CB Transceiver DX's the World!

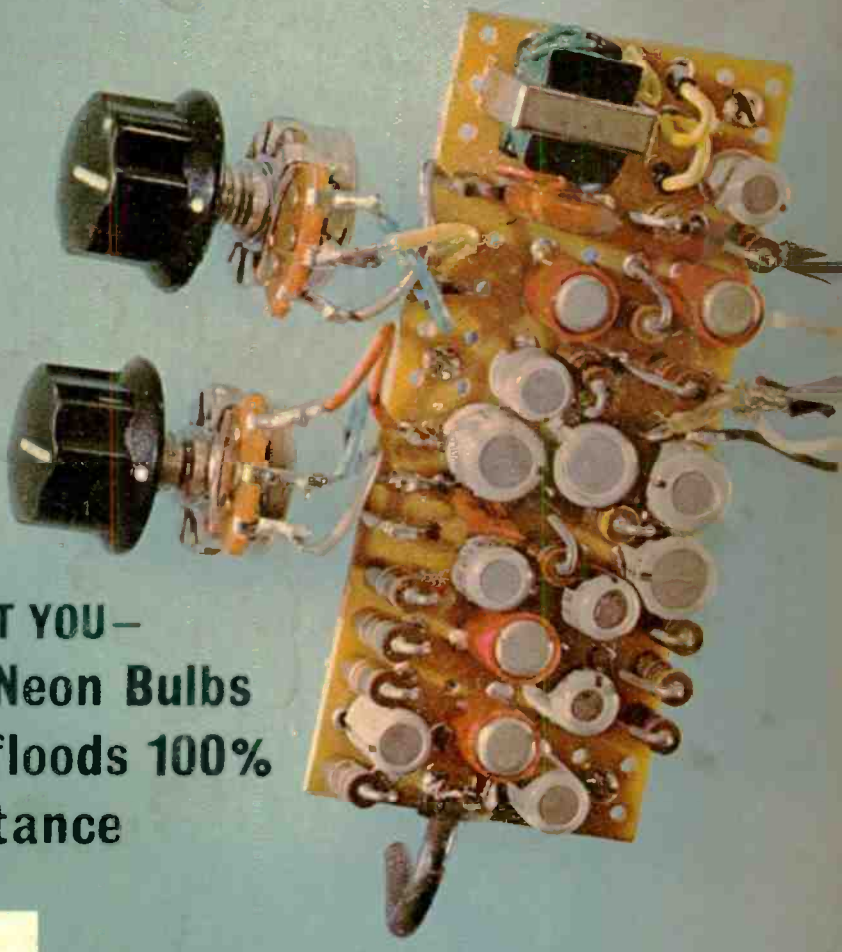
RADIO-TV EXPERIMENTER

JUNE-JULY 75c

WHITE'S RADIO LOG

AM-FM STATIONS
WORLD-WIDE
SHORT-WAVE LISTINGS!

IS THERE A SOVIET H-BOMB IN ORBIT?



PROJECTS THAT LET YOU—

- Multiply with Neon Bulbs
- Control Photofloods 100%
- Dial Any Resistance

TEST REPORTS

Hallicrafters CB-15 AM/Part-15 Walkie-Talkie

Lafayette Model HA-520 Dual-Band VHF Receiver

Jensen Model CC-1 Headset Control Center

4-TRANSISTOR AUDIO COMPRESSOR GIVES YOUR MODULATION A BOOST

Be creative–and thrifty too!

Save up to 50% with EICO Kits and Wired.

EICO supports your sense of achievement with no-compromise engineering, finest parts, dramatic esthetics, simple step-by-step instructions and large pictorial diagrams. You need no technical background—just pliers, screwdriver, soldering iron. Three million people, ages 8 to 89, have built EICO kits. If you love to create, EICO is for you. And if you want the best buys in ready-to-use factory-assembled equipment, again EICO is for you. Judge critically for yourself. Send for your free catalog. See EICO at your local dealer.

EICO

KITS & WIRED

TEST EQUIPMENT

Model 232 Peak-to-Peak VTVM. A must for color or B&W TV and industrial use. 7-non-skip ranges on all 4 functions. With Uni-Probe.® $29.95 kit, $49.95 wired.

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. $89.95 kit, $129.50 wired.

Model 324 RF Signal Generator. 150kc to 435mc range. For IF-RF alignment and signal tracing of TV, FM, AM, CB and mobile. Built-in and ext. modulation. $32.95 kit, $44.95 wired.

CITIZENS BAND/ HAM RADIO

New Model 779 Sentinel 23 CB Transceiver. 23-channel frequency synthesizer provides crystal-controlled transmit and receive on all 23 channels. No additional crystals to buy ever! Features include dual conversion, illuminated S/RF meter, adjustable squelch and noise limiter, TVI filter, 117VAC and 12VDC transistorized dual power supply. Also serves as 3.5 watt P.A. system. $169.95 wired.

New Model 712 Sentinel 12 Dual Conversion 5-watt CB Transceiver. Permits 12-channel crystal-controlled transmit and receive, plus 23-channel tunable receive. Incorporates adjustable squelch & noise limiter, & switches for 3.5 watt P.A. use, spotting, & Part 15 operation. Transistorized 12VDC & 117VAC dual power supply. $99.95 wired only.

New Model 753 The one and only SSB/AM CW Tri-Band Transceiver Kit. "The best ham transceiver buy for 1966"—Radio TV Experimenter Magazine. 200 watts PEP on 80, 40 and 20 meters. Receiver offset tuning, built-in VOX, high level dynamic ALC. Unequaled performance, features and appearance. Sensationally priced at $189.95 kit, $299.95 wired.

STEREO/HI-FI

New Model 3566 All Solid-State Automatic FM MPX Stereo Tuner/Amplifier. "Very satisfactory product, very attractive price"—Audio Magazine. No tubes, not even nuvistors. Delivers 112 watts IHF total to 4 ohms, 75 watts to 8 ohms. Completely pre-wired and pre-aligned RF, IF and MPX circuitry, plus plug-in transistor sockets. $219.95 kit (optional walnut cabinet $14.95), $325.00 wired including walnut cabinet. UL approved.

Model ST70 70-Watt Integrated Stereo Amplifier. Best buy of highest ranked stereo amplifiers according to independent testing. $99.95 kit, $149.95 wired. ST40 40-Watt Integrated Stereo Amplifier. $79.95 kit, $129.95 wired. ST97 Matching FM MPX Stereo Tuner, $89.95 kit; $139.95 wired.

FREE 1966 CATALOG

EICO Electronic Instrument Co., Inc.
131-01 39th Ave., Flushing, N.Y. 11352 RTVE-6

Send me **FREE** catalog describing the full EICO line of 200 best buys, and name of nearest dealer. I'm interested in:

- ☐ test equipment
- ☐ ham radio
- ☐ stereo hi-fi
- ☐ Citizens Band radio

Name_____

Address_____

City_____

State_____ Zip_____

1945-1965: TWENTY YEARS OF LEADERSHIP IN CREATIVE ELECTRONICS

RADIO-TV EXPERIMENTER

Cover Photo
by Don Lothrop

June-July 1966

CONTENTS/INDEX

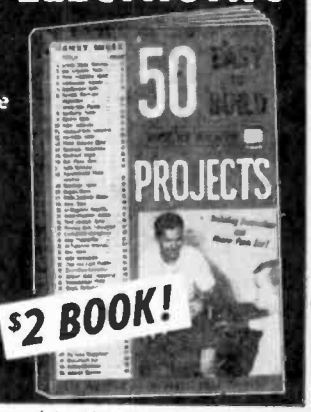
☆Cover Highlights

Additional Short Subjects on pages 58, 68, 72, 74, 80 & 86.

WHITE'S RADIO LOG, Vol. 45, No. 3—Page 96

FREE: RADIO SHACK SOLID STATE ELECTRONIC PROJECT BOOK

With Purchases of $4.95 or More



SURPRISE PAKS

At a fraction of their cost — WHILE THEY LAST! All types, all kinds — semiconductors (tested & untested), buy now!

60-pc Transistor Surprise Pak

2.98 NPN's, PNP's 10W, 20W, 50W transistors plus subminiature types.
27-034 ..... 2.98

100-pc Semiconductor Grab Pak

2.98 PNP's, NPN's, asst. case styles TO-36 & TO-3 power transistors, top hats, dual germaniums, etc. 27-037, 2.98

Infra-Red Transducer Kit

1.98 Parabolic reflector, 3" filter detector complete with pictorial diagram. 27-035 ..... 1.98

60-pc Jumbo Rectifier Surprise Pak

1.98 Less than 4¢ ea. Includes top hats, epoxies, zeners, diodes, etc. A great buy! 27-033 .. 1.98

10-pc Power Transistor Pak

1.98 Asst. 4 10-20 watt, 50 watt sizes; germanium, silicon types. Asst. TO-3, -5, -8, -13 and TO-36 cases.
27-036 ..... Net 1.98

ARCHER TWIN-PAKS Popular PNP Types

1.98 • 5 Each of
• 2N107 Types
• CK722 Types

Exclusive! Ideal for all audio applications. Base diagrams incl. 27-031 .... 1.98

10 NPN & 15 PNP

25 for **1.98** For RF applications, switching, general purpose audio types. Replace many numbers without circuit change.
27-1516 ..... 1.98

SOLID-STATE MODULES

- (A) **Wireless Phono Oscillator Module:** designed to play your phonograph, directly through a radio without connecting wires. 27-257 .... 4.95
- (B) **Intercom Amplifier Module:** custom-build a modern, convenient intercom system for your home or office. 27-254 ..... 4.95
- (C) **"Baby-Sitter" Amplifier Module:** gives real peace of mind; even lets you monitor sound of baby's breathing. 27-256 ..... 4.95
- (D) **Phonograph Amplifier Module:** designed for use with crystal or ceramic cartridge. 2 watts peak power. 27-261 ..... 4.95
- (E) **Telephone Amplifier Module:** permits "group-listening" to a phone conversation; talk with hands free. 27-260 ..... 4.95
- (F) **Super High-Gain Amplifier Module:** for use as a hearing aid, audio signal tracer, "eavesdropper", etc. 27-251 ..... 4.95
- (G) **Power Amplifier Module:** the ideal amplifier to use with tuners, microphones, paging systems, or as signal tracer. 27-253 ..... 4.95
- (H) **Guitar Amplifier Module:** can be used with guitars or any stringed instrument. 2 watts peak power. 27-255 ..... 4.95

AC Power Supply Module: converts 115 VAC to 6 VAC, 1 amp. Use with rectifier-electronic filter (below). 27-258 ..... 1.95

Rectifier-Electronic Filter Module: provides dual DC output from AC power supply. 6 VDC; 24V max., 1 amp. 27-259 ..... 3.95

Optional Accessories for Modules Above

Cat. No.	Description	Key Letters	Each
27-1430	Loopstick Antenna	A	.59
23-465	"C" Cells (4 required)	A	.14
27-1437	Battery Holder (2 required)	A	.25
23-006	6V Lantern Battery	B, C, D, E, G, H	1.05
27-258	AC Power Supply	B, C, D, E, G, H	1.95
27-259	Rectifier-Electronic Filter	B, C, D, E, G, H	3.95
40-1203	4" Speakers (2 required)	B	1.99
27-1384	4PDT Switch	B	.49
27-066	500Ω Control w/Switch	B	.79
40-219	8" Extension Speaker	C	8.95
27-1264	100-Ft. Speaker Wire	C	2.39
33-100	Lapel Microphone	C, F	1.89
27-212	500K Control w/Switch	D, E, F, H	.79
40-1213	8" Speaker	D, E, G, F	3.99
44-533	Telephone Pickup	E	.99
33-180	Headphone	F	1.98
23-468	Penlight Batteries (2 required)	F	.10
27-1433	Battery Holder	F	.22
33-918	Dynamic Microphone	G	8.95
33-115	Contact Type Microphone	H	1.49

MAIL TODAY to NEAREST RADIO SHACK STORE

☐ *Please send FREE 1966 Radio Shack Catalog!* R/TV-66

Please send me the modules and accessories I have listed below. ☐ My order totals $4.95, so include my FREE copy of your $2.00 Solid-State Electronic Project book. I enclose $_____, which includes 50¢ to cover postage and handling anywhere in the U.S.A.

Name (please print)_____

Street_____

City_____ State_____ Zip_____

JUNE-JULY 1966

RADIO-TV EXPERIMENTER

Dedicated to America's Electronics Experimenters

JULIAN M. SIENKIEWICZ WA2CQL/KMD4313	*Editor*
WILLIAM HARTFORD KKD7432	*Technical Editor*
ELMER C. CARLSON	*Construction Editor*
ANTHONY MACCARRONE	*Art Director*
IRVING BERNSTEIN	*Cover Art Director*
EUGENE F. LANDINO	*Associate Art Director*
RON STAFFIERI	*Art Editor*
JUDITH ANDERSON	*Art Associate*
ELLIOT S. KRANE	*Advertising Director*
JIM CAPPELLO	*Advertising Manager*
LEONARD F. PINTO	*Production Director*
CARL BARTEE	*Production Manager*
HELEN GOODSTEIN	*Assistant Production Manager*
CLIFF SHEARER	*Promotion Director*
JOSEPH DAFFRON	*Executive Editor*

President and Publisher
B. G. DAVIS

Executive Vice President and Assistant Publisher
JOEL DAVIS

Vice President and Editorial Director
HERB LEAVY, KMD4529

RADIO-TV EXPERIMENTER, Vol. 20, No. 3 (#789), is published bi-monthly by SCIENCE & MECHANICS PUBLISHING CO., a subsidiary of Davis Publications, Inc. Editorial, business and subscription offices: 505 Park Ave., New York, N. Y. 10022. One-year subscription (six issues)—$4.00; two-year subscription (12 issues)—$7.00; and three-year subscription (18 issues)—$10.00. Add $1.00 per year for postage outside the U.S.A. and Canada. Advertising offices: New York, 505 Park Ave., PL-2-6200; Chicago: 520 N. Michigan Ave., 527-0330; Los Angeles: 1709 W. 8th St. 213-483-5317; Atlanta: Pirnie & Brown, 3108 Piedmont Rd., N.E., 404-233-6729; Long Island: Len Osten, 9 Garden Street, Great Neck, N.Y., 516-487-3305; Southwestern advertising representative: Jim Wright, 4 N. Eight St., St. Louis, CH 1-1965.

EDITORIAL CONTRIBUTIONS must be accompanied by return postage and will be handled with reasonable care; however, publisher assumes no responsibility for return or safety of manuscripts, art work, or photographs. All contributions should be addressed to the Editor, Radio-TV Experimenter, 505 Park Avenue, New York, New York 10022.

KEEP PACE WITH SPACE AGE! SEE MANNED MOON SHOTS, SPACE FLIGHTS, CLOSE-UP!

AMAZING SCIENCE BUYS for FUN, STUDY or PROFIT

FREE! FREE! SEND FOR GIANT 148 PAGE CATALOG "HP" SEE BELOW!

SOLVE PROBLEMS! TELL FORTUNES! PLAY GAMES!

NEW WORKING MODEL DIGITAL COMPUTER

ACTUAL MINIATURE VERSION OF GIANT ELECTRONIC BRAINS

Fascinating new see-through model computer actually solves problems, teaches computer fundamentals. Adds, subtracts, multiplies, shifts, complements, carries, memorizes, counts, compares, sequences. Attractively colored, rigid plastic parts easily assembled. 12" x 3½" x 4¾". Incl. step-by-step assembly diagrams, 32-page instruction book covering operation, computer language (binary system), programming, problems and 15 experiments.

Stock No. 70,683-HP . . . . . **$5.98 Postpaid**

Handymen, Hobbyists, Homeowners!

INGENIOUS NEW VACUUM BASE

Makes Tools and Appliances Portable

Now move all kinds of normally bolted-down devices from place to place. Machined top surface of Vacuum Base drilled to securely hold vices, miter boxes, drills, reflectors, gages, measuring devices, food choppers and other home appliances. Base also handily adapted for mounting camera, binocular or telescope to car window. Bottom plate of heavy neoprene attaches securely (by vacuum) vertically, horizontally, even upside down to linoleum, metal, porcelain, formica, glass, etc. Unit resists 50 to 75-lb. force parallel to base, 200-lb. force perpendicular to base. Ruggedly constructed of cast aluminum. Gray baked enamel finish. Top surface measures 2⅞" x 3¾". Overall size 5" x 4¼" x 2" high.

Stock No. 60,567-HP . . . . . **$3.00 Postpaid**

BARGAIN PRICE—WAR SURPLUS

COLLIMATOR AND INFINITE LIGHT SOURCE

Expensive surplus gun sight orig. cost Gov't. about $100. Was essentially a collimator or source of infinite light. Many uses for experimenters—research labs. Contains ring and dot reticle, 2" achromatic lens, silvered reflector bulb, 3⅝"x2⅝" reflector glass plate. Bulb operates on 14V, can be converted to 110V or inexpensive transformers are available. Convenient holes for easy mounting. Sturdily built unit meas. 6⅜"x5"x2¾".

Stock No. 70,774-HP . . . . . **$9.95 Postpaid**

160V Transformer for Light Source.

Stock No. 60,521-HP . . . . . **$3.75 Postpaid**

'FISH' WITH A WAR SURPLUS MAGNET

Go Treasure Hunting on the Bottom

Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. Cost, $50. Lifts over 150 lbs. on land—much greater weights under water. Order now and try this new sport.

Stock No. 70,571-HP 5 lb. Magnet . . . . . **$12.50 Postpaid**
Stock No. 70,570-HP 3½ lb. Lifts 40 lbs. . . . . . **$8.75 Postpaid**
Stock No. 85,152-HP 15¾ lb. size, lifts 350 lbs. . . . . . **$33.60 FOB**

BINOCULAR-TO-CAMERA HOLDER

Will Fit Any Camera

For Exciting Telephoto Pictures

Bring distant objects 7 times nearer with a 35-mm camera. 7x50 binocular and our NEW CAMERA-TO-BINOCULAR HOLDER. Ideal for long range photos of wild life, ships, people, planes, etc. Camera and binocular attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white shots. Attractive gray crinkle and bright chrome finish. 10" long. Full directions for taking telephotos.

Stock No. 70,223-HP . . . . . **$11.50 Postpaid**

"Balls of Fun" for Kids . . .
Traffic Stoppers for Stores . . .
Terrific for Amateur Meteorologists . . .

SURPLUS GIANT WEATHER BALLOONS

At last . . . available again in big 8-ft. diameter. Create a neighborhood sensation. Great backyard fun. Exciting beach attraction. Blow up with vacuum cleaners or auto air hose. Sturdy enough for hard play; all other uses. Filled with helium (available locally) use balloons high in the sky to attract crowds, advertise store sales, announce fair openings, etc. Amateur meteorologists use balloons to measure cloud heights, wind speed, temperature, pressure, humidity at various heights. Photographers can utilize for low-cost aerial photos. Recent Gov't surplus of heavy, black, neoprene rubber.

Stock No. 60,568-HP . . . . . **$2.00 Postpaid**

SLIGHTLY HEAVIER RUBBER—LATER MANUFACTURE!

Stock No. 60,562-HP—4 ft. diam. size . . . . . **$2.00 Postpaid**
Stock No. 60,564-HP—8 ft. diam. size . . . . . **$4.00 Postpaid**

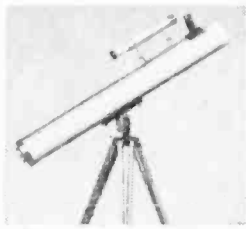
ORDER BY STOCK NUMBER . SEND CHECK OR MONEY ORDER . SATISFACTION GUARANTEED!

EDMUND SCIENTIFIC CO., BARRINGTON, N. J.

See the Stars, Moon, Planets Close Up!

3" ASTRONOMICAL REFLECTING TELESCOPE

60 to 180 Power—Famous Mt. Palomar Type! An Unusual Buy!



Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet, Mars, huge craters on the Moon, Phases of Venus, Star Clusters, Moons of Jupiter in detail, Galaxies! Equatorial mount with lock on both axes. Aluminized and overcoated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 to 180 power. Low-cost accessory eyepiece available for higher powers. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE with Scope: —Valuable *STAR CHART* plus 272 page *"HANDBOOK OF HEAVENS"* plus *"HOW TO USE YOUR TELESCOPE"* BOOK.

Stock No. 85,050-HP . . . . . **$29.95 Postpaid**

4¼" Reflecting Telescope—up to 270 Power

Stock No. 85,105-HP . . . . . **$79.50 F.O.B.**

SUPERB 6" REFLECTOR TELESCOPE

Up to 576 Power. Equatorial mount and Pedestal Base.

Stock No. 85,086-HP . . . . . **$199.50 F.O.B.**

WAR SURPLUS AMERICAN-MADE 7x50 BINOCULARS

Big savings! Brand new! Crystal clear viewing —7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7mm. Approx. field at 1,000 yds. is 370 ft. Carrying case included. American 7 x 50's normally cost $274.50. Our war surplus price saves you real money.

Stock No. 1544-HP . . . . . **Only $78.40 Ppd.**

8 x 30 Binoculars—similar to above.

Stock No. 963-HP . . . . . **$40.00 Postpaid**

7 x 35 American Made Binoculars.

Stock No. 964-HP . . . . . **$55.00 Ppd.**

MAKE YOUR OWN POWERFUL ASTRONOMICAL TELESCOPE

Grind Your Own Astronomical Mirror

Kits contain mirror blank, tool, abrasives, diagonal mirror and eyepiece lenses. You build instruments ranging in value from $75.00 to hundreds of dollars.

Stock No.	Diam.	Mirror Thickness	Price
70,003-HP	4¼"	¾"	$ 7.50 ppd.
70,004-HP	6"	1"	11.95 ppd.
70,005-HP	8"	1⅜"	19.50 ppd.
70,006-HP	10"	1¾"	30.75 } f.o.b.
70,007-HP	12½"	2⅛"	59.95 { Barrington

Brand New, Quick-Charge, Industrial Surplus

NICKEL-CADMIUM BATTERY

Unparalleled Value

For the first time a 6-volt, light-weight nickel-cadmium battery in stainless steel, strap type casing. 4-amp hour capacity. Almost unlimited life—thousands of discharge-charge cycles with minute deterioration—charges fully in approx. 1 hr. with Edmund charger kit. Just a few drops of water per year provide full maintenance. Hundreds of uses for hobbyists, amateur photographers, campers, model builders, etc. Unequalled for rechargeable lanterns; cycle scooters, and boat lights; portable fluorescent and ultra-violet lights; electronic flash units. Battery requires minimum of electrolyte; is sealed to prevent loss; delivers nearly 100% of output at below freezing temperatures compared to 50% by lead-acid batteries. No corrosive fumes under any stage of recharge. Can't be damaged by accidental charge in reverse (but not recommended). Stud type terminals on top 1⅛" apart marked for polarity; 6/32 thread, nuts and lock-washers. 6"x2"x4". Wt. 2 lbs. 12 ounces.

Stock No. 70,776-HP . . . . . **$15.00 Postpaid**

CHARGER KIT FOR 6-VOLT BATTERY. Charges in approx. 1 hr. Shuts off automatically. Attaches to Stock No. 70,776 battery case. Includes transformer, ballast resistors, charger circuit board, mounting hardware, 8-ft. cord, plug switch, assembly instructions.

Stock No. 70,807-HP . . . . . **$8.00 Postpaid**

ONE 1.2 VOLT NICKEL-CADMIUM CELL

Stock No. 40,798-HP . . . . . **$3.95 Postpaid**

MAIL COUPON for FREE CATALOG "HP"

EDMUND SCIENTIFIC CO., Barrington, N. J.
Completely New 1966 Edition. 148 pages.
Nearly 4500 Unusual Bargains.

Please rush Free Giant Catalog-HP.

Name . . . . . .

Address . . . . . .

City . . . . . State . . . . Zip . . . . .

POSITIVE FEEDBACK

JULIAN M. SIENKIEWICZ, EDITOR
WA2CQL/KMD4313

Thank you! In our last issue many of you discovered a questionnaire asking for information about you—our reader. You were asked many questions including such personal ones as income, age, occupation, etc. Replies began to come in almost immediately after you subscribers received your copies. A few days later replies from newsstand readers began to cover my desk. In fact, even now as I write this thank you note, my desk top is deluged with unopened envelopes that demand my attention before I go home tonight.

I have made it a rule to open each envelope and examine the replies carefully. Each questionnaire's data was summed in my mind much in the same manner as data bits are digested by a digital computer. This first processing of the raw data, much cruder than the final tabulation will be, gives me a "first" impression of my readers, and indicates to me that the survey is doing the job it was designed to do.

Exactly how difficult it was to prepare the questions for a survey can be gleaned from the following short story once told to me by a Madison Avenue researcher. It seems that one cloudy day on a New England campus rich with ivy-covered halls a fiery object plummeted from the skies burying itself in the turf amid the fanfare of a blinding flash and deafening roar. Naturally, every major scientific department in the University laid claim to the object: so before it was dug up an Academic Commission consisting of leading professors from the Physics, Chemistry, Biology, Mathematics, Geology and Medicine departments plus a few others joined forces to explore the buried object. Once removed

from its shallow grave, and washed clean of sod, the cosmic visitor turned out to be a solid block cube exactly one meter on its sides with no markings on any of its six faces. The cube defied all tests put to it. It could not be chipped, X-rays would not pass through it, flames would not sear it, chemicals would not dissolve it; just to name a few of the many tests put to it. Finally, the austere Commission announced its failure to the University's governing board declaring that no one could possibly discover anything about the cube—it defied analysis. To which, an obscure professor of Psychiatry asked, "May I try?" Naturally, he was sneered at, but the cube was placed in his trust for examination. Removed to a quiet room, the cube was placed on a soft chair. The professor sat down nearby, crossed his legs, opened his notebook and wet a poised pencil tip as he asked, "What is your name?"

The cube answered, "Harold!"

The moral of this story is that one must ask significant questions in order to get significant answers.

I believe significant questions were asked in our survey and you gave us significant answers. Armed with detailed knowledge about you, our reader, the editors of RADIO-TV EXPERIMENTER can better plan and prepare future issues. Even more important, we are now better prepared to ask our readers more detailed and significant questions in ensuing surveys. When you see them, we beg that you will respond as you have done in the past.

Again, let me say, "Thank you."

Dig that Computer. The clarion notes of a trumpet are now sounding forth from a machine. For the first time, the sound of a trumpet has been generated by a computer with such fidelity that professional musicians are unable to tell the difference between the computer sound and the real one. A special computer program was devised by researchers at the Bell Telephone Laboratories and was used to achieve the trumpet notes by Jean C. Risset, French physicist and composer on a visit to Bell Laboratories for the past year.

In the research study, trumpet notes were recorded on magnetic tape and converted into digital form, which was then fed to an IBM 7094 computer, Mr. Risset explained. The computer analyzed each tone for its sound wave frequencies and then displayed the spectra, or patterns, in graphic form.

Positive Feedback

Having made spectra from musical notes, the computer then used its "knowledge" to make notes from spectra. It generated numbers which were converted to electrical signals. These signals were fed to a loudspeaker, resulting in the realistic notes of a trumpet. No fuse is needed when this computer blows.

Blackout Look Back. Repetition of the massive power failure in New York and New England last November can only be avoided by a major overhaul of the electric systems of these states. This is the essence of a report published by the American Public Power Association. APPA is composed of representatives from 2,000 publicly owned power systems throughout the United States, 90% of which are municipal companies, the other 10% primarily county systems. At least three deficiencies stand out as basic causes of the Northeastern blackout.

One is the lack of a major transmission line, capable of carrying high voltage and linking all the private and public utilities. Northeastern states do not have a backbone line because their electrical system evolved piece by piece rather than on a regional plan.

Two outstanding transmission grids have been built by the Federal Government working from regional plans—one in the Tennessee Valley Authority and the other in the Bonneville area of the Northwest. Two more are under construction on the West Coast as a cooperative effort of Government and private power companies. If such a major line had been available to Easterners, emergency power could have been delivered immediately from the Virginia area to affected states. The power was available, but it could not be delivered.

A second, related cause of the failure was lack of Government authority to establish minimum standards in the design and operation of interconnections. Since the Northeast system is no more than a network of many small companies each of which joined at its own convenience, there has been no overall supervision of the size and efficiency of the links. In contrast, the West Coast has fewer utility companies and bigger links.

A third underlying cause of the failure was the alternating current used over most of the

United States. Rather than flowing in a direct stream (DC), the electrical energy alternates (AC), making it mandatory for all the local companies to synchronize their AC power to the same clock. If one current gets out of phase, it throws the next utility out of whack and a "cascading" effect takes place.

This is what happened last November:

Because *one* switch in *one* plant in Ontario, Canada, shut off, the current was disrupted. A sudden decrease in power followed by an equally sudden increase threw off connections all the way to northeastern New Jersey and to the tip of Long Island.

The APPA recommended consideration of expanded use of direct current transmission lines. The West Coast is now experimenting with DC tielines in its regional system.

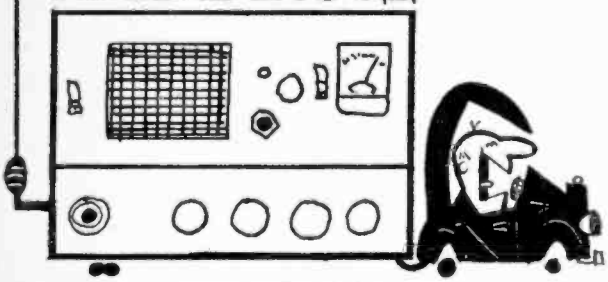
In all, the APPA made nine recommendations including a call for more hydroelectric sites in the Northeast. More than eight million kilowatts of undeveloped hydroelectric power exist in the New England and North Atlantic states. At present, most power in this area comes from steam.

One of the ironies of the power failure was that Consolidated Edison system in New York City, largest of the Northeast utility companies, had enough reserve electricity to service its entire area. But it could not get the steam up fast enough. Hydro-electricity requires no more than throwing open the gates.

Part of the Northeast's problem may be solved by construction of an Atlantic backbone transmission line, proposed by the Yankee-Dixie Power Association. The line would carry high voltage, and extend from Appalachia to Boston. ■

"I guess we forgot to call back—
we fixed it ourselves this morning."

CB RIGS & RIGMAROLE



a what's new product column that's fun to read

■ Ever want more "talk power," ever think about getting something which offers more than just a little more than most CB rigs, or did you ever think about pocket CB'ing with a miniature rig? If you've been bothered by these things, Bunky, we've got some possible solutions for you.

Blasting the Band. Like the elusive "Flying Dutchman" lost gold mine, for years CB operators have been hot on the trail of something which they refer to as "talk power." "Talk power" is a term which you won't find in a dictionary, and its exact definition is rather inexact. For most CB'ers, it means boosting the signal in order to work out over longer distances without running either more power or higher modulation than is permitted under the FCC's prissy CB regulations. This, at first, may sound like an easy task, but it's about as easy as pouring hot butter into a wildcat's ear.

One way to boost your signal is via the super-duper sky-hook method, but a fancy and elaborate antenna isn't always possible. One other, and often overlooked, method is by adding a dash of pepper to the rig's audio system. This is accomplished by means of some sort of audio processor such as a speech compressor, clipper, preamp, etc.

E. C. A. TalkPOW'r Audio Processing Unit

Of the ton-and-a-half of these gadgets now offered to CB'ers, one of our favorites is the "TalkPOW'r" audio processing unit being marketed by E.C.A., 1236 N.E. 44 St., Oklahoma City, Okla. 73111. Available for $17.95 wired and tested (less battery and plug) or $14.95 in kit form, or the printed circuit board alone for $2, the "TalkPOW'r" will work on virtually any CB rig.

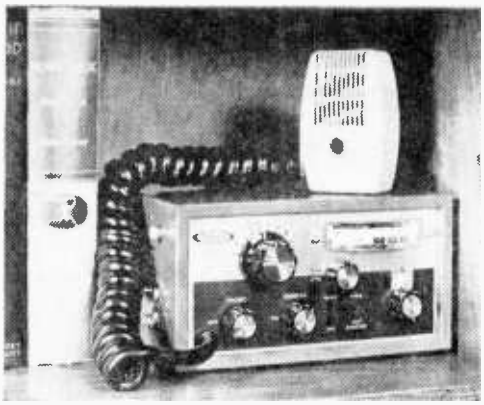
Tucked away in its 3 transistor circuit is the ability to give up to 40 db of voltage gain for soft voices, and up to 20 db clipping for average microphone and voice. While all of this electronic hocus pocus doesn't make one whit of difference in the actual output wattage of your rig, the "TalkPOW'r" unit pumps a souped-up amount of modulation onto the carrier. It even works on rigs which have existing speech boosting circuits built-in.

Placing the device into the circuit of a CB rig is a matter of unplugging the mike, plugging the "TalkPOW'r" into the mike socket on the rig, and then running the mike into the plug on the processor. Output level can be adjusted, and you can even switch it out of the circuit if you aren't in the mood to melt down the other guy's receiver.

The whole she-bang is a little larger than two packs of cigarettes—watch it light up your signal! Can't be matched.

CB Rolls Royce? The people at Amphenol Distributor Division, 2875 S. 25th Avenue, Broadview, Ill., have whipped together a rather unique piece of communications gear, such as "you can't hardly find no more" on 11 meters. Dubbed the Model 650, it hums along on 18 transistors and 9 diodes.

Within its rather small cabinet are some pretty sophisticated features such as 10 channel transmitter with both crystal and tunable receiving provisions, built-in PA system, combination S-meter/power output meter, adjustable squelch, crystal controlled first oscillator with



Amphenol Model 650 CB Transceiver

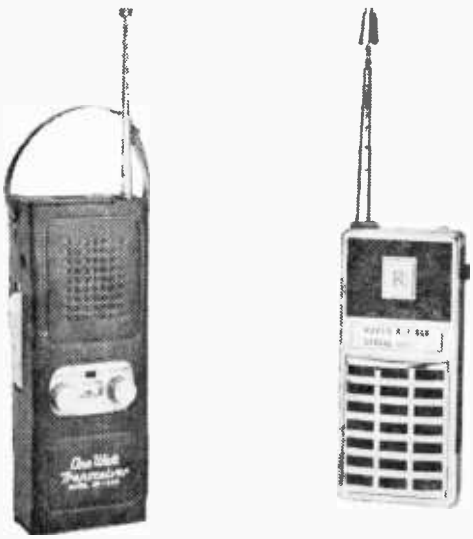
two IF stages for superior stability, selectivity and adjacent channel rejection.

Amphenol claims that the power output peaks at 3½ watts with modulation percentage running over 95%, all of this being filtered through twin harmonic traps so as to let Uncle Elmo watch his favorite TV program without benefit of your CB signal.

Built like a brick space station, the Model 650 is just about indestructible. For instance, it will function at temperatures as low as 25 degrees below zero, and shaking such as will seldom be encountered in normal use. The set is housed in a cabinet made of heavy-gauge steel.

With its self-contained power supply for 12 volts DC and 115 volts AC, it comes equipped for operation on Channel 11. Retail price is $229.95.

Mighty Midgets. A relatively new comer to the CB marketplace has issued forth two hand held units which should be snapped up for 1001



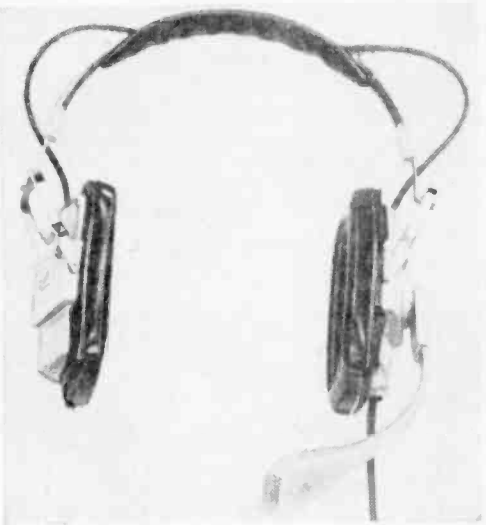
Robyn "Walkie-Talkie" (left) and R/T-400 (right)

uses. The company is The Robyn Company, 4303 Kroes Road, Rockford, Mich., and their sets are called the Robyn Walkie Talkie and the Robyn R/T-400 100-mw Transceiver.

The Robyn Walkie Talkie is a full one watt, two-channel hand held CB station. It comes with batteries, leather carrying case, earphone, external battery or AC power adapter jack, squelch control with RF amplifier and combination battery and modulation meter. Nickel-Cadmium rechargeable batteries and charger are optional. Price is $69.95 each, or $129.95 for a pair.

In the low-power department, the R/T-400 is a pocket size, single channel unit running one-tenth of a watt input. The 9 transistor circuit features a superhet megacycle inhaler and a transmitter which averages about a mile coverage. Price is $49.95 for a pair of the little devils.

Look Ma, No Hands! Safety first usually means CB second, because it isn't always easy to zip along the highway with a mike and its push-button in one hand with the steering wheel in 'tuther. Here's a way of eliminating the problem, while still having full use of your CB station. An outfit known far and wide as Roanwell Corporation, 180 Varick St., New York, N. Y. 10014, offers a combination head-



Roanwell Corporation CB Headset

set/microphone which allows you to keep both hands on the wheel. All you need do is put your push-to-talk button on the steering wheel, or on the floor under your left foot. This button kicks the rig on and off and that's all there is to it!

Prices vary, as there are a number of mike types and impedances available for various rigs.

If you go mobile, it may pay you to look into this item. Remember the mobile CB'ers lament:

He went sizzling down the highway,
One hand held mike and switch,
A truck pulled out in front of him,
He didn't even twitch.

Pretty as a Picture. We saw these QSL plaques and they looked so neat that we thought you would like to know about them. You send the manufacturer your QSL card and he reproduces it via a new process called "Permatography" which gives you an image on a metal plate. The image is actually a part of the metal and can't be rubbed, worn, corroded, chipped or peeled off—and it won't fade. The metal "pematograph" of your QSL is then mounted on an attractive wood-grain plaque with a hanging ring.

Perma-Pic Corp. Attractive Wood-Grain Plaque

Two sizes are available. 3" by 3½" at $3.50 ppd. and 5½" by 6½" for $4.95 ppd. You can also have photographs or even your CB license done up this way. The manufacturer is Perma-Pic Corporation of America, Box 67, New Hope, Pa. ■

BOOKMARK

by Bookworm

■ Everything is going up—wages, astronauts, hem lines and the cost of publishing. But you wouldn't believe it by scanning the prices for the texts reviewed in this issue of RADIO-TV EXPERIMENTER. In fact, for only one *fin* you can pick up all four books and still have enough scratch left to buy a good pre-Castro cigar.

Hi-Fi Duet. Today's music lover has a problem. Never before has there been so much high fidelity equipment for reproducing music in the home. On the other hand, without a technical background, the music lover can feel himself to be ill-equipped to make decisions on what kind and make of system to buy or build, and how and where to install it to get the best results on what is after all a considerable investment. Even when these questions are dealt with, his problems are only just starting. He has to live with a tangle of wires, knobs and tubes as mysterious and complex as the organism of a newborn baby, and demanding as much attention and care. Hum, distortion, or other disturbances can occur and he may have no means of knowing if these are the result of a defective component, or a simple misadjustment. A friend's set may sound better. Is this because his system is a better one, or because his speakers are differently placed, the needle lighter, or the curtains made of different fabric?

Such information is not always easy to come by. Two concise, reliable guides to the how and the why of high fidelity written specially for the layman, but also offering a great deal of useful advice for all owners and would-be owners have just been reissued by Dover in paperback. They are *High Fidelity Systems: A User's Guide* by Roy Allison, currently Plant Manager of Acoustic Research, Inc., and a former Audio Editor of High Fidelity magazine; and *Reproduction of*

90 pages
Soft cover
46 illus.
$1.00

Sound by Edgar Villchur, President and Director of Research at Acoustic Research, where he has designed AR speakers and turntables. Both books sell at $1.00 each.

High Fidelity Systems has been expanded and revised. It covers every aspect of choice of equipment, installation, operation and maintenance in clear, non-technical language, helped by detailed charts illustrating each component, its relation to the others, how it should be wired and so on. After an initial chapter on mono systems, the author covers every stereophonic component and discusses how to adjust the system and other fundamentals. While his book is not intended to be a buying guide to specific brands of hi-fi products, he does give helpful guidelines on how to buy, what questions to ask one's dealer, what conditions are best for testing, including which records should be played to illustrate various characteristics, and what to look for in general.

92 pages
Soft cover
69 illus.
$1.00

In *Reproduction of Sound*, Villchur explains in non-technical language how the different parts of a reproducing system work. After a description of sound in general, he discusses such topics as standards of high fidelity, sound reproducing systems, disc recording, pickups and needles, pickup arms, amplifiers, preamplifiers and control units, power amplifiers, negative feedback, loudspeakers, speaker enclosures, and room environments. Historical developments are also described.

To get your copy of either book write to the publisher, Dover Publications, Inc., 180 Varick Street, New York, N. Y. 10014, or check your local book store.

Tape Users Guide. Relatively few owners of tape recorders, or potential buyers are aware of the tremendous versatility of their machines. Most persons view the tape recorder simply as a supplement to or as an alternate for a record player.

To acquaint the growing number of those who enjoy tape recorders with their full potentialities, *Elpa Marketing Industries, Inc.* asked Joel Tall, noted expert on tape editing, and Martin Clifford, author and editor, to prepare a book on this subject. Their joint efforts resulted in a book entitled, *"Your Tape Recorder: How to Use it, How to Enjoy it, How to Get More Out of it."* This attractively illustrated book contains such subject headings as: The Reproduction of Sound:

Bookmark

32 pages
Soft cover
Over 20 illus.
$1.00

How a Tape Recorder Works; How Magnetic Tape Works; Types and Selection of Tape; Type of Tape to Use; How to Record; Recording Speed; Recording Live; Using a Mixer; Wow; Flutter; Superimposing; How to Splice; EDITall Blocks and EDITabs; Personality in Speech; Storage of Tape; plus suggestions on the numerous uses for tape recorders.

Your Tape Recorder is sold for $1.00 through local Hi-Fi dealers or can be obtained directly from Elpa Marketing Industries, Inc., Dept. PUS, New Hyde Park, N. Y.

RCA Does It Again. The newest *RCA Receiving Tube Manual, RC-24,* continues as the most complete and authoritative reference in its field at its price. The new streamlined edition, more compact and easier to use than ever, provides up-to-date information on receiving tubes for home-entertainment applications, picture tubes for black-and-white and color television receivers, and voltage-regulator and voltage-reference tubes. In fact, it's the best vacuum tube reference manual the experimenter can buy.

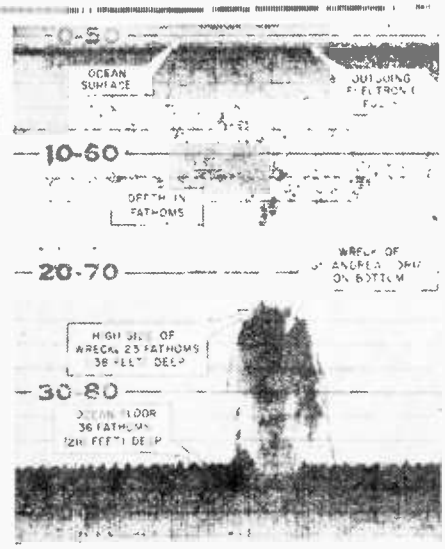
576 pages
Soft cover
Countless illus.
$1.25

As in the previous edition, the Technical Data Section is restricted to detailed coverage of active receiving tube types. Definitive data on discontinued and replacement receiving types, on picture tubes, and on voltage-regulator and voltage-reference tubes are presented in tabular charts for easy reference and comparison.

All the other features which make the *RCA Receiving Tube Manual* a perennial best seller

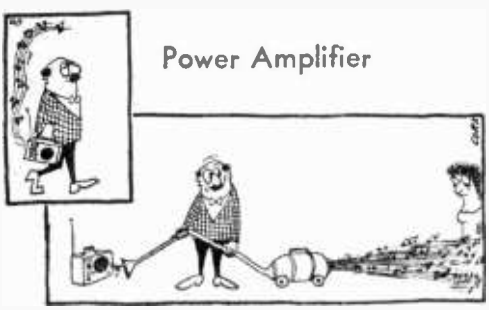
still remain: the well illustrated, easy-to-understand text chapters; the handy Application Guide for Receiving Tubes; the popular Circuits Section with its many timely and practical tube applications; and the many other aids which make the manual an indispensable tool for the use and understanding of receiving tubes.

Copies of the new *RCA Receiving Tube Manual RC-24* may be obtained from radio parts distributors throughout the U. S. A., or by sending $1.25 to Commercial Engineering, RCA Electronic Components and Devices, Dept. RTVE, Harrison, New Jersey 07029. ■



Sound of a Sunken Ship

Fathometer depth sounder aboard a salvage vessel graphed this view of sunken liner *SS Andrea Doria* lying on her side in 216 feet of water off Nantucket, Massachusetts. Electronic view of wreck was made with a Raytheon depth sounder that sends out ultrasonic impulses and records echoes bouncing off the bottom, obstructions, and passing fish. Various teams of would-be salvagers have been attracted to the site since the ship went down on July 25, 1956.



Power Amplifier

Power Supply

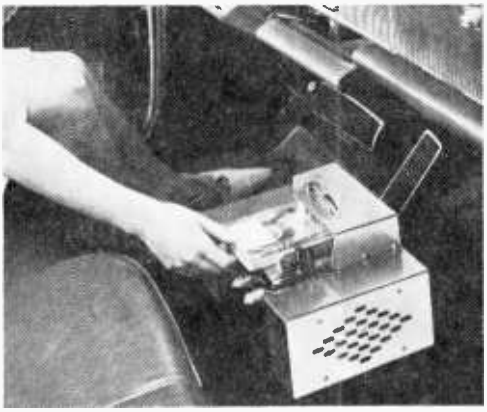
Experimenters! Kick the power supply building habit with the new Precise Electronics regulated power supply. A compact 2-in-1 instrument providing variable regulated dc plate and bias voltages, plus ac heater voltages. It has separate dc meters for plate voltage and current.

The Model 780 provides precise regulation from 0 to 400 volts at high current, up to 150 milliamperes. It gives up to 6 amperes at 6.3 vac for operation of vacuum tube heaters. New safety and convenience features include a high voltage indicator, a separate regulated bias supply, and separate meters for voltage and current. The 780 sells for $99.95. For more information and complete specifications write to Precise Electronics, Designatronics Inc., Dept. DP-1. 76 East Second St., Mineola, L. I., New York 11501.

Precise Electronics Model 780 Regulated Power Supply

Reels on Wheels Over the Hump

Martel Electronics has recently introduced their new Auto-Sonic stereo 603M Tape Deck the first and only 4-track cartridge tape deck for the auto that needs *absolutely no installation*. Its handsome and unusual design is created to fit over the hump on the floor of any car adjustable speakers can be raised and low-

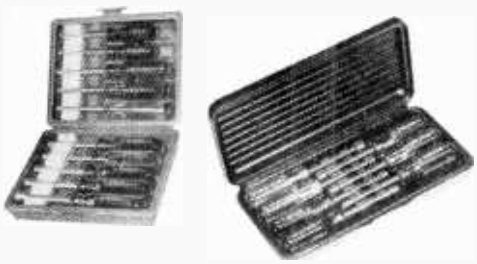


Martel Electronics 603M Tape Deck

ered. The 603M plugs directly into the cigarette lighter. A twenty-five foot extension cord permits portability and convenience. It not only plays in the car, but can be carried onto the beach, boat, or patio. An AC converter is available which enahles the user to listen to tapes at home or at office as well. The Auto-Sonic 603M by Martel is the first to offer all these features as well as over 10,000 musical selections to choose from. If preferred, the 603M can be permanently attached under the dash. For more information on the first car stereo tape deck that needs no installation, write to Martel Electronics, Dept. DP-1, 2356 S. Cotner, W. Los Angeles, California.

It's the Nuts

Color coded, solid and hollow shaft nutdrivers manufactured by Xcelite Incorporated are now being offered in new sets which feature handy, pebble-grain plastic cases for keeping the tools in good order on the workbench and



Xcelite HS6-18 (left) and 77 (Right)
Color Coded Nutdriver Sets

NEW PRODVCTS

on service calls. Snap-lock lids shut tight to protect tools from scattering. Exceptionally compact, the kits fit neatly in a tool box. The solid shaft set can also be hung on a wall by means of a hole in the lid of the case. Molded compartments keep tools from tumbling out.

Set No. 77 contains seven solid shaft nutdrivers with hex openings from 3/16" thru 3/8". Set No. HS6-18 contains ten hollow shaft nutdrivers with hex openings from 3/16" thru 9/16". Nutdrivers are of professional quality and have precision fit, case-hardened sockets; polished and plated steel shafts; and shockproof, breakproof. plastic (UL) handles.

Complete information is obtainable by requesting Form S865 from Xcelite Incorporated, Dept. DP-1, Orchard Park, N. Y. Can't wait? Then drop in on your local radio replacement parts dealer and ask him to show you Xcelite's Sets No. 77 and No. H 56-18.

Dictate on the Run

The new portable StenOtape Dictating Machine G-540 may be operated three ways—on "C" batteries, on a 12 volt DC auto battery or from the normal AC current (105 to 240 volts, 50 or 60 cycles). Change-over from one power source to another is automatic. No AC adapter is needed.

American Geloso StenOtape Dictating Machine G-540

A magnetic tape unit, the StenOtape G-540, may also be used for transcribing and conference recording. It operates two hours on one self-loading reel of tape. Remote control microphone starts and stops the tape. Complete controls are available for dictating, stop, review, transcribing, fast rewind and fast forward. One very important note, the StenOtape G-540 is compatible with all capston drive, reel to reel, magnetic tape machines.

Small in size—the unit weighs only 6 lbs. and lists for $148.50 complete with carrying case, shoulder strap, remote microphone, tape and batteries. A wide variety of accessories, including a foot pedal, dynamic lavalier microphone,

telephone pick up, etc. are available. Details and literature may be secured from StenOtape Div., American Geloso Electronics, Inc., Dept. DP-1, 251 Park Avenue South, New York, New York 10010.

SSB/CW Ham Xmitter.

Hallicrafters new amateur band transmitter employing advanced single-conversion signal path circuitry puts out 180 watts PEP input on SSB and 150 watts on CW. Designed as a companion to the company's previously announced SX-146 receiver, the HT-46 may be worked independently or inter-connected with the SX-146 for transceive operation.

Hallicrafters Model HT-46 Amateur Transmitter

The HT-46 is all-new from the chassis up. Frequency coverage is 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 mc and 28-30 mc in four 500 kc steps. A crystal is provided for 28.5-29.0 mc coverage. Other 10 meter crystals are optional. Housed in a compact, cleanly designed cabinet, the HT-46 measures 5⅞"H x 13⅛"W x 11"D. It has a 9 mc quartz filter for upper or lower sideband. It features grid block keying for CW, and push-to-talk operation with provision for optional plug-in VOX. Solid state circuitry is used in the self-contained power supply. Unwanted sideband and carrier suppression are rated at better than 50 db.

A full complement of front panel controls is conveniently grouped for ease of operation. They include: band selector, frequency tuning, driver tuning, dial calibration, microphone gain, carrier level, a MA-HFO meter, and all mode controls for USB, LSB, and CW-Tune operation. A key jack, antenna jack, VOX accessory socket, and receiver input for transceive operation are located on the rear apron.

Amateur net price of the HT-46 is $349.95. The accessory HA-16 VOX adapter has an amateur net price of $37.95. Complete specifications may be obtained by writing to The Hallicrafters Co., Dept. DP-1, 5th & Kostner Avenues, Chicago, Illinois 60624.

DC to 6 Mc. Solid-State Scope

A new 3-inch completely solid-state DC to 6 mc. oscilloscope that weighs only 16 lbs., uses less than 15 watts of power, has cali-

brated vertical sensitivity, calibrated sweep times and triggered sweep is now available from Allied Electronics. The Knight model KN-5005 Scope, the latest addition to Allied's private brand line of instruments. is designed to meet every modern-day testing requirement. It is priced at $425.00.

Knight KN-5005 Solid-State Oscilloscope

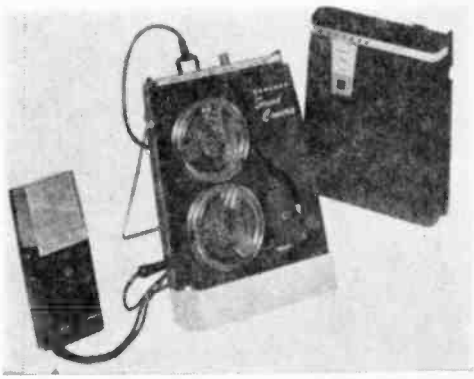
Specifications for the vertical sweep system are: Sensitivity: .05 v/division Linear over 8 divisions (2"). Frequency: compensated attenuator; ten steps (X1 to X1000 attenuation). .05v to 50v/division: 3% accuracy. DC response: DC to 3 mc. at 4 divisions amplitude: DC to 6 mc. ± 3 db. at 2 divisions; useful to 12 mc. AC response: 10 cps to 3 mc. at 4 divisions amplitude; :10 cps to mc. at 2 divisions; useful to 12 mc. Rise time: .075 m.sec at 2 divisions amplitude; .1 m.sec at 4 divisions.

Specs on the horizontal system are: Sweep speeds: 1 m.sec division to 100 m.sec/division in 6 steps (18 steps to 500 m.sec used with X1, X2, and X5 multipliers). Accurate within 3%. 1 m.sec to 50 m.sec/division; ± 10%. 100-500 sec. Continuously variable uncalibrated sweep speeds over above range. Multiplier (X5) increase sweep rate to 0.2 m.sec/division.

Trigger Modes specs are: Free run, plus positive and negative internal and (adjustable trigger level) external slope. Stable automatic sweep—when in trigger mode, trace is definitely triggered at the slope and level set; cannot stop sweeping or free run. Delay between signal reaching trigger level and start of sweep is about .75 microsec. Additional information may be obtained from Allied Electronics Corp., Dept. JR, 100 N. Western, Chicago, Ill. 60680.

Automatic Voice-Control Recorder

A new voice-operated automatic "Sound Camera" has been added to the Concord line of "Sound Camera" portable, battery-operated tape recorders. Using the Concord VM-10 voice-control microphone, the new Model F-88 starts when it picks up sound and stops when the sound stops. The F-88 is Concord's latest extension of its emphasis on "Take-anywhere" portables.



Concord VM-10 Voice-Control Microphone

Only 5" x 7" x 3", the miniaturized unit weighs just two pounds. Because it is dual track, the F-88 permits an hour's play on a single reel of tape. Precision operation is achieved through use of a capstan-drive tape transport mechanism, as well as a governor-controlled, servo-type DC drive motor and Concord's flux-field head for improved frequency response at low tape speeds.

The F-88 "Sound Camera" may also be operated manually by pushbuttons or remote control on microphone if voice operation is not desired. Other features include record-level and battery-level indication, extension speaker jack, AC-adapter jack, and optional direct recording from radio, TV or record player.

Specifications include—recording time: — 1 hour on a single reel of tape (triple play). Recording Speed: — Standard 1⅞ IPS recording speed. Power Source: — Four standard flashlight batteries (size "C"). Battery Life: — Approximately 12 hours. Dimensions: —7" x 5" x 3". Weight: — 2 pounds.

Price of the F-88 is under $80.00. More information is available from Concord Electronics Corporation, 1935 Armacost Avenue, Los Angeles, California 90025. ■

RADIO-TV EXPERIMENTER *brings the know-how of electronics experts to its readers. If you have any questions to ask of this reader-service column, just type it on the back of a 4¢ postal card and send it to "Ask Me Another,"* RADIO-TV EXPERIMENTER, *505 Park Avenue, New York, New York 10022. The experts will try to answer your questions in the available space in upcoming issues. Sorry, the experts will be unable to answer your questions by mail.*

UHF-TV: Channels 14 to 83

There is a new TV station on the air here, Channel 47. My TV set's channel selector indicates only channels 2 through 13. How can I tune in Channel 47?

—B. B., Flushing, N. Y.

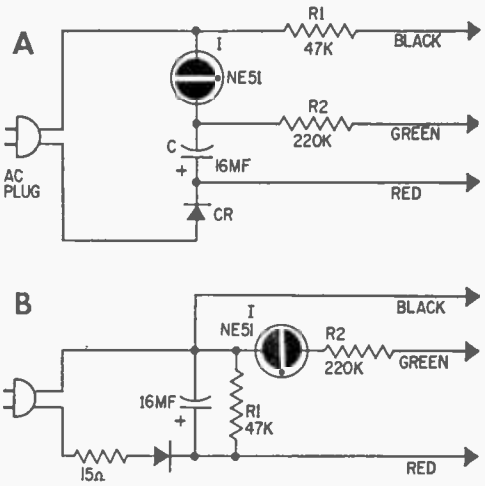
Channel 47 is in the UHF television band where there are many unused channels. All new TV sets are now required by law to be capable of tuning in all VHF and UHF television stations. To tune in UHF stations with an older TV set you need a UHF converter. They cost as little as $15.95 at Lafayette stores in the New York City area. Try Allen Electronics or other radio parts stores in Flushing. When you use a converter with your old TV set, you'll then have a choice of nine stations in both bands, including Channel 31 which is operated by the City of New York.

Cheap Tester

Over five years ago I built a tester using the circuit shown in the diagram. I have since forgotten what the instrument is called. I find that I can test a capacitor by connecting the red and black test leads to it. If the neon lamp flashes only once, the capacitor is O.K. But, what is the green lead for? (See diagram A below.)

—H. H., Menasha, Wis.

It is a combination continuity and capacitor tester. It looks like it is hooked up wrong. If you rewire it as shown in diagram B (below), it will work as a capacitor and continuity tester using the red and green test leads. You will also have a small DC power supply (about 150 volts) using the red and black leads. Resistor R1, shunted across filter capacitor C stabilizes the voltage and bleeds off the charge in C when the AC plug is disconnected.



160-mc Aero Bander

How can I adapt the Aero Bander described in the December-January issue of RADIO-TV EXPERIMENTER *for tuning in 152 to 162-mc band stations?*

—L. N., Seahurst, Wash.

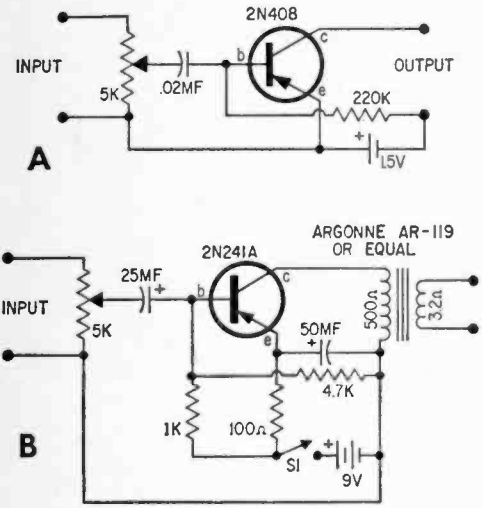
Use fewer turns on L2 and L4. With C2 set at maximum capacitance, adjust L2 turns and turn spacing so that they resonate at 152 mc as checked with a dip meter. With C7 set at maximum capacitance, adjust L4 turns and turn spacing so that they resonate at 70.6 mc, also as checked with a dip meter. To receive FM signals, adjust C7 slightly off frequency so that slope detection results.

More Power

To drive a PM dynamic extension speaker, I built a one-transistor amplifier using the circuit shown in the diagram. The only problem is that it overloads when I turn up the volume. What substitutions or modifications can cure this?

—S. G., Chevy Chase, Md.

Your amplier (A) is obviously incapable of handling sufficient power, particularly when using only a 1.5-volt battery. You need an amplifier with a considerably higher power output rating. The second circuit (B) shown here should work considerably better.



TV DX?

I would like to pick up TV stations some 200 miles away. Is there any antenna on the market capable of doing this? If so, what is the manufacturer's name?

—W. B. M., Richmond, Ind.

The Winegard Model C-44 is rated at up to 175 miles range. When used with a 30-db (gain) antenna amplifier, and when supported on a mast high enough, it might just do the trick.

Use a Sky Wire

I have a portable transistor radio which employs 12 transistors and 5 diodes. How can I improve its long distance, shortwave capability?

—J. T., Muskegon, Mich.

Connect an outdoor antenna to its whip antenna.

80-meter Problem

How can I convert my shortwave set so I can tune in the 80-meter band? It now tunes from 6 mc to 18 mc.

—D. C. G., Greensboro, N.C.

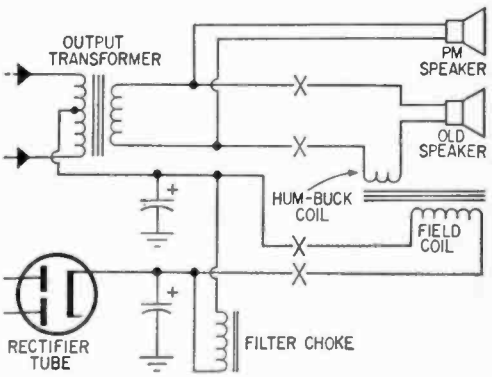
Add turns to the coils. You will need about twice as much inductance. You can get ready made coils such as the Miller 4406 which can be adjusted to vary its inductance from 6.7 to 15 microhenries. Of course, you will limit the tuning range at the high end when you change the coils.

Field Coils are Out

A radio I have has a field coil speaker. Is there any way I can replace it with a PM dynamic speaker?

—D. S., Hanover, Pa.

Use a filter choke in place of a low-resistance field coil, connected as shown in the diagram. The filter-choke inductance value is not critical, but it must be able to handle the receiver's total plate current. A Stancor C-1002, for example, is rated at 15 henries and 75 milliamperes. Some sets used a high-resistance (5K to 10K ohms) field coil in parallel to the B-plus supply. It is generally not necessary to substitute a filter choke for this inductance. Many old auto radios do not need the choke either—it will only use extra battery current since it is connected in parallel to the filaments.



BCB Frequency Meter

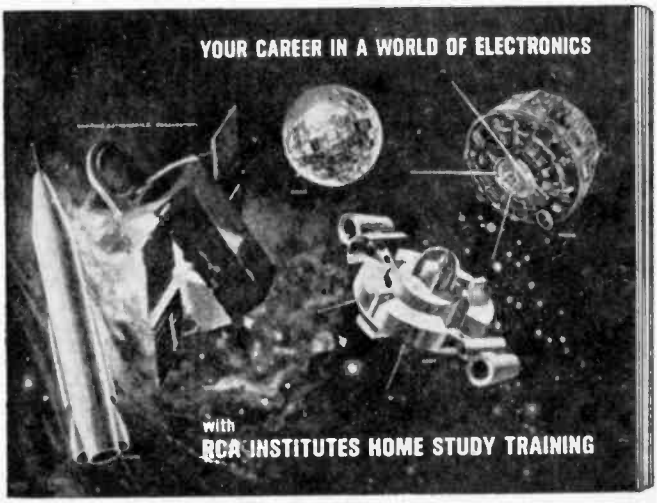
How can I get information on a tuning meter that reads Kilocycles in the AM broadcast band?

—S. H., Stillwater, Minn.

You can use a BC-221 frequency meter. They are available at military surplus stores for around $100. Or, get a calibrated dip meter.

(Continued on page 28)

SEND CARD FOR RCA'S NEW 1966 HOME STUDY CAREER BOOK TODAY



CUT THE TIME BETWEEN NOW AND SUCCESS

- Find out about RCA Institutes Career Programs.
- Learn about the amazing "Autotext" programmed instruction method—the easier way to learn.
- Get the facts about the prime quality kits you get at no extra cost.
- Read about RCA Institutes' Liberal Tuition Plan—the most economical way for you to learn electronics now.
- Discover how RCA Institutes Home Training has helped its students enter profitable electronic careers.

Lots more helpful and interesting facts too! Send postage-paid card for your FREE copy now. No obligation. No salesman will call.

RCA INSTITUTES, Inc. Dept. RX-66
350 West 4th Street, New York, N. Y. 10014

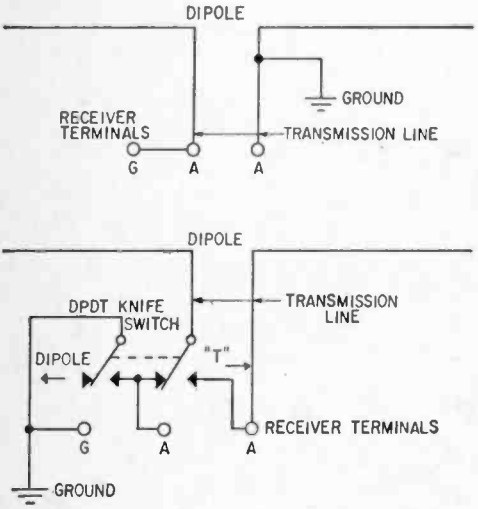
RCA Institutes also offers Classroom Training.
Catalog free on request.
(Courses also available in Spanish)

RCA **The Most Trusted Name in Electronics**

Continued from page 24

Grounded

I have a shortwave receiver and a 40-meter band dipole antenna, connected as shown in the diagram. AM broadcast stations cover the entire 160-meter band, except when I disconnect the ground. Is there anyway I can eliminate the BCI without removing the ground.



—R. A., Butte, Mont.

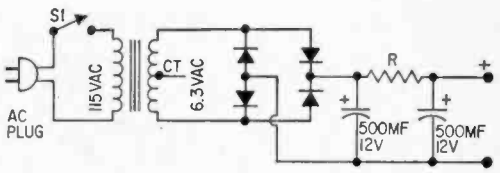
You've got the antenna hooked up wrong. Connect the dipole transmission line to the "A" and "A" terminal, and remove the shorting bar. Or, if you want more pick up on bands other than 40-meter, you can add a switch, as shown in the diagram, which will enable you to use the dipole as a "T" antenna. If you have been using coaxial transmission line, the shield should go to the center "A" connection.

4.5-volt DC Supply

Will you give me a diagram of a 4.5-volt DC power supply to replace three "D" cells?

—D. R. T., Mayo, Florida

You can use a 6.3-volt filament transformer and four 750-ma silicon diodes in a full-wave bridge circuit, as shown in the diagram. The value of the filter resistor (R), depends upon the current drain and it affects the output voltage. Try values from 5 to 100 ohms.

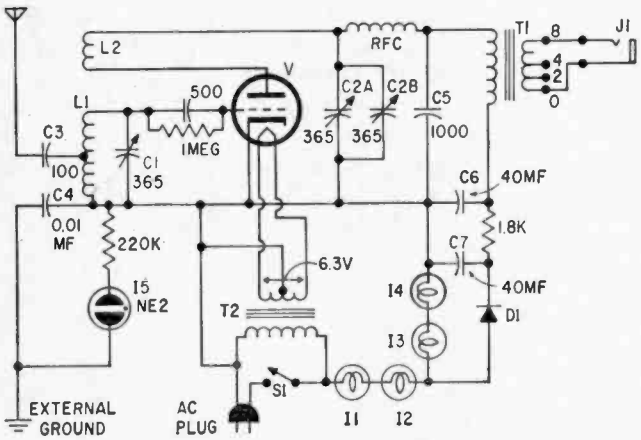


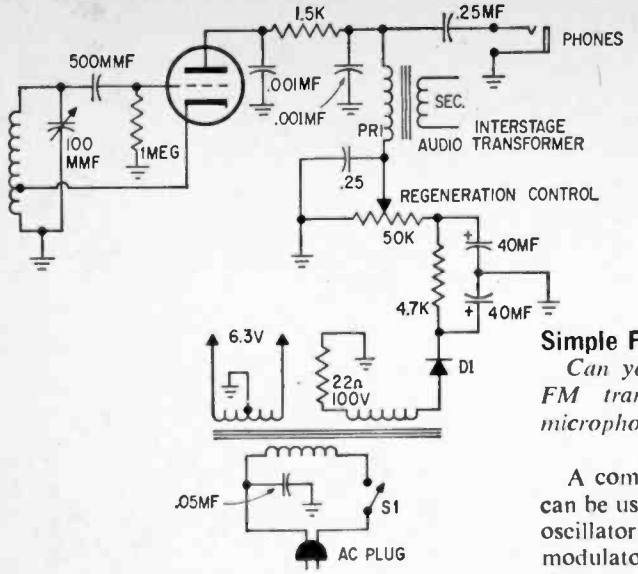
Regen Receiver

Can you give me a diagram for a one-tube, AC-powered radio?

—B. W., Petrolia, Ont.

The circuit diagram (bottom of page) is of a regenerative receiver. Coils L1 and L2 can be a Superex No. 11 loopstick, tuned by a 365 mmf capacitor. The regeneration control (C2A, C2B) is a two-gang 365 mmf tuning capacitor with the stators paralleled. To keep cost low, only a filament transformer (T2) is used in the power supply. Lamps I1 through I4 are GE 1819 28-volt pilot lamps (which fit an S. C. bayonet socket) function as a voltage divider. The output transformer (T1) can be one of the universal type so you can use low impedance earphones (8 ohms). Lamp I5 is a neon bulb which should not light when the set is





plugged in and connected to a ground. Reverse the AC plug prongs so the lamp does not light. Keep the regeneration control so that the circuit won't oscillate and cause interference. The set will be most sensitive just below the point where oscillation begins.

Brass Pounder's Tin Ear

How can I build a code monitor for my CW transmitter?

—C. C. S., Valdosta, Ga.

You could build a tone generator and key it at the same time as you key the transmitter, but you would not be hearing your actual signal. Instead, build a regenerative receiver using a circuit like the one shown above. Put it in a metal box so it won't radiate. Use plug-in coils to cover the various bands. Place it near your transmitter and tune the receiver until you pick up your transmitter's signal. You'll hear a whistle which is equal to your transmitter frequency plus or minus the monitor's frequency, when the regeneration control of the code monitor is advanced just beyond the point where is starts to oscillate.

Simple FM Transmitter

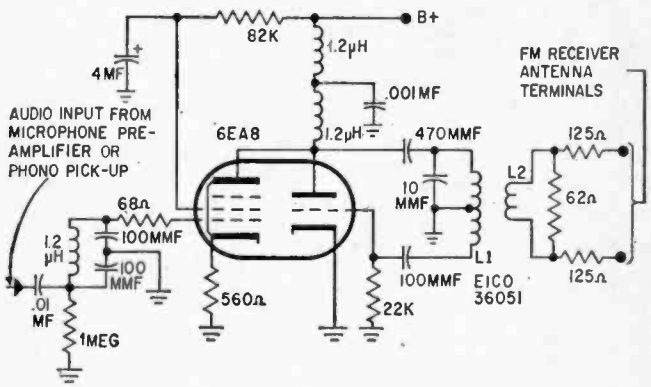
Can you give me a circuit for a simple FM transmitter for use as a wireless microphone?

—A. M., Santa Barbara, Calif.

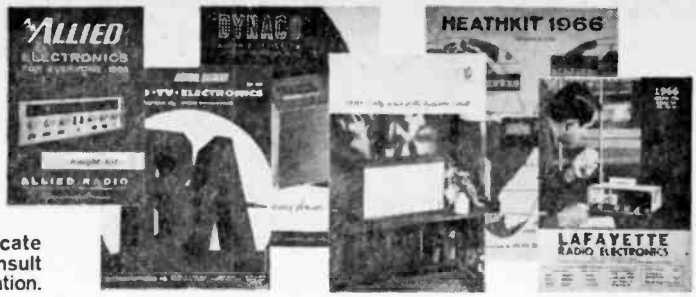
A combination pentode-triode 6EA8 tube can be used. The triode operates as a Hartley oscillator and the pentode as a reactance modulator. See below. Circuit values are shown except for the tank coil. This can be Eico Part Number 36051 available for $1.74 from Eico Electronic Instrument Co., Inc., Flushing, N. Y. 11352. Perhaps your Eico distributor can order one for you. Using the coil, the oscillator operates at around 100 mc.

Under Part 15 rules, only a type approved FM transmitter can be used without a station license. For wireless operation, a short piece of wire will suffice as an antenna, connected to one end of L2 with the other end of L2 grounded to the chassis. To use it legally, connect a 62-ohm resistor across L2 and feed each side of L2 through a 125-ohm resistor to the 300-ohm antenna terminals of the FM receiver.

The same circuit can be used as a low-power FM transmitter in the 2-meter or 6-meter ham band by using a coil that will tune to the band. Since it is not crystal controlled, it cannot be used by a novice ham. ■



Literature Library



Numbers in heavy type indicate advertisers in this issue. Consult their ads for additional information.

ELECTRONIC PARTS

1. This 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 latest *Allied Radio* catalog? The surprising thing is that it's free!

2. The new 510-page 1966 edition of *Lafayette Radio's* multi-colored catalog is a perfect buyer's guide for hi-fi'ers, experimenters, kit builders, CB'ers and hams. Get your free copy, today!

4. We'll exert our influence to get you on the *Olson* mailing list. This catalog comes out regularly with lots of new and surplus items. If you find your name hidden in the pages, you win $5 in free merchandise!

5. Unusual scientific, optical and mathematical values. That's what *Edmund Scientific* has. War surplus equipment as well as many other hard-to-get items are included in this new 148-page catalog.

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

7. Whether you buy surplus or new, you will be interested in *Fair Radio Sales Co.'s* latest catalog—chuck full of buys for every experimenter.

8. Want a colorful catalog of goodies? *John Meshna, Jr.* has one that covers everything from assemblies to zener diodes. Listed are government surplus radio, radar, parts, etc. All at unbelievable prices.

10. *Burstein-Applebee* offers a new giant catalog containing 100's 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.

12. VHF listeners will want the latest catalog from *Kuhn Electronics*. All types and forms of complete receivers and converters.

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

25. Unusual surplus and new equipment/parts are priced "way down" in a 32-page flyer from *Edlie Electronics*. Get one.

75. *Transistors Unlimited* has a brand new catalog listing hundreds of parts at exceptionally low prices. Don't miss these bargains!

HI-FI/AUDIO

15. A name well-known in audio circles is *Acoustic Research*. Here's its booklet on the famous AR speakers and the new AR turntable.

16. *Garrard* has prepared a 32-page booklet on its full line of automatic turntables including the Lab 80, the first automatic transcription turntable. Accessories are detailed too.

17. Build your own bass reflex enclosures from fool-proof plans offered by *Electro-Voice*. At the same time get the specs on *EV's* solid-state hi-fi line—a new pace setter for the audio industry.

19. *Empire Scientific's* new 8-page, full color catalog is now available to our readers. Don't miss the sparkling decorating-with-sound ideas. Just circle #19.

22. A wide variety of loudspeakers and enclosures from *Utah Electronics* lists sizes shapes and prices. All types are covered in this heavily illustrated brochure.

24. Need a hi-fi or PA mike? *University Sound* has an interesting microphone booklet audio fans should read before making a purchase.

26. Always a leader, *H. H. Scott* introduces a new concept in stereo console catalogs. "At Home With Stereo" the 1966 guide, offers decorating ideas, a complete explanation of the more technical aspects of stereo consoles, and, of course, the complete new line of *Scott* consoles.

27. An assortment of high fidelity components and cabinets are described in the *Sherwood* brochure. The cabinets can almost be designed to your requirements, as they use modules.

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. Interested in learning about amplifier specifications as well as what's available in kit and wired form from *Acoustech?* Then get your copy of *Acoustech's* 8-page colorful brochure.

TAPE RECORDERS AND TAPE

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

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

33. Become the first to learn about *Norelco's* complete Carry-Corder 150 portable tape recorder outfit. Four-color booklet describes this new cartridge-tape unit.

34. The 1966 line of *Sony* tape recorders, microphones and accessories is illustrated in a new 16-page full color booklet just released by *Superscope, Inc.*, exclusive U.S. distributor.

35. If you are a serious tape audiophile, you will be interested in the new *Viking of Minneapolis* line—they carry both reel and cartridge recorders you should know about.

91. Sound begins and ends with a *Uher* tape recorder. Write for this new 20 page catalog showing the entire line of *Uher* recorders and accessories. How to synchronize your slide projector, execute sound on sound, and many other exclusive features.

HI-FI ACCESSORIES

76. A new voice-activated tape recorder switch is now available from *Kinematix*. Send for information on this and other exciting products.

39. A 12-page catalog describing the audio accessories that make hi-fi living a bit easier is yours from *Switchcraft, Inc.* The cables, mike mixers, and junctions are essentials!

