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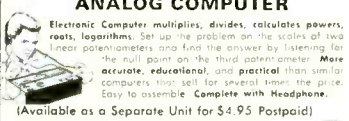

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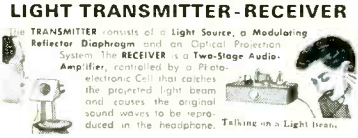

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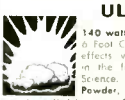

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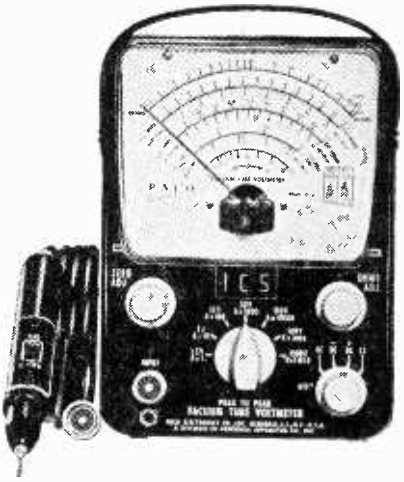

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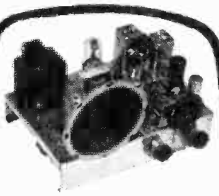

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DECEMBER 1964—
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VOLUME 17 No. 3

RADIO-TV EXPERIMENTER

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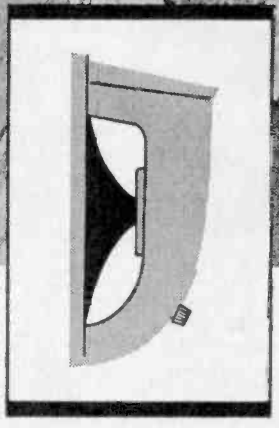

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POSITIVE FEEDBACK

Julian M. Sienkiewicz, Editor
WA2CQL/2W5115

Docket 14843 is the fancy name for an item in the FCC files which has been hovering over the heads of all CB'ers for almost two years. It is, specifically, an FCC proposal for a major revamping of the FCC's rules and regulations governing citizens radio service. We should say, it *was* an FCC proposal, because this past summer the FCC finally took action on the proposal and pushed through a number of changes in the rules which they scheduled for a November 1 "in effect" date.

It has long been known that the Commission has been trying to discourage the strictly "hobby" use of CB, that is, using CB as if it was a poor man's ham radio service. This FCC discouragement has been despite the fact that a seemingly overwhelming majority of the CB users would prefer at least a *little* hobbying mixed in with their other uses for the service. Regardless of this, the new rules would *seem to be* a tightening of the former rules, however, upon close examination they are but a restating of the majority of the previous rules with only a few really BIG changes.

Channel Limitations. The major change is that CB'ers will be restricted to using *only* channels 9, 10, 11, 12, 13, 14, and 23 for communications between stations of different licenses. The remaining channels are to be used *only* for communications between units of the same licensee.

The following types of messages and transmissions are now specifically *forbidden,* under any circumstances, on CB, according to the new rules: activities in violation of law, carrying on communications for hire, communications containing obscene, indecent or profane words, language or meaning; communications in the nature of a broadcast or those not directed to specific persons; malicious interference; transmissions of music,

FLASH!! The FCC has decided not to go ahead with the proposed rules changes on November 1st as mentioned in the editorial on this page. The Editor expects the date will be delayed 90 days during which time new hearings will be made. In all probability the rules will remain relatively unchanged and will go into effect the early part of 1965.

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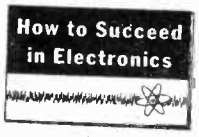

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whistling, sound effects, etc.; communications to stations *of other licensees* relating to technical performance, capabilities, testing of any transmitter, including transmissions concerning signal strength or frequency stability of transmitters; communications advertising or soliciting the sale of goods or services; communications to another station of more than 150 miles; in addition to these rules, persons selling CB gear shall not allow customers to operate under the seller's station license.

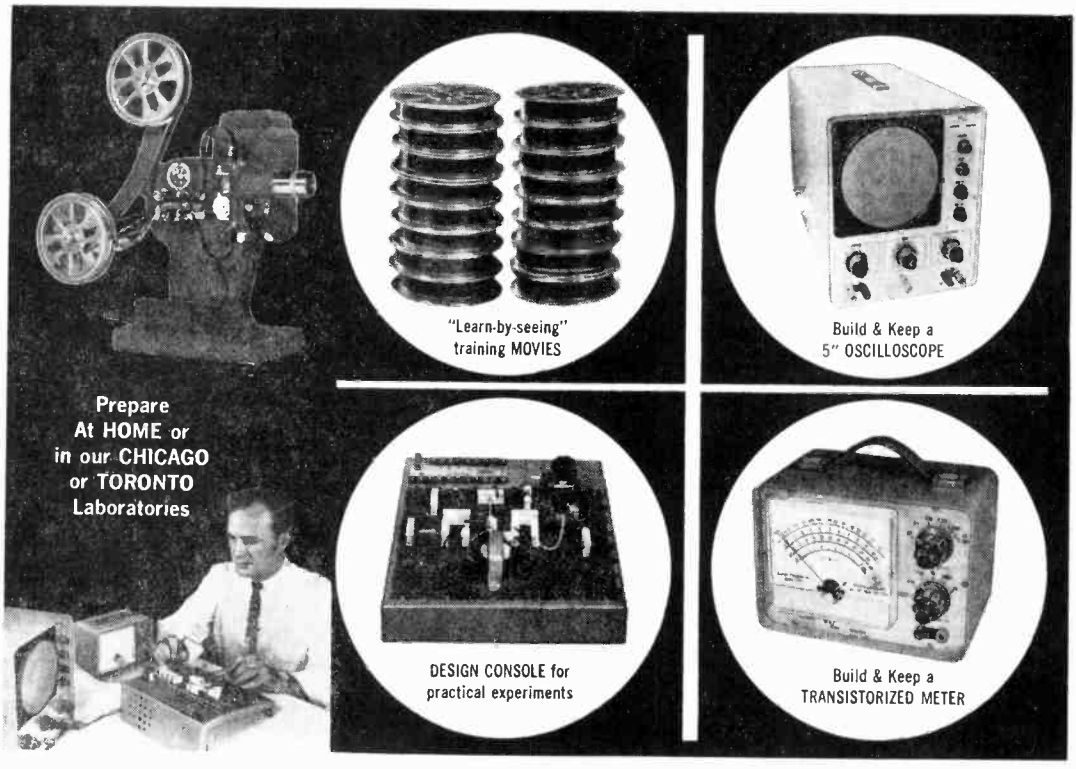
Time Limit. Other significant portions of the new rules state that communications *between stations of different licensees* may not exceed five minutes, and that a five minute silent period must be then observed before another transmission is permitted. The call sign shall be used on each frequency utilized, and the call sign of the station being called shall be included in the complete identification. If a contact is switched to another channel, the complete identification must again be given on the new channel.

The FCC spelled out in no uncertain terms that there is to be no further "loaning call signs to a friend," and that a call sign may be used only by the licensee himself and by members of his immediate family living in the same household, or by employees of the licensee acting within the scope of their employment.

The one exception to this rule is in the instance of certain organizations such as Civil Defense, volunteer fire departments, auxiliary police departments, etc., which are now authorized to take out a license for a large number of units and "loan out" the calls to participating stations which may already be licensed with their own call signs.

The other main change in the rules specifies that if you should have your license taken away from you by the FCC, you will not be permitted to operate another fellow's station until you are again issued your own license.

Those are the basic changes, and there are one or two things which may be guessed at by reading between the lines and by knowing something of the FCC's psychology. It is our opinion that any improper uses of CB on channels 1 through 8 and 15 through 22 will be delt with severely. We also feel that the Commission may "tolerate" a limited amount of *unauthorized* communications on channels 9 through 14 and on 23, with the hopes that



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SOUND INTERESTING? Then see for yourself how YOU may get ready to join the many DeVry graduates now enjoying good jobs, fine salaries and real progress in one of today's outstanding fields–ELECTRONICS. Mail the coupon today for no-obligation details.

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Please give me your two free booklets, "Pocket Guide to Real Earnings" and "Electronics in Space Travel"; also include details on how to prepare for a career in Electronics. I am interested in the following opportunity fields (check one or more):

- ☐ Space & Missile Electronics
- ☐ Television and Radio
- ☐ Microwaves
- ☐ Radar
- ☐ Automation Electronics
- ☐ Communications
- ☐ Computers
- ☐ Broadcasting
- ☐ Industrial Electronics
- ☐ Electronic Control

Name_____ Age_____

Address_____ Apt._____

City_____ Zone_____ State_____

☐ Check here if you are under 16 years of age.

Canadian residents: Write DeVry Tech of Canada, Ltd.
2094 970 Lawrence Avenue West, Toronto 19, Ontario

Positive Feedback

the operators will talk themselves out and either get a ham license or lose interest. If these transmissions, however, get too obnoxious the operators will wind up behind the Commission's 8-ball.

FTC Steps In. Back in August of this year, the FTC (Federal Trade Commission) took what many believed to be a poke at the manufacturers of CB equipment. In the letter it was stated, "It is believed that much of this misuse of Citizens Radio Service equipment is due to widespread misunderstanding as to the permissible use of this equipment and that much of the misunderstanding flows from advertisements of such equipment which describe its use without setting forth the limitations imposed by law or which are placed, without any reference to use, in publications which present the use of equipment as a hobby in and of itself."

The above quote is quite a mouthful, but the FTC did not stop there; they want the manufacturers to include the following paragraph as a part of their paid advertisements in periodicals:

> *"Transmitting equipment employed for voice communication in the Citizens Radio Service must be operated under a station license issued by the Federal Communications Commission and in accordance with the limitations on permissible communications contained in Part 95, (formerly Part 19) Citizens Radio Service, of its rules. The operation of such equipment as a hobby, in and of itself, or for the exchange of aimless small talk is not permitted."*

Who's At Fault? The FTC is bearing down on CB equipment manufacturers, however, your editor believes that the pressure is not justified. As one manufacturer said to me, "They are asking me to put more words in my ads than I use to describe the product itself, and I am asked to use print as large as the type used to describe the unit." Further, he claimed that he would be very happy to spell out the legal uses of the equipment in his catalogs and mailing leaflets. His views were shared by several other CB manufacturers.

Why should the FTC bear down on manufacturers when the magazines are to blame? Today, you can walk to a newsstand and find a few electronic periodicals which either dedicate their complete editorial content to CB as a hobby, or include a featured column

Choose Your Tailor-Made Course in N.T.S. "PROJECT METHOD" ELECTRONICS!

Now! N.T.S. — one of America's oldest leading home-study and resident technical schools — offers you GREATER CAREER OPPORTUNITIES IN ELECTRONICS. N.T.S. "Project Method" home training lessons are shop-tested in the Resident School in Los Angeles. You work on practical job projects, learn to use shop manuals and schematics. Your N.T.S. training is individual. You proceed at your own pace. The Schools' practical methods, plus more than 60 years of experience, have helped thousands of students all over the world to successful careers. Prepare now for a secure future in one of 8 N.T.S. Electronics Courses designed to fit your own particular needs.

Work on the electronic "brains" of industry — computers, data processing and other automation equipment. Become a TV-Radio Technician, an electronics field engineer, or succeed in your own business.

CHOOSE YOUR FIELD—INSURE YOUR FUTURE!

1 **ELECTRONICS-TV-RADIO-SERVICING & COMMUNICATIONS** A basic course thoroughly covering fundamentals of electronics, radio, TV servicing and communications.

2 **MASTER COURSE IN ELECTRONICS-TV-RADIO, PLUS ADVANCED TV & INDUSTRIAL ELECTRONICS** This course covers everything included in Course No. 1 plus Automation and every phase of the Electronics industry.

3 **FCC LICENSE** Preparation for this government license essential for interesting jobs in radar, radio, television, communications, guided missiles, many others. Upon completion of this course, if you do not pass the FCC exam for a 1st Class Commercial Radiotelephone License your tuition will be refunded.

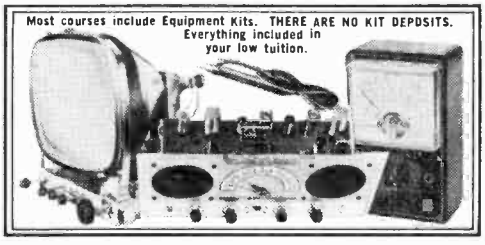
4 **RADIO SERVICING (AM-FM-Transistors)** Train for radio sales and service with dealer or distributor.

5 **TELEVISION SERVICING (Including Color)** Covers installation, adjustment, repair and servicing of black and white and color television . . . prepares you for your own sales and service business.

6 **STEREO, HI-FI AND SOUND SYSTEMS** A growing field. Prepares you to build, install and service modern sound equipment for home or industry.

7 **BASIC ELECTRONICS** Gives you the fundamentals you must know to build on for a future Electronics career. Also offers an excellent background for Salesmen, Purchasing Agents, and others in Electronics.

8 **ELECTRONICS MATH** Simple, easy-to-follow instructions in the specialized math you need in many electronics jobs.



CLASSROOM TRAINING AT LOS ANGELES

You can take classroom training in our famous Resident School at Los Angeles in Sunny Southern California. N.T.S. is the oldest and largest school of its kind. Associate in Science Degree also offered in our Resident Program. Check Resident School box in coupon for full details.

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Learn easily. New modern method. National also offers accredited high school programs for men and women. Take only subjects you need. Study at your own pace. Latest approved textbooks—yours to keep—everything included at one low tuition. Check High School box in coupon for information.

MAIL COUPON TODAY FOR FREE BOOK AND SAMPLE LESSON

In Field of Your Choice.

You enroll by Mail — and Save Money. No Salesmen: This means lower tuition for you. Accredited Member N.H.S.C.

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NATIONAL TECHNICAL SCHOOLS

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Please Rush FREE Electronics "Opportunity Book" and sample lesson on course checked below:

- ☐ Electronics-TV-Radio Servicing & Communications
- ☐ Master Course in Electronics-TV-RADIO Advanced TV & Industrial Electronics
- ☐ FCC License
- ☐ Radio Servicing (AM-FM-Transistors)
- ☐ Television Servicing (Including Color)
- ☐ Stereo, Hi-Fi and Sound Systems
- ☐ Basic Electronics ☐ Electronics Math

Dept. RKK-114

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Address _____

City _____ State _____ Zip _____

☐ Check here if interested ONLY in Classroom Training at L.A.

☐ Check here for High School Department Catalog only.

Positive Feedback

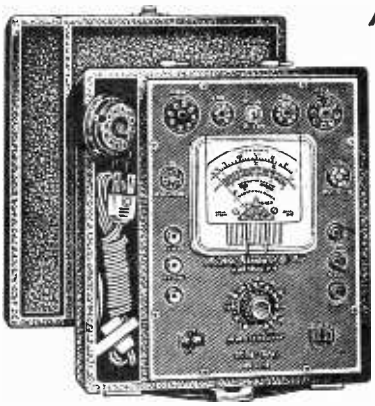
and an article or two on "hobbying it up on CB." It is these magazines that misinform their readers as to the proper use of CB more so than the advertisements in them. If magazines, through their editorial content, encourage misuse of the CB service, then it is these magazines that should be called to task before the FTC.

Call Channel. It would certainly seem that now is the time for CB'ers to decide that the long talked about plan to make *Channel 9* the *National Emergency Calling and Traveling Frequency* to be monitored when you've got the rig on and you aren't in communication with another station. If you want to reach another station, you would call the station on *channel 9*, and once the contact is established, the chatter would switch to any of the other authorized channels so as to keep channel 9 clear at all times for calls from local stations and mobile units. Out-of-towners passing through your area will appreciate this when they need road directions or other help. You will appreciate this too, as the "calling channel" method of communications has been tried and proven in a number of other long established radio services. The use of a calling channel will promote a large degree of self-policing among CB'ers as well as an increased willingness to obey the FCC rules. For a calling channel to operate successfully, it will require CB'ers to develop a spirit of dedication to the rules and regulations of the service parallel to that exercised by amateurs on their bands. ■

"And to think that I used to complain about commercial TV programming!"

New Model 161 UTILITY TESTER®

FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS • AUTOMOBILES • TV TUBES



As an electrical trouble shooter the Model 161:

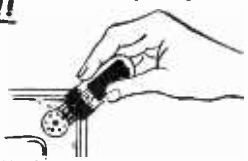
- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.
- *Will test all TV tubes (including picture tubes)* for open filaments and burned out tubes.
- Measures A.C. and D.C. Voltages, (Both 110 Volt and 220 Volt lines).
- Will measure current consumption (amperes) *while the appliance under test is in operation.*
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.

As an Automotive Tester the Model 161 will test:

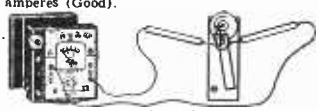
• Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

IT'S SO EASY!!

With tester's cord in outlet, current consumption of appliance is read direct on meter when line cord is connected to receptacle on panel. This typical iron takes 7 amperes (Good).



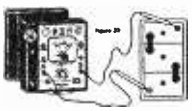
Simply insert tube in appropriate socket then follow procedure as outlined in our manual.



Control circuits of most furnaces use 24 volts obtained from step-down transformer. Here's how to check room thermostat to see if wires to it are live.

Small electric fan motor indicates 50 ohms (normal resistance).

Test Generators
READ THIS!



Test Storage Batteries
READ THIS!

Test Circuit Breakers
READ THIS!

INCLUDED FREE!!

This 56-page-book—practically a condensed course in electricity. Learn by doing.

Just read the following *partial* list of contents:

• What is electricity? • Simplified version of Ohms Law • What is wattage? • Simplified wattage charts • How to measure voltage, current, resistance and leakage • How to test all electrical appliances and motors using a simplified trouble-shooting technique.

• How to test all TV tubes; also simple procedure for determining which specific tube (or tubes) is causing the trouble.

• How to trace trouble in the electrical circuits and parts in automobiles and trucks.

Model 161 comes complete with above book and test leads. Only $22.50

You don't pay for the Model 161 until AFTER you have examined it in the privacy of your home!

SEND NO MONEY WITH ORDER
PAY POSTMAN NOTHING ON DELIVERY

Try it for 10 days before you buy. If completely satisfied *then* send $5.00 and pay the balance at the rate of $5.00 per month until the total price of $22.50 (plus small P.P. and budget charge) is paid. If not completely satisfied, return to us, no explanation necessary.

ACCURATE INSTRUMENT CO., INC.
Dept. D-373, 911 Faile St., Bronx 59, N. Y.

Please rush me one Model 161. If satisfactory I agree to pay $5.00 within 10 days and balance at rate of $5 per month until total price of $22.50 (plus small P.P. and budget charge) is paid. If not satisfactory, I may return for cancellation of account.

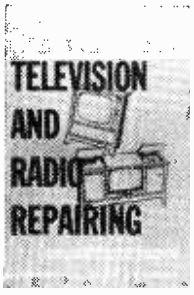
Name _____

Address _____

City _____ Zone _____ State _____

BOOKMARK
by Bookworm

WITH Christmas just around the corner, your o' Bookworm suggests you visit a book store to solve many of your tough gift problems. Far too often one hears people complain, "Don't know what to get that boy—always has his nose in books." Never before have book stores been so well equipped to serve the needs of parents and wives looking for gifts for their families' electronic *geniuses*. And if you want to treat yourself any time throughout the year, browse about your nearest book store—you may bump into me as we both reach for the latest electronic title.

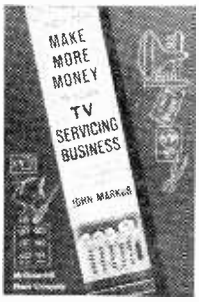


568 pages
Hard cover
$8.95

Servicing. A new title and a second edition by *John Markus* will make many a new comer to radio and TV servicing an expert and money-maker in short time. The titles are *Television and Radio Repairing* and *How to Make More Money in your TV Servicing Business*. The former is a practical manual of television and radio servicing containing simple step-by-step instructions for testing, repairing, and replacing all parts. The latter offers sound, practical, business tips and techniques for making more money *honestly* and how to avoid financial pitfalls that even some pros make.

Before you have gotten halfway through *Television and Radio Repairing* you can go out and fix half the television and radio receivers that come your way. The author, a long-recognized expert, shows *how* in a new and completely practical way. Every sentence is boiled down to give you facts in a hurry. Only those facts that will give you

some real help in testing and repairing sets are included. The book begins the minute after you've decided to get into the money-making field of radio and television servicing. It tells you what servicing involves—how to get information and help—and the tools you'll need on the job. You're told enough of how radio and TV sets work to help you talk to customers confidently.



346 pages
Hard cover
$7.95

The *How to Make More Money in . . .*" title is a storehouse of some of the most helpful business tips and techniques ever brought together for the purpose of making money and avoiding financial pitfalls in television, radio, and home audio servicing business. It offers a carefully coordinated program for making one's own business pay a profit.

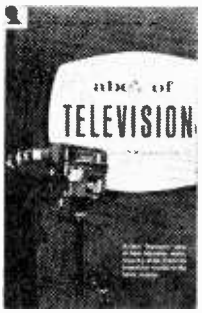
In addition, the text gives you valuable advice on such business routines as the right way to make out a bill; how to handle the money you make; setting up records; planning your advertising program; making telephone-directory ads pay off; getting new customers; handling callbacks and complaints; hiring and managing a good serviceman; the dangers of buying a service business; taking care of installment taxes, etc. In fact, the text is so complete, even the old pro with many years under his belt will find this book filled with facts he should have discovered were he not so busy.

Both books on servicing are published by *McGraw-Hill Book Company, Inc.* and are just two of several top quality servicing books. As others are published, your ol' Bookworm will make it a point to review them.

How TV Works. You would be surprised of the number of experimenters who know next to nothing about the innards of theTV

BOOKMARK

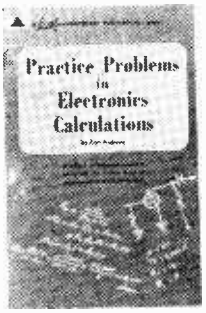
set in their living room. Many people have come to accept television as one of the wonders of modern living. They know how to turn the receiver on and off, change channels, and adjust the operating controls to some degree of usefulness, but when it comes to understanding how television works, they are at a complete loss. *ABC's of Television*, by *Len Buckwalter*, provides a basic understanding of television and how it works.



96 pages
Soft cover
$1.95

Readers of RADIO-TV EXPERIMENTER have read many of the author's magazine articles and have enjoyed his clear concise style which he uses successfully in his book. If you are one of those experimenters who calls a serviceman to fix your TV set, or if you are unable to draw a block diagram of a TV set and show input and output wave forms, then Len's book is for you. This *Howard W. Sams* publication fits neatly in your pocket and makes good reading during your idle hours.

Mathematics & Electronics. Far too often it is the lack of a good understanding of mathematics used in computations related to electronic circuits that separates the good technician from *so-so* types. The key to applying electronics technology is in knowing how to use electronic math. An electronic technician must be able to rapidly and accurately evaluate circuit parameters by applying related mathematical formulas and laws. Becoming familiar with the applications of electronics math and learning how to manipulate the various formulas requires a working knowledge which can only be achieved by extensive practice. Two recently

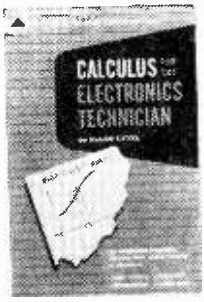


208 pages
Soft cover
$3.95

published books by *Howard W. Sams & Co.* are worth your consideration if you are weak in *paper-work* electronics.

Practice Problems in Electronic Calculations by *Alan Andrews*, the first of its kind, is a "workbook" designed to provide working technicians with experience in analyzing electronic circuit requirements. The author's previous two-volume effort, *Electronics Math Simplified*, serves as the basic study text for the new volume. The chapters in the new volume include: Working with Numbers, Algebra and Trigonometry, Units of Measurements, DC Circuits, Alternating Current, AC Circuits, Power Supplies, Amplifiers and Oscillators, Transmitting Equipment, Receivers, Measurements, and Logarithms and their Applications. You will find the material in this book serve three major needs—they are to provide (1) a more fluent understanding of electronics; (2) supplementary study material needed to pass FCC exams; and (3) practice in solving problems as part of a study course.

Calculus for the Electronics Technician by *Allan Lytel* is written to provide the busy technician with an understanding of calculus. It assumes a knowledge of algebra up to and including quadratic equations. A knowledge of trigonometry is not required to



160 pages
Soft cover
$3.95

BOOKMARK

understand this book, but such knowledge is helpful. Abstract mathematical presentations are resorted to only when they are necessary for clarity, thus making this a practical and usable self-study guide and reference. Reference equations and graphs with which the reader may have been familiar but forgotten, are included in the Appendix. This text is an introduction to calculus; however, with it, most technicians should be able to gain enough knowledge to fill their needs. If further study is necessary, the reader should not have trouble following more advanced texts on the subject.

Electronic Navigation. Each new boating season brings an increased array of electronic navigation equipment and an increased sense of confusion to the boat owner. Do I need a RDF (Radio Direction Finder), depth sounder, etc.? What kind? How do I use it properly? Such questions are answered completely in a new comprehensive guide, *Electronic Navigation Made Easy*—a *John F. Rider* publication. Pleasure boat owners will find here a complete, informal course in modern electric navigation. The author, *John D. Lenk,* employs an

176 pages
Soft cover
$3.95

extremely practical "how-to" approach throughout—requiring neither mathematics nor previous experience in navigation. Everything the modern skipper should know is covered. Full descriptions are given of modern marine charts—how to get them, and read them; modern navigational aids—marker buoys, government publications, and time signals. Excellent instruction is also given for navigational procedures such as reading a compass, laying a course, finding distances, plotting bearings, taking running fixes, and deviation cards. Separate chapters thoroughly discuss navigation with the following equipment: RDF, Consolan, radar, depth sounder and Loran. Review questions appear at the end of each chapter with their answers at the back of the book.

Pro Department. Audiophiles with some serious audio and high fidelity reading under their belt should be very familiar with the works of *G. A. Briggs.* When his grand work, *Sound Reproduction,* ran out of print in 1962, he decided not to reprint because much of the information contained in it was out of date. It was calculated that the new edition

Soft cover
168 pages
$2.95

would take over two years to prepare, so author Briggs divided and conquered by preparing smaller volumes instead of the huge tome running to several hundred pages. Hence, the birth of *Audio and Acoustics,* an excellent volume that covers resonance, echo and reverberation, room acoustics, free-field sound rooms, transient response, stereo, and live/recorded tests. Published by *Wharfedale Wireless Works Limited,* the text is available here in the United States through *Herman Publishing Service, Inc.*

Publishers. The publishers of the texts in this issue's Bookshelf are listed below with their addresses. When writing to a publisher mention that you read all about it in RADIO-TV EXPERIMENTER.

Howard W. Sams & Co., Inc., Technical Book Division, Dept. #714, 4300 West 62nd Street, Indianapolis, Indiana 46206

John F. Rider Publisher, Inc., a Division of Hayden Publishing Company, Inc., Dept. RT4, 116 West 14th Street, New York, New York 10011

Herman Publishing Service, Inc., Stamford House, Stamford, Conn.

McGraw-Hill Book Company, Dept R14, 330 West 42nd Street, New York, New York 10036

"VALUES" THAT DEFY ALL COMPETITION

We must unload 3 BULGING WAREHOUSES . . . at the GREATEST PRICE SLASH in Electronic History!

FREE $1 BUY WITH EVERY 10 YOU ORDER Only applies to "$1" Buys

FREE GIFT WITH EVERY ORDER

- ☐ $27 MERCURY RECTIFIER TESTER $7 tests all types, brochure on request
- ☐ BONANZA "JACKPOT" not gold, not oil, but a wealth of Electronic Items—Money-Back-guarantee . . . $5
- ☐ $50 STARLITE AM-FM RADIO $17 Deluxe 7-Tube, as-is but easy to repair—complete with Tubes . . .
- ☐ PLAYBOY 6 TRANSISTOR RADIO Style, Quality, Performance money-refund basis—Complete . . . $6
- ☐ STARLITE TAPE RECORDER $10 Brand new, Complete, worth double
- ☐ $80 STARLITE AM-FM RADIO $28 12 Transistors, Deluxe quality, sold on a money refund basis—complete
- ☐ CRYSTAL LAPEL MICROPHONE $1 High impedance, 200-6000 cps . .
- ☐ $15.00 RADIO PARTS "JACKPOT" handy assortment $1
- ☐ UNIVERSAL 5" PM SPEAKER $1 Alnico 5 magnet, quality tone . . .
- ☐ UNIVERSAL 4" PM SPEAKER $1 Alnico 5 magnet, quality tone . . . .
- ☐ ELECTROSTATIC 3" TWEETER SPEAKER for FM, HI-FI, etc. . . . $1
- ☐ 2 — UNIVERSAL 2¼" PM SPEAKERS for Radios, Intercom, as multiple Speakers, etc. $1
- ☐ 3 — AUDIO OUTPUT TRANSFORMERS 50L6 type $1
- ☐ 250—ASST. SOLDERING LUGS best types and sizes $1
- ☐ 250—ASST. WOOD SCREWS finest popular selection $1
- ☐ 250 — ASST. SELF TAPPING SCREWS #6, #8, etc. $1
- ☐ 150—ASST. 6/32 SCREWS and 150 6/32 HEX NUTS $1
- ☐ 150—ASST. 8/32 SCREWS and 150—8/32 HEX NUTS $1
- ☐ 150—6/32 HEX NUTS and 150—8/32 HEX NUTS $1
- ☐ 100 — ASST. RUBBER & FELT FEET FOR CABINETS best sizes $1
- ☐ 10—ASSORTED SLIDE SWITCHES SPST, DPDT, etc. $1
- ☐ 4—TOGGLE SWITCHES SPST, SPDT, DPST, DPDT $1
- ☐ 15—ASST. ROTARY SWITCHES all popular types $20 value $1
- ☐ 50—ASSORTED #3AG FUSES Popular assorted ampere ratings . . $1
- ☐ 50 — STRIPS ASSORTED SPAGHETTI handy sizes $1
- ☐ 100—ASSORTED RUBBER GROMMETS best sizes $1
- ☐ 10 — SURE-GRIP ALLIGATOR CLIPS 2" plated $1
- ☐ 10 — SETS PHONO PLUGS & PIN JACKS RCA type $1
- ☐ 10—6' ELECTRIC LINE CORDS with plug standard brands $1
- ☐ 100' STANDARD ZIP CORD 2 conductor #18 white or brown . . $1
- ☐ 100'—MINIATURE ZIP CORD 2 conductor, serves 101 uses $1
- ☐ 100—ASST. RADIO KNOBS all selected popular types $1
- ☐ 100—RADIO & TV SOCKETS all type 7 pin, 8 pin, 9 pin, etc. $1
- ☐ 100—ASST. TERMINAL STRIPS all types, 1-lug to 8-lug $1
- ☐ 100—ASST. CERAMIC CONDENSERS some in 5% $1
- ☐ 100—CERAMIC CONDENSERS Erie 50mmf-50v, 5% $1
- ☐ 100—MICA CONDENSERS Micamold 150mmf-1000v, 10% . . $1
- ☐ 100 — ASSORTED ½ WATT RESISTORS some in 5% $1
- ☐ 30—GOOD-ALL CONDENSERS .19-600v (tests .25-1000v) . . . $1
- ☐ 70 — ASSORTED 1 WATT RESISTORS some in 5% $1
- ☐ 35 — ASSORTED 2 WATT RESISTORS some in 5% $1
- ☐ 50—PRECISION RESISTORS asst. list price $50 less 98% . . $1
- ☐ 20 — ASSTED WIREWOUND RESISTORS, 5, 10, 20 watt $1
- ☐ 6 — ASST. SELENIUM RECTIFIERS 65ma, 100ma, 300ma, etc. $1
- ☐ 25 — SYLVANIA HEAT SINKS for Transistors, etc. $1
- ☐ 50—ASSORTED MILAR CONDENSERS .001 to .47 . . . . . $1
- ☐ 4 — 50' SPOOLS HOOK-UP WIRE 4 different colors $1
- ☐ 100' — INSULATED SHIELDED WIRE #20 braided metal jacket $1
- ☐ 32'—TEST PROD WIRE deluxe quality, red or black $1
- ☐ 100'—HI-VOLTAGE WIRE for TV, special circuits, etc. . . . $1
- ☐ 200'—BUSS WIRE #20 tinned for hookups, special circuits, etc. . $1
- ☐ 100' — TWIN TV LEAD-IN WIRE 300 ohm, heavy duty $1
- ☐ 5 — 50K VOLUME CONTROLS less switch $1
- ☐ 5 — ½ MEG VOLUME CONTROLS less switch $1
- ☐ 3—½ MEG VOLUME CONTROLS with switch, 3" shaft $1
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NEW products

TINY CB TRANSCEIVER PACKS 5-WATT WALLOP

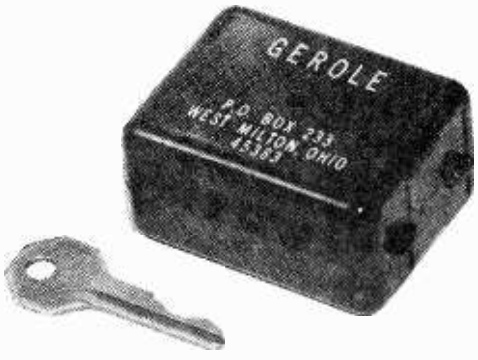
The "Messenger III", one of the smallest full-power Citizens Radio transceivers manufactured to date, has just been introduced by the E. F. Johnson Company of Waseca, Minnesota. Extremely compact in its design, the all transistor "Messenger III" has 18 transistors and 9 diodes—measures less than 2¼" high; less than 6¼" wide; and just 8¾" deep. The "Messenger III" has

been designed as a multi-purpose unit with almost instantaneous adaptability for its use in 4 different types of two-way radio applications. As a mobile unit, the "Messenger III" easily fits under the dashboard of any vehicle—and with the available accessories, is immediately interchangeable for use in a base station: as a self-contained public address amplifier; or as a full, 5-watt battery powered, portable pack set. By simply switching to the "PA" position on the front panel control, and using the microphone along with an accessory weatherproof speaker, the "Messenger III" becomes a full 3-watt Public Address System, still retaining its full capability to receive in-coming radio calls. This feature is especially useful for businesses engaged in field work and construction projects, or for use by marinas or in other out-of-doors applications. The

"Messenger III" is also designed for use with a companion transistor "Tone Alert" selective calling system. This unique accessory completely mutes the speaker on the "Messenger III" until one unit calls another —then, automatically, the stations hear an audio note and an indicator light flashes "on", remaining lighted until the call is answered. Priced at $189.95, the "Messenger III" is furnished complete with crystals for one channel and dynamic microphone with "full-grip" push-to-talk bar and coiled cord. *(For further information and detailed specifications, write directly to E. F. Johnson Company, Dept. RT 14, Waseca, Minnesota.)*

AUTOMOBILE HEADLIGHT-ON ALARM

The Gerole people have designed an inexpensive and easy to install safety alarm that sounds when you leave your parking or headlights on after parking for the night. No longer will you let your battery run down because you hastily departed. Installation is simple and the unit can be installed in any 6- or 12-volt car, negative or positive ground. Built with rugged long-life solid



NEW products

state controlled components, the Gerole Safety Alarm encourages the use of headlights to provide safer driving conditions during sunrise and sunset—the periods when drivers are most apt to leave their lights on after parking. Priced at $2.49 postpaid, the unit weighs only 3 ounces. *(Order direct from Gerole products, Dept. 14, West Milton, Ohio.)*

TINY TAPE RECORDER WITH BUILT-IN MIKE

Add extra fun to your home movies or slide showings with sound effects by the tiny new Craig TR-490 tape recorder, the first "Electronic Notebook" with a built-in mike. Weighing only two pounds, this mighty midget may be used to record descriptions while taking pictures or immediately after, is so compact it can be operated with one hand, and records up to 30 minutes of data. Cartridge loaded, the TR-490 has VU meter for monitoring sound level and battery life, push-button control for starting and stop-

ping. Batteries are rechargeable without removal. Self-contained features include speed and volume control, output for earphone and remote-control extension mike. Packs into minimum space, can be slung over shoulder like a camera, worn on belt, or slipped into a pocket. Dimensions are

6½" x 3¾" x 1⅜". Complete with leather carrying case and remote-control extension mike, $79.95, plus shipping charges. *(For more details, write to Craig-Panorama, Inc., Dept. 7-RT, 3412 South LaCienega, Los Angeles, California 90016.)*

FM STEREO GENERATOR KIT

The latest addition to the Heathkit test instrument line is a new FM stereo generator, Model IG-112, designed to provide all the signal facilities required in monophonic and stereo FM servicing. This completely self-contained instrument generates an audio or composite stereo signal for multiplex adapter adjustments or an RF carrier modulated by these same signals to produce an on-the-air signal similar to those transmitted by an FM station. Instant selection is featured for

either *right* or *left* channels as well as a special *phase* test for accurate adjustment of stereo subcarrier transformers. No balancing is required for equal right and left channel modulation or separate use include 400 cps, modulation. Switch-selected frequencies for 1000 cps, 5000 cps, 19 kc, 38 kc. and two special SCA (Subscription service) frequencies of either 65 kc or 67 kc. A crystal-controlled 19 kc (±2 cps) pilot signal adjustable in level from 0 to 10 percent is provided to check the lock-in range of stereo receivers. The generator also provides a sweep function for over-all RF and IF alignment with marker frequencies at 90.95 mc, 96.30 mc, 101.65 mc. and 107 mc. for checks of dial calibration. The 100 mc. sweep signal is adjustable ± 2 megacycles to allow alignment on a clear portion of the band. A three-step (20 db-per-step) RF attenuator prevents overloading of tuner input. Output of the

NEW products

generator is balanced at 300 ohms for direct connection to the antenna terminals of the tuner or receiver being tested—no complicated matching networks required. Priced at $99.00, the kit is within the reach of all servicemen and part-time servicemen/hobbiests. *(For complete information write to The Heath Company, Dept. #714, Benton Harbor, Mich.)*

BUSINESS BAND FOR VOLUNTEERS

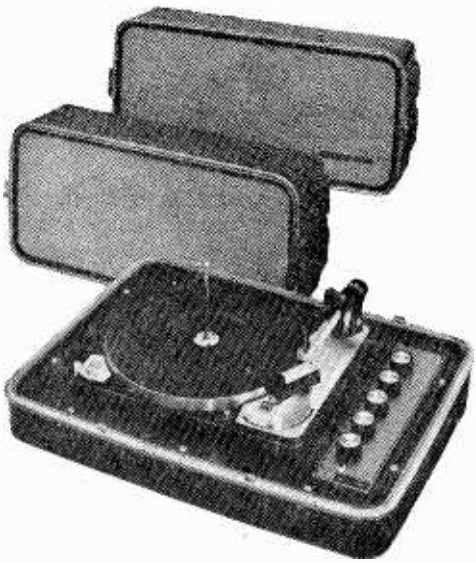
Regency Electronics, Inc., of Indianapolis has developed a new "On-Call" Transistorized Monitoradio that incorporates many new advances in a Fire/Police Dept. emergency radio. The "On-Call" Monito-

radio is specifically designed as a reliable receiver to alert off-duty or volunteer fire or policemen, emergency squads, or private ambulance crews. Claimed to be a first in this type of special-purpose radio, the user is provided with 1 microvolt sensitivity in a completely transistorized unit—18 transistors and 7 diodes, when equipped with all options. Also new to the industry is a 3-way power supply which permits operation on 117 VAC, 12 VDC or with an optional battery pack. The fail-safe emergency battery is automatically activated if there is a power line failure. Nickel-Cadmium rechargeable batteries are used in the built-in pack. Emergency Tone Alert is available on an optional basis. It is incorporated in the Regency Monitoradio to alert special groups in an emergency. For example, the members of a special volunteer emergency squad can

be alerted by receiving a tone signal from the fire department transmitter. They would not have to listen to all fire calls unless they wished to. Four basic models of the Model TM are offered; single channel crystal or multi-channel with up to six crystals. Either variation may be in the high (150 to 175 mc.) or low (30 to 50 mc.) range. Special frequencies are available on request. The Tone Alert or battery pack options may be added to any of the four basic models. All models have blue vinyl laminated steel cabinets measuring 11″ long by 4¾″ wide by 7½″ deep; weight, 5½ pounds. Each unit is sold with a 12 month warranty. Price of the basic model starts at $99.95. Delivery is off-the-shelf. *(For further information, write Regency Electronics, Inc., Dept. 714, 7900* Pendleton Pike, Indianapolis, Indiana.)

HI-FI IN A SUITCASE

If you want your high fidelity in a small, compact package and your standards compel you to seek out the best regardless of price, you are exactly the person for whom a new premium-quality high fidelity stereo phono system has been produced. It is called the M100 Maximum Performance Phono System. Shure engineers designed it especially for music loving perfectionists who want the quality reproduction available only from a component system, but who have neither the time, inclination nor technical



NEW products

knowledge to assemble componets themselves. The M100 is a complete stereo-phono system requiring no extra parts or components. It is ready for immediate enjoyment. Two highly compact models of the M100 are available. One is a portative unit completely self-contained in two fine Samsonite luggage-style cases. It is designed for music lovers on-the-go, college dorms, summer cottages, boats and for school and institutional use where a music system that may be conveniently moved about is desirable. Two models of the M100 are being introduced. One is a portative model completely self-contained in fine Samsonite luggage-style cases. The second is the Library Model finished in impressive solid walnut cabinetry. The portative version is priced at approximately $400.00; the Library Model $450.00, making either model perhaps the most expensive stereo system for its size and style on the market. *(For more information write to Shure Brothers, Inc., 222 Hartrey Avenue, Evanston, Illinois, or see your local hi-fi dealer.)*

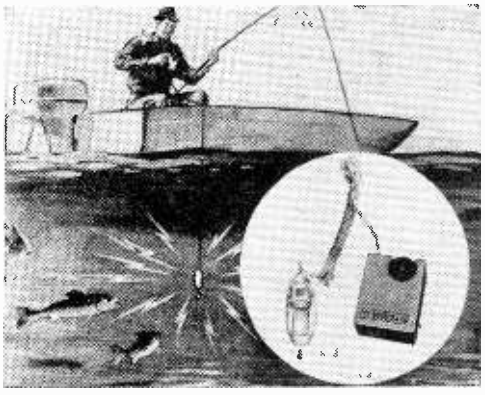
GROOVE JUMPER

A remotely operated attachment for your record player — Repetez — makes your player repeat as many times as desired, from 1 to 75 record grooves. Principal use of Repetez is for language study, but it may also be used for study of music, English enunciation, shorthand, etc. Pressing the remote control's bulb causes repeat playing.

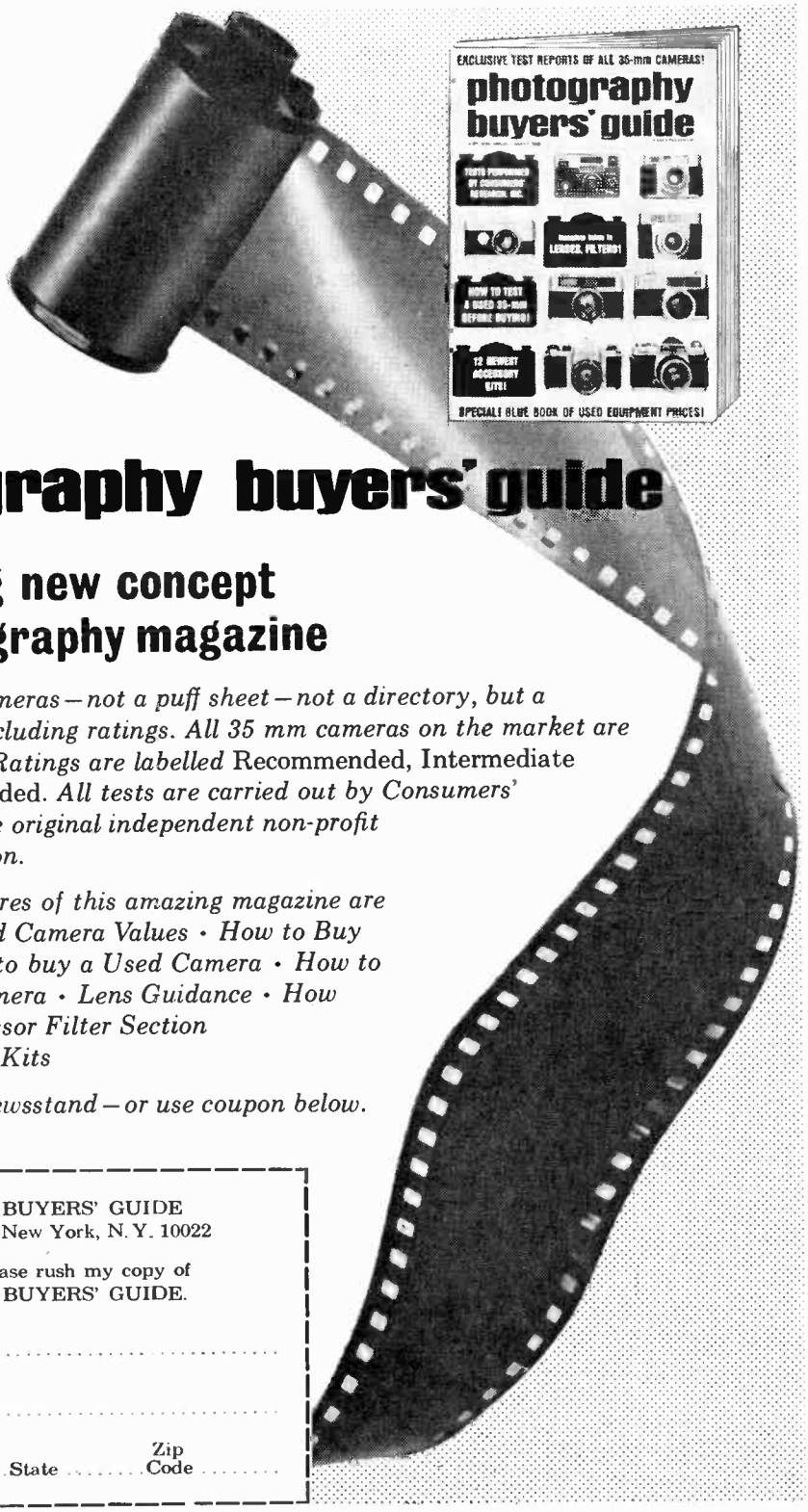
It can be operated by either hand or foot, leaving you free to hold a reference book or musical instrument. Repetez attaches removably, without maring your player, and can be installed in less than 30 seconds. Because the tone arm is lowered gently and with complete accuracy, Repetez can't injure record or needle. It is an entirely new approach to the problem of repeating small portions of a record. Repetez is available for either automatic or manual players at a cost of only $15.00. *(For complete information write to Daellenbach Manufacturing Company, 1304 East Fifth Street, Cheyenne, Wyoming 82001.)*

CALL FOR FISH CALLER

As fishermen know, there are fish in most waters, the problem is in getting the fish on the hook. Now, with a device known as the TR-Sonic fish call you can attract fish right up to the hook. The TR-Sonic is a transistorized device which plays low frequency



sounds under water, and as ichthyologists (fish experts) know, low frequency sounds are the pied pipers of fishdom. Using universally available penlight batteries, the TR-Sonic feeds low frequency sounds in the range of 75 to 300 cycles to a waterproof transducer which couples the sound to the water. While the TR-Sonic is not going to put a fish on a hook, it will attract them to the immediate vicinity, and no longer need you fish an "empty hole." *(The TR-Sonic Fish Call is distributed by Custom Electronics Co., 2929 Fulton St., Brooklyn, 7, N. Y. Price is $12.95 postpaid.)*



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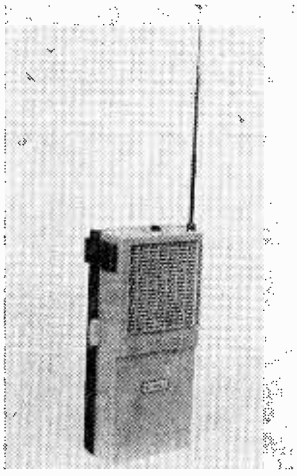
NEW products

100 MILLIWATT CB TRANSCEIVER

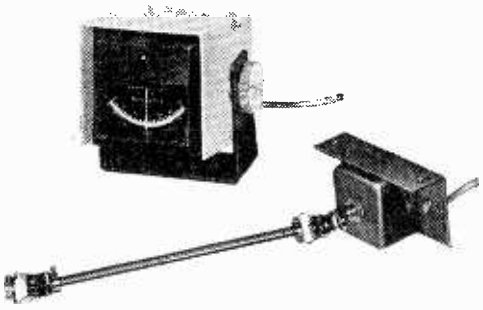
A completely American made 100 milliwatt two-way radio is now available from Cadre Industries Corp. The new Model C-60 offers license-free dual channel communications in the 27 mc band. The battery powered transceiver provides advanced solid-state circuitry with extra power and sensitivity at just $59.95 user net. Leading features are two crystal controlled channels, provision for either penlight cells or nickel cadmium



batteries, low impedance earphone jack, built-in antenna and speaker-microphone, and high impact plastic cabinet. Extended range results from over 70 milliwatts output and less than 1.0 microvolt sensitivity. Weight is less than two pounds and dimensions are 8″ x 4″ x 2″. Ten matched accessories are available for all applications. An application bulletin is available from Cadre at no charge. *(Write to Cadre Industries Corporation, Dept. RTE4, 20 Valley Street, Endicott Street, New York 13761.)*

NEW KIT FOR BOATERS

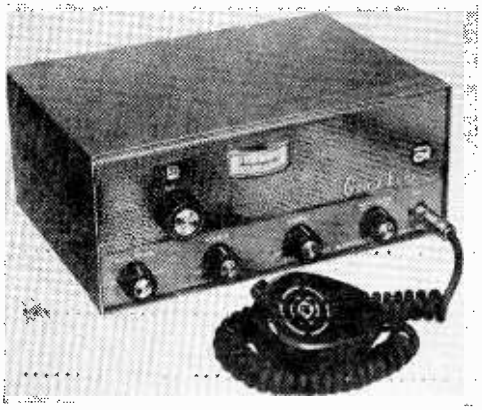
A new rudder position indicator, Model MI-14, that's designed to be used on large water craft where the rudder position is not readily visible has been introduced by the Heath Company. The new unit continuously shows rudder position up to 40 degrees both port and starboard, and it greatly simplifies close maneuvering at the dock. Although the kit can be used on both single and dual-engine boats, it's particularly useful on dual-engine craft since it allows you to compensate for current and wind by adjusting the engines



rather than the rudder to maintain proper heading. As a result, "rudder drag" and excessive fuel consumption are eliminated. Simple circuitry coupled with circuit board construction makes assembly fast, fun and easy even for the novice who's never attempted kit-building before. The new kit sells for $27.50. Shipping weight is 4 lbs. *(Order from the Heath Company, Benton Harbor, Michigan.)*

COPPER-CLAD CB

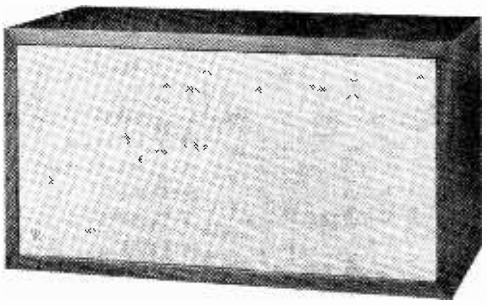
New citizens band transceiver combines crystal-controlled 23-channel operation with 5-watt input for both base-station and mobile use. Called "Genie-Fone", the compact



4½" x 8" x 11" unit includes a frequency synthesizer for full 23 crystal control; delta fine-tuning for within-channel adjustments, and automatic noise limiter with an "on"-"off" switch for increased sensitivity. Corrosion-resistant chassis is housed in a high-styled, rugged steel cabinet with copper-metallic finish. List price is $199.95 *(Details are available from The Alliance Manufacturing Co., Inc., Dept. MF-14, Alliance, Ohio.)*

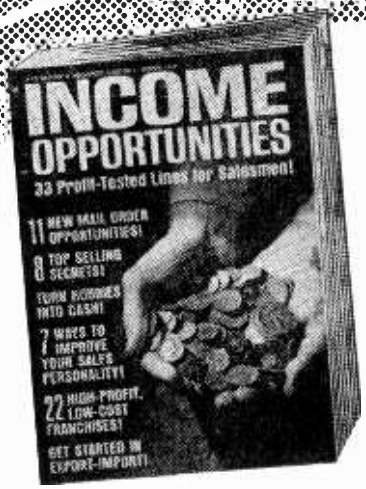
LOW-COST SPEAKER HIGH ON QUALITY

Bookshelf speakers have become the main diet for economy-minded audiophiles. With this market in mind, *Acoustic Research, Inc.*, has come up with the little brother to the AR-3. Tabbed the AR-4, it is an acoustic suspension speaker like all others in the AR line. It has an 8-inch woofer and a 3½-



inch wide-dispersion tweeter. *Acoustic Research* states that the AR-4 design achieves the highest quality per dollar of all its speaker models, and that aside from its necessarily narrower frequency range its musical quality may be compared to the AR-3, AR's best speaker system. You can pick up an AR-4 at your local Hi-Fi dealer for only $51 in unfinished pine (dimensions are 19" x 10" x 9" deep), or for $57 in an oiled walnut enclosure. *(Frequency response and distortion curves are available by writing directly to Acoustic Research, Inc., Department 714, 24 Thorndike Street, Cambridge, Mass. 02141.)*

In the next issue of RADIO-TV EXPERIMENTER the New Products column will be devoted entirely to products introduced for the first time at the New York Hi-Fi Show. ■



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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 up coming issues. Sorry, the experts will be unable to answer your questions by mail.*

Q. Why is it that I receive San Francisco stations clearly during the day, but very poorly at night? Sometimes they sound all garbled.

