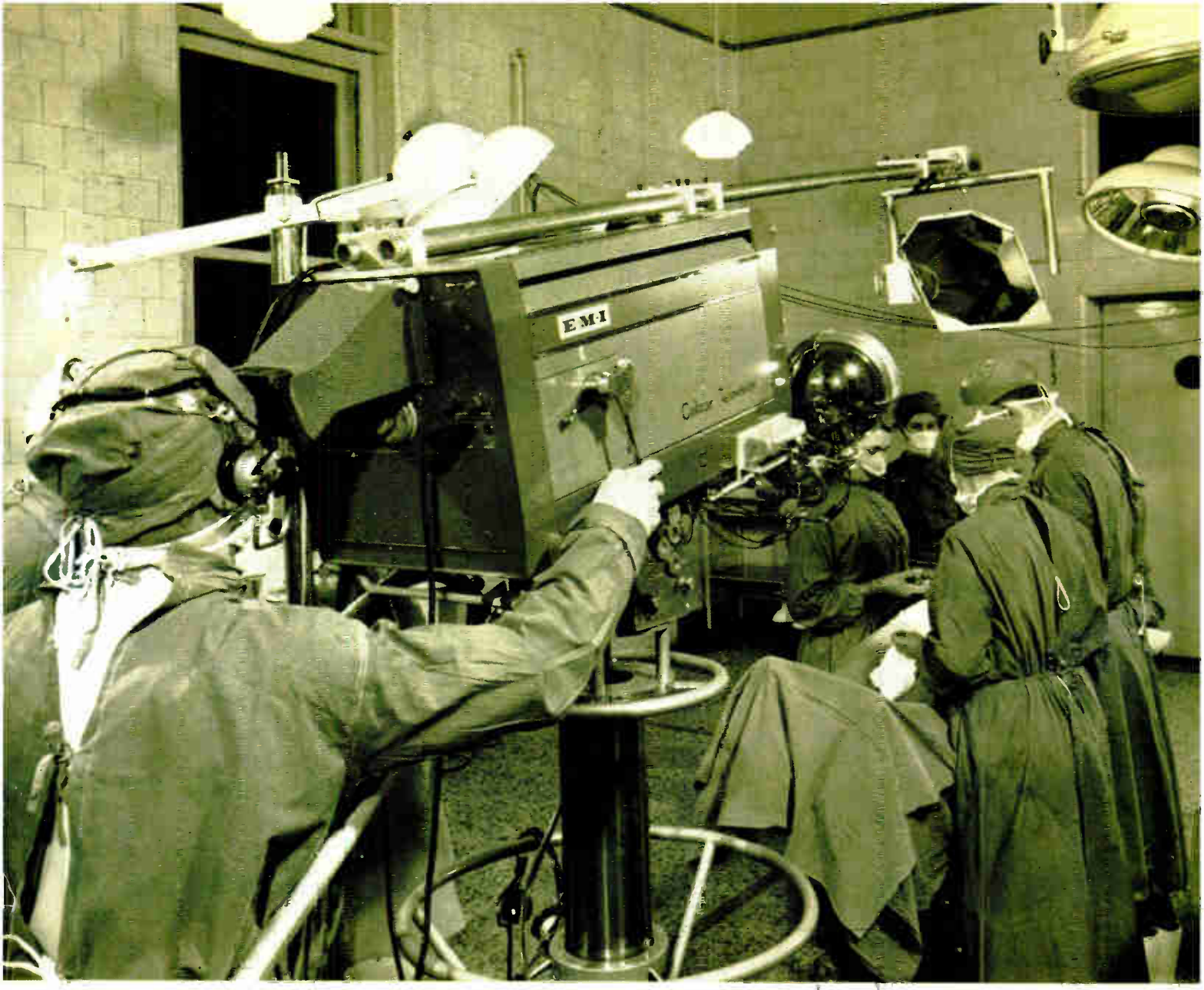


See cover story on page 51

electronics and communications

- *Is Government policy killing the Canadian electronics industry? . . . . page 18*

an age publication
AUGUST 1960

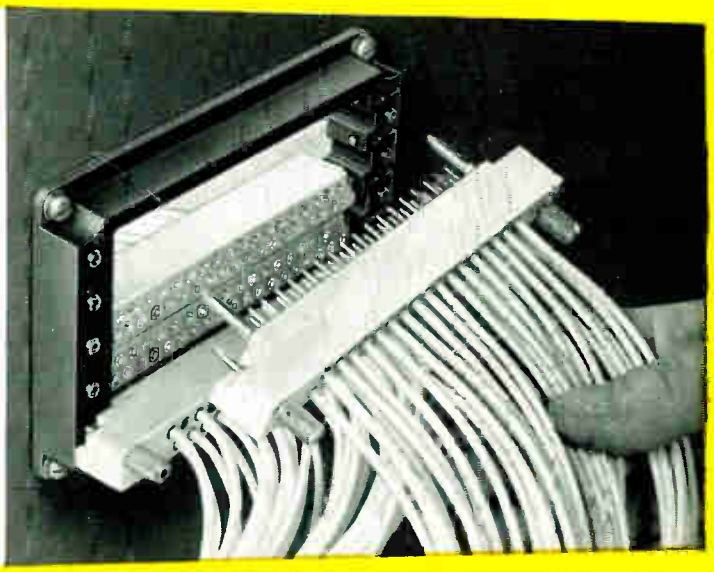
feed-thru, multiple insert

HYFEN®

connector

with crimp-type, snap-locked contacts

Makes possible the design of lighter and more compact equipment. Each insert holds 35 contacts. Frames available for 5 or 8 inserts.



crimp-type

MODULAR ELECTRICAL CONNECTORS

IN 3 NEW BASIC TYPES

Modular units by Burndy provide versatile, rapid and reliable answers to the problem of connecting a multiplicity of wires in relatively limited spaces. Crimped contacts — installed with any of several hand, pneumatic, semi-automatic or automatic tools—can be removed, re-inserted or replaced, providing the most complete flexibility in the connector field. Computers, ground-based radar, missile ground controls, and instrumentation are typical applications for Burndy modular connectors.

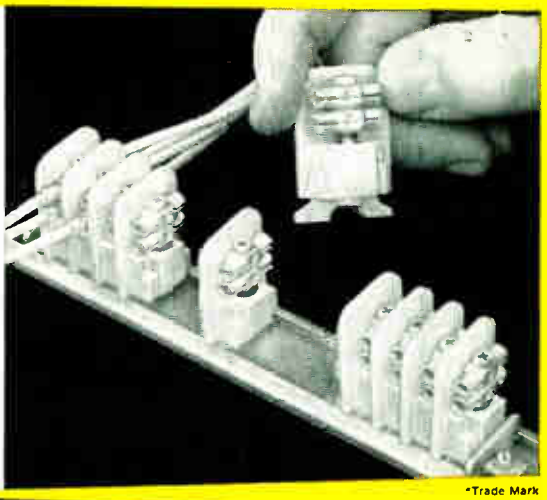
quick-disconnect or permanently connected

MODULOK*

terminal block

with snap-in, spring-loaded contacts

True versatility in a terminal block. 30 modules (2 or 4 tier) per foot. Twist of a screwdriver transforms quick-disconnect contacts to permanent connections.



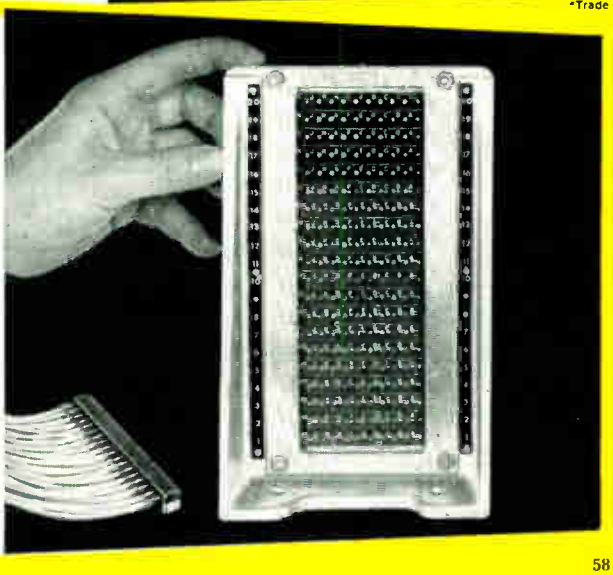
*Trade Mark

crimp-type, solid-shank

STAPIN®

taper pin contacts

Another Burndy contribution to the modular concept of assembling standard units to provide custom-fitted end products.



5819R

BURNDY

CANADA LTD. TORONTO, ONT.

HALIFAX • MONTREAL • TORONTO • WINNIPEG • REGINA • CALGARY • VANCOUVER

For complete details check No. 8 on handy card, page 47

an age publication

electronics and communications

Canada's pioneer journal in the field of electronics and communications engineering

Published by
AGE PUBLICATIONS LIMITED
450 Alliance Avenue, Toronto 9, Ontario
Telephone RO. 2-7225

publishers of
Wine/Beer/Spirits
Restaurants and Institutions
Automatic Heating/Plumbing/Air Conditioning
Food Service Equipment Supplier

MONTREAL
J. R. "Tom" Graham
308 Merton Avenue,
St. Lambert, Que.
Telephone: OR. 1-1532

WEST COAST
Dillenbeck-Galavan, Inc.
226 S. Alexandria Avenue,
Los Angeles 4, California

U.K. and EUROPEAN REPRESENTATIVE
Norman F. Keenan
Regency House,
1 Warwick Street,
London, W.1, England

Indexed in the Canadian Business and Technical Index of the Toronto Public Library.

Subscription Rates: Canada, British Possessions and United States: 1 year — $5.00; 2 years — $9.00; 3 years — $12.00. Foreign 1 year — $10.00.

Member Canadian Circulations Audit Board

Authorized as second class mail by Post Office Dept., Ottawa

CCAB

PRINTED IN CANADA
60

contents

AUGUST 1960 Vol. 8, No. 8

departments

CRTPB newsletter

Prepared by Canadian Radio Technical Planning Board

US-EIA Conference On Maintainability

The Third Conference on Maintainability of Electronic Equipment, sponsored by the US-EIA with the co-operation of the Department of Defense, will be held December 5, 6, 7, 1960 at the San Antonio Texas Hilton Hotel.

Instead of the usual repetitious reading of papers all subject matter will be available in book form in advance of the meeting. Of interest to conferees will be a visit on December 5th to the Kelley Air Force Base for a view of the operation of the San Antonio Air Material Area, which is responsible for the B-52 weapon system.

New Procedure Issued By DOT

Radio Standards Procedure No. 103 Issue No. 1 has been forwarded to all Sponsors and becomes effective August 1st, 1960. The Procedure, entitled "Information Required for Determining the Technical Acceptability of Radio Equipment for Licensing in Canada," amalgamates RSS-103, RSP-105, and RSP-106, which are cancelled on the same date.

The amalgamation has been done to facilitate licensing procedures and to simplify the classification of technically acceptable equipment in the Radio Equipment list. The licensing policies, which applied to equipment acceptable under any of the three cancelled documents, remain unchanged.

An important revision to Specification 103 outlined in the new Procedure is in the information required on Performance Characteristics. The Characteristics, as determined by actual test measurements on the type of equipment involved, shall be given in the form of an engineering brief. A professional engineer must certify that the equipment actually performs in accordance with the characteristics given in the brief.

Applications for links (30 Mc/s to 30,000 Mc/s), covered by Radio Standards Procedure 101, or for stations in the Amateur Service are not affected by this procedure.

I.T.U. Station Lists Published

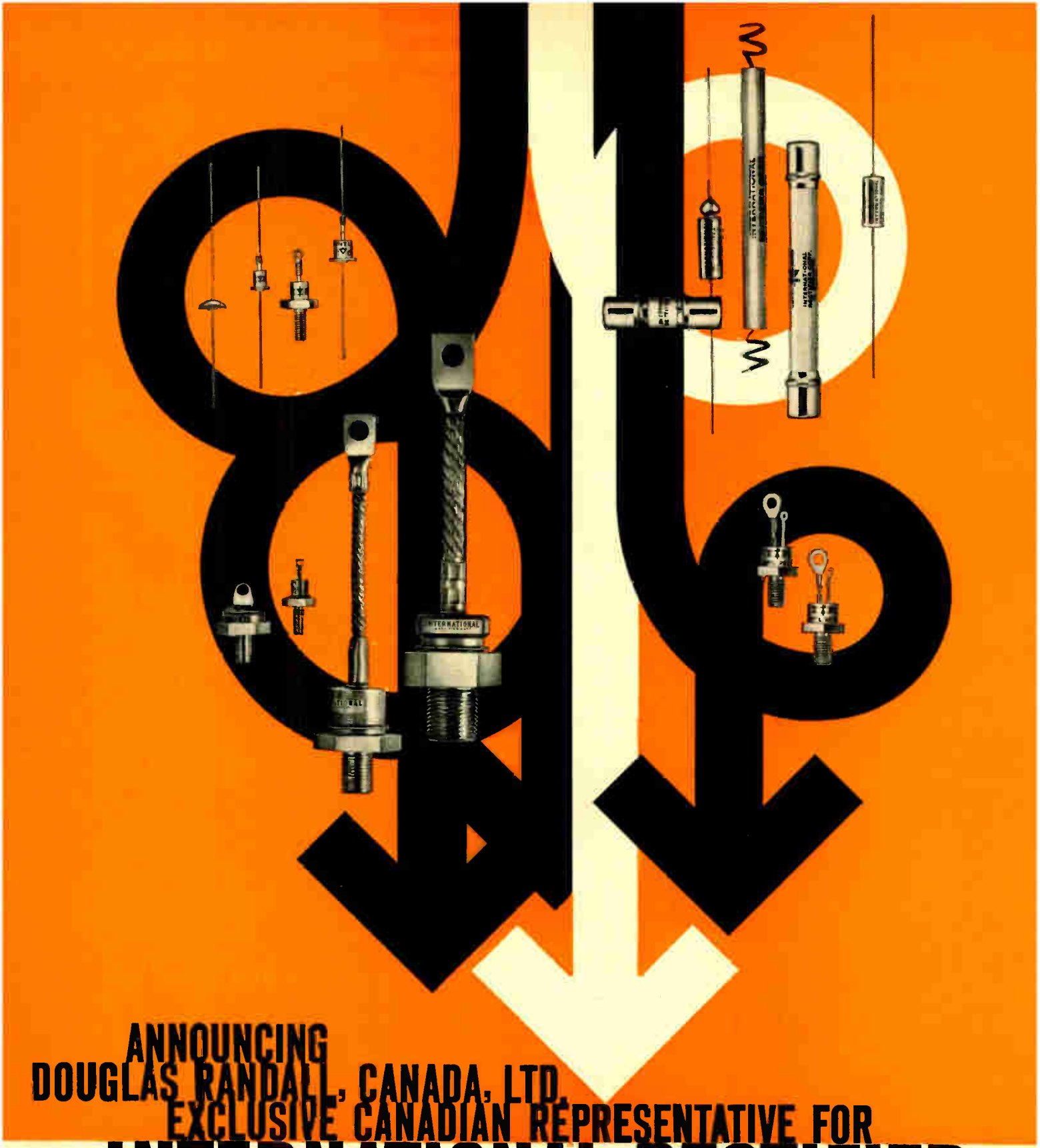
The I.T.U. has announced publication of the 33rd Edition of the List of Coast and Ship Stations in two volumes. Volume I, Coast Stations (574 pages) costs 4.50 Swiss Francs (carriage paid) while Volume II, Ship Stations (1950 pages) costs 16.35 Swiss Francs. A complete list of I.T.U. publications will be sent free of charge in answer to requests made to the I.T.U. General Secretariat, Palais Wilson, Geneva, Switzerland.

RFI Between Satellites And Earth Systems

The United States EIA has concluded that space satellite systems operating on the same frequencies as point-to-point systems on earth will not interfere with each other. The association made the announcement after an intensive study of radio frequency requirements for space communications in the bands above 890 mc.

The US-EIA filed its comments in the form of a statement to be included in FCC's Docket 11866, which was reopened for limited consideration of space frequency allocation. Based on its findings the Association has recommended that FCC use its present frequency allocation system, which provides for channel sharing, for allocations in the above-830 Mc bands.

The study, conducted by EIA's Microwave Section, concluded that satellite and earth point-to-point systems will not interfere "providing reasonable systems engineering judgment is exercised", and based on the feasbility of co-channel sharing between the two systems it is not necessary for separate allocations to be made for this new use of the spectrum.



ANNOUNCING
DOUGLAS RANDALL, CANADA, LTD.
EXCLUSIVE CANADIAN REPRESENTATIVE FOR
INTERNATIONAL RECTIFIER

To provide our Canadian friends and customers with a complete coast-to-coast service, we are pleased to announce that Douglas Randall, Canada, Ltd., will be the exclusive representative of International Rectifier Corporation to distributors and manufacturers in Canada. The excellence of service which typifies the trained staff of Randall Limited sales engineers assures you of immediate attention to your needs and prompt delivery of the International Rectifier Line ... the industry's widest line of semiconductors. **INTERNATIONAL RECTIFIER CORPORATION**

Executive Offices: El Segundo, California · Phone ORegon 8-6181

DOUGLAS RANDALL, CANADA, LTD. 126 Manville Road · Scarborough, (Toronto), Ontario · Phone: OXford 8-3081

a *Genie* at your command—

the CALL director

The 30-button CALL director helps secretaries handle more calls, streamlines office operation.

From Northern Electric comes a new-style genie . . . the CALL director telephone. It's the versatile virtuoso of modern business communications. To reach many inter-office extensions—just press a button. To hold a telephone conference—just press a button. To connect outside calls to others—just press a button. The CALL director is available with 12, 18 or 30 buttons and many features to save precious business time.

The CALL director telephone is another step forward in the science of business communications by Northern Electric, who design and manufacture most of Canada's telephones and related equipment.

Northern's extensive experience in this field, along with their creative engineering and design personnel and modern manufacturing facilities are at your command. Branches are strategically located across Canada to serve you.

Northern Electric
COMPANY LIMITED

SERVES YOU BEST

2060-5

For complete details check No. 28 on handy card, page 47

take the Stromberg-Carlson Instant People test!

SPENDING ½ MINUTE NOW CAN PAVE THE WAY TO IMPORTANT SAVINGS

Right now try to reach the three people in your organization with whom you need the most frequent contact. Allow 10 seconds for each one.

If you *failed* to reach any of the three individuals in 10 seconds, your firm may have that all-too-common business ailment we call *intercommunication lag.*

The first essential step in curing this profit-consuming malady is to *call your Stromberg-Carlson communication consultant.* He's a well-qualified specialist who can study your operation, isolate the problems—and make an impartial recommendation of the type of equipment required to meet your specific needs.

"There is nothing finer than a Stromberg-Carlson"

Look in the Yellow Pages under "Public Address & Sound Equipment," or fill out and mail the coupon.

Because Stromberg-Carlson is the only communications manufacturer specializing in all of these types of systems, we can impartially recommend the one exactly right for you.

1 2. 3. 4.

Hackbusch Electronics Limited
23 Primrose Ave., Toronto 4, Ont.

I didn't pass the Instant People test! Please send ☐ Communication consultant ☐ Literature. I am interested in: ☐ 1. Custom-engineered paging system ☐ 2. Dial-X® ☐ 3. Key-municator* ☐ 4. Pagemaster®

Name ..... *Title* .....

Firm Name .....

Address ..... *City* .....

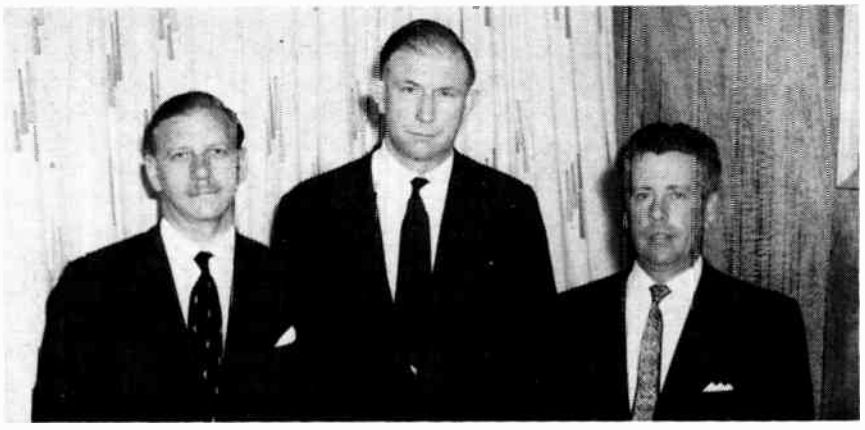
*Trademark

Exclusive Canadian representatives

HACKBUSCH ELECTRONICS LIMITED
STROMBERG-CARLSON
A DIVISION OF GENERAL DYNAMICS

For complete details check No. 21 on handy card, page 47

the industry's business



Photographed above on their recent visit to R. H. Nichols Limited are (left to right): Major W. Logan, general sales manager of Avo Limited of London, England, S. R. Wilkins, managing director of Avo Limited, and H. J. Davie, president of R. H. Nichols Limited. Major Logan and Mr. Wilkins visited the plant of R. H. Nichols en route to Ottawa where they were scheduled to meet with high ranking officials of the Armed Services and other Government departments. Avo Limited of London, England are manufacturers of portable monitoring instruments, many thousands of which have been supplied to Civil Defense authorities in the United Kingdom.

Railway and Power Engineering named Canadian rep.

Railway & Power Engineering Corporation, Limited, Montreal, announce their appointment as distributor of W. S. Shamban & Company, Culver City, California.

Shamban are producers of fluorocarbon products in sheet, bar, tube, moulded and machined forms.

Railway & Power has sales offices and warehouses from coast to coast in Canada. Literature is available at any of these points or from the Advertising Department, 3745 St. James Street West, Montreal 30, Quebec.

Glendon Instrument Co. rep for Waveforms

A. E. Byers, general manager of Waveforms, Inc. of New York City, has announced the appointment of The Glendon Instrument Company Ltd. of 46 Crockford Boulevard, Scarborough, Ontario as the exclusive distributors of Waveforms products in Canada. These products include a wide range of audio oscillators covering numerous combinations of frequency ranges and output voltages, vacuum tube voltmeters and transmission measuring sets.

Dusseldorf chosen as site for Interkama

Based on the success of former Interkamas held at Dusseldorf the presidential council of the show decided at a recent meeting that future shows, at least the 1963 Exposition, will also be held in Dusseldorf.

Interkama for 1960 will be held at Dusseldorf from October 19th to 26th at which more than 400 exhibitors will display European manufacturers' latest instrumentation and automatic equipment.

Management of the show have stated that it is the intention to hold Interkama only every three years in order to provide manufacturers with sufficient time for the development of new products and equipment.

Aviation Electric Limited named reps for Farinon

Aviation Electric Limited has been appointed the exclusive distributor in Eastern Canada for Farinon Electric Company.

Farinon products include Multi-Channel point-to-point radio equipment for frequencies from 50 MC to 2,700 MC, Antenna Diplexers and Automatic Transfer for stand-by equipment.

Avo officials visit R. H. Nichols Ltd.

S. R. Wilkins, managing director, and Major W. Logan, general sales manager of Avo Limited of London, England visited New York and Toronto during June. In Toronto their host was H. J. Davie, president of R. H. Nichols Limited, who represent Avo Limited in Canada.

While in New York the English visitors spent some time at the British Exhibition held there, where their company had a substantial exhibit on the stand of Metal Industries Limited, the large engineering group of which Avo Limited is a member.

In an interview with *Electronics and Communications* it was pointed out that "It has always been the policy of Avo Limited to maintain the closest possible liaison between the company and their Dominion representatives. In accordance with this policy it was considered desirable that a visit be made to Toronto to introduce and discuss their new developments in the electronic and nuclear instrumentation fields."

Teleflex Rep for B.C.

Teleflex, Inc., North Wales, Pa., has announced that The Ron Marston Company, of 18215 Linden Avenue, Seattle, Washington, will represent Teleflex Limited of Canada in British Columbia.

The western representative will handle the company's line of mechanical controls and linkages which are used in aircraft, missiles, architectural, nuclear and other fields.

Canadian Aviation Electronics forms California subsidiary

Canadian Aviation Electronics Ltd., Montreal, Canada, announces it has formed a subsidiary company to be located in Los Angeles, California.

The new company, Calmont Industries Inc., will engage in the business of electro-mechanical and energy conversion devices, with emphasis on research and development in these fields. It is intended that production work will be sub-contracted to CAE's Montreal facility where practical.

Calmont will be under the direction of P. F. Lees, who has been associated with CAE for the past 7 years. Lees will be located in Los Angeles as Vice-President and General Manager. J. F. Tooley, President of CAE, will also be President of Calmont. Other Directors will be L. M. Dickinson and Elmer Stone of Los Angeles, and B. J. Kaganov, D. S. D. McDonald and R. F. Elliott of Montreal.

Lake Engineering merger announced

The merger of A. R. Gardner Sales Co. with Lake Engineering Co. Limited was recently announced jointly by A. R. Gardner and A. Ainlay, president and general manager of Lake Engineering Co. Limited.

A. R. Gardner

The purpose of the merger is to provide the principals of A. R. Gardner Sales Co. with broad sales coverage of the "Lake" organization and to permit Mr. Gardner to specialize in the management of sales to commercial, military and government department users of electronic components, tubes and semiconductors.

Lake Engineering Co. Limited, located at 123 Manville Road, Scarborough, Ontario, will now be responsible for Canadian sales of the products of: Kurz-Kasch Inc., Dayton, Ohio; Richco Plastics Co., Chicago, Ill.; DuCo Ceramics Co., Saxonburg, Pa.; Plasteck Inc., Poteau, Okla.; J. H. Winn Inc., Winchester, Mass.; National Resistance Corp., Pearl River, N.Y.; Heppner Mfg. Co., Round Lake, Ill.; and Radar Relay Inc., Santa Monica, Calif.

Control switch division appoints Canadian rep

The Control Switch Division of Controls Company of America has announced the appointment of Brian Engineering, Ltd., as their Canadian Distributor and Sales Representative. Brian Engineering who have offices in Montreal and Toronto, will handle the complete line of Control Switch Division products. This line includes Switchlites, Push-Button Switches, Precision Snap-Aetion Switches, Indicator Lights, Toggle Switches, Special Switches and Panel Components.

C. P. Clare Canada appointed rep

The Instrument Division of Thomas A. Edison Industries, McGraw-Edison Company, West Orange, New Jersey, announces the appointment of C. P. Clare Canada Ltd. to represent the Instrument Division in Canada for the sale of time delay relays, current sensitive relays, and thermostats.

