HOW TO EAVESDROP ON LOCAL FUZZ

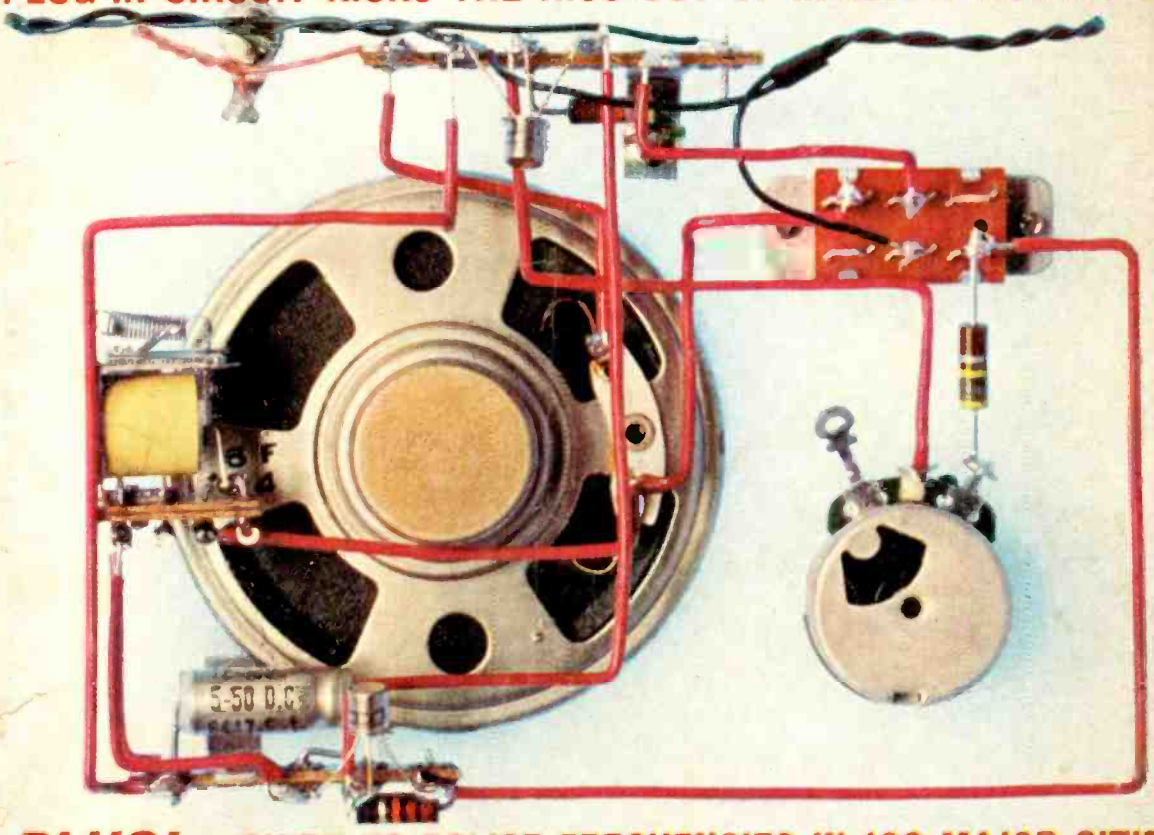
Radio-TV EXPERIMENTER

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

APRIL-MAY 75¢

ADD SQUELCH TO YOUR POLICE RECEIVER

PLUG-IN CIRCUIT KICKS THE HISS OUT OF INTERSTATION NOISE



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Build full-range tremolo for go-go guitars
Build beginner's multi-band compactron receiver

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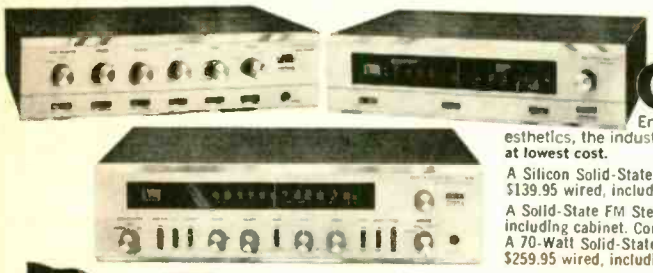
Uncompromising engineering—for value does it!
You save up to 50% with Eico Kits and Wired Equipment.



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

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

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The newest excitement in kits.
100% solid-state and *professional*.
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Model 20A3, 20,000Ω/V, $12.95.
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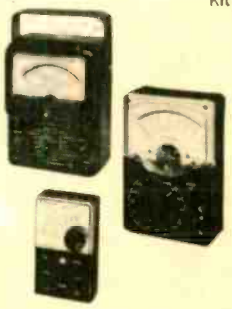

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April/ May 1968

SPECIAL SECTION ON POLICE RADIO

SPECIAL CONSTRUCTION FEATURES

ELECTRONICS FEATURES

COMMUNICATIONS: CB • Ham • SWL

FEATURETTES

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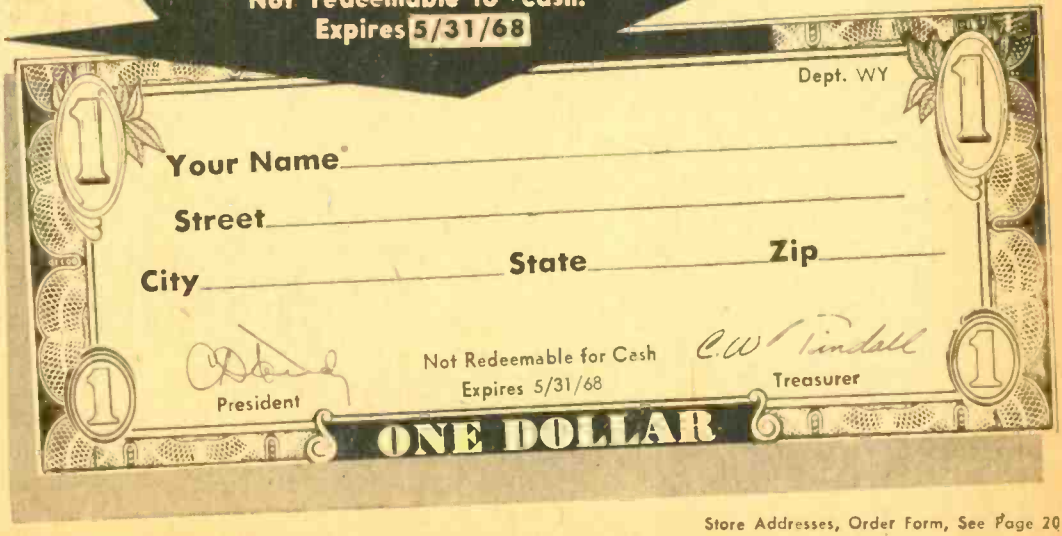

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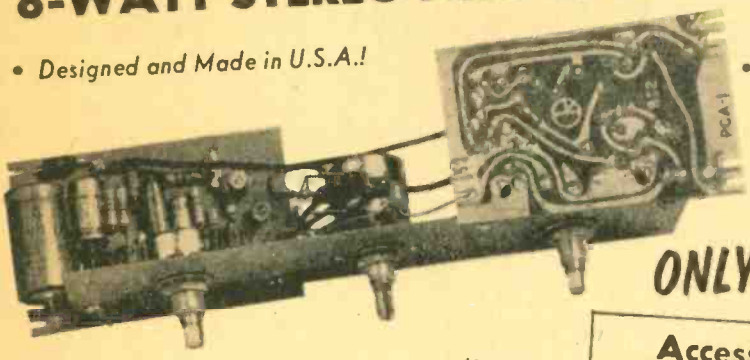
GIANT VALUES FOR "SOUND" HOBBYISTS

8-WATT STEREO AMPLIFIER SEMI-KIT

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



ONLY 10.95

Your chance to scoop up a pre-wired solid state stereo amplifier for only $10.95! Devise your own custom-installation! No engineering skills are required! Just add the leads. 2 volume controls, one for each channel, plus a wide-range tone control. Input impedance is 600KΩ with frequency response from 50-20,000 cps. Operating either on AC or battery, the amplifier accepts 8-16Ω speakers; crystal or ceramic cartridge of AM/FM stereo tuner. Transformerless output circuit. You needn't shop around for other parts. Purchase the accessory kit especially designed for the amplifier (see right). #30-1969

Accessory Kit for 8W Amplifier

ONLY 3.95

- *Knobs*
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Hook Up, Install Anywhere!

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

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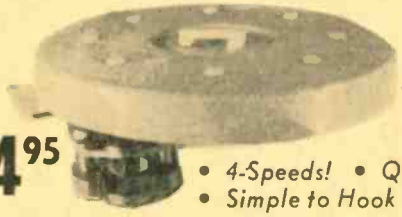

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- *4-Speeds!* • *Quiet!*
- *Simple to Hook Up!*

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

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- *20-20,000 CPS!*

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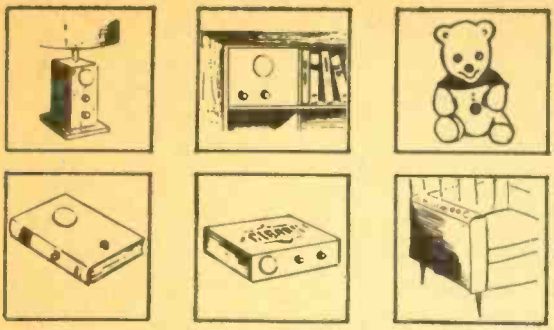

SEE PAGE 5

SAVE EVEN MORE, USE YOUR

FREE $1.00 YEAR END BONUS

NO STRINGS! USE LIKE MONEY!

ONE DOLLA

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

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

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

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

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

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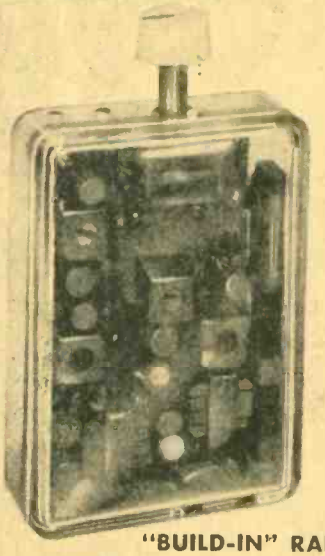
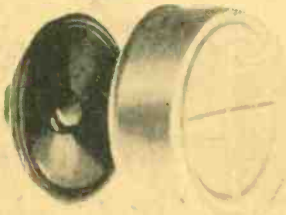


"BUILD-IN" RADIO

VOLUME CONTROL AND SWITCH



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SEE PAGE 5

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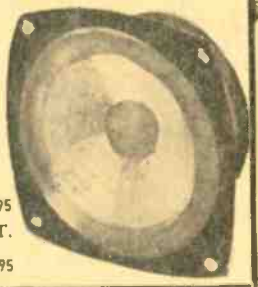
BUILD "EI'S" MIGHTY SUB-MINI SPEAKER

4" Acoustic Suspension FE-103 Speaker System!



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

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

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8 Ohm Impedance

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Separate Transducers!

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No Clamping! No Cleaning!

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Neck/Hand/Desk Use!

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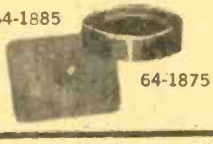
1,000's of Home, Office, Auto Uses!



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69¢ Each
12 & UP
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U.S. made with superactive rosin core. Fits fed. specs. QQ-S-571d
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4 draws with adjustable compartments.
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99¢

Over 600 pieces! Something here for everyone! All brand new — no sweepings! One full pound. Comparable value: $4.50!
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THESE ELECTRONIC PROJECTS HAVE EARNED CASH AWARDS FOR RADIO SHACK CUSTOMERS

Build Yourself — or Win Cash by Sending Us Your Own Ideas!

W. R.
San Francisco, California

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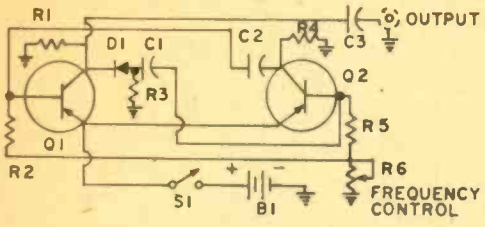
Check Out the Frequency Response of Hi-Fi Amplifiers — Tape Recorders — Preamplifiers



PROJECT PARTS LIST

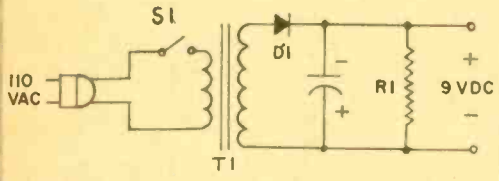
Stock No.	Item	Net
23-464	9V Rectangular Battery	.29
71-5194	.01 mfd Capacitors (C1, C2)	.18
71-0409	.1 mfd Capacitor (C3)	.22
276-1709	1N34 Germanium diode (D1)	.27
276-401	PNP Transistor (Q1, Q2)	.99
70-0195	3.3 K Resistor (R1, R3, R4)	.12
70-0195	6.8 K Resistor (R2, R5)	.12
271-1716	50 K Potentiometer (R6)	.59
275-602	SPST Toggle Switch	.30
270-325	Set of 5 battery connectors	.69
276-1390	Prepunch breadboards, 4½ x 5⅝"	.55
270-1395	Solderless terminals, (set of 5)	.99

Use this square wave generator, together with an oscilloscope, to analyze the frequency characteristics of any audio amplifier. The unit is adjustable over a broad range of audio frequencies.

F. R. F.
Chatsworth H.S. California

ELIMINATOR/CHARGER

Use Either in Place of a 9-Volt Battery or to Charge Batteries to Full Power. Save $$$!



PROJECT PARTS LIST

Stock No.	Item	Net
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273-050	6.3V @ 1.2A Filament Transformer	1.19
274-687	Terminal strips (kit of 5)	.40
276-1135	Rectifier epoxy (kit of 2)	.29
275-602	SPST Switch	.30
272-986	Capacitor 500 μf (1)	.72
70-0195	10 KΩ ½W Resistor (1)	.12
278-1253	6 Ft. Line cord (1)	.39
276-1390	Prepunched breadboard (1)	.55
275-602	SPST Toggle Switch	.30

Now you can run electronic kits and experiments that use 9V DC power without buying new batteries! Simply plug into any 117 VAC outlet; delivers up to 250 ma. at 9 VDC.

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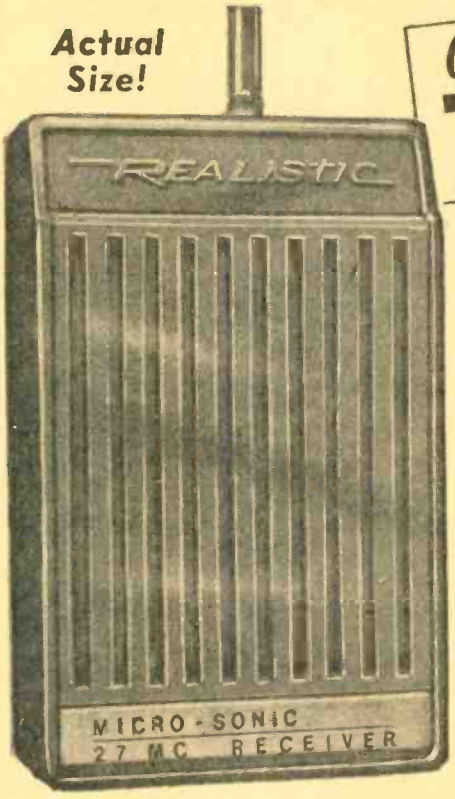
RADIO SHACK EXCLUSIVE! ADD A SLAVE "WALKIE" TO YOUR BASE, MOBILE, OR WALKIE TALKIES!

Actual Size!



ONLY 7.95

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

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

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

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

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

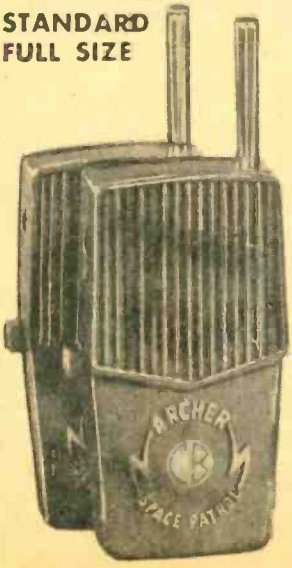
FREE ACCESSORIES:

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

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

RADIO SHACK'S FABULOUS SPACE PATROL® TWOSOME

STANDARD FULL SIZE



ARCHER

SPACE PATROL®

Talk up to ¼ mile with our perennial favorite in the 100MW no-license class. Over 100,000 of these transceivers now in use! "Lock-on" talk switch for continuous transmission when needed. Extra-long 43" telescopic antenna! Channel 14 crystal & battery included.

11.95

PER PAIR

ARCHER MICRO

SPACE PATROL®

Double transformer talk-power in the world's smallest (3-5/6 x 2-7/16 x 1¼") case. Fits easily in your shirt pocket (and your budget). Handsomely styled hi-impact, custom-chromed case. Easy to operate with a hideaway "push-to-talk" button. 9-section telescoping antenna. With channel 14 crystal and battery.

14.95

PER PAIR

For Store Addresses, Order Form, See Page 20

CB'ers MOBILE REALISTIC® TRANSCEIVERS!

23-CHANNEL CRYSTAL-CONTROLLED TRANSCEIVER

139.95

- *18 Transistors; 4 Diodes!*
- *Antenna Change-Over Relay!*
- *Low Battery Drain!*
- *Synthesizer Circuitry!*
- *Illuminated "S" Meter & Channel Selector!*
- *Wood Grain & Chrome Front Panel!*

Obsoletes all other 23-channel crystal-controlled transceivers! High-efficiency — up to 3.5 watts output with 5 watts input. Dual conversion, with 10.62 Mhz and 455 Khz IF's for sharp selectivity. Sensitivity: 0.25 μv at 10 db S/N. Adjustable squelch control and automatic series gate noise limiter. 12 VDC neg. ground. Plug-in ceramic mike and retractable coil cord, fusable DC power cable, bracket, instructions and hardware.

21-124, TRC-24, Ship. Wt. 6 lbs. ..... Net 139.95

REALISTIC® 12 CHANNEL CB TRANSCEIVER

Single Crystal Operation for Receive and Transmit

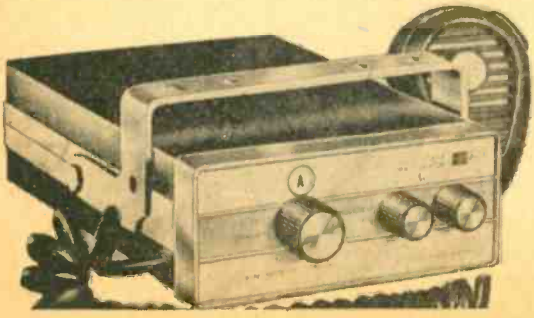
99.95

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

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

21-120, Ship. Wt. 8 lbs. ..... Net 99.95

REALISTIC® SOLID STATE MOBILE 2-WAY RADIO



- *8-Crystal Controlled Channels!*
- *All Silicon Transistors!*

79.95

Economy priced. Model TRC-14 features full 5-watts input, adjustable squelch control and advanced electronic antenna switching. Sensitivity: 1 μv for 10 db SN/N. 12 VDC neg. ground. Set of crystals for channel 11, push-to-talk ceramic mike, mounting bracket, DC cable and instructions. 8¼ x 5⅜ x 2⅓".

21-032, Ship. Wt. 5 lbs. ..... Net 79.95

TRC-15 — Same as above but for 12 channel operation, illuminated channel selector, die cast panel, extruded trim and coil cable push-to-talk.

21-033, Wt. 5 lbs. ..... Net 89.95

For Store Addresses, Order Form, See Page 20.

EASY-TO-USE =MICRONTA TEST EQUIPMENT!

1,000 OHMS/VOLT MULTITESTER

5.95 Factory Wired

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

Only 3½ x 2⅛ x 1"!

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

22-4027, Ship. Wt. 1 lb. ..... Net 5.95

20,000 OHMS/VOLT MULTITESTER

14.95 Factory Wired

- *28-Ranges!*
- *Mirrored 2-Color Scale!*
- *Jewelled Movement!*

Only 3⅝ x 5-3/16 x 1¼"!

Single-knob range selector with separate ohms adjustment. Spec.: DC Volts 0-3/15/60/300/600/1200 @ 20,000 ohms/volt. AC Volts 0-6/30/120/600/1200 @ 10,000 ohms/volt. DC Current 0-60μa/3 ma, 30 ma, 300 ma. Resistance range 0-12K, 120K, 1.2 meg and 12 meg (at center scale 60, 600, 6K & 60K). Decibels: −20 to +63 db (5 ranges).

22-022, Ship. Wt. 2 lbs. ..... Net 14.95

50,000 OHMS/VOLT MULTITESTER

27.95 Factory Wired

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

Only 7 x 5½ x 5⅝"!

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

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

For Store Addresses, Order Form, See Page 20.

=MICRONTA 6½" VTVM METER

39.95 Factory Wired

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

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

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

EXCITING ELECTRONIC PARTS VALUES

10 Germanium Diodes

Similar to 1N34, 1N34A, 1N60

99¢

Equivalent in use to silicon diodes with lower forward voltage drop.
276-821, Wt. ¼ lb. ..... Net .99

JUMPER LEAD CLIPS

99¢ Set of 10

Ten 14" jumper lead wires with miniature alligator clips on each end. Leads are color coded for testing!
278-1156, Ship. Wt. 6 oz. ..... Net .99

5" VERNIER DIAL

3.99 • *6:1 Drive Ratio!* • *5 Blank Scales!*

Large face is ideal for test equipment, calibration, etc. 0-180 logging scale. Hairline pointer ¼" dial shaft in rear can be coupled with another shaft. Plastic see-through window, plus large easy-to-grip knob.
274-388, Ship. Wt. 1 lb. ..... Net 3.99

Variable Loopstick Antenna Kit

99¢ Kit of 3

3-pc pack for general replacement in small radios. Variable core tunes to 365 mmf tuning condenser Tapped for transistor applications.
270-376 ..... Net .99

JUMBO 100 PC. RESISTOR PAK

2.19

50 carbons, 30 precisions, 20 power resistors. Popular values. ½, 1, 2, 3, 5, 7, 10 watt sizes. Some 1% & 5% incl.
271-302, Ship. Wt. 2 lbs. ..... Net 2.19

STANDARD ¼" PHONE PLUG

99¢ Kit of 4

Plugs into standard ¼-inch phone jack. Screw terminal connections.
274-1536, Wt. 4 oz. ..... Net .99

INSULATED CLIP SET

99¢ Set of 14

With rubber insulators — 7 black, 7 red. Solder type Length 1⅜".
270-1545, Ship. wt. 4 oz. ..... Net .99

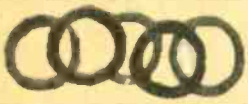
1" MATCHED KNOB KIT

99¢ Set of 5

Black knurled knobs w/polished aluminum inlay. Brass inserts for ¼" shaft. Set screw. 1 x ¾".
274-1552, Ship. Wt. 4 oz. .... Net .99

500' HOOK UP WIRE

2.98



Mammoth bargain. 5-100 ft. coils in popular colors. Sizes #18 thru #22, suitable for most wiring jobs. Stranded and solid types.
278-1484, Sh. wt. 2 lbs. ..... Net 2.98

MINIATURE LAMP ASSEMBLIES

99¢ Kit of 4

Complete with miniature 6V bulbs. Contains 2 red and 2 green jewels. Mounts in 5/16" hole.
272-344, Ship. Wt. ¼ lb. ..... Net .99

½ lb. Jumbo Pack of Disc Capacitors

2.49 Per Pak

OVER 300 PIECES! All popular values and voltages. Most are marked with capacity and voltages.
272-987, Ship. Wt. ½ lb. ..... Net 2.49

60-PC. TRANSISTOR SURPRISE PAK

2.98

Includes NPN's, PNP's, 10W, 20W and 50W transistors, as well as subminiature types, 60 in all!
276-034, Sh. wt. 2 lbs. ..... Net 2.98

SCREW TERMINAL KIT

99¢ Kit of 13 Pc.