—I. W., Sacramento, Calif.

A. Poor night time reception is due to cancellation of the signal, or partial cancellation, by the sky wave which is received in addition to the ground wave. During the day, the sky wave does not reach Sacramento. When the two signals arrive at your receiver out-of-phase, or one later than the other due to one taking the longer reflected sky wave path, the audio may sound garbled.

Q. If I get a Business Radio license, can I operate my CB set on the five channels above the Citizens Band (27.235, 27.245, 27.255, 27.265, 27.275 Mc/s)?

—J. S. Paramus, N. J.

A. On these five channels, only "type accepted" equipment may be used. This means that the manufacturer of the

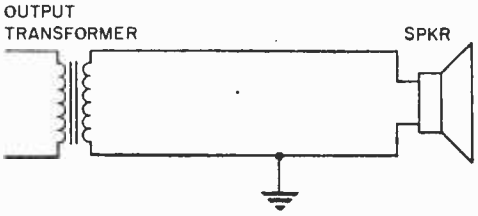
ASK ME another

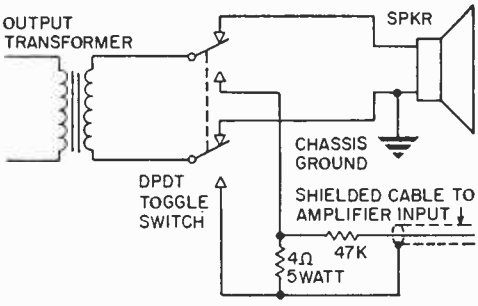
equipment has satisfied the FCC that it meets the technical standards of the Business Radio Service. Most CB sets are not type accepted. When licensed in the Business Radio Service, the transmitter may be used for communicating only with stations controlled by the same licensee. However, a CB set can be used on 27.255 Mc/s which is CB Channel 23, but only when the set has been type accepted or when licensed as a Citizens Radio Station.

Q. How can I use an AC-DC radio as a tuner with a hi-fi amplifier?

—R. M. S., Auburn, Calif.

A. Since an AC-DC radio has no power transformer, the common ground circuit of the receiver is connected to one side of the AC line and, depending upon the way the power plug is inserted in the AC outlet, it can be hot by 117 volts above ground. Therefore, it is not recommended that the audio be tapped at the set's volume control. Instead, the audio can be taken at the secondary of the output transformer as shown in the diagram. Install a DPDT toggle switch at the back of the set and connect it as shown. When in one position, the audio is fed to the radio speaker. In the other switch position, the audio is fed to the input of the external amplifier and a dummy load is connected across the radio's output transformer. Make sure the shield of the cable to the amplifier does not make contact with the radio chassis since it may be hot with respect to ground.





Q. In a boating magazine, I recall reading about Weather Bureau broadcasts but forget the details. Can you enlighten me?

—S. M., Linden, N. J.

A. The U. S. Weather Bureau transmits weather information on 162.55 Mc/s over narrow band FM (± 5 kc/s) stations in New York, Chicago, St. Louis, Kansas City and Los Angeles. The broadcasts can be heard about 50 miles. A VHF/FM monitor receiver is required.

Q. I am looking for a career job in electronics that offers good fringe benefits. Do you have any suggestions?

—B. M., Willow Grove, Pa.

A. Railroads are seeking electronics technicians who hold a second class radiotelephone operator license. Starting pay is quite good and fringe benefits include a pension, paid vacations and travel with expenses paid. Communications equipment maintainers service two-way radio, carrier telephone equipment, teletypewriters and data equipment. Contact the superintendent of communications of the railroads that interest you. Their names can be found in the Official Guide of the Railways which almost any railroad ticket clerk will let you look over. Or, write to Mr. L. Kearney, Communications Engineer, Association of American Railroads, 59 East Van Buren Street, Chicago, Illinois 60605, who usually knows of job openings. Besides getting to ride in Pullman cars free while on the job, railroad

(Continued on page 35)

ASK ME another

(Continued from page 32)

employees can get tickets for their families at reduced rates. While it might seem that the airlines have taken over, there are still many trains and you may have to wait as long as a month to get a reservation on one of the western name trains if you're a paying passenger.

Q. Can I remotely control my Citizens Band transceiver?

—E. L., Everett, Wash.

A. The FCC rules state that a Class A CB transmitter (450-470 Mc/s band) may be remotely controlled. While the rules do not specifically prohibit remote control of Class D (27 Mc/s band) stations, the use of remote control is not intended. When a CB set is installed in a car trunk and is controlled from a control head under the dash, the station is still classed as one that is locally controlled.

Q. I used to have a two-letter ham call. I have been told that I can get a two-letter call if I apply for a new amateur radio license. Is this true?

—P. B., Ridgewood, N. J.

A. Yes, if a two-letter call in your district is available. But, you must apply for a general class license.

Q. The alternator in my car has an AC outlet. Can I use it to operate a CB set or television receiver?

—F. G., Santa Clara, Calif.

A. No. The frequency of the AC from the alternator varies with the speed of the car's engine. If the frequency gets too low it can burn out the power transformer of the CB or TV set. This AC outlet can be used to operate lights or a soldering iron or other resistive load.

ASK ME another

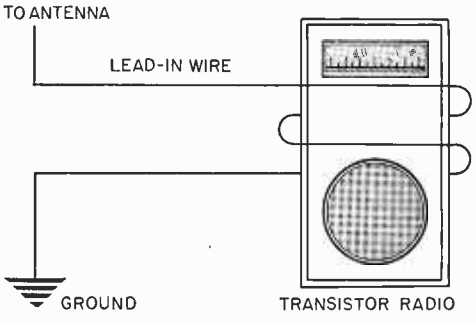
Q. What is the best radio to buy for medium wave DXing and what does it cost?

—J. B. Basking Ridge, N. J.

A. "Best" is a very strong term and often interpreted differently. In the "best" category are such deluxe receivers as the Hammarlund SP-600 which costs more than $1000. But, the Hammarlund people say that their HQ-180 which costs much less is actually more sensitive. National and Hallicrafters also make receivers in this class. Compare the specs with regard to sensitivity and selectivity and then buy the one that has the features you like best personally.

Q. Since I am so far away from broadcasting stations, I get little use out of my transistor radio during the day time. How can I connect it to an outside antenna to increase its pick up?

—L. C., Mont Tremblant, Quebec



A. Wrap the antenna lead-in around the set. Two turns will do. And, ground the far end of the lead-in as shown in the diagram. The ground is important. The wire wrapped around the set acts as an antenna coil which is inductively coupled to the loopstick antenna inside the radio.

Q. Could you please tell me where I can get some information on how to become a disc jockey and where I can get a copy of Broadcasting-Telecasting?

—R. L., Lynn Field, Mass.

A. Many disc jockeys are also radio station operators which means that they need a first class radiotelephone operator license. Why don't you call on the managers of your local broadcasting stations and tell them of your interest? You can get information about Broadcasting-Telecasting magazine by writing to the publisher at 1735 De Sales Street N. W., Washington, D. C.

Q. When our television set is on, whining and buzzing sounds are heard in our radio. How can this interference be stopped without turning off the TV?

—M. S., Appleton, Wis.
—T. C., St. Helens, Ore.

A. Some early model TV sets are notorious generators of radio interference. Modern TV sets must be certified to the effect that they do not radiate interference above a specified level. The trouble is usually caused by inadequate shielding of the TV set's horizontal sweep circuits and high voltage power supplies. The 15,750-cycle sweep frequency and its many harmonies are radiated. Make sure all the shields are tightly in place. Look particularly for the wire that grounds the shield coating around the picture tube. It may be necessary to line the inside of the TV cabinet with metal foil or screening and grounding it to the chassis.

Q. A powerful radar station nearby causes much interference to electronic equipment in the surrounding area. In audio equipment it causes an annoying beep. What do you suggest to reduce or eliminate this interference short of closing down the radar?

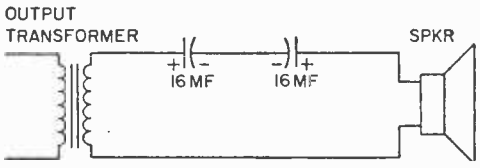
—W. A. M., Winston-Salem, N. C.

A. An RFI (radio frequency interference) expert said that the government is working on this problem. Until something is done to reduce the interference at its source, you might try preventing the interference from getting into your equip-

ment. Such interference can often be eliminated in telephone systems by carefully balancing the lines so that interference is cancelled out. In the case of audio equipment, try grounding the chassis with the shortest possible lead. Check all amplifier input leads to make sure they are shielded all the way and that there are no exposed unshielded plugs or splices. You might try a power line filter, grounding the filter's ground post to the amplifier chassis or external ground.

Q. How can I reduce the bass response of my radio receiver in order to get more crisp speech reproduction?

—R. P., Chicago, Ill.



A. Connect two 16 ufd electrolytic capacitors back-to-back, as shown in the diagram, in series with the voice coil lead. The reactance of the capacitors is high at low frequencies and will cut bass response. By connecting the capacitors as shown, since they are polarity sensitive, they can be used in AC circuits such as audio.

Q. How can I convert a military surplus radar for use on a boat?

—G. M., Chicago, Ill.

A. Take it apart and use the parts for experimenting. Only FCC type accepted radar equipment can be licensed for use on a boat. To get a home-modified radar type accepted might cost more than a brand new type accepted radar.

Q. What would happen to the transmitting frequency when a pair of crystals is connected in parallel in the circuit? What would happen if they were connected in series?

—B. LeB., Houma, La.

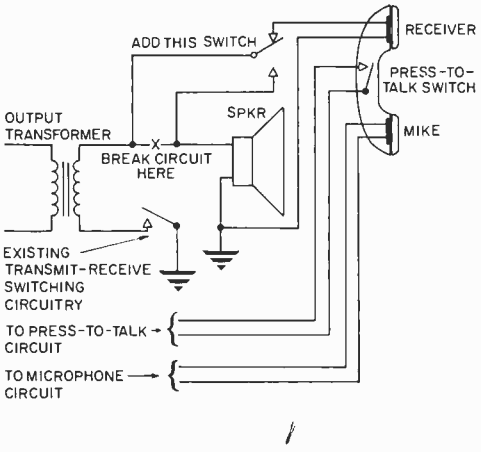
ASK ME another

A. Not having tried it, can't give you a specific answer. There is no apparent advantage in doing so. Remember that a crystal is equivalent to a resonant circuit, series resonant at one frequency, parallel resonant at another.

Q. Can I use a scrambler on my CB set and where can I get a scrambler?

—F. A., Flushing, N. Y.

A. While the FCC rules do not mention scramblers, a telephone call to the Commission revealed that the use of scramblers with CB sets is not prohibited. However, the station call letters must be announced without scrambling.



Delcon Corp., 943 Industrial Avenue, Palo Alto, Calif. manufactures a scrambler that fits over a handset. It can be used with a regular telephone or with a CB set that has a handset instead of a regular mike. A handset can be connected to a CB set as shown in the diagram. The handset must be equipped with a press-to-talk button and the microphone element must be of a type that matches the CB set. Handsets are available from Roanwell Corp., 180 Varick Street, New York City, Metro-Tel Corp., 409 Railroad Avenue, Westbury, N. Y. and other manufacturers of telephone equipment. You might try your local area Graybar Electric Co. office.

Q. In a recent issue you specified a type 2N1748A transistor in the parts list for an FM pocket transistor. I am having difficulty in getting this transistor locally. Can you help me?

—G. S., Lake Forest, Ill.

A. The very latest transistor directory lists the type 2N1748A as being available from Sprague. You might write to Sprague Products Co., 479 Marshall Street, North Adams, Mass. or Sprague Electric Co., Transistor Division, Concord, New Hampshire.

Q. I am interested in getting into the two-way mobile radio business. How do I get a franchise?

—L. N., Seattle, Wash.

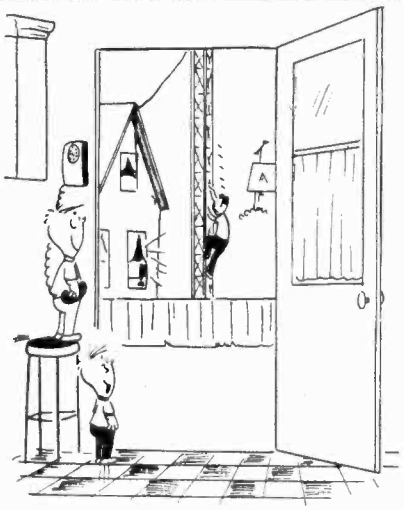
A. Several manufacturers sell through independent dealers. You might write to Fred Macklin, Communications Company, Inc., 300 Greco Avenue, Coral Gables, Florida; Walter Shapiro, Outercom Electronics Corp., 725 Providence Road, Charlotte, North Carolina; or Robert Hartman, Hartman Marine Electronics Corp., 30-30 Northern Boulevard, Long Island City 1, New York.

Q. How can I reduce reverberation in a room in which I make tape recordings?

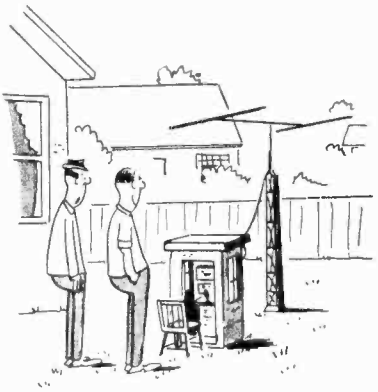
—C. C. M., Claremont, Cal.

A. You can cover the walls and ceiling with sound absorbent acoustical tile or panels and put a rug on the floor. Or, you can cover the walls with carpeting as has been done in the foyers of the New York State Theatre Lincoln Center in New York City. It looks fine. The same idea was used to good effect at Brown's Theatre in Snohomish, Washington when talking movie equipment was first installed in 1928. ■

Tower of the Hour

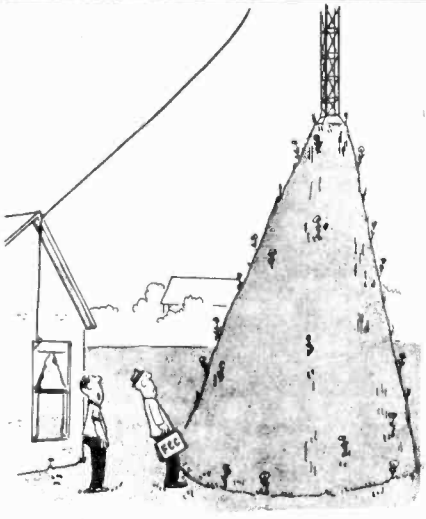


"Let it ring until he gets down and then hang up again."



"Your shack and tower certainly look a helluva lot bigger on your QSL card, Ed."

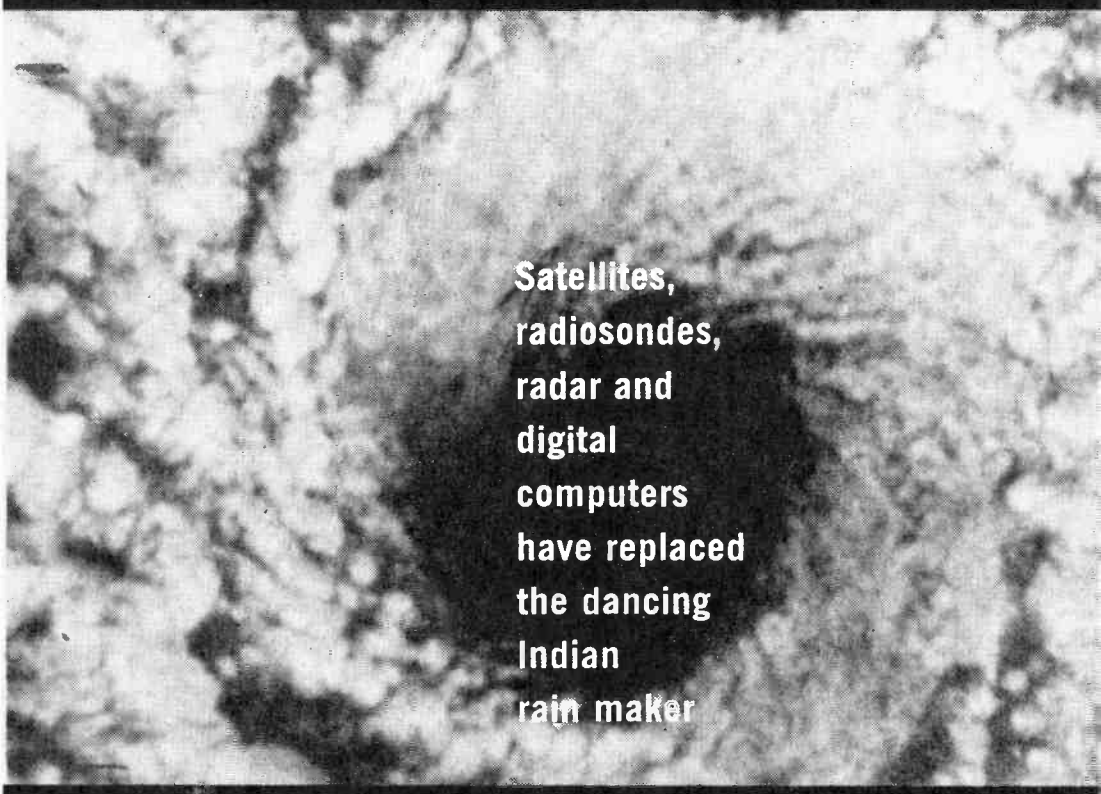
"I'm not complaining about the $2.15 for the antenna tower . . . it's the FOB charges from Hong Kong."



"You see, it's not over seventy feet . . . from the ground."

"Put it in the car yourself."

ELECTRONICS STEALS THE THUNDER



Satellites, radiosondes, radar and digital computers have replaced the dancing Indian rain maker

MAN has too done something about the weather! He has sacrificed pretty maids and other men to appease the thunder gods, Hopi-danced to woo the skies, set rain fires and beat the drums to Dale-Carnegie the clouds, ascribing his weather fortunes to the good gods and the bad gods.

For weather has always ruled the fate of man. Napoleon met his "Waterloo" before Waterloo on the stormy steppes of Russia. A single Texas hurricane in 1900 tolled 6,000 human lives, $20,000,000 in property loss. A typhoon that swept the Bay of Bengal in 1737 left 300,000 persons dead while sunny climes foster happy and prosperous civilizations.

Weather Affects Your Byline. Man has always been so under the influence of the

By Katherine Kirkbride

weather that some experts say your chances of seeing your name in "Who's Who" increase if you choose a January or February birthday. Another claims folks born in March average four more years with the earth's weather than those born in warm July.

This dependence upon the whims of the skies long ago led man to *start* doing something about the weather.

As long ago as 350 B.C., Aristotle dreamed up man's first theory of forecasting. Galileo cooked up a thermometer in the early 1600's; his protege, Torricelli, a barometer in 1643. H. W. Brandes a weather map in 1820. The U. S. Army Signal Corps set up its first weather service in 1870, later renamed it the U. S. Weather Bureau. But progress snail-paced until modern engineers vied with one another contriving ingenious electronic means to temper the tyrant above them.

Tiros. On April 1, 1960, a 42-inch diameter, 300-pound hatbox satellite named Tiros soared 400 miles into space to achieve man's first decisive win in his long war with the weather.

RCA engineers in their laboratories at Hightstown, New Jersey, built Tiros to track storms, clouds, and news of the skies with half-inch vidicon cameras, magnetic tape its pictures and automatically release them as Tiros passed over weather stations on earth.

The first seven Tiros satellites relayed over 330,000 pictures to earth, saved thousands of lives; millions in property values, spotted 1961's Esther hurricane two days before land stations and cited Typhoon Ruth off the coast of Japan.

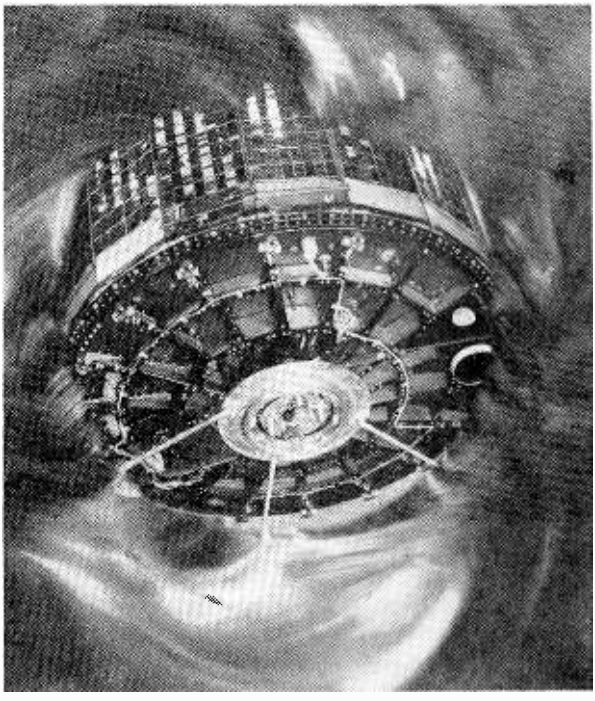
Engineers Add APT. The ingenious RCA men were anxious for each Tiros to learn from the Tiros before it, added probably their most dramatic improvement to Tiros the Eighth. Naming it APT, for automatic picture transmission, the Eighth Tiros facsimile'd its pictures, released them to major ground stations and small ones as well. For the new APT Tiros would release its weather pictures to low-cost $30,000 receiving stations, even turn on the ground station's facsimile as it passed over the station. This meant that any small nation, purchasing a low-priced receiving station could tune in Tiros for pictures of its own local cloud formations.

But the early Tiros series had one major limitation. Fixed in orbit, Tiros could "see" the earth only one-fourth its time in the skies. RCA engineers now plan a new turn. They hope to tip the next hatbox over on its side and wheel it through space in polar orbit.

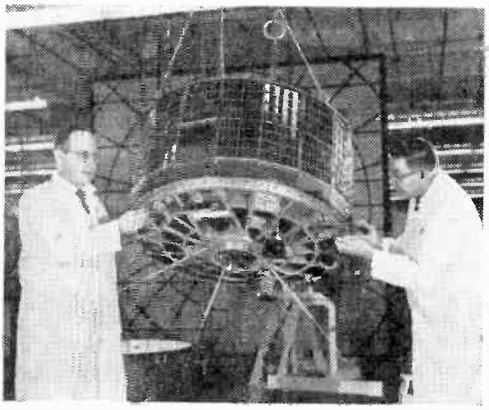
The Wheel Gets a Better Deal. Turned on its side, Tiros is expected to photograph cloud formations every half-minute. And the RCA men predict the new wheel will be able to photograph an area of 500,000 square miles with one "look," photograph every area of the earth at least once a day.

After Tiros the Eighth, Nimbus. On August 28, 1964, man won his second decisive battle in his war against the weather. Next-generation and more sophisticated satellite Nimbus took to the skies in 600-mile orbit, preceding Big-Wheel-Tiros and replacing Tiros the Eighth.

Built by General Electric engineers, Nimbus packs three one-inch RCA vidicon cam-



In order to study and learn more about our weather, Tiros, the first space weather reporter, was set in orbit about 400 miles up to snoop on the world's weather with two TV eyes and send back pictures to earth.



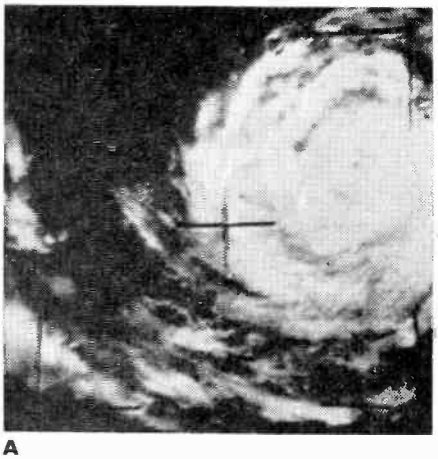
Satellite Tiros received countless electronic and mechanical tests before being launched. Here, Abraham Schnapf (left), Tiros Project Manager, and Thomas Tilton, Leader, Integration area, eyeball latest modifications.

eras, takes 1000 snaps and photographs, 70% of the earth every twenty-four hours, switching to infra-red on the night shift.

Originally powered for a six-month's stay in the skies, each of its two paddles boasts 5,740 solar cells turned toward the sun. Like Tiros, it adds APT to its efforts, so that it too weather-warns small nations throughout the world.

More Down to Earth. Still another group of RCA engineers in Moorestown, New Jersey, see the weather through radar eyes. They have developed an ultra-sensitive radar that can detect treacherous wind currents called "wind shear" on a clear day. Wind shear is one of the fast-ones the weather can play on an unsuspecting pilot.

When two masses of air moving in different directions slide past each other, a downdraft results and stirs up turbulence in the



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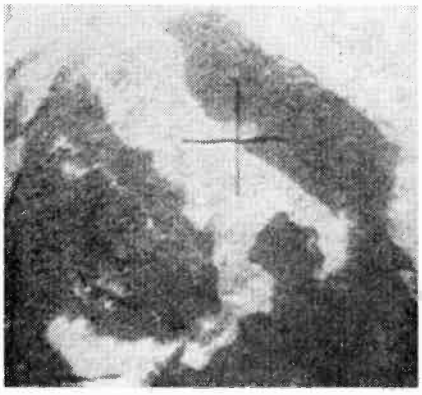

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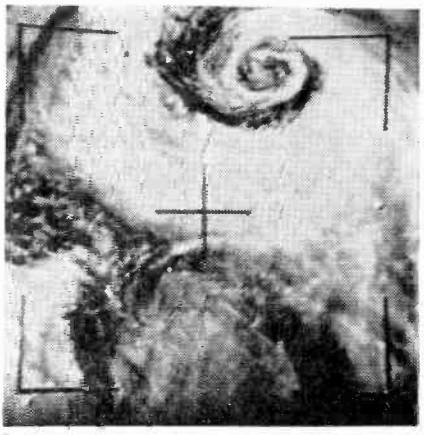


C

D

Tiros TV photographs pin-point the weather; (A) Typhoon Ruth near Japan, eye of storm at left, (B) clear weather over Italy's boot, (C) large spiraling storm vortex in Arctic, and (D) storm front moving north to New York and Cape Cod.

air even though it may seem a clear day. RCA's new radar spots this tricky maneuver, warns the pilot there's a whirlpool ahead.

An Eager-Beaver Drone. To warn pilots, airfields and weather stations, Bendix men in Ann Harbor, Michigan, fashioned a miniaturized "pod" they call their weather pod. Rocket-shaped and weighing only 18¾ pounds, it will report pressure, temperature and precise dewpoint, all vital to weather prediction.

This Bendix "pod" can ride into the skies attached to a plane, relay its findings to earth receivers by UHF telemetering radio band. Or it will travel in a subsonic drone, fly straight into the heart of a storm, report back to earth as long as two hours on its own battery power.

Flying High in the Sky. Bendix engineers at Bendix-Friez at Towson, Maryland, build balloons six feet tall to "weather" the skies. With radio transmitting instruments attached, these king-sized "radiosondes" will fly higher than planes, sail 100,000 feet into the clouds to tell on the weather. Another Bendix balloon, one shaped like a rocket and named "rocketsonde" will soar 300,000 feet.

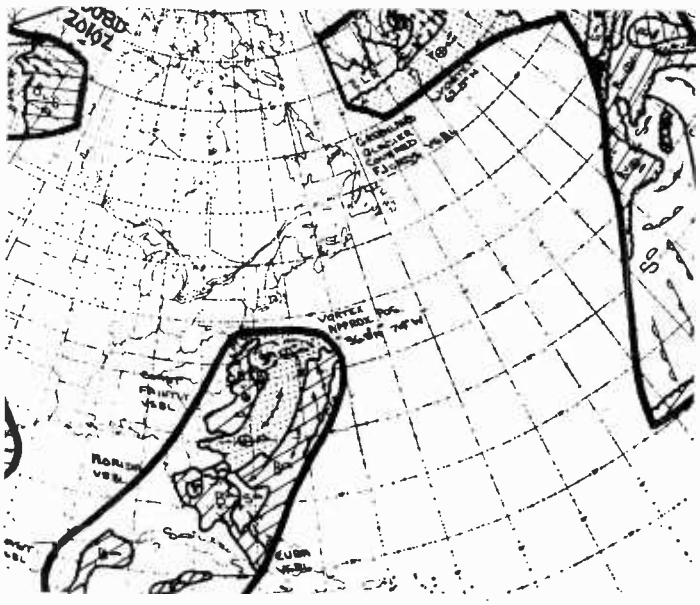
Good Fellows Get Together. While balloons, radar, pods and satellites report weather news from the skies, it takes the earthy computer to sift and relay warnings of storms and news of good weather to airfields, newspapers, radio and TV stations.

In a large white sprawling building in Suitland, Maryland, the world's largest weather center, the National Meteorological Center houses a giant 7094 IBM computer. This know-it-all takes it all in from the country's weather stations and electronic reporters, processes the information through teletypewriter circuits onto tape rolls, then onto IBM 7094 tape.

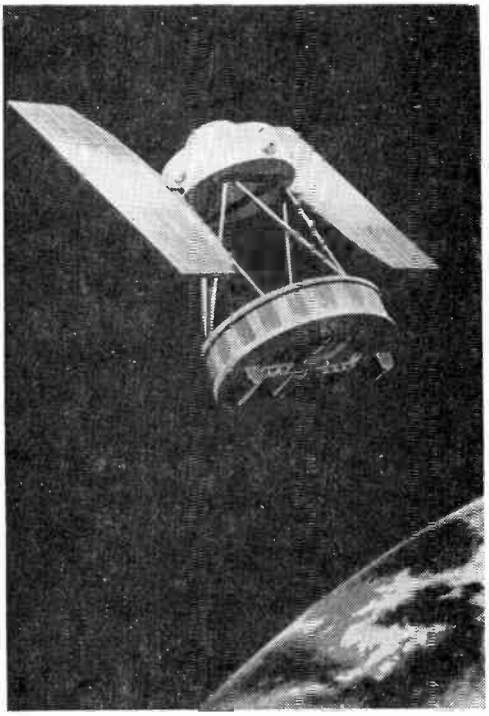
But it's a Breeze for the Computer— The giant machine then condenses, edits, predicts and speeds its deductions to local weather outlets to report blue skies or stormy weather. It has to think fast—for thunderstorms alone cost the United States more than $150,000,000 every year. A single bolt of lightning can carry five million volts, a real hep hurricane travel five hundred miles an hour, pack the power of thousands of H-bombs.

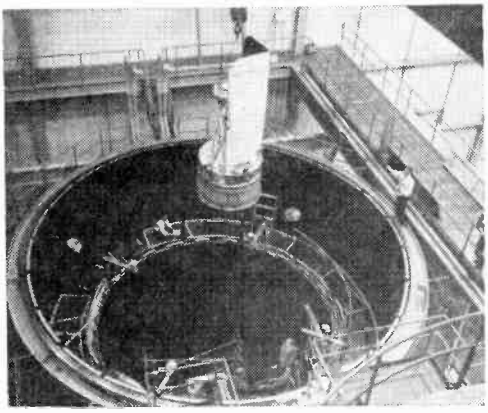
Yet nature's frightening, often savage power doesn't deter the brave Navy flyers of Project Stormfury from flying straight into the heart of storms.

When Beulah hurricaned across the Atlantic in late 1963, a Navy plane spliced into the storm, dropped yard-long canisters of silver iodide into the eye. Alongside, radar

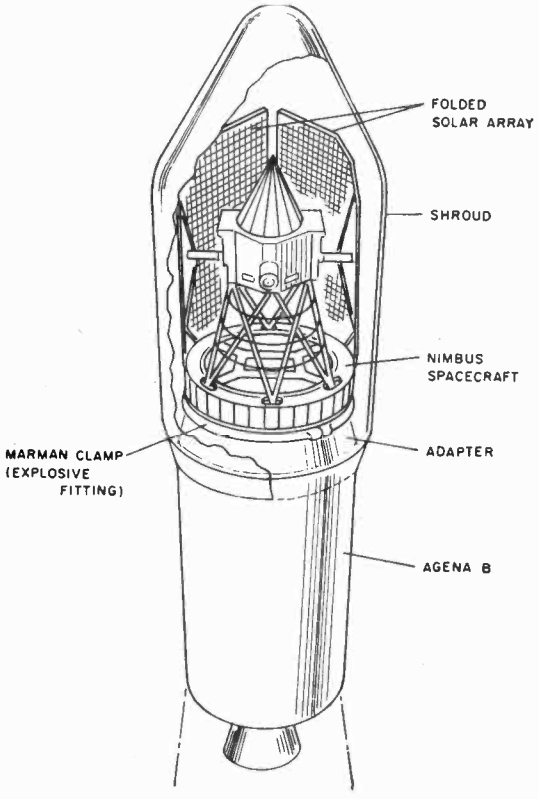


Tiros supplies our space-weather men with photographic reports on happenings at remote spots on earth where there are no weather reporting stations, or where reports are not reliable. These space reports coupled with accurate ground reports enable our scientists to understand the world's weather and to make very accurate forecasts we can depend on. The map at left shows reports from Tiros circled with heavy black line.

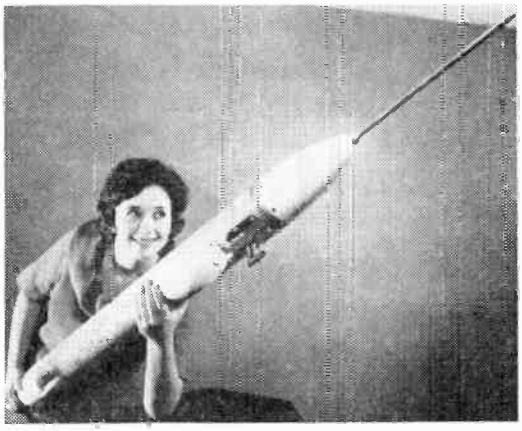




Shown above is an artist concept of the Nimbus Meteorogical Satellite in earth orbit. Note that solar array panels are illuminated by the sun providing the energy to power the satellite's electronic circuits. Compare the appearance of the satellite to the drawing at right—here the solar array is folded to take up minimum space in the nose of its launch rocket. Photo at upper right shows Nimbus being lowered into an environmental test chamber that will duplicate hazards the satellite will experience in space.



"Shooting" weather, is function of this Bendix rocket-like pod designed to take weather measurements while mounted on planes.



planes and one U-2 photographed the storm's reactions for the U. S. Weather Bureau and the National Science Foundation.

Pity the Unhappy Hurricane. An Air-Force U-2 photographed Esther at 65,000 feet in 1961, as silver iodide flares ignited the eye of the storm. The U-2 cameras and the radarscopes of planes flying nearby "saw" definite changes in the eye wall of the hurricane within twenty minutes after the seeding.

The "scopes" registered ice crystals and

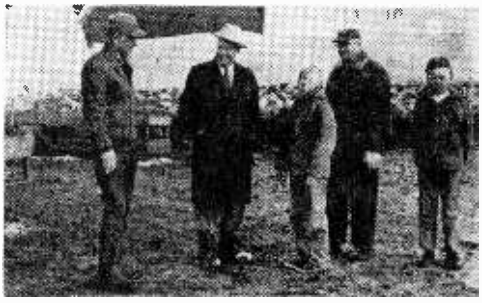
snow where they had seen water droplets before the seeding. And weather scientists speculated the temporary slowing of the storm might have been caused by the heat of fusion released when the droplets seeded to form crystals!

These beginning but significant efforts at taming the fury of the hurricane are based on the early work of General Electric's renowned Dr. Irving Langmuir and Dr. Vincent J. Schaefer. In the forties, the GE scientists first prompted rain and snow from the skies by seeding clouds with water, dry ice and silver iodide.

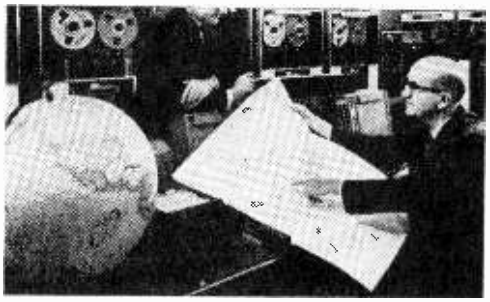
But when these experiments are applied to hurricanes, the results are appraised differently by weather scientists. Some believe we have made definite headway toward weakening and diverting hurricanes from populated areas. Others, that we may one day completely conquer man's enemy, the hurricane. Still others warn that tampering with nature's vast generator upstairs may prove dangerous unless we first learn more about what makes it tick.

(Continued on page 111)

Vincent J. Schaefer's observation of snow crystal nucleation inside a food freezer led to later experiments, with Dr. Irving Langmuir (right), in rain-making cloud seeding.



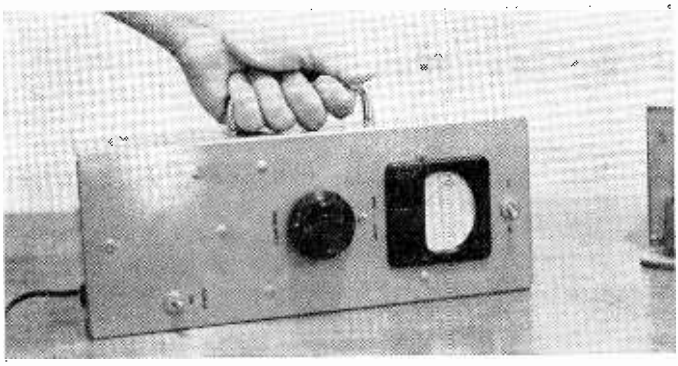
South Dakota's Karl E. Mundt (second from left) is one of the Senate leaders urging increased funding so vital weather research programs can be continued and begin to modify weather to benefit farmers and citizens.



Laboratory meteorologists and mathematicians create models of the atmosphere. They use equations to portray constant motions and changes within their model atmospheres with the help of the world's most exotic computers.

A single day's weather, as simulated in the Weather Bureau's research laboratory, requires a digital computer to perform about 10,000,000,000 operations. To test a model of the atmosphere, the scientists analyze basic weather data (above), and prepare a computer program. The computer prints out weather flow patterns as shown at left.

By Ron Michaels



Build a Stroboscope

A specialized laboratory test instrument that freezes motion

The stroboscope has made possible the speed measurement of rotating, reciprocating, and oscillating machines and moving parts. For example, if you wanted to show someone how the loudspeaker in your hi-fi set is driven in and out, the strobe will do the job. First, connect a signal generator to the amplifiers AUX jack and supply a 400 cycle signal at a volume level that is bearable. Next, adjust the strobe frequency to 400 cycles and illuminate the speaker cone with the xenon flashtube light. Now, fine tune the strobe until the speaker cone just barely moves in and out. If you set the strobe at 399.9 cycles, the speaker cone will move in and out 6 times a minute—slow enough to visually observe.

Most professional stroboscopes cost upwards of several hundreds of dollars. Here's a built-it-yourself strobe that combines the accuracy of the professional jobs with a price tag the home builder can afford. Total cost of parts is about $40. However, a well stocked parts box and some astute purchasing can reduce the price to about $30.00.

How It Works. The stroboscope circuit is a kissing cousin to the photographer's electronic flash. In fact, it's basically an electronic flash hooked to an oscillator that makes it flash at an adjustable rate of between about 4 and 120 flashes per second.

The circuit can be split into four sections: flashtube and energy storage capacitor (C2); trigger circuit; variable frequency oscillator; and power supply.

In operation, the power supply charges the energy storage capacitor to about 185 volts DC, storing a large quantity of electrical energy. General Electric's flashtube FT-30 is a thin glass tube filled with xenon gas. It is connected directly across the charged capacitor C2. Initially, no current flows through the flashtube since xenon is a good insulator.

Silicon controlled rectifier (D5), capacitor C3 and trigger transformer T2 make up the trigger circuit. Whenever an input pulse (from the oscillator) fires the SCR, the SCR discharges C3 through the primary of T2, generating a high voltage spike in the secondary of T2. This high voltage spike is carried to the flashtube via a trigger wire—a few turns of bare tinned copper wire wrapped around the flashtube. The spike ionizes the xenon gas suddenly turning it into a conductor. C2 discharges rapidly through the flashtube, producing a short, intense, burst of blue-white light. Immediately after discharge, the xenon gas becomes an insulator again, permitting C2 to recharge, and the cycle to begin again.

The number of times-per-second the SCR is fired—and hence, the number of times per second the flash tube is triggered—is

Stroboscope

controlled by a variable frequency oscillator built around unijunction transistor Q1. Potentiometer R8 is the frequency control; switch S2 selects high or low frequency ranges. Meter M1, inserted in the "emitter" lead of Q1 reads the oscillator frequency directly. Q1 is either a 2N2160 (preferred) or 2N1671 type.

The power supply has two output voltages: 185 volts DC for the flashtube circuit and trigger circuit, and 18 volts DC to power the unijunction oscillator.

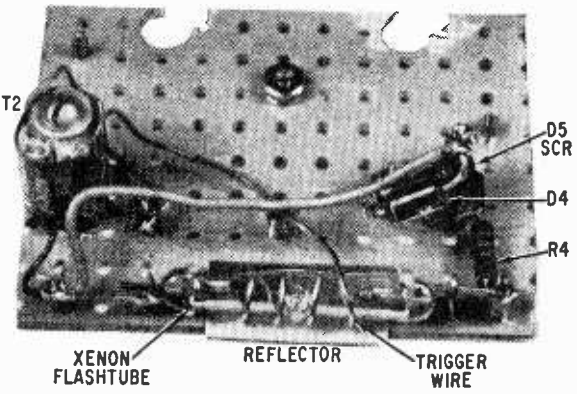
Building It. The stroboscope is built into a 13" x 5⅛" x 2⅝" aluminum case. Start by drilling and punching required holes. Use the accompanying photographs as parts placement guides. Follow placement of parts carefully—do not try to redesign.

The power supply circuitry is mounted directly on the top half of the aluminum case, using terminal strips as wiring points. Make sure that you don't accidentally reverse the polarity of the silicon rectifiers D1, D2 and D3, or the electrolytic capacitors and try not to overheat the rectifiers when soldering them in place.

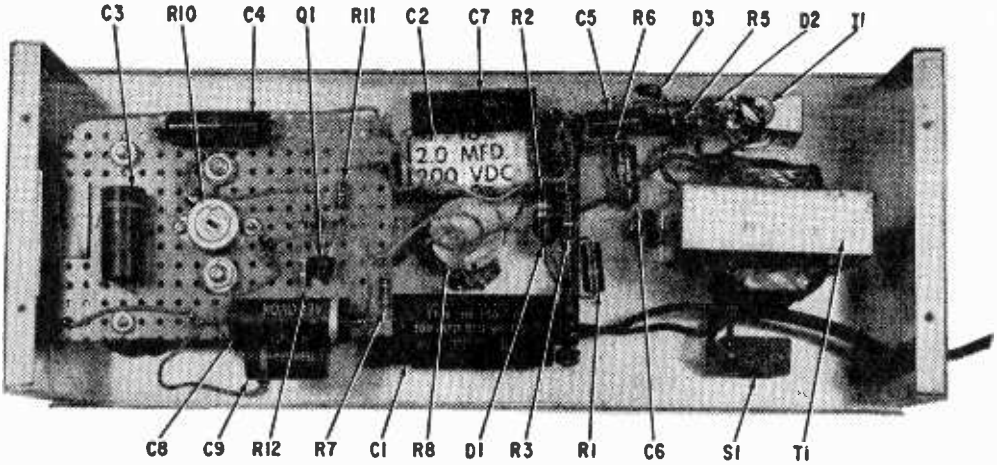
The flashtube, the oscillator circuit and the trigger circuit (with the exception of the meter M1, potentiometer R8, resistor R7 and switch S2) are mounted on a small piece of perforated phenolic chassis board (Vectorboard). Vectorboard push-in terminals make excellent soldering points and should be used. Be very careful when soldering unijunction transistor Q1 into place—grip its leads with needle nose pliers during soldering. The pliers act as a heat sink and protect the heat-sensitive transistor from overheating.

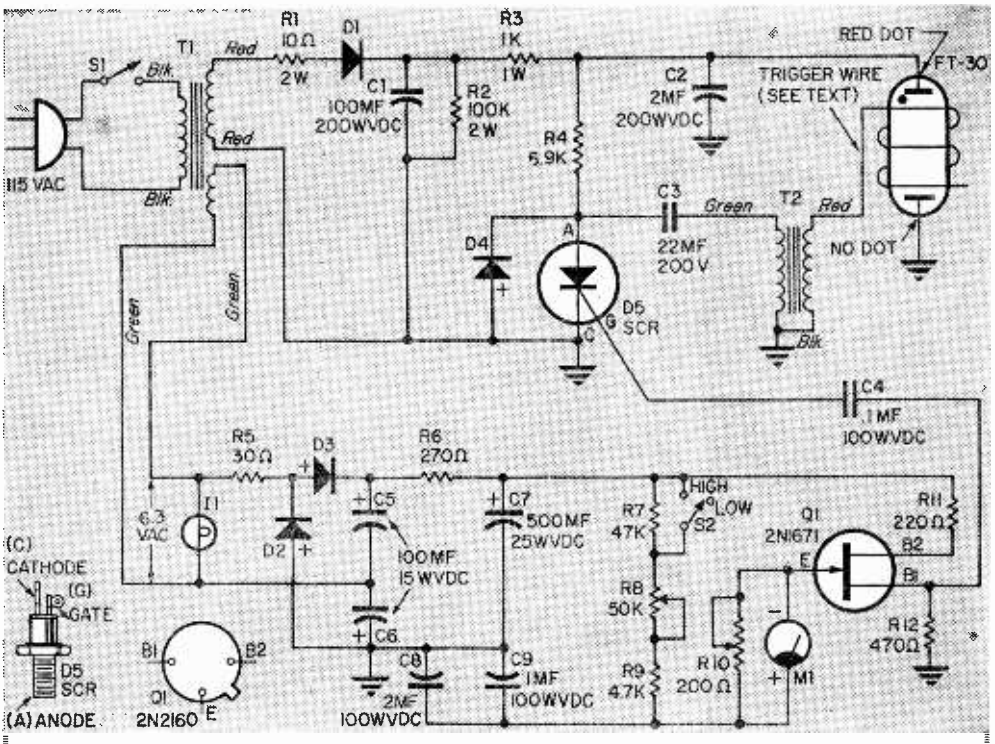
Fasten trigger transformer T2 to the circuit board with a 6-32 machine bolt passed through its center. Mount the flashtube FT-30 by pressing its electrodes *gently* into push-in terminals. Note that the end of the flashtube marked with a small red dot goes to the positive side (hot side) of capacitor C2. Connect the flashtube backwards and you will be buying a replacement in short order.

Capacitors C8 and C9 are wired in parallel



The stroboscope is wired into a flat, long, aluminum chassis box permitting uncrowding of parts. Perforated circuit board (above) mounts on meter screw posts (see below). Except for resistor R9 (hidden under capacitor C2) all parts are shown in photos.





PARTS LIST

C1—100-mf., 200-volt electrolytic capacitor
C2—2-mf., 200-volt paper capacitor
C3—.22-mf., 200-volt paper capacitor
C4—.1-mf., 200-volt paper capacitor
C5, C6—100-mf., 15-volt electrolytic capacitor
C7—500-mf., 25-volt electrolytic capacitor
C8—2-mf., 100-volt paper capacitor
C9—1-mf., 100-volt paper capacitor
D1, D2, D3, D4—5A40 (International Rectifier) or 1 N 2069 (Sylvania, Texas Instrument)
D5—Silicon controlled rectifier, 200-volt reverse rating (Sarkes Tarzian 3TCRE)
I1—Pilot lamp assembly, 6.3-volt bulb, red jewel
M1—0-1 ma. DC milliammeter (Lafayette TM-60)
Q1—2N2160 or 2N1671 transistor (GE)
R1—10-ohm, 2-watt resistor
R2—100,000-ohm, 2-watt resistor
R3—1,000-ohm, ½-watt resistor
R4—6,900-ohm, ½-watt resistor
R5—30-ohm, ½-watt resistor, ±5%
R6—270-ohm, ½-watt resistor
R7—47,000-ohm, ½-watt resistor
R8—50,000-ohm potentiometer with linear taper (Clarostat Series A47)
R9—4,700, ½-watt resistor
R10—200-ohm "Humdinger" hum-adjust potentiometer (Clarostat Series 39)
R11—220-ohm, ½-watt resistor
R12—470-ohm, ½-watt resistor
(All fixed resistors are +10% unless otherwise specified)
S1, S2,—S.p.d.t. toggle switch (Lafayette SW-21 or equiv.)
T1—Power transformer; primary 115-v; secondary 125-volt, 55 ma. and 6.3-volt, 2 amp. (Knight 61 G 411 or equiv.)
T2—Trigger coil for flashtube (Stancor P-6426 or General Electric 86G41)
1—Flashtube (General Electric Company FT-30) (Available from Edmund Scientific Company, Barrington, New Jersey 08007 for $5.20 postpaid)
1—Aluminum chassis 13"x5⅛"x2⅝" (Bud MS-2150 or equiv.)
1—Misc. Perforated phenolic board (Vectorboard), push-in terminals, wire, solder, hardware, line cord, etc.

Estimated cost: $40.00
Estimated Construction time: 8 hours

Stroboscope

to make a 3 microfarad, 100 volt DC capacitor. If you wish, substitute a single 3 microfarad capacitor for the pair provided you can find one available.

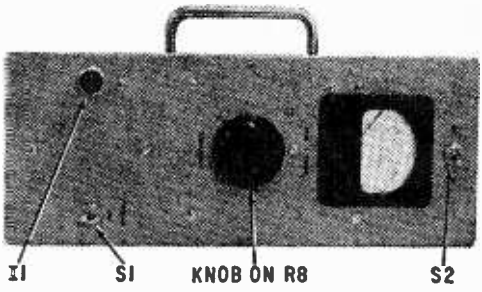
Before mounting the flashtube, wrap about 4 turns of bare #22 tinned copper wire around it, to form the trigger wire. Fashion a simple reflector from a tiny piece of tin-can stock. The reflector may touch the trigger wire, but it *must not touch* the tube's electrodes.

Mount the completed circuit board by securing it directly to the meter M1's terminal connection. Now's the time to probe and peak for shorts and bad soldering joints. Parts are too expensive to proceed blindly ahead by plugging in the power cord and throwing the power switch on.

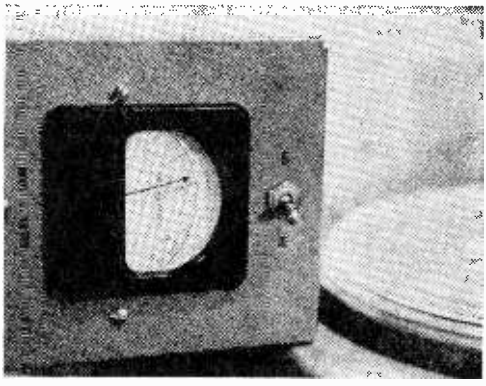
Calibration. The RPM reading on the meter face is linear, so only a single calibration is necessary. Operation of the high-low switch, S2, doesn't affect the calibration—the meter always reads the exact flashing rate. Full scale on the meter corresponds to 166.66 flashes per second, or 10,000 rpm. This was done even though the circuit won't operate above 120 flashes per second, to avoid drawing a new dial on the meter face.

Use a phonograph and paper "stroboscope disc" as a frequency standard to make the single required calibration. Switch the phonograph to 33⅓ rpm, point the stroboscope at the 33⅓ band on the disc, and adjust frequency control R8 until the motion of the band is frozen. Now, adjust potentiometer R10 until the meter reads .36 ma-corresponding to 3600 rpm, or 60 flashes per second. If you wish, you can connect up a test setup with a loudspeaker and signal generator as mentioned at the beginning of this article. This way you can check the accuracy of the metering circuit throughout its entire range. Remember, multiply cycles per second by a factor of 60 to obtain readings in revolutions per minute.

