

DXer's DREAM THAT ALMOST WAS—SHASILAND

Radio-TV EXPERIMENTER

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



AUGUST-SEPTEMBER 75c

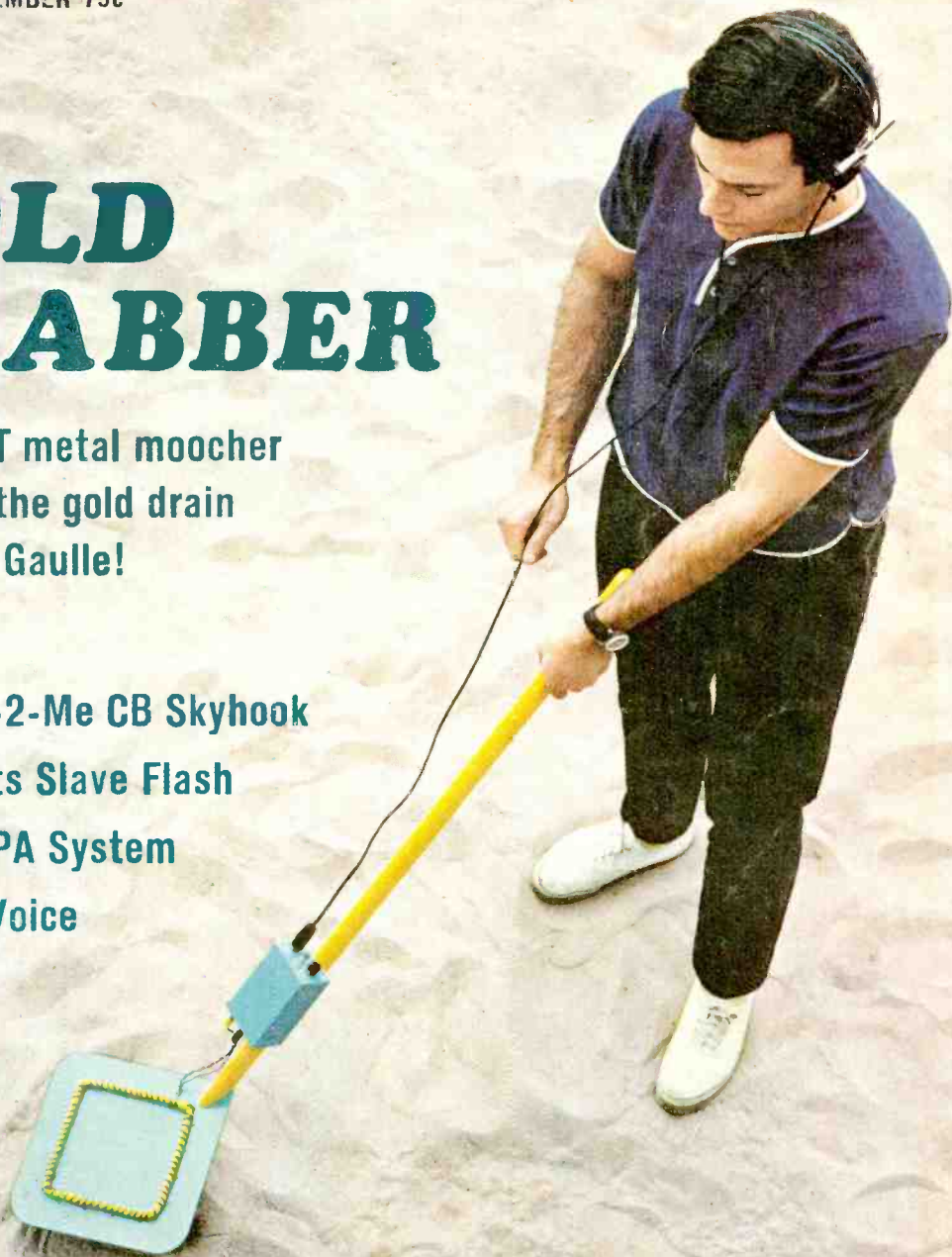
BUILD

GOLD GRABBER

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

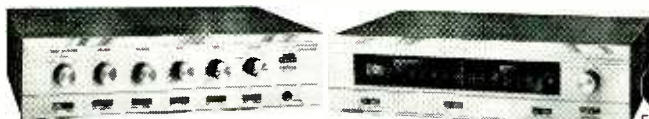
PLUS

- 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.



EICOCRAFT 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.

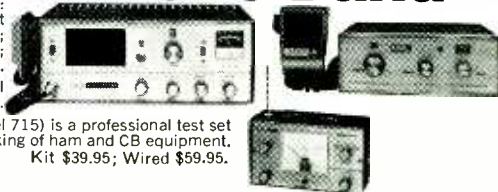


Two years ahead! Model 7923

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, 8 1/4"D. \$189.95 wired only.

The best buy in tube-type CB—"Sentinel-Pro" 23-channel dual conversion 5W Transceiver \$169.95 wired only.

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Truvohm

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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 30A4, 30,000Ω/V, \$19.95.

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.



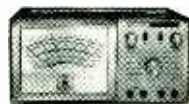
Automotive

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.



Test Equipment **EICO**

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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RTVE-8

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Now! Space Age Science for Everyone AMAZING KT-A-MONTH CLUB

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All the equipment for basic electrical experiments with Wheatstone Bridge (measures resistance), Magnetizer and De-magnetizer, Thermocouple, Mystery Shock Box, Continuity Tester, Exinction Voltmeter, Solenoid Coil Tester, Electromagnetic Relay, Neon Lamp, Galvanometer, Induction Cell, Resistors, Chemicals and Electrodes for Plating and Electrolysis. **FOR SAFETY** a step-down ballast Transformer provides required current.



STROBE LIGHT

A Neon Lamp that flashes at intervals you can synchronize with the speed of rotating or vibrating objects in order to "freeze" their motion to permit close study and checking frequencies and RPM. Flashes are timed by a variable frequency oscillator with a range of 20 to 600 cycles per second.



PHOTOELECTRIC RELAY

Crystal Photo-cell, Electronic Amplifier, Relay, large Condensing Lens in Cabinet Mount. Features automatic on-off or holding circuit operation. Sensitivity Control. Plug-In Outlets for controlled circuit. Use for alarms, counters, etc. Operates on 115V AC. A basic unit for many exciting experiments.



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Electronic Computer multiplies, divides, calculates powers, roots. Set up the problem on the scales of two potentiometers and find the answer on the scale of third potentiometer as indicated by a sensitive meter. Instruction Manual covers computer theory and practical use. Over 150 sample problems and answers demonstrate use with fractions, trigonometry, logarithms, physics formulas, ballistics, etc.



LIGHT AND OPTICS LAB

Exciting optical projects for the study of light. Equipment includes: Five Fresnel Lenses, Prism, Polarizing Filters, Diffraction Grating, Mirror, Telescoping Tubing, Lens Mounts, Tube Holders and Brackets. All the parts and instructions to build a Camera Obscura, Camera Lucida, Polaroscope, and many other optical devices.



Measuring Wavelength of Light

PHOTOGRAPHY LAB

A PRECISION 35MM ENLARGER... horizontal type with twin condensing lenses and 3" f/11 projection lens. Produces quality enlargements up to 8" x 10". Contact Print Frame takes negatives up to 3 1/2" x 4 1/2". 3 Plastic Developing Trays, Neon Safelight, Tray Thermometer, Film Clips, Developing Chemicals, Printing and Enlarging Paper and Darkroom Handbook. Make quality enlargements for \$6. Make prints for only 2¢. Full instructions.



RADIO LAB AND COURSE

YOU BUILD A SHORTWAVE AND BROADCAST RADIO. 3-Tube regenerative circuit. Uses 115V AC. CARBON MICROPHONE with AUDIO AMPLIFIER, RADIO-TRANSMITTER for voice or voice. TIPPED TANK WAVE GENERATOR with variable frequency invaluable in the understanding of wave theory. CODE PRACTICE OSCILLATOR with manual. Steps to a Ham License. All you need to pass the FCC Ham License Exam.



RADIO SERVICING TOOLS

SIGNAL TRACER: A valuable "trouble shooting" tool which enables you to "listen in" as you probe through a faulty circuit until you find the trouble spot. CONTINUITY TESTER: Pinpoints open circuits and test voltages. The use of both pieces fully described in accompanying manual. "Simplified Radio and TV Servicing."



DC POWER SUPPLY

Changes regular 110-120V AC to the direct current required for electronic projects and experimenting. Consists of a Power Transformer, Vacuum Tube Rectifier, 20/20 MFD Capacitor Filter Circuit, and a potentiometer Voltage Selector. A Safe Isolated Power Supply eliminates the need of expensive multi-volt batteries.



MICROCRAFT LAB

Microprojector shows microscopic subjects enlarged with brilliant detail on wall or screen. Has sturdy Steel Cabinet, large Condensing Lenses for extra brightness, and a GE Projection Lamp. Microscope features Ramsden Eyepiece for wide field viewing. Substage Light and Polarizing Filters. Magnifies up to 200X. Includes: Slide, Cover Glasses and Microscopy Manual.



PHOTOMICROGRAPHY CAMERA

Photographs subjects mounted on microscopic slides. Enlarges up to 100X. Takes clear, sharp pictures of specimens too small to be seen with the naked eye. A fully self-contained unit—no microscope required. Uses standard roll film, either 120 or 35, black and white or color. Make a photographic record of your projects with microscopic subjects.



LIGHT TRANSMITTER-RECEIVER

THE TRANSMITTER consists of a Light Source, a Modulating Reflector, Diaphragm and an Optical Projection System. THE RECEIVER is a Two-Stage Audio Amplifier, controlled by a Photo-electric Cell that detects the projected light beam and causes the original sound waves to be reproduced in the loudspeaker.



Talking on a Light Beam

ATOMIC ENERGY LAB

ATOMIC CLOUD CHAMBER with PROJECTOR ILLUMINATOR. See the vapor trails of alpha and beta particles, and of cosmic rays. SPINTHARISCOPIC. Shows exploding atoms. TELESCOPIC—metal housed with Scale and Magnifying Viewer. Measures background radiation and tests sample sources. SAFE RADIOACTIVE MATERIALS. Alpha Source in handy container and Uranium Ore. Full instructions and explanations even up the fascinating field of nuclear physics.



SPECTROSCOPE

Analyze spectra of glowing gases. See and identify the Fraunhofer lines. A quality instrument featuring an easy-to-read built-in scale and a powerful condensing system for a bright spectrum. Equipment includes Alkalal Burner and a 2 Watt Neon Spectral Lamp. Full instructions cover theory and use.



ULTRAVIOLET LAMP

140 watt filter type UV LAMP. Heavy metal cabinet, a Fast Cord, Rotary Switch. Produces dazzling color effects with invisible black light. Has many uses in the fields of Mineralogy, Crime Detection and Science. Accessories include Invisible Ink, Tracer Powder, Fluorescent Crayons.



SURVEYOR'S TRANSIT

A practical Transit. 6X erect image telescope with Range Finder. Refills for measuring remote distances and heights. Vernier reading for both horizontal and vertical scales. Leveling Head with Thumb Screw Adjustment and Spirit Level. Clamps under head hold wooden legs of Tripod. (Legs not included.) Instructions cover elementary surveying, range-finding.



TELESCOPE AND MOUNT

3DX erect image. Extends to 30" length. Five ground and polished lenses. Ramsden Eyepiece. Sturdy Equatorial Mount makes it easy to follow the movement of heavenly bodies. Mount has fittings for wooden legs that complete the tripod (legs are regular 1x2 lumber not included).



WEATHER STATION

A REMOTE READING ANEMOMETER AND WIND-VANE... Flashing Neon Lights on indoor indicator board show wind speed and direction. Safety Pinwheel Card makes all connections safe. 100 Ft. of Lead in Wire. Air-Tank Barometer with 4X indicator column. Sling psychrometer measures relative humidity. Rain Gauge measures rainfall to 1/100 inch. ASO Cloud Chart, Weather Map and Forecasting Manual—a complete set-up for amateur meteorology.



You get **ALL** the equipment for **ALL** the above in **nine** monthly kits

SEND **\$1.00** ONLY TO ENROLL

PAY **\$4.75** FOR EACH KIT THAT YOU RECEIVE

Take as few as you wish—or get all nine... it's up to you!

SOME QUESTIONS ANSWERED

- Q. How is it possible? It seems incredible to be able to get all the equipment shown above in just nine kits—at only \$4.75 per kit!
- A. The low overhead of the membership plan is just part of the answer. The real key to this amazing program is ABC's Club's especially designed multi-use equipment. For example: the Microprojector quickly and easily converts into the Spectroscope, Photo Enlarger and Cloud Chamber Illuminator. Similarly, the Transit Head doubles as a Telescope Mount. Such multi-purpose design makes possible this all-science program at a price everyone can afford.
- Q. May members choose the order in which they receive their kits?
- A. Yes. With the first kit members receive a list of the equipment and projects contained in each of the remaining eight kits. With this information they are able to choose the kit sequence that best suits their particular interest.
- Q. Can members get their kits all at once instead of one-a-month?
- A. Yes. At any time members can have the balance of their kits sent in one shipment. We recommend that you start on the kit-a-month plan because the monthly spacing will give you time to get the full measure of knowledge and enjoyment that each kit has to offer.

NO EXPERIENCE NECESSARY—IT'S FUN! IT'S EASY!

NO OBLIGATION—NO RISK!

- ★ You take only as many kits as you wish.
- ★ All kits on 2 weeks approval.
- ★ You may return any kit for full refund.

Send coupon today—get your first kit on its way!

WISH TO TRY THE KIT-A-MONTH PROGRAM:

- ☐ I enclose \$1.00 to enroll and \$4.75 for the first kit postpaid.
- ☐ I enclose \$1.00 to enroll. Send first kit COD. I'll pay COD fee.

I understand if I am not satisfied with the first kit I may return it for a complete refund including the \$1.00 membership fee.

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ADDRESS _____

CITY AND STATE _____ (PLEASE PRINT) ZIP CODE _____

AMERICAN BASIC SCIENCE CLUB, INC.

104 Helman, San Antonio, Texas 78205

Radio-TV EXPERIMENTER

August/
September
1968



SCIENCE EXTRA

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Rumor has it that the sun has been around for a good many more moons than man has. Question is, will man ever get around to figuring out exactly what makes old sol tick?

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SPECIAL 16-PAGE SECTION

RADIO SHACK 200th STORE CELEBRATION!

FREE
with any order:
50¢ COMPUTER!

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.

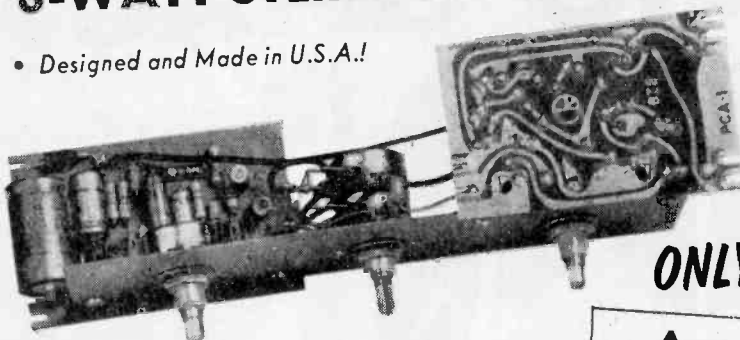


Store Addresses, Order Form, See Page 20

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!

ONLY 9⁹⁵

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

Accessory Kit for 8W Amplifier

ONLY 3⁹⁵

- Knobs
- Transformer
- Line Cord
- Switch
- Diode
- Battery and Clips
- Cables

30-1968, Ship. wt. 1 lb. Net 3.95

THE COMPLETE STEREO SEMI-KIT PACKAGE!

24⁹⁵

Hook Up,
Install
Anywhere!

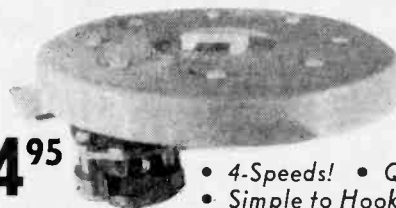


- 8-Watt Stereo Amplifier Semi-Kit Complete with Accessory Kit!
- Turntable, Tone Arm and Stereo Cartridge!
- Two 8-Inch Round Speakers! • No Extras to Buy!

30-1933, Package, Wt. 11 lbs. Net 24.95

PHONOGRAPH MOTOR/TURNTABLE

4⁹⁵



- 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 3½" mounting centers; 2½" below base plate. #42-129; #278-1255, AC Line Cord, .39 net.

STEREO ARM/CARTRIDGE

2⁹⁹

- Simple to Mount!
- Straight Line Design!

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

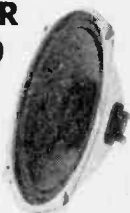
Special Manufacturer's Closeout! Purchase!

8" ROUND SPEAKER

- The Perfect Low-Cost Extension or Replacement Speaker!

2 for 4⁴⁹

Use with semi-kit shown above! Our huge 190-store buying power brings you this quality speaker at sensational savings! Buy several — bring stereo to every room in your home! U.S.-made. Magnet weight: 1.47 oz. 8 ohms. #40-1271.



Store Addresses, Order Form, See Page 20

GREAT SAVINGS ON *REALISTIC* RECORDS, PRERECORDED TAPES!



3-HOUR LONG PLAY PRE-RECORDED STEREO TAPES

- 4-Track, Reel-to-Reel!
- Same as Getting 6 Stereo Tapes!
- Top Artists Perform Top Arrangements!
- 7" Reel! • 3 3/4 IPS!

4⁹⁵ Each
In Sets of 3

SEPARATELY: \$5.95 EACH

QUIET JAZZ: Pool some of America's top jazz musicians, mix in top-notch musical repertoires, and the result: a really great 47-hit tape! Pete Jolly and Bob Freeman are just two of the artists. A "must" for every jazz lover! #51-3001

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CURTAIN UP!: 62 all-time hit show tunes are combined to bring you the musical magic of Broadway theater! Selections from My Fair Lady, West Side Story, Gigi, Bells are Ringing, Oklahoma, many more favorites! #51-3003



TRIPLE PLAY 8 TRACK STEREO TAPE CARTRIDGES

Available Only
at Radio Shack

- 3 Complete Stereo Albums — IN ONE CARTRIDGE!
- 30 Full-Length Tunes!

4⁹⁵ EA.

THE HERITAGE OF BROADWAY: A variety of artists "belting-out" 30 show-tune greats of our time! A family favorite. #51-3004

THE MELODIES OF LOVE: Carol Lawrence, Lena Horne and more stars give you hours of soothing music. #51-3005

SOUNDS SMOOTH: "I'm in the Mood for Love," "Shine on Harvest Moon" — and other popular instrumentals. #51-3006

SAY IT WITH STRINGS: Marcel Lenoir conducts — 30 greats including "Tenderly," and "How Deep is the Ocean." #51-3007

FOREVER FAVORITES: Features a variety of songs by the HiLo's, Ink Spots, Pied Pipers, Fred Astaire, etc. #51-3008

AND THEN THEY WROTE: Hits of Porter, Gershwin, Lerner and Loewe, etc., played by the Kingsbridge Strings. #51-3009

3-Disk Audio Fidelity Stereo LP Sets!



ORGAN IN STEREO

3 Record
Stereo Set

4⁹⁵

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

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



ARMED FORCES SOUND EFFECTS

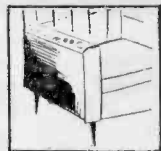
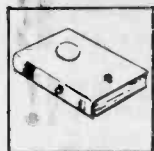
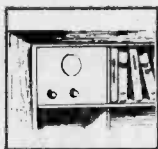
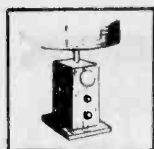
3 Record
Stereo Set

4⁹⁵

The drama of actual combat; the sound of airpower; a nuclear explosion and the fast-paced action of the world's greatest aircraft carrier. Listen to ceremonial military drills and marches. 3 records at what you'd expect to pay for one! #50-2001

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

For Store Addresses, Order Form, See Page 20



RADIO SHACK 200th STORE CELEBRATION!

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

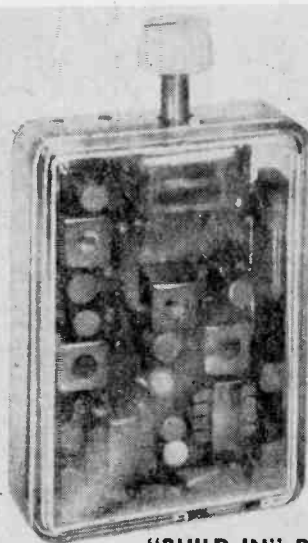
*Here's a wired transistor radio in 3 pieces.
Dextrous do-it-yourselfers should have
a field-day with this one.*

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 $2\frac{1}{4} \times 1 \times 3\frac{1}{8}$ " 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 $2\frac{1}{4}$ " 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 Shack's exciting exclusive products that can't be bought elsewhere. Get a "Build In" at your nearest Radio Shack store.

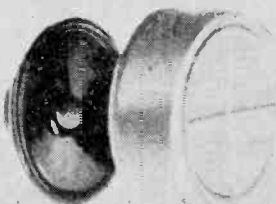
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"BUILD-IN" RADIO



VOLUME
CONTROL
AND SWITCH



PM SPEAKER IN CASE

RADIO SHACK PROJECT BOOKS (4¢ A PROJECT)



"50 EASY TO BUILD SOLID STATE PROJECTS"

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

62-1050 Net 2.00

"A MODERN TRANSISTOR WORKBOOK"

Build your own wireless microphone, AM broadcast tuner, audio pre-amp, PA system, experimenter's power supply, etc. 50 schematics.

62-2025 Net 2.00

**EACH
BOOK
\$2**

RADIO-TV EXPERIMENTER

SPEAKERS, MIKES, TOOLS FOR THE EXPERIMENTER

BUILD "EI'S" MIGHTY SUB-MINI SPEAKER

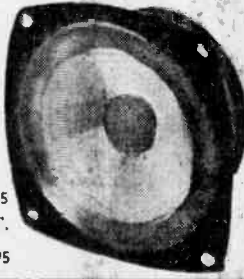
4" Acoustic Suspension
FE-103 Speaker System!

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

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

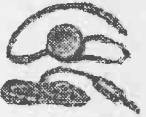
CONTOUR NETWORK KIT.
With instructions.
40-808, coil, capacitor, etc., Net 3.95

7⁹⁵



MIDGET EARPHONES

For Transistor Radios



98^c

Resp. 50-9000 cps. With replaceable earplug, cord. 10 ohms.
33-175, Wt. 2 oz. Net .98
33-174, w/3/32" plug, Net .98

DUOFONE™ HEADPHONES

• Switchable Mono/Stereo!



6⁹⁵

Wide-range dynamic phones for mono or stereo! 8Ω, matching 4-16Ω.
33-196, 1/2 lb. Net 6.95

CRYSTAL LAPEL MIKE

• For Recorders, PA, Paging!



1⁸⁹

Sensitive! Concealable! Response: 200-300 cps.
33-100, Wt. .8 oz. Net 1.89

CRYSTAL MIKE CARTRIDGE



89^c

Precision made crystals! Response up to 7000 cy.
270-075, .8 oz. Net .89

6⁹⁵ LAVALIER DYNAMIC MIKE Neck/Hand/Desk Use!



Pencil-slim hi-Z for use at home, studio, or in PA and guitar systems! With cord, stand. 50K.
33-928, Ship. wt. 2 lbs. Net 6.95

LOW COST 25-W. SOLDERING IRON



1⁸⁹

Precision designed! Comes complete with UL Cord and Plug. Uses 117V AC/DC.
64-2182, 1 lb. Net 1.89
64-2178, Extra copper Tip Net .25

OUR OWN 60/40 SOLDER



69^c Each
12 & UP
59^c Each

U.S. made with superactive rosin core. Fits fed. specs. QQ-5-571d
64-0002 Net .69

For Store Addresses, Order Form, See Page 20

RADIO SHACK 200th STORE CELEBRATION!

MINIATURE PM SPEAKERS FOR TRANSISTOR PROJECTS, RADIOS

8 Ohm Impedance

Small in size but big in sound! Three sizes to choose from: 2 1/2", 2 3/4", or 2". All for the same bargain price!

40-247, 2 1/2" Net .98
40-246, 2 3/4" Net .98
40-245, 2" Net .98



ONLY 98^c EACH!

FABULOUS THERMO-ELECTRIC GLUE GUN REALLY WORKS!

60-Second Bonding Plus Instant-set Caulking!
No Clamping! No Cleaning!



5⁹⁹

for make-or-mend jobs

Makes all other kinds of gluing obsolete! Uses unique hot-melt glue sticks: melted glue bonds permanently in 60 seconds, providing a flexible bond that's perfect for furniture, pottery, metal, leather, plastic or fabric. Use with white sealer sticks for water proof caulking. Glue and caulking included.
64-2860, Gun, 2 lbs. Net 5.99
64-2861, 7 Glue sticks, 1 lb. Net .49
64-2862, 7 Sealer Sticks, 1 lb. Net .49

POWERFUL CERAMIC MAGNETS

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

64-1885



64-1875

10^c 15^c 25^c
Each Each Per Pair
For 10 Singly

10 FOR 1⁰⁰

STEEL CATCH-ALL STORAGE BOX



1⁹⁵

4 draws with adjustable compartments.
64-2050, 2 lbs. Net 1.95

ASSORTED ELECTRIC HARDWARE



6"H x 8 1/4"D x 5 3/4"W
99^c

Over 600 pieces! Something here for everyone! All brand new—no sweepings! One full pound. Comparable value: \$4.50!
64-2890, Wt. 1 lb. Net .99

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!



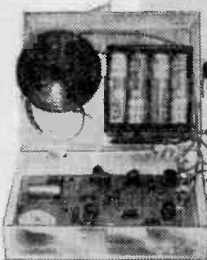
NEW! EXCITING! EASY TO BUILD! Science Fair™ SIREN KIT

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

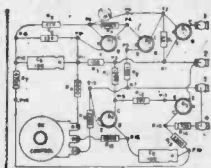
5⁹⁵

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
28-100, 1-Tube DC Radio Kit	3.95	28-112, Bell/Buzzer/Code Key	1.49
28-101, Transistor Organ Kit	5.95	28-113, Stereo Amplifier Kit	8.95
28-103, Wireless AM Mike Kit	3.95	28-109, FM Wireless Microphone Kit ..	6.95
28-104, AC/DC Power Supply Kit	6.95	28-110, 3-Transistor Shortwave Radio Kit	7.95
28-105, 3-Way Code Oscillator Kit ...	3.95		

In Stock at Any One of the
200 Radio Shack Stores Coast to Coast

NEW from RADIO SHACK

Science Fair™

BATTERY KIT

Make 2 "D" Batteries



ONLY
1²⁵

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!

28-125, Ship. wt. 2 lbs. Net 1.25



Science Fair™ 50-IN-1 ELECTRONIC PROJECT KIT

17⁹⁵

- 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 telescope, 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



For Store Addresses, Order Form, See Page 20

CB'ers MOBILE *REALISTIC*® TRANSCEIVERS!

REALISTIC® 12-CHANNEL SOLID STATE CB TRANSCEIVER

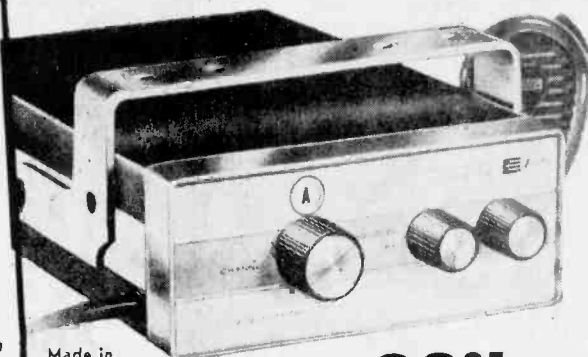
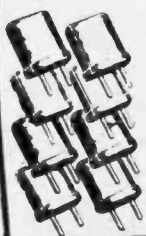
**FREE
CRYSTAL BONUS!**

With Purchase of TRC-15

**4 SETS
OF CRYSTALS**

Channel 11 Installed in Set;
YOUR CHOICE OF 3 ADDI-
TIONAL CHANNELS — FREE!

A Regular \$19.92 Value When
Crystals Purchased Separately



Made in
U.S.A.

Model TRC-15 **89⁹⁵** 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 μ v 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., 8 $\frac{1}{4}$ "x5 $\frac{1}{2}$ "x2 $\frac{3}{4}$ " 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

99⁹⁵



- 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 μ v for 10 db S-N. With cords, brackets, crystal for channel 11. 7 $\frac{1}{2}$ " x 6 $\frac{3}{8}$ " x 2 $\frac{1}{8}$ ".
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!

139⁹⁵

No Money Down

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

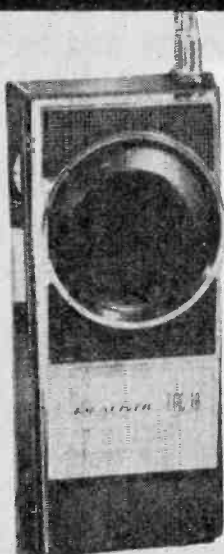
ALL CRYSTALS
SUPPLIED!



ONLY 6"x7"x1 $\frac{3}{4}$ "

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CB WALKIE TALKIE VALUES!



TRC-1B 7-Transistor Superhet

13⁹⁵
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. \$44⁵⁰

SALE 39⁵⁰ 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" Sale 39.50
21-106, Sh. wt. 5 lbs.

1½-WATT 2-CHANNEL TRC-66

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

SAVE \$10
REG. \$59⁹⁵

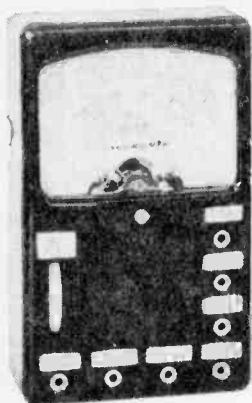
SALE 49⁹⁵ Each

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!
3⁹⁵
Factory
Wired

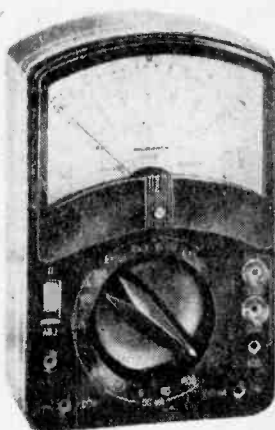
Our Regular \$5.95

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

Only 3 1/2 x 2 1/8 x 1 1/4"

Great for home or workshop! Pin jacks for all 5 ranges; 2-color 1 3/4" meter scale. DC Current 0-150 ma. Resistance: 0-100,000 ohms. Accuracy is $\pm 3\%$ of full scale value on DC ranges, $\pm 4\%$ 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



16⁹⁵
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



27⁹⁵
Factory
Wired

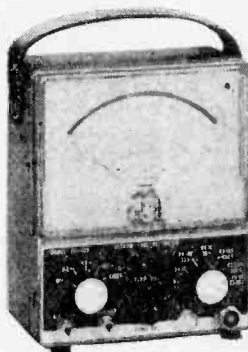
- 4" Full View Meter with Mirrored Scale!
- Meter Protection Circuit!
- 1% Precision Resistors!
- 26-Ranges!

Only 7 x 5 1/2 x 5 5/8"

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. 5 1/2 lbs. Net 27.95

For Store Addresses, Order Form, See Page 20.

MICRANTA 6 1/2" VTVM METER



39⁹⁵
Factory
Wired

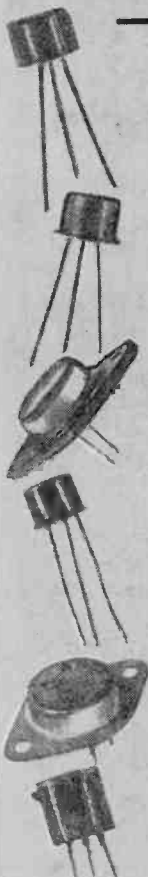
- Precision Resistors!
- Measures Peak-to-Peak and RMS (7 Ranges on Each Function)!
- Frequency Response: 30 cps to 10 mc!

- 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: 0.2 Ω 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:
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:
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:
2N7061TPP, 2N3663, 2N3843A, 2N3900, 2N3901, etc.
276-423, Wt. 3 oz. Net .99

Silicon Field-Effect Transistors



198

- 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

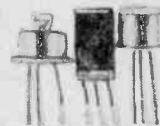
Hard-to-Find IBM Component Boards



8 For 100

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: 2 3/8 x 3 3/8".
276-617 8 for 1.00

NEW! Twin-Pak Transistor Kit



198 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



398

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

Integrated Circuit Specials!



Actual Size

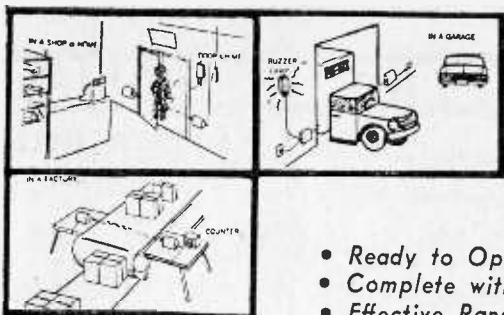
198 Up • Ideal for the Hobbyist, Builder, Experimenter!
• Fantastic Savings!

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 3/4 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



→ 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 **19⁹⁵**

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 $5\frac{1}{2} \times 4 \times 2\frac{7}{8}$ ". 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!

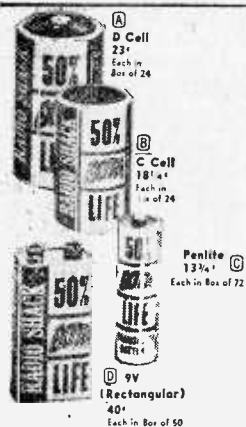


Fig.	Cat. No.	RADIO SHACK	Interchangeable with			Pack	Per Box
			Eve-ready	Burgess	RCA		
A	23-1538	1.5V "D" Cell	950	2	VS036	4/.98	24/5.59
B	23-478	1.5V "AA" Cell	915	Z	VS034A	4/.69	72/9.95
C	23-153	1.5V "C" Cell	935	I	VS035A	4/.88	24/4.49
D	23-152	9V Rect.	216	2U6	VS323	2/.98	50/19.95

AMAZING HOME BATTERY CHARGER

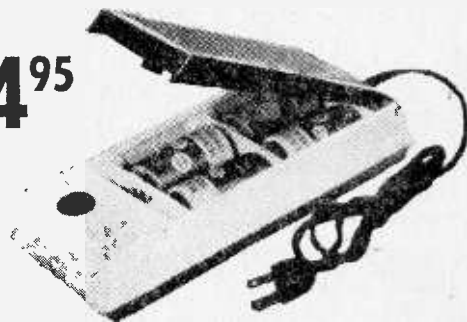
Don't Discard Your "Dead" Batteries!

Accepts All These Types:

- $1\frac{1}{2}$ V "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. $1\frac{1}{2}$ lbs. Net 4.95



ANY
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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 1/2, 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: 3/8 x 3/8 x 1/2".
273-515, 1/4 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, 1/2 lb. Net 1.00

40 Micro Resistors



World's smallest 1/4-watt carbon type resistors! All have axial leads; built for transistor and subminiature circuitry. Assorted values, with resistor color code chart.
271-1574, 1/2 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!
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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, 1/2 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-oscillator, mike, input types. Color coded leads.
273-1581, 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, 1/2 lb. Net 1.00

\$25 SURPRISE PACKAGE!

Loaded with \$1 Parts!

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

\$1

For Store Addresses, Order Form, See Page 20

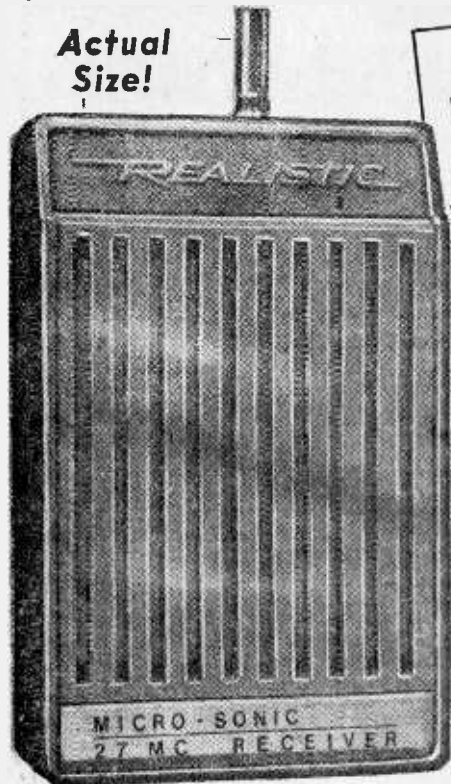
AUGUST-SEPTEMBER, 1968

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

**Actual
Size!**

**ONLY
7⁹⁵**

*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 $3\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{3}{8}$ ". 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

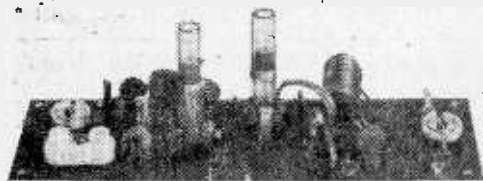
NEW IDEA #2 — as a companion to the above, or a wireless CB microphone (!), there's also the Realistic Microsonic CB transmitter. Same size, color, everything. But transmit only, 100mw of course, with plug-in crystal for Ch. 11. Uses? For example: one of these plus x-number of receivers and you have 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.

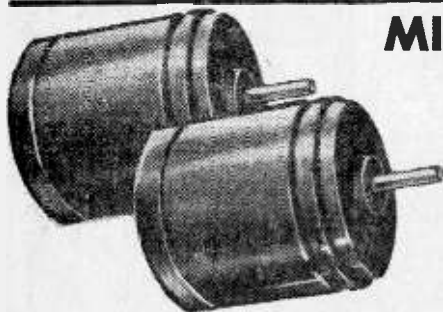


100 MW TRANSMITTER AND REMOTE CONTROL

3⁹⁹ *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 $\frac{1}{4}$ mile, uses plug-in crystal (not supplied). Get yours now at Radio Shack's low price! 21-1166, Sh. wt. $\frac{1}{2}$ lb. Net 3.99



MINIATURE 6V SYNCHROS

For All Remote Control Applications

Ideal for:

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

4⁴⁴

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 $1\frac{1}{8} \times 1\frac{1}{4}$ " shaft $\frac{1}{8} \times \frac{1}{2}$ ".
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 **8⁹⁵**

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 service. 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

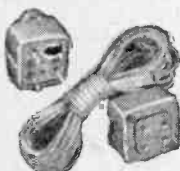


**For Private Phone
and Intercom Systems.**

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

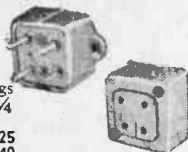
30 Ft. Telephone Extension Cord

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. 1 1/4 lbs. Net 2.98



Telephone Plugs & Jacks

Ideal for making extensions, these plugs and jacks each weigh approximately 1/4 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: 1/4 pound.
278-361 Net 1.19

Four conductor extends up to fifteen feet. Shipping weight: 1/2 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

Store Addresses, Order Form, See Page 20

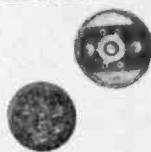
Carbon Type Handset For Mobile and Replacement Use!

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: 1/2 pound.
279-1353 Net .99



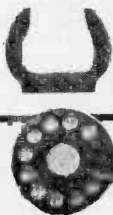
100 Ft. 3-Conductor Telephone Wire

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



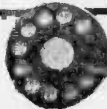
Handset Hanger

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

Standard Western Electric unit. Can be used with automatic control circuits, & electronic combination lock circuits.
279-359, Sh. wt. 1 1/4 lbs. Net 2.99



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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 BUYER'S 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 BUYER'S GUIDE. If you want to see Pam in full color, get a copy today!

how often could you have used...

a Seizer?

two-position
snap-lock

**Handy as an
extra hand or helper.
Clamps lightly or tightly...
for moments or minutes.**

A remarkably versatile tool with unusual holding qualities. Clamps tightly. Holds wires for soldering, acts as a heat sink, retrieves small parts from hard-to-reach places. Two-position snap-lock. Box joint construction. Precision machined from perfectly tempered stainless steel.

4 MODELS: 6" (serrated jaws Nos. 42H straight and 43H curved nose; 5" Jr. (smooth, slim jaws) Nos. 32H straight and 33H curved nose.

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Send Bulletin N564 on Seizers®.

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In Canada contact Charles W. Pointon, Ltd.

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.

With the first two texts, you can repair 70 percent of all TV troubles.

You need no previous experience to take this complete, practical course in TV Repairing.

You don't even have to know a vacuum tube from a resistor. Yet in a matter of months, you can be doing troubleshooting on color sets!

Course consists of 6 texts to bring you along quickly and easily. 936 pages of concise, easy-to-follow instruction, plus 329 detailed illustrations. You also receive a dictionary of TV terms geared directly to course material so you'll understand even the most technical terms.

Instruction is simple, very easy to grasp. Photos show you what a TV screen looks like when everything is normal, and what it looks like when trouble fouls it up. The texts tell you how to remedy the problem, and why that remedy is best.

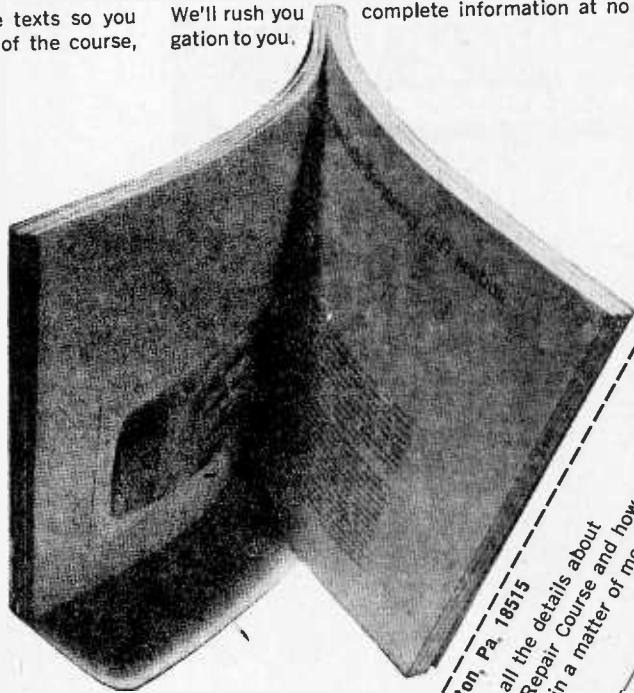
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**Wanna Be a Ham?** There's no doubt that the new FCC/ARRL incentive licensing will mean many changes in the hobby of amateur radio. What these changes are is discussed in the new fourth edition of *So You Want to Be a Ham*, by Robert Hertzberg, W2DJJ. 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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Chapters are devoted to the code, kits, the receiver, getting the ticket, going on the air, the antenna, going mobile, how to be a good operator, test equipment and safety measures, the organization of amateur radio, electronics as a career, the ham in military service, and the radio market place.

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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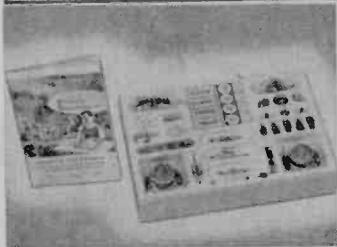


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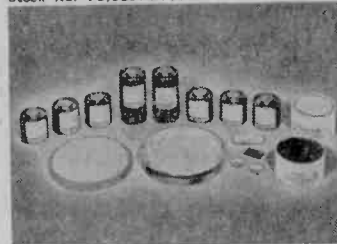
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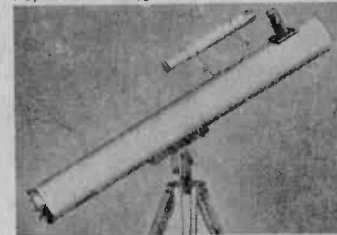
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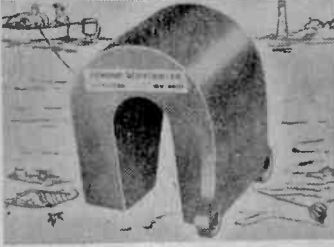
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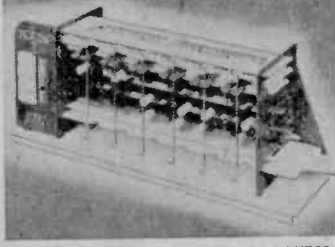
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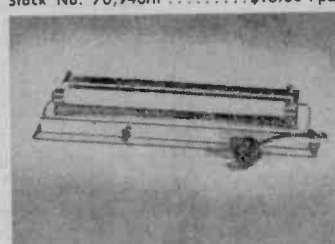
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technicians and engineers become familiar with this important device via a concise treatment of the SCR—*Understanding Silicon Controlled Rectifiers*, by Saul Heller.

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. Nehrlich, 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. RCAI** "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

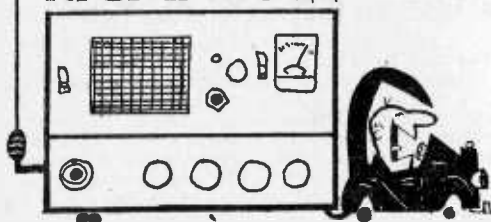


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music into the home by wireless. Over the next fifty-three years, Sarnoff first dreamed and then fulfilled. As the head of the world's foremost electronics company, the Radio Corporation of America, he became the driving force behind such developments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

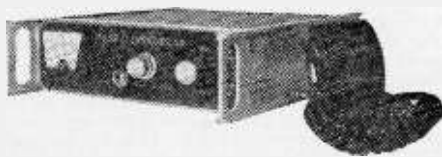
(Continued on page 110)

## 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.

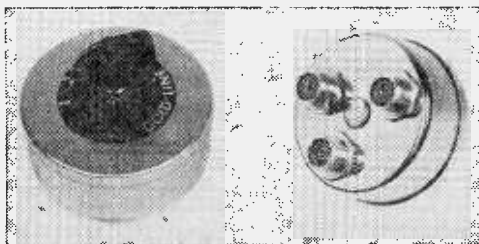


Mark Products 23-Channel Invader Rig

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)



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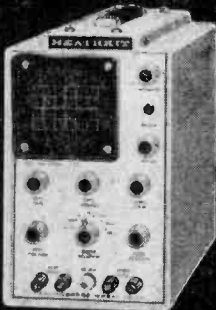
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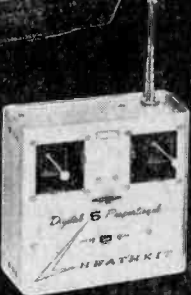


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# From Heath

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## NEW HEATHKIT AA-15 Deluxe Stereo Amplifier

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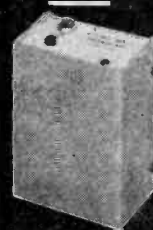
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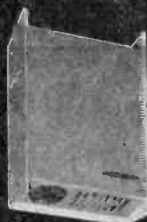
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Extra boxes of ten tear gas shells at \$1.50 per box (prepaid with gun orders). Extra boxes of blanks at \$1.25 per box.

**UNITED SAFETY SUPPLY CO.**

310 West 9th Street  
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## VHF RECEIVER

**AM/FM—MULTI-BAND**

**HIGH SENSITIVITY—SELF CONTAINED**

Hear police, fire, aircraft, amateur CB, etc. signals. Covers 26 to 54 and 88 to 174 mc in eight calibrated bands. Plus a ninth adjustable band for 15 or 20 meter SW BC listening. Five tubes AC power supply with silicon rectifier.



364C

**\$59.95**

Write for catalogue of complete line of converters, receivers and audio equipment for recording.

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## TRANSISTORIZED CONVERTER KITS \$5.00 EACH

Three kits available. Marine 2-3 mc, police & fire, high band 100-200 mc, low band 26-60 mc. 1 mc tuning on car radio. Full instructions.

ANY KIT \$5.00 pp. WIRED \$15.00 pp.

FRED MESHNA, NO. READING, MASS. 01864



## Seen any flying saucers lately?

Thousands claim they have and hundreds of eye-witness reports, plus the most complete directory of sightings ever published, appear in the fascinating pages of this Official Guide to UFOs. Pick up a copy at your newstand or send \$1 to include postage and handling to Official Guide to UFOs, Dept. RTV-8, 505 Park Ave., N. Y., N. Y. 10022.

## CB RIGS & RIGMAROLE

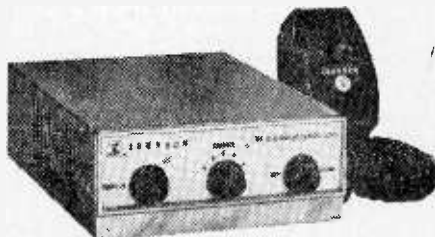
*Continued from page 27*

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 1/2-microvolt sensitivity, and tiny (2 1/2 H x 6 3/16 W x 8 3/4 D) 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. ■

# NEW PRODUCTS

HIGH-FIDELITY  
AMATEUR RADIO  
SHORT WAVE  
RECORDERS  
GIMMICKS  
GADGETS  
TOOLS  
ETC.



## 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

HERE'S YOUR ONE-SOURCE FOR

## CERAMIC CAPACITORS AND SEMICONDUCTORS

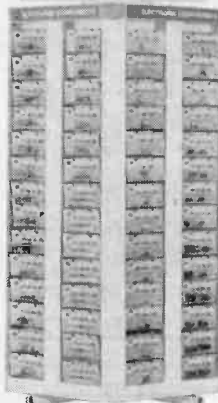


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## NAVY MARINE BAND WALKIE-TALKIE

TRANS. & RECEIVER—Crystal controlled, can be operated on any one channel in freq. range 2.3 to 4.5 MC. Voice (A3) communication only; output of Trans. is 0.2 watts & satisfactory communication between units over average terrain should be maintained approx. up to one (1) mile. With Tubes: 1/IR3, 1/1S5, 2/1T4, 3/3S4. Voltages required: 67.5 VDC 3 MA; 135 VDC 4 MA; 1.5 VDC 225 MA f/Receiver. 67.5 VDC 1.5 MA; 135 VDC 19 MA; 5 VDC 225 MA & -8 VDC 30 MA f/Trans. In a waterproof plastic case w/space for batt. or power supply. Telescoping antenna 8 ft. Has spec. loading coil. Complete w/tubes, antenna, 2 crystals FT-243 (no choice of freq.) headphones, carbon microphone, canvas cover, & manual. Size: 8x8x3 1/2". Wt.: 8 lbs. .... **\$9.95**



"DAV" MODEL—Same as above, but with direction finding loop and lip mic., plywood case w/straps. Size: 14x10x3" . . . **\$12.95**  
VIBRATOR Power Supply f/MAB & DAV. Operates from 6 VDC 4 A N-T-6 Batt. or other power source. 6 1/2x3 3/4x1 3/4". 2 lbs. New. **\$6.95**  
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## \$10 TRANSISTOR IGNITION \$10

Complete electronic 2 transistor dual ignition system for cars, boats, trucks. Fully wired harness, dual primary coil, instant changeover from transistor to conventional or back. Neg. ground, 6 or 12 volt system. Complete with instructions, ready to install. Original price \$35, now only \$10.00 postpaid.

MESHNA 1968 Surplus Electronic catalog shows hundreds of dollar saving surplus bargains. Send 25¢ for new 92 page catalog.  
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### How to Write a Classified Ad That Pulls

Deluxe 48 page booklet—only \$1 per copy. And, with the booklet, you get a \$2 credit towards your payment of your classified ad in RADIO-TV EXPERIMENTER. Send \$1 now to RADIO-TV EXPERIMENTER, 505 Park Avenue, New York, New York 10022.