1½, 2¼, and 2¾" lengths, by ⅛" H.
274-345, Ship. Wt. ¼ lb. ..... Net .99

NEON PILOT LIGHTS

Kit of 3 **99¢**

Built-in neon lamps. Jewel front; 2 red, 1 yellow. For 117 VAC use. With 3 dropping resistors.
272-338, ¼ lb. ..... Net .99

MINIATURE PUSHBUTTON SPST SWITCHES

99¢ Pkg of 5

Momentary pushbutton switches. Normally open circuit. Solder lug terminals. Panel mounting, Red button and black phenolic housing. 2 x ⅜".
275-1547, Ship. wt. ¼ lb. ..... Net .99

3 CIRCUIT PLUG & JACK

99¢ Set of 2

Set of two 3-circuit ¼" phone plugs, jacks. Black bakelite handle. Solder lug terminals. Open circuit jack complete with mounting hardware.
274-323, Ship. wt. ¼ lb. ..... Net .99

Infra-Red Detector Transducer Kit

1.98

Parabolic reflector, 3" filter, and detector complete with pictorial diagram. Wonderful experimenters kit!
276-035, Ship. Wt. ½ lb. ..... Net 1.98

For Store Addresses, Order Form, See Page 20.

SEMI-CONDUCTORS FOR THE HOBBYIST

ARCHER Replacement Transistors

PNP TYPES

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

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

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

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

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

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

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

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

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

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

NPN TYPES

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

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

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

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

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

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

Integrated Circuit Specials!


Actual Size

1.98 Up

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

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

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

DUAL JK FLIP-FLOP. Construct your own binary computers, digital adding machines, etc. Contains up to 26 transistors & 50 resistors per pak.
276-431, Wt. 3 oz. ..... Net 2.49

For Store Addresses, Order Form, See Page 20.

Silicon Field-Effect Transistors

1.98

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

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

IBM Component Boards

29¢

SAVE!

4 for 1.00

All quality American made parts. Each board contains at least two transistors, plus loads of other components: resistors, capacitors, coils, diodes, modules, chokes, and heat sinks. Size: 2⅜ x 3⅞".
276-616, Sh. wt. ¼ lb. ..... Net .29

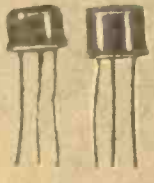
3 Amp Silicon-Controlled Rectifiers

1.95

TO-66 Case! 200V

Designed to deliver loads up to 3 amps. Ideal for use in speed control operation, power converters.
276-1065 ..... Net 1.95
276-1066, TO-66 mtg. hdwr. ..... .30

100-Pc. Jumbo Pak Assorted Transistors



3.98

Includes Silicon & Planars

NPN & PNP in TO-5 case; power transistors, too! Ideal in RF & IF driver, output, switching, general audio purposes.
276-544, Sh. wt. 1 lb. ..... Net 3.98

SEE PAGE 5

SAVE EVEN MORE, USE YOUR

FREE $1.00 YEAR END BONUS

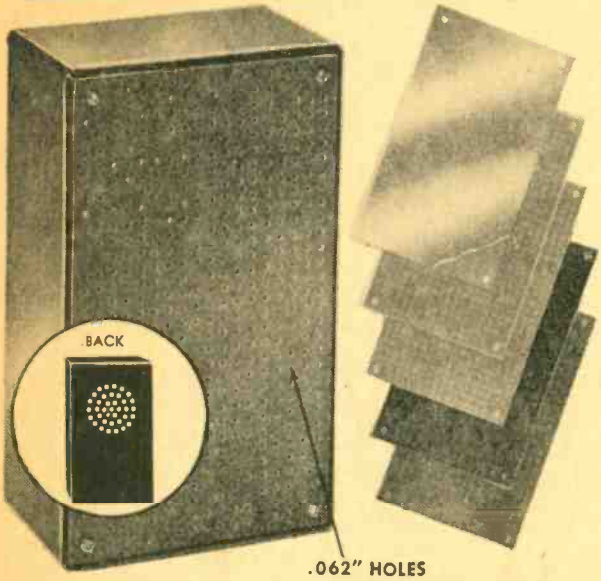
NO STRINGS! USE LIKE MONEY!

ONE DOLLAR

Ingenious New Radio Shack PERFBOX™

"Professionalizes" Project Building

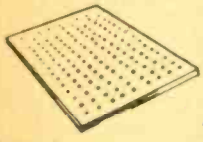
The bloody-knuckle brigade will appreciate Radio Shack's effort to eliminate chassis cutting and drilling and make things easier!



Somebody at "The Shack"—thank heaven! —must hate metal chassis and the generally sloppy look of breadboard projects. Now they've come up with a bakelite chassis box into which they've installed (4 screws) a 3½" x 6" perfboard top. But that's not all—the back of the box is pre-drilled for a 2¼" or other PM speaker, and there's a pre-drilled ¼" outlet hole on one side! This much-needed item is called the Radio Shack Experimenter's PERFBOX™, *(Cat. No. 270-097, price $1.69)* and should sell like film at Expo 67. As an added fillip, there's a companion deal they call Radio Shack Experimenter's 5-Piece Panel Set, consisting of 3 perfboards and 1 aluminum and 1 bakelite panel board, all 3¼"x6" predrilled to fit the PERFBOX™. The latter two boards are un-perfed (to coin a word), and the 5-piece set *(Cat. No. 270-100, price $1.69)* should answer just about any need for extending the usefulness of the PERFBOX short of filling it with champagne!

RECOMMENDED PARTS FOR USE IN PERFBOX PROJECTS

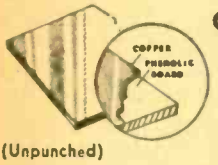
DESIGN, CONSTRUCT YOUR OWN CIRCUITS . . . using these time-saving phenolic boards, breadboard or permanent type. 3/32" holes punched on 0.265" centers. Can be sawed. Shipping weight 1 lb.


Punched

UNCLAD PERF-BOARD

- *Accepts Miniature Components!*
- *Easy-In, Easy-Out Mounting!*
- *Ideal for Modular Construction!*

276-1582, 3.65x6.87x1/16" ..... Net .59
276-1583, 6.87x9.8x1/16" ..... Net 1.15

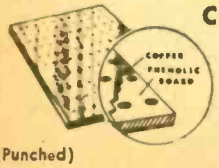


(Unpunched)

COPPER-CLAD SOLID BOARD

- *Make Your Own Printed Circuits!*
- *Quality-Manufactured Board*
- *Bonded with Copper!*

276-1586, 3.65 x 6.87 x 1/16" ..... Net .79
276-1587, 6.87 x 9.8 x 1/16" ..... Net 1.50



(Punched)

COPPER-CLAD PERF-BOARD

- *For Printed Circuit Design and Circuit Checkout!*
- *Easily Etched and Worked!*

276-1584, 3.65x6.87x1/16" ..... Net. .89
276-1585, 6.87x9.8x1/16" ..... Net 1.75

PUSH-IN TERMINAL KIT

1.49 Kit of 100

Use with prepunched perf boards. .062 diameter holes (1/16"). Serrated slots. Easy multiple connections.
270-1394, ¼ lb. Net 1.49

SPRING BANANA PLUGS

99¢ Set of 10

Ideal for 3/32" hole perforated boards. Overall length 1".
270-1543, 2 oz. .... Net 99¢

SOLDERLESS TERMINALS

99¢ Set of 15

Use with .093 diameter holes. Takes up to 7 leads without soldering. USA made. Spring action.
270-1395, 4 oz. .... Net 99¢

ALLIGATOR CLIP SET

99¢

10 brass plated 1⅜" long with insulated phenolic barrels. Strong spring. 5 red, 5 black.
270-1540, 2 oz. .... Net 99¢

For Store Addresses, Order Form, See Page 20

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

SEE PAGE 5

SAVE EVEN MORE, USE YOUR

FREE $1.00 YEAR END BONUS

NO STRINGS! USE LIKE MONEY!

ONE DOLLAR

20 Power Resistors

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

271-1202, 2 lbs. ..... Net 1.00

35 Precision 1% Resistors

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

271-1196, 1 lb. ..... Net 1.00

50 Tubular Capacitors

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

272-1568, 1 lb. ..... Net 1.00

4 Subminiature 455KC IF Transformers

Slug tuned, made for printed circuitry mtg., shielded. Size: ⅜ x ⅜ x ½".

273-515, ¼ lb. .... Net 1.00

8 Sets - RCA Plugs & Jacks

Quality items, ideal for use in phono amplifiers, tuners, recorders, etc. Take advantage of this Radio Shack Special low price!

274-1575, ½ lb. ..... Net 1.00

35 Miniature Resistars

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

271-1566, ½ lb. ..... Net 1.00

40 Coils and Chokes

Shop assortment consisting of RF, OSC, IF, parasitic, peaking and many more types. Individually purchased, this would cost you $15!

273-1569, 1 lb. ..... Net 1.00

45 Mica Capacitors

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

272-1573, 1 lb. ..... Net 1.00

8 Volume Controls

Most Popular Values

Contains 8 assorted values including long and short shaft types. A tremendous bargain for servicemen!

271-127, 1 lb. ..... Net 1.00

Special! 50 Capacitors

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

272-1199, 1 lb. ..... Net 1.00

60 Half-Watt Resistors

Made by Allen Bradley and IRC. Many 5% and 10% tolerance. Color chart. All most popular values. An absolute "must" for hobbyists and kit-builders.

271-1612, 1 lb. ..... Net 1.00

50 Ceramic Capacitors

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

272-1566, 1 lb. ..... Net 1.00

48 Terminal Strips

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

274-1555, 1 lb. ..... Net 1.00

35 Disc Type Capacitors

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

272-1567, ¼ lb. ..... Net 1.00

150' of Hook-Up Wire

Assortment consists of 6 V rolls of 25' each — solid and stranded wire. #18 through #22. Necessary for multitude of jobs and always useful!

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SEE PAGE 5

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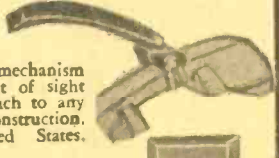

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POSITIVE FEEDBACK

JULIAN M. SIENKIEWICZ, EDITOR

■ Here we go with a reader's letter that talks of the good old days before this Editor was born. It's quite interesting, and to keep its original flavor we've made only a few grammatical corrections just to speed up your reading pleasure.

Dear Sir:

In the Dec. 1967/Jan. 1968 issue of RADIO-TV EXPERIMENTER magazine I read your article about the Variometer Radio.

Back in the summer of 1924 I was living on a farm up in Ashtabula County, Ohio. A neighbor of mine built a one-tube (201A) radio which had a regenerative circuit. It used 2 Variometers, 1 Variocoupler, and earphones. If, when tuning the set you happened to turn the control too high, the set would give off a screech which would make your hair stand on end. At this time, the Neutrodyne was just becoming popular.

In the Fall of 1924 I built a 1-tube radio (201A), using a variable condenser and coil. But it wouldn't tune below a 1000 kHz, so I sent to Randolph Radio Corp. in Chicago and purchased wire to wind experimental coils. Randolph Radio is now Allied Radio Corp. Anyway, I wound a basket-weave coil which would tune from 900 kHz to 1550 kHz. I used a switch so that I could tune the whole broadcast band. The reason that I started this experiment was that our best station, WTAM in Cleveland, Ohio, had its frequency changed to 1100 kHz and we couldn't receive it too well; with the new coil it came in fine. I also built a wavetrap which improved the selectivity of the set. Later, I added audio stages and a speaker.

In the Winter of 1925 I DXed 17 stations in California, which included KFI, KNX, and KPO. I received verification from these stations by sending 10¢ for the verification card. I never knew it till four or five years ago that Earl Anthony Inc., owner of KFI, was the Southern California distributor for General Motors.

I moved back to Marion, Ind. from Ashtabula County, Ohio in Dec. 1935. By the way,

the DX station that I got the biggest kick out of listening to wasn't one of the 17 California stations, but a little 25-watt job in Birmingham, Ala.

Since moving back to Indiana, I built a converter to tune shortwave and connected it to our table radio which was an old *Echophone* set. With this setup back in 1939 I used to listen to news in English at 5:00 p.m. CST each evening from Tokyo, Japan. I now have a Lafayette HE-10 communications set, two C-27 Knight CB dual-conversion transceivers which I built from Allied Knight-kits, one HB-500 Lafayette CB transistor transceiver, a Knight VTVM which I built from a kit, one 70-watt transistor Knight stereo amplifier built from a kit, and one AM/FM multiplex transistor tuner built from an Allied kit. I use two University Mustang speakers mounted in a 72-in. hi-fi cabinet.

A lot of water has went over the dam since that cold winter back in 1924 when we would take the storage battery out of the car and listen to the radio. We tuned in to Guy Lombardo and his Royal Canadians who played in Cleveland for several years. Radio was a Godsend for us folks out there in the country, especially when we were snowed in. Sometimes I wonder what we did for entertainment before the day of radio.

I remember one of the first programs we used to listen to was from Jefferson City, Mo. Harry Snodgrass, who was a prisoner at the Missouri State Prison, played the piano over this station every afternoon. I remember when he was paroled he was given a new Model T Ford and listeners all over the country sent him extras for his car.

I also listened to the first network radio, which was a hookup between three Eastern radio stations. Also, I heard WJZ when it made its first broadcast from its new setup at Boundbrook, N.J. And then there was Norman Brokenshire, the announcer, who started the continuous broadcast in which, when they switched to remote broadcast, the announcer would pick up the conversation from the other announcer and sometimes it would be a few seconds before you realized that it was a different announcer. I am sorry to take up so much of your time but I could go on for quite a while about FM-DX and TV-DX.

Wilbur J. Reed
1618 W. Nelson St.
Marion, Ind. 46952

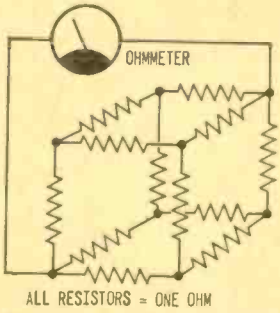
I'm sure there are many other old timers out there in readerland who have an interesting story to tell. Don't keep it under your hat—let me in on it, and I may publish your letter.

Who's Goof-Proof? My young friend Hal sure knows how to hurt a guy. Make one mistake, only one, and he will uncover it to your dismay. Here's a case in point.

Hal uses my extensive library of electronics magazines every chance he gets. I really don't care because I know the great pleasure librarians enjoy each day Hal fails to appear at our local library. One day Hal discovered in a yellowing magazine an electrical problem that I had posed to my readers several years ago, telling them the answer would be in the following issue.

Well, Hal had no reason to look up the answer, since he already knew the answer to what he considered an *elemental* problem. But he did look into the following issue, only to discover I had given the wrong answer to my readers. It made no never-mind to him that I corrected the mistake in a following issue. He insisted I do it all over. So, to set the record straight and get Hal out of my hair, let's have another go at it!

Imagine an ice cube with its 12 edges consisting of one-ohm resistors connected to each other at the corners of the cube. What would be the resistance of the cube after the ice melts and an ohmeter is connected to a pair of diagonally opposite corners of the cube? (See the diagram.)



Here's the resistive cube! Now figure out the ohmmeter reading!

Okay, figure it out any way you want to, but come up with the correct answer as I promise to do in the next issue of RADIO-TV EXPERIMENTER. If you don't have a subscription to the mag, make a deal with your newsstand dealer to save a copy for you. The way the mobs are sacking newsstands to pick up RADIO-TV EXPERIMENTER, newsstand copies are becoming as scarce as hens' teeth.

Last Issue's Puzzler. The trouble with too many of us is that we look for a method to solve a problem and use the first one that crosses our mind, no matter how difficult the method may be, or how easy other

(Continued on page 24)

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A selection of products available by mail for readers of Radio-TV Experimenter
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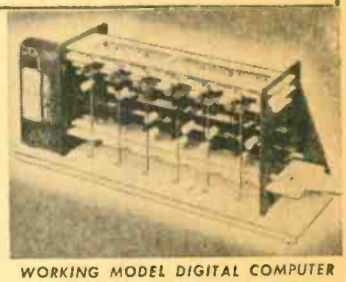

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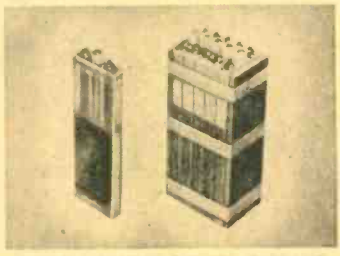

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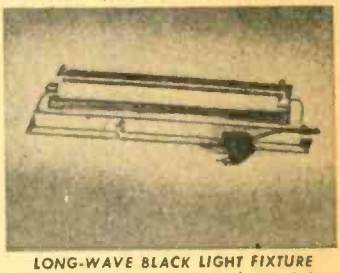
(Charger Kit) .....$ 8.00 Ppd.



LONG-WAVE BLACK LIGHT FIXTURE

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

Stock No. 70,364HP.....$9.95 Ppd.
No. 60,124HP (Replacement Bulb) $3.25 Ppd.

GIANT WEATHER BALLOONS

"Balls of fun" for kids, traffic stoppers for stores, terrific for amateur meteorologists. Create a neighborhood sensation. Great backyard fun. Exciting beach attraction. Amateur meteorologists use to measure cloud heights, wind speed, and temp. Made of heavy duty neoprene. Inflate with vacuum cleaner or auto air hose, or locally available helium for high rise.

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Stock No. 60,632HP...16'....$7.00 Ppd.

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POSITIVE FEEDBACK

Continued from page 22

methods would be if we only had searched for them. Here's how I solved the problem in the last issue by using addition and subtraction only:

1. Hal made one round trip by riding one way and walking back in 1½ hours, or:

walk one-way (hr.) + ride one-way (hr.) = 1½ hrs.

2. Let's assume Hal repeated the trip in step one again, so we write the equation again:

walk one-way (hr.) + ride one-way (hr.) = 1½ hrs.

3. Now, let's add the equation steps *1* and *2*, leaving out the term (hr.) to make the problem appear simpler:

walk one-way + ride one-way = 1½
walk one-way + ride one-way = 1½

walk round trip + ride round trip = 3

The sum tells us that one walking round trip time plus one riding round trip time adds up to 3 hours.

4. But Hal had told us that:

ride round trip = ½ hr.

Therefore, we perform the following subtraction:

walk round trip
+ ride round trip = 3
− ride round trip = − ½

walk round trip = 2½ hrs.

There you are! That's how to determine the round trip walking time, using only addition and subtraction as tools. Sure, the old *Rate* × *Time* = *Distance* equation method's quicker, but with Hal the Mooch, things are never easy.

Power Amp. If you want to cut the noise of a jet engine—and thousands of people do—you might try adding more noise. This paradoxical possibility arises from new research on the production of sound by flames, research that also has produced a high-fidelity system that uses welding torches for its loudspeakers. Researchers find that by adding or imposing electric currents on a flame, they can produce sound.

A lot of a jet's noise comes from a phenomenon called acoustic overloading—the flames as they scream through the engine strike a pitch

that sets the whole chamber, flames and all, vibrating, sending out more noise. But since sound pressure can change the characteristics of the flame, and thus its pitch, added electrically induced sound might throw the flame off-key, preventing the resonance and thus much of the noise.

This happy outcome grows from the work of engineers at the United Technology Center, Sunnyvale, Calif., where Dr. A. G. Cattaneo has been able to change electrical signals into flame vibrations which can fill a room with music or speech. Torch woofers and tweeters, however, are unlikely additions to the home hi-fi set. Although their fidelity is high enough; the complex flame system doesn't add anything (but heat) that can't be achieved more easily with conventional speakers.

Dr. Cattaneo also has, by playing music through a flame, caused it to change both its vibrations and its output of light. The changing light, picked up by a photocell, reproduced the music through a conventional speaker. Anybody got a match?

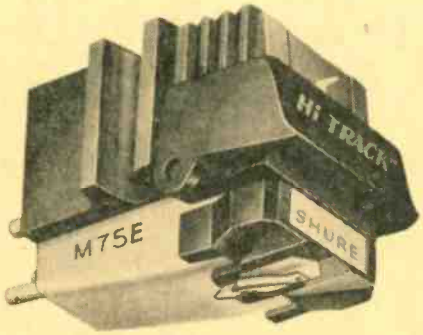
Courtesy National Research Council, Ottawa, Can.

Look Up Boys, Look Up! No, not at the sweet young thing, who happens to be Theresa Ann Tierney, Miss NRC of Canada, but at the tree and its fruit. The apple is the 1967 edition of the famed Newton apple tree. You see, this tree is a descendant of the fabled one Newton sat under when gravity struck him and it has borne fruit for the first time.

The tree, planted in 1963, was presented to NRC's Division of Applied Physics by the National Physical Laboratory at Teddington, England. The original Newton apple tree is said to have died in 1814. However, before it died a graft was said to have been taken from the tree and planted at Belton, England. It is from this tree at Belton that descendants of the original tree have been propagated since 1940. ■

Get on the Hi-Track

One of a new series of hi-track phono cartridges from Shure Bros. is the M75E, which has a bi-radial elliptical stylus, and is designed to track at from ¾ to 1½ grams, with optimum trackability obtained at a tracking force of 1 gram. The retractile stylus has a built-in stylus guard. Response is from 20-20,000 Hz; channel separation is more than 25 dB at 1,000 Hz. List price of the M75E is $39.50; also available is a special conical stylus with a radius of .0025-in., for playing 78 rpm records (the N75-3, $9.00). More details are yours from Shure Bros., Inc., 222 Hartrey Ave., Evanston, Ill. 60204.



Shure Bros. M75E Hi-Track Cartridge

Cool That Circuit, Man!

A new aerosol spray that cools circuits instantly goes by the name of Sprayon No. 2003 Circuit Cooler. Functionally, it permits instant

detection of bad capacitors, transistors, oxidized joints and junctions; isolates components to locate intermittence caused by heat-induced failure. No. 2003 Circuit Cooler is effective on all types of switches, eliminating noise due to dust and dirt. It is non-toxic, non-flammable, and is supplied in a 16-oz. can with an extension tube for pinpoint application. At your local electronic distributor, or write to Industrial Supply Div., Sprayon Products, Inc., 26300 Fargo Ave., Bedford Heights, Ohio 44146.

Sprayon Products No. 2003 Circuit Cooler

Life Sentence in a Cell

According to Waldom Electronics, the LIFE-CELL is the first completely self-contained rechargeable cell ever offered. The cell is in two sections. To recharge, the top section is removed, reversed and plugged into the bottom section again. This exposes a standard male AC plug on the top section, which plugs into any AC wall outlet. After recharging, the process is reversed. The LIFE-CELL can be used in any application where conventional "D" cells are used: in flashlights, radios, toys, power tools, etc. It holds its charge longer when not in use than conventional cells, on the shelf or in the device it's powering; and it's rated as leak-proof and shock-resistant. They recommend recharging on a regular schedule, like once a month, to insure full charge at all times. On this schedule, only 24 hours is usually required to fully recharge. List price of LIFE-CELL is $4.45 each, $8.45 per pair, available wherever batteries are sold. For further info write to Waldom Electronics, Inc., Dept. JS, 4625 W. 53rd St., Chicago, Ill. 60632.

Table This Radio

A beautifully simple receiver, the S-214 6-band AM/FM table radio uses Hallicrafters' "spread" tuning system which expands normally crowded shortwave channels. As well as the 19, 25, 31 and 49-meter overseas bands, the S-214 receives American AM and FM. The solid-state

NEW PRODUCTS

circuit uses 10 transistors and 6 diodes. There are only five controls: *off/on/volume, tone, band selector, AFC,* and *tuning*. An illuminated, multi-color slide rule dial indicates the frequencies of 60 foreign broadcast stations—and tells you the best time of day to look for each. There is automatic gain control, and the tuning range is 550-1600 kHz, 5.9-6.25 MHz, 11.5-12.0 MHz, 15.05-15.55 MHz and 88-108 MHz. Its low-distortion, Class B audio output stage delivers more than one watt to a 4-in. acoustical loudspeaker. And not one but three—count 'em—antennas: built-in ferrite loopstick for AM; telescoping switch for shortwave; line-cord antenna for FM. Private listening is yours by way of the rear-panel speaker/earphone jack. S-214 is 5⅞ x 13⅞ x 8 in., weighs about 10 lbs. See your local Hallicrafters dealer, or write to The Hallicrafters Co., 5th & Kostner Aves., Chicago, Ill. 60624.