98. Swinging to hi-fi stereo headsets? Then get your copy of *Superex Electronics'* 16-page catalog featuring a large selection of quality headsets.

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

KITS

41. Here's a firm that makes everything from TV kits to a complete line of test equipment. *Conar* would like to send you their latest catalog—just ask for it.

42. Here's a 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. A new short-form catalog (pocket size) is yours for the asking from *EICO*. Includes hi-fi, test gear, CB rigs and amateur equipment—many kits are solid-state projects.

AMATEUR RADIO

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

CB—BUSINESS RADIO SHORT-WAVE RADIO

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

49. Want to see the latest in communication receivers? *National Radio Co.* puts out a line of mighty fine ones and their catalog will tell you all about them.

50. Are you getting all you can from your Citizens Band radio equipment? *Amphenol Cadre Industries* has a booklet that answers lots of the questions you may have.

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

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

90. If two-way radio is your meat, send for *Pearce-Simpson's* new booklet! Its 18 pages cover equipment selection, license application, principles of two-way communications, reception, and installation.

93. *Heath Co.* has a new 23-channel all-transistor 5-watt CB rig at the lowest cost on the market, plus a full line of CB gear. See their new 10-band AM/FM/Shortwave portable and line of shortwave radios. #93 on the coupon.

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."

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.

102. *Sentry Mfg. Co.* has some interesting poop sheets on speech clippers, converters, talk power kits and the like for interested CB'ers, hams and SWL'ers, too.

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

SCHOOLS AND EDUCATIONAL

3. Get all the facts on *Progressive Edu-Kits* Home Radio Course. Build 20 radio and electronic circuits—parts and instructions come with course.

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.

56. *Bailey Institute of Technology* offers courses in electronics, basic electricity and drafting as well as refrigeration. More information in their informative pamphlet.

59. 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.*

61. *ICS (International Correspondence Schools)* offers 236 courses including many in the fields of radio, TV, and electronics. Send for free booklet "It's Your Future."

74. How to get an F.C.C. license, plus a description of the complete electronic courses offered by *Cleveland Institute of Electronics* are in their free catalog.

94. *Intercontinental Electronics School* offers three great courses: stereo radio & electronics; basic electricity; transistors. They are all described in *Inesco's* 1966, 16-page booklet.

TOOLS

78. Scrulox square recess screws pose no problems for the serviceman who carries either of *Xcelite's* two new compact Scrulox screwdriver sets in his pocket or toolbox. Bulletin N1065 has the details.

ELECTRONIC PRODUCTS

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

64. If you can use 117-volts, 60-cycle power where no power is available, the *Terado Corp.* Trav-Electric 50-160 is for you. Specifications are for the asking.

67. "Get the most measurement value per dollar," says *Electronics Measurements Corp.* Send for their catalog and find out how!

92. How about installing a transistorized electronic ignition system in your current car? *AEC Laboratories* will mail their brochure giving you specifications, schematics.

TELEVISION

70. *Heath Co.* now has a 19" and 25" rectangular-tube color TV kit in addition to their highly successful 21" model. Both sets can be installed in a wall or cabinet: both are money-saving musts!

73. Attention, TV servicemen! *Barry Electronics* "Green Sheet" lists many TV tube, parts, and equipment buys worth while examining. Good values, sensible prices.

72. Get your 1966 catalog of *Cisin's* TV, radio, and hi-fi service books. Bonus—TV tube substitution guide and trouble-chaser chart is yours for the asking.

29. Install your own TV or FM antenna! *Jefferson-King's* exclusive free booklet reveals secrets of installation, orientation; how to get TV-FM transmission data.

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

Radio-TV Experimenter, Dept. LL-89
505 Park Avenue, New York, N. Y. 10022

Please arrange to have the literature whose numbers I have encircled sent to me as soon as possible. I am enclosing 25¢ (no stamps) to cover handling charges.

☐ I am a subscriber

☐ Indicate total number of booklets requested

Be Sure To Enclose 25¢

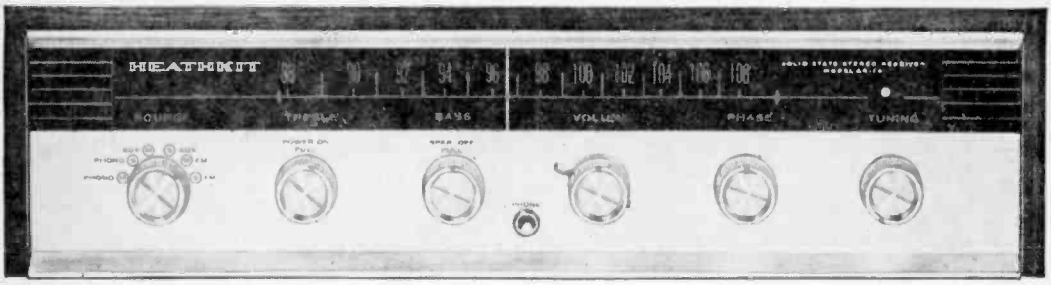
1	2	3	4	5	6	7	8	10	11	12	15	16
19	22	23	24	25	26	27	29	31	32	33	34	35
39	41	42	44	46	48	49	50	54	56	59	61	64
66	67	70	72	73	74	75	76	78	90	91	92	93
94	95	96	97	98	99	100	101	102	103	104	105	

NAME (Print clearly)_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

Over-Engineered & Under-Priced!



This New HEATHKIT® Solid-State FM Stereo Receiver Has 5 uv Sensitivity, 30 Watts Music Power, And Costs Just $99.95*

THE AR-14 AT A GLANCE!

• Advanced 31 transistor, 11 diode circuit • Wide-band FM stereo tuner, plus two preamplifiers and two power amplifiers • ±1 db from 15-50,000 cps at 30 watts IHF music power, 20 watts RMS • Handles your records and tapes, stereo or mono; 4, 8 & 16 ohm speakers • Phase control for 45 db or better separation • Front panel headphone jack • Bookshelf size . . . 3⅞" H. x 15¼" W. x 12" D. • Installs in wall, custom or either Heath cabinet

HOW CAN WE DO IT?

Judging from the high prices on other stereo receivers, you may have a few doubts about a receiver that sells for only $99.95. Don't have. Here's why:

Famous Heath Know-How has been responsible for the best value in hi-fi since 1949. Our audio engineers use the latest, most sophisticated techniques in the "state of the art." And each new design must survive several stages of rigid performance testing . . . your assurance that every Heathkit is *specification guaranteed*. But don't take our word for it. Compare specifications. Read the reviews by hi-fi editors. Ask any Heathkit owner.

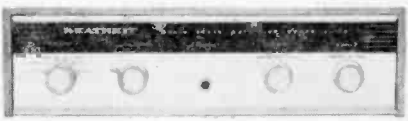
You Buy Direct From The Factory . . . no middleman expenses to add to the price. We offer more service than many dealers . . . liberal credit, advice on product selection, and complete servicing. You shop in the comfort of your home, and get delivery right to your front door.

You Build It Yourself in about 20 hours . . . thus labor costs are eliminated. And building it is half the fun. Takes no special skills or knowledge. The tuner "front-end" is already preassembled. Simple step-by-step instructions and large pictorials show you exactly what to do and how to do it. Nothing is left to chance. Get full AR-14 details in the FREE Heathkit Catalog.

Kit AR-14, 17 lbs., less cabinet $99.95
AE-55, 6 lbs. walnut veneer cabinet $9.95
AE-65, 6 lbs. . . beige steel cabinet $3.95

Also Available As Stereo Separates!

Kit AJ-14, FM/FMX Tuner, 6 lbs $49.95*
Walnut cab. $7.95, metal cab. $3.50. 4 lbs.



Kit AA-14, 30-Watt Amplifier, 11 lbs $59.95*
Walnut cab. $7.95, metal cab. $3.50. 4 lbs.

*less cabinet

FREE!

World's Largest Kit Catalog!

108 pages! Over 250 easy-to-build kits for stereo/hi-fi, amateur radio, shortwave, test, marine, CB, educational. Mail coupon today to Heath Company, Benton Harbor, Mich. 49022.

HEATHKIT

Heath Company, Dept. 19-6
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.
Please send model (s)_____
☐ Please send FREE Heathkit Catalog.

Name_____
Address_____
City_____ State_____ Zip_____

Prices & specifications subject to change without notice. HF-191

by Edward A. Morris, WA2VLU

That RF signal isn't any good unless you can hear the audio—compress peaks to increase average modulation.

■ If your Ham or CB rig does not seem to be getting out the way you think it should, and your contacts remark that your signal is hard to copy—it could be your modulation! What's the answer? Boost your modulation! How? With this compact 4-transistor audio compressor!

Even though your modulation meter says that you're hitting at or near 100% on peaks, if you're not using voice compression, your average modulation is likely to be only 35% —some 10 db of audio lower.

The only ways you can boost your signal, to the guys at the other end, are: to use a more powerful transmitter, put up a high-gain antenna, or to use voice compression. Obviously the easiest method is to use voice compression.

The voice compressor described here is a small, compact, unit that can be built right into the transmitter or transceiver its to be used with. It's modest cost, less than $10.00, won't crimp a small budget. Easy to build, it can be assembled in several hours time.

How it works. The compressor is somewhat unique in its method of operation. That is to say it uses a transistor, Q4, biased so as to act as a variable resistor which shunts part of the output signal to ground whenever the output level rises above a certain value.

Transistors Q1 and Q2 and their associated components form a two-stage common-emitter RC coupled amplifier. Operating bias for Q1 and Q2 is obtained from the voltage dividers formed by resistors R1, R2 and R5, R6. Emitter resistors R3, R7 stabilize the output over a wide range of temperature. Capacitors C3 and C5 bypass the emitter resistors and prevent signal degeneration.

Output from the first stage, developed across the collector-load resistor R4 is fed into the base of Q2 through C4. The output from the amplifier is taken across potentiometer R8 through C6. Note however, that part of the output is coupled into the base of transistor Q3 through capacitor C9 and resistor R10. Resistor R10 limits the signal. Bias for Q3 is set by R12 and potentiometer

R11, which also serves as the compression control.

The output from Q3 is full-wave rectified by diodes D1, D2, and filtered by capacitor C12.

Bias for transistor Q4 under no signal conditions (that is without someone speaking into the microphone) is set by resistors R14 and R15. This transistor is normally operated close to saturation. Any increase in forward (negative voltage) bias will drive the transistor into saturation. When Q4 saturates, its internal resistance drops. This low AC impedance is shunted across the output of the preamplifier—from the collector-load resistor for Q2, through C13 and C14. These capacitors are connected back-to-back to form a large-value non-polarized capacitor.

So we can see that the greater the input signal level, the deeper into saturation transistor Q4 is forced. As a result, more output signal is shunted to ground. The overall action is to compress the peaks so the output signal remains relativity constant, despite variations in the input-signal level.

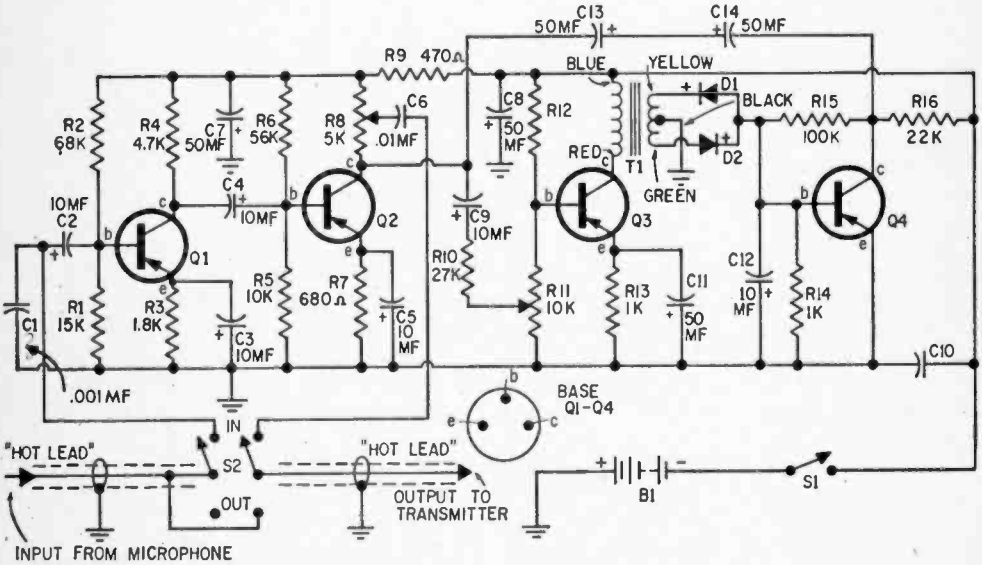
Construction. The use of perforated board simplifies the construction. All components are inserted upright, with their leads passing through the holes in the board. Miniature eyelets, inserted in the proper holes, serve to anchor leads and to provide additional rigidity to the wiring. All capacitors used are miniature types designed for upright mounting. Resistors are mounted on end to conserve space. The general parts layout can be seen in the photographs. All components, except capacitor C1, are mounted on one side of the board, with the wiring on the reverse side. Do not wire in resistor R15 at this time—it's exact value for your particular unit will be determined later.

As all components are mounted close together, the pigtail leads on the components themselves can be used as the interconnecting wiring. Use plastic insulation (spaghetti) where necessary to prevent accidental shorts.

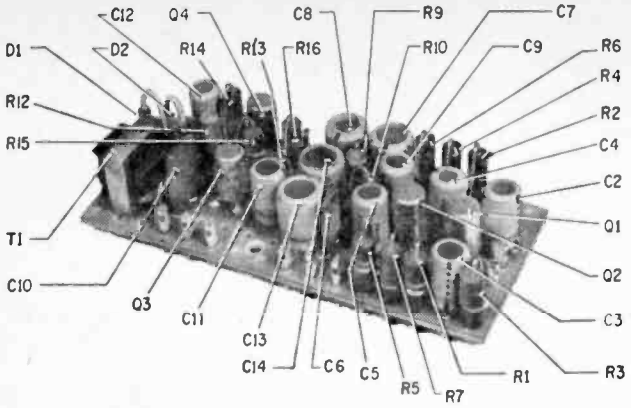
Special care must be taken to prevent damage to the transistors and the diodes when soldering them into the circuit. Complete the soldering operation as quickly as possible. The leads are short and a heat sink is not always practical.

When the compressor is completely wired, double check it against the schematic for possible errors.

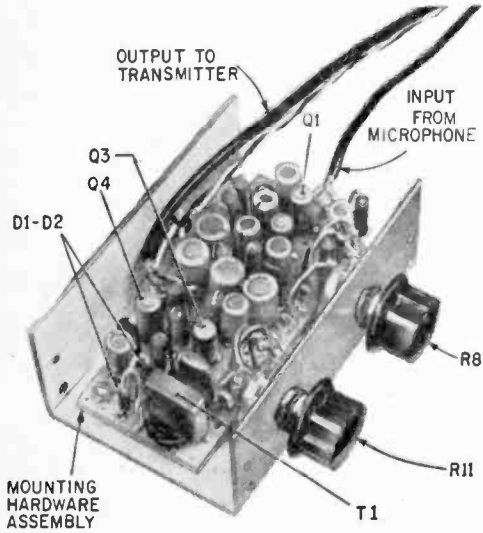
Whether or not the compressor is built into the transmitter it's to be used with, the compressor must be housed in a metal container. The compressor must be shielded well to prevent feedback. If the compressor is built into a transistorized transmitter, switch S1 and battery B1 may be eliminated. The compressor can be connected to the voltage source in the transmitter making a separate ON-OFF switch unnecessary. The com-



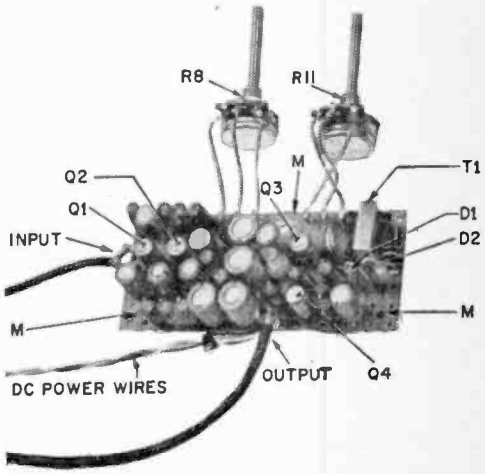
Switch S2 can be eliminated if you want the Compressor to be in the circuit at all times.



Mounted vertically the components resemble the skyline of a large city. This technique allows more components to be packed into each square inch of perforated board. Wafer-thin C1 is mounted against underside of board.



Depending on transmitter layout the leads for audio signals and DC power may be run through either or both ends of chassis box.

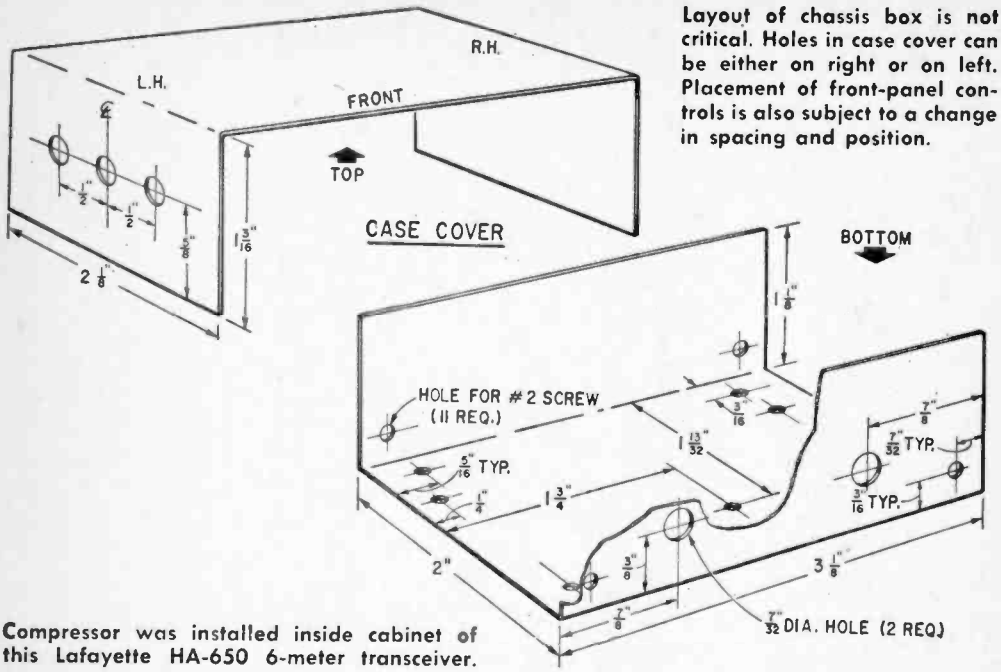


Control shafts for R8 and R11 can be cut short and slotted for screwdriver adjustment to save space required to clear small knobs.

PARTS LIST FOR AUDIO COMPRESSOR

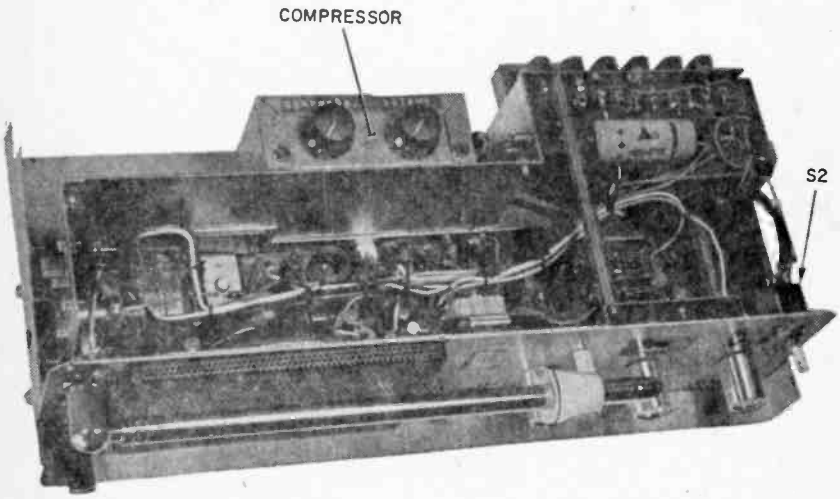
B1—9-12-volt battery (see text)
C1—.001-mf., miniature ceramic capacitor
C2, C3, C4, C5, C9, C12—10-mf., 12-volt miniature electrolytic capacitor (Lafayette 99R6082 or equiv.)
C6—.01-mf., minature ceramic capacitor
C7, C8, C11, C13, C14—50-mf., 12-volt miniature electrolytic capacitor (Lafayette 99R6085, or equiv.)
C10—.05-mf., miniature ceramic capacitor
D1, D2—Diode, 1N34, 1N51, 1N105, 1N267, 1N295 or equiv.
Q1, Q2, Q3, Q4—Transistor, pnp, 2N217, 2N320, 2N407, 2N118 or equiv.
R1—15,000-ohms, ½-watt resistor
R2—68,000-ohms, ½-watt resistor
R3—1,800-ohms, ½-watt resistor
R4—4,700-ohms, ½-watt resistor
R5—10,000-ohms, ½-watt resistor
R6—56,000-ohms, ½-watt resistor
R7—680-ohms, ½-watt resistor
R8—5,000-ohm miniature potentiometer (Lafayette 32R7355 or equiv.)
R9—470-ohms, ½-watt resistor
R10—27,000-ohms, ½-watt resistor
R11—10,000-ohms, miniature potentiometer (Lafayette 32R7356 or equiv.)
R12—100,000-ohms, ½-watt resistor
R13, R14—1,000-ohms, ½-watt resistor
R15—100,000-ohms, ½-watt resistor (see text)
R16—22,000-ohms, ½-watt resistor
S1—S.p.s.t. switch (see text)
S2—D.p.d.t. switch, miniature toggle (Lafayette 99R6162 or equiv.)
T1—Audio transformer, miniature 10,000-ohm primary; 2,000-ohm secondary (Lafayette 99R6126 or equiv.)
1—Aluminum chassis box, 3¼ x 2⅛ x 1⅝-inches
Misc.—Solder; eyelets; perforated board; spaghetti; wire; etc.

Estimated Construction Cost: $8.00
Estimated Construction Time: 6 hours



Layout of chassis box is not critical. Holes in case cover can be either on right or on left. Placement of front-panel controls is also subject to a change in spacing and position.

Compressor was installed inside cabinet of this Lafayette HA-650 6-meter transceiver.



pressor draws only a few milliamperes.

Initial Adjustment. Once the compressor has been wired and checked for errors, connect a 39,000-ohm resistor in series with a 250,000-ohm potentiometer. Wire this combination into the circuit in place of resistor R15. With the OUTPUT control at mid-position, and the COMPRESSION control fully counterclockwise, whistle into the microphone and reduce the resistance value to the potentiometer until the output level *just* drops. Remove the combination from the circuit and measure their combined resistance with an ohmmeter. Replace the combination with a resistor which comes the closest to the measured value. Typical values will range from 50,000 ohms to 150,000 ohms, depending upon the individual characteristics of the transistor used for Q4.

(Continued on page 68)

ohms-range expander

by Thomas H. Charters

If you don't own a VTVM you've already moaned over shortcomings of the ohms ranges on your VOM—here's how to add an RX 100K range.

■ If you have tried to measure resistances larger than one megohm, you know that it is difficult with a VOM. The scale is crowded in this region and just the thickness of the meter needle represents a large difference in resistance. The Ohms-Range Expander gets around this problem by adding an extra-high resistance range to your meter making it possible to measure resistances ten times higher than you could before.

Most multimeters have this limitation; it is a compromise that most manufacturers make to eliminate a high-voltage battery. One of the exceptions to this is the line of multimeters made by Triplett which do have a high-resistance range (and a 30-volt battery.)

The Ohms-range Expander adds a *X100K* resistance range to many multimeters including the following: Simpson Models 260 and 270, Heathkit Model MM-1, Eico Models 555 and 565, Knight VOM kit #83U972MW.

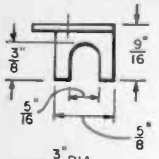
Operation is easy, it can be left connected to the multimeter without interfering with any of the multimeter's other functions, and it is line-operated, eliminating battery replacement.

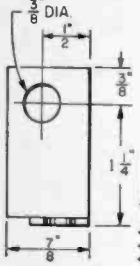
What Happens. The ohmmeter circuit used by several manufacturers for the *R X 10K* range is shown in the diagram. Before measuring the unknown resistance, the leads are shorted together (COM and +) and the potentiometer is adjusted for full-scale deflection (zero-ohms indication) on the meter. (This adjustment is necessary to take into account aging of the battery.) Then the test leads are connected across the unknown resistance and its value read from the meter scale. The calibrations on the scale are very unevenly spaced (non-linear) because the relationship between unknown resistance and meter current is nonlinear. The Ohms-Range Expander makes use of this same scale.

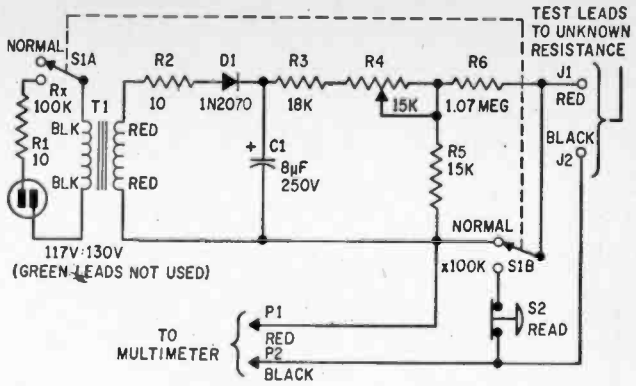
An important question to ask about designing this circuit is, "What value of unknown resistance will cause the meter needle to deflect to half-scale?" The answer is, "A value equal to the total resistance of the meter circuit, in this case 117.7K plus the parallel combination of 23K, 2K, and R3, or about 120K total." A glance at the multimeter shows that 120K is indeed the center-scale value. (Other VOM's may have different center-scale calibrations.) After all, this makes sense because when the leads were shorted, 50 microamps was flowing in the meter. Adding an unknown external resistance equal in value to the ohmmeter circuit's resistance should cut the current in half, giving a center-scale reading.

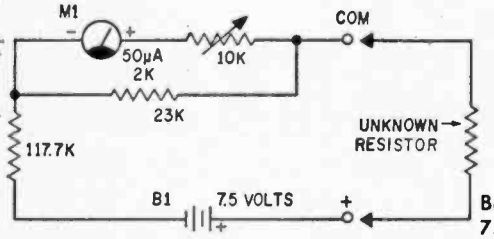
How It Works. Now we are set to see how the Ohms-Range Expander works. In order to have a *R X 100K* range we must have ten times as much resistance in the measuring circuit (so that the center-scale

Bracket (below) holds the calibrating potentiometer R15. Slot is fitted under one test lead jack.









For portable use transformer, rectifier and filter can be replaced with 67½-volt battery. Rewire S1A into battery circuit to prevent continuous current drain in *normal* position.

Basic VOM ohmmeter circuit uses 7.5-volt battery in high range.

PARTS LIST

C1—8-mf., 250-volt electrolytic capacitor
D1—1N2070 silicon rectifier (Texas Inst.) (400-prv, 5 ma or better)
J1—Red banana jack (E. F. Johnson series 108)
J2—Black banana jack (E. F. Johnson Series 108)
P1—Red banana plug (E. F. Johnson series 108)
P2—Black banana plug (E. F. Johnson series 108)
R1—10-ohm, ¼-watt, resistor
R2—10-ohm, ½-watt, resistor
R3—18,000-ohm, 1-watt resistor
R4—15,000-ohm, linear taper potentiometer
R5—15,000-ohm, 1-watt resistor
R6—1.07-megohm, ½-watt 1% precision resistor (IRC metal-film—Allied Radio 25Z018C)
S1—D.p.d.t. slide switch
S2—Pushbutton switch (Switchcraft type 102)
T1—Power transformer, 117-volt, primary; 130-volt, 20 ma secondary (Stancor 8415)
1—aluminum chassis box, 4 x 2¼ x 2¼-inches (Bud CU-2103A)
Misc.—Potentiometer mounting bracket (see text); line cord; rubber feet; strain relief; grommet; heat-shrinkable tubing; terminal strips (see text); spaghetti; mounting hardware; panel lettering; etc.
Estimated construction cost: $6.00
Estimated construction time: 4 hours

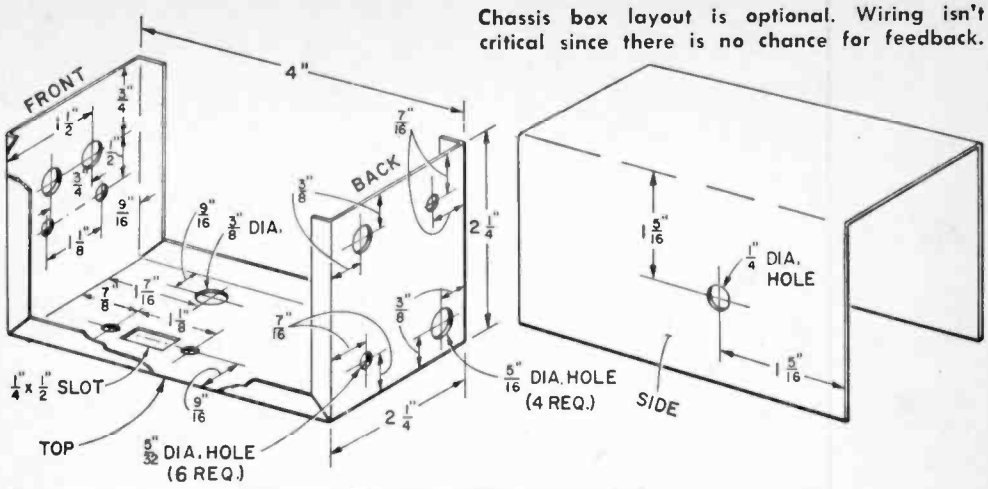
reading will be ten times higher. This also means that we must have ten times more voltage, too, because the meter coil still needs 50 microamps before it will deflect full scale for setting zero ohms.

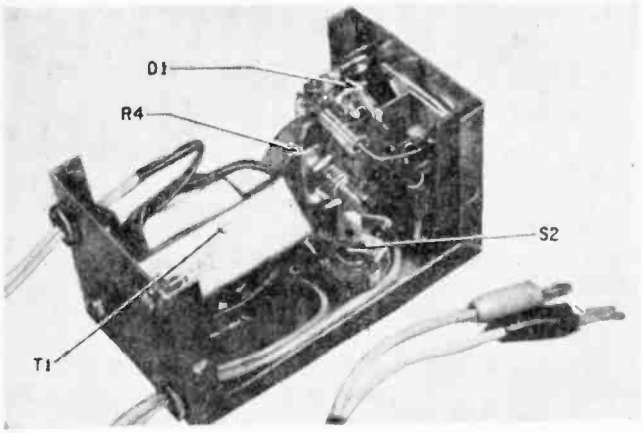
That's all there is to it. To get 10 x 7.5 volts, the Ohms-Range Expander supplies an additional 67.5 volts which added to the 7.5 volts gives 75 volts. To get 10 X 120K, the Ohms-Range Expander supplies 1.08 megohms which adds to the 120K to give 1.20 megohms. Now, the center-scale reading is 1.20 megohms.

The schematic diagram shows the complete circuit. Some extras have been added. Circuit parts T1, R2, D1, and C1 form a half-wave DC-voltage supply. Resistors R3 and R4 reduce the DC voltage to 67.5 volts across R5. R6 adds to the parallel combination of R3, R4, and R5 to give very nearly 1.08 megohms. R1 acts as a cheap fuse in case T1 should short-circuit. When switch S1 is in the *Normal* position, the Ohms-Range Expander is shut off and the meter leads are connected directly to the meter for normal operation. When S1 is in the *R X 100K* position, S2 shorts the multimeter terminals together so that *Zero Ohms* can be set with the multimeter *Ohms-Adjust* knob. After the unknown resistor is connected, the READ button (S2) is pushed which unshorts the meter giving a reading. The main purpose of S2 is to prevent electrical shorts—it keeps the 67.5 volts from appearing across the meter leads except when a measurement is being made.

Construction: If you want to use the chassis box specified in the parts list, the dimensions given in the drawings work well. The layout is very compact, however, and

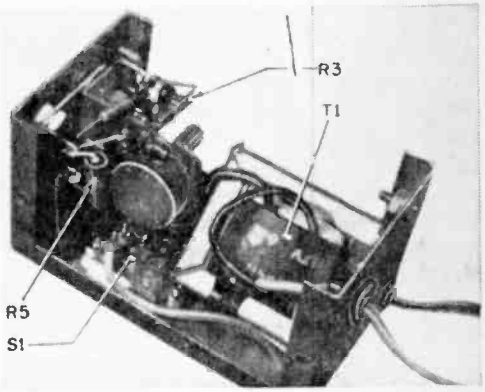
Chassis box layout is optional. Wiring isn't critical since there is no chance for feedback.





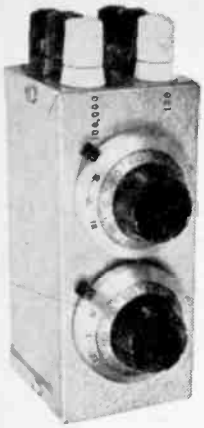
For some multimeters (VOM's) you'll need pin tips on the leads instead of the banana plugs shown here. Since some connections are quite close together it is best to use plastic sleeving (spaghetti) on the longer pigtail leads.

Only thing to watch out for is AC leakage between tie-strip terminals through a buildup of the rosin flux from the solder. This current leakage can add hum to your DC output.



the dimensions should be followed closely. The two terminal strips used (one with a mounting lug and two terminals to the right, the other with a mounting lug and two terminals to the left) were cut from larger strips. The leads to the meter were made from a length of lamp cord, slit three inches from one end, and prevented from separating further by a piece of heat-shrinkable tubing. With some volt-ohm-milliammeters you may have to reverse the connections to the red and black plugs and jacks from those shown in the diagram. To simplify switching these VOM's use reverse polarity to the test leads.

First Time Use. Plug the red and black plugs into the plus (VΩA) and common jacks of the multimeter. Set the multimeter to *R X 10K*. Set the Ohms-Range Expander to *Normal*. Adjust the multimeter *Ohms-Adjust* knob for a reading of zero ohms. Set the Expander to *X100K*. With a screwdriver, set R4 so that the multimeter again reads zero ohms (this adjusts the voltage to 67.5 volts and shouldn't have to be touched again unless the line voltage changes). Plug the meter leads into the Expander, connect a resistor, press the *Read* button, and read. ■



dial-a-ohm resistance substitution box

by e. norbert smith W5MQL

■ As every electronic experimenter knows, a good resistance substitution box is an invaluable aid—a timesaver in breadboard and troubleshooting work. They range in price from less than $6.00 on upward—depending upon accuracy, number of resistance values available, and their power capabilities.

There are three commonly used varieties, each with different applications. The simplest circuit is a selector switch (Fig. 1.) which picks one of several different-value resistors, usually ±10 or ±20% tolerance for quick substitution in radio and TV repair work. These are inexpensive but have two drawbacks; First only a limited number of resistance values are possible leaving many wide gaps and unless ±1%, or better tolerance, resistors are used they are not too useful when accurate substitution is required..

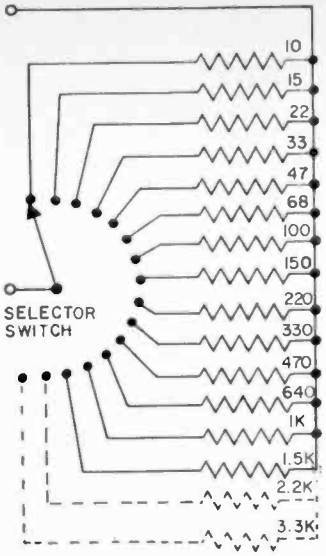
The second, and most commonly used type, is the resistance decade box which consists of several selector switches, with each selector switch having 10 positions, with 9 resistors, see Fig. 2. For example, a 6-switch decade would be capable of any resistance value from 1 ohm to 999,999 ohms in increments of 1 ohm. Of course, this unit would be rather expensive. Considering ±1% resistors at one dollar a piece it will cost (prices vary, of course, with type, manufacturer and power ratings) $54.00 plus selector switch, etc. Another disadvantage is when several resistors are added, the tolerance of the larger may override the resistance of the smaller. For example, assume the resistance of 100,000 ohms is selected, the 1% value of 100,000 is ±1,000 so the 100 ohms is insignificant.

The third type is more of a novelty but merits attention. The circuit in Fig. 3 illustrates a switching type decade in which only 4 resistors are required per switch. The disadvantage of this type are first, a more expensive switch is required and again the tolerances create a cumulative error overshadowing the smaller values and second if one resistor should become damaged several resistance values would be lost.

A New Approach. A simpler, and quite precise method has been used by the author for some time with excellent results. The circuit in Fig. 4 shows simply two, ten-turn potentiometers (pot) (with calibrated turn-counting dials) used as independent substitution resistors. Both are ±3% accurate with .25% linearity. With the turn-counting dials, resolution is accurate to 1/1000 the total value or .1 ohm for the 100-ohm pot and 100 ohms for the 100K pot. This would be equivalent to having a decade box with 7 selector switches and 63 precision resistors.

Using the Variable Decade. Connect the variable decade in the circuit being worked with and adjust the knob until the circuit is functioning properly. Then read the calibrated dial. With the 100-ohm pot each scale division is .1 ohm—each full turn is 10 ohms. The 100K dial reads 100 ohms for each scale division—10K for each turn.

After reading the resistance indicated on the dials refer to the Standard Value Table, and select the standard value of the desired



tolerance nearest the indicated resistance reading and readjust the variable decade to the standard value you intend using and make certain the circuit still functions properly, if not perhaps a closer tolerance resistor must be used.

As with any substitution box caution must be observed to keep the current to a safe value. Current should not exceed 200 milli-

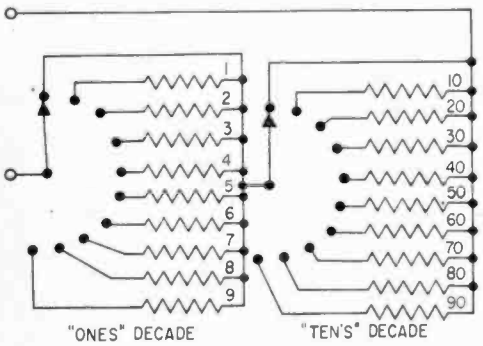


Fig. 2. Nine resistors and a single-gang selector switch are needed for a decade.

amperes in the 100-ohm pot and 200 microamperes in the 100K pot if you use units identical to those used here. Check the specifications of your units carefully. Some 10-turn potentiometers have ratings of 1½ watts—others are rated as 2, 3 and 5 watts.

Sometimes wattage, current and voltage ratings conflict—for example you may not be able to get maximum wattage at maximum resistance without exceeding the voltage rating. *Check all potentiometer specifications carefully.* ■

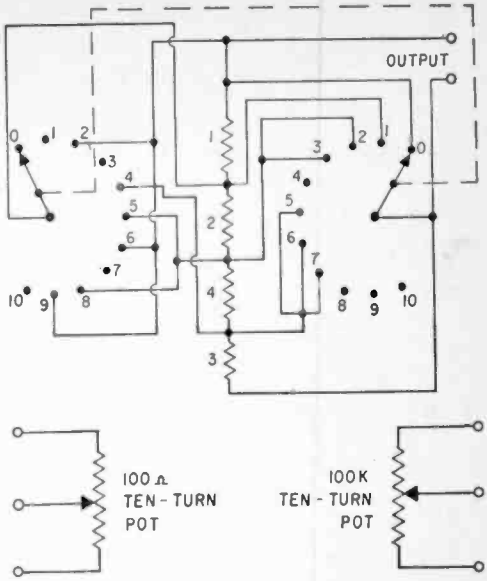
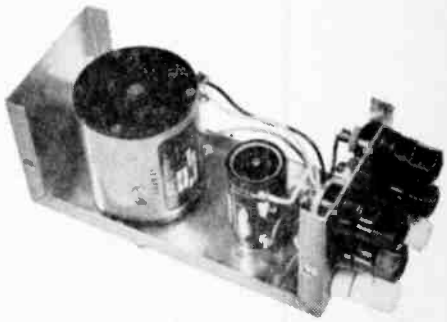


Fig. 1. Circuit of resistance substitutor. Fig. 3. (top, right) Four resistors and a 2-gang switch form one resistance decade. Fig. 4. (above) Potentiometer-type circuit.



Completed unit shows 10-turn "pots" in a chassis box wired to 5-way binding posts.

Standard Fixed Resistor Values

20%	10%	5%	20%	10%	5%
10	10	10	33	33	33
		11			36
	12	12		39	39
		13			43
15	15	15	47	47	47
		16			51
	18	18		56	56
		20			62
22	22	22	68	68	68
		24			75
	27	27		82	82
		30			91

Higher standard values may be formed by adding zeros up to 22 megohm

Will we be made mincemeat from a pie in the sky?

Destruction from Space

by K.C. Kirkbride

THE MOOD of the city was happy and gay. For the past week, holiday crowds had swarmed into stores, buying food and small luxuries and liquors, all the extras of holiday time. Tailors worked nights to repair men's worn dress-up suits and housewives polished shiny the one- or two-room apartments they called their homes. Young girls and women stood in line at hairdressing shops; while others, not as particular or prosperous, watched TV instructions on how to set their own hair.

All through the city the streets were lined with colored lights, and now the city's people who could not crowd their way into Red Square lined the long cobbled reaches of Gorky Street.

Four abreast, standing in a light, falling snow, atop the balcony of Lenin's tomb, were: Marshall Rodion Y. Malinovsky, Soviet Defense Minister, Raul Castro, Cuban Defense Minister, Dmitri S. Polyansky, Deputy Soviet Premier, First Secretary Leonid I. Brezhov, and Khrushchev's successor, the present Premier, Aleksei N. Kosygin.

It's Holiday Time. To the people lining the streets, this was a festive day, a few hours let-up in a long working year. But to the men atop the stone balcony, grim-lipped, severe, the day had deeper, more significant meaning. Now, they awaited the parade that would mark the celebration of the 48th anniversary of the Bolshevik seizure of power in Russia.

Slowly, somberly, two-hundred-fifty pieces of military hardware rolled over the old cobbled streets into the Square, past the saluting men on the balcony, a military show meant to impress and frighten peoples throughout the world. But reporters at the scene said the first part of the Russian "spectacular"

(Continued Overleaf)

didn't reveal any weapon they hadn't seen before.

The Ultimate. Then a stilled hush fell over the crowd. Wide-eyed and awed, the people watched four huge cumbersome olive-dark monsters rumble down Gorky Street into the Square. Even the sight of the menacing missiles sent eerie shivers through the crowd. For before them rolled one of the most ominous weapons man has ever devised, a long-nosed, 115-foot mass killer that could rain terror on distant cities, a killer that could set whole continents aflame.

Tass, the Russian news agency, dubbed it the longest rocket ever built in Russia, a three-stage, liquid-fuel job, an "orbital missile whose warhead can deliver its blows unexpectedly to the aggressor at the first, or any other loop around the world." Moscow Radio added: "At the very end (of the military show) came the orbital missiles—their very size a striking testimony of their colossal power."

Warning. Only weeks before, military correspondent Paul Roberts, reported in the New York Journal that space circles buzzed with stories the Soviet Union would soon launch into orbit a vehicle of "staggering nature and proportion." Though when he wrote his story, Roberts thought the frightening weapon would be a mammoth space station, in which Russian crew members in a "shirt-sleeve" environment, could whisk round the world in orbit, spying, scouting, or dropping H-bombs at will over Western-world cities.

Whether the Western world was in for Soviet blackmail by space station or orbital missile, the whole show of Soviet strength echoed Khrushchev's words at the 1962 Geneva Disarmament talks when he warned Russia had developed a missile that would reach the United States from any angle of approach over distances up to 20,000 miles, turning our Early Warning System into a real sharp, eager-beaver Maginot Line.

Reaction. The warning couldn't have been plainer if printed in 92 point Bodoni type. But what was the reaction of the threatened Western world?

Brigadier General Robert Scott (retired) had already said: "We are moving into a time of astro-power. We face a threat beyond imagination. What may come against our beloved America will not be signalled by one light from the North Church steeple, if they come by land, and two, if they come by sea. Never again. They will come through space, and their light of warning will be the blinding terror of the thermonuclear fireball."

Commander of the United States Air Force Systems, General Bernard A. Schriever added: "Since the Soviet manned orbital flights in 1961, Soviet leaders have boasted they could use their space technology to build 'global rockets' or place 100 megaton bombs in orbit." The General warned the Soviet objective is still world domination, and "for the first time in history, the vast expanse overhead has been penetrated by vehicles we can neither identify nor intercept."

Civilians. But civilian-political reaction differed from military. And somehow the contrast left a foreboding feeling with people who remembered. Hadn't military men warned about Germany, Japan? Hadn't political leaders then scoffed at *Mein Kampf?* Hadn't they pooh-pooh'd when military officers warned Mitsui Toyama, heading the Black Dragon Society, was infiltrating the

Japanese army, navy, government. And his favorite slogan was "We will attack the two great natjons of the world." Meaning then, the United States and Great Britain. But then, as now, political men went about their peacetime business. How could Hitler, a maniac, and Toyama, an idiot, start a war?

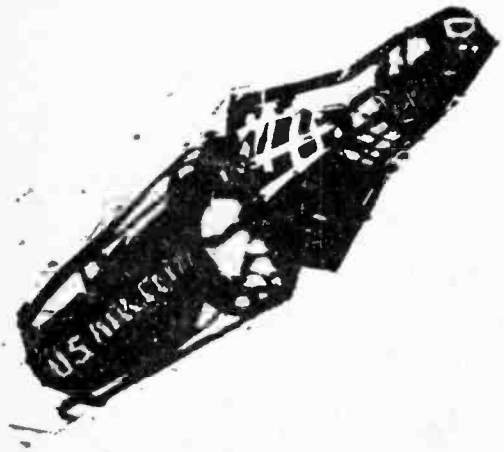
But, in the sixties, do our civilian-political leaders follow the same path of tragic error followed in the thirties? In the face of the dread intimidation in Red Square, our Washington political leaders reacted with a fast mental slap on the Russian leaders. They reminded them tartly, but politely, it really wouldn't be cricket to start any old naughty war in space. After all, on October 16, 1963,

hadn't Russia signed a United Nations Agreement that read:

"The General Assembly-solemnly calls on all states: To refrain from placing in orbit around the earth any objects carrying nuclear weapons or any other kind of weapons of mass destruction, installing such weapons on celestial bodies, or stationing such weapons in outer space in any manner."

Clumsy. Three days after the orbital rockets rumbled through Red Square, the Associated Press carried a story saying our authorities in Washington had considered and rejected the idea of building an orbital nuclear missile. The thing was clumsy, probably inaccurate and not quite up to the efficiency of our land-based and submarine-launched weapons, the story said.

The men quoted in the story (anonymously) flicked the whole thing off the national lapel by adding that any old warhead that started out in life on any such mission from orbit probably wouldn't make the grade to within, say, 50 miles of target. Compared



to this, our missiles, and submarine Polaris weapons boast an accuracy of one mile off target.

Off Target. But is it possible the "authorities" referred to in the AP story were themselves off target? Noted physicist Ralph Lapp reminds us ICBM bases are vulnerable to enemy attack even though hidden in concrete fortifications underground. The Polaris, though capable of long submerged cruises, could be attacked if new technological methods were developed.

While an orbiting H-bomb has a "maximum of mobility and a minimum of vulnerability." And American technicians are already aware coatings and paint jobs can make a weapon almost invulnerable to electronic detection. Even more foreboding is the fact the orbital missile does not need to hurl its bombs to the earth. It can detonate a 150 megaton bomb in space, set a whole continent aflame.

Space Weaponry. Probably hard to grasp now by both civilian and political person alike is the severity and startling innovations of space weaponry. Germany's rocket pioneer Professor Germann Oberth proposed some time ago, we develop a "giant mirror in space (some sixty miles in diameter) that could burn any enemy country on earth." Another reputable German scientist working on photon (electromagnetic ray) power as a source of propulsion, say if such power is possible so is a "death ray," a weapon that would burn or melt targets. While our own American scientists have already developed a limited "death ray," a laser "ray gun" that can pierce through metal.

Pearl Harbor From Space. While these weapons are still in the future (we hope!), the orbital missile is admittedly existent, and Western Air Force officers warn a Pearl Harbor from space would microminiaturize the 1941 version. Yet, in face of these warnings and facts, in the face of the knowledge the Russian space effort has been run from the first by the Red Army, our national policy in space remains committed to "peaceful uses."

In his Journal story, Paul Roberts reported our military men are "desperately concerned at the strategic implications in space, believe our "civilian" preoccupation with space travel can hazard our national survival. For the strongest obstacle the United States Air Force has to overcome in its efforts to win go-aheads for even limited efforts to aid national security is the determined dedicated policy of "peaceful purposes" in our space program. Somewhere along the line, the moon caught our eye, and we forgot about survival.

Small Triumphs. True, the Air Force has made small wins. The right to put up Midas, was one. The satellite detective can scout Russian missile bases, watch from high orbit, give 28 minutes warning if a Soviet missile sets out to attack United States cities. The Midas' infra-red electronic sensors track the heat trail of missiles as they launch into space.

The Air Force won the right to put up Samos, too. Samos, an orbiting camera,

(Continued on page 115)

by
Arnold
Marquis

How Tape Saved The Voice of an American Legend

Will Rogers
1879-1935

A time, patience and magnetic recording miracle

□ If Will Rogers had had his way, you couldn't hear any of his commentaries today. He had little if any interest in recording. He felt that what he had to say was so topical there was no point in preserving it. Thanks to electronics and the modern tape recorder, you can hear his *actual* voice today, making some of his best commentaries—even though he died before tape recording came into its own.

Will Rogers made a few professional ten-inch discs, but these were made in the dead silence of primitive studios with none of the crowd reaction of his public appearances. No organized effort was ever made to record him for posterity.

Those commentaries of his that were recorded at all were recorded incidentally. Early recording buffs, sensing his importance, hauled cumbersome electronic equipment to the places he was to speak and recorded his distinctive voice almost against his will. He kidded the microphones and the equipment; or ignored them altogether. Yet, thanks to those far-seeing buffs, his voice *was* often picked up at banquets, and in such places as auditoriums, armories, race tracks and theatres.

But when they tried to sell him the recordings they'd made, he kidded them out of it. He never bought one. He was not even interested in hearing them. Yet *those* commentaries are some of the most important today.

His famous radio programs were recorded for reference only, that is, for protection should there be a lawsuit over something he said. Of course there never was.

No effort was made to collect these recordings during his lifetime. But several years after his death, his family began to gather what recordings they could find, all on discs of some kind scattered all over the country. They found one here, one there, and since there had been little interest in recording what he said, there was no record of who had these disc recordings. By word of mouth, word of the quest filtered across the country, and one lead led to another. Many people who had recordings had long since forgotten them, and had to be reminded.

New Orleans reception was typical of many impromptu recording sessions by buffs.

Will Rogers and friend in Hollywood pose.

A little backstage horseplay on a Hollywood movie lot relieves tensions.

Recordings were mouldering in neglect in a hundred places, and a sad lot they were, most of them. Most were covered with dust and dirt. Many were cracked. Some were completely broken. Most were scratched, and pieces of the edges chipped off. Some had obviously been dropped or had heavy objects stored on top of them. Nearly all had been mishandled and abused—particularly those that had been sent to Will Rogers, as these had been taken out of their parcels, and neglected. Almost none (either those the Rogers family had or those in the possession of those who made them) had been protected by jackets. Grime and grit ground into them as they were piled, one upon the other, unprotected, like cord-wood.

And because they were made of many kinds of soft material, they were more than ordinarily vulnerable. Some were on aluminum that had corroded. Others were on a flexible material, similar to vellum, which cracked, warped and tore or were on a sort of coated cardboard which bent and broke. All deteriorated from dampness or dryness.

While they were being gathered, one of the radio networks took a mild interest in them. But the network decided the discs were hopeless. So, back into the Rogers' vault in Beverly Hills they went, and there they stayed for more years, ignored and neglected.

I learned of the existence of the recordings while, as a writer and producer, I was doing a series of programs for the Rogers Committee on Indian affairs. I was told that one of the networks had rejected the material as hopeless. But having had some previous experience with modern tape recording techniques, I talked to a skilled technician, Joseph Kay, with whom I had worked for years at NBC. Together we went to the Rogers vault and surveyed the dilapidated recordings. We could see why they had been rejected.

Kay devised a mechanism for flattening the warped discs. Some of them had virtually to be held together on the turntable to keep them from disintegrating. Then Kay concocted a solution to clean away the corrosion, dust and grime, before starting the long

How Tape Saved The Voice

Between takes of *A Connecticut Yankee!* "I only know what I read in the papers." The late FDR was introduced by Rogers during the 1932 Presidential Campaign.

and tedious task of restoration. There were so many mishaps, it seemed the recordings could not be saved. But one thing was obvious, it was now or never. If the recordings got any older, they could never be dubbed, recorded onto a new base. Indeed, some were so far gone that in the very process of dubbing they crumbled to pieces.

We dubbed everything simultaneously onto two 30-ips master tapes. One of these was placed immediately in the Rogers vault. From the other master tape two acetate-base discs were made—one for working purposes the other one also went into the Rogers vault.

One by one the broken, scratched, gouged, grimy recordings were dubbed to tape. A secretary stood by to keep accurate notes on each recording. She noted where the recording had been made; what it was recorded on; who had recorded it; who was on the program besides Will Rogers; the nature of the subject matter; the topics of the day he covered; how long he talked; and any other data we could include.

Rogers never talked long on any subject. Sometimes he delivered just a line or two, like, "Political campaigning is kinda like fishing. You have to go where you can find the fish, and then you have to have the right bait."

Or, "The morning after election people don't come around and say 'Did you conduct a clean and dignified campaign?" No sir. They just come around and say, 'Boy, did you win?' That's politics in a nutshell."

Now the editing started. Aside from the noise and the distortion introduced by the worn, warped and corroded condition of these original disc recordings, there was the imperfection of the original sound pickup itself. The recordings were full of extraneous sounds, the reverberation of the hollow convention halls, wind blowing, auto horns squawking, locomotive whistles, and the whining and moaning of inaccurate speeds. Most of these ills could never be fixed on discs. But many could be fixed on tape.

In editing (cutting, splicing the tapes), there was the problem not only of matching two different levels, but also of matching two different backgrounds. Some of the extraneous sound were so over-powering that they obliterated words, and sometimes whole sentences, completely. But because we were able to work with tape we were able to save a great deal that would have been lost.

The most tiring task was taking out the clicks from cracked records. Every single click, numbering into the thousands, was clipped out and the cut tape ends matched up. Today there is not a single click in any of the Rogers material.

One by one, as they were edited, the reels were cleaned up, and equalized. Then they were dubbed to 15 ips tapes, and typists transcribed them to text. Since Will Rogers ad libbed, there were no scripts to follow. So the typists, working with head-phones, played the tapes and typed every word, every fluff, every grunt, chuckle and laugh.

When the task was done (it took ten months) copies of these tapes were placed

(Continued on page 118)

Neon-Lamp Calculator

By Jack Brayton

Neon glow lamps provide the readout for this desk-top calculator that can be "programmed" to multiply, add and subtract.

■ Pure fun to build; pure fun to operate, that's the Neon-Lamp Calculator. Its magic-like lamps fascinate not only the builder but everybody else as well. And, if it's left about, somebody is bound to turn the rotary switches, then stare at the lamps which appear to "bounce" across the panel indicating the sums, differences or products of the switch-selected numbers.

The Neon-Lamp Calculator can add, subtract, or multiply any two numbers properly set on the switches. It's an exciting, visual aid for youngsters learning math tables or as a Science Fair project. But most of all it's just plain gadget-building fun.

How It Works. Before we analyze the circuit let's look at the basic addition, subtraction, and multiplication functions. It's here that the real secret of the Neon-Lamp Calculator lies hidden.

The table shows all possible problem combinations which can exist when any two numbers from 1 through 9 are added, subtracted, or multiplied. What the table doesn't show is the answers—these are dependent on the functions being performed. However, it's important to note that the 2 numbers which make-up the problem are identical for each function. To illustrate, the numbers 7 and 4 can be added, subtracted, or multiplied, but no matter what we do with them, one 7 and one 4 input is

still required. It's only the *answers* which are different.

The next thing to notice about the table is that we've divided the inputs or number combinations into 3 groups. In the first group we have the combinations where the *first number is larger* than the second number. The second group lists the problems where *both numbers are identical.* And, in the third group the first number is *smaller.*

Of course, with addition or multiplication the answers to both the problems in the *first* and *third* groups are the same. *It doesn't matter which number comes first.* And, with subtraction, the larger number *always comes* first unless negative answers are desired. Therefore, if we don't want negative answers we can eliminate the third group entirely and specify that *the larger number has to come first.* Thus, if the problem reads 1 X 6 we would automatically change this to 6 X 1 before solving. And, it's obvious that some types of calculators could be greatly simplified by this arrangement because they would have to handle only a little over *half* of the input possibilities. This is true of the Neon-Lamp Calculator and that is why we've designed it so the *larger* number *has* to be on S1.

About The Circuit. In the schematic diagram the AC-line voltage is applied to the calculator circuitry through T1—an isolation transformer which provides approximately the same voltage at its secondary as is applied across its primary. This transformer eliminates the shock hazard which would be present if the line was connected directly.

The secondary voltage of T1 is, of course, present at the rotors of the switches (through S3 and R1). R1 limits the lamp current.

Looking at the circuit, we can see that the rotor of S1 connects to the horizontal and S2 to the vertical bus-wires. Thus, for *any* combination of switch settings one *horizontal* wire is connected to one side of T1 (through R1) and *one vertical* wire is connected to the other side. Thus, there's a 110-volt difference of potential *between* the two wires. And, *where they cross,* there's a neon lamp. This lamp, of course, lights. It's important to note that only *one lamp* is connected to the AC voltage for any switch setting.

A small filament transformer (6.3 volts, at .6 amp is more than enough) can be used to light up #47 pilot lamps if greater brilliance is needed for visual-aid displays. Replace R1 with a 7 to 10 ohm resistor to prolong the life of the pilot lamps if they are left burning for long periods or install a momentary-contact pushbutton. Connections can be soldered right to the lamp base—first solder the bottom bus wire to the shell then solder the top bus wire to the tip contact. You won't damage the lamps if you are careful and used tinned wire for all connections.

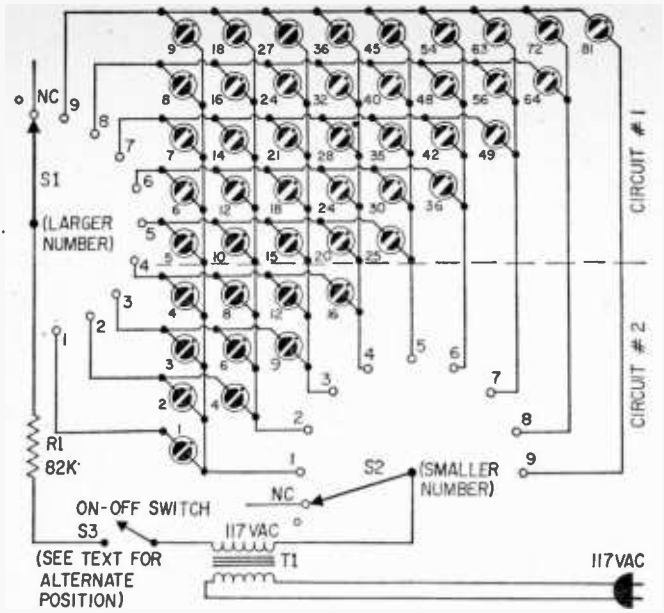
To illustrate, let's assume switch S1 is set at 7 and S2 at 4. Tracing the #4 (vertical) wire and the #7 (horizontal) wire to where they cross we find there's a neon lamp (marked with an asterisk (*) in the schematic). This lamp lights—it's the *only* lamp connected to *both* of these wires. Therefore, it's the only one which can fire. Of course, there are no lamps for settings where S1's number is *smaller* than that of S2. This would require 36 additional lamps and isn't necessary for the reasons stated earlier.

Since we now have a circuit which will light a different lamp for each input-problem combination all we have to do is mark the lamps with the proper answers. But since the answers for each of the functions (multiplication, addition, and subtraction) are different 3 sets of answers are required.

With the Neon-Lamp Calculator we accomplish this simply by using 3 interchangeable front panels—one for each function. The panels fit over the tips of the lamps and

Possible Problem Combinations

S1	S2	S1	S2	S1	S2	S1	S2
Group 1							
2	1	4	2	7	3	7	5
3	1	5	2	8	3	8	5
4	1	6	2	9	3	9	5
5	1	7	2	5	4	7	6
6	1	8	2	6	4	8	6
7	1	9	2	7	4	9	6
8	1	4	3	8	4	8	7
9	1	5	3	9	4	9	7
3	2	6	3	6	5	9	8
Group 2							
1	1	3	3	5	5	7	7
2	2	4	4	6	6	8	8
						9	9
Group 3							
1	2	2	4	3	7	5	7
1	3	2	5	3	8	5	8
1	4	2	6	3	9	5	9
1	5	2	7	4	5	6	7
1	6	2	8	4	6	6	8
1	7	2	9	4	7	6	9
1	8	3	4	4	8	7	8
1	9	3	5	4	9	7	9
2	3	3	6	5	6	8	9



Wiring of Calculator is quite simple. The ten lamps of Circuit #2 are physically fitted into the vacant triangle in the lower-right corner of Circuit #1. S3 can be replaced with a pushbutton or eliminated since the NC positions of S1 and S2 have the same effect. For a much brighter display use 6-volt pilot lamps—replace T1 with 6.3-volt filament transformer and eliminate R1. S3 should be a momentary contact pushbutton to give long life to pilot lamps.

are supported by; but not attached to; the ¼-inch threaded spacers which act as mounting studs. The panels are held only by their weight and can be readily changed.

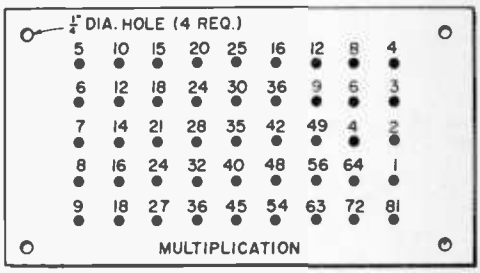
Although they are not separate circuits part of the schematic diagram is labled "Circuit #1" and part "Circuit #2". The reason for this is simply that the lamps do not fit on the panel in the triangle shape they form on the schematic. They are mounted in a square to conserve space. Therefore, physically, we've placed Circuit #2 in the corner of Circuit #1 where there are no lamps.

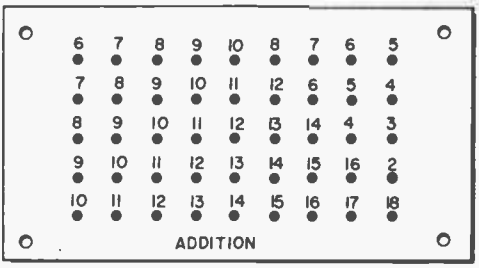
Parts. Most of the parts used in the Neon-Lamp Calculator can be obtained from any electronic supply house. However, the

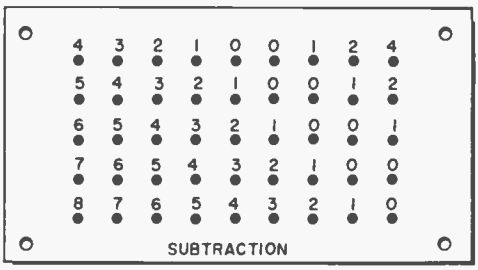
PARTS LIST FOR NEON-LAMP CALCULATOR

R1—82,000-ohms, 1-watt resistor
S1, S2—12-position, single-deck, non-shorting rotary switch (Mallory 32112J or equiv.)
S3—S.p.s.t. toggle switch
T1—Power/Isolation transformer; 117-volt primary, 105-volt secondary (Lafayette 33 R 7502 or equiv.)
1—Aluminum cabinet (Bud AC1613 or equiv.)
2—Dial plates, 1-9 markings (Mallory 379 or equiv.)
45—Neon lamps, type NE-2
Perforated circuit board, 3²1/32 by 6¾-inches, unclad (Lafayette 19 R 3606 or equiv.)
Misc.—Flea clips; machine screws; nuts; washers; grommets (3/16 *inside diameter*); hookup wire; solder; etc.

Estimated cost: $14
Estimated construction time: 7 hours







Three identically-drilled front panels are numbered differently to give the correct answers for the three Calculator functions.

NEON-LAMP CALCULATOR

perforated board, flea clips, and isolation transformer are Lafayette items and can be obtained from them. The perforated board is a stock size (3 21/32 x 6¾ inches) and only one edge has to be cut. The three interchangeable panels can be made from aluminum, pressed board, phenolic, etc.

Construction. The first step in building a Neon-Lamp Calculator is laying out and cutting the perforated board. The holes at the line junctions are neon lamp centers.

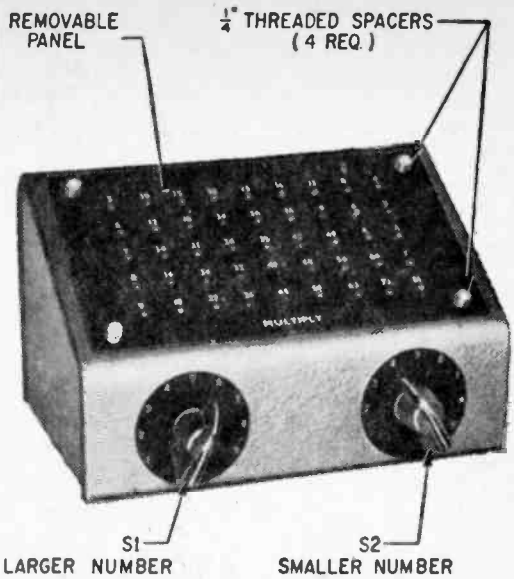
Now, cut the three interchangeable panels to an identical size. Then take a sheet of paper (same size) and tape it to the back of the board. Using a sharp pencil, mark *both* the mounting and lamp hole centers on the paper. Transfer the paper to the cabinet, square it, and center punch *all* of the holes. Then tape the paper to each of the panels but *mark only the 4 corner-mounting holes.* Make a scratch (in approximately the same location) on the *back* of each panel. Later, this mark will tell you which way they were drilled (the holes may match in one position but not in the other).

Drilling. The easiest way to make sure all of the lamp holes match is to drill the *initial* center holes at the same time. This can be accomplished in the following manner.

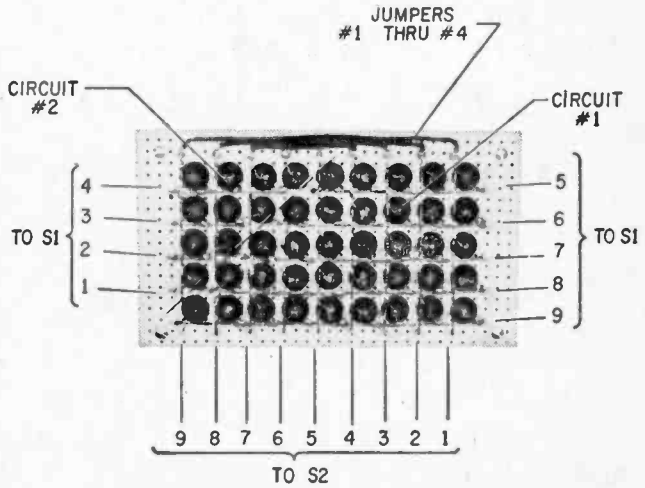
First—using a 9/64-inch (.1406) bit drill the 4 corner mounting holes in the perforated board; cabinet top; and each panel. *These should be drilled separately.* Next take a piece of scrap wood and cut it to about the same size as the panels. The 3 panels and circuit board are attached to the cabinet and the wood is used as backing. The perforated board should be on *top of the cabinet* with the markings facing out and the 3 panels should be *underneath* with their backs (marked earlier) facing *down.* 6-32 machine screws or wood screws in the mounting holes will hold the pieces firmly. Be certain the panel marks are in the *same* position and that the board holes *match* those center punched on the cabinet earlier, then drill the lamp holes using a 9/64-*inch bit.*

Remove the 3 panels and replace the

(Continued on page 91)



It's a simple matter to lift off the panel and drop a new one in place to subtract, add.



Phenolic perforated board layout shows jumpers used to connect Circuit #1 to the corresponding bus bars of Circuit #2. This layout condenses the circuit without making wiring difficult. Leads to selector-switch terminals are numbered for their knob and dial-plate position on front panel.

LAFAYETTE MODEL HA-520
Dual-Band VHF
FM Communications Receiver

■ In the past, the wide frequency ratio between the 30-50 mc. and 152-174 mc. "utility" ("public service") bands was too great for single receiver coverage, and the SWL interested in getting full coverage had to purchase two receivers. Since the assignments to these bands overlap—for example, the New York City Police uses the high band while their next door neighbors in Nassau County uses low band—the SWL with one receiver missed half the fun.

Yet the only difference between high and low band receivers is the front end; the SWL with two receivers has paid for an extra IF strip, audio amplifier, speaker, power supply and cabinet which he doesn't need.

Lafayette Radio's HA-520 Dual-Band VHF Communications Receiver does what should have been done years ago, it resolves the *two-of-everything* problem by doing the obvious thing—it combines two front ends in a single receiver at a substantial savings to the user. As example, two separate receivers, one for the high band and one for the low, would cost nearly $120, yet the HA-520, which is essentially identical to the two separate receivers costs but $89.95—a savings of $30.

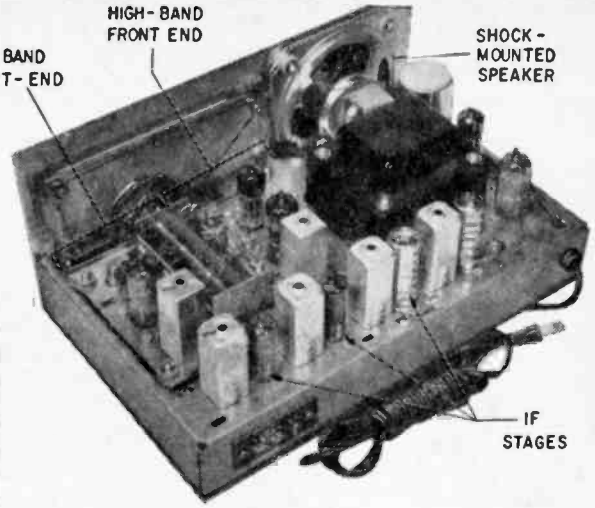
How It's Done. To obtain maximum performance on the high band the front ends are completely separate—not bandswitched in the sense that only coils are changed; and each has its own separate antenna input. While a single antenna *could* be connected to both front ends, separate terminals are provided for each band allowing connection of antennas individually tuned for each band. Each antenna connects directly to its own front end—there is no antenna switching. Only the relatively low frequency output of the high and low band mixers—10.7 mc.—is switched. The mixers feed a three stage IF amplifier, one of which is a limiter, and on into a ratio detector. No AM detector is provided, the HA-520 is *FM only*.

Test Results. The circuit line-up of one stage of single tuned RF and three stages of IF amplification results in rather good performance—particularly when the less than $100 price is considered. While the receiver is rated for a 3 uv. sensitivity we found it applied to the low band; the high band was about 8 uv., still a respectable figure. Selectivity is notably good, as attested by freedom from adjacent channel interference on the low end of the high band, which is as packed with signals in the New York City area as the 11-meter CB band.

Audio quality is excellent, a very crisp sound with very low distortion. Of unusual interest is the fact that even with the volume control wide-open on strong signals there was no tendency for the speaker's vibrations to cause microphonic howling.

The squelch is neither good nor bad—actually, we've seen better. The squelch circuit

LAB CHECK



Shock-mounting for dual front-ends and speaker reduce the possibility of mechanical feedback causing the audio to howl when set for high volume.

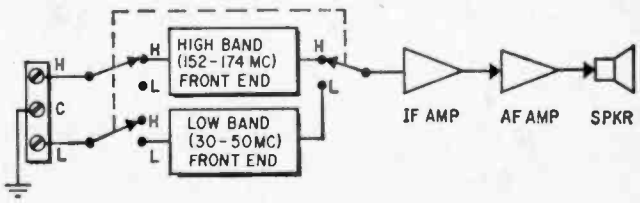
uses the negative voltage developed by the limiter IF amplifier to release the first audio amplifier. Obviously, if the received signal is not strong enough to develop grid voltage on the limiter there will be no squelch release. Under low atmospheric noise conditions the squelch released about 6 db above the minimum usable signal strength. In practical terms, this means the "utility band DX'er" must turn the squelch *off* in order to hear signals coming in just over the noise level. In normal communications use no one is going to bother with signals that weak and the squelch is adequate. Notably, the receiver's noise limiting is good and we did not experience false tripping of the squelch by ignition and atmospheric noises.

The HA-520's overall construction appears to be rugged, and we estimate that even severe handling or bouncing will not adversely affect performance.

Special DX'ers Note. While the HA-520 has separate antenna terminals for each front end the internal wiring lends itself to single antenna operation. The bandswitch, which selects the appropriate front end, also *disconnects* the antenna not in use. Therefore, if the two antenna inputs are shorted together and a single antenna is used at no time will one front end connection load down the other. While the instruction manual does not cover this point we feel it was the circuit designer's original intention to permit a single wire to serve as an antenna for both bands. We tried it out and it works just fine. Though, of course, optimum reception is obtained from separate, outdoor, tuned antennas.

Allowing for its rather good overall performance, good frequency stability after a short warm-up and ruggedized construction we feel the HA-520 is useful not only for the hobbyist and SWL but for professional communications use, such as by volunteer fire departments and "newshawks" (with an AC inverter it will work great in a car).

While the HA-520 is priced at $89.95 and a dual band antenna is an additional $19.95, they are available as a "package deal" for $99.95. For additional information write to Department KCP, Lafayette Radio, 111 Jericho Tpk., Syosset, N. Y. 11791. ■



Block diagram shows the switching of antenna and IF amplifier for dual-band reception.

PHOTO-TROL

The Shutterbug's Variac

By
Herb Friedman
W2ZLF/KBI9457

The right balance of light and shadow is the secret of any great work of art; it's also the secret of excellent photography

■ We'll give you a guarantee: Use our *Photo-Trol* to balance the lighting for your home movies, family stills, or portraits, and your results can be as good as Hollywood or the local pro. If not, tear off the top of your local newsstand dealer and throw it into a mailbox.

Seriously, the secret to good pictures is in the lighting, and as any pro will tell you, good lighting can compensate for virtually any defect; it can even change a sow's ear into a silk purse (contrary to what they teach in school). But while the pros have almost unlimited lighting controls most amateurs are relegated, even by the so-called *lighting manuals*, to pushing a few photofloods around the room and hoping for the best.

But really fine lighting is obtained by balancing the lights, not by pushing them up, down and sideways. And right now, the only device available to the amateur photographer which can balance photo lights is our Photo-Trol, which can adjust photographic flood lights (or any other incandescent light for that matter) from a dim glow to full brilliance. In addition, since the Photo-Trol turns on the lights with reduced power, you can get up to six times the normal life from each set of floods.

Why Photo-Trol Is Better. While the Photo-Trol uses an SCR (silicon controlled rectifier) it is unlike the other so-called lighting controls which are really motor speed controls. Motor speed controls are half wave devices, they can only vary the lighting from zero to about 70 percent of maximum brilliance. To get full brilliance the motor control must have a separate switch which bypasses the control and applies full power to the lamps. Further, the adjustment range of the motor speed controls is very narrow and a very slight adjustment of the knob makes the light jump from minimum to maximum almost instantly; not to forget of course that motor controls cause the lamps to pulsate when set to very low light levels.

On the other hand the Photo-Trol uses a *full wave* SCR (called a Triac) which allows the light to be adjusted smoothly over the entire control range from a dim, barely discernible glow, to maximum brilliance, with no sudden switching jump from 70 percent to full brilliance.

