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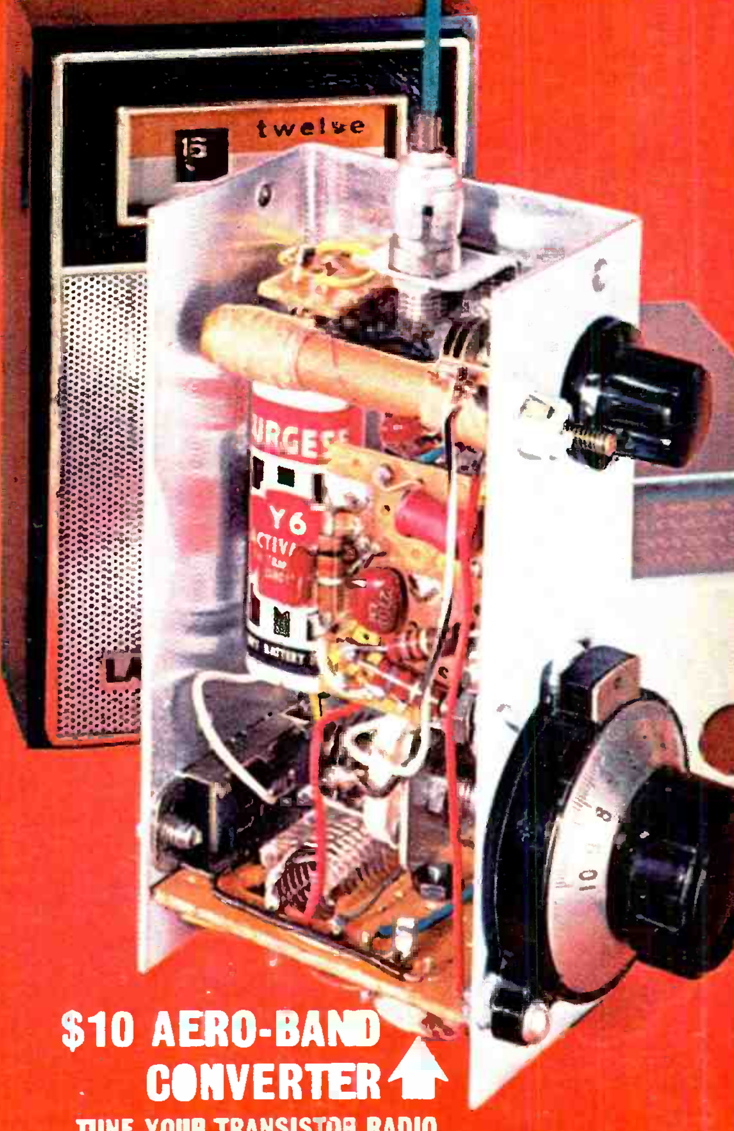

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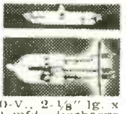

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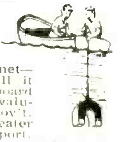

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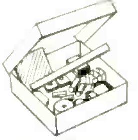

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December-January 1965-66

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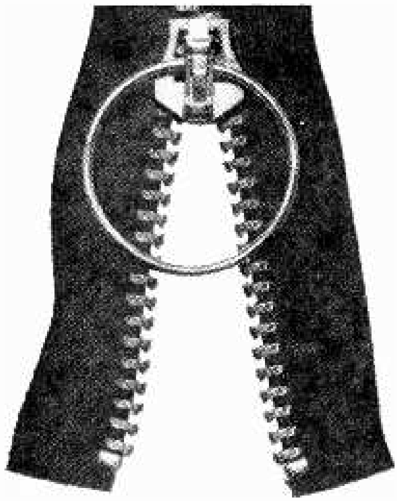

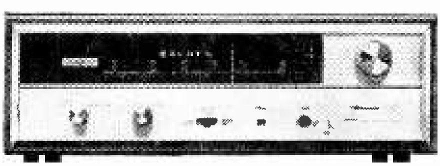

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BOOKMARK

by Bookworm

■ In this issue of Bookmark your ol' Bookworm has reviewed texts covering many electronic interest areas including one industry "Alger Hiss" story on a latter-day Edison.

Inside Motorola. *The Founder's Touch* is the story of Paul Vincent Galvin, who at the time of his death in 1959 was Chairman

240 pages
Hard cover
$4.95

of the Board of Motorola, Inc., and one of the most dynamic leaders on the American business scene. The Founder's Touch is also the exciting account of a vast business built from scratch, and the story of a man whose life reflected the whole changing world of the twentieth century.

Born of pioneer stock in a small Midwestern town, Galvin was essentially a child of his time. But he could not be contained by limited horizons of his birthplace, and in 1923, touched by the first transitions of American life from farm to city, he moved to Chicago where he began to manufacture storage batteries with his brother Joe. Galvin had been deeply affected by World War I, and suddenly, like America itself, he became aware of the world "outside." A new American society was forming; industry had grown and was growing still; radio was little more than a novelty, but on the wave of its popularity, Galvin's small manufacturing company enjoyed a mild success.

However, his limitless energy demanded new outlets, and with his brother and some friends he developed a radio that could be used in the relatively new motorcars appearing on the highways. From that time on, Galvin's story, and his life of joyous and devoted labor, also tells the dramatic story of American business itself.

(Continued on page 12)

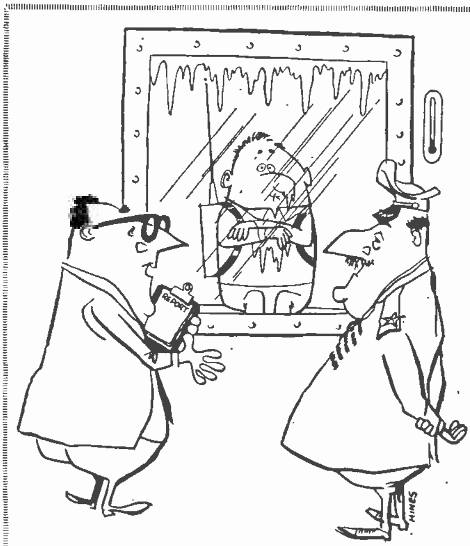
Bookmark

Continued from page 10

His dreams were the dreams of many, his word was his contract, to be honored at any cost. Galvin's achievements, his success as a business leader and a man through the Depression, World War II, and the great expansion in the years that followed all tell Motorola's story as well. From its inception, Motorola's dedication to its employees is unique in the annals of American business. Paul Galvin's faith in himself and his product commanded the respect and loyalty of everyone who worked for him. He was rewarded by the complete trust and devotion of his staff. If Galvin's life was a reflection of America in the twentieth century, it is also a life inextricably bound to that giant corporation, which still retains "the Galvin touch"—a touch this book amply and affectionately chronicles. Prepared by Harry Petrakis, the text was published by McGraw-Hill Book Company, 330 West 42nd St., New York, N. Y. 10036 and it is available at most book stores.

Transistorized. The world of electronics is expanding greatly, and everyone knew that in the course of time it would catch up with the automotive world. During the early days of automobiles, the car owner had to be somewhat of a mechanic to keep the car

(Continued on page 14)



"At 60-degrees below the transceiver operates—but the man can't!"

Some plain talk from Kodak about tape:

The meat of the matter... and some boxing news

Undistorted output from a tape —as from any other link in the chain of audio components—is at the very heart of high fidelity enjoyment. Distortion (or the lack of it) is simple enough to evaluate in theory. You start out with something measurable, and you reproduce it. Everything added (or subtracted or modified) by the reproduction, that can be measured or heard, is distortion. Since most kinds of distortion increase as you push any component of your system closer to its maximum power capability, you have to label your distortion value to tell whether you did this while coasting or at a hard pant.

Cry "uncle"

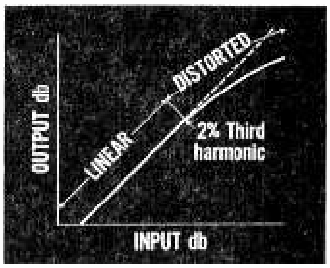
To make the distortions contributed by the tape itself big enough to measure and control, we simply drive the tape until it hollers "uncle" and use that power reference as our benchmark. Here's the procedure. Record a 400-cycle signal (37.5-mil wavelength at 15 ips) and increase its level until in a playback, which is itself pristine, you can measure enough 1200-cycle signal (third harmonic) to represent 2% of the 400-cycle signal level. This spells "uncle!" We use 400 cycles for convenience, but insist upon a reasonably long wavelength because we want to affect the entire oxide depth.

The more output level we can get (holding the reproduce gain constant, of course) before reaching "uncle," the higher the undistorted output potential of the tape. Simple, what?

"Wadayamean—undistorted output at two percent?"

That's what makes a Miss America Contest. Two percent third harmonic is a reference point that we like to contemplate for a picture of oxide performance. Since distortion changes the original sound, it becomes a matter of acumen and definition how little a change is recognizable. If you're listening, two percent is a compromise between a trained and an untrained ear. If you're measuring, it comes at a convenient point on the meter.

Because undistorted output helps to define the upper limit realism of the recording, the higher the undistorted output, the easier it is to reproduce the massed timpani and the solo triangle each at its own concert hall level. And this is just another area where Kodak tapes excel . . . our general-purpose/low-print tape (Type 31A) gives you up to 3 decibels more crisp, clean output range than conventional tapes.



2% third harmonic distortion represents the practical limit to linear recording.

The great unveiling — Kodak's new library box with removable sleeve!

Kodak tapes—in the five- and seven-inch sizes—now *look* as good as they sound. We've put the package identification on a removable sleeve and designed a tape library box with a smart new look. This new box features durable one-piece construction, full index space, plus detailed tape use instructions on the inside. *Kodak* Sound Recording Tapes are available at most electronic, camera, and department stores.

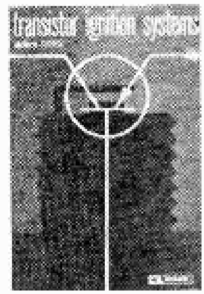
New 24-page, comprehensive "Plain Talk" booklet covers all the important aspects of tape performance, and is free on request. Write: Department 8, Eastman Kodak Company, Rochester, N. Y. 14650.

EASTMAN KODAK COMPANY, Rochester, N. Y.

Bookmark

Continued from page 12

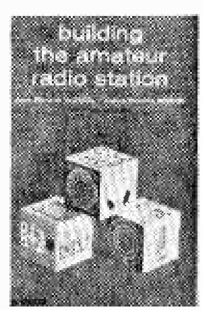
going; today knowledge of automechanics is no longer essential. However, the introduction of transistor ignition systems has brought about new interest in automotive electronics. *Transistorized Ignition Systems*



128 pages
112 illus.
Paperback
$2.95

by author Marvin Tepper offers complete theory, operation, installation, and trouble-shooting which is carefully outlined in this useful volume. The text begins with a thorough discussion of conventional ignition systems and their workings, and then provides complete, valuable information on semiconductors, Zener diodes, and transistor ignition systems. Besides aiding do-it-yourselfers in building their own transistor ignition systems, it also gives the specifications and characteristics of leading commercially produced systems and kits. Published by John F. Rider, Publisher, Inc., 850 Third Avenue, New York, N. Y. 10022.

Ham Shack. An enlarged and up-dated edition of *Building the Amateur Radio Station* is an all-inclusive guide for the construction of a Novice- or General-Class ham radio station. Every necessary tool, and its



144 pages
88 illus.
Paperback
$3.45

use, is fully described. Besides giving a complete listing of all parts needed to construct a station, it explains each electronic component's function. The text also tells how to

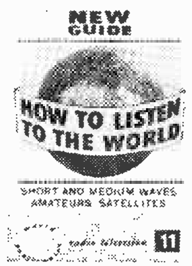
(Continued on page 16)

Bookmark

Continued from page 14

follow schematic and wiring diagrams. Chassis layouts are provided and all text instructions are clarified with many diagrams and illustrations. The text is authored by Jack (W2MDL) and Julius (W2PIK) Berens who also authored *Getting Started in Amateur Radio.* Published by John F. Rider Publishers, Inc., 850 Third Avenue, N. Y. 10022.

SWL Special. The *How to Listen to the World* book is published in Denmark by the former publisher of *World Radio-TV Handbook,* Mr. O. Lund Johansen. *How to Listen*

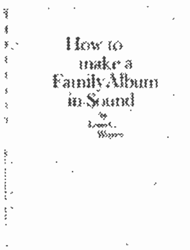


174 pages
Paperback
$2.75

to the World gives the shortwave listener facts on every facet of this hobby that he needs to know. Unlike several books on this topic, published in the past, this book contains 38 separate chapters, totaling the work of some 25 different authors and specialists in the field. For example, wave propagation in discussed by Alan Shapley of the National Bureau of Standards, shortwave broadcasting by John Gayer of the ITU, shortwave clubs by the president of the Newark News Radio Club. The pages are jammed-packed with information not available in any other publication.

Some of the chapter headings are: Reception Conditions, How to Identify Stations, Programs in English, Listening to the Amateur Bands, DX-ing on the Medium Waves, How to Report, Listening to the Satellites, Buyers Guide, Learning Languages by Radio, DX-ing TV Stations, etc. Many electronics parts stores or by mail from GILFER Associates, Box 239, Park Ridge, N. J. 07656.

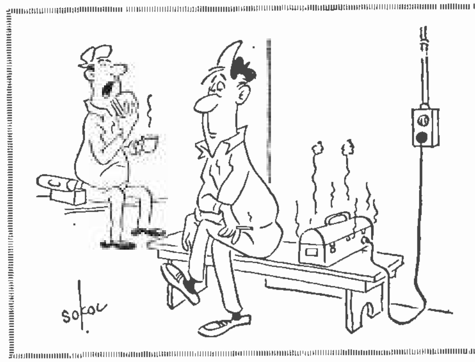
Tips on Taping. "The tape recorder gives the American family its first new history medium since George Eastman invented the snapshot camera." So says, Lester C. Worden, author and publisher of the new book, *How To Make A Family Album In Sound.*



44 pages
Plastic
bound
$3.00

Author Worden has based his book on the theory that while most people have an idea as to how they want to use a tape recorder, they need guidance and a source of ideas. This almost magic means of preserving the present for the future requires some original thinking along new lines. In his book, Worden deals with the use of tape for family recording under such interesting chapter headings as, "Meet The Magnetic Memory," "Sound For Its Own Sake," "Uses Of The Portable Recorder In Traveling," "How To Work With Children," "How Do You Make Your Living?," "The Hidden Mike," "How About A Sound Diary," "Sounds Of The Times."

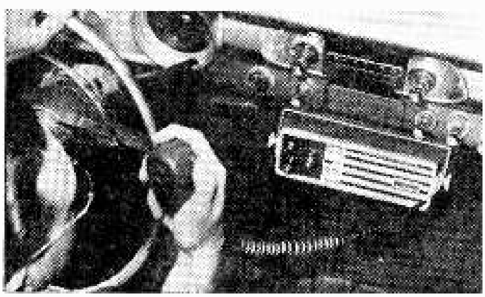
How To Make A Family Album In Sound is written for the family which wants to have an album of recordings ranging from baby's first sounds to grandma's reminiscences. These can be preserved for decades. Recordings can also be made in conjunction with slide or movie coverage to preserve a vivid, living image of family history and activity. Mr. Worden is also the author of *A Living Legacy, How To Make A Recording Of Your Life Story* (Time Mag., April 3, 1964). The publication retails for $3.00 and may be purchased in local bookstores or by mail to Lester C. Worden, 10455 Ashton Avenue, Los Angeles, California 90024. ■



RIGS AND RIGAMAROLE

■ This time round we have some extra-interesting gear for·your consideration—a new and *different* CB rig (stop asking yourself, "What could be different in a CB rig?"); a most unusual CB emergency accessory; and a new aid-to-operating which could be the newest "in" thing to add to your CB shack. So hold on to your capacitors, here we go!

What's New, Pussy Cat? The new CB rig is from Pearce Simpson, P.O. Box 308, Riverside Station, Miami, Fla. 33135. It's called the "Director," and is an ultra-compact 23 channel unit, completely transistorized in its circuitry.



Pearce-Simpson "The Director" Solid-state 23-Channel CB Rig

For one thing, the Director takes less current to operate than an automobile dashboard clock and will still function even when the car battery is so low that it will not turn over the engine. Best of all, when the car's battery is in normal operating condition, you can operate the Director for extended periods without draining the battery.

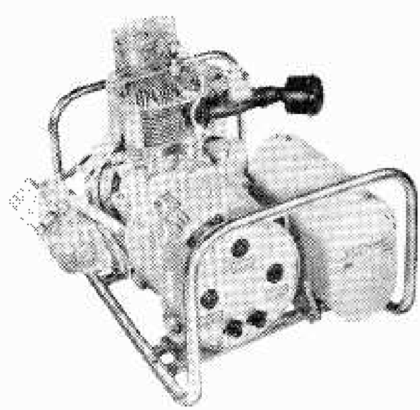
Being transistorized, the Director requires no warm-up time and is on the air instantly. The something "new" in the unit is some clever circuitry which Pearce-Simpson calls Hetro-Sync. This is a frequency synthesis circuit which requires only two mixed frequencies instead of the usual three. The result, Pearce-Simpson claims, is a transmit frequency of exceptional stability with maximum protection against those little unwanted spurious signals which have been known to cause TVI. To further maintain stability, a Zener diode is used in the power circuit and special close-tolerance crystals are employed which provide a transmitted tolerance of ± .003, which is well below FCC specifications and regular industry manufacturing standards.

Other features include: dual conversion receiver, special high gain audio amplifier for more "talk power," negative peak clipping and high level saturation limiting to prevent over-modulation and distortion, squelch and noise limiting circuits designed especially for this unit, a TVI filter, dust-proof enclosed plug-in relay, plug-in ceramic mike, corrosionproof aluminum construction with heavy-duty, lifetime epoxy finish.

Remember we said "ultra-compact?" Well it's only 8½ inches wide, 2¾" high, and 8½" deep—will fit into even the smallest car with a negative ground electrical system (12 volt). It weighs but 5 pounds! The Director is supplied with all crystals and a universal, all angle mounting bracket on a slide rail.

Price of the unit is $299.90, and Pearce-Simpson will send you further details and literature if you contact them.

Pooped Power Pepper. Next we see that the Zeus Portable Generator Co., 12435 Euclid Ave., Cleveland, Ohio 44108, has expanded their line of excellent portable electric generators.

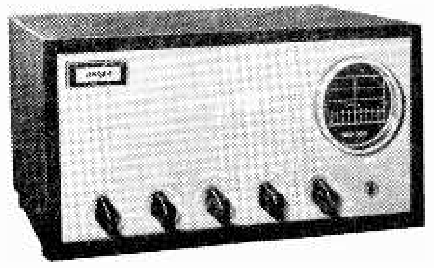


Zeus Portable Power Generator

These generators are ideal for CB clubs wishing to keep a stand-by power supply available in times of local power-supply failure. Operating from either regular gasoline or propane gas (depending upon the particular model), they deliver from 1000 watts of 115 volts AC at 8.7 amps all the way to dual voltage units capable of producing 3000 watts of 115/230 volts AC at 26.2/13.1 amps.

They have even equipped their fourteen different models with mufflers to keep the operation of the generator as quiet as possible, out of respect to those CB'ers who intend operating with their microphone in the immediate vicinity of the generator. Zeus has an excellent 16 page book which describes the specific features of each of their models, including power output available. We suggest that you obtain a copy of this book for your club files or for your own personal reference. It's free; just write to Zeus.

Band Snooper. Next we have something called a "Panadaptor," a device known to most CB'ers who did a stint in any of the military communications branches. The "Panadaptor" is a piece of gear which gives you a visual presentation of just about every signal in your area on the entire 11 meter band—it does this by means of a cathode ray tube. The face of the tube is calibrated to show 100 kc/s to each side of the center, and the center of the tube shows an indication of the signal being heard on the CB rig. The tube shows a green base line with a vertical "spike" representing the signals on the various channels.



Singer Panadaptor Model PR-1

This permits you to rapidly locate a clear channel or to "monitor" a number of channels at once. The device may also be used as a modulation analyzer, and as a signal strength indicator.

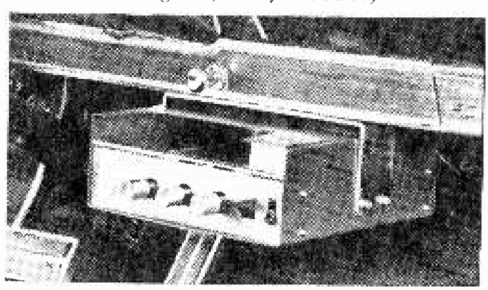
It may be attached in a few seconds to any CB rig (or communications receiver) having an IF of 455 kc/s.

Price is $144.50 from The Singer Company, Metrics Division, 915 Pembroke St., Bridgeport, Conn. ■

NEW products

Auto Stereo Tape-Cartridge Player

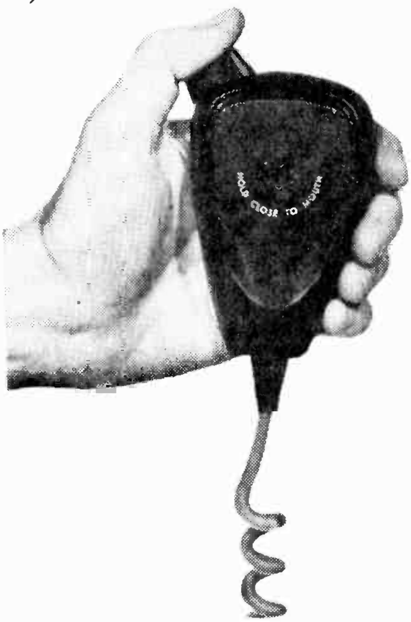
The newly-formed Auto Sound Division of the Craig Panorama, Inc., is introducing a high-styled car-stereo unit, called the Craig C-502, with such exclusive combination features as solid-state two-channel stereo amplifiers, dual-stereo playback heads, electronic track selection, push-pull output, and new self-activating cartridge system operating on auto battery. The unit is highly styled of steel with a brushed-aluminum face plate. Suggested list is $119. An additional all-chrome Craig C-501 model will list for $99.50. Craig is also offering a complete stereo cartridge library offering top Mercury, United Artists, Liberty, MGM and Paramount labels. A self-mailer music catalog is schedule for quarterly issue. (*For further information please write to Auto Sound Division, Craig Panorama, Inc., Dept. AS1-1, So. La Cienega Blvd., Los Angeles, Calif. 90016.*)



Craig C-502 Automobile Stereo

Noise-Canceling Mobile Carbon Microphone

Recent studies on voice intelligibility in communication systems operating in high noise environments have led to some interesting hardware developments. One such device is Roanwell Corporation's new Model RM-515 noise-canceling mobile carbon microphone. Canceling an average of 18 db of ambient noise, the RM-515 offers improved intelligibility over other available carbon noise-canceling units by providing superior noise-cancellation. Human-engineered for secure and comfortable hand operation, it is housed in a high-impact, thermoplastic case. A soft-action press-to-talk DPST switch activates the microphone. Mounting bracket is included. Technical specifications: Frequency Response, 300 to 3500 cps; Sensitivity, −17 db ref. 1 mw/nm^{-2}, (10 dynes/cm^2), or +33 db ref. 1 mv into 100 ohms load for 10 dynes/cm^2, S.P.L.; Carbon Noise, less than 0.001 volts; Recommended Operating Current, 50 to 100 ma; Maximum intermittent Current, 250 ma; Cordage, four-conductor retractile cord (5 ft. extended), vinyl insulation and jacket; Mounting Arrangement, clip type mounting bracket that receives mounting button on back of microphone. *(For more details write to Roanwell Corporation, Dept. R40T, 180 Varick Street, New York, N. Y. 10014)*



Roanwell Model RM-515 Carbon Mike

Tape Aids

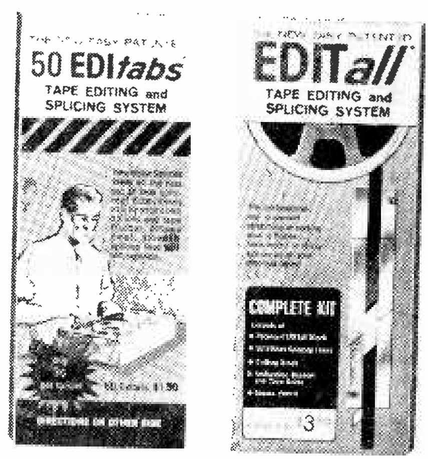
As part of their expanding activities in audio and high fidelity, Elpa Marketing Industries, Inc. will distribute a complete line of tape splicing and editing products known as *EDITall* and *EDItabs*. Both products are manufactured by the Tall Company.

The *EDITall* is a patented tape splicing block that can easily be fastened to any tape machine with or without the use of screws. It enables any owner of a tape machine to splice standard ¼" tape, including small sections hitherto considered impossible, professionally and accurately.

NEW products

The patented *EDItabs* are used for splicing tape and, when used in conjunction with the *EDITall* editing block, results in spliced tape that is as flexible, as uniform and as sturdy as the original tape itself. The use of the *EDITall* and *EDItabs* eliminates the crackles and pops that so often accompany tape that has been improperly spliced. Possible damage to the tape machine is also eliminated.

The new *EDITall* KP-2 editing kit contains an *EDITall* block for splicing and editing tape; 3 sheets of 10 each of EDItabs tape splices; a marking pencil; a specially treated demagnetized razor blade; together with complete instructions. The complete kit will retail for $3.50. Additional *EDItabs* are sold in a package containing 50 *EDItabs* for $1.50. The *EDITall* Kits and *EDItabs* will be distributed throughout the United States by Elpa. For any additional information Elpa Marketing Industries, Inc., Dept. 7R6, New Hyde Park, New York.



Elpa EDItabs (left) 8c EDITall (right)

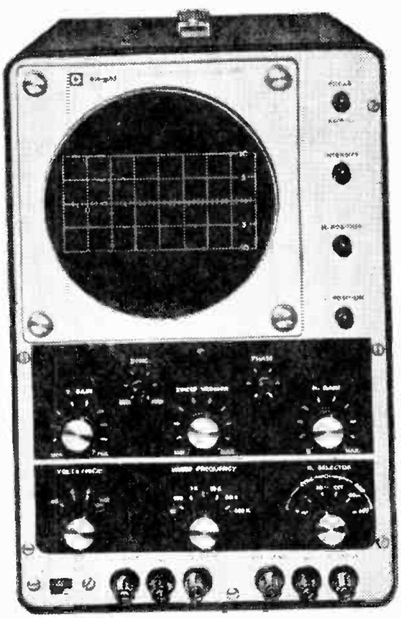
Oscilloscope for Color TV

A moderately priced oscilloscope that fulfills practically every service and test requirement is available from Allied Radio Corp. The new instrument, available both in kit form and factory-assembled, is the Knight-Kit 5" DC to 5.2 MC Wideband Oscilloscope, model KG-635. It can be used for color TV as well as wideband testing. Its wide range of application covers service shops, schools, laboratories, industrial production lines, and hobbyist and general use for high fidelity, amateur and CB equipment.

It features Unique Dynamic Sync Limiter circuit that assures trace uniformity under any high sync level conditions; vertical attenuator marked directly in volts/inch; two regulated power supply potentials; Pull-Push On-Off/Focus Control—no need to reset focus; 1650-volt accelerating potential for sharp traces; polystyrene and mylar capacitors for sweep stability.

Also, Automatic Astigmatism Correction for uniform focus regardless of trace position on screen; series/shunt peaking in amplifiers for overall widespread response; Pull-Push On-Off/Focus Control eliminates need for constantly resetting focus when turning unit on; 2 regulated power supply potentials; retrace blanking; and tapped primary on power transformer for optimum operation. Calibration controls are externally accessible through case. No test equipment required for calibration. Graticule has X and Y linear grids. Rugged black metal case. Highly legible markings on charcoal gray and silver front panel. Black knobs.

The Knight-Kit KG-635 is priced at $99.95 in kit form, $149.95 factory assembled. This new instrument is listed in



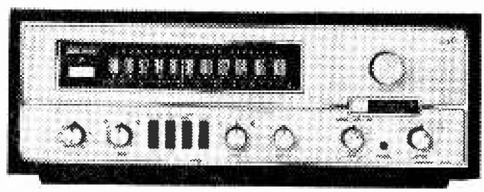
Knight-kit KG-635 DC Oscilloscope

NEW products

Allied's 1966 catalog No. 250, available free from Allied Radio Corp., 100 N. Western, Chicago, Ill., 60680.

FM-Stereo Receiver

A new all-in-one receiver is the Fisher 440-T, a no-compromise highly reliable unit that bristles with engineering innovations and convenience features. Although only 16¾" wide, it incorporates an all-solid-state FM-multiplex tuner with automatic mono-stereo switching, a versatile stereo control-preamplifier, a time-division multiplex system, and a heavy-duty silicon-powered stereo amplifier.



Fisher 440-T 70-Watt Stereo Receiver

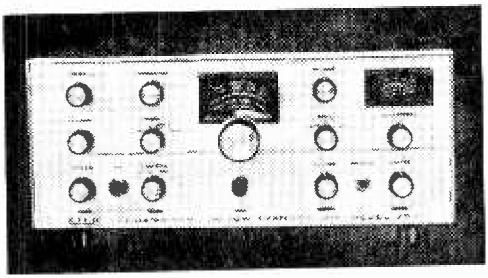
The tuner front-end has an exclusive four-gang all-solid-state design free of distortion and overload. It attains unusually high sensitivity and selectivity and can pull in the weakest FM signals even under the poorest receiving conditions. The controls are logically grouped on the front panel and include separate program and mode selector controls. One unusual feature on the 5-position Mode/Tape Monitor Switch are the positions Tape L and Tape R. These permit playback of each of the four tracks of a monophonic tape through both loudspeakers simultaneously.

In spite of its low price (under $330), the Fisher 440-T has many convenience features. They include a speaker selector switch, front-panel headphone jack, and high and low level magnetic inputs to accommodate all types of magnetic cartridges.

Tri-Band SSB/AM/CW Transceiver

A new three-band SSB/AM/CW Transceiver for use in the 20-, 40- and 80-meter amateur radio bands has been introduced by

EICO Electronic Instrument Co., Inc., 131-01 39th Avenue, Flushing, New York 11352. The new EICO 753 Tri-Band Transceiver may be used at fixed locations or as a mobile station on a vehicle or boat, for manual push-to-talk or automatic voice controlled (VOX) radio-telephone operating, or for radio-telegraph communication employing grid block keying. It has rigid construction compactness and superb styling. Assembly of



EICO SSB/AM/CW Ham Transceiver

the kit version is made easy and fast by VFO and IF circuit boards, plus preassembled crystal lattice filter.

When transmitting, power input is 200 watts PEP for SSB or AM, and 180 watts for CW. Power output is rated at 110 watts PEP for both SSB and AM, and 110 watts carrier power for CW. The transmitter uses a *pi* network to match into 40-80 ohms.

Receiver sensitivity is better than one microvolt for 10 db signal-to-noise ratio. Selectivity, provided by a crystal lattice band-pass filter, is 2.7 Kc at 6 db. A product detector is used for SSB reception and a triode detector for AM.

The transceiver can be operated on any frequency in the 3490-4010 Kc, 6990-7310 Kc and 13,890-14,410 Kc ranges. Frequency is selected with a single knob which has a 6:1 rapid band tuning ratio and a 30:1 vernier bandspread. An offset tuning control is also provided with which the receiver can be tuned over a 10 Kc/s range without altering the transmitting frequency.

Flat-topping is prevented by a high-level dynamic ALC (automatic level control) circuit, even with extreme overmodulation, permitting use of an external linear amplifier with the transceiver. Auxiliary contacts are provided on the transmit-receive relay for control of a linear amplifier.

In kit form it is priced at $179.95 and at $299.95 factory-wired and tested, less power supplies and speaker.

NEW products

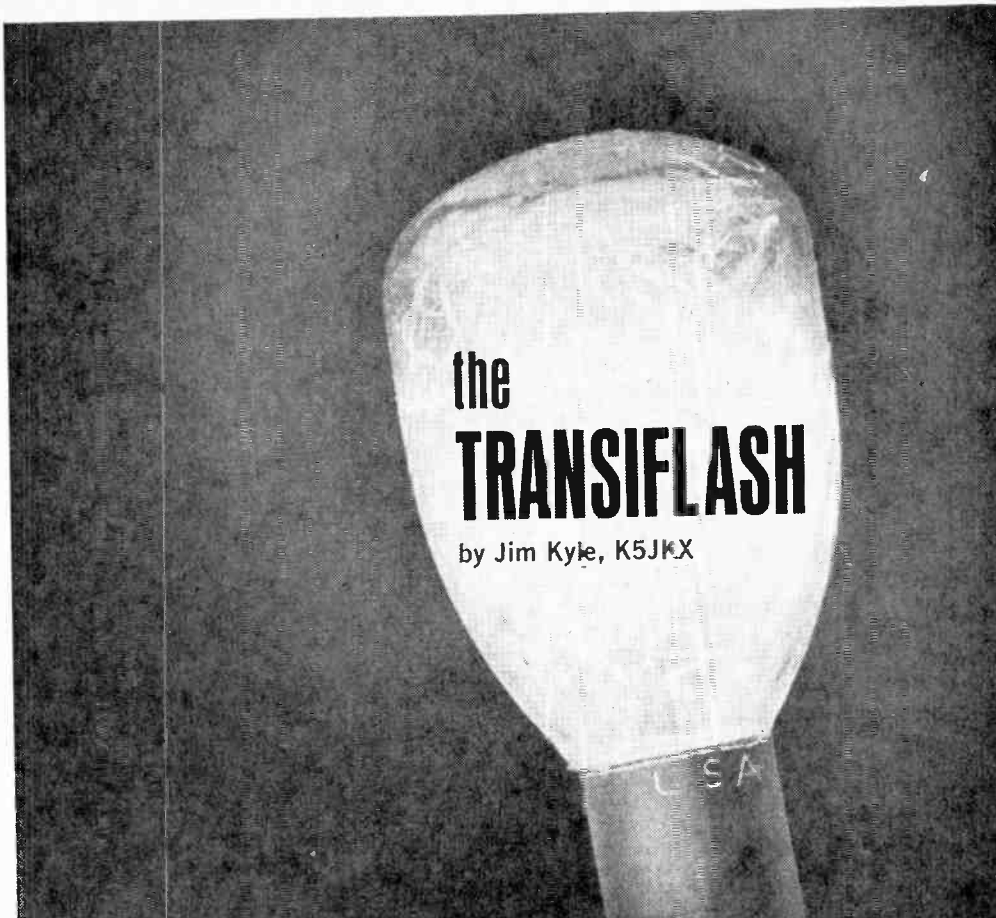
Stereo Headset With Built-in Woofer & Tweeter

A new professional stereophone, the Superex Model ST-PRO, duplicates your hi-fi's speaker system as no other headset has done before. This stereo headset has a woofer-tweeter arrangement with built in cross-over networks in each acoustic chamber earpiece. The low and mid range frequencies are reproduced by a dynamic element; the high frequencies by a ceramic element. Foam filled ear cushions, which are replaceable, are employed with a fully adjustable vinyl covered spring steel headband. A four conductor cord terminated in

Superex ST-PRO Stereo Headset

(Continued on page 29)

"Just in time—almost finished with my new solid-state amplifier."



the TRANSIFLASH

by Jim Kyle, K5JKX

■ A super-sensitive transistor switching circuit provides the punch to fire flashbulbs up to a quarter-mile from the camera with the Transiflash. And though results are spectacular, the circuit itself is extremely simple. Only a battery, a capacitor, a resistor, and two transistors are used.

■ Construction. A 1⅝ x 2 inch piece of perforated Bakelite or phenolic board forms the chassis of the Transiflash. A thin piece of plywood, plain plastic, or even heavy drafting cardboard would also serve.

■ Though all parts are mounted by passing their leads through perforations in the board, the 2N307 power transistor requires two extra mounting holes. They are ⅛ inch in diameter, to pass 4-36 by ⅜-inch machine screws. Location of them is determined by passing the base and emitter terminals through existing perforations, and using the transistor itself as a marking template for the extra holes.

■ The collector of the 2N307 is electrically connected to its case, so that the two mounting bolts serve as collector connections. Put a solder lug beneath one of the nuts for making the connections.

■ With the board drilled and the 2N307 in place, mount the 2N404 by passing its leads through three perforations and pulling the transistor up snugly. Be sure that no lead shorts to the metal case of the transistor in this process.

■ The emitter lead of the 2N404 must be insulated with plastic or cambric tubing to prevent its shorting to the 2N307 collector; all other leads can remain bare.

■ The capacitor and resistor are mounted by passing their leads through appropriate holes as shown in the photos and bending the lead wires over tightly. Make all connections then and solder.

■ To save both space and money, transistor sockets were omitted. This means that you must use heat sinks or grip the transistor leads between the joint and the transistor with long-nose pliers while soldering, to prevent heat damage. When soldering the 2N404 emitter lead to the 2N307 base, grip the 2N307 base terminal. The 2N404 emitter lead is long enough for safety if you work rapidly.

■ For all joints, a 37½-watt pencil-type iron with small tip is recommended; it is hot enough

SIMPLE TRANSISTOR CIRCUIT POPS OFF LIGHT SOURCES AT ¼ MILE

THE TRANSIFLASH

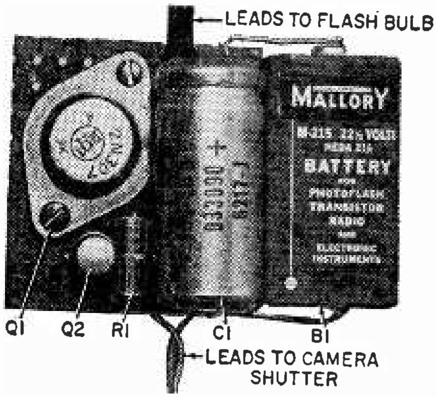
to allow a quick job, yet small enough to handle easily. Soldering guns can damage transistors.

The battery is both connected to the circuit and held in place by short stiff wires soldered first to the battery terminals and then to the capacitor leads. Since average life of the battery is over two years, no battery holder was felt to be necessary. Leaving the battery off the board makes eventual replacement easier.

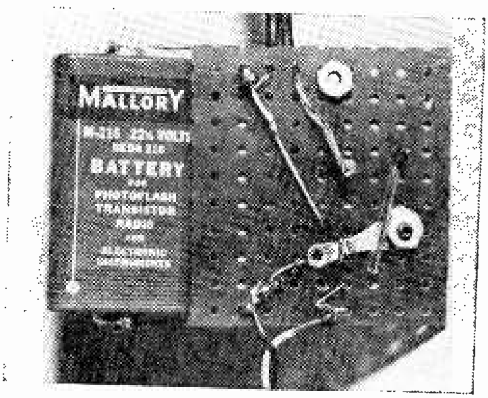
With all connections made according to the drawings and the photos, connect flexible wires to the shutter and bulb terminals and you're ready to try it out. Keep in mind that this is a power unit rather than a complete flashgun; the flashbulb wires can either be soldered to the socket of your present flashgun, or run to a connector which fits the plug of your extension flash units.

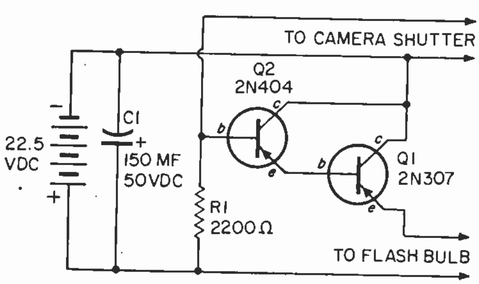
Of course, final housing and possible mounting of the Transiflash depends on your particular camera, how you plan to use it, and whether you just want a *working studio unit* or a *chic* addition to your equipment. A small aluminum chassis box outfitted with jacks for the shutter and flashbulb leads makes a neat package; neater yet when covered with leather or a simulated leather material to match your camera case.

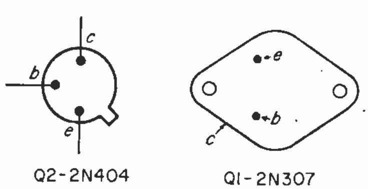
(Continued on page 105)



The handful of electronic parts that make up the Transiflash fit neatly on a 1⅞ x 2-inch phenolic board as shown above. Dry cell battery (below) juts past board and is held in place by its leads. Entire unit can be potted with only the battery outside.







TRANSISTOR LEADS
(BOTTOM VIEW)

PARTS LIST

B1—22.5-volt battery (Mallory M-215 or equiv.)
C1—150mfd., 50vdc midget electrolytic capacitor
Q1—2N307 medium-speed computer switching transistor
Q2—2N404 medium-speed computer switching transistor
R1—2200-ohm, 1-watt resistor
1—perforated phenolic board, 1⅞ x 2 inches
1—Chassis box (see text)
Misc.—Solder lugs; hookup wire; spaghetti; hardware; appropriate plugs, jacks and leads (see text); solder, etc.

Estimated cost: $4.00
Estimated construction time: 1½ hours

Schematic diagram shows that Q1 carries all of the current through its collector-emitter circuit and Q2 serves to fire Q1.

a standard stereo plug is used. Other terminations available free of charge are 2 RCA phone tips, 2 PL-55 phone plugs, 2 mini-plugs. A pair of washable knit ear cushion covers are also supplied at no extra cost. Various accessories offered include a boom mike attachment, 10 ft. retractable cord and alternate impedances of 600, 2K, 15K, 50K ohms. The frequency response is 18 to 22,000 cps. impedance 4-16 ohms, nominal power is 30 milliwatts and maximum power is 2 watts. The net price of the Superex ST-PRO is $50.00. Catalog is available upon request. Just write to Superex Electronics Corp., Dept. RV6, 4-6 Radford Place, Yonkers, N. Y.

Recorder Controls Level Automatically

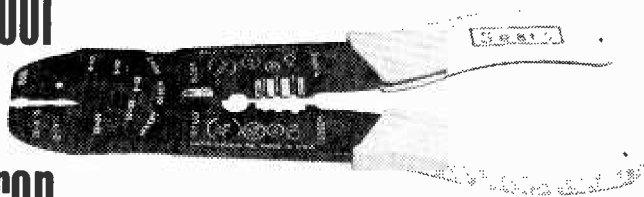
Automatic Level Control (ALC) and completely solid-state electronics feature the Vista 525 tape recorder from Craig Panorama, Inc., of Los Angeles. Automatically maintained recording level and 4 hour recording capacity, make this AC-operated,

Craig Panorama Vita 525 Recorder

6-transistor unit ideal to record meetings in large conference rooms, auditoriums, etc. No need to monitor volume, regardless of distance of speaker from microphone. Speed equalization control at 1-7/8 and 3-3/4 ips standard speeds, with capstan drive. Design features include jam-proof single-lever control, AC bias record, fast forward, PM dynamic microphone record level and power indicator. Unit equipped with inputs for microphone, radio and AC power, outputs for earphone and external speaker. Dimensions are 5-1/2" by 11-3/4" by 9" and weight

(Continued on page 31)

crimp tool replaces soldering iron



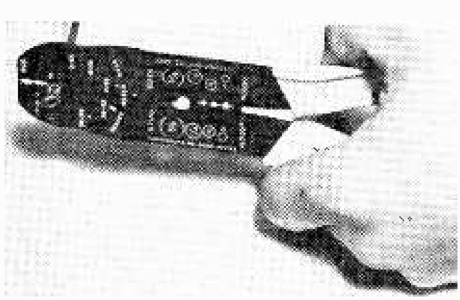
Now your solderless connections, wire stripping and cutting, and bolt cutting are one-squeeze, one-tool operations!

■ This new all-purpose tool is truly a *Super Champ* when it comes to your construction projects. Manufactured by American Pamcor, Inc., the *Super Champ* is a boon to wire handling; it strips the insulation, crimps on a solderless connector, and you just make the connection—simple as one, two, three.

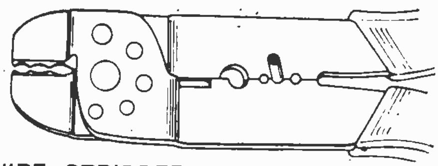
Another feature is the bolt shear operation which allows you to trim your hardware down to size with a squeeze of the handle. If you've ever developed a short in your home-brew equipment and traced it to a wire grounding to an oversized bolt on your chassis, you know how handy it would be to have a quick and easy way to cut *junk box* hardware down to size.

The diagrams, 1 through 5, at the right, illustrate the uses and technique of using the utility tool, which has contoured handles that are fully insulated with high-impact plastic.

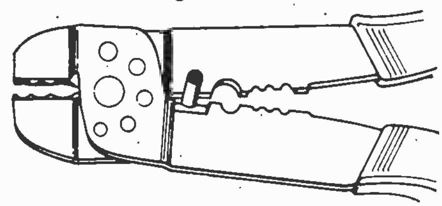
The *Super Champ* tool, as well as the solderless terminals are available from several retail sources: Sears Roebuck & Co., Montgomery Ward, Penney's, and W. T. Grant Company. ■



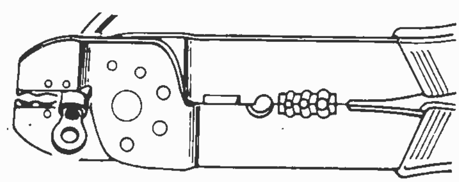
Electrical crimp is made on 12-10 AWG using marked notch and closing tool completely.