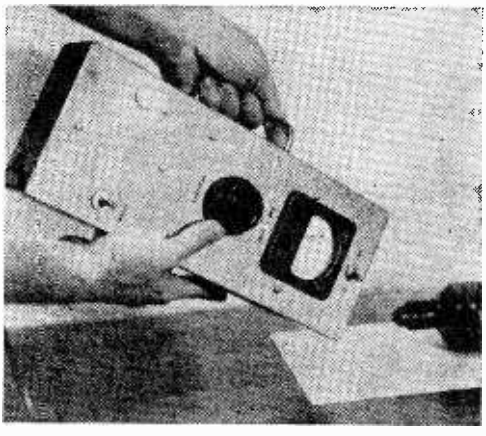
There are several ways you can improve on the construction of the xenon flashtube strobe. If accurate frequency indication is required (better than the meter indication), you can add a vernier dial such as Lafayette's 2⅞" F-346, and calibrate the dial settings against an accurate audio signal generator and loudspeaker hookup. You may want to improve on the xenon flashtube reflector and add a collimator/lens assembly to efficiently beam the light to confined areas. Whatever changes you make, avoid repackaging the unit until you have bread-boarded the circuit. The trigger transformer, T2, should always be close to the flashtube so that the trigger wire is as short as possible. ■



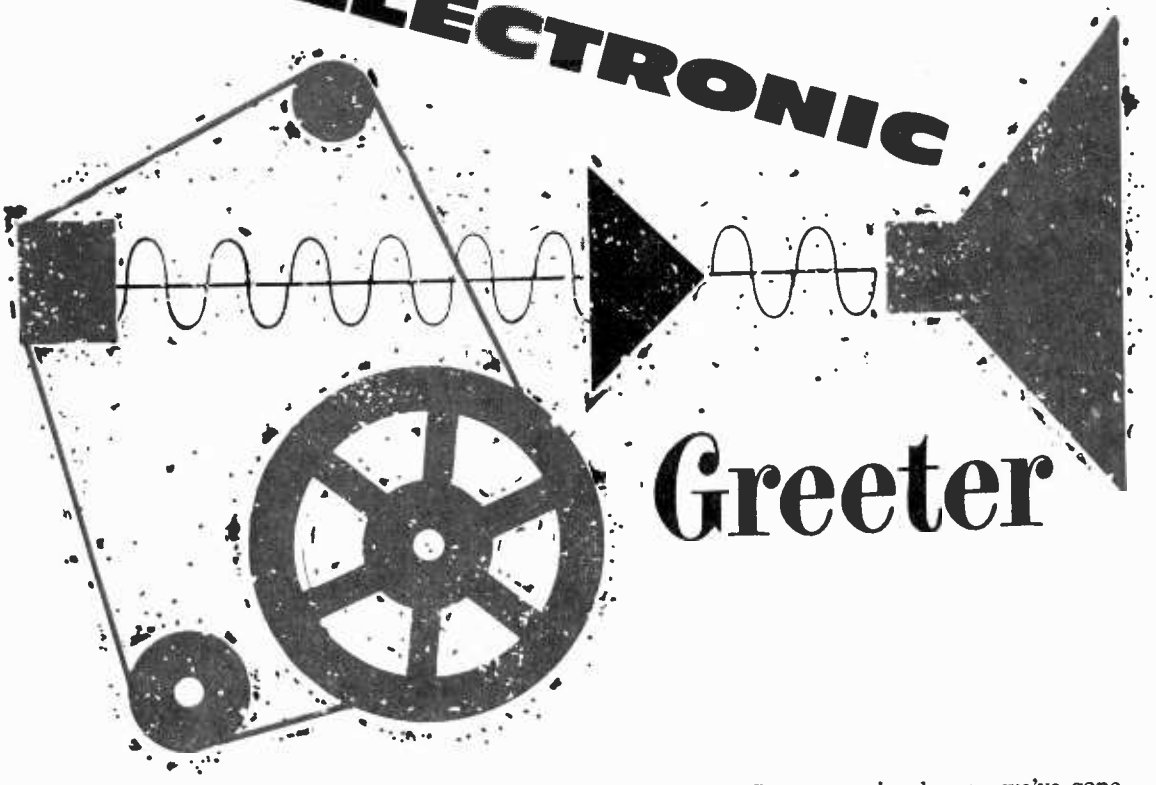
Uncluttered front panel controls give the stroboscope a professional-like appearance.



A phono turntable and strobe disc (above) calibrate the stroboscope. Below, strobe measures unloaded speed of a power tool.



ELECTRONIC Greeter



How many times have you stood
ringing someone's doorbell
again and again
not knowing if they were asleep,
down in the basement,
or out shopping for 10 minutes
or the rest of the day?
Visitors to *your* home
need not have this problem . . .

By Homer L. Davidson

Hello! Sorry we missed you—we've gone to Harrison Park for the day—we should be home about seven o'clock." To the folks who figured they would just drop in, or to unexpected delivery people, or even the Western Union man who rings your doorbell, this message is both a cordial greeting and an explicit answer to the questions they don't get a chance to ask—"Where've they gone now?" "Not a soul home, wonder when they'll be back?" When the caller pushes the front door button, a little battery operated tape recorder, called the Minicorder, is energized and the message comes from a speaker mounted near the bell button. A 20-second message can be recorded on the Minicorder's endless loop tape and will be repeated three times using a 60-second delay relay.

How It Works. The Minicorder, the heart of the Greeter, can be obtained from Mission Liquidators of California for under nine dollars. The complete cost of building the Electronic Greeter is about twenty-two dollars. You can record and set the Minicorder to play back through the outdoor speaker when the doorbell is pressed or first

ELECTRONIC Greeter

play back your message through a one-inch speaker contained in the recorder chassis for test purposes. After you record your message, turn the switch to *Test* and listen to the playback. If you don't like it, record another and listen again. When the message is satisfactory, throw the switch to the *Play* position and the message is ready for either the front or back door. In most cases only the front door need be used for messages. The present front or back door bell buttons can be used with the Electronic Greeter. Simply disconnect the wiring from the door bell power transformer and bell. Run the two wires from the button directly to the Greeter chassis. The Minicorder operates on two standard size, easily obtainable batteries. One a 9-volt transistor radio battery that runs the electronic section, and the other a 1½-volt "C" battery that powers the tape drive motor.

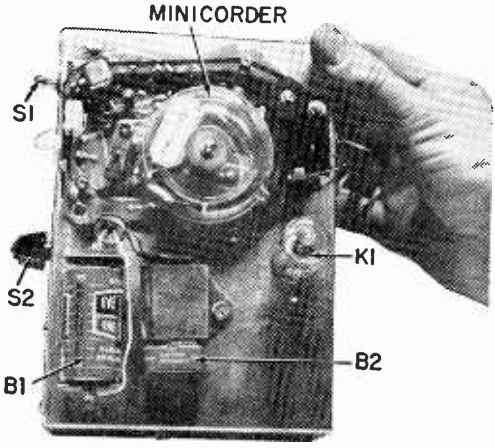
Construction. Using a 5"x7" aluminum chassis lay out the required holes as shown in the chassis layout. Mount all the larger components except the Minicorder which should be mounted after all the wiring has been completed. Be careful when turning the chassis over, the small tape can easily be torn. Before mounting the one-inch speaker, place a wire screen between it and the chassis. The mike input transistor circuit is mounted as parts are wired into the circuit. Since the small recorder has only two transistors, more volume can be obtained by using a transistor input stage and crystal microphone.

Wiring The Unit. Wire the AC cord directly to the primary side of the filament transformer T1. Solder and tape all connections. This transformer is in the circuit all the time, but almost no current is drawn from it until the secondary is used. It may seem that when you wire up the two relay circuits that the relay wiring is complicated, but it is very simple if each section is wired individually.

The small 2½-inch speaker that is included with the Minicorder can be mounted in a metal minibox. If there is no door bell button, mount the button in the same box. Run a four wire cable from the front or back door to the door announcer and connect to terminal on the terminal board.

Mount all of the small transistor input parts as they are wired into the circuit. Be sure to use lead sinks on the transistor leads. The input stage gives the volume necessary for the outdoor installation. Wire the output condenser to terminal 1 of switch S2. All of the parts, including the transistor, are mounted on an insulated 3-terminal lug. Run all wires direct keeping them as short as possible. Twist the switch, speaker, and battery leads on longer runs. Check the wiring over once more and make sure there are no mistakes.

Testing The Unit. Now is the time you have been waiting for. First test the 6-volt



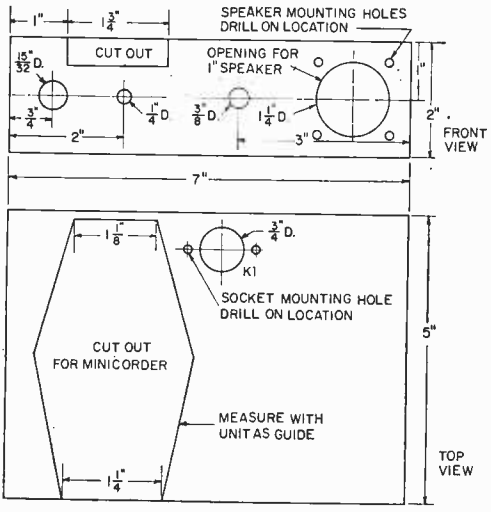
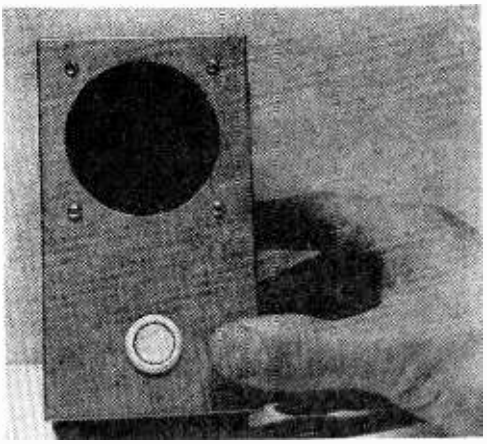


Photo above shows location of above chassis parts. Diagrams (right) give chassis details.



The rear door button and rear door speaker can be mounted in a single aluminum chassis box as the author did. However, both parts can be mounted on a metal plate and flush mounted in the door panel. If you wish, add a jewel lamp to illuminate the panel at night.

relay to see if it is closing by listening for a loud click. Plug in the AC cord to an outlet and flip switch 1 to TEST position. The relay will close and become energized.

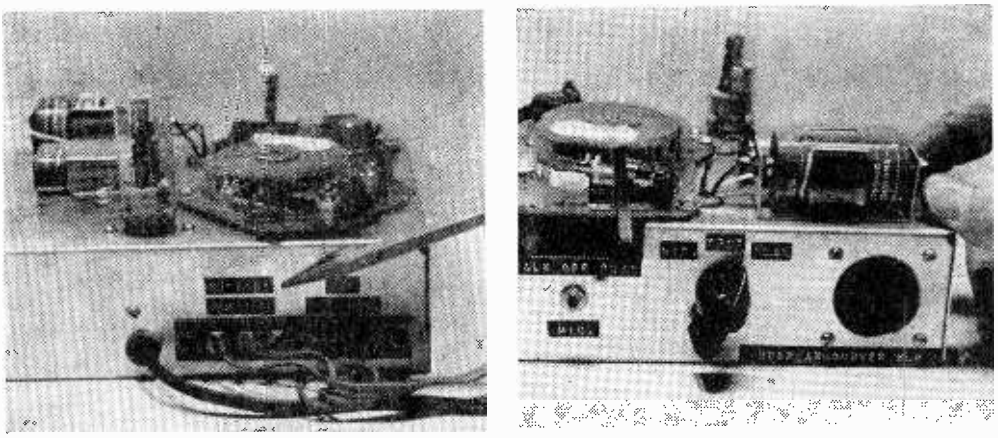
Test the Minicorder by sliding the arm switch to *Play* position and switch 2 to *Test* position. Flip switch 1 to *Test* position and the recorder will turn and play. The slide arm switch on the tape unit can be left in *Play* position and will not be changed unless recording a new message. Switch S1 should be left in *Auto* position and flipped to *Test* only when a test is to be made from inside the house. In this case you will like to hear what you have just recorded.

To record a message turn switch S2 to *Mic.* position and plug in the crystal microphone. Flip switch S1 to *Test* position. Now hold the slide arm switch to *Talk* position. It is best to repeat a message at least twice and several messages can be recorded at the same time. The message that is now recorded will erase the previous message.

The recorder can now be mounted in a cabinet or placed in a case where dust cannot get onto the tape. Label all controls and terminals with a label maker or lettering material.

Trouble Shooting. If the tape runs too slow replace the 1½-volt battery. Squeals and low volume are a sign of a weak 9-volt battery. If the unit double talks, the unit is not erasing the tape normally erased automatically as you record. Sometimes there will be a buildup of sounds that did not erase completely. You can clean the tape electronically by disconnecting the 9-volt battery and running the tape unit through a complete cycle. If the small erase magnet is not up against the tape when recording, double talk will also result. Sometimes this mounting screw will come loose in shipment and will not erase on the tape. To correct this, slide the arm to talk position and loosen the set screw. Make sure the magnet is now against the mounting tape and tighten the set screw.

If the tape runs backwards, the flashlight battery is connected backwards. If the tape breaks or becomes raveled, rethread with regular ¼-inch recording tape. Be sure to check

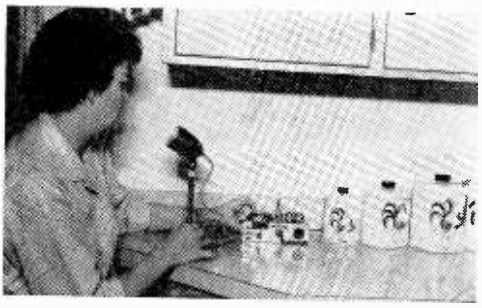


Rear apron (left) mounts the terminal strip (TB1) that interconnects front and rear door buttons and speakers. Batteries (right) are mounted on top of unit making replacement an easy task.

that the contact points on the 6-volt relay close when energized and break when the relay is open.

The batteries will last a long time with intermittent service. For longer life, parallel another battery with each of the 1½- and 9-volt batteries.

The practical applications of the Electronic Greeter are quite numerous but it is not at all limited to the practical. After the few hours construction time involved, those close friends you expect might receive a somewhat dubious greeting—"Go away, there's no one home, go away there's no one home, go away, ther....." ■

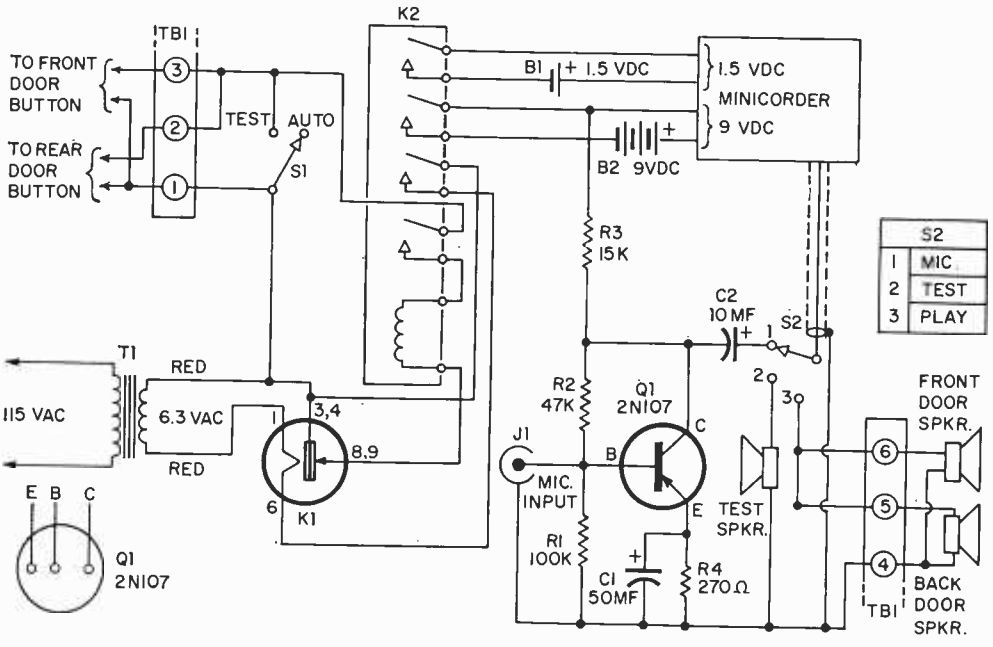


Installed on the kitchen worktable, the lady of the house can tape messages for expectant callers and others before she leaves to shop.

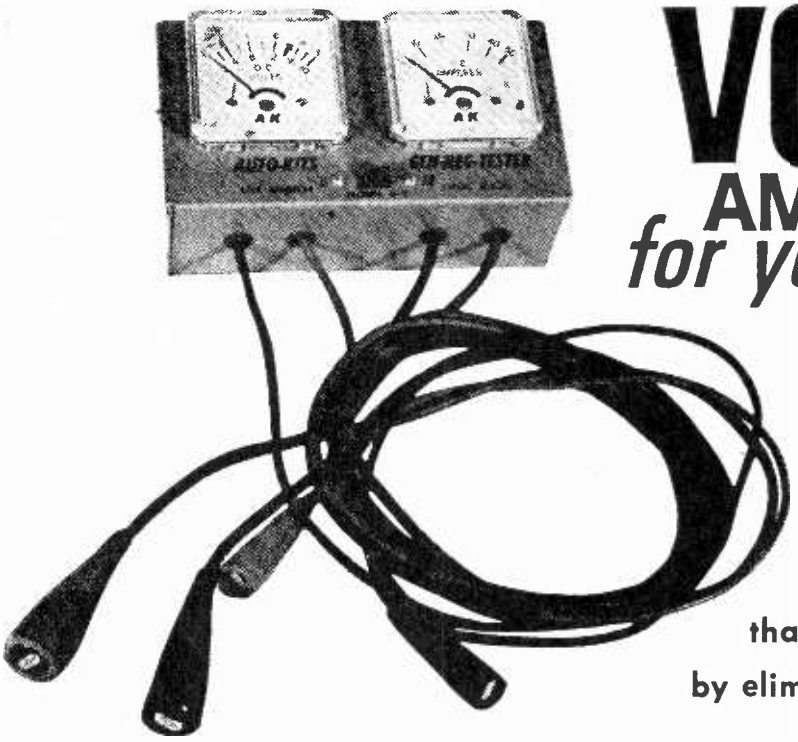
PARTS LIST

B1—1½-volt battery (Eveready 635 or equiv.)
B2—9-volt battery (Eveready 216 or equiv.)
C1—50-mf., 12-VDC electrolytic capacitor
C2—10-mf., 12-VDC electrolytic capacitor
J1—jack to match the microphone used
K1—60-second delay relay with normally closed contacts (Amperite 6C60T-60)
K2—4-p., d.t., 6-VAC relay (Potter and Brumfield 3RY208 coil and 3RY219 contacts)
Q1—2N107 transistor (General Electric)
R1—100,000-ohm, ½-watt resistor
R2—47,000-ohm, ½-watt resistor
R3—15,000-ohm, ½-watt resistor
R4—270-ohms, ½-watt resistor
S1—S.p.d.t. toggle switch
S2—S.p. 3-position rotary switch (Lafayette SW-95 or equiv.)
T1—Filament transformer; 115-v primary, 6.3-v secondary at 1.2 amperes (Stancor P6134 or equiv.)
TB1—6-post terminal barrier strip
1—1-inch PM speaker
1—2½-inch PM speaker
1—Aluminum chassis box, 5"x7"x2" (Bud AC-402)
2—Aluminum chassis box(es) 5¼"x3"x2⅛" (Bud 2106A)
1—Minicorder (available for $8.99 from Mission Liquidators, 735 Celis Street, San Fernando 82, California)
MISC.—AC Power cord, 9-prong wafer tube socket, nuts, bolts, rubber grommets, wire, etc.

Estimated construction time: 5 hours
Estimated cost: $22.00



Schematic diagram for the Electronic Greeter. Wire Q1's circuit close to Minicorder



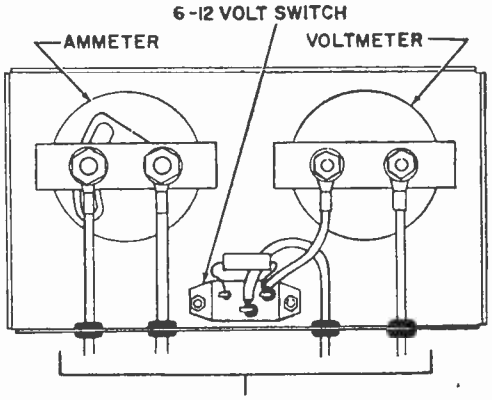
VOLT-AMMETER for your car

You can assemble in one evening a handy tester for auto servicing that will pay for itself by eliminating repair bills

The most experienced electronics experimenter usually ends up at the local garage to service and repair the electrical and electronic equipment or parts in his car. In many cases he does not perform simple preventive maintenance checks such as checking the generator or alternator regulator, battery, lights, switches, relays, stop and tail lights, turn signals and accessory motors. The exact reasons for this reluctance to work on a car's electrical system is two fold: (1) the lack of suitable test instruments, and (2) almost no knowledge of how many of the car's electrical circuits work. Both these reasons can be virtually eliminated with the purchase Gen-Reg-Tester—a kit especially designed for the home auto mechanic.

Engineered for automotive applications, the Model G-R tester has a two range voltmeter (0-10 and 0-20) and —5-0-50 ampere meter. The unit can be wired in one and a half hours. It is rugged and dependable as commercial units costing many dollars more.

The instruction sheets supplied with the kit Gen-Reg-Tester tells you how to make important operating tests on your car. For example, you can check to see whether the current limiter coil in the regulator prevents excessive generator currents from being drawn as well as measuring the regulator's reverse current cutout setting. But most important, the tester permits rapid trouble-shooting on all 6- and 12-volt cars. The Gen-Reg-Tester can be had for $15.95, postpaid, from Auto-Kits Products Inc., Dept. 22, 1244 So. Grand Avenue, Los Angeles, California 90015. ■

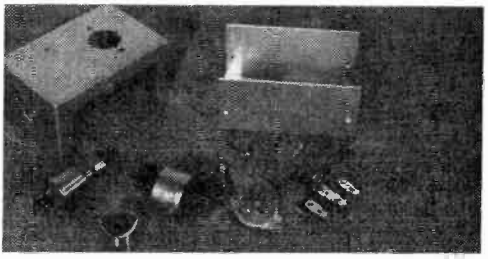


Outline drawing shows location of parts in tester and ease in which it can be assembled.

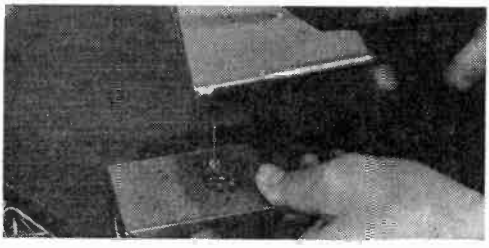
POP GOES THE RIVET

Shake-proof steel rivets give your construction projects the "pro" look

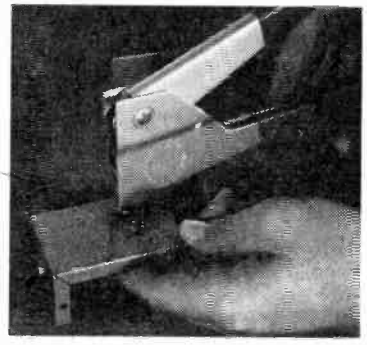
One of the new hand tools on the electronic market place is the "Pop RiveTool"—a plier-like device that is used to install cold steel rivets in blind holes with just a squeeze of the hand. Pop rivets can be used to replace sheet metal screws and machine screws for fastening jobs on chassis, aluminum boxes, name plates, or even children's toys. If your local distributor does not have the "Pop RiveTool," you can obtain yours from Burstein-Applebee Co., 1012 McGee Street, Kansas City, Mo. 64106 for $5.44 plus postage. Start popping projects today!

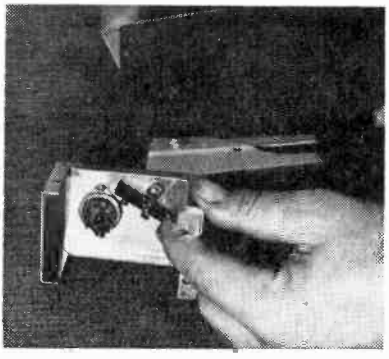


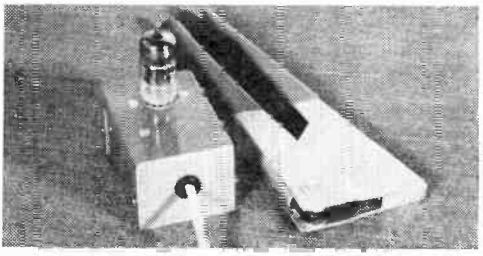
Drill and punch a project chassis as you would normally for assembly with 6-32 machine or self-tapping screws.



Insert rivet with nail tip up (above) in hole where screw would normally be placed. Spot the RiveTool over the nail (right) and slip into place snugly against the chassis.







Now squeeze the RiveTool's handle (left); the nail is pulled out of the rivet at the same time it flattens the rivet's back making a tight fastening job. Above, the completed one-tube project looks like it was store-bought.

Long tape loops are easy to handle when contained in this compact, easily-constructed pack. Use it to capture elusive sounds, as a teaching aid for music or languages

By Jorma Hyypia

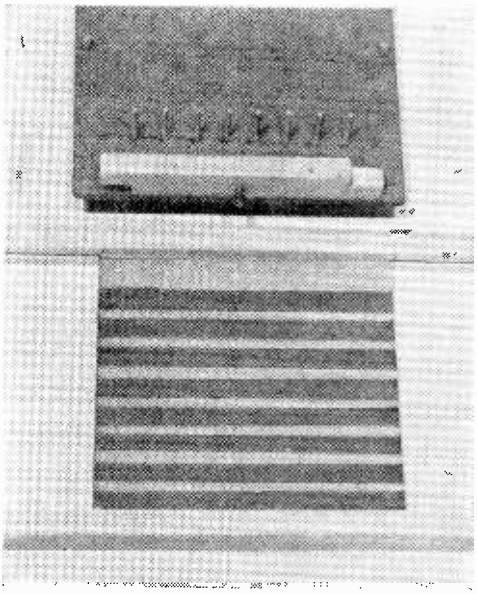
Loop recording is basically a very simple procedure; all you do is splice a length of tape into an endless loop and slip it into the recorder to replay short duration sounds repeatedly without the need of rewinding the tape after each play.

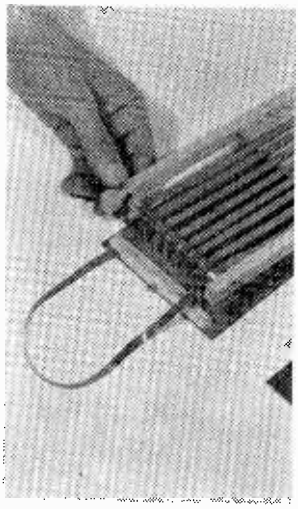
The loop has many practical applications; yet most tape hobbyists seem to make very little use of the technique, probably because only the shortest of loops can be conveniently handled without fear of hopeless snarling.

But build the loop pack described in this article from scrap materials, and you can keep loops up to twenty feet long under full control and ready for instant use at home or in the field. Slip the pack on your recorder in a matter of seconds, and no sound, however elusive, can get by unrecorded.

Using the Loop. The most obvious application is the recording of sounds you know will occur, but whose precise time of occurrence you cannot predict. Thunder claps, bird calls, animal sounds, boat and train whistles—these are all good examples. With your loop pack operating, you can wait for minutes or all day if necessary until the sound occurs; the tape is constantly erased and re-recorded until you stop the machine to preserve the desired sound. You can, of course, use a recorder in the orthodox way to capture such sounds. But what happens? The sound is likely to be buried in the middle of the long tape mostly filled with unwanted sounds; or you have run out of tape, and the sound occurs just as you are in the process of rewinding another reel.

TAPE LOOP PACK





RIGHT. Even spacing of tape on the rack permits easy insertion of rack into base panel section. Spacer pins keep tape running smoothly without annoying tangling.

FAR RIGHT. Loaded pack is ready for instant use; just drop exposed part of loop into recorder head section. Flip over to use other side of tape. Note lock strip and nut that closes pack firmly.

Once the wanted sound is recorded on a loop, you can either keep it in the pack for replay purposes, or you can remove it for splicing into other tapes. You can also transcribe the sound to another tape if you have two recorders to work with.

The same technique can be used to record interesting material from radio or TV broadcasts. Perhaps you like to collect unusual anecdotes, or the voices of celebrities; just keep the loop running while you listen to the broadcast, and turn it off when it picks up something you want to save.

The tape loop is an excellent educational aid in any project involving memorization. Foreign language phrases, for example, can be played over repeatedly while you go about other work; the constant repetition—revealing none of the fatigue that would be soon evident in constant human repetition—soon firmly impresses the words and subtle nuances into the learner's memory. In like manner, complex mathematical formulas or other technical information can be memorized easily with the aid of tape loops.

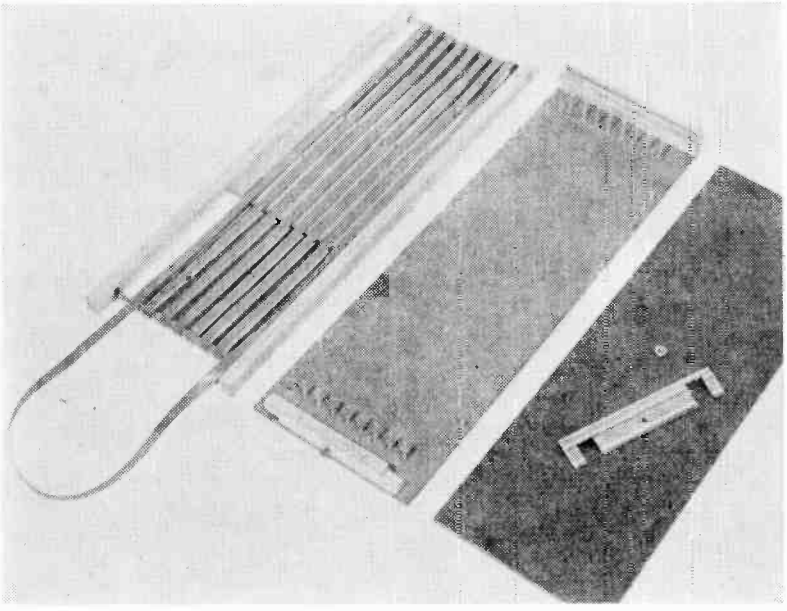
If you play a musical instrument, try recording difficult sections (from records or other tapes) onto a loop; then play along with the constantly repeated sound to improve your own instrumental technique. No need to rewind the tape recorder constantly to play the problem section over again.

As an electronics hobbyist, you can record the sound characteristics of your hi-fi equipment on tape loops in order to study the taped data with an oscilloscope or other test instrument.

Incidentally, you don't have to build the loop pack to test the usefulness of tape loops. Even a long tape can be stretched across the room with the far end hung over a doorknob—provided there are no children or pets running about. But how would you cope with such a free-swinging loop out in the field where there are no door knobs, but perhaps crowds of people or a heavy wind? A pack of some sort is then absolutely essential. This will serve well anywhere, any time.

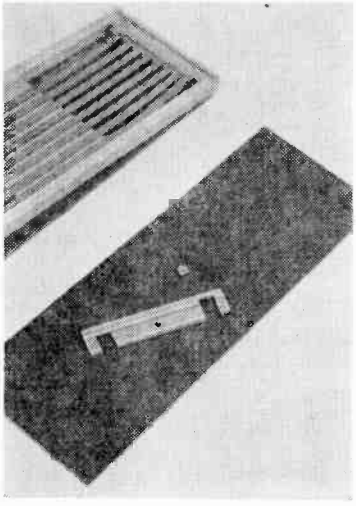
Base Panel. Start construction of the loop pack by cutting *two* 4½" x 14⅛" panels from ⅛"-thick masonite. One of these will form the base panel, the other the pack cover.

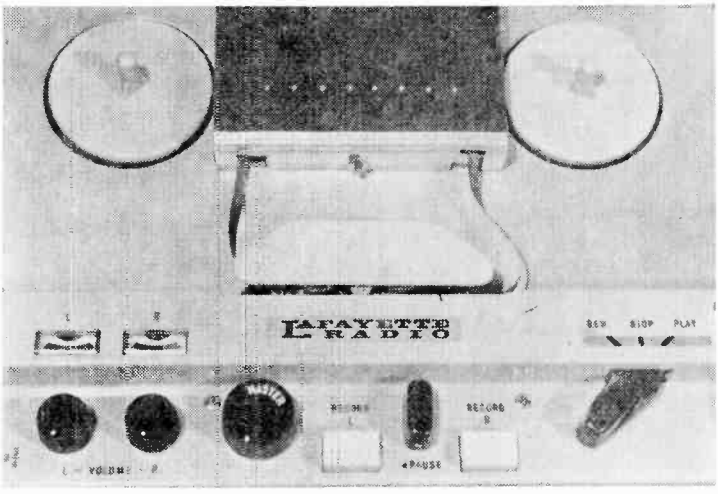
On one end of the base panel (rough side) glue and nail securely a 4½" x ½" x ¼" block of wood. On the rear of this block screw a piece of rigid metal that has been bent to form a lip to hold down the rear end of the pack cover. This rear lock is easily fashioned from aluminum edging material used to trim the edges of formica-covered kitchen counters. The gap between the lock lip and the block to which it is fastened should be no wider than necessary to allow insertion of the cover edge.



FAR LEFT. Paint dark bands on the spacer panel of the rack to facilitate loading of the tape (see text); at top of photo is front end of base panel, showing notched block and one set of tape spacer pins set in place.

LEFT. Component parts of the tape loop pack prior to final assembly: tape loaded rack, base panel with spacer pins, cover panel and the lock plate and securing nut.



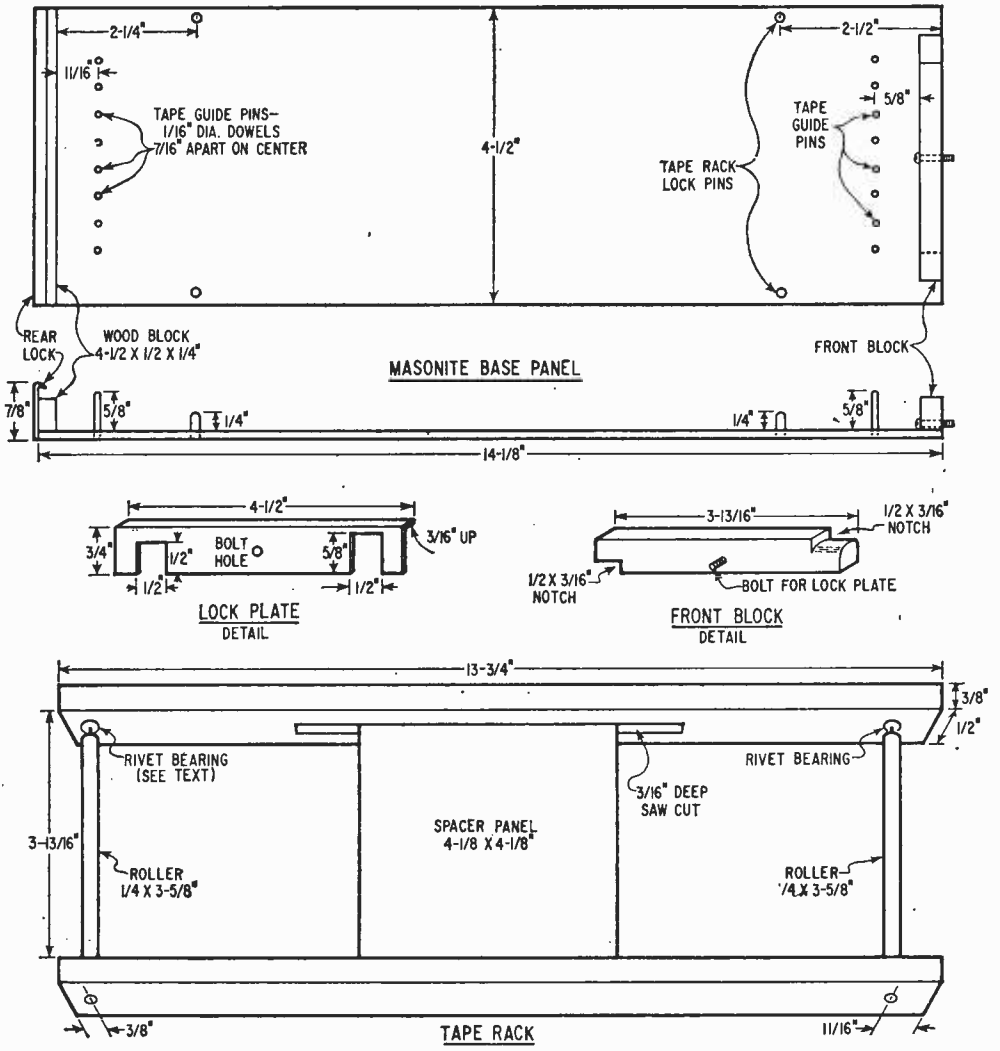


Another block of wood is fastened to the opposite end of the base panel; this is shorter than the rear block, and has two notches cut into it through which the tape will run in and out of the pack. Round off sharp edges in the notch to prevent abrasion or snagging of the tape. Leave drilling of the bolt hole until later.

Near each end of the base panel drill eight 1/16"-diameter holes spaced 7/16" apart. Note that these holes are at slightly different distances from the two end blocks. Before drilling the holes, tape the cover panel underneath the base panel (smooth sides touching) so that the series of holes in both panels are drilled simultaneously. This will ensure perfect alignment of the holes. The tape guide pins will be glued into the base panel holes later.

Tape Rack. The frame of the tape rack consists of two 13¾" x 3/8" x ½" strips of wood. On the inside of each strip cut a 5" groove 1/8" wide and 3/16" deep to hold the spacer panel.

The spacer panel may be of masonite, plastic, metal, or stiff 1/8" thick cardboard. Its length—about 4 inches—is not critical, but the width should be accurately cut to



Detail drawing for making the four assemblies of the tape loop pack.

TAPE LOOP PACK

ensure good alignment of the frame strips with the base panel edges when the spacer is pushed all the way into the grooves.

Near the ends of the frame strips, drill holes to take the roller bearings. Note differing positions of holes at opposite ends of each frame strip. Important: position these holes carefully, and drill straight.

Roller bearings are easily made from four hollow brass rivets, ¼" in diameter and ⅜" long, with heads about ⅜" in diameter. Using a drill that just fits into the rivet shank, drill the hole on through the rivet head; remove all burrs very carefully. The bearing holes in the frame strips should be just large enough to permit snug press-fitting of the rivet shanks into them. The rivet heads must be on the *inside* surfaces of the frame strips.

Roller construction is the most critical part of the pack construction; each roller *must* be perfectly straight and smooth and *must* turn freely without binding. Binding, or a slight warp in the roller, will cause uneven tape movement resulting in distortion.

(Continued on page 109)

grow your own crystal radio

By William J. Mallard

Neither sunshine nor rain are required to sprout this less-than-postage-stamp-size crystal in the dark of your basement workshop lab

In the years since semi-conductors first appeared on the scene, there has been a flood of informative literature describing the complexities of manufacture. Most of the articles have been a point of the extreme purity of the materials used and the minute traces of foreign elements with which they are doped. It's enough to make the most dedicated do-it-yourselfer cringe!

Actually, it's a relatively simple matter to make your own semi-conductor. Furthermore, it requires no exotic minerals with an exasperating degree of purity. Once you have accumulated the few simple materials required, you can turn one out in less than ten minutes. Then you can wire the galena crystal to a coil, two capacitors, ear phones, antenna, and ground and tell your friends, "Come! Listen to the crystal radio I grew."

Xtal Recipe. You will need two ingredients. One is *lead*—either raid the fishing tackle box for some sinkers or beg a few ounces from a friendly plumber. The other ingredient is sulfur. A couple of generations ago it could be found in every medicine chest waiting to be mixed with molasses. Now, however, you'll probably have to stop at the corner drugstore where you can get a small bottle or tin for a few cents.

The items of equipment you'll need to go into the semiconductor manufacturing business consist of a short piece of ½" or ⅜" copper tubing, a propane torch, and perhaps a little sand from the children's sandbox or local beach.

By now the chemist and the old-timer have recognized the "semiconductor" by its ingredients. It is *lead sulfide,* otherwise known in its natural state as *galena.* A long time ago when solid state physics wasn't even a gleam in someone's eye, and germanium and selenium were merely names in the periodic table, the galena crystal was performing yeomen service in the infant radio industry as the detector element.

Nobody questioned how or why it worked.

grow your own crystal radio

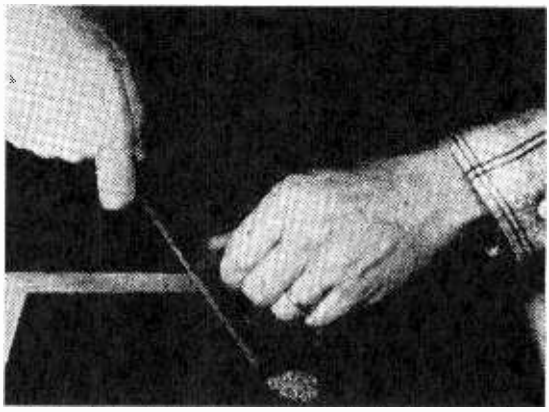
The term "semiconductor" hadn't yet been coined and "holes" were something found only in doughnuts and Swiss cheese. But the crystals worked and you can make some of your own if you follow the pictorial instructions.

Duplicating Nature. You won't get the big, shiny crystals that nature took millenia to produce, but you will get a sparkling nugget loaded with sensitive spots just waiting for the catwhisker—pardon me—I should have said you will get a sensitive semiconducting device in the form of a point-contact diode!

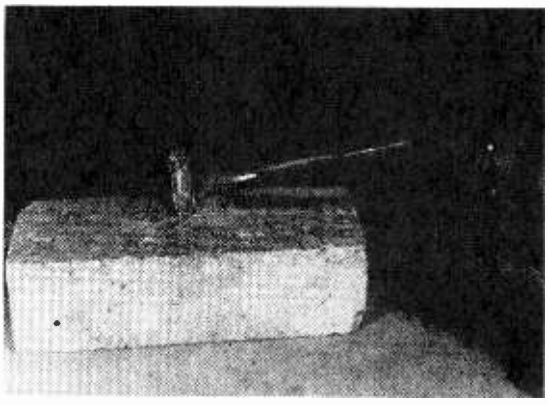
To grow your own galena crystal, follow the step-by-step procedure that is given in the numbered photographs. Follow the instruction carefully keeping in mind that you must proceed carefully to avoid painful and injuring burns.

Crystal Radio. There are probably more variations of crystal set circuits than any single piece of electronic equipment. This is not surprising in view of the fact that a whole generation of experiments worked almost exclusively on the problem of increasing the sensitivity and the selectivity of the crystal set.

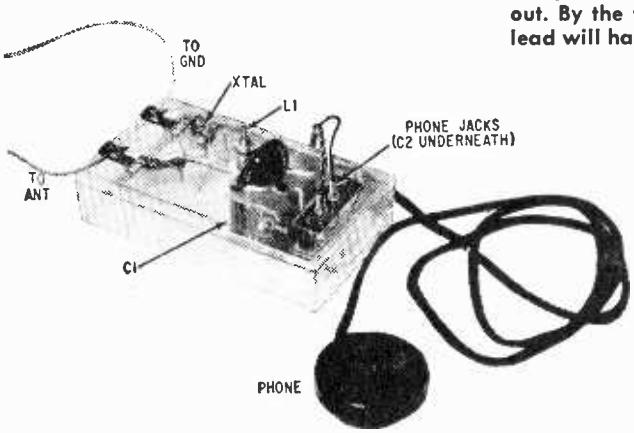
The circuit in the schematic diagram is a compromise. It is simple, uses readily obtain-



Step 1. Reduce the lead to fine granules by rubbing it on a file or rasp. Sulphur melts at 250 F, lead at 600 F. By using powdered lead we can ensure that at least some of the sulphur will combine before it burns up.

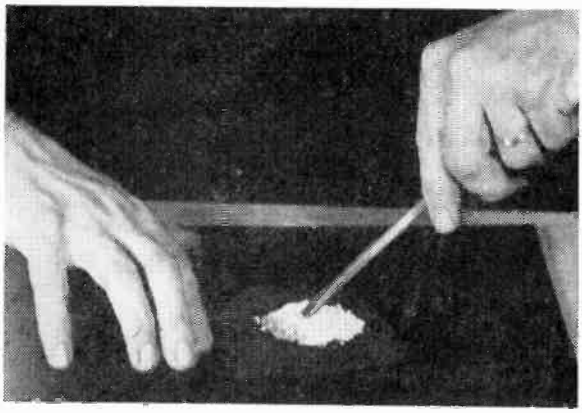


Step 4. Place the filled tube on an insulated surface, a brick will do, and heat gently with the torch. Hold a protective pane of glass or plastic in front of your face while using the torch because the sulphur may spurt out. By the time the tube begins to glow, the lead will have melted. Now wait for it to cool.



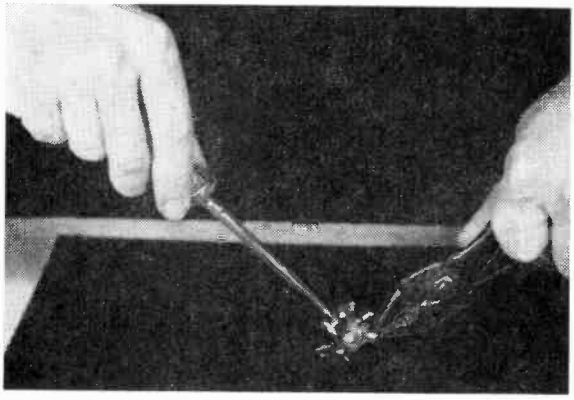
The home-grown radio at the left can be put together as easy as A, B, and C for crystal. See schematic diagram.

Three specimens of mounted crystals. Cylindrical object at the far right is lead sulfide as it comes from the copper tube. As a rule, signals obtained from the crystal near solder line are the strongest.

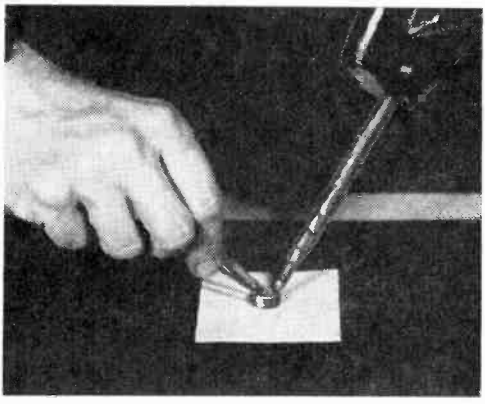


Step 2. Measure out six parts by weight of lead powder to one part of sulphur. Proportions aren't too critical. It's best to be liberal with the sulphur because, unfortunately, a great deal of it goes up in smoke. Be sure to mix the lead and sulphur together thoroughly.

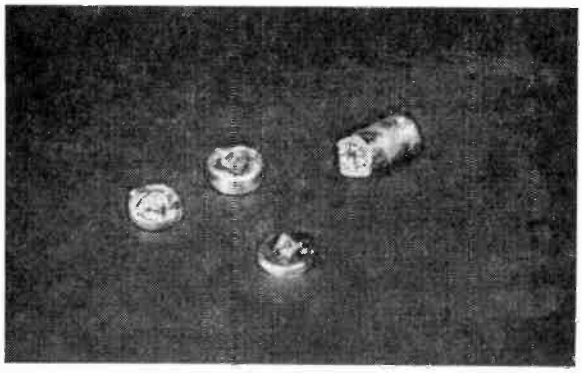
Step 3. Pour the mixture into a piece of copper tubing about 1½ to 2 inches long and tamp it down. Fill the tube about half full. Fill the rest of the tube with sand to reduce the amount of oxygen available to the sulphur in order to decrease its rapid burning.



Step 5. Cut the tube open with a hacksaw and remove the lump of metal. If nugget breaks readily and the broken surface presents a sparkling appearance, you have lead sulfiide. If lump is not brittle but maleable, the sulphur burned up before crystallization took place. Start over applying heat more gently.



Step 6. Line a small ring of copper with paper to keep solder from sticking. Melt the ring full of solder and embed a fragment of crystal. When the slug cools, remove the ring and save for reuse. Clean the solder slug so it will make good contact with its holder. Now the mounted crystal is ready to be used.



able parts, and possesses considerable selectivity. The latter feature is important because today the great bulk of the population lives within range of several local stations. And, let's face it, the crystal set just wasn't made for DXing. So a little loss in sensitivity is sacrificed for simplicity and selectivity.

The detail drawing shows one method of making the "catwhisker," the forerunner of today's point-contact devices. Its purpose is to make contact with one of the shear faces of the lead sulfide crystalline structure

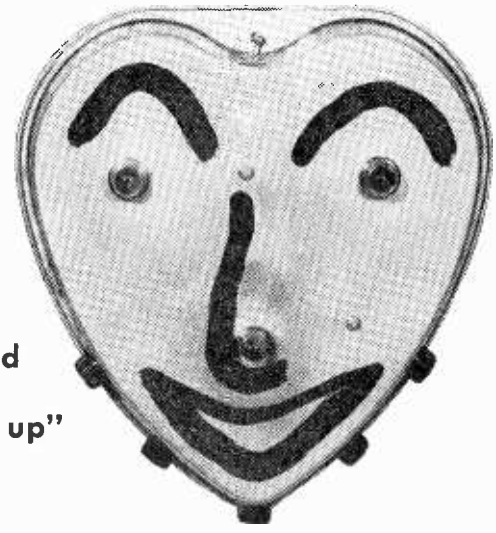
(Continued on page 108)

Four and five year-old Valerie and Jay are a good match at games the youngsters play. Little Jim is happy just watching those pretty color lights.

Switch & Shine

By James Robert Squires

Fill this cake pan with a circuit that requires very little dough and you've got a toy the kids will "eat up"



All children love the twist of a knob or the click of a switch. Very often they will vent their emotions on the TV, your revered hi-fi components, or the electric grill. Turning electrical equipment on and off can be dangerous and damaging. But you can still let the kids have their fun with this "Switch and Shine" toy. It can be built in one evening for only $3.75; and it will provide many evenings of entertainment for the young, and the old who are watching (or playing themselves).

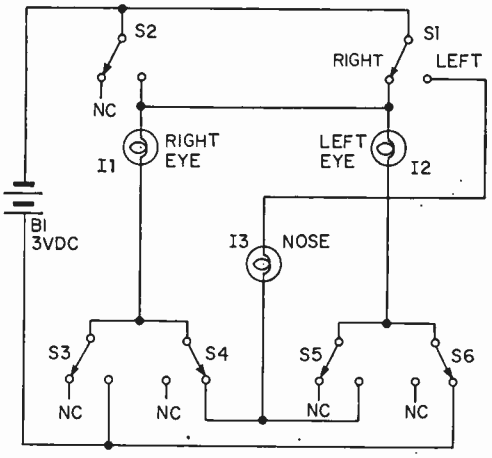
"It's Too Easy!" is a whine you won't hear. One challenge of the toy is to turn on both eyes and the nose at the same time. This is not easily accomplished with a switch for each eye and nose but with the proper *combination* of switches. This takes the clown face out of the realm of a short-lived, easily mastered toy and into the category of a lasting and challenging game and amusement. For example, it took an average of seven tries to place all three lamps in series. This is less than the usual because I knew the special functions of S1 and S2 and therefore had an advantage.

"How Does It Work, Daddy?" The physical locations of the switches are pinpointed in the schematic diagram. For the eyes and nose to light together, five of the six switches must be in the right position. S1 can bypass S2 and provide either nose or eye voltage. To begin with, S1 must be in the left position and S2 in the closed position. The nose lamp completes its circuit through a combination of two switches, either S3-S4

PARTS LIST

B1—3-volt battery (four 1.5-volt cells)
I1, I2, I3—Miniature lamps (GE #49)
S1—S.p.d.t. toggle switch
S2, S3, S4, S5, S6—S.p.s.t. rotary appliance switches (Burstein-Applebee Co. 12A725)
1—Heart-shaped baking pan
1—Battery holder for four C-cells
3—Lamp socket and jewel assemblies, 2 red and 1 green (Allied Radio 7E967 and 7E969, respectively)
Misc.: Wire, solder, solderless connectors, nuts, bolts, etc.

