daystrom Pacific Corp.
Fidelity Amplifier Company
Curtiss-Wright Corporation, Electronics Division
Sciaky Bros. Inc.
G. C. Wilson & Company
Fischer & Porter Co.

TIMERS (Reset)
Rogers Majestic Electronics Limited
Electrovert Limited
Electrodesign
Automatic Electric Sales (Canada) Limited
The J. W. Ellis Industries
Struthers-Dunn, Inc.
General Control Company
Electronics Corporation of America
Davis Automatic Controls Limited
J. R. Longstaffe Co. Ltd.
Canadian Research Institute
P.S.C. Applied Research Limited
Lab-O Ring Enterprises Ltd.
Industrial Timer Corporation
Farmer Electric Products Co. Inc.
The A. W. Haydon Company
Osborne Electric Co. Ltd.
Londex Limited
Daystrom Pacific Corporation
Fischer & Porter Co.
G. C. Wilson & Co.
Sciaky Bros. Inc.
Sperry Gyroscope Company of Canada Ltd.

TIMERS (Electronic)
Rogers Majestic Electronics Limited
Electrodesign
Electronic Associates Ltd.
General Control Company
Electronics Corporation of America
The Autotron Company
J. R. Longstaffe Co. Ltd.
Industrial Electronics of Canada Limited
Martin Engineering Inc.
Canadian Research Institute
P.S.C. Applied Research Limited
Computing Devices of Canada Limited
Electronic Controls Limited
Potter Instrument Company Inc.
Electronic Control Corporation
Ripley Company, Inc.
Robotron Corporation
Farmer Electric Products Co. Inc.
Cinema-Television Limited
Daystrom Pacific Corporation
Dynamic Electronics N.Y. Inc.
Sciaky Bros. Inc.
G. C. Wilson & Co.
Fischer & Porter Company

TIMERS (Impulse)
Rogers Majestic Electronics Limited
Electrovert Limited
Electrodesign
Automatic Electric Sales (Canada) Limited
The J. W. Ellis Industries
Pye Canada Ltd.
General Control Company
Electronics Corporation of America
Davis Automatic Controls Limited
J. R. Longstaffe Co. Ltd.
Canadian Research Institute
P.S.C. Applied Research Limited
Lab-O Ring Enterprises Ltd.
Aeromotive Engineering Products
Industrial Timer Corporation
Potter Instrument Company Inc.
The A. W. Haydon Company
Daystrom Pacific Corporation
Sciaky Bros. Inc.
G. C. Wilson & Co.
Fischer & Porter Company

TIMERS (Sequence)
Rogers Majestic Electronics Limited
Electrovert Limited
Automatic Electric Sales (Canada) Limited
The J. W. Ellis Industries
Struthers-Dunn, Inc.
Montgomery Mfg. Co.
General Control Company
Electronics Corporation of America
Davis Automatic Controls Limited
J. R. Longstaffe Co. Ltd.
The Bristol Company of Canada Limited
Canadian Research Institute
P.S.C. Applied Research Limited
Electronic Controls Limited
Industrial Timer Corporation
Potter Instrument Company Inc.
The A. W. Haydon Company
Robotron Corporation
Londex Limited
Daystrom Pacific Corporation
Sciaky Bros. Inc.
G. C. Wilson & Co.
Fischer & Porter Company

TRACERS (Oscilloscopes)
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited
Industrial Electronics of Canada Limited
Harris Pound & Co.
Computing Devices of Canada Limited
The Solartron Electronic Group Ltd.
Northern Electric Co. Ltd.
RCA Victor Company Ltd.

TEST EQUIPMENT (Microwave)
Ferranti Electric Limited

TRACERS (Signal)
Rogers Majestic Electronics Limited
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited
Industrial Electronics of Canada Limited
Harris Pound & Co.
Electronic Instrument Co. Inc.
RCA Victor Company Ltd.

TOOLS (Wire-Wrap)
Keller Tool Division of Gardner-Denver Company

TRANSCEIVERS
Pye Canada Ltd.
Lear, Incorporated
Electronic Communications Limited
Collins Radio Company of Canada Limited
Morrow Radio Mfg. Co.
Dynamic Electronics N.Y. Inc.
G & M Equipment Co. Inc.
Beaconing Optical & Precision Materials Company Limited

TRANSDUCERS
Rogers Majestic Electronics Limited
Hackbusch Electronics Limited
Campbell Manufacturing Company Limited
Lear, Incorporated
Ultradyne Engineering Labs, Inc.
R-O-R Associates Limited
The Bristol Company of Canada Limited
Computing Devices of Canada Limited
Aeromotive Engineering Products
Servomechanisms, Inc.
Southern Instruments Ltd.
J. Langham Thompson Ltd.
Elliott Brothers (London) Limited
Dawe Instruments Limited
Fielden Electronics Limited (E)
The English Electric Company Limited
Daystrom Pacific Corporation
Bourns Laboratories
Sciaky Bros. Inc.
General Radio Company
Titania Electric Corp. of Can. Ltd.
H. McCardle

TRANSFORMERS
Wind Turbine Company of Canada Ltd.

TRANSFORMERS (Audio)
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
Altec Lansing Corporation
Canadian Westinghouse Co. Ltd., Electronics Division
Canadian General Electric Company Limited
Telequipment Mfg. Co. Ltd.
Copper Wire Products Limited
Triad Transformer Corporation
John R. Tilton Limited
Computing Devices of Canada Limited
Electronic Engineering
Laboratory for Electronics, Inc.
Crest Laboratories Inc., Microtan Company Division
Vidaire Electronics Mfg. Corp.
Texas Instrument Incorporated
Whiteley Electrical Radio Co. Ltd.
Wright & Weaire Limited (E)
Partridge Transformers Ltd.
Osborne Electric Co. Ltd.
Goodmans Industries Limited
New London Instrument Co. Inc.
General Radio Company
Northern Electric Co. Ltd.
RCA Victor Company Ltd.

TRANSFORMERS (Input, Output & Interstage)
New London Instrument Co. Inc.
Teleradio Engineering Corporation
Vokar Corporation
General Radio Company
Northern Electric Co. Ltd.
Osborne Electric Co. Ltd.
Radio Components Ltd.
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
T. S. Farley Ltd.
Altec Lansing Corporation
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
S & T Sales Ltd.
Copper Wire Products Limited
Triad Transformer Corporation
John R. Tilton Limited
Computing Devices of Canada Limited
Electronic Engineering
Laboratory for Electronics, Inc.
Crest Laboratories Inc., Microtan Company Division
J. W. Miller Co.
Texas Instruments Incorporated
Perkin Engineering Corporation
Whiteley Electrical Radio Co. Ltd.
Partridge Transforems Ltd. (E)
Wright & Weaire Ltd. (E)

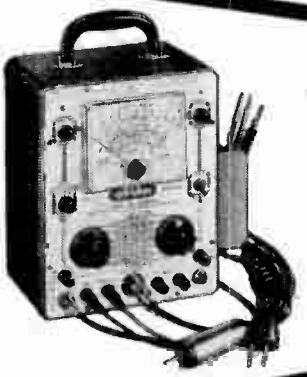
TRANSFORMERS (Modulator)
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
Altec Lansing Corporation
Canadian Westinghouse Co. Ltd., Electronics Division
Copper Wire Products Limited
Triad Transformer Corporation
Electronic Engineering
Crest Laboratories Inc., Microtan Company Division
Standard Electronics Corporation
Partridge Transformers Ltd.
New London Instrument Co. Inc.
Northern Electric Co. Ltd.

TRANSFORMERS (Power)
Hammond Manufacturing Co. Ltd.
Altec Lansing Corporation
Servo Corporation of America
Jack & Heintz, Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Canadian General Electric Company Limited

START WITH STARK TEST EQUIPMENT

MODEL 9—66 DYNAMIC MUTUAL CONDUCTANCE TUBE TESTER

The Stark Model 9—66 Features:
Readings in True Micromho in Three Ranges; 0 — 3,000 — 6,000 — 15,000 important in TV where ordinary passable tubes cause fuzzy pictures.
Noise Test.
Tests Grid Controlled Rectifier Tubes, used in Industrial Applications
Provides Vital Life Test.
Correctly Tests Gas-Filled Rectifier and Starter Tubes.
Tests All Present Day & Future Tubes.

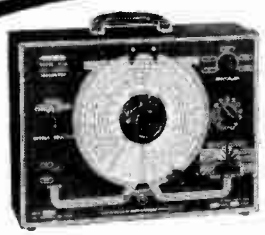


MODEL TA-2 ELECTRONIC VOLT — OHM — CAPACITY INDUCTANCE MILLIAMETER

RANGES:
(a) Volts, A.C. RMS: 0 — 3, 12, 30, 120, 300, 1200
(b) Volts, A.C. Peak to Peak: 0 — 3, 12, 30, 120, 300
(c) Volts, D.C.: 0 — 3, 12, 30, 120, 300, 1200
(d) Mils. D.C.: 0 — 3, 12, 30, 120, 300, 1200
(e) Capacity: 0 — 10,000 mmf. in two ranges
0 — 1,000 mf. in five ranges
50 mh — 100 henries
(f) Ohms: 1 ohm to 10,000 megohms, in eight ranges.

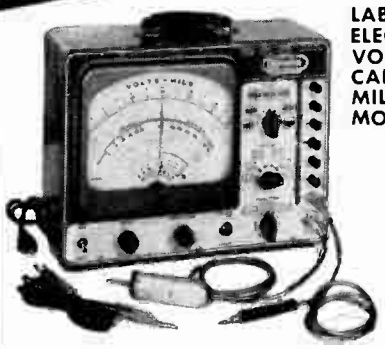
MODEL 197 Battery Test VOLTMETER

Provides the best and most accurate tests possible of all battery conditions.
TESTS DRY BATTERIES UNDER "LOAD" AND "NO LOAD" CONDITIONS.
Ranges: 2 Volt — 10 Volt — 100 Volt.



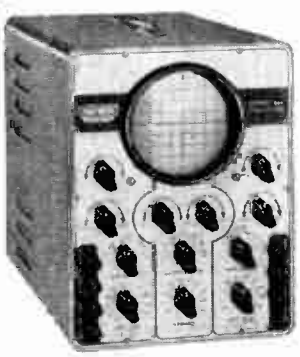
MODEL 10—A R.F. SIGNAL GENERATOR

Radio Frequency Ranges: Calibrated within 1% accuracy in 7 bands 95KC to 144 MC.
Total scale length over 130 Inches.
Maximum output 100,000 microvolts on radio frequencies.
Modulated R.F. output fixed at 400 cycles.
Audio frequency output at 400 cycles.



LABORATORY SIZE ELECTRONIC VOLT OHM CAPACITY MILLIAMMETER MODEL VT—9

Measures A.F., I.F., and R.F. voltages from 20 cycles to 300 megacycles.
Capacity measurements as low as 1 mmf. as high as 1,000 mf. Resistance range: .1 ohm to 10,000 megohms.
Current (D.C.) 5 micro-amperes to 1,200 milliamperes.
A.C. — D.C. Voltage measurements: 0-3, 12, 30, 120, 300, 1200. RMS or Peak to Peak Measurements.
Greater visibility with extra large laboratory size 9" meter.
High voltage D.C. probe available — extends range to 30,000 volts.

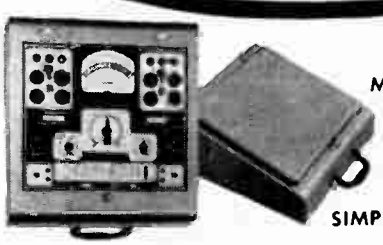


MODEL 11S CATHODE RAY OSCILLOSCOPE

5" CR. Tube.
Complete visual alignment.
High Sensitivity .025V (25MV) per inch.
Wide band vertical amplifier — to 1 megacycle.
Excellent square wave response.
Unitized physical construction.

MODEL ES—1 "TEST ANALYZER MASTER"

20,000 ohm-per-volt
7 D.C. Voltage ranges: (at 20,000 ohms per volt) 0—3, 12, 30, 120, 300, 1200, 3000.
7 A.C. Voltage ranges: (at 1,000 ohms per volt) 0 — 3, 12, 30, 120, 300, 120, 3000.
4 Milliamoere ranges 0 — 3, 30, 300 D.C. Mills — 0—12 D.C. Amps.
3 Ohmmeter ranges: 0 — 10,000, 100,000 — 10 megohms, Center scale: 100 — 1000 — 100,000.
3 DB ranges: — 20 to +57 Decibels.



MODEL 9—56 "DELUXE" TUBE TESTER WITH JUST 3 SIMPLE CONTROLS

Easy to Carry — you can carry easily and safely — without damaging its handsome counter appearance.
Readily Adaptable — tests all tubes from 1.4 volt to 117 volts from 4 prong to 9 prong.
Roller type Chart — works easily and quickly with a spin of your finger.

MODEL SD—1 MINIMASTER

5 A.C. & D.C. Voltage ranges: 0 — 6, 30, 150, 600, 1500.
4 Direct Current ranges: 0 — .3, 30, 300 Milliamperes.
4 Resistance ranges: 0 — 2000, 20,000, 200,000, 2 megohms, with centre scale readings of: 22.5, 225, 22,500 ohms respectively.

MODEL 460 RUGGED VOLT — OHM MILLIAMETER

20,000 ohms per volt D.C.
5,000 ohms per volt A.C.

RANGES:
(a) Volts D.C.: 0 — 2.5, 10, 50, 250, 1000, 5000,
(b) Volts A.C.: 0 — 2.5, 10, 50, 250, 1000, 5000
(c) Ohms: 0 — 1000, 5 ohms Centre scale
0 — 10,000, 50 ohms centre scale
0 — 1 Meg, 5,000 ohms centre scale
0 — 100 Meg, 50,000 ohms centre scale
(d) Microamperes D.C.: 0 — 50
(e) Milliamperes D.C.: 0 — 2.5, 10, 50, 250, 1000
(f) Amperes D.C.: 0 — 10
(g) Decibels — 30 to +55
(h) Output Volts A.C.: 0 — 2.5, 10, 50, 250, 1000, 5,000

MODEL 9-11A "Dynamic" TUBE TESTER with just 3 simple controls

Large ,easy-to-read, 4" meter. Tests all tubes — 1.4 volt to 117 volts including loctal, bantam, midget, single - ended, SPECIAL TYPES — Rogers-Majestic Spray Shield etc.
Neon short test — hot filament type.
Line voltage easily read directly on meter.
Slide control tube index.

STARK ELECTRONIC INSTRUMENTS LIMITED

Factories and Sales Office: **AJAX, ONTARIO**

Foreign Division: 276 West 43rd St., New York 36, N.Y., U.S.A.

Davis Automatic Controls Limited
Triad Transformer Corporation
Copper Wire Products Limited
John R. Tilton Limited
Canadian Electric Resistors Limited
Sola Electric Company
Electronic Engineering
Laboratory for Electronics, Inc.
Crest Laboratories Inc., Microtan Company Division
Whiteley Electrical Radio Co. Ltd.
Partridge Transformers Ltd. (E)
Wright & Weaire Ltd. (E)
Osborne Electric Co. Ltd.
New London Instrument Co. Inc.
Sciaky Bros. Inc.
Northern Electric Co. Ltd.

TRANSFORMERS (Isolation)
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
Altec Lansing Corporation
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Copper Wire Products Limited
Triad Transformer Corporation
Electronic Engineering
Crest Laboratories Inc., Microtan Company Division
Texas Instruments Incorporated
Partridge Transformers Ltd. (E)
Osborne Electric Co. Ltd.
Electrical Facilities Inc.
Sciaky Bros. Inc.
Northern Electric Co. Ltd.

TRANSFORMERS (Variable)
Rogers Majestic Electronics Limited
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corporation
Canadian Electric Resistors Limited
Electronic Engineering
Hycor Sales Company
J. W. Miller Co.
Standard Electronics Corporation
The Superior Electric Company
Whiteley Electrical Radio Co. Ltd.
The Gudeman Company
General Radio Company
Northern Electric Co. Ltd.

TRANSFORMERS (Voltage Regulating)
Hammond Manufacturing Co. Ltd.
Rogers Majestic Electronics Limited
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corporation
Canadian Electric Resistors Limited
Sola Electric Company
Electronic Engineering
Standard Electronics Corporation
The Superior Electric Company
Osborne Electric Co. Ltd.
Scientific Specialties Corporation
Northern Electric Co. Ltd.

TRANSFORMERS (Microwave)
Hackbusch Electronics Limited
Triad Transformer Corporation
Electronic Engineering
Microwave Associates Inc.
Airtron, Inc.
Texas Instruments Incorporated
Technicraft Laboratories Inc.
Northern Electric Co. Ltd.
RCA Victor Company Ltd.
Sperry Gyroscope Company of Canada Ltd.

TRANSFORMERS (Miniature)
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
T. S. Farley Ltd.
Altec Lansing Corporation
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corporation
Copper Wire Products Limited
Computing Devices of Canada Limited
Electronic Engineering
Crest Laboratories Inc., Microtan Company Division
Hycor Sales Company
J. W. Miller Co.
Cambridge Thermionic Corporation
Texas Instruments Incorporated
Partridge Transformers Ltd. (E)
Osborne Electric Co. Ltd.
Vokar Corporation

TRANSFORMERS (Pulse)
Hammond Manufacturing Co. Ltd.
Hackbusch Electronics Limited
Altec Lansing Corporation
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corporation
Copper Wire Products Limited
Computing Devices of Canada Limited
Electronic Engineering
Polyphase Instrument Co.
Crest Laboratories Inc., Microtan Company Division
Texas Instruments Incorporated
Whiteley Electrical Radio Co. Ltd.
The English Electric Company Limited
Specialty Engineering & Electronics Co.
The Gudeman Company
Northern Electric Co. Ltd.

TRANSFORMERS (TV Deflection)
T. S. Farley Ltd.
General Instrument — F. W. Sickles of Canada Limited
Stark Electronic Instruments Ltd.
Canadian General Electric Co. Ltd.
Telequipment Mfg. Co. Ltd.
Triad Transformer Corporation
Copper Wire Products Limited
Electronic Engineering
Whiteley Electrical Radio Co. Ltd.
Cinema-Television Limited
RCA Victor Company Ltd.
Teleradio Engineering Corporation

TRANSFORMERS (Toroidal)
Hackbusch Electronics Limited
T. S. Farley Ltd.
General Instrument — F. W. Sickles of Canada Limited
Triad Transformer Corporation
Bayly Engineering Limited
Electronic Engineering
Hycor Sales Company
Texas Instruments Incorporated
Sperry Gyroscope Company of Canada Ltd.
Transitron Electronic Corporation
General Radio Company
Gertsch Products Inc.

TRANSFORMERS (Very Low Frequency)
Hackbusch Electronics Limited
Altec Lansing Corporation
Canadian Westinghouse Co. Ltd., Electronics Division
Triad Transformer Corporation
Aeromotive Engineering Products
Electronic Engineering
Crest Laboratories Inc., Microtan Company Division
Hycor Sales Company
Texas Instruments Incorporated
Whiteley Electrical Radio Co. Ltd.
Partridge Transformers Ltd. (E)
Osborne Electric Co. Ltd.

TRANSFORMERS (Current Limiting)
Altec Lansing Corporation
Jack & Heintz, Inc.
Canadian General Electric Company Limited
Copper Wire Products Limited
Triad Transformer Corporation
Electronic Engineering
Texas Instruments Incorporated
Osborne Electric Co. Ltd.

TRANSFORMERS (Saturable)
Hammond Manufacturing Co. Ltd.
Altec Lansing Corporation
Canadian General Electric Company Limited
Canadian Westinghouse Co. Ltd. Electronics Division
Triad Transformer Corporation
Hycor Sales Company
Texas Instruments Incorporated
Osborne Electric Co. Ltd.

TRANSFORMERS (X-RAY)
Rogers Majestic Electronics Limited
Altec Lansing Corporation
Triad Transformer Corporation
Electronic Engineering
General Electric Company, X-Ray Dept.

TRANSISTORS
Hackbusch Electronics Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Computing Devices of Canada Limited
Germanium Products Corporation, Subsidiary of Radio Development & Research Corp.
Texas Instruments Incorporated
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Philco Corporation, Government & Industrial Division
Northern Electric Co. Ltd.

TRANSMITTERS (Amateur)
Pye Canada Ltd.
James Millen Mfg. Co., Inc.
American Electronics Co.
E. F. Johnson Company
Collins Radio Company of Canada Ltd.
Morrow Radio Mfg. Co.
Radio Communications Equipment & Engineering Ltd.

TRANSMITTERS (Broadcast)
Rogers Majestic Electronics Limited
Chisholm Industries Ltd.
Canadian Westinghouse Co. Ltd., Electronics Division
Redifon (Canada) Limited
Collins Radio Company of Canada Ltd.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials

TRANSMITTERS (Color Television)
Rogers Majestic Electronics Limited
Canadian Westinghouse Co. Ltd., Electronics Division
Standard Electronics Corporation
Kay Electric Company

TRANSMITTERS (Direction Finding)
Collins Radio Company of Canada Ltd.
Beaconing Optical & Precision Materials Company Limited
G & M Equipment Co. Inc.

TRANSMITTERS (Fixed Station)
Rogers Majestic Electronics Limited
Pye Canada Ltd.
Chisholm Industries Ltd.
Lear, Incorporated
National Company, Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Redifon (Canada) Limited
Collins Radio Company of Canada Ltd.
Morrow Radio Mfg. Co.
Beaconing Optical & Precision Materials Company Limited
Cossor Canada Ltd.
Pearce Simpson Inc.
G & M Equipment Co. Inc.
Kaar Engineering Corp.
Radio Communications Equipment & Engineering Ltd.

TRANSMITTERS (Loran)
Bludworth Marine, Division of National-Simplex-Bludworth Inc.
RCA Victor Company Ltd.
Sperry Gyroscope Company of Canada Ltd.

TRANSMITTERS (Marine)
Rogers Majestic Electronics Limited
Pye Canada Ltd.
Chisholm Industries Ltd.
Bludworth Marine, Division of National-Simplex-Bludworth, Inc.
Canadian Westinghouse Co. Ltd., Electronic Division
S & T Sales Ltd.
Redifon (Canada) Limited
Morrow Radio Mfg. Co.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Radio Communications Equipment & Engineering Ltd.
Pearce Simpson Inc.
Kaar Engineering Corp.
G. & M. Equipment Co. Inc.

TRANSMITTERS (Portable)
Rogers Majestic Electronics Limited
Pye Canada Ltd.
Chisholm Industries Ltd.
Lear, Incorporated
S & T Sales Ltd.
Redifon (Canada) Limited
Morrow Radio Mfg. Co.
Aircraft Radio Corp.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Dynamic Electronics N.Y. Inc.
Radio Communications Equipment & Engineering Ltd.

TRANSMITTERS (Radio Range)
Canadian Westinghouse Co. Ltd., Electronics Division
Collins Radio Company of Canada Ltd.
Texas Instruments Incorporated
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Cossor Canada Ltd.
Radio Communications Equipment & Engineering Ltd.

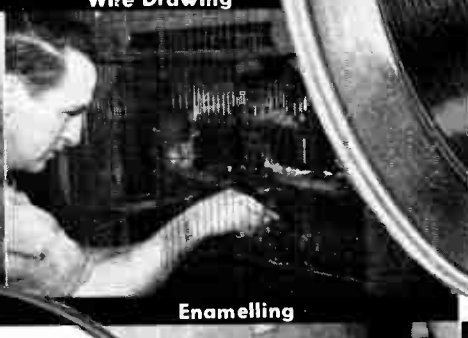
TRANSMITTERS (uhf)
Rogers Majestic Electronics Limited
Pye Canada Ltd.
Lear, Incorporated
National Company, Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
Collins Radio Company of Canada Ltd.
Standard Electronics Corporation
Aircraft Radio Corp.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Chemalloy Electronics Corp.
Sierra Electronic Corporation.
Kay Electric Company.
Kaar Engineering Corp.
Northern Electric Co. Ltd.

TRANSMITTERS (vhf)
Rogers Majestic Electronics Limited
Pye Canada Ltd.
National Company, Inc.
Lear, Incorporated
Canadian Westinghouse Co. Ltd., Electronics Division
S & T Sales Ltd.
Redifon (Canada) Limited
Collins Radio Company of Canada Ltd.
Morrow Radio Mfg. Co.
Standard Electronics Corporation
Aircraft Radio Corp.


Rod Rolling Mill


Wire Drawing


Inspecting Bare Wire


Enamelling

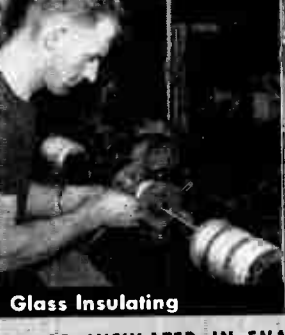
your apparatus
is only as good as
the ***quality*** *of its*
magnet wire


Pin-Hole Test


Paper Insulating


Inspecting Enamelled Wire


Textile Insulating


Glass Insulating


Dielectric Test

BARE, SHAPED, OR INSULATED IN ENAMEL, FORMEL, GLASS, PAPER OR TEXTILES

Some of the finest Magnet Wire obtainable comes from the 99.9% pure copper rolled in Phillips rod mill. Throughout the rolling and drawing operation a high surface finish is imparted to the wire that is invaluable in bare wire, and essential for all insulated types. The annealing process used renders a unique softness to the copper that is ideal for easy winding. When insulated, the dielectric is applied in a smooth impervious layer that is Phillips guarantee of complete reliability.

Whether you need bare, shaped or insulated Magnet Wire, your best bet is Phillips.

Phillips
ELECTRICAL COMPANY LIMITED
WIRES & CABLES
THE CANADIAN AFFILIATE OF THE B. I. C. C. GROUP

Head Office — Brockville, Ont.
MONTREAL • OTTAWA • TORONTO • HAMILTON • WINNIPEG
REGINA • EDMONTON • VANCOUVER

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For further data on advertised products use page 207.

RCA Victor Company Limited
Beaconing Optical & Precision Materials Company Limited
Cossor Canada Ltd.
Sierra Electronic Corporation
Kay Electric Company
Kaar Engineering Corp.
G & M Equipment Co. Inc.

TUBES
Bendix Aviation Corporation, Red Bank Division
S & T Sales Ltd.
Dominion Sound Equipments Limited

TUBES (Amplifier)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
Varian Associates of Canada Ltd.
Amperex Electronic Corp.
RCA Victor Company Ltd.
Cossor Canada Ltd.
Machlett Laboratories Incorporated
Northern Electric Co. Ltd.

TUBES (Battery Charger)
Rogers Majestic Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Amperex Electronic Corp.

TUBES (Camera Pickup)
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Pye Canada Ltd.
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Cinema-Television Limited
RCA Victor Company Ltd.

TUBES (Cathode Ray)
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Electrodesign
Electronic Tube Company
Bayly Engineering Limited
General Electric Company, X-Ray Dept.
Cinema-Television Limited
RCA Victor Company Ltd.
Cossor Canada Ltd.
Philco Corporation, Government & Industrial Division

TUBES (Cathode Ray, Multiple)
Rogers Majestic Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Electronic Tube Company
Bayly Engineering Limited
Cinema-Television Limited
RCA Victor Company Ltd.

TUBES (Cathode Ray, Studio)
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Cinema-Television Limited
RCA Victor Company Ltd.

TUBES (Electrometer)
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Electronic Associates Ltd.
Electronic Tube Company
RCA Victor Company Ltd.

TUBES (Geiger)
Hackbusch Electronics Limited
Rogers Majestic Electronics Limited
Electronic Associates Ltd.
Electrodesign
Pye Canada Ltd.
Electronic Tube Company
Amperex Electronic Corp.
Cinema-Television Limited
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited

TUBES (Geiger-Mueller)
Sharpe Instruments Limited

TUBES (Hearing Aid)
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
Amperex Electronic Corp.

TUBES (Ignitron)
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Amperex Electronic Corp.
RCA Victor Company Ltd.

TUBES (Ionization)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Londex Limited
RCA Victor Company Ltd.

TUBES (Klystron)
Polarad Electronics Corp.
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
R-O-R Associates Limited
Litton Industries, Inc.
Amperex Electronic Corp.
Sperry Gyroscope Company of Canada Ltd.
RCA Victor Company Ltd.
Beaconing Optical Precision Materials Company Limited
Cossor Canada Ltd.

TUBES (Magnetron)
Litton Industries, Inc.

TUBES (Miniature)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
Amperex Electronic Corp.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited

TUBES (Receiving)
Northern Electric Co. Ltd.
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
RCA Victor Company Ltd.
Cossor Canada Ltd.

TUBES (Rectifying)
Machlett Laboratories Incorporated
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Burlec Sales Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Amperex Electronic Corp.
RCA Victor Company Ltd.
Cossor Canada Ltd.

TUBES (Subminiature)
Hackbusch Electronics Ltd.
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Sonotone Corporation
Amperex Electronic Corp.
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited

TUBES (Television Picture)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Rogers Majestic Electronics Limited
Electronic Tube Company
Canadian Westinghouse Co. Ltd., Electronics Division
Harris Pound & Co.
Cinema-Television Limited
RCA Victor Company Ltd.

TUBES (Travelling Wave)
Sperry Gyroscope Company of Canada Ltd.

TUBES (X-Ray)
Amperex Electronic Corp.

TUBING (Aluminum)
J. R. Longstaffe Co. Ltd.
Precision Tube Co. Inc.

TUBING (Waveguide)
Co-Operative Industries, Inc.
J. R. Longstaffe Co. Ltd.
Diamond Microwave Corporation
D. E. Makepeace Co., Division of Union Plate & Wire Co.
Premier Instruments Corp.
Cossor Canada Ltd.
Technicraft Laboratories Inc.

TUNERS (Hi-Fi, AM-FM)
Bell Sound Systems, Inc.

TUNERS (FM, AM Short Wave)
Browning Laboratories Inc.

TUNERS (Television)
Pye Canada Ltd.
Marsland Engineering Limited
General Intrument — F. W. Sickles of Canada Limited
Radio Components Ltd.
Harris Pound & Co. Radio Condensor Company
Blonder-Tongue Laboratories, Inc.
Dynamic Electronics N.Y. Inc.

TURNTABLES (Recording)
Hackbusch Electronics Limited
Canadian Marconi Company, Electronic Tube & Components Division
Canadian Westinghouse Co. Ltd., Electronics Division
Microlab Devices Limited
Chas. W. Pointon Limited
Preston Recording Corporation
RCA Victor Company Ltd.
Rek-O-Kut Company

TURNTABLES (Playback & Transcription)
Rek-O-Kut Company

VIBRATORS
Vokar Corporation

VIBRATORS (Power Supplies)
American Television & Radio Co.

VOLTMETERS
Burton-Rogers Co.
Gulton Mfg. Corp.

VOLTMETERS (Crystal)
Rogers Majestic Electronics Limited
Lab-O Ring Enterprises Ltd.
RCA Victor Company Ltd.

VOLTMETERS (Electronic)
Keithley Instruments
Endevco Corporation
Technology Instrument Corporation
The Solartron Electronic Group Ltd.
Airmec Limited
Baldwin Instrument Co. Ltd. (E)
Fielden Electronics Limited (E)
RCA Victor Company Ltd.
Beaconing Optical & Precision Materials Company Limited
Rogers Majestic Electronics Limited
Stark Electronic Instruments Ltd.
Bach-Simpson Ltd.
Pye Canada Ltd.
Canadian Marconi Company, Electronic Tube & Components Division
Hackbusch Electronics Limited
Electrodesign
Jackson Electrical Instrument Co.
Precision Apparatus Co. Inc.
R-O-R Associates Limited
Electronic Communications Limited
Sharpe Instruments Limited
Industrial Electronics of Canada Limited
Canadian Research Institute
Lab-O Ring Enterprises Ltd.
Computing Devices of Canada Limited
R. H. Nichols Limited
Laboratory for Electronics Inc.
The Hickok Electrical Instrument Company
Electronic Instrument Co. Inc.
Shallcross Manufacturing Co.
Electronic Measurements Corp.
Wheelco Instruments Division-Barber-Colman Company
Specialty Engineering & Electronics Company
Sierra Electronic Corporation
Dynamic Electronics N.Y. Inc.
Gertsch Products, Inc.
Daystrom Electric Corporation
General Radio Company
Titania Electric Corp. of Can. Ltd.
General Precision Industries Limited

VOLTMETERS (Electrical)
Sensitive Research Instrument Corp.
Daven Company
Scientific Specialties Corporation
Northern Electric Co. Ltd.

WASHERS
The Garlock Packing Company of Canada Ltd.
General Tire & Rubber Co. of Canada Ltd., Stokes Division
United-Carr Fastener Co. of Can. Ltd.
Canadian Marconi Company, Electronic Tube & Components Division
Electrolabs Reg'd.
Anti Corrosive Metal Products Co., Inc.
St. Regis Paper Company (Canada) Limited, Panclyte Division
National Fibre Co. of Canada Limited
Shakeproof, Div. of Illinois Tool Works
Micanite Canada Ltd.
Herman H. Smith, Inc.
Walsco Electronics Corp.
Accurate Electronics Corp.

WASHERS (Rubber)
Kerr-Machin Associates
Mechanical Rubber Products Company

WAVEGUIDES
Electrodesign
Co-Operative Industries, Inc.
Canadian Westinghouse Co. Ltd., Electronics Division
J. R. Longstaffe Co. Ltd.
Computing Devices of Canada Limited
Aeromotive Engineering Products
Airtron Inc.
Prodelin Inc.
The Narda Corporation
D. E. Makepeace Co., Division of Union Plate & Wire Co.
Texas Instruments Incorporated
Elliott Brothers (London) Limited
Cossor Canada Ltd.
Chemalloy Electronics Corp.
Technicraft Laboratories Inc.
Kay Electric Company
Northern Electric Co. Ltd.

 For further data on advertised products use page 207.

WAVEGUIDE EQUIPMENT
Electrodesign
Lear, Incorporated
Canadian Westinghouse Co. Ltd., Electronics Division
J. R. Longstaffe Co. Ltd.
R-O-R Associates Limited
Ferranti Electric Limited
Computing Devices of Canada Limited
Diamond Microwave Corporation
Jarrell-Ash Co.
Microwave Associates Inc.
Airtron Inc.
Microwave Instruments Limited
Litton Industries, Inc.
D. E. Makepeace Co., Division of Union Plate & Wire Co.
Premier Instruments Corp.
Texas Instruments Incorporated
The Solartron Electronic Group Ltd.
Elliott Brothers (London) London
Sperry Gyroscope Company of Canada Ltd.
Cossor Canada Ltd.
Chemalloy Electronics Corp.
Kay Electric Company
Cascade Research Corporation
Technicraft Laboratories Inc.
Northern Electric Co. Ltd.
G & M Equipment Co. Inc.

WIRE
Warren Wire Company
Techalloy Co. Inc.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.

WIRE (Aluminum)
Federal Wire & Cable Company, Limited
British Insulated Callender's Cables
The B. Greening Wire Company Limited
Harris Pound & Co.
Saxton Products Inc.
Walsco Electronics Corp.
Northern Electric Co. Ltd.
Cables, Conduits and Fittings, Limited
Federal Wire & Cable Company Limited

WIRE (Antenna)
Canadian Marconi Co. Electronic Tube & Components Div.
Electrolabs Reg'd.
Stark Electronic Instruments Ltd.
Hackbusch Electronics Ltd.
Federal Wire & Cable Co. Ltd.
Alpha Wire Corp.
Wind Turbine Co. of Canada Ltd.
Amphenol Canada Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Saxton Products Inc.
Copperweld Steel Co.—Wire & Cable Div.
Boston Insulated Wire & Cable
Northern Electric Co. Ltd.
Federal Wire & Cable Co. Ltd.
Cables, Conduits & Fittings, Ltd.

WIRE (Bare, Copper, Bronze, and Copper covered Steel)
Copperweld Steel Co.—Wire & Cable Div.

WIRE (Copper)
Copperweld Steel Co.—Wire & Cable Div.
Warren Wire Co.
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Cables, Conduits & Fittings Ltd.
Federal Wire & Cable Co. Ltd.
Electrolabs
Automatic Electric Sales (Canada) Ltd.
Federal Wire & Cable Co., Ltd.
Alpha Wire Corp.
Canadian General Electric Co. Ltd.
Phillips Electrical Co. Ltd.
Critish Insulated Callender's Cables
The B. Greening Wire Co. Ltd.
Saxton Products Inc.

WIRE (Enamelled)
Copperweld Steel Co.—Wire & Cable Div.
Warren Wire Co.
Northern Electric Co. Ltd.
Federal Wire & Cable Co. Ltd.
Electrolabs Reg'd.
Federal Wire & Cable Company, Limited
Universal Wire & Cable Co. Ltd.
Canadian General Electric Company Ltd.
Universal Wire & Cable Co. Ltd.
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Saxton Products Inc.

WIRE (Guy)
Canadian Marconi Company, Electronic Tube & Components Division
Automatic Electric Sales (Canada) Ltd.
Stark Electronic Instruments Ltd.
Hackbusch Electronics Limited
Alpha Wire Corporation
The B. Greening Wire Company Limited
Harris Pound & Co.
Saxton Products Inc.
Copperweld Steel Company, Wire and Cable Division
Northern Electric Co. Ltd.

WIRE (Grounding, Also Ground Rods)
Copperweld Steel Company, Wire and Cable Division

WIRE (High Voltage)
Federal Wire & Cable Company, Limited
Electrolabs
Alpha Wire Corporation
Amphenol Canada Limited
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
William Brand & Co. Inc.
Saxton Products Inc.
Copperweld Steel Company, Wire and Cable Division
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Federal Wire & Cable Company Limited

WIRE (Insulated)
Federal Wire & Cable Company Limited
Electrolabs Reg'd.
Automatic Electric Sales (Canada) Ltd.
Alpha Wire Corporation
Royal Electric Company Inc.
Canadian General Electric Company Ltd.
Amphenol Canada Limited
British Insulated Callender's Cables
Phillips Electrical Co. Ltd.
Aeromotive Engineering Products
Phalo Plastics Corporation
William Brand & Co. Inc.
Saxton Products Inc.
Cossor Canada Ltd.
Copperweld Steel Co., Wire and Cable Division
Warren Wire Company
Boston Insulated Wire & Cable Co.
Northern Electric Co. Ltd.
Cables, Conduits & Fittings, Limited
Federal Wire & Cable Company Limited

WIRE (Stripped)
Electrolabs
Radio Components Ltd.
Federal Wire & Cable Company Limited

WIRE (Tantalum, Tungsten, Molybdenum)
J. R. G. McVity & Company

X-RAY
Rogers Majestic Electronics Limited
Electrodesign
Jarrell-Ash Co.
General Electric Company, X-Ray Dept.
Litton Industries Inc.
Sensitive Research Instrument Corp.

X-RAY (Condensers)
Condensers Products Company

X-RAY (Power Supplies)
Condensers Products Company

X-RAY (Tubes)
Machlett Laboratories Incorporated

YOKES
Stark Electronic Instruments Limited
Hathaway Kraemer Limited
T. S. Farley Ltd.
General Instrument, F. W. Sickles of Canada Limited
Triad Transformer Corporation
J. R. Longstaffe Co. Ltd.
Aeromotive Engineering Products
Cinema-Television Limited
Cossor Canada Ltd.
Teleradio Engineering Corporation

YOKES (Pulse Forming)
Condensers Products Company

YOKES (Tester)
Electronic Instrument Co. Inc.

☆ Addenda To Directory Listing ☆

Armet Industries Ltd., Guelph, Ontario.
Suppliers of: Silicones (Rubber Parts).

Associated Electronic Components, 37 Roselawn Ave., Toronto.
Suppliers of: Capacitors, Chokes, Decade Boxes, Indicators.

Clark, Alex L. Ltd., Toronto, Ontario.
Suppliers of: Amplifiers, antenna reflectors, booms (microphone) communications systems, aircraft traffic control.

Data Processing Associates Ltd., Ottawa, Ontario.
Suppliers of: Amplifiers, computers, delay lines, drums, generators.

Ericson Telephone Sales of Canada Ltd., Montreal, Que.
Suppliers of: Communications systems, Rectifiers (selenium) relays (telephone) intercommunications systems.

Fraser, D. M. Ltd., Toronto ,Ontario.
Suppliers of: Batteries, bridges, controls, galvonometers, resistors.

Lomas, E. G. Company, Ottawa, Ontario.
Suppliers of: Antennas, bridges, capacitors (precision film) paper, tubes (magnetron Tr, Atr.).

Pacific Communications Services Ltd., North Vancouver, B.C.
Suppliers of: Antennas, communications systems, public address systems, telemetering systems, transmitters.

Smyth, J. B., Montreal, Que.
Suppliers of: Amplifiers, bridges, baffles, capacitors, connectors.

Snelgrove, C. R. Company Ltd., Toronto, Ontario.
Suppliers of: Quartz crystals.

Standard Telephone And Cable Mfg., Company, Montreal, Que.
Suppliers of: Amplifiers, antennas, cables, connectors, communications systems.

Federated Metals Canada Ltd., Toronto, Ontario.
Suppliers of: Flux (brazing and soldering) solder.

Amalgamated Electric Corp., Toronto, Ontario.
Suppliers of: Batteries, cables, communication systems, control supervisory relays.

Magnetic Research Corp., El Segundo, California, U.S.A.
Suppliers of: Amplifiers, controls, converters, generators, regulators.

The Telegraph Condenser Corp., Ltd., North Acton, London W3, England.
Suppliers of: Capacitors, printed circuits, suppressors.

Physical Enterprises, London, Ontario.
Suppliers of: Counters (electronic) crystals (scintillation counter) indicators (vacuum) ovens, switches (vacuum).

Harper Company, H. M., The, Morton Grove, Chicago, Ill.
Suppliers of: Bolts, rivets, brass, naval bronze, silicon bronze, monel metal, aluminum, stainless steel.

Herring And Company, John, Toronto, Ontario.
Suppliers of: Capacitors (ceramic) accelerometers, ammeters, blowers, bridges, controls.

For further data on advertised products use page 207.

Directory Of:—

Canadian Electronic And Communication Equipment Suppliers

With Listing Of American And Foreign Principals

Adcola Products Limited, P.O. Box 103, Weston, Toronto 15, Ontario.

Aeromotive Engineering Products, 5257 Queen Mary Road, Montreal, P.Q. Representing:
New Hampshire Ball Bearing
Electroflow Inc.
Vitramon Inc.
Magtrol Inc.
Gar Precision Parts
Wilmar Products
American Electric Motors Inc.
Electro-Mec Laboratory
Avion Instrument Co.
Potter & Brumfield
Unimax Switch
Control Products
Thermo Electric (Canada) Ltd.
Tensolite Insulated Wire Co.
Microwave Development Laboratories

Aerovox Canada Limited, 1551 Barton St. East, Hamilton, Ontario. Representing:
Chas. L. Thompson Limited, Vancouver, B.C.

Aircraft Marine Products of Canada Ltd., 1764 Avenue Road, Toronto, Ontario

Alliance Motors Div. of The Easy Washing Machine Co. Ltd., Schell Avenue, Toronto 10, Ont.

Amphenol Canada Limited, 300 Campbell Ave., Toronto 9, Ont.

Antiference (Canada) Ltd., 169 Bartley Dr., Toronto 16, Ont.
Arrow Radio Company, 1829 Davenport Rd., Toronto, Ont.

Atlas Radio Corporation Ltd., 50 Wingold Avenue, Toronto 10, Ontario

Audio Tool and Engineering Ltd., 32 River Street, Toronto, Ont.

Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ont. Representing:
Automatic Electric (Canada) Limited, Brockville, Ontario
Automatic Electric Co., Chicago 7, Ill.
Lenkurt Electric Co. of Canada Ltd., Vancouver, B.C.
Stromberg Time Recorder Co. of Can. Ltd., Peterborough, Ontario
Paragon Electric Co., Two Rivers, Wis.
TelAutograph Corp., Los Angeles, Cal.

Armet Industries Ltd., Guelph, Ont.

Bach-Simpson Ltd., 1255 Brydges St., London, Ont. Representing:
Welwyn Can. Ltd., 1255 Brydges St., London, Ont.

Bailey Meter Co. Ltd., 1980 Claremont Ave., Montreal 6, Que.

Bakelite Co., Div. Union Carbide & Carbon Corp., Box 395, Belleville, Ont. Representing:
Bakelite Co., Div. of Carbon Corp., New York, N.Y.
Bakelite Co., 40 St. Clair Ave. East, Toronto, Ont.

Bayly Eng. Ltd., First St., Ajax, Ont. Representing:
Allen B. DuMont Laboratories Inc., Clifton, N.J.
Boonton Radio Corp., Boonton, N.J.
Continental Carbon, Inc., Cleveland, Ohio
M. C. Jones Electronics Co. Inc., Bristol, Conn.
Waters Mfg., Inc., Waltham, Mass.
Boesch Mfg. Co. Inc., Danbury, Conn.
De Mornay Bonardi, Pasadena, Cal.

Beaconing Optical & Precision Material Co. Ltd., 455 Craig St. W., Montreal, Que.

Bristol Co. of Canada Limited, The, 71-79 Duchess Street, Toronto 2, Ontario Representing:
Kieley & Mueller, Inc., Middletown, New York
The Bristol Co., Waterbury, Conn.

British Insulated Callender's Cables, c/o Phillips Electrical Co. Ltd., Brockville, Ontario

Burgess Battery Company, 415 Buttrey St., Niagara Falls, Ont.

Burlec Sales Limited, 45 Northline Rd., Toronto 16, Ont. Representing:
The R. W. Cramer Co. Inc., Centerbrook, Conn.
Crowel Designs, West Point Pleasant, N.J.
Ebert Electronics Corp., Queen's Village 28, L.I., N.Y.
Electric Specialty Co., Stamford, Conn.
Electrons Inc., Newark 4, N.J.
Fuse Indicator Corp., Boston 11, Mass.
The Horstmann Gear Co. Ltd., Bath, Eng.
Donald P. Mossman Inc., P.O. Box 265, Brewster, N.Y.
P. K. Neuses, Arlington Heights, Ill.
The Simplex Co., Springfield, Ill.
Syntron Co., Homer City, Pa.
The Wama Co., Baltimore 2, Md.

Canada Decalcomania Co. Ltd., 507-11 King Street East, Toronto, Ontario

Canadian Armature Works, Inc., 6595 St. Urbain Street, Montreal, Quebec

Canadian Astatic Limited, 2273 Danforth Ave., Toronto, Ontario. Representing:
Chas. L. Thompson Ltd., Vancouver, B.C.
Morgan Agencies, Toronto, Ontario

Canadian Electric Resistors Limited, Curity Avenue, Toronto 16, Ont.

Canadian General Electric Co. Ltd., 212 King St. West, Toronto, Ontario

Canadian Johns-Manville Co. Ltd., 565 Lakeshore Road, East, Port Credit, Ontario

Canadian Line Materials Limited, 3595 St. Clair Ave., E., Toronto 13, Ont.

Canadian Marconi Co., Electronic Tube and Components Division, 830 Bayview Ave., Toronto 17, Ont. Representing:
Clarostat Mfg. Co., Dover, N.H.
Electric Soldering Iron Co., Deep River, Conn.
Insuline Corp. of America, Manchester, N.H.
Jackson Electrical Instrument Co., Dayton 1, Ohio
National Co. Inc., Malden, Mass.
The Turner Co., Cedar Rapids, Iowa
Webster-Chicago Corp., Chicago, Ill.
Hunt Capacitors (Canada) Ltd., Ajax, Ont.
Radio Valve Co. Ltd., Toronto, Ont.

Canadian Marconi Co., 2442 Trenton Ave., Montreal 16, Que. Representing:
Gates Radio, Quincy, Ill.
Marconi Wireless Telegraph, London, Eng.
Marconi International Marine, London, England
General Radio Co., 275 Massachusets Ave., Cambridge, Mass.
Atomic Inst. Co., 84 Massachusets Ave., Cambridge, Mass.
Keithley Instruments, 3868 Carnegie Ave., Cleveland, Ohio
Tindsley Inst., St. Jerome, Quebec
Radio Apparatus, Indianapolis, Indiana
Avia Products, Los Angeles, Calif.
Hallicrafter, Toronto, Ont.

Canadian Research Institute, 46 St. George Street, Toronto 5, Ontario. Representing:
Nuclear Instrument & Chemical Corp., Chicago 10, Illinois
Optica Soc. Per Azoni, Milan, Italy
Photovolt Corporation, New York 16, N.Y.
Pulsometer Engineering Co. Ltd., Reading, Eng.
Sensitive Research Instrument Co., Mount Vernon, N.Y.
Tracerlab Inc., Boston 10, Mass.
Triplett Electrical Instrument Co., Bluffton, Ohio
Edin Co. Inc., Worcester 8, Mass.
Golay-Buchel, Lausanne, Switzerland
International Instruments, New Haven 11, Conn.
Isopad Limited, London NW3, Eng.
Labgear Limited, Cambridge, Eng.
Mico Instrument Co., Cambridge 38, Mass.

Canadian Stackpole Ltd., 550 Evans Ave., Toronto 14, Ont.

Canadian Westinghouse Co. Ltd., Electronics Division, Longwood Road, Hamilton, Ont.

Cables, Conduits and Fittings Ltd., 77 Richelieu Street, St. Johns, Que.

Campbell Manufacturing Co. Ltd., 45 Sheppard Ave East, Willowdale, Ont.

Cannon Electric Canada Ltd., 160 Bartley Drive, Toronto 16, Ont.

Central Scientific Co. of Canada Ltd., 146 Kendal Ave., Toronto 4, Ont.

Centralab Canada Ltd., 804 Mt. Pleasant Rd., Toronto, Ont.

Chisholm Industries Ltd., Electronic Ave & Murray St., Port Moody, B.C.

Collins Radio Co. of Canada Ltd., 11 Bermondsey Rd., Toronto, Ont.

Columbian Carbon Co., Mapico Color Div., 33 Edward St., Toronto, Can.

Computing Devices of Canada Limited, 311 Richmond Street, (P.O. Box 508) Ottawa, Ont. Representing:
Allison Laboratories, Ltd., Puento, Cal.
Anatran Engineering Corporation, Pasadena, Cal.
Barth Engineering & Mfg. Co. Inc., Milldale, Conn.
Benson-Lehner Corp., W. Los Angeles, Cal.
Boeing Airplane Company, Seattle 14, Wash.
Convair (Charactron Project) San Diego, Cal.
Elliott Brothers (London) Ltd., London, Eng.
Endevco Corp., Pasadena, Cal.
Goodmans Industries Ltd., Wembley, Eng.
Laboratory for Electronics Inc., Boston, Mass.
National Cash Register Co., Hawthorne, Cal.
Northeastern Engineering Inc., Manchester, N.H.
Radiation Counter Laboratories Inc., Skokie, Ill.
Solartron Electronics Group Ltd., Thames Ditton, Surrey, Eng.
Teletronics Inc., Westbury, L.I., N.Y.
Texas Instruments Inc., Dallas, Texas
Wakefield Industries Inc., Skokie, Ill.
Wharf Engineering Laboratories, Fenny Compton, Eng.

Copper Wire Products Ltd., 300 Campbell Ave., Toronto 9, Ont.

Cosa Corp. of Canada Ltd., 40 Front St. W. Toronto, Ont.
Representing:
Micafil Ltd., Zurich, Alstetten, Switzerland
Friedrich Deckel Ltd., Munchen, West Germany

Cossor Canada Ltd., 301-303 Windsor St., Halifax, N.S. Representing:
A. C. Cossor Ltd., London, England
Sterling Cable Co. Ltd., Aldermaston, England
W. B. Whitely Radio Co. Ltd., Mansfield, England
Empire Devices Products Inc., New York, N.Y.
Spencer Kennedy Laboratories Inc., Cambridge, Mass.
Taylor Electrical Instruments Ltd., Slough, England

W. H. Sanders (Stevenage) Ltd., England
British Thompson Houston Co. Ltd., Rugby, England
A. E. Cawkell Ltd., London, England
Short and Harland Ltd., Belfast, N. Ireland
Eastern Air Devices Inc., Dover, N. Hampshire
Doran Instruments Ltd., Stroud, England
E. M. I. Factories Ltd., London, England
Nagard Ltd., London, England

Daly-Arrow Ltd., 140 Kendal Ave., Toronto 4, Ont. Representing:
Daly (Condensers) Ltd., Ealing, England.

Data Processing, 1313 Wellington St., Ottawa, Can.

Davis Automatic Controls Ltd., 4251 Dundas St. W., Toronto 18, Ont.

Delhi Metal Products Ltd., Waverly St., Delhi, Ont.

Decca Radar (Canada) Ltd.

Decca Navigator (Canada) Ltd., 272 Dalesford Rd., Toronto 14, Ont.

Dominion Aluminum Fabricating Ltd., 150 Seventh St., New Toronto, Ont.

Dominion Sound Equipments Ltd., 4040 St. Catherine St. W., Montreal, Que. Representing:
Northern Electric Co. Ltd., Montreal, Que.
Webster Electric Co., Racine, Wis.
Racon Electric Co., New York 1, N.Y.
Radiant Mfg. Corp., Chicago, Ill.
Machlett Laboratories, Springdale, Conn.
Minnesota Mining Co., London, Ont.

Dow Corning Silicones Ltd., Tippet Rd., Wilson Heights, Toronto, Ont.

Dow Chemical of Canada Ltd., 600 University Ave., Toronto 2, Ont.

Electrodesign, 736 Notre Dame St. W., Montreal, Que. Representing:
Berkeley Div. of Beckman Instruments, Richmond, Calif.
Metrawatt AG, Nurnberg, Germany
Branson Instrument, Fiarfield Ave., Los Angeles, Calif. Stamford, Conn.
Precision Radiation Lab., 2235 La Brea, Los Angeles, Calif.
Southern Instruments, Camberley, Surrey, England
Evans Electroselenium, Harlow, Essex, England

Electrolabs Reg'd, 7385 St. Lawrence Blvd., Montreal 18, Que. Representing:
Kellogg Switchboard & Supply Co., Chicago, Ill.
Onondago Pottery Co., Syracuse, N.Y.
Federal Screw Prod. Inc., Chicago, Ill.
Belden Mfg. Co., Chicago, Ill.

Electronic Associates Ltd., 4616 Yonge St., Willowdale, Ont.

Electronic Communications Ltd., 1514 College St., St. Laurent, Montreal, Que.

Electronic Controls Ltd., 50 Wellington St. E., Toronto 1, Ont.

Electronic Engineering, 62 Bruce St., Galt, Ont.

Electronic Enterprises Ltd., 930 St. George St., Montreal, Que. Representing:
Harman-Kardon Inc.
Crescent Industries Ltd.
Electro Acoustic Industries Ltd.

Electronics Division, Perkins Electric Co. Ltd., 1197 Phillips Pl., Montreal 2, Que. Representing:
Cinema Television Ltd., London, Eng.
Service Controls Ltd., London, Eng.
G. B. Kalee Ltd., London, Eng.
Waveforms Inc., New York, N.Y.
RCA Victor Co. Ltd., Montreal, Que.
Precision Radiation Instruments, Los Angeles, Calif.
Mark Simpson Mfg. Co., New York, N.Y.
University Loudspeakers Inc., New York, N.Y.
Worner Electronics Devices, Rankin, Ill.
Rogers Majestic

Electronic Products Co. Ltd., 1569 West 6th St., Vancouver 9, B.C. Representing:
Philip Industries
Canadian Westinghouse Supply Co. Ltd., Toronto, Ont.
Reid & Campbell Ltd., Toronto, Ont.

Electronic Tube Co., 353 St. Nicholas St., Montreal, Que.

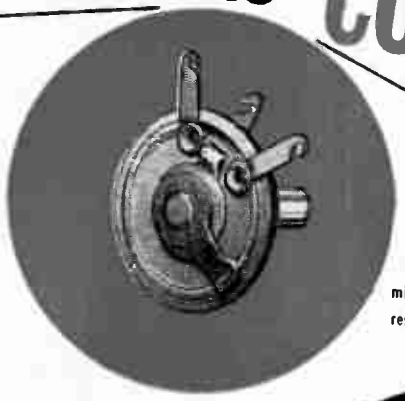
Electrovert Ltd., 265 Craig St. W., Montreal, Que. Representing:
Elliott Bros. (London) Ltd., Lewisham, London S.E. 13, England
Fry's Metal Foundries Ltd., Merton Abbey, London S.W. 19, England
Insuloid Mfg. Co. Ltd., Wythenshawe, Manchester, England
Akustische u., Kino Gerate Ges., M.B.H., Vienna, Austria
Preh Elektrofeinmechanischbe Werke, Bad Neustadt/Saale, Germany

For further data on advertised products use page 207.

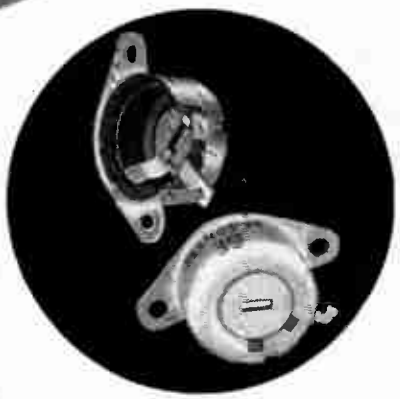
From "The House of Resistors"** come . . .

COST-REDUCING CONTROLS

So you must *get cost down* in designing that assembly? That's just the time to enlist Clarostat's cost-saving talents and facilities. The same superlative engineering and production skill that accounts for the finest quality in controls and resistors, is also available for designing and fabricating cost-reducing components. Three typical examples are presented herewith. These are *standard* items, promptly available in any quantities, at marked savings. And for any extraordinary requirements, *special* controls and resistors can be developed, tooled-up and produced.



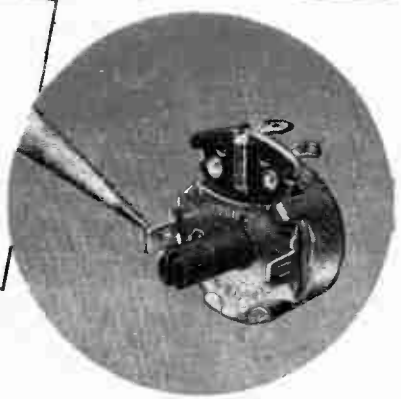
The original "Humdinger" Series MH. Compact, rugged, wire-wound control. Virtually millions in use. Fibre base holds resistance winding. Movable arm and shaft. 1-watt. 2 to 1000 ohms.



Latest "Humdinger" Series 39. Metal-case mounted with rivets or screws. Mounting surface serves as cover. Semi-fixed setting by screwdriver slipped into rotor slot – no shaft. 2-watt. 4 to 5000 ohms.

* *It's easy*

to solve control problems with CLAROSTAT! Send us that control spec, regardless how "special". Our engineering collaboration, quotations and delivery schedules are yours for the asking.



Twist-Tab Mounted Series 47. Eliminates usual bushing, lockwasher, nut. Composition-element control. Metal or plastic shaft. Plastic shaft has rear slotted protrusion, therefore adjustable from front or rear.

STAND PAT WITH CLAROSTAT® **Controls & Resistors**

**Trade Mark

Ask your Distributor now or write to:

ELECTRONIC TUBE & COMPONENTS DIVISION
CANADIAN Marconi COMPANY
830 Bayview Avenue, Toronto, Ontario.
Branches: Vancouver • Winnipeg • Montreal • Halifax • St. John's, Nfld.

For further data on advertised products use page 207.

Devroome Developments Ltd.,
34 Lincoln's Inn Fields,
London W.C. 2, England

Electro-Vox Inc.,
2222 Ontario St. E., Montreal, Que.

Erie Resistor of Canada Ltd., 7 Fraser Ave., Trenton, Ont. Representing:
Erie Resistor Corp., Erie, Penn.
Fryling Mfg., Holly Springs, Miss.
Erie Resistor Ltd.,
Fort Yarmouth, England

Ellis Industries, The J. W., 42 Lombard St., Toronto, Ont. Representing:
A. S. Danbridge, 60 C, Frederikssundsvej, Copenhagen, Denmark
Hartmann & Braun, A.G., 5 Falkstrasse, Frankfurt/Main, West Germany
Dr. B. Lange, Hermannstrasse 14-18, Berlin-Zehlendorf, West Germany
Jaquet, S. A., 19-25 Rue de Thann, Bale, Switzerland
Gebr. Ruhstrat,
68-75 Lange Gessmaratrasse, Gottingen, West Germany
Sodeco, Grand-Pre 70, Geneva, Switzerland

Executone Communication Systems Ltd., 331 Barriert Ave., Toronto 4, Ont.

Exide Batteries of Canada Ltd., 153 Dufferin St., Toronto 3, Ont. Representing:
Exide Batteries of Canada Ltd., Montreal 2, Que.
Exide Batteries of Canada Ltd., Vancouver 10, B.C.

T. S. Farley Ltd., 174 Catherine St. N., Hamilton, Ont.

Federal Wire & Cable Co. Ltd., 265 Suffolk St., Guelph, Ont.

Ferranti Electric Ltd., Industry St., Toronto, Ont.

Fleck, R. D. & Co. Ltd., Beaver Foundry Bldg., Tillsonburg, Ont. Representing:
C. M. Robinson Co., Winnipeg 2, Man.

Garlock Packing Co. of Canada Ltd., The, 750 Bay St., Toronto 2, Ont.

General Instrument-F. W. Sickles of Canada Ltd., 151 Weber St. S., P.O. Box 408, Waterloo, Ont. Representing:
Gen. Instrument Corp., 829 Newark Ave., Elizabeth 3, N.J.
F. W. Sickles Div. of Gen. Instrument Corp., 165 Front St., Chicopee, Mass.

General Precision Industries Ltd., 455 Craig St. W., Montreal, Que. Representing:
Compagnie Generale de Metrologie, Chemin de la Croix-Rouge, Annecy (Hte. Savoie), France

General Tire & Rubber Co. of Canada Ltd., Stokes Div., Kennedy St., Welland, Ont.

Gould-National Batteries of Canada Ltd., P.O. Box 56, Kingston, Ont.

Greening Wire Co. Ltd., The B., 55 Queen St. N., Hamilton, Ont.

Hackbusch Electronics Ltd., 23 Primrose Ave., Toronto, Ont.

Hammond Mfg. Co. Ltd., Wellington St. W., Guelph, Ont.

Harris Co. Ltd., The E., 73 King St. E., Toronto, Ont. Representing:
Wornow Process Paint Co., Los Angeles, Calif.

Harris Pound & Co., 5093 Randall Ave., Montreal 29, Que. Representing:
LaPointe Electronics, Rockville, Conn.
Parker Metal Goods Co., Worcester, Mass.
Mechanical Steel Tubing Co., New York City, N.Y.
P. Wall Mfg. Co., Grove City, Penn.
Advance Electronic Co., Oak Park, Mich.
United Technical Labs., Morristown, N.J.
Surface Conduction Inc., New York, N.Y.
Sound Apparatus Co., Sterling, N.J.
Anchor Radio Corp., Chicago, Ill.

Hathaway Kraemer Ltd., 125 Whitney Pl., Kitchener, Ont.

Heenan Ltd., P. J., 804 Mount Pleasant Rd., Toronto 12, Ont. Representing:
Centralab Canada Ltd., Ajax, Ont.
Centralab Canada Ltd., Milwaukee, Wis.
Heppner Mfg. Co., Round Lake, Ill.
Methode Mfg. Canada Ltd., Chicago, Ill.
Methode Mfg. Canada Ltd., Toronto, Ont.
Sangamo Electric Co. (Capacitor Div.), Marion, Ill.

Industrial Electronics of Canada Ltd., 83 Torbarrie Rd., Toronto 15, Ont.

International Resistance Co. Ltd., 349 Carlaw Ave., Toronto 8, Ont.

Johnson, Matthey & Mallory Ltd., 110 Industry St., Toronto 15, Ont. Representing:
P. R. Mallory & Co. Inc., Indianapolis, Ind.
Johnson, Matthey & Co. Ltd., London, England
A. C. Simmonds & Sons Ltd., Toronto, Ont.

Kelk, G. F. Co., 130 Willowdale Ave., Toronto, Ont.

Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont. Representing:
Allies' Products Corp., Washington, B.C.
Balco Research Laboratories, Newark 2, N.J.
Mechanical Rubber Products, Warwick, N.Y.
Monson Mfg. Corp., Chicago 34, Ill.
Saxonburg Ceramics, Saxonburg, Pa.

Kidde, Walter & Co. of Canada Ltd., 5500 Royalmount Ave., Montreal 16, Que. Representing:
Walter Kidde & Co. of Canada Ltd., Toronto, Ont.

Lab-O-Ring Enterprises Ltd., 23 Collier St., Toronto, Ont.

Lenkurt Electric Co. of Canada Ltd., 926 East Hastings St., Vancouver, B.C. Representing:
Automatic Electric Sales Canada Ltd., Toronto, Ont.

Leonard Electric Ltd., 346 Bering Ave., Toronto, Ont. Representing:
Globe Industries Inc., Dayton, Ohio.
Hetherington Inc., Sharon Hill, Pa.
Leach Relay Co., Los Angeles, Calif.

Linde Air Products Co., Div. of Union Carbide Canada Ltd., 40 St. Clair Ave. E., Toronto 7, Ont.

Longstaff, J. R. Co. Ltd., 300 Campbell Ave., Toronto 9, Ont. Representing:
Airtron Inc., Linden, N.J.
American Pehnolic Corp., Chicago, Ill.
Electro-Snap Switch & Mfg. Co., Chicago, Ill.
General Control Co., Boston, Mass.
Kurz-Kasch Inc., Dayton, Ohio.
Precision Tube Co., North Wales, Penn.
Struthers-Dunn Inc., Pitman, N.J.
Teleradio Eng. Inc., Wilkes-Barre, Pa.

McCardie, H., P.O. Box 197, Grimsby, Ont. Representing:
All Star Products Inc., Defiance, Ohio.
Salford Electrical Instruments Ltd., Salford 3, Lancs., England

McCarter Radio & Television Ltd., 1625 West 3rd Ave., Vancouver 9, B.C.

McCurdy Radio Industries Ltd., 22 Front St. W., Toronto, Ont.

McPhar Engineering Co. of Canada Ltd., 36 Cranfield Rd., Toronto 13, Ont.

McVity, J. R. G. & Co., 51 Dalewood Rd., Toronto 12, Ont. Representing:
Danbury-Knudsen Inc., Danbury, Conn.
Fansteel Metallurgical Corp., North Chicago, Ill.
Fusite Corp., Cincinnati 13, Ohio.
Industrial Products Co., Danbury, Conn.
Lundey Associates, Waltham 54, Mass.
Precision Plastic Products Inc., Chicago 7, Ill.
Radio Materials Corp., Chicago 18, Ill.

Marsland Engineering Ltd., 154 Victoria St. S., Kitchener, Ont. Representing:
Cdn. Licensee of G. H. Leland Inc., 123 Webster St., Dayton, Ohio.

Martin Engineering Inc., 1846 Dorchester St. W., Montreal, Que. Representing:
Martin Engineering Inc., Toronto, Ont.
Martin Engineering Inc., Sherbrooke, Que.
Elect. of America, Photoswitch Div., Cambridge, Mass.
Elect. Corp. of America, Combustion Control Div., Boston, Mass.

Micanite Canada Ltd., 415 Robinson St., Granby, Que. Representing:
Mica Insulator Co., Schenectady, N.Y.
Micanite & Insulators Co., London, England
E. B. Peerless Ltd., Vancouver, B.C.

Microlab Devices Ltd., 1195 Lawrence Ave. W., Toronto 10, Ont. Representing:
E. S. Gould Sales Co., Montreal 28, Que.
Chas. L. Thompson Co. Ltd., North Vancouver, B.C.

