DXer's DREAM THAT ALMOST WAS—SHASILAND

Radio-TV EXPERIMENTER

WHITE'S RADIO LOG
AM-FM STATIONS/WORLD-WIDE SHORTWAVE LISTINGS

AUGUST-SEPTEMBER 75c

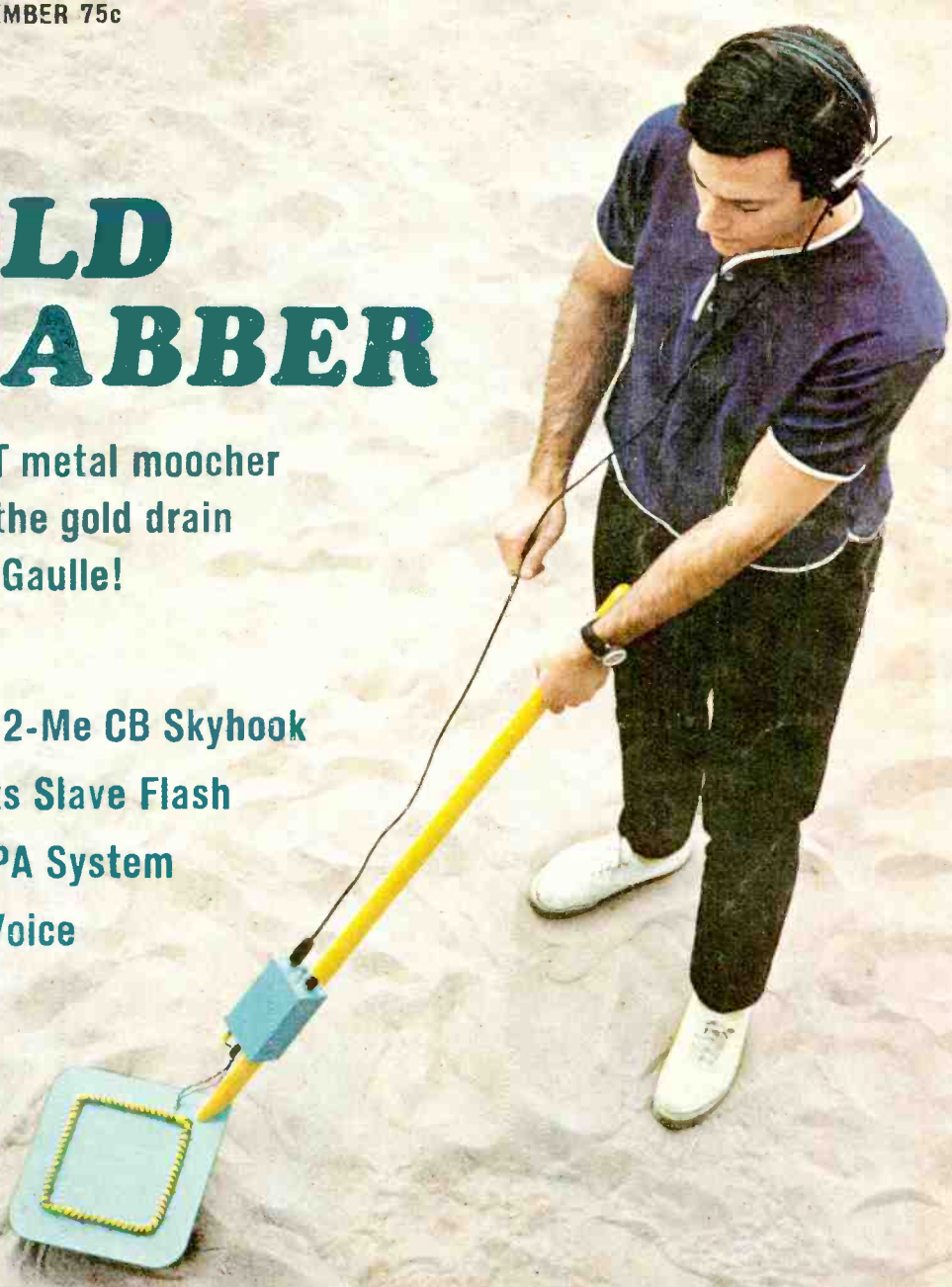
BUILD

GOLD GRABBER

... a 2-FET metal moocher to end the gold drain and De Gaulle!

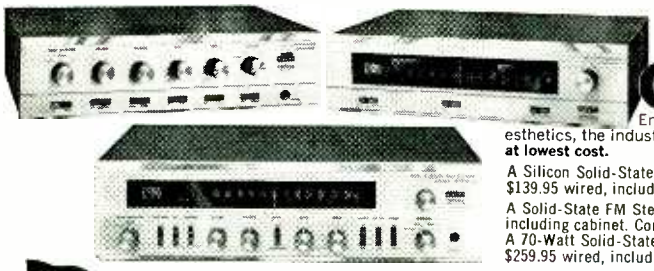
PLUS

- Socket-2-Me CB Skyhook
- No-Parts Slave Flash
- Patrol PA System
- IC Big Voice



EICO Makes It Possible

Uncompromising engineering—for value does it!
You save up to 50% with Eico Kits and Wired Equipment.



Cortina Stereo

Engineering excellence, 100% capability, striking esthetics, the industry's only **TOTAL PERFORMANCE STEREO at lowest cost.**

A Silicon Solid-State 70-Watt Stereo Amplifier for $99.95 kit, $139.95 wired, including cabinet. Cortina 3070.

A Solid-State FM Stereo Tuner for $99.95 kit. $139.95 wired, including cabinet. Cortina 3200.

A 70-Watt Solid-State FM Stereo Receiver for $169.95 kit, $259.95 wired, including cabinet. Cortina 3570.

Eicocraft

The newest excitement in kits.
100% solid-state and *professional*.
Fun to build and use. Expandable, interconnectable. Great as "jiffy" projects and as introductions to electronics. No technical experience needed. Finest parts, pre-drilled etched printed circuit boards, step-by-step instructions.

Electronic Siren $4.95, Burglar Alarm $6.95, Fire Alarm $6.95, Intercom $3.95, Audio Power Amplifier $4.95, Metronome $3.95, Tremolo $8.95, Light Flasher $3.95, Electronic "Mystifier" $4.95, Photo Cell Nite Lite $4.95, Power Supply $7.95, Code Oscillator $2.50, FM Wireless Mike $9.95, AM Wireless Mike $9.95, Electronic VOX $7.95, FM Radio $9.95, AM Radio $7.95, Electronic Bongos $7.95.

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All Solid-State 23-Channel 5W Transceiver. 4 exclusives: dual-crystal lattice filter for razor-sharp selectivity; efficient up-converter frequency synthesizer for advanced stability; precision series-mode fundamental crystals; Small: only 3"H, 8"W, 8¼"D. $189.95 wired only.

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EICO Trans/Match (Model 715) is a professional test set designed for complete checking of ham and CB equipment. Kit $39.95; Wired $59.95.

Truvohm

Professional Portable Multimeters by EICO.
The industry's *greatest* V-O-M values. Designed, made to Eico's high standards of professionalism. Each *complete* with batteries & test leads. Backed 100% by famous EICO warranty.

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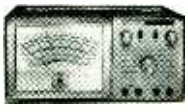
Model 30A3, 30,000Ω/V, $15.95.
Model 20A3, 20,000Ω/V, $12.95.
Model 4A3, 4000Ω/V, $9.95.
Model 1A1, 1000Ω/V, $5.95.

Automotive

EICO 888—Car/Boat Engine Analyzer.
For all 6V/12V systems; 4, 6, 8-cyl. engines.



Now you can keep your car or boat engine in tip-top shape with this solid-state, portable, self-powered universal engine analyzer. Completely tests your *total* ignition/electrical system.

Complete with a Tune-up & Trouble-shooting Manual. Model 888; $49.95 kit, $69.95 wired.

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100 best buys to choose from.

"The Professionals"
—laboratory precision at lowest cost.

Model 460 Wideband Direct-Coupled 5" Oscilloscope. DC-4.5mc for color and B&W TV service and lab use. Push-pull DC vertical amp., bal. or unbal. input. Automatic sync limiter and amp. $109.95 kit, $149.95 wired.

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Radio-TV EXPERIMENTER

August/ September 1968

Cover photo by Leonard Heicklen

RADIO-TV EXPERIMENTER, Vol. 25, No. 1, is published bi-monthly by SCIENCE & MECHANICS PUBLISHING CO., a subsidiary of Davis Publications, Inc. Editorial, business and subscription offices: 505 Park Ave., New York, N.Y. 10022. One-year subscription (six issues)—$4.00; two-year subscription (12 issues)—$7.00; and three-year subscription (18 issues)—$10.00. Add 75c per year for postage outside the U.S.A. and Canada. Advertising offices: New York, 505 Park Ave., 212-752-6200; Chicago: 520 N. Michigan Ave., 312-527-0330; Los Angeles: 1709 W. 8th St., 213-483-3582; Atlanta: Pirnie & Brown, 3108 Piedmont Rd., N.E., 404-233-6729; Long Island: Len Osten, 9 Garden Street, Great Neck, N.Y., 516-487-3305; Southwestern advertising representative: Jim Wright, 4 N. Eighth St., St. Louis, 314-241-1965.

SPECIAL 16-PAGE SECTION

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with any order:

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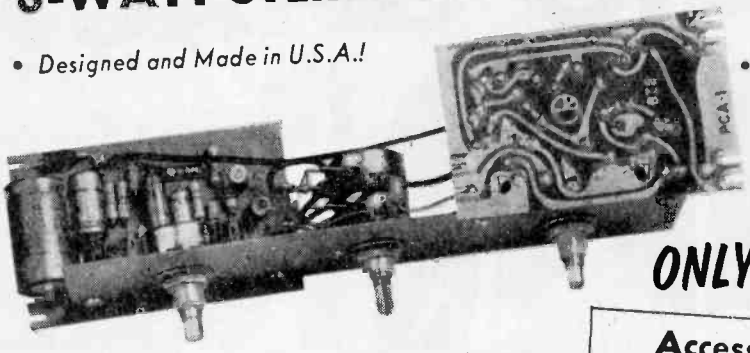
Buy anything (in person or by mail) from the following Radio Shack pages using the order blank on page 20 and we'll automatically include one of our handy "MATH-MILE" COMPUTERS. It's 7½" long and made of tough stock to give years of use. It multiplies and divides as fast as you can twirl the dial. It computes interest, figures percentages, does all kinds of auto computations. For example: you used 12 gallons of gas to drive 180 miles. How many miles did you get per gallon? Set the inner circle 12 against the outer circle 18.0 and read the answer at the black 10. It is 15 — as shown in the illustration. Complete detailed instruction for all computer functions are clearly printed on the back.

Store Addresses, Order Form, See Page 20

GIANT VALUES FOR "SOUND" HOBBYISTS

8-WATT STEREO AMPLIFIER SEMI-KIT

- *Designed and Made in U.S.A.!*
- *A Cinch to Assemble — Just Add Leads!*



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Your chance to scoop up a pre-wired solid state stereo amplifier for only $9.95! Devise your own custom-installation! No engineering skills are required! Just add the leads. 2 volume controls, one for each channel, plus a wide-range tone control. Input impedance is 600KΩ with frequency response from 50-20,000 cps. Operating either on AC or battery, the amplifier accepts 8-16Ω speakers; crystal or ceramic cartridge of AM/FM stereo tuner. Transformerless output circuit. You needn't shop around for other parts. Purchase the accessory kit especially designed for the amplifier (see right). #30-1969

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ONLY 3.95

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Hook Up, Install Anywhere!

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- *Two 8-Inch Round Speakers!* • *No Extras to Buy!*

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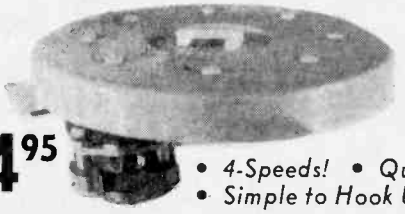

4.95

- *4-Speeds!* • *Quiet!*
- *Simple to Hook Up!*

Use with stereo amplifiers! Vibration-free AC operation assured by rubber shock-mounted friction drive motor. Speed changes controlled by idler driving the 8" metal turntable. 4½ x 3⅜" mounting centers; 2⅛" below base plate. #42-129; #278-1255, AC Line Cord, .39 net.

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- *Simple to Mount!*
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Modernistic 8" tone arm has off-set head, and high output stereo crystal cartridge (2½V) with dual synthetic sapphire styli. Stylus pressure is adjustable by variable spring tension. Comes with finger lift. #42-128

Special Purchase! **Manufacturer's Closeout!**

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3 Record Stereo Set

4.95

- *Studio Quality!*
- *20-20,000 CPS!*

An Audiophile Series standout! 36 selections engineered to bring out the best in any stereo system. Leon Berry at the giant Wurlitzer organ; Al Melgard at the Chicago Stadium organ, and Eddie Osborn at the Baldwin and bongos. 2 hours of entertainment! #50-2000

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- *Studio Quality!*
- *20-20,000 CPS!*

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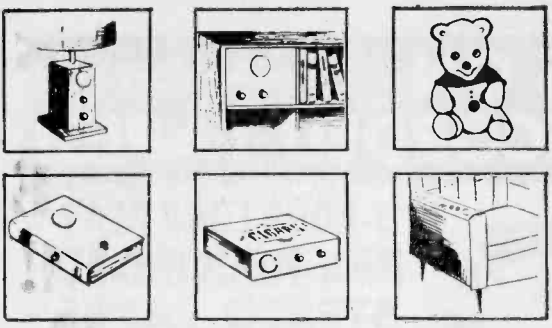


RADIO SHACK 200th STORE CELEBRATION!

What's your project for our "Build In" radio?

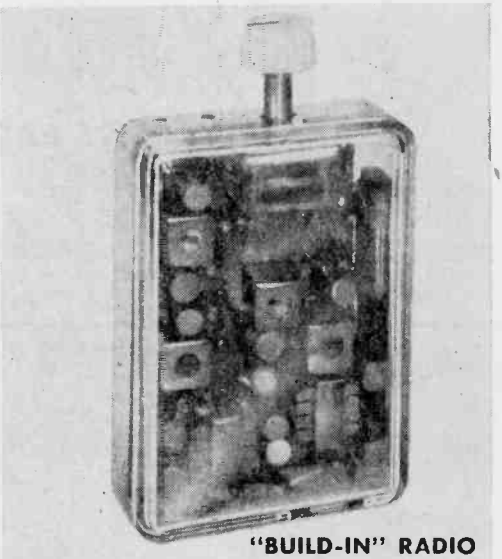
Here's a wired transistor radio in 3 pieces. Dextrous do-it-yourselfers should have a field-day with this one.

You carpenters, metal-workers and gift designers will really appreciate Radio Shack's novel "Build In" — a 6-transistor superhet that's really *a kit that isn't a kit.* Confused? Part *one* is the radio, 100% wired, installed in a crystalline 2¼ x 1 x 3⅛" case with the tuning knob sticking out of one end, and 8 wires out of the other. Part *two* is a separate volume control with built-in switch, knob, and soldered leads. Part *three* is a 2¼" PM speaker installed in a plastic case, with soldered leads.

The three parts (plus a flat 9V battery, not included) can be installed in, on, or under anything, in just about any desired angle or position. And you don't have to be an engineer — Radio Shack's geniuses have provided a simple, idiot-proof lashup pictorial. Now all you need is the price *(just $6.98, Cat No. 12-1150)* and some Yankee ingenuity! Whether you hide "Build In" in a jug of corn likker, junior's wagon or Tillie's sewing box, the result is sure to please.

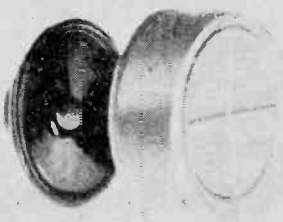
The basic radio itself looks like a little jewel, a real work of art — our photo doesn't do it justice. And the "kit that isn't a kit" is another of Radio Shacks's exciting exclusive products that can't be bought elsewhere. Get a "Build In" at your nearest Radio Shack store.

For Store Addresses, Order Form, See Page 20



"BUILD-IN" RADIO

VOLUME CONTROL AND SWITCH



PM SPEAKER IN CASE

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"50 EASY TO BUILD SOLID STATE PROJECTS"

Build your own transistor radios, electronic organs, amplifiers, code oscillators, megaphones, generators, etc. Ideal for hobbyists.

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EACH BOOK $2

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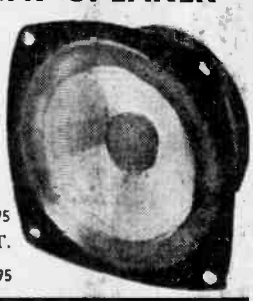
BUILD "EI'S" MIGHTY SUB-MINI SPEAKER

4" Acoustic Suspension FE-103 Speaker System!



The fabulous Realistic FE-103, complete with cabinet construction details as published in Electronics Illustrated! 30-17,000 cps; 15 watts; 8 Ω.

7.95

40-1197, FE-103, Wt. 5 lbs. Net 7.95

CONTOUR NETWORK KIT. With instructions.
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For Transistor Radios

98¢

Resp. 50-9000 cps. With replaceable earplug, cord. 10 ohms.
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Wide-range dynamic phones for mono or stereo! 8Ω, matching 4-16Ω.
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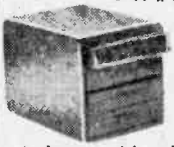
6"H x 8¼"D x 5¾"W



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6"Hx8¼"Dx 5¾"W

99¢

Over 600 pieces! Something here for everyone! All brand new—no sweepings! One full pound. Comparable value: $4.50!
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FABULOUS THERMO-ELECTRIC GLUE GUN REALLY WORKS!

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No Clamping! No Cleaning!

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1,000's of Home, Office, Auto Uses!

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10¢ Each For 10 — **15¢** Each Singly — **25¢** Per Pair

10 FOR 1.00

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NEW Science Fair™ ELECTRONIC KITS

Recommended by Reviewers, Educators!

Created by Radio Shack Engineers to give youngsters and adults alike a ground floor introduction to the theory and practice of modern electronics. You build the way the "pros" do — by breadboarding — so soldering is easy. You can move or interchange parts, even create additional experiments. Detailed pictorials and schematic diagrams, add-on ideas, and all necessary parts are included in each fascinating project. An excellent classroom tool!

NEW! EXCITING! EASY TO BUILD!

Science Fair™ SIREN KIT

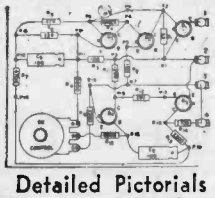
- *Ear-Splitting Volume!*
- *A Great Burglar Alarm!*
- *Loud Automatic "Rise-Fall" Sound!*
- *Adaptable for Bikes!*

5.95

Construct a powerful "rise-fall" oscillator that doubles as a siren or burglar alarm! A wailing sound very similar to a police siren can be produced with ear splitting volume loud enough to be heard on a crowded street. The alarm circuit is completely automatic; no button has to be pushed to control the oscillator's "wailing" rate. Use as a burglar alarm to protect your home while you're away. When activated, a simple micro-switch strategically located in a doorway, window or vehicle, turns the oscillator on at full blast to deter any intruder.

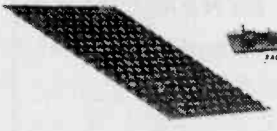
23-468,	AA Battery. 4 Req. (Portable use) Ea.	.10
270-383,	Battery Clip for above	Net .45
28-107,	Siren Kit, Wt. 1 lb.	Net 5.95
23-006,	6V Lantern Batt. (Normal)	Net 1.19
23-541,	6V Lantern Batt. (Heavy duty)	Net 2.59

EACH KIT IS COMPLETE — NO EXTRAS TO BUY! EACH INCLUDES A STEP-BY-STEP INSTRUCTIONAL MANUAL PLUS ADDITIONAL IDEAS FOR SCHOOL AND HOME USE!



Detailed Pictorials

All Necessary Parts



Perf-Board Construction

Add-On Ideas

11 KITS TO CHOOSE FROM:

28-102,	2-Transistor Radio Kit 3.95	28-106,	"OTL" Audio Amplifier Kit ... 4.95
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In Stock at Any One of the
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NEW from RADIO SHACK

Science Fair™

BATTERY KIT

Make 2 "D" Batteries

ONLY 1.25

Learn the Basics of Electrochemistry

- *All Parts and Accessories for Making 2 Working "D" Cells*
- *8-Page Instruction Manual*

The ideal project kit — developed and endorsed by educators — for youngsters from 7 to 16! Contains all material needed for making 2 Radio Shack 50% Longer-Life "D" Batteries, plus step-by-step instruction manual, theory of operation, and suggested practical experiments. Completed batteries are top-quality and usable wherever needed!

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Science Fair™ 50-IN-1

ELECTRONIC PROJECT KIT

17.95

- *Makes 50 Different Projects*
- *Safe — No Soldering — No AC*
- *All Solid State Circuitry*
- *15 Solar Energy Projects*
- *62-Page Illustrated Manual!*

Imagine! Now you can get one of the biggest bargains in electronic kits ever offered — and enjoy the "fun" way to learn the theory of electronics! Build 50 different projects as you learn. Packed (in hardwood case) with everything you need. Read some of the things you can build: home broadcasting station, electronic "organ," germanium radio, one- and 2-transistor radios, morse code key, telephone, radio telegraph, transistor amplifier, wireless phonograph amplifier, oscillator tester, signal tracer, field transistor testers, continuity tester, sensitive galvanometer, Wheatstone bridge, A.C. bridge, solar telemeter, sound level meter, photometer, water purity indicator, light-powered oscillator, electronic metronome, telephone amplifier. And these are only SOME of the things you can build from this king-sized 50-in-1 kit!

28-201, Ship. wt. 5 lbs. ..... Net 17.95

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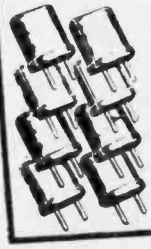
CB'ers MOBILE REALISTIC® TRANSCEIVERS!

REALISTIC® 12-CHANNEL SOLID STATE CB TRANSCEIVER

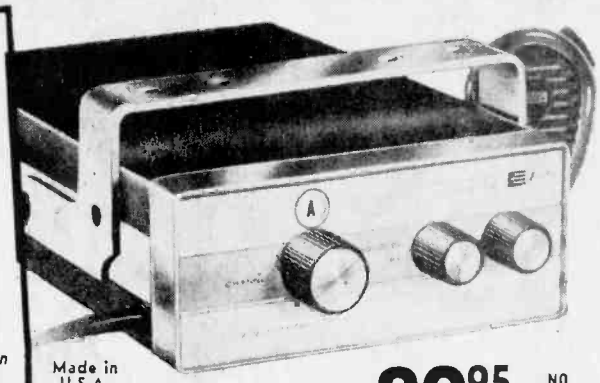
FREE
CRYSTAL BONUS!
With Purchase of TRC-15



4 SETS OF CRYSTALS

Channel 11 Installed in Set; YOUR CHOICE OF 3 ADDITIONAL CHANNELS — FREE!

A Regular $19.92 Value When Crystals Purchased Separately



Made in U.S.A.

Model TRC-15 89.95 NO MONEY DOWN

The $100-quality 2-way radio for any 12V (neg. ground) car, truck or boat! 5 full watts of input power; 1 μv sensitivity; solid 100% modulation! Includes built-in ANL; provision for connecting PA speaker. Complete with set of Ch. 11 crystals, push-to-talk mike with coiled cable, adjustable mounting bracket, DC cable, instructions.
21-033, Sh. wt. 5 lbs., 8¼x5⅝x2⅜" ..... Net 89.95

★ *13 Silicon Transistors; 4 Diodes!* ★ *12 Crystal-Controlled Channels!* ★ *Illuminated Channel Selector!* ★ *Adjustable Squelch!* ★ *Electronic Antenna Switching!* ★ *No Warm-Up Delay!* ★ *Die-Cast Panel; Extruded Trim!* ★ *Provision for PA!*

REALISTIC® 12 CHANNEL CB TRANSCEIVER

Single Crystal Operation for Receive and Transmit

99.95

- *Solid State Circuitry!*
- *Dual Conversion 6.2 MHZ and 455 KHZ for Greater Sensitivity & Selectivity!*
- *Mechanical 455 KHZ Filter!*
- *Push-to-talk Dynamic Mike!*

A truly versatile communications package. Incorporates advanced frequency synthesis technique used on higher priced models, the TRC-18 transmits and receives with only one crystal per channel. Up to 3-watts output with a full 5 watts of RF input. Low battery drain in any 12 VDC neg. ground vehicle. Adjustable squelch control; automatic noise limiter; illuminated channel selector and meter. Sensitivity: 0.5 μv for 10 db S+S/N. With cords, brackets, crystal for channel 11. 7½" x 6⅜" x 2⅛".
21-120, Ship. Wt. 8 lbs. ..... Net 99.95

TRC-24 23-CHANNEL CRYSTAL-CONTROLLED TRANSCEIVER

- *18 Transistors, 4 Diodes!*
- *Low Battery Drain!*
- *Antenna Changeover Relay!*
- *Synthesizer Circuitry!*
- *Illuminated S Meter and Channel Selector!*
- *Chrome and Wood Grain Front Panel!*

ALL CRYSTALS SUPPLIED!

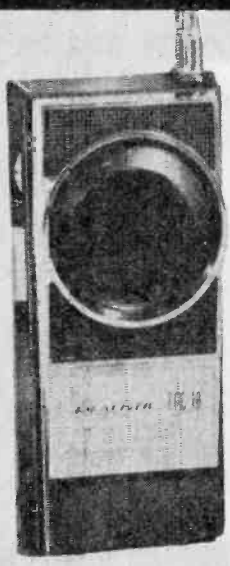
ONLY 6"x7"x1¾"

139.95 No Money Down

Obsoletes all 23-channel crystal-controlled CB transceivers! 0.25 μv sensitivity at 10db S/N! Includes adjustable squelch, automatic series gate noise limiter . . . all wanted features! 12 VDC neg. ground. Plug-in ceramic mike, fusable DC cable, bracket, instructions.
21-124, Sh. wt. 6 lbs. ..... Net 139.95

For Store Addresses, Order Form, See Page 20

CB WALKIE TALKIE VALUES!



TRC-1B 7-Transistor Superhet

13.95 Each

- *Low in Cost — High in Quality!*
- *Compact and Lightweight!*
- *With Push-Pull Audio Output!*
- *100MW — No License Needed!*
- *Rugged Die-Cast Front Panel!*

More RF output power, more audio and greater sensitivity than most others in its price class! Push-pull audio output modulator, 1 diode, on/off volume control switch, and 45" 10-section telescopic antenna. Includes set of crystals for Channel 11, battery, and carry strap. 6 x 2½ x 1½".
21-102, Ship. wt. 2 lbs. ..... Net 13.95

NOW — SAVE UP TO 15% OFF OUR ALREADY LOW, LOW PRICES!

1-WATT 3-CHANNEL TRC-44B

- *Adjustable Squelch!*
- *Automatic Noise Limiter!*
- *Push-Pull Audio Output!*

SAVE $5.00
REG. $44.50
SALE 39.50 Each

Plenty of sock! Exclusive "lock-switch" for continuous transmit; Beep Signal feature; separate microphone and speaker! Has 12 transistors, 3 diodes and a thermistor. With set of Ch. 11 crystals, batteries, telescoping antenna, carry strap. 9x2¾x2"
21-106, Sh. wt. 5 lbs. ..... Sale 39.50

1½-WATT 2-CHANNEL TRC-66

- *Center-Loaded Telescopic Antenna Increases Effective Radiated Power!*
- *Battery Meter Indicator!*
- *Beep Signal!*

SAVE $10
REG. $59.95
SALE 49.95 Each

15 times the power of 100 MW units! This husky feature-packed unit has 14 transistors, 4 diodes and 1 thermistor, plus ANL and "DX-boost" for better modulation. With crystals, batteries, earphone.
21-105, Sh. wt. 5 lbs. ..... Sale 49.95

EASY-TO-USE =MICRANTA TEST EQUIPMENT!

1,000 OHMS/VOLT MULTITESTER

SPECIAL!

3.95 Factory Wired

Our Regular $5.95

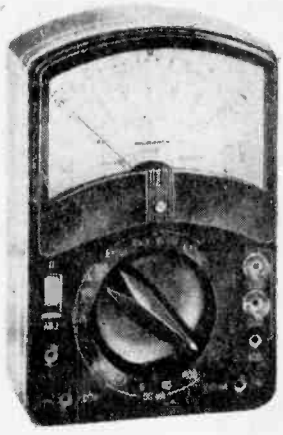
- *Convenient Thumb-Set Zero Adjustment!*
- *Reads AC/DC Volts in 3 Ranges: 0-5, 150, 1000!*

Only 3½ x 2⅛ x 1"!

Great for home or workshop! Pin jacks for all 5 ranges; 2-color 1¾" meter scale. DC Current 0-150 ma. Resistance: 0-100,000 ohms. Accuracy is ±3% of full scale value on DC ranges, ±4% of full scale on AC ranges. A rugged black bakelite case. Comes with pair of color-coded test leads, instructions, battery.

22-4027, Ship. Wt. 1 lb. ..... Net 3.95

30,000 Ω/V 26-RANGE MULTITESTER



16.95 Factory Wired

- *30,000 Ohms/VDC!*
- *15,000 Ohms/VAC!*
- *Single Knob Selector!*
- *Easy-to-Read Meter!*

Makes easy work of the big jobs with precision 1% resistors and recessed zero ohm adjustment! DC volts: 0-0,6/3/15/60/300/600/1200/3000; AC volts: 0-6/30/120/600/1200. Resistance: R x 1/100/1000/10,000. Current (ma): 0-0.03/6/60/600. −2 to +63db in 5 ranges. With leads, instructions, battery.

22-049, Wt. 2 lbs. ..... Net 16.95

50,000 OHMS/VOLT MULTITESTER

27.95 Factory Wired

- *4" Full View Meter with Mirrored Scale!*
- *Meter Protection Circuit!*
- *1% Precision Resistors!*
- *26-Ranges!*

Only 7 x 5½ x 5⅝"!

Great for technicians, mechanics and hobbyists. Specs: DC volts: 0-0.5-2.5-10-50-250-500-1000V @ 50,000 Ω/volts. AC volts: 0-2.5-10-50-250-1000V @ 12,500 Ω/volts. DC current: 0-25ma-2.5ma-250ma-1 amp-10 amps. DC Resistance: 0-10,000/100,000/1 meg./10 meg-ohms. Center scale: 90/900/9000/900,000 ohms. Decibels: −20 to +62 (5 Ranges).

22-150, Ship. Wt. 5½ lbs. ..... Net 27.95

For Store Addresses, Order Form, See Page 20.

=MICRANTA 6½" VTVM METER

39.95 Factory Wired

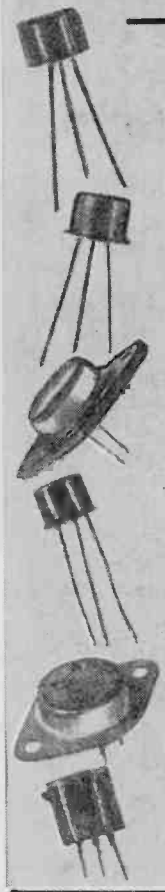
- *Precision Resistors!*
- *Measures Peak-to-Peak and RMS (7 Ranges on Each Function)!*
- *Frequency Response: 30 cps to 10 mc!*
- *Easy-to-Read 2-Color Full View Mirrored Scale!*

Features a zero-center scale for alignment of FM-TV detector circuits. Specs: AC volts: RMS 0.1 to 1500 V. (7 ranges); DC volts: 0.1 to 1500 V. (7 ranges). Peak-to-peak 4-4000 V. (7 ranges). Output −20 db to +65 db (7 ranges). Resistance: 0.2Ω to 1000 meg-ohms (7 ranges). Tubes: 12AU7, 6AC5 and SR1A. Power: 117 VAC, 50/60 cycles.

22-025, Ship. Wt. 7 lbs. ..... Net 39.95

SEMI-CONDUCTORS FOR THE HOBBYIST

ARCHER Replacement Transistors



PNP TYPES

For high frequency, RF-IF, and converter circuits. Replaces: 2N247, 2N248, 2N252, 2N267, 2N274, 2N308, 2N309, 2N310.
276-412, Wt. 3 oz. 1.29

For mixer/oscillator converter circuits. Replaces: 2N112, 2N113, 2N114, 2N135, 2N136, 2N137, 2N140, 2N175, etc.
276-401, Wt. 3 oz. ..... .99

For universal IF circuits. Replaces: 2N111, 2N112, 2N139, 2N218, 2N219, 2N315, 2N366, 2N406, etc.
276-402, Wt. 3 oz. ..... .99

For 6 volt audio circuits. Replaces: 2N77, 2N104, 2N105, 2N107, 2N109, 2N130, 2N131.
276-403, Wt. 3 oz. ..... .99

For 12 volt audio circuits. Replaces: 2N36, 2N37, 2N38, 2N41, 2N43, 2N44, 2N45, 2N46, etc.
276-404, Wt. 3 oz. ..... .99

For 9 volt audio circuits. Replaces: 2N188, 2N189, 2N190, 2N191, 2N192, 2N195, 2N196, 2N197, etc.
276-405, Wt. 3 oz. ..... .99

For auto radio AF amplifier circuits. Replaces: 2N176, 2N178, 2N179, 2N234, 2N235, 2N35B, 2N236, 2N242, etc.
276-406, Wt. 3 oz. 1.19

For high power AF circuits in auto radios. Replaces: 2N173, 2N174, 2N277, 2N278, 2N441, 2N442, 2N443, 2N1515, etc.
276-407, Wt. 3 oz. 2.29

Silicon Epoxy high gain. Replaces: 2N940-2N946, 2N2333-2N2337, 2N3548-2N3550.
276-420, Wt. 3 oz. .... Net 1.09

Silicon Epoxy medium gain. Replaces: 2N1132, 2N923-2N928, 2N2372, 2N859, 2N865.
276-421, Wt. 3 oz. ..... Net .99

NPN TYPES

For mixer/oscillator converter circuits. Replaces: 2N193, 2N194/A, 2N211, 2N2-12, 2N233, 2N234, 2N357, 2N358.
276-408, Wt. 3 oz. 1.09

For universal IF amplifier circuits. Replaces: 2N98, 2N99, 2N100, 2N145, 2N146, 2N147, 2N148, 2N149, etc.
276-409, Wt. 3 oz. 1.15

For 9 volt AF amplifier circuits. Replaces: 2N35, 2N169A, 2N213, 2N214, 2N228, 2N306, 2N312, 2N313, etc.
276-410, Wt. 3 oz. ..... .99

For 12 volt AF amplifier circuits. Replaces: 2N306A, 2N445A, 2N446A, 2N447A, 2N556, 2N557, 2N587, 2N649, etc.
276-411, Wt. 3 oz. ..... .99

Silicon Epoxy high gain. Replaces: 2N3704-2N3709, 2N3415-2N3417, 2N3877.
276-422, Wt. 3 oz. .... Net 1.09

Silicon Epoxy Medium gain. Replaces: 2N706TPP, 2N3663, 2N3843A, 2N3900, 2N3901, etc.
276-423, Wt. 3 oz. ..... Net .99

Integrated Circuit Specials!

1.98 Up

- *Ideal for the Hobbyist, Builder, Experimenter!*
- *Fantastic Savings!*

New from Radio Shack! Resistor-Transistor Logic type ICs are ideal for builders, hobbyists, labs, industry etc. Guaranteed to be 100% perfect electronically and mechanically. Each comes complete with diagram and lead locations. Power requirements: 3 volts. Flat Pak type. Size ¾ x 5/16 x 1/16".

DUAL 3 INPUT GATE. Can be used as a 6 input microphone mixer. Contains up to 6 transistors & 8 resistors in pak. Elements can be used parallel to increase current capabilities.
276-430, Wt. 3 oz. ..... Net 1.98

DUAL JK FLIP-FLOP. Construct your own binary computers, digital adding machines, etc. Contains up to 25 transistors and 32 resistors per pak.
276-431, Wt. 3 oz. ..... Net 2.49

For Store Addresses, Order Form, See Page 20

Silicon Field-Effect Transistors

1.98

- *High Impedance Input!*
- *Low Noise! High Gain!*
- *Characteristics Similar to Pentode Vacuum Tube!*

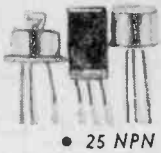
1000's of applications where pentode tubes are used in low level circuits: field strength meters, "gate dippers," receivers, flea power transmitters, etc. TO-5 case. Includes specifications.
276-664, Sh. wt. 2 oz. ..... Net 1.98

Hard-to-Find IBM Component Boards

8 For 1.00

All quality American made parts. Each board contains at least two transistors, plus loads of other components: resistors, capacitors, coils, diodes, modules, chokes, and heat sinks. Size: 2⅜ x 3⅞".
276-617 ..... 8 for 1.00

NEW! Twin-Pak Transistor Kit

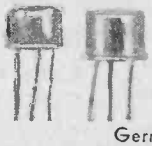


1.98 Pak of 50

- *25 NPN • 25 PNP*
- *Silicon & Planars Included*

A sensational value! Full-length leads; ideal for RF applications, switching and general-purpose audio use. Silicon and planar types included to provide replacements for many popular numbers without circuit change. Think of it — less than 4¢ per transistor!
276-1516, Wt. 2 lbs. ..... Net 1.98

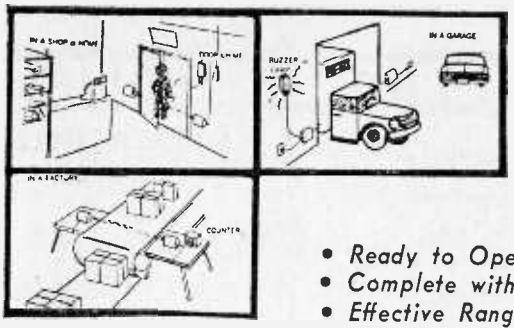
100-Pc. Jumbo Pak Assorted Transistors



3.98

Includes Germanium & Silicon

PNP and NPN's in assorted cases, TO-1, TO-5, TO-3, TO-22, etc. Ideal for RF, IF, OSC., audio and power.
276-544, Sh. wt. 1 lb. ..... Net 3.98



ARCHER

PHOTO-ELECTRIC RELAY SYSTEM

- *Ready to Operate — Not a Kit!*
- *Complete with Exciter Lamp and Photo-Cell Receiver!*
- *Effective Range: up to 50 Feet!*
- *Each Unit Is Separately Powered!*

ONLY 19.95

The ideal multi-purpose photo-relay for business, retail store, home or warehouse use! System consists of an exciter lamp and photo-cell receiver, each housed in a rugged metal case. Both plug into standard 117 VAC house current. The system can be used (with bell or buzzer) to signal when someone enters a room and "breaks" the beam; to count people or objects; or to trigger an alarm to deter intruders. A variable sensitivity control adjusts for ambient light level, or can be used to inactivate the system temporarily. Each unit 5½x4x2⅞".
275-489, Sh. wt. 6 lbs. ..... Net 19.95

RADIO SHACK "EXTRA-LIFE" BATTERIES

- *50% Longer Life!* • *Higher Lumen Output!* • *Higher MNO Content!* • *Steel Encased with Anti-Corrosive Caps!*

Radio Shack's new 50% Extra Life cells yield fresher, longer life without sacrificing "shelf life," or adding weight. Ideal for radios, recorders, flashlights, etc. Designed to exceed U.S. Government standards! Buy 'em by the box — save more!

Fig.	Cat. No.	RADIO SHACK	Interchangeable with Eveready	Burgess	RCA	Pack	Per Box
A	23-1538	1.5V "D" Cell	950	2	VS036	4/.98	24/5.59
B	23-478	1.5V "AA" Cell	915	Z	VS034A	4/.69	72/9.95
C	23-153	1.5V "C" Cell	935	1	VS035A	4/.88	24/4.49
D	23-152	9V Rect.	216	2U6	VS323	2/.98	50/19.95

AMAZING HOME BATTERY CHARGER

4.95

Don't Discard Your "Dead" Batteries!

Accepts All These Types:

- *1½V "AA" Cells* • *"D" and "C" Cells*
- *9V Transistor Radio Batteries*

Count the number of batteries you use around the house right now — then count how much you'd save by recharging them over and over again. End replacement costs! Get the handy battery charger that plugs into any 117 VAC house outlet and recharges batteries overnight! Accepts up to 4 batteries at a time. Cannot overcharge or burn out. Start saving money today!
270-1526, Sh. wt. 1½ lbs. ..... Net 4.95

ANY ARCHER-PAK ON THIS PAGE **$1** PER PAK

RADIO SHACK 200th STORE CELEBRATION!

20 Power Resistors

Package consists of high-quality vitreous, cand-ohm and wire-wound types. Includes 5 to 25-watt power resistors; individual catalog net — $10!
271-1202, 2 lbs. ..... Net 1.00

35 Precision 1% Resistors

Large assortment of popular ½, 1 and 2-watt values; includes encapsulated, bobbin, carbon film, etc. Made by Aerovox, Shellcross, IRC, and other famous names.
271-1196, 1 lb. ..... Net 1.00

50 Tubular Capacitors

An assortment of quality tubular capacitors, 100 mmf to .1 mf to 600 WVDC. Includes molded, paper and porcelain types. $10 if purchased individually from catalog!
272-1568, 1 lb. ..... Net 1.00

4 Subminiature 455KC IF Transformers

Slug tuned, made for printed circuitry mtg., shielded. Size: ⅜ x ⅜ x ½".
273-515, ¼ lb. .... Net 1.00

8 Sets - RCA Plugs & Jacks

Quality items, ideal for use in phono amplifiers, tuners, recorders, etc. Take advantage of this Radio Shack Special low price!
274-1575, ½ lb. ..... Net 1.00

40 Micro Resistors

World's smallest ¼-watt carbon type resistors! All have axial leads; built for transistor and subminiature circuitry! Assorted values, with resistor color code chart.
271-1574, ½ lb. ....Net 1.00

40 Coils and Chokes

Shop assortment consisting of RF, OSC, IF, parasitic, peaking and many more types. Individually purchased, this would cost you $15!
273-1569, 1 lb. ..... Net 1.00

50 Mica Capacitors

Famous name micas — Aerovox, Sangamo, C.D., etc. This assortment includes popular values 100 mmf to .01 mf, as well as silver type condensers. A $10 catalog net value!
272-1573, 1 lb. ..... Net 1.00

8 Volume Controls

Most Popular Values

Contains 8 assorted values including long and short shaft types. A tremendous bargain for servicemen!
271-127, 1 lb. ..... Net 1.00

Special! 50 Capacitors

Assortment of many types including disc, ceramic, mylar, temperature coefficient, molded, paper, oil, Vit-Q. You save $9 over industrial net catalog prices!
272-1199, 1 lb. ..... Net 1.00

60 Half-Watt Resistors

Made by Allen Bradley and IRC. Many 5% and 10% tolerance. Color chart. All most popular values. An absolute "must" for hobbyists and kit-builders.
271-1612, 1 lb. ..... Net 1.00

50 Ceramic Capacitors

Wide variety of popular values by Centralab and other famous-name makers. 10 mmf to .04 mf to KV. Assortment includes tubulars, discs, NPO's, temp. coefficient, etc.
272-1566, 1 lb. .... Net 1.00

40 Terminal Strips

You get a wide variety of screw and solder lug type terminal strips with 1 to 6 lugs. Outstanding value at this low price! 101 uses for the builder and experimenter.
274-1555, 1 lb. ..... Net 1.00

40 Disc Type Capacitors

A varied assortment of types, including NPO's, Hi-Q, N-750's, mylar and ceramic. 10 mmf to .01 mf to 6 KV. A $10 catalog net value!
272-1567, ¼ lb. ..... Net 1.00

150' of Hook-Up Wire

Assortment consists of 6 V rolls of 25' each — solid and stranded wire. #18 through #22. Necessary for multitude of jobs and always useful!
278-025, ½ lb. ..... Net 1.00

40 One-Watt Resistors

Here are resistors for hundreds of uses! Assortment has Allen Bradley and IRC carbons, with 5% values included. This pack is a regular $8.00 catalog net!
271-1576, 1 lb. ..... Net 1.00

4 Transistor Transformers

Made by UTC and Remington Rand. Famous miniatures. Includes sub-ouncer, mike, input types. Color coded leads.
273-1581, 1 lb. ..... Net 1.00

$25 SURPRISE PACKAGE!

Loaded with Parts! $1

The biggest surprise package yet! Enough electronics components to make your eyes pop! Resistors, capacitors, condensers, diodes . . . your guess is as good as ours. The famous-make parts are worth *at least* $25.00!
270-1251, 1 lb., Net 1.00

50 Plugs and Sockets

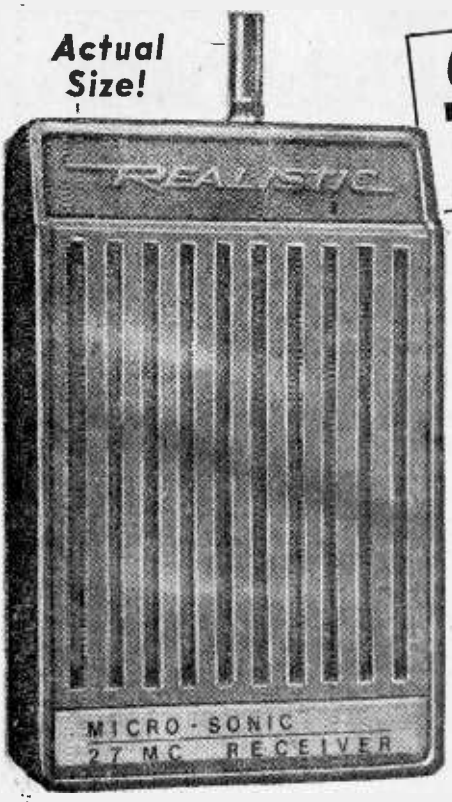
Ideal bench assortment for servicemen, hams, etc. Subminiature and printed circuit types included! This assortment saves you $10 over individual catalog prices!
274-1562, 1 lb. ..... Net 1.00

30 2-Watt Resistors

These quality 2-watt resistors are non-inductive, magnetic film, carbon types. Many with 5% values. Made by famous-name manufacturers.
271-1211, ½ lb. ... Net 1.00

For Store Addresses, Order Form, See Page 20

RADIO SHACK EXCLUSIVE! ADD A SLAVE "WALKIE" TO YOUR BASE, MOBILE, OR WALKIE TALKIES!



Actual Size!

ONLY 7.95

Crystal-controlled superhet receiver ONLY! Add as many ears to your network as you want. Fits in a shirt pocket — an excellent paging or guided tour device!

This unusual Radio Shack product, called the Realistic Microsonic 27MC Receiver, comes complete with a Ch. 11 CB crystal — and because it's a plug-in, it can be changed to any of the 23 channels. It's a teeny 3½ x 2½ x 1⅜". It includes an earphone with clip, and the phone's lead acts as the antenna. So if you want to hide it away as a pager, there's nothing showing. For DX we've included a 16" telescopic whip to be used only if necessary. Let your imagination run wild with this novel device!

21-109 Microsonic 27MC Receiver ..... Only 7.95

NEW IDEA #2 — as a companion to the above, or a wireless CB microphone (!), there's also the Realistic Microsonic CB transmitter. Same size, color, everything. But transmit only, 100mw of course, with plug-in crystal for Ch. 11. Uses? For example: one of these plus x-number of receivers and you have a guided tour technique that'll never quit!

21-110 Microsonic CB Transmitter ..... Only 7.95

FREE ACCESSORIES:

- **Receiver — earphone and whip antenna**
- **Transmitter — 35" telescopic antenna**

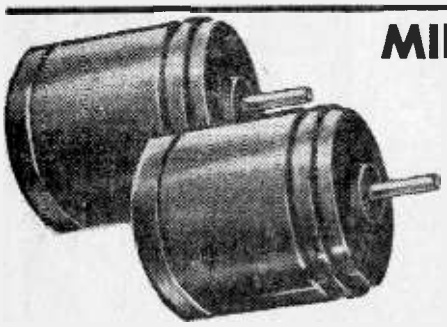
Note: both units include crystals but require a 9V transistor battery to operate. 23-464, 29¢ each.

100 MW TRANSMITTER AND REMOTE CONTROL

3.99 *Perfect as a CW Transmitter or Wireless Mike!*

Loads into almost any antenna; 100 milliwatt output; plays into any CB set. Use as low-power CB transmitter, band marker, or signal generator. Range to ¼ mile, uses plug-in crystal (not supplied). Get yours now at Radio Shack's low price!

21-1166, Sh. wt. ½ lb. ..... Net 3.99



MINIATURE 6V SYNCHROS

For All Remote Control Applications

Ideal for:

- *Amateur & CB Beam Antennas*
- *Weathervanes and Other Indicating Uses*

4.44 Pair

Used originally in aircraft equipment. Compact, ruggedly built. Operate on 26 VAC @ 400 cycles. Guaranteed to operate efficiently at 6 VAC @ 60 cycles. With wiring diagram. Size 1⅝ x 1⅛"; shaft ⅛ x ½".

273-2006, Ship. wt. 1 lb. ..... Pair 4.44

273-050, 6.3 VAC Transformers ..... Net 1.19

Now Everyone Can Own a Second Telephone!

Standard Desk Telephone

Ready to Install 8.95

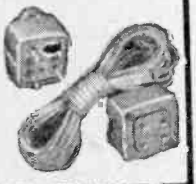
- Save Time!
- Save Steps!
- Save Money!

Enjoy the extra convenience of an extra phone! Our most popular style; it's modern, low-cost, and easy to install. Each phone is factory reconditioned to give trouble-free setvice. Bakelite body and handset; metal base. Dial, bell and coil included. (Note: use of telephone equipment not installed by a telephone company may be subject to local tariff.)

279-371, Sh. wt. 10 lbs. ..... Net 8.95

For Private Phone and Intercom Systems.

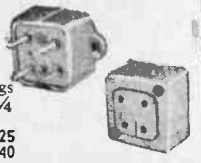
30 Ft. Telephone Extension Cord



Move your phone from room to room! Highest-quality 4-conductor flexible cord plus standard telephone jack and plug. Ideal for intercom. Use 2 or more for extra length.

279-1261, Sh. wt. 1¼ lbs. ..... Net 2.98

Telephone Plugs & Jacks



Ideal for making extensions, these plugs and jacks each weigh approximately ¼ pound.

279-366, plug ..... Net 1.25
279-367, jack ..... Net 1.40

Coiled Phone Cords

Stretches up to six feet. 3-conductor. Shipping weight: ¼ pound.

278-361 ..... Net 1.19

Four conductor extends up to fifteen feet. Shipping weight: ½ pound.

278-1389 ..... Net 5.95

Shoulder Rest

Frees both hands! Spring mechanism enables arm to be folded out of sight when not in use. Easy to attach to any phone. Long lasting metal construction. Manufactured in the United States. Weight: 1 pound.

279-606 ..... Net 1.49

Telephone Wall Jack

For 2, 3, 4-wire systems. Fits standard wall conduit boxes. 1 lb.

279-1507 ..... Net 1.99

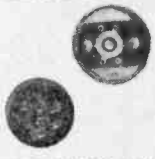
Carbon Type Handset

For Mobile and Replacement Use!

Great for use with mobiles & intercoms, or as outdoor mike for camps and construction sites. Withstands extreme temperatures. High output mike can be used with low gain circuits. Adapt to your CB transceiver or radio. Includes earpiece and 3-conductor cord.

279-1351, Sh. wt. 1 lb. ..... Net 2.99

Sound-Powered Elements



Kit of two! Talk without electricity — your voice powers these devices. Hook them up and talk up to 300 feet. Shipping weight: ½ pound.

279-1353 ..... Net .99

100 Ft. 3-Conductor Telephone Wire

Multi-use 100' 3-conductor wire for telephone work. Ideal for linking temporary phones for field uses.

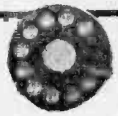
278-370, Sh. wt. 2 lbs. ..... Net 3.49

Handset Hanger

Hang up your phone without cutting off party on other end. Ideal for wall telephones. Anodized black aluminum.

279-1528, Sh. wt. ¼ lb. ..... Net 1.25

Telephone Dials



Standard Western Electric unit. Can be used with automatic control circuits, & electronic combination lock circuits.

279-359, Sh. wt. 1¼ lbs. ..... Net 2.99

Store Addresses, Order Form, See Page 20

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POSITIVE FEEDBACK

JULIAN M. SIENKIEWICZ, EDITOR

Man, oh, man—talk about winners, we've got one in the new 1968 CB BUYERS' GUIDE, now on your newsstand. It's our third edition and our best. Yep, the Editors of RADIO-TV EXPERIMENTER had a finger in the preparation of this fine CB annual, and we'd like all our readers to thumb through a copy at their favorite newsstand. Why not! We're sure you'll depart with the mag in your clutches—after you have paid for it!

To make this CB mag really great, we started with the cover and went wild from there on in. For example, take a look at pretty Pamela putting out plenty of flower power with an E. F. Johnson 323 CB rig and portable power pack. (The bikini isn't much to look at, but that's the way it should be!)

You may see Pamela on the beach this summer with her CB rig. If you do, take a snapshot of her and send it to me. Be sure to identify the CB gear in the photo and identify the lass if she

This is she—Pamela, the cover girl on the 1968 CB BUYERS' GUIDE. If you want to see Pam in full color, get a copy today!

happens to look like your favorite playmate. Do this and we may publish your snap this winter when the frost is on the pumpkin. In fact, we may even send you a little something or other in the event we publish the photo. Please—we cannot return photos, so send us an extra copy only. And while you're waiting for the snap to be published, spend the days reading the 1968 CB BUYERS' GUIDE—or looking at Pam.

I Got The Fever. Editors like to talk to editors from other magazines, and last Friday found me chatting with Joe Gutts of SCIENCE & MECHANICS magazine. Joe's their Auto Editor and a monster of a man, so when he started to criticize *my* magazine, I listened. Joe complained about our Lab Checks. In his own words, "All youse guys report on is electronic junk filled with wires. What gives with the nice things in life—like wheels, man!"

Well, Joe had more than a point on his head this time. We're all consumers and we're all interested in consumer products. Therefore, I'm

Man, we were lucky to get this Dodge Charger to stand still for the photo. Racing stripe around trunk and rear fenders gives it a gift-wrapped look.

going to make it a practice to report on non-electronic consumer products in this column that I have a chance to test. Whenever a non-electronic item comes along that I think you'd like to hear about, you'll find news of it here—as long as I can use the item long enough to become acquainted with it and make some meaningful comments.

To get the ball rolling, I would like to report on the 1968 Dodge Hemi-Charger Joe Gutts loaned me for the weekend. Joe mentioned something about a 425-horsepower engine, but I figured he was giving me the mileage (no car has that much power!) So off I go with this 4-speed, stick-shift, bright-red thunderstick through New York City streets. I had trouble with the shift only because I am shiftless in my habits—I kept the Charger in second all the way home. Believe it or not, the tach never entered the red zone even when I was doing 60. (New York City cops do not read!)

Once home I practiced shifting for 15 minutes and was able to drag with the best. It all comes back quickly if you learned to drive on a shift car. Now, off to a weekend of fun with the Mrs. to upstate New York. The Charger handled great on the road—power steering was at its best. I chewed up the roads, risking speeding tickets in the interest of sound reporting. My mileage was about 14 miles per gallon, but then I was not looking for any mpg awards.

Oh yes, there was something wrong with the accelerator—every time I floored it the car leaped to 95 mph and the wife screamed (I understand Dodge will not fix *this* defect). Coming home on Sunday I decided to stay within legal limits and let the radar traps go hungry. Most of my mileage was at 50 mph with a short stretch at a legal 60—result, 20.34 miles per gallon. Joe Gutts doesn't believe me, but I'll swear to it.

The Dodge Charger with its Hemi engine is just great for young at heart and for couples who like to travel on weekends. The racing stripe wrapped around the trunk is the greatest and so is the plush interior. But all good things come to an end, and I returned the Charger to Joe Gutts.

Next Fall. Gravity is the most taken-for-granted force on earth. The youngest child soon learns that if he trips, he will fall, and he eventually begins to take precautions. As the child grows up he eventually learns that all material objects fall toward each other simply because they *are* material.

Scientists have been explaining why things fall for a long time. Isaac Newton gave one explanation that satisfied thinkers for more than 200 years. Difficulties with some of Newton's predictions led Albert Einstein to formulate a new theory in 1916. One of the unexpected things about this new theory—as Einstein pointed out—was that it predicted that bodies could exchange energy with each other by means of gravitational waves in a manner similar to electromagnetic waves such as light and radio.

But nobody has yet seen a gravitational wave. And it has only been a short while that anyone has been steadily looking. Most physicists believed that gravity waves could not be detected, and so far only two small groups have been willing to expend the effort to hunt for them. Such waves are extremely difficult to find because gravitational forces are very weak. Gravity maintains the stars and planets in their courses, but the large forces involved result from the huge masses of the bodies concerned. Given comparable charges, gravitational forces are a hundred billion billion billion billion times weaker than electromagnetic forces.

Only in the last eight years have a few physicists been willing to develop the fantastically precise technology required for even a hope of detecting gravitational waves. The first to begin was a group led by Prof. Joseph Weber of the

(Continued on page 111)

Here's a new, complete ICS course in TV Servicing that costs less than $100.

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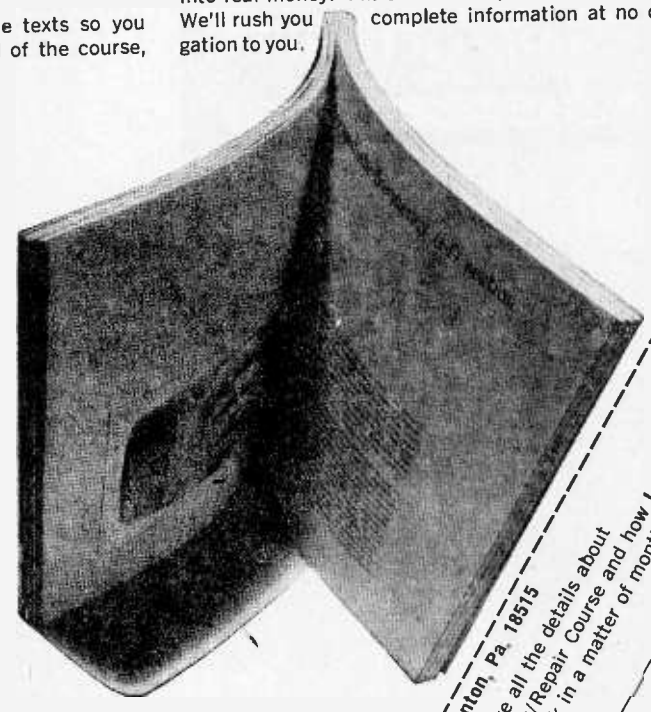

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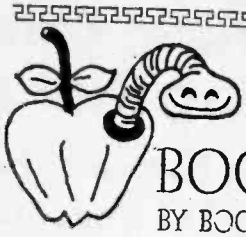
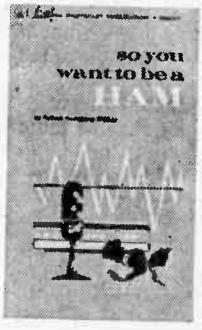


BOOKMARK
BY BOOKWORM

Wanna Be a Ham? There's no doubt that the new FCC/ARRL incentive licensing will mean many changes in the hobby of amateur radio. What these changes are is discussed in the new fourth edition of *So You Want to Be a Ham*, by Robert Hertzberg, W2DJJ. Everything the would-be radio amateur needs or wants to know about the hobby of amateur radio is contained in this old favorite. It's a must for those going for their ham ticket.



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The book contains profuse illustrations and descriptions of modern equipment to aid the reader in making a selection. It also describes operating procedures, and gives helpful guidance on passing the FCC exam.

Copies of *So You Want to Be a Ham* are available from electronics parts distributors and bookstores throughout the country, or direct from the publisher Howard W. Sams & Co., Inc., 4300 West 62nd Street, Indianapolis, Indiana 46268.

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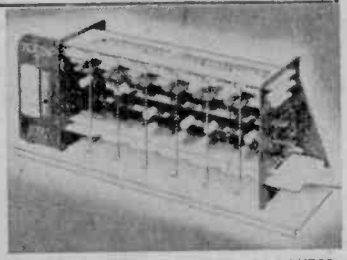

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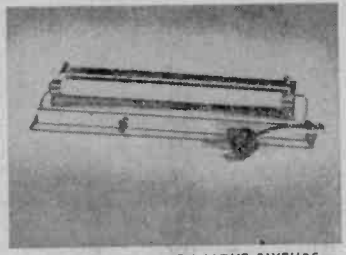
Create spectacular psychedelic lighting effects with this genuine electronic strobe. Terrific for parties, special occasions, experiments . . . perfect for combos, night clubs, dances, exhibitions. Adjusts from 1 to 10 short-duration flashes per second—not a make-shift mechanical device. Amaze friends with old-time movie effects. Best party ice-breaker ever—"freeze" the action and "unfreeze" your guests. Practical too—check action of mod-erate-speed machinery. Xenon lamp gives one million flashes. 6½" diam. reflector. Uses reg. 110-120 volt A.C. current. Handsome solid walnut cabinet, 9⅛"x9⅝"x4". Send for Bulletin #75—describes other startlingly new unique lighting effects.

Stock No. 70,989HP.....$79.95 Ppd.



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Extremely versatile, compactly designed, long wave (3200-4000 angstroms) black light (ultraviolet) fixture. Has 6-watt, 110-V lamp with built-in filter—eliminates harmful shorter wave ultraviolet rays. Use to identify minerals, fungi, bacteria—check for surface flaws, oil and gas leakage—perfect for displays with fluorescent paper, paints, chalk, crayons, trace powder. Incl. adjustable aluminum reflector, push-pull switch, connecting plug. Mount vert., horr., or on corner. 10" L., 1½" W., 1¼" H.

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Stock No. 85,050HP.....$29.95 Ppd.
Stock No. 85,105HP—(4¼").$84.50 F.O.B.
Stock No. 85,086HP—(6").$199.50 F.O.B.

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9 Ft. tall. Rises to amazing heights on just hot air. Supplied with tether attached, so can be used over and over. Easy to make, launch, fly. Loads of fun. Great for celebrations, science fairs, plain fun. Will lift model gliders, parachutes, instruments, etc.—anything up to ½ lb. Approx. 5 ft. diam. when fully inflated. Kit contains 10 pre-cut red & white gores (No. 1 model paper), 6 ft. 14-gage wire for bottom ring, top, "tie-off" cord, complete instructions.

Stock No. 60,691HP.....$2.00 Ppd.

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technicians and engineers become familiar with this important device via a concise treatment of the SCR—*Understanding Silicon Controlled Rectifiers,* by Saul Heller.

This fully illustrated guide introduces the reader to the SCR, familiarizes him with its theory of operation, acquaints him with the circuits in which it has been used, and provides

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a practical understanding of this solid-state device. Beginning with a review of semiconductor fundamentals, the text goes on to present a detailed run-down on how the SCR is constructed, how it operates, and what its capabilities are. Triggering circuits associated with the various SCRs are also covered.

The book considers each member of the SCR family individually. It describes their characteristics and applications as static switches, phase-control switches, inverters, choppers, and cyclo converters. Focusing on the problem of selecting the proper SCR for a given task, the book discusses a number of factors that influence SCR performance.

Author Saul Heller brings to this book his considerable experience as writer, editor, teacher and technician. He has written three other books and over 200 articles in the electronics field. To get your copy of *Understanding Silicon Controlled Rectifiers,* write directly to Hayden Book Company, Inc., 116 West 14th Street, New York, N. Y. 10011.

Lot of Light. To the non-scientific mind, all things dealing with lasers seem utterly beyond comprehension. For these readers a new, simple and clear book opens up the fascinating world of lasers. This volume, called *Atomic Light: Lasers,* by Richard B. Nehrich, Jr., Glenn I. Voran and Norman F. Dessel, is written in everyday language and terms and uses a multitude of pictures to help reveal the facts about the startling laser beam, the most powerful light ever dreamed possible. For the laser is simply a beam created from coherent light waves locked in step instead of the ordinary dispersed or incoherent waves. The increase in power is tremendous.

The authors, all from San Diego, California,

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who have themselves been involved in research and invention of the gas laser, show how some lasers can break through the strongest substances known to man, yet other lasers can be used to transmit 3-dimensional pictures or destroy a single chromosome in a human cell! Six short years ago, the laser was discovered. Today, after much experimentation, progress in atomic light has been so stupendous that one can easily see many applications in everyday life.

This book gives you an insight into what lies ahead with this new type of coherent light in the fields of medicine, communication, optics, travel, business and industry. If you can't resist peeking into a crystal ball (and who can?), this is a rare opportunity to see your future! If your local bookstore doesn't have a copy, write to Sterling Publishing Co., Inc., 419 Park Avenue South, New York, N. Y. 10016.

Mr. RCA! "I have in mind a plan . . ." These words written in 1915 signalled the beginning of a lifetime of prophesy by a man who has exercised a great influence over modern day living.

The writer was David Sarnoff and his plan was a "Radio Music Box" to bring news and

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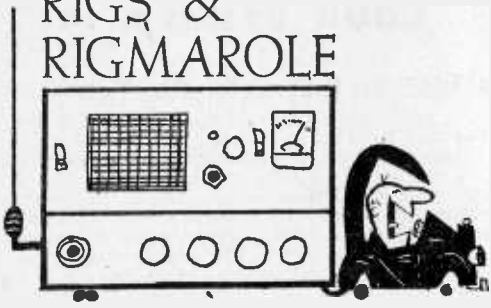
music into the home by wireless. Over the next fifty-three years, Sarnoff first dreamed and then fulfilled. As the head of the world's foremost electronics company, the Radio Corporation of America, he became the driving force behind such developments as network broadcasting, black-and-white television and color TV.

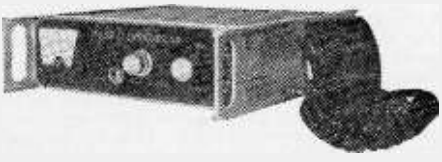
(Continued on page 110)

CB RIGS & RIGMAROLE



• **Invaders from Space.** It has outer space styling and *they* decided to call it *The Invader.* Actually it will invade all 23 CB channels with its high level 5-watt signal (runs about 3½ watts output—that's good!)

The "they" involved in the design of the Invader is none other than Mark Products, 5439 West Fargo Ave., Skokie, Ill. 60076. Mark Products has long been known as one of the more advanced companies in CB, what with their Sidewinder SSB rig which we covered here a few issues back. The Invader uses conventional AM modulation.

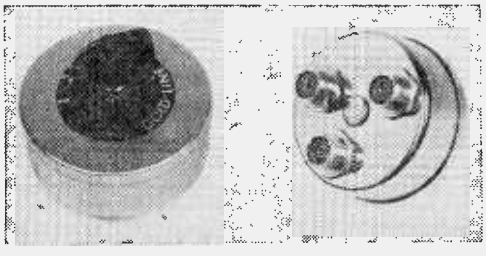


Mark Products 23-Channel Invader Rig

Some of the jazzy features of this rig include ½-microvolt receiver sensitivity, 29 solid-state devices in the circuit, mechanical filter for sharp tuning, light weight (6 lbs), full-size calibrated S-meter and RF output meter, built-in PA system. The rig sells for $169.95 and an optional 110 volt AC power supply is available.

• **They've Got Connections.** What a perplexing problem when you've either got two CB rigs and one antenna, or two antennas for one CB rig. Each time you want to switch over to the

(Continued on page 30)



Gold Line Model 2P Coax Switch

Look What's New

NEW HEATHKIT In-Circuit Transistor Tester

At last, a realistic price for in-circuit testing of transistors! The new Heathkit IT-18 Tester has the facilities you need and it costs a lot less. It measures DC Beta in-or-out-of-circuit in 2 ranges from 2 to 1000 (the spec. commonly used by mftrs. and schematics to determine transistor gain). It tests diodes in-or-out-of-circuit for forward and reverse current to indicate opens or shorts. Measures transistors out-of-circuit for ICEO and ICBO leakage on leakage current scale of 0 to 5,000 uA. Identifies NPN or PNP devices, anode and cathode of unmarked diodes; matches transistors of the same type or opposite types. Cannot damage device or circuit even if connected incorrectly. Big 4½" 200 uA meter. 10-turn calibrate control. Completely portable, powered by "D" cell (long battery life). Front panel socket for lower power devices. Attached 3' test leads. Rugged polypropylene case with attached cover. Build in 2 hours. 4 lbs.

NEW HEATHKIT 1-15 VDC Regulated Power Supply

Labs, service shops, hams, home experimenters . . . anybody working with transistor circuitry can use this handy new Heathkit All-Silicon Transistor Power Supply. Voltage regulated (less than 40 mV variation no-load to full-load; less than 0.05% change in output with input change from 105-125 VAC). Current limiting; adjustable from 10-500 mA. Ripple and noise less than 0.1 mV. Transient response 25 uS. Output impedance 0.5 ohm or less to 100 kHz. AC or DC programming (3 mA driving current on DC). Circuit board construction. Operates 105-125 or 210-250 VAC, 50/60 Hz. 6 lbs.

NEW HEATHKIT Low-Cost 5 MHz 3" 'Scope

Here is the wideband response, extra sensitivity and utility you need, all at low cost. The Heathkit IO-17 features vertical response of 5 Hz to 5 MHz; 30 mv Peak-to-Peak sensitivity; vertical gain control with pull-out X50 attenuator; front panel 1 volt Peak-to-Peak reference voltage; horizontal sweep from internal generator, 60 Hz line, or external source; wide range automatic sync; plastic graticle with 4 major vertical divisions & 6 major horizontal; front mounted controls; completely nickel-alloy shielded 3" CRT; solid-state high & low voltage power supplies for 115/230 VAC, 50-60 Hz; Zener diode regulators minimize trace bounce from line voltage variations: new professional Heath instrument styling with removable cabinet shells; beige & black color; just 9½" H. x 5½" W. x 14½" L.; circuit board construction, shipping wt. 17 lbs.

NEW HEATHKIT Solid-State Portable Volt-Ohm Meter

There's never been a better buy in meters. Solid-state circuit has FET input, 4 silicon transistors (2 used as diodes), and 1 silicon diode. 11 megohm input on DC, 1 megohm on AC. 4 DC volt ranges, 0-1000 v, with ±3% accuracy; 4 AC volt ranges, 0-1000 v. with ±5% accuracy. 4 resistance ranges, 10 ohms center scale x1, x100, x10K, x1M, measures from 0.1 ohm to 1000 megohms. 4½", 200 uA meter with multicolored scales. Operates on "C" cell and 8.4 v. mercury cell (not included). Housed in rugged black polypropylene case with molded-in cover and handle and plenty of space for the three built-in test leads. An extra jack is provided for connecting accessory probes to extend basic ranges. Controls include zero-adjust, ohms-adjust, DC polarity reversing switch, continuous rotation 12-position function switch. Easy-to-build circuit board construction completes in 3-4 hours. 4 lbs.

NEW HEATHKIT/Kraft 5-Channel Digital Proportional System with Variable Capacitor Servos

This Heathkit version of the internationally famous Kraft system saves you over $200. The system includes solid-state transmitter with built-in charger and rechargeable battery, solid-state receiver, receiver rechargeable battery, four variable capacitor servos, and all cables. Servos feature sealed variable capacitor feedback to eliminate failure due to dirty contacts, vibration, etc.; three outputs; two linear shafts travel ⅝" in simultaneous opposite directions plus rotary wheel. Specify freq.: 26.995, 27.045, 27.095, 27.145, 27.195 MHz.