## NEW PRODUCTS ☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

response of 30 to 20,000 Hz  $\pm$  1 dB. Unit measures 15 1/4 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.

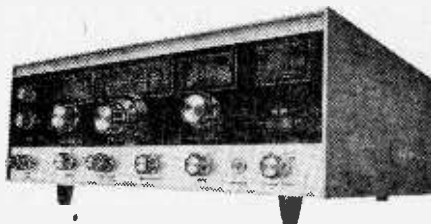
## Electric Auto Antennas

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

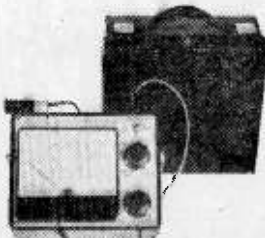
### Please Don't Hit the Deck!

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  $\pm$  2.5 dB @ 7½ ips; 40-15,000 Hz

(Continued on page 109)

## THE SUPERSENSITIVE DARKROOM METER

### S & M MODEL A-3



**\$44.50**  
in kit form\*

**\$49.50**  
fully  
assembled\*

\*Carrying Case  
Included

Here is a precision instrument that meets the highest standards of any meter available today. The S & M A-3 uses the newest cadmium sulfide light cell to measure light levels from twilight to bright sunlight at ASA speeds of 3 to 25,000. This supersensitive darkroom meter is successfully used with movie or still cameras, microscopes, telescopes and it can also be set up for use as a densitometer.

The computer gives F stops from .7 to 90 and lists exposure time from 1/15,000 sec. to 8 hours; 4 range selection; EV-EVS-LV settings. The unit is also equipped with a large (4½") illuminated meter, paper speed control knob and a new battery test switch.

The S & M A-3 darkroom meter is ideal for darkroom and studio applications where accuracy is a necessity. It's available fully-assembled from the factory, or in easy to assemble kit form.

SCIENCE & MECHANICS — Kit Division  
505 Park Ave./New York, New York 10022

RTV-868

Please send the A-3 Supersensitive Darkroom Meter as checked below. I understand that if I am not satisfied, I may return the meter within 10 days for a complete refund.

Add 10% for Canadian and foreign orders  
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| <input type="checkbox"/> \$44.50 — in kit form                          | <input type="checkbox"/> \$49.50 — fully assembled                                                |
| <input type="checkbox"/> Check or money order enclosed, ship post paid. | <input type="checkbox"/> Enclosed \$3.00 deposit, ship balance COD, plus postage and COD charges. |

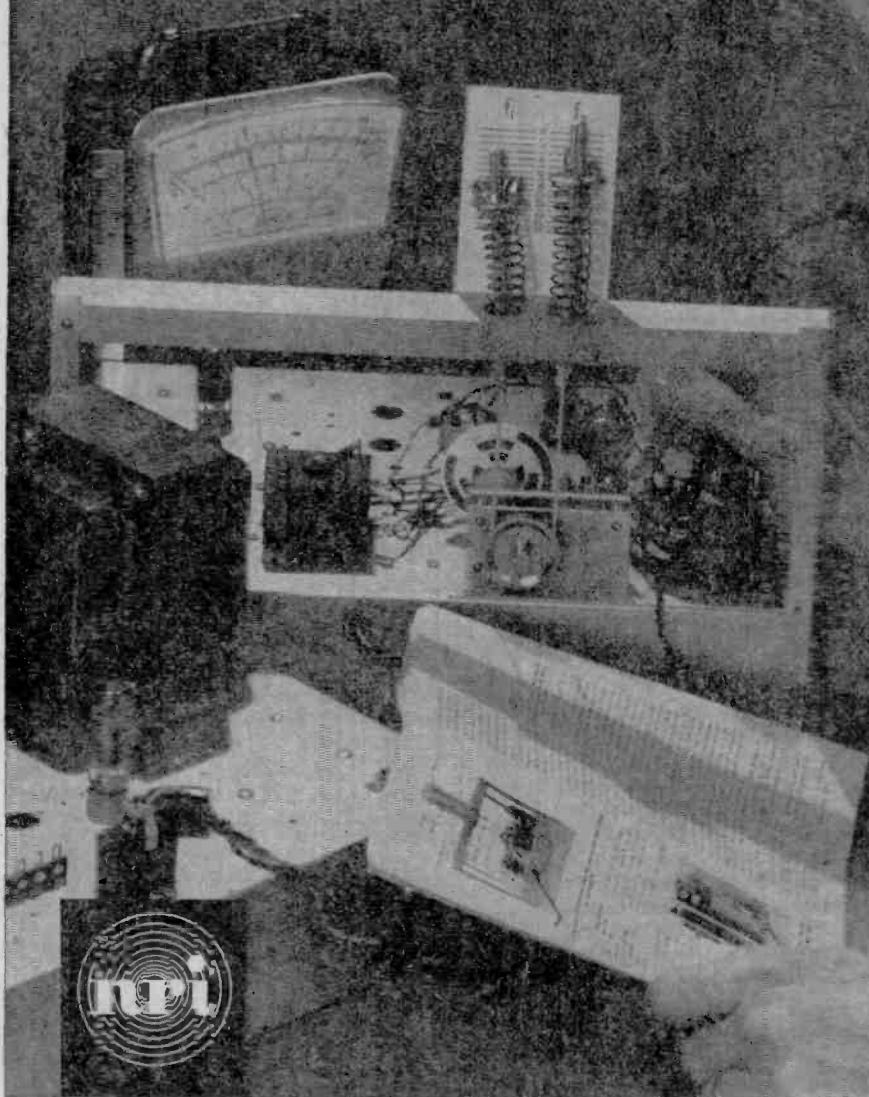
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**6. BASIC ELECTRONICS** — For anyone wanting a basic understanding of Radio-TV Electronics terminology and components, and a better understanding of the field.

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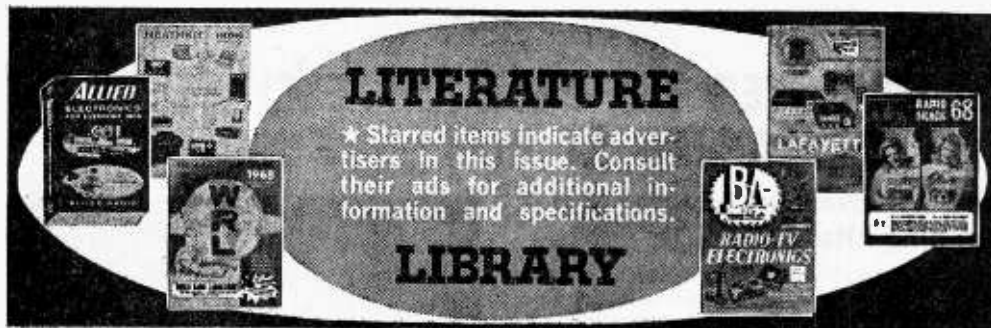
**9. MARINE COMMUNICATIONS\*** — Covers electronic equipment used on commercial ships, pleasure boats. Prepares for FCC License with Radar Endorsement.

**10. MOBILE COMMUNICATIONS\*** — Learn to install, maintain mobile transmitters and receivers. Prepares for FCC License exams.

**11. ELECTRICAL APPLIANCE REPAIR** — Learn to repair all appliances, including air conditioning, refrigeration, small gas engines. Leads to profitable part or full-time business.

**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 11—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 "SSS." Also, CB accessories that add versatility to their 5-wattors.

**46.** A long-time builder of ham equipment, *Hallcrafters* 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 *Versa-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 *Amper-ex*. 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 cat-

alog 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 1/2" 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 Omnibook." 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-Tarjian** 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-page "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

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| 44  | 45  | 46  | 48  | 50  | 54  | 66  | 70  | 74  | 78  |
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| 105 | 106 | 107 | 109 | 111 | 112 | 114 | 115 | 116 | 117 |
| 118 | 119 | 120 | 122 | 123 | 124 | 126 | 127 | 128 | 129 |
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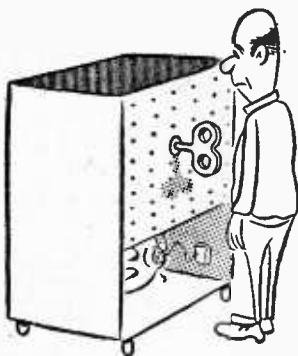
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## ELEMENTARY ELECTRONICS

The magazine that serves up electronics theory in pleasant spoonfuls and reinforces the knowledge you gain with exciting and useful projects.

## RADIO-TV EXPERIMENTER

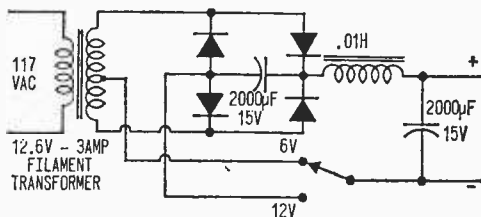
The magazine dedicated to the hobbyist—the man who wants to obtain a fuller and broader knowledge of electronics through the applications of his hobby.



## 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)

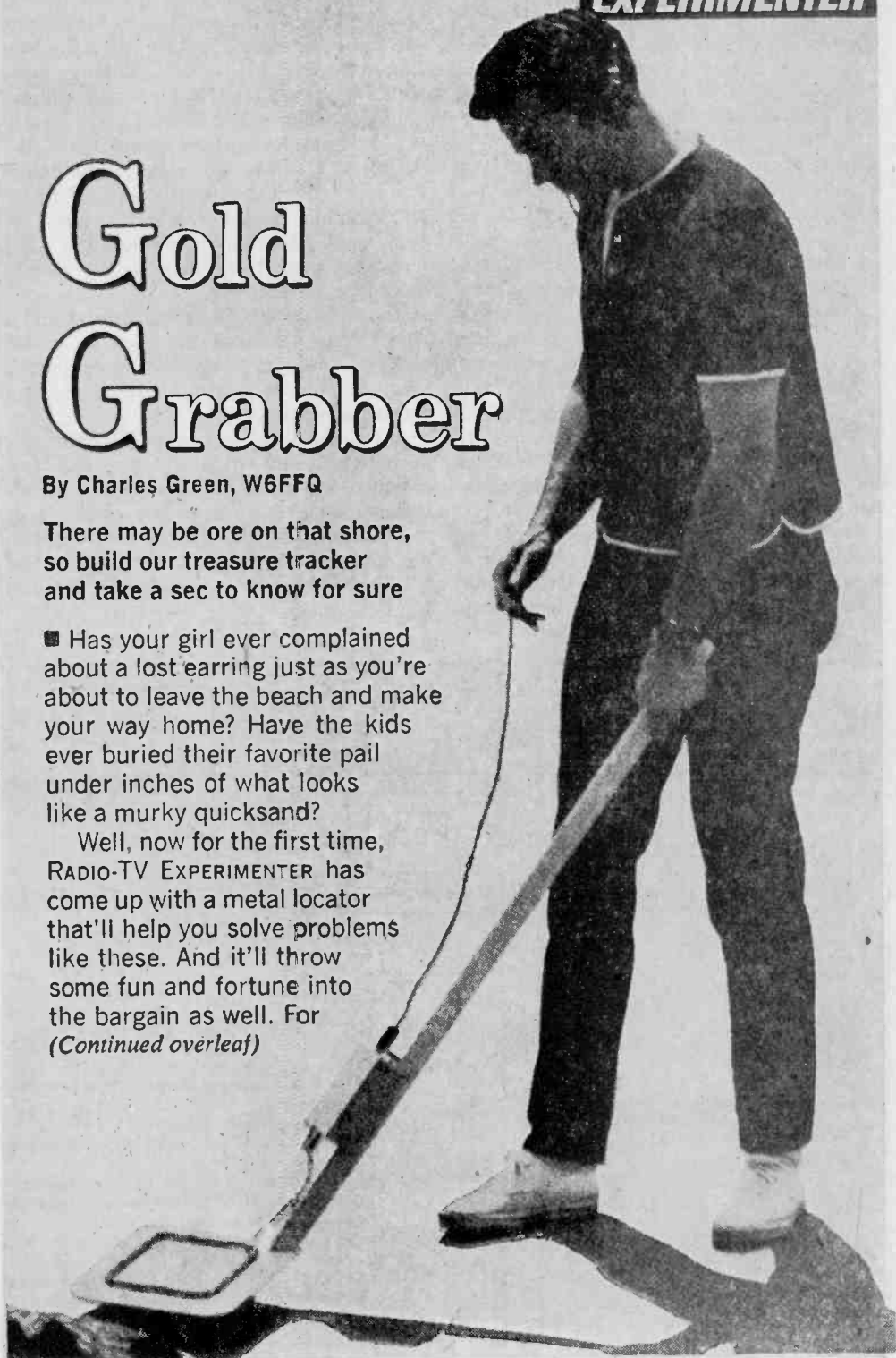
# Gold Grabber

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

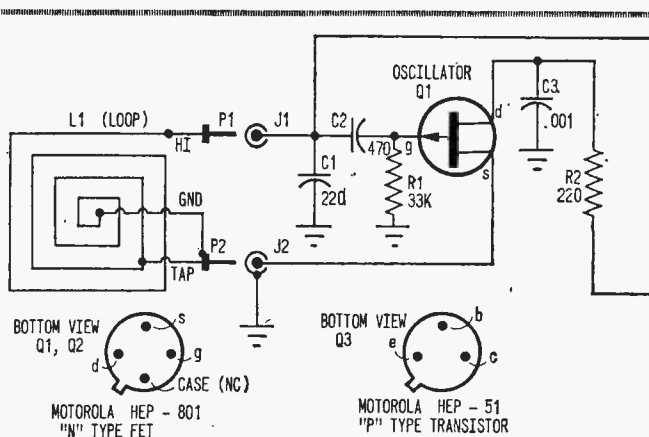
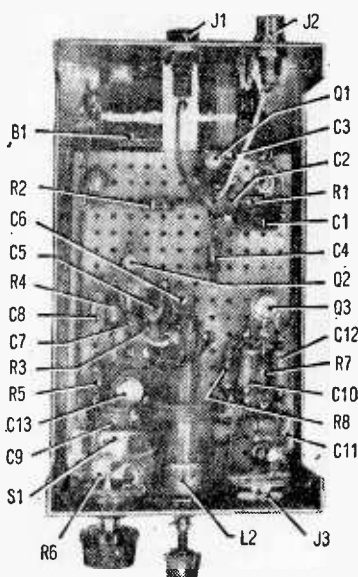
battery, it is light enough to permit easy operation as a search tool. (As you can see from the photos, there are two versions of Gold Grabber—one jazzed up by the editors, and one constructed by the author. You choose the one best for you. But stay away from ferrous material! Brass screws will do, but 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

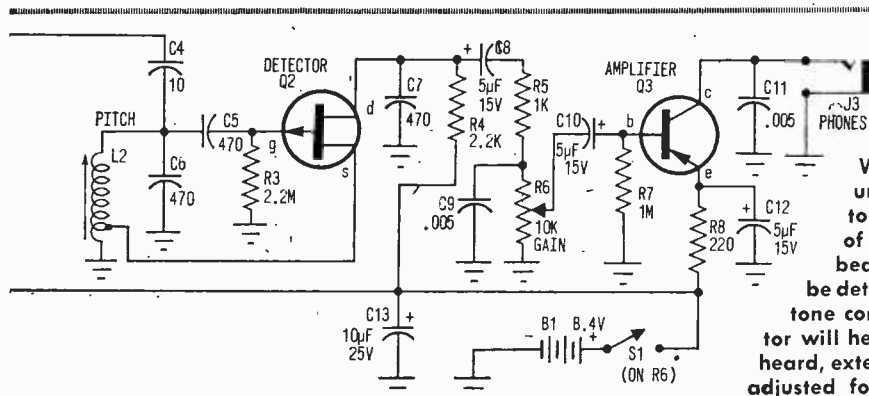
3x2½-in. aluminum box. We'll start with the locator unit in the box.

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 2½ x 4 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—5¼ x 3x2 ⅛-in. aluminum box (LMB-780 or equiv.)  
Misc.—⅛-in. masonite, ⅞-in. OD aluminum tubing, ¼-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

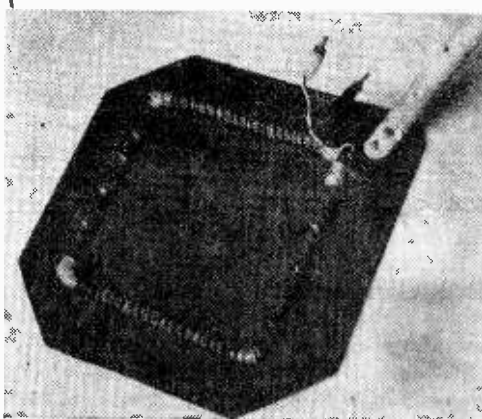
is no electrical connection to the case leads of Q1 or Q2, but the leads should be connected to push-in terminals to help support the FETs. Make sure that all parts and wiring are anchored down, or performance of the Gold Grabber will be affected. Use spaghetti over the leads of Q1, Q2, and Q3 to prevent 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  $\frac{1}{4}$ -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  $\frac{1}{8}$ -in. hardboard and round the corners as shown in the photo. Center the loop on the board, and mark hole locations about an



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.

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.

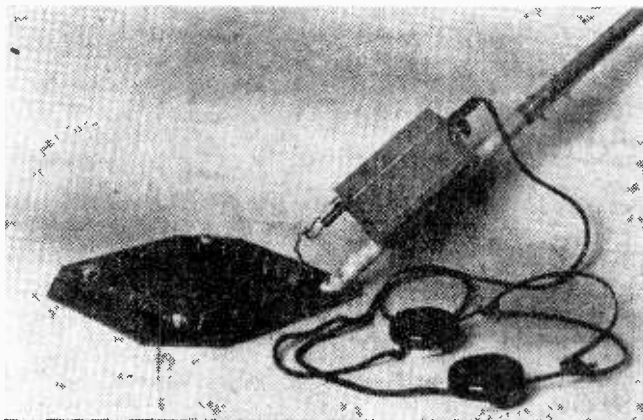
**Hold On Tight.** Cut one end of a 15-in. length of  $\frac{3}{4}$ -in. wood dowel at a 45-deg angle and fasten it to the end of the loop board with two machine screws and nuts (brass screws are a must).

Mount the aluminum box on the wood dowel approximately 3 in. up from the loop board. You can use a 44-in. length of  $\frac{7}{8}$ -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

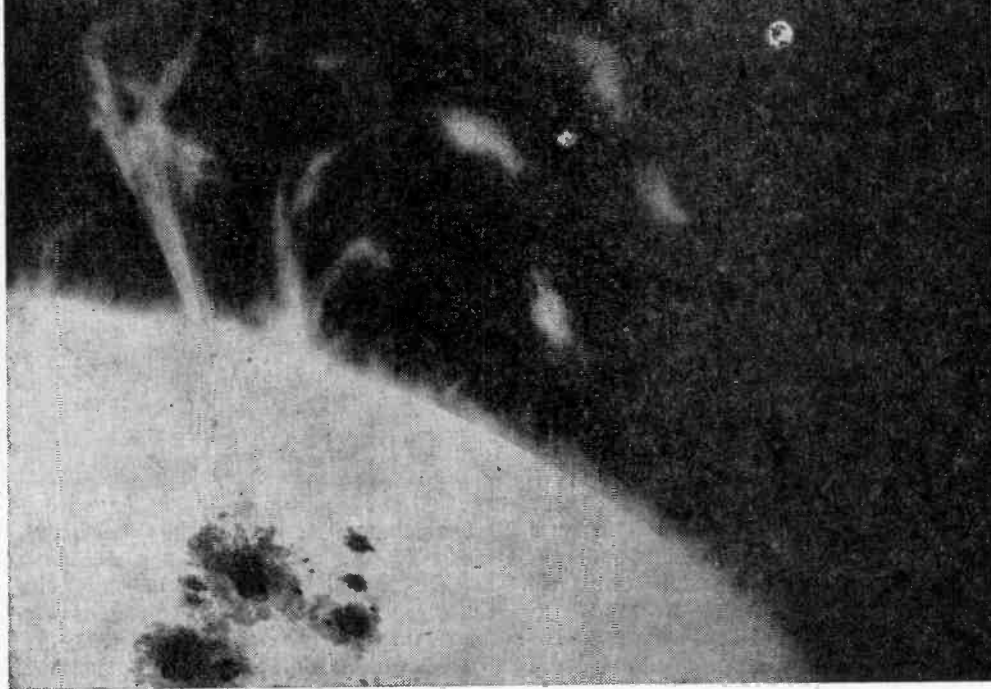
# WHAT GIVES WITH OLD SOL?

□ 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.

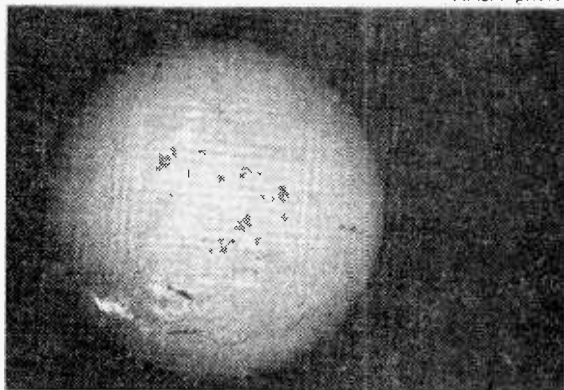
This latest Orbiting Solar Observatory (OSO-IV) is the fourth such space laboratory to be sent aloft and the first to concentrate entirely on the sun. During its planned tour of duty of about six months, OSO-IV will aim nine different pieces of astronomical equipment at the sun with awesome accuracy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

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.



gram 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.

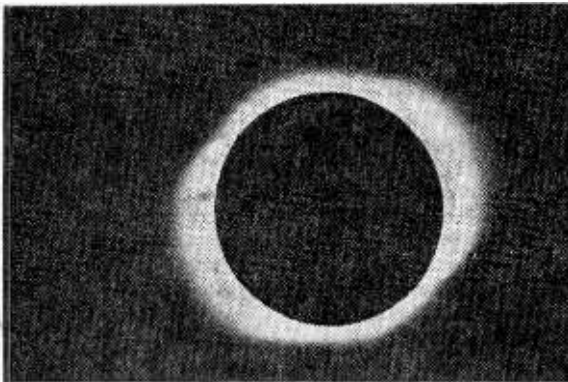
**Electronic Pilot.** All of the sophisticated



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 direc-

tion 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.

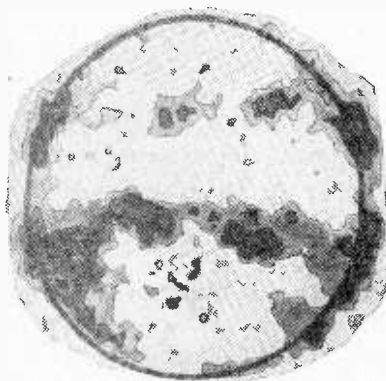
Once during each orbit the system is

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.

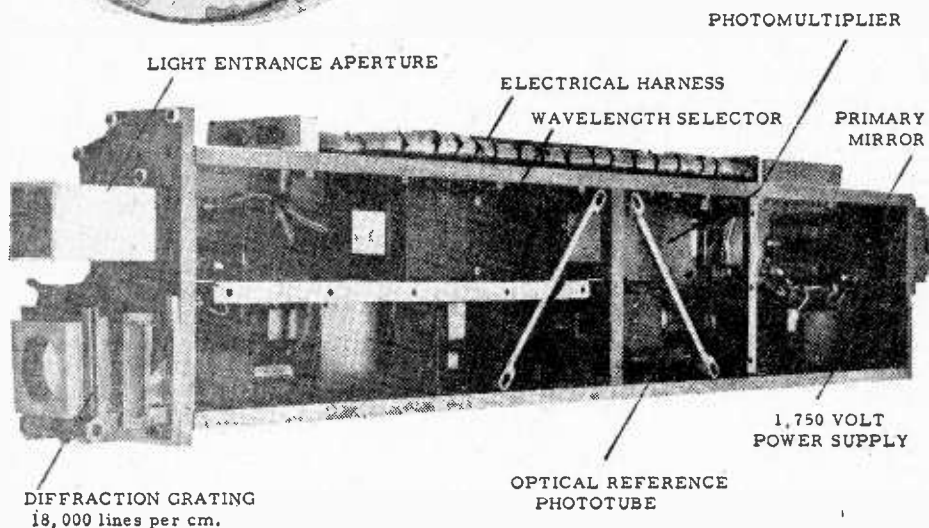
The 2016 solar cells on the sail section are arranged in 36 parallel strings of 56 cells each. The total cell surface area of 4 sq. ft. can produce a maximum power output of 38 watts. These cells provide electrical energy to power the craft during sunlight hours and to charge batteries used during nighttime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

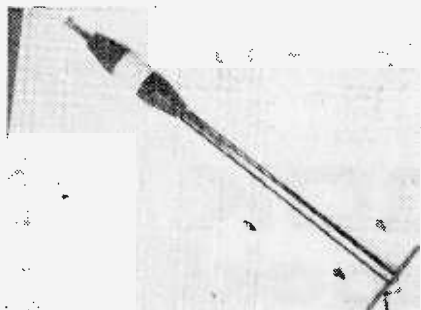
■ A low-cost, center-loaded R/C antenna makes a good CB skyhook for cliff dwellers and temporary installations anywhere. Field-tested on the outskirts of a big city's concrete jungle, this convenient whip belts out good signals from a near ground-level base station to any mobile unit over a four-mile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

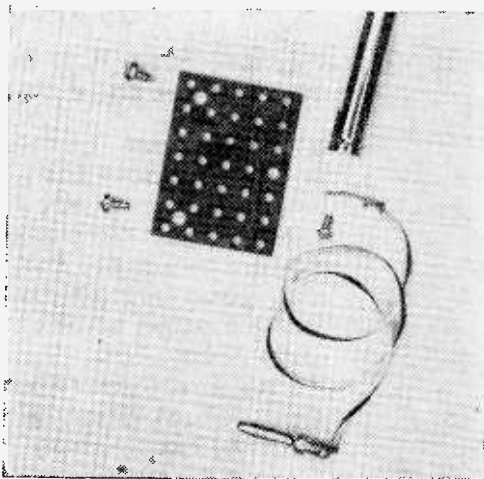
- 1—Center-loaded R/C antenna (Lafayette 99H9098 or equiv.)
- 1—1 3/8 x 1 3/4-in. piece of perforated phenolic
- 1—Banana plug
- 1—Solder lug
- 2—1/2 x 6 Parker-Kalon binderhead sheetmetal screws
- 1—12-in. length of AWG-18 plastic-covered hookup wire
- 1—1/2-in. 6-36 roundhead machine screw (if not supplied with antenna)
- Misc.—Solder, wire, 1/4-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 "Sidebender.")

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.

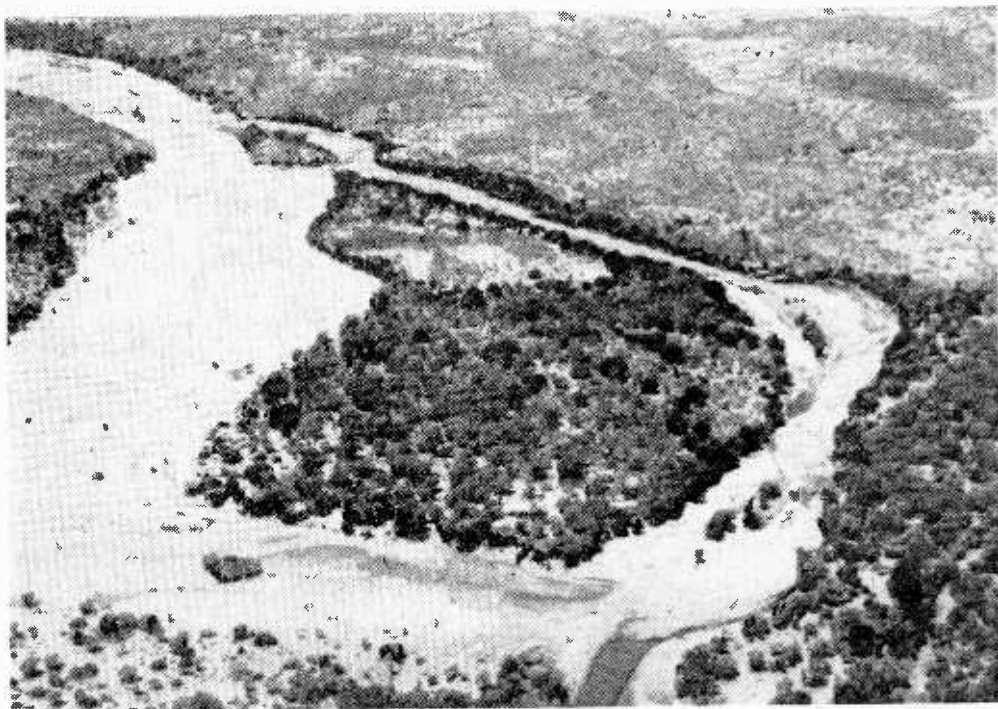
If you do decide to mount the antenna in the center of the cabinet, you'll need a set of four 1/4-in. spacers to raise the phenolic above the cabinet surface. Then the lug and the screw at the bottom end of the antenna will clear the cabinet.

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*

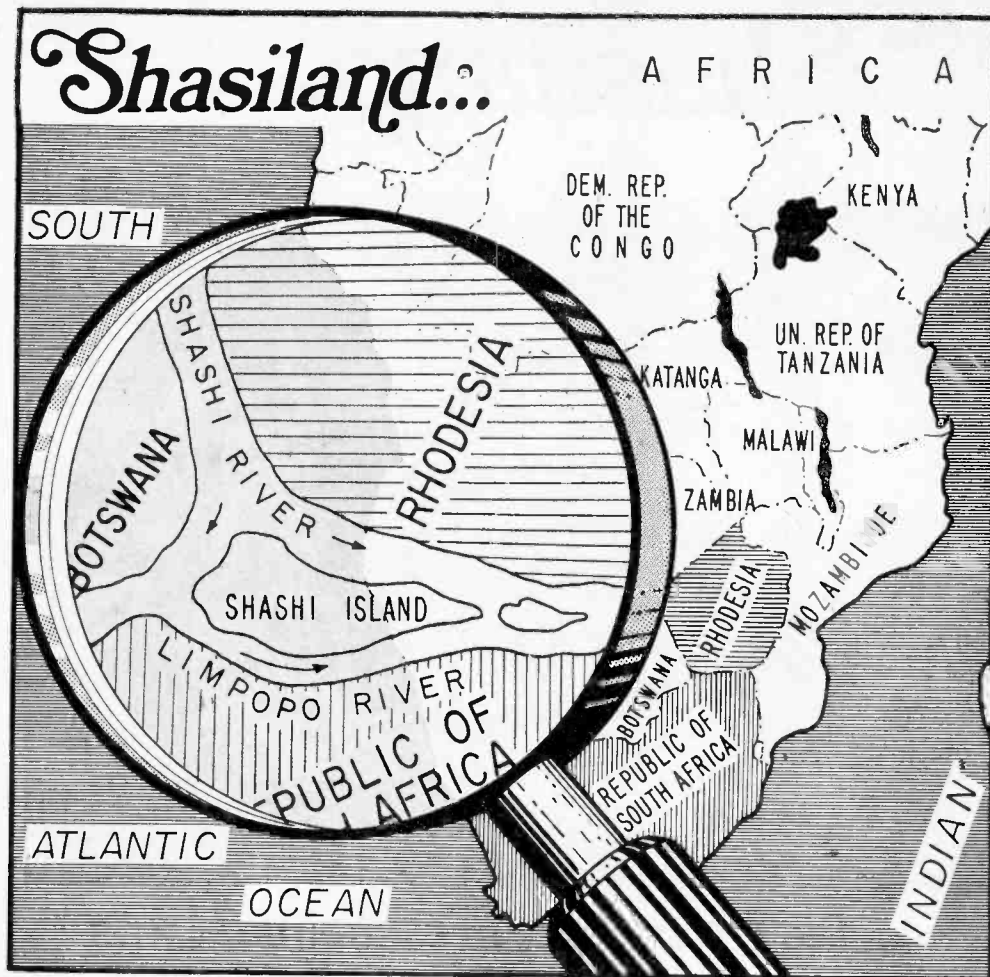
By Don Jensen

■ 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.

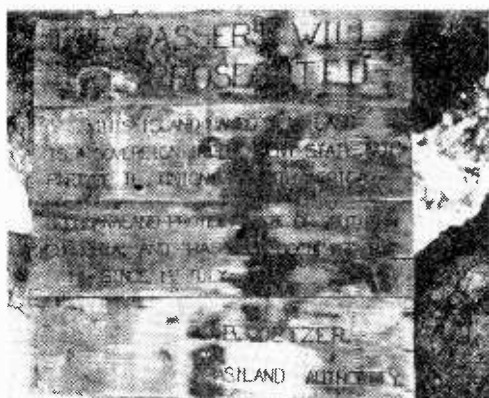
So, on July 1, 1952, Coetzer nailed a sign to a big tree on the 215-acre island, proclaiming it a sovereign, independent state. As far as Coetzer was concerned, Shasiland was his. No one else seemed the least bit interested in his little island. All it had to

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



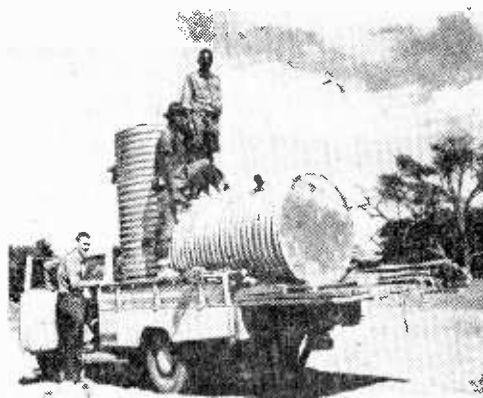


**Shasiland was born when Coetzer posted this sign, proclaiming it an independent state.**

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



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

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 Gaborone. 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 photo-electric 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-

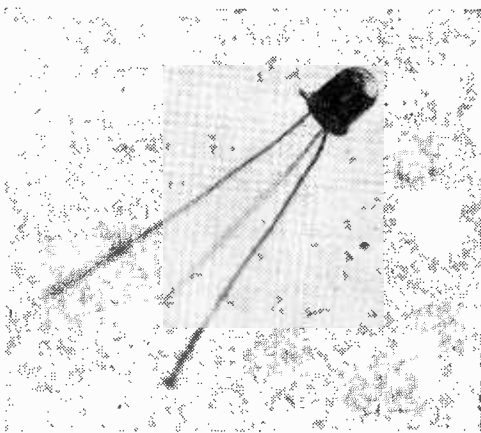


Fig. 1. Looking for all the world like an ordinary, everyday transistor, the LASCR differs in that it contains a lens on top.

# SLAVE FLASH

pacitor which 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.

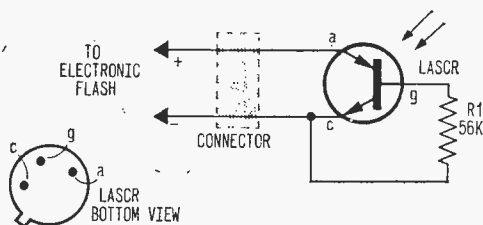


Fig. 2. Schematic of "No-Parts" Slave Flash. Author used LASCR supplied by Poly-Paks, Inc.; see text above for additional information.

**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  $\frac{1}{8}$  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

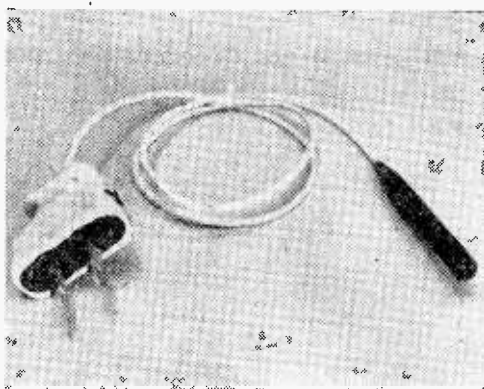


Fig. 4. Completed Slave, ready for use with most any electronic flash unit. However, plug on cable must match connector on flash.

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)

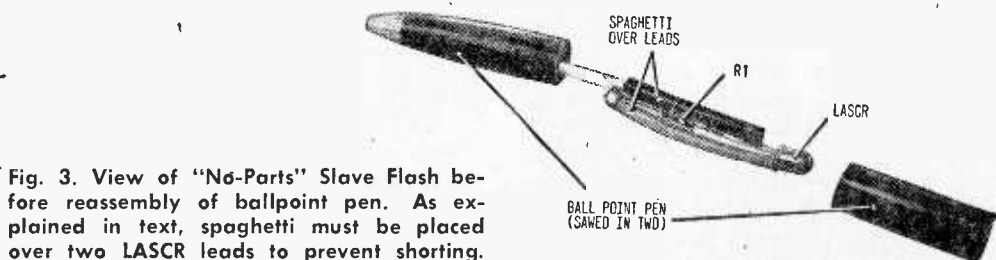
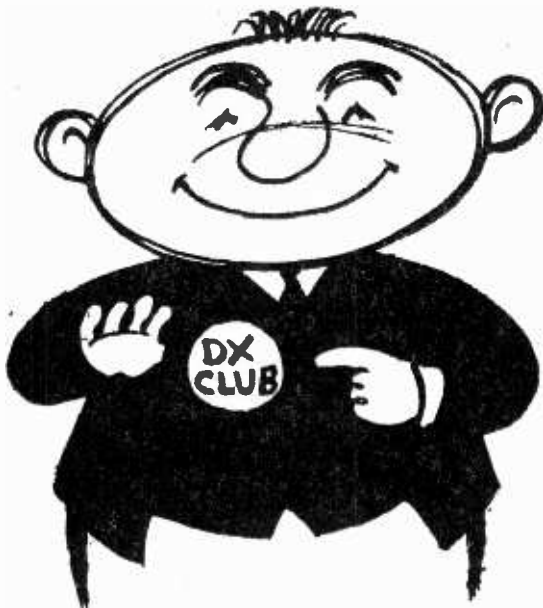


Fig. 3. View of "No-Parts" Slave Flash before reassembly of ballpoint pen. As explained in text, spaghetti must be placed over two LASCR leads to prevent shorting.



# 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

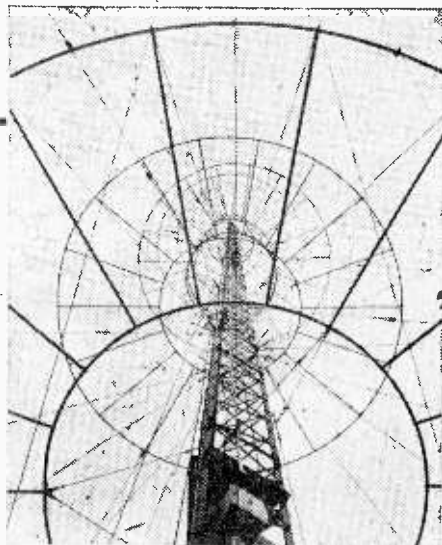
Paul Kilborn looked up from his latest copy of *Playboy* and out through the screen of his porch, 300 feet up the side of a West Virginia mountain. In the valley, lights were flashing on, first in the office building, then in the equipment sheds of the big Green Bank observatory. Paul stepped quickly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

"What's going on down there?"

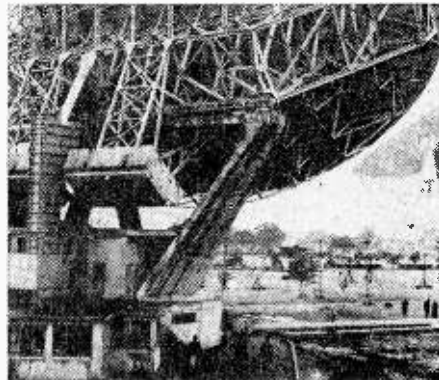
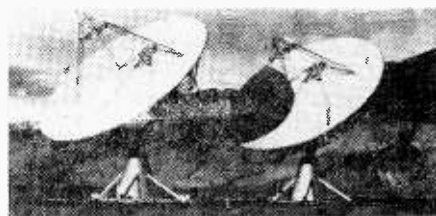
"We're not sure, sir." It was one of the new technicians assigned to the National Observatory since its 1967 expansion. "We don't know what it is, but we're getting a signal. A pattern."

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

sembles 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

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."



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 re-

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

"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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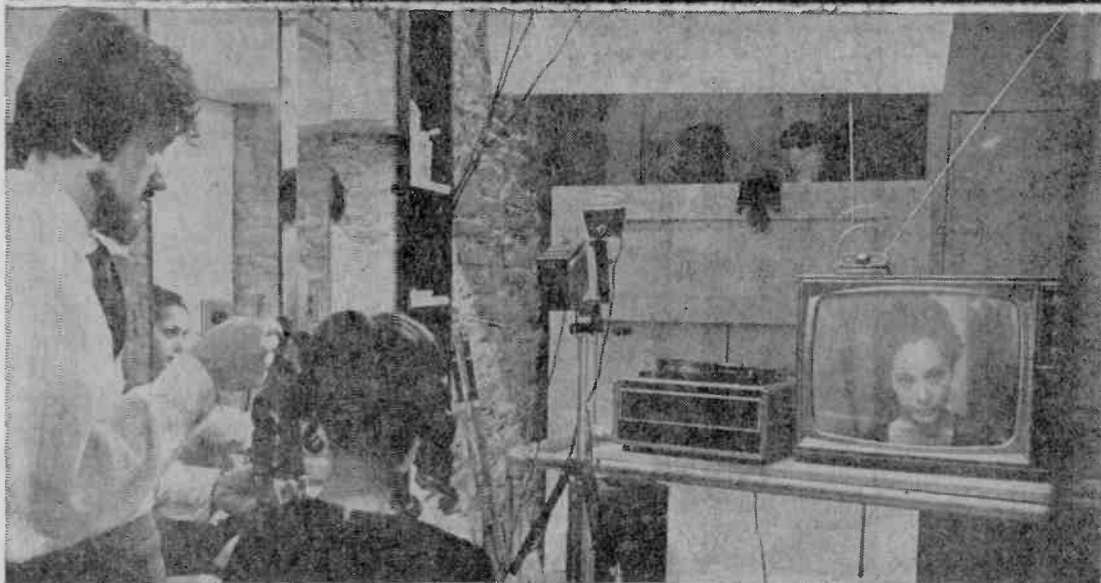
# RCA



■ 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 multi-dimensional 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.

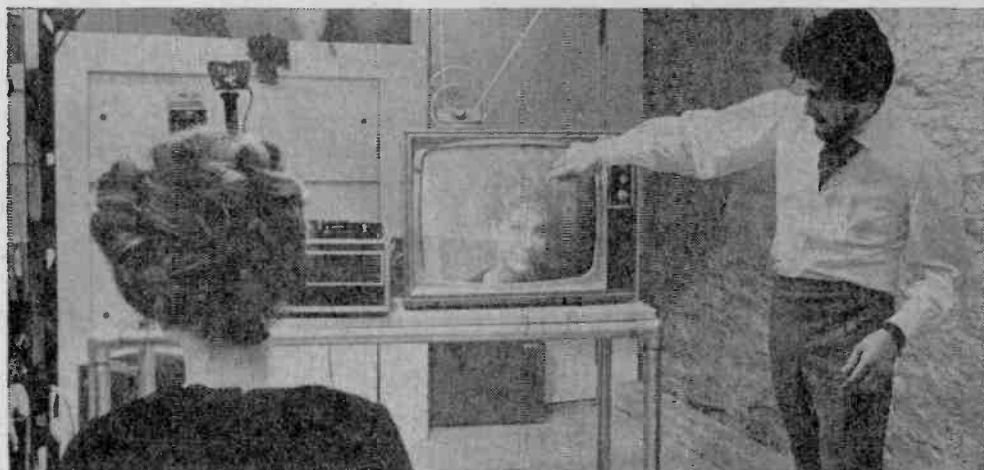


# *instant me!*

*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.

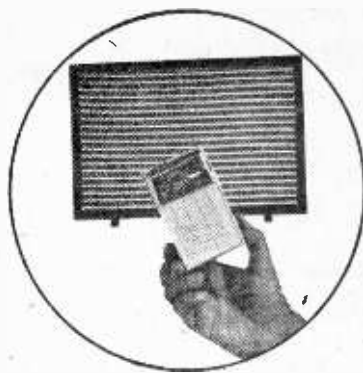
Professor Peta points out how a hair-piece can make an instantly more appealing YOU. And if you forget the effect, you can play it back next year.



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 1/2-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.

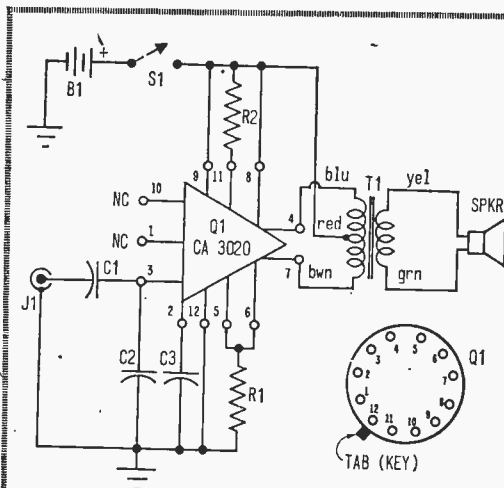
*(Turn page)*

# Hi-Power Crowd Getter

Drill a 5/16-in. hole for Q1's socket about 1 1/4 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

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.



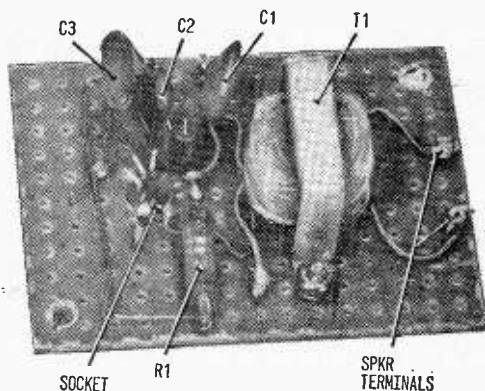
Integrated circuit is from RCA. While IC has 12 leads, a 10-pin socket is used for economy. Leads 11 and 12 are bent out from case, so remaining leads align with socket terminals.

## PARTS LIST FOR CROWD GETTER

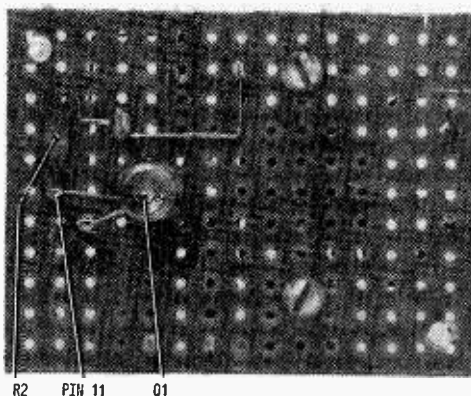
- B1—6-volt battery (Burgess Z4 or equiv.)
  - C1—.1-uF, 10-VDC capacitor
  - C2—.01-uF, 10-VDC capacitor
  - C3—.22- or .25-uF, 10-VDC capacitor
  - J1—Phono jack (supplied with speaker)
  - Q1—Integrated circuit (RCA CA3020)
  - R1—0.82- or 1-ohm, 1/2-watt resistor
  - R2—1000-ohm, 1/2-watt resistor
  - 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.

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

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



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 1/2 in. long in order to prevent heat damage to unit while soldering.

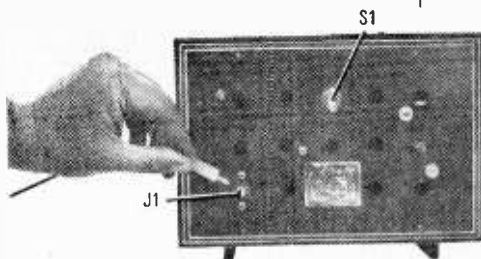
to check Q1's installation, because you won't get a second chance if you make an error.

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 bat-

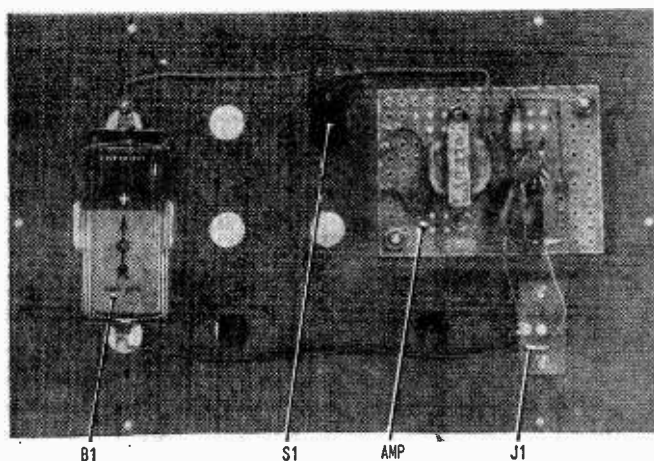


Connect shielded patch cord between transistor radio's earphone jack and J1. S1 turns on power, but volume is controlled by radio.

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



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.

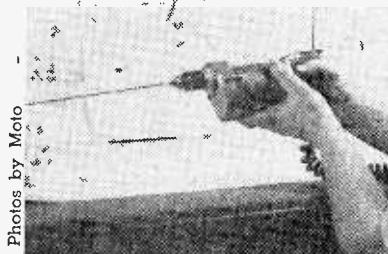
tery holder for B1. Though B1 is a 6-volt battery, it will fit a standard D-cell holder such as the Keytone #175. For slightly higher power output a 9-volt battery can be substituted, though it must be rated for at least 100 mA. Don't use a transistor radio 9-volt battery like the 2U6. The 2U6 won't 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.

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!