C. P. Clare Canada Ltd. is located at 2700 Jane Street, Downseviw, Ontario.

Railway & Power rep for Fidelity Instrument

Railway & Power Engineering Corporation, Limited, Montreal, Que., have announced their appointment as exclusive Canadian distributor for Fidelity Instrument Corporation, York, Pa.

Fidelity are producers of power packages and variable speed drives of the static and tubeless magnetic amplifier type, and of similar magnetic amplifier voltage regulators.

International Rectifier appoints Canadian rep

Announcement was made recently by the International Rectifier Corporation of El Segundo, California, that Douglas Randall, Canada, Ltd. will be the exclusive International Rectifier Corporation representative to distributors and manufacturers in Canada. This action has been taken to provide Canadian customers with a complete coast-to-coast service.

Douglas Randall, Canada, Ltd. is located at 126 Manville Road, Scarborough, Ontario.

IBM training school

In an effort to help solve the problem of a shortage of computer professionals in North America, the International Business Machines Corporation is setting up a new-type training school, to be called the IBM Systems Research Institute.

Initially the Institute will be for IBM employees, but once it has become established and has been operating for a while, personnel from offices using IBM equipment will be invited. Canadians will be eligible to attend.

The new Institute will be the first of its kind in the computer industry and its purpose is to train people to find computer system solutions to the most complex business and scientific problems.

The annual budegt for this school is expected to approximate $2 million, and eventually IBM will train up to 400 people a year.

Toronto computing firm opens traffic research centre

The Traffic Research Corporation Ltd. is a new subsidiary company of KCS Limited. This company has been formed to concentrate the considerable experience, skills and facilities of KCS Limited towards the solution of vexing traffic problems.

KCS Limited has worked out answers to traffic problems by using teams of engineers, statisticians, economists and accountants backed by powerful electronic facilities.

The complexity of modern traffic problems and the tremendous costs associated with meeting these problems emphasize the need for a Traffic Research enter. In its new subsidiary, Traffic Research Corporation, KCS Limited will bring to bear on these problems the broad experience of a diversified group of professionals backed by the most modern equipment for analysis.

The above illustration shows the first Canadian order being transmitted on the international high-speed automatic private wire teletype system between Canada and the United States. Left to right are: W. F. Dinnick, president, A. E. Osler Company Limited, Toronto; E. D. Scott, chairman of the board of governors, Toronto Stock Exchange; D. H. Hawley, chief of sales and traffic services, Canadian National Telegraphs.

EIA report

by R. T. O'Brien

Industry Problems Get Special Committee Attention

To co-ordinate the plan of attack on the industry's problems created by importation and consequent loss of employment the Association's Board of Directors has authorized the setting up of a Special Committee to examine the difficulties and arrive at a proper sequence of action. The Special Committee will comprise the main representatives from the Government Liaison, the Defense Production Sharing, and Importation committees together with representation from the tube manufacturers.

Technicians' Educational Scheme

Reporting on the EIA-approved course of instruction held at Ryerson Institute of Technology the Service Committee says that eighteen technicians had written the final examinations and that these results indicate a true need for an educational scheme.

So far, the only location in Canada providing such a course has been Toronto but encouraging results have been noted with the possible introduction of the EIA course at the Vancouver Technical School. It is hoped that, by the fall of 1960, a similar course will be introduced in Halifax and in other Ontario centers.

Service Code Of Ethics

Expressing concern over the possible adverse publicity that could result from consumer dissatisfaction with questionable service practices the Sales and Merchandising Committee has recommended that the EIA consider the preparation of a Service Code of Ethics.

Prepared for display by servicemen in Canada such a code would be helpful in acquainting the consuming public with the Association's recommended standards of service performance and would undoubtedly assist the serviceman maintain a high standard of work for increasing customer satisfaction.

Urges Continued Support Of CRTPB

Missing his first meeting in many years through illness the Director of Engineering, Ralph A. Hackbusch, has submitted a comprehensive report on all engineering activities in the Association over the past year. In his report Mr. Hackbusch recommends the continued support of the Canadian Radio Technical Planning Board and the Canadian National Committee of the International Electrotechnical Commission.

Mr. Hackbusch suggests that it is the function and the responsibility of the manufacturers to provide the basic standards for all equipment which requires type approval of licensing. Only the manufacturers are in a position to properly assess the capabilities of the industry and interpret the state of the art in terms of economic production to meet future requirements.

Radio-TV Day, C.N.E.

It has been announced that Saturday, September 3rd, will be Radio and Television day at the Canadian National Exhibition. Guest Speaker at the special luncheon will be Mr. D. A. Golden, Deputy Minister of Defense Production.

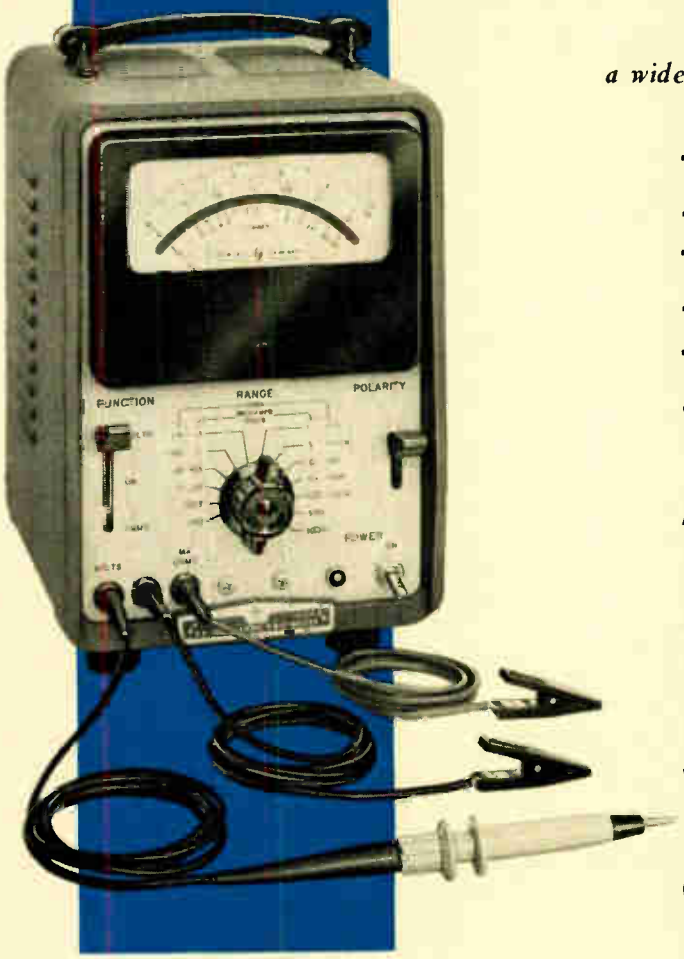
EIA-IRE Golf Tournament

The EIA-IRE Annual Golf Tournament will be held on Thursday, September 29th, at the Cedar Brae Club, Toronto.

Forthcoming Meetings

The Executive Committee will meet in the CRTPB Office, 200 St. Clair Avenue West, Toronto on Wednesday, August 10th at 9:30 a.m.

The first meeting of the new Maritime Committee will be held in Room No. 8, Board of Trade Building, Toronto, on Thursday, August 18th at 9:30 a.m.



This precision DC VTVM is also a wide range, precision ohmmeter and ammeter!

1% accuracy 100 μv to 1,000 volts!

Also 2% accuracy, 1 μa to 1 amp full scale.

Measures 0.02 ohms to 5,000 megohms.

No zero adjustment. 1 minute warm-up.

Floating chassis. $1,000 worth of convenience for $350!

Haven't you wished for one compact, simple instrument that would make *precision* dc voltage, dc current and resistance measurements over a wide range?

The new hp 412A is it! In its VTVM circuit, the 412A uses an exclusive hp photo-chopper instead of old-style mechanical vibrators—no drift, no 60 cps pickup. Input is floating, with resistance increasing from 10 megohms on the 1 mv range to 200 megohms on ranges above 100 mv. Current and voltage ranges have a 10 db sequence for maximum readability and overlap. The ohmmeter is a modified Kelvin bridge eliminating lead resistance error; you measure resistance accurately on hook-up wire sections as short as 6".

Model 412A also includes a 1 v or 1 ma recorder output, and 3 separate probes. Call your hp rep today for a demonstration on your bench. Price, $350.

HEWLETT-PACKARD COMPANY

Represented in Canada by
ATLAS INSTRUMENT CORPORATION, LTD.
77 Danforth St., Ottawa, Ont.; 50 Wingold Ave., Toronto, Ont.;
106-525 Seymour St., Vancouver, B.C.;
3333 Cavendish Blvd., Montreal, Que.

hp 400L LOGARITHMIC VOLTMETER—$325

New hp voltmeter covers 10 cps to 4 MC; accuracy high as ±2% of reading or 1% of full scale. Voltage range 0.3 mv to 300 v, 12 ranges, 1-3-10 sequence. Max. full scale sensitivity 1 mv. Large 5" true log voltage scale, linear 12 db scale, generous overlap. High stability, high input impedance. Also useful as amplifier for small signals, or to monitor waveforms.

hp 400H PRECISION VOLTMETER—$325

Extreme accuracy as high as ±1% to 500 KC, ±2% to 1 MC, ±5% full range. Frequency coverage 10 cps to 4 MC. Large 5" meter with precision mirror scale. Voltage range 0.1 mv to 300 v; max. full scale sensitivity 1 mv. High 10 megohm input impedance minimizes circuit disturbances. Amplifier with 56 db feedback insures lasting stability. Reads direct in db or volts.

hp 400D WIDE RANGE VOLTMETER—$225

Highest quality, extremely versatile. Covers 10 cps to 4 MC. Highly sensitive, accurate to within ±2% to 1 MC. Measures 0.1 mv to 300 v; max. full scale sensitivity 1 mv. Reads direct in dbm. High 10 megohm input impedance virtually eliminates circuit loading. 56 db amplifier feedback insures high stability and freedom from change due to external conditions.

Data subject to change without notice. Prices f.o.b. factory

5028

hp complete precision voltage measuring equipment

For complete details check No. 22 on handy card, page 47

industry personnel

Paul A. Vatcher

Ampex of Canada sales appointment

The appointment of **Edward L. Koller** to the position of Data Products sales manager for Ampex of Canada Limited has been announced by James E. Detlor, managing director of Ampex of Canada Limited.

Mr. Koller joined Ampex in 1952 as manager of the Field Service Department for the United States. His most recent position was that of manager of the Marketing Development Unit of the U.S. Data Products Instrumentation Division. Prior to joining Ampex, he worked as Studio Engineer for the National Broadcasting Company, and the Columbia Broadcasting System.

In his new position as Data Products sales manager for Canada, Mr. Koller will be responsible for sales of both computer and instrumentation products.

E. G. Micklewright appointed sales engineer

Allan Crawford Associates Ltd. announce the appointment of **E. G Micklewright** as a sales engineer. Born in Regina, Gordon Micklewright is a physics graduate of the University of Saskatchewan. Prior to joining Allan Crawford Associates Ltd., he spent several years in industry as service manager for Stark Electronic Instruments Ltd. and as plant superintendent for W. Harris & Co. Allan Crawford Associates Ltd. handle Precision Electronic Instruments for use in research and industry

Tele-Radio Systems Ltd. sales appointment

I. H. Nixon, president of Tele-Radio Systems Ltd., announces the appointment of **Paul A. Vatcher** to manage advertising and sales promotion.

Mr. Vatcher brings to the company's marketing activities many years of diversified experience with government and industry in the fields of telecommunications, sales and advertising. In this new position, he is assuming responsibility initially for making more widely known the products and services handled.

RCA Victor regional manager

The appointment of **R. J. Norton, P. Eng.,** as Ontario regional manager, Technical Products Marketing Division, RCA Victor Company, Limited., has been announced by B. R. Machum, division manager. Mr. Norton succeeds D. C. Tucker who has left the company to take up a position with Northern Broadcasting Company, Ltd.

Mr. Norton joined RCA Victor in 1950. In 1954 he left to become chief engineer for Cape Breton Broadcasting Company, Sydney, N.S., where he was responsible for the installation and operation of one of Canada's foremost television stations, CJCB-TV.

Northern Electric appointment

W. Ritchie Johnston has recently been appointed sales manager of the communications equipment division of Northern Electric Company Limited, replacing the late W. V. Faith.

Canadian Admiral appoints Montreal sales manager

Ed. Whittaker, vice president sales, Canadian Admiral Corporation Ltd., today announced the appointment of **J. Albert Reed** as manager of the company's Montreal sales branch.

Mr. Reed joined Canadian Admiral in May 1952 as sales representative. He was appointed Sales Manager of the Montreal branch in April 1954. Previous to joining Admiral, Mr. Reed was Sales Manager for E. Roy Industries of L'Assomption, Quebec.

C.G.E. sales appointment

Appointment of **J. Paul Belanger** as a two-way radio sales representative for Canadian General Electric Company Limited is announced by P. T. Wilson, two-way radio sales manager. Mr. Belanger joins the firm's two-way radio sales group in the province of Quebec.

Mr. Belanger has had extensive training and experience in the field of communications. Until he joined C. G. E. early this year, he was director and general manager of the Tele-Technic Institute in Montreal, a trade school for radio and television service technicians. The school was founded by Mr. Belanger in 1950.

J. Tindall named to sales staff

H. R. Herron, Marketing Manager of Lenkurt Electric Comany of Canada Limited, Vancouver, has recently announced the appointment of **John Tindall, P. Eng.,** as Sales Manager, military industrial accounts, with offices in Montreal. Mr. Tindall will also provide engineering assistance and factory liaison for Automatic Electric Sales (Canada) Limited, distributor of Lenkurt products to the communications industry.

Mr. Tindall joined Lenkurt in 1952 as a sales engineer and for the past 8 years has performed numerous engineering and customer relation functions. Prior to joining Lenkurt, he was with the Canadian National Telegraphs as an outside plant engineer.

W. R. Johnston

J. P. Belanger

E. L. Koller

J. Tindall

E. G. Micklewright

R. J. Norton

DDP contracts awarded

The following is a list of unclassified electronic defense contracts for $10,000 or more awarded during the period June 1-15, 1960 to Canadian firms by the Department of Defense Production.

- Abbey Electronics Ltd., Downsview, Ont., electronic tubes, $10.700.
- Beaconing Optical and Precision Materials Co. Ltd., Montreal, electronic equipment, $52,240.
- Canada Wire and Cable Co., Ltd., Ottawa, electrical cable, $200,856.
- Canadian Aviation Electronics Ltd., Montreal, rental of mobile calibration laboratories, $719,060.
- Canadian General Electric Co. Ltd., Toronto, installation and check out of training equipment, $12,233.
- Canadian Marconi Co., Montreal, technical representatives, $23,485.
- Canadian National Telegraphs, Winnipeg, provision and installation of video and control cable, 24,000.
- Canadian Pacific Railway Co., maintenance of teletype equipment, $32,000.
- Computing Devices of Canada Ltd., Ottawa, installation, repair and check out of airborne instrumentation in aircraft, balloons & rockets, $45,000; technical representative, $10,000.
- E. M. I. - Cossor Electronics Ltd., Halifax, N.S., technical representative, $13,604.
- Federal Wire & Cable Co. Ltd., Guelph, Ont., electrical cable, $21,868.
- Hunting Survey Corporation Ltd., Toronto, radar altimetry, $39,125.
- Northern Electric Co. Ltd., Ottawa, maintenance of radar and communications equipment, $536,000.
- Pioneer Electric Eastern Ltd., Toronto, transformers, $11,370.
- Presentey Engineering Products Ltd., Ottawa, electronic components, $14,412.
- Avro Aircraft Ltd., Toronto, controls for high speed wind tunnel at Uplands, Ontario, $13,911.

engineers' book-case

Interference between Power Systems and Telecommunication Lines by H. R. J. Klewe.

This volume, which comprises Report Ref. M/T 126 of the Electrical Research Association, should be of immense benefit to all who are concerned with the construction of power and communication lines. To a certain extent the problems posed by the coexistence of the two have been eased by the modern use of high-frequency cables for long-distance telephone conversations. But in many countries power and communication lines must be built side by side in conditions favorable to interference. Insofar as quantitatively it is possible to guard the effects of such proximity are understood and can be estimated against them and to do so with minimum expenditure.

The Macmillan Company of Canada Limited, 70 Bond St., Toronto, contains 256 pages, hard cover bound, price $14.00.

Semiconductor Abstracts — Volume V — 1957 Issue, C. S. Peet, Editor.

This year's compilation of Abstracts of Literature on Semiconducting and Luminescent Materials and Their Applications has been prepared jointly by members of the Solid State Devices Division, the Applied Physics Division and the Physical Chemistry Division of Battelle Memorial Institute of Columbus, Ohio. The whole compilation is under the sponsorship of The Electrochemical Society, Inc., of New York City. The acceleration of the growth of literature since 1956 has necessitated steps designed to further increase the usefulness of "Semiconductor Abstracts" while keeping its dimensions within a single volume of reasonable size.

John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N.Y., contains 450 pages, hard cover bound, price $12.00.

Introduction to Electrical Engineering (Third Edition) by Robert P. Ward.

The third edition of this popular basic treatment of electrical engineering is decidedly improved by Professor Ward's expanded and more rigorous coverage of the electric circuit and the magnetic and electric fields. Such topics as network graphs, current sources, nodal method, transient response, etc. are now included. The author made these additions in the light of the modern trend toward giving a more thorough grounding in circuits and fields as a foundation for advanced work in these areas.

Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N.Y., contains 372 pages, hard cover bound, price $8.50.

Progress in Semiconductors, Vol. 4. General Editor — Alan F. Gibson, B.Sc., Ph.D.

In his preface the General Editor announces Volume 4 of the Progress in Semiconductors series as the most international volume so far. It contains contributions for the first time from the Soviet Union, Holland, Japan, and Germany.

The book contains eight papers covering a wide variety of topics, of both general and specialist interest. The papers are entitled: "Negative Effective Masses in Semiconductors"; "Oxidation Phenomena on Germanium Surfaces"; "Theory of Avalanche Multiplication in Non-polar Semiconductors"; "Internal Field Emission"; "Noise in Semiconductors"; "The Electrical Effects of Dislocations in Semiconductors"; "Dielectric Properties of Solids in Relation to Imperfections".

John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N.Y., contains 292 pages, hard cover bound, price $10.50.

Basics of Gyroscopes (Vol.1 and Vol. 2) by Carl Machover.

These books present for the non-specialist, the student — even salesmen and managers who come in contact with gyroscopes in their study or work — a basic explanation of the principles underlying the science of gyroscopics. Mathematics are included only where they are essential to comprehension of gyroscope principles. These books are presented in the "pictured-text" format — enabling a dramatic and forceful, yet extremely lucid approach. The drawings are specially conceived and prepared to convey the thought without ambiguity of ideas.

The books begin with an explanation of the construction and the physics of gyroscope operation. Then they advance to the commercial types of gyroscopes and their utility for stabilizing purposes, as used in equipment commonly bound to the earth's surface.

John F. Rider Publisher, Inc., 116 W. 14th St., New York, N.Y., the two volumes containing a total of 232 pages; price — soft cover, $6.60, set of two; cloth binding, $7.75, set of two.

NEW TEKTRONIX OSCILLOSCOPE

Uses Signal-Amplifier and Time-Base Plug-In Units

The new Type 561 Oscilloscope is basically an indicator. It contains a 5-inch monoaccelerator cathode-ray tube with 3.5-kv accelerating potential, a husky power supply, and a calibrator for amplitude and sweep time. The Plug-In Units drive the crt deflection plates directly, receiving their operating power from the main unit.

This system offers versatility in conventional operation. You can use a time-base plug-in unit with (1) a simple signal-amplifier plug-in unit, (2) a dual-trace, (3) a wide-band, or (4) a differential-input plug-in unit. In addition, you can operate the Type 561 as an X-Y oscilloscope by using identical signal-amplifier plug-in units in both the vertical and horizontal channels.

The Type 561 is designed to accept contemplated plug-in amplifier and time-base units for specialized applications in the electronic, electrical, mechanical, medical, chemical, and other fields. Unlike earlier similar instruments, it is not subject to the limitations imposed by active or passive circuitry between the plug-in units and the crt deflection plates.

Tentative Specifications

Type 561 Indicator Unit

5-inch monoaccelerator cathode-ray tube.

3.5-kv accelerating potential.

New deflection blanking.

8-cm by 10-cm viewing area.

Regulated power supply, capable of both present and future plug-in current requirements.

12-v dc regulated heater supply for gain stability and low drift.

Z-axis input.

Calibrator—line-frequency square wave with 2-μsec rise-time, 0.2 mv to 100 v, accuracy within 3%.

Type 60 Plug-In Unit

Passband—dc to 800 kc.

Sensitivity—50 mv/cm to 50 v/cm in 4 calibrated steps, with variable control.

Type 62 Dual-Trace Unit

Five operating modes: Alternate sweeps, chopped, channel A only, channel B only, Channels A and B added algebraically.

Passband—dc to 500 kc.

Sensitivity—10 mv/cm to 20 v/cm in 11 calibrated steps, with variable control.

Type 63 Differential Unit

Differential input, 100-to-1 rejection ratio at full gain.

Passband—dc to 300 kc.

Sensitivity—1 mv/cm to 20 v/cm in 14 calibrated steps, with variable control.

Type 65 Wide-Band Unit

Passband—dc to 4 mc.

Sensitivity—50 mv/cm to 20 v/cm in 9 calibrated steps, with variable control.

Type 77 Time-Base Unit

18 calibrated sweep rates—1 μsec/cm to 0.5 sec/cm, accurate within 3%.

Versatile triggering—automatic or amplitude-level selection from rising or falling slope of triggering waveform, ac-coupled or dc-coupled, internal or external.

External input to sweep amplifier—3 v/cm sensitivity.

Skeleton Plug-In

Contains 24-pin connector, latch, front-panel overlay—for constructing your own special circuits.

PRICES TO BE ANNOUNCED AT WESCON

CAREER OPPORTUNITIES now exist at Tektronix in the following fields: Instrument design, Circuit design and engineering, Cathode ray tubes, Electron physics, Solid state and semi-conductor devices. For information write to Irving Smith, Personnel Director.

Tektronix, Inc.

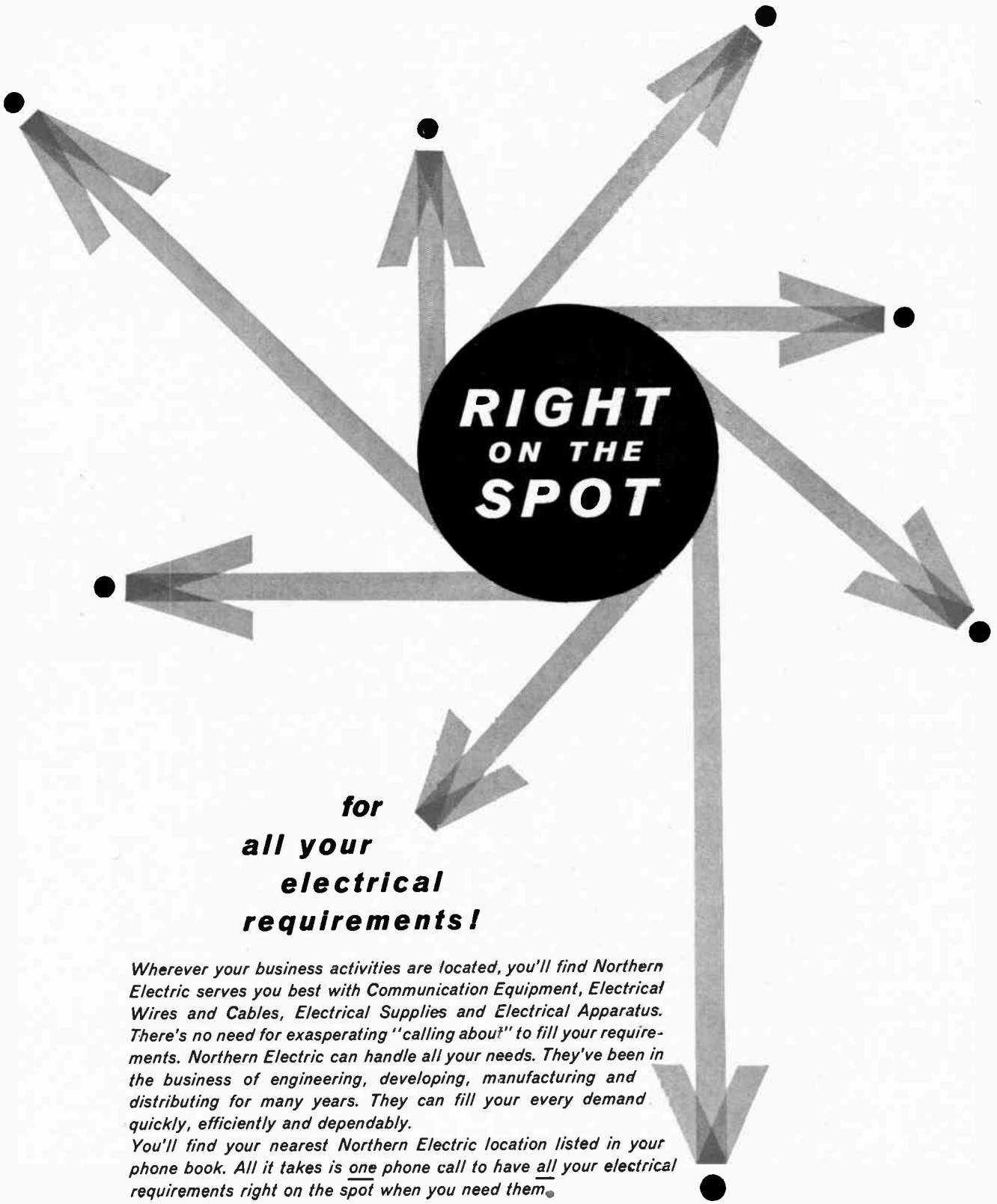
CANADIAN FIELD OFFICE: **Willowdale, Ontario**
3 Finch Avenue East • Phone: Toronto, BAldwin 5-1138

TEKTRONIX FIELD OFFICES: Albuquerque, N. Mex. • Atlanta, Ga. • Baltimore (Towson, Md.) • Boston (Lexington, Mass.) • Buffalo, N.Y. • Chicago (Park Ridge, Ill.) • Cleveland, Ohio • Dallas, Texas • Dayton, Ohio • Denver, Colo. • Detroit (Lathrup Village, Mich.) • Endicott (Endwell, N.Y.) • Greensboro, N.C. • Houston, Texas • Kansas City (Mission, Kan.) • Los Angeles, Calif., area (East L.A., Encino, West L.A.) • Minneapolis, Minn. • New York City Area (Albertson, L.I., N.Y. • Stamford, Conn. • Union, N.J.) • Orlando, Fla. • Philadelphia, Pa. • Phoenix, (Scottsdale, Ariz.) • Poughkeepsie, N.Y. • San Diego, Calif. • San Francisco (Palo Alto, Calif.) • St. Petersburg, Fla. • Syracuse, N.Y. • Toronto (Willowdale, Ont.) Canada • Washington, D.C. (Annandale, Va.)