From Heath

NEW HEATHKIT AJ-15 Deluxe Stereo Tuner

For the man who already owns a fine stereo amplifier, and in response to many requests, Heath now offers the superb FM stereo tuner section of the renowned AR-15 receiver as a separate unit. The new AJ-15 FM Stereo Tuner has the exclusive design FET FM tuner for remarkable sensitivity, the exclusive Crystal Filters in the IF strip for perfect response curve and no alignment; Integrated Circuits in the IF for high gain, best limiting; elaborate Noise-Operated Squelch; Stereo-Threshold Switch; Stereo-Only Switch; Adjustable Multiplex Phase, two Tuning Meters; two variable output Stereo Phone jacks; one pair variable outputs plus two fixed outputs for amps., recorders, etc.; front panel mounted controls; "Black Magic" panel lighting; 120/240 VAC operation. 18 lbs. *Walnut cabinet AE-18, $19.95.

NEW HEATHKIT AA-15 Deluxe Stereo Amplifier

For the man who already owns a fine stereo tuner, Heath now offers the famous amplifier section of the AR-15 receiver as a separate unit. The new AA-15 Stereo Amplifier has the same superb features: 150 watts Music Power; Ultra-Low Harmonic & IM Distortion (less than 0.5% at full output); Ultra-Wide Frequency Response (±1 dB, 8 to 40,000 Hz at 1 watt); Ultra-Wide Dynamic Range Preamp (98 dB); Tone-Flat Switch; Front Panel Input Level Controls; Transformerless Amplifier; Capacitor Coupled Outputs; Massive Power Supply; All-Silicon Transistor Circuit; Positive Circuit Protection; "Black Magic" Panel Lighting; new second system Remote Speaker Switch; 120/240 VAC. 26 lbs. *Walnut cabinet AE-18, $19.95.

NEW HEATHKIT 2-Meter AM Amateur Transceiver

2-Meters at low cost. And the HW-17 Transceiver has 143.2 to 148.2 MHz extended coverage to include MARS, CAP, and Coast Guard Auxiliary operation. Output power of tube-type transmitter is 8 to 10 watts, AM. 4 crystal sockets plus VFO input. Relayless PTT operation. Double conversion solid-state superhet. Receiver has 1 uV sensitivity with prebuilt, aligned FET tuner, ANL, Squelch, "Spot" function, and lighted dial. Signal-strength/relative power-output meter. Battery saver switch for low current drain during receiving only. 15 transistor, 18 diode, 3 tube circuit on two boards builds in about 20 hours. Built-in 120/240 VAC, 50-60 Hz power supply and 3" x 5" speaker; low profile aluminum cabinet in Heath gray-green; ceramic mic. and gimbal mount included. 17 lbs. *Optional DC mobile supply, HWA-17-1, $24.95.

NEW HEATHKIT Home Protection System

Customize your own system with these new Heathkit units to guard the safety of your home and family. Warns of smoke, fire, intruders, freezing, cooling, thawing, pressure, water, almost any change you want to be warned about. Your house is already wired for this system, just plug units into AC outlets. Exclusive "loading" design of transmitters generates unusual signal which is detected by the Receiver/Alarm. Solid-state circuitry with fail-safe features warns if components of system have failed. Any number of units may be used in system. Receiver/Alarm has built-in 2800 Hz alarm and rechargeable battery to signal if power line fails (built-in charger keeps battery in peak condition). Receiver accepts external 117 VAC bells or horns. Smoke/Heat Detector-Transmitter senses smoke and 133°F. heat (extra heat sensors may be added to it). Utility Transmitter has several contacts to accept any type switch or thermostat to guard against any hazard except smoke. All units feature circuit board construction and each builds in 3-4 hours. All are small and finished in beige and brown velvet finish. Operating cost similar to that of electric clocks. Invest in safety now with this unique new low-cost Heathkit system.

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NEW Kit AA-15 $169.95*

NEW Kit HW-17 $129.95*

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CB RIGS & RIGMAROLE

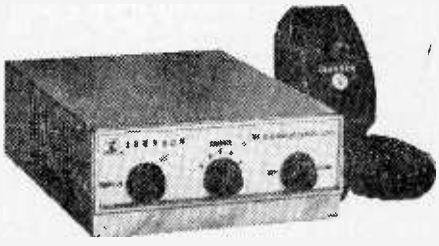
Continued from page 27

second rig or antenna you've got to pull apart your operating table and grope around the rear of the rig for the antenna connector, unscrew it, locate the other connector—oh well, you get the picture! Pity is the word which was in the hearts of the people at Gold Line, Muller Ave., Norwalk, Conn. 06852. They felt genuine pity for CBers and designed a single pole two position switch for coaxial cables. Rated at 1000 watts (even though they know that no self respecting CBer would *dare* run more than 750 watts!), the Model 2P may be left in the antenna line without any measurable signal loss because of its special design, brass fittings, phenolic insulating.

Marty Miller at Gold Line will be happy to send you additional details if you drop him a card. Tell him the boys at RADIO-TV EXPERIMENTER sent you.

• **Johnson Rides Again (E. F., not L. B.).** Yes, not satisfied with producing some of the most popular deluxe sets in CB-land, Johnson has shook up a lot of people with a set which sells for $99.95 and still maintains the high Johnson quality.

The new baby in the Johnson family has been dubbed the Messenger 110. It's a 5-channel rig with a built-in speech compression circuit, bet-



E.F. Johnson 5-Channel Messenger 110

ter than ½-microvolt sensitivity, and tiny (2½H x 6 3/16W x 8¾D) construction for inconspicuous mobile mounting. The set is FCC and Canadian DOT approved. E. F. Johnson Co. holes up at Waseca, Minn. 56093. Want to know more about the new Messenger? Then why not get the straight dope from them?

• **Rectifying Your Rig.** It's now possible to replace the rectifier tube in your CB rig with a transistorized gizmo which does not drain filament current and generates no heat, and generally increases the B-plus (high voltage) of your set.

These replacements meet Mil Specs and can be directly substituted for the following tubes: 6X4, 12X4, 6BW4, 12BW4. Price is $6.95 each from Specialty Engineering and Sales Co., 600 San Mateo Blvd., S.E., Albuquerque, N. M. 87108. ■

Crazy Unmixed-Up Mixer

The latest in the series of microphone mixers from American Geloso is the G1/501/U. It's portable, mounted in an attractive case with handle and built-in power supply. Geloso says the G1/501/U meets all professional, commercial and industrial sound application requirements, like: 8 low- and high-impedance channels with individual volume control and *on/off* switch; high level auxiliary inputs; two outputs for high and low impedance amplifiers, tape recorders, and guitar amplifiers; monitor earphone output with separate level control and monitor control for each channel or output; master volume control that simultaneously adjusts gain of all output; and individual preamplifier for each channel. The G1/501/U has a

Geloso Electronics G1/501/U Microphone Mixer

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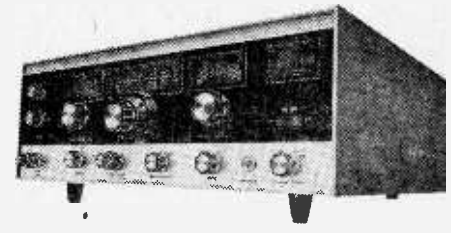
response of 30 to 20,000 Hz ± 1 dB. Unit measures 15¼ x 9 x 5 in., and may be ganged for supplemental microphone application. Suggested price is $142.50; for some more info, write American Geloso Electronics, Inc., 251 Park Ave. So., New York, N.Y. 10010.

Electric Auto Antennas

In their expanding Brach line of auto antennas, JFD Electronics have come out with two new electric models—a front-mount and a rear-mount—along with a rear-mount extension kit. The front-mount job, Model 86-6753 ($43.40), has a 5-section mast that extends to 46 in. The motor develops 18 to 20 lb. of thrust to raise or lower the antenna, even in sub-zero weather. This model includes 56 in. of cable, and a 6-ft. electric harness with an up-and-down control switch and bracket. The rear-mount antenna, 86-6756 ($48.00), has the same dimensions and power output, 180 in. of shielded cable, and a 180-in. electric harness extension with up-and-down control switch and bracket, and a rear-mount adapter pad. Then there is the rear-mount extension kit, 86-6755 ($7.50), optional with 86-6753, consisting of 180-in. cable extension, 180-in. electric harness extension, and a rear-mount adapter pad. Each model comes with complete assembly hardware including perforated steel anchor brackets, metal screws, washers and instruction sheet. For further information write to Brach Div., JFD Electronics Co., 15th Ave. at 62nd St., Brooklyn, N. Y. 11219.

Ready for a Pro Receiver?

Though designed for professional applications the Galaxy R-530 HF receiver is priced within reach of the discriminating amateur and serious SWL (about $700). All solid state, of course, with continuous coverage of from 0.5 to 30 MHz. Crystal lattice filters are used in the



Galaxy R-530 Shortwave Receiver

high frequency IF for optimum selectivity. Frequency stability, less than 100 Hz drift after turn-on; frequency accuracy, 1 kHz throughout frequency coverage, making the R-530 particularly suited for communications applications where pre-assigned frequencies are to be received. R-530 offers reception of selectable upper and lower sideband, AM, CW, and RTTY signals. Rear panel outputs of the PTO, high frequency IF, AVC, RF gain control and balanced 600-ohm audio permit dual and space diversity utilization with minimum accessories. Power requirements: 115/230 VAC, 50/60 Hz, or 12 VDC @ 1 amp. An optional standard rack mounting is available. Total weight 23 lb. For further info, contact Galaxy Electronics, 10 S. 34th St., Council Bluffs, Iowa 51501.

Let the Burglar Beware

Affix one of these decals to your apartment door or your car window (whether you have an alarm or not) and it's sure to have a psychological effect on any would-be burglar. The chances are that thieves and vandals won't take the chance. The cost is $1.00 for a set of two electronic alarm decals, and you may order them from J. Ross, 80-34 Kent St., Jamaica, N. Y. 11432.

Ross Electronic Sentry Decal

Please Don't Hit the Deck!

Here, for serious tape recording buffs, is a new deck from Uher, the 7000. But for this one, you don't have to be rich. In a hand-rubbed walnut base, the Deck 7000 has two speeds—7½ and 3¾ ips—and allows for sound-on-sound recordings for multiple effects. Precise balancing of each channel of stereo recording is possible through the individual level control and VU meter. Some other features are: proven transport system, positive track selection and indication for monophonic recording, automatic shut-off with metallic leader, full fingertip control, 4-digit index counter with push-button reset, frequency response of 40-18,000 Hz ± 2.5 dB @ 7½ ips; 40-15,000 Hz

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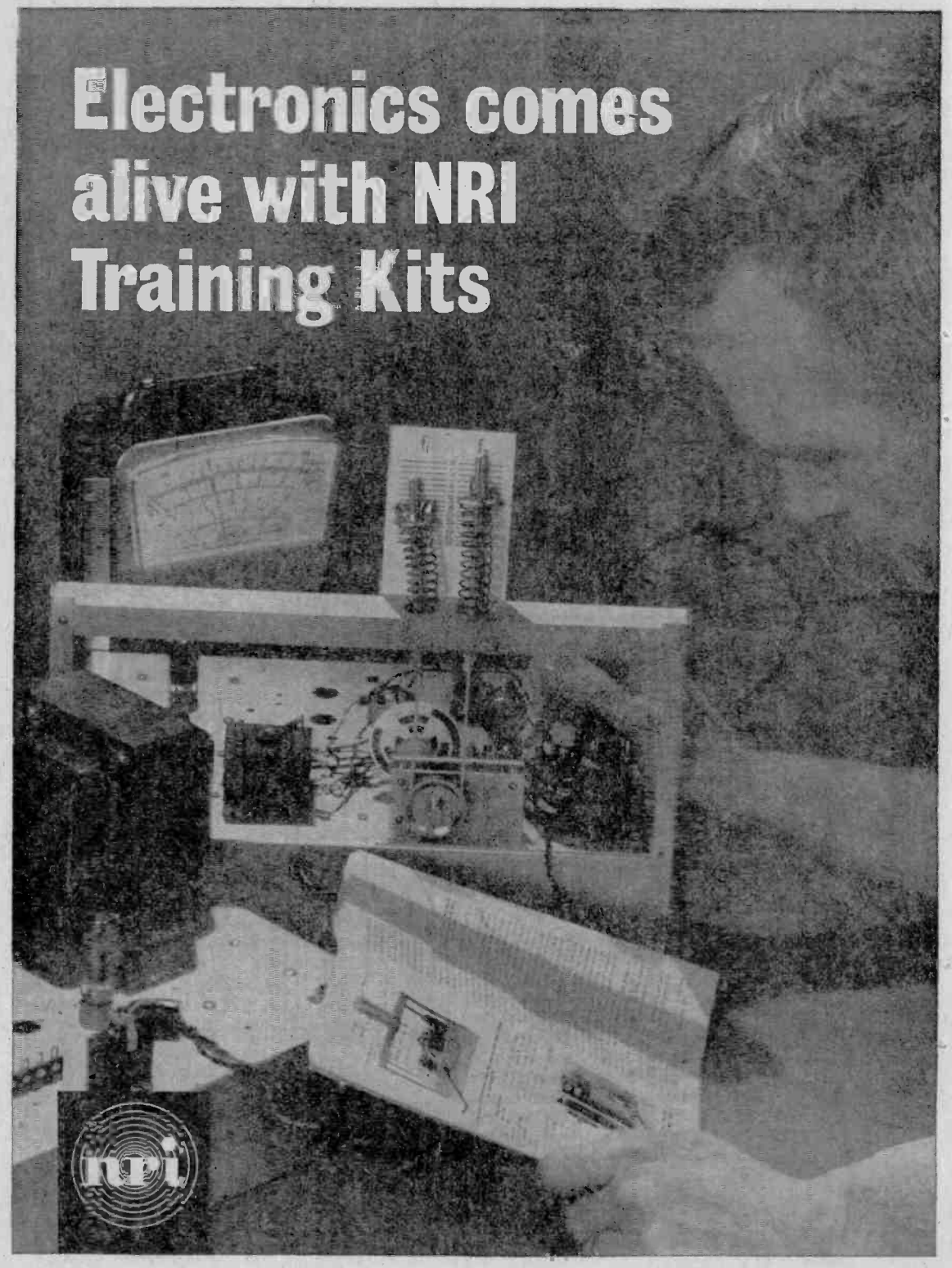

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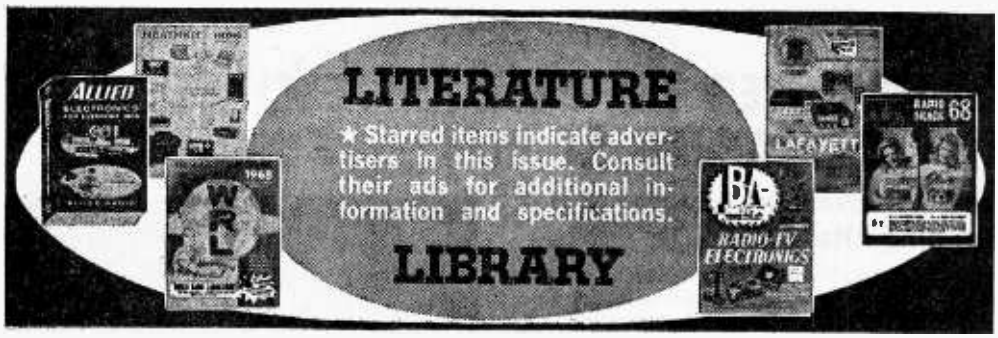
12. ELECTRONICS FOR PRINTERS — Operation and maintenance of Electronic equipment used in graphic arts industry. From basics to computer circuits. Approved by major manufacturers.

* You must pass your FCC License exams (any Communications course) or NRI refunds in full the tuition you have paid.



CB—AMATEUR RADIO—SHORTWAVE RADIO

102. No never mind what brand your CB set is, *Sentry* has the crystal you need. Same goes for ham rigs. Seeing is believing, so get *Sentry's* catalog today. Circle 102.

130. Bone up on the CB with the latest *Sams* books. Titles range from "ABC's of CB Radio" to "99 Ways to Improve your CB Radio." So Circle 130 and get the facts from *Sams*.

107. Want a deluxe CB base station? Then get the specs on *Tram's* all new Titan II—it's the SSB/AM rig you've been waiting for!

101. If it's a CB product, chances are *International Crystal* has it listed in their colorful catalog. Whether kit or wired, accessory or test gear, this CB-oriented company can be relied on to fill the bill.

96. If a rugged low-cost business/industrial two-way radio is what you've been looking for, be sure to send for the brochure on *E. F. Johnson Co.'s* brand new Messenger "202."

★129. Boy, oh boy—if you want to read about a flock of CB winners, get your hands on *Lafayette's* new 1968 catalog. *Lafayette* has CB sets for all pocketbooks.

103. *Squires-Sanders* would like you to know about their CB transceivers, the "23'er" and the new "S5S." Also, CB accessories that add versatility to their 5-watters.

46. A long-time builder of ham equipment, *Hallicrafters* will send you lots of info on ham, CB and commercial radio equipment.

122. Discover the most inexpensive CB mobile, Citi-Fone II by *Multi-Elmac Company*. Get the facts plus other CB product data before you buy.

116. Pep-up your CB rig's performance with *Turner's* M+2 mobile microphone. Get complete spec sheets and data on other *Turner* mikes.

48. *Hy-Gain's* new CB antenna catalog is packed full of useful information and product data that every CBer should know. Get a copy.

111. Get the scoop on *Vers-Tronics'* Versa-Tenna with instant magnetic mounting. Antenna models available for CBers, hams and mobile units from 27 MHz to 1000 MHz.

45. Hams, CBers, experimenters! *World Radio Labs* 1968 catalog is a bargain hunter's delight. Get your copy—it's free.

50. Get your copy of *Amphenol's* "User's Guide to CB Radio"—18 pages packed with CB know-how and chit-chat. Also, *Amphenol* will let you know what's new on their product line.

115. Get the full story on *Polytronics Laboratories'* latest CB entry Poly-Pup. Full 5-watts, great for mobile, base or portable use. Works on 12 VDC or 117 VAC.

100. You can get increased CB range and clarity using the "Cobra-23" transceiver with speech compressor—receiver sensitivity is excellent. Catalog sheet will be mailed by *B&K Division* of *Dynascan Corporation*.

54. A catalog for CBers, hams and experimenters, with outstanding values. Terrific buys on *Grove Electronics'* antennas, mikes and accessories.

ELECTRONIC PARTS

★135. Get with ICs! *RCA's* new integrated Circuit Experimenter's Kit KD2112 is the first of its kind and should be a part of your next project. Get all the facts direct from *RCA*. Circle 135.

132. Discover 18 new and different professional-quality amplifiers, tuners, and preamps completely assembled on PC-boards now offered by *Amperex*. Prices will amaze you!

1. *Allied's* catalog is so widely used as a reference book, that it's regarded as a standard by people in the electronics industry. Don't *you* have the 1968 *Allied Radio* catalog? The surprising thing is that it's free!

★2. The new 1968 Edition of *Lafayette's* catalog features sections on stereo hi-fi, CB, ham gear, test equipment, cameras, optics, tools and much more. Get your copy today.

★8. Get it now! *John Meshna, Jr.'s* new 46-page catalog is jam packed with surplus buys—surplus radios, new parts, computer parts, etc.

★23. No electronics bargain hunter should be caught without the 1968 copy of *Radio Shack's* catalog. Some equipment and kit offers are so low, they look like misprints. Buying is believing.

★5. *Edmund Scientific's* new catalog contains over 4000 products that embrace many interests and fields. It's a 148-page buyers' guide for Science Fair fans.

106. With 70 million TV and 240 million radios somebody somewhere will need a vacuum tube replacement at the rate of one a second! Get *Universal Tube Co.'s* Troubleshooting Chart and facts on their $1 flat rate per tube.

★4. *Olson's* catalog is a multi-colored newspaper that's packed with more bargains than a phone book has names. Don't believe us? Get a copy.

★7. Before you build from scratch check the *Fair Radio Sales* latest catalog for electronic gear that can be modified to your needs. *Fair* way to save cash.

6. Bargains galore, that's what's in store! *Poly-Paks Co.* will send you their latest eight-page flyer listing the latest in available merchandise, including a giant $1 special sale.

★10. *Burstein-Applebee* offers a new giant catalog containing 100s of big pages crammed with savings including hundreds of bargains on hi-fi kits, power tools, tubes, and parts.

11. Now available from *EDI (Electronic Distributors, Inc.):* a catalog containing hundreds of electronic items. *EDI* will be happy to place you on their mailing list.

120. *Tab's* new electronics parts catalog is now off the press and you're welcome to have a copy. Some of *Tab's* bargains and odd-ball items are unbelievable offers.

117. Harried by the high cost of parts for projects? Examine *Bigelow's* 13th Anniversary catalog packed with "Lucky 13" specials.

ELECTRONIC PRODUCTS

★42. Here's colorful 108-page catalog containing a wide assortment of electronic kits. You'll find something for any interest, any budget. And *Heath Co.* will happily send you a copy.

★44. Kit Builder? Like wired products? *EICO's* 1968 catalog takes care of both breeds of buyers. 32 pages full of hi-fi, test, CB, ham, SWL, automotive and hobby kits and products—do you have a copy?

128. If you can hammer a nail and miss your thumb, you can assemble a *Schober* organ. To prove the point, *Schober* will send you their catalog and a 7-in. disc recording.

126. *Delta Products* new capacitive discharge ignition system in kit form will pep up your car. Designed to cut gas costs and reduce point and plug wear. Get *Delta's* details in full-color literature.

66. Try instant lettering to mark control panels and component parts. *Datak's* booklets and sample show this easy dry transfer method.

109. *Seco* offers a line of specialized and standard test equipment that's ideal for the home experimenter and pro. Get specs and prices today.

TOOLS

★78. Need an extra hand? *Xcelite's* Seizers clamp tightly, hold wires for soldering, act as heat sinks, retrieve small parts from hard to reach places. Get *Xcelite* Bulletin N564 for details.

118. Secure coax cables, speaker wires, phone wires, etc., with *Arrow* staple gun tackers. 3 models for wires and cables from 3/16" to ½" dia. Get fact-full Arrow literature.

SCHOOLS AND EDUCATIONAL

★**74.** Whiz through math and electronics problems without pencil and paper. Get the facts on the amazing electronics slide rule and 4-lesson instruction course offered by *Cleveland Institute of Electronics*. No charge at all.

★**136.** "Power Engineering," a new 32-page, illustrated brochure by *ICS (International Correspondence Schools)* describes seven *ICS* Power Engineering courses that may open a new career for you. Get a copy today!

114. Prepare for tomorrow by studying at home with *Technical Training International*. Get the facts today on how you can step up in your present job.

137. For success in communications, broadcasting and electronics get your First Class FCC license and *Grantham School of Electronics* will show you how. Interesting booklets are yours for the asking.

138. For a complete rundown on curriculum, lesson outlines, and full details from a leading electronic school, ask for this brochure from the *Indiana Home Study Institute*.

105. Get the low-down on the latest in educational electronic kits from *Trans-Tek*. Build light dimmers, amplifiers, metronomes, and many more. *Trans-Tek* helps you to learn while building.

★**3.** Get all the facts on Progressive Edu-Kits Home Radio Course. Build 20 radios and electronic circuits; parts, tools and instructions come with course.

HI-FI/AUDIO

134. Discover *PlayTape*—America's newest tape cartridge and tape players. Units priced at under $17 with cartridges at 45-disc prices. *PlayTape* has one of America's largest recording libraries.

19. *Empire's* new 16-page, full-color catalog features speaker systems in odd shapes for beautiful room decor. Also, rediscover *Empire's* quality turntable line and cartridges.

124. Now, *Sonotone* offers you young ideas in microphone use in their new catalog. Mikes for talk sessions, swinging combos, home recording, PA systems and many more uses.

26. Always a leader, *H. H. Scott* introduces a new concept in stereo console catalogs. The information-packed 1968 Stereo Guide and catalog are required reading for audio fans.

85. Write the specs for an ideal preamp and amp, and you've spelled out *Dynaco's* stereo 120 amp and PAS-3X preamp. So why not get all the facts from *Dynaco!*

119. *Kenwood* puts it right on the line. The all-new *Kenwood* stereo-FM receivers are described in a colorful 16-page booklet complete with easy-to-read-and-compare spec data. Get your copy today!

131. Let *Elpa* send you "The Record Omibook." It's a great buy and *Elpa* wants you to have it free. Your records will thank you when the mailman delivers it.

17. Mikes, speakers, amps, receivers—you name it, *Electro-Voice* makes it and makes it good. Get the straight poop from *E-V* today.

27. 12 pages of *Sherwood* receivers, tuners, amplifiers, speaker systems, and cabinetry make up a colorful booklet every hi-fi bug should see.

95. Confused about stereo? Want to beat the high cost of hi-fi without compromising on the results? Then you need the new 24-page catalog by *Jensen Manufacturing*.

99. Get the inside info on why *Telex/Acoustech's* solid-state amplifiers are the rage of the experts. Colorful brochure answers all your questions.

TAPE RECORDERS AND TAPE

123. Yours for the asking—*Elpa's* new "The Tape Recording Omnibook." 16 jam-packed pages on facts and tips you should know about before you buy a tape recorder.

31. All the facts about *Concord Electronics Corp.* tape recorders are yours for the asking in a free booklet. Portable, battery operated to four-track, fully transistorized stereos cover every recording need.

32. "Everybody's Tape Recording Handbook" is the title of a booklet that *Sarkes-Tarzian* will send you. It's 24-pages jam-packed with info for the home recording enthusiast. Includes a valuable table of recording times for various tapes.

34. "All the Best from *Sony*" is an 8-page booklet describing *Sony-Superscope* products—tape recorders, microphones, tape and accessories. Get a copy before you buy!

35. If you are a serious tape audiophile, you will be interested in the all new *Viking/Telex* line of quality tape recorders.

HI-FI ACCESSORIES

112. *Telex* would like you to know about their improved Serenata Headset—and their entire line of quality stereo headsets.

104. You can't hear FM stereo unless your FM antenna can pull 'em in. Learn more and discover what's available from *Finco's* 6-pager "Third Dimensional Sound."

TELEVISION

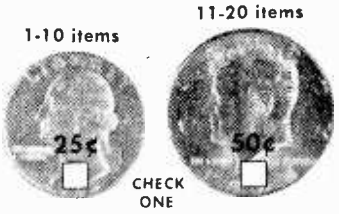
★**70.** Need a new TV set? Then assemble a *Heath* TV kit. *Heath* has all sizes, B&W and color, portable and fixed. Why not build the next TV you watch?

127. *National Schools* will help you learn all about color TV as you assemble their 25-in. color TV kit. Just one of *National's* many exciting and rewarding courses.

97. Interesting, helpful brochures describing the TV antenna discovery of the decade—the log periodic antenna for VHF and UHF-TV, and FM-stereo. Get it from *JFD Electronics Corporation*.

RADIO-TV EXPERIMENTER
Dept. 868
505 Park Avenue
New York, N. Y. 10022

Please arrange to have the literature whose numbers I have circled sent to me as soon as possible. I am enclosing 25¢ for 1 to 10 items; 50¢ for 11 to 20 items to cover handling. No stamps, please.



maximum number of items = 20

☐ Indicate total number of booklets requested

1	2	3	4	5	6	7	8	10	11
17	19	23	26	27	31	32	34	35	42
44	45	46	48	50	54	66	70	74	78
85	95	96	97	99	100	101	102	103	104
105	106	107	109	111	112	114	115	116	117
118	119	120	122	123	124	126	127	128	129
130	131	132	134	135	136	137	138		

NAME_____

ADDRESS_____

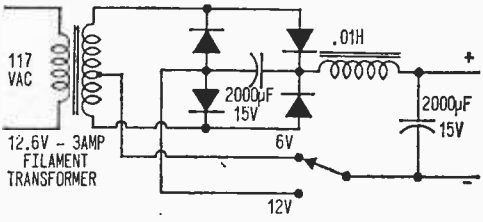
CITY_____

STATE_____ ZIP_____

Six and Twelve

I want to build a battery eliminator with a 6- and 12-volt output, 110-VAC input, and giving up to 3 amps. Can you give me a schematic or tell me where to get one?

—W. D., Belleville, Ill.



The circuit shown employs a bridge rectifier for 12 volts and a full-wave rectifier for 6 volts. The diodes should be able to handle at least 2 amperes, preferably more to allow a margin of safety.

Calling All Cars

Can you tell me where KEX-460 is located? I hear it near 168 MHz on my FM receiver. I think the station is a police unit near me.

——J. R. M., Morton, Pa.

Regarding police units, it's unlawful for anyone to divulge what was transmitted, or that a transmission took place. Amateur or broadcast stations are an exception. The operators of KEX-460 would undoubtedly take a dim view of your listening to their transmissions. They're supposed to be as private as your telephone calls.

All Charged Up

I have an outboard motorboat with transistorized ignition and an alternator for charging the 12-volt storage battery. Also, a depth finder which now runs on a separate 12-volt dry-cell battery. The depth finder produces stray flashes when I hook it up to the boat wiring system be-

(Continued on page 116)

Radio-TV AUG-SEPT 1968 EXPERIMENTER

Gold Grabber

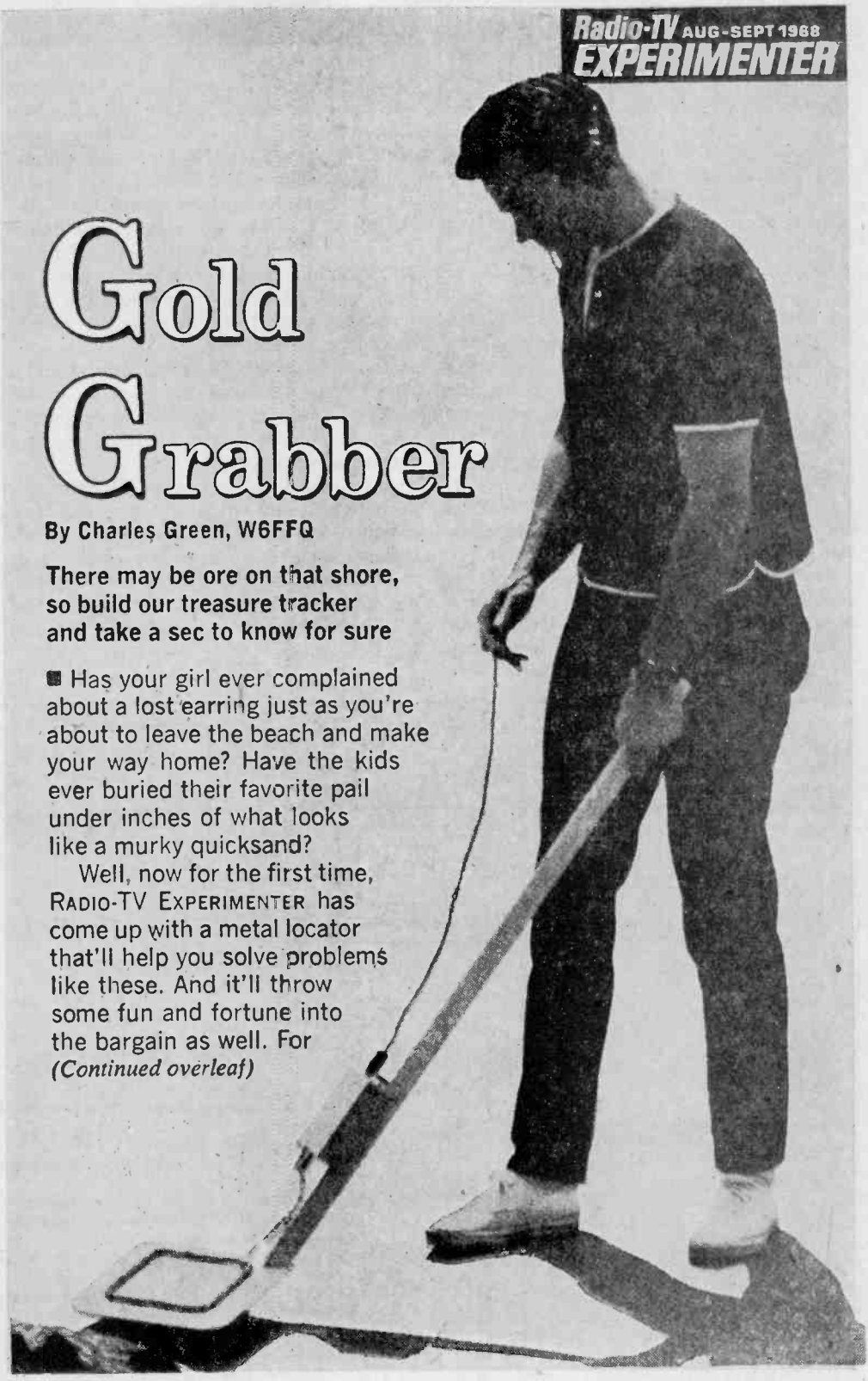
By Charles Green, W6FFQ

There may be ore on that shore, so build our treasure tracker and take a sec to know for sure

■ Has your girl ever complained about a lost earring just as you're about to leave the beach and make your way home? Have the kids ever buried their favorite pail under inches of what looks like a murky quicksand?

Well, now for the first time, RADIO-TV EXPERIMENTER has come up with a metal locator that'll help you solve problems like these. And it'll throw some fun and fortune into the bargain as well. For

(Continued overleaf)



Gold Grabber

whether it's minor disasters like the ones mentioned, or just a natural lust to go out adventuring. Gold Grabber will keep you busy like nothing you've ever seen.

Pieces of Eight. Lucky folks down in the Caribbean or in the California and Central America areas can go looking for the gold coins and relics which abound on some of the exotic beaches and landscapes. And the battlefields of Civil War fame are hunting grounds that should keep any buff busy for days on end.

You can also use Gold Grabber to find buried cables and conduits; to make up games for the youngsters so they can have fun looking for hidden objects; or just to help out a friend in need of a metal locator. In fact, every reader will be able to come up with countless ideas that'll increase the value of his instrument a thousandfold.

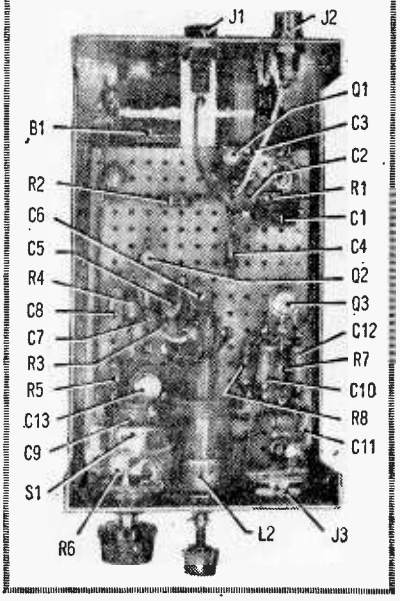
Easy Operation. Gold Grabber consists of a search loop and locator unit mounted on a wooden handle. Since the locator unit is all-solid-state and powered by a mercury battery, it is light enough to permit easy operation as a search tool. (As you can see from the photos, there are two versions of Gold Grabber—one jazzed up by the editors, and one constructed by the author. You choose the one best for you. But stay away from ferrous material! Brass screws will do, but epoxy glue would be best.)

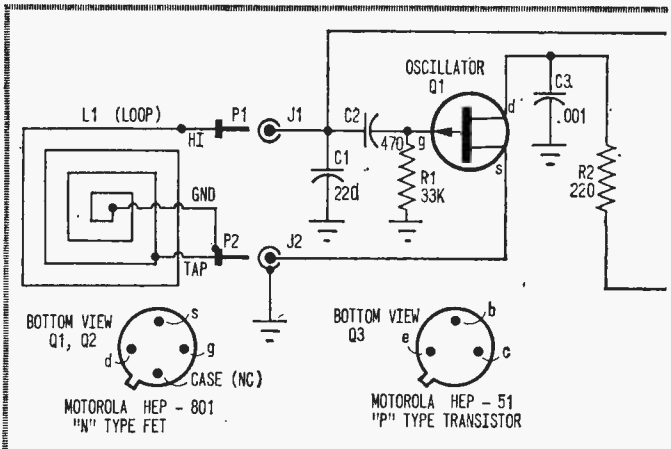
Most metal locators are complex to build, but Gold Grabber has a simplified design that makes for easy construction. The simplified circuit, of course, is not designed for great depth penetration in the earth. But metallic objects lying close to the surface should be no problem.

Two FETs (field-effect transistors) and a conventional transistor are used in an RF beat-frequency, metal-detector circuit which does not require any complex test equipment for initial adjustment.

The Circuit. Q1 (an n-type FET) is connected to L1 and C1 in a Hartley oscillator circuit operating at a frequency of approximately 500 kHz. The source electrode of Q1 is connected to a tap on L1 to obtain the RF feedback needed in this circuit. The C2/R1 combo form the gate-leak self-bias for Q1.

Layout shown below allows plenty of space for components. Check clearance of pot R6, and make sure that green index dot of L2 shows on top of coil. Parts must be anchored securely.





B1—8.4-V mercury battery (Mallory TR-286 or equiv.)
C1—220-pF mica capacitor
C2, C5, C7—470-pF, 50-V disc ceramic capacitor
C3—.001 uF, 50-V disc ceramic capacitor
C4—10-pF, 50-V tubular ceramic capacitor
C6—470-pF mica capacitor
C8, C10, C12—5-uF, 15-V electrolytic capacitor
C9, C11—.005-uF, 50-V disc ceramic capacitor
C13—10-uF, 15-V electrolytic capacitor
J1—phone pin jack

L1 is an external loop which radiates the oscillator RF energy. A small portion of this RF is coupled via C4 to the oscillating detector circuit of Q2. Note that Q2 is connected in a Hartley circuit similar to Q1, except that the gate leak is much larger, and the detected output is taken from the drain electrode.

Resonant circuit L2/C6 is tuned to a frequency very close to the operating frequency of the Q1 oscillator, thereby producing an audio beat-note signal from detector Q1. This audio signal is coupled through C8 and low-pass filter R5/C9 to volume control R6. The audio signal from R6 is amplified by the circuit of Q3 and direct-coupled to J3, and a pair of external 2000-ohm earphones.

When RF energy radiated from external loop L1 is absorbed by a nearby metallic conducting surface, the Q1 oscillator circuit changes its frequency. This change in frequency also changes the beat-note frequency of the Q2 detector circuit, thereby changing the frequency of the audio signal heard in the earphones.

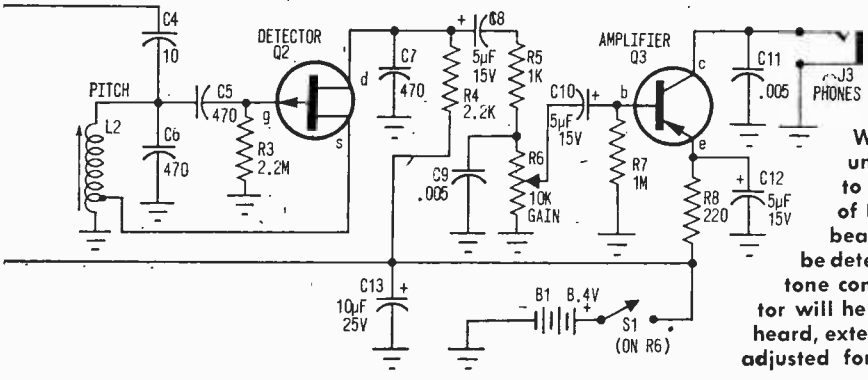
On Your Way. The Gold Grabber has two major assemblies: the external loop, and the oscillator/amplifier mounted in a 5¼ x 3x2⅛-in. aluminum box. We'll start with the locator unit in the box.

Best way to begin construction is to install two 1¼-in. machine screws spaced two inches apart and centered on the long side of the box. The screws extend out from the bottom of the box and are used to mount the box to the loop assembly. Use serrated washers with the nuts to prevent any movement.

Cut a section of perforated wiring board to approximately 2⅝x4 in. and mount it as shown in the photo with machine screws and nuts. Position it ⅜ in. above the box bottom. Install two ground lugs as shown in the photo, and use serrated washers as required.

Mount the components on the sides of the box as shown, using washers to prevent movement. Position R6 to stay clear of the top cover and mounting screws. Battery B1 is fastened to the side of the box with a tape-covered aluminum strap. Position L2 so that its green index dot is on top of the coil.

Insert the push-in terminals, and mount the parts on the wiring board as shown in the photo. Make your connections with short, stiff leads to prevent movement. There



When working with units, it's important to adjust tuning slug of L2 so that change in beat-note frequency can be detected quickly. Audio tone comfortable for operator will help. If beat note isn't heard, external loop L1 must be adjusted for correct frequency.

PARTS LIST FOR GOLD GRABBER

J2—Phono jack
J3—phone jack
L1—Loop (see text)
L2—Tapped oscillator coil (Miller X-5496-C or equiv.)
P1—Phone tip plug
P2—Phono plug
Q1, Q2—HEP-801 FET (Motorola)
Q3—Pnp-HEP-51 pnp transistor (Motorola)
R1—33,000-ohm, ½-watt resistor
R2, R8—220-ohm, ½-watt resistor
R3—2,200,000-ohm, ½-watt resistor
R4—2200-ohm, ½-watt resistor
R5—1000-ohm, ½-watt resistor
R6—10,000-ohm, audio taper potentiometer (with S1)
R7—1,000,000-ohm, ½-watt resistor
S1—Spst switch (part of R6)
1—5¼x3x2⅛-in. aluminum box (LMB-780 or equiv.)
Misc.—⅛-in. masonite, ⅞-in. OD aluminum tubing, ¾-in. wooden dowel, #22 plastic-insulated hook-up wire, hardware, perf board and push-in terminals, knob to fit L2 tuning screw (optional) and knob for R6, 2000-ohm earphones, wire, solder, etc.

Gold Grabber

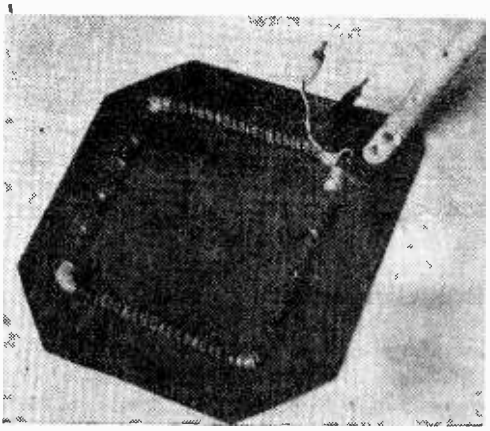
is no electrical connection to the case leads of Q1 or Q2, but the leads should be connected to push-in terminals to help support the FETs. Make sure that all parts and wiring are anchored down, or performance of the Gold Grabber will be affected. Use spaghetti over the leads of Q1, Q2, and Q3 to prevent shorts.

Looping The Loop. Fasten four nails in a 6-in. square of a piece of scrap wood. The nails should protrude approximately 1 in. Wind 10 turns of #22 plastic-covered wire (Belden 8530 or equiv.) around the square, and connect a length of wire at this point for the tap. Continue winding until there are 25 turns forming the square loop.

Carefully remove the nails and wire loop from the scrap, tape the corners of the loop with plastic tape, and connect a length of wire to the start of the loop (ground end). This done, wrap it tightly around one-half of the loop spaced approximately in ¼-in. turns. Tape the end to the loop. Then connect another length of wire to the ground end of the loop and wind it around the *remaining* side of the loop in the same way. Tape the end to the loop, making sure it does not short to the other length of wire.

Cut the three-loop leads to approximately 5 in. and connect them to P1 and P2 as shown in the schematic. Twist the leads of P2 together. Make sure the loop is firm, but use tape sparingly to hold it together.

Now cut a 10-in. square of tempered ⅛-in. hardboard and round the corners as shown in the photo. Center the loop on the board, and mark hole locations about an inch apart on both sides of the loop. Drill the holes and lace the loop onto the board with insulated tubing or fish line. Make sure the loop is tightly secured.



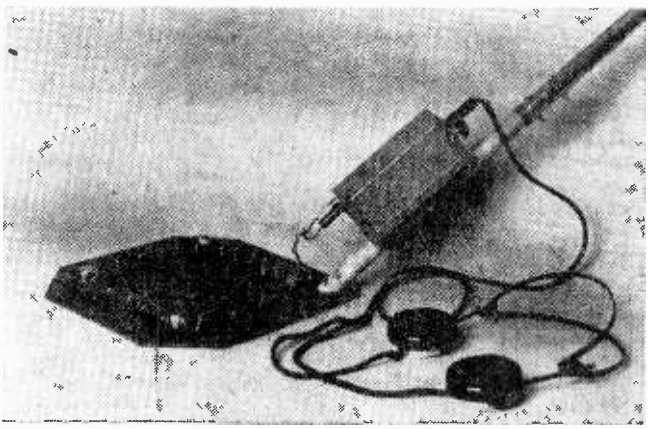
Loop should first be constructed on a piece of scrap wood, with three connections for Hi, Tap, and Gnd. Two wires from ground lead are wrapped around opposite sides of loop.

Hold On Tight. Cut one end of a 15-in. length of ¾-in. wood dowel at a 45-deg angle and fasten it to the end of the loop board with two machine screws and nuts (brass screws are a must).

Mount the aluminum box on the wood dowel approximately 3 in. up from the loop board. You can use a 44-in. length of ⅞-in. OD aluminum tubing for a handle, and fasten it to the dowel approximately 3 in. behind the box with two machine screws. (Since the tubing can be of any convenient length, you can make it as long as desired.)

Plug It In. To test the Gold Grabber, connect the loop to J1 and J2, plug a pair of 2000-ohm earphones into J3, and turn R6 full clockwise for maximum volume. Adjust

(Continued on page 111)



Photos of author's unit show slight variations from model on cover. Brass screws are a must, as use of any ferrous materials will affect metal locator's performance greatly.

By Jorma Hyypia

WHAT GIVES WITH OLD SOL?

□ About 500,000 years ago, Homo Sapiens first turned his uncomprehending, bedazzled eyes toward the sun. Yet almost everything he now knows about this star has been learned in the last 350 years. With the aid of electronics, man will learn more about this seething, life-supporting furnace during the next decade than he has ever been able to grasp in the preceding half million years of sun-watching!

Until now, our astronomers have been trap-

(Continued overleaf)

Photos of sun courtesy American Museum Of Natural History

WHAT GIVES WITH OLD SOL?

ped behind an imprisoning barrier of air that permits only a partial glimpse of outer space. Like a prisoner peering through the iron bars in the window of his cell, the astronomer has had only a limited view of what exists in the outer world. He has been forced to deduce the nature of that world mainly on the basis of brief, often distorted glimpses of passing events.

The advent of the space age has changed all that. For the first time, man has placed an astronomic observatory outside of the earth's atmospheric mantle where he now has an unobstructed view of the sun, and of the universe as a whole.

Unquestionably, electronics provided the vital key to this liberation. The spectacle of a huge rocket leaving its launch pad is manifest in the thunderous roar of burning fuel. But only a complex system of electronics can start this relatively simple combustion process. Electronic systems guide the space vehicle to its proper orbit, stabilize it there, manipulate the payload instruments that gather information from outer space, and communicate by telemetry the acquired data back to men on the ground.

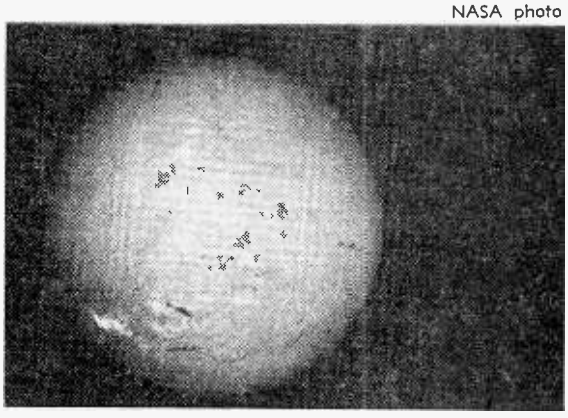
Orbiting Observatory. On October 18, 1967, a three-stage Delta launch vehicle roared off the pad at Complex 17 at Cape Kennedy. It pushed a 599-lb. solar observatory into a 350-mile circular orbit around the earth. Its mission was to obtain new information about the nature of the sun by measuring ultraviolet, X-ray, and other radiations that cannot penetrate the earth's atmosphere and therefore cannot be studied at ground level.

This latest Orbiting Solar Observatory (OSO-IV) is the fourth such space laboratory to be sent aloft and the first to concentrate entirely on the sun. During its planned tour of duty of about six months, OSO-IV will aim nine different pieces of astronomical equipment at the sun with awesome accuracy and efficiency.

And this is only the beginning. Other observatories will follow OSO-IV into space to continue observation of the sun for most of an eleven-year period—a full solar cycle during which the sun will pass through its characteristic quiet and active phases.

The OSO program is one of the National Aeronautics and Space Administration's major efforts in solar physics. But NASA alone cannot handle a project as complex as this; many other groups having specialized experience must participate. Organizations cooperating in the OSO-IV experimental program include: Harvard College Observatory, U.S. Naval Research Laboratory, American Science and Engineering, Inc., University College and the University of Leicester (England), and the University of California.

NASA photo



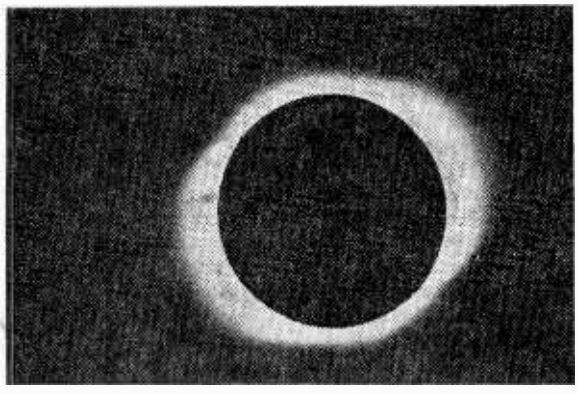
Above, photo of sun taken by Air Weather Service personnel using only light emitted by hydrogen gas. Such specialized pictures tell much about sun's chemical composition and nature of different types of solar radiation. At right, photo of sun taken during total eclipse. Whereas previously the corona could only be studied in profile—during an eclipse—now earth-orbiting observatories probe all of it except for small portion behind solar disk. Below, solar flares resulting from sunspot activity create lethal clouds of radiation. These deadly blasts can kill space travelers, throw orbiting satellites off course, and disturb vital radio communications systems.

Electronic Pilot. All of the sophisticated

observational equipment contained in OSO-IV would be useless unless the spacecraft is aimed accurately at the sun and stabilized during its orbital travels. After three months in orbit, it is obvious that the ingenious electronic pilot inside OSO-IV is doing its job magnificently.

It is not an easy job. The sun, some 94 million miles away, appears as a small target. To draw an accurate bead on this target from a laboratory zipping around the earth at great speed, the OSO-IV system must have a pretty steady eye. In fact, as we shall see. it requires several pairs of eyes to perform the feat.

The OSO-IV system has two main sections: 1) a spinning wheel, which is surmounted by 2) a sail that can be tacked into the direction of the solar wind. To stabilize the spacecraft properly, the wheel section must spin within a fairly narrow rpm range.



A set of silicon photoelectric eyes on the rim of the wheel count the frequency at which they see the sun as the wheel spins. If the frequency exceeds 41 spottings per minute, nitrogen gas is released through tiny jets on the gas storage bottles to slow down the wheel. If the spin rate drops below 26 rpm, jets on the opposite sides of the bottles operate to speed up the wheel.

The semicircular sail atop the wheel is about 44 in. wide, and is covered with 2016 solar cells. Inside the sail are the electronic and mechanical components used to operate it. While the ship is in the dark stage of orbital flight, the sail rotates along with the supporting wheel. But each time the craft comes back into the sunlight, the sail locks onto the sun.

Two pairs of silicon photodetector eyes—a pair on each side of the sail—control a servo motor that drives the sail in a direction opposite to the spinning wheel. Together, the four eyes have a 360-deg. field of view. When the pair of eyes on the side facing the sun sense the morning sunlight, the servo motor is activated to hold the sun within 3 deg. of perfect alignment with the instruments contained in the sail. Other eyes mounted near the viewing ends of the observatory instruments provide additional corrections for an aiming within one minute of arc in azimuth and elevation.

No Rock 'n Roll. Rolling and pitching of the spacecraft must be kept at a minimum. An aspect-monitoring system measures the craft's roll position in relation to the sun by means of a magnetometer that senses the craft's position relative to a plane in the earth's magnetic field. Simultaneously, the system produces a time pulse which indicates points along the magnetic plane at which the spacecraft sights on the sun. Information obtained from the aspects-monitoring system, along with data on the craft's pitch angle, is compared to known values of the earth's magnetic field using a ground-based computer. The calculated roll angle will then serve to indicate what corrective measures are needed.

Any backward or forward pitching motion is controlled by an automatic system that maintains the spacecraft spin axis within 3.5 deg. of the perpendicular to the direction of the sun. A pair of photoelectric eyes on the sun side of the sail and their associated electronic circuits activate pitch-control gas jets mounted inside the top edge of the sail. This pitch-control system can also be worked by command control from the ground.

A magnetic torque coil wound around the inside hub of the wheel section also helps minimize pitching. The coil can be energized in three basic modes by ground command. Power can be adjusted to full, half, or off levels. The polarity of the coil can even be reversed. When energized, the coil produces a torqueing force perpendicular to the coil which tends to line up perpendicular with the earth's magnetic field. Since the force also coincides with the spin axis of the spacecraft, it helps to minimize any pitching action.

Communications Complex. The OSO-IV communications system must perform three basic chores: 1) receive and process command signals, 2) record experimental data, 3) transmit experimental and spacecraft operational data to the ground. *(Turn page)*

WHAT GIVES WITH OLD SOL?

The system accepts 140 different commands in digital form, using two on-board command receivers that operate continually to protect against possible failure of a single receiver. The outputs from the command receivers are fed into three decoders for command execution. Output commands from the decoders actuate latching relays and transistor switches to execute the commands.

The system transmits data to earth in real time while simultaneously recording the same scientific data with an on-board tape recorder. This recorder operates throughout the craft's orbital period, recording data at the rate of 400 bits of digital information per second.

Once during each orbit the system is commanded to play back the information at 18 times the recording speed—at 7200 bits per second. A complete transmission takes only about five minutes. After playback, the tape recorder automatically reverts back to the record mode and the craft resumes transmitting real-time data.

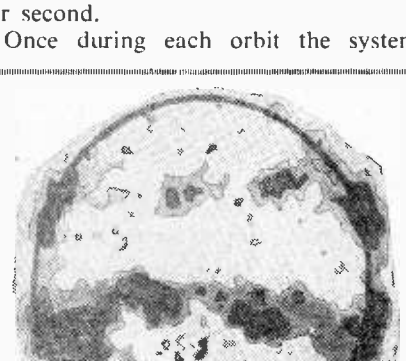
Power Package. The spacecraft requires about 26 watts of electric power (13 watts each for spacecraft systems and for experiments) while travelling in sunlight. The power requirement drops to seven watts during the orbital night.

The 2016 solar cells on the sail section are arranged in 36 parallel strings of 56 cells each. The total cell surface area of 4 sq. ft. can produce a maximum power output of 38 watts. These cells provide electrical energy to power the craft during sunlight hours and to charge batteries used during nighttime operations.

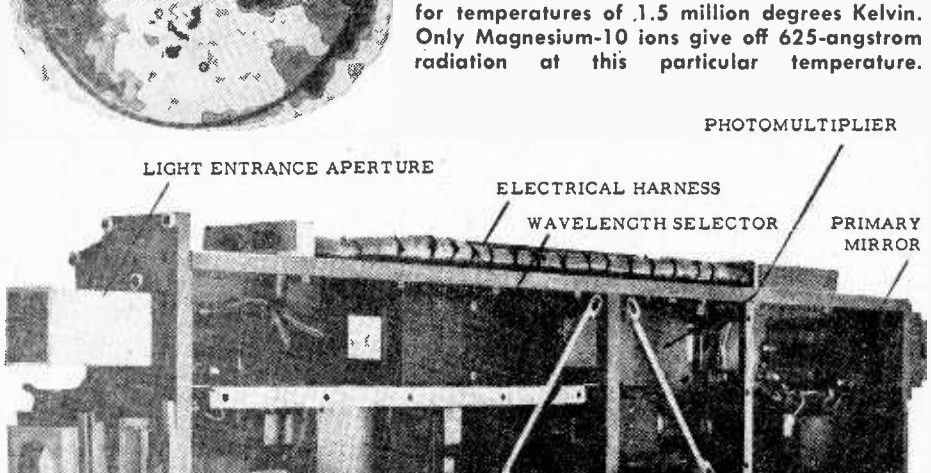
The prime battery pack consists of 42 re-

(Continued on page 114)

THE SUN IN A DIFFERENT LIGHT



Ultraviolet spectrometer (below) in OSO-IV is of primary importance. While in orbit, device is instructed by ground station to take thousands of corona pictures at various wavelengths. Magnesium-10 spectroheliogram (at left) is example of photo taken by UV spectrometer at wavelength of 625 angstroms. At this wavelength, a temperature plot of sun's corona can be made for temperatures of 1.5 million degrees Kelvin. Only Magnesium-10 ions give off 625-angstrom radiation at this particular temperature.



CB SKYHOOK mit sock!

By Elmer Carlson

Socket-2-me, CB baby, with a whip that rises in seconds and stays up for months

■ A low-cost, center-loaded R/C antenna makes a good CB skyhook for cliff dwellers and temporary installations anywhere. Field-tested on the outskirts of a big city's concrete jungle, this convenient whip belts out good signals from a near ground-level base station to any mobile unit over a four-mile area.

Whether you're just anxious to get some use out of your newly-arrived license, or Mother Nature has leveled your roof-mount in one blustery blast, you'll find this whip can fill in better than you ever expected. There are no coax losses, mismatches, etc. All five watts (or whatever) pour right into the ol' radiator.

R/C or CB? The beauty of this project is the convenience of a ready-to-go, center-loading coil antenna available from Lafayette Radio for $2.99, plus postage (by mail: 111 Jericho Tpke., Syosset, N.Y. 11791). Though advertised for R/C (radio control), it's good for frequencies in the CB band and will work fine. And those five watts certainly won't melt a tubular antenna; you need much more power for that. Even the center-loading coil will *(Continued overleaf)*

CB SKYHOOK

stand up under the strain of CB transceiver power and will match all CB rigs.

Center-loading whip extends to 54 in. Use length of stranded hookup wire for lead.

PARTS LIST FOR CB SKYHOOK

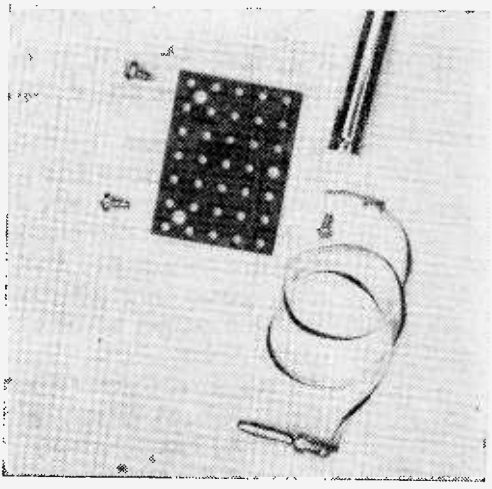
1—Center-loaded R/C antenna (Lafayette 99H9098 or equiv.)
1—1⅜ x 1¾-in. piece of perforated phenolic
1—Banana plug
1—Solder lug
2—½ x 6 Parker-Kalon binderhead sheetmetal screws
1—12-in. length of AWG-18 plastic-covered hookup wire
1—½-in. 6-36 roundhead machine screw (if not supplied with antenna)
Misc.—Solder, wire, ¼-in. spacers (if needed), etc.

Three Plus Two. Believe it or not, you don't have to build anything. All you do is drill five holes—three in a scrap of phenolic (or any insulating material), and two in the rear edge of the top of the CB transceiver cabinet. This set-up allows the antenna to be mounted just behind the cabinet rim. (The author attached his unit to the rear of an Olson "Sidebander.")

The holes drilled into the cabinet should be smaller than those drilled through the perforated phenolic. As shown in our photo, the perforated phenolic is attached to the cabinet of transceiver with self-tapping screws. This eliminates the need for opening the cabinet. Sheet-metal screws have deeper threads and will hold better in the thin metal.

When drilling those two screw holes be careful that you don't spray metal chips over the inside of the transceiver. Drill at a low speed—even if you have to use the ol' egg-beater. The use of a slow drilling speed is especially important with tube-type transceivers. High-speed drilling will cause more vibration, and there's a better chance of damaging delicate vacuum tubes. A little oil on the self-tapping screws will make it easier to set them in their holes.

In the Middle. Alternatively, you can mount the whip right in the center of the transceiver cabinet. Doing so might give you a little better ground-plane effect, but you probably won't be able to notice the difference. Then, too, it would also mean extra hardware.



Solder lug and wire are attached to whip from underside of phenolic. Phenolic is then screwed down on top of cabinet at rear.

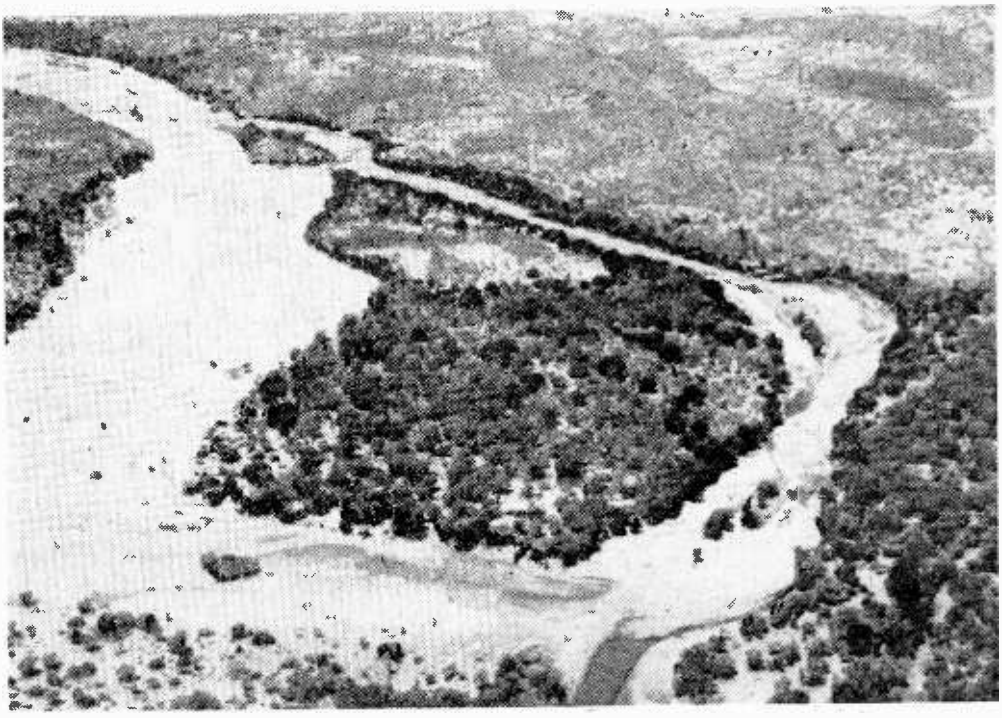
If you do decide to mount the antenna in the center of the cabinet, you'll need a set of four ¼-in. spacers to raise the phenolic above the cabinet surface. Then the lug and the screw at the bottom end of the antenna will clear the cabinet.

To connect the antenna to your rig, strip the ends of an 8- to 12-in. length of hookup wire. Solder one end to a solder lug and the other to a banana plug. You don't need an insulator on the shank end of the plug.

That's just about it. How much quicker can you get? All that's left is to mount the whip on the cabinet of the CB transceiver, and get on the air.

So go to it, and don't be shy about using this CB skyhook to get on the air—fast! ■

Shasiland...



...the DXer's dream that almost was

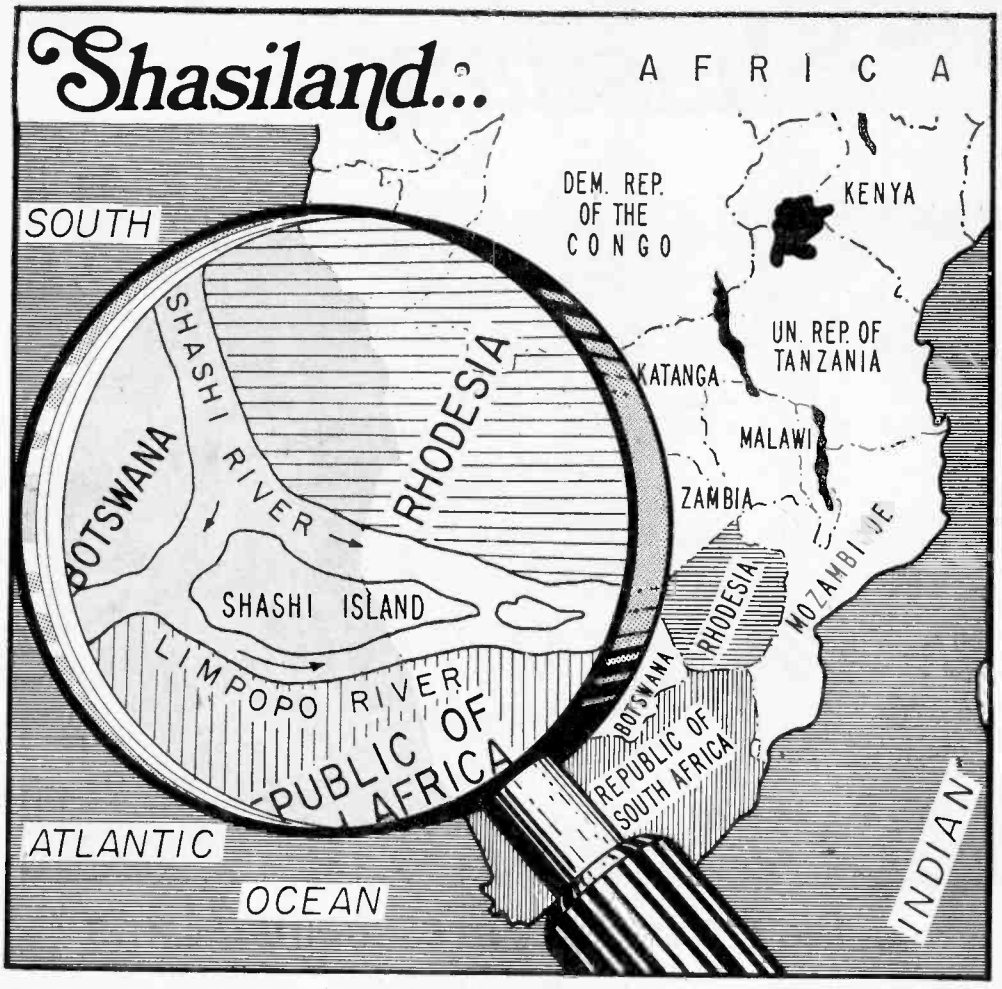
By Don Jensen

■ On a warm May morning two years ago, a truckload of police constables forded a muddy river, seized a partially-built shortwave station, and claimed the tiny island on which it stood —Shasiland. But where is Shasiland?

Ask that question of almost any DXer, and chances are you'll get only a shrug and a blank stare in return. For Shasiland, a tiny, would-be country in southern Africa, is almost totally unknown. And this despite the fact that it came within a hairs-breadth of becoming the rarest DX target in the world!

But for the vagaries of African politics, Shasiland today would be the home of a small but thriving missionary radio station. And it would be operated by a South African religious group called Christian Action by Radio in Africa, or CARA for short.

CARA's adventures in Shasiland are really two tales in one— the story of how this strange little country came to be, and the story of a fledgling missionary society that nearly overcame overwhelming odds to establish a Christian radio voice in southern Africa. *(Continued overleaf)*



Map pinpoints location of Shasi Island: at junction of Shasi and Limpopo Rivers and between what are now Botswana, Rhodesia, and the Republic of South Africa. Not shown is W. B. Coetzer's farm, located on the Bechuanaland border, directly across from the island he tried to make into a country of his own. For an actual aerial view of Shasiland, see photo on p. 51.

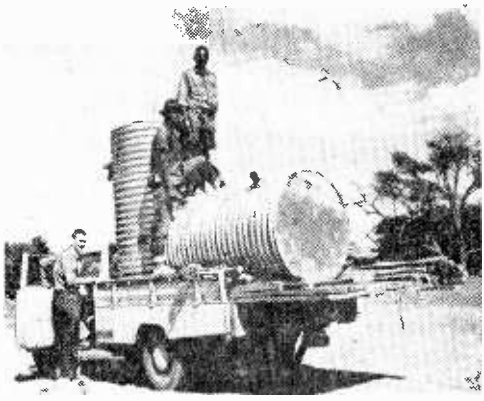
Claiming The Unclaimed. The Shasiland story begins many years ago, when W. B. Coetzer, a prosperous businessman who owned a farm on the border of the British protectorate of Bechuanaland (now Botswana), made an interesting discovery. He learned that uninhabited Shasi Island, located at the confluence of the Shasi and Limpopo Rivers where Bechuanaland, Rhodesia, and South Africa meet, was unclaimed territory.

So, on July 1, 1952, Coetzer nailed a sign to a big tree on the 215-acre island, proclaiming it a sovereign, independent state. As far as Coetzer was concerned, Shasiland was his. No one else seemed the least bit interested in his little island. All it had to offer was a jungle of huge twisted trees, monkey ropes, Malela palms, and undergrowth. Its only residents were the hundreds of different birds that chirped and shrieked cacophonously. For years his claim went unnoticed and unchallenged.

CARA Calling? Then CARA entered the picture. In 1961, five students and a Dutch Reformed Church minister had founded Christian Action by Radio in Africa. Their goal was to bring a Gospel message to Africa by radio.

In time, the society established recording studios in four nations. The stumbling block, however, was the lack of transmitting facilities. A weekly half-hour broadcast over the commercial Radio Clube de Mozambique

Shasiland was born when Coetzer posted this sign, proclaiming it an independent state.



Station's "power plant" was moved to Gaberones after police confiscated the transmitter.

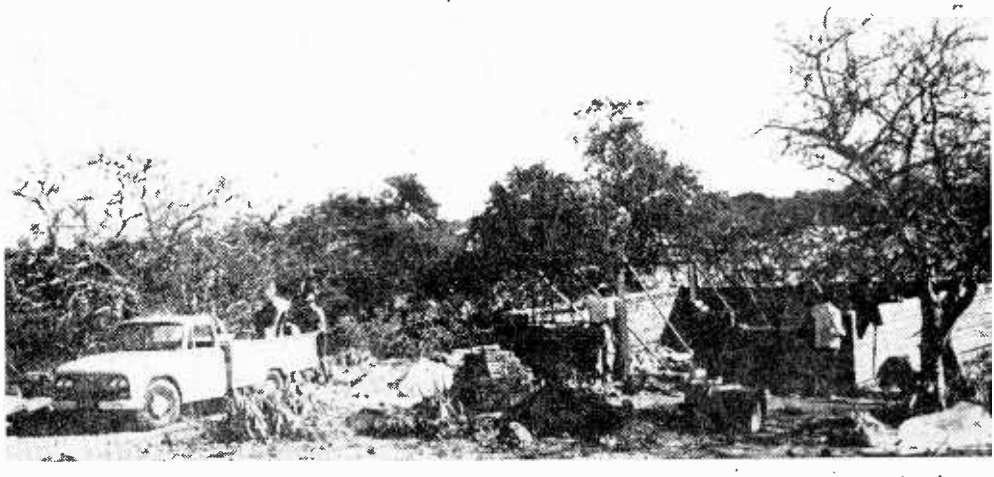
proved inadequate. CARA wanted its own shortwave station, but permission to operate could not be obtained from any country in southern Africa. So Shasiland seemed to offer the missionary group its best opportunity.

With the assistance of Coetzer's son, a medical missionary, an interview was arranged with the island's owner at the Mt. Nelson Hotel in Cape Town. The Reverend Steyn Fourie explained CARA's needs. Coetzer, in turn, listened carefully, then agreed to the proposal to establish a station on Shasiland. His sign, he said, had been posted on the island for ten years, the time necessary, according to international law, to proclaim it a separate, independent state.