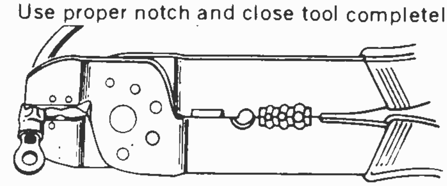
1 WIRE STRIPPER
Use correct stripping notch—close tool and pull wire removing insulation.



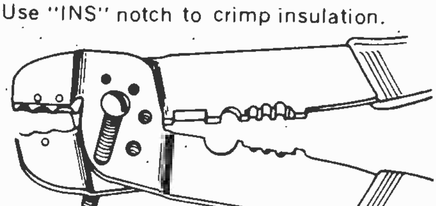
2 WIRE BUTTER
Severs wire easily and cleanly.



3 ELECTRICAL CRIMP
Use proper notch and close tool completely.



4 MECHANICAL CRIMP
Use "INS" notch to crimp insulation.



5 BOLT CUTTER
Insert bolt in threaded side of tool, bolt sizes are marked. Turn bolt to desired length–allow ⅛" for tool thickness. Squeeze handles together quickly. Cuts bolt clean with no thread damage or burrs.

NEW products

Continued from page 29

only 8 lbs. Price: $69.95. Accessories include microphone and patchcord. For further information, please write Dept. R212, Craig Panorama, Inc., 3412 So. La Cienega Blvd., Los Angeles, Calif. 90016.

Solid-State 10-Meter Ham Band Converter

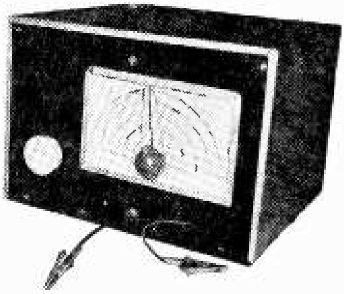
A new solid state, self-contained amateur ten-meter band converter for use with standard automobile radios has been introduced by Instrument Devices Corporation. The new unit, designated the Model SS-Ten converter, features solderless, instant installation on any automobile radio and offers immediate reception of all ten meter band phone stations. A single on-off switch in the unit allows the user to switch his radio back to normal broadcast bands instantly. The converter permits tuning through the radio amateur ten-meter phone band (28.400 to 29.450 mc).

Instrument Devices SS-Ten Converter

Its technical features include a printed circuit, three American-made transistors, RF stage, mixer and a crystal-controlled oscillator. Power requirements are 9 volts at 3 ma. from a self contained battery. Broadcast band image rejection is better than 80 db. The unit is 5 in. x 2-¼ in. x 2-¼ in. and weighs only 6 ounces. It has a baked enamel finish and may be kept either in the automobile glove compartment or attached under the instrument panel. It comes complete with battery, instructions and technical specifications, and is available from Instrument Devices Corporation, Dept. 7T6, P. O. Box 248, Huntington, L. I., New York for $22.95 postpaid.

(Continued on page 33)

$7 CALIBRATION DIAL FOR 15¢!



A piece of scrap aluminum and a 3x5 filing card are the no-cost materials required for this calibrating dial

The radio experimenter who likes to cobble up a bit of home-brew equipment now and then soon discovers that a calibrating vernier can kick the price of a modest job well above his budget's tolerance level. So here's a readable, easy-to-assemble dial that can be tossed together in less than an hour and for practically nothing.

The plate that frames and holds the dial is cut from stiff aluminum flashing or any scrap .020 sheet metal. The dimensions include a bend allowance so that a 3x5-inch filing card will slip in easily behind the frame.

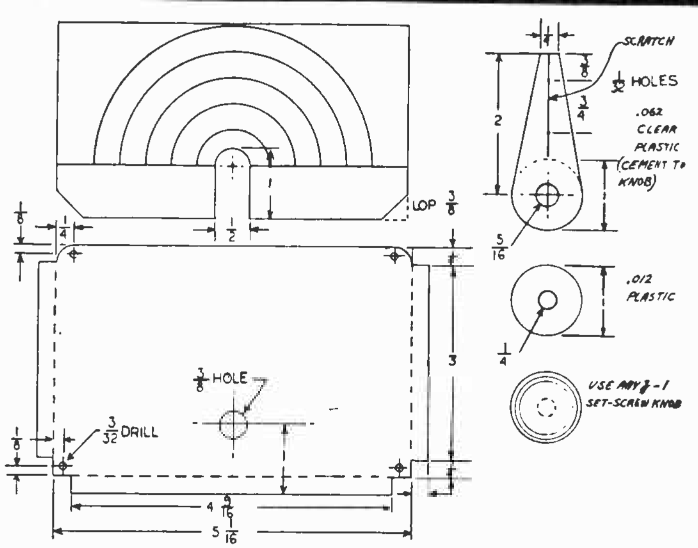
Drill a 3/8-inch hole for the control shaft. Spot and drill the corner mounting holes for the four 3/32x3/4-inch mounting bolts. Bend up the side and bottom edges by pinching them in a vise and bending the plate 90°. Continue bending using a scrap of 1/32-inch phenolic board inserted under the edges to preserve clearance for the card.

A 3x5-inch card has space for four calibration arcs about 3/8-inch wide. Use a compass and India ink to draw these arcs from a base line that cuts the center of the shaft hole. Lop off the corners of the card so it clears the bottom bolt holes, then slot it to drop over the shaft.

The pointer is 1/32-inch clear plastic. Cut it to shape, drill the hole for the shaft and scratch a line down the middle. Rub the scratch with a China marking pencil and wipe off the excess to produce a "lubber line."

Drill two 1/32-inch holes through the pointer midway between each pair of scales. Cement the pointer to the back of a 3/4- or 1-inch set-screw knob. A thin plastic friction washer can be used between pointer and card. With the pointer dialed to a particular frequency, prick the card through the hole next to the appropriate scale, then swing it out of the way and write in the figures.

A grounding lug should go under one of the mounting nuts on the back. This may be needed if the set is installed on an insulated panel where it is necessary to ground the dial plate to the chassis to prevent de-tuning through hand-capacity effect. —*Roy Clough, Jr.*

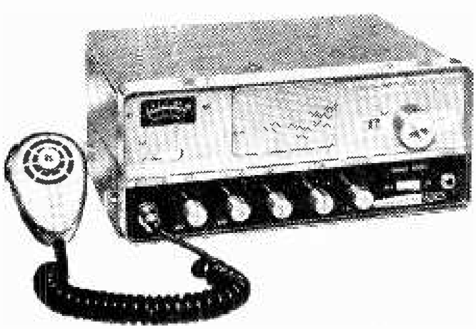


NEW products

Continued from page 31

23-Channel CB Rig For Land or Mobile Stations

A new 23-channel crystal-controlled CB transceiver for base or mobile operation is now available from Lafayette Radio. The rig (Model HB-444) is a deluxe 5-watt dual-conversion transceiver incorporating an advanced frequency-synthesis circuit for 23-channel crystal-control with all crystals supplied. Zener diode full-wave range-boost circuit increases the average depth of modulation during transmission. The HB-444 uses 13 tubes, 2 transistors and 8 diodes including low noise nuvistor front end offering 0.3 μV sensitivity and excellent adjacent channel rejection. Receiver selectivity, 8 kc. at 31 db down. Other HB-444 features include: large combination "S" and relative power output meter, 100 mw and 5-watt power input switch, variable ANL and squelch, crystal delta tune, ± 2 kc.; and PA switch with front panel variable volume



Lafayette HB-444 CB Transceiver

control. Built-in 117-volt AC and transistorized 12-volt DC power supply for mobile operation with low battery drain. Has socket for addition of Lafayette Priva-Com selective call unit. Includes deluxe mobile mounting bracket, cables and rugged ceramic push-to-talk microphone. Handsome extrusion panel has all control dials illuminated. Size: 12″ wide x 5″ high x 10″ deep. Imported to Lafayette's specifications. Priced at $179.95, the HB-444 can be had via the mail by using Stock No. 99-3059WX in your order. For more information, write to Lafayette Radio, Dept. CP6, 111 Jericho Turnpike, Syosset, L. I., New York. ■

ASK ME another

By Leo G. Sands

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.*

Loop It.

I have a 12-transistor radio and am having selectivity problems. A station on 1370 kc, less than a mile away covers the dial from 1300 to 1400 kc, making it difficult for me to receive stations on 1340 kc and 1390 kc which are about 20 miles away. What can I do?

—V. M., Pottstown, Pa.

The lack of selectivity is apparently inherent in the design of your receiver. However, you should be able to improve matters by properly orienting the receiver's loop antenna. If the loop is on top of the set it is usually designed so it can be rotated. If it is inside the set, its directional characteristics can be adjusted by rotating the entire set. Tune the set to the interfering station and then rotate the loop or the entire set until the signal is weakest. This is a fairly narrow arc, known as the "null". Then tune in one of the desired stations. If the interfering station is not in exactly the same direction as the desired station, there should be a big improvement.

BC-221

Can I use a military surplus BC-221 frequency meter for measuring citizens band frequencies?

—F. L., Montclair, N. J.

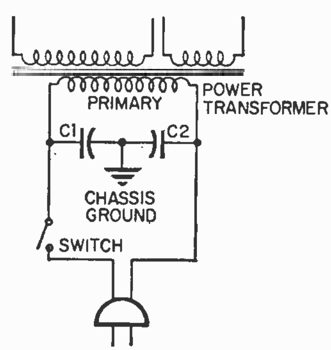
The range of the BC-221 extends up to 20 mc which is not high enough and its accuracy is not as great as required by the FCC. It's a fine instrument for other purposes, however.

From Little Arcs Come Big Shocks

There is a loud hum and the voices are muffled until I remove the ground wire from my short wave receiver. When I hook up the ground wire, there is an arc. What is the trouble?

—J. L. D., Washington, D. C.

If your set has no power transformer, it probably should not be grounded. On the other hand, if it does have a power transformer, the primary winding of the transformer may be grounded to the core, in which case the transformer should be replaced. Or, if the set has line filter capacitors in it, as shown in the diagram, one of the capacitors may be defective and should be replaced. Take an ohmmeter and measure the resistance between one of the prongs of the set's power plug (switch on, but plug out of socket) and the chassis or grounded terminal. You should get an open circuit indication.



Class A CB Afoot

Where can I get a walkie-talkie for the Class-A, 450-740 mc citizens band?

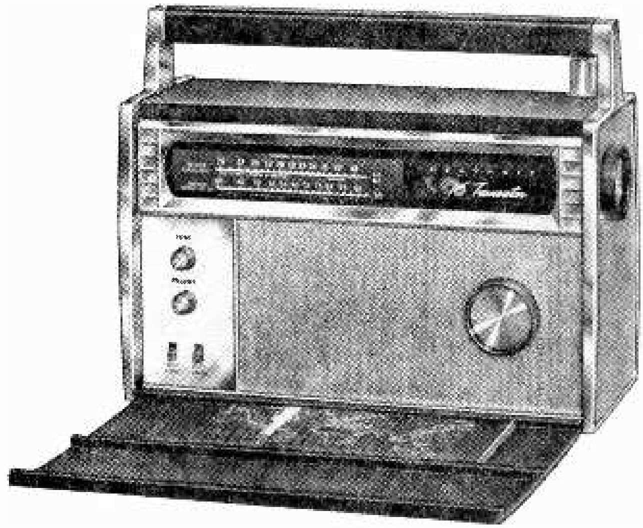
—R. J. H., Seattle, Wash.

Motorola (4515 W. Augusta Blvd., Chicago, Ill. 60651) has recently introduced an

(Continued on page 40)

'Round The World Cruise Only $159.95

DEPARTURE TIME:
10 Hours After Opening The Carton



Travel Anywhere In The World, First-Class, On Longwave, Standard AM, FM, and 7 Shortwave Bands with this New Heathkit All-Transistor Portable

Tour The Voice Capitals Of The World. Your round-trip ticket to unsurpassed global listening is always ready when you own this superb new Heathkit 10-Band Portable Radio. Seven Bands tune 2-22.5 mc shortwave, marine and amateur stations. Longwave 150-400 kc tunes aircraft and marine stations. FM Band, 88-108 mc—full coverage—full fidelity. Standard AM band 550-1600 kc. All with a sharpness of tuning that permits receiving stations you've never heard before.

16 Transistors, 6 Diodes, 44 Factory-Built And Aligned RF Circuits assure cool, instant operation, superior performance, long life, and easy assembly. Two separate AM and FM tuners are ready to drop into place (the FM tuner and IF strip are the same components used in deluxe Heathkit FM Stereo equipment).

Two Built-In Antennas... one in carrying handle for AM, and 5' telescoping whip for FM and Shortwave.

Convenient, Versatile Controls. Like the Battery-Saver Switch that reduces power to 150 milliwatts for normal indoor listening (cuts battery drain as much as 35%), or boosts power to 500 milliwatts for strong, outdoor reception. The handsome rotating turret dial scale is directly driven by a 10-position selector, permits easy viewing of any single band (a log scale is provided for re-locating unknown stations). There's a battery saving Dial Light switch for nighttime use; Automatic Frequency Control with on-off switch for drift-free, accurately tuned FM; a big, 8½ revolution Tuning knob easily separates stations; a combination on-off-volume control; and a continuous Tone Control for listening as you like it.

Big 4" x 6" Speaker, plus earphone for private listening.

Inexpensive, Flashlight Battery Power. Uses 6 "D" size batteries to operate the radio, plus 1 "C" battery for the dial light (batteries not included). Also operates on 117 VAC with the optional converter/charger available.

Deluxe Styling Matches Its Deluxe Performance. Jet black extruded aluminum front and back panels contrast with luxurious chrome-plated, die-cast end pieces to present a rugged, handsome unit you'll be proud to take anywhere. Hinged front and back panels open and close easily thanks to special magnetic edges... no cumbersome snaps or latches. Inside the front panel you'll find a hard-bound "listener's guide" book containing frequencies of worldwide Shortwave and U.S. FM stations plus a special map for easy conversion of world time zones. It travels snugly in its own special slot in the front panel.

Build It In 10 Hours Or Less! Since the two tuners and all R.F. circuits are preassembled and factory-aligned, you merely mount this entire section on the chassis and wire 3 small circuit boards. The lucid Heathkit Construction Manual and thoughtful design make it easy to complete without special tools or instruments.

Send For Your World Tour Ticket Now... use the coupon below to order your new Heathkit 10-Band Portable.
KIT GR-43, 17 lbs........................ **$159.95**

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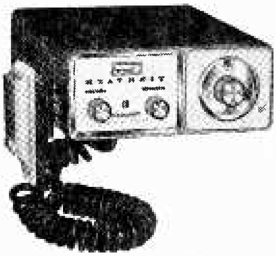
Look What's

NEW KITS

New 23-Channel, 5-Watt Transistor CB Transceiver



Kit GW-14 **$89.95** (Assembled GWW-14, $124.95)

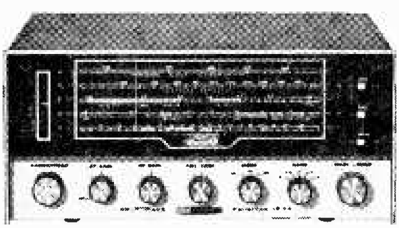
23 channel transmit & receive capability. All-transistor circuit for instant operation, low battery drain . . . only .75 A transmit, .12 A receive. Only 2⅞" H x 7" W x 10½" D . . . ideal for car, boat, etc. ½ uv sensitivity for 10 db signal plus noise to noise ratio. Front-panel "S" meter, adjustable squelch, automatic noise limiter, built-in speaker, ceramic PTT mike, charcoal gray aluminum cabinet. 8 lbs. Kit GWA-14-1, AC Power Supply, . . . $14.95.

New Transistor FM Stereo Tuner . . . Build In 6 Hours!

Kit AJ-14 **$49.95** (less cabinet)

World's easiest to build stereo/hi-fi kit . . . takes 6 hours or less. 14-transistor, 4-diode circuit for cool instant operation, natural transistor sound. Phase control assures best stereo performance. 4-stage IF for high sensitivity. Filtered outputs for direct stereo recording. Automatic stereo indicator light, preassembled & aligned "front-end." Install in a wall or either Heath cabinet, (walnut $7.95), (metal $3.50). 6 lbs.

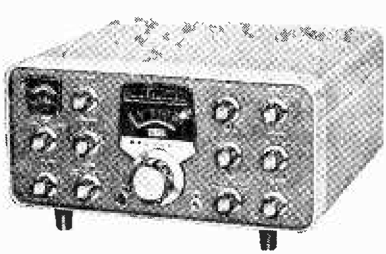
New Deluxe Shortwave Radio



Kit GR-54 **$84.95**

Compare it to sets costing $150 and more! 5 bands cover 200-400 kc, AM, and 2-30 mc. Tuned RF stage, crystal filter for greater selectivity, 2 detectors for AM and SSB, tuning meter, bandspread tuning, code practice monitor, automatic noise limiter, automatic volume control, antenna trimmer, built-in 4" x 6" speaker, headphone jack, gray metal cabinet, and free SWL antenna. Assemble in 15 hours. 25 lbs.

New 6-Meter SSB Ham Transceiver



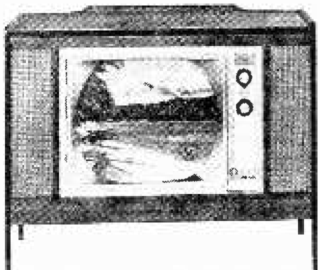
Kit SB-110 **$320.00**

Full SSB-CW transceive operation on 6 meters. 180 watts PEP SSB—150 watts CW. Operates fixed or mobile; PTT and VOX. Switch selection of upper sideband, lower sideband, and CW. Covers 50-52 mc with crystals supplied, total coverage 49.5-54 mc. Famous Heath SB series Linear Master Oscillator for true linear tuning. Built-in 100 kc calibrator and antenna switching. Accessory mobile mount, SBA-100-1 . . . $14.95. 23 lbs.

NEW From Heath!

NEW LOW PRICES

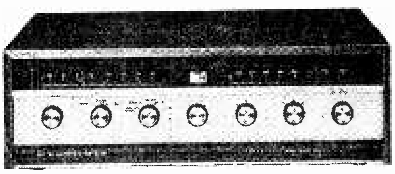
New Low Price On Deluxe 21" Color TV



Kit GR-53A
Now Only
$375.00
(less cabinet)

Ends costly color TV servicing . . . only set you adjust and maintain yourself. Only color TV you can install 3 ways . . . wall, custom or Heathkit cabinets. Tunes all channels for 21" of the best color pictures in TV plus true hi-fi sound. Assembles in 25 hours . . . no special skills needed. 127 lbs. Also new low price on preassembled Heathkit cabinets: GRA-53-7, walnut cab. (illust.), 85 lbs. . . . $108; GRA-53-6, walnut-finish hardboard cab., 52 lbs. . . $46.50.

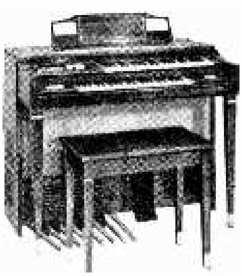
New Low Prices On Heathkit Stereo/Hi-Fi



Kit AR-13A
Now Only
$184.00

Like the AR-13A Transistor Stereo Receiver opposite with 66-watt amplifier; AM, FM, FM Stereo tuning; walnut cabinet. 35 lbs. Other new low-priced stereo components including,
Kit AJ-43D, deluxe transistor AM/FM/FM stereo tuner . . . $109.00
Kit AJ-33A, transistor AM/FM/FM stereo tuner . . . $94.50
Kit AJ-41 (tube), AM/FM/FM stereo tuner . . . $112.50
Kit AJ-12 (tube), FM/FM stereo tuner . . . $65.95
See them all in FREE Heathkit catalog.

New Low Prices On Heathkit®/Thomas Organs



Kit GD-983
Now Only
$799.00

Like the GD-983 Heathkit/Thomas "Coronado" Transistor Organ, opposite, with 17 organ voices, two 44-note keyboards, Leslie plus 2-unit main speaker system, 28 notes of chimes, bench, plus many more professional features. 242 lbs. Also the Heathkit/Thomas "Artiste" Transistor Organ with 10 voices, two 37-note keyboards, repeat percussion, etc. is now only $332. 154 lbs. Both organs have all genuine Thomas factory fabricated components.

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☐ Please send FREE 1966 Heathkit Catalog.

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Address________
City________ State______ Zip______

Prices & specifications subject to change without notice. CL-214R

ASK ME another ?

Continued from page 34

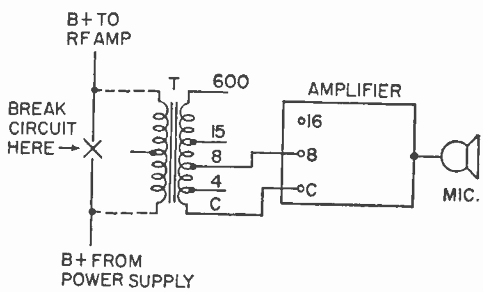
FM Handie-Talkie for the 450-470 mc band. It employs a crystal controlled receiver and transmitter and can be licensed as a Class A or B Citizens Radio Station or in other Safety and Special Radio Services.

Quitting CW for Phone

I have a 40/80-meter home brew CW transmitter. Is there any way I can convert it to AM or SSB?

—*R. G., Dayton, Ohio*

To convert it to SSB would be difficult but AM is easy. All you have to do is connect an audio amplifier in series with the final RF amplifier B+ lead through a matching transformer as shown in the diagram. The audio signal, in series with the DC plate voltage, alternately raises and lowers the plate voltage reaching the RF amplifier. The audio output of the audio amplifier should be roughly equal to half the DC input power of the RF amplifier (40 watts of audio for an 80-watt transmitter, etc.). The impedance matching transformer may be an output transformer, such as a Stancor A-3311, connected backwards, as shown. The impedance



can be varied by trying various amplifier output and transformer connections such as 8-ohm or 16-ohm amplifier output to 4, 8 or 15-ohm transformer lead. Set the amplifier tone controls to reduce high frequency response so you won't cause excessively wide side bands to be produced.

Or you can buy a modulator, such as the Eico 730 ($59.95 in kit form) which contains an impedance matching transformer and can be connected directly to a transmitter rated at up to 100 watts input.

Frigid Electrolytic

What effect do sub-freezing temperatures have on the electrolytic capacitors in ordinary house radios? I am concerned since I often transport radios in cars when the temperature is many degrees below freezing and the sets are sometimes exposed to the cold for eight hours or more.

—P. E. K., St. Paul, Minn.

To avoid freezing, electrolytic capacitor manufacturers employ electrolytes which will not freeze when exposed to natural low temperatures. Radios and television sets are usually shipped in unheated railroad freight cars which may be exposed to sub-zero temperatures for many days. Low temperatures may temporarily lower the capacity of electrolytes. High temperatures tend to increase capacity and lower breakdown voltage.

Takes 2 To Tango

I have a 10-watt amplifier which is no longer on the market. What amplifier can I use with it to form a stereo system?

—R. R. L., San Antonio, Tex.

It is not necessary for both amplifiers in a stereo system to have identical characteristics although critical audiophiles may insist on it. Almost any high quality amplifier of similar power rating should do.

. . . But Don't Call Us!

On certain bands, I get a loss in volume when I pull out the headphone plug from my portable Trans-Oceanic shortwave receiver. It also occurs when I switch bands. I was told it is the oscillator tube, but it checks OK. Do you have any idea as to what is causing the trouble?

—J. M. , Newark, N. J.

While it doesn't sound like oscillator tube trouble, try a new one anyway. It sounds more like band switch contact trouble. Get some contact cleaner and clean the contacts. If this doesn't cure the trouble, call MA 4-1700 in Newark and get the name of an authorized local service station.

Help!

Could you give me the tube locations for a McGee miniature broadcasting station?

—D. S., Virden, Ill.

We don't have that information available and suggest you write directly to McGee Radio Company, 1901 McGee Street, Kansas City, Missouri, giving them the model number of your unit.

Frozen Noise

The electrical interference lever here is so high that I can get an S-9 noise reading on my HQ-180-A occasionally, and at times I can't even work other hams less than a mile away. Local utility personnel have assured me that they will fix the trouble if I find the cause. I have tried transistor radios but the noise is so strong I can't find a null. What can I use to locate the source of the noise?

—G. T. B., Eilson AFB, Alaska

Write to the Engineer in Charge of the FCC Field Office, Box 644, Anchorage, Alaska, and spell out the frequency bands on which the interference is most severe, time of occurrence, etc. If it is not caused by radar or other military equipment the FCC might be interested in helping you eradicate the noise.

A portable radio direction finder can be useful in tracking down noise sources. The new Bendix Navigator 400 (sold through EICO and its distributors) is compact and highly sensitive. It costs around $100, however.

The noise might be brought in over the power line and then picked up by your receivers antenna. Try a power line filter.

Stick It Anywhere

I have a Lowry Lincolnwood 25 electronic organ designed for use with an external speaker. I understood that an internal speaker could be added later. I find there is not room for a Leslie type speaker. Since I don't have room for an external speaker, I wonder if any of your readers has ever built a Leslie type speaker system using an 8" or 10" speaker, into the chamber space available in an organ which, in my case, is 24" long, 11" deep, 12" high. Does anyone have plans available?

—P. F. M., Verona, Wis.

Instead of opening up the organ console, have you considered a speaker suspended from the ceiling or recessed in the wall? Quite some time ago, Milt Herth, a big-name organist set his speakers right on top of his Hammond while performing at Jack Dempsay's restaurant in New York. Sounded great even if it wasn't particularly attractive to the eye. Do any readers have suggestions that can help *P.F.M.?*

Mess With the C

At the New York Hi-Fi show I heard a speaker system that I thought was really good. It consisted of an AR-1W woofer.

ASK ME another

Janzen 130 mid-range and Ionovac tweeter. They were using an 0.5 mfd capacitor between the tweeter and the mid-range speaker. The year before, they used a 2.0 mfd capacitor. I would like to bring in the tweeter no lower than 7500 cps. How should I connect it?

—T. A. C., Livingston, N. J.

The easiest way is to try various size capacitors until you find the one that gives you the most pleasing results. Or, talk to your dealer. Most hi-fi dealers have at least one expert who knows their products intimately.

Finding the Circuit

Where can I get circuit diagrams and other technical information on European and Japanese made radios and tape recorders?

—A. S. S., Karachi, Pakistan

Wish we could give you specific answers. You might try writing to Howard W. Sams & Co., Inc., 4300 West 62nd Street, Indianapolis, Indiana. The firm publishes diagrams of most popular makes and types.

Too Much Soup

My receiver picks up the image of a local station on 1450 kc at 540 kc and of another local station 1490 kc at 580 kc. How can I eliminate the images?

—J. A. C., Cicero., Ill.

Doesn't sound like images. If your receiver has a 455-kc IF, its oscillator would be tuned to 1905 kc when the set is tuned to receive on 1450 kc (1905−455=1450). It might also be able to receive a strong signal on 2460-kc which, beating against the 1905-kc oscillator signal, will produce a 455-kc IF signal (2460 − 1905 = 455).

It sounds like intermodulation. Strong unheard signals could beat with the 1450 kc signal and produce a 540 kc beat, etc. The heterodyning could occur in the receiver front end (RF ampilfier or mixer). However, it would occur external to the receiver. Two pipes, touching but not making good electrical contact, could act as a detector and radiate the beat signal produced by two or more strong radio signals. Metal sheathing, making poor contact, could also cause such trouble. Use a portable transistor radio tuned to 540 kc to locate the source of the beat signal. If it is due to poor electrical contact, bond the two mental surfaces together.

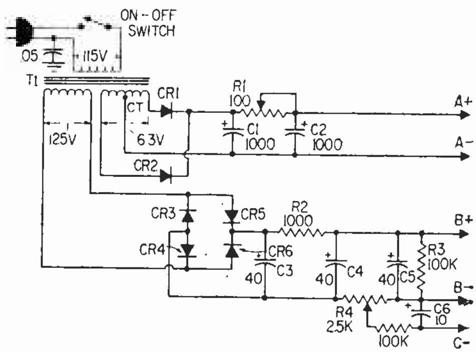
If it is occurring in the receiver, try using a shorter antenna or a wavetrap, across the antenna and ground terminals tuned to the frequency of the offending signal.

Scat Bat!

Can you give me a circuit for an AC power supply for a battery-operated radio? It requires two volts at 0.06 amperes, 90-135 volts DC and −9 volts DC.

—K. F. F., Regina, Sask., Can.

The power supply circuit shown in the diagram below will replace your A, B, and C batteries. Power transformer T is one of the low cost types that furnish 6.3 and 125 volts AC. The diodes are of the silicon type, rated at 750ma/400 PIV (much better than needed), which are available at low cost. Adjust R1, with the radio connected and turned on, while measuring voltage across A and A− to 2 volts. Adjust R4, under the same conditions, to 9 volts. If hum is excessive, use larger value capacitors for C1 and C2.



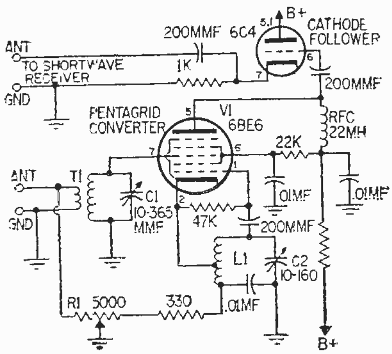
Going Up!

I have a good war surplus short wave receiver which does not cover the broadcast band. Can you describe a converter I can use so I can tune through the broadcast band?

—G. P., Tucson, Ariz.

You can build a simple converter using the circuit shown in the diagram. It employs a pentagrid converter (V1) whose RF input is tuned with C1 to the desired station. The local oscillator is fixed tuned by C2 to 2000 kc. Thus, a broadcast signal at 560 kc heterodyne with 2000 kc local oscillator will produce a 2560 kc beat signal which is tuned in by your short wave receiver. A broadcast signal at 1500 kc will produce a beat at 3500 kc.

Transformer T1 is a standard broadcast band antenna coil. The oscillator coil, L1, is a standard broadcast band oscillator coil, for use in a receiver with 455-kc IF, which is normally tuned from 1010 ks to 2060 kc. Instead of a variable tuning capacitor, a small trimmer capacitor (C2) is used for setting it to 2000 kc.



To use the converter, tune the short wave receiver dial from 2560 kc through 3500 kc until you find a local station and adjust C1 for maximum volume. Then set the short wave receiver dial to the frequency of the station you just heard plus 2000 kc. (For example, if station is on 1010 kc, dial should read 3010 kc). Now, adjust C1 until you again hear the same station. You can now tune though the band with the shortwave set tuning dial and adjust C1 for best reception. A manual volume control (R1) is provided to prevent overloading the converter.

Listen to This!

I noted with interest the letters and comments caused by your mention of hearing radio signals via fillings in teeth. There are some facts regarding direct interaction of the organism with electromagnetic energy which you may not have encountered. Scattered reports, which have been circulating, have usually been shrugged off as "just one of those things." Audition by means of dental nerves has not only been (somewhat) investigated, but a special device to create the effect deliberately was patented. At least, certain nerves in the body can be directly stimulated to produce the sensation of hearing, without the use of the ear mechanism. The brain has the ability to correctly interpret several classes of electromagnetic energy and extract intelligence therefrom, without using any of the normal sensory inputs. Very little has been published on these effects, almost nothing in the electronics industry as far as I have seen. I think that this has prevented the possible contributions of experimenters, and delayed much development work as a result.

One fairly crude but simple experiment deserves mention. Hook two small (one inch approximately) metal plates to the leads from a high Z power amplifier (a reversed output transformer connected to the speaker output works). Cover the electrodes with one mil mylar or similar dielectric. Feed the amplifier from a music source. When placed on the skin of the face, usually in the vicinity of the hinge of the jaw, the majority of people will hear the music, but not through the ears. Probe voltages of 8 to 30 volts rms seem adequate for the path from one side of the head to the other. Some people have been able to "hear" with the electrodes on back, arms, etc. at higher voltages. If insulation breaks down, all that is experienced is a mild shock, but no sound.

I would like to discuss this at greater length, if any of your readers are interested.

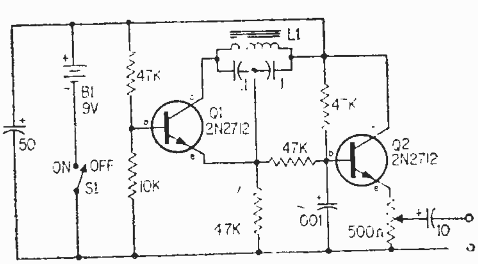
—H. A. G. S., Neptune, N. J.

Your statements are most interesting. Readers interested in discussing this subject with you are requested to address their letters to "Ask Me Another" for forwarding to you. As for connecting electrodes to the human body, this is one practice the Editor hopes to discourage except for trained researchers in properly equipped labs.

Transistorized Audio Generator

Can you give me a circuit for fixed-frequency audio signal generator using transistors and operable from a battery?

—E. D., Jackson Heights, N. Y.



The oscillator circuit shown in the diagram employs two transistors. Its frequency depends upon the inductance value of audio frequency choke L1. It can be the primary winding of an output transformer when the secondary winding is not used. ■

Build the Aero Bander

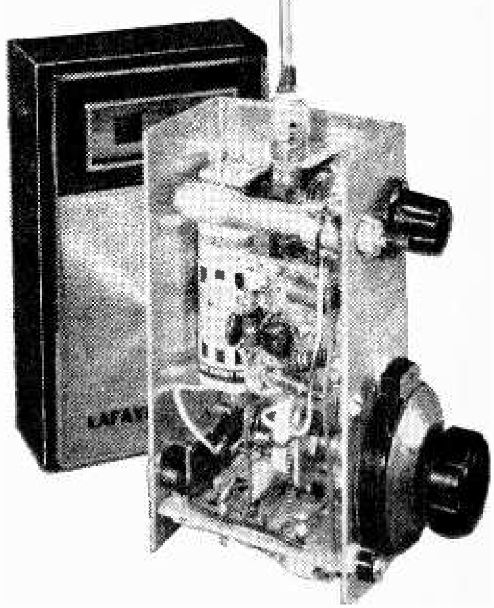
by
Edward A. Morris, WA2VLU

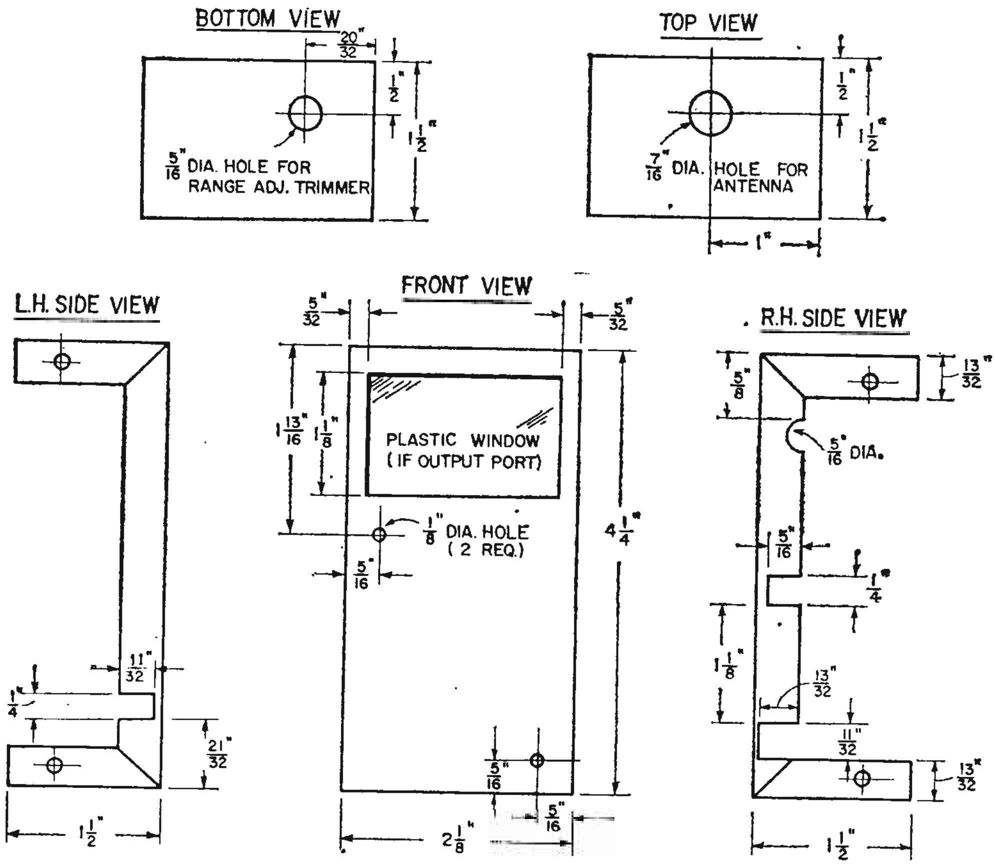
■ Here is a simple project that'll give you many hours of construction and listening delight. The Aero-Bander is a self contained converter that adapts your pocket portable transistor broadcast radio to receive the aeronautical communications that fill the bands 'round the clock. You'll be able to listen to planes taking off and landing, ground controllers, pilots requesting weather information, and much, much more.

The Aero-Bander is both easy and fun to build. A rank novice should be able to put it together in less than 5 hours! It's inexpensive, building it won't put a crimp in your wallet. Using all new parts, the total tab is less than ten dollars. In average use its single 9-volt battery should last its entire shelf life.

The Circuit. The Aero-Bander uses a single transistor in an Autodyne oscillator-mixer configuration. See schematic diagram. The oscillator is somewhat unique in that it operates at one-half the desired injection frequency, that is from 54.2 mc. to 66.7 mc.

Signals picked up by the antenna are coupled into the base input circuit of transistor Q1 by capacitor C1 and coil L1. The base input is peaked with variable capacitor C2, which together with coil L2 resonate at the desired incoming signal frequency. The incoming signal mixes with the second harmonic of the oscillator—that is, from 108.4 mc. to 133.4 mc.—and produces an intermediate frequency signal of 1600 kc.—which





Flanged half of the chassis box is prepared as shown above; cement window inside chassis.

is the converter's intermediate frequency.

The IF signal is radiated into the transistor pocket radio by L3, which is placed in close proximity to the receiver's antenna coil. The radio is tuned to the converter's IF signal, 1600 kc.—the "top of the dial."

Tuning is accomplished by varying capacitor C7, which together with C4, C6, and L4, control the frequency of the oscillator. Capacitor C6 serves a dual function, it sets the frequency range that will be received by tuning C7, and is also part of the feedback network that starts and sustains oscillation.

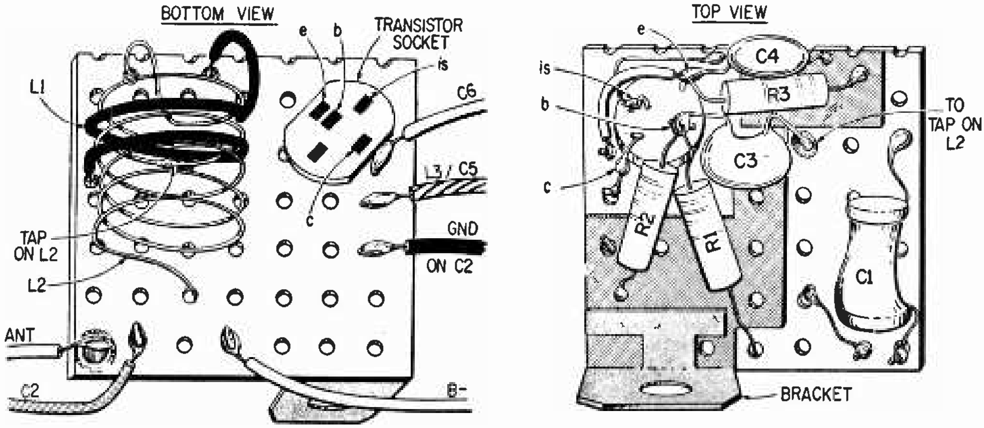
Bias current for transistor Q1 is supplied through resistors R1 and R2. Resistor R3 helps to stabilize the circuit, and is by-passed by capacitor C4.

As we said, the output of the converter appears at L3, which is tuned to the IF frequency of 1600 kc. by capacitor C5. Capacitor C5 looks much like a short circuit to the very much higher frequency signal of the oscillator, and in effect connects the collector of Q1 to coil L4.

Mechanical Construction. Begin construction by laying out the spots to be drilled on the chassis box. The larger holes are easily formed by first drilling a smaller hole, then enlarging it to the proper size with an aluminum or steel reamer. Two detail drawings, one for the chassis box cover and one for the case, give complete specifications for preparing the box prior to assembly. Follow these plans closely—do not deviate.

The opening for switch S1 can be made by drilling two ¼-inch holes ¼-inch apart, center to center. The ¼ x ½" rectangular slot is then formed with a small triangular file.

Mounting brackets for C2, C7, J1, and battery B1 are fashioned out of two size "AA" battery holders. Drill out the rivets which hold the spring clip to the body of the holder. These clips are used as a battery holder for B1. Next the rivets holding the solder tabs to the body of the holder are drilled out. The bodies of the holders are then cut apart to provide mounting brackets



Top and bottom of larger of the two perf boards are shown here for construction details.

for capacitors C2, C7, and for jack J1.

Battery terminal clips for B1 can be had by separating the terminals from the bakelite strip of a used transistor radio battery.

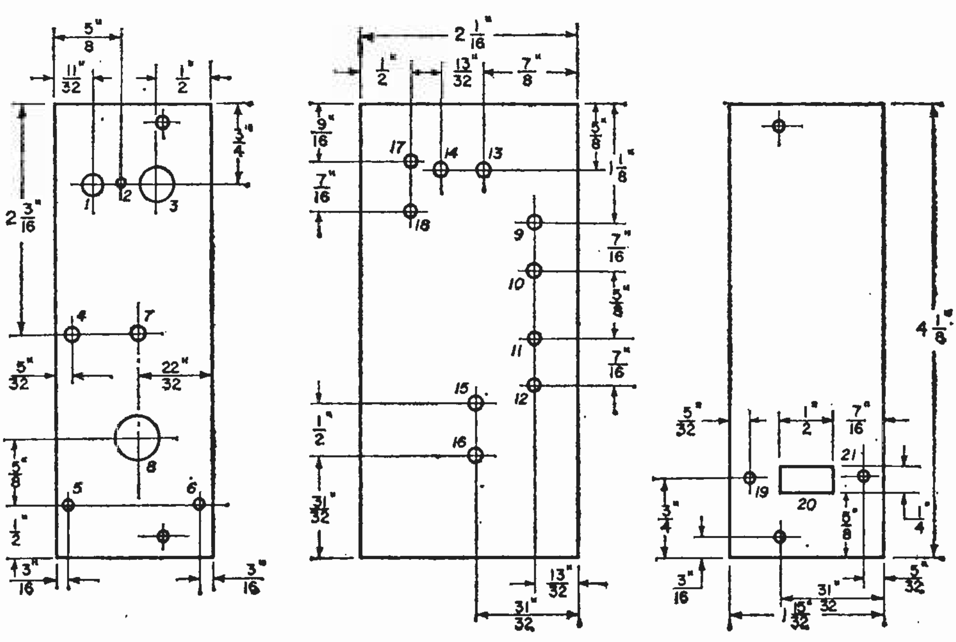
Cut a piece of 1/16-inch thick plastic and cement on the inside of the case, over the opening for the IF output port.

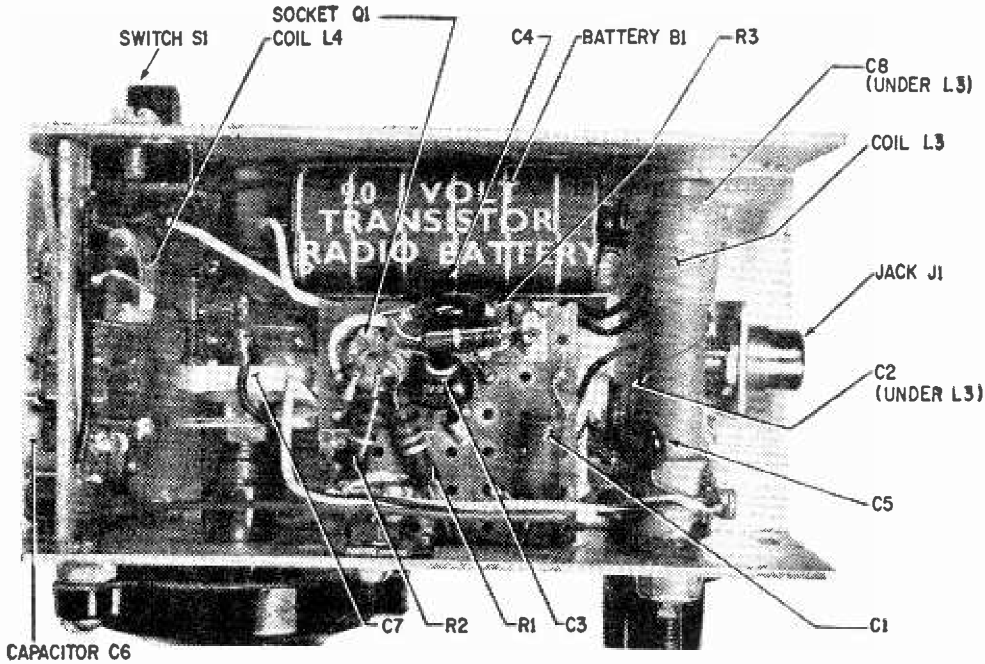
The shafts of capacitors C2 and C7 are 3/16 inch in diameter. These shafts will not directly fit either a standard 1/4 inch knob, or the vernier dial which was made for use with 1/4 inch shafts. An adapter can be made from common 1/4-inch o.d. copper tubing, which has a 3/16 i.d. A length of tubing is cut, and if necessary straightened. The adapter is slid

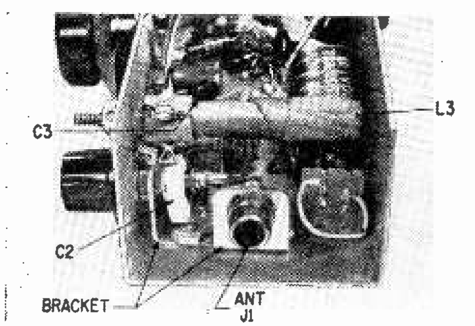
CHASSIS HOLE NUMBER KEY

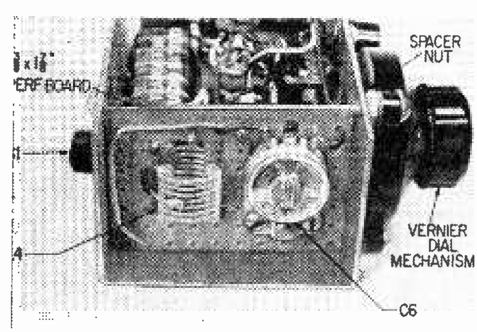
1: 5/16" diam. for L3. 2: 1/16" diam. for L3. 3: 3/8" diam. for C2 shaft. 4: hole for #4 screw to mount perf board. 5, 6, 7: hole for #4 screw for vernier dial. 8: 7/16" hole for vernier dial shaft. 9, 10, 11, 12: holes for #6 screws to mount battery clips. 13, 14: holes for #6 screws to mount antenna bracket, J1. 15, 16: holes for #6 screws to mount bracket for C7. 17, 18: holes for #6 screws to mount bracket for C2. 19, 21: holes for #6 screws to hold S1. 20: 1/2" x 1/4" cut out for on-off slide switch S1.