Hallicrafters S-214 Table Radio

Pencil that +s, −s, ×s, ÷s By Itself!

And it solves square root problems, too. The Math-Wiz pencil calculator, 6½ x ½ in. in a gold-anodized aluminum case, gives answers automatically to addition, subtraction, multiplication, division and square root problems, simply by rotating its inside barrel. A nice gift idea, the Math-Wiz is $2.95 postpaid from Jack Weiser, Dept. 3, 1417 S. Fairfax Ave., Los Angeles, Calif. 90019.

Good/Bad Xistor Analyzer

Lectrotech's Model TT-250, which checks transistors in or out of the circuit, has no numerical readings to interpret—you get positive Good/Bad readings. Transistor leads do not have to be unsoldered or clipped for in-circuit tests measuring AC gain, a positive indication of transistor condition. Out-of-circuit tests measure Beta, or gain, on two scales: 0-250 and 0-500. Biasing is automatic and no calibration is required—all you do is plug in the transistor and read Beta. All testing is non-destructive—in or out of circuit—transistors or components can't be damaged. Pnp or npn can be determined im-

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Lectrotech TT-250 Transistor Analyzer

mediately without any set-up book. The Lectrotech TT-250 features a 6-in. meter and an all-steel case. Size, 10½ x 7 x 4 in.; weight 5½ lbs. Net price $87.50 at electronics distributors, or write to Lectrotech, Inc., 1221 W. Devon Ave., Chicago, Ill. 60626.

Fool-Proof Stereo Amp

This handsomely designed 40-watt solid-state stereo amplifier, the AM-310 from Olson, has special fast-action circuit breakers in each output circuit. If the speaker wires become shorted the circuit breaker quickly opens the circuit and protects the transistors. The solid-state circuit features special low-noise transistors and resistors in the critical pre-amp circuits. The AM-310 is housed in a walnut-finished wood cabinet with a brushed aluminum front panel, which has a stereo headphone jack. Power output 40 watts (20 per channel); response, 20-20,000 Hz. Inputs; magnetic phono, tape head, tuner, auxiliary. Outputs; tape monitor, tape record, speakers 8-16 ohms. Controls: volume, bass, treble, balance. Switches include selector, mono/stereo, loudness, tape monitor, speaker/phones and power. All this in a cabinet 9 3/16-in. h. x 4⅝-in. w. x 9-in. d. Available from Olson Electronics, Inc., 260 S. Forge St., Akron, Ohio 44308, for $89.98. ■

CAN YOU WRITE?

Did you know that RADIO-TV EXPERIMENTER buys the construction articles you read in each and every issue? And did you know that more than half are contributed by readers just like you? So, if you have built an original project, gear, rig or gadget, let the Editor know about it. Send a letter giving details, diagrams and photo. Do it now! ■

Disappointed Expectations

With my Alarcon B-10AP VHF/FM communications receiver, I sometimes pick up 88-108 MHz FM broadcasting stations. Could you please tell me how to remedy this and how I should hook up an external antenna?

—B.G., Windsor, Ont.

Last first: don't—an outside antenna will just help you pick up the unwanted FM broadcast band. Solution: buy a better receiver or just suffer.

Obviously

What can I use to substitute for a defective 1L6 converter tube used in a Zenith Trans-Oceanic?

—M.A., Aberdeen Proving Grounds, Md.

A new one!

The Eyes Have It

Please give me any information you have about lie detectors.

—S. K., Hetland, S. Dak.

Prof. Trelevan of Columbia University said you can detect lies by looking into the eyes and watching for pupil dilation and contraction. Contraction means a lie. Does that help?

April Fool?

How can I add an inexpensive automatic volume control (AVC) to an already assembled shortwave kit? Enclosed is a schematic of the receiver.

—S.R., Chattanooga, Tenn.

Wow! Putting AVC on a two-tube regenerative set like yours seems a little like installing air conditioning on a pair of roller skates, n'est ce pas?

Way Back When

I have a Crosley "Cincinnati" radio (and I mean one with white whiskers) but only one tube numbered "Experimental #ER 5552311." There is no serial, model or other information anywhere in the cabinet or on the chassis. Do you know where I could pick up three additional tubes for the antique? If I could get this baby of the stone age to work, wonder what I would pick up?

—W.H.A., Dalton, Ga.

You could probably pick up great, wild and wonderful things like the ones you pick up on your transistor portable. Meanwhile, try writing to Avco Corp. in Cincinnati to get replacement tubes. They bought up Powell Crosley's business a while ago.

Cheap Talk

I have heard about hydrophones. I would like to be able to talk from my boat to my shore-side cottage without using radio. Is this possible?

—F.S., Reno, Nev.

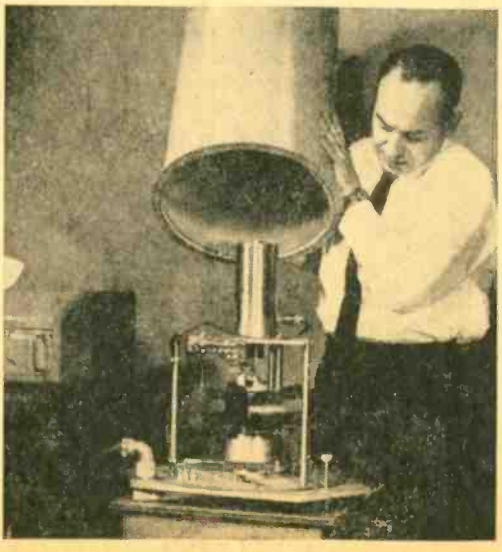
Now look here, F.S., if you don't want to use two-way radio, why are you reading this book?

Pressure-Watching Nut

Can you tell me how to make a barometer? I got the idea that with a tube of mercury, a special purpose vacuum tube of some type, a meter of some type, a pot and other parts unknown to me at this time, a barometer could be made fairly cheaply and simply. I prefer that it indicate millibars but inches will do.

—H.W.A., Somerville, Ala.

You can make one like this (below) for a couple of thousand—or you can buy an aneroid type barometer for a few bucks. O.K.?



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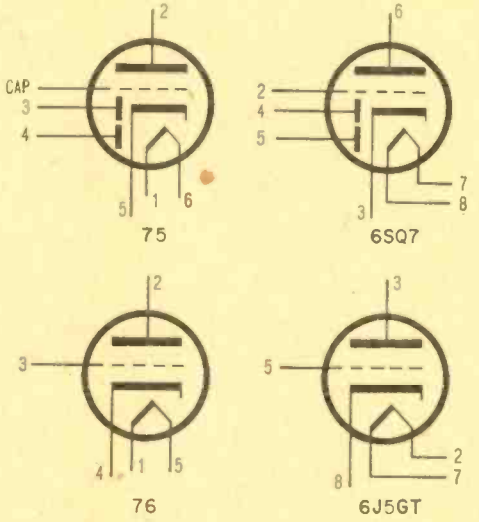
Out With the Old

I have some old military radio gear that uses some old tubes, such as 75, 76, etc. How can I use new tubes, or where can I get some of these obsolete ones?

—F.F., Los Altos, Calif.

A 6SQ7 is the electrical equivalent of a type 75 tube. The diagram shows the base connections. To use a 6SQ7 in place of a 75, replace



the 6-prong socket with an octal type. If memory serves me right, a 76 is a triode which can be replaced with a 6J5GT. Replace the 5-prong socket with an octal type. The diagram shows the difference in socket connections.

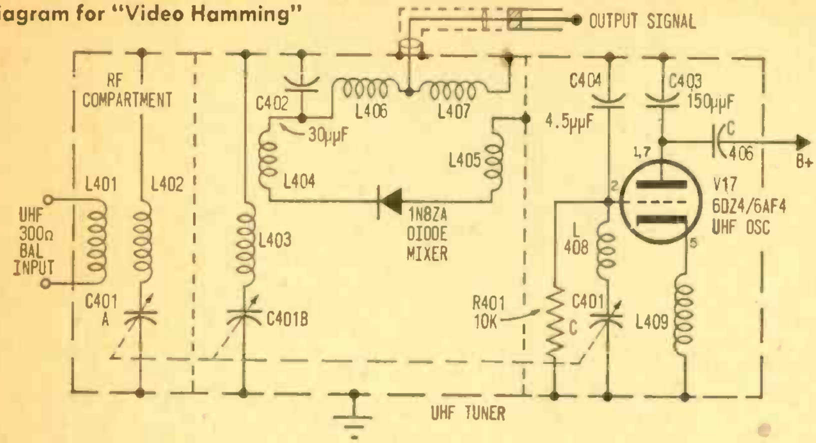
Video Hamming

A local Sunday newspaper just featured a story about hams who broadcast on the amateur TV channels. How can I convert my VHF/UHF to receive the amateur TV station broadcasting in this area? What type of antenna will I need?

—J.N.M., South Lawrence, Mass.

Hams are permitted to transmit television in the 420-450, 1215-1300, 2300-2450, 3300-3500, 5650-5925 MHz bands as well as the 10-10.5 and 21-22 GHz (GigaHertz—thousands of MHz) bands and at any frequency above 40 GHz. The most practical is the 420-450 MHz band since you could use your existing UHF antenna without serious signal loss. All you have to do is add a very small amount of capacitance across the tuning capacitors in your UHF tuner. In the diagram shown, the tuning capacitors are C401A, C401B and C401C. This will alter the tuning range of your UHF tuner so the channel numbers will no longer be correct on the tuning dial. You won't be able to tune to the high UHF channels (around 800 MHz), but there's nothing

Diagram for "Video Hamming"

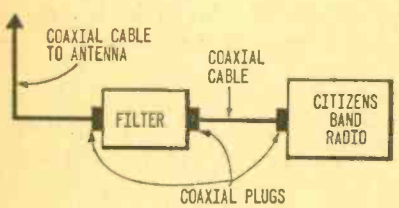


up there at present. You will have to do a lot of tinkering to lower the UHF range from 470 MHz at the low end to 420 MHz. Don't have your hands in the set with the power turned on. It's dangerous and we can't afford to lose any readers.

Hard-Luck Story

My Citizens Band radio interferes with TV reception on my boat whenever I transmit. The TV set is one of those compact portables which runs off of the boat's 12-volt battery. How can I stop the interference?

—D.E.R., Palo Alto, Calif.



Go to a radio parts store and ask for a "low pass TVI filter for a CB set." Connect it between the radio and the antenna as directed by the instructions that come with the gadget.

Second Hand

I have been offered a second hand marine radiotelephone for less than $100. Is it safe to buy used radio equipment?

—L.W., Everett, Wash.

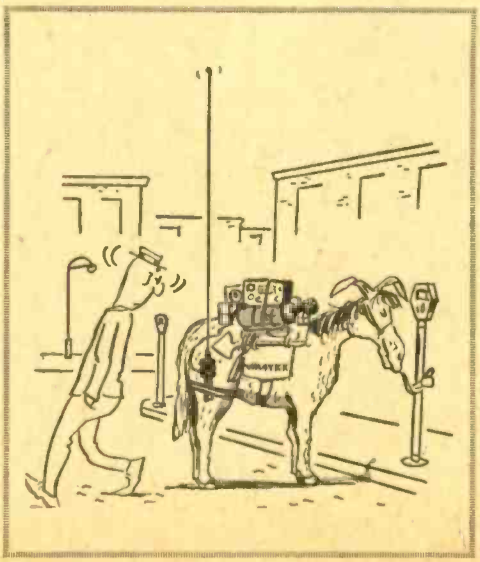
Chances are that it does not meet current FCC technical standards if it was manufactured before 1963. Call the FCC office in Seattle or write the Federal Communications Commission, Washington, D. C. 20554, Mentioning the make and model and asking if it has been "type accepted." Otherwise, buying used radio equipment is like buying a used car. Sometimes you do well. Sometimes you don't.

How About That?

I plan to do research in Physiology and need an oscilloscope of the type that can be used as an Electrocardioscope-Electroencephaloscope such as the Scopette by Corbin-Farnsworth, Inc. Could you advise me on a relatively inexpensive kit similar in quality to the Scopette? Also, just what would it entail to convert it to a synchronized graphic arrangement? I would appreciate any help you may give me in this matter.

—M. H. B., Knoxville, Tenn.

Your question is out of our scope. Perhaps you can get the desired information from the American Journal of Medical Electronics, 645 Stewart Ave., Garden City, N. Y. 11533. ■



COLOR IT PORTABLE PEACOCK

■ Live color TV broadcasting direct from the action scene is the newsworthy note here. In the foreground is the 35-pound color TV camera comfortably carryable by the operator on an over-the-shoulder back pack. In the background, well, she speaks for herself at 105 pounds!

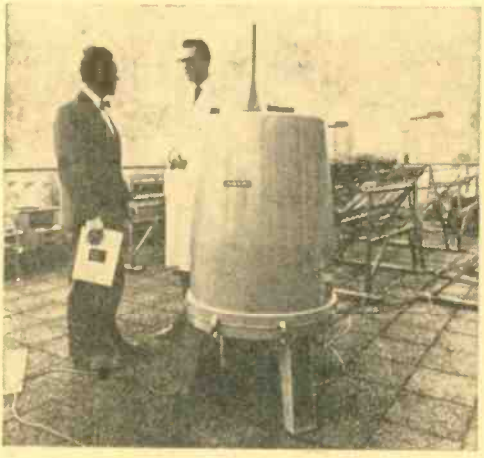
The first truly portable hand-held camera used on the air, it can be battery operated and connected to the studio via a built-in microwave link. This seemingly entitles it to be billed as the most maneuverable color camera in the world.

Operating quite happily with only 150-foot candles of available light, the camera provides excellent picture resolution. It has a signal-to-noise ratio of 42 dB and a bandwidth of about 4 MHz.

The operator can keep in constant contact with the base station with the camera's built-in intercom. And a tally light on the camera indicated when it's on the air.

Stated as being comparable to larger, more complex studio equipment, the system was developed by Ampex for ABC.

AIRPORT LAZER BLAZER

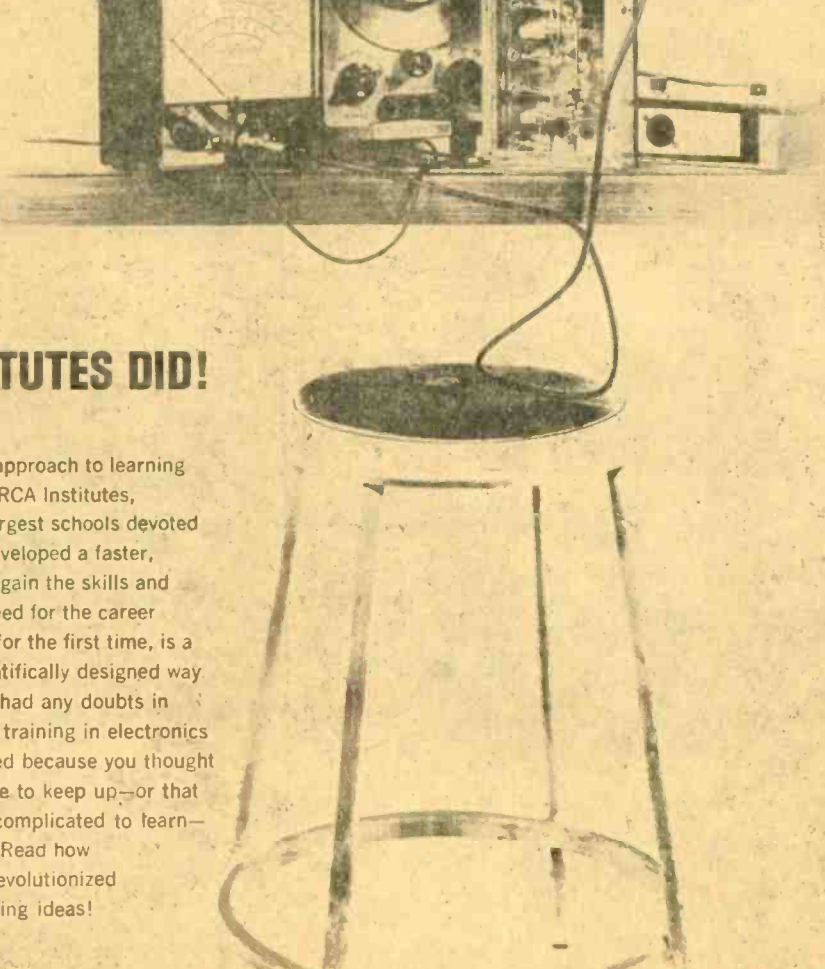


■ A laser radar system for automatically measuring cloud height and density has been developed in Sweden by ASEA Electric. The completely weatherproof system sits on a rooftop blasting an extremely short burst of laser light straight up. Measuring return time tells cloud height. Observing on a scope the amount of pulse echo lengthening lets the observer determine cloud density.

PUNCH FOR SCOPE DOPE

■ Punch the right keys and instantaneous viewing of computer stored information is your reward if you happen to have this Sperry Rand Uniscope at your beck and call. Operation consists of typing the inquiry message on the keyboard of 61 keys. The message, as it is typed, appears on the screen for visual verification, before it is transmitted to the remote computer. An immediate answer is supplied by the computer and displayed on the scope. Applications include handy retrieval of sales information and inventory figures for businessmen, expediting travel reservations, and speeding customer service at bank teller's windows. ■

SOMEONE SHOULD DEVELOP AN EASY WAY TO LEARN ELECTRONICS AT HOME



RCA INSTITUTES DID!

Here is a whole new approach to learning electronics at home! RCA Institutes, one of the nations' largest schools devoted to electronics, has developed a faster, easier way for you to gain the skills and the knowledge you need for the career of your choice. Here for the first time, is a student-proved, scientifically designed way to learn. If you have had any doubts in the past about home training in electronics —if you have hesitated because you thought you might not be able to keep up—or that electronics was too complicated to learn—here is your answer! Read how RCA Institutes has revolutionized its entire home training ideas!

NEW CAREER PROGRAMS BEGIN WITH "AUTOTEXT" INSTRUCTION METHOD!

Start to learn the field of your choice immediately!

No previous training or experience in electronics needed!

With this new revolutionized method of home training you pick the career of your choice—and RCA Institutes trains you for it. RCA's Career Programs assure you that everything you learn will help you go directly to the field that you have chosen! No wasted time learning things you'll never use on the job! The Career Program you choose is especially designed to get you into that career in the fastest, easiest possible way!

And each Career Program starts with the amazing "AUTOTEXT" Programmed Instruction Method—the new, faster way to learn that's almost automatic! "AUTOTEXT" helps even those who have had trouble with conventional home training methods in the past. This is the "Space Age" way to learn everything you need to know with the least amount of time and effort.

CHOOSE A CAREER PROGRAM NOW

Your next stop may be the job of your choice. Each one of these RCA Institutes Career Programs is a complete unit. It contains the know-how you need to step into a profitable career. Here are the names of the programs and the kinds of jobs they train you for. Which one is for you?

Television Servicing. Prepares you for a career as a TV Technician/Serviceman; Master Antenna Systems Technician; TV Laboratory Technician; Educational TV Technician.

FCC License Preparation. For those who want to become TV Station Engineers, Communications Laboratory Technicians, or Field Engineers.

Automation Electronics. Gets you ready to be an Automation Electronics Technician; Manufacturer's Representative; Industrial Electronics Technician.

Automatic Controls. Prepares you to be an Automatic Controls Electronics Technician; Industrial Laboratory Technician; Maintenance Technician; Field Engineer.

Digital Techniques. For a career as a Digital Techniques Electronics Technician; Industrial Electronics Technician; Industrial Laboratory Technician.

Telecommunications. For a job as TV Station Engineer, Mobile Communications Technician, Marine Radio Technician.

Industrial Electronics. For jobs as Industrial Electronics Technicians; Field Engineers; Maintenance Technicians; Industrial Laboratory Technicians.

Nuclear Instrumentation. For those who want careers as Nuclear Instrumentation Electronics Technicians; Industrial Laboratory Technicians; Industrial Electronics Technicians.

Solid State Electronics. Become a specialist in the Semiconductor Field.

Electronics Drafting. Junior Draftsman, Junior Technical Illustrator; Parts Inspector; Design Draftsman Trainee Chartist.

SEPARATE COURSES

In addition, in order to meet specific needs, RCA Institutes offers a wide variety of separate courses which may be taken independently of the Career Programs, on all subjects from Electronics Fundamentals to Computer Programming. Complete information will be sent with your other materials.

LIBERAL TUITION PLAN

RCA offers you a unique Liberal Tuition Plan—your most economical way to learn. You pay for lessons only as you order them. No long term contracts. If you wish to stop your training for any reason, you may do so and not owe one cent until you resume the course.

VALUABLE EQUIPMENT

You receive valuable equipment to keep and use on the job—and you never have to take apart one piece to build another. **New—Programmed Electronics Breadboard.** You now will receive a scientifically programmed electronic breadboard with your study material. This breadboard provides limitless experimentation with basic electrical and electronic circuits involving vacuum tubes and transistors and includes the construction of a working signal generator and superheterodyne AM Receiver.

Bonus From RCA—Multimeter and Oscilloscope Kits. At no additional cost, you will receive with every RCA Institutes Career Program the instruments and kit material you need to build a multimeter and oscilloscope. The inclusion of both these kits is an RCA extra.

CLASSROOM TRAINING ALSO AVAILABLE

RCA Institutes maintains one of the largest schools of its kind in New York City where classroom and laboratory training is available in day or evening sessions. You may be admitted without any previous technical training; preparatory courses are available if you haven't completed high school. Coeducational classes start four times a year.

JOB PLACEMENT SERVICE, TOO!

Companies like IBM, Bell Telephone Labs, GE, RCA, Xerox, Honeywell, Grumman, Westinghouse, and major Radio and TV Networks have regularly employed graduates through RCA Institutes' own placement service.

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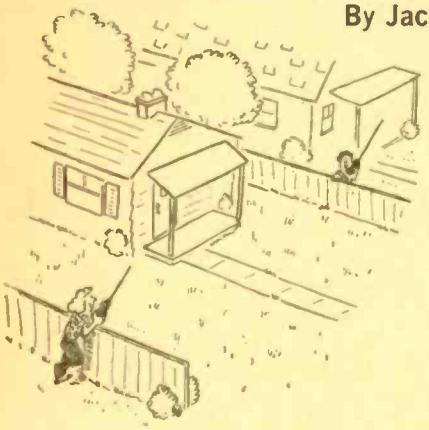
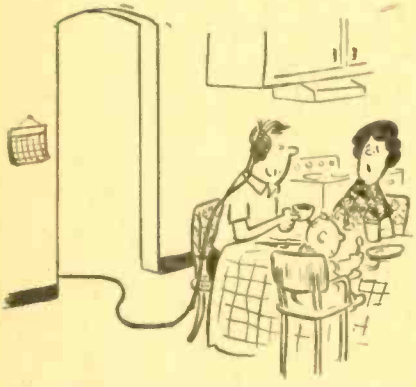
RCA

LADY'S DAY

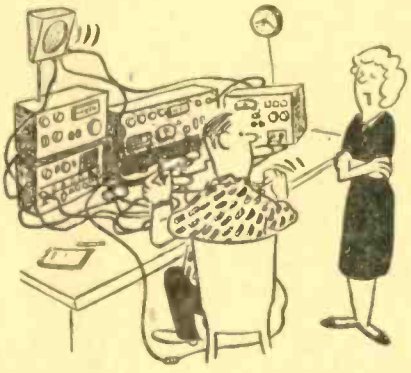
By Jack Schmidt



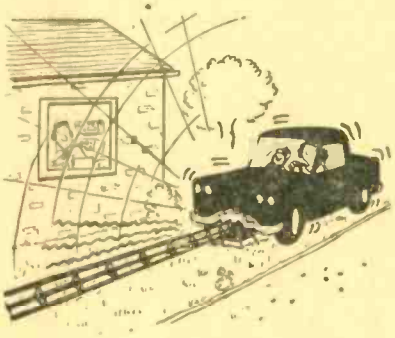


"Honestly, Harry, just how much can go on in the time it takes us to eat?"