# IMAGINEERING DESIGN TIPS

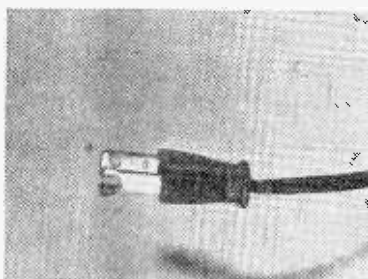


Photos by Moto

## 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.

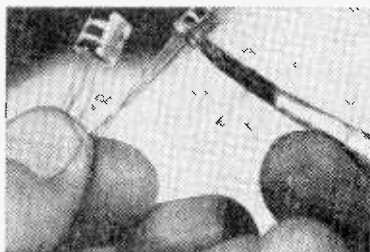
—Al Wise



## 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!

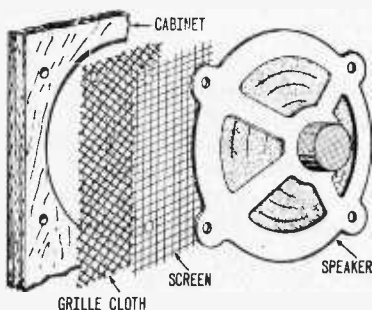
—L. Grant



## 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

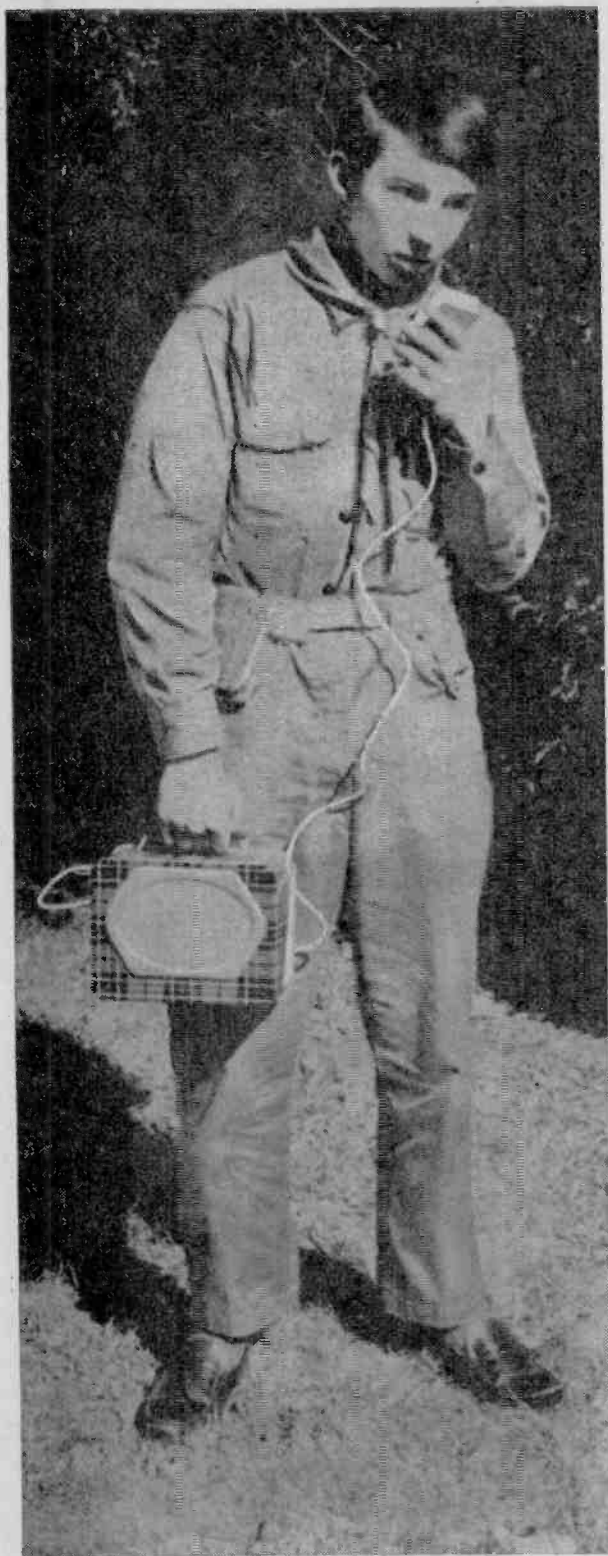


## DOWN WITH FINGER POKING

● 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. \*

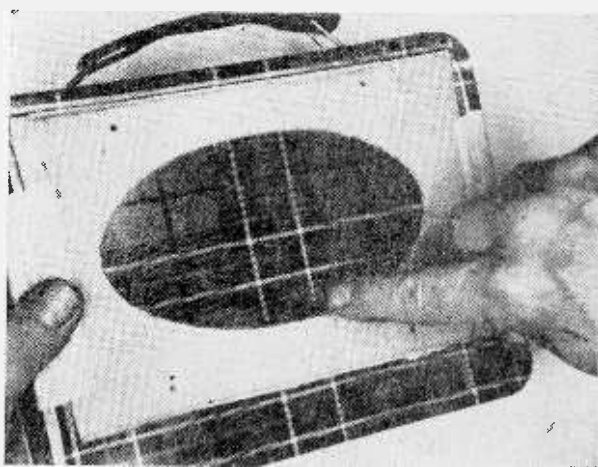
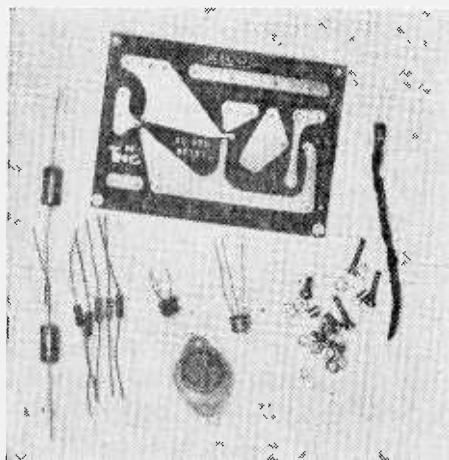
**Saving Space.** To eliminate need for a matching transformer, a low-impedance mike is used. For a smaller package, you can use a mike cartridge without a case. Just wire leads to cartridge and mount it in a small plastic box. However, there's more than enough room for a full-sized unit.

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 (Amphe-nol 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 Maltz St., Brooklyn, N.Y. 11207, or from your local dealer.

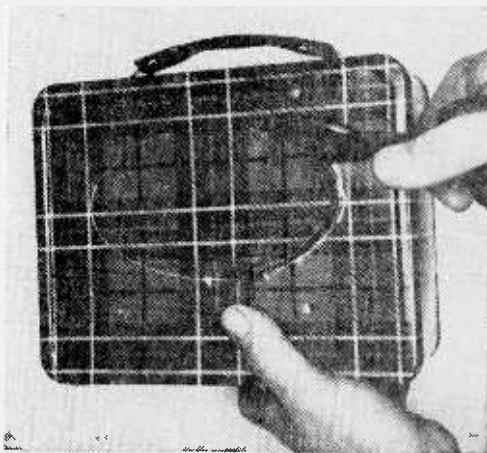


Everything you need for construction is included in kits—PC boards, transistors, capacitors, resistors, and even hardware for mounting boards in lunchbox. Your work will go easier if you lay out components before assembly. But do only one kit at a time.

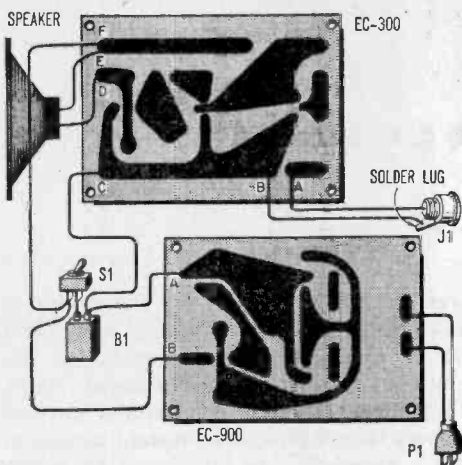
Above right, speaker template is first used to mark speaker opening in lunchbox bottom.

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.





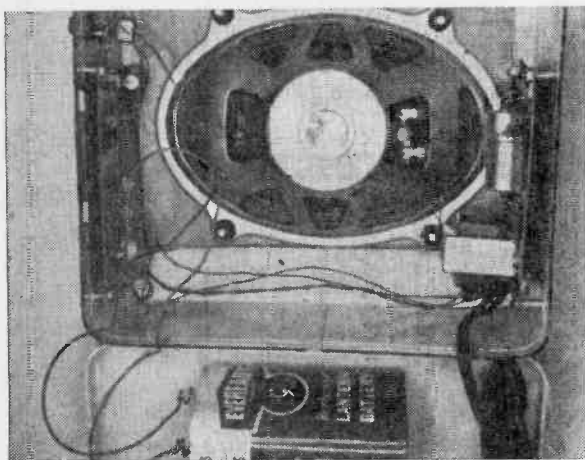


With connections used here, switch doesn't control operation of amplifier when power supply is used—it only turns battery on or off. But other connections are possible.

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.

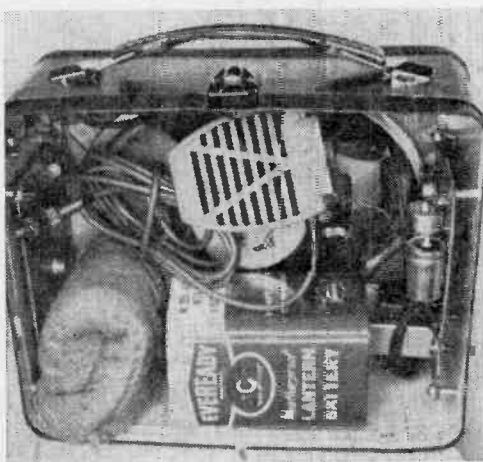
**Power to Spare.** If you can't obtain the lantern battery, substitute four D-cells. The lantern battery, however, will give longer service. For an extended trip, try to get heavy-duty alkaline D-cells. They have more than four times the current rating of a similar-size cell.



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.



**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.

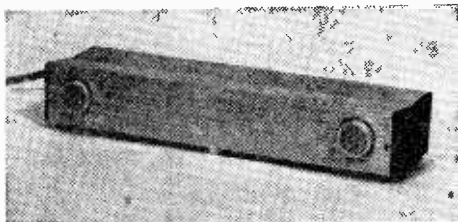
Turning our attention away from the very

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<br>LISTENER'S<br>STANDARD<br>TIME | ASIA<br>(except<br>Near East) | EUROPE,<br>NEAR EAST<br>& AFRICA<br>(N. of the<br>Sahara) | AFRICA<br>(S. of the<br>Sahara) | SOUTH<br>PACIFIC | LATIN<br>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.

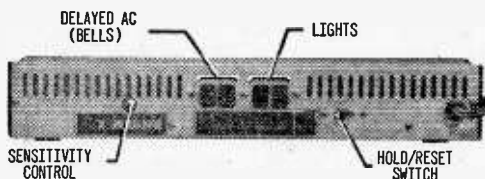
What happens in the receiver is the real difference between the simplified intrusion alarm and the Euphonics Unit. When the Euphonics receiver is tripped it just doesn't turn on an alarm. Instead, the receiver activates time-delay circuits which provide a variety of possible alarm combinations.

**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. ■



# 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 atti-

tudes 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, sneering 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.

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# HAM TRAFFIC

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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 sub-

mitted, 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.

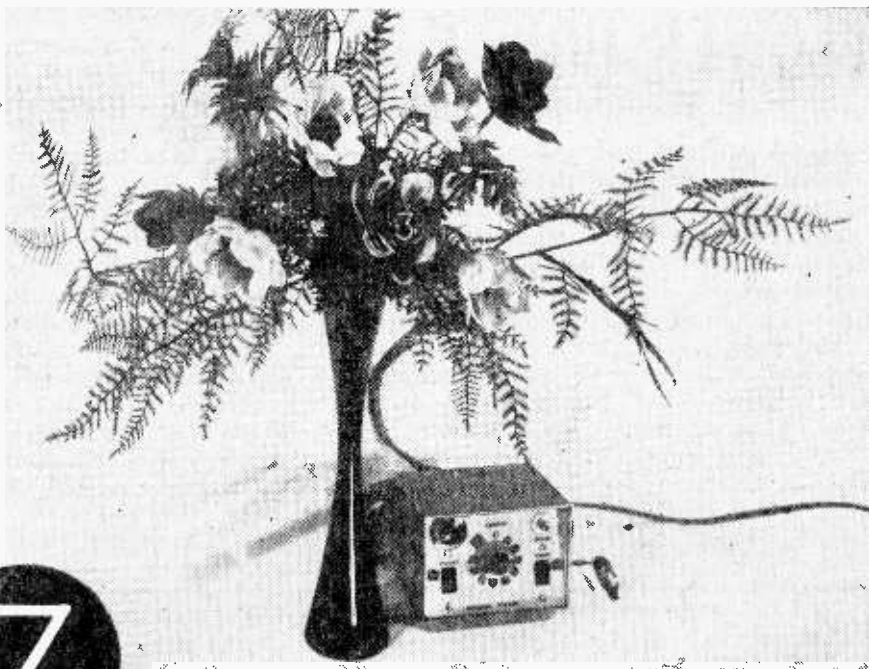
Modern air transportation depends heavily on radio for navigation and air traffic control, as well as for routine communications. A few seconds of interference at a critical time during a flight could easily spell doom for over a hundred people. For these reasons, the FCC was recently given added authority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

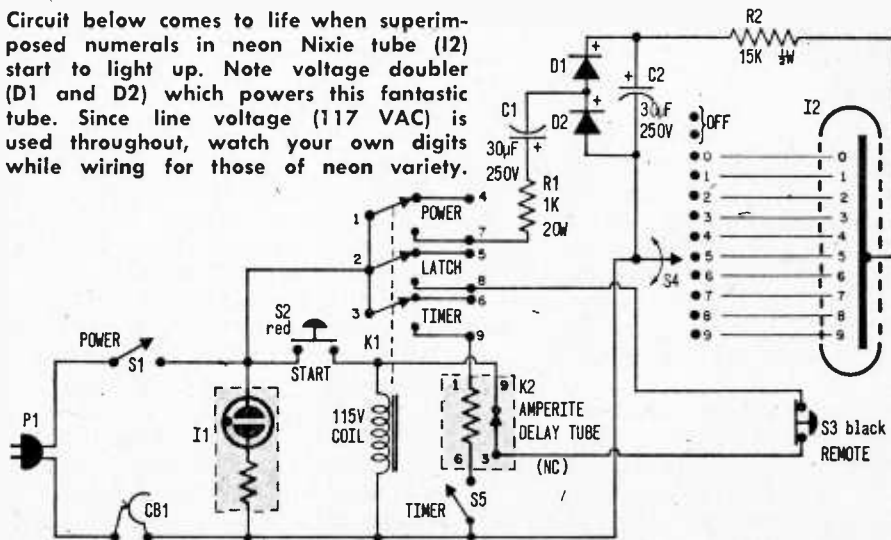
## PARTS LIST FOR FLOWER POWER SIGNALITE

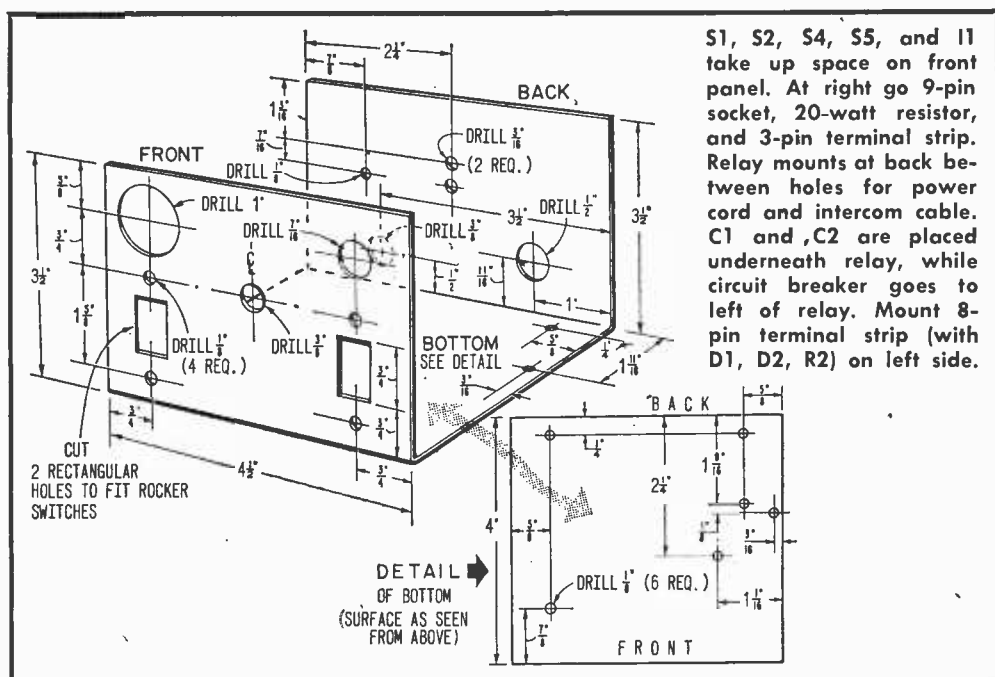
- C1, C2—30- $\mu$ F, 250-VDC electrolytic capacitor  
CB1—Circuit breaker (Sylvania MB-315 or equiv.)  
D1, D2—1N4365 silicon rectifier (Texas Instruments)  
I1—Snap-in neon panel light, 1-in. dia. (Burrstein-Applebee 17C312 or equiv.)  
I2—Neon-glow readout tube (National Electronics NL840 or equiv.)  
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, 7/16 ft. (Burrstein-Applebee 19B800 or equiv.)  
R1—1,000-ohm, 20-watt resistor  
R2—15,000-ohm, 1/2-watt resistor

- S1, S5—Spst rocker switch (Burststein-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, 3/4-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.





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.

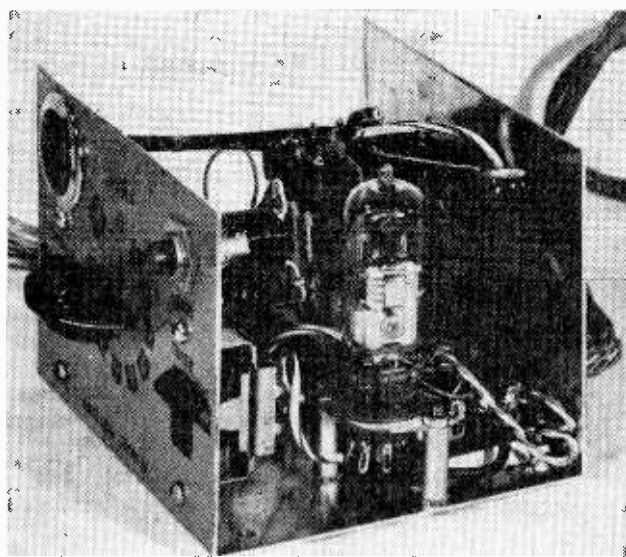
Before mounting the nine-pin socket for the Amperite miniature delay tube, wire pins 1, 3, 6, and 9 of the socket with a 6-in. length of #20 wire. Then mount the socket using 3/4-in. standoffs. Be careful not to short the metal pins to any surrounding metal.

**Cord to Cable.** The two 30- $\mu$ F capaci-

tors 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

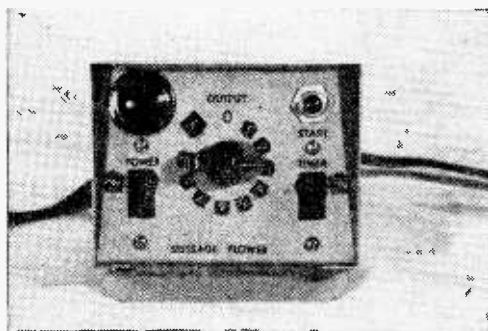


Right side of chassis with cover removed. Power cord is at far left, while intercom cable comes in just behind power resistor. Use grommets for these holes, and mount 9-pin socket on 3/4-in. standoffs. Since power resistor gets very hot, drilling ventilation holes near it (on back panel) will help it 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.

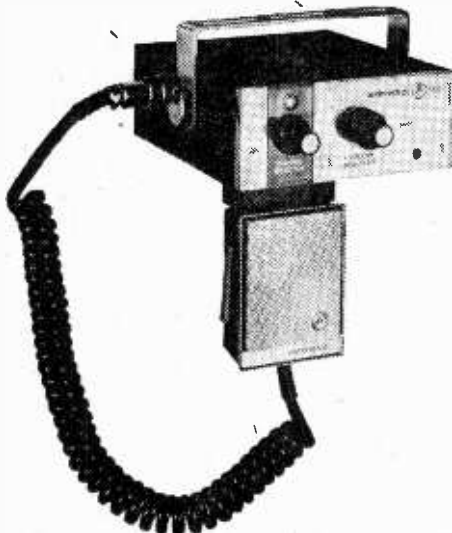
The relay may be unlatched by either the remote button, the internal timer, or the power switch. The timer circuit opens the relay after 45 seconds, assuming a message has not been sent during the previous minute. If messages are sent (using timer cutoff) in intervals of less than two minutes, relay 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. ■



**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 3/4 x 5 1/2 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 trans-

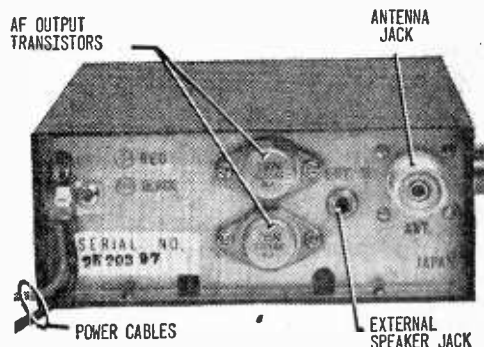
ceiver is more or less standard for the low-priced group. Both the transmitter and receiver are crystal-controlled on any of six channels. Separate crystals are used for both transmit and receive. The transmitter is a 3-stage affair with a triple L-section tuned output circuit. The receiver is single-conversion 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.

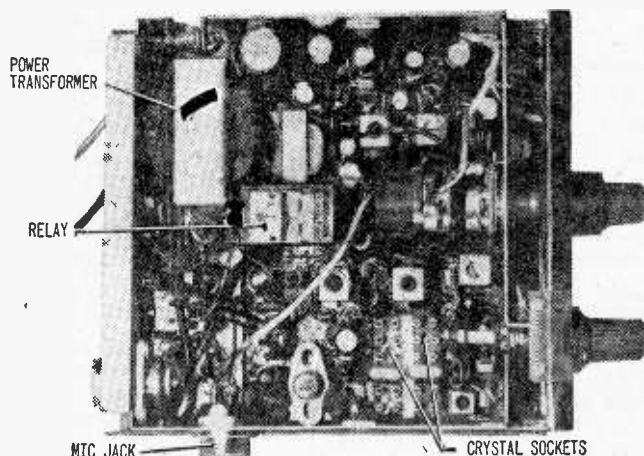
**Performance.** Since gimmicks are worthless if performance isn't up to par, we tested the Amphenol 750 just as we would any other 5-watt transceiver. The transmitter's performance was typical of most other solid-state transceivers. Power output with a

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  $\mu\text{V}$  (to simulate a weak signal), and 1000  $\mu\text{V}$  (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.



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  $\mu\text{V}$  for a 10 dB S+N/N (signal plus

**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

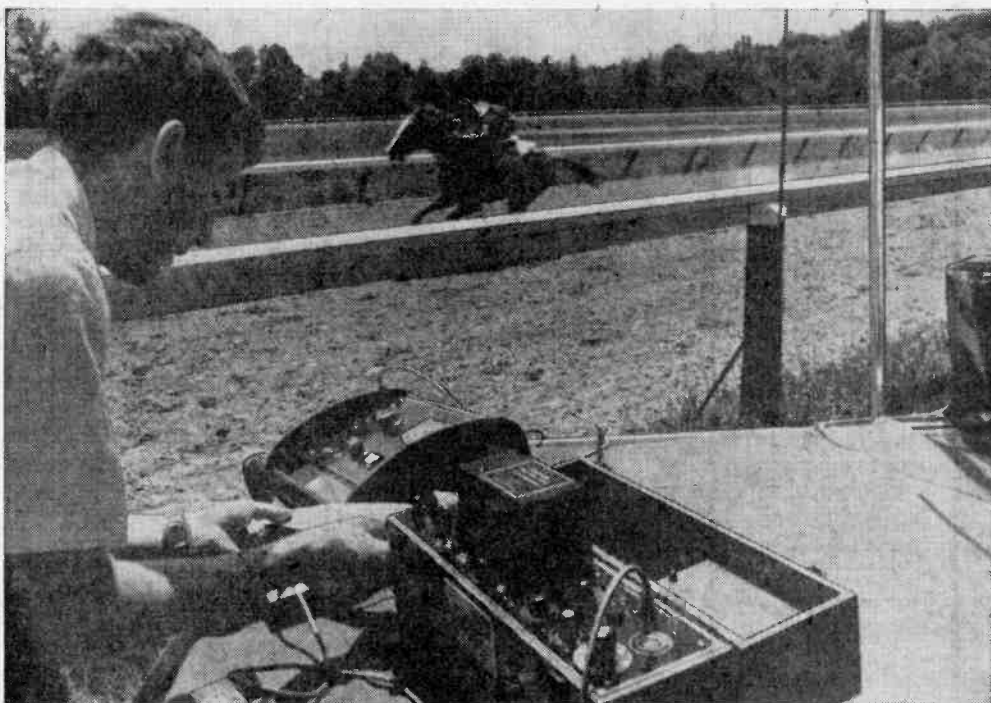
□ In the beautiful rolling hills of New Jersey, a young veterinarian is using aerospace technology to write a new chapter in man's scientific efforts to learn more about the horse.

Dr. G. Frederick Fregin is pioneering in

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

Facts & photos courtesy United Aircraft's BEE-HIVE



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

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

# 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

**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



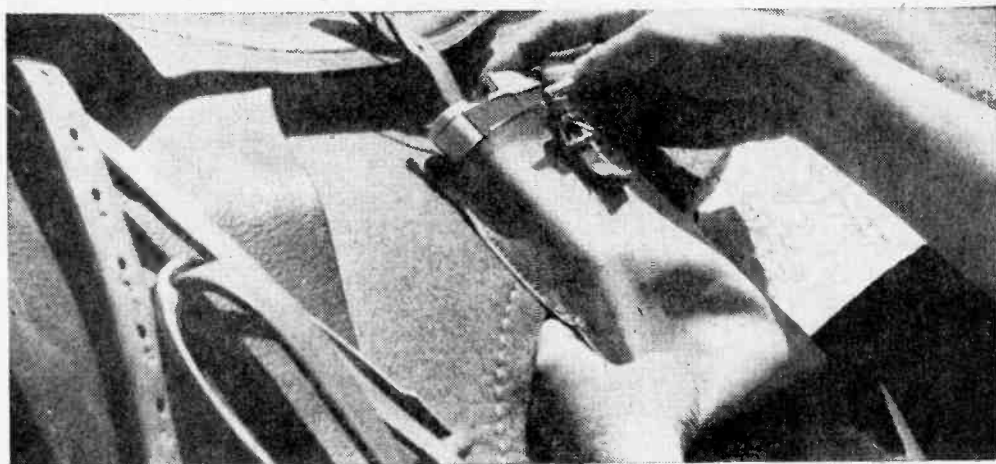
Dr. G. Frederick Fregin adjusts radio transmitter before placing it in special pouch on saddle. Transmitter will send continuous ECG of running horse to distant receiver. Before radio telemetry, electrocardiography required wiring an animal to a stationary machine. New mobility will be big aid to veterinary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

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.

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



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 radioelectrocardiograms 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.

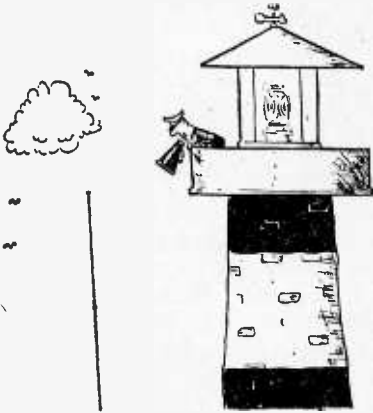
*(Continued on page 112)*



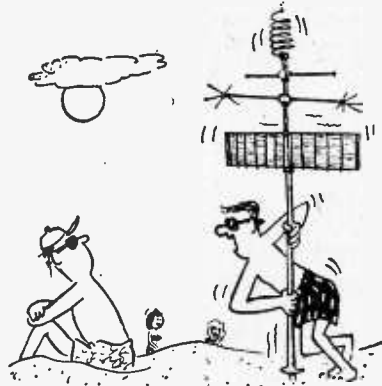
Electrodes are attached just before workout begins. A great deal of testing was required before right electrode combination was found which would stick during heavy exercise.

# ...by the SEA

by Jack Schmidt



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



"The main thing it picks up is girls!"



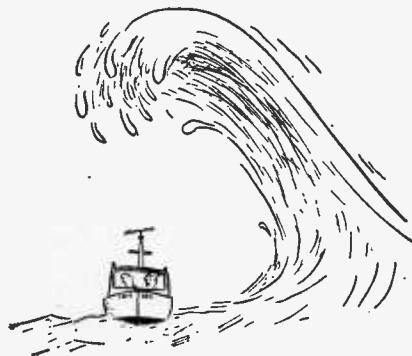
"I'll carry it up . . . you ask if it's waterproof!"



"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**

**I**n 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. ☐

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# WHITE'S RADIO LOG

## U.S. AM Stations by Frequency

U. S. stations listed alphabetically by states within groups. Abbreviations: kHz, frequency in kilohertz; 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.  | kHz                       | Wave Length | W.P. | kHz                                  | Wave Length | W.P. | kHz                       | Wave Length | W.P. |
|----------------------------|-------------|-------|---------------------------|-------------|------|--------------------------------------|-------------|------|---------------------------|-------------|------|
| 540—555.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| KVIP Redding, Calif.       |             | 5000d | KLUB Salt Lake City, Utah | 5000        |      | KAVL Lancaster, Calif.               | 1000        |      | 680—440.9                 |             |      |
| WGTO Cypress Gardens, Fla. | 500000d     |       | KVI Seattle, Wash.        | 5000        |      | KFRC San Francisco, Calif.           | 5000        |      | KNBR San Francisco, Cal.  | 50000       |      |
| WDAK Columbus, Ga.         | 5000        |       | WMAF Marinette, Wis.      | 250d        |      | WTOR Torrington, Conn.               | 1000        |      | WPIN St. Petersburg, Fla. | 1000d       |      |
| WKMT Ft. Dodge, Iowa       | 5000d       |       | 580—516.9                 |             |      | WIOD Miami, Fla.                     | 5000        |      | WRNG N. Atlanta, Ga.      | 5000        |      |
| KNDE Monroe, La.           | 5000        |       | WABT Tuskegee, Ala.       | 500d        |      | WCEH Hawkinsville, Ga.               | 500d        |      | WCIT Corbin, Ky.          | 1000        |      |
| WDMY Pocomoke City, Md.    | 500d        |       | KIKX Tucson, Ariz.        | 5000        |      | KUAM Agana, Guam                     | 10000       |      | WCBM Baltimore, Md.       | 10000       |      |
| WLIX Islip, N.J.           | 250d        |       | KMJ Fresno, Calif.        | 5000        |      | WRUS Russellville, Ky.               | 500d        |      | WRKO Boston, Mass.        | 50000       |      |
| WETC Wendell-Zebulon, N.C. | 250d        |       | KUBC Montrose, Colo.      | 5000        |      | KDAP Duluth, Minn.                   | 5000        |      | WDBC Escanaba, Mich.      | 10000       |      |
| WARO Canonsburg, Pa.       | 250d        |       | WBOO Orlando, Fla.        | 5000        |      | WDAF Kansas City, Mo.                | 5000        |      | KFEQ St. Joseph, Mo.      | 5000        |      |
| WYNN Florence, S.C.        | 250d        |       | WGAC Augusta, Ga.         | 5000        |      | KOJM Havre, Mont.                    | 1000        |      | WINR Binghamton, N.Y.     | 1000        |      |
| WRXN Clarksville, Tenn.    | 1000d       |       | KFXD Nampa, Idaho         | 5000        |      | KCSR Chadron, Nebr.                  | 1000d       |      | WNYR Rochester, N.Y.      | 250         |      |
| WDIC Clarksburg, Va.       | 1000d       |       | WILL Urbana, Ill.         | 5000d       |      | WGIR Manchester, N.H.                | 5000        |      | WPTF Raleigh, N.C.        | 50000       |      |
| WYLO Jackson, Wis.         | 250d        |       | KSAC Manhattan, Kans.     | 5000        |      | KGGM Albuquerque, N.Mex.             | 5000        |      | WBSR Butler, Pa.          | 250d        |      |
| 550—545.1                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| KENI Anchorage, Alaska     | 5000        |       | WIBW Topeka, Kans.        | 5000        |      | WAYS Charlotte, N.C.                 | 5000        |      | WAPA San Juan, P.Rico.    | 10000       |      |
| KOY Phoenix, Ariz.         | 5000        |       | KALB Alexandria, La.      | 5000        |      | WTVN Columbus, Ohio                  | 5000        |      | WMPF Memphis, Tenn.       | 10000       |      |
| KAFY Bakersfield, Calif.   | 1000        |       | WTAG Worcester, Mass.     | 5000        |      | WIP Philadelphia, Pa.                | 5000        |      | KBAT San Antonio, Tex.    | 50000       |      |
| KRAI Craig, Colo.          | 1000        |       | WLO Tupelo, Miss.         | 1000        |      | KILT Houston, Tex.                   | 5000        |      | KOMW Omak, Wash.          | 1000d       |      |
| WAYR Orange Park, Fla.     | 1000d       |       | KANA Anacosta, Mont.      | 1000        |      | KVNU Logan, Utah                     | 5000        |      | WCWA Charleston, W.Va.    | 10000d      |      |
| WGGA Gainesville, Ga.      | 5000        |       | WAGR Lumberton, N.C.      | 500         |      | WLSL Roanoke, Va.                    | 5000        |      | 690—434.5                 |             |      |
| KMWI Wailuku, Hawaii       | 5000        |       | KWIN Ashland, Oreg.       | 1000        |      | WHPL Winchester, Va.                 | 500         |      | WVOK Birmingham, Ala.     | 50000d      |      |
| KFRM Salina, Kans.         | 5000d       |       | WHP Harrisburg, Pa.       | 1000        |      | KEPR Kennewick-Richmond-Pasco, Wash. | 5000        |      | KEOS Flagstaff, Ariz.     | 1000        |      |
| WGBI Columbus, Miss.       | 1000        |       | WKAQ San Juan, P.R.       | 5000        |      | 620—483.6                            |             |      | KBBB Benton, Ark.         | 250d        |      |
| KSD St. Louis, Mo.         | 5000        |       | KOBH Hot Springs, S.Dak.  | 500d        |      | KTAR Phoenix, Ariz.                  | 5000        |      | KAPI Pueblo, Colo.        | 250d        |      |
| KBOV Butte, Mont.          | 1000        |       | WRKH Rockwood, Tenn.      | 5000        |      | KNGS Hanford, Calif.                 | 1000        |      | WADS Ansonia, Conn.       | 500d        |      |
| WGR Buffalo, N.Y.          | 5000        |       | KDAY Lubbock, Tex.        | 5000        |      | KWSD Mt. Shasta, Calif.              | 1000d       |      | WAPE Jacksonville, Fla.   | 50000       |      |
| WDBM Statesville, N.C.     | 5000        |       | WLES Lawrenceville, Va.   | 500d        |      | KSTR Grand Junction, Colo.           | 5000d       |      | KKUA Honolulu, Hawaii     | 10000       |      |
| KFYR Bismarck, N.Dak.      | 5000        |       | WCHS Charleston, W.Va.    | 5000        |      | WSUN St. Petersburg, Fla.            | 5000        |      | KBLI Blackfoot, Idaho     | 1000d       |      |
| WKRC Cincinnati, Ohio      | 5000        |       | WKTY LaCrosse, Wis.       | 5000        |      | WTRP LaGrange, Ga.                   | 1000d       |      | KGGF Coffeyville, Kans.   | 10000       |      |
| WGOC Corvallis, Oreg.      | 5000        |       | 590—508.2                 |             |      | KWIP Wallase, Idaho                  | 1000        |      | WTIX New Orleans, La.     | 5000        |      |
| WHLM Bloomsburg, Pa.       | 1000        |       | KHAR Anchorage, Alaska    | 5000        |      | KMNS Sioux City, Iowa                | 1000        |      | KTCR Minneapolis, Minn.   | 500d        |      |
| WPAB Ponce, P.R.           | 5000        |       | WRAG Carrollton, Ala.     | 1000d       |      | WTMT Louisville, Ky.                 | 5000        |      | KSTL St. Louis, Mo.       | 1000d       |      |
| WTRP Pawtucket, R.I.       | 1000        |       | KBHS Hot Springs, Ark.    | 5000d       |      | WLBZ Bangor, Maine                   | 5000        |      | KEYR Terrytown, Nebr.     | 1000d       |      |
| KCRS Midland, Tex.         | 5000        |       | KXSM San Bernardino, Cal. | 1000        |      | WJDX Jackson, Miss.                  | 5000        |      | KRCO Prineville, Oreg.    | 1000d       |      |
| KTSA San Antonio, Tex.     | 5000        |       | KCSJ Pueblo, Colo.        | 1000        |      | WVNI Newark, N.J.                    | 5000        |      | WXUR Media, Pa.           | 500d        |      |
| WDEV Waterbury, Vt.        | 5000        |       | WDLP Panama City, Fla.    | 1000        |      | WHEN Syracuse, N.Y.                  | 5000        |      | KUSD Vermillion, S.Dak.   | 1000d       |      |
| WSVA Harrisonburg, Va.     | 5000        |       | WPLA Atlanta, Ga.         | 5000        |      | WOPK Durham, N.C.                    | 5000        |      | KHEY El Paso, Tex.        | 1000d       |      |
| KARI Blair, Wash.          | 5000d       |       | KGMB Honolulu, Hawaii     | 5000        |      | KGW Portland, Oreg.                  | 5000        |      | KPTF Norfolk, Tex.        | 250         |      |
| WSAU Wausau, Wis.          | 5000        |       | KIDO Idaho Falls, Idaho   | 1000        |      | WHJB Greensburg, Pa.                 | 5000        |      | KZEY Tyler, Tex.          | 5000        |      |
| 560—535.4                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| WOOF Dothan, Ala.          | 5000d       |       | WRTH Wood River, Ill.     | 1000        |      | WCAY Cayce, S.C.                     | 5000        |      | WCYB Bristol, Va.         | 10000d      |      |
| KYUM Yuma, Ariz.           | 1000        |       | WYLK Lexington, Ky.       | 5000        |      | WATE Knoxville, Tenn.                | 5000        |      | WNNT Warsaw, Va.          | 250d        |      |
| KSFO San Fran., Calif.     | 5000        |       | WEEI Boston, Mass.        | 5000        |      | KWFT Wichita Falls, Tex.             | 5000        |      | WELD Fisher, W. Va.       | 500d        |      |
| KLZ Denver, Colo.          | 5000        |       | WKZD Kaiaimazoo, Mich.    | 5000        |      | WVMT Burlington, Vt.                 | 5000        |      | WAGO Oshkosh, Wis.        | 5000        |      |
| WQAM Miami, Fla.           | 5000        |       | KGLE Glendive, Mont.      | 500d        |      | WNNR Beckley, W.Va.                  | 1000        |      | 700—428.3                 |             |      |
| WIND Chicago, Ill.         | 5000        |       | WQW Omaha, Nebr.          | 5000        |      | WTMJ Milwaukee, Wis.                 | 5000        |      | WLW Cincinnati, Ohio      | 50000       |      |
| WKIK Middleboro, Ky.       | 5000        |       | WROW Albany, N.Y.         | 5000        |      | WAYU Albertville, Ala.               | 1000d       |      | 710—422.3                 |             |      |
| WOPR Portland, Maine       | 5000        |       | WCAIB Rutland, N. C.      | 500d        |      | WDBB Thomasville, Ala.               | 1000d       |      | WKRG Mobile, Ala.         | 1000        |      |
| WFRB Frostburg, Md.        | 1000        |       | WGTN Wilson, N.C.         | 5000        |      | KYAK Anchorage, Alaska               | 5000d       |      | KMPC Los Angeles, Calif.  | 50000       |      |
| WHYN Springfield, Mass.    | 5000        |       | KUGN Eugene, Oreg.        | 5000        |      | KJNO Juneau, Alaska                  | 1000        |      | KBTR Denver, Colo.        | 5000        |      |
| WOTE Monroe, Mich.         | 500d        |       | WARM Scranton, Pa.        | 5000        |      | KVMA Magnolia, Ark.                  | 1000d       |      | WGBS Miami, Fla.          | 50000       |      |
| WEBC Duluth, Minn.         | 5000        |       | WMBS Uniontown, Pa.       | 1000        |      | KIDO Monterey, Calif.                | 1000        |      | WUFF Eastman, Ga.         | 1000d       |      |
| KWTO Springfield, Mo.      | 5000        |       | KTBC Austin, Tex.         | 5000        |      | KHOW Denver, Colo.                   | 5000        |      | WROM Rome, Ga.            | 1000d       |      |
| KNON Grand Falls, Mont.    | 5000        |       | KSUB Cedar City, Utah     | 1000        |      | WMAL Washington, D.C.                | 5000        |      | KEEL Shreveport, La.      | 50000       |      |
| WGAI Elizabeth City, N.C.  | 1000        |       | KLVA Lynchburg, Va.       | 5000        |      | WSAV Savannah, Ga.                   | 5000        |      | WHB Kansas City, Mo.      | 10000       |      |
| WFIL Philadelphia, Pa.     | 5000        |       | KHQ Spokane, Wash.        | 5000        |      | WNEQ Tooele, Ga.                     | 5000        |      | WOR New York, N.Y.        | 50000       |      |
| WIS Columbia, S.C.         | 5000        |       | 600—499.7                 |             |      | KIDO Boise, Idaho                    | 5000        |      | DZRH Manila, P.I.         | 10000       |      |
| WHBQ Memphis, Tenn.        | 5000        |       | WIRB Enterprise, Ala.     | 1000        |      | WLAP Lexington, Ky.                  | 5000        |      | WKJB Mayaguez, P.Rico     | 1000        |      |
| KLVI Beaumont, Tex.        | 5000        |       | KCLS Flagstaff, Ariz.     | 5000        |      | KTIB Thibodaux, La.                  | 500d        |      | WTPR Paris, Tenn.         | 250d        |      |
| KPK Wenatchee, Wash.       | 5000        |       | KVCV Redding, Calif.      | 5000        |      | WIOB Ironwood, Mich.                 | 1000        |      | KGNC Amarillo, Tex.       | 10000       |      |
| WJLS Beckley, W.Va.        | 5000        |       | KOGO San Diego, Calif.    | 5000        |      | KDWB So. St. Paul, Minn.             | 5000        |      | KURV Edinburg, Tex.       | 250         |      |
| 570—526.0                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| WAAX Gadsden, Ala.         | 5000        |       | KZIX Ft. Collins, Colo.   | 1000d       |      | KXOK St. Louis, Mo.                  | 5000        |      | KIRO Seattle, Wash.       | 50000       |      |
| KNMO Alturas, Calif.       | 5000        |       | WICQ Bridgeport, Conn.    | 5000        |      | KGVB Belgrade, Mont.                 | 1000d       |      | WDSM Superior, Wis.       | 5000        |      |
| KGMS Washington, D.C.      | 5000        |       | WPDQ Jacksonville, Fla.   | 5000        |      | KOH Reno, Nev.                       | 5000        |      | 720—416.4                 |             |      |
| WFO Pinellas Park, Fla.    | 500d        |       | WMT Cedar Rapids, Iowa    | 5000        |      | KLEA Lovington, N.Mex.               | 5000        |      | KUAI Eleele, Hawaii       | 5000        |      |
| WACL Waycross, Ga.         | 5000        |       | WWOM New Orleans, La.     | 1000d       |      | WIRC Hickory, N.C.                   | 1000d       |      | WGN Chicago, Ill.         | 50000       |      |
| KYKY Paducah, Ky.          | 1000        |       | WFT Caribou, Maine        | 5000d       |      | WMFD Wilmington, N.C.                | 1000        |      | 730—410.7                 |             |      |
| WGMS Bethesda, Md.         | 5000d       |       | WCAO Baltimore, Md.       | 5000        |      | KWFO Coquille, Oreg.                 | 5000d       |      | WJMW Athens, Ala.         | 1000        |      |
| WYMI Biloxi, Miss.         | 1000d       |       | WLST Escanaba, Mich.      | 1000d       |      | WEIL Scranton, Pa.                   | 500d        |      | KSUD W. Memphis, Ark.     | 250d        |      |
| KGRT Las Cruces, N.Mex.    | 5000d       |       | WGTZ Flint, Mich.         | 1000        |      | WKYN San Juan, P.R.                  | 5000        |      | WLOR Thomasville, Ga.     | 5000d       |      |
| WAGA New York, N.Y.        | 5000        |       | KGEE Kalispell, Mont.     | 1000        |      | WPRO Providence, R.I.                | 5000        |      | KLOE Goodland, Kans.      | 1000d       |      |
| WYR Syracuse, N.Y.         | 5000        |       | WCVF Murphy, N.C.         | 1000d       |      | KMAC San Antonio, Tex.               | 5000        |      | WFMW Madisonville, Ky     | 500         |      |
| WYNC Asheville, N.C.       | 5000        |       | WSIS Winston-Salem, N.C.  | 5000        |      | KSXX Salt Lake City, Utah            | 1000d       |      | WMTVC Van Cleve, Ky.      | 1000d       |      |
| WLE Raleigh, N.C.          | 500d        |       | WSOM Salem, Ohio          | 5000        |      | KGDN Edmonds, Wash.                  | 5000        |      | KTRY Bastrop, La.         | 250d        |      |
| WKBN Youngstown, Ohio      | 5000        |       | WFRM Coudersport, Pa.     | 1000d       |      | KZUN Opportunity, Wash.              | 500d        |      | WARB Covington, La.       | 250d        |      |
| WNAX Yankton, S.Dak.       | 5000        |       | WAEI Mayaguez, P.R.       | 5000        |      | 640—468.5                            |             |      | WJTO Bath, Maine          | 1000d       |      |
| WFAA Dallas, Tex.          | 5000        |       | KROD El Paso, Tex.        | 5000        |      | KFI Los Angeles, Calif.              | 50000       |      | WACE Chicopee, Mass.      | 5000d       |      |
| WBAP Ft. Worth, Tex.       | 5000        |       | KERB Kermit, Tex.         | 1000d       |      | WOI Ames, Iowa                       | 5000d       |      | WVIC E. Lansing, Mich.    | 500         |      |
| 580—516.9                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 590—508.2                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 600—499.7                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 610—491.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 620—483.6                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 630—475.9                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 640—468.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 650—461.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 660—454.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 670—447.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 680—440.9                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 690—434.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 700—282.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 710—222.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 720—416.4                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 730—410.7                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 740—389.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 750—370.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 760—352.5                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 770—337.3                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 780—322.7                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 790—308.1                  |             |       |                           |             |      |                                      |             |      |                           |             |      |
| 800—293.0                  |             |       |                           |             |      |                                      |             |      |                           |             |      |