Minnesota Mining & Mfg. of Can. Ltd., P.O. Box 757, London, Ont.

Musimart of Canada Ltd. (Electronic Div.), 901 Bleury St., Montreal, Que. Representing:
Birmingham Sound Reproducers Ltd., Old Hill, Staffs, England
Goldring Mfg. Co. (Great Briton) Ltd., London, England
Permanoid Ltd., Manchester, England
Truvox Engineering Co. Ltd., Wembley, England
P. X. Fox Ltd., Yorks, England
Wimbleton Eng. Co. Ltd., Lower Morden, England
Connector Corp., Chicago, Ill.
Comar Electric Co., Chicago, Ill.
Molon Motors & Coils Co., Chicago, Ill.
Schadow Co., Wittena u., Germany
Brenell Eng. Co. Ltd., London, England

National Carbon Co., Div. of Union Carbide Can. Ltd., 805 Davenport Rd., Toronto 4, Ont.

National Fibre Co. of Canada Ltd., Atlantic & Hanna Aves., Toronto 3, Ont.

Nichols, R. H. Ltd., 2781 Dufferin St., Toronto 10, Ont. Representing:
Eversheld & Vignoles Ltd., London W4, England
Cambridge Instrument Co. Ltd., London S.W. 1, England
Automatic Coil Winder & Electrical Co. Ltd., London S.W. 1, England
Ernest Turner Electrical Instruments Ltd., Bucks, England
James Jaquet S.A., Bale, Switzerland
Westinghouse Brake & Signal Co., London N. 1, England

Noranda Copper and Brass Ltd., P.O. Box 1238, Place D'Armes, Montreal, Que. Representing:
Noranda Copper & Brass Ltd., Toronto, Ont.
Noranda Copper & Brass Ltd., Windsor, Ont.
Noranda Copper & Brass Ltd., Edmonton, Alta.
Noranda Copper & Brass Ltd., Vancouver, B.C.

Northern Electric Co. Ltd., 1600 Notre Dame St. W., Montreal, Que. Representing:
Western Electric Co., New York, N.Y.
Gamewell Co., Newton Upper Falls, Mass.
Automatic Signal Div., Eastern Industries Inc., E. Norwalk, Conn.
Westrex Corp., New York, N.Y.
Altec Lansing Corp., Beverly Hills, Calif.
Gray Mfg. Co., Hartford, Conn.

Osborne Electric Co. Ltd., 95 Wesley St., Toronto 14, Ont. Representing:
Automatic Electric Mfg. Co., Mankato, Minn.

Pacific Communications Services Ltd., 1181 Marine, North Vancouver, B.C. Representing:
Rogers Majestic Electronics Ltd., Leaside, Ont.
Northern Radio Co., Seattle, Wash.

Panelyte Div. St. Regis Co. Canada Ltd., 55 Montcalm Blvd., St. Johns, Que. Representing:
Panelyte Div. St. Regis Co. Canada Ltd., Montreal, Que.
Panelyte Div. St. Regis Co. Canada Ltd., Toronto, Ont.

Peacock Brothers Ltd., 260 St. Patrick St. (Ville LaSalle), Montreal 32, Que. Representing:
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Bin-Dicator Co., Detroit, Mich.
Budenberg Gauge Co. Ltd., Altrincham, England
John Davis & Son (Derby) Ltd., Derby, England
The Foxboro Co., Foxboro, Mass.
Jerguson Gauge & Valve Co., Somerville, Mass.
M. & C. Switchgear Ltd., Glasgow, Scotland
Mariam Instrument Co., Cleveland, Ohio
Richardson Scale Co., Clifton, N.J.
Siemens-Schuckert (Great Briton) Ltd., Brentford, England
Vavor Recovery Systems Co., Compton, Cal.

Phillips Electrical Co. Ltd., Brockville, Ont.

Pointon, Charles W., Ltd., 6 Alcina Ave., Toronto, Ont. Representing:
Astron Corp., East Newark, N.J.
American Microphone Co., Pasadena, Calif.
Bell Sound Systems Inc., Columbus, Ohio
Carter Motor Co., Chicago, Ill.
Allen D. Cardwell Electronics Productions Inc., Plainvill, Conn.
Duotone Co. Inc., Keyport, N.J.
Garrard Engineering & Mfg. Co. Ltd., Swindon, England
General Industries Co., Elyria, Ohio
General Cement Mfg. Co., Rockford, Ill.
Multicore Solders Ltd., Hempstead, England
Pickering & Co. Inc., Oceanside, N.Y.
The Radiart Corp., Cleveland, Ohio.
Radio Receptor Co. Inc., New York, N.Y.
John F. Rider Publisher Inc., New York, N.Y.
RJ Audio Products, New York, N.Y.
Sorensen & Co. Inc., Stamford, Conn.
Trimm Inc., Libertyville, Ill.
Trix Electrical Co. Ltd., London, England
Xcelite Inc., Orchard Park, N.Y.

Precision Electronic Components Ltd., 50 Wingold, Toronto, Ont.

Pye Canada Ltd., 60 Front St. W., Toronto, Ont. Representing:
Pye Ltd., Cambridge, England
Unicam Instruments Ltd., Cambridge, England
Lab Gear, Cambridge, England
Power Controls, Cambridge, England
Cathodeon Ltd., Cambridge, England
Etelco Ltd., London, England
Budelman Radio Corp., Stamford, Conn.
Bav Electronics, San Francisco, Calif.

Prince & Roberts, 61 Charles St. W., Toronto, Ont.

P.S.C. Applied Research Ltd., 1500 O'Connor Drive, Toronto, Ont.

Radio Condenser Co. Ltd., 6 Bermondsey Rd., Toronto 16, Ont.

Radio Components Ltd., 50 Wingold Ave., Toronto, Ont. Representing:
Oak Mfg. Co., 1260 Clybourn Ave., Chicago 10, Ill.
Radio Industries, 5225 North Ravenswood, Chicago 40, Ill.

Radio Communications & Engineering Ltd., 850-5th Ave., Lachine, Que. Representing:
Harrington Tool & Die, Lachine, Que.

Rawlplug Products (Canada) Ltd., Rawlplug Bldg., 7320 Upper Lachine Rd., Montreal 28, Que. Representing:
The Rawlplug Co. Ltd., London, England

RCA Victor Co. Ltd., 1001 Lenoir St., Montreal, Que.

Redifon (Canada) Ltd., 6301 Park Ave., Montreal 15, Que.

Renfrew Electric & Refrigerator Co. Ltd., Renfrew Ave. E., Renfrew, Ont.

Rogers Majestic Electronics Ltd., 11-19 Brentcliffe Rd., Leaside, Toronto, Ont. Representing:
Motorola Inc., Communications & Electronics Div., Chicago, Ill.
Philips Industries, Eindhoven, Holland
Mullard Ltd., London, England
Amperex Electronic Corp., Hicksville, L.I., N.Y.
Ferroxcube Corp. of America, Saugerties, N.Y.
North American Philips Co. Inc., Elmet Div., Lewiston, Maine
C. H. F. Mueller, Aktiengellschaft, Hamburg 1, Germany
Dage Electronics Corp., Beech Grove, Ind.

R-O-R Associates Ltd., 290 Lawrence Ave. W., Toronto 12, Ont. Representing:
Arga Div., Beckman Instruments Inc., 220 Pasadena Ave., S. Pasadena, Calif.
Ballantine Laboratories Inc., Boonton, N.J.
Bomac Laboratories Inc., Beverly, Mass.
Electro-Pulse Inc., Culver City, Calif.
Filtron Co. Inc., Flushing, L.I., N.Y.
Helipot Corp., Toronto 18, Ont.
Huggenberger Co., Zurich, Switzerland
Industrial Instruments Inc., Cedar Grove, N.J.
Mepco Inc., Morristown, N.J.
Microfot Div., Felts Corp., South Pasadena, Calif.
F. L. Moseley Co., Pasadena, Calif.
Sanborn Co., Cambridge 39, Mass.
Vectron Inc., Waltham, Mass.
Waveline Inc., Caldwell, N.J.

Sharpe Instruments Ltd., 6080 Yonge St., Willowdale, Ont. (Toronto)

Silvercel of Canada Ltd., 1425 The Queensway, Toronto, Ont.

Sola Electric Co., 617 Runnymede Rd., Toronto 9, Ont. Representing:
Sola Electric Co., Chicago 50, Ill.

Soundmaster Equipments, 256 Kent St., Ottawa, Ont.

Speight, N. H., Laboratories, 145 Wellington St. W., Toronto 1, Ont. Representing:
Winegard Co., 3000 Scotten Blvd., Burlington, Iowa
Spaulding Prod. Co., Tipton, Ind.
Metal Ware Mfg. Co. Inc., 5055 Stickney Ave., Toledo, Ohio.

Sperry Gyroscope Co. of Canada Ltd., 6011 Cote de Liesse Rd., Montreal, Que.

Spotton, John, Co. Ltd., 21 Carson St., Toronto 14, Ont. Representing:
Ilsco Corp., Cincinnati, Ohio

Stark Electronic Instruments Ltd., Box 240, Ajax, Ont. Representing:
Hickok Electrical Instrument Co., Cleveland, Ohio
Beta Electric Corp., New York, N.Y.
Radio Merchandise Sales, New York, N.Y.
Filtors Inc., Port Washington
New London Instrument Co., New London, Conn.
Hardwick Hindle Inc., Newark, N.J.
Browning Laboratories Inc., Winchester, Mass.
Thorens Co., Switzerland
Illinois Condenser Co., Chicago, Ill.
Ames Wire Corp., New York, N.Y.
Rogers Electronic Corp., New York, N.Y.
Telectron Co., Cleveland, Ohio
Porter & Dietch Corp., St. Paul, Minn.
Standard Electronics Div. (Hupp Corp.) Carlisle, Penn.
International Electronics Co., Dallas, Tex.

S. & T. Sales Ltd., 44 Water St., Vancouver 4, B.C.

Taylor Electric Mfg. Co. Ltd., 625 Princess Ave., London, Ont. Representing:
Taylor Electric Mfg. Co. Ltd., Montreal, Que.
Taylor Electric Mfg. Co. Ltd., Toronto, Ont.
Taylor Electric Mfg. Co. Ltd. Winnipeg, Man.
Taylor Electric Mfg. Co. Ltd. Calgary, Alta.
Taylor Electric Mfg. Co. Ltd. Vancouver, B.C.

Telequipment Mfg. Co. Ltd., 729 Dundas St., London, Ont. Representing:
Blonder-Tongue Labs. Inc., Westfield, N.J.
Ram Electronics Sales Co., Irvington-On Hudson, N.Y.
Stephens Mfg. Corp., Culver City, Calif.
Karlson Associates Inc., Brooklyn, N.Y.
Acrosound Products Co., Philadelphia, Pa.

Tenatronics Ltd., Newmarket, Ont. Representing:
Tenna Mfg., Cleveland, Ohio.
Rodilco Mfg. Co., Cleveland, Ohio.
Gramer Haldorson Transformer Corp., Chicago, Ill.

Thermovolt Instruments Ltd., 19 Ulster Ave., Toronto 18, Ont. Representing:
Gessen & Co., Germany (Erlangen)
Haonni & Co., Switzerland
Jeens Co., Germany

John R. Tilton Ltd., 51 McCormack St., Toronto 9, Ont. Representing:
Atlantic Wire & Cable Co., College Point, N.Y.
David Bogen Co. Inc., New York 14, N.Y.
Harry G. Cisin, Amagansett, N.Y.
Electronic Instrument Co. Inc., Brooklyn 11, N.Y.
Home Recording Products Co. Inc., Freeport, L.I., N.Y.
JFD Mfg. Co. Inc., Brooklyn 4, N.Y.
Livingston Electronics Inc., Livingston, N.J.
Mosley Electronics Inc., St. Louis 14, Mo.
Quam Nichols Co., Chicago 37, Ill.
Sonic Recording Products Inc., Freeport, N.Y.
Sprague Electric International Ltd., North Adams, Mass.
Standard Television Products Ltd., Kitchener, Ont.
University Loudspeakers Inc., White Plains, N.Y.
Walco Products Inc., East Orange, N.J.
Wind Turbine Co., West Chester, Pa.
York Woodcraft Ltd., New Hamburg, Ont.

Tinsley, H. & Co. Ltd., 234 Ste. Paule Ave., St. Jerome, Que. Representing:
H. Tinsley & Co. Ltd., Werndee Hall, South Norwood, London S.E. 25, England

Titania Electric Corp. of Canada Ltd., 234 Dundas St., Trenton, Ont. Representing:
Gulton Industries Inc., Metuchen, N.J.
Glenco Corp., Metuchen, N.J.
Greibach Instrument Corp., New Rochelle, N.Y.
Vibro-Ceramic Corp., Metuchen, N.Y.
Thermistor Corp. of America, Metuchen, N.J.
E.C.E. Products, Albuquerque, New Mexico

United Carr Fastener Co. of Can. Ltd., Gage Ave. N., Hamilton, Ont. Representing:
Cinch Mfg. Co., Chicago, Ill.
H. B. Jones Div. of Cinch Mfg. Co., Chicago, Ill.
Ucinite Co., Newtonville, Mass.

Universal Wire & Cable Co. Ltd., 2155 Moreau St., Montreal, Que.

Varian Associates of Canada Ltd., 45 River Dr., Georgetown, Ont.

Wickett, Bradford J., 2792 Yonge St., Toronto 12, Ont.

Wind Turbine Co. of Canada Ltd., 51 McCormack St., Toronto 9, Ont. Representing:
John R. Tilton Ltd., 51 McCormack St., Toronto 9, Ont.

Wolf Electric Tools Ltd., 2271 Bloor St. W., Toronto, Ont. Representing:
Canadian Trade Corp., Montreal, Que.
Swann & Millar of Canada Ltd., Vancouver, B.C.

York Woodcraft Ltd., Hincks St., New Hamburg, Ont.

COMMUNICATIONS

(Continued from page 70)

communication circuit is one of equalization, that is, each side of the circuit is exposed equally to the power circuit.

The change of phase of the induction into a communication circuit by transposition in either the power circuit, or both, affords a means of reducing induction effects, in that the induction in one section of the line may be largely neutralized by the induction in neighboring section.

Unless a proper adjustment of neutralization and equalization is effected by means of co-ordinating the transposition of both power and communications circuits, induction will result.

The numerous types of power line protectors such as circuit breakers, fuses, etc., in their operation create unbalances in the power system thus greatly increasing the residual voltages. These types of protective devices primarily are designed to limit the magnitude of the fault or short circuit currents on the power system for pre-determined periods of time. In the case of the communication pair, the protective devices ar einstalled to limit the voltage and/or current in the communication circuit or plant at least within the capacity of these protective devices.

However, where induced voltages and currents are in the order of thousands of volts or amperes, it is useless to install protective devices of the communication circuit capable of handling only a few hundred volts or amperes. The time of the power line fault current dictates the duration of the induced currents. It is therefore useless to consider communication protective devices which cannot handle the fault currents for the time involved. Therefore unless consideration is given to the adoption of communication protective devices which will adequately handle the fault voltages and currents for prescribed periods of time, as dictated by the power system, serious hazards are likely to occur.

The Osborne system of protective devices to eliminate the hazards of extraneous potentials and currents in the communications systems is primarily based on the use of a combined drainage and insulating transformer. FIG. 1.

Its purpose is to hold the line always in balance, since:

1. An isolated telephone or communications line has a very high impedance to ground and a much lower transverse impedance depending in the main on the impedances of the apparatus connected in shunt on the line.

2. Extraneous potentials appear, primarily, between line and ground, and in the case of balanced impedance to ground, no transverse potential appears.

3. If the communication line becomes unbalanced, an extreme case of which is a dead ground on one side, the transverse impedance remains unchanged. The extraneous potential in the grounded side is impressed on the apparatus in shunt with the line. If, for instance, an insulating transformer is interposed between the line and the terminal apparatus, it transforms the transverse potential to saturation point of the transformer core, above which

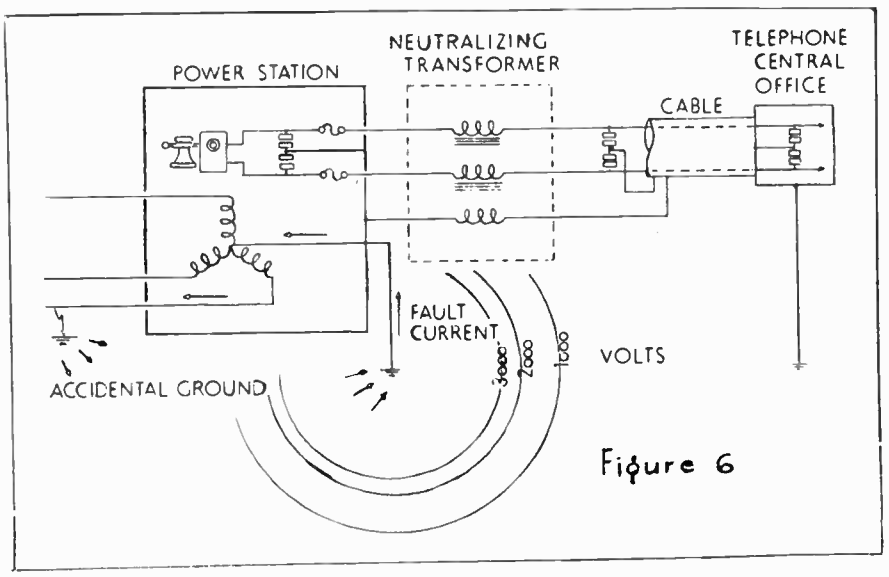


Figure 6

excessive exciting current may damage the primary winding. The secondary potential impressed on the terminal apparatus, may be very high depending on the frequency of the extraneous potential. Therefore, an insulating transformer does not offer satisfactory protection.

4. When the drainage and insulating transformer is interposed between the line and the terminal apparatus, the neutral point of the primary or line winding of the transformer is connected to ground. This lowers the impedance to ground to a very low value without normally altering the tranverse impedance. Any unbalance in the communication line, an extreme case of which is a dead ground on one side, affects the total impedance negligibly due to the fact that the neutral ground on the transformer and the line ground constitute a short circuit of one half on the primary winding. The transverse impedance therefore becomes the impedance of the transformer under such short circuit conditions. The design of the drainage and insulating transformer is such that the transverse voltage appearing in the secondary winding will be of low value.

5. In order to maintain this self balancing effect of the Osborne drainage and insulating transformer, the communication line connections must always remain intact. Fuses or any circuit opening devices defeat this characteristic unless they open both sides of the circuit simultaneously. However, any transformer has a certain maximum capacity and so it is with respect to the drainage capacity of the drainage and insulating transformer. Therefore, it should be protected from overload.

In order to protect the transformer from excessive drainage and to provide a method of grounding both sides of the primary winding simultaneously, the transformer is protected by a grounding relay. This relay is inserted in the circuit immediately ahead of the drainage and isolating transformer. FIG. 2.

The grounding relay entirely dispenses with fuses as mentioned previously for transformer protection. When the extraneous current to ground through the neutral of the transformers exceeds the safe continuous drainage current capacity of the transformer, the relay ground contact closes, short circuiting and grounding the primary terminals of the transformer. When the extraneous current subsides, the contacts open without further interruption to service. The relay has two windings, one connected in series on each side of the circuit, which operate the relay mechanism. Therefore, any currents, balanced or unbalanced in each side of the line, with respect to each other, will, if of sufficient magnitude as determined by adjustment, cause the relay armature to close. The relay windings also function as chokes to further protect the transformer from steep wave front surges such as lightning and other severe disturbances. They also facilitate discharge across a set of horn gap arresters immediately ahead of the grounding relay. FIG. 3.

The grounding relay operates on the repulsion induction principle and comprises a rectangular copper ring as the armature on a closed magnetic coil in common with the relay windings.

This type of grounding relay has several advantages over the conventional electro-magnetic or clapper type of relay, as follows:

1. The repulsion force is nearly constant throughout the movement of the operating element or armature, the initial force being slightly greater than when the armature is in the final or closed position.
2. It is quiet in operation having but slight tendency to chatter.
3. There is no tendency of the armature to stick in the closed position since residual magnetism has no effect.
4. With a given current it has the same operating characteristic at any frequency including the commercial fundamental and higher harmonics.

These are extremely important points with respect to a current operated relay for the purpose. Adjustment for closing current is accurate and very simple.

Horn Gap Arresters

In many instances the magnitude of fault currents to ground greatly exceed the capacity of the grounding relay even for short periods of time. In the case of lightning or crosses between communication and power line, several thousand amperes are flowing and the wave fronts may be quite steep. To take these surges the isolating and drainage transformer and grounding relay is protected by a heavy duty horn gap arrester. These horn gaps are of rugged construction and utilize 3/8" diameter electrodes. FIG. 4.

Referring back to the question of power station ground potential rise, serious difficulties are encountered in the event of a power line fault which causes the power station ground to rise in potential with respect to a remote point or another station. Voltages in the order of several thousand volts are not uncommon.

There are several types of communications circuits serving power stations which by virtue of using direct current must have a continuous circuit from transmitter to receiver. There are several types of service such as pilot wire relaying wherein service must be available during fault conditions and are non-interruptable. The use of the drainage and isolating transformer as a means of protection is precluded in such instances and it becomes necessary to utilize a device known as the neutralizing transformer.

Neutralizing Transformers

The neutralizing transformer is a device for the protection of communication circuits either open wire or cable against extraneous longitudinal voltages.

It functions as its name implies, by neutralizing the voltages. This neutralization is accomplished in general by connecting a secondary winding of the transformer in series with each of the communication wires to be protected. By induction from the primary winding connected into a circuit subject to the same voltage, there is introduced into the secondary winding a voltage substantially equal in magnitude and opposite in phase to the disturbing voltage. The result is the reduction of the voltage in the circuit to a value sufficiently low to prevent harmful effects. FIG. 5.

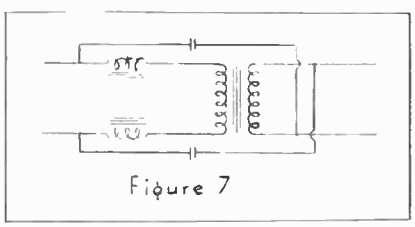
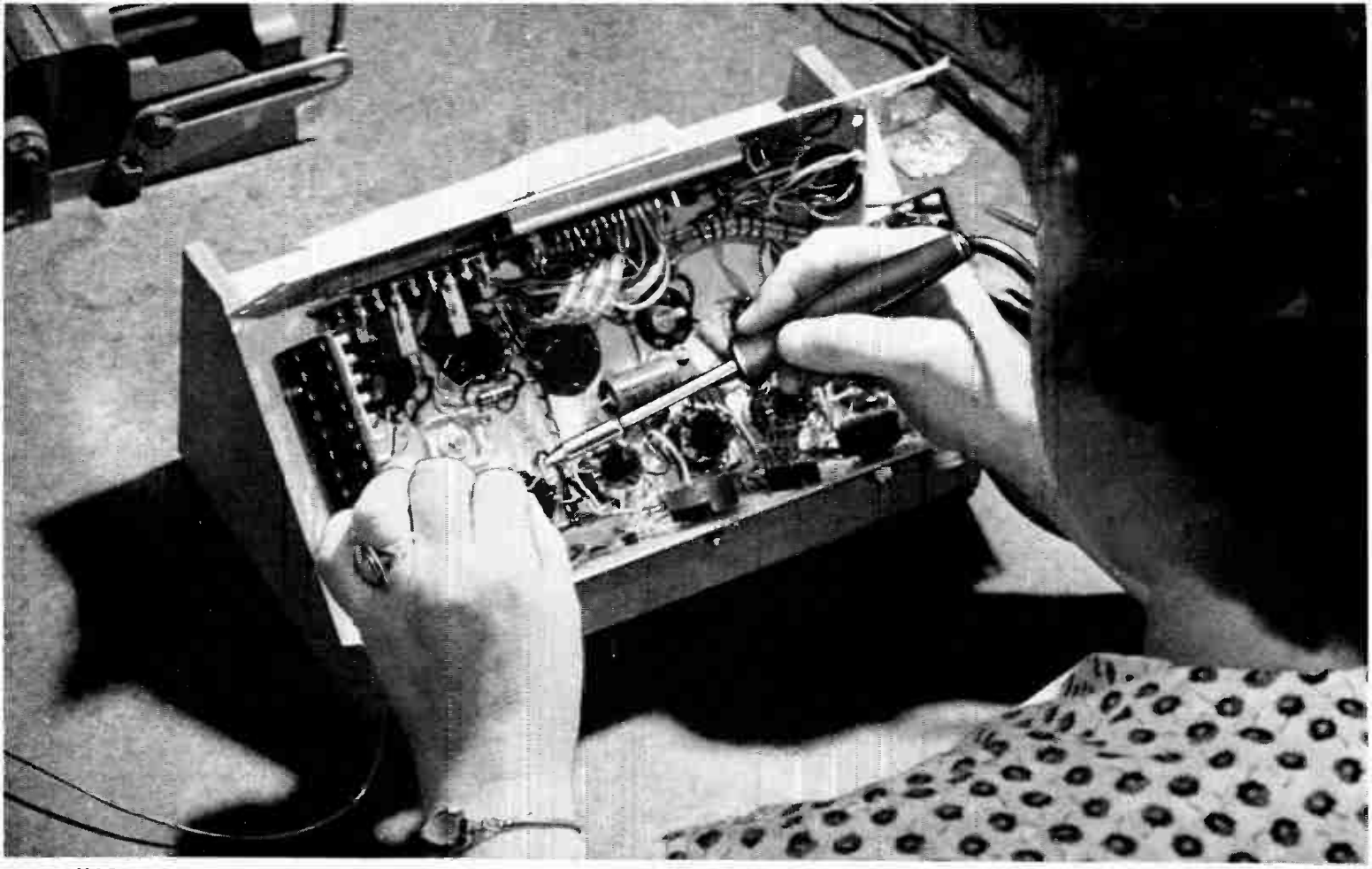


Figure 7

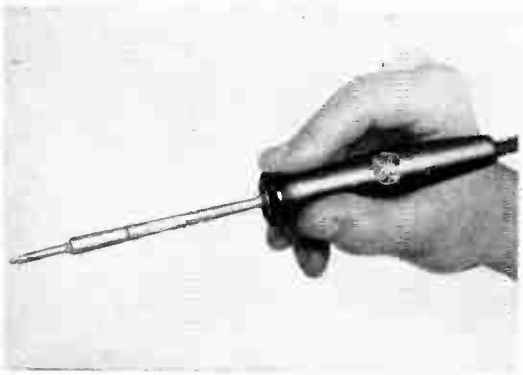
In FIG. 5 let V-0 represent the disturbing voltage. V-1 is the voltage across the primary winding and V-2 is the secondary voltage. The induced voltage into the secondary winding is not quite of the same magnitude nor not quite opposite in phase as the disturbing voltage. Consequently complete neutralization is not achieved and a small remnant voltage remains which is not dangerous. In order to achieve as low a remnant voltage as possible the neutralizing transformer should be one of high primary impedance compared to the external circuit impedance, low primary resistance, 1:1 winding ratio with close coupling and a very small phase shift. Good transmission dictates a low secondary resistance and a low value of leakage reactance between secondary windings. The direct and mutual capacitances between windings should be kept small to minimize their shunting action on the communication

(Continued on page 158)

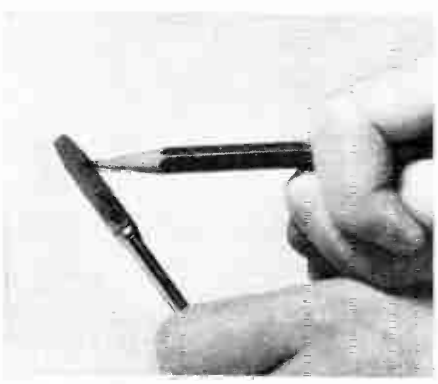


HARD-TO-REACH JOINTS are soldered quickly with the fine-point G-E Midget iron—with no damage to adjacent parts. Weight of iron—less than 3 ounces—helps increase output by reducing operator fatigue. The Midget's ironclad-copper tip has saved users as much as ½ hour cleaning and tinning time daily, per operator station.

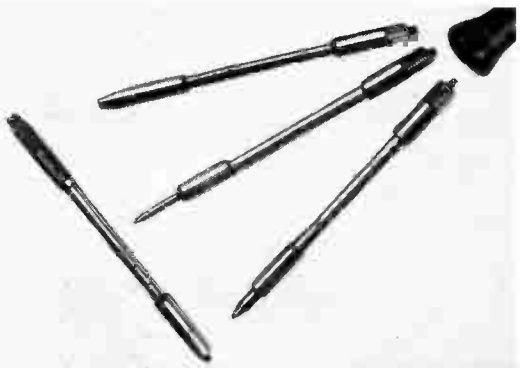
Speed assembly with G-E Midget Iron, a small soldering iron with big-iron efficiency



HANDLES LIKE A PENCIL—Weighing less than a package of cigarettes, the General Electric Midget soldering iron speeds production by reducing operator fatigue.



RAPID HEAT TRANSFER is achieved through a famous Calrod heater located in the ironclad-copper tip. Result—the G-E Midget iron's heat efficiency is 90%.



THREE-IN-ONE IRON with ⅛", ¼", 3/16" tip sizes gives you greater versatility to meet your soldering requirements. Tips can be changed in only 5 seconds.

GENERAL ELECTRIC

MIDGET
SOLDERING IRONS

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

Heating Devices Sales,
Canadian General Electric Co. Ltd.,
224 Wallace St., Toronto, Ont.
Please send me FREE "Industrial Soldering Irons" bulletin GEC-1318

Name .....

Address .....

City ..... Prov. .....

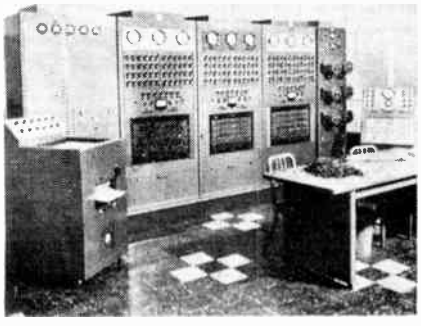
436W255

PRODUCT INFORMATION SECTION

Mid-Century Electronic Analog Computers And Accessories

Item 760

Mid-Century Instrumatic Corporation, New York, N.Y., manufacturers of precision high accuracy analog computers and associated equipment offer to the Canadian market a complete line of equipment and service. Mid-Century's success is due to customer endorsement of their analog computing equipment for accuracy and performance. Standard equipment provides for accuracy better than 0.1 per



cent and higher accuracies are available as an optional feature. M-C Amplifiers are all chopper stabilized. Computer systems including Function Generators, Electronic Multipliers, Multichannel Recorders and components can be supplied. Complete technical and descriptive literature upon request. A complete computer facility is available for customer evaluation and problem analysis. For further information write to exclusive Canadian representatives:

Data Processing Associates Limited, 1313 Wellington Street, Ottawa, Ont.

Digital And Analog Computing Services

Item 761

For organizations having large volumes of data to process and special engineering and scientific problems to solve, but who cannot justify the purchase or lease of high speed computing equipment, a complete digital and analog computing service bureau is now available.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Data Processing Associates Limited, Ottawa, Ontario, specializing in electronic data processing, computing and data reduction have an experienced staff of engineers and application personnel to handle routine and special computing problems. Analog problems are processed at the DIAN Laboratories Inc. facility where a large and complete Mid-Century computer installation is available on a time contract basis. Business and scientific data processing requiring digital computing facilities is carried out at the Data Processing Services Bureau of Electro-Data Corporation using the DATATRON digital computer.

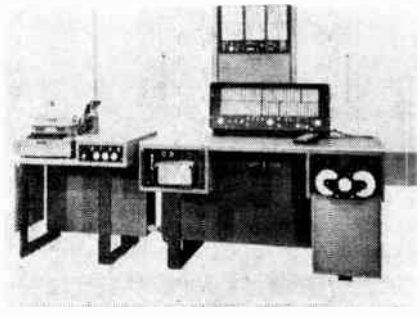
Full details will be supplied by writing to:

Data Processing Associates Limited, 1313 Wellington Street, Ottawa, Ont.

Tally Register Digital Point Plotter

Item 762

Operating directly from electronic digital computers, punch card machines, keyboards and punched tapes, the TALLY REGISTER high speed digital point plotter provides a continuous feed two direction grid printing facility. Type 8113 — Model 3



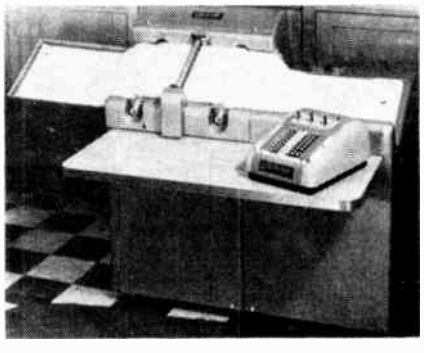
Plotter features numeric abscissa printing. This provides for numeric printed identification of reference points along the lower edge of the plot. Characters may be printed at a rate of ten per second and may be programmed to print at any abscissa point desired. Speed of 20 points per second with four symbols and sequenced programming can be accomplished. The TALLY REGISTER Plotter is manufactured by TALLY REGISTER Corporation, Seattle, Washington. Full Technical information may be obtained from their Canadian representatives:

Data Processing Associates Limited, 1313 Wellington Street, Ottawa, Ont.

Datatron Electronic Data Processing Machine

Item 763

Science, industry, and business are faced with enormous and expensive operations in the handling and processing of data. DATATRON electronic data processing machines are helping to bring about revolutionary improvements in such operations. On any type of data processing problem, DATATRON systems are fast, efficient, and offer practical dollar savings.



Available through lease or purchase at a fraction of the cost of the very large-scale data processing systems, DATATRON is within the reach of virtually all business, research, and engineering organization. Substantial company-wide savings are made possible by the DATATRON computer in such functions as statistical analysis, maintenance of office systems, storage of records, accounting operations, design, development and testing, and manufacturing control. Reduced operating costs may be far more significant than the initial low purchase price of DATATRON machines.

DATATRON machines are designed so that all components function at levels far below their engineered specifications, thus assuring maximum reliability of operation.

A two-week course in programming and coding is scheduled regularly at ElectroData's computing center in Pasadena, and training in maintenance is available to customer personnel.

The DATATRON digital computer system is manufactured by ELECTRODATA Corporation, Pasadena, California, an affiliate of Consolidated Engineering Corporation. All phases of customer application and service, sales and maintenance in Canada are handled by:

Data Processing Associates Limited, 1313 Wellington Street, Ottawa, Ont.

Model "D-1" Two-Wheel Stripper

Item 764

Wire Stripping: Your jobs are peculiar to your own business and may be governed by such variables as kind and size of wire, what you use it for, your production requirements, and other similar factors.

So we may serve you promptly and efficiently, tell us what you are now doing and your hopes in the way of improved quality, increased production and lower costs.

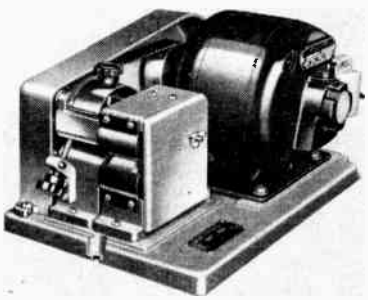


Illustration shows a Model "D-1" Two-Wheel Stripper, which is but one of the many different types of machines made. This one uses 1¼" diameter stripping wheels and is ordinarily used to strip any type of Film Insulation from wires in the range of AWG No. 25 to AWG No. 44. A wide variety of stripping wheels are available, made from FybRglass and Brush Wire, all designed to provide economical service.

This particular machine is only $156.25, f.o.b. Syracuse, exclusive of stripping wheels. It is available on a Test-Rental Plan or may be purchased out of savings over a ten month period.

For a confidential report containing our recommendations, send samples and complete information to

Rush Wire Stripping Division, The Eraser Company, Inc., 1060 South Clinton Street, Syracuse 4, New York.

For Convenience In Requesting Information On The Items Listed In THE PRODUCT INFORMATION SECTION Use The Handy Coupons On Page 207. The Editors Of Electronics and Communications Will Process Your Requests Promptly. The Coupons May Also Be Used For Obtaining Additional Information On The Merchandise Advertised In This Issue

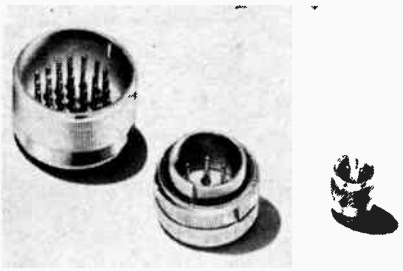
Hermetic Announces New Vac-Tite A-N Connectors For Leak-Proof Application Under Conditions of Extreme Heat And Pressure

Item 765

Hermetic Seal Products Co., 33 South Sixth Street, Newark 7, New Jersey, long established in the design, develoment and production of matched glass and Vac-Tite hermetic seals, announces the development and availability of their new HS 2 (AN 3102) receptacles and HS 6 (AN 3106) plugs featuring Hermetic Vac-Tite glass-to-metal construction to insure leak-proof high performance under conditions of extreme heat and pressure.

These Hermetic Vac-Tite A-N Connectors were specifically intended for use in severe instrumentation problems where the vacuum tightness and arc-resistance of glass were necessary for superior performance during high-temperature operation. The shock and vibration proof constructed HS 2 and HS 6 A-N Connectors are corrosion resistant and 100 per cent moisture and pressure repellent. The new Hermetic A-N Connectors are equivalent to MIL-C-5015.

In addition to the HS 2 and HS 6 A-N Connectors, Hermetic has made special units available with particular plating



requirements, varied flange style, and extra-high pressure resistance to meet the most specialized needs.

Additional engineering data, drawings and samples can be obtained by writing to the:

Hermetic Seal Products Co., 33 South Sixth Street, Newark 7, New Jersey.

Miniature Solenoids For Computers, Aircraft

Item 766

PSP Miniature Solenoids for electronic control units are made in a range of types for all applications requiring short strokes. Typical performance data: 6.5 pounds pull at .020

stroke; .510 amps at 24 V. D.C. (Solenoid SD-328) . . . continuous duty at 18-30 V. D.C. . . . ambient temperature range —65°F. to +165°F . . . mounting methods to meet requirements, for details write to:

PSP Engineering Company, 8420 Otis Street, South Gate, California.

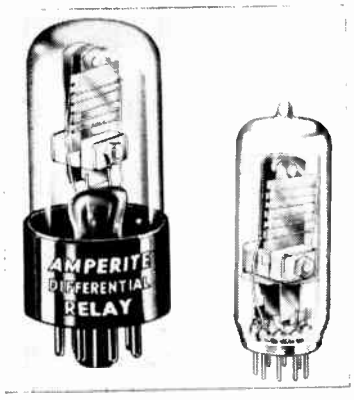
New Line Of Hermetically Sealed Differential Relays Offered By The Amperite Co., Inc.

Item 767

The new line of Amperite Differential Relays may be used for automatic overload, over-voltage, under voltage or under-current protection. They reset automatically when the abnormal condition is removed.

Since the actuating element is a heater, the Relay may be designed for time constants varying from approximately 3 to 30 seconds. It will not respond to transients of shorter dura-

tion. Available in SPST — normally open or normally closed. Completely isolated contacts makes may circuit variations possible. The Relays can be designed for currents from 10 to 1000 ma., voltages from 1 to 100V. Higher currents can be handled by an external contactor. Approximately 1 watt is required for the heater. However, the Relay will withstand 100 per cent overload indefinitely.



The Amperite Differential Relay is available in either the standard octal base or nine-pin miniature. They are pre-set at the factory. Standard tolerance of voltage or current for opening and closing is ±10 per cent. Closer tolerances are available on special order. The Relay is compact, light, rugged. Being hermetically sealed, they are not affected by changes in temperature, pressure, or humidity. List price is $4.00 each.

Additional information on this and other Amperite hermetically sealed Delay Relays may be obtained by writing to:

Amperite Company, 561 Broadway, New York 12, N.Y. In Canada write to: Atlas Radio Corp., 560 King St. W., Toronto 2B, Ontario.

Instruments By Cossor Canada Limited

Item 768

COSSOR (CANADA) announce the availability of two new and interesting instruments:

1. FORK REGULATED POWER SUPPLY, Type 7523. This instrument is designed to fit into a standard 19 inch rack and to supply up to 70 watts of power at a voltage of 115 volts which may be adjusted with frequency from 110 to 125.

Stabilized at 60 cycles ± 0.005 per cent. The equipment is compensated to work accurately at a wide variety of ambient temperatures.

2. VARIABLE PULSE GENERATOR, Type 7534. This equipment permits the generation of variable pulse trains and fits in a standard relay rack. The amplitude of each pulse is accurately resettable and pulse height can be set in DB. Pulse width is variable from 5 to 500 milliseconds. The time interval between pulses is continuously variable from 100 milliseconds to 3 seconds. Each pulse is a modulation envelope of a tone where frequency is variable from 100 to 10,000 cycles per second. Variable external noise can be applied externally. A vacuum tube voltmeter permits levelling of input and ten outputs are available. The equipment generates from 115 volts 60 cycles and contains a built-in stabilized power supply.

Cossor Canada Limited, 301-303 Windsor Street, Halifax, N.S.

Latching Relay By Filters Inc. Of Port Washington, N.Y.

Item 769

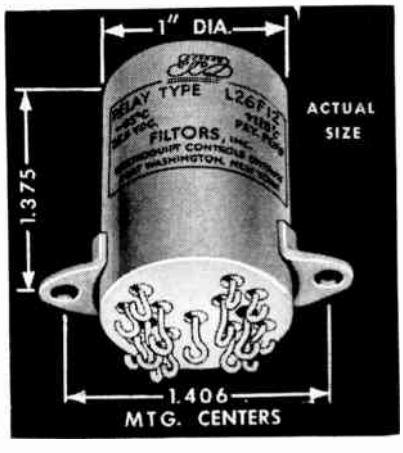
LATCHING RELAY. What is believed to be, by far, the smallest and lightest latching relay available has been announced by Filtors, Inc. Magnetically held and electrically reset, it is hermetically sealed in an enclosure only one inch in diameter x 1 1/16" long (excluding terminals). The weight of the six-pole, double throw type is only 3.3 ozs.

This latching relay is available in 2, 4 and 6 pole double throw contact arrangements and is designed to comply with Military Specifications MIL-R-5757B and MIL-R-25018 (USAF).

Salient Features: Continuous duty (either Coil), temperature range —65°C. to +125°C., Shock 50 G's.

Advantages of this Latching Relay:

Relay remains in "energized" position indefinitely without consuming power.



As an overload relay it can be electrically reset from a remote position.

Contacts can be closed by one circuit and opened by another circuit.

It has many applications in fail-safe circuits.

Its small size, light weight and hermetically sealed enclosure make possible its use in airborne equipment.

Either coil may be energized continuously without damage to the relay.

It affords the designer great latitude in circuitry, particularly in "lock-up" circuits, e.g., where the contacts of one conventional relay are used to lock-up the coil of another relay. Thus it avoids redundancy.

Filtors, Inc., of Port Washington, New York.

Oil-Tight Indicator Lights For Heavy Duty Use In Industrial Applications Announced By The Dialight Corp.

Item 770

DIALCO now offers a new series of Oil-Tight Pilot Lights for severe industrial service. The units are of streamlined design that gains in ruggedness from its very simplicity. This is in marked contrast with the "traditional" bulky and complicated oil-tight pilot lights now in use.

Unique features of the new DIALCO line of Oil-Tight Pilot Lights include the following: (1) Special provision for retained oil-resistant gaskets. (2) Glass lenses in several shapes with

omnidirectional light spread . . . (3) Discs (with words, letters, or numbers) inserted behind flat glass lenses to deliver specific messages . . . (4) Wide range of incandescent lamps, with screw or bayonet base, as well as several neon types are accommodated . . . (5) Mounting in either 1 1/16" or 1" clearance hole . . . (6) Full range of lens colors are available.

Optional details permit the choice of an assembly to fit any set of conditions. Complete technical data and description on DIALCO Oil-Tight Pilot Lights are described in Bulletin L-200. Samples for design purposes, or additional engineering information, are available at once without charge from:

Mr. R. E. Greene, Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y.; Telephone HYacinth 7-7600.

Superior Red Iron Oxides For Ferrite Electronic Components

Item 771

Mapico Red Iron Oxides provide the maker of top-quality Ferrite components with high purity raw materials of reagent quality. Their carefully controlled particle size and shape contribute to effective control of packing and shrinking. Successfully used for many years in commercial production.

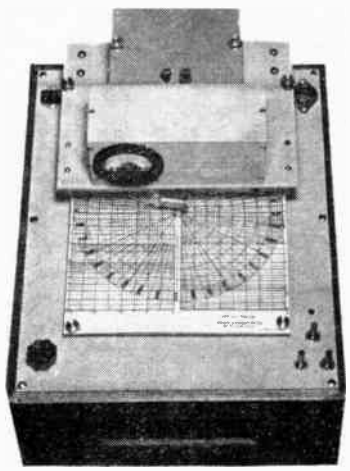
Highly modern manufacturing processes under rigid laboratory control assure uniformity and dependability. Ask us for full technical information. Our Technical Service Department is ready to give you the full benefit of its experience and will gladly co-operate in the solution of any problem.

Columbian Carbon Co. (Canada) Ltd., Mapico Color Division, 33 Edward Street, Toronto, Canadian Distributor.

Model PFR Polinear Recorder And PR Polar Recorder

Item 772

Sound Apparatus Company's Model PFR Polinear Recorder and PR Polar Recorder are extremely adaptable instruments particularly suited to the automatic plotting of the directional characteristics of microphones, loudspeakers, antennas, light sources, and other pattern-emitting or receiving devices. These general purpose pen and



ink recorders plot ac or dc electrical voltage levels in either polar or rectangular co-ordinates on linear, square root, or decibel scales.

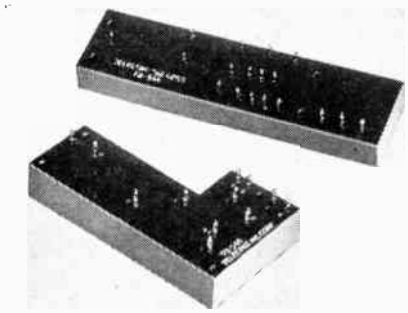
For further information on these and other recorders for a large variety of laboratory and field applications write:

Sound Apparatus Company, Stirling, N.J. (Canadian Representative: Harris Pound, 5093 Randall Ave., Montreal, Quebec.)

Encapsulated Components

Item 773

TELECTRO'S ENCAPSULATED ASSEMBLIES will afford your design engineers complete design flexibility especially in applications where factors of size, weight and miniaturization are of paramount importance. Use of encapsulated assemblies permit you to make great strides forward in miniaturizing and unitizing electrical and electronic circuits.



Maintenance techniques are simplified through utilizing; entire assemblies can be removed and replaced easily and quickly using common hand tools.

Use of special epoxy-resin formulations and techniques assures mechanical rigidity of components, reduces the danger of high voltage breakdown, corona formation and discharge and permits the use of standard components under extremes of temperature, humidity and altitude.

Formulations are available to meet all conditions arising from differences in thermal expansion characteristics of the encapsulated components under a wide range of operational service.

TELECTRO'S encapsulating services and formulations are specially designed to assure highest quality of completed products at low cost, for either short-run or long-run production. TELECTRO'S engineering staff has pioneered in the development of encapsulating techniques using the latest advances in epoxy-resin formulations such as: rigid or flexible types, transparent or opaque, heavy or light, or the new foamed-in-place types.

Choice of method and materials for encapsulating complete networks or individual components is determined by your application and requirements. Your problem will be carefully analyzed by our staff of encapsulation experts. Our past experience with solving problems for many satisfied clients has convinced us that encapsulation problems are solved best by careful analysis and co-ordination of the project from beginning to end, and when required, the development of special formulations for special applications.

Telectro Industries Corp., 35-16 37th Street, Long Island City 1, New York.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Permanoid Of Manchester England

Item 774

PERMANOID of Manchester, England are one of the foremost British manufacturers specializing in THERMOPLASTIC CABLES and EXTRUSIONS as used in all sections of the Electronic Industry.

PERMANOID's manufacturing program includes: SOLID & EXPANDED POLYTHENE low-loss co-axial cables, GRADE VO high-temperature insulated wires of high dielectric strength and resistivity, SHIELDED PVC covered single and multi-core as well as SHEATHED cables of great flexibility, SLEEVINGS and SCREENED LEADS for electronic communication equipment.

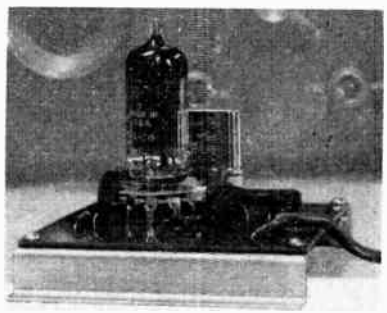
Illustrated folders giving detailed technical specifications on all PERMANOID products are obtainable upon request from their Canadian representatives:

Messrs. Musimart of Canada Ltd., Electronic Division, 901, Bleury St., Montreal, P.Q.

Printed Circuit Oscillators Guarantee Spot Frequency Tolerances

Item 775

International Crystal Manufacturing Company, Inc. of Oklahoma City is now marketing a series of printed circuit oscillators for use where close predetermined tolerances are desired. Since the user cannot vary the wiring layout or tuning, the unit can be purchased in kit form with the assurance that certain tolerances can be obtained with proper crystals. The series,



known as the FO-1 oscillator, covers the range 200 KC to 60 MC. The FO-1 unit covers the range 200 KC to 15 MC using fundamental crystals, and the FO-1B covers 15 MC to 60 MC with overtone crystals. The FX-1 crystal must be used with oscillator to obtain the correct frequency tolerance. The FX-1 is calibrated for the FO-1 and FO-1B circuit characteristics.

This oscillator is excellent for standard marker use, and may be adapted to old equipment to obtain close crystal control operation. Available with tolerances as close as .001 per cent, the oscillator and companion crystal are exceptionally low priced to the user. Sold directly by International Crystal, full details are available for the asking.

International Crystal Mfg. Co., Inc., 18 N. Lee, Oklahoma City, Okla. Phone FO. 5-1165.

Leadcast

Item 776

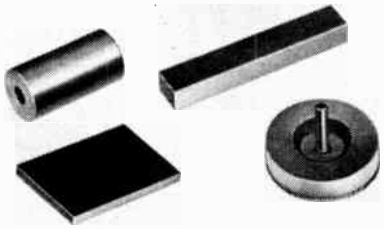
Telectro Industries Corp. has developed a new plastic material, LEADCAST, suitable as shielding for radioactive materials.

Telectro has developed both LEADCAST and methods for precision molding of the material. LEADCAST, a plastic compound, containing 95 per cent lead, is harder than pure lead, and has a structural rigidity greater than pure lead, and has a structural rigidity greater than pure lead. LEADCAST may be molded with any structural members with excellent bonding results. It can be molded into a variety of shapes with an as-cast tolerance of ±.0005 of an inch and with a surface that requires no finishing and is inert to oxidation or other corrosive contamination.

The amount of lead in LEADCAST can b evaried to 95 per cent by weight, and hardness can be controlled from

that of a semi-rubber like material to that of cast pure aluminum. For special purposes such a selective absorption of radio-activity or increased shielding effects, the metallic constituents may be any metal, mixture or compound.

Tests have indicated that the material has excellent shielding characteristics and a practical economical utility not found in materials now in use. LEADCAST will find use in such applications as:



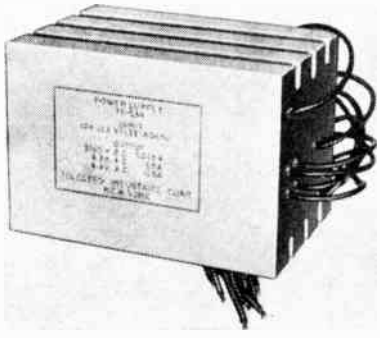
1. Source containers for high energy radiation sources with metal components molded in.
2. Housing shielding on various instruments.
3. Special shipping containers for isotopes or fissionable materials.
4. Standard construction sizes from a wall tile to 4 by 8 foot panels.
5. Interlocking bricks for temporary or movable shielding.

Our engineering staff is available for discussion of possible applications of LEADCAST and will provide pilot-production samples at your request. **Telectro Industries Corp., 35-16 37th Street, Long Island City 1, New York.**

30 Watt Encapsulated High Voltage Power Supply

Item 777

TELECTRO announces the introduc- SUPPLY, suitable for aircraft installation of the new Telectro ENCAPSULATED HIGH VOLTAGE POWER lations, to meet the requirements of Spec. MIL-E-5400. The power supply operates from a 115v a-c 400 cycle source, and delivers 5.1 KV at 7.5 m.a.



as well at 6.3v a-c at 1.5 amps and 6.3v a-c at .5 amps.

THE HIGH VOLTAGE POWER SUPPLY features an unique application of the encapsulating techniques developed by Telectro Industries. The high voltage transformer, full-wave bridge selenium rectifiers, filter capacitor and bleeder resistors are all encapsulated in one easy-to-install package.

TELECTRO's new encapsulating techniques assure reduction in size and weight and eliminate the hazards of corona especially at high altitudes. A special feature is the fin construction which assures a minimum temperature rise due to internal heating effects.

ENCAPSULATED HIGH VOLTAGE POWER SUPPLY will operate over the range of —62°C (—80°F) to +85°C (185°F) with good regulation.

The 30 watt unit illustrated, complete with all components measures 4 x 4 x 6 inches and weighs less than 6½ lbs.

TELECTRO ENCAPSULATED HIGH VOLTAGE POWER SUPPLIES are available in a variety of voltage, current, wattage and frequency combinations to meet your particular requirements.

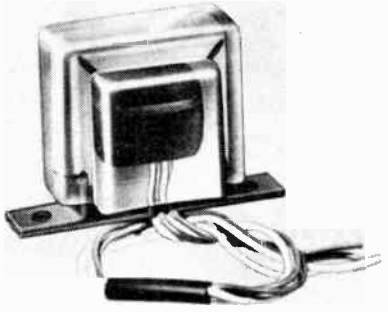
Additional data may be obtained by writing to:

Telectro Industries Corp., 36-16 37th Street, Long Island City 1, N.Y.

"Telectran" Encapsulated Transformers

Item 778

Through the use of an exclusive encapsulation process, Telectran makes the conventional metal-cased hermetically sealed transformer obsolete. Designed to meet the most stringent requirements of temperature cycling



immersion and moisture tests Telectran is custom-manufactured in both pilot-run and production-run quantities to suit your audio, power and low frequency R.F. needs. Lighter, smaller and less expensive, Telectron meets U.S. Signal Corps Engineering Laboratories (SCEL) approval, and fulfills all requirements of MIL-T-27 Grade 1, Class A Specifications. Leads are sealed, flexible and waterproof. Can be supplied with solder terminals.

Telectro Industries Corporation, 35-16 37th Street, Long Island City 1, N.Y.

Accelerometer

Item 779

A new lightweight, extremely sensitive accelerometer has been developed by Daystrom Pacific Corporation, Santa Monica, California, for use in the aircraft and guided missile fields.

The compact design features ruggedness and durability without mass, which make the instrument ideally suited to installations where space and weight are of primary importance.

The instrument has a relatively high acceleration range, and exceptionally good damping characteristics for its size.

Available in production quantities, this sturdy, reliable instrument should prove the answer to aircraft and missile accelerometer problems.

Further information and specifications may be had without obligation by writing the manufacturer's representative:

Electromechanical Products, Box 105, St. Thomas, Ontario.

Aircraft Radio Corporation Model 3 A.M. Mobile Unit

Item 780

Designers and Manufacturers of Airborne Communication and Navigation Equipment and Associated Test Equipment.

Sole Canadian Representative is: **Anthony Foster & Sons, Toronto, Ont.**

Slip Ring Assemblies

Item 781

Fire Control, telemetering, strain gauge, thermocouple, servo motors, or special purpose electro mechanical devices often require slip ring circuits. Makepeace, the largest United States slip ring manufacturer, offers both custom designed self contained units, tailored to meet special specifications, and standard off the shelf assemblies, at great savings in tooling and design. Speeds in excess of 20,000 RPM, noise levels below 64 DB, 500 or more circuits, DC through 100 MC.

D. E. Makepeace Company, Division of Union Plate and Wire Company, Attleboro, Mass.

Toroidal Coil Winder

Item 782

Here is a machine that permits substantial savings in time, labor and wire. The Arnold winder sets up quickly . . . is easy to operate, and takes a wide range of wire sizes.

Specifications include: min. finished hole size: .18 in.; max. finished toroid OD: 4.0 in.; winding speed: 1500 turns per minute; wire range: AWG 44 to AWG 26; dual, self-checking turns counting system; loading (wire length) counter; core range: ¼ in. ID to 4 in.

OD to 1½ in. high. In laboratory use the Arnold winder changes wire and core size, too, in 45 seconds. For production use, it winds 1500 turns per minute. Operator can insert core and load the machine in 20 seconds. Literature sent on request to:

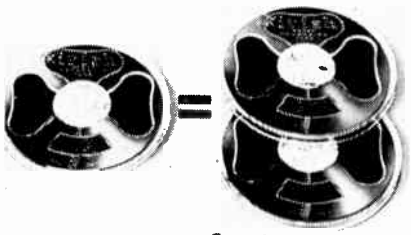
Arnold Magnetics Co., 5962 Smiley Drive, Culver City, California, U.S.A.

Double-Play Tape . . .

Item 783

A completely new magnetic recording tape that will double the playing time over standard recording tape has been announced by ORRadio Industries, manufacturers of IRISH Brand Magnetic Recording Tape. The new tape will be known as IRISH Double-Play Recording Tape, No. 7-2400.

All of the opera, all of the sports or news events can now be recorded on IRISH Double-Play Tape without having to change reels because of 100 per cent increase in playing time. Up to four hours can be recorded without a reel change at 1⅞ speed, and eight hours dual track.



One 7 Reel of New Irish *Double-Play* Tape Has As Much Playing Time – 2400 Feet – As Two 7 Reels of Ordinary Tape!

For the first time, 2400 ft. of magnetic tape is available on the 7 inch reel, which is the largest reel popular and medium priced tape recorders can normally accommodate. Now all tape recorder owners can enjoy professional 2400 ft. tapes on standard tape recorders. No longer is it necessary to buy adaptors and tricky attachments to get professional recording time, explained J. Herbert Orr, President of ORRadio.

The new IRISH Double-Play Tape gets 100 per cent increase in playing time by 2400 ft. instead of 1200 ft. of tape on a 7 inch reel. This is made possible by the use of .5 mil Mylar, the new miracle DuPont film, the strongest film yet developed for magnetic tape. Mylar is virtually tear resistant, is unaffected by temperature extremes, and cannot dry out and embrittle with age.

The new tape will be manufactured by the exclusive Ferro-Sheen Process, developed by ORRadio. This results in a super-smooth surface which greatly reduces head wear, shedding of oxide, and makes better head contact, which improves frequency response.

The price of the new Double-Play Tape is $7.50 hi-fi net for the 2400 ft. reel.

ORRadio Industries have been American pioneers in the development of magnetic tapes and are the world's largest exclusive manufacturer of recording tapes.

ORRadio Industries, Inc., Shamrock Circle, Opelika, Alabama.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

West Coast Electronics Co. Model 3 AM Mobile Unit

Item 784

Developed especially for long-distance voice communication among vehicles and designed to withstand desert heat and rough terrain, the West Coast Electronics Co. recently introduced its Model 3 A.M. Mobile Unit, a transmitter-receiver for operation in the 148 to 174 megacycle frequency range.

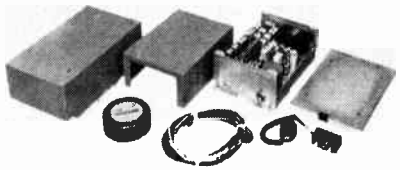
The transmitter delivers 20 watts output and employs speech clipping to give exceptional articulation in the presence of noise.

Unusual sensitivity is provided in the receiver to permit detection of distant signals; the minimum detectable signal level is at least 31 db below one micro-microwatt. Automatic volume control maintains the receiver output constant at r.f. input levels up to 50,000 microvolts.

The receiver delivers up to two watts of audio signal power. A noise clipper and an adjustable carrier-operated squelch circuit minimize noise output.

Transmitter and receiver are crystal controlled; the frequency stability of 0.003 per cent insures accurate netting of units operating on the same channel. Transmitter and receiver can be operated on the same frequency or different frequencies.

The unit transmits and receives amplitude modulated signals.



The unit is packaged for installation in car, jeep or truck, and operates from a six volt storage battery supply; it can be supplied for 12 volt operation on special order. Microphone, speaker, control panel and whip antenna are included in the basic unit. A weatherproof cover can be supplied if required.

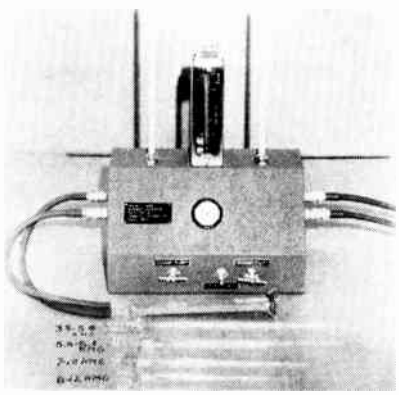
West Coast Electronics Company, 5873 West Jefferson Blvd., Los Angeles 16, California.

Microwave Calorimetric Wattmeter And Load

Item 785

Accuracy of microwave power measurement improves twenty times from 2 db down to 2 per cent by calorimetric techniques to directly handle and absorb average power at its natural level independent of peak power.

The passage of liquid through transparent loads exposed to microwave energy absorbs power as a temperature rise. Temperature change in degrees C multiplied by flow rate in cc/minute directly computes to calories per minute. Each 14.334 ca./min. is an ABSOLUTE WATT OF POWER.



27 new features during post Korean period has reduced weight, size and cost four-fold as well as extending frequency and power coverages for single instrument.

Widely used in USA and Canada to measure or absorb power without space radiation, quality control, maintenance, instrument calibration etc. Information available from:

Chemalloy Electronics Corporation, Santee, California.

Variable Frequency Power Supply

Item 786

The new Vectron VFS-250 Variable Frequency Power Supply is a compact, self-contained, semi-portable source of 45 to 2000 cycle alternating current with available output up to 300 volt-amperes. Extreme flexibility makes this frequency changer suitable for:

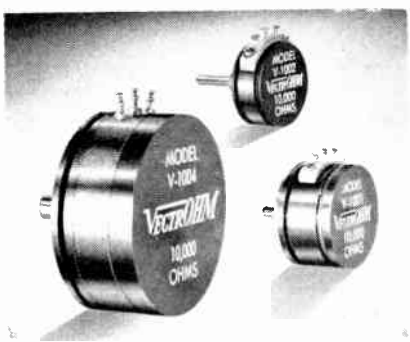
(1) testing airborne electronic amplifiers, transformers, inductors and export equipment; (2) powering choppers, vibrators, vibrator shakers and magnetic amplifiers; (3) controlling synchronous motors and processing equipment:

Vectron, Inc., Waltham 54, Mass. Canadian Representatives: R-O-R Associates Ltd., 290 Lawrence Ave. W., Toronto 12, Ont.; Ron Merritt Co., 229 Rogers Bldg., Vancouver, B.C.

New Vectrohm Standard Potentiometers

Item 787

The new Vectrohm standard line of precision wirewound potentiometers provides, at moderate cost, the mechanical precision and electrical characteristics of "custom" potentiometers. Available in a choice of 16 resistance values from 10 ohms to 100,000 ohms



for each of four diameters:, $\frac{7}{8}$", $1\frac{1}{16}$", $1\frac{5}{8}$" and 2", Vectrohm standard units cover a wide range of applications. In addition, a full line of "custom" styles is offered to meet exact military and customer specifications:

Vectron, Inc., Waltham 54, Mass. In Western Canada, Ron Merritt Co., 229 Rogers Bldg., Vancouver, B.C.

P.P. Output Transformer For High Quality Audio Equipment

Item 788

The P.L.2 is a "C" core, push-pull output transformer manufactured by Partridge Transformers Ltd. Designed for use in high quality audio frequency reproducing equipment, it reproduces the full a-f range with very low distortion and the characteristics are such that a large degree of negative feedback can be taken from the secondary and fed into a point three or four stages back. Each half primary is brought out to terminals as a separate winding and is tapped at 43% of the turns. The transformer uses grain-orientated strip wound cores and is hermetically sealed in deep drawn metal case of attractive and purposeful design.

The performance figures given below apply to the 10-12 Kohm rimary transformer working in a resistive circuit of 5,000 ohms source and 10,000 ohms referred load; therefore they do not include distortion introduced by valve stages or include reduction of

overall distortion by negative feedback.

Power Rating:
50 watts at 60 cps and 14 watts at 30 cps for less than ½% distortion.

Frequency Characteristic:
Flat within ± ½ db between 30 and 30,000 cps.

For full details of the U.L.2, prices, etc., write to the Sole Canadian Distributors:

Atlas Radio Corporation Ltd., 50 Wingold Avenue, Toronto, or direct to the manufacturers: Partridge Transformers Ltd., Tolworth, Surrey, England.

Resistance Thermometer Elements—Rapid Response . . . Amazing Accuracy RdF Stikon

Item 789

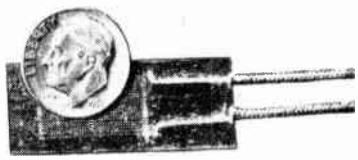
Intended for surface temperature measurement and control, and RdF Stikon consists of a temperature-sensitive grid of very fine nickel wire bonded into a paper-thin wafer of flexible insulating material. Attached by cement to almost any surface anywhere, and RdF Stikon is unaffected by shock or vibration. The response is extremely fast and accurate.

Features of RdF Stikons:

BN-1: Response fits curve defined by A-N Specification MIL-B-7990.

BN-3 & BN-4: Similar to BN-1 but smaller in size. Response curve differs from BN-1.

PN-1 & PN-2: Paper construction for low cost.



SN-1: High-temperature element.

SUMMARY OF CHARACTERISTICS

Type	Resistance at 70°F. (ohms)	Temperature Range F*
BN-1	81.7	—100° to +300°
BN-3	50.	—100° to +300°
BN-4	200.	—100° to +300°
PN-1	50.	—100° to +180°
PN-2	200.	—100° to +180°
SN-1	100.	—100° to +500°

*For continuous operation — may be used intermittently at higher temperatures. See RdF Stikon Brochure T-54.

Type	Wafter Material	•Size (Inches)
BN-1	Bakelite	½ x 1½ x .005
BN-3	Bakelite	$\frac{5}{16}$ x ¾ x .006
BN-4	Bakelite	$\frac{9}{16}$ x ⅞ x .006
PN-1	Paper	$\frac{5}{16}$ x ¾ x .006
PN-2	Paper	$\frac{9}{16}$ x ⅞ x .006
SN-1	Silicon-Glass	$\frac{9}{16}$ x $1\frac{7}{16}$ x .010

Types BN-1, BN-3 and PN-1 are marked to 0.2 ohms, while types BN-4, PN-2 and SN-1 are marked to 0.5 ohms.

In addition to the standard RdF Stikons tabulated above, Arthur C. Ruge Associates, Inc. manufactures special resistance thermometer elements tailored to specific customer needs.

Write today for RdF Stikon Brochure T-54 to:

Arthur C. Ruge Associates, Inc., 733 Concord Ave., Cambridge 38, Mass.