The first meeting was held in April, 1962, but it took CARA four years to raise the funds needed for the project. Using the framework of an old transmitter, John Graham, a missionary-engineer, built the 1000-watt shortwave station in the workshop of South Africa's Stellenbosch University. And on May 5, 1966, Graham and his wife, Lorraine, left Cape Town for Shasiland, the transmitter and other vital parts loaded into a 1½-ton truck and a station wagon.

After a 1300-mile trip, the Grahams joined another missionary couple, Mr. and Mrs. J. Foster, already on the island. A mud-brick transmitter building had been partially completed. Work was progressing rapidly, and it looked as though CARA's long-awaited station would soon be on the air.

CARA Going? Then the Bechuanaland authorities stepped in. On May 18, police constables crossed the shallow Shasi River and seized the transmitter. By their action, they claimed Shasi Island as part of



In this rare photo, Shasiland's only (and one of the world's rarest) radio stations is shown under construction on Shasi Island. But as later events show, it was never to be completed.

Shasiland...

Bechuanaland. And thereby ended the country that might have been, the DXer's dream that almost was. (Can you imagine tuning in sometime during the wee hours and picking up a transmission from an independent, 215-acre island called Shasiland?) And thereby also ended Shasiland's very claim to be, Coetzer's 1952 notice that "Trespassers will be prosecuted. This island named Shasiland is a sovereign, independent state, not part of the Union of South Africa, Bechuanaland, or Southern Rhodesia, and has been occupied by me since 1st July, 1952."

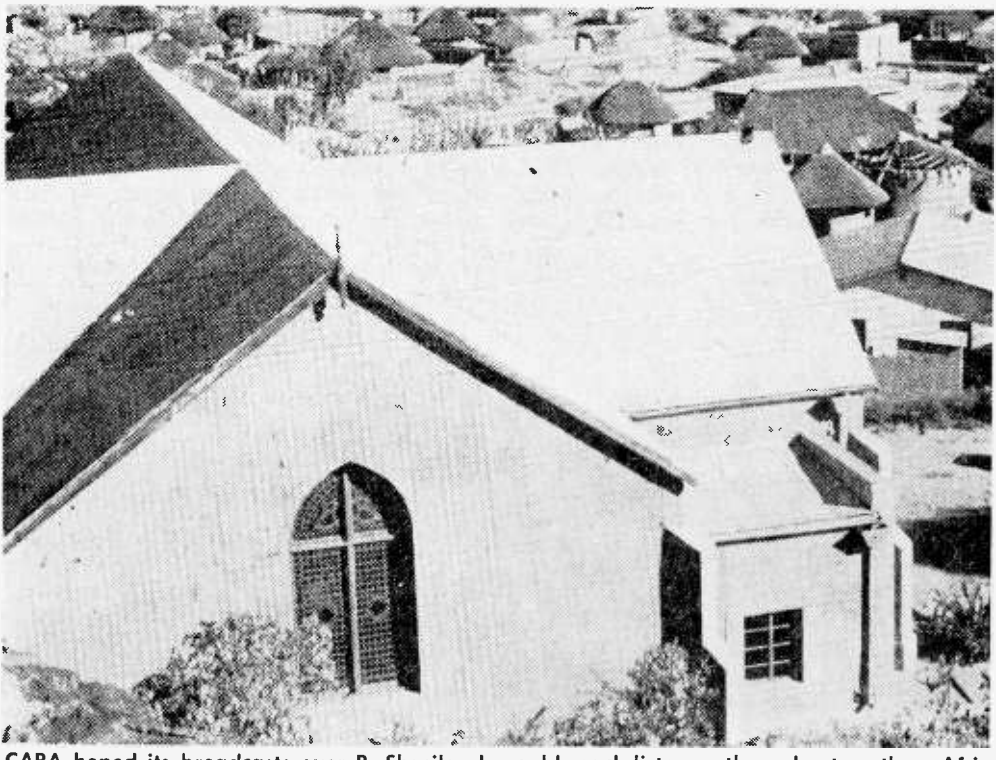
The whole operation was friendly enough. The police cordially issued a receipt for the transmitter, loaded it on their van, and hauled it away. Not wishing to create a major incident, the organization admitted guilt and the case was soon settled. The government promised to return the transmitter should CARA obtain permission to establish a legal station.

Two years later, however, Shasiland's status is still unresolved. Coetzer has indicated he will take the matter to court. The Botswana and South African governments are now discussing boundary questions and upon the outcome of these talks will depend the future of the island.

CARA applied to the new Botswana government for a station license, but after a year of waiting, the answer was a firm *no*. Discouraged, CARA's governing board last fall dissolved the group, turning its activities to MEMA, the audio-visual branch of the Dutch Reformed Church. MEMA maintains the original recording studios, producing religious programs for the national Botswana Radio and South Africa's Radio Bantu FM network.

Graham now heads the MEMA team in Botswana's capital of Gaberones. And while religious broadcasts make up on 3½ percent of the R. Bantu schedule, surveys show them to be the second most popular feature, reaching an audience of three million daily.

Though its work continues, CARA's dream of its own shortwave station in Shasiland is over. And with it went DX listener's chances to log the country that *almost* was. ■



CARA hoped its broadcasts over R. Shasiland would reach listeners throughout southern Africa. In foreground above: a Dutch Reformed Church in Botswana, situated in a typical town.

Housed in the sleeve of a ballpoint pen, this light-activated device stacks up as one of the simplest projects ever. It's so simple, in fact, that we call it our . . .

"NO-PARTS" SLAVE FLASH

By Ronald G. Hilke

■ Many's the time when an amateur photographer needs additional lighting for flash photography. Thing is, large additional expenditures *plus* the complexity of interconnecting multiple electronic flash units discourage most laymen. Fortunately, however, there is an easy way out.

The ready availability of low-cost electronic flash units is one happy side to the picture. This, plus development of a new semiconductor device called the LASCR (light activated silicon controlled rectifier) means that new avenues of multiple electronic flash photography are now open to most every one. One such route is the photoelectric slave flash we're about to describe. It's so simple we call it our "No-Parts" Slave Flash.

Three And A Lens. Fig. 1 shows the LASCR with its three electrical connections —the anode, cathode, and gate. Smack on top of the unit is the lens, which focuses the impinging light energy onto the semiconductor junction. If the light energy is of sufficient intensity, the switch junction conducts.

Once an SCR is in the conducting state, it will continue to conduct until the anode voltage is removed. In an electronic flash, this is accomplished automatically by the flash tube discharging the main storage ca-

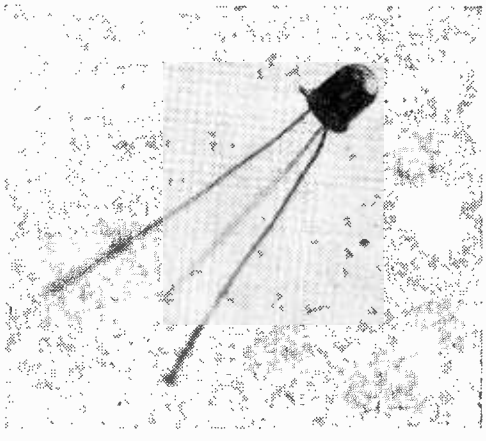


Fig. 1. Looking for all the world like an ordinary, everyday transistor, the LASCR differs in that it contains a lens on top.

SLAVE FLASH

pacitor phich provides voltage for the triggering circuits.

The LASCR used for this project was obtained from Poly-Paks, Inc., Box 942, Lynnfield, Mass. 01940. The device, called a Photran, is available in voltage ratings from 50 to 300 volts. Most electronic flash triggering levels are in the 200-volt range, so to provide a healthy safety factor a 300-volt device was selected; price is $2.95.

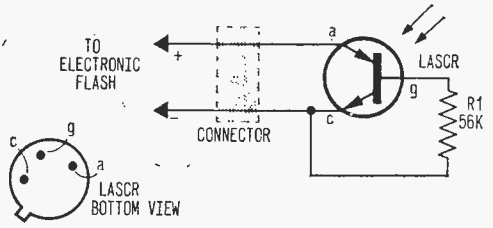


Fig. 2. Schematic of "No-Parts" Slave Flash. Author used LASCR supplied by Poly-Paks, Inc.; see text above for additional information.

Simplicity Plus. Fig. 2 is a schematic of the electrical hookup and a drawing showing the relative placement of the LASCR anode, cathode, and gate leads. Since gate current is extremely small, the wattage rating of the 56k gate resistor is noncritical and can be any value from ⅛ watt on up.

Fig. 3 shows the wiring of the slave trigger unit prior to insertion into the plastic end of a ballpoint pen. The plastic tube has been halved by means of a hacksaw to aid in assembly. If the end of the plastic tube is large enough to accommodate the body of the LASCR, this step won't be necessary.

A length of spaghetti has been placed over the LASCR anode and cathode leads to preclude shorting. However, if spaghetti isn't available, electrical tape or even masking tape will suffice. All leads are soldered at

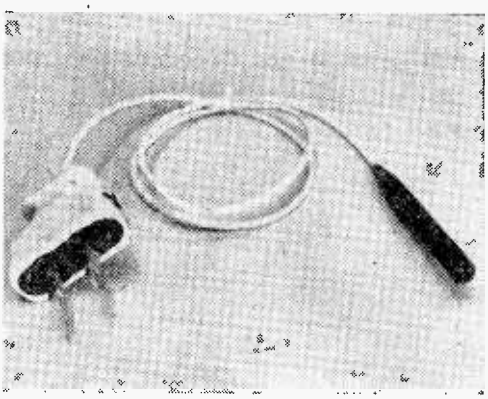


Fig. 4. Completed Slave, ready for use with most any electronic flash unit. However, plug on cable must match connector on flash.

joints; care should be taken to not overheat the LASCR by conduction of heat up through the leads. Overheating may be prevented by clamping the jaws of a needle-nose plier on the LASCR lead between the soldered connection and the LASCR during the soldering operation.

Positive Anode. The electrical hookup to the flash unit requires that a positive voltage exist on the anode of the LASCR. This can be verified with a voltmeter, or by hooking up the trigger unit and attempting to trigger the flash by beaming light from a flashlight into the LASCR lens. If the flash doesn't trigger, reverse the interconnecting cord connections. (No damage to the LASCR will occur because of the reversed polarity.)

Once the unit is operating properly you can complete assembly. Simply insert the works into the plastic tube and cement the case of the LASCR to the front of the tube. The output cable should be cemented to the rear of the tube to prevent twisting the cable and possibly damaging the internal assembly. The finished unit is shown in Fig. 4.

Add A Plug. Several types of connectors can be used at the end of the output cable. A standard female P-C type connector mates

(Continued on page 109)

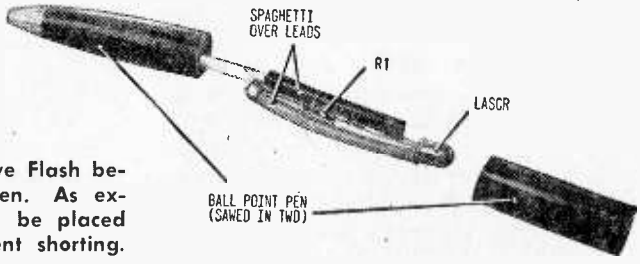


Fig. 3. View of "No-Parts" Slave Flash before reassembly of ballpoint pen. As explained in text, spaghetti must be placed over two LASCR leads to prevent shorting.

WANNA JOIN A DX CLUB?

Most every DXer does. Question is, why do they wait so long?

By the Editors of RADIO-TV EXPERIMENTER

■ There's no doubt about it, hams seem to have more fun. They're constantly talking about their equipment, problems, and families in a never-ending world of chit-chat and fellowship—a far cry, indeed, from the SWL condemned to a lonely existence behind the controls, with only a log book for company.

But all this needn't be so. Whether your main interest is SWLing, BCB, or ham-band operations, the following radio clubs offer everyone a chance to get in on the DX action.

The mainstay of each organization is a club bulletin. Here the enthusiast will find gobs of information and news put together by people who really know their field. And featured columns offer members an opportunity to contribute material based on their major interests. These bulletins are obviously one of the best ways to stay up-to-date on latest happenings in the BC bands.

No Long Shots. Before joining a club, every SWL wants to know which one gives more for the money, and how the various clubs differ in what they offer.

There are many clubs in the U.S. and Canada—both large and small—and each must be judged on its own merits. The longer a club has been in existence, the more believable is its promotion material.

The following groups are all affiliates of the Association of North American Radio Clubs (ANARC is a super-organization of DX clubs dedicated to maintaining standards among members and furthering DX activities). These clubs have members spread far and wide throughout the Western Hemisphere. Though there are certainly other clubs for the DXer, the eleven listed here are known to have a wide range of activities and proven reliability over past years.

Whatever your interest, you should find the one just right for you—there are no boundaries with regard to nationality, age, or occupation. So good luck, and good hunting.

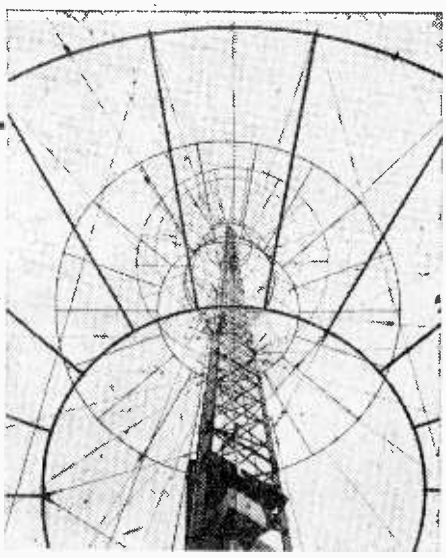
- AMERICAN SWL CLUB (ASWLC), 16182 Ballad La., Huntington, Beach, Calif. 92647. SWBC Editor, C.M. Stanbury II. This club specializes in SWBC coverage and foreign BCB DX. Its monthly publication *SWL* averages 25 pages and has a Utility and Cardswap column. Dues are $4.00 yearly.

- CANADIAN DX CLUB (CDXC), 311 W. 14th St., Riviera Beach, Fla. 33404. President, Ralph J. Irace, Jr. Club's monthly publication called *Cadex*, and it

(Continued on page 113)

DID YOU HEAR THAT STAR?

By Alan C. Van Dine



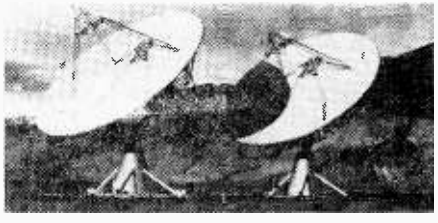
Paul Kilborn looked up from his latest copy of *Playboy* and out through the screen of his porch, 300 feet up the side of a West Virginia mountain. In the valley, lights were flashing on, first in the office building, then in the equipment sheds of the big Green Bank observatory. Paul stepped quickly inside and dialed the main office.

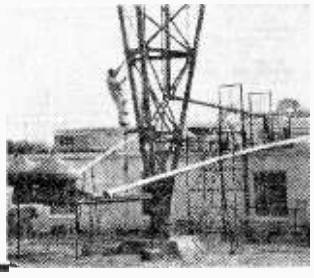
"What's going on down there?"

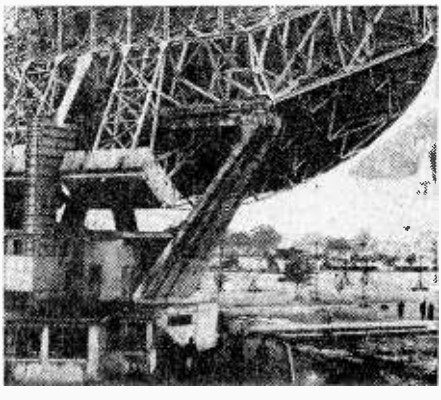
"We're not sure, sir." It was one of the new technicians assigned to the National Observatory since its 1967 expansion. "We don't know what it is, but we're getting a signal. A pattern."

The *Playboy* still in his hand, Paul headed for the station wagon standing in the driveway, its engine still warm. Project Sensor was less than twenty hours old, and already the false alarms were starting. What would it be this time: a ham operator, trespassing on the radio-restricted zone? A distant thunderstorm? A stray transmission from an airline flight?

Theoretically, the antenna was tracking the star Tau Ceti, eleven light years from Earth. But Paul knew to expect surprises. He had helped to redesign the big radio telescope with a new narrow beam antenna and low noise receivers that might pick up almost anything. He found Dr. Gerard in the computer analysis room, wrist deep in readout sheets and frowning.







"Any inkling, Jake?"

"None," said the project director, "except that it's too good to be true."

Paul looked at the pulse pattern, traced out on long grid sheets. "Much too good," he agreed. "It looks almost like a musical score."

"Right," Gerard said. "The Tau Ceti *Toccata and Fugue*. Only it will turn out to be a jamboree from some jerkwater radio station with a faulty transmitter. Wouldn't that look good in the newspapers? *Scientists find intelligent life in West Virginia!*"

Paul glanced at another sheet, then another. More of the same. "When did it start, Jake?"

Gerard checked the timing blips. "Zero one thirteen, and it's still repeating. I thought we might have some weird oscillation in the frequency analyzer, but all circuits check perfectly. The interference analysis crew can't find a thing that resembles this. We played it for the Navy hotshots at Sugar Grove, and they can't identify it either."

Paul squinted at the azimuth and elevation dials. "We can't have drifted off Tau Ceti."

"Not a chance. She's tracking that star steady as a rock. But this signal is much too strong to be coming from the star. Another thing—look at this frequency analysis. The rhythmic signal is superimposed *over* the random noise we were getting from Tau Ceti. Figure that out."

By 3:30 the Sensor team had exhausted every plausible radio source anyone could suggest. No malfunctions apparent. No stray transmissions from outside the valley. But the signal continued: a repeating pattern of four sequences that defied all attempts at decoding. Could it be coming from the Tau Ceti solar system after all? The first real sign of intelligence in deep space? Paul and Dr. Gerard decided to check it out. They steered the antenna off the star.

The signal stopped. For a full minute, not a word passed. Pointlessly, Gerard walked to the visual telescope and peered through, as if to look at the distant radio transmitter that had just materialized in the mind of everyone in the room.

"It can't be," he muttered. "It just can't be."




"Maybe not," Paul said, "but it's what we're here to find."

"It's too distinct," Gerard insisted. "The signal is simply too strong. Where would they get that kind of power?"

"And too complicated," Paul added. "Like a melody, or a series of equations. If they were putting out a beacon signal, it would be something simple and basic, like two plus two equals four." *(Continued overleaf)*

Hear That Star?

Gerard nodded. "Let's try it again."

"Wait a minute," Paul said. "Let's try another target instead." The vague beginnings of an idea were assembling in his mind, but it was too far fetched, and he was too tired . . . he turned his attention back to the antenna controls.

When a second star was zeroed in, the signal resumed—the same pattern—and now all attempts at explanation were in ruins. How could two solar systems, light years apart, be beaming the same message? Gerard called a break for coffee and rest.

Paul, who had been awake for nearly 24 hours when the signal began, now found that he couldn't sleep. Lying on the couch in Gerard's office, he reopened his *Playboy* and thumbed through it.

Gerard, leaning far back in his swivel chair, reached for his cigarettes, started to offer one to Paul, then noticed the magazine.

"Tell me," he said. "Why is it that every time I'm up to my eyelashes in trouble, I find that my top assistant has buried himself in some girlie mag."

"It's envy," Paul said. "A lover looks at a star, and it reminds him of peace, wisdom, and womanhood, which reminds him of his girl. So he tells the star how nice his girl is, and he tells the girl how nice the star is. *We* look at a star and promptly get hung up on electromagnetic frequency analysis. I'd rather be a lover."

"I may cry," Gerard said. "And you, if you happen to get around to it, might try saying something even *half* that smart about radio transmissions from the direction of Tau Ceti."

"Oh, that. Well you see, if we were lovers and poets, the whole thing would be quite simple. We would know immediately that our friend is writing poetry."

"Which friend? Tau Ceti?"

Paul hesitated. "No, not the star. The antenna. It has noticed its first celestial object and reacted like most of our new equipment reacts—temperamentally."

Gerard grunted.

"Think about it," Paul said. "We have put 203 million dollars worth of sharpened perception into this thing, haven't we? And we have it so cross-rigged with computers that we're not even sure we've isolated all of the functions. Right?"

"Right," said Gerard, "except that not even in our most imaginative blundering could we *accidentally* program our computers to write poetry."

"No, no . . . not program. But we *have* hooked the antenna into so much redundant circuitry that the damn thing could practically talk to itself. And the antenna can eavesdrop on stimuli that we haven't even discovered. That's what it's for, isn't it?"

"Okay, okay." Gerard was apparently tiring of the game. "Sensitivity, brains, and a celestial viewpoint. It all adds up to a poet. A 15-acre, 203 million dollar federal poet. Go to sleep!"

Paul shrugged. Sleep, to be sure, was the only solution, and he could finally feel it coming. But Gerard sat up suddenly, grinning.

"I just realized something," he said. "We have a whole roomful of eager young astronomers, physicists, and mathematicians downstairs without a thing to do. Paul, can you think of a more gullible group in all this world than astronomers, physicists, and mathematicians?"

"Not offhand."

Gerard reached for the phone. "Well, since you have come up with the original hypothesis of the night, I suggest we unleash all that Ivy League tuition on testing it. It might be just what we need to get some of those high-priced brains in motion."

A half-awake Princeton mathematician named Pitts was Gerard's choice as project chief for the exercise. The young man stared uncertainly through hanging strands of hair as his boss explained the assignment.

"This is right down your alley, Pitts. Besides, I've always admired your beard. I want you to have everyone who's awake take another crack at decoding the signal pattern, but with two arbitrary assumptions: first, that it translates to meaningful English; second, that it follows a regular meter, like poetry."

"Dr. Gerard, may I point out . . ."

"Pitts," Gerard interrupted, "you are far too bright to go walking around a place like this with a closed mind."

Pitts left. Paul finally slept, but Gerard shook him just before sunrise to say that he had called Pitts to come back and discuss his progress.

"You could have gone down to the control room, you know," Paul yawned. "Supplied some encouragement, a few suggestions." *(Continued on page 108)*

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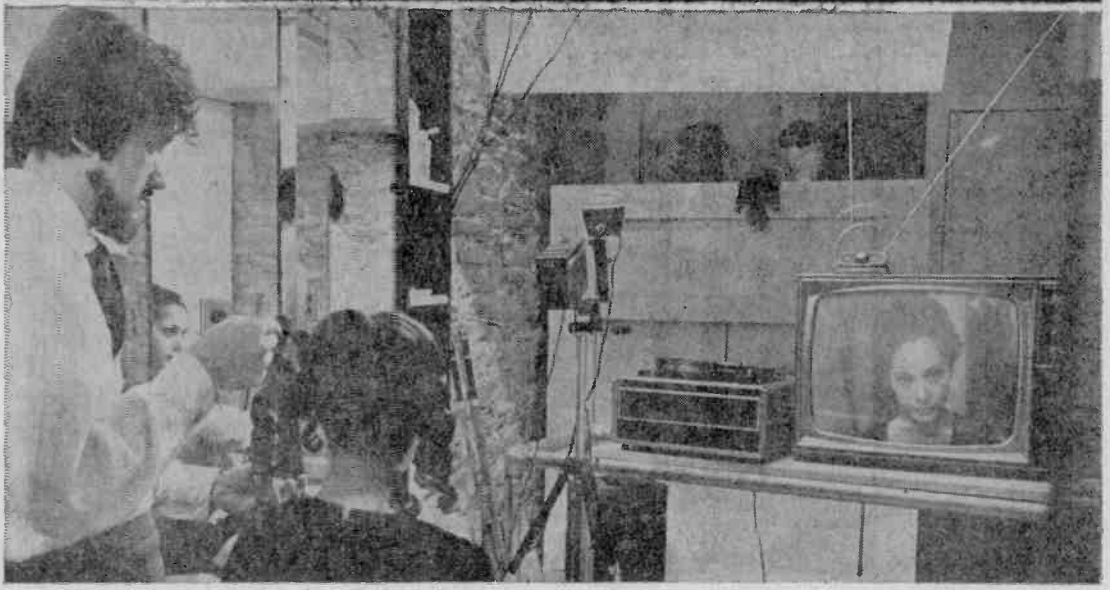
RCA

■ Along comes a man called Peta with an ingenious utilization of the video tape recorder. He trains it on the ladies in his golden grotto of a beauty salon and lets them see themselves in action with different hair styles and hairpieces. Then, if they wish, the tape can be filed. And if, in a few months, a lady would like, say, an Anniversary hairdo, all the details are there to be replayed.

Peta visualizes chic ladies in the future using their home video tape recorders this way—so if you say to your wife "Why can't you do your hair the way you had it at the big dance?"—she can! Meantime, send your Fair One to Peta's (just off New York's 5th Avenue) for a multidimensional consultation (a mere $10) and a starring role in her own production —"Crowning Glory." —*H. Arliss Bell*

LOOK! *instant me!*



Roll 'em first, and rollers next is the order of the day in Peta's salon, where he is casting director, cameraman, coiffeur (and most likely confidant). The lady acts out a short, curly part.

Svengali and Trilby? Maybe, but updated with the electronic assistance of a video tape recorder.

If the FBI can keep your fingerprints and the hospital your X-rays, why not a file on Milady's hairdos in motion?

The name of Peta's shop is Special Occasions, but you don't need one to fall in and star in a production of yourself with ringlets, fall, postiche, frosting. The guys don't have to memorize all these terms, but they'll know what they like when they see the whole scene on camera.

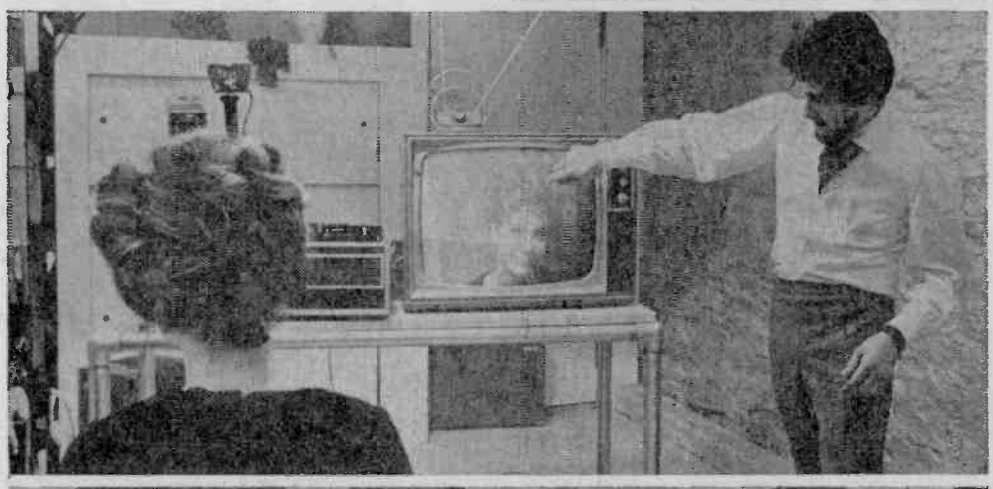
Something to go with a frilly midi? Zee Great Peta will help you decide with his really mod, on-the-spot canned video.

instant me!

Continued from previous page

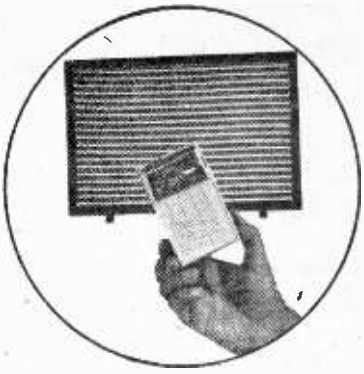
A long time ago, when a lady sat for her portrait, she wasn't allowed to move. Now she can really see herself as others see her with the video tape recorder.

Professor Peta points out how a hairpiece can make an instantly more appealing YOU. And if you forget the effect, you can play it back next year.



In the can with your low-budget, coiffing-by-video production—working title, "Instant Me!"

HI Power Crowd Getter



One transistor radio plus this IC booster spell more bark in the beat

By Herb Friedman, W2ZLF/KBI9457

■ Pocket radios are everywhere. You get AM, FM, even SW coverage anywhere you wander. And the little box fits lickety-split into pocket, purse, beach bag, picnic basket, or what have you.

Trouble is, while transistor radios are getting smaller and smaller, the sound is often not what it should be. The mini levels provided by these transistor units are fine for small rooms and private listening. But try making the scene with the group, and you'll find they're just too pooped to pop.

Take on our Crowd Getter, however, and you can bet your surf parties will zoom like never before. This amplifier/speaker combo will raise any transistor's whisper to an ear-shattering blast that'll gather all the bees to the honey and make your party the success it should be.

Only One IC. The Crowd Getter is a complete booster amplifier housed in a commercially made remote-speaker cabinet (the speaker comes with the cabinet). The amplifier consists of a single IC (integrated circuit) which contains the preamp, driver, and power-output stages. The amplifier shown in our photos is powered by a 6-volt battery which provides about a ½-watt output—roughly equivalent to an old vacuum-tube table radio at full volume. If you substitute a 9-volt battery the sound will be substantially louder, though it might be difficult to fit the larger battery into the speaker cabinet.

Both the IC-amplifier and the battery mount on the back panel of the speaker cabinet, making the Crowd Getter as portable as your transistor radio. In fact, you might even consider attaching a handle to the cabinet.

To use the Crowd Getter, simply connect a cord from the radio's earphone jack—thereby disabling the speaker—to phono jack J1. Volume must be controlled by the radio's volume control, since no control has been included in the amplifier.

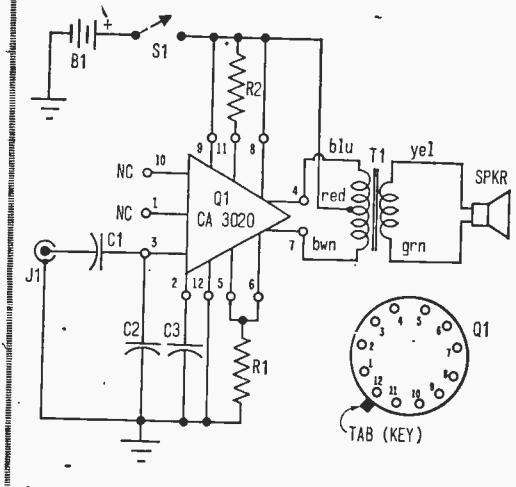
Building The Bomb. While connections can be made directly to Q1's leads via flea-clip terminals, to avoid excessive heat from soldering, we suggest you use a transistor socket as shown. Note that though Q1 has 12 leads, a 10-pin socket is used. A 12-pin socket is not only difficult to obtain, it is also expensive. On the other hand, a low-cost 10-pin socket is available in Motorola's HEP line of components. And if you follow our layout, construction will actually be easier using the 10-pin socket.

First step is to remove the back cover of the speaker enclosure and unsolder the speaker wires connected to phono jack J1 on the cover. Next, assemble the amplifier on a section of perf-board measuring approximately 2 x 3 in. Flea-clips or push-in terminals are tie points. *(Turn page)*

Hi-Power Crowd. Getter

Drill a 5/16-in. hole for Q1's socket about 1¼ in. from one end of the perf-board. Note that the socket is *keyed* with a small point; the key should face the closer end of the perf-board. Bend leads 11 and 12 of Q1 straight out from the case—at right angles to all the other leads. Make certain leads 11 and 12 don't touch Q1's case. Now cut off exactly one-half the total length of the remaining Q1 leads. Place the socket in the perf-board hole, then insert Q1 into the socket.

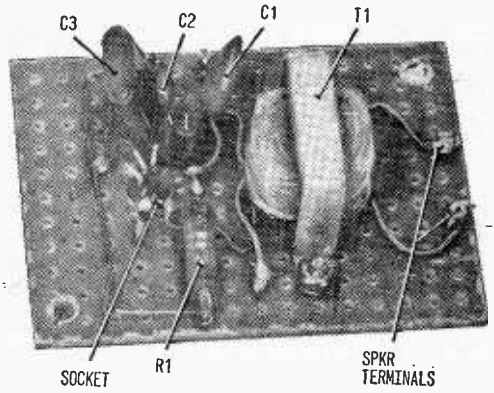
The Q1 lead directly opposite the case's key is 12. Looking at the bottom of Q1, the lead next to 12 in a clockwise direction is 1. On the socket, the pin opposite the key is 10. The next pin in a clockwise direction is 1. This might sound somewhat complicated, but it's not. When Q1's 10 lead is lined up with the socket's 10 pin, all of Q1's leads will fall into line. Just take an extra moment or so



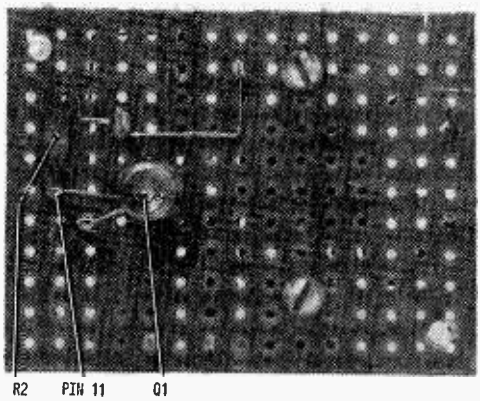
Integrated circuit is from RCA. While IC has 12 leads, a 10-pin socket is used for economy. Leads 11 and 12 are bent out from case, so remaining leads align with socket terminals.

PARTS LIST FOR CROWD GETTER

B1—6-volt battery (Burgess Z4 or equiv.)
C1—.1-uF, 10-VDC capacitor
C2—.01-uF, 10-VDC capacitor
C3—.22- or .25-uF, 10-VDC capacitor
J1—Phono jack (supplied with speaker)
Q1—Integrated circuit (RCA CA3020)
R1—0.82- or 1-ohm, ½-watt resistor
R2—1000-ohm, ½-watt resistor
S1—Spst toggle switch
SP1—Speaker in enclosure (Lafayette 99H4550 or equiv.)
T1—Output transformer, 8 ohms (Lafayette 33H8571 or equiv.)
Misc.—Battery holder (Keystone #175 or equiv.), 10-pin socket for Q1 (Motorola), phono plug, plug for earphone jack, patch cord, perf-board, push-in terminals, wire, solder, hardware, etc.
Note—A kit (#IC-5) containing the CA3020 and 10-pin socket is available from Custom Components, Box 352, Alden Manor, Elmont, N.Y. 11003. Price is $4.50, including postage and handling.



Most components mount on top of perf-board and should be tack-soldered to Q1's socket. Do not attempt to wrap the leads as a socket terminal might become shorted. Leads 1 to 10 of Q1 are cut to about half length.



Q2 (IC) and R2 are mounted on bottom of perf-board assembly. Leads 11 and 12 of Q1 are brought out at right angles to case. They are about ½ in. long in order to prevent heat damage to unit while soldering.

to check Q1's installation, because you won't get a second chance if you make an error.

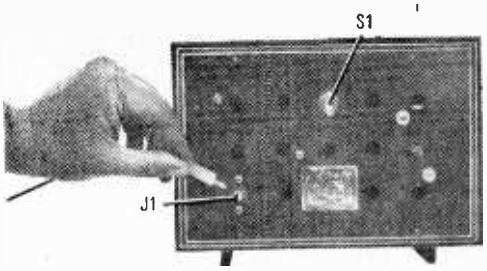
Press Q1 down firmly into the socket, then cement the socket to the perf-board using ordinary hobby or household cement. Don't cement the socket before Q1 is installed, for just a drop of cement in a pin will make the socket useless.

Mount transformer T1 on the socket terminal side of the board, as shown in photo. Position T1 about 1 to 1½ in. from Q1, then install the remaining components. All connections to Q1's socket are *tack-soldered;* don't try to wrap wires around the socket's terminals.

Installation. Install the amplifier on the back cover so the input terminals are in line with phono jack J1. To avoid crushing Q1 on the underside of the perf-board, use a ½- or ¾-in. spacer between the amplifier and the cover at each mounting screw.

Install power switch S1 near the amplifier. It can be installed in any of the ⅜-in. holes pre-drilled in the cover. Finally, install battery holder for B1. Though B1 is a 6-volt battery, it will fit a standard D-cell holder such as the Keytone #175. For slightly higher power output a 9-volt battery can be substituted, though it must be rated for at least 100 mA. Don't use a transistor radio 9-volt battery like the 2U6. The 2U6 won't last more than a couple of hours.

Warning. Q1's supply voltage must not exceed 9 volts. To avoid damage, mount a heat sink on Q1 when using a 9-volt battery.



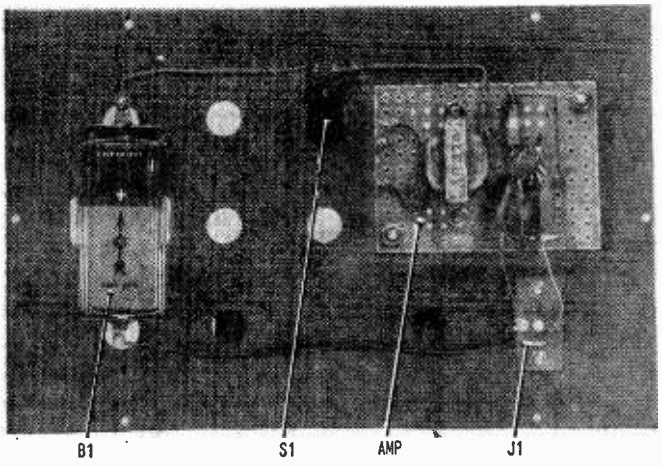
Connect shielded patch cord between transistor radio's earphone jack and J1. S1 turns on power, but volume is controlled by radio.

A heat sink is not needed for a 6-volt power source.

To finish up, connect the speaker wires to T1's secondary terminals, route the leads away from the amplifier's input connections, then install the speaker enclosure's back cover. Your Crowd Getter is now ready for use.

A Final Note. Make up a patch cord with a phono plug on one end and a plug on the other that matches the earphone jack of the transistor radio. Then connect the radio. Turn on the amplifier and turn on radio. Adjust the radio's volume control for the desired level. Do *not* turn on the radio first and then patch it into the booster, as the Crowd Getter requires only a very minute input level (patching in the radio when the volume is up might damage Q1).

So there you are. Have fun, and good listening! ■



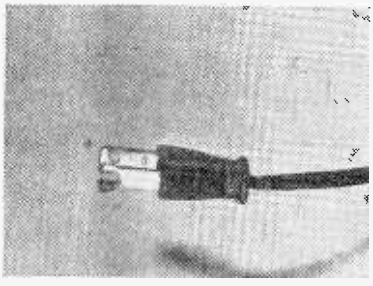
Amplifier, power switch (S1), and battery holder are mounted on back cover of speaker enclosure. Phono jack (J1) is supplied with speaker. Make sure perf-board is mounted on cover with either ½- or ¾-in. spacers so that case of Q1 will not be damaged.

IMAGINEERING DESIGN TIPS

Photos by Moto

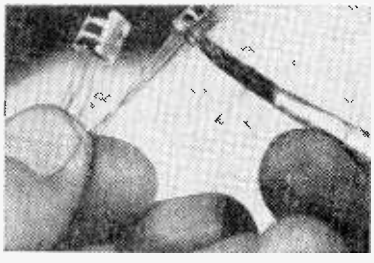
GOING AROUND STEADY

● Next time a kit manual tells you to twist lengths of red and black wires into a twisted pair, here's what you do! Secure an eye hook or a hooked nail in your drill's chuck. Tie the wires to the hook, and clamp the other ends in a vise. Zap the drill's switch trigger for a short blast and watch the twisted pair form. Lengths up to 10 feet can be paired. —*Al Wise*



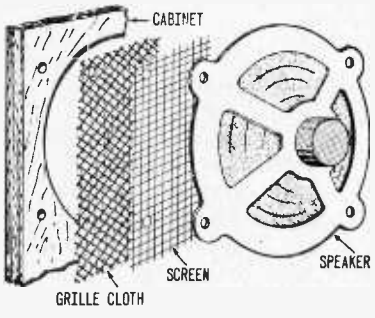
PLUG WITH FORKED TONGUE

● Polarize your hi-fi and test gear to be sure they're properly grounded. The ground slot on an AC outlet is wider than the other, so make the ground prong on the line cord plug wider, too! Just snip the ground prong with a heavy-duty cutter as shown—the prong will spread. But, be sure you have the ground prong before you snip! —*L. Grant*



COLOR CODE YOUR TRANSISTORS

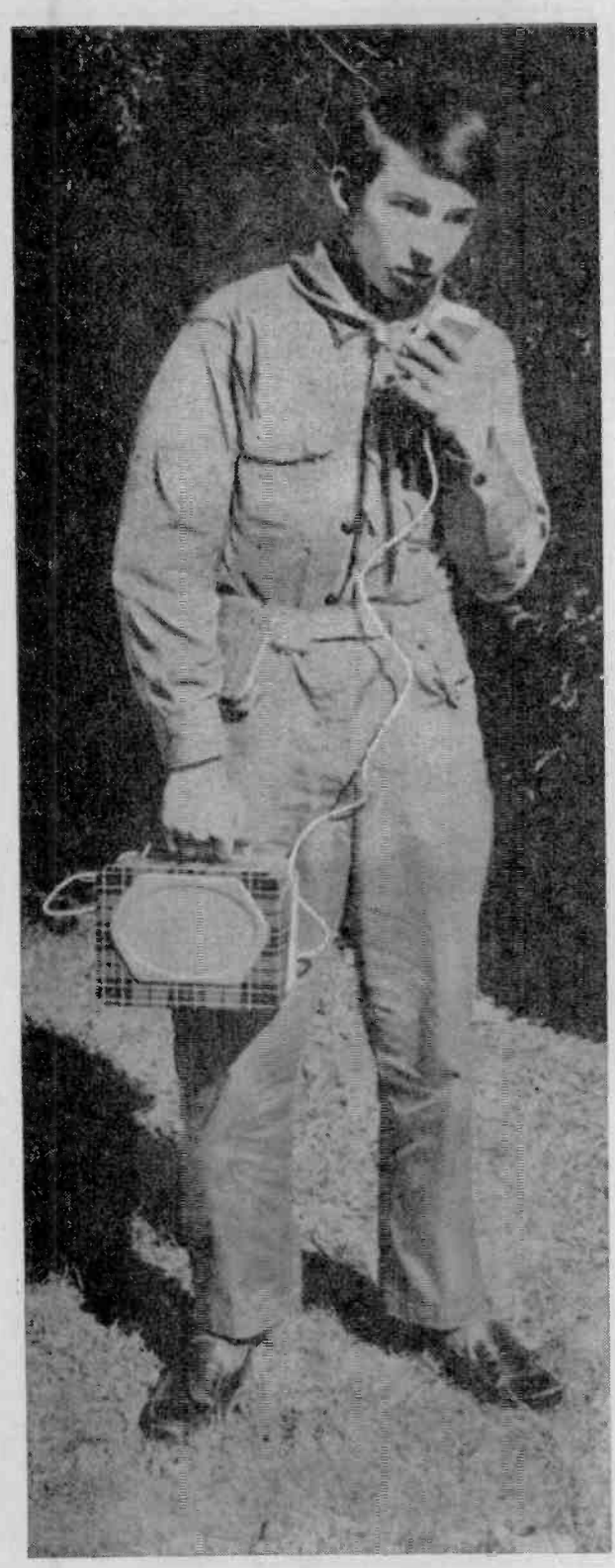
● A few drops of dope will let you identify transistors as you do resistors—the color code is the same. Use hobby-type dope or quick-dry enamel on the transistor case. A red dot on top means "2N". The next 3 or 4 colors give the numbers that follow the 2N prefix, like 2N1177. —*J. Lamb*



DOWN WITH FINGER POKING

● One sure way to destroy a loudspeaker is to poke a hole through it. An easy way to prevent this type of cone damage is to place a metal screen between the speaker and grille cloth. Besides adding protection for the delicate speaker cone, the added steel or aluminum screen will prevent unsightly pushed-in or torn grille cloths. —*Jack Kiser*

● Send your Imagineering Design Tips with full details and a photo or drawing to Radio-TV Experimenter, 229 Park Ave. South, New York, N.Y. 10003. The top ideas selected by the editors will win $10.00. Entries become the property of Radio-TV Experimenter and can't be returned.



SNACK PACK COMMANDER

By Chris Stevens

Build this take-command PA system and watch 'em sit up and listen

☐ Here's a lunchbox public address system that takes the strain off your vocal cords. And it also makes for a radio Merit Badge project that'll help any junior leader be the envy of his troop.

This PA system has a self-contained battery for all-around use, but an AC power supply can be included to conserve or rejuvenate the battery. For occasional use you can get by with just the 6-volt lantern battery. But if you're planning a lot of work indoors, you'll save money if you get the power supply, too.

The Snack Pack Commander won't rattle windows a half-mile away, but you'll be able to talk to people 20 or 30 feet distant. If you want more volume you'll need a higher-

Snack Pack uses two Eicocraft kits. Both the EC-900 solid-state AC power supply and EC-300 solid-state audio power amplifier are available in blister packages from EICO (see Parts List) or from your local jobber.

SNACK PACK COMMANDER

output mike or a 1-transistor preamp.

A sturdy case can be made from a metal lunchbox, and the metal is thin enough to be worked with tin snips and an ice pick or awl.

Saving Space. To eliminate need for a matching transformer, a low-impedance mike is used. For a smaller package, you can use a mike cartridge without a case. Just wire leads to cartridge and mount it in a small plastic box. However, there's more than enough room for a full-sized unit.

Before mounting any parts on PC board, place it in its approximate position in the lunchbox and use the board's mounting holes as a template for marking mounting holes on the sides. When the amplifier kit (and power supply, if used) is completed, set it aside and complete work on the lunchbox.

PARTS LIST FOR SNACK PACK

B1—6-volt battery (Eveready 509 or equiv.) —see text

J1—Miniature microphone connector (Amphenol 75-PC1M or equiv.)

P1—AC line cord (with plug)

S1—Spst toggle switch

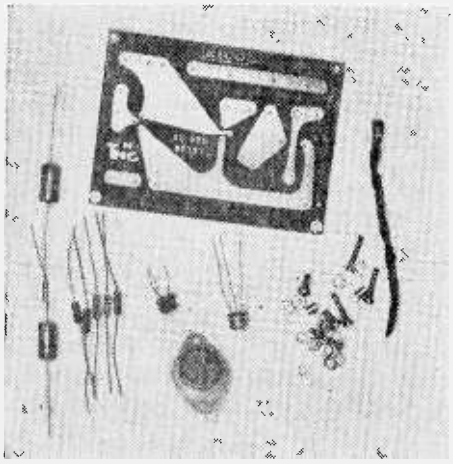
1—Eicocraft EC-300 amplifier kit

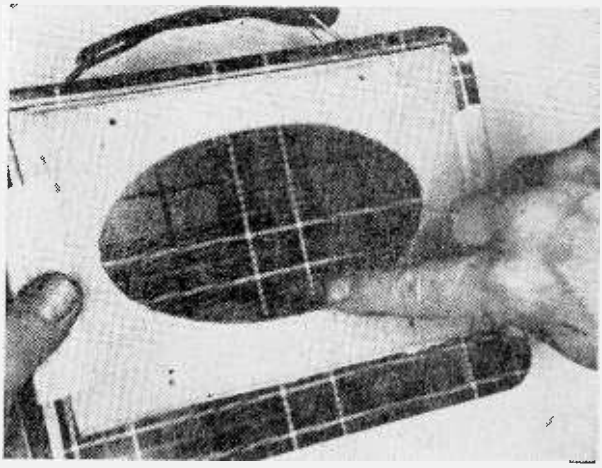
1—Eicocraft EC-900 power supply kit (optional)

1—Remote auto speaker kit (speaker, grille, and template)

Misc.—Metal lunchbox, low-impedance microphone and cable (Lafayette 99H4577 or equiv.), hardware, wire, solder, etc.

Eicocraft kits are available from EICO Electronic Instrument Co., 283 Malta St., Brooklyn, N.Y. 11207, or from your local dealer.

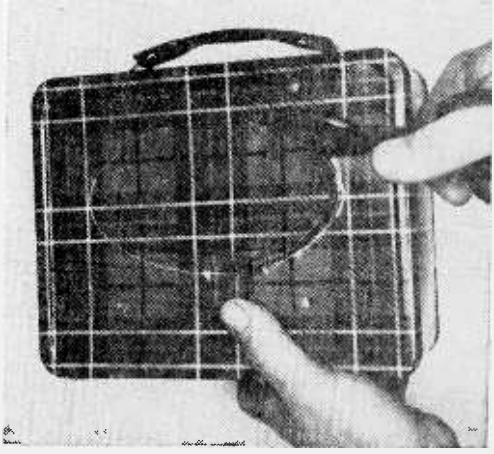


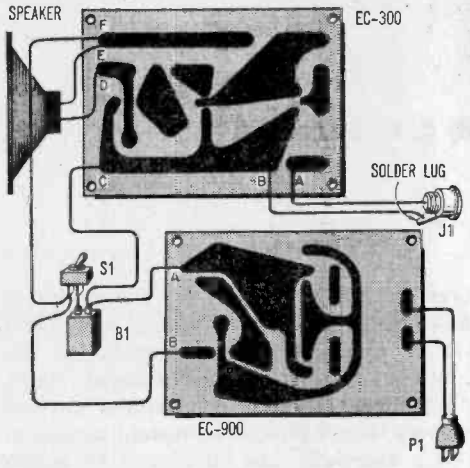


Everything you need for construction is included in kits—PC boards, transistors, capacitors, resistors, and even hardware for mounting boards in lunchbox. Your work will go easier if you lay out components before assembly. But do only one kit at a time.

Above right, speaker template is first used to mark speaker opening in lunchbox bottom. Scratch in outline with ice pick or awl, then punch in mounting holes by pressing point of tool through template and into metal.

At right, hole for speaker is started with heavy-bladed knife, then tin snips finish job. Watch out for sharp edges of metal cutout! Holes for mounting screws must be enlarged to accommodate machine screws furnished with speaker kit.



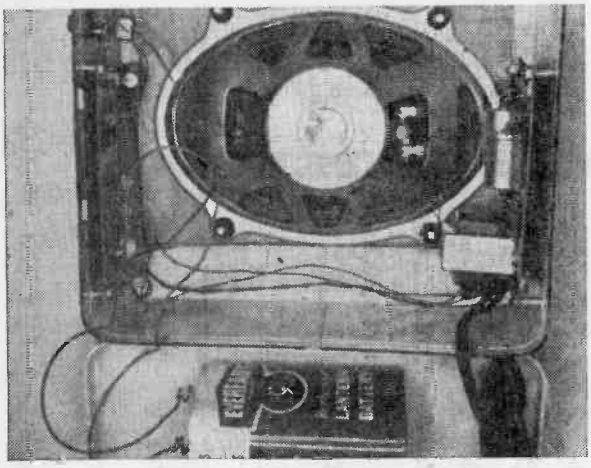


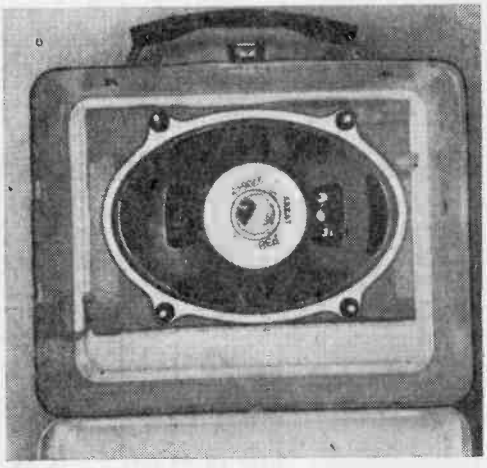
With connections used here, switch doesn't control operation of amplifier when power supply is used—it only turns battery on or off. But other connections are possible.

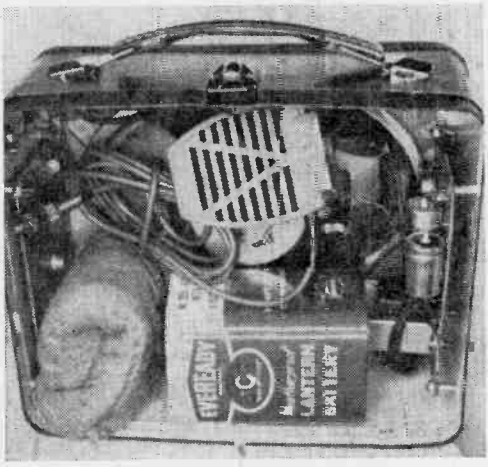
If you're lucky, the remote speaker kit will have a template the same shape as the cone of the speaker. This can be used to mark the speaker cutout. The template can then be placed inside the box to reduce the tinny sound that often occurs when metal boxes are used for speaker enclosures.

If the speaker kit doesn't have a suitable template you can make one quite easily from a piece of soft corrugated cardboard. Just press the speaker face-down into the cardboard and run a pencil around the outline of the speaker. Also mark the positions of the mounting holes. A strip of masking tape will hold the template in place.

Power to Spare. If you can't obtain the lantern battery, substitute four D-cells. The lantern battery, however, will give longer service. For an extended trip, try to get heavy-duty alkaline D-cells. They have more than four times the current rating of a similar-size cell. ■







Above, the 4 x 6-in. speaker, matching metal grille, and speaker template are part of kit for installing a remote speaker in car. Mounting hardware should be included. Low-priced kit will work fine, but make sure that speaker and grille are not too large for box.

Above left, use short wires to connect on/off switch and mike connector to PC boards. Add leads for battery and speaker (and power supply, if used) as shown. If possible, do all soldering before mounting boards.

At left, completely packed unit is ready to go. Lantern battery is held in place by speaker magnet and transformer; roll of packing material protects PC board and helps secure mike. For rough travel, battery can be mounted to case with strap and screws.

Propagation Forecast

By C. M. Stanbury II

■ **With this issue** we have added two new abbreviations to our forecast table—**w** (Western North America) and **e** (Eastern North America). If one of these letters follows a listing, it means the band is only good for that part of the continent. For example, under *Asia* at 1500-1800 listener's time we have listed as a promising second choice "60w," which means a DX opening may occur on this band to Asia, but west of the Mississippi *only*. Incidentally, this particular band opening may not occur more than three or four days out of the whole two month period. But when it does, the band produces spectacular results, so it's worth while monitoring.

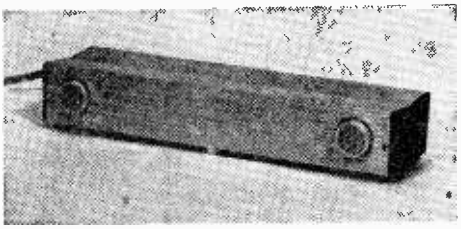
Turning our attention away from the very rarest of DX, conditions for the novice or those SWLs using very simple equipment will be excellent, generally speaking. Because of the high current sunspot count, those super powered transmitters beamed our way should provide consistent reception. This is especially true on 25 and 19 meters where static is seldom a problem.

For all you who did a double take at our *"SW Peak Listening Periods"* table which accompanied the April/May Propagation Forecast, you're right, there was a misprint. The listing for reception of Asia on the *West Coast* should have read 1800-0900 PST, not 1800-2100. This corrected, along with the rest of those peak periods listed, still holds true. ■

RADIO-TV EXPERIMENTER PROPAGATION FORECAST

Aug./Sept. 1968 LISTENER'S STANDARD TIME	ASIA (except Near East)	EUROPE, NEAR EAST & AFRICA (N. of the Sahara)	AFRICA (S. of the Sahara)	SOUTH PACIFIC	LATIN AMERICA
0000-0300	25, 31	31, 41	41, 49, (60e)	41	49, 60
0300-0600	(25), 31, (41), 49	31	Nil, (19w)	41, 49, 60	49, 60
0600-0900	(16), 19, 25, (31)	16, 19	19, (60w)	31	31, 49
0900-1200	19, 25	16, 19	13, 16, 19	25	25
1200-1500	(16), 19	16, 19	13, 16, 19	19 (poor)	19 & 25 (poor)
1500-1800	19, 31, (60w)	19, 25	25, 31, (60e)	19	31
1800-2100	16, 19	25, 31	25, 31, (90), (120)	16, 19	49, 60, 90
2100-2400	16, 19	25, 31	41, 60, (120e)	19, 25, (41w)	49, 60, 90

To use the table put your finger on the region you want to hear and log, move your finger down until it is alongside the local standard time at which you will be listening and lift your finger. Underneath your pointing digit will be the shortwave band or bands that will give the best DX results. The time in the above propagation prediction table is given in *standard time* at the listener's location which effectively compensates for differences in propagation characteristics between the East and West Coasts of North America. However, Asia and the South Pacific stations will generally be received stronger in the West while Europe and Africa will be easier to tune on the East Coast. The shortwave bands in brackets are given as second choices. Refer to White's Radio Log for World-Wide Shortwave Broadcast Stations list.



EUPHONICS TYPE A-1
Doppler Effect
Intrusion Alarm

■ The real wonder of the transistor is that it gives us low-cost, consumer-grade equipment of the type once found only in high-priced industrial equipment. Take, for example, the Euphonics Intrusion Alarm, a device which floods an area with inaudible ultrasonic sound, then uses the reflected sound to determine if a trespasser is about.

Until recently, an ultrasonic silent watchman was built with tubes. Such units were expensive—upwards of $300, and they were large. And while many department stores still protect their camera departments with silent-watchman radiators or globes placed about 20 feet apart, they're far from ideal. Even the store watchman must keep away from the area, for if he enters the sound field he'll likely end up looking for a new job.

Because of the silent watchman's high price, the home owner or small shopkeeper who wanted full protection was relegated to a wired burglar alarm. With this setup, windows and doors were protected by a string of series-connected wires. But now, thanks to transistorization, a silent watchman—the Euphonics Intrusion Alarm—is available at budget prices (under $100.00).

Doppler Again. In actual operation, the Intrusion Alarm works on the Doppler Effect, which is the same thing the fuzz uses to nail speeders with "radar." The Doppler Effect is a rather simple thing to understand if you can recall the last time you heard the horn from a speeding train or truck. Remember how the sound seemed to change in frequency—sort of like *wooo-eee-ooo?* Actually, the horn generated a constant-frequency sound. But since the train or truck was speeding as the horn sounded, the sound waves were stretched, or compressed by the simultaneous motion of the vehicle.

Let's imagine that the vehicle's horn is coming straight at you and that the horn normally produces imaginary sound waves two feet apart. Since the vehicle is moving right along with the sound waves, it compresses the waves so they are only one foot apart; this makes the effective pitch of the horn higher. But once the vehicle passes you it stretches the sound waves away from you and the imaginary waves are now four feet apart. The total effect at your location as the vehicle moves past is an increase and then a decrease in the pitch of the horn.

Got the picture? Okay, let's imagine a setup. On the left side is an oscillator/transducer which is emitting a steady 30-kHz tone. At the right is a receiver which is very sharply tuned to 29 kHz. Normally, the receiver cannot "hear" the 30-kHz tone, so it has no output (in our example, the receiver will activate an alarm bell when it "hears" a tone).

Now let's assume that someone moves into the sound field. The person's motion will compress and expand the reflected sound waves, and at some instant the receiver will sense a 29-kHz signal. The receiver is now activated and produces a DC output voltage, which in turn trips a latching relay that turns on the alarm.

In practice, commercial intrusion alarms use a more complicated circuit which ensures sensitive sensing without a tendency toward false tripping. Still, the arrangement just outlined works quite well.

Bounce Pounce. The Euphonics Intrusion Alarm operates on the same principle as our simplified alarm we discussed. Built into a small (1½ x 2½ x 10 in.) case is the transmitter (oscillator/transducer), the receiver, and time-delay control circuits. On one end of the cabinet is the transmitter's transducer, which beams the ultrasonic sound field into the room or area to be protected. On the other end of the cabinet is the receiving transducer, which picks up the ultrasonic

LAB CHECK

sound that is bounced back from hard surfaces in the room or protected area.

Normally, the bounce-back signal is the same frequency as the transmitted sound, so the alarm doesn't trip. But as soon as someone enters the sound field, the frequency of the signals bouncing off the intruder is changed due to the Doppler Effect, and the receiver is tripped.

What happens in the receiver is the real difference between the simplified intrusion alarm and the Euphonics Unit. When the Euphonics receiver is tripped it just doesn't turn on an alarm. Instead, the receiver activates time-delay circuits which provide a variety of possible alarm combinations.

Lights and Bells. On the back of the Euphonics Intrusion Alarm are two 117-VAC outlet sockets, a slide switch, and a sensitivity control. The sensitivity control quite naturally determines the pickup range of the alarm. The two outlets are used for the alarm circuits: one outlet for lights, and one for a delayed sound alarm such as a bell.

The switch provides for *alarm hold* or *auto reset*. When the switch is set to *alarm hold*, the alarm's power outlets are locked on in the event the alarm is tripped. But when the switch is set to *auto reset*, the alarm will reset itself to standby after one minute and will then detect any subsequent motion.

Here's how the entire alarm system works from turn-on to sound-off. As soon as power is applied by turning the power switch *on*, a 20-second time delay is activated, which allows the user 20 seconds to get out of the area. After 20 seconds the alarm circuits are activated.

As soon as an intruder enters the area,

Rear view of alarm. Lights or bells connected to lights sockets come on instantly; other sockets have built-in 20-sec delay.

the receiver trips the 117-VAC light outlet and the room lights or flood lamps are turned on. From the instant the lights go on a 20-second delay is activated, at the end of which time the 117-VAC *alarm bell* outlet is activated. The purpose of the delay is to allow the user to turn off the alarm before the bell sounds off, if so desired.

With the slide switch set to *alarm hold*, both the lights and the alarm bell are continuously *on* until the intrusion alarm's power is disconnected. However, with the switch on the *reset* position, the alarm turns itself off after one minute and as already mentioned, is then ready to detect any subsequent motion in the area.

Performance. We tried the Euphonics Intrusion Alarm exactly as suggested in the instructions: i.e., we placed it at one end of a room at an approximate height of 4 ft. (concealed between books in a bookcase). By adjusting the sensitivity control we were able to detect just a slight wave of the hand 20 ft. away.

Hard-surfaced rooms with lots of uncovered wall space produced more sound reflections and the alarm's coverage was almost wall-to-wall. But soft rooms, rooms with poor sound reflections because of covered walls and upholstered furniture, reduced the alarm's sensitivity range to 10 to 15 ft., depending on the degree of room hardness. But even a 10-ft. range still gives coverage to the center of the room and will spot anyone walking around or through.

Though Euphonics claims the alarm can be used outdoors, we didn't have a chance to run an outdoor test. Nonetheless, we suspect that birds, cats, and dogs would be just as effective at tripping the alarm as a human intruder.

The unit is supplied complete, with a set of mounting brackets that permit the alarm to be mounted on a wall or under a shelf. The lights (up to 800 watts can be handled by the alarm) are supplied by the user, though dealers can provide alarm bells.

Summing Up. As far as we can tell, the Euphonics Intrusion Alarm is as effective a device for protecting the home as anyone could want. And because of its very small size it makes a highly attractive alarm system for travelers worried about leaving their valuables in an empty hotel or motel room (just the sudden flashing on of lights is generally enough to scare off a burglar).

The Euphonics Intrusion Alarm (type A-1) lists at $97.50; optional equipment includes indoor and outdoor bells and a key-lock power switch. For additional information write Euphonics Marketing, Dept. LE, 173 W. Madison St., Chicago, Ill. 60602. ■

By MARSHALL LINCOLN

HAM TRAFFIC DE W7DQS

Kiboshing Hamdom's Hooligan Breed

■ Do you want to join the latest "in" crowd that's invading amateur radio? If so, you'd better hurry. You've got to make your "rep" fast and develop habits to match.

First, you must prepare a long list of nasty four-letter words and keep this as a reference close beside your rig. Then you must build up a sizable collection of off-color stories. Better set up a file card system for these, so you can find the one you want quickly while on the air. Next, develop a knack for using these two operating aids on the air to ridicule other operators and to promote your own pet ideas on politics, religion, or what have you.

Finally, devote several hours each day developing an intense feeling of disrespect for your brother hams and an utter disregard for the effect of your actions on the future of amateur radio. Be ready, willing, able, and eager to deliberately interfere with any station on the air which you don't like.

Now you are properly equipped to become a participating member of a growing and influential group in modern amateur radio. We'll call this bunch of shortwave hooligans the *ham busters*. They're the guys who are bringing pool-hall language and gutter attitudes to amateur radio. Their contemptible and irresponsible behavior will soon wreck our priceless hobby unless they are squelched.

Loose Living. Eyebrows are lifting all over the country at the senseless carryings-on of operators who seem to think the ham bands are nothing more than a nationwide stag party. The once proud traditions and shining accomplishments of amateur radio could go down the drain with a sick gurgle if these sick minds aren't either cured or put off the air.

Though the number of operators engaged in these activities is still fairly small, it seems to be growing daily. Guttersnipe language, snearing remarks with a double meaning, and derogatory comments on a wide variety of subjects including politics, religion, and race are making some of the ham frequencies sound like rats' alley.

Maybe the current tendency toward "anything goes" has spawned this recklessness in amateur radio. Perhaps the frequent contemptuous outbursts in our modern society where respect for the other person seems forgotten has also had its effect on today's ham. Whatever the cause, this modern mania certainly is no good for ham radio. We're

Operating ham station setup at Sahara Amateur Radio Operators convention in Las Vegas are Lee Miller (left), WA7AEL, and Wayne Nail, WB6CBW. Station was manned by members of West Coast Amateur Radio Service, a 500-member group that monitors 7255 kHz daily for emergency and routine communications. Nearly 900 hams attended convention.

HAM TRAFFIC

already criticized for spawning too much idle talk and too few technical accomplishments. Now that some of this talk sounds like a barroom brawl, our respectability in the eyes of outsiders will drop several notches further.

To the Rescue. Vigilante groups are already springing up in radio clubs across the nation to deal with this menacing behavior on our ham bands. These groups, if well handled, can be the most effective force in dealing with the problem. This is because the FCC rules governing obscene and profane conduct on the air are quite vague and have been watered down even further by court decisions. Also, deliberate interference and harassment directed at other stations is extremely hard to prove. So, official enforcement is likely only in extremely bad cases.

In past years, hams have done a pretty good job of policing their own bands. With this new menace facing us, it's hoped we can still face up to the challenge.

What can an individual do? The most important thing which should be obvious to all operators is to behave yourself on the air. Make sure you don't fall into the bad habits of the *ham buster* crowd. Next, when you hear another ham abusing his operating privilege by causing interference or using improper language, don't lower yourself to his level by bawling him out on the air. This would just make matters worse.

One thing you should do is make a mental note to *never*, absolutely never talk to this guy on the air—not even in a casual signal report. Ignore him completely. If enough hams do this, the *ham busters* may get the idea that their presence on the bands isn't appreciated. Then they'll have to give up ham radio, or clean up their manners. In either case, ham radio—and all conscientious, respectable hams—will be the winners.

FCC Rule Change. This one is rather minor, and affects only some of the paper shuffling we all must do at times to stay legal. The new rule requires that when you move from one permanent address to another, you must submit the change of address (on a form 610) within four months after the move, and before any on-the-air operating at your new address.

Once this change of address has been submitted, you may operate as a portable station at the new address, just as before. However, now there is no time limit to this portable operation, and you need to send a notice of this portable operation only to the FCC office having jurisdiction over your new address.

Formerly, you were supposed to notify the FCC office with jurisdiction over your old address as well, though a lot of ops didn't bother to do this. Just like the changes in ham station identification requirements a few months back, these new changes make it legal to do approximately what many hams have been doing for years!

Birdies and Fuzz. Are your "birdies" bothering the iron birds? Or in plain language, do you have a transmitter emitting spurious radiation that can interfere with aircraft radios? If so, better clean up the trouble before you get an angry knock on the door in the middle of a QSO.

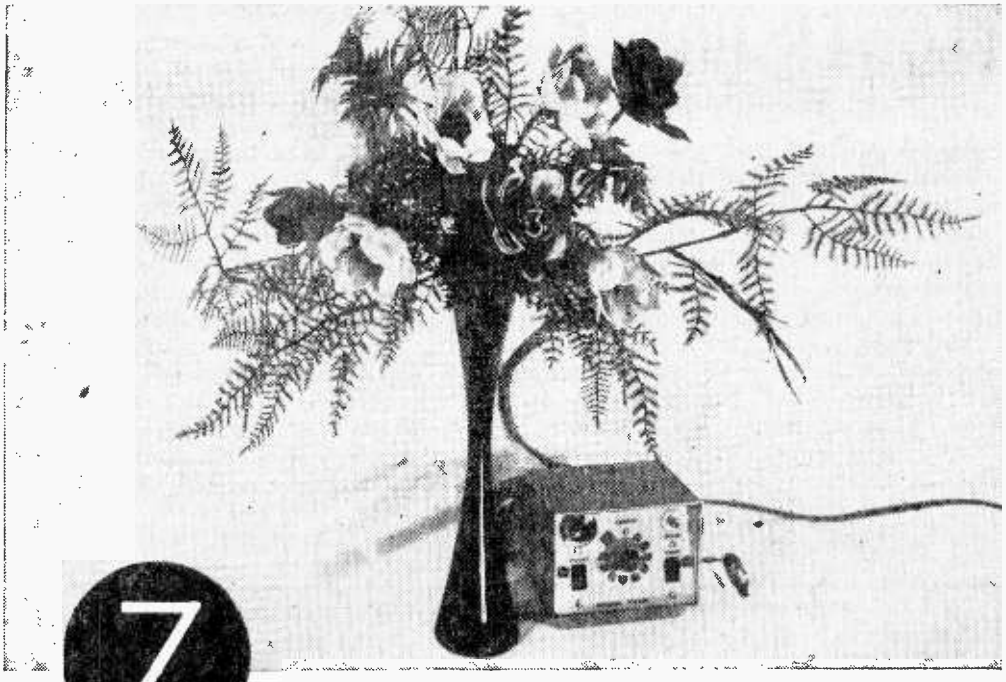
The Federal Aviation Administration says some electronic devices, including walkie-talkies and radio-controlled garage door openers, emit signals that interfere with aircraft communications. And an FCC official says these gadgets, plus such items as electronic heaters, wireless microphones, and welding tools have polluted the radio spectrum with noise. He reports the FCC received 40,000 interference complaints last year, with the most serious ones involving aviation communications.

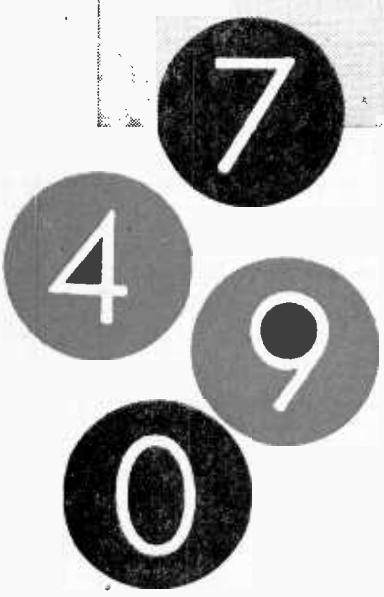
Modern air transportation depends heavily on radio for navigation and air traffic control, as well as for routine communications. A few seconds of interference at a critical time during a flight could easily spell doom for over a hundred people. For these reasons, the FCC was recently given added authority to crack down on gadgets that interfere with legal communications. Got the message?

News for GIs. The FCC seems to be leaning over backwards to encourage folks of all ages to obtain Novice Class ham licenses and make use of them for their intended purpose—to learn about ham radio through on-the-air operation. A while back the Feds extended the Novice license term to two years. Now special provision has been made for Novices who go into military service overseas.

James E. Barr, chief of the FCC's safety and special radio services bureau, reports that if a serviceman has a Novice license

(Continued on page 108)





FLOWER POWER SIGNALITE

Nifty posies from Nixieland speak in sweet nothings only *she* can understand

By James Robert Squires

■ Many times when I left my desk I had to leave a note for my secretary. Frequently these notes were lost in the pile of mail on her desk, and they finally got so cumbersome she suggested using a code of numbers—each having a different meaning. For example, the number *5* on a sheet of paper could mean "I have left the building for the morning."