| kHz                          | Wave Length | W.P. | kHz                              | Wave Length | W.P. | kHz                       | Wave Length | W.P. | kHz                         | Wave Length | W.P. |
|------------------------------|-------------|------|----------------------------------|-------------|------|---------------------------|-------------|------|-----------------------------|-------------|------|
| KULE Ephrata, Wash.          | 10000       |      | KING Juneau, Alaska              | 5000        |      | KSHA Medford, Oreg.       | 10000       |      | KCJB Minot, N. Dak.         | 1000        |      |
| WXMT Merrill, Wis.           | 10000       |      | KAGH Crosssett, Ark.             | 2500        |      | WAMO Pittsburgh, Pa.      | 10000       |      | WBRI Marietta, O.           | 5000        |      |
| <b>740-405.2</b>             |             |      | KVOM Morrilton, Ark.             | 2500        |      | WTEL Philadelphia, Pa.    | 10000       |      | WFPB Middletown, Ohio       | 1000        |      |
| WBAM Montgomery, Ala.        | 500000      |      | KUZZ Bakersfield, Calif.         | 2500        |      | WLBG Laurens, S.C.        | 10000       |      | GLC Miami, Okla.            | 1000        |      |
| KMEQ Phoenix, Ariz.          | 10000       |      | KDAD Weed, Calif.                | 10000       |      | KFTS Ft. Stockton, Tex.   | 2500        |      | KURY Brookings, Oreg.       | 10000       |      |
| KBIG Avalon, Cal.            | 100000      |      | KBRN Brighton, Colo.             | 5000        |      | KPAN Hereford, Tex.       | 10000       |      | WAVL Apollo, Pa.            | 10000       |      |
| KCBS San Francisco, Calif.   | 50000       |      | WLAD Danbury, Conn.              | 10000       |      | KSFA Nacogdoches, Tex.    | 10000       |      | WGBI Scranton, Pa.          | 10000       |      |
| KSSS Colorado Springs, Colo. | 10000       |      | KRVK Rockville, Conn.            | 10000       |      | KONO San Antonio, Tex.    | 5000        |      | WSPA York, Pa.              | 5000        |      |
| KVFC Cortez, Colo.           | 10000       |      | WSUZ Palatka, Fla.               | 10000       |      | KWHO Salt Lake City, Utah | 10000       |      | WRP Pottsville, P.R.        | 5000        |      |
| WSBR Boca Raton, Fla.        | 10000       |      | WIAT Swainsboro, Ga.             | 10000       |      | WEVA Emporia, Va.         | 10000       |      | WNGC North Charleston, S.C. | 5000        |      |
| WKMK Blountstown, Fla.       | 10000       |      | WKZI Casey, Ill.                 | 2500        |      | WOAY Oak Hill, W. Va.     | 10000       |      | WORD Spartanburg, S.C.      | 50000       |      |
| WKIS Orlando, Fla.           | 5000        |      | KXIC Iowa City, Iowa             | 10000       |      | WFOX Milwaukee, Wis.      | 2500        |      | WJCV Johnson City, Tenn.    | 5000        |      |
| KYME Boise, Idaho            | 5000        |      | WCCM Lawrence, Mass.             | 10000       |      |                           |             |      | WEPG S. Pittsburgh, Tenn.   | 5000        |      |
| WVLN Olney, Ill.             | 10000       |      | WVAL Sauk Rapids, Minn.          | 2500        |      |                           |             |      | KNAF Fredericksburg, Tex.   | 10000       |      |
| KBQE Oskaloosa, Iowa         | 2500        |      | KREI Farmington, Mo.             | 10000       |      |                           |             |      | KRIO McAlester, Tex.        | 5000        |      |
| WNOP Newport, Ky.            | 10000       |      | KWDN Camden, N. J.               | 50000       |      |                           |             |      | KRRV Sherman, Tex.          | 1000        |      |
| WCAS Cambridge, Mass.        | 2500        |      | KJEM Okla. City, Okla.           | 2500        |      |                           |             |      | KALL Salt Lake City, Utah   | 5000        |      |
| KPBM Carlsbad, N. Mex.       | 50000       |      | KPDQ Portland, Ore.              | 10000       |      |                           |             |      | WNHV White River Jet., Vt.  | 10000       |      |
| WGSM Huntington, N.Y.        | 50000       |      | WCHA Chambersburg, Pa.           | 10000       |      |                           |             |      |                             |             |      |
| WMBL Morehead City, N.C.     | 10000       |      | WOSC Dillon, S.C.                | 10000       |      |                           |             |      | WRNL Richmond, Va.          | 5000        |      |
| WPAQ Mount Airy, N.C.        | 100000      |      | WEAB Greer, S.C.                 | 2500        |      |                           |             |      | WPXI Roonoke, Va.           | 10000       |      |
| KRMG Tulsa, Okla.            | 50000       |      | WDEH Sweetwater, Tenn.           | 10000       |      |                           |             |      | KORD Pasco, Wash.           | 10000       |      |
| WVCH Chester, Pa.            | 10000       |      | KDDD Dumas, Tex.                 | 2500        |      |                           |             |      | KIXI Seattle, Wash.         | 1000        |      |
| WIAC San Juan, P.Rio         | 10000       |      | KBUH Brigham City, Utah          | 2500        |      |                           |             |      | KISN Vancouver, Wash.       | 5000        |      |
| WBAW Barnwell, S.C.          | 10000       |      | WSVS Crewe, Va.                  | 50000       |      |                           |             |      | WBSM Hayward, Wis.          | 50000       |      |
| WIRJ Hurlburt, Tenn.         | 2500        |      | WKEE Huntington, W. Va.          | 50000       |      |                           |             |      | WDR Sturgeon Bay, Wis.      | 10000       |      |
| WJIG Tullahoma, Tenn.        | 2500        |      | WDUX Waupaca, Wis.               | 50000       |      |                           |             |      |                             |             |      |
| KTRH Houston, Tex.           | 50000       |      | <b>810-370.2</b>                 |             |      |                           |             |      | <b>920-325.9</b>            |             |      |
| KCMC Texarkana, Tex.         | 1000        |      | KGO San Francisco, Calif.        | 50000       |      | KRVN Lexington, Neb.      | 50000       |      | WCTA Ada, Okla.             | 5000        |      |
| WBCI Williamsburg, Va.       | 5000        |      | KWSR Rifle, Colo.                | 10000       |      | WCBS New York, N.Y.       | 50000       |      | WWWR Russellville, Ala.     | 10000       |      |
| WBOO Baraboo, Wis.           | 5000        |      | WATI Indianapolis, Ind.          | 25000       |      | WRRZ Clinton, N.C.        | 10000       |      | KSRM Soldotna, Alaska       | 5000        |      |
| <b>750-399.8</b>             |             |      | WYRE Annapolis, Md.              | 2500        |      | WRFD Worthington, Ohio    | 50000       |      | KARK Little Rock, Ark.      | 5000        |      |
| KFQD Anchorage, Alaska       | 10000       |      | WJPW Rockford, Mich.             | 50000       |      |                           |             |      | KLOC Ceres, Calif.          | 5000        |      |
| WSS Atlanta, Ga.             | 50000       |      | WSJC Magee, Miss.                | 50000       |      |                           |             |      | KDES Palm Springs, Cal.     | 5000        |      |
| WBMD Baltimore, Md.          | 10000       |      | KCMH Miami City, Mo.             | 50000       |      |                           |             |      | KVEC San Luis Obispo, Cal.  | 10000       |      |
| KMMJ Grand Island, Neb.      | 10000       |      | KAFE Santa Fe, N.M.              | 50000       |      |                           |             |      | KLMR Lamar, Colo.           | 5000        |      |
| WHEB Portsmouth, N.H.        | 10000       |      | WGY Schenectady, N.Y.            | 50000       |      |                           |             |      | WMEC Eau Claire, Fla.       | 1000        |      |
| KSEO Durant, Okla.           | 2500        |      | WKBC N. Wilkesboro, N.C.         | 10000       |      |                           |             |      | WVGH Hazelhurst, Ga.        | 5000        |      |
| KXL Portland, Oreg.          | 50000       |      | WCEC Rocky Mount, N.C.           | 10000       |      |                           |             |      | WGNU Granite City, Ill.     | 5000        |      |
| WPDX Clarksburg, W. Va.      | 10000       |      | WEDO McKeesport, Pa.             | 10000       |      |                           |             |      | WMOK Metropolis, Ill.       | 10000       |      |
| <b>760-394.5</b>             |             |      | KVMY San Juan, P.R.              | 50000       |      |                           |             |      | WBAA W. Lafayette, Ind.     | 5000        |      |
| KFMB San Diego, Cal.         | 5000        |      | WQIZ St. George, S.C.            | 50000       |      |                           |             |      | KFNF Shenandoah, Va.        | 10000       |      |
| KGU Honolulu, Hawaii         | 10000       |      | KBHS Sturgis, S.D.               | 50000       |      |                           |             |      | KFNF Shenandoah, Va.        | 10000       |      |
| WJR Detroit, Mich.           | 50000       |      | KWTS Murfreesboro, Tenn.         | 50000       |      |                           |             |      | KFNF Shenandoah, Va.        | 10000       |      |
| WCPS Tarboro, N.C.           | 10000       |      | KWDR Del Rio, Tex.               | 50000       |      |                           |             |      | WBOX Bogalusa, La.          | 10000       |      |
| WORA Mayaguez, P.R.          | 5000        |      | WILT Tomahawk, Wis.              | 50000       |      |                           |             |      | KTCQ Jonesboro, La.         | 10000       |      |
| <b>770-389.4</b>             |             |      | <b>820-365.6</b>                 |             |      |                           |             |      | WPTX Lexington Park, Md.    | 5000        |      |
| KUOM Minneapolis, Minn.      | 50000       |      | WAIT Chicago, Ill.               | 50000       |      |                           |             |      | WMPL Hancock, Mich.         | 10000       |      |
| WCAL Northfield, Minn.       | 50000       |      | WIKY Evansville, Ind.            | 2500        |      |                           |             |      | KDHL Fairbault, Minn.       | 5000        |      |
| WEW St. Louis, Mo.           | 10000       |      | WOSU Columbus, Ohio              | 50000       |      |                           |             |      | KWAD Wadena, Minn.          | 1000        |      |
| KBO Albuquerque, N.Mex.      | 50000       |      | WFAA Dallas, Tex.                | 50000       |      |                           |             |      | KWYS W. Yellowstone, Mont.  | 1000        |      |
| WABC New York, N.Y.          | 50000       |      | WBAF Ft. Worth, Tex.             | 50000       |      |                           |             |      | KRAM Las Vegas, Nev.        | 1000        |      |
| KXA Seattle, Wash.           | 1000        |      | <b>830-361.2</b>                 |             |      |                           |             |      | KOLO Reno, Nev.             | 1000        |      |
| <b>780-384.4</b>             |             |      | KIKI Honolulu, Hawaii            | 10000       |      |                           |             |      | KQEB Albuquerque, N.Mex.    | 1000        |      |
| WBBM Chicago, Ill.           | 50000       |      | WCCO Minneapolis-St. Paul, Minn. | 50000       |      |                           |             |      | WTTM Trenton, N.J.          | 1000        |      |
| WJAG Norfolk, Neb.           | 10000       |      | KBOA Kennett, Mo.                | 50000       |      |                           |             |      | WKRT Cortland, N.Y.         | 1000        |      |
| WCKB Dunn, N.C.              | 10000       |      | WNYC New York, N.Y.              | 1000        |      |                           |             |      | WHGQ Kingston, N.Y.         | 50000       |      |
| WBBO Forest City, N.C.       | 10000       |      | <b>840-356.9</b>                 |             |      |                           |             |      | WIRD Lake Placid, N.Y.      | 1000        |      |
| KSPI Stillwater, Okla.       | 2500        |      | WTUF Mobile, Ala.                | 10000       |      |                           |             |      | WBBB Burlington, N.C.       | 50000       |      |
| WAVA Arlington, Va.          | 10000       |      | WRYM New Britain, Conn.          | 10000       |      |                           |             |      | WMNI Columbus, Ohio         | 1000        |      |
| <b>790-379.5</b>             |             |      | WHAS Louisville, Ky.             | 50000       |      |                           |             |      | KGAL Lebanon, Oreg.         | 1000        |      |
| WTUG Tuscaloosa, Ala.        | 10000       |      | WPPO Stroudsburg, Pa.            | 25000       |      |                           |             |      | WKVA Lewistown, Pa.         | 1000        |      |
| KCAM Glennallen, Alaska      | 5000        |      | <b>850-352.7</b>                 |             |      |                           |             |      | WJAR Providence, R.I.       | 5000        |      |
| KCEE Tucson, Ariz.           | 10000       |      | WYDE Birmingham, Ala.            | 10000       |      |                           |             |      | WTND Orangeburg, S.C.       | 10000       |      |
| KOSY Texarkana, Ark.         | 10000       |      | KICY New York, Alaska            | 10000       |      |                           |             |      | KEZU Rapid City, S.Dak.     | 10000       |      |
| KABC Los Angeles, Calif.     | 5000        |      | KGKO Benton, Ark.                | 10000       |      |                           |             |      | WLVN Livingston, Tenn.      | 10000       |      |
| WLBE Leesburg, Fla.          | 5000        |      | KOA Denver, Colo.                | 50000       |      |                           |             |      | KELP El Paso, Tex.          | 1000        |      |
| WFUN S. Miami, Fla.          | 5000        |      | WRUF Gainesville, Fla.           | 5000        |      |                           |             |      | WRZR Odessa, Tex.           | 1000        |      |
| WQXI Atlanta, Ga.            | 50000       |      | WEAT W. Palm Beach, Fla.         | 1000        |      |                           |             |      | KTWV Texas City, Tex.       | 10000       |      |
| WYNR Brunswick, Ga.          | 5000        |      | KIMO Hilo, Hawaii                | 1000        |      |                           |             |      | KITN Olympia, Wash.         | 10000       |      |
| KOWA Cairo, Ga.              | 1000        |      | WCLR Crystal Lake, Ill.          | 5000        |      |                           |             |      | KXLY Spokane, Wash.         | 5000        |      |
| KONA Kealahou, Hawaii        | 1000        |      | WHBH Boston, Mass.               | 50000       |      |                           |             |      | WMMN Fairmont, W. Va.       | 5000        |      |
| KEST Boise, Idaho            | 10000       |      | WBZ Muskegon, Mich.              | 1000        |      |                           |             |      | WFOU Milwaukee, Wis.        | 5000        |      |
| KBRV Soda Springs, Ida.      | 5000        |      | KFUO Clayton, Mo.                | 10000       |      |                           |             |      | <b>930-322.4</b>            |             |      |
| WRMS Beardstown, Ill.        | 5000        |      | WKIX Raleigh, N.C.               | 5000        |      |                           |             |      | WETO Gadsden, Ala.          | 10000       |      |
| KXXS Colby, Kans.            | 50000       |      | WIJW Cleveland, Ohio             | 10000       |      |                           |             |      | KTKN Ketchikan, Alaska      | 5000        |      |
| WAKY Louisville, Ky.         | 50000       |      | WJAC Johnstown, Pa.              | 10000       |      |                           |             |      | KAPN Douglas, Ariz.         | 5000        |      |
| WRUM Rumford, Me.            | 10000       |      | WEUE Reading, Pa.                | 5000        |      |                           |             |      | KHF Flagstaff, Ariz.        | 50000       |      |
| WSGW Saginaw, Mich.          | 5000        |      | WABA Aqueduct, P.R.              | 5000        |      |                           |             |      | KAJ Los Angeles, Calif.     | 5000        |      |
| KGHL Billings, Mont.         | 5000        |      | WVWK Knoxville, Tenn.            | 50000       |      |                           |             |      | KEWQ Paradise, Cal.         | 50000       |      |
| WNNY Watertown, N.Y.         | 1000        |      | WRAP Norfolk, Va.                | 5000        |      |                           |             |      | KIUP Durango, Colo.         | 5000        |      |
| WLSV Wellsville, N.Y.        | 10000       |      | KTAC Tacoma, Wash.               | 10000       |      |                           |             |      | WTHD Milford, Del.          | 5000        |      |
| WTNC Thomasville, N.C.       | 10000       |      | <b>860-348.6</b>                 |             |      |                           |             |      | WHAN Haines City, Fla.      | 1000        |      |
| KFGO Fargo, N.D.             | 5000        |      | WHRT Hartselle, Ala.             | 2500        |      |                           |             |      | WJAX Jacksonville, Fla.     | 5000        |      |
| KWIL Albany, Oreg.           | 10000       |      | WAMI Opp, Ala.                   | 10000       |      |                           |             |      | WKXY Sarasota, Fla.         | 1000        |      |
| WAEB Allentown, Pa.          | 10000       |      | KIFN Phoenix, Ariz.              | 10000       |      |                           |             |      | WMGR Bainbridge, Ga.        | 5000        |      |
| WPIO Sharpsburg, Md.         | 1000        |      | KXEN Phoenix, Ariz.              | 10000       |      |                           |             |      | KSEI Pocatello, Idaho       | 5000        |      |
| WABN Providence, R.I.        | 5000        |      | KXOF Denver, Colo.               | 2500        |      |                           |             |      | WTAD Quincy, Ill.           | 5000        |      |
| WWBD Bamberg-Denmark, S.C.   | 10000       |      | KTRB Modesto, Calif.             | 10000       |      |                           |             |      | WHON Centerville, Ind.      | 5000        |      |
| WETB Johnson City, Tenn.     | 5000        |      | WAZE Clearwater, Fla.            | 5000        |      |                           |             |      | WKCT Bowling Green, Ky.     | 1000        |      |
| WMC Memphis, Tenn.           | 10000       |      | WKKO Cocoa, Fla.                 | 1000        |      |                           |             |      | WROR Frederick, Md.         | 5000        |      |
| KTHH Houston, Tex.           | 5000        |      | WERD Atlanta, Ga.                | 1000        |      |                           |             |      | WBCK Battle Creek, Mich.    | 5000        |      |
| KFYD Lubbock, Tex.           | 5000        |      | WDMG Douglas, Ga.                | 50000       |      |                           |             |      | KKIN Aitkin, Minn.          | 10000       |      |
| KUTA Blanding, Utah          | 10000       |      | WMRI Marion, Ind.                | 2500        |      |                           |             |      | WSLI Jackson, Miss.         | 5000        |      |
| WSIG Mount Jackson, Va.      | 10000       |      | KWPC Muscatine, Iowa             | 2500        |      |                           |             |      | KKOC Poplar Bluff, Mo.      | 5000        |      |
| WTAR Norfolk, Va.            | 5000        |      | KOAM Pittsburg, Kan.             | 10000       |      |                           |             |      | KOGA Ogallala, Nebr.        | 5000        |      |
| KGMI Bellingham, Wash.       | 5000        |      | WSON Henderson, Ky.              | 5000        |      |                           |             |      | KCCG Carlsbad, N.M.         | 5000        |      |
| KJRB Spokane, Wash.          | 5000        |      | WYBE Baltimore, Md.              | 10000       |      |                           |             |      | WJAX Jacksonville, Fla.     | 5000        |      |
| WEAQ Eau Claire, Wis.        | 5000        |      | WSBS Gt. Barrington, Mass.       | 2500        |      |                           |             |      | WITN Washington, N.C.       | 5000        |      |
| <b>800-374.8</b>             |             |      | KNUJ New Ulm, Minn.              | 10000       |      |                           |             |      | WWNH Rochester, N.H.        | 5000        |      |
| WHOS Decatur, Ala.           | 10000       |      | WMAG Forest, Miss.               | 5000        |      |                           |             |      | WPAT Paterson, N.J.         | 5000        |      |
| WMBG Montgomery, Ala.        | 10000       |      | KARS El Paso, Tex.               | 5000        |      |                           |             |      | WBEN Buffalo, N.Y.          | 5000        |      |
|                              |             |      | WFMO Fairmont, N.C.              | 10000       |      |                           |             |      | WIZR Johnsonstown, N.Y.     | 10000       |      |
|                              |             |      | WSTH Taylorsville, N. C.         | 2500        |      |                           |             |      | WEOL Elvira, Ohio           | 1000        |      |
|                              |             |      |                                  |             |      |                           |             |      | WKY Oklahoma City, Okla.    | 5000        |      |
|                              |             |      |                                  |             |      |                           |             |      | KAGI Grant Pass, Oreg.      | 5000        |      |
|                              |             |      |                                  |             |      |                           |             |      | KSWB Seaside, Ore.          | 10000       |      |
|                              |             |      |                                  |             |      |                           |             |      | WCNR Bloomsburg, Pa.        | 10000       |      |

# WHITE'S RADIO LOG

| kHx                             | 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 Yakima, Wash.              | 1000d       |      |
| WSAZ Huntington, W.Va.          | 5000        |      |
| KROE Sheridan, Wyo.             | 1000        |      |
| WBLB Auburndale, Wis.           | 5000d       |      |

|                         |       |  |
|-------------------------|-------|--|
| <b>940-319.0</b>        |       |  |
| KFOS Tucson, Ariz.      | 250   |  |
| KHRE Fresno, Calif.     | 5000d |  |
| WINE Brookfield, Conn.  | 1000d |  |
| WKQH Chieffland, Fla.   | 5000d |  |
| WINZ Miami, Fla.        | 5000d |  |
| WMAZ Mason, Ga.         | 5000d |  |
| KAHU Waipahu, Hawaii    | 1000d |  |
| WMIX Mt. Vernon, Ill.   | 5000  |  |
| KIOD Des Moines, Iowa   | 1000d |  |
| WCND Shelbyville, Ky.   | 250d  |  |
| WYLD New Orleans, La.   | 1000d |  |
| WIDG St. Ignace, Mich.  | 5000  |  |
| WOR South Haven, Mich.  | 1000d |  |
| WPCP Houston, Texas     | 5000d |  |
| KSMW Aurora, Mo.        | 5000d |  |
| KVSH Valentine, Nebr.   | 5000d |  |
| WFNC Fayetteville, N.C. | 1000  |  |
| WCIT Lima, Ohio         | 250d  |  |
| WNAL Nelsonville, O.    | 1000d |  |
| KRL Bend, Ore.          | 1000d |  |
| KWRC Woodburn, Ore.     | 1000d |  |
| WESA Charleroi, Pa.     | 250d  |  |
| WGRP Greenville, Pa.    | 1000d |  |
| WIFR San Juan, P.R.     | 1000d |  |
| KIXZ Amarillo, Tex.     | 5000  |  |
| KTON Belton, Tex.       | 1000d |  |
| KTO Texasdome, Tex.     | 1000d |  |
| WNRG Grundy, Va.        | 5000d |  |
| WFAW Ft. Atkinson, Wis. | 500d  |  |
| WCSW Shell Lake, Wis.   |       |  |

|                              |       |  |
|------------------------------|-------|--|
| <b>950-315.6</b>             |       |  |
| WRMA Montgomery, Ala.        | 1000d |  |
| KIBH Seward, Alaska          | 1000  |  |
| KXJK Forrest City, Ark.      | 5000d |  |
| KFSA Ft. Smith, Ark.         | 1000  |  |
| KWH Auburn, Calif.           | 5000d |  |
| KIMN Denver, Colo.           | 5000  |  |
| WLOR Orlando, Fla.           | 5000  |  |
| WGTA Summerville, Ga.        | 5000d |  |
| WGOV Valdosta, Ga.           | 5000  |  |
| KATN Boise, Ida.             | 5000d |  |
| KLER Orofino, Idaho          | 1000d |  |
| WART Chicago, Ill.           | 1000d |  |
| WXLW Indianapolis, Ind.      | 5000d |  |
| KOEL Oelwein, Ia.            | 5000  |  |
| KJRG Newton, Kans.           | 500d  |  |
| WYWY Barboursville, Ky.      | 5000  |  |
| WAGM Presque Isle, Maine     | 5000  |  |
| WXLN Potomac-Cabin John, Md. | 1000d |  |
| WRYT Boston, Mass.           | 5000  |  |
| WWD Detroit, Mich.           | 5000  |  |
| KRSI St. Louis Park, Minn.   | 1000  |  |
| WBKH Hattiesburg, Miss.      | 5000d |  |
| KLIK Jefferson City, Mo.     | 5000d |  |
| KNFT Bayard, N.M.            | 5000  |  |
| WHVW Hyde Park, N.Y.         | 500d  |  |
| WBFB Rochester, N.Y.         | 1000  |  |
| WIBX Utica, N.Y.             | 5000  |  |
| WPET Greensboro, N.C.        | 5000d |  |
| KYES Roseburg, Ore.          | 1000d |  |
| WNCC Barnesboro, Pa.         | 5000  |  |
| WPEN Philadelphia, Pa.       | 5000  |  |
| WBER Moncks Corner, S.C.     | 5000  |  |
| WSPA Spartanburg, S.C.       | 5000  |  |
| WKAT Watertown, S.Dak.       | 1000d |  |
| WAGG Franklin, Tenn.         | 5000  |  |
| 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.       | 5000d |  |
| WKAZ Charleston, W.Va.       | 5000d |  |
| WKTS Sheboygan, Wis.         | 500d  |  |
| KMER Kemmerer, Wyo.          | 1000d |  |

|                           |       |  |
|---------------------------|-------|--|
| <b>960-312.3</b>          |       |  |
| WBRC Birmingham, Ala.     | 5000  |  |
| WMOZ Mobile, Ala.         | 1000  |  |
| KOOL Phoenix, Ariz.       | 5000  |  |
| KAYR Apple Valley, Calif. | 5000d |  |
| KELZ Lompoc, Calif.       | 500   |  |
| KABL Oakland, Calif.      | 5000  |  |
| WELI New Haven, Conn.     | 5000  |  |
| WGRD Lake City, Fla.      | 5000  |  |
| WJCM Sebring, Fla.        | 1000d |  |

|                           |       |  |
|---------------------------|-------|--|
| WBRC Birmingham, Ala.     | 5000  |  |
| WMOZ Mobile, Ala.         | 1000  |  |
| KOOL Phoenix, Ariz.       | 5000  |  |
| KAYR Apple Valley, Calif. | 5000d |  |
| KELZ Lompoc, Calif.       | 500   |  |
| KABL Oakland, Calif.      | 5000  |  |
| WELI New Haven, Conn.     | 5000  |  |
| WGRD Lake City, Fla.      | 5000  |  |
| WJCM Sebring, Fla.        | 1000d |  |

| kHx                      | Wave Length | W.P. |
|--------------------------|-------------|------|
| WJAZ Albany, Ga.         | 5000        |      |
| WRFC Athens, Ga.         | 5000        |      |
| KSRM Salmon, Idaho       | 1000d       |      |
| WDEM Boise, Ill.         | 1000d       |      |
| WSBT South Bend, Ind.    | 5000        |      |
| KMA Shenandoah, Iowa     | 5000        |      |
| WPRT Prestonsburg, Ky.   | 5000d       |      |
| KROF Abbeville, La.      | 1000d       |      |
| WBOS Salisbury, Md.      | 5000        |      |
| WFLG Fitchburg, Mass.    | 1000        |      |
| WHAK Rogers City, Mich.  | 5000d       |      |
| KTF Little Falls, Minn.  | 5000        |      |
| 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        |      |
| WAK Dallas, Pa.          | 5000        |      |
| WFTC Kingston, 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.      | 5000        |      |
| WBMC McMinnville, Tenn.  | 5000        |      |
| 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        |      |

|                           |       |  |
|---------------------------|-------|--|
| <b>970-309.1</b>          |       |  |
| WERH Hamilton, Ala.       | 5000d |  |
| WTBF Troy, Ala.           | 5000  |  |
| KVWM Show Low, Ariz.      | 5000d |  |
| KNEA Jonesboro, Ark.      | 1000d |  |
| KBIS Bakersfield, Calif.  | 5000  |  |
| KCHV Coachesville, Calif. | 5000  |  |
| KBBE Modesto, Calif.      | 1000  |  |
| KFE Pueblo, Colo.         | 1000d |  |
| WBOM Jacksonville, Fla.   | 5000  |  |
| WFLA Tampa, Fla.          | 5000d |  |
| WIIN Atlanta, Ga.         | 5000d |  |
| WVOP Vidalia, Ga.         | 5000d |  |
| KPUA Hilo, Hawaii         | 5000  |  |
| KAYT Rupert, Idaho        | 1000d |  |
| WMAV Springfield, Ill.    | 1000  |  |
| WAVE Louisville, Ky.      | 5000  |  |
| KSYL Alexandria, La.      | 5000  |  |
| WCSH Portland, Maine      | 5000  |  |
| WAMD Aberdeen, Md.        | 500   |  |
| WESO Southbridge, Mass.   | 1000d |  |
| WCKD Ishpeming, Mich.     | 5000d |  |
| KUHN Jackson, Mich.       | 1000  |  |
| KQAB Kansas City, Mo.     | 5000  |  |
| WRKN Brandon, Miss.       | 5000  |  |
| KOOK Billings, Mont.      | 5000  |  |
| KILT No. Platte, Nebr.    | 5000d |  |
| KVEG Las Vegas, Nev.      | 5000  |  |
| WJRZ Hackensack, N.J.     | 5000  |  |
| KDCE Espanola, N.M.       | 1000d |  |
| WBBR Buffalo, N.Y.        | 5000  |  |
| WCHN Norwalk, Conn.       | 5000  |  |
| WRCS Ashokis, N.C.        | 1000d |  |
| WUIT Canton, N.C.         | 1000d |  |
| WDAY Fargo, N.Dak.        | 5000  |  |
| WREO Ashland, Ohio        | 5000  |  |
| WATH Athens, Ohio         | 1000d |  |
| KAKC Tulsa, Okla.         | 1000  |  |
| KOIN Portland, Ore.       | 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  |  |
| WPRR Danville, Va.        | 1000d |  |
| WANV Waynesboro, Va.      | 5000d |  |
| KREM Spokane, Wash.       | 5000  |  |
| WVYO Pineville, W.Va.     | 1000d |  |
| WHA Madison, Wis.         | 5000d |  |
| WAKX Superior, Wis.       | 5000d |  |

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|--------------------------------|-------|--|
| <b>980-305.9</b>               |       |  |
| WKLF Clinton, Ala.             | 1000d |  |
| WXLL Big Delta, Alaska         | 100   |  |
| KCAB Dardanelle, Ark.          | 1000d |  |
| KINS Eureka, Calif.            | 5000  |  |
| KEAP Fresno, Calif.            | 5000  |  |
| KFBW Los Angeles, Calif.       | 5000  |  |
| KCTY Salinas, Calif.           | 1000d |  |
| KGLEN Greenwood Springs, Colo. | 1000d |  |
| WSUB Gorton, Conn.             | 1000d |  |
| WYD Washington, D.C.           | 5000  |  |
| WDVH Gainesville, Fla.         | 5000d |  |
| WTOT Marianna, Fla.            | 1000d |  |
| WBOP Pensacola, Fla.           | 1000d |  |
| WLDD Pompano Beach, Fla.       | 1000d |  |
| WKLY Hartwell, Ga.             | 1000d |  |
| WPGA Perry, Ga.                | 1000d |  |
| KUPJ Idaho Falls, Idaho        | 1000d |  |
| WITY Danville, Ill.            | 1000d |  |
| KREB Shreveport, La.           | 5000d |  |
| WCAP Lowell, Mass.             | 1000d |  |
| WAOP Otsego, Mich.             | 1000d |  |
| WPBC Richfield, Minn.          | 5000  |  |

| kHx                           | Wave Length | W.P. |
|-------------------------------|-------------|------|
| WAPF McComb, Miss.            | 5000d       |      |
| KMBZ Kansas City, Mo.         | 5000        |      |
| KLQY Hamilton, Mont.          | 1000d       |      |
| LVF Fallon, Nev.              | 5000d       |      |
| KICG Clovis, N. Mex.          | 1000        |      |
| KMIN Grants, N. Mex.          | 1000d       |      |
| WTRY Troy, N.Y.               | 5000        |      |
| WKLM Wilmington, N.C.         | 5000d       |      |
| WAAA Wm.-Salem, N.C.          | 1000d       |      |
| WONE Dayton, Ohio             | 5000        |      |
| WLK Wilkes-Barre, Pa.         | 5000        |      |
| WAS Summitville, S.C.         | 1000d       |      |
| WYCL York, S.C.               | 1000d       |      |
| KDSJ Deadwood, S.Dak.         | 1000        |      |
| WSIX Nashville, Tenn.         | 5000        |      |
| KFRD Rosenberg-Richmond, Tex. | 1000d       |      |
| KSCV Richfield, Utah          | 5000d       |      |
| WMEK Bristol, Va.             | 3000        |      |
| WKEK Chase City, Va.          | 5000        |      |
| KUTI Yakima, Wash.            | 5000d       |      |
| WHAW Weston, W.Va.            | 1000d       |      |
| WCUB Manitowish, Wis.         | 1000d       |      |
| WPFP Park Falls, Wis.         | 1000d       |      |
| WPRE Prairie du Chien, Wis.   | 1000        |      |

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| <b>990-302.8</b>              |       |  |
| WEIS Center, Ala.             | 250   |  |
| WVWF Fayetteville, Ala.       | 1000d |  |
| WTCF Fayetteville, Ala.       | 500d  |  |
| KTKT Tucson, Ariz.            | 1000d |  |
| KKIS Pittsburg, Calif.        | 5000  |  |
| KGUD Santa Barbara, Calif.    | 1000d |  |
| KLIR Denver, Colo.            | 1000d |  |
| WFAB Miami, Fla.              | 5000  |  |
| WHOO Orlando, Fla.            | 5000d |  |
| WDWD Dawson, Ga.              | 1000d |  |
| WGML Hinesville, Ga.          | 250d  |  |
| KTRG Honolulu, Hawaii         | 5000  |  |
| WCZA 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 Montett, Mo.             | 250d  |  |
| KSPV Artesia, N.Mex.          | 1000d |  |
| WEEB Southern Pines, N.C.     | 3000d |  |
| WEH Gallipolis, Ohio          | 1000d |  |
| WTIG Massillon, Ohio          | 250d  |  |
| KRKT Albany, Ore.             | 250d  |  |
| WIBG Philadelphia, Pa.        | 5000d |  |
| WVSC Somerset, Pa.            | 5000d |  |
| WPRM Mayaguez, P.R.           | 1000d |  |
| WLKW Providence, R.I.         | 5000  |  |
| WAKN Aiken, S.C.              | 1000d |  |
| WNOK Knoxville, Tenn.         | 1000d |  |
| KWAM Memphis, Tenn.           | 1000d |  |
| KTRM Beaumont, Tex.           | 1000  |  |
| KAML Kenedy-Karnes City, Tex. | 250d  |  |
| KNIN Wichita Falls, Tex.      | 1000d |  |
| KDYL Tooele, Utah             | 1000d |  |
| WNRV Narrows, Va.             | 5000d |  |
| WANT Richmond, Va.            | 1000d |  |

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|---------------------------|-------|--|
| <b>1000-299.8</b>         |       |  |
| WFMI Montgomery, Ala.     | 5000d |  |
| KMKO Vista, Cal.          | 1000d |  |
| WKML Blountstown, Fla.    | 1000d |  |
| WJTS Jupiter, Fla.        | 5000  |  |
| WCFL Chicago, Ill.        | 5000  |  |
| WLMS Leominster, Mass.    | 5000d |  |
| WXTN Lexington, Miss.     | 5000d |  |
| WIQT Horseheads, N.Y.     | 5000  |  |
| WKQB Garner, N.C.         | 5000  |  |
| WSPF Hickory, N.C.        | 1000d |  |
| KTKO Okla. City, Okla.    | 5000  |  |
| WICG Carlisle, Pa.        | 1000  |  |
| WKYB Hemingway, S.C.      | 5000  |  |
| WGDG Wahalla, S.C.        | 1000d |  |
| KSTA Coleman, Tex.        | 250d  |  |
| KGRI Henderson, Tex.      | 250d  |  |
| WKDE Altavista, Va.       | 1000d |  |
| WHWB Rutland, Vt.         | 1000d |  |
| WBNB Charlottesville, Va. | 1000d |  |
| KOMO Seattle, Wash.       | 5000d |  |

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|-------------------------------|-------|--|
| <b>1010-296.9</b>             |       |  |
| KCAC Phoenix, Ariz.           | 500d  |  |
| KVNC Winslow, Ariz.           | 1000  |  |
| KLRA Little Rock, Ark.        | 1000d |  |
| KCHJ Delano, Calif.           | 5000  |  |
| KCMJ Palm Sprgs., Calif.      | 1000  |  |
| KSAJ San Fran., Calif.        | 1000d |  |
| WCNU Crostville, Fla.         | 1000d |  |
| WBIX Jacksonville Beach, Fla. | 1000d |  |
| WINQ Tampa, Fla.              | 5000d |  |
| WGUN Atlanta-Decatur, Ga.     | 5000d |  |
| KATN Boise, Idaho             | 1000d |  |
| WCSI Columbus, Ind.           | 5000  |  |
| KSMN Mason City, Iowa         | 1000  |  |
| KIND Independence, Kans.      | 250d  |  |
| KOLA DeRidder, La.            | 1000d |  |
| WSDI Baltimore, Md.           | 1000d |  |

| kHx                         | Wave Length | W.P. |
|-----------------------------|-------------|------|
| WITL Lansing, Mich.         | 5000d       |      |
| WJSW Maplewood, Minn.       | 250d        |      |
| WMOX Meridian, Miss.        | 1000d       |      |
| KCHI Chillicothe, Mo.       | 250d        |      |
| KXEN Festus-St. Louis, Mo.  | 5000d       |      |
| WCNL Newport, N.H.          | 250d        |      |
| WINS New York, N.Y.         | 5000        |      |
| WABZ Albermarle, N.C.       | 1000d       |      |
| WFGW Black Mountain, N.C.   | 5000d       |      |
| WELS Kinston, N.C.          | 1000d       |      |
| WDOI New Boston, Ohio       | 1000d       |      |
| WUNS Portsmouth, Va.        | 250d        |      |
| WHIN Gallatin, Tenn.        | 1000d       |      |
| WORM Savannah, Tenn.        | 250d        |      |
| KVII Amarillo, Tex.         | 5000        |      |
| KODA Houston, Tex.          | 5000d       |      |
| KAWA Waco-Marlin, Tex.      | 1000d       |      |
| WELK Charlottesville, Va.   | 1000d       |      |
| WMEV Marion, Va.            | 1000d       |      |
| WPMH Portsmouth, Va.        | 250d        |      |
| WCST Berkeley Sprgs., W.Va. | 5000d       |      |
| WSPT Stevens Pt., Wis.      | 1000d       |      |

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|--------------------------|-------|--|
| <b>1020-293.9</b>        |       |  |
| KGBS Los Angeles, Calif. | 5000d |  |
| WCIL Carbondale, Ill.    | 1000d |  |
| WPED Peoria, Ill.        | 1000d |  |
| KWOS Roswell, N.M.       | 5000  |  |
| KDKA Pittsburgh, Pa.     | 5000d |  |

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|---------------------------|-------|--|
| <b>1030-291.1</b>         |       |  |
| WBZ Boston, Mass.         | 5000d |  |
| KCTA Corpus Christi, Tex. | 5000d |  |
| KTWO Casper, Wyo.         | 1000d |  |

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|-----------------------|-------|--|
| <b>1040-288.3</b>     |       |  |
| KHVV Honolulu, Hawaii | 5000  |  |
| WHO Des Moines, Iowa  | 5000d |  |
| KIXL Dallas, Tex.     | 1000d |  |

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|---------------------------|-------|
| 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 |
| KWSD Wasco, Calif.        | 1000d |
| WJSB Crestview, Fla.      | 1000d |
| WIVY Jacksonville, Fla.   | 1000d |
| WHBO Tampa, Fla.          | 250d  |
| WRMF Titusville, Fla.     | 500d  |
| WAUG Augusta, Ga.         | 500d  |
| WMNZ Montezuma, Ga.       | 250d  |
| WDZ Decatur, Ill.         | 1000d |
| WTOA Plymouth, Ind.       | 250d  |
| KUPK Garden City, Kan.    | 5000d |
| WNES Central City, Ky.    | 500d  |
| WVLC Lake Providence, La. | 250d  |
| KCI Shreveport, La.       | 250d  |
| KVPI Villa Platte, La.    | 1000d |
| WMGS Oakland, Md.         | 500d  |
| WQMR Silver Sprng., Md.   | 1000d |
| WPAG Ann Arbor, Mich.     | 5000d |
| KLOH Pipestone, Minn.     | 1000d |
| WACR Columbus, Miss.      | 1000d |
| WVLC Paducah, Mo.         | 1000d |
| KSCS Sedalia, Mo.         | 1000d |
| KLVLC Las Vegas, Nev.     | 500d  |
| WBNC Conway, N.H.         | 1000d |
| WSEN Baldwinville, N.Y.   | 250d  |
| WYBG Massena, N.Y.        | 1000d |
| WVLC New York, N.Y.       | 5000d |
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| kHz                        | Wave Length | W.P. | kHz                        | Wave Length | W.P. | kHz                       | Wave Length | W.P. | kHz                          | Wave Length | W.P. |
|----------------------------|-------------|------|----------------------------|-------------|------|---------------------------|-------------|------|------------------------------|-------------|------|
| KFIL Fergus Falls, Minn.   | 500d        |      | KFAB Omaha, Nebr.          | 5000d       |      | 1160—258.5                |             |      | 1230—243.8                   |             |      |
| KNLY Ord, Neb.             | 1000d       |      | WBT Charlotte, N.C.        | 5000d       |      | WJLD Chicago, Ill.        | 5000d       |      | WAUD Auburn, Ala.            | 1000        |      |
| WMAP Monroe, N.C.          | 1000d       |      | WELX Xenia, O.             | 5000d       |      | KSL Salt Lake City, Utah  | 5000d       |      | WJBB Haleyville, Ala.        | 1000        |      |
| WBYP St. Pauls, N.C.       | 250d        |      | WGOB Atoka, Okla.          | 5000        |      |                           |             |      | WBHP Huntsville, Ala.        | 1000        |      |
| WCOK Spartan, S.C.         | 250d        |      | KBNB Bend, Oreg.           | 5000        |      | 1170—256.3                |             |      | WBTG Talladega, Ala.         | 1000        |      |
| W010 Canton, O.            | 5000d       |      | WJSM Martinsburg, Pa.      | 5000d       |      | WCOV Montgomery, Ala.     | 1000d       |      | WBTC Tuscaloosa, Ala.        | 1000        |      |
| KYW Philadelphia, Pa.      | 5000d       |      | WNR Norristown, Penn.      | 5000d       |      | KJNP North Pole, Alaska   | 1000d       |      | K1FW Sitka, Alaska           | 250         |      |
| WRJS San German, P. R.     | 250         |      | WVJP Caguas, P.R.          | 250         |      | KCBQ San Diego, Calif.    | 5000d       |      | KSNB Bisbee, Ariz.           | 250         |      |
| WALD Walterboro, S. C.     | 1000d       |      | WHIM Providence, R.I.      | 1000d       |      | KLOK San Jose, Calif.     | 1000d       |      | KAAA Kingman, Ariz.          | 1000        |      |
| KGFX Pierre, S. D.         | 1000d       |      | WPHC Waverly, Tenn.        | 1000d       |      | KOH0 Honolulu, Hawaii     | 1000        |      | KRIZ Phoenix, Ariz.          | 250         |      |
| WPHC Waverly, Tenn.        | 1000d       |      | KDRY Alamo Heights, Tex.   | 1000d       |      | WLBH Mattoon, Ill.        | 250d        |      | KAT0 Safford, Ariz.          | 250         |      |
| WCRB Beckley, W. Va.       | 1000d       |      |                            |             |      | KSTT Davenport, Iowa      | 1000        |      | KCON Conway, Ark.            | 1000        |      |
| KHRB Leckhart, Tex.        | 1000d       |      | 1120—267.7                 |             |      | KVOO Tulsa, Okla.         | 5000d       |      | KFPW Ft. Smith, Ark.         | 1000        |      |
| KRSP Salt Lake City, Utah  | 1000d       |      | WUST Bethesda, Md.         | 250d        |      | WLEO Ponce, P.R.          | 250         |      | KBTM Jonesboro, Ark.         | 1000        |      |
|                            |             |      | KMOX St. Louis, Mo.        | 5000d       |      | KPUG Bellingham, Wash.    | 5000d       |      | KCON Conway, Ark.            | 1000        |      |
| 1070—280.2                 |             |      | WWOL Buffalo, N.Y.         | 1000d       |      | WVVA Wheeling, W. Va.     | 5000d       |      | KGEE Bakersfield, Calif.     | 1000        |      |
| WAPI Birmingham, Ala.      | 5000d       |      | KCLE Cleburne, Tex.        | 250d        |      | WLKE Waupun, Wis.         | 1000d       |      | KWTC Barstow, Calif.         | 1000        |      |
| KNX Los Angeles, Calif.    | 5000d       |      | 1130—265.3                 |             |      |                           |             |      | KBS Bishop, Calif.           | 1000        |      |
| WIBC Indianapolis, Ind.    | 5000d       |      | KRDU Dinuba, Calif.        | 1000        |      | 1180—254.1                |             |      | KXO El Centro, Calif.        | 250         |      |
| KILR Estherville, Iowa     | 250d        |      | KSDO San Diego, Calif.     | 5000d       |      | WLDS Jacksonville, Ill.   | 1000d       |      | KDAC Ft. Bragg, Calif.       | 250         |      |
| KFDI Wichita, Kans.        | 1000d       |      | KLEI Kailua, Hawaii        | 1000        |      | KOFI Kailispeil, Mont.    | 5000d       |      | KGFJ Los Angeles, Calif.     | 1000        |      |
| KHMO Hannibal, Mo.         | 5000        |      | KLEY Wellington, Kan.      | 250d        |      | WHAM Rochester, N.Y.      | 5000d       |      | KPLR Paso Robles, Calif.     | 1000        |      |
| WKDR Plattsburgh, N. Y.    | 5000d       |      | KWKH Shreveport, La.       | 5000d       |      | 1190—252.0                |             |      | KRDG Redding, Calif.         | 250         |      |
| WNCT Greenville, N.C.      | 1000d       |      | WCAR Detroit, Mich.        | 5000d       |      | KRDS Tolleson, Ariz.      | 250         |      | KWG Stockton, Calif.         | 1000        |      |
| WHPE High Point, N.C.      | 1000d       |      | WDGY Minneapolis, Minn.    | 5000d       |      | KMCW Augusta, Ga.         | 5000d       |      | KEXO Grand Junction, Colo.   | 1000        |      |
| WKOK Sunbury, Penn.        | 5000        |      | KBLR Bolivar, Mo.          | 250d        |      | KKBY Anaheim, Calif.      | 5000        |      | KBRK Pueblo, Colo.           | 250         |      |
| WMIA Arcadio, P. R.        | 5000        |      | WASP Brownsville, Pa.      | 5000d       |      | KNBA Vallejo, Calif.      | 250d        |      | KGEK Sterling, Colo.         | 1000d       |      |
| WHYZ Greenville, S.C.      | 5000d       |      | KBGH Memphis, Tenn.        | 1000d       |      | WGKA Atlanta, Ga.         | 1000d       |      | WINF Manchester, Conn.       | 1000        |      |
| WFLI Lookout Mtn., Tenn.   | 5000d       |      | WDTM Selmer, Tenn.         | 250d        |      | WRIP Rossville, Ga.       | 5000        |      | WGGG Gainesville, Fla.       | 1000        |      |
| WDIA Memphis, Tenn.        | 5000d       |      | KBGH Memphis, Tenn.        | 1000d       |      | WOWO Ft. Wayne, Ind.      | 5000d       |      | WONN Lakeland, Fla.          | 1000        |      |
| KOPY Alice, Tex.           | 1000        |      | WISN Milwaukee, Wis.       | 5000d       |      | WANN Annapolis, Md.       | 1000d       |      | WMAF Madison, Fla.           | 1000        |      |
| KNNN Friona, Tex.          | 5000        |      |                            |             |      | WKOX Framingham, Mass.    | 1000d       |      | WSBB New Smyrna Bch., Fla.   | 1000        |      |
| KENR Houston, Tex.         | 5000        |      | 1140—263.0                 |             |      | KPAR Albuquerque, N. M.   | 1000d       |      | WNVY Pensacola, Fla.         | 1000        |      |
| WKOW Madison, Wis.         | 1000d       |      | KRAK Sacramento, Calif.    | 5000d       |      | WLIB New York, N. Y.      | 1000d       |      | WCNH Quincy, Fla.            | 1000d       |      |
|                            |             |      | KNAB Burlington, Colo.     | 1000d       |      | WSML Graham, N. C.        | 250d        |      | WJNO W. Palm Beach, Fla.     | 250         |      |
| WKAC Athens, Ala.          | 1000d       |      | WME Miami, Fla.            | 1000d       |      | WIXE Monroe, N. C.        | 5000d       |      | WBIA Augusta, Ga.            | 1000d       |      |
| KSCO Santa Cruz, Calif.    | 1000d       |      | KGEK Boise, Idaho          | 1000d       |      | KEXX Portland, Oreg.      | 5000d       |      | WBLI Dalton, Ga.             | 1000        |      |
| WTIC Hartford, Conn.       | 5000d       |      | WSTV Pktn., Ill.           | 250d        |      | WRAI Rio Piedras, P.R.    | 500         |      | WFLI Dublin, Ga.             | 1000        |      |
| WVCG Coral Gables, Fla.    | 1000d       |      | WAWK Kendallville, Ind.    | 250d        |      | WBMJ San Juan, P.R.       | 1000d       |      | WFOM Marietta, Ga.           | 1000        |      |
| WFIV Kissimmee, Fla.       | 250         |      | KNEI Waukon, Iowa          | 250d        |      | KLIF Dallas, Tex.         | 5000d       |      | WQOK Savannah, Ga.           | 1000        |      |
| WJQT Port St. Joe, Fla.    | 1000d       |      | KBIL Liberty, Mo.          | 500d        |      | 1200—249.9                |             |      | WYAY Waverly, Ga.            | 1000        |      |
| WBIE Marietta, Ga.         | 1000d       |      | KPWB Piedmont, Mo.         | 1000d       |      | WDAI San Antonio, Tex.    | 5000d       |      | KBAR Burley, Idaho           | 1000        |      |
| WPOK Pontiac, Ill.         | 1000d       |      | KLPR Oklahoma City, Okla.  | 1000d       |      |                           |             |      | KORT Grangeville, Ida.       | 1000        |      |
| WNWI Valparaiso, Ind.      | 5000d       |      | WITA San Juan, P.R.        | 1000d       |      | 1210—247.8                |             |      | KRXK Rexburg, Idaho          | 1000        |      |
| KOAK Red Oak, Ia.          | 5000        |      | KSDO Sioux Falls, S. Dak.  | 1000d       |      | KZOO Honolulu, Hawaii     | 1000        |      | WJBC Bloomington, Ill.       | 1000        |      |
| WKLO Louisville, Ky.       | 5000        |      | KORC Mineral Wells, Tex.   | 5000d       |      | WILY Centralia, Ill.      | 1000d       |      | WQUA Moline, Ill.            | 1000        |      |
| WGOO Owosso, Mich.         | 1000d       |      | WRVA Richmond, Va.         | 5000d       |      | WKXX Saginaw, Mich.       | 1000d       |      | WHCO Sparta, Ill.            | 250         |      |
| WUFO Amherst, N.Y.         | 1000d       |      |                            |             |      | WAVE Wadesboro, N.C.      | 1000d       |      | WSAL Logansport, Ind.        | 1000        |      |
| WEUD Laurenburg, N.C.      | 5000d       |      | 1150—260.7                 |             |      | WAVI Dayton, Ohio         | 250d        |      | WTCI Tell City, Ind.         | 1000        |      |
| WWDR Murfreesboro, N.C.    | 5000d       |      | WGEA Geneva, Ala.          | 1000d       |      | KGYN Guymon, Okla.        | 1000d       |      | WBOW Terre Haute, Ind.       | 1000d       |      |
| KNDK Langdon, N.D.         | 5000        |      | WJRD Tuscaloosa, Ala.      | 5000        |      | WCAU Philadelphia, Pa.    | 5000d       |      | KFJB Marshalltown, Iowa      | 1000        |      |
| WMVR Sidney, O.            | 250d        |      | KCKY Coolidge, Ariz.       | 1000        |      | WHYD Salinas, P.R.        | 5000d       |      | WHIR Danville, Ky.           | 1000d       |      |
| KWJF Portland, Oreg.       | 5000d       |      | KCLR No. Little Rock, Ark. | 5000        |      | 1220—245.8                |             |      | WHOP Hopkinsville, Ky.       | 1000        |      |
| WEPP Pittsburgh, Pa.       | 5000d       |      | KRKD Los Angeles, Calif.   | 5000        |      | WAQY Birmingham, Ala.     | 1000d       |      | WANS Dayton, Ky.             | 1000d       |      |
| WLEY Cavey, P.R.           | 250         |      | KJAX Santa Rosa, Calif.    | 5000        |      | WABF Fairhope, Ala.       | 1000d       |      | KLIC Monroe, La.             | 1000d       |      |
| KRLD Dallas, Tex.          | 5000d       |      | KMCB Englewood, Colo.      | 1000d       |      | WABF Fairhope, Ala.       | 1000d       |      | WBOK New Orleans, La.        | 1000d       |      |
| WKBY Chatham, Va.          | 1000d       |      | WCN Middleburg, Conn.      | 1000d       |      | KVSA McGehee, Ark.        | 1000d       |      | KSL0 Opelousas, La.          | 1000d       |      |
|                            |             |      | WDEL Wilmington, Del.      | 5000        |      | KLIP Fowler, Calif.       | 250d        |      | WBME Belfast, Me.            | 250         |      |
| 1090—275.1                 |             |      | WNBD Daytona Bch., Fla.    | 1000d       |      | KIBE Palo Alto, Calif.    | 5000d       |      | WDQY Calais, Maine           | 1000        |      |
| KAAY Little Rock, Ark.     | 5000d       |      | WTMP Tampa, Fla.           | 5000d       |      | KCAR Pomona, Calif.       | 250d        |      | WSJR Madawaska, Me.          | 1000        |      |
| WQIK Jacksonville, Fla.    | 5000d       |      | WFPM Fort Valley, Ga.      | 1000d       |      | KFSC Denver, Calif.       | 1000d       |      | WTH Baltimore, Md.           | 1000        |      |
| WWSO Monticello, Fla.      | 1000d       |      | WJEM Valdosta, Ga.         | 1000d       |      | WCDQ Hamden, Conn.        | 1000d       |      | WUCM Waukegan, Md.           | 1000        |      |
| WBAF Barnesville, Ga.      | 1000d       |      | WGGH Marion, Ill.          | 5000d       |      | WDCJ Arlington, Fla.      | 1000d       |      | WMNB No. Adams, Mass.        | 1000d       |      |
| WCRA Engham, Ill.          | 1000d       |      | WYFE Chicago, Ill.         | 500d        |      | WJPB Kissimmee, Fla.      | 1000d       |      | WESX Salem, Mass.            | 1000        |      |
| WGLC Mendota, Ill.         | 250d        |      | KYND Burlington, Ia.       | 500d        |      | WOAH Miami, Fla.          | 250d        |      | WNEB Worcester, Mass.        | 1000        |      |
| KHAI Honolulu, Hawaii      | 5000        |      | KWKY Des Moines, Iowa      | 1000d       |      | WSAF Sarasota, Fla.       | 1000d       |      | WJEF Grand Rapids, Mich.     | 1000        |      |
| WFRF Ft. Wayne, Ind.       | 5000        |      | KCAL Salina, Kans.         | 5000        |      | WCBF Cambridge, Mass.     | 1000d       |      | WIKB Iron River, Mich.       | 1000d       |      |
| KNWS Waterloo, Iowa        | 1000d       |      | WMST Mt. Sterling, Ky.     | 5000        |      | WPLK Rockmart, Ga.        | 500d        |      | WMPC Lapeer, Mich.           | 1000        |      |
| WDLY Donaldsonville, La.   | 1000d       |      | WLOC Mumfordsville, Ky.    | 1000d       |      | WSFT Thomason, Ga.        | 250d        |      | WSOD St. Ste. Marie, Mich.   | 1000        |      |
| WBAL Baltimore, Md.        | 5000d       |      | WJBO Baton Rouge, La.      | 5000        |      | WLPO LaSalle, Ill.        | 1000d       |      | WSTP Tampa, Fla.             | 1000d       |      |
| WILD Boston, Mass.         | 1000d       |      | WGHM Skowhegan, Maine      | 5000d       |      | WKRS Waukegan, Ill.       | 1000d       |      | WKLK Clouet, Minn.           | 1000        |      |
| WMUS Muskegon, Mich.       | 1000d       |      | WHMC Chattanooga, Md.      | 5000d       |      | WSLM Salem, Ind.          | 5000d       |      | KGHS Internat'l Falls, Minn. | 250         |      |
| WTAK Garden City, Mich.    | 250d        |      | WCOP Boston, Mass.         | 5000        |      | KJAN Atlantic, Iowa       | 250d        |      | KYSM Mankato, Minn.          | 1000        |      |
| KXS Excelsior Springs, Mo. | 5000d       |      | WCEN Mt. Pleasant, Mich.   | 1000        |      | KOUR Independence, Iowa   | 250d        |      | KMRS Morris, Minn.           | 250         |      |
| WKTE King, N.C.            | 1000d       |      | KASM Albany, Minn.         | 1000d       |      | KOFO Ottawa, Kans.        | 250d        |      | KTRF Thief Riv. Falls, Minn. | 1000        |      |
| KTGO Tioga, N.C.           | 1000d       |      | KRMS Osage Beach, Mo.      | 1000d       |      | WFKN Franklin, Ky.        | 250d        |      | KNWO Winona, Minn.           | 1000d       |      |
| WMWM Wilmington, O.        | 1000d       |      | KSEN Shelby, Mont.         | 5000        |      | KBCI Shreveport, La.      | 250d        |      | WCMA Corinth, Miss.          | 1000        |      |
| WKSP Kingsree, S.C.        | 1000d       |      | KDEF Albuquerque, N. M.    | 5000        |      | WLB1 Denham Springs, La.  | 250d        |      | WHSY Hattiesburg, Miss.      | 1000        |      |
| WENR Englewood, Tenn.      | 1000d       |      | WRUN Middleburg, N.Y.      | 5000        |      | WSME Sanford, Maine       | 1000d       |      | WSSO Starkville, Miss.       | 1000        |      |
| WJCM Hartsport, Tenn.      | 250d        |      | WBAG Burlington, N.C.      | 1000d       |      | WBCH Hastings, Mich.      | 250d        |      | WAZF Yazoo City, Miss.       | 1000        |      |
| WKAN Kingsville, Tenn.     | 1000d       |      | WGBR Goldsboro, N.C.       | 5000        |      | WAVN Stillwater, Minn.    | 5000d       |      | KODE Joplin, Mo.             | 1000        |      |
| KANN Ogden, Utah           | 1000d       |      | WCUE Cuyahoga Falls, Ohio  | 1000d       |      | WBRD Hazlehurst, Miss.    | 250d        |      | KQWT Lebanon, Mo.            | 250         |      |
| KING Seattle, Wash.        | 5000d       |      | WIMA Lima, Ohio            | 1000d       |      | KZYM Grove Girardeau, Mo. | 5000d       |      | KELV Ely, Minn.              | 1000        |      |
| 1100—272.6                 |             |      | KNEB McAlister, Okla.      | 1000d       |      | KBHM Brandon, Minn.       | 1000d       |      | KBMN Bozeman, Mont.          | 1000d       |      |
| KFAK San Francisco, Calif. | 5000d       |      | KAGO Klamath Falls, Oreg.  | 5000d       |      | WKBK Keene, N.H.          | 1000d       |      | KHDN Hardin, Mont.           | 1000        |      |
| KREX Grand Junction, Colo. | 5000d       |      | WHUN Chattanooga, Pa.      | 5000d       |      | WGNV Newburgh, N.Y.       | 5000d       |      | KXLO Lewiston, Mont.         | 1000        |      |
| WLBB Carrollton, Ga.       | 1000d       |      | WYNS Lehighton, Pa.        | 1000d       |      | WSOQ N. Syracuse, N.Y.    | 1000d       |      | KLCB Libby, Mont.            | 1000        |      |
| WHLI Hempstead, N.Y.       | 1000d       |      | WKPA New Kensington, Pa.   | 1000d       |      | WKMT Kings Mtn., N.C.     | 1000d       |      | KTNC Falls City, Nebr.       | 1000        |      |
| WKVC Cleveland, O.         | 5000d       |      | WDIX Orangeburg, S.C.      | 5000        |      | WREY Redsville, N.C.      | 1000d       |      | KHAS Hastings, Neb.          | 1000        |      |
| WGPA Bethlehem, Pa.        | 250d        |      | WTCY Rock Hill, S.C.       | 1000d       |      | KEYD Oakes, N. Dak.       | 1000d       |      | KLAV Las Vegas, Nev.         | 250         |      |
|                            |             |      | WSMN Seneca, S.C.          | 5000        |      | WGAR Cleveland, Ohio      | 5000d       |      | KCBN Reno, Nev.              | 1000        |      |
| 1110—270.1                 |             |      | WAPQ Rapid City, S. Dak.   | 5000d       |      | WERT Van Wert, Ohio       | 250d        |      | WMOU Berlin, N. H.           | 1000d       |      |
| WBCA Bay Minette, Ala.     | 1000d       |      | WCRK Morristown, Tenn.     | 1000        |      | KBLV Goldbeach, Oreg.     | 1000d       |      | WTSV Claremont, N.H.         | 1000        |      |
| WBIB Centerville, Ala.     | 1000d       |      | WTAW Bryan, Tex.           | 1000d       |      | KAPT Salem, Oreg.         | 1000        |      | WCWC Woodmont, N.J.          | 1000        |      |
| KRLA Pasadena, Cal.        | 5000d       |      | KCTT Corpus Christi, Tex.  | 1000d       |      | WJUN Mexico, Pa.          | 1000d       |      | KALG Alamogordo, N. M.       | 1000        |      |
| KPOP Roseville, Cal.       | 5000d       |      | KIZZ El Paso, Tex.         | 1000d       |      | KRIB Providence, R.I.     | 1000d       |      | KOTS Del Rio, N. Mex.        | 1000        |      |
| WALT Tampa, Fla.           | 5000d       |      | KVIL Highland Park, Tex.   | 1000d       |      | WFLV Camden, Tenn.        | 250d        |      | KYVA Gallup, N. Mex.         | 1000        |      |
| WGKA Atlanta, Ga.          | 1000d       |      | KJBC Midland, Tex.         | 1000d       |      | WCPH Etowah, Tenn.        | 1000d       |      | KFUN Las Vegas, N. Mex.      | 250         |      |
| WEBS Calhoun, Ga.          | 250d        |      | KPNP Port Neches, Tex.     | 1000d       |      | KZEE Weatherford, Tenn.   | 250d        |      | KRSY Roswell, N. Mex.        | 1000        |      |
| KIPA Hilo, Hawaii          | 1000        |      | KOLJ Quanah, Tex.          | 5000        |      | KVLL Woodville, Tex.      | 250d        |      | WNIA Cheektowaga, N.Y.       | 500         |      |
| WMBI Chicago, Ill.         | 5000d       |      | KBER San Antonio, Tex.     | 1000d       |      | WLSB Big Stone Gap, Va.   | 1000d       |      | WENY Elmira, N.Y.            | 1000        |      |
| WKDZ Cadiz, Ky.            | 5000d       |      | KPUL Pullman, Wash.        | 1000d       |      | WFAK Falls Church, Va.    | 5000d       |      | WIGS Gouverneur, N. Y.       | 1000        |      |
| WFCC Franklinton, La.      | 1000d       |      | KAYO Seattle, Wash.        | 5000        |      | KASY Auburn, Wash.        | 250d        |      | WHIC Hudson, N. Y.           | 1000        |      |
| WUNN Mason, Mich.          | 5000d       |      | KKEY Vancouver, Wash.      | 1000d       |      | KOZY Chelan, Wash.        | 1000d       |      | WLFI Little Falls, N. Y.     | 1000        |      |
| WJML Petoskey, Mich.       | 5000d       |      | WABH Deerfield, Va.        | 1000d       |      | WNEE Wis. Rapids, Wis.    | 500d        |      | WFAS White Plains, N. Y.     | 1000        |      |
| WKRA Holly Springs, Miss.  | 1000d       |      | WELC Welch, W. Va.         | 1000d       |      |                           |             |      |                              |             |      |
|                            |             |      | WAXX Chippewa Falls, Wis.  | 5000d       |      |                           |             |      |                              |             |      |