Heavy Duty Size D Ignitron

Item 790

National Electronics, Inc., Geneva, Illinois, U.S.A. has developed a heavy duty size D ignitron, NL-1053, for resistance welding control. It incorporates two design features which are firsts in the manufacture of sealed ignitrons: (1) internal cooling coil, (2) repairability.

Water cooling is provided by an internal stainless steel cooling coil. The close proximity and increased cooling surface of this coil increases cooling efficiency to give long life at heavy duty operation.

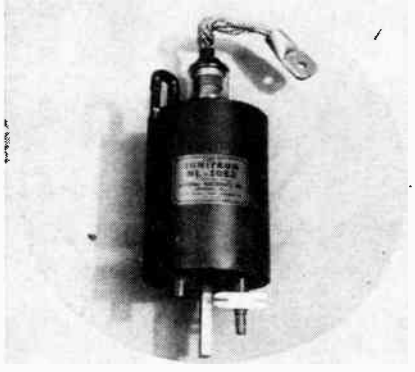
(Continued on page 104)

(Continued from page 103)

The heliarc welded construction was developed to permit repair or rebuilding. Used tubes can be rebuilt at considerably reduced cost and are resold with a new tube warranty. These two factors provide a saving in both down time and cost of replacement tubes.

The diameter of the NL-1053 has been increased to 7" to permit a 50% increase in anode size which results in lower operating temperature. Lower anode temperature, increased cooling of the internal coil, and a deionization baffle combine to reduce arcbacks and give more stable operation.

The water connections are brought forward at a 45° angle so that the tube requires very little more space than the smaller conventional size D ignitrons and can be used as replacements in existing equipments. The heavy duty construction and increased heat capacity of the NL-1053, permits a maximum averaging time double that



of the conventional construction size D ignitron.

The thermostat mounting plate is connected through a short copper block to the bottom of the tube. A thermostat mounted on this plate will sense the true temperature of the tube and mercury pool. Thermal flow switches and their unnecessary troubles due to low pressure water supply, fluctuating or irregular water flow, or warm cooling water can be eliminated. A protection thermostat mounted on the mounting plate will shut down the equipment only when tube temperature endangers the ignitron. As the cooling water does not come in contact with outer wall of the tube, condensation and consequent damaging drip is eliminated.

A water-saver thermostat on the other ignitron can be used to obtain maximum water saving. Its operation during down periods can save unnecessary water flow and decrease condensation on plumbing fixtures.

For additional information on thermal ignitrons and industrial thyratrons and rectifiers write:

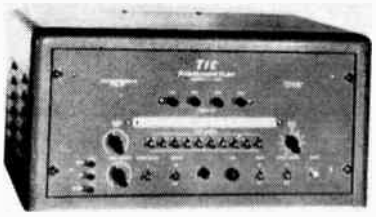
Joe S. Kirk, National Electronics, Inc., Geneva, Illinois, U.S.A.

Video Sweep Generator

Item 791

A new high output level precision Video Sweep Generator has been developed by the Tel-Instrument Electronics Corporation and is being offered for sale throughout Canada through the Atlas Radio Corporation of Toronto, Ontario.

The Type 1105 is a Video Sweep Generator with high output and very low harmonic distortion, intended for the observation of frequency versus



amplitude characteristics of wide band circuitry, such as video amplifiers and filters. It is ideally suited for color television, providing a video frequency sweep from 50 kc to 10 mc and having an RF output adjustable from 1 millivolt to 2.0 volts peak-to-peak into a 75 ohm load from a 75 ohm source.

The RF output signal may be attenuated from 0 to 63 db by means of a pushbutton attenuator with 20 db, 20 db, 10 db and 3 db steps in addition to a continuously variable 0-10 db attenuator.

Ten crystal-controlled frequency markers are provided to indicate 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 mc points. At the customer's option, a maximum of 10 special crystal markers can be furnished instead.

The Tel-Instrument Electronics Corporation also manufactures a complete line of the latest design color signal generating equipment for factory and broadcast studio use.

Tel-Instrument Electronics Corporation, 728 Garden St., Carlstadt, N.J.

Speedy-Cal Foil Metal Nameplates

Item 792

These radically-new nameplates are easily fastened to curved as well as flat surfaces without the need of drilling holes, and they permanently adhere to such surfaces as porcelain, glass, bakelite, wood and metal. Available in many attractive, sparkling colors — such as gold, red, yellow, green, black, blue and a host of other shades as well as clear aluminum — they will not crack, peel, chip or tarnish. They are extensively used on aircraft, electronic and communication equipment and meet most all applicable specifications for commercial as well as government work. Made for nameplates, circuit diagrams, terminal designations and a multitude of other uses, they are only .003 foil and laminated with the newest and finest bonding material. They are anodized, etched, and inexpensive. Free samples are offered plus a free Speedy-Cal decimal equivalent chart. It is possible to serialize them in any typewriter. Catalog available.

For speedy service write, wire or phone: **North Shore Nameplate Inc., 214-27 Northern Blvd., Bayside 61, N.Y., BAyside 4-4000.**

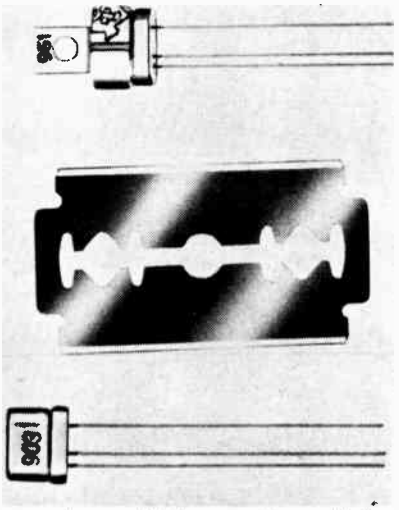
Texas Instruments Marks Full Year As Lone Silicon Transistor Manufacturer, Ups Line From 5 To 7 Types

Item 793

Marking a full year as the exclusive commercial producer of transistors made from silicon, Texas Instruments Incorporated has announced further expansion of its line from five to seven types of n-p-n grown junction silicon transistors. During the year, TI has voluntarily reduced prices twice — once by 25% — to encourage the application of silicon transistors.

Texas Instruments silicon transistors have found wide application in airborne military and complex commercial electronic equipment. Since commercial introduction in May of 1954, steadily increasing production has allowed TI to broaden its line *three* times.

Many manufacturers — including Texas Instruments, which is the largest producer of germanium radio frequency units — make transistors from



germanium, which operates satisfactorily to 65°C (149°F). Silicon transistors will operate satisfactorily to 150°C (302°F).

The new types 951, 952, 953 are medium power silicon transistors and are improvements on the superseded Type X-15. They can produce a power gain of 30 db, supply up to 1 watt of Class B power, and be operated up to 150°C.

The other four silicon transistor types (903, 904, 904A, 905) in the exclusive Texas Instruments line are classified as small signal units. Three current amplification ranges are avail-

able. The minimum alpha in each range is 0.90, 0.95, and 0.975. One type has a minimum alpha frequency cut-off of 8 mc.

Texas Instruments has been able to repeatedly add new models and make substantial price reductions as a result of improved manufacturing techniques. Current production capacity — aided by a recently completed plant extension just for semi-conductors—enables silicon transistors to be delivered in unlimited quantity.

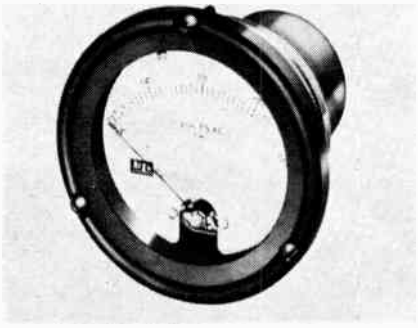
For additional information and prices, write:

Dep't. KP, Telex, Inc., Telex Park, St. Paul 1, Minnesota. Mention this publication.

A.C. Expanded Scale Panel Voltmeter

Item 794

A.C. voltage readings accurate to .5% over the frequency range of 50 to 2000 cps are obtained with the new Expanded Scale Panel Voltmeter manufactured by Arga Division of Beckman Instruments, Inc. Use of a thermal bridge permits the indication of a narrow voltage range. The scale is expanded about a given normal



voltage which may be as low as 6.25 volts with a span of ±0.25 volts, or as high as 230 volts with a span of ±30 volts. A complete line of 3½" and 4½" diameter models is supplemented by square (3½") and rectangular (4 x 6") models. Hermetically sealed and ruggedized models offer extreme durability under exacting conditions.

Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

Microwave And Ultramicrowave Equipment

Item 795

The newest in microwave equipment for 2.6 to 18 KMC is offered by DeMornay-Bonardi, leaders in microwave instrumentation for 14 years. This company will aid Canadian research organizations in planning systems, setting up test equipment, and developing special units. Their equipment is outstanding in precision, dependability, and operating ease.

DeMornay-Bonardi is the first to supply, in addition, a complete line of accurate, reliable research instruments for ultramicrowave frequencies with continuous coverage up to 90 KMC, and engineered for extremely high precision. This line includes

standing wave detectors, precision attenuators, phase shifters, tuners, crystal mounts, wavemeters, horns, terminations, couplers, as well as crystal multipliers to produce required frequencies above the range of currently available tubes.

The company also supplies microwave spectroscopy equipment up to 90 KMC, including absorption cells, Stark and Zeeman cells. For information write to:

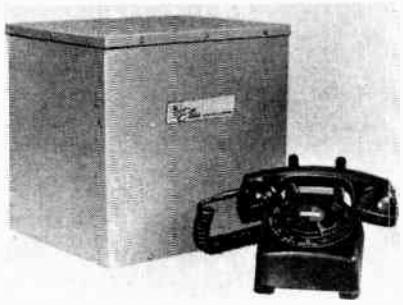
DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, California, U.S.A.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Low Cost Automatic Dial Telephone Intercom

Item 796

Six standard models. Can be installed in minutes. Only two wires from each phone to exchange, then plug into convenient outlet and you are ready to dial. No maintenance problems. No batteries. No buttons to



push! 10 phone exchange, list $194.50, Montreal. Write for descriptive literature or free ten day trial:

Canadian Distributor: Electronic Communications Limited, P.O. Box 88, Station "O", Montreal. Manufactured by: Bliss Electronic Corp., Sussex, N.J.

New Varian Klystron For Airborne Radar Applications

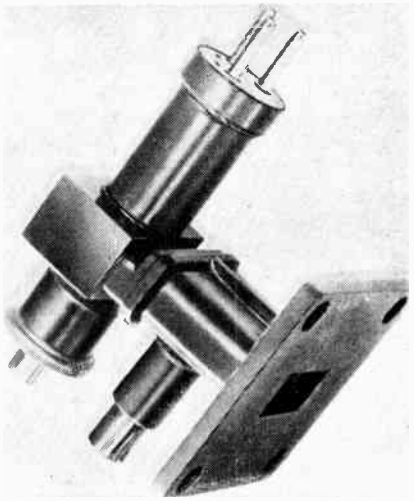
Item 797

A new, low-cost reflex klystron, the VA-203, featuring superior frequency stability for airborne X-band radar receiver and beacon local oscillator service has been introduced by Varian Associates of Palo Alto, California.

Claimed to be the most advanced klystron ever developed for airborne applications, the VA-203 features a unique, brazed-on external tuning cavity to assure exceptional frequency stability. The new klystron is able to withstand shocks of 50 to 100 g's without malfunction or damage.

Among its exclusive characteristics are negligible microphonics, slow tuning rate, long tuning life and a single shaft tuner which adapts easily to motor tuning. Weighing only eight ounces, the low-cost VA-203 mates directly to standard wave guide flanges.

In connection with the introduction of the VA-203, the manufacturer has announced a companion klystron —



the VA-201—for super-rugged service. Equipped with silastic leads, the VA-201 klystron resists shocks as high as 250 g's and performs with the same dependability as the VA-203.

Complete technical data and specifications on the VA-203 and its companion klystron, the VA-201, may be obtained by writing to:

Applications Engineering Department, Varian Associates, 711 Hansen Way, Palo Alto 2, California.

Hardware For Electronic Equipment

Item 798

Quick and sure delivery is assured for thousands of standard or special items used in the electronic industry, such as SCREWS, NUTS, WASHERS, TERMINALS, GROMMETS, RIVETS, EYELETS and ACCESSORIES from Federal Screw Products, Inc. This company also is equipped to supply special cold headed products, Stampings, Screw Machine Parts, made to order in all metals.

Write for catalog 54 to:

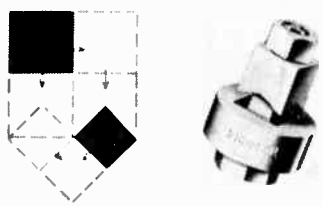
Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Illinois.

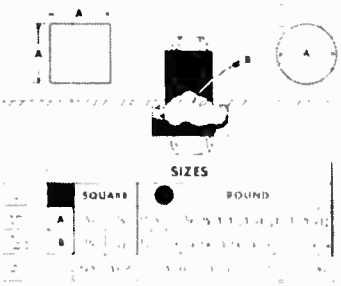
Walsco Electronics Corporation

Item 799

Walsco Electronics Corporation, world famous manufacturer of Electronics products, the most complete

line of its kind, have announced a new product, the "HAM-R-PRESS". This precision punch is the easiest way to cut an exact, clean mounting hole for any electronic part — without drilling.





Another "first" by Walsco is their new *complete* line of Phono & Recorder Drives — the last word in modern merchandising.

For full particulars, write:

Atlas Radio Corporation Limited, 50 Wingold Avenue, Toronto 10, Ontario.

Saxonburg Ceramics

Item 800

Canadian Government approved SAXONBURG CERAMICS Steatite for High frequency insulation, resistor forms, bushings and special shapes to your specifications.

Saxonburg Ceramics, Saxonburg, Pa., U.S.A.

Model SC-2 Loral Sweep Calibrator

Item 801

Applications

The Loral Model SC-2 Sweep Calibrator was developed for the purpose of oscilloscope time base calibration. The Sweep Calibrator is a compact, versatile unit and has many applications including the following:

a. SWEEP TIME CALIBRATION
b. MARKER GENERATOR
c. COUNTER AND COMPUTER CALIBRATOR
d. FREQUENCY MEASUREMENT
e. RECTANGULAR PULSE SHAPER
f. FREQUENCY RESPONSE ANALYSIS

Sweep Calibrator Features:

The Loral Sweep Calibrator has been designed for simple operation and ease of adjustment. Additional features include the following:

a. Compact, lightweight: 8¼ x 8½ x 14"; 10 lbs.
b. Stable operation without the need for recalibration.

c. High harmonic content; may serve as wide range frequency standard.
d. Built to military standards; quality components throughout.
e. Extreme versatility for general laboratory and test application.
f. Printed wiring insures uniform quality and consistent operation.
g. Panel markings color-coded for functional indentification.
h. Output wave forms graphically marked adjacent to associated jacks for rapid identification.

Sweep Calibrator Characteristics:

The Loral Model SC-2 Sweep Calibrator produces narrow marker pulses 0.1 microseconds wide, spaced at crystal controlled intervals of 1, 10, 100, 1000 and 10,000 microseconds. Pulse spacing is selected by the MARKER Switch on the front panel.

Facility for increasing the pulse widths to enable presentation on oscilloscope displays of long time base is provided by the front panel STRETCH switch.

Crystal controlled 1 Omc, 1 mc, and 100 Kc sine waves are provided through a separate rf output jack on the front panel. Selection of marker or rf outputs is made by means of the front panel MARKER switch.

Rectangular output pulses are simultaneously available at crystal controlled frequencies of mc, 100 Kc, 10 Kc and 100 cps. Selection is controlled by the SHAPER switch.

The output of any signal generator may be shaped into rectangular pulses by connecting to the SHAPER IN jack. The output will appear at the SHAPER OUT jack.

The amplitude of the marker outputs is continuously adjustable by means of the MARKER LEVEL control. The output level at the MARKER OUT jack is three volts minimum into 93 ohms.

The marker, rf and rectangular pulse outputs are normally available simultaneously from separate output jacks.

The Loral Sweep Calibrator is completely self-contained and operates on 115 volts ac, 50-420 cps. Power consumption is 50 watts. Shipped complete with rf output cable, tubes and crystals.

The decade arrangements of pulse-spacing scales may be used for checking scalers and computers of various types.

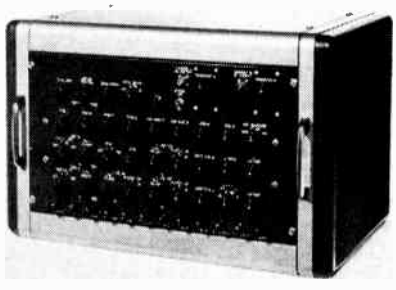
Loral Electronics Corporation, 794 East 140th Street, New York 5, N.Y.

Pulse Signal Simulator

Item 802

HRB Model 60. 3-01 Pulse Signal Simulator is designed to simulate typical radar signals and other signals as training aids, or for use as a piece of test equipment. Radars using conical, sector or circular scanning (as well as those using lobe switching) may be simulated. Various types of pulse transmissions may be simulated, including pulse position, width or frequency modulation.

The pulse repetition frequency may be varied from 20-20,000 p.p.s.; the pulse width from 1-100 usec. and time from 0-100 usec.



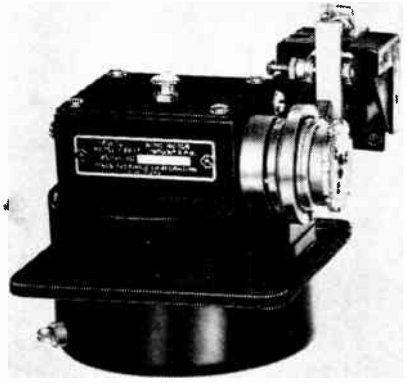
The video outputs may be taken directly from the unit or used to modulate internal oscillators whose frequency coverage is from 55 to 215 mc.

Haller, Raymond & Brown, Inc., State College, Pennsylvania.

Synchronous Motors

Item 803

Times Facsimile Corporation synchronous motors provide power with negligible hunting at precise speed through the range of 400 to 5000 rpm. This characteristic makes them ideal for use in facsimile equipment, Time base recorders, interval recorders, sonar depth recorders, frequency converters and chronometers. The motors are designed to operate efficiently from vacuum tube amplifiers at frequencies from 200 cps to 2500 cps, with an output of approximately 1/100 h.p.



Model KBA synchronous motors are salient pole (phonic wheel) variable reluctance motors. The design employing a sixty-pole rotor limits the instantaneous angular shaft error caused by load or voltage changes to ±0.1 degree. The windings will carry 80 ma continuous duty. The voltage across the winding will vary with frequency; the upper limit for the applied voltage is 1000 v rms continuous duty.

The model KBA has an integral start motor that operates on 110 v AC, 60 cycles. Ordinarily the motors are provided with reduction gearing. Ratios of 20:1 and 30:1 are stocked. Many other ratios and motors having no reduction gear can be supplied on special order. Complete information will be mailed promptly on request.

Times Facsimile Corporation, 540 W. 58th St., New York 19, N.Y., U.S.A.

Precision Deposited Carbon Resistors

Item 804

Allies' Products precision deposited carbon resistors are the standard of many computer, aircraft, and missile manufacturers in circuits requiring high precision at low cost. From the tiny 1/10th watt to the 5 watt unit the temperature coefficient and humidity characteristics are the best in the field. These resistors conform to military specifications. Both axial and radial leads are available on the ½ watt to 5 watt units. Non-inductive 1% resistors, and moisture-proof units with silicone fibre sleeves available.

Kerr-Machin Associates, P.O. Box 34, Station K, Toronto 12, Ontario.

Kay Lab Instruments

Item 805

ABSOLUTE DC POWER SUPPLIES and METER CALIBRATORS
—Dial voltage on decade switch to .02%.

MICROVOLTMETERS
—100μv full scale to 100 v full scale.
—100μμa full scale to 100 ma full scale.

DC and AC DECADE AMPLIFIERS
—High feedback insures accurate gain.

LOW COST TV CAMERA CHAINS
—For studio or field use.

CLOSED CIRCUIT TV FOR INDUSTRY
With a complete line of accessories.
—Remote control of camera and lens.
—Microscope adapter.
—10, 17, and 21-inch remote monitors.

LOGATENS
—Output is logarithmic function of input.

Special Precision Instruments.

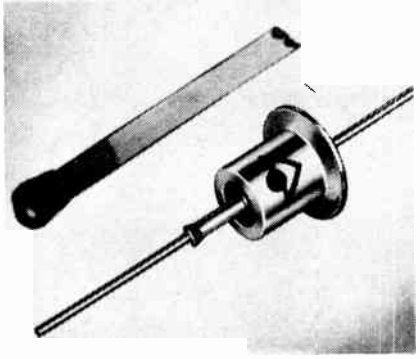
Kay Lab, Box 16, San Diego 12, California. Canadian representative — Atlas Radio Corp., Toronto, Ontario.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Diffused Junction Diodes Germanium Units For Power Use

Item 806

INTERNATIONAL RECTIFIER CORPORATION has released a new line of germanium diffused junction power diodes. These diodes are designed for high rectification efficiency, minimum leakage and an operating temperature range of —55°C to +75° C. They feature a completely hermetically-sealed housing, consisting of



glass-to-metal and welded metal-to-metal seals throughout; no solder or fluxes are used in their construction.

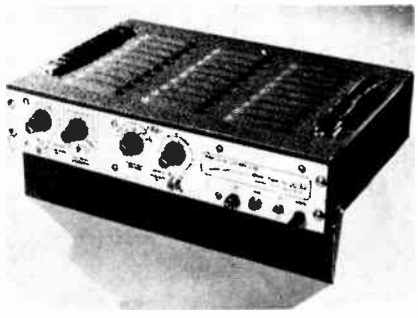
Standard JETEC types, such as IN91, IN92, and IN93 are now available through:

Atlas Radio Corporation, 50 Wingold Ave., Toronto 10. For special types, contact the manufacturer.

Model 3420A Pulse Oscillator

Item 807

The ELECTRO-PULSE, INC. Model 3420A PULSE OSCILLATOR features a wide range of pulse spacing from .03 microsecond (3.3 megacycle repetition rate) to 11,000 microseconds (90 cycle repetition rate) in five ranges. The basic oscillation period is set up by a specially designed multivibrator which has several feed-back paths. Two output blocking oscillator pulses



—either of which can be positive or negative — are available from the front panel, spaced by the half period of the multivibrator oscillator. These pulses are .1 microsecond wide above 100 KC, and widen out to approximately .5 microsecond below 100 KC, with an impedance level of 250 ohms, or below, and with variable amplitude to 25 volts open circuit. The output pulses may be mixed externally to obtain combinations of positive, then negative pulses for applications where set and reset triggers of opposite polarity are needed.

Typical applications for this instrument are flip-flop resolving time studies, clock pulse generators, test and development of high speed circuitry, magnetic core set and reset triggers, and wide range trigger source.

Write for detailed bulletin to:

Electro-Pulse, Inc., 11861 Teale Street, Culver City, California.

Model 5000A Pulse Code Generator

Item 808

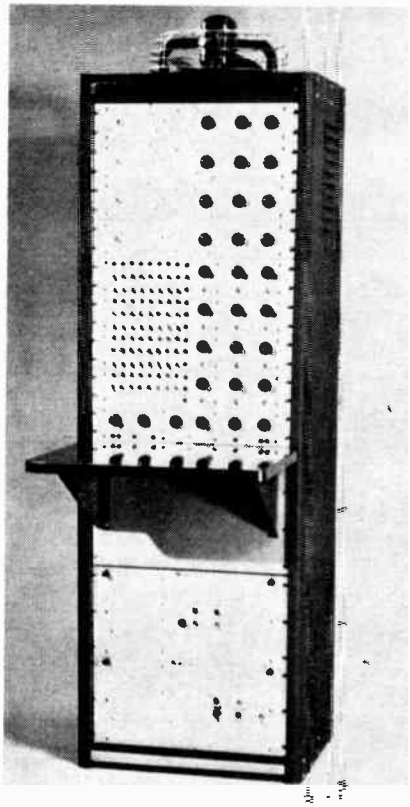
The ELECTRO-PULSE INC. Model 5000A PULSE CODE GENERATOR features a four channel constant current output which is controllable in 100 megacycle steps with a fill-in in between from 100 milliamperes to 1.1 amperes per channel. Two of the output channels are Positive Current and two are Negative Current with the base line at ground potential. Constant current is assured by a sampling and feedback technique with each channel entirely independent of the other. An independent rise time control is placed on each output channel. Each channel can be used independently of the other, or can be mived to obtain a wide variety of pulse shapes.

(Continued on page 108)

(Continued from page 107)

The circuitry used in the other block unitized units is as follows:

A clock pulse generator is used to trigger a scale-of-eight counter which, in turn, is controlled via another flip-flop and time delay generator. This circuitry allows one to repeat two of the basic eight intervals generated by the scale-of-eight as many times as one desires by varying the ratio of the clock pulse interval to the delay interval. These pulses are fed to a GATED PULSE WIDTH CONTROL UNIT which has a three position switch for each of the basic clock



intervals G1 through G8. The gating here is such that on DIRECT CHANNEL the clock pulse triggers a one shot multivibrator in accordance with the switch giving a variable width pulse at the clock pulse time. On DELAYED CHANNEL the clock pulse triggers a delay multivibrator in accordance with the switch which, in turn, triggers a pulse width control multivibrator. The third position is an off position. These pulses now control the current output channels.

This unit can be used to set up almost any sequence of pulses for core testing, data handling, countermeasures, beacon testing, and transistor testing.

Electro-Pulse, Inc., 11861 Teale Street, Culver City, California.

Wornow Printed Circuit Materials

Item 809

A solderable conductive silver ink for screen printing application. Cured by low temperature (300°F.) bake. Excellent bond strength to variety of insulating bases.

Combination resist and flux for etched circuitry. Eliminates need to remove resist, clean copper and apply flux.

Conventional silk screen resist available in Canada through:

The E. Harris Company, 73 King St. E., Toronto.

Industrial Metallic Rectifiers

Item 810

The complete line of INTERNATIONAL RECTIFIER CORPORATION, the World's Largest Supplier of Industrial Metallic Rectifiers, is available through Atlas Radio Corp., 50 Wingold Ave., Toronto 10. The Selenium products, with power ratings from microwatts to thousands of kilowatts, and with efficiencies up to 87%, include: industrial power rectifiers, diodes, high voltage and hermetically-sealed cartridges, photo-electric cells, radio and tv rectifiers. The Germanium products, with power ratings from microwatts to thousands of kilowatts, and with efficiencies up to 97%, include: power rectifiers; natural convection, forced convection and liquid-cooled types; diodes — point-contact and junction power.

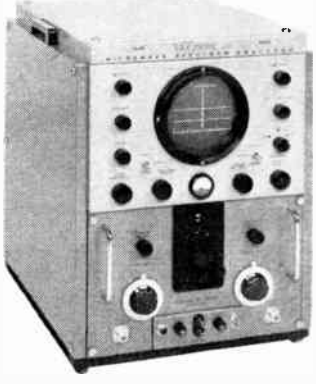
For further information on ratings and specifications contact:

Atlas Radio Corp., 50 Wingold Ave., Toronto 10, Ontario, or the manufacturer.

Microwave Spectrum Analyzers With Interchangeable R.F. Heads

Item 811

Vectron's SA25 Microwave Spectrum Analyzer provides coverage of the spectrum from 800 mc/s to 40,000 mc/s. In this range, more than 99 per cent of all microwave research, development and testing requires precise work in specific portions of the microwave spectrum. To fill the need for such precision, and still provide complete coverage at moderate cost,



Vectron offers a choice of interchangeable R.F. Heads:

Vectron, Inc., Waltham 54, Mass. Canadian Representatives: R-O-R Associates, Ltd., 290 Lawrence Ave. W., Toronto 12, Ont.; Ron Merritt Co., 229 Rogers Bldg., Vancouver, B.C.

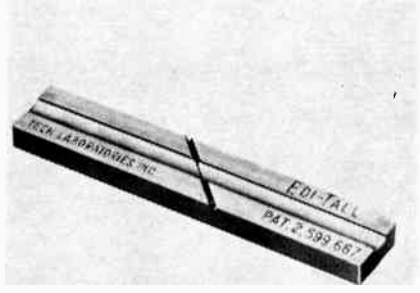
Tape Splicer

Item 812

Tech Laboratories' recording tape splicer, known as "Editall, Jr.", is a small model of the original "Editall" that has gained wide usage throughout the recording field.

This smaller, lighter model was developed for use with home recorders as well as with portable professional equipment, where weight and compactness are important considerations.

"Editall, Jr." does virtually as competent a job of editing tape as the larger block and serves more than adequately for home use.



The new block, priced at $2.80 net, is made of duraluminum and machined with the same precision as the original "Editall" that has become standard in the industry. It has no clips or mechanical devices to get out of order.

For further information write:

Tech Laboratories, Inc., Bergen & Edsall Boulevards, Palisades Park, N.J. Available in Canada through Pylon Electronic Development Co., Ltd., 246 Wright Crescent, Dorval, Quebec.

Telex TV Listener

Item 813

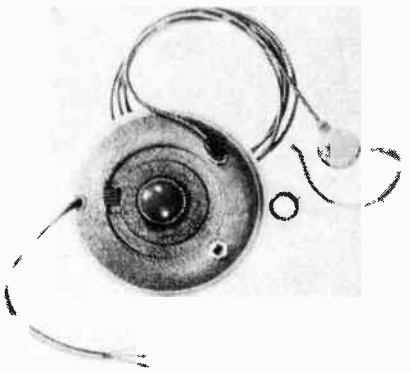
A new listening device that attaches to the audio system of television sets and permits children to hear their favorite programs without disturbing others is being marketed by Telex, Inc., St. Paul, Minn., manufacturers of headsets and electronic components.

Known as the "TV Listener", the device consists of a control unit, with volume controls and on-off switch, and is connected to the TV set's output circuit by a 15-foot cord, two jacks and a Telex Earset receiver which plugs into the jacks.

Earset volume may be adjusted by controls on the chairside. "Listener" control on the unit does not affect volume of TV speaker itself. Earset receiver is lightweight and slips over one ear, leaving the other ear free for conversation while producing full-tones personal hearing, the manufacturer states, and the 4-foot Earset cord allows for the usual shifting of position while helping to confine the children to one general area.

Another useful application for the Listener is in institutions where individual listening controls are desirable. The manufacturer reports the unit to be ideal for persons with hearing loss.

As the unit does not alter the basic operation of the TV set, it is simple and safe to use. The case is 3½" in diameter, 1" thick and extremely light in weight.



For detailed information on the three new types of silicon transistors, write for the new Series 950 Bulletin. Series 900 bulletin on small signal types also.

Texas Instruments represented in Canada by: Computing Devices of Canada Limited, P.O. 508, Ottawa 4.

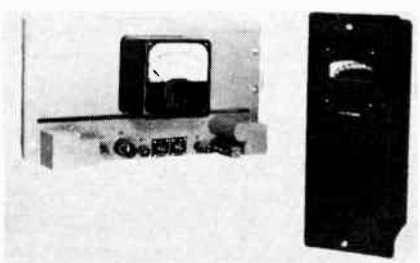
Telemetering Equipment

Item 814

A fast, accurate telemetering system for use on wire circuits, carrier, radio or microwave channels has been introduced by R. H. Nichols Ltd., Toronto.

The equipment operates from an input nominally 115 volts, 60 cps Due to the time division system used, variations in system frequency and input voltage have no appreciable affect on the overall accuracy of the transmitted quantity.

The primary instrument in the transmitter is provided with a pointer and scale, calibrated in the quantity being transmitted. Without test instruments, therefore, it is possible to check the accuracy end-to-end. Either semi-flush



or surface type mounting is available, and connections to metering circuits are completed through studs mounted on the back of the unit. The output from the transmitter is a series of audio tone pulses.

At the receiver, these pulses are converted into a direct current proportional to the setting of the primary instrument. This current is detected and displayed on a standard switchboard instrument calibrated in the same units as the primary instrument. The receiver itself occupies only 3½" of rack space, and contains its own power supply.

Simplicity and ease of service have been emphasized in the construction of the TM-15. Bulletin EA-8 illustrates how it can be used for power systems, waterworks, and pipeline control installations.

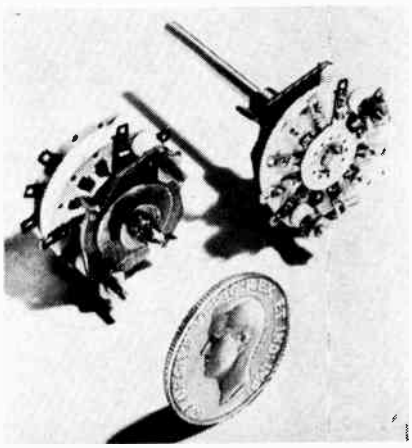
R. H. Nichols Limited, 2781 Dufferin Street, Toronto 10, Ontario.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

New Centralab Series 100 Sub-Miniature Switch

Item 815

An ultra-miniature switch as small as a quarter in diameter — but with the electrical rating of larger switches.



Shaft-length up to 2½" from end of bushing — maximum of 3 sections per shaft. Sections are Centralab Grade L-5 Steatite ceramic (the best).

New! This Centralab switch has already been proven in day-to-day use on military applications. It successfully meets highest corrosion-resistance and insulation-resistance requirements.

Available up to 12 positions. Make and break, resistance load, 1 ampere at 6 volts d.c.; 150 milliamperes at 110 volts a.c.; current-carrying capacity, 5 amperes.

Other Centralab switches include rotary switches with Phenolic or Steatite insulation; medium-duty power switches, for transmitter, industrial control, laboratory testing, military, and commercial; specialized switches — lever, slide, tone, tuner sections, and others.

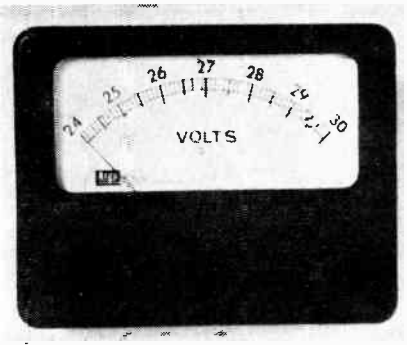
Engineering bulletin EP-73 describing Centralab's Series 100 Sub-Miniature Switch and other switch bulletins are available upon request:

Centralab, A Division of Globe-Union Inc., 964J East Keefe Avenue, Milwaukee 1, Wisconsin.

DC Expanded Scale Panel Voltmeter

Item 816

A new line of D.C. Expanded Scale Voltmeters for panel mounting has been added to the line of A.C. Expanded Scale Voltmeters manufactured by Arga Division, Beckman Instru-



ments, Inc. Accurate to ½% of input voltage, these meters offer a linear scale which includes only the useful portion of the scale; the rest has been entirely eliminated to give highest readability.

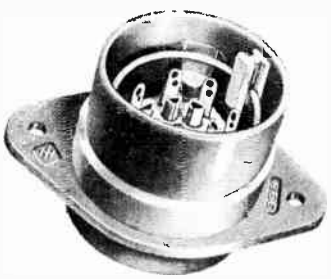
Standard base voltages range from 6.25 volts to 230 volts, with span that can vary from 4% to 25% of base voltage. Hermetically sealed and ruggedized models meet military specifications for environmental conditions. 2½" and 3½" round or square, 4½" round and 4 x 6" rectangular models are available.

Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

New High Voltage Tube Sockets

Item 817

A new line of deep shell High Voltage sockets, has recently been introduced by Industrial Hardware Mfg. Co. Inc., of New York City. These new sockets provide a new high in safe, reliable and economical design of high voltage equipment. Some interesting engineering features of these new sockets are: 1. They provide maximum



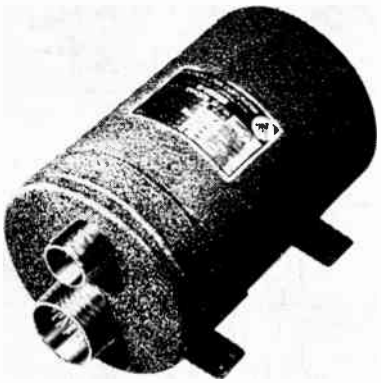
continuous DC voltage without Arc-over to metal chassis. 2. The Deep Shell is molded of natural mica-filled phenolic material. 3. These sockets are available for Octal, miniature, and Noval tubes. The manufacturer invites inquiries for samples and specifications:

Industrial Hardware Mfg. Co. Inc., 109 Prince St., New York 12, N.Y.

Armament Intervalometer

Item 818

An armament intervalometer encompassing a number of fail-safe launching features is now available for application in the rocket and missile fields. With this unit is is possible to fire a pre-determined sequence of rockets



or missiles, either as singue units or in groups. Either DC or AC timing motors can be supplied.

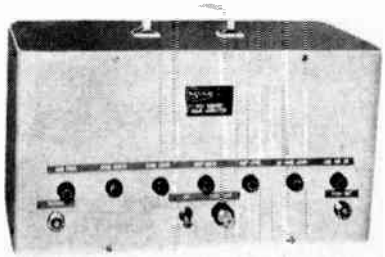
Complete description and specifications are available without obligation from Electromechanical Products, Box 105, St. Thomas, Ontario.

American Gyro, Division of Daystrom Pacific Corporation, 3030 Nebraska Avenue, Santa Monica, California.

Sine-Squared Wave Generator

Item 819

The Model 1073-A Sine-Squared Square Wave Generator is a small portable precise test unit for checking any TV or pulse unit or system for amplitude and phase characteristics. Simple to operate, the unit pro-



duces new type of wave form for "go, no-go" indications. Three $\sin^2$ pulse widths are provided: 0.25, 0.125 and 0.062 usec corresponding to bandwidths of 2MC, 4MC and 8MC, respectively. Size, 8 x 15½ in.

Telechrome Inc., 632 Merrick Road, Amityville, N.Y.

National Coil Company Announces A New, Improved Coil Form with Ceramic Phenolic Covering

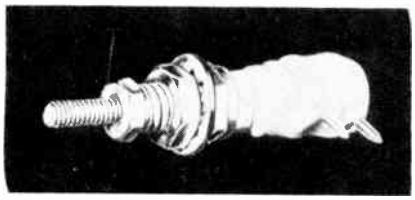
Item 820

A new coil, recently marketed by the National Coil Company of Sheridan, Wyoming, provides new advantages in production and performance. The ceramic phenolic covering holds the coil and leads firmly in place. The need for terminals is eliminated.

Furthermore, the inexpensive covering protects the coil from damage of handling on the production line. Various colors may be provided in the covering, thereby simplifying recognition in the stockroom and on the production line.

The National Coil Company points out that the coil forms have been further improved by the following:

(1) Grinding the outside diameter of the ceramic form to plus or minus .002" to insure uniform electrical characteristics.
(2) The forms are Silicon impregnated.
(3) Forms are held to mounting base by a new thermal type treatment which assures even, lasting mounting.
(4) Iron cores are color coded and rust-proofed.
(5) All metal parts are heavily bright alloy plated — a superior plating to cadmium or nickel.



The new coils meet all Military Specifications.

Additional information may be obtained by contacting:

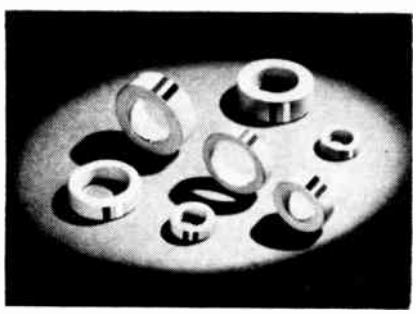
National Coil Company, Sheridan, Wyoming.

Color-Coded Permalloy Powder Cores

Item 821

Magnetics, Inc., is now grading its Performance-Guaranteed molybdenum permalloy Powder Cores according to inductance for 1,000-turn winding, so as to make customer assembly operations easier and faster.

Cores are color coded in 2% bands from —5% to +15% of published nominal inductance. This provides a guide for assembly operations, allowing the proper number of turns to be put on individual cores without special testing. There is no increase in cost for this color coding.



A convenient card, giving full details of the color-coding, and Powder Core Bulletin PC-103 may be obtained by writing:

Magnetics, Inc., Dept. ECD, Butler, Pennsylvania.

Series 6000 Miniature Micro-Relay By Terado

Item 822

OPERATING POWER
65 Milliwatts
Less on special adjustment
SINGLE POLE
Double Throw

SWITCH RATING
1.0 ampere/1,000,000 operations 24 volt non-inductive load.
Greater load capacity at fewer operations.
CONTACTS
Solid coined silver
COIL RESISTANCE
To 10,000 OHMS
SHOCK TEST — 50 G
VIBRATION
Excellent characteristics due to small armature mass.
INSULATION
500 volt any terminal to ground
HERMETICALLY SEALED
OPERATING TEMPERATURE
—55°C— +85°C
BASE TO FIT 7-PIN
Miniature tube socket
PHYSICAL SIZE
¾" x 1-⅛"
Write direct to:

TERADO Company, Precision Equipment Dept., 1059 Raymond Ave., St. Paul 14, Minnesota.

Engineer's Experimental Kit Model PK-10

Item 823

JFD Electronics, division of JFD Manufacturing Company, Inc., Brooklyn 4, N.Y., recently begun production of an Engineer's Experimental Kit, Model PK-10, a selection of 10 JFD Variable Trimmer Piston Capacitors housed in a felt-lined dust-proof styrene container, together with pertinent data for each capacitor.

The Kit was designed by JFD Electronics specifically for the experimenter and designer in: Radar, Radio, Television, Communications, Microwave Transmission, Automation, Guided Missiles, Nuclear Physics, etc. With a wide selection of capacitors at the designer's finger tips, research and experimentation can progress more rapidly and effectively.

The capacitors have fused quartz or glass dielectrics and offer such

characteristics as: matched temperature coefficients, incremental adjustment of capacity for highly critical tuning, freedom from microphonics, no tuning backlash, absolute surface resistivity, etc.

The Kit is available from local industrial parts distributors and direct from:

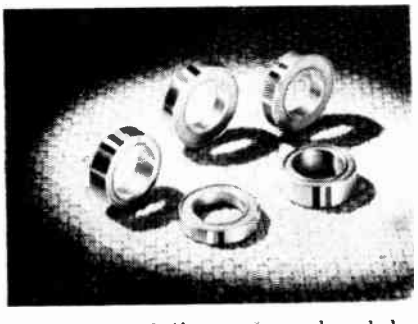
JFD Electronics, Brooklyn 4, N.Y.

Aluminum Core Boxes For Tape Wound Cores

Item 824

Magnetics, Inc., has introduced an aluminum core box for its Performance-Guaranteed Tape Wound Cores, and now available in 108 standard sizes. it offers four major advantages:

1. Tape Wound Cores in the aluminum core boxes will operate at temperatures of at least 450°F.



2. Because of the seal produced by forming the aluminum over a silicone glass seal, true vacuum impregnation of coils is now possible. Varnish cannot penetrate the core box, and affect magnetic properties of the tape.
3. The strong metal construction prevents distortion of the core when wound, and thus prevents changes in magnetic properties.
4. The core has added protection against vibration and shock.

The industry's most complete catalog, TWC-100, and Bulletin TWC-200 are available by writing:

Magnetics, Inc., Dept. ECD, Butler, Pennsylvania.

Single Sideband Transmitting And Receiving Equipment

Item 825

Crosby Laboratories, Inc., Hicksville, New York, has recently developed the following communications equipment for communication by single sideband operation.

The Model 161 B Single Sideband Transmitter providing approximately 50 watts on frequencies of 1.5 to 7.5 M.C.

The Model 166 Single Sideband Receiver, a companion unit for the Model 161 B Transmitter for the reception of single sideband signals of 1.5 M.C. to 7.5 M.C.

Their line also includes various other single sideband adapters — Models 47 and 48 — for connection to communications receivers for single receiver or diversity combinations.

A single sideband signal generator — Model 160 — is also available for purposes of testing single sideband equipment and systems.

Write for descriptive literature and prices to:

Crosby Laboratories, Inc., Box 233, Hicksville, New York.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Permanent Magnet Focusing Device

Item 826

Glaser-Steers of Canada, Ltd., Trenton, Ontario, is now producing for the Television Industry's leaders a new Permanent Magnet Focusing Device.

The Model "D" Permanent Magnet Focuser weighs approximately 13 ounces, requires only 1⅛ inches along the tube neck, can be easily adjusted for focus by a screwdriver from outside the back of the set and has a quick acting locking mechanism on the centering plate handle. With this unit, a much larger area of the picture tube is in good focus and there is no noticeable rotation of the raster when focusing flux is adjusted from minimum to maximum.

An optional mounting for the focuser has been devised which secures the yoke and clamps to the neck of the tube. This eliminates all bracketry formerly necessary to hold the yoke and the focuser, and can effect a considerable cost savings.

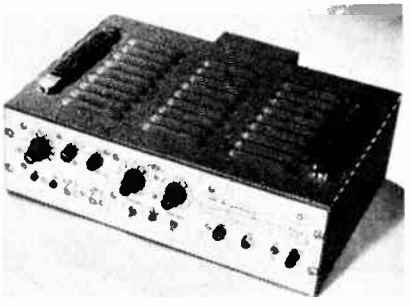
Glaser-Steers of Canada Ltd., Trenton, Ontario.

Model 4120A Variable Pulse Generator

Item 827

The ELECTRO-PULSE, INC. Model 4120A VARIABLE PULSE GENERATOR provides variable width, delay, and repetition rate pulses, with these functions controlled by coarse-fine concentric controls for high resolution.

Pulse width is variable from .25 to 100 microseconds and pulse delay from 1 to 100 microseconds. The repetition rate control covers 30 CPS to 330 KC in four ranges. Positive and negative pulse outputs are simultaneously available, with a rise time of .1 microsecond and amplitude variable to at least 50 volts from 100 ohms internal impedance.



Typical applications are in drive transistor ring counters, transient response studies, relay and switch development, testing of magnetic drum circuitry, computer development, and data handling system design.

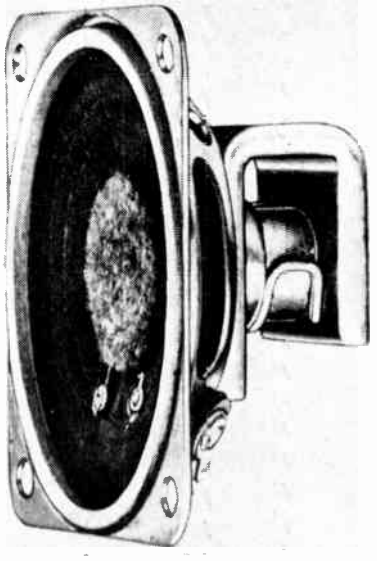
Write for detailed technical bulletin to:

Electro-Pulse, Inc., 11861 Teale Street, Culver City, California.

2½" Miniature Loudspeaker

Item 828

A new small speaker for personal-portable radios, intercommunications equipment and all other uses where an extremely small, rugged speaker is required, is being supplied by the Quam-Nichols Co. It is available for both original equipment and replacement use.



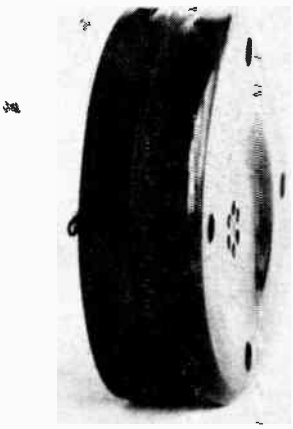
The Model 25A07 is only 1¼" deep, maximum input, 2 watts; 0.65 Alnico V magnet; U-shaped pot; impedance 3.2 ohms, 10%. For the replacement field it is supplied with four threaded mounting holes on the pot, in addition to the four rim mounting holes.

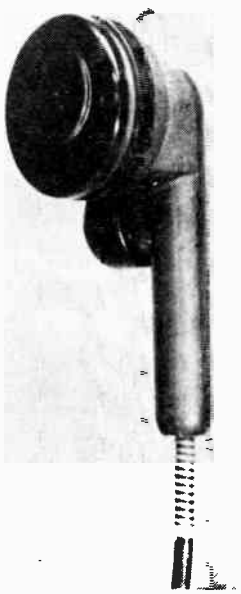
Quam-Nichols Co., 240 East Marquette Road, Chicago 37, Illinois.

Differential (Noise Cancelling) Microphone

Item 829

M. J. Sears Company, Roxbury, New York, has developed a new differential (noise-cancelling) microphone for radio or telephone communication from very noisy places. It was developed for the USAF and meets Specification M-15. Electrically interchangeable with the T-17 and other carbon microphones, it is available mounted in anodized aluminum handle





with two circuit press-to-talk switch, 5 foot neoprene cable and telephone plug PJ-068. It features effective noise-cancellation, high articulation rating, consistent full signal output and long life.

Available as complete M-15, SEARS No. 1280; or mouthpiece assembly only, SEARS No. 1278, for easy installation in any T-17 switch handle.

Write for technical description bulletin M-15 and prices to:

M. J. Sears Company, Roxbury, Delaware County, New York.

Tention Gauger

Item 830

These are precision measuring instruments for determining the tension of any spring up to 500 grammes with micrometer accuracy, and are the most advanced gauges of their kind in the world. This design eliminates approximation and the user pre-sets the gauge to the required tension (in grammes) by means of the knurled pre-setting screw. The operating strip is then applied to the tip of the spring under test; deflection of the operating strip to either side, simultaneously

with movement of the spring under test, indicates that the spring tension is equal to the gauge setting. The user can concentrate attention simply on the movement of the spring under test without having to try to observe a gauge scale at the same time.

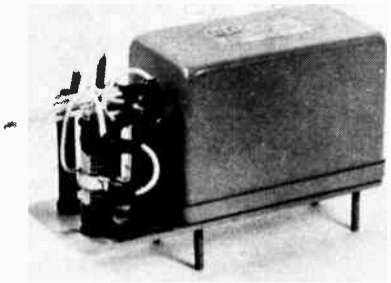
Distributed in Ontario by Prince and Roberts, 61 Charles St. W., Toronto.

Arga Voltage Regulator

Item 831

The Arga Voltage Regulator combines magnetic and transistor components to produce 1/10 second response and regulation to ½%, for a nengine-driven 30 KW alternator.

The small size of the regulator makes it especially desirable in places where space is at a premium. The 30 KW unit occupies only 30 cubic inches and is furnished in an hermetically sealed transformer can.



Built to military standards, the Arga Voltage Regulator gives long service over an ambient temperature range of —55°C to +71°C, with voltage stability over this entire range.

Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

Peirce Dictation Systems

Item 832

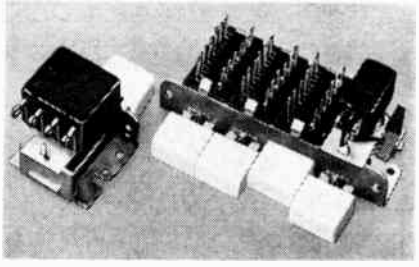
The Peirce Dictation Systems of Chicago, with distribution in Canada through dealers listed in the 1955 directory of ELECTRONICS & COMMUNICATIONS has made available, to the Canadian market the complete line of the Peirce Magnetic Belt Dictating Machines, all of which conform to the Canadian Standards Association.

Peirce Dictation Systems, 5900N Northwest Highway, Chicago 31, Ill.

Push Button Switch Assemblies By R. Schadow, Germany

Item 833

Messrs. Schadow of Germany are specialists in the manufacture of high-performance and extremely robust miniature PUSH BUTTON SWITCH ASSEMBLIES for use in inter-com equipment, switch controls in HIFI-sound reproduction installations, tape-recorders, dictation machines, etc. SCHADOW PUSH BUTTON SWITCHES are available in numerous switch-release combinations including 2-step actions. Special designs incorporating relay-contacts can also be supplied whereby the 2-step push-button switch actions are of particular value. (Contacts are of self-cleaning type.)



Manufacturers' enquiries should be addressed to Messrs. Musimart of Canada Limited, Electronic Division, 901 Bleury Street, Montreal, Canadian Representatives.

New Clarostat Resistor Doubles As Fuse

Item 834

A new CLAROSTAT resistor which will withstand repeatedly high surge currents without damage, but which will fuse when the surge becomes dangerous to expensive components, is being distributed in Canada by the Electronic Tube and Components Division of Canadian Marconi Company, Canadian sales representatives for the Clarostat Manufacturing Company.

A dual purpose, plug-in, fuse type resistor, the "Fuzohm" is provided with two plug terminals accurately spaced and positioned by the separator strip to plug into jacks provided for it in TV and other assemblies. An expended "Fuzohm" is readily replaced.

A 7.5 ohm resistor, the "Fuzohm" will normally carry a current of 1 ampere and will withstand surge currents of 1.75 amperes. The unit is designed to fuse, and thus break the

power supply, at 2.3 amperes in less than 30 seconds.

For further information write to:

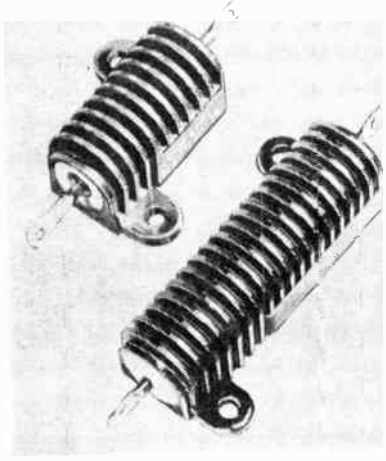
Electronic Tube and Components Division, Canadian Marconi Company, 830 Bayview Avenue, Toronto.

Precision Resistors

Item 835

Dale Products, Inc., of Columbus, Nebraska, U.S.A., offers a precision line of miniature power resistors and deposited carbon resistors under the trade name Dalohm, all of them meeting or exceeding the application United States JAN and MIL Specifications.

Included in the line are Type RH (25, 50 and 250 watt) and Type RS (2, 5 and 10 watt) Miniature Power Resistors. They are completely welded from terminal to terminal, coated with a special silicone material, offer



maximum heat resistance, and are impervious to moisture. The RH's are further sealed in a die-cast, black anodized radiator finned housing. Temperature coefficient is 0.00002/Degree C; resistance ranges are from 0.1 ohm to 55,000 ohms depending on type; tolerances are from 0.05% to 5%.

Shown in the picture are the RH-25 and RH-50 resistors.

Write for information on the complete line.

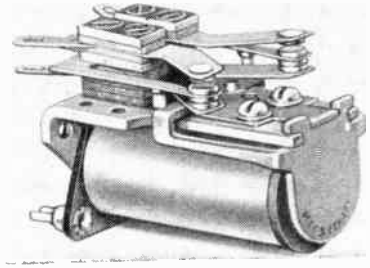
Charles W. Pointon, Ltd., 6 Alcina Ave., Toronto, is the Dale representative in Canada.

New Miniature Power Relay

Item 836

Reliable switching of heavy currents up to 10 amperes and great operating sensitivity are combined in a new miniature power relay announced by the Magnecraft Electric Company, 3354H West Grand Avenue, Chicago 51, Ill.

The new heavy current contacts can be furnished in combination with bifurcated contacts for switching both heavy loads and low level signal loads with the same relay.



Coil and contact terminals at mounting end of the relay facilitate concealed wiring of either individually mounted or strip mounted relays.

Contact combinations up to four-pole double-throw can be furnished, also hermetically sealed or dust tight enclosure:

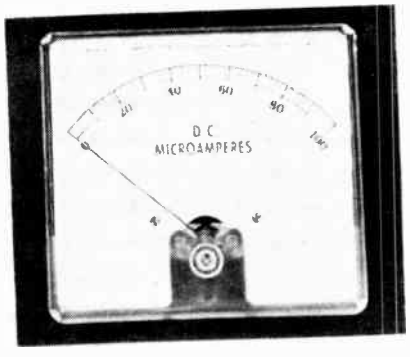
Available for 60-cycle AC, any voltage to 440; DC, any voltage to 230. Descriptive literature and dimensional data on request.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Panel Instruments

Item 837

A new range of instruments in clear plastic cases is announced by HOYT. The new cases give "Big Meter" visibility, an extra-long 4¼" scale, and 46 per cent more area for multi-band scales. They are anti-static treated, and have popular mounting dimensions.



Write for full information on HOYT moving coil, repulsion, and rectifier type meters to the:

Hoyt Electrical Instrument Works, 42 Carleton St., Cambridge 42, Mass., U.S.A.

Hysol Epoxy Resins *Item 838*

The complete line of all commercially used forms of Epoxy resins, hardeners and rod, sheet and tube for the electrical and electronics field will be manufactured and stocked in Toronto by the Canadian subsidiary of Houghton Laboratories, Inc., Olean, New York, by late 1955. Write for complete details to:

Houghton Laboratories, Inc., in Olean, New York, U.S.A.

Wide-Band Adaptable R18568A Transistorized Indicator *Item 839*

The R18568A Extended Range Volume Indicator is intended for use in measuring volume levels over a full scale range of —50 to +31 dbm in 600 ohms. This increase in sensitivity over the conventional indicator circuit is obtained by the use of a three-stage transistor amplifier. It is a portable, battery operated instrument contained in a wooden carying case and weighing seven pounds, including the batteries. Connection can be made to

it through either binding posts or a telephone type jack and both bridging and terminating input impedances are available. Means are provided for checking the condition of the batteries and for adjusting the calibration.

Northern Electric Company Limited, 1600 Notre Dame Street West, Montreal.

Extended Range Volume Oscilloscope *Item 840*

The Model 411 Easy-Six Oscilloscope is a precision instrument for the critical engineer. It has brought together a happy combination of wide-band precision circuits, flexibility through plug-in adapters and logically functioning controls. Bandwidth of the vertical amplifier is 10 mc. Six X-axis plug-in units enable the instrument to be used as a delayed or undelayed scope, as a dual channel scope, as a specialized TV test instrument, with a gated marker generator, or with a long sweep generator.

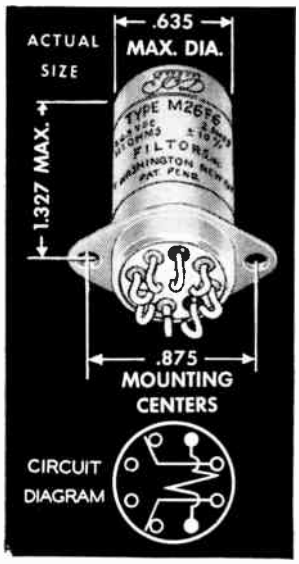
Laboratory for Electronics, Inc., Boston, Mass.

Hermetically Sealed Double Pole Double Throw Relay

Item 841

Filtors, Inc., of Port Washington, N.Y., after extensive research and development, has started production of a hermetically sealed, double pole, double throw relay to meet the specification requirements of MIL-R-5757B and MIL-R-25018 (USAF).

Life expectancy within the stated rating of this subminiature relay is in excess of 500,000 operations.



TECHNICAL DATA

Contacts: Two Form C; 2 Amps. resistive at 26.5 V.D.C. or 115 V.A.C.

Coil: 325 ohms for 26.5 V.D.C. operation.

Size: 0.635 dia. max. x 1.327 above chassis.

Weight: 1.3 oz.

Ambient Temperature: —65°C. to +125°C.

Shock (operational): 50 G's for 11 milliseconds.

Vibration: 5 to 2000 CPS to 10 G's.

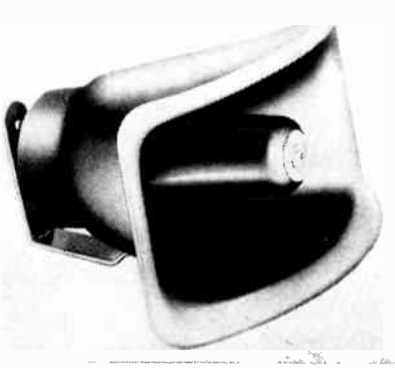
Type Designation: M26F6.

Filtors Inc. of Port Washington, New York.

Cobra-Jector Model CJ-14

Item 842

For all types of inter-com and paging systems, wide angle sound dispersion.



Super-efficient within the range most useful in voice reproduction. Excellent as a microphone in talk-back use. All weather, double sealed, fiber glass construction.

Power 5 watts, impedance 4, 8 or 45 ohms, front opening 14" x 6" — 8½" long.

Atlas Radio Corporation, Toronto 10, Canada.

Miniature AC Generator

Item 843

The Arga Division of Beckman Instruments, Inc. is now manufacturing a miniature A.C. permanent magnet generator, precision designed and constructed for indicating the position of a rotating shaft by providing two voltages, one the sine of the shaft position, the other the cosine.

Use of a permanent magnet for the rotor eliminates the need for sliding contacts in the unit. The generator can operate up to 6000 RPM with a maximum harmonic content of 3%, is built to military specifications for high and low temperature operation, contains stainless steel ball bearings for corrosion resistance.

The generator is available in two sizes . . . 1.43" dia. and 1.67" dia. . . .

with identical operating characteristics; the larger size can be provided with a seal at the terminal block end for use in hermetically sealed assemblies.

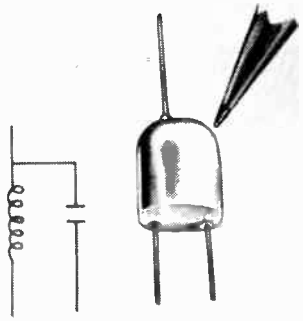
Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

National Coil Offers New Plastic Molded Coil And Condenser

Item 844

Ideally suited for printed circuits and miniaturization, National Coil Company's new molded coil and condenser measures ⅜" thick by $\frac{13}{32}$" wide by $\frac{9}{16}$" long.

The product was designed to further minimize components by molding two parts that are connected in the same circuit in one compact package. Where desirable, resistors may be molded with the coils in place of the condenser or along with the other two to form a small, sealed unit. The items meet all Military Specifications. The



National Coil Company, Sheridan, Wyoming, has specialized in the compression molding of electronic components and precision mass production of quality coils and coil forms.

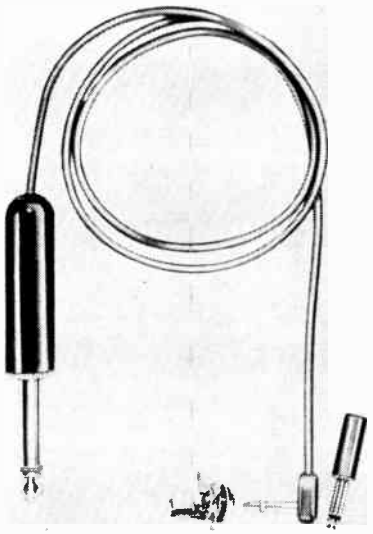
The National Coil Company, Sheridan, Wyoming.

Miniature Jack And Plug

Item 845

Advantages and applications of the Telex miniature jack and plug combination are given in a new catalog sheet recently issued by Telex, Inc., St. Paul, Minn., hearing aid and electronic component firm.

One-third the size of previous models, the combination can be installed in computers, dictating machines, tape recorders and miniature radios. The illustrated literature reports that the unit is available with L-shaped plug molded to cord or detachable straight



plug. Complete specifications are given.

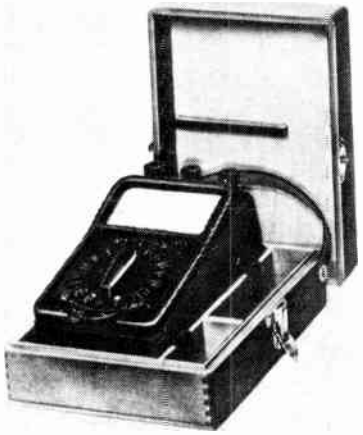
For additional information or copies of the literature, write:

Dep't KP, Telex, Inc., Telex Park, St. Paul 1, Minn.

Physics Research Laboratories Inc.

Item 846

Physics Research Laboratories, Inc., of West Hampstead, New York offers the complete electrical instrument line of C. P. Goerz, Vienna. Illustrated here is the Goerz Universal 3 multi-range instrument for the electronic and electrical engineer. The Universal 3 has 7 D.C. voltage ranges (100 mv to 1000 v at 20,000 ohms/volt); 6 D.C. current ranges (100μa to 1.0 ampere); 5 A.C. voltage ranges (3 v to 1000 v at 2,000 ohms/volt); 5 A.C. current



ranges (3 ma to 1.5 amperes); 5 resistance ranges (100 ohms to 100 megohms) and a capacitance range (0.005 μf to 10 μf). Accuracy is ± 1.5% on D.C. and ± 2.5% on A.C. Meter is color coded and operating instructions are printed on back. Meter is dust- and moisture-proof.

Physics Research Laboratories, Inc., 507 Hempstead Turnpike, West Hampstead, L.I., N.Y.

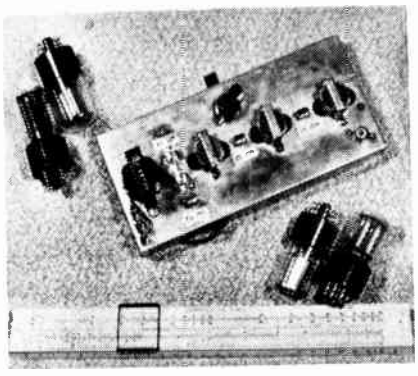
Transistorized Audio Amplifier

Item 847

This transistorized audio amplifier uses four TEXAS INSTRUMENTS transistors, and features 100 db power gain and 150 milliwatts output, with less than 5 per cent distortion. The total current drain from the 6 volt battery is less than 40 milliamperes.

For comparison, tubes from a comparable vacuum tube amplifier are shown.

The unit is a production prototype which, when further miniaturized, will occupy about 40 per cent less space, enabling it to fit comfortably into an ordinary suit coat pocket. For further details contact:



Computing Devices of Canada Ltd., P.O. Box 508, Ottawa, Ontario. Exclusive Canadian Representatives for Texas Instruments Inc., Dallas, Texas.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Potentiometers

Item 848

A line of sub-miniature potentiometers is available in production quantities to meet the electronic industry's need for accurate, high performance, space and weight saving variable resistors. The trimming potentiometer, Model 300-00 (illustrated), is one-half inch square, three-sixteenth inch thick, and weighs less than two grams.

The Series Type T-10-½, ten turn potentiometers measuring one inch in diameter by one inch in length and weighing nine grams is furnished with either sleeve type or ball bearings. Mounting may be adapted to either servo or panel.

These potentiometers offer ruggedness and adaptability without sacrificing accurance and stability.

For detailed information write Electromechanical Products, Box 105, St. Thomas, Ontario.

Manufactured by Daystrom Pacific Corporation, Potentiometer Division, 3030 Nebraska Avenue, Santa Monica, California.

Gyroscopes

Item 849

A sub-miniature rate gyro with an output signal level of sufficient magnitude that supplemental amplification equipment is not required, is now available in production quantities. The instrument incorporates fluid floatation and gimbal systems providing a previously unattainable immunity to extremes of acceleration, shock and vibration. Both DC and AC pickoffs are available.

In addition to other gyros having extensive applications, the manufacturer also produces free gyros with gimbal bearings of extremely low friction characteristics.

For detailed information write Electromechanical Products, Box 105, St. Thomas, Ontario.

Manufactured by American Gyro, Division of Daystrom Pacific Corporation, 3030 Nebraska Avenue, Santa Monica, California.

Centralab Snap-Tite Volume Controls

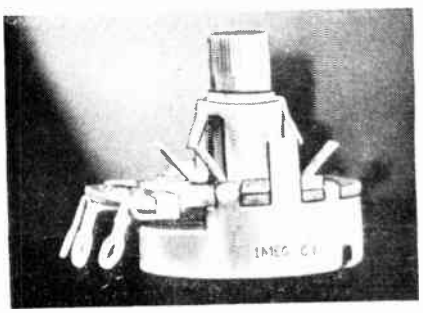
Item 850

Ten values replace 75 per cent of current rear-end or "hidden" TV or instrument controls.