The unit shown will handle two circuits, as most amateur photographers desire control over only two lights. However, you may place more than one light on each circuit or use a larger cabinet and build in three or

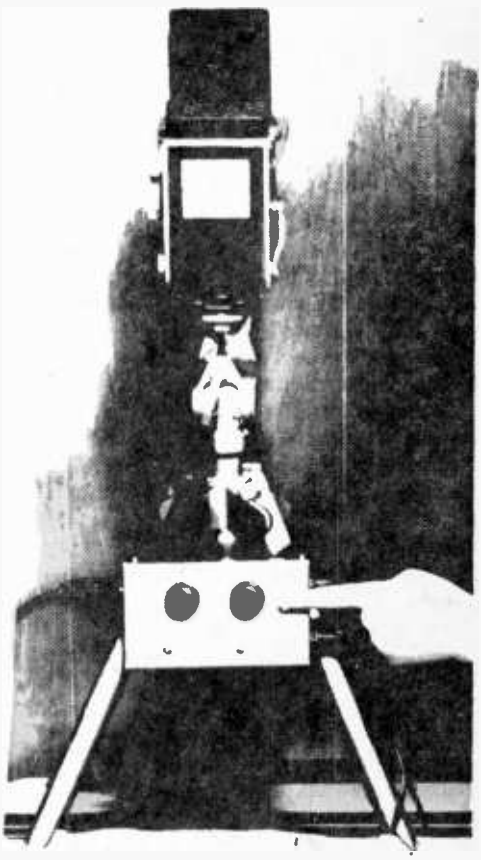
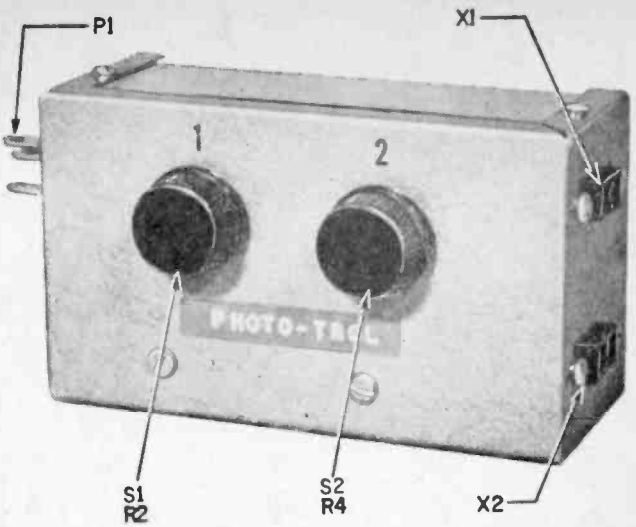
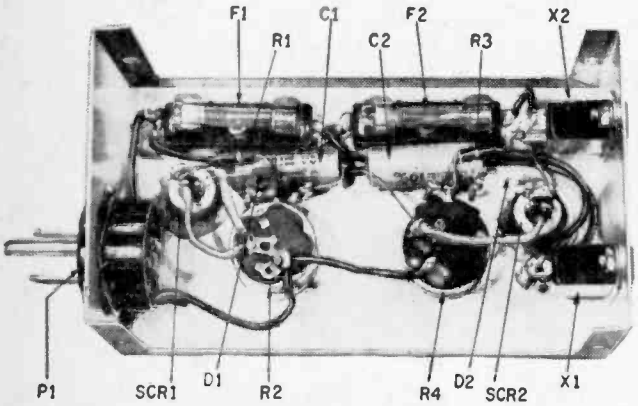
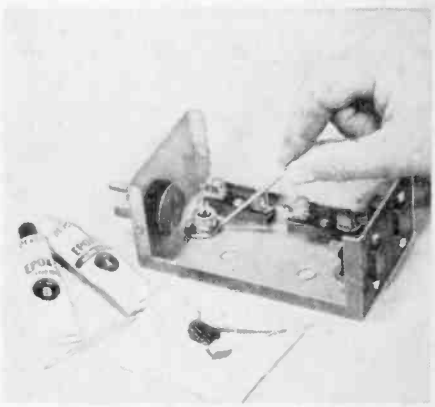


PHOTO-TROL



Potentiometers R2 and R4 contain integral switches S1 and S2. Rotate the pots until the switches click on; at this point, lamps will be about 50-percent brilliance. Then the pots can be rotated to give full brilliance or soft glow.



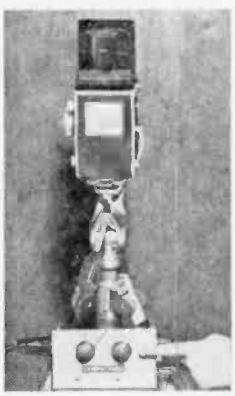


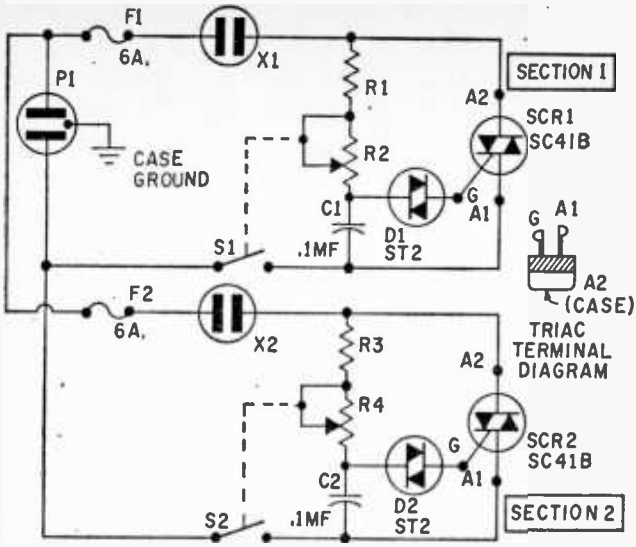
As shown above left, the chassis box comfortably houses all components of the Photo-Trol. At the right, epoxy cement is being applied to SCR1; when cement hardens, mount major components. As shown below, the unit can be easily mounted right on your tripod.

more circuits. With the components specified each circuit will carry a maximum of 6 amperes or 700 watts. Up to 1200 watts can be carried by each circuit if type SC46B Triacs are substituted for specified SC41Bs.

Construction. The Photo-Trol is built on the main section of an aluminum chassis box approximately 2⅛ x 3 x 5¼ inches. The specified SCR's do not have a mounting lug nor do they require a separate heat sink; they are epoxy cemented directly to the cabinet—the cabinet provides the heat sink. First, drill the cabinet for all the major components. Temporarily mount the potentiometers, fuse holders and sockets and then mark the positions for the SCR's; position the SCR's so they are not too close to other major components—then remove the components.

Mount the SCR's in the following manner. Place a very thin piece of tape such as cellophane tape or the plastic electrical tape on the cabinet—the tape should be no larger





Schematic diagram of the Photo-Trol shows the double circuit—section 1 and section 2—for control of two sets of lights. Each section is rated at 6 amperes or 700 watts. Details for increasing the power capacity are given in text. Use of plug P1 on the chassis box allows the box to be mounted on your tripod with no permanently attached external power cables to get in your way.

than the base of the SCR; it is only an insulator. Apply a liberal quantity of two-tube or hot epoxy cement to the SCR base and place the SCR over the tape. Using a toothpick, or similar item, pack epoxy all around the base of the SCR at the chassis junction. When the epoxy hardens the SCR will be insulated from and bonded to the cabinet—with the cabinet being the heat sink. Then mount the major components.

The SCR case itself is the second anode (A2) connection. Thoroughly clean a small section of the case, preferably with sandpaper, and using a soldering iron rated 100 watts or less, tin the SCR. If possible, use a very thin or low temperature solder. Make the connection fast; avoid applying heat for an extended period to the SCR. When installing D1 use a heat sink on the leads.

Fuses F1 and F2 should be rated no higher than the maximum SCR rating; 6 amps for the specified type (SC41B), 10 amps for the optional type (SC46B). Use standard 3AG fuses, not *slo-blow*. Miniature glass circuit breakers can be used if they're fast-acting.

The 3-prong power input, P1, is just a convenience, a power cord connected directly can be used. However, regardless of the power connection the leads should be #16 minimum, *not #18 zip cord*. Similarly, all leads connecting to the Triac's anode "cathode" (actually the first anode, A1) should be at least #16 or heavier.

Using the Photo-Trol. Connect the power to P1 and the photofloods to X1 and X2. Rotate either R2 or R4 just past the point where the power switch clicks in. Keep advancing the control until the lamp suddenly goes on—the lamp-on point is at about 50 percent brilliance. Once the lamp is on R2 or R4 can be backed-off, reducing the brilliance to a *dull glow*, or *full-off;* or, the control can be advanced until the lamp is *full on*. In short, the controls have a "backlash" in that the lamp must go on first at about 50 percent brilliance before it can be dimmed to a glow.

There are no precautions necessary in the Photo-Trol's operation. The lamps can be controlled at light level or "snapped open" to full brilliance instantly. A *singing* sound from either the Triacs or lamps is normal (caused by the current pulses at reduced light level) and should not be a cause for concern. Now get out there, tiger, and snap away with the ol' Brownie like the Pros. ■

PARTS LIST

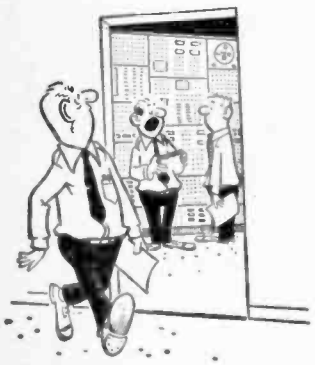
C1, C2—.1-mf., 200-VDC mylar paper capacitor (or equiv.)
D1, D2—Diac type ST2 (GE)
F1, F2—6-amp., 3AG-size fuse (See text)
P1—AC 3-wire plug for retainer-ring mounting (Amphenol 61-M or equiv.)
R1, R3—4,700-ohm, ½-watt resistor
R2, R4—250,000-ohm linear potentiometer with s.p.d.t. switch
S1, S2—S.p.d.t. switch, part of potentiometers R2, R4
SCR1, SCR2—Triac Type SC41B, 6 amps., (GE) (See text)
1—Aluminum chassis box, 2⅛ x 3 x 5¼-inches (Bud 2106A or equiv.)
Misc.—Fuse holders (2), epoxy cement, line cord, #16 wire, solder, hardware, etc.

Estimated cost: $18.00
Estimated construction time: 2 hours (not including epoxy curing time)

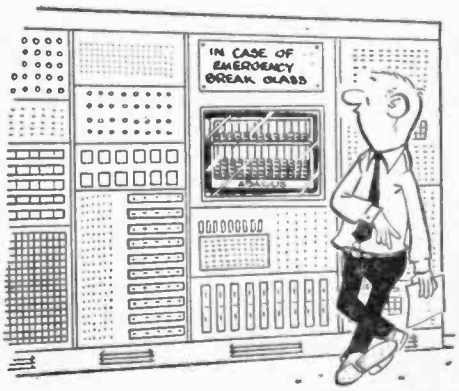
Computer Talk

By Walt Miller

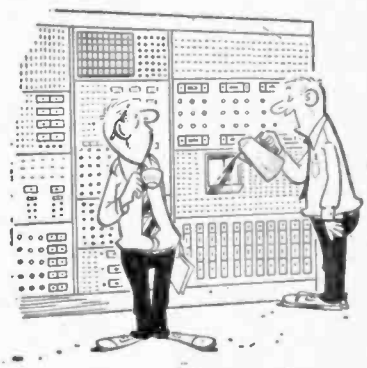
"I see Ed Chambers is back!"



". . . so much for Nevada. Let's check the demand for pearl-handled putty knives in Idaho."



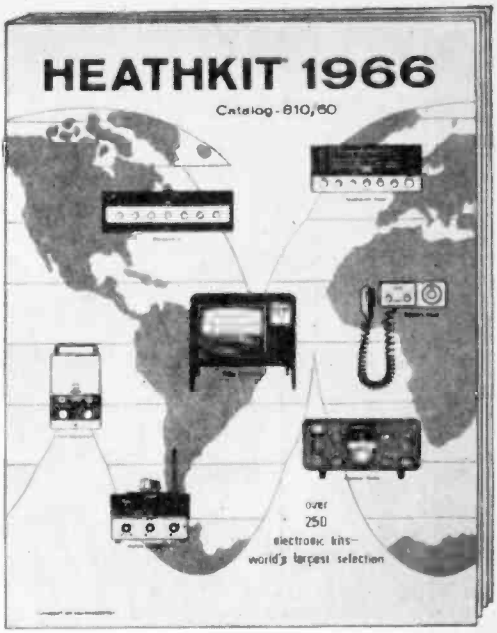
"You'll never guess how I found the solution to that problem."



"It's almost human!"

FREE CATALOG.

250 "Do-It-Yourself" Electronic Kits At Up To 50% Savings



WHY BUILD HEATHKIT ELECTRONICS? A desire for top-quality products at 50% savings, to be sure. But it goes beyond that. The reason people choose Heathkit is pride. Not just the pride of owning something new, but something a bit better that you have created yourself! From watching your Heathkit grow and take shape from your own efforts. It's a labor of love and a lot of fun. The large pictorial diagrams and simple, step-by-step instructions make it easy. And when you finish and turn it on you'll know that unique self-satisfaction that comes with "do-it-yourself." You will have joined the millions of people, from ages 11 to 79, people with no special electronic skills or knowledge, who successfully build Heathkits. People like you! Give it a try. Your FREE Heathkit catalog is waiting for you now.

World's Largest Selection Of Electronic Kits

NEW Low Price On Heathkit 21" Color TV . . . Only $375.00

NEW Transistor FM Stereo Tuner That Assembles In 6 Hours Or Less . . . Only $49.95

NEW Low Prices On Many Heathkit Stereo/Hi-Fi Components

NEW Deluxe Shortwave Radio . . . Only $84.95

NEW 23-Channel, 5-Watt All-Transistor CB Transceiver . . . Only $89.95

- ★ See The Vast Selection Of Portable And Table Model AM, FM and Shortwave Radios
- ★ See The Famous Heathkit/Thomas Transistor Electronic Organs
- ★ See A Complete Selection Of Home & Hobby Items . . . Intercoms, Garage Door Opener, Automotive Kits, Tools, Color TV Sets
- ★ See All Heathkit Stereo/Hi-Fi Components . . . Tuners, Amplifiers, Speakers, Turntables, Cartridges, Furniture
- ★ See The Full Complement Of Heath Marine Electronics
- ★ See The Complete Line Of Citizen's Band Radio Gear . . . Transceivers, Walkie-Talkies, Accessories
- ★ See The Wide Selection Of Heath Educational Kits For Home Or Classroom Study
- ★ See The World's Largest Line Of Amateur Radio Gear
- ★ See The Full Line Of Heathkit Lab & Test Instruments For Home Workshop, Industrial & Educational Use

MAIL COUPON FOR YOUR FREE COPY

HEATHKIT

HEATH COMPANY, Dept. 19-6
Benton Harbor, Michigan 49022

☐ Please send FREE 1966 Heathkit Catalog

Name_____

Address_____

City_____ State_____ Zip_____

Prices & specifications subject to change without notice. CL-215

JOIN A RADIO CLUB

By Tom Kneitel, Master SWL'er

Don't be a loner—tie up with a short-wave listening fraternity!

☐ Want to get the most from your hobby? If you're a Ham operator, join the American Radio Relay League. If you're a racing fan, join the Sports Car Club of America. If you're interested in DX'ing, join a DX club —any one of the many such clubs which happens to suit your particular DX appetite.

You mean, you never heard of DX clubs? Shame on you, no self-respecting listener would dare touch his tuning capacitor unless he was affiliated with one or two DX clubs.

These clubs publish detailed bulletins and newsletters for their members—some are as thick as 50 pages per month! Typical contents of a club bulletin include reception reports from members, data on new stations, QSL information, lists of members who wish to swap QSL cards or recording tapes, and shack descriptions.

The main problem in joining a DX club is getting a hold on one which is here to stay—oh yes, they have been known to come and go from time to time. Some clubs start up with a really great burst of enthusiasm and are little more than a memory by the third edition of their monthly bulletin. Other clubs do really well until the one or two fellows who turn out the newspaper tire of their work and can't find a replacement editor. Elections kill some clubs, lack of new members kill others.

We have screened through a number of clubs and came up with a summary of the current crop of clubs—the ones which seem to be making the grade on a rather permanent basis (one of these clubs has been going strong since 1927). In addition to the listing, we are presenting a "universal" membership application which may be used when contacting any of these clubs; just complete the form and send it in with your first year's dues.

If you aren't certain which club is the one for you, just about all of these clubs will send you a sample copy of their current newspaper, all they ask is that you send along some postage (about 25¢). They are all nonprofit groups and try hard to scrape through "in the black" at the end of the year.

When writing, please be certain to mention RADIO-TV EXPERIMENTER.

American SWL Club, % Gerry Klinck, 223 Potters Road, Buffalo, N.Y. 14220. Dues are $3 per year in this well established DX club. They publish a 30-page bulletin each month which covers all phases of DX'ing. The club has a large number of awards

(Continued on page 116)

DX CLUB MEMBERSHIP APPLICATION

To_____Club

Please enroll me in your organization. I am an active DX enthusiast.

My interest lies primarily in the following aspects of DX_____

My age is: _____ I have been DX'ing since: _____ I have the following receiving equipment: _____

If I am accepted for membership, I will endeavor to make every effort to further the cause of good DX'ing.

Signed: _____

Name: _____

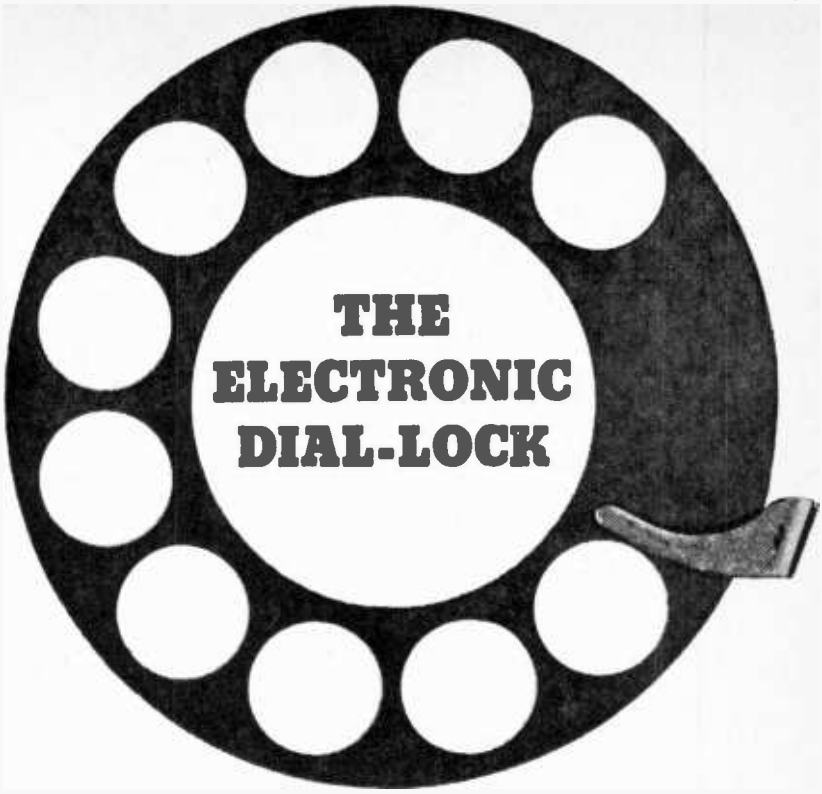
I am enclosing $ _____ dues.
(Please use check or money order)

Address: _____

City: _____

RADIO-TV EXPERIMENTER

State: _____ Zip: _____



by
Homer L. Davidson

Your finger is the key to this lock. Just memorize a few numbers—twirl the dial—press a button—and you're in!

■ You don't need a key for this lock. To open it just dial a few numbers. It's as easy as dialing your telephone. In fact the Electronic Dial-Lock is built around two telephone components. One is a telephone dial mechanism, just like the one on the telephone that you use to dial your party. The other telephone component is a 2-circuit, 44-position stepping relay.

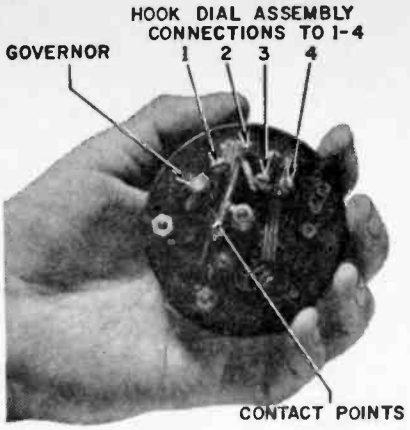
The Circuit. The Electronic Dial-Lock is very simple to operate. Just flip a switch and dial a few numbers. Pesto, like magic, the door latch buzzes and the door is unlocked.

The stepping relay will select the correct contact position while you are twirling the telephone-dial assembly. For instance, dial seven, and the stepping relay steps off seven contact points.

A 12-volt DC power supply must be constructed for the stepping relay. The AC voltage from a 12-volt filament transformer is rectified by a 2-ampere silicon diode (*a 6-volt filament transformer and a voltage-doubler rectifier can also be used—Editor*). The DC output is filtered with a 1000-mf electrolytic capacitor. The rectified DC output is 20 volts without a load. When the solenoid load of K1 is connected across the power supply (when the switch contacts of the dial mechanism close) the voltage goes down to 15 volts.

A latching relay (K2) was inserted into the circuit to make the stepping relay (K1) pick out two numbers, instead of just one, as it goes through the 88 contacts (instead of just 44). The latching relay cuts down the possibility of anyone finding the com-

Simplified version of the lock is mounted in partition along side of workshop door.



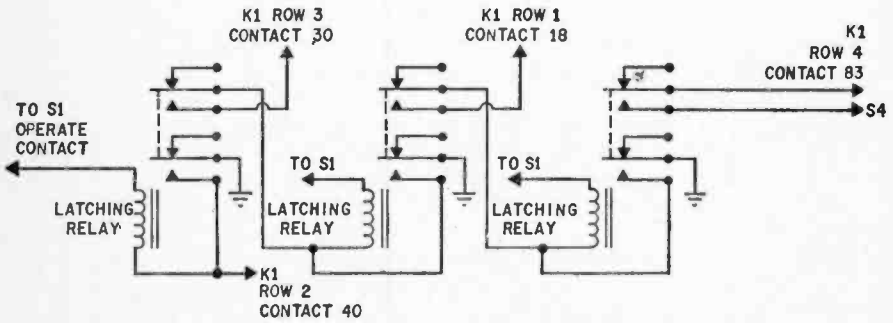
Rearview of dial shows the few components that make up this pulsing-switch assembly.

bination just by chance since two definite numbers must be dialed to unlock the door. Of course, the latching relay can be eliminated to reduce the construction cost—and the numbers to be dialed will be reduced to only 44.

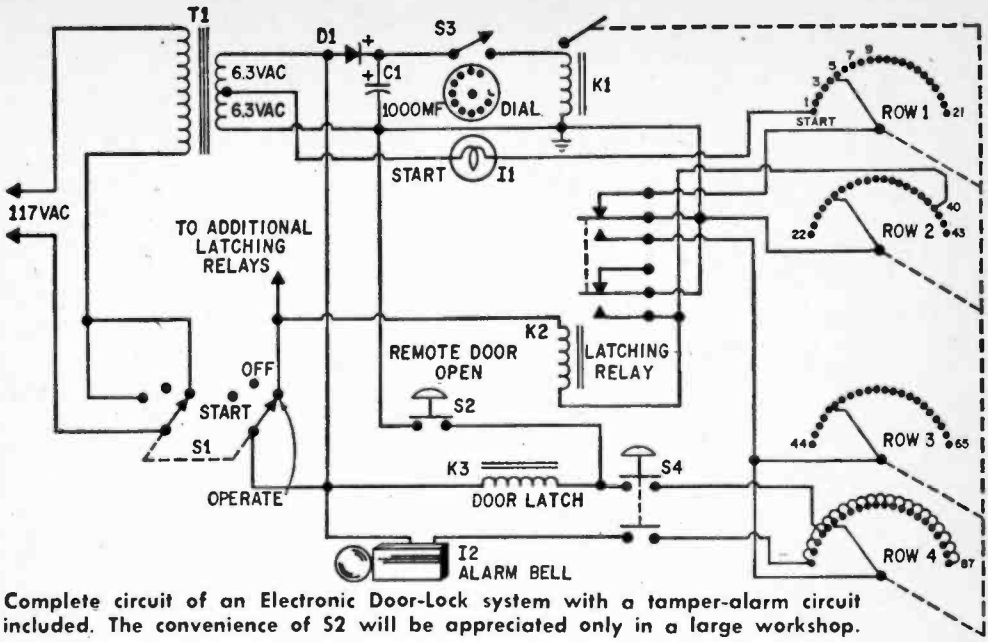
With the latching relay in the circuit the problems of finding the "lucky" numbers are doubled. Of course most locks can be "picked" by the professionals. Yet, for *limited-access* use the Electronic Dial-Lock will serve to keep out "honest" people. The lock is not fool-proof since the combination can be found by triggering the stepping relay one step at a time. To prevent this a push-button (S4) was added along with the alarm bell.

All the contacts in ROW 4 are wired together except the one which is connected to the DOOR LATCH (through S4). If the wrong contact is selected by the wiper arm for ROW 4 the alarm bell will ring when the push-button is pressed. If the correct contact has been dialed the DOOR LATCH will buzz and the door may be opened.

Actually several latching relays can be connected into the circuit—each one being energized by a particular contact on the stepping relay. You can even increase the number of usable contacts by connecting the coil of one latching relay through the contacts of another latching relay. For example, by using these latching relays you can increase the effective number of contacts to almost three times 88. In the alternate latching-relay circuit, dialing 40 pulses closes K2; dialing 78 more pulses—back to contact 30—closes K3; dialing 76 more pulses closes K4 and 65 more pulses brings you to contact 83 completing the circuit through pushbutton S4. Of course dialing almost 260 pulses will



This alternate latching-relay circuit can be carried out still further by adding even more relays. Complex contact combinations can be made with just a little time for experimenting.



Complete circuit of an Electronic Door-Lock system with a tamper-alarm circuit included. The convenience of S2 will be appreciated only in a large workshop.

take some time dialing to hit the number just by chance. Anyhow, you can see how extra latching relays can increase the security.

Large-value capacitors across 6-volt DC latching-relay coils with series dropping resistors to the 12-volt DC supply will prevent the latching relays from pulling in rapidly and a very definite pause must be made at each number before the relay will pull in. The dropping resistor should drop 6 volts—the capacitance of the electrolytic across the 6-volt relay coil will determine the length of time you must pause at the number dialed before the latching relay will pull in.

Other circuit components are a START light, START/OPERATE switch and the magnetic door latch. The START light only comes on when the starting switch is in either the START or OPERATE positions and the ROW 1 wiper arm is on contact 1. The magnetic door latch will energize only when the latching relay(s) are energized and the wiper arm for ROW 4 is on the proper contact when pushbutton S4 is pressed—the alarm bell will sound if the wiper arm is on any of the other contacts.

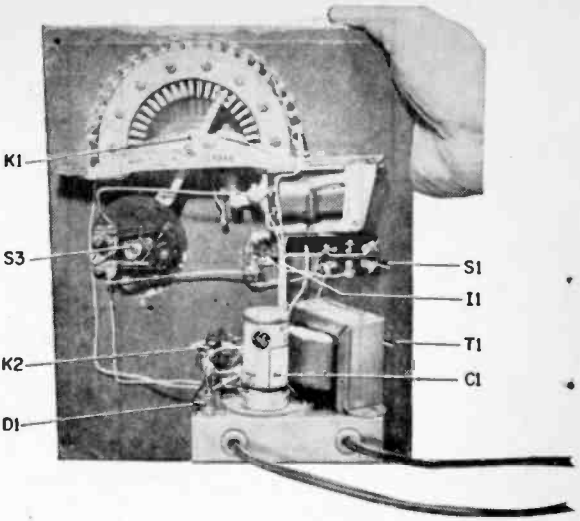
Operation. To unlock the door a combination of numbers are dialed. The stepping relay will follow the pulses from the contacts of the dial assembly. The two wiper blades of the stepping relay sweep through the 88 contacts of the four rows. To one contact in ROW 2 we have connected a latching relay that pulls in when this contact is made and is "latched" by its own holding contacts which keep the coil energized until the fourth row wiper arm can make contact (or the START/OPERATE switch is set to the OFF or START positions). In ROW 4 you wire one contact to the magnetic door-latch circuit.

PARTS LIST FOR ELECTRONIC DIAL-LOCK

C1—1000-mf., 16-volt electrolytic capacitor (General Electric XC1-26; Lafayette 34R5517 or equiv.)
D1—2-ampere, 50-volt prv silicon diode (Lafayette 19R5007, or equiv.)
I1—Pilot lamp, type 47
I2—Bell, 12-volt
K1—Stepping relay, 2-circuit, 44 contact (Olson SW327 or equiv.)
K2—Latching relay, d.p.d.t. 12-volts, 60-cycle AC (Potter-Brumfield KA11AY; Guardian, 200-12A coil, 200-2 contacts or equiv.)
K3—Door latch, magnetic 6-8 volts, 60 cycle AC
S1—D.p.d.t. toggle switch (center OFF) (Lafayette 99R6148 or equiv.)
S2—S.p.s.t. pushbutton (remote door open) single door-bell button
S3—Dial assembly (Olson Electronics PH41 or equiv.)
S4—D.p.s.t. pushbutton (Mallory 1014 or equiv.)
T1—12-6-volts centertapped 2-ampere filament transformer (Lafayette 33R8119 or equiv.)

Estimated construction cost: $25.00
Estimated construction time: 5 hours

THE ELECTRONIC DIAL-LOCK



Above, thumb points to adjusting screw—it lengthens or shortens stroke of stepping relay action should K1 miss a step or two. Rearview of Electronic Dial-Lock (right) shows the locations of major components. The power supply is built as a separate unit.

The door latch is energized and lets the door open when the wiper contact lands on the correctly dialed number.

To start the operation of the basic Electronic Dial-Lock, flip S1 to the START position. Now dial 1 again and again until the START light comes on. The wiper arm is now on the START contact in ROW 1. To get the wiper arm to go through the first row of contacts the numbers dialed must equal the remaining number of contacts in that row. Since the first contact in ROW 1 is the START contact dialing 22 pulses will bring the wiper arm to the first contact in ROW 2.

Let's use 778 as the first three numbers (we could use 944, 679 or any other three numbers that add up to 22). Now before the latching relay (K2) can be energized through its contact in ROW 2, we'll have to dial a couple more numbers. Let's dial 9. This number plus the next number dialed will bring the stepping relay wiper to the latching relay connection and the latching-relay contacts will close.

For example, assume that we have placed the latching-relay connection on contact number 19 in ROW 2. This is the fourth contact from the end of rotation.

The latching relay connections can be placed anywhere on ROW 2. But it is best to keep the connection toward the end of the row so that more numbers will need to be dialed before the relay energizes. This also adds to the dial-switching confusion for anyone trying to open the lock without knowing the correct numbers.

Dial 9 again and the stepping relay stops at terminal 19 of ROW 2. Up to now we have dialed 778-99 for a total of 40 contacts after the START contact in ROW 1; the wiper arm is on the latching-relay contact.

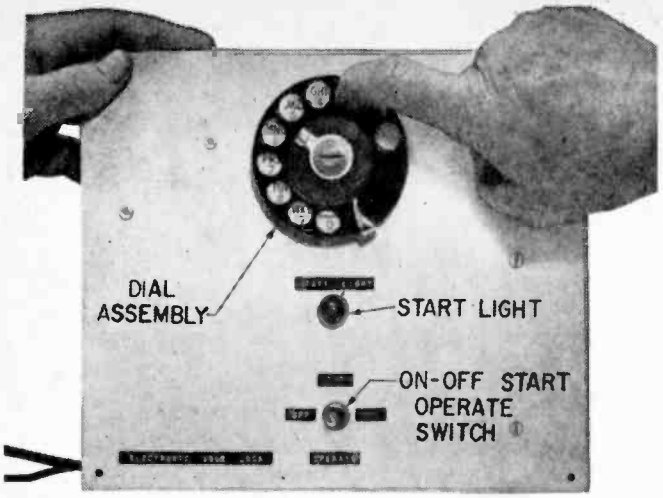
There are no connections to the contacts on ROW 3 so we can go through most of this row rather quickly by dialing 0 twice—actually 20 pulses and 20 contacts on the stepping relay.

After dialing 778-9900 we are *near* the end of ROW 3, but if we don't want to dial two more numbers we must keep the hookup point in front of contact 5 on ROW 4. Let's put the door latch connection to contact number 4. Now, just dial 9, press S4, the latch buzzes and the door can be opened.

If the stepping-relay wiper arm goes beyond contact 4 the magnetic door latch would click or give a quick buzz as the wiping contact goes by if pushbutton S4 wasn't in the circuit.

You must find the correct combination of numbers so the stepping relay will stop at the right contact—not one for the alarm bell. You may want to use your own telephone number, but to get past the sum of 60 pulses you may have to add a number or two. In our number 778-99009 we have a total of 69 pulses to step the relay K1.

Fewer Numbers. To make the lock quicker to open you can leave out the added safety of the latching relay. Not only will this bring the cost of the project down it will make the combination of numbers to open the lock easier. If you leave out the latching relay (K2) place the connection to the magnetic door latch to the contact where the relay should be connected. You can place the magnetic door latch on any connection



Make all your tests before installing Dial-Lock in partition. You can use lamps in place of the alarm bell and electric door latch for testing. Schematic diagram of the power supply (below) shows how various voltages are taken from unit with a common ground terminal.

on ROW 2 but it is best to use a connection near the end of ROW 2 for the added protection more numbers give.

When the circuit is completed to the magnetic door latch the latch will buzz—and continue to do so until S1 is thrown to the START or OFF positions if you do not use pushbutton S4. When you want to lock the door again you must dial a number to get the wiper arm off the door latch contact.

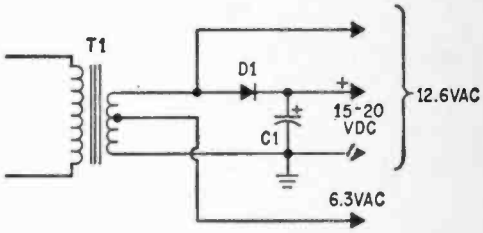
Most hardware and electrical supply houses stock, or can order, the magnetic (electric) door latch—particularly those in areas that have many apartment buildings.

Minor Adjustments. Before the stepping relay is mounted on the panel a few minor changes should be made. Unless you want to include an automatic reset circuit remove the contact leaves at the bottom of the stepping relay assembly. They are not included in this circuit and are removed so they will not hamper the stepping action of K1.

Since these relays are not new some have connections soldered to them already. Sometimes these can be used for the alarm bell circuit connections—it won't matter if you interchange the rows of contacts (1 and 2 for 3 and 4) if they happen to be wired already.

If the stepping relay misses a step now and then you can adjust the stop point slightly as shown in the photograph.

The contact points on the latching relay(s) may have to be closer spaced. (Leave well enough alone if possible. The contacts can be cleaned with a strip of writing paper—just draw it lightly through the contacts several times.) But if you become really desperate and want to take the chance you



can use a pair of long-nosed pliers and bend the moveable center contacts downward. They should not touch—just be close enough to make good contact when the coil is energized. But before you start make real sure that the contacts are clean.

Construction. The Electronic Dial-Lock may be built on two chassis and located inside the locked room while the dial assembly is mounted in its own chassis box near the door. The dial-lock as shown here was mounted on one chassis with a panel. The major parts, except the magnetic door latch are placed on the front panel while the power supply is wired in the chassis and mounted as an assembly.

Cut the panel to 8½ by 10-inches—use hardboard, aluminum or steel depending on how "secure" you want your dial lock to be. Drill all holes before finishing the front of the panel. The stepping relay mounts to the left and the telephone dial assembly at the top center of the panel. A 2¼-inch hole (drilled, punched or cut with a circle cutter) is needed for the dial assembly so it will lay flat against the front panel. After all the holes are drilled clean the panel thoroughly for painting. Two or three thinly-sprayed coats are better than one heavy coat but let

the paint dry overnight to harden properly before assembling the rest of the front-panel.

The Power Chassis. The only critical part of the power supply is D1—it mounts directly to the metal chassis which serves as the heat sink. This is very important. If D1 overheats it can be ruined in the time it takes to dial the combination numbers. Make sure the mounting hole for D1 has been properly deburred. The mica insulating washers are easily punctured by rough edges or stray metal filings that stick to the conducting grease that insures complete contact for heat conduction to the chassis.

The Wiring. The job is quite simple, if you start on one section of the circuit at a time. Begin with the power supply wiring. Then wire the telephone dial assembly and stepping relay solenoid. In the photographs you can see the correct terminals of the dial assembly to wire into the circuit. You will note the small governor and contact points on the dial assembly—keep them clean and free of chips and solder droppings.

Be sure to use awg #22 (or one size larger) solid-hookup wire. Check the wiring over at least three times, quite slowly. Run the AC line cord, through a grommet in the chassis, to the magnetic door latch. The length of this wire depends on how far the control board is away from the lock itself.

Open the Door Richard! Let's give it a run for the money, so to speak. You have chosen the numbers that you want to use as the lock combination. So, flip the switch to START position. Rotate the telephone dial one step at a time until the START light comes on. Set the switch to the OPERATE position. Now dial your number combination and the door buzzes. Open the door and flip the START/OPERATE switch to OFF.

If the door doesn't buzz, go through the complete cycle again. Notice when the latching relay energizes. (You can hear it click in.) Check the connection to the stepping relay. When you come to the last number see if the wiper of the stepping relay stops at this contact.

Be sure the stepping relay is not jumping a step. Adjust the spacing at the rear of the solenoid. Check the contacts on the latching relay—see if they are dirty, or making contact. Be sure this relay holds through the last two complete rotations of the stepping relay. Go over that wiring again. Now have some of your friends or relatives try to open the door. ■

RTVE's Audio Compressor

Continued from page 36

Some Modifications. If the compressor is to be used with a high-impedance microphone, a transformer will be needed to match the high impedance of the microphone to the low-impedance input of the compressor. A suitable unit would have a 100,000-ohm primary and a 1,000-ohm secondary, such as the Lafayette 99 R 6034.

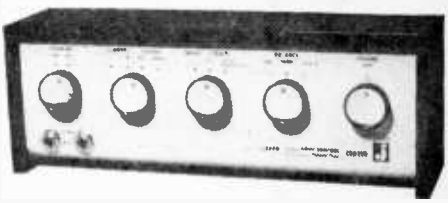
When the compressor is to be used with a transmitter which normally uses a low-impedance microphone, replace C6 with a 2-MF electrolytic capacitor.

Operation. With the OUTPUT control (R8) and the COMPRESSION control (R11) fully counterclockwise, advance the output control until the modulation reaches 100% on *peaks*. Next advance the compression control until the modulation drops to about 60%. Now bring up the output control. Repeat this process until optimum results are obtained. If you don't have access to a modulation meter, peak the compressor by adjusting it while listening to your signal for best results.

As this compressor provides a substantial amount of audio gain, along with voice compression, the output may have to be reduced to prevent overmodulation with some transmitters. This can be accomplished quite simply by removing capacitor C3 from the circuit. Without a bypass capacitor across R3 the gain of transistor Q1 is reduced because of degeneration (negative feedback) in the emitter circuit. If audio output is still too high readjust modulator or remove capacitor C5.

When properly used, voice compression can make the difference to a Ham, between making or not making a contact with that rare DX station. Do not, however, be misled into thinking that if a moderate amount of compression is good, that a greater amount of compression is better—it's not. If the COMPRESSION control is set too high serious distortion will occur, and actually reduce the intelligibility of your signal. ■

JENSEN Model CC-1 Stereo Headphone Control Center



■ The Jensen CC-1 is a headphone control center designed to free the headset user from the immediate confines of the amplifier or receiver. In addition, it provides "space perspective," an effect that compensates for the *binaural* effect—decidedly left or right sound—common to headphone reception.

As normally used, headphones are connected at the amplifier location so the user can adjust volume and separation controls at his discretion. If the amplifier location is not the most comfortable—which it usually isn't—an extension cord can be connected to the headphone so the listener sits in his favorite chair. Unfortunately, extension cords mean the listener must get up to readjust the amplifier controls.

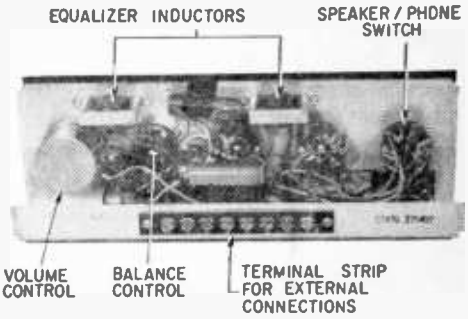
A second problem with headsets is "sound perspective." When stereo programs are reproduced from a speaker, normal room reverberation spills some of the right sound to the left ear and some of the left sound to the right ear. Recording engineers, who use speaker monitors, naturally hear the monitor sound as you would in your home. However, the actual recorded tracks do not contain as much *center fill* as much of the center fill intermixture is provided by the room acoustics. Additionally, with speaker reproduction, there is a slight time delay—the left ear hears sound from the right side a fraction of a second after the right ear, and *vice versa*.

When headphones are used for monitoring, both the room acoustic effect and the time delay are lost as the sound is fed directly into the ear; and on some stereo programs the sound appears to come from way out on the right and left with nothing in the center—a most unnatural and unmusical effect.

The CC-1 Stereo Headphone Control Center attempts to overcome both the headphone problems by combining volume and switching controls with "space-perspective" correction in a single *armchair sized* cabinet.

Wire Talk. The CC-1 connects to the amplifier's left and right *speaker* output terminals. Then a pair of leads are run from the CC-1 to each speaker. One of the CC-1's front panel switches determines whether the amplifier connects through to the speaker or to the CC-1's headphone jack(s). Two jacks are provided so that two sets of 4 or 8 ohm headphones can be used simultaneously. (The phones must be 4 or 8 ohms to insure proper operation of the "space-perspective" circuit.)

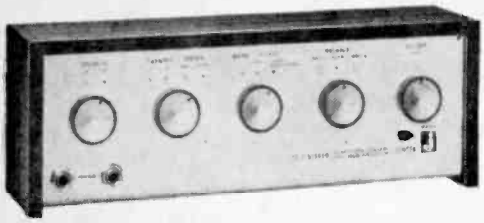
Once the speakers and phones have been connected the CC-1 takes over local control of the amplifier's output signals. A ganged *volume* control is provided that simultaneously adjusts the level of both channels. In addition, a separate *balance* control adjusts the level between the two channels. A third control determines whether just the left *or* right channel is fed to the phones or whether the phones receive the normal stereo program or reversed stereo (left side sound to the right and *vice versa*). The fourth control



Shot of Control Center with cover removed shows wiring, controls, and terminal strip for connecting both amplifier and speakers.

selects either headphone or speaker.

The remaining control determines either mono, stereo or stereo with space-perspective. In the mono mode the outputs of the left and right amplifiers are connected together (through suitable isolation resistors



Five controls are spaced across the CC-1's front panel. From left to right: Speakers (On-Off); Channel/Stereo (left, right, reverse, normal); Mono/Stereo (mono, regular, space perspective); Balance (increase left, normal, increase right); and Volume control. See text for operation of space perspective.

to avoid having two transistor amplifiers short-circuit each other).

When set to the stereo-space-perspective mode, equalizing networks are connected in the headphone circuit so that some of the right sound is fed to the left ear and some of the left sound to the right ear. However, while this sounds like straight *center channel fill*, it's really not. The cross-feed sound is delayed (via the equalizers) 0.4 milliseconds; the time it would take cross-feed sound to reach the opposite ear when listening to speakers.

How it works. The switching and volume functions are excellent, in the sense they do exactly what they're supposed to do. Except for tone control adjustments, amplifier control is moved to the listening location (it can even be in the next room).

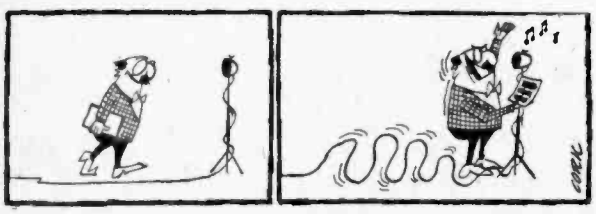
The space perspective depends upon what *you think* is good sound. On early stereo recording with a decided ping-pong effect, or new recording with ping-pong, space-perspective works well. Without it, the sound appears to come from way out on both sides. With space perspective *in*, the sound appears to be suspended in space somewhere's above and behind your head. (Some listeners said the sound was above and in front of the head.) We can safely say that space-perspective definitely corrects for early recording technique deficiencies.

Newer recordings. in which the sound has been moved to the center stage by the recording engineer, are not in the least improved by space-perspective as the *center fill* already exists on the record. If anything, with good recordings, space perspective appears to add a bit of *definition*—sort of a boost to the midrange frequencies. While not generally noticeable on newer musical recordings, space-perspective does appear to "sharpen" the definition of choral works.

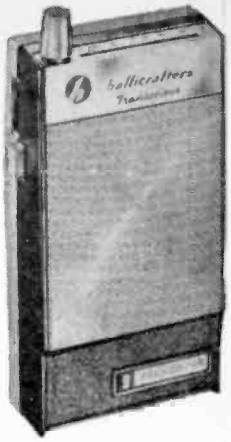
More Power to You. Quite naturally, the CC-1's volume and balance controls as well as the space-perspective burns up a lot of audio enegry. While headphones are usually more sensitive than speakers, requiring much less driving power, the reverse is true when using the CC-1 as much of the amplifier's output is used to compensate for the CC-1's losses. We estimate that the CC-1 requires an amplifier capable of delivering a minimum of 10 to 15 watts.

To Buy Or Not. If you need local control of the amplifier switching and volume adjustments at your favorite armchair the CC-1 will obviously fill your needs and can well be the only reason one needs to buy the unit. If you're looking for *a new dimension in* sound better give the space-perspective a long listen at the Hi-Fi showroom; and take along your own records. If you've always complained of excessive headphone separation space-perspective might be your new sound dimension. This is especially true for rock-and-roll, "bop", and twist recordings. But if you've been generally satisfied with stereo headphone sound, space-perspective will probably offer no new sound thrills.

Price is $52. For additional information on the CC-1 Stereo Headphone Control Center write to Jensen Manufacturing Co., Dept. KK, 6601 South Laramie Ave., Chicago 38, Illinois. ■



HALLICRAFTERS Model CB-15 Transistorized AM/Part-15 Receiver/Walkie-Talkie



■ If we needed a single phrase to describe Hallicrafters' latest CB walkie-talkie, the CB-15, we'd probably go for "Portable Communications Center", for in a way the CB-15 is a communications center for people *on the go*.

The CB-15 is basically a nine transistor 100-milliwatt walkie-talkie with *two big extras*—a built-in standard broadcast AM radio and about the most reliable construction we've yet to run across in pocket-sized equipment.

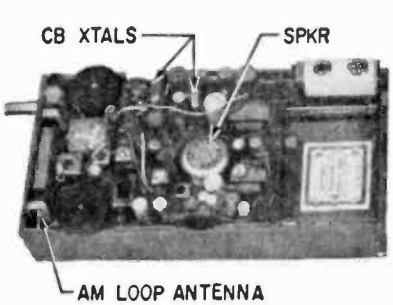
As a CB walkie-talkie the CB-15 is similar in performance to any other *high-quality* pocket sized transceiver. It runs the legal limit of 100 mw. input, has a 48-inch whip antenna and is good for a range of about two miles in open country.

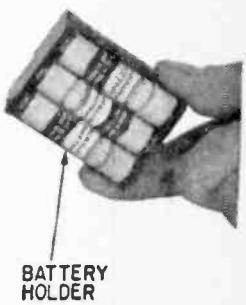
Both transmit modulation and received audio quality is notably good, distinguished by very low distortion. Somewhat unusual, the CB-15 is *insensitive to receiver overload* and two of these units could be used within a hundred feet of each other without overload turning the modulation into undecipherable hash.

The CB-15 converts into a "transistor radio" by simply throwing a slide switch mounted on the back of the case. Compared to most other pocket size radios the CB-15's performance is superb. First, the AM tuning dial, which is located on the top of the case, uses a slide rule dial taking several turns of the tuning knob to cover the BC band from end to end. Selectivity and sensitivity is high (by transistor radio standards) and though the dial is virtually filled with signals at night the stations can be easily separated. Unusual for transistor radios, sensitivity on both the high and low ends of the band is *high*: there's no general loss of sensitivity as the radio is tuned to the high end stations. As with CB transceiver performance, the radio sound is exceptionally clean (again by transistor radio standards).

The AM radio utilizes its own built-in loop antenna; extending the whip has no effect on AM reception as it's used only for CB.

(Concluded overleaf)





Top of the CB-15 reveals the AM tuning dial. The whip antenna for CB communications telescopes out of the case. Neat packaging of the receiver/walkie-talkie is shown at the right. CB crystals plug in for receive and transmit; AM antenna is built in; and battery holder is spring loaded.

Small slide switch on the back of the case selects CB or AM operation. Jack is provided for earphone which comes with CB-15.

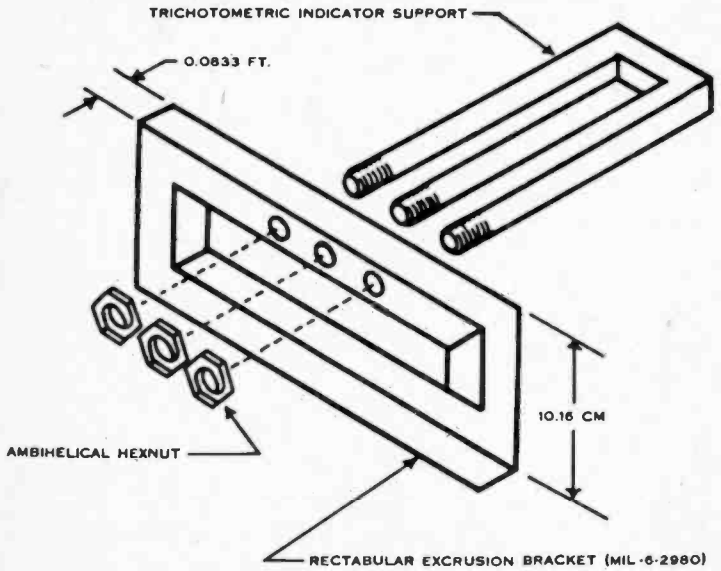
A Peek Inside. Removing the cabinet cover reveals some surprises. Both the transmit and receiver crystals are standard miniature plug-in type and the operation channel is changed by simply plugging in another set of crystals. The individual components appear to be of the highest quality, and every single resistor as well as any other metal component which could possibly short-circuit if inadvertently moved is completely enclosed in a plastic sleeve.

The six penlight (AA) batteries are housed in a removable plastic battery holder which spring loads the batteries to insure good contact.

Earphone reception—an earphone is provided—is available via a jack on the rear of the case. A second jack permits the CB-15 to be powered by an external battery pack or AC power supply. (You'll have to build your own power supply as it's not an option.)

Complete with leather case, strap, earphone and earphone case—and naturally, one set of CB crystals—the CB-15 is *list priced* at $59.95. For additional information write to Hallicrafters, Dept. PK, 5th & Kostner Aves., Chicago, Illinois 60624. ■

We dare you to build it!



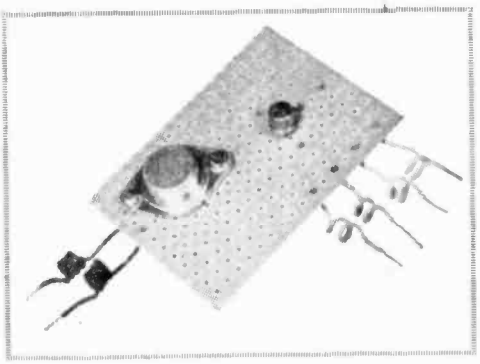
Before you accept the challenge, take a second look! Don't take a third though, 'cause chances are your eyes will make a couple of ambihelical turns and screw right out of your head! They may act like the unique nuts above; any attempt to remove them will only tighten them; for this reason the nut must be fully screwed on before it can be screwed off!—NAA "Operations and Service News"

Perf-Board Project

Build the Screamer

Using the perf-board construction technique you can build a variable tone siren that will wobble up and down in frequency controlled by a pushbutton.

■ Back in the not-so-good-old-days the circus announced it was back in town by having the band march down Main Street playing *Screamers*, big brassy marches that attracted people and horses from ten miles out. The modern version of the *screamer* is the siren; let one loose and you get the right of way in traffic, you can gather crowds till you've got the roadways blocked from curb to curb, or you can set one off behind your secretary and watch her jump ten feet into the air.



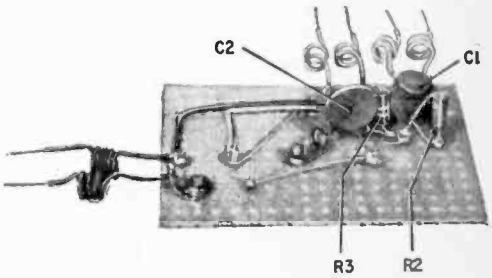
Even if your junk box is no more than an old coffee container stuffed with salvaged parts you can throw together a *Screamer*, an electronic siren, for a couple of bucks and an evening's work. Assemble the screamer on a piece of perf-board, as shown, and you've got a unit you can tuck out of sight in your pocket or under the dashboard.

The Screamer will operate off either 6 or 12 volts. At six volts the current requirement is only 20 mils so you can get away with a small Z6 battery or four penlights if you want a small portable unit. (Actually, some low quality transistors will draw up to 50 mils on standby.) The volume depends on the speaker—any 8-ohm type will do. A small two or three-inch transistor radio type speaker will just about strain the ears in a 10 x 20-foot room, while a 12-inch speaker, or a PA horn, will blast you out of the house.

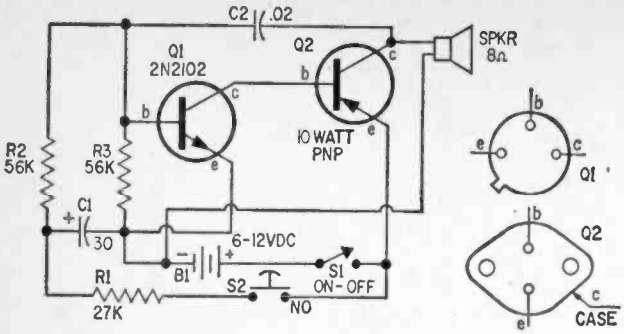
Building the Screamer. The electronics is assembled on a stock size piece of perforated wiring board 2 7/16 x 3 3/8 inches. Flea clips are used as tie points. To avoid a parts jam, even though the board is oversize, the resistors are mounted on end and a printed circuit type—both leads protruding from the same end—capacitor is used for C1. To simplify wiring, the transistors are mounted on the bottom of the board with their leads sticking through the perforations to the wiring side. Q2's collector connections are made directly to the transistor case *via* lugs under the mounting screws.

While Q1 and Q2 are specified in the parts list, any low cost equivalents can be used; just make certain Q1 is *npn* and Q2, *pnp*. It is possible for a Q1 with high leakage current to cause the Screamer to pulse a tone burst every few seconds even with trigger switch PB1 in the *off* position; if it happens simply substitute another transistor for Q1.

Resistor and capacitor values are not necessarily critical and the Screamer will work with anything close to the specified values. While the resistance values deter-

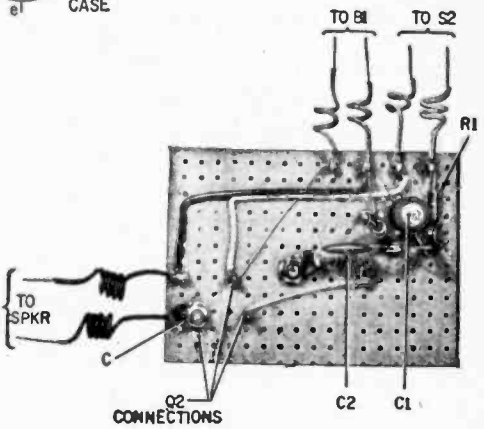


More than enough space is available on the perf-board; however, mount the resistors on end—start saving space as a matter of practice because that next project may be crowded.



Capacitor C2 provides the necessary feedback to bring the audio amplifier circuit into oscillation. Try different values for C2 (see text) to alter the Screamer's ouput pitch.

The finished Screamer (below) is relatively flat and will fit nicely into a plastic jewel box.



PARTS LIST

B1—6 or 12-volt battery (See text)
C1—30-mf., 15-WVDC electrolytic capacitor
C2—.02-mf., 75-WVDC or higher (See text)
Q1—2N2102 or any general purpose *npn* audio transistor
Q2—10-watt, *pnp* power transistor (Lafayette 19R1501 or equiv.)
R1—27,000-ohms, ½-watt resistor
R2, R3—56,000-ohms, ½-watt resistor
S1—S.p.s.t. on-off switch
S2—Normally off push-button switch
SPRK1—8-ohm loudspeaker (See text)
Misc.—Perf-board (Lafayette Radio 19R3605), Flea clips (Lafayette Radio 19R3301), wire, solder, etc.

mine the output frequency(s) to some degree, C2 has the greatest effect. The specified value of .02 mf. produces a high pitched tone just about equal to that of the new police type electronic sirens. To lower the tone *increase* C2's value; to *raise* the pitch decrease C2.—any value from .01 to .1 mf. will work.

Using the Screamer. Turn the main power switch, S1, *on*. Then press the normally open push button, S2. When S2 is closed a rising tone will be heard in the speaker. Releasing S2 will cause the tone to slide downscale. If S2 is alternately closed and opened the output will be a rising and falling wail.

Just one note of caution. The police of most communities frown on the average citizen opening up holes in bumper-to-bumper traffic with a siren. If you get any ideas about sticking one in your car just make certain you hold some position that entitles you to a siren. —*Herb Friedman* ■

Zip Along Zip Numbers

☐ An electronic engineer tests the new revolutionary high-speed ZIP Code "reader" in the highly mechanized Detroit Post Office. The "reader," attached to an existing letter sorter, is designed to sort incoming and outgoing machine-printed ZIP Coded mail to 300 separations at a rate of 36,000 letters per hour. The system, using two electronic scanning units, examines the face of each envelope, locates the ZIP Code and then instructs the letter sorter where to distribute each letter. In addition, the machine is capable, at the flick of a switch, to sort incoming or local mail directly to letter carrier delivery routes within the city. The equipment is the first of its kind in the world. ■

Propagation Forecast

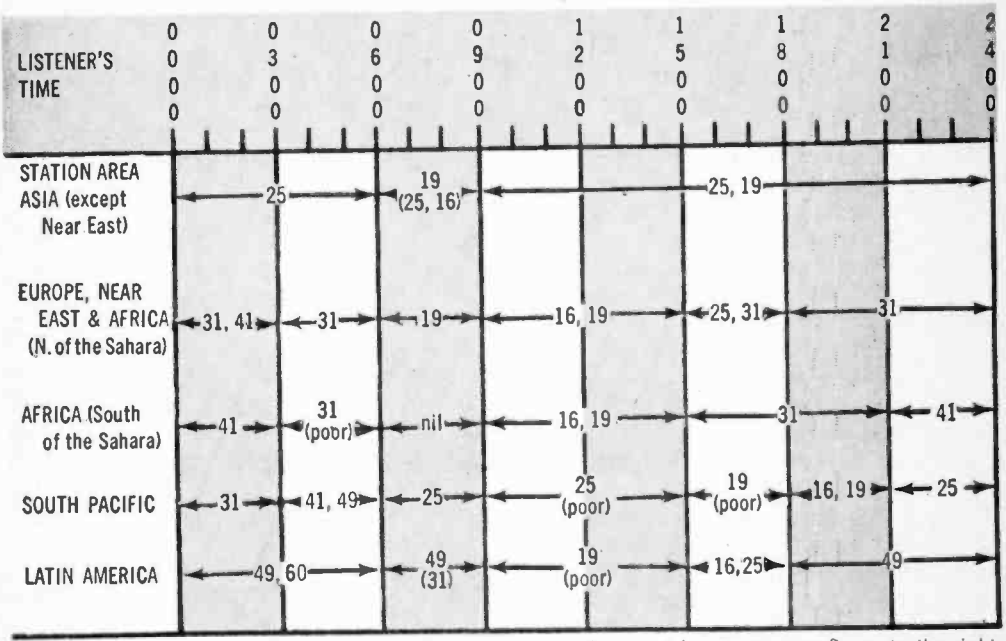
By C. M. Stanbury II

June/July 1966

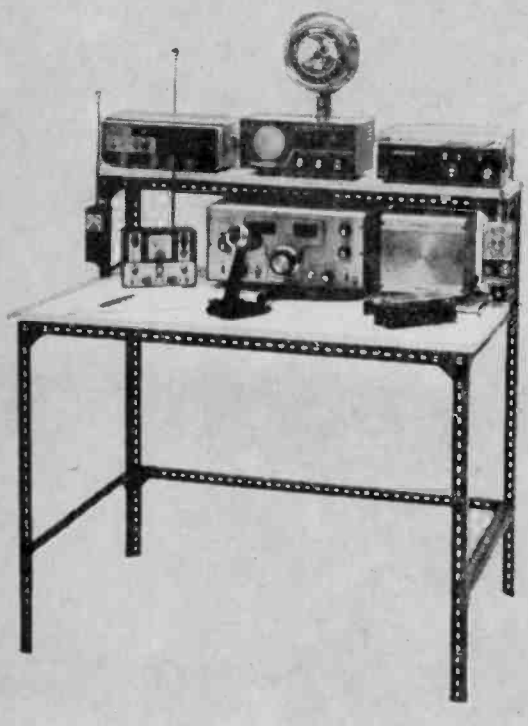
■ Conditions for these next two months will be described by many as "normal." Which means that most distant reception will occur above 7 mc. due to that combination of a rising sunspot count and a peak output of summer static. The situation is good for day after day reception but poor for really spectacular *DX*.

Excepting Latin America, most rare *DX* there is will be found on 41 meters. Even there, interference from amateur stations will become an increasing problem for *SWBC* hunters. This reverses a trend of the past couple years when broadcast transmitters pretty much dominated the band during hours of darkness. If your receiver is blessed with crystal selectivity, you will find 41-meter frequencies below 7200 kc. best. U.S. hams are permitted to use only CW here and crystal selectivity with the phasing control can eliminate some of this *QRM*.

Despite its expanse and widely differing range of distances from the U.S. and Canada, we have always treated Latin America as one reception area and for most time periods this method works well. But note that at 1500-1800 listener's time, 16-meters is listed specifically for Brazilian reception. At least 7 Brazilian stations operate up here and many will have clear channels during that period. Further, we can expect comparatively improved reception from South America below the equator on all bands. Remember t'is *winter* down there. ■



To use the table put your finger on the region you want to hear and log, move your finger to the right until it is under the local standard time you will be listening and lift your finger. Underneath your pointing digit will be the short-wave 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 easy to tune on the east coast. The short-wave bands in brackets are given as poor second choices. Refer to White's Radio Log for World-Wide Short-Wave Broadcast Stations list.



New Angle for your Work Bench

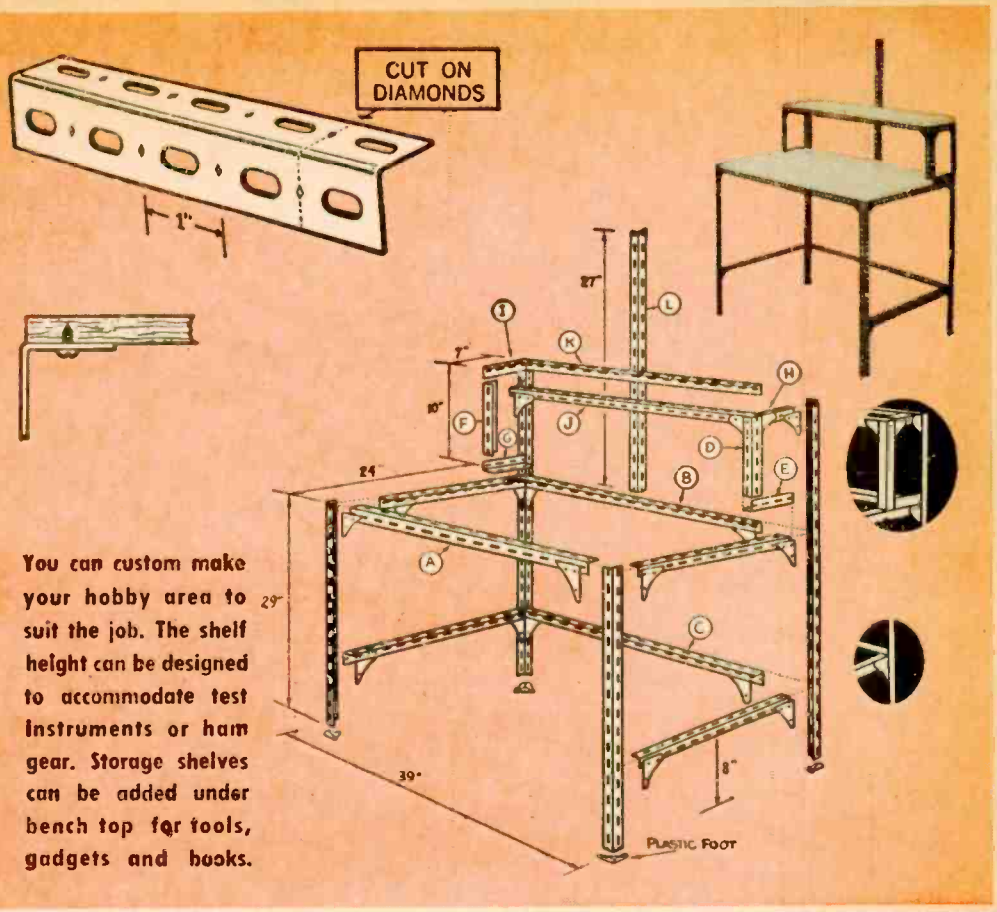
■ If you are one of those people who feels that building your own workbench or rack for test gear or ham station is a bit beyond your talents as a craftsman, you can now cast that reservation aside. We've uncovered a steel framing material called *slotted angle* that will enable you to build a tailor-made, professionally finished unit, using the very simplest of tools—just a 7/16" wrench and a hacksaw. *Slotted angle* goes together with nuts and bolts much in the same way as a boy's Erector set, and it's just as much fun . . . but, don't let the kids know.

To build this handsome, split level bench you'll need 41 feet, 10 inches of *slotted angle*, plus a few accessory items. (See Material List.) Dexion's 125 *slotted angle*, the size we chose for this project, is packaged in quantities of 52' (eight 6'6" lengths). Each package also contains 75 nuts and bolts and 20 corner plates and sells for approximately $12.75 a package. Special plastic feet that slip onto the ends of the *slotted angle* are available separately. Both Allied Radio and Lafayette Radio Electronics Corp. as well as hardware and building material outlets carry the Dexion product line.

Making the Bench. Your first step will be to cut the *slotted angle* to size using an ordinary hacksaw. To get the most out of your material follow our cutting schedule in the Materials List by sawing your longest lengths first, followed by the next in size, etc. Dexion *slotted angle* is embossed with diamond marks at one inch intervals and it is important for proper alignment to cut exactly on these marks.

Once all your *slotted angle* has been cut you can begin assembly by bolting your two side frames together. These are the four legs and horizontal side pieces that join the legs on each end together as shown in the Detail Drawing. Be sure to use the corner plates at all points shown.

Now tie these two frames together using members A, B, and C. Next, bolt members D, E, F, and G into place. All bolts should be finger tight at this point. You can now install your ¾" plywood decking on this first



You can custom make your hobby area to suit the job. The shelf height can be designed to accommodate test instruments or ham gear. Storage shelves can be added under bench top for tools, gadgets and books.

level notching it approximately 7″ back from its rear edge in order to clear members D and F. Once this has been completed, bolt the rest of the members into place (H through L). Now lay your top level decking into place and fix both levels permanently in position with wood screws. You can now tighten all bolts until every joint is absolutely rigid.

MATERIAL LIST

1—A package of Dexion 125. Project requires 41′10″ of slotted angle, 20 corner plates and 72 nuts and bolts.
4—Dexion 125 plastic feet
1—¾″ plywood 39″ x 24″
1—¾″ plywood 7″ x 39″

CUTTING SCHEDULE

Ⓐ—7 pieces at 39″ =	22′	9″
Ⓑ—2 pieces at 29″ =	4′	10″
Ⓒ—1 piece at 27″ =	2′	3″
Ⓓ—4 pieces at 24″ =	8′	0″
Ⓔ—2 pieces at 10″ =	1′	8″
Ⓕ—4 pieces at 7″ =	2′	4″
20 pieces	41′	10″

It's Up to You. The work bench illustrated in this article was designed to serve as a bench in a ham shack that could serve equally as well as a work surface during repairs or project construction. The design is basic and can find countless applications. However, don't let us design your work bench. Conjur up your own design at the drawing board, it's easy to do and the end result usually is great.

For a test bench, shelves are often the best arrangement for instruments while the setup for a Ham station may be better if the layout is designed to accommodate the standard relay-rack panels. The 19-inch wide panel is the most common.

For more information about Dexion slotted angle write to Dexion, Incorporated, Dept. JS, 39-27 59th St., Woodside, N. Y. 11377. They've just published their latest "idea pamphlet" which illustrates a variety of twenty-one applications for slotted angle, ranging from a workbench to a bicycle rack. It's yours for the asking. ■

■ If you've ever thrilled at the sound of a distant "skip" CB station rolling through on your CB rig, you'll really flip when you begin hearing stations in Russia, Japan, France, and many other countries. You've never heard them? Don't worry, you soon will.

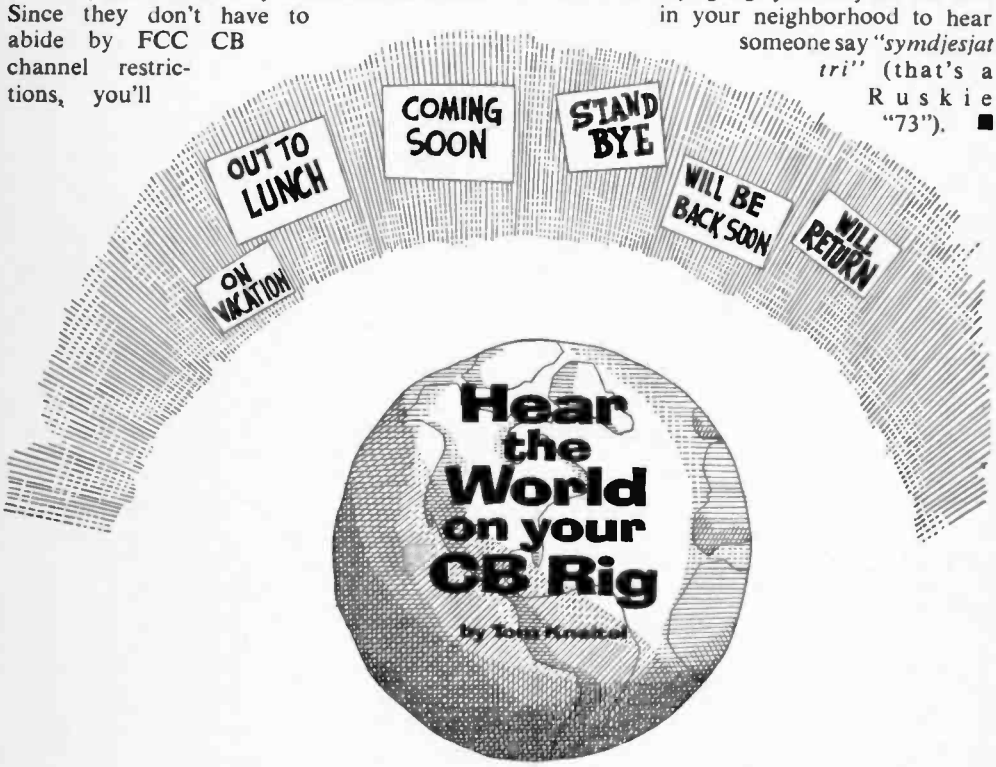
CB "skip" is governed by ionized layers of the ionosphere above the earth, which, in turn, are affected by sunspots. When there are plenty of sunspots, the "skip" gets heavy, and it can cover many thousands of miles. During the past few years sunspots were on vacation, but scientists tell us that they're on the way back. They predict that within a very few months the 11-meter CB band will be *wide open* for world-wide signals—much the same way it was back in the late 1940's when 10-meter hams were working around the world with 20- and 30-watt rigs.

Because of the fact that the countries of the world outside of the western hemisphere have very little CB activity, the 11-meter band is used by many high power commercial CW and 'phone stations, about 150 of them. You will shortly be hearing these stations, some of which run many thousands of watts. Since they don't have to abide by FCC CB channel restrictions, you'll be hearing them not only on, but also in between, the CB channels.

The Subject Is Tabled. So that you can really enjoy DX'ing the world on your CB rig, we have prepared a listing of most of the stations you are apt to hear on 11 meters. Your vertical CB antenna will probably do a nice job on these stations, even though the majority are using horizontal polarization. This is because when the signals bounce off the ionosphere, their polarity is usually switched around (at a power loss, natch). For monitoring of CW stations, it is suggested that you either build or buy a beat frequency oscillator (BFO).

Listening here can also be fruitful, a number of very juicy QSL cards have been obtained from a few of the earlier band openings.

So here's your key to hearing the world on a CB rig—the mysterious Russian "CB" network of 1,000 watt stations, a French Navy network, some low powered Japanese "fishing" stations, and even a harmonic of a Mexican station operating on 6 megacycles. So listen closely, gang, you may be the first in your neighborhood to hear someone say *"symdjesjat tri"* (that's a Ruskie "73"). ■



Here's your chance to log hot DX during early morning quiet hours. Keep the FCC happy while you SWL!