TEKTRONIX ENGINEERING REPRESENTATIVES: Hawthorne Electronics, Portland, Oregon • Seattle, Washington. Tektronix is represented in twenty overseas countries by qualified engineering organizations. In Europe please write Tektronix Inc., Victoria Ave., St. Sampsons, Guernsey C.I., for the address of the Tektronix Representative in your country.

SEE THE TYPE 561 AND OTHER NEW TEKTRONIX INSTRUMENTS AT WESCON, BOOTHS 817 AND 818

For complete details check No. 37 on handy card, page 47



for all your electrical requirements!

Wherever your business activities are located, you'll find Northern Electric serves you best with Communication Equipment, Electrical Wires and Cables, Electrical Supplies and Electrical Apparatus. There's no need for exasperating "calling about" to fill your requirements. Northern Electric can handle all your needs. They've been in the business of engineering, developing, manufacturing and distributing for many years. They can fill your every demand quickly, efficiently and dependably.

You'll find your nearest Northern Electric location listed in your phone book. All it takes is one phone call to have all your electrical requirements right on the spot when you need them.

Northern Electric
COMPANY LIMITED

SERVES YOU BEST

6660-23

For complete details check No. 29 on handy card, page 47

Is Government policy killing the electronics industry?

Tube imports from low-wage countries jeopardize Canadian industry

" - - - if present trend persists Canadian tube manufacturers must stop all production - - - "

Whither is the Canadian electronic tube manufacturing industry going? According to the Electronic Industries Association of Canada it is going out of business unless the exporters of electronic tubes to Canada from low wage rate countries can be prevailed upon to enforce self-imposed restrictions on their exports or the Canadian Government can be convinced of the necessity of import quotas on foreign-made products.

The issue is a serious one for the industry and a ticklish one for the Government. In short, it is a matter of survival for the electronic tube industry and a matter of respecting the principals of two-way trade on the part of the Government.

While the primary issue at stake concerns only the electronic tube manufacturing segment of the industry, there is inherent in the situation the broader question of: to what extent will the remainder of the Canadian electronics industry be affected if the tube problem cannot be resolved either by inter-industry negotiation between Canadian and foreign producers or between the Canadian industry and the Canadian Government?

In an effort to determine the thinking on the part of industry in this matter, *Electronics and Communications* interviewed several of the industry's leaders and asked what action in their opinion should be taken on the part of Government to preserve the welfare of the Canadian electronics industry, why such action should be taken and what the consequences may be if such action is not taken. Their comments are as follows:

"- - - surely this is the time for a real decisive look by the Minister of Finance - - -"

R. M. Robinson
Electronic Equipment Dept.
Canadian General Electric

"One serious aspect of the problem of importation of electronic components into Canada from low wage countries is tube importations from Japan. They have reached an alarming proportion, running 258% of the first quarter of 1959. This could be the forerunner of similar attacks on Canadian production of electronic components. Measuring this against Canadian produced types of tubes, a projection for 1960 would indicate that Japanese importation will be as high as 50% of the Canadian produced types. This indicates a destructive attack on Canadian industry. The 1959 shipments from Japan to the United States accounted for only 1.7% of their American produced types. Should this inflow continue without restriction, it seems only a short jump to the shipment of completed chassis from Japan, thereby calling a halt to component manufacturing and chassis assembly in this country. The possibilities beyond this would certainly reach into the field of communications and industry control equipment, thereby controlling the whole electronics business in Canada.

"This action will not only destroy the industry but seems destined to be a major contributor to a fast weakening of Canadian economy. The tax loss to the Government in all forms, such as, excise and sales tax, (which favor the importer), corporation tax, and personal income tax, will make a real dent in Government revenue.

"Surely this is the time for a real, decisive look by the Minister of Finance at this threat of destruction of an essential industry and a substantial reduction in revenue."

Japan lifts ban on exports to Canada

Temporary ban on the export of Japanese transistor radios to the United States and Canada will be lifted July 1, the Japanese Government said June 29. The ban imposed May 10 was to prevent sagging prices due to excessive sales by Japanese exporters at prices lower than the official check price. The ministry of International Trade and Industry set a series of export quotas for firms in accordance with their past export records as the first step to control over-exports. The ministry also decided to set ceilings on the number of transistors sent to other markets to prevent re-export to Canada and America by third countries.

Christian Science Monitor, June 29, 1960

"- - - the survival of this vital industry is being severely threatened - - -"

James Key, President
Electronic Industries Association of Canada

"The Canadian Electronics Industry, though comparatively young, has reached the stature of one of our most important industries. In the consumer field of radio, hi-fi, stereo and television its products are a part of every Canadian household. In industry and commerce it provides equipments for improved methods and controls to increase our efficiency and productivity that we may continue to enjoy our high standard of living. In defense it provides such complex equipment as radar, fire control and missiles, to name but a few — the nerve center of our Armed Forces.

"In short, electronics is everywhere.

"If this industry is allowed to progress it will continue to provide the new and the revolutionary things to serve all of these functions. Yet, through Government policies which favor foreign imports, the survival of this vital industry is being severely threatened. Let us look at a few statistics:

"Imports of Japanese radio sets jumped from 155,000 in 1958 to 395.000 in 1959 — an increase of 155% — accounting for 31% of all radios sold in Canada.

"Imports from all countries have taken more than 45% of the radio market in Canada.

"Radio tube imports from Japan jumped from 210,000 in 1958 to 2,205,000 in 1959 — an increase of 950% ! !

"Employment in the electronic manufacturing industry has declined 24% since 1955.

"Project these figures and it can readily be seen that if such expansion of imports from low wage countries is allowed to continue, the very backbone of the electronic industry will be non-existent in a very few years. Again, be reminded that this is an industry vital to our nation's defense.

"The Electronic Industries Association of Canada, comprising 114 member companies, recognizes that trade is a two-way street but submits that trade should be promoted in an orderly fashion and not to the overwhelming detriment of any particular segment of our economy.

"It is ironic that, through taxation, we subsidize the export of some commodities and on the other hand we, in effect, subsidize imports (as is the case on electronic tubes) by imposing excise and sales taxes on the Canadian product far in excess of the total revenue derived by the Government on the sale of an identical item imported from a low wage country — and at no benefit to the consumer !

"We suggest the following remedial action:

1. The Japanese Ambassador to Canada has, on more than one occasion, expressed this policy of Japanese Government 'when it is established that the increase of our exports of a particular commodity is such that it is causing or threatening serious injury to domestic producers of a commodity in the importing country it is the constant policy to take any possible measure by ourselves to prevent or remedy such a situation'.

We urge the Japanese Government to exercise this policy.

2. The Canadian Government should recognize, in its trade policies, the vital nature of electronics, in defense, in industry and in communications and in so doing create a favorable climate for its orderly existence and growth.

Continued on page 43

E. I. A. takes on work of reluctant Goverment

The Canadian Electronic Tube Industry is in danger of being wiped out if the present state of affairs on imports from low wage countries continues. This is the warning sounded by the Electronic Industries Association of Canada in a Brief presented recently to the Japanese Government. The presentation shows the impact that Japanese tubes are having on Canadian business and employment.

The Brief asks the Japanese Government to assist in bringing to the attention of the Japanese electronic tube manufacturers the fact that "the Canadian Electronic Tube Industry is seriously and adversely affected by the flood of low priced receiving type electronic tubes imported from Japan; and the damage can be avoided but still leave open to the Japanese manufacturers a market in Canada for a reasonable increase in dollar sales of electronic tubes".

The tube group bolstered their presentation with facts to show that from 1958 to 1959 alone the tube importation level from Japan increased ten times. This has resulted in the last year in a 23 per cent reduction in employment of Canadians manufacturing the same types of receiving tubes as are being imported from Japan. Further reductions in employment are being made as the rate of imports continues to rise.

While continuing to make urgent representations to the Canadian Government for an effective program to maintain Canadian electronic manufacturing, the Electronic Industries Association of Canada is directly approaching the Japanese trade officials. Tube manufacturers believe their proposals are unique because they maintain Canadian manufacturing while suggesting a continuing market for the tube manufacturers of Japan. Canadian tube manufacturers suggest that if Japan were to sell tube types that are not made in Canada it could result in an increase of dollar exports to Canada from Japan; in a larger share of requirement for types of tubes that Japan is not supplying to Canada but which are important in the world market; and in an opportunity to comply with Japanese stated policy of preventing serious injury to a Canadian industry.

The Brief points out that the growth of exports from Japan into Canada occurred at a time when the market for electronic tubes is in rapid decline. In spite of the decline in the market, the demand for new types involving development costs continues. It is quite clear that if the present trend persists the Canadian tube manufacturers must soon stop all production.

General exterior view of the transportable micro-scatter equipment showing the trailer mounted antennae

SYSTEM DESIGN

Transportable micro-scatter system features trailer-mounted antennae

A reliability figure of 99.9 per cent in the system engineering and equipment design of this Canadian produced apparatus was aimed at and achieved

By J. C. Wilder, P. Eng.*

Ideally suited for air traffic control from remote installations, S.H.F. tropospheric micro-scatter equipment manufactured by the Canadian Westinghouse Company Limited, Hamilton, Ontario, has already gained acceptance both in Europe and America. The system operates with 2 KW power output at a frequency between 4,400 and 5,000 mc.

The system, designated as type HJ, is highly transportable, can relay raw wide-band video to airport control towers and command points or operation centers up to 100 and 200 miles distant in a single hop. Identical signals can be received at all points at the same time, and data need not be converted into digital form. Standard equipment is available with 48, 60, and 120 voice channels or the 3.5 mc wideband version.

Broadband transmission of 5 mc bandwidth, for sending high quality raw video, azimuth, elevation control and synchronization data, is possible for extending the range of air traffic control radar. The system has a 99.9 reliability with quadruple diversity and a complete repeater station can be housed and transported in a 40-foot truck-trailer.

The choice of the super-high frequency was related to advantages other than simply working in a band not used by other companies. At 5,000 mc antennae of only 12 ft. diameter give the narrow beamwidth of about 1 deg. required for efficient transmission. In addition, it affords great economic savings as opposed to 60 and 120 foot antennae at 900 mc. This means that the antennae for a terminal station, or a repeater in the case of longer links, can easily be mounted on a trailer which contains the transmitting and receiving equipment, and stored inside the trailer during transportation if it is necessary to relocate the station. This feature makes the system particularly useful for military communications and the narrow beamwidth

*Supervisor Communication Sales, Electronics Division, Canadian Westinghouse Company, Ltd.

also provides the privacy required for confidential messages. The maximum size of antenna used with this equipment is a 28-foot parabolic reflector.

Design philosophy

Since existing communications systems, such as wire telephony, have attained reliability figures of 99.9% and higher, it was essential to aim for similar reliability in the new system from the outset. Thus the system engineering and the equipment design were undertaken with a view to meet or surpass this standard.

To achieve diversity, necessary in any scatter system, space diversity was selected. Quadruple diversity was obtained by a combination of space and polarization diversity. At 5,000 mc the required antenna spacing of 100 wavelengths needs only 20 feet. With this separation there is almost no correlation between the received signals. For greater reliability, type HJ equipment makes use of maintenance standby units which when operated in parallel provide quadruple diversity (dual space and polarization).

The versatility of the equipment is exemplified by the modulator base bandwidth and linearity which are compatible with the output from any available type of frequency division multiplex. The type HJ is also suitable for the transmission of voice, teletype, facsimile, television, and data type signals from any existing communication network.

Particular attention has been paid in the design to simplifying adjustments and maintenance. For example, the microwave circuitry has been reduced to simple co-ordinated packages with a minimum of tubes; tip jack test points are provided on all major circuits; and all important functions are indicated on panel instruments.

Ciruit operation

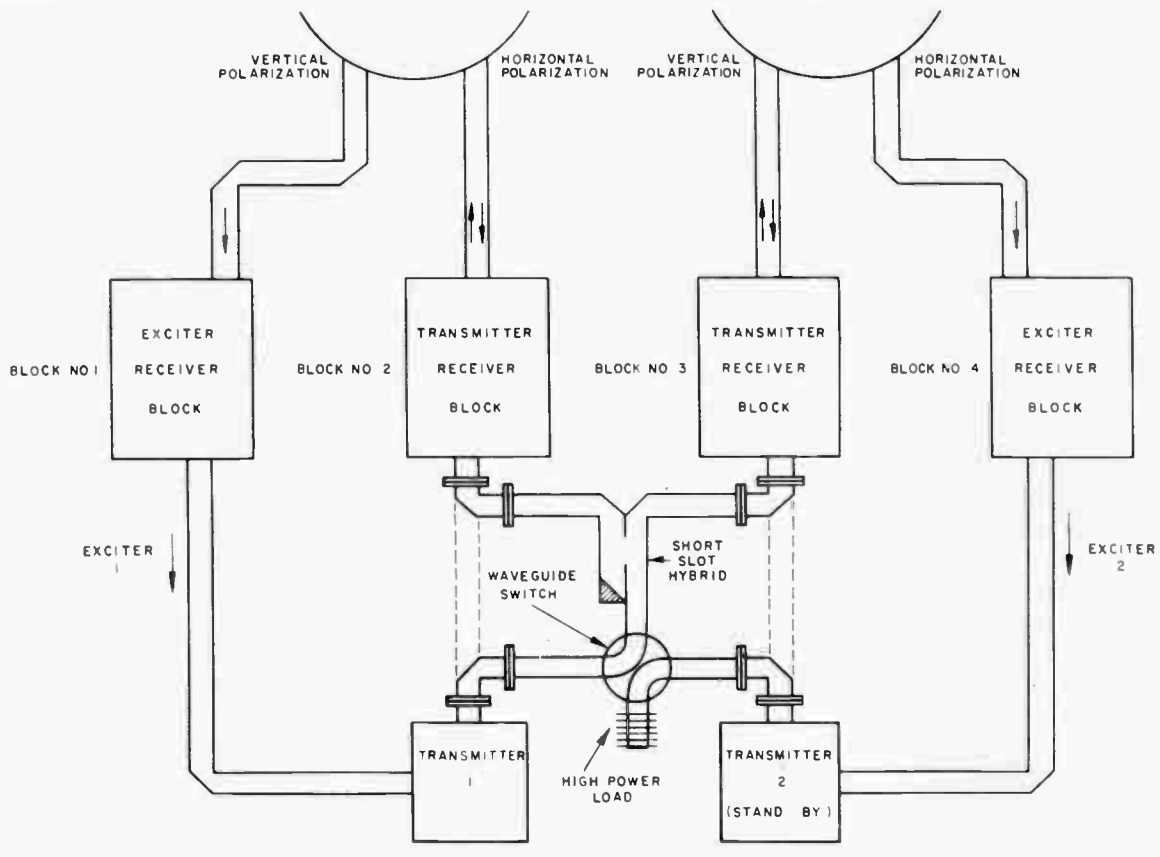
A microwave block houses the microwave exciter tube (type V249/1k) and the reference mixer. A crystal controlled frequency multiplier unit, mounted on the block, drives a microwave triode to provide a reference frequency in the microwave range. The output signal from the reference mixer is fed to the 10.7 mc amplifier which forms a part of the afc loop.

Following a limiter and a discriminator, a DC amplifier completes the afc loop. The overall gain of this loop is about 25 db which provides a short term transmitter stability which is fully comparable to that of a crystal driven transmitter. The long term stability mainly depends on the afc discriminator, the zero shift of which does not exceed 5 kc over a 0 to 50 deg. temperature range.

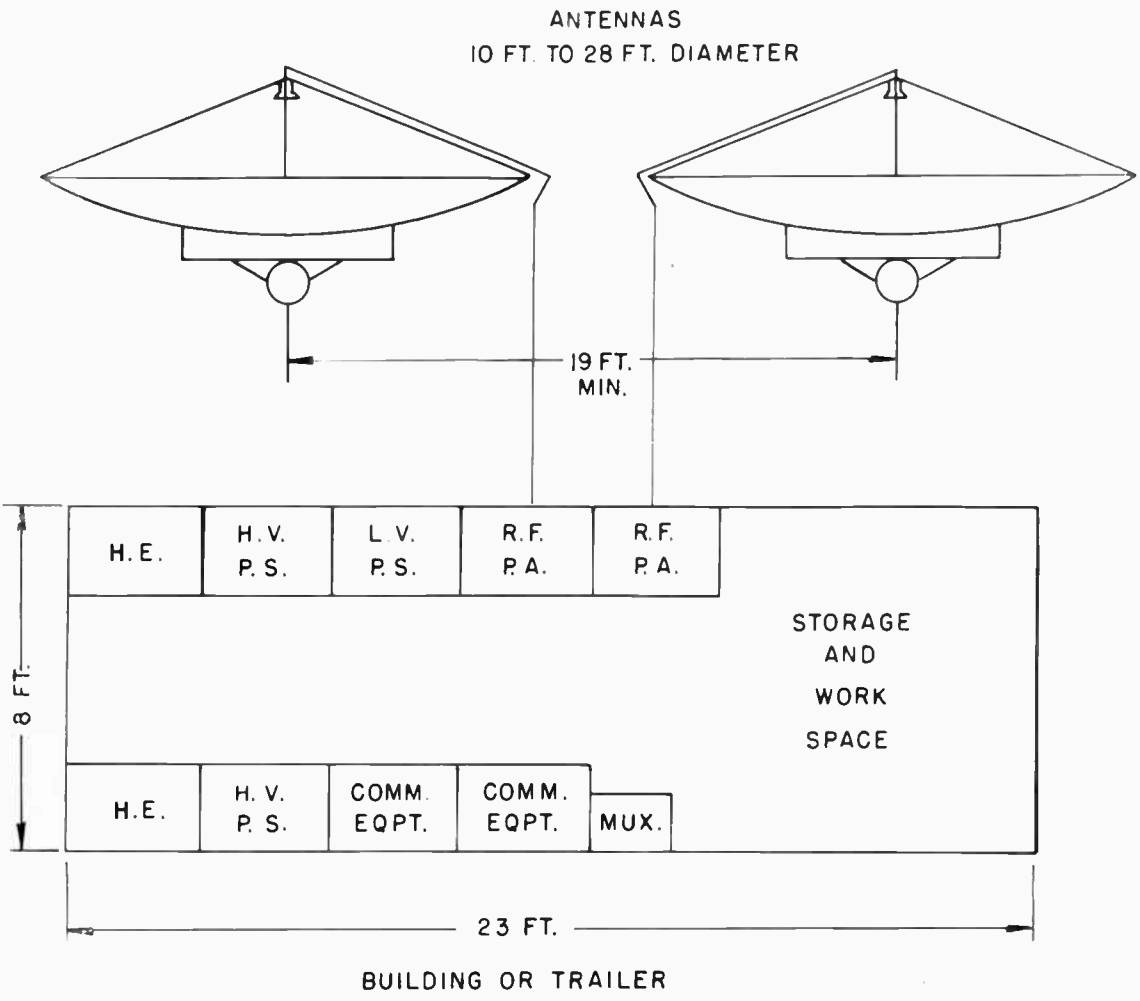
The main advantage of a high afc gain lies in reducing the noise in the service channel circuit and the lower channels of the multiplex, which are thus made less sensitive to microphony, supply voltage ripple and heater inducted hum.

A double superheterodyne method of detection is used. The received signals pass through a band-pass filter to a balanced crystal mixer. The resultant 70 mc i-f output is pre-amplified and is then further changed in frequency in the compression receiver system. This system provides up to 8 db improvement at threshold depending upon the system's channel capacity.

The outputs of the compression receivers (the number depends upon the degree of diversity) are passed to an electronic combiner, the function of which is to provide a combined non-fading signal from the diversity receivers and supply it at the correct impedance and level to the input of the multiplex.



Type HJ waveguide switching for one transmitter quadruple diversity operation



Equipment layout for Type HJ microscatter quadruple diversity terminal.

All micro-wave functions, except the excitation of the power klystron, are carried out within micro-wave blocks, which incorporate a T-junction, transmitter band-pass filter, transmitter frequency test point, receiver band-pass filter, balanced mixer, local oscillator cavity, local oscillator frequency test point and output modulation test point. The 70 mc preamplifier is also mounted on the block. No external tuplexers or other waveguide or transmission line filters are necessary.

A terminal unit consists of five cabinets for dual diversity and nine cabinets for quadruple diversity. The basic assembly consists of:

a) The RF power amplifier cabinet, containing the following units: the klystron power amplifier, the exciter micro-wave block, transmitter/receiver micro-wave block, receivers and limiters, and the exciter fault panel. Two of these are needed for quadruple diversity. In cases where quadruple diversity is achieved by feeding two antennae from one transmitter, the required waveguide switches are also located in this cabinet.

b) The high-voltage power supply cabinet provides the power supplies for the transmitter operation and protective equipment of the type HJ microscatter. One of these units is used for a dual diversity terminal and two for the quadruple diversity system.

c) The equipment also includes a low voltage power supply cabinet and common equipment cabinets. These include the equipment which is common to both the dual and quadruple diversity systems. In general they contain the following units: combiners, combiner power supplies, baseband amplifiers, service channel, pilot amplifiers, AFC amplifiers and power supplies. Two of these cabinets are required for dual and quadruple diversity.

d) The power klystrons which employ an ethylene-glycol liquid solution as a coolant are contained in the heat exchanger cabinets. The coolant system, main and standby, heat exchanger, air filters, coolant reservoir, and supervisory controls are housed in a self-contained cabinet. Access doors and panels are provided for changing filters and other service. Normally the cabinet is located apart from the radio and power cabinets and ducted through the station walls for air intake and discharge. If required, the hot air discharge may be used to heat the station building in winter.

The microscatter system has been packaged in such a manner that each of the individual rack assemblies is identical in size and of a weight convenient for man handling and air shipment. The maximum dimension

Continued on page 37

The special area of the Standard Telephones and Cables Ltd. works at North Woolwich, London, England, where the repeaters for the round-the-world Commonwealth telephone cables are being made in conditions of air purity.

QUALITY CONTROL

Repeaters for Canada-New Zealand cable designed for 20 year life span

The loss of revenue and the cost of raising a submarine cable to repair a faulty repeater would be uneconomic if the occasions were too frequent

By H. J. Chard.*

With the news that the four Governments concerned — the United Kingdom, Canada, Australia and New Zealand — have agreed to the construction of a large capacity trans-Pacific telephone cable from Vancouver to New Zealand, the Commonwealth round-the-world cable is now on its way to being realized.

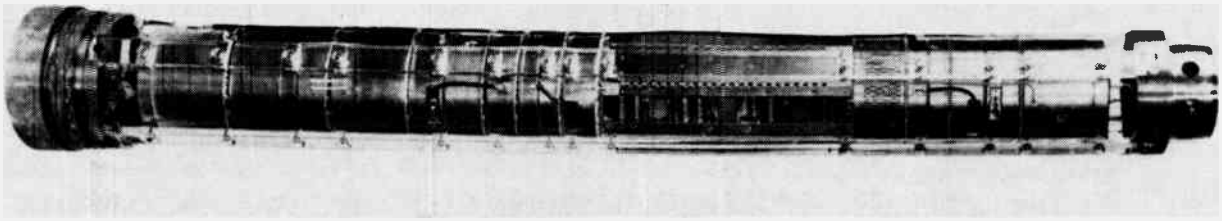
The new cable, which it is hoped will be ready in 1964, will cost an estimated $72,062,000, will be over 8,000 nautical miles long, and will include more than 300 repeaters. The two-way cable will be a lightweight type designed by the United Kingdom Post Office; rigid, two-way repeaters, also designed by the Post Office, will be used with the cable.

Atlantic next year

CANTAT — the new trans-Atlantic cable of a special non-twisting coaxial type development by Submarine Cables Ltd. of Erith, Kent, England due to be laid next year — will form, with the existing circuits in the first United Kingdom-Canada cable, the first section of this Commonwealth round-the-world telephone cable. CANTAT will carry 60 simultaneous conversations from Oban, in Scotland, across the North Atlantic to Corner Brook in Newfoundland, and thence by an overland section to Hampden on the Newfoundland coast. CANTAT will be linked to the trans-Pacific cable lines across Canada, the complete system providing first-class telephone and telegraph communications over a distance of 14,000 miles.

Cable and repeaters for CANTAT will be of the same type as those to be used for the trans-Pacific cable. Standard Telephones and Cables Ltd., of London, have the contract to supply 92 submerged repeaters. In addition to the equalizers which form an integral part of each repeater, the cable will be fitted at intervals along its length with eleven additional equalizer units. Each of these units will be accommodated in a novel type demountable housing developed by Standard Telephones and Cables Ltd. The function of the additional equalizers is to correct for residual distortion not catered for by the repeater equalizers.

*Transmission Division of Standard Telephones and Cables Ltd., Montreal and London



A two-way submerged repeater before being encased in its armor plating.

First Telephone System

TAT-I — the first trans-Atlantic cable telephone system — went into service in 1956. From Oban in Scotland across the North Atlantic to Clarenville in Newfoundland, two separate submarine cables were each equipped with flexible repeaters, designed for one-way transmission, which were developed and manufactured in the United States of America. Between Clarenville and Sydney Mines, Nova Scotia, a single submarine cable equipped with rigid construction repeaters for transmission in both directions was developed and manufactured in Britain.

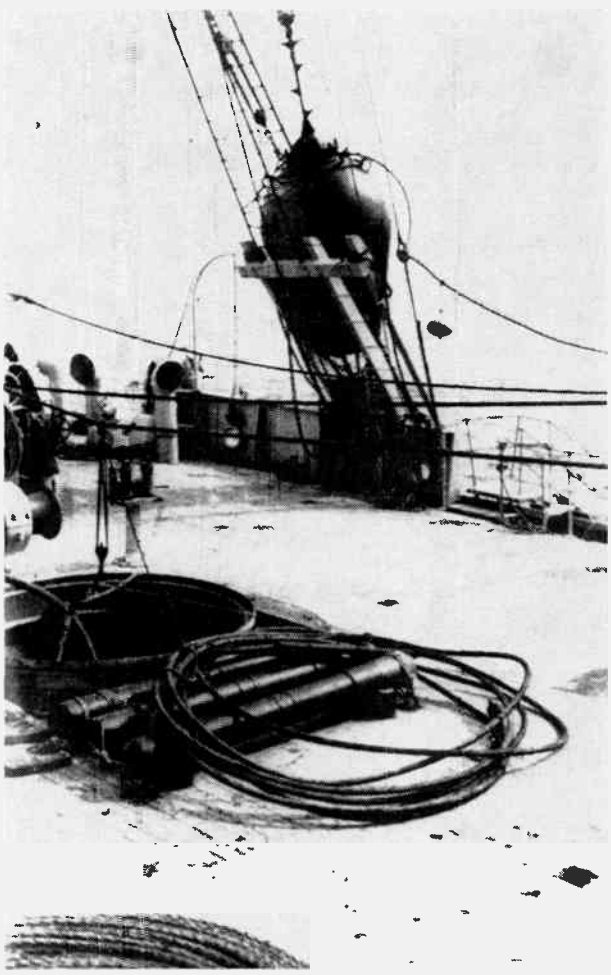
The second trans-Atlantic cable (TAT-2), practically identical with the first, but crossing the North Atlantic between Clarenville and Penmarch, Franch, has been in service since September, 1959.