# WHITE'S RADIO LOG

**kHz Wave Length W.P.**

WSKY Asheville, N.C. 1000  
WFAI Fayetteville, N.C. 1000  
WMFR High Point, N.C. 1000  
WISP Winston, N.C. 1000  
WNNC Newton, N.C. 1000  
WCBT Roanoke Rap., N.C. 1000  
KDIX Dickinson, N.Dak. 250  
WUBE Cincinnati, O. 1000  
WCOL Columbus, Ohio 1000  
WIRO Ironton, O. 1000  
WCWA Toledo, O. 1000  
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, Ore. 1000  
KYJC Medford, Ore. 1000  
KDKL Lakeview, Ore. 1000  
KTIO Toledo, Ore. 1000  
WBVP Beaver Falls, Pa. 1000  
WEEX Easton, Pa. 1000  
WBOB Harrisburg, Pa. 1000  
WCRO Johnstown, Pa. 1000  
WBZL Lock Haven, Pa. 1000  
WTVI Titusville, Pa. 1000  
WNIK Areibo, P.R. 1000  
WERI Westerly, R.I. 1000  
WAIM Anderson, S.C. 1000  
WOKK Columbia, S.C. 1000  
WOLS Florence, S.C. 1000  
KISD Sioux Falls, S.Dak. 1000  
WAKI McMinnville, Tenn. 1000  
KSIX Corpus Christi, Tex. 1000  
KDLK Del Rio, Tex. 250  
KNUZ Houston, Tex. 1000  
KERY Kerrville, Tex. 1000  
KWTJ Levelland, Tex. 1000  
KEEE Nacogdoches, Tex. 1000  
KOSA Odessa, Tex. 1000  
KGRO Pampa, Tex. 250  
KSEY Seymour, Tex. 1000  
KSST Sulphur Springs, Tex. 1000  
KWTX Waco, Tex. 1000  
KMOR Fort Worth, Utah 1000  
KOAL Price, Utah 1000  
WJOY Burlington, Vt. 1000  
WCVR Randolph, Vt. 1000  
WBBI Abingdon, Va. 1000  
WODI Brookneal, Va. 1000  
WCVF Clifton Forge, Va. 1000  
WVAK Fredericksburg, Va. 1000  
WNOR Norfolk, Va. 1000  
KWYZ Everett, Wash. 1000  
KSPD Spokane, Wash. 1000  
KREW Sunnyside, Wash. 1000  
WLOG Logan, W.Va. 1000  
WAPF Parkersburg, W.Va. 1000  
WHBY Appleton, Wis. 1000  
WCLO Janesville, Wis. 1000  
KWCO Wausau, Wis. 1000  
XVCO Casper, Wyo. 1000

## 1240-241.8

WEBJ Brewton, Ala. 250  
WPRN Butler, Ala. 1000  
WALA Eufula, Ala. 1000  
WOWL Florence, Ala. 1000  
WARF Jasper, Ala. 1000  
KVRD Cottonwood, Ariz. 250  
KZOW So. of Globe, Ariz. 1000  
KCVN Williams, Ariz. 1000  
KVRK Arkadelphia, Ark. 250  
KTLO Mountain Home, Ark. 1000  
WMAK Stuttgart, Ark. 250  
KPLY Crescent City, Calif. 250  
KOAD Lemoore, Cal. 250  
KMBY Monterey, Calif. 1000  
KPPC Pasadena, Calif. 1000  
KLOA Redcrest, Calif. 250  
KROY Sacramento, Calif. 1000  
KRNO San Bern Co., California 1000  
KSON San Diego, Calif. 250  
KSMA Santa Maria, Calif. 250  
KSUE Sunaville, Calif. 1000  
KRDO Colo. Springs, Colo. 1000  
KQGO Durango, Colo. 1000  
KSLV Monte Vista, Colo. 1000  
KCTR Trinidad, Colo. 250  
WWCO Waterbury, Conn. 1000  
WBGD Chipey, Fla. 1000  
WLCO Eustis, Fla. 1000  
WINK Ft. Myers, Fla. 1000  
WMBB Melbourne, Fla. 1000  
WFOY St. Augustine, Fla. 1000  
WBHB Fitzgerald, Fla. 1000  
WDUN Gainesville, Ga. 1000  
WLAG LaGrange, Ga. 1000  
WBML Macon, Ga. 1000

**kHz Wave Length W.P.**

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  
WKWJ Pocatello, Idaho 250  
WCRW Chicago, Ill. 1000  
WEDC Chicago, Ill. 1000  
WSBC Chicago, Ill. 1000  
WEBQ Harrisburg, Ill. 1000  
WTAX Springfield, Ill. 1000  
WSDR Sterling, Ill. 1000  
WHEU Anderson, Ind. 1000  
WDEC Decatur, Iowa 1000  
KWBZ Ottumwa, Iowa 1000  
KICD Spencer, Iowa 1000  
KIUL Garden City, Kans. 1000  
KAKE Wichita, Kans. 250  
WINN Louisville, Ky. 1000  
WFTM Mayville, Ky. 1000  
WPIKE Pikeville, Ky. 1000  
WFSF Somerset, Ky. 1000  
KASO Minden, La. 1000  
KANE New Iberia, La. 1000  
WCOW Lewiston, Maine 1000  
WMKR Millinocket, Me. 1000  
WCEM Cambridge, Md. 1000  
WHEJ Hagerstown, Md. 1000  
WHAJ Desorah, Iowa 250  
WOCB W. Yarmouth, Mass. 1000  
WATT Cadillac, Mich. 1000  
WCBC Cheboygan, Mich. 1000  
WJPD Ishpeming, Mich. 1000  
WJIM Lansing, Mich. 1000  
WPRF Hibbing, Minn. 1000  
WPMR Park Rapids, Minn. 1000  
WJON St. Cloud, Minn. 1000  
WMPA Aberdeen, Miss. 1000  
WGRM Greenwood, Miss. 1000  
WCGM Gulfport, Miss. 1000  
WMS Natatch, Miss. 250  
WCMO Flat River, Mo. 1000  
KODE Joplin, Mo. 1000  
KNEM Nevada, Mo. 250  
KBMV Billings, Mont. 1000  
KLTX Glasgow, Mont. 1000  
KBLL Helena, Mont. 1000  
KFOR Lincoln, Nebr. 1000  
KODY Kodak, Nebr. 1000  
KELK Elko, Nev. 1000  
WFTN Franklin, N.H. 1000  
WSNJ Bridgeton, N.J. 1000  
KAVE Carlsbad, N.Mex. 1000  
KCLV Clovis, N.Mex. 1000  
WGBR Freeport, N.Y. 1000  
WPIA Geneva, N.Y. 1000  
WJTN Jamestown, N.Y. 500  
WYOS Liberty, N.Y. 1000  
WNBZ Saranac Lake, N.Y. 1000  
WBSNY Schenectady, N.Y. 1000  
WATN Watertown, N.Y. 1000  
WPNF Brevard, N.C. 1000  
WYOK Charlotte, N.C. 1000  
WCNC Elizabeth City, N.C. 1000  
WJNC Jacksonville, N.C. 1000  
WRNC Raleigh, N.C. 1000  
KDLR Devils Lake, N.Dak. 250  
WBBW Youngstown, Ohio 1000  
WHIZ Zanesville, Ohio 1000  
KVSJ Andrews, Okla. 250  
KBEL Elk City, Okla. 1000  
KOKL Okmulgee, Okla. 1000  
KFLY Corvallis, Oreg. 1000  
KTIX Pendleton, Oreg. 1000  
KPRB Redmond, Oreg. 1000  
KOEN Roseburg, Ore. 1000  
WRTA Altoona, Pa. 1000  
WHUM Reading, Pa. 1000  
WSEW Selinsgrove, Pa. 1000  
WRAX Wilkes-Barre, Pa. 1000  
WALO Humacao, P.R. 1000  
WWON Woonsocket, R.I. 1000  
WDXK Newberry, S.C. 1000  
WDDX 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  
KYLE Alpi, Tex. 1000  
KEAN Brownwood, Tex. 1000  
KORA Bryan, Tex. 1000  
KOCA Kilgore, Tex. 1000  
KSOU Raymondville, Tex. 1000  
KCKG Sonora, Tex. 1000  
KOKX Sweetwater, Tex. 1000  
WSKI Montpelier, Vt. 1000  
WSSV Petersburg, Va. 1000  
WROD Roanoke, Va. 1000  
WTON Staunton, Va. 1000  
KXLE Ellensburg, Wash. 1000  
KGY Olympia, Wash. 1000  
WKDY Bluefield, W.Va. 1000  
WTPF Charleston, W.Va. 1000  
WDNE Elkins, W.Va. 1000  
WOMT Manitowoc, Wis. 1000  
WIBU Poyonette, Wis. 1000  
WOBT Rhinelander, Wis. 1000

**kHz Wave Length W.P.**

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. 1000  
WETU Wetumpka, Ala. 5000  
KSWW Wickenburg, Ariz. 5000  
KHIL Wilcox, Ariz. 5000  
KFAY Fayetteville, Ark. 1000  
KALO Little Rock, Ark. 1000  
KHOT Madera, Calif. 5000  
KTMS Santa Barbara, Calif. 1000  
KDHI Twenty-Nine Palms, Calif. 1000  
KMSL Ukiah, Calif. 5000  
KICM Golden, Colo. 1000  
WNER Live Oak, Fla. 1000  
WDAE Tampa, Fla. 5000  
WLYB Albany, Fla. 1000  
WYTH Madison, Fla. 1000  
WIZZ Streater, Ill. 5000  
WGL Ft. Wayne, Ind. 1000  
WRAY Princeton, Ind. 1000  
KCFI Cedar Falls, Iowa 5000  
KFKU Lawrence, Kans. 5000  
WNVN Topeka, Kans. 5000  
WLCK Scottsville, Ky. 5000  
WGUW Bangor, Maine 5000  
WARE Ware, Mass. 1000  
WXOX Bay City, Mich. 1000  
KBFR Fergus Falls, Minn. 1000  
KCUE Red Wing, Minn. 1000  
WVMA Macomb, Miss. 5000  
KBCT Houston, Mo. 1000  
WKBR Manchester, N.H. 5000  
WMTR Morristown, N.J. 5000  
WIPS Ticonderoga, N.Y. 1000  
WFAF Farmville, N.C. 5000  
WKDX Hamlet, N.C. 1000  
WBRM Ramoth, N.C. 1000  
WCHO Washington Court House, Ohio 5000  
WLEM Emporium, Pa. 1000  
WPOL Montrose, Pa. 1000  
WTAE Pittsburgh, Pa. 1000  
WNOW York, Pa. 5000  
WKMA Charleston, S.C. 5000  
WCKM Winesboro, S.C. 5000  
WKBL Covington, Tenn. 1000  
WKYZ Madisonville, Tenn. 1000  
WNNT Tazewell, Tenn. 1000  
KFTV Paris, Tex. 5000  
KPAC Port Arthur, Tex. 1000  
KUKK San Antonio, Tex. 1000  
KTFO Seminole, Tex. 1000  
KVEL Vernal, Utah 5000  
WDVA Danville, Va. 5000  
WYSR Franklin, Va. 1000  
WEER Warrenton, Va. 1000  
KWSC Pullman, Wash. 5000  
KWTW Seattle, Wash. 5000  
WEMP Milwaukee, Wis. 5000

## 1260-238.0

KPIN Casa Grande, Ariz. 1000  
KCCB Corning, Ark. 1000  
KBHC Nashville, Ark. 5000  
KGLL San Fernando, Calif. 5000  
KYA San Francisco, Calif. 5000  
KSNO Aspen, Colo. 5000  
WCRT Birmingham, Ala. 5000  
WMMM Westport, Conn. 1000  
WNRK Newark, Del. 5000  
WDDC Washington, D.C. 5000  
WFTW Fort Walton Beach, Florida 1000  
WAME Miami, Fla. 5000  
WWPF Palatka, Fla. 1000  
WHAB Baxley, Ga. 5000  
WBBK Blakely, Ga. 1000  
KGLL Baton Rouge, La. 1000  
KTEE Idaho Falls, Ida. 5000  
KWEI Weiser, Ida. 1000  
WIBV Belleville, Ill. 5000  
WFBM Indianapolis, Ind. 5000  
KFGQ Boone, Iowa 1000  
KWHK Hutchinson, Kans. 1000  
WALA Baton Rouge, La. 1000  
WEZE Boston, Mass. 5000  
WALM Albion, Mich. 5000  
WJBL Holland, Mich. 5000  
KROX Crookston, Minn. 1000  
KDUX Hutehinson, Minn. 1000  
WGVN Greenville, Miss. 5000  
WNSL Baton Rouge, Miss. 5000  
WCSA Ripley, Miss. 5000  
KGBX Springfield, Mo. 5000  
KIMB Kimball, Nebr. 1000  
WBUD Trenton, N.J. 5000  
KVSF Santa Fe, N.Mex. 1000  
WBNR Beacon, N.Y. 1000  
WNSR Syracuse, N.Y. 5000  
WGNR Asheville, N.C. 5000  
WCDJ Edenton, N.C. 1000  
WIXY Cleveland, O. 5000  
WNXT Portsmouth, Ohio 5000

**kHz Wave Length W.P.**

KWSH Wekiva-Seminole, Okla. 1000  
KMCM McMinnville, Oreg. 1000  
WWYN Erie, Pa. 5000  
WPHB Phillipsburg, Pa. 5000  
WISO Ponce, P.R. 1000  
WUUU Greenville, S.C. 5000  
WJOT Lake City, S.C. 1000  
KWYR Winner, S.Dak. 5000  
WNOO Chattanooga, Tenn. 1000  
WMCH Church Hill, Tenn. 1000  
WDKN Dickson, Tenn. 1000  
WCLC Jamestown, Tenn. 1000  
KSPD Diboll, Tex. 1000  
KPSS Fallfurris, Tex. 5000  
KWRP San Angelo, Tex. 1000  
KTUE Tulla, Tex. 1000  
KTAE Taylor, Tex. 1000  
WCHV Charlottesville, Va. 5000  
WJWJ Chattanooga, Va. 1000  
WKMQ Moses Lake, Wash. 1000  
WVWV Grafton, W.Va. 500  
WWIS Black River Falls, Wis. 1000  
WEKZ Monroe, Wis. 1000  
WOCO Oconto, Wis. 1000  
KPOW Powell, Wyo. 5000

## 1270-236.1

WGSV Guntersville, Ala. 1000  
WFMU Fairchild, Ala. 1000  
KEYR Anchorage, Alaska 1000  
KDJJ Holbrook, Ariz. 5000  
KADL Pine Bluff, Ark. 5000  
KBLC Lakeport, Calif. 5000  
KQOL Palm Desert, Cal. 5000  
KCOK Tulare, Calif. 5000  
WOGG Waukegan, Ill. 5000  
WHIY Orlando, Fla. 5000  
WNTN Tallahassee, Fla. 5000  
KWRW Cartersville, Ga. 5000  
WHYD Columbus, Ga. 5000  
WJJC Commerce, Ga. 1000  
KNDI Honolulu, Hawaii 5000  
KTFI Twin Falls, Idaho 1000  
WHEF Hartford, Ill. 5000  
WBFR Rock Island, Ill. 5000  
WCMR Elkhart, Ind. 5000  
WWCA Gary, Ind. 1000  
WGORX Madison, Ind. 1000  
KSCB Liberal, Kans. 1000  
WAIN Columbia, Ky. 1000  
WULF London, Ky. 1000  
KVCJ Winnfield, La. 1000  
WKYR Cumberland, Md. 5000  
WSPR Springfield, Mass. 5000  
WYDZ Detroit, Mich. 5000  
KWBV Rochester, Minn. 5000  
WYOM Ioka, Miss. 1000  
WLSM Jackson, Miss. 5000  
KUSN Jacksonville, Mo. 1000  
KBUS Sparks, Nev. 1000  
WTSN Dover, N.H. 5000  
WDLV Vineland, N.J. 5000  
KINN Alamogordo, N.M. 1000  
WHLN Niagara Falls, N.Y. 5000  
WDLA Walton, N.Y. 1000  
WCGC Belmont, N.C. 5000  
WPMF Smithfield, N.C. 5000  
KBOM Mandan, N.Dak. 1000  
WILE Cambridge, Ohio 1000  
KWPR Claremore, Okla. 5000  
KJAO Grants Pass, Oreg. 5000  
WLBK Lebanon, Pa. 5000  
WBHC Hampton, S.C. 1000  
KNWC Sioux Falls, S.Dak. 1000  
WLK Newport, Tenn. 5000  
KIOX Bay City, Tex. 1000  
KHEM Big Spring, Tex. 1000  
KEPS Eagle Pass, Tex. 1000  
KFJZ Fort Worth, Tex. 5000  
WTDW Newport News, Va. 1000  
WHEO Stuart, Va. 1000  
KCVL Colville, Wash. 1000  
KBAM Longview, Wash. 5000  
WRJC Mauston, Wis. 5000  
WWJC Superior, Wis. 5000  
KIML Gillette, Wyo. 5000

## 1280-234.2

WPID Piedmont, Ala. 1000  
WNPY Tallahassee, Ala. 5000  
KHEP Phoenix, Ariz. 1000  
KNBY Newport, Ark. 1000  
KOAG Arroyo Grande, Cal. 1000  
KIXF Fortuna, Cal. 5000  
KFOK Long Beach, Calif. 1000  
KCIH San Luis Obispo, Cal. 5000  
KJOY Stockton, Calif. 1000  
KTLN Livermore, Cal. 5000  
WSSX Seafood, Del. 1000  
WDSF DeFuniak Springs, Florida 5000  
WIPC Lake Wales, Fla. 1000  
WYND Sarasota, Fla. 5000  
WBNT Mason, Ga. 5000  
WHRD Anver, Ga. 5000  
WGBF Evansville, Ind. 5000  
KCOB Newton, Iowa 1000  
KSOK Arkansas City, Kans. 1000  
WCPM Cumberland, Ky. 1000

[www.americanradiohistory.com](http://www.americanradiohistory.com)



# WHITE'S RADIO LOG

**kHz Wave Length W.P.**

|                             |      |
|-----------------------------|------|
| KATL Miles City, Mont.      | 1000 |
| KYLT Missoula, Mont.        | 250  |
| KHUB Fremont, Nebr.         | 500  |
| KGFV Kearney, Nebr.         | 1000 |
| KSID Sidney, Nebr.          | 1000 |
| KORK Las Vegas, Nev.        | 1000 |
| KBET Reno, Nev.             | 1000 |
| WDOR Hanover, N.H.          | 1000 |
| WMAF Atlantic City, N.J.    | 1000 |
| KHAP Aztec, N.M.            | 1000 |
| KRRR Ruidoso, N. Mex.       | 1000 |
| KRTT Taos, N. Mex.          | 250  |
| KSIL Silver City, N. Mex.   | 1000 |
| WMBO Auburn, N.Y.           | 1000 |
| WENT Gloversville, N.Y.     | 1000 |
| WKSJ 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 |
| WMW Greeen, N.C.            | 1000 |
| WGNL Wilmington, N.C.       | 1000 |
| WAIR Winston-Salem, N.C.    | 250  |
| KGPC Grafton, N.Dak.        | 1000 |
| WNCO Ashland, O.            | 1000 |
| WOUB Athens, Ohio           | 250  |
| WDOE Springfield, Ohio      | 1000 |
| WUSJ Steubenville, Ohio     | 1000 |
| KIHN Hugo, Okla.            | 250  |
| KOCY Okla. City, Okla.      | 1000 |
| KTOW Sand Springs, Okla.    | 500  |
| KLOO Corvallis, Ore.        | 1000 |
| KWVR Enterprise, Ore.       | 250  |
| KIHR Hood River, Ore.       | 250  |
| KIRH N. Bend, Ore.          | 1000 |
| WCVI Connellsville, Pa.     | 1000 |
| 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 |
| WYFA Williamsport, Pa.      | 1000 |
| WUNA Aquadilla, P.R.        | 250  |
| WOKC Charleston, S.C.       | 1000 |
| WRHI Rock Hill, S.C.        | 1000 |
| WSSC Sumter, S.C.           | 1000 |
| KIIV Huron, S. D.           | 1000 |
| KRSD Rapid City, S. Dak.    | 1000 |
| KSCD Cleveland, Tenn.       | 1000 |
| WKRM Columbia, Tenn.        | 1000 |
| WGRV Greeneville, Tenn.     | 1000 |
| WKGK Knoxville, Tenn.       | 1000 |
| WLOK Memphis, Tenn.         | 1000 |
| WCDT Winchester, Tenn.      | 1000 |
| KWKC Abilene, Tex.          | 1000 |
| KART Austin, Tex.           | 250  |
| KAMD Corsicana, Tex.        | 1000 |
| KSET El Paso, Tex.          | 250  |
| KLKB Lubbock, Tex.          | 1000 |
| KRBA Lufkin, Tex.           | 1000 |
| KPDN Pampa, Tex.            | 250  |
| KOLE Fort Arthur, Tex.      | 1000 |
| KTVO 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.            | 250  |
| KART 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  |
| KWZY Welch, W. Va.          | 1000 |
| WLDY Ladysmith, Wis.        | 1000 |
| WRIT Milwaukee, Wis.        | 1000 |
| KSJT Kaukaunee, Wyo.        | 250  |
| KYCN Wheatland, Wyo.        | 250  |
| KWOR Worland, Wyo.          | 1000 |

## 1350-222.1

|                           |      |
|---------------------------|------|
| WELB Elba, Ala.           | 1000 |
| WGAD Gadsden, Ala.        | 5000 |
| KLYD Bakersfield, Calif.  | 1000 |
| KCKC San Bernardino, Cal. | 5000 |
| KSRO Santa Rosa, Calif.   | 5000 |
| KKAM Pueblo, Colo.        | 5000 |
| WNLK Norwalk, Conn.       | 1000 |
| WINY Putnam, Conn.        | 1000 |
| WEZY Cocoa, Fla.          | 1000 |
| WDCE Dade City, Fla.      | 1000 |
| WCAI Ft. Myers, Fla.      | 1000 |
| WBSG Blackshear, Ga.      | 500  |

**kHz Wave Length W.P.**

|                            |      |
|----------------------------|------|
| WRWH Cleveland, Ga.        | 1000 |
| WAVC Warner Robins, Ga.    | 5000 |
| KTOH Lihue, Hawaii         | 5000 |
| KRLC Lewiston, Ida.        | 5000 |
| WVCL Peoria, Ill.          | 1000 |
| WJBD Salem, Ill.           | 1000 |
| WIOU Kokomo, Ind.          | 5000 |
| KRNT Oes Moines, Iowa      | 5000 |
| KMAN Manhattan, Kans.      | 5000 |
| WLou Louisville, Ky.       | 5000 |
| WSMB New Orleans, La.      | 5000 |
| WHMI Howell, Mich.         | 500  |
| KDIO Otine City, Minn.     | 1000 |
| WCMP Pine City, Minn.      | 1000 |
| WKCU Corinth, Miss.        | 1000 |
| WKOZ Kosciusko, Miss.      | 5000 |
| KCHR Charleston, Mo.       | 1000 |
| KBRX O'Neill, Nebr.        | 1000 |
| WLNH Laconia, N.H.         | 5000 |
| WVWH Haverhill, N.J.       | 5000 |
| KABO Albuquerque, N.M.     | 1000 |
| WCBA Corning, N.Y.         | 1000 |
| WRNY Rome, N.Y.            | 500  |
| WBMS Black Mountain, N. C. | 500  |
| WHIP Mooresville, N.C.     | 1000 |
| WLLY Wilson, N.C.          | 1000 |
| KBBM Bismarck, N. D.       | 500  |
| WLSR Akron, O.             | 500  |
| WCSM Colina, Ohio          | 500  |
| WCHI Chillicothe, Ohio     | 1000 |
| KRHD Duncan, Okla.         | 250  |
| KTLQ Tahlequah, Okla.      | 1000 |
| KRVC Ashland, Ore.         | 1000 |
| KORK York, Pa.             | 5000 |
| WBBR Windboro, Pa.         | 1000 |
| WDAR Darlington, S.C.      | 1000 |
| WRGW Greenwood, S.C.       | 1000 |
| WRKM Carthage, Tenn.       | 1000 |
| KCAR Clarksville, Tex.     | 1000 |
| KTJX Jasper, Tex.          | 1000 |
| KDOR San Antonio, Tex.     | 500  |
| WBLT Beard, Va.            | 1000 |
| WFLS Fredericksburg, Va.   | 1000 |
| WNVA Norton, Va.           | 5000 |
| WAVY Portsmouth, Va.       | 5000 |
| WPDR Portage, Wis.         | 5000 |

## 1360-220.4

|                             |      |
|-----------------------------|------|
| WWBB Jasper, Ala.           | 1000 |
| WLQI Mobile, Ala.           | 5000 |
| WMFC Monroeville, Ala.      | 1000 |
| WELR Roanoke, Ala.          | 1000 |
| KRUX Glendale, Ariz.        | 3000 |
| KLVN Clarksville, Ark.      | 1000 |
| KFFA Heland, Ark.           | 1000 |
| KFIV Modesto, Cal.          | 500  |
| KRCK Ridgecrest, Calif.     | 1000 |
| KGB San Diego, Calif.       | 6000 |
| WDRG Hartford, Conn.        | 5000 |
| WOBK Jacksonville, Fla.     | 5000 |
| WKAT Miami Beach, Fla.      | 1000 |
| KWNT Water Haven, Fla.      | 1000 |
| WAZA Bainbridge, Ga.        | 1000 |
| WLAW Lawrenceville, Ga.     | 1000 |
| WMAC Metter, Ga.            | 500  |
| WIYN Rome, Ga.              | 500  |
| WLBK DeKalb, Ill.           | 1000 |
| WVMC Mt. Carmel, Ill.       | 5000 |
| WGFA Waukegan, Ill.         | 1000 |
| KHAK Cedar Rapids, Iowa     | 1000 |
| KRCB Council Bluffs, Iowa   | 1000 |
| KXGI Ft. Madison, Iowa      | 1000 |
| KSCJ Sioux City, Iowa       | 5000 |
| KBTO El Dorado, Kans.       | 500  |
| WFLW Monticello, Ky.        | 1000 |
| KDXI Mansfield, La.         | 1000 |
| KTLD Tallulah, La.          | 500  |
| WBBB Baltimore, Md.         | 5000 |
| WLYN Lynn, Mass.            | 1000 |
| WKYO Car, Mich.             | 5000 |
| WKMI Kalamazoo, Mich.       | 5000 |
| KLRS Mountaintop Grove, Mo. | 1000 |
| KICK McCook, Neb.           | 1000 |
| WNNJ Newton, N.J.           | 1000 |
| WBBZ Vineland, N.J.         | 1000 |
| WKOP Binghamton, N.Y.       | 5000 |
| WMNS Olean, N.Y.            | 1000 |
| WCHL Chapel Hill, N.C.      | 1000 |
| KEYZ Winston, N.C.          | 500  |
| WSAI Cincinnati, Ohio       | 5000 |
| WOWG Conneaut, Ohio         | 500  |
| KUIK Hillsboro, Ore.        | 5000 |
| WMCK McKeesport, Pa.        | 5000 |
| WPPA Portville, Pa.         | 1000 |
| WELP Easley, S.C.           | 1000 |
| WLCM Lancaster, S.C.        | 1000 |
| WBLG Lenoir City, Tenn.     | 1000 |
| WNAH Nashville, Tenn.       | 1000 |
| KRAY Amarillo, Tex.         | 5000 |
| KACT Andrews, Tex.          | 1000 |
| KWBA Baytown, Tex.          | 1000 |
| KRYS Corpus Christi, Tex.   | 5000 |
| KXOL Ft. Worth, Tex.        | 1000 |
| WBOB Galax, Va.             | 1000 |
| WHBG Harrisonburg, Va.      | 5000 |
| KFDR Grand Coulee, Wash.    | 5000 |
| KMO Tacoma, Wash.           | 5000 |
| WHJC Matawan, W. Va.        | 1000 |

**kHz Wave Length W.P.**

|                         |      |
|-------------------------|------|
| WMOV Ravenswood, W. Va. | 1000 |
| WBAY Green Bay, Wis.    | 5000 |
| WISV Virgna, Wis.       | 1000 |
| WMNE Menomone, Wis.     | 1000 |
| KVRS Rock Springs, Wyo. | 1000 |

## 1370-218.8

|                           |      |
|---------------------------|------|
| WBYE Calera, Ala.         | 1000 |
| KAWW Heber Springs, Ark.  | 5000 |
| KREL Corona, Cal.         | 5000 |
| KQCY Quincy, Calif.       | 5000 |
| KEEN San Jose, Calif.     | 5000 |
| KGEN Tulare, Calif.       | 1000 |
| WKMK Blountstown, Fla.    | 5000 |
| WKKE Ocala, Fla.          | 5000 |
| WCDA Pensacola, Fla.      | 5000 |
| WAXE Vero Beach, Fla.     | 5000 |
| WLOP Jesup, Ga.           | 5000 |
| WDFR Manchester, Ga.      | 1000 |
| WLOV Washington, Ga.      | 1000 |
| WPRC Lineoln, Ill.        | 1000 |
| WTTS Bloomington, Ind.    | 5000 |
| WLTH Gary, Ind.           | 1000 |
| KDTH Dubuque, Iowa        | 5000 |
| KGNO Dodge City, Kans.    | 5000 |
| KALN Iola, Kans.          | 5000 |
| WABD Ft. Campbell, Ky.    | 5000 |
| WGOH Grayson, Ky.         | 5000 |
| WTKY Tompkinsville, Ky.   | 1000 |
| KAPB Marksville, La.      | 1000 |
| WDEA Ellsworth, Me.       | 5000 |
| WMHI Braddoke Hts., Md.   | 5000 |
| WIK Leonardtown, Md.      | 1000 |
| WWM Cadillae, Mich.       | 1000 |
| WGHN Grand Haven, Mich.   | 5000 |
| KSUM Fairmont, Minn.      | 1000 |
| WMKT St. Paul, Minn.      | 5000 |
| WMGO Canton, Miss.        | 1000 |
| KWRT Boonville, Mo.       | 1000 |
| KCRV Caruthersville, Mo.  | 1000 |
| KXLF Butte, Mont.         | 1000 |
| KAWL York, Nebr.          | 5000 |
| WFEA Manchester, N.H.     | 5000 |
| WELV Ellanville, N.Y.     | 500  |
| WALK Patheogue, N.Y.      | 5000 |
| WSAY Rochester, N.Y.      | 5000 |
| WLTC Gastonia, N.C.       | 5000 |
| WTAB Tabor City, N.C.     | 5000 |
| KFJM Grand Forks, N.D.    | 1000 |
| WSPD Toledo, Ohio         | 1000 |
| KVYL Holdenville, Okla.   | 5000 |
| KAST Astoria, Ore.        | 1000 |
| WOTR Corry, Pa.           | 1000 |
| WPAZ Portstown, Pa.       | 1000 |
| WKMC Rocking Sprgs., Pa.  | 1000 |
| WIVV Viegues, P.R.        | 1000 |
| WKFD Walford, R.I.        | 500  |
| WDEF Chattanooga, Tenn.   | 5000 |
| WDXE Lawrenceburg, Tenn.  | 1000 |
| WRGS Rogersville, Tenn.   | 1000 |
| KOKE Austin, Tex.         | 1000 |
| KFRQ Longview, Tex.       | 1000 |
| KWNT Water Haven, Fla.    | 1000 |
| KSPB Salt Lake City, Utah | 1000 |
| WBTN Bennington, Vt.      | 1000 |
| WHEE Martinsville, Va.    | 5000 |
| WJWS South Hill, Va.      | 5000 |
| KPOR Quincy, Wash.        | 1000 |
| WEIF Moundsville, W. Va.  | 5000 |
| WCCN Nellisville, Wis.    | 5000 |
| KVWO Cheyenne, Wyo.       | 1000 |

## 1380-217.3

|                           |      |
|---------------------------|------|
| WRAB Arab, Ala.           | 1000 |
| WGVV Greenville, Ala.     | 1000 |
| WYSA Vernon, Ala.         | 1000 |
| KDKE N. Little Rock, Ark. | 1000 |
| KBVM Lapeaster, Calif.    | 1000 |
| KGMS Sacramento, Calif.   | 1000 |
| KSBW Sallinas, Calif.     | 1000 |
| KFLV Walsenburg, Colo.    | 1000 |
| WQWW Waukegan, Conn.      | 5000 |
| WAMS Wilmington, Del.     | 5000 |
| WLIZ Lake Worth, Fla.     | 5000 |
| WQXQ Ormond Beh., Fla.    | 1000 |
| WLCT St. Petersburg, Fla. | 1000 |
| WAOK Atlanta, Ga.         | 5000 |
| WSIZ Oeliga, Ga.          | 5000 |
| KOTI Honolulu, Hawaii     | 5000 |
| WCMC Brazil, Ind.         | 5000 |
| WKJG Ft. Wayne, Ind.      | 5000 |
| KCIM Carroll, Iowa        | 1000 |
| KCIJ Washington, Iowa     | 5000 |
| KUDL Fairway, Kan.        | 5000 |
| WMTA Central City, Ky.    | 5000 |
| WKYK Winchester, Ky.      | 5000 |
| WYMK Baton Rouge, La.     | 5000 |
| WKTJ Farmington, Me.      | 1000 |
| WPHM Port Huron, Mich.    | 1000 |
| WPLB Greenville, Mich.    | 1000 |
| KLIZ Brainerd, Minn.      | 5000 |
| KAGE Winona, Minn.        | 5000 |
| WDLI Indianapolis, Miss.  | 5000 |
| KUVR Holdrede, Nebr.      | 500  |
| WBBX Portsmouth, N.H.     | 5000 |
| WAWZ Zarephath, N.J.      | 5000 |
| WFSR Bath, N.Y.           | 5000 |
| WBXN New York, N.Y.       | 5000 |
| WLOS Asheville, N.C.      | 5000 |

**kHz Wave Length W.P.**

|                          |      |
|--------------------------|------|
| WTOB Winston-Salem, N.C. | 5000 |
| WPKO Waverly, Ohio       | 1000 |
| KSOW Lawton, Okla.       | 1000 |
| KBUS Muskogee, Okla.     | 1000 |
| KMSH Ocean Lake, Ore.    | 1000 |
| KSRV Ontario, Ore.       | 5000 |
| WACB Kittanning, Pa.     | 1000 |
| WMLP Milton, Pa.         | 1000 |
| WAYZ Waynesboro, Pa.     | 1000 |
| WNRI Woonsocket, R.I.    | 1000 |
| WAGS Bishopville, S.C.   | 1000 |
| WUGS N. Augusta, S.C.    | 1000 |
| KOTA Rapid City, S. Dak. | 5000 |
| WFCB Redfield, S. Dak.   | 5000 |
| WYSH Wysh Clinton, Tenn. | 5000 |
| WGMW Millington, Tenn.   | 1000 |
| KJET Beaumont, Tex.      | 1000 |
| KBWD Brownwood, Tex.     | 1000 |
| KCRM Crane, Tex.         | 1000 |
| KTSM El Paso, Tex.       | 5000 |
| KMUL Muleshoe, Tex.      | 1000 |
| KKOP Pleasanton, Tex.    | 1000 |
| WYSB Ruston, Tex.        | 5000 |
| WTVR Richmond, Va.       | 5000 |
| KRKO Everett, Wash.      | 5000 |
| KPEG Spokane, Wash.      | 5000 |
| WMTD Hinton, W. Va.      | 1000 |
| WBEL Beloit, Wis.        | 5000 |

## 1390-215.7

|                              |      |
|------------------------------|------|
| WHMA Anniston, Ala.          | 5000 |
| KDQW Oklawaha, Ark.          | 5000 |
| KAMO Rogers, Ark.            | 1000 |
| KGER Long Beach, Calif.      | 5000 |
| KCEY Turlock, Calif.         | 5000 |
| KFUL Denver, Colo.           | 5000 |
| KWUW Gainesville, Fla.       | 5000 |
| WISK Americus, Ga.           | 5000 |
| WNUS Chicago, Ill.           | 5000 |
| WFIW Fairfield, Ill.         | 1000 |
| WJCD Seymour, Ind.           | 1000 |
| KCLN Clinton, Iowa           | 1000 |
| KCBC Des Moines, Iowa        | 1000 |
| KNSD Concordia, Kans.        | 500  |
| WANY Albany, Ky.             | 1000 |
| WKHC Hazard, Ky.             | 1000 |
| KFRA Frankfort, Ky.          | 500  |
| WEGP Presque Isle, Me.       | 5000 |
| KJPW Waynesville, Mo.        | 1000 |
| WCAT Orange, Mass.           | 1000 |
| WPLM Plymouth, Mass.         | 5000 |
| WCER Charlotte, Mich.        | 5000 |
| KAOH Duluth, Minn.           | 500  |
| KRFO Owatonna, Minn.         | 500  |
| WROA Gulfport, Miss.         | 1000 |
| WQIC Meridian, Miss.         | 5000 |
| KJPW Waynesville, Mo.        | 1000 |
| KENN Farmington, N. Mex.     | 5000 |
| KHOB Hobbs, N. Mex.          | 5000 |
| WEOK Poughkeepsie, N.Y.      | 5000 |
| WIVR Riverhead, N.Y.         | 1000 |
| WFLB Syracuse, N.Y.          | 1000 |
| WEED Rocky Mount, N.C.       | 500  |
| WADA Shelby, N.C.            | 1000 |
| WJRY Troy, N.C.              | 500  |
| KLPM Minot, N. Dak.          | 5000 |
| WONP Bellefontaine, Ohio     | 5000 |
| WMPO Middleport, Pomeroy, O. | 5000 |
| WFMJ Youngstown, Ohio        | 5000 |
| KCRM Enid, Okla.             | 1000 |
| KSLM Salem, Ore.             | 5000 |
| WLAN Lancaster, Pa.          | 5000 |
| WRSR State College, Pa.      | 1000 |
| WISA Isabella, P.R.          | 1000 |
| WHPB Baiton, S.C.            | 5000 |
| WCSC Charleston, S.C.        | 5000 |
| KJAM Madison, S.D.           | 5000 |
| WYXI Athens, Tenn.           | 500  |
| WTJS Jackson, Tenn.          | 5000 |
| WMCT Mountain City, Tenn.    | 1000 |
| KULP El Campo, Tex.          | 500  |
| KGEC Waxahachie, Tex.        | 500  |
| OHN Logan, Utah              | 5000 |
| WEAM Arlington, Va.          | 5000 |
| WWOOD Lynchburg, Va.         | 5000 |
| WKLP Keyser, W. Va.          | 1000 |
| KBBQ Yakima, Wash.           | 1000 |