II-METER STATIONS AROUND THE WORLD

When stations are authorized to operate on a CB channel, the number of the CB channel is indicated on the left. All other stations operate between the indicated CB channels and can be heard only on tunable CB receivers

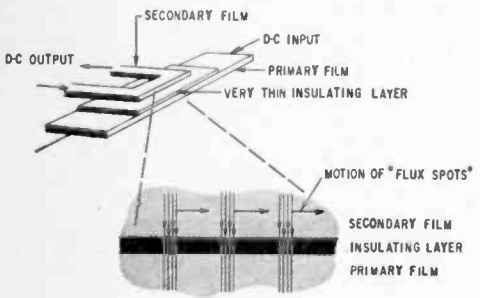
CB Channel	Kc/s	Call	Location	Watts	Type
—	26960	"Nagasaki"	Nagasaki, Japan	30	AM
		MUJ	Nairobi, Kenya	10K	CW
		RXD	Novosibirsk, USSR	15K	AM/FM
1	26965	TDTZ2	El Rancho K87, Guat.	5	FM
		TDTZ3	El Rancho, Guat.	5	FM
		ASS37	Pipri, Pakistan	20K	CW
		OAAT3	Izcozazin, Peru	5	AM
—	26966	RFR	Paitigorsk, USSR	1K	AM/CW
	26969	RQE8	Farich, USSR	1K	AM/CW
	26970	MKG	Stanbridge, England	25K	SSB
	26972	UWMZ	Tchernaia, USSR	1K	AM/CW
2	26975	"St. Pierre"	St. Pierre I.	5	AM
—	26979	UWBC	Karadonly, USSR	1K	AM/CW
	26980	"Miyazaki"	Miyazaki, Japan	30	AM
3	26985	FLE62	Paris, France	1K	CW
		"Cordage"	Spanishtown, Jamaica	5	AM
		OAAT3	Izcozazin, Peru	5	AM
		GAQ46	Criggon, England	10K	RTTY
		ART	Lahore, Pakistan	40	FM
—	26988	UBZ6	Vladimirazaliv, USSR	1K	AM/CW
	26990	5R21	Tananarive, Madagascar	5K	CW
	26994	UGL5	Churtchi, USSR	1K	AM/CW
	27000	FLE61	Paris, France	1K	CW
		DYV22	Dumaguete, Phillippines	10	FM
		DYV21	Sibulan Negros, Phil.	10	FM
		RVU	Vladivostok, USSR	15K	AM/CW
	27003	UTEF	Ust Urgal, USSR	1K	AM/CW
4	27005	RUH6	Itcha, USSR	1K	AM/CW
		OAAT3	Izcozazin, Peru	5	AM
		DZB56	Manlla, Phil.	5	AM
—	27006	LQH5	Ollvos, Arg.	500	CW
	27010	DFZ21	Bonames, Germany	20K	AM/CW
		FYZ21	Paris, France	20K	DSB/CW
		FZB47	Bamako, MLI	20K	DSB/CW
	27012	LRB201	Gen. Pacheco, Arg.	30K	AM/CW
	27013	UXP5	Tachkumyr, USSR	1K	AM/CW
	27020	"Ashizuri"	Ashizuri, Japan	30	AM
	27023	UBYT	Tsagheri, USSR	1K	AM/CW
6	27025	LRB202	Gen. Pacheco, Arg.	30K	AM/CW
—	27030	JAW42	Osaka, Japan	10K	CW
		RBT	Irkutsk, USSR	15K	AM/CW
	27033	UWAP	Ustbolcheretsk, USSR	1K	AM/CW
	27034	LQC33	Mt. Grande, Arg.	30K	AM/CW
7	27035	GFM	Nairobi, Kenya	30K	CW
—	27040	FYZ24	Ste. Assise, France	20K	CW
		"Morioka"	Morioka, Japan	30	AM
	27043	UWGP	Stavropol, USSR	1K	AM/CW
	27044	LRB204	Gen. Pacheco, Arg.	30K	AM/CW
	27045	OXT27	Skamlebaek, Den.	10K	DBS/CW
	27053	UBZ	Ust Niman, USSR	1K	AM/CW
	27059	UZPD	Tamdy, USSR	1K	AM/CW
	27060	FUB	Paris, France	10K	CW
	27060	"Sendai"	Sendai, Japan	30	AM
		XDA75	Mexico, Mex. (harmonic of 6765 kc)		CW
		6XS	Diego Suarez, Malagsay	10K	CW
		FUF	Ft. de France, Martinique	10K	CW
		FUJ	Noumea, N. Caledonia	10K	CW
		FUM	Papeete, Tahiti	10K	CW
		FUW	Dakar, Senegal	10K	CW
		FUV	Djibouti, Fr. Somaliland	10K	CW
9	27065	UEY5	Ust Kiahkia, USSR	1K	AM/CW
—	27071	URW5	Kafan, USSR	1K	AM/CW
10	27075	GAQ47	Rugby, England	30K	DSB
		TDAN	San jose, C.R.	5	AM
—	27077	UZB5	Kkhutsin, USSR	1K	AM/CW
	27080	UMP4	Piltun, USSR	1K	AM/CW
	27083	UZD5	Kutaisi, USSR	1K	AM/CW
11	27085	RS17	Olotchi, USSR	1K	AM/CW
—	27089	UTX4	Gurlen, USSR	1K	AM/CW
	27090	FYZ29	Paris, France	20K	CW
		FZB57	Bamako, Mali	20K	CW
		FZQ70	Papeete, Tahiti	20K	CW
	27095	UTY5	Ilek, USSR	1K	AM/CW
	27100	CJY74	Calgary, Alta., Can.	10	CW
		CJY63	Regina, Sask., Can.	30	AM
		CJY43	Vancouver, B.C. Can.	50	AM
		4UP	Karachi, Pakistan	5K	CW
	27103	UBM6	Taldy, Kurgan, USSR	1K	AM/CW
12	27105	UBPX	Kirillov, USSR	1K	AM/CW
—	27109	UWWZ	Iusenghi Gora, USSR	1K	AM/CW
	27110	GEW	Aden, Aden	40K	CW
		FYZ31	Paris, France	20K	CW
		GEI27	Nairobi, Kenya	25K	SSB
		6VK527	Dakar, Senegal	20K	SSB/CW
13	27115	KUO	Okinawa, Ryukyu Is.	5	AM
		UW1T	Odessa, USSR	60K	AM/CW
—	27120	PWZ	I. Governador	1½K	CW
	27123	UEWS	Milskii, USSR	1K	AM/CW
14	27125	ART	Lahore, Pakistan	40	FM
—	27130	TN171	Brazzaville, Congo	20K	SSB/CW
		CLA	Havana, Cuba	100	FM
		FYZ33	Paris, France	20K	SSB/CW
	27140	DZR47	Bigaa Bulacan, Phil.	400	AM/CW
		RKI	Moskow, USSR	25K	AM/CW
	27150	PTR2A	Fernan Noronha, Braz.	2½K	AM/CW
		NSS	Washington, D.C.	15K	CW
	27153	URL4	Narina Khuduk, USSR	1K	AM/CW
	27159	UJG6	Lerik, USSR	1K	AM/CW
	27160	"ITO"	Ito, Japan	30	FM
17	27165	PBK27	Kootwijk, Neth.	4K	
—	27168	UWOL	Leningrad, USSR	1K	AM/CW
	27170	PBK37	Kootwijk, Neth.	3K	
		ARS32	Chittagong, Pakistan	50	AM
18	27175	PBK47	Kootwijk, Neth.	4K	CW
—	27178	UNM4	Oranjereinyi, USSR	1K	AM/CW
	27180	"MISAKI"	Misaki, Japan	30	AM
	27183	CXL44	Montevideo, Uruguay	2½K	SSB
	27184	UBQ7	Sovetskia, USSR	1K	AM/CW
	27190	FYZ39	Paris, France	20K	CW
		5RZ71	Tananarive, Madag.	20K	CW
	27196	UWII	Sofiiskoe, USSR	1K	AM/CW
	27200	PTA	Rio de Janeiro, Braz. (6 stations in France)	1K	CW
		GFM	Nairobi, Kenya	10	FM
		"CRASH TRUCK"	Manila, Phil.	25K	CW
				10	FM
20	27205	UIZ	Altyn Mazar, USSR	25K	AM/CW
—	27208	UWSQ	Mer, USSR	1K	AM/CW
	27210	FYZ41	Paris, France	20K	CW
		FZH47	Bamako, Mali	20K	CW
		FZK72	Djibouti, Fr. Somaliland	20K	CW
	27220	TN172	Brazzaville, Congo	20K	CW
		FYZ42	Paris, France	20K	CW
		"HAKO-ZAKI"	Hakozaki, Japan	30	AM
		FZN72	Noumea, New Caledonia	20K	CW
	27226	UWNX	Pioner Sovkhoz, USSR	1K	AM/CW
	27230	FYZ43	Paris, France	20K	CW
		FZG72	Ft. de France, Mart.	20K	CW
		UFK6	Turii Rog, USSR	15K	AM/CW
	27235	ART	Lahore, Pakistan	40	FM
	27238	UWMU	Krasnovodsk, USSR	1K	AM/CW
	27240	CML	San Pedro Bauta, Cuba	5K	CW
		FYZ44	Paris, France	20K	CW
		GXC	Mauritius	10K	CW
		5RZ72	Tananarive, Madag.	20K	CW
		FZG73	Ft. de France, Martin.	20K	CW
	27244	UWPF	Kenimekh, USSR	1K	AM/CW
	27250	XDDB	Hermosillo, Mex.	500	AM/FM
		XDDC	Merida, Mex.	500	AM/FM
		XDDA	Mexico, Mex.	500	AM/FM
		HBU57	Bern, Switzerland	40K	CW
	27253	UVK7	Kzyl Orda, USSR	1K	AM/CW

Transformer for DC

Take back your primary, ay,
your secondary, ay,
your iron core, ay, ay, ay!
Sounds hot? This DC transformer needs liquid helium!

■ Working with extremely thin films of tin deposited on a glass slide, a General Electric scientist has built and operated a laboratory model of a direct current (DC) transformer —long considered an "unachievable" scientific goal. The device is a result of research on superconducting materials—metals and alloys that have zero electrical resistance and unique magnetic properties at very low temperatures of liquid helium.

General Electric physicist Dr. Ivar Giaever disclosed that his DC transformer, which can convert a direct current input into a larger or smaller direct current output, has been operated at very low voltages and currents with an efficiency of about ten per cent. Although no immediate commercial applications are foreseen for the DC transformer, the device marks the achievement of a goal that had eluded researchers ever since the alternating current transformer was first demonstrated nearly a century ago.



In the new DC transformer discovered by Dr. Ivar Giaever, the primary and the secondary are made from two thin films of tin. When the DC transformer is cooled to liquid helium temperatures and a direct current is fed into the primary, magnetic "flux spots" begin to move in one direction relative to the primary film. These flux spots also penetrate and move through the secondary film, which is only on the order of .000001 inch away. As a result of this moving (and hence changing) magnetic field, a direct current is induced in the secondary film. By placing a number of secondary films in series, a secondary voltage can be developed many times higher than the primary voltage. Similarly, by placing a number of primary films in series, the output voltage can be "stepped down" below the input voltage—transformer style!

AC vs. DC. AC transformers consist basically of two separate wire coils placed near one another. When an alternating current is passed through one coil (the primary winding), a changing magnetic field is produced—one in which the magnetic lines of force travel first in one direction and then in the opposite direction. This changing field induces an alternating current in the second coil (the secondary winding). Conventional AC transformers are unable to transform direct current—which, in materials with conventional magnetic properties, sets up an unchanging magnetic field.

In Dr. Giaever's new DC transformer, the primary and the secondary windings are made of thin tin films, which belong to a family of *Type II* superconductors. When an ordinary superconductor is placed on a magnetic field, the metal excludes the magnetic lines of force. *Type II* superconductors, on the other hand, can be penetrated by a magnetic field—but only in so-called "flux spots." When a direct current is passed through the tin primary, the magnetic flux spots begin to move in one direction relative to the film. In the DC transformer, these flux spots also penetrate and move through the adjacent secondary film. As a result of this moving (and hence changing) magnetic field, a direct current is induced in the secondary film.

The magnetic field fluctuations produced by the primary of the DC transformer exist only very close to the film. Thus, the secondary film must be placed no more than about .000001 inch away from the primary film. In Dr. Giaever's experimental devices,

(Continued on page 116)

CALLING ALL VAMPIRES

BY
C.M. STANBURY II

■ I took a swipe at friend bat perched atop the console, it hovered menacingly over my head for a moment. "I outrank you, bird." It made a mock pass at yours truly's left ear then went off and sulked in a far corner of the studio. Besides outranking him, I'm also not superstitious. If I were, I never would have kept this job a whole month.

I turned on the carrier, let it warm up a moment then went on the air. "This is Radio Station YZUN transmitting from Motor Vessel Vampire." So we drifted a little. "YZUN is owned by Count Y from the planet Zunar. Your announcer is Knight X." I was the announcer every morning. And evenings too! Started the program off with some spooky music.

Princess Q entered the studio noiselessly, noted that my mike was off. "Studio already for the Count's publicity pictures?" The Princess served as YZUN's station manager, secretary and general girl Friday.

"Complete with yonder bat." The thing flapped his wings and I displayed my long gray cape.

"And how do I look?" she said, posing in her low-cut snow-white shroud.

"Succulent."

"Down man, Countie gets jealous, remember." She considered it and laughed. "He's the worrier type."

"The man should worry. He's old enough to be your father."

She whispered softly, "Papa's got the money."

Count Y's real name is Fred Gant and he's a veteran con artist who used to work through a Mexican border station at Matamoras until his electronic device for warding off witches and werewolves was even too much for them. So he turned the coin over, became a vampire himself and went *maritime mobile*. But he still gets his mail through the same Brownsville P. O. Box.

I let the turntable move on to another cut, "Gloomy Sunday," without making an announcement. "How soon's he supposed to be back from Progreso with that photographer?"

"Anytime now." She looked over my script.

"Good. I'm hot as the devil in this outfit." I had another complaint for Count Y too.

"Where's the Spanish version?" She returned the script.

"In my pocket. Hush now, I've got to start on this." Gloomy Sunday faded out and I opened my mike. "It is time. It is time you joined the Reformation. It is time you sent for that first book of instruction."

Princess sat down in that corner furthest from the bat.

"We have been sent by Zunar, 12th planet from the Sun, to show you the way. Vampires live forever if not corrupted by mor-

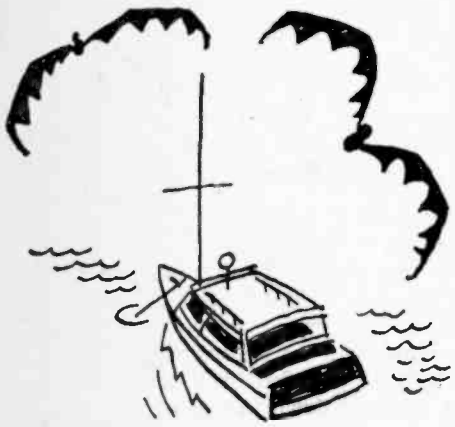
tals. Therefore all mortals must become vampires." Assumed my most serious tone. "If you do not join us, Zunar will send its space army and conquer the Earth."

Bat took off, crossed the room, and tried to perch on Princess' shoulder. She shivered a little and chased it away.

"You need that book of instruction. Oh, how you need this book. It's only two dollars, just the cost of printing." Switched to my hungry tone. "Do it now. Send us two dollars by cash, check or money order."

I cued in some more music just as the Count filled the doorway. He was alone.

The Princess got up keeping one wary eye



on bird. "Where's your photographer?"

He shrugged. "The Mex wanted too much." Produced a camera and a box of flashbulbs from beneath his long black cape. "Decided to do the job myself."

Of course when YZUN broadcasts in Spanish, we were always careful to say "Mexicano."

Hands on hips she shook her head. "Papa, I knew you were tight but this is ridiculous."

He stuck a flashbulb in his camera. "How do you think the old count has stayed in business all these years."

So I spent the rest of the morning trying to announce and pose at the same time. The Count was so unsure with his camera that he'd take each shot ten times. We spent twice what that Progreso photographer would have cost us. And when not announcing, I had to take pictures of him. Around 1400 the Princess was fed up to here with the picture bit. She went up on deck for some air.

He ran over his work mentally. "Let's see, we need another shot with me and the bat."

I laid the camera down atop my console. "Take five, Count, there's something I want to talk to you about."

Like he'd just seen the wooden stake. "You want more money?" Took a long deep breath. "Where was it you were working before you tied on with Pops, some little station at Piny Swamps?"

"Something like that."

"And you got fired from the job."

"It's not money I want, it's shore leave." To signal his support, the bird rat flapped both wings.

The Count grinned and mopped his brow. "Sure, when we get back to Brownsville next month."

"No, I want to go into Progreso tonight." Assumed my most determined bearing. "I haven't been off this scow for a month."

"You can't do that, boy. It'd spoil our image." The bat hovered over the Count's head but he ignored it.

"Well, I wouldn't wear the cape or nothing."

The Count laughed, big put on friendly laugh. "Oh, they'd still put gringo and gringo together." He slapped me on the back. "We've had enough of this picture taking business for today. Go on over to your cabin and take the day off." Deadly serious. "I'll announce the evening show myself. Go on now, that's an order."

So I did.

And brooded. When it got dark, bat came and flapped at my door. I let him in, then we both brooded together. Not only did the Princess have a heart of silver, literally, but this job with YZUN was taking me nowhere fast. Just like the ship itself, I was anchored. Then, the Count was not only a tight fisted phony, but stupid and ignorant too. He's still back in the 18th century when vampires spent their days hiding in coffins.

Bird flapped his wings in agreement.

You really don't talk people into becoming vampires, no matter how many watts YZUN put out. Soon the novelty would wear off, the revenue would drop off and just like that comes the end of the road.

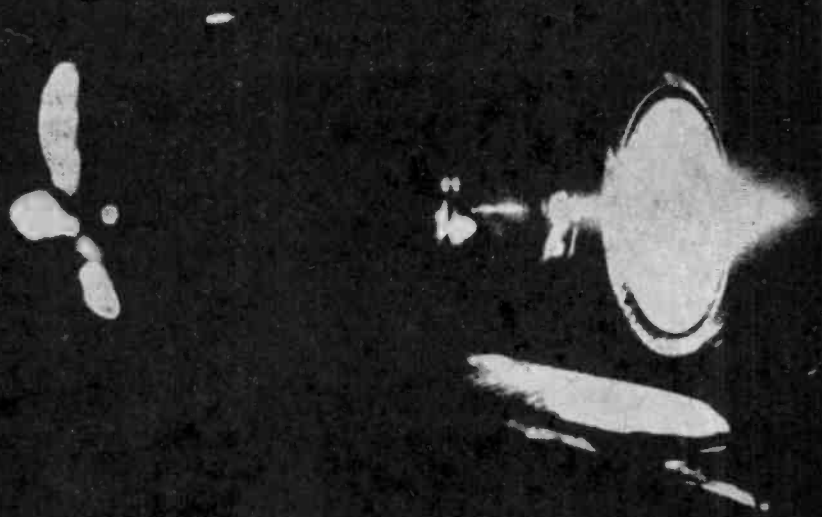
"Agreed."

So that left me no choice. I turned myself into a bat and along with bird flew out through the porthole, circled the antenna mast once and headed into Progreso. Like I keep telling the brass back on Zunar, there's only one way to make people into vampires. And come tomorrow morning, YZUN will have lots of new listeners. ■

Electronic Light Watchman

by Edward P. Nawracaj

Headlights or parking lights can't accidentally run down the ignition-system storage battery when this little computer is on duty—always alert.



NO DOUBT you have at one time or another parked your car, locked it and walked off. Only looking back, by chance, did you discover that you had forgotten to turn off the lights. Sure, it's an inconvenience to go back and shut them off—but it's better than returning several hours later and making that discovery after your battery had run down to where it couldn't start the car.

Here is a warning device to connect to your car. It sounds an alarm and flashes a light whenever you turn your ignition *off* and leave your lights on.

A simple computer. This circuit has been designed to indicate whether certain voltages are present or absent—whether the headlights are *on* when the ignition is *off*.

The circuit uses two *npn* transistors—both are wired to act as switches. When a positive voltage is applied to their base circuits they become a closed switch (the transistor is *saturated*). Without voltage at the base the switch is open (the transistor is *cutoff*). In the schematic diagram (Fig. 1) transistor Q1 (continued overleaf)

is a logic circuit; Q2 is just a switch for indicator lamp I1 and a contact protector for K1 (I1 draws about 150 milliamperes—the coil of K1 about 20). As warning indicator I1 blinks or flashes rapidly, as K1 also clicks out its warning that your lights are still *on*.

How it works. Referring to the schematic diagram (Fig. 1) let us first assume that both the automobile headlights and ignition are turned *off*. Since the entire circuit is without power no alarm will sound.

With the ignition turned *on* and the headlights *off* (as you would for daylight driving) voltage is applied to the base of Q1 but none is applied to the collector because that circuit gets its voltage from the headlight switch which is *off*. Some base-to-emitter current flows in Q1 but not in Q2—without collector current an alarm cannot be sounded.

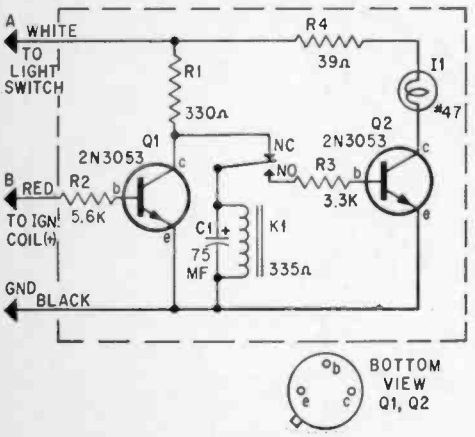


Fig. 1. In the circuit above, capacitor C1 can be increased in value to slowdown clicking of relay K1 and flashing of warning lamp I1.

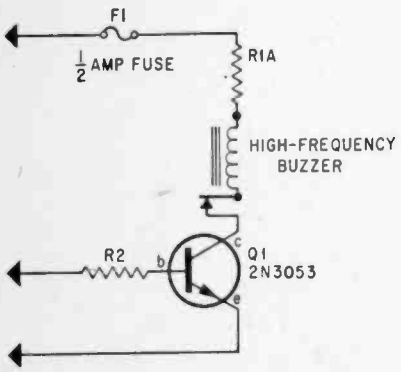
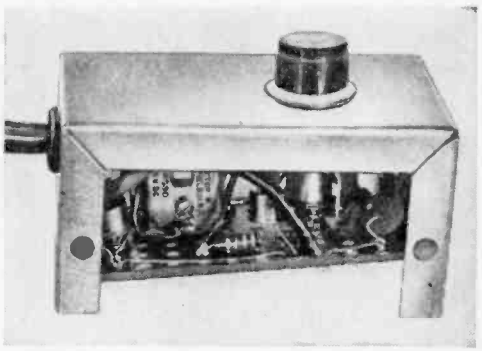


Fig. 2. Resistance R1A (1000 ohms) limits current through the high-frequency buzzer and drops the voltage so that rated value is measured across high-frequency buzzer terminals.

When both the lights and ignition are *on* Q1 conducts because the collector and base are at the same potential (+ 12 volts). Q1 is now a closed "switch"—current flows through R1 and relay coil (K1) is shorted by Q1 and the relay contacts remain in their normal (deenergized) position. Again no alarm is sounded.

The alarm will be given only when the headlights are left *on* and the ignition is turned *off*. When the ignition is off the voltage applied to the base of Q1 is absent. The collector-to-base current through Q1 stops and relay coil K1 is not shorted any longer (its "switch" is open). Resistor R1 is now in series with the coil of K1 and, since their resistance value is about equal approximately half of the 12 volts from the battery will appear across R1 and the rest across



Completed unit above is held into chassis box only by the pilot-lamp assembly jewel bezel.

PARTS LIST

C1—75-mf 15-volt electrolytic capacitor
F1—Fuse, ½-amp, instrument type
I1—Pilot lamp, Type 47
K1—6-volt, 335-ohm coil (Potter & Brumfield RS5D)
Q1, Q2—2N3053 or equivalent npn transistor
R1—330-ohm, 1-watt resistor (See Fig. 2 for alternate value)
R2—5600-ohm, ½-watt resistor
R3—3300-ohm, ½-watt resistor
R4—39-ohm, ½-watt resistor (See Fig. 3 for alternate value)
1—Buzzer, high-frequency Code-Practice (Lafayette 99R2556)
1—aluminum chassis box (Bud CU2101 or equiv.)
Misc.—perforated phenolic board, eyelets, wire, pilot lamp assembly, lugs, aluminum for bracket, etc.
Estimated construction cost: $7.00
Estimated construction time: 1 ½ hours

the 6-volt DC coil of flasher relay K1.

The 6 volts across K1 causes the relay armature to be attracted to the core. As it is pulled closer the *normally closed* (NC) contacts are opened and the *normally open* (NO) contacts close momentarily. The coil of K1 deenergizes and the NO contacts open and the NC contacts close—starting the energize-deenergize cycle over, again and again, until either the lights are turned *off* or the ignition turned *on*.

The frequency of the energize-deenergize cycle depends on the flexibility of the contacts of K1 and the capacitance of C1. With C1 discharged it takes a certain time for the voltage to build up across K1 as C1's charging current is limited by R1. When K1's NC contacts open the charge on C1 keeps the coil energized for a time after the NC contacts open—keeping the NO contacts closed. Normal RC time-constant calculations do not work here since the *on-off* time is affected by the pull-in and drop-out characteristics of the relay—the capacitor does not charge fully or discharge completely during the energize-deenergize cycle. To slow down the repetition rate of the clicker and flashing light increase the capacitance value of C1. Do not change R1 unless another relay, with different coil resistance, is used.

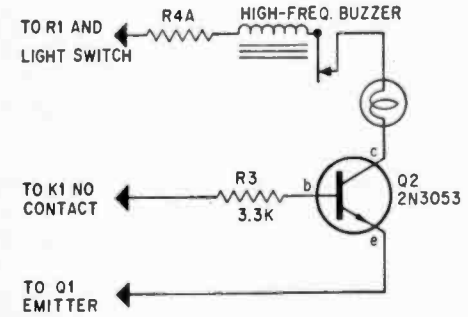


Fig. 3. When using this circuit wire a 10-ohm resistor across buzzer to pass additional current to light lamp I1 properly. Resistor R4A should be 27 ohms, ½ watt for a #47 lamp.

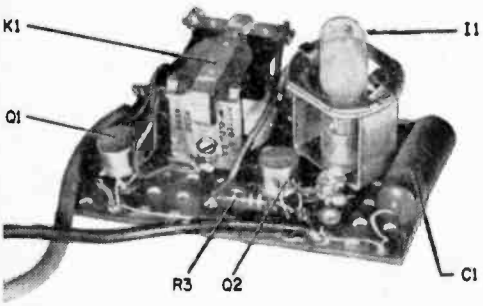


Fig. 4. Basic parts layout may seem a bit crowded—parts placement is not critical. Pilot-lamp jewel bezel threads into ring of pilot-lamp assembly that surrounds lamp I1.

Flasher Switch. The other half of the circuit is just a "switch" that controls the current through I1. The base bias of Q2 is just the charge on C1. When the NO contacts close +6 volts is applied to the base of Q2 through R3 and current flows through the collector-emitter circuit of Q2 lighting I1. R4 is a current limiting resistor and about 6 volts drop appears across it when current flows through I1 and Q2.

Some Changes. If you feel that the clicking of K1 is enough warning for you just forget about R3, R4, I1 and Q2. Without them K1 will still click about 5 times each second. (For a more audible click the relay (K1) should be mounted directly on the metal case instead of on the phenolic perforated board.)

For an even louder attention-getting warning a low-voltage, low-current, high-frequency buzzer can be used in the circuit. Connected in series with R1 (Fig. 2) you can eliminate K1, C1, R3, R4, I1 and Q2. This brings the cost of the project down to about $2. Of course the buzzer can be connected in series with R4 and I1 too. (Fig. 3). If you connect the buzzer into the circuit be sure to change the value of R1 or R4 as indicated in the schematics.

Construction. Component layout is not at all critical as long as you make sure that nothing touches the aluminum box to make an accidental short circuit. Fuse F1 (Fig. 2) can be included to automatically disconnect the unit from the light switch—it will not protect the transistors under all of the pos-

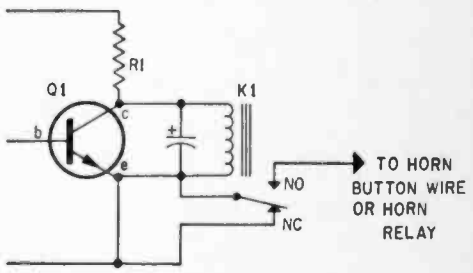
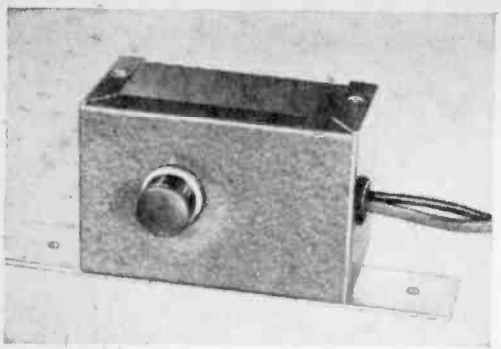
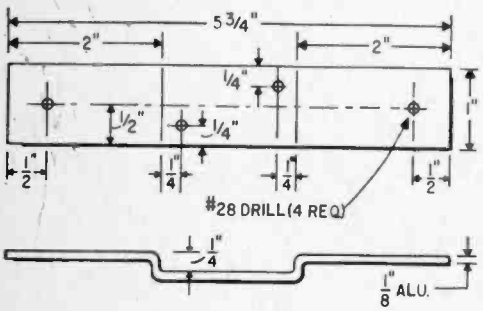


Fig. 5. Rewiring relay K1 allows vehicle horn-button circuit to become part of the Light Watchman. It is hard to ignore a rapidly beeping horn—if local laws permit such use.



Light Watchman with dashboard mounting bracket that fits holes drilled in dashboard.



Details of mounting bracket—bend offset to clear the box's flanges or use spacers or nuts.

sible problems that can arise from improper wiring or sloppy construction.

In the parts layout in Fig. 4 fuse F1 was not used. About three 75-mf capacitors can be stacked (connected in parallel) on top of C1 if you want to make the click slower or flash interval longer. This can be a lot easier than laying out new positions for the components in a larger case just because a higher capacitance unit will not fit in the space for C1.

Use Your Horn. In areas where it is not prohibited, circuit for relay K1 can be rewired (Fig. 5) so that the NO contacts can be used to actuate the horn *relay*—do not use the contacts of K1 to operate the horn directly since this heavy current will burn the contacts of K1.

Parking or Headlights. If your local laws do not require you to leave your parking lights on while your car is parked on the street at night connect while lead (A) to the tail-light circuit. These lights are on a separate switch contact—they are *on* when the parking lights are *on* and they are *on* when the headlights are *on*. No matter which circuit you use you can check the connection with a test lamp before making it permanent.

Installation. Once you have decided on where you can mount the case that contains the circuitry you'll know whether you need a bracket to mount the unit under the dashboard. Without a light as an indicator you can mount the unit on the fire wall with a couple of self-tapping screws.

With a few under-dash contortions you can connect the white wire (A) to the light switch—just check your terminals first to make sure you connect to the correct terminal.

The red lead (B) can be connected to any of the accessories that go *on* and *off* with the ignition—putting the ignition switch in the *accessories* position (if your car is so equipped) will allow you to park with your lights *on* and ignition *off* if this should ever be necessary. The ignition circuit uses a separate contact on the 3-position ignition switch. With a sealed ignition switch it may be necessary to connect directly to the ignition coil "hot" terminal—not the one that goes to the distributor breaker points. ■

Minuteman "Nerve Center"

A full-scale mock-up of an underground launch facility of the U. S. Air Force's Minuteman ICBM has been built in Waltham, Mass. by Sylvania Electric Products Inc. Actual operational launch control capsules will be located 50-feet below ground and will be linked to unmanned missile silos located miles away. Air Force officers man the "nerve centers" on a round-the-clock basis. Sylvania constructed the unit as part of a multi-million dollar contract for an improved version of the nation's first solid-fuel, three-stage missile. In photo, officer (rear) is seated at command console. Officer in foreground checks missile readiness at control console. It doesn't look much like a classroom, but it is one of many in America's space-age school system.

LANGUAGE QSX

By Stanley Leinwoll

Have QSL's lost their thrill? Try for a QSL for each language broadcast by those stations!

■ During the past several years there has been a significant increase in the number of short-wave transmitters being used in international broadcasting. Moreover, the power of these transmitters has been on the upswing. For example, since 1962 there has been an increase of more than 10 percent in the number of African and Asian nations engaged in high frequency broadcasting. In addition, many Afro-Asian nations engaged in International Broadcasting before 1962 have recently begun to improve their services by adding high power transmitters.

Ghana has recently added two 250,000-watt and two 100,000-watt short-wave transmitters to its foreign service programs; the United Arab Republic has one 250 kilowatt transmitter in operation, and is planning to add three more; Kuwait has four 250-kw transmitters under construction, and Saudi Arabia is planning the addition of two 250-kw transmitters.

Of even greater importance to the short wave listener has been the expansion of the number of transmitters used by the world's major broadcasters. In particular, the Voice of America and Radio Moscow have added heavily to the number of transmitters operating in the short wave bands.

It's How They Say It. Although the steadily increasing number of transmitters in service, as well as higher average power per transmitter, have resulted in increased interference in the high frequency spectrum, it

TABLE A—FOREIGN LANGUAGE CHECK SHEET

Language	Broadcaster	Date Monitored	Band (meters)	QSL Rec'd
Adigey	R. Liberty	March 4, 1966	31	Apr 18
Afrikaans	Netherlands	March 7, 1966	19	Apr 17
Albanian	BBC	Feb 21, 1966	49	Mar 20
Amharic	Cairo	Feb 28, 1966	41	
Bambara	Moscow	April 1, 1966	25	
Czech	V. of America	Feb 17, 1966	31	Mar 8

has also afforded the SWL unprecedented DX opportunities. Not only have the *number of countries* engaged in international broadcasting increased, but, of potentially more importance to the SWL, the number of *languages* being carried in the international services of many of the world's broadcasters has increased sharply.

As a result, the adventuresome SWL, in addition to accumulating country QSL's as he has done in the past, can now begin to *collect languages*. Because of the higher average power per transmitter, the listener has a better opportunity to hear some of the languages on the air than ever before.

Once he has decided on this entirely different and exciting approach to his hobby, the DX'er can then vary his search for new languages in several different ways.

At the present time, the world's broadcasting community has in regularly scheduled operation program transmissions in more than *135* languages and dialects. This figure has been increasing steadily in recent years, and now includes many exotic, and not often heard-of languages, among which are *Amharic, Baluchi, Efik, Fanti, Hausa, Konkani, Quechua,* and *Wolof*.

Log It. One approach to language DX is the direct one: to log as many languages as possible and to collect a QSL for each language. A sample checksheet is shown, with a proposed format for a log, in Table A.

If you have a tape recorder put it to work —collect the station breaks. Often station breaks are given in more than one language which may be identified in yours.

In addition to his receiver, the language DX'er will find a copy of the *World Radio and TV Handbook for Listeners* an indispensable tool in determining which languages are broadcast by whom, and at what time, and on which frequencies. Most SWL's are familiar with the handbook, which can be obtained at most SWL and electronic supply houses, or ordered direct from: *Gilfer Associates, Dept. JS, P. O. Box 239, Park Ridge, New Jersey.*

TABLE B—ENGLISH LANGUAGE CHECK SHEET

Broadcaster	Time	Band (meters)	Date	QSL Rec'd
BBC	1700	19	Apr 18	
Egypt	2130	25	Feb 1	Apr 1
Ghana	1630	16	Jan 21	
Switzerland	0115	31	Jan 18	Mar 10
V. of America	1600	19	Mar 1	Mar 27
Radio Moscow	2200	41	Jan 27	Apr 14
Bulgaria	1930	49	Mar 22	

Some Numbers. As a start, the language DX'er can study the schedules of the Voice of America, the British Broadcasting Corporation, and Radio Moscow. Radio Moscow is the *world's leader* in International Broadcast output, transmitting in a total of 63 different languages. BBC is *second* with 40 different, and VOA *third* with 37 different languages. Cairo is a *surprising fourth* with 26 different languages.

These four broadcasters alone will provide the listener with close to one hundred languages that range all the way from *Albanian* to *Zulu*. It will, of course, be impossible to log all the languages of all the world's broadcasters, since many of these are regional dialects, transmitted on low power to adjacent territories; under ordinary conditions, therefore, the signals carrying some of these languages will not be strong enough to be heard over a wide area.

It should be possible, however, for the determined DX'er to log at least 75 different languages in a relatively short time, provided he has accurate schedule information. As indicated previously, the *WRTV Handbook* is the best source of schedule information for all international broadcasters, offering a wealth of comprehensive information about times, frequencies, and language services for the world's broadcasting community.

Another variation of language DX'ing is to try to log all the languages transmitted by a single broadcaster. As mentioned previously, the Voice of America transmits in 37 different languages, and would probably be the

(Continued on page 118)

POLARITY TATTLETALE

by

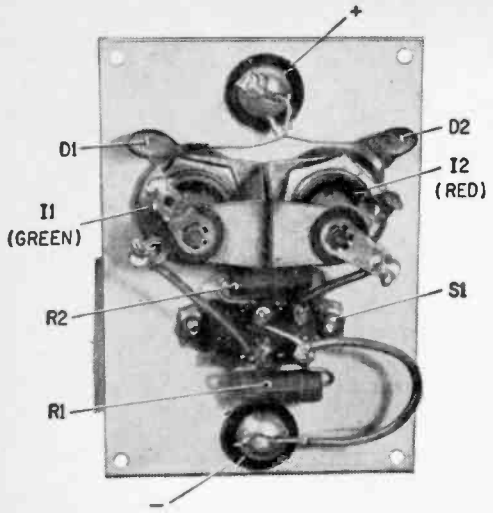
James A. Fred

Are you positive of your polarity? This handy little electronic gadget will indicate battery or charger polarity. Low in cost—easy to build. Why be without it?

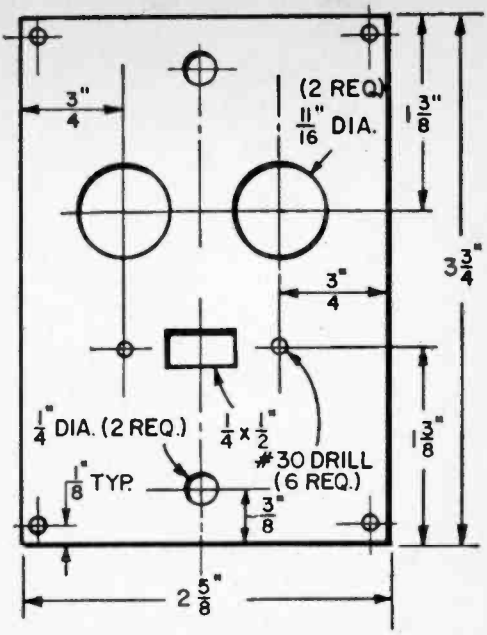
■ Several years ago most battery chargers made for use by the home auto mechanic, had red and green lights on their front panel. The green light was a combination power ON indicator and a proper polarity indicator. The red light was a wrong-polarity indicator. It would light up if the charger was connected to the battery backwards. The newer battery chargers shown do not have polarity indicators. Many of them do have an ammeter however, which will go violently off scale if the charger is connected backwards.

One of the oldest ways used to detect polarity is to use a potato. Just cut a potato in half; plunge a pair of wires into the cut surface. The area around the positive lead connected to the battery will turn green. A more modern way is to use a voltmeter. However most home style auto mechanics don't have a voltmeter.

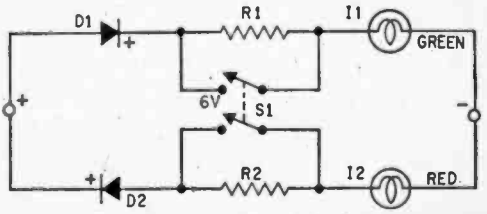
This little device that we built uses the property of a silicon rectifier of passing current in only one direction to indicate the polarity of a battery charger. Each rectifier is connected in series with a light bulb and when the plus side of the battery is connected to the positive terminal then the green light will light, but if the negative terminal of the battery is connected to the positive terminal then the red bulb will light indicating that the battery is connected backward. By using 6-volt bulbs and switching in a series resistor for a 12-volt battery, the device can be used on both 6- and 12-volt batteries or power supplies. *(Continued Overleaf)*



Large terminal screws are for convenience since current is limited by pilot lamps.



Complete circuit is mounted on this cover using lamp and switch lugs as tie points.



Circuit is simple. R1, R2 limit current through 6-volt lamps when used on 12-volts.

PARTS LIST FOR POLARITY INDICATOR

D1, D2—Silicon rectifier (Mallory 1N2090 or equiv.)
I1, I2—Pilot lamps (See text)
R1, R2—Resistors, 2-watt (See text)
S1—D.p.s.t. slide switch
1—molded black plastic case, 2 7/8" x 4" x 1-9/16" (Allied 87U895 or equiv.)
Misc.—Green pilot-light assembly; red pilot-light assembly, aluminum for case cover; wire; solder; terminal and mounting hardware; insulating washers; etc.
Estimated construction cost: $3.00
Estimated construction time: 2 hours

Start the Project. First collect all the parts on the list. Layout and drill the holes in the cover. The cover can be made of metal, wood, phenolic or other material of your choice. I used aluminum because it is easy to work with. The aluminum was etched in a strong solution of household lye until it had a uniform satin finish. A coat of clear spray was applied and then decals were applied. Another coat of clear spray finished the cover. When mounting the battery connecting bolts be sure and use insulating washers if your cover is made of metal. The polarity connections to the rectifiers are very important because this determines which light will light. You may use type 51 lamps with a 70-ohm, 2-watt resistor or type 47 lamps with a 56-ohm, 2-watt resistor for maximum brightness during 6-volt operation. If you will be using only 12-volt batteries (or can stand less brilliance during 6-volt operation) use a 12-volt lamp like the 428, 1446, 1487 or 1815. Then you can also eliminate the 6/12-volt switch and the two 2-watt resistors.

Making Tests. After you have wired and double checked the Polarity Indicator you are ready to test it. To test a battery or battery charger for polarity connect a wire from the plus wing nut on the tester to a post on the battery and connect a wire from the negative wing nut to the other post of the battery. (We are referring to the common type lead-acid automobile battery rather than a dry cell battery.) If the *green* indicator lights up you are connected properly, but if the red indicator glows you have the wires to the battery reversed. After determining the proper polarity of a battery terminal take some red fingernail polish and paint the top of the positive terminal post. ■

Neon-Lamp Calculator

Continued from page 52

wood backing. Then enlarge the circuit board and cabinet top holes to ¼ inch. The panel mounting holes are also drilled to ¼ inch. *Do not enlarge the 4 mounting holes in the perforated board or cabinet.*

Drilling is complete on the cabinet *top* and panels. But the circuit board lamp holes have to be enlarged to 5/16 inch. And, since bits of this size tend to tear the phenolic, it's best if a *reamer* is used instead of a drill.

Finally, the cabinet front and back holes are laid out and drilled.

Lamp Subassembly. The neon lamps are held in place by rubber grommets—installing these grommets is the first step. The grommets have a 3/16-inch *inside diameter* and mount in 5/16-inch holes.

After the grommets are in place insert the flea clips to support the ends of the bus-wires. Note that the #9 horizontal wire has a flea clip tie in the center. Next cut and solder the bus-wires. The horizontal wires are laid against the board and are soldered to the bottom of the flea clips. The *vertical* wires are soldered to the *top* of the flea clips and their ends are bent and shoved down the center of the clips. The two sets of wires should not touch. Care should be used at the junction of Circuit #1 and #2 to be sure the wires are properly placed.

Next put the 5/8-inch, 6-32 machine screws in the mounting holes (heads on same side as the bus-wires) and thread on two, ¼-inch spacers on *each* machine screw. A #6 washer goes between the two spacers. Later, the second spacer and washer are removed and used on the top of the cabinet to hold the board in place but this allows us to use the panels as a guide for installing the lamps.

Install one lamp at a time and solder it into the circuit. One wire connects to the nearest vertical bus-wire and the other to the nearest horizontal wire. After each lamp is installed, place a panel over the spacers and check the lamp's height. The tip of the lamp should be through the 9/64-inch lamp holes and flush with the top of the panel. After the wiring is complete, remove the second spacer and washer from each mounting bolt and install the board in the cabinet.

Rotary Switches. Although the rotary switches specified have 12 positions only 9 switch positions are used. And, since there are no stops, any 9 consecutive positions will work. The terminal in the *center* is the *rotor.*

Nothing is preventing the builder from using all 12 positions of the switches to go as high as 12 times 12 etc.—The Editors

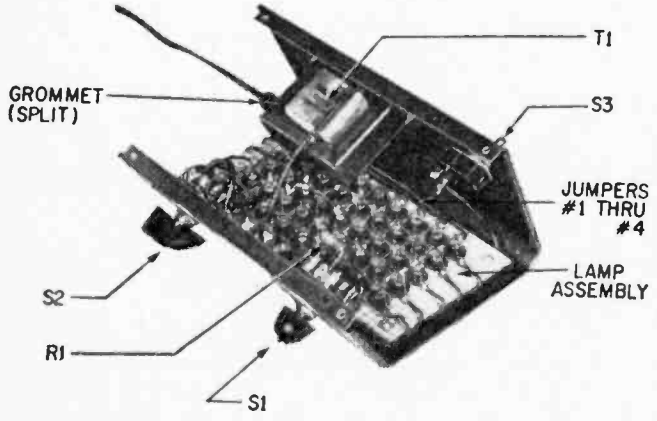
Looking at the back of the switch, count *counterclockwise* when connecting the wires. Connect one wire to each of the 9 positions used. (Cut-off the shafts at the first notch *before* fastening the switches in the cabinet.) To position the knobs check for circuit continuity and set them accordingly. Mount the remaining parts in the cabinet as shown in the drawings and photos.

Final Wiring. The final wiring consists of merely connecting the switch wires to the proper board terminals. The isolation transformer, R1, and S3 are wired according to the schematic diagram. Note that the #10 position on S1 is used as a tie point for R1.

The last step is marking the three panels which are used for the different functions.

To check the unit run through the problem combinations shown in *the first two* groups in the table and check the answers.

The Neon-Lamp Calculator is finished but the fun hasn't even started! ■



Completely wired unit is ready to be "buttoned up" after final check has been made. Grommet is split to go onto ready-wired linecord of T1. Put a knot in linecord to give some strain relief to the connections on T1. Cord protecting grommet fits in slot in edge of side of cabinet's bottom plate.

You can earn more money if you get an FCC License

...and here's our famous CIE warranty that you will get your license if you study with us at home

NOT SATISFIED with your present income? The most practical thing you can do about it is "bone up" on your electronics, pass the FCC exam, and get your Government license.

The demand for licensed men is enormous. Ten years ago there were about 100,000 licensed communications stations, including those for police and fire departments, airlines, the merchant marine, pipelines, telephone companies, taxicabs, railroads, trucking firms, delivery services, and so on.

Today there are over a million such stations on the air, and the number is growing constantly. And according to Federal law, no one is permitted to operate or service such equipment without a Commercial FCC License or without being under the direct supervision of a licensed operator.

This has resulted in a gold mine of new business for licensed service technicians. A typical mobile radio service contract pays an average of about $100 a month. It's possible for one trained technician to maintain eight to ten such mobile systems. Some men cover as many as fifteen systems, each with perhaps a dozen units.

Coming Impact of UHF

This demand for licensed operators and service technicians will be boosted again in the next 5 years by the mushrooming of UHF television. To the 500 or so VHF television stations now in operation, several times that many UHF stations may be added by the licensing of UHF channels and the sale of 10 million all-channel sets per year.

Opportunities in Plants

And there are other exciting opportunities in aerospace industries, electronics manufacturers, telephone companies, and plants operated by electronic automation. Inside industrial plants like these, it's the licensed technician who is always considered first for promotion and in-plant training programs. The reason is simple. Passing the Federal government's FCC exam and getting your license is widely accepted proof that you know the fundamentals of electronics.

So why doesn't everybody who "tinkers" with electronic components get an FCC License and start cleaning up?

The answer: it's not that simple. The government's licensing exam is tough. In fact, an average of two out of every three men who take the FCC exam fail.

There is one way, however, of being pretty certain that you will pass the FCC exam. And that is to take one of the FCC home study courses offered by the Cleveland Institute of Electronics.

CIE courses are so effective that better than 9 out of every 10 CIE-trained men who take the exam pass it... on their very first try! That's why we can afford to back our courses with the iron-clad Warranty shown on the facing page: you get your FCC License or your money back.

There's a reason for this remarkable record. From the beginning, CIE has specialized in electronics courses designed for home study. We have developed techniques that make learning at home easy, even if you've had trouble studying before.

In a Class by Yourself

Your CIE instructor gives his undivided personal attention to the lessons and questions you send in. It's like being the only student in his "class." He not only grades your work, he analyzes it. And he mails back his corrections and comments the same day he receives your assignment, so you can read his notations while everything is still fresh in your mind.

Mail Card for Two Free Books

Want to know more? The postpaid reply card bound-in here will bring you free copies of our school catalog describing opportunities in electronics, our teaching methods, and our courses, together with our special booklet, "How to Get a Commercial FCC License." If card has been removed, just send your name and address to us.

Matt Stuczynski, Senior Transmitter Operator, Radio Station WBOE

"I give Cleveland Institute credit for my First Class Commercial FCC License. Even though I had only six weeks of high school algebra, CIE's AUTO-PROGRAMMED™ lessons make electronics theory and fundamentals easy. After completing my CIE Course, I took and passed the 1st Class FCC Exam. I now have a good job in studio operation, transmitting, proof of performance, equipment servicing."

Chuck Hawkins, Chief Radio Technican, Division 12, Ohio Dept. of Highways

"My CIE Course enabled me to pass both the 2nd and 1st Class License Exams on my first attempt...I had no prior electronics training either. (Many of the others who took the exam with me were trying to pass for the eighth or ninth time!) I'm now in charge of Division Communications. It's an interesting, challenging and rewarding job. And incidentally, I got it through CIE's Job Placement Service."

Glenn Horning, Local Equipment Supervisor, Western Reserve Telephone Company

"There's no doubt about it. I owe my 2nd Class FCC License to Cleveland Institute. Their FCC License Course really teaches you theory and fundamentals and is particularly strong on transistors, mobile radio, troubleshooting and math. Do I use this knowledge? You bet. We're installing more sophisticated electronic gear all the time and what I learned from CIE sure helps."

CIE Cleveland Institute of Electronics

1776 E. 17th St., Dept. EX-16, Cleveland, Ohio 44114

Accredited by the Accrediting Commission of the National Home Study Council, and the only home study school to provide complete coverage of electronics fundamentals plus such up-to-date applications as: Microminiaturization • Laser Theory and Application • Suppressed Carrier Modulation • Single Sideband Techniques • Logical Troubleshooting • Boolean Algebra • Pulse Theory • Timebase Generators...and many more.

Better than 9 out of 10 CIE men win their "ticket" the very first time they try

(NATIONAL AVERAGE IS ONLY 1 OUT OF 3)

Cleveland Institute of Electronics

WARRANTY

of success in obtaining a Government FCC License

The Cleveland Institute of Electronics hereby warrants that upon completion of the Electronics Technology, Broadcast Engineering, or First-Class FCC License course, you will be able to pass the FCC examination for a First Class Commercial Radio Telephone License (with Radar Endorsement);

OR upon completion of the Electronic Communications course you will be able to pass the FCC examination for a Second Class Commercial Radio Telephone License;

AND in the event that you are unable to pass the FCC test for the course you select, on the very first try, you will receive a FULL REFUND of all tuition payments.

This warranty is valid for the entire period of the completion time allowed for the course selected.

G. O. Allen

G. O. Allen
President

Volume 45, No. 3

WHITE'S RADIO LOG

An up-to-date Broadcasting Directory of North American AM, FM and TV Stations. Including a Special Section on World-Wide Short-Wave Stations

This is the third and last part of *White's Radio Log*, now published in three parts twice each year. This format presentation enables the Editors of RADIO-TV EXPERIMENTER to offer its readers two complete volumes of *White's Radio Log* each year, while increasing the scope of the *Log* and its accuracy.

In this issue of *White's Radio Log* we have included 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 the World-Wide Short-Wave Section.

In August-September 1966 issue of RADIO-TV EXPERIMENTER, Volume 46, No. 1, the *Log* will contain the following listings: U. S. AM Stations by Frequency, Canadian AM Stations by Frequency, U. S. Television Stations by States, Canadian Television Stations by Location and the World-Wide Short-Wave Section. In the event you missed a part of the *Log* published during the first half of 1966, you will have a complete volume of *White's Radio Log* by collecting any three consecutive issues of RADIO-TV EXPERIMENTER during the last half of 1966. The three consecutive issues are an entire volume of *White's Radio Log* that offers complete listings with last minute station change data that are not offered in any other magazine or book.

If you are a broadcast band DX'er, FM station logger, like to photograph distant TV test patterns, or tune the short-wave bands, you will find the new *White's* format an unbeatable and up-to-date reference.

QUICK REFERENCE INDEX

U. S. AM Stations by Call Letters

C.L.	Location	Kc.
KAAA	Kingman, Ariz.	1230
KAAB	Hot Springs, Ark.	1340
KAAY	Little Rock, Ark.	1090
KABC	Los Angeles, Calif.	790
KABH	Midland, Tex.	1510
KABI	Abilene, Kans.	1560
KABL	Oakland, Calif.	960
KABQ	Albuquerque, N.M.	1350
KABR	Aberdeen, S.Dak.	1420
KACE	Riverside, Calif.	1570
KACI	The Dalles, Oreg.	1300
KACL	Santa Barbara, Cal.	1290
KACT	Andrews, Tex.	1360
KACY	Port Hueneme, Calif.	1520
KADA	Ada, Okla.	1230
KADL	Pine Bluff, Ark.	1270
KADO	Marshall, Tex.	1410
KAOY	St. Charles, Mo.	1460
KAFY	Bakersfield, Calif.	550
KAGE	Winona, Minn.	1380
KAGH	Crossett, Ark.	800
KAGI	Grants Pass, Oreg.	930
KAGO	Klamath Falls, Oreg.	1150
KAGR	Yuba City, Calif.	1450
KAGT	Anacortes, Wash.	1340
KAHI	Auburn, Calif.	950
KAHR	Redding, Calif.	1330
KAHU	Waipahu, Hawaii	940
KAIM	Honolulu, Hawaii	870
KAIN	Nampa, Ida.	1340
KAIR	Tucson, Ariz.	1490
KAJO	Grants Pass, Oreg.	1270
KAKA	Wickenburg, Ariz.	1250
KAKC	Tulsa, Okla.	970
KAKE	Wichita, Kan.	1240
KALB	Alexandria, La.	580
KALE	Richland, Wash.	960
KALF	Mesa, Ariz.	1510
KALG	Alamogordo, N.Mex.	1230
KALI	San Gabriel, Cal.	1430
KALL	Salt Lake City, Utah	910
KALM	Thayer, Mo.	1290
KALN	Iola, Kan.	1370
KALO	Little Rock, Ark.	1250
KALT	Atlanta, Tex.	900
KALV	Alva, Okla.	1430
KAMD	Camden, Ark.	910
KAMI	Cozad, Neb.	1580
KAML	Kenedy-Karnes City, Tex.	990
KAMO	Rogers, Ark.	1390
KAMP	El Centro, Calif.	1430
KAMY	McCamey, Tex.	1450
KANA	Anaconda, Mont.	580
KANB	Shreveport, La.	1300
KAND	Corsicana, Tex.	1340
KANE	New Iberia, La.	1240
KANI	Wharton, Tex.	1500
KANN	Ogden, Utah	1250
KANO	Anoka, Minn.	1470
KANS	Larned, Kan.	1510
KAOH	Duluth, Minn.	1390
KAOK	Lake Charles, La.	1400
KAOL	Carrollton, Mo.	1430
KAOR	Oroville, Calif.	1340
KAPA	Raymond, Wash.	1340
KAPB	Marksville, La.	1370
KAPE	San Antonio, Tex.	1480
KAPI	Pueblo, Colo.	690
KAPR	Douglas, Ariz.	930
KAPS	Mt. Vernon, Wash.	1470
KAPT	Salem, Ore.	1220
KAPY	Port Angeles, Wash.	1290
KARA	Albuquerque, N.M.	1310
KARE	Atchison, Kan.	1470
KARI	Blaine, Wash.	550
KARK	Little Rock, Ark.	920
KARM	Fresno, Calif.	1430
KARR	Great Falls, Mont.	1400
KARS	Belen, N.M.	860
KART	Jerome, Idaho	1400
KARY	Prosser, Wash.	1310
KASH	Eugene, Ore.	1590
KASI	Ames, Iowa	1430
KASK	Ontario, Calif.	1510
KASL	Newcastle, Wyo.	1240
KASM	Albany, Minn.	1150
KASO	Minden, La.	1240
KAST	Astoria, Ore.	1370
KASY	Auburn, Wash.	1220
KATA	Arcata, Calif.	1340
KATE	Albert Lea, Minn.	1450
KATI	Casper, Wyo.	1400
KATL	Miles City, Mont.	1340
KATN	Boise, Idaho	1010
KATO	Safford, Ariz.	1230
KATQ	Texarkana, Tex.	940
KATR	Eugene, Ore.	1320
KATY	San Luis Obispo, Cal.	1340
KATZ	St. Louis, Mo.	1600
KAUS	Austin, Minn.	1480
KAVE	Carlsbad, N.Mex.	1240
KAVI	Rocky Ford, Colo.	1320
KAVL	Lancaster, Calif.	610
KAVR	Apple Valley, Calif.	960
KAWA	Waco-Marlin, Tex.	1010
KAWL	York, Neb.	1370
KAWT	Douglas, Ariz.	1450
KAYC	Beaumont, Tex.	1450
KAYG	Lakewood, Wash.	1480
KAYL	Storm Lake, Iowa	990
KAYO	Seattle, Wash.	1150
KAYS	Hays, Kans.	1400
KAYT	Rupert, Idaho	970
KBAB	Indianola, Iowa	1490
KBAL	San Saba, Tex.	1410
KBAM	Longview, Wash.	1270
KBAN	Bowie, Tex.	1410
KBAR	Burley, Idaho	1230
KBAT	San Antonio, Tex.	680
KBBA	Benton, Ark.	690
KBBB	Borger, Tex.	1600
KBBC	Centerville, Utah	1600
KBBO	Yakima, Wash.	1390
KBBR	North Bend, Oreg.	1340
KBBS	Buffalo, Wyo.	1450
KBCH	Oceanlake, Oreg.	1380
KBCL	Shreveport, La.	1220
KBEA	Mission, Kans.	1480
KBEC	Waxahachie, Tex.	1390
KBEE	Modesto, Calif.	970
KBEK	Elk City, Okla.	1240
KBEL	Idabel, Okla.	1240
KBEN	Carrizo Sprgs., Tex.	1450
KBER	San Antonio, Tex.	1150
KBET	Reno, Nev.	1340
KBEV	Portland, Oreg.	1010
KBEW	Blue Earth, Minn.	1560
KBFS	Belle Fourche, S.Dak.	1450
KBGN	Caldwell, Idaho	910
KBGO	Waco, Tex.	1580
KBHB	Sturgis, S. D.	1280
KBHC	Nashville, Ark.	1260
KBHM	Branson, Mo.	1220
KBHS	Hot Springs, Ark.	590
KBIA	Burlington, Ia.	1150
KBIB	Monette, Ark.	1580
KBIF	Fresno, Calif.	900
KBIG	Avalon, Cal.	740
KBIM	Roswell, N.Mex.	910
KBIS	Bakersfield, Calif.	970
KBIX	Muskogee, Okla.	1490
KBJM	Lemmon, S.D.	1400
KBJZ	Ottumwa, Iowa	1240
KBJT	Fordyce, Ark.	1570
KBKR	Baker, Oreg.	1490
KBKW	Aberdeen, Wash.	1450
KBLA	Burbank, Calif.	1500
KBLE	Seattle, Wash.	1050
KBLF	Red Bluff, Calif.	1490
KBLI	Blackfoot, Idaho	690
KBLL	Helena, Mont.	1240
KBLR	Bolivar, Mo.	1550
KBLT	Big Lake, Tex.	1290
KBLU	Yuma, Ariz.	1320
KBLY	Gold Beach, Oreg.	1220
KBMI	Henderson, Nev.	1400
KBMN	Bozeman, Mont.	1230
KBMO	Benson, Minn.	1290
KBMR	Bismarck, N. D.	1350
KBMW	Wahpeton, N.D.-Breckenridge, Minn.	1450
KBMX	Coalinga, Calif.	1470
KBMY	Billings, Mont.	1240
KBND	Bend, Oreg.	1110
KBOA	Kennett, Mo.	830
KBOE	Oskaloosa, Iowa	740
KBOI	Boise, Idaho	670
KBOK	Malvern, Ark.	1310
KBOL	Boulder, Colo.	1490
KBDM	Bismark-Mandan, N. Dak.	1270
KBON	Omaha, Nebr.	1490
KBOP	Pleasanton, Tex.	1380
KBOR	Brownsville, Tex.	1600
KBOW	Butte, Mont.	550
KBOX	Dallas, Tex.	1480
KBOY	Medford, Oreg.	730
KBPS	Portland, Oreg.	1450
KBRC	Mt. Vernon, Wash.	1430
KBRI	Brinkley, Ark.	1570
KBRK	Brookings, S.Dak.	1430
KBRL	McCook, Nebr.	1300
KBRN	Brighton, Colo.	800
KBRO	Bremerton, Wash.	1490
KBRR	Leadville, Colo.	1230
KBRS	Springdale, Ark.	1340
KBRV	Soda Sprgs., Ida.	540
KBRX	O'Neill, Nebr.	1350
KBRZ	Freeport, Texas	1460
KBSF	Springhill, La.	1460
KBSN	Crane, Tex.	970
KBST	Big Spring, Tex.	1490
KBTA	Batesville, Ark.	1340
KBTC	Houston, Mo.	1250
KBTM	Jonesboro, Ark.	1230
KBTN	Neosho, Mo.	1420
KBTO	El Dorado, Kans.	1360
KBTR	Denver, Colo.	710
KBUD	Athens, Tex.	1410
KBUH	Brigham City, Utah	800
KBUN	Bemidji, Minn.	1450
KBUR	Burlington, Iowa	1490
KBUS	Mexia, Tex.	1590
KBUY	Amarillo, Tex.	1010
KBUZ	Mesa, Ariz.	1310
KBVM	Lancaster, Calif.	1380
KBVU	Bellevue, Wash.	1540
KBWD	Brownwood, Tex.	1380
KBXM	Kennett, Mo.	1540
KBYE	Okla. City, Okla.	890
KBYG	Big Spring, Tex.	1400
KBYP	Shamrock, Tex.	1580
KBYR	Anchorage, Alaska	1270
KBZY	Salem, Oreg.	1490
KBZZ	LaJunta, Colo.	1400
KCAB	Dardanelle, Ark.	980
KCAC	Phoenix, Ariz.	1010
KCAD	Abilene, Tex.	1560
KCAL	Redlands, Calif.	1410
KCAM	Glennallen, Alaska	790
KCAN	Canyon, Tex.	1550
KCAP	Helena, Mont.	1340
KCAR	Clarksville, Tex.	1350
KCAS	Slaton, Tex.	1050
KCAT	Pine Bluff, Ark.	1530
KCBC	Des Moines, Iowa	1390
KCBD	Lubbock, Tex.	1590
KCBQ	San Diego, Calif.	1170
KCBS	San Fran., Calif.	740
KCCB	Corning, Ark.	1260
KCCL	Paris, Ark.	1460
KCCN	Honolulu, Hawaii	1420
KCCO	Lawton, Okla.	1050
KCCR	Pierre, S. D.	1240
KCCT	Corpus Christi, Tex.	1150
KCCV	Independence, Mo.	1510
KCEE	Tucson, Ariz.	790
KCEY	Tunlock, Calif.	1390
KCFA	Spokane, Wash.	1330
KCFH	Cuero, Tex.	1600
KCFI	Cedar Falls, Iowa	1250
KCGM	Columbia, Mo.	1580
KCHA	Charles City, Iowa	1580
KCHE	Cherokee, Iowa	1440
KCHI	Chillicothe, Mo.	1010
KCHJ	Delano, Calif.	1010
KCHR	Charleston, Mo.	1350
KCHS	Truth or Consequences, New Mexico	1400
KCHV	Coachella, Calif.	970
KCHY	Cheyenne, Wyo.	1530
KCID	Caldwell, Idaho	1490
KCII	Washington, Iowa	1380
KCIJ	Shreveport, La.	1050
KCIL	Houma, La.	1490
KCIM	Carroll, Iowa	1380
KCIN	Victorville, Calif.	1590
KCJB	Minot, N.Dak.	910
KCKC	San Bernardino, Cal.	1350
KCKG	Sonora, Tex	1240
KCKN	Kansas City, Kans.	1340
KCKW	Jena, La.	1480
KCKY	Coolidge, Ariz.	1150
KCLA	Pine Bluff, Ark.	1400
KCLE	Cleburne, Tex.	1120
KCLN	Clinton, Iowa	1390
KCLO	Leavenworth, Kans.	1410
KCLR	Ralls, Tex.	1530
KCLS	Flagstaff, Ariz.	600
KCLU	Rolla, Mo.	1590
KCLV	Clovis, N.Mex.	1240
KCLW	Hamilton, Tex.	900
KCLX	Colfax, Wash.	1450
KCMC	Texarkana, Tex	1230
KCMJ	Palm Sprgs., Calif.	1010
KCMO	Kansas City, Mo.	810
KCMS	Manitou Sprgs., Colo.	1490
KCNI	Broken Bow, Nebr.	1280
KCNO	Alturas, Calif.	570
KCNY	San Marcos, Tex.	1470
KCDB	Newton, Iowa	1280
KCDG	Centerville, Iowa	1400
KCOH	Houston, Tex.	1430
KCOK	Tulare, Calif.	1270
KCOL	Ft. Collins, Colo.	1410
KCOM	Comanche, Tex.	1550
KCON	Conway, Ark.	1230
KCOR	San Antonio, Tex.	1350
KCOW	Alliance, Nebr.	1400
KCOY	Santa Maria, Calif.	1400
KCPX	Salt Lake City, Utah	1320
KCRA	Sacramento, Calif.	1320
KCRB	Chanute, Kans.	1460
KCRC	Enid, Okla.	1390
KCRG	Cedar Rapids, Iowa	1600
KCRM	Crane, Tex.	1380
KCRS	Midland, Tex.	550
KCRT	Trinidad, Colo.	1240
KCRV	Caruthersville, Mo.	1370
KCSJ	Pueblo, Colo.	590
KCSR	Chadron, Nebr.	610
KCTA	Corpus Christi, Tex.	1030
KCTI	Gonzales, Tex.	1450
KCTY	Salinas, Calif.	980
KCTX	Childress, Tex.	1510
KCUB	Tucson, Ariz.	1290
KCUE	Red Wing, Minn.	1250
KCUL	Fort Worth, Tex.	1540
KCVL	Colville, Wash.	1270
KCVR	Lodi, Calif.	1570
KCYL	Lampasas, Tex.	1450
KDAC	Ft. Bragg, Calif.	1230
KDAD	Weed, Calif.	800
KDAK	Carrington, N.D.	1600
KDAL	Duluth, Minn.	610
KDAN	Eureka, Calif.	790
KDAV	Lubbock, Tex.	580
KDAY	Santa Monica, Calif.	1580
KDB	Santa Barbara, Calif.	1490
KDBM	Dillon, Mont.	800
KDBS	Alexandria, La.	1410
KDCE	Espanola, N.M.	970
KDDA	Dumas, Ark.	1580
KDDD	Dumas, Tex.	800
KDEC	Decorah, Iowa	1240
KDEF	Albuquerque, N.Mex.	1150
KDEN	Denver, Colo.	1340
KDEO	El Cajon, Calif.	910
KDES	Palm Sprgs., Calif.	920
KDET	Center, Tex.	930
KDEX	Dexter, Mo.	1590
KDEY	Boulder, Colo.	1360
KDFL	Sumner, Wash.	1560
KDFN	Doniphan, Mo.	1500
KDGO	Durango, Colo.	1240
KDHI	Twenty-nine Palms, California	1250
KDHL	Faribault, Minn.	920
KDHN	Dimmitt, Tex.	1470
KDIA	Oakland, Calif.	1310
KDIO	Ortonville, Minn.	1350
KDIX	Dickinson, N.Dak.	1230
KDJI	Holbrook, Ariz.	1270
KDKA	Pittsburgh, Pa.	1020
KDKD	Clinton, Mo.	1280
KDKO	Littleton, Colo.	1510
KDLA	DeRidder, La.	1010
KDLK	Del Rio, Tex.	1230
KDLM	Detroit Lakes, Minn.	1340
KDLR	Devils Lake, N.Dak.	1240
KDLS	Perry, Iowa	1310
KDMA	Montevideo, Minn.	1450
KDMO	Carthage, Mo.	1490
KDMS	El Dorado, Ark.	1290
KDNC	Spokane, Wash.	1440
KDNT	Denton, Tex.	1440
KDOK	Tyler, Tex.	1330
KDOL	Mojave, Calif.	1340
KDOM	Windom, Minn.	1580
KDON	Salinas, Calif.	1460
KDOT	Scottsdale, Ariz.	1440
KDOV	Medford, Oreg.	1300
KDOX	Marshall, Tex.	1410
KDQN	DeQueen, Ark.	1390
KDRG	Deer Lodge, Mont.	1400
KDRO	Sedalia, Mo.	1340
KDRS	Paragould, Ark.	1490
KDRY	Alamo Hts., Tex.	1110
KDSJ	Deadwood, S.Dak.	980
KDSN	Denison, Iowa	1580
KDSX	Denison-Sherman, Tex.	950
KDTA	Delta, Colo.	1400
KDTH	Dubuque, Iowa	1370
KDUZ	Hutchinson, Minn.	1260
KDWA	Hastings, Minn.	1460
KDWB	St. Paul, Minn.	630
KDWT	Stamford, Tex.	1400
KDXE	No. Little Rock, Ark.	1380
KDXI	Mansfield, La.	1360
KDXU	St. George, Utah	1450
KDYL	Tooele, Utah	990
KDZA	Pueblo, Colo.	1230
KEAN	Brownwood, Tex.	1240
KEAP	Fresno, Calif.	980
KEBE	Jacksonville, Tex.	1400
KECH	Ketchikan, Alaska	620
KECK	Odessa, Tex.	920
KEDA	San Antonio, Tex.	1540
KEDD	Dodge City, Kans.	1550
KEDO	Longview, Wash.	1400

Every effort has been made to ensure accuracy of the information listed in this publication, but absolute accuracy is not guaranteed and of course, only information available up to press-time could be included.