Assembler can install two Snap-Tite controls at a time — one with each hand. A light push with the thumb and forefinger securely seats Snap-Tite in the chassis mounting-hole. No tools are needed — no nuts, lock-washers, or other hardware.

TV manufacturers have cut the cost of installing rear-end controls as much as 73 per cent by changing over to Snap-Tite.

Snap-Tite is part of Centralab's complete line of variable resistors — including 1/2-w. standard (250 ohms to 10 megs.), for radio and TV; 1/10-w. sub-miniature (500 ohms to 10 megs.), for hearing aids, communications, computers; 1/4-w. sub-miniature (10,000 ohms to 1 meg. — linear taper), for instruments and military.



Group "A" bulletins describing the Centralab line of variable resistors are available upon request:

Centralab, A division of Globe-Union Inc., 964J East Keefe Avenue, Milwaukee 1, Wisconsin.

New Chatham Electronic Switch Offers Compact Design, Lightweight and Economy

Item 851

The new Chatham Electronic Switch Type 650 is a portable instrument which makes possible simultaneous observation of two recurrent patterns on the screen of a single cathode-ray oscilloscope. The relative positions of the patterns on the oscilloscope may be varied so that they are superimposed on each other, or separated by a desired amount. Direct comparison of amplitudes, wave-forms, frequencies, and phase relationships may be observed.

A square-wave voltage of variable frequency and amplitude is available at the output terminals for use as a test signal in studying the transmission characteristics of vacuum-tube amplifiers and other circuits.

There are direct-coupled inputs to the amplifiers in Electronic Switch Type 650 which are alternatively operative and inoperative at a rate determined by the switching frequency. The instrument is therefore effective for chopping a d-c signal, making it suitable for transmission through the a-c amplifiers which are usually found in cathode-ray oscilloscopes.

The instrument is housed in a metal cabinet, which is provided with a carrying handle. The over-all dimensions are 6 inches in depth by 7 inches wide by 8 inches high. The instrument is contained in a gray cabinet with a blue panel and weighs approximately 10 pounds.

Readers are invited to request complete data from the manufacturer:
Chatham Electronics, Division of Gera Corporation, Livingston, New Jersey.

Reliable Digital Frequency Meter

Item 852

The Model 501 Time-Rate Indicator is the first truly dependable counting type frequency meter. Reliability is obtained by the use of an electronic scaler-determined time base. Measurements are made at the maximum rate of 10,000,000 per second with a seven column neon light display. In addition to frequency, other measurements include period, time interval, total count and frequency ratio.

Laboratory for Electronics, Inc., Boston, Mass.

New Scintillation Counter For Uranium And Oil Prospecting Assays Ore Samples At Site

Item 853

CHATHAM ELECTRONICS, DIVISION OF GERA CORPORATION, INTRODUCES THE MOST VERSATILE INSTRUMENT IN THE FIELD TODAY FOR —

URANIUM PROSPECTING FROM PLANE, CAR OR ON FOOT.
ASSAYING ORE SAMPLES IN THE FIELD.
FUNCTIONS IN PLANE AT SPEEDS TO 175 mph, 300 FT. ABOVE GROUND.
ADAPTS TO WELL LOGGING.
OIL PROSPECTING.

New Chatham Scintillation Counter SC-102 features extreme sensitivity which enables it to respond to radiation at distances greater than 300 ft. above the ground. Type SC-102 functions at high efficiency in planes travelling up to 175 miles per hour. The sensitivity selector covers six ranges starting with the ultra sensitive range of 0.003 mr/hr. to its top range of 1 mr/hr.

ASSAYING ORE SAMPLES—Accurate assaying at the site saves time and the necessity of sending ore sample from the field for assay.

OIL PROSPECTING — The Chatham Scintillation Counter responds to the presence of oil deposits by indicating the special radiation characteristics surrounding such formations.

WELL LOGGING—The Type SC-102 probe may be lowered into drill holes to read the radiation of subsurface deposits. This feature makes it unnecessary to remove costly core samples.

Engineered for rugged field use, all sensitive and delicate electronic components have been shock mounted and protected by non-breakable casing and high grade aluminum. Waterproof seals and ruggedized hermetically sealed meter enable this instrument to be used under the most adverse climatic conditions.

Convenient carrying strap included on the "body contoured" case.

For full information readers are invited to write to:
Chatham Electronics, Division of Gera Corporation, Livingston, New Jersey.

New Centralab Iso-Kap Molded Disc Ceramic Capacitor

Item 854

There's nothing else like Iso-Kap.

It's the only molded, completely insulated ceramic disc capacitor on the market today. Breakdown to ground is in excess of 3000 V. D. C. Capacitance characteristics are virtually flat over a wide temperature range.

Iso-Kap's one-piece construction is unaffected by extremes of vibration; by ozone, salt water, or any known acid or solvent at room temperature. Thickness, diameter and lead spacing are always exact. Leads are always on perfect center line, never offset. Lead strength is greater than the tensile strength of No. 22 wire.

Iso-Kap is clearly labelled to avoid confusion and mistakes. Stamped with capacity, voltage rating, and tolerance.

There are many other Centralab ceramic capacitors: TC and BC discs and tubulars, 150 v. to 6,000 v.d.c.w., 1 mmf. — 0.1 mf. TV available +100 to —5250. High-voltage types, up to 30,000 v.d.c.w. High-accuracy types, ±1 per cent tolerance, 500 v.d.c.w., up to 2,500 mmf. Tubular or flat trimmer capacitors, 1 mmf. to 400 mmf., 500 v.d.c.w. Specialties include feed-through, stand-off, button-shape, potted, and other capacitors.

Engineering bulletin EP-48 describing Iso-Kap and other capacitor bulletins are available upon request:
Centralab, A Division of Globe-Union Inc., 964J East Keefe Avenue, Milwaukee 1, Wisconsin.

Arga Miniature P.M. Inverter

Item 855

The Arga Miniature P.M. Inverter, a precision designed permanent magnet motor generator, converts 28 volt direct to 400 cycles alternating current. Equipped with governors for maintaining constant speed, units operate over an input range of 18 to 30 volts D.C. and an output of 90 to 150 volts A.C. The permanent magnet construction makes the output voltage independent of the condition of the battery.

Available in 25 volt ampere, 100 volt ampere and 250 volt ampere ratings, the units with standard winding put out 115 volts. However, the voltage can be varied to meet the customer's requirements. At a .9

power factor the A.C. voltage regulation is within ± 5% and the frequence within ± 1%.

Designed for 1000 hours of trouble free service through an ambient temperature range of —55°C to +71°C, the units withstand 10G acceleration and meet military requirements for noise suppression. The Arga Miniature P.M. Inverter in the 100 volt ampere size weighs seven pounds and occupies a space 6.4 x 4.6 x 4.4 inches.

Operating Characteristics of the 100 Volt Ampere Size

Input	
Voltage	27.5±5v
Current	12 Amps Max.
Output	
Voltage	115±2v
Volt Amps	100
Phases	3
Power Factor	.8 to 1.0 lagging
Volt. Regulation	±5%
Frequency	400 ±8CPS
Harmonic Distortion	10% maximum
Speed	6000 RPM
Ambient Temp. Range	—55°C to ±71°C
Brush Life	1000 hours at sea level 250 hours at 35,000 to 50,000 feet

Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

Type FE Railroad Radio

Item 856

Westinghouse FE Railroad Radio is rapidly becoming a standard as far as railroad communications are concerned.

FE Radio, especially designed for the stringent requirements of railroad traffic, and built with the ruggedness and reliability generally associated with railroad equipment, is installed in Canadian rolling stock and will become an important factor in increasing efficiency and safety in Canadian Rail operations.

Address enquiries to:
Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

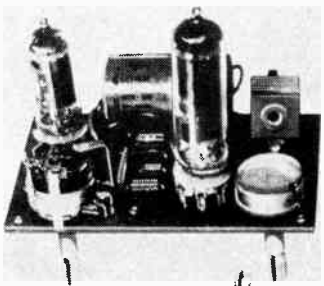
New "Printed Circuit" Audio Amplifier Assembly

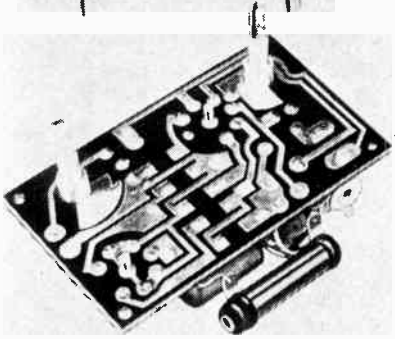
Item 857

Substantial economies in the production of phonographs, Hi-Fi systems and intercommunication systems can be achieved through the use of a low-cost, compact printed-wire audio amplifier assembly offered by Photocircuits Corporation. Only 2½" wide x 4⅛" long x 1¾" deep, exclusive of control shafts, this two-stage unit produces up to 2 watts output, sufficient for many audio applications. It can be used as an amplifier by itself, or can be incorporated into equipment as a sub-assembly.

The amplifier is a complete unit, including volume control and a tone control, except for an output transformer which is usually mounted on the loudspeaker.

Frequency response is flat to 8000 cycles. Input voltage required is 0.2 volts. Power required at 115 volts, AC or DC, is 24 watts. A 12AT6 is used as a voltage amplifier driving a 50B5 power output tube. The power supply uses a selenium rectifier.





The mechanical design of the unit is extremely flexible permitting variations to suit individual requirements.

The cost of the unit is low because of printed wiring, dip soldering, and the use of components especially suited for printed wiring. Further information may be obtained by writing:
Photocircuits Corporation, Glen Cove, New York.

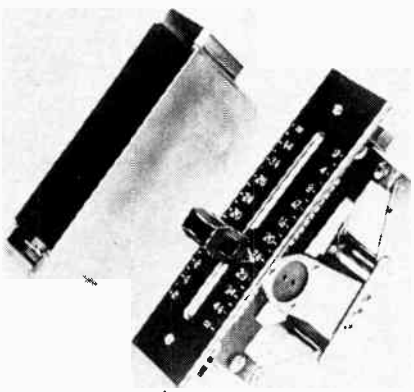
To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Vertical Attenuator

Item 858

This low cost vertical attenuator covering the audio range, developed by Tech Laboratories, Palisades Park, New Jersey, has such outstanding characteristics it may eventually displace all rotary units.

The attenuator has straight-line, finger-tip operation, accomplished without any guide rods through the use of a new linkage system that completely eliminates any backlash or stickiness, minimizing wear and extending the life of the unit.



It is possible to tie a number of units together for simultaneous operation, with narrow construction permitting use of as many as ten mixers on one 19-inch panel.

Both plug-in and fixed-panel designs of the vertical attenuator are available from Tech Laboratories. Standard units are furnished in two sizes of 30 and 20 steps, 30-step units are at 1.5 db and 20-step units at 2 db. Ladder "T" or potentiometer circuits are standard, with impedance values for ladders ranging from 30 to 600 ohms, and 250,000 ohms for potentiometers. Special impedance values and loss per step can be obtained upon request. The construction of the unit is such that spare resistor assemblies can be furnished and installed in a couple of minutes. Also the same unit can be used for several impedance and loss values.

Additional features of the vertical attenuator include a completely shielded and dust proof construction, new floating switch blades with better adjustment of spring tension, and better indication of volume setting (the knob at top means full volume, at bottom off).

Complete information is available on request from:

Tech Laboratories, Inc., Bergen & Edsall Boulevards, Palisades Park, New Jersey, or from Canadian representative: Pylon Electronic Development Co., Ltd., 246 Wright Crescent, Dorval, Quebec.

Plastic Molded Collet Fitting Knobs

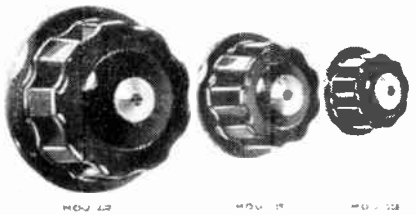
Item 859

A range of three plastic molded collet fitting knobs designed specially to meet the requirements of high class electrical equipment molded in thermo-setting plastic of high impact strength. Standard color black, but other colors can be supplied to suit customers' requirements. Minimum quantity for special color: 100.

Outstanding features are:

Fits permanently tight to plain round shafts, will not slip or loosen.

Saves cost of flat on hole in shafts.



Does not bruise or damage shaft material even in soft metals such as brass or aluminum.

Collet accommodates inaccuracies in spindle diameter.

Knob fits concentrically on shaft and can be positioned accurately and easily — a valuable feature when used with large calibrated dials.

Standard collets are interchangeable between the three sizes of knob and are made for ¼", [illegible]" and ⅜" diameter shafts.

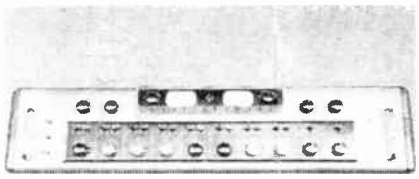
Dispenses with inaccessible grub screws.

Canadian Electric Resistors Limited, Curity Avenue, Toronto 16, Ontario, Canada.

Type HC Audio Console

Item 860

A new studio console with 16 inputs, 8 mixing and 2 master positions, built-in monitor and cue amplifiers, 2 output with volume indicators is now available to meet any broadcast studio



requirement. The use of miniature plug-in amplifiers interchangeable through a hinged front panel simplifies maintenance.

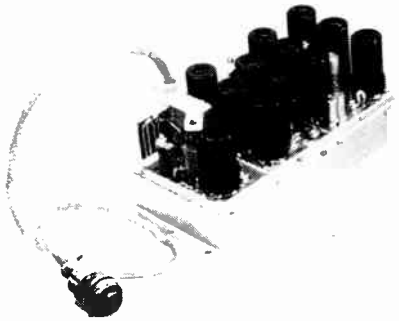
Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

XT-1 Telemetering Transmitter

Item 861

West Coast Electronics Company has produced a new telemetering transmitter designed for higher powered data transmission in guided missile and aircraft telemetering systems. This new development in telemetering transmitters has been named the XT-1. It is basically a crystal controlled, phase modulated transmitter that accepts low level modulating signals between 900 cycles and 100,000 cycles and provides wide-band, frequency modulated output with less than 1 per cent distortion. Particularly economical for use where large channel capacity is required, the XT-1 Telemetering Transmitter makes available a channel capacity greater than most non-crystal controlled telemetering transmitters. With a power output of more than 8½ watts over the band from 215 to 235 mcs., the XT-1 exceeds by four to six times the power output of most telemetering transmitters. The XT-1 Transmitter is suitable for use as both an individually packaged transmitter, or as an exciter for an 80 to 90 watt final amplifier such as the Amperex 5894. The unit weighs only 60 ounces, occupies only 144 cubic inches, and withstands the



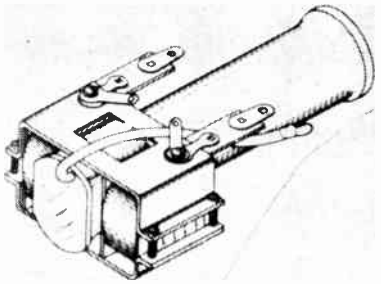
vibration and temperature encountered in aircraft and missile applications. The new XT-1 Telemetering Transmitter may be purchased directly from:

West Coast Electronics Company, 5873 West Jefferson Blvd., Los Angeles 16, California.

Fork Oscillators

Item 862

High-precision tuning fork oscillators manufactured by Times Facsimile Corporation are used in many applications requiring extreme frequency stability and reliability. The design incorporates special features to overcome the effects of varying conditions of temperature, pressure, humidity and position. The most extensive use is in Facsimile equipment of both portable and fixed station types. The fork controls the motor speed over a wide temperature range at a precision which, expressed as cumulative error in time measurement, amounts to one second or less per month (0.4 parts per million).



Synchronous motors controlled by Times Facsimile forks are also used to drive chronometers, sonar depth recorders and other devices where precise timing is important. In electronic systems, the forks are used as audio frequency standards, base frequency for controlled rf and reference frequency for test and measuring instruments.

The forks are small, mechanically rugged, and will operate in any position, in stationary or mobile equipment.

Write for further information:

Times Facsimile Corporation, 540 W. 58th St., New York 19, N.Y., U.S.A.

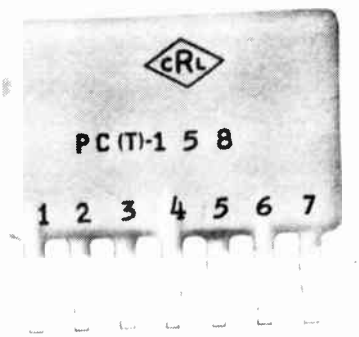
Centralab Plug-In Packaged Electronic Circuits With Twin-Tapered Tab Leads

Item 863

These new Centralab development speed the assembly of circuit boards, with positive positioning and positive solder connections inside or outside of chassis holes.

Like all Centrab Packaged Electronic Circuits, they provide other advantages, also: Uniformity of circuit performance, Saving in size and cost of circuit chassis. Saving of soldering time. Elimination of wiring errors.

Centralab originated the technique of packaging complete electronic circuits to specific performance limits and now makes radio-TV circuits, amplifiers, oscillators, detector networks, and resistor networks — including capacitors (up to .01 mmf.), resistors (1/2 w., 50 ohms to 50 megs.), wiring and inductances.



Engineering bulletin EP-40R describing Centralab Plug-In Packaged Electronic Circuits and other P.E.C. bulletins are available upon request:

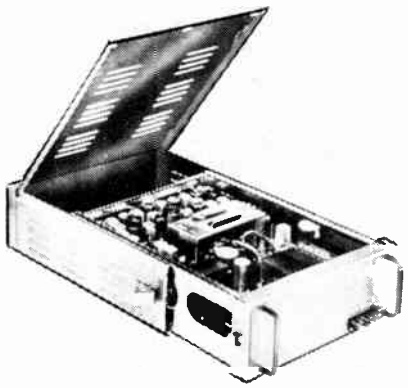
Centralab, A Division of Globe-Union Inc., 964J East Keefe Avenue, Milwaukee 1, Wisconsin.

Universal 6/12 Volt Mobile Radio Equipment

Item 864

The Model 6000 Series Mobile Radio is a frequency modulated transmitter-receiver designed to afford interference free operation in the frequency ranges of 25-50 Mc and 152-174 Mc.

The basic mechanical design incorporates a transmitter and receiver mounted on a single chassis which may be integrated under one cover with a choice of power supply which will afford 30 or 60 watts RF power output in the 25-50 Mc and 152-174 Mc band.



The 6000 series mobile transmitter and receiver may be supplied and equipped for two frequency operation within a spread of 300 Kc. Universal 6/12 volt operation is accomplished automatically by the battery connector. No wiring changes are required.

In addition to the above, the 6000 series equipment is designed for adjacent channel selectivity. The receiver provides a nominal 85 db or better signal attenuation, 30 Kc from center frequency not more than 6 db at 15 Kc. Bandwidth is adjustable in the field for split channel operation.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

Small Inconspicuous Condenser Microphones

Item 865

Due to the development of the M.S.C.2 low-noise amplifier valve by Albert Hiller, K.G., Hiller Condenser Microphones with associated amplifiers are now available in much reduced sizes, meeting the demand for inconspicuous microphones in TV and radio studios, for broadcasts from concert halls or theaters — on speaker's rostrums or for radio commentary work. New type thin metal diaphragm takes care of high temperature demands permitting good performance up to 80°C. This diaphragm is also corrosion-proof.

The valve and capsule are contained in one unit and the other bulky components of the amplifier including the transformer in another unit separate from the microphone and can be placed out of sight.

Increased frequency range and a low noise level provides improved quality of production now demanded by the use of high frequency techniques.

Hiller Condenser Microphones are made in several models — table models — floor models — coupling units—combination swan neck. Coupling unit and clamp and with protective cage.

Enquire:

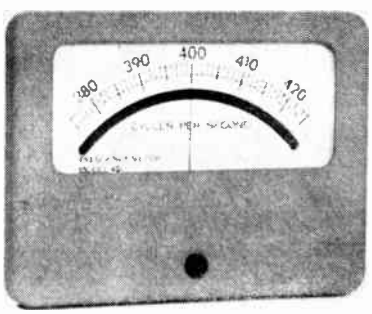
Alex L. Clark Limited, 3745 Bloor St. W., Toronto 18, Ontario.

Arga Expanded Scale Frequency Meter

Item 866

The Arga Expanded Scale Frequency Meter is an instrument for accurate monitoring of line frequency. It is available in two base frequencies; the 60 cycle base with span of ±2 or ±4 cycles, and the 400 base with span of ±20 or ±50 cycles.

The accuracy is ¼% for both instruments for input harmonics of 15% and input voltage variations of —10%, —20 from nominal.



The meters are supplied for panel mounting in 2½ and 3½ inch round and square commercial, in 2½, 3½, and 4½ inch round ruggedized and sealed, and 4 x 6 commercial.

All meters give long dependable service over wide ranges of environmental conditions.

Sales Representative: R-O-R Associates, Ltd., 290 Lawrence Avenue West, Toronto, Canada.

New ESICO Luger Soldering Gun

Item 867

The new, compact ESICO Luger Soldering Gun has its light weight evenly distributed . . . reduces fatigue and speeds work. Its handsome, red, molded housing is built to stand up to rough handling. Perfect balance makes it feel right the first time because it's designed to fit the hand for easy use. Twin lights eliminate all shadows and spotlight the work. Now, those hard-to-get-at places are a snap . . . the loop tips get into nooks, crannies and remote spots with complete ease. ESICO long-lasting tips heat more quickly to save time, too. Available in

short or long, straight or bent shapes to meet every requirement. When not in use the Luger rests on its side without the necessity of a stand. See the new ESICO Luger today at your local distributors or write to:

Electronic Tube and Components Division, Canadian Marconi Company, 830 Bayview Avenue, Toronto, Ontario.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Broadcaster Transmitters

Item 868

A range of 0.25, 1, 5, 10 and 50 KW broadcast transmitters from Canadian Westinghouse Co. Ltd.

These transmitters represent a deluxe design in which no features that would improve performance, reliability and ease of operation are omitted. They are especially suited to the requirements of present day regional stations utilizing directional antenna systems, and unattended operation.

Canadian Westinghouse also supply the latest type of remote control equipment of advanced design and extreme versatility. The Company is fully equipped to engineer and build complete broadcasting stations on a package basis.

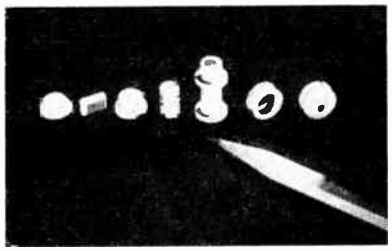
Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

New Centralab Facilities Cut Cost Of Grade L-5 Steatite Ceramics

Item 869

New Centralab production equipment and methods provide substantial savings on diamond-hard insulators and small parts, such as feed-throughs, coil forms, tubes, bobbins, and igniter parts.



Centralab's steatite ceramics are harder than quartz — and provide low loss at high frequencies. They can be metallized for close-tolerance applications. They have exceptionally high dielectric strength, high compressive strength, dimensional stability, and high heat resistance. They are impervious to alkalis, grease, oil, and common acids.

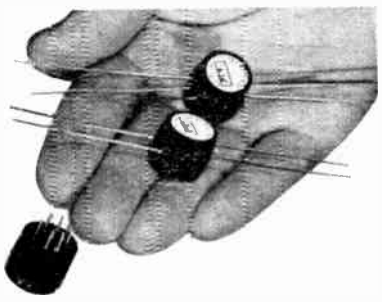
Centralab's Ceramic Buyer's Guide, Bulletin 42-221 is available upon request:

Centralab, A Division of Globe-Union Inc., 964J East Keefe Avenue, Milwaukee 1, Wisconsin.

Tiny Encapsulated Pulse Transformers Wound To Your Requirements

Item 870

Technitrol Pulse Transformers are wound on ferrite cores and cast in resin. They lend themselves well to printed circuits where holes can be drilled in the circuit board, the transformer plugged in, and the pins soldered to the leads on the side opposite the body of the transformer.



Compact Delay Lines Designed To Fit Your Need

Technitrol Delay Lines — with no more than ¼" diameter and 6¼" length, or in a package — will be designed for your particular circuit application. A variety of mountings offers you a wide choice.

Write for information, specifying application and requirements:

Technitrol Engineering Company, 2751 North Fourth Street, Philadelphia 33, Penna., U.S.A.

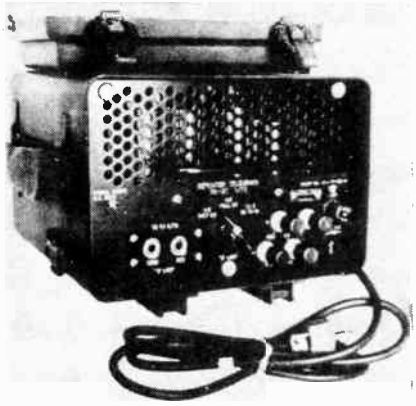
Repeater, Telegraph TH-12/TC

Item 871

The Stelma Repeater, Telegraph TH-12/TC provides two-way operation between two-wire half duplex loop and four-wire full duplex loops.

The TH-12/TC Repeater provides for connection between a four-wire full duplex neutral loop and a two-wire half duplex neutral loop. Either line may be 20 ma or 60 ma. One line may be 20 ma while the other is 60 ma. No loop current is supplied by the Repeater. Lock out circuits provide two-way operation without interference. Two seconds after transmission has ceased in one direction the Repeater is ready for transmission in either direction.

The Repeater is provided in a cabinet 10" wide x 6¾" high x 10½" deep.



Two units may be mounted on one 7 x 19 inch panel for rack mounting. No relays are used in the Repeater. Keying speeds up to 240 wpm may be handled by the Repeater with less than 5 per cent distortion.

Stelma, Inc., 389 Ludlow Street, Stamford, Conn., U.S.A.

National Teletronics Corp.

Item 872

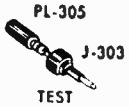
SPIRAL TYPE SECOND ANODE CONNECTOR NO. 245

1. Clip-Made from .045 music wire; good spring tension. Design features: hooks eliminate any possibility of disconnection. Spiral: eliminates possibility of conductor breaking off at solder joint due to any bending strain.
2. Sleeve Insulator — Made of temflex-polyethylene; will withstand approximately 15,000 volts.
3. Wire — 16/30 or 19/30 stranded copper tin coated with .045 or .067 wall thickness; rulon insulation (polyethylene flame resistant).

#245
SPIRAL TYPE

INSULATED TIP JACK NO. J-303

1. Body — ¼" — 32 brass nickel; supplied with hex nut and insulating shouldered washer.
2. Head — $\frac{7}{16}$" and ½" diameter machined plastic in red, black and other standard colors.
3. Contact — Sturdy spring made from phosphor bronze silver plated or any other finish specified.



INSULATED TIP PLUG NO. PL-305

1. Handle — Molded plastic; red, black and other standard colors.
2. Plug — Brass nickel plated and threaded wire hole.
3. Knurled Sleeve — For tightening up on wire making unnecessary to solder connection.

OUR CATALOG WILL BE SENT UPON REQUEST.

National Teletronics Corp., Yonkers, New York.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

High Frequency Wood Bonding Equipment

Item 873

Extremely fast wood bonding is possible with electronic equipment manufactured by Woodwelding, Inc., of Burbank, California. Standard and custom built models ranging from small "hand guns" to giant factory jigs and presses are now widely used in all fields where extremely fast wood

bonding and lamination are desired . . . from doors, cabinets and architectural installation to boats and aircraft.

More information, service and technical engineering are available from:

Preston Woodworking Machinery Co., Preston, Ontario, and the Sutherland-Schultz Electric Company, Kitchener, Ontario.

Power Converter

Item 874

Trav-Electric "Chief" is the new leader in a line of power converters, changing battery to 110 volts A.C. It is manufactured by the TERADO COMPANY, St. Paul, Minn. Designed to be mounted under the dashboard of a car, the new unit is suitable for operating tape recorders, wire recorders, public address systems, amplifiers, business machines, electric drills,

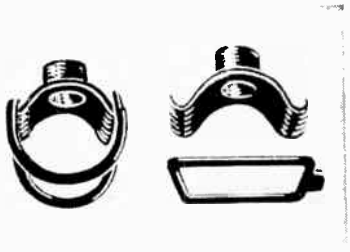
heating pads, radios, hand vacs, electric shavers, etc. It is equipped with an automatic ON-OFF switch. Two models are available; the 6 volt with a capacity of 75 to 100 watts and the 12 volt rated at 100 to 125 watts. For further information write to:

Atlas Radio Corporation Ltd., 50 Wingold Avenue, Toronto 10, Canada, who are Terado's Canadian representatives.

Cradleclip

Item 875

Wiring time in electrical installations can now be substantially reduced through the use of the Insuloid CRADLECLIP Wiring System. Binders for unsupported wiring and cradles for anchored wiring assure permanent, safe and fast installation.



British Patent No. 735763
Canadian Patent Pending

Both Binders and Cradles are made of tough, unbreakable Nylon, while fastening rings are formed of molded PVC. This arrangement combines durability and flexibility necessary to secure any type of wiring. Available in a range of sizes to meet all electrical needs.

Distributed exclusively by:

Electrovert Ltd., 265 Craig St. W., Montreal.

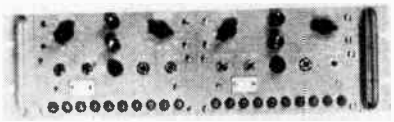
Automatic Telegraph Distortion Monitor

Item 876

The Automatic Telegraph Distortion Monitor is designed to detect a predetermined number of telegraph distortion hits with a specified interval of time and, upon detection, operate a visual and audible alarm.

Any 20 ma or 60 ma neutral loop may be monitored by simply connecting the input of the Distortion Monitor in series with the loop.

When an automatic telegraph circuit begins to deteriorate considerable copy may be lost before an attendant notices the errors in received messages. To prevent loss of traffic and to decrease considerably the amount of attendance required in terminal stations, Stelma, Inc., has developed the Automatic Telegraph Distortion Monitor.



By connecting a Monitor unit into each telegraph loop at the terminal end, a line which is deteriorating will set off an alarm at the Monitor before serious loss of copy can result. The Monitor unit can be preset so that various degrees of loop signal deterioration will actuate the alarm.

Stelma, Inc., 389 Ludlow Street, Stamford, Conn., U.S.A.

Microwave Associates Inc. Descriptive Catalog

Item 877

A complete catalog in file folder form describes Microwave Associates Inc. extensive line of components for the range of frequencies 2000 to 75,000 mcs.

Included are: circular wave-guide components, silicon diodes, tr and atr tubes, magnetrons and microwave instrumentation.

Microwave Associates silicon diodes have application to airborne and ground telecommunications, test instruments and armament electronics. Special purpose types, capable of being applied directly to: Vidio impedances, directional couplers, and guided missile Beacon detectors are specified, along with coaxial type diodes for the upper portion of the spectrum.

Microwave Associates TR tubes for s and x bands feature special high "Q" windows for high power operation — also obtainable on separate order. TR tubes in dual combinations, for slot hybrid duplexers, along with solenoid operated shutter types, for added crystal protection, are among the special types featured.

One hundred components for operation within the range of frequencies 2-75 kmcs are specified, and include: radar rf units, test benches, hog horns, balanced mixers, crystal mounts, attenuators, water load calorimeters, rotary joints, precision rf switches and echo boxes.

Microwave Associates research in the field of circular wave-guide transmission is reflected in the inclusion of several circular waveguide components in this catalog.

Microwave Associates has experienced and specialized engineering sales representation in Canada, which is at the disposal of both government and industry.

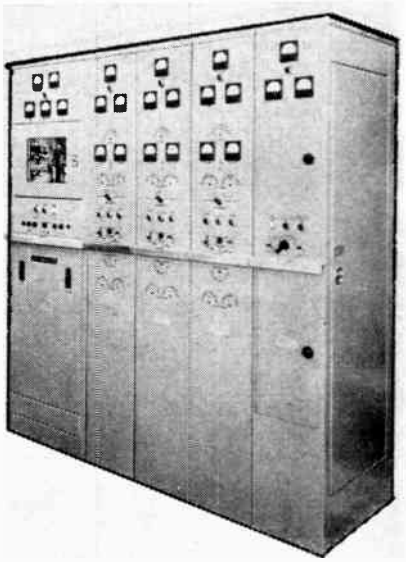
Write for, either the catalog, or individual technical specifications to:

E. G. Lomas, 227 Laurier Ave. West, Ottawa, Ontario.

Type MW Communications Transmitter

Item 878

A range of Medium Power point-to-point transmitters is available from Canadian Westinghouse. This unitized transmitter is available for operation on the 250-540 Kcs or 2.0-24.0 Mcs bands. Rated powers are 4.5 KW LF/MF and 3.0 KW HF.



Unitized construction is employed with separate rectifier and RF units, providing maximum flexibility. A unique feature is the absence of conventional tuning elements in the LF/MF units. These components are replaced by specially designed Hipersil cored transformers.

In widespread use throughout the world, Westinghouse Type MW transmitters have a proven record of operation under extreme climatic conditions, and are to be recommended where a high degree of reliability is paramount.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

New Industrial Subminiature And Transistor Sockets

Item 879

Specially designed for subminiature circuits and transistors, these new Industrial sockets are made of low-loss mica-filled phenolic. They feature a novel chamfer design at the top surfaces to allow easy insertion of delicate tube or transistor leads. Generous trail spacing laterally provides

ample soldering room and greater protection against shorts. Beryllium copper contacts are used. Silver coated plating as well as other finishes are available. The manufacturer invites inquiries for samples and specifications:

Industrial Hardware Mfg. Co. Inc., 109 Prince St., New York 12, N.Y.

Megohm Meter

Item 880

A Megohm Meter able to test to 10 million megohms at 200 or 500 volts D.C. is combined with a 3000 volt A.C. high potential test set in one portable unit, the "MEGPOT". A sensitive leakage indicator with a 20 micro-amperes to 3 milliampers range provides non-destructive testing efficiency opening the circuit when desired allowable leakage is exceeded. The Megpot's

high-speed safety relay protects personnel from shock danger and a built in calibrator assures accuracy. Primary input measurement errors are eliminated because voltage is read directly across output leads. Highest voltage ranges are provided at slight extra cost.

Instrument Division — GENERAL HERMETIC SEALING CORPORATION, 99 East Hawthrone Avenue, Valley Stream, New York, U.S.A.

Type HJ Scatter Equipment

Item 881

The Electronics Division of Canadian Westinghouse is supplementing the Type FR/FJ 2000 Mc/s Microwave equipment with long range tropospheric scatter equipment. This new equipment can profitably be used in areas where standard microwave links are impossible, requires a minimum of maintenance and can be transported by air to installation sites.

Employing high power transmitters and high gain antenna, the equipment provides reliable communication over distance heretofore covered by several repeaters in tandem for a "conventional" microwave system.

Increased flexibility and greatly reduced installation costs make the use of scatter equipment for utilities mining and construction companies even more attractive than previously employed conventional radio communication systems.

In snow, rain or fog, the Westinghouse Type HJ Scatter equipment spans vast areas of inaccessible terrain, and will take its place in the rapidly expanding communication networks of the world.

Address enquiries to:

Canadian Westinghouse Co. Ltd Electronics Division, Hamilton, Ont.

Telescoping Shield For Miniature Tubes

Item 882

A new type of telescoping shield for miniature tubes has been developed by the Staver Company as an addition to the standard line of wrap-around Mini-Shields presently being used on printed circuits and metal chassis. The new CapTiVated Mini-Shield for use in "hot chassis" applications is secured by utilizing standard chassis mounting holes, eliminating the hazard of grounding.

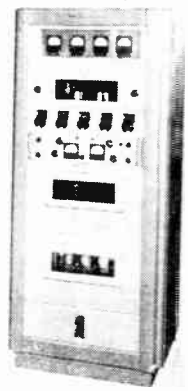
CapTiVated Mini-Shields for 7 and 9-pin medium height miniature tubes are in production, with other lengths and varieties to follow. Standard Mini-Shields are available in all sizes.

Staver Company, Incorporated, 41-51 N. Saxon Ave., Bay Shore, L.I., N.Y. Represented in Canada by Electronic Essentials Ltd., 50 Wingold Avenue, Toronto 10, Canada.

Type HA HF Transmitter

Item 883

A new communicating transmitter has been announced by Canadian Westinghouse employing latest tubes and circuit techniques. The Type HA transmitter has a rated output of 1 KW into output impedances of 51.5 ohms and 300-600 ohms over a tuning range of 2.0-27.0 Mcs without band switching. Design provides for high



speed CW., radiotelephone, frequency shift keying, and facsimile transmission. A high level speech modulator is employed which provides clipping and limiting functions consistent with ample power.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

Radio Cores, Inc. Has Everything In Iron Cores

Item 884

Regardless of your requirement, we can supply a full line of custom iron cores in a variety of sizes and shapes.

We originated the ways and means of providing ENGINEERED ECONOMY* IRON CORES at money saving prices and from stock. Over 14 types are available.

The world's largest producers of iron cores, employing the largest, most experienced and most efficient engineering department to design, produce and suggest iron cores which will do the best job for you.

Write today . . . tell us your problems . . . you'll be glad you did.

* Trademark.

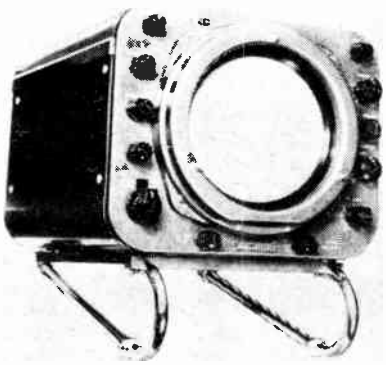
Radio Cores, Inc., 9540 Tulley Avenue, Oak Lawn, Illinois, U.S.A.

Marine Radar

Item 885

The only complete range of Marine Radar equipment featuring advanced design techniques is offered by Decca Radar (Canada) Limited. Decca 212, introduced early in 1955, a low cost full performance marine radar, brings within reach of smaller vessels a high standard of performance not previously obtainable without the penalty of higher cost, excessive weight and size and high power consumption. The Decca 212 has dual pulse lengths, 9" display and range scales from ½ mile through to 30 miles. Total weight (including motor alternator) 329 pounds.

Decca River Radar Type 214 has just been introduced throughout the world. This revolutionary radar was originally designed by Decca for the exacting requirements of Rhine and Mississippi Navigation. Wherever the hazards of bad visibility and fog combined with heavy currents, narrow channels and high traffic density or



similar conditions preclude the use of Marine Radar, Decca 214 has an application. Range scales from ½ to 10 Kilowatts and a pulse length of 0.05 u.sec. with receiver band width of 20 m.c/s ensures high definition with a range discrimination of 10 yards.

Decca 45 continues to provide the optimum in long range performance featuring range scales from ½ mile through to 45 miles on a 12" display. A choice of two pulse lengths and receiver band widths (0.1 u.sec-10 m.c/s) 1.0 u.sec- 4m.c/s) ensures high definition when needed without detracting from the long range capabilities of the set.

Decca Radar (Canada) Limited, Toronto.

Decca Air Surveillance Radar M.R. 75

Item 886

This new radar meets a growing demand in both military and civil fields for a simple, reliable, yet economical equipment for medium range Air Traffic Control use. It fills the gap between Decca Airfield Control Radar Type 424 and the more expensive high power 10-50 c.m. radars. A high gain aerial having a cosecant² coverage pattern is employed, which may be

mounted remote from the displays, with a 250 K.W. peak pulse output transmitter.

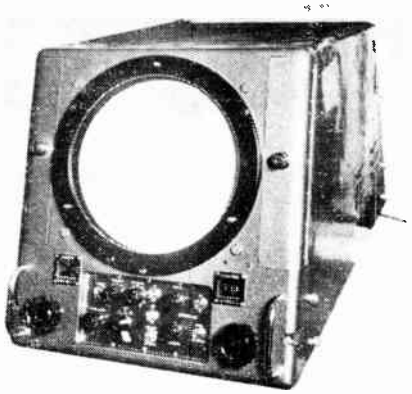
The transmitter receiver cabinet feeds either a rotating coil or the new Decca fixed coil display. Solid vertical coverage on a small aircraft such as a jet fighter is achieved out to approximately 50 miles at heights up to 25,000 feet. The maximum range on larger aircraft is 75 miles. Features such as dual pulse lengths and receiver bandwidths, aerial controllable in angle of elevation, choice of linear or logarithmic receiver gain characteristics, off centering of the display and variable range marker are standard on the Decca MR 75.

Decca Radar (Canada) Limited, Toronto.

Decca Universal Display

Item 887

The increasing complexity of radar equipments and everchanging operational requirements has led to a trend towards universal display techniques. To be universal in the true sense requires that the basic function of the display can be changed with a



minimum of time and expense. The Decca Universal Display incorporates a fixed coil design allowing several interscans and considerable flexibility in the type of presentation. Unit chassis of the "plug-in" type contain the various deflection, gating, calibration, mixing and interscan circuits and these individual chassis can be readily changed to alter the function of the display. The viewing unit itself is compact and all ancillary circuits are contained in rack mountings which can be remoted to an equipment room. The unique features of this display insures against obsolescence and facilitates incorporation of the display in an operational radar unit.

Decca Radar (Canada) Limited, Toronto.

The Decca Q-Band Radar

Item 888

Another Decca "first", Decca Q-Band Radar, for Airfield Surface Movement Indication was designed to meet an urgent operational requirement at large modern airports. Existing modern navigational aids and airport radar systems enable air traffic to be maintained under conditions of very poor visibility but the steady flow of inbound and outbound traffic can

be maintained only if aircraft can be supervised and directed when on the ground. Conventional 10 c.m. and 3 c.m. wavebands cannot, if they are to be economic in design, paint a picture of the airport with sufficient accuracy and clarity. The previously unexplored 8 millimetre waveband (34,000 m.c/s) used in Decca A.S.M.I. Radar, together with a beamwidth of 0.3 degree and pulse length of 0.05 u.sec produces an airport picture in which every feature is sharply and clearly defined. Stationery and moving traffic on the runways and perimeter track is accurately plotted.

Decca Radar (Canada) Limited, Toronto.

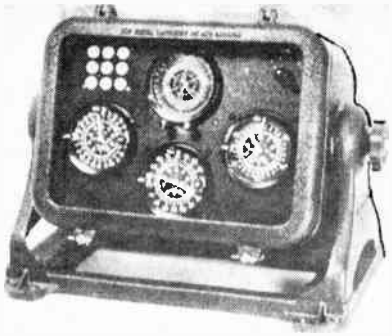
To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Decca Navigator

Item 889

The Decca Navigator System is finding increasing use in Canada in the specialized fields of Aerial Photographic Survey, Hydrographic Survey, Cable laying etc. Light weight transportable ground station equipment simplifies the problem of site selection and a variety or receivers, airborne, marine, survey and special man

(Continued on page 124)



pack type, together with Track Guide Flight Log equipment ensures ease of application of the system to most navigational or position fixing problems. The Company will be pleased to discuss the application of the Decca Navigator System or provide further information on request.

Decca Radar (Canada) Limited, Toronto.

Decca Radar 424 Series (X Band)

Item 890

The Decca 424 originally introduced as an airfield radar for approach surveillance and control has led to a series of specialized equipments suitable for coast watching, port supervision, control of bombing and artillery ranges and similar applications.

Type 424N — provides a higher data rate and increased detection ranges, with 60 K.W. peak power, 40 r.p.m. scanner rotation and p.r.f. of 2000.

Type 424NB — a raviation of the standard 424N fitted with a narrow beam aerial system and a display providing high accuracy plotting facilities.

Type 424W — cosecant² vertical coverage — high data rate, log/linear receivers with PPI presentation and as an extra, a "B" scan display for photographic purposes. Peak Pulse power up to 250 K.W.

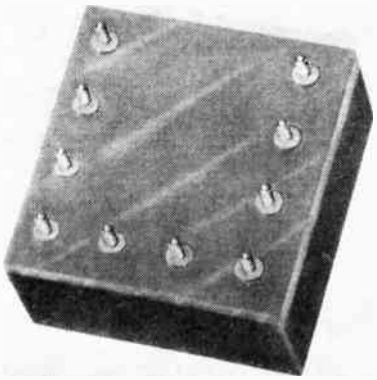
Decca Radar (Canada) Limited, Toronto.

Epsco Magnetic Storage Element Type SR 11

Item 891

An extremely low power, medium frequency, sub-miniaturized magetic storage element suitable for mounting on etched wiring boards. The wide operating limits and encapsulated packaging contribute to the ultra-reliable performance of this unit.

This unit is intended for airborne and missile applications and may be driven by sub-miniature tubes. It is adaptable for transistor operation. An exceptional design feature is the high ratio of storage elements to drive tubes.



Information rate design center (kc)	10
Practical upper information rate (kc)	20
Max. peak power per shifted one at design center (watts)	5
Cores per binary digit	1
Nominal drive current peak (ma)	70
Nominal voltage signal at point x (v)	11
Nominal one to zero voltage ratio	7
Peak inverse voltage diode rating minimum (v)	25
Minimum drive current width at nominal amplitude (us)	5
Maximum drive current width at nominal amplitude (us)	20
Voltage drop on drive winding at nominal current (v)	7

Size: ¾" x ¾" x 7/8" high.

Diodes not supplied by Epsco except on special order. Unit not guaranteed unless used with Transitron Type 1N116 Diode or exact equivalent.

Epsco Incorporated, 588 Commonwealth Ave., Boston, Mass.

New Miniature Multiturn Precision Potentiometer

Item 892

This precision miniature 10-turn potentiometer features linearity of .05 per cent standard and .025 per cent above 10 K. as a special tolerance where required. Overall length of the L10S is 1⅜" from front mounting surface. Diameter of the pilot is ¾". The red anodized aluminum housing is fully shielded High resolution, low torque, long life and stability under environmental conditions meeting military specifications are features of the L10S. The synchro mounting provides precision positioning. Precision stainless steel ball bearings and high concentricity contribute to the low torque specifications.

CHARACTERISTICS:

Resistance range is 1000 ohms to 100,000 ohms, with a tolerance of ±5 per cent of total R. standard. ±.05 per cent special.

Ambient temperature range is —55° C. to +125° C. Power rating 5 watts at 40° C., derated to zero at 130° C.

Maximum starting torque .75 inch ounces at 20° C. and running torque .60 inch ounces.

Limit stops have 5 in. lbs. breakage torque. The mechanical rotation is 3660° ±5° and electrical rotation is 3600° +1° —0.

Gold flashed silver turret terminals are standard.

Taps may be provided to within ±1° std.

Multiple taps available on special order.

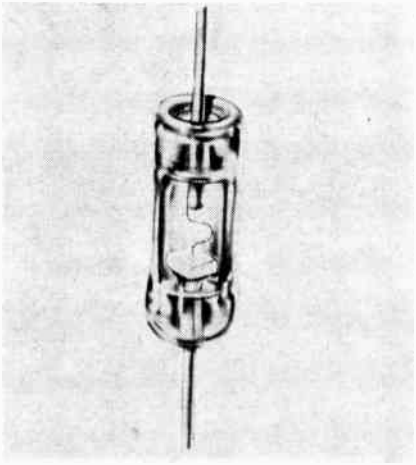
Technology Instrument Corporation, 531 Main St., Acton, Mass.

Subminiature Gold Bonded Germanium Diodes

Item 893

Transitron Electronic Corporation of Melrose, Mass., announce the availability of a new type of subminiature glass diode for computer operation.

Types such as the T7G have a forward current of over 200 ma at 1 volt, with .5 megohms inverse resistance at —50 volts. Peak currents of over 350 ma are realistic for this diode. Other diodes such as the T5G have inverse resistances greater than 1 megohm at —100 volts.



This diode has been developed primarily for low impedance applications that require a diode with good switching characteristics. It is ideally suited for many computer applications requiring high peak pulse currents. It is also coming into prominence in many applications employing transistors. Their hermetically sealed gold bonded construction is designed to MIL-E-1B specifications.

Transitron Electronic Corp., 407 Main Street, Melrose 76, Mass.

Silicon Power Rectifier For 135°C. Operation

Item 894

Transitron Electronic Corporation of Melrose, Mass., announces the availability of a group of silicon power rectifiers capable of continuous operation at full rated power at a case temperature of 135°C.

These new rectifiers overcome the basic disadvantage of selenium, germanium and vacuum tube types, and provide, for the first time, reliable operation under wide variations in ambient temperature. Their high forward conductance and extremely low leakage current allow operation at efficiencies up to 98 per cent. Designed for conduction cooling, these rugged rectifiers provide major savings in both size and weight.

Types for both magnetic amplifier and power supply applications are available. Since these rectifiers do not exhibit forward aging effects, complex and costly compensating networks are unnecessary.

The silicon rectifier is now in production and immediately available.

Transitron Electronics Corp., 407 Main Street, Melrose 76, Mass.

Technology Instrument Corp. Of Acton, Mass. Announces The Type 800-A Vacuum Tube Voltmeter for Extended-Range Voltage, Resistance and Current Measurement

Item 895

The new Type 800-A combines the inherent accuracy of the basic voltmeter with a highly degenerative amplifier circuit. Combined with the further improvement of developing the feedback voltage across a single precision resistor, the degenerative network provides previously unachieved stability. The unique circuitry of the 800-A provides this long-term stability by elimination of the tube-aging problem and the effect of fluctuations of the meter's copper-wound coil resistance due to temperature and manufacturing variations.

Designed for rugged field duty as well as precision laboratory work, this compact instrument reads AC voltage over the frequency range from 15 cps to 100 Mc on eight full scale ranges of 0.1 volt to 300 volts; nine DC voltage scales from 0.1 volt to 1000 volts; resistances on a single scale calibrated from 0.2 to 500 ohms with nine multipliers from XO.1 (0.02 to 50 ohm scale) up to X10 Meg. (2 to 5000 megohm scale); and nine direct-current, full-scale ranges from 0.001 microampere to 100 milliamperes.

Accuracy on AC voltage is ±3 per cent of full scale for 1.0 volt and higher ranges, and ±5 per cent of full scale for 0.3 volt and 0.1 volt ranges. Accuracy on DC voltages is ±2 per cent of full scale for 1.0 volt and higher ranges, and ±3 per cent for 0.3 and 0.1 volt ranges. Accuracy of direct current is ±2 per cent of full scale for 0.1 microampere and higher ranges, and ±3 per cent for 0.001 and 0.01 microampere ranges.

Input impedance for DC volts is 100 megohms; for AC volts, probe input capacitance is 5 uuf. and 10 megohms (nominal) at lower frequencies; for direct current, input impedance is such that input voltage drop is 0.1 volt at full scale on all ranges.

Because of the highly stable circuitry of the Type 800-A independent AC and DC zero-set controls need be set only on voltage ranges below 1 volt full scale. Once adjusted for low scale operation, no further calibration is required for measurement in any multiplier range. Size 7" x 7" x 9", weight 11¾ lbs.

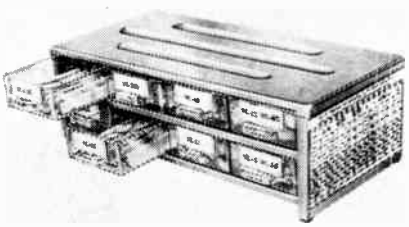
Write for detailed bulletins to:

Technology Instrument Corp., Dept. PR, 531 Main Street, Acton, Mass.

JFD Piston Capacitor Kit, PK85

Item 896

New JFD piston capacitor kit, PK85, contains a comprehensive assortment of 85 quartz and glass precision piston capacitors of the 10 basic types now in electronic experimental use.



All piston capacitors in the PK85 are individually packaged, and housed by a rugged metal cabinet with a double row of compartment drawers.

Further information on request from:

J.F.D. Manufacturing Co. Inc—Electronics Division, 6101 16th Avenue, Brooklyn 4, N.Y.

Type HB Variload Power Meter

Item 897

Announcing the new Type HB Variload Power Meter for the UHF Band. Originally intended to provide any terminating resistance in coaxial lines from 40 ohms to 100 ohm, this novel design has been made into a power meter reading directly on a single scale power inputs of 0-100 Watts in the UHF range of 200-500 Mc/s.

Thus in a single power meter a resistance of 50, 75 and 93 can be readily set providing a correct terminating resistance for each of the standard line impedances. For additional information refer to the display advertisement in this issue.

Address enquiries to:

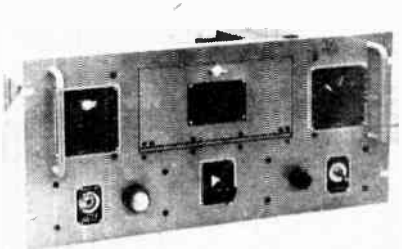
Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Electronic Regenerative Repeater TT-63A

Item 898

The Stelma Regenerative Repeater TT-63A is designed to accept 60, 75 or 100 wpm telegraph signals with up to 45 per cent marking or spacing bias and produce an output of less than 5



per cent distortion. Either tone or dc signals are accepted by the TT-63A. The output may be polar or neutral signals. The Stelma TT-63A is being used throughout the U.S. Government Services.

Stelma, Inc., 389 Ludlow Street, Stamford, Conn., U.S.A.

New Miniature Electrolytics

Item 899

The New Type ET has industry's widest range of values, specifically designed for: portable TV sets, miniature radios, hearing aids, miniature tape recorders and other sibminiature assemblies with conventional or printed circuitry and/or transistors in applications where space is severly limited. They feature exclusive Astron "SM" Safety Margin design — conservative ratings in subminiature cases. Hermetically sealed for reliable operation in all climates. Dependable 85° C. operation. Widest range of values available anywhere. Stable capacitance characteristics due to extremely pure foil and special high-gain etch process. Exceptionally low current leakage. Low-resistance terminal tab connection. Available with cardboard or plastic sleeves. These tiny electrolytics have the self-restoration properties and the stamina needed to withstand high surge voltage, ripple current and high temp applications.

Series "X" Mylar — Plus Capacitors

This new group of capacitors including combinations with "Mylar" sweep away all present conceptions of plastic capacitor operation. They have operating characteristics as follows: A temperature range from —65°C. to 150°C. and can be adapted to 200° C., either D.C. or A.C. with maximum frequency of 400 cps.; maximum efficiency at any altitude. Astron series "X" Mylar — plus capacitors are available in many case styles, including hermetically sealed metal cases that meet the requirements of the temperature and immersion tests of MLL-C-25A. Special sizes to meet particular applications can be supplied to your specifications.

The Astron Comet

A "first" in molded plastic tubular metalized paper capacitors. The Comet type MBP special capacitance values to meet your particular applications. It combines the operating characteristics of a metalized paper capacitor with the protection of a molded plastic shell and bonded seal.

It possesses properties that provide extra protection against overloads and monetary surges. Metalized-paper construction results in small size and light weight with lof r-f impedance. A new, solid thermosetting impregnant provides high di-electric strength and improved insulation resistance. The capacitor operates dependably up to 125°C., and the shell and seal are immersion-proof and impervious to extremes of heat, cold and moisture. Leads cannot pull out or melt out. Every unit is individually tested and guaranteed.

Astron Corporation, 225 Grant Avenue East, Newark, N.J., U.S.A. In Canada: Charles W. Pointon Limited, 6 Alcina Ave., Toronto 10, Ont.

Silicon Junction Diodes With High Forward Conductance

Item 900

Transitron Electronic Corporation of Melrose, Massachusetts, announces the availability of silicon junction diodes for operation up to 150°C. and featuring high forward conductance.

These new diodes satisfy the widespread need for reliable high temperature performance. By combining high forward conductance with high inverse resistance, they are ideally suited to nearly all low and medium frequency diode applications. In addition to standard types, new diodes such as the 1N138B offer 40 ma at 1V. Other types, with inverse ratings up to 300V are available.

Designed primarily for signal magnetic amplifier and power supply use, these diodes are also finding application in voltage regulator and limiter service. Their extremely sharp Zener break provides a stable voltage reference.

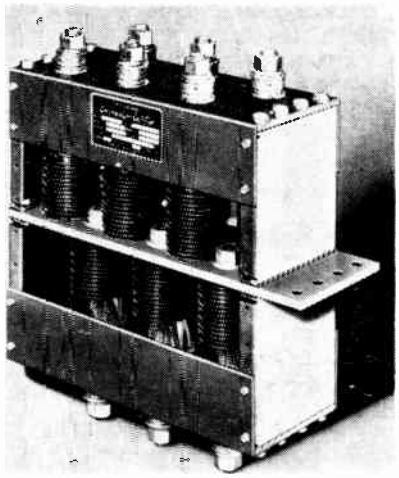
The silicon junction diodes are now in production and immediately available.

Transitron Electronics Corp., 407 Main Street, Melrose 76, Mass.

Germanium Power Rectifiers

Item 901

Three new styles of diffused junction germanium power rectifiers — natural convection, forced convection, and liquid-cooled, have been developed by the INTERNATIONAL RECTIFIER CORPORATION. These units are recommended for AC to DC power conversion where high power output, efficiency, non-aging, and small unit size are required. By careful selection of



junction characteristics and circuit design, and connecting junctions and assemblies in series or parallels, these rectifiers can be supplied for voltage ranges from 10v to 100kv and from 10 amps to 100,000 amps.

These three styles of germanium power rectifiers are now available through:

Atlas Radio Corp., 50 Wingold Ave., Toronto 10.

Oscillographic Recorder

Item 902

A direct-writing, eight-channel, oscillographic recorder just marketed has a frequency response which is flat within plus or minus 3 per cent from zero (dc) to 900 cycles per second. Waveforms on it are scribed as a transparent line on blackened 35 mm. acetate film stock by galvanometer actuated styli which produce a high definition trace of constant width. No photographic processing is needed. High frequency response is achieved in the galvanometer design and by limiting styli excursions to approximately 1 mm, but direct optical projection of the film strip onto a hooded ground glass screen provides enlargement for study or for viewing the recording in progress. Eight information recording channels or traces are provided, plus a ninth solenoid actuated channel for timing or reference marking. All connections are independent.

For full information write to:

Technology Instrument Corporation, 531 Main Street, Acton, Massachusetts.

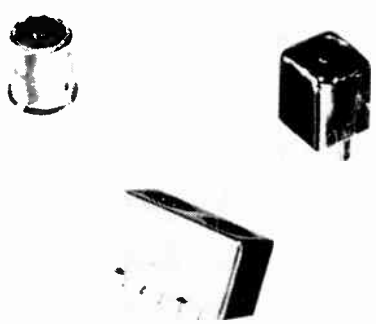
Vokar Corporation Supplies Components

Item 903

As a manufacturer of electronic components, Vokar Corporation supplies vibrators to leading manufacturers of auto-radios, and Vo-Tron IF Transformers, Oscillator Coils and Ferrite Antennas to manufacturers of transistorized radios. The company also manufactures two complete lines of replacement vibrators to fit all 6 and 12 volt auto-radios made since 1939.

The replacement vibrators — the Imperial line and the Quality Brand line — have a number of features in their design which bring performance of the units to an unusually high level.

"Sahara Dry-Packing", developed by Vokar engineers, keeps moisture in the air at such a low level during "canning" operations that the possibility of condensation within the vibrator can during shipping and storage is virtually eliminated. This prevents the condensation on points and resultant corrosion which occurs as the result of ordinary canning methods.



An anti-oxidant coating known as "Vapor-Block" coating which is applied to vibrator points by hand, further protects points from corrosion during the interval between manufacture and final use, and reduces the possibility of pitting and arcing at points which cause early-life failures in conventional vibrators. A new "Swing-Suspension" design reduces mechanical vibration in the vibrator to a minimum improving radio performance.

Vokar's Vo-Tron line of subminiature components first appeared when Vokar supplied IF Transformers and Oscillator Coils for the Regency all-transistor pocket-radio. Measuring only ½" x ½" x ½", these tiny units were the first of that size to be mass-produced.

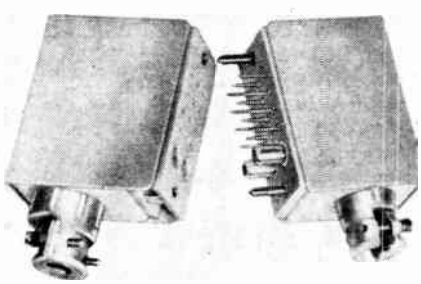
Recently introduced to the electronic industry were the first tandem-tuned IF Transformers (1" x ½" x ⅝") and a square IF Transformer only ½" x ½" x ⅝". These units combining extremely high performance in minimum space, are being incorporated into miniature radio receivers.

Canadian representative for Vokar is Desser E-E Ltd., of Toronto and Montreal. Vokar Corporation, Dexter 11, Michigan.

Type PS Rack And Panel Connectors

Item 904

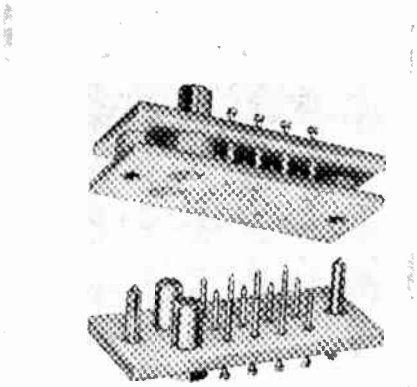
The standard series of connectors is offered in five sizes with various combinations of 3 to 17 power contacts and one or two coaxial contacts. The power contacts have an 8 ampere rating and a minimum sea level flash-over voltage of 3500 volts RMS. The insulators are a new high strength polyester melamine laminate that has good arc resistance and low moisture absorption. The coaxial contacts are



approximately 50-ohms impedance and generally satisfactory for frequencies up to 1,000 mc. Clamping parts, that require no soldering of the braid wires, are available in various sizes for coaxial cables from $\frac{1}{16}$ OD up to ¼ inch for RG-59/U etc. cables.

The basic connectors are supplied for standard machine screw mounting. A Guide Pin and Bushing Kit GK-1 is available that adapts the standard connectors to guide pin engagement and mounting. Cover and cable clamp assemblies are available for hand engagement of the connectors in patch cord or test applications.

The design of the connector parts is such that the pin and socket contacts, coaxial contacts, insulator, and guide mountings can be arranged to make practically any shape or size of connector. The flat insulators do not require molds. Therefore special shapes and combinations can be supplied promptly without special tooling charges.



In addition to the standard types, the parts are available separately. These parts can be readily assembled into special connectors by merely drilling standard size holes in the insulator plates and assembling the component parts. Riveting tools are available which make assembly easy.

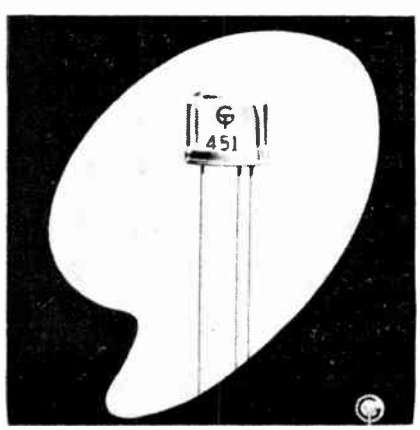
Danbury - Knudsen, Inc., Danbury, Connecticut.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

New High Frequency Transistors By General

Item 905

General Transistor Corp., Jamaica, N.Y., manufacturers of diffused P-N-P junction transistors, is now delivering their new high frequency GT-760 series, it was announced recently by Herman Fialkov, president.



This new series is designed for high frequency operation as RF and IF amplifiers in broadcast receivers, and as switches for high speed computor application.

GT-760, GT-761, and GT-762 with respective Alpha cut-off frequencies of 5 mc, 10 mc, and 20 mc are double sealed like all General transistors — encapsulated in plastic and hermetically sealed in a can.

General Transistor Corp., Jamaica, N.Y.

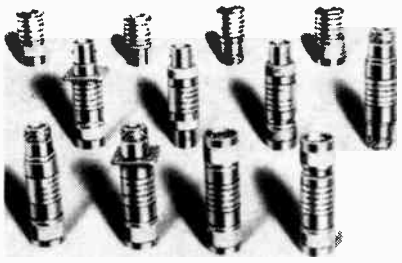
Coaxial Attenuator Pads And Turret Attenuator

Item 906

A new group of single "in-the-line" coaxial attenuator pads and 50-ohm coaxial terminations are now available from the Stoddart Aircraft Radio Company, Inc.

These pads and terminations feature the popular Type "C" and Type "N" connectors, and permit any conceivable combination of the two styles. For example, the two connector types, either male or female, can be supplied on the same attenuator pads, with or without flanges, so that they serve as an adapter as well as an attenuator.

Any value of attenuation from one db to 60 db is available, for the frequency range of dc to 3000 mcs. VSWR is 1.2 maximum over the frequency range for values from 10 to 60 db. As the value decreases below 10 db, the VSWR increases to not over 1.5.



Accuracy of attenuation is ±0.5 db. One watt sine wave power dissipation rating.

The Stoddart Coaxial Line Terminations provide a precision resistive termination for a standard 50-ohm coaxial line fitted with Type "N" or Type "C" connectors.

The popular Stoddart six-position "Pull-Turn-Push" Turret Attenuator is also available. It consists of five standard Stoddart attenuator pads plus a sixth "straight-through" section for zero attenuation. These are turret-mounted about a central shaft, which impart radial and linear motion to the assembly. The selection of each step of attenuation requires simply a "Pull-Turn-Push" sequence. Smooth, positive positioning is accomplished by a spring-loaded detent.

A complete brochure describing both the attenuator pads and the Turret Attenuator and a helpful technical bulletin, "The Measurement of RF Attenuation", will be sent upon request. Write:

Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, California.

Low-Cost Precision Potentiometers

Item 907

New P Series provides low cost molded bakelite precision potentiometers for automation and industrial application. Called the P Series, these units retain all of the precision features developed for stringent military requirements that are applicable to commercial requirements. Available in single or ganged assemblies in three sizes, P3, P1-⅝, and P1-¼, they feature: high standards of accuracy, low noise, long life, low torque, minimized distributed capacity, excellent frequency response, and high stability.

Mounting by means of threaded bushing is standard on P1-¼ and P1-⅝. Precision pilot is optional for servo applications as special order, identified as Type SP1-¼ or SP1-⅝. The P3 mounting consists of three tapped holes as standard. Optional for precision pilot an additional flange is available, as special order identified as Type SP-3. The numeral in Type identifies the diameter of the potentiometer.

For full information write to:

Technology Instrument Corporation, Acton, Mass.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

V.H.F. - U.H.F. Filters

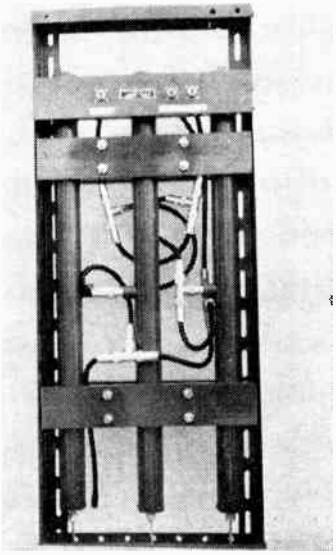
Item 908

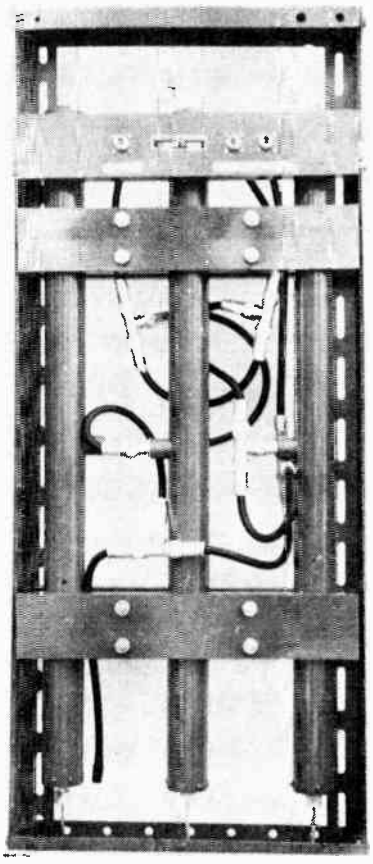
A new type of V.H.F. and U.H.F. filter has been developed by Sinclair Radio Laboratories Limited. These provide isolation between transmitters and receivers in duplex or diplex operation. The models available are:

V70-1A, 70 to 90 Mc/s range.
V150-2A, 150 to 174 Mc/s range.
U450-1A, 450 to 470 Mc/s range.