All components are mounted on "cover" half of the chassis box; holes are keyed by number.









Various views of chassis show the mounting of perf boards, and the location of components.

over the shaft, and cemented in place with epoxy cement.

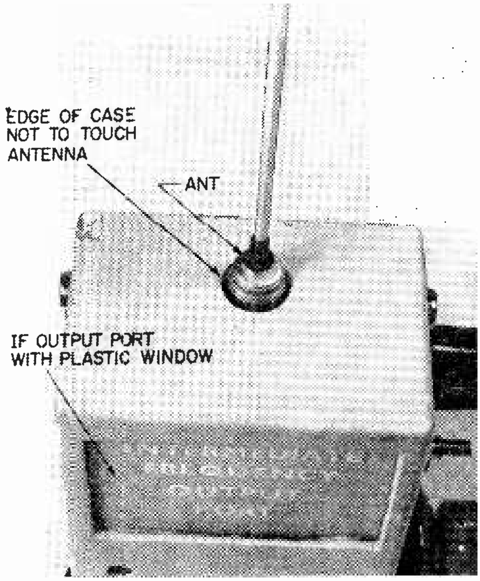
Finishing It Off. A professional appearance can be had when the case is neatly painted, and decals applied. Before painting, carefully clean the case to remove any dirt or grease which would mar the finish. The case can then be spray painted following the manufacturers directions. Remember, two thin coats are better than one thick coat. Allow for sufficient time for the first coat to dry before applying the second. Decals can be applied when the paint has thoroughly dried. Two coats of clear spray lacquer can be applied to protect the decals.

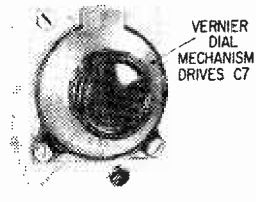
After the case has been prepared, mount the vernier dial using 4-40 hardware. Note that the vernier dial is not mounted directly against the case, but is mounted with a 3/16 inch spacer between it and the case. This is done so the lip of half "A" of the case will go under the vernier dial, otherwise the two halves of the case will not mate.

Capacitors C2, C7, and jack J1 are mounted using 6-32 hardware. Insert L3 in the mounting hole provided for it, and mount switch S1 with 4-40 hardware.

Take special note that if you alter the mechanical lay-out presented here, that the coil on L3 must be located as close as possible to the antenna coil in the radio.

Remember too that the position of the plastic window in the case will have to be changed if the position of L3 is changed. It should be directly between the coil on L3 and the antenna coil in the radio. The con-





Close-up views of front panel and top of the chassis show details of construction. Notching of chassis for L3 and tuning dial is shown above; antenna mounting details and IF output port are shown in view at left.

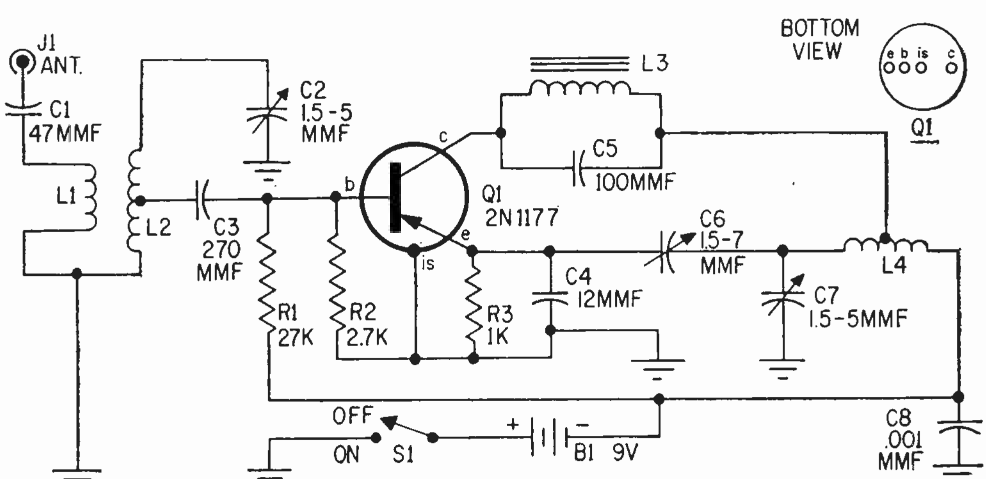
verter will not operate properly if L3 is located too close to the sides of the case.

Electrical Construction. As shown in the photographs, the unit was built on two sections of perforated board. The first section, 1⅜-inch by 1⅞-inch is located near the bottom of the unit. This section holds the range adjustment capacitor C6, and coil L4. Coil L4 is mounted in a cutout in the board, and is held in place with epoxy cement. Capacitor C6 is mounted with 4-40 hardware. Flea clips are used as terminal points. After this is wired and assembled, glue it in place with epoxy cement.

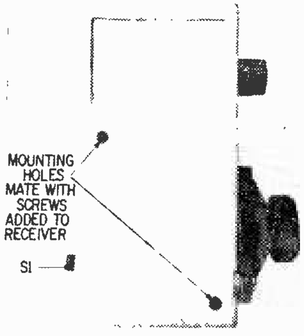
The second section of perforated board holds capacitors C1, C3, and C4, as well as resistors R1, R2, R3, and transistor Q1. The general parts lay-out can be seen in the photographs. Flea clips are again used as terminal points. The board is mechanically held in place with a bracket and 4-40 hardware.

Although the author chose to use a transistor socket for mounting Q1, the transistor may be soldered directly into the circuit. If you plan to solder Q1 in directly, be sure to use a well tinned low wattage iron and a suitable heatsink to prevent damage to the transistor. Complete the soldering quickly.

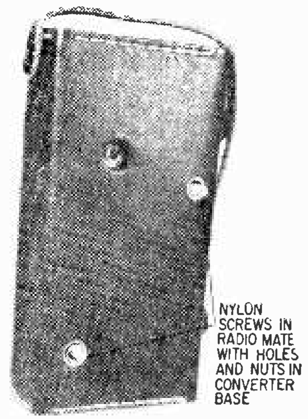
In view of the very high frequencies involved in the operation of the converter be sure to keep all leads as short and as rigid as possible. Make every effort to keep every-



Schematic diagram of the Aero-Bander: notice the apparent absence of any output from unit!



To give your Aero-Bander a pro look bolt the unit to your transistor BCB receiver — rubberbands look messy. Place nylon studs on the receiver with mating holes in the cove of the Aero-Bander.



thing as mechanically solid, otherwise the stability of the converter will be adversely affected.

All fixed value capacitors are Eimeco type DM-10 Dipped Silver Mica capacitors, unless stated otherwise.

PARTS LIST

B1—9-volt battery (Eveready #E-177 or equiv.)
C1—47-pf capacitor (Lafayette #30G3518)
C2, C7—1.5-5-pf miniature variable capacitor (E. F. Johnson #160-102)
C3—270-pf capacitor (Lafayette #30G3538)
C4—12-pf capacitor (Lafayette #30G3506)
C5—100-pf capacitor (Lafayette #30G3527)
C6—1.5-7-pf ceramic trimmer (Centralab type 825EZ)
C8—.001-mf ceramic capacitor
J1—RCA single hole mounting phono jack
L1—2 turns #22 hook-up wire over gnd. end of L2
L2—5 turns B & W Miniductor #3002, tapped at 2 turns from gnd. (Lafayette #40G1611)
L3—Ferrite loopstick antenna (Lafayette #32G4108)
L4—7 turns B & W Miniductor #3003 center tapped
Q1—2N1177 transistor (RCA)
R1—27,000-ohm, ½-watt resistor
R2—2,700-ohm, ½-watt resistor
R3—1,000-ohm, ½-watt resistor
S1—S.p.s.t. slide switch (Lafayette 34G3703 or equiv.)
1—4¼" x 2⅛" x 1½" aluminum chassis box
1—2" x 1⅜" x 1/16" plastic sheet
1—Vernier dial mechanism (Lafayette 99G6031 or equiv.)
2—Size AA battery clips (Keystone #137 or equiv.)
1—RCA phono plug for antenna
Misc.—Nuts, bolts, hook-up wire, transistor socket, perforated circuit board, solder, knobs, etc.

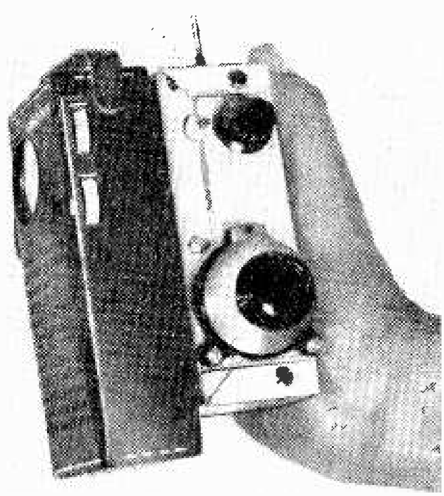
Estimated construction time: 8 hours
Estimated cost: $10.00 or less

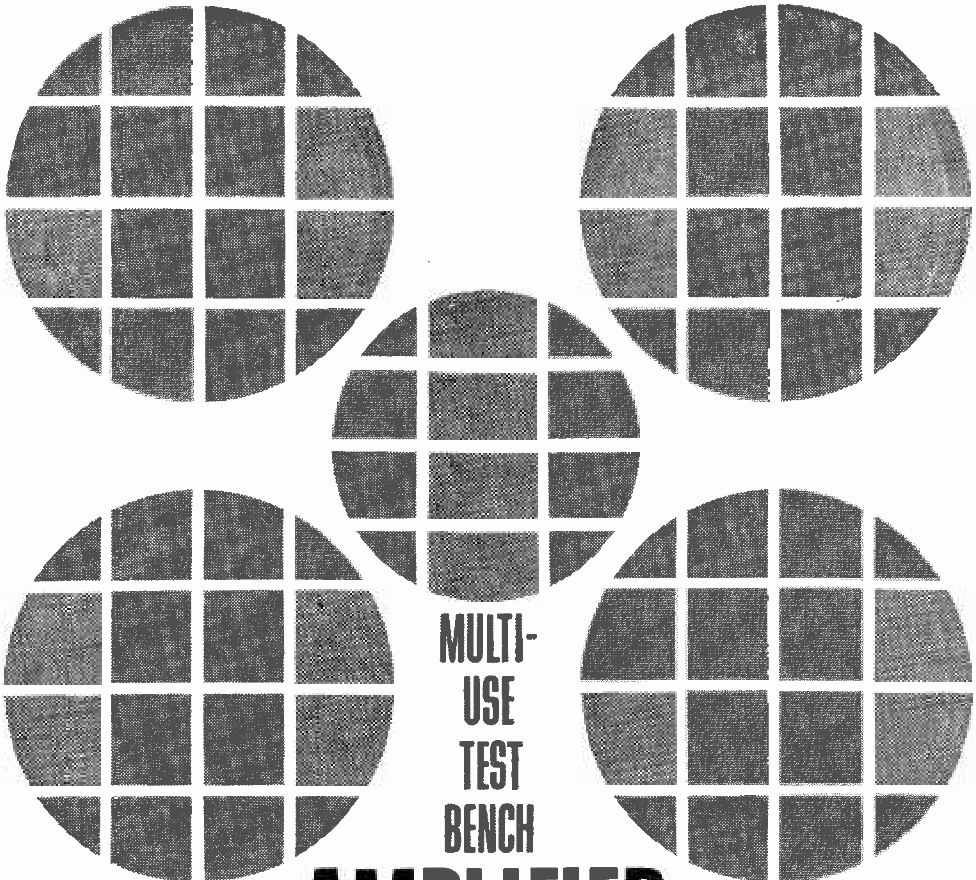
When you're finished, recheck all wiring to be sure the unit is wired as shown in the schematic diagram. Be especially careful with the wiring to the transistor, and to B1.

A suitable antenna can be made from an 8-inch piece of coathanger wire. Scrape the paint from the last inch or so from one end, and tin with a soldering iron. Solder on an RCA phone plug, being careful not to use an excessive amount of solder that might cause a short inside the plug. Slip a piece of insulating tubing down along the wire, and part

(Continued on page 131)

Piggy-backed to a standard broadcast receiver, the Aero-Bander is all set to pull in DX.





MULTI-USE TEST BENCH AMPLIFIER

by DAVID J GREEN, K3KNY

"Getting more than you bargained for" is usually a phrase that's used with tongue-in-cheek—but not when describing this unit!

■ A handy test bench amplifier should be exactly that—handy! Why not put an end to fooling around with temporary setups and build a multi-use unit that has some guts? A quick look at the schematic diagram for this construction project shows that it has quite a few features that expand and simplify your experimental work:

- An internal speaker is right there, built in and ready to use when you need it; or
- External jacks can be used for connecting earphones or 4-, 8-, or 16-ohm external speakers.
- Pin jacks allow you to pick off your signal after the triode amplifier stage of V1 to determine the signal characteristics.
- A built-in neon indicator lets you monitor the peak level of your signal.
- Jacks are even provided for external B+ and filament voltage at a power sufficient to operate small experimental circuits.

All the jacks, switches and indicators for utilizing these features are accessible on the front panel and the top of the 4"x5"x6" aluminum enclosure used for the unit.

Circuit Operation. The signal input level is controlled by resistor R1 and then passed to the control grid of V1A through capacitor C1. Bias is provided by capacitor C2 and resistor R2. The auxiliary output jack, J3, for the oscilloscope connection, is provided through capacitor C3 to the plate of the triode section of V1A. The double section of the 6U8-A tube provides two stages of amplification in one envelope.

The signal is coupled to the pentode stage, V1B, through capacitor C4 after being developed across 270,000-ohm resistor R3. The bias for V1B is provided by C5 and R5. The peak-level neon indicator lamp, I1, is connected through capacitor C7 to the plate of the pentode section; similarly, the phone jack, J4, is connected through C8 to the plate.

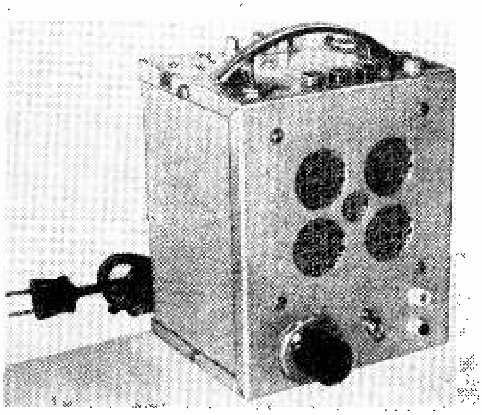
Output transformer T1 provides 16, 8, or 4-ohm outputs for the speaker jacks J5, J6, and J7. The internal speaker is connected to the 4-ohm jack and is cut in and out of the circuit by switch S1.

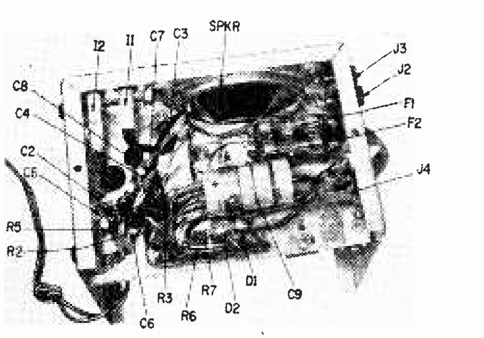
The power supply section of the amplifier is comprised of transformer T2, diode rectifier D1 and D2, and the RC filter circuit formed by C9A, C9B, and resistor R6. The B+ and 6.3 vac power supply voltages are connected through fuses F1 and F2 to the external pin jacks allowing the amplifier to be used as a power supply for low power applications.

The neon indicator lamp, I2, across the primary of power transformer, T2, indicates a power-on condition when S2 (located on potentiometer R1) is closed and applies power to the circuit.

Putting It Together. Begin construction of the bench amplifier by perforating the front of the aluminum chassis box for the speaker. Cut one large or several smaller holes and back up with a square of aluminum screening to protect the speaker. The next step is to form an inside chassis of sheet aluminum that is cut at one end to fit around

The completed amplifier is handsome as well as easy to use; and with its carrying handle, a cinch to transport. The side view (bottom) calls out the components on one side of the inside chassis as well as showing how the chassis is cut out to fit around the speaker. Radiator-type metal screening was used on the front panel to protect the speaker cone.





PARTS LIST

- C1, C4, C8—.005 mf ceramic capacitors
- C2, C5—5 mf, 15 WVDC electrolytic capacitors
- C3, C6, C7—.01 mf ceramic capacitors
- C9—20-20-20 mf triple-section, 150-volt electrolytic capacitor (Sprague TVA3440 or equiv.)
- D1, D2—Diode rectifiers, 400 PIV, 450 ma (GE-504 or equiv.)
- F1—1/16-amp, 250-volt fuse, type 3AG with fuse holder
- F2, F3—½-amp, 250-volt fuse, type 3AG with fuse holder
- I1, I2—"Tineon" indicator lamps, types 41N2317-6 and 36N-2311-6, respectively
- J1, J5, J6, J7—phono jacks
- J2, J3, J8, J9, J10—insulated tip jacks
- J4—2-connector phone jack
- R1—1,000,000-ohm potentiometer with s.p.s.t. switch (S2)
- R2—5600-ohm, ½-watt resistor
- R3—270,000-ohm, ½-watt resistor
- R4—1,000,000-ohm, ½-watt resistor
- R5—68-ohm, ½-watt resistor
- R6, R7—1800-ohm, 2-watt resistors
- S1—S.p.s.t. toggle switch
- S2—S.p.s.t. switch (see R1)
- T1—Universal output transformer (Knight 6-W-14-HFL or equiv.)
- T2—Power transformer; Pri: 110-120 vac, 60 cps, Sec: 125 volts CT, @ 25 ma, and 6.3 vac @ 1 amp. (Knight 6-K-1 or equiv.)
- V1—6U8-A vacuum tube with 9-pin miniature socket
- 1—4-ohm, 4-inch diameter speaker
- 1—4" x 5" x 6" aluminum chassis box (LMB CU-3007-A or equiv.)
- 1—3⅞" x 5⅞" aluminum sheet
- Misc.—Line cord, grommets, angle brackets, dial knob, aluminum screening, carrying handle, rubber feet, panel marking, hookup wire, hardware, solder, etc.

Estimated cost: $15.00
Estimated construction time: 8 hours

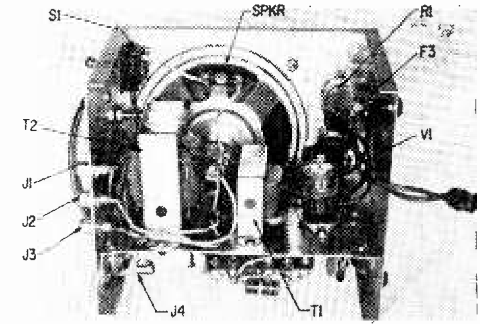
the speaker. Now begin mounting components on the chassis and front and top panels of the enclosure: check clearances as you work, and use photographs as a guide.

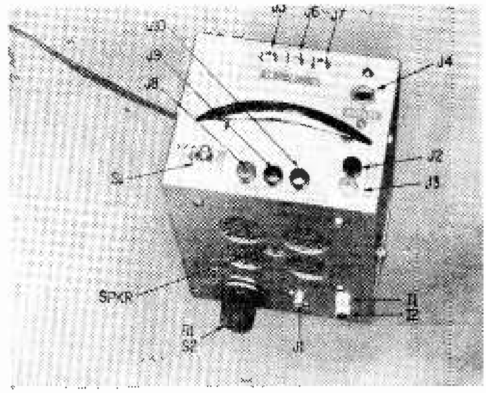
After wiring the unit, finish the outside by identifying the jacks and switches with suitable panel markings. Mount rubber feet on the bottom of the unit. Finally, provide ventilation by opening some holes in a neat pattern on the back or sides of the aluminum chassis box.

Putting It To Work. Allow the unit to warm up and connect an audio signal from, perhaps, a crystal set or phone output. Use the internal speaker first and then continue checking out your wiring by using external speakers and the headphone jack.

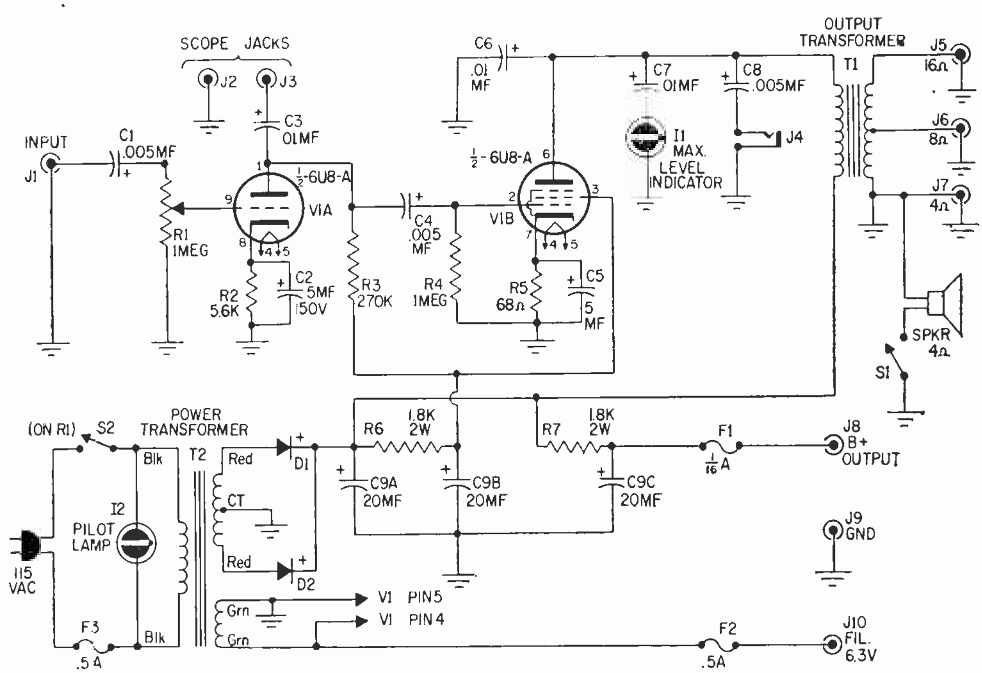
External power for circuits you are working on can be taken from the pin jacks while the unit is being used as an amplifier. The B+ is available at 120 volts at 15 wa. and the filament heater voltage at 6.3 vac at .5 amperes.

To use indicator lamp I1 to determine the peak level of an output signal, first disconnect any external speaker, then set the speaker switch S1 to off. Turning up the volume control R1 will increase the signal to I1 causing it to flash and giving you an indication of signal strength. By connecting an AC voltmeter to the phone jack J4, you can measure actual signal level and relate the intensity of I1 to actual voltage values. ■



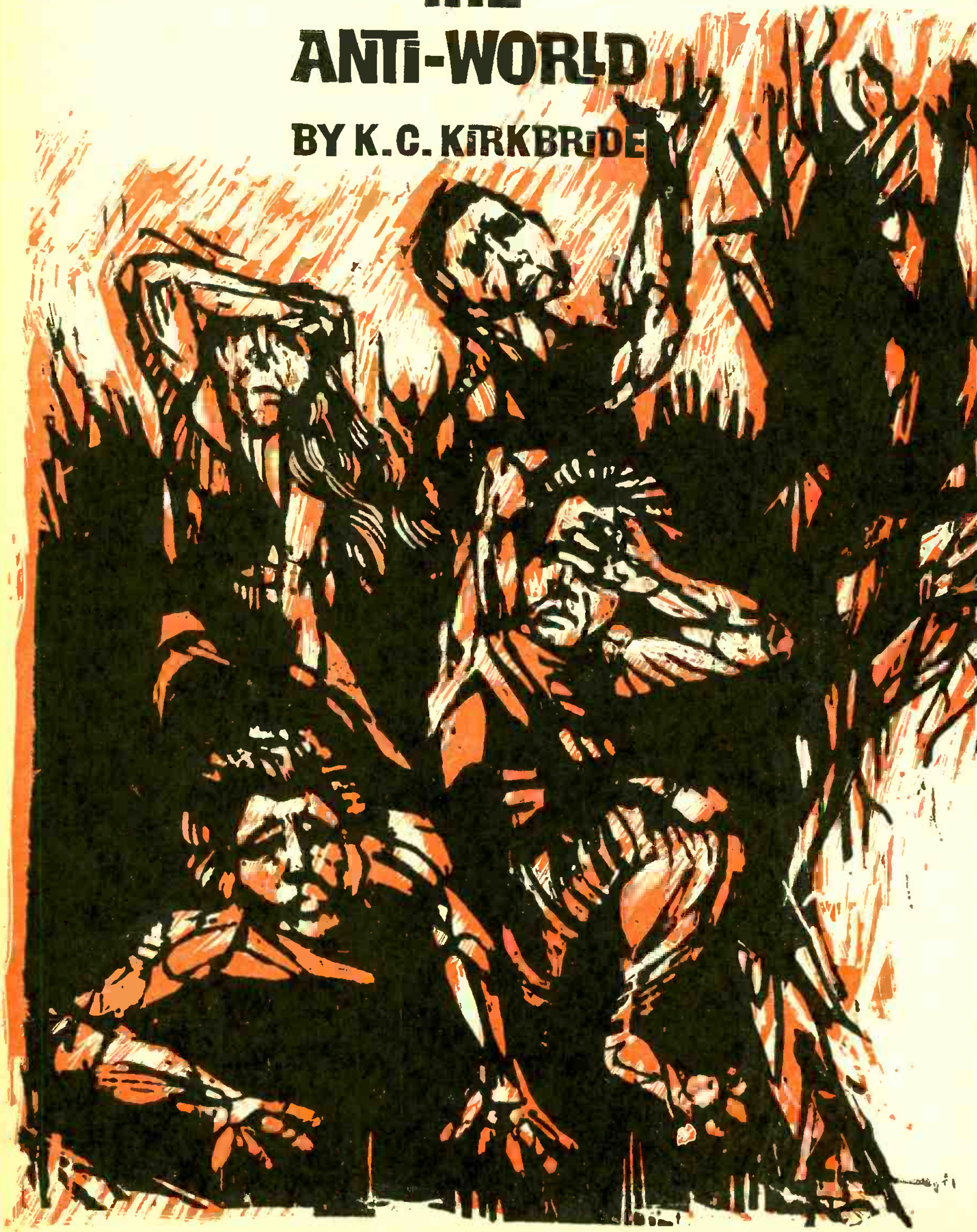


This view of the inside chassis (top) shows the components on its other side. The view of the front and top panels (above) calls out the location of the jacks and controls.



PROBING THE SECRET OF THE ANTI-WORLD

BY K. C. KIRKBRIDE



The scientifically confirmed existence of atomic anti-particles primes the imagination to accept the possibility of an anti-world—even an anti-self!

In the early morning hours of June 30, 1908, in the basin of the Tunguska River, in Siberia, a giant explosion burst out of a clear sunlit sky—an explosion so violent even the sun seemed dark.

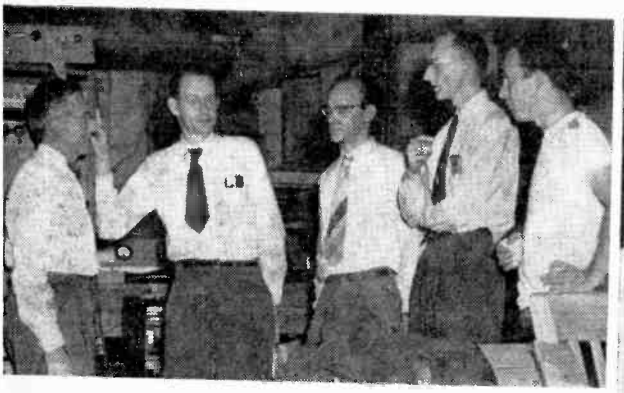
Farmers forty miles away were hurled to the ground and burned, silverware melted, trees thirty miles from the flash turned over, uprooted. And for many months afterward, the sky was bright at night in Europe; and as far South as the Caucasus, one could read a newspaper at midnight without artificial light.

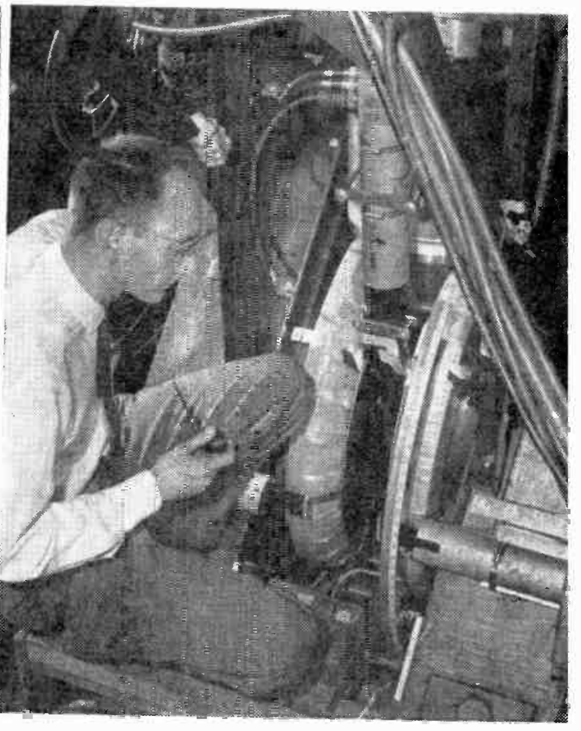
What Caused It? For many years afterward, scientists sought the cause of the explosion. Some said it might have been the result of a meteor crash but no crater existed. Others thought it might have been touched off by a comet, but no one had seen a comet crashing toward earth.

Now, almost sixty years later, man ventures to spell out a strange phenomenon that may account for the freak explosion, a phenomenon that could ultimately mean a new source of vast power, or a new means of violent destruction. A phenomenon that could spell discovery of an *anti-world,* a world to mirror our own, but reversing time, and possibly peopled by anti-human beings. A world made of materials that when they collide with the materials of this planet, explode, giving off tremendous radiations.

Invading Matter. Scientists now have reasoned: could the Siberian explosion be linked to this strange phenomenon? Could a sizeable hunk of anti-matter possibly have seeped into our galaxy and have exploded in the air before crashing to earth?

If it had, they reasoned, then a vast number of free neutrons must have been released at the time, to join nitrogen atoms, and turn into radioactive carbon-14. The explosion,





The discovery of the antiproton in 1955 at the University of California Lawrence Radiation Laboratory was marked by the photo above. Left to right are Dr. Emilio Segre, Dr. Clyde Wiegand, Dr. Edward J. Lofgren, Dr. Owen Chamberlain, and Tom Ypsilantis, then a graduate student. The discovery team consisted of Segre, Wiegand, Chamberlain and Ypsilantis. Dr. Lofgren was in charge of the Bevatron, the accelerator with which the particle was discovered. Right, Dr. Chamberlain, co-discoverer of element 43, and anti-proton examines huge but delicate accelerator.

in that case, would have increased the content of carbon-14 in the earth's atmosphere by 7% and this heightened radio-activity be recorded in vegetation existent at the time.

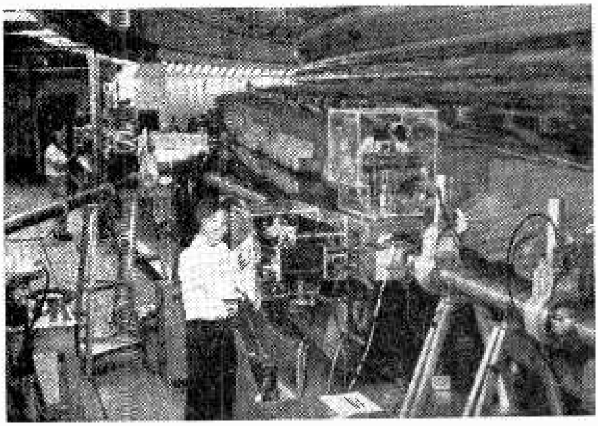
The Tree Tells A Secret. In the early months of this year, physicist Clyde Cowan of the Catholic University of America, with Chemist Willard Libby of UCLA, decided to test out this anti-matter theory. They peeled rings from a 300-year-old Douglas fir tree near Tucson, Arizona, found just what they sought, a small, but unmistakable increased deposit of radio-activity in the rings representing the year of the Siberian explosion. To them the rings proved one-seventh the energy causing the mysterious explosion was anti-matter.

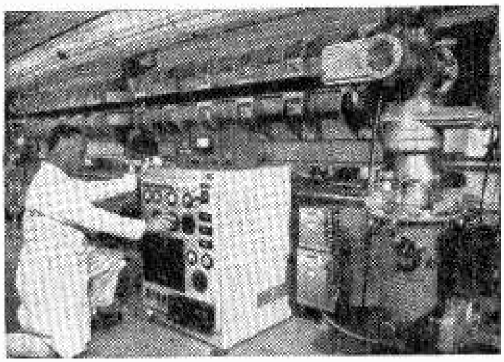
But it had taken over half a century to reach this solution. For the theories of annihilation of matter have been among the elusive mysteries of our time.

In the early decades of this century, famed British scientist Sir Arthur Eddington theoretically reasoned negative and positive explosions of energy caused the stars to burn. He defined matter as minute positive and minute negative charges which cancelled out when run together, "leaving a splash in the ether which spreads out as an electromagnetic wave carrying off the energy released."

He believed the amount released so great that if we annihilated a single drop of water, we would be supplied with 15,000 watt-hours for a year. And while, he said, we "covet"

The scientists who discovered the antineutron with the University of California Bevatron, the largest atom-smasher in the world: Bruce Cork, Oreste Piccioni, Glen Lambertson, and William Wenzel. They are shown with one of the accurately calibrated magnet assemblies used in the experiments in which the antineutron was identified. This discovery was made in July-August, 1965, and followed by almost a year the discovery of the first antinuclein, the antiproton, by another research in the Berkley laboratory (above).





Two views inside the tunnel of the one-half mile circumference ring of the Alternating Gradient Synchrotron at the Brookhaven National Laboratory at Upton, New York. Above, complex plumbing is used to determine energy spread of protons leaving the synchrotron. Just above the head of the man in the foreground are steering magnets used for horizontal and vertical deflecting of the proton beam. Right above, one of the 48 titanium evaporation pumps and control console used to maintain high vacuum in the synchrotron.

this vast power, there is little hope man may penetrate the secrets of its manufacture. Later he added, if the stars could learn, then man might in time.

And he was right for it has taken many years to probe the secrets of matter versus anti-matter.

First Clue. In the late 1920's, a young mathematical physicist P. A. M. Dirac, was studying for his Ph. D., in the University of Cambridge, England. Mulling over an equation of his, one true both to the relativity theory and quantum mechanics, that described the behavior of the electron, he was suddenly startled.

He had only to fill in charge and mass of the electron, and then the spin and magnetic moment, and his equation described the hydrogen electron perfectly. The only problem was, if his amazing equation was right, there must be an undiscovered electron in the universe!

For according to his equation, the electron must have two different types of energy states, one positive, the other negative. Since the only electron we knew was negatively charged, his equation had to mean, there was an electron with positive charge!

Can't Be. As this interpretation seemed downright heretical at the time, he searched further for another solution. Could the particle represented in the equation be a proton? But the particle had to have equal mass with a negative electron, and the proton's charge is 1836 times as massive as the electron. Probing further, he found there must also be an anti-proton, and that the universe should show a complete symmetry between particles and anti-particles.

The Search Begins. When the young Doctor finally announced his revolutionary mathematical theories in late 1928, his findings so startled the world of physics that scientists surprised the press with the first predictions of an anti-world made up of anti-particles and anti-atoms. The next step was to catch the elusive electron in the laboratory.

(Continued on page 108)

BIG MEN IN THE SMALL WORLD OF ANTI-MATTER

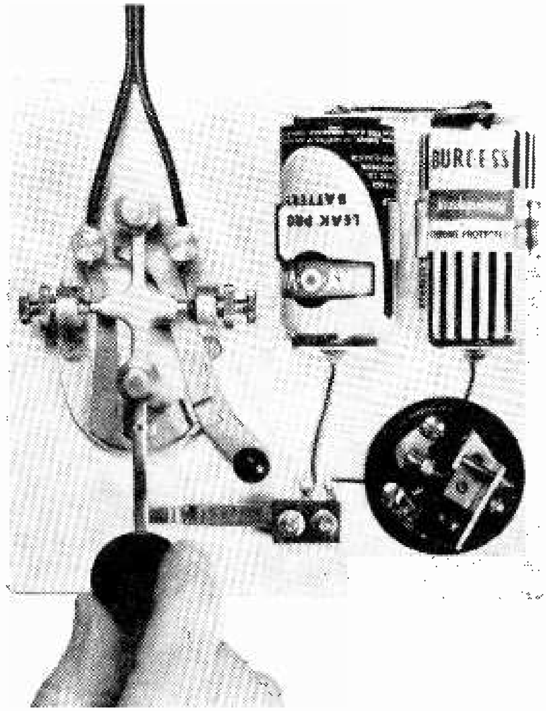
DR. ROBERT A. MILLIKAN
Nobel Laureate
Physics, 1923

DR. CARL D. ANDERSON
Nobel Laureate
Physics, 1936

DR. EMILIO SEGRE
Nobel Laureate
Physics, 1959

DR. MAURICE GOLDHABER
Director
Brookhaven National Lab.

DR. LEON LEDERMAN
Professor of Physics
Columbia University



SIMPLE CODE MONITOR

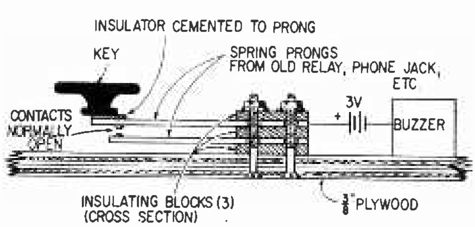
By Art Trauffer

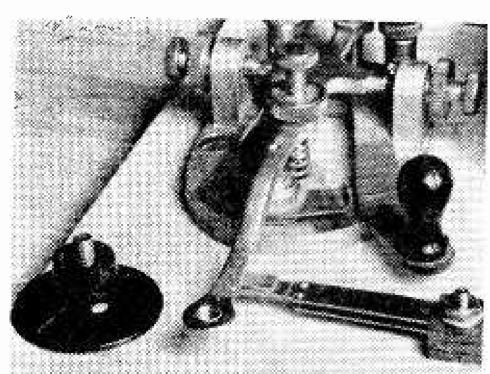
■ Most of us send better code when we can hear what we're sending. This code monitor, which is entirely independent of your receiver or transmitter and has no electrical connections to any of your equipment, is quickly rigged up using only three main components: first, a pair of prongs or reeds from an old phone jack, switch, or relay; secondly, a 3-volt supply (two D batteries); and, finally, a buzzer.

As shown in the photos and cross-section below, the monitor is actuated by the lever of your regular transmitter key. While the regular key operates your transmitter, it also closes the spring prongs of the old relay, activating the buzzer.

Monitor Mounting. Your transmitter key, monitor spring contacts, buzzer and battery are all mounted on a convenient surface; as shown here, they were mounted on a 6-inch square piece of ⅜-inch plywood. Prongs are mounted under the lever of your key close to the knob. A small piece of insulating material is cemented to the top spring prong to insulate it from the key. Adjust the monitor prongs so that they make contact just before the transmitter key contacts; then wire monitor in series and start sending! ■

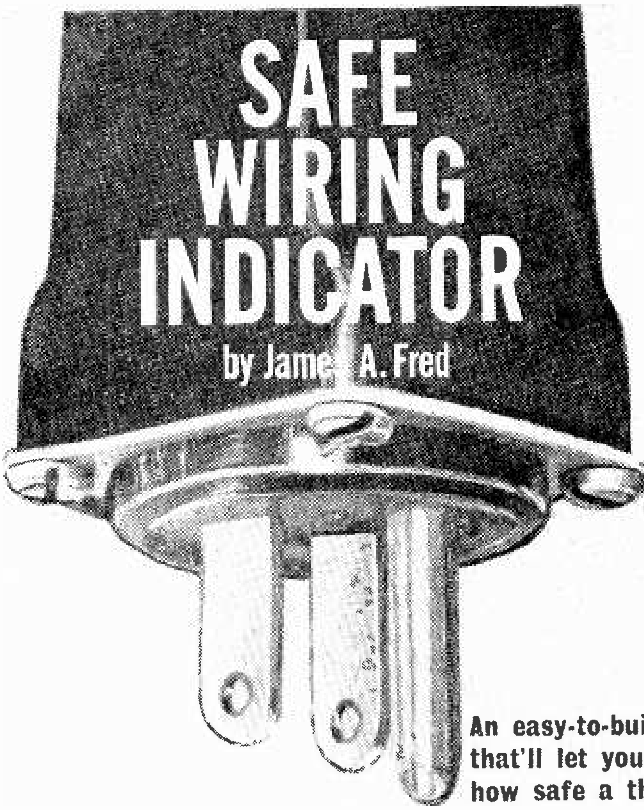
The knob of the telegraph key at the right is removed to show how the key actuates the insulated top spring prong to make contact with the bottom prong, thereby completing buzzer circuit. Size of insulating blocks, below, is determined by height of the key.





SAFE WIRING INDICATOR

by James A. Fred



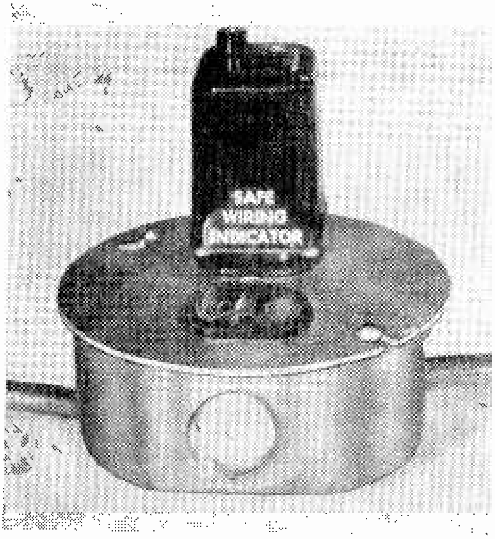
An easy-to-build $2 gadget that'll let you know for sure how safe a three-wire outlet is!

■ Would you spend two dollars to make a small neon indicator that might save your life? Simple to build and even easier to use, the Safe Wiring Indicator will point out *safe* and *unsafe* AC outlets before you discover them the hard way. As you know, homes and factories are being wired with grounded electrical outlets. This means that you have the two regular blade openings plus a round opening in each electrical outlet. The round socket is wired to a ground wire that goes from each receptacle and metal box back to a ground rod at the meter box or to a water pipe. There is also a brass screw in each outlet that is supposed to connect to the black wire and a white nickel screw that is supposed to connect to the white wire in the Romex or other wiring cable used.

Some communities have laws that prevent a homeowner from doing his own electrical wiring. Fortunately, I live in a small community where I can add to my own house wiring without interference. I know that my receptacles are wired correctly and thus are polarized to prevent dangerous shocks. But what happens when you go to a neighbor's or relative's home to do some work? Or maybe you are a professional repairman or carpenter doing some remodeling. How are you to know that the receptacles that you plug your power tools into is wired correctly?

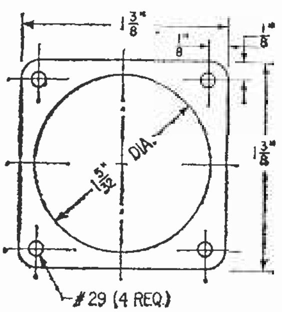
How It's Done. If you have one of my Safe Wiring Indicators you can plug it into the outlet you want to use and if both indicator bulbs light it is safe to go ahead and use the receptacle. The Safe Wiring Indicator can answer one of six possible questions:

1. Has the receptacle been wired correctly?
2. Is the black "hot" wire open circuit?
3. Is the white wire open circuit?
4. Is the ground wire open circuit?
5. Are the black and white wires reversed?
6. Are the black and ground wires reversed?