WHITE'S RADIO LOG

C.L.	Location	Kc.
KEED	Springfield-Eugene, Ore.	1120
KEEE	Nacogdoches, Tex.	1230
KEEL	Shreveport, La.	710
KEEN	San Jose, Calif.	1370
KEEP	Twin Falls, Idaho	1450
KEES	Gladewater, Tex.	1430
KELA	Centralia-Chekalis, Wash.	1470
KELD	El Dorado, Ark.	1400
KELI	Tulsa, Okla.	1430
KELK	Elko, Nev.	1240
KELO	Sioux Falls, S.Dak.	1320
KELP	El Paso, Tex.	920
KELR	El Reno, Okla.	1460
KELY	Ely, Nev.	1230
KENA	Mena, Ark.	1450
KEND	Cheyenne, Wyo.	980
KENE	Toppenish, Wash.	1490
KENI	Anchorage, Alaska	550
KENM	Portales, N.Mex.	1450
KENN	Farmington, N.M.	1390
KENO	Las Vegas, Nev.	1460
KENR	Houston, Tex.	1070
KENT	Prescott, Ariz.	1340
KENY	Bellingham-Ferndale, Wash.	930
KEOS	Flagstaff, Ariz.	690
KEPR	Kennevick-Richland-Pasco, Wash.	610
KEPS	Eagle Pass, Tex.	1270
KERB	Kermit, Tex.	600
KERC	Eastland, Tex.	1590
KERG	Eugene, Oreg.	1280
KERN	Bakersfield, Calif.	1410
KERV	Kerrville, Tex.	1230
KESM	Eldorado Springs, Mo.	1580
KEST	Boise, Idaho	790
KETO	Seattle, Wash.	1590
KETX	Livingston, Tex.	1440
KEUN	Eunice, La.	1490
KEVA	Evanston, Wyo.	1240
KEVL	White Castle, La.	1590
KEVT	Tucson, Ariz.	690
KEWB	Oakland, Calif.	910
KEWI	Topeka, Kans.	1440
KEX	Portland, Oreg.	1190
KEXO	Grand June., Colo.	1230
KEYD	Oakes, N.Dak.	1220
KEYE	Perryton, Tex.	1400
KEYJ	Jamestown, N.Dak.	1400
KEYL	Long Prairie, Minn.	1400
KEYR	Terrytown, Nebr.	690
KEYS	Corpus Christi, Tex.	1440
KEYY	Provo, Utah	1450
KEYZ	Williston, N.Dak.	1360
KEZU	Rapid City, S.Dak.	920
KEZY	Anaheim, Calif.	1190
KFAB	Omaha, Nebr.	1110
KFAC	Los Angeles, Calif.	1330
KFAH	Lakewood Center, Wash.	1480
KFAL	Fulton, Mo.	900
KFAM	St. Cloud, Minn.	1450
KFAR	Fairbanks, Alaska	610
KFAX	San Francisco, Calif.	1100
KFAY	Fayetteville, Ark.	1250
KFAZ	Liberty, Tex.	1050
KFBB	Great Falls, Mont.	1310
KFBC	Cheyenne, Wyo.	1240
KFBK	Sacramento, Calif.	1530
KFCB	Redfield, S. Dak.	1380
KFDA	Amarillo, Tex.	1440
KFDF	Van Buren, Ark.	1580
KFDI	Wichita, Kansas	1070
KFDR	Grand Coulee, Wash.	1360
KFEL	Pueblo, Colo.	970
KFEQ	St. Joseph, Mo.	680
KFFA	Helena, Ark.	1360
KFGQ	Boone, Iowa	1260
KFGT	Flagstaff, Ariz.	930
KFH	Wichita, Kans.	1330
KFI	Los Angeles, Calif.	640
KFIF	Tucson, Ariz.	1550
KFIV	Modesto, Calif.	1360
KFIZ	Fond du Lac, Wis.	1450
KFJB	Marshalltown, Iowa	1230
KFJM	Grand Forks, N.Dak	1370
KFJZ	Ft. Worth, Tex.	1270
KFKA	Greeley, Colo.	1310
KFKF	Bellevue, Wash.	1330
KFKU	Lawrence, Kans.	1250
KFLA	Scott City, Kans.	1310
KFLD	Floydada, Tex.	900
KFLI	Mountain Home, Ida.	1240
KFLJ	Walsenburg, Colo.	1380
KFLN	Baker, Mont.	960
KFLW	Klamath Falls, Oreg.	1450
KFLY	Corvallis, Oreg.	1240
KFMB	San Diego, Cal.	760
KFMJ	Tulsa, Okla.	1050
KFML	Denver, Colo.	1390
KFMO	Flat River, Mo.	1240
KFNF	Shenandoah, Iowa	920
KFNV	Ferriday, La.	1600
KFNW	Fargo, N.Dak.	900
KFOR	Lincoln, Nebr.	1240
KFOX	Long Beach, Calif.	1280
KFPW	Ft. Smith, Ark.	1230
KFQD	Anchorage, Alaska	750
KFRA	Franklin, La.	1390
KFRB	Fairbanks, Alaska	900
KFRC	San Francisco, Calif.	610
KFRD	Rosenberg-Richmond, Tex.	980
KFRE	Fresno, Calif.	940
KFRM	Kansas City, Mo.	550
KFRO	Longview, Tex.	1370
KFRU	Columbia, Mo.	1400
KFSA	Ft. Smith, Ark.	950
KFSB	Joplin, Mo.	1310
KFSC	Denver, Colo.	1220
KFST	Ft. Stockton, Tex.	860
KFTM	Ft. Morgan, Colo.	1400
KFTV	Paris, Tex.	1250
KFTW	Fredericktown, Mo.	1450
KFUN	Las Vegas, N.Mex.	1230
KFUO	Clayton, Mo.	850
KFVS	Cape Girardeau, Mo.	960
KFWB	Los Angeles, Calif.	980
KFXD	Nampa, Idaho	580
KFXM	San Bernardino, Calif.	590
KFYN	Bonham, Tex.	1420
KFYO	Lubbock, Tex.	790
KFYR	Bismarck, N.Dak.	550
KGA	Spokane, Wasn.	1510
KGAF	Gainesville, Tex.	1580
KGAK	Gallup, N.Mex.	1330
KGAL	Lebanon, Oreg.	920
KGAR	Vancouver, Wash.	1550
KGAS	Carthage, Tex.	1590
KGAY	Salem, Oreg.	1430
KGB	San Diego, Calif.	1360
KGBC	Galveston, Tex.	1540
KGBS	Los Angeles, Calif.	1020
KGBT	Harlingen, Tex.	1530
KGBX	Springfield, Mo.	1260
KGCA	Rugby, N.D.	1450
KGCL	East Prairie, Mo.	1080
KGCX	Sidney, Mont.	1480
KGDN	Edmonds, Wash.	630
KGEE	Bakersfield, Calif.	1230
KGEK	Sterling, Colo.	1230
KGEM	Boise, Idaho	1140
KGEN	Tulare, Calif.	1370
KGER	Long Beach, Calif.	1390
KGEZ	Kalispell, Mont.	600
KGFF	Shawnee, Okla.	1450
KGFJ	Los Angeles, Calif.	1230
KGFL	Roswell, N.Mex.	1400
KGFW	Kearney, Nebr.	1340
KGFX	Pierre, S.Dak.	630
KGGF	Coffeyville, Kans.	690
KGGM	Albuquerque, N.Mex.	610
KGHL	Billings, Mont.	790
KGHM	Brookfield, Mo.	1470
KGHO	Hoquiam, Wash.	1560
KGHS	International Falls, Minn.	1230
KGHT	Hollister, Calif.	1520
KGIL	San Fernando, Calif.	1260
KGIW	Alamosa, Colo.	1450
KGKB	Tyler, Tex.	1490
KGKL	San Angelo, Tex.	960
KGKO	Benton, Ark.	850
KGLC	Miami, Okla.	910
KGLE	Glendive, Mont.	590
KGLM	Avalon, Calif.	740
KGLN	Glenwood Sprgs., Colo.	980
KGLO	Mason City, Iowa	1300
KGLU	Safford, Ariz.	1480
KGMB	Honolulu, Hawaii	590
KGMC	Englewood, Colo.	1150
KGMI	Bellingham, Wash.	790
KGMO	Cape Girardeau, Mo.	1220
KGMR	Jacksonville, Ark.	1500
KGMS	Sacramento, Calif.	1380
KGMT	Fairbury, Nebr.	1310
KGNB	New Braunfels, Tex.	1420
KGNC	Amarillo, Tex.	710
KGNO	Dodge City, Kans.	1370
KGNU	Santa Clara, Cal.	1430
KGNS	Laredo, Tex.	1390
KGO	San Francisco, Calif.	810
KGOL	Palm Desert, Cal.	1270
KGOS	Torrington, Wyo.	1490
KGPC	Grafton, N.Oak.	1340
KGRB	West Loma, Cal.	900
KGRI	Henderson, Tex.	1000
KGRL	Bend, Oreg.	940
KGRN	Grinnell, Iowa	1410
KGRS	Pasco, Wash.	1340
KGRT	Las Cruces, N.Mex.	570
KGST	Fresno, Calif.	1600
KGTN	Georgetown, Tex.	1530
KGU	Honolulu, Hawaii	760
KGUC	Gunnison, Colo.	1490
KGUD	Santa Barbara, Calif.	990
KGUL	Port Lavaca, Tex.	1560
KGVL	Greenville, Tex.	1400
KGVO	Missoula, Mont.	1290
KGVW	Belgrade, Mont.	630
KGW	Portland, Oreg.	620
KGWA	Enid, Okla.	960
KGY	Olympia, Wash.	1240
KGYN	Guymon, Okla.	1220
KHAI	Honolulu, Hawaii	1090
KHAK	Cedar Rapids, Iowa	1360
KHAL	Homer, La.	1300
KHAP	Aztec, N.M.	1340
KHAR	Anchorage, Alaska	590
KHAS	Hastings, Nebr.	1230
KHAT	Phoenix, Ariz.	1480
KHBM	Monticello, Ark.	1430
KHBR	Hillsboro, Tex.	1560
KHDN	Hardin, Mont.	1230
KHEB	Heber Springs, Ark.	1370
KHEM	Big Springs, Tex.	1270
KHEN	Henryetta, Okla.	1590
KHEP	Phoenix, Ariz.	1280
KHER	Santa Maria, Calif.	1600
KHEY	El Paso, Tex.	690
KHFH	Sierra Vista, Ariz.	1420
KHFI	Austin, Tex.	970
KHHH	Pampa, Tex.	1230
KHIP	Albuquerque, N.M.	1520
KHIT	Walla Walla, Wash.	1320
KHJ	Los Angeles, Calif.	930
KHMO	Hannibal, Mo.	1070
KHOB	Hobbs, N.Mex.	1390
KHOE	Truckee, Calif.	1400
KHOG	Fayetteville, Ark.	1440
KHOS	Tucson, Ariz.	940
KHOT	Madera, Calif.	1250
KHOW	Denver, Colo.	630
KHOZ	Harrison, Ark.	900
KHQ	Spokane, Wash.	590
KHRT	Minot, N. D.	1320
KHSJ	Hemet, Calif.	1320
KHSL	Chico, Calif.	1290
KHUB	Fremont, Nebr.	1340
KHUM	Santa Rosa, Calif.	1580
KHUZ	Borger, Tex.	1490
KHVH	Honolulu, Hawaii	1040
KIBE	Palo Alto, Calif.	1220
KIBH	Seward, Alaska	950
KIBL	Beeville, Tex.	1490
KIBS	Bishop, Calif.	1230
KICA	Clovis, N.M.	980
KICD	Spencer, Iowa	1240
KICK	Springfield, Mo.	1340
KICM	Golden, Colo.	1250
KICO	Calexico, Calif.	1490
KICS	Hastings, Neb.	1550
KICY	Nome, Alaska	850
KIDK	Idaho Falls, Idaho	590
KIDD	Monterey, Calif.	630
KIDO	Boise, Idaho	630
KIEV	Glendale, Calif.	870
KIFG	Iowa Falls, Ia.	1510
KIFN	Phoenix, Ariz.	860
KIFW	Sitka, Alaska	1230
KIGO	St. Anthony, Ida.	1400
KIHN	Hugo, Okla.	1340
KIHR	Hood River, Oreg.	1340
KIJV	Huron, S.Dak.	1340
KIKI	Honolulu, Hawaii	830
KIKK	Pasadena, Tex.	650
KIKO	Miami, Ariz.	1340
KIKS	Sulphur, La.	1310
KILE	Galveston, Tex.	1400
KILO	Grand Forks, S.Dak.	1440
KILT	Houston, Tex.	610
KIMA	Yakima, Wash.	1460
KIMB	Kimball, Nebr.	1260
KIML	Gillette, Wyo.	1490
KIMM	Rapid City, S.D.	1150
KIMN	Denver, Colo.	950
KIMO	Hilo, Hawaii	850
KIMP	Mt. Pleasant, Tex.	960
KINO	Independence, Kans.	1010
KINE	Kingsville, Tex.	1330
KING	Seattle, Wash.	1090
KINO	Winslow, Ariz.	1230
KINS	Eureka, Calif.	980
KINT	El Paso, Tex.	1590
KINY	Juneau, Alaska	800
KIOA	Des Moines, Iowa	940
KIOT	Barstow, Calif.	1310
KIOX	Bay City, Tex.	1270
KIPA	Hilo, Hawaii	1110
KIQS	Willows, Calif.	1560
KIRO	Seattle, Wash.	710
KIRT	Mission, Tex.	1580
KIRV	Fresno, Cal.	1510
KIRX	Kirksville, Mo.	1450
KISO	Sioux Falls, S.Dak.	1230
KISI	Salina, Kan.	910
KISN	Vancouver, Wash.	910
KIST	Santa Barbara, Calif.	1340
KIT	Yakima, Wash.	1280
KITE	San Antonio, Tex.	930
KITI	Chahalis-Centralia, Wash.	1420
KITN	Olympia, Wash.	920
KIUL	Garden City, Kans.	1240
KIUN	Pecos, Tex.	1400
KIUP	Durango, Colo.	930
KIVY	Crockett, Tex.	1290
KIWA	Sheldon, Iowa	1550
KIXI	Seattle, Wash.	910
KIXL	Dallas, Tex.	1040
KIXX	Provo, Utah	1400
KIXZ	Amarillo, Tex.	940
KIZZ	El Paso, Tex.	1150
KJAM	Madison, S.Dak.	1390
KJAN	Atlantic, Iowa	1220
KJAX	Santa Rosa, Calif.	1150
KJAY	Sacramento, Calif.	1430
KJBC	Midland, Tex.	1150
KJCF	Festus, Mo.	1400
KJCK	Junction City, Kans.	1420
KJDY	John Day, Ore.	1400
KJEF	Jennings, La.	1290
KJEM	Oklahoma City, Okla.	800
KJET	Beaumont, Tex.	1380
KJFJ	Webster City, Iowa	1570
KJIM	Ft. Worth, Tex.	870
KJKJ	Flagstaff, Ariz.	1400
KJLT	North Platte, Nebr.	970
KJNO	Juneau, Alaska	630
KJOE	Shreveport, La.	1480
KJOY	Stockton, Calif.	1280
KJPW	Waynesville, Mo.	1390
KJR	Seattle, Wash.	950
KJRG	Newton, Kans.	950
KJSK	Columbus, Nebr.	900
KJWH	Camden, Ark.	1450
KKAL	Denver City, Tex.	1580
KKAM	Pueblo, Colo.	1350
KKAN	Phillipsburg, Kans.	1490
KKAR	Pomona, Calif.	1220
KKAS	Silsbee, Tex.	1300
KKEY	Vancouver, Wash.	1150
KKHI	San Francisco, Calif.	1550
KKIN	Aitkin, Minn.	930
KKIS	Pittsburg, Calif.	990
KKIT	Taos, N.Mex.	1340
KKJO	St. Joseph, Mo.	1550
KKOK	Lompoc, Calif.	1410
KKUB	Brownfield, Tex.	1300
KLAC	Los Angeles, Calif.	570
KLAD	Klamath Falls, Oreg.	960
KLAK	Lakewood, Colo.	1600
KLAM	Cordova, Alaska	1450
KLAN	Lemoore, Calif.	1320
KLAV	Las Vegas, Nev.	1230
KLBK	Lubbock, Tex.	1340
KLBM	La Grande, Oreg.	1450
KLBS	Los Banos, Calif.	1330
KLCB	Libby, Mont.	1230
KLCN	Blytheville, Ark.	910
KLCO	Poteau, Okla.	1280
KLEA	Lovington, N.Mex.	630
KLEB	Golden Meadow, La.	1600
KLEE	Ottumwa, Iowa	1480
KLEI	Kailua, Hawaii	1130
KLEM	LeMars, Iowa	1410
KLEN	Killeen, Tex.	1050
KLEO	Wichita, Kans.	1480
KLER	Orofino, Idaho	950
KLEX	Lexington, Mo.	1570
KLFD	Litchfield, Minn.	1410
KLFF	Mead, Wash.	1590
KLGA	Algona, Iowa	1600
KLGN	Logan, Utah	1390
KLGR	Redwood Falls, Minn.	1490
KLIB	Liberal, Kans.	1470
KLIC	Monroe, La.	1230
KLID	Poplar Bluff, Mo.	1340
KLIF	Dallas, Tex.	1190
KLIK	Jefferson City, Mo.	950
KLIN	Lincoln, Nebr.	1400
KLIP	Fowler, Calif.	1220
KLIQ	Portland, Oreg.	1290
KLIR	Denver, Colo.	990
KLIV	San Jose, Cal.	1590
KLIX	Twin Falls, Idaho	1310
KLIZ	Brainerd, Minn.	1380
KLKC	Parsons, Kans.	1540
KLLA	Leesville, La.	1570
KLLL	Lubbock, Tex.	1460
KLME	Laramie, Wyo.	1490
KLMO	Longmont, Colo.	1060
KLMR	Lamar, Colo.	920
KLMS	Lincoln, Nebr.	1480
KLMX	Clayton, N.Mex.	1450
KLO	Ogden, Utah	1430
KLOA	Ridgecrest, Calif	1240
KLOC	Ceres, Calif.	920
KLOE	Goodland, Kans.	730
KLOG	Kelso, Wash.	1490
KLOH	Pipestone, Minn.	1050
KLOK	San Jose, Calif.	1170
KLOL	Lincoln, Neb.	1530
KLOM	Lompoc, Calif.	1330
KLOO	Corvallis, Ore.	1340
KLOS	Albuquerque, N. M.	1580
KLOU	Lake Charles, La.	1580
KLOW	Loveland, Colo.	1570
KLPL	Lake Providence, La.	1050
KLPM	Minot, N.Oak.	1390
KLPR	Okla. City, Okla.	1140
KLRA	Little Rock, Ark.	1010
KLRS	Mountain Grove, Mo.	1360
KLTF	Little Falls, Minn.	960
KLTI	Macon, Mo.	1560
KLTR	Blackwell, Okla.	1580
KLTZ	Glasgow, Mont.	1240
KLUB	Salt Lake City, Utah	570
KLUC	Las Vegas, Nev.	1050
KLUE	Longview, Tex.	1280
KLUV	Haynesville, La.	1580
KLVI	Beaumont, Tex.	560
KLVL	Pasadena, Tex.	1480
KLVT	Levelland, Tex.	1230
KLWN	Lawrence, Kans.	1320
KLWT	Lebanon, Mo.	1230
KLWW	Cedar Rapids, Iowa	1450
KLYD	Bakersfield, Calif.	1350

C.L.	Location	Kc.
KLYQ	Hamilton, Mont.	980
KLYR	Clarksville, Ark.	1360
KLZ	Denver, Colo.	560
KMA	Shenandoah, Iowa	960
KMAC	San Antonio, Tex.	630
KMAD	Madill, Okla.	1550
KMAK	Fresno, Calif.	1340
KMAM	Butler, Mo.	1530
KMAN	Manhattan, Kans.	1350
KMAQ	Maquoketa, Iowa	1320
KMAR	Winnsboro, La.	1570
KMAS	Shelton, Wash.	1280
KMBC	Kansas City, Mo.	980
KMBL	Junction, Tex.	1450
KMBY	Monterey, Calif.	1240
KMCD	Fairfield, Iowa	1570
KMCL	McCall, Ida.	1240
KMCM	McMinnville, Oreg.	1260
KMCO	Conroe, Tex.	900
KMDO	Ft. Scott, Kans.	1600
KMED	Medford, Oreg.	1440
KMEL	Wenatchee, Wash.	1340
KMEN	San Bernardino, California	1290
KMER	Kemmerer, Wyo.	950
KMHL	Marshall, Minn.	1400
KMHT	Marshall, Tex.	1450
KMIL	Cameron, Tex.	1330
KMIN	Grants, N.M.	980
KMIS	Portageville, Mo.	1050
KMJ	Fresno, Calif.	580
KMLB	Monroe, La.	1440
KMMJ	Grand Island, Nebr.	750
KMMO	Marshall, Mo.	1300
KMNS	Sioux City, Iowa	620
KMO	Tacoma, Wash.	1360
KMON	Great Falls, Mont.	560
KMOP	Tucson, Ariz.	1330
KMOR	Murray, Utah	1230
KMOX	St. Louis, Mo.	1120
KMPC	Los Angeles, Calif.	710
KMPL	Sikeston, Mo.	1520
KMRC	Morgan City, La.	1430
KMRE	Anderson, Cal.	1580
KMRS	Morris, Minn.	1230
KMSL	Ukiah, Calif.	1250
KMUL	Muleshoe, Tex.	1380
KMUS	Muskogee, Okla.	1380
KMVI	Wailuku, Hawaii	550
KMYC	Marysville, Calif.	1410
KNAF	Fredericksburg, Tex.	910
KNAK	Salt Lake City, Utah	1280
KNAL	Victoria, Tex.	1410
KNBA	Vallejo, Calif.	1190
KNBI	Norton, Kan.	1530
KNBR	San Francisco, Cal.	680
KNBY	Newport, Ark.	1280
KNCK	Concordia, Kans.	1390
KNCM	Moberly, Mo.	1230
KNCY	Nebraska City, Nebr.	1600
KNDC	Hettinger, N.Dak.	1490
KNDI	Honolulu, Hawaii	1270
KNDY	Marysville, Kans.	1570
KNEA	Jonesboro, Ark.	970
KNEB	Scottsbluff, Nebr.	960
KNED	McAlester, Okla.	1150
KNEL	Brady, Tex.	1490
KNEM	Nevada, Mo.	1240
KNET	Palestine, Tex.	1450
KNEW	Spokane, Wash.	790
KNEX	McPherson, Kans.	1540
KNEZ	Lompoc, Calif.	980
KNGL	Paradise, Calif.	950
KNGS	Hanford, Calif.	620
KNIA	Knoxville, Iowa	1320
KNIC	Winfield, Kan.	1550
KNIM	Maryville, Mo.	1580
KNIN	Wichita Falls, Tex.	990
KNIT	Abilene, Tex.	1280
KNLV	Ord, Nebr.	1060
KNND	Cottage Grove, Oreg.	1400
KNOC	Natchitoches, La.	1450
KNOE	Monroe, La.	540
KNOG	Nogales, Ariz.	1340
KNOK	Ft. Worth, Tex.	970
KNOP	N. Platte, Nebr.	1410
KNOR	Norman, Okla.	1400
KNOT	Prescott, Ariz.	1450
KNOW	Austin, Tex.	1490
KNOX	Grand Forks, N.Dak.	1310
KNPT	Newport, Ore.	1310
KNUI	Makawao, Hawaii	1310
KNUJ	New Ulm, Minn.	860
KNUZ	Houston, Tex.	1230
KNWC	Sioux Falls, S.D.	1270
KNWS	Waterloo, Iowa	1090
KNX	Los Angeles, Calif.	1070
KOA	Denver, Colo.	850
KOAC	Corvallis, Oreg.	550
KOAD	Lemoore, Calif.	1240
KOAG	Arroyo Grande, Cal.	1280
KOAL	Price, Utah	1230
KOAM	Pittsburg, Kans.	860
KOB	Albuquerque, N.Mex.	770
KOBE	Las Cruces, N.Mex.	1450
KOBH	Hot Springs, S.Dak.	580
KOCA	Kilgore, Tex.	1240
KOCY	Oklahoma City, Okla.	1340
KODA	Houston, Tex.	1010
KODE	Joplin, Mo.	1230
KODI	Cody, Wyo.	1400
KODL	The Dalles, Oreg.	1440
KODY	North Platte, Nebr.	1240
KOEL	Oelwein, Iowa	950
KOFE	Pullman, Wash.	1150
KOFI	Kalispell, Mont.	930
KOFO	Ottawa, Kans.	1220
KOFY	San Mateo, Calif.	1050
KOGA	Ogallala, Nebr.	930
KOGO	San Diego, Calif.	600
KOGT	Orange, Tex.	1600
KOH	Reno, Nev.	630
KOHI	St. Helens, Ore.	1600
KOHO	Honolulu, Hawaii	1170
KOHU	Hermiston, Oreg.	1570
KOIL	Omaha, Nebr.	1290
KOIN	Portland, Oreg.	970
KOJM	Havre, Mont.	610
KOKA	Shreveport, La.	1550
KOKE	Austin, Tex.	1370
KOKL	Okmulgee, Okla.	1240
KOKO	Warrensburg, Mo.	1450
KOKX	Keokuk, Iowa	1310
KOKY	Little Rock, Ark.	1440
KOL	Seattle, Wash.	1300
KOLD	Tucson, Ariz.	1450
KOLE	Port Arthur, Tex.	1340
KOLJ	Quanah, Tex.	1150
KOLM	Rochester, Minn.	1520
KOLO	Reno, Nev.	920
KOLR	Sterling, Colo.	1490
KOLS	Pryor, Okla.	1570
KOLT	Scottsbluff, Nebr.	1320
KOLY	Mobridge, S.Dak.	1300
KOMA	Okla. City, Okla.	1520
KOME	Tulsa, Okla.	1300
KOMO	Seattle, Wash.	1000
KOMW	Omak, Wash.	680
KOMY	Watsonville, Calif.	1340
KONA	Kealakekua, Hawaii	790
KONE	Reno, Nev.	1450
KONG	Visalia, Calif.	1400
KONI	Spanish Fork, Utah	1480
KOND	San Antonio, Tex.	860
KONP	Port Angeles, Wash.	1450
KOOK	Billings, Mont.	970
KOOL	Phoenix, Ariz.	960
KOOO	Omaha, Nebr.	1420
KOOS	Coos Bay, Oreg.	1230
KOPR	Butte, Mont.	550
KOPY	Alice, Tex.	1070
KOQT	Bellingham, Wash.	1550
KORA	Bryan, Tex.	1240
KORC	Mineral Wells, Tex.	1140
KORD	Pasco, Wash.	910
KORE	Eugene, Oreg.	1450
KORK	Las Vegas, Nev.	1340
KORL	Honolulu, Hawaii	650
KORN	Mitchell, S.Dak.	1490
KORT	Grangeville, Idaho	1230
KOSA	Odessa, Tex.	1230
KOSE	Osceola, Ark.	860
KOSG	Panshuska, Okla.	1500
KOSI	Aurora, Colo.	1430
KOSY	Texarkana, Ark.	790
KOTA	Rapid City, S.Dak.	1380
KOTE	Fergus Falls, Minn.	1250
KOTN	Pine Bluff, Ark.	1490
KOTS	Deming, N.M.	1230
KOUR	Independence, Iowa	1220
KOVC	Valley City, N.Dak.	1490
KOVE	Lander, Wyo.	1330
KOVO	Provo, Utah	960
KOWB	Laramie, Wyo.	1290
KOWH	Omaha, Neb.	660
KOWL	Bijou, Calif.	1490
KOWN	Escondido, Calif.	1450
KOXR	Oxnard, Calif.	910
KOY	Phoenix, Ariz.	550
KOYL	Odessa, Tex.	1310
KOYN	Billings, Mont.	910
KOZE	Lewiston, Idaho	1900
KOZI	Chelan, Wash.	1220
KOZY	Grand Rapids, Minn.	1490
KPAC	Port Arthur, Tex.	1250
KPAL	Palm Springs, Calif.	1450
KPAM	Portland, Oreg.	1410
KPAN	Hereford, Tex.	860
KPAS	Banning, Calif.	1490
KPAT	Berkeley, Calif.	1400
KPAY	Chico, Calif.	1060
KPBA	Pine Bluff, Ark.	1590
KPBM	Carlsbad, N.Mex.	740
KPCA	Marked Tree, Ark.	1580
KPCN	Grand Prairie, Tex.	730
KPDN	Pampa, Tex.	1340
KPDQ	Portland, Oreg.	800
KPEG	Spokane, Wash.	1380
KPEL	Lafayette, La.	1420
KPEP	San Angelo, Tex.	1420
KPER	Gilroy, Calif.	1290
KPET	Lamesa, Tex.	690
KPGE	Page, Ariz.	1340
KPHO	Phoenix, Ariz.	910
KPIK	Colorado Sprgs., Colo.	1580
KPIN	Casa Grande, Ariz.	1260
KPIR	Eugene, Wash.	1500
KPLC	Lake Charles, La.	1470
KPLT	Paris, Tex.	1490
KPLY	Crescent City, Calif.	1240
KPMC	Bakersfield, Calif.	1560
KPNG	Port Neches, Tex.	1150
KPOC	Pocahontas, Ark.	1420
KPOD	Crescent City, Calif.	1310
KPOF	Denver, Colo.	910
KPOI	Honolulu, Hawaii	1380
KPOJ	Portland, Oreg.	1330
KPOL	Los Angeles, Calif.	1540
KPOR	Quincy, Wash.	1370
KPOS	Post, Tex.	1370
KPOW	Powell, Wyo.	1260
KPPC	Pasadena, Calif.	1240
KPQ	Wenatchee, Wash.	560
KPRB	Redmond, Oreg.	1240
KPRC	Houston, Tex.	950
KPRK	Livingston, Mont.	1340
KPRL	Paso Robles, Calif.	1230
KPRM	Park Rapids, Minn.	1240
KPRO	Riverside, Calif.	1440
KPRS	Kansas City, Mo.	1590
KPSO	Falfurrias, Tex.	1260
KPST	Preston, Idaho	1340
KPTL	Carson City, Nev.	1300
KPUA	Hilo, Hawaii	970
KPUB	Pueblo, Colo.	1480
KPUG	Bellingham, Wash.	1170
KPUY	Puyallup, Wash.	1450
KQAQ	Austin, Minn.	970
KQCY	Quincy, Calif.	1370
KQEN	Roseburg, Ore.	1240
KQED	Albuquerque, N.Mex.	920
KQIK	Lakeview, Oreg.	1230
KQMS	Redding, Calif.	1400
KQOT	Yakima, Wash.	930
KQRS	Golden Valley, Minn.	1440
KQTE	Missoula, Mont.	1340
KQV	Pittsburgh, Pa.	1410
KQWB	Fargo, N. D.	1550
KQXI	Arvada, Colo.	1550
KQYX	Joplin, Mo.	1560
KRAC	Alamogordo, N.M.	1270
KRAD	E. Grand Forks, Minn.	1590
KRAF	Reedsport, Ore.	1470
KRAI	Craig, Colo.	550
KRAK	Sacramento, Cal.	1140
KRAL	Rawlins, Wyo.	1240
KRAM	Las Vegas, Nev.	920
KRAN	Morton, Tex.	1280
KRAY	Amarillo, Tex.	1360
KRBA	Lufkin, Tex.	1340
KRBC	Abilene, Tex.	1470
KRBI	St. Peter, Minn.	1310
KRBN	Red Lodge, Mont.	1450
KRCB	Council Bluffs, Ia.	1360
KRCK	Ridgecrest, Calif.	1360
KRCO	Prineville, Oreg.	690
KRDD	Roswell, N. M.	1320
KRDG	Redding, Calif.	1230
KRDO	Colo. Springs, Colo.	1240
KRDR	Gresham, Ore.	1230
KRDS	Tolleson, Ariz.	1190
KRDU	Dinuba, Calif.	1240
KREB	Shreveport, La.	980
KREH	Oakdale, La.	900
KREI	Farmington, Mo.	800
KREK	Sapulpa, Okla.	1550
KREL	Corona, Cal.	1370
KREM	Spokane, Wash.	970
KREN	Renton, Wash.	1420
KREO	Indio, Calif.	1400
KREW	Sunnyside, Wash.	1230
KREX	Grand Junc., Colo.	920
KRFO	Owatonna, Minn.	1390
KRFS	Superior, Nebr.	1600
KRGI	Grand Island, Neb.	1430
KRGV	Weslaco, Tex.	1290
KRHD	Duncan, Okla.	1550
KRIB	Mason City, Iowa	1490
KRIG	Odessa, Tex.	1410
KRIH	Rayville, La.	990
KRIK	Roswell N. Mex.	960
KRIO	McAllen, Tex.	910
KRIZ	Phoenix, Ariz.	1230
KRKC	King City, Calif.	1490
KRKO	Los Angeles, Calif.	1150
KRKO	Everett, Wash.	1380
KRKT	Albany, Ore.	990
KRLA	Pasadena, Calif.	1110
KRLC	Lewiston, Ida.-Clarkston, Wash.	1350
KRLD	Dallas, Tex.	1080
KRLN	Canon City, Colo.	1400
KRLW	Walnut Ridge, Ark.	1320
KRMD	Shreveport, La.	1340
KRMG	Tulsa, Okla.	740
KRML	Carmel, Calif.	1410
KRMO	Monett, Mo.	990
KRMS	Osage Beach, Mo.	1150
KRNO	San Bernardino, Calif.	1290
KRNR	Roseburg, Oreg.	1490
KRNS	Burns, Oreg.	1290
KRNT	Des Moines, Iowa	1350
KRNY	Kearney, Nebr.	1460
KROB	Robstown, Tex.	1510
KROC	Rochester, Minn.	1340
KROD	El Paso, Tex.	600
KROE	Sheridan, Wyo.	930
KROF	Abbeville, La.	960
KROP	Brawley, Calif.	1300
KROS	Clinton, Iowa	1340
KROW	Dallas, Ore.	1460
KROX	Crookston, Minn.	1260
KROY	Sacramento, Calif.	1240
KRPL	Moscow, Idaho	1400
KRRR	Ruidoso, N.Mex.	1340
KRRV	Sherman, Tex.	910
KRSA	Alisal, Calif.	1570
KRSC	Othello, Wash.	1400
KRSD	Rapid City, S.Dak.	1340
KRSI	St. Louis Park, Minn.	950
KRSL	Russell, Kans.	990
KRSN	Los Alamos, N.Mex.	1490
KRSY	Roswell, N.Mex.	1230
KRTN	Raton, N.Mex.	1490
KRTR	Thermopolis, Wyo.	1490
KRUN	Ballinger, Tex.	1400
KRUS	Ruston, La.	1490
KRUX	Glendale, Ariz.	1360
KRVC	Ashland, Oreg.	1350
KRVN	Lexington, Nebr.	1010
KRWB	Roseau, Minn.	1410
KRXK	Rexburg, Idaho	1230
KRYS	Corpus Christi, Tex.	1360
KRYT	Colo. Springs, Colo.	1530
KRZE	Farmington, N.M.	1280
KRZY	Albuquerque, N.M.	1580
KSAC	Manhattan, Kans.	580
KSAL	Salina, Kans.	1150
KSAM	Huntsville, Tex.	1490
KSAY	San Francisco, Calif.	1010
KSBW	Salinas, Calif.	1380
KSCB	Liberal, Kans.	600
KSCJ	Sioux City, Iowa	1360
KSCO	Santa Cruz, Calif.	1080
KSD	St. Louis, Mo.	550
KSDN	Aberdeen, S.Dak.	930
KSDO	San Diego, Calif.	1130
KSDR	Waterton, S.Dak.	1480
KSEE	Santa Maria, Calif.	1480
KSEI	Pocatello, Idaho	930
KSEK	Pittsburg, Kans.	1340
KSEL	Lubbock, Tex.	950
KSEM	Moses Lake, Wash.	1470
KSEN	Shelby, Mont.	1150
KSEO	Durant, Okla.	750
KSET	El Paso, Tex.	1340
KSEW	Sitka, Alaska	1400
KSEY	Seymour, Tex.	1230
KSFA	Nacogdoches, Tex.	860
KSFE	Needles, Calif.	1340
KSFO	San Francisco, Calif.	560
KSGM	Ste. Genevieve, Mo.	1340
KSGT	Jackson, Wyo.	1340
KSHA	Medford, Ore.	860
KSIB	Creston, Iowa	1520
KSID	Sidney, Nebr.	1340
KSIG	Crowley, La.	1450
KSIL	Silver City, N.Mex.	1340
KSIM	Sikeston, Mo.	1400
KSIR	Wichita, Kans.	900
KSIS	Sedalia, Mo.	1050
KSIW	Woodward, Okla.	1450
KSIX	Corpus Christi, Tex.	1230
KSJB	Jamestown, N.Dak.	600
KSKI	Sun Valley, Idaho	1340
KSKY	Dallas, Tex.	660
KSL	Salt Lake City, Utah	1160
KSLM	Salem, Oreg.	1390
KSLO	Opelousas, La.	1230
KSLV	Monte Vista, Colo.	1240
KSLY	San Luis Obispo, Cal.	1400
KSMA	Santa Maria, Calif.	1240
KSMM	Shakopee, Minn.	1530
KSMN	Mason City, Iowa	1010
KSMO	Salem, Mo.	1340
KSNN	Pocatello, Ida.	1290
KSNO	Aspen, Colo.	1260
KSNY	Snyder, Tex.	1450
KSO	Des Moines, Iowa	1460
KSOK	Arkansas City, Kans.	1280
KSOL	San Francisco, Cal.	1450
KSON	San Diego, Calif.	1240
KSOO	Sioux Falls, S.Dak.	1140
KSOP	Salt Lake City, Utah	1370
KSOX	Raymondville, Tex.	1240
KSPA	Santa Paula, Calif.	1400
KSPI	Stillwater, Okla.	780
KSPL	Diboll, Tex.	1260
KSPO	Spokane, Wash.	1230
KSPT	Sandpoint, Idaho	1400
KSRA	Salmon, Idaho	960
KSRC	Socorro, N.Mex.	1290
KSRO	Santa Rosa, Calif.	1350
KSRV	Ontario, Oreg.	1380
KSSS	Colorado Springs, Colo.	740
KSST	Sulphur Springs, Tex.	1230
KSTA	Coleman, Tex.	1000
KSTB	Breckenridge, Tex.	1430
KSTL	St. Louis, Mo.	690
KSTN	Stockton, Calif.	1420
KSTP	St. Paul, Minn.	1500
KSTR	Grand Junction, Colo.	620
KSTT	Davenport, Iowa	1170
KSTV	Stephenville, Tex.	1510
KSUB	Cedar City, Utah	590
KSUD	W. Memphis, Ark.	730
KSUE	Susanville, Calif.	1240
KSUM	Fairmont, Minn.	1370
KSUN	Bisbee, Ariz.	1230
KSVC	Richfield, Utah	980
KSVN	Ogden, Utah	730
KSVP	Artesia, N.Mex.	990
KSWA	Graham, Tex.	1330
KSWM	Aurora, Mo.	940
KSWO	Lawton, Okla.	1380
KSXX	Salt Lake City, Utah	630
KSYC	Yreka, Calif.	1490
KSYL	Alexandria, La.	970
KSYX	Santa Rosa, N.Mex.	1420
KTAC	Tacoma, Wash.	850
KTAE	Taylor, Tex.	1260
KTAN	Tucson, Ariz.	580
KTAR	Phoenix, Ariz.	620
KTAT	Frederick, Okla.	1570
KTBB	Tyler, Tex.	600
KTBC	Austin, Tex.	590

WHITE'S RADIO LOG

C.L.	Location	Kc.
KTCB	Malden, Mo.	1470
KTCR	Minneapolis, Minn.	690
KTCS	Fort Smith, Ark.	1410
KTDL	Farmersville, La.	1470
KTDO	Toledo, Oreg.	1230
KTEE	Idaho Falls, Idaho	1260
KTEL	Walla Walla, Wash.	1490
KTEM	Temple, Tex.	1400
KTEO	San Angelo, Tex.	1340
KTER	Terrell, Tex.	1570
KTFI	Twin Falls, Idaho	1270
KTFO	Seminole, Tenn.	1250
KTFS	Texarkana, Tex.	1400
KTHE	Thermopolis, Wyo.	1240
KTHO	Tahoe Valley, Calif.	590
KTHS	Berryville, Ark.	1480
KTHT	Houston, Tex.	790
KTIB	Thibodaux, La.	630
KTIL	Tillamook, Oreg.	1590
KTIM	San Rafael, Calif.	1510
KTIP	Porterville, Calif.	1450
KTIS	Minneapolis, Minn.	900
KTIX	Pendleton, Ore.	1240
KTKN	Ketchikan, Alaska	930
KTKR	Taft, Calif.	1310
KTKT	Tucson, Ariz.	990
KTLD	Tullulah, La.	1360
KTLN	Denver, Colo.	1280
KTLO	Mountain Home, Ark.	1240
KTLQ	Tahlequah, Okla.	1350
KTLU	Rusk, Tex.	1580
KTLW	Texas City, Tex.	920
KTMC	McAlester, Okla.	1400
KTMN	Trumann, Ark.	1530
KTMS	Santa Barbara, Calif.	1250
KTNC	Falls City, Nebr.	1230
KTNM	Tucumcari, N.Mex.	1400
KTNT	Tacoma, Wash.	1400
KTOB	Petaluma, Cal.	1490
KTOC	Jonesboro, La.	920
KTOD	Sinton, Tex.	1590
KTOE	Mankato, Minn.	1420
KTOH	Lihue, Hawaii	1490
KTOK	Oklahoma City, Okla.	1000
KTON	Belton, Tex.	940
KTOO	Henderson, Nev.	1280
KTOP	Topeka, Kans.	1490
KTOT	Big Bear Lake, Cal.	1050
KTOW	Sand Spring, Okla.	1340
KTPA	Prescott, Ark.	1370
KTRB	Modesto, Calif.	860
KTRC	Santa Fe, N.Mex.	1400
KTRE	Lufkin, Tex.	1420
KTRF	Thief River Falls, Minn.	1230
KTRG	Honolulu, Hawaii	990
KTRH	Houston, Tex.	740
KTRI	Sioux City, Iowa	1470
KTRM	Beaumont, Tex.	990
KTRN	Wichita Falls, Tex.	1290
KTRY	Bastrop, La.	730
KTSA	San Antonio, Tex.	550
KTSL	Burnett, Tex.	1340
KTSM	El Paso, Tex.	1380
KTTN	Trenton, Mo.	1600
KTTR	Rolla, Mo.	1490
KTTS	Springfield, Mo.	1400
KTTT	Columbus, Nebr.	1510
KTUC	Tucson, Ariz.	1400
KTUE	Tulia, Tex.	1260
KTUI	Sullivan, Mo.	1560
KTW	Seattle, Wash.	1250
KTWO	Casper, Wyo.	1470
KTXJ	Jasper, Tex.	1350
KTXO	Sherman, Tex.	1500
KTYM	Inglewood, Calif.	1460
KUAI	Eleele, Kanai, Hawaii	720
KUAM	Agana, Guam	610
KUBA	Yuba City, Calif.	1600
KUBC	Montrose, Colo.	580
KUBO	San Antonio, Tex.	1310
KUDE	Oceanside, Calif.	1320
KUDI	Great Falls, Mont.	1450
KUDL	Fairway, Kan.	1380
KUDU	Ventura, Calif.	1590
KUDY	Spokane, Wash.	1280
KUEN	Wenatchee, Wash.	900
KUEQ	Phoenix, Ariz.	740
KUGN	Eugene, Oreg.	590
KUIK	Hillsboro, Oreg.	1360
KUJ	Walla Walla, Wash.	1420
KUKA	San Antonio, Tex.	1250
KUKI	Ukiah, Calif.	1400
KUKU	Willow Springs, Mo.	1330
KULA	Honolulu, Hawaii	690
KULE	Ephrata, Wash.	730
KULP	El Campo, Tex.	1390
KULY	Ulysses, Kan.	1420
KUMA	Pendleton, Oreg.	1290
KUNO	Corpus Christi, Tex.	1400
KUOA	Siloam Springs, Ark.	1290
KUOM	Minneapolis, Minn.	770
KUPD	Tempe, Ariz.	1060
KUPI	Idaho Falls, Idaho	980
KUPK	Garden City, Kan.	1050
KURA	Moab, Utah	1450
KURL	Billings, Mont.	730
KURV	Edinburg, Tex.	710
KURY	Brookings, Oreg.	910
KUSD	Vermillion, S.Dak.	890
KUSH	Cushing, Okla.	1600
KUSN	St. Joseph, Mo.	1270
KUTA	Blanding, Utah	790
KUTI	Yakima, Wash.	980
KUTY	Palmdale, Calif.	1470
KUVR	Holdredge, Nebr.	1380
KUXL	Golden Valley, Minn.	1570
KUZN	W. Monroe, La.	1310
KUZZ	Bakersfield, Calif.	800
KVAL	Sauk Rapids, Minn.	800
KVAN	Camas, Wash.	1480
KVAS	Astoria, Ore.	1230
KVBR	Brainerd, Minn.	1340
KVCK	Wolf Point, Nebr.	1450
KVCL	Winnfield, La.	1270
KVCV	Redding, Calif.	600
KVEC	San Luis Obispo, Calif.	920
KVEE	Conway, Ark.	1330
KVEG	Las Vegas, Nev.	970
KVEL	Vernal, Utah	1250
KVEN	Ventura, Calif.	1450
KVET	Austin, Tex.	1300
KVFC	Cortez, Colo.	740
KVFD	Ft. Dodge, Iowa	1400
KVGB	Great Bend, Kans.	1590
KVI	Seattle, Wash.	570
KVIC	Victoria, Tex.	1340
KVIL	Highland Park, Tex.	1150
KVIM	New Iberia, La.	1360
KVIN	Vinita, Okla.	1470
KVIO	Cottonwood, Ariz.	1600
KVIP	Redding, Calif.	540
KVKM	Monahans, Tex.	1330
KVLB	Cleveland, Tex.	1410
KVLC	Little Rock, Ark.	1050
KVLF	Alpine, Tex.	1240
KVLG	LaGrange, Tex.	1570
KVLH	Pauls Valley, Okla.	1470
KVLL	Livingston, Tex.	1220
KVLV	Fallon, Nev.	980
KVMA	Magnolia, Ark	890
KVMC	Colorado City, Tex.	1320
KVML	Sonora, Calif.	1450
KVNC	Winslow, Ariz.	1010
KVNI	Coeur d'Alene, Idaho	1240
KVNU	Logan, Utah	610
KVOB	Bastrop, La.	1340
KVOC	Casper, Wyo.	1230
KVOD	Albuquerque, N. Mex.	730
KVOE	Emporia, Kans.	1400
KVOG	Ogden, Utah	1490
KVOL	Lafayette, La.	1330
KVOM	Morrilton, Ark.	800
KVON	Napa, Calif.	1440
KVOO	Tulsa, Okla.	1170
KVOP	Plainview, Tex.	1400
KVOR	Colo. Springs, Colo.	1300
KVOU	Uvalde, Tex.	1400
KVOW	Riverton, Wyo.	1450
KVOX	Moorhead, Minn.	1280
KVOY	Yuma, Ariz.	1400
KVOZ	Laredo, Tex.	1490
KVPI	Ville Platte, La.	1050
KVRC	Arkadelphia, Ark.	1240
KVRD	Cottonwood, Ariz.	1240
KVRE	Santa Rosa, Calif.	1460
KVRH	Salida, Colo.	1340
KVRS	Rock Springs, Wyo.	1360
KVSA	McGehee, Ark.	1220
KVSF	Santa Fe, N.Mex.	1260
KVSH	Valentine, Nebr.	940
KVSI	Montpelier, Ida.	1450
KVSO	Ardmore, Okla.	1240
KVWC	Vernon, Tex.	1490
KVWG	Pearsall, Tex.	1280
KVWM	Show Low, Ariz.	970
KVWO	Cheyenne, Wyo.	1370
KVYL	Holdenville, Okla.	1370
KWAC	Bakersfield, Calif.	1490
KWAD	Wadena, Minn.	920
KWAK	Stuttgart, Ark.	1240
KWAL	Wallace, Idaho	620
KWAM	Memphis, Tenn.	990
KWAT	Watertown, S.Dak.	950
KWAY	Forest Grove, Oreg.	1570
KWBA	Baytown, Tex.	1360
KWBB	Wichita, Kans.	1410
KWBC	Navasota, Tex.	1550
KWBE	Beatrice, Nebr.	1450
KWBG	Boone, Iowa	1590
KWBW	Hutchinson, Kans.	1450
KWCB	Searcy, Ark.	1300
KWCL	Oak Grove, La.	1280
KWCO	Chickasha, Okla.	1560
KWEB	Rochester, Minn.	1270
KWED	Seguin, Tex.	1580
KWEI	Weiser, Idaho	1260
KWEL	Midland, Tex.	1440
KWEW	Hobbs, N.Mex.	1480
KWFA	Merkle, Tex.	1500
KWFR	San Angelo, Tex.	1260
KWFS	Eugene, Oreg.	1540
KWFT	Wichita Falls, Tex.	620
KWG	Stockton, Calif.	1230
KWHI	Brenham, Tex.	1280
KWHK	Hutchinson, Kans.	1260
KWHN	Fort Smith, Ark.	1320
KWHO	Salt Lake City, Utah	860
KWHW	Altus, Okla.	1450
KWIC	Salt Lake City, Utah	1550
KWIK	Pocatello, Idaho	1240
KWIL	Albany, Oreg.	790
KWIN	Ashland, Oreg.	580
KWIP	Merced, Calif.	1580
KWIQ	Moses Lake, Wash.	1260
KWIV	Douglas, Wyo.	1050
KWIZ	Santa Ana, Calif.	1480
KWJJ	Portland, Oreg.	1080
KWK	St. Louis, Mo.	1380
KWKC	Abilene, Tex.	1340
KWKH	Shreveport, La.	1130
KWKW	Pasadena, Calif.	1300
KWKY	Des Moines, Iowa	1150
KWLA	Many, La.	1530
KWLC	Decorah, Iowa	1240
KWLG	Wagoner, Okla.	1530
KWLM	Willmar, Minn.	1340
KWMT	Ft. Dodge, Iowa	540
KWNA	Winnemucca, Nev.	1400
KWNO	Winona, Minn.	1230
KWNS	Pratt, Kans.	1290
KWNT	Davenport, Iowa	1580
KWOA	Worthington, Minn.	730
KWOC	Poplar Bluff, Mo.	930
KWOE	Clinton, Okla.	1320
KWON	Bartlesville, Okla.	1400
KWOR	Worland, Wyo.	1340
KWOS	Jefferson City, Mo.	1240
KWOW	Pomona, Calif.	1600
KWPC	Muscatine, Iowa	860
KWPM	West Plains, Mo.	1450
KWPR	Claremore, Okla.	1270
KWRC	Woodburn, Ore.	940
KWRD	Henderson, Tex.	1470
KWRE	Warrenton, Mo.	730
KWRF	Warren, Ark.	860
KWRG	New Roods, La.	1500
KWRO	Coquille, Oreg.	630
KWRT	Boonville, Mo.	1370
KWRV	McCook, Nebr.	1360
KWRW	Guthrie, Okla.	1490
KWSC	Pullman, Wash.	1250
KWSD	Mt. Shasta, Calif.	620
KWSH	Wewoka-Seminole, Oklahoma	1260
KWSL	Grand Junction, Colo.	1340
KWSO	Wasco, Calif.	1050
KWTC	Barstow, Calif.	1230
KWTO	Springfield, Mo.	560
KWTX	Waco, Tex.	1230
KWUN	Concord, Cal.	1480
KWVR	Enterprise, Oreg.	1340
KWVY	Waverly, Iowa	1470
KWWL	Waterloo, Iowa	1330
KWXY	Cathedral City, Cal.	1340
KWYK	Farmington, N.Mex.	960
KWYN	Wynne, Ark.	1400
KWYO	Sheridan, Wyo.	1410
KWYR	Winner, S.Dak.	1260
KWYZ	Everett, Wash.	1230
KXA	Seattle, Wash.	770
KXAR	Hope, Ark.	1490
KXEL	Waterloo, Iowa	1540
KXEN	Festus-St. Louis, Mo.	1010
KXEO	Mexico, Mo.	1340
KXEW	Tucson, Ariz.	1600
KXEX	Fresno, Calif.	1550
KXGI	Ft. Madison, Iowa	1360
KXGN	Glendive, Mont.	1400
KXGO	Fargo, N. Dak.	790
KXIC	Iowa City, Iowa	800
KXIT	Dalhart, Tex.	1410
KXIV	Phoenix, Ariz.	1400
KXJK	Forrest City, Ark.	950
KXKW	Lafayette, La.	1520
KXL	Portland, Oreg.	750
KXLE	Ellensburg, Wash.	1240
KXLF	Butte, Mont.	1370
KXLJ	Helena, Mont.	1240
KXLL	Missoula, Mont.	1450
KXLO	Lewiston, Mont.	1230
KXLR	Little Rock, Ark.	1150
KXLW	Clayton, Mo.	1320
KXLY	Spokane, Wash.	920
KXO	El Centro, Calif.	1230
KXOA	Sacramento, Calif.	1470
KXOK	St. Louis, Mo.	630
KXOL	Ft. Worth, Tex.	1360
KXOX	Sweetwater, Tex.	1240
KXRA	Alexandria, Minn.	1490
KXRJ	Russellville, Ark.	1490
KXRO	Aberdeen, Wash.	1320
KXRX	San Jose, Calif.	1500
KXXL	Bozeman, Mont.	1450
KXXX	Colby, Kans.	790
KXYZ	Houston, Tex.	1320
KYA	San Francisco, Calif.	1260
KYAC	Kirkland, Wash.	1460
KYAL	McKinney, Tex.	1600
KYCA	Prescott, Ariz.	1490
KYCN	Wheatland, Wyo.	1340
KYED	Burlington, La.	1150
KYES	Roseburg, Oreg.	950
KTET	Payette, Idaho	1450
KYJC	Medford, Oreg.	1230
KYME	Boise, Idaho	740
KYMN	Oregon City, Ore.	1520
KYND	Tempe, Ariz.	1580
KYNG	Coos Bay, Oreg.	1420
KYNO	Fresno, Calif.	1300
KYNT	Yankton, S.Dak.	1450
KYOK	Houston, Tex.	1590
KYOR	Blythe, Calif.	1450
KYOS	Merced, Calif.	1480
KYOU	Greeley, Colo.	1450
KYRO	Potosi, Mo.	1280
KYSM	Mankato, Minn.	1230
KYSN	Colorado Sprgs., Colo.	1460
KYSS	Missoula, Mont.	910
KYUM	Yuma, Ariz.	560
KYVA	Gallup, N.Mex.	1230
KYW	Philadelphia, Pa.	1060
KZEE	Weatherford, Tex.	1220
KZEY	Tyler, Tex.	690
KZIP	Amarillo, Tex.	1310
KZIX	Fort Collins, Colo.	600
KZNG	Hot Springs, Ark.	1470
KZDE	Princeton, Ill.	1490
KZOL	Farwell, Tex.	1570
KZOO	Honolulu, Hawaii	1210
KZOT	Marianna, Ark.	1460
KZOW	Globe, Ariz.	1240
KZUN	Opportunity, Wash.	630
KZYM	Cape Girardeau, Mo.	1220
KZZN	Littlefield, Tex.	1490
VOUS	Argentia, Nfld.	1480
WAAA	Winston-Salem, N.C.	980
WAAB	Worcester, Mass.	1440
WAAC	Terre Haute, Ind.	1300
WAAF	Chicago, Ill.	950
WAAG	Adel, Ga.	1470
WAAK	Dallas, N.C.	960
WAAM	Ann Arbor, Mich.	1600
WAAT	Trenton, N.J.	1300
WAAX	Gadsden, Ala.	570
WAAY	Huntsville, Ala.	1550
WABA	Aguadilla, P.Rico	850
WABB	Mobile, Ala.	1480
WABC	New York, N.Y.	770
WABD	Ft. Campbell, Ky.	1370
WABF	Fairhope, Ala.	1220
WABG	Greenwood, Miss.	960
WABH	Deerfield, Va.	1150
WABI	Bangor, Maine	910
WABJ	Adrian, Mich.	1490
WABL	Amite, La.	1570
WABO	Waynesboro, Miss.	990
WABQ	Cleveland, Ohio	1540
WABR	Winter Park, Fla.	1440
WABT	Tuskegee, Ala.	580
WABV	Abbeville, S.C.	1590
WABY	Albany, N.Y.	1400
WABZ	Albemarle, N.C.	1010
WACA	Camden, S.C.	1590
WACB	Kittanning, Pa.	1380
WACE	Chicopee, Mass.	730
WACI	The Dalles, Ore.	1300
WACK	Newark, N.Y.	1420
WACL	Waycross, Ga.	570
WACO	Waco, Tex.	1460
WACR	Columbus, Miss.	1050
WACT	Tuscaloosa, Ala.	1420
WACY	Moss Point, Miss.	1460
WADA	Shelby, N.C.	1390
WADE	Wadesboro, N.C.	1210
WADK	Newport, R.I.	1540
WADM	Decatur, Ind.	1540
WADO	New York, N.Y.	1280
WADS	Ansonia, Conn.	690
WAEB	Allentown, Pa.	790
WAEL	Mayaguez, P.Rico	600
WAEW	Crossville, Tenn.	1330
WAFG	Staunton, Va.	900
WAFS	Amsterdam, N.Y.	1570
WAGC	Centre, Ala.	1550
WAGE	Leesburg, Va.	1290
WAGF	Dothan, Ala.	1320
WAGG	Franklin, Tenn.	950
WAGL	Lancaster, S. C.	1550
WAGM	Presque Isle, Maine	950
WAGN	Menominee, Mich.	1340
WAGR	Lumberton, N.C.	580
WAGS	Bishopville, S.C.	1380
WAGY	Forest City, N.C.	1320
WAIA	College Park, Ga.	1570
WAIK	Galesburg, Ill.	1590
WAIL	Baton Rouge, La.	1460
WAIM	Anderson, S.C.	1230
WAIN	Columbia, Ky.	1270
WAIR	Winston-Salem, N.C.	1340
WAIT	Chicago, Ill.	820
WAJF	Decatur, Ala.	1490
WAJR	Morgantown, W.Va.	1440
WAKI	McMinnville, Tenn.	1230
WAKN	Aiken, S.C.	990
WAKO	Lawrenceville, Ill.	910
WAKR	Akron, Ohio	1590
WAKY	Louisville, Ky.	790
WALD	Walterboro, S.C.	1220
WALE	Fall River, Mass.	1400
WALG	Albany, Ga.	1590
WALK	Patchogue, N.Y.	1370
WALL	Middletown, N.Y.	1340
WALM	Albion, Mich.	1260
WALO	Humacao, P.R.	1240
WALT	Tampa, Fla.	1110
WALY	Herkimer, N.Y.	1420
WAMD	Aberdeen, Md.	970
WAME	Miami, Fla.	1260
WAMI	Opp, Ala.	860

C.L.	Location	Kc.
WAML	Laurel, Miss.	1340
WAMM	Flint, Mich.	1420
WAMO	Homestead, Pa.	860
WAMR	Venice, Fla.	1320
WAMS	Wilmington, Del.	1380
WAMW	Washington, Ind.	1580
WAMY	Amory, Miss.	1580
WANA	Anniston, Ala.	1490
WANB	Waynesburg, Pa.	1580
WANN	Annapolis, Md.	1190
WANS	Anderson, S.C.	1280
WANT	Richmond, Va.	990
WANV	Waynesboro, Va.	970
WANY	Albany, Ky.	1390
WAOK	Atlanta, Ga.	1380
WAOP	Ostego, Mich.	980
WAOV	Vincennes, Ind.	1450
WAPA	San Juan, P.R.	680
WAPC	Riverhead, N.Y.	1570
WAPE	Jacksonville, Fla.	690
WAPF	McComb, Miss.	980
WAPG	Arcadia, Fla.	1480
WAPI	Birmingham, Ala.	1070
WAPL	Appleton, Wis.	1570
WAPO	Chattanooga, Tenn.	1150
WAPX	Montgomery, Ala.	1600
WAQE	Towson, Md.	1570
WAQI	Ashtabula, Ohio	1600
WAQY	Birmingham, Ala.	1220
WARA	Attleboro, Mass.	1320
WARB	Covington, La.	730
WARD	Johnstown, Pa.	1490
WARE	Ware, Mass.	1250
WARF	Jasper, Ala.	1240
WARI	Abbeville, Ala.	1480
WARK	Hagerstown, Md.	1490
WARM	Scranton, Pa.	590
WARN	Ft. Pierce, Fla.	1330
WARO	Canonsburg, Pa.	540
WART	Moulton, Ala.	1530
WARU	Peru, Ind.	1600
WASA	Havre de Grace, Md.	1330
WASC	Spartanburg, S.C.	1530
WASK	Lafayette, Ind.	1450
WATA	Boone, N.C.	1450
WATC	Gaylord, Mich.	900
WATE	Knoxville, Tenn.	620
WATH	Athens, Ohio	970
WATI	Indianapolis, Ind.	810
WATK	Antigo, Wis.	900
WATM	Atmore, Ala.	1590
WATN	Watertown, N.Y.	1240
WATO	Oak Ridge, Tenn.	1290
WATP	Marion, S.C.	1490
WATR	Waterbury, Conn.	1320
WATS	Sayre, Pa.	960
WATT	Cadillac, Mich.	1240
WATV	Birmingham, Ala.	900
WATW	Ashland, Wis.	1400
WATY	N. Atlanta, Ga.	680
WATZ	Altoona, Mich.	1450
WAUB	Auburn, N.Y.	1590
WAUC	Wauchula, Fla.	1310
WAUD	Auburn, Ala.	1230
WAUG	Augusta, Ga.	1050
WAUK	Waukesha, Wis.	1510
WAVA	Arlington, Va.	780
WAVE	Louisville, Ky.	970
WAVI	Dayton, Ohio	1210
WAVL	Apollo, Pa.	910
WAVN	Stillwater, Minn.	1220
WAVO	Avondale Estates, Ga.	1420
WAVP	Avon Park, Fla.	1390
WAVU	Albertville, Ala.	630
WAVY	Portsmouth, Va.	1350
WAVZ	New Haven, Conn.	1300
WAWA	West Allis, Wis.	1590
WAWK	Kendallville, Ind.	1570
WAWZ	Zarephath, N.J.	1380
WAXE	Vero Beach, Fla.	1370
WAXK	Superior, Wis.	1320
WAXU	Georgetown, Ky.	1580
WAXX	Chippewa Falls, Wis.	1150
WAYB	Waynesboro, Va.	1490
WAYE	Baltimore, Md.	860
WAYK	Valparaiso, Ind.	1500
WAYN	Rockingham, N.C.	900
WAYR	Orange Park, Fla.	550
WAYS	Charlotte, N.C.	610
WAYX	Waycross, Ga.	1230
WAYZ	Waynesboro, Pa.	1380
WAZA	Bainbridge, Ga.	1360
WAZE	Clearwater, Fla.	860
WAZF	Yazoo City, Miss.	1230
WAZL	Hazelton, Pa.	1490
WAZS	Summerville, S.C.	780
WAZY	Lafayette, Ind.	1410
WBAA	West Lafayette, Ind.	920
WBAB	Babylon, N.Y.	1440
WBAC	Cleveland, Tenn.	1340
WBAG	Burlington, N.C.	1150
WBAL	Baltimore, Md.	1090
WBAM	Montgomery, Ala.	740
WBAP	Fort Worth, Tex.	570 & 820
WBAR	Bartow, Fla.	1460
WBAT	Marion, Ind.	1400
WBAW	Barnwell, S.C.	740
WBAX	Wilkes-Barre, Pa.	1240
WBAY	Green Bay, Wis.	1360
WBAZ	Kingston, N.Y.	1550
WBBA	Pittsfield, Ill.	1580
WBBB	Burlington, N.C.	920
WBBF	Rochester, N.Y.	950
WBBI	Abingdon, Va.	1230
WBBK	Blakely, Ga.	1260
WBBL	Richmond, Va.	1480
WBBM	Chicago, Ill.	780
WBBO	Forest City, N.C.	780
WBBQ	Augusta, Ga.	1340
WBBR	Travelers Rest, S.C.	1580
WBBT	Lyons, Ga.	1340
WBBW	Youngstown, Ohio	1240
WBBX	Portsmouth, N.H.	1380
WBBZ	Ponca City, Okla.	1230
WBCA	Bay Minette, Ala.	1150
WBCB	Levittown, Pa.	1490
WBCH	Hastings, Mich.	1220
WBCI	Williamsburg, Va.	740
WBCK	Battle Creek, Mich.	930
WBCM	Bay City, Mich.	1440
WBCO	Bucyrus, Ohio	1540
WBCU	Union, S.C.	1460
WBEC	Pittsfield, Mass.	1420
WBEE	Harvey, Ill.	1570
WBEJ	Elizabethton, Tenn.	1240
WBEL	Beloit, Wis.	1380
WBEN	Buffalo, N.Y.	930
WBER	Moncks Corner, S. C.	950
WBET	Brockton, Mass.	1460
WBEU	Beaufort, S.C.	960
WBEV	Beaver Dam, Wis.	1430
WBEX	Chillicothe, Ohio	1490
WBFD	Bedford, Pa.	1310
WBFJ	Woodbury, Tenn.	1540
WBGC	Chipley, Fla.	1240
WBGN	Bowling Green, Ky.	1340
WBGS	Slidell, La.	1560
WBHB	Fitzgerald, Ga.	1240
WBHC	Hampton, S.C.	1270
WBHF	Cartersville, Ga.	1450
WBHM	Birmingham, Ala.	1550
WBHP	Huntsville, Ala.	1230
WBHT	Brownsville, Tenn.	1520
WBIA	Augusta, Ga.	1230
WBIB	Centreville, Ala.	1590
WBIC	Islip, N.Y.	540
WBIE	Marietta, Ga.	1080
WBIG	Greensboro, N.C.	1470
WBIL	Leesburg, Fla.	1410
WBIP	Booneville, Miss.	1400
WBIR	Knoxville, Tenn.	1240
WBIS	Bristol, Conn.	1440
WBIW	Bedford, Ind.	1340
WBIX	Jacksonville Beach, Fla.	1010
WBIZ	Eau Claire, Wis.	1400
WBKH	Hattiesburg, Miss.	950
WBKN	Newton, Miss.	1410
WBKV	West Bend, Wis.	1470
WBLA	Elizabethtown, N.C.	1440
WBLC	Lenoir City, Tenn.	1360
WBLE	Batesville, Miss.	1290
WBLF	Bellefonte, Pa.	1330
WBLG	Lexington, Ky.	1300
WBLJ	Dalton, Ga.	1230
WBLO	Evergreen, Ala.	1470
WBLR	Batesburg, S.C.	1430
WBLT	Bedford, Va.	1350
WBLU	Salem, Va.	1480
WBLY	Springfield, Ohio	1600
WBMA	Beaufort, N.C.	1400
WBMC	McMinnville, Tenn.	960
WBMD	Baltimore, Md.	750
WBME	Belfast, Me.	1230
WBMK	West Point, Ga.	1310
WBML	Macon, Ga.	1240
WBMT	Black Mountain, N.C.	1350
WBNB	Charlotte Amalie, Virgin Islands	1000
WBNC	Conway, N.H.	1050
WBNL	Boonville, Ind.	1540
WBNO	Bryan, Ohio	1520
WBNR	Beacon, N.Y.	1260
WBNS	Columbus, Ohio	1460
WBNT	Oneida, Tenn.	1310
WBNX	New York, N.Y.	1380
WBOB	Galax, Va.	1360
WBOC	Salisbury, Md.	960
WBOK	New Orleans, La.	800
WBOL	Bolivar, Tenn.	1560
WBOP	Pensacola, Fla.	980
WBOS	Brookline, Mass.	1600
WBOW	Terre Haute, Ind.	1230
WBOX	Bogalusa, La.	920
WBOY	Clarksburg, W.Va.	1400
WBPR	Bayamon, P.R.	1600
WBPZ	Lock Haven, Pa.	1230
WBRB	Mt. Clemens, Mich.	1430
WBRC	Birmingham, Ala.	960
WBRD	Bradenton, Fla.	1420
WBRE	Wilkes-Barre, Pa.	1340
WBRG	Lynchburg, Va.	1050
WBRI	Indianapolis, Ind.	1500
WBRJ	Marietta, O.	910
WBRK	Pittsfield, Mass.	1340
WBRL	Berlin, N.H.	1400
WBRM	Marion, N.C.	1250
WBRN	Big Rapids, Mich.	1460
WBRT	Bardstown, Ky.	1320
WBRO	Waynesboro, Ga.	1310
WBRV	Boonville, N.Y.	900
WBRW	Brewster, N.Y.	1510
WBRX	Berwick, Pa.	1280
WBRY	Waterbury, Conn.	1590
WBSA	Boaz, Ala.	1300
WBSC	Bennetsville, S.C.	1550
WBSG	Blackshear, Ga.	1350
WBSM	New Bedford, Mass.	1420
WBSR	Pensacola, Fla.	1540
WBT	Charlotte, N.C.	1110
WBTA	Batavia, N.Y.	1490
WBTC	Uhrichsville, O.	1540
WBTH	Williamson, W.Va.	1400
WBTM	Danville, Va.	1330
WBTN	Bennington, Vt.	1370
WBTO	Linton, Ind.	1600
WBTS	Bridgeport, Ala.	1480
WBUC	Buckhannon, W.Va.	1460
WBUD	Trenton, N.J.	1260
WBUG	Ridgeland, S.C.	1430
WBUT	Butler, Pa.	1050
WBUX	Doylestown, Pa.	1570
WBUY	Lexington, N.C.	1440
WBUZ	Fredonia, N.Y.	1570
WBVL	Barbourville, Ky.	950
WBVM	Utica, N.Y.	1550
WBVP	Beaver Falls, Pa.	1230
WBYE	Calera, Ala.	1370
WBYG	Savannah, Ga.	1450
WBYS	Canton, Ill.	1560
WBZ	Boston, Mass.	1030
WBZA	Glens Falls, N.Y.	1410
WBZB	Selma, N.C.	1090
WBZE	Wheeling, W. Va.	1470
WBZY	Torrington, Conn.	990
WCAI	Fort Myers, Fla.	1350
WCAL	Northfield, Minn.	770
WCAM	Camden, N.J.	1310
WCAO	Baltimore, Md.	600
WCAP	Lowell, Mass.	980
WCAR	Detroit, Mich.	1130
WCAT	Orange, Mass.	1390
WCAU	Philadelphia, Pa.	1210
WCAW	Charleston, W.Va.	680
WCAY	Cayce, S.C.	620
WCAZ	Carthage, Ill.	990
WCBA	Corning, N.Y.	1350
WCBG	Chambersburg, Pa.	1590
WCBI	Columbus, Miss.	550
WCBL	Benton, Ky.	1290
WCBM	Baltimore, Md.	680
WCBS	New York, N.Y.	880
WCBT	Roanoke Rapids, N.C.	1230
WCBY	Cheboygan, Mich.	1240
WCCC	Hartford, Conn.	1290
WCCF	Punta Gorda, Fla.	1580
WCCM	Lawrence, Mass.	800
WCCN	Neillsville, Wis.	1370
WCCO	Minneapolis-St. Paul, Minn.	830
WCCW	Traverse City, Mich.	1310
WCDJ	Edenton, N.C.	1260
WCDL	Carbondale, Pa.	1440
WCDS	Glasgow, Ky.	1440
WCDT	Winchester, Tenn.	1340
WCEC	Rocky Mount, N.C.	810
WCED	DuBois, Pa.	1420
WCEF	Parksburg, W.Va.	1050
WCEH	Hawkinsville, Ga.	610
WCEM	Cambridge, Md.	1240
WCEN	Mt. Pleasant, Mich.	1150
WCER	Charlotte, Mich.	1390
WCFL	Chicago, Ill.	1000
WCFR	Springfield, Vt.	1480
WCFV	Clifton Forge, Va.	1230
WCGA	Calhoun, Ga.	900
WCGC	Belmont, N.C.	1270
WCGO	Chicago Hghts., Ill.	1600
WCGR	Canandaigua, N.Y.	1550
WCHA	Chambersburg, Pa.	800
WCHB	Inkster, Mich.	1440
WCHE	Westchester, Pa.	1520
WCHI	Chillicothe, Ohio	1350
WCHJ	Brookhaven, Miss.	1470
WCHK	Canton, Ga.	1290
WCHL	Chapel Hill, N.C.	1360
WCHN	Norwich, N.Y.	970
WCHD	Washington Court House, Ohio	1250
WCHS	Charleston, W.Va.	580
WCHV	Charlottesville, Va.	1260
WCIL	Carbondale, Ill.	1020
WCIN	Cincinnati, Ohio	1480
WCIT	Lima, Ohio	940
WCJU	Columbia, Miss.	1450
WCKB	Dunn, N.C.	780
WCKD	Ishpenning, Mich.	970
WCKI	Greer, S.C.	1300
WCKM	Winnsboro, S.C.	1250
WCKY	Cincinnati, Ohio	1530
WCLA	Claxton, Ga.	1470
WCLB	Camilla, Ga.	1220
WCLC	Jamestown, Tenn.	1260
WCLD	Cleveland, Miss.	1490
WCLE	Cleveland, Tenn.	1570
WCLG	Morgantown, W.Va.	1300
WCLI	Corning, N.Y.	1450
WCLO	Janesville, Wis.	1230
WCLR	Crystal Lake, Ill.	850
WCLS	Columbus, Ga.	1580
WCLT	Newark, Ohio	1430
WCLU	Covington, Ky.	1320
WCLW	Mansfield, Ohio	1570
WCMA	Corinth, Miss.	1230
WCMB	Harrisburg, Pa.	1460
WCMC	Wildwood, N.J.	1230
WCME	Brunswick, Maine	900
WCMI	Ashland, Ky.	1340
WCMN	Arecibo, P.R.	1280
WCMP	Pine City, Minn.	1350
WCMR	Elkhart, Ind.	1270
WCMS	Norfolk, Va.	1050
WCMT	Martin, Tenn.	1410
WCMY	Ottawa, Ill.	1430
WCNB	Connersville, Ind.	1580
WCNC	Elizabeth City, N.C.	1240
WCND	Shelbyville, Ky.	940
WCNF	Weldon, N.C.	1400
WCNH	Quincy, Fla.	1230
WCNL	Newport, N. H.	1010
WCNR	Bloomsburg, Pa.	930
WCNS	Canton, O.	900
WCNT	Centralia, Ill.	1210
WCNU	Crestview, Fla.	1010
WCNW	Hamilton, O.	1560
WCNX	Middletown, Conn.	1150
WCOA	Pensacola, Fla.	1370
WCOC	Meridian, Miss.	910
WCOF	Immokalee, Fla.	1490
WCOG	Greensboro, N.C.	1320
WCOH	Newnan, Ga.	1400
WCOJ	Coatesville, Pa.	1420
WCOL	Columbus, Ohio	1230
WCON	Cornelia, Ga.	1450
WCOP	Boston, Mass.	1150
WCOR	Lebanon, Tenn.	900
WCOS	Columbia, S.C.	1400
WCOU	Lewiston, Maine	1240
WCOV	Montgomery, Ala.	1170
WCOW	Sparta, Wis.	1290
WCOY	Columbia, Pa.	1580
WCPA	Clearfield, Pa.	900
WCPC	Houston, Miss.	940
WCPH	Etowah, Tenn.	1220
WCPM	Cumberland, Ky.	1280
WCPO	Cincinnati, Ohio	1230
WCPS	Tarboro, N.C.	760
WCQS	Alma, Ga.	1400
WCRA	Effingham, Ill.	1090
WCRB	Waltham, Mass.	1330
WCRE	Cheraw, S.C.	1420
WCRI	Scottsboro, Ala.	1050
WCRK	Morristown, Tenn.	1150
WCRL	Oneonta, Ala.	1570
WCRM	Clare, Mich.	990
WCRO	Johnstown, Pa.	1230
WCRS	Greenwood, S.C.	1450
WCRT	Birmingham, Ala.	1260
WCRV	Washington, N.J.	1580
WCRW	Chicago, Ill.	1240
WCRY	Macon, Ga.	900
WCSA	Ripley, Mass.	1260
WCSC	Charleston, S.C.	1390
WCSH	Portland, Maine	970
WCSI	Columbus, Ind.	1010
WCSJ	Morris, Ill.	1550
WCSL	Cherryville, N. C.	1590
WCSM	Celina, Ohio	1350
WCSR	Hillsdale, Mich.	1340
WCSS	Amsterdam, N.Y.	1490
WCST	Berkeley Springs, W.Va.	1010
WCTA	Andalusia, Ala.	920
WCTC	New Brunswick, N.J.	1450
WCTR	Chestertown, Md.	1530
WCTT	Corbin, Ky.	680
WCTW	New Castle, Ind.	1550
WCUB	Manitowoc, Wis.	980
WCUE	Cuyahoga Falls, Ohio	1150
WCUM	Cumberland, Md.	1230
WCVA	Culpeper, Va.	1490
WCVI	Connellsville, Pa.	1340
WCVL	Crawfordsville, Ind.	1550
WCVP	Murphy, N.C.	600
WCVS	Springfield, Ill.	1450
WCWA	Toledo, O.	1230
WCWC	Ripon, Wis.	1600
WCWR	Tarpon Springs, Fla.	1470
WCYB	Bristol, Va.	690
WCYN	Cynthiana, Ky.	1400
WDAD	Indiana, Pa.	1450
WDAE	Tampa, Fla.	1250
WDAF	Kansas City, Mo.	610
WDAK	Columbus, Ga.	540
WDAL	Meridian, Miss.	1330
WDAN	Danville, Ill.	1490
WDAR	Darlington, S.C.	1350
WDAS	Philadelphia, Pa.	1480
WDAX	McRae, Ga.	1410
WDAY	Fargo, N. Dak.	970
WDBC	Escanaba, Mich.	680
WDBF	Delray Beach, Fla.	1420
WDBJ	Roanoke, Va.	960
WDBL	Springfield, Tenn.	1590
WDBN	Statesville, N.C.	550
WDBO	Orlando, Fla.	580
WDBQ	Dubuque, Iowa	1490
WDCF	Dade City, Fla.	1350
WDCJ	Arlington, Fla.	1220
WDCR	Hanover, N.H.	1340
WDDT	Greenville, Miss.	900
WDDY	Gloucester, Va.	1420
WDEA	Ellsworth, Me.	1370
WDEC	Americus, Ga.	1290
WDEE	Hamden, Conn.	1220
WDEF	Chattanooga, Tenn.	1370
WDEH	Sweetwater, Tenn.	800
WDEL	Wilmington, Del.	1150
WDEV	Waterbury, Vt.	550
WDEW	Westfield, Mass.	1570
WDGL	Douglasville, Ga.	1520