Estimated cost: $3.75
Estimated construction time: 1½ hours



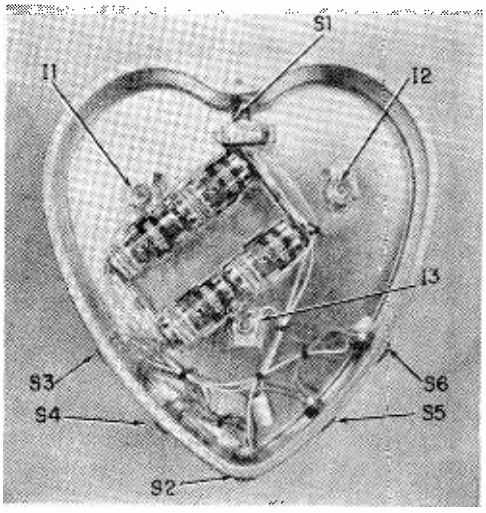
Lighting the face is easy when you can consult the schematic diagram to determine the correct combination of switches to close.

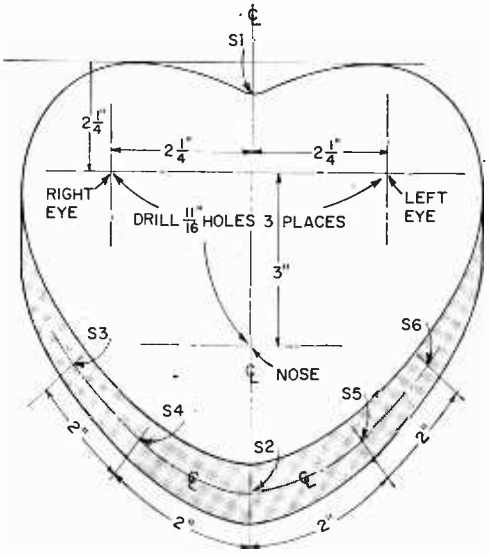
or S5-S6. The right eye can complete its circuit through S3 or S4, S5 and S6. This also applies to the left eye; it can complete its circuit through S6 or S5, S4 and S3. For these reasons no one switch controls any eye or the nose by itself. These interconnections even serve to thwart the adult memory; and you may even find yourself sitting on the floor holding a half-lighted clown's face while your youngest smugly holds his or her's with its eyes and nose glowing!

The switches are not identified on the face but their physical positions are learned after awhile, of course. Switches S1 and S2 have distinct functions; their effect on the lighting can be memorized. However, switches S3 through S6 may have one effect on the lights at one time and another the next.

Electrical Checkers. Two can play the game with the goal being that the first person to place all the lamps in series is the winner—both players work independently against time. Or two can play "clown's faces" with the goal of all lamps lighted by alternating moves as in checkers. Skill comes when you learn to predict the next move or switch that should be operated. It is possible to plan moves to confuse your opponent but, be careful, that next move may set him up to win.

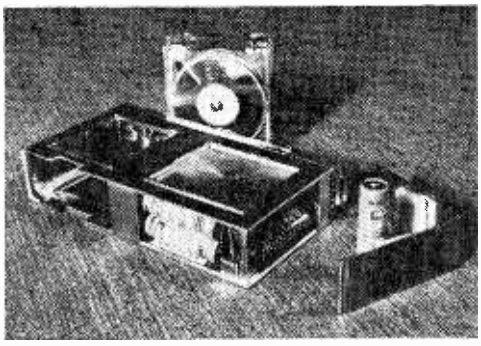
(Continued on page 110)





You'll find this heart-shaped chassis in the kitchen—it's a cake pan! It quickly changes to a "funny face" by placing lights, switches, batteries as shown in these chassis layouts.

Lovely Ina Balin finds the Lodestar just perfect for rehearsing her lines in the latest Jerry Lewis film "The Patsy." Below, tape cartridge and battery cover are removed revealing sturdy internal construction.



TAPE RECORDING "from the hip"

Lab checked for utility, Channel Master Lodestar miniature tape recorder rates a top buy as a practical portable voice recorder

If you're a club secretary having trouble keeping minutes during hot debates, then Channel Master's *Lodestar* cartridge-loading, miniature, tape recorder should be at your side. This precision quality, battery operated instrument can be carried (it weighs two pounds fully loaded) and played anywhere. Designed to record only in the human voice frequency range, it is ideal for business meetings, parties, social events, etc., then play back, loud and clear, at your convenience.

Tape Cartridge. The single, most significant feature of the Lodestar is its tape cartridge and how easy you can load it into the recorder's cartridge slot with the same finesse George Raft would use to slap a full clip into his 45 automatic. Record for 16 uninterrupted minutes on one-half track, remove the cartridge, flip it and start on a second 16 minute interval—32 minutes in all. Rewind takes four short minutes.

The recorder and cartridge were handed to three individuals with the verbal instructions to record, "Mary had a little lamb," and to play it back. Having never seen the unit before and without the aid of Channel Master's illustrated operating instructions, all three were able to do so in under five minutes —the record time was 96 seconds. With the instruction manual, only non-readers could fail to operate the unit without helpful hints.

Use Test. The best test for a consumer product is to use it as the owner would under

(Continued on page 110)

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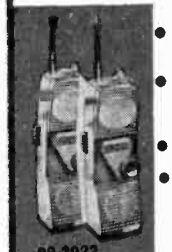

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PROPAGATION FORECAST

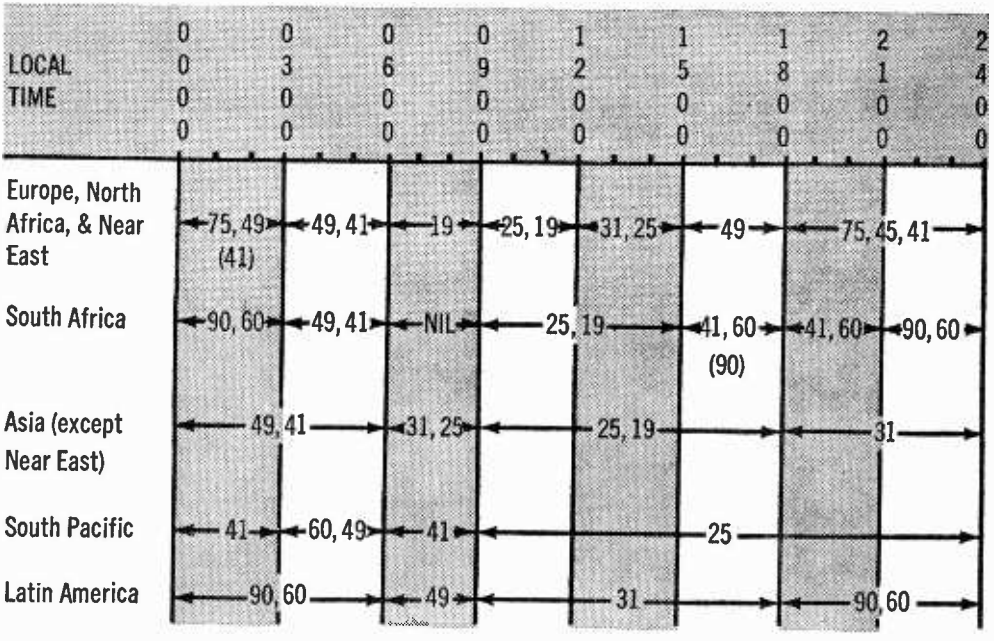
for December, 1964—January 1965

By C. M. Stanbury II

The next two months can either be the best or very worst for SWL's. It all depends upon the listener himself. Those higher bands, 31 meters and up, while still useful during daylight hours will be at their lowest ebb in 10 years. Nighttime crowding on 49 meters will reach an almost intolerable level especially between 1800 and 0100 EST. On the other hand, reception on 60, 75 (SWBC) and 90 meters will set all kinds of records. Small, hidden away countries and stations can be expected to appear on numerous occasions with remote African stations coming in like locals.

We remind readers that these predictions are primarily valid for short-wave broadcast stations. Our figuring takes into account not only propagation factors (time of year, sunspots, and the like) but operating habits of the SWBC stations themselves plus QRM patterns. The latter two factors are every bit as important as any "natural" condition.

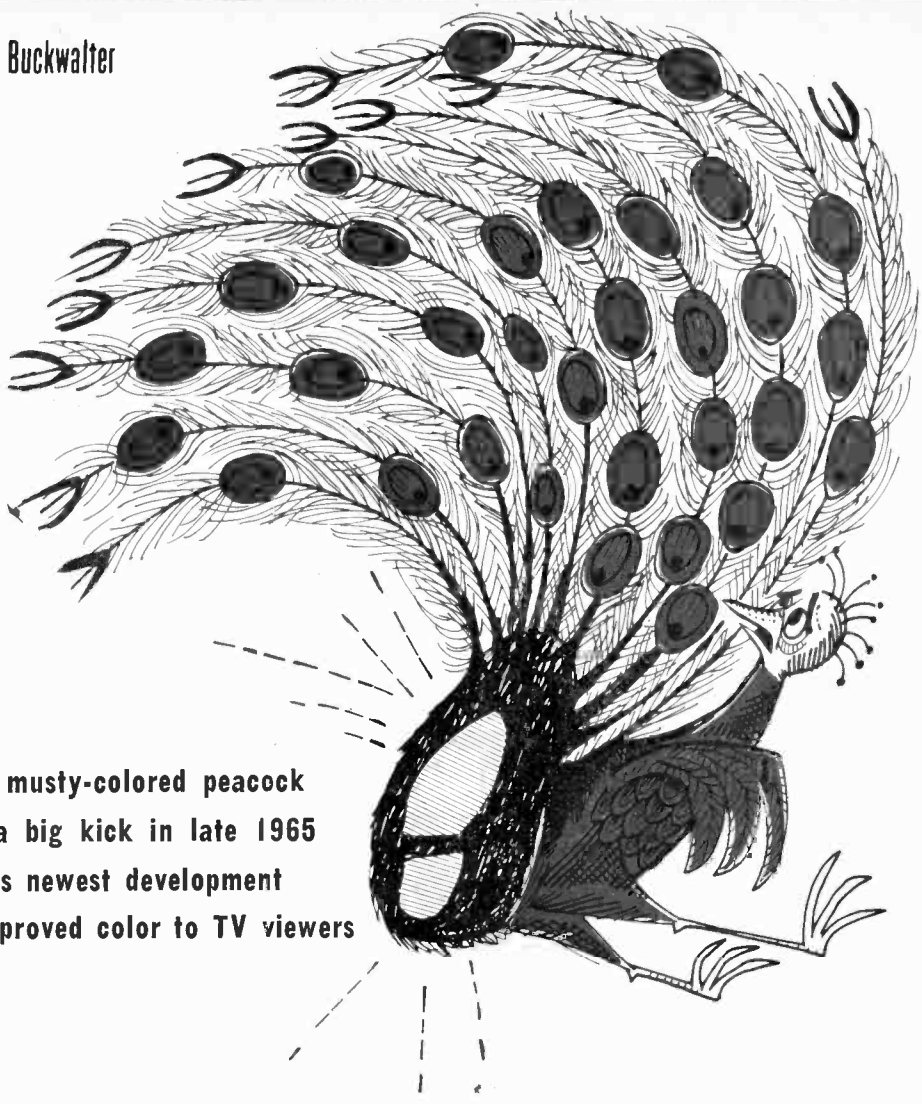
Utility stations (aeronautical, marine, etc.) of course follow different operating patterns and the above does not necessarily hold for them. Their communications are generally over shorter distances and they will normally use the lowest frequency open. Read *Marine Broadcast DX* on page 95. Thus DXer's should pick the lowest band shown above for the appropriate area at any given time and work near these frequencies.



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 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 second choices.

By Len Buckwalter



That old musty-colored peacock will get a big kick in late 1965 when TV's newest development brings improved color to TV viewers

CHROMATRON COMES TO COLOR TV

That living-color picture—a peacock fanning a color-splashed tail—is in for a big change. After a decade of home color reception built around the "shadow mask" picture tube, a new breed of color tube is bowing in. It is the Lawrence tube, conceived by a university professor 14 years ago, cheered as an engineering marvel—and once rejected as impractical. Today it is a reality. Far from a laboratory curiosity (like most other stabs at a new-type color tube) the Lawrence version has followed a tortuous path of development until refined to the point of practicality. The first commercial TV sets containing Dr. Lawrence's radically different technique will soon be here. You'll

be seeing the tube under a new name, too; it's now the "Chromatron."

According to its present developers, Paramount Pictures Corp., the Chromatron promises several advantages. First is increased color brightness. More vivid color gives the illusion of depth in the picture and permits viewing under more room light. It's simpler, too. The number of tubes required over a black and white set is reduced by four or five. Circuits, are fewer; adjustments, less. The Chromatron could also open up the big, untapped field of small-screen color TV. The tube lends itself exceptionally well to under 21-inch screen sizes.

Seeing Is Believing. By what technical wizardry does the Chromatron hope to capture a sizeable segment of the growing color TV market? To find the answer, I traveled to New York's big Paramount theater—to an office situated a few floors above the huge movie screen. The attraction in that office proved far more exciting than the current movie attraction floors below. There were three side-by-side TV receivers, each displaying the identical program in black and white. The time: 10:27 a.m. I was instructed to watch and carefully compare the screens. In three minutes the local TV station would start transmitting in color. As 10:30 came up, the peacock obligingly fanned its polychromatic tail. The eye could not resist being drawn to the center screen; the bird appeared in brilliant and vivid color, nearly eclipsing the images on the two sets alongside it. (One was black and white, the other a conventional color receiver.) After some minutes, an engineer flicked on two white fluorescent lamps, aiming their beams directly at the two color screens. Again the results were startling. The center screen continued to display strong, clear color, suffering little "wash out" from the bright lamplight. I moved in close to the center screen, placing my eye about two inches from it. Instead of the usual fine dots I'd been accustomed to seeing on the usual color screen, there were numerous thin lines similar to what you see on a black-and-white screen when viewed up close. On this TV picture tube, however, those lines ran up and down, and glowed in different colors.

That center screen was the business end of a Chromatron. Paul Raibourn, vice-president of Paramount, then conducted an interesting demonstration to illustrate how increasing color brightness sharpens and suggests a 3-dimensional quality in the image; a bowl of fruit appeared to pop out from its background. An identical picture, of less illumination, appeared flattened. This, of course, dramatized the big advantages in Chromatron's ability to deliver high-intensity color. But to probe the inner workings, operation and theory of the tube, I toured the lab where actual developments had occurred; Paramount Picture's Chromatic Division.

Inside the Chromatron. Easily the most significant feature of the Chromatron is a

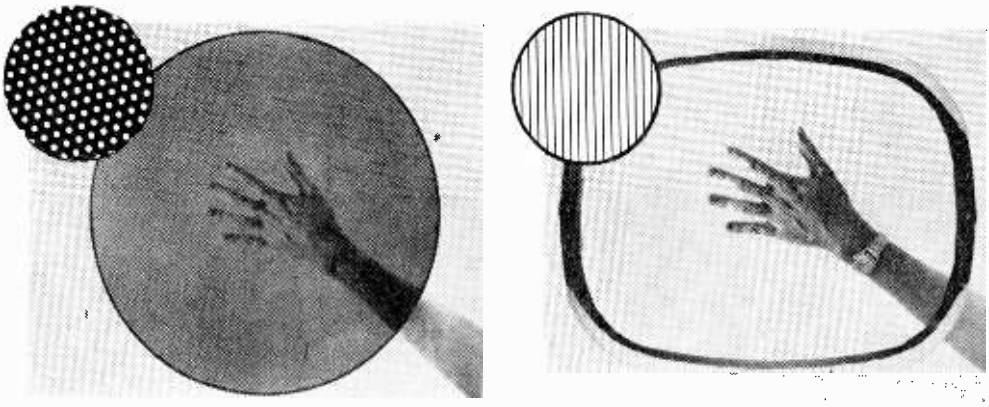


Fig. 1. Conventional color tubes uses a dot-pattern shadow mask (left) that consists of many fine holes; Chromatron uses fine, evenly spaced grid wires (right). Note the difference in transparency of the masks.

unique grid structure of fine stainless steel wires positioned just behind the viewing screen. Here lies the secret of the tube's "transparency"—the characteristic which determines how brightly the screen can light up. In a regular black-and-white tube, transparency presents little problem; an electron beam issuing from the neck of the tube strikes the viewing screen and causes it to glow with light. There is little to block its path.

But in color tubes, some additional element must be introduced between the tube neck and screen. Although its function varies, as shown later, this element generally serves to keep colors on their correct screen position. But in performing its job, this element also cuts down the number of electrons which may reach the screen. Brightness suffers. We can compare this effect in Fig. 1. In the conventional color tube, electrons must enter small holes in a "shadow mask"—only a certain number can get through to the screen. The grid wires of the Chromatron, however, present rather wide spaces to the beam so electrons in greater numbers may continue on to the screen. As explained by Emil Sanford, engineering manager of the division, the grid is 90 percent transparent vs. 16 percent for the conventional color tube. It results in approximately seven times more brightness. .

The second key feature of the new tube is in its electron gun; the structure contained in the tube neck which supplies electrons, and aims them toward the screen where they generate visible light. The conventional tube utilizes a *3-gun* arrangement. The Chromatron, however, achieves color with a *single gun.*

To draw further comparisons, and venture more deeply into Chromatron operation, it's necessary to consider certain features of the transmitted color signal. They can be considered more simply at the studio end, where the televised scene is broken down into basic colors, then into corresponding electrical signals by the camera. As we will see, any color tube at the receiving end principally acts to reverse the order of what occurred in the camera.

The Color TV Camera. The drawing in Fig. 2 reveals a color-separating action of the studio camera. Based on a system of primary colors, the camera is seen in three distinct sections. Each responds to a different color; red, green or blue. There are, of course, many more than three hues in a

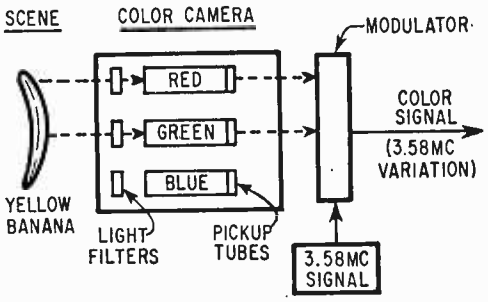


Fig. 2. TV camera breaks scene into primary colors—converts them to electrical signals.

scene. The human eye, in fact, can discern up to about 40,000 different ones. But just as the artist mixes primary colors to gain countless combinations so does color TV rely on a tri-color system to handle a huge number of hues. The color camera, however, achieves a neat trick that would befuddle the artist. It begins with a *complete* picture (the scene to be televised), then breaks it down into three primary colors. You demonstrate the principle everytime you look through a piece of colored glass or cellophane. If it's tinted red, for example, only the red content of the scene filters through. Thus, the camera in Fig. 2 has red, blue and green filters—equivalent to primary colors —for dividing many colors in the scene into their simplest form.

We've shown a yellow banana in front of the camera to illustrate the point. Yellow, it's been discovered, is actually a mixture of two primaries—red and green. This might sound disturbing to an artist who, upon mixing red and green, would get some muddy-looking combination. Color TV however, mixes *light,* not paint pigments. Light mixtures follow a different set of principles. Another example is that the artist cannot mix red, blue and green to get white. But in working with these colors as *light,* the following percentages will form white: 30 percent red, 59 percent green and 11 percent blue. So our yellow banana shows up in the color camera as red and green, after its light is split by filters. The pickup tubes, operating like photocells, convert the colored shafts of light into corresponding electrical signals. In this fashion, thousands of colors are decoded into three separate signals ready for transmission over the air.

There remains another important step—modulation. Since the color TV system must satisfy the needs of both monochrome and

CHROMATRON

color receivers to be compatible, color signals must not interfere with black and white. This is done by side-pocketing color information on its own carrier. This is the 3.58 mc in Fig. 2. In the modulation process, color signals are encoded on 3.58 mc, which is subsequently rejected by black and white sets. The Chromatron, however, utilizes it in a unique image-producing system.

The Color Picture. Let's see how signals are converted back into light of the correct color at the receiving end. In Fig. 3 is an overall view of a Chromatron tube. Housed in the narrow neck of the tube is an electron gun. Its hot cathode boils off electrons which travel as a beam in the direction of the yoke. Purpose of the yoke is to deflect the beam over the entire surface of the screen. Based on magnetic push-pull action, the yoke moves the beam over a familiar path: the same one your eyes now traces over the printed page; from left to right and top to bottom. The screen, therefore, is completely scanned. Occurring 60 times per second, the eye sees the screen uniformly filled with light. (Identical scanning action is also occurring at the studio camera. Camera and receiver beams are locked together by synchronizing signals transmitted by the station.) As the beam travels away from the yoke, it passes through the grid of fine wires mentioned earlier, then strikes the screen. Chemical phosphors deposited over the screen surface glow with

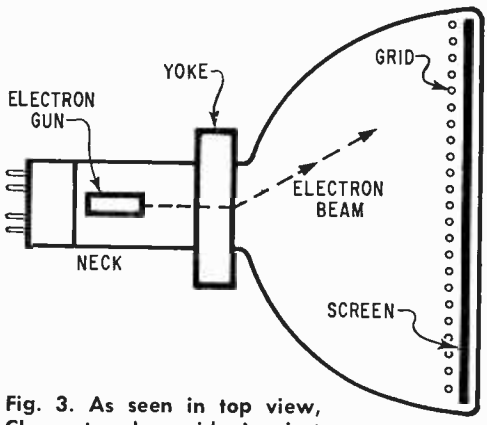


Fig. 3. As seen in top view, Chromatron has grid wires just behind viewing screen. Grid is shown greatly magnified.

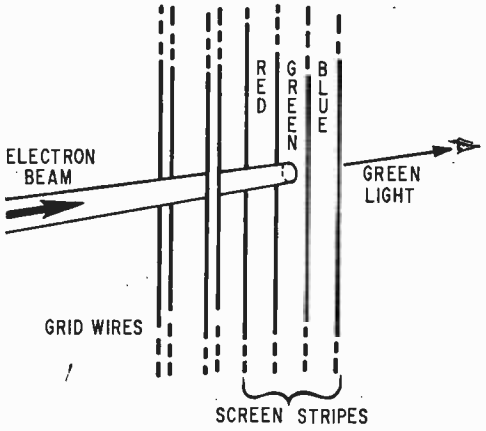


Fig. 4. Electron beam passes between grid wires undeflected—shown striking green phosphor stripe between red and blue ones.

light under the impact of the electron beam. The Chromatron, up to this point, has provided two important effects: a scanning electron beam in step with that of the camera, and a screen illuminated with light. There remains now the task of applying color and positioning it in the correct place on the phosphor screen.

Grid Wires. Let's examine a small section of the screen and the grid which lies just behind it, as illustrated in Fig. 4. The screen consists of thin stripes of phosphor material which emit red, green or blue light when struck by electrons. (Only three are shown for clarity, but they are repeated over the whole screen width. Note the position of the two grid wires shown. Since the electron beam is passing between them, striking only the middle phosphor stripe, the color green would be produced at this instant.

To understand the action of the grid, try this simple demonstration. Hold your arm up and point your index finger toward the wall. Now start to wiggle your index finger from side to side while, *at the same time,* sweeping your whole arm across the wall. This is a good illustration of the grid's function: it "wiggles" the *tip* of the electron beam so it moves over red, green and blue phosphor stripes. (Your sweeping arm movement represented the overall scan of the beam caused by the yoke in the tube's neck.) Now to look more closely at how the grid achieves this effect—and the role it plays in selecting correct colors.

In Fig. 5 is a portion of the screen viewed from the top. Shown are three possible beam

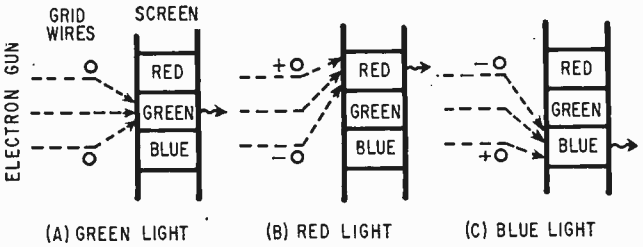


Fig. 5. Applying voltages to pairs of grid wires focuses the electron beam on one of the three phosphor screen stripes.

positions for producing primary colors. Consider, first, Fig. 5 (A). Green is being produced, as just described; the beam passes through the grid wires and strikes the green phosphor. Now let's apply an electrical charge to the pair of grid wires. If the upper wire, shown in Fig. 5 (B) is impressed with a *positive* charge, it will attract the electron beam (which is negative) in the direction shown. A *negative* charge placed on the lower wire aids this direction by repelling electrons. Thus, the overall effect is to deflect the beam toward the red phosphor. The final example, Fig. 5 (C), simply reverses the charge on the grid wires and the beam now strikes the blue phosphor stripe. It should be apparent that by placing the proper electrical charges on the grid, the beam can be angled to select any of the three primary colors.

This system can not only produce white, but all the mixtures needed for rendering a color program. To generate white light, it is necessary to wiggle the beam among the three stripes—red, blue and green. It's done by placing an alternating voltage on the grid wires, as illustrated in Fig. 6. Although movement is extremely rapid, the beam remains just the right amount of time on each primary color for producing the white mixture. The viewer's eye blends the primary colors, since the glowing stripes are narrow and close together, and the complete screen appears white. And a complete scale from black to gray to white can be produced by varying the strength of the electron beam. This function—beam strength—will be provided by control voltages applied to the electron gun.

3.58-mc Carrier. Now to create a full-color image on the screen. Recall, for a moment, what happened back at the TV studio. Electrical signals corresponding to primary colors were modulated onto a 3.58-mc carrier. When these signals arrive at the receiver, a detector circuit reverses the modulation process to recover the original information. Signals are now restored to the same form as when they emerged from the camera. The 3.58-mc carrier, however, is not discarded; it serves to synchronize the Chromatron, as shown in the block diagram of Fig. 7. Note that 3.58 mc is applied directly to the switching grid of the tube. Here it fulfills the same function ascribed earlier to the "alternating voltage;" that is, to wobble the beam among the three phosphor stripes. But note the same 3.58-mc energy is also being fed to red, blue and green "gates" which feed the electron gun. As the name implies, the gate opens or closes to permit the color signal to reach the Chromatron's electron gun. Let's assume that we want the color red only to appear on the screen. *As the 3.58-mc grid switching voltage focuses the beam on a red stripe,* it also unlocks the *"red gate."* This permits the red color signal to pass through the gate. It turns on the electron gun and red appears. At the same time, green and blue color signals are unable to turn on the beam; their gates are locked. As 3.58-mc energy switches the beam to green, it simultaneously opens the green gate—and shuts red and blue gates. Thus the Chromatron's circuits continuously sort out the incoming color signals and place them on their correct stripes. This would be equivalent to the filtering, or color separating, action in the studio camera.

A Yellow Banana. Now that we can position colors properly, there remains the

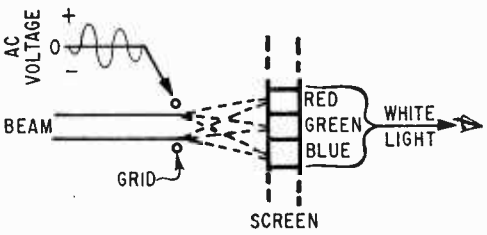


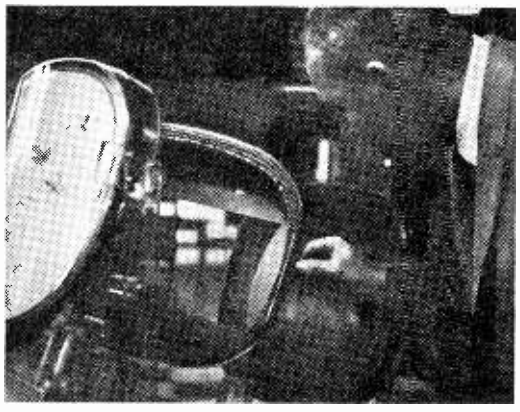
Fig. 6. An alternating voltage on grid wires shifts the beam among screen stripes.

CHROMATRON

problem of their mixtures. Creating the pure yellow banana televised earlier is not too difficult to visualize; as the beam swings over the screen area of the banana, red and green stripes illuminate (the blue gate shuts). The viewer sees a yellow mixture. A whole range of other colors is possible by varying the strength of the electron beam for each primary hue. Incoming color signals provide this information. As the strength of a given color increases, the signal raises the strength of the electron beam. Countless juggling of proportions presents all necessary screen hues for reproducing the color signal.

This, in simplified form, is the Chromatron's operation. Bringing it to its present state of development was no mean feat. That color switching grid, for example, presented engineering problems in early models. The fast switching voltages applied to the thin stainless steel wires set up a type of oscillation, or ringing, not unlike a microphonic tube in an audio amplifier. As the wires vibrated mechanically, they affected color reproduction. Today the problem is cured by stringing a very fine glass fiber thread through the wires to damp out movement. Perfect alignment of the grid wire with phosphor stripes on the screen was also difficult. Now, an electron printing system is used; during manufacture, electron beams are swept across the raw screen to "print" the positions where the phosphor stripes are to be deposited. The resulting match is perfect.

Unmasked. Other features of the Chromatron are apparent when the tube is compared to the conventional "shadow" mask color tube, shown in Fig. 8. The standard tube utilizes three electron guns aimed at a screen covered with tiny phosphor dots. Each gun is driven by color signals from the



Mockup of basic Chromatron structure (upper left) shows glass phosphor screen, left, wire grid, center, then bellshape section leading to neck of tube. Layout of small Chromatron (above) that will be seen late next year. Note dark frame held by hand. It permits one-piece assembly of fine grid-wire suspension; an important breakthrough for mass-producing the Chromatron. At lower left, Engineer John Petro looks at 8" and 23" Chromatron.

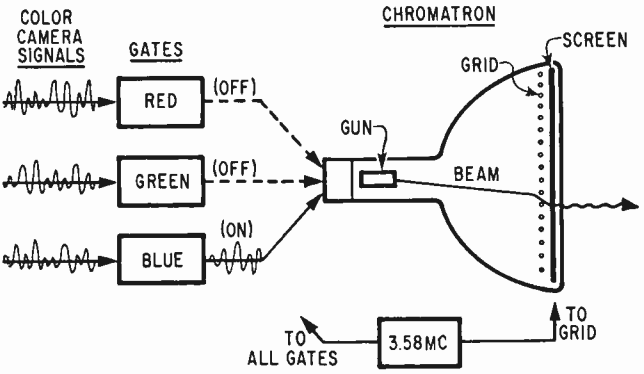


Fig. 7. Action necessary for producing blue image on phosphor screen—the 3.58-mc signal simultaneously positions beam on blue screen stripe and opens blue gate. Blue signal (originally from TV camera) may now control gun's beam strength at this short instant.

station—red, blue and green—and the corresponding dots glow in color. The purpose of the shadow mask, is to prevent the triple beam from sweeping over the wrong dots. This is how color separation is achieved. The elimination of the shadow mask in the Chromatron is the basis that tube's claim to much higher color brightness. But another major factor occurs; convergence. The three beams of the conventional tube must focus precisely as they pass through holes in the shadow mask. Only in this fashion will they strike correct color dots. To provide the focusing action, there are special adjustable coils and magnets on the neck of the tube which compress, or converge, the beams together. Since the Chromatron has only one electron gun, the convergence problem is eliminated; the switching grid focuses the beam onto the proper stripe. The effects of the earth's magnetic field, too, are less in the Chromatron. This would ease the problem of moving a color portable from one room to another, or from a picnic area to seashore, for example. Variations in the earth's field are less disturbing to color purity.

Want to Buy One. When will you see Chromatron-equipped sets on dealer's shelves? It is expected that production models will make their initial entry into this country via Japan. Under license from Paramount, Japan's big Sony Corporation is concentrating on an 18-inch color portable. Among American companies, Raytheon appears to be closest to producing the tube for U. S. manufacturers. Size might be anywhere from 8 to 16 inches. The only problem now confronting U. S. producers is setting up the tube on a production line, have it spew out in large quantities, and retain close tolerances. When this kind of momentum is achieved, the uncomplicated, low-cost color receiver should come on strong. In any case, Sony considers the Chromatron just about ready for production and possibly could bring sets into the U. S. in the very near future. Price at this time has not been announced, but Peter Ramella, Chromatic's general manager, believes that ultimately the Chromatron approach could lop a sizeable chunk off the price of small-screen color. His estimate is an approximate $250 price tag.

Research has not ceased on the Chromatron. Even now there is an effort to further simplify the circuits outside the tube. Also under development are techniques which would enable the picture tube to accomplish functions now handled by small chassis tubes. New techniques, which promise even greater brightness, are in the offing.

With engineering now in a highly refined state, there remains only the mass-production details to work out. There is no question about the high interest being demonstrated by Sony and other Japanese firms. Combine this with interest already expressed by American producers and you can say that the Chromatron has come to color TV. ■

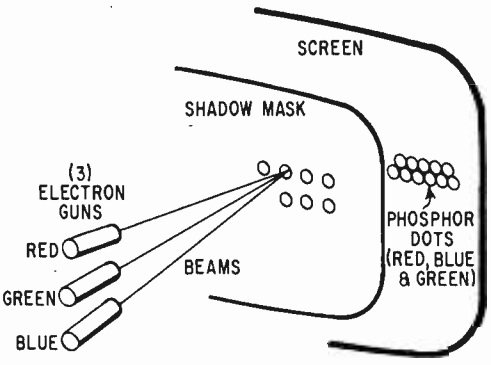


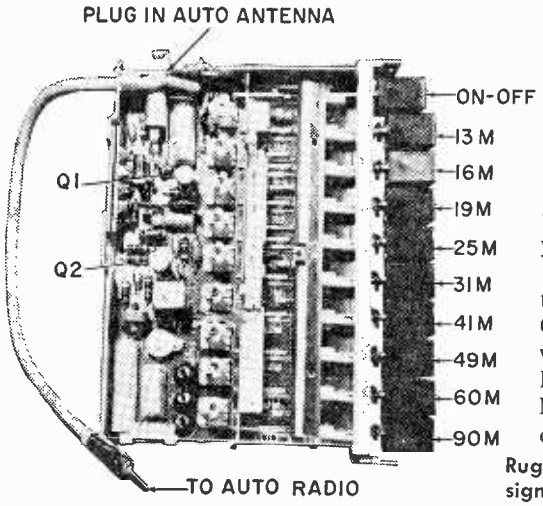
Fig. 8. Conventional color tube uses three guns, shadow mask, and phosphor-dot screen.

Short-Wave listening hits the road

Two-transistor Converter offers 9 SWBC-band operation

Short-wave listeners who take to the highways for family outling on Sundays need not leave their hobby behind while motoring. Now, SWL's can install an all-transistorized, *Autovox* short-wave converter, Model OC-401, under the dashboard and convert the existing auto radio into a full-fledged short-wave receiver. World-wide reception on the nine popular short-wave bands (13, 16, 19, 25, 31, 41, 49, 60 and 90 meters) is just a flick of a pushbutton away. Since the off button restores normal broadcast band reception, the *Mrs.* wouldn't mind the attractively designed 1⅜" high, 7-1/16" wide and 5-1/3" chromed unit under the dash.

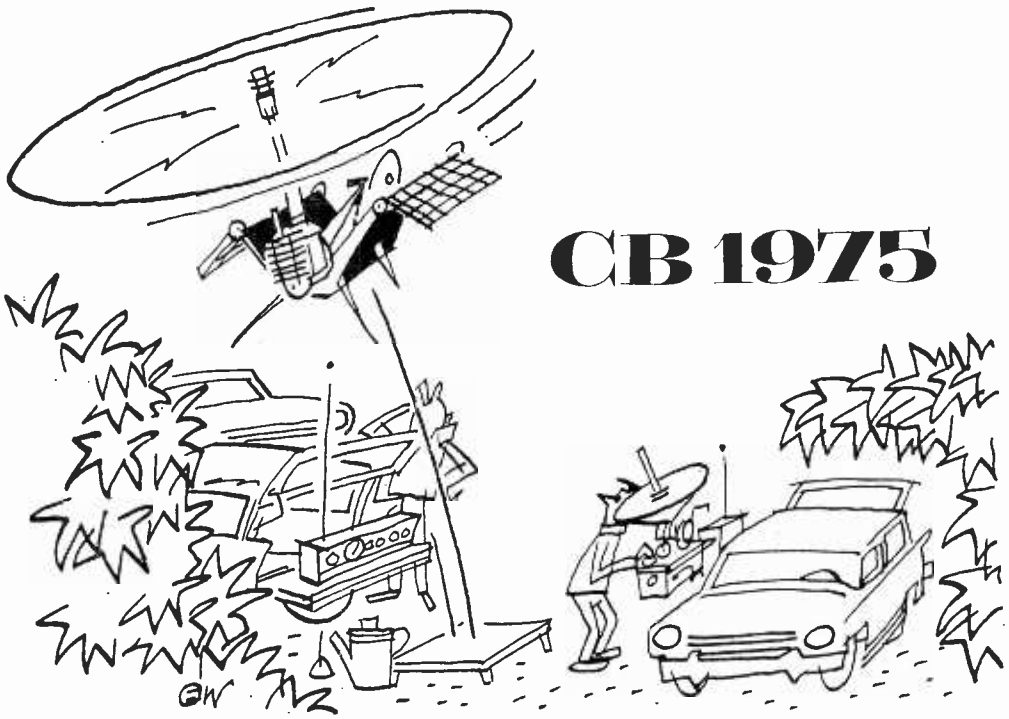
The circuit of the converter is quite simple, however, parts mounted on an uncrowded printed circuit board secured to sturdy steel give the unit an appearance that it was designed for the military. Each push-button picks out a tuned LC circuit for the input to the RF transistor amplifier. The amplified signal is then supplied to a oscillator/mixer transistor stage which "beats" the signal down to the high end of the broadcast band. The oscillator circuit uses slug-tuned, high-Q coils for each band. The power supply has two important features. One is that either a 6-volt, negative ground or 12-volt, positive or negative ground car battery system may be used to power the converter. The other feature is a regulated supply powering the oscillator /mixer stage. Voltage regulation insures against frequency drift no matter what the battery/generator system is delivering to the converter.



Rugged, but neat, the Autovox converter is designed to take the hard knocks an auto can give.

The converter comes complete with brackets and hardware needed to install the unit under the dash of any car. Once mounted, unplug the antenna from your car radio and plug it into the converter—then plug the antenna lead from the converter into the AM radio. Two trimmers must be adjusted—these can be done with or without test instruments. Now connect the power lead to any DC line that is de-energized when the ignition switch is locked at off and you're all set to DX.

If you like the idea of DX'ing while on the road, then the *Autovox* converter, Model OC-401 is a hot buy at $36.25 postpaid. Just write to Autovox Corporation of America, Dept. RT-14, 250 West 57th Street New York, New York 10019 to place your order or obtain a list of local dealers. ■



CB 1975

Flying CB relays became a big time hobby when integrity died

C. M. Stanbury II

I **sat quiet,** and calmly listened to Waldron Arthur's flying CB relay, KBZ12000 as it hovered two miles up. The final competition started in an hour, his CBR1C relay had consistently flown higher than mine, his airborne receiver was blessed with a lower noise level and his directional beam would certainly produce more gain. But I was still going to beat him, like just once.

Harvey listened too, fiddled with my car keys. "Hadn't you better leave soon?"

"Yeah, I guess." I stood up. "You got it down pat?"

He droned off the grand design. "During the competition I monitor your signals. When you give your call as KBZ-thirteen-245, I push this button." Harvey pointed to my spore transmitter. "Out goes a false signal to Waldron's relay and down she comes."

"The relay is turned 45 degrees and then it can't pick up his ground signal." I took my car keys from brother rat.

"But eventually Waldron's pride and joy will crash?"

Half way out the door. "Yeah, probably." Outside, I got into my car, started the motor, headed for Davis Park and the CB-DX showdown. No matter which side Harvey was on, he got on your nerves after a while. Harvey is, frankly, a louse. He's not in the competition because he'd lost his license. A perpetual CQ right through a marine distress did the trick. Waldron turned out to be that distress and big man Waldron sicked the FCC on Harvey.

It was a hot day with threat of lightning and thunder. But the noise level at 27 mc. was not yet high enough to foul up anyone's control system. The real fireworks was still to come.

Waldron is the first and only CB'er to work all 51 states. I have 50. Waldron was first to work a Mexican CB'er, beat me by 5 minutes. In fact, Waldron invented the flying CB relays themselves. That's why I just had to do him in this time.

Davis Park is on a hill, highest point in the area which pretty well eliminated natural

terrain as a contest factor. When I got there, judges and official monitoring stations had already begun their final communications checks. A fixed station every 10 miles with mobile rigs to determine that winning distance exactly.

I slid from behind the wheel, Waldron waited with great big put-on friendly smile. "You already for the big day, boy?"

I nodded. "Think so." Removed my gear from the trunk. As I lifted out the miniature launch pad, Waldron took one end and helped me set it up.

"Think we got it level?" he asked.

"Good enough." If this had been Harvey, he would have busted a support or something dirty like that. In fact I kept my own R/C channel and system secret from him in case another competitor offered a better price. But Waldron is such a good sport, it's disgusting. "You got your gear already setup, man?"

"Oh, yes." He pointed to his own spot half way across the park. "Waiting to go for the last half hour."

"Aren't you afraid somebody'll monkey with it?" I said as I brought out my helicopter-like relay.

"Well, nobody except Harvey takes DX that seriously. It's really just a game," he said softly. "That's all."

Harvey gets on the nerves; Waldron nauseates.

I injected the fuel and started the motor. Let it warm up then sent her up about 100 feet.

Waldron watched, confident as the devil. "Your motor sounds nice and smooth."

Checked out the other controls—down, up again, forward, back and turn—everything functioned well.

A blast from the PA. "Places, fellows, let's get this show on the road." Even the judges had delusions of grandeur.

He slapped me on the back. "Good luck, old man," and trotted off toward his own rig.

"Same to you, Waldron!" I sent the relay straight up. I wanted to catch as much tail wind as possible. Around 11,000 feet she would go no higher but now the wind and motor drove the relay east at 10 m.p.h. With a speed like that there'd be no trouble reaching the 130 plus maximum miles between base and relay. And the winning signal hop would be somewhere over 260.

From monitor's checks you could tell Waldron was using the same strategy. We both worked Monitor 10 within the first half hour. To count, the monitor only had to hear us at these speeds both relays would keep clear of those thunder storms moving in from the West. I figured on waiting for that storm to put Waldron out.

Everything broke loose around Midnight, rain, lightning, thunder, the works. Waldron and I had all base gear mounted in our cars but the other challengers were outside and in a few minutes really drenched. It unnerved one guy so badly he muffed a signal and lost control of his relay. Decided it was time for Waldron to do likewise. "Monitor 20, this is KBZ-*thirteen*-245. How do you read me?"

"KBZ13245, Monitor 20. Loud and clear," came through the QRN.

I switched over and monitored Waldron.

"Monitor 20, this KBZ12000. How do you read me?"

No answer, nothing but atmospherics. Harvey had done it well. Waldron tried again. Same result.

"Monitor 1, this is KBZ12000. My relay seems to have gone up. I am switching to 4, my alternate channel."

"Roger, KBZ12000."

I moved my receiver over to 4, knew it wouldn't help.

"Monitor 20, KBZ12000. How am I on 4?"

"S/9, KBZ12000."

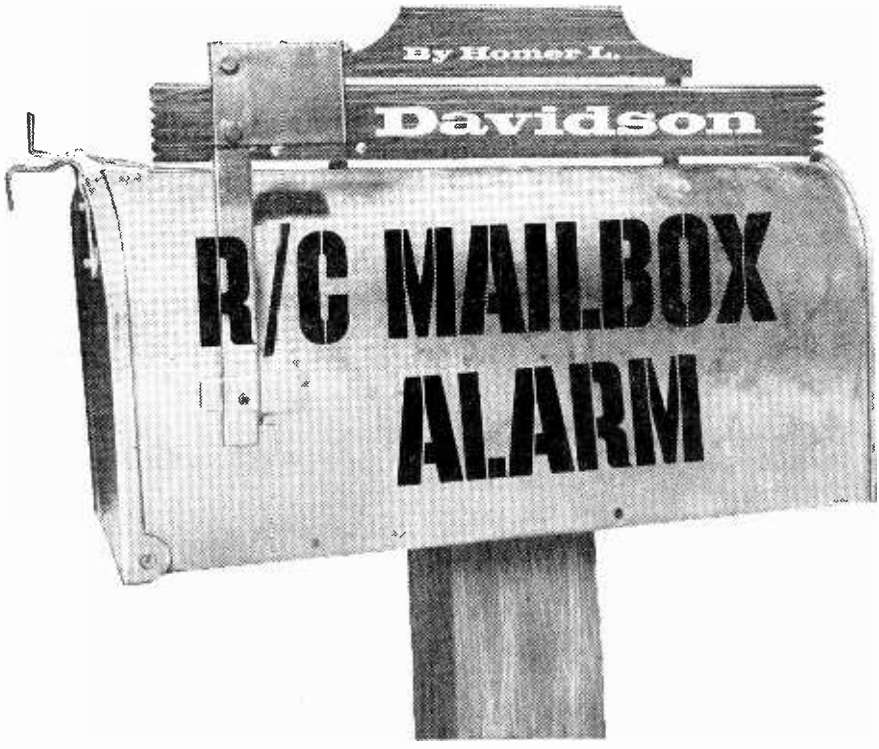
"KBZ12000, this is Monitor 26. I'm now reading you also." I shell shocked! Not only was Waldron back on the air but his range had suddenly jumped by 60 miles.

I sat there for a while knowing that KBZ12000 would win again. I ignored my own relay, tuned my receiver aimlessly over the channels. I listened to his RC frequency. Nothing, no control signals at all!

Now I systematically checked all 27. Waldron was not controlling his relay.

It took a couple more minutes before I got the whole picture. KBZ12000 had a second relay, already strategically located before the competition began and controlled down course by some stooge.

Not only is Waldron a better CB DX'er than yours truly, he's also a better cheat, too! ■



You can stop watching and waiting for the mailman and go about your chores—he has arrived when your receiver's light pops on

Here is a small R/C mailbox alarm that will tip you off when the postman leaves your valuable mail. And, of course, it will also flash when someone who shouldn't be is tampering with your mailbox.

The alarm is constructed in two units—a small R/C transmitter that is installed in the mailbox and a small portable R/C receiver that can be taken to any room in the house. When the mailman opens the mailbox lid, a red light comes on in the small receiver alerting you that your mail has arrived.

The Transmitter. The mailbox alarm is operated on the R/C and CB Channel 23 frequency of 27.255 mc. A small transistor oscillator in the transmitter provides the power to turn the receiver relay on. The transmitting unit circuit is very simple and only a few hours are needed to construct it. The effective range is a good three blocks. Circuit operation, initiated by a mercury switch, is illustrated in the schematic diagram.

Construction. Cut a small piece of perforated board 1¾ x 2¾ inches. Drill two ⅛-inch holes in opposite corners for mounting the board to the metal chassis. Place coil L1 upon the board and drill holes for the coil connections. Lay the crystal down and drill two small holes for the crystal's prongs to stick through the perforated board. The layout of the small transmitter is not critical but the photos showing the placement of parts should be followed as closely as possible.

In wiring the unit, start at the antenna connection. Wind ten turns of number 22 hookup wire over a pencil to make L2 and then push the coil off the pencil form. Leave twelve inches of wire on one end to go to the small dipole antenna. Solder the other end of the coil to terminal 1 of L1. Run a wire

R/C MAILBOX ALARM

from terminal 2 to one side of the crystal. Place a 15 mmf. condenser across terminals 1 and 2 on coil L1 and solder these connections.

After all major connections are made, mount the small transistor by pushing all transistor leads through the small holes in the perforated board. Tie collector to coil L1, terminal 1. Solder the emitter to the upper end of R3 and C2. The base connection goes to the other side of the crystal and junction R1 and R2. Resistor R1 is soldered to the junction and to ground. Refer to photograph and schematic diagram for details.

Take the battery connections and solder the black lead to junction C3 and terminal 3. The red battery lead will go to one side of S1. Place a s.p.s.t. toggle switch, S2, in series with S1 and ground. S2 is an emergency switch—when you go on vacation, you can switch off the transmitter. S1, the mercury tilting type switch, will be installed in the mailbox. Leave about 25 inches of flexible wire to connect the transmitting unit to S1. Use flexiable earphone or phono two wire cable.

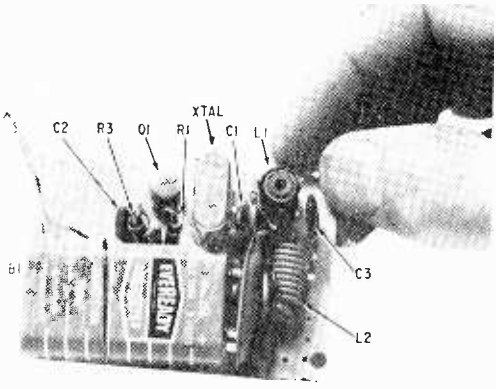
Mailbox Minibox. The transmitter will fit in a 3¼ x 2⅛ x 1⅝-inch minibox. Just drill two holes in the chassis to match those in the corners of the perforated board. In the side of the metal box, drill two ⅜ inch holes to place rubber grommets—one hole for the antenna wire and the other for the wire to S1. Drill a ¼-inch hole in the front cover opposite coil L1. This is made for easy tune-up adjustment. A small ⅛ inch hole is drilled in the back of the minibox for a metal screw to mount the transmitter to the mailbox.

Use ½-inch spacer washers when bolting the perforated board to the bottom of the minibox so the bare wiring doesn't touch the metal box. Pull the twelve inches of antenna wire and the flexible switch wire out through the rubber grommet. Do not mount the minibox transmitter in the back of the mailbox until you have checked out the system.

The Receiver. The receiver is a commercially available (Lafayette 99 G 3008, $8.95) radio control receiver used in boats and airplanes. The receiver, which uses a 3S4 tube is completely enclosed in a plastic container. Only a plug for power and actuator connections is external to the enclosure.

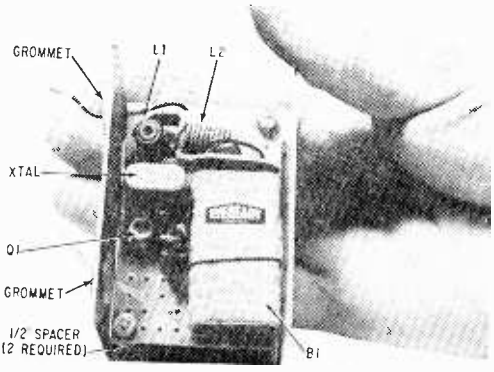
This receiver, the necessary batteries, and components peculiar to the alarm are mounted inside a bakelite meter case to comprise the receiver unit. With this arrangement the receiver is compact and portable for taking it to any room in the house. You may be in the recreation room in the basement, but when the indicator light goes on you know the mail has arrived, or someone is tampering with your mailbox.

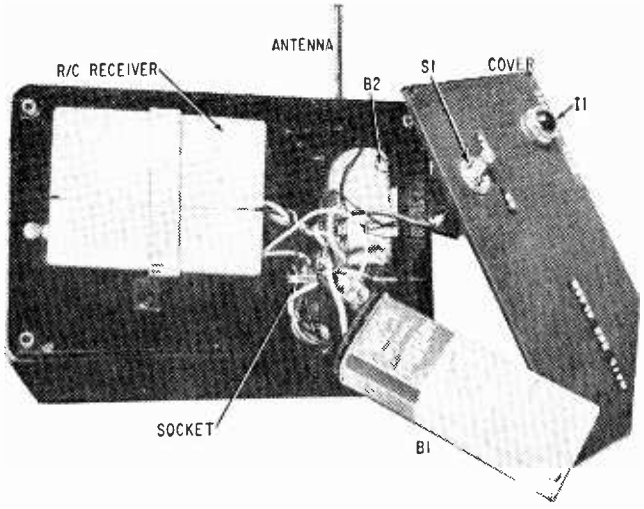
Receiver Packaging. Referring to the receiver photographs, drill a ½-inch hole in the top of the bakelite case for the tuning rod on the R/C receiver to project. Also, drill a ⅛-inch hole in the top of the case for the pull-out dipole antenna.



The small perforated board holds all the transmitter components including the 9-volt battery. Component placement should be as shown.

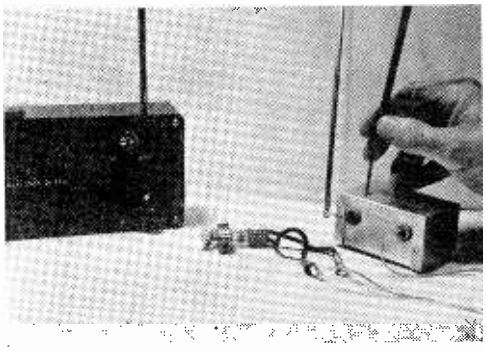
The mounting board is secured in a minibox using ½-inch spacer washers to prevent the wiring on underside from shorting to the box.