"...then run the diode to the 6146..."

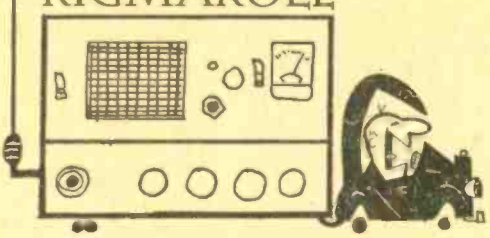


"Right now it sounds to me as though you're talking to yourself!"



"Any other husband would be happy if his wife washed his gear!"

CB RIGS & RIGMAROLE



■ We're rigged! Yup, somebody must have rigged it this time because we've got some dandy rigs in both the economy and deluxe ends of the price scale.

● **The Eagle Fits.** Those of you who have complained that the famous Browning Eagle base station wasn't available for mobile use will be flipping at the news that Browning has brought out a mobile version of their famous CB bird.

Browning Solid-State Eaglette Transceiver

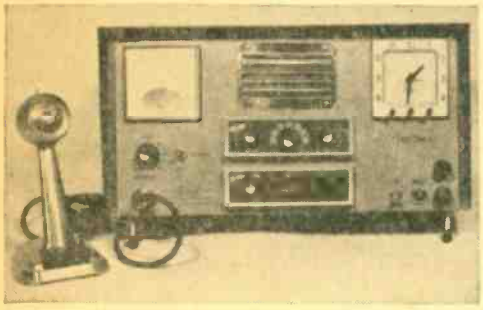
Browning's answer is the new Eaglette rig, a 23-channel feller of all silicon-transistor innards. Features include an illuminated S-meter and channel-selector switch, PA function with separate jacks for PA and remote speakers, squelch and noise squasher. Crystals for full 23-channel operation are included.

This doesn't replace any sets which already exist in the famous Browning line of deluxe equipment—it merely rounds out what they now have. The Eaglette, by the way, is a 12-V rig, aimed at just about every car on today's roads.

Once you get this little gem mounted on your wheels you will want to be assured that it will always be there, so Browning has given the Eaglette a locking-type mounting bracket. The set is topped off in rich-looking anodized gold and chocolate brown—looks good enough to eat. Set sells for $209.50 from Browning Laboratories, Inc., Dept. JS, 100 Union Ave., Laconia, N.H. 03246. *(Turn page)*

● **Console Yourself.** A base station console is something you haven't seen on the market, but Polytronics has put an end to that!

Though designed specifically for use with the Poly-Comm 23C transceiver, the new Polyconsole will combine with any of the new breed



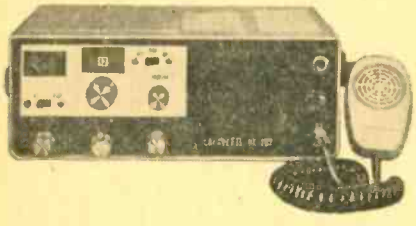
Polytronics CB Control Polyconsole

of smaller CB rigs to give you a very impressive looking "custom dispatcher" desk console, complete with clock.

The Polyconsole is a functional and attractive package, and all you have to do is slide the CB rig into the space provided. The console contains the power supply, fuses, control switches, large built-in speaker, and a multi-function meter which shows, among other things, SWR.

Price is $89 (does not include CB rig or selective call unit) from Polytronics Communications, Box 536, Baltimore, Md. 21203.

● **Too Good To Transist?** For many years now Lafayette has made a good reputation with their economy priced HE-20 CB rig; a good "bread and taters" no-nonsense piece of gear. Well, not one to let a good thing just sit there, Lafayette has gone and revamped and modernized the rig by making it all solid-state and renaming it the HE-20T.



Lafayette's Transistorized HE-20T Rig

This time 'round the rig runs 13 transistors and 10 diodes, a tunable superhet receiver, 455-kHz mechanical filter, squelch, fancy noise limiter, S-meter, spotting switch, pi-network antenna match, earphone jack, PA provisions, and even a jack for plugging in Lafayette's selective calling system.

With all those goodies, the HE-20T goes for only $89.95. Check with Lafayette Radio, Dept. JS, 111 Jericho Tpke., Syosset, N.Y. 11791, for further details. And if you haven't already gotten your copy of Lafayette's 510-page catalog, remember that it's free and an excellent reference that belongs in every CB shack.

● **Tiny Talkie.** Billed as the "smallest transceiver of its kind" and coupled with a 10-year guarantee, we now announce the arrival of the Courier TR-5 rig. It's fully transistorized, gives 5 channels with an illuminated selector, auxiliary speaker jack, modulation indicator, external crystal socket, and an exclusive safety circuit

c.c.i. Solid-State TR-5 Transceiver

to ward off the possibility of your damaging the rig by botching the rig's installation.

Just $99 for the Courier TR-5. How 'bout that? From Courier Communications, Inc., Dept. JS, 56 Hamilton Ave., White Plains, N.Y. 10601. ■

"Calling LSD3, Calling LSD3 . . ."

EXCERPTS FROM FCC PART 15
"Low Power Communication Devices"

15.3 General Condition of Operation

Persons operating restricted or incidental radiation devices shall not be deemed to have any vested or recognizable right to the continued use of any given frequency, by virtue of prior registration or certification of equipment. Operation of these devices is subject to the conditions that no harmful interference is caused.

15.4 General Definitions

(f) *Low power communication device.* A low power communication device is a restricted radiation device, exclusive of those employing conducted or guided radio frequency techniques, used for the transmission of signs, signals (including control signals), writing, images and sounds or intelligence of any nature by radiation of electromagnetic energy.

15.5 Equipment Available for Inspection

Any equipment or device subject to the provisions of this part together with any license, certificate, notice of registration or any technical data required to be kept on file by the operator of the device shall be made available for inspection by Commission representatives upon reasonable request.

15.205 Operation Within the Frequency Band 26.97-27.27 Mc/s

A low power communication device may operate within the band 26.97-27.27 Mc/s (27.12 Mc/s ± 150 kc/s) provided it complies with all of the following requirements:

(a) The carrier of the device shall be maintained within the band 26.97-27.27 Mc/s.

(b) All emissions, including modulation products, below 26.97 Mc/s or above 27.27 Mc/s shall be suppressed 20 db or more below the unmodulated carrier.

(c) The power input to the final radio stage (exclusive of filament or heater power) shall not exceed 100 milliwatts.

(d) The antenna shall consist of a single element that does not exceed 5 feet in length.

15.208 Certification Requirements

(a) No low power communication device manufactured after the dates set forth in 15.211 shall be operated without a station license unless it has been certificated to demonstrate compliance with the requirements of this part.

(b) The owner or operator need not certificate his own low power communication device, if it has been certificated by the manufacturer or distributor.

(c) Where certification is based on measurement of a prototype, a sufficient number of units shall be tested to assure that all production units comply with the technical requirements of this subpart.

(d) The certificate may be executed by a technician skilled in making and interpreting the measurements that are required to assure compliance with the requirements of this part.

(e) The certificate shall contain the following information:

(1) The operating conditions under which the device is intended to be used.

(2) The antenna to be used with the device.

(3) A statement certifying that the device can be expected to comply with the requirements of this subpart under the operating conditions specified in the certificate.

(4) The month and the year in which the device was manufactured.

15.209 Location of Certificate

The certificate shall be permanently attached to the device and shall be readily available for inspection.

15.210 Interference From Low Power Communication Devices

Notwithstanding the other requirements of this part, the operator of a low power communication device, regardless of date of manufacture, which causes harmful interference to an authorized radio service, shall promptly stop operating the device until the harmful interference has been eliminated.

Copped-out Cable Catcher

■ The old problem of finding a break in buried cables boasts a new solution. It's a solid-state device made by Hewlett-Packard.

Formerly, a cable suspected of being faulty had to be dug up here and there, all the while being checked with an ohmmeter as a means of locating the break. This system was tediously time-consuming (sometimes taking days) and expensive.

Hewlett-Packard's 20-pound system consists of a self-contained transmitting unit, a search wand, and a contact frame. The transmitter generates a 990-Hz signal pulsed at 7 Hz.

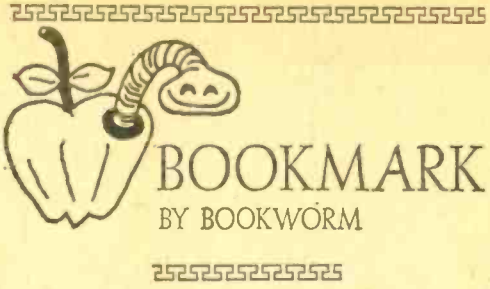
In operation, the transmitting unit is hooked to the suspect cable and ground. When this is done, the search wand is used to trace the route of the cable by inductively picking up the transmitter signal. The operator listens to a built-in speaker for the transmitter's output and can see changes in signal intensity on a meter.

When the search wand is directly over the cable, the audial and visual indicators null (drop to zero). With the wand slightly to one side, the transmitter signal comes through loud and clear. As a result, cable tracing proves both rapid and very accurate.

To locate a break, the contact frame, which has two metal prongs, is stuck into the ground along the cable's path. When a signal is picked up, the area of the fault has been located. And when the signal nulls, the break is directly between the two prongs. ■

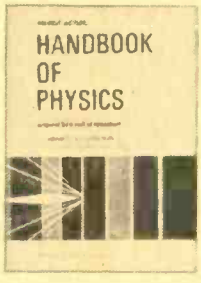
Probing cable's course with contact frame, operator watches first for peak reading, then for null indicating exact position of break.

Transmitting unit (bottom of photo) sends signal through suspect cable. Inductive probe is then used to determine cable's path.



Handbook Bonanza. It isn't very often the ol' Bookworm touts an expensive volume, but if the tome is worth the scratch—damn the price. In this case McGraw-Hill has published their *Second Edition* of the *Handbook of Physics*. This reference volume is a must for all serious-minded high school students, collegians and just plain folks who work at almost any technological occupation.

Handbook of Physics, the work of scores of experts, is designed to be used as a source of reference, as a place to check basic ideas and mathematical methods, and ideas of all branches of classical and modern physics.



Hard cover
1626 pages plus Index
829 illustrations
$32.50

The 92 chapters of this comprehensive volume are divided into the following nine sections: Mathematics — Algebra, Partial Differential Equations; Numerical Analysis, Vector Analysis, Calculus of Variations, Statistical Design of Experiments; Mechanics of Particles and Rigid Bodies—Dynamical Principles, Orbital Motion, Dynamics of Rigid Bodies, Theory of Relativity, Gravitation; Mechanics of Deformable Bodies—Fluid Mechanics, Wave Propagation in Fluids, Statics of Elastic Bodies, Experimental Stress Analysis, Acoustics; Electricity and Magnetism —Electric Circuits, Electronic Circuits, Conduction; Heat and Thermodynamics—Principles of Thermodynamics, Thermometry and Pyrometry, Vacuum Technique, Chemical Kinetics, Superfluids, Superconductivity; Optics—Photometry and Illumination, Diffraction and Interference, Molecular Optics, Fluorescence and Phosphorescence; Atomic Physics—Atomic Spectra, Atomic Line Strengths, Infrared Spectra of Molecules, Microwave Spectroscopy, Mass Spectroscopy Ionization Processes, Fundamental Constants of Atomic Physics; The Solid State—The Energy-band Theory of Solids, Flow of

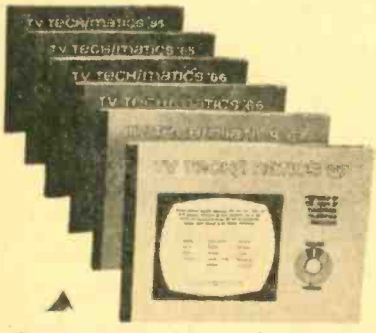
Electrons and Holes in Semiconductors, Photoelectric Effect, Glass, Magnetic Resonance; Nuclear Physics—Measurement of Nuclear Masses, Nuclear Moments, Alpha Particles, Beta Radioactivity, Neutron Physics, Nuclear Reactions, Fission, Cosmic Rays.

Further information on *Handbook of Physics, Second Edition* may be obtained from the McGraw-Hill Book Information Service, Dept. JMS, 327 West 41st St., New York, N. Y. 10036.

Need a TV Schematic? Too many times, part-time servicemen and "do-it-yourselfers" stumble through the repair of a TV receiver. Hours are lost when the task would have taken minutes with the help of *TV Tech/matics*, a Hayden publication series covering the entire year's schematic diagram needs from Admiral to Zenith—all models; color and black & white. You get more than schematics; included are tube and critical parts location, voltage readings and complete alignment information including color purity and color convergence adjustments. The *TV Tech/matics* currently available from Hayden are:

* 1965, Vol. 1, Admiral—Packard Bell
1965, Vol. 2, Philco—Zenith
1966, Vol. 1, Admiral—Packard Bell
1966, Vol. 2, Philco—Zenith
1967, Vol. 1, Admiral—Philco-Ford
1967, Vol. 2, RCA Victor—Zenith

* This edition includes all 1960-1965 color sets at no extra cost.



Each soft cover volume of TV Tech/matics has 230 11x 14-in. pages. Volumes cost $9.50 each plus postage.

More information can be obtained by writing to the publisher, Hayden Book Company, Inc., Box RT, 116 West 14th St., New York, N. Y. 10011. While you're at it, ask for their informative brochure.

All in One Book. Scores of exciting experiments and projects for the electronics and radio experimenter are given to the reader in the new *Junior Electronics and Radio Experiments*. Clear-cut, step-by-step instructions and illustrations explain all phases of each experiment. Written by many experts familiar to the reader and edited by the Editors of this magazine, the text includes chapters on basic electricity, vacuum tube theory, experiments to show how transistors work, how SCR and Zener diodes work,

Hard cover
176 pages
$3.95

experiments with resistive circuits and many other fascinating and challenging experiments.

Among the numerous projects are the building of an audio fire alarm, stroboscope, crystal receiver, audio amplifier, neon-lamp calculator, weather indicator, etc. There are also chapters on shortwave listening and how to get started in amateur radio.

All projects and experiments are thoroughly tested, and they can be built with a minimum of equipment and at low cost. All projects are imaginatively conceived, educational, and are guaranteed to provide hours of rewarding, stimulating fun as well as an important grounding in electronic knowledge for experimenters. Your copy of *Junior Electronics and Radio Experiments* is available at your local bookstore or direct from Arco Publishing Co., Inc., 219 Park Avenue South, New York, N.Y. 10003.

FET Projects. A new, 96-page project book introducing field effect transistors (FET) to the hobbyist-experimenter has been published by Motorola Semiconductor Products, Inc., as part of their HEP program. Entitled Field Effect Transistor Projects, it is divided into three basic segments; an introduction to field effect transistors with a glossary of terms; a section on construction techniques to assist the newcomer to electronics and detailed, step-by-step instructions

Soft cover
93 pages
$1.00

on building the various projects. These projects include test equipment, amplifiers, ham and hi-fi gear. The text was written to appeal to both the novice and the expert electronic hobbyist. It contains 70 illustrations, schematics and pictorial diagrams from which the expert can work and detailed instructions for the novice that follow the "electronics by the numbers" concept.

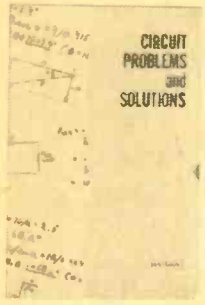
Some of the projects you can build from the Motorola plans are: audio mixer, crystal oscillator, DC voltmeter, vibrato, tuner and others. *Field Effect Transistor Projects* is available through more than 800 HEP electronics parts outlets in the United States. If you cannot pick up a copy, write directly to Motorola, HEP, Box 955, Phoenix, Arizona 85001. Be sure to enclose $1 plus 10¢ for postage.

Figure It Out. A math book is just another math book until its problems and solutions become the everyday computations of the reader. Then, the text becomes a friend who speaks the reader's language. *Circuit Problems and Solutions, Volume One* by Gerard Lippin speak the language of the RADIO-TV EXPERIMENTER reader. Written for the student and hobbyist, here is a practical guide for the solution of electrical problems which serves as a supplement to electricity texts and as a handy reference tool for anyone involved in basic electrical studies.

Each chapter of *Circuit Problems and Solutions* first briefly reviews a particular aspect of circuit theory and then applies that theory to numerous problems, showing their step-by-step solutions. The book contains nearly 300 such problems covering a wide range of DC and AC situations—from simple resistive series circuits to series parallel RLC circuits. The presentation

"Would you believe I was 12 years old before I could tie my shoelaces!"

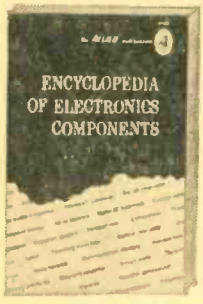
of the material permits use of the book without the aid of an instructor.



Soft cover
190 pages
$3.95

At present, only *Volume One* is available at your local bookstore or direct from the publisher. What about future volumes? Tell the publisher to keep you informed. Write to Hayden Book Company, Inc., 116 West 14 Street, New York, N.Y. 10011.

Aardvark. The all new *Encyclopedia of Electronics Components* alphabetically lists, describes and illustrates the basic components currently used by experimenters, hams and professional design engineers. Edited by Dr. Alva C. Todd, Professor of Electrical Engineering, Illinois Institute of Technology, the *Encyclopedia* is virtually an electronic text that provides in one reading an understanding of individual



Soft cover
112 pages
$1.00

units used in electronics devices and systems. Descriptions are in non-technical language. Each component is clearly identified, its use is carefully explained and any special handling or installation requirements is covered. A handy reference for anyone in electronics, even the veteran technician, interesting and useful to students, hobbyists and experimenters, the book is available directly from Allied Radio Corp., 100 N. Western Ave., Chicago, Ill. 60680.

Don't Be a Science Fair Dropout! Here it is —the pass key to the winner's circle at your school's next science fair! *New Ideas for Science Fair Projects* is a "must" book for all serious participants and would-be winners in local, regional and national science fairs. Every aspect of science fair activity is fully explained and explored. How to choose a project? What are the basic techniques of research? How to plan and build a project around your selected subject? In fact, more "Hows?" and "Whats?" on science fairs are answered completely in this text than in any other volume to date.

A major section of the text is devoted to actual projects by former winners of national fairs, told in their own words. These winners describe how they went about choosing a topic, their methods of research, and presentation of their projects. The topics described, and fully illustrated, range over a wide field of science: mathematics, physiology, biology, ultrasonics,

Hard cover
155 pages
$3.95

chemistry, botany, engineering, radiology, physics, electronics, plus many others.

It's a great book co-authored by Roger Williams Sawyer and Robert A. Farmer, and published by Arco Publishing Company, Inc., 219 Park Avenue South, New York, N. Y. 10003. Get a copy! Who knows, as a science fair participant you may make a valuable and very rewarding contribution to science.

"This home study electronics course has everything, Gladys!"

Radio-TV EXPERIMENTER APRIL/MAY 1968

Discover The ACTION BEAT

BY THE EDITORS OF RADIO-TV EXPERIMENTER

Minute-by-minute life-and-death drama as it happens—yours for the listening at the twist of a dial

■ If you're sitting there listening to the local news broadcast on the radio, you're probably aware that all the real drama behind the story has been distilled down to a minute-long capsule. That big bank robbery might have taken an hour—what with the cops barrel-

The Editors wish to thank Tom Kneitel, K2AES, and Herb Friedman, W2ZLF, for their assistance in the preparation of this article.

ACTION BEAT

ing through the streets at breakneck speed and shooting up the place—and all you get from the disc jockey is about 45 seconds of summary. You also get it minutes (if not hours) late, to boot.

But with very little effort you can practically ride along on the running board of the police car during the chase, be in on the capture, and even hear a shoot-out between the good guys and the baddies!

Or, another time, you might hear the local radar speed trap stakeout radioing in to headquarters the license plate numbers of your friends and neighbors. And you can be right there in the middle of the action (and lots of it, too) by simply adding a small VHF receiver or convertor to your worldly possessions.

Legal Snooping. Most people have an idea that it's against the law to listen to police radio transmissions. Fact is, this is an old wives' tale, and one which many police departments don't seem to be in any hurry to dispel.

Actually, there isn't a law in the land which says you can't listen to police (or any other) communications in your home for your own personal entertainment and edification. Some localities prohibit your eavesdropping on the fuzz from your car, however, so it's best to check with the local gendarmes before trying *that* one.

There are many ways to get started listening in on the action beat with a variety of receivers available to suit every budget. Above is the Knight KG-221A FM Monitor Receiver and below, the Tunaverter convertor.

To help you get started listening to this most fascinating world of instant action, we have obtained an exclusive listing of high-band police frequencies in the hundred largest U.S. cities. This first-time-in-print-ever chart will let you select the receiver or convertor you need for listening in your area, and will give you the exact frequencies to tune.

One sure way to put yourself in the heart (and heat) of the action is to buy a police receiver, and there are a number of these now available at relatively low cost. Japanese manufacturers have come out with a line of this gear which is sold at truly down-to-earth prices.

A check of Lafayette, Radio Shack, or Allied catalogs will provide you with a large array of suitable receivers in a wide price range to fit every action-minded budget. Some of the better known manufacturers producing this gear are Knight, Lafayette, Regency, and Sonar.

Convertors, Too! Convertors do the work of a receiver but are usually used for mobile work (though there is nothing to stop you from using one at home if you want to provide the necessary low voltage for powering the unit). In operation, the convertor will usually pick up only 1 or 2 frequencies (which you specify when ordering the unit), then convert them to a frequency that can be tuned on a standard broadcast-band radio.

Many manufacturers are now producing convertors for receiving police communications and a look through several catalogs and magazines will give you a number of different models to choose from.

A new model, just out, offers you the opportunity to tune to a wide range of frequencies in your chosen band plus the convenience of a single crystal-controlled (fixed frequency) channel of your choice. The set is powered from its own internal battery, too. This unit is called the Tunaverter and is available from Herbert Salch & Co., Woodsboro, Tex. 78393 for $29.95, postpaid.

Before you rush out and buy a receiver or convertor, you should know which frequency or frequency band your local police use since they have several bands available to them. Some stations are on high-band VHF (151.45 MHz through 159.21 MHz); these can be identified by the police mobile units using short (about 17-in. high) an-

★ U.S. POLICE FREQUENCIES AT A GLANCE ★

Frequency (kHz)	Remarks
1634.0, 1682.0, 1690.0, 1714.0, 1730.0, 2382.0, 2442.0	Only 13 services licensed in Alaska, Calif., Mich., Nev., N.H., Texas and Wis.
2804.0, 2808.0, 2812.0	212 services licensed
5135, 5140, 5195	197 services licensed
7480, 7805, 7935	109 services licensed
10525.0	Adrian, Mich. only
27245, 27255, 27275	9 services licensed in Fla., Ia., Ky., Ohio and Pa.
37020-37400, 39020-39980, 42020-42940, 44620-46420	Over 9000 services licensed
47200	Boise, Idaho only
72020-72140, 72260-75980	279 services licensed
151450-151460, 153740, 154430-156760, 158730-159210, 159476*, 159630*, 159750*, 160470*, 161010*, 161130*, 161610, 161670*, 161730*, 162825*	Over 10,000 services licensed (*less than 5 stations per frequency)
453050-453950, 458050-458950	About 700 services licensed
952500-959700, 1001855-1001995, 1002455, 1006585-1006865, 1010515, 1010525, 1012210, 1012210, 1012690	Over 3400 services licensed

tenna mounted on the center of the roof.

The other commonly used band is the low band which runs from 37.02 MHz to 46.42 MHz; its users' gear is equipped with 5- or 6-ft. whip antennas on the rear deck of the mobile units. You might be able to get the specific frequency used by calling the department, or you can look at our specially prepared chart above for the major police frequencies used throughout the land.