At the time the decisions on the type of repeater were taken, the choice of the two types of repeater was influenced by the different experience gained in submarine communications by the United Kingdom Post Office and the Bell Telephone Laboratories. While the Post Office was recognized as being pre-eminent in the field of shallow water repeaters its deepwater designs had not, at that time, been subjected to the same rigorous tests as the Bell System repeaters. The two-way repeater has many advantages, and now that its reliability has been proved and laying difficulties overcome, it will provide great flexibility and economy in systems design.

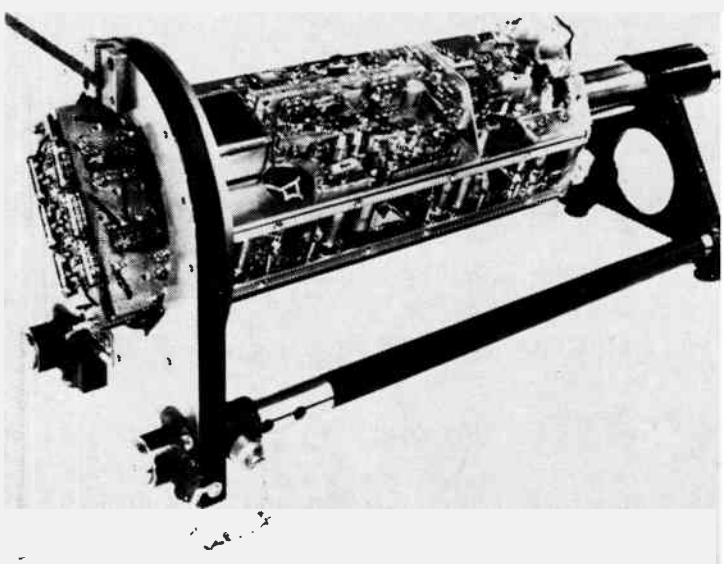
Correct strength

A submarine repeater performs the same functions in a sea cable as a repeater in a land cable. Inserted at prescribed intervals in the cable, it amplifies the received signals for onward transmission, thus maintaining the signals at a constant intelligible strength between the two terminals. The major differences between the two types are obviously dictated by environment.

Whereas the land repeater can be visited at regular intervals for service and replacement, a submerged repeater must be sufficiently reliable to be left for a number of years to operate unattended on the sea bed. The loss of revenue and the cost of raising a submarine cable in the middle of the ocean to replace a faulty repeater would be uneconomic if the occasions were too frequent. Therefore no pains are spared during



A Standard Telephones and Cables Ltd. rigid type two-way repeater on the deck of the British cable-laying ship Monarch.



A submerged two-way amplifier unit in an assembly and wiring jig.

manufacture to ensure that every single part, electrical and mechanical, of a submerged repeater meets the highest possible standard of quality.

A special submerged repeater manufacturing unit, the first of its kind in Britain, was created by Standard Telephones and Cables Ltd. in 1953, since when it has been enlarged considerably. The accommodation used for the production of submerged repeaters, known as the "dairy", is air-conditioned to eliminate dust.

It is operated under almost clinical conditions of cleanliness, with the temperature and humidity controlled within specified limits. Operators are specially selected and trained. All personnel must wear clean protective clothing which is donned in an ante-room before entering the working area, where smoking or eating is prohibited. Each member of the staff is made fully aware of his or her responsibilities, and of the vital consequences of an error or mistake, however small.

Plated with gold

With the exception of the valves and some resistors, which are produced elsewhere, all electrical components are manufactured in the "dairy", and only those considered to be of absolute reliability and long life are used. Most elaborate precautions are taken during manufacture to fulfil all the conditions necessary for long survival. From the raw material to the finished repeater unit, rigorous inspection and tests of a high technical standard are applied with meticulous thoroughness.

Care is taken at every stage to exclude all moisture and to eliminate foreign substances such as bits of solder and waste wire clippings that might cause failure or contribute towards shortening the working life of the repeater. Experience has led to the elimination of many unexpected sources of foreign bodies; to guard against the possibility of "whisker growth" a large proportion of the components are plated with gold.

The cable section between Clarenville and Sydney Mines is designed to carry 60 telephone circuits, and each repeater is primarily a three-stage amplifier arranged to serve both directions of transmission. One direction is catered for by a group of low frequencies (20 - 264 kc/s) and the other by a higher frequency group (312 - 552kc/s). Power supplies to energize the repeaters are fed over the cable from land-based power equipment specially developed to provide a constant current of 316 mA at a voltage of about 2,300. This direct current is separated from the signal path by power separating filters in each repeater.

Plastic framework

Each repeater consists of a series of containers for the electrical apparatus, which are mounted in a plastic framework and enclosed in a thin walled brass cylinder, hermetically sealed from a gas-tight capsule 7¾ inches (19.68 centimetres) in diameter and 50 inches (127 centimetres) long. Flexible coaxial cable emerges from each end of the capsule and is connected to the sea cable through water-tight glands in the bulkheads of the sea casing. The housed repeater is 10½ inches (26.67 centimetres) in diameter and 9 feet (2.74 metres) in length.

The amplifier unit, positioned centrally in the capsule, is flanked on either side by the necessary directional filters and equalizers. It consists of two three-stage amplifiers connected in parallel between common input and output transformers with a single feed-back network. This arrangement allows one amplifier path to fail without appreciably affecting the gain of the complete amplifier unit.

Care has been taken to ensure that the open or short-circuiting of a component in one amplifier path will not affect the life or stability of the remaining path; this has involved the duplication of certain components. Mixed feed-back is employed to produce the required output impedance. The gain response of the amplifier is chiefly controlled by series - arm components in the feedback network which resonate at 600kc/s.

Specially designed and selected long-life valves are used which must meet performance requirements quite different from those imposed by other communications systems. The anticipated life of the valves is of the order of 20 years.

Constant check

The precise location of a faulty or ageing repeater in the cable is of the utmost importance, and two supervisory methods are used: pulse distortion measurement, which requires no extra components in the repeater, and loop-gain monitoring.

For the latter, a supervisory unit is incorporated in the repeater; it is essentially a second harmonic generator operating at a frequency unique to each repeater. These test frequencies are spaced at 120 c/s in the 260-264 kc/s band. The second harmonics return to the terminal in the 520 - 528 kc/s band, and during measurement the two channels used for this purpose must be lost to service.

Similar types of repeater have since been used in a number of other submarine cable telephone systems, and in one of the two cables between the Netherlands and Denmark the older type repeaters have been replaced by new. The capacity of the cable in this instance was increased from 36 to 120 two-way telephone circuits. Replacement of the repeaters in the other cable is scheduled for 1960. It will bring the total capacity for the two cables to 240 circuits.

A repeater to provide 180 circuits on a single submarine cable between the United Kingdom and the Netherlands was installed in 1957. Other systems with repeaters for 60 and 120 circuits are operating beneath the waters of the English Channel and the Mediterranean.

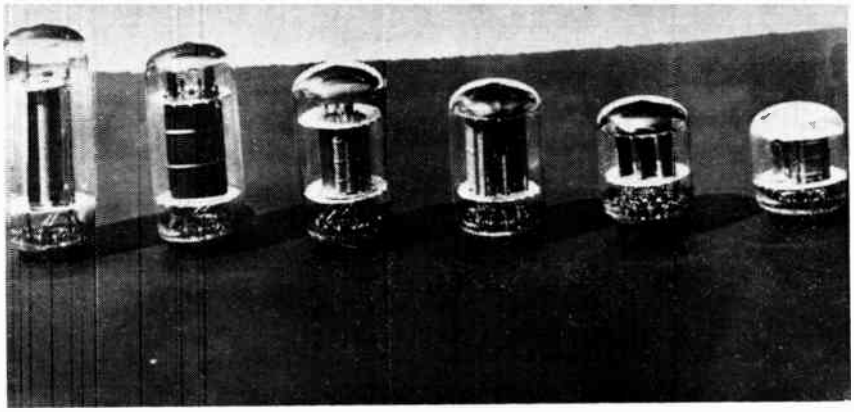
"Compactrons" How significant to the tube industry?

A new electronic device that combines into one unit the functions now performed by several components in home-entertainment equipment has been announced by Canadian General Electric Company.

The device, called "compactron", will make it possible for manufacturers of radios, televisions, high-fidelity sets and electronic organs to achieve, in the near future, significant size reductions in their products.

Announcement of the compactron development was made by R. Story, manager of Canadian General Electric's Electronic Tube Section at Toronto. Story said the development work on compactron began several years ago by General Electric's Electronic Component Division at Owensboro, Ky., and recently was stepped up when the need became apparent for a more compact circuitry than possible with present commercial miniature receiving tubes.

"At the same time," Story added, "there existed the need to get costs down appreciably below those of tubes, while preserving the superior performance characteristics of tubes in relation to other existing miniaturized devices."



Canadian General Electric has announced a new electronic development — compactron — that combines into one unit electron-control functions formerly performed by as many as three miniature tubes. The six compactrons shown are the forerunners of a line the manufacturer expects will expand to 100 in the next two years.

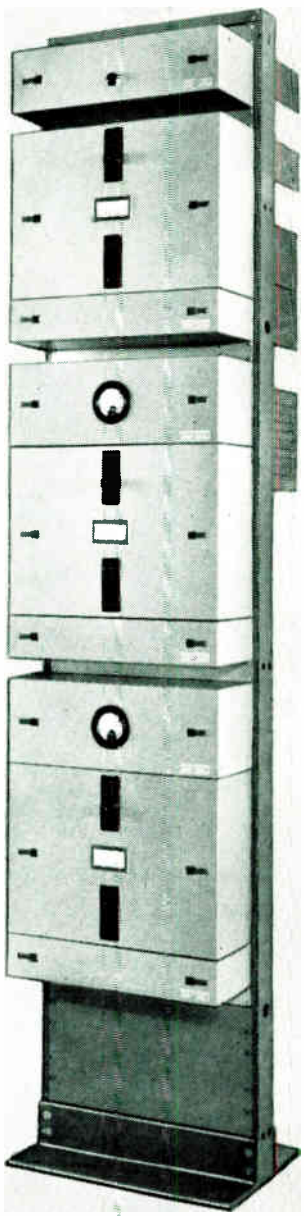
Potential electronic advances now made possible with the use of compactrons are:

A television receiver that could be designed with 10 compactrons, replacing present TV set circuits that require 15 tubes and three diodes, or 24 transistors and 11 diodes; a two-compactron 12-volt automobile radio that could obsolete the present four-tube car radio design; and monaural high-fidelity equipment using four compactrons rather than either six tubes or 11 transistors.

Regarding future non-entertainment applications of compactron, Everard D. Etches, manager of engineering, said the new device showed promise of wide use in industrial controls and instrumentation, as well as in two-way communication equipment. In these areas, Etches added, the advantages of smaller size and multi-function capability at lower cost would be equally strong.

Development engineers said also that other circuit elements would conceivably be included in evacuated compactrons in the future to further enhance miniaturization, reliability and total cost savings.

Lenkurt



TYPE 33A CARRIER proven in service— across Canada

In the course of several years of service throughout Canada, Lenkurt's 33A carrier has established an enviable reputation for dependability under all types of operating conditions. "33A" has, in fact, become a byword with both large and small communications companies for open-wire applications requiring maximum reliability with minimum maintenance.

The 33A provides up to three channels, and is ideal for short toll trunk applications, since it may be installed one channel at a time, and will prove in over short distances. However, the system is highly flexible, and may be used economically in a wide variety of applications, including stacking above existing single-channel systems, and a number of channel dropping arrangements. All standard signalling options, AC or DC operation, pilot regulation, and carrier synchronization, are available.

New and interesting applications for 33A are being found every day. Your local Automatic Electric office would be happy to tell you about them.

If you would like further information, call or write any Automatic Electric office today.

AUTOMATIC ELECTRIC

Subsidiary of

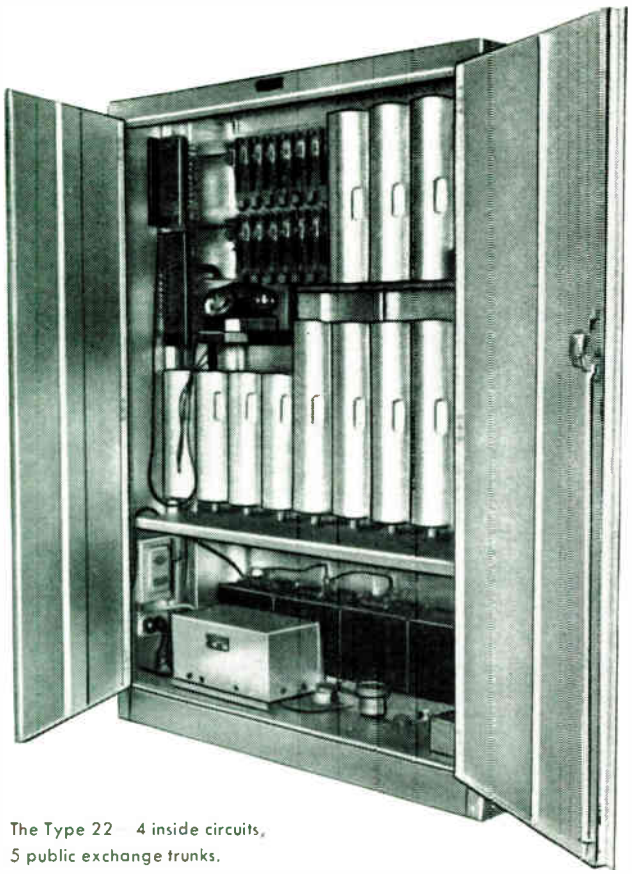
GENERAL TELEPHONE & ELECTRONICS

6051

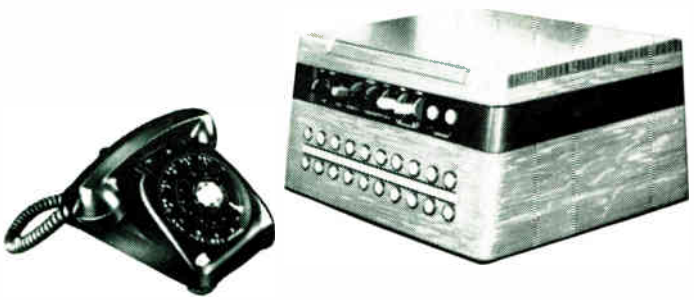
For complete details check No. 4 on handy card, page 47

Service your subscribers

EARNS EXTRA



The Type 22 — 4 inside circuits, 5 public exchange trunks.



The Type 22 Attendant Cabinet. Attendant can make, answer, hold, and transfer public exchange calls — two at a time if necessary.

P-A-B-X

has been
the stepping-off point for a
tremendous variety of businesses . . .
made all the difference between
waning output, and renewed
vitality and growth. And for the
telephone companies that have
supplied the equipment, the
changeover has meant
important additional revenues.

PABX (Private Automatic Branch Exchange) can supply the businesses of your community with fast, convenient telephone communications, that can boost efficiency and output almost overnight. Having a compact cabinet and modern dial telephones, the system helps management *and* staff get through more, more easily, in much less time, without having to leave their desks. Inside calls are *dialed*—between widely separated buildings. And outside calls are just as easily placed.

Sell the businesses in *your* area on modern, efficient PABX—and increase your own company's revenues at the same time.

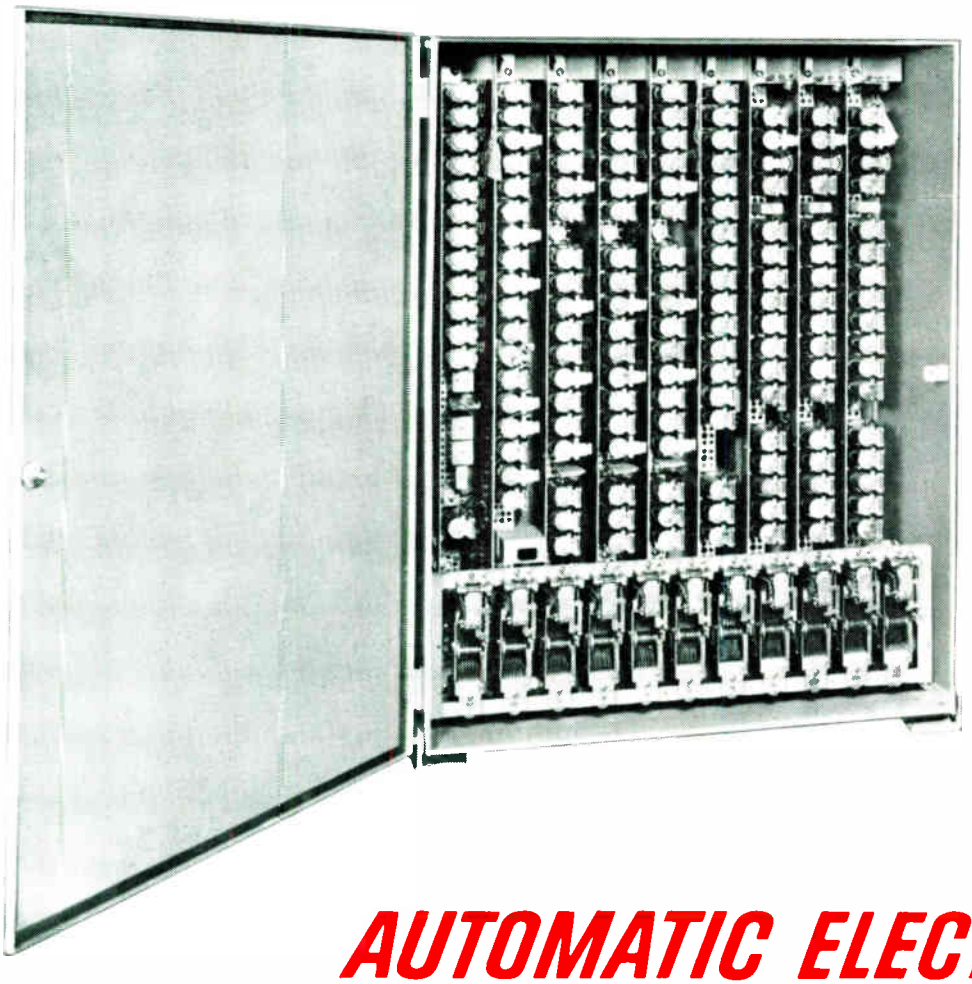
Call or write any Automatic Electric office if you would like further details.

welcome

REVENUES FOR YOU

TYPE 22—The Type 22 is a system with all the features for a medium sized organization, and so flexible it can be adapted to any requirements. It provides 4 inside circuits and 5 public exchange trunks—can be used with or without attendant—switched from attended to unattended operation whenever required.
Outside calls may be made or answered at all stations, or some stations may be restricted to inside service only and others restricted to receive outside calls by transfer from unrestricted phones. Stations permitted to answer, hold and transfer outside trunk calls are equipped with a pushbutton.

TYPE 95—The Type 95 is designed for organizations needing up to 12 telephones, with not more than six conversations at once—three inside and three outside. No attendant cabinet is necessary as all transferring of calls is done by pushbutton. Outside calls may be made or received at all telephones, or stations may be restricted or semi-restricted as required.



The Type 95 12 lines, 3 trunks, 3 local conversations.

AUTOMATIC ELECTRIC

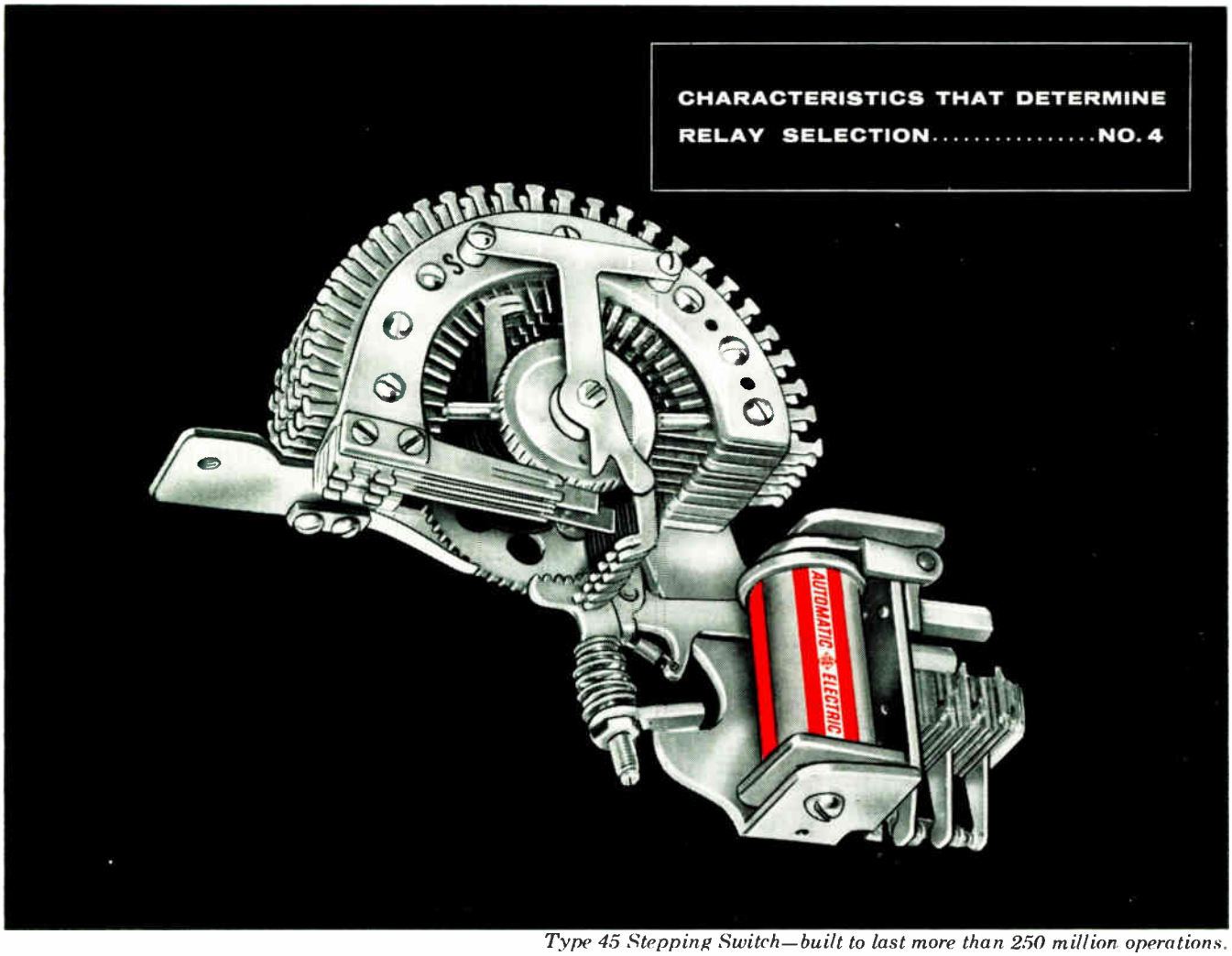
GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

6054

For complete details check No. 5 on handy card, page 47



Type 45 Stepping Switch—built to last more than 250 million operations.

where extra-large capacity is required

Helpful selection data
Type 45 stepping switch

CAPACITY
Twelve 25-point, eight 50-point bank levels

OPERATING VOLTAGE
any d-c voltage up to 110, or 115 volts, 60 cycles a-c, with rectifier

DRIVING MECHANISM
Pawl and ratchet type, spring driven.

OPERATING SPEEDS
Self-interrupted, 60 steps per second or more.

The Type 45 high-speed rotary stepping switch, by Automatic Electric, has exceptional capacity and can be used for a tremendous variety of applications. Ruggedly built and capable of performing more than 250 million operations —with complete reliability—it will function at speeds of 60 steps per second, or even more. The contact bank is built up on a one-piece frame, to provide up to twelve 25-point bank levels or eight 50-point bank levels, with no alteration in base construction, and with no decrease in structural strength.

The switch is spring driven, and either self-interrupted or impulse controlled. A specially designed armature steps the wiper assembly from one position to the next, and automatically locks the rotor in position. This is a unique feature that eliminates wiper overthrow completely.

The Type 45 is the finest, most reliable switch of its kind on the market—the switch used and proven in telephone exchange equipment everywhere in the world.

For further information, call or write Automatic Electric Sales (Canada) Limited, 185 Bartley Drive, Toronto, Ontario. Branches across Canada.

AUTOMATIC ELECTRIC GENERAL SYSTEM

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

AN ORGANIZATION SERVING CANADIAN INDUSTRIES WITH COMMUNICATION AND CONTROL SYSTEMS

6035

For complete details check No. 6 on handy card, page 47

Union Carbide renames divisions

A. A. Cumming, president of Union Carbide Canada Limited, recently announced that, effective July 25, 1960, the names of the company's divisions will be changed as follows: Bakelite Company will be known as Bakelite Division; Carbide Chemicals Company will be known as Chemicals and Plastics Division; Electro Metallurgical Company and Haynes Alloys Company will become the Metals and Carbon Division; Linde Company will become Linde Gases Division; National Carbon Company will become Consumer Products Division; and Visking Company will be known as Visking Division.

According to Mr. Cumming, the changes in no way alter the company structure, or the authority or responsibilities of the divisions and their management, but are designed solely to improve the company's communications with customers, supplies and the general public.

B. H. McGregor extends representative lines

Bruce H. McGregor P.Eng., who operates his own sales organization in Toronto, announces that he has been appointed exclusive agent in Canada for the following three companies: Judson Bigelow Sales Co., of Cranston, R.I.; Micro-Test, Inc., of Santa Monica, California; and Hathaway Instruments Inc., of Denver, Colo.

Judson Bigelow Sales prints a wide range of chart papers for oscillographic recorders, as well as potentiometric type recorders. Micro-Test manufactures a weldable type strain gauge for use in difficult environments, such as extreme humidity, high and low temperatures, and for total immersion. Hathaway Instruments is well-known in the power utility field, and in the test laboratories for high frequency oscillograph equipment.