Completed indicator unit shown plugged into AC outlet. Neon bulbs are at top of case.

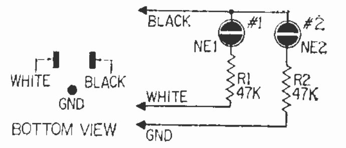
Since mounting plate for 3-wire AC plug is not readily available, it can be made from sheet metal using dimensions shown here.



You can refer to the Indicator Lights Chart for the proper light sequence. This is all done by two neon bulbs with series resistors wired to a grounding type AC plug. To make the unit convenient to use the parts are mounted in a plastic case adapted to plug into any grounded electrical receptacle. It can be "whipped" together for about $2.00 or less in an hour's time. The indicator will give you a lifetime of protection from improperly wired electrical outlets.

Making It. The mounting plate for the AC plug must be made since no known company supplies one ready made. The neon bulbs on plastic lenses can be pressed into 5/32-inch diameter holes. If necessary, a few spots of

SCHEMATIC DIAGRAM



PARTS LIST

NE1, NE2—Neon indicator (Econoglow Type 117-Red, Allied Radio 7EE900, or equiv.)
R1, R2—47,000-ohm, ½-watt resistor
1—Plastic case for mounting relay (Allied Radio 75P55B or equiv.)
1—AC plug, three terminal (Amphenol 160-11)
Misc.—Sleeving, screws, sheet metal, solder, etc.

Estimated construction cost: $2.00
Estimated construction time: 1 hour

model cement may be used to lock them into place. Use 47,000-ohm, ½-watt series resistors to make the neon bulbs burn brighter. Since the neon bulbs will only be lit briefly, their life should be practically forever. Use sleeving on all bare wires to prevent shorts. You can paint the inside of the plastic case with black model paint to hide the interior wiring.

Once the Safe Wiring Indicator is finished either test it by plugging it into a properly wired outlet or by using clip leads connect it to a conventional wall outlet and the ground to a nearby cold water pipe. If the indications are correct (refer to the chart) you can put it away until you need it to test an unfamiliar electrical outlet.

INDICATOR LIGHTS CHART

Explanation of indication	Light No. 1	Light No. 2
Wiring is safe to use	On	On
Black wire open	Off	Off
White wire open	Off	On
Ground wire open	On	Off
Black and white reversed	On	Off
Black and ground reversed	Off	On

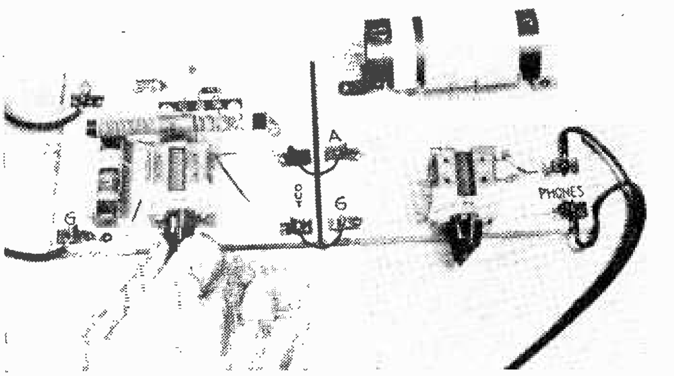
CAUTION! There are two things this device won't tell you:

1. When the white and ground wires are reversed. This isn't too important since in most cases the white wire is grounded at the meter box anyway.

2. Whether or not the ground wire is in place at the meter box. A visual inspection will soon verify this fact. ■

transistorized TRF amplifier stage

Give your crystal detector rig half a chance to pick up DX stations by pepping up the input soup with a one transistor selective RF amp



by
Art Trauffer

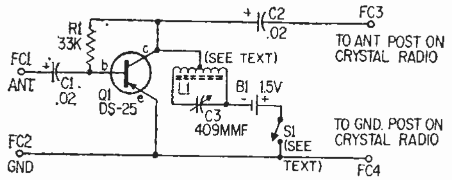
■ Want an extra boost of performance from your crystal radio? This tuned RF amplifier is the perfect new front end for your crystal set. There have been many construction projects for crystal radios, many of which include one or more stages of transistorized audio frequency amplification to boost the signal after detection. But this transistorized tuned radio-frequency amplifier stage will boost the signal before detection. This makes it possible to use a shorter antenna or just plain be ahead of the game before the signal is detected.

Matching Components. The amplifier stage was breadboarded to match the Allied Knight-Kit crystal set shown at the right of the amplifier in Fig. 1. Simplicity was the rule in building the amplifier which gives good results with only a 1.5 volt battery. The battery is connected in the circuit as shown in Fig. 2.

The components of the amplifier are mounted on a 6-inch by 4½-inch piece of ⅜-inch plywood and located as shown in Fig. 3. The 409 mmf variable capacitor, C3, is mounted using small angle brackets. Use short screws to secure the brackets to C3 so the screws don't touch the rotor plates. The ferrite core coil, L1, is mounted on the back of C3 using a strap of insulating material such as fibre, plastic or cardboard. Details of winding the coil will be given shortly.

Transistor Q1 is mounted on a 3-lug terminal strip by its own leads. Remember the heat sink when soldering the leads in place. Use long nose pliers if you don't have a heat sink. The battery can be quickly and easily mounted between two angle brackets that act as its holder. A neat trick to even get around the need for a switch to cut the battery out of the circuit is to insert a piece of insulating material between the negative end of the battery and the angle bracket (see Fig. 4).

Roll Your Own. The drawing of Fig. 5 shows you how to make the ferrite core coil,



Simple? You bet it is! Only one tuned circuit is used to eliminate tracking error. Transistor Q1 is not critical. Almost any pnp unit rated at 2 mc., hfe 10 will do the job. Aside from units given in parts list, the following may be used for Q1: 2N247, 2N252, 2N274, 2N308-310, 2N315, 2N370-374, 2N384, 2N501, 2N504 and other pnp rf units.

PARTS LIST

B1—1.5-volt battery
C1, C2—.02 mf, 200-volt capacitors
C3—409 mmf variable capacitor (Allied Radio 13L524 or equiv.)
L1—Self-wound ferrite core coil (see text)
Q1—RF amplifier transistor (Delco DS-25, Lafayette 19R4220, or equiv.)
R1—33,000-ohm, ½-watt resistor
S1—See text
1—⅜" x 6" x 4½" plywood base board
Misc.—Fahnestock clips, terminal strip, pointer knob, solder lugs, Litz wire and ⅜" ferrite rod (see text), scrap sheet metal, hardware, hookup wire, solder, etc.

Estimated cost: $6.00
Estimated construction time: 2 hours

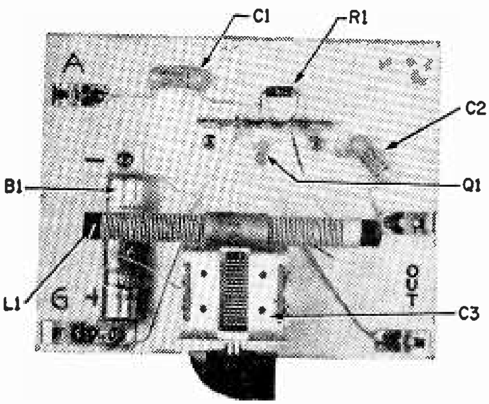
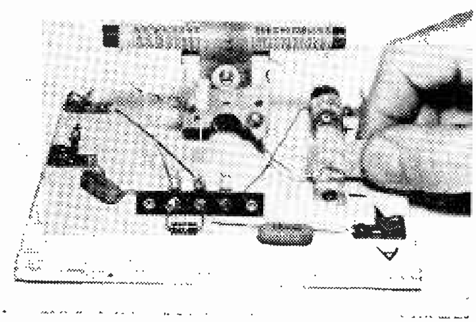


Photo above illustrates breadboard layout used by author. At left, piece of cardboard is used as switch to disconnect battery.



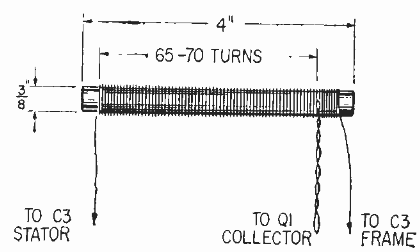


FIGURE 5

Detail drawing of fabricated coil L1. Make no substitutions and follow plan carefully.

L1. The coil works fine as an RF coil and you can also use it as an antenna coil in another project. A length of 10-38 Litz wire and a ⅜-inch diameter ferrite core was used in this project, but alternate materials can be used. For example, Belden 7-41 Litz (Lafayette 32G1485) can be wound on .33-inch ferrite core (Lafayette 32G6102). Or simply use No. 26 enameled cotton-covered magnet wire instead of Litz. Note from Fig. 5 that the first 10 turns of the coil are close-wound while the remainder of the turns are slightly spaced. Use Duco or coil cement to hold the wire at the ends of the coil and to secure the twisted tap to the collector of Q1 from the tenth turn on the coil.

Circuit Operation. The antenna input to the amplifier is through capacitor C1 which blocks DC and passes RF in case your antenna accidentally contacts a power line. Resistor R1 is the base bias resistor for transistor Q1. Coil L1 and variable capacitor C3 form the RF-tuning tank in the collector circuit of Q1. The collector is tapped close to the ground end of the coil to better match the transistor's low output impedance; this gives better selectivity. Capacitor C2 blocks DC and passes the amplified RF signal to the antenna post of your crystal radio.

As with a crystal radio, this RF amplifier works best with a good ground and a good outdoor antenna. TRF amplification can be increased a bit by using two AA batteries in series to provide 3 volts. Keep polarity in mind when wiring the circuit: the Delco DS-25 used in the project is a pnp transistor so negative terminal goes to the collector. ■

WHAT AND WHAT NOT'S OF
TV SERVICE CALLS

BY H. E. HOLLAND

"I finally got that antenna strapped to the chimney."

"Why not try carrying that tool caddy with your right hand for awhile?"

"I hate to charge you anything . . . your husband told me mostly what to do."

"It's a Japanese receiver Mr. Cates . . . yes, operator, give me Yokahama, Japan."

"It all started when it was just a kit."

The Pickup Problem

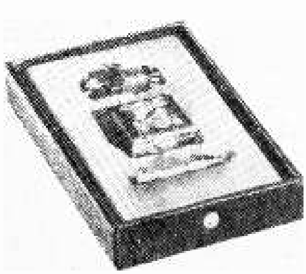
by John Milder

■ There have been striking improvements in audio components over the past few years, but stereo pickups have made the most dramatic progress of all. Today's cartridges not only help music flow more smoothly than ever from the record, but they keep its grooves in near-mint condition through dozens of playings. And they have just about demolished the old contention that records would have to give way to tape as the medium for real fidelity.

The point is that you don't have to search warily these days for a "good" cartridge. Among pickups you are likely to come across in a hi-fi showroom, there is hardly a "bad" one in sight. Therein lies the problem of selection. What you *do* have to look for is a pickup that's really suited to the particular use you have in mind. And while you're looking around you may have to sacrifice some notions about the virtues of the perfect pickup in favor of some practical considerations. Before we discuss those practical matters, let's take a brief refresher course in what cartridges do, and how they do it.

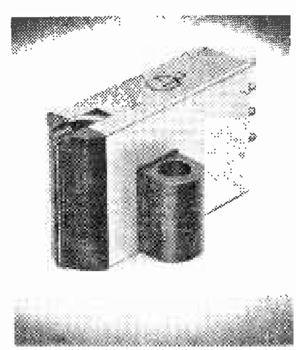
In the Groove. Unless you're a total stranger to audio, you probably already know that music on disks consists of complex wiggles in the vinyl walls of the grooves. A pickup's stylus has to accurately follow the groove's undulations—long and wide for loud bass notes, short and rapid for high frequencies. Stylus motion is then translated into an electrical signal, again with as much precision as possible. Most of the time the job is done by making the cartridge a voltage generator. By rotating a coil in a magnetic field, twisting a tiny magnet between fixed coils, or flexing of a small ceramic element, an electrical signal is produced.

One reason for the startling performance of today's cartridges is that converting stylus motion into an electrical signal has become refined to the point where a stylus pushes an almost weightless generating mechanism. This allows stylus assemblies to be made far more delicate and low in mass, with an increasing ability to follow the most subtle twists and turns in record grooves. Because of low mass, today's stylus assemblies can be made so compliant (free to move) that they can follow the widest swings produced in the groove by the loudest bass tones. At the same time, lower mass means a higher frequency for the point where the stylus and the vinyl material of records *resonate* together. The



Stanton 581

Grado Model B



Grado Model A

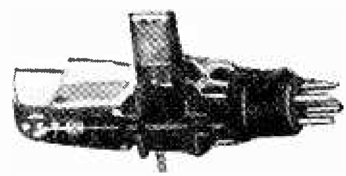
higher the frequency where resonance occurs, the less harshness or artificial "zinginess" in the sound of high frequencies. It also means less groove wear at high frequencies.

Almost everything, from the material used in stylus assemblies to the polish put on diamond tips, has now been refined to an almost incredible degree. The job that some experts said couldn't be done—getting two separate stereo signals on the walls of a single groove—has become a ho-hum proposition. Today's *avant-garde* audiophile concerns himself with more sophisticated problems. Witness, for example, the lowest fashion in stylus tips: the ell ptical.

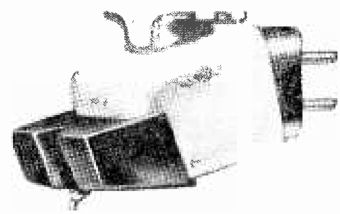
What's Up Front. According to persuasive theory, the elliptical tip is an important advance in pickup design. Because it resembles the wedge shape of the recording stylus used to cut master discs, it can "trace" the path cut by the original stylus better than can the conventional ball-shaped tip. And because the elliptical combines a narrow area of groove contact with a broad frontal profile, it can be equally at home in the crowded squiggles of a stereo record groove and the fairly wide-open spaces of mono grooves. With this combination of virtues in its favor, it's hardly surprising that the elliptical tip can now be had—either as standard or optional—from practically every cartridge maker.

But here is where we can begin to get a bit practical. Should you insist on an elliptical when it's time to buy a pickup? Not necessarily. Let's ignore the theoretical drawbacks that might balance the advantages of the elliptical. The important thing is that the elliptical's advantages, whether great or marginal, apply only when a cartridge and stylus assembly can be kept in *perfect* theoretical alignment with record grooves. As soon as the elliptical shape is canted or tilted even slightly, those theoretical advantages disappear. In some cases, in fact, the tip becomes a menace to record grooves, with a leading edge that tends to bite into the groove like the cutter on which it's modeled.

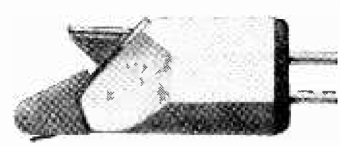
Thus, the problem is that it's almost impossible to install and maintain a pickup with that mandatory perfect alignment. If you do manage to install your pickup perfectly in its shell (and the odds are overwhelmingly against it), chances are it won't stay in alignment for very long—whether it's exposed to normal human handling or the stress of a record changer's trip mechanism. So much, then, for the elliptical's still-disputed theo-



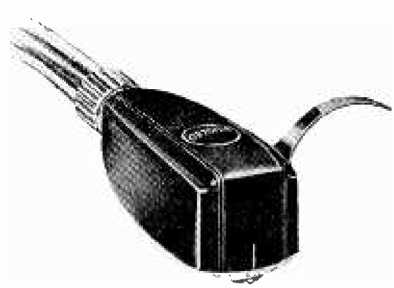
Sonotone Velocitone



Pickering V-15 Micro-Magnetic

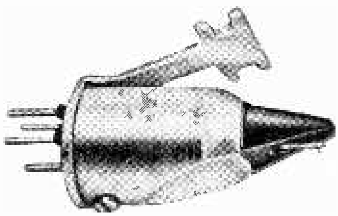


Empire 888P

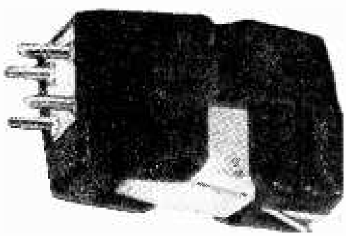


Ortofon SPU

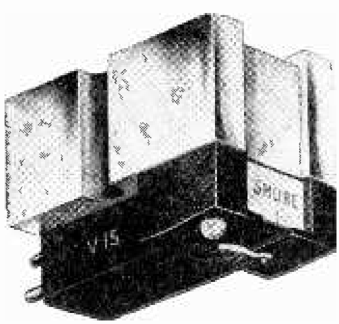
Today's cartridges are a far cry from the old steel needle, crystal units that bore down on disks, causing premature wear and poor sound. New techniques, plus a better understanding of cartridge problems, have led to very light, high-performance models such as shown here.



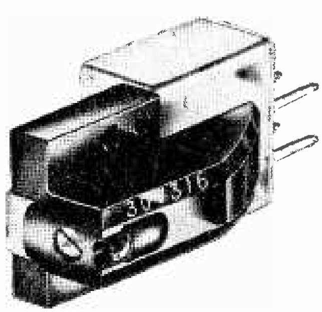
Dynaco Stereodyne III



ADC Point Four



Shure V15



Ortofon SPU/T

Modern, high-quality cartridges are remarkably comparable in performance characteristics. The user, however, should make a careful choice among the available units, as discussed in the text, to secure a cartridge that best matches his own requirements; for example, either changer or automatic turntable.

retical advantages. Unless you're a relentless perfectionist with automated fingers, you would probably be better off with a conventional non-elliptical cartridge.

Fallacy of the Absolute. Theory and practice also come into combat on other fronts. Take the matter of a pickup's compliance. So much attention has been paid to compliance as a specification that many audiophiles use it as *the* index of comparison between cartridges, automatically assuming that the pickup with the higher figure in front of that mysterious "10-6 cm/dyne" rating is the better performer and therefore the better choice. Not so. Even if you assume—as you shouldn't—that the cartridge with a compliance of 10x10-6 cm/dyne has the edge in performance over one with a figure of 9x10-6 cm/dyne, you don't know whether it is more suited to your particular needs. If you intend to use the cartridge in an automatic turntable, very high compliance can mean that the stylus will not be able to stand up to the stress of the automatic trip mechanism over a long period of use. Or if you're going to use the pickup in an older or less-than-compliant stylus may buckle after only a few feather-gentle record changer, the super-plays.

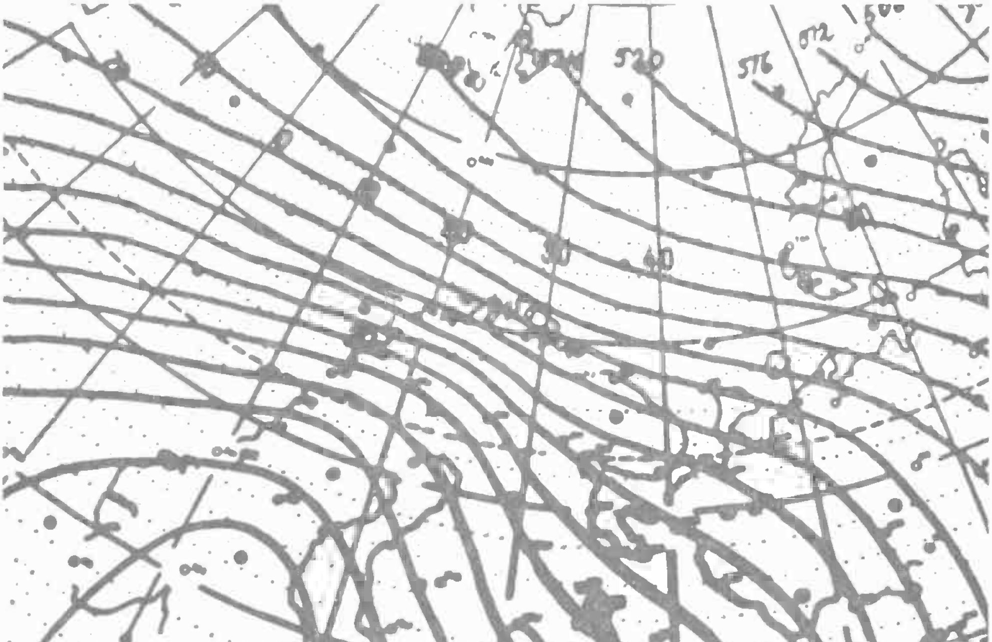
It makes sense, then, to modify your expectations of "pure" specs and start looking at the less glamorous matters that may count more in the long run. First of all, let the record-playing gear you intend to use decide the general category you will pick from. (See cartridge chart.) If you're going to use an older-style or inexpensive record changer, make your choice from the rugged pickups designed to stand up to casual handling. If you have a newer, more expensive automatic turntable, you can pick from the "Auto Turntable" or "General" categories on the chart, or—if you *know* that your tone arm and automatic trip mechanism are suitably gentle—one of the premium pickups designed for single-play turntables. If you use a single-play transcription table, you can choose either a premium, perfectionist pickup or—if you're not concerned with cat's-whisker fidelity or if you know there will be some casual handling by others—any of the lesser, more rugged categories.

What Are You Playing? Another matter to consider carefully is the kind of record you intend to play. If you put nothing but the newest in mono and stereo LP's on your turntable, you don't have to think about any-

(Continued on page 110)

MANUFACTURER	MODEL	TYPE	STYLUS RADIUS (MILS)	STYLUS TYPE	PRICE	NOTES
AUDIO DYNAMICS CORPORATION①	Point Four/E	Induced Magnet	.2/.7	E	$60.00	
	660/E		.2/.7	E	39.50	
	770		.7	R	29.50	
	809/E		.2/.7	E	—	
DYNACO	Stereodyne II	Moving Iron	.5, .7, 3.0	R	17.95	Integrated arm-cartridge assembly available
	Stereodyne III		.7	R	19.95	
EMPIRE①	888P	Moving Magnet	.6	R	21.95	15° vertical tracking angle
	888PE		2/.9	E	32.95	
	880		.7	R	17.95	
	880P		.6	R	19.95	
	880PE		.2/.9	E	29.95	
EUPHONICS	CK-15-LS	Semi-conductor	.2/.9	E	55.00	Integrated arm-cartridge assembly available
	CK-15-P		.5	R	30.00	
GRADO	A	Moving Coil	.3/.9	E	49.50	"Twin Tip" truncated stylus
	B	Semi-conductor	.6/.3	R or E	under $20	
ORTOFON	SPU/T	Moving Coil	.6	R	50.00	Available premounted in shell for Ortofon arms
	SPE/T		—	E	75.00	
PICKERING①	380C	Moving Magnet	.7	R	11.76	
	V-15/AC-2		.7	R	17.95	
	V-15/AT-2		.7	R	19.95	
	V-15/AM-1		.7	R	21.95	
	V-15/AME-1		.25/.85	E	29.95	
SHURE①	M-44-C	Moving Magnet	.7	R	17.95	15° tracking
	M7/N21D		.7	R	17.95	
	M55-E		.2/.7	E	35.50	15° tracking
	M80-E		.2/.7	E	38.00	
	V-15		.2/.7	E	62.50	15° tracking
SONOTONE	Velocitone Mark IV	Ceramic	.7/3	R	23.15	Turnover stylus with second LP-Stereo tip or 78 tip
STANTON	581-EL	Moving Magnet	—	E	49.50	1.0 and 2.7 mil stylus available
	581-AA		.5	R	49.50	
WEATHERS	LDM	Ceramic	.7	R	under $20	For Weathers arm only

Legend: ① Plug-in stylus assemblies available for Mono LP's and/or 78's. E = Elliptical stylus. R = Round (conical) stylus.



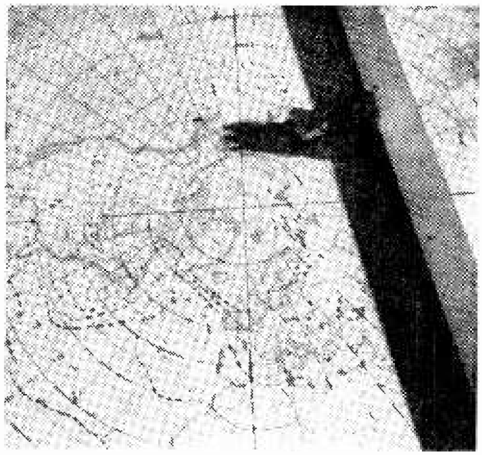
World Weather Phone

by Patty Cavin

reprinted from RCA Electronic Age

The young meteorologist in the noisy communications room on the third floor of the U.S. Weather Bureau's National Weather Satellite Center in Suitland, Md., squinted nervously at the clock above the compact bank of electronic machines. It was two minutes after 10 A.M. The shiny red phone in his hand emitted a high-pitched squeak.

Behind him lights flashed above a row of somber black telephones, direct lines to Cape Kennedy, Fla.; Fairbanks, Alaska; the National Hurricane Center in Miami; and NASA headquarters in Washington, D.C. Around him a serious group of men checked



Russian weather map (see facing page) received at U.S. Weather Bureau in Suitland, Md. via weather circuit. Above left are Dr. Robert M. White, Chief of U.S. Weather Bureau, and Dr. J. Herbert Hollomon. Above is electronically drawn weather map received at National Weather Satellite Center in Suitland. At left, U.S. Weather Bureau checks voice conditions on Washington-Moscow weather line. The 5000-mile link can carry voice, photos, maps and telegraph signals.

the electronic scanner machines steadily rolling off weather maps, while facsimile specialists scanned the keys of their machines, preparing for instant action.

Suddenly it came:

"Hello, Washington . . hello, Washington. . . . This is Moscow. Professor Bugaev is here."

As the crackling tones of a Russian interpreter 5,000 miles away in the Central Forecasting Institute in Moscow faded through the speaker, the U.S. Weather Bureau's sandy-haired Arthur W. Johnson, Manager of the Operations Division of the national Weather Satellite Center, picked up the receiver and began what undoubtedly is the longest "person-to-person" conversation held regularly these days between Washington and Moscow.

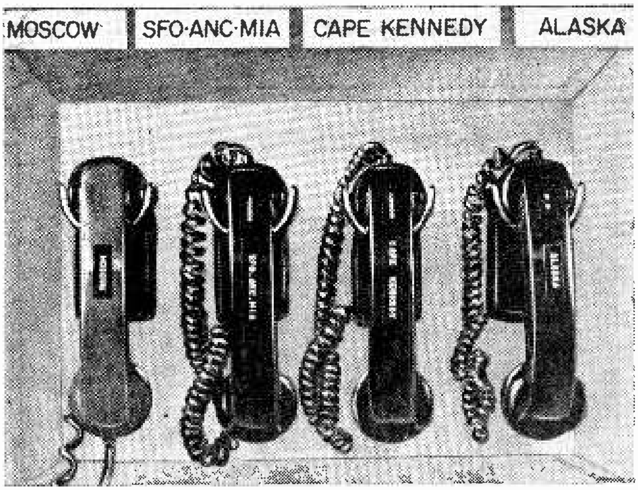
Weather Over Moscow. The voice at the other end of the line belonged to his Russian counterpart, stocky, white-haired Victor Bugaev, Director of Russia's Central Forecasting Institute, a four-story yellow stone building on the grounds of the Academy of Sciences in the heart of Moscow. Since November, 1964, these two men have talked every 10 days for periods of 15 to 40 minutes on the widely varied scientific topics involved in modern weather analysis.

Both principals in these conversations were technical negotiators who took part in the talks leading to the establishment of the recently completed U.S.-Soviet direct weather circuit.

It is no common telephone line through which this international "weatherese" flows three times a month. Instead, Johnson and Bugaev talk directly through a series of interconnected wireline and cable channels, operating 24 hours a day from the U.S. Weather Bureau's national nerve center in Suitland through London, Frankfurt, Berlin, Warsaw, and on to the Central Forecasting Institute.

Most Americans are aware of the Pentagon-White House Hot Line to Moscow designed, in cases of dire emergency, to keep the President in quick touch with the Soviet Premier in case of emergency. Few, however, realize that a weather line exists. An important step forward in the United Nations' three-year-old master plan to strengthen world weather service and research, the line itself has been an actuality since October 1, 1964, when RCA Communications, Inc., prime contractor in establishing the circuit, turned it over in working condition to the U.S. Weather Bureau.

Although the Johnson-Bugaev conversations are mere preliminary checkups on the international exchange, weather information



Phone on left connects the U.S. Weather Bureau's National Weather Satellite Center in Suitland, Md. with the Central Forecasting Institute in Moscow.

has been steadily flowing over the line since October 25, 1964. It is transmitted by four different modes—voice, facsimile, photograph, and telegraph. Thus, the most technical cloud-cap data and maps, charted courtesy of the U.S. family of TIROS weather satellites, could be speedily flashed to Russia within minutes of their reception at the Satellite Center in Suitland.

As of December, 1964, the line has worked smoothly, but only conventional weather data have been reciprocally exchanged on the regular daily schedules. It is hoped that satellite information will flow back and forth in the near future, according to Dr. J. Herbert Hollomon, Assistant Secretary of Commerce for Science and Technology.

Establishing the Line. Dr. Hollomon, 46, like his Chief of the U.S. Weather Bureau, Dr. Robert M. White, 42, is one of the new breed of young scientist-engineer administrators currently holding key posts in government. Since joining the Bureau on October 1, 1963, Dr. White has been serving as Permanent Representative of the United States to the World Meteorological Organization, a specialized U.N. agency. Both he and Dr. Hollomon lent official enthusiasm and administration know-how in the final stages of the U.S.-Soviet agreement.

Top credit for negotiations, however, belongs to the distinguished American scientist Dr. Hugh L. Dryden, Deputy Administrator of the National Aeronautics and Space Administration, whose continued persuasiveness as technical adviser to the U.S. representative on the U.N.'s broadly based 28-nation Outer Space Committee finally convinced Russia's shrewd academician Professor Anatoli Blagonravov that the Soviet Union should hook up to the weather line.

Dr. Dryden gladly shares credit for initiating the project with Dr. Francis W. Reichelderfer, retired Chief of the Weather Bureau. Dr. Reichelderfer, with the late Dr. Harry Wexler, pioneered the initial idea on the American side with his chief of research. NASA's capable Arnold Frutkin, Assistant Administrator for International Programs, also played a major part in the long-range negotiations.

Both Dr. Hollomon and Dr. White agree that the most difficult part of the negotiations was reaching agreement for the payment of the weather line. Both countries share equally the expenses that are approximately $26,500 a month.

All principals on the American side share President Johnson's initial hope that other member nations of the World Meteorological Organization will eventually receive data transmitted over the new weather link.

The President gave the first official word of the new exchange at a press conference on October 24, 1964.

"I am happy to be able to announce that we have reached an agreement with the Soviet Union for the exchange of weather information between Moscow and Washington," Johnson commented.

". . . We know," the President continued, "that the new link, when in operation, will be a substantial step forward in speeding the transmission of valuable weather data in both directions. The American weathermen and the American public will immediately

(Continued on page 111)

DX'ing the Vanishing Breed

By Tom Kneitel, K3FLL/WB2AAI

Police operating frequencies have been soaring they're up to 450 mc! But here's the story on pulling in those low frequency boys still around!

■ Time was when anyone with a communications receiver could pass the time of day by listening to his local police dispatcher. Federal Communications Commission records indicate that at the end of 1947 there were almost 700 police base stations operating on low frequencies (between 1600 kc/s, the high frequency end of the standard broadcasting band, and 2500 kc/s). That was *then*, but not any longer.

Today the police stations have all but deserted the low frequency bands, fleeing to the use of frequency modulation on bands at 30 mc., 150 mc., and (shudder!) even *450* mc. To hear the high frequency stations you require a specialized frequency coverage FM receiver, a critically measured vertical antenna, and a good location. At best, these high frequency stations can communicate for thirty or forty miles.

Hit'm Low. But wait, we said that the police stations have *all but* deserted low frequencies. There is still a handful of hearty stations clinging to these channels—true, they diminish in number each year, but they are still there—today numbering less than 100. They *still* make fascinating listening, they can easily be heard throughout all of North America (using no more than a fair receiver and a hunk-of-wire antenna), and

Above are some members of the "dying breed;" these QSL's are from some of the police stations working LF. Lieutenant Edward Gibbons, commanding officer Boston Police Division 8, maintains direct communication with police boats using either marine or police radio channels. Below, several police officers maintain communications with the patrol cars working out of Nassau County Police Headquarters in Mineola, Long Island, New York.

most of them *will* QSL your reception reports. All you need to DX the "dying breed" is the information on who and where the stations are; and to QSL them you'll need a few "inside" tips.

The beauty of DX'ing these stations is that, with a modest amount of time and effort expended, it is possible to hear and verify just about all of these stations. Which other radio service offers you such a fighting chance to reach such an appetizing "end of the road"—3,900 broadcasting stations? 250,000 hams? 800,000 CB'ers?

To aid you in keeping track of your DX'ing accomplishments, we offer you a detailed guide to the remaining low frequency police base stations, together with a check-box reminder for when stations have been heard and then when the QSL has been received.

SWL Late Show. The best time to listen for these stations is late at night, especially during the winter months. Forget about the whole thing during daylight hours, nothing happens until around sunset. The whole band swings right on through the night until dawn.

Just let your receiver "sit" on a single

(Continued on page 109)

Police Radio Stations operating Between 1600-2500 Kc.

Freq.(kc.)	Call	City	State	Agency
1610	KMA224	San Rafael	Calif.	CP
	KMA518	Napa	Calif.	CP
	KMA862*	San Rafael	Calif.	CP
	KMA994	Crescent City	Calif.	CP
	KMG688	San Rafael	Calif.	CP
1618	KIC358	Knoxville	Tenn.	SP
	KIC360	Chattanooga	Tenn.	SP
	KIC361	Jordonia	Tenn.	SP
	KIG264*		Tenn.	SP
1626	KQA698	Elkins	W. Va.	SP
	KQB569	S. Charleston	W. Va.	SP
1634	KOA303	Reno	Nev.	MP
	KOA726	Carson City	Nev.	
	KOB220	Fallon	Nev.	CP
	KOB221	Ely	Nev.	CP
	KOB372	Elko	Nev.	CP
	KOB393	Lovelock	Nev.	CP
	KOE525	Yerington	Nev.	CP
1658	KED784	Corpus Christi	Tex.	SP
	KKC784	Calallen	Tex.	SP
	KKD303	Austin	Tex.	SP
	KKI412	Amarillo	Tex.	SP
	KMA539	San Leandro	Calif.	CP
	KMA846*	San Leandro	Calif.	CP
	KMA848	Santa Rita	Calif.	CP
	KMA934*	Martinez	Calif.	CP
1682	KCA999	Concord	N.H.	SP
	KCB538	Lancaster	N.H.	SP
	KDZ367	Stratham	N.H.	SP
	KMA785	Los Angeles	Calif.	MP
	KMA787	Los Angeles	Calif.	MP
	KMA807	Newhall	Calif.	SP
1690	KMA788	Sacramento	Calif.	SP
	KMA797*		Calif.	SP
	KMA799	Grass Valley	Calif.	SP
	KMA800	Willows	Calif.	SP
	KMA802	Vallejo	Calif.	SP
	KMA803	Alturas	Calif.	SP
	KMA805	Oroville	Calif.	SP
	KMA962	San Francisco	Calif.	SP
1706	KQA398	Cincinnati	Ohio	MP
1714	KCA281	Revere	Mass.	MP
	KCA692	Newton	Mass.	MP
	KCA955	Newton	Mass.	MP
	KKA463	Longview	Tex.	CP
	KKB364	Dallas	Tex.	MP
	KKB840	Texas City	Tex.	PM
	KKC355	Victoria	Tex.	CP
	KKD297	Dallas	Tex.	MP
	KKD489	Waco	Tex.	MP
	KKD490	Houston	Tex.	MP
	KMA793	Needles	Calif.	CP
	KMA795	San Bernardino	Calif.	CP
	KMA943	Pasadena	Calif.	MP
1722	KMA213	Davis	Calif.	MP
	KMA866	Westwood	Calif.	CP
	KMA867	Susanville	Calif.	CP
	KMA910*	Sacramento	Calif.	MP
	KUA210	Wailulu	Hawaii	CP
	KUA212	Lahaina	Hawaii	CP
1730	KMA367	Los Angeles	Calif.	MP
	KMA785	Los Angeles	Calif.	MP
	KMA992*	Los Angeles	Calif.	MP
	KQB358	Wilmington	Ohio	SP
2366	KMA785	Los Angeles	Calif.	MP
	KMA786	Los Angeles	Calif.	MP
	KMA787	Los Angeles	Calif.	MP
	KMA992*	Los Angeles	Calif.	MP
	KMM577	City Terrace	Calif.	
2382	KSA765	Oshkosh	Wisc.	CP
2414	KKE370	Clovis	N.M.	MP
	KMA789	Tulare	Calif.	MP
	KMA858	Merced	Calif.	CP
2422	KEA317	Freehold	N.J.	CP
2442	KMA361	Vacaville	Calif.	MP
	KMA583	Indio	Calif.	CP
	KMA878	Banning	Calif.	CP
	KMA879	Blythe	Calif.	CP
	KMA880	Riverside	Calif.	CP
	KQA739	Saginaw	Mich.	MP
	KWA216	Tok Junction	Alaska	MP
	KWA217	Glenn Allen	Alaska	MP
	KWA218	Anchorage	Alaska	MP
	KWA219	Fairbanks	Alaska	MP
	KWA233	Fairbanks	Alaska	MP
	KWA237	Palmer	Alaska	MP
	KWA238	Valdez	Alaska	MP
	KWA239	Seward	Alaska	MP
	KWA629	Kenai	Alaska	MP
	KWA746	Anchorage	Alaska	MP
	KWA747	Fairbanks	Alaska	MP
	KWA797	Third Division	Alaska	MP
	KWA862	Homer	Alaska	MP
2466	KMA438	San Francisco	Calif.	MP
2490	KMA790	El Centro	Calif.	MP
	KMA824	San Diego	Calif.	MP
	KMA938	Orange	Calif.	CP

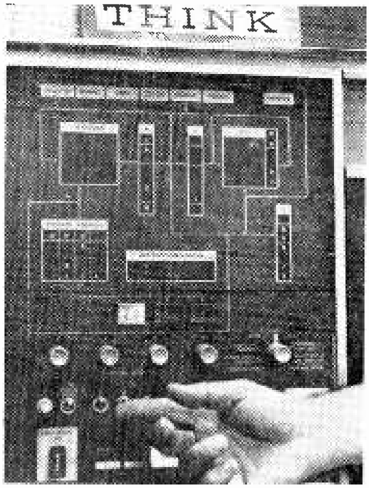
COMPUTERS VS. CRIME

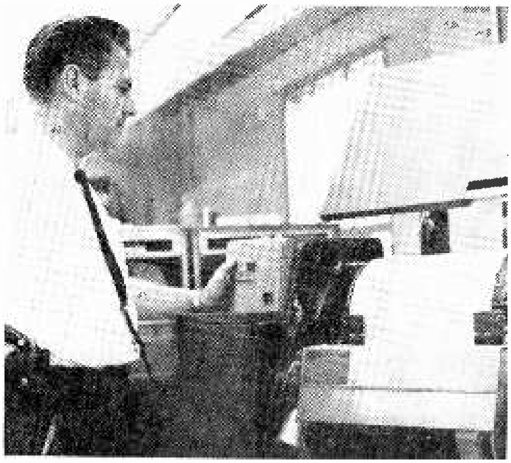
■ Time was when any self-respecting burglar could get a set of tools, wait for a dark night, then head for a second story. Sure there were hazards—being bitten by the family dog, tripping an alarm, maybe getting caught in the act. But if what's happening in New York City is any indication, budding burglars may soon have to out-fox the IBM computer. For in the newest brand of electronic gamesmanship, computers can help tell the police where the action is.

Reason for computerizing the cops was simply that no-one could get a bird's-eye view of crime as it happened in the big city on a day-to-day basis. Too many reports to digest, let alone read. Mountains of statistics prove useless unless they can be interpreted with speed and accuracy.

Which, of course, is why any computer exists. As shown in these photos, the electronic brain gobbles up data on every complaint, arrest, traffic accident and crime for each 24-hour period. Then it scurrys through the material at incredible speed, comes up with a clear, over-all picture of what's happening throughout the city. The computer can spot shifting trends or spot a fast-developing pattern in crime which might otherwise go undetected for days.

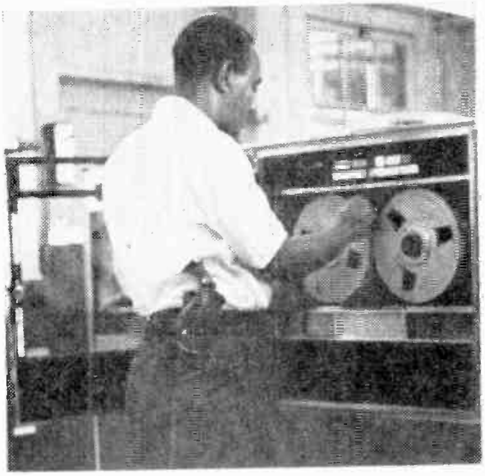
Armed with this information, the cops now know where to beef up forces or to deploy them for maximum prevention effect. Who knows? The familiar "Hands up" may be replaced by a punch card titled "Apprehended by Automation." ■

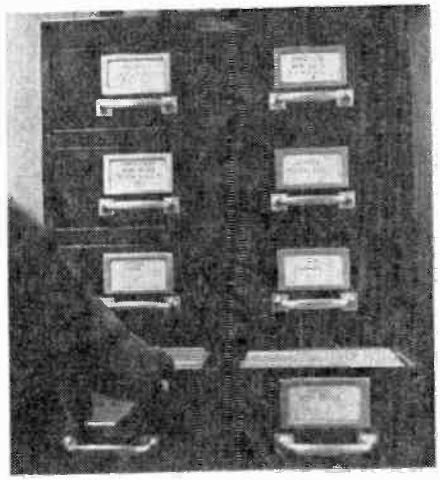


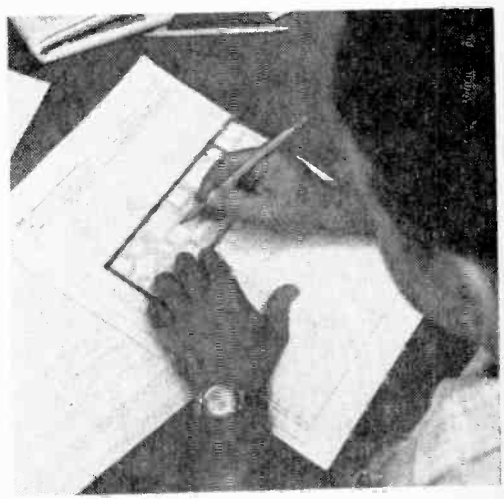


Process begins (top right) as operators punch IBM cards with police information gathered from local precincts during a 24-hour period: arrests, complaints, accidents, etc. Computer console (above) enables operator to control data flow through the system. Operator may feed several information sources simultaneously and check that every pertinent fact is turned into readable information. At right, computer prints out reports at the rate of 600 lines per minute. Reading the report is Sgt. James F. Mooney of the New York Police Department's data processing staff.

Pistol-packin' cop, trained by IBM, now operates console which stores information on reels of magnetic tape. This is just one section of a computer installation worth $300,000. Filing cabinets (below right) contain over 150 data processing programs. Since computers can't really think for themselves, programs provide instructions for handling the data.







Girl at desk (upper left) is tape librarian, keeps track of some 500 reels of magnetic tape loaded with crime. Close-up of tape-reel cans at left is in "Arrest" section. Tapes record information from punch cards. Length of the tape is 2400 feet, with every inch accommodating 556 characters. Thus a total of 5 million characters per tape provides storage for much data. Above, a programmer is devising a new set of instructions for the computer to follow. His chart is a logic diagram with which the computer will, hopefully, prove that crime won't pay.

Propagation Forecast

By C. M. Stanbury II

December 1965/January 1966

■ This time around we have again included our semiannual Peak Reception Chart. After looking it over, undoubtedly the most startling discovery you'll make is that tremendous advantage enjoyed by western SWL's when it comes to Asiatic reception. In fact, it's more startling than the chart shows.

During the period 0000-0600 PST, Far East reception in western North America will not only be possible via those bands shown on the main chart but is also feasible all the way down to 75 and 90 meters. True these bands require a little more effort, however, you will be rewarded with a better selection of DX.