The receiver unit, a bakelite meter case, houses the commercial R/C receiver, its power supply, the wiring to the telescoping antenna, indicator light and on-off switch. This packaging makes unit versatile for placing in the house or yard.

Transmitter and receiver should be tuned before the transmitter is installed in mailbox. Temporarily connect antenna and mailbox lid mercury switch.



Inside the bottom of the case drill two small ⅛-inch holes for the battery bracket. Another ⅛-inch hole is drilled quite close to the middle of the plastic box. Place the receiver, with condenser shaft through the top hole, and mark this bracket hole. In the case front panel, drill two 15/32-inch holes for S1 and the pilot light assembly.

Drill a ⅛-inch hole in one end of the battery holder terminal and mount the 7-prong wafer socket that comes with the R/C receiver. Now mount the battery bracket in the case. Bracket the R/C receiver unit to the bottom of the box and mount S1 and pilot light assembly I1.

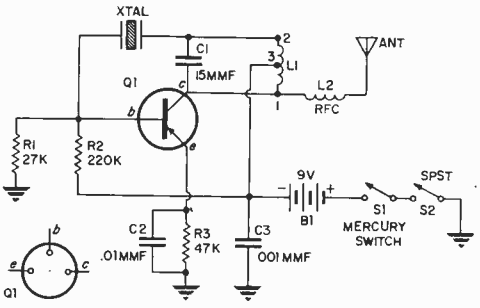
You will notice when you run the yellow antenna wire to the dipole antenna that female and male button type clips are furnished with the R/C receiver for this hookup. Use a lock washer under the dipole antenna connection so it will not loosen. Run the positive lead of the 67½ volt battery (B1) to terminal 1 of the wafer socket. Solder the negative lead of B1 to one side of S1; solder the negative terminal of the 1½-volt battery (B2) to the same side of S1. The other lead of B2 goes to terminal 2 of the wafer socket.

Be sure to complete and check all connections on the wafer tube socket. Make sure the 67½-volt and 1½-volt batteries, B1 and B2, are connected properly. If the battery wires are reversed, the filament of the 3S4 tube will burn out.

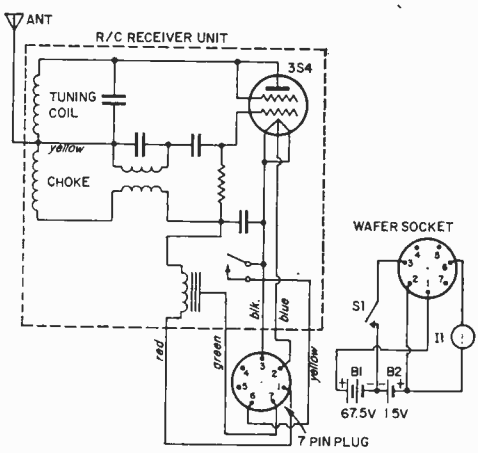
Tuning the Units. Set the receiver tuning knob in the full clockwise position. Turn on S1 and the red light should go on. Now raise the antenna to about two feet and turn the condenser knob counter clockwise. The light at this point will start to flicker and then go off. If the relay chatters, back off another ½ turn. The higher the antenna is raised, the more the condenser will have to be adjusted so the light will go out. To operate at the longest distance, the antenna should be at full length. After the antenna is set, no further adjustments are necessary.

Now set the small transmitter close to the receiver and temporarily connect the antenna. Tip the mercury switch, so the transmitter is on. Adjust the slug of coil L1 so it is about half way out of the coil. The red indicator light should go on. Now separate the two units by about ten feet and adjust coil L1 again for the most sensitive spot. Leave the adjustment set at this point. All adjustments should be made slowly and rather carefully. When the transmitting unit is placed in the mailbox, coil L1 and the yellow knob on the black box, may have to be adjusted for sensitivity again, due to the

R/C MAILBOX ALARM



The transmitter radiates on R/C and CB channel 23—27.255 MC. The crystal controlled oscillator utilizes PNP transistor Q1. Switch S2, in series with mercury switch S1, is necessary to cut off transmitter at will without disarming S1.



The receiver heart is the R/C receiver unit that is tuned through a small hole in its plastic case. Wafer plug and socket connect receiver to batteries. The socket also serves as a terminal point for connecting switch S1 and lamp.

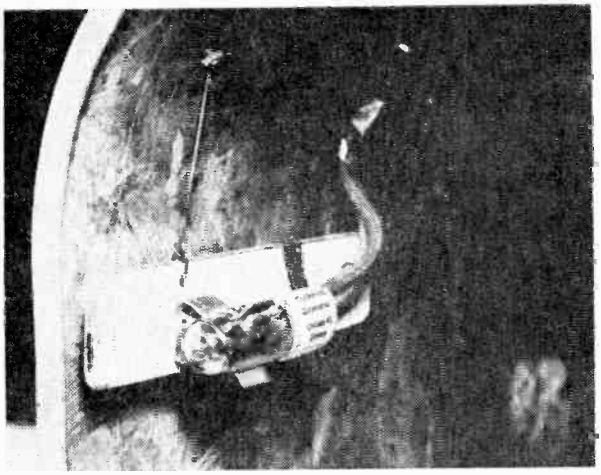
PARTS LIST

Transmitter
B1—9-volt Eveready 216 battery
C1—15-mmf. fixed mica capacitor
C2—.01-mmf. fixed mica capacitor
C3—.001-mmf. fixed mica capacitor
L1—6 turns No. 22 enameled magnet wire over ¼-coil with slug
L2—10 turns hookup wire (See text)
Q1—30 mc PNP RF transistor (Lafayette Radio 19 G 4211)
R1—27,000-ohm, ½-watt resistor
R2—220,000-ohm, ½-watt resistor
R3—47,000-ohm, ½-watt resistor
S1—S.p.s.t. mercury switch (Burstein-Applebee Co. #17A994)
S2—S.p.s.t. toggle switch
XTAL—27.255 mc crystal for radio-control citizens band service
1—Aluminum chassis box 3¼" x 2⅛" x 1⅝" (Premier AMC-1001)
1—27 mc, telescoping antenna (Lafayette Radio 99 G 3008)
Receiver
B1—67.5-volt battery
B2—1.5-volt dry cell
I1—Indicator lamp assembly with red jewel and 1.5-volt lamp
S1—S.p.s.t. toggle switch
1—Radio-control receiver (Lafayette Radio 99 G 9028)
1—27 mc telescoping antenna (Lafayette Radio 99 G 3008)
1—Bakelite case 6¼" x 3¾" x 2" and front panel (Lafayette Radio 19 G 2001 and 19 G 3701, respectively)
1—7-prong wafer socket
Misc.—Rubber grommets, wire, plastic, masonite, tape, nuts, bolts, washers, etc.
Estimated cost: $23.00
Estimated construction time: 4 hours

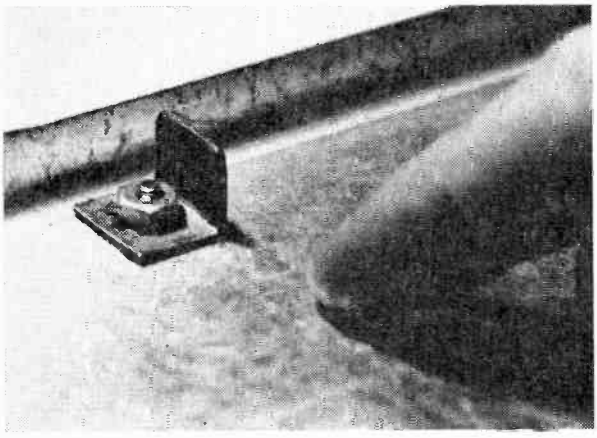
greater distance to the receiver. Each time the transmitter mercury switch is tipped the red light on the portable receiver will go on. The front panel can be marked with decals, or with a labeling gun.

Mercury Switch Installation. The mercury switch that activates the transmitter is installed on a masonite arm in the mailbox.

Cut a piece of hard masonite 5½ inches long by one inch wide and drill two 9/64 holes in it as shown in the drawing. Bolt the mercury switch bracket to the masonite strip and insert the switch in its bracket. See photo. Tape the switch leads to the masonite strip and use star washers on the switch strip and on all the bolts that could loosen with use. Now drill a 5/64-inch hole above the mercury switch. Tie a foot long piece of fish cord, or



The mercury switch is shown being held in the horizontal off position as when lid is closed.



The angle bracket on the mailbox lid holds the mercury switch off until the lid is pulled open.

Telescoping antenna is installed on the back of the mailbox where it is out of harm's way.

dial light string, to this small hole.

Place the switch assembly close to the front lid of the metal mail box. Drill a 9/64-inch hole in one side of the metal box. Be sure the masonite switch piece can fall freely to the bottom of the box. Push a small bolt through the spacer and washers as shown in the diagram. Snug up the bolt, so the mercury switch will fall freely downward. Cut off the end of the bolt and solder the outside nut in place. The solder will keep the bolt from coming loose.

Drill a 9/64-inch hole in the lid of the mailbox for a small angle bracket. See photo. This bracket should be about level with the pivot point of the mercury switch assembly. Use star washers on both sides of the lid and small "L" bracket. Above the string on the switch assembly, drill a 9/64-inch hole in the top of the mailbox for the small string; feed the string up through the hole. The string should only be long enough to let the mercury switch fall clear downward. Now, knot the cord or tie a small nut or washer to it so it will not slip through the hole. Lift the string and close the mailbox lid. The switch will rest horizontally on the angle bracket in the off position. Now pull open the mailbox . . . down swings the mercury switch, and the transmitter is fired.

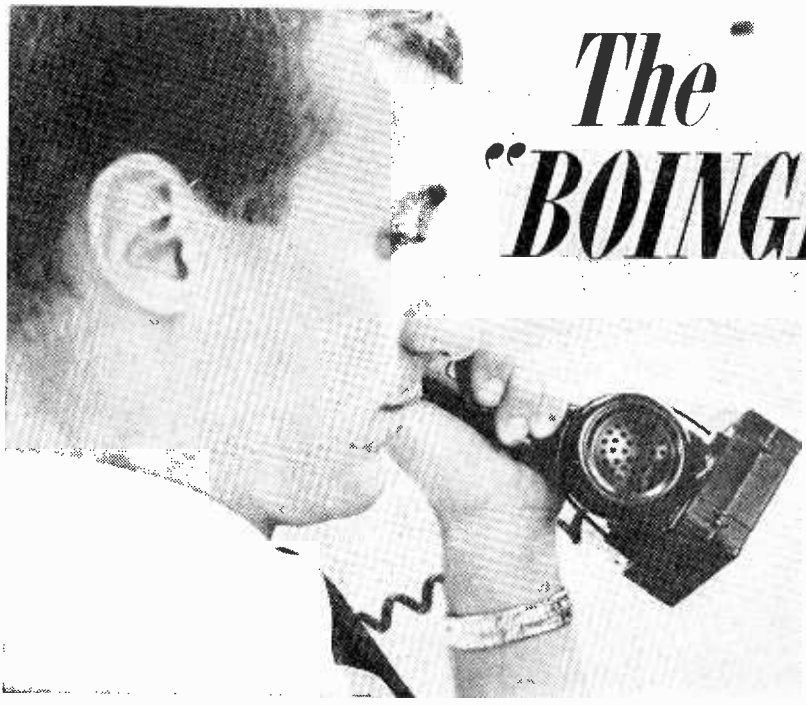
A Final Dipole Detail. Let's not forget we have to radiate back to the house.

The small dipole antenna must be installed and insulated from the metal mailbox. Cut two pieces of plastic or another insulator material 3 inches long and one inch wide. Drill all holes in them as shown in the diagram and then drill two small 9/64-inch holes in the dipole antenna. Bolt the antenna to the outside piece of plastic. Grind down or countersink the bolt heads and push them into the plastic. Now cover these two heads with the inside piece of plastic and bolt both pieces to the metal mailbox. The most logical place for the antenna is the rear of the mailbox away from possible damage.

Drill a hole in the bottom of the mailbox for the antenna lead from the transmitter. Bolt the wire to the bottom insulated nut on the antenna keeping the wire as short as possible.

On the Air. After remounting your mailbox it's ready to go on the air. Pull the switch up with the small cord, close the mailbox lid, and switch on the receiver. When the mailman arrives you'll know it—whether you're in the house, or out in the backyard, for that matter. ■

Legalize your taped telephone calls with...



The "BOINGER"

By Fred Blechman K6UGT

Due to the availability of inexpensive tape recorders and pickup devices, recording telephone calls has become very common in the last few years. Many people record long-distance phone calls for playback to the family, for example. Technical discussions recorded from the phone, and later played back, invariably disclose some facts that just didn't "register" during the brainstorming session. Telephone recordings can speed the transfer of information (dates, times, places, schedules, inventory, etc.), thus shortening the toll on long-distance calls, since it is not necessary to take the time to write out everything during the call.

The Law. However, the Federal Communications Commission (FCC) realized a few years ago that recordings from the phone could also present the problem of invasion of privacy if the person called was not aware that the conversation was being recorded. Therefore, it is now Federal law that a characteristic tone be transmitted approximately every 15 seconds during any telephone call between two States if the conversation is being recorded. Many States have similar legal requirements on all recorded calls *within* the State that would include all local calls.

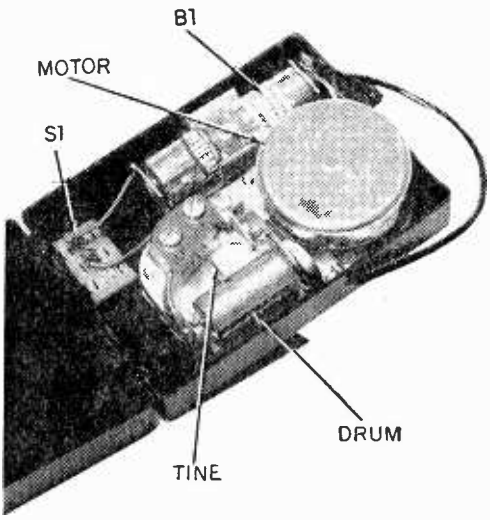
The Boing. We have all become familiar with the standard "beep" tone; people recognize this regular background interuption as an indication that the conversation is being recorded. Although the Boinger does not duplicate this sound precisely, its musical "boing" seems to fulfill the intention of the law, and with a great deal less cost and complexity than other means. Local and federal requirements for a recording identifier are difficult to define, and subject to interpretation. Therefore, anyone who does much telephone recording and would like to keep it legal, the Boinger proves satisfactory and certainly shows intent to comply with the law.

The Boinger. This gadget costs less than $3.50 to build from all new parts, is an ex-

tremely simple device that injects a musical "boing" into the telephone conversation every 15 seconds. The coupling to the telephone is acoustic, directly into the mouthpiece. The person at the other end of the line hears a sharp clear tone and the same tone is documented on the tape at the recording end. There is no tendency for recorder blocking during the tone which is an unfortunate characteristic of some telephone recording "beepers."

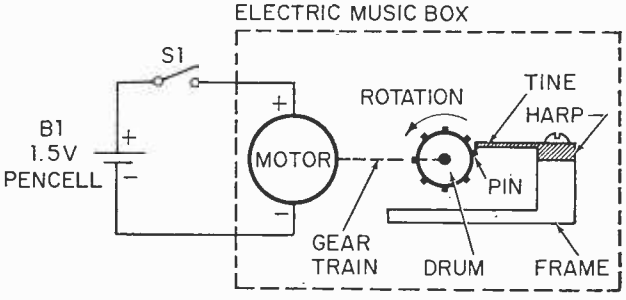
Description. The self-powered Boinger will run for hours on its built-in 15-cent battery. Connection to the telephone headset is quick and easy using the simple wire retainer that snaps into the mouthpiece groove. A small piece of foam rubber acts both as a spring and a cradle for the telephone. The regular telephone recording pickup attaches to the earpiece or under the telephone base in the usual manner.

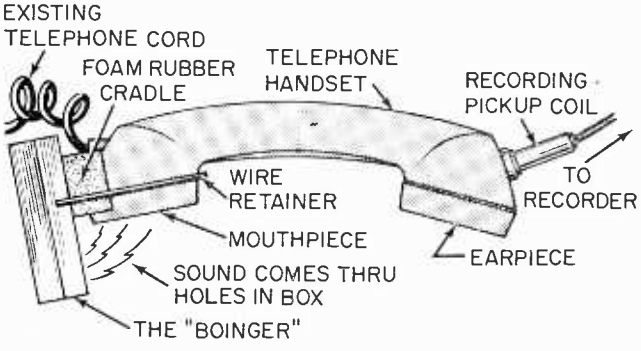
The heart of the Boinger is any inexpensive and small music box movement such as those available from Lafayette Radio for $1.98. When the movement is slightly modified, as described later, all that remains is to add a battery and a switch to make the Boinger. The music box, as purchased, is completely assembled, and contains the 1.5-volt motor, gears, drum, and a harp with about 20 tines. With switch S1 closed the battery powers the motor. Through a reduction gear arrangement, the drum turns at 4 revolutions per minute, which, by a happy coincidence, is one revolution and boing every 15 seconds. On the drum are small



Small size of the music box movement makes Boinger feasible for use on telephone handset. Note the removal of all tines but one.

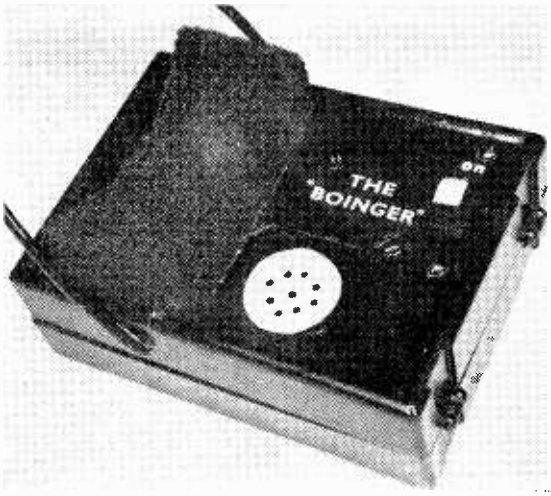
Combined schematic-pictorial diagram shows the switch and battery connected to the motor of the music box movement. Note the position of the tine with respect to the drum. The drum must turn in the direction shown (by using correct battery polarity) or may jam and burn out the motor, or the tine will shortly fatigue and snap.





The Boinger attaches directly to the mouthpiece of your telephone, and puts out an audible "boing" every 15 seconds. It is used when recording a telephone conversation to remind both parties that the conversation is being recorded. This is a Federal law on interstate calls and is also a law on local telephone calls in a large number of our 50 states.

Foam rubber and wire cradle is so functional it could have been designed by Telephone Co.



projecting pins, so placed that they trigger various tines of the steel harp as they rotate past. The vibration of the tines makes the characteristic music box sounds. By removing all the tines but one, a single tone can be produced every 15 seconds!

Construction. The unit shown was built in a plastic box but a metal box is preferable. The reason is that noise has been noted in testing, caused by electromagnetic radiations from the motor being coupled inductively to the recording pickup at the other end of the headset. By using a metal box to house the Boinger, you can shield these radiations and eliminate this background static on the recording. The internal wiring is not at all critical, but the components should be arranged so that the most direct path is available from the tine to the mouthpiece. The switch should be located in a convenient spot, and several holes should be drilled in the box near the mouthpiece so the tone is directly coupled. (In the plastic box version, a small piece of metal, with holes, was mounted under the music box frame to act as a sounding board.) A piece of foam rubber, cut to shape with a sharp knife, is cemented to the box to form a cradle for the phone mouthpiece. A piece of music wire or coat hanger wire is formed around the mouthpiece groove and the ends bent to fit into two small holes in the side of the Boinger box. This wire swivels down for storage, swings up for attachment to the phone. A snug fit to the phone is provided by the springy foam rubber cradle.

Don't forget to modify the music box steel harp. This is easily done. Remove the two screws holding the harp to the frame, and snip or bend off all the tines except one near the center. Temporarily reinstall the harp and note which projections on the drum trigger the lone remaining tine, and then remove all these projecting pins but one with pliers or a file. Now, the one tine will be triggered only once each time the drum makes one revolution—which is once every 15 seconds —just what we want!

Backward Boing. Although at first thought it would seem that the polarity of the battery would not be important, it turns out to be quite important. The DC motor will operate with either polarity, but the direction of rotation is determined by the polarity. The tine must be triggered from below, or it will break off in a short time. If the drum is turning in the wrong direction, that is, triggering the tine from above, then turn the battery over in its holder. When the proper direction has been found, put a dab of red nail polish on the positive battery holder terminal so that you will know which end of the battery goes where when you replace the battery at some future date.

Install the tine firmly and check the positioning to insure that the remaining drum pin makes firm contact with the tine. There is enough slop in the harp screws to allow adjustment for a nice strong "boing." Now you are ready to put the Boinger to use.

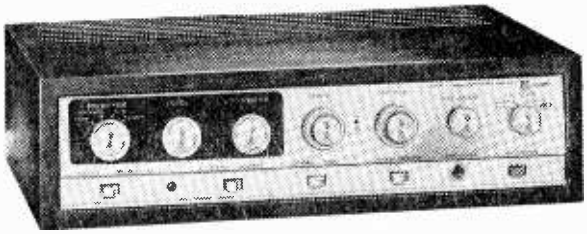
Boinging. When you intend to record a phone call, attach your regular recording pickup (either a suction-cup type, or a flat under-base type) and then clip the Boinger to the mouthpiece. Turn on the Boinger switch, place your call, and record. After you have completed your call, the Boinger will remind you to turn it off—it will boing every 15 seconds until you do! ■

PARTS LIST

B1—1.5-volt battery (Eveready 915 or equiv.)
S1—S.p.s.t. slide switch
1—Pencell holder
1—Electric music box movement (Lafayette 99-G-9013, 99-G-9018 or equiv.)
1—Aluminum Minibox 4 1/4 x 2 1/4 x 1 1/2 (Premier PMC-1016)
Misc.—Foam rubber, coat hanger wire, cement, nuts, bolts, etc.

Estimated cost: $4.00
Estimated construction time: 2 hours

RADIO-TV EXPERIMENTER LAB CHECK



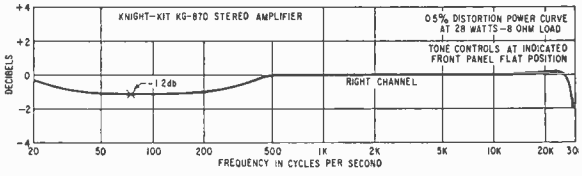
KNIGHT-KIT KG-870 All-Transistor Stereo Amplifier

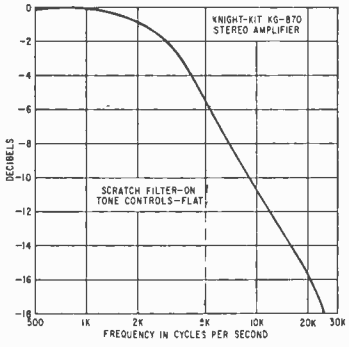
A **seventy-watt** all-transistor stereo amplifier that runs as cool as a cucumber, that can be held in one hand, and is small enough to fit into a briefcase—all for $99.95. Ridiculous? No! That's the description of the Knight-Kit KG-870, a full-feature integrated stereo amplifier kit that definitely has *transistor sound*.

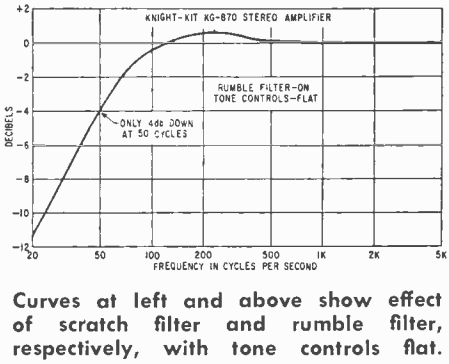
When first unpacked, components and hardware seem to overflow the table—this is not a stripped down kit. And unless you want to spend your time searching for individual components it is best to follow instructions by pouring each bag of components into an individual container, such as a muffin tin. Typical of Knight's efforts to make the kit trouble-free, resistors are supplied mounted on an easel card (it stands up); since each resistor position is marked with an identifying number you just reach out and pluck the right resistor the first time. Not only is color coded wire provided, each lead is precut and stripped to the correct size. And while some leads may appear to be oversize don't trim them; the amplifier works best when made *Knight's way*.

Paper Work. Two manuals are provided: an Operator's Manual with a notably excellent troubleshooting section, and an Assembly manual. The assembly manual is uniformly good. There are no pages of corrections and pictorials, and illustrations are always on the page facing the wiring instructions. For those who like oversize wall-mounted, wiring guides a set of individual wall-size pictorials is provided.

Frequency response curve (right) for the KG-870 is shown for the right channel only since both channels were almost identical. Frequency response was within Knight-Kit's claims.







Curves at left and above show effect of scratch filter and rumble filter, respectively, with tone controls flat.

The pictorials are particularly good, with individual cuts showing just a few wires and components—no "unit pictures" showing a tangle of coded wires and components. Since newcomers often have trouble identifying hardware (What's a filister head screw?), life size illustrations of all hardware are provided.

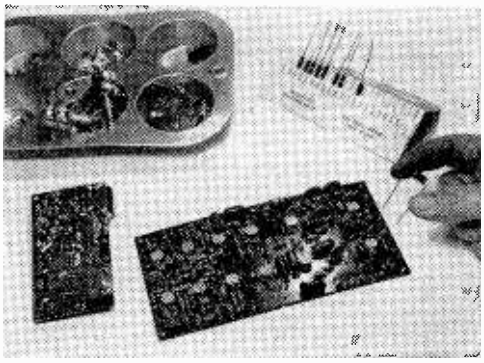
Putting It Together. The kit uses a combination of printed circuit and point-to-point wiring in about equal proportions. Actually, the point-to-point wiring is primarily connecting leads between the front panel controls and the PC boards; most components go on the boards. To avoid the jungle of parts usually associated with the tone controls (two bass and two treble), two couplets of seven leads are provided; no rat's nest wiring and no shorts.

Since the wiring is built up in layers it's very easy to melt a few leads if you try to bull your way in with a soldering gun or a large iron. Invest a buck and do the soldering with a low wattage pencil tipped iron; it's sort of insurance the kit will work the first time.

What You Get. It takes about 25 hours to wire the KG-870, but when you're finished you have a full-feature amplifier having just about every convenience. There are five inputs: an RIAA magnetic phono, an NARTB tape head, a high and low level auxilliary and a tuner input—all controlled by a single selector switch. A sixth input for tape monitor permits the amplifier to be used for monitoring while recording on a three head tape recorder using the same amplifier for the program source (the professional way to make tape recordings). The tape recorder feed—a jack on the rear apron—is connected ahead of the tone and volume controls so changes made to the amplifier sound do not affect the recording.

Both a level (volume) and variable loudness controls are provided. The ganged tone controls are locked by a friction clutch; after each channel is set for optimum tone balance they track together. The balance control, which adjusts the volume of *both* channels to correct for speaker placement, can also be used to completely shut down either channel, such as might be desired when playing "background" music.

Front panel slide switches adjust speaker phasing and reversal. Another slide switch ties both amplifier inputs together when all mono is desired. A panel mounted headset jack is also provided—when phones are plugged in the speaker volume is automatically reduced to a negligible level. A single selector switch permits either flat operation, rumble or scratch filter, or both.



If the assembler is careful with his soldering, the printed circuit board is the best means for putting together a transistor kit. Cuts down wiring time, too.

What's It Like. The KG-870 definitely has "transistor sound"; a quality which can't be shown on a curve, it can only be heard. The sound seems to come from nowhere—there is no hum or noise that rides under the sound in vacuum tube amplifiers. Only when all controls are run wide open is there a trace of a "hiss" (no hum). Even with inexpensive speakers the sound seems notably clean (that "transistor sound" again).

Typical of transistor amplifiers, rated power output depends upon the speaker impedance, either 16- or 8-ohms. We haven't omitted 4 ohm speakers, they're just not recommended with this amplifier.

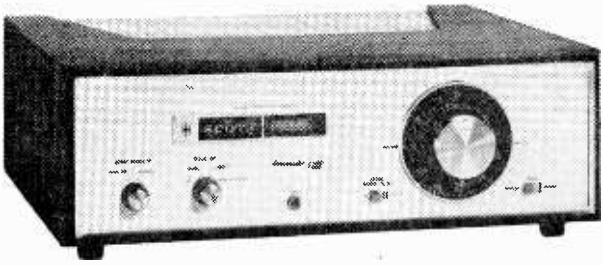
The input sensitivities shown are measured. Though the magnetic phono is listed a 3 millivolts, high level mono pickups can be used (if your budget won't allow a new pickup now) since the pre-amp will take more than 12 millivolts without overload. The curves and charts tell the rest of the story; the Knight specs are well within Knight's claims.

Both a wood and a leatherette finish metal cabinets are optional. The metal cabinet, being a snug fit, results in a very compact amplifier which fits unobtrusively on a bookshelf. There is practically no heat dissipation, the amplifier doesn't require "wide open spaces" you lose practically no shelf space.

Summing up; the KG-870 at $99.95 is an attractive buy when purchasing your first hi-fi amplifier or picking up a replacement for that vacuum-tube *heat wave.* ■

RADIO-TV EXPERIMENTER LAB CHECK

H. H. SCOTT LT-110B FM-Multiplex Stereo Tuner



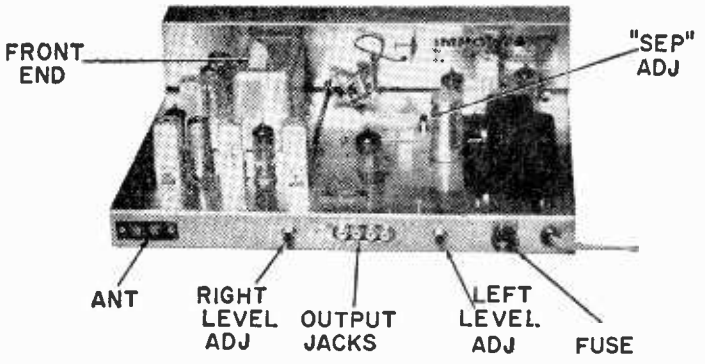
There are certain trade names—such as *Rolls-Royce*—which are synonymous with quality. In fact, these names by themselves are often used to mean quality. One such name in the hi-fi field is *H. H. Scott*. Anyone hearing the name *Scott* assumes that the equipment is of the highest quality; that it is not stripped down with as few components as possible and pushed to the absolute limit. So when Scott offers an FM stereo tuner in *kit* form (Model LT-110B) it would not be incorrect to assume a "something extra" in performance and assembly ease.

Color Comes to Hi-Fi. The extras start off with an assembly manual using a new approach to kit construction. The first thing noticed is color—a profusion of color. Every wire and component is shown in the pictorials exactly as it appears on the chassis. If you're connecting a red lead, the pictorial shows a red lead. If you're connecting a 150K resistor, the pictorial shows a resistor with brown-black-yellow bands plus the tolerance band of gold or silver. Unless you're color blind you have to try mighty hard to make a mistake. And if you are color blind, don't fret. The instructions are complete even if the color aids were left out.

The pictorials for each group of wiring steps is on the same page as the steps—in some instances the pictorial is spread all over the page to retain the same proportions as the actual components.

Best of all, the soldering steps are indicated in a red solder code. If you're working on a step with a red "S" and haven't used a soldering iron, you've made a mistake. Similarly, if you've picked up the iron on a step without a red "S," you're about to make an error.

What You Do. While the LT-110B is not a stripped down kit you aren't buried under boxes and boxes of components. The critical circuits—the front end and the MPX adapter —are not only supplied pre-wired, they are pre-mounted to the chassis. The pre-mount-



Once the LT-110B is wired and aligned, it is installed into the high-fidelity system in the same manner as any other tuner. Level adjustments should be made with amplifier balance control centered. "SEP" adjustment should not be attempted until after the detailed instructions are read.

ing insures that the factory alignment of these circuits will in no way be changed by wiring or mishandling.

So what's left for the user to wire? Plenty! The connecting leads, IF amplifiers, power supply and audio amplifiers—all non-critical circuits. The user still has to put in about 6 hours of construction time. However, don't try to wire the kit over the weekend. Take your time, and take lots of coffee breaks. Kit manufacturers have found that kit builders make more mistakes when they are tired than for any other reason.

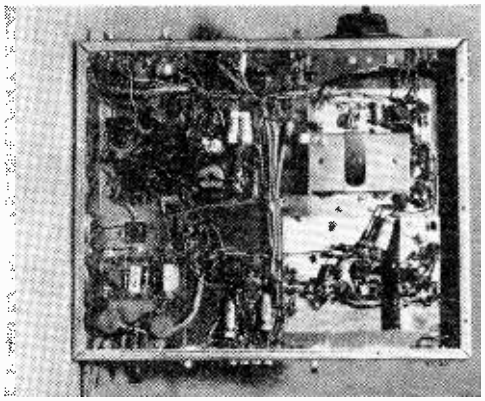
As good as the layout is in terms of ease of assembly there are a few tight corners, particularly on the terminal strips. In a few instances up to five wires are connected to a single terminal lug; take care that *every* connection is neat and clean. On terminals with over three wires make certain the solder flows over all wires; often just the top wires get soldered if the iron is removed too quickly.

You will find a thin copper foil bonded to a section of the aluminum chassis. At the RF frequencies encountered in FM proper grounding is important, and copper—a superior conductor to aluminum—insures good grounds.

Alignment. Though the completed tuner is complex by any standards, there is no alignment problem; actually, it couldn't be easier. The really critical circuits—the front end and MPX adapter—are pre-aligned at the factory and under no circumstances should the user attempt to improve on the factory alignment. Only the IF amplifiers and detector is *user* aligned, and it is done *without instruments.*

First, a station is tuned in so it peaks on the built-in tuning meter. Then, using the supplied alignment tool the IF transformers are adjusted for maximum meter reading—that's all there is to the IF alignment. To align the detector, a supplied capacitor (with clips) is connected across one tube, causing a loud hum to be heard when the tuner is connected to an amplifier. The detector transformer slug is then adjusted for minimum hum and alignment is complete.

Of course, for those who insist that nothing can equal an instrument alignment, Scott supplies instrument alignment instructions. However, the instruments required are unlikely to be found in the local serviceman's shop let alone on the home workbench. We suggest that if you insist on an instrument alignment you bring the tuner to an *authorized* Scott service agency.



All the tough wiring, about 90% of that shown in the top half of the photo, is done at the factory, tested and pre-aligned.

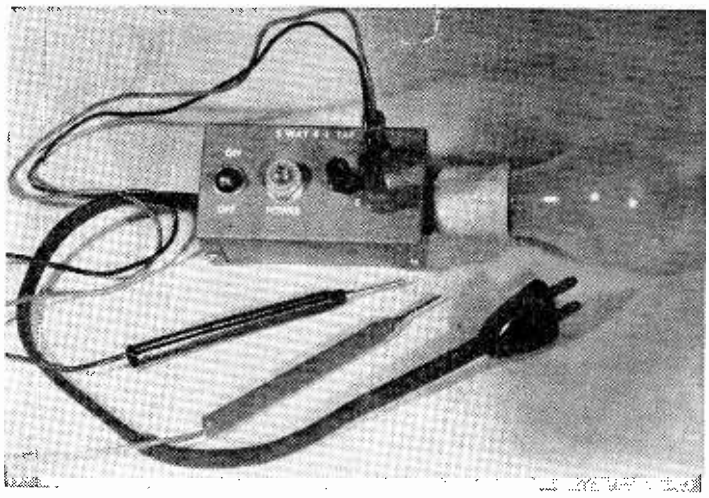
Electronic Features. Now to the electronics (you've waited long enough). A single function switch selects the mono, stereo and stereo with subchannel filter modes. In addition, a separate stereo noise filter is provided which attenuates the high frequency response when a stereo program has severe noise conditions. The AGC (automatic gain control) is also adjustable. In the mono mode it reduces interference which might be caused by strong local FM stations. In the stereo (MPX) position it provides a better signal-to-noise ratio on the subchannel.

To insure proper identification of stereo programs and to insure optimum stereo tuning a *sonic monitor* is provided (on the front panel). In the monitor position the audio output is muted. As the stations are tuned in no sound is heard until a stereo program is received. Then the monitor produces a steady tone in the speakers. When the tuner is adjusted for cleanest tone coincident with highest tuning-meter reading, the station is tuned on-the-button. Shuting off the *stereo monitor* restores the audio output.

A separate gain control is provided on each audio output (left and right). These controls allow the tuner's output to be equalized with the other amplifier inputs—such as the phono—so the listener isn't subject to "blasting" when switching from tuner to any other sound source.

In addition to the normal tuner outputs, two sets of tape recorder jacks are provided. On the rear panel standard phono jacks are paralleled with the tuner outputs to provide a tape recorder feed for recorder's built into the equipment cabinet. For portable type

(Continued on page 106)



Five-Way Power Tap

By James A. Fred

Eliminating temporary setups saves time, fumbling, and shocks

The 5-way power tap inserted between an electrical appliance and an ac outlet enables you to make five checks on small electrical appliances, electric lamps, electric motors, and other electrical devices. This low cost test gadget may be dispensible in the radio repair shop, but it has proven itself invaluable in the repair of home appliances and motors. The five most common applications of the tester are:

1. Measuring current drawn by electrical devices
2. Detecting shorts, grounds, or continuity in appliances
3. Testing appliances suspected to be faulty
4. Testing line voltage or voltage drop across an appliance
5. Tapping off line voltage safely.

Current Measurement. To measure the amount of current drawn by an appliance an ammeter can be plugged into the two red binding posts placing it in series with the appliance. The appliance is then plugged into the receptacle.

Continuity Test Lamp. To use this device as a test lamp for checking shorts, continuity, and grounds, plug the lamp and adapter into the receptacle and plug a set of test leads into the two red binding posts. To check for low resistance leakage use a 100 watt bulb, to check for medium leakage use a 7.5 watt bulb, and to check high resistance circuits use a neon bulb. The usual procedure when checking for shorts or grounds is to touch one test prod to the case or frame of the appliance or motor and the other test prod to one pin at a time of the line cord (not plugged in of course). To check for continuity touch each test prod to one pin of the line cord.

Fused Outlet. To use the device as a fuse box, a fuse block is constructed that will plug into the two red binding posts. Fuses of various amperages can then be used. The rating of fuse will depend on the current being drawn by the appliance being tested. Checking every repaired appliance this way will relieve the embarrassment of blowing out the line fuses and plugging your household into darkness.

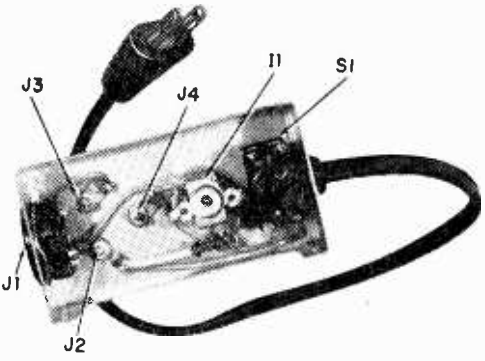
Appliance Voltage Drop. Often it is desirable to be able to measure the line voltage drop of an electrical appliance. An

appliance is plugged into the receptacle and a voltage reading is taken at the red binding post on the line side and at the black post. A fuse of the proper rating is inserted into the two red posts and another reading is taken. The difference between the two readings is the voltage drop.

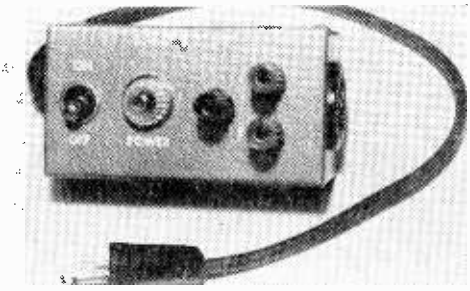
Line Voltage Tap. When making experimental hookups it is often necessary to tap into the line voltage. By connecting clip leads to the black post and the red post on the line side, you can tap off the line. By using a fuse in the two red posts, and moving one clip lead to place the fuse in the circuit, you have a fused voltage available. The neon pilot light reminds you when the EI tap is plugged in—so be careful with those hot test probes!

Construction Tips. The tester is built into a very compact aluminum box. As shown in the photograph, the d.p.s.t. toggle switch, neon pilot light, and three binding posts are mounted on top of the box. On one end is a single female receptacle and on the other a short power cord. These components can be laid out in any arrangement that is convenient. If you intend to use the tester in a garage or basement, it would be wise to use a three wire line cord and a grounding receptacle.

In construction, be sure to use at least number 16 wire line cord and a d.p.s.t. toggle switch. Number 16 wire is necessary for working on the higher current appliances; and the d.p.s.t. switch breaks both sides of the line which will save you the trouble of removing the line cord from the wall. The pilot serves to remind you to throw the switch off before changing accessories. Of, course, use number 16 wire to wire the receptacle, switch, and binding posts.



Underside of chassis, above, shows number 16 wire used throughout for working on higher current appliances. Below is front panel.



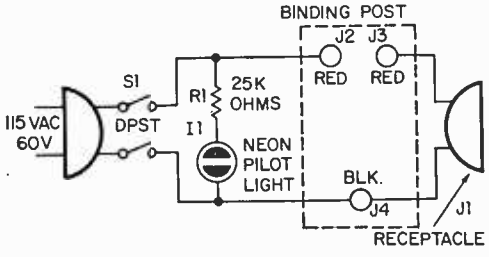
Most of the parts used in the tester can be obtained from any well-stocked radio parts supply house. The lamp adapter used for the test lamp can be purchased at the housewares rack of your local supermarket.

A Capital Investment. The little time and energy invested in building the 5-way tester is returned in time and aggravation-saving dividends everytime you would otherwise try to accomplish its function by fumbling with wires and temporary setups. ■

PARTS LIST

I1—Neon pilot light, NE-51H
J1—Female receptacle, Amphenol 61-F (Allied Radio 40H677)
J2, J3, J4—Binding posts; 2 red and 1 black (Allied Radio 41H368 and 41H367, respectively)
R1—25,000-ohm, ½-watt resistor
S1—D.p.s.t. toggle switch
1—Aluminum chassis box 4"x2⅛"x1⅝" (Bud CU-2102A)
Misc.—line cord, screws, nuts, decals, etc.

Estimated cost: $5.00
Estimated construction time: 1½ hours



The neon pilot light connected across the line voltage reminds you the tap is "hot."

Marine Broadcast DX

GYR, NUZY, GNE and ZEL are not Nairobi names for the Beatles, but four of many marine weather stations you can tune in today

SAY "broadcast" and most DX'ers automatically think of programs intended for the general public on the AM, FM and SWBC bands. But those stations transmitting solely for the benefit of mariners can also provide both interesting and varied DX. These marine broadcast stations operate on frequencies ranging from just above the AM broadcast band (and below!) to the upper limits of short-wave. These are the only broadcasters using both CW as well as voice for their 'programs' (weather forecasts, warnings to navigation) and can be DX'ed on either a domestic or international basis.

2670 Kc. Most of the voice stations operate below 3 mc. While this low frequency cuts down the range somewhat, truly inviting targets are waiting to be logged. The low sunspot count means better DX reception is at its peak. A striking example occurred

By C. M. Stanbury II

Marine Broadcast DX

during the Alaskan earthquake emergency. With every DX'er hunting for this stricken area, only station reaching coast-to-coast was NMJ on 2670 kc. operated by the U. S. Coast Guard at Ketchikan. During their regularly scheduled broadcast at 0100 EST, along with numerous special transmissions, a complete account of those coastal locations hit was provided. If a navigation aid (light, beacon etc.) had gone out, you knew the quake or tidal wave had been there. NMJ's info was every bit as up to date as that from any orthodox broadcast station.

An equally inviting catch is NUZY, the Campeche Patrol Vessel serving American shrimp boats in the lower Gulf of Mexico. Broadcasts from international waters have been very much in the DX news, but only on the BCB. NUZY is the only short-wave to make regularly scheduled broadcasts from the high seas. That NUZY transmission you are most likely to hear is at 0120 again on 2670. Come to think of it, there is yet a third important broadcast on that channel —from NMR, San Juan, Puerto Rico at 2200 EST. Puerto Rico, of course, has no orthodox short-wave broadcast outlets.

NMJ, NUZY and NMR are all operated by the CG and reports should be addressed to Radioman in Charge, (call letters), U. S. Coast Guard, at the appropriate location. NUZY's appropriate location is Brownsville, Texas. It is usually necessary to enclose a prepared QSL post card which the R.I.C. merely has to sign and mail.

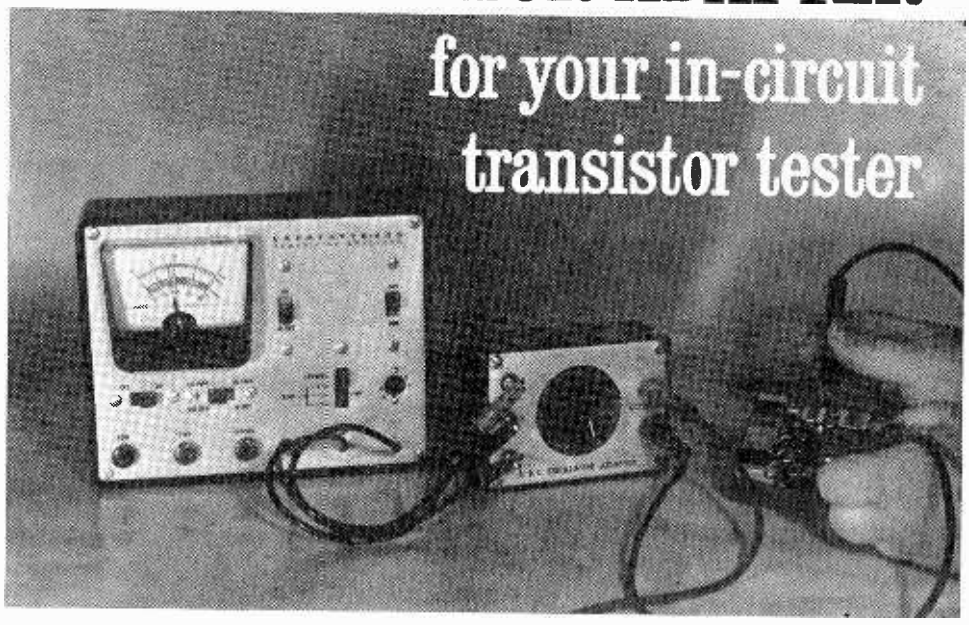
Nit Picking. Next with that low sunspot count, you will be able to bag some rare targets in Europe. There is GNE on 2740

(Continued on page 106)

CW Marine Broadcast DX Guide

Country	Call	Frequency (Kc)	Time (EST)	City & Operator
Aden	ZNR	8710	0000, 1130	Cable & Wireless (ME) Ltd.
	ZNR	17175.2	0200	
Alaska	NHB	2356, 4825, 8622	0600, 1200	Kodiak, USN
	NHB	4825, 8622, 12817½	1800	
Ethiopia	NKA	9060, 12817.5, 17150 & 22760	0300, 0900, 1500	Asmara, USN
		3220, 4515, 9060, 12817.5 & 22760	2100	
Falkland Islands	ZHF88	7425, 9100, 19800	2130, 1630	Port Stanley, Govt.
		7425, 9100, 12300	2100	
Fr. Somaliland	TXZ8	8682	0400, 1000, 1300	Djibouti, Adm. de P&T
Guam	NPN	4955, 8155, 13530, 17530 & 21760	0500, 1100, 1700 & 2300	Aguana, USN
Kenya	ZVG & ZGV2	6875, 12315	0730	Nairobi, Cable & Wireless Ltd.
Malaysia	ZEL24	12325	0415, 2018	Hong Kong, Cable & Wireless Ltd.
	ZEL22	7658	0818	
Malta	GYR2, 4, 5 & 6	4319, 8594, 13105.5, 16988 & 22419	0000, 0100, 1245, 1300 & 1600	Royal Navy (British)
	VPT	8710	0430	Cable & Wireless Ltd.
South Georgia (Brit. Antarctica)	ZBH	8642	1215	Grytviken, Gov't.

Build a 5-kc OSCILLATOR ADAPTER for your in-circuit transistor tester



Put an end to those messy, time consuming temporary setups

As more transistor radios need servicing, more radio technicians are purchasing inexpensive in-circuit transistor testers. These testers measure the ability of the transistor, while still wired in the circuit, to oscillate at a frequency in the range of 5 kc. This type of transistor tester will also function as a signal generator by connecting a *pnp* transistor to the test leads. The Oscillator Adapter is a simple "add-on" unit for your in-circuit transistor tester. It supplies the *pnp* transistor plus means for varying the unit's output level. The circuit design permits the generation of many harmonics so signals throughout the entire audio, IF, and RF spectrum are available for troubleshooting and signal tracing transistor and vacuum-tube receivers and audio devices.

Signal Generator Setup. To use a transistor tester or analyzer as a signal generator requires connecting together a *pnp* transistor, a coupling capacitor, and a pair of test leads. As well as making an untidy mess on your workbench, this temporary connection provides no means to attenuate the signal as it is applied to various points in the set. As you work your way from the speaker to the antenna, the signal will get louder as more stages of amplification are added. But adding a 10,000-ohm variable resistor, as shown in the schematic diagram, makes it possible to attenuate the signal as it is applied to the various test points in the set.

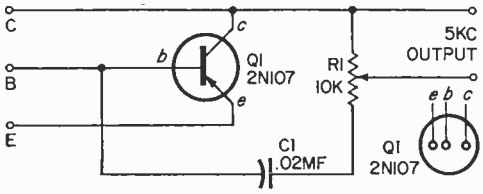
Compact Package. Putting all these components into a small plastic box reduces the tangle of leads and makes for more efficient trouble-shooting procedure. Since a front panel is not available with the plastic case, it will be necessary to make one, preferably from sheet aluminum. If wood or plastic is used, cement aluminum foil to the underside of the panel to provide shielding. Also use spaghetti on the output leads as shown in the photograph of the rear of the panel.

The base, collector, and emitter posts on the front panel are simply appropriate length

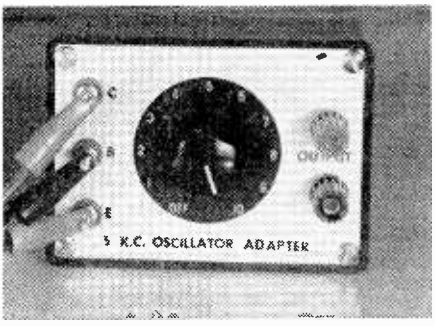
By James A. Fred

PARTS LIST

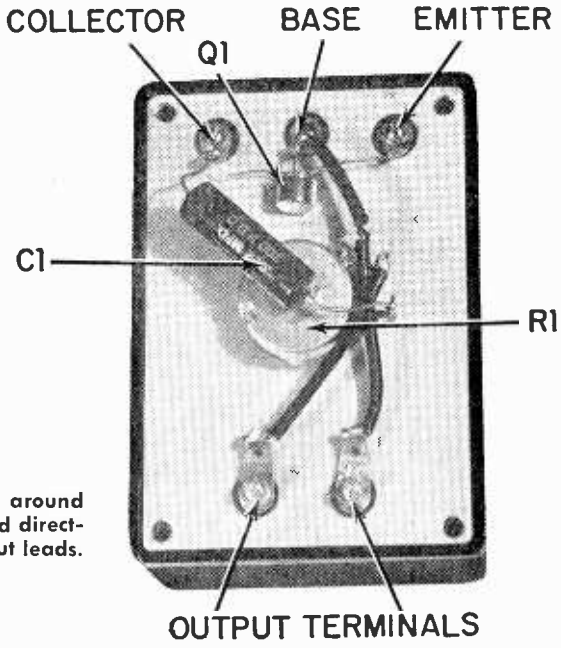
C1—.02 mf., 200-vdc tubular paper capacitor
Q1—2N107 Transistor, pnp (GE)
R1—10,000-ohm linear potentiometer (Mallory Midgetrol U20 or equiv.)
1—Dial plate (Mallory 390)
1—Fluted knob
1—Plastic instrument case 4" x 2 55/64" x 1 9/16" (Burstein-Applebee Co. No. 29B8)
2—Binding posts, one black and one red
Misc.—Screws, bolts, nuts, wire, solder lugs, front panel material, insulating washers, spaghetti, etc.
Estimated cost: $4.50
Estimated construction time: 1 ½ hours



Feature of oscillator adapter is 10K potentiometer, R1, to attenuate the signal when working on a receiver front end. Transistor base diagram identifies leads.