Mr. McGregor also announces his appointment as exclusive agent for Eastern Canada for Daytronic Corporation, of Dayton, Ohio, and for Smith-Florence, Inc., of Seattle, Washington.

Daytronic manufactures linear variable differential transformers and indicators for use in instrumenting physical tests as well as in gauging of components, both individually and automatically. Smith-Florence offer a wide range of cable fault finders for use by communications companies, power utilities, and broadcast stations.

Mr. McGregor may be contacted through P.O. Box 156, Station "H", Toronto 13, Ontario, or by 'phone — OXford 9-5521.

scatter matter

Scanning the international scene

British television sets, working on the basis of pictures composed of 405 horizontal lines, will be replaced in four years by an even more complex 625-line system for greater definition and clarity. That's the gist of recommendations to the Government by the Television Advisory Committee, representing all sections of the industry. The British system has fewer lines than the North American 525, although clarity is good. Continental European TV stations use 625 lines. The switch-over in Britain is urged by the committee as a requirement in the longterm interests of television development, and also as a preparation for the more exacting conditions of color TV.

Formation of a new company believed to be among the largest single electronics companies in Italy was recently announced jointly in the United States and Italy. This represents a substantial American investment in Italy's burgeoning electronics industry. To be called SELENIA Spa, (Industrie Elettroniche Associate), the new organization will be owned by Raytheon Company, one of the world's largest electronics companies, with 40%; Finmeccanica, an Italian governmental holding company of 27 manufacturing areas, with 40%; and the Italian Societa Edison, with 20%. The new company will be formed of the assets of Finmeccanica's subsidiary, MICROLAMBDA, located at Fusaro near Naples, and Societa Edison's subsidiary, SINDEL, with laboratories near Rome. Raytheon is making a capital investment of $3 million.

A very high frequency aeronautical radio system, jointly financed by British West Indian Airways and International Aeradio Ltd. has been put into operation connecting 10 major islands of the Eastern Caribbean, it has been announced by BWIA. The new system, installed at a cost of $1,129,000, provides direct dial telephone and teleprinter connections between all islands served by BWIA, from Trinidad in the south to San Juan, Puerto Rico, in the north. It is described by its developers as the world's most advanced and extensive system of its kind.

With orders for 22 computers on hand, Elliott Brothers (London) Limited are experiencing an upswing in demand for computers far greater than was expected only a few months ago. The greatest success is being experienced with the fully transistorized National-Elliott 803 which is being delivered to the United States in quantity and for which orders have been received in the past few weeks from Finland and Germany as well as from the home market.

Electronic semiconductor devices produced in America will help make Italy's new luxury liner, the Leonardo da Vinci the most highly automatized passenger vessel afloat, International Rectifier Corporation has disclosed. The company, a world leader in production of rectifiers, diodes and solar cells for space programs, supplied the Leonardo da Vinci's builders with silicon diodes for motors that will operate the ship's two main anchors, eight cargo winches and four drift anchors.

Radio Corporation of America will conduct fundamental studies in the physics and chemistry of solids at a new laboratory being built by the firm in Tokyo, Japan. Initially the laboratory will be staffed by several scientists recruited from Japanese universities who will study the electrical, magnetic and optical properties of materials.

U.K. electronics industry increases exports

Ten per cent ploughed back for research

Britain's electronics industry is growing at the rate of £30 million a year and gross output approached £475 million in 1959, according to the annual review of the industry put out by the Electronic Engineering Association. Ten per cent of the annual turnover is ploughed back for research — a proportion topped only by the aviation industry.

Among the many outstanding export orders received during the year were: a contract worth £7 million for an extensive NATO early warning radar system to be shared by Britain and France, with Britain carrying the major responsibility; a radar defense system for Sweden embodying new, secret, electronic techniques including a very high speed computer to solve many interception problems simultaneously. Sweden has also ordered microwave equipment worth £750,000 linking six broadcast and television stations, over a distance of 300 miles, and 16 television and 20 FM sound transmitters.

Another contract in this field is an order from Pernambuco, Brazil, for a complete £250,000 transmitting station, studio equipment and a 3-camera outside-broadcasting unit.

The aviation electronics industry in the U.K. has a new customer in Russia — the TU. 104 jet aircraft on the London-Moscow service now use British navigation equipment. Russia has also bought £100,000 worth of British instrument landing equipment, similar to that used in the internationally famous BLEU (Blind Landing Experimental Unit) system of "hands off" landing which enables aircraft to land whatever the weather conditions.

Sea-going ships are being fitted with British radar at the rate of eight each working day and one British company has received orders worth £250,000 to supply ground radar equipment to Switzerland, Belgium, Holland, New Zealand and Ghana.

The extensive orders for computers for industrial and government organizations in Britain which have been received, include a contract for a £500,000 machine for the Ministry of Pensions which will process 25 million personal insurance records every day. It will be Europe's biggest computer.

Letters to the editor

Canadian contribution

The Editor:

We noted with interest the photograph and caption on page 18 of the July issue of your publication, portraying the use of NIXIE tube radio channel indicators by the RCAF.

May we draw to your attention some additional background information relating to this device.

The principle of using a remote indicator based on glowing number tubes was the outcome of an inspiration of a serving member of the RCAF.

On the basis of this idea our Company has designed a suitable instrument for installation in aircraft of the RCAF.

Luminous NIXIE lights commercially available on the U.S. market were used in the design.

The B.O.P. design was tested in flight and approved by the RCAF, and was subsequently manufactured in quantity by this Company. We are currently in production of these indicators.

We have since carried out further design work and have perfected two new versions, one incorporating a dimmer and the second a prismatic viewing device to meet special requirements in the CF-100 aircraft, both of which have been successfully evaluated by the RCAF.

As there was no reference in your caption to the creative contribution made by Canadians in meeting this requirement of the RCAF, we trust that you will appreciate our interest in drawing the above-mentioned information to your attention.

H. S. Toczylowski—Sales Mgr.
Beaconing Optical and
Precision Materials Co., Ltd.

Concerning CSA approvals

The Editor:

The section of your magazine devoted to new products is of considerable interest and value to our Engineers in Ontario Hydro's Research Division. However you do not normally indicate whether CSA approval has been obtained on these items. Many of them require either CSA approval or a special electrical inspection before we may use them. Many U.S. manufacturers are unaware of this requirement and others are indifferent to it. If you mentioned those that have approval it would assist us and at the same time serve as a reminder of this requirement to others.

J. H. Waghorne
Engineer-in-Charge
Electrical Research Dept.
Hydro-Electric Power Comm.
of Ont.

Permission granted

The Editor:

As publishers of the *Electronics & Communications* "Canadian" we are writing you with the request that you direct this communication through the proper channels

We are very desirous of obtaining a new manuscript copy and permission to reprint the article entitled "Current Microwave Technique in the United Kingdom", by David Simpson A.M.I.E.E. and G. T. J. Summer B.Sc., which appeared in the May 1960 issue of the above named publication.

Tore N. Anderson
The Microwave Journal,
Boston, Mass.

product panorama

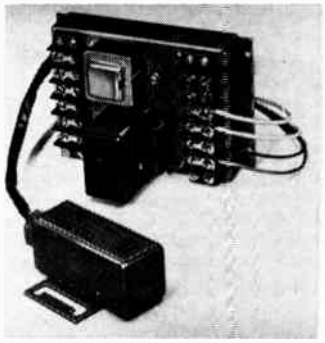
For further information on New Products use Readers' Service Cards on page 47 and 48.

Proximity switch

Item 545

A new proximity switch — designed for use as limit, interlock, counter or indicator sensor under such unfavorable environments as those created by oil, grit, extreme vibration, dirt or sludge — has been introduced by the Micro Switch Division of Honeywell Controls Limited.

The switch consist of a sensor and a separate transistorized amplifier with plug-in relay. The sensor detects magnetic material



without physical contact and feeds an electrical output to the remotely located bi-stable amplifier. The amplifier operates the double-pole-double-throw relay, which is wired to the circuit in the same manner as a conventional limit switch.

The two components of the new unit may be located up to 150 feet apart without the use of shielded wire.

The switch can sense products with highly polished surfaces without touching them, thus eliminating the possibility of scratching. In addition, it can detect small items without retarding their flow.

Ask for Data Sheet 163 on this new switch and address enquiry to **B. Colwell, Merchandising Dept., Honeywell Controls Ltd., Vanderhoof Ave., Toronto 17, Ontario.**

Studio-transmitter link

Item 546

Designed for the transmission of aural program material for AM, FM, or TV broadcast service, a high-quality Studio-Transmitter Link is now available to Canadian stations.

Operation is in the 450-470 mc. or the 890-960 mc. band, whichever is required by DOT licensing policy. Transmission quality from 50 to 15,000 cycles meets or well exceeds DOT or EIA standards in overall frequency response, low distortion and low noise. Made by Budelman Electronics Corporation of Stamford, Connecticut, the equipment is designated Type 14A-STL and is available at a cost far below video microwave STL's.

Full information, including the engineering report, is available from **Tele-Radio Systems Limited, 3633 Dundas St. West, Toronto 9, Ont.**

Silicon rectifiers

Item 547

Sixteen new medium current silicon rectifiers are now immediately available in production quantities from Canadian General Electric Company. The new stud-mounted devices are designed for rectifier applications in the 2 to 8 ampere range. Continuous peak inverse voltage ratings of the various models range from 50 to 600-volts. In addition, both positive and negative polarity units are available.

A feature of the device is the all hard-solder design for maximum thermal fatigue free operation.

The new silicon rectifiers have been assigned JEDEC numbers 1N1341A through 1N1348A. The negative polarity units, with the stud serving as the anode, are designated 1N1341RA through 1N1348RA. They are housed in a package conforming to the industry-accepted DO-4 outline.

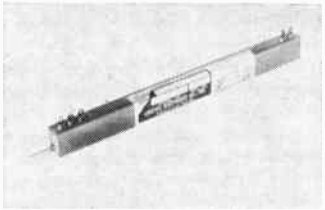
Further information on the new medium current silicon rectifiers may be obtained by writing for brochure ECG 479 to the **Canadian General Electric Company, 189 Dufferin Street, Toronto.**

Magnetostrictive delay line

Item 548

A new, variable magnetostrictive delay line with delays ranging from 2 to 20 microseconds and featuring infinite resolution is now available from Control Electronics Company, Inc., Huntington Station, L. 9., N.Y.

The model VM-1020, shown here, accepts input pulse voltages of 5 V peak and input pulse widths of 1 microsecond (±) 0.2 microseconds. Output pulse voltage is in the order of 10 millivolts. Spurious response is kept 17 db down. Input and output impedance is 700 ohms.



Manufactured to applicable MIL specifications, the VM-1020 is hermetically sealed and ruggedly constructed for dependable operation. This line has been manufactured to conform to all applicable MIL SPECS. Operating temperature range is from −55°C to +85°C. Weight is 3 oz. and dimensions are: ⅝" high, $\frac{7}{8}$" wide, 7" long and a ⅛" shaft diameter.

For further information on the VM-1020 or complete information on fixed, variable or tapped magnetostrictive lines with delays from 2 to 10,000 microseconds, write to the Canadian representative, **Whittaker Electronics Limited, 2137 Niagara Drive, Ottawa, Ontario.**

AC capacitors

Item 549

A new line of AC motor-run capacitors offering a height reduction of almost 15% over conventional type units has been released by Aerovox Corporation. This dramatic reduction in can height has been achieved without any sacrifice of electrical performance or life characteristics. The new compact units were developed by Aerovox to meet the specific demands of the motor and appliance industries for space-saving components to enable designers to reduce chassis heights.

Units are currently available in production quantities in voltage ratings of 236, 370, 440 and 660 VAC in a wide range of capacitances. Furnished in drawn metal cases with double-lock seams, they are hermetically sealed for continuous duty operations. All capacitors are supplied with double-blade universal terminals and new, one-piece dual-cup bushings to meet all UL creepage requirements. An exclusive Aerovox "Weatherguard" case finish is applied to all units for maximum protection against rust and corrosion.

For complete details write to **Aerovox Canada Limited, Hamilton, Ontario.**

115-volt servomotor

Item 550

A four-page folder showing advance performance data for their model 8 SM 461 Size 8 Servomotor has been released by the Helipot Division of Beckman Instruments, Inc., Toronto, Ontario. The new servomotor, only 0.840 inches in length, and wound for 115-volt operation is believed to be the smallest of its type available.

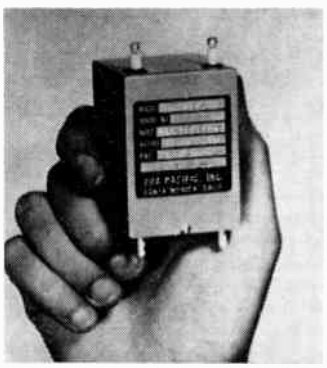
The illustrated data sheet lists features of the new motor, shows dimensional outline drawings and torque-speed curves for the unit. In addition, construction features are delineated, and all principal electrical and mechanical characteristics are called out.

Free copies of the data sheet describing the new Size 8 Servomotor Model 8 SM 461 are available from **R-O-R Associates, Ltd., 1470 Don Mills Road, Don Mills, Ontario,** sales representatives for Helipot Division of Beckman Instruments, Inc.

Subminiature power packs

Item 551

Era Pacific, Inc., Santa Monica, California, has extended its present line of HYPAC high voltage supplies with the addition of the MICROPAC series of subminiature solid state high voltage D.C. power supplies. These units provide regulated voltages ranging from 1000 to 5000 VDC while featuring extremely small size and light weight, accomplished through the use of new semiconductor techniques.



Units are available for operation from a 60- or 400-cycle line, in addition to a 26-29 VDC line. Line regulation of ± .5% is provided along with load regulation of ± .5% for 20-100% load changes. Ripple is 1% RMS. Standard voltages available are 1000, 3000 and 5000 VDC at maximum load current of 00 microamperes. Also available are units having the same input and output voltages but without the regulating circuit.

All units are housed in MIL-T-27A type housings, and sizes range from AJ to GA for the 5000 volt supply. High voltage termination is in the form of two stand-off insulators on the top of the can whereas the input voltages enter through a header on the bottom.

Era Pacific, Inc., 1760 Stanford St., Santa Monica, Calif., U.S.A.

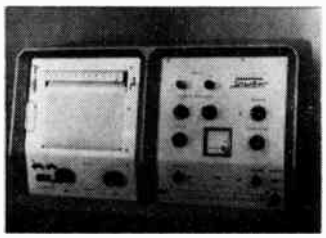
Selector Tast-Polarograph

Item 552

Type Selector D, a product of Atlas-Werke AG, Bremen, Germany, combines a conventional type of Polarograph and electronic equipment for the recording of Tastpolarograms and of derivative Tastpolarograms.

In this completely mains-operated equipment high accuracy and sensitivity are coupled with reliability of operation and simplicity of control.

The built-in high-speed potentiometer recorder with a chart width of 200 mm and a normal recording length of 20 cm for a 2 volts' potential scanning is within a recording accuracy of ±0.3%. Its high fidelity of tracing corresponds to the particular demands of the Tast-polarography.



By pressing certain push-buttons either normal polarograms or tastpolarograms can be recorded. The optimum position of the selected internal ("Tast-interval") will be set by means of a step-switch in connection with an indicating lamp (beginning of this interval max. 7 sec. after drop-fall). The duration of the selected interval can be set continuously at a potentiometer between about 0.4 sec. and 2 sec.

Further data available from the exclusive Canadian reps — **Biotronics Laboratories, P.O. Box 744, Station B, Montreal, Que.**

Absolute standard capacitor

Item 553

To meet the need for a suitable absolute standard for reference, Wayne Kerr Corporation, Philadelphia, has developed an Absolute Standard of Low Capacitance.

This new instrument provides a suitable absolute standard to avoid use of substitution methods of measurements with National Bureau of Standards calibrated sub-standards of lower impedance which may vary after the calibration date.

A designer and producer of instruments for electronic, physical and chemical measurement, Wayne Kerr constructed its Absolute Standard of Low Capacitance to a value of 10 $\mu\mu$f.

Such standards have previously been of little practical use because impedances of this magnitude could not be measured precisely with an orthodox type of bridge. With the extension of the three-terminal transformer ratio-arm bridge, developed and perfected by Wayne Kerr, impedances of this magnitude and accuracy can now be measured.

For further information write **The Glendon Instrument Co., Ltd., 46 Crockford Blvd., Scarborough, Ont.,** Canadian distributors for Wayne Kerr Corporation.

Single compact wiring arrangement

Item 554

Printed wiring eliminates laborious point to point wiring and introduces a new, unform element to electronic assemblies — a single compact wiring arrangement on which the various sub-assemblies, components and tubes are placed.

In 1954, the United Shoe Machinery Co. put its machine design talents to work to utilize this new wiring technique — recognizing that the uniform element of printed wiring also made feasible the machine assembly of components. The result was United's development of DYNASERT — a line of production equipment assemblies.

The Dynasert approach to mechanized assembly provides a machine to insert each component. Most of the more standard component types in all sizes can be inserted with Dynasert equipment. Machines are designed to feed, prepare the component for insertion, insert and clinch it below the board. For volume work a series of machines can be arranged in any desired sequence on a conveyor. The boards move along the conveyor on pallets stopping automatically at each machine. Production is at the rate of 9,600 assemblies per eight-hour day. Up to 40 or as few as 8 stations in line are practical.

For further details contact **Industrial Sales Division, United Shoe Machinery Company of Canada Limited, 2610 Bennett St., Montreal, Que.**

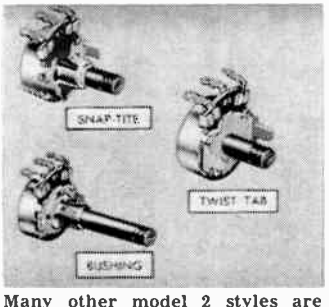
Model 2 radiohms

Item 555

Ideal for rear service adjust TV control and other shock hazard applications, Centralab Canada Ltd., Ajax, Ontario, recently previewed their model 2 Radiohm.

Made of U.L. approved phenolic, the eight different lengths of heat-stable phenolic shafts, extend through the control with screwdriver adjust slots on either end.

The popular Model 2 (½ watt, ⅜" dia.) Radiohms is just one of the many fine Centralab products.



Many other model 2 styles are available in a variety of terminals, shafts, mountings and line switches. Centralab also manufactures complete lines of 6 other miniature composition variable resistors and a full line of 5 watt wire-wound units, all designed and tested to meet the most exacting requirements.

For further information, or descriptive literature please write **Centralab Canada Ltd., Ajax, Ontario.**

Mains coupler

Item 556

The Rendar Safebloc provides a safe, quick and secure means of connecting 2-core or 3-core bare-ended flexible leads to the mains.

The base and lid of the block are robustly molded in a tough thermo-setting plastic insulating material. With the lid closed, all live items are completely inaccessible; as the lid is raised, the supply is disconnected from all exposed metallic parts. The live line is fused with a 5-amp fuse as standard, but any fuse up to a maximum rating of 13 amps can be inserted to suit the apparatus being tested.

Provision is made for securing the block in any convenient position on bench or wall. Opening the lid gives immediate access to the terminals. These are nickel-plated, corrosion-resisting clips, color-coded red, green and black, and clearly marked L, N and E, for instant identification. The wires are clipped in position in a moment. Closing the lid completes the connection to the supply.

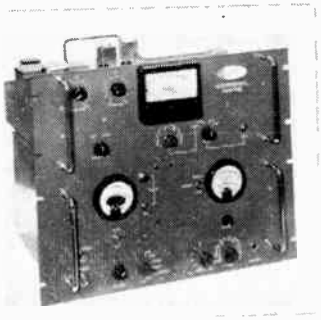
Rendar Instruments Ltd., Victoria Rd., Burgess Hill, Sussex, England.

SSB receiver/adapter system

Item 557

A new, high performance Model RSSB-55-1A SSB Receiver system with unique all-electronic AFC and carrier loss protection is now available for high frequency military and commercial use.

Supplied as a complete SSB receiver or as a separate SSB adapter for use with new or existing AM communications receivers, the all-electronic AFC



system corrects frequency errors of ±2 kc at the transmitter or in the associated receiver to within one cycle. Carrier loss protection during severe fades is provided by a special magnetic storage device. Thus, the best features of conventional reactance tube and motor tuning are preserved and their familiar disadvantages eliminated.

Reception modes include independent upper and lower sidebands, double sideband AM, PM exalted carrier and completely suppressed carrier SSB. Reconditioned or local carrier operation is selected by front panel switch. Audio response in each of two independent sideband receiving channels provided is within ±2 db from 150 to 6,000 cps.

Kahn Research Laboratories, Inc., 81 South Bergen Place, Freeport, N.Y., U.S.A.

4 way CRT brightener

Item 558

Automatic Coil Manufacturing Company Limited, Toronto announces the release of the first in a new series of products for the TV Serviceman — a universal 4-way Cathode Ray Tube brightener model CRB-100.

A truly universal CRT brightener (parallel-series, electromagnetic — electrostatic), the model CRB-100 incorporates the latest engineering advances in CRT booster design.

The ACM CRT brightener is distributed in Canada by **Atlas Radio Corporation Limited, 50 Wingold Ave., Toronto 19.**

Broadband klystrons

Item 559

Broadband Klystrons at L-band have been announced as currently available by Litton Industries' Electron Tube Division. Designated L-3283, the tubes achieve gain and power characteristics which are essentially flat over the minimum bandwidth of 50 Mc.

Minimum peak power output at band edges is 2 MW. The tubes' linear phase shift versus frequency characteristic makes them ideal for sophisticated radar systems requiring electronic tuning and pulse shaping. Other broadband Klystrons are under development by Litton.

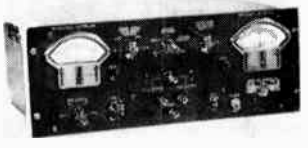
For detailed information, write **Marketing Dept., Litton Industries, Electron Tube Division, 960 Industrial Road, San Carlos, Calif.**

Impedance comparator

Item 560

A double-duty instrument that provides laboratory accuracy in production-line testing, as well as production-test speed in laboratory measurements, has been announced by the General Radio Company.

A new version of the Impedance Comparator — Type 1605-AS2 — the device serves to compare a resistor, capacitor or inductor with a standard sample, indicating directly on panel meters the magnitude and deviation of impedance difference and phase-angle difference between them. Basically a self-contained impedance-measuring system, the instrument comprises a signal source, bridge and detecting circuit. The bridge circuit consists of the standard and unknown external impedances, which are to be compared, and two precise transformer-type unity ratio arms.



The voltages across these ratio arms are equal to within one part in a million. The internal oscillator provides 100 cps, 1-, 10- and 100-kc frequencies, all ± 3%.

In view of the increased sensitivity of this bridge — by a factor of 3 — providing a full-scale phase-angle reading of 0.001 instead of 0.003, it is now possible to obtain sufficient deflection for such precision operations as the sorting of high-quality silvered mica films. The deflection improvement affords rapid selection of the films for capacitance values or rejection for high dissipation factors. Other applications include checking of temperature coefficients — in the lab or on the production line; also making environmental reliability tests and measurements of small dielectric-constant changes of gases and of dilute solutions. A built-in guard circuit permits measurement of remote samples without error from the impedance of long leads.

Canadian office of the General Radio Company is located at **99 Floral Parkway, Toronto 15, Ont.**

Tunnel diode

Item 561

Canadian General Electric has made sample quantities of a second tunnel diode, a 1000 megacycle device, available to electronic industry designers.

The tunnel diode is a new electronic part like the transistor, but smaller. It operates on a different principle, however, and offers advantages the transistor lacks. Tunnel diodes achieve higher frequency operation easier than the transistor and are relatively insensitive to temperature changes and nuclear irradiation. Thus they are expected to effect important space and capability improvements in computers, TV sets, communication equipment, nuclear controls, satellites and space vehicles.

Features of the new tunnel diode include a minimum peak to valley current ratio of 5 to 1, a typical peak point current rating of 1-milliampere, which is held to plus or minus ten percent, and a typical negative conductance of 0.065-mho.

Canadian General Electric Co. Ltd., 214 King St. W., Toronto, Ontario.

X-Y oscilloscope

Item 562

A differential-input X-Y oscilloscope with sensitivity of 1 mv/cm, the Type 503 introduces Tektronix quality to the dc-to-450 kc range. It is compact, dependable, easy-to-operate. It utilizes a minimum number of tubes (equivalent 17 plus rectifiers) for the maximum degree of reliability.

Vertical and horizontal amplifiers are identical. Characteristics include: input stages electronically regulated, calibrated steps to 20 v/cm, adjustable between 14 steps and to over 50 v/cm uncalibrated, differential input and constant input impedance (for easy probe use) at all sensitivities.

Other features include: functional panel layout, 8 x 10 cm viewing area, 21 calibrated sweep rates with 5 degrees of magnification, electronically-regulated power supplies, and extremely adaptable trigger facilities.

Tektronix, Inc., P.O. Box 831, Portland 7, Oregon, U.S.A.

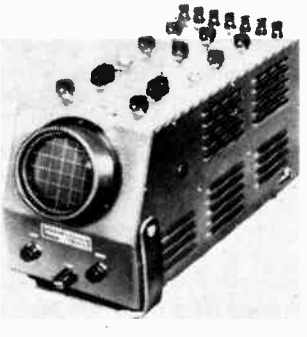
Hi-gain pocketscope

Item 563

The Waterman High Gain Pocketscope Model S-14-A is a high sensitivity oscilloscope of convenient light weight size. Its D.C. coupled amplifiers assure low frequency response even while reproducing low level signals. Identical amplifiers are utilized which permit measurements to be made of phase shifts.

Triggered or repetitive sweeps are available from 0.5 CPS to 50 Kc/s. Band-pass between D.C. and 150 Kc/s is a design feature of both amplifiers.

Vertical and horizontal channels have frequency compensated attenuators giving an overall



attenuation to each channel of approximately 10,000:1. A sensitivity of 12 millivolts RMS per inch combined with a rise time of 1.8 micro-seconds are incorporated.

With a weight of only 12¾ lbs. the S-14-A is ideally suited for field service in addition to laboratory and industrial testing.

Aviation Electric Limited, P.O. Box 6102, Montreal, Que.

Continued on page 37

HEATHKIT
TEST EQUIPMENT

...for top performance at a budget price!

MUTUAL CONDUCTANCE TUBE TESTER KIT (TT-1)

The impressive list of electronic and mechanical features found in this mutual conductance tube tester positively rates it as one of the finest test instrument values in the electronic industry!