WHITE'S RADIO LOG

C.L.	Location	Kc.
WDGY	Minneapolis, Minn.	1130
WDIA	Memphis, Tenn.	1070
WDIC	Clinchco, Va.	1430
WDIG	Dothan, Ala.	1450
WDIX	Orangeburg, S.C.	1150
WDJS	Mt. Olive, N.C.	149
WDKD	Kingstree, S. C.	131
WDKN	Dickson, Tenn.	1400
WDLA	Walton, N.Y.	1270
WDLB	Marshfield, Wis.	1450
WDLC	Port Jervis, N.Y.	1490
WDLR	Delaware, Ohio	1550
WDLM	E. Moline, Ill.	960
WDLP	Panama City, Fla.	590
WDLT	Indianola, Miss.	1380
WDMG	Douglas, Ga.	860
WDMJ	Marquette, Mich.	1320
WDMS	Lynchburg, Va.	1320
WDMV	Pocomoke City, Md.	540
WDNC	Durham, N.C.	620
WDNE	Elkins, W.Va.	1240
WDNG	Anniston, Ala.	1450
WDNT	Dayton, Tenn.	1280
WDOB	Canton, Miss.	1370
WDOC	Prestonsburg, Ky.	1310
WDOD	Chattanooga, Tenn.	1310
WDOE	Dunkirk, N.Y.	1410
WDOK	Cleveland, Ohio	1260
WDOL	Athens, Ga.	1470
WDON	Wheaton, Md.	1540
WDOR	Sturgeon Bay, Wis.	910
WDOS	Oneonta, N.Y.	730
WDOT	Burlington, Va.	1400
WDOV	Dover, Del.	1410
WDOW	Dowagiac, Mich.	1440
WDQN	DuQuoin, Ill.	1580
WDRC	Hartford, Conn.	1360
WDSC	Dillon, S.C.	800
WDSG	Dyersburg, Tenn.	1450
WDSK	Cleveland, Miss.	1410
WDSL	Mocksville, N. C.	1520
WDSM	Superior, Wis.	710
WDSP	DeFuniak Springs, Florida	1280
WDSR	Lake City, Fla.	1340
WDUN	Gainesville, Ga.	1240
WDUX	Waupaca, Wis.	800
WDUZ	Green Bay, Wis.	1400
WDVA	Danville, Va.	1250
WDVH	Gainesville, Fla.	980
WDVL	Vineland, N.J.	1270
WDWD	Dawson, Ga.	990
WDWS	Champaign, Ill.	1400
WDXB	Chattanooga, Tenn.	1490
WDXE	Lawrenceburg, Tenn.	1370
WDXI	Jackson, Tenn.	1310
WDXL	Lexington, Tenn.	1490
WDXN	Clarksville, Tenn.	540
WDXR	Paducah, Ky.	1560
WDXY	Sumter, S.C.	1240
WDYX	Buford, Ga.	1460
WDZ	Decatur, Ill.	1050
WEAB	Greer, S.C.	800
WEAC	Gaffney, S. C.	1500
WEAD	College Park, Ga.	1570
WEAG	Alcoa, Tenn.	1470
WEAL	Greensboro, N. C.	1510
WEAM	Arlington, Va.	1390
WEAN	Providence, R.I.	790
WEAQ	Eau Claire, Wis.	790
WEAS	Savannah, Ga.	900
WEAT	W. Palm Beach, Fla.	850
WEAV	Plattsburg, N.Y.	960
WEAW	Evanston, Ill.	1330
WEBB	Baltimore, Md.	1360
WEBC	Duluth, Minn.	560
WEBJ	Brewton, Ala.	1240
WEBO	Owego, N.Y.	1330
WEBQ	Harrisburg, Ill.	1240
WEBR	Buffalo, N.Y.	970
WEBY	Milton, Fla.	1330
WECL	Eau Claire, Wis.	1050
WEDC	Chicago, Ill.	1240
WEDO	McKeesport, Pa.	810
WEEB	Southern Pines, N.C.	990
WEED	Rocky Mount, N.C.	1300
WEEE	Rensselaer, N.Y.	1300
WEEF	Highland Park, Ill.	1430
WEEI	Boston, Mass.	590
WEEL	Fairfax, Va.	1310
WEEN	Lafayette, Tenn.	1460
WEEP	Pittsburgh, Pa.	1080
WEER	Warrenton, Va.	1570
WEET	Richmond, Va.	1320
WEEU	Reading, Pa.	850
WEEW	Washington, N.C.	1320
WEEX	Easton, Pa.	1290
WEEZ	Chester, Pa.	1590
WEGO	Concord, N.C.	1410
WEGP	Presque Isle, Maine	1390
WEHH	Elmira Heights-Horseheads, N. Y.	1590
WEIC	Charleston, Ill.	1270
WEIF	Moundsville, W. Va.	1370
WEIM	Fitchburg, Mass.	1280
WEIR	Weirton, W.Va.	1430
WEIS	Center, Ala.	990
WEJL	Scranton, Pa.	630
WEKR	Fayetteville, Tenn.	1240
WEKY	Richmond, Ky.	1340
WEKZ	Monroe, Wis.	1260
WELB	Elba, Ala.	1350
WELC	Welch, W.Va.	1150
WELD	Fisher, W.Va.	690
WELE	S. Daytona, Fla.	1590
WELI	New Haven, Conn.	960
WELK	Charlottesville, Va.	1010
WELM	Elmira, N.Y.	1410
WELO	Tupelo, Miss.	580
WELP	Easley, S.C.	1360
WELR	Roanoke, Ala.	1360
WELS	Kinston, N.C.	1010
WELV	Ellenville, N. Y.	1370
WELW	Willoughby, O.	1330
WELY	Ely, Minn.	1450
WELZ	Belzoni, Miss.	1460
WEMB	Erwin, Tenn.	1420
WEMD	Easton, Md.	1460
WEMJ	Laconia, N.H.	1490
WEMP	Milwaukee, Wis.	1250
WENC	Whiteville, N.C.	1220
WEND	Edensburg, Pa.	1580
WENE	Endicott, N.Y.	1430
WENG	Englewood, Fla.	1530
WENK	Union City, Tenn.	1240
WENN	Birmingham, Ala.	1320
WENO	Madison, Tenn.	1430
WENT	Gloversville, N.Y.	1340
WENY	Elmira, N.Y.	1230
WENZ	Highland Springs, Va.	1450
WEOK	Poughkeepsie, N.Y.	1390
WEOL	Elyria, Ohio	930
WEPG	S. Pittsburgh, Tenn.	910
WEPM	Martinsburg, W.Va.	1340
WERA	Plainfield, N.J.	1590
WERB	Garden City, Mich.	1090
WERD	Atlanta, Ga.	860
WERE	Cleveland, Ohio	1300
WERH	Hamilton, Ala.	970
WERI	Westerly, R.I.	1230
WERK	Muncie, Ind.	990
WERL	Eagle River, Wis.	950
WERT	Van Wert, Ohio	1220
WERX	Wyoming, Mich.	1530
WESA	Charleroi, Pa.	940
WESB	Bradford, Pa.	1490
WESC	Greenville, S.C.	660
WESO	Southbridge, Mass.	970
WESR	Tasley, Va.	1330
WEST	Easton, Pa.	1400
WESX	Salem, Mass.	1230
WESY	Leland, Miss.	1580
WETB	Johnson City, Tenn.	790
WETC	Wendell-Zebulon, N.C.	540
WETH	St. Augustine, Fla.	1420
WETO	Gadsden, Ala.	930
WETT	Ocean City, Md.	1590
WETU	Wetumpka, Ala.	1250
WETZ	New Martinsville, West Virginia	1330
WEUC	Ponce, P.R.	1420
WEUP	Huntsville, Ala.	1600
WEVA	Emporia, Va.	860
WEVD	New York, N.Y.	1330
WEVE	Eveleth, Minn.	1340
WEW	St. Louis, Mo.	770
WEWO	Laurinburg, N.C.	1080
WEXL	Royal Oak, Mich.	1340
WEXT	W. Hartford, Conn.	1550
WEYE	Sanford, N.C.	1290
WEYY	Talladega, Ala.	1580
WEZE	Boston, Mass.	1260
WEZJ	Williamsburg, Ky.	1440
WEZQ	Winfield, Ala.	1300
WEZY	Cocoa, Fla.	1350
WFAA	Dallas, Tex.	570
		820
WFAB	Miami, Fla.	990
WFAG	Farmville, N.C.	1250
WFAH	Alliance, Ohio	1310
WFAI	Fayetteville, N.C.	1230
WFAR	Farrell, Pa.	1470
WFAS	White Plains, N.Y.	1230
WFAU	Augusta, Me.	1340
WFAW	Ft. Atkinson, Wis.	940
WFAX	Falls Church, Va.	1220
WFBA	San Sebastion, P.R.	1460
WFBC	Greenville, S.C.	1330
WFBF	Fernandino Beach, Fla.	1570
WFBG	Altoona, Pa.	1290
WFBL	Syracuse, N.Y.	1390
WFBM	Indianapolis, Ind.	1260
WFBR	Baltimore, Md.	1300
WFBS	Spring Lake, N. C.	1450
WFDF	Flint, Mich.	910
WFDR	Manchester, Ga.	1370
WFEA	Manchester, N.H.	1370
WFEB	Sylacauga, Ala.	1340
WFEC	Harrisburg, Pa.	1400
WFFF	Columbia, Miss.	1360
WFFG	Marathon, Fla.	1300
WFGM	Fitchburg, Mass.	960
WFGN	Gaffney, S.C.	1570
WFGW	Black Mountains, N.C.	1010
WFHG	Bristol, Va.	980
WFHK	Pell City, Ala.	1430
WFHR	Wis. Rapids, Wis.	1320
WFIA	Louisville, Ky.	900
WFIF	Milford, Conn.	1500
WFIG	Sumter, S.C.	1290
WFIL	Philadelphia, Pa.	560
WFIN	Findlay, Ohio	1330
WFIS	Fountain Inn, S.C.	1600
WFIV	Kissimmee, Fla.	1080
WFIW	Fairfield, Ill.	1390
WFIX	Huntsville, Ala.	1450
WFKN	Franklin, Ky.	1220
WFKY	Frankfort, Ky.	1490
WFLA	Tampa, Fla.	970
WFLB	Fayetteville, N.C.	1490
WFLI	Lookout Mtn., Tenn.	1070
WFLN	Philadelphia, Pa.	900
WFLO	Farmville, Va.	870
WFLR	Dundee, N.Y.	1570
WFLS	Fredericksburg, Va.	1350
WFLW	Monticello, Ky.	1360
WFMC	Goldsboro, N.C.	730
WFMD	Frederick, Md.	930
WFMH	Cullman, Ala.	1460
WFMI	Montgomery, Ala.	1500
WFMJ	Youngstown, Ohio	1390
WFMO	Fairmont, N.C.	860
WFMW	Madisonville, Ky.	730
WFNC	Fayetteville, N.C.	1390
WFNL	No. Augusta, S.C.	1410
WFOB	Fostoria, Ohio	1430
WFOM	Marietta, Ga.	1230
WFOR	Hattiesburg, Miss.	1400
WFOX	Milwaukee, Wis.	880
WFOY	St. Augustine, Fla.	1240
WFPA	Fort Payne, Ala.	1400
WFPG	Atlantic City, N.J.	1450
WFPM	Fort Valley, Ga.	1150
WFPR	Hammond, La.	1400
WFRA	Franklin, Pa.	1450
WFRB	Frostburg, Md.	560
WFRC	Reidsville, N.C.	1600
WFRL	Freeport, Ill.	1570
WFRM	Coudersport, Pa.	600
WFRO	Fremont, Ohio	900
WFRX	West Frankfort, Ill.	1300
WFSC	Franklin, N.C.	1050
WFSG	Boca Raton, Fla.	740
WFSO	Pinellas, Fla.	570
WFSR	Bath, N.Y.	1380
WFST	Caribou, Maine	600
WFTC	Kinston, N.C.	960
WFTG	London, Ky.	1400
WFTL	Ft. Lauderdale, Fla.	1400
WFTM	Maysville, Ky.	1240
WFTN	Franklin, N.H.	1240
WFTR	Front Royal, Va.	1450
WFTW	Ft. Walton Beach, Florida	1260
WFUL	Fulton, Ky.	1270
WFUR	Grand Rapids, Mich.	1570
WFVA	Fredericksburg, Va.	1230
WFVG	Fuquay Springs, N.C.	1460
WFWL	Camden, Tenn.	1220
WFYC	Alma, Mich.	1280
WGAA	Cedartown, Ga.	1340
WGAC	Augusta, Ga.	580
WGAD	Gadsden, Ala.	1350
WGAF	Valdosta, Ga.	910
WGAI	Elizabeth City, N.C.	560
WGAL	Lancaster, Pa.	1490
WGAN	Portland, Maine	560
WGAP	Maryville, Tenn.	1400
WGAR	Cleveland, Ohio	1220
WGAS	S. Gastonia, N.C.	1420
WGAT	Gate City, Va.	1050
WGAU	Athens, Ga.	1340
WGAW	Gardner, Mass.	1340
WGBR	Freeport, N.Y.	1240
WGBC	Chipley, Fla.	1240
WGBF	Evansville, Ind.	1280
WGBG	Greensboro, N.C.	1400
WGBI	Scranton, Pa.	910
WGBR	Goldsboro, N. C.	1150
WGBS	Miami, Fla.	710
WGCB	Red Lion, Pa.	1440
WGCD	Chester, S.C.	1400
WGCH	Greenwich, Conn.	1490
WGCM	Gulfport, Miss.	1240
WGEA	Geneva, Ala.	1150
WGEE	Indianapolis, Ind.	1590
WGEM	Quincy, Ill.	1440
WGET	Gettysburg, Pa.	1320
WGEZ	Beloit, Wis.	1400
WGFA	Watseka, Ill.	1360
WGFS	Covington, Ga.	1430
WGGA	Gainesville, Ga.	550
WGGG	Gainesville, Fla.	1230
WGGH	Marion, Ill.	1150
WGGO	Salamanca, N.Y.	1590
WGH	Newport News, Va.	1310
WGHC	Clayton, Ga.	1570
WGHM	Skowegan, Maine	1150
WGHN	Grd. Haven, Mich.	1370
WGHQ	Kingston, N.Y.	920
WGIG	Brunswick, Ga.	1440
WGIL	Galesburg, Ill.	1400
WGIR	Manchester, N.H.	610
WGIV	Charlotte, N.C.	1600
WGKA	Atlanta, Ga.	1600
WGKR	Perry, Fla.	1310
WGKV	Charleston, W. Va.	1490
WGL	Fort Wayne, Ind.	1250
WGLB	Port Wash., Wis.	1560
WGLC	Mendota, Ill.	1090
WGLI	Babylon, N.Y.	1290
WGMA	Hollywood, Fla.	1320
WGML	Hinesville, Ga.	990
WGMM	Millington, Tenn.	1380
WGMS	Washington, D.C.	570
WGN	Chicago, Ill.	720
WGNC	Gastonia, N.C.	1450
WGNE	Panama City Beach, Fla.	1480
WGNI	Wilmington, N.C.	1450
WGNP	Indian Rocks Beach, Fla.	1520
WGNS	Murfreesboro, Tenn.	1450
WGNU	Granite City, Ill.	920
WGNY	Newburgh, N.Y.	1220
WGOE	Richmond, Va.	1590
WGOG	Walhalla, S. C.	1000
WGOH	Grayson, Ky.	1370
WGOK	Mobile, Ala.	900
WGOL	Goldsboro, N.C.	1300
WGON	Munising, Mich.	1400
WGOO	Georgetown, S. C.	1470
WGOV	Valdosta, Ga.	950
WGPA	Bethlehem, Pa.	1100
WGPC	Albany, Ga.	1450
WGR	Buffalo, N.Y.	550
WGRA	Cairo, Ga.	790
WGRD	Grand Rapids, Mich.	1410
WGRI	Griffin, Ga.	1410
WGRM	Greenwood, Miss.	1240
WGRO	Lake City, Fla.	960
WGRP	Greenville, Pa.	940
WGRV	Greenville, Tenn.	1340
WGSA	Ephrata, Pa.	1310
WGSB	Geneva, Ill.	1480
WGSM	Huntington, N.Y.	740
WGSR	Millen, Ga.	1570
WGST	Atlanta, Ga.	920
WGSV	Guntersville, Ala.	1270
WGSW	Greenwood, S.C.	1350
WGTA	Summerville, Ga.	950
WGTC	Greenville, N.C.	1590
WGTL	Kannapolis, N.C.	870
WGTM	Wilson, N.C.	590
WGTN	Georgetown, S.C.	1400
WGTO	Cypress Gardens, Fla.	540
WGUL	New Port Richey, Fla.	1500
WGUN	Atlanta-Decatur, Ga.	1010
WGUS	North Augusta, S.C.	1380
WGUY	Bangor, Maine	1250
WGVA	Geneva, N.Y.	1240
WGVM	Greenville, Miss.	1260
WGWC	Selma, Ala.	1340
WGWR	Asheboro, N.C.	1260
WGY	Schenectady, N.Y.	810
WGYV	Greenville, Ala.	1380
WGYW	Fountain City, Tenn.	1430
WHA	Madison, Wis.	750
WHAB	Baxley, Ga.	1260
WHAG	Halfway, Md.	1410
WHAI	Greenfield, Mass.	1240
WHAK	Rogers City, Mich.	960
WHAL	Shelbyville, Tenn.	1400
WHAM	Rochester, N.Y.	1180
WHAN	Haines City, Fla.	930
WHAP	Hopewell, Va.	1340
WHAR	Clarksburg, W.Va.	1340
WHAS	Louisville, Ky.	840
WHAT	Philadelphia, Pa.	1340
WHAV	Haverhill, Mass.	1490
WHAW	Weston, W.Va.	980
WHAZ	Troy, N.Y.	1330
WHB	Kansas City, Mo.	710
WHBB	Selma, Ala.	1490
WHBC	Canton, Ohio	1480
WHBF	Rock Island, Ill.	1270
WHBG	Harrisonburg, Va.	1360
WHBL	Sheboygan, Wis.	1330
WHBN	Harrodsburg, Ky.	1420
WHBO	Tampa, Fla.	1050
WHBQ	Memphis, Tenn.	560
WHBT	Harriman, Tenn.	1600
WHBU	Anderson, Ind.	1240
WHBY	Appleton, Wis.	1230
WHCC	Waynesville, N.C.	1400
WHCO	Sparta, Ill.	1230
WHCQ	Spartanburg, S.C.	1400
WHCU	Ithaca, N.Y.	870
WHDF	Houghton, Mich.	1400
WHDH	Boston, Mass.	850
WHDL	Olean, N.Y.	1450
WHDM	McKenzie, Tenn.	1440
WHEB	Portsmouth, N.H.	750
WHEC	Rochester, N.Y.	1460
WHEE	Martinsville, Va.	1370
WHEN	Syracuse, N.Y.	620
WHEO	Stuart, Va.	1270
WHEP	Foley, Ala.	1310
WHER	Memphis, Tenn.	1430
WHEW	Riveria Beach, Fla.	1600
WHFB	Benton Harbor-St. Joseph, Mich.	1060
WHGR	Houghton L., Mich.	1290
WHHH	Warren, Ohio	1440
WHHL	Holly Hill, S.C.	1440
WHHT	Lucedale, Miss.	1440
WHHV	Hillsville, Va.	1400
WHHY	Montgomery, Ala.	1440

C.L.	Location	Kc.
WHIE	Griffin, Ga.	1320
WHIH	Portsmouth, Va.	1400
WHIL	Medford, Mass.	1430
WHIM	Providence, R.I.	1110
WHIN	Gallatin, Tenn.	1010
WHIO	Dayton, Ohio	1290
WHIP	Mooresville, N.C.	1350
WHIR	Danville, Ky.	1230
WHIS	Bluefield, W.Va.	1440
WHIT	New Bern, N.C.	1450
WHIY	Orlando, Fla.	1270
WHIZ	Zanesville, Ohio	1240
WHJB	Greensburg, Pa.	620
WHJC	Matewan, W.Va.	1360
WHK	Cleveland, Ohio	1420
WHKP	Hendersonville, N.C.	1450
WHKY	Hickory, N.C.	1290
WHLB	Virginia, Minn.	1400
WHLD	Niagara Falls, N.Y.	1270
WHLF	South Boston, Va.	1400
WHLI	Hempstead, N.Y.	1100
WHLL	Wheeling, W.Va.	1600
WHLM	Bloomsburg, Pa.	550
WHLN	Harlan, Ky.	1410
WHLO	Akron, Ohio	640
WHLP	Centerville, Tenn.	1570
WHLS	Port Huron, Mich.	1450
WHLT	Huntington, Ind.	1300
WHMA	Anniston, Ala.	1390
WHMC	Gaithersburg, Md.	1150
WHMI	Howell, Mich.	1350
WHMP	Northampton, Mass.	1400
WHN	New York, N.Y.	1050
WHNC	Henderson, N.C.	890
WHNY	McComb, Miss.	1250
WHO	Des Moines, Iowa	1040
WHOA	San Juan, P.R.	870
WHOC	Philadelphia, Miss.	1490
WHOD	Jackson, Ala.	1290
WHOF	Canton, Ohio	1060
WHOK	Lancaster, Ohio	1320
WHOL	Allentown, Pa.	600
WHOM	New York, N.Y.	1480
WHON	Centerville, Ind.	930
WHOO	Orlando, Fla.	990
WHOP	Hopkinsville, Ky.	1230
WHOS	Decatur, Ala.	800
WHOT	Campbell, Ohio	1330
WHOU	Houlton, Maine	1340
WHOW	Clinton, Ill.	1520
WHP	Harrisburg, Pa.	580
WHPB	Belton, S.C.	1390
WHPE	High Point, N.C.	1070
WHPL	Winchester, Va.	610
WHRN	Herendon, Va.	1440
WHRT	Hartselle, Ala.	860
WHRV	Ann Arbor, Mich.	1600
WHRY	Elizabethtown, Pa.	1600
WHSC	Hartsville, S.C.	1450
WHSL	Wilmington, N.C.	1490
WHSM	Hayward, Wis.	910
WHSY	Hattiesburg, Miss.	1230
WHTC	Holland, Mich.	1450
WHTG	Asbury Park-Eatontown, N.J.	1410
WHUB	Cookeville, Tenn.	1400
WHUC	Hudson, N.Y.	1230
WHUM	Reading, Pa.	1240
WHUN	Huntington, Pa.	1150
WHUT	Anderson, Ind.	1470
WHVL	Hendersonville, N.C.	1600
WHVR	Hanover, Pa.	1280
WHVW	Hyde Park, N.Y.	950
WHWB	Rutland, Vt.	1000
WHWH	Princeton, N.J.	1350
WHYD	Columbus, Ga.	1270
WHYE	Roanoke, Va.	910
WHYL	Carlisle, Pa.	960
WHYN	Springfield, Mass.	560
WIAC	San Juan, P.R.	740
WIAM	Williamston, N.C.	900
WIBA	Madison, Wis.	1310
WIBB	Macon, Ga.	1280
WIBC	Indianapolis, Ind.	1070
WIBG	Philadelphia, Pa.	990
WIBM	Jackson, Mich.	1450
WIBR	Baton Rouge, La.	1300
WIBU	Poynette, Wis.	1240
WIBV	Belleville, Ill.	1260
WIBW	Topeka, Kans.	580
WIBX	Utica, N.Y.	950
WICC	Bridgeport, Conn.	600
WICE	Providence, R.I.	1290
WICH	Norwich, Conn.	1310
WICK	Scranton, Pa.	1400
WICO	Salisbury, Md.	1320
WICU	Erie, Pa.	1330
WICY	Malone, N.Y.	1490
WIDE	Biddeford, Maine	1400
WIDO	Elizabethton, Tenn.	1520
WIDU	Fayetteville, N.C.	1600
WIEL	Elizabethtown, Ky.	1400
WIFE	Indianapolis, Ind.	1310
WIFM	Elkin, N.C.	1540
WIGL	Superior, Wis.	970
WIGM	Medford, Wis.	1490
WIGO	Atlanta, Ga.	1340
WIGS	Gouverneur, N.Y.	1230
WIII	Homestead, Fla.	1430
WIIN	Atlanta, Ga.	970
WIKC	Bogalusa, La.	1490
WIKE	Newport, Vt.	1490
WIKI	Chester, Va.	1410
WIKY	Evansville, Ind.	820
WIL	St. Louis, Mo.	1430
WILA	Danville, Va.	1580
WILD	Boston, Mass.	1090
WILE	Cambridge, Ohio	1270
WILI	Willimantic, Conn.	1400
WILK	Wilkes-Barre, Pa.	980
WILL	Urbana, Ill.	580
WILM	Wilmington, Del.	1450
WILO	Frankfort, Ind.	1570
WILS	Lansing, Mich.	1320
WILZ	St. Petersburg Beach, Florida	1590
WIMA	Lima, Ohio	1150
WIMO	Winder, Ga.	1300
WIMS	Michigan City, Ind.	1420
WINA	Charlottesville, Va.	1400
WINC	Winchester, Va.	1400
WIND	Chicago, Ill.	560
WINE	Brookfield, Conn.	940
WINF	Manchester, Conn.	1230
WING	Dayton, Ohio	1410
WINI	Murphysboro, Ill.	1420
WINK	Fort Myers, Fla.	1240
WINN	Louisville, Ky.	1240
WINQ	Tampa, Fla.	1010
WINR	Binghamton, N.Y.	680
WINS	New York, N.Y.	1010
WINT	Winter Haven, Fla.	1360
WINU	Highland Park, Ill.	1510
WINW	Canton, O.	1520
WINX	Rockville, Md.	1600
WINY	Putnam, Conn.	1350
WINZ	Miami, Fla.	940
WINU	Highland, Ill.	1510
WInW	Canton, Ohio	1520
WIOD	Miami, Fla.	610
WIOI	New Boston, Ohio	1010
WIOK	Normal, Ill.	1440
WION	Ionia, Mich.	1430
WIOO	Carlisle, Pa.	1000
WIOS	Tawas City, Mich.	1480
WIOU	Kokomo, Ind.	1350
WIP	Philadelphia, Pa.	610
WIPC	Lake Wales, Fla.	1280
WIPR	San Juan, P.R.	940
WIPS	Ticonderoga, N.Y.	1250
WIRA	Ft. Pierce, Fla.	1400
WIRB	Enterprise, Ala.	600
WIRC	Hickory, N.C.	630
WIRD	Lake Placid, N.Y.	920
WIRE	Indianapolis, Ind.	1430
WIRJ	Humboldt, Tenn.	740
WIRK	W. Palm Beach, Fla.	1290
WIRL	Peoria, Ill.	1290
WIRO	Ironton, Ohio	1230
WIRV	Irvine, Ky.	1550
WIRY	Plattsburg, N.Y.	1340
WIS	Columbia, S.C.	560
WISA	Isabella, P.R.	1390
WISE	Asheville, N.C.	1310
WISK	Americus, Ga.	1390
WISL	Shamokin, Pa.	1480
WISM	Madison, Wis.	1480
WISN	Milwaukee, Wis.	1130
WISO	Ponce, P.R.	1260
WISP	Kinston, N.C.	1230
WISR	Butler, Pa.	680
WIST	Charlotte, N.C.	1240
WISV	Viroqua, Wis.	1360
WISZ	Glen Burnie, Md.	1590
WITA	San Juan, P.R.	1140
WITH	Baltimore, Md.	1230
WITL	Lansing, Mich.	1010
WITN	Washington, N.C.	930
WITY	Danville, Ill.	980
WITZ	Jasper, Ind.	990
WIVE	Ashland, Va.	1430
WIVI	Christiansted, V.I.	970
WIVK	Knoxville, Tenn.	850
WIVV	Vieques, P.R.	1370
WIVY	Jacksonville, Fla.	1050
WIXI	Irondale, Ala.	1480
WIXK	New Richmond, Wis.	1590
WIXN	Dixon, Ill.	1460
WIXX	Oakland Park, Fla.	1520
WIYN	Rome, Ga.	1360
WIZE	Springfield, Ohio	1340
WIZR	Johnstown, N.Y.	930
WIZS	Henderson, N.C.	1450
WIZZ	Streator, Ill.	1250
WJAB	Westbrook, Me.	1440
WJAC	Johnstown, Pa.	850
WJAG	Norfolk, Nebr.	780
WJAK	Jackson, Tenn.	1460
WJAM	Marion, Ala.	1310
WJAR	Providence, R.I.	920
WJAS	Pittsburgh, Pa.	1320
WJAT	Swainsboro, Ga.	800
WJAX	Jacksonville, Fla.	930
WJAY	Mullins, S.C.	1280
WJAZ	Albany, Ga.	960
WJBB	Haleyville, Ala.	1230
WJBC	Bloomington, Ill.	1230
WJBD	Salem, Ill.	1350
WJBG	Pontiac, Ill.	1080
WJBK	Detroit, Mich.	1500
WJBL	Holland, Mich.	1260
WJBM	Jerseyville, Ill.	1480
WJBD	Baton Rouge, La.	1150
WJBS	DeLand, Fla.	1490
WJCD	Seymour, Ind.	1390
WJCM	Sebring, Fla.	960
WJCD	Jackson, Mich	1510
WJCW	Johnson City, Tenn.	910
WJDA	Quincy, Mass.	1300
WJDB	Thomasville, Ala.	630
WJDX	Jackson, Miss.	620
WJDY	Salisbury, Md.	1470
WJEF	Grand Rapids, Mich.	1230
WJEH	Gallipolis, Ohio	990
WJEJ	Hagerstown, Md.	1240
WJEM	Valdosta, Ga.	1150
WJER	Dover, Ohio	1450
WJES	Johnston, S.C.	1570
WJET	Erie, Pa.	1400
WJFC	Jefferson City, Tenn.	1480
WJHO	Opelika, Ala.	1400
WJIC	Salem, N. J.	1510
WJIG	Tullahoma, Tenn.	740
WJIL	Jacksonville, Ill.	1550
WJIM	Lansing, Mich.	1240
WJJC	Commerce, Ga.	1270
WJJD	Chicago, Ill.	1160
WJJJ	Christiansburg, Va.	1260
WJJL	Niagara Falls, N.Y.	1440
WJJM	Lewisburg, Tenn.	1490
WJJZ	Mount Holly, N.J.	1460
WJLB	Detroit, Mich.	1400
WJLD	Homewood, Ala.	1400
WJLE	Smithville, Tenn.	1480
WJLK	Asbury Park, N. J.	1440
WJLS	Beckley, W.Va.	560
WJMA	Orange, Va.	1340
WJMB	Brookhaven, Miss.	1340
WJMC	Rice Lake, Wis.	1240
WJMO	Cleveland Hgts., Ohio	1490
WJMS	Ironwood, Mich.	630
WJMW	Athens, Ala.	730
WJMX	Florence, S.C.	970
WJNC	Jacksonville, N.C.	1240
WJNO	W. Palm Beach, Fla.	1230
WJOB	Hammond, Ind.	1230
WJOE	Port Joe, Fla.	1080
WJOI	Florence, Ala.	1340
WJOL	Joliet, Ill.	1340
WJON	St. Cloud, Minn.	1240
WJOR	South Haven, Mich.	940
WJOT	Lake City, S.C.	1260
WJOY	Burlington, Vt.	1230
WJPA	Washington, Pa.	1450
WJPD	Ishpeming, Mich.	1240
WJPF	Herrin, Ill.	1340
WJPG	Green Bay, Wis.	1440
WJPR	Greenville, Miss.	1330
WJPS	Evansville, Ind.	1330
WJPW	Rockford, Mich.	810
WJQS	Jackson, Miss.	1400
WJR	Detroit, Mich.	760
WJRC	Joliet, Ill.	1510
WJRD	Tuscaloosa, Ala.	1150
WJRI	Lenoir, N.C.	1340
WJRL	Rockford, Ill.	1150
WJRM	Troy, N.C.	1390
WJRZ	Newark, N.J.	970
WJSB	Crestview, Fla.	1050
WJSO	Jonesboro, Tenn.	1590
WJTN	Jamestown, N.Y.	1240
WJTO	Bath, Me.	730
WJUD	St. Johns, Mich.	1580
WJUN	Mexico, Pa.	1220
WJVA	South Bend, Ind.	1580
WJW	Cleveland, Ohio	850
WJWL	Georgetown, Del.	900
WJWS	South Hill, Va.	1370
WJXN	Jackson, Miss.	1450
WJZM	Clarksville, Tenn.	1400
WKAC	Athens, Ala.	1080
WKAI	Macomb, Ill.	1510
WKAJ	Saratoga Springs, N.Y.	900
WKAL	Rome, N.Y.	1450
WKAM	Goshen, Ind.	1460
WKAN	Kankakee, Ill.	1320
WKAP	Allentown, Pa.	1320
WKAQ	San Juan, P.R.	580
WKAR	East Lansing, Mich.	870
WKAT	Miami Beach, Fla.	1360
WKAU	Kaukanna, Wis.	1050
WKAY	Glasgow, Ky.	1490
WKAZ	Charleston, W.Va.	950
WKBA	Vinton, Va.	1550
WKBC	N. Wilkesboro, N.C.	810
WKBH	La Crosse, Wis.	1410
WKBJ	Milan, Tenn.	1600
WKBK	Keene, N.H.	1220
WKBL	Covington, Tenn.	1250
WKBN	Youngstown, Ohio	570
WKBO	Harrisburg, Pa.	1230
WKBR	Manchester, N.H.	1250
WKBV	Richmond, Ind.	1490
WKBW	Buffalo, N. Y.	1520
WKBX	Winston-Salem, N.C.	1500
WKBY	Chatham, Va.	1080
WKBZ	Muskegon, Mich.	850
WKCT	Bowling Green, Ky.	930
WKCU	Corinth, Miss.	1350
WKCW	Warrenton, Va.	1420
WKDA	Nashville, Tenn.	1240
WKDE	Altavista, Va.	1280
WKDK	Newberry, S.C.	1240
WKOL	Clarksdale, Miss.	1600
WKDN	Camden, N.J.	800
WKDX	Hamlet, N. C.	1250
WKDZ	Cadiz, Ky.	1110
WKEE	Huntington, W. Va.	800
WKEI	Kewanee, Ill.	1450
WKEN	Dover, Del.	1600
WKER	Pompton Lakes, N.J.	1500
WKEU	Griffin, Ga.	1450
WKEY	Covington, Va.	1340
WKFD	Wickford, R.I.	1370
WKFE	Yauco, P.R.	1550
WKFR	Battle Creek, Mich.	1400
WKGN	Knoxville, Tenn.	1340
WKHM	Jackson, Mich.	970
WKIC	Hazard, Ky.	1390
WKIO	Urbana, Ill.	1580
WKIG	Glenville, Ga.	1580
WKIK	Leonardtown, Md.	1370
WKIN	Kingsport, Tenn.	1320
WKIP	Poughkeepsie, N.Y.	1450
WKIS	Orlando, Fla.	740
WKIX	Raleigh, N.C.	850
WKIZ	Key West, Fla.	1500
WKJB	Mayaguez, P.R.	710
WKJG	Fort Wayne, Ind.	1380
WKJK	Granite Falls, N. C.	1580
WKJR	Muskegon, Mich.	1520
WKKD	Aurora, Ill.	1580
WKKO	Cocoa, Fla.	860
WKKS	Vanceburg, Ky.	1570
WKLA	Ludington, Mich.	1450
WKLC	St. Albans, W.Va.	1300
WKLF	Clanton, Ala.	980
WKLK	Cloquet, Minn.	1230
WKLM	Wilmington, N.C.	980
WKLO	Louisville, Ky.	1080
WKLP	Keyser, W. Va.	1390
WKLV	Blackstone, Va.	1440
WKLY	Hartwell, Ga.	980
WKLZ	Kalamazoo, Mich.	1470
WKMC	Roaring Sprgs., Pa.	1370
WKMF	Flint, Mich.	1470
WKMI	Kalamazoo, Mich.	1360
WKMK	Blountstown, Fla.	1370
WKMT	Kings Mtn., N.C.	1220
WKNE	Keene, N.H.	1290
WKNR	Dearborn, Mich.	1310
WKNT	Kent, Ohio	1520
WKNX	Saginaw, Mich.	1210
WKNY	Kingston, N.Y.	1490
WKOA	Hopkinsville, Ky.	1480
WKOK	Sunbury, Pa.	1070
WKOP	Binghamton, N.Y.	1360
WKOV	Wellston, Ohio	1330
WKOW	Madison, Wis.	1070
WKOX	Framingham, Mass.	1190
WKOY	Bluefield, W.Va.	1240
WKOZ	Kosciusko, Miss.	1350
WKPA	New Kensington, Pa.	1150
WKPO	Prentiss, Miss.	1510
WKPR	Kalamazoo, Mich.	1420
WKPT	Kingsport, Tenn.	1400
WKQV	Sullivan, Ind.	1550
WKRA	Holly Springs, Miss.	1110
WKRC	Cincinnati, Ohio	550
WKRG	Mobile, Ala.	710
WKRK	Murphy, N.C.	1320
WKRM	Columbia, Tenn.	1340
WKRO	Cairo, Ill.	1490
WKRS	Waukegan, Ill.	1220
WKRT	Cortland, N.Y.	920
WKRW	Cartersville, Ga.	
WKRZ	Oil City, Pa.	1340
WKSB	Milford, Del.	930
WKSC	Kershaw, S.C.	1300
WKSK	W. Jefferson, N.C.	1600
WKSN	Jamestown, N.Y.	1340
WKSR	Pulaski, Tenn.	1420
WKST	New Castle, Pa.	1280
WKTC	Charlotte, N.C.	1310
WKTG	Thomasville, Ga.	730
WKTJ	Farmington, Maine	1380
WKTQ	South Paris, Maine	1450
WKTS	Sheboygan, Wis.	950
WKTX	Atlantic Beach, Fla.	1600
WKTY	LaCrosse, Wis.	580
WKUL	Cullman, Ala.	1340
WKVA	Lewistown, Pa.	920
WKVK	Virginia Beach, Va.	1550
WKVM	San Juan, P.R.	810
WKVT	Brattleboro, Vt.	1490
WKWF	Key West, Fla.	1600
WKWK	Wheeling, W.Va.	1400
WKWS	Rocky Mount, Va.	1290
WKXL	Concord, N.H.	1450
WKXV	Knoxville, Tenn.	900
WKXY	Sarasota, Fla.	930
WKYC	Cleveland, Ohio	1100
WKYE	Bristol, Tenn.	1550
WKYF	Greenville, Ky.	1600
WKYN	Rio Piedras, P.R.	630
WKYO	Caro, Mich.	1360
WKYR	Keyser, W.Va.	1270
WKYX	Paducah, Ky.	570
WKZA	Kane, Pa.	960
WKZI	Casey, Ill.	800
WKZO	Kalamazoo, Mich.	590
WLAC	Nashville, Tenn.	1510
WLAO	Danbury, Conn.	800
WLAF	LaFollette, Tenn.	1450
WLAG	La Grange, Ga.	1240
WLAK	Lakeland, Fla.	1430
WLAM	Lewiston, Maine	1470
WLAN	Lancaster, Pa.	1390
WLAP	Lexington, Ky.	630
WLAQ	Rome, Ga.	1410

WHITE'S RADIO LOG

C.L.	Location	Kc.
WLAR	Athens, Tenn.	1450
WLAS	Jacksonville, N.C.	910
WLAT	Conway, S.C.	1330
WLAU	Laurel, Miss.	1600
WLAV	Grand Rapids, Mich.	1340
WLAW	Lawrenceville, Ga.	1360
WLAY	Muscle Shoals, Ala.	1450
WLBA	Gainesville, Ga.	1580
WLBB	Carrollton, Ga.	1100
WLBC	Muncie, Ind.	1340
WLBE	Leesburg, Fla.	790
WLBG	Laurens, S.C.	860
WLBH	Mattoon, Ill.	1170
WLBI	Denham Springs, La.	1220
WLBJ	Bowling Green, Ky.	1410
WLBK	DeKalb, Ill.	1360
WLBL	Auburndale, Wis.	930
WLBN	Lebanon, Ky.	1590
WLBR	Lebanon, Pa.	1280
WLBZ	Bangor, Maine	620
WLCB	Moulton, Ala.	1530
WLCK	Scottsville, Ky.	1250
WLCM	Lancaster, S.C.	1360
WLCN	Laurensburg, N.C.	1300
WLCO	Eustis, Fla.	1240
WLCS	Baton Rouge, La.	910
WLCX	LaCrosse, Wis.	1490
WLCY	St. Petersburg, Fla.	1380
WLDB	Atlantic City, N.J.	1490
WLDS	Jacksonville, Ill.	1180
WLDY	Ladysmith, Wis.	1340
WLEA	Hornell, N.Y.	1480
WLEC	Sandusky, Ohio	1450
WLEE	Richmond, Va.	1480
WLEF	Greenwood, Miss.	1540
WLEM	Emporium, Pa.	1240
WLES	Lawrenceville, Va.	580
WLET	Toccoa, Ga.	1420
WLEW	Bad Axe, Mich.	1340
WLEY	Cayey, P.R.	1080
WLFA	Lafayette, Ga.	1590
WLFH	Little Falls, N.Y.	1230
WLIB	New York, N.Y.	1190
WLIJ	Shelbyville, Tenn.	1580
WLIK	Newport, Tenn.	1270
WLIL	Lenoir City, Tenn.	730
WLIP	Kenosha, Wis.	1050
WLIQ	Mobile, Ala.	1360
WLIS	Old Saybrook, Conn.	1420
WLIV	Livingston, Tenn.	920
WLIZ	Lake Worth, Fla.	1380
WLKM	Three Rivers, Mich.	1510
WLKN	Lincoln, Me.	1450
WLKS	W. Liberty, Ky.	1450
WLKW	Providence, R.I.	990
WLLE	Raleigh, N.C.	570
WLLH	Lowell, Mass.	1400
WLLL	Lynchburg, Va.	930
WLLY	Wilson, N.C.	1350
WLMD	Laurel, Md.	900
WLNC	Laurinburg, N.C.	1300
WLMJ	Jackson, Ohio	1280
WLNA	Peekskill, N.Y.	1420
WLNG	Sag Harbor, N.Y.	1600
WLNH	Laconia, N.H.	1350
WLOA	Braddock, Pa.	1550
WLOB	Portland, Maine	1310
WLOC	Munfordville, Ky.	1150
WLOD	Pompano Beach, Fla.	980
WLOE	Leaksville, N.C.	1490
WLOF	Orlando, Fla.	950
WLOG	Logan, W.Va.	1230
WLOH	Princeton, W.Va.	1490
WLOI	LaPorte, Ind.	1540
WLOK	Memphis, Tenn.	1340
WLOL	Minneapolis, Minn.	1330
WLON	Lincolnton, N.C.	1050
WLOP	Jesup, Ga.	1370
WLOR	Thomasville, Ga.	730
WLOS	Asheville, N.C.	1380
WLOU	Louisville, Ky.	1350
WLOV	Washington, Ga.	1370
WLOW	Aiken, S.C.	1300
WLOX	Biloxi, Miss.	1490
WLPM	Suffolk, Va.	1460
WLPQ	LaSalle, Ill.	1220
WLPS	Lehighton, Pa.	1150
WLRC	Whitehall, Mich.	1490
WLS	Chicago, Ill.	890
WLSB	Copper Hill, Tenn.	1400
WLSC	Loris, S.C.	1570
WLSD	Big Stone Gap, Va.	1220
WLSE	Wallace, N.C.	1400
WLSH	Lansford, Pa.	1410
WLSI	Pikeville, Ky.	900
WLSM	Louisville, Miss.	1270
WLST	Escanaba, Mich.	600
WLSV	Wellsville, N.Y.	790
WLTC	Gastonia, N.C.	1370
WLTH	Gary, Ind.	1370
WLTN	Littleton, N. H.	1400
WLUV	Loves Park, Ill.	1520
WLVA	Lynchburg, Va.	590
WLUX	Baton Rouge, La.	1550
WLW	Cincinnati, Ohio	700
WLWO	(V.O.A.) Marathon, Fla.	1040
WLWO	(V.O.A.) Marathon, Fla.	1180
WLYB	Albany, Ga.	1250
WLYC	Williamsport, Pa.	1050
WLYN	Lynn, Mass.	1360
WLYO	New Orleans, La.	940
WLYV	Ft. Wayne, Ind.	1450
WMAB	Munising, Mich.	1400
WMAC	Netter, Ga.	1360
WMAD	Madison, Wis.	1550
WMAF	Madison, Fla.	1230
WMAG	Forest, Miss.	860
WMAJ	State College, Pa.	1450
WMAK	Nashville, Tenn.	1300
WMAL	Washington, D.C.	630
WMAM	Marinette, Wis.	570
WMAN	Mansfield, Ohio	1400
WMAP	Monroe, N.C.	1060
WMAQ	Chicago, Ill.	670
WMAS	Springfield, Mass.	1450
WMAT	Lansing, Mich.	1010
WMAX	Grand Rapids, Mich.	1480
WMAY	Springfield, Ill.	970
WMAZ	Macon, Ga.	940
WMBA	Ambridge, Pa.	1460
WMBC	Macon, Miss.	1400
WMBD	Peoria, Ill.	1470
WMBG	Richmond, Va.	1380
WMBH	Joplin, Mo.	1450
WMBI	Chicago, Ill.	1110
WMBL	Morehead City, N.C.	740
WMBM	Miami Beach, Fla.	1490
WMBN	Petoskey, Mich.	1340
WMBO	Auburn, N.Y.	1340
WMBR	Jacksonville, Fla.	1460
WMBS	Uniontown, Pa.	590
WMBT	Shenandoah, Pa.	1530
WMC	Memphis, Tenn.	790
WMCA	New York, N.Y.	570
WMCH	Church Hill, Tenn.	1260
WMCK	McKeesport, Pa.	1360
WMCP	Columbia, Tenn.	1280
WMCR	Oneida, N.Y.	1600
WMCW	Harvard, Ill.	1600
WMDC	Hazlehurst, Miss.	1220
WMDD	Fajardo, P.R.	1480
WMDN	Midland, Mich.	1490
WMEG	Eau Gallie, Fla.	920
WMEK	Chase City, Va.	980
WMEL	Pensacola, Fla.	610
WMEN	Tallahassee, Fla.	1330
WMEV	Marion, Va.	1010
WMEX	Boston, Mass.	1510
WMFC	Monroeville, Ala.	1360
WMFD	Wilmington, N.C.	630
WMFG	Hibbing, Minn.	1240
WMFJ	Daytona Beach, Fla.	1450
WMFR	High Point, N.C.	1230
WMGA	Moultrie, Ga.	1400
WMGR	Bainbridge, Ga.	930
WMGS	Bowling Green, Ohio	730
WMGW	Meadville, Pa.	1490
WMGY	Montgomery, Ala.	800
WMIA	Arecibo, P. R.	1070
WMID	Atlantic City, N.J.	1340
WMIE	Miami, Fla.	1140
WMIK	Middlesboro, Ky.	560
WMIL	Milwaukee, Wis.	1290
WMIN	Mpls.-St. Paul, Minn.	1400
WMIQ	Iron Mountain, Mich.	1450
WMIR	Lake Geneva, Wis.	1550
WMIS	Natchez, Miss.	1240
WMIX	Mt. Vernon, Ill.	940
WMJM	Cordele, Ga.	1490
WMKR	Millinocket, Me.	1240
WMKT	S. St. Paul, Minn.	1370
WMLF	Pineville, Ky.	1230
WMLO	Beverly, Mass.	1570
WMLP	Milton, Pa.	1380
WMLS	Sylacauga, Ala.	1290
WMLT	Dublin, Ga.	1330
WMMB	Melbourne, Fla.	1240
WMMH	Marshall, N.C.	1460
WMMJ	Lancaster, N.Y.	1300
WMMM	Westport, Conn.	1260
WMMN	Fairmont, W.Va.	920
WMMW	Meriden, Conn.	1470
WMNA	Gretna, Va.	730
WMNB	No. Adams, Mass.	1230
WMNC	Morganton, N.C.	1430
WMNE	Menomonie, Wis.	1360
WMNI	Columbus, Ohio	920
WMNS	Olean, N.Y.	1360
WMNT	Manati, P.R.	1500
WMNZ	Montezuma, Ga.	1050
WMOA	Marietta, Ohio	1490
WMOC	Chattanooga, Tenn.	1450
WMOG	Brunswick, Ga.	1490
WMOH	Hamilton, Ohio	1450
WMOK	Metropolis, Ill.	920
WMON	Montgomery, W.Va.	1340
WMOO	Mobile, Ala.	1550
WMOP	Ocala, Fla.	900
WMOR	Morehead, Ky.	1330
WMOU	Berlin, N.H.	1230
WMOV	Ravenswood, W.Va.	1360
WMOX	Meridian, Miss.	1240
WMOZ	Mobile, Ala.	960
WMPA	Aberdeen, Miss.	1240
WMPC	Lapeer, Mich.	1230
WMPL	Hancock, Mich.	920
WMPM	Smithfield, N.C.	1270
WMPO	Middleport-Pomeroy, Ohio	1390
WMPP	Chicago Heights, Ill.	1470
WMPS	Memphis, Tenn.	680
WMPT	So. Williamsport, Pa.	1450
WMQM	Memphis, Tenn.	1480
WMRB	Greenville, S.C.	1490
WMRC	Milford, Mass.	1490
WMRE	Monroe, Ga.	1490
WMRF	Lewistown, Pa.	1490
WMRI	Marion, Ind.	860
WMRN	Marion, Ohio	1490
WMRO	Aurora, Ill.	1280
WMRP	Flint, Mich.	1570
WMRR	Marshall, Mich.	1540
WMSA	Massena, N.Y.	1340
WMSG	Oakland, Md.	1050
WMSJ	Sylva, N.C.	1480
WMSK	Morganfield, Ky.	1550
WMSL	Decatur, Ala.	1400
WMSR	Manchester, Tenn.	1320
WMST	Mt. Sterling, Ky.	1150
WMT	Cedar Rapids, Iowa	600
WMTA	Central City, Ky.	1380
WMTC	Vancleve, Ky.	730
WMTD	Hinton, W. Va.	1380
WMTE	Manistee, Mich.	1340
WMTL	Leitchfield, Ky.	1580
WMTM	Moultrie, Ga.	1300
WMTN	Morristown, Tenn.	1300
WMTR	Morristown, N.J.	1250
WMTS	Murfreesboro, Tenn.	810
WMUS	Muskegon, Mich.	1090
WMUU	Greenville, S.C.	1260
WMVA	Martinsville, Va.	1450
WMVB	Millville, N.J.	1440
WMVG	Milledgeville, Ga.	1450
WMVO	Mt. Vernon, Ohio	1300
WMVR	Sidney, Ohio	1080
WMWM	Wilmington, O.	1090
WMYB	Myrtle Beach, S.C.	1450
WMYN	Mayodan, N.C.	1420
WMYR	Ft. Myers, Fla.	1410
WNAB	Bridgeport, Conn.	1450
WNAC	Boston, Mass.	680
WNAD	Norman, Okla.	640
WNAE	Warren, Pa.	1310
WNAG	Grenada, Miss.	1400
WNAH	Nashville, Tenn.	1360
WNAK	Nanticoke, Pa.	730
WNAM	Neenah, Wis.	1280
WNAR	Norristown, Pa.	1110
WNAT	Natchez, Miss.	1450
WNAU	New Albany, Miss.	1470
WNAV	Annapolis, Md.	1430
WNAX	Yankton, S.Dak.	570
WNBC	New York, N.Y.	660
WNBF	Binghamton, N.Y.	1290
WNBH	New Bedford, Mass.	1340
WNBP	Newburyport, Mass.	1470
WNBS	Murray, Ky.	1340
WNBT	Wellsboro, Pa.	1490
WNBZ	Saranac Lake, N.Y.	1240
WNCA	Siler City, N.C.	1570
WNCC	Barnesboro, Pa.	950
WNCG	N. Charleston, S.C.	910
WNCO	Ashland, Ohio	1340
WNCT	Greenville, N. C.	1590
WNOB	Daytona Beach, Fla.	1150
WNOR	Syracuse, N.Y.	1260
WNOU	South Bend, Ind.	1490
WNEB	Worcester, Mass.	1230
WNEG	Toccoa, Ga.	630
WNEL	Caguas, P. R.	1430
WNER	Live Oak, Fla.	1250
WNES	Central City, Ky.	1050
WNEW	New York, N.Y.	1130
WNEX	Macon, Ga.	1400
WNGA	Nashville, Ga.	1600
WNGO	Mayfield, Ky.	1320
WNHC	New Haven, Conn.	1340
WNIA	Cheektowaga, N.Y.	1230
WNIK	Arecibo, P.R.	1230
WNIL	Niles, Mich.	1290
WNIO	Niles, Ohio	1540
WNIR	New Albany, Ind.	1290
WNJH	Hammonton, N.J.	1580
WNJR	Newark, N.J.	1430
WNKY	Neon, Ky.	1480
WNLC	New London, Conn.	1510
WNLK	Norwalk, Conn.	1350
WNMP	Evanston, Ill.	1590
WNNC	Newton, N.C.	1230
WNNJ	Newton, N.J.	1360
WNNR	New Orleans, La.	990
WNNT	Warsaw, Va.	690
WNOE	New Orleans, La.	1060
WNOG	Naples, Fla.	1270
WNOH	Raleigh, N. C.	1550
WNOK	Columbia, S.C.	1230
WNOO	Chattanooga, Tenn.	1260
WNOP	No. Platte, Neb.	1410
WNOR	Norfolk, Va.	1230
WNOS	High Point, N.C.	1590
WNOW	York, Pa.	1250
WNOX	Knoxville, Tenn.	990
WNPS	New Orleans, La.	1450
WNPT	Tuscaloosa, Ala.	1280
WNPV	Lansdale, Pa.	1440
WNRG	Grundy, Va.	940
WNRI	Woonsocket, R.I.	1380
WNRK	Newark, Del.	1260
WNRV	Narrows, Va.	990
WNSL	Laurel, Miss.	1260
WNSM	Valparaiso-Niceville, Florida	1340
WNTN	Newton, Mass.	1550
WNTT	Tazewell, Tenn.	1250
WNUE	Ft. Walton Bch., Fla.	1400
WNUS	Chicago, Ill.	1390
WNUW	New Albany, Ind.	1570
WNUZ	Talladega, Ala.	1230
WNVA	Norton, Va.	1350
WNVL	Nicholasville, Ky.	1250
WNVY	Pensacola, Fla.	1230
WNWI	Northwestern, Ind.	1080
WNXT	Portsmouth, Ohio	1260
WNYC	New York, N.Y.	830
WNYR	Rochester, N.Y.	680
WOAH	Miami, Fla.	1220
WOAI	San Antonio, Tex.	1200
WOAP	Owosso, Mich.	1080
WOAY	Oak Hill, W.Va.	860
WOBS	Jacksonville, Fla.	1360
WOBT	Rhinelander, Wis.	1240
WOC	Davenport, Iowa	1420
WOCB	W. Yarmouth, Mass.	1240
WOCH	North Vernon, Ind.	1460
WOCK	Okeechobee, Fla.	1570
WODI	Brookneal, Va.	1230
WODY	Bassett, Va.	900
WOGA	Sylvester, Ga.	1540
WOHI	E. Liverpool, Ohio	1490
WOHO	Toledo, Ohio	1470
WOHP	Bellefontaine, Ohio	1390
WOHS	Shelby, N.C.	730
WOI	Ames, Iowa	640
WOIB	Saline, Mich.	1290
WOIC	Columbia, S.C.	1320
WOKA	Douglas, Ga.	1310
WOKB	Winter Garden, Fla	1600
WOKE	Charleston, S.C.	1340
WOKK	Meridian, Miss.	1450
WOKO	Albany, N.Y.	1460
WOKS	Columbus, Ga.	1340
WOKW	Brockton, Mass.	1410
WOKY	Milwaukee, Wis.	920
WOKZ	Alton, Ill.	1570
WOL	Washington, D.C.	1450
WOLD	Marlon, Va.	1330
WOLF	Syracuse, N.Y.	1490
WOLS	Florence, S. C.	1230
WOMI	Owensboro, Ky.	1490
WOMN	Decatur, Ga.	1310
WOMP	Bellaire, Ohio	1290
WOMT	Manitowoc, Wis.	1240
WONA	Winona, Miss.	1570
WOND	Pleasantville, N.J.	1400
WONE	Dayton, Ohio	980
WONN	Lakeland, Fla.	1230
WONS	Tallahassee, Fla.	1410
WONW	Defiance, Ohio	1280
WOOD	Grand Rapids, Mich.	1300
WOOF	Dothan, Ala.	560
WOOK	Washington, D.C.	1340
WOOO	Oeland, Fla.	1310
WOOW	Greenville, N.C.	1340
WOPA	Oak Park, Ill.	1490
WOPI	Bristol, Tenn.	1490
WOR	New York, N.Y.	710
WORA	Mayaguez, P.R.	760
WORC	Worcester, Mass.	1310
WORD	Spartanburg, S.C.	910
WORG	Orangeburg, S.C.	1580
WORK	York, Pa.	1350
WORL	Boston, Mass.	950
WORM	Savannah, Tenn.	1010
WORT	New Smyrna Beach, Florida	1550
WORX	Madison, Ind.	1270
WOSC	Fulton, N.Y.	1300
WOSH	Oshkosh, Wis.	1490
WOSU	Columbus, Ohio	820
WOTR	Corry, Pa.	1370
WOTT	Watertown, N.Y.	1410
WOTW	Nashua, N.H.	900
WOUB	Athens, Ohio	1340
WOVE	Welch, W.Va.	1340
WOW	Omaha, Nebr.	590
WOWL	Florence, Ala.	1240
WOWO	Ft. Wayne, Ind.	1190
WOWW	Naugatuck, Conn.	860
WOWY	Clewiston, Fla.	500d
WOXF	Oxford, N.C.	1340
WOZK	Ozark, Ala.	900
WPAB	Ponce, P.R.	550
WPAC	Patchogue, N.Y.	1580
WPAD	Paducah, Ky.	1450
WPAG	Ann Arbor, Mich.	1050
WPAL	Charleston, S.C.	730
WPAM	Pottsville, Pa.	1450
WPAQ	Mount Airy, N.C.	740
WPAR	Parkersburg, W.Va.	1450
WPAT	Paterson, N.J.	930
WPAW	E. Syracuse, N.Y.	1540
WPAX	Thomasville, Ga.	1240
WPAY	Portsmouth, Ohio	1400
WPAZ	Pottstown, Pa.	1370
WPBC	Richfield, Minn.	980
WPCC	Clinton, S.C.	1400
WPCF	Panama City, Fla.	1430
WPCO	Mt. Vernon, Ind.	1590
WPDE	Paris, Ky.	1440
WPDF	Corydon, Ind.	1550
WPDM	Potsdam, N.Y.	1470

C.L.	Location	Kc.
WPDQ	Jacksonville, Fla.	600
WPDR	Portage, Wis.	1350
WPDX	Clarksburg, W.Va.	750
WPEG	Winston-Salem, N.C.	1550
WPEH	Louisville, Ga.	1420
WPEL	Montrose, Pa.	1250
WPEN	Philadelphia, Pa.	950
WPEO	Peoria, Ill.	1020
WPEP	Taunton, Mass.	1570
WPET	Greensboro, N.C.	950
WPFB	Middletown, Ohio	910
WPFP	Park Falls, Wis.	1450
WPGA	Perry, Ga.	980
WPGC	Bradbury Hghts., Md.	1580
WPGF	Burgaw, N. C.	1470
WPGM	Danville, Pa.	1570
WPGW	Portland, Ind.	1440
WPHB	Philipsburg, Pa.	1260
WPHC	Waverly, Tenn.	1060
WPHN	Liberty, Ky.	1560
WPIC	Sharon, Pa.	790
WPID	Piedmont, Ala.	1280
WPIK	Alexandria, Va.	730
WPIN	St. Petersburg, Fla.	680
WPIT	Pittsburgh, Pa.	730
WPKE	Pikeville, Ky.	1240
WPKO	Waverly, Ohio	1380
WPKY	Princeton, Ky.	1580
WPLA	Plant City, Fla.	910
WPLB	Greenville, Mich.	1380
WPLK	Rockmart, Ga.	1220
WPLM	Plymouth, Mass.	1390
WPLO	Atlanta, Ga.	590
WPLY	Plymouth, Wis.	1420
WPMB	Vandalia, Ill.	1500
WPME	Punxsutawney, Pa.	1540
WPMH	Portsmouth, Va.	1010
WPMP	Pascagoula, Miss.	1580
WPNC	Plymouth, N.C.	1470
WPNF	Brevard, N.C.	1240
WPNH	Plymouth, N. H.	1300
WPNX	Phoenix City, Ala.	1460
WPON	Pontiac, Mich.	1460
WPOP	Hartford, Conn.	1410
WPOR	Portland, Maine	1490
WPOW	New York, N.Y.	1330
WPPA	Pottsville, Pa.	1360
WPRA	Mayaguez, P.R.	990
WPRC	Lincoln, Ill.	1370
WPRE	Prairie Du Chien, Wis.	980
WPRN	Butler, Ala.	1220
WPRO	Providence, R.I.	630
WPRP	Ponce, P.R.	910
WPRS	Paris, Ill.	1440
WPRT	Prestonsburg, Ky.	960
WPRV	Wauchula, Fla.	1600
WPRW	Manassas, Va.	1460
WPRY	Perry, Fla.	1400
WPSL	Monroeville, Pa.	1510
WPTF	Raleigh, N.C.	680
WPTL	Canton, N.C.	920
WPTN	Cookeville, Tenn.	1500
WPTR	Albany, N.Y.	1540
WPTS	Pittston, Pa.	1540
WPTW	Piqua, Ohio	1570
WPTX	Lexington Pk., Md.	920
WPUV	Pulaski, Va.	1580
WPVA	Colonial Hghts., Va.	1290
WPVL	Painesville, Ohio	1460
WPXE	Starke, Fla.	1490
WPXY	Greenville, N. C.	1550
WPYB	Benson, N.C.	1580
WQAM	Miami, Fla.	560
WQBC	Vicksburg, Miss.	1420
WQDY	Calais, Maine	1230
WQIC	Meridian, Miss.	1390
WQIK	Jacksonville, Fla.	1280
WQIZ	St. George, S. C.	1300
WQMR	Silver Spring, Md.	1050
WQOK	Greenville, S.C.	1440
WQSN	Charleston, S.C.	1450
WQSR	Solvay, N.Y.	1320
WQTE	Monroe, Mich.	560
WQTW	Latrobe, Pa.	1570
WQUA	Moline, Ill.	1230
WQVA	Quantico, Va.	1530
WQXI	Atlanta, Ga.	790
WQXL	Columbia, S.C.	1320
WQXQ	Ormond Bch., Fla.	1380
WQXR	New York, N.Y.	1560
WQXT	Palm Beach, Fla.	1340
WRAA	Luray, Va.	1330
WRAB	Arab, Ala.	1380
WRAC	Racine, Wis.	1460
WRAD	Radford, Va.	1460
WRAG	Carrollton, Ala.	590
WRAI	Rio Piedras, P.R.	1190
WRAJ	Anna, Ill.	1440
WRAK	Williamsport, Pa.	1400
WRAM	Monmouth, Ill.	1330
WRAN	Dover, N.J.	1510
WRAP	Norfolk, Va.	850
WRAW	Reading, Pa.	1340
WRAY	Princeton, Ind.	1250
WRBC	Jackson, Miss.	1300
WRBD	Pampano Beach, Fla.	1470
WRBL	Columbus, Ga.	1420
WRBN	Warner Robins, Ga.	1600
WRC	Washington, D.C.	980
WRCD	Dalton, Ga.	1430
WRCH	New Britain, Conn.	910
WRCK	Tuscumbia, Ala.	1410
WRCO	Richland, Wis.	1450
WRCP	Philadelphia, Pa.	1540
WRCR	Maplewood, Minn.	1010
WRCS	Ahoskie, N.C.	970
WRDB	Reedsburg, Wis.	1400
WRDO	Augusta, Maine	1400
WRDS	S. Charleston, W.Va.	1410
WROW	Augusta, Ga.	1480
WREB	Holyoke, Mass.	930
WREC	Memphis, Tenn.	600
WREL	Lexington, Va.	1450
WREM	Remsen, N.Y.	1480
WREN	Topeka, Kans.	1250
WREO	Ashtabula, Ohio	970
WREV	Reidsville, N.C.	1220
WREX	Grand Junction, Colo.	920
WRFC	Athens, Ga.	960
WRFD	Worthington, Ohio	880
WRFS	Alexander City, Ala.	1050
WRGA	Rome, Ga.	1470
WRGS	Rogersville, Tenn.	1370
WRHC	Jacksonville, Fla.	1400
WRHI	Rock Hill, S.C.	1340
WRIB	Providence, R.I.	1220
WRIC	Richlands, Va.	540
WRIG	Wausau, Wis.	1400
WRIM	Pahokee, Fla.	1250
WRIN	Rensselaer, Ind.	1560
WRIP	Rossville, Ga.	980
WRIS	Roanoke, Va.	1410
WRIT	Milwaukee, Wis.	1340
WRIV	Riverhead, N.Y.	1390
WRIZ	Coral Gables, Fla.	1550
WRJC	Mauston, Wis.	1270
WRJN	Racine, Wis.	1400
WRJS	San German, P. R.	1060
WRJW	Picayune, Miss.	1320
WRKB	Kannapolis, N.C.	1460
WRKD	Rockland, Maine	1450
WRKH	Rockwood, Tenn.	580
WRKL	New City, N. Y.	910
WRKM	Carthage, Tenn.	1350
WRKT	Cocoa Beach, Fla.	1300
WRLD	Lanett, Ala.-W. Point, Ga.	1490
WRMA	Montgomery, Ala.	950
WRMF	Titusville, Fla.	1050
WRMN	Elgin, Ill.	1410
WRMS	Beardstown, Ill.	790
WRMT	Rocky Mount, N.C.	1490
WRNB	New Bern, N.C.	1490
WRNC	Raleigh, N.C.	1240
WRNE	Wis. Rapids, Wis.	1220
WRNL	Richmond, Va.	910
WRNY	Rome, N.Y.	1350
WROA	Gulfport, Miss.	1390
WROB	West Point, Miss.	1450
WROC	Rochester, N.Y.	1280
WROD	Daytona Beach, Fla.	1340
WROK	Rockford, Ill.	1440
WROL	Fountain City, Tenn.	1490
WROM	Rome, Ga.	710
WRON	Ronceverte, W.Va.	1400
WROS	Scottsboro, Ala.	1330
WROV	Roanoke, Va.	1240
WROW	Albany, N.Y.	590
WROX	Clarksdale, Miss.	1450
WROY	Carmi, Ill.	1460
WROZ	Evansville, Ind.	1400
WRPB	Warner Robbins, Ga.	1350
WRPL	Charlotte, N.C.	1540
WRPM	Poplarville, Miss.	1530
WRR	Dallas, Tex.	1310
WRRC	Spring Valley, N. Y.	1300
WRRR	Rockford, Ill.	1330
WRRZ	Clinton, N.C.	880
WRSA	Saratoga Sprgs., N.Y.	1280
WRSC	State College, Pa.	1390
WRSJ	Bayamon, P. R.	1560
WRSL	Stanford, Ky.	1520
WRSW	Warsaw, Ind.	1480
WRTA	Altoona, Pa.	1240
WRTH	Wood River, Ill.	590
WRTL	Ranloul, Ill.	250d
WRUF	Gainesville, Fla.	850
WRUM	Rumford, Maine	790
WRUN	Utica, N.Y.	1150
WRUS	Russellville, Ky.	610
WRVA	Richmond, Va.	1140
WRVK	Mt. Vernon, Ky.	1460
WRWD	Augusta, Ga.	1480
WRWH	Cleveland, Ga.	1380
WRWJ	Selma, Ala.	1570
WRXO	Roxboro, N.C.	1430
WRYM	New Britain, Conn.	840
WRYT	Pittsburgh, Pa.	1250
WSAC	Fort Knox, Ky.	1470
WSAF	Sarasota, Fla.	1220
WSAI	Cincinnati, Ohio	1360
WSAJ	Grove City, Pa.	1340
WSAL	Logansport, Ind.	1230
WSAM	Saginaw, Mich.	1400
WSAN	Allentown, Pa.	1470
WSAO	Senatobia, Miss.	1550
WSAR	Fall River, Mass.	1480
WSAT	nr. Salisbury, N.C.	1280
WSAU	Wausau, Wis.	550
WSAV	Savannah, Ga.	630
WSAY	Rochester, N.Y.	1370
WSAZ	Huntington, W.Va.	930
WSB	Atlanta, Ga.	750
WSBA	Savannah, Ga.	1400
WSBB	New Smyrna Beach, Florida	1230
WSBC	Chicago, Ill.	1240
WSBR	Boca Raton, Fla.	740
WSBS	Gt. Barrington, Mass.	860
WSBT	South Bend, Ind.	960
WSCM	Panama City Beach, Florida	1290
WSBP	Chattahoochee, Fla.	1580
WSCR	Scranton, Pa.	1320
WSDR	Sterling, Ill.	1240
WSEB	Sebring, Fla.	1340
WSEL	Pontotoc, Miss.	1440
WSEM	Donaldsonville, Ga.	1500
WSEN	Baldwinsville, N.Y.	1050
WSER	Elkton, Md.	1550
WSET	Glen Falls, N.Y.	1410
WSEV	Sevierville, Tenn.	930
WSFB	Quitman, Ga.	1490
WSFC	Somerset, Ky.	1240
WSFR	Sanford, Fla.	1360
WSFT	Thomaston, Ga.	1220
WSGA	Savannah, Ga.	1400
WSGB	Sutton, W.Va.	1490
WSGC	Elberton, Ga.	1400
WSGN	Birmingham, Ala.	610
WSGO	Oswego, N.Y.	1440
WSGW	Saginaw, Mich.	790
WSHB	Raeford, N.C.	1400
WSHC	Collierville, Tenn.	1590
WSHF	Sheffield, Ala.	1290
WSHN	Fremont, Mich.	1550
WSHO	New Orleans, La.	1230
WSHP	Shippenburg, Pa.	1460
WSIB	Beaufort, S.C.	1490
WSIC	Statesville, N.C.	1400
WSID	Baltimore, Md.	1010
WSIG	Mount Jackson, Va.	790
WSIM	Prichard, Ala.	1270
WSIP	Paintsville, Ky.	1490
WSIR	Winter Haven, Fla.	1490
WSIV	Pekin, Ill.	1140
WSIX	Nashville, Tenn.	980
WSJC	Magee, Miss.	810
WSJM	St. Joseph, Mich.	1400
WSJR	Modawaska, Me.	1230
WSJS	Winston-Salem, N.C.	600
WSJT	Chesapeake, Va.	1600
WSKI	Montpelier-Barre, Vt.	1240
WSKP	Miami, Fla.	1450
WSKT	S. Knoxville, Tenn.	1580
WSKY	Asheville, N.C.	1230
WSLB	Ogdensburg, N.Y.	1400
WSLC	Clermont, Fla.	1340
WSLG	Clermont, Fla.	1340
WSLI	Jackson, Miss.	930
WSMA	Marine City, Mich.	1590
WSLM	Salem, Ind.	1220
WSLR	Akron, Ohio	1350
WSLS	Roanoke, Va.	610
WSLT	Ocean City-Somers Pt., N. J.	1520
WSM	Nashville, Tenn.	650
WSMB	New Orleans, La.	1350
WSMD	La Plata, Md.	1560
WSME	Sanford, Maine	1220
WSMG	Greenville, Tenn.	1450
WSMI	Litchfield, Ill.	1540
WSMN	Nashua, N.H.	1590
WSMT	Sparta, Tenn.	1050
WSNE	Cummings, Ga.	1410
WSNJ	nr. Bridgeton, N.J.	1240
WSNO	Barre, Vt.	1450
WSNT	Sandersville, Ga.	1490
WSNW	Seneca, S. C.	1150
WSNY	Schenectady, N.Y.	1240
WSOC	Charlotte, N.C.	930
WSOK	Savannah, Ga.	1230
WSOL	Tampa, Fla.	1300
WSOM	Salem, Ohio	600
WSON	Henderson, Ky.	860
WSOO	Slt. Ste. Marie, Mich.	1230
WSOQ	No. Syracuse, N.Y.	1220
WSOR	Windsor, Conn.	1480
WSOY	Decatur, Ill.	1340
WSPA	Spartanburg, S.C.	950
WSPB	Sarasota, Fla.	1450
WSPD	Toledo, Ohio	1370
WSPF	Hickory, N.C.	1000
WSPR	Springfield, Mass.	1270
WSPT	Stevens Pt., Wis.	1010
WSPZ	Spencer, W.Va.	1400
WSRA	Milton, Fla.	1490
WSRC	Durham, N.C.	1410
WSRO	Marlborough, Mass.	1470
WSRW	Hillsboro, Ohio	1590
WSSB	Durham, N.C.	1490
WSSC	Sumter, S.C.	1340
WSSO	Starkville, Miss.	1230
WSSV	Petersburg, Va.	1240
WSTC	Stamford, Conn.	1400
WSTH	Taylorsville, N. C.	860
WSTI	St. Ignace, Mich.	940
WSTK	Woodstock, Va.	1230
WSTP	Salisbury, N.C.	1490
WSTR	Sturgis, Mich.	1230
WSTU	Stuart, Fla.	1450
WSTV	Steubenville, Ohio	1340
WSUB	Groton, Conn.	980
WSUH	Oxford, Miss.	1420
WSUI	Iowa City, Iowa	910
WSUN	St. Petersburg, Fla.	620
WSUX	Seaford, Del.	1280
WSUZ	Palatka, Fla.	800
WSVA	Harrisonburg, Va.	550
WSVL	Shelbyville, Ind.	1520
WSVN	Valdese, N.C.	1490
WSVM	Valdese, N.C.	1490
WSVS	Crewe, Va.	800
WSWN	Belle Glade, Fla.	900
WSWV	Pennington Gap, Va.	1570
WSWW	Platteville, Wis.	1590
WSYB	Rutland, Vt.	1380
WSYD	Mt. Airy, N.C.	1300
WSYL	Sylvania, Ga.	1490
WSYR	Syracuse, N.Y.	570
WTAB	Tabor City, N.C.	1370
WTAC	Flint, Mich.	600
WTAD	Quincy, Ill.	930
WTAG	Worcester, Mass.	580
WTAL	Tallahassee, Fla.	1450
WTAN	Clearwater, Fla.	1340
WTAP	Parkersburg, W.Va.	1230
WTAQ	LaGrange, Ill.	1300
WTAR	Norfolk, Va.	790
WTAW	Bryan, Tex.	1150
WTAX	Springfield, Ill.	1240
WTAY	Robinson, Ill.	1570
WTBC	Tuscaloosa, Ala.	1230
WTBF	Troy, Ala.	970
WTBO	Cumberland, Md.	1450
WTCA	Plymouth, Ind.	1050
WTCB	Flomaton, Ala.	990
WTCH	Shawano, Wis.	960
WTCJ	Tell City, Ind.	1230
WTCM	Traverse City, Mich.	1400
WTCO	Campbellsville, Ky.	1450
WTCR	Ashland, Ky.	1420
WTCS	Fairmont, W.Va.	1490
WTCW	Whitesburg, Ky.	920
WTEL	Philadelphia, Pa.	860
WTGA	Thomaston, Ga.	1590
WTGR	Myrtle Beach, S. C.	1520
WTHE	Mineola, N.Y.	1520
WTHI	Terre Haute, Ind.	1480
WTHM	Lapeer, Mich.	1530
WTHN	Thomaston, Ga.	1500
WTHT	Hazleton, Pa.	1300
WTIC	Hartford, Conn.	1080
WTID	Newport News, Va.	1270
WTIF	Tifton, Ga.	1340
WTIG	Massillon, Ohio	990
WTIK	Durham, N.C.	1310
WTIL	Mayaguez, P.R.	1300
WTIM	Taylorville, Ill.	1410
WTIP	Charleston, W.Va.	1240
WTIQ	Manistique, Mich.	1490
WTIX	New Orleans, La.	690
WTJH	East Point, Ga.	1260
WTJS	Jackson, Tenn.	1390
WTKM	Hartford, Wis.	1540
WTKO	Ithaca, N.Y.	1470
WTKY	Tompkinsville, Ky.	1370
WTLB	Utica, N.Y.	1310
WTLK	Taylorsville, N.C.	1570
WTLN	Apopka, Fla.	1520
WTLO	Somerset, Ky.	1480
WTLS	Tallasee, Ala.	1300
WTMA	Charleston, S.C.	1250
WTMB	Tomah, Wis.	1390
WTMC	Ocala, Fla.	1290
WTMJ	Milwaukee, Wis.	620
WTMP	Tampa Fla.	1150
WTMT	Louisville, Ky.	620
WTNC	Thomasville, N.C.	790
WTND	Orangeburg, S.C.	920
WTNS	Coshocton, Ohio	1560
WTNT	Tallahassee, Fla.	1270
WTOB	Winston-Salem, N.C.	1380
WTOC	Savannah, Ga.	1290
WTOD	Toledo, Ohio	1560
WTOE	Spruce Pine, N.C.	1470
WTOJ	Tomah, Wis.	1460
WTON	Staunton, Va.	1240
WTOP	Washington, D.C.	1500
WTOR	Torrington, Conn.	610
WTOT	Marianna, Fla.	980
WTPR	Paris, Tenn.	710
WTPS	Portage, Mich.	1560
WTRA	Latrobe, Pa.	1480
WTRB	Ripley, Tenn.	1570
WTRC	Elkhart, Ind.	1340
WTRL	Bradenton, Fla.	1490
WTRN	Tyrone, Pa.	1340
WTRO	Dyersburg, Tenn.	1330
WTRP	LaGrange, Ga.	620
WTRR	Sanford, Fla.	1400
WTRU	Muskegon, Mich.	1600
WTRW	Two Rivers, Wis.	1590
WTRX	Flint, Mich.	1330
WTRY	Troy, N.Y.	980
WTSA	Brattleboro, Vt.	1450
WTSB	Lumberton, N.C.	1340
WTSL	Hanover-Lebanon, New Hampshire	1400
WTSN	Dover, N.H.	1270
WTSV	Claremont, N.H.	1230
WTTB	Vero Beach, Fla.	1490
WTTC	Towanda, Pa.	1550
WTTF	Tiffin, Ohio	1600
WTTH	Port Huron, Mich.	1380
WTTI	Dalton, Ga.	1530
WTTL	Madisonville, Ky.	1310
WTTM	Trenton, N.J.	920
WTTN	Watertown, Wis.	1580
WTTO	Toledo, Ohio	1520
WTTR	Westminster, Md.	1470
WTTS	Bloomington, Ind.	1370