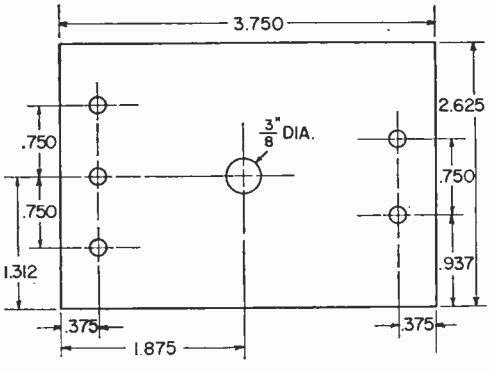


No tangle of leads involved when using oscillator adapter to troubleshoot and signal trace receivers and audio devices.



Rear view of front panel turned around in case shows transistor connected directly to bolts, and spaghetti on output leads.

Panel layout locates holes at left for transistor connections, center hole for R1, and output binding post holes.

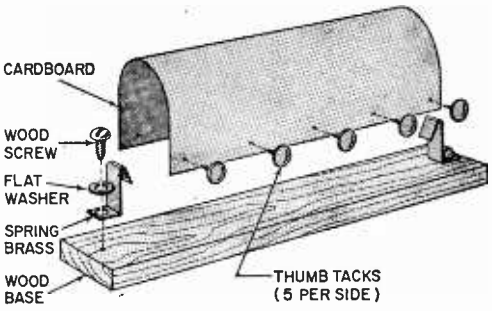


bolts pushed through the panel from the inside and nutted on the front. Use insulating washers on both sides. The clip leads from the transistor analyzer clip onto the exposed bolt. Binding posts are used for the oscillator output for attaching test probes.

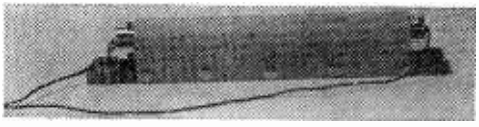
Unqualified Use. The oscillator adapter is shown used with the Lafayette Model KT-223 transistor analyzer but it is equally useful with the EMC Model 212, the Paralon In-circuit Tester, the Seco Model 100, and numerous other transistor checkers. ■

Workbench Battery Holder

A **simple** but practical workbench dry cell holder can be made by the experimenter from a scrap of wood, some stiff cardboard, thumb or carpet tacks, two small wood screws, and two pieces of spring brass or steel from an old clock. The holder can be made for one to five or more dry cells in series provided the tension of the two springs insures sufficient contact pressure between all the dry cells and the springs. Connect a red and black insulated wire, if desired, under each flat washer—black to minus, red to positive—and connect alligator clips to the ends to provide quick connect or disconnect. ■



Assemble the battery holder by first determining the distance required between the spring brass end terminals. Do this by laying out the number of dry cells the holder will mount and scribe lines at ends.



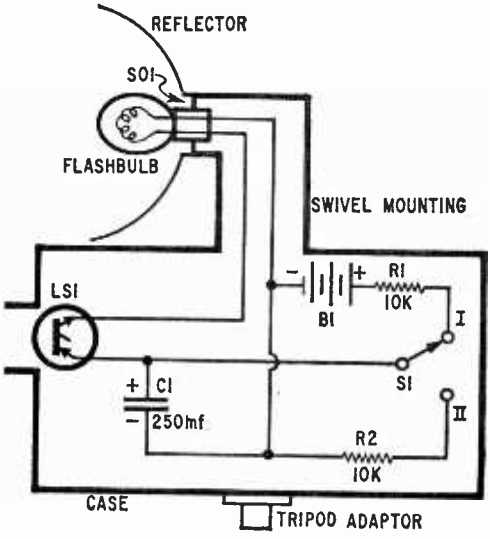
Slave Photoflash

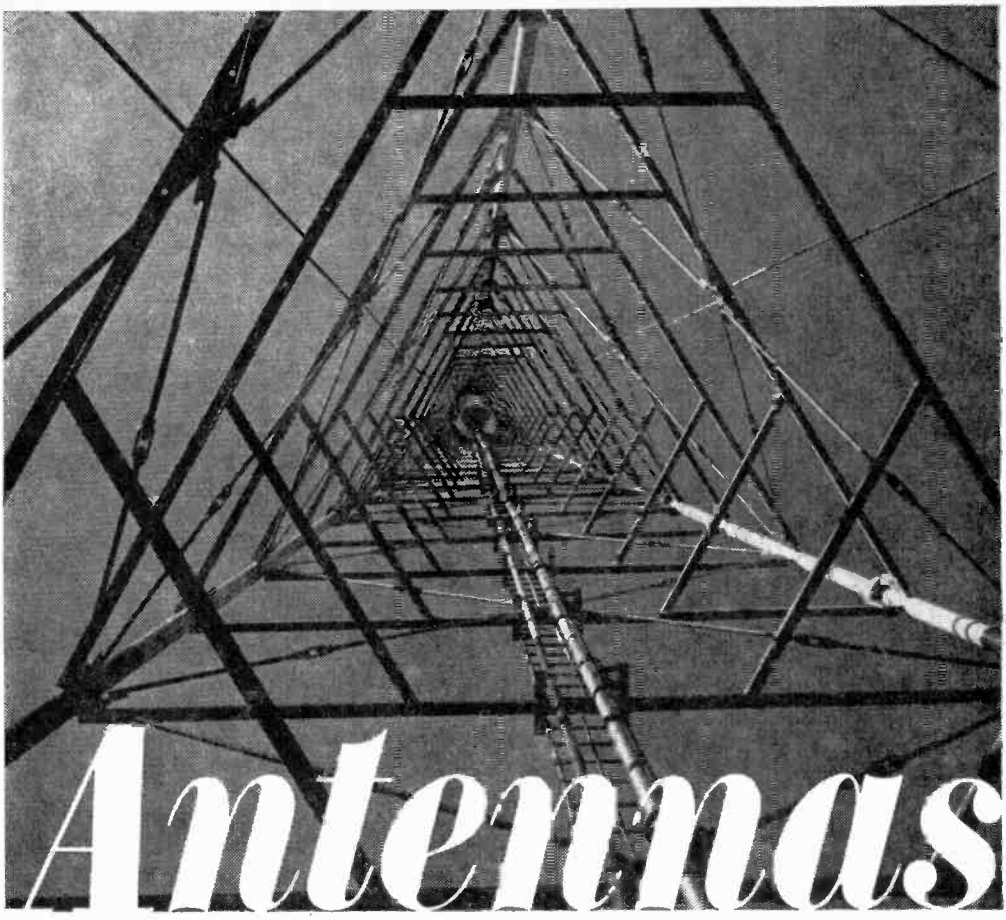
A **useful** project for the amateur photographer, the Slave Photoflash shown schematically at right, can be used to provide side or back lighting of flash shots. In operation, C1 is charged by B1 through current limiting resistor R1. When light from the main flash strikes the light-activated switch, LS1, this device switches "on," permitting C1 to discharge through the flashbulb and fire it. Switch S1 is a s.p.d.t. momentary switch to discharge C1 through R2 while a new flashbulb is being installed.

Referring to the schematic diagram of the photoflash, LS1 is a *GE* type GE-X2 light-activated switch. Battery B1 is a 22½-volt battery such as *Burgess* type U15. Resistor R1 is a 10K, ½-watt resistor and R2 a 10-ohm, 1 watt unit. Capacitor C1 is a 250 mf., 25-volt electrolytic capacitor. S1 is a s.p.d.t. momentary contact push-button, switch (it should normally be in position "I"). SO1 is a standard flashbulb socket.

The instrument may be assembled in a small *Minibox* or similar case. A tripod adaptor should be used to simplify mounting. A standard flashreflector assembly is used, but it should be attached to the case using a flexible (or swivel) connector.

In use, the LS1 is "aimed" towards the main flash while the slave flash reflector is pointed in the direction needed to achieve the desired lighting effect. Camera's shutter speed should be set to 1/10 second. Switch S1 should be held in position "II" whenever a flash bulb is installed. ■





Antennas for the new amateur

By Herbert Friedman, W2ZLF

If you're a newcomer to amateur radio—whether a new novice or a general class—most likely your new shack is buried in a mountain of antenna literature all of which claims the most sophisticated design yet. And your mind is cluttered with all the variables involved in making the best selection for your particular circumstances. There are dipoles, trap antennas, beams, and Yagis, and colinears, and verticals, and so on, and so on. In fact, any radio catalog worthy of the name has at least several pages of "superb," "magnificent," or "extraordinary" sky hooks, and, of course, they all have extraordinary prices.

Getting the right antenna is more than just a question of plunking down your money and picking the antenna with the most esoteric specs or the most cleverly merchandised name—some of which are doozies. You have to know what you want the antenna to do, and a fledgling rarely knows what's needed until he has kicked around the band and gotten the hang of things.

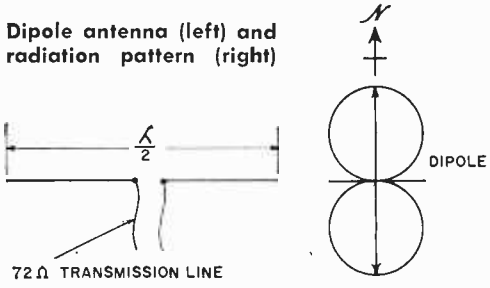
Most often, the best antenna requires only a few dollars worth of wire and an hour or so of time, following, of course, all the adequate forethought. You want something simple that works right off the bat; and an antenna that doesn't require a hundred bucks worth of test gear and five years of experience to get going. Don't laugh! There are

Antennas for the new amateur

many fine antennas that give outstanding performance when tuned to a gnat's eyelash, but when they're not tuned you'd be better off coupling the transmitter to the bedspring. Many antenna types fall into the "simple" or the "quick and dirty" category, and most of them do a fine job, not only for the novice but for the Ol' Timer as well.

The Dipole. The dipole is the basic antenna to which all other antennas are compared. It has an overall electrical length of half-a-wavelength from end to end. We say *electrical* half-wavelength since the antenna is physically shorter than a calculated half-wavelength. Something known as "end effect" electrically shortens the antenna, so it must be shortened physically to be electrically correct. For this reason, a dipole's length is calculated from the modified formula.

Dipole antenna (left) and radiation pattern (right)



$$L(feet) = 468/f(mc)$$

The freespace formula is

$$L(feet) = 492/f(mc)$$

Keep in mind that the end effect only applies to antennas supported on the ends by insulators. If you erect a dipole that is supported by a mast in the center, there are no end effects and the standard formula

$$L(feet) = 492/f(mc)$$

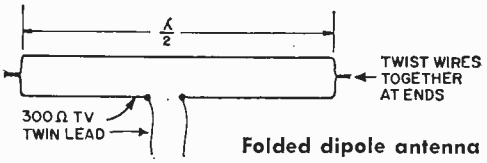
is used. The feedpoint impedance (radiation resistance) of the antenna at its resonant frequency is 72 ohms, a value easily matched by either 72-ohm coaxial or twinlead transmission line. Fifty-two ohm coax will also work well.

Note that the energy of a dipole is radiated at right angles to the wire axis. If the wire axis is running from east to west, the energy is radiated north and south. A perfect dipole would have no east-west radiation. This fact must be considered when erecting your antenna. If you live on the east coast and want to work Europe, the dipole must be positioned so it radiates essentially east and west. South America would require an east-west alignment of the antenna, naturally. It's almost impossible to cover several directions with a single dipole, and for reasonably full coverage it may be necessary to string two dipoles at right angles to each other.

The Folded Dipole. While similar in characteristics to the straight dipole, the folded dipole is often attractive to new amateurs because it's the cheapest and the easiest antenna to erect. The folded dipole is an electrical half-wavelength loop, open at the center. If the loop is made from ordinary 300-ohm TV twinlead, the feedpoint impedance is 300 ohms; another section of 300-ohm twinlead can be used for the transmission line. With the price of twinlead at one to two cents a foot, an entire folded dipole installation for 80 meters can be bought for less than four dollars. The energy distribution pattern (radiation pattern) of the folded dipole is the same as for the straight dipole.

Loaded Dipoles. One of the problems the modern urban amateur has to face is that his Old Homestead rarely includes a rear 20 acres. If he's got a plot 40 or 80 x 100 he's lucky. A few simple calculations shows that it's going to be difficult to stretch a 135-foot, 80-meter dipole on a modern lot; and not many neighbors appreciate antennas or "those wires" crossing their property. And 80 meters isn't the only headache; if you've got to string your antenna in the tight dimensions of 60 x 100 even a shoehorn won't squeeze in a 65-foot, 40-meter antenna. What to do?

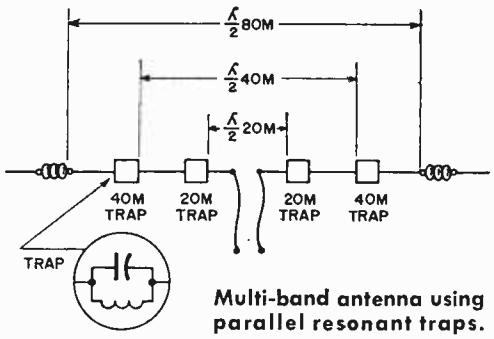
Antennas can be physically shortened with a device known as a loading coil. You remove a substantial section of that long length of wire, stick in the coil, and *voila!*, a short resonant dipole. You could build your own loading antenna but you're better off buying one. Several manufacturers offer loaded antennas, and if you're interested in working



Folded dipole antenna

the low bands but haven't the space, look into a loaded "short antenna."

Trap Antennas. One of the variables to consider in setting up your rig is the number of bands you'll be working. Assuming you'll want the provision for working 10, 15, 20, 40, and 80 meters as most amateurs do, you'll



Multi-band antenna using parallel resonant traps.

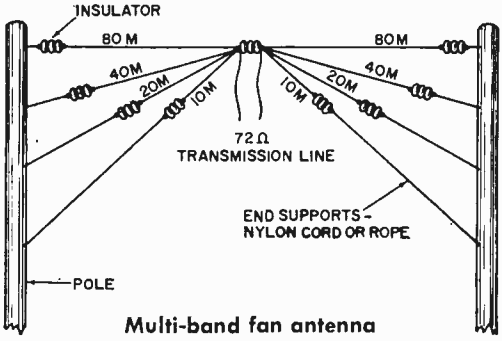
start studying your too-cozy back yard and wonder, how? Figuring that multi-band operation means an antenna for each band, you will visualize your lovely backyard cultivated to an antenna farm and forget the whole thing there and then. But this is where trap antennas pay off.

The trap antenna is a basic dipole at the lowest operating frequency you desire—80 meters, most likely. Parallel resonant tuned circuits (traps) are placed at the electrical half wave length points for the higher operating frequencies. The 40-meter traps "stop" the 40-meter energy and as far as the transmitter is concerned it is working into the length of a 40-meter antenna. The 40-meter traps become effective only when 40-meter energy is fed into the antenna system. Similarly, the 20-meter traps electrically shorten the antenna only when 20-meter energy is fed into the antenna. The action is similar to that of an automatic switch—the frequency of the RF energy determines which antenna section is utilized.

Again, you could build your own trap antenna, if you had the necessary test equipment to get one working, but you're better off buying a manufactured model.

The Multi-Band Fan. For the save-a-buck operators: a multi-band antenna known as a "fan" can be built for just a few dollars. Individual dipoles, spaced about a foot apart at the ends, are tied together at a common feed point. Nylon cord or rope is used to make up the difference in length for the higher frequency antennas. This system can be fed with 72- or 52-ohm cable, and, as with the trap antenna, the transmitter "sees" only the correct antenna for the band in use.

Harmonic Hazards—and Tricks. Whenever you use a multi-band antenna—whether trap or fan—keep in mind that it will radiate harmonic energy just as efficiently as the fundamental. This is unlike a single band antenna, such as a straight dipole which radiates efficiently only at its resonant frequency. If, for example, you're working 80 meters with a strong 40-meter harmonic, a multi-band antenna will put you on both bands! Similarly, if you're working 80 meters and the transmitter has a 10-meter parasitic, a multi-band antenna with a 10-meter section will do a great job of radiating the parasitic. Therefore, when using any multi-band antenna, make certain your transmitter is as clean



Multi-band fan antenna

as you can make it. If you suspect a high harmonic output, utilize an antenna tuner between the transmitter and the antenna system; the tuner will stop harmonic energy before it is radiated.

You may have noted that in the fan antenna drawing there is no provision for 15 meters. But you can still work this band! A dipole will operate with reasonable efficiency on the third harmonic, so the 40-meter antenna is used for 15 meters.

Get on the Air Fast. While there are many other antenna types, the basic configurations we've covered are recommended because they give the least trouble, work efficiently, and allow you to get on the air fast. Many of you will become "antenna men" coming up with a new design every week, but while you're digging into those antenna books you'll be on the air with these pure and simple work horses. There are still many Ol' Timers and DX Hounds using them year after year accumulating an enviable collection of QSL's. ■

Marine Broadcast DX

(Continued from page 96)

kc. at Oban, Scotland with a broadcast at 0303 EST (although you will need crystal selectivity for this one). After that, you should switch back to old standby 2670 kc. at 0333 EST for the transmitter at Ilfacombe, Eire—one of the very few communications stations which do not have call letters. Your chances for this pair will improve as the winter deepens.

On upper short-wave frequencies there is only one important marine voice broadcast. This one is produced by the Malaysian Telecommunications Dept. and aired at 2045 EST via VPW4, 8762.2 kc. Singapore. The new federation is not too easily logged in eastern North America due to interference, however VPW4 will sometimes provide a QRM-free alternate.

Breaking the Code. Now all other upper frequency DX marine broadcasts use cw (Morse code) but this is not nearly as big a road block as it appears. Many have long ID (identification) periods before their transmissions. Any DX'er may tune in approximately 15 minutes ahead of schedule and decode the call one letter at a time. The call will be interspersed with some sort of "marker" such as the letter V, E or CQ. After this marker come the word "de" (-.. .) then those all important call letters. Once the DX'er has, with a little practice, mastered this initial stage of cw DX, he will be able to tackle those cw marine stations which are too busy to send markers, for even they transmit call letters three time in succession very near the beginning of each short-wave broadcast.

All right, exactly what DX can be heard via cw broadcasts? Well, there is ZHF88 Port Stanley, Falkland Islands—certainly a rare country. But even better is ZBH at Grytviken, South Georgia. This island is classed by the British (who own it) as part of Antarctica, so here's one way to log the 7th continent. Switching poles and returning to Alaska, those who find NMJ and low frequencies too rough should try NHB at Kodiak, Alaska. Between these polar extremes are goodies like Malta, Aden, French Somaliland, Guam (Marianas), Malaysia again via transmitters at Hong Kong plus the often politically embroiled U.S. military base at Asmara, Ethiopia (NKA) on the Red Sea. Complete details on all these targets are contained in our CW Marine Broadcast DX Guide given in this article on page 96.

When you master that second stage of cw–DX skill, you can apply it to the low frequencies as well. For example, that surprisingly rough task of working coast to coast on long wave is actually quite easy. Westerners should go for WSL, 418 kc. Amgansett, N. Y., at 0300 PST while east coast DX'ers will find KSE, 482 kc., Torrance, California, inviting at 2318 EST. Station WSL is operated by Mackay Radio & Telegraph Co. and station KSE by Radiomarine Corp. of America. ■

Lab Check/Scott LT-110B

(Continued from page 92)

recorders which are used only occasionally for FM tapings a three circuit phone jack is provided on the tuner's front panel—you don't have to pull the tuner out of a cabinet or jockey it around for recordings on portable recorders.

For perfomance of course, you get the noted Scott quality. Very good stereo separation and excellent sound. And just in case you feel separation isn't up to snuff—occasionally poor *station* separation is blamed on the tuner—Scott provides a control which allows the user to adjust the tuner for the optimum separation. However, the best performance test you can give an FM tuner is the *consumer listening test*. In this test the LT-110B was connected to an indoor 300-ohm, TV-lead antenna (supplied with the kit) and turned on. All the FM stations within the reception range of the test site were received loud and clear without noise even on normally weak stations. Also, fringe stereo stations were heard for the first time in true stereo without the hiss and static we have become accustomed to hearing.

The tuning control is Scott's "instrument type"—a planetary vernier drive with good calibration. Though the tuner is not provided with AFC (automatic frequency control) the oscillator stability is exceptionally good and can be considered drift free—even after a short warm-up. ■

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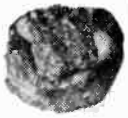


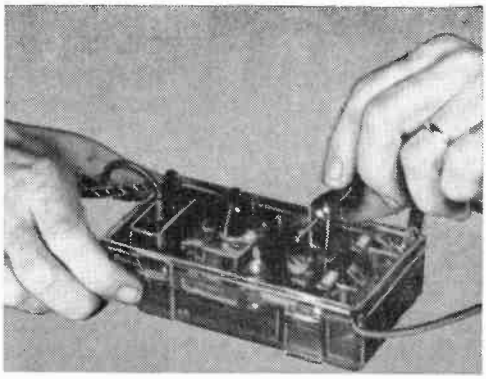
grow your own crystal radio

(Continued from page 63)

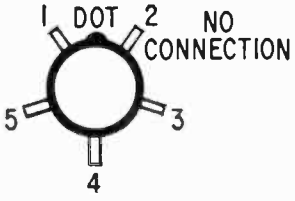
—a sensitive spot. It must be easily maneuverable and yet remain in place once it is adjusted.

When you have the crystal set built you can simplify matters considerably, if you have a germanium diode, by wiring it temporarily in place of the crystal until you have the coil adjusted and the condenser tuned to a strong local signal. An outdoor antenna and a good ground are essential. The ground can be either a water pipe or the electrical conduit shielding the house wiring.

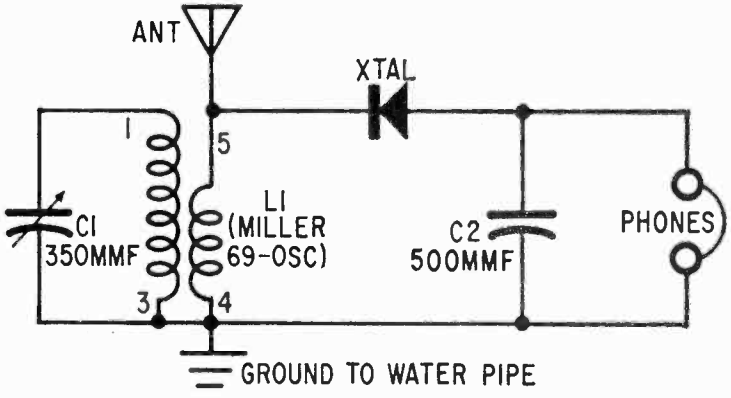
With a little ingenuity the dyed-in-the-wool experimenter can wind the coils, make a fixed condenser from foil and waxed paper or Saran wrap, and a variable condenser from two sets of sliding metal plates separated by paper or thin plastic. He can then point with pride to the crystal set as his own product, right down to the last component—including the crystal he grew. ■



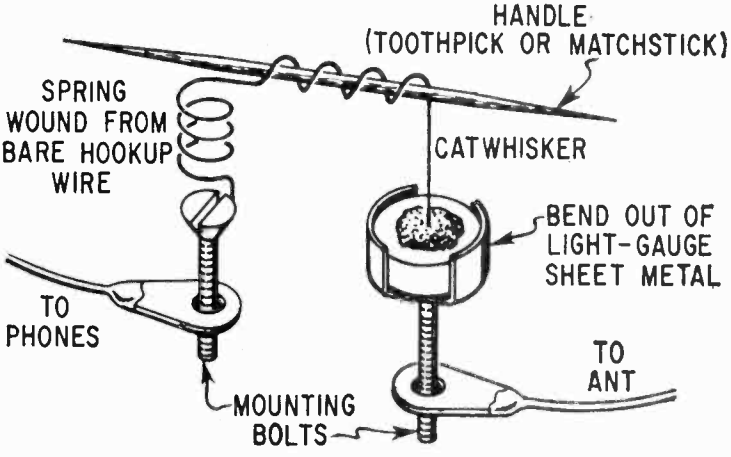
It will take a steady hand to bring the "catwhisker" in contact with shear face of crystal.



BOTTOM VIEW OF TERMINALS ON COIL



Using this schematic diagram, you can begin construction of a crystal receiver with a detecting diode you've homemade. If you wind your own coil to boot, you'll ignore coil detail.



This being one method of engineering the catwhisker to make a contact with the crystal.

Tape Loop Pack

(Continued from page 60)

Perfectly uniform and smooth wood dowels will serve as rollers if you can insert brad pins in the ends; the pins must be centered accurately and be in true alignment with the roller axis. Rollers may also be made from ¼" diameter steel rods whose ends are turned or filed down into pins. The rollers shown in the illustrations were made by pushing brass tubes into acrylic plastic tubes, after brad pins had been sweat soldered to the ends of the brass tubes.

Assemble the rollers in the rack and check for freedom from binding or wobble.

Lay the assembled rack on the base panel, and tape into position temporarily. The end with the roller nearest the frame end butts against the rear block of the base panel; the other end of the frame overlaps the ends of the shorter front (notched) block.

Turn the assembly over and drill about four ⅛" holes through the back of the base panel and part way into the frame strips. This ensures accurate alignment of the tape rack lock pins with the holes in the frame. The ⅛" diameter dowel pins should project about ¼" above the base panel surface.

Tape Guide Pins. The pin holes in the cover panel *only* should be enlarged to 5/64" or 3/32" diameter (one or two drill sizes larger than original).

Place the cover in place, slipping the rear of the panel under the rear lock plate lip. Check to see that holes in the two panels align accurately.

Place a drop of glue into each of the rear pin holes. Then thrust 1/16"-diameter dowels (rough cut to about 1½" lengths) through the cover holes until they emerge from the base panel holes. When all pins are in place, cut them flush with the outer surface of each panel. Fasten pins at the other end of the pack in the same way.

If you have trouble finding 1/16" diameter doweling, check your drug store for the small sticks used to make cotton Q-tips. Do not use dowels larger than this size.

It may seem unnecessary to make the tape guide pins project into holes in the top cover. However, if this is not done, the thin magnetic tape may slip between the pin tops and underside of the cover and cause binding.

Front Lock Plate. Aluminum counter-top edging was used to make the front lock plate. Cut to dimensions shown in the drawings. Tape into position so that the lock lip holds down the front end of the cover and drill a hole through the wood block, using the lock hole as a guide. Make this hole slightly smaller than the one in the lock strip; you should have to *screw* the 6-32 bolt through the hole after inserting it from the rear of the block. Use a hex- or wing-nut to hold the lock plate in place.

Test Procedure. Prepare a tape loop by splicing together the ends of 19 feet of magnetic tape. Hold the rack vertically in the right hand and wind the tape over the rollers from right to left. Place the loaded rack into the base section, moving the tape loops into position between the guide pins.

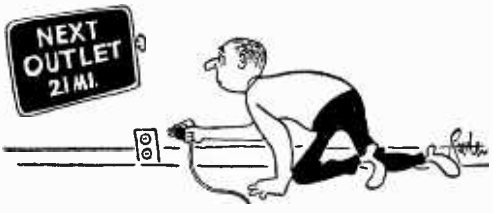
Now mark the tape positions on the spacer panel surface, remove the tape, and ink or paint bold stripes to indicate the tape positions. These will serve as guides to greatly facilitate proper winding of the tape for easy insertion of the rack into the base section without entangling the tape with the pins.

You can make the first test recording with the cover off to observe tape movement.

Recording Procedure. To use the pack, just lay it on top of the recorder, dropping the exposed portion of the tape into the recording head section of the machine. The size of the external loop should be just long enough to drop into position easily; a little slack does no harm.

The 19 feet of tape in the pack will provide one minute of recording time at 3¾ ips tape speed or 30 seconds at 7½ ips. You can, of course, load the pack with shorter loops if you wish. Longer loops would require *wider* tape packs; but the bigger the pack, the more carefully it must be constructed to reduce to a minimum all internal friction that would put a drag on the tape.

Using a monaural tape recorder, you can record two separate channels by turning the pack over after one channel has been recorded. You can make stereo recordings in the same way, or put four monaural channels on the same tape by using one stereo channel at a time. ■



Tape Recording "from the hip"

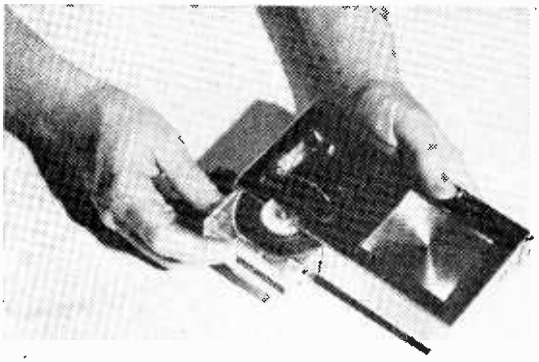
(Continued from page 66)

extreme conditions—if it works, then, it is sure to work under less demanding conditions.

With the Lodestar carried on a shoulder strap and mike attached to the carrier's lapel, recording tests were made at a party, press conference, and classroom lecture. Results—the unit performed admirably, faithfully recording and playing back the human voices it heard. Although the unit is not recommended by the manufacturer for recording music, you can pick up *pop tunes* off the air so that you can learn the lyrics and *sing-along* later. Under the test conditions, the four penlight cells provided six hours of service. The meter indicator, used to set tape speed, also doubles as an audio recording indicator to prevent overload distortion.

The unit's cast aluminum case, rigid semiconductor circuitry, and leather carrying case offer good shock resistance against accidental drops. The test unit was dropped three times on each of its axes from a 30-inch table top onto a linoleum surface. It continued to play without a trace of damage.

Price. The Lodestar (Model 6546) lists for $59.95 and is obtainable nationwide at Channel Master dealers. Write to Channel Master Corp., Sales Department, Ellenville, New York for the name and address of your local dealer. The recorder comes complete with crystal microphone, magnetic earphone, tape cartridge with protective plastic cover, leather case and strap, and a small leather case to hold mike and earpiece when not in use. Additional tape cartridges with mailing cases for tape pals cost only $2.95 each. Considering the craftsmanship that went into the construction of the Channel Master miniature recorder, simplicity, and low-cost battery power supply, the Lodestar will make a swinging gift during the coming Christmas gift-giving season. ■



The tape cartridge snaps in and out with a gentle tap or pull when the recorder is set at off. Plastic case and window in recorder lets you see how much tape has been used.

Switch & Shine

(Continued from page 65)

Moms Cake Pan and Dad's Know-how. A heart-shaped cake pan is used as the chassis for the funny face. The metal is thin and easily worked. Using the dimensions on the chassis diagram, locate and drill the eye and nose holes, and switch holes around the chin of the pan. The rotary switches used around the chin are perfect in this application since they don't indicate their electrical position. This is important when used for a game. The "Switch and Shine" toy as illustrated here uses a multiple battery holder to hold four batteries instead of two to give extended life to the toy. Two sets of two batteries are connected in series and then the sets are paralled to give 3 volts at a current rating sufficient to light all the lights for considerable time.

The chassis face can be painted as a clown or as any one of a dozen funny faces to delight the children. You can even let them do the painting! If you mount the lamp holders first, the jewels will protect the painted face from getting scratched during construction. Solderless connections were used in this construction because they were around; but they do prevent shorts and taping connections. Although the cake pan was left open in the illustrations, it would be advantageous to make a panel to cover it to protect the circuits from curious little fingers.

"Daddy Made It." The creative use of things at hand and the part of you that goes into a child's toy proves rewarding to both you and your children. It not only fosters a closer parent-child relationship but you endow your child with a finer sense of values than those children who grow up crying "buy me that!" ■

Electronics Steals the Thunder

(Continued from page 46)

Pretty Heavy Weather. Weather Bureau scientists estimate the "weather" above us weighs five billion million tons, is a vast dynamo of air masses reacting to the storms of the sun, the movement and topography of the earth, that it is never still and never repeats its actions exactly.

The Great Outdoors Indoors. Trouble with the weather it's always stayed outdoors. To learn more about this powerful dynamo above us, so we can study modification faster and with safety, man is now creating his "weather" indoors. Frustrated by the fact he could never quite bring the weather into a nice cool laboratory, and take it apart, modern engineers try next-best, they simulate "weather" by electronic computer.

In a small, modern building in the heart of Washington, D. C., scientists of the Weather Bureau's General Circulation Research Laboratory first seek to build a framework of physical laws already known. They translate these into mathematical formulas to analyze and program into IBM's largest computer, STRETCH.

It Picks Up the Pieces. Wind speed and direction, temperature, humidity at 10,000 points of the earth's surface and on each of nine levels of the atmosphere are fed into the computer. To describe the state of the atmosphere for one single instant in time takes 400,000 pieces of information.

Fed its instructions, the computer dutifully predicts changes in wind speed and direction, temperature and humidity at 100,000 points for each succeeding five-minute period. To simulate a single day's weather takes 10,000,000,000 operations. More than one trillion operations are needed to compute weather changes over a period of one hundred days. But Bureau scientists are so enthusiastic about their simulated weather they predict we may one day forecast one full year in advance, even study changing the weather.

Already H. Wexler, director of research of the U. S. Weather Bureau, contemplates melting icecaps by dropping carbon dust on their tops to attract the intense heat from the sun. Other weather scientist enthusiasts predict one day we will make the deserts bloom, the Arctic poles flourish with vegetation.

From Capitol Hill. When we called on Karl E. Mundt, U. S. Senator from farm-state South Dakota, to seek out his views, we found this subject one of his favorites.

"I believe weather modification is now coming of age," he said thoughtfully. "Funding has been too meager if one considers the importance of the subject. For years, I have been interested in doing something about weather control and modification, increase of rainfall, the elimination of devastating tornadoes."

The farm-state Senator told RADIO-TV EXPERIMENTER, "This year it looks as if the Congress might provide more funds so that we can continue vital research programs and begin to modify the weather" for the benefit of "farmers and citizens generally."

He summed up his thoughts: "The goal is producing water from the clouds at the time we want it and where we want it." And he quoted a farmer friend of his who had told him, " 'When we don't need rain, we get too much. When we need it, there ain't none at all.' "

It's this sort of whimsy on the part of the weather that long ago prompted Mark Twain to comment nobody ever does anything about it. But Mark Twain complained before silver iodide and satellites, radar, balloons and computers stole the thunder from the dancing Hopi's. ■

"Come in XZ4P."

A Radio-TV Experimenter Service

LITERATURE LIBRARY

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

ELECTRONIC PARTS

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

2. The new 440-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 1964 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 surplus goodies? *John Meshna Jr.* has one that covers everything from assemblies to Zener diodes. You can buy complex units that set the government back thousands, at a fraction of the cost!

9. Are you still paying drugstore prices for tubes? *Nationwide Tube Co.* will send you their special bargain list of tubes. This will make you light up!

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 electronic 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.

HI-FI/AUDIO

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

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

14. For the love of mikes! *Astatic Corp.* has lots. Studio types, ham types, recording types, etc. See its catalog sheets for the details.

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 four-color booklet on its full line of automatic turntables. 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."

18. Speakers and enclosures from *Argos Products Co.* feature a new and novel well-mounting system. To find out more, *Argus* will be happy to send literature.

19. A valuable 8-page brochure from *Empire Scientific Corp.* describes technical features of their record playback equipment. Also included are sections on basic facts and stereo record library.

20. Tape recorder heads wear out. After all, the head of a tape deck is like the stylus of a phonograph, and *Robins Industries* has a booklet showing exact replacements. Lots of good info on how the things are built, too.

21. *Wharfedale,* a leading name in loudspeakers and speaker systems, has a colorful booklet to send to you on its product line. Complete with prices, it is a top-notch buyers guide.

22. A wide variety of loudspeakers and enclosures from *Utah Electronics* lists sizes shapes and prices. All types are covered in this 16-page 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.

TAPE RECORDERS AND TAPE

30. "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.

31. "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.

32. You can learn lots about tape recorders. Big tape recorders for studios, little tape recorders for business men, all kinds of tape recorders from *American Concertone.*

33. "40 and More Ways to Use Your Roberts Tape Recorder" shows how to get the most enjoyment from your tape recorder for "your family growing up," language lessons, speeches, even synchronized sound with slides and home movies. Yours for the asking from *Roberts Electronics.*

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.

HI-FI ACCESSORIES

36. 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!

38. An entirely new concept in customizing electron tubes has generated a new replacement line. *Gold Lion* tubes give higher output and lower distortion than ordinary production high-fidelity tubes.

39. Got "furniture-sag"? Hmmm? *Adjustable Caster Co.* thinks you'd better level the shelf your turntable sits on before you try to level the turntable itself! Lots of data here.

KITS

41. Here's a firm that makes everything from television kits to pocket stoves. The *Conar* catalog is yours for the asking.

42. Here's a 100-page catalog of a wide assortment of kits. They're high-styled, highly-versatile, and *Heath Co.* will happily add your name to the mailing list.

43. Want to learn about computers the easy way? Brochure from *Digication Electronics* describes its line of transistorized kits.

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, chockfull of electronic bargains are also available.

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

47. Here's a goodly assortment of literature covering the products of the *Dow-Key Co.* They make coaxial relays, switches, and preamps for hams and CB'ers.

CITIZENS BAND 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? *Cadre Industries* has a booklet that answers lots of the questions you may have.

51. Antennas for CB and ham use as well as for commercial installations is the specialty of *Antenna Specialists Co.* They also have a generator for power in the field.

53. When private citizens group together for the mutual good, something big happens. *Hallicrafters, Inc.* is backing the CB React teams and if you're interested in CB, circle #53.

54. A catalog for CB'ers, hams and experimenters, with outstanding values. Terrific buys on antennas, mikes and accessories. Just circle #54 to get *Grove Electronics* free 1964 Catalog of Values.
Also see items 46 and 47.

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

SCHOOLS AND EDUCATIONAL

56. Three new courses in marine communication, aircraft communication, and guidance and mobile communications are available from *National Radio Institute.* The pamphlets are well-illustrated and educational.

57. Here are three pamphlets dealing with television trouble-shooting, radio trouble-shooting and high fidelity. These, from *Progressive Edu-Kits* are very complete and easy to understand.

58. Interested in ETV? *Adler Electronics* has a booklet describing educational television and this goes into a depth study of ETV in all its ramifications. There's a good science fair project here for someone!

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.

ORGANS

61. A complete booklet and price list giving you the inside data on *Schober Organs* are yours for the asking.

AUTOMOTIVE

63. Got some questions regarding transistor ignition? *W. F. Palmer Labs* will send you a booklet which explains what transistor ignition is all about. If you decide, after reading, that this is for you, their kits will let you build your own!

65. Want power plus for your auto? New Transistorized Ignition adds 20% more MPG. 3 to 5 times more spark plug life. Lower maintenance cost. Free catalog and instruction booklet available from *Anderson Engineering.*

TEST EQUIPMENT

67. Get the most measurement value per dollar." That's what *Electronic Measurements Corp.* says. Looking through the catalogue they send out, they very well might be right!

TELEVISION

69. Interested in tackling a TV kit? *Arkay International, Inc.* will send you full literature (including a schematic) of this truly educational kit. It's used in many of the electronic schools.

70. The first entry into the color-TV market in kit form comes from the *Heath Company.* A do-it-yourself money saver that all TV watchers should know about.

71. The smallest television set to date is featured in this beautiful prepared brochure from *SONY Corp.* You'll be amazed at the variety this firm offers.

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.

SLIDE RULE

75. Want to find rapid solutions to complicated math problems? Solve interest and ratio, log and trig problems with 10-scale slide rule. *Alsynco* will send complete information.

TOOLS

78. Xcelite's Allen hex-type screwdriver kits in plastic cases are must items for the home experimenter's tool box. Learn about what's available to keep your tool box filled with the right tool for the right job.

Radio-TV Experimenter, Dept. LL-714
505 Park Avenue, New York, N. Y. 10022

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☐ Indicate total number of booklets requested

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Volume 42, 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 change, the first in over two decades, 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, 1965 issue of RADIO-TV EXPERIMETER, Volume 43, 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 any part of the *Log* published during 1964, you will have a complete volume of *White's Radio Log* by collecting any three consecutive issues of RADIO-TV EXPERIMENTER during 1964 and 1965. The three consecutive issues are an entire volume of *White's Rodio 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 reference.

QUICK REFERENCE INDEX

U. S. AM Stations by Call Letters

C.L.	Location	Kc.
KAAA	Kingman, Ariz.	1230
KAAB	Hot Springs, Ark.	1840
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
KASE	Austin, Tex.	970
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-Martin, Tex.	1010
KAWL	York, Neb.	1370
KAWT	Douglas, Ariz.	1450
KAYC	Beaumont, Tex.	1450
KAYE	Puyallup, Wash.	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	Bramson, Mo.	1220
KBHS	Hot Springs, Ark.	590
KBIB	Monette, Ark.	1560
KBIF	Fresno, Calif.	900
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	950
KBOK	Malvern, Ark.	1310
KBOL	Boulder, Colo.	1490
KBOM	Bismark-Mandan, N. Dak.	1270
KBON	Omaha, Nebr.	1490
KBOP	Pleasanton, Tex.	1380
KBOR	Brownsville, Tex.	1600
KBOW	Butte, Mont.	1490
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
KBUC	Corona, Calif.	1370
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.Dak.	1590
KCCT	Corpus Christi, Tex.	1150
KCCV	Independence, Mo.	1510
KCDI	Kirkland, Wash	
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
KCJH	Arroyo Grande, Cal.	1280
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
KDBC	Mansfield, La.	1360
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.	1460
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
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
KDQN	DeQueen, Ark.	1390
KDRG	Deer Lodge, Mont.	1400
KDRO	Sedalia, Mo.	1490
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
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.	1050
KEEE	Nacogdoches, Tex.	1250
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.	1480
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
KENE	Toppenish, Wash.	1490
KENI	Anchorage, Alaska	550
KENM	Portales, N.Mex.	1450
KENN	Farmington, N.M.	1390
KENO	Las Vegas, Nev.	1460
KENT	Prescott, Ariz.	1340
KENY	Bellingham-Ferndale, Wash.	930
KEOK	Payette, Idaho	1450
KEOS	Flagstaff, Ariz.	690
KEPR	Kennewick-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
KEVE	Golden Valley, Minn.	1440
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
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
KFAH	Lakewood Center, Wash.	1480
KFI	Los Angeles, Calif.	640
KFIF	Tucson, Ariz,	1550
KFIV	Modesto, Calif.	1360
KFIZ	Fond du Lac, Wis.	1450
KFJB	Marshalltown, Iowa	1280
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, Calif.	540
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	Fredericktown, Mo.	1450
KFUN	Las Vegas, N.Mex.	1230
KFUO	Clayton, Mo.	850
KFVS	Cape Girardeau, Mo,	960
KFWB	Los Angeles, Calif.	980
KFXD	Nampa, Idaho	580
KFXM	San Bernardino, Calif.	590
KFYN	Bonham, Tex.	1420
KFYO	Lubbock, Tex.	790
KFYR	Bismarck, N.Dak.	550
KGA	Spokane, 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
KGHF	Pueblo, Colo.	1350
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
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
KGLM	Avalon, Calif.	740
KGON	Oregon City, Oreg.	1520
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
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, Cal.	1420
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
KHSJ	Hemet, Calif.	1320
KHSL	Chico, Calif.	1290
KHUB	Fremont, Nebr.	1340
KHUM	Santa Rosa, Calif,	1580
KHUZ	Berger, Tex.	1490
KHVH	Honolulu, Hawaii	1040
KIBE	Palo Alto, Calif,	1220
KIBH	Seward, Alaska	1340
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
KISN	Vancouver, Wash.	910
KIST	Santa Barbara, Calif.	1340
KIT	Yakima, Wash.	1280
KITE	San Antonio, Tex.	930
KITI	Chahalis-Centralia, Wash.	1420
KITN	Olympia, Wash.	920
KIUL	Garden City, Kans.	1240
KIUN	Pecos, Tex.	1400
KIUP	Durango, Colo.	930
KIVY	Crockett, Tex.	1290
KIWA	Sheldon, Iowa	1550
KIXI	Seattle, Wash.	910
KIXL	Dallas, Tex.	1040
KIXX	Provo, Utah	1400
KIXZ	Amarillo, Tex.	940
KIZZ	El Paso, Tex.	1150
KJAM	Madison, S.Dak.	1390
KJAN	Atlantic, Iowa	1220
KJAX	Santa Rosa, Calif.	1150
KJAY	Sacramento, Calif.	1430
KJBC	Midland, Tex.	1150
KJCF	Festus, Mo.	1400
KJCK	Junction City, Kans.	1420
KJDY	John Day, Ore.	1400
KJEF	Jennings, La.	1290
KJEM	Oklahoma City, Okla.	800
KJET	Beaumont, Tex.	1380
KJFJ	Webster City, Iowa	1570
KJIM	Ft. Worth, Tex.	870
KJKJ	Flagstaff, Ariz.	1400
KJLT	North Platte, Nebr.	970
KJNO	Juneau, Alaska	630
KJOE	Shreveport, La.	1480
KJOY	Stockton, Calif.	1280
KJPW	Waynesville, Mo.	1390
KJR	Seattle, Wash.	950
KJRG	Newton, Kans.	950
KJSK	Columbus, Nebr.	900
KJWH	Camden, Ark.	1450
KKAL	Denver City, Tex.	1580
KKAN	Phillipsburg, Kans.	1490
KKAR	Pomona, Calif.	1220
KKAS	Silsbee, Tex.	1300
KKET	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
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.	1000
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	Golcon 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
KLHS	Lordsburg, N.M.	950
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.	1050
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.Mex.	1450
KLOU	Lake Charles, La.	1580
KLOW	Loveland, Colo.	1570
KLPL	Lake Providence, La.	1050
KLPM	Minot, N.Dak.	1390
KLPR	Okla. City, Okla.	1140
KLPW	Union, Mo.	1220
KLRA	Little Rock, Ark.	1010
KLRS	Mountain Grove, Mo.	1360
KLIS	Salina, Kan.	910
KLTF	Little Falls, Minn.	960
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
KLYK	Spokane, Wash.	1230

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	Littleton, Colo.	1510
KMOX	St. Louis, Mo.	1120
KMPC	Los Angeles, Calif.	710
KMRC	Morgan City, La.	1430
KMRS	Morris, Minn.	1230
KMSL	Ukiah, Calif.	1250
KMUL	Muleshoe, Tex.	1380
KMUR	Murray, Utah	1230
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
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
KPON	Anderson, Calif.	1580
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
KQAQ	Austin, Minn.	970
KQCY	Quincy, Calif.	1370
KQDY	Minot, N.Dak.	1320
KQEN	Roseburg, Ore.	1240
KQEO	Albuquerque, N.Mex.	920
KQIK	Lakeview, Oreg.	1230
KQMS	Redding, Calif.	1400
KQOT	Yakima, Wash.	940
KQTE	Missoula, Mont.	1340
KQTY	Salina, Kans.	910
KQV	Pittsburgh, Pa.	1410
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
KRCK	Ridgecrest, Calif.	1360
KRCO	Prineville, Oreg.	690
KRDD	Roservelt, 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
KRED	Eureka, Calif.	1480
KREH	Oakdale, La.	900
KREI	Farmington, Mo.	800
KREK	Sapulpa, Okla.	1550
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
KRHD	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.	1420
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
KSAN	San Francisco, Calif.	1450
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.	980
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
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
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
KSPT	Sandpoint, Idaho	1400
KSRA	Salmon, Idaho	960
KSRC	Socorro, N.Mex.	1290
KSRO	Santa Rosa, Calif.	1350
KSRV	Ontario, Oreg.	1380
KSSS	Colorado Springs, Colo.	740
KSST	Sulphur Springs, Tex.	1230
KSTA	Coleman, Tex.	1000
KSTB	Breckenridge, Tex.	1430
KSTL	St. Louis, Mo.	690
KSTN	Stockton, Calif.	1420
KSTP	St. Paul, Minn.	1500
KSTR	Grand Junction, Colo.	620
KSTT	Davenport, Iowa	1170
KSTV	Stephenville, Tex.	1510
KSUB	Cedar City, Utah	590
KSUD	W. Memphis, Ark.	730
KSUE	Susanville, Calif.	1240
KSUM	Fairmont, Minn.	1370
KSUN	Bisbee, Ariz.	1230
KSVC	Richfield, Utah	980
KSVN	Ogden, Utah	730
KSVP	Artesia, N.Mex.	990
KSWA	Graham, Tex.	1330
KSWI	Council Bluffs, Iowa	1560
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
KTCR	Minneapolis, Minn.	690
KTCS	Fort Smith, Ark.	1410
KTDL	Farmersville, La.	1470
KTDO	Toledo, Oreg.	1230
KTEE	Idaho Falls, Idaho	1260

WHITE'S

RADIO LOG

C.L.	Location	Kc.
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
KTFY	Brownfield, Tex.	1300
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
KTLU	Tallulah, 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	Pentalumna, Pa.	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
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
KUAM	Agana, Guam	610
KUBA	Yuba City, Calif.	1600
KUBC	Montrose, Colo.	580
KUBE	Pendleton, Oreg.	1050
KUKO	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
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
KUTT	Fargo, N.Dak.	1550
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
KVNA	Flagstaff, Ariz.	690
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
KWAB	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
KWBY	Scottsdale, Ariz.	1440
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	1570
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
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
KWSK	Pratt, Kans.	1570
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
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.	1230
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
KYCA	Prescott, Ariz.	1490
KYCN	Wheatland, Wyo.	1340
KYES	Roseburg, Oreg.	950
KYJC	Medford, Oreg.	1230
KYME	Boise, Idaho	740
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
KZIM	Cape Girardeau, Mo.	1220
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
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	Wayeross, Ga.	570
WACO	Waco, Tex.	1460
WACR	Columbus, Miss.	1050
WACT	Tuscaloosa, Ala.	1420
WADA	Shelby, N.C.	1390
WADC	Akron, Ohio	1350
WADE	Wadesboro, N.C.	1210
WADK	Newport, R.I.	1540
WADM	Decatur, Ind,	1540
WADO	New York, N.Y.	1280
WADP	Kane, Pa.	960
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
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
WALA	Mobile, Ala.	1410
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
WALD	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
WAMS	Wilmington, Del.	1380
WAMV	East St. Louis, Ill.	1490
WAMW	Washington, Ind.	1580
WAMY	Amory, Miss.	1580
WANA	Anniston, Ala.	1490
WANB	Waynesburg, Pa.	1580