If you are using a tunable receiver which covers the appropriate frequency band, you will find the police frequencies without much trouble if you tune around for a few minutes —even if you don't know the exact frequency.

Fuzz-Catching Skyhooks. The antenna for monitoring your local police need be nothing more than a 5-ft. hank of wire hanging down in back of the set—or outdoors if you live in a metal frame building. The higher the antenna the better the range.

For a professional-looking installation, you can dig through the catalogs and find yourself a ground-plane antenna cut for the desired band. You will need some RG58A/U coaxial cable to connect the set to the antenna. *(Continued on page 52)*

This policeman is communicating with other mobile units from a special communications van that can be quickly moved to the center of the action. Vans, like this one, see considerable use in riots and other cases of civil disobedience, as well as in cases of disasters such as floods or hurricanes.

Guide To VHF Police

City	Channels (kHz)		
Akron, O.			155,370
Albany, N. Y.	154,650	154,800	154,860
	155,460	155,550	155,910
			159,150
Albuquerque, N. M.		155,670	155,850
Amarillo, Tex.			155,190
Atlanta, Ga.	153,740	154,680	154,800
	155,370	155,580	159,476
Austin, Tex.	155,550	155,610	156,150
			159,090
Baltimore, Md.	154,650	155,190	155,430
	155,550	155,610	155,670
		155,850	155,970
Baton Rouge, La.	155,610	155,670	159,030
			159,090
Beaumont, Tex.	154,950	155,190	155,370
		158,970	159,090
Birmingham, Ala.	156,210	158,790	158,910
			159,210
Boston, Mass.	154,890	155,010	156,030
	158,910	158,970	159,030
			159,210
Buffalo, N. Y.	155,370	155,730	155,970
		156,030	159,150
Camden, N. J.	154,890	156,030	158,790
		159,030	159,150
Canton, O.		155,370	158,790
Charlotte, N. C.		155,970	156,030
Chicago, Ill.	154,650	154,680	154,740
	154,860	154,920	154,950
	155,370	155,340	155,460
	155,520	155,580	155,640
	155,700	155,850	155,980
	158,730	158,850	159,030
			159,150
Cincinnati, O.	155,370	155,700	156,090
	156,150	158,850	158,910
			159,150
Cleveland, O.	154,785	154,800	154,815
	154,830	154,845	155,010
			155,370
Columbus, Ga.	154,830	155,070	155,250
	155,310	155,370	155,460
		155,685	159,090
Columbus, O.	154,650	154,830	154,950
	155,070	155,250	155,310
	155,370	155,460	155,550
			155,580
Corpus Christi, Tex.			155,610
Dallas, Tex.	155,250	155,370	155,520
		155,850	159,210
Dayton, O.	154,725	154,890	155,130
	155,370	155,610	155,670
			158,790
Denver, Colo.	155,550	155,910	155,970
	156,090	156,690	158,910
	159,030	159,090	159,210
Des Moines, Iowa	155,070	155,370	155,445
			156,690
Detroit, Mich.	154,650	154,665	154,860
	154,920	155,370	155,850
	156,030	156,090	156,150
	156,210	158,910	158,980
	159,090	159,150	159,210
			168,625
El Paso, Tex.	154,950	155,310	155,430
	155,610	156,030	158,790
			159,210
Erie, Pa.	155,010	155,130	155,370
			158,850
Evansville, Ind.			155,370
Flint, Mich.	154,770	155,250	155,370
	155,610	155,850	156,150
Ft. Wayne, Ind.	155,520	155,610	156,090
		158,970	159,030
Ft. Worth, Tex.	154,650	154,710	154,770
	155,370	158,730	158,790
			158,850
Fresno, Calif.	154,680	154,950	155,460
		156,390	159,030
Gary, Ind.		155,010	155,370
Glendale, Calif.			159,090
Grand Rapids, Mich.	154,770	154,830	154,890
	154,950	155,010	155,070
			155,370

Frequencies In 100 Major Cities

City	Channels		(kHz)
Greensboro, N. C.			155,700
Hartford, Conn.			158,790
Honolulu, Hawaii	155,070	155,130	155,190
	155,250	155,370	155,430
Houston, Tex.	155,130	155,370	155,550
	155,670	156,030	156,150
Indianapolis, Ind.	155,010	155,370	155,445
		155,610	158,850
Jackson, Miss.	154,830	155,010	155,190
Jacksonville, Fla.	155,370	155,670	155,910
		156,150	158,730
Jersey City, N. J.	154,830	155,730	158,850
			158,970
Kansas City, Kan.	155,370	155,430	155,520
			158,910
Kansas City, Mo.	154,710	154,740	155,370
	155,640	155,860	156,090
			159,210
Lincoln, Neb.		155,250	158,910
Long Beach, Calif.	155,430	155,550	156,150
Los Angeles, Calif.	154,650	154,680	154,710
	154,770	154,785	154,830
	154,950	155,010	155,070
	155,130	155,190	155,250
	155,370	155,460	155,520
	155,550	155,790	158,910
	159,030	159,150	159,750
Louisville, Ky.	154,740	155,370	158,850
Lubbock, Tex.		155,910	156,150
Madison, Wis.			155,370
Memphis, Tenn.	155,250	158,730	158,850
			159,030
Miami, Fla.	154,695	154,800	154,860
	154,935	155,010	155,190
	155,250	155,370	155,670
	158,730	158,910	158,970
Milwaukee, Wis.	153,740	154,650	154,770
	154,845	155,010	155,370
	155,640	155,700	155,910
	155,970	156,030	156,090
		156,150	159,150
Minneapolis, Minn.	154,725	154,740	154,755
	154,785	154,800	155,190
	155,370	155,610	155,850
		156,030	158,910

City	Channels		(kHz)
Mobile, Ala.	154,650	155,130	155,250
	155,370	155,640	158,730
		158,790	159,210
Montgomery, Ala.	154,950	158,790	159,210
Nashville, Tenn.	155,130	155,190	158,980
Newark, N. J.	154,800	155,670	156,210
			159,030
New Haven, Conn.			158,790
New Orleans, La.	155,310	155,550	155,850
	158,730	158,790	158,850
	158,910	158,970	159,210
New York, N. Y.	151,145	151,160	151,190
	151,205	151,235	151,250
	151,340	151,355	151,370
	151,460	154,725	154,740
	154,755	154,770	154,785
	155,010	155,520	155,535
	155,640	155,655	155,670
	155,700	155,850	155,980
		156,030	159,150
Norfolk, Va.	155,310	155,640	155,850
Oakland, Calif.	155,670	155,790	156,090
			159,210
Oklahoma City, Okla.	155,670	156,030	156,090
	159,030	159,090	159,150
Omaha, Neb.	155,070	155,130	156,210
	156,690	158,970	159,030
			159,150
Pasadena, Calif.		155,430	156,030
Philadelphia, Pa.	154,890	155,250	158,790
Phoenix, Ariz.	154,935	155,070	155,430
	155,475	155,520	155,610
	155,790	158,910	159,090
Pittsburgh, Pa.	154,725	158,730	158,980
			159,030
Portland, Ore.	154,650	154,830	154,890
	154,950	155,610	156,150
	158,730	158,910	159,030
			159,210
Providence, R. I.	155,610	155,850	156,160
			158,970
Richmond, Va.	155,010	155,670	155,850
		156,090	158,910

(Table continued on page 130)

ACTION BEAT

Continued from page 49

You may find that you really want to become top-dog neighborhood snoop and monitor the frequencies used by police departments in surrounding communities. There's the state police or highway patrol, the DA's office, or the sheriff's patrol; they're usually all within the same band of frequencies. And, it takes no more than the effort to tune around and look for them for you to dig their scene. This, of course, puts you in the realm of being in the new breed of VHF SWLs because before you know it, you'll be trying to see how many different law-enforcement agencies you can log.

For the dedicated action—beat listener, it is actually possible to get reception verification cards from various police departments. Full details on QSLing the Law are given in text. The samples here even include a verification from a patrol boat.

QSLing The Constabulary. Eventually you may even want to try to get QSLs from the stations. And you'll be happy to know that, if properly approached, many police departments will QSL reception reports. When reporting to the station, give the exact time (in local time, not GMT, as with foreign broadcasting stations) and the exact or approximate frequency. Also, give a rough idea of the transmission(s) heard over a span of about 15 minutes. Just don't go into exacting details about the contents of the transmissions. For one thing, too detailed a report may squash your chances for a QSL. And for another, it could possibly put you into the realm of violating the FCC's secrecy of communications rules.

Always include with your report a prepared and stamped reply card for the radio operator to complete and mail back to you. Explain that shortwave listening is your hobby and tell how many similar QSLs you have received from other stations. Tell about yourself and the equipment you are using and advise the station of how well their signal is being received at your location.

Address your report to the Chief Radio Dispatcher at the department. Chances are that within a week or so, you'll be the proud possessor of verification of your reception.

From time to time you may even hear police stations popping through on oddball non-police channels, and you can try for a QSL from these transmissions. QSLs have come from police boats operating on marine radio frequencies and even from a police department ham radio club station! ■

With police relying more and more on two-way radio communications in their battle with baddies, there is more excitement than ever listening in on the action beat.

By Hartland B. Smith, W8VVD

ssssSHUSH BOX

Photo by Moto

There's lots better listening to be had on that inexpensive VHF police-band receiver by building this neat and easy add-on noise-knocking squelch unit

■ Eavesdropping on the world of cops and robbers—good guys and bad—is becoming a very popular hobby. And this is probably as close to the exciting but dangerous world of hardened criminals and shoot-outs as most of us want to get. One of the main reasons this pastime is becoming such a favorite is the availability of inexpensive receivers that'll tune the VHF bands. Low in cost, portable and transistorized, several different models of these little police-band receivers are available from Allied, Lafayette, and Radio Shack.

These VHF rigs are all similar in design and all have a common fault: no squelch (squelch is a handy little circuit that mutes the receiver while no signal is being received). Lack of squelch makes long-term listening very tedious because of loud spectrum noise (or hiss) coming through the speaker while no signal is being picked up.

But now you can stay tuned to the good guys without suffering the sound of the great hiss. Silence is golden, and that's exactly what you'll get with our Shush Box whenever the local constabulary takes five.

Shush Box is a transistorized, add-on squelch that's quick and easy to build and hooks up to any receiver that uses a ratio detector. The prototype was used with a Radio Shack Patrolman, but connection to any other receiver will be virtually the same.

Kicking The Hiss Out. Patrolman's FM ratio detector and first audio amplifier stages are shown in Fig. 1. Whenever a signal is received, a positive voltage appears across the 10 μF capacitor at point A. The stronger the received signal, the greater the voltage.

The two wires attached to J1 feed a portion of this voltage via P1 and isolation resistor R1 to the base of Q1 in Shush Box (see Fig. 2). The voltage forward-biases Q1, an NPN transistor, which then conducts, causing a current to flow in R4. The current in R4 produces a voltage drop which is negative with respect to the base-emitter circuit of Q2, forward-biasing this PNP transistor so that a current flows through relay K1 in the collector circuit.

Relay K1 closes, grounding the voice coil of the Shush Box's speaker. The signal of the station to which the receiver is tuned

ssssSHUSH BOX

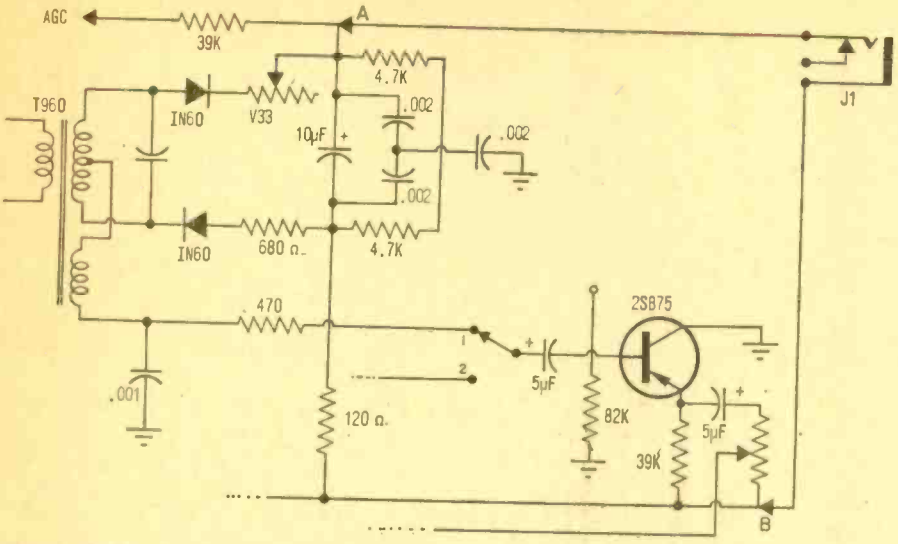


Fig. 1. Ratio detector circuit of Radio Shack Patrolman. The only modification of receiver to accommodate squelch is addition of jack J1 wired to points A and B.

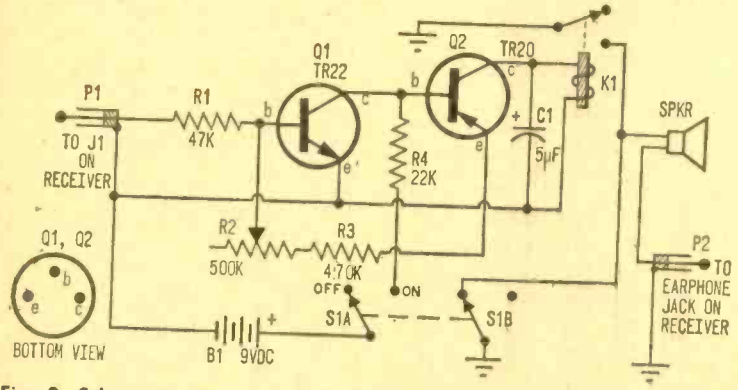
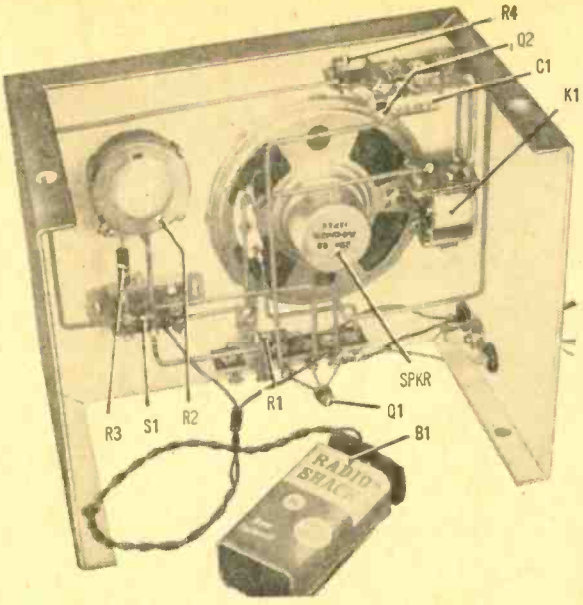


Fig. 2. Schematic diagram of Shush Box. Circuit functions as a simple amplifier energizing relay K1 whenever receiver picks up a signal.

PARTS LIST FOR SHUSH BOX

B1—9-VDC battery (2U6, 216 or equiv.)
C1—5-uF, 12-VDC electrolytic capacitor
J1—Ultraminiature 3-circuit phone jack
K1—5000-ohm miniature relay (Lafayette 99H6091 or equiv.)
P1—Ultraminiature phone plug
P2—Subminiature phone plug
Q1—TR-22 NPN silicon transistor (available from Allied Radio or International Rectifier)
Q2—TR-20 PNP silicon transistor (available from Allied Radio or International Rectifier)
R1—47,000-ohm, ½-watt resistor
R2—500,000-ohm potentiometer
R3—470,000-ohm, ½-watt resistor
R4—22,000-ohm, ½-watt resistor
S1—D.p.d.t. slide switch
1—2½-in. 8-ohm speaker (Radio Shack 40-247 or equiv.)
1—Battery connector
1—5x4x3-in. chassis box (Bud CU2105-A or equiv.)
1—Miniature knob
2—¼-in. rubber grommets
1—4-lug terminal strip
1—5-lug terminal strip

Misc.—Wire, solder, 4-40 and 6-32 machine screws and nuts, decals, etc.



Wide-open spaces in prototype makes construction a snap. Parts arrangement isn't critical and can be arranged to suit. Note use of terminal strips.

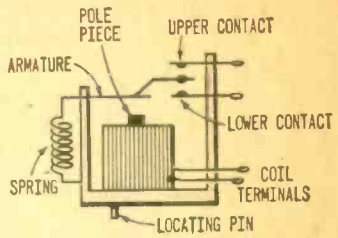


Fig. 3. The only critical part in building Shush Box is adjusting relay K1 above. Detailed instructions are given in text and should be followed.

comes through loud and clear. As soon as the transmission is concluded, voltage at point A in Fig. 1 drops and Q1 and Q2 cease to conduct. Relay K1 then opens the speaker voice-coil lead to completely silence the set.

Since plugging P2 into the Patrolman's earphone jack automatically disables the receiver's speaker, a separate speaker is provided in Shush Box.

Resistor R2, the *Squelch Adjust* control, is used to set the bias on the base of Q1 to the point where collector current will begin to flow the moment there is even a tiny positive voltage coming into the unit from P1.

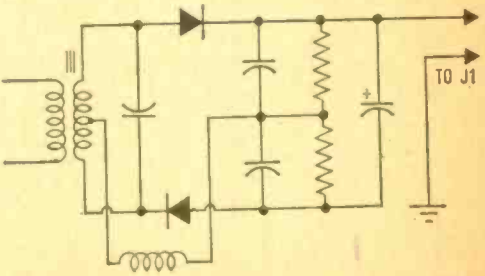
Shush Box is powered by a 9-VDC battery. Current drain is in the neighborhood of a mere ½ mA when no signal is being received, and jumps to only 2 or 3 mA during the brief intervals when Police transmissions are received. Battery life should be several hundred hours, even with an inexpensive battery.

Putting Shush In A Box. Before starting work on Shush Box, relay K1 must be adjusted so that when the leads from a 9-VDC battery are applied to the coil terminals, the armature snaps from the upper to the lower contact without hesitation. To adjust it, remove the relay from the box in which it is shipped. Invert the box and temporarily fasten the relay to it for support during the adjusting process. Be patient! Don't handle K1 roughly, or you may damage it.

First, carefully bend the lower contact down until the armature almost touches the pole piece when you push on the armature and close the relay with your finger. Then, bend down the upper contact until you can just see light between the movable contact on the armature and the lower contact when the relay is de-energized. See Fig. 3 for details on how relay is built.

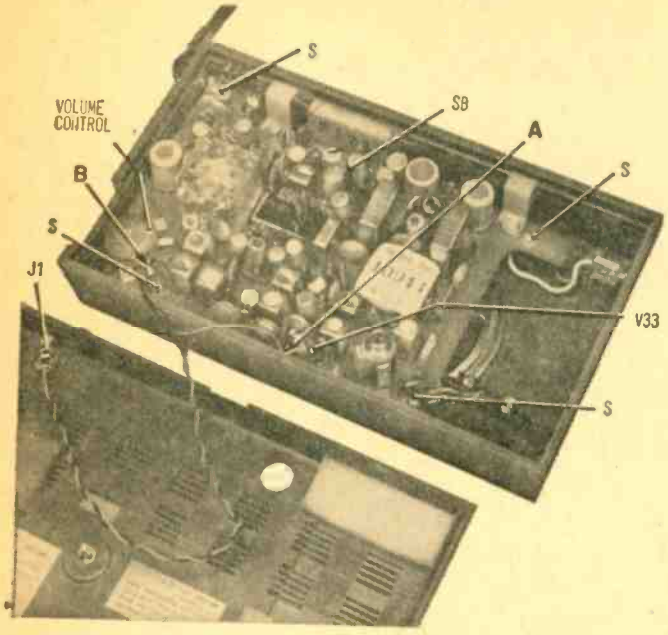
Touch the battery leads to the coil terminals. If the armature fails to snap closed each time the battery is connected, stretch the spring ever so gently. Stretch it a little at a time until a point is reached where the relay closes positively each time voltage is applied and flips open the moment the battery leads are removed. Only after you have the relay adjusted in this manner should you proceed with construction.

Shush Box is contained in a 5 x 4 x 3-in.



Shush Box can be added to any receiver using a ratio detector. Typical circuit above shows how detector output is hooked to J1.

ssssSHUSH BOX



Circuit board on Patrolman receiver must be lifted so wires to J1 can be soldered in place. This is accomplished by removing screws marked S and SB.

aluminum chassis box. Fortunately, parts are not very crowded and assembly and wiring aren't difficult. In short, the layout isn't critical and almost any arrangement of parts that proves convenient can be used.

The most tedious part of the job is drilling the front panel holes for the speaker grille. The speaker can be held in place with epoxy or other cement.

No sockets are required for the transistors. Merely solder the leads to appropriate tie points on the terminal strips. Don't allow the transistors to get too hot during the soldering process—heat-sink their leads with long-nosed pliers.

There is a locating pin on the bottom of K1. Grind this off to simplify mounting.

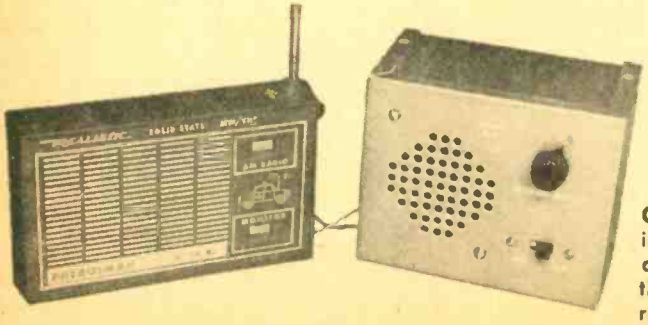
Wire resistor R2 so that the lead from Q1's base goes to the center terminal and R3 goes to the left-hand terminal of the control (see photo on previous page).

An NPN transistor is required at Q1 and a PNP unit at Q2. A number of different kinds were tried while experimenting with the prototype and all worked satisfactorily. However, the transistors specified in the Parts List are recommended because they are low in cost and readily available by mail or from local dealers stocking International Rectifier components.

Receiver Modification. Drill a hole in the lower left hand corner of the rear cover and mount an ultra-miniature phone jack, as illustrated above. Remove the volume-control knob. Then solder a 7-in. length of hookup wire between the lower terminal of the volume control (point B in Fig. 1) and the outside ring of J1.

Temporarily remove the four Phillips-type screws marked S in Fig. 4 and also the slotted brass bushing, SB. Gently lift the printed circuit board by the corner nearest the earphone jack until variable resistor V33 is far enough above the edge of the receiver case to solder a 7-in. length of wire to the terminal of V33 nearest the volume control (point

(Continued on page 127)



Completed Shush Box is plugged in to modified Patrolman VHF receiver. Now only messages come through loud and clear; the rest of the time, all's quiet.

LAB CHECK

LAFAYETTE RADIO MODEL PB-50
Solid-State VHF FM
Public Service Receiver

■ Until recently, those in need of a portable receiver for the public service frequencies (police, fire, etc.) had few rigs to choose from. Either they had to use a not-too-good convertor feeding a standard radio or they had to get a tube type receiver bound by a line-cord to an AC outlet or a car battery. But now, you can obtain a solid-state public-service VHF receiver that will work off AC, the car battery, or a battery pack of standard "D" cells.

One such receiver now available is Lafayette Radio's model PB-50 (30-50 MHz). It is an all solid-state mobile unit requiring a 12 VDC positive or negative ground power source. The PB-50 receiver provides volume, squelch and tuning controls, and an Xtal/Tune switch that selects either continuous tuning or one crystal controlled frequency. The crystal frequency is user selected and can be changed at any time by simply plugging in a crystal and retuning a few coils—it's easy to do.