On the other hand, EST and CST listeners should not neglect those two peak hours of Asian reception available to them. With all eyes on that Vietnam conflict, Asia has become the SWL's number one target—no matter where he lives! ■

North America Peak Reception Chart

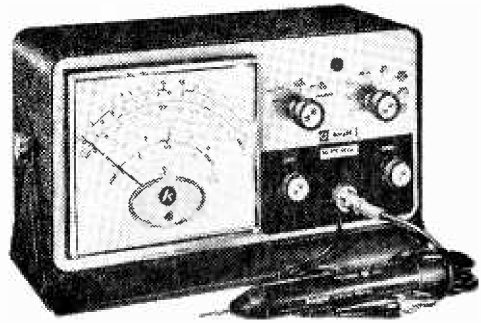
Stations from	East Coast (EST)	West Coast (PST)
Asia (except Near East)	0600-0900 1800-2100	1800-0800
Europe, Near East & Africa (N. of Sahara)	1500-2100	1500-2100
Africa (S. of Sahara)	1500-0100	1500-2200
South Pacific	0600-0900 1800-2400	1800-0800
Latin America	1700-0700	1600-0500

<table>
<tr><th>LISTENER'S TIME</th><th>0000–0300</th><th>0300–0600</th><th>0600–0900</th><th>0900–1200</th><th>1200–1500</th><th>1500–1800</th><th>1800–2100</th><th>2100–2400</th></tr>
<tr><td>STATIONS FROM... ASIA (except Near East)</td><td>41 (31)</td><td>41 (49)</td><td>25, 19</td><td colspan="2">25 (19)</td><td>31</td><td>31 (19, 25)</td><td>19, 25</td></tr>
<tr><td>EUROPE, NEAR EAST & AFRICA (N. of the Sahara)</td><td>31, 41</td><td>31 (poor)</td><td>19</td><td colspan="2">16, 19</td><td>25</td><td colspan="2">31</td></tr>
<tr><td>AFRICA (S. of the Sahara)</td><td>49 (60)</td><td colspan="2">Nil</td><td colspan="2">16, 19</td><td>25</td><td>31</td><td>41 (60)</td></tr>
<tr><td>SOUTH PACIFIC</td><td colspan="2">31</td><td>25</td><td colspan="2">25 (poor)</td><td>19 (poor)</td><td>19</td><td>25 (19)</td></tr>
<tr><td>LATIN AMERICA</td><td colspan="2">49, 60</td><td>49 (31, 60)</td><td colspan="2">25, 19</td><td>25</td><td colspan="2">49, 60, 90</td></tr>
</table>

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.

RADIO-TV EXPERIMENTER LAB CHECK

KNIGHT-KIT KG-625
6-Inch Peak-to-Peak
Vacuum Tube Voltmeter Kit



■ While the VOM is the mainstay instrument in most shops—whether hobbyist or professional—for serious experimental or service work a vacuum tube voltmeter (VTVM) is a *must have.* For example, take a simple thing such as aligning an AC/DC radio. The proper way to do the job is to feed in an unmodulated RF signal and then peak the IF and RF circuits for maximum AVC voltage. But the AVC bus is at the least 500,000 ohms above ground, and trying to measure the AVC voltage with even a 20,000 ohms/volt VOM would result in serious loading of the circuit; for even if the VOM was set to the 50-volt range the VOM would represent a load of 1 megohm, serious loading for even a 500,000-ohm bus (and most AVC busses are about 2.5 megohms above ground). Or how about trying to measure the bias on an audio amplifier; a vacuum tube's input impedance is very high; again, using a VOM would result in serious loading.

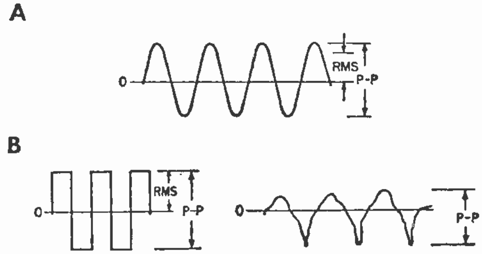
The proper way to measure voltages in high impedance circuits is with a VTVM, since the common service type VTVM has an input impedance for DC measurements of 11 megohms—and rare is the typical circuit that will be loaded with 11 megs.

More to Consider. But modern electronics has another measurement problem—whether you're working with tubes or transistors. Years ago, the average equipment handled only *sine-waveform*—no problem for any service instrument. But today, with TV receivers as the perfect example, the average household equipment processes complex-waveforms; square waves, sawtooths, etc. Why even the modern tape recorders with built-in voice control uses multi-vibrators.

So the modern VTVM, in addition to representing a high impedance to DC circuits must also be capable of measuring complex AC waveforms from peak to peak such as shown in Fig. 1. And that brings us to Knight's newest VTVM, the KG-625 available in kit or wired form.

Basically, the Knight-Kit VTVM is like any other, utilizing the *(simplified)* circuit shown in Fig. 2. V1 is a twin triode amplifier. With no signal present R1 is adjusted so the plate voltages on both V1a and V1b are identical. Since there is no voltage difference no current can flow through meter M1 and it indicates zero. When a positive voltage is applied to V1a's grid, thereby increasing V1a's plate current, the voltage drop across R2 increases, the voltage at the plate falls, and now, since there is a difference between the two plate voltages current flows through M1 and we get our reading. When a negative

Fig. 1. Most VTVM's respond only to sine voltage waveforms (A) and meter indication does not hold true for waveforms in (B). Knight's KG-625 reads true peak-to-peak voltages and interpolates AC to true *rms* values.



RADIO-TV EXPERIMENTER LAB CHECK

voltage is applied, which would cause M1 to read downscale, the VTVM's function switch simply reverses the meter polarity *(—DC Volts)* causing the meter to read upscale.

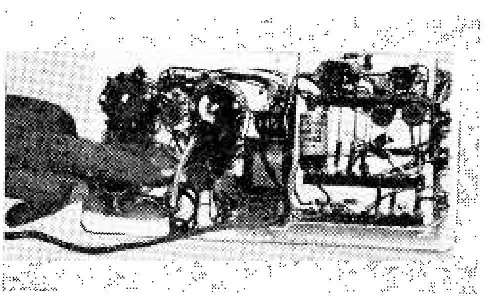
The voltage doubler shown in Fig. 3 is switched in between the probe and the range switch for P-P AC measurements. Actually, while we show the solid-state diode symbol the VTVM uses a dual diode vacuum tube.

C1 is the DC blocking capacitor that allows AC to be measured in the presence of DC. When the positive going part of the AC waveform passes C1, diode D1 conducts, charging C2 to the full positive peak value. When the negative going pulse follows, diode D2 conducts and both the negative pulse and the voltage stored by C2 charges C3 to the full peak-to-peak voltage. The voltage across C3 is applied to the range switch and hence to the VTVM. In earlier VTVM's a standard half-wave rectifier was used instead of the doubler and the VTVM could only indicate rms values.

The Extras. While the basic circuits are common to all service grade VTVM's, it's the refinements, particularly in the DC circuit that makes the KG-625 a strong contender for a position on your test bench.

The KG-625 as normally supplied covers the range from 0–1500 volts full scale; an optional high voltage probe extends the range to 25 KV full scale. For ease in transistor servicing the bottom range is .5 volts full scale. Since this allows a minimum reading of .01 volts there's never any problem discerning the minute difference between voltages common to transistor circuitry.

The AC rms ranges are similar to the DC ranges with the exception of the .5 volt scale —the AC ranges start at 1.5 volts full scale. (Common to all service grade instruments.) The big difference here is that the AC func-



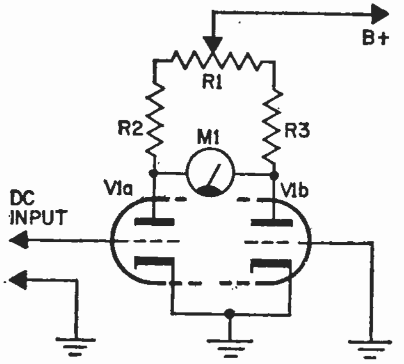


Fig. 2. Meter M1 reads zero in bridge circuit with zero input—DC input upsets balance.

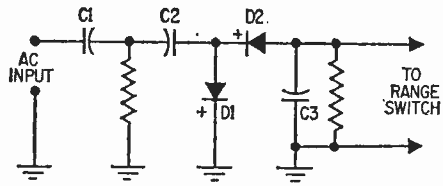


Fig. 3. AC input circuit is actually a simple voltage doubler that charges P-to-P, not rms.

tion really indicates true peak-to-peak. The average rms indicating meter does not give a true picture of what's taking place with complex waveform. For example, an rms reading meter would indicate a 10 volt P-P *square wave* as being only 3.54 volts rms. But the KG-625 actually responds to and is calibrated in P-P; in our example it would indicate 10 volts P-P. It is the meter calibration which interpolates P-P to rms. for sine-waveform (voltages such as when measuring line voltage).

The ohmmeter has 7 ranges to 1000 megohms, with 10 ohms and its multiples at center scale.

The KG-625 utilizes the so-called "laboratory styling." The cabinet is horizontal with an oversize 6-inch meter having notably clear and contrasting calibrations. An extra heavy duty gimbal bracket allows the meter to be placed on a bench or mounted on a wall; it can even be hung under a shelf. Thumb screws lock the meter in any desired position after the gimbal is positioned.

Putting One Together. The kit version is easy to build, even for the newcomer to instrument construction. Except for the func-

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To insure zero-set stability on all ranges, input lead must be routed free of all other leads.

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LAFAYETTE HB-600 CB/Business Band Solid-State Transceiver

■ Let's be frank, as far as noise limiters go CB transceivers are still back in the early 1940's, or at least they were until the Lafayette HB-600 came along. Consider for a moment what CB is: it is a *mobile* radio system located in perhaps the *most* noise-prone frequencies. Auto ignitions, generators, fluorescent lights, motors and a host of other annoying and irritating pops and crackles; yet, what was served up as noise limiters even in the most expensive transceivers?—that's right, the same old shunt, or series, or half or full wave noise limiters described in the *Radio Amateur's Handbook* twenty years ago.

What CB needed was a noise limiter that actually *eliminated* the noise, rather than just reduced an intolerable grind into a slightly tolerable grind. Now you have it, throw the noise limiter switch on the HB-600 and you've heard your last pop, crackle and snap.

Behind the Front Panel. The HB-600 is an all transistor (solid-state if you will) CB transceiver that not only covers all 23 channels but has built-in facilities for either the proposed H.E.L.P. channels or two business band channels. No modifications are required for either service. In addition to the usual 23 channels on the dial (both transmit and receive) there are A and B positions. When H.E.L.P. finally gets off its rear end all you have to do is plug in the appropriate crystals. Or, if you feel you'd like to retain the advantages of CB yet enjoy the clear-channels of the Business Band (located right above the CB band), again, you just have to plug in the appropriate crystals and a single transceiver serves on two distinct bands *at your option*.

The minor features are more or less standard equipment on high quality transceivers. An S-meter which doubles as an RF output meter calibrated in "Watts Output," a phone jack for headphones or a remote speaker, delta tuning to compensate for the received station being off center-frequency, Public address facility and a vari-tilt bracket.

In Comes the Signal. Okay, you've waited long enough, we'll get to the receiver. The receiver is double conversion with a *mechanical filter* that delivers outstanding selectivity. With a bandwidth of only 3 kc. 6 db down it is virtually impossible for a signal on an adjacent channel to interfere with the channel you're monitoring—providing the adjacent channel is not splattering due to overmodulation, this would cause interference on any receiver.

Though the IF bandwidth is exceptionally narrow the received audio quality is quite good, received signals are not "muddy"; this is due to frequency correction in the entire audio system. Though the cabinet is all metal, and small, there is virtually none of the "boxy" sound common to small speakers in small metal cabinets.

Sensitivity is very high, less than 1 microvolt for a 10 db signal plus noise-to-noise ratio (the standard reference).

It is in noise reduction that the HB-600 really triumphs. First, there is a standard noise limiter which by itself is notably good, reducing the severest of mobile impulse noise to tolerable snaps and pops. Then there is an RF noise silencer that removes all impulse noise. See the block diagram.

Kicking out the Noise. The antenna itself receives a broad range of frequencies, among them the desired 27 mc. signals. Noise, which is rather broad in frequency distribution is also present in the antenna; noise present at 27 mc. also exists at 25 mc. The HB-600's input circuits splits the antenna signal, feeding the 27 mc. signals to a standard RF amplifier and the 25 mc. noise pulses to it's own RF amplifier—a filter network keeps the 27 mc. signals out of the noise amplifiers. The noise is amplified and then rectified; the resultant DC pulse, which

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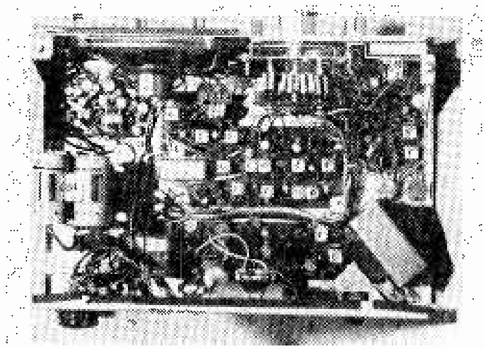
corresponds to the noise pulse is then further amplified. The amplified pulse is then applied to the receiver's second mixer which is also a noise gate. When no noise pulses are present the noise gate is open and the output of the second mixer, 455 kc., is fed to the IF amplifiers. When a noise pulse is received, it's amplified DC pulse is applied to the noise gate which cuts off the mixer, thereby "punching a hole" in the mixer's output. For a very short duration, about 10 microseconds, no signal gets from the mixer to the IF amplifier so no noise pulse come out of the speaker. Because of the short duration of the control pulse the "holes" are not detected by the human ear.

Performancewise. The noise silencer does not make it appear there is an absence of noise. While there is no pulse noise present there is a slight steady hiss. And if the hiss level (noise level) is stronger than the received signal quite naturally the hiss does interfere with the signal. But the marginal signals, which are above the noise level but which were obscured by the impulse noise, are now completely readable. Essentially, for 90 percent of CB communications noise interference when using the RF silencer simply doesn't exist.

We should like to point out that while Lafayette makes no claims for the silencer other than for mobile type impulse noise, we found the silencer highly effective against interference from fluorescent lights, SCR speed controls, photoflood SCR regulators, motors, sewing machines and the oil burner. While it is true that the sewing machine and oil burner did break through the silencer we could still understand relatively weak signals—which is more than we could do with the silencer *off*.



The HB-600 rig sports separate PC's for receiver, transmitter and audio—all solid-state.

Another silencer advantage is that it makes the squelch completely noise-immune. Since squelch circuits generally control audio amplifiers following the detector, strong noise pulses can trip the squelch. Since there are no noise pulses in the HB-600 the squelch trips (releases) only when a signal is received.

One aspect of the silencer must be called to your attention to avoid complaints when none really exist. When the silencer is switched-in the audio level appears to drop—at first it appears to the receiver's sensitivity has been degraded. Actually, this is not so. Since the silencer punches "holes" in the mixer output it's signal level is somewhat reduced *in terms of the audio output.* This is normal. All that's required is a slight advancing of the volume control—the HB-600 has plenty of reserve audio gain—to return the speaker volume to normal.

Similarly, if the delta tuning—2.5 kc. above and below the center frequency—is switched in, there might appear to be a reduction in audio level. This will occur if the Delta tuning is used when the received signal is actually on center channel—you

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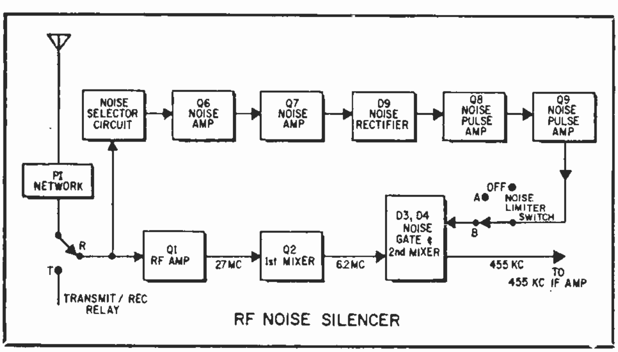
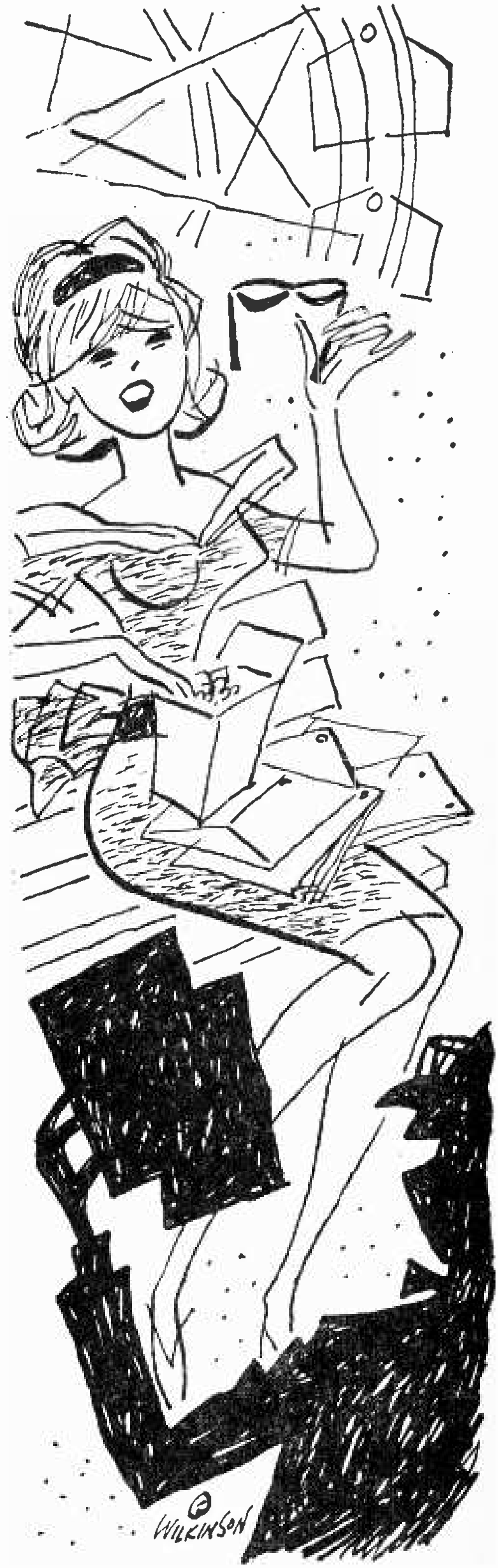


Block diagram shows signal flow in the RF silencer circuit. Noise selector circuit picks off noise on 25 mc.—same noise heard on CB band—then uses this noise to "punch holes" into the CB sound output when random noise pulses occur.

the Hoaxer

By C. M. Stanbury, II

Or how, for me, QSL will always stand for Quick, Slick, Lady from slippery SWBC Station, WWWW!



■ Everyone knows that R. Q. Smith is the world's worst hoaxer, at least all those DX clubs which count know it. Like once he reported that the Voice of America and Radio Peking had worked out a special program exchange, then at the last moment announced that the deal had been cancelled. Or there was the time Radio Moscow operated a relay station in Mississippi.

So yours truly, Michael Tanner, wrote an editorial, a real blast in our club bulletin, "Short-Wave Age," which not only brought me plenty of publicity but got friend R. Q. (Radio Questionable) black-listed. In fact, so much did this editorial do for my reputation, I was contacted by America's newest short-wave broadcast station, WWWW. They wanted me to provide them with weekly DX scripts.

Station WWWW, operating from Cometland, supposedly the world's longest midway, would be a real break. It planned a brand new SWBC format. No classical music, no news and no propaganda. In fact nothing but rock'n'roll and DX tips. With this programming it promised to rate number one with the world's SWL's. And if I became the DX director, it would really put me on the short-wave map.

So I negotiated long and hard with WWWW's program director, Sandy Robin, all the time plugging their station in "Short-Wave Age." But at the last moment a hitch developed—they were seriously considering somebody else. You guessed it. They were considering R. Q. Smith!

Too much! I gathered up all that documented evidence I had against him and come the weekend, headed for Cometland. I hit town at two in the afternoon, located a phone booth and promptly called their office.

"WWWW, Wonderful Wacky Watt Waves," a cool feminine voice answered.

"May I speak to Mr. Robin please. This is Mr. Tanner of Short-Wave Age."

"You're speaking to Miss Robin." Crisp. Took me off guard—"The program director?"

"That's right. And I'm afraid we've pretty well made up our minds."

I pushed on. "I brought some documentation with me, samples of Mr. Smith's work that might change your mind." Hesitated, lost my nerve momentarily. "Will you at least look at them?"

The silence indicated she considered it. "All right, we do want to be sure. But the heat in this office today is really something else. Why don't you meet me in the park where there's supposed to be a breeze."

Figured I had it made. "Okay, where?" My evidence was irrefutable.

"In ten minutes, by the merry-go-round."

"Crazy, you'll know me by the big brown envelope."

She hung up and I headed into the midway. In addition to that documentation (juicy clippings from DX papers) the envelope also contained some of my prize QSL's. To prove I was a bonafide DX champion. Radio Nord's card displaying the "pirate" ship from which it operated, Radio Dili on Timor with palm tree, clouds and hut, Radio Brunei featuring the Sultan's palace. All those QSL's for which I had really sweat.

I found the merry-go-round in five minutes, took a seat in front of it and waited. Behind me were the roller coaster and Ferris wheel. I killed time by watching coaster cars crawl to the top, then come charging down, like some DX'ers.

"Mr. Tanner?" She put herself down beside me. Mousy with glasses but a nice figure. When she wasn't all business, she wouldn't be bad at all.

"That's right, Miss Robin." A soft breeze came off the lake.

"And what is it you have that will change our minds about Mr. Smith?"

"These!" I opened the envelope and produced the clippings. "I'm sure you wouldn't want this kind of stuff going out over WWWW."

Miss Robin took the package and began thumbing through it carefully. "There's a popcorn stand just to our left." She motioned with her head. "Will you get me a box?"

"Sure." Got up, went over to the stand and returned with a box for each of us.

"Thanks." She finished R. Q.'s Mississippi report, put the documents down, opened her box, set it on the bench between us and resumed her inspection. "Are all these reports hoaxes?"

"Oh, no." Tasted my popcorn, too salty. "Smith throws in a lot of good stuff so he won't be spotted right away."

"Like this item from 1963 where he reports a new SWBC station planned for Cometland." She held up a piece of popcorn, studied it.

"Yes, but he lists Cometland as a country, not just a resort on the Great Lakes." Like Perry Mason.

She looked at the report again, nodded. "Yes, he did do that."

"There's more than one way to create a hoax." Pushed the knife into R. Q.'s back a little further. "You can take some perfectly legitimate news item and add some wild details. For example, a rebel station hidden in Yemen . . . broadcasting for the French and English."

She came to my QSL's. "What are these?"

"Looked over her shoulder with pride. "Proof that I am a legitimate DX'er."

Softly, "And a good one." She admired them one by one, with the other hand kept working on that box of popcorn which was now half empty. "How long have you been at it?"

Could almost taste that DX program. "Ten years, since my 15th birthday."

She set the cards on her lap. "I am dying of thirst. Would you get me a coke?" Shook her head. "All that popcorn."

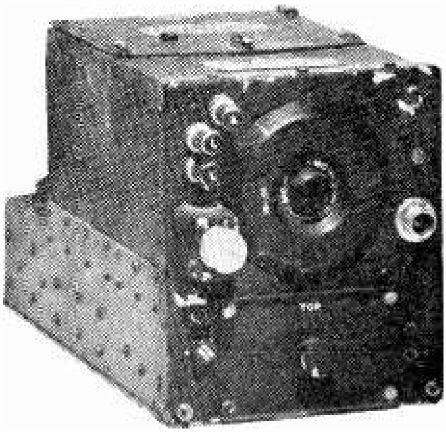
I looked around.

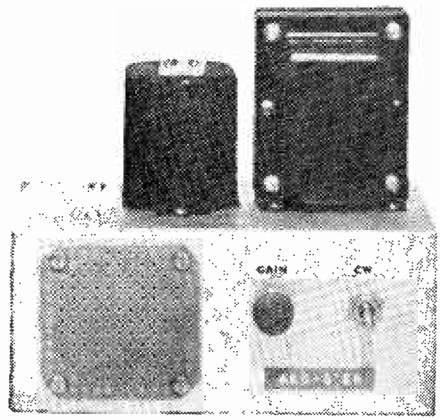
"Behind the Ferris wheel." She took another look at my card from Brunei.

Spotted those coke and orange crush signs. "Okay." I moved out, circled the big wheel and stopped dead. In front of me was a gadget to test your body electricity. But this one was different, a dummy radio tower which would light up for the right person. Atop the tower those call letters "WWWW" which a really mighty body charge would also light.

An idea began to gnaw at my insides and yours truly's Perry Mason sixth sense flashed "*H-O-A-X*". I sprinted back to the bench. She was gone and the envelope empty, except for a note which read, "Never trust a lady hoaxer. Sandy Robin (alias R. Q. Smith)." ■

COMMAND RECEIVER POWER SUPPLY





One way to pile up $urplus $avings on the road to SWL'ing is to build this supply for a vintage receiver

By Herb Friedman, W2ZLF

■ Most everyone knows there are great savings to be had by re-working surplus gear. The only problem is that many of the surplus wonders require extensive modifications which are often beyond the capabilities of the experimenter. But there is one area in which the experimenter can literally mine gold, and the mine is called "Command Receivers."

The Command line consists of a series of receivers and transmitters used through World War II by the military. While the transmitters are of little use to other than amateur radio operators, the receivers are about the cheapest path to short-wave listening.

The Receiver Circuit. The Command receivers are one band superheterodynes with a line-up found in most medium priced equipment: RF amplifier, mixer, two IF amplifiers and audio output. A typical Command circuit is shown in Fig. 1; except for the L-C (tuned) circuits used in the RF and IF amplifiers Command receivers are essentually alike.

While each receiver covers only a single band, five models cover the spectrum from 190 kc. through 9 mc. Aside from the broadcast band this range includes the FAA low frequency, weather broadcasts, marine ship-to-shore, 80-and 40-meter amateur bands, and the popular SW frequencies.

Command Receivers

Model Army	JAN	Range	I.F. FREQ.
BC-453	R-23	190-550 kc.	85 kc.
BC-946	R-24	520-1500 kc.	239 kc.
———	R-25	1.5-3 mc.	N.A.
BC-454	R-26	3-6 mc.	1415 kc.
BC-455	R-27	6-9.1 mc.	2830 kc.

As shown, the IF frequencies for the 3 to 9 mc. receivers are rather high, and selectivity is just passable. But when one considers that a Command set-up can cost less than twenty bucks it's a heck of an inexpensive way to enjoy SWLing.

RADIO RECEIVER BC-453-A (or -B) (190-550 Kc). SCHEMATIC

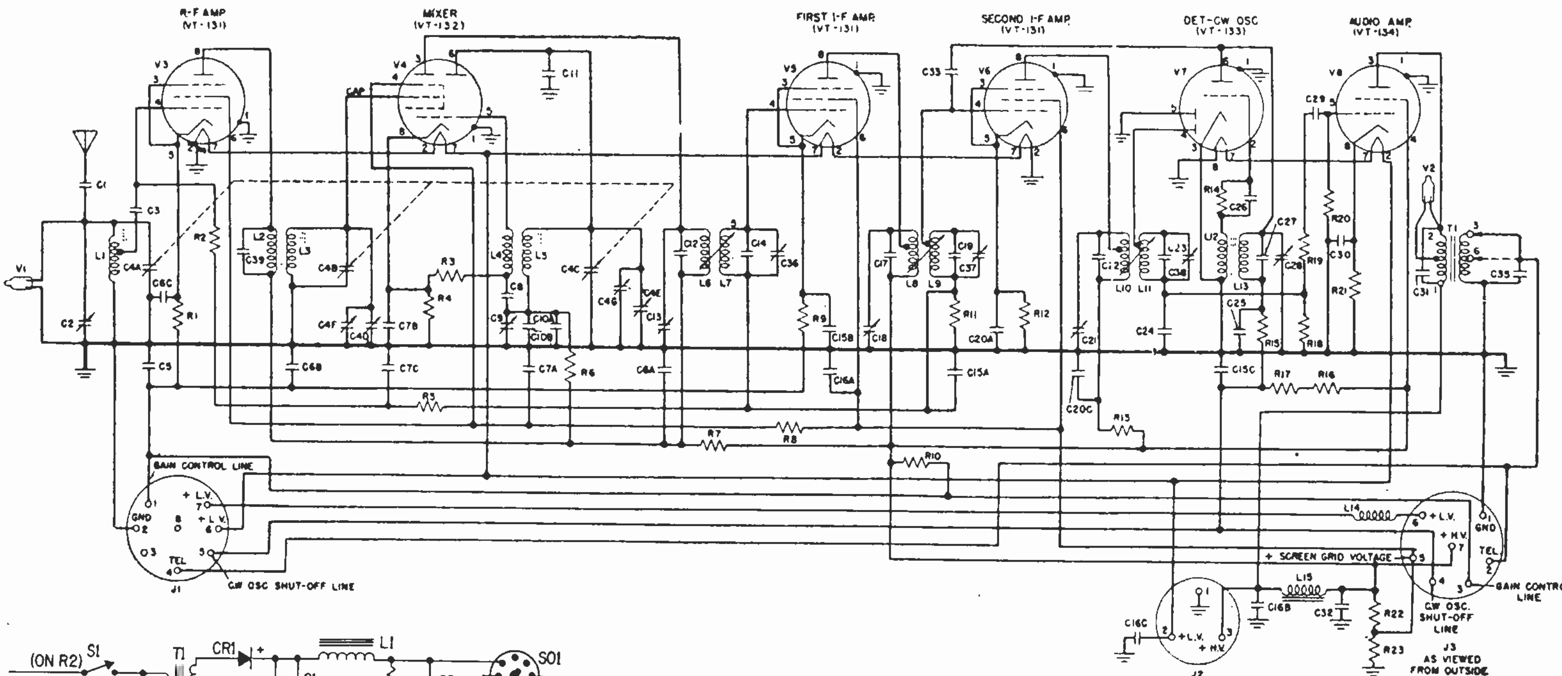


Fig. 1. Schematic diagram of the lowest frequency receiver of the "Command" type. The IF frequency of 85 kilocycles is amplified in two IF stages.

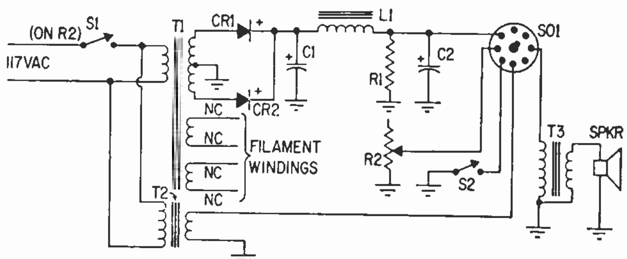
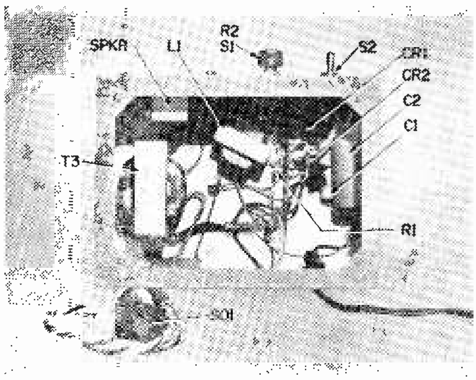
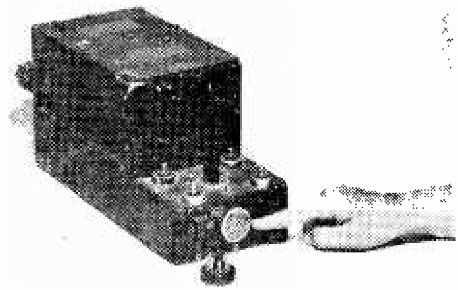


Fig. 2. Schematic diagram of power supply, the ARC-5'er, shows 400 to 450-volt CT transformer, T1; text discusses unconnected filament windings.





Socket SO1, shown at left on power supply, mates with the plug you wire into receiver.

While the receivers are called "Command" receivers it is the joint Army-Navy models, the ARC-5 series, which are commonly available today; so the schematic shown in Fig. 1 is that of an ARC-5 model.

Super-Selective Conversion. We should not overlook the fact that Command receivers have value other than for listening. The 190-550 kc model is otherwise known as the famous Q-5'er. The 85 kc. IF frequency of this Command model produces fabulous selectivity. If the receiver could be coupled to another receiver, even of the budget type, the overall selectivity would equal the performance of receivers selling for several hundred dollars. And that's exactly what you can do. Since the Command unit tunes 190 -550 kc. the common budget receiver IF frequency of 455 kc. falls right in the tuning range. All that's needed for a super-selective double conversion set-up is to connect the ARC-5's input to the last IF transformer of the communications receiver—it's as simple as two quick solder connections. And sometimes, you can avoid soldering by just placing a short length of wire connected to the ARC-5 input near the receiver's detector.

Just Build the Power Supply. All Command receiver controls are external, so all that's required to get these receivers on-the-air is a plug-in power supply which also contains the speaker, BFO shut-off switch and a gain control.

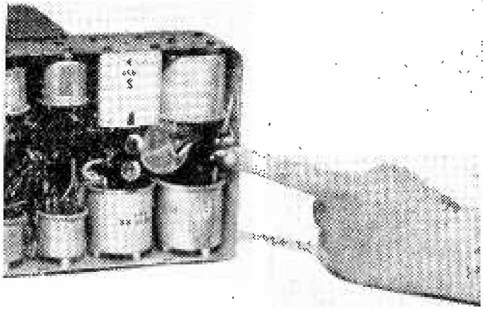
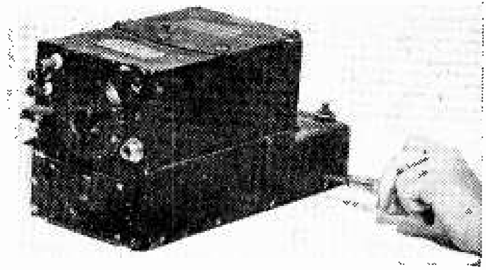
The power control center—which we'll call the *ARC-5'er*—is shown in Fig. 2. To keep costs down to absolute rock-bottom we've selected components usually found in the mythical junk-box or which can be obtained at very low cost.

While the unit shown is built on a 5 x 7 x 2-inch aluminum chassis virtually any layout can be used—it's not extremely critical.

Plate transformer T1 can be any power or plate transformer rated from 400 to 450 volts center tapped (200 or 225 volts either side of center) at 40 ma. or higher. Don't use a higher voltage than 450 CT as the receiver's internal filter capacitors cannot withstand excess voltage. If you're using a power transformer cut the filament leads short and tape them, making certain the ends don't short circuit. (The filament leads of T1 cannot be used since the filaments in Command receivers are series-parallel connected for 24 volts; and it's easier to use a 24-volt transformer than rewire filaments.)

PARTS LIST

C1—8 mfd., 450-volt capacitor
C2—20 mfd., 450-volt capacitor
CR1, CR2—Silicon rectifiers, 750 PIV minimum (Lafayette Radio 19R4203 or equiv.)
L1—5 henry, 50 ma (see text)
R1—270,000-ohm, ½-watt resistor
R2—25,000-ohm linear potentiometer with s.p.s.t. switch
S1—S.p.s.t. switch (see R2)
S2—S.p.s.t. toggle switch
SO1—Octal cable socket (see text: "Connecting the ARC-5'er")
T1—Plate power transformer (see text)
T2—24-volt, 1.0-ampere filament transformer (Olson Electronics T-290 or equiv.)
T3—50L6 output transformer (Lafayette Radio 33R3701 or equiv.; see text)
1—3.2-ohm speaker
1—5" x 7" x 2" aluminum chassis box (Premier ACH-426 or equiv.)
Misc.—Terminal strips, perforated speaker grill, line cord, panel marking, hardware, hookup wire, solder, etc.
NOTE: Connector plugs for Command receivers are generally available for $1.50; spin tuning knobs for $1.00, from Fair Radio Sales, 2133 Elida Road, Lima, Ohio, 45802.
Estimated cost: $9.00
Estimated construction time: 5 hours



Area behind power plug, left, is tightly packed. Above, BFO oscillator is adjusted.

Silicon rectifiers CR1 and CR2 must be rated at least 750 PIV (the rule of thumb for full-wave power supplies is PIV equals at least 3 times the RMS voltage). The current rating can be anything above 250 ma.

Transformer T3 matches the relatively high audio output impedance of the ARC-5 to the low speaker impedance. Most Command receivers are designed for listening with a 4000-ohm or 8000-ohm headset, so the matching transformer is necessary for a speaker connection. However, don't spend too much for a matching transformer; an inexpensive AC/DC radio output transformer which can usually be purchased for about fifty cents is adequate. Some Command receivers have an optional 500-ohm output; if yours is so equipped you can use an inexpensive transistor output transformer with a 500-ohm primary for T3.

Any 3.2-ohm speaker is. Suitable for the ARC-5'er. The inexpensive 2-inch replacement type is recommended as its opening can be easily cut with a standard multi-size hole saw.

Choke L1 can be just about anything you've got around; if it came out of 117-volt, 60-cycle equipment and is rated at least 40 ma. it's okay to use it.

Connecting the ARC-5'er. The Command receivers have two unusual connectors on the rear apron. The plug on top is for the dynamotor power supply which clipped onto the receiver. Since the full B+ will be available on one terminal, wrap the plug with several layers of tape. Unless you're highly skilled at servicing don't try to remove the plug; it's almost impossible to avoid destroying several under-chassis components. The power socket is on the rear apron. Matching plugs are not generally available, though you should always check with the dealer from whom you purchase the receiver. If you cannot obtain a matching plug remove the socket and substitute an *octal plug*—not a socket. Carefully reconnect all the internal wires to matching pins. For example, if the receiver ground was connected to socket pin 1 connect it to octal plug pin 1, etc., etc. This way your schematic will still be correct. This plug substitution is the only receiver modification that might me necessary. Once the power center is plugged-in, the receiver is ready for operation. Naturally, the connections to the power center's matching connector must match the connections on the receiver.

Using the Receiver. The power is applied via S1, which is part of volume control R2. R2 is actually an RF gain control, there is no audio gain control *per se*. S2, when *closed* deactivates the BFO.

The Command receiver's antenna input is designed for long wire antennas, so just connect a long wire to the antenna terminal on the receiver's front panel. If you utilize coaxial lead-in connect the center conductor to the antenna terminal and the shield to the nearest cabinet screw. Command receivers have a front panel antenna trimmer which compensates for any detuning to the receiver's front end by the antenna. Simply adjust the trimmer for maximum signal or noise level.

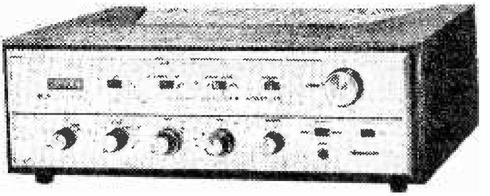
While there is no BFO pitch control on the front panel, Command receivers have an adjustable BFO.

Located on the right side of the chassis is a small hole—the only hole—which is the access to the BFO pitch control. You can either adjust the control with a small screwdriver, or you can cement a small shaft to the control.

We'd be less than honest if we didn't point out that volume is not outstanding. Command receivers were designed for headphones, so in the conversion, while the speaker volume is adequate, it's not loud. ■

RADIO-TV EXPERIMENTER LAB CHECK

H. H. SCOTT LK-60 80-Watt Solid-State Stereo Amplifier Kit



■ While the trend has been to simplified equipment—to the point where a stereo receiver is no more complex than its mono counterpart—many audiophiles still have need for greater flexibility than that offered by one or two controls. The serious audiophile often needs extra inputs to accommodate accessory equipment, greater control over record defects and perhaps even remote, semi-automatic speaker switching. Not to leave out precise speaker balancing and sound source orientation.

Just such control flexibility is offered in Scott's solid-state stereo amplifier kit LK-60; yet it is all done with virtually no jumble of controls and switches.

The Ins and Outs. The LK-60 accommodates a total of five inputs: magnetic phono, tape head, tape preamp and an auxiliary—labeled "extra." To allow for convenient setting of the volume control and to insure proper operation of the *loudness compensation* a three position attenuator is associated with the magnetic input; the switch is normally set to the position which corresponds to the pickup's output voltage. If it isn't known, the main volume control is set to the 12 o'clock position and the *phono sensitivity* switch is set to the position that results in average room volume.

A tape output is provided for simultaneous tape recording. A tape selector switch on the front panel allows the amplifier to be used as a monitor during simultaneous recording if *the recorder is a three head model with built-in preamp.*

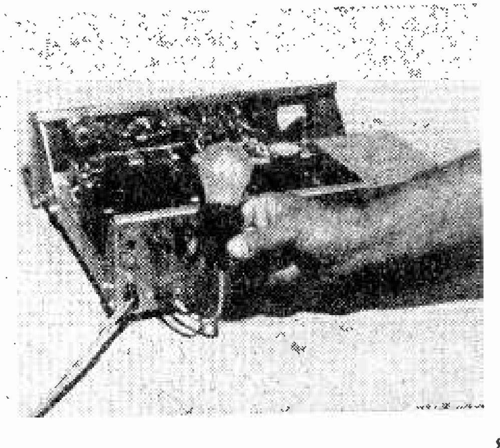
The output circuit offers virtually the maximum in flexibility, all determined by a single switch: stereo, reverse stereo, mono, left input to both speakers, right input to both speakers, both right and left signals to the left speaker and both right and left signals to the right speaker. Not enough? Okay, even remote switching is built in; an extra set of terminals on the rear apron is for direct connection of a second set of speakers, as example, Patio speakers. To switch to the remote speakers the user simply flips a panel mounted slide switch—no external switching unit is required.

What's Watt. The amplifiers are rated at 30 watts rms (steady state, sine-waveform) at less than 1 per cent distortion and checked out as such. Either 4-, 8- or 16-ohm speakers can be used. Rear apron switches correct the feedback for 4- or 8-16-ohm speakers. The speaker circuits are fused with fast acting instrument type fuses *accessible from outside the cabinet.*

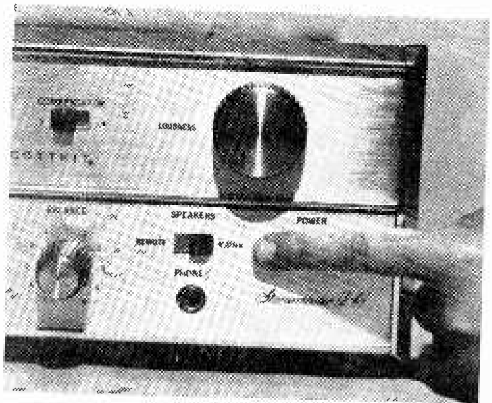
The overall frequency response with the tone controls in the indicated flat position is shown in Fig. 1 on the next page. By juggling the tone controls the amplifier's response can be made flat within 1 db.

Fig. 2 shows the effects of the rumble and scratch filters. Generally, with modern turntables the rumble filter isn't needed. On the other hand, a scratch filter is particularly

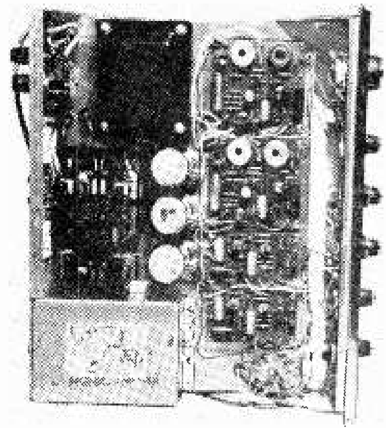
The light bulb, connected in series with the power transformer for an initial check of your wiring, is a unique power-on-test feature of kit.



LAB CHECK



Nice front panel feature is REMOTE-MAIN switch for selecting either set of speakers.



Preamp section of amplifier (left rear corner) is covered and isolated from power amplifier.

useful on well worn records (the ones you simply won't replace). The LK-60's scratch filter is particularly good. Note that severe high frequency attenuation doesn't start till after 5 kc., thereby leaving a good part of the sound while removing most of the noise —superior to just dumping everything above 3 kc.

The overall sound to the ear is very good, having the solid "body" common to transistor amplifiers.

Test Bench Views. Assembling the Scott LK-60 is the next best thing to buying it wired as it's not really a kit—it's a semi-kit. The really critical, difficult, and notably boring chore of assembling the printed circuit boards used for the preamps, tone controls and output drivers is done at the factory. All the user does is connect the appropriate connecting leads to the printed circuit boards. The heat sinks and their components, used for the output transistors, are also factory assembled. The remainder of the wiring which is mostly switching leads and controls isn't a problem as there's plenty of room, with no parts jammed into tight corners.

The instruction manual is Scott's typical style, full-scale pictorials with wiring shown in the actual color codes. In terms of assembling and using the amplifier the instruction manual is very good—beginners will attest to this. In terms of servicing the

(Continued on page 137)

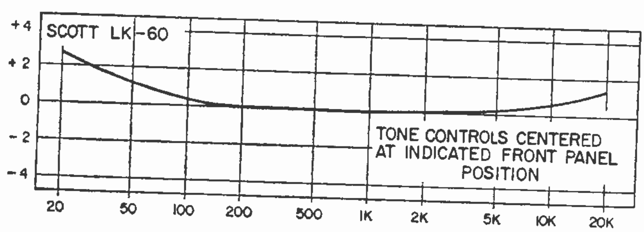


Fig. 1. Frequency response curve plotted with tone controls centered shows response boosted less than 3 db at 20 cycles. Adjustment of controls gives flat response within 1 db.