C.L.	Location	Kc.
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
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
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
WATK	Antigo, Wis.	900
WATM	Atmore, Ala.	1590
WATN	Watertown, N.Y.	1240
WATO	Oak Ridge, Tenn.	1290
WATP	Marion, S.C.	1480
WATR	Waterbury, Conn.	1320
WATS	Sayre, Pa.	960
WATT	Cadillac, Mich.	1240
WATV	Birmingham, Ala.	900
WATW	Ashland, Wis.	1400
WATZ	Alpena, Mich.	1450
WAUB	Auburn, N.Y.	1590
WAUC	Wauchula, Fla.	1310
WAUD	Auburn, Ala.	1230
WAUG	Augusta, Ga.	1050
WAUX	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
WAXU	Georgetown, Ky.	1580
WAXX	Chippewa Falls, Wis.	1150
WAYB	Waynesboro, Va.	1490
WAYE	Dundalk, Md.	860
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
WBBY	Wood River, Ill.	590
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
WBCR	Christiansburg, Va.	1260
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
WBGS	Slidell, La.	1560
WBGN	Bowling Green, Ky.	1340
WBGR	Jesup, Ga.	1370
WBGS	Sidell, La.	1560
WBHB	Fitzgerald, Ga.	1240
WBHC	Hampton, S.C.	1270
WBHF	Cartersville, Ga.	1450
WBHM	Birmingham, Ala.	1550
WBHP	Huntsville, Ala.	1230
WBIA	Augusta, Ga.	1230
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
WBLE	Batesville, Miss.	1290
WBLF	Bellefonte, Pa.	1330
WBLG	Lexington, Ky.	1800
WBLJ	Dalton, Ga.	1230
WBLO	Evergreen, Ala.	1470
WBLR	Batesburg, S.C.	1430
WBLT	Bedford, Va.	1350
WBLU	Salem, Va.	1480
WBLY	Springfield, Ohio	1600
WBMA	Beaufort, N.C.	1400
WBMC	McMinnville, Tenn.	960
WBMD	Baltimore, Md.	750
WBME	Belfast, Me.	1230
WBMK	West Point, Ga.	1310
WBML	Macon, Ga.	1240
WBMT	Black Mountain, N.C.	1350
WBNB	Charlotte Amalie, Virgin Islands	1000
WBNC	Conway, N.H.	1050
WBNL	Boonville, Ind.	1540
WBNO	Bryan, Ohio	1520
WBNR	Beacon, N.Y.	1260
WBNS	Columbus, Ohio	1460
WBNT	Oneida, Tenn.	1310
WBNX	New York, N.Y.	1380
WBOB	Galax, Va.	1360
WBOC	Salisbury, Md.	960
WBOF	Virginia Beach, Va.	1550
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
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
WBRT	Bardstown, Ky.	1320
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
WBVA	Waynesboro, Va.	970
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
WBZE	Wheeling, W. Va.	1470
WBZI	Brazil, Ind.	1380
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
WCBQ	Whitehall, Mich.	1490
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	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.	1440
WCHB	Inkster, Mich.	1520
WCHE	Westchester, Pa.	1350
WCHI	Chillicothe, Ohio	1470
WCHJ	Brookhaven, Miss.	1290
WCHK	Canton, Ga.	1360
WCHL	Chapel Hill, N.C.	970
WCHN	Norwich, N.Y.	
WCHO	Washington Court House, Ohio	1250
WCHS	Charleston, W.Va.	580
WCHV	Charlottesville, Va.	1260
WCIC	Cambridge, Minn.	1300
WCIL	Carbondale, Ill.	1020
WCIN	Cincinnati, Ohio	1480
WCIT	Lima, Ohio	940
WCJU	Columbia, Miss.	1450
WCKB	Dunn, N.C.	780
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
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.	1320
WCME	Brunswick, Maine	900
WCMI	Ashland, Ky.	1510
WCMN	Arecibo, P.R.	1280
WCMP	Pine City, Minn.	1590
WCMR	Elkhart, Ind.	1300
WCMS	Norfolk, Va.	1550
WCMT	Martin, Tenn.	1350
WCMY	Ottawa, Ill.	1420
WCNB	Connersville, Ind.	1540
WCNC	Elizabeth City, N.C.	1110
WCND	Shelbyville, Ky.	1490
WCNF	Weldon, N.C.	1540
WCNH	Quiney, Fla.	1400
WCNL	Newport, N. H.	1330
WCNR	Bloomsburg, Pa.	1370
WCNS	Canton, O.	1600
WCNT	Centralia, Ill.	1480
WCNU	Crestview, Fla.	1460
WCNW	Hamilton, O.	1260
WCNX	Middletown, Conn.	1430
WCOA	Pensacola, Fla.	1150
WCOC	Meridian, Miss.	1370
WCOF	Immokalee, Fla.	910
WCOG	Greensboro, N.C.	1490
WCOH	Newnan, Ga.	1320
WCOJ	Coatesville, Pa.	1400
WCOL	Columbus, Ohio	1420
WCON	Cornelia, Ga.	1230
WCOP	Boston, Mass.	1450
WCOR	Lebanon, Tenn.	1150
WCOS	Columbia, S.C.	900
WCOU	Lewiston, Maine	1400
WCOV	Montgomery, Ala.	1240
WCOW	Sparta, Wis.	1170
WCOY	Columbia, Pa.	1290
WCPA	Clearfield, Pa.	1580
WCPC	Houston, Miss.	900
WCPH	Etowah, Tenn.	940
WCPM	Cumberland, Ky.	1220
WCPO	Cincinnati, Ohio	1280
WCPS	Tarboro, N.C.	1230
WCQS	Alma, Ga.	760
WCRA	Effingham, Ill.	1400
WCRB	Waltham, Mass.	1090
WCRE	Cheraw, S.C.	1330
WCRI	Scottsboro, Ala.	1420
WCRK	Morristown, Tenn.	1050
WCRL	Oneonta, Ala.	1150
WCRM	Clare, Mich.	1570
WCRO	Johnstown, Pa.	990
WCRS	Greenwood, S.C.	1230
WCRT	Birmingham, Ala.	1450
WCRV	Washington, N.J.	1260
WCRW	Chicago, Ill.	1580
WCRY	Macon, Ga.	1240
WCSA	Ripley, Miss.	900
WCSC	Charleston, S.C.	1260
WCSH	Portland, Maine	1390
WCSI	Columbus, Ind.	970
WCSJ	Morris, Ill.	1010
WCSL	Cherryville, N. C.	1550
WCSM	Celina, Ohio	1590
WCSR	Hillsdale, Mich.	1350
WCSS	Amsterdam, N.Y.	1340
WCST	Berkeley Springs, W.Va.	1490
WCTA	Andalusia, Ala.	1010
WCTC	New Brunswick, N.J.	920
WCTR	Chestertown, Md.	1450
WCTT	Corbin, Ky.	1530
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
WCVP	Murphy, N.C.	600
WCVS	Springfield, Ill.	1450
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.	1480
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
WDMC	Otsego, Mich.	980
WDMF	Buford, Ga.	1460
WDMG	Douglas, Ga.	860
WDMJ	Marquette, Mich.	1320
WDMS	Lynchburg, Va.	1320
WDMV	Pocomoke City, Md.	540

WHITE'S RADIO LOG

C.L.	Location	Kc.
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	Lawreneeburg, Tenn.	1370
WDXI	Jackson, Tenn.	1310
WDXL	Lexington, Tenn.	1490
WDXN	Clarksville, Tenn.	540
WDXR	Paducah, Ky.	1560
WDXY	Sumter, S.C.	1240
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.	1250
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
WEIM	Fitchburg, Mass.	1280
WEIR	Weirton, W.Va.	1430
WEIS	Center, Ala.	990
WEJL	Scranton, Pa.	630
WEKR	Fayetteville, Tenn.	1240
WEKY	Richmond, Ky.	1340
WEKZ	Monroe, Wis.	1260
WELB	Elba, Ala.	1350
WELC	Welch, W.Va.	1150
WELD	Fisher, W.Va.	690
WELE	S. Daytona, Fla.	1590
WELI	New Haven, Conn.	960
WELK	Charlottesville, Va.	1010
WELL	Battle Creek, Mich.	1400
WELM	Elmira, N.Y.	1410
WELO	Tupelo, Miss.	580
WELP	Easley, S.C.	1360
WELR	Roanoke, Ala.	1360
WELS	Kinston, N.C.	1010
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
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
WEYE	Sanford, N.C.	1290
WEYY	Talladega, Ala.	1580
WEZB	Birmingham, Ala.	1220
WEZE	Boston, Mass.	1260
WEZJ	Williamsburg, Ky.	1440
WEZQ	Winfield, Ala.	1300
WEZY	Cocoa, Fla.	1350
WFAA	Dallas, Tex.	570
WFAA	Dallas, Tex.	570
WFAB	Miami, Fla.	820
WFAG	Farmville, N.C.	990
WFAH	Alliance, Ohio	1250
WFAI	Fayetteville, N.C.	1310
WFAR	Farrell, Pa.	1230
WFAS	White Plains, N.Y.	1470
WFAU	Augusta, Me.	1230
WFAW	Ft. Atkinson, Wis.	1340
WFAX	Falls Church, Va.	940
WFAZ	Albany, Ga.	1220
WFBA	San Sebastion, P.R.	960
WFBC	Greenville, S.C.	1460
WFBG	Altoona, Pa.	1330
WFBL	Syracuse, N.Y.	1290
WFBM	Indianapolis, Ind.	1390
WFBR	Baltimore, Md.	1260
WFBS	Spring Lake, N. C.	1300
WFDF	Flint, Mich.	1450
WFDR	Manchester, Ga.	910
WFEA	Manchester, N.H.	1370
WFEB	Sylacauga, Ala.	1370
WFEC	Miami, Fla.	1340
WFFF	Columbia, Miss.	1220
WFFG	Marathon, Fla.	1360
WFGM	Fitchburg, Mass.	1300
WFGN	Gaffney, S.C.	960
WFGW	Black Mountains, N.C.	1570
WFHG	Bristol, Va.	1010
WFHK	Pell City, Ala.	980
WFHR	Wis. Rapids, Wis.	1430
WFIF	Milford, Conn.	1320
WFIG	Sumter, S.C.	1500
WFIL	Philadelphia, Pa.	1290
WFIN	Findlay, Ohio	560
WFIS	Fountain Inn. S.C.	1330
WFIW	Fairfield, Ill.	1600
WFIX	Huntsville, Ala.	1390
WFKN	Franklin, Ky.	1450
WFKY	Frankfort, Ky.	1220
WFLA	Tampa, Fla,	1490
WFLB	Fayetteville. N.C.	970
WFLI	Lookout Mtn., Tenn.	1490
WFLN	Philadelphia, Pa.	1070
WFLO	Farmville, Va.	900
WFLR	Dundee. N.Y.	870
WFLS	Fredericksburg, Va.	1570
WFLW	Monticello, Ky.	1350
WFMC	Goldsboro, N.C.	1360
WFMD	Frederick, Md.	730
WFMH	Cullman, Ala.	930
WFMJ	Youngstown, Ohio	1460
WFMO	Fairmont, N.C.	1390
WFMW	Madisonville, Ky.	860
WFNC	Fayetteville, N.C.	730
WFNL	No. Augusta, S.C.	1390
WFOB	Fostoria, Ohio	1600
WFOM	Marietta, Ga.	1430
WFOR	Hattiesburg, Miss.	1230
WFOX	Milwaukee, Wis.	1400
WFOY	St. Augustine, Fla.	860
WFPA	Fort Payne, Ala.	730
WFPG	Atlantic City, N.J.	1390
WFPM	Fort Valley, Ga.	1600
WFPR	Hammond, La.	1430
WFRA	Franklin, Pa.	1400
WFRB	Frostburg, Md.	1230
WFRC	Reidsville, N.C.	1400
WFRL	Freeport, Ill.	1450
WFRM	Coudersport, Pa.	1150
WFRO	Fremont, Ohio	1400
WFRX	West Frankfort, Ill.	900
WFSC	Franklin, N.C.	1300
WFSG	Boca Raton, Fla.	1050
WFSO	Pinellas, Fla.	740
WFSR	Bath, N.Y.	570
WFST	Caribou, Maine	1380
WFTC	Kinston, N.C.	600
WFTG	London, Ky.	960
WFTL	Ft. Lauderdale, Fla.	1400
WFTM	Maysville, Ky.	1400
WFTN	Franklin, N.H.	1240
WFTR	Front Royal, Va.	1240
WFTW	Ft. Walton Beach, Florida	1450
WFUL	Fulton, Ky.	1260
WFUN	Huntsville, Ala.	1270
WFUR	Grand Rapids, Mich.	1450
WFVA	Fredericksburg, Va.	1570
WFVG	Fuquay Sprgs., N.C.	1230
WFWL	Camden, Tenn.	1460
WFYC	Alma, Mich.	1220
WFYI	Mineola, N.Y.	1280
WGAA	Cedartown, Ga.	1520
WGAC	Augusta, Ga.	1340
WGAD	Gadsden, Ala.	580
WGAF	Valdosta, Ga.	1350
WGAI	Elizabeth City. N.C.	910
WGAL	Lancaster, Pa.	560
WGAN	Portland, Maine	1490
WGAP	Maryville, Tenn.	560
WGAR	Cleveland, Ohio	1400
WGAS	S. Gastonia, N.C.	1220
WGAT	Gate City, Va.	1420
WGAU	Athens, Ga.	1050
WGAW	Gardner, Mass.	1340
WGBA	Columbus, Ga.	1340
WGBB	Freeport, N.Y.	1270
WGBC	Chipley, Fla.	1240
WGBF	Evansville, Ind.	1240
WGBG	Greensboro, N.C.	1280
WGBI	Scranton, Pa.	1400
WGBR	Goldsboro, N. C.	910
WGBS	Miami, Fla.	1150
WGCB	Red Lion, Pa.	710
WGCD	Chester, S.C.	1440
WGCH	Greenwich, Conn.	1490
WGCM	Gulfport, Miss.	1490
WGEA	Geneva, Ala.	1240
WGEE	Indianapolis, Ind.	1150
WGEM	Quincy, Ill.	1590
WGET	Gettysburg, Pa.	1440
WGEZ	Beloit, Wis.	1320
WGFA	Watseka, Ill.	1490
WGFS	Covington, Ga.	1360
WGGA	Gainesville, Ga.	1430
WGGG	Gainesville, Fla.	550
WGGH	Marion, Ill.	1230
WGGO	Salamanca, N.Y.	1150
WGH	Newport News, Va.	1590
WGHB	Maplewood, Minn.	1310
WGHC	Clayton, Ga.	1010
WGHM	Skowegan, Maine	1570
WGHN	Grd. Haven, Mich.	1150
WGHQ	Kingston, N.Y.	1370
WGIG	Brunswick, Ga.	920
WGIL	Galesburg, Ill.	1440
WGIR	Manchester, N.H.	1400
WGIV	Charlotte, N.C.	610
WGKA	Atlanta, Ga.	1600
WGKR	Perry, Fla.	1600
WGKV	Charleston, W. Va.	1310
WGL	Fort Wayne, Ind.	1490
WGLB	Port Wash., Wis.	1250
WGLD	Chardon, Ohio	1560
WGLI	Babylon, N.Y.	1560
WGMA	Hollywood, Fla.	1290
WGMG	Hinesville, Ga.	1320
WGMM	Millington, Tenn.	990
WGMS	Washington, D.C.	1380
WGN	Chicago, Ill.	570
WGNC	Gastonia, N.C.	720
WGNI	Wilmington, N.C.	1450
WGNP	Indian Rocks Beach, Fla.	1450
WGNS	Murfreesboro, Tenn.	1520
WGNU	Granite City, Ill.	1450
WGNY	Newburgh, N.Y.	920
WGOG	Walhalla, S.C.	1220
WGOH	Grayson, Ky.	1460
WGOK	Mobile, Ala.	1370
WGOL	Goldsboro, N.C.	900
WGOO	Georgetown, S. C.	1300
WGOV	Valdosta, Ga.	1470
WGPA	Bethlehem, Pa.	950
WGPC	Albany, Ga.	1100
WGR	Buffalo, N.Y.	1450
WGRA	Cairo, Ga.	550
WGRB	Greensburg, Ind.	790
WGRD	Grand Rapids, Mich.	1330
WGRF	Aguadella, P.R.	1410
WGRM	Greenwood, Miss.	1340
WGRO	Lake City, Fla.	1240
WGRP	Greenville, Pa.	960
WGRV	Greeneville, Tenn.	940
WGRY	Gary, Ind.	1340
WGSA	Ephrata, Pa.	1370
WGSB	Geneva, Ill.	1310
WGSM	Huntington, N.Y.	1480
WGSR	Millen, Ga.	740
WGST	Atlanta, Ga.	1570
WGSV	Guntersville, Ala.	920
WGSW	Greenwood, S.C.	1270
WGTA	Summerville, Ga.	1350
WGTC	Greenville, N.C.	950
WGTL	Kannapolis, N.C.	1590
WGTM	Wilson, N.C.	870
WGTN	Georgetown, S.C.	590
WGTO	Cypress Gardens, Fla.	540
WGUL	New Port Richey, Fla.	1500
WGUN	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.	970
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
WHAY	New Britain, Conn.	910
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
WCHQ	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	Riverla 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
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

C.L.	Location	Kc.
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
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
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
WHVF	Wausau, Wis.	1230
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
WIDU	Fayetteville, N.C.	1600
WIEL	Elizabethtown, Ky.	1400
WIFE	Indianapolis, Ind.	1310
WIFM	Elkin, N.C.	1540
WIGL	Superior, Wis.	970
WIGM	Medford, Wis.	1490
WIGO	Indianapolis, Ind.	810
WIGS	Gouverneur, N.Y.	1230
WIII	Homestead, Fla.	1430
WIIN	Atlanta, Ga.	970
WIKC	Bogalusa, La.	1490
WIKE	Newport, Vt.	1490
WIKI	Chester, Va.	1410
WIKY	Evansville, Ind.	820
WIL	St. Louis, Mo.	1430
WILA	Danville, Va.	1580
WILD	Boston, Mass.	1090
WILE	Cambridge, Ohio	1270
WILI	Willimantic, Conn.	1400
WILK	Wilkes-Barre, Pa.	980
WILL	Urbana, Ill.	580
WILM	Wilmington, Del.	1450
WILO	Frankfort, Ind.	1570
WILS	Lansing, Mich.	1320
WILZ	St. Petersburg Beach, Florida	1590
WIMA	Lima, Ohio	1150
WIMO	Winder, Ga.	1300
WIMS	Michigan City, Ind.	1420
WINA	Charlottesville, Va.	1400
WINC	Winchester, Va.	1400
WIND	Chicago, Ill.	560
WINE	Brookfield, Conn.	940
WINF	Manchester, Conn.	1230
WING	Dayton, Ohio	1410
WINI	Murphysboro, Ill.	1420
WINK	Fort Myers, Fla.	1240
WINN	Louisville, Ky.	1240
WINQ	Tampa, Fla.	1010
WINR	Binghamton, N.Y.	680
WINS	New York, N.Y.	1010
WINT	Winter Haven, Fla.	1360
WINU	Highland Park, Ill.	1510
WINX	Rockville, Md.	1600
WINY	Putnam, Conn.	1350
WINZ	Miami, Fla.	940
WINU	Highland Park, Ill.	1510
WIOD	Miami, Fla.	610
WIOI	New Boston, Ohio	1010
WIOK	Normal, Ill.	1440
WION	Ionia, Mich.	1430
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	Fort Pierce, Fla.	1490
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	Virouqua, 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
WIZD	Springfield, Ohio	1340
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
WJAN	Ishpeming, Mich.	970
WJAQ	Jackson, Miss.	1550
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
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
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
WJIG	Tullahoma, Tenn.	740
WJIL	Jacksonville, Ill.	1550
WJIM	Lansing, Mich.	1240
WJJC	Commerce, Ga.	1270
WJJD	Chicago, Ill.	1160
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
WJMR	New Orleans, La.	990
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
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
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
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
WKGN	Knoxville, Tenn.	1340
WKHM	Jackson, Mich.	970
WKIC	Hazard, Ky.	1390
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
WKLE	Washington, Ga.	1370
WKLF	Clanton, Ala.	980
WKLK	Cloquet, Minn.	1230
WKLM	Wilmington, N.C.	980
WKLO	Louisville, Ky.	1080
WKLP	Keyser, W. Va.	1390
WKLU	Brunswick, Ga.	790
WKLV	Blackstone, Va.	1440
WKLX	Paris, Ky.	1440
WKLY	Hartwell, Ga.	980
WKLZ	Kalamazoo, Mich.	1470
WKMC	Roaring Sprgs., Pa.	1370
WKMF	Flint, Mich.	1470
WKMH	Dearborn, Mich.	1310
WKMI	Kalamazoo, Mich.	1360
WKMK	Blountstown, Fla.	1370
WKMT	Kings Mtn., N.C.	1220
WKNE	Keene, N.H.	1290
WKNX	Saginaw, Mich.	1210
WKNY	Kingston, N.Y.	1490
WKOA	Hopkinsville, Ky.	1480
WKOK	Sunbury, Pa.	1240
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
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
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
WKYB	Paducah, Ky.	570
WKYE	Bristol, Tenn.	1550
WKYN	Rio Piedras, P.R.	630
WKYO	Caro, Mich.	1360
WKYR	Keyser, W.Va.	1270
WKYW	Louisville, Ky.	900
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
WLBH	Mattoon, Ill.	1170
WLBI	Denham Springs, La.	1220
WLBJ	Bowling Green, Ky.	1410
WLBK	DeKalb, Ill.	1360
WLBL	Stevens Point, Wis.	930
WLBN	Lebanon, Ky.	1590
WLBR	Lebanon, Pa.	1280
WLBS	Centerville, Miss.	1580
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

WHITE'S RADIO LOG

C.L.	Location	Kc.
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
WLKW	Providence, R.I.	990
WLLE	Raleigh, N.C.	570
WLLH	Lowell, Mass.	1400
WLLY	Wilson, N.C.	1350
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
WLOW	Aiken, S.C.	1300
WLOX	Biloxi, Miss.	1490
WLPM	Suffolk, Va.	1460
WLPO	LaSalle, Ill.	1220
WLPS	Lehighton, Pa.	1150
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
WLTN	Littleton, N. H.	1400
WLUV	Loves Park, Ill.	1520
WLVA	Lynchburg, Va.	590
WLUX	Baton Rouge, La.	1550
WLVN	Nashville, Tenn.	1560
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
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
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
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
WMOD	Moundsville, W.Va.	1370
WMOG	Brunswick, Ga.	1490
WMOH	Hamilton, Ohio	1450
WMOK	Metropolis. Ill.	920
WMON	Montgomery, W.Va.	1340
WMOP	Ocala. Fla.	900
WMOR	Morehead, Ky.	1330
WMOU	Berlin, N.H.	1230
WMOV	Ravenswood, W.Va.	1360
WMOX	Meridian, Miss.	1240
WMOZ	Mobile. Ala.	960
WMPA	Aberdeen. Miss.	1240
WMPC	Lapeer. Mich.	1230
WMPL	Hancock, Mich.	920
WMPM	Smithfield, N.C.	1270
WMPO	Middleport-Pomeroy, Ohio	1390
WMPP	Chicago Heights, Ill.	1470
WMPS	Memphis, Tenn.	680
WMPT	So. Williamsport, Pa.	1450
WMQM	Memphis, Tenn.	1480
WMRB	Greenville, S.C.	1490
WMRC	Milford, Mass.	1490
WMRE	Monroe, Ga.	1490
WMRF	Lewistown, Pa.	1490
WMRI	Marion, Ind.	860
WMRN	Marion, Ohio	1490
WMRO	Aurora, Ill.	1280
WMRP	Flint, Mich.	1570
WMRR	Marshall, Mich.	1540
WMSA	Massena, N.Y.	1340
WMSG	Oakland, Md.	1050
WMSJ	Sylva, N.C.	1480
WMSK	Morganfield, Ky.	1550
WMSL	Decatur, Ala.	1400
WMSR	Manchester, Tenn.	1320
WMST	Mt. Sterling, Ky.	1150
WMT	Cedar Rapids, Iowa	600
WMTA	Central City, Ky.	1380
WMTC	Vancleve. Ky.	730
WMTD	Hinton, W. Va.	1380
WMTE	Manistee, Mich.	1340
WMTL	Leitchfield, Ky.	1580
WMTM	Moultrie, Ga.	1300
WMTN	Morristown, Tenn.	1300
WMTR	Morristown, N.J.	1250
WMTS	Murfreesboro, Tenn.	810
WMUS	Muskegon, Mich.	1090
WMUU	Greenville, S.C.	1260
WMVA	Martinsville, Va.	1450
WMVB	Millville, N.J.	1440
WMVG	Milledgeville, Ga.	1450
WMVO	Mt. Vernon, Ohio	1300
WMVR	Sidney. Ohio	1080
WMWM	Wilmington, O.	1090
WMYB	Myrtle Beach, S.C.	1450
WMYN	Mayodan, N.C.	1420
WMYR	Ft. Myers, Fla.	1410
WNAB	Bridgeport, Conn.	1450
WNAC	Boston, Mass.	680
WNAD	Norman, Okla.	640
WNAE	Warren, Pa.	1310
WNAG	Grenada, Miss.	1400
WNAH	Nashville, Tenn.	1360
WNAK	Nanticoke, Pa.	730
WNAM	Neenah, Wis.	1280
WNAR	Norristown, Pa.	1110
WNAT	Natchez, Miss.	1450
WNAU	New Albany, Miss.	1470
WNAV	Annapolis, Md.	1430
WNAX	Yankton, S.Dak.	570
WNBC	New York, N.Y.	660
WNBF	Binghamton, N.Y.	1290
WNBH	New Bedford, Mass.	1340
WNBP	Newburyport, Mass.	1470
WNBS	Murray, Ky.	1340
WNBT	Wellsboro, Pa.	1490
WNBZ	Saranac Lake, N.Y.	1240
WNCA	Siler City, N.C.	1570
WNCC	Barnesboro, Pa.	950
WNCG	N. Charleston, S.C.	910
WNCO	Ashland, Ohio	1340
WNDB	Daytona Beach, Fla.	1150
WNDR	Syracuse, N.Y.	1260
WNDU	South Bend, Ind.	1490
WNDY	Indianapolis, Ind.	1500
WNEB	Worcester, Mass.	1230
WNEG	Toccoa, Ga.	630
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.	1280
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
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	Newport, Ky.	740
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
WNUZ	Talladega, Ala.	1230
WNVA	Norton. Va.	1350
WNVL	Nicholasville, Ky.	1250
WNVY	Pensacola, Fla.	1230
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
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
WOKJ	Jackson, Miss.	1550
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
WOWI	New Albany. Ind.	1570
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
WPAP	Fernandina Beach, Florida	1570
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	Minneapolis, Minn.	980
WPCC	Clinton. S.C.	1400
WPCF	Panama City, Fla.	1430
WPCO	Mt. Vernon. Ind.	1590
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.	1580
WPFP	Park Falls, Wis.	1450
WPGA	Perry, Ga.	980
WPGC	Bradbury Hghts., Md.	1580
WPGF	Burgaw, N. C.	1470
WPMG	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
WPNX	Columbus, Ga.	1460
WPON	Pontiac, Mich.	1460
WPOP	Hartford, Conn.	1410
WPOR	Portland, Maine	1490
WPOW	New York, N.Y.	1330
WPPA	Pottsville, Pa.	1360
WPQR	McKeesport, 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.	680
WPRP	Ponce, P.R.	910

C.L.	Location	Kc.
WPRS	Paris, Ill.	1440
WPRT	Prestonsburg, Ky.	960
WPRV	Wauchula, Fla.	1600
WPRW	Manassas, Va.	1460
WPRY	Perry, Fla.	1400
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
WQMN	Superior, Wis.	1320
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
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
WRFC	Athens, Ga.	960
WRFD	Worthington, Ohio	880
WRFS	Alexander City, Ala.	1050
WRGA	Rome, Ga.	1470
WRGM	Richmond, Va.	1540
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
WRIX	Griffin, Ga.	1410
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 York, N.Y.	910
WRKM	Carthage, Tenn.	1350
WRKT	Cocoa Beach. Fla.	1300
WRLD	Lanitt. Ala.	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	Knoxville, 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
WRRR	Rockford. Ill.	1330
WRRZ	Clinton, N.C.	880
WRSA	Saratoga Sprgs., N.Y.	1280
WRSC	State College, Pa.	1390
WRSL	Stanford, Ky.	1520
WRSW	Warsaw, Ind.	1480
WRTA	Altoona, Pa.	1240
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	Sanitobia. 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
WSBS	Gt. Barrington, Mass.	860
WSBT	South Bend, Ind.	960
WSCM	Panama City Beach, Florida	1290
WSBP	Chattahoochee, Fla.	1580
WSCR	Scranton, Pa.	1320
WSDC	Mocksville, N.C.	1560
WSDR	Sterling, Ill.	1240
WSEB	Sebring, Fla.	1340
WSEL	Pontotoc, Miss.	1440
WSEM	Donaldsonville, Ga.	1500
WSEN	Baldwinsville. N.Y.	1050
WSER	Elkton, Md.	1550
WSET	Glen Falls, N.Y.	1410
WSEV	Sevierville, Tenn.	930
WSFB	Quitman, Ga.	1490
WSFC	Somerset, Ky.	1240
WSFR	Sanford, Fla.	1360
WSFT	Thomaston, Ga.	1220
WSGA	Savannah, Ga.	1400
WSGB	Sutton, W.Va.	1490
WSGC	Elberton, Ga.	1400
WSGN	Birmingham. Ala.	610
WSGO	Oswego. N.Y.	1440
WSGW	Saginaw, Mich.	790
WSHB	Raeford. N.C.	1400
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	Madawska, Me.	1000
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
WSLS	Roanoke. Va.	610
WSLT	Ocean City-Somers Point, N.J.	1240
WSM	Nashville. Tenn.	650
WSMA	Smyrna, Ga.	1550
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 Twnshp., S.C.	1150
WSNY	Schenectady, N.Y.	1240
WSOC	Charlotte, N.C.	930
WSOK	Savannah, Ga.	1230
WSOL	Tampa, Fla.	1300
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
WSTK	Woodstock, Va.	1230
WSTL	Eminence, Ky.	1600
WSTP	Salisbury, N.C.	1490
WSTR	Sturgis, Mich.	1230
WSTS	Massena, N.Y.	1050
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
WTAO	Cambridge, Mass.	740
WTAP	Parkersburg. W.Va.	1230
WTAQ	LaGrange, Ill.	1300
WTAR	Norfolk, Va.	790
WTAW	Bryan, Tex.	1150
WTAX	Springfield. Ill.	1240
WTAY	Robinson, Ill.	1570
WTBC	Tuscaloosa. Ala.	1230
WTBF	Troy, Ala.	970
WTBO	Cumberland. Md.	1450
WTCA	Plymouth. Ind.	1050
WTCB	Flomaton, Ala.	990
WTCH	Shawano, Wis.	960
WTCJ	Tell City, Ind.	1230
WTCM	Traverse City. Mich.	1400
WTCN	Minneapolis. Minn.	1280
WTCO	Campbellsville. Ky.	1450
WTCR	Ashland. Ky.	1420
WTCS	Fairmont, W.Va.	1490
WTCW	Whitesburg, Ky.	920
WTEL	Philadelphia. Pa.	860
WTEA	Thomaston, Ga.	1590
WTHG	Jackson, Ala.	1290
WTHI	Terre Haute, Ind.	1480
WTHM	Lapeer, Mich.	1530
WTHN	Thomaston, Ga.	1500
WTHR	Panama City Fla.	1480
WTHT	Hazleton, Pa.	1300
WTIC	Hartford. Conn.	1080
WTID	Newport News, Va.	1270
WTIF	Tifton, Ga.	1340
WTIG	Massillon, Ohio	990
WTIK	Durham, N.C.	1310
WTIL	Mayaguez, P.R.	1300
WTIM	Taylorville, Ill.	1410
WTIP	Charleston, W.Va.	1240
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
WTOL	Toledo. Ohio	1230
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
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
WULA	Eufaula, Ala.	1240
WUMU	Gainesville. Fla.	1390
WUND	Uhrichsville, Ohio	1540
WUNE	Baton Rouge, La.	1550
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
WVAK	Paoli, Ind.	1560
WVAL	Sauk Rapids, Minn.	800
WVAM	Altoona. Pa.	1430
WVAR	Richwood. W.Va.	1280
WVCB	Bel Air, Md.	1520
WVCF	Apopka. Fla.	1520
WVCG	Coral Gables, Fla.	1070
WVCH	Chester, Pa.	740
WVEC	Hampton. Va.	1490
WVGT	Mt. Dora. Fla.	1580
WVIM	Vicksburg. Miss.	1490
WVIP	Mt. Kisco. N.Y.	1310
WVJP	Caguas, P.R.	1110
WVJS	Owensboro. Ky.	1420
WVKO	Columbus. Ohio	1580
WVLD	Valdosta. Ga.	1450
WVLK	Lexington, Ky.	590
WVLN	Olney, Ill.	740
WVMC	Mt. Carmel. Ill.	1360
WVMI	Biloxi. Miss.	570
WVMT	Burlington, Vt.	620
WVNA	Tuscumbia, Ala.	1590
WVNJ	Newark. N.J.	620
WVOB	Bel Air, Md.	1520
WVOC	Battle Creek. Mich.	1500
WVOE	Chadburn, N.C.	1590
WVOH	Hazelhurst, Ga.	920
WVOK	Birmingham, Ala.	690
WVOL	Berry Hill, Tenn.	1470
WVOM	Iuka, Miss.	1270
WVON	Cicero, Ill.	1450
WVOP	Vidalia, Ga.	970
WVOS	Liberty, N.Y.	1240
WVOT	Wilson, N.C.	1420

WHITE'S RADIO LOG

C.L.	Location	Kc.
WVOW	Logan, W.Va.	1290
WVOX	New Rochelle, N.Y.	1460
WVOZ	Carolina, P.R.	1400
WVPO	Stroudsburg, Pa.	840
WVSC	Somerset, Pa.	990
WVTR	White River Junc., Vt.	910
WVVW	Grafton, W.Va.	1260
WWAB	Lakeland, Fla.	1330
WWBC	Cocoa, Fla.	1510
WWBD	Bamberg, S.C.	790
WWBR	Windber, Pa.	1350
WWBZ	Vineland, N.J.	1360
WWCA	Gary, Ind.	1270
WWCC	Bremen, Ga.	1440
WWCH	Clarion, Pa.	1300
WWCO	Waterbury, Conn.	1240
WWDC	Washington, D.C.	1260
WWDS	Everett, Pa.	1050
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
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
WWSR	St. Albans, Vt.	1420
WWST	Wooster, Ohio	960
WWSW	Pittsburgh, Pa.	970
WWVA	Wheeling, W.Va.	1170
WWWB	Jasper, Ala.	1360
WWWF	Fayette, Ala.	990
WWWR	Russellville, Ala.	920
WWWW	Richmond, Va.	1540
WWXL	Manchester, Ky.	1450
WWYN	Erie, Pa.	1260
WWYO	Pineville, W.Va.	970
WXAL	Demopolis, Ala.	1400
WXGI	Richmond, Va.	950
WXIG	Windemere, Fla.	1480
WXKW	Troy, N. Y.	1600
WXLI	Dublin, Ga.	1230
WXLL	Big Delta, Alaska	980
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
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
WYCL	York, S.C.	1580
WYDE	Birmingham, Ala.	850
WYGO	Corbin, Ky.	1330
WYHE	Bristol, Tenn.	1550
WYKP	Ocean City, N. J.	1520
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	Chicago, Ill.	1390
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
WZEP	DeFuniak Sprgs., Fla.	1460
WZIP	Cincinnati, Ohio	1050
WZKY	Albemarie, 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.
KACA	Prosser, Wash.
KACE-FM	Riverside, Calif.
KADI	St. Louis, Mo.
KAFE	San Francisco, Cal.
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.
KAPP	Redondo Beach, Calif.
KARA-FM	Albuquerque, N.M.
KARK	Little Rock, Ark.
KARM-FM	Fresno, Calif.
KARR-FM	Great Falls, Mont.(s)
KASK-FM	Ontario, Calif.
KASU	Jonesboro, Ark.
KATT	Woodland, Calif.
KATY-FM	San Luis Obispo, Calif.
KAYD	Beaumont, Tex.
KAZZ	Austin, Tex.
KBBI	Los Angeles, Calif.
KBBL	Wichita, Kans.
KBBM	Hayward, Calif.
KBBW	San Diego, Cal.(s)
KBCA	Los Angeles, Calif.
KBCL-FM	Shreveport, La.
KBEE-FM	Modesto, Calif.
KBEY	Kansas City, Mo.
KBFI	Boise, Idaho
KBFM	Lubbock, Tex.
KBGL	Pocatello, Ida.
KBHF	Bozeman, Mont.
KBHS-FM	Hot Springs, Ark.
KBIG	Avalon, Calif.
KBIM-FM	Roswell, N.Mex.
KBLE-FM	Seattle, Wash.
KBMC	Eugene, Ore.
KBMF-FM	Spearman, Tex.
KBMS	Los Angeles, Calif.
KBNO	Houston, Tex.
KBOA-FM	Kennett, Mo.
KBOE-FM	Oskaloosa, Iowa
KBOI-FM	Boise, Ida.(s)
KBOX-FM	Dallas, Tex.
KBOY-FM	Medford, Oreg.
KBPI	Denver, Colo.
KBRG	San Francisco, Cal.
KBRO-FM	Bremerton, Wash.
KBTM-FM	Jonesboro, Ark.
KBUZ-FM	Mesa, Ariz.
KBYR-FM	Anchorage, Alaska(s)
KBYU-FM	Provo, Utah
KCAL-FM	Redlands, Calif.
KCBH	Beverly Hills, Calif.(s)
KCBS-FM	San Francisco, Calif.
KCFC	Kansas City, Kan.
KCFM	St. Louis, Mo.(s)
KCHQ-FM	Amarillo, Tex.(s)
KCHQ-FM	Conchella, Calif.(s)
KCIB-FM	Fresno, Calif.(s)
KCIL-FM	Houma, La.
KCKN-FM	Kansas City, Kan.
KCLE-FM	Cleburne, Tex.
KCLO-FM	Leavenworth, Kans.
KCLU-FM	Rolla, Mo.
KCMA	San Francisco, Cal.
KCMB-FM	Wichita, Kans.
KCMI	Los Angeles, Calif.
KCMK	Kansas City, Mo.
KCMO-FM	Kansas City, Mo.(s)
KCMS-FM	Manitou Springs, Colo.
KCOM	Omaha, Nebr.
KCPS	Tacoma, Wash.
KCPX-FM	Salt Lake City, Utah
KCRA-FM	Sacramento, Calif.
KCRW	Santa Monica, Calif.
KCSB-FM	Santa Barbara, Cal.
KCSM	San Mateo, Calif.
KCSU-FM	Ft. Collins, Colo.
WCTS-FM	Minneapolis, Minn.
KCUI	Pella, Ia.
KCUL-FM	Ft. Worth, Tex.
KCUR-FM	Kansas City, Mo.
KCVR-FM	Lodi, Calif.
KCWS-FM	Ellensburg, 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)
KDFC	San Francisco, Calif.
KDHI-FM	Twenty-Nine Palms, Cal.
KDKA-FM	Pittsburgh, Pa.
KDMC	Corpus Christi, Tex.
KDMI	Des Moines, Iowa(s)
KDNT-FM	Denton, Tex.
KDOK-FM	Tyler, Tex.
KDPS	Des Moines, Iowa
KDUO	Riverside, Calif.(s)
KDVR	Sioux City, Ia.(s)
KEAR	San Francisco, Calif.
KEAX	National City, Calif.
KEBJ	Phoenix, Ariz.
KEBR	Sacramento, Calif.
KEBS	San Diego, Calif.
KECL	Albuquerque, N.M.
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	Sioux Falls, S.Dak.
KELT	Harlingen, Tex.
KEMO	St. Louis, Mo.
KEPI	Phoenix, Ariz.(s)
KERI	Bellingham, Wash.
KERN-FM	Bakersfield, Calif.
KERS	Sacramento, Cal.
KETO-FM	Seattle, Wash.(s)
KEVE-FM	Golden Valley, Minn.
KEWC-FM	Cheney, Wash.
KEYM	Santa Maria, Calif.(s)
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.
KFLY-FM	Corvallis, Ore.
KFMB-FM	San Diego, Calif.
KFMC	Portland, Oreg.
KFMG	Des Moines, Ia.
KFMH	Colorado Springs, Colo.
KFMK	Houston, Tex.(s)
KFML-FM	Denver, Colo.
KFMM	Tucson, Ariz.
KFMN	Abilene, Tex.
KFMP	Port Arthur, Tex.(s)
KFMQ	Lincoln, Nebr.
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	Long Beach, Calif.
KFRC-FM	San Francisco, Calif.
KFRE-FM	Fresno, Calif.
KFUO-FM	Clayton, Mo.
KGAF-FM	Gainesville, Tex.
KGB-FM	San Diego, Calif.(s)
KGBN-FM	Caldwell, Idaho
KGFM	Edmonds, Wash.
KGGK	Garden Grove, Calif.(s)
KGLA	Los Angeles, Calif.
KGMG	Portland, Oreg.(s)
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	Austin, Tex.
KHFM	Albuquerque, N.Mex.(s)
KHFR-FM	Monterey, Calif.(s)
KHGM	Beaumont, Tex.(s)
KHIQ	Sacramento, Calif.(s)
KHJ-FM	Los Angeles, Calif.
KHMS	El Paso, Tex.
KHOF	Los Angeles, Calif.
KHOK-FM	Hoquiam, Wash.
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.
KHVR	Bijou, Calif.
KHYD	Fremont, Cal.
KHYI	Fremont, Calif.
KICS-FM	Hastings, Neb.
KICN	Omaha, Nebr.
KIEM	Eureka, Calif.
KIFM	Bakersfield, Cal.
KIHI	Tulsa, Okla.
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.
KIXI	Seattle, Wash.
KIXL-FM	Dallas, Tex.(s)
KJAZ	Alameda, Calif.
WJBR	Wilmington, Del.
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	Newton, Kans.
KJSB	Houston, Tex.
KJSK-FM	Columbus, Neb.

C.L.	Location
KKHI-FM	San Francisco, Cal.
KLAC-FM	Los Angeles, Calif.
KLAW	Lawton, Okla.
KLAY-FM	Tacoma, Wash.(s)
KLBS-FM	Los Banos, Cal.
KLCN-FM	Blytheville, Ark.
KLEF	Houston, Tex.
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.
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.
KLVL	Pasadena, Tex.
KLWN-FM	Lawrence, Kan.
KLXN	Seattle, Wash.
KLYD-FM	Bakersfield, Calif.
KLYN-FM	Lynden, Wash.
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.
KMER	Fresno, Calif.
KMET	Denver, Colo.
KMFM	San Antonio, Tex.
KMHT	Marshall, Tex.
KMJ-FM	Fresno, Calif.
KMLA	Los Angeles, Calif.(s)
KMLB-FM	Monroe, La.(s)
KMMK	Little Rock, Ark.
KMOD-FM	Midland, Tex.
KMOX-FM	St. Louis, Mo.
KMPX	San Francisco, Calif.(s)
KMSC	Alvin, 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.
KNEB-FM	Scottsbluff, Nebr.
KNER	Dallas, Tex.
KNEV	Reno, Nev. (s)
KNEW-FM	Scottsbluff, Nebr.
KNFM	Midland, Tex.
KNIK-FM	Anchorage, Alaska
KNIX	Phoenix, Ariz.(s)
KNJO	Thousand Oaks, Calif.
KNOB	Long Beach, Calif. (s)
KNOF	St. Paul, Minn.
KNOK-FM	Ft. Worth, Tex.
KNTO	Wichita Falls, Tex.(s)
KNWS-FM	Waterloo, Iowa
KNX-FM	Los Angeles, Calif.
KOA-FM	Denver, Colo.
KOAP-FM	Portland, Ore.
KOAT-FM	Albuquerque, N.M.
KOBH-FM	Hot Springs, S.D.
KOCI-FM	Denver, Colo.
KOCV	Odessa, Tex.
KOCW	Tulsa, Okla.(s)
KOCY-FM	Oklahoma City, Okla.
KODA-FM	Houston, Tex.(s)
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.
KORK	Las Vegas, Nev.(s)
KOSE-FM	Osceola, Ark.
KOST	Dallas, Tex.
KOSU-FM	Stillwater, Okla.(s)
KOTN-FM	Pine Bluff, Ark.
KOZE-FM	Lewiston, Idaho
KPAC-FM	Port Arthur, Tex.
KPAT-FM	Berkeley, Calif.
KPCS	Pasadena, Calif.
KPDQ-FM	Portland, Ore.
KPEN	San Francisco, Cal.(s)
KPET-FM	Lamesa, Tex.
KPFA	Berkeley, Calif.
KPFB	Berkeley, Calif.
KPFK	Los Angeles, Calif.
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)
KQBY-FM	San Francisco, Calif.
KQFM	Portland, Oreg.
KQIP	Odessa, Tex.
KQRO	Dallas, Tex.
KQTY	Wichita, Kan.
KQUE	Houston, Tex. (s)
KQV-FM	Pittsburgh, Pa.
KQXR	Bakersfield, Calif.
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.
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.
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.
KROS-FM	Clinton, Iowa
KROW	Santa Barbara, Calif.
KROY-FM	Sacramento, Calif.
KRPM	San Jose, Calif.
KRRC	San Jose, Calif.
KRSI	Minneapolis, Minn.(s)
KRSI-FM	St. Louis Park, Minn.
KRSN-FM	Los Alamos, N.Mex.
KRVM	Eugene, Oreg.
KRVN-FM	Lexington, Nebr.
KRVS-FM	Lafayette, La.
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.
KSJO-FM	San Jose, Calif.(s)
KSJS	San Jose, Calif.
KSL-FM	Salt Lake City, Utah(s)
KSLA	Seattle, Wash.(s)
KSLH	St. Louis, Mo.
KSLT	Tyler, Tex.
KSMA-FM	Santa Maria, Calif.
KSO-FM	Des Moines, Iowa
KSOM	Tucson, Ariz.
KSOP-FM	Salt Lake City, Utah
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.
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.
KTGM	Denver, Colo.
KTIM	San Rafael, Calif.
KTIS-FM	Minneapolis, Minn.
KTJO-FM	Ottawa, Kans.
KTNT-FM	Tacoma, Wash.
KTOD-FM	Sinton, Tex.(s)
KTOP	Topeka, Kan.
KTOY	Tacoma, Wash.
KTPM	Sun City, Ariz.(s)
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.
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
KUFY	Redwood City, Calif.
KUGN-FM	Eugene, Oreg.
KUHF	Houston, Tex.
KUIL-FM	Highland Park, 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.
KUT-FM	Austin, Tex.
KUTE	Glendale, Calif.
KVCR	San Bernardino, Calif.
KVEC-FM	San Luis Obispo, Calif.(s)
KVEN-FM	Ventura, Calif.
KVFM	San Fernando, Calif.
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-FM	Showlow, Ariz.
KWAM-FM	Memphis, Tenn.
KWAR	Waverly, Iowa
KWAX	Eugene, Oreg.
KWBE-FM	Beatrice, Neb.
KWDM	Des Moines, Ia.
KWFM	Minneapolis, Minn.(s)
KWG-FM	Stockton, Calif.
KWGN-FM	Abernathy, Tex.
KWGS	Tulsa, Okla.
KWHG	Lincoln, Neb.
KWHI-FM	Brenham, Tex.
KWHP	Edmond, Okla.
KWIX	St. Louis, Mo.
KWIZ-FM	Santa Ana, Calif.
KWJB-FM	Globe, Ariz.
KWKC-FM	Abilene, Tex.
KWKH-FM	Shreveport, La.
KWME	Walnut Creek, Calif.(s)
KWMF-FM	Walnut Creek, Cal.
KWMO	Odessa, Tex.
KWOA-FM	Worthington, Minn.
KWOC-FM	Poplar Bluff, Mo.
KWPC-FM	Muscatine, Iowa
KWPM-FM	West Plains, Mo.
KXEL-FM	Waterloo, Iowa(s)
KXFM	Fort Worth, Tex.
KXJK-FM	Forrest City, Ark.
KXKX	San Francisco, Calif.
KXLU	Los Angeles, Calif.
KXLV	Las Vegas, Nev.
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)
KXYZ	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
KZAM	Seattle, Wash.(s)
KZFM	Corpus Christi, Tex.
KZOM	Oklahoma City, Okla.
KZSU	Stanford, Cal.
KZUN-FM	Opportunity, Wash
WAAB-FM	Worcester, Mass.
WAAM-FM	Parkersburg, W.Va.
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.
WAHR	Huntsville, Ala.
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.
WAKR-FM	Akron, Ohio
WAKW-FM	Cincinnati, Ohio
WALK-FM	Patchogue, N.Y.
WAMC	Albany, N.Y.
WAMF	Amherst, Mass.
WAMO-FM	Pittsburgh, Pa.
WAMU-FM	Washington, D.C.
WANG	Goldwater, Mich.
WAPC-FM	Riverhead, N.Y.(s)
WAPI-FM	Birmingham, Ala.
WAPS	Akron, Ohio
WAQE-FM	Towson, Md.(s)
WARC	Meadville, Pa.
WARD-FM	Johnstown, Pa.
WARK-FM	Hagerstown, Md.
WARN-FM	Fort Pierce, Fla.
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.
WAVQ	Atlanta, Ga.
WAVU-FM	Albertville, Ala.
WAVY-FM	Portsmouth, Va.
WAWR-FM	Bowling Green, O.
WAWZ-FM	Zarephath, N.J.
WAXO	Kenosha, Wis.
WAYL-FM	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)
WBBC	Jackson, Mich.
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.
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	New York, N.Y.
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.
WBLY-FM	Springfield, Ohio
WBMK-FM	West Point, Ga.
WBMI	Meridan, Conn.(s)
WBNE-FM	Fitchburg, Mass.
WBMP	Elwood, Ind.
WBNS-FM	Columbus, Ohio (s)
WBOE	Cleveland, Ohio
WBON	Milwaukee, Wis.
WBOR	Brunswick, Maine
WBOS-FM	Brookline, Mass.
WBRB-FM	Mt. Clemens, Mich.
WBRC	Birmingham, Ala.
WBRD-FM	Bradenton, Fla.
WBRE-FM	Wilkes-Barre, Pa.
WBSM-FM	New Bedford, Mass.
WBRN-FM	Big Rapids, Mich.
WBSM-FM	New Bedford, Mass.
WBST	Muncie, Ind.
WBT-FM	Charlotte, N.C.(s)
WBUD-FM	Trenton, N.J.(s)
WBUF	Buffalo, N.Y.
WBUR	Boston, Mass.
WBUT-FM	Butler, Pa.
WBUY-FM	Lexington, N.C.
WBVA	Woodbridge, Va.
WBVP-FM	Beaver Falls, Pa.
WBWC	Berea, Ohio
WBYM	Bayamon, P.R.
WBYO	Boyertown, Pa.(s)
WBZ-FM	Boston, Mass.
WCAC	Anderson, S.C.
WCAO-FM	Baltimore, Md.
WCAS	Knoxville, Tenn.
WCAU-FM	Philadelphia, Pa.
WCAW-FM	Charleston, W.Va.
WCBC-FM	Anderson, Ind.
WCBE	Columbus, Ohio
WCBM-FM	Baltimore, Md.
WCBS-FM	New York, N.Y.
WCBW	Columbia, Ill.
WCCC-FM	Hartford, Conn.
WCCN-FM	Neillsville, Wis.
WCCV-FM	Charlottesville, Va.

WHITE'S RADIO LOG

C.L.	Location
WCDL-FM	Carbondale, Pa.
WCED-FM	Dubois, Pa.
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.
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
WCMU-FM	Mt. Pleasant, Mich.
WCNB-FM	Connersville, Ind.
WCNO	Canton, Ohio(s)
WCOA-FM	Pensacola. Fla.
WCOD	Richmond, Va.
WCOH-FM	Newnan, Ga.
WCOL-FM	Columbus, Ohio
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-FM	Cleveland, Ohio
WCRT-FM	Birmingham, Ala.(s)
WCSC-FM	Charleston, S.C.
WCSI-FM	Columbus, Ind.(s)
WCSQ	Central Square, N.Y.
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.
WDAC	Lancaster, Pa.
WDAE-FM	Tampa, Fla.
WDAF-FM	Kansas City, Mo.
WDOA	Dayton, O.
WDAS-FM	Philadelphia, Pa.
WDBJ-FM	Roanoke, Va.
WDBL-FM	Springfield, Tenn.
WDBN	Akron, Ohio(s)
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.
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.
WDIA-FM	Memphis, Tenn.
WDIF	Buffalo, N.Y.
WDJK	Atlanta, Ga.
WDJK	Smyrma, Ga.
WDJR	Oil City, Pa.
WDKN-FM	Dickson, Tenn.
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.
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.
WOVR	Philadelphia, Pa.
WDWS-FM	Champaign, Ill.
WDXL-FM	Lexington, Tenn.
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.
WECW	Elmira, N.Y.
WEDK	Springfield, Mass.
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.
WEIV	Ithaca, N.Y.
WEKZ-FM	Monroe. Wis.
WELF	Glen Ellyn, Ill.
WELG	Elgin, Ill.
WELL-FM	Battle Creek. Mich.
WEMC	Harrisonburg, Va.
WEMP-FM	Milwaukee, Wis.
WENR-FM	Chicago, Ill.
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.
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.
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.
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.
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.
WFLY	Troy, N.Y.
WFMA	Rocky Mount, N.C.
WFMB	Nashville, Tenn.
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.
WFMQ	Chicago, Ill.(s)
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.
WFPG	Atlantic City. N.J.
WFPK	Louisville, Ky.
WFPL	Louisville, Ky.
WFQM	San Juan, P.R.
WFRL-FM	Freeport, Ill.
WFRO-FM	Fremont, Ohio
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.
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)
WGHJ	Lawrence, Mass.
WGKA-FM	Atlanta, Ga.
WGLI	Babylon, N.Y.
WGLM	Richmond, Ind.
WGLS	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.
WGPA-FM	Bethlehem, Pa. (from Ga.)
WGPC	Albany, Ga.
WGPM	Detroit, Mich.
WGPR	Detroit. Mich.(s)
WGPS	Greensboro, N.C.
WGR-FM	Buffalo, N.Y.
WGRE	Greencastle, Ind.
WGRN	Greenville, Ill.
WGRV-FM	Greeneville. Tenn.
WGSU	Geneseo, 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.
WHAI-FM	Greenfield, Mass.
WHAT-FM	Philadelphia. Pa.(s)
WHAV-FM	Haverhill. Mass.
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.
WHFC	Chicago, Ill.
WHFI	Birmingham. Mich.
WHFM	Rochester, N.Y.
WHFS	Bethesda, Md.(s)
WHHI	Highland, Wis.
WHHS	Havertown, Pa.
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.
WHMA-FM	Anniston, Ala.
WHNC-FM	Henderson, N.C.
WHNR	McMinnville, Tenn.
WHO-FM	Des Moines, Iowa
WHOH	Hamilton, Ohio
WHOK-FM	Lancaster, Ohio
WHOM-FM	New York, N.Y.
WHOO-FM	Orlando, Fla.(s)
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.
WHTG-FM	Asbury Park, N.J.
WHUB-FM	Cookeville, Tenn.
WHUS	Storrs, Conn.
WHWC	Colfax, Wis.
WHYL-FM	Carlisle, Pa.
WHYN-FM	Springfield, Mass.
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.
WIBW-FM	Topeka, Kan.
WICB	Ithaca, N.Y.
WICR	Indianapolis, Ind.
WIFI	Glenside. Pa.(s)
WIFM-FM	Elkin, N.C.
WIKY-FM	Evansville, Ind.
WIL-FM	St. Louis, Mo.
WILE-FM	Cambridge, O.
WILL-FM	Urbana, Ill.
WILO-FM	Frankfort, Ind.
WIMA-FM	Lima, Ohio
WINA-FM	Charlottesville, Va.
WINE-FM	Kenmore, N.Y.
WINF-FM	Manchester, Conn.
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)
WISK	Medford, Mass.
WISM-FM	Madison. Wis.(s)
WISN-FM	Milwaukee, Wis.
WIST-FM	Charlotte, N.C.
WISU	Terre Haute, Ind.
WITA-FM	San Juan, P.R.
WITH-FM	Baltimore, Md.
WITN-FM	Grifton, N.C.
WITZ-FM	Jasper, Ind.
WIUS	Christiansted, V.I.
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.
WJBK-FM	Detroit. Mich.
WJBL-FM	Holland, Mich.
WJBO-FM	Baton Rouge, La.
WJBR	Wilmington. Del.(s)
WJCD-FM	Seymour, Ind.
WJDX-FM	Jackson, Miss.
WJEF-FM	Grand Rpds., Mich.(s)
WJEH-FM	Gallipolis, Ohio
WJEJ-FM	Hagerstown, Md.
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.
WJMX-FM	Florence, S.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.
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)
WKHM-FM	Jackson. Mich.
WKIC-FM	Hazard, Ky.
WKIP-FM	Poughkeepsie, N.Y.
WKIS-FM	Orlando, Fla.
WKIX-FM	Raleigh, N.C.
WKJF	Pittsburgh, Pa.(s)
WKKD	Aurora. Ill.
WKKY-FM	Erlanger, Ky.
WKLF-FM	Clanton, Ala.
WKLS	Marietta. Ga.(s)
WKLW-FM	Grand Rapids, Mich.
WKMH-FM	Dearborn, Mich.