WHITE'S RADIO LOG

C.L.	Location	Kc.
WTTT	Amherst, Mass.	1430
WTUF	Mobile, Ala.	840
WTUG	Tuscaloosa, Ala.	790
WTUP	Tupelo, Miss.	1490
WTUX	Wilmington, Del.	1290
WTVB	Coldwater, Mich.	1590
WTVL	Waterville, Maine	1490
WTVN	Columbus, Ohio	610
WTWA	Thomson, Ga.	1240
WTWB	Auburndale, Fla.	1570
WTWN	St. Johnsbury, Vt.	1340
WTXL	W. Spgfd., Mass.	1490
WTYC	Rock Hill, S.C.	1150
WTYM	East Longmeadow, Mass.	1600
WTYN	Tryon, N.C.	1550
WTYS	Marianna, Fla.	1340
WUFO	Amherst, N.Y.	1080
WUFF	Eastman, Ga.	710
WUFO	Amherst, N.Y.	1080
WULA	Eufaula, Ala.	1240
WUMU	Gainesville, Fla.	1390
WUNA	Aquadilla, P. R.	1340
WUND	Uhrichsville, Ohio	1540
WUNE	Baton Rouge, La.	1550
WUNI	Mobile, Ala.	1410
WUNO	Rio Piedras, P.R.	1320
WUNS	Lewisburg, Pa.	1010
WUPR	Utado, P.R.	1530
WUSJ	Lockport, N.Y.	1340
WUSM	Havelock, N.C.	1330
WUST	Bethesda, Md.	1120
WUWU	Gainsville, Fla.	1390
WVAK	Paoli, Ind.	1560
WVAL	Sauk Rapids, Minn.	800
WVAM	Altoona, Pa.	1430
WVAR	Richwood, W.Va.	1280
WVCB	Shallotte, N. C.	1410
WVCF	Windermere, Fla.	1480
WVCG	Coral Gables, Fla.	1080
WVCH	Chester, Pa.	740
WVEC	Hampton, Va.	1490
WVGT	Mt. Dora, Fla.	1580
WVIC	E. Lansing, Mich.	730
WVIM	Vicksburg, Miss.	1490
WVIP	Mt. Kisco, N.Y.	1310
WVJP	Caguas, P.R.	1110
WVJS	Owensboro, Ky.	1420
WVKO	Columbus, Ohio	1580
WVLD	Valdosta, Ga.	1450
WVLK	Lexington, Ky.	590
WVLN	Olney, Ill.	740
WVMC	Mt. Carmel, Ill.	1360
WVMI	Biloxi, Miss.	570
WVMT	Burlington, Vt.	620
WVNA	Tuscumbia, Ala.	1590
WVNJ	Newark, N.J.	620
WVOB	Bel Air, Md.	1520
WVOC	Battle Creek, Mich.	1500
WVOE	Chadburn, N.C.	1590
WVOH	Hazelhurst, Ga.	920
WVOK	Birmingham, Ala.	690
WVOL	Berry Hill, Tenn.	1470
WVOM	Iuka, Miss.	1270
WVUN	Cicero, Ill.	1450
WVOP	Vidalia, Ga.	970
WVOS	Liberty, N.Y.	1240
WVOT	Wilson, N.C.	1420
WVOW	Logan, W.Va.	1290
WVOX	New Rochelle, N.Y.	1460
WVOZ	Carolina, P.R.	1400
WVPO	Stroudsburg, Pa.	840
WVSC	Somerset, Pa.	990
WVTR	White River Junc., Vt.	910
WVVW	Grafton, W.Va.	1260
WWAB	Lakeland, Fla.	1330
WWBC	Cocoa, Fla.	1510
WWBD	Bamberg-Denmark, S.C.	790
WWBR	Windber, Pa.	1350
WWBZ	Vineland, N.J.	1360
WWCA	Gary, Ind.	1270
WWCC	Bremen, Ga.	1440
WWCH	Clarion, Pa.	1300
WWCM	Brazil, Ind.	1380
WWCO	Waterbury, Conn.	1240
WWDC	Washington, D.C.	1260
WWDR	Murfreesboro, N. C.	1080
WWDS	Everett, Pa.	1110
WWGM	Nashville, Tenn.	1560
WWGO	Erie, Pa.	1450
WWGP	Sanford, N.C.	1050
WWGS	Tifton, Ga.	1430
WWHG	Hornell, N.Y.	1320
WWHY	Huntington, W.Va.	1470
WWIL	Ft. Lauderdale, Fla.	1580
WWIN	Baltimore, Md.	1400
WWIS	Black River Falls, Wis.	1260
WWIT	Canton, N.C.	970
WWIZ	Lorain, Ohio	1380
WWJ	Detroit, Mich.	950
WWJB	Brooksville, Fla.	1450
WWJC	Superior, Wis.	1270
WWKE	Ocala, Fla.	1370
WWKY	Winchester, Ky.	1380
WWL	New Orleans, La.	870
WWML	Portage, Wis.	1470
WWNC	Asheville, N.C.	570
WWNH	Rochester, N.H.	930
WWNR	Beckley, W.Va.	620
WWNS	Statesboro, Ga.	1240
WWNY	Watertown, N.Y.	790
WWOD	Lynchburg, Va.	1390
WWOK	Charlotte, N.C.	1480
WWOL	Buffalo, N.Y.	1120
WWOM	New Orleans, La.	600
WWON	Woonsocket, R.I.	1240
WWOW	Conneaut, Ohio	1360
WWPA	Williamsport, Pa.	1340
WWPF	Palatka, Fla.	1260
WWRI	W. Warwick, R.I.	1450
WWRL	New York, N.Y.	1600
WWSC	Glens Falls, N.Y.	1450
WWSD	Monticello, Fla.	1090
WWSF	Loretto, Pa.	1400
WWSR	St. Albans, Vt.	1420
WWST	Wooster, Ohio	960
WWSW	Pittsburgh, Pa.	970
WWTC	Minneapolis, Minn.	1280
WWUN	Jackson, Miss.	1590
WWVA	Wheeling, W.Va.	1170
WWWB	Jasper, Ala.	1360
WWWF	Fayette, Ala.	990
WWWR	Russellville, Ala.	920
WWXL	Manchester, Ky.	1450
WWYN	Erie, Pa.	1260
WWYO	Pineville, W.Va.	970
WXAL	Demopolis, Ala.	1400
WXCL	Peoria, Ill.	1350
WXCO	Wausau, Wis.	1230
WXGI	Richmond, Va.	950
WXHR	Cambridge, Mass.	740
WXIG	Windemere, Fla.	1480
WXKW	Troy, N. Y.	1600
WXLI	Dublin, Ga.	1230
WXLL	Big Delta, Alaska	980
WXLN	Potomac-Cabin John, Md.	950
WXLW	Indianapolis, Ind.	950
WXOK	Baton Rouge, La.	1260
WXOX	Bay City, Mich.	1250
WXMT	Merrill, Wis.	730
WXRF	Guayama, P.R.	1590
WXTN	Lexington, Miss.	1000
WXTR	Pawtucket, R.I.	550
WXUR	Media, Pa.	690
WXVA	Charles Town, W.Va.	1550
WXVW	Jeffersonville, Ind.	1450
WXXX	Hattiesburg, Miss.	1310
WXYC	Ft. Myers, Fla.	1350
WXYZ	Detroit, Mich.	1270
WYAL	Scotland Neck, N.C.	1280
WYAM	Bessemer, Ala.	1450
WYBG	Massena, N. Y.	1050
WYCL	York, S.C.	1580
WYDE	Birmingham, Ala.	850
WYGO	Corbin, Ky.	1330
WYHE	Bristol, Tenn.	1550
WYLD	New Orleans, La.	940
WYLO	Jackson, Wis.	540
WYMB	Manning, S.C.	1410
WYND	Sarasota, Fla.	1280
WYNG	Warwick-East Greenwich, R.I.	1590
WYNK	Baton Rouge, La.	1380
WYNN	Florence, S.C.	540
WYNR	Brunswick, Ga.	790
WYNS	Leighton, Pa.	1150
WYNX	Smyrna, Ga.	1550
WYNZ	Ypsilanti, Mich.	1520
WYOQ	Wyoming, Mich.	1530
WYOU	Tampa, Fla.	1550
WYPR	Danville, Va.	970
WYRE	Annapolis, Md.	810
WYRN	Louisburg, N.C.	1480
WYSH	Clinton, Tenn.	1380
WYSI	Ypsilanti, Mich.	1480
WYSL	Buffalo, N.Y.	1400
WYSR	Franklin, Va.	1250
WYTH	Madison, Ga.	1250
WYTI	Rocky Mount, Va.	1570
WYVE	Wytheville, Va.	1280
WYZE	Atlanta, Ga.	1480
WZBN	Zion, Ill.	1500
WZEP	DeFuniak Sprgs., Fla.	1460
WZIP	Cincinnati, Ohio	1050
WZKY	Albemarle, N.C.	1580
WZOB	Ft. Payne, Ala.	1250
WZOE	Princeton, Ill.	1490
WZOK	Jacksonville, Fla.	1320
WZRH	Zephyr Hills, Fla.	1400
WZUM	Carnegie, Pa.	1590
WZYX	Cowan, Tenn.	1440
WZZZ	Boynton Beach, Fla.	1510

U. S. FM Stations by Call Letters

C.L.	Location
KABC-FM	Los Angeles, Calif.
KABL-FM	San Francisco, Cal.
KACA	Prosser, Wash.
KACE-FM	Riverside, Calif.
KADI	St. Louis, Mo.
KAFI	Auburn, Calif.
KAFM	Salina, Kans.
KAIM-FM	Honolulu, Hawaii
KAJS	Newport Beach, Calif.
KAKC	Tulsa, Okla.
KAKI	San Antonio, Tex.
KALB-FM	Alexandria, La.
KALH	Oenver, Colo.
KALW	San Francisco, Calif.
KAMS	Mammoth Spring, Ark.
KANG	Angwin, Cal.
KANS-FM	Larned, Kan.
KANT-FM	Lancaster, Calif.
KANU	Lawrence, Kans.
KANW	Albuquerque, N.Mex.
KAQL-FM	Carrollton, Mo.
KARA-FM	Albuquerque, N.M.
KARK	Little Rock, Ark.
KARL-FM	Carlsbad, Cal.
KARM-FM	Fresno, Calif.
KASU	Jonesboro, Ark.
KATT	Woodland, Calif.
KATY-FM	San Luis Obispo, Calif.
KAVI-FM	Rocky Ford, Colo.
KAVR-FM	Applevalley, Cal.
KAYD	Beaumont, Tex.
KAZZ	Austin, Tex.
KBBI	Los Angeles, Calif.
KBBL	Riverside, Cal.
KBBW	San Diego, Cal.
KBBX	Seattle, Wash.
KBCA	Los Angeles, Calif.
KBCL-FM	Shreveport, La.
KBEE-FM	Modesto, Calif.
KBEY	Kansas City, Mo.
KBFI	Boise, Idaho
KBFL	Buffalo, Mo.
KBFM	Lubbock, Tex.
KBGL	Pocatello, Ida.
KBHF	Bozeman, Mont.
KBHS-FM	Hot Springs, Ark.
KBIG-FM	Los Angeles-Avalon, Cal.
KBIM-FM	Roswell, N.Mex.
KBLE-FM	Seattle, Wash.
KBMC	Eugene, Ore.
KBMF-FM	Spearman, Tex.
KBMS	Los Angeles, Calif.
KBNO	Houston, Tex.
KBOA-FM	Kennett, Mo.
KBOC	Ogden, Utah
KBOE-FM	Oskaloosa, Iowa
KBOI-FM	Boise, Ida.
KBOX-FM	Dallas, Tex.
KBOY-FM	Medford, Oreg.
KBPI	Denver, Colo.
KBRG	San Francisco, Cal.
KBRO-FM	Bremerton, Wash.
KBTC-FM	Houston, Mo.
KBTM-FM	Jonesboro, Ark.
KBUZ-FM	Mesa, Ariz.
KBVR	Corvallis, Ore.
KBYR-FM	Anchorage, Alaska
KBYU-FM	Provo, Utah
KCAB-FM	Dardanelle, Ark.
KCAL-FM	Redlands, Calif.
KCBH	Beverly Hills, Calif.(s)
KCBS-FM	San Francisco, Calif.
KCEE-FM	Tucson, Ariz.
KCER	Redding, Cal.
KCFC	Kansas City, Kan.
KCFM	St. Louis, Mo.
KCHQ-FM	Conchella, Calif.
KCIB-FM	Fresno, Calif.(s)
KCIL-FM	Houma, La.
KCKN-FM	Kansas City, Kan.
KCLE-FM	Cleburne, Tex.
KCLO-FM	Leavenworth, Kans.
KCLU-FM	Rolla, Mo.
KCMA	San Francisco, Cal.
KCMB-FM	Wichita, Kans.
KCMI	Los Angeles, Calif.
KCMK	Kansas City, Mo.
KCMO-FM	Kansas City, Mo.(s)
KCMS-FM	Manitou Springs, Colo.
KCOM	Omaha, Nebr.
KCPS	Tacoma, Wash.
KCPX-FM	Salt Lake City, Utah
KCRA-FM	Sacramento, Calif.
KCRW	Santa Monica, Calif.
KCSB-FM	Santa Barbara, Cal.
KCSM	San Mateo, Calif.
KCSU-FM	Ft. Collins, Colo.
WCTS FM	Minneapolis, Minn.
KCUE-FM	Red Wing, Minn.
KCUI	Pella, Ia.
KCUL-FM	Ft. Worth, Tex.
KCUR-FM	Kansas City, Mo.
KCVR-FM	Lodi, Calif.
KCWS-FM	Ellensburg, Wash.
KCYS	Richland, Wash.
WDAF-FM	Kansas, Mo.
KDB-FM	Santa Barbara, Calif.
KDDD-FM	Dumas, Tex.
KDEF-FM	Albuquerque, N.Mex.
KOES-FM	Palm Sgs., Calif.
KOFC	San Francisco, Calif.
KDEF-FM	Albuquerque, N. M.
KDFM	Walnut Creek, Cal.
KDFR	Tulare, Cal.
KDHI-FM	Twenty-Nine Palms, Cal.
KDKA-FM	Pittsburgh, Pa.
KDLA-FM	De Ridder, La.
KDMC	Corpus Christi, Tex.
KDMI	Des Moines, Iowa(s)
KDNC-FM	Spokane, Wash.
KDNT-FM	Denton, Tex.
KDOK-FM	Tyler, Tex.
KDPS	Des Moines, Iowa
KDSU	Fargo, N.D.
KDTH-FM	Dubuque, Ia.
KDUO	Riverside, Calif.(s)
KDUX-FM	Aberdeen, Wash.
KDVR	Sioux City, Ia.(s)
KEAR	San Francisco, Calif.
KEAX	National City, Calif.
KEBJ	Phoenix, Ariz.
KEBR	Sacramento, Calif.
KEBS	San Diego, Calif.
KECR	El Cajon, Calif.
KEDC-FM	Northridge, Cal.
KEED-FM	Springfield-Eugene, Oregon
KEEN-FM	San Jose, Calif.
KEEZ	San Antonio, Tex.(s)
KEFC	Waco, Tex.(s)
KEFM	Santa Posa, Cal.
KEFW	Honolulu, Hawaii
KEIR	Dallas, Tex.
KELD-FM	El Dorado, Ark.(s)
KELE	Phoenix, Ariz.
KELO-FM	Sioux Falls, S. D.
KELT	Harlingen, Tex.
KEMO	St. Louis, Mo.
KERI	Bellingham, Wash.
KERN-FM	Bakersfield, Calif.
KERR	Salinas, Cal.
KERS	Sacramento, Cal.
KESM-FM	El Dorado Springs, Mo.
KETO-FM	Seattle, Wash.(s)
KEWC-FM	Cheney, Wash.
KEZE	Anaheim, Calif.
KFAB-FM	Omaha, Nebr.
KFAC-FM	Los Angeles, Calif.
KFAM-FM	St. Cloud, Minn.
KFAY-FM	Fayetteville, Ark.
KFBD	Waynesville, Mo.
KFBK-FM	Sacramento, Calif.
KFCA	Phoenix, Ariz.
KFGQ-FM	Boone, Iowa
KFH-FM	Wichita, Kans.
KFJC	Los Altos, Cal.
KFJZ	Fort Worth, Tex.
KFLA-FM	Scott City, Kan.
KFLY-FM	Corvallis, Ore.
KFMB-FM	San Diego, Calif.
KFMC	Portland, Oreg.
KFMF	Ft. Collins, Colo.
KFMG	Des Moines, Ia.
KFMK	Houston, Tex.(s)
KFML-FM	Denver, Colo.(s)
KFMM	Tucson, Ariz.
KFMN	Abilene, Tex.
KFMP	Port Arthur, Tex.(s)
KFMQ	Lincoln, Nebr.
KFMR	Fremont, Cal.
KFMU	Glendale, Calif. (s)
KFMV	Minneapolis, Minn
KFMW	San Bernardino, Calif.
KFMX	San Diego, Calif.(s)
KFMY	Eugene, Oreg.(s)
KFNB	Oklahoma City, Okla.
KFNE	Big Springs, Tex.
KFNW-FM	Fargo, N.D.
KFOG	San Francisco, Calif.
KFOX-FM	Los Angeles, Cal.
KFRC-FM	San Francisco, Calif.
KFRE-FM	Fresno, Calif.
KFRN-FM	Brownwood, Tex.
KFUO-FM	Clayton, Mo.
KFYR-FM	Bismarck, N.D.
KGAF-FM	Gainesville, Tex.
KGB-FM	San Diego, Calif.

C.L.	Location
KGBC-FM	Galveston, Tex.
KGBI-FM	Omaha, Neb.
KGBN-FM	Caldwell, Idaho
KGEE-FM	Bakersfield, Cal. (s)
KGEN-FM	Tulare, Cal.
KGFM	Edmonds, Wash.
KGGK	Garden Grove, Calif.(s)
KGHO-FM	Hoquiam, Wash.
KGLA	Los Angeles, Calif.
KGME-FM	Centralia, Wash.
KGMI-FM	Bellingham, Wash.
KGNC-FM	Amarillo, Tex.
KGNO-FM	Dodge City, Kan.
KGO-FM	San Francisco, Calif.
KGPO	Grants Pass, Oreg.
KGRI-FM	Henderson, Tex.
KGUD-FM	Santa Barbara, Calif.
KGUS	Hot Springs, Ark.
KGVW-FM	Belgrade, Mont.
KHAK-FM	Cedar Rapids, Iowa(s)
KHAR-FM	Anchorage, Alaska
KHBL	Plainview, Tex.
KHBR-FM	Hillsboro, Tex.
KHCB-FM	Houston, Tex.
KHEP-FM	Phoenix, Ariz.
KHFI-FM	Austin, Tex.
KHFM	Albuquerque, N.Mex.(s)
KHFR-FM	Monterey, Calif.(s)
KHGM	Beaumont, Tex.(s)
KHIQ	Sacramento, Calif.(s)
KHJ-FM	Los Angeles, Calif.
KHMS	El Paso, Tex.
KHOB-FM	Hobbs, N. M.
KHOF	Los Angeles, Calif.
KHOL-FM	Kearney, Neb.
KHOM-FM	Turlock, Calif.(s)
KHOZ-FM	Harrison, Ark.
KHPC	Brownwood, Tex.
KHQ-FM	Spokane, Wash.
KHSC	Arcata, Calif.
KHSJ-FM	Hemet, Cal.
KHUL	Houston, Tex.
KHVH-FM	Honolulu, Hawaii
KHVR	Bijou, Calif.
KHYI	Fremont, Calif.
KICD-FM	Spencer, Ia.
KICS-FM	Hastings, Neb.
KICN	Omaha, Nebr.
KID-FM	Idaho Falls, Ida.
KIEM	Eureka, Calif.
KIFG-FM	Iowa Falls, Ia.
KIFM	Bakersfield, Cal.
KIHI	Tulsa, Okla.
KIKS-FM	Lake Charles, La.
KIMN-FM	Denver, Colo.
KIMP-FM	Mt. Pleasant, Tex.
KING-FM	Seattle, Wash.
KIOD	Oklahoma, Okla.
KIRO-FM	Seattle, Wash.
KISA	Kansas City, Mo.
KISS	San Antonio, Tex.
KISW	Seattle, Wash.(s)
KITH	Phoenix, Ariz.
KITT	San Diego, Calif.
KITY	San Antonio, Tex. (s)
KIXI-FM	Seattle, Wash.
KIXL-FM	Dallas, Tex.(s)
KJAZ	Alameda, Calif.
KJCK-FM	Junction City, Kan.
KJEF-FM	Jennings, La.
KJEM-FM	Okla. City, Okla.
KJIM	Ft. Worth, Tex.
KJLH	Long Beach, Cal.
KJLM	San Diego, Calif.
KJML	Sacramento, Calif.
KJOY-FM	Burlington, Vt.
KJPO	Fresno, Calif.
KJRG-FM	Newton, Kans. (s)
KJSB	Houston, Tex.
KJSK-FM	Columbus, Neb.
KKFM	Colorado Springs, Colo.
KKHI-FM	San Francisco, Cal.
KKIT-FM	Taos, N. M.
KKOP	Redondo Beach, Cal.
KLAC-FM	Los Angeles, Calif.
KLAK-FM	Lakewood, Colo.
KLAW	Lawton, Okla.
KLAY-FM	Tacoma, Wash.
KLBS-FM	Los Banos, Cal.
KLCN-FM	Blytheville, Ark.
KLEA-FM	Lovington, N. M.
KLEF	Houston, Tex. (s)
KLEN-FM	Killeen, Tex.
KLGS	Los Gatos, Cal.
KLFM	Beverly Hills, Calif.
KLIR-FM	Denver, Colo.
KLIZ-FM	Brainerd, Minn.
KLJT	Lake Jackson, Tex.
KLMO-FM	Longmont, Colo.
KLOA-FM	Ridgecrest, Calif.
KLOM-FM	Lompoc, Cal.
KLON	Long Beach, Calif.
KLOR-FM	Ponca City, Okla.
KLOV-FM	Loveland, Colo.
KLRO	San Diego, Calif.(s)
KLSN	Seattle, Wash.(s)
KLST	Colorado Springs, Colo.(s)
KLUB-FM	Salt Lake City, Utah
KLUE-FM	Longview, Tex.
KLUR	Wichita Falls, Tex.
KLVI-FM	Beaumont, Tex.
KLVL	Pasadena, Tex.

C.L.	Location
KLWN-FM	Lawrence, Kan.
KLXN	Seattle, Wash.
KLYD-FM	Bakersfield, Calif.
KLYN-FM	Lynden, Wash.
KLYX	Memphis, Tenn.
KLZ-FM	Denver, Colo.
KMAG-FM	Ft. Smith, Ark.
KMAK-FM	Fresno, Calif.
KMAP	Dallas, Tex.
KMAX	Sierra Madre, Calif.
KMBC-FM	Kansas City, Mo.(s)
KMBY-FM	Pacific Grove, Cal.
KMCP	Portland, Oreg.
KMEO	Phoenix, Ariz. (s)
KMER	Fresno, Calif.
KMET	Denver, Colo.
KMFM	San Antonio, Tex. (s)
KMHT	Marshall, Tex.
KMJ-FM	Fresno, Calif.
KMLB-FM	Monroe, La.(s)
KMMK	Little Rock, Ark.
KMOD-FM	Midland, Tex.
KMOR-FM	Morehead, Ky.
KMOX-FM	St. Louis, Mo.
KMPX	San Francisco, Calif.(s)
KMSC	Clear Lake City, Tex.
KMSM	Rolla, Mo.
KMSU	Mankato, Minn.
KMUL-FM	Muleshoe, Tex.
KMUW	Wichita, Kans.
KMYC-FM	Marysville, Calif.
KMUZ	Santa Barbara, Calif.(s)
KNBQ	Bethany, Okla.
KNBR-FM	San Francisco, Calif.
KNBU	Baldwin, Kan.
KNDX	Yakima, Wash.
KNEA-FM	Jonesboro, Ark.
KNEB-FM	Scottsbluff, Nebr.
KNEO-FM	McAlester, Okla.
KNER	Dallas, Tex.
KNEV	Reno, Nev. (s)
KNEW-FM	Scottsbluff, Nebr.
KNFB	Nowata, Okla.
KNFM	Midland, Tex.
KNHS	Torrance, Cal.
KNIK-FM	Anchorage, Alaska
KNIX-FM	Phoenix, Ariz. (s)
KNJO	Thousand Oaks, Calif.
KNOB	Long Beach, Calif. (s)
KNOC-FM	Natchitoches, La.
KNOE-FM	Monroe, La.
KNOF	St. Paul, Minn.
KNOK-FM	Ft. Worth, Tex.
KNRO-FM	Conroe, Tex.
KNTO	Wichita Falls, Tex.(s)
KNUS	Dallas, Tex.
KNWS-FM	Waterloo, Iowa
KNX-FM	Los Angeles, Calif.
KNXR	Rochester, Minn.
KOA-FM	Denver, Colo.
KOAP-FM	Portland, Ore.
KOAT-FM	Albuquerque, N.M.
KOB-FM	Albuquerque, N.M.
KOBH-FM	Hot Springs, S.D.
KOCM	Newport Beach, Cal.
KOCV	Odessa, Tex.
KOCW	Tulsa, Okla.(s)
KOCY-FM	Oklahoma City, Okla.
KODA-FM	Houston, Tex.
KOFM	Oklahoma City, Okla.
KOFO-FM	Ottawa, Kan.
KOGM-FM	Tulsa, Okla
KOGO	San Diego, Calif.
KOIN-FM	Portland, Oreg.
KOKH	Oklahoma City, Okla.
KOL-FM	Seattle, Wash.
KONG-FM	Visalia, Calif.
KOOL-FM	Phoenix, Ariz.
KOPR-FM	Great Falls, Mont.
KORA-FM	Bryan, Tex.
KORK	Las Vegas, Nev.
KOSE-FM	Osceola, Ark.
KOSI-FM	Denver, Colo.
KOST	Dallas, Tex.
KOSU-FM	Stillwater, Okla.(s)
KOSY-FM	Texarkana, Tex.
KOTN-FM	Pine Bluff, Ark.
KOWH-FM	Omaha, Neb.
KOWN-FM	Escondido, Cal.
KOYA	Ontario, Cal.
KOYL-FM	Odessa, Tex.
KOZE-FM	Lewiston, Idaho
KPAC-FM	Port Arthur, Tex.
KPAN-FM	Hereford, Tex.
KPAT-FM	Berkeley, Calif.
KPCS	Pasadena, Calif.
KPDQ-FM	Portland, Ore.
KPEL-FM	Lafayette, La.
KPEN	San Francisco, Cal.(s)
KPET-FM	Lamesa, Tex.
KPFA	Berkeley, Calif.
KPFB	Berkeley, Calif.
KPFK	Los Angeles, Calif.
KPLC-FM	Lake Charles, La.
KPLT-FM	Paris, Tex.
KPLX	San Jose, Cal.
KPFM	Portland, Oreg.(s)
KPGM	Los Altos, Calif.
KPLR-FM	St. Louis, Mo.
KPMT	Oxnard, Cal.
KPOI-FM	Honolulu, Hawaii (s)
KPOJ-FM	Portland, Oreg.
KPOL-FM	Los Angeles, Calif.

C.L.	Location
KPPC-FM	Pasadena, Calif.
KPPS-FM	Parsons, Kans.
KPRI	San Diego, Calif.
KPRN	Seattle, Wash.
KPRS-FM	Kansas City, Mo.
KPSD	Dallas, Tex.
KQAL-FM	Omaha, Nebr.(s)
KQFM	Portland, Oreg.
KQIP	Odessa, Tex.
KQRS-FM	Golden Valley, Minn.
KQTY	Wichita, Kan.
KQUE	Houston, Tex. (s)
KQV-FM	Pittsburgh, Pa.
KRAB	Seattle, Wash.
KRAK-FM	Stockton, Calif.
KRAM-FM	Las Vegas, Nev.
KRAV	Tulsa, Okla.(s)
KRBE	Houston, Tex.(s)
KRCC	Colorado Springs, Colo.
KRCW	Santa Barbara, Calif.
KREB	Monroe, La.
KREM-FM	Spokane, Wash.
KREP	Santa Clara, Cal.
KREX-FM	Grand Junction, Colo.
KRFM	Phoenix, Ariz.
KRHM	Los Angeles, Calif.
KRIL	El Dorado, Ark.(s)
KRIT	Clarion, Iowa
KRKD-FM	Los Angeles, Calif.
KRKH-FM	Lubbock, Tex.
KRKY	Denver, Colo.
KRLD-FM	Dallas, Tex.
KRMD-FM	Shreveport, La.
KRMG-FM	Tulsa, Okla.
KRML-FM	Carmel, Cal.
KRMS-FM	Osage Beach, Mo.
KRNL-FM	Mt. Vernon, Ia.
KRNW	Boulder, Colo.
KRNY-FM	Kearney-Holdrege, Nebraska
KRDC-FM	Rochester, Minn.
KRON-FM	San Francisco, Calif.
KROS-FM	Clinton, Iowa
KROW	Santa Barbara, Calif.
KRDY-FM	Sacramento, Calif.
KRPM	San Jose, Calif.
KRRC	San Jose, Calif.
KRSA-FM	Salinas, Cal.
KRSI	Minneapolis, Minn.(s)
KRSI-FM	St. Louis Park, Minn.
KRSL-FM	Russell, Kan.
KRSN-FM	Los Alamos, N.Mex.
KRST	Albuquerque, N. M.
KRUS-FM	Ruston, La.
KRVM	Eugene, Oreg.
KRVN-FM	Lexington, Nebr.
KRWG	University Park, N. M.
KRVS-FM	Lafayette, La.
KRYT-FM	Colorado Springs, Colo.
KSAM-FM	Huntsville, Tex.
KSBY-FM	San Luis Obispo, Cal.
KSCO	Santa Cruz, Calif.
KSBW-FM	Salinas, Calif.
KSOA	La Sierra, Calif.
KSOB-FM	Manhattan, Kans.
KSDO-FM	San Diego, Cal.
KSDS	San Diego, Calif.
KSEA	San Diego, Calif.
KSEL-FM	Lubbock, Tex.
KSEO-FM	Durant, Okla.
KSFM	Dallas, Tex.(s)
KSFR	San Francisco, Calif.(s)
KSFV	San Fernando, Calif.
KSFX	San Francisco, Calif.
KSGV	West Covina, Cal.
KSHE	Crestwood, Mo.
KSHS	Colorado Springs, Colo.
KSIS-FM	Sedalia, Mo. (s)
KSJO-FM	San Jose, Calif.(s)
KSJS	San Jose, Calif.
KSJT	San Angelo, Tex.
KSL-FM	Salt Lake City, Utah(s)
KSLA	Seattle, Wash.(s)
KSLH	St. Louis, Mo.
KSLO-FM	Opelousas, La.
KSMA-FM	Santa Maria, Calif.
KSMB	Lafayette, La.
KSNM	Santa Fe, N. M.
KSO-FM	Des Moines, Iowa
KSOM	Tucson, Ariz.
KSOP-FM	Salt Lake City, Utah (s)
KSPC	Claremont, Calif.
KSPI-FM	Stillwater, Okla.
KSPL-FM	Diboll, Tex.
KSRF	Santa Monica, Calif.
KSTE	Emporia, Kans.
KSTL-FM	St. Louis, Mo.
KSTN-FM	Stockton, Calif.
KSTP-FM	St. Paul, Minn.
KSUI	Iowa City, Iowa
KSYN	Joplin, Mo.(s)
KTAC-FM	Tacoma, Wash.
KTAL	Texarkana, Tex.
KTAP	Tucson, Ariz.
KTAR-FM	Phoenix, Ariz.
KTBC-FM	Austin, Tex.(s)
KTCF	Cedar Falls, Iowa
KTCS-FM	Ft. Smith, Ark.
KTCU-FM	Ft. Worth, Tex.
KTEA-FM	Midwest City, Okla.
KTEC	Oretech, Oreg.

C.L.	Location
KTFC	Sioux City, Ia.
KTGM	Denver, Colo.
KTIB-FM	Thibodaux, La.
KTIM	San Rafael, Calif.
KTIS-FM	Minneapolis, Minn.
KTJO-FM	Ottawa, Kans.
KTMS-FM	Santa Barbara, Cal.
KTNT-FM	Tacoma, Wash.
KTOD-FM	Sinton, Tex.(s)
KTOP	Topeka, Kan.
KTOY	Tacoma, Wash.
KTQM-FM	Clovis, N. M.
KTRB-FM	Modesto, Calif.
KTRH-FM	Houston, Tex.
KTSM-FM	El Paso, Tex.
KTSR	Kansas City, Mo.
KTTS-FM	Springfield, Mo.
KTUX	Hayward, Cal.
KTW-FM	Seattle, Wash.
KTWD	Spokane, Wash.
KTWN	Anoka, Minn.
KTXJ-FM	Jasper, Tex.
KTXN-FM	Victoria, Tex.
KTWR	Tacoma, Wash.
KTXR-FM	Springfield, Mo.(s)
KTXT-FM	Lubbock, Tex.
KTYM-FM	Inglewood, Calif.
KUAC	College, Alaska
KUID	Moscow, Ida.
KUDE-FM	Oceanside, Calif.
KUDU-FM	Ventura-Oxnard, Calif.(s)
KUER	Salt Lake City, Utah
KUFM	Missoula, Mont.
KUFY	Redwood City, Calif.
KUGN-FM	Eugene, Oreg.
KUHF	Houston, Tex.
KUKI-FM	Ukiah, Cal.
KUMD-FM	Duluth, Minn.
KUNF	La Canada, Cal.
KUOA-FM	Siloam Springs, Ark.
KUOH	Honolulu, Hawaii
KUOP	Stockton, Cal.(s)
KUOR-FM	Redlands, Cal.
KUOW	Seattle, Wash.
KUPD-FM	Tempe, Ariz.
KUPK-FM	Garden City, Kan.
KURL-FM	Billings, Mont.
KUSC	Los Angeles, Calif.
KUSN-FM	St. Joseph, Mo.
KUSU-FM	Logan, Utah
KUT-FM	Austin, Tex.
KUTE	Glendale, Calif.
KUWS-FM	Newton, Ia.
KVCR	San Bernardino, Calif.
KVEG-FM	Las Vegas, Nev.
KVEN-FM	Ventura, Calif.
KVFM	San Fernando, Calif.
KVII-FM	Amarillo, Tex.
KVIL-FM	Highland Park-Dallas, Tex.
KVOA-FM	Tucson, Ariz.
KVOE-FM	Emporia, Kan.
KVOF-FM	El Paso, Tex.
KVOK	Honolulu, Hawaii
KVOP-FM	Plainview, Tex.
KVOR-FM	Colorado Springs, Colo.
KVSC	Logan, Utah
KVTT	Dallas, Tex.
KVWM	Show Low, Ariz.
KWAR	Waverly, Iowa
KWAX	Eugene, Oreg.
KWBE-FM	Beatrice, Neb.
KWBU	Waco, Tex.
KWDM	Des Moines, Ia. (s)
KWFM	Minneapolis, Minn.(s)
KWG-FM	Stockton, Calif.
KWGN-FM	Abernathy, Tex.
KWGS	Tulsa, Okla.
KWHG	Lincoln, Neb.
KWHI-FM	Brenham, Tex.
KWHO-FM	Salt Lake City, Utah
KWHP	Edmond, Okla.
KWIP-FM	Merced, Cal.
KWIX	St. Louis, Mo.
KWIZ-FM	Santa Ana, Calif.
KWJB-FM	Globe, Ariz.
KWKC-FM	Abilene, Tex.
KWKH-FM	Shreveport, La.
KWLM-FM	Willmar, Minn.
KWLW	San Angelo, Tex.
KWMF-FM	Walnut Creek, Cal.
KWMO	Odessa, Tex.
KWMT-FM	Ft. Dodge, Ia.
KWNS-FM	Pratt, Kan.
KWNT-FM	Davenport, Ia.
KWOA-FM	Worthington, Minn.
KWOC-FM	Poplar Bluff, Mo.
KWPC-FM	Muscatine, Iowa
KWPM-FM	West Plains, Mo.
KWWC-FM	Columbia, Mo.
KXEL-FM	Waterloo, Iowa(s)
KXFM	Santa Maria, Cal.
KXIC-FM	Iowa City, Ia.
KXJK-FM	Forrest City, Ark.
KXKX	San Francisco, Calif.
KXL-FM	Portland, Ore.
KXLU	Los Angeles, Calif.
KXLY-FM	Spokane, Wash.
KXOA	Sacramento, Calif.
KXOL-FM	Ft. Worth, Tex. (s)
KXQR	Fresno, Calif.(s)
KXRQ	Sacramento, Calif.

WHITE'S RADIO LOG

C.L.	Location
KXTR	Kansas City, Mo.(s)
KXXI	Alamogordo, N. M.
KXYZ-FM	Houston, Tex. (s)
KYA-FM	San Francisco, Calif.
KYEW	Phoenix, Ariz.
KYFM	Oklahoma City, Okla.
KYLE-FM	Temple, Tex.
KYMS	Santa Ana, Cal.
KYSM-FM	Mankato, Minn.
KYW-FM	Cleveland, Ohio
KZAK	Tyler, Tex.
KZAM	Seattle, Wash.(s)
KZFM	Corpus Christi, Tex.
KZOM	Oklahoma City, Okla.
KZSU	Stanford, Cal.
KZUN-FM	Opportunity, Wash.
WAAB-FM	Worcester, Mass.
WAAM-FM	Parkersburg, W.Va.
WAAZ-FM	Crestview, Fla.
WABA-FM	Aguadilla, P.R.
WABC-FM	New York, N.Y.
WABE	Atlanta, Ga.
WABF-FM	Fairhope, Ala.
WABI-FM	Bangor, Maine
WABQ	Cleveland, Ohio
WABX-FM	Detroit, Mich. (s)
WABZ-FM	Albemarle, N.C.
WACO	Waco, Tex.
WACT-FM	Tuscaloosa, Ala.
WACY-FM	Moss Point, Miss.
WAEB-FM	Cincinnati, Ohio
WAEF-FM	Cincinnati, O.
WAER	Syracuse, N.Y.
WAEZ	Miami Beach, Fla.(s)
WAGR-FM	Lumberton, N.C.
WAGY-FM	Forest City, N. C.
WAHR	Huntsville, Ala. (s)
WAIC	San Juan, P.R.
WAIR-FM	Winston-Salem, N.C.
WAIV	Indianapolis, Ind.
WAJC	Indianapolis, Ind.
WAJM	Montgomery, Ala.(s)
WAJP	Joliet, Ill.
WAJR-FM	Morgantown, W.Va.
WAKN-FM	Aiken, S.C.
WAKO-FM	Lawrenceville, Ill.
WAKR-FM	Akron, Ohio
WAKW-FM	Cincinnati, Ohio
WALK-FM	Patchogue, N.Y.
WALL-FM	Middletown, N. Y.
WAMC	Albany, N.Y.
WAMF	Amherst, Mass.
WAMO-FM	Pittsburgh, Pa.
WAMU-FM	Washington, D.C.
WANG	Goldwater, Mich.
WANY-FM	Albany, Ky.
WAOV-FM	Vincennes, Ind.
WAPC-FM	Riverhead, N.Y.(s)
WAPI-FM	Birmingham, Ala.
WAPL-FM	Appleton, Wis.
WAPS	Akron, Ohio
WAQE-FM	Towson, Md.(s)
WARC	Meadville, Pa.
WARD-FM	Johnstown, Pa.
WARK	Little Rock, Ark. (s)
WARN-FM	Fort Pierce, Fla.
WARU-FM	Peru, Ind.
WASA-FM	Havre De Grace, Md.
WASH	Washington, D.C.(s)
WASK-FM	Lafayette, Ind.
WATH-FM	Athens, O.
WATR-FM	Waterbury, Conn.
WAUG-FM	Augusta, Ga.
WAUK-FM	Waukesha, Wis.
WAUP	Akron, Ohio
WAVA-FM	Arlington, Va.
WAVO-FM	Atlanta, Ga.
WAVU-FM	Albertville, Ala.
WAVY-FM	Portsmouth, Va.
WAWK-FM	Kendallville, Ind.
WAWR-FM	Bowling Green, O.
WAWZ-FM	Zarephath, N.J.
WAXO	Kenosha, Wis.
WAYL	Minneapolis, Minn. (s)
WAYZ-FM	Waynesboro, Pa.
WAZL-FM	Hazelton, Pa.
WAZY-FM	Lafayette, Ind.
WBAA-FM	W. Lafayette, Ind.
WBAB-FM	Babylon, N.Y.
WBAI	New York, N.Y.
WBAL-FM	Baltimore, Md.
WBAP-FM	Ft. Worth, Tex.(s)
WBAY	Green Bay, Wis.(s)
WBBB-FM	Burlington, N.C.(s)
WBBF-FM	Rochester, N.Y.
WBBM-FM	Chicago, Ill.
WBBO-FM	Forest City, N.C.
WBBQ-FM	Augusta, Ga.
WBBR-FM	E. St. Louis, Ill.
WBBW-FM	Youngstown, Ohio (s)
WBCA-FM	Bay Minette, Ala.
WBCB-FM	Levittown-Fairless Hills, Pa.
WBCI-FM	Williamsburg, Va.
WBCL-FM	South Beloit, Ill.
WBCM-FM	Bay City, Mich.
WBCN	Boston, Mass.(s)
WBCO-FM	Bucyrus, O.
WBCR-FM	Beloit, Wis.
WBDG	Indianapolis, Ind.
WBEL-FM	S. Beloit, Ill.
WBEN-FM	Buffalo, N.Y.
WBET-FM	Brockton, Mass.
WBEU-FM	Beaufort, S.C.(s)
WBEX-FM	Chillicothe, Ohio
WBEZ	Chicago, Ill.
WBFG	Detroit, Mich.
WBFM	Seneca, S. C.
WBFO	Buffalo, N.Y.
WBGM-FM	Tallahassee, Fla.
WBGO	Newark, N.J.
WBGU	Bowling Green, Ohio
WBHS	Warwick, R.I.
WBHT-FM	Brownsville, Tenn.
WBIE-FM	Marietta, Ga.
WBIR	Knoxville, Tenn.
WBIV	Wethersfield, N.Y.
WBJC	Baltimore, Md.
WBKV-FM	West Bend, Wis.(s)
WBKW	Beckley, W.Va.
WBKY	Lexington, Ky.
WBLK-FM	Buffalo, N.Y.
WBLR-FM	Batesburg, S.C.
WBLY-FM	Springfield, Ohio
WBMK-FM	West Point, Ga.
WBMI	Meridan, Conn.(s)
WBNE-FM	Fitchburg, Mass.
WBNT-FM	Oneida, Tenn.
WBMP	Elwood, Ind.
WBNO-FM	Bryan, Ohio
WBNS-FM	Columbus, Ohio
WBOC-FM	Salisbury, Md.
WBOE	Cleveland, Ohio
WBON	Milwaukee, Wis.
WBOR	Brunswick, Maine
WBOS-FM	Brookline, Mass.
WBOW-FM	Terre Haute, Ind.
WBPZ-FM	Lock Haven, Pa.
WBRB-FM	Mt. Clemens, Mich.
WBRC	Birmingham, Ala.
WBRD-FM	Bradenton, Fla. (s)
WBRE-FM	Wilkes-Barre, Pa.
WBRK-FM	Pittsfield, Mass.
WBRN-FM	Big Rapids, Mich.
WBRU	Providence, R.I.
WBSM-FM	New Bedford, Mass.
WBST	Muncie, Ind.
WBT-FM	Charlotte, N.C.(s)
WBTC-FM	Houston, Mo.
WBUD-FM	Trenton, N.J.(s)
WBUF	Buffalo, N.Y.
WBUR	Boston, Mass.
WBUT-FM	Butler, Pa.
WBUY-FM	Lexington, N.C.
WBVA	Woodbridge, Va.
WBVP-FM	Beaver Falls, Pa.
WBWC	Berea, Ohio
WBYM	Bayamon, P.R.
WBYO	Boyertown, Pa.(s)
WBZ-FM	Boston, Mass.
WCAC	Anderson, S.C.
WCAO-FM	Baltimore, Md.
WCAR-FM	Detroit, Mich.
WCAS	Knoxville, Tenn.
WCAU-FM	Philadelphia, Pa.
WCBC	Catonsville, Md.
WCBE	Columbus, Ohio
WCBL-FM	Benton, Ky.
WCBM-FM	Baltimore, Md.
WCBS-FM	New York, N.Y.
WCBW	Columbia, Ill.
WCCC-FM	Hartford, Conn.
WCCM-FM	Lawrence, Mass.
WCCN-FM	Neillsville, Wis.
WCCV-FM	Charlottesville, Va.
WCED-FM	Dubois, Pa.
WCEF-FM	Parkersburg, W. Va.
WCEN-FM	Mt. Pleasant, Mich.(s)
WCER-FM	Charlotte, Mich.
WCFM	Williamstown, Mass.
WCHA-FM	Chambersburg, Pa.(s)
WCHD	Detroit, Mich.
WCHK-FM	Canton, Ga.
WCHN-FM	Norwich, N.Y.
WCHS-FM	Charlestown, W.Va.
WCHO-FM	Washington Court House, O.
WCKW	La Place, La.
WCLE-FM	Cleveland, Tenn.
WCLI-FM	Corning, N.Y.
WCLM	Chicago, Ill.
WCLO-FM	Janesville, Wis.
WCLT-FM	Newark, Ohio
WCLV	Cleveland, O.(s)
WCLW-FM	Mansfield, Ohio
WCMC-FM	Wildwood, N.J.
WCMB-FM	Harrisburg, Pa.
WCME-FM	Brunswick, Maine
WCMF-FM	Rochester, N.Y.(s)
WCMI-FM	Ashland, Ky.
WCMN-FM	Arecibo, P.R.
WCMO	Marietta, Ohio
WCMS-FM	Norfolk, Va.
WCMU-FM	Mt. Pleasant, Mich.
WCNB-FM	Connersville, Ind.
WCNH-FM	Quincy, Fla.
WCNO	Canton, Ohio(s)
WCNT-FM	Centralia, Ill.
WCNW-FM	Hamilton, Ohio
WCOA-FM	Pensacola, Fla.
WCOD	Richmond, Va.
WCOH-FM	Newnan, Ga.
WCOL-FM	Columbus, Ohio
WCOM-FM	Urbana, O.
WCON-FM	Cornelia, Ga.
WCOP-FM	Boston, Mass.
WCOS-FM	Columbia, S.C.
WCOU-FM	Lewiston, Maine
WCOW-FM	Sparta, Wis.
WCPO-FM	Cincinnati, Ohio
WCPS-FM	Tarbor, N.C.
WCRA-FM	Effingham, Ill.
WCRB-FM	Waltham, Mass.(s)
WCRO	Bluffton, Ind.
WCRF	Cleveland, O.
WCRQ	Providence, R. I.
WCRS-FM	Greenwood, S. C.
WCRT-FM	Birmingham, Ala.
WCSC-FM	Charleston, S.C.
WCSI-FM	Columbus, Ind.(s)
WCSM-FM	Celina, O.
WCSQ	Central Square, N.Y.
WCST-FM	Berkeley Springs, W. Va.
WCTC-FM	New Brunswick, N.J.
WCTM	Eaton, Ohio
WCTS-FM	Minneapolis, Minn.
WCTW-FM	New Castle, Ind.
WCUE-FM	Akron, O.
WCUF	Akron, Ohio
WCUM-FM	Cumberland, Md.
WCUY-FM	Cleveland Hts., Ohio
WCWC-FM	Ripon, Wis.
WCWM	Williamsburg, Va.
WCWP	Brookville, N. Y.
WDAC	Lancaster, Pa.
WDAE-FM	Tampa, Fla.
WDAF-FM	Kansas City, Mo.
WDAO	Dayton, Ohio
WDAS-FM	Philadelphia, Pa.
WDAY-FM	Fargo, N. D.
WDBJ-FM	Roanoke, Va.
WDBL-FM	Springfield, Tenn.
WDBN	Barberton, O.
WDBO-FM	Orlando, Fla.
WDBQ-FM	Dubuque, Iowa
WDCX	Buffalo, N.Y.(s)
WDDE	Hamden, Conn.
WDDS-FM	Syracuse, N.Y.
WDEA-FM	Ellsworth, Me.
WDEB	Jamestown, Tenn.
WDEC-FM	Americus, Ga. (s)
WDEE	Hamden, Conn.
WDEF-FM	Chattanooga, Tenn.
WDEL-FM	Wilmington, Del.
WDET-FM	Detroit, Mich.
WDFM	State College, Pa.
WDHA-FM	Dover, N.J.
WDHF	Chicago, Ill.
WDIF	Buffalo, N.Y.
WDJK	Atlanta, Ga.
WDJR	Oil City, Pa.
WDKD-FM	Kingstree, S.C.
WDKN-FM	Dickson, Tenn.
WDLB-FM	Marshfield, Wis.
WDLP-FM	Panama City, Fla.
WDMB-FM	Statesville, N.C.
WDMJ-FM	Marquette, Mich.
WDMS-FM	Lynchburg, Va.
WDNC-FM	Durham, N.C.
WDOC-FM	Prestonsburg, Ky.
WDOD-FM	Chattanooga, Tenn.
WDOK-FM	Cleveland, Ohio
WDOL-FM	Athens, Ga.
WDOR-FM	Sturgeon Bay, Wis.
WDOV-FM	Dover, Del.
WDRC-FM	Hartford, Conn.
WDRK-FM	Greenville, Ohio
WDRM	Darien, Conn.
WDRN	Norwalk, Conn.
WDSC-FM	Dillon, S.C.
WDSU-FM	New Orleans, La.
WDTM	Detroit, Mich.(s)
WDTR	Detroit, Mich.
WDUB	Granville, Ohio
WDUN-FM	Gainesville, Ga.(s)
WDUQ	Pittsburgh, Pa.
WDUX-FM	Aberdeen, Wash.
WDUZ-FM	Green Bay, Wis.
WDVR	Philadelphia, Pa.
WDWS-FM	Champaign, Ill.
WDXE-FM	Lawrenceburg, Tenn.
WDXL-FM	Lexington, Tenn.
WEAF-FM	Philadelphia, Pa.
WEAS-FM	Savannah, Ga.
WEAU-FM	Eau Claire, Wis.
WEAV-FM	Plattsburgh, N.Y.
WEAW-FM	Evanston, Ill.
WEBH	Chicago, Ill.
WEBL	Jacksonville, Fla.
WEBQ-FM	Harrisburg, Ill.
WEBR-FM	Buffalo, N.Y.
WECI	Richmond, Ind.
WECW	Elmira, N.Y.
WEDA-FM	Grove City, Pa.
WEDR-FM	Miami, Fla.
WEEC	Springfield, Ohio
WEED-FM	Rocky Mount, N.C.
WEEF-FM	Highland Park, Ill.
WEEI-FM	Boston, Mass.
WEEP-FM	Pittsburgh, Pa.
WEEX-FM	Easton, Pa.
WEFA	Waukegan, Ill.
WEFM	Chicago, Ill.
WEGO-FM	Concord, N.C.
WEHH-FM	Elmira, N. Y.
WEIC-FM	Charleston, Ill.
WEIV	Ithaca, N.Y.
WEKZ-FM	Monroe, Wis.
WELD-FM	Tupelo, Miss.
WELF	Glen Ellyn, Ill.
WELG	Elgin, Ill.
WELL-FM	Freeport, Ill.
WELP-FM	Easley, S. C.
WEMC	Harrisonburg, Va.
WEMI	Tampa, Fla.
WEMP-FM	Milwaukee, Wis.
WEMU	Ypsilanti, Mich.
WEND-FM	Ebensburg, Pa.
WENY-FM	Elmira, N. Y.
WEOK-FM	Poughkeepsie, N.Y.
WEOL-FM	Elyria, Ohio
WEPM-FM	Martinsburg, W.Va.
WEPS	Elgin, Ill.
WEQR	Goldsboro, N.C.
WERE-FM	Cleveland, Ohio
WERI-FM	Westerly, R.I.
WERM	Wapakoneta, Ohio
WERS	Boston, Mass.
WERT-FM	Van Wert, Ohio
WESC-FM	Greenville, S.C.
WEST-FM	Easton, Pa.
WETL	South Bend, Ind.
WETN	Wheaton, Ill.
WEVC	Evansville, Ind
WEVD-FM	New York, N.Y.
WEWO-FM	Laurinburg, N.C.
WEZY-FM	Cocoa, Fla.
WFAA-FM	Dallas, Tex.
WFAC	Mt. Dora, Fla.
WFAH-FM	Alliance, Ohio
WFAN	Washington, D.C.
WFAS-FM	White Plains, N.Y.
WFAU-FM	Augusta, Maine
WFAW	Fort Atkinson, Wis.
WFBC-FM	Greenville, S.C.
WFBE	Flint, Mich.
WFBG-FM	Altoona, Pa.
WFBM-FM	Indianapolis, Ind.
WFBS-FM	Winston-Salem, N.C.
WFCI	Franklin, Ind.
WFCJ	Miamisburg, Ohio
WFCR	Amherst, Mass.
WFDR-FM	Manchester, Ga.
WFDS-FM	Baltimore, Md.
WFFM	Muskegon, Mich.
WFHA-FM	Red Bank, N.J.
WFHR-FM	Wisconsin Rapids, Wis.
WFID	Rio Piedras, P.R.(s)
WFIG	Sumter, S.C.
WFIL-FM	Philadelphia, Pa.
WFIN-FM	Findlay, Ohio(s)
WFIU	Bloomington, Ind.
WFIW-FM	Fairfield, Ill.
WFIZ	Conneault, O.
WFKO	Kokomo, Ind.
WFLA-FM	Tampa, Fla.
WFLM	Ft. Lauderdale, Fla.
WFLN-FM	Philadelphia, Pa.
WFLO	Farmville, Va.
WFLT-FM	Franklin, Tenn.
WFLW-FM	Monticello, Ky.
WFLY	Troy, N.Y.
WFMA	Rocky Mount, N.C.
WFMB	Springfield, Ill.
WFMD-FM	Frederick, Md.
WFME	Newark, N.J.
WFMF	Chicago, Ill.
WFMG	Gallatin, Tenn.
WFMH-FM	Cullman, Ala.
WFMI	Montgomery, Ala.
WFMK	Mt. Horeb, Wis.
WFML	Washington, Ind.
WFMM-FM	Baltimore, Md.
WFMS	Indianapolis, Ind.
WFMT	Chicago, Ill.(s)
WFMU	East Orange, N.J.
WFMW-FM	Madisonville, Ky.
WFMX	Statesville, N.C.
WFMZ	Allentown, Pa.
WFNC-FM	Fayetteville, N.C.
WFNS-FM	Burlington, N.C.
WFNY	Racine, Wis.
WFOB-FM	Fostoria, Ohio
WFOL	Hamilton, Ohio(s)
WFOS	South Norfolk, Va.
WFOY-FM	St. Augustine, Fla.
WFPG	Atlantic City, N.J.
WFPK	Louisville, Ky.
WFPL	Louisville, Ky.
WFQM	San Juan, P.R.
WFRB-FM	Frostburg, Md.
WFRE-FM	Fresno, Cal.
WFRL-FM	Freeport, Ill.
WFRO-FM	Fremont, Ohio
WFSC-FM	Franklin, N. C.
WFST-FM	Caribou, Maine
WFSU-FM	Tallahassee, Fla.
WFTL-FM	Ft. Lauderdale, Fla.
WFTM-FM	Maysville, Ky.

C.L.	Location
WFTW-FM	Ft. Walton Beach, Fla.
WFUL-FM	Fulton, Ky.
WFUR-FM	Grand Rapids, Mich.
WFUV	New York, N.Y.
WFVA-FM	Fredericksburg, Va.
WFYC-FM	Alma, Mich.
WGAL-FM	Lancaster, Pa.
WGAR-FM	Cleveland, Ohio
WGAU-FM	Athens, Ga.(s)
WGAY	Washington, D.C.
WGBE-FM	Columbus, Ga.
WGBH-FM	Cambridge, Mass.(s)
WGBI-FM	Scranton, Pa.
WGBS-FM	Miami, Fla.
WGCB-FM	Red Lion, Pa. (s)
WGCS	Goshen, Ind.
WGEE-FM	Indianapolis, Ind.
WGEM-FM	Quincy, Ill.(s)
WGET-FM	Gettysburg, Pa.
WGEV	Beaver Falls, Pa.
WGFM	Schenectady, N.Y. (s)
WGGC	Glasgow, Ky.
WGGM	Taylorville, Ill.
WGH-FM	Newport News, Va.
WGHF	Brookfield, Conn.(s)
WGHQ-FM	Kingston, N.Y.
WGIG-FM	Brunswick, Ga.
WGIR-FM	Manchester, N. H.
WGKA-FM	Atlanta, Ga.
WGLB-FM	Port Washington, Wis.
WGLC-FM	Mendota, Ill.
WGLM	Richmond, Ind.
WGLS-FM	Glassboro, N. J.
WGLT	Normal, Ill.
WGMR-FM	Tyrone, Pa.
WGMS-FM	Washington, D.C.
WGMZ	Flint, Mich.(s)
WGNB	St. Petersburg, Fla.
WGNC-FM	Gastonia, N.C.
WGNU-FM	Madison, Ill.
WGOV-FM	Valdosta, Ga.
WGPA-FM	Bethlehem, Pa. (from Ga.)
WGPC-FM	Albany, Ga. (s)
WGPM	Detroit, Mich.
WGPR	Detroit, Mich.(s)
WGPS	Greensboro, N.C.
WGR-FM	Buffalo, N.Y.
WGRE	Greencastle, Ind.
WGRN	Greenville, Ill.
WGRP-FM	Greenville, Pa.
WGRV-FM	Greeneville, Tenn.
WGSM-FM	Babylon, N.Y.
WGSU	Genesco, N.Y.
WGTB-FM	Washington, D.C.
WGTS-FM	Takoma Park, Md.
WGUC	Cincinnati, Ohio
WGVE	Gary, Ind.
WGWR-FM	Asheboro, N.C.
WGYA	Interlochen, Mich.
WHA-FM	Madison, Wis.
WHAD	Delafield, Wis.
WHAG-FM	Halfway, Md. (s)
WHAI-FM	Greenfield, Mass.
WHAT-FM	Philadelphia, Pa. (s)
WHAV-FM	Haverhill, Mass.
WHBB-FM	Selma, Ala.
WHBC-FM	Canton, Ohio
WHBF-FM	Rock Island, Ill.(s)
WHBI	Newark, N.J.
WHBM-FM	Xenia, Ohio
WHCI	Hartford City, Ind.
WHCL-FM	Clinton, N.Y.
WHCN	Hartford, Conn.
WHCU-FM	Ithaca, N.Y.
WHDH-FM	Boston, Mass.
WHDL-FM	Allegheny, N.Y.
WHEB-FM	Portsmouth, N.H.
WHEN-FM	Syracuse, N.Y.
WHFB-FM	Benton Harbor, Mich.
WHFH	Flossmoor, Ill.
WHFI	Birmingham, Mich.
WHFM	Rochester, N.Y.
WHFS	Bethesda, Md.(s)
WHHI	Highland, Wis.
WHHS	Havertown, Pa.
WHHY-FM	Montgomery, Ala.
WHIL-FM	Medford, Mass.
WHIM-FM	Providence, R.I.
WHIO-FM	Dayton, Ohio
WHIZ-FM	Zanesville, Ohio
WHJB	Greensburg, Pa.
WHK-FM	Cleveland, Ohio
WHKP-FM	Hendersonville, N.C.
WHKW	Chilton, Wis.
WHKY-FM	Hickory, N. C. (s)
WHLA	Holmen, Wis.
WHLD-FM	Niagara Falls, N. Y.
WHLF-FM	South Boston, Va.
WHLI-FM	Hempstead, N.Y.
WHLM-FM	Bloomsburg, Pa.
WHLS-FM	Port Huron, Mich.
WHLT-FM	Huntington, Ind.
WHMA-FM	Anniston, Ala.
WHMD	Marinette, Wis.
WHME	South Bend, Ind.
WHMP-FM	Northampton, Mass.
WHNC-FM	Henderson, N.C.
WHNR	McMinnville, Tenn.
WHO-FM	Des Moines, Iowa
WHOD-FM	Jackson, Ala.
WHOH	Hamilton, Ohio
WHOK-FM	Lancaster, Ohio
WHOM-FM	New York, N.Y.
WHOO-FM	Orlando, Fla.(s)
WHOP-FM	Hopkinsville, Ky.
WHOS-FM	Decatur, Ala.
WHOV	Hampton, Va.
WHP-FM	Harrisburg, Pa.
WHPE-FM	High Point, N.C.
WHPL-FM	Winchester, Va.
WHPR	Highland Park, Mich.
WHPS	High Point, N.C.
WHRB-FM	Cambridge, Mass.
WHRM	Wausau, Wis.
WHSA	Highland Twp., Wis.
WHSB	Alpena, Mich.
WHSR-FM	Winchester, Mass.
WHSY-FM	Hattiesburg, Miss.
WHTC-FM	Holland, Mich.
WHTG-FM	Eatontown, N.J.
WHUB-FM	Cookeville, Tenn.
WHUS	Storrs, Conn.
WHWC	Colfax, Wis.
WHYL-FM	Carlisle, Pa.
WHYN-FM	Springfield, Mass.
WIAC-FM	San Juan, P. R. (s)
WIAL	Eau Claire, Wis.
WIAM-FM	Williamston, N.C.
WIAN	Indianapolis, Ind.
WIBA-FM	Madison, Wis.
WIBC-FM	Indianapolis, Ind.
WIBF-FM	Jenkintown, Pa.
WIBG-FM	Philadelphia, Pa.
WIBM-FM	Jackson, Mich.
WIBW-FM	Topeka, Kan.
WICB	Ithaca, N.Y.
WICR	Indianapolis, Ind.
WIFI	Philadelphia, Pa. (s)
WIFN	Franklin, Ind.
WIKY-FM	Evansville, Ind.
WIL-FM	St. Louis, Mo.
WILE-FM	Cambridge, O.
WILL-FM	Urbana, Ill.
WILO-FM	Frankfort, Ind.
WILS-FM	Lansing, Mich.
WIMA-FM	Lima, Ohio
WINA-FM	Charlottesville, Va.
WINE-FM	Kenmore, N.Y.
WINK-FM	Ft. Myers, Fla.
WINT-FM	Winter Haven, Fla.
WINZ-FM	Miami, Fla.
WIOD-FM	Miami, Fla.
WIP-FM	Philadelphia, Pa.
WIPR-FM	San Juan, P.R.
WIRA-FM	Ft. Pierce, Fla.
WIRC-FM	Hickory, N. C. (s)
WIRJ-FM	Humboldt, Tenn.
WISA-FM	Isabela, P.R.
WIRQ	Rochester, N.Y.
WISH-FM	Indianapolis, Ind.(s)
WISM-FM	Madison, Wis.(s)
WISN-FM	Milwaukee, Wis.
WIST-FM	Charlotte, N.C.
WISU	Terre Haute, Ind.
WISZ-FM	Glen Burnie, Md.
WITA-FM	San Juan, P.R.
WITH-FM	Baltimore, Md.
WITN-FM	Washington, N. C.
WITZ-FM	Jasper, Ind.
WIUS	Christiansted, V.I.
WIVI-FM	Christiansted, St. Croix, V. I.
WIVK-FM	Knoxville, Tenn.
WIVY-FM	Jacksonville, Fla.
WIXN-FM	Dixon, Ill.
WIZR-FM	Johnstown, N.Y.
WIZZ-FM	Streator, Ill.
WJAC-FM	Johnstown, Pa.
WJAS-FM	Pittsburgh, Pa.
WJAX-FM	Jacksonville, Fla.
WJAZ	Albany, Ga.
WJBC-FM	Bloomington, Ill.
WJBI	Cincinnati, Ohio
WJBK-FM	Detroit, Mich.
WJBL-FM	Holland, Mich.
WJBO-FM	Baton Rouge, La.
WJBR	Wilmington, Del.
WJCD-FM	Seymour, Ind.
WJCW-FM	Johnson City, Tenn.
WJDX-FM	Jackson, Miss.
WJEF-FM	Grand Rpds., Mich.(s)
WJEH-FM	Gallipolis, Ohio
WJEJ-FM	Hagerstown, Md.
WJET-FM	Erie, Pa.
WJGS	Houghton, Mich.
WJHL-FM	Johnson City, Tenn.
WJIG-FM	Tullahoma, Tenn.(s)
WJIM-FM	Lansing, Mich.
WJIV	Cherry Valley, N.Y.
WJIZ	Albany, Ga.
WJJD-FM	Chicago, Ill.
WJLK-FM	Asbury Park, N.J.
WJLN	Birmingham, Ala.
WJMC-FM	Rice Lake, Wis.
WJMD	Bethesda, Md.(s)
WJMK	Plainfield, Ind.
WJML	Petoskey, Mich.
WJMX-FM	Florence, S.C.
WJNC-FM	Jacksonville, N. C.
WJOF	Athens, Ala.
WJOL-FM	Joliet, Ill.
WJOY-FM	Burlington, Vt.
WJPA-FM	Washington, Pa.
WJR-FM	Detroit, Mich.
WJRH	Easton, Pa.
WJSC-FM	Wilberforce, Ohio
WJSI	Peoria, Ill.
WJSM	Martinsburg, Pa.
WJTN-FM	Jamestown, N.Y.
WJVA-FM	South Bend, Ind.
WJW-FM	Cleveland, Ohio
WJZZ	Bridgeport, Conn.
WKAI-FM	MaComb, Ill.
WKAK	Kankakee, Ill.
WKAQ-FM	San Juan, P.R.
WKAR-FM	E. Lansing, Mich.
WKAT-FM	Miami, Fla.
WKAY-FM	Glasgow, Ky.
WKAZ-FM	Charleston, W.Va.
WKBC-FM	N. Wilkesboro, N.C.
WKBJ-FM	Milan, Tenn.
WKBL-FM	Covington, Tenn.
WKBN-FM	Youngstown, Ohio
WKBR-FM	Manchester, N.H.
WKBV-FM	Richmond, Ind.
WKCQ	Berlin, N.H.
WKCR-FM	New York, N.Y.
WKCS	Knoxville, Tenn.
WKDN-FM	Camden, N.J.
WKEE-FM	Huntington, W.Va.
WKET-FM	Kettering, Ohio(s)
WKEU-FM	Griffin, Ga.
WKEY-FM	Covington, Va.
WKFM	Chicago, Ill.(s)
WKFR-FM	Battle Creek, Mich.
WKHM-FM	Jackson, Mich.
WKIC-FM	Hazard, Ky.
WKIP-FM	Poughkeepsie, N.Y.
WKIS-FM	Orlando, Fla.
WKIX-FM	Raleigh, N.C.
WKIZ-FM	Key West, Fla.
WKJB-FM	Mayaguez, P. R.
WKJF	Pittsburgh, Pa.(s)
WKJG-FM	Ft. Wayne, Ind.
WKKD-FM	Aurora, Ill.
WKKY-FM	Erlanger, Ky.
WKLC-FM	St. Albans, W.Va.
WKLF-FM	Clanton, Ala.
WKLS	Marietta, Ga.
WKLW-FM	Grand Rapids, Mich.
WKMH-FM	Dearborn, Mich.
WKMI-FM	Kalamazoo, Mich.
WKMO	Kokomo, Ind.
WKNA	Charleston, W.Va.(s)
WKNE-FM	Keene, N.H.
WKNT-FM	Kent, O.
WKOF	Hopkinsville, Ky.
WKOK-FM	Sunbury, Pa.
WKOP-FM	Binghamton, N.Y.
WKOX-FM	Framingham, Mass.
WKOZ-FM	Kosciusko, Miss.
WKPT-FM	Kingsport, Tenn.(s)
WKRC-FM	Cincinnati, Ohio (s)
WKRG-FM	Mobile, Ala.
WKRT-FM	Cortland, N.Y.
WKSN-FM	Jamestown, N. Y.
WKSU-FM	Kent, Ohio
WKTA	McKenzie, Tenn.
WKTL	Struthers, O.
WKTM	N. Charleston, S.C.
WKTM-FM	Mayfield, Ky.(s)
WKTN-FM	Kenton, O.
WKTZ-FM	Jacksonville, Fla.(s)
WKUZ	Wabash, Ind.
WKWK-FM	Wheeling, W.Va.
WKXI	Smyrna, Ga.
WKYX-FM	Paducah, Ky.
WLAC-FM	Nashville, Tenn.
WLAD-FM	Danbury, Conn.
WLAE	Hartford, Conn.
WLAG-FM	LaGrange, Ga.
WLAN-FM	Lancaster, Pa.
WLAP-FM	Lexington, Ky.
WLAT-FM	Conway, S.C.
WLAV-FM	Grand Rapids, Mich.
WLAY-FM	Muscle Shoals, Ala.
WLBA-FM	Gainesville, Ga.
WLBB-FM	Carrollton, Ga.
WLBG-FM	Laurens-Clinton, S.C.
WLBH-FM	Mattoon, Ill.
WLBJ-FM	Bowling Green, Ky.
WLBK-FM	DeKalb, Ill.
WLBR-FM	Lebanon, Pa.
WLCM-FM	Lancaster, S.C.
WLDM	Oak Park, Mich.(s)
WLDR-FM	Traverse City, Mich.
WLDS-FM	Jacksonville, Ill.
WLEC-FM	Sandusky, Ohio
WLEN	Adrian, Mich.
WLEO-FM	Ponce, P. R.
WLET-FM	Toccoa, Ga.
WLFM	Appleton, Wis.
WLGN-FM	Logan, O.
WLIB-FM	New York, N.Y.
WLIN	Detroit, Mich.
WLIP-FM	Kenosha, Wis.
WLIR	Hicksville, N.Y.(s)
WLIV-FM	Livingston, Tenn.
WLJC	Beattyville, Ky.
WLKR-FM	Norwalk, Ohio
WLLH-FM	Lowell, Mass.
WLMC	Okeechobee, Fla.
WLNA-FM	Peekskill, N.Y.
WLNH-FM	Laconia, N.H.
WLNO	London, Ohio
WLNR-FM	Lansing, Ill.
WLOA-FM	Braddock, Pa.(s)
WLOB-FM	Portland, Maine
WLOC-FM	Munfordville, Ky.
WLOE-FM	Leaksville, N.C.
WLOI-FM	La Porte, Ind.
WLOL-FM	Minneapolis, Minn.
WLOM	Chattanooga, Tenn.
WLOQ	Winter Park, Fla.
WLOS-FM	Asheville, N.C.
WLOV	Cranston, R.I.
WLPO-FM	La Salle, Ill.
WLPR	Mobile, Ala. (s)
WLRS	Louisville, Ky.
WLRJ	Roanoke, Va.
WLRW	Champaign, Ill.
WLS-FM	Chicago, Ill.
WLTA-FM	Atlanta, Ga.(s)
WLUV-FM	Loves Park, Ill.(s)
WLVL	Louisville, Ky.
WLVP	Franklin, N. J.
WLYC-FM	Williamsport, Pa.
WLYM-FM	Lynn, Mass.
WMAI-FM	Panama City, Fla.
WMAJ-FM	State College, Pa.
WMAL-FM	Washington, D. C. (s)
WMAQ-FM	Chicago, Ill.(s)
WMAS-FM	Springfield, Mass.
WMAZ-FM	Macon, Ga.
WMBD-FM	Peoria, Ill.
WMBI-FM	Chicago, Ill.
WMBM	Miami Beach, Fla.
WMBN-FM	Petoskey, Mich.
WMBO-FM	Auburn, N.Y.
WMC-FM	Memphis, Tenn.
WMCF	Stuart, Fla. (s)
WMCO	New Concord, Ohio
WMDD-FM	Fajardo, P. R.
WMDE	Greensboro, N.C.(s)
WMEB-FM	Orono, Maine
WMER	Celina, Ohio
WMEV-FM	Marion, Va.
WMFC-FM	Monroeville, Ala.
WMFJ-FM	Daytona Beach, Fla.
WMFM	Madison, Wis.
WMFP	Ft. Lauderdale, Fla.
WMFR-FM	High Point, N.C.
WMGM	Atlantic City, N.J.
WMGW-FM	Meadville, Pa.
WMHC	South Hadley, Mass.
WMHE	Toledo, Ohio
WMIL-FM	Milwaukee, Wis.
WMIT	Black Mountain, N.C.
WMIV	S. Bristol, N.Y.
WMIX-FM	Mt. Vernon, Ill.
WMJR	Ft. Lauderdale, Fla.
WMKC	Oshkosh, Wis.
WMKY-FM	Morehead, Ky.
WMLS-FM	Sylacauga, Ala.
WMLW	Milwaukee, Wis.
WMMB-FM	Melbourne, Fla.
WMMM	Westport, Conn.
WMNA-FM	Gretna, Va.
WMNB-FM	North Adams, Mass.(s)
WMNI-FM	Columbus, Ohio
WMOA-FM	Marietta, O.
WMOP-FM	Ocala, Fla.
WMOR-FM	Morehead, Ky.
WMOU-FM	Berlin, N.H.
WMPL-FM	Hancock, Mich.
WMPS-FM	Memphis, Tenn.
WMRF-FM	Lewistown, Pa.
WMRI-FM	Marion, Ind.
WMRN-FM	Marion, Ohio
WMRO-FM	Aurora, Ill.
WMRP-FM	Flint, Mich.
WMSH-FM	Elizabethtown, Pa.
WMSP	Harrisburg, Pa.
WMSR-FM	Manchester, Tenn.
WMT-FM	Cedar Rapids, Iowa (s)
WMTH	Park Ridge, Ill.
WMTI	Norfolk, Va.
WMTM-FM	Moultrie, Ga.
WMTN-FM	Morristown, Tex.(s)
WMTW-FM	Mt. Washington, N.H.(s)
WMUA	Amherst, Mass.
WMUB	Oxford, Ohio
WMUH	Allentown, Pa.
WMUK	Kalamazoo, Mich.
WMUL	Huntington, W.Va.
WMUN	Muncie, Ind.
WMUU-FM	Greenville, S. C. (s)
WMUZ	Detroit, Mich.
WMVA-FM	Martinsville, Va.(s)
WMVB-FM	Millville, N.J.
WMVG-FM	Milledgeville, Ga.
WMVO-FM	Mount Vernon, Ohio
WMVR-FM	Sidney, Ohio
WMYB-FM	Myrtle Beach, Fla.
WMYR-FM	Ft. Myers, Fla.
WNAD-FM	Norman, Okla.
WNAM-FM	Neenah-Menasha, Wis.
WNAS	New Albany, Ind.
WNAV-FM	Annapolis, Md.
WNBC-FM	New York, N.Y.
WNBD-FM	Daytona Beach, Fla.
WNBF-FM	Binghamton, N.Y.
WNBH-FM	New Bedford, Mass.
WNBX	Andalusia, Ala.
WNCN	New York, N.Y.
WNCO-FM	Ashland, Ohio