After trying this for a while, the next step was to convert this random system of messages into an electronic device that met two criteria. First, it had to be pleasant to have on the desk. And second, it had to communicate the message efficiently.

Secretaries, bless them, love flowers. And flowers are a natural way to effectively conceal a message indicator. So I purchased a bouquet of artificial flowers and hid a neon Nixie tube amid the colorful posies. With these digits coming through nicely, the Flower Power Signalite later took on many of the duties of an intercom—often too expensive and too noisy for many offices and homes.

Digital Design. To illustrate how the Signalite worked, my code for "Don't bother me no matter what" was the number *0*. The number *1* soon came to mean "Please come in for dictation"—and so on through the ten digits. With continued use, other features

FLOWER POWER

proved helpful and they were added. For instance, a remote switch was provided for my secretary so that when she had understood the message, she could turn off the indicator. The sharp click of the relay in the control unit on my desk was a clear indication that the message had been read AOK.

Whatever applications you discover, the numerals lend themselves to any sort of code you wish to devise. Simplicity, however, should be the key factor in your system.

Off and Running. A tilted, cowl-type chassis/cabinet was selected to give a pleasant appearance on the desk. The parts will fit into any small cabinet of at least 4½ x 4½ x 3½ in. with room to spare. (A cabinet measuring 5 x 5 x 5 in. is given in Parts List.)

First remove the cover, then tape white paper firmly over the faces of the cabinet. Using the pictorial diagram, lay out the drill centers on the front, bottom, and rear of the control box.

The two rocker-switch holes are best cut by constantly comparing the rocker arm and the rectangular hole as you shape and file. A little care will provide a neat, rectangular cutout. Black paint along the edges of the holes improves their appearance. Drill the other holes in the bottom and rear of the chassis according to the diagram.

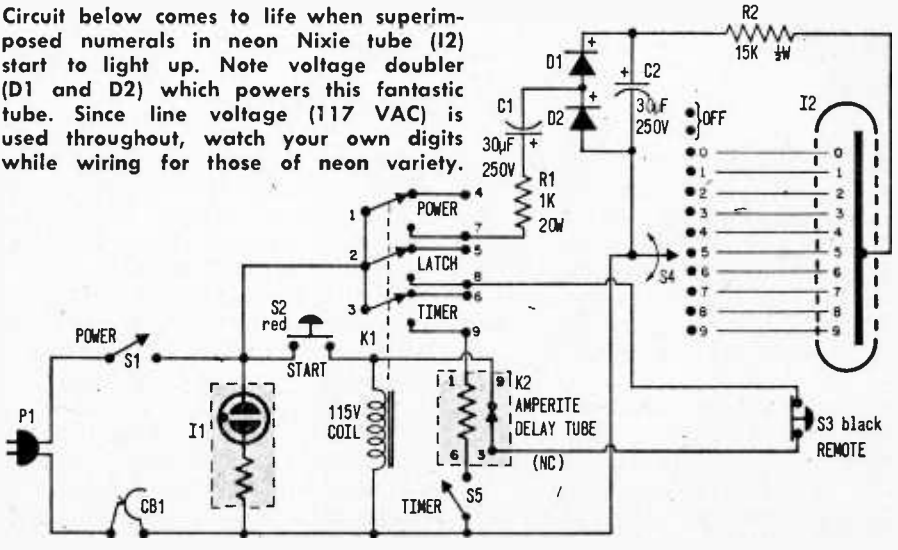
Install the power cord using a strain-relief plug, and leave about six inches extending into the box for wiring purposes. Two terminal strips, an eight-pin and a three-pin, come next. You can use round-head screws,

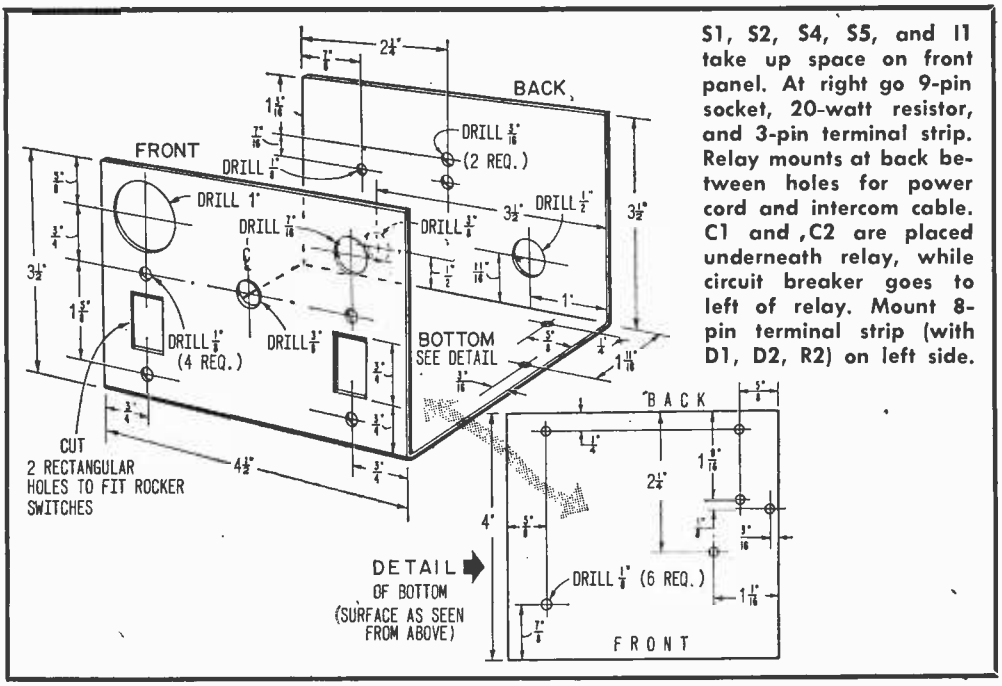
PARTS LIST FOR FLOWER POWER SIGNALITE

C1, C2—30-uF, 250-VDC electrolytic capacitor
CB1—Circuit breaker (Sylvania MB-315 or equiv.)
D1, D2—1N4365 silicon rectifier (Texas Instruments)
I1—Snap-in neon panel light, 1-in. dia. (Burstein-Applebee 17C312 or equiv.)
I2—Neon-glow readout tube (National Electronics NL840 or equiv.)
K1—115-V, 10-A, 3PDT enclosed relay (Guardian IR 1220-3C-115A or equiv.)
K2—115-V, 45-sec. spst thermal delay relay, 9-pin min., normally closed (Amperite 115-C45T or equiv.)
P1—Power cord and plug, grey, 7½ ft. (Burstein-Applebee 19B800 or equiv.)
R1—1,000-ohm, 20-watt resistor
R2—15,000-ohm, ½-watt resistor
S1, S5—Spst rocker switch (Burstein-Applebee 18D510 or equiv.)
S2—Spst, red pushbutton switch, normally open
S3—Spst, black pushbutton switch, normally closed
S4—1-pole, 12-position, non-shorting rotary switch (Mallory 32112J or equiv.)
1—5x5x5-in. cowl-type cabinet/chassis (Bud SC-2133 or equiv.)
1—Box for black remote switch (see text)
1—Unshielded intercom cable (Allied 55E8552 or equiv.—see text)

Misc.—Miniature 9-pin socket, terminal strips (see text), fuse clip, ¾-in. standoffs, strain-relief plug, artificial flowers, decals, grommets, hardware, wire, solder, etc.

Circuit below comes to life when superimposed numerals in neon Nixie tube (I2) start to light up. Note voltage doubler (D1 and D2) which powers this fantastic tube. Since line voltage (117 VAC) is used throughout, watch your own digits while wiring for those of neon variety.





S1, S2, S4, S5, and I1 take up space on front panel. At right go 9-pin socket, 20-watt resistor, and 3-pin terminal strip. Relay mounts at back between holes for power cord and intercom cable. C1 and ,C2 are placed underneath relay, while circuit breaker goes to left of relay. Mount 8-pin terminal strip (with D1, D2, R2) on left side.

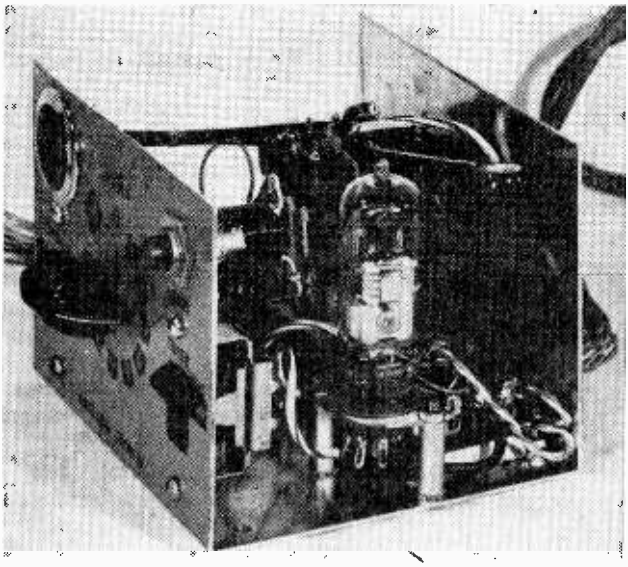
but it would be better to use countersunk flats if they are available. Two Cinch-Jones terminal strips and the fuse clip for the Sylvania circuit breaker are now mounted as shown in photo.

Before mounting the nine-pin socket for the Amperite miniature delay tube, wire pins 1, 3, 6, and 9 of the socket with a 6-in. length of #20 wire. Then mount the socket using ¾-in. standoffs. Be careful not to short the metal pins to any surrounding metal.

Cord to Cable. The two 30-*u*F capacitors are dressed along the floor of the chassis with the plus ends facing the Amperite tube. This way, the positive ends use the three-pin terminal strip and the negative ends connect to the eight-pin strip.

The mounting plate provided with the relay is snapped on to the unit, and the assembly is then mounted to the rear wall of the box.

It is helpful to start wiring at the power cord and work through the schematic towards the output cable going to the Nixie

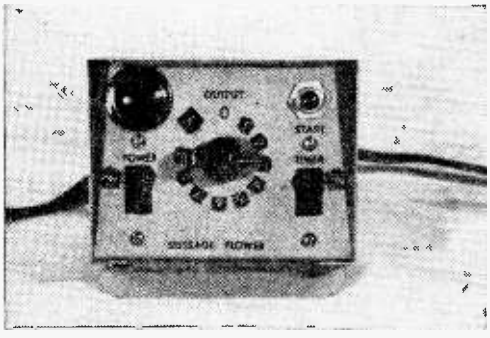


Right side of chassis with cover removed. Power cord is at far left, while intercom cable comes in just behind power resistor. Use grommets for these holes, and mount 9-pin socket on ¾-in. standoffs. Since power resistor gets very hot, drilling ventilation holes near it (on back panel) will help it to keep its cool.

FLOWER POWER

tube. When hooking up the relay, check your work against the schematic provided with it. Then, before you turn the unit on, assure yourself that R1 (the 20-watt, 1000-ohm power resistor) is mounted clear of other wires and circuitry. This resistor will get very hot, so adding some ventilation holes near it might not be a bad idea.

Diodes D1, D2, and resistor R2 are mounted on the eight-pin terminal strip. The remote-cutoff button (this is switch S3 on the schematic diagram) must be mounted in a chassis so that its terminals cannot be touched. You can use any sort of box or cover that is appropriate.



Control box has symmetrical layout and will have attractive appearance on any desk. Power cord and intercom cable can be hidden.

The eleven leads from I2 (the Nixie tube) and two leads from the remote button are now wired into the box. (Note—since there are no unshielded intercom cables having just 13 leads, a cable with 18 leads is given in Parts List. Many of the parts for your Flower Signalite may be difficult to obtain locally. Consult catalogs of Burstein-Applebee, 1012 McGee St., Kansas City, Mo. 64106, and Allied Radio, 100 N. Western Ave., Chicago, Ill. 60680, for the components listed.)

When all wiring is completed, it should be checked thoroughly. Line voltage (117 VAC) is used throughout, so the circuit can be dangerous if connected improperly. Circuit breaker CB1 will open at about 1.5 A. However, it closes again when cool, even though the short still remains. It is best to unplug the cord as soon as possible after a short is noticed.

Neon Glow. There are at least two neon numerical-indicator tubes available on the market. Burroughs Corp. and National Electronics both sell indicators using the neon glow principle (a National Electronics model is given in the Parts List). The Nixie tube was used with a cut-down socket.

One artificial flower was disassembled and strung around the tube wires. The petals and leaves were added to give a natural look and to make it look as though the tube were the natural center of the flower. The wired flower was then clustered amid the others in a colorful bouquet. It is a good idea to weigh down the base with BBs to prevent it from being top-heavy.

Turning on power switch S1 energizes panel light I1 only. The relay is wired as a latching device and is activated only by pressing S2 (red button). Operation may be continuous, or timed to switch off in 45 seconds. The timed sequence is initiated by switching on S5.

The relay may be unlatched by either the remote button, the internal timer, or the power switch. The timer circuit opens the relay after 45 seconds, assuming a message has not been sent during the previous minute. If messages are sent (using timer cutoff) in intervals of less than two minutes, relay shut-off times will be less than 45 seconds. The sound of the clicking relay is enough to tell you when the indicator switches off.

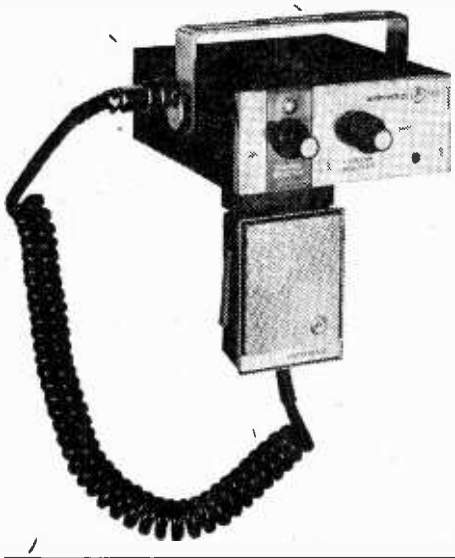
The message indicator can be energized for longer times by switching off the timer control. In this position the relay can only be turned off by the remote button or the main power switch. However, it is best not to leave the message on for too long, as R1 will eventually heat up excessively. The unit is designed for message-on times of three minutes or less.

The twelve-position selector switch S4 is used to select any one of ten digits from 0 to 9. Note that there are two off positions on S4 which are adjacent.

Your Flower Power Signalite will find use in the office, between den and kitchen or workshop and kitchen, and especially in the sick room. It is particularly useful when voice transmission is either impossible or impractical. In machine shops, for example, a voice intercom between foreman and front office would be of very little help to either party.

But gal Friday should be the principal beneficiary. You know a fellow can never go wrong if he gives his girl flowers—especially if there's a message for her. ■

Radio-TV EXPERIMENTER LAB CHECK



AMPHENOL MODEL 750
Pocket-Sized
5-Watt CB Transceiver

■ You never realize just how much space a little speaker eats up till you see a solid-state transceiver without a speaker inside. A case in point is Amphenol's latest entry in the CB field, the model 750 5-watt transceiver. Yes, that little package shown in the photo is just about the size of a walkie-talkie and less than a hand's span wide.

And now hear this: it's also a full 5-watt transceiver. Fact is, the photos don't show how small it really is, because the unit can actually be tucked into a coat pocket!

Measuring just 2 x 4¾ x 5½ in., the 750 gets its small size by eliminating the speaker from the case (the rest of the circuitry common to a 5-watt transceiver is all there). And where's the speaker? In the microphone case—as you may have already guessed. Depress the PTT (push-to-talk) button and you switch the speaker into the modulator circuit to make like a microphone. Yet it looks for all the world like a standard hand-held mike.

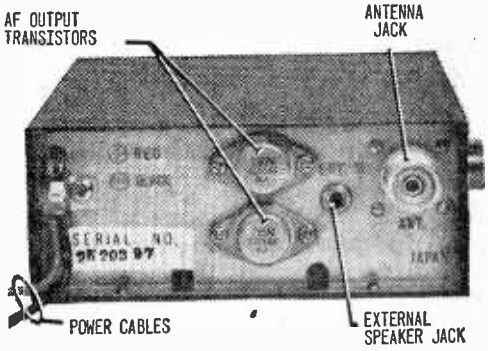
CC On Six. The remainder of the transceiver is more or less standard for the low-priced group. Both the transmitter and receiver are crystal-controlled on any of six channels. Separate crystals are used for both transmit and receive. The transmitter is a 3-stage affair with a triple L-section tuned output circuit. The receiver is single-conversion with a stage of RF amplification, a mixer, an oscillator, two stages of IF amplification, a noise limiter, and AF output.

An external jack on the rear apron allows connection of a standard remote speaker. The external speaker jack automatically disconnects the "mike" speaker during receive when the remote speaker is plugged in. Yet the mike functions normally in the transmit mode even with a remote speaker connected.

To obtain greater selectivity (or adjacent-channel rejection) than is common with two stages of IF amplification, a ceramic filter is used in the first IF amplifier.

The transceiver is supplied complete with one set of crystals, the mobile mount, and a plug-jack connected microphone. The DC power leads are permanently connected for 12-V negative-ground operation. The channel-selector window is illuminated, and a set of numerals is provided so the user can slip in the appropriate channel markers.

Two Brackets. Two microphone brackets are provided. One is the standard clip-type which can be mounted just about anywhere on the dashboard. The second bracket is somewhat unusual—it's a grooved plastic



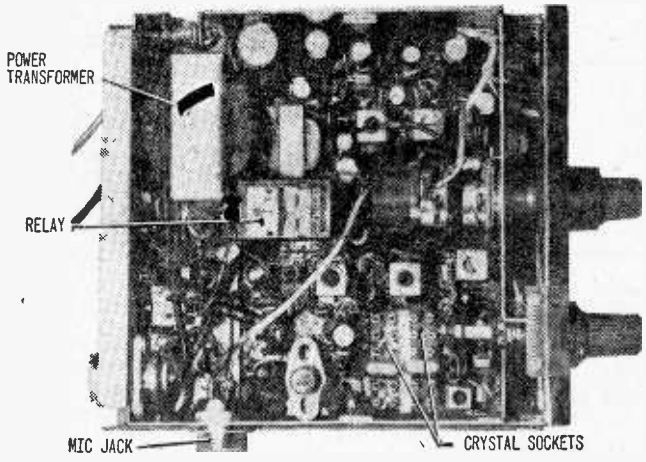
Jack allows connection of external speaker without affecting mike function of speaker/mike combo, secret of 750's small size.

LAB CHECK

block permanently mounted on the bottom of the transceiver case.

The top of the "mike" speaker has a mating plastic block that slides into the grooved bracket. When the "mike" speaker is slipped into the groove it becomes part of the transceiver, and the sound radiates forward just as though the speaker were built into the front of the transceiver case. Yet when a call is received, the user simply slips the "mike" speaker out of the grooved holder and brings it toward his face.

Performance. Since gimmicks are worthless if performance isn't up to par, we tested the Amphenol 750 just as we would any other 5-watt transceiver. The transmitter's performance was typical of most other solid-state transceivers. Power output with a 13.8-V power supply (simulating battery charging voltage in a moving auto) checked out at 3.1 watts into a 50-ohm load. The modulation sensitivity (the signal into the microphone) at 1000 Hz was exactly average for 85% modulation. (The 85% figure is the standard measurement value and is essentially equal to 100%.)



Negative modulation was limited to 100%, and test signals into the microphone equal to a very loud shout did not cause overmodulation. Due to use of a speaker-type microphone, modulation quality resulted in a sound very much like that from a standard intercom.

Receiver section sensitivity checked out at 0.8 μV for a 10 dB S+N/N (signal plus noise to noise) ratio, somewhat better than the claimed specs. Adjacent-channel rejection measured 31 dB, considerably better than claimed by the manufacturer. Image rejection, the ability of the receiver to reject signals appearing at twice the IF frequency, measured but 4 dB (poor). Still, this is typical of nearly all single-conversion solid-state transceivers. Further, normally there are no signals on the image frequency, so the user will seldom be bothered by image-frequency interference.

AGC action for a 1 to 1000 microvolt test signal range was 4 dB (good). By way of explanation, AGC (automatic gain control) is provided in a receiver to avoid overload on strong signals, and to prevent strong signals from blasting from the speaker when the volume control has been cranked wide open to pick up a weak station. The effect of AGC is to automatically reduce the receiver's gain on strong signals.

Between the input signal test values of 1 μV (to simulate a weak signal), and 1000 μV (to simulate a very strong signal), the 750's AGC reduced the 60-dB signal spread to a mere 4 dB variation in speaker output level. So good was the AGC action, in fact, that the change in sound volume between the two stations was barely noticeable.

About the size of a walkie-talkie, the 750 accepts six transmit, six receive crystals.

Low-Power Drain. Besides its very small size the Amphenol 750 features a very low current drain. The total consumption is only 170 mA in receive/standby, and 1.2 A during transmit. Because of this low current drain a set of 6-V lantern batteries used as a portable power supply will provide several hours of operation. The batteries can even be tied to the top of the transceiver, and the addition of a book strap would complete a very portable, full 5-watt station.

Summing Up. Where size is of first importance the Amphenol 750 is the first choice. The unit goes for a mere $79.95.

For additional information write to the Amphenol Corp., Dept. DF, 2875 S. 25th Ave., Broadview, Ill. 60153. ■

THE HOOFIN' HEART

☐ In the beautiful rolling hills of New Jersey, a young veterinarian is using aerospace technology to write a new chapter in man's scientific efforts to learn more about the horse.

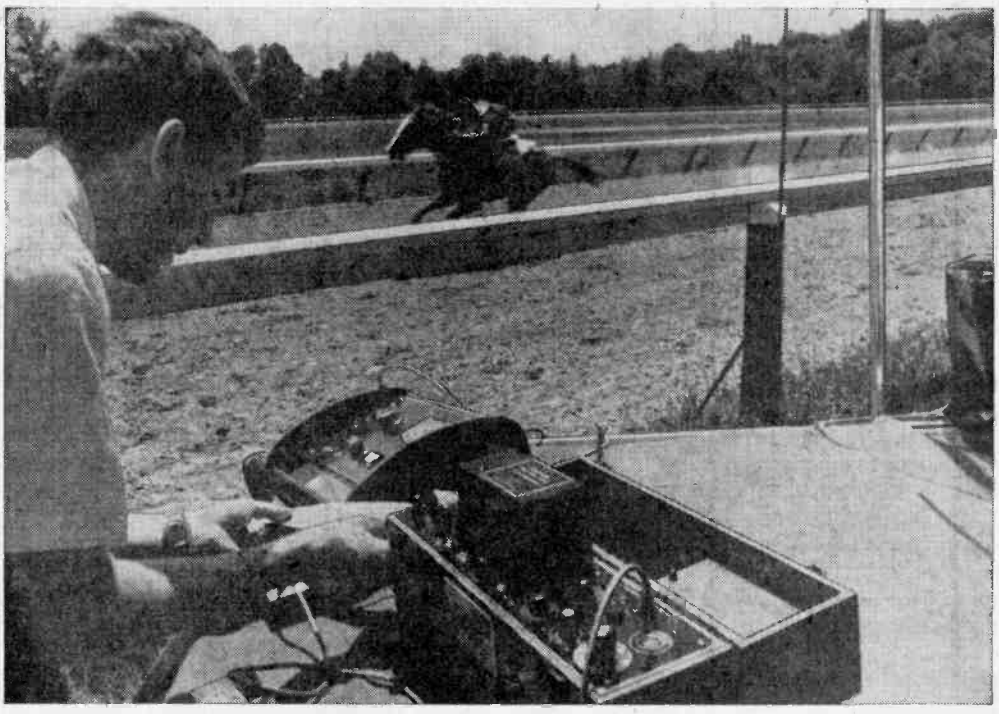
Dr. G. Frederick Fregin is pioneering in the field of radioelectrocardiography in veterinary medicine. Specifically, he's studying race horses to find out what constitutes their normal heart activity under varying conditions, so that later he will be able to discover abnormalities.

Radioelectrocardiography is the use of radio telemetry for heart study. The telemetry equipment measures the activity of the heart and transmits the results to a distant receiving device.

With techniques of modern medicine it is relatively easy to record the electrocardiogram (ECG) of a human. A doctor merely tapes electrodes to the patient's skin, attaches them to a small transmitter which can be carried in the patient's pocket, and studies the results on a nearby recording device.

Humans vs. Horses. Significant work has been done in human electrocardiography, but there hasn't been much done with horses," Dr. Fregin observes. Though the first normal ECG of a horse was published in 1910, little has been done in the field since, and nothing with radioelectrocardiography until recently."

Dr. Fregin became interested in radio telemetry as a post-doctoral student at the University of Pennsylvania's School of Veterinary Medicine, where he is now a fellow in cardiology. A guest lecturer, Dr. T. Senta, described how he and his associates in Japan, using radio telemetry, had been able to take a horse's ECG while the horse was running. Intrigued by the Japanese experiments, Dr. Fregin borrowed some radio telemetry equipment from Dr. Samuel Bellet, a widely known cardiologist who had studied



Facts & photos courtesy United Aircraft's BEE-HIVE

The Hoofin' Heart

the heart reactions of automobile drivers to various situations behind the wheel.

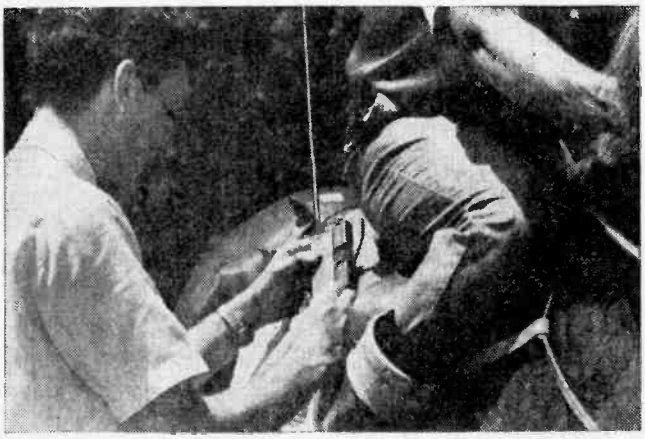
But Dr. Fregin had difficulty adapting the technique: "When the horses stood still, the ECG trackings were good. But during exercise, the horses sweated so profusely and moved so violently that the electrodes kept pulling loose."

Dr. Fregin experimented with various combinations of electrodes, electrode housings, jellies, and glues, and finally found a combination that worked. But a more serious problem arose: his borrowed equipment was not powerful enough. If a horse moved more than a few feet away, the signal would not reach the receiver.

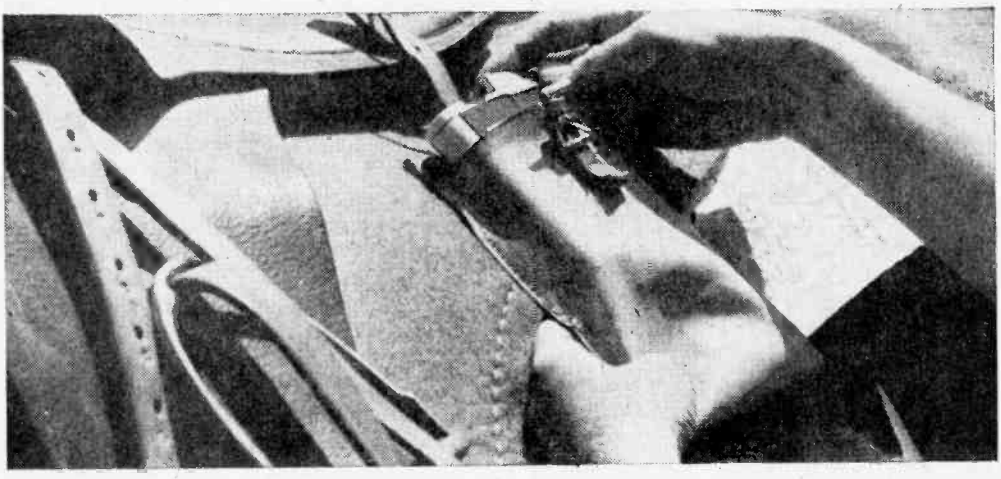
Longer Range. He procured even more powerful equipment from a United Aircraft medical telemetry group based in the corporation's Hamilton Standard Division in Windsor Locks, Conn. The new equipment suited Dr. Fregin's work perfectly. A more powerful transmitter and the use of a special antenna on the receiver increased the range to about a half-mile.

The doctor began further testing on race horses in Hydes, Md. He even devised a special saddle to carry the transmitter so as not to encumber the highly excitable thoroughbreds. He was encouraged by the way the equipment worked, so he extended his testing to the more docile American standardbreds, the breed normally associated with harness racing.

Still, the doctor was working in virtually uncharted waters. With standard equipment, it had been possible to take a horse's ECG



Dr. G. Frederick Fregin adjusts radio transmitter before placing it in special pouch on saddle. Transmitter will send continuous ECG of running horse to distant receiver. Before radio telemetry, electrocardiography required wiring an animal to a stationary machine. New mobility will be big aid to veterinary medicine.



Before radio telemetry, MDs only guessed at horse's maximum heart rate—about 260 beats.

Doctor Fregin secures saddle before test run. He designed special saddle so as not to disturb and encumber highly excitable thoroughbreds. Here, transmitter goes into empty pouch. But for work with trotters, transmitter is strapped on to back of sulky driver by means of a special harness.

within a minute or two after exercise—the time it took to bring the horse from the track and attach it to the device. But the heartbeat of a horse slows quickly during the first minute after such exercise, sometimes as much as 100 beats a minute.

With radio telemetry, the ECG can be taken either while the horse is on the dead run or while it is standing quietly in its stall. The resulting information has surprised veterinarians.

When a normal horse is resting, its heart usually beats 30 to 35 times a minute. During strenuous exercise, Dr. Fregin has measured the rate as high as 260 beats a minute!

No More Guessing. Doctors had only guessed the maximum heart rate of a horse, because before radio telemetry there was no way to measure it. "The increase in rates between rest and heavy exercise that we have seen with radio telemetry are remarkable and much higher than many doctors would have believed possible," Dr. Fregin comments.

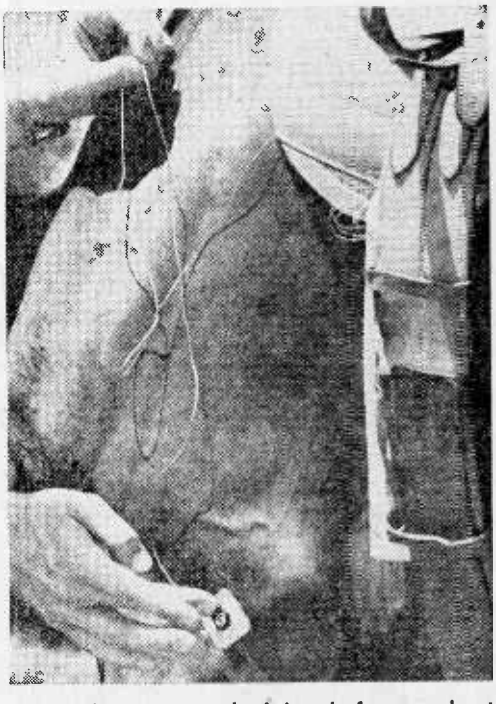
The doctor has begun to compile statistics on horses' heartbeats under varying exercise conditions to establish what is normal and what is abnormal. Without such data for comparison, future examinations would be meaningless. He has confined his study to taking radioelectrocardigrams of 20 clinically normal horses at rest, during exercise, and immediately after exercise.

"We know certain changes occur in the ECG of humans during various stages of exercise. Similar changes also appear in horses. Some people have felt that these ECG changes in horses suggest signs of mild cardiac damage, others say the changes are normal. I want to find out what they really mean in otherwise normal, healthy horses."

Before he reaches any conclusions, the doctor will weigh whatever he learns by means of radio telemetry with information gathered during extensive physical examinations of the horses. He expects his study to take about a year, and the results will be the basis of his master's degree thesis.

The 29-year-old doctor spends much of his time in his second-floor office and in the adjacent barns and laboratories which make up the quadrangle of the School of Veterinary Medicine in downtown Philadelphia.

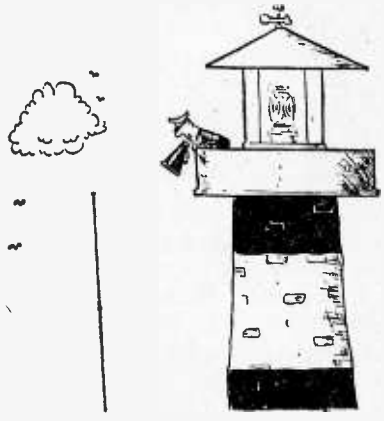
(Continued on page 112)



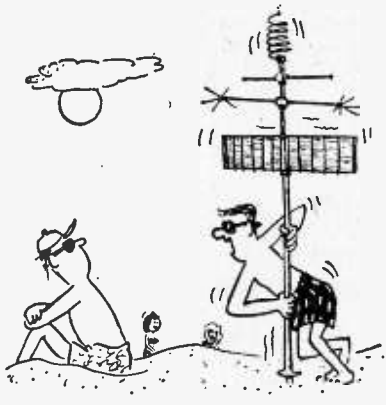
Electrodes are attached just before workout begins. A great deal of testing was required before right electrode combination was found which would stick during heavy exercise.

...by the SEA

by Jack Schmidt

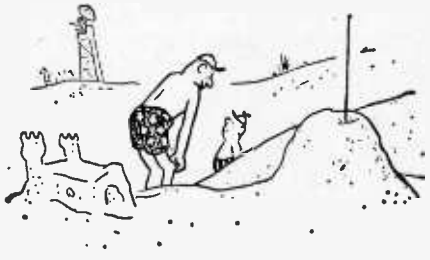


"Yes, Sir, that's quite an antenna you have."



"The main thing it picks up is girls!"

"I'll carry it up . . . you ask if it's waterproof!"



"Come on, Tommy, tell Daddy where his radio is!"

"Yes, I would mind moving to the left!"

"Have to get it checked . . . picture's weak again!"

WHITE'S RADIO LOG

Volume 50, No. 1

An up-to-date Broadcasting Directory of North American AM, FM and TV Stations, including a Special Section on World-Wide Shortwave Stations

In this issue of *White's Radio Log* we have included the following listings: U.S. AM Stations by Frequency, Canadian AM Stations by Frequency, U.S. Television Stations by States, Canadian Television Stations by Cities, and World-Wide Shortwave Stations.

In Our Next Issue, Oct.-Nov., 1968, the *Log* will contain the following listings: U.S. AM Stations by Location, U.S. FM Stations by States, Canadian AM Stations by Location, Canadian FM Stations by Location, and an expanded Shortwave Section. The shortwave listings are always completely revised in each issue of *Log* to insure 100 percent up-to-date and accurate information.

In the December, 1968 issue of RADIO-TV EXPERIMENTER, the *Log* will contain the following listings: U.S. AM Stations by Call Letters, U.S. FM Stations by Call Letters, Canadian AM Stations by Call Letters, Canadian FM Stations by Call Letters, and an expanded World-Wide Shortwave Section.

Therefore, in any three consecutive 1968 issues of RADIO-TV EXPERIMENTER magazine, you will have a complete cross-reference listings of *White's Radio Log* that is always up-to-date. The three consecutive issues are a complete volume of *White's Radio Log* that offers up to the minute listings that are not to be found in any other magazine or book. If you are a broadcast band DXer, FM station logger, like to photograph distant TV test patterns, or tune the shortwave bands, you will find the new *White's Radio Log* format an unbeatable reference. □

QUICK REFERENCE INDEX

WHITE'S

RADIO LOG

U.S. AM Stations by Frequency

U. S. stations listed alphabetically by states within groups. Abbreviations: kHz, frequency in kilocycles; W.P., power in watts; d, operates daytime only; n, operates nighttime only. Wave length is given in meters. Listing indicates stations on the air up to April 1, 1968.

kHz	Wave Length	W.P.
540—555.5		
KVIP	Redding, Calif.	5000d
WGTO	Cypress Gardens, Fla.	50000d
WDAK	Columbus, Ga.	5000
KWMT	Ft. Dodge, Iowa	5000d
KNOE	Monroe, La.	5000
WDMV	Pocomoke City, Md.	500d
WLIX	Islip, N.J	250d
WETC	Wendell-Zebulon, N.C.	250d
WARO	Canonsburg, Pa.	250d
WYNN	Florence, S.C.	250d
WDXN	Clarksville, Tenn.	1000d
WRIC	Richlands, Va.	1000d
WYLO	Jackson, Wisc.	250d
550—545.1		
KENI	Anchorage, Alaska	5000
KOY	Phoenix, Ariz.	5000
KAFY	Bakersfield, Calif.	1000
KRAI	Craig, Colo.	1000
WAYR	Orange Park, Fla.	1000d
WGGA	Gainesville, Ga.	5000
KMVI	Wailuku, Hawaii	5000
KFRM	Salina, Kans.	5000d
WCBI	Columbus, Miss.	1000
KSD	St. Louis, Mo.	5000
KBOW	Butte, Mont.	1000
WGR	Buffalo, N.Y.	5000
WDBM	Statesville, N.C.	500d
KFYR	Bismarck, N.Dak.	5000
WKRC	Cincinnati, Ohio	5000
KOAC	Corvallis, Oreg.	5000
WHLM	Bloomsburg, Pa.	1000
WPAB	Ponce, P.R.	5000
WXTR	Pawtucket, R.I.	1000
KCRS	Midland, Tex.	5000
KTSA	San Antonio, Tex.	5000
WDEV	Waterbury, Vt.	5000
WSVA	Harrisonburg, Va.	5000
KARI	Blaine, Wash.	5000d
WSAU	Wausau, Wis.	5000
560—535.4		
WOOF	Dothan, Ala.	5000d
KYUM	Yuma, Ariz.	1000
KSFO	San Fran., Calif.	5000
KLZ	Denver, Colo.	5000
WQAM	Miami, Fla.	5000
WIND	Chicago, Ill.	5000
WMIK	Middlesboro, Ky.	500d
WGAN	Portland, Maine	5000
WFRB	Frostburg, Md.	1000
WHYN	Springfield, Mass.	5000
WQTE	Monroe, Mich.	500d
WEBC	Duluth, Minn.	5000
KWTO	Springfield, Mo.	5000
KMON	Great Falls, Mont.	5000
WGAI	Elizabeth City, N.C.	1000
WFIL	Philadelphia, Pa.	5000
WIS	Columbia, S.C.	5000
WHBQ	Memphis, Tenn.	5000
KLVI	Beaumont, Tex.	5000
KPQ	Wenatchee, Wash.	5000
WJLS	Beckley, W.Va.	5000
570—526.0		
WAAX	Gadsden, Ala.	5000
KCNO	Alturas, Calif.	5000
WGMS	Washington, D.C.	5000
WFSO	Pinellas Park, Fla.	500d
WACL	Waycross, Ga.	5000
WKYX	Paducah, Ky.	1000
WGMS	Bethesda, Md.	5000d
WVMI	Biloxi, Miss.	1000d
KGRT	Las Cruces, N.Mex.	5000d
WMCA	New York, N.Y.	5000
WSYR	Syracuse, N.Y.	5000
WWNC	Asheville, N.C.	5000
WLLE	Raleigh, N.C.	500d
WKBN	Youngstown, Ohio	5000
WNAX	Yankton, S.Dak.	5000
WFAA	Dallas, Tex.	5000
WBAP	Ft. Worth, Tex.	5000
KLUB	Salt Lake City, Utah	5000
KVI	Seattle, Wash.	5000
WMAM	Marinette, Wis.	250d
580—516.9		
WABT	Tuskegee, Ala.	500d
KIKX	Tucson, Ariz.	5000
KMJ	Fresno, Calif.	5000
KUBC	Montrose, Colo.	5000
WDBO	Orlando, Fla.	5000
WGAC	Augusta, Ga.	5000
KFXD	Nampa, Idaho	5000
WILL	Urbana, Ill.	5000d
KSAC	Manhattan, Kans.	5000
WIBW	Topeka, Kans.	5000
KALB	Alexandria, La.	5000
WTAG	Worcester, Mass.	5000
WELO	Tupelo, Miss.	1000
KANA	Anaconda, Mont.	1000
WAGR	Lumberton, N.C.	500
KWIN	Ashland, Oreg.	1000
WHP	Harrisburg, Pa.	5000
WKAQ	San Juan, P.R.	5000
KOBH	Hot Springs, S.Dak.	500d
WRKH	Rockwood, Tenn.	1000d
KDAV	Lubbock, Tex.	500d
WLES	Lawreneeville, Va.	500d
WCHS	Charleston, W.Va.	5000
WKTY	LaCrosse, Wis.	5000
590—508.2		
KHAR	Anchorage, Alaska	5000
WRAG	Carrollton, Ala.	1000d
KBHS	Hot Springs, Ark.	5000d
KFXM	San Bernardino, Cal.	1000
KTHO	So. Lake Tahoe, Cal.	1000
KCSJ	Pueblo, Colo.	1000
WDLP	Panama City, Fla.	1000
WPLO	Atlanta, Ga.	5000
KGMB	Honolulu, Hawaii	5000
KID	Idaho Falls, Idaho	5000
WRTH	Wood River, Ill.	1000
WVLK	Lexington, Ky.	5000
WEEI	Boston, Mass.	5000
WKZO	Kalamazoo, Mich.	5000
KGLE	Glendive, Mont.	500d
WOW	Omaha, Nebr.	5000
WROW	Albany, N.Y.	5000
WCAB	Rutherfordton, N. C.	500d
WGTM	Wilson, N.C.	5000
KUGN	Eugene, Oreg.	5000
WARM	Scranton, Pa.	5000
WMBS	Uniontown, Pa.	1000
KTBC	Austin, Tex.	5000
KSUB	Cedar City, Utah	1000
WLVA	Lynchburg, Va.	1000
KHQ	Spokane, Wash.	5000
600—499.7		
WIRB	Enterprise, Ala.	1000
KCLS	Flagstaff, Ariz.	5000
KVCV	Redding, Calif.	1000
KOGO	San Diego, Calif.	5000
KZIX	Ft. Collins, Colo.	1000d
WICC	Bridgeport, Conn.	5000
WPDQ	Jacksonville, Fla.	5000
WMT	Cedar Rapids, Iowa	5000
WWOM	New Orleans, La.	1000d
WFST	Caribou, Maine	5000d
WCAO	Baltimore, Md.	5000
WLST	Escanaba, Mich.	1000d
WTAC	Flint, Mich.	1000
KGEZ	Kalispell, Mont.	1000
WCVP	Murphy, N.C.	1000d
WSJS	Winston-Salem, N.C.	5000
KSJB	Jamestown, N.D.	5000
WSOM	Salem, Ohio	500d
WFRM	Coudersport, Pa.	1000d
WAEL	Mayaguez, P.R.	1000
WREC	Memphis, Tenn.	5000
KROD	El Paso, Tex.	5000
KERB	Kermit, Tex.	1000d
KTBB	Tyler, Tex.	1000
WVAR	Richwood, W.Va.	1000d
610—491.5		
WSGN	Birmingham, Ala.	5000
KAVL	Lancaster, Calif.	1000
KFRC	San Francisco, Calif.	5000
WTOR	Torrington, Conn.	1000
WIOD	Miami, Fla.	5000
WMEL	Pensacola, Fla.	500d
WCEH	Hawkinsville, Ga.	500d
KUAM	Agana, Guam	10000
WRUS	Russellville, Ky.	500d
KDAL	Duluth, Minn.	5000
WDAF	Kansas City, Mo.	5000
KOJM	Havre, Mont.	1000
KCSR	Chadron, Nebr.	1000d
WGIR	Manchester, N.H.	5000
KGGM	Albuquerque, N.Mex.	5000
WAYS	Charlotte, N.C.	5000
WTVN	Columbus, Ohio	5000
WIP	Philadelphia, Pa.	5000
KILT	Houston, Tex.	5000
KVNU	Logan, Utah	5000
WSLS	Roanoke, Va.	5000
WHPL	Winchester, Va.	500
KEPR	Kennewick-Richmond-Pasco, Wash.	5000
620—483.6		
KTAR	Phoenix, Ariz.	5000
KNGS	Hanford, Calif.	1000
KWSD	Mt. Shasta, Calif.	1000d
KSTR	Grand Junction, Colo.	5000d
WSUN	St. Petersburg, Fla.	5000
WTRP	LaGrange, Ga.	1000d
KWAL	Wallace, Idaho	1000
KMNS	Sioux City, Iowa	1000
WTMT	Louisville, Ky.	500d
WLBZ	Bangor, Maine	5000
WJDX	Jackson, Miss.	5000
WVNJ	Newark, N.J.	5000
WHEN	Syracuse, N.Y.	5000
WDNC	Durham, N.C.	5000
KGW	Portland, Oreg.	5000
WHJB	Greensburg, Pa.	1000
WCAY	Cayce, S.C.	500d
WATE	Knoxville, Tenn.	5000
KWFT	Wichita Falls, Tex.	5000
WVMT	Burlington, Vt.	5000
WWNR	Beckley, W.Va.	1000
WTMJ	Milwaukee, Wis.	5000
630—475.9		
WAVU	Albertville, Ala.	1000d
WJDB	Thomasville, Ala.	1000d
KYAK	Anchorage, Alaska	5000d
KJNO	Juneau, Alaska	1000
KVMA	Magnolia, Ark.	1000d
KIDO	Monterey, Calif.	1000
KHOW	Denver, Colo.	5000
WMAL	Washington, D.C.	5000
WSAV	Savannah, Ga.	5000
WNEG	Toccoa, Ga.	500d
KIDO	Boise, Idaho	5000
WLAP	Lexington, Ky.	5000
KTIB	Thibodaux, La.	500d
WJMS	Ironwood, Mich.	1000
KDWB	So. St. Paul, Minn.	5000
KXOK	St. Louis, Mo.	5000
KGVW	Belgrade, Mont.	1000d
KOH	Reno, Nev.	5000
KLEA	Lovington, N.Mex.	500d
WIRC	Hickory, N.C.	1000d
WMFD	Wilmington, N.C.	1000
KWRO	Coquille, Oreg.	5000d
WEIL	Scranton, Pa.	500d
WKYN	San Juan, P.R.	5000
WPRO	Providence, R.I.	5000
KMAC	San Antonio, Tex.	5000
KSXX	Salt Lake City, Utah	1000d
KGDN	Edmonds, Wash.	5000
KZUN	Opportunity, Wash.	500d
640—468.5		
KFI	Los Angeles, Calif.	50000
WOI	Ames, Iowa	5000d
WHLO	Akron, O.	1000d
WNAD	Norman, Okla.	1000d
650—461.3		
KORL	Honolulu, Hawaii	10000
WSM	Nashville, Tenn.	50000
KIKK	Pasadena, Texas	250d
660—454.3		
KFAR	Fairbanks, Alaska	10000
KOZN	Omaha, Neb.	1000d
WNBC	New York, N.Y.	50000
WESC	Greenville, S.C.	10000d
KSKY	Dallas, Tex	10000d
670—447.5		
WMAQ	Chicago, Ill.	50000
680—440.9		
KNBR	San Francisco, Cal.	50000
WPIN	St. Petersburg, Fla.	1000d
WRNG	N. Atlanta, Ga.	5000
WCTT	Corbin, Ky.	1000
WCBM	Baltimore, Md.	10000
WRKO	Boston, Mass.	50000
WDBC	Escanaba, Mich.	10000
KFEQ	St. Joseph, Mo.	5000
WINR	Binghamton, N.Y.	1000
WNYR	Rochester, N.Y.	250
WPTF	Raleigh, N.C.	50000
WISR	Butler, Pa.	250d
WAPA	San Juan, P.Rico.	10000
WMPS	Memphis, Tenn.	10000
KBAT	San Antonio, Tex.	50000
KOMW	Omak, Wash.	1000d
WCAW	Charleston, W.Va.	10000d
690—434.5		
WVOK	Birmingham, Ala.	50000d
KEOS	Flagstaff, Ariz.	1000
KEVT	Tucson, Ariz.	250d
KBBA	Benton, Ark.	250d
KAPI	Pueblo, Colo.	250d
WADS	Ansonia, Conn.	500d
WAPE	Jacksonville, Fla.	50000
KKUA	Honolulu, Hawaii	10000
KBLI	Blackfoot, Idaho	1000d
KGGF	Coffeyville, Kans.	10000
WTIX	New Orleans, La.	10000
KTCR	Minneapolis, Minn.	500d
KSTL	St. Louis, Mo.	1000d
KEYR	Terrytown, Nebr.	1000d
KRCO	Prineville, Oreg.	1000d
WXUR	Media, Pa.	500d
KUSD	Vermillion, S.Dak.	1000d
KHEY	El Paso, Tex.	10000
KPET	Lamesa, Tex.	250
KZEY	Tyler, Tex.	5000
WCYB	Bristol, Va.	10000d
WNNT	Warsaw, Va.	250d
WELD	Fisher, W. Va.	500d
WAGO	Oshkosh, Wis.	
700—428.3		
WLW	Cincinnati, Ohio	50000
710—422.3		
WKRG	Mobile, Ala.	1000
KMPC	Los Angeles, Calif.	50000
KBTR	Denver, Colo.	5000
WGBS	Miami, Fla.	50000
WUFF	Eastman, Ga.	1000d
WROM	Rome, Ga.	1000d
KEEL	Shreveport, La.	50000
WHB	Kansas City, Mo.	10000
WOR	New York, N.Y.	50000
DZRH	Manila, P.I.	10000
WKJB	Mayaguez, P.Rico	1000
WTPR	Paris, Tenn.	250d
KGNC	Amarillo, Tex.	10000
KURV	Edinburg, Tex.	250
KIRO	Seattle, Wash.	50000
WDSM	Superior, Wis.	5000
720—416.4		
KUAI	Eleele, Hawaii	5000
WGN	Chicago, Ill.	50000
730—410.7		
WJMW	Athens, Ala.	1000
KSUD	W. Memphis, Ark.	250d
WLOR	Thomasville, Ga.	5000d
KLOE	Goodland, Kans.	1000d
WFMW	Madisonville, Ky	500
WMTC	Van Cleve, Ky.	1000d
KTRY	Bastrop, La.	250d
WARB	Covington, La.	250d
WJTO	Bath, Maine	1000d
WACE	Chicopee, Mass.	5000d
WVIC	E. Lansing, Mich.	500
KWRE	Warrenton, Mo.	1000d
KWOA	Worthington, Minn.	1000d
KURL	Billings, Mont.	500d
KVOO	Albuquerque, N.Mex.	1000d
WDOS	Oneonta, N.Y.	1000d
WFMC	Goldsboro, N.C.	1000d
WOHS	Shelby, N.C.	1000d
WMGS	Bowling Green, Ohio	1000d
KBOY	Medford, Oreg.	1000d
WNAK	Nanticoke, Pa.	1000d
WPIT	Pittsburgh, Pa.	5000d
WPAL	Charleston, S.C.	1000d
WLIL	Lenoir, Tenn.	1000d
KPCN	Grand Prairie, Tex.	500d
KSVN	Ogden, Utah	1000d
WPIK	Alexandria, Va.	5000d
WMNA	Gretna, Va.	1000d

kHz	Wave Length	W.P.
KULE	Ephrata, Wash.	1000d
WXMT	Merrill, Wis.	1000d

740—405.2

WBAM	Montgomery, Ala.	50000d
KMEO	Phoenix, Ariz.	1000d
KBIG	Avalon, Cal.	10000d
KCBS	San Francisco, Calif.	50000
KSSS	Colorado Springs, Colo.	1000d
KVFC	Cortez, Colo.	1000d
WSBR	Boca Raton, Fla.	1000
WKMK	Blountston, Fla.	1000d
WKIS	Orlando, Fla.	5000
KYME	Boise, Idaho	500d
WVLN	Olney, Ill.	1000d
KBOE	Oskaloosa, Iowa	250d
WNOP	Newport, Ky.	1000d
WCAS	Cambridge, Mass	250d
KPBM	Carlsbad, N.Mex.	1000d
WGSM	Huntington, N.Y.	5000d
WMBL	Morehead City, N.C.	1000d
WPAQ	Mount Airy, N.C.	10000d
KRMG	Tulsa, Okla.	50000
WVCH	Chester, Pa.	1000d
WIAC	San Juan, P.Rico	10000
WBAW	Barnwell, S.C.	1000d
WIRJ	Humbolt, Tenn.	250d
WJIG	Tullahoma, Tenn.	250d
KTRH	Houston, Tex.	50000
KCMC	Texarkana, Tex.	1000
WBCI	Williamsburg, Va.	500d
WBOO	Baraboo, Wis.	

750—399.8

KFQD	Anchorage, Alaska	10000
WSB	Atlanta, Ga.	50000
WBMD	Baltimore, Md.	1000d
KMMJ	Grand Island, Neb.	10000
WHEB	Portsmouth, N.H.	1000d
KSEO	Durant, Okla.	250d
KXL	Portland, Oreg.	50000
WPDX	Clarksburg, W.Va.	1000d

760—394.5

KFMB	San Diego, Cal.	5000
KGU	Honolulu, Hawaii	10000
WJR	Detroit, Mich.	50000
WCPS	Tarboro, N.C.	1000d
WORA	Mayaguez, P.R.	5000

770—389.4

KUOM	Minneapolis, Minn.	5000d
WCAL	Northfield, Minn.	5000d
WEW	St. Louis, Mo.	1000d
KOB	Albuquerque, N.Mex.	50000
WABC	New York, N.Y.	50000
KXA	Seattle, Wash.	1000

780—384.4

WBBM	Chicago, Ill.	50000
WJAG	Norfolk, Neb.	1000d
WCKB	Dunn, N.C.	1000d
WBBO	Forest City, N.C.	1000d
KSPI	Stillwater, Okla.	250d
WAVA	Arlington, Va.	1000d

790—379.5

WTUG	Tuscaloosa, Ala.	1000d
KCAM	Glennallen, Alaska	5000
KCEE	Tucson, Ariz.	5000
KOSY	Texarkana, Ark.	1000
KABC	Los Angeles, Calif.	5000
WLBE	Leesburg, Fla.	5000
WFUN	S. Miami, Fla.	5000
WQXI	Atlanta, Ga.	5000d
WYNR	Brunswick, Ga.	500d
WGRA	Cairo, Ga.	1000d
KONA	Kealakekua, Hawaii	1000
KEST	Boise, Idaho	1000d
KBRV	Soda Springs, Ida.	5000d
WRMS	Beardstown, Ill.	500d
KXXX	Colby, Kans.	5000d
WAKY	Louisville, Ky.	5000
WRUM	Rumford, Me.	1000d
WSGW	Saginaw, Mich.	5000
KGHL	Billings, Mont.	5000
WWNY	Watertown, N.Y.	1000
WLSV	Wellsville, N.Y.	1000d
WTNC	Thomasville, N.C.	1000d
KFGO	Fargo, N.D.	5000
KWIL	Albany, Oreg.	1000
WAEB	Allentown, Pa.	1000
WPIC	Sharon, Pa.	1000d
WEAN	Providenece, R.I.	5000
WWBD	Bamberg-Denmark, S.C.	1000d
WETB	Johnson City, Tenn.	1000d
WMC	Memphis, Tenn.	5000
KTHT	Houston, Tex.	5000
KFYD	Lubbock, Tex.	5000
KUTA	Blanding, Utah	1000d
WSIG	Mount Jackson, Va.	1000d
WTAR	Norfolk, Va.	5000
KGMI	Bellingham, Wash.	5000
KJRB	Spokane, Wash	5000
WEAQ	Eau Claire, Wis.	5000

800—374.8

WHOS	Decatur, Ala.	1000d
WMGY	Montgomery, Ala.	1000d
KINY	Juneau, Alaska	5000
KAGH	Crossett, Ark.	250d
KVOM	Morrilton, Ark.	250d
KUZZ	Bakersfield, Calif.	250d
KDAD	Weed, Calif.	1000d
KBRN	Brighton, Colo.	500d
WLAD	Danbury, Conn.	1000d
WRKV	Rockville, Conn.	
WSUZ	Palatka, Fla.	1000d
WJAT	Swainsboro, Ga.	1000d
WKZI	Casey, Ill.	250d
KXIC	Iowa City, Iowa	1000d
WCCM	Lawrence, Mass.	1000d
WVAL	Sauk Rapids, Minn.	250d
KREI	Farmington, Mo.	1000d
WKDN	Camden, N. J.	5000d
KJEM	Okla. City, Okla.	250d
KPDQ	Portland, Ore.	1000d
WCHA	Chambersburg, Pa.	1000d
WDSC	Dillon, S.C.	1000d
WEAB	Greer, S.C.	250d
WDEH	Sweetwater, Tenn.	1000d
KDDD	Dumas, Tex.	250d
KBUH	Brigham City, Utah	250d
WSVS	Crewe, Va.	5000d
WKEE	Huntington, W.Va.	5000d
WDUX	Waupaca, Wis.	5000d

810—370.2

KGO	San Francisco, Calif.	50000
KWSR	Rifle, Colo.	1000d
WATI	Indianapolis, Ind.	2500d
WYRE	Annapolis, Md.	250d
WJPW	Rockford, Mich.	500d
WSJC	Magee, Miss.	50000
KCMO	Kansas City, Mo.	50000
KAFE	Santa Fe, N.M.	
WGY	Schenectady, N.Y.	50000
WKBC	N.Wilkesboro, N.C.	1000d
WCEC	Rocky Mount, N.C.	1000d
WEDO	McKeesport, Pa.	1000d
WKVM	San Juan, P.R.	50000
WQIZ	St. George, S.C.	5000d
KBHB	Sturgis, S.D.	5000d
WMTS	Murfreesboro, Tenn.	5000d
KWDR	Del Rio, Tex.	
WILT	Tomahawk, Wis.	

820—365.6

WAIT	Chicago, Ill.	5000d
WIKY	Evansville, Ind.	250d
WOSU	Columbus, Ohio	5000d
WFAA	Dallas, Tex.	50000
WBAP	Ft. Worth, Tex.	50000

830—361.2

KIKI	Honolulu, Hawaii	10000
WCCO	Minneapolis-St. Paul, Minn.	50000
KBOA	Kennett, Mo.	1000d
WNYC	New York, N.Y.	1000

840—356.9

WTUF	Mobile, Ala.	1000d
WRYM	New Britain, Conn.	1000d
WHAS	Louisville, Ky.	50000
WVPO	Stroudsburg, Pa.	250d

850—352.7

WYDE	Birmingham, Ala.	10000
KICY	Nome, Alaska	5000
KGKO	Benton, Ark.	1000d
KOA	Denver, Colo.	50000
WRUF	Gainesville, Fla.	5000
WEAT	W. Palm Beach, Fla.	1000
KIMO	Hilo, Hawaii	1000
WCLR	Crystal Lake, Ill.	500d
WHDH	Boston, Mass.	50000
WKBZ	Muskegon, Mich.	1000
KFUO	Clayton, Mo.	5000
WKIX	Raleigh, N.C.	10000
WJW	Cleveland, Ohio	10000
WJAC	Johnstown, Pa.	10000
WEEU	Reading, Pa.	1000
WABA	Aguadilla, P.R.	500
WIVK	Knoxville, Tenn.	50000d
WRAP	Norfolk, Va.	5000
KTAC	Tacoma, Wash.	10000

860—348.6

WHRT	Hartselle, Ala.	250d
WAMI	Opp, Ala.	1000d
KIFN	Phoenix, Ariz.	1000d
KOSE	Osceola, Ark.	1000d
KWRF	Warren, Ark.	250d
KTRB	Modesto, Calif.	10000
WAZE	Clearwater, Fla.	500d
WKKO	Cocoa, Fla.	1000
WERD	Atlanta, Ga.	1000
WDMG	Douglas, Ga.	5000d
WMRI	Marion, Ind.	250d
KWPC	Muscatine, Iowa	250d
KOAM	Pittsburg, Kan.	10000
WSON	Henderson, Ky.	500d
WAYE	Baltimore, Md.	1000d
WSBS	Gt. Barrington, Mass.	250d
KNUJ	New Ulm, Minn.	1000d
WMAG	Forest, Miss.	500d
KARS	Belen, N. Mex.	250d
WFMO	Fairmont, N.C.	1000d
WSTH	Taylorsville, N. C.	250d
KSHA	Medford, Oreg.	1000d
WAMO	Pittsburgh, Pa.	1000d
WTEL	Philadelphia, Pa.	10000d
WLBG	Laurens, S.C.	1000d
KFST	Ft. Stockton, Tex.	250d
KPAN	Hereford, Tex.	250d
KSFA	Nacogdoches, Tex.	1000d
KONO	San Antonio, Tex.	5000
KWHO	Salt Lake City, Utah	1000d
WEVA	Emporia, Va.	1000d
WOAY	Oak Hill, W.Va.	10000d
WFOX	Milwaukee, Wis.	250d

870—344.6

KIEV	Glendale, Calif.	500d
KAIM	Honolulu, Hawaii	5000
WWL	New Orleans, La.	50000
WKAR	E. Lansing, Mich.	10000d
WHCU	Ithaca, N.Y.	5000
WGTL	Kannapolis, N.C.	1000d
WHDA	San Juan, P.R.	5000
KJIM	Ft. Worth, Tex.	250
WFLO	Farmville, Va.	1000d

880—340.7

KRVN	Lexington, Neb.	50000
WCBS	New York, N.Y.	50000
WRRZ	Clinton, N.C.	1000d
WRFD	Worthington, Ohio	5000d

890—336.9

WLS	Chicago, Ill.	50000
WHNC	Henderson, N.C.	1000d
KBYE	Okla. City, Okla.	1000d

900—333.1

WATV	Birmingham, Ala.	1000d
WGOK	Mobile, Ala.	1000d
WOZK	Dzark, Ala.	1000d
KPRB	Fairbanks, Alaska	10000
KHOZ	Harrison, Ark.	1000d
KBIF	Fresno, Calif.	1000d
KGRB	West Covina, Cal.	250d
WJWL	Georgetown, Del.	1000d
WSWN	Belle Glade, Fla.	1000d
WMOP	Ocala, Fla.	1000d
WCGA	Calhoun, Ga.	1000d
WCRY	Macon, Ga.	250d
WEAS	Savannah, Ga.	5000d
KTEE	Idaho Falls, Ida.	1000d
KEYN	Wichita, Kan.	250d
WFIA	Louisville, Ky.	1000d
WLSI	Pikeville, Ky.	5000d
KREH	Oakdale, La.	250d
WCME	Brunswick, Maine	1000d
WLMD	Laurel, Md.	1000d
WATC	Gaylord, Mich.	1000d
KTIS	Minneapolis, Minn.	1000d
WDDT	Greenville, Miss.	1000d
KFAL	Fulton, Mo.	1000d
KJSK	Columbus, Nebr.	1000d
WOTW	Nashua, N.H.	1000d
WBRV	Boonville, N.Y.	1000d
WKAJ	Saratoga Springs, N.Y.	250d
WKJK	Granite Falls, N.C.	500d
WAYN	Rockingham, N.C.	1000d
WIAM	Williamston, N.C.	1000d
KFNW	Fargo, N.Dak.	1000d
WNYN	Canton, O.	5000d
WFRO	Fremont, Ohio	500d
WCPA	Clearfield, Pa.	1000d
WFLN	Philadelphia, Pa.	1000d
WKXV	Knoxville, Tenn.	1000d
WCOR	Lebanon, Tenn.	500d
KALT	Atlanta, Tex.	1000d
KMCO	Conroe, Tex.	500d
KFLD	Floydada, Tex.	250d
KCLW	Hamilton, Tex.	250d
WODY	Bassett, Va.	500d
WAFC	Staunton, Va.	1000d
KUEN	Wenatchee, Wash.	1000d
WATK	Antigo, Wis.	250d

910—329.5

WDVC	Dadeville, Ala.	500d
KPHO	Phoenix, Ariz.	5000
KLCN	Blytheville, Ark.	5000d
KAMD	Camden, Ark.	5000
KDEO	El Cajon, Calif.	1000
KNEW	Oakland, Calif.	5000
KOXR	Oxnard, Cal.	5000
KPOF	Denver, Colo.	5000d
WRCH	New Britain, Conn.	5000
WPLA	Plant City, Fla.	1000d
WGAF	Valdosta, Ga.	5000
KBGN	Caldwell, Ida.	1000d
WAKO	Lawrenceville, Ill.	500d
WSUI	Iowa City, Iowa	5000
KISI	Salina, Kan.	500d
WLCS	Baton Rouge, La.	1000
WABI	Bangor, Maine	5000
WFDF	Flint, Mich.	5000
WCOC	Meridian, Miss.	5000
KOYN	Billings, Mont.	1000d
KYSS	Missoula, Mont.	1000d
KBIM	Roswell, N. M.	5000
WRKL	New City, N.Y.	1000d
WLAS	Jacksonville, N.C.	5000d
KCJB	Minot, N.Dak.	1000
WBRJ	Marietta, O.	5000
WPFB	Middletown, Ohio	1000
KGLC	Miami, Okla.	1000
KURY	Brookings, Oreg.	1000d
WAVL	Apollo, Pa.	1000d
WGBI	Scranton, Pa.	1000
WSBA	York, Pa.	5000
WPRP	Ponce, P.R.	5000
WNCG	North Charleston, S.C.	500d
WORD	Spartanburg, S.C.	5000d
WJCW	Johnson City, Tenn.	5000
WEPG	S. Pittsburgh, Tenn.	500d
KNAF	Fredericksburg, Tex.	1000d
KRIO	McAllen, Tex.	5000
KRRV	Sherman, Tex.	1000
KALL	Salt Lake City, Utah	5000
WNHV	White River Jct., Vt.	1000d
WRNL	Richmond, Va.	5000
WPXI	Roanoke, Va.	1000d
KORD	Pasco, Wash.	1000d
KIXI	Seattle, Wash.	1000
KISN	Vancouver, Wash.	5000
WHSM	Hayward, Wis.	5000d
WDOR	Sturgeon Bay, Wis.	1000d

920—325.9

WCTA	Adalusia, Ala.	5000
WWWR	Russellville, Ala.	1000d
KSRM	Soldotna, Alaska	5000
KARK	Little Rock, Ark.	5000
KLOC	Ceres, Calif.	500d
KDES	Palm Springs, Cal.	5000
KVEC	San Luis Obispo, Cal.	1000
KLMR	Lamar, Colo.	5000
WMEG	Eau Gallie, Fla.	1000
WGST	Atlanta, Ga.	5000
WVOH	Hazelhurst, Ga.	500d
WGNU	Granite City, Ill.	500d
WMOK	Metropolis, Ill.	1000d
WBAA	W. Lafayette, Ind.	5000
KFNF	Council Bluffs, Ia.	5000
KFNF	Shenandoah, Ia.	1000d
WTCW	Whitesburg, Ky.	5000d
WBOX	Bogalusa, La.	1000d
KTOC	Jonesboro, La.	1000d
WPTX	Lexington Park, Md.	5000
WMPL	Hancock, Mich.	1000d
KDHL	Fairbault, Minn.	5000
KWAD	Wadena, Minn.	1000
KWYS	W. Yellowstone, Mont.	
KRAM	Las Vegas, Nev.	1000
KOLO	Reno, Nev.	1000
KQEO	Albuquerque, N.Mex.	1000
WTTM	Trenton, N.J.	1000
WKRT	Cortland, N.Y.	1000
WGHQ	Kingston, N.Y.	5000d
WIRD	Lake Placid, N.Y.	1000
WBBB	Burlington, N.C.	5000d
WMNI	Columbus, Ohio	1000
KGAL	Lebanon, Oreg.	1000
WKVA	Lewistown, Pa.	1000
WJAR	Providence, R.I.	5000
WTND	Orangeburg, S.C.	1000d
KEZU	Rapid City, S.Dak.	1000d
WLIV	Livingston, Tenn.	1000d
KELP	El Paso, Tex.	1000
WRZB	Odessa, Tex.	1000
KTLW	Texas City, Tex.	1000d
KITN	Olympia, Wash.	1000d
KXLY	Spokane, Wash.	5000
WMMN	Fairmont, W.Va.	5000
WOKY	Milwaukee, Wis.	5000

930—322.4

WETO	Gadsden, Ala.	1000d
KTKN	Ketchikan, Alaska	5000
KAPR	Douglas, Ariz.	1000d
KAFF	Flagstaff, Ariz.	5000d
KHJ	Los Angeles, Calif.	5000
KEWQ	Paradise, Cal.	5000d
KIUP	Durango, Colo.	5000
WTHD	Milford, Del.	500d
WHAN	Haines City, Fla.	1000
WJAX	Jacksonville, Fla.	5000
WKXY	Sarasota, Fla.	1000
WMGR	Bainbridge, Ga.	5000
KSEI	Pocatello, Idaho	5000
WTAD	Quincy, Ill.	5000
WHON	Centerville, Ind.	500d
WKCT	Bowling Green, Ky.	1000
WFMD	Frederick, Md.	5000
WREB	Holyoke, Mass.	500d
WBCK	Battle Creek, Mich.	5000
KKIN	Aitkin, Minn.	1000d
WSLI	Jackson, Miss.	5000
KWOC	Poplar Bluff, Mo.	5000
KOGA	Ogallala, Nebr.	500d
KCCC	Carlsbad, N.M.	
WSOC	Charlotte, N.C.	5000
WITN	Washington, N.C.	5000
WWNH	Rochester, N.H.	5000
WPAT	Paterson, N.J.	5000
WBEN	Buffalo, N.Y.	5000
WIZR	Johnstown, N.Y.	1000d
WEOL	Elyria, Ohio	1000
WKY	Oklahoma City, Okla.	5000
KAGI	Grants Pass, Oreg.	5000
KSWB	Seaside, Ore.	
WCNR	Bloomsburg, Pa.	1000d

WHITE'S RADIO LOG

kHz	Wave Length	W.P.
KSDN	Aberdeen, S.D.	1000
WSEV	Sevierville, Tenn.	5000d
KDET	Center, Tex.	1000d
KITE	San Antonio, Tex.	5000
WLLL	Lynchburg, Va.	5000d
KENY	Bellingham-Ferndale, Wash.	1000d
KQOT	Yaklma, Wash.	1000d
WSAZ	Huntington, W.Va.	5000
KROE	Sheridan, Wyo.	1000d
WLBL	Auburndale, Wis.	5000d

940—319.0

KHOS	Tucson, Ariz.	250
KFRE	Fresno, Calif.	50000
WINE	Brookfield, Conn.	1000d
WKQH	Chiefland, Fla.	
WINZ	Miami, Fla.	50000
WMAZ	Macon, Ga.	50000
KAHU	Waipahu, Hawaii	10000
WMIX	Mt. Vernon, Ill.	5000d
KIOA	Des Moines, Iowa	10000
WCND	Shelbyville, Ky.	250d
WYLD	New Orleans, La.	10000
WIDG	St. Ignace, Mich.	5000
WJOR	South Haven, Mich.	1000d
WCPC	Houston, Miss.	50000d
KSMW	Aurora, Mo.	500d
KVSH	Valentine, Nebr.	5000d
WFNC	Fayetteville, N. C.	10000
WCIT	Lima, Ohio	250d
WNAL	Nelsonville, O.	
KGRL	Bend, Oreg.	1000d
KWRC	Woodburn, Ore.	1000d
WESA	Charleroi, Pa.	250d
WGRP	Greenville, Pa.	1000d
WIPR	San Juan, P.R.	10000
KIXZ	Amarillo, Tex.	5000
KTON	Belton, Tex.	1000d
KATQ	Texarkana, Tex.	1000d
WNRG	Grundy, Va.	5000d
WFAW	Ft. Atkinson, Wis.	500d
WCSW	Shell Lake, Wis.	