The isolation is 70 db at 5 Mc separation.

Several other types of filters are also available, i.e. low pass filters for harmonic suppression. Inquiries are invited regarding any antenna and filter problems.





Sinclair Radio Labs. Ltd., 70 Sheffield Street, Toronto 15, Ontario.

I.T.V.

Item 909

A complete line of Industrial Closed Circuit Television equipment is now available from Canadian Westinghouse Ltd. It is designed to give outstanding definition and contrast under indifferent lighting conditions and to withstand the most rigorous industrial usage. The controls associated with the equipment are kept to a minimum, and the units are housed in portable steel cabinets.

The comprehensive line of equipment offered includes cameras, tripods, monitors, control cabinets and explosive and weatherproof cases for equipment. Facilities are available for the movement and adjustment of the camera controlled electrically from a distant point and for the projection of the picture upon a screen for mass viewing.

The standard setup consists of a vidicon camera, camera control unit, and monitor. Cable connections up to 1500 feet can be made without amplifiers. For severe operating conditions, weatherproof and explosion proof housings are supplied.

The camera can be equipped with remote control for focus and lens opening, and focal length control for zoom lens. A complete range of lenses

from wide angle to telephoto can be used. Also offered is remote control of camera pan and tilt.

A 17" monitor is standard equipment and operates directly from a video signal from the camera control unit. The system can also be arranged to operate domestic TV receivers.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

Universal Beacon Transmitter

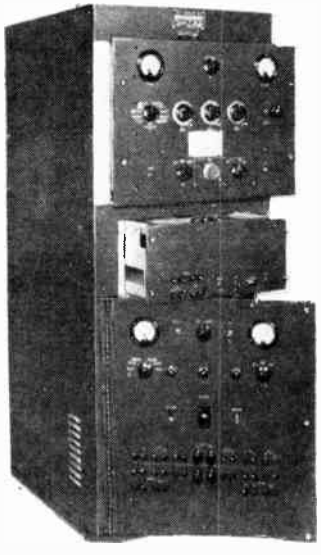
Item 910

The new low frequency Beacon transmitter has been designed and developed by Standard Telephones & Cables Mfg. Co. (Canada) Ltd. to provide an unattended aircraft Beacon for applications where reliability, unattended operation, and severe climatic conditions are considerations of importance.

The transmitter unit, designated the STC R9949, is extremely compact, the modulator keyer and RF stages all being housed in a single cabinet 60" x 25" x 27". The unit is equipped with an automatic keyer providing any desired combination of three letter calls. Two modulating tones, 700 and 1020 cps. are provided, and either may be selected at will by means of the front panel control.

To meet the severe requirements the transmitter has a frequency stability of plus or minus. 01 per cent when operating on crystal, and plus or minus .02 per cent when the built-in VFO is employed. These tolerances apply throughout the operating temperature range of zero to fifty degrees centigrade.

In addition to standard Beacon facilities the unit may be operated as a CW telegraph transmitter, and is also capable of providing commercially



acceptable R/T service. The transmitter will deliver better than 1000 watts into a 50-75 ohm transmission line, and is continuously tunable over a frequency range of 200-530 kcs. All tuning controls are located on the front panel of the transmitter, and operating simplicity is one of its salient features.

A remote control unit is available, enabling the Beacon operation to be controlled from a distant point.

An interesting feature is a completely weather proofed antenna tuning unit which is climatically tested from minus 55° centigrade to plus 55° centigrade. This unit is capable of matching the 50-75 ohm output of the transmitter into a wide range of antennas. A monitor unit is included as an integral part of the ATU and signals an alarm condition to the transmitter station in the case of failure of either the modulation or the RF signal.

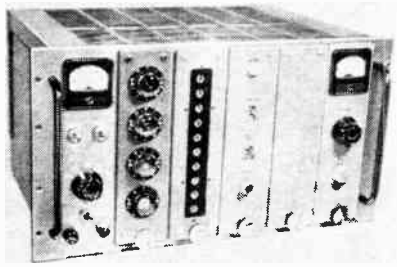
A considerable quantity of these equipments have been manufactured by Standard Telephones & Cables Mfg. Co. (Canada) Ltd. for the Royal Canadian Air Force. They are, however, also available for commercial use.

Standard Telephones & Cables Mfg.. Co. (Canada) Limited, 9600 St. Lawrence Blvd., Montreal, Quebec.

AECL Radiation Scaler Type 908

Item 911

This scaler is a flexible unitized instrument, providing decade scaling and presentation, and designed for the optimum in reliability.



Sub-units can be combined in a number of forms for various purposes. The versatility and reliability of subunits make this instrument useful in a wide variety of applications. Write for detailed specifications to:

Measurement Engineering Limited, Arnprior, Ontario.

Induction Heating

Item 912

Years of experience as a manufacturer of radio frequency, rotating machine frequency and line frequency induction heating equipment has resulted in the development by Westinghouse of a complete line of generating and handling equipment for applications, typical of which are heating for forging, hardening, heat treating and brazing.

Electronic tube oscillators are used to supply power in the radio frequency range. This high frequency power is especially effective in heating smaller work pieces for brazing and soldering, and the hardening of parts where shallow case depths are required. Such equipment can be supplied in output ratings of 5, 10, 25, 50 and 100 KW; larger sizes being available to special order. Accessories include output transformers, transfer switches and standard work handling equipment.

Motor-Generator equipment is available in sizes from 30 KW-1250KW output rating in the frequency range 960-9600 cycles per second. Associated with the basic generating equipment is a comprehensive range of control gear output utilization cabinets, starting equipment and accessories such as power factor correcting capacitors, hypersil cored output transformers and contactors.

A laboratory equipped for testing of customer's applications is located at Hamilton, Ontario, and the services of experienced personnel are available for consultation.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

Automatic Radio Direction Finder

Item 913

Another radio aid to navigation offered by Standard Telephones & Cables is the FTL type 14 Automatic VHF Radio Direction Finder.

This unit provides instantaneous direct reading DF bearings on the CF or voice transmissions of the usual airplane transmitter used for communication with aiport control towers. In its more elaborate form an automatically and remotely controlled 10-channel receiver is available, enabling rapid selection of any one of the 10 VHF Tower frequencies allotted for air ground use. The ready availability of 10 channels makes this equipment extremely attractive where identification of aircraft is required in addition to direction finding. Where a simple system is required a single channel receiver can be supplied and located in

the control tower, making for an inexpensive and efficient single channel D.F. installation.

One of the interesting features of this equipment is that the bearing indicator is mounted on a microphone type table stand and has a display face of approximately 4½" diameter, obviating the usual large viewing consoles in the control tower.

Providing the line frequency is stabilized, accuracy of the equipment for normal low angle vertical polarized signals is within plus or minus 4½°.

(Continued on page 130)

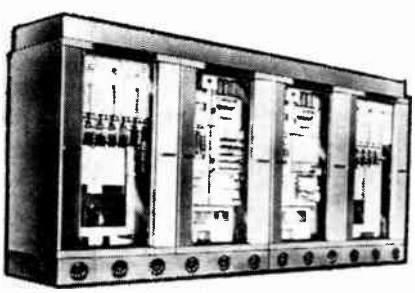
The sensitivity naturally varies with the type of aircraft transmitter used, but bearings obtained are accurate to distances as great as those at which voice communication can be maintained between the tower and the aircraft.

Standard Telephones & Cables Mfg., Co. (Canada) Limited, 9600 St. Lawrence Blvd., Montreal, Quebec.

10 Kw Television Transmitter

Item 914

A new concept in T.V. Transmitters is presented in the Standard Electronics 10 KW Transmitter featuring lower initial cost — lower installation cost, all units self-contained — lower



operation costs. Only 30 KW at 90 per cent power factor — black level and lowest prices with longest life amplifier tubes.

Address enquiries to:

Canadian Westinghouse Co. Ltd., Electronics Division, Hamilton, Ont.

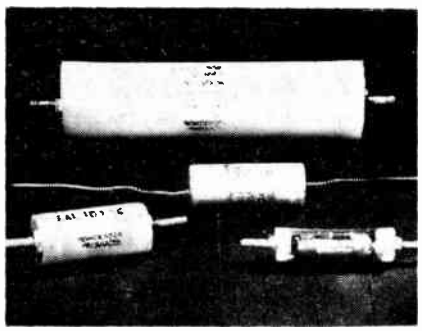
High Insulation Resistance

Item 915

Condenser Products Company, division of New Haven Clock and Watch Company, New Haven, Conn., has announced the development of a polystyrene capacitor of extremely high insulation resistance. The capacitor is designed for use as a charge storage capacitor and as a capacitance divider.

The company has exploited the high insulation resistance of the polystyrene dielectric by using a high insulation resistance plastic tube for the case. The capacitor, except for its studs and aluminum foil winding, is completely plastic. The case itself has much higher insulation resistance than either glass or metal, the two usual capacitor case materials. Thus, surface leakage is kept to a minimum.

The insulation resistance at room temperature is 30,000,000 MEG X MFD at 400 VDC. At 75 Degrees C. the insulation resistance is 1,000,000 MEG X MFD at 400 VDC. These resistance values are measured by the



time decay of voltage method. The plastic case has the added advantage of being only slightly effected by humidity conditions.

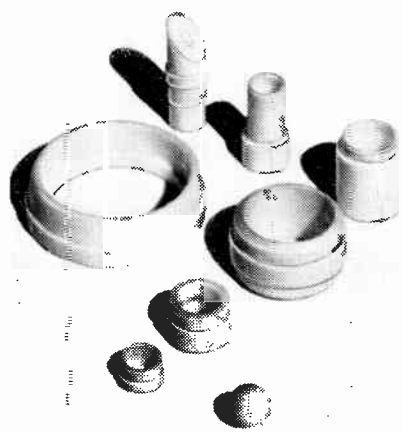
Condenser Products Company, Division of New Haven Clock and Watch Company, 140 Hamilton Street, New Haven, Conn.

Precision Machined Plastic Components

Item 916

The Tri-Point Manufacturing and Developing Company of Brooklyn, New York, specializes in the machining of precision plastic component parts for the electronic field.

Plastics such as Teflon, Kel-F, Nylon, Rexolite, Polystyrene, Polyethylene, Q200.5 and laminated phenolics are described in their brochure.



Tri-Point possesses the technical and engineering down to earth "know how" necessary to fill your requirements promptly, efficiently, and economically.

Write for bulletin:

Tri-Point Manufacturing & Developing Co., 401 Grand Street, Brooklyn 11, N.Y.

Laqua, A New Protective Coating For Metals

Item 917

Fidelity Chemical Products Corp., Newark, New Jersey, manufacturers of Organic Finishes, Metal Treating and Cleaning Compounds, Spray Booth Maintenance Compounds and "X-Var" Wire Stripper Compound, announces a new 4-page brochure on LAQUA, Fidelity's new coating for metals that preserves chemically cleaned surfaces obtained directly after electro plating or a chemical cleaning operation. The new brochure shows how LAQUA is applied by spray on a clean metal surface or as a dip after a final water rinse without drying. This is so, because LAQUA displaces water as it deposits a thin protective film.

Write for copy of the LAQUA brochure to:

Fidelity Chemical Products Corp., 470-474 Frelinghuysen Avenue, Newark, New Jersey.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

A Low Cost Adjustable Toroid Now Available

Item 918

A variable toroidal inductor, called "Adjustoroid", is the latest achievement to emerge from the research laboratories of Burnell & Co., Inc., of Yonkers, N.Y., manufacturers of toroidal coils and filters for various communications and audio applications. ADJUSTEROID is now commercially available in quantity and in any value of inductance available in standard toroids, it was announced by Norman Burnell, President.

ADJUSTEROID provides precise, instant adjustment over a 10 per cent range of inductance, eliminating the need for critical close tolerance capacitors. Some other important features are: high Q, no external power supply, truly hermetic sealing, temperature coefficients same as fixed toroids, no increase in case diameter.

This most recent development of Burnell & Co., Inc., is related to the "ROTOROID", a continuously variable toroidal inductor which they introduced about a year ago. The ROTOROID is stepless and employs no mechanical resistance contacts and is therefore free of noise and wear. It provides a 4:1 range of maximum-to-minimum inductance in 180° rotation of a shaft, and at maximum inductance provides the full Q of the toroid it contains. ROTOROIDS are hermetically sealed and are virtually vibration and shock-proof. They can be chassis or panel mounted.

Design engineers experimenting with ROTOROIDS have already far

expanded the initial applications envisioned by the manufacturer, including tuning audio oscillators, variable impedance devices, adjustable selective networks, variable phase shift networks, variable filters, servo systems and telemetering. Experience of the first few months indicate that the coming year will also bring dozens of new uses for ADJUSTEROIDS.

For illustrated technical bulletins describing either ADJUSTEROIDS or ROTOROIDS, as well as TOROIDS, FILTERS and RELATED NETWORKS, write:

Burnell & Co., Inc., 45 Warburton Avenue, Yonkers, New York.

Heathkit Audio Generator Kit

Item 919

This new Heathkit Model features step-tuning from 10 cps to 100 kc with three rotary switches that provide two significant figures and multiplier. Less than .1 per cent distortion. Frequency accurate to within ± 5 per cent.

Output monitored on a large 4½" meter that reads voltage or db. Both variable and step-type attenuation provided. Meter reads zero-to-maximum and step-type attenuation provided.

at each attenuator position. Output ranges (and therefore meter ranges) are 0-.003, .01, .03, .1, .3, 1, 3, 10 volts. Step-tuning provides rapid positive selection of the desired frequency, and allows accurate return to any given frequency.

For further information write:

Heath Company, Benton Harbor, Mich.

New Oscilloscope Camera In Moderate Price Field

Item 920

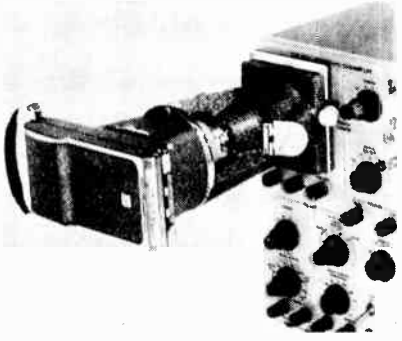
Aremac Associates of Pasadena are now offering a compact, moderately priced oscilloscope camera capable of providing accurate, single-frame photographic records of CRT phenomena 60 seconds after exposure of the scope image.

The light-weight Recordoscope 1414, of special configuration and based on an adaptation of the new small Polaroid* fast-print magazine, mounts easily on any standard 3-inch or 5-inch scope. Swing-away camera hood and mounting plate are included in a packaged accessory group.

Said by the manufacturer to be the most universally practical precision oscilloscope camera available, the Aremac 1414 can easily record three exposures on a single 2⅛-inch by 2⅞-inch black-field print, through the scope centering control adjustment.

Full-size image is recorded from 3-inch scopes, while 5-inch scope data is recorded at .5 or .7 of full scale.

Overall versatility and precision performance at a new, lower cost make the Recordoscope 1414 a standard engineering requirement for industrial, electric, electronic and basic R & D laboratories, states the maker.



Speed and facility of mounting enables a single camera to service several scopes of various types and manufacture.

A complete line of data cameras, including the fully automatic Recordoscope 1185, is produced by Aremac Associates at 50 S. San Gabriel Blvd., Pasadena, California.

General Specifications: Coated Oscillator f/2.3-67.5 mm lens; Synchro-type shutter with "T" and "B" settings and speeds of 1 sec., 1/2, 1/5, 1/10, 1/25, 1/50 and 1/100 second; fixed focus; camera measures 4½" x 6" x 7¾": weight, 4 pounds; 3" hood is 1¾" long, 5" hood is 8⅜" long. Uses type No. 31 Polaroid standard self-developing film.

* Polaroid is the registered name of the Polaroid Corporation.

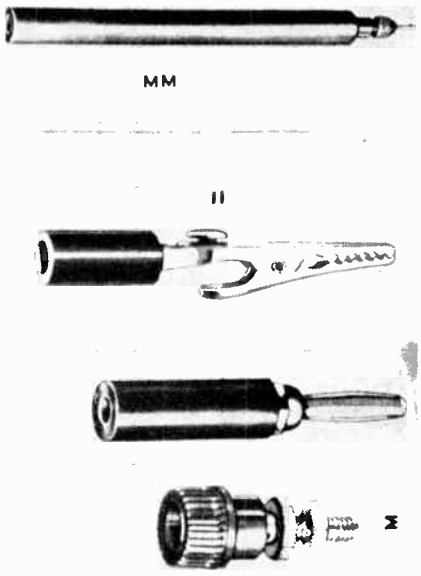
Inquiries about the Recordoscope 1414 should be addressed to:

Roy Helphingstine, sales manager, Aremac Associates, 50 S. San Gabriel Blvd., Pasadena, California.

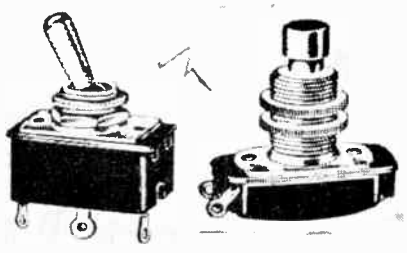
H. H. Smith

Item 921

H.H. SMITH, is offering a complete range of Electronic Components, which include in part: Jacks, plugs, alligator



clips, battery test clips, test rods, tool kits, test leads, switches, TV Safety cords, etc., etc. Also included is a full line of those small inexpensive, yet hard to find though essential components and accessories.



We are prepared to assist in the design and development of components and assemblies for special requirements:

Write Atlas Radio Corporation Limited, 50 Wingold Avenue, Toronto 10, Ontario.

Electronic Equipment

Item 922

300 OHM Standard and Mini-Plate antenna Wall Plates in single, double, triple, dual TV couplers, 4-wire UHF-VHF, lead-in accessories, connectors, crystal holders, feed thru bushings, H.V. probes, plugs, polarized connectors, splicers, terminal sockets and strips.

Brand names: JAVEX. Javabond, Tenna-Shingle, Mini-Plate, Tenna-Tube.

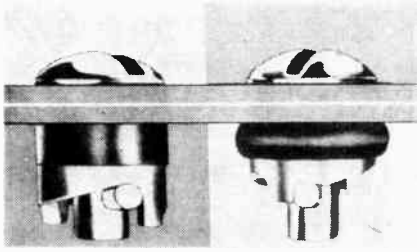
For further information write:

Atlas Radio Corporation Ltd., 50 Wingold Ave., Toronto, Canada.

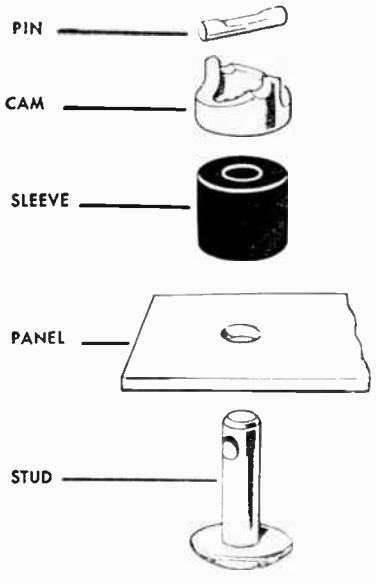
Vibrex Fasteners — Locks, Seals And Cushions

Item 923

Here is a sturdy half-turn fastener that is also an elastic joint. A rattle proof unit that is also a shock absorber. It is also a water and dust-proof seal — because Vibrex units cushion



the entire assembly base in live resilient rubber. Produced in a range of sizes and types. When installed and assembled — they are one single unit. Illustrations show how simply they can be installed.



The Vibrex Fastener is mounted in a hole in the removable panel. The stud is inserted through the hole in the panel, rubber sleeeve, and cam, as in the diagram. To insert the pin in the stud, the cam is pressed down, slightly compressing the sleeve. This can be done by hand but special tools are available.

Vibrex Fasteners lock in ½" holes in the base panel. Simply join panel and base and twist. A half turn locks it . . . with a distinctive click. A reverse half turn disengages.

Send for catalog covering Vibrex's many applications. You will find it interesting.

Audio Tool and Engineering Limited, 32 River St., Toronto.

Close Tolerance Miniature Capacitors Now Available In Polystyrene, Teflon, Mylar, Silvered Mica

Item 924

The complete line of EFCON Plastic Film Miniature Capacitors are consistently made to tolerances closer than ± 1 per cent. They are available in a range of capacitance values from .001 to 2 Mfd. Non-standard values are made to customers' specifications.

EFCON Polystyrene and Mylar Close Tolerance Capacitors provide excellent stability over an extended temperature range. Polystyrene has an extremely high insulation resistance (1012 ohms at 25°C.). They have a negative temperature coefficient of less than minus 100 PPM/°C. In addition to a very low dialectric absorption EFCON Capacitors feature the lowest

dissipation factor of any film capacitors. They are tested at a DC voltage of at least 200 per cent of rated voltage at 25°C.

For technical data which includes new charts describing average temperature characteristics . . . capacitance . . . power factor . . . insulation resistance . . . write:

Dept. R, Electronic Fabricators, Inc., 682 Broadway, New York 12, New York.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Specialized Technical Service

Item 925

Flamboro Instrument Company, Dundas, Ontario, have special facilities to subcontract for the production of specialized electronic equipment for either short or long runs. Excellent co-ordination and high quality of workmanship are guaranteed. Special experience is available on equipment associated with nucleonics, process control and instrumentation.

Enquiries should be made to:

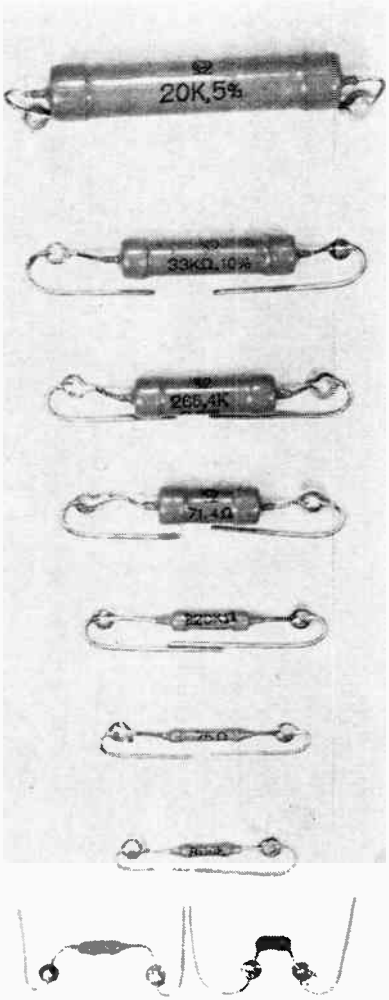
Flamboro Instruments Company, Dundas, Ontario.

For further data on advertised products use page 207.

Precision Deposited Carbon Resistors

Item 926

"Constanta" Precision Deposited Carbon Resistors are now manufactured in Canada. The range of products includes such items as subminiature deposited carbon resistors to close tolerances as well as a range of "Master" Resistors with a tolerance of ± 0.5 per cent. This latter development has been made possible by the



development of a carbon coat with extremely low temperature coefficient and negligible drift under shelf life or operating conditions.

Constanta Resistors are coated with an exceptionally rugged and anti-hygroscopic coating which precludes changes due to handling or ambient conditions.

The Glendon Company Ltd., 44 Wellington St. East., Toronto, Ont.

Revolutionary New Tiny Dry Cell

Item 927

Tiny size of the new "wafer cell" just announced by Burgess Battery Company and simplicity of its construction into a high-powered dry battery is shown in this close-up actual

size photo. The cell itself, smaller than a fingertip, yet a third more powerful than conventional flat cells, is made entirely by machine and is sealed in an airtight pliofilm envelope. Merely stacking 15 such cells in a column wrapped tightly with transparent plastic and capping it in a leakproof tube of drawn aluminum produces this 22½ volt battery for pocket radios, hearing aids, Geiger counters, and other small electronic devices.

Burgess Battery Company, Niagara Falls, Ont.

Sola Constant Voltage Transformers Maintain ±1% Regulated Output

Item 928

Adequate performance of complex electrical and electronic equipment often requires input voltage controlled within narrow limits. Sola Constant Voltage Transformers — static-magnetic regulators — provide supply voltage regulated within ± 1 per cent in the face of line voltage variations as great as ± 15 per cent.

Sola stabilizers have many advantages over electronic and other magnetic regulators. Included are: (1) Completely automatic, continuous

regulation. (2) No moving parts or manual adjustments. (3) Response is 1.5 cycles or less. (4) Self-protecting against short circuits on output or load circuits.

For complete data write to:

Sola Electric Co., 617 Runnymede Road, Toronto 9, Ontario. Home Office, Chicago 50, Illinois.

Extra Low Leakage "Superlytic" Condensers

Item 929

The T.C.C. Superlytics exhibit such an exceptionally low leakage current that one can properly think in terms of insulation resistance for these capacitors. This makes it possible to use "Superlytics" in applications requiring high capacitance at low working voltages, a field in which Paper Capacitors are bulky and expensive.

A figure of 10,000 Megohms — Mfd is achieved and in addition these capacitors have an exceptionally long working life that will appeal for example to designers of telephone equipment. Another important advantage is that these capacitors may be operated at up to 100°C.

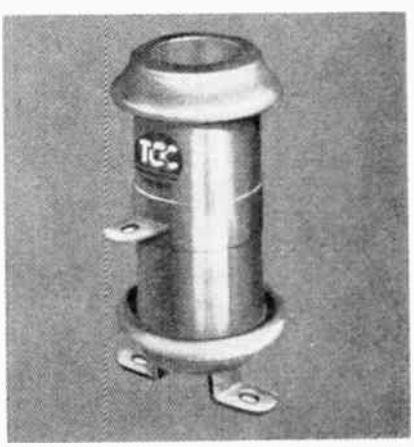
The Glendon Company Ltd., 44 Wellington St. East, Toronto, Ont.

Ceramic Transmitter Capacitors

Item 930

T.C.C. "Hiload" Capacitors are actually the largest commercially produced ceramic dielectric capacitors in the world.

The advantages of "Hiload" capacitors lie in the fact that no impregnant of any kind is involved. The nature of the dielectric is such that it is not subject to any changes in electrical properties during the use of the condensers.



The glazed ceramic rim is designed to eliminate corona losses at the edges of the dielectric. The electrodes consist of substantial fired-on silver layers to which the terminals are soldered.

Due to their tubular shape these condensers are excellently suited to dissipate heat and this results in very high KVA ratings for a given size. Forced air cooling will increase the permissible RF load substantially.

The Glendon Company Ltd., 44 Wellington St. East, Toronto, Ont.

(Products continued on page 181)

Directory Of:—

American and Foreign Electronic & Communication Equipment Suppliers

With Listing Of Canadian Representatives

Accurate Electronics Corp., 169 S. Abbe St., Elyria, Ohio. Represented by:
Barron, Wm. T., P.O. 126, Oakville, Ont.

Acheson Colloids Co., Div. of Acheson Industries Inc., Port Huron, Mich. Represented by:
Lubrite Co. of Canada Ltd., 150 Berkeley St., Toronto 2, Ont.

Acromark Co., The, 109 Morrell St., Elizabeth 4, N.J. Represented by:
Canada Tool & Supply Co., 19 Melinda St., Toronto, Ont.

Adams & Westlake Co., The, 1025 N. Michigan St., Elkhart, Ind. Represented by:
Powerlite Devices Ltd., 1870 Davenport Rd., Toronto 9, Ont.
233 Dunbar Ave., Montreal 17, Que.
308 Water St., Vancouver, B.C.

Adel Precision Products, Div. of General Metals Cor., 10777 Vanowen St., Burbank, Calif. Represented by:
Railway & Power Engineering Corp. Ltd.

Advance Electric & Relay Co., Anelgin National Watch Co. Affiliate, 2435 N. Naomi St., Burbank, Calif. Represented by:
Atlas Radio Corp., Toronto 2B, Ont.

Aircraft Radio Corp., Boonton, N.J. Represented by:
Anthony Foster & Sons Ltd., Church St., Toronto, Ont.

Airmec Ltd., High Wycombe, Buckinghamshire, England. Represented by:
Electrodesign, 736 Notre Dame W., Montreal, Que.

Airtron Inc., 1096 W. Elizabeth Ave., Linden, N.J. Represented by:
Longstaffe, J.R., Co. Ltd., 1500 St. Catherine St. W., Montreal, Que.
Longstaffe, J. R., Co. Ltd., 300 Campbell Ave., Toronto, Ont.
Renfrew Elec. & Refrig. Co., Renfrew, Ont.

Allen Mfg. Co., The, Drawer 570, Hartford 2, Conn. Represented by:
Canadian Acme Screw & Gear Ltd.

Allied Control Co. Inc., 2 East End Ave., New York 21, N.Y. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St. W., Montreal, Que.

Allies' Products Corp., 1028 Connecticut Ave. N.W., Washington 6, D.C. Represented by:
Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont.

Alpha Wire Corp., 430 Broadway, New York, N.Y. Represented by:
Alpha Aracon Radio Co. Ltd., 29 Adelaide St. W., Toronto, Ont.

Altec Lansing Corp., 9356 Santa Monica Blvd., Beverley Hills, Calif. Represented by:
Dominion Sound Equipments Ltd., P.O. Drawer 220 (Wesmount), Montreal, Que.
Northern Electric Co., P.O. Box 400, Belleville, Ont.

Ambroid Co., 798 Washington St., Weymouth 88, Mass. Represented by:
J. H. Ashdown Hardware, Winnipeg, Edmonton, Regina, Calgary, Saskatoon
Walter Woods Ltd., Hamilton, Winnipeg, Saskatoon
John Leckie Ltd., Montreal, Quebec, Winnipeg, Toronto
Hudson's Bay Co., Winnipeg, Montreal
George Taylor Hardware, Kirkland Lake, Cochrane, Noranda
Lewis Bros., Montreal
Marshall Welles Ltd., Port Arthur, Edmonton, Calgary
Caverhill Learmont & Co., Ottawa, Toronto, Montreal
Cochrane-Dunlop Hardware Ltd. Sudbury, Sault Ste. Marie
A. Prud Homme & Fils, Montreal
Pascal Hardware, Montreal
Allcock, Laight & Westwood Co., Leaside, Toronto

American Electronics Co., 1203-05 Bryant Ave., New York 59, N.Y. Represented by:
Rutherford Agencies, 9500 St. Lawrence Blvd., Montreal, Que.

American Research Corp., 11 Brook St., P.O. Box 1121, Bristol, Conn. Represented by:
Ringer, Ray, Climatic Equipment, P.O. Box 312, Ottawa, Ont.

American Television & Radio Co., 300 E. Fourth St., St. Paul 1, Minn. Represented by:
R. C. Kahnert Sales Co., 1908 Avenue Rd., Toronto, Ont.
Charles L. Thompson Ltd., 3093 Woodbine Dr., No. Vancouver, B.C.

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y. Represented by:
Rogers Majestic Electronics Ltd., 11-19 Brentcliffe Rd., Leaside, Toronto 17, Ont.

Amperite Co. Inc., 561 Broadway, New York, N.Y.

Anti-Corrosive Metal Products Co. Inc., Upper River Rd., Castleton-on-Hudson, N.Y. Represented by:
Railway & Power Engr. Corp. Ltd., 169 Eastern Ave., Toronto, Ont.

Arnold Magnetics Co., 5962 Smiley Dr., Culver City, Calif.

Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill. Represented by:
Process-Instruments Systems Ltd., 1893 Avenue Rd., Toronto, Ont.

Associated Research Inc., 3758 W. Belmont Ave., Chicago 18, Ill. Represented by:
Bach-Simpson Ltd., 1255 Brydges St., London, Ont.

Atlas E-E Corp., Bedford Airport, Bedford, Mass. Represented by:
Desser E-E Ltd., 441 St. Francois Xavier St., Montreal 1, Que.
Desser E-E Ltd., 1512 Eglinton Ave. W., Toronto, Ont.

Atlas Sound Corp., 1449-39th St., Brooklyn 18, N.Y. Represented by:
Atlas Radio Corp., 50 Wingold Ave., Toronto 10, Ont.

Audio Instrument Co. Inc., 133 West 14th St., New York 11, N.Y. Represented by:
Clark, Alex. L., Ltd., 3745 Bloor St. W., Toronto 18, Ont.

Automatic & Precision Mfg. Co., 252 Hawthorne Ave., Yonkers, N.Y. Represented by:
A. T. R. Armstrong Co., 700 Weston Rd., Toronto 9, Ont.
H. D. Campbell Inc., 501 Jones Bldg., Seattle, Wash.

Autotron Co., The, 128 West Main St., Danville, Ill. Represented by:
Higginson Engineering Sales, 275 James St. N., Hamilton, Ont.

Avion Div. of ACF Industries Inc., 299 State Highway No. 17, Paramus, N.J. Represented by:
Aeromotive Engineering Products, P.O. Box 760, Brampton, Ont.

Avionex Electronics Corp., 2838 N. Naomi St., Burbank, Calif. Represented by:
Aviation Electric Pacific Ltd., Vancouver A.M.F., B.C.
Aviation Electric Ltd., Montreal, Que.

Baker Manufacturing Co., 133 Enterprise St., Evansville, Wis. Represented by:
Eric Jeanes, 333 Home St., Winnipeg, Man.

Balco Research Laboratories Inc., 49-53 Edison Ave., Newark 2, N.J. Represented by:
Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont.

Baldwin Instrument Co. Ltd., Brooklands Works, Dartford, Kent, England. Represented by:
Electrodesign, 736 Notre Dame St. W., Montreal, Que.

Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York, N.Y. Represented by:
Canadian Industries Ltd., P. O. Box 10, Montreal, Que.
Canadian Industries Ltd., Yonge St., Toronto, Ont.
Drew-Brown Ltd., 60 Clarkson Ave., Toronto, Ont.
C. A. Hall, 5410 Ferrier St., Montreal, Que.

Barry Controls Inc., 700 Pleasant St., Watertown, Mass. Represented by:
Hooker, Samuel C. (Canada) Ltd., 8025 Decaire Blvd., Montreal 9, Que.
Hooker, Samuel C. (Canada) Ltd., 21 King St. E., Rm. 300, Toronto 1, Ont.

Bart-Messing Corp., 229 Main St., Belleville, New Jersey. Represented by:
Armolite Co. Ltd., Crystal Arts Sq., Toronto, Ont.
Lea Products Co., 996 De Bullion St., Montreal, Que.

Baird Associates Inc., 33 University Rd., Cambridge, Mass. Represented by:
Measurement Engineering Ltd., Arnprior, Ont:

Bel Fuse Inc., 311 Mountain Rd., Union City, N.J.

Bell Sound Systems Inc., 555 Marion Rd., Columbus 7, Ohio. Represented by:
Charles W. Pointon Ltd., 6 Alcina Drive, Toronto, Ont.

Belling & Lee Ltd., Great Cambridge Rd., Enfield, Middx., England. Represented by:
Astral Electric Co. Ltd., 44 Danforth Rd., Toronto 13, Ont.

Bliss Electronic Corp., Box 366, Sussex, N.Y.

Blonder-Tongue Laboratories Inc., 526-536 North Avenue, Westfield, N.J. Represented by:
Telequipment Mfg. Corp., P.O. Box 844, London, Ont.

Bludworth Marine Division of National-Simplex-Bludworth Inc., 92 Gold Street, New York 38, N.Y. Represented by:
Kelvin & Hughes (Canada) Ltd., 401 McGill St., Montreal, Que.

Boesch Mfg. Co., Inc., 45 River St., Danbury, Conn. Represented by:
Bayly Engineering Ltd., First St., Ajax, Ont.

Boonton Radio Corp., Intervale Rd., Boonton, N.J. Represented by:
Bayly Engineering Ltd., First St., Ajax, Ont.

Borden Co. (The), Chemical Division-Monomer Dept., 511 Lancaster St., Leominster, Mass. Represented by:
Polyresins Ltd., 184 Laird Dr., Leaside, Toronto 17, Ont.

Boston Insulated Wire & Cable Co., 65 Bay St., Boston 25, Mass. Represented by:
Boston Insulated Wire & Cable Ltd., Hamilton, Ont.

Bourns Laboratories, 6135 Magnolia Ave., Riverside, Calif. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Brand, William & Co. Inc., North and Valley Sts., Willimantic, Conn. Represented by:
Barron, William T., 550 Evans Ave., Toronto, Ont.

Bradley Laboratories Inc., 168 Columbus Ave., New Haven, Conn. Represented by:
Measurements Engineering Co., Arnprior, Ont.

Brady, W. H. Co., 727 W. Glendale, Milwaukee 12, Wis. Represented by:
Northern Electric Co.

Broadcast Equipment Specialties Corp., Box 149, Beacon, N.Y. Represented by:
Canadian Marconi Co., Montreal, Que.

Browning Laboratories Inc., 750 Main St., Winchester, Mass. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
MJS Electronic Sales Ltd., P.O. Box 240, Ajax, Ont.

Buckeye Bobbin Co., The, 12200 Sprecher Ave., Cleveland 11, Ohio. Represented by:
Chaulk, George C., 3238 Curry Ave., Windsor, Ont.

Burton-Rogers Co., 42 Carleton St., Cambridge 42, Mass. Represented by:
Projean Meters Reg'd., 1833 Craig St. E., Montreal 24, Que.
Frank T. Ross & Sons Ltd., Cypress Park Post Office, W. Vancouver, B.C.

Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Miss. Represented by:
Great Lakes Elec. Specialties Ltd., Algie Ave., Toronto 14, Ont.

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass. Represented by:
Hooker, Samuel C. (Canada) Ltd., 8025 Decarie Blvd., Montreal, Que.
Hooker, Samuel C. (Canada) Ltd., 21 King St. E., Toronto 1, Ont.

Campbell Industries Inc., 3806 St. Elmo Ave., Chattanooga 9, Tenn. Represented by:
Canadian Marconi Co., 2442 Trenton Ave., Toronto 17, Ont.
Canadian Marconi Co., 2422 Trenton Ave., Montreal, Que.

Carbonneau Industries Inc., 100 Lexington Ave. S.W., Grand Rapids, Mich. Represented by:
Musimart of Canada, 901 Bleury St., Montreal, Que.

Cascade Research Corp., 53 Victory Lane, 205 Gatos, Calif. Represented by:
Micro-Tower Ltd., 62 Richmond St. W., Toronto, Ont.

Cavitron-Woodwelder Mfg. Plant No. 1, Division of Woodwelding Inc., 2921 W. Alameda, Burbank, Calif. Represented by:
Leventhal, S. H. & Co., P.O. Box 487, Winnipeg, Man.
Preston Sales & Service, Preston, Ont.

Central Scientific Co. of Canada Ltd., 146 Kendal Ave., Toronto 4, Ont. Represented by:
Central Scientific Co. of Canada Ltd., 7275 St. Urbain St., Montreal 14, Que.
Central Scientific Co. of Canada Ltd., 1206 Homer St., Vancouver 3, B.C.
Central Scientific Co. of Canada Ltd., Room 5, Harvey Arcade, 130 Sparks St., Ottawa, Ont.

Century Electronics & Instruments Inc., 1333 No. Utica, Tulsa, Okla. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.
Canadian Seisco Ltd., 2117 10th Ave. W., Calgary, Alta.
Century Geophysical Corp. of Canada, 1105 7th Ave. W., Calgary, Alta.

Chatham Electronics, Div. Gera Corp., 630 W. Mount Pleasant Ave., Livingston, N.J.

Chemalloy Electronics Corp., Gillespie Airport, Santee, Calif. Represented by:
General Smelting Co. Ltd., Hamilton, Ont.

Cherry Electrical Products Corp., 3080 Skokie Valley Rd., Highland Park, Ill. Represented by:
Automatic Controls (Canada) Ltd., 17 Advance Rd., Toronto 14, Ont.

For further data on advertised products use page 207.

Cinema Engineering Co., Division Aerovox Corp., 1100 Chestnut St., Burbank, Calif.
Represented by:
Hooker, Samuel C. (Canada) Ltd., 8025 DeCarie, Montreal 9, Que.
Hooker, Samuel C. (Canada) Ltd., 21 King St. E., Toronto 1, Ont.

Cinema-Television Ltd., Worsley Bridge Rd., Lower Sydenham, London S.E. 26, Eng.
Represented by:
Perkins Electric Co. Ltd., 1197 Phillips Place, Montreal, Que.

Circuit Instruments Inc., P.O. Box 355, 1927 First Ave. S., St. Petersburg, Fla.
Represented by:
International Resistance Co. Ltd., 300 Campbell Ave., Toronto 9, Ont.

Clarke, H. & Co. (Manchester) Ltd., Atlas Works, George St., Patricroft, Manchester, Lancs.
Represented by:
Electric Element and Mica Co. Ltd., 85 King St. E., Toronto 1, Ont.

Condenser Products Co., 140 Hamilton St., New Haven 4, Conn.
Represented by:
ROR Associates, 290 Lawrence Ave., Toronto, Ont.

Conrad Inc., 141 Jefferson St., Holland, Mich. Represented by:
Andrews, A. M., Box 64, Station Q., Toronto 7, Ont.

Continental Carbon Inc., 13900 Lorain Ave., Cleveland 11, Ohio. Represented by:
Bayly Engineering Ltd., 5 First St., Ajax, Ont.

Continental Connector Corp., 30-30 Northern Blvd., Long Island City 1, N.Y.
Represented by:
Atlas Radio Corp., Toronto, Ont.

Co-Operative Industries Inc., 100 Oakdale Rd., Chester, N.J.
Represented by:
Arthur O. Secord, 54 Baby Point Cresc., West Toronto 9, Ont.
E. G. Lomas, 227 Laurier Ave. W., Ottawa, Ont.

Copperweld Steel Co.—Wire and Cable Division, Glassport, Penn.
Represented by:
Copperweld Steel International Co., 17 Braemar St., Toronto 7, Ont.
Canada Wire & Cable Co. Ltd., Postal Station "R", Toronto 17, Ont.
Northern Electric Co. Ltd., Fleet St. at Jarvis, Toronto, Ont.
Northern Electric Co. Ltd., 10305 106th St., Edmonton, Alta.
Phillips Electrical Co. (1953) Ltd., 26 Hollinger Rd., Toronto 16, Ont.
Slater, N. Co. Ltd., 400 W. Broadway, Vancouver 10, B.C.

Cornell-Dubilier Electric Corp., 333 Hamilton Blvd., South Plainfield, N.J.
Represented by:
Barron, W., P.O. Box 126, Oakville, Ont.
Rutherford Agencies, 9500 St. Lawrence Blvd., Montreal, Que.

Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill. Represented by:
Crane Packing Co. Ltd., 617 Parkdale Ave. N., Hamilton, Ont.
Crane Packing Co. Ltd., 664 Lagauchestiere St. W., Montreal, Que.

Crosby Laboratories, P.O. Box 233, Robbins Lane, Hicksville, L. I., N.Y.

Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee 16, Wis.
Represented by:
A. C. Simmonds & Sons Ltd., 100 Merton St., Toronto 12, Ont.

Curtiss-Wright Corp., Electronics Division, 22-02 Raphael St., Fair Lawn, N.J.
Represented by:
Consolidated Electronic Equipment Co., 1156 Yonge St., Toronto, Ont.

Dale Products Inc., P.O. Box 136, Columbus, Nebr. Represented by:
Charles W. Pointon Ltd., 6 Alcina Ave., Toronto 10, Ont.

Daven Co., 191 Central Ave., Newark, N.J. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St. W., Montreal, Que.
Adams Engineering Ltd., 65 Bloor St. W., Toronto, Ont.

Davis Electric Co., 230 N. Spring St., Cape Girardeau, Missouri.
Represented by:
Components Canadian Television & Radio, 109 Gordon Rd., Willowdale, Ont.

Dawe Instruments Ltd., 99 Uxbridge Rd., Ealing, London W. 5.
Represented by:
Dawe Instruments Ltd., Canadian Div., 1654 Bank St., Ottawa, Ont.

Daystrom Electric Corp., 751 Main St., Poughkeepsie, N.J. Represented by:
Kahnert, R. C., Sales Co., 1908 Avenue Rd., Toronto, Ont.
McLennan, D. Eldon, 2191 W. 1st Ave., Vancouver, B.C.

Daystrom Pacific Corp., 3030 Nebraska Ave., Santa Monica, Calif.
Represented by:
Electromechanical Products, Agincourt, Ont.

DeJur-Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N.Y.
Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto 10, Ont.

DeMornay-Bonardi, 780 St. Arroya Parkway, Pasadena, Cal.

Detectron Corp. (The), 5528 Vineland Ave., North Hollywood, Calif.
Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Dialight Corp., 60 Stewart Ave., Brooklyn, N.Y. 37

Diamond Microwave Corp., 7 North Ave., Wakefield, Mass. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St., West Montreal, Que.
Adams Engineering Ltd., 65 Bloor St. W., Toronto, Ont.

Dialectron Div. of The Gudeman Co., 2669 S. Myrtle Ave., Manrovia, Calif.
Represented by:
Hooker, Samuel C. Ltd., 8025 Decarie Blvd., Montreal 9, P.Q.

Dixon Corp., 7-21 Burnside St., Bristol, Rhode Island.
Represented by:
National Fibre Co. of Canada, Ltd., Corner Atlantic & Hanna Aves., Toronto 3, Ont.
National Fibre Co. of Canada Ltd., 1411 Crescent St., Montreal, Que.

Dormitzer Electric & Mfg. Co. Inc., 5 Hadley St., Cambridge 40, Mass.
Represented by:
Kingsway Films Ltd., 3569 Dundas W., Toronto 9, Ont.

DuKane Corp., St. Charles, Ill.
Represented by:
Offices All Across Canada

Duotone Co. Inc., Locust St., Keyport, N.J. Represented by:
Pointon, Charles Co., 6 Alcina Ave., Toronto, Ont.

Durant Mfg. Co., 1941 No. Buffum St., Milwaukee 1, Wis. Represented by:
Williams & Wilson Ltd., 544 Inspector St., Montreal 3, P.Q.
Williams & Wilson Ltd., 11 Front St. E., Toronto 1, Ont.

Dynamic Air Engineering Inc., 7412 Maie Ave., Los Angeles 1, Calif.
Represented by:

Dynamic Electronics, 73-39 Woodhaven Blvd., Forest Hills, N.Y.
Represented by:
Radio Supply Inc., 54 Craig W., Montreal, Que.

Eastern Air Devices Inc., 385 Central Ave., Dover, N.H.
Represented by:
Cossor (Canada) Ltd., 301-303 Windsor St., Halifax, N.S.
Cossor (Canada) Ltd., 648A Yonge St., Toronto, Ont.
Cossor (Canada) Ltd., 758 Victoria Sq., Montreal, Que.

Ebert Electronics Corp., 212-26 Jamaica Ave., Queens Village 28, N.Y.
Represented by:
Burlec Sales Ltd., 45 Northline, Toronto 16, Ont.

Edwards High Vacuum Ltd., Manor Royal, Crawley, Sussex, Eng.
Represented by:
W. Edwards & Co., 17 Jutland Rd., Toronto, Ont.

Electrical Facilities Inc., 4224 Holden St., Oakland 8, Calif.
Represented by:
Griffon Sales Ltd., 188 West 5th Ave., Vancouver 10, B.C.

Electro-Measurements Inc., 4312 S. E. Stark St., Portland, Ore.
Represented by:
Measurements Engineering Ltd., Arnprior, Ont.

Electro-Mechanical Research Inc., 64 Main St., P.O. Box N, Ridgefield, Conn. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Electro-Pulse Inc., 11861 Teale St., Culver City, Cal.

Electro Technical Products Division, Sun Chemical Corp., 113 East Centre St., Hutley, N.J.
Represented by:
Paisley Products of Canada Ltd., P.O. Box 159, Station "H" Toronto 13, Ont.

For further data on advertised products use page 207.

Electro-Voice Inc., Buchanan, Mich.
Represented by:
McLennan, D. Eldon,
2191 W. First Ave., Vancouver, B.C.
Kahnert, R. C., Sales Co.,
1908 Avenue Rd., Toronto, Ont.

Electronic Control Corp.,
1573 E. Forest Ave., Detroit 7, Mich.
Represented by:
Dominion Electrohome Industries Ltd.,
Kitchener, Ont.

Electronic Instrument Co. Inc. (Elco),
84 Withers St., Brooklyn 11, N.Y.
Represented by:
Tilton, John R. Ltd.,
51 McCormack St., Toronto, Ont.

Electronic Measurements Corp.,
280 Lafayette St., New York 12, N.Y.
Represented by:
Burgess, Norris,
418 Mt. Pleasant Rd., Toronto, Ont.

Electronic Research Associates Inc.,
67 E. Centre St., Nutley 10, N.J.
Represented by:
Avionics Ltd., Stone Rd.,
Niagara-on-the-Lake, Ont.

Electronics Corp. of America,
77 Broadway, Cambridge, Mass.
Represented by:
Mackay-Morton Western Ltd.,
705-11th Ave. W., Calgary, Alta.
MacKay-Morton Western Ltd.,
10364-105th St., Edmonton, Alta.
Martin Engineering Inc.,
1846 Dorchester St. W.,
Montreal 25, Que.
MacKay-Morton Ltd.,
201 Kerr Block, Scarth St.,
Regina, Sask.
Martin Engineering Inc.,
1072 Prospect St., Sherbrooke, Que.
Pacific Controls Ltd.,
1042 Davie St., Vancouver, B.C.
Martin Engineering Inc.,
1977 Avenue Rd., Toronto 18, Ont.

Elliott Brothers (London) Ltd.,
Century Works,
Lewisham, London S.E. 13, Eng.
Represented by:
Electrovert Ltd., Radio City Buildings,
265 Craig St. W., Montreal, Que.

Empire Devices Products Corp.,
38-15 Bell Blvd., Bayside 61, New York.
Represented by:
Cossor (Canada) Ltd.,
301-303 Windsor St., Halifax, N.S.
Cossor (Canada) Ltd.,
758 Victoria Sq., Montreal, Que.
Cossor (Canada) Ltd.,
648A Yonge St., Toronto, Ont.

Endevco Corp., 689 South Fair Oaks Ave., Pasadena, Calif. Represented by:
Computing Devices of Canada Ltd.,
P.O. Box 508, Ottawa 4, Ont.

English Electric Co. Ltd.,
Queens House, Kingsway,
London, Eng. Represented by:
Branches in all Principal Cities
across Canada

Epsco Inc., 588 Commonwealth Ave., Boston 15, Mass.

Erie Resistor Corp.,
644 West 12th St., Erie, Pa.
Represented by:
Fred Eaton,
4972 Dundas St. W., Toronto, Ont.

Ess Instrument Co.,
98 South Washington Ave.,
Bergenfield, N.J. Represented by:
Irvine, Frederick M. Ltd.,
910 Wellington St., P.O. Box 133, N.D.G.,
Montreal, Que.
Darling, David A.,
850 W. Hastings St., Vancouver, B.C.
Polytronics Co. (The),
582 Bathurst St., Toronto, Ont.

Evershed & Vignoles Ltd.,
Acton Lane Works, Chiswick, London W. 4
Represented by:
Nichols, R. R., Ltd.,
2781 Dufferin St., Toronto 10, Ont.
Evershed & Vignoles (Canada) Ltd.,
2781 Dufferin St., Toronto 10, Ont.

Exide Industrial Division, The Electric Storage Battery Co.,
42 South 15th St., Philadelphia 3, Pa.
Represented by:
Exide Batteries of Canada Ltd.,
153 Dufferin St., Toronto, Ont.

Fairchild Camera & Instrument Corp.,
Robbins Lane, Syosset, L. I., N.Y.
Represented by:
Instruments 1951 Ltd.,
300 Parkdale Ave., Ottawa, Ont.
Instruments 1951 Ltd.,
14 Adelaide St. W., Toronto, Ont.

Farmer Electric Products Co. Inc.,
21 Mossfield Rd., Waban, Mass.
Represented by:
Electrodesign,
209 St. Paul St. W., Montreal, Que.

Federal Screw Products,
3917 N. Kedzie Ave., Chicago 18, Ill.

For further data on advertised products use page 207.

Fidelity Amplifier Co.,
703 Willow St., Chicago 14, Ill.
Represented by:
Howard, Harold,
P.O. Box 171, Saskatoon, Sask.

Fielden Electronics Ltd., Paston Rd., Wythenshawe, Manchester
Represented by:
Electrodesign,
736 Notre Dame St. W., Montreal, Que.

Fielden Instrument Division,
2920 N. Fourth St., Philadelphia 33, Pa.
Represented by:
Electrodesign, 736 Notre Dame St., West Montreal, Que.

Filtors Inc., 30 Sagamore Hill Drive, Port Washington, L. I., N.Y.
Represented by:
M.J.S. Electronic Sales Ltd.,
P.O. Box 240, Ajax, Ont.

Fischer & Porter Co.,
530 Warminster Rd., Hatboro, Pa.
Represented by:
Fischer & Porter (Canada) Ltd.,
997 Decarie Blvd.,
Ville St. Laurent, Montreal 9, P.Q.
Fischer & Porter (Canada) Ltd.,
2700 Jane St., Box 135, Toronto 15, Ont.

Formica Co., The,
4614 Spring Grove Ave.,
Cincinnati 32, Ohio
Represented by:
Arnold Banfield & Co. Ltd.,
Oakville, Ont.
Arnold Banfield & Co. Ltd.,
1638 Sherbrooke St. W.,
Montreal, P.Q.
Arnold Banfield & Co. Ltd.,
755 Terminal Ave., Vancouver, B.C.

Gaertner Scientific Corp., The
1201 Wrightwood Ave.,
Chicago 14, Ill. Represented by:
Canadian Laboratory Supplies,
403 St. Paul St., West Montreal, Que.
Fisher Scientific Co. Ltd.,
910 St. James St., West Montreal, Que.
The Hughes Owens Co. Ltd.,
527 Sussex St., P.O. Box 77, Ottawa
Central Scientific of Canada,
7275 St. Urbain St., Montreal, Que.
Casgrain & Charbonneau,
Scientific Instruments Div.,
445 St. Lawrence St., Montreal, Que.

Garde Manufacturing Co.,
588 Eddy St., Providence 3, R. I.
Represented by:
Consolidated Electronic Equipment Co. Ltd., 1156 Yonge St., Toronto, Ont.

G & M Equipment Co. Inc.,
7315 Varna St., North Hollywood, Calif.

Gee-Lar Mfg. Co.,
819 Elm St., Rockford, Ill.
Represented by:
R. S. Gould Sales Co.,
3533 Oxford Ave., Montreal 28, Can.
D. Eldon McLennan,
2191 West First Ave., Vancouver, B.C.

General Cement Mfg. Co.,
919 Taylor Ave., Rockford, Ill.
Represented by:
Chas. W. Pointon,
6 Alcina Ave., Toronto, Ont.
Dave M. Lee Co.,
2517 Second Ave., Seattle, Wash.

General Electric Co., X-Ray Dept.,
4855 Electric Ave., Milwaukee 1, Wis.
Represented by:
Martin, J.W.,
11051 95th St., Edmonton, Alta.
Hollingum, E. H.,
127 Cunard St., Halifax, N.S.
Bradley, R. H.,
5525 Western Ave., Montreal, Que.
Hamon, H. T.,
56 Sparks St., Ottawa 25, Ont.
Davidson, R. J.,
1553 Eglinton Ave., Toronto 10, Ont.
Frederickson, H. T.,
645 Hornby St., Vancouver, B.C.
Nickerson, E. A.,
565 Portage Ave., Winnipeg, Man.
All of above are managers of local offices of General Electric X-Ray Corp. Ltd.

General Devices Inc.,
P.O. Box 253, Princetin, N.J.
Represented by:
Electromechanical Products,
Warden Ave., Agincourt, Ont.

General Hermetic Sealing Corp.,
99 E. Hawthorne Ave.,
Valley Stream, N.Y.

General Radio Co.,
275 Massachusetts Ave.,
Cambridge 39, Mass. Represented by:
Canadian Marconi Co. Ltd.,
2442 Trenton Ave., Montreal 16, Que.

General Control Co.,
1220 Soldiers Field Rd., Boston 34, Mass.
Represented by:
J. R. Langstaffe Co. Ltd.,
300 Campbell St., Toronto, Ont.

Germanium Products Corp., Subsidiary of Radio Development & Research Corp.,
26 Cornelison Ave., Jersey City, N.J.
Represented by:
Northern Electric Ltd.,
143 Fleet St. E.,
P.O. Box 130, Terminal A,
Toronto, Ont.
Northern Electric Ltd., 100 Gay St.,
P.O. Box 6125, Montreal, Que.
Northern Electric Ltd.,
1620 Notre Dame St., Montreal, Que.
Northern Electric Ltd.,
141 Catherine St., Ottawa, Ont.

Gertsch Products Inc.,
11846 Mississippi Ave., P.O. Box 25856, Los Angeles 25, Calif. Represented by:
Atlas Radio Corp. Ltd.,
50 Wingold Ave., Toronto 10, Ont.

Glaser-Steers Corp., 2 Main St., Belleville 9, N.J. Represented by:
Glaser-Steers of Canada,
99 Wragg St., Trenton, Ont.

Goodmans Industries Ltd.,
Lancelot Rd., Wembley, Middx., Eng.
Represented by:
A. C. Simmonds & Sons Ltd.,
100 Merton St., Toronto 7, Ont.

Gray Research & Development Co. Inc.,
658 Hilliard St., Manchester, Conn.
Representatives in principal cities across Canada

Grieve-Hendry Co. Inc.,
1401-17 West Carroll Ave.,
Chicago 7, Ill. Represented by:
Williams & Wilson Ltd.,
544 Inspector St., Montreal 3, Que.

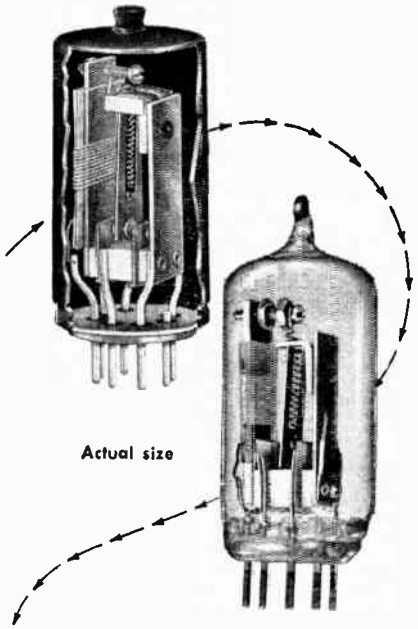
Guardian Electric Manufacturing Co.,
1621 West Walnut St.,
Chicago 12, Ill. Represented by:
Simmonds, A. C., & Sons,
100 Merton Ave., Toronto 7, Ont.

Gudeman Co. (The),
340 West Huron, Chicago, Ill.
Represented by:
Hooker, Samuel C. (Canada) Ltd.,
21 King St. E., Toronto 1, Ont.
Hooker, Samuel C. (Canada) Ltd.,
8025 Decarie Blvd., Montreal 9, P.Q.

Gulton Mfg. Corp., 212 Durham Ave., Metuchen, N.J. Represented by:
Titania Electric Corp. of Canada Ltd.,
234 Dundas St. W., Trenton, Ont.

Hallam, Sleigh & Cheston Ltd.,
Widney Works, Bagot St.,
Birmingham 4, Eng. Represented by:
Electronic Research Co.,
292 Glebemount Ave., Toronto, Ont.

For further data on advertised products use page 207.



Actual size

CURTISS-WRIGHT

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THE "SNAPPER" THERMAL TIME DELAY RELAY

Relied on for positive action and long life in scores of applications involving time delay in electrical circuits, the "SNAPPER," formerly produced by Elly Electronics Corp., is now a Curtiss-Wright product.

Single pole, double throw contact action eliminates chatter. These unique relays feature snap action, double throw, reliability, small size. They are adaptable to military and commercial applications. Time delay periods: preset from 3 seconds up. Envelope: metal, miniature (7 and 9 pin) or octal (8 pin). Glass, 9 pin only.

High-Low Differential Thermostat

The "SNAPPER" Thermostat is a single pole, double throw snap action temperature sensitive switch. Its snap action principle has been extended to provide a low differential thermostat with precision characteristics, at low cost.

Canadian Representative: Consolidated Electronics Equipment Company, Ltd. 1156 Yonge St., Toronto, Ont.

ELECTRONICS DIVISION
CURTISS-WRIGHT
CORPORATION • CARLSTADT, N. J.

Hammarlund Mfg. Co. Inc. (The), 460 W. 34th St., New York, N.Y. Represented by:
Ahern & Soper, P.O. Box 715, Ottawa, Ont.
White Radio Ltd., 41 West Ave. N. P.O. Box 463, Hamilton, Ont.

Haller, Raymond & Brown, State College, Pa.

Hartley, H. A. Co. Inc., 521 E. 162nd St. New York, N.Y. Represented by:
J. C. Swail Co., 18 Kilbarry Cresc., Ottawa, Ont.

Haydon, A. W., Co. (The), 232 North Elm St., Waterbury, Conn. Represented by:
Rogers Majestic Electronics Ltd., Scientific & Industrial Division, Room 701 Victoria Bldg, 140 Wellington St., Ottawa, Ont.

Heinemann Electric Company, Pennsylvania Avenue & Plum Street, Trenton, N.J. Represented by:
Gerranti Electric Limited, Mount Dennis, Toronto 15, Ont.

Heli-Coil Corporation, Shelter Rock Lane, Danbury, Conn. Represented by:
W. R. Watkins and Co. Ltd., 41 Kipling Ave., South, Toronto, Ont.

Hermetics Seal Products Co., 29-37—S. 6th St., Newark 7, N.J.

Hetherington, Inc., 1200 Elmwood Ave., Sharon Hill, Pa., Represented by:
Leonard Electric, Ltd., Toronto, Ont.

Hewson Company, Inc., (The), 443 Broad St., Newark 2, N.J. Represented by:
Powerlite Devices, Ltd., 1870 Davenport Road, Toronto 9, Ont.
Powerlite Devices, Limited, 233 Dunbar Avenue, Montreal 16, Quebec
Powerlite Devices Limited, 308 Water St., Vancouver 3, B.C.

Hickok Electrical Instrument Co. (The) 10514 Dupont Avenue, Cleveland 8, Ohio Represented by:
MJS Electronic Sales Ltd., 240 Box, Ajax, Ontario
Stark Electronic Instruments Ltd., Ajax, Ontario

Holub Industries, Inc., 413 DeKalb Avenue, Sycamore, Ill. Represented by:
A. C. Simmonds & Sons, Ltd., 100 Merton St., Toronto 12, Ont.
Verd-A-Ray Electric Products, Ltd., 1285 Hodge St., Ville St. Laurent, Montreal 9, Quebec

Houghton Laboratories, Inc., Olean, N.Y.

Hoyt Electrical Instrument, 42 Carleton St., Cambridge 42, Mass.

Hycor Sales Company, 11423 Vanowen St., North Hollywood, Calif., Represented by:
I. R. C. Ltd., 11 King St. West, Toronto, Ontario

Ilsco Corp., 5751 Mariemont Ave., Cincinnati 27, Ohio Represented by:
John Spotton Company, 21 Carson St., Toronto 14, Ont.
R. L. Brews & Sons, 1324-11th Ave., West, Calgary, Alberta
R. L. Brews & Sons, 10340-112th Street, Edmonton, Alberta

Inet Division of Leach Corporation, 4441 South Santa Fe Avenue, Los Angeles 58, Calif. Represented by:
Mumford, Medland, Ltd., 576 Wall Street, Winnipeg, Man.

Industrial Instruments, Inc., 89 Commerce Road, Cedar Grove, N.J. Represented by:
R.O.R Associates Ltd., 290 Lawrence Ave. West, Toronto 12, Ont.
R.O.R. Associates Ltd., 4650 Clanranald Ave., Montreal, Que.

Industrial Timer Corporation, 131 Ogden St., Newark 4, N.J. Represented by:
Simmons, A. C. & Sons, Ltd., 100 Merton St., Toronto 7, Ont.

International Crystal Mfg. Co., Inc., 18 North Lee, Oklahoma City, Oklahoma Represented by:
Electronic Tube Company, 353 St. Nicholas St., Montreal, P.Q.

International Resistance Co., 401 N. Broad Street, Philadelphia 8, Pa. Represented by:
International Resistance Co., Ltd., Toronto, Ont.

Jack & Heintz, Inc., 17600 Broadway, Cleveland 1, Ohio. Represented by:
Aircraft Appliances & Equipment, Ltd., 71 Kipling Ave., South-West, Toronto 18. Ontario

Jackson Electrical Instrument Co., 18 So. Patterson Blvd., Dayton 2, Ohio Represented by:
Canadian Marconi Company, Toronto, Ont.
Canadian Marconi Company, St. John's, Newfoundland
Canadian Marconi Company, Halifax, N.S.
Canadian Marconi Company, Montreal, Que.
Canadian Marconi Company, Vancouver, B.C.
Canadian Marconi Company, Winnipeg, Man.

Jarrell-Ash Co., 26 Farwell St., Newtonville, Mass. Represented by:
Technical Service Laboratories, 22 Harbord St., Toronto, Ont.

Javex, P.O. Box 646, Redlands, Calif. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold St., Toronto, Ont.

J-B-T Instruments, Inc., 441 Chapel Street, New Haven 8, Conn. Represented by:
Kahnert, R. C., Sales Co., 1908 Avenue Road, Toronto, Ont.
Robinson, C. M., Co., 189 Market Ave. E., Winnipeg, Man.

JFD Mfg. Co. Inc., 6101-16th Ave., Brooklyn, N.Y.

Jensen Ind. Inc., 7333 W. Harrison, Forest Park, Ill. Represented by:
A. T. R. Armstrong, Toronto, Ont.

Johnson, E. F. Company, 206 2nd Ave. S.W., Waseca, Minnesota Represented by:
A. C. Simmonds and Sons Ltd., Toronto, Ont.

Johnson Mfg. Company, Inc., Mount Vernon, Iowa. Represented by:
Mr. Frank O. Farey, 5866 Decarie Blvd., Montreal 29, Quebec.

Jones, Howard B., Div., 1026 S. Homan Ave., Chicago 24, Ill. Represented by:
United Carr Fastener Co. of Canada, Ltd., Gage Ave. and Beach Road, Hamilton, Ont.

Kaab Engineering Corp., 2995 Middlefield Road, Palo Alto, Calif. Represented by:
Armstrong, Gordon S., 801 Dominion Bldg., Vancouver, B.C.

Katolight Corporation, First Avenue at Chestnut, Mankato, Minn. Represented by:
Terry Machinery Co., Ltd., 10030 Montee St., Laurent, Montreal 9, Que.
Chas. L. Thompson Ltd., 3093 Woodbine Drive, N. Vancouver, B.C.

Kay Electric Co., 14 Maple Ave., Pinebrook, N.J. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., Toronto, Ont.
Measurement Engineering Ltd., Montreal, Que.

Kay Lab, 5725 Kearney Villa Road, San Diego, 12, Calif.

Keithley Instruments, 3868 Carnegie Ave., Cleveland, Ohio. Represented by:
Canadian Marconi Company, Marconi Bldg., 2442 Trenton Ave., Montreal 16. Que.