C.L.	Location
WKMI-FM	Kalamazoo, Mich.
WKMO	Kokomo, Ind.
WKNA	Charleston, W.Va.(s)
WKNE-FM	Keene, N.H.
WKOF	Hopkinsville, Ky.
WKOK-FM	Sunbury, Pa.
WKOP-FM	Binghamton, N.Y.
WKOX-FM	Framingham, Mass.
WKPT-FM	Kingsport, Tenn.(s)
WKRC-FM	Cincinnati, Ohio (s)
WKRG-FM	Mobile, Ala.
WKRT-FM	Cortland, N.Y.
WKSU-FM	Kent, Ohio
WKTA	McKenzie, Tenn.
WKTM	N. Charleston, S.C.
WKTM-FM	Mayfield, Ky.(s)
WKTZ-FM	Jacksonville, Fla.(s)
WKWK-FM	Wheeling, W.Va.
WKYB-FM	Paducah, Ky.
WLAD-FM	Danbury, Conn.
WLAG-FM	LaGrange, Ga.
WLAN-FM	Lancaster, Pa.
WLAP-FM	Lexington, Ky.
WLAT-FM	Conway, S.C.
WLAV-FM	Grand Rapids, Mich.
WLAY-FM	Muscle Shoals, Ala.
WLBB-FM	Carrollton, Ga.
WLBG-FM	Laurens-Clinton, S.C.
WLBH-FM	Mattoon, Ill.
WLBJ-FM	Bowling Green, Ky.
WLBK-FM	DeKalb, Ill.
WLBR-FM	Lebanon, Pa.
WLCM-FM	Lancaster, S.C.
WLDM	Oak Park, Mich.(s)
WLDS-FM	Jacksonville, Ill.
WLEC-FM	Sandusky, Ohio
WLET-FM	Toccoa, Ga.
WLFM	Appleton, Wis.
WLIB-FM	New York, N.Y.
WLIN	Detroit, Mich.
WLIP-FM	Kenosha, Wis.
WLIR	Hicksville, N.Y.(s)
WLKR-FM	Norwalk, Ohio
WLLH-FM	Lowell, Mass.
WLNA-FM	Peekskill, N.Y.
WLNH-FM	Laconia, N.H.
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.
WLOS-FM	Asheville, N.C.
WLOV	Cranston, R.I.
WLPO-FM	La Salle, Ill.
WLPR	Mobile, Ala.
WLRS	Louisville, Ky.
WLRJ	Roanoke, Va.
WLRW	Champaign, Ill.
WLTA-FM	Atlanta, Ga.(s)
WLUV-FM	Loves Park, Ill.(s)
WLVL	Louisville, Ky.
WLYC-FM	Williamsport, Pa.
WLYM-FM	Lynn, Mass.
WMAI-FM	Panama City, Fla.
WMAJ-FM	State College, Pa.
WMAL-FM	Washington, D.C.
WMAM-FM	Marinette, Wis.
WMAQ-FM	Chicago, Ill.(s)
WMAS-FM	Springfield, Mass.
WMAX-FM	Grand Rapids, Mich.
WMAZ-FM	Macon, Ga.
WMBD-FM	Peoria, Ill.
WMBI-FM	Chicago, Ill.
WMBM	Miami Beach, Fla.
WMBO-FM	Auburn, N.Y.
WMCF	Memphis, Tenn.
WMCO	New Concord, Ohio
WMCR	Kalamazoo, Mich.
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.
WMLS-FM	Sylacauga, Ala.
WMLW	Milwaukee, Wis.
WMMB-FM	Melbourne, Fla.
WMMM	Westport, Conn.
WMNA-FM	Gretna, Va.
WMNI-FM	Columbus, Ohio
WMOP-FM	Ocala, Fla.
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.
WMTN-FM	Morristown, Tex.(s)
WMTW-FM	Mt. Washington, N.H.(s)
WMUA	Amherst, Mass.
WMUB	Oxford, Ohio
WMUL	Huntington, W.Va.
WMUS-FM	Muskegon, Mich.
WMUN	Muncie, Ind.
WMUU-FM	Greenville, S.C.
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.
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.
WNEM-FM	Bay City, Mich.(s)
WNES-FM	Central City, Ky.
WNEW-FM	New York, N.Y.
WNEX-FM	Macon, Ga.
WNFO-FM	Nashville, Tenn.(s)
WNGO-FM	Mayfield, Ky.
WNHC-FM	New Haven, Conn.
WNIB	Chicago, Ill.
WNIC	DeKalb, Ill.
WNNJ-FM	Newton, N.J.
WNOB	Cleveland, Ohio (s)
WNOK-FM	High Point, N.C.
WNOR-FM	Norfolk, Va.
WNOS-FM	High Point, N.C.
WNOW-FM	York, Pa.
WNRG-FM	Grundy, Va.
WNSL-FM	Laurel, Miss.
WMTH	Winnetka, Ill.
WNTI	Hackettstown, N.J.
WNTM-FM	Moultrie, Ga.
WNUR	Evanston, Ill.
WNWC-FM	Arlington Hts., Ill.
WNYC-FM	New York, N.Y.
WNYE	New York, N.Y.
WOAK	Royal Oak, Mich.
WOAY-FM	Oak Hill, W.Va.
WOBN	Westerville, Ohio
WOC-FM	Davenport, Iowa
WOCB-FM	W. Yarmouth, Mass.
WOCH-FM	North Vernon, Ind.
WOHS-FM	Shelby, N.C.
WOI-FM	Ames, Iowa
WOIO	Cincinnati, Ohio
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	Syracuse, N.Y.
WOOD-FM	Grand Rapids, Mich.(s)
WOOF-FM	Dothan, Ala.
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.
WOSU-FM	Columbus, Ohio
WOTW-FM	Nashua, N.H.
WOUB-FM	Athens, Ohio
WOW-FM	Omaha, Nebr.
WOXR	Oxford, Ohio
WPAC-FM	Patchogue, N.Y.(s)
WPAD-FM	Paducah, Ky.
WPAT-FM	Paterson, N.J.
WPAY-FM	Portsmouth, Ohio (s)
WPBC-FM	Minneapolis, Minn.
WPBS	Philadelphia, Pa.
WPCA-FM	Philadelphia, Pa.
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.
WPGS	Warren, Mich.
WPIC-FM	Sharon, Pa.
WPIN-FM	St. Petersburg, Fla.
WPIT-FM	Pittsburgh, Pa.
WPJB-FM	Providence, R.I.
WPKM	Tampa, Fla.
WPLB	Greenville, Mich.
WPLM-FM	Plymouth, Mass.
WPLN	Nashville, Tenn.
WPLO-FM	Atlanta, Ga.
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.
WPTN-FM	Crookeville, Tenn.
WPTW-FM	Piqua, Ohio
WPWT	Philadelphia, Pa.
WQAL	Philadelphia, Pa.(s)
WQDC-FM	Midland, Mich.(s)
WQFM	Milwaukee, Wis.
WQIK-FM	Jacksonville, Fla.
WQMF	Babylon, N.Y.(s)
WQMG	Greensboro, N.C.(s)
WQMS	Hamilton, Ohio
WQRS-FM	Pittsfield, Mass.
WQSS-FM	Detroit, Mich.
WQXI-FM	Atlanta, Ga.
WQXR-FM	New York, N.Y.(s)
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.
WRCM	New Orleans, La.
WRED	Youngstown, Ohio
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.
WRHM-FM	Livingston, Tenn.
WRHS	Park Forest, Ill.
WRIG-FM	Wausau, Wis.
WRIT-FM	Milwaukee, Wis.
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)
WRLX	Hopkinsville, Ky.
WRLD-FM	Lanett, Ala.
WRMI-FM	Morris, Ill.
WRMN-FM	Elgin, Ill.
WRNJ	Atlantic City, N.J.
WRNL-FM	Richmond, Va.
WRNW	Mount Kisco, N.Y.
WROA-FM	Gulfport, Miss.
WROC-FM	Rochester, N.Y.
WROK-FM	Rockford, Ill.
WROW-FM	Albany, N.Y.
WROY-FM	Carmi, Ill.
WRPI	Troy, N.Y.
WRPN-FM	Ripon, Wis.
WRR-FM	Dallas, Tex.
WRRH	Franklin Lakes, N.J.
WRRN	Warren, Pa.
WRSJ-FM	Bayamon, P.R.
WRSV	Skokie, Ill.
WRSE-FM	Elmhurst, Ill.
WRSW-FM	Warsaw, Ind.
WRTC-FM	Hartford, Conn.
WRTI-FM	Philadelphia, Pa.
WRUF-FM	Gainesville, Fla.
WRUN-FM	Utica, N.Y.
WRVA-FM	Richmond, Va.
WRVB-FM	Madison, Wis.
WRVC	Norfolk, Va.
WRVG	Georgetown, Ky.
WRVM-FM	Rochester, N.Y.
WRVP	New York, N.Y.
WRWR	Port Clinton, Ohio(s)
WRXO-FM	Roxboro, N.C.
WRYT	Pittsburgh, Pa.
WSAB	Mt. Carmel, Ill.
WSAE	Spring Arbor, Mich.
WSAI-FM	Cincinnati, Ohio
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.
WSCH	Hartford, Conn.
WSCI-FM	Platteville, Wis.
WSEI	Olney, Ill.
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.
WSIU	Carbondale, 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.
WSNW-FM	Seneca, S.C.
WSOC-FM	Charlotte, N.C.
WSOM	Salem, Ohio
WSON-FM	Henderson, Ky.
WSOU	S. Orange, N.J.
WSOY-FM	Decatur, Ill.
WSPA-FM	Spartanburg, S.C.(s)
WSPA-FM	Sarasota, Fla.
WSPD-FM	Toledo, Ohio
WSPE	Springville, N.Y.
WSPT-FM	Stevens Point, Wis.
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
WSVA-FM	Harrisonburg, Va.
WSVL-FM	Shelbyville, Ind.
WSVS-FM	Crewe, Va.
WSWM	East Lansing, Mich.(s)
WSYR-FM	Syracuse, N.Y.(s)
WTAD-FM	Quincy, Ill.
WTAR	Norfolk, Va.(s)
WTAS	Crete, Ill.
WTAW-FM	College Station, Tex.
WTAX-FM	Springfield, Ill.
WTAY-FM	Robinson, Ill.
WTBC-FM	Tuscaloosa, Ala.
WTBO-FM	Cumberland, Md.
WTBS	Cambridge, Mass.
WTCO-FM	Campellsville, Ky.
WTCW-FM	Whitesburg, Ky.
WTCX	St. Petersburg, Fla.(s)
WTDS	Toledo, Ohio
WTFM	Lake Success, N.Y.(s)
WTHG-FM	Jackson, Ala.
WTHI-FM	Terre Haute, Ind.
WTHS	Miami, Fla.
WTIC-FM	Hartford, Conn.(s)
WTIP-FM	Charleston, W.Wa.
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-FM	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
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.
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.
WVGR-FM	Grand Rapids, Mich.
WVHC	Hempstead, N.Y.
WVHI	Evansville, Ind.
WVIC	E. Lansing, Mich.(s)
WVIP-FM	Mount Kisco, N.Y.
WVIS	Terre Haute, Ind.
WVJS-FM	Owensboro, Ky.
WVKC-FM	Galesburg, Ill.
WVKO-FM	Columbus, Ohio
WVLK-FM	Lexington, Ky.(s)
WVLR	Sauk City, Wis.
WVMC-FM	Mt. Carmel, Ill.
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.

WHITE'S

RADIO LOG

C.L.	Location
WVOX-FM	New Rochelle, N.Y.
WVPO-FM	Stroudsburg, Pa.
WVQM	Huntington, W.Va.
WVSH	Huntington, Ind.
WVST	St. Petersburg, Fla.
WVTS	Terre Haute, Ind.(s)
WVWO-FM	Cheyenne, Wyo.
WWCF	Greenfield, Wis.
WWCO-FM	Waterbury, Conn.
WWDC-FM	Washington, D.C.
WWDL-FM	Scranton, Pa.
WWGP-FM	Sanford, N.C.
WWHG-FM	Hornell, N.Y.
WWHI	Muncie, Ind.
WWHO	Jackson, Miss.
WWIL-FM	Ft. Lauderdale, Fla.
WWJ-FM	Detroit, Mich.
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.
WWON-FM	Woonsocket, R.I.
WWOS	Palm Beach, Fla.
WWPB	Miami, Fla.(s)
WW8T-FM	Wooster, Ohio
WWSW-FM	Pittsburgh, Pa.
WWTV-FM	Cadillac, Mich.
WWVA-FM	Wheeling, W.Va.
WWWS	Greenville, N.C.
WWYN-FM	Erie, Pa.
WXAX	Elkhart, Ind.
WXBM-FM	Milton, Fla.
WXBR	Cocoa Beach, Fla.
WXCN	Providence, R.I.(s)
WXEN	Cleveland, O.
WXFM	Elmwood Park, Ill.
WXHR	Cambridge, Mass.
WXPN	Philadelphia, Pa.
WXRI	Norfolk, Va.
WXTC	Annapolis, Md.
WXTO-FM	Grand Rapids, Mich.
WXUR-FM	Media, Pa.
WXYZ-FM	Detroit, Mich.
WYAK	Sarasota, Fla.(s)
WYBC-FM	New Haven, Conn.
KYDD	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.
WYRE-FM	Pittsburgh, Pa.
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.
CBA	Sackville, N.B.	1070
CBAF	Moncton, N.B.	1300
CBE	Windsor, Ont.	1550
CBF	Montreal, Que.	690
CBG	Gander, Nfld.	1450
CBH	Halifax, N.S.	860
CBI	Sydney, N.S.	1140
CBJ	Chicoutimi, Que.	1580
CBK	Regina, Sask.	540
CBL	Toronto, Ont.	740
CBM	Montreal, Que.	940
CBN	St. John's, Nfld.	640
CBO	Ottawa, Ont.	910
CBT	Grand Falls, Nfld.	540
CBU	Vancouver, B.C.	690
CBV	Quebec, Que.	980
CBW	Winnipeg, Man.	990
CBX	Edmonton, Alta.	1010
CBXA	Edmonton, Alta.	740
CBY	Corner Brook, Nfld.	990
CBZ	Fredericton, N.B.	1480
CFAB	Windsor, N.S.	1450
CFAC	Calgary, Alta.	960
CFAM	Altona, Man.	1290
CFAR	Flin Flon, Man.	590
CFAX	Victoria, B.C.	810
CFBC	Saint John, N.B.	930
CFBR	Sudbury, Ont.	550
CFBV	Smithers, B.C.	1230
CFCB	Corner Brook, Nfld.	570
CFCF	Montreal, Que.	600
CFCH	Callander, Ont.	600
CFCL	Timmins, Ont.	620
CFCN	Calgary, Alta.	1060
CFCO	Chatham, Ont.	630
CFCP	Courtenay, B.C.	1440
CFCW	Camrose, Alta.	790
CFCY	Charlottetown, P.E.I.	630
CFDA	Victoriaville, Que.	1380
CFDR	Dartmouth, N.S.	790
CFGB	Goose Bay, Nfld.	1340
CFGM	Richmond Hill, Ont.	1310
CFGP	Grande Prairie, Alta.	1050
CFGR	Gravelbourg, Sask.	1230
CFGT	Saint-Joseph-d' Alma, Que.	1270
CFJC	Kamloops, B.C.	910
CFJR	Brockville, Ont.	1450
CFKL	Scheffervile, Que.	1230
CFLM	La Tuque, Que.	1240
CFLV	Valleyfield, Que.	1370
CFMB	Montreal, Que.	1410
CFML	Cornwall, Ont.	1110
CFMR	Fort Simpson, N.W.T.	1490
CFNB	Fredericton, N.B.	550
CFNS	Saskatoon, Sask.	1170
CFOB	Fort Frances, Ont.	800
CFOR	Orillia, Ont.	1570
CFOS	Owen Sound, Ont.	560
CFOX	Pointe. Claire, Que.	1470
CFPA	Port Arthur, Ont.	1230
CFPL	London, Ont.	980
CFPR	Prince Rupert, B.C.	1240
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
CFTJ	Galt, Ont.	1110
CFTK	Terrace, B.C.	1140
CFUN	Vancouver, B.C.	1410
CFVR	Abbotsford, B.C.	1240
CFWB	Campbell River B.C.	1490
CFYK	Yellowknife, N.W.T.	1340
CFWH	Whitehorse, Y.T.	570
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, Alberta	1090
CHED	Edmonton, Alta.	630
CHEF	Granby, Que.	1450
CHEX	Peterborough, Ont.	980
CHFA	Edmonton, Alta.	680
CHFC	Churchill, Man.	1320
CHFI	Toronto, Ont.	1540
CHGB	Sainte-Anne-de-la-Pocatière, Que.	1310
CHIC	Brampton, Ont.	1090
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	Samia, Ont.	1070
CHOV	Pembroke, Ont.	1350
CHOW	Welland, Ont.	1470
CHQM	Vancouver, B.C.	1320
CHRC	Quebec, Que.	800
CHRD	Drummondville, Que.	1340
CHRL	Roberval, Que.	910
CHRS	St-Jean, Que.	1090
CHSJ	Saint John, N.B.	1150
CHSM	Steinbach, Man.	1250
CHTN	Thompson, Man.	610
CHUB	Nanaimo, B.C.	1570
CHUC	Cobourg, Ontario	1500
CHUM	Toronto 7, Ontario	1050
CHVC	Niagara Falls, Ont.	1600
CHWK	Chilliwack, B.C.	1270
CHWO	Oakville, Ont.	1250
CJAD	Montreal, Que.	800
CJAF	Cabano, Que.	1340
CJAT	Trail, B.C.	610
CJAV	Port Alberi, B.C.	1240
CJBC	Toronto, Ont.	860
CJBM	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
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	Riviere-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.	1050
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.	1460
CJNR	Blind River, Ont.	730
CJOB	Winnipeg Man.	680
CJOC	Lethbridge, Alta.	1220
CJON	St. John's, Nfld.	930
CJOR	Vancouver, B.C.	600
CJOY	Guelph, Ont.	1460
CJQC	Quebec, Que.	1340
CJQM	Winnipeg, Manitoba	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
CKAC	Montreal, Que.	730
CKAD	Wilmot Stn. N.S.	1490
CKAD	Middletown, N.S.	1490
CKAR	Huntsville, Ont.	630
CKAR-1	Huntsville, Ont.	1340
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.	360
CKCQ	Quesnel, B.C.	570
CKCQ-1	Quesnel, B.C.	1240
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.	1400
CKDM	Dauphin, Man.	730
CKDR	Kenora, Ont.	900
CKEC	New Glasgow, N.S.	1320
CKEK	Cranbrook, B.C.	570
CKEN	Kentville, N.S.	1350
CKEY	Toronto, Ont.	580
CKFH	Toronto, Ont.	1430
CKGB	Timmins, Ont.	680
CKGM	Montreal, Que.	980
CKJL	Saint-Jérôme, Que.	900
CKKW	Kitchener, Ontario	1320
CKLB	Oshawa, Ont.	1350
CKLC	Kingston, Ont.	1380
CKLD	Thetford Mines, Que.	1230
CKLG	Vancouver, B.C.	730
CKLM	Montreal, Que.	1570
CKLN	Nelson, B.C.	1390
CKLS	La Sarre, Que.	1240
CKLW	Windsor, Ont.	800
CKLY	Lindsay, Ont.	910
CKML	Mont Laurier, Que.	610
CKMP	Midland, Ont.	1230
CKMR	Newcastle, N.B.	790
CKNB	Campbellton, N.B.	950
CKNL	Fort St. John, B.C.	950
CKNW	New Westminister, 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.	1150
CKSB	Saint-Boniface, Man.	1050
CKSL	London, Ont.	1290
CKSM	Shawinigan, Que.	1220
CKSO	Sudbury, Ont.	790
CKSW	Swift Current, Sask.	1400
CKTB	St. Catharines, Ont.	610
CKTX	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
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

C.L.	Location
CBC-FM	Toronto, Ont.
CBF-FM	Montreal, Que.
CBM-FM	Montreal, Que.
CBO-FM	Ottawa, Ont.
CBU-FM	Vancouver, B.C.
CFCF-FM	Montreal, Que.
CFFM-FM	Kamloops, B.C.
CFMO-FM	Ottawa, Ont.
CFMW-FM	St. Norbert, (Winnipeg) Man.
CFPL-FM	London, Ont.
CFQM-FM	Vancouver, B.C.
CFRC-FM	Kingston, Ont.
CFRN-FM	Edmonton, Alta.
CHEC-FM	Lethbridge, Alta.
CHFI-FM	Toronto, Ont.
CHFM-FM	Calgary, Alta.
CHIC-FM	Brampton, Ont.
CHLT-FM	Sherbrooke, Que.
CHNS-FM	Halifax, N.S.
CHRC-FM	Quebec (P.Q.)
CHUM-FM	Toronto, Ont.
CJBQ-FM	Belleville, Ont.
CJBR-FM	Rimouski, Que.

C.L.	Location
CJCA-FM	Edmonton, Alta.
CJCB-FM	Sydney, N.S.
CJFM-FM	Montreal, Que.
CJIC	Sault Ste. Marie, Ont.
CJMS	Montreal, Que.
CJOB-FM	Winnipeg, Man.
CJRT-FM	Toronto, Ont.

C.L.	Location
CJSS-FM	Cornwall, Ont.
CKCR-FM	Kitchener, Ont.
CKCY	Sault Ste. Marie, Ont.
CKDA-FM	Victoria, B.C.
CKFM-FM	Toronto, Ont.
CKGB-FM	Timmins, Ont.
CKGM-FM	Montreal, P.Q.

C.L.	Location
CKLB-FM	Oshawa, Ont.
CKLC-FM	Kingston, Ont.
CKLW-FM	Windsor, Ont.
CKPC-FM	Brantford, Ont.
CKPR-FM	Ft. William, Ont.
CKQM-FM	Winnipeg, Man.
CKTB-FM	St. Catharines, Ont.

C.L.	Location
CKUA-FM	Edmonton, Alta.
CKVL-FM	Verdun, Que.
CKWS-FM	Kingston, Ont.
CKX-FM	Brandon, Man.
CKY-FM	Manitoba

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
	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
	XEQY	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.

WHITE'S RADIO LOG

For the DX'er. If you care to roam the bands for DX, we present here some information which will be of invaluable use to you in tracking down DX stations.

Although the current radio propagation conditions have made the high frequency bands (11 and 13 meter bands) relatively poor for DX'ers, the other bands are generally good during certain periods of the year. As a general rule, the following bands are "hot for DX" during the times indicated:

60-meter band=Winter nights.
49-meter band=Winter nights.
41-meter band=Winter nights.
31-meter band=Nights, all year.
25-meter band=Nights, all year.
19-meter band=Days all year, and Summer nights.
16-meter band=Days, all year, and Summer nights.
13-meter band=Days, all year.
11-meter band=Days, all year.

Something Different is being tried this time around in our listings. A number of monitors feel that they would get more use from our listings if we arranged the stations by frequency rather than by country, as we have done in previous issues. We would appreciate your comments on which way suits your DX chasing.

We are also listing, for the first time in this issue, a number of non-broadcast stations and frequencies reported by our monitoring stations. These are all indicated by an asterisk (*). In some cases, when a great number of stations of the same general category utilize a frequency, we have indicated the use of the frequency rather than attempt to list any of the specific stations monitored (2182, 2662 kc/s, etc,).

A new "clandestine" station has been monitored on 6700, 6705 and 7275 kc/s. The station is "Bayrak Radio," The Voice of the Turkish Cypriot Fighters. Although their schedules, by necessity, must be irregular, they seem to be most active at 0130 and 1230 in Turkish, 0200 and 1330 in Greek, and 0230 and 1400 in English on 6700 kc/s (times EST). Check their various frequencies at these times.

The past few months has shown an alarming outbreak of ship-based "pirate" broadcasters, mostly centered around England. A few land-based pirates have also popped into the scene. For the record, here's some data on the most talked about of these stations:

Radio Caroline, (see the article "New Pirate Broadcaster," by Tom Kneitel, R-TVE Aug-Sept, page 101) has now settled down on 1520 kc/s with a 0000 to 1500 and 1800 to 2100 (EST) schedule. The owners of *Radio Caroline* bought out the interests of a rival pirate, *Radio Atlanta,* and will now operate *two* pirate broadcasters on 1520 kc/s under the *Radio Caroline* identification. As a result of the merger, the original ship has now been moved from the east coast to broadcast from the west coast near the Isle of Man. This gives the station coverage into Manchester and Liverpool. The new ship will cover the old *Radio Caroline* spot on the east coast. The merger killed the opening of yet another pirate, *Radio Vannin,* which was set to open at Douglas Head, Isle of Man, with *no* less than *four* 20 kw medium wave transmitters. The only competition expected will be from *Radio Mary Rose,* which is expected to drop anchor off Liverpool and blanket northwest England.

Radio Leeds, another pirate, has been operated by students of Leeds University. The station is aboard a yacht off Harwich, Essex, England and uses 1520 kc/s (same frequency used by *Radio Caroline*).

Radio Sutch, on 1542 kc/s, will operate with 500 watts from 0600 to 0800 and 1100 to 1830.

Radio Invicta, broadcasting from an abandoned Army fort in the esturary of the Thames River, runs 10 hours of music daily. The station's claim to fame is that it broadcasts music "of a higher quality than the other pirate stations."

As an ironic twist, *Radio Free Yorkshire* was operated by two Liberal candidates "to demonstrate the dangers of pirate radio and to protest against the conditions which allow pirate radio to exist."

The above data on pirates came from Tom Kneitel, K3FLL/WB2AAI, who keeps track of such things.

R-TVE monitor John Westbrook, at the USN Sonar School in Key West, Fla., writes to tell us about the clandestine station Radio Free Dixie on 700 kc/s. John said that when heard at 2210 EST the signals were very strong. Programming was mostly jazz music and racist propaganda. We understand that this is a Cuban station.

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.

TNX. We are indebted to the following DX'ers who added their loggings to those of DX CENTRAL, the official RADIO-TV EXPERIMENTER monitoring station in New York City, to bring you this month's listings:

Why not send us your loggings for our next listing? Share your DX with others!

Get those reports in *now!* Good *DX!*

Ernest P. Kionke, Gowanda, N. Y.
Russell Hawkins, Lavergne, Tenn.
Gordon Robinson, Victoria, B. C.
Robert Wallace, Dallas, Tex.
Pericles Cosseboom, San Francisco, Calif.
William Dickerman, Williamsport, Pa.
John Charlton, Windsor, Ont.
Timothy C. Brown, Williamsport, Md.
John Truesdale, St. Joseph, Mo.
Gary Bate, Sarnia, Ont.
Ernie Dagg, Sarnia, Ont.
Cliff Goodelt, Chattanooga, Tenn.
S. Brown, Williamsport, Md.
Harold E. Theard, Jr., New Orleans, La.
Richard Kline, Englewood, N. J.
Philip Atchley, Croughton, England (USAF)
Victor L. Fields, Montezuma, Ind.
Edward Zebrowski, Holyoke, Mass.
Michael Evans, Arlington, Tex.
Dave Carlstrom, Huntington, N. Y.
Jack L. Dennis, Washington, D. C.
Joseph M. Areglla, Ft. Lauderdale, Fla.
Geoff Check, Lacon, Ill.
K. Korber, Toronto, Ont.
Jacques St. Germain, St. Hyacinthe, Que.
David Pollock, Oak Park, Mich.
A/1C Allison Kingsley, USAF, near London, Eng.
Walter P. Pyne, Hagerstown, Md.
Charles B. Aher, E. St. Louis, Ill.
Walter J. Baxter, Billings, Mont.
R. Smeltzer, Montreal, Que.
Donald McKnight, Grove City, Pa.
Tom Kneitel, New York, N. Y.
Leo Blouin, Quebec, Que.
Stephen B. Berman, Washington, D. C.
Edwin Anderson, Middletown, Del.
Bobby Glover, Wilson, N. C.
Gordon Amey, Jr., Baltimore, Md.
James McGrath, Holyoke, Mass.
Ronald J. Shopinski, Mt. Carmel, Pa.
David Vik, Dallas, Tex.
George Bennett, Anderson, Ind.
Ned Stearns, Warren, Ohio
Hugh Applewhite, Mobile, Ala.
Guy Pacaud, Quebec, Que.
Norman Zarr, Brooklyn, N. Y.
Bill Cheatwood II, Duncan, Okla.
Stephen McGinn, Concord, Mass.
John M. Westbrook, Key West, Fla.
Steve Wilkes, Dallas, Tex.
John S. Meyer, Kentland, Md.
Gil Torbeck, Colorado Spgs, Colo.
Mike Clarson, Clark, N. J.
Lee Rand, Old Town, Me.
Alan Greene, Philadelphia, Pa.
Mike Adcock, Jackson, Miss.

Kc/s	Call	Name	Location	EST
2182	—	(Marine emergency)*	various ship & land	—
2450	WOU	Boston Marine Op.*	Boston, Mass.	0910
2466	WFA	Tampa Marine Op.*	Tampa, Fla.	2135
2490	WDR	Miami Marine Op.*	Miami, Fla.	1840
2662	—	U.S. Coast Guard*	various ship & land	—
2670	—	U.S. Coast Guard*	various ship & land	—
2678	—	U.S. Coast Guard*	various ship & land	—
2702	—	U.S. Coast Guard*	various ship & land	—
2716	—	U.S. Navy	various ship & land	—
2945	—	(European Aero)*	various air & land	
2966	—	(Carib. Aero)*	various air & land	
3255	YVQL	V. del Tigre	El Tigre, Venez.	1900
3280	—	Windward I. BC	St. Georges, Grenada	2100
3347	HIAS	Onda Musical	Sto. Domingo, D.R.	1830
3368	HI2D	R. Hit Musical	SantiagoCab., D.R.	1730
3385	YVQI	R. Barcelona	Barcelona, Vanez.	2130
3824	ZNF4V	ZNF4V	Maseru, Basutoland	0145
3960	—	R. Quitandinha	RiodeJanero, Brazil	1945
3971	—	R. Cordac	Usumbura, Burundi	0100
3985	—	R. Cordac	Usumbura, Burundi	0100
4067	—	(Mississippi River)*	various ship & land	—
4475	WSY	N.Y. Aeradio*	New York, N.Y.	0050
	CSA	Santa Maria*	Santa Maria, Azores	0050
4600	—	R. Nepal	Kathmandu, Nepal	0630
4744	—	R. Mali	Bamako, Mali	1545

60 Meter Band—4750 to 5060 Kc/s

4870	—	R. Dahomey	Cotonou, Dahomey	2235
4780	—	R. Djibouti	Djibouti, Fr.Somal.	1515
4795	HJFU	R. V. de Comercio	Armenia, Colombia	2130
4875	HJBG	V. del Norte	Cucuta, Colombia	0300
4890	VLK9	Austral. BC	Pt. Moresby, New Guinea	0355
4965	—	R. Santa Fe	Bogota, Colombia	2230
4967	—	Dar Al Idhaat	Kuwait	1300
4970	—	R. Pakistan	Karachi, Pakistan	1130
4990	—	R. Nigeria	Lagos, Nigeria	1200
5010	—	Windw. I. BC	St. Georges, Grenada	1900
5020	HJFW	Transm. Caldas	Manizales, Colombia	0522

WHITE'S RADIO LOG

Kc/s	Call	Name	Location	EST
5030	HI3C	V. del Papagayo	La Romana, D.R.	2000
5038	—	Sudan BC	Omdurman, Sudan	1100
5040	—	Govorit Tblisi	Tblisi, U.S.S.R.	1100
5045	ZK5	R. Raratonga	Raratonga, Cook Is.	2300
5047	—	R. Rep. Togo	Lome, Togo	1600
5100	—	V. of America	Bethany, Ohio	0750
5507	—	(Medit. Aero)*	various air & land	—
5878	CP72	R. Illimani	La Paz, Bolivia	2000
5925	OAX7K	R. Puno	Arequipa, Peru	1630

49 Meter Band—5950 to 6200 Kc/s

5950	—	R. Soekarnobura	W. Irian, Indonesia	0200
5955	CE595	R. Nuevo Mundo	Santiago, Chile	0500
5960	—	Trans World R.	Monte Carlo, Monaco	0345
5985	LRS2	R. Splendid	Buenos Aires, Arg.	1830
5995	HRPI	Eco de Honduras	San Pedro Sula, Hond.	1900
6000	—	R. Americas	Swan Island	0450
6010	—	R. Nacional	San Salvador, El. Salv.	1900
6015	WRUL	R. N.Y. Worldwide	New York, N.Y.	1845
6017	ZPA10	R. Paraguay	Asuncion, Paraguay	1600
6025	—	V. of West	Lisbon, Portugal	2125
6030	TGQO	R. Internacional	Guatemala City, Guat.	1630
	—	R. Baghdad	Baghdad, Iraq	1530
6040	—	R. Nacional	Madrid, Spain	2230
6060	—	R. Havana	Havana, Cuba	2200
6070	—	R. Soekarnobura	W. Irian, Indonesia	0200
	CPI8	R. El Condor	Oruro, Bolivia	2000
	CFRX	Rogers R.	Toronto, Ont.	0105
6075	DMR27	Nord & West. R.	Norden Osterloog, W. Germ.	2110
6080	ZL3	R. N.Z.	Wellington, N.Z.	0300
6085	—	R. Nederland	Hilversum, Neth.	2300
6090	—	R. Luxembourg	Junglinster, Lux.	1100
	LRII	RAE	Buenos Aires, Arg.	2200
6095	BED29	V. of Free China	Taipei, Formosa	2150
6105	XEQM	R. Frecuencias	Merida, Mexico	2000
6110	HRXV	R. Comayaguela	Comayaguela, Hond.	1915
	GSL	B.B.C.	London, England	2100
6120	—	Deutsche Welle	Cologne, W. Germ.	1710
	XETS	R. XETS	Tapachula, Mex.	0000
6130	CHNX	Maritime BC	Halifax, N.S.	1700
6135	—	R. Havana	Havana, Cuba	2300
6140	OAXIA	R. Delcar	Chiclayo, Peru	2215
6145	—	V. of America	Greenville, N.C.	1915
	—	Vatican R.	Vatican City	2005
	PRL9	R. Nacional	Rio de Janeiro, Brazil	0300
6150	—	R. Belgrade	Belgrade, Yugoslavia	0700
	VLW6	Austral. BC	Perth, Australia	1500
	GRW	B.B.C.	London, England	1800
6155	—	Ici Conakry	Conakry, Guinea Rep.	0130
6160	HJKJ	E. Nueva Granada	Bogota, Colombia	0708
	HSK9	Overseas BC	Bangkok, Thailand	2315
6175	—	R. Soekarnorbura	W. Irian, Indo.	0200
	—	R. Guarani	Belo Horizonte, Brazil	0040
6185	—	V. of The West	Lisbon, Port.	2245
6195	HJEZ	V. de Cali	Cali, Colombia	0720
	GRN	B.B.C.	London, England	2210
6205	OAZ4E	R. Mineria	La Oroya, Peru	1954
6210	TIHBG	R. Reloj	San Jose, Costa Rica	0130
6250	OAX7A	R. Cuzco	Cuzco, Peru	0930
6255	—	R. Andina	Huancayo, Peru	0355
6300	—	Radio N.T.S.	clandestine, W. Germ.	0300
6400	—	V. of America	Greenville, N.C.	1730
6705	—	Bayrak R.	clandestine, Cyprus	0130
6731	—	U.S. Air Force*	various air & land	—
6735	NAU	Guantanamo Air*	Guantanamo, Cuba	0315
6790	—	R. Tirana	Tirana, Albania	1420
6850	—	R. Tirana	Tirana, Albania	1420
7050	—	V. of America	Greenville, N.C.	0045

41 Meter Band—7100 to 7300 Kc/s

7120	GRM	B.B.C.	London, England	1740
7130	—	B.B.C.	London, England	2100
	BED7	V. of Free China	Taipei Formosa	0410
7150	—	R. Moscow	Moscow, U.S.S.R.	1700
7170	—	R. Moscow	Moscow, U.S.S.R.	1700
7195	—	R. Bucharest	Bucharest, Rumania	2120
7200	ETLF	R..V. of The Gospel	Addis Ababa, Ethiopia	1200
7235	VUD	All India Radio	Calcutta, India	1448
7240	—	R. Moscow	Moscow, U.S.S.R.	1700
7245	—	R. Francaise	St. Denis, Reunion I.	0238
7250	—	Vatican R.	Vatican City	1950
7260	—	Trans World R.	Monte Carlo, Monaco	0630
7275	—	Bayrak R.	clandestine, Cyprus	0130
7290	—	R. Moscow	Moscow, U.S.S.R.	1700
7305	HSK9	Overseas BC	Bangkok, Thailand	0725
7310	—	R. Moscow	Moscow, U.S.S.R.	1900
7335	CHU	Dominion Observ.*	Ottawa, Ontario	2202
7345	—	R. Prague	Prague, Czech.	2010
7360	—	R. Moscow	Moscow, U.S.S.R.	1900
7385	—	V. de la I. Palma	Las Palmas, Canary Is.	1530
7440	—	R. Moscow	Moscow, U.S.S.R.	1900
8829	WSY	N.Y. Aeradio*	New York, N.Y.	2316
8914	—	(N. Atl. Aero)*	various air & land	—
8984	—	U.S. Coast Guard Aero*	various air & land	—
9360	—	R. Nacional	Madrid, Spain	2000
9410	GRI	B.B.C.	London, England	0000
9485	—	United Arab BC	Cairo, Egypt	1750

31 Meter Band—9500 to 9775 Kc/s

9505	—	R. Japan N.H.K.	Tokyo, Japan	0300
	HIUA	Santo Domingo TV	Santo Domingo, D.R.	1840
9510	GSB	B.B.C.	London, England	2100
9515	XEWW	V. Amer. Latina	Mexico D.F., Mexico	2030
9520	VLT9	Austral BC	Port Moresby, New Guinea	0130
	OZF5	V. Denmark	Copenhagen, Den.	2030
	OAX4J	R. La Cronica	Lima, Peru	2300
9525	—	R. Havana	Havana, Cuba	1930
9535	HER4	Swiss BC	Berne, Switz.	2015
9540	ZL2	R. N.Z.	Wellington, N.Z.	0110
9555	YSS	R. Nacional	San Salvador, El Salv.	2300
9560	—	V. of America	Greenville, N.C.	0115
	—	R. Amman	Amman, Jordan	2045
9570	—	R. Australia	Melbourne, Australia	0100
9575	—	RAI	Rome, Italy	2215
9580	—	R. Australia	Melbourne, Australia	0715
	GSC	B.B.C.	London, England	2210
9590	—	Lebanese BC	Beirut, Lebanon	2130
9600	—	R. Australia	Melbourne, Australia	1300
	CE960	R. Pres. Balmareda	Santiago, Chile	0000
9605	DMQ9	Deutsche Welle	Cologne, W. Germ.	2045
9607	—	R. Athens	Athens, Greece	1600
9610	VLW9	Austral. BC	Perth, Australia	0300
	LLG	R. Norway	Oslo, Norway	2000
9615	TIRICA	V. de la Victor	San Jose, Costa Rica	2130
	—	R. Nacional	Madrid, Spain	2010
9625	—	R. Canada	Montreal, Que.	1705
9635	—	V. of America	Greenville, N.C.	1830
9640	DMQ9	Deutsche Welle	Cologne, W. Germ.	2230
	HLK5	Korean BC	Seoul, Korea	2215
9645	—	Vatican R.	Vatican City	2005
9660	—	Govorit Kiev	Kiev, U.S.S.R.	2150
9665	CR6RD	R. Clb. de Huambo	Nova Lisboa, Angola	1330
9670	TGNB	R. Cultural	Guatemala City, Guat.	2230
9675	ZYT29	R. Diario Manha	Sao Paulo, Brazil	1830
9685	BED73	V. of Free China	Taipei, Formosa	2150
	ZYR227	R. Gazeta	Sao Paulo, Braz.	1800
9690	LRA32	RAE	Buenos Aires, Arg.	2210
9700	—	V. of America	Greenville, N.C.	1000
	—	R. Sofia	Sofia, Bulgaria	1925
9715	—	R. Nederland	Hilversum, Neth.	2300
9720	—	R. Dakar	Dakar, Senegal	0330
9730	—	Far East BC	Manila, Phil.	1030
9745	HCJB	V. of the Andes	Quito, Ecuador	1840
9755	—	R. TV Francaise	Paris, France	2100
9770	4VEH	V. Evangelique	Cap Hatien, Haiti	1300
	OAX80	R. Amazonas	Iquitos, Peru	2045
	OEI47	R. Austria	Vienna, Austria	2115
9795	—	R. Prague	Prague, Czech.	2231
9833	—	R. Budapest	Budapest, Hungary	1700
9885	—	Kol Yisrael	Jerusalem, Israel	1543
9915	VUD	All India R.	Delhi, India	1448
11540	—	RAI	Rome, Italy	2000

Kc/s	Call	Name	Location	EST
11675	—	R. Australia	Melbourne, Australia	0715
11690	—	Govorit Yerevan	Yerevan, U.S.S.R.	1515

25 Meter Band—11700 to 11975 Kc/s

11710	—	R. Australia	Melbourne, Australia	0100
	KGEI	V. of Friendship	San Francisco, Calif.	2305
11720	—	R. Athens	Athens, Greece	1600
	CHOL	R. Canada	Montreal, Que.	0230
11725	—	R. Brazzaville	Brazzaville, Congo	0035
11730	—	R. Nederland	Hilversum, Neth.	1600
	—	Armed Forces R.	Los Angeles, Calif.	2125
	—	R. Moscow	Moscow, U.S.S.R.	1730
11735	—	R. Havana	Havana, Cuba	0145
11738	CE1174	R. Nuevo Mundo	Santiago, Chile	1715
11740	—	Vatican R.	Vatican City	1615
11750	GSD	B.B.C.	London, England	1600
11765	—	Armed Forces R.	Los Angeles, Calif.	2100
11770	GVU	B.B.C.	London, England	1600
	—	R. Havana	Havana, Cuba	0952
11780	—	B.B.C.	London, England	1810
	ZL3	R. N.Z.	Wellington, N.Z.	2230
11795	WINB	WINB	Red Lion, Pa.	0500
11800	—	R. Ghana	Accra, Ghana	1555
11805	—	R. Globo	Rio de Janeiro, Brazil	1900
	—	R. Sweden	Stockholm, Sweden	2105
11810	—	R. Australia	Melbourne, Australia	0135
11825	WRUL	R. N.Y. Worldwide	New York, N.Y.	1125
	BED69	V. of Free China	Taipei, Formosa	2150
11835	4VEH	V. Evangelique	Cap Hatien, Haiti	1843
	CXA19	R. el Espectador	Montivideo, Uruguay	1530
11840	—	R. Australia	Melbourne, Australia	1300
11850	LLK	R. Norway	Oslo, Norway	2300
	ORU4	Belgian R. TV	Brussels, Belg.	1815
11860	—	R. Havana	Havana, Cuba	0000
	BED45	V. of Free China	Taipei, Formosa	0410
11865	HER5	Swiss BC	Berne, Switzerland	2315
	—	R. Havana	Havana, Cuba	2200
11880	XEHH	R. Comerciales	Mexico D.F., Mex.	1730
11900	—	RAI	Rome, Italy	1920
	WRUL	R. N.Y. Worldwide	New York, N.Y.	1130
	—	Armed Forces R.	Los Angeles, Calif.	2040
11905	—	RAI	Rome, Italy	1930
11910	HSK9	Overseas BC	Bangkok, Thailand	0800
	—	R. Budapest	Budapest, Hungary	1930
11925	HLK6	Korean BC	Seoul, Korea	0245
11940	WRUL	R. N.Y. Worldwide	New York, N.Y.	1100
11945	—	R. Angkatan Udara	Djakarta, Indonesia	0515
11950	—	Korean BC	Seoul, Korea	0915
11970	—	R. Havana	Havana, Cuba	2000
12095	GRF	B.B.C.	London, England	1650
13265	—	(N. Atl. Aero)*	various air & land	—
15070	GWC	B.B.C.	London, England	1915

19 Meter Band—15100 to 15450 Kc/s

15105	—	R. Japan N.H.K.	Tokyo, Japan	1700
15110	—	R. Moscow	Moscow, U.S.S.R.	1150
15115	—	R. Peking	Peking, China	2230
15120	—	R. Havana	Havana, Cuba	0950
15125	—	R. Teheran	Teheran, Iran	1530
15155	—	R. Havana	Havana, Cuba	1500
15160	TAU	R. Ankara	Ankara, Turkey	1700
15165	OZF7	V. of Denmark	Copenhagen, Denmark	1020
	—	R. Damascus	Damascus, Syria	1120
15180	GSO	B.B.C.	London, England	1445
15185	—	Finnish BC	Helsinki Finland	1630
15200	VLG15	R. Australia	Melbourne, Australia	1300
15205	XESC	R. Tropical Mex.	Mexico D.F., Mex.	1800
15210	—	V. of Africa	Cairo, Egypt	1600
15220	—	R. Australia	Melbourne, Australia	2329
	—	R. S. Africa	Paradys, S. Africa	1246
15225	—	Armed Forces R.	New York, N.Y.	0930
15230	—	Far East BC	Manila, Phil.	0720
15240	—	R. Sweden	Stockholm, Sweden	0915
	—	R. Australia	Melbourne, Australia	2315
	—	R. Berlin I'ntl.	Berlin, E. Germany	0750
	—	R. Pyongyang	Pyongyang, N. Korea	2200
15245	VLX15	Austral. BC	Perth, Australia	0715
15255	—	V. of Nigeria	Lagos, Nigeria	0900
15260	GSI	B.B.C.	London, England	1745
15275	—	Armed Forces BC	Los Angeles, Calif.	1730
15280	—	Armed Forces BC	Los Angeles, Calif.	1730
15300	—	V. of America	Greenville, N.C.	1800
	—	V. of America	Tangiers, Morocco	1100
	GWR	B.B.C.	London, England	1800
15305	HER6	Swiss BC	Berne, Switz.	0820
15315	—	V. of America	Monrovia, Liberia	1145
15320	CKCS	R. Canada	Montreal, Que.	1500
15345	—	R. Athens	Athens, Greece	1500
	BED49	V. of Free China	Taipei, Formosa	2150
15350	HCJB	V. of the Andes	Quito, Ecuador	1730
15370	—	Govorit Tallin	Tallinn, Estonian S.S.R.	0500
	—	R. Liberdad	clandestine	1911
15380	—	Far East BC	Manila, Phil.	1630
	—	V. of The West	Lisbon, Portugal	1315
15395	BED71	V. of Free China	Taipei, Formosa	2150
15410	—	Armed Forces R.	Los Angeles, Calif.	1950
	ETLF	V. of The Gospel	Addis Ababa, Ethiopia	0700
15425	—	R. Nederland	Hilversum, Neth.	1600
15440	WRUL	R. N.Y. Worldwide	New York, N.Y.	1105
15445	—	R. Sweden	Stockholm, Sweden	1010
16005	—	R. Peking	Peking, China	1705
16095	—	R. Baghdad	Baghdad, Iraq	1600
17695	—	B.B.C.	London, England	1100

16 Meter Band—17700 to 17900 Kc/s

17720	WINB	WINB	Red Lion, Pa.	1435
17725	—	R. Japan NHK	Tokyo, Japan	0100
17740	GRQ	B.B.C.	London, England	1510
17790	GSG	B.B.C.	London, England	0845
17820	—	R. Australia	Melbourne, Australia	2329
17840	—	R. Australia	Melbourne, Australia	2000
17860	—	R. Havana	Havana, Cuba	0943
17870	GRP	B.B.C.	London, England	1455
	—	R. Australia	Melbourne, Australia	2300
17890	BED40	V. of Free China	Taipei, Formosa	2150
	HCJB	V. of the Andes	Quito, Ecuador	0633
17894	—	R. Japan NHK	Tokyo, Japan	0130
17900	—	R. Havana	Havana, Cuba	1500
17910	—	R. Ghana	Accra, Ghana	0945

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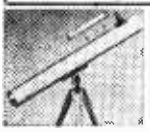

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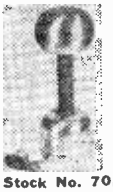

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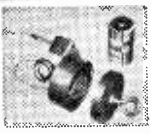

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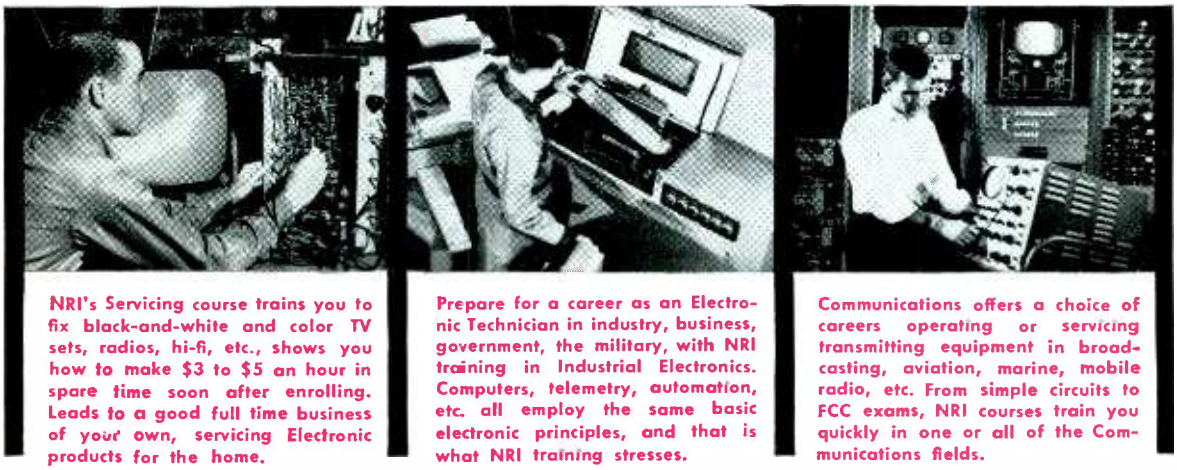

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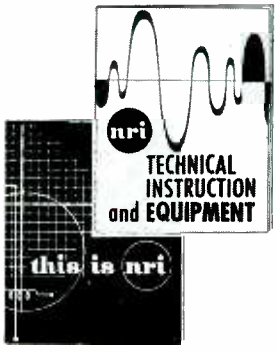

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