950—315.6

WRMA	Montgomery, Ala.	1000d
KIBH	Seward, Alaska	1000
KXJK	Forrest City, Ark.	5000d
KFSA	Ft. Smith, Ark.	1000
KAHI	Auburn, Calif.	5000d
KIMN	Denver, Colo.	5000
WLOF	Orlando, Fla.	5000
WGTA	Summerville, Ga.	5000d
WGOV	Valdosta, Ga.	5000
KATN	Boise, Ida.	5000d
KLER	Orofino, Idaho	1000d
WGRT	Chicago, Ill.	1000d
WXLW	Indianapolis, Ind.	5000d
KOEL	Oelwein, Ia.	5000
KJRG	Newton, Kans.	500d
WYWY	Barbourville, Ky.	
WAGM	Presque Isle, Maine	5000
WXLN	Potomac-Cabin John, Md.	1000d
WRYT	Boston, Mass.	5000d
WWJ	Detroit, Mich.	5000
KRSI	St. Louis Park, Minn.	1000
WBKH	Hattiesburg, Miss.	5000d
KLIK	Jefferson City, Mo.	5000d
KNFT	Bayard, N. M.	
WHVW	Hyde Park, N.Y.	500d
WBBF	Rochester, N.Y.	1000
WIBX	Utica, N.Y.	5000
WPET	Greensboro, N.C.	5000d
KYES	Roseburg, Oreg.	1000d
WNCC	Barnesboro, Pa.	500d
WPEN	Philadelphia, Pa.	5000
WBER	Moncks Corner, S. C.	500d
WSPA	Spartanburg, S.C.	5000
KWAT	Watertown, S.Dak.	1000
WAGG	Franklin, Tenn.	1000d
KDSX	Denison-Sherman, Tex.	500
KPRC	Houston, Tex.	5000
KSEL	Lubbock, Tex.	5000
WXGI	Richmond, Va.	5000d
KJR	Seattle, Wash.	5000
WERL	Eagle River, Wis.	1000d
WKAZ	Charleston, W.Va.	5000d
WKTS	Sheboygan, Wis.	500d
KMER	Kemmerer, Wyo.	1000d

960—312.3

WBRC	Birmingham, Ala.	5000
WMOZ	Mobile, Ala.	1000
KOOL	Phoenix, Ariz.	5000
KAVR	Apple Valley, Calif.	5000d
KNEZ	Lompoc, Calif.	500
KABL	Oakland, Calif.	5000
WELI	New Haven, Conn.	5000
WGRO	Lake City, Fla.	500d
WJCM	Sebring, Fla.	1000d
WJAZ	Albany, Ga.	5000
WRFC	Athens, Ga.	5000
KSRA	Salmon, Idaho	1000d
WDLM	E. Moline, Ill.	1000d
WSBT	South Bend, Ind.	5000
KMA	Shenandoah, Iowa	5000
WPRT	Prestonsburg, Ky.	5000d
KROF	Abbeville, La.	1000d
WBOC	Salisbury, Md.	5000
WFGL	Fitchburg, Mass.	1000
WHAK	Rogers City, Mich.	5000d
KLTF	Little Falls, Minn.	500d
WABG	Greenwood, Miss.	1000
KFVS	Cape Girardeau, Mo.	5000
KFLN	Baker, Mont.	5000d
KNEB	Scottsbluff, Nebr.	1000
KWYK	Farmington, N.Mex.	1000d
KRIK	Roswell, N. Mex.	1000d
WEAV	Plattsburg, N.Y.	5000
WAAK	Dallas, N.C.	1000d
WFTC	Kinston, N.C.	5000
WWST	Wooster, Ohio	1000d
KGWA	Enid, Okla.	1000
KLAD	Klamath Falls, Ore.	5000
WHYL	Carlisle, Pa.	5000d
WKZA	Kane, Pa.	1000d
WATS	Sayre, Pa.	1000d
WBEU	Beaufort, S.C.	1000d
WBMC	McMinnville, Tenn.	500d
KIMP	Mt. Pleasant, Tex.	1000d
KGKL	San Angelo, Tex.	5000
KOVO	Provo, Utah	5000
WDBJ	Roanoke, Va.	5000
KALE	Richland, Wash.	1000
WTCH	Shawano, Wis.	1000

970—309.1

WERH	Hamilton, Ala.	5000d
WTBF	Troy, Ala.	5000
KVWM	Show Low, Ariz.	5000d
KNEA	Jonesboro, Ark.	1000d
KBIS	Bakersfield, Calif.	1000
KCHV	Coachella, Calif.	5000
KBEE	Modesto, Calif.	1000
KFEL	Pueblo, Colo.	1000d
WBOM	Jacksonville, Fla.	
WFLA	Tampa, Fla.	5000
WIIN	Atlanta, Ga.	5000d
WVOP	Vidalia, Ga.	5000d
KPUA	Hilo, Hawaii	5000
KAYT	Rupert, Idaho	1000d
WMAY	Springfield, Ill.	1000
WAVE	Louisville, Ky.	5000
KSYL	Alexandria, La.	1000
WCSH	Portland, Maine	5000
WAMD	Aberdeen, Md.	500
WESO	Southbridge, Mass.	1000d
WCKD	Ishpeming, Mich.	5000d
WKHM	Jackson, Mich.	1000
KQAQ	Austin, Minn.	5000
WRKN	Brandon, Miss.	
KOOK	Billings, Mont.	5000
KJLT	No. Platte, Nebr.	5000d
KVEG	Las Vegas, Nev.	500d
WJRZ	Hackensack, N. J.	5000d
KDCE	Espanola, N. M.	1000d
WEBR	Buffalo, N.Y.	5000
WCHN	Norwich, N.Y.	500d
WRCS	Ahoskie, N.C.	1000d
WWIT	Canton, N.C.	1000d
WDAY	Fargo, N.Dak.	5000
WREO	Ashtabula, Ohio	5000
WATH	Athens, Ohio	1000d
KAKC	Tulsa, Okla.	1000
KOIN	Portland, Oreg.	5000
WWSW	Pittsburgh, Pa.	5000
WJMX	Florence, S.C.	5000
KHFI	Austin, Tex.	1000d
KBSN	Crane, Tex.	1000d
KNOK	Ft. Worth, Tex.	1000d
WIVI	Christiansted, V. I.	5000
WYPR	Danville, Va.	1000d
WANV	Waynesboro, Va.	5000d
KREM	Spokane, Wash.	5000
WWYO	Pineville, W.Va.	1000d
WHA	Madison, Wis.	5000d
WAKX	Superior, Wis.	500d

980—305.9

WKLF	Clanton, Ala.	1000d
WXLL	Big Delta, Alaska	100
KCAB	Dardanelle, Ark.	1000d
KINS	Eureka, Calif.	5000
KEAP	Fresno, Calif.	500d
KFWB	Los Angeles, Calif.	5000
KCTY	Salinas, Calif.	1000d
KGLN	Glennwood Springs, Colo.	1000d
WSUB	Groton, Conn.	1000d
WRC	Washington, D.C.	5000
WDVH	Gainesville, Fla.	5000d
WTOT	Marianna, Fla.	1000d
WBOP	Pensacola, Fla.	1000d
WLOD	Pompano Beach, Fla.	1000d
WKLY	Hartwell, Ga.	1000d
WPGA	Perry, Ga.	1000d
KUPI	Idaho Falls, Idaho	1000d
WITY	Danville, Ill.	1000
KREB	Shreveport, La.	5000d
WCAP	Lowell, Mass.	1000d
WAOP	Otsego, Mich.	1000d
WPBC	Richfield, Minn.	5000
WAPF	McComb, Miss.	5000d
KMBZ	Kansas City, Mo.	5000
KLYQ	Hamilton, Mont.	1000d
KVLV	Fallon, Nev.	5000d
KICA	Clovis, N. Mex.	1000
KMIN	Grants, N. Mex.	1000d
WTRY	Troy, N.Y.	5000
WKLM	Wilmington, N.C.	5000d
WAAA	Win.-Salem, N.C.	1000d
WONE	Dayton, Ohio	5000
WILK	Wilkes-Barre, Pa.	5000
WAZS	Summerville, S.C.	1000d
WYCL	York, S. C.	1000d
KDSJ	Deadwood, S.Dak.	1000
WSIX	Nashville, Tenn.	5000
KFRD	Rosenberg-Richmond, Tex.	1000d
KSVC	Richfield, Utah	5000d
WFHG	Bristol, Va.	5000
WMEK	Chase City, Va.	500d
KUTI	Yakima, Wash.	5000d
WHAW	Weston, W.Va.	1000d
WCUB	Manitowoc, Wis.	1000d
WPFP	Park Falls, Wis.	1000d
WPRE	Prairie du Chien, Wis.	1000

990—302.8

WEIS	Center, Ala.	250
WWWF	Fayette, Ala.	1000d
WTCB	Flomaton, Ala.	500d
KTKT	Tucson, Ariz.	10000
KKIS	Pittsburg, Calif.	5000
KGUD	Santa Barbara, Calif.	1000d
KLIR	Denver, Colo.	1000d
WFAB	Miami, Fla.	5000
WHOO	Orlando, Fla.	50000
WDWD	Dawson, Ga.	1000d
WGML	Hinesville, Ga.	250d
KTRG	Honolulu, Hawaii	5000
WCAZ	Carthage, Ill.	1000d
WITZ	Jasper, Ind.	1000d
WERK	Muncie, Ind.	250d
KAYL	Storm Lake, Iowa	250d
KRSL	Russell, Kans.	250d
WNNR	New Orleans, La.	250d
KRIH	Rayville, La.	250d
WCRM	Clare, Mich.	250d
WABO	Waynesboro, Miss.	250d
KRMO	Monett, Mo.	250d
KSVP	Artesia, N.Mex.	1000
WEEB	Southern Pines, N.C.	5000d
WJEH	Gallipolis, Ohio	1000d
WTIG	Massillon, Ohio	250d
KRKT	Albany, Oreg.	250d
WIBG	Philadelphia, Pa.	50000
WVSC	Somerset, Pa.	5000d
WPRA	Mayaguez, P.R.	10000
WLKW	Providence, R.I.	50000
WAKN	Aiken, S.C.	1000d
WNOX	Knoxville, Tenn.	10000
KWAM	Memphis, Tenn.	10000d
KTRM	Beaumont, Tex.	1000
KAML	Kenedy-Karnes City, Tex.	250d
KNIN	Wichita Falls, Tex.	10000
KDYL	Tooele, Utah	1000d
WNRV	Narrows-Pearisburg, Va.	5000d
WANT	Richmond, Va.	1000d

1000—299.8

WFMI	Montgomery, Ala.	5000d
KMLO	Vista, Cal.	1000d
WKMK	Blountstown, Fla.	1000d
WJTS	Jupiter, Fla.	
WCFL	Chicago, Ill.	50000
WLMS	Leominster, Mass.	
WXTN	Lexington, Miss.	5000d
WIQT	Horseheads, N.Y.	
WKBQ	Garner, N. C.	
WSPF	Hickory, N.C.	1000d
KTOK	Okla. City, Okla.	5000
WIOO	Carlisle, Pa.	1000
WKYB	Hemingway, S.C.	
WGOG	Wahalla, S. C.	1000d
KSTA	Coleman, Tex.	250d
KGRI	Henderson, Tex.	250d
WKDE	Altavista, Va.	1000d
WHWB	Rutland, Vt.	1000d
WBNB	Charlotte Amalie, Virgin Islands	1000
KOMO	Seattle, Wash.	50000

1010—296.9

KCAC	Phoenix, Ariz.	500d
KVNC	Winslow, Ariz.	1000
KLRA	Little Rock, Ark.	10000
KCHJ	Delano, Calif.	5000
KCMJ	Palm Sprgs., Calif.	1000
KSAY	San Fran., Calif.	10000d
WCNU	Crostview, Fla.	1000d
WBIX	Jacksonville Beach, Fla.	10000d
WINQ	Tampa, Fla.	50000d
WGUN	Atlanta-Decatur, Ga.	50000d
KATN	Boise, Idaho	1000d
WCSI	Columbus, Ind.	500d
KSMN	Mason City, Iowa	1000d
KIND	Independence, Kans.	250d
KDLA	DeRidder, La.	1000d
WSID	Baltimore, Md.	1000d
WITL	Lansing, Mich.	5000d
WJSW	Maplewood, Minn.	250d
WMOX	Meridian, Miss.	10000
KCHI	Chillicothe, Mo.	250d
KXEN	Festus-St. Louis, Mo.	50000d
WCNL	Newport, N.H.	250d
WINS	New York, N.Y.	50000
WABZ	Albermarle, N.C.	1000d
WFGW	Black Mountain, N.C.	50000d
WELS	Kinston, N.C.	1000d
WIOI	New Boston, Ohio	1000d
WUNS	Lewisburg, Pa.	250d
WHIN	Gallatin, Tenn.	1000d
WORM	Savannah, Tenn.	250d
KVII	Amarillo, Tex.	5000
KODA	Houston, Tex.	5000d
KAWA	Waco-Marlin, Tex.	10000d
WELK	Charlottesville, Va.	1000d
WMEV	Marion, Va.	1000d
WPMH	Portsmouth, Va.	5000d
WCST	Berkeley Sprgs., W.Va.	250d
WSPT	Stevens Pt., Wis.	1000d

1020—293.9

KGBS	Los Angeles, Calif.	50000
WCIL	Carbondale, Ill.	1000d
WPEO	Peoria, Ill.	10000d
KSWS	Roswell, N. M.	50000
KDKA	Pittsburgh, Pa.	50000

1030—291.1

WBZ	Boston, Mass.	50000
KCTA	Corpus Christi, Tex.	50000d
KTWO	Casper, Wyo.	10000

1040—288.3

KHVH	Honolulu, Hawaii	5000
WHO	Des Moines, Iowa	50000
KIXL	Dallas, Tex.	1000d

1050—285.5

WRFS	Alexander City, Ala.	1000d
WCRI	Scottsboro, Ala.	250d
KVLC	Little Rock, Ark.	1000d
KTOT	Big Bear Lake, Cal.	250d
KOFY	San Mateo, Calif.	1000d
KWSO	Wasco, Calif.	1000d
WJSB	Crestview, Fla.	1000d
WIVY	Jacksonville, Fla.	1000d
WHBO	Tampa, Fla.	250d
WRMF	Titusville, Fla.	500d
WAUG	Augusta, Ga.	5000d
WMNZ	Montezuma, Ga.	250d
WDZ	Decatur, Ill.	1000d
WTCA	Plymouth, Ind.	250d
KUPK	Garden City, Kan.	5000d
WNES	Central City, Ky.	500d
KLPL	Lake Providence, La.	250d
KCIJ	Shreveport, La.	250d
KVPI	Villa Platte, La.	250d
WMSG	Oakland, Md.	500d
WQMR	Silver Sprg., Md.	1000d
WPAG	Ann Arbor, Mich.	5000d
KLOH	Pipestone, Minn.	1000d
WACR	Columbus, Miss.	1000d
KMIS	Portageville, Mo.	1000d
KSIS	Sedalia, Mo.	1000d
KLVC	Las Vegas, Nev.	500d
WBNC	Conway, N.H.	1000d
WSEN	Baldwinsville, N.Y.	250d
WYBG	Massena, N.Y.	1000d
WHN	New York, N.Y.	50000
WFSC	Franklin, N.C.	1000d
WLON	Lincolnton, N.C.	1000d
WWGP	Sanford, N.C.	1000d
WZIP	Cincinnati, Ohio	1000d
KCCO	Lawton, Okla.	250d
KFMJ	Tulsa, Okla.	1000d
KORE	Eugene, Ore.	1000d
WBUT	Butler, Pa.	1000d
WSKE	Everett, Pa.	250d
WLYC	Williamsport, Pa.	1000d
WCGB	Pastillo, P. R.	1000d
WSMT	Sparta, Tenn.	1000d
KLEN	Killeen, Tex.	250d
KPXE	Liberty, Tex.	250d
KCAS	Slaton, Tex.	250d
WINA	Charlottesville, Va.	5000
WGAT	Gate City, Va.	1000d
WBRG	Lynchburg, Va.	1000d
WCMS	Norfolk, Va.	5000d
KBLE	Seattle, Wash.	5000d
WCEF	Parkersburg, W. Va.	5000d
WECL	Eau Claire, Wis.	1000d
WKAU	Kaukauna, Wis.	1000
WLIP	Kenosha, Wis.	250d
KWIV	Douglas, Wyo.	250d

1060—282.8

KUPD	Tempe, Ariz.	500
KPAY	Chico, Calif.	10000
KLMO	Longmont, Colo.	10000d
WMCL	McLeansboro, Ill.	250d
WRHL	Rochelle, Ill.	250d
WJKY	Jamestown, Ky.	1000d
WNOE	New Orleans, La.	50000
WGTR	Natick, Mass.	1000d
WHFB	Benton Harbor-St. Joseph, Mich.	5000d

kHz	Wave Length	W.P.
KFIL	Fergus Falls, Minn.	500d
KNLY	Ord, Neb.	1000d
WMAP	Monroe, N.C.	1000d
WBYB	St. Pauls, N.C.	250d
WCOK	Sparta, N.C.	250d
WOIO	Canton, O.	5000d
KYW	Philadelphia, Pa.	50000
WRJS	San German, P. R.	250
WALD	Walterboro, S. C.	1000d
KGFX	Pierre, S. D.	10000d
WPHC	Waverly, Tenn.	1000d
WCIR	Beckley, W.Va.	10000d
KHRB	Lockhart, Tex.	
KRSP	Salt Lake City, Utah	10000
1070—280.2		
WAPI	Birmingham, Ala.	50000
KNX	Los Angeles, Calif.	50000
WIBC	Indianapolis, Ind.	50000
KILR	Estherville, Iowa	250d
KFDI	Wichita, Kans.	10000
KHMO	Hannibal, Mo.	5000
WKDR	Plattsburgh, N. Y.	
WNCT	Greenville, N.C.	10000
WHPE	High Point, N.C.	1000d
WKOK	Sunbury, Penn.	10000
WMIA	Arecibo, P. R.	5000
WHYZ	Greenville, S.C.	50000d
WFLI	Lookout Mtn., Tenn.	50000
WDIA	Memphis, Tenn.	50000
KOPY	Alice, Tex.	1000
KNNN	Friona, Tex.	
KENR	Houston, Tex.	5000
WKOW	Madison, Wis.	10000
1080—277.6		
WKAC	Athens, Ala.	1000d
KSCO	Santa Cruz, Calif.	10000
WTIC	Hartford, Conn.	50000
WVCG	Coral Gables, Fla.	10000
WFIV	Kissimmee, Fla.	250
WJOE	Port St. Joe, Fla.	1000d
WBIE	Marietta, Ga.	10000d
WPOK	Pontiac, Ill.	1000d
WNWI	Valparaiso, Ind.	5000d
KOAK	Red Oak, Ia.	
WKLO	Louisville, Ky.	5000
WOAP	Owosso, Mich.	1000d
KGCL	East Prairie, Mo.	
WUFO	Amherst, N.Y.	1000d
WEWO	Laurinburg, N.C.	5000d
WWDR	Murfreesboro, N.C.	500d
KNDK	Langdon, N.D.	
WMVR	Sidney, O.	250d
KWJJ	Portland, Oreg.	50000
WEEP	Pittsburgh, Pa.	50000
WLEY	Cayey, P.R.	250
KRLD	Dallas, Tex.	50000
WKBY	Chatham, Va.	1000d
1090—275.1		
KAAY	Little Rock, Ark.	50000
WQIK	Jacksonville, Fla.	50000d
WWSD	Monticello, Fla.	1000d
WBAF	Barnesville, Ga.	
WCRA	Effingham, Ill.	1000
WGLC	Mendota, Ill.	250d
KHAI	Honolulu, Hawaii	5000
WFWR	Ft. Wayne, Ind.	
KNWS	Waterloo, Iowa	1000d
WDLV	Donalsonville, La.	
WBAL	Baltimore, Md.	50000
WILD	Boston, Mass.	1000d
WMUS	Muskegon, Mich.	1000d
WTAK	Garden City, Mich.	250d
KEXS	Excelsior Springs, Mo.	
WKTE	King, N. C.	1000d
KTGO	Tioga, N.D.	
WMWM	Wilmington, O.	1000d
WKSP	Kingstree, S.C.	
WENR	Englewood, Tenn.	1000d
WJKM	Hartsville, Tenn.	250d
WGOC	Kingsport, Tenn.	
KANN	Ogden, Utah	1000d
KING	Seattle, Wash.	50000
1100—272.6		
KFAX	San Francisco, Calif.	50000
KREX	Grand Junction, Colo.	50000
WLBB	Carrollton, Ga.	1000d
WHLI	Hempstead, N.Y.	10000d
WKYC	Cleveland, O.	50000
WGPA	Bethlehem, Pa.	250d
1110—270.1		
WBCA	Bay Minette, Ala.	10000d
WBIB	Centreville, Ala.	1000d
KRLA	Pasadena, Cal.	50000
KPOP	Roseville, Cal.	
WALT	Tampa, Fla.	50000d
WGKA	Atlanta, Ga.	1000d
WEBS	Calhoun, Ga.	250d
KIPA	Hilo, Hawaii	1000
WMBI	Chicago, Ill.	5000d
WKDZ	Cadiz, Ky.	
WFCC	Franklinton, La.	1000d
WUNN	Mason, Mich.	
WJML	Petoskey, Mich.	
WKRA	Holly Springs, Miss.	1000d
KFAB	Omaha, Nebr.	50000
WBT	Charlotte, N.C.	50000
WELX	Xenia, O.	
KEOR	Atoka, Okla.	
KBND	Bend, Oreg.	5000
WJSM	Martinsburg, Pa.	
WNAR	Norristown, Penn.	50000d
WVJP	Caguas, P.R.	250
WHIM	Providence, R.I.	1000d
WPHC	Waverly, Tenn.	1000d
KDRY	Alamo Heights, Tex.	1000d
1120—267.7		
WUST	Bethesda, Md.	250d
KMOX	St. Louis, Mo.	50000
WWOL	Buffalo, N.Y.	1000d
KCLE	Cleburne, Tex.	250d
1130—265.3		
KRDU	Dinuba, Calif.	1000
KSDO	San Diego, Cal.	5000d
KLEI	Kailua, Hawaii	1000
KLEY	Wellington, Kan.	250d
KWKH	Shreveport, La.	50000
WCAR	Detroit, Mich.	50000
WDGY	Minneapolis, Minn.	50000
KBLR	Bolivar, Mo.	250d
WNEW	New York, N.Y.	50000
WASP	Brownsville, Pa.	
KBGH	Memphis, Tenn.	1000d
WDTM	Selmer, Tenn.	250d
KBGH	Memphis, Tex.	
WISN	Milwaukee, Wis.	50000
1140—263.0		
KRAK	Sacramento, Calif.	50000
KNAB	Burlington, Colo.	
WMIE	Miami, Fla.	10000
KGEM	Boise, Idaho	10000
WSIV	Pekin, Ill.	5000d
WAWK	Kendallville, Ind.	250d
KNEI	Waukon, Iowa	250d
KBIL	Liberty, Mo.	500d
KPWB	Piedmont, Mo.	1000d
KLPR	Oklahoma City, Okla.	1000d
WITA	San Juan, P.R.	10000
KSOO	Sioux Falls, S.Dak.	10000
KORC	Mineral Wells, Tex.	250d
WRVA	Richmond, Va.	50000
1150—260.7		
WGEA	Geneva, Ala.	1000d
WJRD	Tuscaloosa, Ala.	5000
KCKY	Coolidge, Ariz.	1000
KXLR	No. Little Rock, Ark.	5000
KRKD	Los Angeles, Calif.	5000
KJAX	Santa Rosa, Calif.	5000
KGMC	Englewood, Colo.	1000d
WCNX	Middletown, Conn.	1000d
WDEL	Wilmington, Del.	5000
WNDB	Daytona Bch., Fla.	1000
WTMP	Tampa, Fla.	5000d
WFPM	Fort Valley, Ga.	1000d
WJEM	Valdosta, Ga.	1000d
WGGH	Marion, Ill.	5000d
WYFE	Rockford, Ill.	500d
KYND	Burlington, Ia.	500d
KWKY	Des Moines, Iowa	1000
KSAL	Salina, Kans.	5000
WMST	Mt. Sterling, Ky.	500d
WLOC	Mumfordville, Ky.	1000d
WJBO	Baton Rouge, La.	5000
WGHM	Skowhegan, Maine	5000d
WHMC	Gaithersburg, Md.	1000
WCOP	Boston, Mass.	5000
WCEN	Mt. Pleasant, Mich.	1000
KASM	Albany, Minn.	1000d
KRMS	Osage Beach, Mo.	1000d
KSEN	Shelby, Mont.	5000
KDEF	Albuquerque, N. M.	5000
WRUN	Utica, N.Y.	5000
WBAG	Burlington, N.C.	1000d
WGBR	Goldsboro, N.C.	5000
WCUE	Cuyahoga Falls, Ohio	1000d
WIMA	Lima, Ohio	1000
KNED	McAlester, Okla.	1000
KAGO	Klamath Falls, Oreg.	5000
WHUN	Huntingdon, Pa.	5000d
WYNS	Lehighton, Pa.	1000d
WKPA	New Kensington, Pa.	1000d
WDIX	Orangeburg, S.C.	5000
WTYC	Rock Hill, S.C.	1000d
WSNW	Seneca, S.C.	1000d
KIMM	Rapid City, S.Dak.	5000d
WAPO	Chattanooga, Tenn.	5000
WCRK	Morristown, Tenn.	1000
WTAW	Bryan, Tex.	1000d
KCCT	Corpus Christi, Tex.	1000d
KIZZ	El Paso, Tex.	1000d
KVIL	Highland Park, Tex.	1000d
KJBC	Midland, Tex.	1000d
KPNG	Port Neches, Tex.	500d
KOLJ	Quanah, Tex.	500d
KBER	San Antonio, Tex.	1000d
KPUL	Pullman, Wash.	1000d
KAYO	Seattle, Wash.	5000
KKEY	Vancouver, Wash.	1000d
WABH	Deerfield, Va.	1000d
WELC	Welch, W.Va.	1000d
WAXX	Chippewa Falls, Wis.	5000d
1160—258.5		
WJJD	Chicago, Ill.	50000d
KSL	Salt Lake City, Utah	50000
1170—256.3		
WCOV	Montgomery, Ala.	10000
KJNP	North Pole, Alaska	
KCBQ	San Diego, Calif	50000
KLOK	San Jose, Calif.	10000
KOHO	Honolulu, Hawaii	1000
WLBH	Mattoon, Ill.	250d
KSTT	Davenport, Iowa	1000
KVOO	Tulsa, Okla.	50000
WLEO	Ponce, P.R.	250
KPUG	Bellingham, Wash.	5000
WWVA	Wheeling, W.Va.	50000
WLKE	Waupun, Wis.	1000d
1180—254.1		
WLDS	Jacksonville, Ill.	1000d
KOFI	Kalispell, Mont.	50000
WHAM	Rochester, N.Y.	50000
1190—252.0		
KRDS	Tolleson, Ariz.	250
KMCW	Augusta, Ark.	250d
KEZY	Anaheim, Calif	5000
KNBA	Vallejo, Calif.	250d
WGKA	Atlanta, Ga.	1000d
WRIP	Rossville, Ga.	500d
WOWO	Ft. Wayne, Ind.	50000
WANN	Annapolis, Md.	10000d
WKOX	Fram'gham, Mass.	1000d
KPAR	Albuquerque, N. M.	1000d
WLIB	New York, N. Y.	1000d
WSML	Graham, N. C.	250d
WIXE	Monroe, N. C.	
KEX	Portland, Oreg.	50000
WRAI	Rio Piedras, P. R.	500
WBMJ	San Juan, P.R.	10000
KLIF	Dallas, Tex.	50000
1200—249.9		
WOAI	San Antonio, Tex.	50000
1210—247.8		
KZOO	Honolulu, Hawaii	1000
WILY	Centralia, Ill.	1000d
WKNX	Saginaw, Mich.	10000d
WADE	Wadesboro, N.C.	1000d
WAVI	Dayton, Ohio	250d
KGYN	Guymon, Okla.	10000
WCAU	Philadelphia, Pa.	50000
WHOY	Salinas, P.R.	
1220—245.8		
WAQY	Birmingham, Ala.	1000d
WABF	Fairhope, Ala.	1000
KVSA	McGehee, Ark.	1000d
KLIP	Fowler, Calif.	250d
KIBE	Palo Alto, Cal.	5000d
KKAR	Pomona, Calif.	250d
KFSC	Denver, Colo.	1000d
WCDQ	Hamden, Conn.	1000d
WDCJ	Arlington, Fla.	1000d
WJPB	Kissimmee, Fla.	
WOAH	Miami, Fla.	250d
WSAF	Sarasota, Fla.	1000d
WCLB	Camilla, Ga.	1000d
WPLK	Rockmart, Ga.	500d
WSFT	Thomaston, Ga.	250d
WLPO	LaSalle, Ill.	1000d
WKRS	Waukegan, Ill.	1000d
WSLM	Salem, Ind.	5000d
KJAN	Atlantic, Iowa	250d
KOUR	Independence, Iowa	250d
KOFO	Ottawa, Kans.	250d
WFKN	Franklin, Ky.	250d
KBCL	Shreveport, La.	250d
WLBI	Denham Springs, La.	250d
WSME	Sanford, Maine	1000d
WBCH	Hastings, Mich.	250d
WAVN	Stillwater, Minn.	5000d
WMDC	Hazlehurst, Miss.	250d
KZYM	Cape Girardeau, Mo.	250d
KBHM	Branson, Mo.	1000d
WKBK	Keene, N.H.	1000d
WGNY	Newburgh, N.Y.	5000d
WSOQ	N. Syracuse, N.Y.	1000d
WKMT	Kings Mtn., N.C.	1000d
WREV	Reidsville, N.C.	1000d
WENC	Whiteville, N.C.	5000d
KEYD	Oakes, N.Dak.	1000d
WGAR	Cleveland, Ohio	50000
WERT	Van Wert, Ohio	250d
KBLY	Goldbeach, Oreg.	1000d
KAPT	Salem, Ore.	1000
WJUN	Mexico, Pa.	1000d
WRIB	Providence, R.I.	1000d
WFWL	Camden, Tenn.	250d
WCPH	Etowah, Tenn.	1000d
KZEE	Weatherford, Tex.	250d
KVLL	Woodville, Tex.	250d
WLSD	Big Stone Gap, Va.	1000d
WFAX	Falls Church, Va.	5000d
KASY	Auburn, Wash.	250d
KOZI	Chelan, Wash.	1000d
WRNE	Wis. Rapids, Wis.	500d
1230—243.8		
WAUD	Auburn, Ala.	1000
WJBB	Haleyville, Ala.	1000
WBHP	Huntsville, Ala.	1000
WNUZ	Talledega, Ala.	1000
WTBC	Tuscaloosa, Ala.	1000
KIFW	Sitka, Alaska	250
KSUN	Bisbee, Ariz.	250
KAAA	Kingman, Ariz.	1000
KRIZ	Phoenix, Ariz.	250
KATO	Safford, Ariz.	250
KINO	Winslow, Ariz.	1000
KCON	Conway, Ark.	250
KFPW	Ft. Smith, Ark.	1000
KBTM	Jonesboro, Ark.	1000
KCON	Conway, Ark.	1000
KGEE	Bakersfield, Calif.	1000
KWTC	Barstow, Calif.	1000
KIBS	Bishop, Calif.	1000
KXO	El Centro, Calif.	250
KDAC	Ft. Bragg, Calif.	250
KGFJ	Los Angeles, Calif.	1000
KPRL	Paso Robles, Calif.	1000
KRDG	Redding, Calif.	250
KWG	Stockton, Calif	1000
KEXO	Grand Junction, Colo.	1000
KBRR	Leadville, Colo.	250
KDZA	Pueblo, Colo.	1000d
KGEK	Sterling, Colo.	1000d
WINF	Manchester, Conn.	1000
WGGG	Gainesville, Fla.	1000
WONN	Lakeland, Fla	1000
WMAF	Madison, Fla.	1000
WSBB	New Smyrna Bch., Florida	1000
WNVY	Pensacola, Fla.	1000
WCNH	Quincy, Fla.	1000d
WJNO	W. Palm Beach, Fla.	250
WBIA	Augusta, Ga.	1000d
WBLJ	Dalton, Ga.	1000
WXLI	Dublin, Ga.	1000
WFOM	Marietta, Ga.	1000
WSOK	Savannah, Ga.	1000
WAYX	Waycross, Ga.	1000
KBAR	Burley, Idaho	1000
KORT	Grangeville, Ida.	1000
KRXK	Rexburg, Idaho	1000
WJBC	Bloomington, Ill.	1000
WQUA	Moline, Ill.	1000
WHCO	Sparta, Ill.	250
WJOB	Hammond, Ind.	1000
WSAL	Logansport, Ind.	1000
WTCJ	Tell City, Ind.	1000
WBOW	Terre Haute, Ind.	1000d
KFJB	Marshalltown, Iowa	1000
WHIR	Danville, Ky.	1000d
WHOP	Hopkinsville, Ky.	1000
WANO	Pineville, Ky.	1000d
KLIC	Monroe, La.	1000d
WBOK	New Orleans, La.	1000d
KSLO	Opelousas, La.	1000
WBME	Belfast, Me.	250
WQDY	Calais, Maine	1000d
WSJR	Madawaska, Me.	1000
WITH	Baltimore, Md.	1000d
WCUM	Cumberland, Md.	1000
WMNB	No. Adams, Mass.	1000d
WESX	Salem, Mass.	1000
WNEB	Worcester, Mass.	1000
WJEF	Grand Rapids, Mich.	1000
WIKB	Iron River, Mich.	1000d
WMPC	Lapeer, Mich.	250
WSOO	Slt. Ste. Marie, Mich.	1000
WSTR	Sturgis, Mich.	1000d
WKLK	Cloquet, Minn.	1000
KGHS	Internat'l Falls, Minn.	250
KYSM	Mankato, Minn.	1000
KMRS	Morris, Minn.	250
KTRF	Thief Riv. Falls, Minn.	1000
KWNO	Winona, Minn.	1000d
WCMA	Corinth, Miss.	1000
WHSY	Hattiesburg, Miss.	1000
WSSO	Starkville, Miss.	1000
WAZF	Yazoo City, Miss.	1000
KODE	Joplin, Mo.	1000
KLWT	Lebanon, Mo.	250
KWIT	Moberly, Mo.	1000
KBMN	Bozeman, Mont.	1000d
KHDN	Hardin, Mont.	1000
KXLO	Lewiston, Mont.	1000
KLCB	Libby, Mont.	1000
KTNC	Falls City, Nebr.	100
KHAS	Hastings, Neb.	1000
KELY	Ely, Nev.	250
KLAV	Las Vegas, Nev.	250
KCBN	Reno, Nev.	1000
WMOU	Berlin, N.H.	1000d
WTSV	Claremont, N.H.	1000
WCMC	Wildwood, N.J.	1000
KALG	Alamagordo, N. M.	1000
KOTS	Deming, N.Mex.	250
KYVA	Gallup, N. Mex.	1000
KFUN	Las Vegas, N.Mex.	250
KRSY	Roswell, N. Mex.	1000
WNIA	Cheektowaga, N.Y.	500
WENY	Elmira, N.Y.	1000
WIGS	Gouverneur, N. Y.	1000
WHUC	Hudson, N. Y.	1000
WLFH	Little Falls, N. Y.	1000
WFAS	White Plains, N. Y.	1000

WHITE'S RADIO LOG

kHz	Wave Length	W.P.
WSKY	Asheville, N.C.	1000
WFAI	Fayetteville, N.C.	1000d
WMFR	High Point, N.C.	1000
WISP	Kinston, N.C.	1000d
WNNC	Newton, N. C.	1000
WCBT	Roanoke Rap., N. C.	1000
KDIX	Dickinson, N.Dak.	250
WUBE	Cincinnati, O.	1000d
WCOL	Columbus, Ohio	1000
WIRO	Ironton, O.	1000
WCWA	Toledo, O.	1000d
KADA	N. of Ada, Okla.	250
WBBZ	Ponca City, Okla.	250
KVAS	Astoria, Ore.	1000
KRNS	Burns, Ore.	1000
KOOS	Coos Bay, Ore.	1000
KRDR	Gresham, Oreg.	1000
KYJC	Medford, Oreg.	1000
KQIK	Lakeview, Ore.	1000
KTDO	Toledo, Ore.	1000
WBVP	Beaver Falls, Pa.	1000
WEEX	Easton, Pa.	1000
WKBO	Harrisburg, Pa.	1000
WCRO	Johnstown, Pa.	1000
WBPZ	Lock Haven, Pa.	1000
WTIV	Titusville, Pa.	1000
WNIK	Arecibo, P.R.	1000
WERI	Westerly, R.I.	1000
WAIM	Anderson, S.C.	1000
WNOK	Columbia, S.C.	1000d
WOLS	Florence, S.C.	1000
KISD	Sioux Falls, S.Dak.	1000d
WAKI	McMinnville, Tenn.	1000
KSIX	Corpus Christi, Tex.	1000
KDLK	Del Rio, Tex.	250
KNUZ	Houston, Tex.	1000
KERV	Kerrville, Tex.	1000
KLVT	Levelland, Tex.	1000
KEEE	Nacogdoches, Tex.	1000
KOSA	Odessa, Tex.	1000
KGRO	Pampa, Tex.	250
KSEY	Seymour, Tex.	1000
KSST	Sulphur Sprgs., Tex.	1000
KWTX	Waco, Tex.	1000d
KMOR	Murray, Utah	1000
KOAL	Price, Utah	1000
WJOY	Burlington, Vt.	1000
WCVR	Randolph, Vt.	
WBBI	Abingdon, Va.	1000d
WODI	Brookneal, Va.	1000
WCFV	Clifton Forge, Va.	1000
WFVA	Fredericksburg, Va.	1000
WNOR	Norfolk, Va.	1000
KWYZ	Everett, Wash.	1000
KSPO	Spokane, Wash.	1000
KREW	Sunnyside, Wash.	1000
WLOG	Logan, W.Va.	1000
WTAP	Parkersburg, W.Va.	1000
WHBY	Appleton, Wis.	1000
WCLO	Janesville, Wis.	1000
WXCO	Wausau, Wis.	1000d
KVOC	Casper, Wyo.	1000

1240—241.8

WEBJ	Brewton, Ala.	250
WPRN	Butler, Ala.	1000
WULA	Eufaula, Ala.	1000
WOWL	Florence, Ala.	1000
WARF	Jasper, Ala.	1000
KVRD	Cottonwood, Ariz.	250
KZOW	So. of Globe, Ariz.	1000
KCYN	Williams, Ariz.	1000
KVRC	Arkadelphia, Ark.	250
KTLO	Mountain Home, Ark.	1000
KWAK	Stuttgart, Ark.	250
KPLY	Crescent City, Calif.	250
KOAD	Lemoore, Cal.	250
KMBY	Monterey, Calif.	1000
KPPC	Pasadena, Calif.	100
KLOA	Ridgecrest, Calif.	250
KROY	Sacramento, Calif.	1000
KRNO	San Bernardino, California	1000d
KSON	San Diego, Calif.	250
KSMA	Santa Maria, Calif.	250
KSUE	Susanville, Calif.	1000
KRDO	Colo. Springs, Colo.	1000d
KDGO	Durango, Colo.	1000
KSLV	Monte Vista, Colo.	1000
KCRT	Trinidad, Colo.	250
WWCO	Waterbury, Conn.	1000
WBGC	Chipley, Fla.	1000
WLCO	Eustis, Fla.	1000
WINK	Ft. Myers, Fla.	1000
WMMB	Melbourne, Fla.	1000
WFOY	St. Augustine, Fla.	1000
WBHB	Fitzgerald, Ga.	1000
WDUN	Gainesville, Ga.	1000
WLAG	LaGrange, Ga.	1000
WBML	Macon, Ga.	1000
WWNS	Statesboro, Ga.	1000
WPAX	Thomasville, Ga.	1000
WTWA	Thomson, Ga.	250
KVNI	Coeur d'Alene, Idaho	1000
KFLI	Mountain Home, Idaho	250
KMCL	McCall, Ida.	1000
KWIK	Pocatello, Idaho	250
WCRW	Chicago, Ill.	1000
WEDC	Chicago, Ill.	1000d
WSBC	Chicago, Ill.	1000
WEBQ	Harrisburg, Ill.	1000
WTAX	Springfield, Ill.	1000
WSDR	Sterling, Ill.	500
WHBU	Anderson, Ind.	1000d
KDEC	Decorah, Iowa	1000
KWLC	Decorah, Iowa	1000
KBIZ	Ottumwa, Iowa	1000
KICD	Spencer, Iowa	1000
KIUL	Garden City, Kans.	1000
KAKE	Wichita, Kans.	250
WINN	Louisville, Ky.	1000
WFTM	Maysville, Ky.	1000
WPKE	Pikeville, Ky.	1000d
WSFC	Somerset, Ky.	1000
KASO	Minden, La.	1000
KANE	New Iberia, La.	1000
WCOU	Lewiston, Maine	1000
WMKR	Millinocket, Me.	1000
WCEM	Cambridge, Md.	1000
WJEJ	Hagerstown, Md.	1000
WHAI	Greenfield, Mass.	250
WOCB	W. Yarmouth, Mass.	1000
WATT	Cadillac, Mich.	1000
WCBY	Cheboygan, Mich.	1000
WJPD	Ishpeming, Mich.	1000
WJIM	Lansing, Mich.	1000d
WMFG	Hibbing, Minn.	1000
KPRM	Park Rapids, Minn.	1000
WJON	St. Cloud, Minn.	1000
WMPA	Aberdeen, Miss.	1000
WGRM	Greenwood, Miss.	250
WGCM	Gulfport, Miss.	1000
WMIS	Natchez, Miss.	250
KFMO	Flat River, Mo.	1000
KWOS	Jefferson City, Mo.	1000d
KODE	Joplin, Mo.	1000d
KNEM	Nevada, Mo.	250
KBMY	Billings, Mont.	1000
KLTZ	Glasgow, Mont.	1000
KBLL	Helena, Mont.	1000
KFOR	Lincoln, Nebr.	1000
KODY	North Platte, Nebr.	1000
KELK	Elko, Nev.	1000
WFTN	Franklin, N.H.	250
WSNJ	Bridgeton, N. J.	1000
KAVE	Carlsbad, N.Mex.	1000
KCLV	Clovis, N.Mex.	1000
WGBB	Freeport, N.Y.	1000
WGVA	Geneva, N.Y.	1000d
WJTN	Jamestown, N.Y.	500
WOS	Liberty, N. Y.	1000
WNBZ	Saranac Lake, N.Y.	1000
WSNY	Schenectady, N.Y.	1000d
WATN	Watertown, N. Y.	1000
WPNF	Brevard, N.C.	1000
WIST	Charlotte, N.C.	1000
WCNC	Elizabeth City, N.C.	1000d
WJNC	Jacksonville, N.C.	1000
WRNC	Raleigh, N.C.	1000
KDLR	Devils Lake, N.Dak.	250
WBBW	Youngstown, Ohio	1000
WHIZ	Zanesville, Ohio	1000
KVSO	Ardmore, Okla.	250
KBEK	Elk City, Okla.	250
KBEL	Idabel, Okla.	250
KOKL	Okmulgee, Okla.	1000
KFLY	Corvallis, Oreg.	1000d
KTIX	Pendleton, Oreg.	1000
KPRB	Redmond, Oreg.	250
KQEN	Roseburg, Ore.	1000
WRTA	Altoona, Pa.	1000
WHUM	Reading, Pa.	1000
WSEW	Selinsgrove, Pa.	
WRAX	Wilkes-Barre, Pa.	1000
WALO	Humacao, P.R.	1000
WWON	Woonsocket, R.I.	1000
WKDK	Newberry, S.C.	1000
WDXY	Sumter, S. C.	1000
KCCR	Pierre, S. D.	1000
WBEJ	Elizabethton, Tenn.	1000
WEKR	Fayetteville, Tenn.	1000
WBIR	Knoxville, Tenn.	1000
WKDA	Nashville, Tenn.	1000
WENK	Union City, Tenn.	1000
KVLF	Alpine, Tex.	1000
KEAN	Brownwood, Tex.	1000
KORA	Bryan, Tex.	1000
KOCA	Kilgore, Tex.	1000
KSOX	Raymondville, Tex.	250
KCKG	Sonora, Tex.	1000
KXOX	Sweetwater, Tex.	1000
WSKI	Montpelier, Vt.	1000
WSSV	Petersburg, Va.	1000
WROV	Roanoke, Va.	1000
WTON	Staunton, Va.	1000
KXLE	Ellensburg, Wash.	1000
KGY	Olympia, Wash.	1000
WKOY	Bluefield, W.Va.	1000
WTIP	Charleston, W.Va.	1000d
WDNE	Elkins, W.Va.	1000
WOMT	Manitowoc, Wis.	1000d
WIBU	Poynette, Wis.	1000d
WOBT	Rhinelander, Wis.	1000
WJMC	Rice Lake, Wis.	1000
KFBC	Cheyenne, Wyo.	1000
KEVA	Evanston, Wyo.	1000
KASL	Newcastle, Wyo.	250
KRAL	Rawlins, Wyo.	1000
KTHE	Thermopolis, Wyo.	1000

1250—239.9

WZOB	Ft. Payne, Ala.	1000d
WETU	Wetumpka, Ala.	5000d
KSWW	Wickenburg, Ariz.	500d
KHIL	Willcox, Ariz.	5000d
KFAY	Fayetteville, Ark.	1000d
KALO	Little Rock, Ark.	1000
KHOT	Madera, Calif.	500d
KTMS	Santa Barbara, Calif.	1000
KDHI	Twenty-Nine Palms, California	1000d
KMSL	Ukiah, Calif.	500d
KICM	Golden, Colo.	1000d
WNER	Live Oak, Fla.	1000d
WDAE	Tampa, Fla.	5000
WLYB	Albany, Ga.	1000d
WYTH	Madison, Ga.	1000d
WIZZ	Streator, Ill.	500d
WGL	Ft. Wayne, Ind.	1000
WRAY	Princeton, Ind.	1000d
KCFI	Cedar Falls, Iowa	500d
KFKU	Lawrence, Kans.	5000
WREN	Topeka, Kans.	5000
WNVL	Nicholasville, Ky.	500
WLCK	Scottsville, Ky.	500d
WGUY	Bangor, Maine	5000d
WARE	Ware, Mass.	1000
WXOX	Bay City, Mich.	1000
KBRF	Fergus Falls, Minn.	1000
KCUE	Red Wing, Minn.	1000d
WHNY	McComb, Miss.	5000
KBTC	Houston, Mo.	1000d
WKBR	Manchester, N.H.	5000
WMTR	Morristown, N.J.	5000d
WIPS	Ticonderoga, N.Y.	1000d
WFAG	Farmville, N.C.	500d
WKDX	Hamlet, N. C.	1000d
WBRM	Marion, N.C.	1000d
WCHO	Washington Court House, Ohio	500d
WLEM	Emporium, Pa.	1000d
WPEL	Montrose, Pa.	1000d
WTAE	Pittsburgh, Pa.	5000
WNOW	York, Pa.	5000d
WTMA	Charleston, S.C.	5000
WCKM	Winnsboro, S.C.	500d
WKBL	Covington, Tenn.	1000d
WKYZ	Madisonville, Tenn.	
WNTT	Tazewell, Tenn.	500d
KFTV	Paris, Tex.	500d
KPAC	Port Arthur, Tex.	5000
KUKA	San Antonio, Tex.	1000d
KTFO	Seminole, Tex.	1000d
KVEL	Vernal, Utah	5000d
WDVA	Danville, Va.	5000
WYSR	Franklin, Va.	1000d
WEER	Warrenton, Va.	1000d
KWSC	Pullman, Wash.	5000
KTW	Seattle, Wash.	5000
WEMP	Milwaukee, Wis.	5000

1260—238.0

KPIN	Casa Grande, Ariz.	1000d
KCCB	Corning, Ark.	1000d
KBHC	Nashville, Ark.	500d
KGIL	San Fernando, Calif.	5000
KYA	San Francisco, Calif.	5000
KSNO	Aspen, Colo.	5000d
WCRT	Birmingham, Ala.	5000d
WMMM	Westport, Conn.	1000d
WNRK	Newark, Del.	500d
WWDC	Washington, D.C.	5000
WFTW	Fort Walton Beach, Florida	1000d
WAME	Miami, Fla.	5000
WWPF	Palatka, Fla.	1000
WHAB	Baxley, Ga.	5000d
WBBK	Blakely, Ga.	1000d
WTJH	East Point, Ga.	5000d
KTEE	Idaho Falls, Ida.	5000d
KWEI	Weiser, Ida.	1000d
WIBV	Belleville, Ill.	5000d
WFBM	Indianapolis, Ind.	5000
KFGQ	Boone, Iowa	1000d
KWHK	Hutchinson, Kans.	1000
WAIL	Baton Rouge, La.	1000d
WEZE	Boston, Mass.	5000
WALM	Albion, Mich.	1000
WJBL	Holland, Mich.	5000
KROX	Crookston, Minn.	1000
KDUZ	Hutchinson, Minn.	1000d
WGVM	Greenville, Miss.	5000d
WNSL	Laurel, Miss.	5000d
WCSA	Ripley, Miss.	500
KGBX	Springfield, Mo.	5000
KIMB	Kimball, Nebr.	1000d
WBUD	Trenton, N.J.	5000
KVSF	Santa Fe, N.Mex.	1000
WBNR	Beacon, N.Y.	1000d
WNDR	Syracuse, N.Y.	5000
WGWR	Asheboro, N.C.	5000
WCDJ	Edenton, N.C.	1000d
WIXY	Cleveland, O.	5000
WNXT	Portsmouth, Ohio	5000
KWSH	Wewoka-Seminole, Oklahoma	1000
KMCM	McMinnville, Oreg.	1000
WWYN	Erie, Pa.	5000
WPHB	Philipsburg, Pa.	5000d
WISO	Ponce, P.R.	1000
WMUU	Greenville, S.C.	5000d
WJOT	Lake City, S.C.	1000d
KWYR	Winner, S.Dak.	5000d
WNOO	Chattanooga, Tenn.	1000d
WMCH	Church Hill, Tenn.	1000d
WDKN	Dickson, Tenn.	1000d
WCLC	Jamestown, Tenn.	1000d
KSPL	Diboll, Tex.	1000d
KPSO	Falfurrias, Tex.	500d
KWFR	San Angelo, Tex.	1000d
KTUE	Tulia, Tex.	1000d
KTAE	Taylor, Tex.	1000d
WCHV	Charlottesville, Va.	5000
WJJJ	Christiansburg, Va.	1000d
KWIQ	Moses Lake, Wash.	1000d
WVVW	Grafton, W.Va.	500
WWIS	Black River Falls, Wis.	1000d
WEKZ	Monroe, Wis.	1000d
WOCO	Oconto, Wis.	
KPOW	Powell, Wyo.	5000

1270—236.1

WGSV	Guntersville, Ala.	1000d
WZAM	Prichard, Ala.	1000d
KBYR	Anchorage, Alaska	1000
KDJI	Holbrook, Ariz.	5000d
KADL	Pine Bluff, Ark.	5000d
KBLC	Lakeport, Calif.	
KGOL	Palm Desert, Cal.	500d
KCOK	Tulare, Calif.	5000d
WNOG	Naples, Fla.	500d
WHIY	Orlando, Fla.	5000d
WTNT	Tallahassee, Fla.	5000
WKRW	Cartersville, Ga.	500d
WHYD	Columbus, Ga.	5000d
WJJC	Commerce, Ga.	1000d
KNDI	Honolulu, Hawaii	5000
KTFI	Twin Falls, Idaho	5000
WEIC	Charleston, Ill.	1000d
WHBF	Rock Island, Ill.	5000
WCMR	Elkhart, Ind.	5000
WWCA	Gary, Ind.	1000
WORX	Madison, Ind.	1000d
KSCB	Liberal, Kans.	1000
WAIN	Columbia, Ky.	1000d
WFUL	Fulton, Ky.	1000d
KVCL	Winnfield, La.	1000d
WKYR	Cumberland, Md.	5000
WSPR	Springfield, Mass.	5000
WXYZ	Detroit, Mich.	5000
KWEB	Rochester, Minn.	5000
WVOM	Ioka, Miss.	1000d
WLSM	Louisville, Miss.	5000d
KUSN	St. Joseph, Mo.	1000d
KBUB	Sparks, Nev.	1000d
WTSN	Dover, N.H.	5000
WDVL	Vineland, N.J.	500d
KINN	Alamogordo, N.M.	1000d
WHLD	Niagara Falls, N.Y.	5000d
WDLA	Walton, N.Y.	1000d
WCGC	Belmont, N. C.	1000
WMPM	Smithfield, N.C.	5000d
KBOM	Mandan, N.Dak.	1000
WILE	Cambridge, Ohio	1000d
KWPR	Claremore, Okla.	500d
KAJO	Grants Pass, Oreg.	5000d
WLBR	Lebanon, Pa.	5000
WBHC	Hampton, S.C.	1000d
KNWC	Sioux Falls, S.Dak.	1000
WLIK	Newport, Tenn.	5000
KIOX	Bay City, Tex.	1000
KHEM	Big Spring, Tex.	1000d
KEPS	Eagle Pass, Tex.	1000d
KFJZ	Fort Worth, Tex.	5000
WTID	Newport News, Va.	1000d
WHEO	Stuart, Va.	1000d
KCVL	Colville, Wash.	1000d
KBAM	Longview, Wash.	5000d
WRJC	Mauston, Wis.	500d
WWJC	Superior, Wis.	5000d
KIML	Gillette, Wyo.	5000

1280—234.2

WPID	Piedmont, Ala.	1000d
WNPT	Tuscaloosa, Ala.	5000
KHEP	Phoenix, Ariz.	1000d
KNBY	Newport, Ark.	1000d
KOAG	Arroyo Grande, Cal.	1000
KIXF	Fortuna, Cal.	5000d
KFOX	Long Beach, Calif.	1000
KCJH	San Luis Obispo, Cal.	500d
KJOY	Stockton, Calif.	1000
KTLN	Denver, Colo.	5000
WSUX	Seaford, Del.	1000d
WDSP	DeFuniak Springs, Florida	5000d
WIPC	Lake Wales, Fla.	1000d
WYND	Sarasota, Fla.	500d
WIBB	Macon, Ga.	5000d
WMRO	Aurora, Ill.	1000d
WGBF	Evansville, Ind.	5000
KCOB	Newton, Iowa	1000d
KSOK	Arkansas City, Kans.	1000
WCPM	Cumberland, Ky.	1000d

kHz	Wave Length	W.P.
WIXI	Lancaster, Ky.	500d
WDSU	New Orleans, La.	5000
KWCL	Oakgrove, La.	1000d
WABK	Gardiner, Me.	
WEIM	Fitchburg, Mass.	5000
WFYC	Alma, Mich.	5000d
WWTC	Minneapolis, Minn.	5000
KVOX	Moorhead, Minn.	1000
KDKD	Clinton, Mo.	1000d
KYRO	Potosi,Mo.	500d
KCNI	Broken Bow, Nebr.	1000d
KTOO	Henderson, Nev.	5000d
KRZE	Farmington, N.Mex.	5000d
WADO	New York, N.Y.	5000
WROC	Rochester, N.Y.	5000d
WSAT	Salisbury, N.C.	1000
WYAL	Scotland Neck, N.C.	5000d
WONW	Defiance, Ohio	1000
WLMJ	Jackson, Ohio	1000d
KLCO	Poteau, Okla.	1000d
KERG	Eugene, Oreg.	5000
WBRX	Berwick, P.	1000d
WHVR	Hanover, Pa.	5000
WKST	New Castle, Pa.	1000
WCMN	Arecibo, P. R.	5000
WANS	Anderson, S.C.	5000
WJAY	Mullins, S.C.	5000d
WMCP	Columbia, Tenn.	1000d
WDNT	Dayton, Tenn.	1000d
KNIT	Abilene, Tex.	500d
KWHI	Brenham, Tex.	1000d
KLUE	Longview, Tex.	1000d
KRAN	Morton, Tex.	500
KVWG	Pearsall, Tex.	500d
KNAK	Salt Lake City, Utah	5000
WYVE	Wytheville, Va.	1000d
KMAS	Shelton, Wash.	1000d
KUDY	Spokane, Wash.	5000d
KIT	Yakima, Wash.	5000
WVAR	Richwood, W.Va.	1000d
WNAM	Neenah, Wis.	5000

1290—232.4

WHOD	Jackson, Ala.	1000d
WSHF	Sheffield, Ala.	1000d
WMLS	Sylacauga, Ala.	1000d
KCUB	Tucson, Ariz.	1000
KDMS	El Dorado, Ark.	5000d
KUOA	Siloam Sprgs., Ark.	5000d
KHSL	Chico, Calif.	5000
KAZA	Gilroy, Cal.	
KMEN	San Bernardino, California	5000
KACL	Santa Barbara, Cal.	500d
WCCC	Hartford, Conn.	500d
WTUX	Wilmington, Del.	1000d
WTMC	Ocala, Fla.	5000
WSCM	Panama City Beach, Florida	500d
WIRK	W. Palm Bch., Fla.	5000
WDEC	Americus, Ga.	1000d
WCHK	Canton, Ga.	1000d
WTOC	Savannah, Ga.	5000
KSNN	Pocatello, Idaho	1000d
WIRL	Peoria, Ill.	5000
WREY	New Albany, Ind.	5000
KWNS	Pratt, Kansas	5000
WCBL	Benton, Ky.	5000d
KJEF	Jennings, La.	1000d
WHGR	Houghton Lake, Mich.	5000
WNIL	Niles, Mich.	500d
WOIB	Saline, Mich.	500d
KBMO	Benson, Minn.	500d
WBLE	Batesville, Miss.	1000d
KALM	Thayer, Mo.	1000d
KGVO	Missoula, Mont.	5000
KOIL	Omaha, Nebr.	5000
WKNE	Keene, N.H.	5000
KSRC	Socorro, N.M.	1000d
WGLI	Babylon, N. Y.	5000
WNBF	Binghamton, N.Y.	5000
WHKY	Hickory, N.C.	5000
WEYE	Sanford, N.C.	1000d
WOMP	Bellaire, Ohio	1000d
WHIO	Dayton, Ohio	5000
KUMA	Pendleton, Oreg.	5000
KLIQ	Portland, Oreg.	5000d
WFBG	Altoona, Pa.	5000
WICE	Providence, R.I.	5000
WFIG	Sumter, S.C.	1000
WATO	Oak Ridge, Tenn.	5000
KBLT	Big Lake, Tex.	1000d
KIVY	Crockett, Tex.	500d
KRGV	Weslaco, Tex.	5000
KTRN	Wichita Falls, Tex.	5000
WPVA	Colonial Hgts., Va.	5000d
WAGE	Leesburg, Va.	1000d
WKWS	Rocky Mount, Va.	1000d
WVOW	Logan, W.Va.	5000
KAPY	Port Angeles, Wash.	1000d
WMIL	Milwaukee, Wis.	1000d
WCOW	Sparta, Wis.	5000d
KOWB	Laramie, Wyo.	5000

1300—230.6

WBSA	Boaz, Ala.	1000d
WTLS	Tallassee, Ala.	1000d
WEZQ	Winfield, Ala.	1000d
KHAC	Window Rock, Ariz.	
KWCB	Searcy, Ark.	1000d
KROP	Brawley, Calif.	1000
KYNO	Fresno, Calif.	5000
KWKW	Pasadena, Calif.	5000
KVOR	Colorado Springs, Colo.	5000
WAVZ	New Haven, Conn.	1000
WRKT	Cocoa Beach, Fla.	5000
WFFG	Marathon, Fla.	500
WSOL	Tampa, Fla.	5000d
WMTM	Moultrie, Ga.	5000d
WNEA	Newman, Ga.	500
WIMO	Winder, Ga.	1000d
KOZE	Lewiston, Idaho	5000
WTAQ	La Grange, Ill.	5000
WFRX	W. Frankfort, Ill.	1000d
WHLT	Huntington, Ind.	500d
WAAC	Terre Haute, Ind.	5000
KGLO	Mason City, Iowa	5000
WBLG	Lexington, Ky.	1000
WIBR	Baton Rouge, La.	1000
WFBR	Baltimore, Md.	5000
WJDA	Quincy, Mass.	1000d
WOOD	Grand Rapids, Mich.	5000
WKPM	Princeton, Minn.	
WRBC	Jackson, Miss.	5000
KMMO	Marshall, Mo.	1000d
KBRL	McCook, Nebr.	5000d
KPTL	Carson City, Nev.	5000
WPNH	Plymouth, N.H.	1000d
WAAT	Trenton, N.J.	5000d
WOSC	Fulton, N.Y.	1000d
WMMJ	Lancaster, N.Y.	1000d
WEEE	Rensselaer, N.Y.	5000d
WKQW	Spring Valley, N. Y.	500d
WGOL	Goldsboro, N.C.	1000d
WLNC	Laurinburg, N.C.	500
WSYD	Mt. Airy, N.C.	5000
WERE	Cleveland, Ohio	5000
WMVO	Mt. Vernon, Ohio	500
KOME	Tulsa, Okla.	5000
KDOV	Medford, Oreg.	5000d
KACI	The Dalles, Oreg.	1000d
WWCH	Clarion, Pa.	500d
WTHT	Hazleton, Pa.	1000d
WTIL	Mayaguez, P.R.	1000
WLOW	Aiken, S.C.	500d
WDOG	Allendale, S.C.	1000d
WCKI	Greer, S.C.	1000d
WKSC	Kershaw, S.C.	500d
KOLY	Mobridge, S.Dak.	1000d
WMTN	Morristown, Tenn.	5000d
WMAK	Nashville, Tenn.	5000
KVET	Austin, Tex.	5000
KKUB	Brownfield, Tex.	1000d
KGNS	Laredo, Tex.	1000d
KKAS	Silsbee, Tex.	500d
KSTU	Logan, Utah	1000
WKCY	Harrisonburg, Va.	
KOL	Seattle, Wash.	5000
WCLG	Morgantown, W.Va.	1000d
WKLC	St. Albans, W.Va.	1000d

1310—228.9

WHEP	Foley, Ala.	1000d
WJAM	Marion, Ala.	5000d
KBUZ	Mesa, Ariz.	5000
KBOK	Malvern, Ark.	1000d
KIOT	Barstow, Calif	5000d
KPOD	Crescent City, Calif.	1000d
KDIA	Oakland, Cal.	5000
KTKR	Taft, Calif.	1000d
KFKA	Greeley, Colo.	5000d
WICH	Norwich, Conn.	5000
WOOO	Deland, Fla.	5000d
WGKR	Perry, Fla.	1000d
WAUC	Wauchula, Fla.	500d
WOMN	Decatur, Ga.	500
WOKA	Douglas, Ga.	1000d
WBRO	Waynesboro, Ga.	1000d
WBMK	West Point, Ga.	1000d
KNUI	Makawao, Hawaii	5000
KLIX	Twin Falls, Idaho	5000
WIFE	Indianapolis, Ind.	5000
KDLS	Perry, Iowa	500d
KOKX	Keokuk, Ia.	1000
KFLA	Scott City, Kans.	500d
WTTL	Madisonville, Ky.	1000
WDOC	Prestonsburg, Ky.	5000d
KIKS	Sulphur, La.	500d
KUZN	W. Monroe, La.	1000d
WLOB	Portland, Me.	5000
WORC	Worcester, Mass.	5000
WKNR	Dearborn, Mich.	5000
WCCW	Traverse City, Mich.	5000d
KRBI	St. Peter, Minn.	1000d
WXXX	Hattiesburg, Miss.	1000d
KFSB	Joplin, Mo.	5000
KFBB	Great Falls, Mont.	5000
KGMT	Fairbury, Nebr.	500d
WJLK	Asbury Park, N.J.	1000d
WCAM	Camden, N. J.	1000
KARA	Albuquerque, N.M.	1000d
WVIP	Mt. Kisco, N.Y.	5000d
WTLB	Utica, N.Y.	1000
WISE	Asheville, N.C.	5000
WIKTC	Charlotte, N.C.	1000
WTIK	Durham, N.C.	5000
KNOX	Grand Forks, N.Dak.	5000
WFAH	Alliance, Ohio	1000d
KNPT	Newport, Oreg.	5000
WBFD	Bedford, Pa.	5000d
WGSA	Ephrata, Pa.	5000d
WNAE	Warren, Pa.	5000d
WDKD	Kingstree, S.C.	5000d
WDOD	Chattanooga, Tenn.	5000
WDXI	Jackson, Tenn.	5000
WBNT	Oneida, Tenn.	1000d
KZIP	Amarillo, Tex.	1000d
WRR	Dallas, Tex.	5000
KOYL	Odessa, Tex.	1000d
KBUC	San Antonio, Tex.	5000
WEEL	Fairfax, Va.	5000
WGH	Newport News, Va.	5000
KARY	Prosser, Wash.	1000d
WIBA	Madison, Wis.	5000

1320—227.1

WAGF	Dothan, Ala.	1000
WENN	Birmingham, Ala.	5000d
KBLU	Yuma, Ariz.	500d
KWHN	Fort Smith, Ark.	5000
KRLW	Walnut Ridge, Ark.	1000d
KHSJ	Hemet, Calif.	500d
KLAN	Lemoore, Calif.	1000d
KUDE	Oceanside, Calif.	500
KCRA	Sacramento, Calif.	5000
KAVI	Rocky Ford, Colo.	1000d
WATR	Waterbury, Conn.	5000
WGMA	Hollywood, Fla.	5000
WZOK	Jacksonville, Fla.	5000
WAMR	Venice, Fla.	500d
WHIE	Griffin, Ga.	5000d
WKAN	Kankakee, Ill.	1000
KNIA	Knoxville, Iowa	500d
KMAQ	Maquoketa, Iowa	500d
KLWN	Lawrence, Kans.	500d
WBRT	Bardstown, Ky.	1000d
WCLU	Covington, Ky.	500d
WNGO	Mayfield, Ky.	1000d
KHAL	Homer, La.	1000d
WICO	Salisbury, Md.	1000d
WARA	Attleboro, Mass.	1000
WILS	Lansing, Mich.	5000
WDMJ	Marquette, Mich.	1000
WRJW	Picayune, Miss.	5000d
WVLY	Water Valley, Miss.	500d
KXLW	Clayton, Mo.	1000d
KOLT	Scottsbluff, Nebr.	5000
KRDD	Roswell, N.M.	1000d
WWHG	Hornell, N.Y.	5000d
WAGY	Forest City, N.C.	1000
WCOG	Greensboro, N.C.	5000
WKRK	Murphy, N.C.	5000d
WEEW	Washington, N.C.	5000d
KHRT	Minot, N.D.	1000d
WHOK	Lancaster, Ohio	1000d
KWOE	Clinton, Okla.	1000d
KATR	Eugene, Ore.	1000d
WKAP	Allentown, Pa.	5000
WGET	Gettysburg, Pa.	1000
WJAS	Pittsburgh, Pa.	5000
WSCR	Scranton, Pa.	1000
WUNO	Rio Piedras, P.R.	5000
WOIC	Columbia, S. C.	5000
KELO	Sioux Falls, S.Dak.	5000
WKIN	Kingsport, Tenn.	5000d
WMSR	Manchester, Tenn.	5000d
KVMC	Colo. City, Tex.	1000d
KXYZ	Houston, Tex.	5000
KCPX	Salt Lake City, Utah	5000
WDMS	Lynchburg, Va.	1000
WEET	Richmond, Va.	1000d
KXRO	Aberdeen, Wash.	5000
KHIT	Walla Walla, Wash.	1000d
WFHR	Wisconsin Rapids, Wis.	5000

1330—225.4

WROS	Scottsboro, Ala.	1000d
KMOP	Tucson, Ariz.	500d
KVEE	Conway, Ark.	500d
KLOM	Lompoc, Cal.	1000d
KFAC	Los Angeles, Calif.	5000
KLBS	Los Banos, Calif.	500d
KAHR	Redding, Calif.	5000d
WARN	Ft. Pierce, Fla.	1000
WWAB	Lakeland, Fla.	1000d
WEBY	Milton, Fla.	5000d
WMEN	Tallahassee, Fla.	5000d
WMLT	Dublin, Ga.	5000
WEAW	Evanston, Ill.	5000
WRAM	Monmouth, Ill.	1000d
WRRR	Rockford, Ill.	1000d
WJPS	Evansville, Ind.	5000
WTRE	Greensburg, Ind.	
KWWL	Waterloo, Iowa	5000
KFH	Wichita, Kans.	5000
WYGO	Corbin, Ky.	5000d
WMOR	Morehead, Ky.	1000d
KVOL	Lafayette, La.	5000
WASA	Havre de Grace, Md.	5000d
WCRB	Waltham, Mass.	5000
WTRX	Flint, Mich.	5000
KTOL	Minneapolis, Minn.	5000
WFTO	Fulton, Miss.	1000d
WJPR	Greenville, Miss.	1000
WDAL	Meridian, Miss.	1000d
KUKU	Willow Springs, Mo.	1000d
KGAK	Gallup, N.Mex.	5000
WEVD	New York, N.Y.	5000
WPOW	New York, N.Y.	5000
WEBO	Owego, N.Y.	1000d
WHAZ	Troy, N.Y.	1000
WUSM	Havelock, N.C.	1000d
WHOT	Campbell, Ohio	1000
WFIN	Findlay, Ohio	1000d
WKOV	Wellston, Ohio	500d
WELW	Willoughby, O.	500d
KPOJ	Portland, Oreg.	5000
WBLF	Bellefonte, Pa.	500
WRIE	Erie, Pa.	5000
WLAT	Conway, S. C.	5000
WFBC	Greenville, S.C.	5000
WAEW	Crossville, Tenn.	1000d
WTRO	Dyersburg, Tenn.	500d
KMIL	Cameron, Tex.	500d
KSWA	Graham, Tex.	500d
KINE	Kingsville, Tex.	1000d
KVKM	Monahans, Tex.	5000
KZAK	Tyler, Tex.	1000d
WBTM	Danville, Va.	5000
WRAA	Luray, Va.	1000d
WOLD	Marion, Va.	1000d
WESR	Tasley, Va.	5000d
KCFA	Spokane, Wash.	5000d
WETZ	New Martinsville, W.Va.	1000d
WHBL	Sheboygan, Wis.	5000
KOVE	Lander, Wyo.	5000

1340—223.7

WKUL	Cullman, Ala.	1000
WJOI	Florence, Ala.	1000
WAMA	Selma, Ala.	250
WFEB	Sylacauga, Ala.	1000
KIKO	Miami, Ariz.	1000
KFBR	Nogales, Ariz.	250
KPGE	Page, Ariz.	
KENT	Prescott, Ariz.	1000
KBTA	Batesville, Ark.	1000
KZNG	Hot Springs, Ark.	250
KBRS	Springdale, Ark.	1000
KATA	Arcata, Cal.	1000
KWXY	Cathedral City, Cal.	250
KMAK	Fresno, Calif	1000
KDOL	Mojave, Cal.	500
KSFE	Needles, Calif.	250
KAOR	Oroville, Cal.	1000
KATY	San Luis Obispo, California	1000
KIST	Santa Barbara, Calif.	1000
KOMY	Watsonville, Calif.	1000
KDEN	Denver, Colo.	1000
KWSL	Grand Junction, Colo.	250
KVRH	Salida, Colo.	1000
WNHC	New Haven, Conn.	1000
WOOK	Washington, D. C.	1000
WSLC	Clermont, Fla.	250
WTAN	Clearwater, Fla.	250
WROD	Daytona Bch., Fla.	1000
WDSR	Lake City, Fla.	1000
WTYS	Marianna, Fla.	1000
WQXT	Palm Beach, Fla.	500
WSEB	Sebring, Fla.	1000
WFSH	Valparaiso, Fla.	1000
WIGO	Atlanta, Ga.	1000d
WGAU	Athens, Ga.	1000
WBBQ	Augusta, Ga.	1000
WGAA	Cedartown, Ga.	1000
WOKS	Columbus, Ga.	1000
WBBT	Lyons, Ga.	1000
WTIF	Tifton, Ga.	1000
KAIN	Nampa, Idaho	1000
KPST	Preston, Idaho	250
KSKI	Sun Valley, Idaho	1000
WSOY	Decatur, Ill.	1000
WJPF	Herrin, Ill.	1000
WJOL	Joliet, Ill.	1000
WBIW	Bedford, Ind.	1000
WTRC	Elkhart, Ind.	1000
WLBC	Muncie, Ind.	1000
KROS	Clinton, Iowa	1000
KCKN	Kansas City, Kans.	1000d
KSEK	Pittsburg, Kans.	1000
WCMI	Ashland, Ky.	1000
KENT	Prescott, Ariz.	250
WNBS	Murray, Ky.	1000d
WEKY	Richmond, Ky.	1000
KVOB	Bastrop, La.	1000
KRMD	Shreveport, La.	1000
WFAU	Augusta, Maine	1000
WDME	Dover-Foxcroft, Me.	250
WHOU	Houlton, Maine	1000
WGAW	Gardner, Mass.	1000
WNBH	New Bedford, Mass.	1000
WBRK	Pittsfield, Mass.	1000
WLEW	Bad Axe, Mich.	1000
WLAV	Grand Rap., Mich.	1000
WCSR	Hillsdale, Mich.	1000
WMTE	Manistee, Mich.	1000
WAGN	Menominee, Mich.	1000
WMBN	Petoskey, Mich.	1000
WEXL	Royal Oak, Mich.	1000
KVBR	Brainerd, Minn.	1000
KDLM	Detroit Lakes, Minn.	1000
WEVE	Eveleth, Minn.	1000
KROC	Rochester, Minn.	1000
KWLM	Willmar, Minn.	1000
WJMB	Brookhaven, Miss.	250
WAML	Laurel, Miss.	250
KXEO	Mexico, Mo.	1000
KLID	Poplar Bluff, Mo.	1000d
KSGM	St. Genevieve, Mo.	1000
KSMO	Salem, Mo.	1000
KDRO	Sedalia, Mo.	1000
KICK	Springfield, Mo.	1000
KCAP	Helena, Mont.	1000
KPRK	Livingston, Mont.	1000