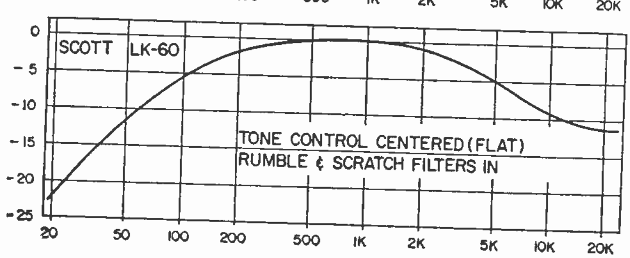
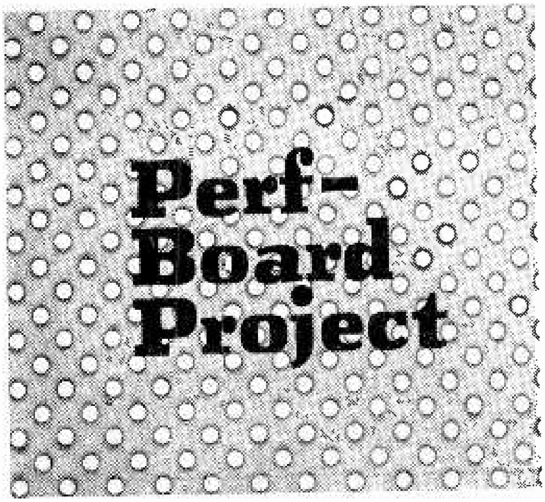


Fig. 2. Response curve with both filters in circuit shows attenuation. Rumble filter will drop 20 cps mush from that old turntable (that you haven't replaced yet) down 22 db. Good scratch filter doesn't give sharp dump of signal above 3 kc.



TEST AUDIO OSCILLATOR

Tiny audio oscillator provides steady signal needed for testing audio amplifiers in high fidelity, ham or CB gear!

By Herb Friedman

■ One of the handiest items to have in an experimenter's shop is an easy to set-up and easy to use audio frequency (AF) test oscillator; for when it comes to checking out or servicing amplifiers, tape recorders, speakers or just a home-brew throw-together circuit nothing beats having a steady signal you can follow from input to output. It sure beats going "woof test" and trying to read several meters at once.

And of course, a steady signal is all that's generally needed to check out modulator breakdowns in CB and amateur transmitters.

While a low distortion factory-built AF oscillator is always the best bet, they are expensive; and often the experimenter who has one isn't in the mood to bother with setting it up. But, take out an hour or so, throw together a handful of parts—most of which you've probably got lying around—and you can come up with the Perf-Board Audio Test Oscillator, a low distortion AF oscillator having an output frequency of about 1500 cps at .2 volts.

If you want to cut costs to absolute rock-bottom—less than $5—build it just as shown, without a cabinet; it will work the same with or without a fancy cabinet.

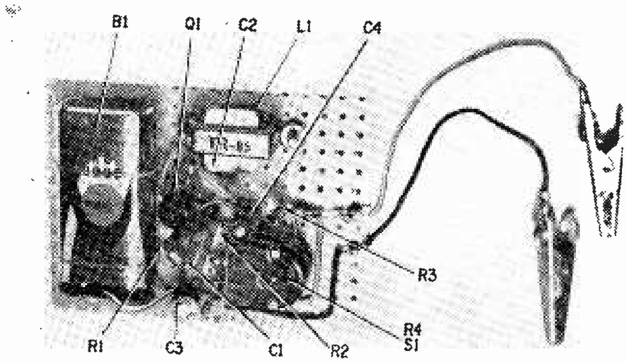
Making One. The oscillator is a transistorized Colpitts running about 1% distortion with the specified values. No component values are really critical so low-priced components can be used throughout. Nor is the wiring layout critical, just as long as the parts are connected as shown you're virtually guaranteed the project will work. While we've sort of squeezed everything together there's nothing to stop you from using a larger board, nor will there be any adverse effects if you mount the oscillator in a metal cabinet.

The unit shown is built on a $2\frac{7}{16}$ x $3\frac{3}{8}$-inch section of perforated phenolic board (Perf-Board). This is a stock size so you won't have to do any cutting. Flea clips are used as terminal points and all wiring is kept on the same side of the board. End-mount capacitors—with both leads coming through the same side—are used to avoid large "wire loops" which are prone to short-circuits.

Mounting is Easy. Start construction by pre-mounting the major components; volume control R4, choke L1 and battery B1. R4 is a subminiature potentiometer with built-in switch, S1; a standard size pot will crowd the board and make assembly difficult. L1 is a modified transistor output transformer; the modifications consist of cutting off the primary center-tap and the secondary leads —only the blue and brown leads are used. B1 is the miniature 9-volt transistor radio battery; it is held to the board by two wire bands wrapped around the battery, passed through holes in the Perf-Board and twisted together under the board.

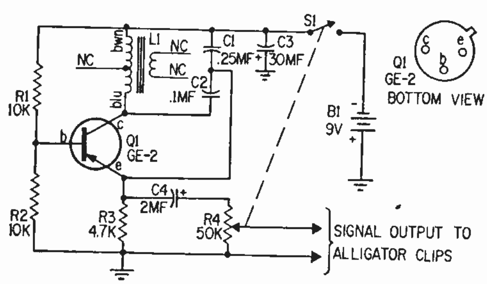
If Q1's leads are cut shorter than ½ inch, of if the soldering iron is rated more than 50 watts, use a heat sink such as an alligator clip on each of Q1's leads when soldering.

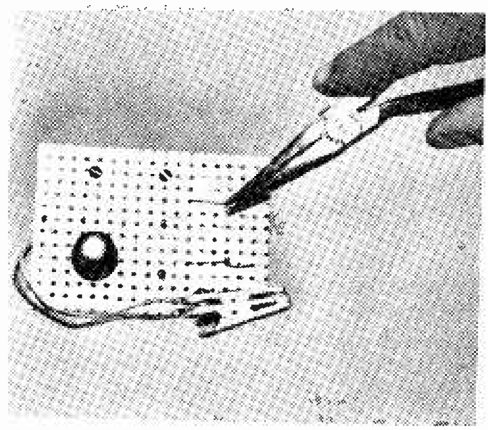
Note carefully the polarity of C3 and C4; if the polarities are reversed the oscillator won't work. Also, do not substitute for the specified Q1 unless you use a transistor which the *GE-2 is supposed to replace.



Finished project may be used without a cabinet. Two audio output leads are at right, ending with alligator clips.

Carefully follow Q1 lead layout shown in schematic and bottom view diagram. Battery is replaced (right) by untwisting wire.





PARTS LIST

B1—9-volt transistor battery (Burgess 2U6 or equiv.)
C1—.25-mf., 75-WVDC micro-miniature ceramic capacitor (Lafayette 99R6067 or equiv.)
C2—.1-mf., 75-WVDC micro-miniature capacitor (Lafayette 99R6066 or 99R6069, or equiv.)
C3—30-mf., 12-WVDC miniature electrolytic capacitor (Lafayette 99R6084 or equiv.)
C4—2-mf., 15-WVDC miniature electrolytic capacitor (Lafayette 99R6043 or equiv.)
L1—Miniature transistor output transformer, see text for modification (Lafayette 99G6123 or equiv.)
Q1—GE-2 transistor (General Electric)
R1, R2—10,000-ohms, 1/2-watt resistor
R3—4,700-ohm, 1/2-watt resistor
R4—50,000-ohm, miniature potentiometer with s.p.s.t. switch (Lafayette 32G7367)
S1—S.p.s.t switch, part of R4
1—Perf-Board, (perforated phenolic board) unclad, 2-7/16 x 3 3/8-in. (Lafayette 19G3605 or equiv.)
1 pkg.—Flea clips (Lafayette 19R3301 or equiv.)
Misc.—Alligator clips, battery clips, wire, solder, hardware, etc.

Estimated cost: $5.00
Estimated construction time: 1 hour

Check the position of C1 and C2 before they are soldered into the circuit; make certain C1 is connected on the battery side of L1 while C2 is connected on the collector side—the oscillator might not work if their positions are reversed.

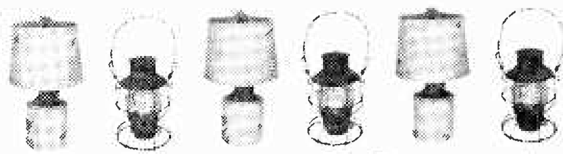
Any capacitors can be used as long as their voltage rating is 12 volts or higher. Voltage values given in Parts List were determined by availability and low price.

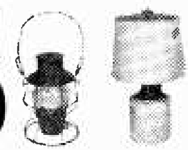
Finally, use two flea clips as tie pints and connect the AF output leads: two short lengths of wire about 6 inches long with alligator clips. If longer leads are desired shielded cable should be used.

A Tip. The oscillator can be used with any equipment whose input impedance is greater than 50,000 ohms. If it is to be used with lower input impedances, say 500 ohms, volume control R4 should not be advanced beyond the mid-position (thereby keeping at least 25,000 ohms series resistance in the oscillator's output circuit). ■

* **GE-2** replaces 2N112A, 113, 114, 123, 135, 136, 139, 140, 2N247, 252, 273, 274, 2N311, 2N409, 410, 411, 412, 413A, 414A, 415A, 2N1284.

TV LAMPS





by James A. Fred

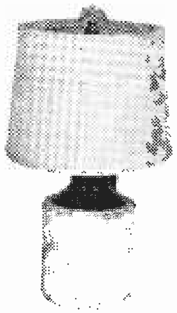
The 'ol incandescent bulb socket can find its way into the strangest places, and wind up making a lamp that outshines any you might find in the most exclusive of shops—and all for a saving of at least 90 percent to add to the bargain!

■ If you are a dedicated electronics experimenter, then you must have felt the pinch of pennies everytime you filled out a mail order blank supplied by electronic parts supply houses. Sure, you can save cash by picking up bargains, or taking the salvage route by stripping old projects, scrap TV's, or even raiding your mother-in-law's transistor portable, but there are other ways. Like the day the better half said, "Hon, while you're downtown today, pick up a TV lamp, but don't go over ten dollars."

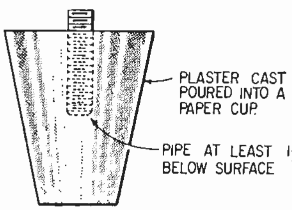
Good Lord, ten bucks! The rusty old wheels upstairs started to turn and it wasn't long before I found a way to put better than nine of that big bill into my pocket.

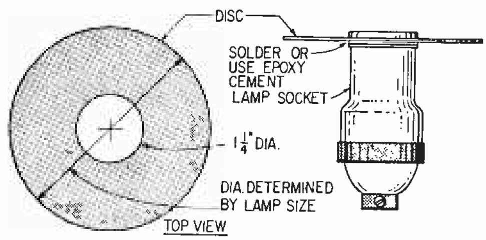
The Ol' Brown Jug. I spotted a large mouth, stoneware, one gallon jug at an auction sale and bought it for 25¢. It was first necessary to make an adapter to go from the wide mouth jug to a lamp socket. A paper cup of the proper size to fit the jug opening, was selected along with a piece of ⅜-inch outside-diameter pipe. The pipe was centered in the paper cup with about ½-inch of thread extending out of the open end of the cup. The cup was then poured full of dental plaster, plaster of Paris, or casting compound. After a week of drying the plaster casting was given a coat of shellac and the top was painted with brown enamel that matched the jug.

The plaster casting was then cemented into the open jug mouth with mastic cement. This cement was left over from a mosaic tile project. A brass lamp socket with a side cord outlet was screwed onto the threaded pipe with an eight inch harp being used to hold



The " 'ol brown jug" lamp on the left was converted using the plaster adapter shown below. It is cast in a paper cup to fit the neck of the jug; then cemented in place. The lantern lamp on the right was converted to contain an electrical socket using the mounting trick shown below. The disc is cut to fit the old lamp you find while browsing





the shade. Be sure that the brass socket has a removable key (the on-off knob) so that an ornate brass key can be used in place of the bakelite one supplied. A burlap shade makes a perfect finish to the jug lamp especially when it is topped with a small brass spread eagle. A piece of felt should be glued to the bottom of the jug to prevent scratches when it sets on a desk or table.

The pipe, socket, brass key and shade harp can be purchased at the electrical hardware counter of your local five-and-dime or hardware store. Check to see that the pipe threads into the socket before you buy.

Cashing In. Not much time went by before my wife's bridge group had big eyes, so I got those wheels moving again. Why not go into the lamp business while waiting for the mail order parcels? I did, and here is another idea that brought in a ten dollar bill.

A hanging lantern was made from an old kerosene type railroad lantern. This lantern was purchased at a farm sale for the magnificent sum of 10¢. The lantern was dirty and rusty and no one else even bid on it. It was necessary to soak it for several hours in two different changes of household lye in hot water to remove the dirt and most of the rust. A motor driven scratch wheel removed the balance of the rust. A final polishing by hand with steel wool produced a shiny, clean, although somewhat pitted, railroad lantern.

The glass chimney was in perfect condition and bore the name "Pennsylvania Railroad" molded into the glass. The steel wire frame was given a coat of flat black lacquer from a spray can. A very simple adapter was made to hold the lamp socket as shown in the drawing. It is a round metal disc with a hole in the middle and also painted flat black. If you can obtain a brass socket, solder it into the hole. If your socket is aluminum, use epoxy cement to hold it in place. The socket fits into the well formerly occupied by the oil burner. An ornate brass key can be used here also. We used a 25-watt flame shaped bulb to stimulate a sale which took all of 30 seconds.

Get Busy. If you electronics experimenters are a bit tired of run-of-the-mill projects why don't you try your hand at making a lamp? Not only will you get a great deal of satisfaction from designing and building a lamp, but it will also put you in solid with your wife when you present the lamp to her. Incidentally, *thars gold in dem hills, too!* ■

Build the Versameter

by Howard S. Pyle, W7OE

Build this little gem for your ham shack. It's a wavemeter, field-strength indicator, phone monitor and milliammeter all rolled in one. It'll help keep signals clean and legal.

■ The other evening a timid knock sounded on the door of my basement workshop. I opened it to admit a recently licensed neighborhood novice radio amateur whom I had examined for his ticket. His woe-begone look and general air of dejection led me to ask, "Well; you look a bit down-in-the-mouth Gene, what's biting you?" He reached in his pocket and silently handed me his first FCC citation, "earned" after only three weeks on the air! The accusation was ". . . operation on an unauthorized frequency; 7466 kc!" Wow!

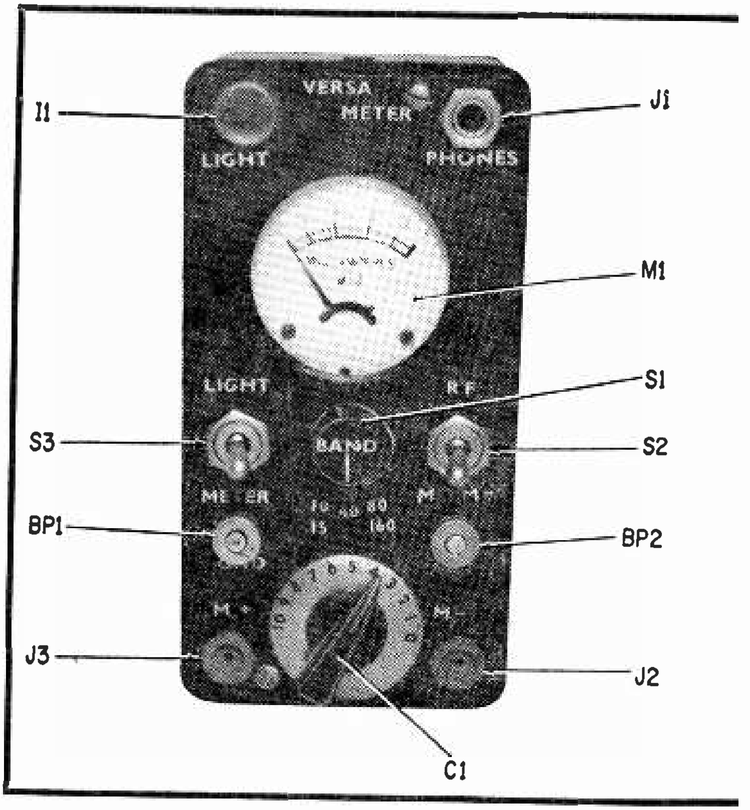
Double Trouble. A little questioning soon produced the answer. He had carefully tuned his oscillator to his crystal frequency . . . 3733, perfectly legal for operation in the novice portion of the 3.5-4.0 megacycle band. But it was pretty obvious that he had dipped his final at the *second harmonic* rather than at the fundamental crystal frequency. The fact that he had no replies to numerous CQ's was pretty good confirmation that he was very evidently transmitting on the second harmonic but *listening* on his crystal frequency!

"Did you ever build that simple little absorption wave-meter I sketched for you a few weeks ago?" I asked him. "*W-e-l-l*, I was *going* to but I didn't have the right size variable capacitor in my 'junk box' " came the reply. So, after a little lecture on taking every possible step to insure legal operation, I suggested that he bring his junk box along the next evening and between what odds and ends we could produce between us, we'd build a wave-meter which would insure him against another citation for the same cause.

An Instrument is Born. The next evening from his little collection and my rather mountainous assortment of odds and ends from years of accumulation, we came up with everything we would need for a simple little absorption type wave-meter with a pilot light bulb resonance indicator. In fact, a cursory inventory of the collection of parts inspired the idea to go far beyond a simple wave-meter so we sat down, sketched it out and came up with what on completion we termed the *Versameter* in deference to its great versatility. *Wave-meter, field strength indicator, crystal receiver,* (for phone monitoring) *pilot light* and *milliammeter* for resonance indicators (choice of either by panel switching), separate terminals for using the milliammeter alone in other circuits, no plug-in coils but all band-switching from 10 through 160 meters from the front of the panel, truly a really versatile little gadget with dozens of uses around the shack. All we lacked was the meter movement and Gene picked that up the next day.

Putting It Together. The accompanying photographs and circuit diagram will tell you all you need to know to duplicate this little instrument. Use any parts you have equivalent to those we picked from our junk boxes —"spare parts box" is a better name. A little

Build the Versameter



Front panel of Versameter, a multipurpose test instrument for the ham shack. Dials and switches are easily accessible to quickly select among the unit's various functions.

larger case to house the components and use of smaller items such as using the miniature type of parts, will save space and reduce crowding. We managed however to get them all in a 3" x 6" x 2" plastic meter case. We cut a panel from a piece of scrap bakelite; *don't* use a *metal* cabinet or panel or else you won't get any RF pick-up on the internal wave-meter inductance.

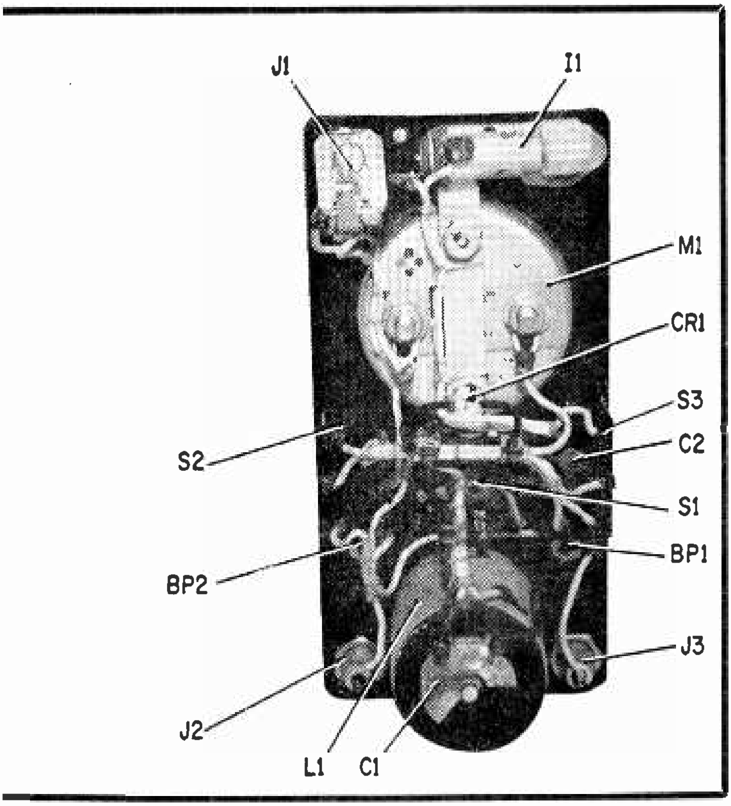
We drilled all the holes and assembled the parts to the panel the second evening. The next night we wound the coil and calibrated it with my receiver for the variable capacitor we would use. Incidentally, this was a Hammarlund APC-140 which was a perfect fit inside the 1¼-inch mailing tube which we used for the coil form. We modified the rotor portion of the capacitor slightly to provide a ¼" shaft through the panel rather than the original screw-driver adjustment.

We thought that we might have to *pad* the 80-160 portion of the coil to get the full swing through both of these bands but it turned out that we didn't. Apparently there was enough added capacity and inductance through bunching the tap leads from the coil to the band switch to take care of the full range. Should you build a Versameter and find it necessary to pad the capacitor for the

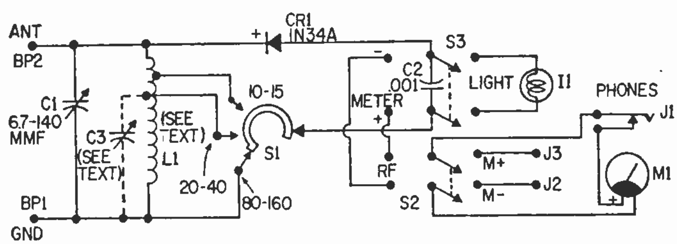
PARTS LIST

BP1, BP2—Binding posts
C1—100 mmf variable capacitor (Hammarlund APC-140, 6.7-140 mmf, or equiv.)
C2—.001 mf. ceramic capacitor
C3—Midget trimmer capacitor (optional pad, see text)
CR1—1N34A rectifier diode
I1—Indicator lamp assembly and GE-49 pilot lamp
J1—Standard closed-circuit phone jack
J2, J3—Insulated tip jacks (red and black)
L1—Tuning coil (see text: "Winding the Coil")
M1—0-1 DC milliammeter (Shurite 550 or equiv.)
S1—Single-pole, 3-position rotary wafer switch (Lafayette 99R6177 or equiv.)
S2, S3—D.p.d.t. toggle switches
1—6¼" x 3¾" x 2" bakelite case with front panel (Lafayette Radio 19R2001 and 19R3701, respectively, or equiv.)
Misc.—Cardboard coil form (see text), dial plate for C1, hardware, panel markings, hookup wire, No. 24 enameled wire, solder, etc.

Estimated cost (all new parts): $9.00
Estimated construction time: 5 hours



All components mount behind front panel. At top is bulb, with tuning capacitor C1 at the bottom. Be sure to use a plastic case, not metal, to assure adequate RF pickup.



Schematic. Tuned circuit at left selects signal; CR1 converts it to DC.

160 meter band, use one of the little screw-driver adjustable padding condensers such as the Bud MT-333, 3-36 mmf. This optional pad is shown in the schematic diagram as C3; its connections are shown by dotted lines. Or, if you have only infrequent occasion to check on 160, simply connect a small variable capacitor across the antenna and ground terminals of the Versameter externally.

Winding the Coil. And now the coil; you'll want the specs on this if you duplicate our Versameter. The coil form was a 1¼-inch diameter cardboard mailing tube. We calculated the turns required for the lowest frequency with the 140 mmf tuning capacitor. After winding we checked this by coupling to the antenna of the station receiver and tuning the L/C combination of the Versameter to peak signals at each end of each band. We came up with the following turns: 68 turns of #24 enameled wire for the full length of the coil (1⅞ inches). This tuned from 4050 to 1780 kc give or take a few kcs. A tap at 4 turns from one end took care of both the 10- and 15-meter bands and another tap at 12 turns from the same end, covered 20 and 40 nicely. The whole coil is switched in for 80 and 160 and the band switch is so wired that the portion of the coil not being used on the 20-40 and the 15-10 settings, was shorted out. This will be clear from the wiring diagram.

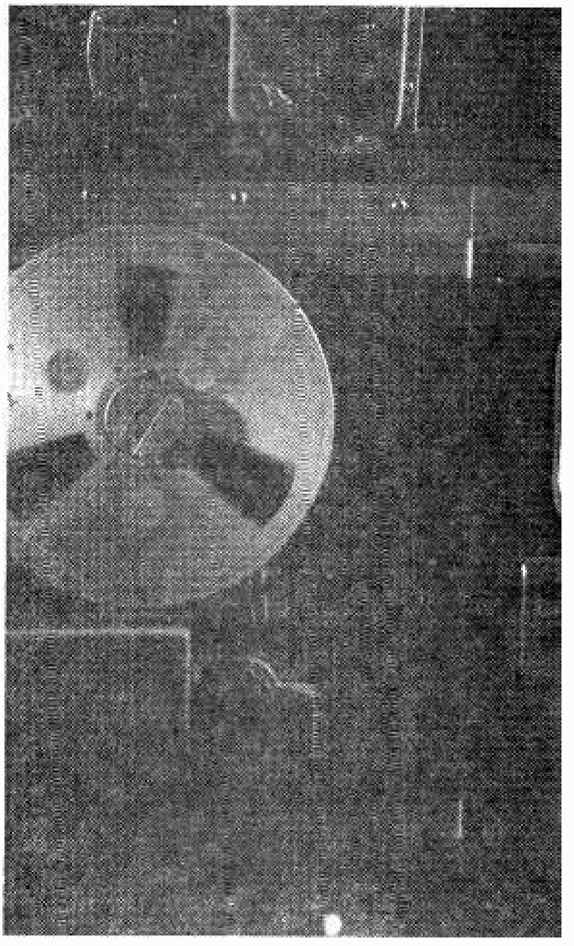
Checking It Out. On our third evening

(Continued on page 131)

Pilots, athletes, and students are just a few of the many people who are learning, increasing their skills, or just relaxing and viewing . . .

VIA VIDEOTAPE

by Matt P. Spinello

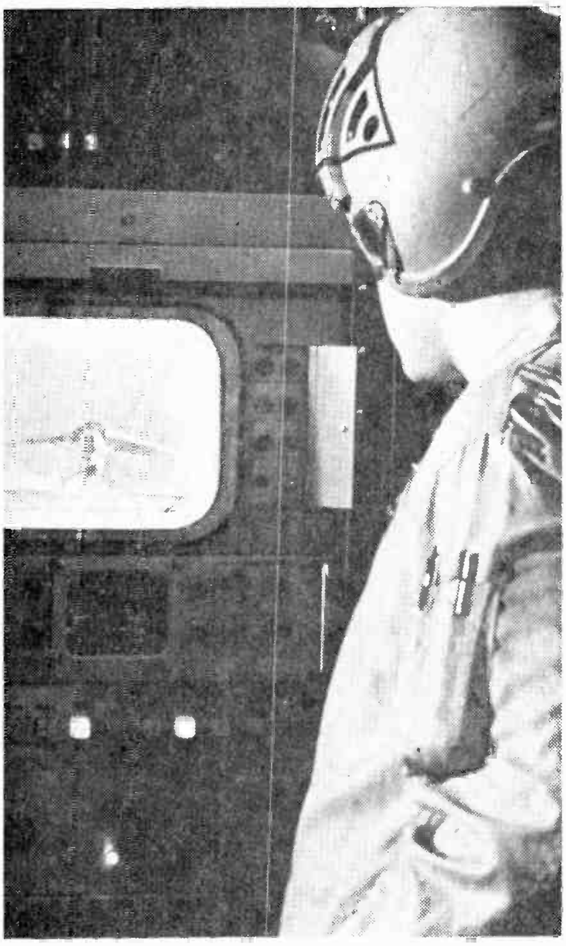


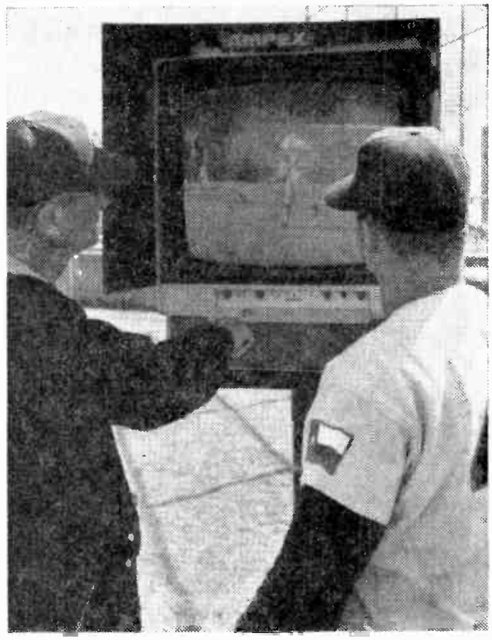
■ "Roll your VTR" was an expression unheard of ten years ago. Today it is a command given daily by thousands of television directors as a direct cue to an engineer to get his video tape recorder in gear. It signifies that in three seconds the contents of the tape will be transmitted as a videotaped playback of a commercial message, a public service announcement, or even an hour-long special program.

Beginning of the Reel. The commercial programming of videotape took hold in November of 1956 when the average televiewer found it hard to distinguish between the *live* version of *Douglas Edwards with the News* and his polyester-based twin on videotape. Today it is just as, if not more, difficult to distinguish the *live* from the *taped* broadcast. Technical advancements in tapc quality and equipment standards have risen videotape performances to the head of the class to the extent that it is not worth gambling over whether the preceding program was *live* or pre-recorded and being played back on tape.

Videotape programming that has been dramatic, newsworthy, commercial, religious and public serviceable, has made up the bulk of *electronic playback* with which the general viewing public is familiar. But today there are even more uses of Videotape in not-so-familiar applications. Some of them fall into categories that are as important, if not more so, than the areas of entertainment to which videotape has applied.

Tape Measure of Learning. In the summer of 1959 the National Educational Television (NET) Radio Center purchased 43 videotape recorders for installation in educational stations across the country. This marked the beginning of the first non-commercial national tape network. It was obvious that educators were quick to realize the potential of this audio/video facility from the start. It has already been reported that television in the classroom has resulted in a general upgrading of teaching as a whole. Tele-





Houston Colt manager Paul Richards shows rookie Dave Adlesh replay of his swing.

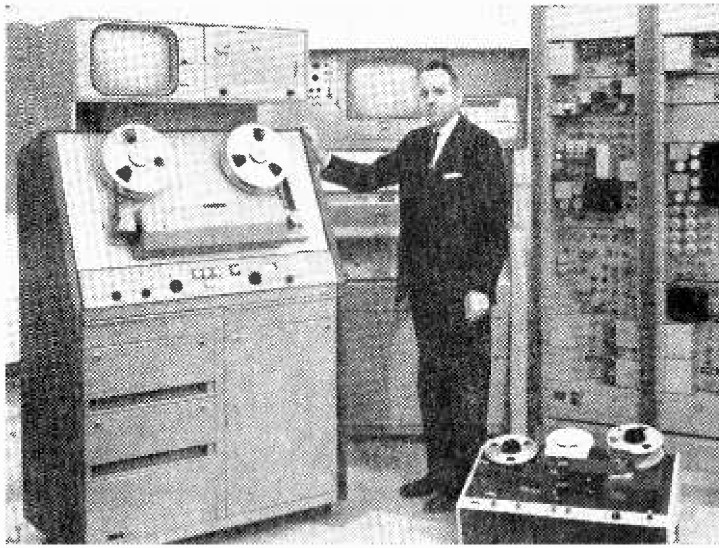
Jet pilot watches a videotape playback of a carrier landing he made only minutes before.

vision has become a valuable aid which the classroom teacher can use to cover more material for an ever-increasing number of students. This does not imply, of course, that television will replace the teacher in the classroom. However, lessons recorded on magnetic tape are always available when they are needed. They may be presented by the most able instructors and these instructors can review and polish their presentations long before they are transmitted to the classroom. Moreover, literally any kind of special material is readily incorporated into the lesson—material from any source—either within or outside the school. Furthermore, the completely *live* quality is retained in the televised image no matter when the lesson appears on the screen.

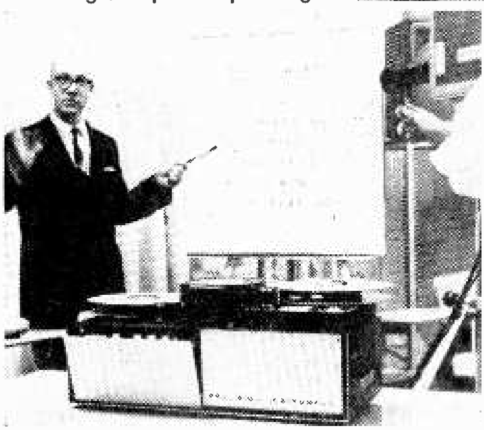
In essence, the VTR is extending the range of outstanding teachers, raising the quality of their educational programs, accelerating the learning process, and boosting the level of achievement among students. To date, the number and types of applications with which Videotape may serve our educational system remain limitless, and probably always will. It should even be considered that in the not too distant future you will be having your library card punched for borrowing the latest Videotaped version of a how-to-do-it course of your choice. You will play it back through your television receiver; close ups and Videotape quality will make it as *live* as though you were standing directly in front of the instructor's desk. Learning to fly, playing better bridge, beginning and advanced electronics, learning to play an instrument; even cooking, could all come under a listing from thousands of practical courses which might be placed on tape.

VTR's Aweigh! In another area of education—that of safety—experience with a closed-circuit television system has shown that videotape recording can be effectively employed to increase the safety of jet aircraft landing and improve the proficiency of

Family of commercial Ampex videotape recorders are shown by Ampex VP, C. Gus Grant. Background shows VR-1000 broadcast recorder; left foreground: all transistor VR-1100 recorder for small and medium TV stations; right foreground: VR-1500 portable recorder used for closed circuit shots.



At General Motors Institute, Prof. Robert Carter points out elements of good oral presentation technique. Students, management, and dealers use the Precision Instrument recorder in foreground to develop communications skills for sales presentations, personnel screening and public speaking.

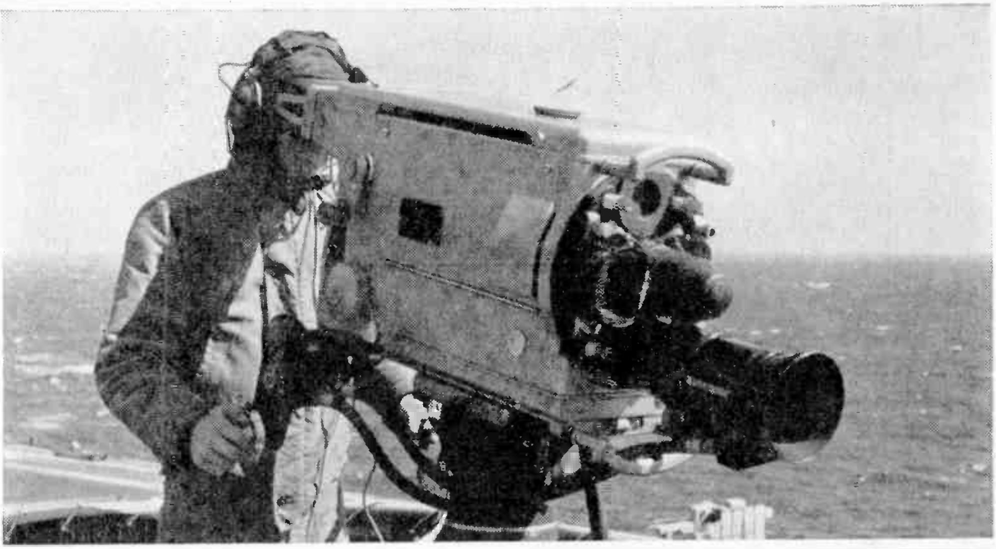


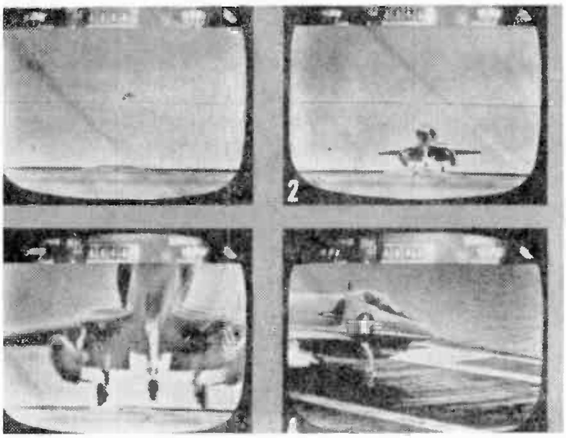
both pilot and landing control personnel. Developed by The Ampex Corporation in conjunction with the United States Navy, Pilot Landing Aid Television (PLAT) is a completely integrated system of electronic audio and video recording designed to monitor and simultaneously record aircraft landing operations from approach through final recovery under day and night conditions and to immediately play back the recording for post-flight analysis and evaluation.

In 1955 U.S. Naval aviation adopted two British innovations which virtually revolutionized carrier landing procedures: the angled deck and the optical landing system. The third major improvement, PLAT, was introduced in early 1962 after the basic elements were advanced by the Navy in 1959 and trials conducted by Ampex in 1960 and 1961. Prior to the introduction of PLAT, carrier landings and take-offs were recorded on 16mm film. Processing the film took a minimum of six hours which presented an obvious drawback since the film could not be used for immediate debriefing of pilots. In addition, no permanent visual record of approach speed and other data board information was available. With the development of the PLAT system, the limitations of the standard gun camera were overcome. Videotape recordings of landings, complete with audio recordings of conversation between the pilot and carrier landing personnel, could be played back within minutes of the actual operation.

Heaving Deck. Landing a jet with a touchdown speed of over 130 knots on a pitching 250-foot-wide deck is a demanding task for pilots despite the improved angled decks and optical landing systems of modern carriers. Installation of the PLAT system on U.S. Navy carriers has resulted in fewer incorrect approaches, quicker assimilation of landing techniques by pilots, and provided indisputable accident investigation evidence. PLAT's value in possible saving of pilot life cannot be estimated in monetary terms. It is demonstrably evident, however, that the cost of the PLAT system is minor compared to replacement of even one aircraft.

Essentially, PLAT is made up of four television cameras in different locations aboard the aircraft carrier, connected to a closed-circuit television system incorporating a Videotape installation to record and play back landing information. Two unmanned image-orthicon cameras, connected to a mirror assembly and stabilized from signals generated by the optical landing system, are installed in a modified light-well on the flight





Seven stories above carrier deck, Navy cameraman, top, zooms in on landing jet. Sequence of shots, left, was taken by other PLAT cameras. Technician on the Bon Homme Richard, above, adjusts recording system.

deck centerline. A reticle is fixed to the cameras to produce cross hairs on the televised picture. A horizontal cross hair, bore-sighted along the glide slope, identifies the on-course glide path. A vertical cross hair is aligned to coincide with the centerline of the angled deck and identifies the azimuth on-course flight path. As the pilot sights the optical landing system and follows it down, the aircraft is picked up by the centerline cameras. The aircraft's lineup with the cross hairs displayed on the ship's monitor system alignment, attitude, and glide slope are shown on a split screen in combination with the output of a data board camera.

A small vidicon camera is permanently focused on the data board in the control room to record the date, time, wind velocity, aircraft approach speed and "wave-off" signal. This camera output is displayed simultaneously with the output of either the centerline cameras or the island camera. Forty feet above the flight deck a manned image-orthicon camera (TV studio-type) picks up the aircraft as it passes over the centerline cameras. This camera *zooms in* for a close-up and follows the arresting wire back to its sheaves to determine which of the four wires was engaged. If the aircraft bolters, the cameraman follows it as it departs the ship.

I.p.s. and M.p.h. After a mission is completed, pilots and landing operation personnel can watch a minute-by-minute playback of the entire landing operation. Any errors in judgment or procedure can be pointed out while the operation is still fresh. Details that may be near-impossible to remember are re-created in their entirety on tape to lend authoritative reference to the hasty and often cryptic notes made during the operation. Later, the same tape can be used to help train new pilots long before their first carrier land-

Dallas Texans used videotape recorder in game with Buffalo Bills to analyze plays.

ing is ever attempted. And, of course, the tape is reusable time and again.

Follow the Bouncing Ball. Further into the depths of educational TV, the world of sports has entered the scene and can positively be considered within the permanent scope of the educational-TV-user. Actual TV tape recording of game action by a football team (for use by its coaches and players) was first demonstrated by the Los Angeles Rams during the 1958 season in a game with the San Francisco 49'ers. The Rams used a closed-circuit system which consisted of a camera, videotape recorder and television receivers in the coaching booth, in the press box and in the dressing room. This way each play of the game was available for playback on request for the assistant coaches in the press box. Then at half-time, the first-half plays were shown to the players. It was no wonder that Rams officials and players were enthusiastic over the results of the demonstration. They won the game 40 to 38. Quarterback Bill Wade had completed 10 of 10 passes in the first half and credited the recorder with helping solve the defense.

Sporting Chance. In a similar demonstration for the Dallas Texans during the 1962 season in a game with the Buffalo Bills, Coach Hank Stram had a television receiver stationed at the bench. Second string quarterback Eddie Wilson watched the screen at all times and called for replays of the action as it was requested by the coaches. Replays of two punts which were almost blocked corrected an error in the blocking assignments. Then late in the third quarter, the Dallas coaches asked for several replays to study the position of the Buffalo linebackers. The *second look* revealed they were drifting outside to protect against the swoops of Abner Haynes. A play was immediately sent in and halfback Frank Jackson sped 21 yards up the middle for a touchdown.

Into the Living Room. While the average electronics enthusiast will probably not be adding a $75,000 VTR system along side his stereo rig within the very near future, the advancements in the video recording field have surpassed those in most other related fields by leaps and bounds. How small and less expensive can they get? Well, one of the first miniaturized videotape recorders weighing 30 pounds and occupying less than one cubic foot of space, was developed by Ampex in December, 1961, for the National Aeronautics and Space Administration to record satellite television pictures as well as other scientific data.

On the home front, several electronic manufacturers are involved in research and development along the lines of a *home-type* video recorder. In fact, several are on the market and it only remains to lower prices still further for these VTR's as was done with once-expensive transistor equipment. One unit from England, the Wesgrove Video Recorder, VKR500, is now available in kit form for $392.00. The assembled version, the VR700 is $492. (For more information write to Wesgrove International, 3325 Filmore Street, San Francisco.) But even though designers seem to be closer than ever to reaching the consumer level pricewise with such a device, the additional expense of a TV camera chain, may still pose a barrier to the average buyer.

With all the facts statistically weighed and measured, it's still a happy thought to assume that within a short time you'll be able to tape the back yard picnic, junior at bat in the sand lot game and the first steps of the new baby. Mom will even be able to tape that special TV program fare while dad's stuck at the office so he'll be able to watch it at breakfast. Maybe we're not so far from *wrist-o-vision* as one might think! ■

WHAT LIES AHEAD?

By K. C. Kirkbride. **The next chair you sit in might be monitored by the new long-distance lie detector—and you won't even know it!**

■ Few would view George Orwell as a cheery soul. But recently-announced electronic devices suggest he may have been an ardent Pollyanna fan when he wrote *1984*. He portrayed the horrors of men subjugated to living in a goldfish bowl in the *future*. But even *now* Senate Committee members listen to reports of electronic eavesdropping possible over thousands of miles, gadgets that can televise a room from blocks away, listen in on conversations by simply direct-dialing a number! But the latest soul-snooper to be announced *out-eeries* them all.

For recently, Scientific Director of the Foundation for Medical Technology, Dr. Carl Berkley, announced we will soon be able to put a lie detector together that can detect at a distance, from as far as thirty feet away, and without the person monitored being any the wiser.

The Elusive Truth. While Dr. Berkley sees "constructive" applications for such a device, both medical and Congressional committee members warn against the present detector, let alone a long-distance inquisitor. Yet man's suspicions of his fellow man's veracity have existed through the centuries, and tracking the truth has never been a pleasant procedure.

Early man proved his innocence by thrusting his hand in a flame. If the hand came out of the fire unsinged, the truth had been told. The Chinese thought up a slightly less fiendish lie-detector. They demanded a man chew rice while being questioned. If the rice was dry when the grilling ended, the man was condemned. The theory was that guilt dried his salivary glands.

For even way-back physiological changes were linked with prevarication. But not until the 1920's was the theory applied and mechanized. A young psychologist named John Larson designed a contraption he said could read blood pressure, pulse rate and breathing changes all at the same time. His associate, a man named Leonarde Keeler added a few complications to the gadget, named it the Keeler polygraph, and the modern lie-detector was born.

The principle behind this uncanny contrivance was the supposition that when a man lies he gives an emotional reaction caused by conflict between early conditioning toward telling the truth, coupled with his desire to escape detection. And, in turn, this emotional reaction causes physiological changes.

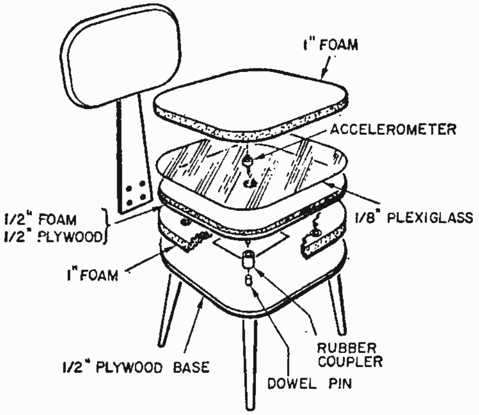
These physiological changes can be measured by a real slick detector in the form of blood pressure changes, heart rate, respiration movements and frequency of perspiration in the palm of the hand or galvanic skin responses.

End Justifies the Means? The subject questioned simply sits in a specially-constructed chair, his arms resting on pivots linked to pens that record on a graph every fidget, while a bar under the chair registers leg movements and squirming.

The examiner then fastens a ten-inch corrugated rubber tube about the subject's chest to check breathing, a metal gadget to clamp electrodes on index and fourth fingers to record galvanic skin reflexes. An inflatable rubber strapped about the upper arm measures blood pressure, while a human inquisitor sits beyond the subject's vision to spot the subject's facial expression in profile.

If the subject is lying, so says the theory, the lies show in sudden levelling of respiration coupled with a slight rise in blood pressure changes that register on the graph.