Tests: GM (amplifiers) 0-24,000 micromhos; Emission, rectifiers and diodes; Leakage, direct reading ohmmeter; Grid Current, ¼ microampere sensitivity; Voltage Regulators, firing voltage and regulation tolerances; Low Power Thyratron, grid characteristics, conduction capabilities: Eye Tubes, control grid characteristics.

HEATHKIT TT-1 $185.95

5" OSCILLOSCOPE (OP-1)

A truly professional performer. Features DC coupled amplifiers and DC coupled CR tube unblanking. Triggered sweep circuit operates on external or internal signals and may be AC or DC coupled. Fuse protected transformer operated power supply uses silicon diode rectifiers. Five prewired component boards and precut, cabled wiring harness simplify constructon.

HEATHKIT OP-1 $225.95

Write for your free HEATHKIT catalogue!

DAYSTROM LIMITED

2 RAITHERM ROAD, TORONTO 19, ONT.

6036

For complete details check No. 15 on handy card, page 47

FOR PRECISION LABORATORY OR PRODUCTION TESTING

FREED 1110-AB
INCREMENTAL INDUCTANCE BRIDGE
AND ACCESSORIES

Accurate inductance measurement with or without superimposed D.C., for all types of iron core components.

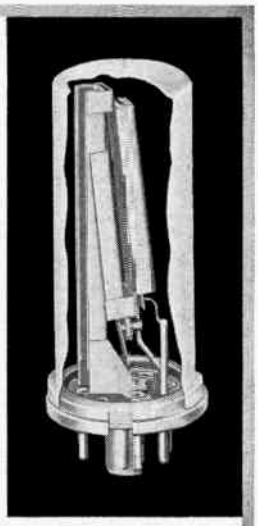
- INDUCTANCE — 1 Millihenry to 1000 Henry
- FREQUENCY — 20 to 10,000 Cycles
- ACCURACY — 1% to 1000 Cycle, 2% to 10KC
- CONDUCTANCE — 1 Micromho to 1 MHO
- "Q" — 0.5 to 100
- SUPERIMPOSED D.C. — Up to 1 Ampere
- DIRECT READING — For use by unskilled operators.

ACCESSORIES AVAILABLE:
1140-A Null Detector, 1210-A Null Detector — V.T.V.M., 1170 D.C. Supply and 1180 A.C. Supply.

INSTRUMENT DIVISION
FREED TRANSFORMER CO., INC.
1716 Weirfield St., Brooklyn (Ridgewood) 27, N.Y.

Sales Agents for Canada: CONWAY ELECTRONIC ENTERPRISES
1514 Eglinton Ave. West, Toronto 10, Ontario
For complete details check No. 18 on handy card, page 47

G-V RED/LINE



industrial thermal timing relays for dependability and long life previously available only in high cost relays

- Delays of 2 Seconds to 3 Minutes
- Energizing Voltages— 6.3 to 230 AC or DC
- Rugged Stainless Steel Mechanism
- Tamper Proof
- Shatterproof —No Glass
- Dust Tight Enclosure
- Steel Encased Heaters
- Directly Interchangeable

G-V®

Write today for Publication 131.

G-V CONTROLS INC.
LIVINGSTON, NEW JERSEY

REPRESENTED IN CANADA BY:
LEONARD ELECTRIC LTD., 346 BERING AVE., TORONTO 18
For complete details check No. 19 on handy card, page 47

Elapsed time indicator

Item 564

A low cost elapsed time indicator which is unsealed and has a bakelite case, has been introduced by Honeywell Controls Limited as one of its line of Marion electrical indicating instruments.

It has a self-starting, synchronous motor which drives a five-digit

counter and records hours to 99999 or hours and tenths to 9999.9. A square model 53 Set 3½" is also available. The indicator is for 110 or 220 volt, 60 cycle AC. Its mounting is standard ASA/MIL 3½ inch.

Further information may be procured from **B. Colwell, Honeywell Controls Limited, Toronto 17, Ontario.**

Laboratory monitor

Item 565

Development of the Victoreen Model LM-1 Laboratory Monitor, an economical instrument for general laboratory counting, hot-cell monitoring and classroom demonstration, is announced by The Victoreen Instrument Company.

Designed by Victoreen's Tullamore Electronics division, the instrument features five counting rate ranges from 50 to 500,000 cpm. The count rate meter portion can display full-scale counting rates of 50, 500, 5,000, 50,000 or 500,000 cpm. A probable error switch permits the operator to select 2, 6 or 25% counting rate probable errors.

Other user advantages include aural monitoring through a 4" speaker, and variable input sensitivity of from 0.25 to 5.0 volts. Outputs for both current and voltage type chart recorders are provided.

The Victoreen Model LM-1 Laboratory Monitor features exclusive "Inline-Expedient" chassis construction for excellent ventilation and easy access. Measuring 19½ x 10 x 5½", the unit uses a standard 5¼ inch panel for rack or cabinet mounting. Full details available on request to **The Victoreen Instrument Company, 5806 Hough Avenue, Cleveland 3, Ohio.**

Expanded scale thermometers

Item 566

Accurate, durable Beckman Expanded Scale Thermometers to meet a wide variety of customer specifications can be supplied by Helipot Division of Beckman Instruments, Inc. Utilizing the Beckman Expanded Scale Meter

as the basic unit, models range from battery-powered, portable styles to ruggedized and sealed panel-mounting instruments. Probes are available for measuring the temperatures of either gases, liquids, or solids.

Accuracy to ±0.5C is available for temperatures from 0°C to 200°C and standard expansions of ±25°C maximum or ±10°C minimum. Large, linear scales add readability to accuracy. Input voltage for panel-mounting models is six volts minimum, AC or DC. Maximum power dissipation on all models is 1/10 watt.

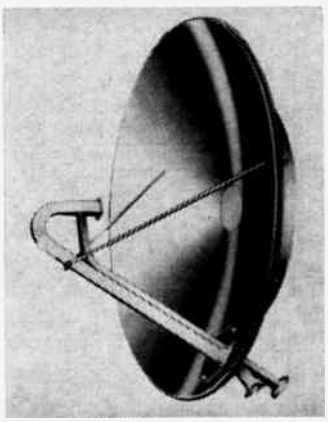
Complete information is available from **R-O-R Associates, Limited, 1470 Don Mills Road, Don Mills, Ontario,** sales representatives for Helipot Division of Beckman Instruments, Inc.

Microwave antennas

Item 567

A series of dual polarized 6 kmc antennas is now offered by Andrew Corporation, manufacturers of antenna system equipment. These antennas combine two microwave signals in a single antenna. The two signals are fed to the antenna by independent waveguides. This design eliminates the need for circulators, reduces tower windloading, installation and maintenance cost.

The mechanical specifications of these antennas are similar to those for comparable sizes of the Andrew plane polarized 6 kmc antennas. Antennas are offered in 4, 6, 8 and 10 foot sizes.



Complete details may be obtained from the **Andrew Antenna Corporation, Ltd., 606 Beech St., Whitby, Ontario.**

Trip unit and warning amplifier

Item 568

Elliott Nucleonics Limited, a member of the Elliott-Automation Group, has developed an extremely accurate and reliable warning system which is provided by a d.c. amplifier operating from d.c. inputs, such as thermocouples. The unit is transistorized and a complete Trip Unit comprises a trip amplifier and transistor power supply each plugged into a single mounting frame.

The mounting frame houses the trip setting potentiometer, alarm lamps, relays, test jack socket and meter indicating margin from trip set point. A pre-trip warning can also be incorporated with a panel control to make a setting at a fixed level below the trip level. Indication of the trip is by a red lamp and of the warning by an amber lamp. In both cases a normally energized relay will be released.

A trip level may be set to an accuracy of 0.1% with digital indication of setting. Six standard input current and input voltage ranges varying from 0-10 uA to 0-30 mA and 0-10 mV to 0-150 mV are provided and the range may be changed by a plug-in range card.

For further information write: **John Geddes, Elliott-Automation Ltd., 34 Portland Place, London, W.1., England.**

Transportable microscatter equipment

Continued from page 22

of any rack is 74-inches plus crating allowance which makes it possible to transport the individual units in virtually any small aircraft. The width is 36-inches and the depth is 21-inches. Each of the seven cabinets requires 5.25 square feet of floor space and weighs from 950 to 450 lbs.

The complete type HJ equipment is packaged on 19-inch rack cabinets giving front access only. Swing out construction has eliminated the need for rear access while providing the complete accessibility to all equipment.

Installation

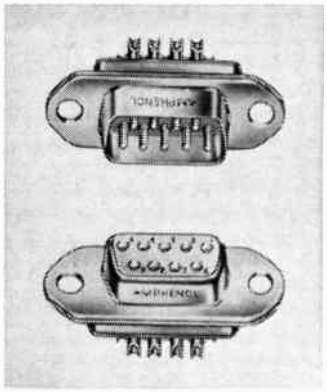
The type HJ microscatter may be installed as conventional fixed station equipment in a building or a trailer installation may be considered. Antennae can be located on the roof of an equipment building or by driving a trailer to the site, guying it and lifting the support masts for the small antenna. These are partially supported by the corners of the trailer. The only other part of the installation would be the tying-in to existing primary power or starting the powered generator. The final step is the alignment of the antenna, and equipment checkout.

Since all systems are tested station by station at the factory, the installation time in the field is cut to a minimum. In a trailer installation, communication may be established 3½ hours after arrival at site.

Cable connectors

Item 569

A new family of miniature rack and panel, cable to chassis and cable to cable connectors, has been announced by Amphenol Canada Ltd. Trade named "Min Rac 17", the connectors are said to be half the size and weight of standard size connectors, and to have almost unlimited application versatility in electronic equipments.



Modified Amphenol Poke Home contacts are employed, allowing fast solder or crimp assembly of contacts to leads outside the connector, and removal and replacement in the event of changes in circuitry.

"Min Rac 17's" have a temperature range of 0°F to 230°F and have a current rating of 5 Amps. They are available with 9, 15, 25, 37, or 50 contract. Shells may be ordered wtih either clear chromate or gold irridite finish.

For further information, write to **Amphenol Canada Limited, 349 Carlaw Ave., Toronto 8, Onatrio.**

Laboratory power supply

Item 570

Ideal for use both in the developing and testing of transistor circuits, the Advance Components Ltd. model PP5 has been designed specifically to satisfy the demand for a compact laboratory power supply at low cost. Completely transistorized, the instrument provides a stabilized d.c. supply continuously variable in one calibrated range from 0 to 15 volts at a maximum current of 500 milliamps. The source impedance at d.c. is less than 0.01 ohms and the maximum ripple voltage is less than 1 millivolt peak-to-peak.

A unique adjustable electronic cut-out provides full protection against progressive current overloads and short circuits. The operating point of the cut-out is adjustable from 50 to 500 milliamps, and can therefore be set to provide protection for the load circuit (i.e. against thermal runaway in amplifiers, etc.) as well as for the instrument.

A grade-one dual range meter is incorporated, and can be switched to monitor both the output current and voltage. The instrument is attractively presented, and is fitted with a retractable bipod stand and leather carrying handle.

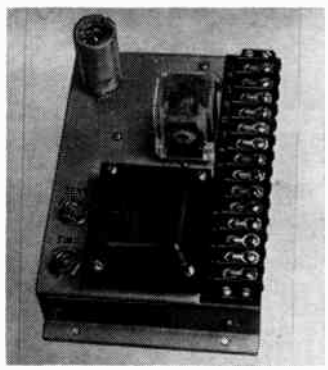
Further information from **Advance Components Ltd. of Hainault, Essex, England,** or from **Irwin Technical Limited, 9 Ormond Close, London, W.C. 1, England.**

Photoelectric scanner relay

Item 571

A time-response adjustment that permits the light-beam to be interrupted repeatedly, for intervals shorter than the selected delay-time, makes the Farmer Type PE5 Photoelectric Scanner Relay suitable for such uses as monitoring the movement of parts through handling systems and providing positive indication when parts fail to feed or when they jam up on a moving conveyor. Delay can be as little as 50 milliseconds or up to 1½ seconds.

Various light-source/photocell combinations permit choice of scanning distance and use of direct light or of the Farmer Proximity Sensor. The double-pole double-throw plug-in relay handles eight amperes non-inductive load at 115 volts AC. All electric connections are made to a screw-terminal strip on top of the chassis. Screwdriver adjustments for delay-interval and sensitivity are secured by locknuts. The unit connects to any 100-130 volt AC line.



Bulletin 605, giving detailed information about the Type PE5 Scanner Relay, is available from the Canadian representatives: **Electrodesign, 736 Notre Dame West, Montreal, P.Q., or John Best Co., 96 Kipling Avenue North, Islington, Ontario.**

Voltage regulator

Item 572

The new Solamatic line of static-magnetic voltage regulators designed for three-phase circuits from 50 kva to 2000 kva is now available from Sola Electric Co., a division of Basic Products Corporation, Chicago 50, Ill. It provides output voltage regulation of ±1% for line voltage variations of ±10%. Regulation is completely automatic and continuous, and is maintained even for instantaneous load changes ranging between zero load and full load. Regulation is maintained despite changes in load power factor. Response time is 1.5 cycles or less, and sine-wave output has 5% or less total harmonic content at any load.

The unit is a self-contained, transformer-type device having no moving parts or complicated feedback systems. It has no tubes, and requires no manual adjustments or routine maintenance. The heart of this new voltage regulator is the Solamatic Reactor, polyunit, static-magnetic, transformer-type component which produces large changes in current for small changes in voltage.

Sola Electric Co., 4633 West 16th Street, Chicago 50, Ill., U.S.A.

CGE develops modular TV transmitter

A new 10 KW modular television transmitter, described as the first transmitter available with complete standby, has been developed by Canadian General Electric Company, Limited.

Announcing the new unit, C. E. Spence, manager of broadcast equipment sales, said it was "the natural outgrowth of the modular concept which the company has applied to its basic transmitter design."

Designated the TTC-100 series, the new CGE transmitter is the first such transmitter designed specifically for Canadian operational needs. It is designed to take care of any kind of transmitter failure at the touch of a button, with less than five seconds lost air time.

Power Service Products name service reps.

Power Service Products, Canadian agent for Cramer Controls, announces the appointment of United Electric and X-ray as the factory authorized service depot for Cramer timers.

This firm is located at 618 Vaughan Road, Toronto, and will carry a complete stock of repair parts for all Cramer assemblies. The repairs will be handled by trained personnel, and where a complete overhaul is made on a timer assembly, it will be relabeled and reguaranteed for the same period as applied to new equipment.

CN-CPC speed up Telex service

A major speed up of its domestic Telex network was undertaken by Canadian National-Canadian Pacific Communications during the weekend of July 9-10, according to an announcement by J. R. White, general manager of Canadian National Telegraphs, and G. H. Pescud, general manager of Canadian Pacific Communications.

The changeover, requiring the regearing of more than 3,000 subscribers' Telex machines throughout Canada by CN-CPC technicians was undertaken jointly with Western Union Telex Service in the United States. CN-CPC officials say the conversion will not only speed messages from subscriber to subscriber, but will also bring the North American Telex network into conformity with international standards for message transmission. In effect, the change represents a 10 per cent speed increase in domestic service — from 60 to 66 words a minute.

techdata for engineers

Key telephone system *Item 573*

The Communications Equipment Division of the Northern Electric Company Limited has devoted its Sales Letter No. SL-6008 to the No. 6A Key Telephone System.

The No. 6A Key Telephone System is an efficient, economically designed dial selective (or push-button) local intercommunicating system accommodating up to thirty-six main stations.

This 32-page booklet includes a description of the special features in connection with this Key Telephone System, and of the cabinets and mounting arrangements suitable for the various types of units.

A number of wiring diagrams fit neatly into a pocket on the inside back cover of the booklet.

Available from **Northern Electric Company Limited, Communications Equipment Division, P. O. Box 6123, Montreal, Que.**

Electronic instruments *Item 574*

The J. W. Ellis Industries announces the new 1960 Danbridge Short Catalog of Electrical and Electronic Instruments for research work, educational purposes, production control and service, which has recently become available. As compared with the previous catalog this new catalog shows as new additions the Vacuum Tube Voltmeter Type FR 31, the Vacuum Tube Voltmeter Type FR 21, the Test Oscilloscope Type PO 13, an example of Nuclear Instrumentation, the new Ferrite-Cored Decade Inductors Type DI and the new Stabilized Power Supply Type P 17 b.

Persons interested may obtain this catalog from **The J. W. Ellis Industries, 80 Richmond Street East, Toronto, 1, Ontario.**

Military components catalog

Item 575

One of the most unusual publications ever to be produced by a private manufacturer, has been made available for distribution to qualified personnel by Ohmite Manufacturing Company. Designated formally as a "catalog" of military electronic components, it is simultaneously an invaluable handbook on U.S. military specifications covering those components which Ohmite manufactures.

This "handbook-catalog" reduces the formidable maze of military specifications to the essential element — the "type designation" — that sometimes puzzling conglomeration of numbers and letters by which military parts are described and ordered. "Type designations" for each military specification are explained in an extremely graphic manner and the options permitted for each type of component are clearly outlined.

Attractively illustrated and exceedingly readable, this publication is available from the **Ohmite Manufacturing Company, 3675 Howard Street, Skokie, Illinois.** Request Catalog 50.

Electronic terminals *Item 576*

A new 32-page catalog of electronic terminals and hardware is available from Lerco Electronics, Inc. Included are more than 380 standard part numbers which are stocked for immediate delivery by Lerco. Complete specifications and ordering information are contained for standard and molded insulated terminals; terminal boards; eyelets, stand-offs, shaft locks and miscellaneous hardware; handles and control knobs; and custom engineering facilities. Cataloged for the first time is Lerco's new line of instrument control knobs, designed to MS-91528 specifications for military applications. For free copy, send for **Catalog 32, Lerco Electronics, Inc., 501 S. Varney Street, Burbank, Calif.**

Precision stock gears *Item 577*

The Dynamic Gear Comapny, Inc. of Amityville, N.Y., has issued catalog F-128 on its stock of Dynaco Precision Gears and components. This new catalog not only represents a vastly broadened array of items, but also has been constructed with eye-ease green pages for reading comfort and legibility.

It is very useful as a text book by mechanical and electro-mechanical engineers, draftsmen, instrument men, and others.

Copies will be furnished to interested persons at no charge by the Canadian representative **Whittaker Electronics Limited, 2137 Niagara Drive, Ottawa, Ontario.**

Electro-acoustic products

Item 578

Amplivox announce the issue of a loose leaf catalog containing illustrated brochures and technical data sheets describing Amplivox electro-acoustic products including Miniature Magnetic Microphones and Earphones, Lightweight high quality Headphones and Headsets, Stethophone Listening Units, Miniature Transistor Amplifiers and Ear Defenders. Please write on your company's letter heading to **Amplivox Limited, Beresford Avenue, Wembley, Middlesex, England.**

CGE provides TV studio-on-wheels

A contract to design and equip a mobile video tape television production studio-on-wheels, said to be the largest of its kind in North America, has been awarded to the Electronic Equipment and Tube Department of Canadian General Electric Company Limited. Total cost of the unit is in excess of $250,000.

The 50-foot van, being built for Taylor Video Corporation, Toronto, will be a complete travelling studio, equipped to produce both feature television programs and TV commercials in virtually any location. Equipment in the van will include three E.M.I. 4½" image orthicon television cameras, the first such units to be sold here since C.G.E. concluded a Canadian marketing arrangement with the U.K. electronics and communications firm. It will also contain the latest Ampex video tape recorder, associated studio gear for the cameras, complete 16-channel audio system, telechrome special effects, mobile radio units and other facilities.

Indiana Steel of Canada stocks TV ferrites

The Indiana Steel Products Company of Canada, Ltd. of Kitchener, Ontario, recently became the first company in Canada to stock TV ferrites as shelf items. In making the announcement, Charles D. McLeish, vice-president and general manager of the company, said: "For the first time in the history of the Canadian electronics industry, a customer will be able to ask for a ferrite deflection yoke core or flyback transformer core and receive it in a day or two. Heretofore, these materials had to be imported from the United States or Europe, since they are not manufactured in Canada."

The ferrites which the Kitchener concern will handle are manufactured by the General Ceramics Division of the Indiana General Corporation and are marketed under the trade name, "Ferramic".

Private TV station for Vancouver

Vancouver's first private television station, Channel 8 TV, will locate its studios and offices in Lake City Industrial Park in Burnaby, B.C.

Cost of the three level building and land is estimated at $800,000. Construction of the studio, offices and service center will start immediately and is scheduled to be completed by November 1960.

Accelerator for development in U.K.

A development contract for a mobile linear accelerator designed to take X-ray photographs of the welds in the pressure vessel of a nuclear power station has been placed by the U.K. Atomic Energy Authority with Mullard Equipment Ltd. The machine is expected to be operational towards the end of the year.

The contract results from investigations, commissioned by the Authority, into the suitability of such machines for making radiographic inspections of welds in thick materials.

The accelerator will have an energy rating of 4.3 million electron volts and will give an X-ray output of over 600 rontgens a minute in air at 1 meter focus film distance. Because of its high energy rating it will make possible faster radiographs through greater thicknesses of material than is practicable with conventional X-ray or isotope sources. With an exposure time of less than 100 seconds, using Ilford industrial 'F' film, the accelerator will produce a high definition radiograph of a steel specimen 6 inches thick; with faster film the exposure time for this thickness would be reduced to under 60 seconds.

The accelerator is specially designed for use on site during the building of a nuclear power station with a minimum of disturbance to the constructional work. It is compact, easily controllable and has comprehensive positioning facilities for easy and accurate location on the specimen.

The accelerator unit will be mounted in a trunnion fork assembly and will weigh approximately 1.3 tons and measure about 8 ft. overall length.

Its power supply and control units will be housed in a transportable cabin which may be placed up to 250 ft. away from the accelerator unit. Besides giving greater flexibility for on-site operation, this will enable the operators to keep well clear of radiation from the machine.

The machine will be developed from the standard 4.3 MeV accelerators which have been marketed by the company for a number of years for medical, industrial research and radiographic applications.

Additional technical data

The X-ray output of the accelerator is greater than 600 rontgents a minute measured in air at one meter distant from the target, with the beam collimated to give a circular field 30 cm in diameter.

larger fields. An adjustable lead iris enables the field size to be reduced to 30 cm x 5 cm at one meter focus film distance.

With a source diameter of approximately 2 mm the resulting X-ray photographs show a sensitivity better than 0.5 per cent on steel specimens between 4 and 8 inches thick and 0.8 per cent with thicknesses of about 2 inches. These results are obtained using standard DIN wire penetrameters, the film (Ilford industrial 'F') being exposed to give a density of 2.5.

The rf power source is a magnetron valve driven by 5 megawatt power pulses from the modulator. The pulse duration is 2 microseconds and the pulse repetition frequency 500 a second.

Epoxy resins to be produced in Canada

The initial phase of a 10-year expansion program into the production of epoxy resins was announced recently by P. O. Jeffrey, vice-president and general manager of Union Carbide Canada Limited, Bakelite Division. Modification of existing phenolic reaction equipment at Bakelite's Belleville plant, plus auxiliary installations, will enable the company to commence production of liquid epoxy resins this fall. Construction is to begin immediately.

Mr. Jeffrey explained that "Bakelite" epoxy resins are now imported. Once the Belleville plant goes on stream, the liquid epoxies produced will meet all the Company's marketing requirements at the present time. As the market for the product increases, the plant's manufacturing facilities can be expanded to meet the demand with comparatively little additional investment.

Spaulding Fibre of Canada announce new appointments

In keeping with the policy to make Spaulding Fibre of Canada Limited as 100 per cent Canadian as possible, the following appointments have been announced.

Charles A. Dykeman, former plant manager, is now general manager. Bill Christensen has been appointed sales manager. Mr. Christensen, an alumnus of the University of Toronto, was previously sales engineer in the Western Ontario District.

B. G. Orth, formerly office manager is now assistant general manager and J. Frey has been appointed assistant plant manager.

Thomas C. Drees, vice-president and former general manager, has been appointed administrative assistant to the president of the American Company.

Tube imports jeopardize Canadian industry

Continued from page 19

We urge the Canadian Government to indicate such recognition.

3. The 15% excise tax on our consumer products, including replacement tubes, is unique to our industry and has long been regarded as discriminatory.
We urge complete removal of this tax.

4. The manufacturing industry comprises 45% of the working population of this country. At all levels of purchasing — Government, industry and the wholesaler to the householder — there must be an awareness that our prosperity depends upon maximum employment.
We urge the Canadian purchaser to "Buy Canadian and Keep Canadians Working".

". . . if Canada is to hold its place in the forefront of manufacturing nations it is essential that it maintain a healthy and growing electronics industry

W. H. Jeffery, Vice-President
Philco Corp. of Canada Ltd.

"To be subjected to the competition of foreign imports is not a new experience for the Canadian Electronics Industry. As long as this competition came from countries in which the labor rates were from 50% to 75% of those being paid in Canada, and as long as the countries from whom these imports came were not as completely automated as were we, these importations were not a serious threat to the existence and profitability of our industry. However, as these countries became more fully automated, and as other countries became proficient in electronics — countries in which the wage rates were one-eighth to one-tenth of those being paid in Canada — the rate of importations grew so alarmingly as to seriously threaten the very existence and continuity of some sections of the Electronic Industry.

"The two areas most seriously affected to date are Transistor Radios and Electron Tubes. I will not dwell on the statistics involved as you are, no doubt, well aware of them, and others will be supplying the complete details to illustrate the inroads that have been made by importations in these areas.

"There is, however, one criticism of our interpretation of the Transistor Radio statistics which should be answered. It has been interpreted by some critics that the great growth of Japanese Transistor Radio sales has resulted in a satisfactory domestic production of other radios, and that essentially little Canadian production of Transistor Radios has ever been instituted. It is our contention that the healthy sales of electric radios has not been occasioned or influenced by the sale of Transistor Radios.

"Secondly, imported Transistor Radios were available at such low costs and in such quantities as to make it impossible for Canadian manufacturing to get under way in volume. Thus, the Canadian producer has been deprived of a market which is justifiably his.

"As serious as the impact is on radio production and electron tube production, the industry is even more vitally concerned about the possible encroachment by importations in other areas. Other industries have been faced with extinction as a result of importations from low wage level countries. What makes the plight of the Electronic Industry different and more serious? The answer is in two parts.