Keller Tool Division of Gardner-Denver Company, 1333 Fulton St., Grand Haven, Mich. Represented by:
F. F. Barber Machinery Company, Ltd., 187-191 Fleet St. W., Toronto, Ont.

Kelvin & Hughes (Industrial) Limited, 2 Caxton Street, London, S.W. 1, Represented by:
Kelvin & Hughes (Canada) Ltd., 401 McGill St., Montreal, Que.

Keystone Electronics Corp., 423 Broome St., New York 13, N.Y. Represented by:
Burgess, Norris, 418 Mt. Pleasant Road, Toronto, Ont.

Kirkland, H. R., Co. (The) 8-10 King St., Morristown, N.J., Represented by:
Electric Specialty Co., 1117 St. Catherine St. W., Montreal, Que.

Koiled Kords, Inc., P.O. Box K, Hamden, Conn. Represented by:
Fleck, R.D., & Co., Oshawa, Ont.

Krohn-Hite Inst., Co., 580 Massachusetts Ave., Cambridge 39, Mass. Represented by:
Measurement Engineering Ltd., 232 John Street, Arnprior, Ont.
Measurement Engineering Ltd., 226 Donlea Drive, Toronto, Ont.

Kulka Electric Mfg. Co. Inc., 633 South Fulton Ave., Mount Vernon, New York Represented by:
A. T. R. Armstrong, Ltd., 700 Weston Road, Toronto 9, Ont.

Laboratory For Electronics, Inc., 75 Pitts St., Boston 14, Mass. Represented by:
Computing Devices of Canada, 338 Queen St., Ottawa, Ont.

Lear, Incorporated, 3171 South Bundy Drive, Santa Monica, Calif. Represented by:
Sanderson Aircraft, Ltd., Malton, Ont.

Lectrohm, Incorporated, 5560 Northwest Highway, Chicago 30, Ill. Represented by:
Mr. William Cohen, 4890 Plamondon Ave., Suite 10, Montreal, Que.

Leland Electric Company, The, Div., American Machine & Foundry Co., 1501 Webster Street, Dayton, Ohio Represented by:
Leland Electric Canada Ltd., 50 Crimea St., Guelph, Ont.
Cochrane Stephenson Western Ltd., 617 10th Ave. West, Calgary, Alberta.
Cochrane Stephenson Western Ltd., 10330 104th Street, Edmonton, Alberta
Cochrane Stephenson Western Ltd., 786 Beatty St., Vancouver, B.C.
Cochrane Stephenson Western Ltd., 401 Ryan Building, Winnipeg, Man.

For further data on advertised products use page 207.

Quality that builds profits...

Quality that never lets you down is the most profitable investment you can make to assure continuous customer satisfaction. That is why most Canadian manufacturers of radio, television, and electronic equipment insist on G-E Electronic Tubes. Made and tested to the highest quality standards in Canada's largest tube factory, they give your product a reputation for dependability and long life.

Electronic TUBES

MADE IN CANADA SINCE 1922

712W-955

CANADIAN GENERAL ELECTRIC COMPANY LIMITED
Head Office—Toronto

For further data on advertised products use page 207.

A. H. Murray & Co. Ltd., St. Johns, Newfoundland
Leland Electric Canada Ltd., 64 Gordon St., Guelph, Ont.
Leland Electric Canada Ltd., 18 Six Point Road, Islington, Ontario, (Toronto)
Leland Electric Canada Ltd., 5625 Pare St., Town of Mount Royal, Montreal, Que.

Leland, G. H., Inc., 123 Webster Street, Dayton 2, Ohio. Represented by:
Marsland Engineering Company Ltd., Kitchener, Ont.

Lepel High Frequency Laboratories, Inc., 54-18 37th Avenue, Woodside 77, New York City. Represented by:
Rudel Machinery Co., Ltd., 614 St. James Street West, Montreal 3, Que.
Rudel Machinery Co., Ltd., 260 Fleet St. East, Toronto 2, Ont.
Rudel Machinery Co., Ltd., 535 E. Hastings Street, Vancouver, B.C.

Lindgren, Erik A., & Associates, 4515 N. Ravenswood Ave., Chicago, Ill. Represented by:
Atlas Radio Corp., Ltd., 50 Wingold Ave., Toronto 10, Ont.

Litton Industries, Inc., 336 North Foothill Rd., Beverley Hills, Calif. Represented by:
R. O. R. Associates, 290 Lawrence Ave. W., Toronto 12, Ont.
R. O. R. Associates, 4650 Clanranald Ave., Montreal, Que.
Ron Merritt Company, Room 229 Granville Str., Vancouver 2, B.C.

Londex Limited, 207 Anerley Rd., London S.E. 20, England. Represented by:
Electrovert, Radio City Building, 265 Craig Street West, Montreal 1, Que.

Loral Electronics Corp., 794 E. 140th, New York 54, N.Y.

Luma Electric Equipment Co., 1607 Coining Drive, Toledo, Ohio. Represented by:
Upton, Bradeen and James Ltd.
Williams & Wilson
Alexander & Orlick

Lundey Associates, 694 Main Street, Waltham 54, Mass. Represented by:
J. R. G. McVity & Company, 61 Dalewood Road, Toronto 12, Ont.

Lynmar Engineers Inc., 1432 Carlisle St., Philadelphia 21, Penn. Represented by:
Burcham, Don, Portland, Ore., British Columbia Area

Machlett Laboratories Incorporated, 1063 Hope Street, Springdale, Connecticut Represented by:
Dominion Sound Equipments Limited, 4040 St. Catherine St., W., Montreal, Que.
Northern Electric Company Limited, 250 Sidney St., Belleville, Ont.

Mack Electric Devices, Inc., 41 Glenside Ave., Wyncote, Penn. Represented by:
Baker Instruments Ltd., 229 Yonge Street, Toronto 1, Canada

Magnecraft Electric Co., 3352 W. Grand Ave., Chicago 51, Ill.

Megnetics Inc., P.O. Box 230-E., Butler, Pa.

Makespeace, D. E., Co., Division of Union Plate & Wire Co., Pine and Dunham Sts., Attleboro, Mass. Represented by:
Baker Platinum of Canada, Ltd., 512 King St., East, Toronto, Ont.

Magnecord, Inc., 1101 South Kilbourn Ave., Chicago 24, Ill. Represented by:
Magnecord, Canada, Ltd., 3745 Bloor St., W., Toronto 18, Ont.

Magnetic Devices Limited, Exning Road, Newmarket, Suffolk. Represented by:
Messrs. Pye Canada Ltd., 60 Front St. W., Toronto, Ont.

Marion Electrical Instrument Company, Canal St., Manchester, New Hampshire Represented by:
Gray, Roy, 44 Danforth Rd., Toronto, Ont.

Mark Simpson Mfg. Co., Inc., 32-28 49th St., Long Island City 3, N.Y. Represented by:
Chas. L. Thompson, Ltd., 1998 Maple St., Vancouver 9, B.C.

McColpin-Christie Corp., 3410 West 67th St., Los Angeles, Calif. Represented by:
Anthony Foster & Sons Limited, 294-306 Church St., Toronto, Ont.

Measuring Instruments (Pullin) Ltd., Electrin Works, Winchester St., Acton, London W3, England. Represented by:
Eastern Electrical Supply Co. Ltd., 422 McGill St., Montreal, Que.

Mechanical Rubber Products Co., Warwick, New York. Represented by:
Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont.

Melody Master Mfg. Co., 2842 North Cicero Ave., Chicago, Ill. Represented by:
Wallace Electric Co., 427 Seymour, Vancouver, B.C.
R. K. Turner, 1351 Guy St., Montreal, Que.
Harry Hichon, Bridge St., Belleville, Ont.
Ken Steeves, Windsor, Ont.

Mercoid Corporation (The) 4201 W. Belmont Ave., Chicago, Ill. Represented by:
Wells H. Morton & Co., Ltd., 613 11th Ave. W., Calgary, Alberta

For further data on advertised products use page 207.

Martin Engineering Inc., 1846 Dorchester W., Montreal, Que.
Davis Automatic Controls Ltd., 4257 Dundas St. W., Toronto, Ont.
Pacific Controls Co., 1042 Davie Street, Vancouver, B.C.
Robinson Electric Co., 1179 Homer St., Vancouver, B.C.

Methode Manufacturing Corp., 2021 W. Churchill St., Chicago 47, Ill. Represented by:
Heenan, P. J. Ltd., 804 Mt. Pleasant Rd., Toronto, Ont.

Microdot Division-Felts Corporation, 1826 Fremont Ave., South Pasadena, Calif. Represented by:
Ave. West, Toronto 12, Ont.
R-O-R Associates, Limited, 290 Lawrence

Microtan Company Division, Crest Laboratories, Inc., 84-11 Rockaway Beach Blvd., Rockaway Beach 93, N.Y. Represented by:
General Communications Limited, 980 O'Connor Drive, Toronto, Ont.

Microwave Associates Inc., 22 Cummington St., Boston 15, Mass. Represented by:
Lomas, E. G., 227 Laurier Ave. West, Ottawa, Ont.

Millan Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass. Represented by:
H. Roy Gray, 46 Danforth Rd., Toronto 13, Ont.

Miller, J. W., Co., 5917 So. Main St., Los Angeles 3, Calif. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto 10, Ont.

Montgomery Mfg. Co., 206 S. Main, Owensville, Indiana. Represented by:
Canadian Marconi Company, 2442 Trenton Ave., Montreal 16, P.Q.
Associated Clock Industries, 525 St. Martin St., Montreal, Que.
Thompson & Sutherland Limited, New Glasgow, N.S.
Amplification & Communication Reg'd., 6054 Christophe-Colomb St., Montreal, Que.
Paul Chaput, Ltd., 2222 E. Ontario St., Montreal 29, Canada

Monson Mfg. Corporation, 6059 West Belmont Ave., Chicago 34, Ill. Represented by:
Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont.

Morrow Radio Mfg. Co., 2794 Market St., Salem, Oregon. Represented by:
Armstrong Pacific Ltd., 814 Dominion Blvd., Vancouver, B.C.

Mucon Corp., 9 St. Francis St., Newark 5, N.J. Represented by:
John Herring & Co. Ltd., 3468 Dundas St. West, Toronto 9, Ont.

Muellev Electric Co., 1604 H E. 31st St., Cleveland 14, Ohio. Represented by:
Cooper, W. H., & Co., 1103 Yonge Street, Toronto, Ont.

Mytron Manufacturing Company, 4528 Brazil St., Los Angeles 39, Calif.

National Coil Co., P.O. Box 1237, Sheridan, Wyoming

National Company, Inc., 61 Sherman Street, Malden 48, Massachusetts. Represented by:
Canadian Marconi Company, 830 Bayview Ave., Toronto, Ont.

National Electric Products Corp., Two Gateway Center, Pittsburgh 22, Penna. Represented by:
Plewes, John, 52 Humbercrest Blvd., Toronto 9, Ont.

National Electronics Inc., Geneva, Ill.

National Moldite Company, 1410 Chestnut Ave., Hillside, N.J. Represented by:
John S. Plewes Co., 52 Humbercrest Blvd., Toronto 9, Ont.

National Research Corporation, 160 Charlemont St., Newton Highlands 61, Mass. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., 226 Donlea Drive, Toronto, Ont.

Narda Corporation (The) 66 Main Street, Mineola, N.Y. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., 226 Donlea Drive, Toronto 17, Ont.

New London Instrument Company, Inc., 82 Union St., New London, Connecticut Represented by:
Electronic Sales Ltd., Box 240, Ajax, Ont.

Nickel Cadmium Battery Corporation, 172 Pleasant St., Easthampton, Mass. Represented by:
Standard Electric Time Co. of Canada Ltd. (The) 726 St. Felix St., Montreal 3, Que.

Northeast Scientific Corp., 617 Concord Ave., Cambridge 38, Mass. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Norton Behr-Manning Overseas Inc., 1 New Bond St., Worcester 6, Massachusetts Represented by:
Norton Company of Canada, Ltd., P.O. Box 107, Station B, Hamilton, Ont.
A. P. Green Fire Brick Co., Ltd., 234 Rosemount Ave. (Weston) Toronto, Ont.

North Shore Nameplate Inc., 214-25 Northern Blvd., Bayside 61, N.Y.

Ohio Carbon Company, (The) 12508 Berea Road, Cleveland 11, Ohio. Represented by:
Frank T. Ross & Sons, Ltd., Cypress Park (Post Office) Vancouver, B.C.

Ohmite Manufacturing Company, 3601 Howard St., Skokie, Ill. Represented by:
Robinson, C. M., Company, 189 Market St. East, Winnipeg, Man.
Simmonds and Sons, A.C., Ltd., 100 Merton St., Toronto 7, Ont.

ORRadio Industries Inc., 120 Marvyn Road, Opelike, Alabama. Represented by:
Atlas Radio Corp., 50 Wingold Ave., Toronto, Ont.

Pacific Scientific Company, 1430 Grande Vista Ave., Los Angeles 23, Calif. Represented by:
Garrett Manufacturing Corp. of Canada, Ltd., 4 Racine Road, Box 513, Weston, Postal Station, Toronto 15, Ont.

Painton & Company Limited, Bembridge Drive, Kingsthorpe, Northampton, Eng. Represented by:
Smyth, J. B., 380 Craig Street, West, Montreal 1, Que.

Partridge Transformers Ltd., Roebuck Rd., Tolworth, Surrey, England Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto 10, Ont.

Pearce Simpson, Inc., 3023 Coral Way, Miami 34, Florida. Represented by:
Dominion Diesel Ltd., 63 Yorkville Ave., Toronto, Ont.

Peirce Dictation Systems, 5900 N. Northwest Hwy., Chicago 31, Ill.

Peiree Dictation Systems, 5900 N. Northwest Hwy,. Chicago 31, Ill. Represented by:
Avden Dictation Systems Inc., 716 Cambie St., Vancouver 3, B.C.
Sharp's Theatre Supplies, Film Exchange Bldg., Calgary, Alta.
Mitchell, Haughton Ltd., 76-78 Richmond St. East, Toronto, Ont.
Mitchell, Haughton Ltd., 1015-20 Beaver Hall Road, Montreal 1, Que.
Office Appliances Ltd., 270 Queen Street, Ottawa 4, Ont.
Winnipeg Dictation Services, 761 Osborne St., Winnipeg, Man.

Physics Research Laboratories, 507 Hempstead Turnpike, W. Hempstead, L.I., N.Y.

Pentron Corporation, (The) 777 S. Tripp Ave., Chicago 24, Ill. Represented by:
Atlas Radio Co., 50 Wingold Ave., Toronto, Ont.

Perkin Engineering Corporation, 345 Kansas St., El Segundo, Calif. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Permanoid Ltd., New Islington, Manchester 4, England

Permo, Incorporated, 6415 Ravenswood Ave., Chicago 26, Ill. Represented by:
Rutherford Agencies, 9500 St. Lawrence Blvd., Montreal, Que.
Mr. Charles L. Thompson, 3093 Woodbine Drive, N. Vancouver, B.C.

Phalo Plastics Corporation, 25 Foster St., Worcester 8, Mass. Represented by:
Smyth, J. B., 2063 Victoria St., Montreal 2, Que.

Philadelphia Quartz Company, 1146 Public Ledger Bldg., Philadelphia 6, Pa. Represented by:
National Silicates Limited, Toronto, Ont.

Philbrick, George A., Researches, Inc., 230 Congress St., Boston 10, Massachusetts. Represented by:
Ahearn & Soper Co., Ltd., (The) P.O. Box No. 715, Ottawa, Ont.

Philco Corporation, Government & Industrial Division, 4700 Wissahickon Ave., Philadelphia 44, Pa. Represented by:
Philco Corporation of Canada, Ltd., Don Mills Rd., Don Mills, Ont.

Photocircuits Corp., New St., Glen Cove, N.Y. Represented by:
Paramount Agencies, Alberta

Pickering and Company, Inc., 309 Woods Ave., Oceanside, L.I., New York Represented by:
Pointon, Charles W., 6 Alcina Ave., Toronto, Ont.

Polarad Electronics Corp., 43-20 34th St., Long Island City, N.Y. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., Toronto, Ont.

Potter Instrument Company, Inc., 115 Cutter Mill Road, Great Neck, N.Y. Represented by:
Measurement Engineering Company, Arnprior, Ont.

For further data on advertised products use page 207.

Polypenco Inc., Reading, Pa.
Represented by:
Peckover's Inc., 115 McCormack St., Toronto, Ont.

Polyphase Instrument Co., 701 Haverford Road, Bryn Mawr, Pa. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Power Controls Limited, Exning Road, Newmarket, Suffolk Represented by:
Pye Canada Ltd., 60 Front St. W., Toronto, Ont.

Pratt & Whitney Div., Niles- Bement—Pond Co., Charter Oak Blvd., West Hartford 5, Conn. Represented by:
Acme Bertram Machine Tools Ltd., 15 Brandon Ave., Toronto 4, Ont.
Acme Bertram Machine Tools Ltd., 319 Drummond Bldg., 1117 St. Catherine St. West, Montreal, Que.
Acme Bertram Machine Tools Ltd., 16 Imperial Block, 1922 Wyandotte St., Windsor, Ont.
Acme Bertram Machine Tools Ltd., 312 Power Bldg., 428 Portage Ave., Winnipeg, Man.
Acme Bertram Machine Tools Ltd., Dundas, Ont. (Hamilton Office)

Precision Apparatus Co., Inc., 70-31 84th St., Glendale 27, L.I., N.Y. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto 10, Ont.

Precision Metal Products Company, 41 Elm St., Stoneham 80, Massachusetts Represented by:
Norman J. Rolph, 18 Toronto St., Toronto. Ont.

Precision Paper Tube Company, 2053 West Charleston St., Chicago 47, Illinois Represented by:
Playford, E. W., Ltd., P.O. Box E, Montreal, Que.

Precision Radiation Instruments, Inc., 4223 W. Jefferson Blvd., Los Angeles 16, Calif. Represented by:
Seismic Service Supply Ltd., 1318-9th Ave. E., Calgary, Alberta
Telephone Supply Company, 10918-88th Ave., Edmonton, Alberta
Oliver Meateteria, Box 387, Oliver, British Columbia
King, E. F., c/o Pacific Nor-West Traders, Terrace, British Columbia
Metcalfe, S. K. (Mr.) 471 Wellington, Trail, British Columbia
Industrial Equipment Co., 60 Princess St., Winnipeg, British Columbia
Mutual Distributors, Box 672, Fredericton, New Brunswick
Instruments 1951 Ltd., Box 236 (300 Parkdale Ave.) Ottawa, Ont.
Electronic Associates Ltd., 4616 Yonge St., Willowdale, Ont.
Canadian Electrical Supply Co., Ltd., 275 Craig St. W., Montreal, Que.

Precision Scientific Company, 3737 West Cortland Ave., Chicago 39, Illinois Represented by:
Canadian Laboratory Supplies Ltd., 3701 Dundas St. W., Toronto 9, Ont.
Scientific Supplies Co., 650 Industrial Ave., Vancouver 4, B.C.
Cave and Company, Ltd., 567 Hornby St., Vancouver 1, B.C.
Central Scientific Co. of Canada Ltd., 146 Kendal Ave., Toronto 4, Ont.
Fisher Scientific Co. Ltd., 910 St. James St. W., Montreal 3, Que.
Scientific Supplies Co., 650 Industrial Ave., Vancouver 4, B.C.

Precision Tube Co., Inc., Church Ro., & Wissahickon Ave., North Wales, Pa. Represented by:
Longstaffe, J. R., Co. Ltd., 300 Campbell Ave., Toronto 9, Ont.

Preis, H. P., Engraving Machine Co., 651 U.S. Hwy 22, Hillside, New Jersey Represented by:
Moore Bros. Machinery Co., Montreal, Que.
Empire Engineering Co., Toronto, Ont.

Premier Instruments Corp., 52 West Houston St., New York 12, N.Y. Represented by:
Crestmount Products Ltd., 45 Hollinger Road, Toronto 16, Ont.

Presto Recording Corporation, P.O. Box 500, Paramus, N.J. Represented by:
Instantaneous Recording Service, 42 Lombard St., Toronto, Ont.
Instantaneous Recording Service, 1650 Pembina Highway, Winnipeg, Man.
Instantaneous Recording Service, 3921 Berri St., Montreal, Que.

Prodelin Inc., 307 Bergen Ave., Kearny, N.J. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St. W., Montreal, Que.
Adams Engineering Ltd., 65 Bloor St. W., Toronto, Ont.

PSP Engineering Co., 8420 Otis St., Southgate, Calif.

Pyramid Electric Company, 1445 Hudson Blvd., North Bergen, N.J. Represented by:
Cohen, William, 4890 Plamondon, Suite 10, Montreal, Que.

Quam-Nichols Company, Marquette Rd., and Prairie Ave., Chicago 37, Ill.

Radio Apparatus Corp. and Regency Div., I.D.E.A. Inc., 7900 Pendleton Pike, Indianapolis, Ind. Represented by:
Canadian Marconi Co., 2442 Trenton Ave., Montreal, Que.
Alpha Aracon Radio Co. Ltd., 29 Adelaide St. West, Toronto, Ont.
Hygrade Radio Limited, 971 Richards St., Vancouver, B.C.
A. T. R. Armstrong Ltd., 700 Weston Rd. Toronto 9, Ont.

Radio Condenser Company, Davis & Copewood Sts., Camden 3, N.J. Represented by:
Radio Condenser Co., Ltd., 6 Bermondsey Rd., Toronto, Ont.

Radio Cores Inc., 9540 Tulley Ave., Oak Lawn, Ill.

Red Bank Division, Bendix Aviation Corp., Eatontown, N.J. Represented by:
Aviation Electric Ltd., P.O. Box 6102, Montreal, P.Q.

Reichhold Chemicals, Inc., 525 North Broadway, White Plains, N.Y. Represented by:
Reichhold Chemicals (Canada) Ltd., P.O. Box 130, Port Moody, B.C.
Reichhold Chemicals (Canada) Ltd., P.O. Box 730, Ste. Therese De Blainville, Que.
Reichhold Chemicals (Canada) Ltd., 1919 Wilson Ave., Toronto 15, Ont.

Rek-O-Kut Company, 38-01 Queens Blvd., Long Island City 1, New York Represented by:
Atlas Radio Corporation, 50 Wingold St., Toronto, Ont.

Reliance Mfg. Co. (Southwark) Ltd., Sutherland Road, Higham Hill, Walthamstow, E 17 London, England Represented by:
Measurement Engineering, Arnprior, Ont.

Reon Resistor Corporation, 117 Stanley Ave., Yonkers, N.Y. Represented by:
Atlas Radio Corporation, 50 Wingold Ave., Toronto 10, Canada

Ripley Company, Inc., 1 Factory Street, Middletown, Conn. Represented by:
Herring, John & Co. Ltd., 3468 Dundas St. West, Toronto 9, Ont.

Roanwell Corporation, 662 Pacific Street, Brooklyn 17, N.Y. Represented by:
Samuel C. Hooker, Ltd., 21 King St. E., Toronto, Ont.
Samuel C. Hooker, Ltd., 4 Valois Circle, Pointe-Claire, Que.

Robins Industries Corp., 41-08 Bell Blvd., Bayside 61, New York. Represented by: Represented by:
Atlas Radio Corp., 50 Wingold Ave., Toronto, Ont.

Robinson Aviation, Inc., Teterboro, N.J. Represented by:
Aviation Electric Ltd., P.O. Box 6102, Montreal 9, Que.

Rogers Corporation, Rogers, Connecticut Represented by:
Electric Insulation and Fibre, Toronto, Ont.

Royal Electric Company, Inc., 95 Grande Ave., Pawducket, Rhode Island Ave., Pawtucket, Rhode Island Represented by:
George L. Luck Associates, 5715 Darlington Ave., Montreal, Que.
Arthur A. Robinson & Associates, 21 Lombard St., Toronto, Ont.

Robotron Corporation, 21300 W. Eight Mile Road, Detroit 19, Mich. Represented by:
Amy, Frank, 43 Admiral Rd., Brantford, Ont.

Ruge, Arthur C., Associates, Inc., 733 Concord Ave., Cambridge 38, Mass. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Sanborn Company, 195 Massachusetts Ave., Cambridge, Mass. Represented by:
R-O-R Associates, 290 Lawrence Ave. W., Toronto 12, Ont.

Sanders Associates Incorporated, 137 Canal St., Nashua, N.H. Represented by:
Measurement Engineering Limited, Arnprior, Ont.
Measurement Engineering Limited, 226 Donlea Drive, Toronto, Ont.

Sauereisen Cements Company, 1045 North Canal St., Pittsburgh 15, Penna. Represented by:
Fraser, D. M., Ltd., 1070 Birchmount Rd., Toronto, Ont.

Saxonburg Ceramics, Saxonburg, Pa. Represented by:
Kerr-Machin Associates, P.O. Box 34, Station "K", Toronto 12, Ont.

For further data on advertised products use page 207.

Saxton Products, Inc., 1661 Boone Ave., New York 60, N.Y. Represented by:
Harris Pound, 5093 Randall Ave., Montreal 29, P.Q.

Schadow, Rudolph, Bauteile fur- Radio-u, Fernmeldtechnik, Berlin-Wittenau, Germany, Hermsdorfer Str. 14 Represented by:
Musimart of Canada Ltd., Electronics Division, 901 Bleury St., Montreal, Que.

Schauer Manufacturing Corporation, 4500 Alpine Ave., Cincinnati 36, Ohio Represented by:
Pitt Distributing Company Ltd., 71 Front St. East, Toronto 1, Ont.

Sciaky Bros. Inc., 4915 W. 67 St., Chicago 38, Illinois. Represented by:
Rumble, George, Co. Ltd., Terminal Bldg., Toronto 1, Ont.
Rumble, George, Co. Ltd., 690 St. Paul St. W., Montreal, Que.

Scientifiic Specialties Corporation, Snow & Union Sts., Boston 35, Massachusetts. Represented by:
Electrodesign, 736 Notre Dame St. West, Montreal, Que.

Sears Company, M. J., Delaware County, N.Y.

Sensitive Research Instrument Corp., 9-11 Elm Ave., Mount Vernon, N.Y. Represented by:
Measurement Engineering Limited, Arnprior, Ont.

Servo Corporation of America, 20-20 Jericho Turnpike, New Hyde Park, N.Y.

Shakeproof, Division of Illinois Tool Works, St. Charles Road, Blain, Illinois Represented by:
Canada Illinois Tool Works Ltd., Toronto, Ont.

Shure Brothers, Inc., 225 West Huron St., Chicago 10, Ill. Represented by:
C. M. Robinson, 189 Market Ave., East, 2nd Floor, Winnipeg, Man.
A. C. Simmonds & Sons, Ltd., 100 Merton St., Toronto 7, Ont.
Northwestern Agencies, Inc., 4130 First Ave., South, Seattle 4, Wash.

Shallcross Manufacturing Co., Jackson & Pusey Avenues, Collingdale, Penna. Represented by:
Herring, John & Co., 3565 Dundas St., Toronto 9, Ont.
Instrument Service Labs, Ltd., 21 West Broadway, Vancouver, B.C.

Sierra Electronic Corporation, 1050 Brittan Ave., San Carlos, Calif. Represented by:
Atlas Radio Corporation, 50 Wingold Ave., Toronto 12, Ont.

Signal Engineering & Mfg. Co., 273 Branchport Ave., Long Branch, N.J. Represented by:
Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ont.

Small Motors Inc., 2076 Elston Ave., Chicago 14, Ill. Represented by:
Silver Bros., 7-11 Mary St., Hamilton, Ont.

Smith, Herman H. Inc., 2326 Nostrand Ave., Brooklyn 10, N.Y. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto, Ont.

Solartron Electronic Group Ltd. (The) Queen's Rd., Thames Ditton, Surrey, Eng. Represented by:
Computing Devices of Canada Ltd., P.O. Box 508, Ottawa 4, Ont.
Represented by:
Measurement Engineering Ltmited, Arnprior, Ont.
Measurment Engineering Limited, 226 Donlea Ave., Leaside, Ont.

Servomechanisms, Inc., Post and Stewart Avenues, Westbury, L.I., N.Y. Represented by:
Industrial Electronics of Canada Limited, 83 Torbarrie Road, Toronto 15, Ont.

Scintilla Division, Bendix Aviation Corp., Sidney, N.Y. Represented by:
Lewis, A. J., 2444 Bloor St. W., Toronto, Ont.

Sonotone Corporation, P.O. Box 200, Elmsford, N.Y. Represented by:
Canadian Aviation Electronics, P.O. Box 630, Ville St. Laurent, Que.

Sound Apparatus Company, Sterling, N.J.
Custom Sound & Vision Ltd., 390 Eglinton Ave. West, Toronto, Ont.

Southco Div., South Chester Corporation, Lester, Penna. Represented by:
Metal & Wood Fastening Devices, 60 Lakeshore Rd., Valois, Montreal 33, Que.

Southern Instruments Ltd., Frimley Road, Camberley, Surrey Represented by:
Electrodesign, 736 Notre Dame St. West, Montreal, Que.

Specialty Engineering & Electronics Co., 79 Clifton Place, Brooklyn 38, N.Y. Represented by:
Ahearn & Soper Co. Ltd., P.O. Box 715, Ottawa, Ont.

For further data on advertised products use page 207.

Stanat Manufacturing Co., Inc., 47-33 37th St., Long Island City, N.Y. Represented by:
Dawson-Rhoades-Thibodeau Mach'y Co., Ltd.

Standard Electronics Corporation, 285 Emmet St., Newark, N.J. Represented by:
Canadian Westinghouse Company Ltd., Hamilton, Ont.

Staver Company, Inc. (The) 41-51 North Saxon Ave., Bay Shore, L.I., N.Y. Represented by:
Electronic Essential Limited, 50 Wingold Ave., Toronto, Ont.

Stevens Manufacturing Company, Inc., 45 N. Plymouth St., Lexington, Ohio (Plant Location) P.O. Box 1007, Mansfield, Ohio (Mailing Address) Represented by:
Stark, R. W., 44 Renfrew St. West, Renfrew, Ont.

Stewart, F. W. Corp., 4311-13 Ravenswood Ave., Chicago 13, Ill. Represented by:
E. A. Tipping, 957 Notre Dame Ave., Winnipeg, Man.

Stokes, F. J., Machine Company, 5500 Tabor Road, Philadelphia 20, Penna. Represented by:
Robinson, J. William, 27 Wellington East, Toronto, Ont.
Walters, Fred, 27 Wellington East, Toronto, Ont.

Stou Mfg. Co., 443 State St., Binghampton, N.Y. Represented by:
Canadian Fairbanks Morse Co. Ltd.,
St. John, N.B.
Halifax, N.S.
Windsor, Ont.
Fort William, Ont.
Winnipeg, Man.
Regina, Sask.
Edmonton, Alberta
Calgary, Alberta
Victoria, B.C.

Stratton & Co. Ltd., Eddystone Works, Alvechurch Rd., West Heath, Birmingham 31, Warwickshire. Represented by:
The Astral Electric Co. Ltd., 44 Danforth Rd., Toronto 13, Ont.
Birch-Jones & Co., 119 Pender St. W., Vancouver, B.C.

Struthers-Dunn Inc., Lambs Rd., Pitman, N.J. Represented by:
E. W. Playford Ltd., P.O. Box E, 5851 Western Ave., Montreal 28, Que.
J. R. Longstaffe Ltd., 300 Campbell Ave., Toronto 9, Ont.

Stupakoff Ceramic & Mfg. Co., Division of The Carborundum Co., Latrobe, Penn. Represented by:
Canada Sand Papers Ltd., Box 8, Station Q, Toronto 7, Ont.

Superex Electronics Corp., 4-6 Radford Pl., Yonkers, N.Y. Represented by:
A. T. Armstrong Ltd., 700 Weston Rd., Toronto, Ont.
C. M. Robinson Co., 189 Market Ave. E., Winnipeg 2, Man.
Robinson, C. M., Co., 550 Beatty St., Vancouver, B.C.
Robinson, C. M., 325 10th Ave. W., Calgary, Alta.

Superior Electric Co., The, 83 Laurel St., Bristol, Conn. Represented by:
The Superior Electric Co., 453-A Eglinton Ave. W., Room 202, Toronto 12, Ont.

Superior Flux & Mfg. Co., The, 1302 Ontario St., Cleveland 13, Ohio. Represented by:
Acetogen Cutting Gas Co., 1332 Powell, Vancouver, B.C.
Le Hage Metals Ltd., 152 Sheldrake Blvd., Toronto, Ont.

Switchcraft Inc., 1328-30 N. Halsted St., Chicago, Ill. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold St., Toronto 10, Ont.

Synthane Corp., Oaks, Penn. Represented by:
Plastic Supply Co., 6078 Sherbrooke St., Montreal 28, Que.

Tank Corp., The, P.O. Box 346, Newark-Granville Rd., Newark, Ohio. Represented by:
Powerlite Devices Ltd., 233 Dunbar Ave., Montreal 25, Que.
Powerlite Devices Ltd., 1870 Davenport Rd., Toronto 9, Ont.
Powerlite Devices Ltd., 1170 Kingsway, Vancouver 10, B.C.
Permaflex Industries Ltd., 2710 St. Clair Ave. W., Toronto, Can.

Tech Laboratories Inc., Palisades Park, New Jersey

Techalloy Co. :nc., Route 113, Rahns, Pa. Represented by:
Alloy Metal Sales Co., Toronto, Ont.
Robert Bartram, Montreal, Que.

Technicraft Laboratories Inc., Thomaston-Waterbury Rd., Thomaston, Conn. Represented by:
Magna Electronics Ltd., 980 Broadview, Toronto, Ont.

For further data on advertised products use page 207.

POWER PACKED CONTROL

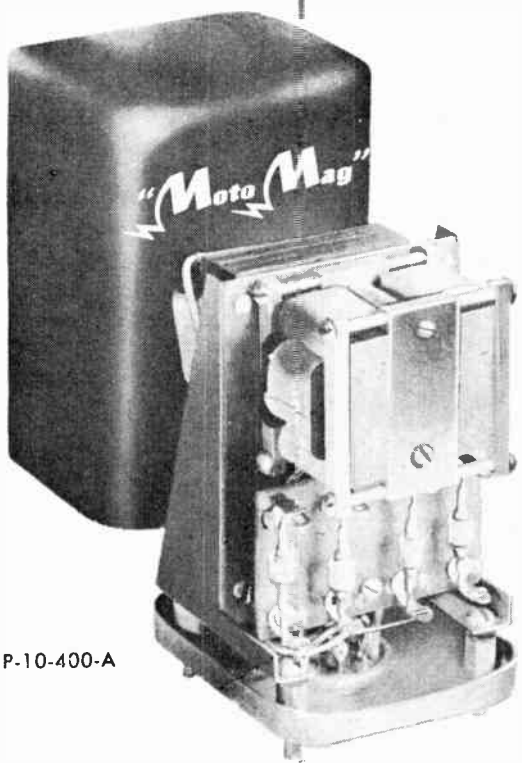
TEN TIMES

more accurate than MANUAL CONTROL

Fast, unfailing accuracy in transmitting fire control data demands power-packed, reliable electronic components. First choice for rugged, exacting jobs like this is the Keystone Moto Mag — small, sensitive, dependable.

In industry, too, that same accuracy and reliability help build the products of peace in countless positioning and control applications.

Better magnetic amplifiers can dramatically improve the performance of *your* product or control system. Write today for information on new, improved Keystone Moto Mags.



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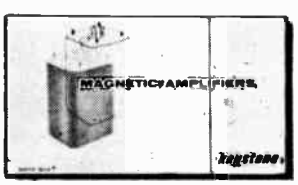
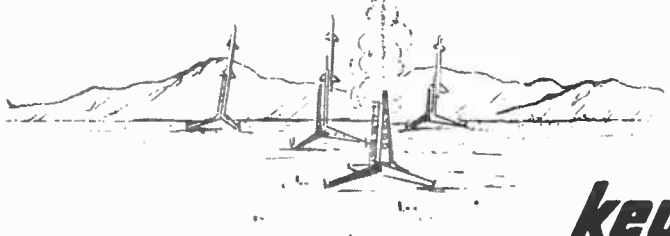
KP-10-400

KP-10-410



Send for new magnetic amplifier catalog showing specifications, performance data and quotes.



keystone PRODUCTS COMPANY

904 23RD STREET UNION CITY 2. N. J.

Exclusive Canadian Representative:
GENERAL COMMUNICATIONS LTD.
980 O'Connor Drive, Toronto, Ont.

For further data on advertised products use page 207.

Technology Instrument Corp., 531 Main St., Acton, Mass. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., 226 Don Lea Drive, Toronto, Ont.

Tecnifax Corp., 195 Appleton St., Holyoke, Mass. Represented by:
Instruments (1951) Ltd., P.O. Box 236, Ottawa, Ont.

Telechrome Inc., 88 Merrick Rd., Amityville, N.Y.

Telectro Industries Corp., 35-16 37th St., Long Island, New York 1, N.Y.

Telectron Co., The, 4019 Prospect St., Cleveland, Ohio. Represented by:
Stark Electronic Instruments Ltd., Ajax, Ont.

Tel-Instrument Electronics Corp., 728 Garden St., Carlstadt, N.J. Represented by:
Atlas Radio Corp., 50 Wingold St., Toronto, Ont.

Teleradio Engineering Corp., 99 Wall St., New York City 5, N.Y. Represented by:
Longstaffe, J. R., Co. Ltd., 300 Campbell Ave., Toronto 9, Ont.
Longstaffe, J.R., Co. Ltd., 1500 St. Catherine St. W., Montreal, Que.
Longstaffe, J.R., Co. Ltd., 492 Somerset St. W., Ottawa, Ont.
Radiovision Sales Ltd., 325 10th Ave. W., Calgary, Alta.

Teletronics Laboratory Inc., 54 Kinkel St., Westbury, L.I., N.Y. Represented by:
Computing Devices of Canada Ltd., P.O. Box 508, Ottawa 4, Ont.

Telewave Laboratories Inc., 4320 34th St., Long Island City, N.Y. Represented by:
Measurement Engineering Ltd., Arnprior, Ont.
Measurement Engineering Ltd., Toronto, Ont.

Telex Inc., 1633 Eustis St., St. Paul 1, Minn. Represented by:
Atlas Radio Corp. Ltd., 50 Wingold Ave., Toronto 10, Ont.

Telrex Inc., Asbury Park, N.J. Represented by:
Delhi Metal Products Ltd., Delhi, Ont.

Tenna Mfg. Co., 7580 Garfield Blvd., Cleveland, Ohio. Represented by:
Tenatronics Ltd., Newmarket, Ont.
Thompson, Charles, Ltd., North Vancouver, B.C.

Tenney Engineering Inc., 1090 Springfield Rd., Union, N.J. Represented by:
Lock, J. H., & Sons Ltd., 150 Perth Ave., Toronto, Ont.
Lock, J. H., & Sons Ltd., 900 Boyd Ave., Ottawa, Ont.

Tensitron Inc., Harvard, Mass. Represented by:
Morrison, J. B., Machinery Co., 45 Oriole Pkwy., Toronto 7, Ont.

Terado Co., 1068 Raymond Ave., St. Paul 14, Minn. Represented by:
Atlas Radio Corp., 50 Wingold Ave., Toronto, Ont.

Texas Instruments Inc., 6000 Lemmon Ave., Dallas 9, Texas. Represented by:
Computing Devices of Canada Ltd., P.O. Box 508, Ottawa 4, Ont.

Thomas & Skinner Steel Products Co. Inc., 1120 E. 23rd St., Indianapolis, Ind. Represented by:
Hugh Russel & Sons Ltd., 80 Prince St., Montreal 3, Que.
Hugh Russel & Sons Ltd., 235 Wicksteed Ave., Leaside, Toronto 17, Ont.

Thompson, J. Langham, Ltd., Springland Laboratories, Bushey Heath, Herts, England Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Times Facsimile Corp., 540 W. 58th St., New York 19, N.Y.

Tobe Deutschmann Corp., 921 Providence Hghwy., Norwood, Mass. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St. W., Montreal 25, Que.
Adams Engineering Ltd., 65 Bloor St. W., Toronto, Ont.

Thermal American Fused Quartz Co., 18-20 Salem St., Dover, N.J. Represented by:
Fisher Scientific Co., 910 St. James St. W., Montreal, Que.

Trad Electronic Corp., 1001 First Ave., Asbury Park, N.J. Represented by:
Measurements Engineering Ltd., Arnprior, Ont.

Transitron Electronic Corp., 407 Main St., Melrose 76, Mass. Represented by:
Adams Engineering Ltd., 1500 St. Catherine St. W., Montreal, Que.

Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif. Represented by:
K. C. Kahnert, 1908 Avenue Rd., Toronto 12, Ont.
D. Eldon McLennan, 2191 West First Ave., Vancouver, B.C.

Trico Fuse Mfg Co., 2948 North 5th St., Milwaukee 12, Wis. Represented by:
Irving Smith Ltd., 2095 Madison Ave., Montreal 28, Que.

Trio Manufacturing Co., Griggsville, Ill. Represented by:
H. R. Gray, Astral Electric Co. Ltd., 44 Danforth, Toronto, Ont.

Tru-OHM Products, Division of Model Eng. & Mfg. Inc., 2800 N. Milwaukee Ave., Chicago 18, Ill. Represented by:
A. T. R. Armstrong Co., 700 Weston Rd., Toronto 9, Ont.

Turner Co., The, 909 17th St. N.E., Cedar Rapids, Iowa. Represented by:
Canadian Marconi Co., 830 Bayview Ave., Toronto 17, Ont.

Ultradyne Engineering Lass. Inc., P.O. Box 8007, Albuquerque, New Mexico Represented by:
Electrodesign, 736 Notre Dame St., West Montreal, Que.

Underwood Corp., Electronic Computer Div., 35-10 36th Ave., Long Island City 6, N.Y. Represented by:
Underwood Ltd., 135 Victoria St., Toronto, Ont.

Unimax Div., The W. L. Maxson Corp., 460 West 34th St., New York 1, N.Y. Represented by:
Aeromotive Engineering Products, 5257 Queen Mary Rd., Montreal 29, Que.

United Electric Controls Co., 85 School St., Watertown 72, Mass. Represented by:
Playford, E. W., 5851 Western Ave., P.O. Box E, Montreal 28, Que.
Process-Instrument Systems Ltd., 1893 Avenue Rd., Toronto, Ont.

United Electronic Manufacturing Corp., 542-39th St., Union City, N.J. Represented by:
Desser, E. E., Ltd., 441 St. Francois Xavier St., Montreal, Que.
Desser, E. E., Ltd., 457 Palmerston Blvd., Toronto, Ont.

United Shoe Machinery Corp., 140 Federal St., Boston, Mass. Represented by:
United Shoe Machinery Co. of Can. Ltd., 2610 Bennett Ave., Montreal, Que.

Universal Electronics Co., 1720 22nd St., Santa Monica, Calif. Represented by:
Electromechanical Products, Warden Ave., Agincourt, Ont.

Valco Manufacturing Co., 4700 W. Walton, Chicago 51, Ill. Represented by:
Peate Musical Co., 1429 Mansfield St., Montreal 2, Que.
Turner Musical Instruments Ltd., 9 Church St., Toronto 1, Ont.

Vectron Inc., 1584 Trapelo Rd., Waltham 54, Mass. Represented by:
R-O-R Associates Ltd., 290 Lawrence Ave. W., Toronto 12, Ont.
Merritt, Ron, Co., 229 Rogers Bldg., Vancouver, B.C.

Vidaire Electronics Mfg. Corp., 576 W. Merrick Rd., Lynbrook, New York, N.Y. Represented by:
Burgess, Norris, 418 Mt. Pleasant Rd., Toronto 7, Ont.

Vocaline Co. of America Inc., Coulter St., Old Saybrook, Conn. Represented by:
Street, Robert, Sales Co., 270 Donlands Ave., Toronto, Ont.

Vokar Corp., 7300 Huron River Drive, Dexter, Mich. Represented by:
Desser, E. E., Ltd., 441 St. Francois Xavier, Montreal 1, Que.
Desser, E. E., Ltd., 1512 Eglinton Ave. W., Toronto, Ont.

Wall, P., Mfg. Co., Erie & Grant Sts., Grove City, Pa. Represented by:
Jewel Sales Co., 417 St. Peter St., Montreal, Que.
Harris Pound, 5093 Randall Ave., Montreal, Que.

Walsco Electronics Corp., 3602 Crenshaw Blvd., Los Angeles 16, Calif. Represented by:
Atlas Radio Corp., 50 Wingold St., Toronto, Ont.

Warren Wire Co., Pownal, Vermont. Represented by:
Northern Electric Co. Ltd., P.O. Box 6123, Montreal, Que.

Wassco Electric Products Corp., 126 W. Cass St., Joliet, Ill. Represented by:
York Agencies Ltd., 9739-85th Ave., Edmonton, Alta.
York Agencies Ltd., 2439-29th Ave. S.W., Calgary, Alta.

For further data on advertised products use page 207.

Waters Manufacturing Inc., 4 Gordon St., Waltham, Mass. Represented by:
Bayly Engineering Ltd.,
First St., Ajax, Ont.
Webster Electric Co., Racine, Wis. Represented by:
Dominion Sound Equipments Ltd.,
4040 St. Catherine St. W.,
Montreal, Que.
West Coast Electronics, Subs. Litton Ind. Inc., 5873 W. Jefferson Blvd., Los Angeles 16, Calif.
West Instrument Corp., 525 No. Noble St., Chicago, Ill. Represented by:
Upton, Bradeen & James Ltd.,
890 Yonge St., Toronto, Ont.
Western Gear Works, Electro Prod. Div., 132 W. Colorado St., Pasadena, Calif. Represented by:
Hooker, S. C., Ltd.,
8025 Decarie Blvd., Montreal 9, Que.
Hooker, S. C., Ltd.,
21 King St. E., Toronto 1, Ont.
Wheelco Instruments Division, Barber-Colman Co., 1300 Rock St., Rockford, Ill. Represented by:
Barber-Colman of Canada Ltd.,
Wheelco Instruments Div.,
601 Merton St., Toronto 12, Ont.
Barber-Colman of Canada Ltd.,
Wheelco Instruments Div.,
6693 Park Ave., Montreal 15, Que.
Instrument Service Labs., The,
21 West Broadway, Vancouver, B.C.
Wells H. Morton Co. Ltd.,
613-11th Ave. W., Calgary, Alta.
Whiteley Electrical Radio Co. Ltd., 109 Kingsway, London W.C. 2, England Represented by:
Cossor (Canada) Ltd.,
301-303 Windsor St., Halifax, N.S.
Whitney Blake Co., P.O. Box K, Hamden, Conn. Represented by:
R. D. Fleck & Co. Ltd., Oshawa, Ont.
Wilson, G. C., & Co., 1950-8th Ave., Huntington, West Virginia Represented by:
Higginson Engineering Sales,
275 James St. N., Hamilton, Ont.
Winegard Co., 3000 Scotten Blvd., Burlington, Iowa. Represented by:
Norman H. Speight, 145 Wellington St. W.,
Toronto, Ont.
Winslow Co. Inc., The, 9 Liberty St., Newark 5, N.J. Represented by:
Patlon Aircraft of Canada, Ltd.,
132 Laird Drive, Toronto, Ont.
Worcester Pressed Steel Co., 100 Barber Ave., Worcester 6, Mass. Represented by:
G. R. Marshall & Co. Ltd.,
82-84 Richmond St. E., Toronto 1, Ont.
Workman TV Inc., 309 Queen Anne Rd., Teaneck, N.J. Represented by:
Gould, E. S., Sales Co.,
3533 Oxford Ave., Montreal, Que.
Lanphear, William R., Co.,
8329 N.E. 30th, Bellevue, Wash.
Wright & Weaire Ltd., 131 Sloane St., London, England. Represented by:
Astral Electric Co. Ltd.,
44 Danforth Rd., Toronto 13, Ont.

For further data on advertised products use page 207.

NEWS...

Kerr-Machin Appointed Ontario Reps For Mechanical Rubber Products Company

Mechanical Rubber Products Company of Warwick, New York, through their Mr. Stanley Kogut, have appointed Kerr-Machin Associates, Toronto,


E. L. KERR


H. C. MACHIN

as Ontario sales representatives for their line of specialty engineered rubber products applicable to the electronics, aircraft, and allied industries.

AIEE Committee On Computing Devices Appoints Ottawa Engineer

It has been recently announced by the AIEE Headquarters in New York that Mr. George Glinski, Ottawa electronics engineer and business man, has been appointed member of the Committee on Computing Devices.

The scope of this committee is as follows: "Treatment of all matters in which the dominant factors are the requirements, design, construction, selection, installation, and operation of machinery and devices relating to computing devices, including studies of the electro-magnetic, electronic and mechanical phenomena of such devices."


G. GLINSKI

George Glinski, P. Eng., Dipl. Eng., is one of Canada's leading experts in electronic computation. For the past five years he has been conducting graduate courses on analog and digital computation at McGill University in Montreal and Carleton College in Ottawa. Mr. Glinski has contributed many new techniques of data processing for government and industry and is the president of Data Processing Associates Limited, an Ottawa company specializing in this field.

For further data on advertised products use page 207.

Data Processing Associates Limited Sign Important Contract

Mr. George Glinski, president, Data Processing Associates Limited, Ottawa, Canada, recently announced that an exclusive Canadian agreement has been signed with Dynamics Research Associates, Seattle, Washington, designers and manufacturers of electronic equipment and components for automation.

This association brings to Canada a new service and several new products which have wide application in guided missiles, industrial control, automation and government research work.

Data Processing Associates Limited is the only Canadian Company specializing in electronic data processing and automation. Personnel of DPA have had experience in the design and utilization of automatic processors for machine tools. Mr. Glinski, lecturer on this subject at Mr. Gill University and Carleton College feels that Canadian industry is making great strides in developing new techniques and although implementation has been relatively slow, this will speed up considerably in the near future.

Toronto-Hamilton Sections I.R.E. Hold Combined Meeting

Dr. J. D. Ryder, Fellow and President of the Institute of Radio Engineers, will address the first of two local IRE meetings, in the Westinghouse Auditorium, Hamilton, on the subject of "Automatic Electronic Production".

This meeting will be in the form of a joint meeting with the Hamilton and London sections and will be held Monday, October 24th.

The second meeting will be addressed by Mr. A. D. Turnbull, of Dominion Sound Equipments Limited, Montreal, and will deal with "Recent Developments in Motion Sound Reproduction", as devoted chiefly to the newer techniques of sterephonic multitrack magnetic sound reproduction.

This meeting will be held in Room E.21, Electrical Building, University of Toronto, on Monday, October 31.

CESCO President Visits British Radio Show

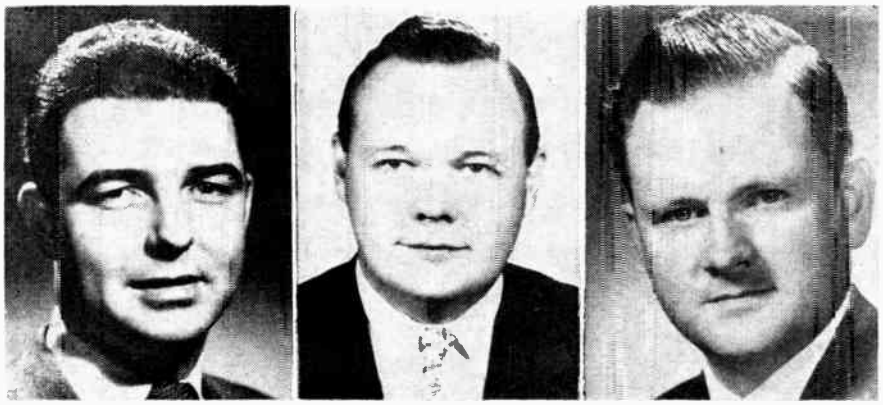
M. I. Rosenthal, president and general manager of Canadian Electrical Supply Company, has recently returned from a trip to England and Holland where he attended the Radio Industry Council Show at Earl's Court, London.

Mr. Rosenthal expressed great satisfaction from his visits and said they proved to be quite valuable. During his time in London he had the opportunity of contacting the major manufacturers and seeing the latest products being marketed in England.

(Continued on page 152)

  For further data on advertised products use page 207.

MARCONI APPOINTMENTS



H. E. BUCHANAN C. D. McRAE M. J. BISCOTT

Balco Research Laboratories Appoint Eastern Canadian Reps

Balco Research Laboratories of Newark, New Jersey, manufacturers of high temperature sealed capacitors, used in the guided missile programs, and other critical applications, have appointed Kerr-Machin Associates, Toronto, Ontario, as representatives for Eastern Canada. This sales representation was arranged by Mr. Machin with Mr. Robert Nobel, Executive Vice-President of Balco Research Laboratories.

Rogers Majestic Electronics Appoint B.C. Representatives

Rogers Majestic Electronics Limited have announced the appointment of Alan M. Crawford and Fred Neveroski as exclusive sales representatives for British Columbia for Communications and Equipment products.

This appointment, effective July 31, makes for a streamlined sales/service operation with improved engineering back-up.

Temporarily, Messrs. Crawford and Neveroski will be located at the Rogers Majestic Electronics Limited offices at 375 Terminal Avenue in Vancouver.

Marconi Company Announces Sales Appointments

New appointments in the sales organization of the Electronic Tube and Components Division of the Canadian Marconi Company are announced by S. Slinger, Division Manager.

G. D. McRae has been appointed Division Sales Manager. He will be responsible for the co-ordination of the Division's sales activities, both Industrial and Distributor. M. J. Biscott has been promoted to the position of Industrial Sales Manager, succeeding Mr. McRae. H. E. Buchanan will continue as Distributor Sales Manager for the Division. The two new appointments are effective from the first of August.

Mr. McRae, Mr. Buchanan and Mr. Biscott have had a total of 35 years' experience with the Canadian Marconi Company.

Lenkurt Organizes Special Engineering Department

Establishment of a Contract Project Engineering department to handle "Engineer, Furnish & Install" (E.F. & I.) jobs has been announced by the Lenkurt Electric Co. of San Carlos, California.

The E.F. & I. service is designed to aid in the provision of carrier or radio facilities for a company which does not wish to undertake all the engineering or installation work involved. This service is available to telephone companies, railroads, electric utilities, government agencies, pipelines and other private firms which operate their own communications systems.

Two veteran communications men have been named to top jobs in the new Lenkurt department, which is a branch of the company's Applications Engineering division. William B. Farinon is department manager and Rodman C. Romayne is project engineer.

Night Course To Teach Computers

This fall McGill University Department of University Extension will conduct again a specialized course on Digital and Analog Computers (data processing). The lecturer will be Mr. George Glinski, P. Eng., Dipl. Eng., Ottawa and Montreal business man.

Mr. Glinski has been specializing since 1948 in data processing systems for defence and industrial applications. He is the president of Data Processing Associates Limited, an Ottawa firm, providing services in these fields of growing importance for business and industry.

For further data on advertised products use page 207.

Path Testing Begun For World's Longest Microwave System

"Telephone Talk" official publication of the British Columbia Telephone Company reports that site testing between 12 mountain radio stations in the rugged British Columbia portion of what will be the world's longest single microwave system was begun last August. Designed to provide television channels and long distance telephone circuits over a 3800-mile route from Vancouver to Sydney, N.S., the network will be operated by the member companies of the Trans-Canada Telephone System.

Aerial surveys of the proposed sites were made earlier this year, and more recently engineers have been carrying out preliminary tests on the ground, using special mirrors to establish line-of-sight paths between the projected relay stations. Actual radio path testing will entail the use of portable 200-foot towers and associated radio equipment. Construction of the B.C. section of the system will cost more than $5,000,000 and is expected to take three years to complete.

J. B. Smyth Takes Over Larger Quarters

Officials of J. B. Smyth, Electronic Components, Montreal, have announced that the company has moved its premises to larger quarters at 380 Craig Street West, Montreal.

Andrew Appoints New West Coast Manager

Jeff D. Montgomery, former sales engineer for Andrew Corporation, Chicago, has been named West Coast engineering manager, of Andrew California Corporation, Claremont, California, designers and manufacturers of antennas, antenna systems, and transmission lines.

J. MONTGOMERY

Mr. Montgomery has been associated with Andrew in the capacity of a research and development engineer, and subsequently as a sales engineer.

He is a graduate engineer of the Illinois Institute of Technology and is a member of the Institute of Radio Engineers. He is also a member of the Honorary engineering fraternity, Eta Kappa Nu.

In California he will supervise sales and engineering activities in twelve western states, operating from the newly acquired quarters of Andrew California Corporation, in Claremont.

(Continued on page 154)

For further data on advertised products use page 207.

Kerr-Machin To Handle Monson Product

The Monson Corporation of Chicago, manufacturers of the bobbinless type precision wire wound resistors will shortly introduce a new type flat resistor to the Canadian electronics industry through its Canadian Representatives, Kerr - Machin Associates, of Toronto.

Radio Valve Company Produce 1,000,000th Tube

The 1,000,000th television picture tube came off the assembly line of Radio Valve Co. Ltd., Canada's oldest and largest electronic tube manufacturer on September 3rd last. The impact of television on Canadian buyers has been so marked it is estimated there are now 1,500,000 sets in Canada; a TV set for every 10 Canadians.

"There is no parallel in the history of communications to compare with the unprecedented public acceptance of television," Mr. Davison stated. "Never has an industry emerged from its pioneer days in so short a time."

"In 1941 the Company set up the first production line in North America to mass produce cathode ray tubes for military use. In 1948 we produced television picture tubes and the public got its first look at a 7-inch set. And now in 1955 we have produced our one millionth picture tube. During this period over 90 per cent of all picture tubes used in Canadian TV sets have been supplied by the Radio Valve Co. Ltd."

"Our continuing investment since 1937 in research, development, and production facilities for picture tubes is evidence of the confidence we have in the growth of Canada and the electronic industry."

Canadian Marconi Named Exclusive Canadian Distributor

Canadian Marconi Company has been appointed exclusive Canadian distributors for the Vandivere Automatic Sequencer, a brand-new electronic device which permits AM radio stations and television stations to have automatic control of tape recorders, reproducers, turntables, slide projectors, and various associated equipment.

The Automatic Sequencer is manufactured by Vandivere Laboratories Inc., of Arlington, Virginia, who have exclusive patents applied for in connection with this new product. It is specifically designed for use with aural announcements:

Distribution of Vandivere Automatic Sequencers is being handled through the Broadcast and Television Station Equipment section of Canadian Marconi's Commercial Products Division, 2442 Trenton Avenue, Montreal, Que.

ARL's R-Theta Demonstrated At National Air Show

The R-Theta Computer, judged this year's outstanding achievement in Canadian aviation, was shown in public for the first time outside Canada at the National Air Show in Philadelphia, September 3-5.

The device, which was invented for RCAF use by W/C J. G. Wright, DFC, one of Canada's outstanding navigation specialists, is regarded with great interest by the USAF. It indicates to the pilot of an aircraft how many miles he is from base or target and what direction he must steer to arrive there.

(Continued on page 155)

● On September 3, 1941, Radio Valve Co. Ltd., produced its first cathode ray tube. On August 22, 1955, No. 1,000,000 is shown here being picked from the endless picture tube production line of the company which produces 90 per cent of Canada's picture tubes. Shown on the occasion are left to right, R. C. Hudson, Plant Superintendent, L. M. Price, Chief Engineer and W. E. Davison, President.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

NEWS

(Continued from page 154)

Westinghouse Executive Killed In Automobile Accident

A tragic level-crossing accident on August 7th took the life of Julian M. Tuteur, sales manager for the Canadian Westinghouse Company's Television-Radio Division. The 28-year-old executive died instantly when his automobile struck a train near Guelph, Ontario.

J. M. TUTEUR

Nationally-known throughout television and radio circles, Mr. Tuteur was in the seventh year of an outstanding career with Westinghouse during which he had quickly risen from a salesman's job in 1948 to become head of the sales organization of one of the country's biggest television and radio manufacturing divisions.

A dynamic, aggressive personality coupled with a natural ability to conceive and execute top-line marketing and merchandising programs, took Tuteur swiftly up through the posts of field supervisor, supervisor of home radio and manager of radio and TV marketing. He was appointed sales manager for the Westinghouse TV-Radio Division only last year. Constant travel across Canada made him one of the best-informed men in the industry.

Index Of Electron Tubes In "5500" Series Camesa Publication Now Available

The Electron Tube Section of the Canadian Military Electronics Standard Agency (CAMESA) has arranged with the U.S. RETMA to print a document entitled "Index of Electron Tubes Registered in the '5500' Series" and identified as JETEC (Joint Electron Tube Engineering Council) Publication No. 5.

The new document has been prepared to assist equipment designers in identifying tubes in the "5000-6000" series and replaces CAMESA Information Bulletin No. 4.

Copies of the document have been made available to RETMA of Canada for Canadian distribution at cost ($1.00 per copy). Copies should be ordered from the Radio-Electronics-Television Manufacturers Association of Canada, 200 St. Clair Avenue West, Toronto 7, Ontario. Payment should be made by cheque or money order made payable to the Association.

(Continued on page 159)

For further data on advertised products use page 207.

Growing With The Industry - - -

So We're Going Monthly !

In April 1953, less than three years ago, Electronics and Communications was established and commenced publication on a bi-monthly basis.

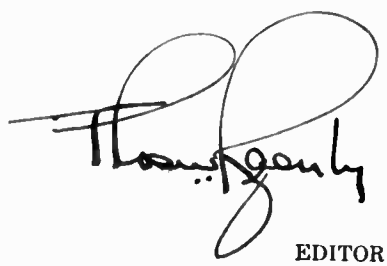
From the first, Electronics and Communications served an industry scattered widely over the vast area that comprises Canada — an industry which — until the publication of Electronics and Communications, had no common meeting ground between suppliers and buyers in the rapidly expanding market for electronic and communications equipment and components.

Electronics and Communications was established to fill this gap and the spontaneous enthusiasm with which all those engaged in the industry received it and the continued acceptance by both readers and advertisers of the contribution it has made to their sphere of business indicates that Electronics and Communications has filled a vital need.

Much has happened during the comparatively short space of time since Electronics and Communications commenced publication. Today it serves an industry which, in the not too distant future, may occupy one of the most important spots in our industrial economy.

We believe that Electronics and Communications has been an important factor in establishing a truer realization of the magnitude and potential of the Canadian electronics and communications market. We like to think too, that Electronics and Communications has also been a factor in the rapid expansion of the industry which has taken place during the less than three years of publication.

So in order to keep pace with the increased activity of the electronics and communications industries the time has come for an expansion of the service provided by Electronics and Communications magazine and beginning in January 1956 Electronics and Communications will start publication on a monthly basis to better serve an industry which we are confident will continue to grow at its unprecedented rate.



EDITOR

COMMUNICATIONS

(Continued from page 95)

frequencies. The design of a good neutralizing transformer is essentially a compromise of all these factors.

The Osborne neutralizing transformers are designed for single or multi circuits for up to 102 pair cable and for voltages up to 15,000. To avoid crosstalk, the secondary winding is essentially a telephone type cable and to obtain the necessary close coupling primary and secondary are wound in parallel. Therefore close to perfectly equalizing coupling is obtained. The transformer is, of course, protected against lightning and power contacts by the use of carbon block protectors. Where there is a danger of power follow through after a lightning surge the primary winding is usually shunted by a distribution type lightning arrester. FIG. 6 shows a typical method of in Figure 6 shows a typical method of installing a power station: FIG. 6.

1. Power transformer.
2. Power station telephone terminal.
3. Protector block.
4. Distribution type arrester.

A-B Cable insulated from ground for 1000 to 1500 feet.

5. Telephone cable.

Some typical characteristics of the Osborne 5000 volt 26 pair, 60 cycle neutralizing transformer are as follows:

Insertion Loss	**20 cycles—**	**1.7 db**
60 MW into	**300 cycles—**	**.3 db**
600 Ohms	**10000 cycles—**	**.3 db**
	40000 cycles—	**.9 db**
	60000 cycles—	**1.4 db**
Bridging Loss	**20 cycles—**	**1.6 db**
	300 cycles—	**.06 db**
	10000 cycles—	**.06 db**
	40000 cycles—	**.08 db**
	60000 cycles—	**.1 db**
Remanent Voltage	**1000 volts —**	**.5 volts**
	5000 volts —	**1.8 volts**
	7000 volts —	**3 volts**

It will be seen therefore that these transformers can be used on carrier frequencies up to 50 kc without undue loss. They are usually designed for a 25 kv impulse dielectric test.

The Osborne Company have developed some rather interesting protectors evolved from the companies basic Telephone Protector. It is well known that the utilities desire frequencies in some cases up to 450 kc for the transmission of intelligence. An iron cored transformer is usually unsatisfactory to pass frequencies from 20 cycles to 450 kilocycles. In order to provide a wide band transmission, and at the same time provide all the basic features of the basic protector, a unit is available wherein frequencies above 20 kc are by-passed by the use of high voltage capacitors. Figure 7 shows a typical circuit.

This protector shows up a flat insertion loss characteristic, with the exception of two minor peaks, over the range 20 cycles to 450 kilocycles.

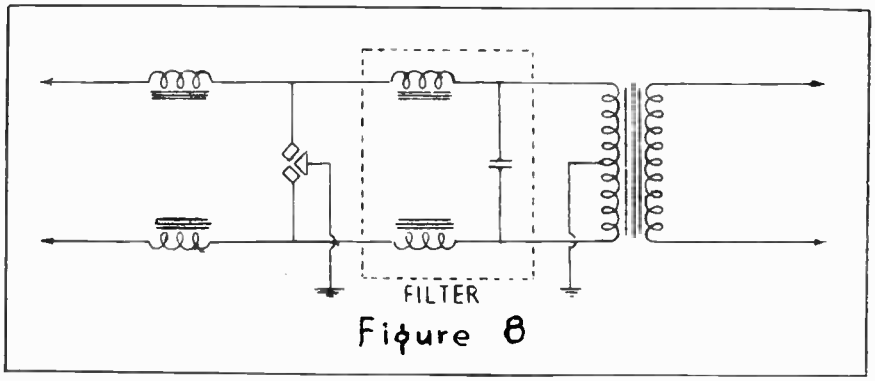


Figure 8

Another interesting application is a protector for waystation telephone tapped off a carrier line. In this instance a series of special high voltage bridging filters have been developed which have varying cut-off frequencies above the voice frequency limit. These filters are designed to co-ordinate with the insulation level and drainage characteristics of the isolating and drainage transformers. They are usually insulated for 5 kv or 10 kv line to line and line to ground. A typical circuit is shown in Figure 8, showing the filter inserted between the transformer and grounding relay.

Now available for the portable linesman's telephone are two transformers, each designed for 10 kv isolation. A unique feature is their small compact size, weighing only 2½ to 3 pounds. They are fully molded in a thermoset plastic so that no metal appears on the outside. Although a slight sacrifice was made in insertion loss, such losses are still remarkably low, for the protection offered.

Interesting Communications System

Recently a very interesting communications system came into operation. The development of the iron ore deposits in Northern Quebec and Labrador depended on the construction of a railway to haul the ore from the mines to the St. Lawrence River. For this purpose, the Quebec North Shore and Labrador Railway was constructed from the village of Seven Islands on the St. Lawrence some 360 miles north to Knob Lake. The rail line is single track with a total of 56 automatically controlled sidings. The traffic density will exceed anything on the Continent today.

Along the right of way a 23 kv single phase power line was constructed primarily to provide power for the charging of the batteries used to operate the railway block signals and switches. On the same pole structures is a single pair communications circuit. Over this pair the following intelligence is transmitted.

1. Voice frequency telephone.
2. 12 Channels of carrier for telegraph teletype, and voice.
3. Dc railway signalling, i.e. Centralized Traffic Control System varying up to 180 volts, 0.5 amps. on a 25 cycle pulse system base.