WHITE'S RADIO LOG

C.L.	Location
WNCT-FM	Greenville, N.C.
WNDA	Huntsville, Ala.(s)
WNDU-FM	South Bend, Ind.
WNDY	Crawfordsville, Ind.
WNEM-FM	Bay City, Mich.(s)
WNES-FM	Central City, Ky.
WNEW-FM	New York, N.Y.
WNEX-FM	Macon, Ga.
WNFM	Naples, Fla.
WNFD-FM	Nashville, Tenn.(s)
WNGO-FM	Mayfield, Ky.
WNHC-FM	New Haven, Conn.
WNIB	Chicago, Ill.
WNIC	DeKalb, Ill.
WNIK-FM	Arecibo, P. R.
WNNJ-FM	Newton, N.J.
WNNR-FM	New Orleans, La.
WNOB	Cleveland, Ohio(s)
WNOF	St. Paul, Minn.
WNOK-FM	High Point, N.C.
WNOR-FM	Norfolk, Va.
WNOS-FM	High Point, N.C.
WNOW-FM	York, Pa.
WNRE	Circleville, Ohio
WNRG-FM	Grundy, Va.
WNSL-FM	Laurel, Miss.
WNTH	Winnetka, Ill.
WNTI	Hackettstown, N.J.
WNTL	Memphis, Tenn.
WNUR	Evanston, Ill.
WNUS-FM	Chicago, Ill. (s)
WNWC-FM	Arlington Hts., Ill.
WNXT-FM	Portsmouth, O.
WNYC-FM	New York, N.Y.
WNYE	New York, N.Y.
WOAK	Royal Oak, Mich.
WOAP-FM	Owosso, Mich.
WOAY-FM	Oak Hill, W.Va.
WOBN	Westerville, Ohio
WOBT-FM	Rhinelander, Wis.
WOC-FM	Davenport, Iowa
WOCB-FM	W. Yarmouth, Mass.
WOCH-FM	North Vernon, Ind.
WODL-FM	Carbondale, Pa.
WOHS-FM	Shelby, N.C.
WOI-FM	Ames, Iowa
WOIV	De Ruyter, N.Y.
WOKZ-FM	Alton, Ill.
WOL-FM	Washington, D.C.
WOLA	San Juan, P.R.
WOLI	Ottawa, Ill.
WOMC	Royal Oak, Mich.(s)
WOMI-FM	Owensboro, Ky.
WOMP-FM	Bellaire, Ohio
WONE-FM	Dayton, O.
WONO-FM	Syracuse, N. Y. (s)
WOOD-FM	Grand Rapids, Mich.(s)
WOOF-FM	Dothan, Ala. (s)
WOPA-FM	Oak Park, Ill.
WOPI-FM	Bristol, Tenn.
WOR-FM	New York, N.Y.
WORA-FM	Mayaguez, P.R.
WORM-FM	Savannah, Tenn.
WORX-FM	Madison, Ind.
WOSC-FM	Fulton, N.Y.
WOSE	Oswego, N. Y.
WOSU-FM	Columbus, Ohio
WOTW-FM	Nashua, N.H.
WOUB-FM	Athens, Ohio
WOW-FM	Omaha, Nebr.
WOXR	Oxford, Ohio
WOYE-FM	Mayaguez, P. R.
WPAA	Andover, Mass.
WPAB-FM	Ponce, P. R.
WPAC-FM	Patchogue, N.Y.(s)
WPAD-FM	Paducah, Ky.
WPAT-FM	Paterson, N. J. (s)
WPAY-FM	Portsmouth, Ohio (s)
WPBC-FM	Richfield, Minn. (s)
WPBF	W. Palm Beach, Fla.
WPBS	Philadelphia, Pa.
WPBS	Philadelphia, Pa. (s)
WPEA	Exeter, N.H.
WPEL-FM	Montrose, Pa.
WPEN-FM	Philadelphia, Pa.
WPEX-FM	Pensacola, Fla.(s)
WPFB-FM	Middletown, Ohio (s)
WPFK	Los Angeles, Cal.
WPFM	Providence, R.I.(s)
WPFR	Terre Haute, Ind.
WPGC	Bradbury Hts., Md.
WPGF-FM	Burgaw, N.C.
WPGI	Pittsburgh, Pa.
WPGU	Urbana, Ill.
WPHD	Norfolk, Va.
WPHS	Warren, Mich.
WPIC-FM	Sharon, Pa.
WPIN-FM	St. Petersburg, Fla.
WPIT-FM	Pittsburgh, Pa.
WPIX-FM	New York, N. Y.
WPJB-FM	Providence, R.I.
WPKE-FM	Pikeville, Ky.
WPKM	Tampa, Fla.
WPLB	Greenville, Mich.
WPLM-FM	Plymouth, Mass.
WPLN	Nashville, Tenn.
WPLO-FM	Atlanta, Ga.
WPMP-FM	Pascagoula, Miss.
WPPA-FM	Pottsville, Pa.
WPRB	Princeton, N.J.
WPRK	Winter Park, Fla.
WPRM	San Juan, P.R.
WPRO-FM	Providence, R.I.
WPRS-FM	Paris, Ill.
WPRW-FM	Manassas, Va.
WPSR	Evansville, Ind.
WPTF-FM	Raleigh, N.C.
WPTH	Fort Wayne, Ind. (s)
WPTN-FM	Crookeville, Tenn.
WPTW-FM	Piqua, Ohio
WPWT	Philadelphia, Pa.
WQAL	Philadelphia, Pa.(s)
WQDC-FM	Midland, Mich.(s)
WQFM	Milwaukee, Wis.
WQIK-FM	Jacksonville, Fla.
WQMF	Babylon, N.Y.(s)
WQMG	Greensboro, N.C.
WQMS	Hamilton, Ohio
WQRB-FM	Pittsfield, Mass.
WQRS-FM	Detroit, Mich.
WQST	Forest, Miss.
WQXI-FM	Atlanta, Ga.
WQXR-FM	New York, N.Y.
WRAD-FM	Radford, Va.
WRAJ-FM	Anna, Ill.
WRAK-FM	Williamsport, Pa.
WRAL-FM	Raleigh, N.C.
WRAY-FM	Princeton, Ind.
WRBL-FM	Columbus, Ga.
WRBS	Baltimore, Md.
WRC-FM	Washington, D.C.
WRCO-FM	Richland Center, Wis.
WRCP-FM	Philadelphia, Pa.
WREC-FM	Memphis, Tenn.
WRED	Youngstown, Ohio
WREK	Woodstock, Ill.
WREO-FM	Ashtabula, Ohio
WRFD-FM	Worthington-Columbus, Ohio
WRFK	Richmond, Va.
WRFL	Winchester, Va.
WRFM	New York, N.Y.
WRFS-FM	Alexander City, Ala.
WRFY-FM	Reading, Pa.
WRGA-FM	Rome, Ga.
WRHS	Park Forest, Ill.
WRIG-FM	Wausau, Wis.
WRIP-FM	Rossville, Ga.
WRIT-FM	Milwaukee, Wis.
WRIU	Kingston, R. I.
WRJN-FM	Racine, Wis.
WRJR	Lewiston, Maine
WRKB-FM	Kannapolis, N.C.
WRKO-FM	Boston, Mass.
WRKT-FM	Cocoa Beach, Fla.(s)
WRLB	Long Branch, N.J.(s)
WRLC	Palmyre, Pa.
WRLD-FM	Lanett, Ala.
WRLM	N. Attleboro, Mass.
WRMI-FM	Morris, Ill.
WRMN-FM	Elgin, Ill.
WRNJ	Atlantic City, N.J.
WRNL-FM	Richmond, Va.
WRNW	Mount Kisco, N.Y.
WROA-FM	Gulfport, Miss.
WROC-FM	Rochester, N.Y.
WROK-FM	Rockford, Ill.
WROM-FM	Rome, Ga.
WROW-FM	Albany, N.Y.
WROY-FM	Carmi, Ill.
WRPI	Troy, N.Y.
WRPM-FM	Poplarville, Miss.
WRPN-FM	Ripon, Wis.
WRR-FM	Dallas, Tex. (s)
WRRH	Franklin Lakes, N.J.
WRRN	Warren, Pa.
WRRZ-FM	Clinton, N.C.
WRSA	Decatur, Ala.
WRSC-FM	State College, Pa.
WRSJ-FM	Bayamon, P.R.
WRSV	Skokie, Ill.
WRSE-FM	Elmhurst, Ill.
WRSJ-FM	Bayamon, P. R.
WRSW-FM	Warsaw, Ind.
WRTC-FM	Hartford, Conn.
WRTI-FM	Philadelphia, Pa.
WRUF-FM	Gainesville, Fla.
WRUN-FM	Utica, N.Y.
WRUS-FM	Russellville, Ky.
WRUV	Burlington, Vt.
WRVA-FM	Richmond, Va.
WRVB-FM	Madison, Wis.
WRVC	Norfolk, Va.
WRVG	Georgetown, Ky.
WRVP	New York, N.Y.
WRWR	Port Clinton, Ohio(s)
WRXO-FM	Roxboro, N.C.
WRYT-FM	Pittsburgh, Pa.
WSAB	Mt. Carmel, Ill.
WSAC-FM	Ft. Knox, Ky.
WSAE	Spring Arbor, Mich.
WSAL-FM	Logansport, Ind.
WSAM-FM	Saginaw, Mich.
WSAU-FM	Wausau, Wis.
WSB-FM	Atlanta, Ga.(s)
WSBA-FM	York, Pa.
WSBC-FM	Chicago, Ill.(s)
WSBF-FM	Clemson, S.C.
WSCB	Springfield, Mass.
WSCI-FM	Platteville, Wis.
WSCT-FM	Berkeley Springs, W.V.
WSDM	Chicago, Ill.
WSEB	Sebring, Fla.
WSEI	Olney, Ill.
WSEL-FM	Pontotoc, Miss.
WSEV-FM	Sevierville, Tenn. (s)
WSFI-FM	Somerset, Ky.
WSFM	Birmingham, Ala.(s)
WSHS	Floral Park, N.Y.
WSHU	Fairfield, Conn.
WSID-FM	Baltimore, Md.
WSIM-FM	Salem, Ind.
WSIP-FM	Paintsville, Ky.
WSIU	Carbondale, Ill.
WSIV-FM	Pekin, Ill.
WSIX-FM	Nashville, Tenn.(s)
WSJG	Hallandale, Fla.
WSJS-FM	Winston-Salem, N.C.
WSKS	Wabash, Ind.
WSLI-FM	Jackson, Miss.
WSLN	Delaware, Ohio
WSLS-FM	Roanoke, Va.
WSLU	Canton, N.Y.
WSMC-FM	Collegedale, Tenn.
WSMD-FM	Waldorf, Md.
WSMI-FM	Litchfield, Ill.
WSMJ	Greenfield, Ind.
WSMT-FM	Sparta, Tenn.
WSNJ-FM	Bridgeton, N.J.
WSOC-FM	Charlotte, N.C.
WSOM-FM	Salem, Ohio
WSON-FM	Henderson, Ky.
WSOU	S. Orange, N.J.
WSOY-FM	Decatur, Ill.
WSPA-FM	Spartanburg, S.C.(s)
WSPB-FM	Sarasota, Fla.
WSPD-FM	Toledo, Ohio
WSPE	Springville, N.Y.
WSPT-FM	Stevens Point, Wis.
WSRC-FM	Durham, N. C.
WSRS	Worchester, Mass.
WSRW-FM	Hillsboro, Ohio
WSSU	Superior, Wis.
WSTC-FM	Stamford, Conn.
WSTM	St. Mathews, Ky.
WSTO	Owensboro, Ky. (s)
WSTP-FM	Salisbury, N.C.
WSTR-FM	Sturgis, Mich.
WSTU-FM	Stuart, Fla.
WSTV-FM	Steubenville, Ohio
WSUP	Platteville, Wis.
WSUW	Whitewater, Wis.
WSVA-FM	Harrisonburg, Va.
WSVB	Tamaqua, Pa.
WSVL-FM	Shelbyville, Ind.
WSVS-FM	Crewe, Va.
WSWG	Greenwood, Miss.
WSWM	East Lansing, Mich.(s)
WSWN-FM	Belle Glade, Fla.
WSWW-FM	Platteville, Wis.
WSYR-FM	Syracuse, N.Y.(s)
WTAB-FM	Tabor City, N. C.
WTAD-FM	Quincy, Ill.
WTAP-FM	Parkersburg, W. Va.
WTAR	Norfolk, Va.(s)
WTAS	Crete, Ill.
WTAW-FM	College Station, Tex.
WTAX-FM	Springfield, Ill. (s)
WTAY-FM	Robinson, Ill.
WTBC-FM	Tuscaloosa, Ala.
WTBO-FM	Cumberland, Md.
WTBS	Cambridge, Mass.
WTCA-FM	Plymouth, Ind.
WTCH-FM	Shawano, Wis.
WTCM-FM	Traverse City, Mich.
WTCO-FM	Campellsville, Ky.
WTCW-FM	Whitesburg, Ky.
WTCX	St. Petersburg, Fla.(s)
WTDS	Toledo, Ohio
WTFM	Lake Success, N.Y.(s)
WTGI	Hammond, La.
WTHI-FM	Terre Haute, Ind.
WTHS	Miami, Fla.
WTIC-FM	Hartford, Conn.(s)
WTIO	Charleston, W. Va.
WTJS-FM	Jackson, Tenn.
WTJU	Charlottesville, Va.
WTLN-FM	Maitland, Fla.
WTMA-FM	Charleston, S.C.
WTMB-FM	Tomah, Wis.
WTMJ-FM	Milwaukee, Wis.(s)
WTNC-FM	Thomasville, N.C.
WTOA	Trenton, N.J.
WTOC-FM	Savannah, Ga.
WTOD-FM	Toledo, Ohio
WTOF	Canton, Ohio
WTOL-FM	Toledo, Ohio
WTOP-FM	Washington, D.C.
WTOS	Wauwatosa, Wis.
WTOT-FM	Marianna, Fla.
WTPA-FM	Harrisburg, Pa.
WTRC-FM	Elkhart, Ind.
WTRE	Greensburg, Ind.
WTRF-FM	Wheeling, W.Va.
WTRW-FM	Two Rivers, Wis.
WTSB-FM	Lumberton, N.C.
WTES-FM	Buffalo, N.Y.
WTSR	Trenton, N.J.
WTSV-FM	Claremont, N.H.
WTTC-FM	Towanda, Pa.
WTTF-FM	Tiffin, Ohio
WTTM-FM	Trenton, N.J.
WTTN-FM	Watertown, Wis.
WTTR-FM	Westminster, Md.
WTTV-FM	Bloomington, Ind.
WTVN-FM	Columbus, Ohio
WUAG	Greensboro, N. C.
WUCB-FM	Chicago, Ill.
WUFM	Utica, N.Y.(s)
WUHY-FM	Philadelphia, Pa.
WULX-FM	Richmond, Ind.
WUNC	Chapel Hill, N.C.
WUNH	Durham, N.H.
WUOA	Tuscaloosa, Ala.
WUOM	Ann Arbor, Mich.
WUOT	Knoxville, Tenn.
WUPY	Lynn, Mass.(s)
WUSC-FM	Columbia, S.C.
WUSF	Tampa, Fla.
WUST-FM	Bethesda, Md.
WUSV	Scranton, Pa.
WUWM	Milwaukee, Wis.
WVAF-FM	Charleston, W. Va. (s)
WVAM-FM	Altoona, Pa.
WVBR-FM	Ithaca, N.Y.
WVBU-FM	Lewisbury, Pa.
WVCA-FM	Gloucester, Mass.
WVCG-FM	Coral Gables, Fla.(s)
WVEC-FM	Hampton, Va.
WVEM	Springfield, Ill.
WVFM	Lakeland, Fla.
WVGR-FM	Grand Rapids, Mich.
WVHC	Hempstead, N.Y.
WVHI	Evansville, Ind.
WVIC-FM	E. Lansing, Mich.
WVIP-FM	Mount Kisco, N.Y.
WVIS	Terre Haute, Ind.
WVJS-FM	Owensboro, Ky.
WVKC-FM	Galesburg, Ill.
WVKO-FM	Columbus, Ohio
WVLK-FM	Lexington, Ky.(s)
WVLR	Sauk City, Wis.
WVMC-FM	Mt. Carmel, Ill.
WVMI-FM	Biloxi, Miss.
WVNA-FM	Tuscumbia, Ala.
WVNJ-FM	Newark, N.J.
WVNO-FM	Mansfield, Ohio(s)
WVOR	Rochester, N.Y.
WVOS-FM	Liberty, N.Y.
WVOT-FM	Wilson, N.C.
WVOX-FM	New Rochelle, N.Y.
WVOZ-FM	Carolina, P. R.
WVPO-FM	Stroudsburg, Pa.
WVQM	Huntington, W.Va.
WVSC-FM	Somerset, Pa.
WVSH	Huntington, Ind.
WVST	St. Petersburg, Fla.
WVTS	Terre Haute, Ind.(s)
WVUD-FM	Kettering, Ohio
WVVV	Blacksburg, Va.
WVWO-FM	Cheyenne, Wyo.
WWBD-FM	Bamberg, S.C.
WWCF	Greenfield, Wis.
WWCO-FM	Waterbury, Conn.
WWDC-FM	Washington, D.C.
WWDL-FM	Scranton, Pa. (s)
WWDL	Scranton, Pa. (s)
WWGP-FM	Sanford, N.C.
WWHC	Hartford City, Ind.
WWHG-FM	Hornell, N.Y.
WWHI	Muncie, Ind.
WWHO	Jackson, Miss.
WWIL-FM	Ft. Lauderdale, Fla.
WWJ-FM	Detroit, Mich.
WWJC-FM	Superior, Wis.
WWKS	Macomb, Ill.
WWLA	La Crosse, Wis.
WWMO	Reidsville, N.C.
WWMT	New Orleans, La.(s)
WWOD-FM	Lynchburg, Va.
WWOG	Boca Raton, Fla.
WWOL-FM	Buffalo, N.Y.
WWOM-FM	New Orleans, La.
WWON-FM	Woonsocket, R.I.
WWOS	Palm Beach, Fla.
WWPB	Miami, Fla.(s)
WWST-FM	Wooster, Ohio
WWSW-FM	Pittsburgh, Pa.
WWTV-FM	Cadillac, Mich.
WWVA-FM	Wheeling, W.Va.
WWWS	Greenville, N.C.
WWYN-FM	Erie, Pa. (s)
WXAX	Elkhart, Ind.
WXBM-FM	Milton, Fla.
WXBR	Cocoa Beach, Fla.
WXEL	Louisville, Ky.
WXEN-FM	Cleveland, Ohio
WXFM	Elmwood Park, Ill.
WXHR-FM	Boston, Mass.
WXLI-FM	Dublin, Ga.
WXPN	Philadelphia, Pa.
WXQR-FM	Jacksonville, N. C.
WXRA	Woodbridge, Va.
WXRF-FM	Guayama, P. R.
WXRI	Norfolk, Va.
WXTC	Annapolis, Md.
WXTO-FM	Grand Rapids, Mich.
WXUR-FM	Media, Pa.

C.L.	Location
WXYW	Suffolk, Va.
WXYZ-FM	Detroit, Mich.
WYAK	Sarasota, Fla.(s)
WYBC-FM	New Haven, Conn.
WYBG-FM	New Haven, Conn.
WYDD	New Kensington, Pa.
WYCA	Hammond, Ind.
WYCE	Warwick, R.I.
WYCR	York-Hanover, Pa.
WYCS	Yorktown, Va.
WYFE	Lansing, Mich.
WYFI	Norfolk, Va.(s)
WYFM	Charlotte, N.C.
WYFS	Winston-Salem, N.C.
WYNR-FM	Brunswick, Ga.
WYON	Grand Rapids, Mich.
WYSL-FM	Buffalo, N.Y.
WYSO	Yellow Springs, Ohio
WYZZ	Wilkes-Barre, Pa.
WZAK	Cleveland, O.
WZEP-FM	DeFuniak Springs, Fla.
WZIP-FM	Cincinnati, Ohio
WZMF	Menomonee Falls, Wis.

Canadian AM Stations By Call Letters

C.L.	Location	Kc.
CBA	Sackville, N.B.	1070
CBAF	Moncton, N.B.	1300
CBD	Saint John, N.B.	1110
CBE	Windsor, Ont.	1550
CBF	Montréal, Que.	690
CBG	Gander, Nfld.	1450
CBH	Halifax, N.S.	860
CBI	Sydney, N.S.	1140
CBJ	Chicoutimi, Que.	1580
CBK	Regina, Sask.	540
CBL	Toronto, Ont.	740
CBM	Montreal, Que.	940
CBN	St. John's, Nfld.	640
CBO	Ottawa, Ont.	910
CBOF	Ottawa, Ont.	1250
CBT	Grand Falls, Nfld.	540
CBU	Vancouver, B.C.	690
CBV	Québec, Que.	980
CBR	Calgary, Alta.	1010
CBW	Winnipeg, Man.	990
CBX	Edmonton, Alta.	740
CBY	Corner Brook, Nfld.	990
CBZ	Fredericton, N.B.	970
CFAB	Windsor, N.S.	1450
CFAC	Calgary, Alta.	960
CFAM	Altona, Man.	1290
CFAR	Flin Flon, Man.	590
CFAX	Victoria, B.C.	1070
CFBC	Saint John, N.B.	930
CFBR	Sudbury, Ont.	550
CFBV	Smithers, B.C.	1230
CFCB	Corner Brook, Nfld.	570
CFCF	Montreal 15, Que.	600
CFCH	Callander, Ont.	600
CFCL	Timmins, Ont.	620
CFCN	Calgary, Alta.	1060
CFCO	Chatham, Ont.	630
CFCP	Courtenay, B.C.	1440
CFCW	Camrose, Alta.	790
CFCY	Charlottetown, P.E.I.	630
CFDA	Victoriaville, Que.	1380
CFDR	Dartmouth, N.S.	790
CFGB	Goose Bay, Nfld.	1340
CFGM	Richmond Hill, Ont.	1310
CFGP	Grande Prairie, Alta.	1050
CFGR	Gravelbourg, Sask.	1230
CFGT	Saint-Joseph-d'Alma, Que.	1270
CFJC	Kamloops, B.C.	910
CFJR	Brockville, Ont.	1450
CFKL	Schefferville, Que.	1230
CFLD	Smithers, B.C. Studio at Station CFBV	1400
CFLM	La Tuque, Que.	1240
CFLV	Valleyfield, Que.	1370
CFMB	Montreal, Que.	1410
CFML	Cornwall, Ont.	1110
CFMR	Fort Simpson, N.W.T.	1490
CFNB	Fredericton, N.B.	550
CFNS	Saskatoon, Sask.	1170
CFOB	Fort Frances, Ont.	800
CFOM	Quebec, Que.	1340
CFOR	Orillia, Ont.	1570
CFOS	Owen Sound, Ont.	560
CFOX	Pointe Claire, Que.	1470
CFPA	Port Arthur, Ont.	1230
CFPL	London, Ont.	980
CFPR	Prince Rupert, B.C.	860
CFQC	Saskatoon, Sask.	600
CFRA	Ottawa, Ont.	580
CFRB	Toronto, Ont.	1010
CFRC	Kingston, Ont.	1490
CFRG	Gravelbourg, Sask.	710
CFRN	Edmonton, Alta.	1260
CFSL	Weyburn, Sask.	1340
CFSX	Stephenville, Nfld.	910
CFRS	Simcoe, Ont.	1560
CFRY	Portage la Prairie, Man.	920
CFTJ	Galt, Ont.	1110
CFTK	Terrace, B.C.	590
CFUN	Vancouver, B.C.	1410
CFVR	Abbotsford, B.C.	1240
CFWB	Campbell River, B.C.	1490
CFWH	Whitehorse, Y.T.	570
CFYK	Yellowknife, N.W.T.	1340
CHAB	Moose Jaw, Sask.	800
CHAD	Amos, Que.	1340
CHAK	Inuvik, N.W.T.	860
CHAT	Medicine Hat, Alta.	1270
CHCM	Marystown, Nfld. with another studio at St. John's, Nfld.	560
CHEC	Lethbridge, Alta.	1090
CHED	Edmonton, Alta.	630
CHEF	Granby, Que.	1450
CHEX	Peterborough, Ont.	980
CHFA	Edmonton, Alta.	680
CHFC	Churchill, Man.	1230
CHFI	Toronto, Ont.	1540
CHGB	La Pocatière, Que.	1310
CHIC	Brampton, Ont.	790
CHIQ	Hamilton, Ont.	1280
CHLC	Saguenay Co., Que.	580
CHLN	Trois-Rivières, Que.	550
CHLO	St. Thomas, Ont.	680
CHLT	Sherbrooke, Que.	630
CHML	Hamilton, Ont.	900
CHNC	New Carlisle, Que.	610
CHNO	Sudbury, Ont.	900
CHNS	Halifax, N.S.	960
CHOK	Sarnia, Ont.	1070
CHOV	Pembroke, Ont.	1350
CHOW	Welland, Ont.	1470
CHQM	Vancouver, B.C.	1320
CHQR	Calgary, Alta.	810
CHQT	Edmonton, Alta.	1110
CHRC	Québec, Que.	800
CHRD	Drummondville, Que.	1340
CHRL	Roberval, Que.	910
CHRS	Jacques-Cartier, Que.	1090
CHSJ	Saint John, N.B.	1150
CHSM	Steinbach, Man. Studio at Station CFAM, Altona, Man.	1250
CHTK	Prince Rupert, B.C.	560
CHTM	Thompson, Man.	610
CHUB	Nanaimo, B.C.	1570
CHUC	Cobourg, Ont.	1450
CHUM	Toronto, Ont.	1050
CHWK	Chilliwack, B.C.	1270
CHWO	Oakville, Ont.	1250
CHYM	Kitchener, Ont.	1490
CJAD	Montreal, Que.	800
CJAF	Cabano, Que.	1240
CJAT	Trail, B.C.	610
CJAV	Port Alberni, B.C.	1240
CJBC	Toronto, Ont.	860
CJBM	Causapscal, Que., with Studio at Rimouski, Que.	1450
CJBQ	Belleville, Ont.	800
CJBR	Rimouski, Que.	900
CJCA	Edmonton, Alta.	930
CJCB	Sydney, N.S.	1270
CJCH	Halifax, N.S.	920
CJCJ	Woodstock, N.B.	920
CJCN	Grand Falls, Nfld.	680
CJCS	Stratford, Ont.	1240
CJDC	Dawson Creek, B.C.	1350
CJDV	Drumheller, Alta.	910
CJEM	Edmundston, N.B.	570
CJET	Smiths Falls, Ont.	630
CJFP	Rivière-du-Loup, Que.	1400
CJFX	Antigonish, N.S.	580
CJGX	Yorkton, Sask.	940
CJIB	Vernon, B.C.	940
CJIC	Sault Ste. Marie, Ont.	1050
CJJC	Langley, B.C.	850
CJKL	Kirkland Lake, Ont.	560
CJLM	Joliette, Que.	1350
CJLR	Quebec, Que.	1060
CJLS	Yarmouth, N.S.	1340
CJLX	Fort William, Ont.	800
CJME	Regina, Sask.	1300
CJMS	Montreal, Que.	1280
CJMT	Chicoutimi, Que.	1420
CJNB	North Battleford, Sask.	1050
CJNR	Blind River, Ont.	730
CJOB	Winnipeg, Man.	680
CJOC	Lethbridge, Alta.	1220
CJON	St. John's, Nfld.	930
CJOR	Vancouver, B.C.	600
CJOX	Grand Bank, Nfld.	710
CJOY	Guelph, Ont.	1460
CJQM	Winnipeg, Man.	1470
CJRL	Kenora, Ont.	1220
CJRN	Niagara Falls, Ont.	1600
CJRW	Summerside, P.E.I.	1240
CJSL	Estevan, Sask.	1280
CJSO	Sorel, Que.	1320
CJSP	Leamington, Ont.	710
CJSS	Cornwall, Ont.	1220
CJVI	Victoria, B.C.	900
CJWA	Sault Ste. Marie, Ont.	1240
CKAC	Montréal, Que.	730
CKAD	Middleton, N.S.	1490
CKAP	Kapuskasing, Ont.	580
CKAR	Huntsville, Ont.	630
CKAR-1	Parry Sound, Ontario. Studio at Station CKAR, Huntsville, Ontario	1340
CKAY	Duncan, B.C.	1500
CKBB	Barrie, Ont.	950
CKBC	Bathurst, N.B.	1360
CKBI	Prince Albert, Sask.	900
CKBL	Matane, Que.	1250
CKBM	Montmagny, Que.	1490
CKBS	St. Hyacinthe, Que.	1240
CKBW	Bridgewater, N.S.	1000
CKCB	Collingwood, Ont. with another Studio at Barrie, Ont.	1400
CKCH	Hull, Que.	970
CKCK	Regina, Sask.	620
CKCL	Truro, N.S.	600
CKCM	Grand Falls, Nfld. with another studio at St. John's, Nfld.	620
CKCN	Sept-Iles, Que.	560
CKCQ	Quesnel, B.C.	570
CKCR	Revelstoke, B.C. Studio at Station CKXR, Salmon Arm, B.C.	1340
CKCV	Québec, Que.	1280
CKCW	Moncton, N.B.	1220
CKCY	Sault Ste. Marie, Ont.	920
CKDA	Victoria, B.C.	1220
CKDH	Amherst, N.S.	900
CKDM	Dauphin, Man.	730
CKDR	Dryden, Ont. Studio at Station CJRL, Kenora, Ont.	960
CKEC	New Glasgow, N.S.	1320
CKEK	Cranbrook, B.C.	570
CKEN	Kentville, N.S.	1350
CKEY	Toronto, Ont.	590
CKFH	Toronto, Ont.	1430
CKGB	Timmins, Ont.	680
CKGM	Montreal, Que.	980
CKJL	Saint-Jérôme, Que.	900
CKKW	Kitchener, Ont.	1320
CKLB	Oshawa, Ont.	1350
CKLC	Kingston, Ont.	1380
CKLD	Thetford Mines, Que.	1230
CKLG	Vancouver, B.C.	730
CKLM	Montreal, Que.	1570
CKLN	Nelson, B.C.	1390
CKLS	La Sarre, Que.	1240
CKLW	Windsor, Ont.	800
CKLY	Lindsay, Ont.	910
CKML	Mont Laurier, Que.	610
CKMP	Midland, Ontario	1230
CKMR	Newcastle, N.B.	790
CKNB	Campbellton, N.B.	950
CKNL	Fort St. John, B.C.	560
CKNW	New Westminster, B.C.	980
CKNX	Wingham, Ont.	920
CKOC	Hamilton, Ont.	1150
CKOK	Penticton, B.C.	800
CKOM	Saskatoon, Sask.	1250
CKOT	Tillsonburg, Ont.	1510
CKOV	Kelowna, B.C.	630
CKOX	Woodstock, Ont.	1340
CKOY	Ottawa, Ont.	1310
CKPC	Brantford, Ont.	1380
CKPG	Prince George, B.C.	550
CKPM	Ottawa, Ont.	1440
CKPR	Port Arthur, Ont.	580
CKPT	Peterborough, Ont.	1420
CKRB	Cté de Beauce, Que.	1460
CKRC	Winnipeg, Man.	630
CKRD	Red Deer, Alta.	850
CKRM	Regina, Sask.	980
CKRN	Rouyn, Que.	1400
CKRS	Jonquière, Que.	590
CKSA	Lloydminster, Alta.	1080
CKSB	Saint-Boniface, Man.	1050
CKSL	London, Ont.	1410
CKSM	Shawinigan, Que.	1220
CKSO	Sudbury, Ont.	790
CKSW	Swift Current, Sask.	1400
CKTB	St. Catharines, Ont.	610
CKTK	Kitimat, B.C.	1230
CKTR	Trois-Rivières, Que.	1150
CKTS	Sherbrooke, Que.	900
CKUA	Edmonton, Alta.	580
CKVD	Val-d'Or, Que.	1230
CKVL	Verdun, Que.	850
CKVM	Ville-Marie, Que.	710
CKWL	Williams Lake, B.C.	1240
CKWS	Kingston, Ont.	960
CKWW	Windsor, Ont.	580
CKWX	Vancouver, B.C.	1130
CKX	Brandon, Man.	1150
CKXL	Calgary, Alta.	1140
CKXR	Salmon Arm, B.C.	580
CKY	Winnipeg, Man.	580
CKYL	Peace River, Alta.	610
VOAR	St. John's, Nfld.	1230
VOCM	St. John's, Nfld.	590
VOWR	St. John's, Nfld.	800

Canadian FM Stations by Call Letters

Abbreviations: (s) broadcasts stereo

C.L.	Location	Mc.
CBC-FM	Toronto, Ont.	99.1
CBF-FM	Montreal, Que.	95.1
CBM-FM	Montreal, Que.	100.7
CBO-FM	Ottawa, Ont.	103.3
CBU-FM	Vancouver, B.C.	105.7
CBW-FM	Winnipeg, Man.	98.3
CFBC-FM	Saint John, N.B.	98.9
CFCF-FM	Montreal, Que.	92.5
CFFM-FM	Kamloops, B.C.	98.3
CFMC-FM	Saskatoon, Sask.	103.9
CFMO-FM	Ottawa, Ont.	93.9
CFMS-FM	Victoria, B.C.	98.5
CFPL-FM	London, Ont.	95.9
CFRC-FM	Kingston, Ont.	91.9
CFRN-FM	Edmonton, Alta.	100.3
CHEC-FM	Lethbridge, Alta.	100.9
CHFI-FM	Toronto, Ont.	98.1
CHFM-FM	Calgary, Alta.	95.9
CHIC-FM	Brampton, Ont.	102.1
CHLT-FM	Sherbrooke, Que.	102.7
CHML-FM	Hamilton, Ont.	95.3
CHNS-FM	Halifax, N.S.	96.1
CHQM-FM	Vancouver, B.C.	103.5
CHRC-FM	Quebec, Que.	98.1
CHUM-FM	Toronto, Ont.	104.5
CHYM-FM	Kitchener, Ont.	96.7
CJBQ-FM	Belleville, Ont.	97.1
CJBR-FM	Rimouski, Que.	101.5
CJCA-FM	Edmonton, Alta.	99.5
CJCB-FM	Sydney, N.S.	94.9
CJFM-FM	Montreal, Que.	95.9
CJIC-FM	Sault Ste. Marie, Ont.	100.5
CJMS-FM	Montreal, Que.	94.3
CJOB-FM	Winnipeg, Man.	97.5
CJOV-FM	Kelowna, B.C.	104.7
CJRT-FM	Toronto, Ont.	91.1
CJSS-FM	Cornwall, Ont.	104.5
CKCL-FM	Truro, N.S.	100.9
CKCY-FM	Sault Ste. Marie, Ont.	104.3
CKFM-FM	Toronto, Ont.	99.9
CKGB-FM	Timmins, Ont.	94.5
CKGM-FM	Montreal, Que.	97.7
CKLB-FM	Oshawa, Ont.	93.5
CKLC-FM	Kingston, Ont.	99.5
CKLG-FM	Vancouver, B.C.	99.3
CKLW-FM	Windsor, Ont.	93.9
CKOK-FM	Penticton, B.C.	97.1
CKPC-FM	Brantford, Ont.	92.1
CKPR-FM	Port Arthur, Ont.	94.3
CKQM-FM	Winnipeg, Man.	94.3
CKRD-FM	Red Deer, Alta.	98.9
CKSO-FM	Sudbury, Ont.	92.7
CKTB-FM	St. Catharines, Ont.	97.7
CKUA-FM	Edmonton, Alta.	98.1
CKVL-FM	Verdun, Que.	96.9
CKWM-FM	Kentville, N.S.	97.7
CKWS-FM	Kingston, Ont.	96.3
CKX-FM	Brandon, Man.	96.1
CKY-FM	Winnipeg, Man.	92.1

World-Wide Short-Wave Stations

■ The shortwave section of *White's Radio Log* is an exclusive feature of RADIO-TV EXPERIMENTER magazine. This is a listing of the most active and most often reported stations, as compiled from reader reports sent in to us, from published schedules of the stations listed, and from actual monitoring at the official RADIO-TV EXPERIMENTER monitoring station, DX Central.

We invite our readers to send in their loggings for inclusion in these listings. Be sure to include the following information for each station reported: approximate frequency, callsign and/or station name, and time monitored in Greenwich Mean Time (24 hour clock). Address your reports to: DX Central, White's Radio Log, RADIO-TV EXPERIMENTER, 505 Park Avenue, New York, N.Y. 10022, U.S.A.

We are indebted to the following DX reporters for making this listing possible.

Patrick Martin, Seward, Alaska
John Shoemaker, Freeport, Ill.
P. L. Miles, Levittown, N. Y.
Tom Kneitel, K2AES, Pt. Washington, N. Y.
W. L. Gunstream, Jr., Orange, Tex.
Allen McCann, Buffalo, N. Y.
Norman Zarr, Brooklyn, N. Y.
Errald Turner, Newport, Me.
Robert L. Ehman, Los Angeles, Calif.
Harold D. Allen, Arvida, Que.
Jerry Stuart, Lawton, Okla.
Danny Jamison, Orange, Va.
Julian M. Sienkiewicz, Brooklyn, N. Y.
Andrew Mandala, Washington, D. C.
Jack Copeland, Hackensack, N. J.
Ricky Vezzani, East Northport, N. Y.
Chuck Edwards, Ft. Lauderdale, Fla.
Melvin D. Herr, Jr., Ft. Sam Houston, Tex.
Steve West, Staunton, Va.
Kenneth Cohen, Woodbridge, N. J.
W. Bates, Schenectady, N. Y.
LeRoy P. Ackerman, Phoenix, Ariz.
George Zeller, Salem, Ohio
Richard Schultz, San Diego, Calif.
William Zlobik, Bridgeton, N. J.
Arthur Zimmerman, Moline, Ill.

Note! At the request of many of our readers, and to conform with radio club publications and international broadcasting schedules, we are going to be bringing you the Shortwave Section of WHITES RADIO LOG with all times indicated in Greenwich Mean Time, 24 hour clock. "GMT" is the international time system and indicates the time at the Greenwich Observatory in England.

To aid you in converting GMT into your local time, we offer you the following chart, which you may find a handy guide around your DX shack.

GMT TIME TABLE

GMT	EST	CST	MST	PST
0000	1900	1800	1700	1600
0100	2000	1900	1800	1700
0200	2100	2000	1900	1800
0300	2200	2100	2000	1900
0400	2300	2200	2100	2000
0500	0000	2300	2200	2100
0600	0100	0000	2300	2200
0700	0200	0100	0000	2300
0800	0300	0200	0100	0000
0900	0400	0300	0200	0100
1000	0500	0400	0300	0200
1100	0600	0500	0400	0300
1200	0700	0600	0500	0400
1300	0800	0700	0600	0500
1400	0900	0800	0700	0600
1500	1000	0900	0800	0700
1600	1100	1000	0900	0800
1700	1200	1100	1000	0900
1800	1300	1200	1100	1000
1900	1400	1300	1200	1100
2000	1500	1400	1300	1200
2100	1600	1500	1400	1300
2200	1700	1600	1500	1400
2300	1800	1700	1600	1500

For conversion of GMT to U.S. Daylight (summer) time, add one hour to the desired local time. In other words, 0000 GMT is 1900 EST and would be 2000 EDST, 1900 CDST, etc.

The following abbreviations are used: BC- Broadcasting Company, Corporation or System; E- Emissora; R- Radio; V- Voice or Voz.

Freq. (KC)	Call	Name	Location	GMT
2415	—	Windward Is. BC	St. Georges, Grenada	2230
2450	4VEH	V. Evangelique	Cap Haitien, Haiti	1930
2500	OLB5*	(time signals)	Prague, Czech.	1340
2510	HLK50	V. Free Korea	Seoul, Korea	1400
3175	OLB5*	(time signals)	Prague, Czech.	1340
3250	—	R. S. Africa	Capetown, S. Africa	2030
3265	ZFY	R. Demerara	Georgetown, Br. Guiana	0200
3285	—	R. S. Africa	Capetown, S. Africa	2000
3315	—	R-TV Francaise	Ft. de France, Martinique	0100
	—	R-TV Francaise	Cayenne, Fr. Guiana	0200
3320	—	R. S. Africa	Capetown, S. Africa	2010
3332	—	ORTF	Brazzaville, Congo	0500
3356	—	R. Bechuanaland	Gaberones, Bech.	1200

Freq. (KC)	Call	Name	Location	GMT
3370	—	R. Mil	Esmeraldas, Ecuador	0310
3390	—	R. Zaracay	Sto. Domingo, Ecuador	1000
3824	ZNF4V	—	Maseru, Basutoland	1930
3883	—	R. Clb. de Cabo Verde	Praia, Cape Verde Is.	2100
3913	HLK51	V. Free Korea	Seoul, Korea	1400
3995	VQO4	Solomon I. BC	Honiara, Solomon Is.	0725
	—	R. Budapest	Budapest, Hungary	1945
4494	—	R. Omdurman	Omdurman, Sudan	0530
4600	—	R. Nepal	Kathmandu, Nepal	1358
4715	—	R. Mindelo	S. Vicente, Cape Verde Is.	1830
4745	HCEH3	R. El Progresso	Loja, Ecuador	0410

60 Meter Band—4750 to 5060 Kc/s

4761	—	E. Mariana	Pasto, Colombia	0230
4795	—	R. Comercia	Anogla	0530
	—	ORTF	Brazzaville, Congo	0500
	HCLV4	V. de los Caras	Bahia, Ecuador	0430
4810	—	R. S. Africa	Capetown, S. Africa	0430
	VMG	R. Popular	Maracaibo, Venezuela	0540
4840	—	BBC Relay	Francistown, Bechuanaland	1615
4870	—	R. Ceylon	Colombo, Ceylon	0945
4875	HSIJS	Army BC	Bangkok, Thailand	0730
4872	—	R. S. Cruz	Tegucigalpa, Guatemala	0030
4875	—	R. S. Africa	Capetown, S. Africa	0430
4885	—	V. Kenya	Nairob', Kenya	1600
4890	HSVSS2	Army BC	Bangkok, Thailand	0730
	YVKB	R. Venezuela	Caracas, Venez.	0400
4895	—	R. S. Africa	Capetown, S. Africa	1600
4940	—	Lins. R. Clube	Brazil	0300
4945	—	R. S. Africa	Capetown, S. Africa	1635
4950	—	R. Juticalpa	Juticalpa, Honduras	2345
4951	HJCQ	R. Nacional	Bogota, Colombia	0400
4960	VUD	All India R.	Delhi, India	1230
4994	—	R. Omdurman	Omdurman, Sudan	1620
5015	CP48	R. Universario	La Paz, Bolivia	2300
5030	—	Cadena Nacional	Bogota, Colombia	0200
5045	—	R. Altiplano	La Paz, Bolivia	2345
5047	—	R. Lome	Lome, Togo	2015
5057	YVKD	R. Cultura	Caracas, Venez.	2213
5060	—	Burma BC	Rangoon, Burma	1430
5900	—	R. Budapest	Budapest, Hungary	1930
5920	—	R. Vilnus	Vilnus, USSR	2230
5930	—	R. Prague	Prague, Czech.	0100
5940	—	R. Vilnus	Vilnus, USSR	2230

49 Meter Band—5950 to 6200 Kc/s

5950	OAX6A	R. Ariquepa	Ariquepa, Peru	0400
5958	—	R. Interprovincial	Katanga	0400
5970	—	R. Berlin Int'l.	Berlin, E. Germany	0100
5970	HJKA	R. Horizonte	Bogota, Colombia	1900
	—	ORTF	Brazzaville, Congo	0500
5980	—	Trans. de la Independ.	Tunja, Colombia	0300
5980	—	Greenland BC	Godthaab, Greenl.	2205
5985	—	R. Portugal	Lisbon, Port.	0215
5990	—	R. Habana	Havana, Cuba	2200
	—	RAI	Rome, Italy	2020
	—	R. Bucharest	Bucharest, Rumania	0300
5995	—	R. Andorra	Andorra	2100
6000	YVNL	R. Miramda	Los Teques, Venezuela	1700
6003	—	E. do Liceu	Lisbon, Portugal	1700
6005	—	R. S. Africa	Capetown, S. Africa	0430
6010	—	R. Ivorienne	Abidjan, Ivory Coast	1930
	—	RAI	Rome, Italy	0100
6025	—	R. Kiev	Kiev, USSR	0030
	PCJ	N. Nederland	Hilversum, Netherl.	2000
	CR6RZ	E. Official	Luanda, Angola	0600
6035	XZK3	Burmese BC	Rangoon, Burma	1500
6040	VUD	All India R.	Delhi, India	1230
6045	XEX-QOC	R. Universidad	S. Luis Potosi, Mex.	0400
6050	—	RAI	Rome, Italy	2020
6065	—	R. Sweden	Stockholm, Sweden	0930
6080	—	V. de la Liberdad	(clandestine) Algeria	0015
6085	PCJ	R. Nederland	Hilversum, Netherlands	2000
6095	—	R. S. Africa	Capetown, S. Africa	0430
6100	—	R. Phnom Penh	Phnom Penh, Cambodia	1230
	HCSP4	V. del Volante	Portoviejo, Ecuador	1215
	—	R. Belgrade	Belgrade, Yugoslavia	2130
6110	—	R. Ghana	Accra, Ghana	0330
6117	—	R. Centro Populare	Colombia	0040
	HJIQ	V. del Llano	Villav'encio, Colombia	0330
6130	—	R. Nacional Espana	Madrid, Spain	0100
6135	—	R. Habana	Havana, Cuba	1100
	—	R. Papeete	Papeete, Tahiti	0300
6150	—	R. S. Africa	Capetown, S. Africa	1635
	—	R. Bucharest	Bucharest, Rumania	0300
6160	—	R. Berlin Int'l.	Berlin, E. Germany	0230
6165	HJKJ	E. Nueva Grenada	Bogota, Colombia	0400
6170	—	R. Habana	Havana, Cuba	0100
6175	—	V. de la Liberdad	(clandestine) Algeria	0015
6180	HJCT	R. Nacional	Bogota, Colombia	0400
6190	—	R. Bucharest	Bucharest, Rumania	0300
6193	HJEZ	V. de Cali	Cali, Colombia	0400
6199	—	V. de Pathet Lao	Laos	1430
6210	—	R. Peking	Peking, China	2030
6215	—	V. of Truth	(clandestine) Greece	0037
6234	—	R. Budapest	Budapest, Hungary	2200
6530	—	"Kiss Me Honey"	(clandestine)	1530
7015	—	ORTF	Brazzaville, Congo	1400
7080	—	R. Peking	Peking, China	2030
7085	—	V. of Iranian Nation	(clandestine) Albania	1800
7115	—	R. Prague	Prague, Czech.	0100
7120	—	R. Kiev	Kiev, USSR	0030
	—	R. Mogadiscio	Mogadiscio, Somalia	0310
7135	—	R. Iran	Tehran, Iran	2000
7145	—	Syrian BC	Damascus, Syria	1400
7155	—	R. Comercial	Angola	1030
7175	—	Rhodesian BC	Rhodesia	0600
7180	—	R. Kiev	Kiev, USSR	0430
7185	—	R. Vilnus	Vilnus, USSR	2230
7200	—	R. Belgrade	Belgrade, Yugoslavia	2130
7210	—	R. Int'l. Red Cross	Geneva, Switz.	0600
7215	—	R. Budapest	Budapest, Hungary	2200
	—	Armed Forces R.	Taipei, Formosa	1000
7220	—	R. Budapest	Budapest, Hungary	2130
7235	—	RAI	Rome, Italy	2020
7240	—	Rhodesian BC	Rhodesia	1300
7250	—	R. Vilnus	Vilnus, USSR	2230
7255	—	R. Iran	Tehran, Iran	2200
	VUD	All India R.	Delhi, India	1945
7265	—	R. Tirana	Tirana, Albania	0630
7270	—	R. S. Africa	Capetown, S. Africa	2000
7275	—	RAI	Rome, Italy	2020
7275	—	V. Nigeria	Lagos, Nigeria	2200
7280	—	R. Kiev	Kiev, USSR	0030
7295	—	BBC Relay	Francistown, Bechuanaland	0400
7305	—	R. Budapest	Budapest, Hungary	1930
	—	R. Malaysia	Kuala Lumpur, Malaysia	1400
7345	—	R. Prague	Prague, Czech.	0100
7360	—	R. Vilnus	Vilnus, USSR	2230
8070	—	V. of Truth	(clandestine) Greece	0210
9360	—	R. Nacional Espana	Madrid, Spain	2020
9390	—	R. Tirana	Tirana, Albania	0630
9457	—	R. Peking	Peking, China	2030

31 Meter Band—9500 to 9775 Kc/s

9505	—	R. Prague	Prague, Czech.	0700
	—	R. Belgrade	Belgrade, Czech.	2130
	CR6RB	R. Benguela	Benguela, Angola	0830
9508	—	R. Omdurman	Omdurman, Sudan	0530
9510	—	R. Bucharest	Bucharest, Rumania	0300

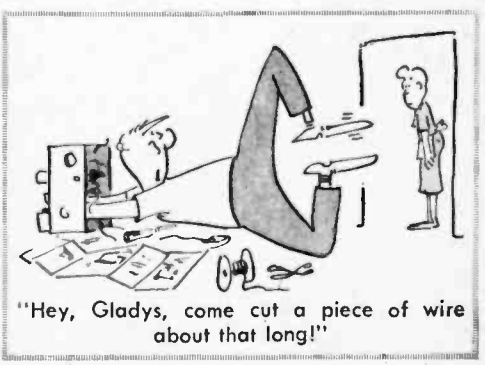
Freq. (KC)	Call	Name	Location	GMT
9525	—	R. S. Africa	Capetown, S. Africa	0525
	—	R. Habana	Havana, Cuba	1700
9540	—	R. Ulan Bator	Ulan Bator, Mongolia	2130
	—	R. Interprovincial	Katanga	2115
9543	—	R. America	Lima, Peru	0515
9545	—	R. Ghana	Accra, Ghana	1900
9550	—	R. Habana	Havana, Cuba	1700
9570	CE957	R. Portales	Santiago, Chile	0000
9575	—	RAI	Rome, Italy	1200
	—	R. Berlin Int'l.	Berlin, E. Germany	0615
9590	—	R. Bucharest	Bucharest, Rumania	0300
9605	—	Syrian BC	Damascus, Syria	2330
9615	—	R. Nacional Espana	Madrid, Spain	0100
9620	—	R. Sweden	Stockholm, Sweden	1400
9625	—	R. Sweden	Stockholm, Sweden	0900
9630	—	RAI	Rome, Italy	0100
9640	—	R. Kiev	Kiev, USSR	0030
	HLK5	V. Free Korea	Seoul, Korea	2100
9650	—	R. S. Africa	Capetown, S. Africa	0500
9655	—	R. Habana	Havana, Cuba	1100
	DMQ9	Deutsche Welle	Cologne, W. Germany	2140
9675	—	R. Dakar	Dakar, Senegal	1730
9680	—	R. Kiev	Kiev, USSR	0030
9685	—	V. de la Liberdad	(clandestine) Algeria	0015
	BED73	V. of Free China	Taipei, Formosa	1015
9688	LRA32	RAE	Buenos Aires, Argentina	0000
9690	—	V. of Nigeria	Lagos, Nigeria	2200
9705	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0330
9710	—	RAI	Rome, Italy	2020
	—	R. Beirut	Beirut, Lebanon	0130
9715	KGEI	V. of Friendship	San Francisco, Calif.	0200
9720	—	R. Saudi Arabia	Riydah, Saudi Arabia	1645
9750	—	R. Beirut	Beirut, Lebanon	2300
9753	OAX8Q	R. Sideral	Pucallpa, Peru	0200
9760	—	R. Ghana	Accra, Ghana	2000
	—	R. Nacional Espana	Madrid, Spain	0220
9768	OAX80	R. Amazones	Iquitos, Peru	0330
9730	—	ORTF	Brazzaville, Congo	0500
9767	BED74	V. of Free China	Taipei, Formosa	1530
9770	—	Austrian R.	Vienna, Austria	2300
9795	—	R. Prague	Prague, Czech.	0100
9840	—	R. Hanoi	Hanoi, N. Vietnam	1000
9865	—	R. Djakarta	Djakarta, Indonesia	1900
9870	—	R. Tirana	Tirana, Albania	0030
9915	VUD	All India R.	Delhi, India	1945
11640	VUD	All India R.	Delhi, India	1945

25 Meter Band—11700 to 11975 Kc/s

11705	—	R. Sweden	Stockholm, Sweden	0100
11710	—	ORTF	Brazzaville, Congo	1400
	LRA35	RAE	Buenos Aires, Argentina	2215
11715	YDF2	R. Djakarta	Djakarta, Indonesia	1730
11725	—	ORTF	Brazzaville, Congo	0500
11755	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0330
11770	HCJB	V. of Andes	Quito, Ecuador	2100
	ZYB8	R. de Sao Paulo	Sao Paulo, Brazil	0820
	—	R. Beirut	Beirut, Lebanon	1830
11775	—	R. Kabul	Kabul, Afghanistan	1400
11795	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0300
	DMQ11	Deutsche Welle	Cologne, W. Germany	2140
11790	—	R. Yerevan	Yerevan, USSR	0850
11795	—	R. Berlin Int'l.	Berlin, E. Germany	0345
11800	—	R. Ghana	Accra, Ghana	1900
11810	—	R. Bucharest	Bucharest, Rumania	0300
11820	XEBR	Heraldo de Sonora	Sonora, Mexico	2145
	—	R. Berlin Int'l.	Berlin, E. Germany	1915
	—	R. Papeete	Papeete, Tahiti	0300
11825	—	R. Berlin Int'l.	Berlin, E. Germany	1215
11835	CXA19	R. el Espectador	Montevideo, Uruguay	2300
11840	—	Trans World R.	Bonaire, Neth. Ant.	1830
	—	R. Hanoi	Hanoi, N. Vietnam	1000
11850	DZH8	Far East BC	Manila, Phil.	0900
	—	R. Ulan Bator	Ulan Bator, Mongolia	0220
11865	—	RAI	Rome, Italy	1200
11866	—	R. Interprovincial	Katanga	2115
11875	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0600
11885	—	R. Bucharest	Bucharest, Rumania	1500
11895	—	West Indies BC	St. Georges, Grenada	2000
11900	—	R. S. Africa	Capetown, S. Africa	1000
11915	—	V. Nigeria	Lagos, Nigeria	2200
	—	Syrian BC	Damascus, Syria	2330
11930	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0530
	—	ORTF	Brazzaville, Congo	1730
	—	R. Habana	Havana, Cuba	2200
11940	—	R. Bucharest	Bucharest, Rumania	1500
11945	HSK9	R. Thailand	Bangkok, Thailand	1030
11970	—	R. Habana	Havana, Cuba	2200
	—	ORTF	Brazzaville, Congo	1100
11975	—	R. S. Africa	Capetown, S. Africa	1845
11990	—	R. Prague	Prague, Czech.	0100
13670	—	R. Pyongyang	Pyongyang, N. Korea	1100
14100	VR6AC*	—	Pitcairn I.	1230
14200	VR6AC*	—	Pitcairn I.	1230
14278*	VR6AC*	—	Pitcairn I.	1230
14324*	VR6AC*	—	Pitcairn I.	1230
15016	—	(Gemini music)	Cape Kennedy, Fla.	1530
15060	—	R. Peking	Peking, China	0930

19 Meter Band—15100 to 15450 Kc/s

15120	ZYN31	R. Soc. da Bahia	Bahia, Brazil	0000
15170	TGWA	V. de Guatemala	Tegucigalpa, Guat.	1600
15190	—	ORTF	Brazzaville, Congo	1730
	—	Syrian BC	Damascus, Syria	2330
15220	—	R. S. Africa	Capetown, S. Africa	1000
15230	—	R. Prague	Prague, Czech.	0700
15240	—	R. Berlin Int'l.	Berlin, E. Germany	1600
15255	—	V. Nigeria	Lagos, Nigeria	2200
15270	—	R. Habana	Havana, Cuba	1100
15285	—	R. Prague	Prague, Czech.	0700
15293	—	R. C. Lourenco Marques	Lourenco Marques, Mozamb.	1630
15300	—	R. Habana	Havana, Cuba	1100
15333	—	R. Ceylon	Colombo, Ceylon	0700
15340	—	R. Habana	Havana, Cuba	2200
15380	—	Deutsche Welle	Kigali, Rwanda	0100
	—	R. Bucharest	Bucharest, Rumania	1500
15405	HCJB	V. of Andes	Quito, Ecuador	2100
15410	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0600
15445	—	ORTF	Brazzaville, Congo	0500
17715	—	R. Habana	Havana, Cuba	1100
17720	—	ORTF	Brazzaville, Congo	1300
17805	—	R. S. Africa	Capetown, S. Africa	1000
17780	—	R. Budapest	Budapest, Hungary	1930
17830	—	R. Ceylon	Colombo, Ceylon	0915
17855	—	R. Habana	Havana, Cuba	1100
18985	OLB5*	(time signals)	Prague, Czech.	1340
21450	—	R. Prague	Prague, Czech.	0700
21500	—	ORTF	Brazzaville, Congo	1300
21545	—	R. Ghana	Accra, Ghana	1530
21720	—	R. Ghana	Accra, Ghana	1515



"Hey, Gladys, come cut a piece of wire about that long!"

Destruction from Space

Continued from page 45

photographs the earth from 300 miles up, electronically marking its position by measuring the stars above. It photographs so fast, travelling at 17,000 miles an hour, that one commentator said Samos photographs much as one would take pictures of "a horse race from a moving elevator."

Bambi. Bambi, still under study, is an electronic satellite designed to one day spot and intercept fired missiles two to 500 miles in space. The boost phase of a missile may last only three minutes, and in those 180 seconds Bambi is to cite the firing by infrared, intercept by heat-seeking warhead.

Although Bambi, admittedly, is still in study stage, there is promise we will one day see this amazing satellite. But its fellow scout planned to help meet our serious problem in space, has been cut back. Satellite Inspector, first named Saint, to be designed and built by RCA was cut back "two years ago." If the Inspector had survived, it would have been designed to scout intruders in space, scan a space object to be sure it was enemy, not friend, then destroy it by strewing sand or chemical in the satellite's path if it was a hostile fellow.

More Cut Back. Another Air-Force victim of cancelled contracts was the space glider Dyna-Soar, programmed in 1958 to be operational by 1965 or 1966, it was cut back in 1963, when the Department of Defense replaced it with a thirty million dollar "study" of the manned orbital laboratory.

But not until a few months ago, when President Lyndon Johnson invited newsmen to the White House did we see real action meant to meet this tragic gap in our space program. Then, on August 25, 1965, the President invited newsmen to the White House, made this important announcement. We would build, he said, at the cost of $1.5 billion dollars, a manned orbital (MOL) laboratory. Directed by the Air Force, the project would be handled by two major companies. Douglas Aircraft would design and build the laboratory. General Electric would plan and develop space experiments. And the purpose of the craft, the President said, would be to "learn more about what man is capable of doing in space, and how that ability can be used for military purposes."

Unmanned flights would be scheduled to test launching beginning late 1966, or early 1967. The initial unmanned launch of a fully-equipped MOL would be scheduled for year 1968. This would be followed later that year by the first of five flights with two-man crews. MOL's future astronauts would be military test pilots, science or engineering graduates of the Aerospace Research Pilot School at Edwards Air Force Base in California.

No Talk. After that heralded press conference, the Government lost its voice. So did the Air Force, Defense, Douglas Aircraft. But to break through the wall of hush-hush and fill in RADIO-TV EXPERIMENTER readers, we sought out these facts about the future laboratory.

The entire vehicle, according to John M. Coulter, a Colonel writing a paper for the Air University Review, will consist of a Gemini B capsule, carrying a crew of two, with a house-trailer size lab, that will launch into space on a Titan IIIC booster. Once in orbit the crew will transfer from their Gemini capsule into the laboratory section. There, in "shirt-sleeve" pressurized environment, they will stay in space thirty days carrying out "scientific and military" experiments.

When the mission is completed, or if there is an emergency, the crew will return to the capsule, separate from the laboratory, re-enter earth's atmosphere to be recovered at sea like any other Gemini. The laboratory could then be left abandoned in orbit, or programmed for command re-entry and destruction. It is possible, too that the future lab may be designed to rendezvous and dock, and if it is, it could be used to supply ferry vehicles for outer-space craft.

MOL Military. But MOL's first thoughts must be military. As Secretary of Defense Robert S. McNamara has put it, MOL's mission will be to "develop technology to improve capabilities for manned or unmanned operations of military significance."

All of which is fine. We will have a craft capable of military effort by the year 1968. But when we realize orbital bombers roll across Red Square, not bashful at all threatening destruction of the free world with their "colossal power" we wonder what will hold back these H-bombers until '68. A United Nations agreement? Fear of what the people in Tanganyika may think of the Russians if they start war? Shall we hurl peaceful intention at H and megaton bombs? Or hope to

(Concluded on page 118)

DC Transformer

Continued from page 80

the primary and secondary films—each only approximately 1000 angstroms thick (one angstrom equals one hundred-millionth of a centimeter)—are separated by an even thinner film of silicon oxide, an insulating material, only about 100 angstroms thick. By placing a number of secondary films in series in the DC transformer, it is possible to develop a secondary voltage many times higher than the primary voltage. Similarly, by placing a number of primary films in series, the output voltage can be "stepped down" below the input voltage.

The DC transformer marks Dr. Giaever's second major contribution to superconductor research. In 1960, he announced the discovery that electron "tunneling," originally observed only in carefully prepared semiconductor materials, also could occur in thin film superconducting devices of far simpler configuration. Subsequent tunneling studies have added greatly to fundamental scientific knowledge of both tunneling and superconductivity. ■

Join a Radio Club

Continued from page 62

which are available to members for DX'ing prowess. The ASWLC produces the weekly DX broadcast over SW station WRUL.

American Central Radio Club, % Richard Wood, 207 East 16th Street, Bloomington, Ind. 47403. Founded in 1963, the ACRC gets $2 a year from members. They furnish a nice 10-page paper each month which seems to concentrate on listings of Latin American stations, especially those on the shortwave bands.

International League of Signal Chasers, % Mark Starin, 19 Dorlen Circle, Wethersfield, Conn. 06109. A new club, organized last year, they have a paper called *The Longwire*. Dues are 75¢.

DX Internationale, % David Wilson, 91 Court St., Newton, Mass. 02160. This club is really on the way up, and they haven't slowed since their founding in 1963. They publish a giant (sometimes 50 page) monthly bulletin which frequently features color. Coverage includes every possible phase of DX'ing, tape swapping, etc.

International Radio Club of America, % Bill Nittler, P.O. Box 5181, Denver, Colo. 80217. Started in 1964 by a group of former members of NRC, IRCA devotes efforts towards BCB DX'ing. Dues are $4.

National Radio Club, % Ray Edge, Box 63, Kennsington Station, Buffalo, N. Y. 14215. Started about 33 years ago, this is the top club in the country for BCB DX enthusiasts. The yearly conventions are a blast. Dues are $4.

Newark News Radio Club, 215 Market Street, Newark, N. J. 07001. If you never do anything else in DX'ing you should join the NNRC, the oldest and largest of all of the clubs. They publish a massive monthly DX bulletin which takes up all aspects of DX'ing—really helpful. $5 dues.

North American Shortwave Association, % Bill Eddings, 1503 Fifth Avenue, Altoona, Pa. 16602. Going strong and growing since 1961, the NASA has racked up several hundred members and a good reputation for putting out a healthy DX bulletin with worthwhile items. Dues are $3.

These aren't all of the clubs, but these are the ones which have proven themselves as being "here to stay." Why not see what they have to offer you? ■

"Pulling Power Is Amazing"

Classified MARKET PLACE

Classified Ads 55¢ per word, each insertion, minimum 10 words, payable in advance. To be included in the next available issue of RADIO-TV EXPERIMENTER, copy must be in our New York Office by June 10th. Address orders to C. D. Wilson, Manager, Classified Advertising, RADIO-TV EXPERIMENTER, 505 Park Ave., New York, N. Y. 10022.

FOR BIGGER PROFITS! NEW CAREER OPPORTUNITIES!

READ AND REPLY TO THESE CLASSIFIED ADS

ADDITIONAL INCOME

MAKE Your Classified Ad Pay. Get "How To Write a Classified Ad That Pulls." Includes certificate worth $2.00 towards classified ad in S & M. Send $1.00 to C. D. Wilson, Science & Mechanics, 505 Park Ave., New York, N. Y. 10022.

BOATS, MOTORS & MARINE SUPPLIES

FULL size, cut-to-shape boat patterns, blueprints. Send 50¢ for big New illustrated "Build a Boat" catalog includes Fishing Boats, Garvies, Cruisers, Catamarans, Houseboats—Outboards, Inboards, Sailboats—7½ to 38'. "How to Build a Boat" booklet $2.50. Cleveland Boat Blueprint Co., Box 18250, Cleveland, Ohio.

BOAT Kits. Factory molded fiberglas or pre-assembled plywood. 50 models, 12' to 40', Runabouts, Cruisers, Houseboats. Free catalog. Luger, Dept. UC-66, 9200 Bloomington Freeway, Bloomington, Minnesota.

BOAT COMPASS: Liquid, Compensatable, Illuminated, Guaranteed. $7.50 Prepaid. Brochure on Request. Burbet Imports, Box 1683, Highland, Indiana 46322.

BOOKS & PERIODICALS

FREE! The U.S. Coast Guard Boating Guide—(sail and power). Cigar Smokers: Get this $1.00 book free! Clip this ad, send with 25 cigar bands from one shape of any one brand to P.O. Box 16579, Phila., Pa. 19122. Include name, address, zip code. Expires Sept. 15, 1966.

BUSINESS OPPORTUNITIES

I MADE $40,000.00 a Year by Mailorder. Helped others to make money! Start with $10.00—Free Proof. Torrey. Box 63566T, Oklahoma City, Okla. 73106.

FREE Book "990 Successful Little-Known Businesses." Fascinating! Work home! Plymouth-911-Y, Brooklyn, N. Y. 11218.

DOCKS & WATER FRONT CONSTRUCTION

DOCKS—Assembled, nine ft. sections. You can launch these yourself. Need no piling or winter removal. Water Front Constructioneers, R.D. 2, Box 113, Newton, N. J. 07860.

EARTHWORMS

BIG Money Raising Fishworms and Crickets. Free Literature. Carter Farm-O, Plains, Georgia. 31780

FIREARMS, AMMUNITION & EQUIPMENT

SILENCERS: Rifles, Pistols, Details Construction Operation $1.00. Gunsco, Soquel, Calif. 95073.

THE New "Hunting Guide" draws a bead on Regional Hunting Forecasts. "Testing The Buck Sluggers," "Getting In Shape For The Hunt," etc. Send for your copy; Hunting Guide (#755). 505 Park Ave., New York, N. Y. 10022. $1.25.

FLORIDA LAND

FLORIDA Water Wonderland—Home, cottage, Mobilesites. Established area, $590.00 full price, $9.00 a month. Swimming, fishing, boating. Write: Lake Weir, Box MH38, Silver Springs, Florida AD 646127 (F-1).

FOR INVENTORS

PATENT Searches—48 hour airmail service, $6.00, including nearest patent copies. More than 200 registered patent attorneys have used my service. Free invention protection Forms. Write Miss Ann Hastings, Patent Searcher, P. O. Box 176, Washington 4, D. C.

FOR SALE—MISCELLANEOUS

BARGAINS Our Business. Catalog 10¢ Refundable. Tojocar, 2907-B West 39th Place, Chicago, Ill. 60632.

CATALOG of all Science & Mechanics Craftprints. Send 25¢ to cover postage and handling to Craftprint Div., Science & Mechanics, 505 Park Ave., New York, New York 10022.

HYPNOTISM

NEW concept teaches you self-hypnosis quickly! Free literature. Smith-McKinley, Box 3038, San Bernardino, Calif.

HYPNOTIZE secretly, cleverly, one glance . . . or money-back. $2.00. Elton's, Box 18223-TV2, Indianapolis, Indiana, 46218.

INVENTIONS WANTED

WE either sell your invention or pay cash bonus. Write for details. Universal Inventions, 298-5, Marion, Ohio.

MONEYMAKING OPPORTUNITIES

PROVEN! Easiest Money Ever!! Plan $1.00. Action, Box 3114, Corpus Christi, Texas.

TRAIN at home for High-Paying Jobs! Send for the complete guide with its important Directory of Courses and discover what courses are best for your talents. Send $1.00 for "How To Succeed Through Home Study." 505 Park Ave., New York, New York 10022.

PATENT SERVICE

PATENT Searches, $6.00; For free "Invention Record" and "Important Information Inventors Need," Write: Miss Hayward, 1029D Vermont, Washington 5, District of Columbia.

PATENT Searches—48 hour airmail service, $6.00, including nearest patent copies. More than 200 registered patent attorneys have used my service. Free Invention Protection Forms write: Miss Ann Hastings, Patent Searcher, P. O. Box 176, Washington 4, D. C.

PERSONAL

REVOLUTIONARY Weekly Stock Market exposure poll signifies advance market action. Free Details. Publisher, Box 908-C, Brooksville, Florida 33512.

PETS—DOGS, BIRDS, RABBITS, HAMSTERS, ETC.

MAKE big money raising rabbits for us. Information 25¢. Keeney Brothers, New Freedom, Penna.

PROFITABLE OCCUPATIONS

INVESTIGATE Accidents. Earn $750.00 to $1,500.00 monthly. Car furnished. Expenses paid. No selling. No college education necessary. Pick own job location in U. S., Canada or overseas. Investigate full time. Or earn $8.44 hour spare time. Men urgently needed now. Write for Free information. Absolutely no obligation. Universal, CMH, 6801 Hillcrest, Dallas 5, Texas.

START Profitable Business in spare time. Investigate many moneymaking agency and franchise opportunities. Send 10¢ for sample copy of Income Opportunities Magazine, 505 Park Ave., New York 10022, Dept. S.

RADIO & TELEVISION

McGEE Radio Company. Big 1966 Catalog Sent Free. America's Best Values. HI-FI, Amplifiers, Speakers, Electronic Parts. Send Name, Address and Zip Code Number to McGee Radio Company, 1901 McGee Street, Dept. RTV, Kansas City, Missouri 64108.

FREE Catalog. Electronics parts, tubes. Wholesale. Thousands of items. Unbeatable prices. Arcturus Electronics-RT, 502 22nd St., Union City, N. J. 07087.

CONVERT any television to sensitive, big-screen oscilloscope. Only minor changes required. No electronic experience necessary. Illustrated plans, $2.00. Relco-A30, Box 10563, Houston, Texas 77018.

TELEVISION troubles spotted in minutes! Repair all makes and models this easy expert way. No Book theory. A real "work bench" simplified method. Used by "pros" throughout the industry. Write, specifying black/white, or color. National Technical Research Labs., 6430 So. Western Ave., Whittier, Calif.

NEW! HI-FI Enthusiasts—A Special Magazine for you. Read the unbiased tests on new equipment. Send $1.50 to HI-FI Buyers' Guide, 505 Park Ave., New York, N. Y. 10022.

SONGWRITERS

POEMS Wanted for musical setting and recording. Send poems. Free examination. Crown Music, 49-SC West 32, New York 1.

SPECIAL SERVICES

LOOK Men—especially Golf Players. Cut your shoe cost. Send 25¢ for details. Delph's Leather Products, Tamaqua, Pennsylvania 18252.

TREASURE FINDERS—PROSPECTING EQUIPMENT

"NEW" Scientific Instrument detects buried gold, silver, coins, treasures. $19.95 up. Free catalog. Relco-A30, Box 10563, Houston, Texas 77018.

Language DX

Continued from page 88

best organization to start with for several reasons. The Voice has transmitting plants in North Carolina, Ohio, and California, and this relative closeness, plus the high power in use by the Voice, affords the SWL an excellent opportunity of picking up all of the languages transmitted by the Voice of America.

In addition, schedules are relatively simple to obtain. They can be had by writing: Mr. George Jacobs, Frequency Division, Voice of America, Washington 25, D. C. The Frequency Division is also responsible for answering requests for QSL's.

Pick a Lingo. Still another variation of the language DX hobby gives promise of many rewarding hours. Choose a single language and check as many broadcasters as you can transmitting in that language.

English, for example, would be a good beginning, and a sample check sheet for the interested DX'er is shown in Table B.

There are advantages to starting with *English*, since it is understood by all readers of this magazine. In addition, it is the most popular language of international broadcasters, appearing in the schedules of some 94 different broadcast organizations, including a number of clandestine stations, such as *The Voice of Cyprus*, the *Voice of the Falcon*, and *The Voice of Freedom Fighters of North Borneo*.

Other candidates for DX'ing a particular language are *French*, carried by 68 different broadcasters, *Spanish*, carried by 48 broadcasters. Running a surprising fourth is *Arabic*, carried in the International Service of 47 different broadcasters.

At the other end of the spectrum, there are a number of languages that are carried by only one broadcaster. Among these there is *Adigey* carried by Radio Liberty, *Efik* by Spanish Guinea, *Fanti* by ELWA Monrovia, *Latin* by The Vatican, *Niue* by Radio New Zealand, *Turki* by Radio Pakistan, and *Wolof*, by Tangier

In conclusion, it would seem that with a veritable windfall of new and exotic languages now being transmitted by the world's broadcasters, the hobbyist has an unprecedented opportunity to begin a very interesting and stimulating variation of a very popular but somewhat limited hobby. ■

Destruction from Space

Continued from page 115

base our survival on weapons Ralph Lapp calls "vulnerable?"

Three Missions. Or should we heed our military men? They warn the orbital missile may be missioned three ways:

It could blackmail the free world by orbiting in space, frightening the people with a Damocles of H-bombs over their heads, while gloating Russian leaders demanded surrender.

The missile might possibly be put into orbit undetected, to aim its H-bombs at United States cities in mammoth surprise attack.

Or, most frightening of all, the missile could orbit 150 miles in space, carrying a bomb yield of 100 to 150 megaton warhead, then detonate this yield in space. Military experts tell us no concussion would be felt on earth. There would be no immediate radiation coming through the earth's atmosphere. But the bomb's effects could be a "wide blast of searing heat," that could set a whole continent on fire.

Peace. Which leaves us one question! Will we pay with massive national destruction as direct result of the "peaceful purposes," the Dale Carnegie, love-everybody attitudes of our passive leaders?

Already it is possible an H-bomb orbits over our heads in the skies. ■

Tape that Saved the Voice

Continued from page 48

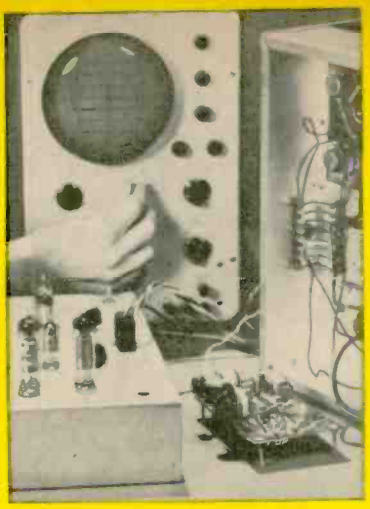
in the Congressional Library in Washington and in the Will Rogers Memorial at Claremore, Oklahoma. Today visitors at the Memorial at Claremore can hear anything from a two-minute sample of his commentaries, to hours of them. In addition, his voice is heard on radio and on television, and can be had in new record albums.

The true simplicity, humility and greatness of this man whose voice was all but lost forever can now be preserved. Thanks to the magic of magnetic recording tape you may hear his restored voice saying, in that Oklahoma drawl, "You never saw a picture of a Pilgrim praying when he didn't have a gun beside him. That was to see that he got what he was praying for." ■

BUILD, EXPERIMENT, EXPLORE, DISCOVER WITH NRI CUSTOM-DESIGNED TRAINING KITS

BUILD YOUR OWN PHONE/CODE TRANSMITTER

This is just one of seven training kits programmed into NRI's Complete Communications course. You get actual practice in building your own crystal-controlled, phone/code transmitter and putting it on the air. You experiment with modulation, "clamping" circuits, key filters, other aspects of commercial transmitter operation. Can be put on the air simply by attaching an antenna and complies with FCC regulations. As with all NRI training kits, you get the most modern features and parts.



BUILD ACTUAL ANALOG COMPUTER CIRCUITS

Incustry, business offices, the government and military all need trained Electronics Technicians. NRI's Industrial Electronics course prepares you. You progress through 10 carefully designed training kits, topping off your practical experience phase of training by experimenting with feedback control systems, analog computers and digital computer elements. You actually solve problems on this analog computer you build yourself. This is the *practical*, fast way to a good paying career position.

BUILD A CUSTOM-ENGINEERED TELEVISION RECEIVER

Want to earn $3 to $5 an hour in spare time? Want your own part-time or full-time business? In Radio-TV Servicing you learn to install, maintain, service radios, TV sets, hi-fi and stereo, other home Electronics equipment. In your training are eight training kits including this complete, modern, slim-line TV receiver. You build it yourself, become familiar with components and circuits, learn servicing procedures . . . and earn extra money as you train. National Radio Institute, Washington, D.C.

SEE OTHER SIDE ▶

Join the Thousands Who Gained Success with NRI

"I am Frequency Coordinator for the 11th Naval District. The course was priceless." J. J. JENKINS, San Diego, Calif.

"Many thanks to NRI. I hold FCC License, am master control engineer with KXIB-TV." R.L. WOOD, Fargo, N.D.

"I am a Senior Engineering Aide. Without NRI I would still be working in a factory at a lower standard of living." D. F. CONRAD, Reseda, Calif.

nri

FIRST CLASS
PERMIT
NO. 20-R
Washington, D.C.

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

POSTAGE WILL BE PAID BY

NATIONAL RADIO INSTITUTE
3939 Wisconsin Avenue
Washington, D.C. 20016

YOU GET MORE FOR YOUR MONEY FROM NRI

Below is an example of material included in just one NRI course. Other NRI home study plans are equally complete.

AMERICA'S OLDEST AND LARGEST RADIO-TV, ELECTRONICS HOME-STUDY SCHOOL

Compare if you like. You'll find—as have so many thousands of others—that NRI training can't be beat. From the delivery of your first lessons in the remarkable, new Achievement Kit sent the day we receive your enrollment, to "bite-size," easily read texts and carefully designed training equipment . . . NRI gives you more value. The picture above dramatically illustrates the material included in just one NRI course. Everything you see is included in low-cost NRI training. But NRI is more than kits and texts. It's also friendly, personal services which have made NRI a 50 year leader in the home study field.

Whatever your interest or need . . . whatever your education . . . there is an NRI instruction plan in Radio-TV Servicing, Electronics or Communications to fit your needs; tuition rates to fit your budget. Prove to yourself—your best home-study buy is NRI. Mail postage-free card today. No salesman will call. NATIONAL RADIO INSTITUTE, Electronics Division, Washington, D.C. 20016.

SEE OTHER SIDE

National Radio Institute, Electronics Division
Washington, D.C. 20016 5-066

Please send me your catalog. I have checked the field(s) of most interest to me. (No salesman will call) PLEASE PRINT.

- ☐ Television-Radio Servicing
- ☐ Complete Communications
- ☐ Industrial-Military Electronics
- ☐ FCC License
- ☐ Basic Electronics
- ☐ Math for Electronics
- ☐ Electronics for Automation
- ☐ Aviation Communications
- ☐ Marine Communications
- ☐ Mobile Communications

130 GMT

Name_____ Age_____

Address_____ Zip Code_____

City_____ State_____

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL

NOW 10 WAYS to train at home

MAIL CARD

NO POSTAGE REQUIRED

nri

OVER 50 YEARS OF LEADERSHIP IN ELECTRONICS TRAINING