## 1400-214.2

|                            |      |
|----------------------------|------|
| WMSL Decatur, Ala.         | 1000 |
| WXAL Demopolis, Ala.       | 1000 |
| WFFA Ft. Payne, Ala.       | 1000 |
| WJLD Homewood, Ala.        | 1000 |
| WCLA Pine Bluff, Ark.      | 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 |
| WJLA Pine Bluff, Ark.      | 1000 |
| KWYN Wynne, Ark.           | 1000 |
| KPAT Berkeley, Calif.      | 1000 |
| KREO Indio, Calif.         | 250  |
| KMSD Redding, Calif.       | 250  |
| KSLS San Luis Obispo, Cal. | 250  |
| KIQI Santa Paula, Cal.     | 250  |
| KHOE Truckee, Calif.       | 1000 |
| KUKI Ukiah, Calif.         | 1000 |
| KONG Visalia, Calif.       | 1000 |



| kHz                                    | Wave Length | W.P. | kHz                              | Wave Length | W.P. | kHz                            | Wave Length | W.P. | kHz                              | Wave Length | W.P. |
|----------------------------------------|-------------|------|----------------------------------|-------------|------|--------------------------------|-------------|------|----------------------------------|-------------|------|
| KRLN Canon City, Colo.                 | 250         |      | WGAP Maryville, Tenn.            | 1000d       |      | KJST Joshua Tree, Cal.         | 1000d       |      | KCOH Houston, Tex.               | 1000d       |      |
| KOTA Delta, Colo.                      | 250         |      | WHAH Shelbyville, Tenn.          | 1000        |      | KSTN Stockton, Calif.          | 5000        |      | KLD Ogden, Utah                  | 5000        |      |
| KFTM Ft. Morgan, Colo.                 | 2500        |      | KRUN Ballinger, Tex.             | 1000        |      | WLIS Did Saybrook, Conn.       | 5000        |      | WIVE Ashland, Va.                | 1000d       |      |
| KBZZ La Junta, Colo.                   | 1000        |      | KBYG Big Springs, Tex.           | 1000        |      | WBRD Bradenton, Fla.           | 1000        |      | WVIC Clincho, Va.                | 1000d       |      |
| WSTC Stamford, Conn.                   | 1000        |      | KUNO Corpus Christi, Tex.        | 1000        |      | WDBF Delray Beach, Fla.        | 5000d       |      | KBCR Mt. Vernon, Wash.           | 5000d       |      |
| WILI Williamfite, Conn.                | 1000        |      | KILE nr. Galveston, Tex.         | 250         |      | KTVL Highgate, Fla.            | 1000d       |      | WEIR Weirton, W. Va.             | 1000        |      |
| WFTL Ft. Lauderdale, Fla.              | 1000        |      | KTFB Oakarkana, Tex.             | 250         |      | WAVO Avondale Estates, Ga.     | 1000d       |      | WBEV Beaver Dam, Wis.            | 1000d       |      |
| WIRA Ft. Pierce, Fla.                  | 1000        |      | KEBE Jacksonville, Tex.          | 1000        |      | WRBL Columbus, Ga.             | 5000        |      | 1440—208.2                       |             |      |
| WNUE Ft. Walton Beach, Fla.            | 1000d       |      | KIUN Pecos, Tex.                 | 1000        |      | WPEH Louisville, Ga.           | 5000        |      |                                  |             |      |
| WRHC Jacksonville, Fla.                | 1000d       |      | KEYE Perryton, Tex.              | 250         |      | WLET Toccoa, Ga.               | 5000d       |      | WHHY Montgomery, Ala.            | 5000        |      |
| WPRY Perry, Fla.                       | 1000        |      | KVOP Plainville, Tex.            | 1000        |      | KCCN Honolulu, Hawaii          | 5000        |      | KDOT Scottsdale, Ariz.           | 5000        |      |
| WTRR Sanford, Fla.                     | 1000        |      | KDWT Stamford, Tex.              | 1000        |      | WINI Murphysboro, Ill.         | 5000d       |      | KHOG Fayetteville, Ark.          | 1000d       |      |
| WPAS Zephyrhills, Fla.                 | 1000        |      | KTEM Temple, Tex.                | 1000        |      | WIMS Stillington City, Ind.    | 5000d       |      | KOKY Little Rock, Ark.           | 5000d       |      |
| WQSS Alma, Ga.                         | 1000        |      | KTFB Oakarkana, Tex.             | 250         |      | WOC Davenport, Iowa            | 5000        |      | KVON Napa, Cal.                  | 5000        |      |
| WSSC Elberton, Ga.                     | 1000        |      | KVOU Uvalde, Tex.                | 250         |      | KJCK Junction City, Kans.      | 1000d       |      | KPRD Rivera, Calif.              | 1000        |      |
| WNEX Macon, Ga.                        | 1000        |      | KIXX Provo, Utah                 | 250         |      | KULY Ulysses, Kans.            | 1000d       |      | KCDY Santa Maria, Calif.         | 1000        |      |
| WMGA Moultrie, Ga.                     | 1000        |      | WDOT Burlington, Vt.             | 1000        |      | WTCR Ashland, Ky.              | 5000d       |      | WBIS Bristol, Conn.              | 5000        |      |
| WCOH Newnan, Ga.                       | 1000        |      | WELK Charlottesville, Va.        | 1000d       |      | WHBN Harrodsburg, Ky.          | 1000d       |      | WLEH Lehigh Acres, Fla.          | 5000        |      |
| WOSA Savannah, Ga.                     | 1000        |      | WHHV Hillsville, Va.             | 1000        |      | WVJS Owensboro, Ky.            | 5000        |      | WABR Winter Park, Fla.           | 5000        |      |
| KART Jerome, Ida.                      | 1000        |      | WHIH Portsmouth, Va.             | 1000        |      | KPEL Lafayette, La.            | 1000        |      | WWCC Bremen, Ga.                 | 1000d       |      |
| KRPL Moscow, Ida.                      | 1000        |      | WHLF So. Boston, Va.             | 1000        |      | WBSM New Bedford, Mass.        | 5000        |      | WGIG Brunswick, Ga.              | 5000        |      |
| KIGO St. Anthony, Ida.                 | 1000        |      | WINC Winchester, Va.             | 1000        |      | WEC Pittsfield, Mass.          | 1000d       |      | KVWG Cochrán, Ga.                | 5000        |      |
| KSPT Sandpoint, Idaho                  | 1000        |      | KEDO Longview, Wash.             | 1000        |      | WAMM Flint, Mich.              | 1000d       |      | WRA Anna, Ill.                   | 5000        |      |
| WDWS Champaign, Ill.                   | 1000        |      | KRSC Othello, Wash.              | 250         |      | WKPR Kalamazoo, Mich.          | 1000d       |      | WIOK Normal, Ill.                | 1000        |      |
| WGIL Evansburg, Ill.                   | 1000        |      | KTNT Tacoma, Wash.               | 1000        |      | KTOE Mankato, Minn.            | 5000        |      | WPRS Paris, Ill.                 | 1000d       |      |
| WROZ Evansville, Ind.                  | 1000        |      | WBOY Clarkesburg, W. Va.         | 1000        |      | WSUH Oxford, Miss.             | 1000d       |      | WGMG Quincy, Ill.                | 5000        |      |
| WBAT Marion, Ind.                      | 1000        |      | WRDN Ronceverte, W. Va.          | 1000        |      | WQBC Vicksburg, Miss.          | 1000        |      | WRCK Rockford, Ill.              | 5000        |      |
| KODG Centerville, Ia.                  | 1000        |      | WVRG Spencer, W. Va.             | 1000        |      | WGGG Wiggins, Miss.            | 5000        |      | KPGH Portland, Ind.              | 5000        |      |
| KVFD Fort Dodge, Iowa                  | 250         |      | WKWK Wheeling, W. Va.            | 1000        |      | WBDN New N. C.                 | 5000        |      | KGHE Cherokee, Iowa              | 5000        |      |
| KVOE Emporia, Kans.                    | 1000        |      | WSTH Williamston, W. Va.         | 1000        |      | WDDY Gloucester, Va.           | 1000d       |      | KEMI Topeka, Kans.               | 5000        |      |
| KAYS Hays, Kans.                       | 1000        |      | WATW Ashland, Wis.               | 1000        |      | KSYX Santa Rosa, N. Mex.       | 1000d       |      | KWDS Glasgow, Ky.                | 1000d       |      |
| WCYN Cynthiahna, Ky.                   | 250         |      | WBIZ Eau Claire, Wis.            | 1000        |      | WALY Herkimer, N.Y.            | 1000d       |      | WPDE Paris, Ky.                  | 1000        |      |
| WIEL Elizabethtown, Ky.                | 1000        |      | WDUZ Green Bay, Wis.             | 1000        |      | WACK Newark, N.Y.              | 500         |      | WEZJ Williamsburg, Ky.           | 1000d       |      |
| WFTG London, Ky.                       | 250         |      | WRJN Racine, Wis.                | 1000        |      | WLNA Peckskill, N.Y.           | 1000d       |      | KMLB Monroe, La.                 | 5000        |      |
| WFRP Hammond, La.                      | 1000        |      | WRDB Redsburg, Wis.              | 1000        |      | WMYN Mayodon, N.C.             | 500         |      | WJAB Westbrook, Me.              | 5000d       |      |
| KADK Lake Charles, La.                 | 1000        |      | WRIG Wausau, Wis.                | 1000d       |      | WGAS S. Gastonia, N.C.         | 5000        |      | WAAB Worcester, Mass.            | 5000        |      |
| KWDD Augusta, Maine                    | 1000d       |      | KOTI Cooper, Wyo.                | 1000        |      | WHBN Erie, Tenn.               | 1000        |      | WBCM Bay City, Mich.             | 1000        |      |
| WIDE Biddeford, Maine                  | 1000        |      | KODI Cody, Wyo.                  | 1000        |      | WHK Cleveland, Ohio            | 1000d       |      | WDOT Dowagiac, Mich.             | 1000d       |      |
| WMCS Machias, Me.                      | 1000d       |      | 1410—212.6                       |             |      | KYNG Coos Bay, Oreg.           | 1000        |      | WCHB Inkster, Mich.              | 5000        |      |
| WMIN Baltimore, Md.                    | 1000        |      | WUNI Mobile, Ala.                | 5000        |      | WCOJ Coatesville, Pa.          | 5000        |      | KORS Golden Valley, Minn.        | 5000d       |      |
| WALE Fall River, Mass.                 | 1000        |      | WRCK Tuscumbia, Ala.             | 5000d       |      | WCEB - DuBois, Pa.             | 5000        |      | KEYL Long Prairie, Minn.         | 1000        |      |
| WLLH Lowell, Mass.                     | 1000        |      | KTCS Fort Smith, Ark.            | 1000        |      | WEUC Ponce, P.R.               | 1000        |      | WHHT Lucedale, Miss.             | 1000d       |      |
| WHMP Northampton, Mass.                | 1000        |      | KERN Bakersfield, Calif.         | 1000        |      | WCRE Cherau, S.C.              | 1000d       |      | WSEL Pontotoc, Miss.             | 1000d       |      |
| WKFR Battle Creek, Mich.               | 1000        |      | KRML Carmel, Calif.              | 5000        |      | KABR Aberdeen, S.D.            | 1000        |      | WMVB Millville, N.J.             | 1000d       |      |
| WLB Detroit, Mich.                     | 1000d       |      | KKOK Lamoc, Calif.               | 5000        |      | WKBK Pulaski, Tenn.            | 5000        |      | WBAW Babylon, N.Y.               | 1000        |      |
| WHDF Houghton, Mich.                   | 250         |      | KMYC Marysville, Calif.          | 5000        |      | KFYB Bonham, Tex.              | 250d        |      | WJLJ Niagara Falls, N.Y.         | 1000        |      |
| WGON Munising, Mich.                   | 1000        |      | KCAL Redlands, Cal.              | 5000        |      | KLFB Lubbock, Tex.             | 5000        |      | WSGO Oswego, N.Y.                | 1000d       |      |
| WSAM Saginaw, Mich.                    | 1000        |      | KCOL Ft. Collins, Colo.          | 1000        |      | KTRE Lufkin, Tex.              | 1000        |      | WBLA Elizabethtown, N.C.         | 1000        |      |
| WSJM St. Joseph, Mich.                 | 1000        |      | WPOP Hartford, Conn.             | 5000        |      | KGNB New Braunfels, Tex.       | 1000        |      | WBUV Lexington, N.C.             | 5000        |      |
| WTCM Traverse City, Mich.              | 1000        |      | WDOV Dover, Del.                 | 5000        |      | KPEP San Angelo, Tex.          | 1000        |      | KILO Grand Forks, N.D.           | 1000        |      |
| KEYL Long Prairie, Minn.               | 1000        |      | WMYR Fort Myers, Fla.            | 5000        |      | WWSR St. Albans, Vt.           | 1000        |      | WHHH Warren, Ohio                | 5000        |      |
| KMHL Marshall, Minn.                   | 1000        |      | WZST Leesburg, Fla.              | 1000d       |      | WDDY Gloucester, Va.           | 1000d       |      | KMED Medford, Oreg.              | 5000        |      |
| WMIN Mpls.-St. Paul, Minn.             | 1000        |      | WONS Tallahassee, Fla.           | 5000d       |      | WKCW Warrenton, Va.            | 5000d       |      | KODL The Dalles, Oreg.           | 1000        |      |
| WHLB Virginia, Minn.                   | 1000        |      | WGRI Griffin, Ga.                | 1000d       |      | KITI Chehalis-Centralia, Wash. | 1000d       |      | WCDP Carbondale, Pa.             | 5000d       |      |
| WBIP Booneville, Miss.                 | 1000        |      | WSNE Cummings, Ga.               | 1000d       |      | KREN Renton, Wash.             | 5000        |      | WNVP Lansdale, Pa.               | 5000        |      |
| WNAG Grenada, Miss.                    | 1000        |      | WDXA McRae, Ga.                  | 1000d       |      | KUJ Walla Walla, Wash.         | 5000        |      | WQCB Red Lion, Pa.               | 1000d       |      |
| WFOR Hattiesburg, Miss.                | 1000        |      | WLAQ Rome, Ga.                   | 1000        |      | WPLJ Plymouth, Wis.            | 5000        |      | WGOK Greenville, S.C.            | 5000        |      |
| WQJS Jackson, Miss.                    | 1000        |      | WRMN Elgin, Ill.                 | 1000        |      | 1430—209.7                     |             |      | WZYX Cowan, Tenn.                | 1000d       |      |
| WMGO Macon, Mich.                      | 1000        |      | WTRM Taylorville, Ill.           | 1000d       |      | WFHK Pull City, Ala.           | 1000d       |      | WHDM McKenzie, Tenn.             | 5000        |      |
| KFRU Columbia, Mo.                     | 1000        |      | WAZY Lafayette, Ind.             | 1000d       |      | KHBM Monticello, Ark.          | 1000        |      | KPUR Amarillo, Tex.              | 5000        |      |
| KJCF Festus, Mo.                       | 1000        |      | KGRN Grinnell, Iowa              | 5000        |      | KOSI Aurora, Cal.              | 5000        |      | KYS Corraux Christi, Tex.        | 1000        |      |
| KSIM Sikaston, Mo.                     | 1000        |      | KLEM LeMars, Iowa                | 1000d       |      | KAMP El Centro, Calif.         | 1000        |      | KDNT Denton, Tex.                | 5000        |      |
| KTTS Springfield, Mo.                  | 1000        |      | KCLO Leavenworth, Kans.          | 5000d       |      | KARM Fresno, Calif.            | 5000        |      | KGVJ Greenville, Tex.            | 1000        |      |
| KDRG Deer Lodge, Mont.                 | 250         |      | KWBB Wichita, Kans.              | 5000        |      | KALI San Gabriel, Calif.       | 5000        |      | KWEL Midland, Tex.               | 5000d       |      |
| KXGN Glendive, Mont.                   | 250         |      | WLBJ Bowling Green, Ky.          | 5000        |      | KJAY Sacramento, Calif.        | 5000        |      | KETX Livingston, Tex.            | 5000d       |      |
| KARB Great Falls, Mont.                | 1000        |      | KWBK Bowling Green, Ky.          | 5000        |      | KGNU Santa Clara, Cal.         | 5000        |      | WKLV Blackstone, Va.             | 5000d       |      |
| KBBB Ainsworth, Neb.                   | 1000        |      | KDBS Alexandria, La.             | 1000d       |      | KOSA Aurora, Colo.             | 5000        |      | WHRN Herndon, Va.                | 5000        |      |
| KCOW Alliance, Nebr.                   | 1000        |      | WHAG Halfway, Md.                | 1000d       |      | WIII Homestead, Fla.           | 5000        |      | KNC Kansas City, Mo.             | 5000d       |      |
| KLIN Lincoln, Neb.                     | 1000        |      | WOKW Brockton, Mass.             | 1000d       |      | WLAK Lakeland, Fla.            | 5000        |      | WHIS Bluefield, W. Va.           | 5000        |      |
| KBNI Henderson, Nev.                   | 250         |      | WGRD Grand Rap., Mich.           | 1000        |      | WPCF Panama City, Fla.         | 5000        |      | WAJR Morgantown, W. Va.          | 5000        |      |
| KWNA Winnemucca, Nev.                  | 1000        |      | KLFD Litchfield, Minn.           | 5000        |      | WGFS Covington, Ga.            | 1000d       |      | WNFL Green Bay, Wis.             | 5000        |      |
| WBRL Berlin, N.H.                      | 250         |      | KRWB Roseau, Minn.               | 1000        |      | WRCD Dalton, Ga.               | 1000d       |      | 1450—206.8                       |             |      |
| WTSL Hanover, N.H.                     | 250         |      | WDSB Roseland, N.J.              | 5000        |      | WGSJ Tifton, Ga.               | 5000        |      | WDNG Aniston, Ala.               | 1000        |      |
| WLTN Littleton, N.H.                   | 250         |      | WBKN Newton, Mass.               | 5000        |      | WEEF Highland Park, Ill.       | 5000        |      | WYAM Bessemer, Ala.              | 1000        |      |
| KTRC Santa Fe, N.M.                    | 1000        |      | KNOP N. Platte, Neb.             | 1000d       |      | WCMY Ottawa, Ill.              | 5000        |      | WDIG Dothan, Ala.                | 1000        |      |
| KCHS Truth or Consequences, New Mexico | 250         |      | WHTG Asbury Park-Eatontown, N.J. | 5000        |      | WIRE Indianapolis, Ind.        | 5000        |      | WPIX Huntsville, Ala.            | 1000d       |      |
| KTNM Tucumcari, N.M.                   | 1000        |      | WDOE Dunkirk, N.Y.               | 1000        |      | KASI Ames, Iowa                | 1000d       |      | WLAY Muscle Shoals City, Alabama | 1000        |      |
| WOND Pleasantville, N.J.               | 1000        |      | WELM Elmira, N.Y.                | 1000        |      | KMRC Morgan City, La.          | 5000        |      | KLAM Cordova, Alaska             | 250         |      |
| WABY Albany, N.Y.                      | 1000        |      | WBEA Glens Falls, N. Y.          | 1000d       |      | WNAV Annapolis, Md.            | 5000        |      | KAWT Douglas, Ariz.              | 250         |      |
| WYSL Buffalo, N.Y.                     | 1000        |      | WOTW Watertown, N.Y.             | 5000        |      | WTTT Antietam, Mass.           | 5000d       |      | KNOT Prescott, Ariz.             | 5000        |      |
| WSLB Ogdenburg, N.Y.                   | 1000        |      | WYCB Shalotte, N.C.              | 5000        |      | WHIL Newell, Mass.             | 5000d       |      | KVSL Show Low, Ariz.             | 1000        |      |
| WBMA Beaufort, N.C.                    | 250         |      | WEGO Concord, N.C.               | 1000d       |      | WION Ionia, Mich.              | 5000d       |      | KENA Mena, Ariz.                 | 250         |      |
| WGBG Greensboro, N.C.                  | 1000        |      | WSRC Durham, N.C.                | 1000        |      | WBRB Mt. Clemens, Mich.        | 5000        |      | KJWH Camden, Ark.                | 1000d       |      |
| WSHC Raeford, N.C.                     | 1000        |      | WING Dayton, Ohio                | 5000        |      | WLAU Laurel, Miss.             | 5000d       |      | KYOR Blythe, Cal.                | 1000        |      |
| WSIC Statesville, N.C.                 | 1000        |      | KPAM Portland, Oreg.             | 5000d       |      | KAOL Carrollton, Mo.           | 5000        |      | KAVA Burey, Cal.                 | 5000        |      |
| WLSE Walling, N.C.                     | 1000        |      | KWLN Newland, N.C.               | 5000d       |      | WIL St. Louis, Mo.             | 5000        |      | KOWN Escondido, Calif.           | 250         |      |
| WHCC Waynesville, N.C.                 | 1000        |      | KOV Pittsburgh, Pa.              | 5000        |      | KRGJ Grand Island, Nebr.       | 5000        |      | KPAL Palm Springs, Cal.          | 1000        |      |
| WSMY Weldon, N.C.                      | 1000d       |      | WPCC Clinton, S.C.               | 1000d       |      | WNLJ Newland, N.C.             | 5000d       |      | KTP Palmdale, Calif.             | 5000        |      |
| KEYJ Jamestown, N. Dak.                | 1000        |      | WYMB Martin, S.C.                | 1000d       |      | KGFL Roswell, N.M.             | 5000d       |      | KSL San Francisco, Cal.          | 1000        |      |
| WMAN Mansfield, Ohio                   | 1000d       |      | WYMT Manning, Tenn.              | 1000        |      | WENE Endicott, N.Y.            | 5000        |      | KVNL Sonora, Calif.              | 1000        |      |
| WPAY Portsmouth, Ohio                  | 1000        |      | KBAD Athens, Tex.                | 5000        |      | WMNC Morgantown, N.C.          | 5000        |      | KVEN Ventura, Calif.             | 1000        |      |
| KWON Bartlesville, Okla.               | 1000        |      | KLBW Bowie, Tex.                 | 5000        |      | WDJS Mt. Olive, N.C.           | 1000d       |      | KZIN Yuba City, Calif.           | 100         |      |
| KTMG McAlester, Okla.                  | 250         |      | KXLB Beland, Tex.                | 5000        |      | WRXO Roxboro, N.C.             | 1000d       |      | KGIW Alamosa, Colo.              | 1000        |      |
| KNOR Norman, Okla.                     | 250         |      | KXIT Daltart, Tex.               | 5000        |      | WFOB Fosteria, Ohio            | 1000        |      | KYVO Greeley, Colo.              | 1000        |      |
| KPTN Central Point, Ore.               | 250         |      | KDOX Marshall, Tex.              | 500         |      | KALV Alva, Okla.               | 500         |      | WNAE Bridgeport, Conn.           | 1000        |      |
| KNND Cottage Grove, Oreg.              | 1000d       |      | KRIG Odessa, Tex.                | 1000        |      | KELI Tulsa, Okla.              | 5000        |      | WILM Wilmington, Del.            | 1000        |      |
| KJDY, John Day, Ore.                   | 1000        |      | KBAL San Saba, Tex.              | 5000        |      | KGAY Salem, Oreg.              | 5000d       |      | WOL Washington, D. C.            | 1000        |      |
| WEST Easton, Pa.                       | 1000        |      | KNAL Victoria, Tex.              | 500         |      | KVNL Altona, Pa.               | 5000        |      | WJJB Brooksville, Fla.           | 250         |      |
| WJET Erie, Pa.                         | 1000        |      | WIKI Chester, Va.                | 5000d       |      | WNL Caguan, P. R.              | 5000        |      | WMFJ Daytona Beach, Fla.         | 1000        |      |
| WFEO Harrisburg, Pa.                   | 1000        |      | WRIS Richmond, Va.               | 5000d       |      | WBRL Batesburg, S.C.           | 5000        |      | WCNN Miami, Fla.                 | 250         |      |
| WWSF Lordsburg, N.M.                   | 250         |      | WDS Charleston, W. Va.           | 1000d       |      | WATP Marion, S.C.              | 1000        |      | WBSR Pensacola, Fla.             | 1000        |      |
| WICK Scranton, Pa.                     | 1000        |      | WKBH LaCrosse, Wis.              | 5000        |      | WBUG Newburg, S.C.             | 5000d       |      | WSPR Paradise, Fla.              | 1000        |      |
| WRAX Williamsport, Pa.                 | 1000        |      | KWYO Sheridan, Wyo.              | 1000        |      | KBRK Brookings, S. Dak.        | 1000d       |      | WSTU Stuart, Fla.                | 250         |      |
| WVOZ Carolina, P. R.                   | 500         |      | 1420—211.1                       |             |      | WJBE Knoxville, Tenn.          | 1000d       |      | WTAL Tallahassee, Fla.           | 1000        |      |
| WCOS Columbia, S.C.                    | 1000        |      | WACT Tuscaloosa, Ala.            | 5000d       |      | WENO Madison, Tenn.            | 5000        |      | WGPC Albany, Ga.                 | 1000        |      |
| WGTS Georgetown, S.C.                  | 1000        |      | KHFF Sierra Vista, Ariz.         | 1000        |      | WHER Memphis, Tenn.            | 1000        |      | WBHF Cartersville, Ga.           | 1000        |      |
| WHCO Spartanburg, S.C.                 | 1000        |      | KXOW Hot Springs, Ark.           | 1000        |      | KSTB Breckenridge, Tex.        | 1000d       |      | WCON Cornelia, Ga.               | 250         |      |
| WBJM Lemmon, S.D.                      | 1000        |      | KPCO Pocatonto, Ark.             | 1000d       |      | KESB Gladewater, Tex.          | 1000d       |      | WKEU Griffin, Ga.                | 1000        |      |
| WJZM Clarksville, Tenn.                | 1000        |      | KRDO Colo. Sprgs., Colo.         | 1000        |      |                                |             |      | WMVG Milledgeville, Ga.          | 1000        |      |
| WHUB Cookeville, Tenn.                 | 1000        |      |                                  |             |      |                                |             |      |                                  |             |      |
| WLSB Copperhill, Tenn.                 | 1000        |      |                                  |             |      |                                |             |      |                                  |             |      |

# WHITE'S RADIO LOG

| kHx                            | Wave Length | W.P. |
|--------------------------------|-------------|------|
| WBYG Savannah, Ga.             | 1000        |      |
| WVLD Valdosta, Ga.             | 1000        |      |
| WVSI 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         |      |
| WXVW Jeffersonville, Ind.      | 1000        |      |
| WASK Lafayette, Ind.           | 1000        |      |
| WVJ Vincennes, Ind.            | 1000        |      |
| KLWW Cedar Rapids, Ia.         | 250         |      |
| KYET Payette, Ida.             | 250         |      |
| KWBW Hutchinson, Kans.         | 1000        |      |
| WTCO Campbellville, Ky.        | 1000        |      |
| WXLX Manchester, Ky.           | 1000        |      |
| WPAD Paducah, Ky.              | 1000        |      |
| WLCS W. Liberty, Ky.           | 1000        |      |
| KICG-Crowley, La.              | 1000        |      |
| KNOC Natchitoches, La.         | 1000        |      |
| WNPS New Orleans, La.          | 250         |      |
| WLKN Lincoln, La.              | 1000        |      |
| WRKD Rockland, Maine           | 250         |      |
| WTQT South Paris, Maine        | 1000        |      |
| WTBO Cumberland, Md.           | 1000        |      |
| KTHU Thurmont, Md.             | 100         |      |
| WNAS Springfield, Mass.        | 1000        |      |
| WATZ Alpena Township, Michigan | 1000        |      |
| WHTC Holland, Mich.            | 1000        |      |
| WMIQ Iron Mtn., Mich.          | 250         |      |
| WIBM Jackson, Mich.            | 1000        |      |
| WBLA Ludington, Mich.          | 1000        |      |
| KHBY Newberry, Mich.           | 1000        |      |
| WHLN Port Huron, Mich.         | 1000        |      |
| KATE Albert Lea, Minn.         | 250         |      |
| KBUN Bemidji, Minn.            | 1000        |      |
| KBMW Wahpeton, N.D.            | 1000        |      |
| Breckinridge, Minn.            | 1000        |      |
| WELY Ely, Minn.                | 1000        |      |
| KIAM 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        |      |
| WFRD Fredricktown, Mo.         | 1000        |      |
| WMBH Joplin, Mo.               | 1000        |      |
| KIRX Kirksville, Mo.           | 1000        |      |
| KOKO Warrensburg, Mo.          | 1000        |      |
| KWPM West Plains, Mo.          | 1000        |      |
| KXXL Bozeman, Mont.            | 1000        |      |
| KUJI Great Falls, Mont.        | 1000        |      |
| KGMV Missoula, Mont.           | 1000        |      |
| 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        |      |
| KSCB New Brunswick, N.J.       | 1000        |      |
| KRZY Allentown, N.M.           | 1000        |      |
| KLMX Clayton, N.Mex.           | 1000        |      |
| KOBE Las Cruces, N.Mex.        | 250         |      |
| KENM Portales, N.Mex.          | 1000        |      |
| WCIL Corning, N.Y.             | 1000        |      |
| WVSC Glen Falls, N.Y.          | 1000        |      |
| WHDL Olean, N.Y.               | 1000        |      |
| WKIP Poughkeepsie, N. Y.       | 1000        |      |
| WKAL Rome, N.Y.                | 1000        |      |
| WATA Boone, N.C.               | 1000        |      |
| WGNB Gastonia, N.C.            | 1000        |      |
| WIZS Henderson, N.C.           | 1000        |      |
| WHKP Hendersonville, N.C.      | 1000        |      |
| WHIT New Bern, N.C.            | 1000        |      |
| KSPB Spring Hill, N.C.         | 1000        |      |
| KGCA Rugby, N.D.               | 250         |      |
| WJER Dover, Ohio               | 1000        |      |
| WMOH Hamilton, Ohio            | 1000        |      |
| WLEH Sandusky, Ohio            | 1000        |      |
| KLHW Altus, Okla.              | 1000        |      |
| KGFF Shawnee, Okla.            | 1000        |      |
| KSPB Woodward, Okla.           | 1000        |      |
| KEED Eugene, Ore.              | 1000        |      |
| KFLW Klamath Falls, Ore.       | 1000        |      |
| KLBM La Grande, Ore.           | 1000        |      |
| KBPS Portland, Ore.            | 250         |      |
| WGOE Erie, Pa.                 | 1000        |      |
| WFRP Franklin, Pa.             | 1000        |      |
| WDAD Indiana, Pa.              | 1000        |      |
| WPAH Potomac, Pa.              | 1000        |      |
| WMPJ St. Williamsport, Pa.     | 1000        |      |
| WMAJ State College, Pa.        | 1000        |      |
| WJPA Washington, Pa.           | 250         |      |
| WCPR Coamo, P.R.               | 1000        |      |
| WWRJ W. Warwick, R.I.          | 1000        |      |
| WQSN Charleston, S.C.          | 1000        |      |
| WCRS Greenwood, S.C.           | 1000        |      |
| WMBY Myrtle Beach, S.C.        | 1000        |      |

| kHx                            | Wave Length | W.P. |
|--------------------------------|-------------|------|
| WHSC Hartsville, S.C.          | 1000        |      |
| KBFS Belle Fourche, S. Dak.    | 1000        |      |
| KYNT Yankton, S. D.            | 1000        |      |
| WLAR Athens, Tenn.             | 1000        |      |
| WNOC Chattanooga, Tenn.        | 1000        |      |
| WDSG Dyersburg, Tenn.          | 1000        |      |
| WSMG Greeneville, Tenn.        | 1000        |      |
| WLAF LaFollette, Tenn.         | 1000        |      |
| WGNB Murfreesboro, Tenn.       | 1000        |      |
| KAYC Beaumont, Tex.            | 1000        |      |
| KBCN Carrizo Sprgs., Tex.      | 250         |      |
| KCMJ Gonzales, Tex.            | 250         |      |
| KCYL Lampasas, Tex.            | 1000        |      |
| KMHT Marshall, Tex.            | 1000        |      |
| KAMT McCombs, Tex.             | 1000        |      |
| KNET Palestine, Tex.           | 250         |      |
| KSNY Snyder, Tex.              | 1000        |      |
| KURA Moab, Utah                | 1000        |      |
| EFVY Provo, Utah               | 250         |      |
| KDXU Salt Lake City, Utah      | 1000        |      |
| WNSO Barre, Vt.                | 1000        |      |
| WTSA Brattleboro, Vt.          | 1000        |      |
| WFTF Front Royal, Va.          | 1000        |      |
| WENZ Highland Springs, Va.     | 1000        |      |
| WREL Lexington, Va.            | 1000        |      |
| WMAA Martinsville, Va.         | 1000        |      |
| WLPN Suffolk, Va.              | 1000        |      |
| KBKW Aberdeen, Wash.           | 1000        |      |
| KCLX Colfax, Wash.             | 1000        |      |
| KONP Port Angeles, Wash.       | 250         |      |
| KAPY Puyallup, Wash.           | 1000        |      |
| WPAP Parkersburg, W. Va.       | 1000        |      |
| KFID Fond du Lac, Wis.         | 1000        |      |
| WDLB Marshfield, Wis.          | 1000        |      |
| WRCD Richland Center, Wis.     | 1000        |      |
| KBSB Buffalo, Wyo.             | 250         |      |
| KVOV Riverton, Wyo.            | 1000        |      |
| WFMH Cullman, Ala.             | 5000        |      |
| WPXN Phenix City, Ala.         | 5000        |      |
| KZOT Marianna, Ark.            | 500         |      |
| KCCP Paris, Ark.               | 500         |      |
| KTYM Ingleswood, Calif.        | 5000        |      |
| KSLN Salinas, Calif.           | 1000        |      |
| KVRE Santa Rosa, Calif.        | 1000        |      |
| KYSN Colo. Sprgs., Colo.       | 1000        |      |
| WBAR Bartow, Fla.              | 1000        |      |
| WZEP DeFuniak Springs, Florida | 1000        |      |
| WMBR Jacksonville, Fla.        | 5000        |      |
| WVYZ Buford, Ga.               | 5000        |      |
| KDBR Columbus, Kans.           | 1000        |      |
| WRVK Mt. Vernon, Ky.           | 500         |      |
| WXOK Batong Rouge, La.         | 500         |      |
| KBSF Springfield, La.          | 1000        |      |
| WEMD Easton, Md.               | 1000        |      |
| WBET Brockton, Mass.           | 5000        |      |
| WBRN Big Rapids, Mich.         | 1000        |      |
| WFOH Pontiac, Mich.            | 1000        |      |
| KDWA Hastings, Minn.           | 1000        |      |
| KDMA Montevideo, Minn.         | 1000        |      |
| WELZ Belzoni, Miss.            | 1000        |      |
| KWAZ Moss Point, Miss.         | 1000        |      |
| KIRL St. Charles, Mo.          | 5000        |      |
| KRNY Kearney, Nebr.            | 5000        |      |
| KENO Las Vegas, Nev.           | 5000        |      |
| WJZ Mt. Holly, N.J.            | 1000        |      |
| WOKO Albany, N.Y.              | 5000        |      |
| WVOX New Rochelle, N.Y.        | 5000        |      |
| WHCC Rochester, N.Y.           | 5000        |      |
| WAKS Fuquay Springs, N. C.     | 1000        |      |
| WRKB Kannapolis, N.C.          | 5000        |      |
| WMMH Marshall, N.C.            | 5000        |      |
| WBNS Columbus, Ohio            | 5000        |      |
| WPVL Painesville, O.           | 1000        |      |
| KROW Dallas, Ore.              | 5000        |      |
| KELR El Reno, Okla.            | 5000        |      |
| WMBR Amarillo, Okla.           | 5000        |      |
| WCMR Harrisburg, Pa.           | 5000        |      |
| WFSB San Sebastian, P.R.       | 1000        |      |
| WBCU Union, P.R.               | 1000        |      |
| WJAK Jackson, Tenn.            | 5000        |      |
| WEEN Lafayette, Tenn.          | 1000        |      |
| KBRZ Freeport, Tex.            | 5000        |      |
| KRME Hondo, Tex.               | 5000        |      |
| KLLL Lubbock, Tex.             | 1000        |      |
| WACO Waco, Tex.                | 1000        |      |
| WPRW Manassas, Va.             | 5000        |      |
| WRAD Radford, Va.              | 5000        |      |
| KYXC Kirkland, Wash.           | 5000        |      |
| KIMA Yakima, Wash.             | 5000        |      |
| WUBC Bickhamann, W.Va.         | 5000        |      |
| WRAC Racine, Wis.              | 5000        |      |
| WTMB Tomah, Wis.               | 1000        |      |

## 1470-204.0

|                       |      |
|-----------------------|------|
| WBLD Evergreen, Ala.  | 1000 |
| KDEW DeWitt, Ark.     | 5000 |
| KULI Coalinga, Calif. | 5000 |
| KUTY Palmdale, Calif. | 5000 |

| kHx                          | Wave Length | W.P. |
|------------------------------|-------------|------|
| KXDA Sacramento, Calif.      | 5000        |      |
| KKEP Estes Park, Colo.       | 5000        |      |
| WMW Meriden, Conn.           | 1000        |      |
| WRBD Pompano Beach, Fla.     | 5000        |      |
| WCWR Tarpon Springs, Fla.    | 5000        |      |
| WAAG Adel, Ga.               | 1000        |      |
| WDLA Athens, Ga.             | 1000        |      |
| WCLA Oaxton, Ga.             | 1000        |      |
| WRGA Rome, Ga.               | 1000        |      |
| WMPP Chicago Heights, Ill.   | 1000        |      |
| WMBD Peoria, Ill.            | 5000        |      |
| WHUT Anderson, Ind.          | 1000        |      |
| KTRI Sioux City, Iowa        | 5000        |      |
| KWVY Waverly, Iowa           | 1000        |      |
| KARE Atchison, Kans.         | 1000        |      |
| KLIB Liberal, Kans.          | 1000        |      |
| WSAC Fort Knox, Ky.          | 1000        |      |
| KTDL Farmersville, La.       | 1000        |      |
| KPLC Lake Charles, La.       | 5000        |      |
| WLAM Lewiston, Maine         | 5000        |      |
| WIDY Salisbury, Md.          | 5000        |      |
| WTRT Westminster, Md.        | 1000        |      |
| WSRO Marlborough, Mass.      | 1000        |      |
| WNBP Newburyport, Mass.      | 5000        |      |
| WKMF Flint, Mich.            | 5000        |      |
| WKLZ Kalamazoo, Mich.        | 5000        |      |
| KANO Anoka, Minn.            | 1000        |      |
| WCHJ Brookhaven, Miss.       | 1000        |      |
| WNAU New Albany, Miss.       | 5000        |      |
| KGHM Brookfield, Mo.         | 5000        |      |
| KTCB Malden, Mo.             | 1000        |      |
| WYAC Ithaca, N.Y.            | 1000        |      |
| WDPM Potsdam, N.Y.           | 1000        |      |
| WBGH Greensboro, N.C.        | 5000        |      |
| WPNC Plymouth, N.C.          | 1000        |      |
| WTOE Spruce Pine, N.C.       | 1000        |      |
| WOHO Toledo, Ohio            | 1000        |      |
| KVLH Pauls Valley, Okla.     | 2500        |      |
| KVIN Vineta, Okla.           | 5000        |      |
| KRAF Reedport, Ore.          | 5000        |      |
| WSAN Altamont, Pa.           | 5000        |      |
| WFAR Farrell, Pa.            | 1000        |      |
| WMML Portage, Pa.            | 5000        |      |
| WQXL Columbia, S.C.          | 5000        |      |
| WINH Georgetown, S.C.        | 1000        |      |
| WEAG Alcoa, Tenn.            | 1000        |      |
| WVOL Berry Hill, Tenn.       | 5000        |      |
| KSBC Abene, Tex.             | 5000        |      |
| KDHN Dimitt, Tex.            | 5000        |      |
| KWRD Henderson, Tex.         | 2500        |      |
| KCNV San Marcos, Tex.        | 2500        |      |
| WTZE Tazewell, Va.           | 1000        |      |
| KELA Centralia, Wash.        | 5000        |      |
| KSEM Moses Lake, Wash.       | 5000        |      |
| KAPS Mount Vernon, Wash.     | 5000        |      |
| WWHY Huntington, W.Va.       | 5000        |      |
| WBEZ Wheeling, W.Va.         | 5000        |      |
| WBKV West Bend, Wis.         | 1000        |      |
| WARI Abbeville, Ala.         | 1000        |      |
| WLPH Irondale, Ala.          | 5000        |      |
| WBTS Bridgeport, Ala.        | 1000        |      |
| WABB Mobile, Ala.            | 5000        |      |
| KAT Phenix, Ariz.            | 500         |      |
| KGLO Safford, Ariz.          | 500         |      |
| KTHS Berryville, Ark.        | 1000        |      |
| KWUN Concord, Calif.         | 5000        |      |
| KYOS Merced, Calif.          | 5000        |      |
| KWEE Santa Ana, Calif.       | 5000        |      |
| KSEE Santa Maria, Calif.     | 1000        |      |
| KMS Manitou Springs, Colo.   | 500         |      |
| KPUA Pueblo, Colo.           | 500         |      |
| WEHW Windsor, Conn.          | 500         |      |
| WAPG Arcadia, Fla.           | 1000        |      |
| WENE Panama City Beach, Fla. | 5000        |      |
| WVCF Windermere, Fla.        | 1000        |      |
| WYZE Atlanta, Ga.            | 5000        |      |
| KRDW Augusta, Ga.            | 1000        |      |
| WBSB Geneva, Ill.            | 5000        |      |
| WJBM Jerseyville, Ill.       | 5000        |      |
| WTHI Terre Haute, Ind.       | 5000        |      |
| WRSW Warsaw, Ind.            | 1000        |      |
| KLEE Ottumwa, Iowa           | 5000        |      |
| KBEA Mission, Kan.           | 5000        |      |
| KLEA Wichita, Kans.          | 5000        |      |
| KLOA Hopedale, Ky.           | 1000        |      |
| WNKY Neon, Ky.               | 1000        |      |
| WTLO Somerset, Ky.           | 1000        |      |
| KCKW Jena, La.               | 5000        |      |
| KANV Jonesville, La.         | 5000        |      |
| KJOE Shreveport, La.         | 1000        |      |
| WSAR Fall River, Mass.       | 5000        |      |
| WMAX Grand Rapids, Mich.     | 5000        |      |
| WIOS Tawas City, Mich.       | 1000        |      |
| WYSI Ypsilanti, Mich.        | 5000        |      |
| KAUS Austin, Minn.           | 1000        |      |
| KEHG Fosston, Minn.          | 1000        |      |
| WECF Carthage, Miss.         | 5000        |      |
| KGCS Sidney, Mont.           | 1000        |      |
| KLMS Lincoln, Nebr.          | 1000        |      |
| KWEW Hobbs, N. Mex.          | 5000        |      |
| WLEA Hornell, N.Y.           | 1000        |      |
| WHOM New York, N.Y.          | 5000        |      |
| WADR Remsen, N.Y.            | 5000        |      |
| WWKO Fair Bluff, N. C.       | 1000        |      |
| WWOK Charlotte, N.C.         | 5000        |      |
| WYRN Louisville, N.C.        | 5000        |      |

| kHx                         | Wave Length | W.P. |
|-----------------------------|-------------|------|
| WMSJ Sylva, N.C.            | 5000        |      |
| WYDK Yadkinville, N.C.      | 1000        |      |
| WHBC Canton, Ohio           | 5000        |      |
| WCIN Cincinnati, Ohio       | 5000        |      |
| WTRA Latrobe, Pa.           | 5000        |      |
| WDAS Philadelphia, Pa.      | 5000        |      |
| WISL Shamokin, Pa.          | 1000        |      |
| WSHP Shippensburg, Pa.      | 1000        |      |
| WMDL Palmdale, P. Utah      | 5000        |      |
| KSDR Watertown, S.D.        | 1000        |      |
| WJFC Jefferson City, Tenn.  | 500         |      |
| WMQM Memphis, Tenn.         | 5000        |      |
| WJLE Smithville, Tenn.      | 1000        |      |
| KBOX Dallas, Tex.           | 5000        |      |
| KLVL Pasadena, Tex.         | 1000        |      |
| KAPE San Antonio, Tex.      | 5000        |      |
| KONI Spanish Fork, Utah     | 1000        |      |
| WCFR Springfield, Vt.       | 1000        |      |
| WBBL Richmond, Va.          | 5000        |      |
| WLEE Richmond, Va.          | 5000        |      |
| WBLU Salem, Va.             | 5000        |      |
| KOOD Lakewood Center, Wash. | 1000        |      |
| KVAN Vancouver, Wash.       | 1000        |      |
| WISM Madison, Wis.          | 5000        |      |
| KRAE Cheyenne, Wyo.         | 1000        |      |
| WANA Anniston, Ala.         | 250         |      |
| WAJF Decatur, Ala.          | 1000        |      |
| WRDL 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        |      |
| KXRT Russellville, Ark.     | 1000        |      |
| KWAC Bakersfield, Calif.    | 1000        |      |
| KPAS Banning, Calif.        | 5000        |      |
| KICO Calexico, Calif.       | 250         |      |
| KRKC Kiki 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        |      |
| KBOU Boulder, Colo.         | 1000        |      |
| KGLD Gunnison, Colo.        | 5000        |      |
| KCMS Manitou Springs, Colo. | 500         |      |
| KOLR Sterling, Colo.        | 250         |      |
| WGGH Greenwich, Conn.       | 250         |      |
| WTRL Bradenton, Fla.        | 250         |      |
| WJBS Deland, Fla.           | 1000        |      |
| WFLA Ft. Pierce, Fla.       | 250         |      |
| WCOF Immokalee, Fla.        | 250         |      |
| WMBM Miami Beach, Fla.      | 250         |      |
| WSRA Milton, Fla.           | 1000        |      |
| WPXE Starke, Fla.           | 1000        |      |
| WTRB Vero Beach, Fla.       | 1000        |      |
| WTSR Winter Haven, Fla.     | 500         |      |
| WMOB Brunswick, Ga.         | 1000        |      |
| WJIM Cordale, Ga.           | 1000        |      |
| WMRE Monroe, Ga.            | 1000        |      |
| WSFB Quitman, Ga.           | 250         |      |
| WSNT Sandersville, Ga.      | 500         |      |
| WSQL Sylva, Ga.             | 1000        |      |
| KLOD Caldwell, Idaho        | 1000        |      |
| WROD Cairo, Ill.            | 250         |      |
| WLAN Danville, Ill.         | 1000        |      |
| WAMY East St. Louis, Ill.   | 1000        |      |
| WOPA Oak Park, Ill.         | 1000        |      |
| WZOE Princeton, Ill.        | 1000        |      |
| WKBY Richmond, Ind.         | 1000        |      |
| WNDU South Bend, Ind.       | 1000        |      |
| KBUR Burlington, Iowa       | 1000        |      |
| WDBQ Dubuque, Iowa          | 1000        |      |
| KBAB Indianapolis, Ia.      | 500         |      |
| KRIB Mason City, Ia.        | 1000        |      |
| KKAN Phillipsburg, Kans.    | 250         |      |
| KTOP Topeka, Kan.           | 1000        |      |
| WKFY Frankfort, Ky.         | 1000        |      |
| WKAY Glasgow, Ky.           | 1000        |      |
| WOMI Owensboro, Ky.         | 1000        |      |
| WSP Paintsville, Ky.        | 1000        |      |
| WIKC Bogalusa, La.          | 1000        |      |
| KEUN Eunice, La.            | 1000        |      |
| KJIN Houma, La.             | 1000        |      |
| KRUS Ruston, La.            | 1000        |      |
| WFOR Portland, Maine        | 1000        |      |
| WTVL Waterville, Maine      | 1000        |      |
| WARK Hagerstown, Md.        | 1000        |      |
| WHAV Haverhill, Mass.       | 1000        |      |
| WMRC Milford, Mass.         | 1000        |      |
| WTLX W. Springfield, Mass.  | 1000        |      |
| WABI Adrian, Mich.          | 1000        |      |
| WMDW Midland, Mich.         | 1000        |      |
| WLRC Whitehall, Mich.       | 1000        |      |
| KXRA Alexandria, Minn.      | 250         |      |
| KOZY Grand Rapids, Minn.    | 1000        |      |
| KLGR Redwood Falls, Minn.   | 1000        |      |
| WLXO Blot, Miss.            | 1000        |      |
| WCLD Cleveland, Miss.       | 1000        |      |
| WTLN Philadelphia, Miss.    | 1000        |      |
| WTUP Tupelo, Miss.          | 1000        |      |
| WVIM Vicksburg, Miss.       | 250         |      |
| KDMD Carthage, Mo.          | 250         |      |
| KTRR Rolla, Mo.             | 1000        |      |
| KDRO Sedalia, Mo.           | 1000        |      |
| KDBM Dillon, Mont.          | 1000        |      |
| KRON Omaha, Nebr.           | 1000        |      |