While this device has proved its merits many times over snagging perpetrators of violent crimes, it has also been known to frighten innocent persons into unwarranted admissions. Two University of Virginia doctors, H. B. Dearman and B. M. Smith, cite the instance of a bank vice-president, called



Exploded view of otherwise innocuous looking chair designed for subtle interrogation.

on to make a routine test by his bank's detective agency, who confessed to a crime he had never committed.

The very process of being questioned is many times seriously disturbing to a sensitive person, and though survey claims 80-percent truth-telling by the machine, congressional and medical leaders both question its use by industry and its "unscrupulous" use by Governmental departments.

Insidious Sophistication. Now Dr. Berkley foresees a detector that may soon operate without the frightening clamps, hoses, or special chairs, one that will detect without embarrassing the questioned for he need not know he is being monitored!

Respiration would be measured by scanning light changes along a subject's profile as he breathes in and out. A single frequency of ultrasound could be beamed at the subject, recording changes in the reflected beam caused by in-and-out movement of the chest wall. The subject's temperature could easily be monitored by infra-red, and skin perspiration changes recorded by reflecting microwaves or by reflection of polarized light.

Changes in blood pressure could be tracked by spot-scanning fluctuations of veins in the forehead or neck and pulse checked by tracking reflections of the skin. Pulsed ultrasonic radar could detect a second reflection through the chest wall from the motion of the heart, or a spot follower cite pulse rate.

A partial forerunner to such a comprehensive peeping-tom has already been built by General Motors' scientists at Santa Barbara, California, who built a chair that looks to the civilian eye like any ordinary chair, but conceals an indirect heart-rate monitoring system that records pumping action of the heart, and broadcasts data to a recorder.

Another chair that will take an electrocardiogram indirectly by detecting circulating electric current produced by heart action has been tested by Syracuse University, in Syracuse, New York.

The End of Intrigue. While such a device seems frightening to most, the applications of a long-distance lie-detector could serve at diplomatic conferences, says Dr. Berkley. It could spot espionage agents, might work out dandy at the United Nations, and could certainly truth-up political discussions on international relations. But is this the way to mutual understanding and trust?

Less optimistic observers are certain to view this new detector as savoring of the sterile and inhuman society of *1984*. Already Senate Committee members hear reports of electronic devices that can monitor private conversations on Capitol Hill from as far away as Hawaii, a laser that will televise action in a room from a point blocks away, a gadget to link to a telephone line, then direct-dial the number from any phone in the nation and hear the conversation in the room, while the receiver remains on the hook!

Reports of such electronic super-snoopers, coupled with reports of radio receivers sheltered in Martini olives, tie clips and shoe soles, shudder us all. Then if you add the product recently advertised for a mere $18.00 that reportedly will listen to your best-friend's conversation 500 feet away, and a long-distance lie detector, you are certain to elect George Orwell the century's leading optimist. Is it possible that 1984, a year that should never arrive if it brings society to Orwell's satiric prophecy, may be even closer than 18 calendar years? What lies ahead? ■

The Anti-World

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Five years later, a young physicist, Carl David Anderson, working with the famed Robert Millikan in the California Institute of Technology, on cosmic ray studies, was poring over photographs of tracks in a special cloud chamber he had designed. Tracked across the chamber, he thought he saw tracks of a *wrong-way-Corrigan* electron, an electron curved the wrong way.

Curved Track. The tracks showed just what could be expected from electrons carrying positive charge rather than negative, and the startled Anderson suddenly realized he had tracked the heralded missing electron. He promptly named it the "positron."

For the wrong-way electron answered all the requirements laid down by Dirac. When it met a negative electron it cancelled out, and released energy in the form of gamma rays.

The Search Is On Now. The new discovery intensified the search for the second particle, the proton, that Dirac had also forecast, but this time discovery was to take a good twenty-two years.

Again specifications were clear. The new proton must have the mass of a regular proton, have equal charge, be stable, disappear when it met its opponent proton, and liberate energy equal to the mass of the two.

When the Second World War ended, an Italian-American physicist, prominent for his work on the atomic bomb and the new element 43, turned to the search for the missing anti-particle. Teaming with Owen Chamberlain at the University of California, Emile Segre worked out plans to create or find an anti-proton. It was obvious that to create such a particle would require tremendous energies, and the giant synchroton at the University was just the accelerator that might do it.

One Bev. The anti-proton could be created only in pairs with the proton, and they needed to produce energy equal to the mass of two protons. According to the Einstein theory, this would amount to 1,876 million electron volts, or about two billion electron volts.

To find the anti-particle they needed to hurl a high energy particle at a target, a proton against a proton. After collision they should have four particles, the two original protons, plus the newly-created photon-anti-photon pair.

By October of 1955 Segre and Chamberlain announced they had found the missing anti-proton predicted by Dirac. They had bombarded copper atoms with very high energy protons, and had created sixty anti-protons, an average of four an hour in the Bevatron accelerator. And all anti-protons passed the tests set up to determine a true anti-proton.

Every Particle Has Its Anti. With this finding, physicists claimed every particle must have its anti-particle, and they could see the day coming soon when they would prove an anti-world existed. But where this world was and how it could have formed seemed still a mystery.

The famed Doctor Maurice Goldhaber, Director of the Brookhaven Laboratories, at Upton, New York, offered a possible solution to its formation. He suggested the universe could have first existed as a single particle which contained the mass of the whole universe.

This first particle he called the "universon." At some distant time in the past, he believed, this universon could have divided into a particle and its anti-particle which he called the "cosmon" and the "anti-cosmon," each with a large nucleonic charge but of opposite sign.

This division, he believed, could be similar to the spontaneous decay of a fundamental particle into a particle and an anti-particle. Thus, the cosmon and the anti-cosmon might have flown apart, and after separating, the cosmon might have decayed in time into nucleons, which in turn, formed our present cosmos.

Radio From Space. Other advanced scientists agreed there could be more than one universe, one made of matter, the second of anti-matter.

While still others theorized anti-matter galaxies colliding with matter galaxies in space might cause the heavy radiations that speeded radio messages to earth.

But to prove an anti-world existed took more than theory. Man still had to find an anti-atom. Scientists had proved Dirac's equation by creating anti-particles. They had watched particles annihilate in their accelerators, seconding Eddington's theories and suggesting solution to the Siberian explosion.

To be certain an anti-world existed, they needed to prove anti-particles held together with the same nuclear binding as particles become atoms in the matter-world.

The Atom Next. A five-man research team at Columbia University, New York, headed by Professor of Physics, Dr. Leon Lederman, set out to find this vital link, the anti-atom.

First they built a mass spectrometer, then aimed a proton beam from Brookhaven's 33-billion-electron-volt synchroton at a beryllium target, the spectrometer system watching the particles flying off the resulting collisions, to produce the first anti-deuteron, the first known anti-nucleus made of an anti-proton and an anti-neutron. They had created the first complex atomic nucleus, the anti-nucleus of the heavy hydrogen atom. An anti-atom bound by strong nuclear force!

Anti-World. With the discovery of the anti-deuteron, man now knows an anti-world exists. In Lederman's words, "It is no longer possible to question the basic physics part of the conception of a literal anti-world populated by stars and planets."

With continued searching, we will one day penetrate the deepest secrets of the anti-world, the world that mirrors our own, but reverses time. And who can tell, we may discover anti-people in the anti-world.

People who will land at New York's mirrored Kennedy airport at noon, take off from a Los Angeles airport a few hours later, men who will grow younger instead of older, people who will start the "day" at midnight, go to sleep at dawn. A strange world where a communications space craft aimed at our world would destroy us in a nuclear holocaust. ■

DX'ing the Vanishing Breed

Continued from page 75

frequency for an hour or two. If you resist the temptation to tune away during a period of extended station inactivity (we have listened to a dead frequency for 15 minutes only to have it come alive with several stations all at the same time), or during some bursts of man-made static, you will be able to log most of the stations on the channel in one or two sittings.

You will eventually get to have a few favorites among the "old reliables" on the band and will enjoy tuning them in on evenings when you aren't really in the mood to devote intense effort to breaking DX records. One of our favorites is KCA999 of the New Hampshire State Police. They operate on 1682 kc., packing a fantastic signal which has been heard regularly in Europe!

How to QSL. When sending a reception report to any of these stations, be sure to include the date, time, frequency, signal strength, equipment used at your station (don't forget to tell about your antenna), and some specific detail of the transmission(s) monitored, such as: "You broadcast State Police Bulletin #27-A5," or, "You had a notice about a stolen 1962 green Ford sedan."

Since these stations do not have regular QSL cards to send out, it is suggested that you include with your report a stamped, self-addressed, prepared reply card which the operator can fill in, sign, and return to you. If you don't include the card with your report you *may* receive a verification letter, but chances are that you will receive nothing.

Address your report to the Chief Operator at the station you heard. Our list of stations indicates whether the station is operated by municipal, county, or state law enforcement agencies (indicated MP, CP, and SP), and this will have to be included in the address. Typical mailing addresses might look as follows: *Chief Operator, Radio Station KCA-999, New Hampshire State Police, Concord, N. H.*, or *Chief Operator, Radio Station KMA785, Police Department, Los Angeles, Calif.* More often than not, county law enforcement comes under the jurisdiction of the sheriff, so your report to a county station would be: *Chief Operator, Radio Station KMA795, Sheriff's Department, San Bernardino, Calif.*

Those stations on our list which are indicated by an asterisk (*) are of a temporary nature, rather than being at a fixed location. These might be located in a truck or communications van and intended for use during a local emergency where it is necessary to establish a base station to dispatch mobile units for a period of hours or days. Reports to these stations should be sent to the local police department, the county sheriff, or the state police, whichever is applicable.

There's plenty of fine listening here, and when you think that in a few years these stations might be little more than memories to be discussed around the table with other "old time DX'ers," they seem even more interesting to track down and QSL. Better make hay while the sun shines by turning on your receiver at sunset! ■

The Pickup Problem

Continued from page 66

thing but the above considerations. But if you're going to play older LP's and/or 78's as well, you've got some choosing to do when it comes to the size of a stylus tip and the *type* of cartridge. If your record collection really runs the gamut, you may be best off with a moving-magnet or induced-magnet pickup with a set of interchangeable, plug-in stylus assemblies. Should the choice be strictly a matter of new stereo discs and old LP's, an elliptical stylus can be the answer—provided it's installed and maintained with loving care. For the most people, though, either a compromise .7-mil stylus or a pair of interchangeable assemblies would be a more logical choice. If you are mainly concerned with top stereo performance, you may choose an ultra-small (.6 to .4 mil) tip and tolerate occasional noise and distortion when the tip "bottoms" in the wider groove of an early mono or stereo LP.

Stick-to-itiveness. At this point, it's worth talking for a moment about the much-misunderstood subject of tracking force. Somewhere along the line, many audiophiles seem to have picked up the notion that any pickup should be set at as low a tracking force as possible. This has been translated into the idea that tracking force is an index of quality and the pickup with the lowest stated force is the one to buy. These are notions to avoid.

Tracking force itself is a function primarily of a cartridge's mass and compliance (both of which are partially a function of the use it's designed for) and of its stylus tip size. It's worth understanding that tip size alone can account for the different forces specified for two cartridges—and that the lighter force for a smaller tip may actually be heavier, overall, than an *apparently* larger force for a larger tip. Once you accept this reasonably straightforward proposition, you should go on to acknowledge that tracking force itself is mainly a question these days of the *use* involved. Within the tracking ranges specified by manufacturers, *none* of the cartridges on the accompanying chart acts like one of the heavy-tracking record-destroyers of a few years back. Choose your pickup according to use, and *then*—with the help of a good test record—set the lightest force *at which perfect groove contact is possible.* Keep in mind that when you go below a particular pickup's optimum force (whether that force is one gram or four), loss of proper groove contact will cause far more severe groove damage than slightly-too-heavy force.

So far, we've conspicuously avoided two major yardsticks of hi-fi: measured performance and audible sound quality. The first of these is getting increasingly tougher to interpret. Because test records and test methods vary so critically, it is virtually impossible to tell anything about a pickup's tested performance except in direct comparisons with others tested in the same way at the same time. When you do have a chance to see a comparative report, the differences between today's excellent pickups are reduced to subtle variations in square-wave pictures and the point and extent of high-frequency groove resonance. Unless the square-wave has severe ringing at one frequency, or unless there is a noticeable peak or dip in or above the 10-kc region, the best you can do is predict whether a cartridge will sound slightly brighter or mellower than another. And you will find it next-to-useless to compare the usual set of specs from manufacturers. The problem is simply that pickups have gotten too good for the old spec-searching game.

The Answer. What *should* you do, then? By all means listen closely to the pickups suited to your own particular needs. Listen preferably *via* the same amplifier and speakers you're going to use at home, so you can tell whether a slight dip or peak in a pickup's response will be increased or decreased in effect (to the point of excessive brightness or dullness) by the rest of your equipment. If any pickup that should be a good performer sounds "spitty" or distorted, check to see whether an eager-beaver salesman has set tracking force too light—or if the record sounds bad on other cartridges as well.

Is anything going on that might make today's choice obsolete tomorrow? Probably not. The one discernible trend (beyond the elliptical tip) is toward the semi-conductor pickup which promises further reduction in size and mass of stylus assemblies and signal-producing mechanisms inside cartridges. But for now, there seems to be no threat of a revolution in pickup design.

Thus you don't have to become an expert on dynamic mass, compliance or other esoteric matters to pick a good pickup. Forget the figures, remember the kind of use you intend to give a cartridge—and listen. ■

Weather Phone

Continued from page 70

benefit from these improvements."

The Speed of Lightning. Since the President's October announcement, the benefits have been largely those of time.

"We are presently achieving an active speed-up of raw facts from one to five hours," says Dr. White of the Weather Bureau. "All weather forces depend on data from large geographical areas. Meteorology is the international science par excellence. The weather affecting one part of the world today affects the other part tomorrow. Everybody needs all the information. The sooner we get this information, the better are our prognosis maps."

Dr. Hollomon, who made a trip to Russia after the line was activated, reports that the American weather maps received on the Soviet side are extremely clear and detailed. While in Moscow, he visited the Central Forecasting Institute, now designated as the first World Weather Center.

"Tremendous excitement was exhibited by Russian weathermen I met about the speed with which information is transmitted on the line," explains Dr. Hollomon. "They have many more people on their weather staff than we. Thus, many of their maps are drawn by hand, while ours are done by computers. The Russians are very capable people. Technologically, they can do anything we can do."

Anyone who has followed the chain of events leading up to the new U.S.-Soviet weather line and the international plan for a World Weather System might well agree with Dr. Hollomon.

Both ideas have piqued the imaginations and spurred into action not only Russian diplomats but also three American Presidents—Eisenhower, Kennedy, and Johnson. Speaking to the United Nations, late in his term of office, President Eisenhower proposed that ". . . we press forward with a program of international cooperation for constructive peaceful uses of outer space under the United Nations. Better weather forecasts, improved world-wide communications . . . are but a few of the benefits of such cooperation."

President-elect John F. Kennedy, in November of 1960, also began to think about the weather and what he could personally do about it. His State of the Union message reflected his personal enthusiasm for the first two TIROS weather satellites orbiting the earth and sending back helpful photographic data.

"I now invite all nations . . . including the Soviet Union . . . to join with us in developing a weather prediction program," he said.

John Kennedy's hopes for international cooperation in meteorology became a growing plan 11 months later when, in December, 1964, the U.N. General Assembly unanimously approved Resolution 1721, embodying a Kennedy-proposed four-point program of space cooperation. It was this resolution that sent the World Meteorological Organization into immediate action.

Expanding the Weather Eye. The WMO's first report in June of 1962 recommended the creation of a World Weather System, which itself became a working blueprint in the spring of 1963. Long-range studies to bring improved weather services to all nations of the world were started at that time. A special research and development fund for improvement of facilities, education, and training was established. The system was planned to focus on three World Weather Centers, one to be located in Moscow, another in Washington, and a third in the Southern Hemisphere.

In addition to gathering, processing, and disseminating global weather observations from satellites and other sources, the Centers would also train meteorologists, study large-scale weather systems, and archive weather information for research purposes.

Now, three years after WMO's first report, Russia has the first Center, and a new weather line links Moscow to Washington. Thus, the Northern Hemisphere benefits daily from very high-speed facsimile communications over the new 5,000-mile transcontinental circuit. Photos are also received and transmitted at twice the speed usually used on international circuits.

While Moscow and Suitland are the only two transmitting points on this first link, plans are being made to offer the weather data on a receive-only basis to countries that may wish to participate by payment of a proportional share of the cost.

On December 31, 1964, the Weather Bureau's Suitland operation was officially named the second World Weather Center. Although Drs. Hollomon and White refuse to name the third, informed sources in Washington wager that it will be in Australia—and by 1968. ■

Volume 44, 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, Cuban and Mexican AM Stations by Call Letters, and the World-Wide Short-Wave Section.

In February-March 1966 issue of RADIO-TV EXPERIMENTER, Volume 45, 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 last half of 1965, you will have a complete volume of *White's Radio Log* by collecting any three consecutive issues of RADIO-TV EXPERIMENTER during the first 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
KABE	Westwego, La.	1540
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
KADY	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
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.	1560
KBIF	Fresno, Calif.	900
KBIG	Avalon, Cal.	740
KBIM	Roswell, N.Mex.	910
KBIS	Bakersfield, Calif.	970
KBIX	Muskogee, Okla.	1490
KBIZ	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
KBOM	Bismarck-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
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
KCOB	Newton, Iowa	1280
KCOG	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
KDAB	Arvada, Colo.	1550
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
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
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
KDMD	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
KEDD	Dodge City, Kans.	1550
KEDO	Longview, Wash.	1400

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
KEKO	Kealakekua, Hawaii	790
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 Junc., 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

C.L.	Location	Kc.
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	730
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	Frederickstown, 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, Wash.	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
KGBA	Santa Clara	1430
KGBC	Galveston, Tex.	1540
KGBS	Los Angeles, Calif.	1020
KGBT	Harlingen, Tex.	1530
KGBX	Springfield, Mo.	1260
KGCA	Rugby, N.D.	1450
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
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.	1600
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
KGNS	Laredo, Tex.	1390
KGO	San Francisco, Calif.	810
KGOL	Palm Desert, Cal.	1270
KGOS	Torrington, Wyo.	1490
KGPC	Grafton, N.Dak.	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

C.L.	Location	Kc.
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
KHBC	Hilo, Hawaii	970
KHBM	Monticello, Ark.	1430
KHBR	Hillsboro, Tex.	1560
KHDN	Hardin, Mont.	1230
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
KHOK	Hoquiam, Wash.	1560
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
KID	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
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
KIND	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
KISD	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
KITH	Clinton, Mo.	1350
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

C.L.	Location	Kc.
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.Dak.	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
KMAE	McKinney, Tex.	1600
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
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
KNCO	Garden City, Kans.	1050
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.	960
KNGL	Paradise, Calif.	930
KNGS	Hanford, Calif.	620
KNIA	Knoxville, Iowa	1320
KNIC	Winfield, Kan.	1550
KNIN	Wichita Falls, Tex.	990
KNIT	Abilene, Tex.	1280
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
KOLL	Honolulu, Hawaii	1420
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
KONE	Reno, Nev.	1450
KONG	Visalia, Calif.	1400
KONI	Spanish Fork, Utah	1480
KONO	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	1300
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
KPUB	Pueblo, Colo.	1480
KPUG	Bellingham, Wash.	1170
KPUY	Puyallup, Wash.	1450
KQAQ	Austin, Minn.	970
KQCY	Quincy, Calif.	1370
KQEN	Roseburg, Ore.	1240
KQEO	Albuquerque, N.Mex.	920
KQIK	Lakeview, Oreg.	1230
KQMS	Redding, Calif.	1400
KQOT	Yakima, Wash.	940
KQRS	Golden Valley, Minn.	1440
KQTE	Missoula, Mont.	1340
KQV	Pittsburgh, Pa.	1410
KQWB	Fargo, N. D.	1550
KQXI	Atlanta, Ga.	790
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	Weslasco, Tex.	1290
KRHO	Duncan, Okla.	1350
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
KRKD	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.	1240
KRNR	Roseburg, Oreg.	1490
KRNS	Burns, Oreg.	1230
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	Minneapolis-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
KTCB	Malden, Mo.	1470

WHITE'S

RADIO LOG

C.L.	Location	Kc.
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	Mtn. Home, Ark.	1490
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
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
KURA	Moab, Utah	1450
KURL	Billings, Mont.	730
KURV	Edinburg, Tex.	710
KURY	Brookings, Oreg.	910
KUSD	Vermillion, S.Dak.	690
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	630
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
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
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
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	Cleveland, Ohio	1100
KZEE	Weatherford, Tex.	1220
KZEY	Tyler, Tex.	690
KZIP	Amarillo, Tex.	1310
KZIX	Fort Collins, Colo.	600
KZNG	Hot Springs, Ark.	1470
KZOE	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
WAAP	Peoria, Ill.	1350
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
WAFC	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
WAKE	Atlanta, Ga.	1340
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
WAML	Laurel, Miss.	1340
WAMM	Flint, Mich.	1420
WAMO	Homestead, Pa.	860
WAMR	Venice, Fla.	1320

C.L.	Location	Kc.
WAMS	Wilmington, Del.	1380
WAMW	Washington, Ind.	1580
WAMY	Amory, Miss.	1580
WANA	Anniston, Ala.	1490
WANB	Waynesburg, Pa.	1580
WANE	Ft. Wayne, Ind.	1450
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
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.	1430
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	Alpena, 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
WBGR	Jesup, Ga.	1370
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, Mo.	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
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
WBZB	Selma, N. C.	1510
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
WCHO	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
WDBM	Statesville, N.C.	550
WDBO	Orlando, Fla.	580
WDBQ	Dubuque, Iowa	1490
WDCF	Dade City, Fla.	1350
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
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.	1430

WHITE'S RADIO LOG

C.L.	Location	Kc.
WDKD	Kingstree, S. C.	1310
WDKN	Dickson, Tenn.	1260
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
WDOG	Marine City, Mich.	1590
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.	1390
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.	1230
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

C.L.	Location	Kc.
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.	1330d
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
WFIF	Milford, Conn.	1500

C.L.	Location	Kc.
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
WFMJ	Youngstown, Ohio	1390
WFMO	Fairmont, N.C.	860
WFMW	Madisonville, Ky.	730
WFNC	Fayetteville, N.C.	1390
WFNL	No. Augusta, S.C.	1600
WFOB	Fostoria, Ohio	1430
WFOM	Marietta, Ga.	1230
WFOR	Hattiesburg, Miss.	1400
WFOX	Milwaukee, Wis.	860
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 Sprgs., N.C.	1460
WFWL	Camden, Tenn.	1220
WFYC	Alma, Mich.	1280
WFYI	Mineola, N.Y.	1520
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
WGBA	Columbus, Ga.	1270
WGBB	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.	1490
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.	1490
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

C.L.	Location	Kc.
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	Greeneville, 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	Riviera 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
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

C.L.	Location	Kc.
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	Matawan, 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
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
WIDD	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
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

C.L.	Location	Kc.
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.	860
WIVV	Vieques, P.R.	1370
WIVY	Jacksonville, Fla.	1050
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
WJBO	Baton Rouge, La.	1150
WJBS	DeLand, Fla.	1490
WJCD	Seymour, Ind.	1390
WJCM	Sebring, Fla.	960
WJCO	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

C.L.	Location	Kc.
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
WJWT	Demopolis, Ala.	1350
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
WKBZ	Muskegon, Mich.	850
WKCT	Bowling Green, Ky.	930
WKCW	Warrenton, Va.	1420
WKDA	Nashville, Tenn.	1240
WKDE	Altavista, Va.	1280
WKDK	Newberry, S.C.	1240
WKDL	Clarksdale, Miss.	1600
WKDN	Camden, N.J.	800
WKDX	Hamlet, N. C.	1250
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

C.L.	Location	Kc.
WKID	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
WKOS	Ocala, Fla.	1370
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
WKPR	Kalamazoo, Mich.	1420
WKPT	Kingsport, Tenn.	1400
WKQV	Sullivan, Ind.	1550
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
WKY	Oklahoma City, Okla.	930
WKYE	Bristol, Tenn.	1550
WKYF	Greenville, Ky.	1600
WKYN	Rio Piedras, P.R.	630
WKYO	Caro, Mich.	1360
WKYR	Keyser, W.Va.	1270
WKYW	Louisville, Ky.	900
WKYX	Paducah, Ky.	570
WKZA	Kane, Pa.	960
WKZI	Casey, Ill.	800
WKZO	Kalamazoo, Mich.	590
WLAC	Nashville, Tenn.	1510
WLAD	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
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

WHITE'S RADIO LOG

C.L.	Location	Kc.
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
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
WLLI	Brookneal, Va.	1230
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
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
WLPO	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
WMAB	Munising, Mich.	1400

C.L.	Location	Kc.
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
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

C.L.	Location	Kc.
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
WNDB	Daytona Beach, Fla.	1150
WNDR	Syracuse, N.Y.	1260
WNDU	South Bend, Ind.	1490
WNEB	Worcester, Mass.	1230
WNEG	Taccoa, 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
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
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

C.L.	Location	Kc.
WNWI	Northwestern, Ind.	1080
WNXT	Portsmouth, Ohio	1260
WNYC	New York, N.Y.	830
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
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	Marion, 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	Deland, 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
WOSL	Kissimmee, Fla.	1220
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
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
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
WPFE	Eastman, Ga.	710
WPFP	Park Falls, Wis.	1450
WPGA	Perry, Ga.	980
WPGC	Bradbury Hghts., Md.	1580
WPGF	Burgaw, N. C.	1470

C.L.	Location	Kc.
WPGM	Danville, Pa.	1570
WPGW	Portland, Ind.	1440
WPHB	Philipsburg, Pa.	1260
WPHC	Waverly, Tenn.	1540
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.	1240
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
WQTY	Arlington, Fla.	1220
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
WRAL	Raleigh, N.C.	1240
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
WRC	Washington, D.C.	980
WRCD	Dalton, Ga.	1430
WRCH	New Britain, Conn.	910
WRCK	Tuscumbia, Ala.	1410
WRCO	Richland, Wis.	1450
WRCR	Maplewood, Minn.	1010
WRCS	Ahoskie, N.C.	970
WRCV	Philadelphia, Pa.	1060
WRDB	Reedsburg, Wis.	1400
WRDO	Augusta, Maine	1400
WRDS	S. Charleston, W.Va.	1410
WRDW	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

C.L.	Location	Kc.
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
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	Rantoul, 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
WRVM	Rochester, N.Y.	680
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

C.L.	Location	Kc.
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.	1480
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.	1280
WSJM	St. Joseph, Mich.	1400
WSJR	Modawaska, Me.	1230
WSJS	Winston-Salem, N.C.	600
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
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
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
WSTL	Eminence, Ky.	1600
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

C.L.	Location	Kc.
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
WTHI	Terre Haute, Ind.	1480
WTHM	Lapeer, Mich.	1530
WTHN	Thomaston, Ga.	1500
WTHT	Hazleton, Pa.	1300
WTIC	Hartford, Conn.	1080
WTIO	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
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
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
WUFD	Amherst, N.Y.	1080
WUFF	Eastman, Ga.	1580
WUFO	Amherst, N. Y.	1080
WULA	Eufaula, Ala.	1240

WHITE'S RADIO LOG

C.L.	Location	Kc.
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	Apopka, Fla.	1520
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

C.L.	Location	Kc.
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
WVON	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
WWBB	Bamberg-Denmark, S. C.	790
WWBC	Cocoa, Fla.	1510
WWBD	Bamberg, 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
WWKY	Winchester, Ky.	1380

C.L.	Location	Kc.
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	Woodside, 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
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.	1150
WXTR	Pawtucket, R.I.	550

C.L.	Location	Kc.
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

Abbreviation: (s)—broadcasts stereo

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 (s)
KAJS	Newport Beach, Calif.
KAKC	Tulsa, Okla.
KAKI	San Antonio, Tex.
KALB-FM	Alexandria, La.
KALH	Denver, Colo.
KALW	San Francisco, Calif.
KAMS	Mammoth Spring, Ark.
KANG	Angwin, Cal.
KANT-FM	Lancaster, Calif.
KANU	Lawrence, Kans. (s)
KANW	Albuquerque, N.Mex.
KAOL-FM	Carrollton, Mo.
KARA-FM	Albuquerque, N.M.
KARK	Little Rock, Ark.
KARL-FM	Carlsbad, Cal.
KARM-FM	Fresno, Calif.
KASK-FM	Ontario, Calif.
KASU	Jonesboro, Ark.
KATT	Woodland, Calif.
KATY-FM	San Luis Obispo, Calif.
KAVR-FM	Applevalley, Cal.
KAYD	Beaumont, Tex.
KAZZ	Austin, Tex.
KBBI	Los Angeles, Calif.
KBBL	Riverside, Cal.
KBBM	Hayward, Calif.
KBBW	San Diego, Cal. (s)
KBCA	Los Angeles, Calif.
KBCL-FM	Shreveport, La. (s)
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. (s)
KBOA-FM	Kennett, Mo.
KBOC	Ogden, Utah (s)
KBOE-FM	Oskaloosa, Iowa

C.L.	Location
KBOI-FM	Boise, Ida. (s)
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.
KBTV-FM	Houston, Mo.
KBUZ-FM	Mesa, Ariz.
KBVR	Corvallis, Ore.
KBYR-FM	Anchorage, Alaska (s)
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. (s)
KCHQ-FM	Conchella, Calif. (s)
KCIB-FM	Fresno, Calif. (s)
KCIC	Clinton, Mo.
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. (s)
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.
KDES-FM	Palm Spgs., Calif. (s)

C.L.	Location
KDFC	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
KDUO	Riverside, Calif. (s)
KDUX-FM	Aberdeen, Wash. (s)
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 (s)
KEEN-FM	San Jose, Calif.
KEEZ	San Antonio, Tex. (s)
KEFC	Waco, Tex. (s)
KEFM	Santa Posa, Cal.
KEFW	Honolulu, Hawaii
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.

C.L.	Location
KFLA-FM	Scott City, Kan.
KFLY-FM	Corvallis, Ore.
KFMB-FM	San Diego, Calif.
KFMC	Portland, Oreg.
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. (s)
KFNE	Big Springs, Tex.
KFNW-FM	Fargo, N.D.
KFOG	San Francisco, Calif. (s)
KFOX-FM	Los Angeles, Cal.
KFRC-FM	San Francisco, Calif.
KFRE-FM	Fresno, Calif.
KFRN-FM	Brownwood, Tex.
KFUO-FM	Clayton, Mo.
KGAF-FM	Gainesville, Tex.
KGB-FM	San Diego, Calif. (s)
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)
KGLA	Los Angeles, Calif.
KGME-FM	Centralia, Wash.
KGMI-FM	Bellingham, Wash.
KGNC-FM	Amarillo, Tex.
KGO-FM	San Francisco, Calif.
KGPO	Grants Pass, Oreg.
KGRI-FM	Henderson, Tex.
KGUD-FM	Santa Barbara, Calif.
KGVW-FM	Belgrade, Mont.
KHAK-FM	Cedar Rapids, Iowa (s)
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.

C.L. **Location**

KHMS El Paso, Tex.
KHOB-FM Hobbs, N. M.
KHOF Los Angeles, Calif.
KHOK-FM Hoquiam, Wash.
KHOL-FM Kearney-Holdrege, 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.
KIFM Bakersfield, Cal.
KIHI Tulsa, Okla.
WILB Long Beach, Cal.
KIMN-FM Denver, Colo.
KIMP-FM Mt. Pleasant, Tex.
KING-FM Seattle, Wash.
KIOO 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.
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. (s)
KLAY-FM Tacoma, Wash.(s)
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.(s)
KLIZ-FM Brainerd, Minn.
KLJT Lake Jackson, Tex.
KLMO-FM Longmont, Colo.
KLOA-FM Ridgecrest, Calif.
KLOM-FM Lompoc, Cal.
KLON Long Beach, Calif.
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.
KLWN-FM Lawrence, Kan.
KLXN Seattle, Wash.
KLYD-FM Bakersfield, Calif.
KLYN-FM Lynden, Wash.
KLYX Memphis, Tenn.
KLZ-FM Denver, Colo.
KMAG Ft. Smith, Ark.
KMAK-FM Fresno, Calif.
KMAP Dallas, Tex.
KMAX Sierra Madre, Calif.
KMBC-FM Kansas City, Mo.(s)
KMCP Portland, Oreg.
KMCS Seattle, Wash. (s)
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.
KMOX-FM St. Louis, Mo.
KMPX San Francisco, Calif.(s)
KMSC Clear Lake City, Tex.
KMSM Rolla, Mo.
KMSU Mankato, Minn.
KMUW Wichita, Kans.
KMYC-FM Marysville, Calif.
KMUZ Santa Barbara, Calif.(s)
KNBB Newport Beach, Cal.
KNBR-FM San Francisco, Calif.
KNCO-FM Garden City, Kans.
KNDX Yakima, Wash.

C.L. **Location**

KNEB-FM Scottsbluff, Nebr.
KNED-FM McAlester, Okla.
KNER Dallas, Tex.
KNEV Reno, Nev. (s)
KNEW-FM Scottsbluff, Nebr.
KNFB Nowata, Okla.
KNFM Midland, Tex.
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.
KOBH-FM Hot Springs, S.D.
KOCI-FM Denver, Colo.
KOCM Newport Beach, Cal.
KOCV Odessa, Tex.
KOCW Tulsa, Okla.(s)
KOCY-FM Oklahoma City, Okla. (s)
KODA-FM Houston, Tex.(s)
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.(s)
KOOL-FM Phoenix, Ariz.
KOPR-FM Great Falls, Mont.
KORK Las Vegas, Nev.(s)
KOSE-FM Osceola, Ark.
KOST Dallas, Tex.
KOSU-FM Stillwater, Okla.(s)
KOSY-FM Texarkana, Tex.
KOTN-FM Pine Bluff, Ark.
KOWN-FM Escondido, 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.
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.(s)
KPPC-FM Pasadena, Calif.
KPPS-FM Parsons, Kans.
KPRI San Diego, Calif.(s)
KPRN Seattle, Wash.
KPRS-FM Kansas City, Mo.
KPSD Dallas, Tex.
KQAL-FM Omaha, Nebr.(s)
KQFM Portland, Oreg.
KQIP Odessa, Tex.
KQRO Dallas, 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.
KREM-FM Spokane, Wash.
KREP Santa Clara, Cal.
KREX-FM Grand Junction, Colo.
KRFM Phoenix, Ariz. (s)
KRHM Los Angeles, Calif.(s)
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
KROC-FM Rochester, Minn.
KRON-FM San Francisco, Calif.

C.L. **Location**

KROS-FM Clinton, Iowa
KROW Santa Barbara, Calif.
KROY-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.
KRVM Eugene, Oreg.
KRVN-FM Lexington, Nebr.
KRWG University Park, N. M. (s)
KRVS-FM Lafayette, La.
KRYT-FM Colorado Springs, Colo.
KSAM-FM Huntsville, Tex.
KSCO Santa Cruz, Calif.
KSBW-FM Salinas, Calif.
KSDA La Sierra, Calif.
KSDB-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.(s)
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.
KTFC Sioux City, Ia.
KTGM Denver, Colo.
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.
KTW-FM Seattle, Wash.
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.
KUMD-FM Duluth, Minn.
KUOA-FM Siloam Springs, Ark.
KUOH Honolulu, Hawaii
KUOP Stockton, Cal.(s)
KUOW Seattle, Wash.
KUPD-FM Tempe, Ariz.
KURL-FM Billings, Mont.
KUSC Los Angeles, Calif.
KUSN-FM St. Joseph, Mo.
KUSU-FM Logan, Utah
KUT-FM Austin, Tex.

C.L. **Location**

KUTE Glendale, Calif.
KUWS-FM Newton, Ia.
KVCR San Bernardino, Calif.
KVEC-FM San Luis Obispo, Calif.(s)
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.
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.
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. (s)
KWKH-FM Shreveport, La.
KWLM-FM Willmar, Minn.
KWLW San Angelo, Tex.
KWMF-FM Walnut Creek, Cal.
KWMO Odessa, Tex.
KWNS-FM Pratt, Kan.
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.
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.
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.
KZIX-FM Ft. Collins, Colo.
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.
WABI-FM Bangor, Maine
WABQ Cleveland, Ohio
WABX-FM Detroit, Mich. (s)
WABZ-FM Albemarle, N.C.
WACO Waco, Tex.
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.
WAKO-FM Lawrenceville, Ill.
WAKR-FM Akron, Ohio
WAKW-FM Cincinnati, Ohio
WALK-FM Patchogue, N.Y.
WALL-FM Middletown, N. Y.
WALZ-FM Jacksonville, Fla.
WAMC Albany, N.Y.
WAMF Amherst, Mass.
WAMO-FM Pittsburgh, Pa.
WAMU-FM Washington, D.C.
WANG Goldwater, Mich.

WHITE'S RADIO LOG

C.L. Location

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.
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.
WBBS Crawfordsville, Ind.
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.
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 Tallahassee, Fla.
WBGO Newark, N.J.
WBGU Bowling Green, Ohio
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 Depew, N. Y.
WBLR-FM Datesburg, 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 (s)
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.
WBRN-FM Big Rapids, Mich.
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.

C.L. Location

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
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.
WCHO-FM Washington Court House, O.
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.
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)
WCRD Bluffton, Ind.
WCRF Cleveland, O.
WCRQ Providence, R. I.
WCRS-FM Greenwood, S. C.
WCRT-FM Birmingham, Ala.(s)
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.
WCTA-FM Andalusia, Ala.
WCTC-FM New Brunswick, N.J.
WCTM Eaton, Ohio
WCTW-FM New Castle, Ind.
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.
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.(s)
WDHF Chicago, Ill.
WDIF Buffalo, N.Y.
WDJK Atlanta, Ga.
WDJK Smyrma, Ga.

C.L. Location

WDJR Oil City, Pa.
WDKN-FM Dickson, Tenn.
WDLB-FM Marshfield, Wis.
WDLP-FM Panama City, Fla.
WDMB-FM Statesville, N.C.
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.
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.
WEAS-FM Savannah, Ga.
WEAU-FM Eau Claire, Wis.
WEAV-FM Plattsburgh, N.Y.
WEAW-FM Evanston, Ill.
WEBH Chicago, Ill.
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.(s)
WEGO-FM Concord, N.C.
WEHH-FM Elmira, N. Y.
WEIC-FM Charleston, Ill.
WEIV Ithaca, N.Y.
WEKZ-FM Monroe, Wis.
WELF Glen Ellyn, Ill.
WELG Elgin, Ill.
WELP-FM Easley, S. C.
WEMC Harrisonburg, Va.
WEMI Tampa, Fla.
WEMP-FM Milwaukee, Wis.
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 Cincinnati, Ohio
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.(s)
WFLN-FM Philadelphia, Pa.(s)
WFLO Farmville, Va.
WFLT-FM Franklin, Tenn.
WFLW-FM Monticello, Ky.
WFLY Troy, N.Y.

C.L. Location

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.(s)
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.
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 Silver Spring, Md.
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.
WGFM Schenectady, N.Y. (s)
WGGC Glasgow, Ky.
WGGM Taylorville, Ill.
WGH-FM Newport News, Va.
WGHF Brookfield, Conn.(s)
WGIG-FM Brunswick, Ga.
WGIR-FM Manchester, N. H.
WGKA-FM Atlanta, Ga.
WGLC-FM Mendota, Ill.
WGLI Babylon, N.Y.
WGLM Richmond, Ind.
WGLS-FM Glassboro, N. J.
WGMR-FM Tyrone, Pa.
WGMS-FM Washington, D.C.
WGMZ Flint, Mich.(s)
WGNB St. Petersburg, Fla.
WGNC-FM Gastonia, N.C.
WGNO 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.
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. (s)
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.

C.L. Location

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.
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. (s)
WHTG-FM Asbury Park, 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 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 Cristiansted, St. Croix, V. I.
WIVY-FM Jacksonville, Fla.
WIXN-FM Dixon, Ill.
WIZZ-FM Streator, Ill.
WJAC-FM Johnstown, Pa.(s)
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.

C.L. Location

WJBR Wilmington, Del.(s)
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)
WJMJ-FM Philadelphia, Pa.
WJMK Plainfield, Ind.
WJML Petoskey, Mich.
WJMX-FM Florence, S.C.
WJNC-FM Jacksonville, N. C.
WJOF Athens, Ala.
WJOL-FM Joliet, Ill.(s)
WJOY-FM Burlington, Vt.
WJPA-FM Washington, Pa.
WJR-FM Detroit, Mich.
WJRH Easton, Pa.
WJSC-FM Wilberforce, Ohio
WJSM Martinsburg, Pa.
WJTN-FM Jamestown, N.Y.
WJVA-FM South Bend, Ind.
WJW-FM Cleveland, Ohio
WJWR Palmyra, Pa.
WJZZ Bridgeport, Conn.
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)
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.
WKLF-FM Clanton, Ala.
WKLS Marietta, Ga.(s)
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)
WKWK-FM Wheeling, W.Va.
WKYX-FM Paducah, Ky.
WLAC-FM Nashville, Tenn.
WLAD-FM Danbury, Conn.
WLAE Hartford, Conn.
WLAG-FM LaGrange, Ga. (s)
WLAM-FM Lewiston, Me.
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.

C.L. Location

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.
WMAG-FM Forest, Miss.
WMAI-FM Panama City, Fla.
WMAJ-FM State College, Pa.
WMAL-FM Washington, D. C. (s)
WMAM-FM Marinette, Wis.
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.
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.
WMFM Madison, Wis.(s)
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.
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
WMOP-FM Ocala, Fla.
WMOR-FM Morehead, Ky.
WMOU-FM Berlin, N.H.
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
WMUK Kalamazoo, Mich.
WMUL Huntington, W.Va.
WMUS-FM Muskegon, Mich.
WMUN Muncie, Ind.

C.L. Location

WMUU-FM Greenville, S. C. (s)
WMUZ Detroit, Mich.
WMVA-FM Martinsville, Va.(s)
WMVB-FM Millville, N.J.
WMVO-FM Mount Vernon, Ohio
WMVR-FM Sidney, Ohio
WMYB-FM Myrtle Beach, Fla.
WMYR-FM Ft. Myers, Fla.
WNAD-FM Norman, Okla.
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.
WNCN New York, N.Y.
WNCO-FM Ashland, Ohio
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.
WNFO-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.
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.
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 Mayaquez, 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.
WPHS Warren, Mich.
WPIC-FM Sharon, Pa.
WPIN-FM St. Petersburg, Fla.
WPIT-FM Pittsburgh, Pa.

WHITE'S RADIO LOG

C.L.	Location
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.
WQMF	Babylon, N.Y. (s)
WQMG	Greensboro, N.C. (s)
WQMS	Hamilton, Ohio
WQRB-FM	Pittsfield, Mass.
WQRS-FM	Detroit, Mich.
WQXI-FM	Atlanta, Ga.
WQXR-FM	New York, N.Y. (s)
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.
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)
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.
WRDC-FM	Rochester, N.Y.
WROK-FM	Rockford, Ill.
WROM-FM	Rome, Ga.
WROW-FM	Albany, N.Y.

C.L.	Location
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.
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.
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.
WSDM	Chicago, Ill.
WSEB	Sebring, Fla.
WSEI	Olney, Ill.
WSEL-FM	Pontotoc, Miss.
WSEV-FM	Sieverville, Tenn. (s)
WSFC-FM	Somerset, Ky.
WSFM	Birmingham, Ala. (s)
WSHS	Floral Park, N.Y.
WSHU	Fairfield, Conn.
WSID	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.
WSLN	Delaware, Ohio
WSLS-FM	Roanoke, Va. (s)
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
WSTC-FM	Stamford, Conn.
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.

C.L.	Location
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.
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.
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.
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.
WTRC-FM	Elkhart, Ind.
WTRE	Greensburg, Ind.
WTRF-FM	Wheeling, W.Va.
WTSB-FM	Lumberton, N.C.
WTES-FM	Buffalo, N.Y.
WTSV-FM	Claremont, N.H.
WTTC-FM	Towanda, Pa.
WTTF-FM	Tiffin, Ohio
WTTR-FM	Westminster, Md.
WTTV-FM	Bloomington, Ind.
WTUN	Tampa, Fla.
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.