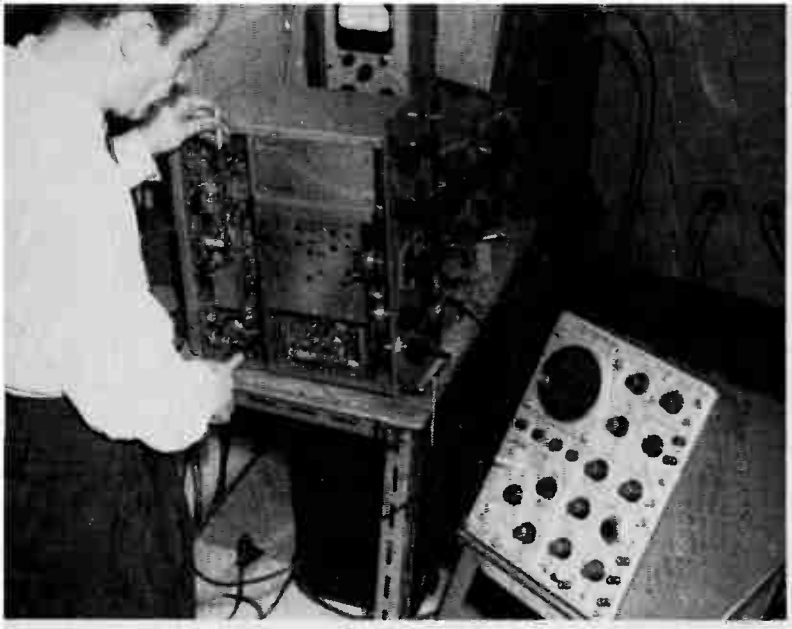
"More than any other industry, Electronics is interwoven as an integral part of the warp and woof of every manufacturing industry; whether it is transportation, communication, chemistry, steel, metal fabrication, electronics does play an integral part. Surely, therefore, if Canada is to hold its place in the forefront of manufacturing nations, it is essential that it maintain a healthy and growing electronics industry. Our national defense is based on electronics, without which no plane could fly, no target could be selected, no missile could be fired. Canada, without electronics, is basically without a defense industry.

"For these reasons and others, we must appeal to the Government for assistance in solving these problems. If the Government says, "Yes, Canada should have an electronic industry", then, we say, "The proper climate must be created to make it possible for such an industry to exist and grow under our free enterprise system. No amount of increased efficiency, or technological development, or merchandising cleverness can compensate for the basic economic fact that our competition from abroad can produce at a fraction of the cost. No Canadian is prepared to reduce his level of living to that of the labor from across the sea. Nor will any Canadian purchaser, whether it be for factory or for home, pay more for a product just because it is made in Canada."

"For these reasons we place the issue squarely before the Government of Canada, and we believe that the only possible way of solving the problem without harming our trade relations with the various nations concerned is to establish realistic quotas in the various problem areas. Such quotas will allow for reasonable growth of importations and at the same time will encourage Canadian industry to expand its effort to ensure keeping the major workload in Canada where it belongs."

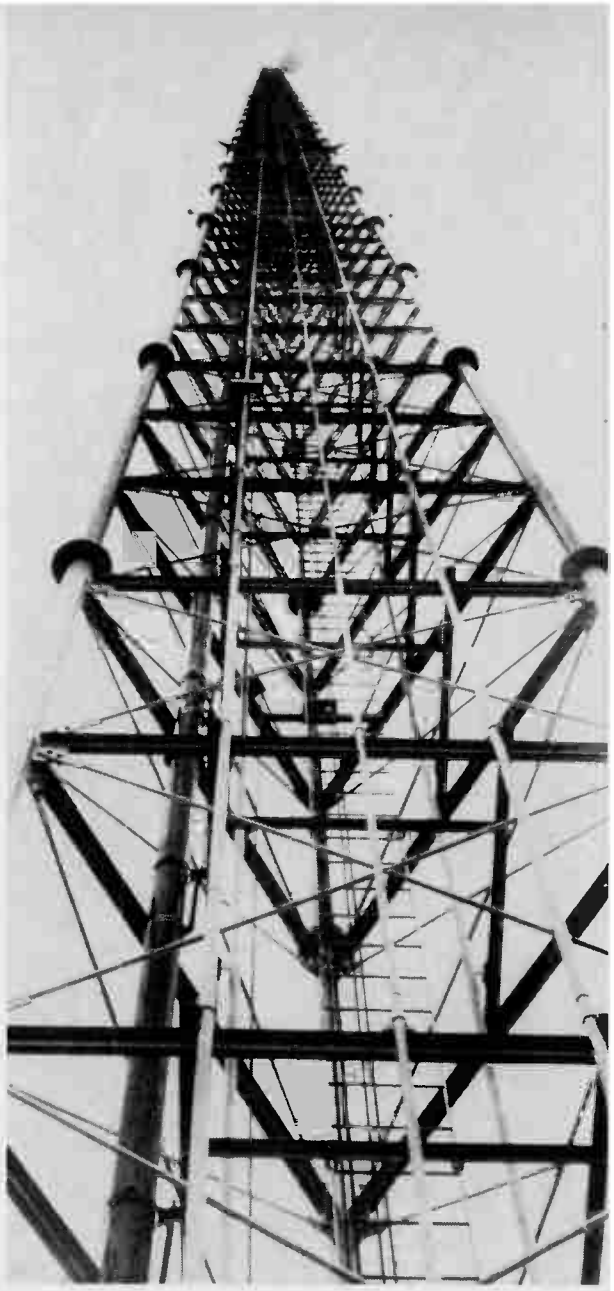
Continued on page 50

The editors of *Electronics and Communications* will welcome expressions of opinion from interested parties in the electronics industry whose welfare may be affected by the current problem of tube imports. Expressions both pro and con will be welcomed from dealers, manufacturers and wholesalers.



The above photograph shows a view of the production engineering department of T.M.C. (Canada) Ltd. of Ottawa with a technician setting up a Single Sideband Exciter System for a one kilowatt Single Sideband Transmitter System for H.M.C.S. Shearwater, Dartmouth, Nova Scotia.

Shown above is the Hon. George Hees inspecting equipment in the new Department of Transport testing laboratory in Ottawa. The new laboratory is rendering valuable service to the fields of business, industry and communications.

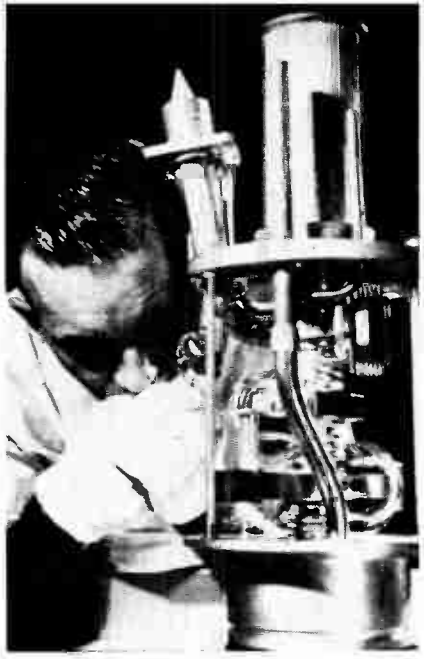


This 1619-foot antenna tower, the world's tallest structure, is being erected at the WGAN-TV transmitter site at Raymond, Maine. The structure is higher by 154 feet than the Empire State Building.

close-up

looking lenswise at your industry in action

Illustrated at left is an application of Microwave Associates' varactors to a prototype Harris negative resistance parametric amplifier constructed by E. G. Lomas of Ottawa. The unit, although basically narrow band, has provided good definition on channel 9 TV video at reduced gain.



Shown above is the first photo revealing details of a new microwave tube that boosts output power of military radars 5,000 times for more precise tracking of missiles at longer ranges than formerly possible.

G.E. engineer fits Compactron, a new tube reducing device developed by G.E. into slim silhouette radio.

More than 80,000 soldered connections are used in the 27-pound transistorized digital computer shown above. The device is manufactured by the Technical Measurement Corporation, North Haven, Connecticut.

RCA Victor's camera operator Neil Fields and technician Rudy Maurizio manipulate the closed-circuit TV system in the gallery of an operating theater at the Montreal General Hospital. An audience of over 70 gynaecologists attending the clinical program of the Continental Gynecologic Society viewed three operations on RCA Victor TV sets placed in the hospital auditorium, two floors below.

When scientists launch a rocket, they must be confident that its instruments and control mechanisms will withstand the stress of acceleration. E.M.I. Electronics Ltd. new Vibrator Type EMV 100A, which has a frequency range of 1-20,000 cps, is used to pre-test the delicate mechanisms employed for missile control.

This new Phillips catalogue lists...

989

DIFFERENT TELEPHONE WIRES AND CABLES!

FREE . . . As a comprehensive reference on wire and cable specifications, this new catalogue is an invaluable aid to anyone in the communications field. For your free copy, address your letterhead request to:
Phillips Electrical Co. Ltd.

Phillips Electrical Company LIMITED

WIRES CABLES

Head Office—Brockville, Ontario.
Branches—Halifax, Montreal, Ottawa, Toronto, Hamilton, Winnipeg, Edmonton, Vancouver.

Phillips Telephone Wires & Cables are also distributed throughout Canada by Automatic Electric Sales (Canada) Ltd.

6019

For complete details check No. 30 on handy card, page 47

Use this convenient card to facilitate receiving E & C

For more information or literature about any product described or advertised in this issue – use these post paid "more information" cards for quick results

APPLICATION FOR FREE SUBSCRIPTION

Please ☐ ADD my name to receive ELECTRONICS & COMMUNICATIONS
Please ☐ CHANGE my address for mailings.
Note — Card must be completed in full to be valid.

My Name
Please Print

Mail copies to my ☐ home, or ☐ business address as noted below.

Street

City Zone Prov.

If you have recently CHANGED your address please note former address here:

Company Nature of Business
(State, when applicable, whether electronic equipment or components are manufactured, sold, or used in manufacturing, etc.)

ARE YOU AN ENGINEER? Yes ☐ No ☐

Signature Position
8-60

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in Canada

5c POSTAGE WILL BE PAID BY

ELECTRONICS AND COMMUNICATIONS
450 Alliance Avenue
Toronto 9, Ontario

CANADA — POSTES — POSTAGE
5 CENTS
13241

PLEASE SEND FURTHER INFORMATION ON FOLLOWING PRODUCT ITEMS AS NUMBERED BELOW. (All Literature & Product Items Numbered)

☐ 545	☐ 546	☐ 547	☐ 548	☐ 549	☐ 550	☐ 551	☐ 552	☐ 553	☐ 554	☐ 555	☐ 556
☐ 557	☐ 558	☐ 559	☐ 560	☐ 561	☐ 562	☐ 563	☐ 564	☐ 565	☐ 566	☐ 567	☐ 568
☐ 569	☐ 570	☐ 571	☐ 572	☐ 573	☐ 574	☐ 575	☐ 576	☐ 577	☐ 578	☐ 579	☐ 580

PLEASE SEND FURTHER INFORMATION ON THE FOLLOWING ADVERTISEMENTS AS NUMBERED BELOW. (Key numbers in column overleaf)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10	☐ 11	☐ 12
☐ 13	☐ 14	☐ 15	☐ 16	☐ 17	☐ 18	☐ 19	☐ 20	☐ 21	☐ 22	☐ 23	☐ 24
☐ 25	☐ 26	☐ 27	☐ 28	☐ 29	☐ 30	☐ 31	☐ 32	☐ 33	☐ 34	☐ 35	☐ 36
☐ 37	☐ 38	☐ 39	☐ 40	☐ 41	☐ 42						

Name Position

Company

Street City Prov.
8-60

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in Canada

5c POSTAGE WILL BE PAID BY

ELECTRONICS AND COMMUNICATIONS

450 Alliance Avenue

Toronto 9, Ontario

CANADA POSTES POSTAGE 5 CENTS 13241

PLEASE SEND FURTHER INFORMATION ON FOLLOWING PRODUCT ITEMS AS NUMBERED BELOW. (All Literature & Product Items Numbered)

☐ 545	☐ 546	☐ 547	☐ 548	☐ 549	☐ 550	☐ 551	☐ 552	☐ 553	☐ 554	☐ 555	☐ 556
☐ 557	☐ 558	☐ 559	☐ 560	☐ 561	☐ 562	☐ 563	☐ 564	☐ 565	☐ 566	☐ 567	☐ 568
☐ 569	☐ 570	☐ 571	☐ 572	☐ 573	☐ 574	☐ 575	☐ 576	☐ 577	☐ 578	☐ 579	☐ 580

PLEASE SEND FURTHER INFORMATION ON THE FOLLOWING ADVERTISEMENTS AS NUMBERED BELOW.

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐ 8	☐ 9	☐ 10	☐ 11	☐ 12
☐ 13	☐ 14	☐ 15	☐ 16	☐ 17	☐ 18	☐ 19	☐ 20	☐ 21	☐ 22	☐ 23	☐ 24
☐ 25	☐ 26	☐ 27	☐ 28	☐ 29	☐ 30	☐ 31	☐ 32	☐ 33	☐ 34	☐ 35	☐ 36
☐ 37	☐ 38	☐ 39	☐ 40	☐ 41	☐ 42						

Name Position

Company

Street City Prov.

8-60

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in Canada

5c POSTAGE WILL BE PAID BY

ELECTRONICS AND COMMUNICATIONS

450 Alliance Avenue

Toronto 9, Ontario

CANADA POSTES POSTAGE 5 CENTS 13241

INDEX TO ADVERTISERS

Page number is on the right. Key number for use with READER SERVICE CARD is on the left.

Tube Imports

Continued from page 43

". . . we say to our Prime Minister: 'Declare yourself'. If you wish an electronics industry to survive in Canada, you must move and move quickly . . ."

W. E. Curry, Vice-President
Dominion Electrohome Ind. Ltd.

"Manufacturing in Canada grew slowly over the years up to 1939, governed by conditions which followed a familiar pattern and which were understood by all. The Government of Canada, during the same period, evolved a system of tariffs and subsidies geared to those trade conditions.

"During the Second World War, the disruption in the normal channels of trade, and the demands of war, encouraged a rapid expansion of Canadian industry. Following the war, this expanded industry fed a prosperous and product-hungry Canada and, at the same time, had the benefit of the best kind of protection from imports — other nations of the world were so busy repairing their economies and serving their own starved markets that they had no time to invade the Canadian market. The seeds, then, for a major change in patterns of trade were sown during the war but did not bear fruit until recently. Suddenly Canada finds herself faced with a vastly different trade situation and with a system of government protection that is twenty years out of date! The other world economies, also stimulated by war and post-war demands and grown expert in manufacturing techniques through the production of high volume to serve the pent-up demand of their home markets, are now eagerly seeking outlets for surplus capacity on world markets. Wealthy Canada, of course, is a prime target.

"This resurgence of world trade is not something to be deplored but is something to be encouraged. However, because of the large domestic volume and low-wage levels from which overseas competition springs, imports from overseas are hurting Canadian industry in a way that can be disastrous if allowed to proceed without restraint. The national policy of our government is hopelessly out of date and ill-equipped to deal with the new conditions.

"Perhaps the best way to illustrate what we have in mind is to deal with the electronics industry with which we are most concerned. The expansion of the electronics industry in Canada in the last twenty years has been dramatic, as indeed it has been in most great industrial nations. This industry is valuable, not only in providing jobs, but also because almost every aspect of our existence is dependent, in one way or another, on electronics and this dependence will become greater year by year. Now we find that overseas low-wage countries, having satisfied their domestic requirements, are able to ship to us electronic components and completed goods at prices which can mean only one thing:

the destruction of the Canadian electronics industry. Government policy has been unable to cope with the situation because of the following reasons:

1. The tariff structure was never designed to meet conditions of this kind.
2. The sales and excise tax, being a percentage of cost, actually bonuses these overseas imports, and places a severe penalty on the Canadian producer. We have the well-known example of an identical radio receiving tube on which the Japanese product pays a 9c tax and the Canadian product pays a 26c tax. Surely this approach is one of economic suicide!
3. The Government of Canada has not really made up its mind whether it wants a manufacturing industry. It is torn between the claims of an agrarian economy and that of the recently emerged manufacturing economy. This is the same situation faced by England several hundred years ago at the time of the so-called Commercial Revolution when the political "balance of power" passed from the owners of land to commercial interests. This change in "balance of power" has not taken place in this country.

"What can we as manufacturers do about this? The solution is not one within the power of any one manufacturer or any group. Great economic forces cannot be held back by voluntary action in a free economy. This is clearly a matter of national policy and Mr. Diefenbaker must find the answer. We suggest that our Government must:

1. Make a clear-cut decision as to the national attitude toward the manufacturing industry in Canada. While we recognize the need for and the desirability of increased international trade, we believe that, through careful quotas, we must protect such imports from destroying whole segments of our manufacturing industry.
2. Face up to the fact that Canada cannot continue to spend and tax at present levels and stay in world business. We need leadership from the Government in this regard, particularly a courageous stand against the continual, spiral of wage increases and social benefits. No government leader*, as yet, has spoken out clearly on this issue; rather, to the contrary, the Conservative Government came into power on promises of more for everyone and a commitment to lower taxes. We cannot expect the citizens of the country to exercise discipline when the government leaders do not.

"And just a word about "Made in Canada" campaigns. As a secondary approach to solving the problem of imports from low-wage countries, "Made in Canada" campaigns have very real value. However, one cannot expect a housewife with a large family to buy rubber footwear from Canadian manufacturers if she badly needs money for other urgent family requirements; nor can any free, profit-directed industry be expected to commit suicide. If radio and television manufacturers have to buy Japanese low-cost components as the alternative to going out of business, they will probably buy them, quite apart from how strongly they feel about supporting the Canadian component industry.

"May we reiterate, then, that this problem is one of national policy for which our Government bears responsibility. It is proper, therefore, that we say to our Prime Minister: "Declare yourself. If you wish an electronics industry to survive in Canada, you must move and move quickly."

* *The Governor of the Bank of Canada has spoken up but he is not a government spokesman and his views traditionally have been given scant notice by government leaders.*

COVER STORY

During the British Medical Association's annual conference at Torquay, attended by over a thousand doctors and their wives from the British Commonwealth, E.M.I. Electronics Ltd.'s color TV cameras were used to televise surgical operations and clinical procedures from Torbay Hospital. The television demonstrations, which were sponsored and produced by Smith, Kline and French Laboratories Ltd., were given in Torquay's Town Hall, where a projector receiver gave the doctors a larger-than-life view of the operations in natural color on a 7′ x 4′ screen. Picture shows an E.M.I. color TV camera in use recently during a similar demonstration from Hammersmith Hospital to the Great Hall of the Royal College of Surgeon's headquarters in Lincoln's Inn Fields.

opportunities

These classified advertisements are published to assist those in the trade who have articles for sale, positions available, positions desired, sales agency openings or business opportunities. Charges are 25c per word or figure, not including heading or box number. Minimum charge is $5.00 payable on submission. No agency commission paid. There is absolutely NO CHARGE for "positions desired" advts.

Send all material to the attention of the advertising manager of ELECTRONICS AND COMMUNICATIONS, 450 Alliance Ave., Toronto 9, Ontario.

P. R. EXECUTIVE

Experienced public relations counsel ready to assume full-time or part-time service for industrial or commercial organization in Ontario. Publishing field background on daily newspapers, business newspapers, trade magazines and house publications as reporter, feature writer, editor and advertising salesman.

Box 137JW
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

DESIGN ENGINEER

seeks change of position. 36 years of age, M.I.A.S., A.R.Ae.S., with 18 years' experience in aircraft and allied industry. Eight years in supervisory capacity, technically responsible for design control and coordination of up to 75 draftsmen and designers. Wide knowledge of electronic packaging techniques for both airborne and ground installations. Specialist in test instrumentation and electro-mechanical control and measurement fields. Available September 1, 1960.

Box 5040
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ENGINEERS, TECHNICIANS

AND

MATERIAL AND QUALITY CONTROL PERSONNEL

FOR PRODUCTION OF

INERTIAL GUIDANCE SYSTEMS

SENIOR AND JUNIOR ELECTRONIC AND MECHANICAL ENGINEERS WITH PRODUCTION AND ADMINISTRATIVE EXPERIENCE.

SENIOR ELECTRONIC AND MECHANICAL TECHNICIANS WITH FIVE YEARS OR MORE EXPERIENCE ON PRODUCTION AND MAINTENANCE OF COMPLEX AIRBORNE ELECTRONIC EQUIPMENT.

FOR THE PRODUCTION IN TORONTO OF LITTON INERTIAL GUIDANCE SYSTEMS AND OTHER LITTON PROGRAMS

APPLY IN WRITING WITH RESUME OF EXPERIENCE AND PERSONAL HISTORY TO:

BOX 5043, ELECTRONICS & COMMUNICATIONS

RELAY SALES ENGINEER

A major supplier of telephone type, electromagnetic relays, requires an experienced sales engineer for the Toronto area. A professional engineer, with experience in the design, manufacture, sales and application of telephone type relays, is preferred, but not essential if technical qualifications and experience are equal. Duties will be to assist the sales force in the application and sale of the products. Reply in confidence giving a full résumé to —

Box 5035
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario.

SALES ENGINEER

required to establish and take full charge of Toronto Office. Applicant must have had previous experience in the sale of electronic components. Must be mature and responsible. Excellent remuneration for right party. For further details contact:

DESSER E-E LTD.
441 St. Francois Xavier St., Montreal, P.Q.
Victor 5-6570

ENGINEERING TECHNICIAN

desires position in Toronto-Hamilton area. 29 years of age, with eight years' experience in production supervision and development of industrial electronic measuring and control equipment.

Box 5037
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ELECTRONICS ENGINEER

seeks technical or administrative position. Ten years' manufacturing experience at project level on vehicular and military airborne communications equipment. Experienced in high performance component selection. Familiar with MIL specifications and environmental testing.

Box 5039
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

INSTRUMENTATION SALES ENGINEER

required for the Toronto area. An excellent opportunity for a young, aggressive and experienced sales engineer. For local interview apply —

Radionics Limited,
8230 Mayrand Street,
Montreal 9, Quebec.

SALES MANAGER

Young executive, able to offer unique background of 14 years in industry, experienced in all phases of sales and marketing of electronic components and equipment; seeks challenging position with dynamic company.

Box 5041
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

TECHNICAL AUTHORS WANTED

The editors of Electronics and Communications magazine are seeking manuscripts on the subject of electronic development and design from Canadian authors. Articles up to a maximum of 3000 words in length accompanied by glossy photographs and/or schematic illustrations are preferred but articles of greater length will be considered. Notification of acceptance of work for publication is given within one week to ten days of receipt of the manuscripts and payment is made on publication. Manuscripts should be addressed to the Editor, Electronics and Communications, 450 Alliance Avenue, Toronto 9, Ontario.

ENGINEERING TECHNICIAN

Engineering or technical assistant position sought by young man seeking more challenging work. Seven years' telecommunications background, both theoretical and practical. Presently employed Montreal area.

Box 5042
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ELECTRONIC COMPONENT LINES

wanted by well established sales representative company for O.E.M. and Industrial accounts.

Prime Electronic Components Ltd.
868 Dundas Highway East, Dixie, Ontario

REPRESENTATIVES WANTED

Sales organizations to handle Canadian manufactured Stedivolt AC line voltage regulators in Eastern and Western provinces of Canada. Must be well-established in electronic, electrical and government circles. Reply giving details of history, size, facilities, coverage and commission expected.

George Kelk Ltd.,
5 Lesmill Road,
Don Mills, Ontario

2000 NEW CUSTOMERS AVAILABLE

In September, *Electronics and Communications* will increase its circulation by 2,000 overseas electronics personnel. South America, Australia, New Zealand, Europe and other parts of the globe will all receive copies of Canada's leading electronics publication.

Canada is ideally situated and regarded to do business in these areas. Advertise your wares to these electronics buyers (you have until August 22 — if there are questions call us at RO. 2-7225).

the destruction of the Canadian electronics industry. Government policy has been unable to cope with the situation because of the following reasons:

1. The tariff structure was never designed to meet conditions of this kind.
2. The sales and excise tax, being a percentage of cost, actually bonuses these overseas imports, and places a severe penalty on the Canadian producer. We have the well-known example of an identical radio receiving tube on which the Japanese product pays a 9c tax and the Canadian product pays a 26c tax. Surely this approach is one of economic suicide!
3. The Government of Canada has not really made up its mind whether it wants a manufacturing industry. It is torn between the claims of an agrarian economy and that of the recently emerged manufacturing economy. This is the same situation faced by England several hundred years ago at the time of the so-called Commercial Revolution when the political "balance of power" passed from the owners of land to commercial interests. This change in "balance of power" has not taken place in this country.

"What can we as manufacturers do about this? The solution is not one within the power of any one manufacturer or any group. Great economic forces cannot be held back by voluntary action in a free economy. This is clearly a matter of national policy and Mr. Diefenbaker must find the answer. We suggest that our Government must:

1. Make a clear-cut decision as to the national attitude toward the manufacturing industry in Canada. While we recognize the need for and the desirability of increased international trade, we believe that, through careful quotas, we must protect such imports from destroying whole segments of our manufacturing industry.
2. Face up to the fact that Canada cannot continue to spend and tax at present levels and stay in world business. We need leadership from the Government in this regard, particularly a courageous stand against the continual, spiral of wage increases and social benefits. No government leader*, as yet, has spoken out clearly on this issue; rather, to the contrary, the Conservative Government came into power on promises of more for everyone and a commitment to lower taxes. We cannot expect the citizens of the country to exercise discipline when the government leaders do not.

"And just a word about "Made in Canada" campaigns. As a secondary approach to solving the problem of imports from low-wage countries, "Made in Canada" campaigns have very real value. However, one cannot expect a housewife with a large family to buy rubber footwear from Canadian manufacturers if she badly needs money for other urgent family requirements; nor can any free, profit-directed industry be expected to commit suicide. If radio and television manufacturers have to buy Japanese low-cost components as the alternative to going out of business, they will probably buy them, quite apart from how strongly they feel about supporting the Canadian component industry.

"May we reiterate, then, that this problem is one of national policy for which our Government bears responsibility. It is proper, therefore, that we say to our Prime Minister: "Declare yourself. If you wish an electronics industry to survive in Canada, you must move and move quickly."

* *The Governor of the Bank of Canada has spoken up but he is not a government spokesman and his views traditionally have been given scant notice by government leaders.*

COVER STORY

During the British Medical Association's annual conference at Torquay, attended by over a thousand doctors and their wives from the British Commonwealth, E.M.I. Electronics Ltd.'s color TV cameras were used to televise surgical operations and clinical procedures from Torbay Hospital. The television demonstrations, which were sponsored and produced by Smith, Kline and French Laboratories Ltd., were given in Torquay's Town Hall, where a projector receiver gave the doctors a larger-than-life view of the operations in natural color on a 7′ x 4′ screen. Picture shows an E.M.I. color TV camera in use recently during a similar demonstration from Hammersmith Hospital to the Great Hall of the Royal College of Surgeon's headquarters in Lincoln's Inn Fields.

briefing the industry

■ **The total strength of all radioactive** isotopes exported by the Commercial Products Division of Atomic Energy of Canada Limited in the last twelve years amounts to 1,000,000 curies. According to spokesmen for the Atomic Energy Authority this puts Canada in the lead of Western exporters of this type of product.