The carefully-tuned front end assembly feeds a 5-stage IF amplifier with ICs (integrated circuits) used for four IF amplifiers (4ICs). The IF output feeds a ratio detector whose output goes to a three-stage audio amplifier. The power input to the entire receiver is regulated by an amplified transistor/zener diode voltage regulator. A two-stage squelch/noise amplifier mutes the receiver when no signal is received.

When used barefoot, that is, with no accessory equipment, the receiver may be mounted under an auto dash with the mobile bracket and hardware supplied with the receiver. Since the basic receiver is just about the size of a standard solid-state CB transceiver (2⅜ H x 6¼ W x 8-in. D) it can be mounted just about anywhere under the dash, and even in an oversize glove compartment.

For base operation, an optional plug-in AC power supply, model HB-502 priced at $16.95, is placed under the receiver, forming a receiver base that angles the receiver slightly upwards. Hardware is provided for securing the base to the receiver.

While not shown on the public service receiver page of the Lafayette catalog, the PB-50 receiver can be made portable by simply fabricating a 12 VDC battery pack. A simple box with 8 D cells is all that's required for a battery pack.

Continuously tunable, Lafayette's rugged public-service band receiver also incorporates provisions for one crystal-controlled channel.

Whether used in a car or with a battery pack, there is no strain on the batteries as the receiver's idling current is about 100 mA, peaking to about 250 mA when the volume control is wide open and a loud signal is being received.

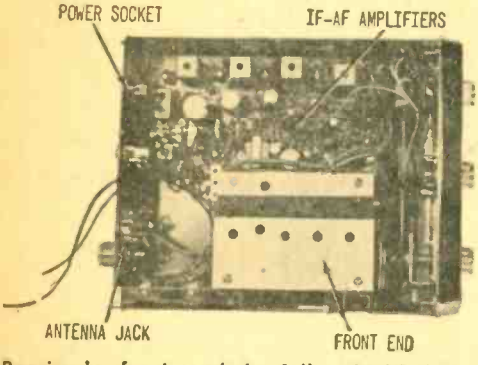
Fixed Frequency Operation. When reception of one particular frequency is needed, the user can install the appropriate crystal himself. The crystal socket is exposed by removing the four screws that hold

LAB CHECK

the front-end shield in place. The user then adjusts two coils for maximum reception of background noise, or maximum signal pickup.

Of course, optimum performance is obtained if the crystal tuning circuits are adjusted with a signal generator. But the noise or signal adjustment gives excellent results.

A jack on the rear apron allows for the connection of an 8- or 16-ohm remote (external) speaker, such as might be mounted on the fender of a service vehicle. The jack is so wired that when the remote speaker plug is inserted, the receiver's internal speaker is disconnected.



Receiver's front end is fully shielded for stability. Four out of five IF stages employ integrated circuits, keeping unit fairly compact.

Performance. The PB-50's sensitivity measured slightly less than 1 *u*V for 20 dB of quieting. In other words, it took an input signal slightly lower than 1 *u*V to reduce the receiver noise 20 dB. The selectivity was quite good though not measured. In comparison tests, the PB-50 was less subject to adjacent channel interference than a competitively priced receiver.

Image rejection was very good for a receiver of the PB-50's $69.95 price, measuring 62 dB against the claimed 65 dB.

It should be noted that even with this reasonably good image rejection, it was possible to pick up TV Channel 2 in the middle of the public service band with the receiver located 20 miles from the TV transmitter. We would suggest that should TV interference (probably only from channel 2) jam the desired public service station, a parallel resonant trap tuned to the TV channel's frequency can be connected in series with the antenna's transmission line.

The maximum undistorted power output was a very good quality 2 watts into 8 ohms. We say very good because the sound had an easy-to-read quality. Frequency drift was negligible 5 minutes after turn-on.

General Construction. Of course, any equipment intended for "emergency" service should have built-in reliability both electrically and mechanically. While we could not perform any extended tests, we were able to simulate some typical rugged usage. First, to simulate a defective auto charging system we operated the receiver for one hour with a 15.5 VDC power source with no ill effects apparently thanks to the built-in voltage regulator.

Several severe jolts as well as three four-foot drops to the floor failed to impede performance. A check with a reduced-voltage power-source to simulate performance with a battery pack having partially exhausted batteries, indicated the receiver was capable of operation with a power source as low as 8 VDC, though with slightly reduced sensitivity.

Summing Up. Performancewise the PB-50 is easily worth the $69.95 price which includes the mobile mount and DC power cable. From the viewpoint of flexibility, it is the most convenient and adaptable public service receiver presently available to the general public. Also, consider Lafayette's PB-150 (152-174 MHz) that sells for $69.95.

For the full story on selecting a receiver to cover your local police frequencies, refer to *Discover The Action Beat* starting on page 47. Included in this article are tables of general police frequencies in use in the U.S. and specific frequencies used by the police in the hundred largest U.S. cities.

The receiver's rear panel has jacks for the required external antenna, the 12-VDC power source, and an external remote speaker.

For additional information write to Lafayette Radio, Dept. CP, 111 Jericho Tpke., Syosset, N.Y. 11791. ■

THE TRANSISTOR THAT ALMOST RAN

Springtime is a great time for a fresh new look at one of man's ablest electronic servants

By Harvey Emerson Ezekiel

Transistors surround us. They are found in hearing aids, radios, television sets, telephones, phonographs, satellites, and elsewhere. Clearly, transistors are hard at work for us. Yet, ironically enough, few people know anything of the makeup and function of these little wondermites.

Just reach over and take one out of your transistor radio there, and examine, if you will, its simplistic intricacy. Taking off the cover, you will notice that the transistor is very much like a sandwich—a slab of crystal between two slabs of crystal. (Do not misplace the cover, as transistors will not function well if dust is allowed to settle inside.) You are probably surprised to find only three tiny pieces of material, each connected to one of the wire ends. That, however, is the wonder of it all.

Slab Pulling. Carefully remove the middle slab of material. This is the *base*. (Do not bend or fold it, since it must fit back snugly between the two outer pieces.) Like a traffic policeman, it stands between the other two crystals and directs traffic. The base gets its orders from an electrical current passed through it. Responding to this current, it permits certain electrons to flow while, at the same time, backing traffic up the other way Lord knows how many blocks beyond, like a *true* traffic policeman. Hence, the letter *p* is used to designate this part of the transistor, the *p*-type semiconductor or base.

It is usually made of silicon or germanium, which, in their natural state are insulators (like glass). But, for pure devilment, someone goes around poking holes in this material. Close observation will reveal the many holes, or missing electrons, that do not appear in some atoms (see Fig. 1 on next page).

Do not make the mistake of some amateurs who replaced the base with a pure slab of silicon. The holes (caused by slipping in impurities like boron, aluminum, or gallium) become vitally important in the transistor's function.

Not AWOL. Leaving the base for a mo-

THE TRANSISTOR THAT ALMOST RAN

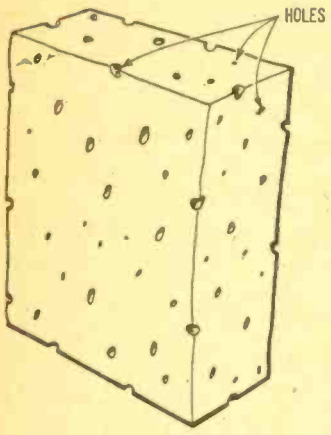


Fig. 1. P-type semiconductor is readily identified by its holes. These are essentially places where something should be but isn't.

ment, you will notice that the two outer crystals (the emitter and collector) are composed of semiconductor material also. However, an *emitter*, unlike the base, has a few extra electrons for some of its atoms. As a matter of fact, it may be necessary to deposit these extra electrons somewhere, as they tend to keep falling all over everything (see Fig. 2). The extras are the result of a process wherein arsenic is fed to the original germanium or silicon.

This procedure makes the resultant semiconductor *n*ervous (wouldn't *you* be, too?), hence the profusion of electrons, and the classification, *n*-type semiconductor. (Some electronics students find it helpful to remember the two types of semiconductors as positive, *p*-type, and negative, *n*-type; however, this kind of "crutch" is discouraged and avoided among technicians, engineers, and professionals.)

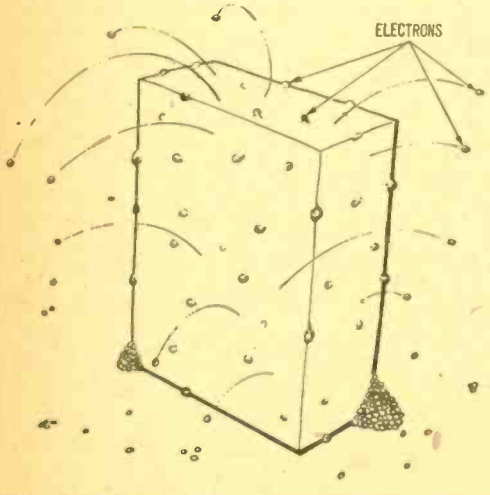


Fig. 2. Semiconductor of the N-type has overabundance of electrons spilling out all over without much regard for neatness.

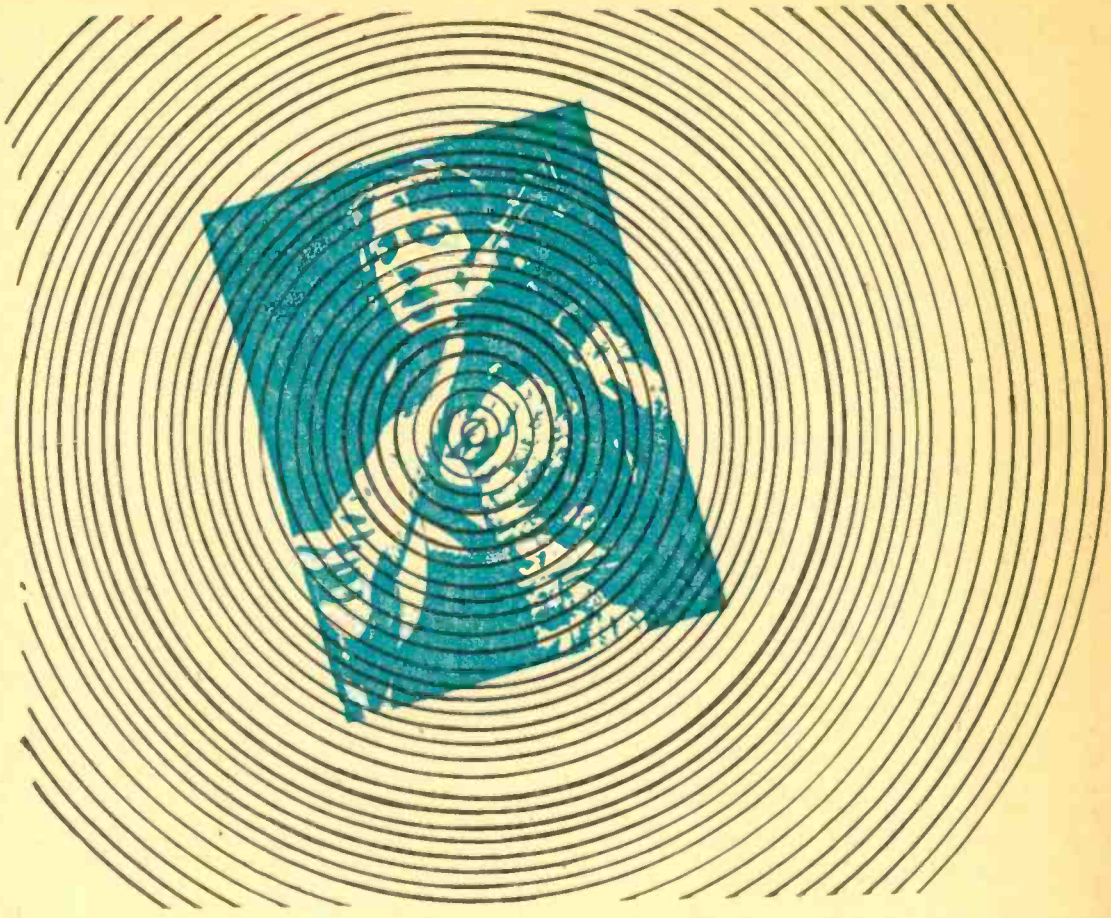
The Actual Truth. The plot thickens, as we come now to the actual function of the transistor. When you were in school, you were taught that electricity is the flow of electrons. That is not altogether untrue. A much better definition for electricity, though, would be the flow of electrons or the flow of the lack of electrons (holes). Yes, don't panic; holes flow (see Fig. 3).

Fig. 3. Holes (nothing where something might have been) are shown flowing left to right in a quiet, orderly fashion in drawing.

This flow of current from the *n*-type semiconductor to its *n*-type counterpart through the *p*-type base (which brazenly lures and attracts the innocent electrons) is the basic premise upon which the whole transistor works, enabling it to amplify, or strengthen, any electric signal that it might receive (such as a radio wave). This kind of transistor is called an *npn* transistor (pronounced, ĕn-pēē-ĕn trăn-zis'-t'r). It is the standard sort found in all your household electronic equipment. (There are *pnp* transistors also, but they are not discussed here, since some of the readers undoubtedly already find it difficult to accept the theory of flowing holes —a concept essential to *pnp* transistors.)

Doing The Undone. In reassembling your transistor, you may find a pair of tweezers and some safety goggles very helpful. (If

(Continued on page 133)



Finger Poppin' Throb Maker

By Steve Karlsen

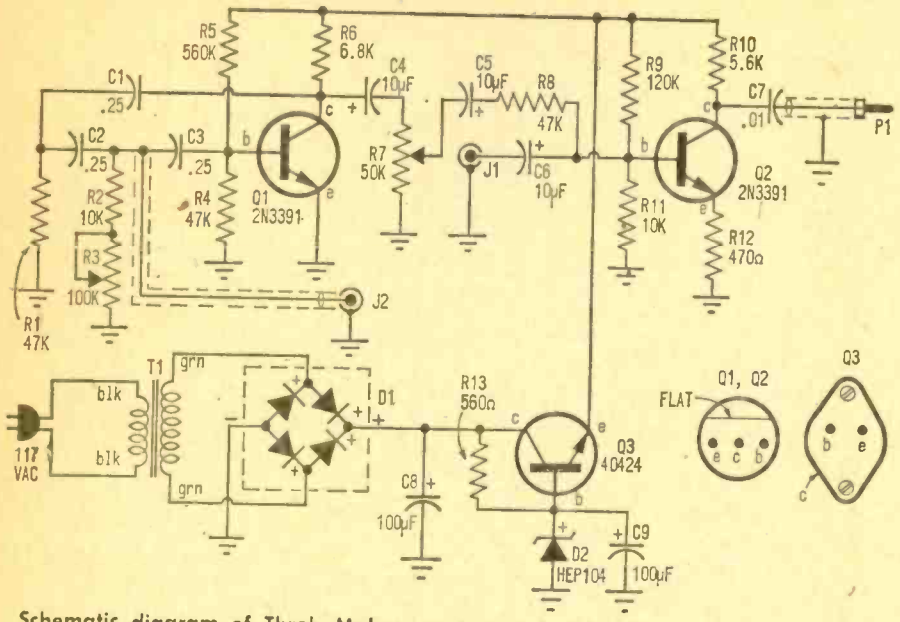
Add-on tremolo for gone guitars

The real *gut* sound of the Big Beat has a solid pulsation that comes from way down low—sort of like the deep moanin' of the blues. Unfortunately, no amount of practice will give the guitarist the Big Beat sound because it's all done electronically.

Inside the more expensive guitar amplifiers is a device called a *tremolo* which varies the gain of the amplifier at a very low rate—in the neighborhood of 4 to 20 times a second. Tremolo pulses the gain of the amplifier so the sound varies from very low to nearly twice the normal output. To the listener, the guitar can throb like a torch-singing gal who lost her man (heavy tremolo at a low rate) or sing like the mill of a GTO doing figure 8s (light tremolo, high rate).

Generally, tremolo is fully adjustable as to depth and rate. The depth control determines the degree of tremolo. Turn the depth up just a little and one barely perceives a pulsation; crank the depth wide open and the pulsations are strong enough to rattle glasses on the shelves. *(Continued overleaf)*

Throb Maker



Schematic diagram of Throb Maker, an easy-to-build add-on tremolo adapter.

PARTS LIST FOR THROB MAKER

C1, C2, C3—0.25-uF, 12-VDC capacitor (see text)
C4, C5, C6—10-uF, 12-VDC miniature electrolytic capacitor
C7—0.01-uF, 12-VDC capacitor
C8, C9—100-uF, 15-VDC miniature electrolytic capacitor
D1—Silicon rectifier bridge (Motorola HEP-175 or equiv.)
D2—9.1-VDC Zener diode (Motorola HEP-104 or equiv.)
J1—Phone jack (Guitar Input)
J2—Phone or phono jack (Footswitch)
P1—Phone plug
Q1, Q2—2N3391 transistor (Allied Radio, 72¢ ea., not listed in catalog)
Q3—40424 transistor (Allied Radio, 98¢ ea., not listed in catalog)
R1, R4, R8—47,000-ohm, ½-watt resistor
R2—10,000-ohm, ½-watt resistor
R3—100,000-ohm, linear-taper potentiometer
R5—560,000-ohm, ½-watt resistor
R6—6800-ohm, ½-watt resistor
R7—50,000-ohm, linear-taper potentiometer
R9—120,000-ohm, ½-watt resistor (5 %)
R10—5600-ohm, ½-watt resistor (5 %)
R11—10,000-ohm, ½-watt resistor (5 %)
R12—470-ohm, ½-watt resistor
R13—560-ohm, ½-watt resistor
T1—Filament transformer: 117-VAC pri.; 6-VAC, 1A sec. (Lafayette 33H3702 or equiv.)
1—2⅛ x 3 x 5-in. aluminum chassis box

Misc.—⅜-in. rubber grommets, perf board, terminals, shielded wire, hookup wire, solder, knobs, etc.

The rate control determines the frequency of pulsation. At a low rate (about 4 Hz), the guitar will sound like your heart pounding after a hard run. Set to a high rate (say 20 Hz), the guitar will sound like Bugs Bunny gargling under water.

While you can always beg, borrow, or steal a hundred or more dollars to buy a guitar amp with built-in tremolo, you can save most of this cost by adding our Finger Poppin' Throb Maker to your present guitar amp. Even if you've got one of those 30-buck budget jobs, Throb Maker will give you full tremolo effects. For example, the amplifier shown in the photographs is the rock-bottom-priced Lafayette 99C9101 ($29.95), yet Throb Maker gives it the same tremolo effects of amplifiers priced much higher.

Best of all, our tremolo in no way interferes with the guitar's normal operation, since it plugs into the guitar's regular input; no modification of the amp is required, either.

Throb Maker's Talents. Since the adapter is AC-powered, no batteries are needed here.

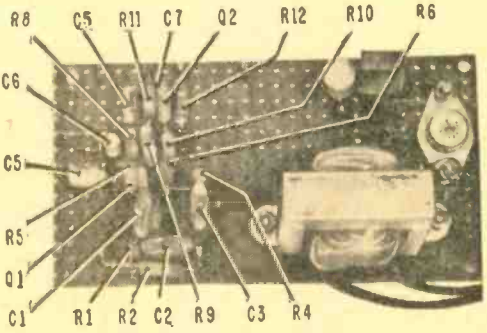
It's provided with a depth control that varies the tremolo effect from full *off* to full *on* (full *on* equals a depth of about 70%—a typical value). The rate control is adjustable from about 4 to 20 Hz, and there is a keying jack (J2) that allows tremolo to be keyed in and out with a foot switch.

When the tremolo is disabled, either by closing the foot switch or setting the depth control to full *off*, Throb Maker acts like a simple low-gain preamplifier and has no effect on the sound.

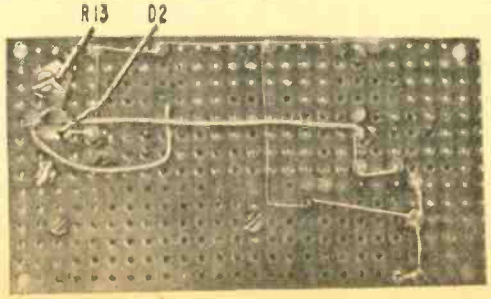
Making With The Beat. The complete tremolo unit is shown in the schematic. Transistor Q2 is a straight transistor amplifier with a relatively low gain. The input signal applied to J1 is amplified and appears at plug P1. Q1 is a phase-shift oscillator whose output frequency is determined by the values of C1, C2, C3, R1, R2, and R3.

Generally, for any given output frequency, all the capacitors are of the same value, as are the resistors. However, the output frequency can be varied over a narrow range of about 4 to 20 Hz by adjusting R3. Resistor R2 ensures that R3's value will not be set so low that oscillations cease. The output of the oscillator is taken off Q2's collector through capacitor C4.

Resistor R7 determines the amount of oscillator voltage (hence current) coupled through C5 and R8 to Q2's base. The oscillator voltage applied to Q2's base shifts its operating point and therefore the gain. This occurs since the oscillator voltage is added to Q2's base bias which is developed through R9 and R11.



Throb Maker uses a perf-board chassis to speed construction. Follow layout given here to ensure best results. Note that most components are mounted on end to save space.



Makin' It. Throb Maker is built into a 2⅛ x 3 x 5-in. aluminum chassis box. Most of the circuitry is pre-assembled on a section of perforated board that has a hole size to accommodate Vector T28 terminals or Lafayette flea clips.

To begin, cut a section of perf board so it will just fit in the bottom of the chassis box. Make certain the board is slightly undersize to allow the cover to be slipped into position.

Note that all parts values are critical and no substitutions should be made. If possible, use 5% resistors for R9, R10, and R11. Even T1 is critical. While this is a standard 6.3 VAC filament transformer, its normal secondary voltage at the low required current is nearly 8 VAC, and series voltage regulator Q3 has been designed for this voltage. Use only the T1 specified in the Parts List.

Also note Q1 and Q2's lead arrangement as it is somewhat different from that of typical experimenter transistors. Looking at the bottom, with the flat side facing up, the left lead is the emitter, the center lead the collector, and the right lead the base. Transistors Q1, Q2, and Q3 might not be available locally, but they are standard stock from Allied Radio's industrial department. Their prices are given in the Parts List—allow for insurance and postage for 5 ounces.

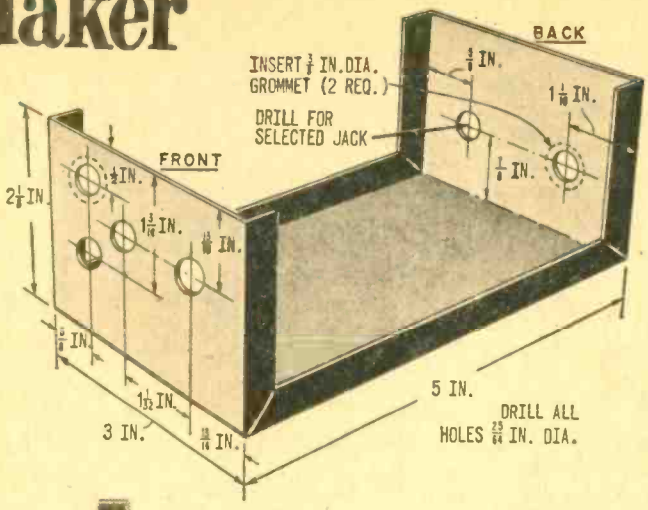
Tight Fit. Space for the controls is very tight so double-check that all components will fit before you cut any holes. The drill centers for the front and rear panels are shown in the illustration. Temporarily mount all the cabinet controls so you can position the circuits on the perf board.

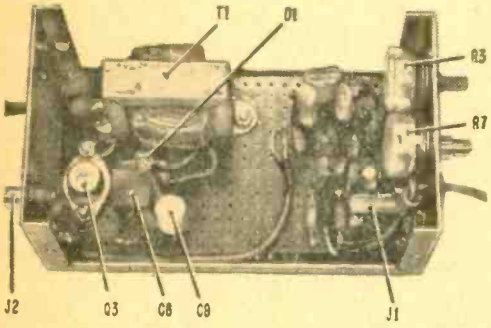
Put the power-supply components on the extreme end of the board as shown in the photos. Position the amplifier and oscillator as close as possible to the controls. To avoid hum pickup, the power supply must be as far as possible from the amplifier and oscillator.