| kHx                        | Wave Length | W.P. | kHx                               | Wave Length | W.P. | kHx                         | Wave Length | W.P. | kHx                        | Wave Length | W.P. |
|----------------------------|-------------|------|-----------------------------------|-------------|------|-----------------------------|-------------|------|----------------------------|-------------|------|
| WEMJ Laconia, N.H.         | 1000        |      | KOSG Pawhuska, Okla.              | 5000d       |      | WERY Wyoming, Mich.         | 5000d       |      | KCAN Canyon, Tex.          | 1000        |      |
| WLOB Atlantic City, N. J.  | 1000        |      | KPNW Eugene, Ore.                 | 5000d       |      | KSSM Shakopee, Minn.        | 5000d       |      | KWBC Navasota, Tex.        | 2500        |      |
| KRSN Los Alamos, N.Mex.    | 1000        |      | WMNT Manati, P.R.                 | 250         |      | KPCR Bowling Green, Mo.     | 250         |      | WKYE Bristol, Tenn.        | 1000d       |      |
| KRTN Raton, N.Mex.         | 1000        |      | WEAC Gaffney, S. C.               | 1000d       |      | KMAM Butler, Mo.            | 5000d       |      | WPTN Cookeville, Tenn.     | 2500        |      |
| WCSS Amsterdam, N.Y.       | 1000        |      | WDEB Jamestown, Tenn.             | 1000d       |      | KLOL Lincoln, Neb.          | 5000d       |      | WPTI Cookeville, Tenn.     | 2500        |      |
| WETA Baiton, N.Y.          | 250         |      | WTNE Trenton, Tenn.               | 250d        |      | WCKY Cincinnati, Ohio       | 5000d       |      | WKPT Kingsport, Tenn.      | 10000d      |      |
| WKNY Kingston, N.Y.        | 1000        |      | WKFA Merkle, Tex.                 | 250d        |      | KWLG Wagoner, Okla.         | 1000d       |      | KCOM Comanche, Tex.        | 250d        |      |
| WICY Malone, N.Y.          | 1000        |      | KTXO Sherman, Tex.                | 250         |      | WHYP North East, Pa.        | 1000d       |      | KRGO Salt Lake City, Utah  | 10000d      |      |
| WOLC Port Jervis, N. Y.    | 1000        |      | KANI Wharton, Tex.                | 500         |      | WMBT Shenandoah, Pa.        | 250d        |      | WKBA Vinton, Va.           | 10000d      |      |
| WOLF Syracuse, N. Y.       | 1000        |      |                                   |             |      | WUPR Utuado, P.R.           | 1000d       |      | WVAB Virginia Beh., Va.    | 5000d       |      |
| WSSB Durham, N. C.         | 1000        |      | 1510—199.1                        |             |      | WASC Spartanburg, S.C.      | 1000        |      | WVXA Charleston, W. Va.    | 5000        |      |
| WFLB Fayetteville, N.C.    | 1000        |      | KALF Mesa, Ariz.                  | 10000d      |      | KCTN Georgetown, Tex.       | 5000d       |      | KQOT Bellingham, Wash.     | 1000d       |      |
| WLOE Leaksville, N.C.      | 1000        |      | KSOM Ontario, Cal.                | 1000d       |      | KCBT Harlingen, Tex.        | 5000d       |      | KGAR Vancouver, Wash.      | 1000d       |      |
| WRNB New Bern, N.C.        | 1000        |      | KIRV Fresno, Cal.                 | 1000d       |      | KCLR Ralls, Tex.            | 250         |      | WMIR Lake Geneva, Wis.     | 5000d       |      |
| WRMT Rocky Mount, N. C.    | 1000        |      | KDKO Littleton, Colo.             | 1000        |      | WQVA Quantico, Va.          | 1000d       |      | WMAD Madison, Wis.         | 1000d       |      |
| WSTP Salisbury, N. C.      | 1000        |      | WNLC New London, Conn.            | 1000d       |      | KCHY Cheyenne, Wyo.         |             |      |                            |             |      |
| WVSM Valdese, N.C.         | 1000        |      | WWBC Cocoa, Fla.                  | 250d        |      | 1540—195.0                  |             |      | 1560—192.3                 |             |      |
| WWSL Wilmington, N. C.     | 1000        |      | WINU Highland, Ill.               | 250d        |      | WANL Lineville, Ala.        | 1000d       |      | WAGC Centre, Ala.          | 1000d       |      |
| KNDC Hettinger, N.D.       | 1000        |      | WJRC Joliet, Ill.                 | 500d        |      | KASA Phoenix, Ariz.         | 5000d       |      | KODA Dumas, Ark.           | 250d        |      |
| KQVC Valley City, N. Dak.  | 1000        |      | WKAI Macomb, Ill.                 | 1000d       |      | KPOL Los Angeles, Calif.    | 1000        |      | KBIB Monette, Ark.         | 1000d       |      |
| WBEX Chillicothe, Ohio     | 1000        |      | KIFG Iowa Falls, Iowa             | 1000d       |      | WBSS Pensacola, Fla.        | 1000        |      | KPCB Bersfield, Calif.     | 1000d       |      |
| WIMO Cleveland Hgts., O.   | 1000        |      | KANS Larned, Kan.                 | 1000d       |      | WIGA Jackson, Ga.           | 1000d       |      | KIOS Willows, Calif.       | 250d        |      |
| WOHI E. Liverpool, Ohio    | 1000        |      | KPBC Port Sulpher, La.            | 500d        |      | WOGA Sylvestre, La.         | 1000d       |      | WTAI Eau Gallie, Fla.      | 5000d       |      |
| WMOA Marietta, Ohio        | 1000        |      | WMEX Boston, Mass.                | 5000d       |      | WSMI Litchfield, Ill.       | 1000d       |      | WYSE Inverness, Fla.       | 1000        |      |
| WMRN Marion, Ohio          | 1000        |      | WJCO Jackson, Mich.               | 5000d       |      | WBNI Boonville, Ind.        | 250d        |      | WCIC Gordon, Ga.           | 5000d       |      |
| KWRW Guthrie, Okla.        | 1000        |      | WLKM Three Rivers, Mich.          | 500         |      | WADM Decatur, Ind.          | 250d        |      | WBYS Canton, Ill.          | 250d        |      |
| KBIX Muskogee, Okla.       | 1000        |      | WKPO Prentiss, Miss.              | 1000d       |      | WLOI LaPorte, Ind.          | 250d        |      | WYAK Paoli, Ind.           | 250d        |      |
| KBKR Baker, Ore.           | 1000        |      | KCCV Independence, Mo.            | 1000d       |      | WCBK Martinsville, Ind.     | 250d        |      | WRIN Rensselaer, Ind.      | 1000d       |      |
| KBNR Roseburg, Oreg.       | 1000        |      | KTTT Columbus, Nebr.              | 1000        |      | KXEL Waterloo, Iowa         | 5000d       |      | KSWI Council Bluffs, Iowa  | 250d        |      |
| KBYZ Salem, Oreg.          | 1000        |      | WRAN Dover, N.J.                  | 250d        |      | KNEX McPherson, Kans.       | 250d        |      | KABI Abilene, Kan.         | 250d        |      |
| WESB Bradford, Pa.         | 1000        |      | WJIC Salem, N.J.                  | 250d        |      | KLIC Columbia, Kans.        | 250d        |      | WPHN Liberty, Ky.          | 1000d       |      |
| WAZL Hazleton, Pa.         | 1000        |      | WPUT Brewster, N. Y.              | 1000d       |      | WDOH Wheaton, Ill.          | 1000d       |      | WDXR Paducah, Ky.          | 1000d       |      |
| WARD Johnstown, Pa.        | 1000        |      | WEAL Greensboro, N.C.             | 1000d       |      | WMRR Marshall, Mich.        | 250d        |      | WBGS Sidell, La.           | 1000d       |      |
| WGAL Lancaster, Pa.        | 1000        |      | WBBZ Selma, N. C.                 | 500d        |      | WLEF Greenwood, Miss.       | 1000d       |      | WMSD La Plata, Md.         | 1000d       |      |
| WBCB Levittown, Pa.        | 1000        |      | WLKR Norwalk, O.                  | 500d        |      | KBXM Kennett, Mo.           | 250d        |      | WTPS Portage, Mich.        | 1000d       |      |
| WMBF Lewistown, Pa.        | 1000d       |      | WAHT Annullville-Cleona, Pa.      | 5000d       |      | WKXR Exeter, N.H.           | 1000d       |      | WMIC Sandusky, Mich.       | 1000d       |      |
| WMGW Meadville, Pa.        | 1000d       |      | WPSJ Woodbury, S.C.               | 250d        |      | WPRR Albany, N.Y.           | 5000d       |      | KBEW Blue Earth, Minn.     | 250d        |      |
| WNBT Wellsboro, Pa.        | 1000        |      | WLAC Washville, Tenn.             | 5000d       |      | WPAA Albany, N.Y.           | 1000d       |      | KLTI Mason, Mo.            | 250d        |      |
| WSIB Beaufort, Pa.         | 500         |      | KCTX Chidress, Tex.               | 250d        |      | WKYK Burnsville, N.C.       | 1000d       |      | KTUI Sullivan, Mo.         | 1000d       |      |
| WGCD Chester, S.C.         | 1000d       |      | KABH Midland, Tex.                | 500d        |      | WRPL Charlotte, N.C.        | 1000d       |      | WQXR New York, N.Y.        | 5000d       |      |
| WMRB Greenville, S.C.      | 1000        |      | KMDO Mineola, Tex.                | 250d        |      | WIFM Elkin, N.C.            | 1000d       |      | WTNS Coshocton, Ohio       | 1000d       |      |
| KORN Mitchell, S.Dak.      | 1000        |      | KROB Robstown, Tex.               | 500d        |      | WBCO Bucyrus, Ohio          | 500d        |      | WCNW Fairfield, O.         | 5000d       |      |
| WOPI Bristol, Tenn.        | 1000        |      | KSTV Stephenville, Tex.           | 250d        |      | WABQ Cleveland, Ohio        | 1000d       |      | WTDI Toledo, Ohio          | 5000d       |      |
| WDXB Chattanooga, Tenn.    | 1000        |      | WLGK Logan, Utah                  | 1000d       |      | WNIO Niles, Ohio            | 250d        |      | KWCO Chickasha, Okla.      | 5000        |      |
| WDFB Fountain City, Tenn.  | 1000        |      | KURB Mountain Terrace, Wash.      | 5000d       |      | WZLW Niles, Ohio            | 250d        |      | WRSJ Jayaman, P.R.         | 5000        |      |
| WJLM Lewisburg, Tenn.      | 1000        |      | KGA Spokane, Wash.                | 5000d       |      | KZEL Eugene, Ore.           | 1000d       |      | WACL Lancaster, S.C.       | 10000d      |      |
| WDXL Lexington, Tenn.      | 250         |      | WAWK Waukesha, Wis.               | 10000d      |      | WRCP Philadelphia, Pa.      | 50000d      |      | WWMG Nashville, Tenn.      | 10000d      |      |
| KNOW Austin, Tex.          | 250         |      | 1520—197.4                        |             |      | WPTS Pittsburg, Pa.         | 1000d       |      | WBOL Bolivar, Tenn.        | 250d        |      |
| KIBL Beeville, Tex.        | 250         |      | WAOA Opelika, Ala.                | 5000d       |      | WPME Punxsutawney, Pa.      | 1000d       |      | KCAD Abilene, Tex.         | 500d        |      |
| KBST Big Spring, Tex.      | 1000        |      | KMPG Hollister, Cal.              | 500         |      | WADK Newport, R.I.          | 1000d       |      | KEGG Daingerfield, Tex.    | 1000d       |      |
| KHYZ Berger, Tex.          | 250         |      | KMFB Mendocino, Cal.              | 1000d       |      | WKKR Pickens, S.C.          | 1000d       |      | KHBR Hillsboro, Tex.       | 500d        |      |
| KNEL Brady, Tex.           | 250d        |      | KACY Port Hueneene, Calif.        | 1000d       |      | WBFJ Woodbury, Tenn.        | 1000d       |      | KGLU Port Lavaca, Tex.     | 500d        |      |
| KWMC Del Rio, Tex.         | 250d        |      | WTLN Apopka, Fla.                 | 1000d       |      | KBUY Ft. Worth, Tex.        | 5000d       |      | KQUH Aquiaum, Wash.        | 1000d       |      |
| KSAM Huntsville, Tex.      | 250         |      | WGNP Indian Rocks Beach, Fla.     | 1000d       |      | KEDA San Antonio, Tex.      | 1000d       |      | KDFL Sumner, Wash.         | 250d        |      |
| KVOZ Laredo, Tex.          | 250         |      | WIXX Oakland Park, Fla.           | 1000d       |      | WRGM Richmond, Va.          | 10000d      |      | WFSP Kingwood, W. Va.      | 1000d       |      |
| KZZN Littlefield, Tex.     | 1000        |      | WXPQ Eatonton, Ga.                | 500d        |      | KFKF Bellevue, Wash.        | 500d        |      | WGLB Port Washington, Wis. | 250d        |      |
| KPLT Paris, Tex.           | 1000        |      | WHOW Clinton, Ill.                | 5000d       |      | WTKM Hartford, Wis.         |             |      |                            |             |      |
| KDDK Tyler, Tex.           | 1000        |      | WLUV Loves Park, Ill.             | 500d        |      | 1550—193.5                  |             |      | 1570—191.1                 |             |      |
| KVVC Vernon, Tex.          | 250         |      | WSVL Shelbyville, Ind.            | 1000        |      | WAAV Huntsville, Ala.       | 5000d       |      | WCRL Oneonta, Ala.         | 1000d       |      |
| KVOG Ogden, Utah           | 1000        |      | KSIB Creston, Iowa                | 1000d       |      | WMOD Mobile, Ala.           | 5000d       |      | WTQX Selma, Ala.           | 5000d       |      |
| WKVT Brattleboro, Vt.      | 1000        |      | WHIC Hinsburg, Ky.                | 250d        |      | KUAT Tucson, Ariz.          | 5000d       |      | KBRI Brinkley, Ark.        | 250d        |      |
| WFDAD Middlebury, Vt.      | 1000        |      | WRSI Randolph, Ky.                | 500d        |      | KXEX Fresno, Calif.         | 5000d       |      | KBIT Fordey, Ark.          | 250d        |      |
| WIKI Newport, Vt.          | 1000        |      | KXKW Lafayette, La.               | 1000d       |      | KKHI San Fran., Calif.      | 1000d       |      | KRSA Ascal, Calif.         | 250d        |      |
| WVCA Culpeper, Va.         | 1000        |      | WVOB El Ar, Md.                   | 250d        |      | KQXI Arvada, Colo.          | 1000d       |      | KCVI Los Angeles, Calif.   | 5000d       |      |
| WVEC Hampton, Va.          | 1000        |      | WTRI Brunswick, Mich.             | 500d        |      | WEST W. Hartford, Conn.     | 1000d       |      | KACE Riverside, Cal.       | 5000d       |      |
| WVAY Waynesboro, Va.       | 1000        |      | WKIR Muskogee Hts., Mich.         | 1000d       |      | WRIZ Coral Gables, Fla.     | 1000d       |      | KLOV Loveland, Colo.       | 250d        |      |
| KBRO Bremerton, Wash.      | 1000        |      | WYNZ Ypsilanti, Mich.             | 250d        |      | WOGO New Smyrna Beach, Fla. | 250         |      | WTFB Auburndale, Fla.      | 5000d       |      |
| KVAC Forks, Wash.          | 500         |      | KOLM Rochester, Minn.             | 10000d      |      | WYOU Tampa, Fla.            | 1000d       |      | WOKC Okeschoee, Fla.       | 1000d       |      |
| KLOG Kelso, Wash.          | 1000        |      | KMPL Sikeston, Mo.                | 5000        |      | WYTH Augusta, Ga.           | 5000d       |      | WJOE Ward Ridge, Fla.      | 250         |      |
| KENE Toppenish, Wash.      | 1000        |      | WSLT Ocean City-Somers Pt., N. J. | 1000d       |      | WJIL Jacksonville, Ill.     | 1000d       |      | WMES Ashburn, Ga.          | 1000d       |      |
| KTEL Walla Walla, Wash.    | 1000        |      | WKBW Buffalo, N.Y.                | 5000d       |      | WCSJ Morris, Ill.           | 250d        |      | WGHC Clayton, Ga.          | 1000d       |      |
| WGKV Charleston, W. Va.    | 1000        |      | WDBL Mineola, N. Y.               | 5000d       |      | WPDF Corydon, Ind.          | 250d        |      | WBAD College Park, Ga.     | 1000d       |      |
| WTCB Fairmont, W. Va.      | 1000d       |      | WDSL Mocksville, N.C.             | 5000        |      | WCVL Crawfordville, Ind.    | 250d        |      | WGSF Millen, Ga.           | 1000d       |      |
| WLOH Princeton, W. Va.     | 1000        |      | WBNO Bryan, Ohio                  | 500d        |      | WCTW New Castle, Ind.       | 250d        |      | WOKZ Alton, Ill.           | 250d        |      |
| WGSB Sutton, W. Va.        | 1000        |      | WINT Canton, O.                   | 1000d       |      | KIWA Sheldon, Iowa          | 250d        |      | WRL Freeport, Ill.         | 5000d       |      |
| WGEZ Beloit, Wis.          | 1000d       |      | WKNT Kent, O.                     | 1000d       |      | KEDD Dodge City, Kans.      | 1000d       |      | WBE Harvey, Ill.           | 5000d       |      |
| WLXC LaCrosse, Wis.        | 1000        |      | WTTD Toledo, O.                   | 1000        |      | KNIC Winfield, Kan.         | 250d        |      | WTAY Robinson, Ill.        | 250d        |      |
| WIGM Medford, Wis.         | 1000        |      | KOMA Okla. City, Okla.            | 1000d       |      | WIRV Irvine, Ky.            | 1000d       |      | WHEL Frankfort, Ind.       | 250d        |      |
| WOSH Oshkosh, Wis.         | 1000        |      | KYXI Oregon City, Ore.            | 250d        |      | WMSK Morganfield, Ky.       | 250d        |      | WHOL New Albany, Ind.      | 10000d      |      |
| KLME Laramie, Wyo.         | 500         |      | WCIC West Chester, Pa.            | 1000d       |      | WLUX Baton Rouge, La.       | 5000d       |      | KMCD Fairfield, Iowa       | 250d        |      |
| KRTB Thermopolis, Wyo.     | 250         |      | WRAI San Juan, P. R.              | 1000d       |      | KOK Shreveport, La.         | 5000d       |      | KJFJ Webster City, Iowa    | 250d        |      |
| KGOS Torrington, Wyo.      | 1000        |      | WTRG Myrtle Beach, S.C.           | 250         |      | WESH Elkton, Md.            | 1000d       |      | KNDY Marysville, Kans.     | 250d        |      |
| 1500—199.9                 |             |      | WKMG Newberry, S. C.              | 1000d       |      | WSHN Fremont, Mich.         | 1000d       |      | WKKS Vanceburg, Ky.        | 500d        |      |
| WVSM Rainsville, Ala.      | 1000d       |      | WLSV Ardmore, Tenn.               | 1000d       |      | WOKJ Jackson, Miss.         | 5000d       |      | WABL La Grange, La.        | 1000        |      |
| KGMR Jacksonville, Ark.    | 1000d       |      | WBHT Brownsville, Tenn.           | 250d        |      | WSAO Senatobia, Miss.       | 5000d       |      | KLAR Los Angeles, La.      | 1000        |      |
| KBBQ Burbank, Cal.         | 10000d      |      | WBDT Elizabethton, Tenn.          | 1000d       |      | KGMO Cape Girardeau, Mo.    | 5000d       |      | KMAR Winnboro, La.         | 1000        |      |
| KXRX San Jose, Cal.        | 1000d       |      | 1530—196.1                        |             |      | KKJO St. Joseph, Mo.        | 5000d       |      | WPPE Taunton, Mass.        | 1000d       |      |
| WFFI Milford, Conn.        | 5000d       |      | WAAO Andalusia, Ala.              | 1000d       |      | KICS Hastings, Neb.         | 5000        |      | WMLO Beverly, Mass.        | 500d        |      |
| WTOP Washington, D.C.      | 5000d       |      | WLCB Moulton, Ala.                | 1000d       |      | WGR Canandaigua, N.Y.       | 250         |      | WDEW Westfield, Mass.      | 1000d       |      |
| WKIZ Key West, Fla.        | 250         |      | WCTR Chestertown, Mo.             | 1530        |      | WBAZ Kingston, N.Y.         | 5000d       |      | WMRP Flint, Mich.          | 1000d       |      |
| WGLU New Port Richey, Fla. | 250d        |      | KCAT Pine Bluff, Ark.             | 250d        |      | WBVM Utica, N.Y.            | 5000d       |      | WUFR Grand Rapids, Mich.   | 1000d       |      |
| WSEM Donaldsonville, Ga.   | 1000d       |      | KTMN Truman, Ark.                 | 250d        |      | WPXY Greenville, N. C.      | 5000d       |      | KUXL Golden Valley, Minn.  | 1000d       |      |
| WDEB Macon, Ga.            | 1000d       |      | KFBK Sacramento, Calif.           | 5000d       |      | WYNA Raleigh, N.C.          | 1000d       |      | WQNA Winona, Miss.         | 1000d       |      |
| WTHN Thomaston, Ga.        | 1000d       |      | KRYT Colorado Springs, Colo.      | 1000d       |      | WTFM Winston-Salem, N.C.    | 1000d       |      | KLEX Lexington, Mo.        | 250d        |      |
| KUMU Honolulu, Hawaii      | 5000        |      | WDJZ Bridgeport, Conn.            | 1000d       |      | KQWB Fargo, N.D.            | 5000d       |      | WAFS Amsterdam, N.Y.       | 1000d       |      |
| WEEN Geneseo, Ill.         | 250         |      | WENG Englewood, Fla.              | 1000        |      | WDLR Delaware, Ohio         | 5000d       |      | WFLR Dundee, N.Y.          | 1000d       |      |
| WZBN Zion, Ill.            | 250d        |      | WTTI Dalton, Ga.                  | 1000d       |      | KMAD Madill, Okla.          | 5000d       |      | WBUZ Fredonia, N.Y.        | 250d        |      |
| WBRI Indianapolis, Ind.    | 5000d       |      | KNBI Norton, Kan.                 | 1000d       |      | KREK Sapulpa, Okla.         | 5000d       |      | WHRR Riverhead, N.Y.       | 500         |      |
| WAKE Valparaiso, Ind.      | 1000d       |      | KWLA Many, La.                    | 1000d       |      | WLOA Bradstock, Pa.         | 5000d       |      | WTLN Taylorsville, N.C.    | 500         |      |
| KWVG New Roads, La.        | 1000d       |      | WCTR Chestertown, Md.             | 250d        |      | WTTCS Towanda, Pa.          | 500d        |      | WNSA Siler City, N.C.      | 1000d       |      |
| WVOC Battle Creek, Mich.   | 1000d       |      | WRPM Poplarville, Miss.           | 1000d       |      | WKFE Yauco, P.R.            | 500d        |      | WCLW Mansfield, O.         | 1000d       |      |
| WJBK Detroit, Mich.        | 50000d      |      | WTRM Lapeer, Mich.                | 5000d       |      | WBSC Bennettsville, S.C.    | 1000d       |      | WPTW Piqua, Ohio           | 250d        |      |
| KSTP St. Paul, Minn.       | 1000d       |      |                                   |             |      |                             |             |      | TKAT Frederick, Okla.      | 250d        |      |
| WBFN Quitman, Miss.        | 1000d       |      |                                   |             |      |                             |             |      | KOLS Pryor, Okla.          | 1000d       |      |
| KOFN Doniphan, Mo.         | 1000d       |      |                                   |             |      |                             |             |      |                            |             |      |
| WKER Pompton Lakes, N.J.   | 500         |      |                                   |             |      |                             |             |      |                            |             |      |
| WGMF Watkins Glen, N.Y.    | 500         |      |                                   |             |      |                             |             |      |                            |             |      |
| WKBX Xenia-Salem, N.C.     | 1000d       |      |                                   |             |      |                             |             |      |                            |             |      |
| WGXC Xenia, O.             | 500d        |      |                                   |             |      |                             |             |      |                            |             |      |

# WHITE'S RADIO LOG

| kHz  | Wave Length         | W.P.  |
|------|---------------------|-------|
| KOHU | Hermiston, Oreg.    | 1000d |
| WPGM | Danville, Penn.     | 1000d |
| WBUX | Doylstown, Pa.      | 5000d |
| WQTN | Lafayette, Pa.      | 1000d |
| WTFN | Gaffney, S.C.       | 2500d |
| WJES | Johnston, S.C.      | 2500d |
| WLSC | Loris, S.C.         | 1000d |
| KVRA | Vermillion, S.D.    | 1000d |
| WHLP | Centerville, Tenn.  | 1000d |
| WCLE | Cleveland, Tenn.    | 1000d |
| WTRB | Ripley, Tenn.       | 1000d |
| KZOL | Farwell, Tex.       | 2500d |
| KVLG | La Grange, Tex.     | 2500d |
| KTER | Terrell, Tex.       | 2500d |
| WSWV | Pennington Gap, Va. | 1000d |
| WYTI | Rocky Mount, Va.    | 1000d |
| WEER | Warrenton, Va.      | 1000d |
| WAPL | Appleton, Wis.      | 1000d |

## 1580—189.2

|      |                       |       |
|------|-----------------------|-------|
| WEYU | Talladega, Ala.       | 1000d |
| KTFU | Tempe, Ariz.          | 2500d |
| KPCA | Marked Tree, Ark.     | 2500d |
| KFDV | Van Buren, Ark.       | 1000d |
| KMRE | Anderson, Cal.        | 1000d |
| KWIP | Merced, Calif.        | 500d  |
| KDAY | Santa Monica, Calif.  | 5000d |
| KHUM | Santa Rosa, Calif.    | 500d  |
| KPKK | Colorado Sprs., Colo. | 5000d |
| WSBP | Chattahoochee, Fla.   | 1000d |
| WSRF | Flt. Lauderdale, Fla. | 1000d |
| WVGT | Mount Dora, Fla.      | 1000d |
| WCFF | Punta Gorda, Fla.     | 1000d |
| WCLS | Columbus, Ga.         | 1000d |
| WNRJ | Gainesville, Ga.      | 1000d |
| WVWG | Glenview, Ga.         | 1000d |
| WKKD | Aurora, Ill.          | 2500d |
| WDQN | DuQuoin, Ill.         | 2500d |
| WBBA | Pittsfield, Ill.      | 2500d |
| WKID | Urbana, Ill.          | 2500d |
| WCNB | Connerville, Ind.     | 2500d |
| WJVA | South Bend, Ind.      | 1000d |
| WAMW | Washington, Ind.      | 2500d |
| KCHA | Charles City, Iowa    | 500d  |
| KDSN | Davenport, Iowa       | 500d  |
| WAXU | Greentown, Ky.        | 1000d |
| WMTL | Leitchfield, Ky.      | 2500d |
| WPKY | Princeton, Ky.        | 2500d |
| KLUV | Haynesville, La.      | 2500d |
| KLOU | Lake Charles, La.     | 1000d |

| kHz  | Wave Length                        | W.P.   |
|------|------------------------------------|--------|
| WPGC | Bradbury Hts., Md.                 | 10000d |
| WAGE | Towson, Md.                        | 5000d  |
| WRBJ | St. Johns, Mich.                   | 1000d  |
| KDOM | Windom, Minn.                      | 2500d  |
| WAMY | Amory, Miss.                       | 5000d  |
| WESY | Leland, Miss.                      | 1000d  |
| WPMP | Pascagoula-Moss Point, Mississippi | 1000d  |
| KTRG | Columbia, Mo.                      | 2500d  |
| KESM | El Dorado Springs, Mo.             | 500d   |
| KNIM | Maryville, Mo.                     | 2500d  |
| KAMI | Cozad, Neb.                        | 1000d  |
| WNHJ | Hammon, N.J.                       | 2500d  |
| WCRV | Washington, N.J.                   | 500d   |
| KZIA | Albuquerque, N.M.                  | 1000d  |
| WPAC | Patchoque, N.Y.                    | 10000d |
| WZKY | Albamarie, N.C.                    | 2500d  |
| WPBY | Benson, N.C.                       | 500d   |
| WKCO | Columbus, Ohio                     | 1000d  |
| KLTR | Blackwell, Okla.                   | 1000d  |
| WCOB | Columbia, Pa.                      | 500d   |
| WEND | Dobensburg, Pa.                    | 1000d  |
| WANB | Waynesburg, Pa.                    | 2500d  |
| WORG | Orangeburg, S.C.                   | 1000d  |
| WBBR | Travelers Rest, S.C.               | 1000d  |
| WSKT | Colonial Village, Tenn.            | 2500d  |
| WHHM | Henderson, Tenn.                   | 2500d  |
| WLII | Shelbyville, Tenn.                 | 1000d  |
| WSKT | South Knoxville, Tenn.             | 2500d  |
| KKAL | Denver City, Tex.                  | 2500d  |
| KGAF | Gainesville, Tex.                  | 2500d  |
| KIRT | Mission, Tex.                      | 1000d  |
| KTLU | Rusk, Tex.                         | 500d   |
| KWED | Seguin, Tex.                       | 1000d  |
| KBYP | Shamrock, Tex.                     | 2500d  |
| KBGO | Waco, Tex.                         | 1000d  |
| WPUV | Pulsaski, Va.                      | 5000d  |
| WTTN | Watertown, Wis.                    | 1000d  |

## 1590—188.7

|      |                            |       |
|------|----------------------------|-------|
| WATM | Altmore, Ala.              | 5000d |
| WBIB | Centerville, Ala.          | 1000d |
| WBNA | Tuscumbia, Ala.            | 500d  |
| KPBA | Pine Bluff, Ark.           | 1000d |
| KSPR | Springdale, Ark.           | 500d  |
| KLVJ | San Jose, Cal.             | 500d  |
| KUDU | Ventura, Cal.              | 1000d |
| KCIN | Victoria, Calif.           | 500d  |
| WARV | Warwick, Conn.             | 500d  |
| WBRV | Waterbury, Conn.           | 500d  |
| WILZ | St. Petersburg Beach, Fla. | 1000d |
| WELE | S. Daytona Bch., Fla.      | 1000d |
| WALG | Albany, Ga.                | 500d  |
| WLFA | Lafayette, Ga.             | 500d  |
| WTGA | Thomas, Ga.                | 500d  |
| WNMP | Evansville, Ill.           | 1000d |
| WAIK | Galesburg, Ill.            | 500d  |
| WGEE | Indianapolis, Ind.         | 5000d |
| WPCO | Mt. Vernon, Ind.           | 500d  |

| kHz  | Wave Length                     | W.P.  |
|------|---------------------------------|-------|
| KWBG | Boone, Iowa                     | 1000d |
| KVGB | Great Bend, Kans.               | 5000d |
| WLBK | Lebanon, Ky.                    | 1000d |
| KEVL | White Castle, La.               | 1000d |
| WETT | Ocean City, Md.                 | 1000d |
| WTVB | Coldwater, Mich.                | 5000d |
| WSMC | St. Helen, Mich.                | 5000d |
| KRAD | E. Grand Forks, Minn.           | 1000d |
| WWUN | Jackson, Miss.                  | 5000d |
| KDEX | Dexter, Mo.                     | 1000d |
| KRCS | Kansas City, Mo.                | 1000d |
| KLLI | Rolla, Mo.                      | 1000d |
| WSMN | Nashua, N.H.                    | 500d  |
| WERA | Plainfield, N.J.                | 500d  |
| WAUB | Auburn, N.Y.                    | 500d  |
| WEHH | Elmira Heights-Horseheads, N.Y. | 500d  |
| WGGG | Salamanca, N.Y.                 | 5000d |
| WBHN | Bryson City, N.C.               | 500d  |
| WCSL | Cherryville, N.C.               | 500d  |
| WVOE | Chadburn, N.C.                  | 1000d |
| WNOS | High Point, N.C.                | 1000d |
| WAKR | Akron, Ohio                     | 500d  |
| WSRW | Hillsboro, Ohio                 | 500d  |
| KHEN | Henryetta, Okla.                | 500d  |
| KTIL | Tillamook, Ore.                 | 500d  |
| WZUR | Chamberg, Pa.                   | 1000d |
| WEEZ | Chester, Pa.                    | 1000d |
| WXRF | Guayama, P.R.                   | 1000d |
| WYNG | Warwick, R.I.                   | 1000d |
| WABV | Abbeville, S.C.                 | 1000d |
| WACA | Camden, S.C.                    | 1000d |
| KCOR | Pierre, S.D.                    | 2500d |
| 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.                   | 5000d |
| KCBD | Lubbock, Tex.                   | 1000d |
| KBUS | Mexia, Tex.                     | 1000d |
| KTOD | Sinton, Tex.                    | 1000d |
| WISZ | Glen Burnie, Md.                | 500d  |
| WGOE | Richmond, Va.                   | 5000d |
| KNSD | Seattle, Wash.                  | 5000d |
| WIXK | New Richmond, Wis.              | 5000d |
| KSWV | Platteville, Wis.               | 5000d |
| WQTC | Two Rivers, Wis.                | 1000d |
| WAWA | West Allis, Wis.                | 1000d |

## 1600—187.5

|      |                   |       |
|------|-------------------|-------|
| WEUP | Huntsville, Ala.  | 5000d |
| WAPX | Montgomery, Ala.  | 1000d |
| KVIO | Cottonwood, Ariz. | 1000d |
| KXEW | Tucson, Ariz.     | 1000d |
| KGST | Fresno, Cal.      | 5000d |
| KWOW | Pomona, Cal.      | 5000d |
| KZOS | Santa Maria, Cal. | 5000d |
| KUBA | Yuba City, Calif. | 5000d |
| KLAB | Lakewood, Colo.   | 5000d |

| kHz  | Wave Length            | W.P.  |
|------|------------------------|-------|
| WKEN | Dover, Del.            | 1000d |
| WKTX | Atlantic Beach, Fla.   | 1000d |
| WKWF | Key West, Fla.         | 500d  |
| WHEW | Riviera Beach, Fla.    | 1000d |
| 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 | Card Rapids, Iowa      | 5000d |
| KMDO | Ft. Scott, Kans.       | 500d  |
| WSTL | Eminence, Ky.          | 500d  |
| WKVF | Greenville, Ky.        | 500d  |
| KFNW | Ferriday, La.          | 1000d |
| KLEB | Golden Meadow, La.     | 1000d |
| KNCB | Vivian, La.            | 5000d |
| WINX | Rockville, Md.         | 1000d |
| WBOS | Brookline, Mass.       | 5000d |
| WTYM | East Longmeadow, Mass. | 5000d |
| WAAM | Ann Arbor, Mich.       | 5000d |
| WTRU | Nekegon, Mich.         | 5000d |
| WKDL | Clarksdale, Miss.      | 1000d |
| WFFF | Columbia, Miss.        | 500d  |
| KATZ | St. Louis, Mo.         | 5000d |
| KTTN | Trenton, Mo.           | 500d  |
| KNCY | Nebraska City, Nebr.   | 500d  |
| KRFS | Superior, Nebr.        | 500d  |
| WWRJ | New York, N.Y.         | 5000d |
| WMCR | Oneida, N.Y.           | 500d  |
| WLSG | Sag Harbor, N.Y.       | 500d  |
| WXXW | Troy, N.Y.             | 500d  |
| WWRJ | Woodside, N.Y.         | 500d  |
| WGVJ | Charlotte, N.C.        | 1000d |
| WIDU | Fayetteville, N.C.     | 1000d |
| WHVL | Hendersonville, N.C.   | 1000d |
| WFRG | Greenville, N.C.       | 1000d |
| WKSK | W. Jefferson, N.C.     | 1000d |
| KDAK | Carrington, N.Dak.     | 500d  |
| WQOI | Ashabula, Ohio         | 1000d |
| WBLV | Springfield, Ohio      | 1000d |
| WTFY | Tiffin, Ohio           | 500d  |
| KUSH | Cushing, Okla.         | 1000d |
| KASH | Ashtabula, Ore.        | 500d  |
| KOHJ | St. Helens, Ore.       | 1000d |
| WHOL | Allentown, Pa.         | 500d  |
| WHRY | Elizabethtown, Pa.     | 500d  |
| WFIS | Fountain Inn, S.C.     | 1000d |
| WFNL | No. Augusta, S.C.      | 500d  |
| WHST | Harrisburg, Tenn.      | 5000d |
| WKB  | Midland, Tenn.         | 1000d |
| KRPB | Port Republic, Tex.    | 1000d |
| KBOR | Brownsville, Tex.      | 1000d |
| KWLD | Midland, Tex.          | 1000d |
| KCFH | Cuepo, Tex.            | 500d  |
| KYAL | McKinney, Tex.         | 5000d |
| KOGT | Orange, Tex.           | 1000d |
| KBCB | Centerville, Utah      | 1000d |
| WCPC | Chesapeake, Va.        | 1000d |
| WHLV | Wheeling, W.Va.        | 5000d |
| WCWC | Ripon, Wis.            | 5000d |

## 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.    |
|------------------|----------------------|---------|
| <b>540—555.5</b> |                      |         |
| CBK              | Regina, Sask.        | 50,000  |
| CBT              | Grand Falls, Nfld.   | 10,000  |
| <b>550—545.1</b> |                      |         |
| CFBR             | Sudbury, Ont.        | 1,000d  |
| CFNR             | Fredericton, N.B.    | 50,000  |
| CHLN             | Trois-Rivières, Que. | 10,000d |
| CKPG             | Prince George, B.C.  | 10,000  |
| <b>560—525.4</b> |                      |         |
| CFOS             | Owen Sound, Ont.     | 1,000   |
| CHCM             | Marystown, Nfld.     | 1,000d  |
| CHTK             | Prince Rupert, B.C.  | 1,000d  |
| CJKL             | Kirkland Lake, Ont.  | 5,000   |
| CKCN             | Sept-Îles, Que.      | 10,000d |
| CKNL             | Fort St. John, B.C.  | 1,000   |
| <b>570—526.0</b> |                      |         |
| CFGB             | Corner Brook, Nfld.  | 1,000   |
| CJEM             | Edmundston, N.B.     | 5,000d  |
| CKCQ             | Quebec, B.C.         | 1,000   |
| CKEK             | Granby, B.C.         | 1,000   |
| CFWH             | Whitehorse, Y.T.     | 1,000   |
| <b>580—516.9</b> |                      |         |
| CFRA             | Ottawa, Ont.         | 50,000d |

| kHz              | Wave Length          | W.P.    |
|------------------|----------------------|---------|
| CHLC             | Hatfield, Que.       | 5,000d  |
| CJFX             | Antigonish, N. S.    | 2,500d  |
| CKAP             | Kapuskasing, Ont.    | 1,000   |
| CKPR             | Port Arthur, Ont.    | 5,000d  |
| CKUA             | Edmonton, Alta.      | 1,000d  |
| CKWW             | Windsor, Ont.        | 10,000  |
| CKXR             | Salmon Arm, B.C.     | 1,000   |
| CKY              | Winnipeg, Man.       | 50,000  |
| <b>590—508.2</b> |                      |         |
| CFAR             | Flin Flin, Man.      | 10,000d |
| CFNL             | Fort Nelson, B.C.    | 1,000d  |
| CKEY             | Toronto, Ont.        | 500     |
| CKRS             | Jonquiere, Que.      | 1,000   |
| CFTK             | Terrace, B.C.        | 1,000   |
| VOCM             | St. John's, Nfld.    | 10,000  |
| <b>600—499.7</b> |                      |         |
| CFCH             | Montreal, Que.       | 5,000   |
| CFCH             | Callander, Ont.      | 10,000d |
| CFQC             | Saskatoon, Sask.     | 5,000   |
| CJOR             | Vancouver, B.C.      | 10,000  |
| CKCL             | Truro, N.S.          | 1,000   |
| <b>610—491.7</b> |                      |         |
| CHNC             | New Carlisle, Que.   | 10,000d |
| CHTM             | Thompson, Man.       | 5,000   |
| CJAT             | Trail, B.C.          | 1,000   |
| CKML             | Mont Laurier, P.Q.   | 1,000   |
| CKTB             | St. Catharines, Ont. | 10,000d |

| kHz              | Wave Length             | W.P.    |
|------------------|-------------------------|---------|
| CKYL             | Peace River, Alta.      | 10,000d |
| <b>620—483.6</b> |                         |         |
| CFCL             | Timmins, Ont.           | 10,000d |
| CKCK             | Regina, Sask.           | 5,000   |
| CKCM             | Grand Falls, Nfld.      | 10,000  |
| <b>630—475.9</b> |                         |         |
| CFCO             | Chatham, Ont.           | 10,000d |
| CFCY             | Charlottetown, P. E. I. | 1,000d  |
| CHED             | Edmonton, Alta.         | 10,000  |
| CHLT             | Sherbrooke, Que.        | 10,000d |
| CJET             | Smiths Falls, Ont.      | 5,000   |
| CKRR             | Huntsville, Ont.        | 1,000   |
| CKDW             | Kelowna, B.C.           | 1,000   |
| CKRC             | Winnipeg, Man.          | 10,000  |
| <b>640—468.5</b> |                         |         |
| CBN              | St. John's, Nfld.       | 10,000  |
| <b>680—440.9</b> |                         |         |
| CHFA             | Edmonton, Alta.         | 5,000   |
| CHFI             | Toronto, Ont.           | 1,000d  |
| CHLO             | St. Thomas, Ont.        | 10,000d |
| CJCN             | Grand Falls, Nfld.      | 1,000   |
| CJOB             | Winnipeg, Man.          | 10,000d |
| CKGB             | Timmins, Ont.           | 2,500   |

| kHz              | Wave Length           | W.P.    |
|------------------|-----------------------|---------|
| <b>690—434.5</b> |                       |         |
| CBF              | Montreal, Que.        | 50,000  |
| CBU              | Vancouver, B.C.       | 10,000  |
| <b>710—422.3</b> |                       |         |
| CFRG             | Gravelbourg, Sask.    | 5,000d  |
| CHYR             | Leamington, Ont.      | 10,000  |
| CKYM             | Ville-Marie, Que.     | 10,000d |
| CJOX             | Grand Bank, Nfld.     | 1,000d  |
| <b>730—410.7</b> |                       |         |
| CHIR             | Leamington, Ont.      | 250     |
| CJNR             | Blind River, Ont.     | 1,000   |
| CKAC             | Montreal, Que.        | 50,000  |
| CKDM             | Dauphin, Man.         | 10,000d |
| CKLG             | North Vancouver, B.C. | 5,000d  |
| <b>740—405.2</b> |                       |         |
| CBL              | Toronto, Ont.         | 50,000  |
| CBX              | Edmonton, Alta.       | 50,000  |
| <b>790—379.5</b> |                       |         |
| CFDR             | Dartmouth, N.S.       | 5,000   |
| CFWC             | Camrose, Alta.        | 10,000  |
| CKMR             | Newcastle, N.B.       | 1,000   |
| CKSD             | Sudbury, Ont.         | 10,000d |
| CHIC             | Brampton, Ont.        | 1,000d  |

| kH <sub>z</sub>               | Wave Length | W.P. | kH <sub>z</sub>                   | Wave Length | W.P. | kH <sub>z</sub>                     | Wave Length | W.P. | kH <sub>z</sub>              | Wave Length | W.P. |
|-------------------------------|-------------|------|-----------------------------------|-------------|------|-------------------------------------|-------------|------|------------------------------|-------------|------|
| <b>800—374.8</b>              |             |      | <b>990—302.8</b>                  |             |      | CJAF Cabano, Que.                   | 250         |      | <b>1400—214.2</b>            |             |      |
| CFOB Fort Frances, Ont.       | 1,000d      |      | CBW Winnipeg, Man.                | 50,000      |      | CJAV Port Alberni, B.C.             | 1,000d      |      | CFLD Burns Lake, B.C.        | 250         |      |
| CHAB Moose Jaw, Sask.         | 500n        |      | CBY Corner Brook, Nfld.           | 10,000      |      | CJCS Stratford                      | 250n        |      | CJFP Rivière du Loup, Que.   | 10,000d     |      |
| CHRC Quebec, Que.             | 10,000d     |      | <b>1000—299.8</b>                 |             |      | CJRW Summerside, P.E.I.             | 250         |      | CKCB Collingwood, Ont.       | 250         |      |
| CJAD Montreal, Que.           | 5,000n      |      | CKBW Bridgewater, N.S.            | 10,000      |      | CJWA Wawa, Ont.                     | 1,000d      |      | CKRN Rouyn, Que.             | 250         |      |
| CJBQ Belleville, Ont.         | 10,000d     |      | <b>1010—296.9</b>                 |             |      | CKWL Williams Lake, B.C.            | 250n        |      | CKSW Swift Current, Sask.    | 1,000d      |      |
| CJLX Fort William, Ont.       | 1,000       |      | CBR Calgary, Alta.                | 50,000      |      | CKBS St. Hyacinthe, Que.            | 250         |      |                              |             |      |
| CKOK Penticton, B.C.          | 5,000n      |      | CFRB Toronto, Ont.                | 50,000      |      | CKLS La Sarre, Que.                 | 250         |      | <b>1410—212.6</b>            |             |      |
| CKLW Windsor, Ont.            | 10,000d     |      | <b>1050—285.5</b>                 |             |      | CKOO Osoyoos, B.C.                  | 1,000d      |      | CFMB Montreal, Que.          | 10,000      |      |
| VOWR St. John's, Nfld.        | 500n        |      | CFGP Grande Prairie, Alta.        | 10,000      |      |                                     | 250n        |      | CFMV Vancouver, B.C.         | 10,000      |      |
| <b>810—370.2</b>              |             |      | CHUM Toronto, Ont.                | 50,000      |      | <b>1250—239.9</b>                   |             |      | CKSL London, Ont.            | 10,000      |      |
| CHQR Calgary, Alta.           | 1,000       |      | CJIC Sault Ste. Marie, Ont.       | 10,000d     |      | CBOF Ottawa, Ont.                   | 10,000      |      | <b>1420—211.1</b>            |             |      |
| <b>850—352.7</b>              |             |      | CJNB North Battleford, Sask.      | 2,500n      |      | CHWO Oakville, Ont.                 | 1,000d      |      | CJMT Chicoutimi, Que.        | 1,000       |      |
| CJJC Langley, B.C.            | 10,000      |      | CKSB St. Boniface, Man.           | 10,000      |      | CHSM Steinbach, Man.                | 10,000      |      | CJVR Melfort, Sask.          | 10,000      |      |
| CKRD Red Deer, Alta.          | 1,000       |      | <b>1060—282.8</b>                 |             |      | CKBL Matane, Que.                   | 10,000d     |      | CKPT Peterborough, Ont.      | 5,000       |      |
| CKVL Verdun, Que.             | 50,000d     |      | CFCN Calgary, Alta.               | 50,000      |      | CKOM Saskatoon, Sask.               | 5,000n      |      | <b>1430—209.7</b>            |             |      |
| <b>860—348.6</b>              |             |      | CJLR Quebec, Que.                 | 10,000      |      | <b>1260—238.0</b>                   |             |      | CKFH Toronto, Ont.           | 10,000      |      |
| CBH Halifax, N.S.             | 10,000d     |      | <b>1070—280.2</b>                 |             |      | CFRN Edmonton, Alta.                | 50,000      |      | <b>1440—208.2</b>            |             |      |
| CFPR Prince Rupert, B.C.      | 1,000       |      | CBA Sackville, N.B.               | 50,000      |      | <b>1270—263.1</b>                   |             |      | CFCP Courtenay, B.C.         | 1,000       |      |
| CHAK Inuvik, N.W.T.           | 1,000       |      | CFAX Victoria, B.C.               | 1,000       |      | CFGT Alma, Que.                     | 1,000       |      | CKPM Ottawa, Ont.            | 10,000      |      |
| CJBC Toronto, Ont.            | 50,000      |      | CHOK Samia, Ont.                  | 5,000d      |      | CHAT Medicine Hat, Alta.            | 10,000      |      | <b>1450—206.8</b>            |             |      |
| <b>900—333.1</b>              |             |      | <b>1080—277.6</b>                 |             |      | CHWK Chilliwack, B.C.               | 10,000      |      | CBG Gander, Nfld.            | 250         |      |
| CHML Hamilton, Ont.           | 5,000       |      | CKSA Lloydminster, Alta.          | 10,000      |      | CJCB Sydney, N.S.                   | 10,000      |      | CFAB Windsor, N.S.           | 250         |      |
| CHNO Sudbury, Ont.            | 10,000d     |      | <b>1090—275.1</b>                 |             |      | CHIQ Hamilton, Ont.                 | 10,000d     |      | CFJR Brockville, Ont.        | 1,000d      |      |
| CJBR Rimouski, Que.           | 1,000       |      | CHCC Lethbridge, Alta.            | 5,000       |      | CHQB Powell River, B.C.             | 5,000n      |      | CHEF Granby, Que.            | 250n        |      |
| CJVI Victoria, B.C.           | 10,000      |      | CHRS St. Jean, Que.               | 10,000d     |      | CJMS Montreal, Que.                 | 50,000      |      | CHRT Rivière du Loup, P.Q.   | 250         |      |
| CKBI Prince Albert, Sask.     | 10,000      |      | <b>1110—272.6</b>                 |             |      | CJSL Estevan, Sask.                 | 1,000       |      | CHUC Cobourg, Ont.           | 1,000       |      |
| CKDR Dryden, Ont.             | 1,000d      |      | CBD Saint John, N.B.              | 10,000      |      | CKCV Quebec, Que.                   | 10,000d     |      | CJBM Causapsal, Que.         | 1,000d      |      |
| CKDH Amherst, N.S.            | 250n        |      | CFLM Cornwall, Ont.               | 1,000       |      | <b>1290—232.4</b>                   |             |      | <b>1460—205.4</b>            |             |      |
| CKJL St. Jérôme, Que.         | 1,000       |      | CFTJ Galt, Ont.                   | 250d        |      | CFAM Altona, Man.                   | 10,000d     |      | CJOY Guelph, Ont.            | 10,000d     |      |
| CKTS Sherbrooke, Que.         | 1,000       |      | CHQT Edmonton, Alta.              | 10,000      |      | CJOE London, Ont.                   | 5,000n      |      | CKRB Ville St. Georges, Que. | 5,000n      |      |
| CKVD Val D'Or, Que.           | 2,500n      |      | <b>1130—265.3</b>                 |             |      | <b>1300—230.6</b>                   |             |      | <b>1470—204.0</b>            |             |      |
| <b>910—329.5</b>              |             |      | CKWX Vancouver, B.C.              | 50,000      |      | CBFA Moncton, N.B.                  | 5,000       |      | CFOX Pointe Claire, Que.     | 10,000d     |      |
| CBO Ottawa, Ont.              | 5,000       |      | <b>1140—263.0</b>                 |             |      | CJME Regina, Sask.                  | 1,000       |      | CFRW Winnipeg, Man.          | 5,000       |      |
| CFJC Kamloops, B.C.           | 10,000d     |      | CBI Sydney, N.S.                  | 10,000      |      | <b>1310—228.9</b>                   |             |      | CHOW Welland, Ont.           | 1,000d      |      |
| CFXS Stephenville, Nfld.      | 500         |      | CKXL Calgary, Alta.               | 10,000      |      | CFGM Richmond Hill, Ont.            | 10,000d     |      | <b>1480—202.6</b>            |             |      |
| CHRL Roberval, Que.           | 1,000       |      | <b>1150—260.7</b>                 |             |      | CHGB Ste-Anne-de-la-Pocatière, Que. | 2,500n      |      | CHRD Drummondville, Que.     | 10,000      |      |
| CJVD Drumheller, Alta.        | 5,000       |      | CHSJ Saint John, N.B.             | 10,000d     |      | CKOY Ottawa, Ont.                   | 5,000       |      | <b>1490—201.2</b>            |             |      |
| CKLY Lindsay, Ont.            | 1,000       |      | CKOC Hamilton, Ont.               | 5,000n      |      | <b>1320—227.1</b>                   |             |      | CFMR Fort Simpson, N.W.T.    | 25          |      |
| <b>920—329.9</b>              |             |      | CKTR Trois-Rivières, Que.         | 10,000d     |      | CHQM Vancouver, B.C.                | 50,000      |      | CFRC Kingston, Ont.          | 100         |      |
| CFRY Portage La Prairie, Man. | 1,000       |      | CKX Braidon, Man.                 | 10,000d     |      | CJSD Sorel, Que.                    | 10,000d     |      | CHYM Kitchener, Ont.         | 10,000d     |      |
| CJCH Halifax, N.S.            | 5,000       |      | <b>1170—256.3</b>                 |             |      | CKEC New Glasgow, N.S.              | 5,000       |      | CJSN Shaunavon, Sask.        | 1,000d      |      |
| CJCI Woodstock, N.B.          | 1,000       |      | CFNS Saskatoon, Sask.             | 1,000       |      | CKKW Kitchener, Ont.                | 1,000       |      | CKAD Middleton, N.S.         | 1,000d      |      |
| CKCY Sault Ste. Marie, Ont.   | 10,000d     |      | <b>1220—245.8</b>                 |             |      | CKKR Rosetown, Sask.                | 10,000      |      | CKBM Montmagny, Que.         | 1,000d      |      |
| CKNX Wingham, Ont.            | 2,500d      |      | CHSC St. Catharines, Ont.         | 1,000d      |      | <b>1340—223.7</b>                   |             |      | CFWB Campbell River, B.C.    | 250         |      |
| <b>930—322.4</b>              |             |      | CJOC Lethbridge, Alta.            | 500n        |      | CFGB Goose Bay, Nfld.               | 1,000       |      | <b>1500—199.9</b>            |             |      |
| CFBC Saint John, N.B.         | 10,000d     |      | CJRL Kenora, Ont.                 | 1,000       |      | CFLH Hearst, Ont.                   | 100         |      | CKAY Duncan, B.C.            | 1,000       |      |
| CJCA Edmonton, Alberta        | 10,000d     |      | CJSS Cornwall, Ontario            | 1,000       |      | CFSL Weyburn, Sask.                 | 1,000d      |      | <b>1510—199.1</b>            |             |      |
| CJON St. John's, Nfld.        | 5,000n      |      | CKDA Victoria, B.C.               | 10,000      |      | CFYK Yellowknife, N.W.T.            | 1,000       |      | CKRS Sherbrooke, P.Q.        | 10,000      |      |
| <b>940—319.0</b>              |             |      | CKCW Moncton, N.B.                | 10,000      |      | CHAD Amos, Que.                     | 250         |      | CKOT Tillsonburg, Ont.       | 1,000       |      |
| CBM Montreal, Que.            | 50,000      |      | CKSM Shawinigan, Que.             | 1,000       |      | CJLS Yarmouth, N.S.                 | 250         |      | <b>1540—195.0</b>            |             |      |
| CJGX Yorkton, Sask.           | 10,000      |      | <b>1230—243.8</b>                 |             |      | CFOM Ville Vanier, Que.             | 250         |      | CHIN Toronto, Ont.           | 50,000      |      |
| CJIB Vernon, B.C.             | 10,000d     |      | CBDR Schefferville, Que.          | 250         |      | CKAR-1 Parry Sound, Ont.            | 250         |      | <b>1550—193.5</b>            |             |      |
| <b>950—315.6</b>              |             |      | CFBV Smithers, B.C.               | 1,000d      |      | CKCR Revelstoke, B.C.               | 250         |      | CKE Windsor, Ont.            | 10,000      |      |
| CHER Sydney, N.S.             | 10,000      |      | CFGR Gravelbourg, Sask.           | 250n        |      | CKNR Elliott Lake, Ont.             | 250         |      | <b>1560—192.3</b>            |             |      |
| CKBB Barrie, Ont.             | 10,000d     |      | CFLK Kaspuksing, Ont.             | 100         |      | CKOX Woodstock, Ont.                | 1,000d      |      | CFRS Simcoe, Ont.            | 250d        |      |
| CKNB Campbellton, N.B.        | 10,000d     |      | CFPA Pert Arthur, Ont.            | 1,000d      |      | <b>1350—222.1</b>                   |             |      | <b>1570—191.1</b>            |             |      |
| <b>960—312.3</b>              |             |      | CHFC Churchill, Man.              | 250         |      | CHOV Pembroke, Ont.                 | 1,000       |      | CFOR Orillia, Ont.           | 10,000d     |      |
| CFAC Calgary, Alta.           | 10,000      |      | CHVD Dolbeau, P.Q.                | 1,000d      |      | CJDC Dawson Creek, B.C.             | 1,000       |      | CHUB Nanaimo, B.C.           | 1,000n      |      |
| CHNS Halifax, N.S.            | 10,000d     |      | CJSA Ste. Agathes des Monts, Que. | 250n        |      | CJLM Joliette, Que.                 | 1,000       |      | CKLM Montreal, Que.          | 50,000      |      |
| CKWS Kingston, Ont.           | 5,000n      |      | CJTT New Liskeard, Ont.           | 1,000d      |      | CKEN Kentville, N.S.                | 1,000       |      | <b>1580—189.2</b>            |             |      |
| <b>970—309.1</b>              |             |      | CKLD Thetford Mines, Que.         | 1,000d      |      | CKLB Oshawa, Ont.                   | 10,000d     |      | CBJ Chicoutimi, Que.         | 10,000      |      |
| CKCH Hull, Que.               | 5,000       |      | CKMP Midland, Ont.                | 250n        |      | <b>1360—220.4</b>                   |             |      | <b>1600—187.5</b>            |             |      |
| CBZ Fredericton, N.B.         | 10,000      |      | CKTK Kitimat, B.C.                | 1,000d      |      | CKBC Bathurst, N.B.                 | 10,000      |      | CJRN Niagara Falls, Ont.     | 10,000      |      |
| <b>980—305.9</b>              |             |      | VOAR St. John's, Nfld.            | 100         |      | <b>1370—218.8</b>                   |             |      |                              |             |      |
| CBV Quebec, Que.              | 5,000       |      | <b>1240—241.8</b>                 |             |      | CFLV Valleyfield, Que.              | 1,000       |      |                              |             |      |
| CFPL London, Ontario          | 10,000d     |      | CFLM La Tuque, Que.               | 1,000d      |      | <b>1380—217.3</b>                   |             |      |                              |             |      |
| CHEX Peterborough, Ont.       | 10,000d     |      | CFLS Lewis, P.Q.                  | 250n        |      | CFDA Victoriaville, Que.            | 1,000       |      |                              |             |      |
| CKGM Montreal, Que.           | 10,000      |      | CFVR Abbotsford, B.C.             | 1,000d      |      | CKLC Kingston, Ont.                 | 10,000d     |      |                              |             |      |
| CKNW New Westminster, B.C.    | 50,000      |      |                                   | 250n        |      | CKPC Brantford, Ont.                | 10,000      |      |                              |             |      |
| CKRM Regina, Sask.            | 10,000d     |      |                                   | 250n        |      | <b>1390—215.7</b>                   |             |      |                              |             |      |
|                               | 5,000n      |      |                                   | 250n        |      | CHOO Ajax, Ont.                     | 10,000      |      |                              |             |      |
|                               |             |      |                                   |             |      | CKKC Nelson, B.C.                   | 1,000       |      |                              |             |      |

# 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. f, 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  
Tuscaloosa WMBF-TV 23  
Decatur WTVY 23  
Dothan WDIQ 2  
Florence WFIQ 36  
Huntsville WWOI-TV 15  
WHTN-TV 19  
WHLI-TV 25  
WAAZ-TV 31  
Louisville WGIQ 43  
Mobile WKRG-TV 5  
WALA-TV 10  
Montgomery WCOV-TV 20  
WFAI-TV 12  
WVAB-TV 32  
WKAJ-TV 26  
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 12  
Juneau KTVF 11  
Sitka KINY-TV 8  
KIFW-TV 13

### ARIZONA

Nogales XHFA-TV 2  
Phoenix KZAZ 11  
KTUV 3  
KPAZ-TV 21  
KPHO-TV 5  
KODL-TV 10  
KTAR-TV 12  
KMET 8  
KPAZ-TV 21  
KVOA-TV 4  
KGUN-TV 9  
KOLD-TV 13  
KUAT-TV 11  
KIVA 11  
KBLU-TV 13

### ARKANSAS

El Dorado KTVE 10  
Ft. Smith KFSA-TV 5  
Jonesboro KAIT-TV 8  
Little Rock KARL-TV 4  
KATV 7  
KTHV 11  
KETS 2

### CALIFORNIA

Bakersfield KLYD-TV 17  
KERO-TV 23  
KBAK-TV 29  
KNSL-TV 12  
KBCS-TV 52  
Chico XHBC-TV 3  
Corona KIEM-TV 3  
El Centro KVIQ-TV 6  
Mexicali KRWI-TV 13  
Eureka KKLK-TV 24  
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  
KCOB 13  
KWHY-TV 22  
KMEX-TV 34  
KTCET 28  
KLOC-TV 19  
Modesto KMBY-TV 46  
Monterey KTVU 2  
Oakland-San Francisco KPMP-TV 42  
Palm Springs KRCL-TV 3  
Redding KIXE-TV 9

Location C.L. Chan. Location C.L. Chan. Location C.L. Chan.