WHITE'S RADIO LOG

kHz	Wave Length	W.P.
KATL	Miles City, Mont.	1000
KYLT	Missoula, Mont.	250
KHUB	Fremont, Nebr.	500
KGFW	Kearney, Nebr.	1000
KSID	Sidney, Nebr.	1000
KORK	Las Vegas, Nev.	1000
KBET	Reno, Nev.	1000
WDCR	Hanover, N.H.	1000
WMID	Atlantic City, N.J.	1000
KHAP	Aztec, N.M.	1000d
KRRR	Ruidoso, N. Mex.	1000
KKIT	Taos, N.Mex.	250
KSIL	Silver City, N.Mex.	1000
WMBO	Auburn, N.Y.	1000
WENT	Gloversville, N.Y.	1000
WKSN	Jamestown, N.Y.	250
WUSJ	Lockport, N.Y.	250
WMSA	Massena, N.Y.	1000
WALL	Middletown, N.Y.	1000
WIRY	Plattsburgh, N.Y.	1000
WJRI	Lenoir, N.C.	1000
WTSB	Lumberton, N.C.	1000
WOXF	Oxford, N.C.	1000
WOOW	Greenville, N.C.	1000
WGNI	Wilmington, N.C.	1000
WAIR	Winston-Salem, N.C.	250
KGPC	Grafton, N.Dak.	1000
WNCO	Ashland, O.	1000
WOUB	Athens, Ohio	250
WIZE	Springfield, Ohio	1000
WSTV	Steubenville, Ohio	1000
KIHN	Hugo, Okla.	250
KOCY	Okla. City, Okla.	1000
KTOW	Sand Springs, Okla.	500
KLOO	Corvallis, Ore.	1000
KWJR	Enterprise, Oreg.	250
KIHR	Hood River, Oreg.	250
KBBR	N. Bend, Ore.	1000d
WCVI	Connellsville, Pa.	1000d
WSAJ	Grove City, Pa.	100
WKRZ	Oil City, Pa.	1000
WHAT	Philadelphia, Pa.	1000
WRAW	Reading, Pa.	1000
WTRN	Tyrone, Pa.	1000
WBRE	Wilkes-Barre, Pa.	1000
WWPA	Williamsport, Pa.	1000
WUNA	Aquadilla, P.R.	250
WOKE	Charleston, S.C.	1000
WRHI	Rock Hill, S.C.	1000
WSSC	Sumter, S.C.	1000
KIJV	Huron, S. D.	1000
KRSD	Rapid City, S.Dak.	1000
WBAC	Cleveland, Tenn.	1000
WKRM	Columbia, Tenn.	1000
WGRV	Greeneville, Tenn.	1000
WKGN	Knoxville, Tenn.	1000
WLOK	Memphis, Tenn.	1000d
WCDT	Winchester, Tenn.	1000
KWKC	Abilene, Tex.	1000
KTSL	Burnett, Tex.	250
KAND	Corsicana, Tex.	1000
KSET	El Paso, Tex.	250
KLBK	Lubbock, Tex.	1000
KRBA	Lufkin, Tex.	1000
KPDN	Pampa, Tex.	250
KOLE	Port Arthur, Tex.	250
KTEO	San Angelo, Tex.	250
KVIC	Victoria, Tex.	250
WTWN	St. Johnsbury, Vt.	1000
WSTA	Charlotte Amalie, V.I.	250
WKEY	Covington, Va.	1000
WHAP	Hopewell, Va.	1000
WJMA	Orange, Va.	1000
KAGT	Anacortes, Wash.	250
KSMK	Kennewick, Wash.	1000
KAPA	Raymond, Wash.	1000
KMEL	Wenatchee, Wash.	250
WHAR	Clarksburg, W.Va.	1000
WEPM	Martinsburg, W. Va.	1000
WMON	Montgomery, W.Va.	250
WOVE	Welch, W.Va.	1000
WLDY	Ladysmith, Wis.	1000
WRIT	Milwaukee, Wis.	1000
KSGT	Jackson, Wyo.	250
KYCN	Wheatland, Wyo.	250
KWOR	Worland, Wyo.	1000

1350—222.1

kHz	Wave Length	W.P.
WELB	Elba, Ala.	1000d
WGAD	Gadsden, Ala.	5000d
KLYD	Bakersfield, Calif.	1000d
KCKC	San Bernardino, Cal.	5000
KSRO	Santa Rosa, Calif.	5000
KKAM	Pueblo, Colo.	5000
WNLK	Norwalk, Conn.	1000
WINY	Putnam, Conn.	1000d
WEZY	Cocoa, Fla.	1000
WDCF	Dade City, Fla.	1000d
WCAI	Ft. Myers, Fla.	1000d
WBSG	Blackshear, Ga.	500d
WRWH	Cleveland, Ga.	1000d
WAVC	Warner Robins, Ga.	5000d
KTOH	Lihue, Hawaii	5000
KRLC	Lewiston, Ida.-Clarkston, Wash.	5000d
WXCL	Peoria, Ill.	1000
WJBD	Salem, Ill.	1000d
WIOU	Kokomo, Ind.	5000
KRNT	Oes Moines, Iowa	5000
KMAN	Manhattan, Kans.	500d
WLOU	Louisville, Ky.	5000d
WSMB	New Orleans, La.	5000
WHMI	Howell, Mich.	500
KDIO	Ortonville, Minn.	1000d
WCMP	Pine City, Minn.	1000d
WKCU	Corinth, Miss.	1000
WKOZ	Kosciusko, Miss.	5000d
KCHR	Charleston, Mo.	1000d
KBRX	O'Neill, Nebr.	1000d
WLNH	Laconia, N.H.	5000d
WHWH	Princeton, N.J.	5000
KABQ	Albuquerque, N.M.	5000
WCBA	Corning, N.Y.	1000d
WRNY	Rome, N.Y.	500d
WBMS	Black Mountain, N. C.	500d
WHIP	Mooresville, N.C.	1000d
WLLY	Wilson, N.C.	1000d
KBMR	Bismarck, N. D.	500d
WSLR	Akron, O.	5000
WCSM	Celina, Ohio	500d
WCHI	Chillicothe, Ohio	1000d
KRHD	Duncan, Okla.	250
KTLQ	Tahlequah, Okla.	1000d
KRVC	Ashland, Oreg.	1000d
WORK	York, Pa.	5000
WWBR	Windber, Pa.	1000d
WDAR	Darlington, S.C.	1000d
WGSW	Greenwood, S.C.	1000d
WRKM	Carthage, Tenn.	1000d
KCAR	Clarksville, Tex.	500d
KTXJ	Jasper, Tex.	1000d
KCOR	San Antonio, Tex.	5000
WBLT	Bedford, Va.	1000d
WFLS	Fredericksburg, Va.	1000d
WNVA	Norton, Va.	5000d
WAVY	Portsmouth, Va.	5000
WPDR	Portage, Wis.	5000d

1360—220.4

kHz	Wave Length	W.P.
WWWB	Jasper, Ala.	1000d
WLIQ	Mobile, Ala.	5000d
WMFC	Monroeville, Ala.	1000d
WELR	Roanoke, Ala.	1000d
KRUX	Glendale, Ariz.	5000
KLYR	Clarksville, Ark.	500d
KFFA	Helena, Ark.	1000
KFIV	Modesto, Cal.	5000
KRCK	Ridgecrest, Calif.	1000d
KGB	San Diego, Calif.	5000
WDRC	Hartford, Conn.	5000
WOBS	Jacksonville, Fla.	5000d
WKAT	Miami Beach, Fla.	5000
WINT	Winter Haven, Fla.	1000d
WAZA	Bainbridge, Ga.	1000d
WLAW	Lawrenceville, Ga.	1000d
WMAC	Metter, Ga.	500d
WIYN	Rome, Ga.	500d
WLBK	DeKalb, Ill.	1000d
WVMC	Mt. Carmel, Ill.	500d
WGFA	Watseka, Ill.	1000d
KHAK	Cedar Rapids, Iowa	1000d
KRCB	Council Bluffs, Iowa	
KXGI	Ft. Madison, Iowa	1000d
KSCJ	Sioux City, Iowa	5000
KBTO	El Dorado, Kans.	500d
WFLW	Monticello, Ky.	1000d
KDXI	Mansfield, La.	1000d
KNIR	New Iberia, La.	1000d
KTLD	Tallulah, La.	500d
WEBB	Baltimore, Md.	5000d
WLYN	Lynn, Mass.	1000d
WKYO	Caro, Mich.	500d
WKMI	Kalamazoo, Mich.	5000
KLRS	Mountain Grove, Mo.	1000d
KICX	McCook, Nebr.	1000d
WNNJ	Newton, N.J.	1000d
WWBZ	Vineland, N.J.	1000
WKOP	Binghamton, N.Y.	5000
WMNS	Olean, N.Y.	1000d
WCHL	Chapel Hill, N.C.	1000
KEYZ	Williston, N.D.	5000
WSAI	Cincinnati, Ohio	5000
WWOW	Conneaut, Ohio	500d
KUIK	Hillsboro, Oreg.	1000d
WMCK	McKeesport, Pa.	5000
WPPA	Pottsville, Pa.	5000
WELP	Easley, S.C.	1000d
WLCM	Lancaster, S.C.	1000d
WBLC	Lenoir City, Tenn.	
WNAH	Nashville, Tenn.	1000d
KRAY	Amarillo, Tex.	500d
KACT	Andrews, Tex.	1000d
KWBA	Baytown, Tex.	1000
KRYS	Corpus Christi, Tex.	1000
KXOL	Ft. Worth, Tex.	5000
WBOB	Galax, Va.	1000d
WHBG	Harrisonburg, Va.	5000d
KFDR	Grand Coulee, Wash.	1000d
KMO	Tacoma, Wash.	5000
WHJC	Matawan, W.Va.	1000d
WMOV	Ravenswood, W.Va.	1000d
WBAY	Green Bay, Wis.	5000
WISV	Virgqua, Wis.	1000
WMNE	Menomonie, Wis.	1000d
KVRS	Rock Springs, Wyo.	1000

1370—218.8

kHz	Wave Length	W.P.
WBYE	Calera, Ala.	1000d
KAWW	Heber Springs, Ark.	500d
KTPA	Prescott, Ark.	500d
KREL	Corona, Cal.	5000
KQCY	Quincy, Calif.	500d
KEEN	San Jose, Calif.	5000
KGEN	Tulare, Calif.	1000d
KMKK	Blountstown, Fla.	500d
WWKE	Ocala, Fla.	5000d
WCOA	Pensacola, Fla.	5000
WAXE	Vero Beach, Fla.	1000d
WLOP	Jesup, Ga.	5000
WFDR	Manchester, Ga.	1000d
WLOV	Washington, Ga.	1000d
WPRC	Lincoln, Ill.	1000d
WTTS	Bloomington, Ind.	5000
WLTH	Gary, Ind.	1000d
KDTH	Dubuque, Iowa	5000
KGNO	Dodge City, Kans.	5000
KALN	Iola, Kans.	500d
WABD	Ft. Campbell, Ky.	500d
WGOH	Grayson, Ky.	5000d
WTKY	Tompkinsville, Ky.	1000d
KAPB	Marksville, La.	1000d
WDEA	Ellsworth, Me.	5000d
WMHI	Braddocks Hts., Md.	500d
WKIK	Leonardtown, Md.	1000d
WWAM	Cadillac, Mich.	
WGHN	Grand Haven, Mich.	500d
KSUM	Fairmont, Minn.	1000
WMKT	S. St. Paul, Minn.	500d
WMGO	Canton, Miss.	1000d
KWRT	Boonville, Mo.	1000d
KCRV	Caruthersville, Mo.	1000d
KXLF	Butte, Mont.	5000
KAWL	York, Nebr.	500d
WFEA	Manchester, N.H.	5000
WELV	Ellenville, N.Y.	500
WALK	Patchogue, N.Y.	500d
WSAY	Rochester, N.Y.	5000
WLTC	Gastonia, N.C.	5000d
WTAB	Tabor City, N.C.	5000d
KFJM	Grand Forks, N.D.	1000d
WSPD	Toledo, Ohio	5000
KVYL	Holdenville, Okla.	500d
KAST	Astoria, Oreg.	1000
WOTR	Corry, Pa.	1000
WPAZ	Pottstown, Pa.	1000d
WKMC	Roaring Sprgs., Pa.	1000d
WIVV	Viegues, P.R.	1000
WKFD	Wiekford, R.I.	500d
WDEF	Chattanooga, Tenn.	5000
WDXE	Lawrenceburg, Tenn.	1000d
WRGS	Rogersville, Tenn.	1000d
KOKE	Austin, Tex.	1000d
KFRO	Longview, Tex.	1000
KPOS	Post, Tex.	1000d
KSOP	Salt Lake City, Utah	1000d
WBTN	Bennington, Vt.	1000d
WHEE	Martinsville, Va.	5000d
WJWS	South Hill, Va.	5000d
KPOR	Quincy, Wash.	1000d
WEIF	Moundsville, W. Va.	1000d
WCCN	Neillsville, Wis.	5000d
KVWO	Cheyenne, Wyo.	1000

1380—217.3

kHz	Wave Length	W.P.
WRAB	Arab, Ala.	1000d
WGYV	Greenville, Ala.	1000d
WVSA	Vernon, Ala.	
KDXE	N. Little Rock, Ark.	1000d
KBVM	Lancaster, Calif.	1000d
KGMS	Sacramento, Calif.	1000
KSBW	Salinas, Calif.	5000
KFLJ	Walsenburg, Colo.	1000d
WOWW	Naugatuck, Conn.	5000
WAMS	Wilmington, Del.	5000
WLIZ	Lake Worth, Fla.	500d
WQXQ	Ormond Bch., Fla.	1000d
WLCY	St. Petersburg, Fla.	5000
WAOK	Atlanta, Ga.	5000
WSIZ	Cedilia, Ga.	5000d
KPOI	Honolulu, Hawaii	5000
WWCM	Brazil, Ind.	500d
WKJG	Ft. Wayne, Ind.	5000
KCIM	Carroll, Iowa	1000
KCII	Washington, Iowa	500d
KUDL	Fairway, Kan.	5000
WMTA	Central City, Ky.	500d
WWKY	Winchester, Ky.	1000d
WYNK	Baton Rouge, La.	500d
WKTJ	Farmington, Me.	1000d
WPHM	Port Huron, Mich.	1000
WPLB	Greenville, Mich.	1000
KLIZ	Brainerd, Minn.	5000
KAGE	Winona, Minn.	1000
WDLT	Indianola, Miss.	500d
KWK	St. Louis, Mo.	5000
KUVR	Holdredge, Nebr.	500
WBBX	Portsmouth, N.H.	1000
WAWZ	Zarephath, N.J.	5000
WFSR	Bath, N.Y.	500d
WBNX	New York, N.Y.	5000
WLOS	Asheville, N.C.	5000
WTOB	Winston-Salem, N.C.	5000
WPKO	Waverly, Ohio	1000d
KSWO	Lawton, Okla.	1000
KMUS	Muskogee, Okla.	1000
KBCH	Ocean Lake, Oreg.	1000d
KSRV	Ontario, Oreg.	5000
WACB	Kittanning, Pa.	1000d
WMLP	Milton, Pa.	1000d
WAYZ	Waynesboro, Pa.	1000d
WNRI	Woonsocket, R.I.	1000d
WAGS	Bishopville, S.C.	1000d
WGUS	N. Augusta, S.C.	1000d
KOTA	Rapid City, S.Dak.	5000
KFCB	Redfield, S.Dak.	500d
WYSH	Clinton, Tenn.	1000d
WGMM	Millington, Tenn.	500d
KJET	Beaumont, Tex.	1000
KBWD	Brownwood, Tex.	1000
KCRM	Crane, Tex.	1000d
KTSM	El Paso, Tex.	5000
KMUL	Muleshoe, Tex.	1000d
KBOP	Pleasanton, Tex.	1000d
WSYB	Rutland, Vt.	5000
WTVR	Richmond, Va.	5000
KRKO	Everett, Wash.	5000
KPEG	Spokane, Wash.	5000d
WMTD	Hinton, W.Va.	1000d
WBEL	Beloit, Wis.	5000

1390—215.7

kHz	Wave Length	W.P.
WHMA	Anniston, Ala.	5000
KDQN	DeQueen, Ark.	500d
KAMO	Rogers, Ark.	1000d
KGER	Long Beach, Calif.	5000
KCEY	Turlock, Calif.	5000
KFML	Denver, Colo	5000d
WUWU	Gainsville, Fla.	5000d
WISK	Americus, Ga.	5000d
WNUS	Chicago, Ill.	5000
WFIW	Fairfield, Ill.	1000
WJCD	Seymour, Ind.	1000d
KCLN	Clinton, Iowa	1000d
KCBC	Des Moines, Iowa	1000
KNCK	Concordia, Kans.	500d
WANY	Albany, Ky.	1000d
WKIC	Hazard, Ky.	5000d
KFRA	Franklin, La.	500d
WEGP	Presque Isle, Me.	5000d
KJPW	Waynesville, Mo.	1000d
WCAT	Orange, Mass.	1000d
WPLM	Plymouth, Mass.	5000
WCER	Charlotte, Mich.	5000d
KAOH	Duluth, Minn.	500
KRFO	Owatonna, Minn.	500d
WROA	Gulfport, Miss.	1000d
WQIC	Meridian, Miss.	5000d
KJPW	Waynesville, Mo.	1000d
KENN	Farmington, N.Mex.	5000
KHOB	Hobbs, N.Mex.	5000d
WEOK	Poughkeepsie, N.Y.	5000
WRIV	Riverhead, N.Y.	1000d
WFBL	Syracuse, N.Y.	5000
WEED	Rocky Mount, N.C.	5000
WADA	Shelby, N.C.	1000
WJRM	Troy, N.C.	500d
KLPM	Minot, N.Dak.	5000
WOHP	Bellefontaine, Ohio	500d
WMPO	Middleport-Pomeroy, O.	5000d
WFMJ	Youngstown, Ohio	5000
KCRC	Enid, Okla.	1000
KSLM	Salem, Oreg.	5000
WLAN	Lancaster, Pa.	5000
WRSC	State College, Pa.	1000d
WISA	Isabella, P.R.	1000
WHPB	Belton, S.C.	1000d
WCSC	Charleston, S.C.	5000
KJAM	Madison, S.D.	5000d
WYXI	Athens, Tenn.	500d
WTJS	Jackson, Tenn.	5000
WMCT	Mountain City, Tenn.	
KULP	El Campo, Tex.	500d
KBEC	Waxahachie, Tex.	500d
KOHN	Logan, Utah	1000
WEAM	Arlington, Va.	5000
WWOD	Lynchburg, Va.	5000
WKLP	Keyser, W.Va.	1000d
KBBO	Yakima, Wash.	1000

1400—214.2

kHz	Wave Length	W.P.
WMSL	Decatur, Ala.	1000
WXAL	Demopolis, Ala.	1000d
WFPA	Ft. Payne, Ala.	1000
WJLD	Homewood, Ala.	1000
WJHO	Opelika, Ala.	1000
KSEW	Sitka, Alaska	1000
KCLF	Clifton, Ariz.	250
KXIV	Phoenix, Ariz.	1000
KTUC	Tucson, Ariz.	250
KVOY	Yuma, Ariz.	250
KELD	El Dorado, Ark.	1000
KCLA	Pine Bluff, Ark.	1000
KWYN	Wynne, Ark.	1000
KPAT	Berkeley, Calif.	1000
KREO	Indio, Calif.	250
KQMS	Redding, Calif.	250
KSLY	San Luis Obispo, Cal.	250
KQIQ	Santa Paula, Cal.	250
KHOE	Truckee, Calif.	1000
KUKI	Ukiah, Calif.	1000
KONG	Visalia, Calif.	1000

kHz	Wave Length	W.P.
KRLN	Canon City, Colo.	250
KDTA	Delta, Colo.	250
KFTM	Ft. Morgan, Colo.	250
KBZZ	La Junta, Colo.	1000
WSTC	Stamford, Conn.	1000
WILI	Willimantic, Conn.	1000
WFTL	Ft. Lauderdale, Fla.	1000
WIRA	Ft. Pierce, Fla.	1000
WNUE	Ft. Walton Beach, Fla.	1000d
WRHC	Jacksonville, Fla.	1000
WPRY	Perry, Fla.	1000
WTRR	Sanford, Fla.	1000
WPAS	Zephyrhills, Fla.	250
WCQS	Alma, Ga.	1000
WSGC	Elberton, Ga.	1000
WNEX	Macon, Ga.	1000
WMGA	Moultrie, Ga.	1000
WCOH	Newnan, Ga.	1000
WGSA	Savannah, Ga.	1000
KART	Jerome, Ida.	1000
KRPL	Moscow, Ida.	1000
KIGO	St. Anthony, Ida.	
KSPT	Sandpoint, Idaho	1000
WDWS	Champaign, Ill.	1000
WGIL	Galesburg, Ill.	1000
WROZ	Evansville, Ind.	1000
WBAT	Marion, Ind.	1000
KCDG	Centerville, Ia.	500
KVFD	Fort Dodge, Iowa	1000
KVOE	Emporia, Kans.	1000
KAYS	Hays, Kans.	1000
WCYN	Cynthiana, Ky.	250
WIEL	Elizabethtown, Ky.	1000
WFTG	London, Ky.	250
WFPR	Hammond, La.	1000
KADK	Lake Charles, La.	1000
WRDO	Augusta, Maine	1000d
WIDE	Biddeford, Maine	1000
WMCS	Machias, Me.	1000d
WWIN	Baltimore, Md.	1000
WALE	Fall River, Mass.	1000
WLLH	Lowell, Mass.	1000
WHMP	Northampton, Mass.	1000
WKFR	Battle Creek, Mich.	1000
WJLB	Detroit, Mich.	1000d
WHDF	Houghton, Mich.	250
WGON	Munising, Mich.	1000
WSAM	Saginaw, Mich.	1000
WSJM	St. Joseph, Mich.	1000
WTCM	Traverse City, Mich.	1000
KEYL	Long Prairie, Minn.	1000
KMHL	Marshall, Minn.	1000
WMIN	Mpls.-St. Paul, Minn.	1000
WHLB	Virginia, Minn.	1000
WBIP	Booneville, Miss.	1000
WNAG	Grenada, Miss.	1000
WFOR	Hattiesburg, Miss.	1000
WJQS	Jackson, Miss.	1000
WMBC	Macon, Miss.	1000
KFRU	Columbia, Mo.	1000
KJCF	Festus, Mo.	1000
KSIM	Sikeston, Mo.	1000
KTTS	Springfield, Mo.	1000
KDRG	Deer Lodge, Mont.	250
KXGN	Glendive, Mont.	250
KARR	Great Falls, Mont.	1000
KBRB	Ainsworth, Neb.	1000
KCOW	Alliance, Nebr.	1000
KLIN	Lincoln, Neb.	1000
KBMI	Henderson, Nev.	250
KWNA	Winnemucca, Nev.	1000
WBRL	Berlin, N.H.	250
WTSL	Hanover, N.H.	1000
WLTN	Littleton, N.H.	250
KTRC	Santa Fe, N.M.	1000
KCHS	Truth or Consequences, New Mexico	250
KTNM	Tucumcari, N.M.	1000
WONDP	Pleasantville, N.J.	1000
WABY	Albany, N.Y.	1000
WYSL	Buffalo, N.Y.	1000
WSLB	Ogdensburg, N.Y.	1000
WBMA	Beaufort, N.C.	1000
WGBG	Greensboro, N.C.	1000
WSHB	Raeford, N.C.	1000
WSIC	Statesville, N.C.	1000
WLSE	Wallace, N. C.	1000
WHCC	Waynesville, N.C.	1000
WSMY	Weldon, N.C	1000d
KEYJ	Jamestown, N.Dak.	1000
WMAN	Mansfield, Ohio	1000d
WPAY	Portsmouth, Ohio	1000
KWON	Bartlesville, Okla.	1000
KTMC	McAlester, Okla.	250
KNOR	Norman, Okla.	250
KPTN	Central Point, Ore.	250
KNND	Cottage Grove, Oreg.	1000d
KJDY	John Day, Ore.	1000
WEST	Easton, Pa.	1000
WJET	Erie, Pa.	1000
WFEC	Harrisburg, Pa.	1000d
WWSF	Loretto, Pa.	250
WICK	Scranton, Pa.	250
WRAK	Williamsport, Pa.	1000
WVOZ	Carolina, P. R.	500
WCOS	Columbia, S.C.	1000
WGTN	Georgetown, S.C.	1000
WHCQ	Spartanburg, S.C.	1000d
WBJM	Lemmon, S.D.	1000
WJZM	Clarksville, Tenn.	1000
WHUB	Cookeville, Tenn.	1000
WLSB	Copperhill, Tenn.	1000
WGAP	Maryville, Tenn.	1000d
WHAL	Shelbyville, Tenn.	1000
KRUN	Ballinger, Tex.	1000
KBYG	Big Springs, Tex.	1000
KUNO	Corpus Christi, Tex.	1000
KILE	nr. Galveston, Tex.	1000
KGVL	Greenville, Tex.	1000
KEBE	Jacksonville, Tex.	1000
KIUN	Pecos, Tex.	1000
KEYE	Perryton, Tex.	250
KVOP	Plainview, Tex.	1000
KDWT	Stamford, Tex.	1000
KTEM	Temple, Tex.	1000
KTFS	Texarkana, Tex.	250
KVOU	Uvalde, Tex.	250
KIXX	Provo, Utah	250
WDOT	Burlington, Vt.	1000
WELK	Charlottesville, Va.	1000d
WHHV	Hillsville, Va.	1000
WHIH	Portsmouth, Va.	1000
WHLF	So. Boston, Va.	1000
WINC	Winchester, Va.	1000
KEDO	Longview, Wash.	1000
KRSC	Othello, Wash.	250
KTNT	Tacoma, Wash.	1000
WBOY	Clarkesburg, W.Va.	1000
WRDN	Ronceverte, W.Va.	1000
WVRC	Spencer, W.Va.	1000
WKWK	Wheeling, W.Va.	1000
WBTH	Williamson, W.Va.	1000
WATW	Ashland, Wis.	1000
WBIZ	Eau Claire, Wis.	1000
WDUZ	Green Bay, Wis.	1000
WRJN	Racine, Wis.	1000
WRDB	Reedsburg, Wis.	1000
WRIG	Wausau, Wis.	1000d
KATI	Casper, Wyo.	1000
KODI	Cody, Wyo.	1000

1410—212.6

WUNI	Mobile, Ala.	5000
WRCK	Tuscumbia, Ala.	500d
KTCS	Fort Smith, Ark.	1000
KERN	Bakersfield, Calif.	1000
KRML	Carmel, Calif.	500d
KKOK	Lompoc, Calif.	500d
KMYC	Marysville, Calif.	5000
KCAL	Redlands, Cal.	5000
KCOL	Ft. Collins, Colo.	1000
WPOP	Hartford, Conn.	5000
WDOV	Dover, Del.	5000
WMYR	Fort Myers, Fla.	5000
WZST	Leesburg, Fla.	1000d
WONS	Tallahassee, Fla.	5000d
WGRI	Griffin, Ga.	1000d
WSNE	Cummings, Ga.	1000d
WDAX	McRae, Ga.	1000d
WLAQ	Rome, Ga.	1000
WRMN	Elgin, Ill.	1000d
WTIM	Taylorville, Ill.	1000d
WAZY	Lafayette, Ind.	1000d
KGRN	Grinnell, Iowa	500d
KLEM	LeMars, Iowa	1000d
KCLO	Leavenworth, Kans.	5000d
KWBB	Wichita, Kans.	5000
WLBJ	Bowling Green, Ky.	5000
WHLN	Harlan, Ky.	5000d
KDBS	Alexandria, La.	1000d
WHAG	Halfway, Md.	1000d
WOKW	Brockton, Mass.	1000d
WGRD	Grand Rap., Mich.	1000d
KLFD	Litchfield, Minn.	500d
KRWB	Roseau, Minn.	1000
WDSK	Cleveland, Miss.	1000d
WBKN	Newton, Miss.	500d
KNOP	N. Platte, Neb.	1000d
WHTG	Asbury Park-Eatontown, N.J.	500d
WDOE	Dunkirk, N.Y.	1000
WELM	Elmira, N.Y.	1000
WBZA	Glens Falls, N. Y.	1000d
WOTT	Watertown, N.Y.	5000
WVCB	Shallotte, N.C.	500d
WEGO	Concord, N.C.	1000d
WSRC	Durham, N.C.	1000d
WING	Dayton, Ohio	5000
KPAM	Portland, Oreg.	5000d
WLSH	Lansford, Pa.	5000d
KQV	Pittsburgh, Pa.	5000
WPCC	Clinton, S.C.	1000d
WYMB	Manning, S.C.	1000d
WCMT	Martin, Tenn.	1000d
KBUD	Athens, Tex.	1000d
KBAN	Bowie, Tex.	500d
KVLB	Cleveland, Tex.	500
KXIT	Dalhart, Tex.	500d
KDOX	Marshall, Tex.	500
KRIG	Odessa, Tex.	1000
KBAL	San Saba, Tex.	500d
KNAL	Victoria, Tex.	500
WIKI	Chester, Va.	5000d
WRIS	Roanoke, Va.	5000d
WRDS	S. Charleston, W.Va.	1000d
WKBH	LaCrosse, Wis.	5000
KWYO	Sheridan, Wyo.	1000

1420—211.1

WACT	Tuscaloosa, Ala.	5000d
KHFH	Sierra Vista, Ariz.	1000
KXOW	Hot Sprinks, Ark.	
KPOC	Pocahontas, Ark.	1000d
KRDO	Colo. Sprgs., Colo.	1000
KJST	Joshua Tree, Cal.	1000d
KSTN	Stockton, Calif.	5000
WLIS	Old Saybrook, Conn.	500d
WBRD	Bradenton, Fla.	1000
WDBF	Delray Beach, Fla.	5000d
WETH	St. Augustine, Fla.	1000d
WAVO	Avondale Estates, Ga.	1000d
WRBL	Columbus, Ga.	5000
WPEH	Louisville, Ga.	1000d
WLET	Toccoa, Ga.	5000d
KCCN	Honolulu, Hawaii	5000
WINI	Murphysboro, Ill.	500d
WIMS	Michigan City, Ind.	5000d
WOC	Davenport, Iowa	5000
KJCK	Junction City, Kans.	1000d
KULY	Ulysses, Kans.	1000d
WTCR	Ashland, Ky.	5000d
WHBN	Harrodsburg, Ky.	1000d
WVJS	Owensboro, Ky.	5000
KPEL	Lafayette, La.	1000
WBSM	New Bedford, Mass.	5000
WBEC	Pittsfield, Mass.	1000
WAMM	Flint, Mich.	1000d
WKPR	Kalamazoo, Mich.	1000d
KTOE	Mankato, Minn.	5000
WSUH	Oxford, Miss.	1000d
WQBC	Vicksburg, Miss.	1000
WIGG	Wiggins, Miss.	1000d
KBTN	Neosho, Mo.	500d
KOOO	Omaha, Nebr.	1000d
KSYX	Santa Rosa, N.Mex.	1000d
WALY	Herkimer, N.Y.	1000d
WACK	Newark, N.Y.	500
WLNA	Peekskill, N.Y.	1000d
WMYN	Mayodan, N.C.	500
WGAS	S. Gastonia, N.C.	500d
WVOT	Wilson, N.C.	1000
WHK	Cleveland, Ohio	5000
KYNG	Coos Bay, Oreg.	1000d
WCOJ	Coatesville, Pa.	5000
WCED	DuBois, Pa.	5000
WEUC	Ponce, P.R.	1000
WCRE	Cheraw, S.C.	1000d
KABR	Aberdeen, S. D.	1000d
WEMB	Erwin, Tenn.	5000d
WKSR	Pulaski, Tenn.	1000
KFYN	Bonham, Tex.	250d
KLFB	Lubbock, Tex.	500d
KTRE	Lufkin, Tex.	1000
KGNB	New Braunfels, Tex.	1000d
KPEP	San Angelo, Tex.	1000d
WWSR	St. Albans, Vt.	1000d
WDDY	Gloucester, Va.	1000d
WKCW	Warrenton, Va.	5000d
KITI	Chehalis-Centralia, Wash.	1000d
KREN	Renton, Wash.	500d
KUJ	Walla Walla, Wash.	5000
WPLY	Plymouth, Wis.	500d

1430—209.7

WFHK	Pell City, Ala.	1000d
KHBM	Monticello, Ark.	1000d
KOSI	Aurora, Cal.	5000
KAMP	El Centro, Calif.	1000d
KARM	Fresno, Calif.	5000
KALI	San Gabriel, Cal.	5000
KJAY	Sacramento, Calif.	500d
KGNU	Santa Clara, Cal.	1000
KOSI	Aurora, Colo.	5000
WIII	Homestead, Fla.	500d
WLAK	Lakeland, Fla.	5000
WPCF	Panama City, Fla.	5000
WGFS	Covington, Ga.	1000d
WRCD	Dalton, Ga.	1000d
WWGS	Tifton, Ga.	5000
WEEF	Highland Park, Ill.	1000d
WCMY	Ottawa, Ill.	500d
WIRE	Indianapolis, Ind.	5000
KASI	Ames, Iowa	1000d
KMRC	Morgan City, La.	500d
WNAV	Annapolis, Md.	5000
WTTT	Amherst, Mass.	5000d
WHIL	Medford, Mass.	5000d
WION	Ionia, Mich.	5000d
WBRB	Mt. Clemens, Mich.	500d
WLAU	Laurel, Miss.	5000d
KAOL	Carrollton, Mo.	500d
WIL	St. Louis, Mo.	5000
KRGI	Grand Island, Nebr.	5000
WNJR	Newark, N.J.	5000
KGFL	Roswell, N.M.	5000d
WENE	Endicott, N.Y.	5000
WMNC	Morganton, N.C.	5000
WDJS	Mt. Olive, N.C.	1000d
WRXO	Roxboro, N.C.	1000d
WFOB	Fostoria, Ohio	1000
WCLT	Newark, Ohio	500d
KALV	Alva, Okla.	500
KELI	Tulsa, Okla.	5000
KGAY	Salem, Oreg.	5000d
WVAM	Altoona, Pa.	5000
WNEL	Caguas, P. R.	5000
WBLR	Batesburg, S.C.	5000d
WATP	Marion, S.C.	1000d
WBUG	Ridgeland, S.C.	1000d
KBRK	Brookings, S. Dak.	1000d
WJBE	Knoxville, Tenn.	1000d
WENO	Madison, Tenn.	5000
WHER	Memphis, Tenn.	1000
KSTB	Breckenridge, Tex.	1000d
KEES	Gladewater, Tex.	1000d
KCOH	Houston, Tex.	1000d
KLD	Ogden, Utah	5000
WIVE	Ashland, Va.	1000d
WDIC	Clinchco, Va.	1000d
KBRC	Mt. Vernon, Wash.	5000
WEIR	Weirton, W.Va.	1000
WBEV	Beaver Dam, Wis.	1000d

1440—208.2

WHHY	Montgomery, Ala.	5000
KDOT	Scottsdale, Ariz.	5000d
KHOG	Fayetteville, Ark.	1000d
KOKY	Little Rock, Ark.	5000d
KVON	Napa, Cal.	5000
KPRO	Riverside, Calif.	1000
KCDY	Santa Maria, Calif.	1000
WBIS	Bristol, Conn.	500d
WLEH	Lehigh Acres, Fla.	5000
WABR	Winter Park, Fla.	5000
WWCC	Bremen, Ga.	1000d
WGIG	Brunswick, Ga.	5000
WVMG	Cochran, Ga.	
WRAJ	Anna, Ill.	500d
WIOK	Normal, Ill.	1000
WPRS	Paris, Ill.	1000d
WGEM	Quincy, Ill.	5000
WROK	Rockford, Ill.	5000
WPGW	Portland, Ind.	500d
KCHE	Cherokee, Iowa	500d
KEWI	Topeka, Kans.	5000
WCDS	Glasgow, Ky.	1000d
WPDE	Paris, Ky.	1000d
WEZJ	Williamsburg, Ky.	1000d
KMLB	Monroe, La.	5000
WJAB	Westbrook, Me.	5000d
WAAB	Worcester, Mass.	5000
WBCM	Bay City, Mich.	1000
WDOW	Dowagiac, Mich.	1000d
WCHB	Inkster, Mich.	1000
KQRS	Golden Valley, Minn.	5000d
KEYL	Long Prairie, Minn.	1000
WHHT	Lucedale, Miss.	1000d
WSEL	Pontotoc, Miss.	1000d
WMVB	Millville, N.J.	1000d
WBAB	Babylon, N.Y.	1000d
WJJL	Niagara Falls, N.Y.	1000d
WSGO	Oswego, N.Y.	1000d
WBLA	Elizabethtown, N.C.	1000d
WBUY	Lexington, N.C.	5000
KILO	Grand Forks, N.D.	1000
WHHH	Warren, Ohio	5000
KMED	Medford, Oreg.	5000
KODL	The Dalles, Oreg.	1000
WCDL	Carbondale, Pa.	5000d
WNPV	Lansdale, Pa.	500d
WGCB	Red Lion, Pa.	1000d
WQOK	Greenville, S.C.	5000
WZYX	Cowan, Tenn.	1000d
WHDM	McKenzie, Tenn.	500d
KPUR	Amarillo, Tex.	5000
KEYS	Corpus Christi, Tex.	1000
KDNT	Denton, Tex.	5000
KGVL	Greenville, Tex.	1000
KWEL	Midland, Tex.	5000d
KETX	Livingston, Tex.	5000d
WKLV	Blackstone, Va.	5000d
WHRN	Herndon, Va.	1000
KDNC	Spokane, Wash.	5000d
WHIS	Bluefield, W.Va.	5000
WAJR	Morgantown, W.Va.	5000
WNFL	Green Bay, Wis.	5000

1450—206.8

WDNG	Anniston, Ala.	1000
WYAM	Bessemer, Ala.	1000
WDIG	Dothan, Ala.	1000
WFIX	Huntsville, Ala.	1000d
WLAY	Muscle Shoals City, Alabama	1000
KLAM	Cordova, Alaska	250
KAWT	Douglas, Ariz.	250
KNOT	Prescott, Ariz.	1000
KVSL	Show Low, Ariz.	1000
KOLD	Tucson, Ariz.	250
KENA	Mena, Ark.	250
KJWH	Camden, Ark.	1000d
KYOR	Blythe, Cal.	1000
KAVA	Burney, Cal.	
KOWN	Escondido, Calif.	250
KPAL	Palm Springs, Cal.	1000
KTIP	Porterville, Calif.	1000
KSOL	San Francisco, Cal.	1000
KVML	Sonora, Calif.	1000
KVEN	Ventura, Calif.	1000
KZIN	Yuba City, Calif.	100
KGIW	Alamosa, Colo.	1000
KYOU	Greeley, Colo.	1000
WNAB	Bridgeport, Conn.	1000
WILM	Wilmington, Del.	1000
WOL	Washington, D. C.	1000
WWJB	Brooksville, Fla.	250
WMFJ	Daytona Beach, Fla.	1000
WOCN	Miami, Fla.	250
WBSR	Pensacola, Fla.	1000
WSPB	Sarasota, Fla.	1000
WSTU	Stuart, Fla.	250
WTAL	Tallahassee, Fla.	1000
WGPC	Albany, Ga.	1000
WBHF	Cartersville, Ga.	1000
WCON	Cornelia, Ga.	250
WKEU	Griffin, Ga.	1000
WMVG	Milledgeville, Ga.	1000

WHITE'S RADIO LOG

kHz	Wave Length	W.P.
WBYG	Savannah, Ga.	1000
WVLD	Valdosta, Ga.	1000
KVSI	Montpelier, Ida.	1000
KEEP	Twin Falls, Idaho	1000
WVON	Cicero, Ill.	1000
WKEI	Kewanee, Ill.	500
WCVS	Springfield, Ill.	1000
WLYV	Ft. Wayne, Ind.	500
WXYW	Jeffersonville, Ind.	1000
WASK	Lafayette, Ind.	1000
WAOV	Vincennes, Ind.	1000
KLWW	Cedar Rapids, Ia.	250
KYET	Payette, Ida.	250
KWBW	Hutchinson, Kans.	1000
WTCO	Campbellsville, Ky.	1000
WWXL	Manchester, Ky.	1000
WPAD	Paducah, Ky.	1000
WLKS	W. Liberty, Ky.	1000
KSIG	Crowley, La.	1000
KNDC	Natchitoches, La.	1000
WNPS	New Orleans, La.	250
WLKN	Lincoln, Me.	1000d
WRKD	Rockland, Maine	250
WKTQ	South Paris, Maine	1000
WTBO	Cumberland, Md.	1000
WTHU	Thurmont, Md.	100
WMAS	Springfield, Mass.	1000
WATZ	Alpena Township, Michigan	1000
WHTC	Holland, Mich.	1000
WMIQ	Iron Mtn., Mich.	250
WIBM	Jackson, Mich.	1000
WKLA	Ludington, Mich.	1000
WNBY	Newberry, Mich.	1000
WHLS	Port Huron, Mich.	1000
KATE	Albert Lea, Minn.	250
KBUN	Bemidji, Minn.	1000
KBMW	Wahpeton, N.D., Breckinridge, Minn.	1000d
WELY	Ely, Minn.	1000
KFAM	St. Cloud, Minn.	1000
WROX	Clarksdale, Miss.	1000
WCJU	Columbia, Miss.	250
WJXN	Jackson, Miss.	250
WOKK	Meridian, Miss.	1000
WNAT	Natchez, Miss.	250
WROB	West Point, Miss.	1000
KFTW	Fredericktown, Mo.	1000
WMBH	Joplin, Mo.	1000
KIRX	Kirksville, Mo.	1000
KOKO	Warrensburg, Mo.	1000
KWPM	West Plains, Mo.	1000
KXXL	Bozeman, Mont.	1000
KUDI	Great Falls, Mont.	1000
KGMY	Missoula, Mont.	250
KRBN	Red Lodge, Mont.	1000
KVCK	Wolf Point, Mont.	1000
KWBE	Beatrice, Nebr.	250
KONE	Reno, Nev.	250
WKXL	Concord, N.H.	1000
WFPG	Atlantic City, N.J.	1000
WCTC	New Brunswick, N.J.	1000
KRZY	Albuquerque, N.M.	250
KLMX	Clayton, N.Mex.	1000d
KOBE	Las Cruces, N.Mex.	250
KENM	Portales, N.Mex.	1000
WCLI	Corning, N.Y.	1000
WWSC	Glen Falls, N.Y.	1000d
WHDL	Olean, N.Y.	1000
WKIP	Poughkeepsie, N.Y.	1000
WKAL	Rome, N.Y.	1000
WATA	Boone, N.C.	1000
WGNC	Gastonia, N.C.	1000
WIZS	Henderson, N.C.	1000
WHKP	Hendersonville, N.C.	1000
WHIT	New Bern, N.C.	1000
WFBS	Spring Lake, N.C.	1000
KGCA	Rugby, N.Dak.	250
WJER	Dover, Ohio	1000
WMOH	Hamilton, Ohio	1000d
WLEC	Sandusky, Ohio	1000
KWHW	Altus, Okla.	1000
KGFF	Shawnee, Okla.	1000
KSIW	Woodward, Okla.	1000
KEED	Eugene, Ore.	1000
KFLW	Klamath Falls, Ore.	1000
KLBM	La Grande, Oreg.	1000
KBPS	Portland, Ore.	250
WWGO	Erie, Pa.	1000d
WFRA	Franklin, Pa.	1000
WDAD	Indiana, Pa.	1000
WPAM	Pottsville, Pa.	1000
WMPT	S. Williamsport, Pa.	1000
WMAJ	State College, Pa.	1000d
WJPA	Washington, Pa.	250
WCPR	Coamo, P.R.	
WWRI	W. Warwick, R.I.	1000
WQSN	Charleston, S.C.	1000
WCRS	Greenwood, S.C.	1000
WMYB	Myrtle Beach, S.C.	1000
WHSC	Hartsville, S.C.	1000
KBFS	Belle Fourche, S. Dak.	1000
KYNT	Yankton, S. D.	1000
WLAR	Athens, Tenn.	1000
WMOC	Chattanooga, Tenn.	1000
WDSG	Dyersburg, Tenn.	1000
WSMG	Greeneville, Tenn.	250
WLAF	LaFollette, Tenn.	1000
WGNS	Murfreesboro, Tenn.	1000
KAYC	Beaumont, Tex.	1000
KBEN	Carrizo Sprgs., Tex.	250
KCTI	Gonzales, Tex.	250
KMBL	Junction, Tex.	1000
KCYL	Lampasas, Tex.	1000
KMHT	Marshall, Tex.	1000
KAMY	McCamey, Tex.	250
KNET	Palestine, Tex.	250
KSNY	Snyder, Tex.	1000
KURA	Moab, Utah	1000
KEYY	Provo, Utah	250
KDXU	St. George, Utah	1000
WSNO	Barre, Vt.	1000
WTSA	Brattleboro, Vt.	1000
WFTR	Front Royal, Va.	1000
WENZ	Highland Springs, Va.	1000
WREL	Lexington, Va.	1000
WMVA	Martinsville, Va.	1000
WLPM	Suffolk, Va.	1000
KBKW	Aberdeen, Wash.	1000
KCLX	Colfax, Wash.	1000
KONP	Port Angeles, Wash.	250
KAYE	Puyallup, Wash.	1000
WPAR	Parkersburg, W. Va.	1000
KFIZ	Fond du Lac, Wis.	1000
WDLB	Marshfield, Wis.	1000
WRCO	Richland Center, Wis.	1000
KBBS	Buffalo, Wyo.	250
KVOW	Riverton, Wyo.	1000

1460—205.4

WFMH	Cullman, Ala.	5000d
WPNX	Phenix City, Ala.	5000
KZOT	Marianna, Ark.	500
KCCL	Paris, Ark.	500d
KTYM	Inglewood, Calif.	5000
KDON	Salinas, Calif.	5000
KVRE	Santa Rosa, Calif.	1000d
KYSN	Colo. Sprgs., Colo.	1000
WBAR	Bartow, Fla.	1000d
WZEP	DeFuniak Springs, Florida	1000d
WMBR	Jacksonville, Fla.	5000
WDYZ	Buford, Ga.	5000d
WPNX	Columbus, Ga.	1000
WROY	Carmi, Ill.	1000d
WIXN	Dixon, Ill.	1000d
WRTL	Rantoul, Ill.	250d
WKAM	Goshen, Ind.	1000
WOCH	North Vernon, Ind.	1000d
KSO	Des Moines, Iowa	5000
KCRB	Chanute, Kans.	1000d
WRVK	Mt. Vernon, Ky.	500d
WXOK	Baton Rouge, La.	5000
KBSF	Springhill, La.	1000d
WEMD	Easton, Md.	1000
WBET	Brockton, Mass.	5000
WBRN	Big Rapids, Mich.	1000d
WPON	Pontiac, Mich.	1000
KDWA	Hastings, Minn.	1000d
KDMA	Montevideo, Minn.	1000
WELZ	Belzoni, Miss.	1000d
WACY	Moss Point, Miss.	1000d
KIRL	St. Charles, Mo.	5000d
KRNY	Kearney, Nebr.	5000d
KENO	Las Vegas, Nev.	5000
WJJZ	Mt. Holly, N.J.	
WOKO	Albany, N.Y.	5000
WVOX	New Rochelle, N.Y.	500d
WHEC	Rochester, N.Y.	5000
WAKS	Fuquay Springs, N.C.	1000d
WRKB	Kannapolis, N.C.	500d
WMMH	Marshall, N.C.	500d
WBNS	Columbus, Ohio	5000
WPVL	Painesville, O.	1000d
KROW	Dallas, Oreg.	5000d
KELR	El Reno, Okla.	500
WMBA	Ambridge, Pa.	500d
WCMB	Harrisburg, Pa.	5000
WFBA	San Sebastian, P.R.	500
WBCU	Union, S.C.	1000
WJAK	Jackson, Tenn.	5000d
WEEN	Lafayette, Tenn.	1000d
KBRZ	Freeport, Tex.	500d
KRME	Hondo, Tex.	500d
KLLL	Lubbock, Tex.	1000d
WACO	Waco, Tex.	1000
WPRW	Manassas, Va.	500d
WRAD	Radford, Va.	5000
KYAC	Kirkland, Wash.	5000d
KIMA	Yakima, Wash.	5000
WBUC	Buckhannon, W.Va.	5000d
WRAC	Racine, Wis.	500d
WTMB	Tomah, Wis.	1000d

1470—204.0

WBLO	Evergreen, Ala.	1000d
KDEW	DeWitt, Ark.	500d
KOLI	Coalinga, Calif.	500d
KUTY	Palmdale, Cal.	5000d
KXOA	Sacramento, Calif.	5000
KKEP	Estes Park, Colo.	500d
WMMW	Meriden, Conn.	1000d
WRBD	Pompano Beach, Fla.	5000
WCWR	Tarpon Springs, Fla.	5000d
WAAG	Adel, Ga.	1000d
WDOL	Athens, Ga.	1000d
WCLA	Claxton, Ga.	1000
WRGA	Rome, Ga.	5000
WMPP	Chicago Heights, Ill.	1000d
WMBD	Peoria, Ill.	5000
WHUT	Anderson, Ind.	1000d
KTRI	Sioux City, Iowa	5000
KWVY	Waverly, Iowa	1000d
KARE	Atchison, Kans.	1000
KLIB	Liberal, Kans.	1000d
WSAC	Fort Knox, Ky.	1000d
KTDL	Farmersville, La.	1000d
KPLC	Lake Charles, La.	5000
WLAM	Lewiston, Maine	5000
WJDY	Salisbury, Md.	5000d
WTTR	Westminster, Md.	1000d
WSRO	Marlborough, Mass.	1000d
WNBP	Newburyport, Mass.	500d
WKMF	Flint, Mich.	5000
WKLZ	Kalamazoo, Mich.	500d
KANO	Anoka, Minn.	1000d
WCHJ	Brookhaven, Miss.	1000d
WNAU	New Albany, Miss.	500d
KGHM	Brookfield, Mo.	500d
KTCB	Malden, Mo.	1000d
WTKO	Ithaca, N.Y.	1000d
WPDM	Potsdam, N.Y.	1000d
WBIG	Greensboro, N.C.	5000
WPNC	Plymouth, N.C.	1000d
WTOE	Spruce Pine, N.C.	1000d
WOHO	Toledo, Ohio	1000
KVLH	Pauls Valley, Okla.	250d
KVIN	Vinita, Okla.	500d
KRAF	Reedsport, Oreg.	5000d
WSAN	Allentown, Pa.	5000
WFAR	Farrell, Pa.	1000d
WWML	Portage, Pa.	500d
WQXL	Columbia, S.C.	5000d
WINH	Georgetown, S.C.	1000d
WEAG	Alcoa, Tenn.	1000d
WVOL	Berry Hill, Tenn.	5000
KRBC	Abilene, Tex.	5000
KDHN	Dimmitt, Tex.	500d
KWRD	Henderson, Tex.	500d
KCNY	San Marcos, Tex.	250d
WTZE	Tazewell, Va.	1000d
KELA	Centralia-Chehalis, Wash.	5000d
KSEM	Moses Lake, Wash.	5000
KAPS	Mount Vernon, Wash.	500d
WWHY	Huntington, W.Va.	5000d
WBZE	Wheeling, W.Va.	500d
WBKV	West Bend, Wis.	1000d

1480—202.6

WARI	Abbeville, Ala.	1000d
WLPH	Irondale, Ala.	5000d
WBTS	Bridgeport, Ala.	1000d
WABB	Mobile, Ala.	5000
KHAT	Phoenix, Ariz.	500
KGLU	Safford, Ariz.	1000
KTHS	Berryville, Ark.	1000
KWUN	Concord, Calif.	500d
KYOS	Merced, Calif.	5000
KWIZ	Santa Ana, Calif.	5000
KSEE	Santa Maria, Calif.	1000
KCMS	Manitou Springs, Colo.	500
KPUB	Pueblo, Colo.	1000d
WEHW	Windsor, Conn.	500d
WAPG	Arcadia, Fla.	1000d
WENE	Panama City Beach, Fla.	500d
WVCF	Windermere, Fla.	1000d
WYZE	Atlanta, Ga.	5000d
WRDW	Augusta, Ga.	5000
WGSB	Geneva, Ill.	1000
WJBM	Jerseyville, Ill.	500d
WTHI	Terre Haute, Ind.	5000
WRSW	Warsaw, Ind.	1000
KLEE	Ottumwa, Iowa	500d
KBEA	Mission, Kan.	1000
KLEO	Wichita, Kans.	5000
WKOA	Hopkinsville, Ky.	1000d
WNKY	Neon, Ky.	1000d
WTLO	Somerset, Ky.	1000d
KCKW	Jena, La.	500d
KANV	Jonesville, La.	500d
KJOE	Shreveport, La.	1000d
WSAR	Fall River, Mass.	5000
WMAX	Grand Rapids, Mich.	5000d
WIOS	Tawas City, Mich.	1000d
WYSI	Ypsilanti, Mich.	500d
KAUS	Austin, Minn.	1000
KEHG	Fosston, Minn.	1000d
WECP	Carthage, Miss.	500d
KGCX	Sidney, Mont.	5000
KLMS	Lincoln, Nebr.	1000
KWEW	Hobbs, N. Mex.	5000
WLEA	Hornell, N.Y.	1000d
WHOM	New York, N.Y.	5000
WADR	Remsen, N.Y.	5000d
WWKO	Fair Bluff, N.C.	1000d
WWOK	Charlotte, N.C.	5000
WYRN	Louisburg, N.C.	500d
WMSJ	Sylva, N.C.	5000
WYDK	Yadkinville, N.C.	1000d
WHBC	Canton, Ohio	5000
WCIN	Cincinnati, Ohio	5000
WTRA	Latrobe, Pa.	500d
WDAS	Philadelphia, Pa.	5000
WISL	Shamokin, Pa.	1000
WSHP	Shippensburg, Pa.	500d
WMDD	Fajardo, P.R.	5000
KSDR	Waterton, S.D.	1000d
WJFC	Jefferson City, Tenn.	500
WMQM	Memphis, Tenn.	5000d
WJLE	Smithville, Tenn.	1000d
KBOX	Dallas, Tex.	5000
KLVL	Pasadena, Tex.	1000
KAPE	San Antonio, Tex.	500d
KONI	Spanish Fork, Utah	1000d
WCFR	Springfield, Vt.	1000d
WBBL	Richmond, Va.	5000
WLEE	Richmond, Va.	5000
WBLU	Salem, Va.	5000d
KOOD	Lakewood Center, Wash.	1000d
KVAN	Vancouver, Wash.	1000d
WISM	Madison, Wis.	5000
KRAE	Cheyenne, Wyo.	1000d

1490—201.2

WANA	Anniston, Ala.	250
WAJF	Decatur, Ala.	1000
WRLD	Lanett, Ala.	1000
WHBB	Selma, Ala.	1000
KYCA	Prescott, Ariz.	1000
KAIR	Tucson, Ariz.	250
KXAR	Hope, Ark.	1000
KDRS	Paragould, Ark.	1000
KOTN	Pine Bluff, Ark.	1000
KXRJ	Russellville, Ark.	1000
KWAC	Bakersfield, Calif.	1000
KPAS	Banning, Calif.	250
KICO	Calexico, Calif.	250
KRKC	King City, Calif.	1000
KTOB	Petaluma, Calif.	1000
KBLF	Red Bluff, Calif.	1000
KDB	Santa Barbara, Calif.	1000
KOWL	So. Lake Tahoe, Cal.	250
KSYC	Yreka, Calif.	1000
KBOL	Boulder, Colo.	1000d
KGUC	Gunnison, Colo.	250
KCMS	Manitou Springs, Colo.	500
KOLR	Sterling, Colo.	250
WGCH	Greenwich, Conn.	250
WTRL	Bradenton, Fla.	250
WIBS	Deland, Fla.	1000
WIRA	Ft. Pierce, Fla.	250
WCOF	Immokalie, Fla.	250
WMBM	Miami Beach, Fla.	250
WSRA	Milton, Fla.	1000
WPXE	Starke, Fla.	1000
WTTB	Vero Beach, Fla.	1000
WSIR	Winter Haven, Fla.	500
WMOG	Brunswick, Ga.	1000
WMJM	Cordele, Ga.	1000
WMRE	Monroe, Ga.	1000d
WSFB	Quitman, Ga.	250
WSNT	Sandersville, Ga.	500
WSYL	Sylvania, Ga.	250
KOID	Caldwell, Idaho	1000
WKRO	Cairo, Ill.	250
WDAN	Danville, Ill.	1000
WAMV	East St. Louis, Ill.	1000
WOPA	Oak Park, Ill.	1000
WZOE	Princeton, Ill.	1000
WKBV	Richmond, Ind.	1000
WNDU	South Bend, Ind.	1000
KBUR	Burlington, Iowa	1000
WDBQ	Dubuque, Iowa	1000
KBAB	Indianola, Ia.	500
KRIB	Mason City, Ia.	1000
KKAN	Phillipsburg, Kans.	250
KTOP	Topeka, Kan.	1000
WFKY	Frankfort, Ky.	1000d
WKAY	Glasgow, Ky.	1000
WOMI	Owensboro, Ky.	1000
WSIP	Paintsville, Ky.	1000
WIKC	Bogalusa, La.	1000
KEUN	Eunice, La.	1000
KJIN	Houma, La.	1000
KRUS	Ruston, La.	1000
WPOR	Portland, Maine	1000
WTVL	Waterville, Maine	1000
WARK	Hagerstown, Md.	1000
WHAV	Haverhill, Mass.	1000
WMRC	Milford, Mass.	1000
WTXL	W. Springfield, Mass.	1000d
WABJ	Adrian, Mich.	1000
WMDN	Midland, Mich.	1000
WLRC	Whitehall, Mich.	1000
KXRA	Alexandria, Minn.	250
KOZY	Grand Rapids, Minn.	1000
KLGR	Redwd. Falls, Minn.	1000
WLOX	Biloxi, Miss.	1000
WCLD	Cleveland, Miss.	1000
WHOC	Philadelphia, Miss.	1000
WTUP	Tupelo, Miss.	1000
WVIM	Vicksburg, Miss.	250
KDMO	Carthage, Mo.	250
KTTR	Rolla, Mo.	1000
KDRO	Sedalia, Mo.	1000
KDBM	Dillon, Mont.	1000
KBON	Omaha, Nebr.	1000

kHz	Wave Length	W.P.
WEMJ	Laconia, N.H.	1000
WLDB	Atlantic City, N. J.	1000
KRSN	Los Alamos, N.Mex.	1000
KRTN	Raton, N.Mex.	1000
WCSS	Amsterdam, N.Y.	1000
WBTA	Batavia, N.Y.	250
WKNY	Kingston, N.Y.	1000
WICY	Malone, N.Y.	1000
WDLC	Port Jervis, N. Y.	1000
WOLF	Syracuse, N. Y.	1000
WSSB	Durham, N. C.	1000
WFLB	Fayetteville, N.C.	1000
WLOE	Leaksville, N.C.	1000
WRNB	New Bern, N.C.	1000
WRMT	Rocky Mount, N. C.	1000
WSTP	Salisbury, N. C.	1000
WSVM	Valdese, N.C.	1000
WHSL	Wilmington, N. C.	1000
KNDC	Hettinger, N.D.	1000
KOVC	Valley City, N. Dak.	1000
WBEX	Chillicothe, Ohio	1000
WJMO	Cleveland Hghts., O.	1000
WOHI	E. Liverpool, Ohio	250
WMOA	Marietta, Ohio	1000
WMRN	Marion, Ohio	1000
KWRW	Guthrie, Okla.	100
KBIX	Muskogee, Okla.	1000
KBKR	Baker, Oreg.	1000
KRNR	Roseburg, Oreg.	1000
KBZY	Salem, Oreg.	1000
WESB	Bradford, Pa.	1000
WAZL	Hazleton, Pa.	1000
WARD	Johnstown, Pa.	1000
WGAL	Lancaster, Pa.	1000
WBCB	Levittown, Pa.	1000
WMRF	Lewiston, Pa.	1000
WMGW	Meadville, Pa.	1000d
WNBT	Wellsboro, Pa.	1000
WSIB	Beaufort, S.C.	500
WGCD	Chester, S.C.	1000d
WMRB	Greenville, S.C.	1000
KORN	Mitchell, S.Dak.	1000
WOPI	Bristol, Tenn.	1000
WDXB	Chattanooga, Tenn.	1000
WROL	Fountain City, Tenn.	1000
WJJM	Lewisburg, Tenn.	1000
WDXL	Lexington, Tenn.	1000
KNOW	Austin, Tex.	250
KIBL	Beeville, Tex.	250
KBST	Big Spring, Tex.	1000
KHUZ	Borger, Tex.	250
KNEL	Brady, Tex.	250d
KWMC	Del Rio, Tex.	
KSAM	Huntsville, Tex.	250
KVOZ	Laredo, Tex.	250
KZZN	Littlefield, Tex.	1000
KPLT	Paris, Tex.	1000
KDOK	Tyler, Tex.	1000
KVWC	Vernon, Tex.	250
KVOG	Ogden, Utah	1000
WKVT	Brattleboro, Vt.	1000
WFAD	Middlebury, Vt.	1000
WIKE	Newport, Vt.	1000
WCVA	Culpeper, Va.	1000
WEC	Hampton, Va.	1000
WAYB	Waynesboro, Va.	1000
KBRO	Bremerton, Wash.	1000
KVAC	Forks, Wash.	500
KLOG	Kelso, Wash.	1000
KENE	Toppenish, Wash.	1000
KTEL	Walla Walla, Wash.	1000
WGKV	Charleston, W.Va.	1000
WTCS	Fairmont, W.Va.	1000d
WLOH	Princeton, W. Va.	1000
WSGB	Sutton, W.Va.	1000
WGEZ	Beloit, Wis.	1000d
WLCX	LaCrosse, Wis.	1000
WIGM	Medford, Wis.	1000
WOSH	Oshkosh, Wis.	1000
KLME	Laramie, Wyo.	500
KRTR	Thermopolis, Wyo.	250
KGOS	Torrington, Wyo.	1000

1500—199.9

WVSM	Rainsville, Ala.	1000d
KGMR	Jacksonville, Ark.	1000d
KBBQ	Burbank, Cal.	10000d
KXRX	San Jose, Cal.	10000
WFIF	Milford, Conn.	5000d
WTOP	Washington, D.C.	50000
WKIZ	Key West, Fla.	250
WGUL	New Port Richey, Fla.	250d
WSEM	Donaldsonville, Ga.	1000d
WDEN	Macon, Ga.	
WTHN	Thomaston, Ga.	1000d
KUMU	Honolulu, Hawaii	5000
WEEN	Genesco, Ill.	250d
WPMB	Vandalia, Ill.	250
WZBN	Zion, Ill.	250d
WBRI	Indianapolis, Ind.	5000d
WAKE	Valparaiso, Ind.	1000d
KWRG	New Roads, La.	1000d
WVOC	Battle Creek, Mich.	1000d
WJBK	Detroit, Mich.	50000d
KSTP	St. Paul, Minn.	50000
WBFN	Quitman, Miss.	1000d
KDFN	Doniphan, Mo.	1000d
WKER	Pompton Lakes, N.J.	500
WGMF	Watkins Glen, N.Y.	
WKBX	Winston-Salem, N.C.	1000d
WGIC	Xenia, O.	500d
KOSG	Pawhuska, Okla.	5000d
KPNW	Eugene, Ore.	50000
WMNT	Manati, P.R.	250
WEAC	Gaffney, S. C.	1000d
WDEB	Jamestown, Tenn.	1000d
WTNE	Trenton, Tenn.	250d
KWFA	Merkle, Tex.	250d
KTXO	Sherman, Tex.	250
KANI	Wharton, Tex.	500

1510—199.1

KALF	Mesa, Ariz.	10000d
KSOM	Ontario, Cal.	10000
KIRV	Fresno, Cal.	500d
KTIM	San Rafael, Calif.	1000d
KDKO	Littleton, Colo.	1000
WNLC	New London, Conn.	10000
WWBC	Cocoa, Fla.	250d
WINU	Highland, Ill.	250d
WJRC	Joliet, Ill.	500d
WKAI	Macomb, Ill.	1000d
KIFG	Iowa Falls, Iowa	1000d
KANS	Larned, Kan.	1000d
KPBC	Port Sulpher, La.	500d
WMEX	Boston, Mass.	50000
WJCO	Jackson, Mich.	5000d
WLKM	Three Rivers, Mich.	500
WKPO	Prentiss, Miss.	1000
KCCV	Independence, Mo.	1000d
KTTT	Columbus, Nebr.	500d
WRAN	Dover, N.J.	1000
WJIC	Salem, N.J.	250d
WPUT	Brewster, N. Y.	1000d
WEAL	Greensboro, N.C.	1000d
WBZB	Selma, N. C.	500d
WLKR	Norwalk, O.	
WAHT	Annville-Cleona, Pa.	5000d
WPSL	Monroeville, Penn.	250d
WSJW	Woodruff, S.C.	
WLAC	Nashville, Tenn.	50000
KCTX	Childress, Tex.	250d
KABH	Midland, Tex.	500d
KMOO	Mineola, Tex.	250d
KROB	Robstown, Tex.	500d
KSTV	Stephenville, Tex.	250d
WLGN	Logan, Utah	
KURB	Mountlake Terrace, Wash.	
KGA	Spokane, Wash.	50000
WAUK	Waukesha, Wis.	10000d

1520—197.4

WAOA	Opelika, Ala.	5000d
KMPG	Hollister, Cal.	500
KMFB	Mendocino, Cal.	1000d
KACY	Port Hueneme, Calif.	10000
WTLN	Apopka, Fla.	
WGNP	Indian Rocks Beach, Fla.	1000d
WIXX	Oakland Park, Fla.	1000d
WXPQ	Eatonton, Ga.	500d
WHOW	Clinton, Ill.	5000d
WLUV	Loves Park, Ill.	500d
WSVL	Shelbyville, Ind.	1000
KSIB	Creston, Iowa	1000d
WHIC	Hardinsburg, Ky.	250d
WRSL	Stanford, Ky.	500d
KXKW	Lafayette, La.	10000
WVOB	Bel Air, Md.	250d
WTRI	Brunswick, Md.	500d
WKJR	Muskegon Hts., Mich.	1000d
WYNZ	Ypsilanti, Mich.	250d
KOLM	Rochester, Minn.	10000d
KMPL	Sikeston, Mo.	5000
WSLT	Ocean City-Somers Pt., N. J.	1000d
WKBW	Buffalo, N.Y.	50000
WTHE	Mineola, N. Y.	10000d
WDSL	Mocksville, N.C.	5000
KMAV	Mayville, N. D.	250d
WBNO	Bryan, Ohio	500d
WINW	Canton, O.	1000d
WKNT	Kent, O.	1000d
WTTO	Toledo, O.	1000
KOMA	Okla. City, Okla.	50000
KYXI	Oregon City, Ore.	10000
WCHE	West Chester, Pa.	250d
WRAI	San Juan, P. R.	10000
WTGR	Myrtle Beach, S.C.	250
WKMG	Newberry,, S. C.	1000d
WSLV	Ardmore, Tenn.	1000d
WBHT	Brownsville, Tenn.	250d
WIDD	Elizabethton, Tenn.	1000d

1530—196.1

WAAO	Andalusia, Ala.	
WLCB	Moulton, Ala.	1000d
WCTR	Chestertown, Md.	1530
KCAT	Pine Bluff, Ark	250d
KTMN	Trumann, Ark.	250d
KFBK	Sacramento, Calif.	50000
KRYT	Colorado Springs, Colo.	1000d
WDJZ	Bridgeport, Conn.	
WENG	Englewood, Fla.	1000
WTTI	Dalton, Ga.	10000d
KNBI	Norton, Kan.	1000d
KWLA	Many, La.	1000d
WCTR	Chestertown, Md.	250d
WRPM	Poplarville, Miss.	10000d
WTHM	Lapeer, Mich.	5000d
WERX	Wyoming, Mich.	500d
KSMM	Shakopee, Minn.	500d
KPCR	Bowling Green, Mo.	250
KMAM	Butler, Mo.	500d
KLOL	Lincoln, Neb.	5000d
WCKY	Cincinnati, Ohio	50000
KWLG	Wagoner, Okla.	
WHYP	North East, Pa.	1000d
WMBT	Shenandoah, Pa.	250d
WUPR	Utuado, P.R.	1000d
WASC	Spartanburg, S.C.	1000
KGTN	Georgetown, Tex.	1000d
KGBT	Harlingen, Tex.	50000
KCLR	Ralls, Tex.	5000d
WQVA	Quantico, Va.	250
KCHY	Cheyenne, Wy.	10000

1540—195.0

WANL	Lineville, Ala.	
KASA	Phoenix, Ariz.	10000d
KPOL	Los Angeles, Calif.	50000
WBSR	Pensacola, Fla.	1000
WJGA	Jackson, Ga.	
WOGA	Sylvester, Ga.	1000d
WSMI	Litchfield, Ill.	1000d
WBNL	Boonville, Ind.	250d
WADM	Decatur, Ind	250d
WLOI	LaPorte, Ind.	250d
WCBK	Martinsville, Ind.	250d
KXEL	Waterloo, Iowa	50000
KNEX	McPherson, Kans.	250d
KLKC	Parsons, Kans.	250d
KCTO	Columbia, La.	1000d
WDON	Wheaton, Md.	1000
WMRR	Marshall, Mich.	250d
WLEF	Greenwood, Miss.	1000d
KBXM	Kennett, Mo.	250d
WKXR	Exeter, N.H.	
WPTR	Albany, N.Y.	50000
WPAW	E. Syracuse, N.Y.	1000d
WKYK	Burnsville, N.C.	1000d
WRFL	Charlotte, N.C.	1000d
WIFM	Elkin, N.C.	1000d
WBCO	Bucyrus, Ohio	500d
WABQ	Cleveland, Ohio	1000d
WNIO	Niles, Ohio	500d
WBTC	Ulrichville, O.	250
KZEL	Eugene, Ore.	1000d
WRCP	Philadelphia, Pa.	50000d
WPTS	Pittston, Pa.	1000d
WPME	Punxsutawney, Pa.	1000d
WADK	Newport, R.I.	1000d
WKKR	Pickens, S.C.	1000d
WBFJ	Woodbury, Tenn.	500d
KBUY	Ft. Worth, Tex.	50000d
KGBC	Galveston, Tex.	1000
KEDA	San Antonio, Tex.	
WRGM	Richmond, Va.	10000d
KFKF	Bellevue, Wash.	1000
WTKM	Hartford, Wis.	500d