Connection to Q3's collector is made directly to the case, to a solder lug placed at one mounting screw. Resistor R13 and Zener diode D2 are installed on the underside of the perf board. To avoid damage, heat-sink D2's leads when soldering. Heat sinks should also be used on Q1 and Q2 when soldering.

Throb Maker

When laying out and drilling chassis box, take care that there is enough space to mount tight-fitting potentiometers R3 and R7. Wired perf-board is installed in chassis box on spacers to keep bottom connections from shorting.





Silicon rectifier D1 is a complete encapsulated 4-diode bridge. The input terminals are marked with an AC symbol; the positive and negative output terminals are marked accordingly. If you desire, four separate diodes can be substituted for the package. Use diodes rated at least 25 PIV at 100 mA.

Final Assembly. Remove all chassis components. Then install the perf board subassembly using a ¼-in. spacer or a stack of washers between the board and the cabinet at each mounting screw. The spacers are needed to keep the terminals from shorting to the chassis.

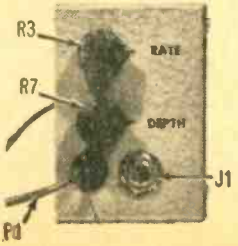
Install and wire the chassis components in the following order: the ⅜-in. rubber grommets for the line cord and the amplifier input cable (P1); rate control R3, depth control R7; footswitch jack J2; input jack J1. Jack J2 can be a phono or phone jack.

Make certain J1 is connected to the board with shielded cable, as the shield provides the ground connection between the cabinet and the subassembly's ground buss. The connecting lead between footswitch jack J2 and the connection to Q1's base must also be shielded. If an unshielded switch lead is used, Q1 functions as an amplifier and will obliterate the guitar's signal with hum. Similarly, the connecting lead from J2 to the footswitch must also be shielded.

Togetherness. The tremolo unit can be attached to the side of the amplifier's case. If you prefer, it can even be mounted inside the case. The final mounting position has no effect on performance. Note that there is no power switch for the tremolo; attach the tremolo's power cord to the amplifier's switched AC input.

Connect plug P1, the tremolo's output, to the amplifier input jack. If the amplifier has two channels or two inputs on a single channel, use either input. Connect the guitar to tremolo input J1.

While Throb Maker can be keyed on and off via jack J2, it is normally *on* when a switch is not plugged into J2. To disable the tremolo, simply turn depth control R7 to full *off*. Any inexpensive footswitch can be used to key the unit while playing, though the switch must be held down to kill the tremolo. You can also get a maintained-contact switch which allows you to remove your foot from the switch after it is activated to either the *on* or *off* position. ■



Completed Throb Maker, ready to be attached to your guitar amplifier for that Big Beat tremolo sound.

DX on Wings

Propaganda Crusades of the SW Nightfliers

By C. M. Stanbury II

■ Since about 1961, the U.S. government has secretly used airborne radio stations for a variety of propaganda and psychological warfare assignments—with at best only fragmentary reports of their activities ever reaching DXers. Even today, when the existence of such stations is common knowledge among most SWLs, the identities, histories, and current activities of these transmitters are shrouded in mystery. After researching numerous clandestine stations during the past 7 years, we still can't promise you all the answers. But those we have come up with can certainly add spice to many a DXer's life.

During the Cuban missile crisis (Oct. 22 through mid-Dec., 1962), Washington and the Voice of America admit using several pieces of portable radio gear. One was the then brand-new 50-KW transportable medium-wave unit featuring what was probably the world's first collapsible (Continued overleaf)

DX on Wings

towers of professional broadcast height, thus overcoming a problem inherent in other land-based portable stations. This station took to the air from a Marathon (Florida Keys) site Nov. 13, 1962 on 1180 kHz (now replaced by a permanent facility). Meanwhile, the U.S. Navy admits having equipped two of its C-118 cargo aircraft with TV and radio broadcast equipment.

The planes operated alternately at 12,000 feet (again, antenna height was no problem) very near Cuba. While the nature of the TV operation has been freely described by Washington (its purpose was to superimpose pictures on Cuban television), no information on the use of the *radio* equipment has ever been released—until now.

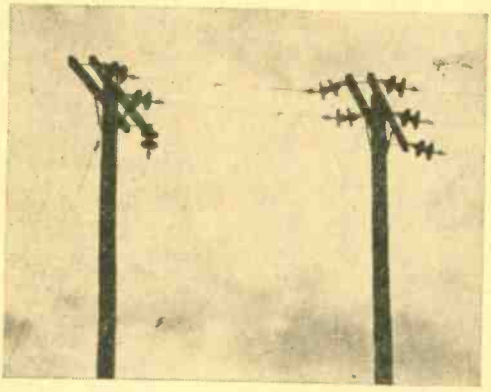
Also on Nov. 13, 1962, a second potent VOA outlet opened on 1040 kHz. Unlike the Marathon rig, it did not identify, and its location was kept secret for several months. But since it managed to get on the air so fast, the unit was obviously portable. What's more, from the signal strength we know that antenna height was adequate, to say the least. Several months later, VOA announced

The young lady holds remains of strain insulators recovered from site of Sugar Loaf outlet, proving it was completely destroyed.

that this station was operating from Sugar Loaf Key (about 50 miles west of the Marathon outlet), from which location it continued to transmit until closed down in the fall of 1965.

Bull-dozed Sugar Loaf. When deleted, the Sugar Loaf site was completely bull-dozed, towers and all. Therefore, we know that these towers were not portable and this was probably not the unit initially used. This suggests an obvious conclusion: VOA 1040 originally used those radio-broadcast equipped aircraft.

This conclusion becomes inescapable when we look at the rest of the evidence. According to official government statements, the 1040 station was built for the Voice of America by the U.S. Navy, which would be most unusual for a land-based relay but not at all surprising when you remember that those C-118s were Navy equipped and operated.



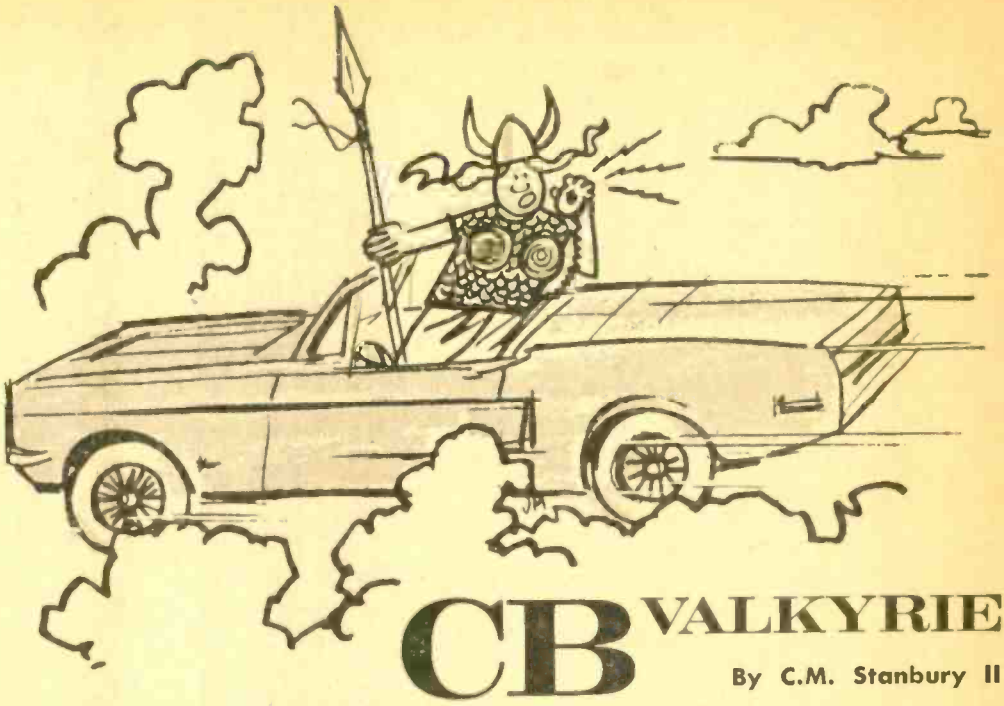
Telephone and power lines serving Sugar Loaf site. Original outlet couldn't be reached by land-line, indicating it was airborne.

Then it appears that the original 1040 relay received its programming by picking it up off the air from the Marathon outlet right from the start, and later the permanent Sugar Loaf facility received programs via land line. Thus, apparently the original 1040 station operated from a site which, unlike Sugar Loaf, could not be reached by normal telephone facilities.

Radio Americas. While the initial, presumably airborne, 1040 operation did not identify, from time to time the ID of whichever station it happened to be relaying slipped through. These included VOA Marathon (probably shortly after takeoff and again shortly before landing), various VOA SW frequencies (Castro simply did not have enough jammers to work on all of these), and most interesting of all, the famous Radio Americas.

The choice of RA as a pickup point is extremely unusual, since both their SW and BCB channels were heavily jammed. Further, while R. Americas relayed VOA transmissions almost continuously during this pe-

(*Continued on page 132*)



CB VALKYRIE

By C.M. Stanbury II

Catching this skyborne babe took a bit of down-to-earth sleuthing!

■ "CQ channel 10. CQ CB DX," murmured a soft feminine voice. "This is LORM-7 standing by for a call." Her signal was a solid S9.

My finger hesitated on the transmit button as I cruised through a green light and headed out into the country. That CQ was illegal and the ID was also illegal, but still I couldn't resist. Putting my rig on the air, I replied, "LORM-7, this is KMD4313. This is KMD4313, how do you read?"

She came back immediately. "4313, I read you loud and clear. How do you hear LORM?"

My hand shook some because I had been trying to contact LORM (League of Radio Masters) for almost two years now. "LORM-7, you are 5 dB over S9." The needle climbed steadily, which meant I was headed in her direction. "What are your call letters, LORM-7?"

Now she had reached 10 dB over. "This station is licensed by the League of Radio Masters and is therefore not under FCC jurisdiction," she answered cooly.

While she was talking, I turned on my home-brew direction finder and double-checked her bearing. Still east of me, but I remembered there was a bend in the highway a couple miles ahead. "Doesn't the FCC object to this?" (My DF can also be used as a general-coverage receiver. When there isn't any CB skip, I count jammers and gather other useful information on the SWBC bands with it.)

Some laughter, like the kind you might expect from Satan's lady friend. "Isn't anything they can do about it."

"And do LORM stations QSL?" The highway swung north, so I watched for a side road which headed east.

In her superior tone, "If you can find us."

Played it cool. "How do I know your card's worth the effort?" Spotted a passable side road and took it. Steered with one hand and checked my DF with the other.

"Well, among other things, our QSL has a picture of me on it."

I was headed in her direction again.

She almost purred. "And of course the QSL automatically makes you a LORM member, which means you'd be exempt from all FCC regulations."

It confirmed everything I'd ever heard about LORM, so the two-year hunt was about to pay off. All I had to do was keep her talking. "LORM-7, what does that beautiful creature on the card look like." I speeded up a little. "And what does she call herself?"

"She calls herself Lorma, what else?"

(*Continued on page 131*)

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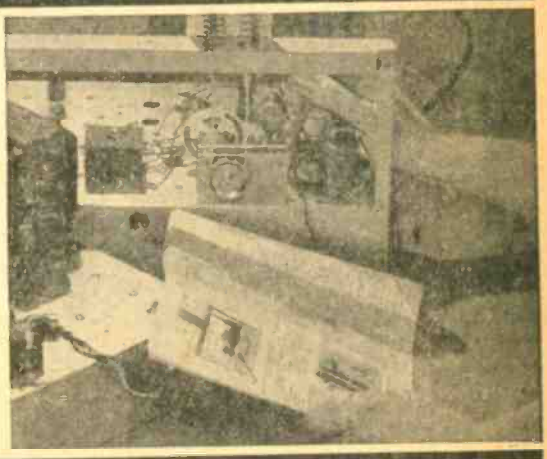

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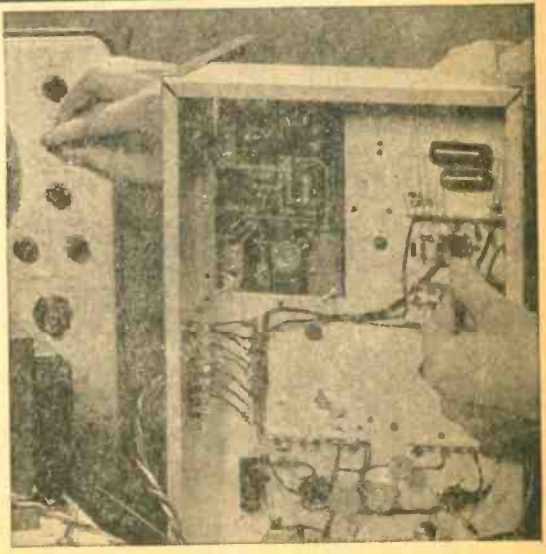

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Propagation Forecast

By C. M. Stanbury II

April/May, 1968

■ Again we have included our more or less semi-annual "SW Peak Listening Periods" table. Unlike the forecast listing, times in this table are specifically either EST or PST. If you live in the CST zone, use the East Coast column while MST DXers should use our West Coast figures.

One forecast which requires special mention is 120 meters, shown as a promising second choice for Africa at 2100-2400 listener's time (West Coasters should try a little earlier). This is intended strictly for *fanatic* DXers. A few very interesting stations in lower Africa have moved on to the 120-meter band in recent years and now is the time to look for them. To spot an opening, watch for R. South Africa's commercial service (alias "Springbok Radio") on 2376 kHz. ■

SW PEAK LISTENING PERIODS

Area	East Coast (EST)	West Coast (PST)
ASIA (Except Near East)	0000-0900	1800-2100
EUROPE, NEAR EAST & AFRICA (N. of Sahara)	0600-0900, 1200-2400	0900-2100
AFRICA (S. of Sahara)	1200-1800, 2100-0300	0900-1500, 1800-2400
SOUTH PACIFIC	0000-0900	1800-0900
LATIN AMERICA	1800-0600	1700-0400

RADIO-TV EXPERIMENTER PROPAGATION FORECAST

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

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

SECOND SPLITTER

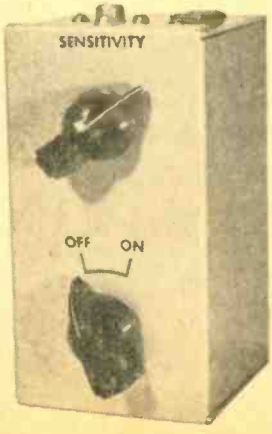
By Marshall Lincoln, W7DQS

Groovy gadget forever stills fast-action happenings as they occur

Bang goes the balloon at the prick of a pin. *Plop, tinkle-tinkle* says the lightbulb encountering the fast-moving head of a hammer. *Plock* is the golf ball's answer to the driving iron's swing. *Thud* tells us the football was kicked, but good! So!

All these happenings have something in common, the fact that we dull-witted creatures are aware that something took place in these instances only by virtue of sound and deduction. A filled balloon one second, a thin skin of rubber the next, and a bang in between lets us figure out what happened. As to what really happens in moments of fast action, we haven't much of a clue. But high-speed photography can be our open sesame to many a fascinating aspect of the world of split-second happenings.

In fact, with our low-cost Second Splitter, occurrences too fast for our slow senses even to react to can be caught and stilled forever by the all-seeing eye of the camera. The secret of Second Splitter's success is sound; the *plop* sound when a hammer smashes a light bulb, for example. Second Splitter reacts to this sound by triggering your flash to make a photo of the action at its peak.



Take a look at the photos of a bulb being smashed and a balloon rupturing after being punctured by a pin; they were made with our Second Splitter. To make photos like these, you'll need a high-speed electronic flash unit to use in conjunction with Second Splitter. These photos were made by the author using a Honeywell Strobonar 660, which can emit a flash lasting about 1/50,000 second. Other electronic flash units, though not this fast, can still be used for a variety of photos in which the sound of the happening triggers the light and captures the picture at the peak of the action.

Second Splitter can also be used to fire ordinary flash bulbs, if you wish. Still, it must be remembered that the flash of usable light from such a bulb lasts approximately 1/25 second and so is suited only for relatively slow-moving subjects. Nevertheless, all sorts of pictures can be taken in which the sound of the action is used to determine

SECOND SPLITTER

the exact instant at which the photo is made.

Splitting Seconds. Essentially, Second Splitter is a transistor audio amplifier that amplifies sound picked up by a microphone. Connected to the output of the amplifier (instead of a speaker or headphones) is a silicon controlled rectifier (SCR), which in turn is connected to the trip circuit of the flash unit. When an audio pulse of sufficient strength reaches the amplifier, the SCR is triggered into instant conduction and it, in turn, fires the flash unit.

The flash contacts in the camera shutter, which ordinarily are used to set off the flash, are not used. Instead, you open the camera shutter on either the "time" or "bulb" setting just before the picture is made. Second Splitter triggers the flash at the right instant, and the shutter is closed.

Of course, the camera must be mounted on a tripod and the area surrounding the motion to be photographed must be darkened before the picture is made to prevent blur and overexposure. The photos shown here were made at the end of the author's den in mid-evening. All room lights were turned off and a flashlight was aimed at the ceiling to produce just enough reflected light to operate the camera shutter, puncture the balloon, and hit the light bulb.

How It's Done. A look at the wiring diagram will disclose the details of Second Splitter's operation. A microphone (a ceramic tape recorder mike is ideal) is connected to the input connector. The mike's output is coupled by C1 to Q1. The signal from Q1 is amplified successively by Q2 and Q3 and applied across R7, which is used as a sensitivity control.

Ordinarily, R7 is in its full *on* position. However, if your mike is extra sensitive, or there is some background noise which may trigger the flash prematurely, adjust R7 to decrease the sensitivity.

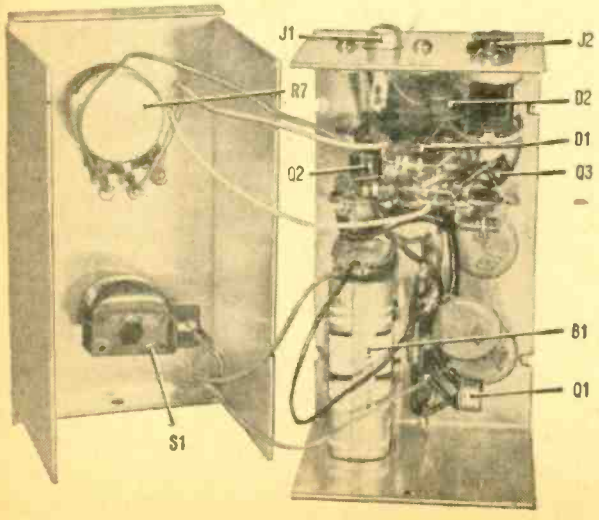
SCR D2 is connected to the output socket, into which is plugged a connecting cord from the flash unit. Ordinarily, this cord would be connected from the light to the camera shutter, but in this case it goes to the output of Second Splitter.

The SCR does not conduct until a voltage pulse of sufficient amplitude from R7 is applied to its gate. When this happens, immediately the SCR conducts, firing the flash unit. After the unit has fired, there is no longer a voltage in the flash unit trigger circuit until it charges up again, so the current flow through the SCR stops and is cut off until the next voltage pulse reaches the gate.

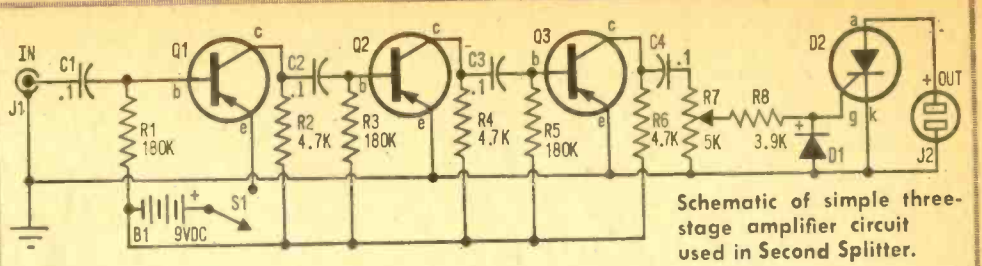
Polarity Observed. Since an SCR conducts in only one direction, you must check the polarity of the voltage across the electronic flash trigger-circuit plug before connecting the flash unit to Second Splitter. Observe the polarity shown in the wiring diagram. Most electronic flash units have polarized plugs so cords may be plugged in only one way. Make up a cord with polarized plugs on both ends so your hookup will always be correct.

The same precaution to ensure correct polarity must also be observed when connecting a flash unit firing ordinary flash bulbs. The flash unit must be connected so the wire leading to the negative pole of the flash unit battery is connected to the cathode (—) of the SCR.

By the way, if you have your electronic flash unit turned on and charged up when you turn on Second Splitter, a transient pulse



Parts layout isn't critical and any arrangement should work. In prototype, terminal strips are used for mounting components.



Schematic of simple three-stage amplifier circuit used in Second Splitter.

PARTS LIST FOR SECOND SPLITTER

B1—9-VDC transistor battery (Eveready 216 or equiv.)
C1, C2, C3, C4—.1-uF, 75-VDC capacitor
D1—1N645 silicon diode (or equiv.)
D2—2N2325 silicon controlled rectifier (GE #C5G or equiv.)
J1—phono jack
J2—Polarized jack to fit flash unit plug (see text)
Q1, Q2, Q3—PNP low-power audio transistor (IR TRO5-C or equiv. Available from Allied Radio—$1.10 ea.)
R1, R3, R5—180,000-ohm, ½-watt resistor
R2, R4, R6—4700-ohm, ½-watt resistor
R7—5000-ohm potentiometer
R8—3900-ohm, ½-watt resistor
S1—S.p.s.t. switch
1—2x2x4-in. chassis box
1—ceramic microphone

Misc.—Terminal strips, mike and trigger cord connectors, wire, solder, hardware, etc.

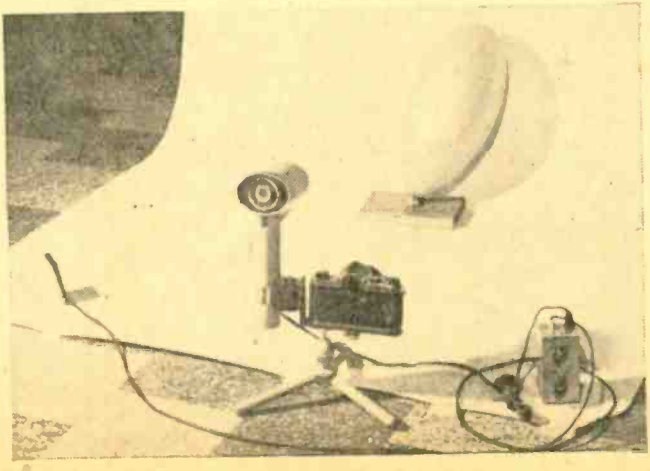
will trigger the flash. This is normal and should be disregarded. However, if you are using flash bulbs, be sure you have everything turned on *before* you put a flash bulb in its socket; otherwise the bulb will fire and be wasted.

Making It. The unit shown here was built in a 2 x 2 x 4-in. metal utility box, using terminal strips to mount the components. A small clip holds the 9-VDC transistor radio battery in place. The components can also be mounted on perforated board, if you prefer. Parts placement is not critical. The only precaution to observe is the usual one: to heat-sink the leads of the transistors, SCR, and diode to prevent heat damage while soldering.