Sacramento KCRA-TV 3  
KXTV 10  
KTVI 6  
Salinas KSBW-TV 8  
Monterey KVCB-TV 24  
San Bernardino KHOF-TV 30  
San Diego KKEB-TV 15  
KFMB-TV 8  
KOGO-TV 10  
KCST 39  
San Diego-Tijuana XETV 6  
San Francisco XEWT-TV 12  
KRON-TV 4  
KPX 7  
KGO-TV 7  
KQED 9  
KSAN-TV 32  
KBHK-TV 44  
San Jose KNTV 11  
KEMO-TV 20  
KQSC-TV 35  
San Luis KTEH-TV 3  
Obispo KSBY-TV 6  
San Mateo KCSM-TV 14  
Santa Barbara KSTV 3  
Santa Maria KCOY-TV 12  
Stockton-Sacramento KQVR 13  
Visalia KICU-TV 43

### COLORADO

Colo. Springs KKTU 11  
KRDO-TV 13  
Denver KWGN-TV 2  
KOA-TV 4  
KLZ-TV 7  
KBTU 9  
Durango KRMK-TV 6  
Grand Junction KREZ-TV 5  
Montrose KREY-TV 10  
Pueblo KOAA-TV 5  
Sterling KTVS 3

### CONNECTICUT

Bridgeport WFTT 43  
Hartford WEDW 49  
WHTC 18  
WEDH 24  
New Britain WHNB-TV 30  
Hartford WNHCTV 8  
New Haven WEDN 53  
Waterbury WATR-TV 20

### DELAWARE

Wilmington WHYY-TV 12

### DISTRICT OF COLUMBIA

Washington WRC-TV 4  
WTTG 7  
WMAL-TV 7  
WTOP-TV 9  
WFAN-TV 14  
WETA-TV 26  
WDCA-TV 20

### FLORIDA

Clearwater WFTS-TV 28  
Daytona Beach WJNR-TV 22  
Orlando WESH-TV 2  
Ft. Myers WINK-TV 11  
Ft. Pierce WTVT 34  
Gainesville WFTS-TV 34  
Jacksonville WJXT 4  
WFGA-TV 12  
WJKS-TV 17  
WTVT 17  
WUMJ-TV 47  
WTVJ 4  
WCIW-TV 6  
WCKT 7  
WLBW-TV 10  
WTHS-TV 10  
WSEC-TV 17  
WJAX-TV 23  
WDBO-TV 6  
WFTV 9  
WMEF-TV 24  
WJHG-TV 7  
WEAR-TV 23  
WFSW-TV 11  
St. Petersburg WSUN-TV 38  
Tampa WTOG 44  
Tallahassee WCTV 6  
Thomasville WFSU-TV 11  
Tallahassee WFLA-TV 8  
Tampa WCLY-TV 10  
St. Petersburg WTVT 13

W. Palm Beach WUSF-TV 16  
WEAT-TV 12

### GEORGIA

Albany WALB-TV 10  
Ashburn WJIA-TV 23  
Athens IWGT 8  
Atlanta WSB-TV 2  
WAGA-TV 5  
WAIL-TV 11  
WVETV 30  
WBRV-TV 36  
WJRI-TV 17  
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  
WACS-TV 25  
WMAZ-TV 13  
WCBW-TV 41  
WABW-TV 14  
WSAV-TV 3  
WTOG-TV 11  
WVAN-TV 9  
WXGA-TV 8  
WCES-TV 20

### HAWAII

Hilo KPUA-TV 9  
KHAW-TV 11  
KHOV 13  
Honolulu KHON-TV 2  
KHVH-TV 4  
KGBM-TV 9  
KTRG-TV 13  
KIHET 11  
KMAU-TV 3  
Kaii-TV 12  
KMEB 10

### IDAHOO

Boise KBOI-TV 2  
KTUV 7  
Idaho Falls-Pocatello KID-TV 3  
KIFI-TV 8  
Lewiston KLEW-TV 3  
Moscow KUID-TV 7  
Twin Falls KMTV 11

### ILLINOIS

Carbondale WSIU 8  
Champaign WCIA 3  
WICD 15  
Chicago WTTW-TV 12  
WBBM-TV 2  
WMAQ-TV 5  
WKBW-TV 7  
WGN-TV 9  
WCIU-TV 26  
WFLD 32  
WTTW 11  
WXXW 20  
WAND 17  
WCEE-TV 23  
WSEL-TV 33  
WEEQ-TV 35  
WQAD-TV 8  
WIRL-TV 19  
WEEK-TV 25  
WEDV-TV 31  
WGBS-TV 31  
WREX-TV 13  
WTVU 17  
Rock Island WHBF-TV 4  
Springfield WICS 20

### INDIANA

Bloomington WTTV 4  
Indianapolis WTVW 7  
Evansville WFTV 14  
WHEH 50  
WANE-TV 15  
WPTA 21  
WKYC-TV 33  
WFBM-TV 8  
WISH-TV 8  
WLWI 13  
Lafayette WLFI-TV 18  
Marion WTAJ-TV 31  
Muncie WLBC-TV 49  
Richmond WACH-TV 43  
St. John WCAE-TV 50  
South Bend WNOU-TV 22  
WSBT-TV 22  
South Bend-Elkhart WSVJ 28  
Terre Haute WTVU 22  
Vincennes WTHI-TV 10  
WTVU 22

Location C.L. Chan.

### IOWA

Ames-Des Moines WOI-TV 5  
Cedar Rapids KCRG-TV 9  
Waterloo WMT-TV 2  
Davenport WOC-TV 6  
Des Moines KRNT-TV 8  
WHO-TV 13  
Ft. Dodge IKDPS-TV 11  
KQV-D-TV 21  
Sioux City KCAU-TV 9  
KMEG 14  
KTVI 4  
Waterloo KWWL-TV 7

### KANSAS

Ensign KTVC 6  
Garden City KGLD 11  
Goodland KUPK-TV 13  
Great Bend WKLB-TV 10  
Hays KCKT 2  
Hutchinson-Wichita KAYS-TV 7  
Pittsburg KTVH 12  
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  
WLBG-TV 62  
Louisville WAVE-TV 3  
WHAS-TV 11  
WLKY-TV 32  
WFPK-TV 15  
WPSD-TV 6

### LOUISIANA

Alexandria KALB-TV 5  
Baton Rouge WBRZ 2  
Lafayette WAFB-TV 9  
KATC 3  
KLFY-TV 10  
KLNH-TV 15  
Lake Charles KPLC-TV 7  
Monroe KNOC-TV 8  
New Orleans WWL-TV 4  
WDSU-TV 6  
WVUE 12  
WYYES-TV 8  
WVUU-TV 26  
Shreveport KTBS-TV 3  
KATL-TV 6  
KSLA-TV 12  
KUZN-TV 39

### MAINE

Augusta WICB 10  
Bangor WLBZ-TV 2  
WABI-TV 5  
WENT 7  
Calais WMEB-TV 13  
Orono WMTW-TV 8  
Poland Spring WCHS-TV 7  
Portland WGAN-TV 9  
Presque Isle WAGM-TV 8  
WMMW-TV 10

### MARYLAND

Baltimore WMAR-TV 2  
WBAL-TV 11  
WJZ-TV 24  
WMET-TV 13  
WETM 67  
WTOB-TV 52  
WBOS-TV 16

### MASSACHUSETTS

Adams WDCD 19  
Boston WBZ-TV 4  
WHDH-TV 5  
WVAC-TV 38  
WSBK-TV 3  
WGRH-TV 2  
WGBX-TV 44  
Cambridge-Boston WKBG-TV 56  
Greenfield WRBP 32  
Springfield WWLP 22  
WHDH-TV 40  
WJZZ-TV 14

### MICHIGAN

Battle Creek WWWU-TV 41  
Bay City-Saginaw WNEM-TV 5  
Cadillac WTVU 9  
Traverse City WTVU 9



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# WHITE'S RADIO LOG

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

## UTAH

|       |         |    |
|-------|---------|----|
| Logan | KUSU-TV | 12 |
| Ogden | KOET    | 1  |
|       | KWCS-TV | 18 |

| Location       | C.L.    | Chan. |
|----------------|---------|-------|
| Provo          | KBYU-TV | 11    |
| Salt Lake City | KUTV    | 2     |
|                | KCPX-TV | 4     |
|                | KSL-TV  | 4     |
|                | KUED    | 7     |

## VERMONT

|               |         |    |
|---------------|---------|----|
| Burlington    | WCAX-TV | 3  |
|               | KWTK    | 30 |
| Rutland       | KWVR    | 28 |
| St. Johnsbury | KWTV    | 20 |
| Windsor       | KWTA    | 41 |

## VIRGINIA

|                    |         |    |
|--------------------|---------|----|
| Bristol            | WCYB-TV | 5  |
| Hampton-Norfolk    | WVEC-TV | 13 |
|                    | WHRO-TV | 15 |
|                    | WVA-TV  | 3  |
| Harrisonburg       | WVLA-TV | 13 |
| Lynchburg-Roanoke  | WTAR-TV | 3  |
| Norfolk            | WXEX-TV | 8  |
| Petersburg         | WYAH-TV | 27 |
| Richmond           | WAVY-TV | 10 |
| Portsmouth         | WTVR-TV | 10 |
| Portsmouth-Norfolk | WRVA-TV | 12 |
| Richmond           | KWCE-TV | 23 |
|                    | WCVW    | 57 |
| Roanoke            | WBRA-TV | 15 |
|                    | WDBJ-TV | 7  |
|                    | WISN-TV | 10 |
| Staunton           | WRFT-TV | 27 |
|                    | KWPT    | 51 |

## WASHINGTON

|            |         |    |
|------------|---------|----|
| Bellingham | KVOS-TV | 12 |
| Pasco      | KEPR-TV | 19 |
| Pullman    | KWSC-TV | 10 |
| Richland   | KNDU    | 25 |

| Location       | C.L.    | Chan. |
|----------------|---------|-------|
| Seattle        | KOMO-TV | 4     |
|                | KING-TV | 5     |
|                | KIRO-TV | 7     |
|                | KCTS-TV | 9     |
|                | KREM-TV | 2     |
|                | KKLY-TV | 4     |
|                | KHQ-TV  | 6     |
|                | KSPS-TV | 7     |
|                | KNTN-TV | 11    |
| Tacoma-Seattle | KTVW    | 13    |
| Tacoma         | KLAY-TV | 20    |
|                | KPEC-TV | 56    |
|                | KTPS    | 62    |
|                | KNDZ    | 23    |
| Yakima         | KIMA-TV | 29    |
|                | KYVE-TV | 47    |

## WEST VIRGINIA

|                  |         |    |
|------------------|---------|----|
| Bluefield        | WHIS-TV | 6  |
| Charleston       | WCHS-TV | 8  |
|                  | WTIP-TV | 23 |
|                  | WBOY-TV | 12 |
|                  | WMUL-TV | 67 |
|                  | WSAZ-TV | 3  |
|                  | WHIT-TV | 13 |
|                  | WOAY-TV | 4  |
| Oak Hill         | WVAP-TV | 15 |
| Parkersburg      | WDTV    | 5  |
| Marletta, O.     | WTRF-TV | 7  |
| Weston           |         |    |
| Wheeling         |         |    |
| Steubenville, O. |         |    |

## WISCONSIN

|            |         |    |
|------------|---------|----|
| Eau Claire | WEAU-TV | 13 |
| Green Bay  | WBTV-TV | 2  |
|            | WFRV-TV | 1  |
|            | WLUX-TV | 11 |
| LaCrosse   | WKBT    | 8  |

| Location  | C.L.    | Chan. |
|-----------|---------|-------|
| Madison   | WISC-TV | 3     |
|           | WMTV    | 15    |
|           | WKOW-TV | 27    |
|           | WHA-TV  | 21    |
|           | WTMJ-TV | 4     |
|           | WITI-TV | 6     |
|           | WISN-TV | 12    |
|           | WVTV    | 18    |
|           | KWMS    | 10    |
|           | KWMT    | 36    |
| Rhineland | WAEO-TV | 20    |
| 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

|           |         |    |
|-----------|---------|----|
| Aquidilla | WOLE-TV | 12 |
| Caguas    | WKBM-TV | 11 |
| Mayaguez  | WORA-TV | 5  |
|           | KWIP-TV | 3  |
| Ponce     | WRIK-TV | 7  |
|           | WUAT-TV | 9  |
|           | WPSP    | 14 |
| San Juan  | WSAQ-TV | 12 |
|           | 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. | Location               | C.L.                  | Chan. | Location                             | C.L.       | Chan. | Location                               | C.L.       | Chan. |
|-------------------------------------|------------|-------|------------------------|-----------------------|-------|--------------------------------------|------------|-------|----------------------------------------|------------|-------|
| Adams Hill, B.C.                    | CFRC-TV-8  | 11    | Cheticamp, N.S.        | CBFCT                 | 10    | Hinton, Alta.                        | CBXT-3     | 8     | Midway, B.C.                           | CKMY-TV-1  | 7     |
| Aldicane, Sask.                     | CKBI-TV-1  | 10    | Chicoutimi, Que.       | CKRS-TV-2             | 2     | Hixon, B.C.                          | CKPG-TV-1  | 10    | Minden, Ont.                           | CHEX-TV-2  | 10    |
| Amherst, N.S.                       | CJCH-TV-3  | 9     | Churchill, Man.        | CHGH-TV               | 4     | Houston, B.C.                        | CFTK-TV-10 | 2     | Moncton, N.B.                          | CBAFT      | 11    |
| Antigonish, N.S.                    | CJCB-TV-2  | 9     | Clearwater, B.C.       | CFOR-TV-10            | 2     | Hudson Hope, B.C.                    | CJDC-TV-1  | 11    | Moncton, N.B.                          | CKCW-TV    | 2     |
| Argenteau, Nfld.                    | CJQX-TV    | 3     | Clinton, B.C.          | CFOR-TV-9             | 9     | Huntsville, Ont.                     | CKFR-TV-2  | 8     | Mont Blanc Perce, Que.                 | CFGW-TV-2  | 8     |
| Ashcroft, B.C.                      | CFRC-TV-2  | 10    | Cloridorme, Que.       | CHAU-TV-8             | 6     | Invermere, B.C.                      | CFWL-TV-1  | 6     | Mont Climont, Que.                     | CKBL-TV-1  | 11    |
| Ashmont, Alta.                      | CFRN-TV-4  | 12    | Coleman, Alta.         | CJLH-TV-1             | 12    | Inverness, N.S.                      | CJCB-TV-1  | 6     | Mont Georges, Que.                     | CKHQ-TV-5  | 13    |
| Athabasca, Alta.                    | CBXT-1     | 8     | Corner Brook, Nfld.    | CBY                   | 5     | Jasper, Alta.                        | CBXT-4     | 5     | Mont Laurier, Que.                     | CBFT-2     | 3     |
| Atikokan, Ont.                      | CBWT-1     | 7     | Corner Brook, Nfld.    | CJON-TV-1             | 10    | Jasper, Que.                         | CKRS-TV    | 12    | Mont-Laurier, Que.                     | CBFT-2     | 3     |
| Avola, B.C.                         | CFRC-TV-13 | 3     | Coronawall, Ont.       | CJSS-TV               | 8     | Jubilee Mountain, B.C.               | CFWL-TV-2  | 8     | Mont-Louis, Que.                       | CKBL-TV-4  | 2     |
| Baldy Mountain, Man.                | CKSS-TV    | 8     | Coronation, Alta.      | CKRD-TV-1             | 10    | Kamloops, B.C.                       | CFTR-TV    | 4     | Mont Tremblant, Que.                   | CBFT-1     | 11    |
| Baie St. Paul, Que.                 | CKRT-TV-1  | 2     | Colgate, Saskatchewan  | CKCK-TV-1             | 12    | Kapuskasing, Ont.                    | CFBT       | 12    | Montreal, Que.                         | CBFT       | 2     |
| Bancroft, Ont.                      | CHEX-TV-1  | 2     | Courtenay, B.C.        | CBUT-1                | 9     | Kapuskasing, Ont.                    | CFCL-TV-3  | 3     | Montreal, Que.                         | CBMT       | 6     |
| Banff, Alta.                        | CKRD-TV-2  | 10    | Cranbrook, B.C.        | CBUT                  | 10    | Kearns, Ont.                         | CFCL-TV-2  | 2     | Montreal, Que.                         | CFCF-TV    | 12    |
|                                     | CHCT-TV-2  | 13    | Crawford Bay, B.C.     | CBUT-3                | 5     | Kemano, B.C.                         | CFCL-TV-5  | 2     | Montreal, Que.                         | CFTM-TV    | 10    |
| Barrie, Ont.                        | CKVR-TV    | 3     | Crecent Valley, B.C.   | CHMS-TV-1             | 5     | Kelowna, B.C.                        | CHBC-TV    | 2     | Mount Timothy, B.C.                    | CHAB-TV    | 4     |
| Bayview, N.S.                       | CJCH-TV-2  | 6     | Creston, B.C.          | CBUT-4                | 3     | Kenora, Ont.                         | CBWT       | 8     |                                        |            |       |
| Big River, Sask.                    | CKBI-TV-5  | 9     | Dawson Creek, B.C.     | CJDC-TV               | 3     | Kenosaw, B.C.                        | CHCK-TV-1  | 5     | Moyie, B.C.                            | CFRC-TV-6  | 5     |
| Bon Accord, N.B.                    | CHSJ-TV-1  | 6     | Deer Lake, Nfld.       | CBYAT                 | 12    | Kildala, B.C.                        | CHCK-TV-1  | 5     | Mt. Parizeau, B.C.                     | CFTR-TV-8  | 5     |
| Bonanza, Nfld.                      | CJON-TV-2  | 10    | Drumheller, Alta.      | CFCN-TV-1             | 12    | Kingston, Ont.                       | CKWS-TV    | 13    | Mt. Poole (near Queen Charlotte), B.C. | CHQC-TV-1  | 4     |
| Bonnyville, Alta.                   | CKSA-TV-2  | 9     | Drumheller, Alta.      | CHCT-TV-1             | 12    | Kitchener, Ont.                      | CKGO-TV    | 13    | Murdochville, Que.                     | CKBL-TV-2  | 6     |
| Boss Mountain, B.C.                 | CFRC-TV-16 | 7     | Dryden, Ont.           | CBWD                  | 9     | Kokish, B.C.                         | CFKB-TV-2  | 9     |                                        |            |       |
| Boston Bar, B.C.                    | CFRC-TV-9  | 5     | Eastend, Sask.         | CJFB-TV-1             | 2     | Labrador City, Nfld.                 | CJCL-TV    | 13    | Nakusp, B.C.                           | CKMU-TV-1  | 3     |
| Bowen Island, B.C.                  | CBUT-4     | 13    | Edmonton, Alta.        | CBXT                  | 5     | Lake Louise, Alta.                   | CFLV-TV-1  | 6     |                                        | CJNP-TV-2  | 4     |
| Bowen Island, B.C.                  | CHAN-TV-2  | 3     | Edmonton, Alta.        | CJBR-TV               | 13    | L'Anse a Vallau, Que.                | CHAU-TV-9  | 7     | Nass Camp (Near Lava Lake)             | CFTR-TV-6  | 5     |
| Bralorne, B.C.                      | CFCE-TV-15 | 3     | Edmonton, N.B.         | CBFT-3                | 12    | Lawn, Nfld.                          | CJQX-TV-10 | 10    | Nelson, B.C.                           | CBUT-1     | 9     |
| Brandon, Man.                       | CKX-TV     | 5     | Elliott Lake, Ont.     | CKSO-TV-1             | 3     | Lethbridge, Alta.                    | CJLH-TV    | 7     | Newcastle, N.B.                        | CKAM-TV-1  | 7     |
| Brooks, Alta.                       | CFCN-TV-3  | 9     | Enderby, B.C.          | CFEN-TV-1             | 5     | Lillooet, B.C.                       | CFRC-TV-1  | 11    | Newcastle Ridge, B.C.                  | CFKB-TV-1  | 7     |
| Bullhead Mt., B.C.                  | CJDC-TV-2  | 8     | Enderby, B.C.          | CHBC-TV-5             | 72    | Liverpool, N.S.                      | CBHT-1     | 12    | New Denver, B.C.                       | CHSL-TV-1  | 6     |
| Burns, Alta.                        | CJLH-TV-3  | 3     | Falkland, B.C.         | CFWS-TV-1             | 5     | Lloydminster, Alta.                  | CKSA-TV    | 2     | New Glasgow, N.S.                      | CFCY-TV-1  | 7     |
| Burnaby, B.C.                       | CHAN-TV    | 2     | Fisher Branch, Man.    | CBWT-1                | 10    | London, Ont.                         | CFPL-TV    | 10    | Ninkish, B.C.                          | CFNV-TV-2  | 6     |
| Burns Lake, B.C.                    | CFTR-TV-4  | 4     | Flin Flon, Man.        | CBWT                  | 10    | Lookout Ridge, Near Chilliwack, B.C. | CBUT-2     | 3     | Nipawin, Sask.                         | CKBI-TV-4  | 2     |
| Calgary, P.Q.                       | CKRT-TV-4  | 5     | Fort Fraser, B.C.      | CKPG-TV-3             | 6     | Lumby, B.C.                          | CHID-TV-3  | 3     | North Battleford, Sask.                | CKBI-TV-2  | 7     |
| Calgary, Alta.                      | CFCN-TV    | 2     | Foxwarren, Man.        | CKX-TV-1              | 11    | Lynn Lake, Man.                      | CBTA-TV    | 8     |                                        |            |       |
| Callander, Ont.                     | CFCH-TV    | 10    | Gaspe, Que.            | CHAU-TV-6             | 10    | Mabel Lake, B.C.                     | CHPP-TV-1  | 8     | New Glasgow, N.S.                      | CFCY-TV-1  | 7     |
| Campbellton, N.B.                   | CKCD-TV    | 2     | Gaspe West, Que.       | (Bechevalse Mountain) | 6     | Magdalen Islands, Que.               | CBFT-1     | 12    | Ninkish, B.C.                          | CFNV-TV-2  | 6     |
| Camp Woss, B.C.                     | CFNV-TV-1  | 3     | Geraldton, Ont.        | CBAT                  | 13    | Malakwa, B.C.                        | CFPI-TV-1  | 5     | Nipawin, Sask.                         | CKBI-TV-4  | 2     |
| Canning, N.S.                       | CJCH-TV-1  | 10    | Goose Bay, Nfld.       | CFLA-TV               | 8     | Malartic, Que.                       | CFCL-TV-5  | 5     | North Battleford, Sask.                | CKBI-TV-2  | 7     |
| Canoe, B.C.                         | CHBC-TV-8  | 3     | Grand Bank, Nfld.      | CJQX-TV-1             | 11    | Manicouagan, Que.                    | CKHQ-TV-1  | 10    | Ocean Falls, B.C.                      | CFTR-TV-2  | 11    |
| Canoe Mountain, Near Valemont, B.C. | CFRC-TV-14 | 8     | Grand Falls, Nfld.     | CBAT                  | 11    | Manitowadge, Ont.                    | CBAT-1     | 8     | Oalla                                  | CHCK-TV-3  | 8     |
| Carleton, Que.                      | CHAU-TV    | 5     | Grand Falls, Nfld.     | CJCN-TV               | 7     | Marquis, Sask.                       | CKMJ-TV    | 7     | Oliver, B.C.                           | CHBC-TV-3  | 8     |
| Carlyle Lake, Sask.                 | CFST-TV    | 7     | Grand Forks, B.C.      | CBUT-5                | 5     | Marystown, Nfld.                     | CBNT-3     | 3     | Ottawa, Ont.                           | CBOT       | 9     |
| Castlegar, B.C.                     | CBUT-2     | 3     | Grande Prairie, Alta.  | CBXT                  | 10    | Matagami, Que.                       | CKRN-TV-4  | 7     |                                        |            |       |
| Causapscal, Que.                    | CKBL-TV-3  | 6     | Grande Vallee          | CKBL-TV-3             | 11    | Matane, Que.                         | CKBL-TV    | 6     | Outardes, Que.                         | CKHQ-TV-13 | 13    |
| Cawston, B.C.                       | CKHC-TV-3  | 3     | Greenwater Lake, Sask. | CKBI-TV-3             | 3     | Meadow Lake, Sask.                   | CKSA-TV-1  | 12    | Parry Sound, Ont.                      | CKVR-TV-1  | 11    |
| Chandler, Que.                      | CHAU-TV-4  | 7     | Haliburton, Ont.       | CKVR-TV               | 5     | Medicine Hat, Alta.                  | CHAT-TV    | 2     | Passmore, B.C.                         | CHMS-TV-2  | 2     |
| Chapleau, Ont.                      | CFCL-TV-6  | 7     | Halifax, N.S.          | CBHT                  | 3     | Melita, Man.                         | CKX-TV-2   | 9     | Peace River, Alta.                     | CBAT-1     | 5     |
| Charlottetown, P.E.I.               | CFCY-TV    | 13    | Halifax, N.S.          | CJCH-TV               | 5     | Merritt, B.C.                        | CFRC-TV-3  | 5     | Peace River, B.C.                      | CHPT-TV-1  | 5     |
| Cherryville, B.C.                   | CJWR-TV-1  | 10    | Hamilton, Ont.         | CHCH-TV               | 11    | Mica Creek Village, B.C.             | CFQZ-TV-2  | 10    | Pembroke, Ont.                         | CHOV-TV    | 5     |
| Chicoutimi, P.Q.                    | CJPM-TV    | 6     | Hearst, Ont.           | CFBT-2                | 7     | Micoua, Que.                         | CKHQ-TV-3  | 6     | Penticton, B.C.                        | CHBC-TV-1  | 13    |
| Chilliwack, B.C.                    | CHAN-TV-1  | 11    |                        | CFCL-TV-4             | 4     |                                      |            |       | Perre, Que.                            | CHAU-TV    | 5     |

| Location                  | C.L.       | Chan. | Location                          | C.L.      | Chan. | Location                     | C.L.      | Chan. | Location             | C.L.      | Chan. |
|---------------------------|------------|-------|-----------------------------------|-----------|-------|------------------------------|-----------|-------|----------------------|-----------|-------|
| Placentia, Nfld.          | CBNT-2     | 12    | Riverhurst, Sask.                 | CJFB-TV-3 | 10    | St. Georges de Beauce, P. Q. | CBVT-1    | 2     | Val D'Or, Que.       | CKRN-TV-2 | 8     |
| Port Albernie, B.C.       | CBUT-3     | 4     | Rivière-au-Renard                 | CHAU-TV-7 | 7     | St. John's, Nfld.            | CBNT      | 8     | Val Marie, Sask.     | CJFB-TV-2 | 2     |
| Port Alfred, Que.         | CKRS-TV-1  | 9     | Rivière du Loup, Que.             | CKRT-TV   | 7     | St. Marguerite-Marie, Que.   | CJON-TV   | 6     | Vancouver, B.C.      | CBUT      | 2     |
| Port Alice, B.C.          | CKPA-TV-1  | 2     | Rivière du Loup, Que.             | CKRT-TV   | 7     | St. Quentin, N.B.            | CHAU-TV-1 | 2     | Vernon, B.C.         | CHBC-TV-2 | 7     |
| Port Arthur, Ont.         | CKPR-TV    | 2     |                                   |           |       | St. Rose du Dégel, Que.      | CHAU-TV-2 | 10    | Victoria, B.C.       | CHEK-TV   | 6     |
| Port Aux Basques, Nfld.   |            |       |                                   |           |       | Stephenville, Nfld.          | CBYT-1    | 8     | Ville Marie, Que.    | CKRN-TV-3 | 6     |
|                           | CBYBT      | 3     | Roberval, Que.                    | CKRS-TV-3 | 8     | Stranraer, Sask.             | CFQC-TV-1 | 3     | Waterton Park, Alta. |           |       |
| Port Daniel, Que.         | CHAU-TV-3  | 10    | Rouyn, Que.                       | CKRN-TV   | 4     | Sturgeon Falls, Ont.         | CBFT      | 7     |                      |           |       |
| Port Hardy, B.C.          | CFKB-TV-3  | 3     | Saint John, N.B.                  | CHSJ-TV   | 4     | Sudbury, Ont.                | CBFT-1    | 13    |                      |           |       |
| Port Renfrew, B.C.        |            |       | Salmon Arm, B.C.                  | CHBC-TV-4 | 8     | Swift Current, Sask.         | CJFB-TV   | 5     |                      |           |       |
|                           | CJTV-TV-1  | 11    | Saskatoon, Sask.                  | CFQC-TV   | 8     | Sydney, N.S.                 | CJCB-TV   | 12    |                      |           |       |
|                           |            |       | Sault Ste. Marie, Ont.            | CJIC-TV   | 2     | Temiscaming, Que.            | CBFT-2    | 12    |                      |           |       |
| Port Rexton, Nfld.        | CBNT-1     | 13    | Savona, B.C.                      | CFCR-TV-7 | 8     | Terrace, B.C.                | CJTK-TV   | 3     |                      |           |       |
| Prince Albert, Sask.      | CKBI-TV    | 5     | Schefferville, Que.               | CFKL-TV   | 11    | The Pas, Man.                | CBWBT-1   | 7     |                      |           |       |
| Prince George, B.C.       | CKPG-TV    | 2     | Senneterre, Que.                  | CKRN-TV-1 | 11    | Timmins, Ont.                | CFCL-TV   | 6     |                      |           |       |
| Princeton, B.C.           | CHGP-TV-1  | 5     | Sheet Harbour, N.S.               | CBHT-4    | 11    | Toronto, Ont.                | CBFT      | 9     |                      |           |       |
| Prince Rupert             | CFTK-TV-1  | 6     | Shelburne, N.S.                   | CBHT-2    | 8     | Trail, B.C.                  | CFGO-TV   | 9     |                      |           |       |
| Promontory Mountain, B.C. |            |       | Sherbrooke, Que.                  | CHLT-TV   | 7     | Trois-Rivières, Que.         | CKTM-TV   | 13    |                      |           |       |
|                           | CFCR-TV-12 | 5     | Sioux Lookout, Ont.               | CBWDT-1   | 12    | Ucluelet, B.C.               | CKUP-TV-1 | 6     |                      |           |       |
| Quebec, Que.              | CBYT       | 11    | Skaha Lake (near Pentelton), B.C. | CHBC-TV-7 | 10    | Upsalquitche Lake, N.B.      | CKAM-TV   | 12    |                      |           |       |
|                           | CFQM-TV    | 4     | Smithers, B.C.                    | CFTK-TV-2 | 5     |                              |           |       |                      |           |       |
|                           | CKMI-TV    | 5     | Sointula, B.C.                    | CFKB-TV-4 | 5     |                              |           |       |                      |           |       |
| Quesnel, B.C.             | CFCR-TV-11 | 7     | Spences Bidge, B.C.               |           |       |                              |           |       |                      |           |       |
| Quesnel, B.C.             | CKCQ-TV-1  | 13    |                                   |           |       |                              |           |       |                      |           |       |
| Red Deer, Alta.           | CKRD-TV    | 10    |                                   |           |       |                              |           |       |                      |           |       |
| Red Lake, Ont.            | CBWET      | 6     |                                   |           |       |                              |           |       |                      |           |       |
| Regina, Sask.             | CHRE-TV    | 9     |                                   |           |       |                              |           |       |                      |           |       |
| Regina, Sask.             | CKCK-TV    | 2     |                                   |           |       |                              |           |       |                      |           |       |
| Revelstoke, B.C.          | CFZQ-TV    | 9     |                                   |           |       |                              |           |       |                      |           |       |
| Rimouski, Que.            | CJBR-TV    | 3     |                                   |           |       |                              |           |       |                      |           |       |

## 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, Tenaflly, 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?

| kHz | Call | Identification | Location | GMT |
|-----|------|----------------|----------|-----|
|-----|------|----------------|----------|-----|

## 90-Meter Band—3200-3400 kHz

|      |       |                         |                             |      |
|------|-------|-------------------------|-----------------------------|------|
| 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 |
| 4770 | 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 |

| kHz | Call | Identification | Location | GMT |
|-----|------|----------------|----------|-----|
|-----|------|----------------|----------|-----|

|      |       |                    |                                  |      |
|------|-------|--------------------|----------------------------------|------|
| 4870 | YVKP  | R. Tropical        | Caracas, Venez.                  | 2330 |
| 4890 | —     | R. 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 | HJCO  | 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

|      |      |             |                       |      |
|------|------|-------------|-----------------------|------|
| 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  | kHz                                  | Call  | Identification     | Location                     | GMT  |
|--------------------------------------|-------|-------------------|-------------------------|------|--------------------------------------|-------|--------------------|------------------------------|------|
| 6015                                 | —     | Swiss BC          | Berne, Switz.           | 2015 | 11720                                | —     | R. Canada          | Montreal, Que.               | 2105 |
| 6020                                 | PCJ   | R. Nederland      | Hilversum, Neth.        | 1030 | 11725                                | —     | BBC Far East Svcs. | Malaysia                     | 2355 |
| 6030                                 | —     | AFRTS             | Greenville, N.C.        | 0110 | 11735                                | —     | R-TV Francaise     | Rabat, Morocco               | 1845 |
| —                                    | CFVP  | V. of the Plaines | Calgary, Alberta        | 2400 | 11740                                | XEMP  | —                  | Mexico City, Mex.            | 2115 |
| 6045                                 | —     | R. Universidad    | San Luis Potosi, Mex.   | 0300 | <b>25-Meter Band—11750-11975 kHz</b> |       |                    |                              |      |
| 6050                                 | HCJB  | V. of Andes       | Quito, Ecuador          | 0718 | 11750                                | —     | Far East Network   | Tokyo, Japan                 | 0335 |
| —                                    | RAI   | RAI               | Rome, Italy             | 1940 | 11760                                | HVJ   | Vatican R.         | Vatican City                 | 0030 |
| 6075                                 | —     | RAI               | Rome, Italy             | 0430 | 11760                                | —     | Swiss BC           | Berne, Switz.                | 0720 |
| 6080                                 | CKFX  | —                 | Vancouver, B.C.         | 1500 | 11775                                | —     | Swiss BC           | Wellington, N.Z.             | 0630 |
| 6085                                 | ZYK2  | R. Jornal         | Recife, Brazil          | 0830 | 11780                                | ZL3   | R. New Zealand     | Wellington, N.Z.             | 2100 |
| 6090                                 | —     | R. Prague         | Prague, Czech.          | 0740 | 11795                                | WINB  | —                  | Red Lion, Pa.                | 0105 |
| 6100                                 | —     | R. Belgrade       | Belgrade, Yugo.         | 2000 | 11800                                | —     | R. Nacional        | Tenerife, Canary Is.         | 0120 |
| 6115                                 | XEUDS | —                 | Hermosillo, Mex.        | 0010 | 11800                                | —     | RAI                | Rome, Italy                  | 0030 |
| 6135                                 | —     | R. Habana         | Havana, Cuba            | 0520 | 11810                                | —     | R. Algiers         | Algiers, Algeria             | 1730 |
| 6145                                 | —     | V. Nigeria        | Enugu, Nigeria          | 0600 | 11815                                | PJB   | —                  | Bonair, Neth. Ant.           | 0030 |
| 6150                                 | —     | R. RSA            | Johannesburg, S. Afr.   | 2345 | 11835                                | 4VEH  | V. Evangelique     | Cap Haitien, Haiti           | 1300 |
| 6155                                 | —     | Austrian R.       | Vienna, Austria         | 2311 | 11840                                | —     | V. West            | Lisbon, Portugal             | 2330 |
| 6160                                 | CFCN  | —                 | Calgary, Alta.          | 0545 | 11845                                | —     | R-TV Francaise     | Paris, France                | 1810 |
| 6165                                 | XEWW  | —                 | Mexico City, Mex.       | 0000 | 11850                                | —     | R. Moscow          | Moscow, USSR                 | 0450 |
| 6174                                 | —     | R. Nacional       | Bogota, Colombia        | 0345 | 11860                                | —     | BBC                | Ascension I.                 | 2300 |
| 6175                                 | —     | V. Malaysia       | Kuala Lumpur, Malaysia  | 1215 | 11865                                | —     | Swiss BC           | Berne, Switz.                | 1130 |
| 6180                                 | TGWB  | R. Nacional       | Guatemala City, Guat.   | 2330 | 11900                                | —     | R. RSA             | Johannesburg, S. Afr.        | 1600 |
| 6205                                 | —     | R. Reloj          | San Jose, C.R.          | 0520 | 11905                                | —     | RAI                | Rome, Italy                  | 1605 |
| <b>41-Meter Band—7100-7300 kHz</b>   |       |                   |                         |      | 11910                                | —     | V. Thailand        | Bangkok, Thailand            | 1155 |
| 7115                                 | —     | V. Thailand       | Bangkok, Thailand       | 1130 | 11915                                | HCJB  | V. Andes           | Quito, Ecuador               | 0330 |
| 7120                                 | —     | R. Peking         | Peking, China           | 0100 | 11920                                | ETLF  | R. Voice of Gospel | Addis Ababa, Ethiopia        | 0430 |
| 7125                                 | —     | V. Guinea         | Conakry, Guinea         | 0600 | 11930                                | —     | R. Habana          | Havana, Cuba                 | 2030 |
| 7130                                 | —     | BBC               | London, England         | 2330 | 11935                                | —     | V. West            | Lisbon, Portugal             | 0345 |
| 7150                                 | —     | BBC               | London, England         | 0600 | 11945                                | —     | R. Peking          | Peking, China                | 0305 |
| 7165                                 | —     | Idaat Al          | Libya                   | 0445 | 11950                                | ELWA  | R. Village         | Monrovia, Liberia            | 0815 |
| 7170                                 | —     | R. Noumea         | Noumea, New Caledonia   | 0735 | 11980                                | —     | R. Kiev            | Kiev, USSR                   | 1850 |
| 7195                                 | —     | V. America        | Monrovia, Liberia       | 2310 | 11990                                | —     | R. Prague          | Prague, Czech.               | 1805 |
| 7200                                 | —     | R. Afghanistan    | Kabul, Afghanistan      | 1300 | 15050                                | —     | R. Libertad        | (clandestine)                | 2150 |
| 7245                                 | —     | Austrian R.       | Vienna, Austria         | 0530 | 15060                                | —     | R. Peking          | Peking, China                | 0010 |
| 7300                                 | ZAA   | R. Tirana         | Tirana, Albania         | 0035 | 15078                                | —     | R. Euzkadi         | (clandestine)                | 2130 |
| 7345                                 | —     | R. Prague         | Prague, Czech.          | 0010 | 15080                                | VUD   | All India R.       | Delhi, India                 | 1800 |
| 9009                                 | 4XB31 | Kol Zion          | Tel Aviv, Israel        | 2100 | <b>19-Meter Band—15100-15450 kHz</b> |       |                    |                              |      |
| 9360                                 | —     | R. Nacional       | Madrid, Spain           | 0015 | 15110                                | XERR  | —                  | Mexico City, Mex.            | 2230 |
| 9380                                 | —     | R. Alma Ata       | Alma Ata, USSR          | 0115 | 15115                                | —     | R. Dakar           | Dakar, Senegal               | 2130 |
| <b>31-Meter Band—9500-9775 kHz</b>   |       |                   |                         |      | 15120                                | —     | R. Lagos           | Lagos, Nigeria               | 2145 |
| 9505                                 | —     | R. Berlin Int'l.  | Berlin, E. Germany      | 0100 | 15125                                | ZYN32 | R. Soc. de Bahia   | Salvador, Brazil             | 2215 |
| 9510                                 | —     | BBC               | London, England         | 1015 | 15125                                | BED60 | V. Free China      | Taipei, Formosa              | 0215 |
| 9515                                 | XEWW  | —                 | Mexico City, Mex.       | 0500 | 15135                                | —     | V. Japan           | Tokyo, Japan                 | 0200 |
| 9520                                 | —     | R. Denmark        | Copenhagen, Denmark     | 1015 | 15140                                | —     | BBC                | London, England              | 2230 |
| 9525                                 | PCJ   | R. Nederland      | Hilversum, Netherlands  | 0600 | 15145                                | ZYK33 | R. Jornal          | Recife, Brazil               | 0230 |
| 9545                                 | —     | V. Ghana          | Accra, Ghana            | 1915 | 15155                                | —     | R. Finland         | Helsinki, Finland            | 2300 |
| 9550                                 | —     | R. Norway         | Oslo, Norway            | 0455 | 15155                                | ELWA  | R. Village         | Monrovia, Liberia            | 1845 |
| 9565                                 | OAX4R | —                 | Lima, Peru              | 0110 | 15155                                | ZYB9  | R. de Sao Paulo    | Sao Paulo, Brazil            | 0045 |
| 9575                                 | —     | R. RSA            | Johannesburg, S. Afr.   | 0600 | 15210                                | —     | Austrian R.        | Vienna, Austria              | 1930 |
| 9585                                 | —     | V. of West        | Lisbon, Port.           | 2310 | 15220                                | —     | V. America         | Philippines                  | 0050 |
| 9590                                 | PCJ   | R. Nederland      | Hilversum, Neth.        | 0440 | 15230                                | —     | R. Ceylon          | Johannesburg, S. Afr.        | 2330 |
| 9605                                 | —     | R. Japan          | Tokyo, Japan            | 1715 | 15245                                | ZYE21 | R. Marajoara       | Colombo, Ceylon              | 0300 |
| —                                    | DMQ9  | Deutsche Welle    | Cologne, W. Germany     | 1050 | 15245                                | —     | V. Nigeria         | Belem, Brazil                | 1900 |
| 9610                                 | —     | R. Canada         | Montreal, Que.          | 2100 | 15270                                | —     | R. Habana          | Lagos, Nigeria               | 1700 |
| 9615                                 | PJB   | —                 | Bonair, Neth. Ant.      | 2330 | 15285                                | —     | R. Ghana           | Havana, Cuba                 | 2300 |
| 9620                                 | —     | R. Kiev           | Kiev, USSR              | 2245 | 15295                                | —     | Aqui Mozambique    | Accra, Ghana                 | 1845 |
| 9625                                 | —     | R. Canada         | Montreal, Que.          | 0110 | 15335                                | —     | R. Pakistan        | Lourenco Marques, Mozambique | 1830 |
| 9635                                 | ZYR83 | R. Ararecida      | Sao Paulo, Brazil       | 2300 | 15435                                | —     | V. Free China      | Karachi, Pakistan            | 2005 |
| 9640                                 | DMQ9  | Deutsche Welle    | Cologne, W. Germany     | 1100 | 15435                                | —     | Far East BC        | Taipei, Formosa              | 0215 |
| 9645                                 | TIFC  | Faro del Caribe   | San Jose, C.R.          | 1430 | 15385                                | —     | V. America         | (Manila, Phil.)              | 2330 |
| 9665                                 | —     | Swiss BC          | Berne, Switz.           | 1130 | 15400                                | —     | V. America         | Greenville, N.C.             | 0230 |
| 9690                                 | LRA   | R. Nacional       | Buenos Aires, Argentina | 0200 | 15405                                | DMQ15 | Deutsche Welle     | Cologne, W. Germany          | 1900 |
| 9700                                 | —     | R. Sofia          | Sofia, Bulgaria         | 0000 | 15430                                | —     | V. Free Korea      | Seoul, Korea                 | 0300 |
| 9712                                 | OAX9C | R. Tropical       | Terapoto, Brazil        | 0400 | 15435                                | —     | BBC Far East Svcs. | Malaysia                     | 2350 |
| 9715                                 | PCJ   | R. Nederland      | Hilversum, Neth.        | 1025 | 15445                                | ZYN32 | R. Nacional        | Brasilia, Brazil             | 0320 |
| 9760                                 | —     | VOA               | Munich, W. Germany      | 1605 | 17760                                | WNYW  | R. New York        | New York, N.Y.               | 2130 |
| 9770                                 | —     | BBC               | London, England         | 1720 | —                                    | ELWA  | Worldwide.         | Monrovia, Liberia            | 1600 |
| 9833                                 | —     | R. Budapest       | Budapest, Hungary       | 0030 | 17785                                | —     | R. Japan           | Tokyo, Japan                 | 0000 |
| 10530                                | —     | R. Alma Ata       | Alma Ata, USSR          | 0210 | 17805                                | —     | R. RSA             | Johannesburg, S. Afr.        | 2340 |
| 11685                                | —     | R. Diamang        | Dundo, Angola           | 1930 | 17845                                | WNYW  | R. New York        | New York, N.Y.               | 1800 |
| 11705                                | —     | R. Japan          | Tokyo, Japan            | 2250 | 17870                                | —     | R. Australia       | Melbourne, Australia         | 2250 |
| 11705                                | —     | R. Sweden         | Stockholm, Sweden       | 2250 | 17875                                | —     | R-TV Francaise     | Paris, France                | 1230 |
| 11710                                | —     | R. Australia      | Melbourne, Australia    | 0710 | 17890                                | —     | V. America         | Greenville, N.C.             | 1830 |
| 11715                                | —     | V. America        | Okinawa I.              | 2300 | 17950                                | —     | R. Pakistan        | Kerachi, Pakistan            | 1335 |
| <b>13-Meter Band—21450-21750 kHz</b> |       |                   |                         |      | 21485                                | —     | V. America         | Bethany, Ohio                | 2110 |
| 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: *didididahdidah*) 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.

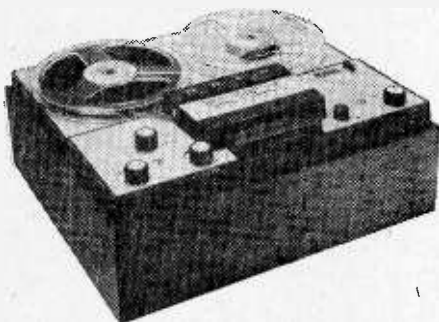
"We have two complete words, and the rest is falling into place quite rapidly," he told Gerard. "But I'm afraid the staff is a little upset."

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*

$\pm$  dB @ 3 $\frac{3}{4}$  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



*Wawasee Electronics Black Cat*

### "No-Parts" Slave Flash

*Continued from page 56*

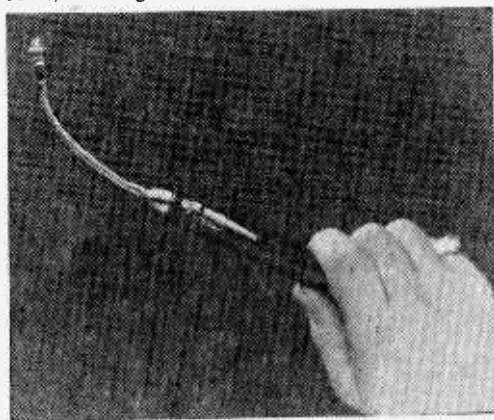
with most modern-day miniature electronic flash units. Some flash units require a *polarized* standard AC plug, available at most photo dealers. A possible connector variation would be to install a P-C type connector directly at the end of the plastic tube. No additional interconnecting cable would then 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

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.

### 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*

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. ■



## Gold Grabber

*Continued from page 44*

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

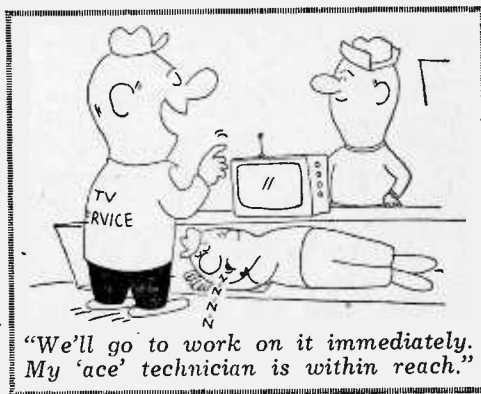
*Continued from page 22*

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!*



## 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 ap-

plications 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. Bi-monthly 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  $\frac{1}{2}$  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.

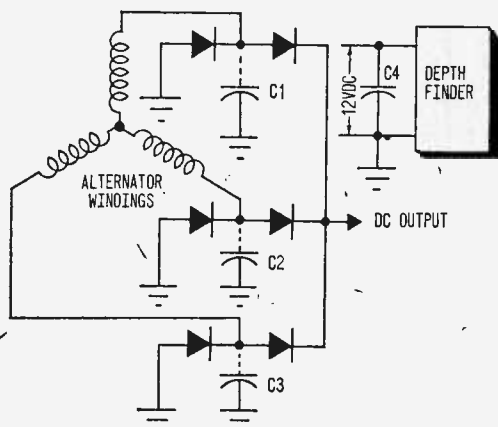
As we said, it has taken mankind a half million years to get a really good look at the sun. But it was worth the wait. The view is fantastic! ■

## 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.

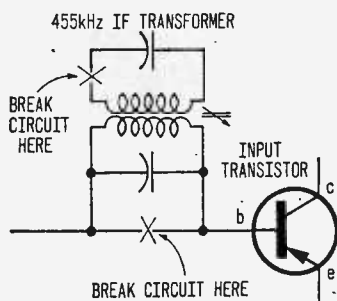


Connect ignition capacitors C1, C2, C3, and C4 across the three AC outputs of the alternator and output of the depth finder as shown in the diagram. You may also have to install ignition noise suppressors at the spark plug and ignition coil.

## 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.



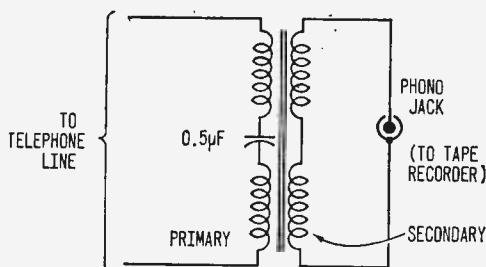
It is possible that the interfering station is very close to you and is overloading the re-

ceiver'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.

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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.**

**H**OW 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



**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!

salaries 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 Dulancy is an outstanding example of the success possible through CIE training. Before he studied with CIE, Dulancy was a crop duster. Today he owns the Dulancy Communications Service, with seven people working for him repairing and manufacturing two-way equipment. Says Dulancy: "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.

#### ENROLL UNDER NEW G.I. BILL

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- PRINTED CIRCUITY

### 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 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, rectifiers, test equipment. You will learn and practice practice code, using the Progressive Code Oscillator. You will learn how to troubleshoot, 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 chassis, 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, a Book 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

### 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 \_\_\_\_\_

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### PROGRESSIVE "EDU-KITS" INC.

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### 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. Statatits, 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 Test 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., Huntington, 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."

### PRINTED CIRCUITY

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.