It is important to note that the utmost of reliability is required of this system, it simply must not fail when one considers that there will be eventually up to 52 trains on the rails either on mainline or in sidings at any one time. It was quite a challenge to the owners, operators and the various manufacturers who made this scheme possible. The unique demands for communications protection will be appreciated. There are installed 56 Waystation telephones, one at each siding plus several others such

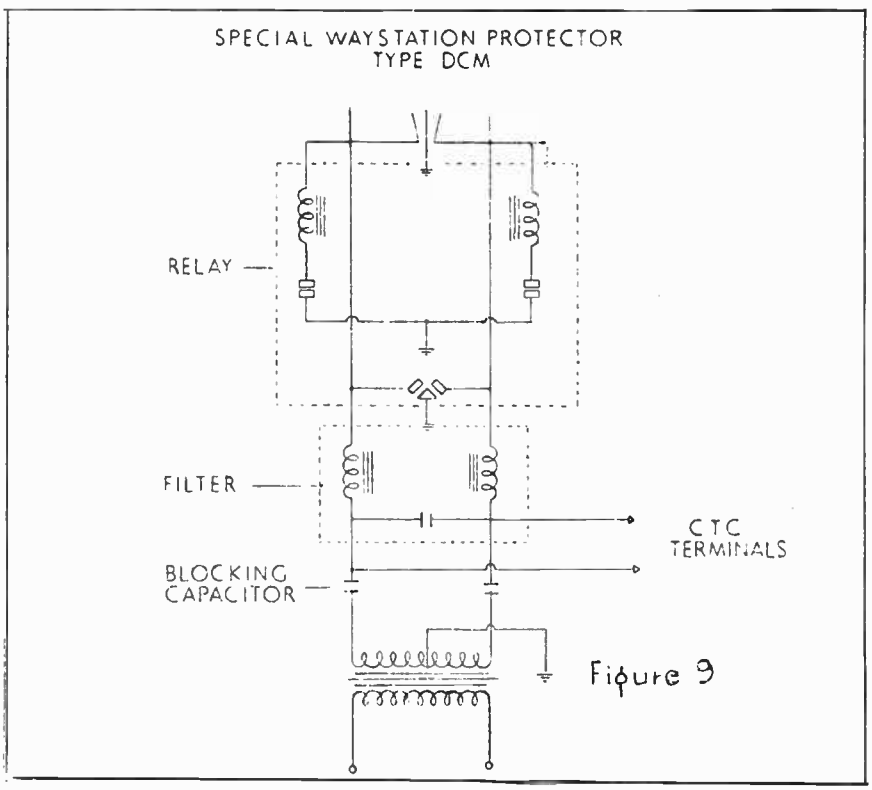


Figure 9

as one at each end of a tunnel, and 56 C.T.C. terminals. All are in the shunt on the line between carrier and power line terminals.

In the case of trouble the power line is sectionalized by single pole manually operated breakers.

Apart from the normal induction encountered, it was determined by test that the electro static induction in the communication pair was approximately 4,800 volts line to line when one side of the power line was opened. By virtue of the large number of telephones and the varying dc signal, serious consideration had to be given to the telephone waystation bridging filters. In addition the protective devices had to be blocked with capacitors to prevent shortcircuiting the line with respect to the dc.

The protector finally conceived and installed at each waystation consists of a combined isolating and drainage transformer having the primary terminals blocked by capacitors. By virtue of the large number of waystations and the limited line current, each transformer capacitor network was designed for low transmission and bridging losses at the expense of drainage capacity. It was necessary to install gas filled arrester tubes to provide for the excitation of the grounding relay in the event of a power line cross.

In order to keep bridging loss down, it is necessary to use a bridging filter. In this instance the filter is placed in the circuit between the transformer and relay. This filter is rather unique in that apart from the usual filter characteristics the filter was designed to pass the full varying dc current of up to 500 milli amp for the C.T.C. circuit, and was designed to withstand a dielectric test of 10 kv line to line and 25 kv to ground. The inductors are completely molded in an epoxy base thermoset resin and the capacitor is of the hermatically sealed type outboard mounted. The C.T.C. is terminated, of course, on the load side of the filter. The circuit is shown in FIG. 2.

Up to this date the system has measured up to expectations with only minor faults.

NEWS

(Continued from page 156)

Bayly Engineering Appointed De Mornay-Bonardi Reps

Bayly Engineering, Ltd., Ajax, Ontario, has been appointed sales representatives for DeMornay-Bonardi, of Pasadena, California, manufacturers of microwave test equipment.

The Bayly organization handles instrument manufacturers' sales to industrials and the armed services. They will represent DeMornay-Bonardi in Southern Ontario and Quebec, on both microwave and ultra-microwave equipment lines. The latter is a recent development, consisting of a complete line of research instruments for continuous coverage of frequencies up to 90 KMC.

C.G.E. Signs Contract For North Bay's TV Transmitter And Studio Installation

Canadian General Electric Company has announced the signing of a contract with a newly formed North Bay company, headed by local business men G. A. Alger, G. D. Stanton, C. H. Hewitt and J. L. Shaw, for a complete television transmitter and studio installation at North Bay, Ontario.

Planning a late 1955 "On Air", the new station's allocated frequency is Channel 10. The combined transmitter-studio operation is situated near Callendar, famous as the birthplace of the Dionne Quintuplets. The site overlooks Lake Nipissing and the proposed building housing the station will blend with the surrounding pine and birch.

The station has applied for the call sign CKGN-TV — "Gateway of the North".

Channel 10, North Bay, is Canadian General Electric's 56th broadcasting station and the equipment supplied includes CGE's new Ultra-Power television antenna. Used on Channels 7 through 13, the Ultra-Power antenna represents a new development in simplified design and provision for block building to the maximum allowed power of 325 KW ERP.

(Continued on page 160)

For further data on advertised products use page 207.

Electronic Experts Meet, Discuss Government Industry Relations

The good relations existing between the Government and the electronics industry were reaffirmed when electronic experts and specialists from industry gathered at Ste. Adele en haut, P.Q. recently.

The industry experts, members of the Radio-Electronics-Television Manufacturers Association of Canada were attending the Second Annual Meeting of the Electronics Division of this organization. Member-companies of this Division are engaged in the production of electronic equipment for military and industrial use and, at the two-day meeting, important sessions were held to discuss research and development, security regulations, engineering specifications, and contractors' patent rights.

On the second day of the gathering, representatives from the Department of Defence Production, the Defence Research Board, and from the Armed Services, met with industry to discuss common problems relating to the development and production of electronic equipment.

The increasing importance of electronics in military and industrial fields is apparent from the growth of the Electronics Division of RETMA of Canada. The Division now has twenty member-companies; total membership in RETMA is over one hundred. The other two divisions comprise the Receiver Division, consisting of firms engaged in the manufacture of radio and television receivers, and the Parts and Accessory Division, members of which produce vast quantities of electronic parts, components, and accessories.

The Canadian electronics industry is now a highly developed industrial asset to Canada and has an extremely promising future. Today the industry is producing radios of all types, television sets, transmitting and studio equipment, automatic gun-laying computors for the Navy, fire control radar for jet fighters of the Air Force, radio and radar equipment for the Army, radar protective networks for scanning the sky, police and taxi two-way communications equipment, microwave television relay apparatus, harbour fog detecting radar systems, and many other types of intricate equipment.

● Among those in attendance at the RETMA meeting and who took part in the discussions on Government Industry relations, were Commander Battles, Royal Canadian Navy, and Frank T. Davies, Asst. Chief Scientist, Defense Research Board. *Standing (l. to r.):* Carl A. Pollock, President of Dominion Electrohome Industries Limited and President of RETMA; W. S. Kendall, Collins Radio of Canada Limited; D. A. Bamford, Measurement Engineering Limited; A. C. Carter, Cossor (Canada) Limited. *Sitting (l. to r.):* H. S. Dawson, Canadian General Electric Company Limited, Chairman of the Electronics Division Nominating Committee; F. T. Winter, Canadian Marconi Company. *Second from top standing (l. to r.):* Stuart D. Brownlee, General Manager of RETMA of Canada; G. J. Walsh, Canadian Radio Manufacturing Corporation Limited; A. P. H. Barclay, Canadian Radio Manufacturing Corporation Limited; D. W. Holdsworth, Crosley Radio and Television Div. Moffats Limited, Chairman of the Electronics Division's Government Relations Section. *Sitting (l. to r.):* J. C. R. Punchard, Northern Electric Company Limited (Belleville), Chairman of The Electronics Division, RETMA of Canada; W. Jones, Pye Canada Limited, Vice-Chairman of the Electronics Division, RETMA of Canada. *Third from top standing (l. to r.):* M. Kassner, Canadian Marconi Company, Chairman of the Microwave, Radio Relay, and Multiplexing Committee, Electronics Division, RETMA of Canada; D. D. McLean, Canadian Westinghouse Company Limited; W. W. H. Dean, Canadian Westinghouse Company Limited; R. P. Matthews, Andrew Antenna Corporation Limited. *Sitting (l. to r.):* J. W. McLeod, Andrew Antenna Corporation Limited; J. W. Paddon, Canadian Aviation Electronics Limited. *Bottom, standing (l. to r.):* R. B. Lanskail, RCA Victor Company Limited; H. B. Seabrook, RCA Victor Company Limited, Chairman of the AM Broadcasting Engineering Committee, Electronics Division of RETMA of Canada; J. A. Price, Philco Corporation of Canada Limited; A. B. Hunt, Northern Electric Company Limited (Montreal), Immediate Past-President of RETMA of Canada. *Sitting (l. to r.):* C. A. Norris, Copper Wire Products Limited, Chairman of the Engineering Committee, Parts and Accessory Division of RETMA of Canada; R. McBurney, Canadian Radio Manufacturing Corporation Limited; D. J. Maser, Computing Devices of Canada Limited; G. W. Crossan, Canadian Radio Manufacturing Corporation Limited, Chairman of the Membership Committee, Electronics Div., RETMA of Canada.

For further data on advertised products use page 207.

Government-Industry Officials Meet At Ste-Adele P.Q.

For further data on advertised products use page 207.

NEWS

(Continued from page 161)

Powertronic Equipment Appoints Two New Executives

Brad W. Richardson and David E. Bawden have been appointed treasurer and secretary, respectively, of Powertronic Equipment Ltd., J. C. Burkholder, president, has announced. Powertronic manufacturers specialized industrial electronic equipment, including rectifiers and automatic control apparatus.

B. W. RICHARDSON

D. F. BAWDEN

Prior to joining Powertronic, Mr. Richardson was associated with Purolator Products (Canada) Ltd., of Toronto, and served in the Royal Navy during the Second World War. He is also a director of Fleet Manufacturing Ltd., of Fort Erie, Ont.

Mr. Bawden was graduated from the University of Toronto with a Bachelor of Applied Science degree and up until his recent appointment was on the staff of the Defense Research Board at Valcartier, Quebec.

Simultaneously, it was announced that Mr. Richardson and Mr. Bawden had been elected treasurer and secretary, respectively, of Burlec Sales Ltd., of Toronto and Montreal, distributors of a variety of standard and specialized electronic equipment and machinery.

New-Type Overhead Wiring Introduced On Prairies

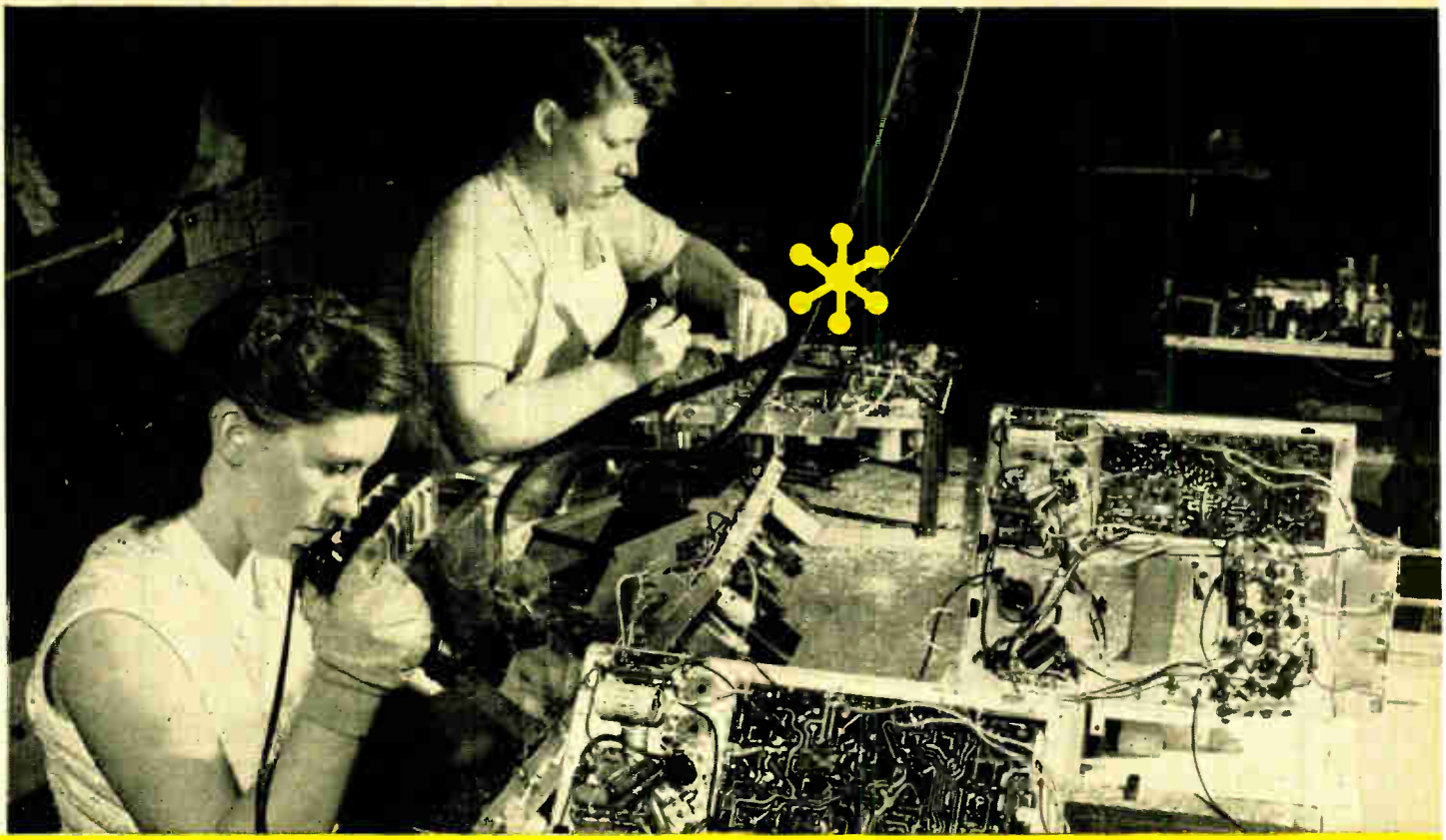
A western wire manufacturer has come up with the answer to a problem which has plagued civic authorities for years — what to do about unsightly overhead wiring?

Pioneers in the aluminum wire process, Western Wire and Cable Company has used lightweight, economical aluminum for a new-type installation which satisfies town planners from the point of view of appearance and at the same time satisfies utility engineers from the point of view of completed costs.

On a certain street in the southern Alberta city of Medicine Hat, electrical power is now distributed by means of a single cable instead of a multiplicity of unsightly, odd-sized wires. First installation of its kind, it has aroused so much favorable comment that plans to extend its use in Medicine Hat are being made and other progressive utility companies have queried Western Wire and Cable with a view to making similar installations.

(Continued on page 164)

For further data on advertised products use page 207.



WIRING TELEVISION RECEIVERS
in the Canadian Admiral Corporation plant, Toronto

and again the choice is
FEDERAL Type TR Hook-up Wire

Here are some of the reasons why Canadian Admiral Corporation use Federal Type TR for hook-up wiring:

- Not affected by coil varnishes.
- Rated at 90° C. and does not become brittle—even at minus 40° C.
- Flame-retarding.
- Highly resistant to moisture, oil and fungus growth.
- Easy to cut and strips clean.
- Available in 10 solid colours and 3 spiral stripes for immediate circuit identification.

There is a Federal product for every electronic wiring purpose. Write for full information. We will be glad to help choose the wire suited to your specific requirements.

5509

FEDERAL Wire and Cable Company Limited
GUELPH, ONTARIO

NEWS

(Continued from page 162)

Guy Valois Appointed Quebec Branch Manager For CAE

The appointment of (Wing Commander) Guy Valois to the newly created position of Branch Manager, Quebec Region, has been announced by Mr. K. R. Patrick, OBE, President and Managing Director of Canadian Aviation Electronics, Limited, Ville St. Laurent, Quebec.

The creation of this new branch, located in Montreal, recognizes the increasing importance of the Quebec market in the Company's sales picture, both for the Industrial and Consumer Products Divisions of CAE. In his capacity as Branch Manager — reporting directly to the President and Managing Director — Mr. Valois will assume complete responsibility for the marketing of all commercial products, including such items as communication equipment and scintillometers, as well as for CAE Dumont television sets for all of Quebec and the Ottawa, Cornwall and Kingston regions.

G. VALOIS

Mr. Valois assumes his new responsibilities as Branch Manager after having been associated for a number of years with the Sales Department of CAE's Consumer Products Division.

Honeywell Exhibits Reactor Control System At Geneva Atom Meeting

A working mock-up model of an automatic control system for nuclear reactors was exhibited at the International Atoms-for-Peace Conference by the Minneapolis-Honeywell Regulator Company. The world conference, sponsored by the United Nations, was held in Geneva, Switzerland, August 8 to 20.

The electronic control system was designed by the firm's nuclear engineering specialists. The system, built into a large panel, incorporated a reactor simulator — an electronic unit which artificially duplicates the operating characteristics of a reactor. The electronic instruments, similar to those used in research reactors and power reactors, demonstrated how they can be harnessed to measure automatically and control key aspects of the reactor's operation.

The Honeywell display was part of an official exhibition of technical and industrial achievement held in conjunction with the international conference.

For further data on advertised products use page 207.

C.N.R. Signal Instructions Car To Supplement Job Training

A new Canadian National Railways signal instruction car, one of two signal cars completed by the C.N.R. to provide a uniform system of instruction, will supplement present on the job training. The car is fitted with the newest features in signalling.

The equipment includes three scale model tracks operated by life size controls, standard crossing protection apparatus, modern instructional aids and a library of reference material.

Classes will be conducted by G. W. Vogen, who has a thorough knowledge of signal systems of the railway. One portion of the unit contains a comfortable living room and a kitchen equipped with electric refrigeration and propane gas stove.

The signal instruction program was developed by the engineering and personnel departments of the railway with the co-operation of the general chairman of the Brotherhood of Railway Signalmen.

Westinghouse Appoints D. Room Division Manager Of Manufacturing

David Room, an Oxford University graduate who joined the Canadian Westinghouse Company's Television-Radio Division last year as superintendent of industrial engineering, has been appointed division manager of manufacturing.

The announcement was made by Ricardo Muniz, manager of the TV-Radio Division at Brantford.

DAVID ROOM

At Oxford, Mr. Room majored in politics, economics and philosophy. Since graduation he's had broad experience in the electronics industry, specializing in industrial engineering and production control systems.

Under Mr. Room's guidance, Westinghouse has just installed the first complete manufacturing facilities in the Canadian television industry for the new automated printed wiring technique.

Aviation Electric Ltd. Appointed Canadian Reps For Ideal Aerosmith

Ideal Aerosmith of Hawthorne, California announces the appointment of Aviation Electric Limited, Montreal, as their exclusive Canadian distributor.

The Ideal Aerosmith is already well known in Canada and consists of industrial test equipment for testing various types of instruments. It also includes the famous Ideal-Aerosmith line of sensitive needle valves so widely used by industry and instrument labs.

Stocks of the most popular items are being carried in both Montreal and Vancouver.

Canadian General Electric Sign Contract For Supply Of St. Jerome Radio Station

Canadian General Electric Company has announced the signing of a contract with Mr. J. LaLonde of Radio Laurentides Inc. for complete transmitting and studio equipment to supply the new radio broadcasting station in St. Jerome, Quebec.

The contract calls for the supply of a 1 Kw AM transmitter (operating into a 2-Tower Array) as well as monitoring and control facilities and complete broadcasting studios. The station will operate on an assigned frequency of 900 Kc. The transmitter is of Canadian design and was manufactured at Canadian General Electric's Royce Works in Toronto.

The new station in St. Jerome will serve a large portion of the Laurentians — farm, industrial, and resort areas alike. Shipment of the equipment is scheduled for this fall.

(Continued on page 166)

For further data on advertised products use page 207.

NEWS

(Continued from page 165)

Ampex Corporation Announces New Canadian Office

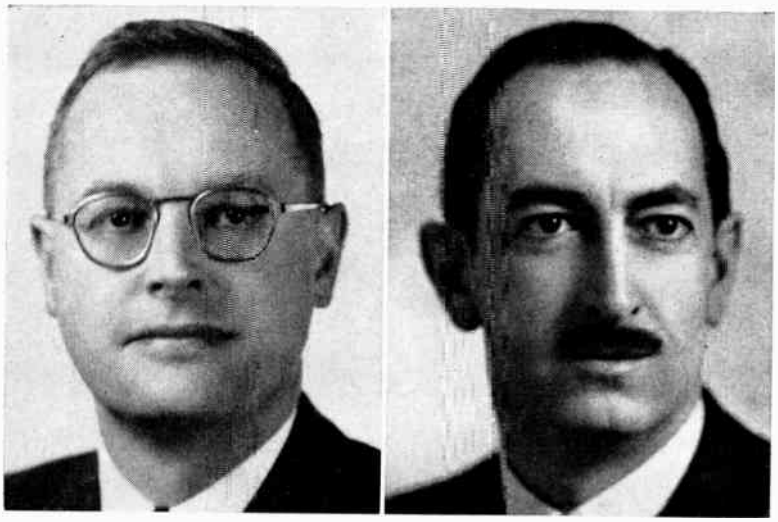
First office to be set up by Canadian division of Ampex American is now open at 70 Grenville Street, Toronto, Harrison Johnston, executive vice-president of the new wholly-owned Ampex Corporation subsidiary, announces.

R. ENDERSBY

The new Toronto office is the first sales and distribution office for Ampex magnetic recording equipment to be set up by Ampex American which will serve customers in all areas in the Western Hemisphere outside of the United States, Johnston explains.

Manager of the new Toronto office is Ralph E. Endersby who joined Ampex last April. Previously, Endersby was employed with the Canadian General Electric Company and McCurdy Radio Industries, both in Toronto.

FEDERAL WIRE & CABLE APPOINTMENTS



G. D. TILLER

T. J. BELL

Federal Wire And Cable Co. Announce Top Appointments

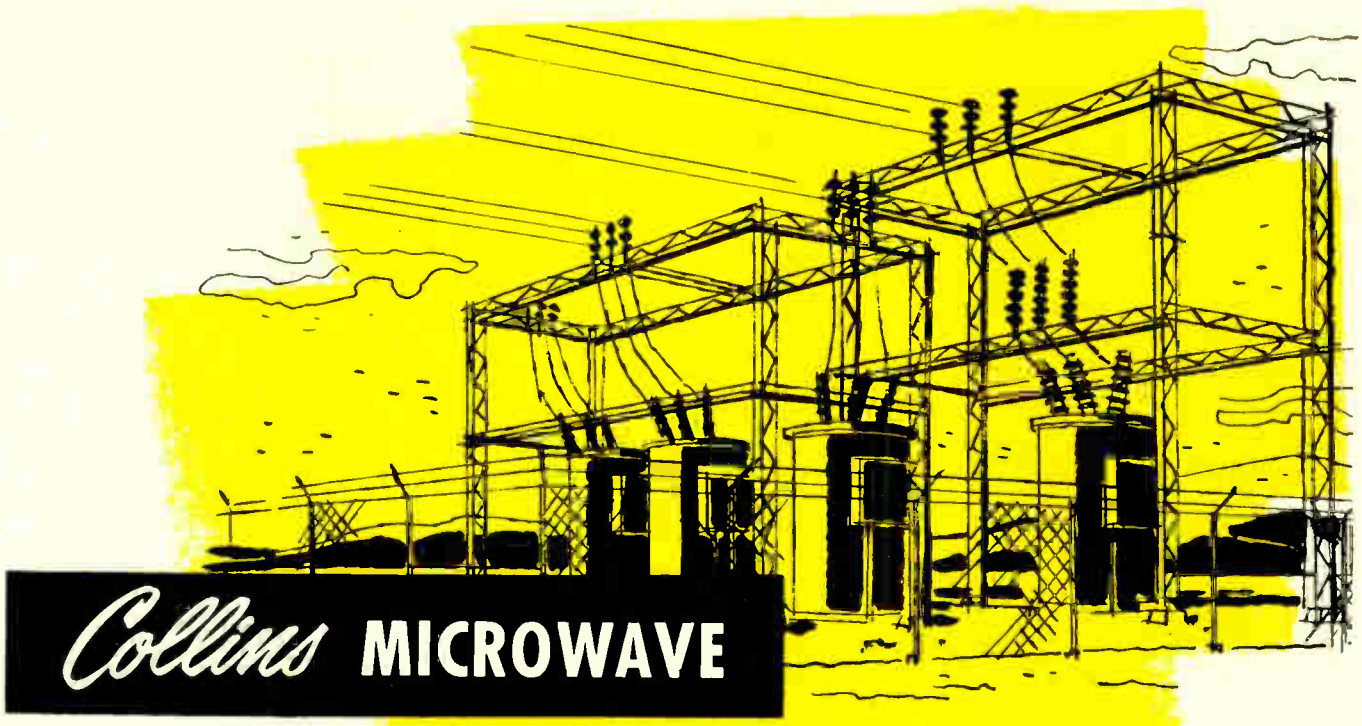
J. Godfrey Smith, President of Federal Wire and Cable Company Limited, Guelph, Ontario, announces the appointment of Gordon D. Tiller as Vice-President and General Manager, effective September 15th, 1955.

G. D. Tiller, a native of Guelph, Ontario, has been associated with Federal Wire and Cable for 15 years and has been Comptroller since 1950. A graduate of the University of Toronto in Commerce and Finance, Mr. Tiller served three years as a lieutenant in the Royal Canadian Artillery during the 2nd world war.

T. J. Bell has been appointed to the Board of Directors upon his resignation as Vice-President and General Manager.

(Continued on page 168)

For further data on advertised products use page 207.

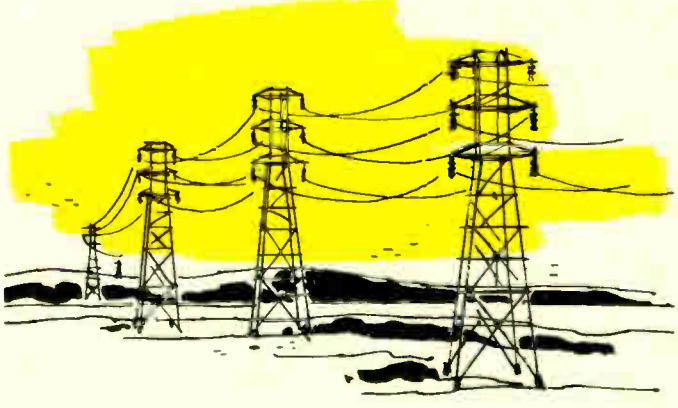


Collins MICROWAVE

Improves Reliability and Economy of System Operation

Power system loading, fuel-transmission coordination, and power pooling communication and control may be efficiently and economically handled with Collins microwave. Collins broadband microwave and mechanically filtered multiplex equipments assure reliable performance, high channel capacity and ease of maintenance. Building block construction plus single sideband modems allow flexibility in meeting today's needs with ready expansion as your operating area increases. Channels may be added for a large number of private telephone circuits as well as remote VHF station operation, high speed protective relaying, supervisory control, system telemetering, automatic load control, centralized office accounting and teletypewriter facilities.

Collins MICROWAVE and MULTIPLEX FEATURES



- LONG-LIFE REFLEX KLYSTRON provides reliable, broadband microwave transmitter.
- OPERATION AT 6700 MC permits use of reflectors to eliminate tower-mounted transmission lines.
- NON-CRITICAL IF AMPLIFIER employs fixed-tuned filters to achieve freedom from adjustment problems.
- TUBELESS POWER SUPPLIES employ magnetic amplifiers and selenium rectifiers for long trouble-free life.
- RELIABLE TUBES (ARINC-approved types). Only 4 tube types, including klystron.
- FREQUENCY DIVISION MULTIPLEX provides flexible channeling without complicated or critical circuitry.
- MECHANICAL FILTERS provide reliable permanently-tuned channel selectivity with almost rectangular passband.
- BILATERAL SINGLE SIDEBAND SUPPRESSED CARRIER permits larger channel capacity.
- OPTIONAL AUTOMATIC SWITCHOVER to standby RF and standby common multiplex.
- MAINTENANCE FEATURES include built-in test facilities, articulated hinges, grasshopper fuses, fault alarm, and service channel.

Write for descriptive literature

COLLINS RADIO COMPANY OF CANADA, LTD.

77 Metcalfe Street,
OTTAWA, ONTARIO

COLLINS

For further data on advertised products use page 207.

NEWS

(Continued from page 166)

Pacific Communications Services Ltd. B.C. Reps For Rogers Majestic Electronics

Rogers Majestic Electronics Ltd. announce the appointment of Pacific Communications Services Ltd. as exclusive sales representatives for British Columbia for Communications and Equipment products of Rogers Majestic Electronics Ltd.

This appointment, effective July 31st, makes for a streamlined sales service operation with improved engineering back-up.

Pacific Communications Services Ltd. are located at 1181 Marine Drive, North Vancouver, B.C.

Maurice A. Robbins Presents Paper At 1955 IRE National Conference

A paper entitled "A High Performance Mobile Unit for 450 Megacycles" was presented by Maurice A. Robbins, of the Commercial Engineering Department of Canadian Marconi Company at the 1955 National Conference of the Institute of Radio Engineers, Professional Group on Vehicular Communications, in Portland, Oregon, on September 26-27.

The paper dealt mainly with the design of Canadian Marconi's new line of mobile and fixed station equipment which will be in production in the near future.

Philippe W. Trudel, Ottawa District Manager For R.C.A.

The appointment of Philippe W. Trudel as Ottawa District Manager of RCA Victor Company, Ltd., was announced today by F. R. Deakins, president.

A specialist in electrical appliances and television sets, Mr. Trudel was promoted from the post of sales manager, Montreal District Office. He will head RCA Victor's expanded operations in Ottawa, where a sales office and warehouse have just been set up to serve Eastern Ontario and Western Quebec.

P. W. TRUDEL

Mr. Trudel is succeeded in his Montreal post by R. Girouard, formerly sales representative in the Greater Montreal area.

R. F. Hill Named Western Canada Rep For Marconi

Ronald F. Hill has been named Western Canada Representative for Broadcast and Television Station Equipment Sales, it is announced by C. P. McNamara, Manager of the Canadian Marconi Company's Commercial Products Division.

R. F. HILL

Mr. Hill will make his headquarters in Calgary from which he will serve the broadcast and television station field in western Canada. In addition, he will handle electronic instrument sales in that territory.

Until this present appointment, Mr. Hill was stationed with the Systems Engineering group of Commercial Products Division in the Marconi Building, Montreal. He replaces Jack M. Gibson in Calgary, who has been transferred to Toronto as Senior Sales Representative for Commercial Products Division.

For further data on advertised products use page 207.

Pre-Fab TV

Lethbridge Gets Westinghouse Package Deal

● Reception area at Tillsonburg's new station, CKOT, shows record library at rear with control room window at right.

Design and engineering for the latest major commercial broadcasting project to be undertaken by the Canadian Westinghouse Company's Electronics Division is now nearing completion. The big job — supplying all equipment from the 600-ft. antenna to the 10 kw transmitter, cameras, projectors, studio control and other apparatus for station CJOC-TV at Lethbridge, Alta. — marks the Division's initial entry into the telecasting field.

Like the three radio broadcasting stations Westinghouse has built and installed in the past two years, the new TV outlet will be a completely-packaged project with all design, engineering and installation supervision work being done by the company's engineers. The last radio station was completed two months ago when CKOT, Tillsonburg, Ontario, went on the air. All studio and transmitter facilities for the 250-watt daytime station were supplied. Other Westinghouse radio station installations are CBF, Montreal and CHLN at Trois Rivieres, P.Q. A fourth station at Truro, N.S., is now under construction.

CJOC-TV is scheduled to begin telecasting in the early Fall and will use a high gain antenna to provide maximum effective radiated power of 190 kw for complete coverage of Lethbridge and the surrounding area.

A complete studio layout is being simulated in the Electronics Division at Hamilton and will be operated as a complete unit prior to shipment. This will permit complete prefabricated interwiring and system checking, thus shortening field installation time.

For further data on advertised products use page 207.

Compatible Color TV shown For First Time In Europe

At the recent International Trade Fair held in Hannover, Germany, an extensive demonstration of color television was presented by Telechrome Incorporated, Amityville, New York. At the invitation of the United States Department of Commerce, Telechrome exhibited its color TV broadcasting and testing equipment, representing America's great advancement in the electronic art.

More than three tons of Telechrome color TV equipment was flown to Hannover where closed-circuit color programs were shown to vast crowds of engineers, industrialists, scientists and other important visitors who were pleased by the excellence of the pictures. Nearly all hoped that it would not be too long before Europe would follow the United States lead in color TV broadcasting.

Probably the world's most important trade fair, more than two million visitors came to Hannover from more than 80 countries. The effort of President Eisenhower to have the United States take a more active interest in International Trade Fairs is being strenuously carried on by the Department of Commerce.

Highlight of the American exhibition was the visit by United States Secretary of Commerce, Sinclair Weeks.

EUROPE SEES COLOR TV

● Visitors to the first color television broadcast in Europe are shown above, left to right: The Secretary, Sinclair Weeks; Lower Saxony Finance Minister, Alfred Kubel; Mr. H. Charles Riker, Vice-President; Mr. J. R. Popkin-Clurman, President, Telechrome, Inc.

September 26th Meeting Of Toronto Section IRE Opens Season's Activities

The Institute of Radio Engineers, Toronto Section, held its first meeting of the 1955-56 season on Monday, September 26. The speaker on the occasion was Donald G. Fink, Director of Research, Philco Corporation whose topic was "Color Television Versus Color Motion Pictures". Mr. Fink's lecture was illustrated with slides and 16mm film and the results of a detailed survey of the practices of motion-picture theatres and the 8mm and 16mm motion-picture systems was compared with the current performance obtained by 21-inch color television receivers.

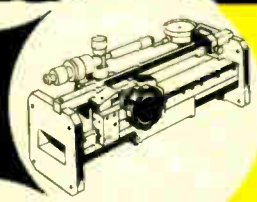
(Continued on page 178)

For further data on advertised products use page 207.

DECCA RADAR AND DECCA NAVIGATOR UNSURPASSED FOR SAFETY AND ACCURACY *on land, sea and in the air!*

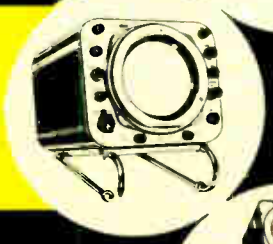
DECCA AIRFIELD RADAR

Decca Type 424 Airfield Control Radar offers an economical solution to the problem of providing an efficient and reliable approach aid under conditions of poor visibility at air terminals. Decca Airfield Surface Indicator is a revolutionary "Q" Band radar for control of all ground movement on airfields.



MICRO WAVE TEST GEAR

The Decca Radar Laboratories have developed a range of precision "S" Band and "X" Band microwave test gear. This range includes Standing Wave Meters, Attenuators, Oscillators, Matched Loads, Noise Sources and complete Test Benches, all built to the highest engineering standards.



DECCA MARINE RADAR

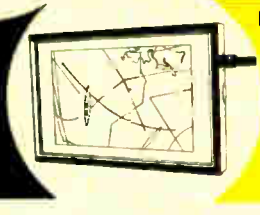
Since 1946 over 8,000 merchant ships of the World have been equipped with marine radar and of this total, Decca Radar has been installed aboard more than 4000 vessels in the past five years. This fact itself testifies to the performance and reliability of Decca Radar, which leads the world in advanced design.

DECCA STORM WARNING RADAR

Decca Type 41 with a useful range beyond 200 miles provides the meteorologist with an essential aid, giving information on storm build up and movement in many cases virtually impossible to acquire by other means.

DECCA NAVIGATOR—MARINE

Over 2600 ships of all classes, including those of many navies testify to the high accuracy, reliability and simplicity in use of the Decca Navigator System.



DECCA NAVIGATOR—AIR

The Decca Navigator System provides complete flexibility in flight planning, continuous fixing of position and the facility of map presentation using the Decca Flight Log. It is ideally suited for Helicopter operation having no "line of sight" limitation and being capable of pilot operation.

DECCA RADAR (CANADA) LIMITED
NAVIGATOR (CANADA) LIMITED
272 DALESFORD ROAD, TORONTO 4, ONTARIO

For further data on advertised products use page 207.

● Tests to determine if radio-telephone communication can increase the speed and efficiency of handling freight trains are being carried out by the Canadian National Railways on its fast Montreal to Vancouver freight trains. The experiments are the first of their kind undertaken in North America

Railway Communications

CNR Tests Radio-Telephone Communications

1090 Transmissions Constitute Continent-Wide Test

TESTS with radio-telephone communications in freight train operations on Canadian National Railways lines between Montreal and Vancouver have been completed.

The tests were undertaken to determine the advantages of radio-telephone communication between the engineman and conductor and train crews and flagmen. The tests also determined whether this system of communication could be operated satisfactorily on this route.

The experiments began in the early morning hours of January 17, when diesel-powered Time Freight 401 pulled out of Montreal's vast Turcot Yards bound for Vancouver.

The consist of the train included special cars 69 and 93. They housed intricate test devices and provided accommodations for A. C. Weaver, assistant transportation engineer, CNR, Montreal; J. W. Ormiston, engineering department, CNT, Toronto; D. H. Leitch and J. Birks of Rogers Majestic Electronics, Montreal. Assistant superintendents and master mechanics accompanied the test train over their respective territories.

Since cabooses are changed at every sub-division and the same locomotive might not be available for the entire round trip journey, the radio equipment was installed in the two business cars. Car 69 (Dynamometer Car) was located directly behind the locomotive, while Car 93 was coupled ahead of the caboose.

From the radio equipment in each car, extension cables were run into the cab of the locomotive and into the caboose. A regular control box, complete with handset and speaker, was connected to each extension and was mounted in suitable locations in the locomotive cab and in the caboose.

Four "portable sets" were supplied for the test, one each for head-end and tail-end crews, with the remaining two being held for spares. The units used in the test were Rogers-Majestic "Porta-Fones" Model CFHTRU-1BL and were powered from dry batteries.

The radio equipment installed in each business car consisted of a Rogers Majestic Type CFMTRU-R80B-C2R2(KW) 1A dual channel 30 watt, railroad radio unit. To operate the mobile radio equipment, 117 volts ac at 60 cycles was required. This power was supplied by a Model 3232 Cornell-Dublilier Vibrator Converter powered from the 32 volt dc car lighting system. A Rogers Majestic Model P-9051 rigid type railroad antenna was used on each car. In order to clear all obstructions, it was necessary to mount the antenna base at one end of the car and in a position where the antenna base was lower than the car roof. It was later discovered that this mounting location was undesirable, since antenna radiation pattern would be unsymmetrical.

The two railroad units in the business cars and the four "Porta-Fones" were operated on a frequency of 161.19 megacycles (Channel 29). This channel has been assigned to the Canadian National Railways for radio-telephone communication use throughout Canada.

Country-Wide Test

Actual testing of the unique devices began immediately upon leaving the Montreal terminal. On the westbound

For further data on advertised products use page 207.

● An engineer demonstrates the use of radio-telephone communication on Canadian National Railways freight trains between Montreal and Vancouver. The tests, the first of their kind in North America, permit instant communication between head and rear end crews and wayside stations.

journey, logs of all radio conversations relating to the operation of the train were prepared by the assistant superintendents and master mechanics. Eastbound, however, these duties were carried out in shifts by the technical engineers, who monitored all transmissions.

Transmissions were also made in order to determine signal strengths while the train was travelling through different types of terrain (rock cuts, tunnels and mountains). While travelling through Northern Ontario and the Prairie Provinces, due to the nature of the terrain, it was not deemed necessary to carry out numerous test transmissions, since receiver current readings during operational transmissions indicated consistently strong signals.

When the foothills of the Rockies were reached, however, signal strength readings were logged every mile. Starting at Brule (in the Brule Sub-division) signal intensity readings were recorded to Jasper. Receiver-received signal levels were noted at every mile-post on the Albreda and Ashcroft sub-divisions, and on the Yale sub-division as far west as Floods.

Satisfactory signal levels and clearly understandable transmissions were obtained throughout the entire trip, except when either the engine or caboose were inside tunnels. If the tunnel was short enough that the engine and the caboose were clear but with the consist passing through it, satisfactory communication could be achieved.

In some locations in the Fraser Canyon, signals were distorted although readable. Engineers concluded that multi-path signals (direct and reflected waves varying as train moved along) were causing voice flutter on transmissions.

1,090 Transmissions

"Porta-Fones" were carried by the head-end and tail-end brakemen while they were inspecting and protecting the train. On occasion exceptional distances were covered using this equipment. It was noted too that when brakemen moved away from the train (steel box cars) by approximately one car length or climbed upon the roof of a car, reception was greatly improved.

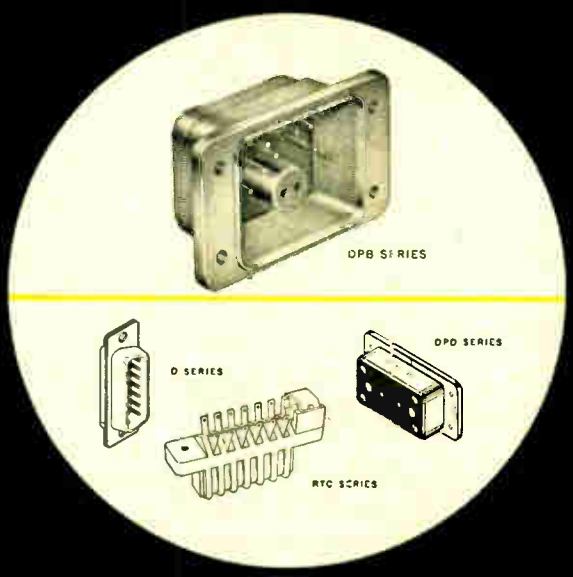
Before the test train reached Winnipeg on the eastbound (return) trip, a Radio Base Station had been set up on the Fort Garry Hotel. Reliable communication was maintained between the hotel and the train from a point 26 miles west of the CNR Winnipeg Depot to a location 34 miles east of the station.

The test train completed the 6,000-mile run when it arrived back in the Montreal Turcot Yards at 10.15 a.m., February 2nd. During the round trip 1,090 transmissions were made.

In their reports, the CNR and Rogers Majestic Electronics engineers concluded that satisfactory radio communications were maintained between locomotive and caboose throughout the trip with the exception of the lapses which occurred when either the engine or caboose were passing through tunnels. Their main recommendation was that noise cancelling microphones be used on all locomotive installations since high noise output from the engine made a small percentage of the transmissions difficult to understand.

For further data on advertised products use page 207.

For further data on advertised products use page 207.



for rapid disconnect

use cannon

"unit plug-in"

connectors

speed up inspection...testing...maintenance! facilitate interchangeability!

You can connect, disconnect, interchange, replace, test, and inspect instruments, assemblies, and sub-assemblies easily and rapidly when you use Cannon "Unit Plug-In" multi-contact electric connectors.

You'll find some with shells . . . some without. Shell style units . . . in a wide variety of designs . . . are ruggedly constructed to take the many "in" and "out" operations of rack, panel, chassis, and sub-assembly applications. Varied, simple, but always rigid mounting facilities provided on each connector half. Standard, miniature, sub-miniature sizes. Either connector half may be made into a plug by use of an end bell. Up to 156 contacts. And . . . an amazing number of combinations of contacts for control, audio, thermocouple, co-ax, twin-ax, as well as pneumatic connections. In single- or double-gang. Special moisture-proofed types. Standby units feature gold-plated contacts to withstand deterioration and corrosion.

Write for full information. Write TODAY!

SINCE 1915 CANNON ELECTRIC

first in connectors

CANNON PLUGS

CANNON ELECTRIC CANADA LIMITED, 160 Bartley Drive, Toronto 16, Ont.
Montreal Office Trans-Atlantic Bldg., Montreal Airport, Dorval, P.Q.
Factories also in Los Angeles, East Haven, London, Melbourne.
Licensees in Paris, Tokyo. 5509

DIASTRE

Television

The Problem Of Maintaining Accurate Focus In The Televising Of Sports Events And Moving Objects Has Been Greatly Facilitated By The Use Of The . . . . . .

By
W. JONES

Vari Focal Lens

THE vari focal lens as its name implies is a photographic lens possessing the facility of a continuous variable focal length within specified limits, maintaining accurate focus throughout the range.

The lens has achieved great acceptability in the television transmission field enhancing the flexibility of the television camera in allowing rapid change in focal length and hence picture area, without the necessity of lens change or dollying in and out. The process is known as "zooming".

"Zooming" first became a requisite for remote pick ups where movement of the camera with relation to the object is limited by conditions beyond the control of the producer. Such instances arise in the televising of football matches, boxing, parades, etc. However, its use has extended into the studio reducing the movement of the camera necessary with a fixed lens and providing a greater measure of program continuity, since the necessity of "racking" of lenses on a turret head is minimized. Also it enables the minimum number of cameras to be used for any one production. Instances have been recorded when whole programs have been shot with one vari focal lens equipped camera.

By limiting the movement of a camera in a studio, production is facilitated giving a greater freedom of movement to the subject matter.

The lens* commonly in use in Canada has a 5:1 ratio giving an area variation of 25:1. The effect of this is that a picture taken at 300 feet can now be "zoomed" to 60 feet.

The design of a vari focal lens is, to say the least, complicated and the present day lens now in use is the result of several years of research and experiment. The larger the zoom ratio the minimum number of cameras to be since the ratio of the image size to the object size is proportionate to the focal length of a lens and to vary this ratio requires the equivalent focal length of the system to be changed. The varifocal lens is a system of lenses, the equivalent focal length being a function of the individual focal lengths and axial separations of the component lenses. To cause a variation in the equivalent focal length it is necessary to vary the separation between two or more lenses. From general optics such variations can produce considerable aberration changes giving rise to poor image resolution.

The larger the zoom ratio, the larger the change in equivalent focal length with a consequent larger image deterioration. It is therefore necessary to design a system so that change in magni-

For further data on advertised products use page 207.

fication is accomplished with a minimum axial separation change of the component lenses.

When the intention is to use the lens in conjunction with television cameras, other conditions of operation must be considered. Since the application is obvious for remote pick ups, the lens must be dust and rain proof, and capable of operating in all climatic conditions experienced in the country. With speed of operation being essential for T.V. work the zoom effect must be obtained without any refocusing or other adjustment, with the image remaining continuously in focus during variation of image size. The quality of the image should be good throughout the whole range if the lens is to replace the function of the lens turret. Again the relative aperture of the lens should remain fixed at the original setting to prevent variations in brightness levels when zooming.

Some types of photocathode used in television pick up tubes have a relatively large size with respect to 35 mm film and for this reason the vari focal lens has been given a larger image diameter than may be necessary in some applications. In common with standard camera lenses, the maximum field size, being in excess of most needs, the central definition is lightly better than that of the extreme edge so that any reduction in size of the image yields a better picture.

A high degree of correction of aberration may be found in a paper* which shows how well known "symmetry principle" may be used to ensure the correction of abberration at the extremes of zoom range, while consideration of Herschel's Condition and the Optical Sine Condition show that the correction will be stable.

The optical system consists of ten lens elements cemented in pairs to form five doublets. These five doublets are arranged to form an afocal (Telescopic) system of variable power, together with a camera lens. The afocal part of the system is symmetrical in the mean position, and the variation in power is achieved by the differential deplacement of the two middle components of this part of the system.

The vari focal lens is noteworthy in that it has only five components with ten air-glass surfaces, comparing favorably with fixed focal length triplet lenses having three components and six air-glass surfaces. All air-glass surfaces in the lens are bloomed to reduce loss of light by reflection at these surfaces, resulting in an increase of contrast of the image due to reduction in scattered light.

Mechanical Construction

Kinematic principles of suspension have been applied throughout the construction to minimize friction and ensure rigidity.

The five lenses of the complete system are mounted in individual cells, four of which are equipped with adjustments for obtaining accurate centering, spacing, and aligning of the optical path.

The two inner lenses are mounted on trolleys, each supported by three rollers running on ground steel rods which are located and secured on to the base. The two rollers on one side of each trolley are vee shaped and locate the trolley directionally on one rod, while the remaining roller on the opposite side is plain and serves only to support the trolley. These trolleys are fitted with miniature ball bearings. The trolleys are constrained against the steel rods by a further roller on each side bearing on the underside of the rods.

These rollers are equipped with an adjustment to regulate the contact friction. Thus with the minimum of friction, a comletely free travel in one direction only is permitted.

The carriage which carries the cams for controlling the lens separations, is supported by rollers on ground steel rods located in accurately machined seatings in the base. The carriage is constrained against the steel rods by a powerful spring which operates against rollers on the underside of the base. In addition to constraining the carriage on to the rods, the spring provides effective protection to the carriage and its fittings against sudden shock.

Differential movement of the two inner lenses is provided by two identical plate cams which operate against ball bearing followers attached to the underside of the lens trolleys.

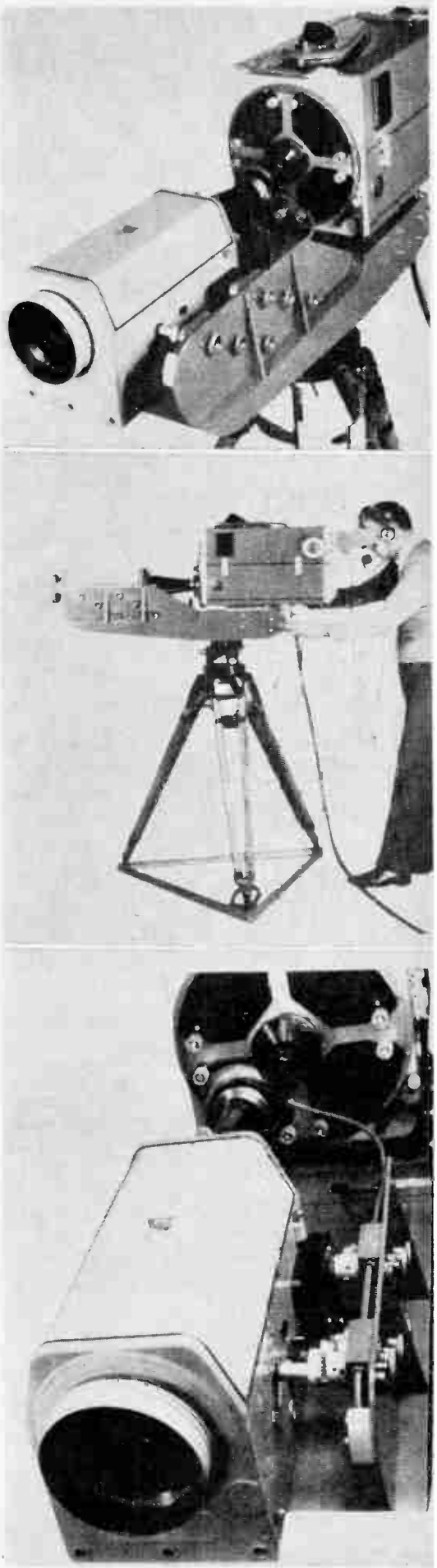
The cams are provided with inner rims parallel with their outside contours and spring operated rollers press against these. The reaction of the springs on the lens trolley holds the cam followers firmly against the outer edges of the cams.

The design of this spring loading mechanism is such that the compression of the springs remains constant, thus combining the accuracy of plate cams with the positive action usually associated with tracked cams.

The cams are mounted on the main carriage on ball bearing arbors. On the underside of the carriage helical gears are attached to the cam arbors. These gears mesh with racks secured to the base. Thus, as the carriage moves the cams rotate causing displacement of the lens trolley, carrying the inner lenses.

After initial adjustment the gears are pinned to and become integral with the cam arbors.

(Continued on page 186)



- *Top:* Vari Focal Lens mounted for manual operation.
- *Center:* Vari Focal Lens mounted on camera tripod.
- *Bottom:* Close up view of lens mounted for manual operation.

NEWS

(Continued from page 170)

EDO Observes Thirtieth Anniversary

The Edo Corporation, electronics manufacturer of College Point, N.Y., observes the thirtieth anniversary of its founding on September 29.

Earl D. Osborn, who founded and gave his initials to the new firm back in 1925, is still active as Chairman of the Board. The original Edo site, on Flushing Bay, Long Island, has been greatly expanded over the years.

Edo was a pioneer in the development of sonar — underwater sound — and builds many complex sonar systems for shipboard installation by the U.S. Navy. Simplification of intricate electric circuitry has become an Edo specialty and has permitted the firm to produce a line of Survey Depth Recorders, Deep Depth Sounders and Fishscopes that are relatively light in weight and low in cost.

Design simplification has also made Edo's two marine navigation aids, Edo Radar and Edo Loran, uniquely fitted for use on small as well as large vessels.

Canadian Marconi Co., Ltd. of Montreal is Canadian distributor for Edo marine electronic products.

Lenkurt Electric Co. Conducts Training Course

Lenkurt Electric Co. has expanded its technical training program for customers to full-time operation and is now offering one-week courses on the installation and maintenance of 45A carrier and 72B radio.

Like similar instruction offered intermittently during the past three-and-a-half years, the courses are being conducted at the Lenkurt plant in San Carlos, California by engineers experienced in field applications.

David Hadley, who has worked in the Applications Engineering and Sales Divisions at Lenkurt, has been assigned as instructor on a full-time basis. Hadley is a graduate of McGill University in Montreal with a B.E. degree in Communications. Before joining Lenkurt two-and-a-half years ago, he worked in both the Equipment and Plant Extension Engineering Sections of the Bell Telephone Co. of Canada.

The present series of courses was started in mid-October and will continue, with interruption for the holiday season, through next spring. A further expansion of the training program is expected in 1956 when it is planned to add courses covering new equipment and other subjects for which there is a demand.

The courses are intended to prepare operating companies' plant personnel to install, line up and maintain Lenkurt equipment. They also should qualify participants to give similar training to other people in their own organizations.

The classes usually are limited to 10 persons. Facilities available in the classroom include working 45A and 72B systems, sub-assemblies, test equipment and drawings. Lenkurt publications also are provided to familiarize participants with sources of technical information.

No tuition or registration fee is charged for the courses. Applications for enrollment are handled by the Lenkurt distributor, Automatic Electric Sales (Canada) Ltd., Toronto.

Centralab Announces Engineering Appointments

Election of Robert L. Wolff as Vice-President in charge of Engineering of the Centralab Division of Globe-Union Inc. was announced recently by William S. Parsons, President of Centralab.

Wolff, an employee of the Company since 1937 has been Director of Centralab Products Engineering since 1951.

Other appointments are W. S. Clark as Division Manager of the "Badger" Centralab plant and R. C. Anderson as Division Manager of "Keefe" plant Centralab operations. Anderson has been with the Company since 1950 and Clark since 1948.

Centralab, one of the nation's outstanding producers of electronic components with plants in Denville, New Jersey, Fort Dodge, Iowa and Ajax, Ontario, Canada also operates four plants in Milwaukee.

RCA To Supply T.V. Equipment

RCA Victor which has equipped 18 of the 28 Canadian TV stations now on the air is providing antennae, transmitters and other equipment for three TV stations and one radio station going on the air this fall.

The TV stations are CJON-TV, St. John's, Newfoundland, which is now on the air commercially but is officially opening in mid-October, CKNX-TV, in Wingham, Ont., which expects to be on the air early in November, and CKRS-TV, Jonquiere, P.Q. The new radio station is at Smiths Falls where RCA Victor's record manufacturing plant is located.

The building, which will house the transmitter and other telecasting equipment at Wingham, has now been completed and RCA equipment is being installed. As in many other Canadian TV installations, the wave-stack antenna invented and developed by RCA Victor engineers in Montreal will be used by the St. John's, Wingham and Jonquiere stations.

For further data on advertised products use page 207.

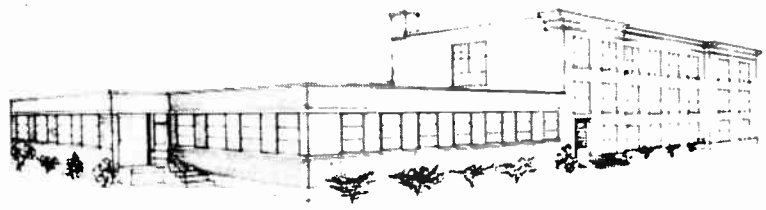
Measurement Engineering Add To Plant Facilities

Construction of additional plant and office space totalling over 5,000 sq. feet has been completed by Measurement Engineering Ltd. at Arnprior, Ont.

This new space provides an increase in production capacity of 50 per cent. Additional staff has been employed in both the sheet metal shop and assembly department.

Approximately $40,000 has been spent on new facilities and equipment for the manufacture of special electronic equipment and sheet metal components for same.

The Company reports a large backlog of orders for defence and industry — including communication equipment, industrial electronics, and control instruments for Atomic Energy use at Chalk River.



● Additional plant facilities of Measurement Engineering Ltd., Arnprior, which has recently been completed. The new addition which cost approximately $40,000 provides over 5,000 square feet of floor space and will increase production capacity by 50 per cent.

Canadian Marconi Company To Handle Vandivere Automatic Sequencer

Canadian Marconi Company has been appointed exclusive Canadian distributors for the Vandivere Automatic Sequencer, a brand-new electronic device which permits AM radio stations and television stations to have automatic control of tape recorders, reproducers, turntables, slide projectors, and various associated equipment.

The Automatic Sequencer is manufactured by Vandivere Laboratories Inc., of Arlington, Virginia, who have exclusive patents applied for in connection with this new product. It is specifically designed for use with aural announcements. The design and arrangements of the equipment are based on the consideration that although the total time consumed in aural announcements at a radio or television station is rather small, the making of such announcements nevertheless ties down announcer, switcher, and projection personnel for the entire length of the day. The Sequencer is designed to permit the recording of such aural announcements in one continuous session, together with subaudible cue signals which may be used to perform the associated switching. With this device it is possible to produce a completely automatic program without taking any more time than is necessary to make the actual announcement.

Working in conjunction with the Automatic Sequencer a tape recorder carrying aural announcements and cue signals may be interconnected with a suitable automatic record changer, so that at the end of the playing of a record the changer will turn itself off automatically and automatically turn on the tape recorder carrying the announcement. At the end of the announcement a cue signal on the magnetic tape will be detected by the Sequencer which will turn off the tape machine and turn on the changer, and so on. This procedure can be repeated for as many records as are contained in the automatic changer.

This will permit one-man operation of a radio station in the evening when the majority of the programs are carried over networks, or even in those periods of the day devoted only to music.

Marconi Appointed Tinsley Agents

Canadian Marconi Company have been appointed exclusive sales agents for H. Tinsley Company of London, England, and St. Jerome, Quebec, manufacturers of Precision Electrical Measuring Instruments.

To meet the growing Canadian demand for their products a factory was opened three years ago at St. Jerome, 30 miles Northwest of Montreal with full facilities for the design and manufacture of instruments to any specification.

(Continued on page 180)

NEWS

(Continued from page 179)

Lake Engineering Announces Unique Application Engineering Services

Lake Engineering Co. Ltd. has been formed to provide Application Engineering service to industry. While the firm will continue to design and manufacture specialized electronic devices to specific requirements it has now added two Sales and Application Engineering Divisions.

A. AINLAY

The Component Division will be under the management of A. Ainlay who is also Vice-President and General Manager of the firm. This Division will provide Application Engineering assistance to Paisley Products of Canada Ltd. in connection with their sale in Canada of General Ceramics Corp. ferrites and ceramics. Lake Engineering will represent James Knights Co.—Quartz crystals, Arnhold Ceramics Inc. — Deposited carbon resistors, Glass Seal Products Co. — Glass hermetic seals, General Scientific Corp.—Precision potentiometers, and Custom Components Inc. — Powdered iron cores.

The Industrial Products Division has a complete Application Engineering Laboratory for High Frequency Induction Heat Treatment. This will enable Lake Engineering to provide a complete service to present and potential users of Induction Heating. This service will include analysis of applications, sale of Redifon Induction Heaters and maintenance of all makes of both Induction and Dielectric Heating equipment. Mr. L. S. J. Fuller is Sales Manager of this Division as well as Vice-President of Lake Engineering Co. Ltd.

Canadian Westinghouse To Manufacture and Distribute Capehart-Farnsworth Radio-TV

J. D. Campbell, General Manager, Consumer Products, Canadian Westinghouse Company Limited, and L. G. Haggerty, President, Capehart-Farnsworth Company — a division of the International Telephone and Telegraph Corporation — jointly announce a licensing agreement between the two companies which provides for the manufacture and distribution of Capehart-Farnsworth black and white TV, colour TV, and high fidelity instruments in Canada by Canadian Westinghouse.

First Canadian-made Capehart products are expected to be on the Canadian market in November, the joint announcement stated. Full details of the sales and distribution plans for Capehart will be announced at a later date, J. D. Campbell stated.

Television Sales Record

According to the Radio-Electronics-Television Manufacturers Association of Canada a preliminary survey of television set sales for September shows that 117,650 units were sold, a 43 per cent increase over September, 1954 and the first time that television set sales have exceeded 100,000 a month since production started in Canada in 1948.

Previous highest monthly sales was in November, 1954 when 93,649 units were sold.

The September figures show a 65.5 per cent increase over the 71,108 television sets sold in Augus tof this year. It was in August that total television set sales exceeded 1½ million, making Canada the third nation in the world in the number of sets in use after the United States, with 37 million, and Great Britain, with 4 million.

Canada now has twenty-eight television sets sold in August of this year. largest number, and about 85 per cent of the Canadian population is within range of these stations.

For further data on advertised products use page 207.

PRODUCTS

(Continued from page 133)

Transistors And Diodes

Item 931

For the first time, High Frequency circuits can be completely transistorized. The Philco type SB-100 is a hermetically sealed surface barrier transistor designed for use as a general purpose IF and RF oscillator or amplifier at frequencies up to 30 mc, as a wide band video amplifier, and as a switching transistor at switching frequencies as high as 1.5 mc. The polarities of the emitter and collector voltages are similar to those of PNP junction transistors. The tinned flexible leads may be soldered or welded directly into the circuit or they may be clipped and used with standard plug-in sockets.

Now available 1N263, through the Government and Industrial Department, Philco Corporation of Canada.

The Philco type 1N263 is a hermetically sealed germanium crystal diode specifically designed for exceptionally low noise performance at X-Band. This crystal is capable of superior performance at any frequency below 12,000 mc.

The 1N263 may be used for wide band mixer applications in the range from 8600 to 9600 mc with the crystal fixed-tuned over the complete range. Particular attention was given in the mechanical design of the 1N263 to the requirements of high performance balanced mixers for a symmetrical diode which can be easily reversed. In mixer applications germanium diodes are capable of performance superior to silicon with regard to noise, burnout and high ambient operating temperature. This crystal maintains outstanding performance under high temperature operations with a degradation of about 1db of noise figure at 90°C.

Philco Corporation of Canada Limited, Don Mills Road, Toronto, Canada.

Sola Power Transformers Provide Regulated Voltage For Plate And Filament Supplies

Item 932

Where line voltage fluctuations impair the performance of voltage-sensitive electronic equipment, Sola Constant Voltage Power Supply Transformers often provide a simple, economical solution by stabilizing ac inputs to plate and filament supplies. They have no moving parts and require no manual adjustment or maintenance. Operation is automatic, with response time 1.5 cycles or less. Regulation of stock units is ± 3 per cent with line voltage variations as great as ± 15 per cent.

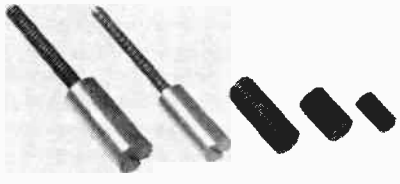
To meet special load requirements or service conditions, units can be specially designed (for production quantity orders) embodying variations in regulating limits, electrical capacities, frequencies, and structural features.

For complete information write to: **Sola Electric Co., 617 Runnymede Road, Toronto 9, Ontario. Home Office, Chicago 50, Illinois.**

Powdered Iron Cores

Item 933

Neosid (Canada) Ltd. is producing a complete range of powdered iron cores in their Canadian plant. This includes screw type cores, stud type cores, disks and many other shapes designed to meet customers requirements.



This Canadian plant is equipped to engineer powdered iron cores to special requirements and is the only manufacturer of this product in Canada.

In addition to cores Neosid (Canada) Ltd. also markets special coil formers and cores manufactured by its Parent Company, Neosid Ltd. in England.

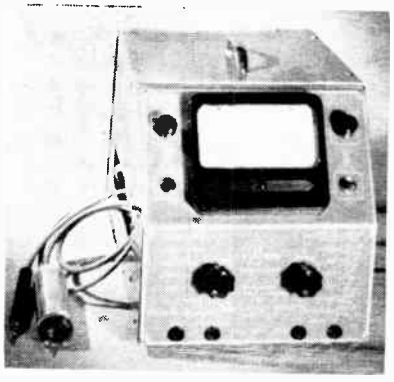
The Glendon Company Ltd., 44 Wellington St. East, Toronto, Ont.

Model E-6300 Vacuum Tube Multimeter

Item 934

At last there is available for the discriminating electronic technician a laboratory type instrument designed for rapid radio and TV servicing. The CRIterion Model E-6300 Vacuum Tube Multimeter, designed and made in Canada by the Canadian Research Institute, 46 St. George Street, Toronto 5, Ontario, originally produced for the RCAF is now available for civilian servicemen.

This versatile instrument, in one self-contained unit 8" x 8" x 12" with sloping instrument panel and large 4½" meter offers 6 D.C. voltage ranges from 0.05 to 1200 volts at 15 megohms input resistance, 6 A.C. voltage ranges from 0.05 to 1200 volts at 12 megohms input impedance good up to 300 megacycles, 6 D.C. current ranges, 0.05 to 1200 milliamperes and 7 ranges each of capacity and inductance to cover all electronic requirements. A feature of the instrument is the large, easy-to-follow instruction book designed to clarify much of the confusion in terms used in electronics today. The unit operates from 115 volts 60 cycles, and comes complete with test leads and high frequency probe.



Canadian Research Institute, 46 St. George St., Toronto 5, Canada.

Heathkit Cathode Ray Tube Checker Kit

Item 935

This new design instrument holds the key to rapid and complete picture tube testing, either in the set, on the workbench, or in the carton. Tests for shorts, leakage, and emission. Features Shadowgraph test (a spot of light on the screen) to indicate whether the tube is capable of functioning.

The Model CC-1 tests all electromagnetic deflection picture tubes normally encountered in television servicing. Supplies all operating voltages to the tube under test, and indicates the condition of the tube on a large "Good-Bad" scale. Features spring loaded test switches for operator protection.

The CC-1 is housed in an attractive portable case and is light weight — ideal for outside service calls.

For further details write:

Heath Company, Benton Harbor, Mich.

(Products continued on page 187)

EDITOR'S SPACE

(Continued from page 28)

the moral deterioration of society. So now, in addition to economic chaos and labor unrest spiritual disintegration has been added as one of the possible results of automation.