1550—193.5

WAAY	Huntsville, Ala.	5000d
WMOO	Mobile, Ala.	50000d
KUAT	Tucson, Ariz.	50000d
KXEX	Fresno, Calif.	500d
KKHI	San Fran., Calif.	10000
KQXI	Arvada, Colo.	10000d
WEXT	W. Hartford, Conn.	1000d
WRIZ	Coral Gables, Fla.	10000d
WOGO	New Smyrna Beach, Fla. 250	
WYOU	Tampa, Fla.	10000d
WTHB	Augusta, Ga.	5000d
WYNX	Smyrna, Ga.	1000d
WJIL	Jacksonville, Ill.	1000d
WCSJ	Morris, Ill.	250d
WPDF	Corydon, Ind.	250d
WCVL	Crawfordsville, Ind.	250
WCTW	New Castle, Ind.	250
WKQV	Sullivan, Ind.	250d
KIWA	Sheldon, Iowa	500d
KEDD	Dodge City, Kans.	1000d
KNIC	Winfield, Kan.	250d
WIRV	Irvine, Ky.	1000d
WMSK	Morganfield, Ky.	250d
WLUX	Baton Rouge, La.	5000d
KOKA	Shreveport, La.	10000
WSER	Elkton, Md.	1000d
WSHN	Fremont, Mich.	1000d
WOKJ	Jackson, Miss.	50000
WSAO	Senatobia, Miss.	5000d
KGMO	Cape Girardeau, Mo.	5000d
KKJO	St. Joseph, Mo.	5000
KICS	Hastings, Neb.	500d
WCGR	Canadaigua, N.Y.	250
WBAZ	Kingston, N.Y.	500d
WBVM	Utica, N.Y.	1000
WPXY	Greenville, N. C.	500d
WYNA	Raleigh, N.C.	1000d
WTYN	Tryon, N.C.	1000d
WFCM	Winston-Salem, N.C.	1000d
KQWB	Fargo, N.D.	5000d
WDLR	Delaware, Ohio	500d
KMAD	Madill, Okla.	250
KREK	Sapulpa, Okla.	500d
WLOA	Braddock, Pa.	1000d
WTTC	Towanda, Pa.	500d
WKFE	Yauco, P.R.	250
WBSC	Bennetsville, S.C.	10000
KCAN	Canyon, Tex.	1000
KWBC	Navasota, Tex.	250d
WKYE	Bristol, Tenn.	1000d
WPTN	Cookeville, Tenn.	250d
WTPI	Cookville, Tenn.	250d
WKPT	Kingsport, Tenn.	10000d
KCOM	Comanche, Tex.	250d
KRGO	Salt Lake City, Utah	10000d
WKBA	Vinton, Va.	10000d
WVAB	Virginia Bch., Va.	5000d
WXVA	Charlestown, W.Va.	500d
KOQT	Bellingham, Wash.	1000d
KGAR	Vancouver, Wash.	1000d
WMIR	Lake Geneva, Wis.	1000d
WMAD	Madison, Wis.	5000d

1560—192.3

WAGC	Centre, Ala.	1000d
KDDA	Dumas, Ark.	
KBIB	Monette, Ark.	250d
KPMC	Bakersfield, Calif.	10000
KIQS	Willows, Calif.	250d
WTAI	Eau Gallie, Fla.	5000d
WYSE	Inverness, Fla.	1000
WCIK	Gordon, Ga.	5000d
WBYS	Canton, Ill.	250d
WVAK	Paoli, Ind.	250d
WRIN	Rensselaer, Ind.	1000d
KSWI	Council Bluffs, Iowa	1000d
KABI	Abilene, Kan.	250d
WPHN	Liberty, Ky.	250d
WDXR	Paducah, Ky.	10000
WBGS	Sidell, La.	1000d
WSMD	La Plata, Md.	1000d
WTPS	Portage, Mich.	1000d
WMIC	Sandusky, Mich.	1000d
KBEW	Blue Earth, Minn.	1000
KQYX	Joplin, Mo.	250d
KLTI	Macon, Mo.	250d
KTUI	Sullivan, Mo.	1000d
WQXR	New York, N.Y.	50000
WTNS	Coshocton, Ohio	1000d
WCNW	Fairfield, O.	5000d
WTOD	Toledo, Ohio	5000d
KWCO	Chickasha, Okla.	1000
WRSJ	Bayamon, P.R.	5000
WAGL	Lancaster, S.C.	10000d
WWGM	Nashville, Tenn.	10000d
WBOL	Bolivar, Tenn.	250d
KCAD	Abilene, Tex.	500d
KEGG	Daingerfield, Tex.	1000d
KHBR	Hillsboro, Tex.	250d
KGUL	Port Lavaca, Tex.	500d
KGHO	Hoquiam, Wash.	1000d
KDFL	Sumner, Wash.	250d
WFSP	Kingwood, W. Va.	1000d
WGLB	Port Washington, Wis.	250d

1570—191.1

WCRL	Oneonta, Ala.	1000d
WTQX	Selma, Ala.	5000d
KBRI	Brinkley, Ark.	250d
KBJT	Fordyce, Ark.	250d
KRSA	Alisal, Calif.	250d
KCVR	Lodi, Cal.	5000d
KACE	Riverside, Cal.	5000d
KLOV	Loveland, Colo.	250d
WTWB	Auburndale, Fla.	5000d
WFBF	Fernandino Beach, Fla.	1000d
WOKC	Okeechobee, Fla.	1000
WJOE	Ward Ridge, Fla.	250
WMES	Ashburn, Ga.	1000d
WGHD	Clayton, Ga.	1000d
WBAD	College Park, Ga.	1000d
WGSR	Millen, Ga.	250d
WOKZ	Alton, Ill.	1000d
WFRL	Freeport, Ill.	5000d
WBEE	Harvey, Ill.	5000d
WTAY	Robinson, Ill.	250d
WILO	Frankfort, Ind.	250d
WHEL	New Albany, Ind.	10000d
KMCD	Fairfield, Iowa	250d
KJFJ	Webster City, Iowa	250d
KNDY	Marysville, Kans.	250d
WKKS	Vanceburg, Ky.	250d
WABL	Amite, La.	500d
KLLA	Leesville, La.	1000
KMAP	Winnsboro, La.	1000
WPEP	Taunton, Mass.	1000d
WMLO	Beverly, Mass.	500d
WDEW	Westfield, Mass.	1000d
WMRP	Flint, Mich.	1000d
WFUR	Grand Rapids, Michigan	1000d
KUXL	Golden Valley, Minn.	1000d
WONA	Winona, Miss.	1000d
KLEX	Lexington, Mo.	250d
WAFS	Amsterdam, N.Y.	1000d
WFLR	Dundee, N.Y.	1000d
WBUZ	Fredonia, N.Y.	250d
WHRF	Riverhead, N. Y.	1000d
WTLK	Taylorsville, N.C.	500
WNCA	Siler City, N.C.	1000d
WCLW	Mansfield, O.	1000d
WPTW	Piqua, Ohio	250d
KTAT	Frederick, Okla.	250d
KOLS	Pryor, Okla.	1000d

WHITE'S RADIO LOG

kHz	Wave Length	W.P.
KOHU	Hermiston, Oreg.	1000d
WPGM	Danville, Penn.	1000d
WBUX	Doylestown, Pa.	5000d
WQTW	Latrobe, Pa.	1000d
WFGN	Gaffney, S.C.	250d
WJES	Johnston, S.C.	250d
WLSC	Loris, S.C.	1000d
KVRA	Vermillion, S.D.	
WHLP	Centerville, Tenn.	1000d
WCLE	Cleveland, Tenn.	1000d
WTRB	Ripley, Tenn.	1000d
KZOL	Farwell, Tex.	250d
KVLG	La Grange, Tex.	250d
KTER	Terrell, Tex.	250d
WSWV	Pennington Gap, Va.	1000d
WYTI	Rocky Mount, Va.	1000d
WEER	Warrenton, Va.	1000d
WAPL	Appleton, Wis.	1000d

1580—189.2

WEYY	Talladega, Ala.	1000d
KTUF	Tempe, Ariz.	50000
KPCA	Marked Tree, Ark.	250d
KFDF	Van Buren, Ark.	1000d
KMRE	Anderson, Cal.	1000d
KWIP	Merced, Calif.	500d
KDAY	Santa Monica, Cal.	50000
KHUM	Santa Rosa, Calif.	500d
KPIK	Colorado Sprgs., Colo.	5000d
WSBP	Chattachoochee, Fla.	1000d
WSRF	Ft. Lauderdale, Fla.	10000
WVGT	Mount Dora, Fla.	1000d
WCCF	Punta Gorda, Fla.	1000d
WCLS	Columbus, Ga.	1000
WNRJ	Gainsville, Ga.	10000d
WKIG	Glenville, Ga.	1000d
WKKD	Aurora, Ill.	250d
WDQN	DuQuoin, Ill.	250d
WBBA	Pittsfield, Ill.	250d
WKID	Urbana, Ill.	250d
WCNB	Connersville, Ind.	250d
WJVA	South Bend, Ind.	1000d
WAMW	Washington, Ind.	250d
KCHA	Charles City, Iowa	500d
KWNT	Davenport, Iowa	500d
KDSN	Denison, Iowa	500d
WAXU	Georgetown, Ky.	10000d
WMTL	Leitchfield, Ky.	250d
WPKY	Princeton, Ky.	250d
KLUV	Haynesville, La.	250d
KLOU	Lake Charles, La.	1000
WPGC	Bradbury Hts., Md.	10000d
WAQE	Towson, Md.	5000
WRBJ	St. Johns, Mich.	1000d
KDOM	Windom, Minn.	250d
WAMY	Amory, Miss.	5000d
WESY	Leland, Miss.	1000
WPMP	Pascagoula-Moss Point, Mississippi	1000d
KTGR	Columbia, Mo.	250d
KESM	El Dorado Springs, Mo.	500d
KNIM	Maryville, Mo.	250d
KAMJ	Cozad, Neb.	1000d
WNJH	Hammonton, N.J.	250d
WCRV	Washington, N.J.	500d
KZIA	Albuquerque, N. M.	1000d
WPAC	Patchogue, N.Y.	10000d
WZKY	Albemarle, N.C.	250d
WPYB	Benson, N.C.	500d
WVKO	Columbus, Ohio	1000d
KLTR	Blackwell, Okla.	1000d
WCOY	Columbia, Pa.	500d
WEND	Ebensburg, Pa.	1000d
WANB	Waynesburg, Pa.	250d
WORG	Orangeburg, S.C.	1000d
WBBR	Travelers Rest, S. C.	1000d
WSKT	Colonial Village, Tenn.	250d
WHHM	Henderson, Tenn.	250d
WLIJ	Shelbyville, Tenn.	1000d
WSKT	South Knoxville, Tenn.	250
KKAL	Denver City, Tex.	250d
KGAF	Gainesville, Tex.	250d
KIRT	Mission, Tex.	1000d
KTLU	Rusk, Tex.	500d
KWED	Seguin, Tex.	1000d
KBYP	Shamrock, Tex.	250d
KBGO	Waco, Tex.	1000
WILA	Danville, Va.	1000d
WPUV	Pulaski, Va.	5000d
WTTN	Watertown, Wis.	1000d

1590—188.7

WATM	Atmore, Ala.	5000d
WBIB	Centerville, Ala.	1000d
WVNA	Tuscumbia, Ala.	5000
KPBA	Pine Bluff, Ark.	1000d
KSPR	Springdale, Ark.	
KLIV	San Jose, Cal.	5000
KUDU	Ventura, Cal.	10000
KCIN	Victorville, Calif.	500d
WARV	Warwick-E. Greenwich, Conn.	
WBRY	Waterbury, Conn.	5000
WILZ	St. Petersburg Beach, Florida	1000d
WELE	S. Daytona Bch., Fla.	1000d
WALG	Albany, Ga.	5000
WLFA	Lafayette, Ga.	5000d
WTGA	Thomaston, Ga.	500d
WNMP	Evanston, Ill.	1000d
WAIK	Galesburg, Ill.	5000d
WGEE	Indianapolis, Ind.	5000d
WPCO	Mt. Vernon, Ind.	500d
KWBG	Boone, Iowa	1000
KVGB	Great Bend, Kans.	5000
WLBN	Lebanon, Ky.	1000d
KEVL	White Castle, La.	1000d
WETT	Ocean City, Md.	1000
WTVB	Coldwater, Mich.	5000
WSMA	Marine City, Mich.	1000d
WMIC	St. Helen, Mich.	500d
KRAD	E. Grand Forks, Minn.	1000d
WWUN	Jackson, Miss.	5000
KDEX	Dexter, Mo.	1000d
KPRS	Kansas City, Mo.	1000d
KCLU	Rolla, Mo.	1000d
KTCH	Wayne, Neb.	500d
WSMN	Nashua, N.H.	5000
WERA	Plainfield, N.J.	500d
WAUB	Auburn, N.Y.	500d
WEHH	Elmira Heights-Horseheads, N.Y.	500d
WGGO	Salamanca, N.Y.	5000d
WBHN	Bryson City, N. C.	500d
WCSL	Cherryville, N.C.	500d
WVOE	Chadburn, N.C.	1000
WNOS	High Point, N.C.	1000d
WAKR	Akron, Ohio	5000
WSRW	Hillsboro, Ohio	500d
KHEN	Henryetta, Okla.	500d
KTIL	Tillamook, Ore.	500d
WZUM	Carnegie, Pa.	1000d
WCBG	Chambersburg, Pa.	5000
WEEZ	Chester, Pa.	1000
WXRF	Guayama, P.R.	1000
WYNG	Warwick, R.I.	1000d
WABV	Abbeville, S.C.	1000d
WACA	Camden, S.C.	1000d
KCCR	Pierre, S. D.	250
WPIP	Collierville, Tenn.	500d
WJSO	Jonesboro, Tenn.	5000d
WDBL	Springfield, Tenn.	1000d
KGAS	Carthage, Tex.	1000d
KERC	Eastland, Tex.	500d
KINT	El Paso, Tex.	1000d
KYOK	Houston, Tex.	5000
KCBD	Lubbock, Tex.	1000
KBUS	Mexia, Tex.	500d
KTOD	Sinton, Tex.	1000
WISZ	Glen Burnie, Md.	500
WGOE	Richmond, Va.	5000d
KSND	Seattle, Wash.	5000d
WIXK	New Richmond, Wis.	5000d
WSWW	Platteville, Wis.	5000
WQTC	Two Rivers, Wis.	1000d
WAWA	West Allis, Wis.	1000d

1600—187.5

WEUP	Huntsville, Ala.	5000d
WAPX	Montgomery, Ala.	1000
KVIO	Cottonwood, Ariz.	1000d
KXEW	Tucson, Ariz.	1000
KGST	Fresno, Cal.	5000d
KWOW	Pomona, Cal.	5000
KZON	Santa Maria, Cal.	500d
KUBA	Yuba City, Calif.	5000
KLAK	Lakewood, Colo.	5000
WKEN	Dover, Del.	1000
WKTX	Atlantic Beach, Fla.	1000d
WKWF	Key West, Fla.	500
WHEW	Riviera Beach, Fla.	1000
WPRV	Wauchula, Fla.	500d
WOKB	Winter Garden, Fla.	5000d
WNGA	Nashville, Ga.	1000d
WRBN	Warner Robins, Ga.	1000d
WCGD	Chicago Hgts., Ill.	1000d
WMCW	Harvard, Ill.	500d
WBTO	Linton, Ind.	500d
WARU	Peru, Ind.	1000d
KLGA	Algona, Iowa	5000d
KCRG	Cedar Rapids, Iowa	5000
KMDO	Ft. Scott, Kans.	500d
WSTL	Eminence, Ky.	500d
WKYF	Greenville, Ky.	500d
KFNV	Ferriday, La.	1000d
KLEB	Golden Meadow, La.	1000d
KNCB	Vivian, La.	5000d
WINX	Rockville, Md.	1000
WBOS	Brookline, Mass.	5000
WTYM	East Longmeadow, Mass.	5000d
WAAM	Ann Arbor, Mich.	5000
WTRU	Muskegon, Mich.	5000
WKDL	Clarksdale, Miss.	1000d
WFFF	Columbia, Miss.	500d
KATZ	St. Louis, Mo.	5000
KTTN	Trenton, Mo.	500d
KNCY	Nebraska City, Nebr.	500d
KRFS	Superior, Nebr.	500d
WWRL	New York, N. Y.	5000
WMCR	Oneida, N.Y.	1000d
WLNG	Sag Harbor, N.Y.	500
WXKW	Troy, N.Y.	500d
WWRL	Woodside, N. Y.	5000
WGIV	Charlotte, N.C.	1000
WIDU	Fayetteville, N.C.	1000d
WHVL	Hendersonville, N.C.	1000d
WFRC	Reidsville, N.C.	1000
WKSK	W. Jefferson, N.C.	1000d
KDAK	Carrington, N.Dak.	500d
WAQI	Ashtabula, Ohio	1000d
WBLY	Springfield, Ohio	1000d
WTTF	Tiffin, Ohio	500d
KUSH	Cushing, Okla.	1000d
KASH	Eugene, Oreg.	5000
KOHI	St. Helens, Ore.	1000d
WHOL	Allentown, Pa.	500d
WHRY	Elizabethtown, Pa.	500d
WFIS	Fountain Inn, S.C.	1000d
WFNL	No. Augusta, S.C.	500d
WHBT	Harriman, Tenn.	5000d
WKBJ	Milan, Tenn.	1000d
KBRB	Borger, Tex.	5000d
KBOR	Brownsville, Tex.	1000
KWEL	Midland, Tex.	1000d
KCFH	Cuero, Tex.	500d
KYAL	McKinney, Tex.	5000d
KOGT	Orange, Tex.	1000
KBBC	Centerville, Utah	1000d
WCPK	Chesapeake, Va.	1000d
WHLL	Wheeling, W.Va.	5000d
WCWC	Ripon, Wis.	5000

Canadian AM Stations by Frequency

Canadian stations listed alphabetically by call letters within groups. Abbreviations: kHz, frequency in kilocycles; W.P., power in watts; d, operates daytime only; n, operates nighttime only. Wave length is given in meters.
Listing indicates stations on the air up to April 1, 1968.

kHz	Wave Length	W.P.
540—555.5		
CBK	Regina, Sask.	50,000
CBT	Grand Falls, Nfld.	10,000
550—545.1		
CFBR	Sudbury, Ont.	1,000d
CFNB	Fredericton, N.B.	50,000
CHLN	Trois-Rivières, Que.	10,000d
		5,000n
CKPG	Prince George, B.C.	10,000
560—525.4		
CFOS	Owen Sound, Ont.	1,000
CHCM	Marystown, Nfld.	1,000d
		500n
CHTK	Prince Rupert, B.C.	1,000d
		250n
CJKL	Kirkland Lake, Ont.	5,000
CKCN	Sept-Iles, Que.	10,000d
		5,000n
CKNL	Fort St. John, B.C.	1,000
570—526.0		
CFCB	Corner Brook, Nfld.	1,000
CJEM	Edmundston, N.B.	5,000d
		1,000n
CKCQ	Quesnel, B.C.	1,000
CKEK	Cranbrook, B.C.	1,000
CFWH	Whitehorse, Y.T.	1,000
580—516.9		
CFRA	Ottawa, Ont.	50,000d
		10,000n
CHLC	Hauterive, Que.	5,000d
		2,500n
CJFX	Antigonish, N. S.	10,000
CKAP	Kapuskasing, Ont.	1,000
CKPR	Port Arthur, Ont.	5,000d
		1,000n
CKUA	Edmonton, Alta.	10,000
CKWW	Windsor, Ont.	500
CKXR	Salmon Arm, B.C.	1,000
CKY	Winnipeg, Man.	50,000
590—508.2		
CFAR	Flin Flon, Man.	10,000d
		1,000n
CFNL	Fort Nelson, B. C.	250
CKEY	Toronto, Ont.	10,000
CKRS	Jonquiere, Que.	1,000
CFTK	Terrace, B.C.	1,000
VOCM	St. John's, Nfld.	10,000
600—499.7		
CFCF	Montreal, Que.	5,000
CFCH	Callander, Ont.	10,000d
		5,000n
CFQC	Saskatoon, Sask.	5,000
CJOR	Vancouver, B.C.	10,000
CKCL	Truro, N.S.	1,000
610—491.7		
CHNC	New Carlisle, Que.	10,000d
		5,000n
CHTM	Thompson, Man.	1,000
CJAT	Trail, B.C.	1,000
CKML	Mont Laurier, P.Q.	1,000
CKTB	St. Catharines, Ont.	10,000d
		5,000n
CKYL	Peace River, Alta.	10,000d
		1,000n
620—483.6		
CFCL	Timmins, Ont.	10,000d
		5,000n
CKCK	Regina, Sask.	5,000
CKCM	Grand Falls, Nfld.	10,000
630—475.9		
CFCO	Chatham, Ont.	10,000d
		1,000n
CFCY	Charlottetown, P. E. I.	10,000
CHED	Edmonton, Alta.	10,000
CHLT	Sherbrooke, Que.	10,000d
		5,000n
CJET	Smiths Falls, Ont.	10,000
CKAR	Huntsville, Ont.	1,000
CKDV	Kelowna, B.C.	1,000
CKRC	Winnipeg, Man.	10,000
640—468.5		
CBN	St. John's, Nfld.	10,000
680—440.9		
CHFA	Edmonton, Alta.	5,000
CHFI	Toronto, Ont.	1,000d
		10,000n
CHLO	St. Thomas, Ont.	1,000
CJCN	Grand Falls, Nfld.	10,000
CJOB	Winnipeg, Man.	10,000d
		2,500n
CKGB	Timmins, Ont.	10,000
690—434.5		
CBF	Montreal, Que.	50,000
CBU	Vancouver, B.C.	10,000
710—422.3		
CFRG	Gravelbourg, Sask.	5,000d
CHYR	Leamington, Ont.	10,000
CKVM	Ville-Marie, Que.	10,000d
		1,000n
CJOX	Grand Bank, Nfld.	1,000
730—410.7		
CHIR	Leamington, Ont.	250
CJNR	Blind River, Ont.	1,000
CKAC	Montreal, Que.	50,000
CKDM	Dauphin, Man.	10,000d
		5,000n
CKLG	North Vancouver, B.C.	10,000
740—405.2		
CBL	Toronto, Ont.	50,000
CBX	Edmonton, Alta.	50,000
790—379.5		
CFDR	Dartmouth, N.S.	5,000
CFCW	Camrose, Alta.	10,000
CKMR	Newcastle, N.B.	1,000
CKSO	Sudbury, Ont.	10,000d
		5,000n
CHIC	Brampton, Ont.	1,000d
		500n

kHz	Wave Length	W.P.
800—374.8		
CFOB	Fort Frances, Ont,	1,000d
		500n
CHAB	Moose Jaw, Sask.	10,000d
		5,000n
CHRC	Quebec, Que.	50,000
CJAD	Montreal, Que.	50,000d
		10,000n
CJBQ	Belleville, Ont.	1,000
CJLX	Fort William, Ont.	10,000d
		5,000n
CKOK	Pentieton, B.C.	10,000d
		500n
CKLW	Windsor, Ont.	50,000
VOWR	St. John's, Nfld.	1,000
810—370.2		
CHQR	Calgary, Alta.	10,000
850—352.7		
CJJC	Langley, B.C.	1,000
CKRD	Red Deer, Alta.	10,000d
		1,000n
CKVL	Verdun, Que.	50,000d
		10,000n
860—348.6		
CBH	Halifax, N.S.	10,000
CFPR	Prince Rupert, B.C.	10,000
CHAK	Inuvik, N.W.T.	1,000
CJBC	Toronto, Ont.	50,000
900—333.1		
CHML	Hamilton, Ont.	5,000
CHNO	Sudbury, Ont.	10,000d
		1,000n
CJBR	Rimouski, Que.	10,000
CJVI	Victoria, B.C.	10,000
CKBI	Prince Albert, Sask.	10,000
CKDR	Dryden, Ont.	1,000d
		250n
CKDH	Amherst, N.S.	1,000
CKJL	St. Jérôme, Que.	1,000
CKTS	Sherbrooke, Que.	1,000
CKVD	Val D'Or, Que.	10,000d
		2,500n
910—329.5		
CBO	Ottawa, Ont.	5,000
CFJC	Kamloops, B.C.	10,000d
		1,000n
CFSX	Stephenville, Nfld.	500
CHRL	Roberval, Que.	1,000
CJDV	Drumheller, Alta.	5,000
CKLY	Lindsay, Ont.	1,000
920—329.9		
CFRY	Portage La Prairie, Man.	1,000
CJCH	Halifax, N.S.	10,000d
		5,000
CJCJ	Woodstock, N.B.	1,000
CKCY	Sault Ste. Marie, Ont.	10,000d
		5,000n
CKNX	Wingham, Ont.	2,500d
		1,000n
930—322.4		
CFBC	Saint John, N.B.	10,000d
		5,000n
CJCA	Edmonton, Alberta	10,000d
		5,000n
CJON	St. John's, Nfld.	10,000
940—319.0		
CBM	Montreal, Que.	50,000
CJGX	Yorkton, Sask.	10,000
CJIB	Vernon, B.C.	10,000d
950—315.6		
CHER	Sydney, N.S.	10,000
CKBB	Barrie, Ont.	10,000d
		2,500n
CKNB	Campbellton, N.B.	10,000d
		1,000n
960—312.3		
CFAC	Calgary, Alta.	10,000
CHNS	Halifax, N.S.	10,000
CKWS	Kingston, Ont.	10,000d
		5,000n
970—309.1		
CKCH	Hull, Que.	5,000
CBZ	Fredericton, N.B.	10,000
980—305.9		
CBV	Quebec, Que.	5,000
CFPL	London, Ontario	10,000d
		5,000n
CHEX	Peterborough, Ont.	10,000d
		5,000n
CKGM	Montreal, Que.	10,000
CKNW	New Westminster, B.C.	50,000
CKRM	Regina, Sask.	10,000d
		5,000n

kHz	Wave Length	W.P.
990—302.8		
CBW	Winnipeg, Man.	50,000
CBY	Corner Brook, Nfld,	10,000
1000—299.8		
CKBW	Bridgewater, N.S.	10,000
1010—296.9		
CBR	Calgary, Alta.	50,000
CFRB	Toronto, Ont.	50,000
1050—285.5		
CFGP	Grande Prairie, Alta.	10,000
CHUM	Toronto, Ont.	50,000
CJIC	Sault Ste. Marie, Ont.	10,000d
		2,500n
CJNB	North Battleford, Sask.	10,000
CKSB	St. Boniface, Man.	10,000
1060—282.8		
CFCN	Calgary, Alta.	50,000
CJLR	Quebec, Que.	10,000
1070—280.2		
CBA	Sackville, N.B.	50,000
CFAX	Victoria, B.C.	1,000
CHOK	Sarnia, Ont.	5,000d
		1,000n
1080—277.6		
CKSA	Lloydminster, Alta.	10,000
1090—275.1		
CHEC	Lethbridge, Alta.	5,000
CHRS	St. Jean, Que.	10,000d
1110—272.6		
CBD	Saint John, N.B.	10,000
CFML	Cornwall, Ont.	1,000
CFTJ	Galt, Ont.	250d
CHQT	Edmonton, Alta.	10,000
1130—265.3		
CKWX	Vancouver, B.C.	50,000
1140—263.0		
CBI	Sydney, N.S.	10,000
CKXL	Calgary, Alta.	10,000
1150—260.7		
CHSJ	Saint John, N.B.	10,000d
		5,000n
CKOC	Hamilton, Ont.	10,000
CKTR	Trois-Rivières, Que.	10,000d
		1,000n
CKX	Brandon, Man.	10,000d
		1,000n
1170—256.3		
CFNS	Saskatoon, Sask.	1,000
1220—245.8		
CHSC	St. Catherines, Ont.	1,000d
		500n
CJOC	Lethbridge, Alta	10,000d
		5,000n
CJRL	Kenora, Ont.	1,000
CJSS	Cornwall, Ontario	1,000
CKDA	Victoria, B.C.	10,000
CKCW	Moncton, N.B.	10,000
CKSM	Shawinigan, Que.	1,000
1230—243.8		
CBDR	Schefferville, Que.	250
CFBV	Smithers, B.C.	1,000d
		250n
CFGR	Gravelbourg, Sask.	250n
CFLK	Kapuskasing, Ont.	100
CFPA	Port Arthur, Ont.	1,000d
		250n
CHFC	Churchill, Man.	250
CHVD	Dolbeau, P.Q.	1,000d
		250n
CJSA	Ste. Agathes des Monts, Que.	1,000d
		250n
CJTT	New Liskeard, Ont.	1,000d
		250n
CKLD	Thetford Mines, Que.	1,000d
		250n
CKMP	Midland, Ont.	1,000d
		250n
CKTK	Kitimat, B.C.	1,000d
		250n
VOAR	St. John's, Nfld.	100
1240—241.8		
CFLM	La Tuque, Que.	1,000d
		250n
CFLS	Lewis, P.Q.	250
CFVR	Abbotsford, B.C.	1,000d
		250n

kHz	Wave Length	W.P.
CJAF	Cabano, Que.	250
CJAV	Port Alberni, B.C.	1,000d
		250n
CJCS	Stratford	500d
		250n
CJRW	Summerside, P.E.I.	250
CJWA	Wawa, Ont.	1,000d
		250n
CKWL	Williams Lake, B.C.	250
CKBS	St. Hyacinthe, Que,	250
CKLS	Ls Sarre, Que.	250
CKOO	Osoyoos, B.C.	1,000d
		250n
1250—239.9		
CBOF	Ottawa, Ont.	10,000
CHWO	Oakville, Ont.	1,000d
CHSM	Steinbach, Man.	10,000
CKBL	Matane, Que.	10,000d
		5,000n
CKOM	Saskatoon, Sask.	10,000
1260—238.0		
CFRN	Edmonton, Alta.	50,000
1270—263.1		
CFGT	Alma, Que.	1,000
CHAT	Medicine Hat, Alta.	10,000
CHWK	Chilliwack, B.C.	10,000
CJCB	Sydney, N.S.	10,000
1280—234.2		
CHIQ	Hamilton, Ont.	10,000d
		5,000n
CHQB	Powell River, B.C.	1,000
CJMS	Montreal, Que.	50,000
CJSL	Estevan, Sask.	1,000
CKCV	Quebec, Que.	10,000d
		5,000n
1290—232.4		
CFAM	Altona, Man.	10,000d
		5,000n
CJOE	London, Ont.	10,000
1300—230.6		
CBAF	Moncton, N.B.	5,000
CJME	Regina, Sask.	1,000
1310—228.9		
CFGM	Richmond Hill, Ont.	10,000d
		2,500n
CHGB	Ste-Anne-de-la-Pocatière, Que.	5,000
CKOY	Ottawa, Ont.	50,000
1320—227.1		
CHQM	Vancouver, B.C.	50,000
CJSO	Sorel, Que.	10,000d
		5,000n
CKEC	New Glasgow, N.S.	5,000
CKKW	Kitchener, Ont.	1,000
1330—225.4		
CKKR	Rosetown, Sask.	10,000
1340—223.7		
CFGB	Goose Bay, Nfld.	1,000
CFLH	Hearst, Ont.	100
CFSL	Weyburn, Sask.	1,000d
		250n
CFYK	Yellowknife, N.W.T.	1,000
CHAD	Amos, Que.	250
CJLS	Yarmouth, N.S.	250
CFOM	Ville Vanier, Que.	250
CKAR-1	Parry Sound, Ont.	250
CKCR	Revelstoke, B.C.	250
CKNR	Elliott Lake, Ont.	250
CKOX	Woodstock, Ont.	1,000d
		250n
1350—222.1		
CHOV	Pembroke, Ont.	1,000
CJDC	Dawson Creek, B.C.	1,000
CJLM	Joliette, Que.	1,000
CKEN	Kentville, N.S.	1,000
CKLB	Oshawa, Ont.	10,000d
		5,000n
1360—220.4		
CKBC	Bathurst, N.B.	10,000
1370—218.8		
CFLV	Valleyfield, Que,	1,000
1380—217.3		
CFDA	Victoriaville, Que.	1,000
CKLC	Kingston, Ont.	10,000d
		5,000n
CKPC	Brantford, Ont.	10,000
1390—215.7		
CHOO	Ajax, Ont.	10,000
CKKC	Nelson, B.C.	1,000

kHz	Wave Length	W.P.
1400—214.2		
CFLD	Burns Lake, B. C.	250
CJFP	Rivière du Loup, Que.	10,000d
		250n
CKCB	Collingwood, Ont.	250
CKRN	Rouyn, Que,	250
CKSW	Swift Current, Sask.	1,000d
		250n
1410—212.6		
CFMB	Montreal, Que.	10,000
CFUN	Vancouver, B.C.	10,000
CKSL	London, Ont,	10,000
1420—211.1		
CJMT	Chicoutimi, Que.	1,000
CJVR	Melfort, Sask.	10,000
CKPT	Peterborough, Ont.	5,000
1430—209.7		
CKFH	Toronto, Ont,	10,000
1440—208.2		
CFCP	Courtenay, B.C,	1,000
CKPM	Ottawa, Ont.	10,000
1450—206.8		
CBG	Gander, Nfld.	250
CFAB	Windsor, N.S.	250
CFJR	Brockville, Ont.	1,000d
		250n
CHEF	Granby, Que.	1,000d
		250n
CHRT	Riviere du Loup, P.Q.	250
CHUC	Cobourg, Ont.	1,000
CJBM	Causapscal, Que.	1,000d
		250n
1460—205.4		
CJOY	Guelph, Ont.	10,000d
		5,000n
CKRB	Ville St. Georges, Que.	10,000d
		5,000n
1470—204.0		
CFOX	Pointe Claire, Que.	10,000d
		5,000n
CFRW	Winnipeg, Man.	5,000
CHOW	Welland, Ont.	1,000d
		500n
1480—202.6		
CHRD	Drummondville, Que.	10,000
1490—201.2		
CFMR	Fort Simpson, N.W.T.	25
CFRC	Kingston, Ont.	100
CHYM	Kitchener, Ont.	10,000d
		5,000n
CJSN	Shaunavon, Sask.	1,000d
		250n
CKAD	Middleton, N.S.	1,000d
		250n
CKBM	Montmagny, Que.	1,000d
		250n
CFWB	Campbell River, B.C.	250
1500—199.9		
CKAY	Ducan, B.C.	1,000
1510—199.1		
CJRS	Sherbrooke, P.Q.	10,000
CKOT	Tillsonburg, Ont.	1,000
1540—195.0		
CHIN	Toronto, Ont.	50,000
1550—193.5		
CBE	Windsor, Ont.	10,000
1560—192.3		
CFRS	Simcoe, Ont.	250d
1570—191.1		
CFOR	Orillia, Ont.	10,000d
		1,000n
CHUB	Nanaimo, B.C.	10,000
CKLM	Montreal, Que.	50,000
1580—189.2		
CBJ	Chicoutimi, Que.	10,000
1600—187.5		
CJRN	Niagara Falls, Ont.	10,000

U. S. Television Stations by States

U. S. stations listed alphabetically by cities within state groups. Territories and possessions follow states. Chan., channel; C.L., call letters. †, educational stations. Listing indicates stations on the air up to April 1, 1968.

WHITE'S RADIO LOG

Location	C.L.	Chan.
ALABAMA		
Birmingham	WBRC-TV	6
	WAPI-TV	13
	WBMG	42
	†WBIQ	10
Decatur	WMSL-TV	23
Dothan	WTVY	4
Dozier	†WDIQ	2
Florence	†WFIQ	36
	WOWL-TV	15
Huntsville	WHNT-TV	19
	†WHIQ	25
	WAAY-TV	31
Louisville	†WGIQ	43
Mobile	WKRG-TV	5
	WALA-TV	10
	†WEIQ	42
Montgomery	WSFA-TV	12
	WCOV-TV	20
	WKAB-TV	32
	†WAIQ	26
Mount Cheaha State Park	†WCIQ	7
Selma	WSLA	8
Tuscaloosa	WCFT-TV	33
ALASKA		
Anchorage	KENI-TV	2
	KTVA	11
	KHAR-TV	13
Fairbanks	KFAR-TV	2
	KTVF	11
Juneau	KINY-TV	8
Sitka	KIFW-TV	13
ARIZONA		
Nogales	XHFA-TV	2
	KZAZ	11
Phoenix	KTVK	3
	KPAZ-TV	21
	KPHO-TV	5
	KOOL-TV	10
	KTAR-TV	12
	†KAET	8
	*KPAZ-TV	21
Tucson	KVOA-TV	4
	KGUN-TV	9
	KOLD-TV	13
	†KUAT-TV	6
Yuma	KIVA	11
	KBLU-TV	13
ARKANSAS		
El Dorado	KTVE	10
Ft. Smith	KFSA-TV	5
Jonesboro	KAIT-TV	8
Little Rock	KARK-TV	4
	KATV	7
	KTHV	11
	†KETS	2
CALIFORNIA		
Bakersfield	KLYD-TV	17
	KERO-TV	23
	KBAK-TV	29
Chico	KHSL-TV	12
Corona	KBSC-TV	52
El Centro-Mexicali	XHBC-TV	3
Eureka	KIEM-TV	3
	KVIQ-TV	6
	†KRWE-TV	13
Fontana	KXLA-TV	40
Fresno	KMJ-TV	24
	KFRE-TV	30
	KJEO	47
	KAIL	53
Los Angeles	KNXT	2
	KNBC	4
	KTLA	5
	KABC-TV	7
	KHJ-TV	9
	KTTV	11
	KCOP	13
	KWHY-TV	22
	KMEX-TV	34
	†KCET	28
Modesto	KLOC-TV	19
Monterey	KMBY-TV	46
Oakland-San Francisco	KTVU	2
Palm Springs	KPLM-TV	42
Redding	KRCR-TV	7
	†KIXE-TV	9
Sacramento	KCRA-TV	3
	KXTV	10
	†KVIE	6
Salinas-Monterey	KSBW-TV	8
San Bernardino	†KVCR-TV	24
	KHOF-TV	30
San Diego	†KEBS-TV	15
	KFMB-TV	8
	KOGO-TV	10
	KCST	39
San Diego-Tijuana	XETV	6
	XEWT-TV	12
San Francisco	KRON-TV	4
	KPIX	5
	KGO-TV	7
	†KQED	9
	KSAN-TV	32
	KBHK-TV	44
San Jose	KNTV	11
	KEMO-TV	20
	KGSC-TV	36
San Luis Obispo	†KTEH	54
San Mateo	KSBY-TV	6
Santa Barbara	†KCSM-TV	14
Santa Maria	KEYT	3
Stockton-Sacramento	KCOY-TV	12
Visalia	KOVR	13
	KICU-TV	43
COLORADO		
Colo. Springs	KKTV	11
	KRDO-TV	13
Denver	KWGN-TV	2
	KOA-TV	4
	KLZ-TV	7
	KBTV	9
	†KRMA-TV	6
Durango	KREZ-TV	6
Grand Junction	KREX-TV	5
Montrose	KREY-TV	10
Pueblo	KOAA-TV	5
Sterling	KTVS	3
CONNECTICUT		
Bridgeport	*WFTT	43
	†WEDW	49
Hartford	WTIC-TV	3
	WHCT	18
	†WEDH	24
New Britain-Hartford	WHNB-TV	30
New Haven	WNHC-TV	8
Norwich	†WEDN	53
Waterbury	WATR-TV	20
DELAWARE		
Wilming.on	†WHYY-TV	12
DISTRICT OF COLUMBIA		
Washington	WRC-TV	4
	WTTG	5
	WMAL-TV	7
	WTOP-TV	9
	WFAN-TV	14
	†WETA-TV	26
	WDCA-TV	20
FLORIDA		
Clearwater	WJNR-TV	22
Daytona Beach-Orlando	WESH-TV	2
Ft. Myers	WINK-TV	11
Ft. Pierce	WTVX	34
Gainesville	†WUFT	5
Jacksonville	WJXT	4
	WFGA-TV	12
	WJKS-TV	17
	†WJCT	7
	WUMJ-TV	47
Miami	WTVJ	4
	WCIX-TV	6
	WCKT	7
	WLBW-TV	10
	†WTHS-TV	2
	†WSEC-TV	17
	WAJA-TV	23
Orlando	WDBO-TV	6
	WFTV	9
	†WMFE-TV	24
Palm Beach	WPTV	5
Panama City	WJHG-TV	7
Pensacola	WEAR-TV	3
	†WSRE	23
St. Petersburg-Tampa	WSUN-TV	38
	†WEDU	3
	WTOG	44
Tallahassee-Thomasville	WCTV	6
Tallahassee	†WFSU-TV	11
Tampa-St. Petersburg	WFLA-TV	8
	WLCY-TV	10
	WTVT	13
W. Palm Beach	†WUSF-TV	16
	WEAT-TV	12
GEORGIA		
Albany	WALB-TV	10
Ashburn	†WJIA-TV	23
Athens	†WGTV	8
Atlanta	WSB-TV	2
	WAGA-TV	5
	WAII-TV	11
	†WETV	30
	*WBMO-TV	36
	WJRJ-TV	17
Augusta	WJBF	6
	WRDW-TV	12
	WATU-TV	20
Chatsworth	†WCLP-TV	18
Cochran	†WDCO-TV	15
Columbus	WRBL-TV	3
	WTVM	9
	†WJSP-TV	28
	WYEA-TV	38
Dawson	†WACS-TV	25
Macon	WMAZ-TV	13
	WCWB-TV	41
Pelham	†WABW-TV	14
Savannah	WSAV-TV	3
	WTOC-TV	11
Waycross	†WVAN-TV	9
Wrens	†WXGA-TV	8
	†WCES-TV	20
HAWAII		
Hilo	KPUA-TV	9
	KHAW-TV	11
Honolulu	KHVO	13
	KHON-TV	2
	KHVH-TV	4
	KGMB-TV	9
	KTRG-TV	13
	†KHET	11
Walluku	KMAU-TV	3
	KAII-TV	7
	KMVI-TV	12
	†KMEB	10
IDAHO		
Boise	KBOI-TV	2
	KTVB	7
Idaho Falls-Pacatello	KID-TV	3
	KIFI-TV	8
Lewiston	KLEW-TV	3
Moscow	†KUID-TV	12
Twin Falls	KMVT	11
ILLINOIS		
Carbondale	†WSIU	8
Champaign	WCIA	3
	WICD	15
	†WILL-TV	12
Chicago	WBBM-TV	2
	WMAQ-TV	5
	WBKB-TV	7
	WGN-TV	9
	WCIU-TV	26
	WFLD	32
	†WTTW	11
	†WXXW	20
Decatur	WAND	17
Freeport	WCEE-TV	23
Harrisburg	WSIL-TV	3
La Salle	WEEQ-TV	35
Moline	WQAD-TV	8
Peoria	WIRL-TV	19
	WEEK-TV	25
	WMBD-TV	31
Quincy-Hannibal	WGEM-TV	10
Rockford	WREX-TV	13
	WTVO	17
Rock Island	WHBF-TV	4
Springfield	WICS	20
INDIANA		
Bloomington-Indianapolis	WTTV	4
Evansville	WTVW	7
	WFIE-TV	14
	WEHT	50
Ft. Wayne	WANE-TV	15
	WPTA	21
	WKJG-TV	33
Indianapolis	WFBM-TV	6
	WISH-TV	8
	WLWI	13
Lafayette	WLFI-TV	18
Marion	WTAF-TV	31
Muncie	WLBC-TV	49
Richmond	WACH-TV	43
St. John	†WCAE	50
South Bend	WNDU-TV	16
	WSBT-TV	22
South Bend-Elkhart	WSJV	28
Terre Haute	WTWO	2
	WTHI-TV	10
Vincennes	*†WVUT	22
IOWA		
Ames-Des Moines	WOI-TV	5
Cedar Rapids	KCRG-TV	9
Cedar Rapids-Waterloo	WMT-TV	2
Davenport	WOC-TV	6
Des Moines	KRNT-TV	8
	WHO-TV	13
	†KDPS-TV	11
Ft. Dodge	KVFD-TV	21
Sioux City	KCAU-TV	9
	KMEG	14
	KTiV	4
Waterloo-Cedar Rapids	KWWL-TV	7
KANSAS		
Ensign	KTVC	6
Garden City	KGLD	11
	KUPK-TV	13
Goodland	KLOE-TV	10
Great Bend	KCKT	2
Hays	KAYS-TV	7
Hutchinson-Wichita	KTVH	12
Pittsburg-Joplin, Mo.	KOAM-TV	7
Salina	*KSLN-TV	34
Topeka	WIBW-TV	13
	KTSB	27
Wichita	KARD-TV	3
	KAKE-TV	10
KENTUCKY		
Bowling Green	WLTV	13
Lexington	WLEX-TV	18
	WKYT-TV	27
	WBLG-TV	62
Louisville	WAVE-TV	3
	WHAS-TV	11
	WLKY-TV	32
	†WFPK-TV	15
Paducah	WPSD-TV	6
LOUISIANA		
Alexandria	KALB-TV	5
Baton Rouge	WBRZ	2
	WAFB-TV	9
Lafayette	KATC	3
	KLFY-TV	10
	KLNI-TV	15
Lake Charles	KPLC-TV	7
Monroe	KNOE-TV	8
New Orleans	WWL-TV	4
	WDSU-TV	6
	WVUE	12
	†WYES-TV	8
	*WWOM-TV	26
Shreveport	KTBS-TV	3
	KTAL-TV	6
	KSLA-TV	12
W. Monroe	KUZN-TV	39
MAINE		
Augusta	†WCBB	10
Bangor	WLBZ-TV	2
	WABI-TV	5
	WEMT	7
Calais	†WMED-TV	13
Orono	†WMEB-TV	12
Poland Spring	WMTW-TV	8
Portland	WCSH-TV	6
	WGAN-TV	13
Presque Isle	WAGM-TV	8
	†WMEM-TV	10
MARYLAND		
Baltimore	WMAR-TV	2
	WBAL-TV	11
	WJZ-TV	13
	WMET-TV	24
	†WETM	67
Cumberland	WTBO-TV	52
Salisbury	WBOC-TV	16
MASSACHUSETTS		
Adams	WCDC	19
Boston	WBZ-TV	4
	WHDH-TV	5
	WNAC-TV	7
	WSBK-TV	38
	†WGBH-TV	2
	†WGBX-TV	44
Cambridge-Boston	WKBG-TV	56
Greenfield	WRLP	32
Springfield	WWLP	22
	WHYN-TV	40
Worcester	WIZB-TV	14
MICHIGAN		
Battle Creek	WWWU-TV	41
Bay City-Saginaw	WNEM-TV	5
Cadillac-Traverse City	WWTV	9

Location	C.L.	Chan.
Cheboygan	WTOM-TV	4
Detroit	WJBK-TV	2
	WWJ-TV	4
	WXYZ-TV	7
	WKBD-TV	50
	†WTVS	56
Detroit-Windsor	CKLW-TV	9
Flint	WJRT-TV	12
Grand Rapids	WZZM-TV	13
Grand Rapids-Kalamazoo	WOOD-TV	8
Kalamazoo	WKZO-TV	3
Lansing	WJIM-TV	6
Lansing (Onondaga)	WILX-TV	10
Marquette	WLUC-TV	6
Mt. Pleasant	*†WCMU-TV	14
Muskegon	WMKG	54
Onondaga-East Lansing	†WMSB	10
Saginaw-Bay City	WKNX-TV	25
Sault Ste. Marie	WWUP-TV	10
Traverse City	WPBN-TV	7
University Center (Bay City)	†WUCM-TV	19

MINNESOTA

Appleton	†KWCM-TV	10
Alexandria	KCMT	7
Austin	KAUS-TV	6
Duluth	†WDSE-TV	8
	WDIO-TV	10
Duluth-Superior	KDAL-TV	3
	WDSM-TV	6
	†WDSE-TV	8
Hibbing	WIRT	13
Mankato	†KEYC-TV	12
Minneapolis-St. Paul	WCCO-TV	4
	KMSP-TV	9
	WTCN-TV	11
Rochester	KROC-TV	10
St. Paul	†KTCI-TV	17
St. Paul-Minneapolis	KSTP-TV	5
	†KTCA-TV	2
Walker	KNMT	12

MISSISSIPPI

Biloxi-Gulfport-Pascagoula	WLOX-TV	13
Columbus	WCBI-TV	4
Greenwood	WABG-TV	6
Gulfport	WROA-TV	25
Hattiesburg-Laurel	WDAM-TV	7
	WLBT	3
Jackson	WJTV	12
Meridian	WTOK-TV	11
Tupelo	WTWV	9

MISSOURI

Cape Girardeau	KFVS-TV	12
Columbia	KOMU-TV	8
Hannibal-Quincy	KHQA-TV	7
Jefferson City	KRCG	13
Joplin	KODE-TV	12
	KUHI-TV	16
Kansas City	WOAF-TV	4
	KCMO-TV	5
	KMBC-TV	9
	†KCSD-TV	19
Kirksville-Ottumwa, Ia.	KTVO	3
Poplar Bluff	*KPOB-TV	15
St. Joseph	KFEQ-TV	2
St. Louis	KTVI	2
	KMOX-TV	4
	KSD-TV	5
	KPLR-TV	11
	†KETC	9
Sedalia	KMOS-TV	6
Springfield	KYTV	3
	KTTS-TV	10

MONTANA

Billings	KOOK-TV	2
	KULR-TV	8
Butte	KXLF-TV	4
Glendive	KXGN-TV	5
Great Falls	KRTV	3
	KFBB-TV	5
Helena	KBLL-TV	12
Kalispell	WCFW-TV	9
Missoula	KGVO-TV	13

NEBRASKA

Albion	KHQL-TV	8
Alliance	†KTNE-TV	18
Bassett	†KMNE-TV	7
Grand Island	KGIN-TV	11
Hastings	KHAS-TV	5
Hayes Center	KHPL-TV	6
Hay Springs	KDUH-TV	4
Henderson	KHBV	5
Kearney-Holdrege	KHOL-TV	13
Lexington	†KLNE-TV	3
Lincoln	KOLN-TV	10
	†KUON-TV	12
McCook	KOMC	8
Norfolk	†KXNE-TV	19
No. Platte	KNOP-TV	2
	†KPNE-TV	5
Omaha	KMTV	3
	WOW-TV	6
	KETV	7
	†KYNE-TV	26
	KAKS	42
Scottsbluff-Gering	KSTF	10
Superior	KHTL-TV	4

NEVADA

Henderson	KHBV	5
Las Vegas	KORK-TV	2
	KLAS-TV	8
	KSHO-TV	13
Reno	KCRL	4
	KOLO-TV	8
	KTVN	2

NEW HAMPSHIRE

Durham	†WENH	11
Lebanon	WRLH	49
Littleton	†WLED-TV	49
Manchester	WMUR-TV	9

NEW JERSEY

Burlington	WKBS-TV	48
Linden (Newark)	WNJU-TV	47
Wildwood	WCMC-TV	40

NEW MEXICO

Albuquerque	KOB-TV	4
	KOAT-TV	7
	KGGM-TV	13
	†KNME-TV	5
	KAVE-TV	6
Carlsbad	KFDW-TV	12
Clovis	KSWS-TV	8
Roswell	KBIM-TV	10

NEW YORK

Albany	WTEN	10
	WAST	13
	WEEE-TV	67
Binghamton	WNBF-TV	12
	WBJA-TV	34
	WINR-TV	40
	†WSKG	46
Buffalo	WGR-TV	2
	WBEN-TV	4
	WKBW-TV	7
	†WNED-TV	17
Carthage-Watertown	WWNY-TV	7
Elmira	WSYE-TV	18
Jamestown	WNYP	26
New York	WCBS-TV	2
	WNBC-TV	4
	WNEW-TV	5
	WABC-TV	7
	†WNYE-TV	25
	WOR-TV	9
	WPIX	11
	†WNDT	13
	#WNYC-TV	31
Plattsburgh	WPTZ	5
Rochester	WROC-TV	8
	WHEC-TV	10
	WAAE-TV	13
	†WXXI	21
Schenectady	WRGB	6
	†WMHT	17
Syracuse	WSYR-TV	3
	WHEN-TV	5
	WNYS-TV	9
	†WCNY-TV	24
Utica	WKTV	2

NORTH CAROLINA

Asheville	WLOS-TV	13
	WISE-TV	62
	†WUNF-TV	33
Chapel Hill	†WUNC-TV	4
Charlotte	WBTV	3
	WCTU-TV	36
	WSOC-TV	9
	†WTVI	42
	*WCTU-TV	36
Columbia	†WUND-TV	2
Concord	†WUNG-TV	58
Durham-Raleigh	WTVD	11
Greensboro	WFMY-TV	2
	WUBC	48
Greenville	WNCT-TV	9
Hickory	WHKY-TV	14
High Point	WGHP-TV	8
New Bern	WNBE-TV	12
Linville	†WUNE-TV	17
Raleigh-Durham	WRAL-TV	5
Washington	WITN-TV	7
Wilmington	WWAY	3
	WECT	6
Winston-Salem	WSJS-TV	12

NORTH DAKOTA

Bismarck	KFYR-TV	5
	KXMB-TV	12
Devils Lake—Grand Forks	WDAZ-TV	57
Dickinson	KDIX-TV	2
Fargo	WDAY-TV	6
	KTHI-TV	11
Minot	KMOT	10
	KXMC-TV	13
Pembina	KCND-TV	12
Valley City	KXJB-TV	4
Williston	KUMV-TV	8

OHIO

Akron	WAKR-TV	49
Athens	†WOUB-TV	20
Bowling Green	†WBGU-TV	70
Canton	WJAN	17
Cincinnati	WLWT	5
	WCPO-TV	9
	WKRC-TV	12
	†WCET	48
	*WSCO-TV	19
Cleveland	WKYC-TV	3
	WEWS	5
	WJW-TV	8
	†WVIZ-TV	25
	WKBF-TV	61
Columbus	WLWC	4
	WTVN-TV	6
	WBNS-TV	10
	†WOSU-TV	34
Dayton	WLWD	2
	WHIO-TV	7
	WKEF	22
Defiance	WDNB-TV	65
Kettering (Dayton)	WKTR-TV	16
Lima	WIMA-TV	35
Newark	†WGSF	28
Oxford	†WMUB-TV	14
Portsmouth	WRLO	30
Steubenville-Wheeling, W. Va.	WSTV-TV	9
Toledo	WTOL-TV	11
	WSPD-TV	13
	WDHO-TV	24
	†WGTE-TV	30
	WDKS-TV	54
Youngstown	WFMJ-TV	21
	WKBN-TV	27
	WYTV	33
Zanesville	WHIZ-TV	18

OKLAHOMA

Ada	KTEN	10
Ardmore		
Sherman-Denison, Tex.	KXII	12
Lawton	KSWO-TV	7
Oklahoma City	WKY-TV	4
	KOCO-TV	5
	KWTV	9
	†KETA	13
	†KOKH-TV	25
Sayre	KFDO-TV	8
Tulsa	KVOO-TV	2
	KOTV	6
	KTUL-TV	8
	†KOED-TV	11

OREGON

Coos Bay	KCBY-TV	11
Corvallis	†KOAC-TV	7
Eugene	KEZI-TV	9
	KVAL-TV	13
Klamath Falls	KOTI	2
La Grande	KTVR	13
Medford	KTVM	5
	KMED-TV	10
Portland	KATU	2
	KOIN-TV	6
	KGW-TV	8
	KPTV	12
	†KOAP-TV	10
	KPVC-TV	24
Roseburg	KPIC	4

PENNSYLVANIA

Allentown	†WLVT-TV	39
Altoona	WFBG-TV	10
Clearfield	†WPSX-TV	3
Erie	WICU-TV	12
	WJET-TV	24
	WSEE	35
	†WQLN	54
Harrisburg	WHP-TV	21
	WTPA	27
Hershey	†WITF-TV	33
Johnstown	WJAC-TV	6
	WARD-TV	56
Lancaster	WGAL-TV	8
Lebanon	WLYH-TV	15
Philadelphia	KYW-TV	3
	WFIL-TV	6
	WCAU-TV	10
	WPHL-TV	17
	WIBF-TV	29
	WKBS-TV	48
	†WUHY-TV	35
Pittsburgh	KDKA-TV	2
	WTAE-TV	4
	WIIC-TV	11
	†WQED	13
	†WQEX	16
	*WECO-TV	53
Scranton	WDAU-TV	22
	†WVIA-TV	44
Scranton-Wilkes-Barre	WNEP-TV	16
	WBRE-TV	28
York	WSBA-TV	43

RHODE ISLAND

Providence	WJAR-TV	10
	WPRI-TV	12
	†WSBE	36
Providence-New Bedford	WTEV	6

SOUTH CAROLINA

Allendale	WEBA-TV	14
Anderson	WAIM-TV	40
Charleston	WUSN-TV	2
	WCIV	4
	WCSC-TV	5
	†WITV	7
Columbia	WIS-TV	10
	WNOK-TV	19
	WOLO-TV	25
	†WRLK-TV	35
Florence	WBTW	13
	†WJPM-TV	33
Greeenville	WFBC-TV	4
	†WNTV	29
Spartanburg	WSPA-TV	7

SOUTH DAKOTA

Aberdeen	KXAB-TV	9
Brookings	†KESD-TV	8
Deadwood-Lead	KDSJ-TV	5
Florence (Watertown)	KDLO-TV	3
Lead	KHSD-TV	11
Mitchell	KORN-TV	5
Rapid City	†KBHE-TV	9
	KOTA-TV	3
	KRSD-TV	7
Reliance	KPLO-TV	6
Sioux Falls	KELO-TV	11
	KSOO-TV	13
Vermillion	†KUSD-TV	2

TENNESSEE

Chattanooga	WRCB-TV	3
	WTVC	9
	WDEF-TV	12
Jackson	WBBJ-TV	7
Johnson City-Bristol-Kingsport	WJHL-TV	11
Knoxville	WATE-TV	6
	WBIR-TV	10
	WTVK	26
Lexington	†WLJT-TV	11
Memphis	WREC-TV	3
	WMCT	5
	WHBQ-TV	13
	†WKNO-TV	10
Nashville	WSM-TV	4
	WLAC-TV	5
	WSIX-TV	8
	†WDCN-TV	2
Sneedville	†WSJK-TV	2

TEXAS

Abilene	KRBC-TV	9
Amarillo	KGNC-TV	4
	KVII-TV	7
	KFDA-TV	10
	KTBC-TV	7
Austin	KHFI-TV	42
Beaumont	KFDM-TV	6
	KBMT	12
Big Spring	KWAB-TV	4
Bryan	KBTX-TV	3
Corpus Christi	KIII	3
	KRIS-TV	6
	KZTV	10
Dallas-Fort Worth	KRLD-TV	4
	WFAA-TV	8
	†KERA-TV	13
	KMEC-TV	23
	KDTV	39
El Paso	KROD-TV	4
	KTSM-TV	9
	KELP-TV	13
El Paso-Juarez	XEPM-TV	2
	XEJ-TV	5
Ft. Worth-Dallas	WBAP-TV	5
	KFWT	40
	KTVT	11
Galveston	KVYE-TV	16
Harlingen	KGBT-TV	4
Houston	KPRC-TV	2
	KHOU-TV	11
	KTRK-TV	13
	KHTV	39
	†KUHT	8
Longview	KHER	16
Laredo	KGNS-TV	8
	KVTV	12
Lubbock	KCBD-TV	11
	KLBK-TV	13
	†KTXT-TV	5

WHITE'S

RADIO LOG

Location	C.L.	Chan.
	KKBC-TV	34
Lufkin	KTRE-TV	9
Midland-Odessa	KMID-TV	2
Monahans	KVKM-TV	9
Odessa	KOSA-TV	7
Port Arthur-Beaumont	KJAC-TV	4
Richardson	†KRET-TV	23
San Angelo	KACB-TV	3
	KCTV	8
San Antonio	WOAI-TV	4
	KENS-TV	5
	KSAT-TV	12
	KWEX-TV	41
San Antonio-Austin	†KLRN-TV	9
Sweetwater-Abilene	KTXS-TV	12
Temple-Waco	KCEN-TV	6
Tyler-Longview	KLTV	7
Waco	KWTX-TV	10
Weslaco	KRGV-TV	5
Wichita Falls	KFDX-TV	3
	KAUZ-TV	6

UTAH

Logan	†KUSU-TV	12
Ogden	†KOET	9
	†KWCS-TV	18
Provo	†KBYU-TV	11
Salt Lake City	KUTV	2
	KCPX-TV	4
	KSL-TV	5
	†KUED	7

VERMONT

Burlington	WCAX-TV	3
	†WETK	30
Rutland	†WVER	28
St. Johnsbury	WVTB	20
Windsor	†WVTA	41

VIRGINIA

Bristol	WCYB-TV	5
Hampton-Norfolk	WVEC-TV	13
	†WHRO-TV	15
Harrisonburg	WSVA-TV	3
Lynchburg-Roanoke	WLVA-TV	13
Norfolk	WTAR-TV	3
Petersburg-Richmond	WXEX-TV	8
Portsmouth	#WYAH-TV	27
Portsmouth-Norfolk	WAVY-TV	10
Richmond	WTVR-TV	6
	WRVA-TV	12
	†WCVE-TV	23
	†WCVW	57
Roanoke	†WBRA-TV	15
	WDBJ-TV	7
	WSLS-TV	10
	WRFT-TV	27
Staunton	†WVPT	51

WASHINGTON

Bellingham	KVOS-TV	12
Pasco	KEPR-TV	19
Pullman	†KWSC-TV	10
Richland	KNDU	25
Seattle	KOMO-TV	4
	KING-TV	5
	KIRO-TV	7
	†KCTS-TV	9
Spokane	KREM-TV	2
	KXLY-TV	4
	KHQ-TV	6
	†KSPS-TV	7
Tacoma-Seattle	KTNT-TV	11
Tacoma	KTVW	13
	KLAY-TV	20
	†KPEC-TV	56
	†KTPS	62
Yakima	KNDO	23
	KIMA-TV	29
	†KYVE-TV	47

WEST VIRGINIA

Bluefield	WHIS-TV	6
Charleston	WCHS-TV	8
	WTIP-TV	23
Clarksburg	WBOY-TV	12
Huntington	†WMUL-TV	67
Huntington-Charleston	WSAZ-TV	3
	WHTN-TV	13
Oak Hill	WOAY-TV	4
Parkersburg-Marietta, O.	WTAP-TV	15
Weston	WDTV	5
Wheeling Steubenville, O	WTRF-TV	7

WISCONSIN

Eau Claire	WEAU-TV	13
Green Bay	WBAY-TV	2
	WFRV-TV	5
	WLUK-TV	11
LaCrosse	WKBT	8
Madison	WISC-TV	3
	WMTV	15
	WKOW-TV	27
Milwaukee	†WHA-TV	21
	WTMJ-TV	4
	WITI-TV	6
	WISN-TV	12
	WVTV	18
	†WMVS	10
	†WMVT	36
Rhinelander	WAEO-TV	12
Wausau	WSAU-TV	7
	WAOW-TV	9

WYOMING

Casper	KTWO-TV	2
Cheyenne	KFBC-TV	5
Riverton	KWRB-TV	10

GUAM

Agana	KUAM-TV	8

PUERTO RICO

Aquadilla	WOLE-TV	12
Caguas	WKBM-TV	11
Mayaguez	WORA-TV	5
	†WIPM-TV	3
Ponce	WRIK-TV	7
	WSUR-TV	9
	*WPSJ	14
San Juan	WKAQ-TV	2
	WAPA-TV	4
	†WIPR-TV	6
	WTSJ	18
	WITA-TV	30

VIRGIN ISLANDS

Charlotte Amalie	WBNB-TV	10
Christiansted	WSVI	8

Canadian Television Stations by Cities

Canadian stations listed alphabetically by cities. Abbreviations: Chan., channel; C.L., call letters.