■ **A committee formed by representatives** of Canada's recently licensed private TV stations met in Winnipeg, July 17-18, to explore plans for establishing a second national TV network, R. E. Misener, general manager CFCF-TV, Montreal, has announced. The group worked out details of providing instantaneous exchange of programs between the new private stations as a follow-up to the video-tape delayed exchanges already planned.

■ **Race fans at Calgary's Victoria Park** can watch the races while they are indoors placing their bets or sitting in the lounge via a new closed-circuit television set-up, first permanent installation of its kind at a Canadian track. Supplied by Canadian General Electric, the new television hook-up comprises eighteen 21-inch television screens installed throughout the ground and mezzanine betting areas, and in the track's new Alberta Derby lounge.

■ **A. G. Lester, vice president,** engineering, Bell Telephone Company of Canada says that every household in Canada will have a telephone by 1970. Furthermore, 30 per cent of the telephones will have extensions bringing the total number of services in Canada up to 10-and-one-half-million. Mr. Lester also believes that 85 per cent of the telephones in use in Canada in 1970 will be colored.

■ **The Vancouver plant of Canadian Aviation Electronics** Limited has ceased operation due to a shrinkage of defense work it has been announced by C. D. Reekie, comptroller of the company. Mr. Reekie stated that the reduction of work in the overhauling of equipment for the Pine Tree Line which the firm handles in Western Canada was a contributing reason for the shut down.

■ **Sixty million pages** of scientific reports will be published in the technical journals of the world during the year 1960 according to the authoritative forecast of Dr. J. P. Nash, Director of Research for the Lockheed Missile and Space Division. Dr. Nash further says that this amount is only a drop in the backet and that noteworthy scientific developments are outstripping the publication capacity of the journals and many American technical magazines are piling up an eleven month backlog of material.

■ **Philco Corporation's Lansdale Division** has followed up completion of its new $3,500,000 transistor plant at Lansdale, Pa., with price reductions on 23 Philco transistors ranging from 13% to 48%. The division has also begun construction of an extension to its 100,000 square-foot Spring City, Pa., plant, opened in 1956.

■ **A new electronic device that** combines into one unit the functions now performed by several units in home entertainment equipment has been announced by the Canadian General Electric Company. The device called a "compactron" will make it possible for manufacturers of radios, television, hi-fi sets and electronic organs to achieve significant size reductions in their products. V. B. Dowdell, manager of marketing for the Electronic Tube Division of C.G.E. predicted that "compactrons" eventually would replace most present day seven and nine-pin miniature tubes as manufacturers continue to reduce product sizes to meet the small package appeal of transistorized entertainment products.

NEW

Simpson

WIDE-VUE
panel instruments

4½"

3½"

2½"

a new concept
in styling and visibility

The clean, graceful lines of these "Wide-Vue" panel instruments add two plus values to your equipment. First, style—ultramodern beauty that blends with the advanced design of today's panels. Second, functionalism—longer scales together with wide-angle readability. The 2½" size, for example, has the same scale length as a conventional 3½" panel instrument. The durable, plastic cover is formed in one piece, and can be supplied with black or color finishes. External magnet type movement or *self shielded* core magnet meter movement.

Bach-Simpson
LIMITED

1255 BRYOGES ST. LONDON ONT.

IN U.S.A.: SIMPSON ELECTRIC COMPANY, 5200 W. KINZIE ST., CHICAGO 44, ILL.

For complete details check No. 7 on handy card, page 47

opportunities

These classified advertisements are published to assist those in the trade who have articles for sale, positions available, positions desired, sales agency openings or business opportunities. Charges are 25c per word or figure, not including heading or box number. Minimum charge is $5.00 payable on submission. No agency commission paid. There is absolutely NO CHARGE for "positions desired" advts.

Send all material to the attention of the advertising manager of ELECTRONICS AND COMMUNICATIONS, 450 Alliance Ave., Toronto 9, Ontario.

P. R. EXECUTIVE

Experienced public relations counsel ready to assume full-time or part-time service for industrial or commercial organization in Ontario. Publishing field background on daily newspapers, business newspapers, trade magazines and house publications as reporter, feature writer, editor and advertising salesman.

Box 137JW
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

DESIGN ENGINEER

seeks change of position. 36 years of age, M.I.A.S., A.R.Ae.S., with 18 years' experience in aircraft and allied industry. Eight years in supervisory capacity, technically responsible for design control and coordination of up to 75 draftsmen and designers. Wide knowledge of electronic packaging techniques for both airborne and ground installations. Specialist in test instrumentation and electro-mechanical control and measurement fields. Available September 1, 1960.

Box 5040
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ENGINEERS, TECHNICIANS

AND

MATERIAL AND QUALITY CONTROL PERSONNEL

FOR PRODUCTION OF

INERTIAL GUIDANCE SYSTEMS

SENIOR AND JUNIOR ELECTRONIC AND MECHANICAL ENGINEERS WITH PRODUCTION AND ADMINISTRATIVE EXPERIENCE.

SENIOR ELECTRONIC AND MECHANICAL TECHNICIANS WITH FIVE YEARS OR MORE EXPERIENCE ON PRODUCTION AND MAINTENANCE OF COMPLEX AIRBORNE ELECTRONIC EQUIPMENT.

FOR THE PRODUCTION IN TORONTO OF LITTON INERTIAL GUIDANCE SYSTEMS AND OTHER LITTON PROGRAMS

APPLY IN WRITING WITH RESUME OF EXPERIENCE AND PERSONAL HISTORY TO:

BOX 5043, ELECTRONICS & COMMUNICATIONS

RELAY SALES ENGINEER

A major supplier of telephone type, electromagnetic relays, requires an experienced sales engineer for the Toronto area. A professional engineer, with experience in the design, manufacture, sales and application of telephone type relays, is preferred, but not essential if technical qualifications and experience are equal. Duties will be to assist the sales force in the application and sale of the products. Reply in confidence giving a full résumé to —

Box 5035
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario.

SALES ENGINEER

required to establish and take full charge of Toronto Office. Applicant must have had previous experience in the sale of electronic components. Must be mature and responsible. Excellent remuneration for right party. For further details contact:

DESSER E-E LTD.
441 St. Francois Xavier St., Montreal, P.Q.
Victor 5-6570

ENGINEERING TECHNICIAN

desires position in Toronto-Hamilton area. 29 years of age, with eight years' experience in production supervision and development of industrial electronic measuring and control equipment.

Box 5037
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ELECTRONICS ENGINEER

seeks technical or administrative position. Ten years' manufacturing experience at project level on vehicular and military airborne communications equipment. Experienced in high performance component selection. Familiar with MIL specifications and environmental testing.

Box 5039
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

INSTRUMENTATION SALES ENGINEER

required for the Toronto area. An excellent opportunity for a young, aggressive and experienced sales engineer. For local interview apply —

Radionics Limited,
8230 Mayrand Street,
Montreal 9, Quebec.

SALES MANAGER

Young executive, able to offer unique background of 14 years in industry, experienced in all phases of sales and marketing of electronic components and equipment; seeks challenging position with dynamic company.

Box 5041
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

TECHNICAL AUTHORS WANTED

The editors of Electronics and Communications magazine are seeking manuscripts on the subject of electronic development and design from Canadian authors. Articles up to a maximum of 3000 words in length accompanied by glossy photographs and/or schematic illustrations are preferred but articles of greater length will be considered. Notification of acceptance of work for publication is given within one week to ten days of receipt of the manuscripts and payment is made on publication. Manuscripts should be addressed to the Editor, Electronics and Communications, 450 Alliance Avenue, Toronto 9, Ontario.

ENGINEERING TECHNICIAN

Engineering or technical assistant position sought by young man seeking more challenging work. Seven years' telecommunications background, both theoretical and practical. Presently employed Montreal area.

Box 5042
Electronics and Communications
450 Alliance Avenue, Toronto 9, Ontario

ELECTRONIC COMPONENT LINES

wanted by well established sales representative company for O.E.M. and Industrial accounts.

Prime Electronic Components Ltd.
868 Dundas Highway East, Dixie, Ontario

REPRESENTATIVES WANTED

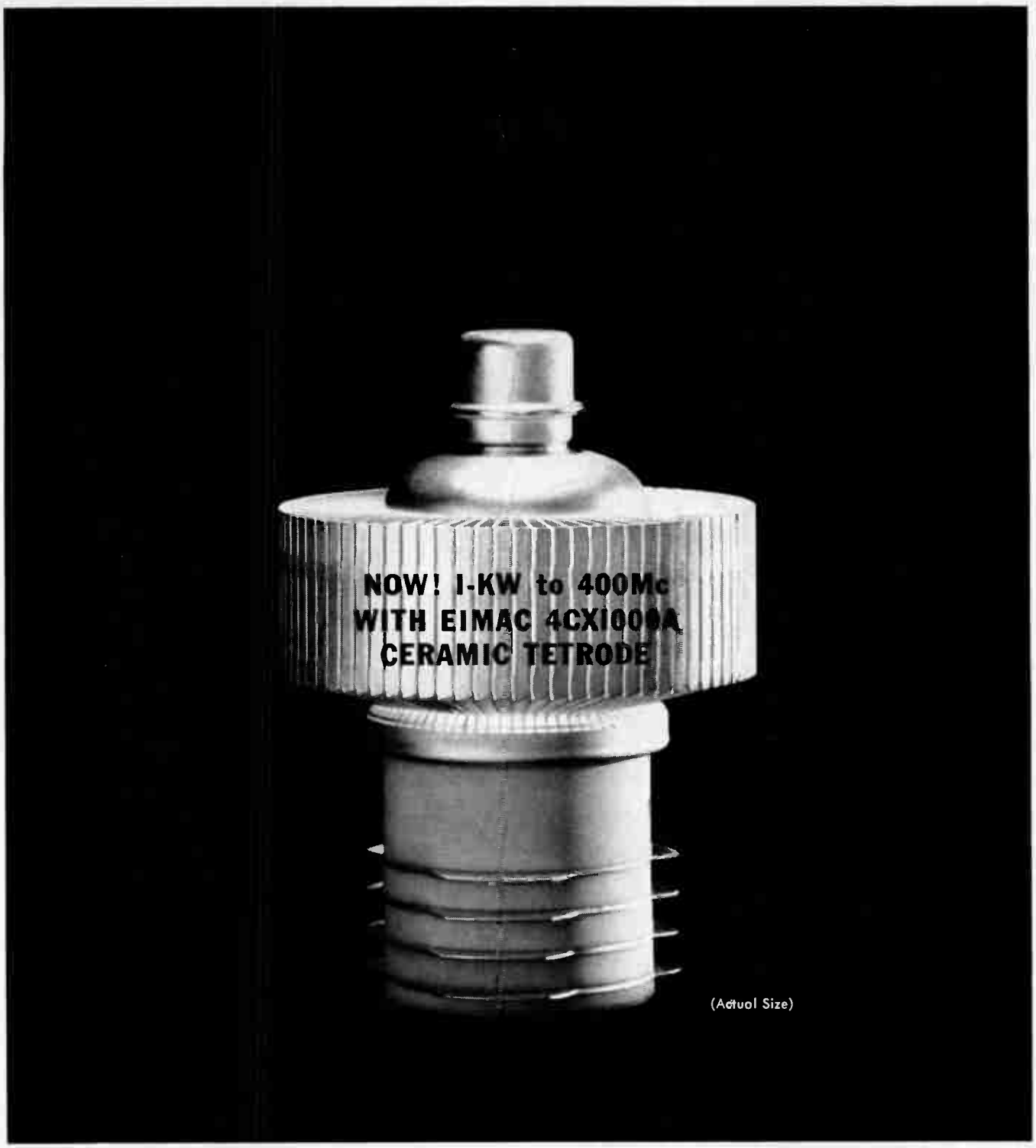
Sales organizations to handle Canadian manufactured Stedivolt AC line voltage regulators in Eastern and Western provinces of Canada. Must be well-established in electronic, electrical and government circles. Reply giving details of history, size, facilities, coverage and commission expected.

George Kelk Ltd.,
5 Lesmill Road,
Don Mills, Ontario

2000 NEW CUSTOMERS AVAILABLE

In September, *Electronics and Communications* will increase its circulation by 2,000 overseas electronics personnel. South America, Australia, New Zealand, Europe and other parts of the globe will all receive copies of Canada's leading electronics publication.

Canada is ideally situated and regarded to do business in these areas. Advertise your wares to these electronics buyers (you have until August 22 — if there are questions call us at RO. 2-7225).



One kilowatt power in a compact ceramic package is now available to 400Mc., with the Eimac 4CX1000A radial-beam power tetrode.

The new, expanded frequency range coverage of the versatile 4CX1000A makes it ideal for AM, FM and SSB operation in the important government communication band, 225-400Mc., and for FM and VHF-TV broadcasting.

An excellent linear amplifier tube, the 4CX1000A has low voltage, high current, high gain characteristics. It achieves maximum rated power output in Class AB_1, SSB service without grid current.

Illustrated here, actual size, it is easy to see why this compact, rugged ceramic tetrode is ideal for tight space, high power situations.

A companion air-system socket to meet your specific requirement is available with the 4CX1000A.

TYPICAL OPERATION 4CX1000A (400Mc FM Amplifier)

DC Plate Voltage	3000 volts
DC Screen Voltage	250 volts
DC Plate Current	750 ma
DC Screen Current	45 ma
Driver Power Output	15 watts
Useful Output Power	1100 watts

EITEL-McCULLOUGH, INC.

Eimac

San Carlos, California

CANADIAN REPRESENTATIVE:
R. D. B. SHEPPARD,
2036 Prince Charles Road, Ottawa 3, Ontario.

6007

For complete details check No. 17 on handy card, page 47

editorial

What the industry thinks of Defense Sharing.

The following question was asked by *Electronics and Communications* at the press conference held in conjunction with the 31st annual meeting of the Electronic Industries Association of Canada held at Mont Tremblant Lodge, Quebec, last June 16 to 17. The answer to the question provided by officials of the Association gives a pretty clear indication of what the industry thinks of the Defense Sharing Program and what measures should be taken to improve the effectiveness of the program in order that the Canadian electronics industry may derive greater benefit from it.

The question posed by *Electronics and Communications* was: "There seems to be considerable disappointment in the Canadian electronics industry with respect to the effectiveness of the United States - Canadian Defense Sharing Program. Can the EIA state its opinion of the worth of the Defense Sharing Program and suggest any means whereby the Defense Sharing Program could be improved on behalf of the Canadian electronics industry?"

The industry's answer to this question was:

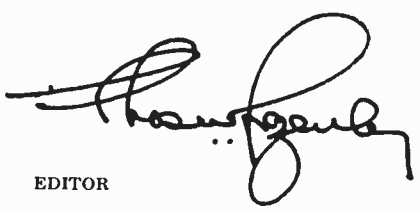
"While the intentions behind the philosophy of Defense Sharing were excellent, and in spite of sincere attempts by both Government and Industry to make this approach work, there are a number of fundamental reasons why it cannot replace the self-sufficiency which this Industry once had. Because of the relative health of the various companies with which Canadian companies must compete in the U.S. and because these U.S. companies are bolstered by enormous Defense Programs in which they have been involved from the basic research and development stage right through to production, it becomes impossible for a Canadian company to compete on equal terms. There have been a few instances where successes have been achieved due to direct negotiation between the two Governments, or because a Canadian firm actually had a 'better mousetrap' to offer. The fact that electronic and communications defense expenditures have dropped from a level averaging in excess of $100 million a year to approximately one-third that amount demonstrates the loss to this Industry in spite of the fact that Defense Budgets are running at approximately the same level as previous years.

"We believe this situation could be improved by placing more of the Canadian requirements with Canadian firms, but more particularly, by placing research and development work with Canadian companies and concentrating these funds into a few specific aspects of Defense which are of interest to the NATO countries as well as to Canada. Wherever posible these areas should represent future potential in terms of commercial products since our Industry must compete with U.S. and Great Britain in the export of commercial products."

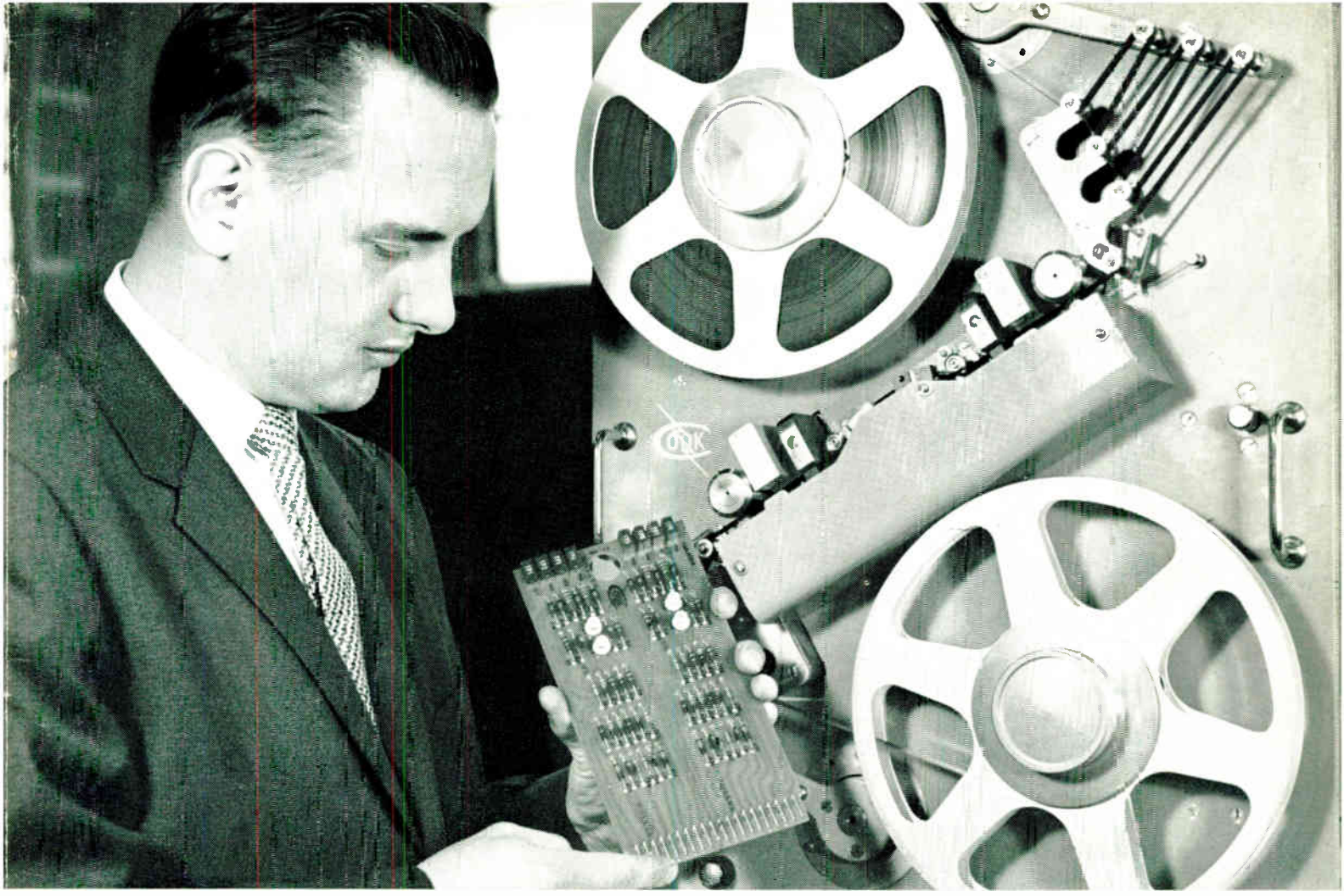
There seems to be little or nothing in the foregoing suggestions offered as a means of stimulating the electronics industry that could not be implemented without delay.

This is especially true in the sphere of research and development for which the Government has already set aside a fund of $5 million, part of which is intended to support the electronics industry through research and development contracts. While it is not known whether any of this money has been allocated to other industries as a means of subsidizing research, it is disconcerting to hear reports that proposals for research and development projects submitted on behalf of the electronics industry have been repeatedly turned down by the Treasury Board.

While it is sufficiently alarming to hear reports of the above nature from Ottawa, it is more alarming to hear whispers that consideration is being given in some Government circles to the entire withdrawal of the $5 million appropriation approved only a short time ago as a means of keeping some spark of technology alive in Canada through Government-subsidized research and development contracts.



EDITOR



Tung-Sol transistors handle critical switching in COOK ELECTRIC high speed tape transport

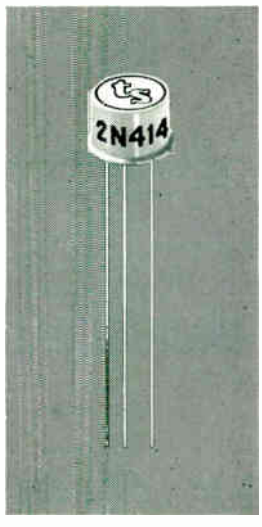
Cook Electric's Model 59 Digital Tape Transport embodies the design know-how gathered by Cook during its 12 years of active participation in missile programs which include the Atlas, Polaris and Titan missiles. It was built to fulfill the demands of modern industry for reliable, high-speed data processing and storage equipment. This tape transport is a direct adaptation of the equipment originally developed to provide unattended, 45-day documentation of the Polaris Missile system.

Gratified with the superior performance demonstrated by Tung-Sol switching transistors in the Polaris version, Cook assigned Tung-Sol units to these critical tasks in the industrial model. Tung-Sol's 2N414 germarium high-speed switching transistors serve in the flip-flop and logic circuits. Here's how Cook engineers evaluated the Tung-Sol semiconductors: "Tung-Sol transistors meet our exacting demands for performance and reliability"

There are many reasons for the superlative performance of all Tung-Sol components. Consider just three: Tung-Sol's exclusive concentration on the technology of component manufacture . . . strict adherence to the highest manufacturing standards . . . a quality control network that's unsurpassed.

If your design requires tubes or semiconductors, or both, specify Tung-Sol. There are many Tung-Sol components for virtually every military and industrial requirement ready to perform with full-life reliability. Our applications engineers will be glad to help you select the components that'll do the best job for you. In Canada: Abbey Electronics, Downsview, Ontario.

Technical assistance is available through the following sales offices: Atlanta, Ga.; Columbus, Ohio; Culver City, Calif.; Dallas, Texas; Denver, Colo.; Detroit, Mich.; Irvington, N. J.; Melrose Park, Ill.; Newark, N. J.; Philadelphia, Pa.; Seattle, Wash. Canada: Toronto, Ont.



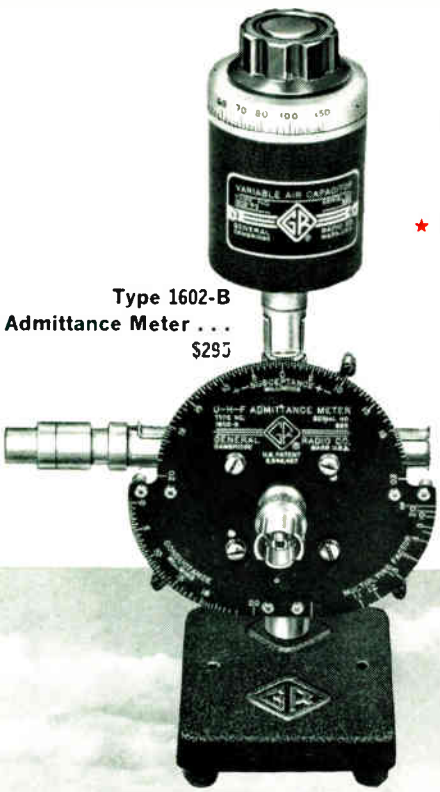
TUNG-SOL®

For complete details check No. 38 on handy card, page 47

Uncomplicate your VHF-UHF Impedance Measurements

Nothing approaches the G-R Admittance Meter in simplicity, ease of use, versatility, and accuracy for admittance, impedance, and VSWR measurements at frequencies from 20 to 1500 Mc.

Its design is basic . . . three coaxial lines, one containing a conductance standard, one a susceptance standard, and one for connection to the unknown, are fed from a voltage source at a common junction point. Each of the lines contains an adjustable loop which samples the field within the line. In making measurements, these loops are adjusted for a null with the aid of an appropriate null detector. (G-R Type DNT Detector recommended.) At null, the settings of the conductance and susceptance loops times a multiplying factor established by a third loop gives the value of the unknown.



Type 1602-B Admittance Meter . . . $295

★ **WIDE FREQUENCY RANGE** . . . 20-1500 Mc; direct reading from 41-1500 Mc; useful for matching to 2000 Mc.

★ **DIRECT READING RANGES** that are independent of frequency
Conductance: 0.2 to 1000 millimhos
Susceptance: ±0.2 to ±1000 millimhos
With ¼-wavelength line between unknown and Meter, scales become direct reading in **Resistance** from 1 to 5000Ω, and **Reactance** from ±1 to ±5000Ω.

★ **EASY TO USE** . . . no sliding balances to chase . . . only three levers to adjust

★ **UNCOMPLICATED CONSTRUCTION** guarantees long, reliable operation and insures that basic ±3% accuracy will be held indefinitely.

★ **SMALL, LIGHTWEIGHT, PORTABLE** . . . ideal for antenna measurements

★ **A WIDE VARIETY OF ACCESSORIES** available to extend versatility:
Balun for measurements on balanced lines and circuits.
Component Mount for measuring circuit elements.
Terminations for measuring reflection coefficient.
Adaptors ranging from BNC to 3½-inch rigid line for measurements with any connector system.
Oscillators and detector systems for complete frequency coverage.

A tribute to the Admittance Meter's versatility is its use at Grumman Aircraft, Bethpage, Long Island. Grumman engineers were faced with the problem of making accurate measurements on developmental aircraft antennas without influencing, by their physical presence, the antenna's radiation pattern or impedance characteristics. As a solution, they mounted an Admittance Meter, a G-R Unit Oscillator, and DNT Detector System inside an aircraft model. Pull cords connected to the Admittance Meter's controls were run out to a remote point where the operator could make his measurements without disturbing the setup. By adjusting the cords and using a surveyor's transit to read the instrument scales, accurate measurements could readily be made.

Write For Complete Information

GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS

our 45th year in Electronics

Canadian Engineering Office in TORONTO
99 Floral Parkway, Toronto 15, Ontario
Arthur Kingsnorth • Richard J. Provan
Tel: CHerry 6-2171
Repair Service: Bayly Engineering Ltd., Ajax, Ontario