It is indeed a gloomy outlook if we take to heart the expressed conviction of Cardinal Leger with regard to automation. In our opinion, it is most unfortunate that Cardinal Leger, whose opinion on such matters is bound to have significant influence and effect on a wide section of the working population, should have deemed it politic to forecast such dire results as a consequence of automation, a product of the God endowed intelligence of man. If the effects of automation are to be foretold to the public then both sides of the story should be presented. While automation will most certainly obviate the necessity of employing persons performing outmoded or inefficient jobs it will also, simultaneously, create new jobs to take the place of those destroyed.

At the turn of the century, for instance, teamsters were displaced by the automobile and in the space of two decades the teamsters job had virtually become an extinct vocation. It should not be forgotten, however, that in the same period of time there was established a requirement for 700,000 chauffeurs and truck drivers. By 1950 this requirement had grown to the point where 2,000,000 people were engaged in driving commercial vehicles.

The advent of the automobile, the loom, the printing press, cotton gins, steam engine and a host of other products of the genius of man have been labelled, so to speak, as the "work of the devil" destined to debase and destroy the social and spiritual equillibrium of man. The results, fortunately have proven otherwise.

And so now, with automation, it is considered neither fair, honest or intelligent to claim that it will lead to a sociological calamity or to a Utopian existence.

Automation is nothing more nor less than another step forward in the progress of man and it is reasonable to assume that, as in the past, as this new technological horizon is reached the intelligence of our legislative bodies and business management will be capable of meeting whatever demands it may place before them by adjusting our supporting economic fabric to meet the needs of the day.

Insofar as the spiritual and moral wellbeing of society is concerned it is, in our opinion, a little premature at this time, to forecast the results of automation with such phraseology as, "a pile of flesh, debased by pleasure and degraded by surrounding weakness", and "fatal disintegration", the ideological program of Marx notwithstanding.

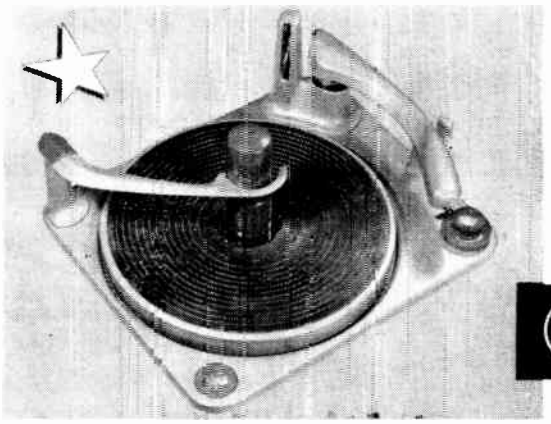
It will come as a surprise to many business and professional men to learn from Cardinal Leger that, "modern working conditions are the result of two events, technological innovation, and the diffusion of a belief tending to substitute man for God by exalting his (man's) bounty and glorifying his egotism".

If this be true then there must also be something to say concerning the distribution of man's bounty — increased by technological knowledge — to the world's starving underprivileged millions who, despite increased production and man's egotism, still can't get enough produce to fill their bellies or cover their hides.

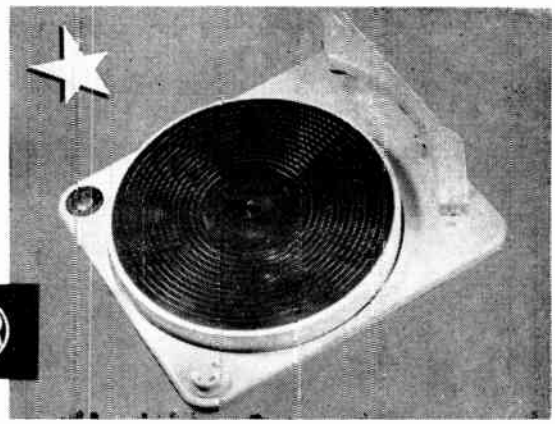
Look's like the best thing to do is forget about automation, reapers and harvesters and all those other weird and wonderful contraptions that have raised our standard of living and start a crusade for social retrogression. If we apply ourselves diligently we may avoid the Cardinal's forecast for 1980 in which "a few men will possess all the power of production, and humanity altogether will become a herd of consumers", and once again achieve that social condition in which a few men possessed all the power of production, and humanity altogether considered itself lucky if it got anything to consume at all. Automation BAH! Hand me my abacus.

For further data on advertised products use page 207.

4 star HI-FI performers



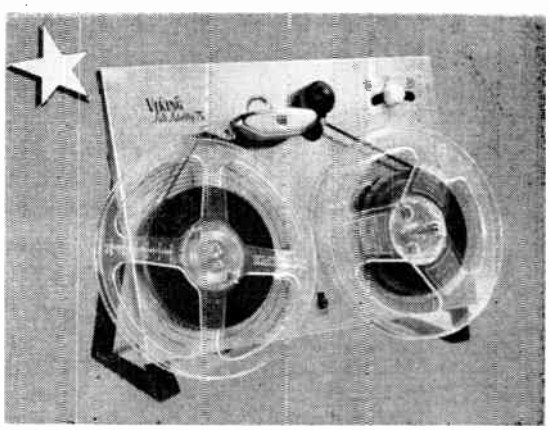
BSR MONARCH Automatic Record Changer
Britain's most popular and Canada's most dependable fully automatic 3-speed changer — intermix — 4-pole motor. Now available with 45 r.p.m. spindle adaptor.



BSR 3-Speed HI-FI Manual Player
4-pole motor, automatic on-off switch, high-gain crystal turn-over cartridge and balanced metal turntable.

GOLDRING No. 500 Variable Reluctance Turn-over Cartridge

Linear response from 20-20,000 cps. Magnetic circuit incorporates a push-pull coil arrangement. Fits any p.u. arm with standard ½" mounting centres. Diamond styli available separately.



Viking of Minneapolis HI-FI TAPE PLAY-BACK DECK Model FF 75
DYNAMU head; frequency response from 40-14,000 cps. at 7½ ips for professional reproduction of pre-recorded tape. 4-pole motor — flutter less than .2%. Can be used with low-impedance pre-amp input. Mounting brackets included for ready operation.

distributed in Canada exclusively by

MUSIMART
OF CANADA LTD.
ELECTRONIC DIVISION

901 BLEURY STREET, MONTREAL

Manufacturer and Jobber Enquiries Invited

Canadian Representatives and Agents for:

AMPLIFONE CORPORATION—Chicago, U.S.A.
(Horizontal Output-Transformers)
Canadian Plant: **11 Water St., Belleville, Ont.**
BIRMINGHAM SOUND REPRODUCERS LTD.—Old Hill, England
(Record Changers and record player units)
COMAR ELECTRIC CO—Chicago, U.S.A.
(Relays and Electronic Control Devices)
CONNECTOR CORPORATION—Chicago, U.S.A.
(Plugs, Sockets)
P. X. FOX LTD.—Horsforth, England
(Toroidal Precision Potentiometers—Low Torque, Ceramic and Helical)
GOLDRING MANUFACTURING CO. (Great Britain) LTD.—London, England
(Variable Reluctance Cartridges and P.U. arm components)
MOLON MOTORS & COILS CO.—Chicago, U.S.A.
(F.H. clutch gear motors)
PERMANOID LTD.—Manchester, England
(H.F. cables and Polythene insulated wires)
SCHADOW R.
(Miniature Push Button Switch Assemblies)
VIKING OF MINNEAPOLIS—Minneapolis, U.S.A.
(Hi-Fi Tape Play-Back Decks)
WIMBLEDON ENGINEERING CO.—Lower Morden, England
(Vibrators—Heavy Duty and Standard)

RCA Victor Appoints P. J. Casella To Top Post

The appointment of P. J. Casella as Vice-President, Consumer Products, was announced today by F. R. Deakins, President, RCA Victor Company, Ltd.

Mr. Casella joined the company in an executive capacity in June, 1954. He was later appointed General Manager of Distribution and subsequently was made Vice-President, Distribution, a position which he held until his new appointment as Vice-President, Consumer Products.

Before joining RCA, Mr. Casella served in top merchandising and executive posts with Montgomery Ward & Company, Inc., in the United States. He was associated with that company since his graduation, and after successfully completing an extensive company trainee program Mr. Casella succeeded, through a series of promotions, to top department store managerial positions.

Successively he managed company department stores in Long Island, Lancaster, Penn., Portsmouth, N.H., Uniontown, Penn., Baltimore, Detroit and, just prior to joining RCA Victor, in Albany, N.Y.

During World War Two he served in the United States Navy as a Lieutenant Commander in Charge of Naval Procurement for the Fourth Naval District. Until his coming to Canada, Mr. Casella also acted as Commanding Officer of a Naval Officer Reserve Training Unit for the Albany-Schenectady area.

P. J. CASELLA

In his new post Mr. Casella is responsible for the development, production, marketing and sales of all RCA Victor consumer products. These include television and radio receiving sets, phonograph and records.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

VARI-FOCAL LENS

(Continued from page 177)

Controls: Manual Operation

The zoom effect is produced by transporting the main carriage from one position to another, when necessary differential movement to the lens trolleys is superimposed through the racks, gears and cams as described above.

Movement of the main carriage is by a non-slip band drive arranged parallel to the one side of the carriage. The steel band is driven by a toothed wheel on a shaft mounted in ball bearings, bringing the operating spindle out on one side, at the rear of the main case. The steel band is attached to a block on the main carriage in such a way that while linear motion is transmitted, without loss, the block is free to take up its own alignment relative to the carriage.

A scale on the carriage is visible through a window on the side of the case, and indicates the focal length obtained at any position of the zooming range.

Focusing is by movement of the front lens. The bracket carrying the lens cell slides on a central steel rod located in the front and rear walls, the focusing movement being controlled by a handwheel on the side, at the rear of the main case.

The initial setting of the iris is by a knob on the side of the main case. Rotation of this knob presets a guide on the sine bar principle which then maintains the preset aperture throughout the zoom run by causing the operating pin of the iris to follow a prescribed incline.

The three controls, zooming, iris and focusing are designed in such a manner that motorizing is achieved.

The range of focal length from 3″/65″ to 6″/30″ is obtained by interchange of the back or camera lens, an operation facilitated by quick release fasteners enable the change to be accomplished in a matter of seconds.

The vari focal lens as described is primarily, to use film camera nomenclature, a 35 mm lens. However, similar lenses for 16 mm operation are now available.

ACKNOWLEDGMENTS

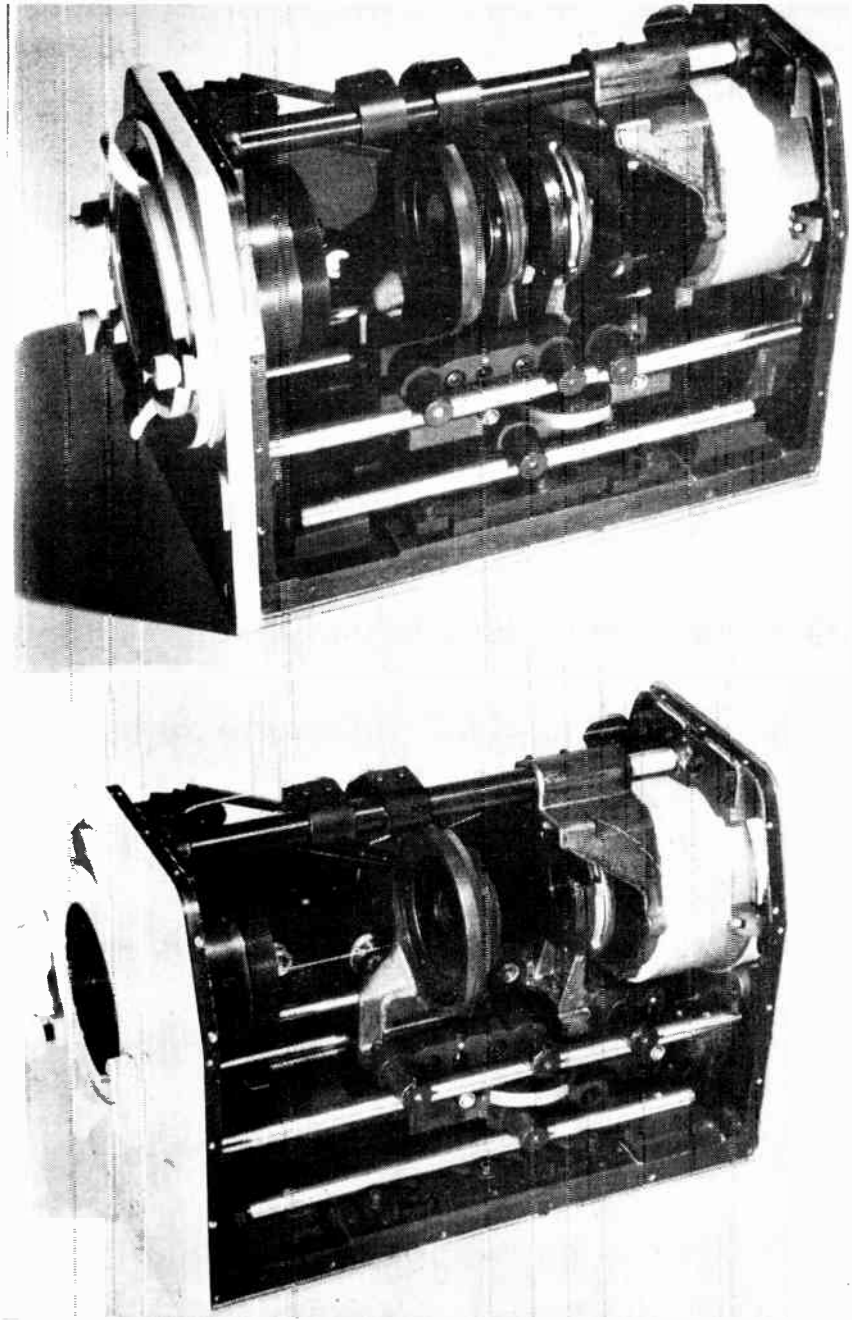
* *The author is indebted to the Directors of W. Watson & Sons Limited, Barnet, England, for technical information and permission to publish.*

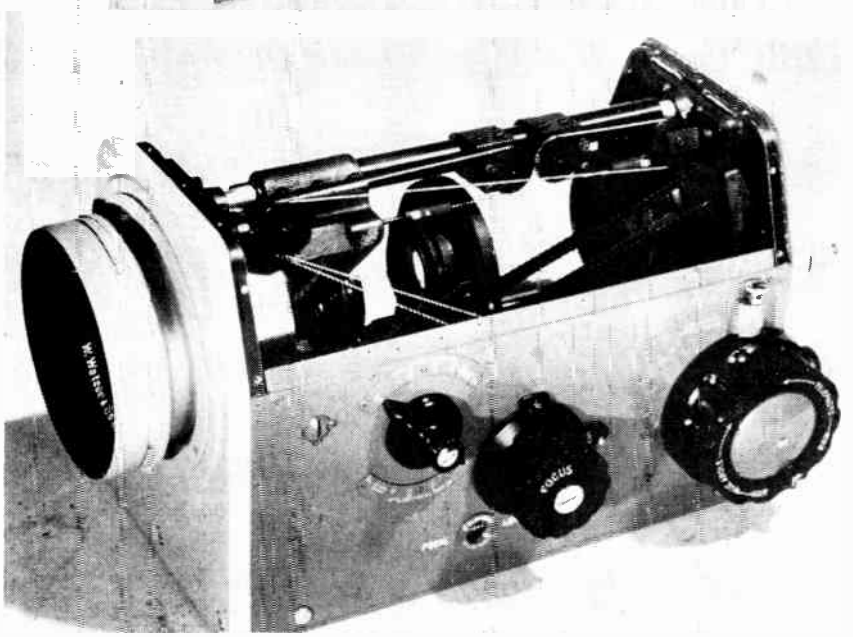
REFERENCES

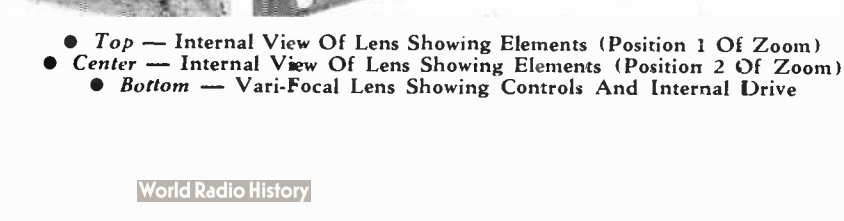
(1) *Proceedings of the London Conference on Optical Instrument 1950 "A Class of Symmetrical Systems of Variable Power" by H. H. Hopkins, Ph.D.*

(2) *Proceedings of the Institution of Electrical Engineers, Vol. 99 Part 111A No. 17 1952. "A 5:1 Television Zoom Lens" by H. H. Hopkins, D.Sc., Ph.D., F.Inst.P.*

NOTE—Dr. Hopkins is Lecturer at the Technical Optics Section of the Physics Department of the Imperial College in the University of London, and is the designer of the Watson Vari-focal Lens.







● *Top* — Internal View Of Lens Showing Elements (Position 1 Of Zoom)
● *Center* — Internal View Of Lens Showing Elements (Position 2 Of Zoom)
● *Bottom* — Vari-Focal Lens Showing Controls And Internal Drive

PRODUCTS (Continued from page 181)

Precision Filter Capacitors

T.C.C. Precision Filter Capacitors are of the Silvered Mica Type and are usually supplied with a tolerance of capacitance of ± 1 per cent or ± 0.5 per cent. The capacitance range extends up to .25 mfd for single units. These capacitors are remarkable for their low temperature coefficient and extremely high stability.

The new T.C.C. "Plimoseal" Process results in capacitors which are solidly encased in a special compound which affords complete protection against humidity and ensures operation over a temperature range of from — 60°C. to + 125°C. together with complete mechanical protection and practically unlimited shelf life.

The Glendon Company Ltd., 44 Wellington St. East, Toronto, Ont.

Product Section Index Of Manufacturers

For further data on advertised products use page 207.

Baird Names R. F. Feland, Jr. Sales Director

Robert F. Feland, Jr., has been named by Baird Associates, Inc., Cambridge, to direct sales and service activities in the western United States and Canada for the company's complete line of emission and absorption analytical and control instruments.

Feland was formerly sales manager of ElectroData Corporation, Pasadena, California. Before joining ElectroData, he was executive assistant to the general sales manager of Applied Research Laboratories, Glendale, California. Feland has also been associated with the C. A. Youngstrom Company, San Jose, California, and Douglas Aircraft Company, Long Beach, California.

A graduate of the University of Arizona, Feland also attended Massachusetts Institute of Technology and the University of California. He was a lecturer in engineering at the latter school. Feland is a member of the Institute of Radio Engineers, American Chemical Society, American Management Association and the Lions Club.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

Dr. J. R. Whitehead To Head RCA Research

Appointment of Dr. James Rennie Whitehead, Ph.D., of McGill University to head the new RCA Victor Company Research Laboratories was announced today by F. R. Deakins, President. Dr. Whitehead's work for Canada's largest electronics organization will be in the field of pure physics and electronics research not necessarily connected with company projects or developments.

Associated with Dr. Whitehead in the RCA Victor Laboratories will be Dr. Sydney Wagner, also of McGill University, and a staff of Canadian physicists. The appointments of Dr. Whitehead and Dr. Wagner are effective October 1st and the new Laboratories will be opened before the end of the year.

"RCA Victor's decision to provide facilities for pure research in the important field of physics and electronics is a new development of vital importance to Canada," Mr. Deakins said. "For many years this company has been engaged in engineering and development work but, like many other companies, has been dependent for its background of fundamental research on activities in the United States or other countries. During the past fifteen years the growth of the electronics industry and of our company in Canada has been tremendous and we now wish to enter the field of pure research, concentrating on physics and electronics."

One of the first, and possibly the first Canadian company to establish research laboratories for pure research, RCA Victor is making a twofold contribution to Canadian industry and scientific development, Mr. Deakins believes. In the first place the company hopes through the work of Dr. Whitehead and Dr. Wagner and their staff to increase scientific knowledge in these two fields and make this knowledge available first in Canada. The company also hopes that by opening up new areas of opportunity for science graduates of Canadian universities it will keep some of Canada's best young scientists at home rather than having them seek employment in other countries.

Dr. Whitehead who leaves his post as associate professor of physics at McGill University to join RCA Victor is recognized as one of the world's leading authorities on radar and other electronic developments. He is a Fellow of the Institute of Phyics and a senior member of the Institute of Radio Engineers and has a long and distinguished record in electronics research.

To Obtain Further Information On The Product Write-Ups In This Section Use The Handy Post Card Coupons On Page 207

Dominion Sound Equipments Move Ottawa Office

Dominion Sound Equipments Limited announce the move of their Ottawa office to 18 Western Avenue in Ottawa.

According to Mr. D. A. Neill, the local manager, their new location will provide the added office, warehouse and parking facilities made necessary by the rapid expansion of business in the Ottawa area.

Canadian Telecommunications

The Canadian Overseas Telecommunications Corporation plan to erect a building in Montreal which will accommodate both the current and forseeable requirements of Canada's overseas telecommunications. The building is scheduled for completion and occupation by the autumn of 1956.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

For further data on advertised products use page 207.

Heathkit PRINTED CIRCUIT 5" COLOR TV Oscilloscope Kit

MODEL 0-10

$69.50

Shpg. Wt. 27 lbs.

The technical specifications for this fine instrument speak for themselves. Vertical channel sensitivity is 0.025 volts RMS/inch at 1 Kc. Vertical frequency response is essentially flat to 5 Mc. and down only 1.5 db at 3.58 Mc. Ideal for Color TV work!

Extended sweep generator range is from 20 cps to 500 Kc in five steps, far beyond the range normally encountered at this price level.

Other features are: plastic-molded capacitors for coupling and by-pass—preformed and cabled wiring harness—Z axis input for intensity modulation—peak-to-peak voltage calibrating source built-in—retrace blanking amplifier—regulated power supply—high insulation printed circuit boards—step attenuated and frequency compensated vertical input circuit—push-pull horizontal and vertical amplifiers—excellent sync. characteristics—sharp, hairline focusing—uses 5UP1 CRT—extremely attractive physical appearance.

An essential instrument for professional Laboratory, or for servicing monochrome or color TV.

Heathkit PRINTED CIRCUIT 3" OSCILLOSCOPE KIT

This light, portable 3" oscilloscope is just the ticket for the ham, for service calls, or as an "extra" scope in the shop, or lab. Measures only 9½" H x 6½" W x 11¾" D, and weighs only 11 lbs.

Employs printed circuit board for improved circuit performance. Vertical amplifiers flat within -3 db from 2 cps to 200 Kc. Vertical sensitivity 0.25 volts RMS/inch peak-to-peak, and sweep generator operates from 20 cps to 100,000 cps. R.F. connection to deflection plates.

MODEL OL-1

$29.50

Shpg. Wt. 14 lbs.

Heathkit PRINTED CIRCUIT 5" OSCILLOSCOPE KIT

This full-size 5" Oscilloscope incorporates many outstanding features.

Vertical channel flat within +3 db, 2 cps to 200 Kc, with 0.09 volts RMS/inch peak-to-peak sensitivity at 1 Kc. Sweep operation from 20 cps to 100,000 cps. Built-in peak-to-peak voltage calibration—3 step frequency compensated input attenuator—phasing control—push-pull deflection amplifiers. Printed circuits for reliable performance and reduced construction time.

MODEL OM-1

$49.50

Shpg. Wt. 26 lbs.

Heathkit PRINTED CIRCUIT VACUUM TUBE VOLTMETER KIT

MODEL V-7

$24.50

Shpg. Wt. 7 lbs.

This VTVM has set a new standard for accuracy and reliability in kit-form electronic instruments. Features modern, time-saving printed circuits, and functional arrangement of controls and scales. Includes new peak-to-peak scale for FM and TV work.

Measures AC (RMS) and DC voltage at 0-1.5, 5, 15, 50, 150, 500, and 1500; peak-to-peak AC voltage at 0-4, 14, 40, 140, 400, 1400, and 4000; center-scale resistance readings of 10, 100, 1000, 10,000, 100 K, 1 meg., and 10 meg. DB scale provided also. Zero-center operation within range of front panel controls. Polarity reversal switch—200 μa 4½ meter—transformer power supply—11 megohm input impedance — 1% precision resistors — high quality components used throughout.

Heathkit 20,000 ohms/volt MULTIMETER KIT

MODEL MM-1

$29.50

Shpg. Wt. 6 lbs.

Features comprehensive range coverage. 20,000 Ω/V D.C. and 5000 Ω/V A.C. Ranges: 0-1.5, 5, 50, 150, 500, 1500, and 5000 V. direct current from 0 to 150 μa., 15a. in 5 steps. Center-scale resistance of 15, 1500 and 150,000 ohms, and db from —10 to +65.

Uses 1% precision resistors—50 μa. meter—molded bakelite case.

Heathkit DIRECT-READING CAPACITY METER KIT

Extremely valuable where speed and convenience are essential. Quality control work, production line checking, etc. Reads capacity directly on meter scale, from 0-100 mmfd, 1000 mmfd, .01 mfd, and .1 mfd. Residual capacity less than 1 mmfd. Not susceptible to hand capacity.

MODEL CM-1

$29.50

Shpg. Wt. 7 lbs.

Heathkit A. C. VACUUM TUEE VOLTMETER KIT

MODEL AV-2

$29.50

Shpg. Wt. 5 lbs.

Measures AC voltage only, from 10 cps to 50 Kc. Covers the range from 1 millivolt to 300 volts in 10 steps at high impedance input. Incorporates full 10 ranges of db scale from —52 db to +52 db. Essential in the audio laboratory or for audio enthusiasts and experimenters. Provides sensitivity essential for low level audio measurements.

Heathkit ELECTRONIC SWITCH KIT

This device will electronically switch between 2 input signals to produce both signals alternately at the output. Used in conjunction with an oscilloscope, it will permit the observation of 2 signals simultaneously. Provides switching rates from 10 cps to 200 cps.

MODEL S-2

$23.50

Shpg. Wt. 11 lbs.

Heathkit VOLTAGE CALIBRATOR KIT

Once calibrated, this instrument provides a known peak-to-peak voltage standard for comparison with unknown voltage values on an oscilloscope. Panel calibrated directly—no involved calculations required. Operates within a voltage range of .01 to 100 volts peak-to-peak.

MODEL VC-2

$11.50

Shpg. Wt. 4 lbs.

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SELECT YOUR NEXT HEATHKIT FROM

Heathkit TUBE CHECKER KIT

MODEL TC-2
$29.50
Shpg. Wt. 12 lbs.

Because of its low price this fine tube tester is available, not only to the service shop and laboratory, but to part-time servicemen, experimenters, and radio amateurs, as well. Will test all tubes commonly encountered in radio and TV service work. Simple "GOOD—BAD" scale on the 4½" meter. Tests for open, short, and quality on the basis of total emission. Includes illuminated roll chart. Fourteen different filament voltage values available. Separate lever switch for each tube element.

Model TC-2P is the same electrically as TC-2, except that it is housed in a beautiful two-toned portable carrying case. Only $34.50. Shpg. Wt. 15 lbs.

Portable carrying case available separately for Model TC-2, or older model TC-1. Cab. No. 91-8. $7.50. Shpg. Wt. 7 lbs.

CRT Test Adapter, Model 355 for use with the TC-2, $4.50. Shpg. Wt. 1 lb.

Heathkit TV ALIGNMENT GENERATOR KIT

Here is the complete R.F. signal source for FM and TV alignment, (both monochrome and color). Provides output on fundamentals from 3.6 Mc to 220 Mc in four bands, with harmonic output usable up through the UHF channels. Electronic sweep circuit eliminates mechanical gadgets and accompanying noise, hum, and vibration. Continuously variable sweep up to 0—42 Mc, depending on base frequency.

Variable marker (19—60 Mc on fundamentals) and crystal marker (4.5 Mc and multiples thereof) generators built-in. Crystal included with kit. Provision for external marker if desired.

Packed with outstanding features. 50 ohm output impedance — exceptionally good linearity—effective AGC action—plenty of R.F. output. An essential instrument for the up-to-date service shop.

$49.50
MODEL TS-4
Shpg. Wt. 16 lbs.

MODEL SG-8
$19.50
Shpg. Wt. 8 lbs.

Heathkit SIGNAL GENERATOR KIT

This is one of our most popular kits, and is "serviceman engineered" to fulfill the signal source requirements of the radio serviceman and experimenter.

Covers 160 Kc to 110 Mc on fundamentals (5 bands), with output in excess of 100,000 microvolts. Calibrated harmonics extend usefulness up to 220 Mc. Choice of unmodulated R.F. output, 400 cps modulated R.F. output, or 400 cps audio output. Step-type and continuously variable output attenuation controls.

Coils are prewound, and construction manual is complete. Calibration unnecessary for service applications.

Model RS-1

Heathkit RESISTANCE SUBSTITUTION BOX KIT

Provides switch selection of 36 RTMA 1 watt standard 10% resistors, ranging from 15 ohms to 10 megohms. Numerous applications in radio and TV work.

$5.50
Shpg. Wt. 2 lbs.

Heathkit CONDENSER SUBSTITUTION BOX KIT

Model CS-1
$5.50
Shpg. Wt. 2 lbs.

Very popular companion to Heathkit RS-1. Individual selection of 18 RTMA standard condenser values from .0001 mfd to .22 mfd. Aluminum panel, bakelite case, and includes 18" flexible leads with alligator clips.

Model DR-1

Heathkit DECADE RESISTANCE KIT

Twenty 1% precision resistors provide resistance from 1–99,999 ohms in 1 ohm steps. Indispensable around service shop, laboratory, ham shack, or home workshop.

$19.50
Shpg. Wt. 4 lbs.

Heathkit DECADE CONDENSER KIT

Model DC-1

Provides capacity values from 100 mmf to 0.111 mfd in steps of 100 mmfs. +1% precision silver-mica condensers used. High quality ceramic wafer switches for reduced leakage.

Shpg. Wt. 3 lbs.
$16.50

Heathkit CONDENSER CHECKER KIT

Model C-3
$19.50
Shpg. Wt. 7 lbs.

Measures capacity in four ranges from .00001 to 1000 mfds. Power factor control is provided for indication of electrolytic condenser efficiency. Tests capacitors under actual load conditions. Checks resistance from 100 ohms to 5 megohms. Direct reading scales for all tests. No calculation necessary.

Heathkit LABORATORY GENERATOR KIT

Model LG-1

Here is a signal generator for use where high accuracy and metered performance are essential. Covers 150 Kc to 30 Mc on fundamentals in 5 bands. 400 cps modulation variable from 0 to 50%. R.F. output at 50 Ω from 100,000 to 1 μv. Meter reads R.F. output in μv. or modulation percentage. Fixed-step and variable output.

$39.50
Shpg. Wt. 16 lbs.

Model T-3

Heathkit VISUAL-AURAL SIGNAL TRACER KIT

$23.50
Shpg. Wt. 9 lbs.

This signal tracer features a high-gain R.F. channel and probe to permit signal tracing from the receiver antenna input through the R.F. and I.F. stages. Separate low gain channel for audio circuits. Both visual and aural indication by means of speaker and electron beam "eye" tube.

Also noise locater circuit, wattmeter, and terminals for "patching" output transformer or speaker into external circuit.

Model M-1

Heathkit HANDITESTER KIT

$14.50
Shpg. Wt. 3 lbs.

The M-1 is literally pocket size to fit in your coat pocket, tool-box, glove compartment, or desk drawer. Measures A.C. or D.C. v. in 5 steps from a full scale minimum of 0—10 v. to a maximum of 0—5000 v. Measures direct current at 0—10 Ma and 0—100 Ma, and provides ohmmeter ranges of 0—3000 and 0—300,000 ohms. Sensitivity of 1,000 ohms/v. 1% precision divider resistors employed.

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THESE HIGH QUALITY INSTRUMENTS

Heathkit HARMONIC DISTORTION METER KIT

Performs the functions of more elaborate and much more expensive audio distortion testing devices and yet is simple to operate and inexpensive to own. Used with a sine wave generator, it will check the harmonic distortion output of audio amplifiers under a variety of conditions. Essential in audio design work.

The HD-1 reads harmonic distortion directly on the meter as a percentage of the original signal input. It operates from 20 to 20,000 cps in 3 ranges, and incorporates a VTVM circuit for initial reference settings and final harmonic distortion readings. VTVM ranges are 0—1, 3, 10, and 30 volts full scale. 1% precision voltage divider resistors used. Distortion meter scales are 0—1, 3, 10, 30 and 100% full scale. Having a high input impedance the HD-1 requires only .3 volt input for distortion tests.

MODEL HD-1
$49.50
Shpg. Wt. 13 lbs

Heathkit AUDIO ANALYZER KIT

MODEL AA-1
$59.50
Shpg. Wt. 13 lbs.

The AA-1 consists of an audio wattmeter, an AC VTVM and a complete IM analyzer, all in one compact unit. It offers a tremendous saving over the price of these instruments purchased separately.

Use the VTVM to measure noise, frequency response, output gain, power supply ripple, etc. Use the wattmeter for measurement of power output. Internal loads provided for 4, 8, 16, or 600 ohms. VTVM also calibrated for DBM units so db gain or loss can be noted quickly.

High or low impedance IM measurements can be made. High (6 Kc) and low (60 cps) frequency generators built-in. Only 4 meter scales are employed, and one of these is in color so that results are easily read on the scale. Full scale VTVM ranges are .01 to 300 volts in 10 steps, full scale wattmeter ranges are .15 mw to 150 w in 7 steps. IM analyzer scales are 1%, 3%, 10%, 30% and 100%.

Heathkit AUDIO GENERATOR KIT

This basic audio reference generator deserves a place in your Laboratory. Complete frequency coverage is afforded from 20 cps to 1 Mc in 5 ranges, and output is constant within ±1 db from 20 cps to 400 Kc. down only 3 db at 600 Kc., and 8 db at 1 Mc. An extremely good sine wave is produced, with a distortion percentage below 0.4% from 100 cps through the audible range.

Plenty of audio output for all applications; up to 10 v. under no load conditions. Output controllable with a continuously variable or step-type attenuator with settings of 1 μv, 100 μv, 1 v, and 10 v. Cathode follower output.

MODEL AG-8
$29.50
Shpg. Wt. 11 lbs.

Heathkit VARIABLE VOLTAGE POWER SUPPLY KIT

Model PS-3
$35.50
Shpg. Wt. 17 lbs.

Provides regulated DC output for B+, and 6.3 v. AC at 4 amps. for filaments. Output variable from 0 to 500 v. DC at no load, linear from 0—10 ma at 450 vdc and 0—130 ma at 200 vdc! Essential for circuit design and development. Voltage or current read on 4½" meter.

Heathkit "Q" METER KIT

Model QM-1
$44.50
Shpg. Wt. 14 lbs.

Will measure Q of condensers, RF resistance and distributed capacity of coils, etc. Uses 4½" 50 μa meter for direct indication. Will test at 150 Kc to 18 Mc in 4 ranges. Measures capacity from 40 mmf to 450 mmf within ±3 mmf. Useful for checking wave traps, chokes, peaking coils. Indispensable for coil winding and determining unknown condenser values.

Heathkit AUDIO OSCILLATOR KIT

MODEL AO-1
$24.50
Shpg. Wt. 10 lbs.

(SINE WAVE — SQUARE WAVE)

Features sine or square wave coverage from 20 to 20,000 cps in 3 ranges. An instrument specifically designed to completely fulfill the needs of the serviceman and high fidelity enthusiast. Offers high-level output across the entire frequency range, low distortion and low impedance output. Uses a thermistor in the second amplifier stage to maintain essentially flat output through the entire frequency range. Produces good, clean square waves with a rise time of only 2 microseconds.

Heathkit IMPEDANCE BRIDGE KIT

Model IB-2
$59.50
Shpg. Wt. 12 lbs.

Measures resistance, capacitance, inductance, dissipation factors of condensers, and the storage factor of inductance. Employs 2-section CRL dial. D, Q and DQ functions are combined in one control. ½% resistors and capacitors used in critical circuits. 100—0—100 microammeter for null indications. 1000 cycle oscillator, 4 tube detector-amplifier, and power supply built-in.

Heathkit 6-12 VOLT BATTERY ELIMINATOR KIT

Model BE-4
$31.50
Shpg. Wt. 17 lbs.

Furnishes 6 or 12 volt output for the new 12 v. car radios in addition to 6 v. models. Two continuously variable output voltage ranges; 0—8 v. DC at 10 A. continuously or 15 A. intermittent, 0—16 v. DC at 5 A. continuously or 7.5 A. intermittent. Output voltage is clean and well filtered by two 10,000 mfd condensers. Panel meters read voltage and current output.

MODEL BR-2
$17.50
(Less Cabinet)
Shpg. Wt. 10 lbs.

Heathkit BROADCAST BAND RECEIVER KIT

Build your own receiver with confidence. Complete instruction book anticipates your every question.

Features transformer-type power supply, high-gain miniature tubes, built-in antenna, planetary tuning from 550 Kc to 1600 Kc, 5½" speaker. Also adaptable for use as AM tuner or phono amplifier.

CABINET: Fabric covered plywood cabinet available, complete with aluminum panel and re-inforced speaker grille. Part No. 91-9, Shpg. Wt. 5 lbs., $4.50

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For further data on advertised products use page 207.

New

Heathkit DX-100 PHONE AND CW TRANSMITTER KIT

This one compact package contains complete transmitter, with built-in VFO, modulator, and power supplies. Provides phone or CW operation—VFO or crystal excitation—and band-switching from 160 meters through 10 meters. R.F. power output 100—125 watts phone, 120—140 CW. Parallel 6146's modulated by push-pull 1625's. Pi network interstage and output coupling for reduced harmonic output. Will match non-reactive antennas between 50 ohms and 600 ohms. TVI suppressed with extensive shielding and filtering. Rugged metal cabinet has inter-locking seams.

The high-quality transmitter is packed with desirable features not expected at this price level. Copper plated chassis—potted transformers—wide spaced tuning capacitors—ceramic insulation—illuminated VFO dial and meter face—remote control socket—preformed wiring harness—concentric control shafts—high quality, well rated components used throughout. Overall dimensions 20⅞" wide x 13¾" high x 16" deep.

Supplied complete with all components, tubes, cabinet and detailed construction Manual. (Less crystals.) Don't be deceived by the low price! This is a top-quality transmitter designed to give you years of reliable service and dependable performance.

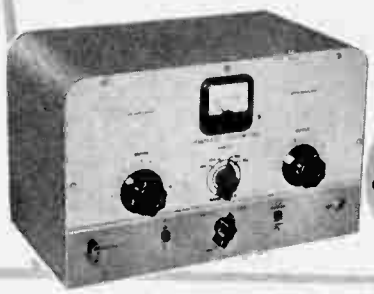
MODEL DX-100

$189.50

Shpg. Wt. 120 lbs.

Shipped motor freight unless otherwise requested. $50.00 deposit required for C.O.D. orders.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

$29.50

Shpg. Wt. 15 lbs.

Enjoy the trouble-free operation of commercially designed equipment while still benefiting from the economies and personal satisfaction of "building it yourself."

This CW Transmitter is complete with its own power supply, and covers 80, 40, 20, 15, 11 and 10 meters. Single knob bandswitching eliminates coil changing. Panel meter indicates grid or plate current for the final. Crystal operation, or can be excited by external VFO. Crystal not included in kit. Incorporates features one would not expect in this price range, such as key-click filter, line-filter, copper plated chassis, prewound coils, 52 ohm coaxial output, and high quality components throughout. Instruction Book simplifies assembly. Uses 6AG7 oscillator, 6L6 final and 5U4G rectifier. Up to 35 watts plate power input.

Heathkit GRID DIP METER KIT

Model GD-1B

$19.50

Shpg. Wt. 4 lbs.

This is an extremely valuable tool for Hams, Engineers or Servicemen. Covering from 2 Mc to 250 Mc, it uses 500 μa meter for indication. Kit includes prewound coils and rack. Will accomplish literally hundreds of jobs on all types of equipment.

Heathkit ANTENNA IMPEDANCE METER KIT

Use in conjunction with a signal source for measuring antenna impedance, line matching purposes, etc. Will double, also, as a phone monitor or relative field strength indicator.

100 μa meter employed. Covers the range from 0 to 600 ohms. An instrument of many uses for the amateur.

Model AM-1

$14.50

Shpg. Wt. 2 lbs.

Heathkit VFO KIT

MODEL VF-1

$19.50

Shpg. Wt. 7 lbs.

Weigh the cost of this kit against the cost of crystals—and consider the convenience and flexibility of VFO operation. This is one of the most outstanding kits we have ever offered for the radio amateur.

Covers 160—80—40—20—15—11 and 10 meters with three basic oscillator frequencies. Illuminated and precalibrated dial scale clearly indicates frequency on all bands and provides more than two feet of dial calibration. Reflects quality design in the use of ceramic coil forms and tuning capacitor insulation, and copper plated chassis. Simply plugs into crystal socket of any modern transmitter to provide coverage of the bands from 160 meters through 10 meters. Uses 6AU6 Clapp oscillator, and OA2 voltage regulator for stability. May be powered from plug on Heathkit Model AT-1 Transmitter, or supplied with power from most transmitters.

Heathkit ANTENNA COUPLER KIT

Model AC-1

$14.50

Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coaxial input—power up to 75 watts—10 through 80 meters.

Heathkit COMMUNICATIONS RECEIVER KIT

Covers 550 Kc to 35 Mc in 4 bands. Features electrical bandspread—separate R.F. and A.F. gain controls—noise limiter—AGC—BFO—phone jack—5½" PM speaker.

CABINET: Fabric covered plywood cabinet. Part No. 91-10. Shpg. Wt. 5 lbs. $4.50

Model AR-2

$25.50

Shpg. Wt. 12 lbs. (Less Cabinet)

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Heathkit DUAL-CHASSIS WILLIAMSON TYPE HIGH FIDELITY AMPLIFIER KIT

Main amplifier and power supply each have their separate chassis for flexibility of installation. Features the Acrosound "ultra-linear" output transformer. Frequency response within ±1 db from 10 cps to 100,000 cps. Power output is over 20 watts.

KIT COMBINATIONS

W-3M: Consists of main amplifier and power supply for separate construction. Includes all tubes, components, and complete assembly instructions. Shpg. Wt. 29 lbs., Exp. Only $49.75

W-3: Consists of W-3M Kit listed above plus Heathkit Model WA-P2 Preamplifier. Shpg. Wt. 37 lbs., Exp. Only $69.50

Heathkit ADVANCED DESIGN High Fidelity AMPLIFIER KIT

This advanced-design 25 watt Hi-Fi Amplifier features a new-design Peerless output transformer, improved circuitry, and uses KT-66 output tubes. This results in higher power output; improved bass and high frequency response; and reduced IM and harmonic distortion. Incorporates all the "extra" features that make for real listening enjoyment. Power handling capabilities increased to follow instantaneous power peak of full orchestra. Also new type balancing circuit, and "tweeter saver" to suppress HF oscillation. New physical design results in attractive appearance, suitable for use either in or out of a cabinet.

KIT COMBINATIONS

W-5M: Consists of main amplifier and power supply for single chassis construction. Includes all tubes, components, and complete assembly instructions. Shpg. Wt. 31 lbs., Exp. Only $59.75

W-5: Consists of W-5M Kit listed above *plus* Heathkit Model WA-P2 Preamplifier. Shpg. Wt. 38 lbs., Exp. Only $79.50

Heathkit SINGLE-CHASSIS WILLIAMSON TYPE HIGH FIDELITY AMPLIFIER KIT

This is the lowest priced Williamson—type Amplifier ever offered in kit form. Main amplifier and power supply on a single chassis. Features Chicago output transformer. Flat within ±1 db from 10 cps to 100,000 cps. Maximum power output over 20 watts.

KIT COMBINATIONS

W-4M: Consists of main amplifier and power supply for single chassis construction. Includes all tubes, components, and complete assembly instructions. Shpg. Wt. 28 lbs., Exp. Only $39.75

W-4: Consists of W-4M Kit listed above *plus* Heathkit Model WA-P2 Preamplifier. Shpg. Wt. 35 lbs., Exp. Only $59.50

Heathkit 6-WATT AMPLIFIER KIT

Model A-7B

$15.50

Shpg. Wt. 10 lbs.

Model A-7B; although not classified as a true high fidelity amplifier, this Heathkit Amplifier provides full 6 watts power output, more than adequate for normal home installation, and frequency charcteristics are ± 1½ db from 20 to 20,000 cps. Push-pull output—detailed construction manual—top-quality parts. Output transformer tapped at 4, 8, and 15 ohms. Bass and treble tone controls provided. Two input channels.

MODEL A-7C: Same as Model A-7B except with preamplifier stage. Shpg Wt. 10 lbs., $17.50

Heathkit 20-WATT HIGH FIDELITY AMPLIFIER KIT

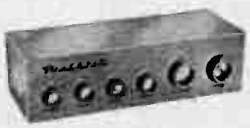
Model A-9B

$35.50

Shpg. Wt. 23 lbs.

Here is your least expensive route to real high fidelity performance. Full 20 watt output—separate bass and treble tone controls—frequency response ±1 db 20 — 20,000 cps — four switch-selected, compensated inputs—low hum and noise level—output transformer tapped at 4, 8, 16, and 500 ohms. Single chassis construction combines preamplifier, main amplifier, and power supply in one unit.

Heathkit HIGH FIDELITY PREAMPLIFIER KIT



Model WA-P2

$19.75

Shpg. Wt. 7 lbs.

Beautiful modern appearance blends with any interior color scheme.

Completely fulfills all the requirements for remote control, compensation, and preamplification for the Heathkit Williamson-type Amplifiers or any conventional Hi-Fi Amplifier. Five separate input channels, each with separate audio level control. Full record equalization accomplished with 4-position turnover and roll-off controls.

Separate bass and treble controls. Overall frequency response within 1 db from 25 cps to 30,000 cps. Hum and noise level extremely low. This brilliant performer will do justice to the finest available program sources.

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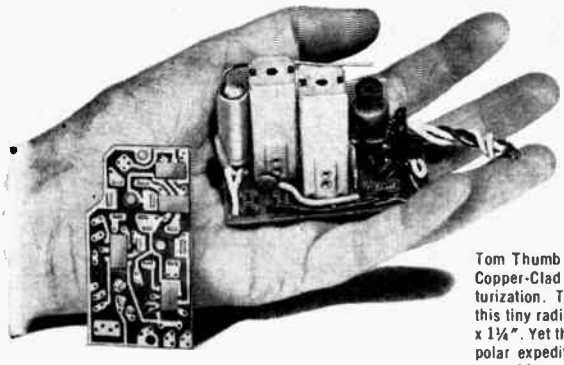
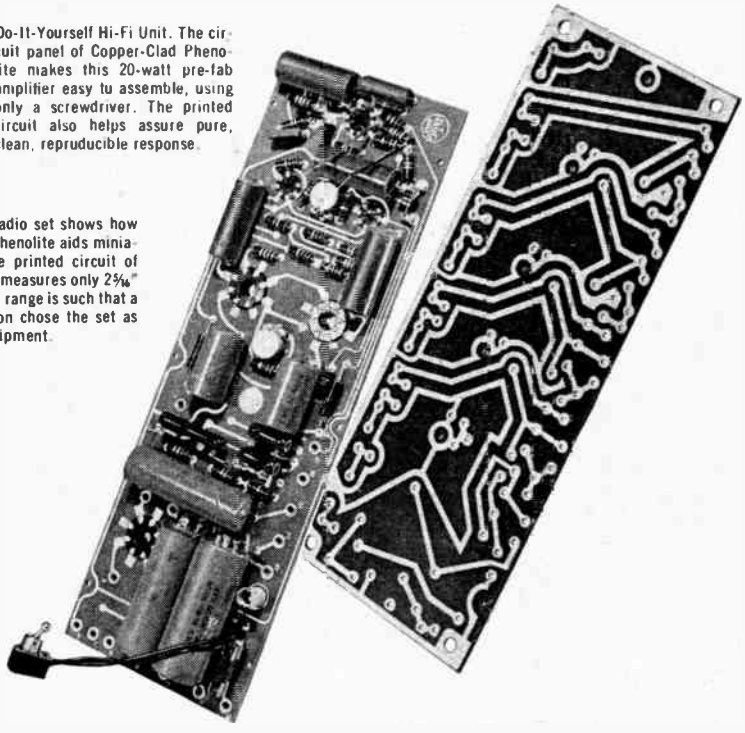
COPPER-CLAD PHENOLITE

When it proves itself in products like these...

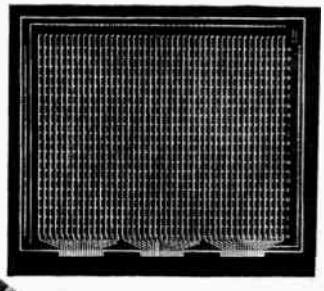


Do-It-Yourself Hi-Fi Unit. The circuit panel of Copper-Clad Phenolite makes this 20-watt pre-fab amplifier easy to assemble, using only a screwdriver. The printed circuit also helps assure pure, clean, repruducible response.

Tom Thumb radio set shows how Copper-Clad Phenolite aids miniaturization. The printed circuit of this tiny radio measures only 2 5/16" x 1¼". Yet the range is such that a polar expedition chose the set as part of its equipment.



Printed circuit—18" x 21"—for a modern computor. The panel contains more than 1,000 through-holes for connection soldering, all of which are pierced in one operation! This shows the fine workability of Copper-Clad Phenolite and its ability to eliminate complex wiring, costly operations, expensive components.



Switch plates, commutator discs, and drum commutators with printed circuits have proved themselves in many diversified applications. Low-cost printed circuit switches are ideal for simple switching, and show up to best economical advantage in complex switching functions.

You know it's best for <u>any</u> printed circuit

The most widely used foundation material for printed circuits is Copper-Clad Phenolite by National.

Reason? Copper-Clad Phenolite—in its many grades—possesses all the properties and characteristics demanded for the job. This scientifically compounded laminate has high dielectric and mechanical strength, resistance to heat, moisture, solvents, oils, acids, alkalies. Also, it's light in weight—easy to machine, punch, saw, drill and solder.

You can't buy a more dependable, versatile, cost-cutting material than Copper-Clad Phenolite. Write us today.

YOUR GUIDE TO PRINTED CIRCUIT SIMPLIFICATION.
You'll find this booklet a most helpful tool in achieving miniaturization or automation. Complete coverage of basic technical facts and design data related to applied printed circuitry. Methods of producing printed circuits and economies in design are fully treated. For your free, personal copy of "Mechanize Your Wiring," write Dept. AD-10.

NATIONAL

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Also Manufacturers of Peerless Insulation, Materials Handling Receptacles, Vul-Cot Wastebaskets and Textile Bobbins.

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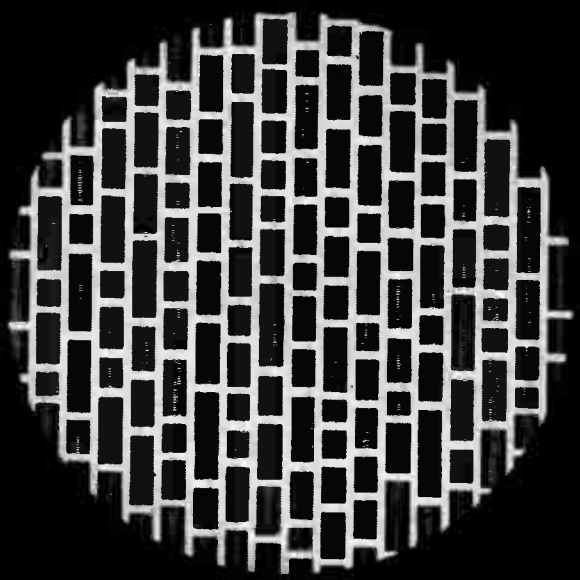
Electron photo microscope's view of conventional oxide coating used by many long play tapes. (Artist's conception.)



Similar enlarged view showing exclusive oxide dispersion method developed by "Scotch" Brand for new Extra Play Tape.

SEE the difference...

then hear the difference...

You'll notice the difference at once—the way revolutionary "Scotch" Brand Extra Play Tape outperforms ordinary long play tapes with old-fashioned, *full-depth* oxide coatings. There's a crisper tone, higher fidelity on "Scotch" Brand . . . *and* a generous 3 db. boost in the high frequency range.

The secret of "Scotch" Brand's superiority? It's the completely new oxide dispersion process. By laying carefully filtered, fine-grain particles in a neat, orderly pattern, "Scotch" Brand is able to produce a super-sensitive magnetic recording surface that contains the same amount of oxide as conventional tapes, yet is 50% thinner. That's important to remember when buying tape. Because recording experts are aware that a thinner, more potent oxide coating is essential for improved results with long play magnetic tapes.

Ask for "Scotch" Brand Extra Play Tape *today!*

NEW! REG. TRADE MARK SCOTCH BRAND

Extra Play Magnetic Tape 190

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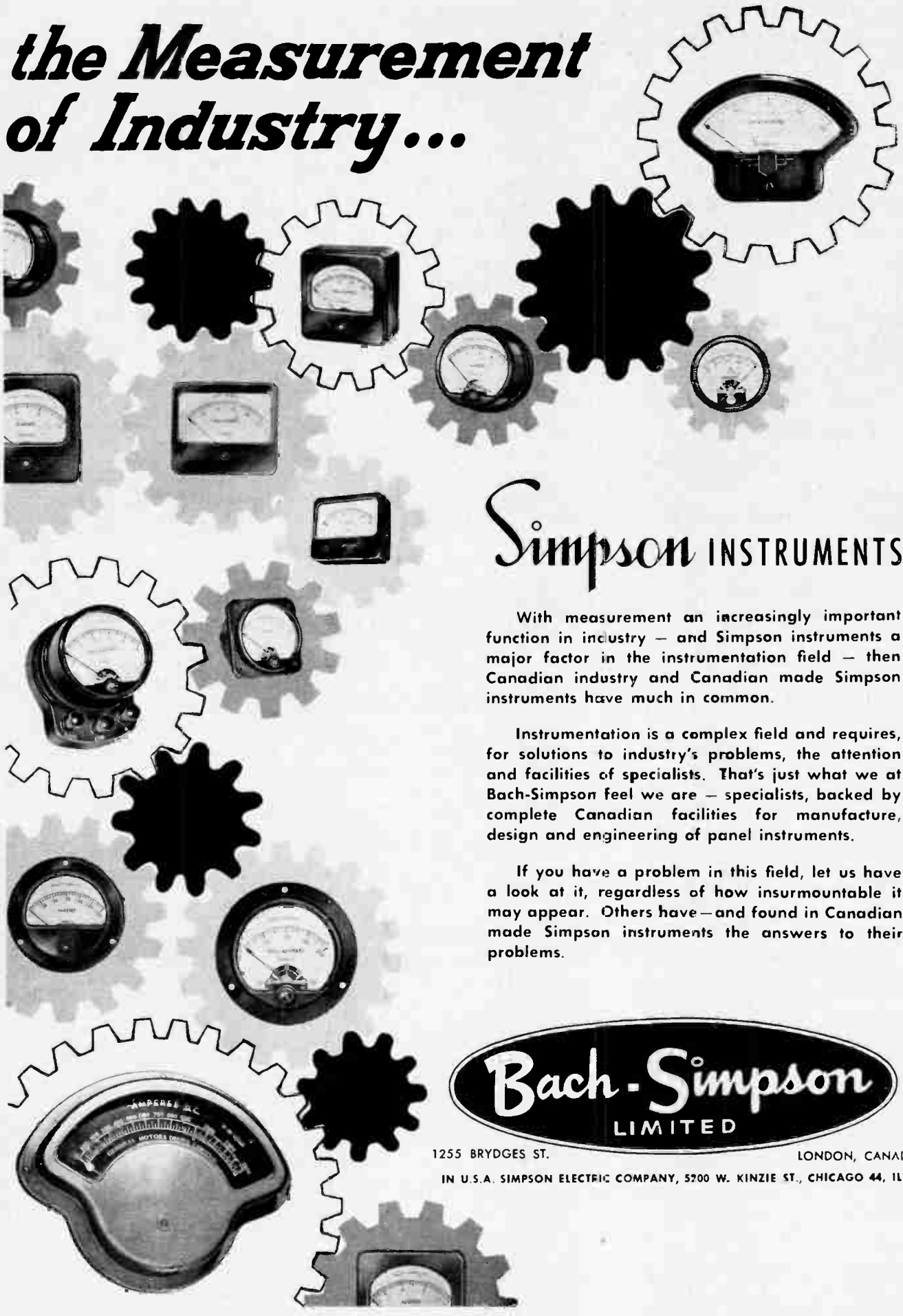
the Measurement of Industry...



Simpson INSTRUMENTS

With measurement an increasingly important function in industry — and Simpson instruments a major factor in the instrumentation field — then Canadian industry and Canadian made Simpson instruments have much in common.

Instrumentation is a complex field and requires, for solutions to industry's problems, the attention and facilities of specialists. That's just what we at Bach-Simpson feel we are — specialists, backed by complete Canadian facilities for manufacture, design and engineering of panel instruments.

If you have a problem in this field, let us have a look at it, regardless of how insurmountable it may appear. Others have—and found in Canadian made Simpson instruments the answers to their problems.

Bach-Simpson LIMITED

1255 BRYDGES ST. LONDON, CANADA

IN U.S.A. SIMPSON ELECTRIC COMPANY, 5200 W. KINZIE ST., CHICAGO 44, ILL.

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Mobile Radio Equipment Model 6000 Series

Link

MOBILE RADIO EQUIPMENT

With Link FM Mobile Radio equipment you get more plus values than with any other mobile radio equipment on the market today.

Only Link offers a complete line of Mobile and Fixed Station radio communication equipment that is designed for specific user applications. Be it for use with Public Utilities, Police and Fire Departments, Construction or Industrial System Operation, Link can supply FM Radio Equipment built *for* the required application and not *around* it.

Link Radio Corporation, the leader in the development and manufacture of FM Mobile equipment, sets the pace in advanced design and engineering.

You get more efficient operation, and longer life at lower maintenance costs, with Link FM Radio equipment.

Get the facts today. Learn how Link FM Radio Equipment can cut your Communications Systems expenditures.

Mobile Radio Equipment Model 6000 Series is an entirely NEW frequency modulated transmitter-receiver designed to afford interference-free operation in the overly crowded frequency ranges of 25-50 Mc and 152-174 Mc.

Mobile Radio Equipment Model 6000 Series is furnished complete with all accessories for accomplishing an operating two-way communication system in a mobile unit. Both transmitter and receiver may be supplied and equipped for two frequency operation within a spread of 300 kc and they may also be supplied for operation from 6 volt, 12 volt or universal 6/12 volt DC primary source. Universal 6/12 volt operation is accomplished automatically by the battery connector. No wiring changes are required.

ADJACENT CHANNEL SELECTIVITY

Receiver provides 100 db attenuation of signal 30 kc from center frequency. Not more than 6 db at 15 kc. Band width adjustable in the field for split channel operation.

PEAK MODULATION CONTROL (PMC)

An automatic modulation limiting circuit — instantaneous in operation. Prevents excessive frequency swing at all times.

Distributed Exclusively in Canada by

WESTINGHOUSE

55K745

CANADIAN WESTINGHOUSE COMPANY LIMITED *Electronics Division* **HAMILTON, CANADA**

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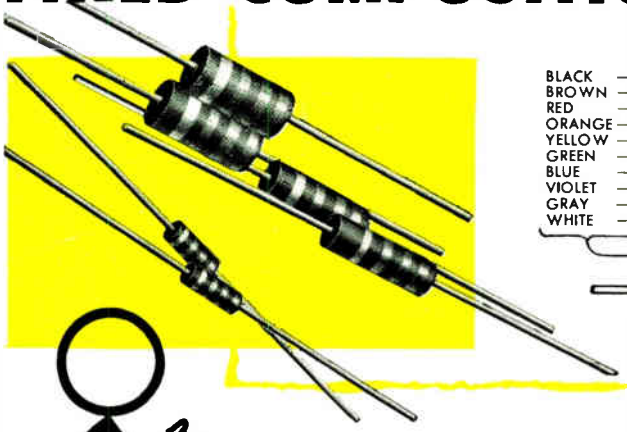
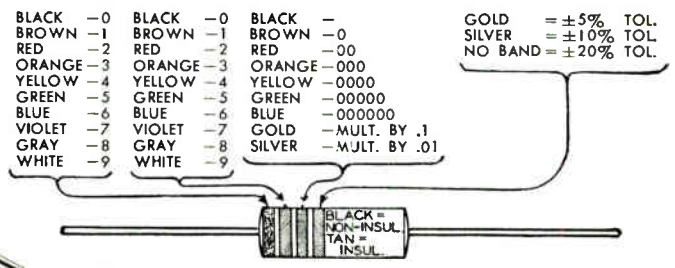
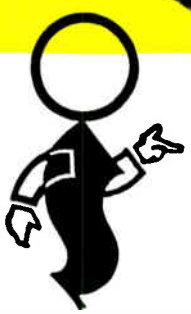
INDEX — Continued

STACKPOLE

FIXED COMPOSITION RESISTORS







These standard resistance ratings have been carefully selected to cover every circuit requirement while avoiding costly and unnecessary overlapping of values. All Stackpole ½-, 1-, and 2-watt resistors are regularly supplied in each of the ranges and tolerances indicated. Through this standardization you are assured of maximum quality and faster deliveries plus easier stocking of resistors for you.

CANADIAN STACKPOLE LIMITED
550 Evans Avenue, Etobicoke, Toronto 14, Ontario

These 69 RETMA Values Meet Every Modern Circuit Need!

±20%	±10%	±5%	±20%	±10%	±5%	±20%	±10%	±5%	±20%	±10%	±5%
10	10	10		390	390	15000	15000	15000		560000	560000
		11			430			16000			620000
	12	12	470	470	470		18000	18000	680000	680000	680000
		13			510			20000			750000
15	15	15		560	560	22000	22000	22000		820000	820000
		16			620			24000			910000
	18	18	680	680	680		27000	27000	1.0 Meg	1.0 Meg	1.0 Meg
		20			750			30000			1.1 Meg
22	22	22		820	820	33000	33000	33000		1.2 Meg	1.2 Meg
		24			910			36000			1.3 Meg
	27	27	1000	1000	1000		39000	39000	1.5 Meg	1.5 Meg	1.5 Meg
		30			1100			43000			1.6 Meg
33	33	33		1200	1200	47000	47000	47000		1.8 Meg	1.8 Meg
		36			1300			51000			2.0 Meg
	39	39	1500	1500	1500		56000	56000	2.2 Meg	2.2 Meg	2.2 Meg
		43			1600			62000			2.4 Meg
47	47	47		1800	1800	68000	68000	68000		2.7 Meg	2.7 Meg
		51			2000			75000			3.0 Meg
	56	56	2200	2200	2200		82000	82000	3.3 Meg	3.3 Meg	3.3 Meg
		62			2400			91000			3.6 Meg
68	68	68		2700	2700	100000	100000	100000		3.9 Meg	3.9 Meg
		75			3000			110000			4.3 Meg
	82	82	3300	3300	3300		120000	120000	4.7 Meg	4.7 Meg	4.7 Meg
		91			3600			130000			5.1 Meg
100	100	100		3900	3900	150000	150000	150000		5.6 Meg	5.6 Meg
		110			4300			160000			6.2 Meg
	120	120	4700	4700	4700		180000	180000	6.8 Meg	6.8 Meg	6.8 Meg
		130			5100			200000			7.5 Meg
150	150	150		5600	5600	220000	220000	220000		8.2 Meg	8.2 Meg
		160			6200			240000			9.1 Meg
	180	180	6800	6800	6800		270000	270000	10.0 Meg	10.0 Meg	10.0 Meg
		200			7500			300000			11.0 Meg
220	220	220		8200	8200	330000	330000	330000		12.0 Meg	12.0 Meg
		240			9100			360000			13.0 Meg
	270	270	10000	10000	10000		390000	390000	15.0 Meg	15.0 Meg	15.0 Meg
		300			11000			430000			16.0 Meg
330	330	330		12000	12000	470000	470000	470000		18.0 Meg	18.0 Meg
		360			13000			510000			20.0 Meg
									22.0 Meg	22.0 Meg	22.0 Meg

APPLICATIONS ...

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Today's design requirements foreshadow tomorrow's revolutionary applications . . . imposing critical new areas of performance on electronic components.

The vexing problem of efficient capacitor and R. F. filter operation under these ultra-severe conditions of extreme heat, cold, moisture and vibration challenges the imagination of the component manufacturer . . . truly he must create "something completely new under the sun"!

A foremost pioneer in the exacting development of advance-design components, to cope with these requirements, is Astron . . . leader in miniaturization, manufacturer of industry's widest variety of types, whose experience, ability and creative far-reaching point of view produces the significant, highly-engineered designs pictured here . . . proof of a dedication to progress.

The types and styles illustrated are but a few of the many available . . . for complete technical and application information on all Astron products, please request catalog AC-4.

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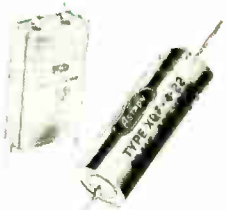
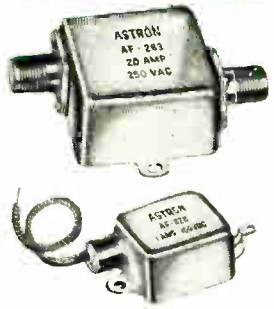
Blue • Point® Molded Plastic Paper Capacitors

Meteor® High Temperature Miniaturized Capacitors



Series "X"* Mylar † - Plus Capacitors



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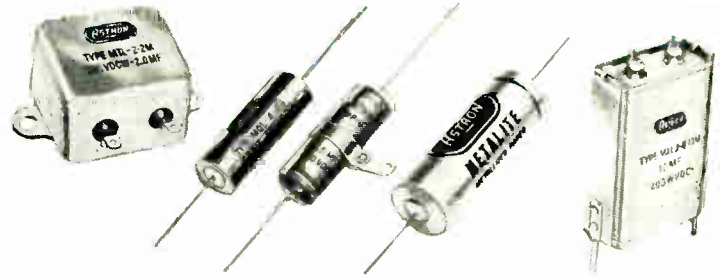
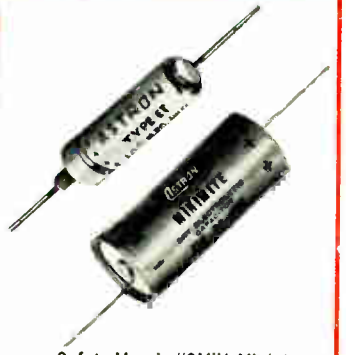


Metalite® and Hy-Met* Sub-Miniature Metallized Paper Capacitors

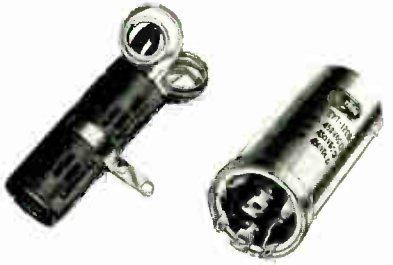
R. F. Noise Suppression Filters. Complete noise suppression "Packaged" service—Definition of requirements • Engineering analysis • Efficient solutions • Advance-type components • Quality production.

Attention: West Coast Buyers

A complete stock is maintained in Pointon's Toronto warehouse.



Safety Margin "SM"* Miniature Electrolytic Capacitors



Safety Margin "SM"* Twist-Prong and Cardboard Cased Electrolytic Capacitors

MIL-Type Hermetically Sealed Paper Capacitors

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