Location	C.L.	Chan.
Adams Hill, B.C.	CFCR-TV-8	11
Altkane, Sask.	CKBI-TV-1	10
Amherst, N.S.	CJCH-TV-3	8
Antigonish, N.S.	CJCB-TV-2	9
Argentia, Nfld.	CJOX-TV	3
Ashcroft, B.C.	CFCR-TV-2	10
Ashmont, Alta.	CFRN-TV-4	12
Athabasca, Alta.	CBXT-1	8
Atikokan, Ont.	CBWCT-1	7
Avola, B.C.	CFCR-TV-13	3
Baldy Mountain, Man.	CKSS-TV	8
Baie St. Paul, Que.	CKRT-TV-1	2
Bancroft, Ont.	CHEX-TV-1	2
Banff, Alta.	CKRD-TV-2	10
	CFCN-TV-2	8
	CHCT-TV-2	13
Barrie, Ont.	CKVR-TV	3
Bayview, N.S.	CJCH-TV-2	6
Big River, Sask.	CKBI-TV-5	9
Bon Accord, N.B.	CHSJ-TV-1	6
Bonavista, Nfld.	CJON-TV-2	10
Bonnyville, Alta.	CKSA-TV-2	9
Boss Mountain, B.C.	CFCR-TV-16	7
Boston Bar, B.C.	CFCR-TV-9	5
Bowen Island, B.C.	CBUT-4	13
Bowen Island, B.C.	CHAN-TV-2	3
Bralorne, B.C.	CFCR-TV-15	3
Brandon, Man.	CKX-TV	5
Brooks, Alta.	CFCN-TV-3	9
Bullhead Mt., B.C.	CJDC-TV-2	8
Burmis, Alta.	CJLH-TV-3	3
Burnaby, B.C.	CHAN-TV	8
Burns Lake, B.C.	CFTK-TV-3	4
Cabano, P.Q.	CKRT-TV-4	5
Calgary, Alta.	CFCN-TV	4
Calgary, Alta.	CHCT-TV	2
Callander, Ont.	CFCH-TV	10
Campbellton, N.B.	CKCD-TV	7
Camp Woss, B.C.	CFNV-TV-1	3
Canning, N.S.	CJCH-TV-1	10
Canoe, B.C.	CHBC-TV-8	3
Canoe Mountain, Near Valemont, B.C.	CFCR-TV-14	8
Carleton, Que.	CHAU-TV	5
Carlyle Lake, Sask.	CFSS-TV	7
Castlegar, B.C.	CBUAT-2	3
Causapscal, Que.	CKBL-TV-5	6
Cawston, B.C.	CHKC-TV-3	3
Celista, B.C.	CHBC-TV-6	6
Chandler, Que.	CHAU-TV-4	7
Chapleau, Ont.	CFCL-TV-6	7
Charlottetown, P.E.I.	CFCY-TV	13
Cherryville, B.C.	CJWR-TV-1	10
Chicoutimi, P.Q.	CJPM-TV	6
Chilliwack, B.C.	CHAN-TV-1	11
Cheticamp, N.S.	CBFCT	10
Chicoutimi, Que.	CKRS-TV-2	2
Churchill, Man.	CHGH-TV	4
Clearwater, B.C.	CFCR-TV-10	2
Clinton, B.C.	CFCR-TV-4	9
Cloridorme, Que.	CHAU-TV-8	8
Coleman, Alta.	CJLH-TV-1	12
Corner Brook, Nfld.	CBYT	5
Corner Brook, Nfld.	CJON-TV-1	10
Cornwall, Ont.	CJSS-TV	8
Coronation, Alta.	CKRD-TV-1	10
Colgate, Saskatchewan	CKCK-TV-1	12
Courtenay, B.C.	CBUT-1	9
Cranbrook, B.C.	CBUBT	10
Crawford Bay, B.C.	CBUAT-3	5
Crescent Valley, B.C.	CHMS-TV-1	5
Creston, B.C.	CBUAT-3	3
Dawson Creek, B.C.	CJDC-TV	5
Deer Lake, Nfld.	CBYAT	12
Drumheller, Alta.	CFCN-TV-1	12
Drumheller, Alta.	CHCT-TV-1	8
Dryden, Ont.	CBWDT	9
Eastend, Sask.	CJFB-TV-1	2
Edmonton, Alta.	CBXT	5
Edmonton, Alta.	CFRN-TV	3
Edmundston, N.B.	CJBR-TV-1	13
Elliott Lake, Ont.	CBFST-3	12
Elliot Lake, Ont.	CKSO-TV-1	3
Enderby, B.C.	CFEN-TV-1	5
Enderby, B.C.	CHBC-TV-5	72
Falkland, B.C.	CFWS-TV-1	5
Fisher Branch, Man.	CBWT-1	10
Flin Flon, Man.	CBWBT	10
Fort Francis, Ont.	CBWCT	5
Fort Fraser, B.C.	CKPG-TV-3	6
Foxwarren, Man.	CKX-TV-1	11
Gaspe, Que.	CHAU-TV-6	10
Gaspe West, Que. (Bechervaise Mountain)	CFGW-TV-1	6
Geraldton, Ont.	CBLAT	13
Goose Bay, Nfld.	CFLA-TV	8
Grand Bank, Nfld.	CJOX-TV-1	10
Grand Falls, Nfld.	CBNAT	11
Grand Falls, Nfld.	CJCN-TV	4
Grand Forks, B.C.	CBUAT-5	5
Grande Prairie, Alta.	CBXAT	10
Grande Vallee	CKBL-TV-3	11
Greenwater Lake, Sask.	CKBI-TV-3	4
Haliburton, Ont.	CKVR-TV-3	5
Halifax, N.S.	CBHT	3
Halifax, N.S.	CJCH-TV	5
Hamilton, Ont.	CHCH-TV	11
Hearst, Ont.	CBFOT-2	7
	CFCL-TV-4	4
High Prairie, Alta.	CBXAT-2	2
Hinton, Alta.	CBXT-3	8
Hixon, B.C.	CKPG-TV-1	10
Houston, B.C.	CFTK-TV-10	2
Hudson Hope, B.C.	CJDC-TV-1	11
Huntsville, Ont.	CKVR-TV-2	8
Invermere, B.C.	CFWL-TV-1	6
Inverness, N.S.	CJCB-TV-1	6
Jasper, Alta.	CBXT-4	5
Jonquiere, Que.	CKRS-TV	12
Jubilee Mountain, B.C.	CFWL-TV-2	8
Juskatla, B.C.	CFTK-TV-7	2
Kamloops, B.C.	CFCR-TV	4
Kapuskasing, Ont.	CBFOT-1	12
Kapuskasing, Ont.	CFCL-TV-3	3
Kearns, Ont.	CFCL-TV-2	2
Kemano, B.C.	CFTK-TV-5	2
Kelowna, B.C.	CHBC-TV	2
Kenora, Ont.	CBWAT	8
Keremeos, B.C.	CHKC-TV-1	5
Kildala, B.C.	CFTK-TV-4	5
Kingston, Ont.	CKWS-TV	11
Kitchener, Ont.	CKCO-TV	13
Kokish, B.C.	CFKB-TV-2	9
Labrador City, Nfld.	CJCL-TV	13
Lake Louise, Alta.	CFLL-TV-1	6
L'Anse a Valleau, Que.	CHAU-TV-9	7
Lawn, Nfld.	CJOX-TV-2	10
Lethbridge, Alta.	CJLH-TV	7
Lillooet, B.C.	CFCR-TV-1	11
Liverpool, N.S.	CBHT-1	12
Lloydminster, Alta.	CKSA-TV	2
London, Ont.	CFPL-TV	10
Lookout Ridge, Near Chilliwack, B.C.	CBUT-2	3
Lumby, B.C.	CHID-TV-1	5
Lynn Lake, Man.	CBTA-TV	8
Mabel Lake, B.C.	CHPP-TV-1	8
Magdalen Islands, Que.	CBFCT-1	12
Malakwa, B.C.	CFFI-TV-1	5
Malartic, Que.	CFCL-TV-5	5
Manicouagan, Que.	CKHQ-TV-1	10
Manitouwadge, Ont.	CBLAT-1	8
Marquis, Sask.	CKMJ-TV	7
Marystown, Nfld.	CBNT-3	5
Matagami, Que.	CKRN-TV-4	7
Matane, Que.	CKBL-TV	9
	CKBL-TV-6	6
Meadow Lake, Sask.	CKSA-TV-1	12
Medicine Hat, Alta.	CHAT-TV	6
Melita, Man.	CKX-TV-2	9
Merritt, B.C.	CFCR-TV-3	10
Mica Creek Village, B.C.	CFZQ-TV-2	5
Micoua, Que.	CKHQ-TV-3	6
Midway, B.C.	CKMY-TV-1	7
Minden, Ont.	CHEX-TV-2	10
Moncton, N.B.	CBAFT	11
Moncton, N.B.	CKCW-TV	2
Mont Blane Perce, Que.	CFGW-TV-2	8
Mont Climont, Que.	CKBL-TV-1	11
Mont Georges, Que.	CKHQ-TV-5	13
Mont-Laurier, Que.	CBFT-2	3
Mont-Louis, Que.	CKBL-TV-4	2
Mont Tremblant, Que.	CBFT-1	11
Montreal, Que.	CBFT	2
Montreal, Que.	CBMT	6
Montreal, Que.	CFCF-TV	12
Montreal, Que.	CFTM-TV	10
Moose Jaw, Sask.	CHAB-TV	4
Mount Timothy, B.C.	CFCR-TV-6	5
Moyie, B.C.	CKVS-TV-1	5
Mt. Parizeau, B.C.	CFTK-TV-8	5
Mt. Poole (near Queen Charlotte) B.C.	CHQC-TV-1	4
Murdochville, Que.	CKBL-TV-2	6
	CKMU-TV-1	3
Nakusp, B.C.	CJNP-TV-1	2
	CJNP-TV-2	4
Nass Camp (Near Lava Lake) B.C.	CFTK-TV-6	5
Nelson, B.C.	CBUAT-1	9
Newcastle, N.B.	CKAM-TV-1	7
Newcastle Ridge, B.C.	CFKB-TV-1	7
New Denver, B. C.	CHSL-TV-1	6
New Glasgow, N.S.	CFCY-TV-1	7
Ninkish, B.C.	CFNV-TV-2	6
Nipawin, Sask.	CKBI-TV-4	2
North Battleford, Sask.	CKBI-TV-2	7
Ocean Falls, B.C.	CFTK-TV-9	2
Olalla	CHKC-TV-2	11
Oliver, B.C.	CHBC-TV-3	8
Ottawa, Ont.	CBOFT	9
	CBOT	4
	CJOH-TV	13
Outardes, Que.	CKHQ-TV-2	12
	CKHQ-TV-4	7
Parry Sound, Ont.	CKVR-TV-1	11
Passmore, B.C.	CHMS-TV-2	2
Peace River, Alta.	CBXAT-1	7
Peachland, B.C.	CHPT-TV-1	5
Pembroke, Ont.	CHOV-TV	5
Penticton, B.C.	CHBC-TV-1	13
Perce, Que.	CHAU-TV-5	2
Perrys, B.C.	CHMS-TV-3	5
Peterborough, Ont.	CHEX-TV	12
Pivot, Alta.	CHAT-TV-1	4

Location	C.L.	Chan.
Placentia, Nfld.	CBNT-2	12
Port Albernie, B.C.	CBUT-3	4
Port Alfred, Que.	CKRS-TV-1	9
Port Alice, B.C.	CKPA-TV-1	2
Port Arthur, Ont.	CKPR-TV	2
Port Aux Basques, Nfld.	CBYBT	3
Port Daniel, Que.	CHAU-TV-3	10
Port Hardy, B.C.	CFKB-TV-3	3
Port Renfrew, B.C.	CJTV-TV-1	11
Port Rexton, Nfld.	CBNT-1	13
Prince Albert, Sask.	CKBI-TV	5
Prince George, B.C.	CKPG-TV	2
Princeton, B.C.	CHGP-TV-1	5
Prince Rupert	CFTK-TV-1	6
Promontory Mountain, B.C.	CFCR-TV-12	5
Quebec, Que.	CBVT	11
	CFCM-TV	4
	CKMI-TV	5
Quesnel, B.C.	CFCR-TV-11	7
Quesnel, B.C.	CKCQ-TV-1	13
Red Deer, Alta.	CKRD-TV	6
Red Lake, Ont.	CBWET	10
Regina, Sask.	CHRE-TV	9
Regina, Sask.	CKCK-TV	2
Revelstoke, B.C.	CFZQ-TV-1	9
Rimouski, Que.	CJBR-TV	3
Riverhurst, Sask.	CJFB-TV-3	10
Rivière-au-Renard	CHAU-TV-7	7
Rivière du Loup, Que.	CKRT-TV	7
Riviere du Loup, Que.	CKRT-TV-3	13
Roberval, Que.	CKRS-TV-3	8
Rouyn, Que.	CKRN-TV	4
Saint John, N.B.	CHSJ-TV	4
Salmon Arm, B.C.	CHBC-TV-4	9
Saskatoon, Sask.	CFQC-TV	8
Sault Ste. Marie, Ont.	CJIC-TV	2
Savona, B.C.	CFCR-TV-7	8
Schefferville, Que.	CFKL-TV	11
Senneterre, Que.	CKRN-TV-1	7
Sheet Harbour, N.S.	CBHT-4	11
Shelburne, N.S.	CBHT-2	8
Sherbrooke, Que.	CHLT-TV	7
Sioux Lookout, Ont.	CBWDT-1	12
Skaha Lake (near Penticton), B.C.	CHBC-TV-7	10
Smithers, B.C.	CFTK-TV-2	5
Sointula, B.C.	CFKB-TV-4	5
Spences Bridge, B.C.	CJNA-TV-1	3
Squamish, B.C.	CHAN-TV-3	7
Squamish, B.C.	CBUT-5	11
St. Andrews, Nfld.	CBYBT-1	6
St. Georges de Beauce, P.Q.	CBVT-1	2
St. John's, Nfld.	CBNT	8
	CJON-TV	6
Ste. Marguerite-Marie, Que.	CHAU-TV-1	2
St. Quentin, N.B.	CHAU-TV-2	10
Ste. Rose du Dégelé, Que.	CKRT-TV-2	2
Stephenville, Nfld.	CBYT-1	8
Stranraer, Sask.	CFQC-TV-1	3
Sturgeon Falls, Ont.	CBFST	7
Sudbury, Ont.	CBFST-1	13
	CKSO-TV	5
Swift Current, Sask.	CJFB-TV	5
Sydney, N.S.	CJCB-TV	4
Temiscaming, Que.	CBFST-2	12
	CJTK-TV-1	3
Terrace, B.C.	CFTK-TV	3
The Pas, Man.	CBWBT-1	7
Timmins, Ont.	CFCL-TV	6
	CBFOT	9
Toronto, Ont.	CBLT	6
	CFTO-TV	9
Trail, B.C.	CBUAT	11
Trois-Rivières, Que.	CKTM-TV	13
Ucluelet, B. C.	CKUP-TV-1	6
Upsalquitch Lake, N.B.	CKAM-TV	12
Val D'Or, Que.	CKRN-TV-2	8
Val Marie, Sask.	CJFB-TV-2	2
Vancouver, B.C.	CBUT	2
Vernon, B.C.	CHBC-TV-2	7
Victoria, B.C.	CHEK-TV	6
Ville Marie, Que.	CKRN-TV-3	6
Waterton Park, Alta.	CJWP-TV-1	12
Wawa, Ont.	CBLAT-3	9
Westwold, B.C.	CFWS-TV-2	12
Whitecourt, Alta.	CBXT-2	9
Williams Lake, B.C.	CFCR-TV-5	8
Willow Bunch, Sask.	CKCK-TV-2	6
Windsor, Ont.	CKLW-TV	9
Wingham, Ont.	CKNX-TV	8
Winnipeg, Man.	CBWFT	3
	CBWT	6
	CJAY-TV	7
Wynyard, Sask.	CHSS-TV	6
Yellowknife, N.W.T.	CFYK-TV	8
Yorkton, Sask.	CKOS-TV	3
Yarmouth, N.S.	CBHT-3	11
Yuill Mountain, Balfour, B.C.	CKBF-TV-1	5

A THANK YOU NOTE FROM THE EDITORS

Thank you! The Editors of R-TV EXPERIMENTER would like to thank all readers who offered information on station changes, additions and deletions during the past few months. Though many of the letters overlapped, each aided us considerably in making the task of keeping White's Radio Log as current as possible at press time. If we left your name out, please forgive us!

Station CHAM, Hamilton, Ont.
Station KCUI, Pella, Iowa
William E. Eisenberg, Pittsburgh, Pa.
Jason Farlam, Capetown, Ont.
John Fitzgerald, Mercer, Pa.
Richard A. Flanagan, Weehawken, N.J.
Stanley Garfield, Tenafly, N.J.
James Harvey, Centralia, Mo.
Jack Hannen, Ocala, Fla.
Howard Hoffman, Suffern, N.Y.
Jerry Padgett, Kansas City, Kans.
Helen Parker, N.Y., N.Y.
Jim Rueskeé, Hillsboro, Ore.
Bill Sand, Chicago, Ill.
Gladys Sienkiewicz, Brooklyn, N.Y.
Ernst Smith, Alton, Ala.
Clifford Steggell, E. Detroit, Mich.
Loren G. Vanderzyl, Pella, Iowa
Gary Yates, Ogden, Utah

■ For this issue we have some real goodies for you to seek out from the static in DX-ing's biggest no-prize non-contest. Let's see how your ability and equipment stack up in the hunt for the following stations:

1. Nepal is one of those mysterious little Asian countries which seldom make the headlines, and even less often the loudspeaker of a shortwave receiver. They are in there though and it's a real challenge to dig them out. Look for *Radio Nepal*, in Kathmandu, broadcasting in English at 1400 GMT on 4600 kHz. They are also being reported with a Sunday program on 4500 and 7100 kHz from 0745 to 0805 GMT.

2. While we're in the remote reaches of Asia, would you believe that there's also a station in Inner Mongolia? Surely is, and if you try *real* hard (with a good receiver) you just might hear it! The station is located in Huhehot and operates 4068 kHz from 2200 GMT. Another one reported is in Hailar and is on 3900 kHz from 2330 GMT, but this in the 75-meter Ham band and you can probably forget about hearing it unless you're also in Inner Mongolia.

3. With the government urging us to curb our overseas travel we can still play at being part of the international jet set. It's easy, just tune your receiver to 8879 kHz some evening and listen to the jets talking to the ground stations throughout Europe, Africa,

This Issue's Contributors

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WHITE'S RADIO LOG

the Pacific. How many ground stations and aircraft can you log in a 30 minute period?

4. Not to forget those of you who prefer ship travel to the airliners, here are some hints on listening to ships on the high seas communicating with shore stations. For instance, if you listen on 12355 kHz tonight you might be treated to some of the major passenger liners contacting ports throughout the world. How many can you log in 1-hour?

5. Tune to 9555 kHz. Do you hear the BBC's *West African Relay Station* in Monrovia, Liberia? You do? Good, take 5 points *off* your score because the station just ceased operation. If you *didn't* hear it, give yourself a 5 point bonus for being honest—a rare quality in many areas of the DX reporting hobby.

6. Get this one while it's still on the air! It's *The Voice of The Arctic*, a bootleg 100-watt broadcaster which transmits programs to the Eskimos in their own language on the Ham-band frequency of 3750 kHz. The owner, a colorful fellow by the name of Dutchman Joe Sanders, is trying to get the station licensed by the Canadian D.O.T. Schedule isn't regular, so check the channel from time to time.

7. Martinique is a beautiful island which isn't too often reported by listeners. Of late, it has been heard and you might try to cash in on this. Look for the *French Telecommunications Service*, in Fort de France, on 17575 kHz at 1215 and 1800 GMT.

8. Do you wait for Kuwait? If so, wait no longer, this tiny Persian Gulf country is being heard on 4967 kHz from 0400 to 0600 GMT.

9. The Swiss Red Cross is going to run some radio tests from their seldom-heard transmitter. The tests will run from now until the end of November (only 2 or 3 days per month) and are on 7210 kHz at 0600, 1130, 1700, and 2300 GMT. If you hear the tests, send a report to them at 7 Avenue de la Paix, Geneva, Switzerland. You'll get a QSL if your report is complete and correct.

10. Listen in on the latest charges, counter-charges, peace talks, peace-talk condemnation, etc., etc. from North Vietnam's one and only Radio Hanoi, also called *The Voice of Vietnam*. In English at 1000, 1300, 1530, and 2300 GMT on 7210, 9760, 9840, 11760, and 11840 kHz. If you have a good sense of humor you'll enjoy their rantings.

Here's how to score. 10 points for numbers 1, 2, 6, 7, 8, 9, 10. Numbers 3 and 4 get one point per logging. Number 5, as indicated.

Since this month we had a few real toughies thrown in we'll go easy on the ratings, but you should make a showing of *at least* 30 points without any trouble. From 31 to 50, very good! From 51 to 60, excellent. From 61 to 80—you're a *super* shortwaver! Above 80—who are you trying to kid?

90-Meter Band—3200-3400 kHz

kHz	Call	Identification	Location	GMT
3265	—	R. Demerara	Georgetown, Guyana	0245
3305	VL8BD	R. Daru	Daru	1205
3335	VL9CD	R. Wewak	Wewak, New Guinea	1245
3340	—	R. Tulcan	Tulcan, Ecuador	0330
3346	—	R. Zambia	Lusaka, Zambia	0400
3365	—	R. Exitos	Santiago, Dom. Rep.	0310
3400	—	Peoples Liberation Army	Fukien, China	1130
4715	CR4AB	R. Clube Mindelo	Sao Vicente, Cape Verde Is.	2300
4753	—	RRI	Makassar, Indonesia	1245
4770	—	R. Bolivar	Caracas, Venez.	2315
	ELWA	R. Village	Monrovia, Liberia	0610
4780	YVLA	V. de Carabobo	Valencia, Venez.	0000
4815	—	R. Haute Volta	Ouagadougou, Upper Volta	0617
4820	HRVC	V. Evangelica	Tegucigalpa, Hond.	0100
4845	HJGF	R. Bucaramanga	Bucaramanga, Colombia	0345
4850	YVMS	R. Universo	Barquisimeto, Venez.	0320
4855	—	R. Enugu	Enugu, Biafra	2130
4860	YVQE	R. Mundo	Maracaibo, Venez.	0240
4865	CR6RN	R. Clube de Angola	Angola	2230
4870	YVKP	R. Tropical	Caracas, Venez.	2330
4890	—	Ici Senegal	Dakar, Senegal	0710
4910	HIN	R. Noticias	Santiago de los Caballeros, D.R.	2150
4915	—	R. Ghana	Accra, Ghana	0700
4925	—	R. Quito	Quito, Ecuador	0415
4930	YVOT	R. Junin	San Cristobal, Venez.	0440
	—	V. Nigeria	Lagos, Nigeria	0600
4945	—	R. RSA	Capetown, S. Afr.	2230
4955	HJCQ	R. Nacional	Bogota, Col.	0400
4960	YVQA	R. Sucre	Cumana, Venez.	0317
4965	—	R. Santa Fe	Bogota, Colombia	0450
4985	CP75	La Cruz del Sur	La Paz, Bolivia	0245
4990	—	V. Nigeria	Lagos, Nigeria	2210
4995	—	R. Omdurman	Omdurman, Sudan	2125
5005	CAX2S	R. Jaen	Lima, Peru	0330
5010	—	Forces BC	Singapore	1230
5020	HJFW	Trasmisoras Caldas	Manizales, Colombia	0015

60-Meter Band—5950-6200 kHz

kHz	Call	Identification	Location	GMT
5954	TIQ	R. Casino	Puerto Limon, C.R.	0545
5955	—	R. Canada	Montreal, Que.	0600
	TGNA	R. Nacional	Guatemala City, Guat.	1100
5980	—	R. Demerara	Georgetown, Guyana	0945
5990	—	R. Sweden	Stockholm, Sweden	0015
6000	—	R. Americas	Swan Island	0030
6005	CFCX	—	Montreal, Que.	2330

kHz	Call	Identification	Location	GMT
6015	—	Swiss BC	Berne, Switz.	2015
6020	PCJ	R. Nederland	Hilversum, Neth.	1030
6030	—	AFRTS	Greenville, N.C.	0110
	CFVP	V. of the Plaines	Calgary, Alberta	2400
6045	—	R. Universidad	San Luis Potosi, Mex.	0300
6050	HCJB	V. of Andes	Quito, Ecuador	0718
	—	RAI	Rome, Italy	1940
6075	—	RAI	Rome, Italy	0430
6080	CKFX	—	Vancouver, B.C.	1500
6085	ZYK2	R. Jornal	Recife, Brazil	0830
6090	—	R. Prague	Prague, Czech.	0740
6100	—	R. Belgrade	Belgrade, Yugo.	2000
6115	XEUDS	—	Hermosillo, Mex.	0010
6135	—	R. Habana	Havana, Cuba	0520
6145	—	V. Nigeria	Enugu, Nigeria	0600
6150	—	R. RSA	Johannesburg, S. Afr.	2345
6155	—	Austrian R.	Vienna, Austria	2311
6160	CFCN	—	Calgary, Alta.	0545
6165	XEWW	—	Mexico City, Mex.	0000
6174	—	R. Nacional	Bogota, Colombia	0345
6175	—	V. Malaysia	Kuala Lumpur, Malaysia	1215
6180	TGWB	R. Nacional	Guatemala City, Guat.	2330
6205	—	R. Reloj	San Jose, C.R.	0520

41-Meter Band—7100-7300 kHz

7115	—	V. Thailand	Bangkok, Thailand	1130
7120	—	R. Peking	Peking, China	0100
7125	—	V. Guinea	Conakry, Guinea	0600
7130	—	BBC	London, England	2330
7150	—	BBC	London, England	0600
7165	—	Idaat Al Malmakete	Libya	0445
7170	—	R. Noumea	Noumea, New Caledonia	0735
7195	—	V. America	Monrovia, Liberia	2310
7200	—	R. Afghanistan	Kabul, Afghanistan	1300
7245	—	Austrian R.	Vienna, Austria	0530
7300	ZAA	R. Tirana	Tirana, Albania	0035
7345	—	R. Prague	Prague, Czech.	0010
9009	4XB31	Kol Zion	Tel Aviv, Israel	2100
9360	—	R. Nacional	Madrid, Spain	0015
9380	—	R. Alma Ata	Alma Ata, USSR	0115

31-Meter Band—9500-9775 kHz

9505	—	R. Berlin Int'l.	Berlin, E. Germany	0100
9510	—	BBC	London, England	1015
9515	XEWW	—	Mexico City, Mex.	0500
9520	—	R. Denmark	Copenhagen, Denmark	1015
9525	PCJ	R. Nederland	Hilversum, Netherlands	0600
9545	—	V. Ghana	Accra, Ghana	1915
9550	—	R. Norway	Oslo, Norway	0455
9565	OAX4R	—	Lima, Peru	0110
9575	—	R. RSA	Johannesburg, S. Afr.	0600
9585	—	V. of West	Lisbon, Port.	2310
9590	PCJ	R. Nederland	Hilversum, Neth.	0440
9605	—	R. Japan	Tokyo, Japan	1715
	DMQ9	Deutsche Welle	Cologne, W. Germany	1050
9610	—	R. Canada	Montreal, Que.	2100
9615	PJB	—	Bonaire, Neth. Ant.	2330
9620	—	R. Kiev	Kiev, USSR	2245
9625	—	R. Canada	Montreal, Que.	0110
9635	ZYR83	R. Araracida	Sao Paulo, Brazil	2300
9640	DMQ9	Deutsche Welle	Cologne, W. Germany	1100
9645	TIFC	Faro del Caribe	San Jose, C.R.	1430
9665	—	Swiss BC	Berne, Switz.	1130
9690	LRA	R. Nacional	Buenos Aires, Argentina	0200
9700	—	R. Sofia	Sofia, Bulgaria	0000
9712	OAX9C	R. Tropical	Terapoto, Brazil	0400
9715	PCJ	R. Nederland	Hilversum, Neth.	1025
9760	—	VOA	Munich, W. Germany	1605
9770	—	BBC	London, England	1720
9833	—	R. Budapest	Budapest, Hungary	0030
10530	—	R. Alma Ata	Alma Ata, USSR	0210
11685	—	R. Diamang	Dundo, Angola	1930
11705	—	R. Japan	Tokyo, Japan	2250
	—	R. Sweden	Stockholm, Sweden	2250
11710	—	R. Australia	Melbourne, Australia	0710
11715	—	V. America	Okinawa I.	2300
11720	—	R. Canada	Montreal, Que.	2105
11725	—	BBC Far East Svces.	Malaysia	2355
11735	—	R-TV Francaise	Rabat, Morocco	1845
11740	XEMP	—	Mexico City, Mex.	2115

25-Meter Band—11750-11975 kHz

11750	—	Far East Network	Tokyo, Japan	0335
11760	HVJ	Vatican R.	Vatican City	0030
11775	—	Swiss BC	Berne, Switz.	0720
11780	ZL3	R. New Zealand	Wellington, N.Z.	0630
11795	WINB	—	Red Lion, Pa.	2100
11800	—	R. Nacional	Tenerife, Canary Is.	0105
11810	—	RAI	Rome, Italy	0120
	—	R. Algiers	Algiers, Algeria	1730
11815	PJB	—	Bonaire, Neth. Ant.	0030
11835	4VEH	V. Evangelique	Cap Haitien, Haiti	1300
11840	—	V. West	Lisbon, Portugal	2330
11845	—	R-TV Francaise	Paris, France	1810
11850	—	R. Moscow	Moscow, USSR	0450
11860	—	BBC	Ascension I.	2300
11865	—	Swiss BC	Berne, Switz.	1130
11900	—	R. RSA	Johannesburg, S. Afr.	1600
11905	—	RAI	Rome, Italy	1605
11910	—	V. Thailand	Bangkok, Thailand	1155
11915	HCJB	V. Andes	Quito, Ecuador	0330
11920	ETLF	R. Voice of Gospel	Addis Ababa, Ethiopia	0430
11930	—	R. Habana	Havana, Cuba	2030
11935	—	V. West	Lisbon, Portugal	0345
11945	—	R. Peking	Peking, China	0305
11950	ELWA	R. Village	Monrovia, Liberia	0815
11980	—	R. Kiev	Kiev, USSR	1850
11990	—	R. Prague	Prague, Czech.	1805
15050	—	R. Liberdad	(clandestine)	2150
15060	—	R. Peking	Peking, China	0010
15078	—	R. Euzkadi	(clandestine)	2130
15080	VUD	All India R.	Delhi, India	1800

19-Meter Band—15100-15450 kHz

15110	XERR	—	Mexico City, Mex.	2230
15115	—	R. Dakar	Dakar, Senegal	2130
15120	—	R. Lagos	Lagos, Nigeria	2145
15125	ZYN32	R. Soc. de Bahia	Salvador, Brazil	2215
15125	BED60	V. Free China	Taipei, Formosa	0215
15135	—	V. Japan	Tokyo, Japan	0200
15140	—	BBC	London, England	2230
15145	ZYK33	R. Jornal	Recife, Brazil	0230
15155	—	R. Finland	Helsinki, Finland	2300
15155	ELWA	R. Village	Monrovia, Liberia	1845
	ZYB9	R. de Sao Paulo	Sao Paulo, Brazil	0045
15210	—	Austrian R.	Vienna, Austria	1930
	—	V. America	Philippines	0050
15220	—	R. RSA	Johannesburg, S. Afr.	2330
15230	—	R. Ceylon	Colombo, Ceylon	0300
15245	ZYE21	R. Marajoara	Belem, Brazil	1900
	—	V. Nigeria	Lagos, Nigeria	1700
15270	—	R. Habana	Havana, Cuba	2300
15285	—	R. Ghana	Accra, Ghana	1845
15295	—	Aqui Mozambique	Lourenco Marques, Mozambique	1830
15335	—	R. Pakistan	Karachi, Pakistan	2005
15435	—	V. Free China	Taipei, Formosa	0215
15385	—	Far East BC	(Manila, Phil.	2330
15400	—	V. America	Greenville, N.C.	0230
15405	DMQ15	Deutsche Welle	Cologne, W. Germany	1900
15430	—	V. Free Korea	Seoul, Korea	0300
15435	—	BBC Far East Svce.	Malaysia	2350
15445	ZYN32	R. Nacional	Brasilia, Brazil	0320
17760	WNYW	R. New York Worldwide.	New York, N.Y.	2130
	ELWA	R. Village	Monrovia, Liberia	1600
17785	—	R. Japan	Tokyo, Japan	0000
17805	—	R. RSA	Johannesburg, S. Afr.	2340
17845	WNYW	R. New York Worldwide	New York, N.Y.	1800
17870	—	R. Australia	Melbourne, Australia	2250
17875	—	R-TV Francaise	Paris, France	1230
17890	—	V. America	Greenville, N.C.	1830
17950	—	R. Pakistan	Karachi, Pakistan	1335

13-Meter Band—21450-21750 kHz

21485	—	V. America	Bethany, Ohio	2110
21535	—	R. RSA	Johannesburg, S. Afr.	1800

Ham Traffic

Continued from page 78

which expires while he's on overseas military duty, he may apply to have it renewed when he returns to the U.S. Formerly, Novice tickets were not renewable. This exception to the rule is a worthwhile one.

Radio Shorthand. In a previous column, some radio operating procedure signs ("pro-signs") for use on CW were introduced as an aid to efficient operating. Here are some more you can put to use. AR (sent with the letters run together, like this: *didahdidahdit)* has two uses. It can mean *go ahead* when you have called another station, but haven't actually made two-way contact yet. For example, if I called WA2CQL, I would send WA2CQL DE W7DOS AR on my first call. After he acknowledged my call, I would no longer use AR when telling him to go ahead, but would use the normal K each time I stood by for him.

The other common meaning for AR (again with the letters run together into one Morse character) is to serve as a warning to the station you're working that you are preparing to stop transmitting and will listen for him. In this case, you send AR *before* actually sending the calls. You still use the regular K after signing the calls.

For example, after concluding one transmission in a series making up a QSO, I would send AR WA2CQL DE W7DQS K. The AR serves to tell WA2CQL that it'll be his turn to transmit in a jiffy, so he'd better push aside his coffee cup and reach for the transmitter key.

SK (again sent with the letters run together: *dididididahdidah)* means *this is my final transmission, but I will stand by for your final.* Good operating practice calls for this to be sent *before* signing the calls, again to give the other chap a warning as to what's on your mind.

For example, when I run out of things to say to WA2CQL, I would send SK WA2CQL DE W7DQS K. He would then say what was on his mind, send a 73 (I hope!) and sign out, concluding the QSO. I might send a snappy GE meaning *good evening,* or GN meaning *good night* and the QSO would be ended.

KN (with the letters run together: *dah-didahdahdit)* is a *go ahead* to the specific station you called, with the additional request that no one try to break in. This one is not used very often (there really isn't much need for it), but once in a while it comes in handy. Anyone trying to break into a QSO after hearing KN sent is a double-headed, droop-eared, diddle-brained lid. Agreed?

AS (with the letters run together: *didah-dididit*) means simply *wait.* You use it anytime you need to stop sending for a few seconds, but want the other op to sit quietly until you resume. You can use it any time you need to look up something in a book, pick up a pencil that rolled under the desk, put out the cat, or hush up the kids. As a matter of courtesy, try not to make the other fellow wait too long.

The pro-sign C means simply *yes* and N means *no.* They're very useful because they're short, and there's no chance of a mistake if they are sent clearly. Even so, many hams ramble on and on to say what a simple *dahdidahdit* or *dahdit* would do.

Pro-signs can speed up CW operating tremendously by taking care of all routine business with snappy abbreviations and allowing more time for the real meat of your transmissions. Use 'em often—and accurately!—and you'll soon rank among the pros on the ham bands. ■

Hear That Star?

Continued from page 60

"No need," said Gerard. "I have one crew running a complete recheck of all equipment while Pitts and his boys play anagrams with your new theory of versified astronomy. Besides, if I went down there Pitts might start asking questions, and then what would I say?"

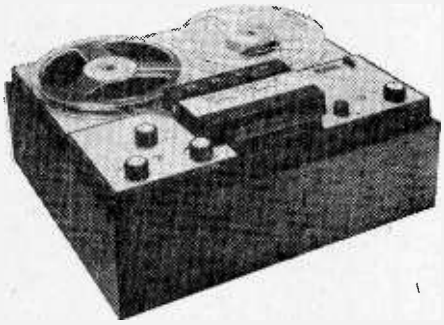
Pitts came in, tight-lipped and plainly annoyed, clutching a scrap of notebook paper in his right hand. He looked like he thought the sky was falling.

"We have two complete words, and the rest is falling into place quite rapidly," he told Gerard. "But I'm afraid the staff is a little upset."

Paul looked quickly at Gerard, then jerked the sheet from the young man's hand; and he and Gerard read it together. It said, "Twinkle, twinkle . . ." ■

New Products

Continued from page 33



Martel Electronics Sales Uher Deck 7000

± dB @ 3¾ ips. And the Uher Deck 7000 is only $139.95. Write to Martel Electronic Sales, Inc., 2356 S. Cotner Ave., Los Angeles, Calif. 90064, for further info.

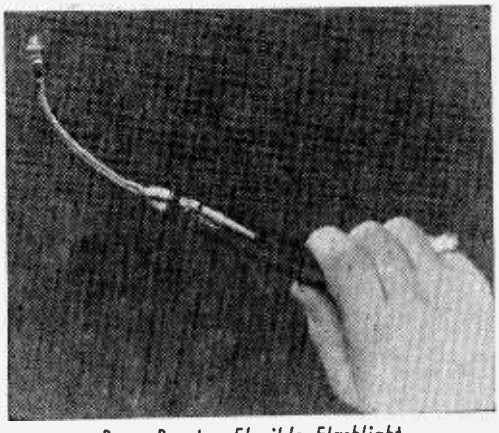
Little Box—Lotsa Zotz!

The Black Cat from Wawasee Electronics (model JB75A) is a mobile linear amplifier for 10-meter ham band and business band operating from 21-38 kHz, principally designed for remote operation with complete automatic switching of the antenna for transmit-receive. This is done by a transistorized RF keyer. The keyer also switches the high-voltage power supply on during transmit time, thus allowing a very low standby receive current drain. The operating voltage is 12-14 VDC, negative ground only; input impedance is 52 ohms; output impedance, 52 ohms. Size is only 2 x 6 x 8 in., and the Black Cat weighs 3 lbs. Maximum output is 75-100 watts; maximum power gain 14-16 dB. The manufacturers would have you put a Black Cat in your trunk, instead of a tiger in your tank. List price is $147.50, and you can get further specs from Wawasee Electronics Co., Box 36, Syracuse, Ind. 46567.

Wawasee Electronics Black Cat

Light Around a Corner

Here's a neat tool for hobbyists! A flexible flashlight which can be twisted, bent around corners, snaked into narrow openings. Based on the principle of the gooseneck lamp, the body is 5-in. long and the flexible head is another 4 in. It has a black leatherette cover and a clip for fastening to shirt or belt. The price is $2.00 postpaid, less batteries. Send for this handy dandy to Bryce-Branton, 690 Southern Ave., Muskegon, Mich. 49440.



Bryce-Branton Flexible Flashlight

"No-Parts" Slave Flash

Continued from page 56

with most modern-day miniature electronic flash units. Some flash units require a *polarized* standard AC plug, available at most photo dealers. A possible connector variation would be to install a P-C type connector directly at the end of the plastic tube. No additional interconnecting cable would then be required; the electronic flash would plug directly into the triggering unit just like they were made for each other.

Sensitivity of the assembled unit is high enough to trigger on light reflected back from the subject being photographed. Angle of light acceptance is approximately 180 deg with the LASCR lens unshielded. If narrow angle of acceptance is desired, the LASCR can be recessed into the plastic tube.

No inclination toward self-triggering has been evidenced in various levels of ambient light. However, if conditions are such that the ambient light triggers the flash units, sensitivity can be reduced by reducing the value of the gate resistor.

Since no batteries are required for this unit, and a minimum of components used, reliability is extremely high. Useful life, in fact, is limited only by mechanical failure. ■

Bookmark

Continued from page 26

Sarnoff's papers of six decades are assembled for the first time in a new book, *Looking Ahead: The Papers of David Sarnoff*, published by McGraw-Hill. Tracing the origins and growth of modern communications and electronics, from the earliest wireless signals to globe-orbiting communications satellites, the book is probably the most authoritative personal report on the 20th Century's most dynamic industry and art.

Scoffed at by associates in the industry, sometimes denounced as a dangerous visionary, Sarnoff's restless mind probed far into the future seeking new opportunities and uses for the fledgling communications art. As he himself confessed: "Because my knowledge is so little as compared with our technical experts, I am not so troubled by the difficulties which they with their greater knowledge can see, and I therefore place no brakes on my imagination."

Thus in 1922, when RCA had barely begun to manufacture the first "Radio Music Boxes," Sarnoff was writing to RCA's Director of Research asking him to develop a portable "radiolette" that would transmit information "not only at home but in the office, workshop, street or elsewhere."

In the same year, he submitted still another plan for a separate company to conduct broadcasting and to be known as the "Public Service Broadcasting Company, or National Radio Broadcasting Company, or American Radio Broadcasting Company, or some similar name." Four years later, the National Broadcasting Company, a separate subsidiary of RCA, was born.

While radio was still in its infancy, Sarnoff's mind was ranging far ahead to new fields. In 1923, he told the RCA Board of Directors: "I believe that television, which is the technical name for seeing instead of hearing by radio, will come to pass in due course." And nearly a decade before the public was to see its first commercial sets, in 1930, he spoke of television "advanced to the stage when color as well as shadow would be faithfully transmitted."

In 1934, when airplanes were still a novelty, Sarnoff was already intrigued by the possibilities of outer space. "We might point to the great frontier that lies daily and nightly above us," he told an audience, "and ask if there is not enough wealth and mystery in the air and sky to test the ingenuity of several future generations."

As his interests broadened and his experience deepened, Sarnoff's vision scanned the widening spectrum of technology and progress. In 1946, he was already speaking of communications through space, atomic power for industry and the conquest of disease, global weather control.

In 1962, Sarnoff presented what many consider to be a definitive projection of man's world at the end of the century. Writing in *Fortune* Magazine, he outlined the shape of things to come—in food resources, raw materials, energy, health, communications and transportation, among others. And he wrote: "By the year 2000 A.D., I believe our descendants will have the technological capacity to make obsolete starvation, to lengthen appreciably the Biblical lifespan and to chance hereditary traits. They will have a limitless abundance of energy sources and raw materials. They will bring the moon and other parts of the solar system within the human domain. They will endow machines with the capacity to multiply thought and logic a millionfold."

As science continued to unfold at an astounding pace, Sarnoff's mind turned typically from problem to solution. At the celebration of his 60th anniversary in communications and electronics, he said: "In the past sixty years our attention has been focused primarily on the means to translate scientific knowledge to practical ends. Now I believe we must involve ourselves in the social applications of technology with the same energy and devotion that we give to its development. As the creators of progress, we share a new and fundamental responsibility to the purpose it serves."

Always a realist, Sarnoff's thinking nevertheless reflects a fundamental optimism about the prospects of the human race. In the last excerpt to appear in *Looking Ahead*, he writes:

"If we muster the wisdom to use the tools which technology has given us, the generosity to devote them to the benefit of all men, the humility to live in harmony with nature, there is little in the spectrum of human progress that is not within our grasp."

Looking Ahead: The Papers of David Sarnoff, was published by the McGraw-Hill Book Company and is available at libraries, bookstores, or direct from the publisher—330 West 42nd Street, New York, N. Y. 10036.

"That's neat, Roger. Is it solid state?"

Gold Grabber

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the tuning screw of L2 until you hear a loud beat note. Further adjustment of L2 should cause the beat note to pass through the zero-beat point and back to an audio note again.

If a beat note cannot be heard with adjustment of L2, check the voltage on the gate leads of Q1 and Q2. The voltage should be measured with a VTVM. Our unit measured −3.5 V at the gate of Q1 (across R1) and −10 V at the gate of Q2 (across R3). The exact voltages are not critical, since they will vary with a particular FET.

If there's a negative voltage on the gates of Q1 and Q2, indicating that the circuits are oscillating, but a beat note is not heard, change the number of turns of L1 until the frequency of the Q1 oscillator circuit is close enough to the detector circuit of Q2 to zero beat.

Finally, move a section of aluminum foil towards the loop. The beat note should change frequency and indicate the presence of metal.

Using It. Practice operating Gold Grabber by burying several sections of aluminum foil a few inches under the ground in locations with differing types of soil and gravel. Hold the metal locator close to the surface of the earth and adjust the tuning slug of L2 to a convenient audio pitch.

Pass the loop over the area until you hear a sudden change in the audio tone, then dig for the aluminum foil targets. Practice with different audio tones until your ear is accustomed to the change in audio pitch that denotes a metal object.

The sensitivity of Gold Grabber is dependent on the surface area of the metal, its depth below the surface, and the composition and moisture content of the earth.

The energy radiated by the loop will be absorbed by the earth in various degrees, depending on the mineral content, etc. The larger the surface of the metal and the closer it is to the surface of the earth, the easier it is to locate. Gold Grabber was able to find a 3x3-in. square of aluminum foil under several inches of gravel and earth. You probably can do better, so get out there and start grabbing. ■

Positive Feedback

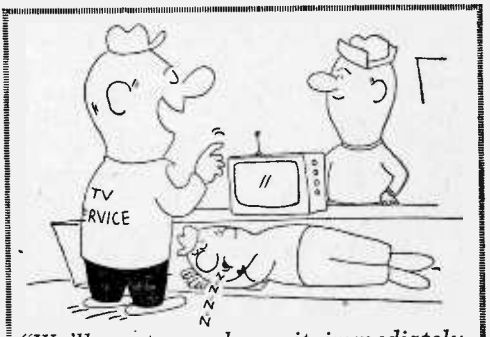
Continued from page 22

University of Maryland. Since about 1965, a second group, under Dr. Robert L. Forward, a former student of Prof. Weber's, has been working at the Hughes Research Laboratories in Malibu, Calif. Prof. Weber's group has recorded events which could be the arrival of gravitational waves generated by astronomical bodies, but he is far from ready to claim that they are. Dr. Forward's group has not yet seen anything of the sort. He is convinced that he could, were his equipment sensitive enough. And he is seeking Government support to build more sensitive antennas.

Gravitational waves should be generated by accelerated masses. In principle, a spinning rod should generate gravity waves. But in practice, something the size of a baseball bat would tear itself apart before it could spin fast enough to generate an amount of power detectable with existing techniques. More practical sources for detectable gravitational radiation are astronomical bodies—planets in their orbits, stars revolving around each other—and it is gravity waves from these that are being sought. To detect a gravity wave would mean measuring the tensions and compressions set up by a wave from a distant source in a receiving body.

The most extended gravitational antenna available is the earth itself, and Prof. Weber's group has used it, seeking fluctuations of the earth's surface—at rates such as one fluctuation every 54 minutes. To search for these, the Maryland group had to build a gravimeter that would sense changes of one part in a hundred billion. They haven't found what they seek, perhaps because there doesn't happen to be any radiation at that frequency. But, the instrument is so good that NASA, which paid for it, wants to send it to the moon to study gravity there.

Now, that's a good idea and it may save a lot of money; however, if NASA sends too many failure projects up there, watch out! We may turn the moon into one vast dump—*keep the moon beautiful!*



"We'll go to work on it immediately. My 'ace' technician is within reach."

The Hoofin' Heart

Continued from page 87

But he is no stranger to the rolling farmland and horse country around New Egypt, N.J., about an hour's drive from the university.

With the Trotters. On a recent day there, he stood between two rows of stalls and carefully attached electrodes to Keystone Dream, a three-year-old trotter. The bay stallion was one of more than 100 trotters and pacers on two adjacent farms, Egyptian Acres and The Farm, run separately by Stanley and Vernon Dancer, brothers whose names are practically synonymous with harness racing in the United States.

Dr. Fregin shaved patches of the horse's hair about the size of a quarter to reach bare skin where he could glue the electrodes for his telemetry equipment. "It's important to be very careful applying the electrodes," Dr. Fregin stated. "We don't want to use anything on the skin which might later cause irritation."

It took the doctor several minutes to attach electrodes to Keystone Dream's back, just behind his neck. Then he cleaned the hair from a patch on the horse's chest between the forelegs and attached an electrode there.

A few minutes later, the doctor and a trainer, James Dancer, brought Keystone Dream outside and harnessed him to a training cart a little heavier than the sulky a driver usually rides during a harness race. The trainer climbed onto the seat and grabbed the reins, while the doctor attached wires to the electrodes on the horse, strung them along the side of the cart, and connected them to a tiny transmitter about the size of a cigarette package. Dr. Fregin stuffed the transmitter into a pouch strapped to the driver's back. With a click of his tongue, the driver started the horse across a narrow road toward the half-mile training track at Egyptian Acres.

Bright Future. Vernon Dancer had been standing near his office next to the stable at The Farm, squinting into the sun to watch Keystone Dream being hitched to the cart. "Dr. Fregin's work has all kinds of ramifications for someone like me who's training and racing horses," he said. Sometimes a horse runs very well for a while. Then, for some reason, he tails off. His time isn't good. He isn't running as well as he should. We could hook him to the telemetry equipment and perhaps find something wrong. Or we can see how he reacts to a different kind of training."

By this time, Keystone Dream was on the track, standing near Dr. Fregin's receiving equipment set up on the hood of an automobile. The ECG tracings came steadily, plotting graphs on paper rolling out of the recorder. Satisfied that the transmitter and receiver were functioning properly, Dr Fregin signalled for Keystone Dream's workout to begin. First the horse walked, then jogged, then went into a fast trot. As Keystone Dream moved easily around the track, the doctor's equipment picked up strong signals.

Dr. David A. Meirs, a New Jersey veterinarian who cares for many of the horses on Egyptian Acres and The Farm, was watching the activity from a shaded bench at trackside.

"The fact that Dr. Fregin is a cardiologist sets him apart from most of the other veterinarians in the United States," Dr. Meirs said. "And the fact that he further specializes in horses sets him apart from all but a handful of the others. But because he is now involved in radioelectrocardiography in veterinary medicine, you have to call him a pioneer. This work just hasn't been done before."

Dr. Meirs said there were thousands of applications for radio telemetry in veterinary medicine. "Not just for horses, but for any animal," he said. "Fred Fregin is pioneering in some exciting work which could prove very meaningful in our field."

Training Techniques. Though Dr. Fregin is sticking to healthy, normal horses in his preliminary studies, he, too, is excited about other possibilities that are apparent for radio telemetry in veterinary medicine. In race horses, for example, it might be used to help evaluate training methods and to study the fitness of the animal being trained.

"Certain trainers train certain ways and produce winners at the track," he observed. "But who is to say there isn't a better way to train horses? With radio telemetry, I think we will be able to evaluate what is happening more scientifically."

The training of race horses is but one potential. Radio telemetry does not require wiring an animal to a stationary machine, as a regular ECG device does, so the animal can move about freely and unencumbered while doctors observe from a remote position. Horses, dogs, cats, or cows, for ex-

ample, can continue to live quietly in their regular environment while their hearts are constantly monitored.

"You could use it to see how an animal is doing before, during, and after an operation," Dr. Fregin comments. "With radio telemetry, you will be getting a truer picture of heart rate because nobody would be near the animal to excite it."

Research Reigns. Radio telemetry could be invaluable in studying the effect certain drugs have on animals during treatment, and one researcher recently published a paper on the blood pressure of giraffes that he studied in the field with radio telemetry.

Dr. Fregin is thinking ahead to future applications of radio telemetry to monitor other physiological functions in animals, such as blood pressure, temperature, and respiration (he calls them a previously untapped reservoir of information). Radio telemetry could be an invaluable diagnostic tool in veterinary medicine, according to Dr. Fregin, not only for detecting heart disease, but for respiratory disorders, blood disease and others.

But these things are in Dr. Fregin's future. Right now, he is concentrating on the study of strong, healthy race horses. "We have to screen for the normal and find out what the normal is, then later we can find the abnormal," says he. ■

Join A DX Club?

Continued from page 83

averages about 40 pages. Coverage includes BCB, SWBC, TV and FM DX, as well as Ham and Utility columns. Dues are $4.00 yearly.

- CANADIAN INTERNATIONAL DX CLUB (CIDXC), 44 Carmen Ave., Winnipeg 5, Man. President, Lorne Jennings. This club is general coverage, with a monthly publication *Messenger* that runs to 40 pages. Columns include SW, BCB, Technical, Cardswap, and Utility. Dues are $3.50 yearly.
- FIRCREST DX CLUB (FDXC), 1021 Alameda Ave., Fircrest, Wash. 98466. President, Juris Burkevics. This Club has a monthly publication *DX Telegramme* that runs to 20 pages. Coverage includes columns on SWBC, BCB, CB, and Ham operations. Dues are $3.00 yearly.
- INTERCONTINENTAL DX CLUB (ICDXC), 94 Pegasus Trail, Scarborough, Ont. President, Richard Langley. Club stresses active participation in SWBC, VHF, LF, Ham, and Utility bands. Bimonthly publication is called *Hi*. Dues are $1.70 yearly for U.S.
- INTERNATIONAL RADIO CLUB OF AMERICA (IRCA), Box 605, Beaverton, Ore. 97005. Secretary-Treasurer, Bill Nittler. This club's publication *DX Monitor* is issued weekly during the BCB peak season and monthly during the summer months; it averages 25 pages. Coverage is BCB DX exclusively. Dues are $4.40 yearly.
- NATIONAL RADIO CLUB (NRC), Box 99, Cambridge, Mass. 02138. Executive Secretary, John Callarman. This is an all BCB club and certainly tops in the field. Its bulletin *DX News* is issued weekly during the summer for a total of 34 issues per year. Research into MW DX is also under way. Dues are roughly $7.75 yearly.
- NEWARK NEWS RADIO CLUB (NNRC), 215 Market St., Newark, N.J. 07101. President, William Schultz. This club is the oldest and possibly the largest. Its monthly bulletin averages 50 to 60 pages and, besides general coverage, has exceptionally fine Ham and SWBC columns. Dues are $5.00 yearly.
- NORTH AMERICAN SW ASSOCIATION (NASWA), Box 989, Altoona, Pa. 16603. Executive Editor, William Eddings. This club offers excellent SWBC coverage and is an all-SWBC organization. Its monthly publication *Frendx* averages 50 pages, and is regarded as a journal for SWLs. Dues are $5.00 yearly.
- NORTHEAST SHORTWAVE LISTENERS CLUB (NESWLC), 971 Iris St., Manchester, N.H. 03102. President, Norman Boisvert. Club publication, the *Bulletin*, appears monthly. Columns include SWBC, TV and FM DX, Cardswap, and Novice Section. Dues are $1.50 yearly.
- WORLDWIDE TV-FM DX ASSOCIATION (WTFDXA), Box 5001, Harbor Station, Milwaukee, Wis. 53204. Executive Editor, Ferdinand Dombrowski, Jr., Club is all TV-FM DX, plus 30-50 MHz band. Monthly publication *VHF/UHF Digest* covers most topics relating to TV-FM DX. Dues are $3.50 yearly.

What's With Old Sol?

Continued from page 48

chargeable nickel-cadmium, type-F cells. Voltage ranges from 16.2 to 22 V. To conserve power, a day-night switch cuts off certain experimental systems while the craft is in the dark portion of its orbit. Signals from solar-sensing detectors actuate the switches to make the instruments operational at the crack of each orbital dawn.

Cat with Nine Lives. The electronic purring and clicking inside the OSO-IV will go on for six months. All the while, communications equipment will relay data about the sun lapped up by the nine separate experimental systems on board. An ultraviolet spectrometer is of primary importance (see photos and caption in box on page 48), but here are the other eight experiments. The OSO-IV contains:

- A spectroheliograph to obtain data about X-ray emanations from the sun in the 3- to 70-angstrom range. This information will reveal much about electron and ion densities in the sun's corona, and about processes involved in solar flares.
- A Bragg crystal spectrometer to determine the spectral differences in the sun during its flare and non-flare periods. This will also distinguish between thermal and non-thermal mechanisms in the X-ray emission process in the 1 to 8 angstrom range.
- A celestial telescope to survey the night sky for cosmic sources of X-radiation with energies from ½ to 30 keV. Such information about interplanetary X-rays is vital to planning future, manned space jaunts.
- A spectrometer to detect solar X-rays in the 1-20 and 44-75 angstrom ranges. This will lead to a new understanding of the solar corona.
- A helium II and helium I monochromator to monitor the total flux of helium II solar radiation at the 204-angstrom level. The instrument also samples hydrogen radiation at the 1216-angstrom level. Objective: to determine how changes in helium radiation from the sun affect the earth's ionosphere.
- A proton-electron telescope to measure the energy dependence and angular distribution of electrons and protons in the magnetic field of the earth.
- A monitor to measure the X-ray input to the earth's atmosphere in several spectral bands ranging from 0.5 to 60 angstroms. This data will provide good characterization of solar X-ray emission, and also provide a set of X-ray indices which other geophysical parameters can be correlated against.
- A Lyman-alpha telescope to scan and record Lyman-alpha night skyglow which results from the scattering of solar hydrogen in the earth's corona. This data will lead to a better understanding of how hydrogen emissions from the sun are absorbed in the earth's upper atmosphere.

These instruments are gathering information vital to an understanding of the sun, and vital for the planning of safe space ventures of future astronauts. But the one instrument that dominates the entire project is an ultraviolet spectrometer constructed at the Harvard College Observatory by a group headed by Professor Leo Goldberg, and in collaboration with Harvard astronomers Edmond Reeves and William Parkinson.

In the first four weeks of operation, the equipment gave these astronomers over 4000 pictures of the sun, the like of which have never been seen before. The pictures reveal wholly new information about its chemical composition, and the temperature ranges at various heights in the sun's atmosphere. The information will almost certainly modify currently held ideas about the origin and evolution of stars like the sun.

Prize Portraits. One reason why astronomers are so excited about these pictures is that for the first time they are able to make full-face mug shots of the sun's corona. Previously, the sun's corona could only be studied at the edge of the solar disc during an eclipse or by means of a coronagraph that creates an artificial eclipse. All of these were profile shots giving only a fraction of the desired information. Now it is possible to make pictures that include all of the corona except the relatively small portions hidden behind the solar disc.

Much is being learned about the distribution of chemical elements and about temperature patterns at various heights in the sun's atmosphere. Such information is vital to a full understanding of the origin and evolution of stars like our sun.

The data accumulated by the spectroheliograph is also revealing much new information about solar flares—those tongues of luminous gas that flick outward around sun spots. Solar flares are believed to be triggered by explosions of electrons that begin high in the corona and stream downward

toward the center of the sun. When flares occur, clouds of protons and electrons shoot off the sun to fill interplanetary space with potent radiation.

Since each solar flare is accompanied by a burst of ultraviolet radiation, the Harvard spectroheliograph is ideal for studying the development of the flares and for observing temperature changes as the flares move through the corona.

Forecasting Flares. There is now tremendous practical value in predicting the probable occurrence of solar flares. OSO-IV is not charged with this forecasting responsibility, though data acquired by the orbiting observatory will be of tremendous value in perfecting present forecasting techniques.

The actual day-by-day job of forecasting solar flares is in the hands of a special detachment of the Air Weather Service of the U.S. Air Force. A specially trained group of the 4th Wing—identified as Detachment 7—works in collaboration with the staffs of several widely-scattered observatories to watch for solar flares 24 hours a day, seven days a week.

A complicated communications network utilizing teletype circuits, military electronic circuits, civilian and military telephone systems, and even the U.S. mail, has been set up to feed data to the central Solar Forecast Facility (SFF). There the information is collated, analyzed, and prepared into suitable form for four routine daily forecasts and an additional once-a-week extended-period forecast.

When there is reason to believe that detectable quantities of sun-generated high-energy protons may reach the vicinity of earth, a special alert system goes into action. This Proton Event Start Time Forecast—bearing the appropriate acronym PESTF—is an alert program organized into a four-part, color-coded warning system.

PESTF—Green means that proton events are not expected. Yellow indicates that optical and/or radio indicators suggest that proton activity on the sun is a possibility. Red means that a major flare has occurred and that a related Type IV radio burst (or some other indicator) has been observed. Purple warns that a major flare has occurred, and that there is sufficient information to state that a proton event is definitely expected to begin before a stated time.

Chinese Dragon. The streaming clouds of high-energy protons, electrons, and alpha particles created by solar flares race toward the earth at speeds that may exceed 100 million miles per hour. Since the sun is only about 94 million miles from earth, any astronaut wandering about in space had better get home—or under cover—in less than an hour after the flare erupts! Unless the flare is anticipated in advance, there isn't much time to relay a warning to the hapless space wanderer.

The astronaut who leaves the earth's protective atmosphere behind must look on the sun as both friend and foe. He can never be quite certain just when the sun will suddenly change into a sort of celestial Chinese Dragon whose fiery mouth will belch vast clouds of lethal vapors into interplanetary space.

More Problems. Just after a flare erupts, the earth's atmosphere is bombarded by X-rays and ultraviolet radiation. These solar products travel at the speed of light and can make the sun-to-earth trip in about eight minutes. These radiations heat the earth's atmosphere and cause it to expand outward. A satellite or space capsule orbiting around the earth along a carefully calculated course will run into unexpectedly dense air and slow down. This alters the craft's trajectory, and results in a rapid loss of altitude. Unless the braking effect of the surging atmosphere is anticipated and offset by those handling flight programming, an unhappy astronaut may find himself coming down in Death Valley instead of making a cool splashdown in the Atlantic.

No radio ham needs to be told that when sunspots appear and solar flares tongue the cosmos, radio communications get fouled up badly because of the resulting magnetic storms. To a ham, this is usually at most an annoying inconvenience. But to others—especially the armed forces—disruption of vital radio communications can be a very serious matter indeed. Sunspots directly affect the ionosphere's ability to reflect signals.

Any advance warning about solar activity that may affect radio communications is obviously of great significance. Moreover, the scientific data now being accumulated about solar phenomena may some day enable electronics engineers to devise wholly new communications systems that will be unaffected by magnetic storms and the like.

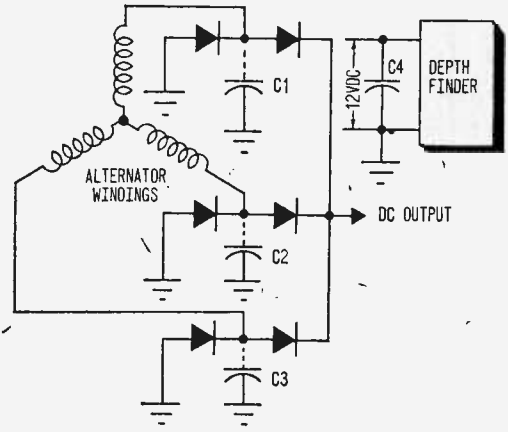
As we said, it has taken mankind a half million years to get a really good look at the sun. But it was worth the wait. The view is fantastic! ■

Ask Me Another

Continued from page 40

cause of electrical noise introduced by the alternator. How can I build a simple filter or power supply to eliminate the dry-cell battery and permit operation of the depth finder directly off the boat wiring system?

—A. M. K., South Natick, Mass.

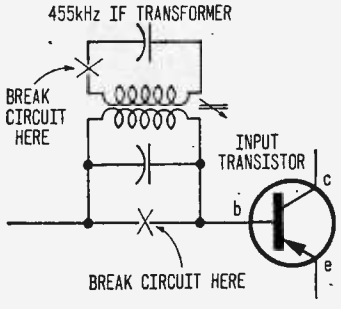


Connect ignition capacitors C1, C2, C3, and C4 across the three AC outputs of the alternator and output of the depth finder as shown in the diagram. You may also have to install ignition noise suppressors at the spark plug and ignition coil.

Ham and Beacon

I recently bought a portable AM/FM/SW receiver of fairly good quality. On AM and SW every station is heterodyned by a CW beacon. I assume the beacon is operating around 455 kHz since it is received across the dial. Is there a simple remedy such as the addition of another tuned circuit in the loop antenna? I don't have any test equipment and only limited parts from other radios.

—Pfc. Salerno, Vietnam

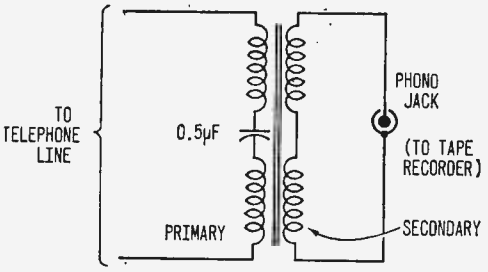


It is possible that the interfering station is very close to you and is overloading the receiver's front end. You might try connecting a 455-kHz wave trap in series with the input to first transistor as shown in diagram. You can use a 455-kHz IF transformer. Adjust the active IF coil's slug until the interference is minimized.

Miniature Invasion

In Robert M. Brown's book The Electronic Invasion, *he mentions a device called a match box for connecting a tape recorder to the telephone at the phone terminal. He states that these devices simply amount to a line-matching device, often a simple transformer, and that most people build their own. What type of transformer is used for a recorder with a 2000-ohm input?*

—D. S., Milwaukee, Wis.



You can use a UTC 0-25 transformer which has a 600-ohm primary and a 2000-ohm secondary connected as shown in the diagram. Use a shielded cable from the phono jack to the tape recorder. You should be able to get this transformer at the Allied Radio branch in Milwaukee. Remember that it is unlawful for you to record any telephone conversation unless you advise the persons whose voices you are recording and also inject a beep tone periodically on the line.

Now Look Here!

I note that you told L.J.H. of Chattanooga that he can't receive aviation stations on his FM receiver. My dear sir, aviation stations are FM! I myself have taken a portable AM/FM receiver, and by spreading apart the oscillator coil and adjusting the trimmer capacitors I received the aviation band loud and clear.

—S. R. M., Chicago, Ill.

You are wrong, friend. Aviation stations use AM. If you can hear them on your FM receiver, its detector is capable of demodulating AM, and it is not a true FM receiver.

Listening Low

What's to hear on VLF, conversation or mostly code?

—S. V., Miami Beach, Fla.

Mostly code and standard-frequency signals. Just the right thing to tune in when you're reading *Playboy*. ■

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How to get into

One of the hottest money-making fields in electronics today– servicing two-way radios!

HE'S FLYING HIGH. Before he got his CIE training and FCC License, Ed Dulaney's only professional skill was as a commercial pilot engaged in crop dusting. Today he has his own two-way radio company, with seven full-time employees. "I am much better off financially, and really enjoy my work," he says. Read here how you can break into this profitable field.

More than 5 million two-way transmitters have skyrocketed the demand for service men and field, system, and R&D engineers. Topnotch licensed experts can earn $12,000 a year or more. You can be your own boss, build your own company. And you don't need a college education to break in.

HOW WOULD YOU LIKE to start collecting your share of the big money being made in electronics today? To start earning $5 to $7 an hour... $200 to $300 a week... $10,000 to $15,000 a year?

Your best bet today, especially if you don't have a college education, is probably in the field of two-way radio.

Two-way radio is booming. Today there are more than *five million* two-way transmitters for police cars, fire department vehicles, taxis, trucks, boats, planes, etc. and Citizen's Band uses—and the number is still growing at the rate of 80,000 new transmitters per month.

This wildfire boom presents a solid gold opportunity for trained two-way radio service experts. Many of them are earning $5,000 to $10,000 a year *more* than the average radio-TV repair man.

Why You'll Earn Top Pay

One reason is that the United States Government doesn't permit anyone to service two-way radio systems unless he is *licensed* by the Federal Communications Commission. And there simply aren't enough licensed electronics experts to go around.

Another reason two-way radio men earn so much more than radio-TV service men is that they are needed more often and more desperately. A home radio or television set may need repair only once every year or two, and there's no real emergency when it does. But a two-way radio user must keep those transmitters operating at all times, and *must* have their frequency modulation and plate power input checked at regular intervals by licensed personnel to meet FCC requirements.

This means that the available licensed experts can "write their own ticket" when it comes to earnings. Some work by the hour and usually charge at least $5.00 per hour, $7.50 on evenings and Sundays, plus travel expenses. A more common arrangement is to be paid a monthly retainer fee by each customer. Although rates vary widely, this fixed charge might be $20 a month for the base station and $7.50 for each mobile station. A survey showed that one man can easily maintain at least 100 stations, averaging 15 base stations and 85 mobiles. This would add up to at least $12,000 a year.

Be Your Own Boss

There are other advantages too. You can become your own boss—work entirely by yourself or gradually build your own fully staffed service company. Instead of being chained to a workbench, machine, or desk all day, you'll move around, see lots of action, rub shoulders with important police and fire officials and business executives who depend on two-way radio for their daily operations. You may even be tapped for a big job working for one of the two-way radio manufacturers in field service, factory quality control, or laboratory research and development.

How To Get Started

How do you break into the ranks of the big-money earners in two-way radio? This is probably the best way:

1. Without quitting your present job, learn enough about electronics fundamentals to pass the Government FCC Exam and get your Commercial FCC License.
2. Then get a job in a two-way radio service shop and "learn the ropes" of the business.
3. As soon as you've earned a reputation as an expert, there are several ways you can go. You can move *out* and start signing up and servicing your own customers. You might become a franchised service representative of a big manufacturer and then start getting into two-way radio sales, where one sales contract might net you $5,000. Or you may even be invited to move *up* into a high-prestige salaried job with one of the major manufacturers either in the plant or out in the field.

The first step—mastering the fundamentals of Electronics in your spare time and getting your FCC License—can be easier than you think.

Cleveland Institute of Electronics has been successfully teaching electronics by mail for over thirty years. Right at home, in your spare time, you learn electronics step by step. Our AUTO-PROGRAMMED™ lessons and coaching by expert instructors make everything clear and easy, even for men who thought they were "poor learners." You'll learn not only the fundamentals that apply to all electronics design and servicing, but also the specific procedures for installing, troubleshooting, and maintaining two-way mobile equipment.

Get Your FCC License... or Your Money Back!

By the time you've finished your CIE course, you'll be able to pass the FCC License Exam with ease. Better than nine out of ten CIE-trained men pass the FCC Exam the first time they try, even though two out of three non-CIE men fail. This startling record of achievement makes possible the famous CIE warranty: you'll pass the FCC Exam upon completion of your course or your tuition will be refunded in full.

Ed Dulaney is an outstanding example of the success possible through CIE training. Before he studied with CIE, Dulaney was a crop duster. Today he owns the Dulaney Communications Service, with seven people working for him repairing and manufacturing two-way equipment. Says Dulaney: "I found the CIE training thorough and the lessons easy to understand. No question about it—the CIE course was the best investment I ever made."

Find out more about how to get ahead in all fields of electronics, including two-way radio. Mail the bound-in postpaid reply card for two FREE books, "How To Get A Commercial FCC License" and "How To Succeed In Electronics." If card has been removed, just send us your name and address on a postcard.

THIS COULD BE YOUR "TICKET" TO A GOOD LIVING. You must have a Commercial FCC License to service two-way radios. Two out of three men who take the FCC exam flunk it... but nine out of ten CIE graduates pass it the first time they try!

ENROLL UNDER NEW G.I. BILL

All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, OR are in service now, check box on reply card for G.I. Bill information.

CIE Cleveland Institute of Electronics
1776 E. 17th St., Dept. EX-27, Cleveland, Ohio 44114

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CIRCUITS AT HOME with the New Improved PROGRESSIVE RADIO "EDU-KIT"®

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- ★ 12 RECEIVERS
- ★ 3 TRANSMITTERS
- ★ SQ. WAVE GENERATOR
- ★ SIGNAL TRACER
- ★ AMPLIFIER
- ★ SIGNAL INJECTOR
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- ★ No Knowledge of Radio Necessary
- ★ No Additional Parts or Tools Needed
- ★ EXCELLENT BACKGROUND FOR TV
- ★ SCHOOL INQUIRIES INVITED
- ★ Sold In 79 Countries

YOU DON'T HAVE TO SPEND HUNDREDS OF DOLLARS FOR A RADIO COURSE

The "Edu-Kit" offers you an outstanding PRACTICAL HOME RADIO COURSE at a rock-bottom price. Our Kit is designed to train Radio & Electronics Technicians, making use of the most modern methods of home training. You will learn radio theory, construction practice and servicing. THIS IS A COMPLETE RADIO COURSE IN EVERY DETAIL.

You will learn how to build radios, using regular schematics; how to wire and solder in a professional manner; how to service radios. You will work with the standard type of punched metal chassis as well as the latest development of Printed Circuit chassis.

You will learn the basic principles of radio. You will construct, study and work with RF and AF amplifiers and oscillators. detectors, receivers, test equipment. You will learn and practice code, using the Progressive Code Oscillator. You will learn and practice trouble-shooting, using the Progressive Signal Tracer, Progressive Signal Injector, Progressive Dynamic Radio & Electronics Tester, Square Wave Generator and the accompanying instructional material.

You will receive training for the Novice, Technician and General Classes of F.C.C. Radio Amateur Licenses. You will build Receiver, Transmitter, Square Wave Generator, Code Oscillator, Signal Tracer and Signal Injector circuits, and learn how to operate them. You will receive an excellent background for television, Hi-Fi and Electronics.

Absolutely no previous knowledge of radio or science is required. The "Edu-Kit" is the product of many years of teaching and engineering experience. The "Edu-Kit" will provide you with a basic education in Electronics and Radio, worth many times the low price you pay. The Signal Tracer alone is worth more than the price of the kit.

THE KIT FOR EVERYONE

You do not need the slightest background in radio or science. Whether you are interested in Radio & Electronics because you want an interesting hobby, a well paying business or a job with a future, you will find the "Edu-Kit" a worth-while investment.

Many thousands of Individuals of all ages and backgrounds have successfully used the "Edu-Kit" in more than 79 countries of the world. The "Edu-Kit" has been carefully designed, step by step, so that you cannot make a mistake. The "Edu-Kit" allows you to teach yourself at your own rate. No instructor is necessary.

PROGRESSIVE TEACHING METHOD

The Progressive Radio "Edu-Kit" is the foremost educational radio kit in the world, and is universally accepted as the standard in the field of electronics training. The "Edu-Kit" uses the modern educational principle of "Learn by Doing." Therefore you construct, learn schematics, study theory, practice trouble shooting—all in a closely integrated program designed to provide an easily-learned, thorough and interesting background in radio.

You begin by examining the various radio parts of the "Edu-Kit." You then learn the function, theory and wiring of these parts. Then you build a simple radio. With this first set you will enjoy listening to regular broadcast stations, learn theory, practice testing and trouble-shooting. Then you build a more advanced radio, learn more advanced theory and techniques. Gradually, in a progressive manner, and at your own rate, you will find yourself constructing more advanced multi-tube radio circuits, and doing work like a professional Radio Technician.

Included in the "Edu-Kit" course are Receiver, Transmitter, Code Oscillator, Signal Tracer, Square Wave Generator and Signal Injector Circuits. These are not unprofessional "breadboard" experiments, but genuine radio circuits, constructed by means of professional wiring and soldering on metal chasis, plus the new method of radio construction known as "Printed Circuitry." These circuits operate on your regular AC or DC house current.

THE "EDU-KIT" IS COMPLETE

You will receive all parts and instructions necessary to build twenty different radio and electronics circuits, each guaranteed to operate. Our Kits contain tubes, tube sockets, variable, electrolytic, mica, ceramic and paper dielectric condensers, resistors, tie strips, hardware, tubing, punched metal chassis, Instruction Manuals, hook-up wire, solder, selenium rectifiers, coils, volume controls and switches, etc.

In addition, you receive Printed Circuit materials, including Printed Circuit chassis, special tube sockets, hardware and instructions. You also receive a useful set of tools, a professional electric soldering iron, and a self-powered Dynamic Radio and Electronics Tester. The "Edu-Kit" also includes Code Instructions and the Progressive Code Oscillator, in addition to F.C.C. Radio Amateur License training. You will also receive lessons for servicing with the Progressive Signal Tracer and the Progressive Signal Injector, a High Fidelity Guide and a Quiz Book. You receive Membership in Radio-TV Club, Free Consultation Service, Certificate of Merit and Discount Privileges. You receive all parts, tools, instructions, etc. Everything is yours to keep.

Progressive "Edu-Kits" Inc., 1186 Broadway, Dept. 549NN, Hewlett, N. Y. 11557

FREE EXTRAS

• SET OF TOOLS

- SOLDERING IRON
- ELECTRONICS TESTER
- PLIERS-CUTTERS
- VALUABLE DISCOUNT CARD
- CERTIFICATE OF MERIT
- TESTER INSTRUCTION MANUAL
- HIGH FIDELITY GUIDE • QUIZZES
- TELEVISION BOOK • RADIO TROUBLE-SHOOTING BOOK
- MEMBERSHIP IN RADIO-TV CLUB: CONSULTATION SERVICE • FCC AMATEUR LICENSE TRAINING
- PRINTED CIRCUITRY

SERVICING LESSONS

You will learn trouble-shooting and servicing in a progressive manner. You will practice repairs on the sets that you construct. You will learn symptoms and causes of trouble in home, portable and car radios. You will learn how to use the professional Signal Tracer, the unique Signal Injector and the dynamic Radio & Electronics Tester. While you are learning in this practical way, you will be able to do many a repair job for your friends and neighbors, and charge fees which will far exceed the price of the "Edu-Kit." Our Consultation Service will help you with any technical problems you may have.

FROM OUR MAIL BAG

J. Stataitis, of 25 Poplar Pl., Waterbury, Conn., writes: "I have repaired several sets for my friends, and made money. The "Edu-Kit" paid for itself. I was ready to spend $240 for a Course, but I found your ad and sent for your Kit."

Ben Valerio, P. O. Box 21, Magna, Utah: "The Edu-Kits are wonderful. Here I am sending you the questions and also the answers for them. I have been in Radio for the last seven years, but like to work with Radio Kits, and like to build Radio Testing Equipment. I enjoyed every minute I worked with the different kits; the Signal Tracer works fine. Also like to let you know that I feel proud of becoming a member of your Radio-TV Club."

Robert L. Shuff, 1534 Monroe Ave., Hunnington, W. Va.: "Thought I would drop you a few lines to say that I received my Edu-Kit, and was really amazed that such a bargain can be had at such a low price. I have already started repairing radios and phonographs. My friends were really surprised to see me get into the swing of it so quickly. The Trouble-shooting Tester that comes with the Kit is really swell, and finds the trouble, if there is any to be found."

UNCONDITIONAL MONEY-BACK GUARANTEE

Please rush my Progressive Radio "Edu-Kit" to me, as indicated below:

Check one box to indicate choice of model

- ☐ Regular model $26.95.
- ☐ Deluxe model $31.95 (same as regular model, except with superior parts and tools plus Radio & TV Parts Jackpot worth $15.)

Check one box to indicate manner of payment

- ☐ I enclose full payment. Ship "Edu-Kit" post paid.
- ☐ Ship "Edu-Kit" C.O.D. I will pay postage.
- ☐ Send me FREE additional information describing "Edu-Kit."

Name .....

Address .....

.....

PROGRESSIVE "EDU-KITS" INC.

1186 Broadway, Dept. 549NN, Hewlett, N. Y. 11557

PRINTED CIRCUITRY

At no increase in price, the "Edu-Kit" now includes Printed Circuitry. You build a Printed Circuit Signal Injector, a unique servicing instrument that can detect many Radio and TV troubles. This revolutionary new technique of radio construction is now becoming popular in commercial radio and TV sets.

A Printed Circuit is a special insulated chassis on which has been deposited a conducting material which takes the place of wiring. The various parts are merely plugged in and soldered to terminals.

Printed Circuitry is the basis of modern Automation Electronics. A knowledge of this subject is a necessity today for anyone interested in Electronics.