C.L.	Location
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.
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.
WWCF	Greenfield, Wis.
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.
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.
WXYW	Suffolk, Va.
WXYZ-FM	Detroit, Mich.
WYAK	Sarasota, Fla. (s)
WYBC-FM	New Haven, Conn.
WYDD	New Kensington, Pa.
WYCA	Hammond, Ind.
WYCE	Warwick, R.I.
WYCR	York-Hanover, Pa.
WYFE	Lansing, Mich.
WYFI	Norfolk, Va. (s)
WYFM	Charlotte, N.C.
WYFS	Winston-Salem, N.C.
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

Canadian AM Stations By Call Letters

C.L.	Location	Kc.	C.L.	Location	Kc.	C.L.	Location	Kc.	C.L.	Location	Kc.
CBA	Sackville, N.B.	1070	CBU	Vancouver, B.C.	690	CFCF	Montreal, Que.	600	CFJC	Kamloops, B.C.	910
CBAF	Moncton, N.B.	1300	CBV	Quebec, Que.	980	CFCH	Callander, Ont.	600	CFJR	Brockville, Ont.	1450
CBD	Saint John, N.B.	1110	CBR	Calgary, Alta.	1010	CFCL	Timmins, Ont.	620	CFKL	Schefferville, Que.	1230
CB-E	Windsor, Ont.	1550	CBW	Winnipeg, Man.	990	CFCN	Calgary, Alta.	1060	CFLM	La Tuque, Que.	1240
CBF	Montreal, Que.	690	CBX	Edmonton, Alta.	740	CFCO	Chatham, Ont.	630	CFLV	Valleyfield, Que.	1370
CBG	Gander, Nfld.	1450	CBY	Corner Brook, Nfld.	990	CFCP	Courtenay, B.C.	1440	CFMB	Montreal, Que.	1410
CBH	Halifax, N.S.	860	CBZ	Fredericton, N.B.	970	CFCW	Camrose, Alta.	790	CFML	Cornwall, Ont.	1110
CBI	Sydney, N.S.	1140	CFAB	Windsor, N. S.	1450	CFCY	Charlottetown, P.E.I.	630	CFMR	Fort Simpson, N.W.T.	1490
CBJ	Chicoutimi, Que.	1580	CFAC	Calgary, Alta.	960	CFDA	Victoriaville, Que.	1380	CFNB	Fredericton, N.B.	550
CBK	Regina, Sask.	540	CFAM	Altona, Man.	1290	CFDR	Dartmouth, N.S.	790	CFNS	Saskatoon, Sask.	1170
CBL	Toronto, Ont.	740	CFAR	Flin Flon, Man.	590	CFGB	Goose Bay, N.B.	970	CFOB	Fort Frances, Ont.	800
CBM	Montreal, Que.	940	CFAX	Victoria, B.C.	1070	CFGM	Richmond Hill, Ont.	1310	CFOM	Quebec, Que.	1340
CBN	St. John's, Nfld.	640	CFBC	Saint John, N.B.	930	CFGP	Grande Prairie, Alta.	1050	CFOR	Orillia, Ont.	1570
CBO	Ottawa, Ont.	910	CFBR	Sudbury, Ont.	550	CFGR	Gravelbourg, Sask.	1230	CFOS	Owen Sound, Ont.	560
CBOF	Ottawa, Ont.	1250	CFBV	Smithers, B.C.	1230	CFGT	Saint-Joseph-d'Alma, Que.	1270	CFOX	Pointe Claire, Que.	1470
CBT	Grand Falls, Nfld.	540	CFCB	Corner Brook, Nfld.	570						

C.L.	Location	Kc.
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
CFRS	Simcoe, Ont.	1560
CFRY	Portage la Prairie, Man.	920
CFSL	Weyburn, Sask.	1340
CFSX	Stephenville, Nfld.	910
CFTJ	Galt, Ont.	1110
CFTK	Terrace, B.C.	590
CFUN	Vancouver, B.C.	1410
CFVR	Abbotsford, B.C.	1240
CFWB	Campoell, 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.	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	Sainte-Anne-de-la-Pocatiere, 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
CHRC	Quebec, Que.	800
CHRD	Drummondville, Que.	1340
CHRL	Roberval, Que.	910
CHRS	Jacques-Cartier, Que.	1090
CHSJ	Saint John, N.B.	1150
CHSM	Altona, Man.	1250
CHTM	Thompson, Man.	610
CHUB	Nanaimo, B.C.	1570

C.L.	Location	Kc.
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

C.L.	Location	Kc.
CKAC	Montreal, Que.	730
CKAD	Middleton, N.S.	1490
CKAR	Huntsville, Ont.	630
CKAR-1	Huntsville, Ont.	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
CKCH	Hull, Que.	970
CKCK	Regina, Sask.	620
CKCL	Truro, N.S.	600
CKCM	Grand Falls, Nfld.	620
CKCN	Sept-Iles, Que.	560
CKCQ	Quesnel, B.C.	570
CKCV	Quebec, Que.	1280
CKAR-1	Huntsville, Ont.	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
CKCH	Hull, Que.	970
CKCK	Regina, Sask.	620
CKCL	Truro, N.S.	600
CKCM	Grand Falls, Nfld.	620
CKCN	Sept-Iles, Que.	560
CKCQ	Quesnel, B.C.	570
CKCR	Kitchener, Ont.	1490
CKCV	Quebec, 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	Kenora, Ont. Studio at Station CJRL	900
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

C.L.	Location	Kc.
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, Ont.	1230
CKMR	Castle Street, 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
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	
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
CFBC-FM	Saint John, N.B.	98.9
CFCF-FM	Montreal, Que.	92.5
CFFM-FM	Kamiloops, B.C.	98.3
CFMC-FM	Saskatoon, Sask.	103.9
CFMO-FM	Ottawa, Ont.	93.9
CFMS-FM	Victoria, B.C.	98.5
CFMW-FM	St. Norbert (Winnipeg), Man.	98.3
CFPL-FM	London, Ont.	95.9
CFQM-FM	Vancouver, B.C.	103.5
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
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
CJCA-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
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
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

Cuba and Mexico AM Stations by all Letters

The broadcast stations listed below carry regular program material and transmit with 5000 watts or better power output during at least part of their broadcasting day.

Cuba

Location	C.L.	Kc.
Havana	CMCY	550
	CMW	590
	CMQ	640
	CMCU	660
	CMBC	690
	CMCA	730
	CMCD	760
	CMCH	790
	CMCU	820
	CMBZ	830
	CMBL	860
	CMCF	910
	CMBF	950
	CMCK	980
	CMBF	1010
	CMCX	1040
	CMBS	1090
	CMBQ	1160
	CMK	1180
	CMCI	1260
	CMBG	1360
	CMBX	1390
	CMCQ	1420
	CMOX	1490
	CMBD	1520
Holguin	CMKJ	740
Santa Clara	CMHI	570
	CMHQ	630

Mexico

Location	C.L.	Kc.
Acapulco, Gro.	XEBB	600
Chetumal, Q.R.	XEDB	960
Chihuahua, Chih.	XEFI	580
	XEBU	620
	XEM	1390
	XEII	1420
Ciudad Acuna, Coah.	XERF	1570
Ciudad Juarez, Chih.	XELO	800
	XEJ	970
	XEF	1420
Ciudad Obregon, Son.	XEIC	810
	XEOX	1430
Coatzacoalcos, Ver.	ZEZS	1170
Culiacan, Sin.	XENW	710
	XEWS	1010
Guadalajara, Jal.	XEAV	580
	XEZZ	760

WHITE'S RADIO LOG

Location	C.L.	Kc.
	XEHL	1010
	XEWK	1190
	XEDK	1250
Hermosillo, Son.	XEBH	920
	XEDM	1580
Irapuato, Gto.	XEWE	1420
Jalapa, Ver.	XEJJ	1550
La Piedad, Mich.	XELC	980
Leon, Gto.	XELG	680
	XEX	730
	XEXG	6065
Matamoros, Tams.	XEEW	1420
Merida, Yuc.	ZEQW	50
Mexicali, B.C.	XECL	990
	XED	1050
	XEKC	1590
Mexico City	XEPH	590
	XENK	620
	XERPM	660
	XEN	690
	XEX	730
	XERC	790
	XELA	830
	XEUN	860
	XEW	900
	XEQ	940
	XEDF	970
	XEOY	1000
	XEQR	1030
	XEDP	1060
	XERCN	1110
	XEJP	1150
	XEB	1220
	XEL	1260
	XEBS	1410
	XELZ	1440
	XESM	1470
	XERH	1500
	XEMC	1590
	XEWW	6165
	XEWW	9515
	XEQQ	9680
	XEHH	11880
	XERR	15110
	XEWW	15160
	XESC	15205
Monterrey, N.L.	XEWA	540
	XEAR	570
	XEFB	630
	XENL	860
	XET	990
	XEG	1050
	XEMR	1140
	XEAW	1280
	XEFZ	1370
Nogales, Son.	XEHF	1370
Nuevo Laredo, Tams.	XEK	960
Oaxaca, Oax.	XEOA	570
Orizaba, Ver.	XETQ	850
Parras De La Fuente, Coah.	XEJQ	1440
Patzcauro, Mich.	XEXL	1370
Piedras Negras, Coah.	XEWU	580
Poza Rica. Ver.	XEPR	1480
Puebla, Pue.	XEPA	1370
Reynosa, Tams.	XERT	1170
Rio Bravo, Tams.	XEFD	590
Sabinas, Coah.	XEBX	610
San Luis Potosi, S.L.P.	XEWA	540
	XEBM	920
Tampico, Tams.	XEFW	810
Tijuana, B.C.	XETRA	690
	XEMO	860
	XEAU	1470
Torreon, Coah.	XEVK	1010
	XEBP	1310
	XETB	1350
Tuxpan, Nay.	XEUX	810
Tuxpan, Ver.	XETL	1390
Uruapan, Mich.	XEUF	610
Veracruz, Ver.	XEWB	760
	XEU	920
	XELL	1430
Villahermosa, Tab.	XEVA	790
	XEVT	970
Zamora,, Mich.	XEZM	650
Zitacuaro, Mich.	XELX	1460

World-Wide Short Wave Stations

The World-Wide short wave stations section of *White's Radio Log* is, as its name implies, a *log*, that lists stations actually monitored by listeners in the United States, Canada and overseas. It is *not* intended to be a listing of *all* shortwave transmitters, licensed as such listings contain numerous inactive transmitters, and low powered stations which are rarely heard by DX'ers. The stations listed here, therefore, are those most often reported and consistently heard during the past few months. Many have been monitored by DX CENTRAL, the official RADIO-TV EXPERIMENTER monitoring post in New York City.

Because of the fact that this log represents actual monitoring reports rather than data taken from published program schedules received from the stations, you may find that frequencies (and operating times) given here differ from *official listings*. This is because foreign short-wave stations frequently operate several kilocycles away from their assigned (and announced) frequencies. In addition, the schedules of these stations are often changed and the changes are not published in the schedules until many months later. We feel that the type of log which *White's Radio Log* is presenting represents a very realistic picture of the current status of short-wave broadcasting, and is something which cannot be obtained elsewhere.

Let Us Know. Listeners are invited to submit their loggings to us for publication in the Shortwave section of *White's Radio Log*. Be sure to include the following information for each station you report: approximate frequency, callsign and/or station name, city and country, and time heard in Eastern Standard Time, 24 hour clock. Address your reports to: DX CENTRAL, *White's Radio Log*, c/o RADIO-TV EXPERIMENTER, 505 Park Avenue, New York, N. Y. 10022, U.S.A.

Time To Listen. All times shown in *White's Radio Log* are in the 24 hour EST clock system. For example, 0800 is 8:00 AM EST, 1200 is noon EST, 1800 is 6 PM EST, and so on. For conversion to other time zones, subtract 1 hour for CST (0800 EST is 7 AM CST), 2 hours for MST, 3 hours for PST.

The following abbreviations are used in our listings: BC—Broadcasting Company, Corporation, or System; E—Emissora; R—Radio or Radiodiffusion; V—Voice or Voz.

Kc/s	Call	Name	Location	EST
2182	—	(marine emerg.)*	various ship & shore	—
2455	—	Zambia BC	Lusaka, Zambia	1100
2670	—	(U.S.C.G.)*	various ship & shore	—
2686	—	(U.S.C.G.)*	various ship & shore	—
2716	—	(U.S.N.)*	various ship & shore	—
3200	—	R. Club Mozambique	Nampula, Mozamb.	2330
3232	—	ORTF	Brazzaville, Congo	0015
3240	—	E. do Aero Clube	Beira, Mozamb.	1030
3284	—	Fiji BC	Suva, Fiji Is.	0415
3285	HISD	R. Sto. Domingo TV	Sto. Domingo, Dom. Rep.	1930
3345	—	R. Ghana	Accra, Ghana	1700
3346	—	Zambia BC	Lusaka, Zambia	1100
3366	—	R. Ghana	Accra, Ghana	1700
3370	—	R. Universitie	Tananarive, Malagasy Rep.	1000
3375	—	E. Offic. do Angola	Luanda, Angola	1245
3380	—	Malawi BC	Blantyre, Malawi	1315
3390	HCOTI	R. Zaracay	Sto. Domingo Cds., Ecu.	2100
3400	—	Jamaica Govt. R.	Kingston, Jamaica	1930
3720	HCGB4	R. Nac. Espejo	Esmeraldas, Ecu.	0700
3824	ZNF4V	Helehelele Mabeoana	Maseru, Basutoland	2350
3845	HCGB4	R. Nac. Espejo	Esmeraldas, Ecu.	2100
3950	HCPZI	R. Rumicha	Tulcan, Ecu.	0645
3995	HCJA5	V. del R. Tarqui	Cuenca, Ecu.	2045

Kc/s	Call	Name	Location	EST
4735	—	E. Niger'an BC	Enugu, Nigeria	1600
4760	YVKY	E. Vargas	La Guaira, Venez.	2300
4775	ZYH29	R. Drago del Mar	Fortaleza, Brazil	1955
4780	YVLA	V. de Carabobo	Valencia, Venez.	1830
4785	—	R. Tanzania	Dar es Salaam, Tanzania	1100
4790	—	R. Malaysia	Kuala Lumpur, Malaysia	0600
4795	—	R. Comercial	Sa da Banderia, Angola	1330
	—	ORTF	Brazzaville, Congo	0015
4797	—	R. Somali	Hargesia, Somalia	1230
4805	—	R. Villa Rica	Huancavelica, Peru	2300
4855	—	E. Nigerian BC	Enugu, Nigeria	1600
4820	—	R. Offic. do Angola	Luanda, Angola	0100
4886	CP77	R. Sararenda	Camiri, Bolivia	2300
4895	CR6RO	R. Clube do Bie	Silva Porto, Angola	1200
4904	HCVS6	V. de Saquisili	Saquisili, Ecu.	2100
4911	—	Zambia BC	Lusaka, Zambia	1100
4912	VTW2	R. Tarawa	Tarawa, Gilb. & Ellice I.	2300
4913	—	V. de Pacifico	San Lorenzo, Hond.	2200
4916	—	R. Trebol	Zaruma, Ecu.	2230
4920	VLM4	ABC	Brisbane, Australia	0400
4926	—	R. Equatorial	Bata, Sp. Guinea	1600
4936	CR6RB	R. Eccles a	Luanda, Angola	0030
4955	—	R. Clube Mozamb.	Nampula, Mozamb.	2230
4965	—	Zambia BC	Lusaka, Zambia	1100
4972	—	R. Yaounde	Yaounde, Cameroon	1500
4980	—	R. UFAC	Elisabethville, Congo	1100
4985	CP75	R. Cruz del Sur	La Paz, Bolivia	0600
5005	OAX2S	R. Jaen	Jaen, Peru	2100
5038	—	R. Malaysia	Kuala Lumpur, Malaysia	0800
5050	—	R. Tanzania	Dar es Salaam, Tanzania	1345
5055	—	R. Malaysia	Singapore, Malaysia	0900
5075	HJGC	Accion Popular	Bogota, Colombia	2040
5327	—	(U.S. Army Engineers)*	various	—
5499	—	(aeronautical)*	N. Pacific area	—
5850	OAX7L	V. del Altiplano	Puno, Peru	1955
5900	HCDFI	V. del Norte	Ibarra, Ecu.	2100
5930	OAX6E	R. Continental	Arequipa, Peru	0000
5942	—	Trans World R.	Bonaire, Neth. Ant.	1430
5954	TIQ	R. Casino	Puerto Limon, C.R.	2200
5955	TGNA	R. Cultural	Guatemala City, Guat.	0700
5960	HJCF	V. de Bogota	Bogota, Colombia	0600
5970	—	ORTF	Brazzaville, Congo	0015
	CKNA	R. Canada	Montreal, Que.	0230
5985	—	RAI	Rome, Italy	0735
	—	R. Peking	Peking, China	1430
5990	—	R. Sweden	Stockholm, Sweden	1530
5995	OAX4V	R. America	Lima, Peru	1945
6010	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	1045
	—	RAI	Rome, Italy	0700
6020	PCJ	R. Nederland	Hilversum, Holland	0900
6025	PCJ	R. Nederland	Hilversum, Holland	0200
	CR6RZ	E. Offic. de Angola	Luanda, Angola	0100
	—	V. of the West	Lisbon, Port.	2250
6030	—	BC Iraqui Rep.	Baghdad, Iraq	1430
6035	—	R. Elisabethville	Elisabethville, Congo	0800
	XZK3	Burma BC	Rangoon, Burma	0930
6040	HJC8	V. del Tolima	Ibague, Col.	0600
6055	HER2	Swiss BC	Berne, Switz.	1400
6070	—	R. Universitie	Tananarive, Malagasy Rep.	0700
	—	R. Sofia	Sofia, Bulgaria	1500
	CFRX	CFRX	Toronto, Ont.	0215
6075	—	R. Sutatenza	Bogota, Colombia	0600
6080	ZL7	R. New Zealand	Wellington, N.Z.	0100
6090	VLI6	ABC	Sydney, Australia	0400
	—	R. Luxembourg	Villa Louvigny, Lux.	2315
	LRY1	R. Belgrano	Buenos Aires, Arg.	2200
6095	—	BC Iraqui Rep.	Baghdad, Iraq	1430
	—	R. Sweden	Stockholm, Sweden	1645
	HJIQ	V. del Llano	Villavicencio, Col.	0600
6101	—	R. Montevideo	Montevideo, Uruguay	1830
6115	—	R. Union	Lima, Peru	0000
6120	—	Swiss BC	Berne, Switz.	2010
	4VEH	La. V. Evangelique	Cap Hatien, Haiti	1945
6130	LKJ	R. Norway	Oslo, Norway	1555
6150	VLR6	ABC	Melbourne, Australia	0400
6155	—	R. Prague	Prague, Czech.	0400
	OE121	Osterreichischen R.	Vienna, Austria	1800
6160	CKZN	CKZN	St. Johns, Nfld.	2100
6175	—	ORTF	Paris, France	1500
	ORU	R-TV Belge	Brussels, Belg.	1900
6180	HJCT	Inst. Nac. R-TV	Bogota, Colombia	2130
6185	—	V. of the West	Lisbon, Portugal	2250
6190	—	Vatican R.	Vatican City	1445
	—	R. Bucharest	Bucharest, Roumania	1330
6195	—	R. Burundi	Bujumbura, Burundi	1100
6210	—	R. Peking	Peking, China	1300
6235	—	R. Budapest	Budapest, Hungary	2200
6236	—	R. Santa Isabel	Sta. Isabel, Span. Guinea	1700
6270	—	R. Peking	Peking, China	1530
6537	—	(aeronautical)*	Caribbean area	—
6540	—	R. Pyongyang	Pyongyang, N. Korea	1500
6890	—	R. Peking	Peking, China	1300
7060	—	R. Peking	Peking, China	1430
7080	—	R. Peking	Peking, China	1300
7105	—	ORTF	Brazzaville, Congo	0015
7125	—	R. Warsaw	Warsaw, Poland	1635
	VUD	All India R.	Delhi, India	1445
7130	BED7	V. of Free China	Taipei, Formosa	0630
7160	—	R. Mogadiscio	Mogadiscio, Somalia	2200
7180	—	R. Kiev	Kiev, USSR	1930
7195	—	R. Bucharest	Bucharest, Roumania	1330
7215	—	R. Budapest	Budapest, Hungary	2200
	—	RAI	Rome, Italy	0955
7225	—	R. Bucharest	Bucharest, Roumania	1330
7235	—	RAI	Rome, Italy	0735
	VUD	All India R.	Delhi, India	1445
	—	E. Offic. de Angola	Luanda, Angola	0100
7240	—	E. de Aero Clube	Beira, Mozamb.	1100
7250	—	Vatican R.	Vatican City	1430
7260	—	R. Peking	Peking, China	1530
7265	—	R. Tirana	Tirana, Albania	0100
7305	—	R. Budapest	Budapest, Roumania	1930
7315	—	R. Peking	Peking, China	1430
7450	—	R. Peking	Peking, China	1300
7580	—	R. Pyongyang	Pyongyang, N. Korea	1500
7620	—	R. Peking	Peking, China	1530
9340	—	R. Peking	Peking, China	1530
9360	—	R. Nac. Espana	Madrid, Spain	2315
9457	—	R. Peking	Peking, China	1300
9480	—	R. Peking	Peking, China	1430
9504	—	R. Prague	Prague, Czech.	0400
9510	—	R. Bucharest	Bucharest, Roumania	1330
9515	ORU	R-TV Belge	Brussels, Belgium	1100
9520	OZF5	V. Denmark	Copenhagen, Denmark	2100
9530	DMQ9	Deutsche Welle	Cologne, W. Germ.	1605
9535	—	R. Offic. de Angola	Luanda, Angola	0500
	HER4	Swiss BC	Berne, Switz.	2047
9540	—	R. Budapest	Budapest, Hungary	1930
	ZL2	R. New Zealand	Wellington, N.Z.	0100
	—	R. Ulan Bator	Ulan Bator, Mongolia	0920
9545	DMQ9	Deutsche Welle	Cologne, W. Germany	1630
9550	—	ORTF	Paris, France	0015
9560	—	R. Berlin Int'l.	Berlin, E. Germany	2000
9570	—	R. Bucharest	Bucharest, Roumania	0630
9590	PCJ	R. Nederland	Hilversum, Holland	1500
9600	CE960	R. Pres. Balmaceda	Santiago, Chile	1700
9610	—	R. Kiev	Keiv, USSR	2330
9615	—	R. Pakistan	Karachi, Pakistan	1445
	ORU	R-TV Belge	Brussels, Belgium	1615
	—	R. Nac. Espana	Madrid, Spain	2025
9620	—	R. Sweden	Stockholm, Sweden	0430
9625	CKLO	R. Canada	Montreal, Que.	0230
	PCJ	R. Nederland	Hilversum, Holland	0900
9630	—	RAI	Rome, Italy	2000
9645	—	Vatican R.	Vatican City	1430
9650	—	Sinico R.	Bamako, Mali	0200
9655	—	Swiss BC	Berne, Switz.	2130
9660	—	R. Kiev	Kiev, USSR	1930
	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	1100
9665	HEU3	Swiss BC	Berne, Switz.	1400
9675	BED73	V. of Free China	Taipei, Formosa	0630
9680	—	R. Kiev	Kiev, USSR	1930

Kc/s	Call	Name	Location	EST
	VLH9	ABC	Melbourne, Australia	0400
	—	R. Moscow	Moscow, USSR	2100
9690	VUD	All India R.	Delhi, India	1445
	LRA	RAE	Buenos Aires, Argentina	2200
9700	—	R. Tirana	Tirana, Albania	0100
9705	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0930
9710	—	RAI	Rome, Italy	1700
	—	Mauritius BC	Forest Side, Maurit.	2300
	—	Lebanese BC	Beirut, Lebanon	2030
9715	PCJ	R. Nederland	Hilversum, Holland	0200
9730	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	0830
	—	ORTF	Brazzaville, Congo	0015
9745	ORU	R-TV Belge	Brussels, Belgium	1100
	—	R. Moscow	Moscow, USSR	2200
9750	—	R. Pyongyang	Pyongyang, N. Korea	1000
9755	—	VTVN	Saigon, S. Vietnam	0700
	—	ORTF	Paris, France	1800
9760	—	R. Kiev	Kiev, USSR	1400
	—	V. of Vietnam	Hanoi, N. Vietnam	0800
9765	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	1130
	—	R. Sofia	Sofia, Bulgaria	1900
9770	—	R. Berlin Int'l.	Berlin, E. Germany	2345
	OEI23	Osterreichischer R.	Vienna, Austria	1700
9810	—	R. Kiev	Kiev, USSR	1930
9830	—	V. of Vietnam	Hanoi, N. Vietnam	0800
9833	—	R. Budapest	Budapest, Hungary	1930
9860	—	R. Peking	Peking, China	1300
9865	—	V. Indonesia	Djakarta, Indonesia	1500
9875	—	R. Pyongyang	Pyongyang, N. Korea	1500
9900	—	R. Peking	Peking, China	1430
9915	VUD	All India R.	Delhi, India	1445
9920	—	R. Peking	Peking, China	1430
11630	—	R. Peking	Peking, China	1300
11672	—	R. Pakistan	Karachi, Pakistan	1445
11705	—	R. Havana	Havana, Cuba	0230
	—	V. of America	Tangier, Morocco	1100
11710	KGEI	V. of Friendship	San Francisco, Calif.	2138
11715	—	R. Havana	Havana, Cuba	0230
	YDF2	V. of Indonesia	Djakarta, Indonesia	1200
11720	CHOL	R. Canada	Montreal, Que.	1330
11722	—	R. Athens	Athens, Greece	1530
11725	—	ORTF	Brazzaville, Congo	0015
	—	R. Canada	Montreal, Que.	1800
11730	PCJ	R. Nederland	Hilversum, Holland	1600
11740	—	R. Peking	Peking, China	1330
	VUD	All India R.	Delhi, India	1445
11750	—	R. Pyongyang	Pyongyang, N. Korea	1500
11755	—	R. Japan	Tokyo, Japan	1130
11760	—	V. of Vietnam	Hanoi, N. Vietnam	0800
11765	CP39	R. Cruz del Sur	La Paz, Bolivia	0600
	—	Sawt Al Islam	Djeddah, Saudi Arabia	0030
11780	LRY2	R. Belgrano	Buenos Aires, Argentina	2200
	ZL3	R. New Zealand	Wellington, N.Z.	1200
11785	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	1330
11790	—	R. Kiev	Kiev, USSR	1930
	WRUL	R. N.Y. Worldwide	New York, N.Y.	0700
11795	YDF3	V. of Indonesia	Djakarta, Indonesia	0600
	WINB	WINB	Red Lion, Pa.	2100
11800	—	R. Nac. Espana	Las Palmas, Canary Is.	2115
11810	—	R. Bucharest	Bucharest, Roumania	0630
11820	WINB	WINB	Red Lion, Pa.	1500
	—	Trans World R.	Bonaire, Neth. Ant.	0100
	—	R-TV Ivorienne	Abidjan, Ivory Coast	1300
11825	BED69	V. of Free China	Taipei, Formosa	0630
11835	4VEH	La V. Evangelique	Cap Hatien, Haiti	1720
11845	ETLF	R. V. of Gospel	Addis Ababa, Ethiopia	1200
	—	ORTF	Paris, France	1330
11850	—	ORTF	Paris, France	0800
	LLK	R. Norway	Oslo, Norway	1555
11855	DZH8	Far East BC	Manila, Philippines	0330
11865	VUD	All India R.	Delhi, India	1445
11880	—	R. Iran	Tehran, Iran	1530
	—	R. Berlin Int'l.	Berlin, E. Germany	2000
	—	R. Nepal	Sanaa, Nepal	0100
	XEHH	R. Comerciales	Mexico DF, Mex.	2300
11885	ORU	R-TV Belge	Brussels, Belgium	1615
11895	ORU	R-TV Belge	Brussels, Belgium	0715
11905	—	ORTF	Paris, France	0015
	—	RAI	Rome, Italy	2000
11925	DMQ11	Deutsche Welle	Cologne, W. Germany	1615
11930	—	R. Berlin Int'l.	Berlin, E. Germany	2345
11940	—	R. Bucharest	Bucharest, Roumania	0630
11950	PCJ	R. Nederland	Hilversum, Nederland	0200
	PRL3	R. Min. Educ.	Rio de Janeiro, Brazil	2150
11970	—	ORTF	Brazzaville, Congo	0600
13750	—	R. Pyongyang	Pyongyang, N. Korea	1000
15077	—	R. Iran	Tehran, Iran	1130
15105	HCJB	V. of Andes	Quito, Ecuador	1530
15110	XERR	R. Comerciales	Mexico DF, Mexico	1600
	ZL21	R. New Zealand	Wellington, N.Z.	0000
15115	HCJB	V. of Andes	Quito, Ecuador	1800
	—	Vatican R.	Vatican City	0745
15125	—	V. Free Korea	Seoul, S. Korea	2200
15130	—	ORTF	Paris, France	1330
	—	WIBS	St. Georges, Grenada	1730
15135	—	R. Japan	Tokyo, Japan	0145
15155	WRUL	R. N.Y. Worldwide	New York, N.Y.	0700
	ZYB9	R. de Sao Paulo	Sao Paulo, Brazil	0745
15160	TAU	R. Ankara	Ankara, Turkey	1330
15165	OZF7	V. Denmark	Copenhagen, Denmark	1000
15170	—	BC Kingdom Jordan	Amman, Jordan	1600
15175	LLM	R. Norway	Oslo, Norway	1555
15185	OIX4	Finnish BC	Helsinki, Finland	0700
15190	—	ORTF	Brazzaville, Congo	1415
	—	Damascus Calling	Damascus, Syria	1730
15200	—	R. Prague	Prague, Czech.	1100
15220	—	R. Australia	Melbourne, Australia	1715
15225	—	R-TV Alger	Algiers, Algeria	1700
	DMQ15	Deutsche Welle	Cologne, W. Germany	1230
15240	—	R. Australia	Melbourne, Australia	1715
	—	R. Sweden	Stockholm, Sweden	1245
15270	DMQ15	Deutsche Welle	Cologne, W. Germany	1615
	—	Sawt Al Islam	Djeddah, Saudi Arabia	0030
15300	DZH9	Far East BC	Manila, Philippines	1655
15310	WRUL	R. N.Y. Worldwide	New York, N.Y.	0945
15315	—	R. Bucharest	Bucharest, Roumania	0630
15320	CKCS	R. Canada	Montreal, Que.	1330
15335	ORU	R-TV Belge	Brussels, Belgium	0500
15345	—	ORTF	Paris, France	0800
15370	—	R. Tupi	Rio de Janeiro, Brazil	0620
15385	—	R. Bucharest	Bucharest, Roumania	1330
15410	ETLF	R. V. Gospel	Addis Ababa, Ethiopia	0815
15425	PCJ	R. Nederland	Hilversum, Holland	0900
	VLX15	ABC	Perth, Australia	0400
	—	R. Nac. Espana	Madrid, Spain	0620
15440	WRUL	R. N.Y. Worldwide	New York, N.Y.	1030
15500	—	R. Havana	Havana, Cuba	1615
17720	—	ORTF	Brazzaville, Congo	0800
17745	WRUL	R. N.Y. Worldwide	New York, N.Y.	1300
17750	ORU	R-TV Belge	Brussels, Belgium	0715
17810	—	Far East BC	Manila, Philippines	1655
17820	CKNC	R. Canada	Montreal, Que.	1330
17825	LLN	R. Norway	Oslo, Norway	1555
17850	HCJB	V. of Andes	Quito, Ecuador	1600
17860	ORU	R-TV Belge	Brussels, Belgium	0500
17875	—	R. Japan	Tokyo, Japan	0145
17880	WRUL	R. N.Y. Worldwide	New York, N.Y.	0745
17890	HCJB	V. of Andes	Quito, Ecuador	1800
21500	—	ORTF	Brazzaville, Congo	0800
21510	ORU	R-TV Belge	Brussels, Belgium	0500
21580	—	ORTF	Paris, France	0800

Build the Aero-Bander

Continued from page 50

way into the plug. Form a safety loop out of the tip of the antenna.

Testing and Tuning Up. Set the radio to be used with the converter to a clear spot at about 1600 kc. Place the plastic window on the converter as near as possible to the antenna coil in the radio. Turn on both the radio and the converter. Tune coil L3 in and out slowly, at some point a rushing noise should be heard from the radio. Tune L3 for maximum noise. Set tuning control capacitor C7, to maximum capacity. Couple the output of a signal generator, or a grid-dip meter, set to 115 mc. to the antenna. Tune the range adjustment control, capacitor C6, until the output of the signal generator is heard from the radio. The converter will now tune from 115 mc. to 127 mc. The range adjustment control, capacitor C6 can be set so that tuning control, capacitor C7, will tune any 12 mc. band from 95 mc. to 135 mc.

If difficulty is experienced obtaining the rushing noise described, which indicates that the oscillator is working, recheck the wiring, and the polarity of B1. If you still can't get the circuit to operate, couple a grid-dip meter set to operate as a wave meter, to coil L4. If you don't get a reading by tuning over the oscillator frequency, move the tap on L4 up, a turn at a time until you do. This indicates that the circuit is working. With some transistors it may be necessary to connect the tap on L4 to within a turn or two of the top of the coil to obtain proper operation.

A Modification. Although the Aero-Bander was designed to cover the aeronautical bands only, it can be modified to receive the two-meter ham band. This is easily accomplished by removing one turn from coils L2 and L4.

Operation. When you have the converter working properly, you will be able to tune in any 12 mc. segment of the aeronautical band. The author chose to set his to receive the 115 mc. to 127 mc. portion of the band, where the most interesting local stations were heard. In operation the antenna tuning control, capacitor C2, should be peaked for maximum signal, or in the absence of a signal for maximum noise. As this control is quite sharp, keep it peaked as you tune. The weaker the station being received, the more critical the tuning will be. Keep in mind that the Aero-Bander was not meant for long range use, but for use nearby or at airports. ■

Build the Versameter

Continued from page 97

session we completed all of the wiring, added the external *spit and polish* with Ami-Cal dry transfer titles and dressed up the interior by cabling and lacing the wiring. Like the fabled pudding, the final test was in the *eating* so we put the little Versameter through its paces. As a wavemeter, fine; we merely threw S2 to RF and S3 to LIGHT and checked all bands using the light bulb indicator with a type 49 bulb (2.0 volts, .06 amps). Good indication everywhere using my Ranger II transmitter as an exciter. Next we flipped S3 to METER and ran through all the bands again; good meter indications all around. Placing a short antenna (about 3 feet of hook-up wire) on the antenna post, we put the transmitter on the air and got good meter readings on all bands in a radius of about 35 feet from the antenna and the meter reading fell off properly as transmitter power was reduced. We had a good field strength meter with S2 in the RF position and S3 on METER. Next, although it obviously *had* to work, we put S2 in the M+M− position and had a usable 0-1 milliammeter across J2 and J3 and divorced from the rest of the Versameter. Last, we plugged a pair of phones into J1 and easily monitored the transmitted voice using our little 3-foot antenna with S2 on RF and S3 on METER; we even heard a couple of local hams with fair volume!

Mass Production. Both Gene and I like the Versameter so well that we're going to build another so we can *each* have one. Build one yourself—use just about any parts you have lying around. There is nothing critical about it; just stick to the drawing, arrange the parts to suit yourself and label them properly. Use a bit of care in getting your coil winding and taps just right; you may have to *prune* or *pad* a bit; or maybe like us, you'll come out all right without either. You'll find the little Versameter just what its name implies—truly versatile. And it's one of the handiest little gadgets you could have round the shack. ■

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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 516-page 1965 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!

3. *Progressive "Edu-Kits" Inc.* now has available their new 1965 catalog featuring hi-fi, CB, Amateur, test equipment in kit and wired form. Also lists books, parts, tools, etc.

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

13. Here's a beautifully presented brochure from *Altec Lansing Corp.* Studio-type mikes, two-way speaker components and other hi-fi products.

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. Two brand new full-color booklets are being offered by *Electro-Voice, Inc.* that every audiophile should read. They are: "Guide to Outdoor High Fidelity" and "Guide to Compact Loudspeaker Systems."

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. Here's a complete catalog of high-styled speaker enclosures and loudspeaker components. *University* is one of the pioneers in the field that keeps things up to date.

26. When a manufacturer of high-quality high fidelity equipment produces a line of kits, you can just bet that they're going to be of the same high quality! *H. H. Scott, Inc.*, has a catalog showing you the full-color, behind-the-panel story.

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.

28. Very pretty, very efficient, that's the word for the new *Betacom* intercom. It's ideal for stores, offices, or just for use in the home, where it doubles as a baby-sitter.

30. Tone-arms, cartridges, hi-fi, and stereo preamps and replacement tape heads and conversions are listed in a complete *Shure Bros.* catalog.

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. "The Care and Feeding of Tape Recorders" is the title of a booklet that *Sarkes-Tarzian* will send you. It's 16-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 1964 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. A compresensive analysis of *Uher* tape recorders and a complete listing of accessories are all in their up-to-date 16-page brochure.

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!

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

45. Catering to hams for 29 years, *World Radio Laboratories* has a new FREE 1965 catalog which includes

all products deserving space in any ham shack. Quarterly fliers, chock-full of electronic bargains are also available.

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 16-page 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.

52. If you're a bug on CB communications or like to listen in on VHF police, fire, emergency bands, then *Regency Electronics* would like to send you their latest specs on their receivers.

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

55. Interested in CB or business-band radio? Then you will be interested in the catalogs and literature *Mosley Electronics* has to offer.

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.

SCHOOLS AND EDUCATIONAL

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

57. *National Radio Institute*, a pioneer in home-study technical training, has a new book describing your opportunities in all branches of electronics. Unique training methods make learning as close to being fun as any school can make it.

36. *Coyne Electronics Institute* offers home/resident training in electricity, radio-TV, electronics, refrigeration and air conditioning.

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*.

60. Facts on accredited curriculum in E. E. Technology is available from *Central Technical Institute* plus a 64-page catalog on modern practical electronics.

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. Circle #74.

94. *Intercontinental Electronics School* offers three great courses: stereo radio & electronics; basic electricity; transistor. They are all described in *Inesco's* 1965, 16-page booklet.

ELECTRONIC PRODUCTS

62. Information on a new lab transistor kit is yours for the asking from *Arkay International*. Educational kit makes 20 projects.

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.

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70. *Heath Co.* now has a 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 1964 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.

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78. Learn about *Xcelite's* line of pliers and snips, specialized for radio, TV and electronic work. *Xcelite's* hand tools offer many advantages worth looking into. Bulletins N464 and N664.

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Lab Check—Knight-Kit KG-625

Continued from page 80

tion and range switches the electronics is on a subassembly, using straight-line connections. That is, the components are wired from point-to-point in a grid arrangement; lack of criss-crossed wiring virtually eliminates the possibility of wiring errors.

Calibrating the kit couldn't be easier since the calibration controls are clearly marked and are accessible through the cabinet. But two corrections must be noted: while Knight recommends "burning in" the tubes for 8 hours before calibration, we found the zero-set stability after 8 hours was almost nonexistent. Switching from function-to-function and range-to-range caused the meter to drift. We suggest a more typical 60 hour burn-in which results in rock-steady stability. This is not a kit fault, but rather an inherent vacuum tube characteristic that the best laboratory meters overcome by burning in instrument tubes for some time. After the 60 hour burn-in, we could switch to any range or function, with the exception of .5 volts DC, and the needle wouldn't budge off the zero-set. The .5 VDC range drifts one or two scale divisions but this is normal for any .5 VDC range on any service grade VTVM.

Another difficulty was the placement of leads about the input lead. The Knight pictorials allow a power transformer lead to be placed directly next to the input lead, this caused a zeroing problem on the 1.5 VAC range. Make certain the input lead is in the clear, push all wires away from the input and you'll get optimum stability on all ranges.

On the Test Bench. As far as total performance goes the KG-625 is very good. Accuracy on all functions was well within the specs of ±3% DC, ±5% AC. Decading accuracy was very good; as example, with an input voltage driving to 15 volts full scale, the reading was exactly 15 volts when the range switch was set to 50 volts.

Ohmmeter accuracy and decading is good, our precision test resistor indicated well within specifications for the low, middle and high scale tests.

Considering its good performance and conveniences, the KG-625 kit at $36.95 ($53.95 factory wired) represents a good buy for both the hobbyist and service shop. The KG-625 is at the top of its price class. To get better performance, only laboratory instruments at many times the KG-625's price are available and then they can only hope to duplicate Knight-kit's usefulness on your test bench. For more information write to Allied Radio, Dept. JR, 100 N. Western Avenue, Chicago, Ill. 60680 for complete specifications. ■

Lab Check—Lafayette HB-600

Continued from page 82

are detuning the receiver. If the received station is really off-frequency, using the Delta tuning will increase the speaker volume since the station is now properly tuned.

Setting the Soup Out. The transmitter delivers slightly under three watts output into a 50-ohm antenna system. Since the output meter is calibrated for 50-ohm loads, an excessively high output reading—above 3 watts—is generally indicative of a high SWR.

The modulation is sharply limited to 100 percent, even if you shout. A so-called *Range-Boost* (a speech compressor) is provided. When the Range-Boost is switched-in the lower voice levels are boosted approximately 6 db; the effect at the receiving station is a sharp increase in "talk power."

And More. The power supply, which operates off either 117 VAC or 12 VDC has a "floating" primary, that is, there is no connection to the chassis. The transceiver can be used in vehicles with either positive or negative battery grounding. Positive or negative connection is made automatically—there is no special switching, power plug rewiring or power plug orientation to be remembered. You simply connect the red power supply lead to the positive battery terminal (or tie point) and the black lead to the negative battery terminal. Both power supply leads are fused, so it makes no difference which battery terminal is grounded—fuse protection is supplied 100% of the time.

In our opinion, while the HB-600 is outstanding in terms of selectivity, sensitivity and clean audio, just the noise silencer alone justifies the $219.95 price tag. For more information on the HB-600 write to Lafayette Radio, Dept. KCP, 111 Jericho Turnpike, Syosset, N. Y. 11791. ■

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ADVERTISING INDEX

Scott LK-60 Amplifier

Continued from page 90

manual has short-comings. Four lines in the manual (their page 50) tell you which circuit is the left channel and right channel. Since there was a defect in one of the pre-wired boards we had occasion to utilize the manual to the fullest extent in order to locate the fault. In our opinion the lack of precise service hints turned what should have been a fifteen minute job into two hours. We suspect the service section was written by an engineer rather than a service technician.

LK-60 Specifications (Measured)

Power output per channel—30 watts steady-state, 40 watts peak
Distortion at 30 watts—less than 1%
Tape head sensitivity—2.1 mv.
Magnetic sensitivity—3, 5, 9 mv.
High level inputs—.5 v.
Noise level—55 db
Boost and cut at 30 cycles—10.5 db
Boost and cut at 10 kc.—9.8 db

Big Extras. Two features not normally common to amplifiers or kits were particularly attractive.

The first is a relative power output meter. Since both the bias and balance of the output transistors are user adjusted some means had to be provided so the adjustments could be made by the average audiophile, someone who does not find service instruments necessary for the enjoyment of music. So Scott included a built-in panel meter with the appropriate switching so *any builder* could easily *factory align* the LK-60 (the alignment is so simple there's no need to go into it). Since the meter was already on the panel Scott provided a selector switch position for *relative power output.* While the meter calibration of 0-10 does not represent any specific power level, we found that a full scale reading of 10 represented 30 watts output, while 40 watts was represented when the needle just about "pinned." While the power output meter is not necessarily useful when the speakers are in the same room as the amplifier, it became almost indispensable when using remote speakers. For example, suppose the remote speakers are located in another room, and they have a different efficiency than the main speakers —where to set the volume control? With the LK-60 you determine the proper volume the first time and then note the meter reading. Henceforth, whenever you switch to the remote speakers you crank up the volume control—regardless of the signal's source—to the correct meter reading. It saves a lot of running back and forth.

The second unusual feature is a 15 watt light bulb supplied with the kit. When the kit is assembled, and before power is first applied, the light bulb is switch-connected in series with the power transformer. Should there be any short circuits which could cause rather expensive damage to the output transistors, power supply rectifier or the power transformer, the light bulb will take up the full load, dropping the voltage to the transformer to a safe value. Since the bulb takes up the full load it glows to almost full brilliance *if there is a short.* If the amplifier is wired correctly or if there is no short or wiring error which would cause *expensive damage* the bulb will flash to full brilliance and then drop to a steady dull glow. While the lamp is strictly a protective device it's comforting to know that even if you've never wired a kit before you can tackle the LK-60 without worrying about blowing $50 worth of parts on a wiring error.

The Scott LK-60 tagged with a $189.95 price will prove to be a pace setter in the solid state component market place. A companion all-transistor tuner, the LT-112, is currently available. For complete specifications on both units write to H. H. Scott, Inc., 111 Powdermill Road, Maynard, Mass. 01754. ■

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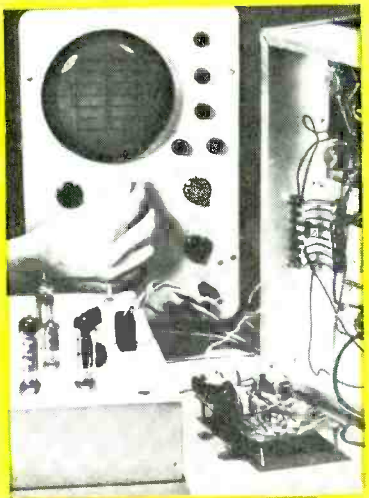

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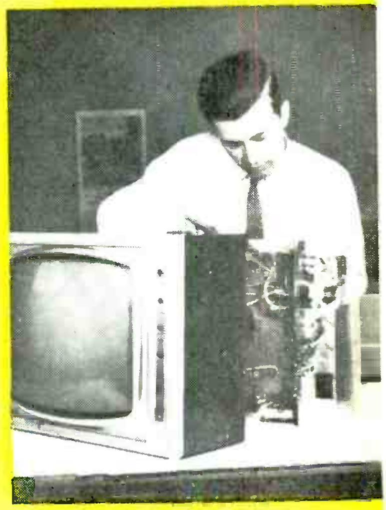

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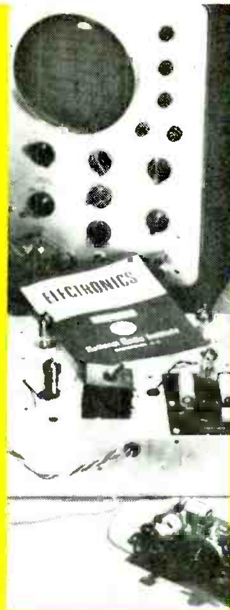


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