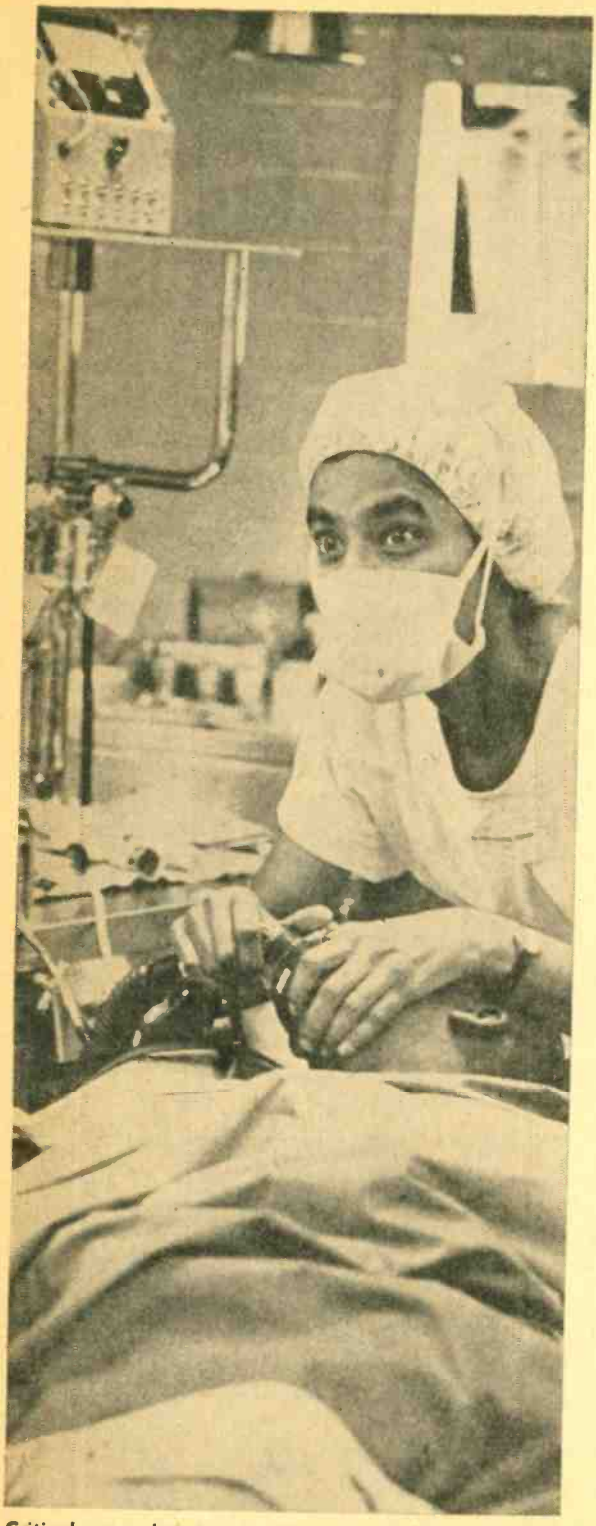
After construction is completed, test your Second Splitter by connecting a flash unit to it, plugging in a mike, and clapping your hands in front of the mike to trigger the unit. A little experimenting with the sensitivity control will soon show how sensitive Second Splitter will be with the particular mike being used.

Using It. Once you have taken a few pictures using Second Splitter, you will want to experiment with changing the timing of the flash by changing the mike position. By moving the mike farther away from the subject, you can photograph the action later in time; by moving the mike closer, you'll catch it sooner. For the action photos shown here, the mike was placed about a foot away, just out of the picture area.

When making pictures involving breaking glass, be careful to protect yourself from the flying fragments. A good investment would be a couple dollars spent for a plastic face mask such as used by workmen operating tool grinders. And don't perform these photographic feats in the middle of the living room floor—it's awfully hard to get the slivers of glass out of the carpet! ■



Second Splitter hooked up to camera and electronic flash ready to catch the action of the balloon being punctured.



Critical, open-heart operations are all but routine at Manhattan's St. Luke's hospital. Patient here is seven-year-old Earl Young, born with a heart defect.

new HOPE

Seven-year-old Earl Young was like any other red-blooded American youngster in every respect, save one. Earl was born with a heart defect known as "tetralogy of Fallot" —which turns out to be a thickening of the walls of the right ventricle, which is responsible for pumping blood to the lungs.

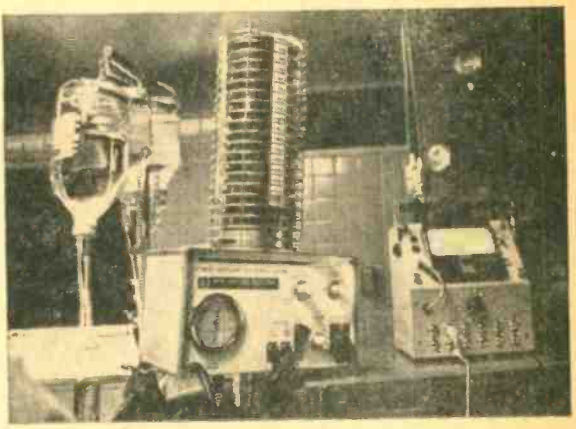
This obstruction of blood flow was discovered when Earl was still an infant. But no action or solution was in sight until he was seen by a physician at a health center affiliated with St. Luke's Hospital in New York City's Morningside Heights.

Earl led a relatively normal life and attended public school. Still, his capacity for physical activity was limited. Playing the ordinary rough-and-tumble games was out of the question; a simple activity such as climbing a flight of stairs posed problems few of his age are forced to face. Successful open-heart surgery at St. Luke's corrected the defect and is expected to help Earl enjoy a fuller and much happier existence.

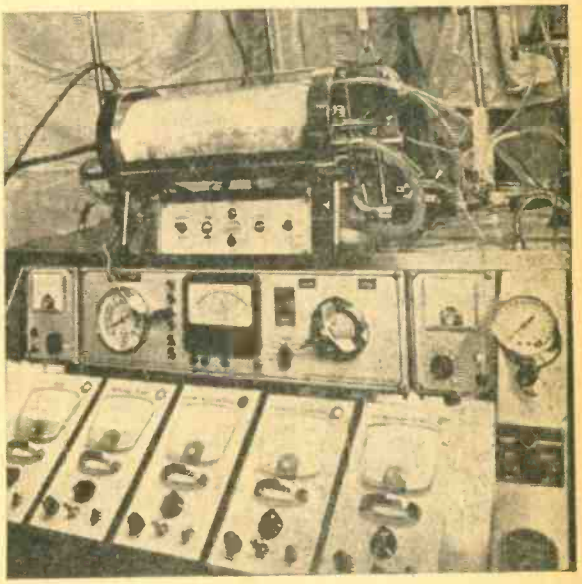
In open-heart surgery, a heart-lung machine takes over the functions of receiving blood carried

for ailing hearts

Operation gets underway promptly at 7:50 a.m. when anesthesia is induced. Here, catheter is inserted.



Bottles contain fluids and blood plasma that are administered intravenously. Respirator (center) forces air into patient's lungs; electronic thermometer (at right) continuously reports patient's body temperature.



Vital heart-lung machine takes over patient's breathing and circulation, freeing heart for surgeon's scalpel. Patient's blood actually flows through machine.

from all parts of the body by the veins, dissolving oxygen in it, and pumping it back through the arteries. Once this machine is attached to the patient, surgeons can then open the victim's heart and correct whatever defects are found to be present.

Two such operations are performed at St. Luke's each week. In 90 percent of the cases, the surgery is elective. In other words, the doctors may recommend that an operation be scheduled, but it is up to the individual concerned (and oftentimes his parents) to determine whether such action is actually undertaken. Generally, the intent is to correct defects in patients whose condition is relatively static and who may have been living with the problem for years.

The decision to recommend surgery is made by a committee of surgeons and medical specialists. Their task is to examine cases referred to St. Luke's physicians, cases which may have been discovered in private practice, community health centers, clinics, and elsewhere.

Referrals are also accepted from

...for ailing hearts

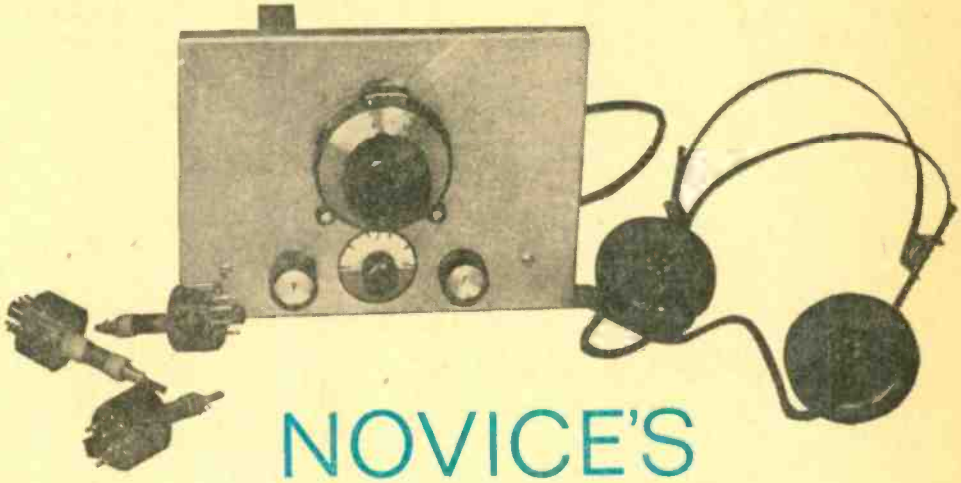
Dramatic moment arrives at 10:43 a.m. when patient's heart and lungs again take over function machine has served for an hour. Having determined there's adequate blood pressure, surgeons close patient's chest while team assists.

local physicians not affiliated with the hospital center. But regardless of the origin of the case, the committee makes its final decision during regular evening sessions when it meets and examines patients at the hospital center.

Statistically speaking, only a relatively small number of cases receive open-heart surgery on an emergency basis. And about half of those who do receive treatment are unable to pay hospital and surgeon's fees themselves. But all who do undergo heart surgery at the clinic are given promise of what to them is priceless: new hope for ailing hearts. ■

Though fluid and blood are still being administered intravenously in small quantities, patient is wheeled out of operating room at 12:45 p.m. Placed in intensive-care unit (right), the patient is fitted with an oxygen mask until he can go it on his own.

Great first receiver for the beginner
or reliable standby for the old pro,
it tunes 600 kHz to 38 MHz in four bands
using one triple-triode tube and plug-in coils!



NOVICE'S ONE-TUBE MULTIBANDER

By David Jay Green, W6FFK

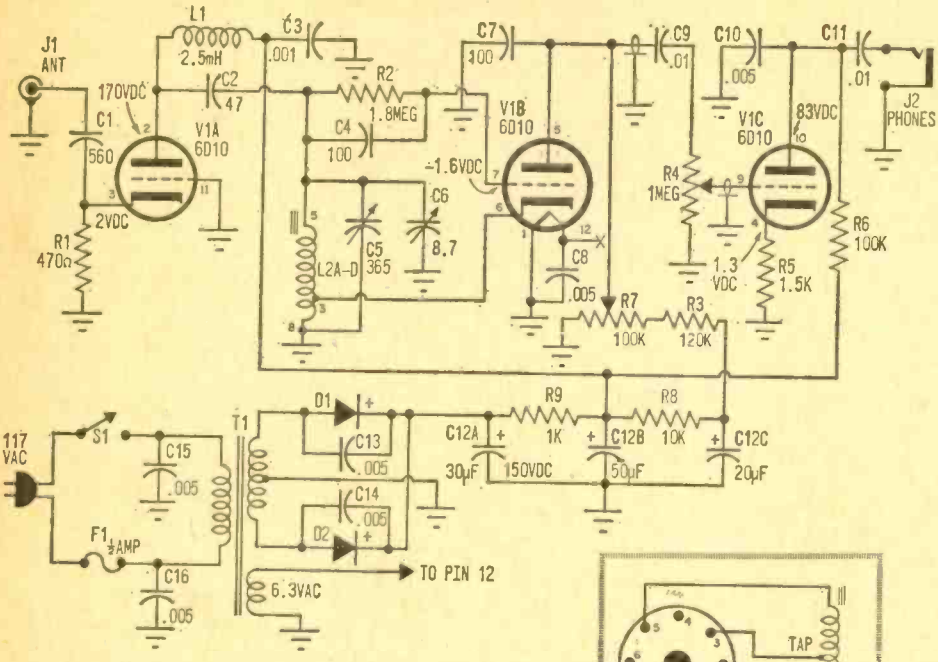
What the newcomer to radio needs is a good, sensitive, selective little receiver to get started with. Whether he be SWL or ham, the one additional requirement usually is that the receiver be inexpensive. To buy a commercial unit that'll fill the bill on all counts is easier said than done. But to get such a receiver, there is an easy way that'll pay an extra dividend as well. The solution is to build Multibander.

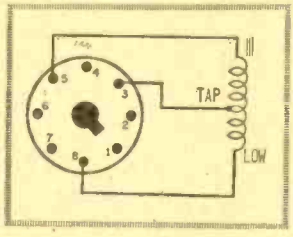
First off, the novice will get a rig that'll put him in the swing of things. And second, he'll get good experience in circuit construction and receiver techniques.

Our Multibander features an RF stage for excellent sensitivity—in conjunction with a good antenna and ground it'll pick up just about everything worth hearing. The isolated grid-leak detector has regeneration and gives good selectivity for separating crowded signals. And, a stage of audio gives enough gain for more than adequate headset volume.

The frosting on the Multibander cake is the fact that it uses simple straightforward circuitry. And, a single

•MULTIBANDER•





Schematic of Multibander shows three-stage circuit using grounded-grid RF amplifier, regenerative detector, and an audio amplifier. Diagram at right gives L2 connections.

PARTS LIST FOR NOVICE'S ONE-TUBE MULTIBANDER

C1—560-pF capacitor
C2—47-pF capacitor
C3—.001-uF capacitor
C4, C7—100-pF capacitor
C5—365-uF variable capacitor (Lafayette 32H1103 or equiv.)
C6—8.7-pF variable capacitor (Allied 43D3759 or equiv.)
C8, C10, C13, C14, C15, C16—.005-uF capacitor
C9, C11—.01-uF capacitor
C12A, B, C—20-, 30-, 50-uF 150-VDC electrolytic capacitor (Lafayette 34H7545 or equiv.)
D1, D2—750-mA, 750-PIV silicon rectifier (Lafayette 19H5002 or equiv.)
F1—½-A fuse and holder
J1—Phono jack
J2—Phone jack
L1—2.5-mH RF choke (Lafayette 34H8792 or equiv.)
L2A—Tapped oscillator coil (J. W. Miller A5496C or equiv.)
L2B—Tapped oscillator coil (J. W. Miller C5496C or equiv.)
L2C—Tapped oscillator coil (J. W. Miller C5496C or equiv.)
L2D—Tapped oscillator coil (J. W. Miller D5496C or equiv.)
R1—470-ohm, ½-watt resistor
R2—1,800,000-ohm, ½-watt resistor
R3—120,000-ohm, ½-watt resistor
R4—1,000,000-ohm potentiometer, audio taper
R5—1500-ohm, ½-watt resistor
R6—100,000-ohm, ½-watt resistor
R7—100,000-ohm potentiometer, linear taper
R8—10,000-ohm, ½-watt resistor
R9—1000-ohm, ½-watt resistor
S1—S.p.s.t. switch on R4
T1—Power transformer; 117-VAC pri.; 250-VAC, 25-mA and 6.3-VAC, 1-A sec. (Stancor PS8419 or equiv.)
V1—6D10 compactron tube
1—12-pin socket for 6D10
1—Octal socket for plug-in coils
4—Octal tube bases
1—2⅞-in dia. vernier dial (Lafayette 99H6029 or equiv.)
1—7 x 7 x 2-in. metal chassis (Lafayette 12H8203 or equiv.)
1—8 x 6-in. aluminum sheet for front panel
Misc.—Terminal strips, line cord, knobs, wire, solder, etc.

three-stage compactron and plug-in coils make it easy and inexpensive to build.

Circuit Operation. Radio signals are coupled through C1 to the grounded-grid RF amplifier section of V1A. This serves two purposes: to get amplification of the signal and to isolate the detector stage from the antenna. Reason is that by isolating the detector, the tuned circuit isn't loaded down, has a higher Q, and is therefore more sensitive and selective. Also, the isolated detector regenerates more smoothly over a wider range.

The amplified signals from the RF stage are then fed to the tuned circuit of the plug-in coil (L2), the main tuning capacitor (C5), and the bandspread capacitor (C6). The grid bias for the detector stage of V1 is developed by the grid-leak composed of R2 and C4.

Regenerative feedback is provided by connecting the cathode of V1B to the tap of L2, and is controlled by varying the voltage to the detector by means of regen control R7.

The detected signals are coupled by C9 to the volume control (R4) and fed to the grid of the audio stage V1C. Amplified audio is then passed to the phone jack by C11.

Construction. The front panel is a 6 x 8-in. piece of sheet aluminum mounted on the chassis with two sheet metal screws. When the front panel is mounted, drill pilot holes for the volume control, the regen control, and the bandspread capacitor. Remove the front panel, and then enlarge the pilot holes to accommodate the controls. The main tuning capacitor is mounted with ⅜-in. aluminum spacers and must be mounted close enough to the front panel to couple to the vernier dial.

Follow the layout shown in the photos for mounting the various components. Actual parts placement isn't critical and can be rearranged to suit—just remember to follow good RF practices and keep leads short.

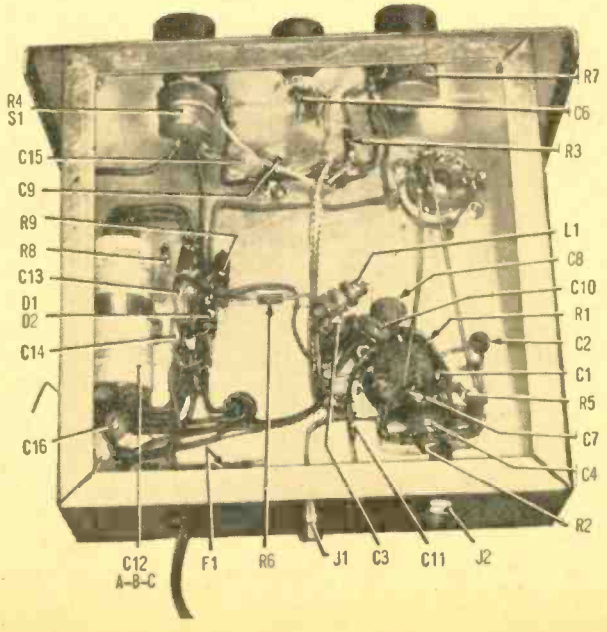
The triple-section electrolytic is mounted on one of the transformer mounting screws, as is a 6-post terminal strip. This terminal strip is used to mount the small components of the power supply. The fuse holder for F1 can be mounted on the remaining transformer screw.

The two shielded leads going to the volume and regen controls are made by slipping hookup wire into a piece of braided shielding. The connection to the main tuning capacitor is made with insulated buss wire through a small chassis hole.

Wire the receiver from the schematic, keeping leads short. Careful placement of components around the tube socket is necessary to avoid a rat's nest of wires. Follow the component placement shown in the photos, and you won't have any trouble.

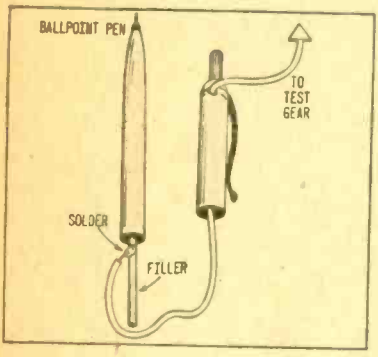
The four plug-in coils are made by wiring the oscillator coils (L2A, B, C, D) inside the tube bases, as shown. The leads should be

(Continued on page 130)



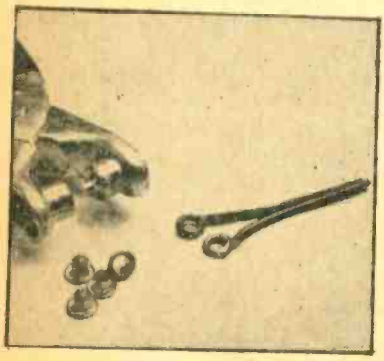
Following suggested layout, there is plenty of room for parts, simplifying construction. Since majority of circuit components are attached to compactron socket, care must be taken here to avoid a rat's nest of wire and components. Top side of finished Multibander is shown above.

IMAGINEERING DESIGN TIPS



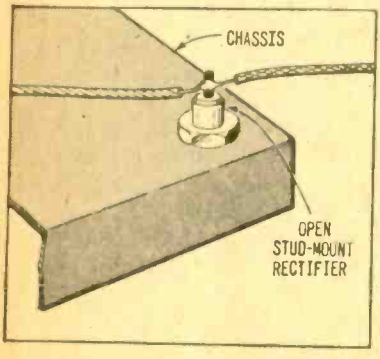
PENS MAKE HANDY PROBES

● A worn out ballpoint pen with an all-plastic barrel makes a handy all-around probe for your multimeter or other test gear. Simply disassemble the pen as shown. Then drill a hole at the top end for the test-lead wire. On some pens, you can force the little button on top of the barrel out and run the wire through there, obviating the need to drill a hole. Then simply solder a piece of flexible test-lead wire to the filler and assemble the pen. —Kevin Green



GARMENT EYELETS FOR WIRE LUGS

● If there's a lady around the house and she has a sewing kit, chances are you have a neat way of putting lugs on the ends of wires. What it takes is some eyelet pliers and common garment eyelets. To terminate a wire, simply strip about half an inch of insulation off the end. Then wrap the bare wire several turns around the brass eyelet. Insert the eyelet in the pliers, squeeze, and presto, you have a nifty brass lug on the end of the wire. —Sebastian F. Luskin



STANDOFFS FROM SILICONS

● Open silicon rectifiers of the stud-mount variety make sturdy standoff insulators suitable for low voltage applications. These diodes rarely short out, they usually go open. Of course, be sure to check that the diode is open before using it for this purpose. If so, then just drill the right size hole where needed and mount the diode. Being fairly rugged, moderately heavy components can be attached to the rectifier's lug.
—William Stamile

● Send your Imagineering Design Tips with full details and a photo or drawing to Radio-TV Experimenter, 505 Park Ave., New York, N. Y. 10022. The top ideas selected by the editors will win $10.00 each. Entries become the property of Radio-TV Experimenter and can't be returned.

HUMBUG

By Herb Freidman, W2ZLF

For the tape buff and serious audiophile, there is nothing worse than the dull and deadly drone of unwanted hum. Now there is a simple and easy way to change all that and make those sounds you love pure again.

If you're a true-blue tape fan, you probably dub tape from many sources, perhaps even from foreign "tapespondents." Naturally, not everyone's tape recorder is as good as yours, and the hum level from the tape being dubbed can often appear as loud as the program material. With voice, hum is not really a problem. But hum on top of a "live" recording of a Tivoli Garden concert sent to you by a Danish tapespondent is not to be tolerated.

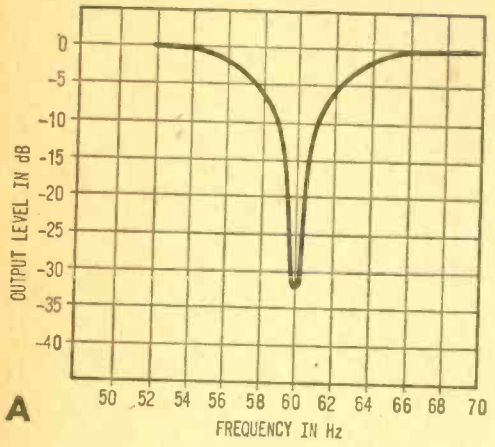
Of course, hum can often be eliminated or reduced by simply attenuating the low-frequency range. But the catch is that cutting the bass will also cut most of the sound below 100 Hz, and perhaps some of the sound above 100 Hz. In other words, there is virtually no satisfactory way to attenuate 100- or 120-Hz hum with a standard bass control.

The ideal hum filter would be a device which could literally punch a hole in the response at the hum frequency—60 and 120 Hz in North America and 50 and 100 Hz on tapes from Europe—while having no effect on other frequencies. Sound impossible or expensive? Not really—all it takes is a simple transistor amplifier, a parallel-T filter, and a little feedback. Put it all in a small cabinet and you have our Hum Bug.

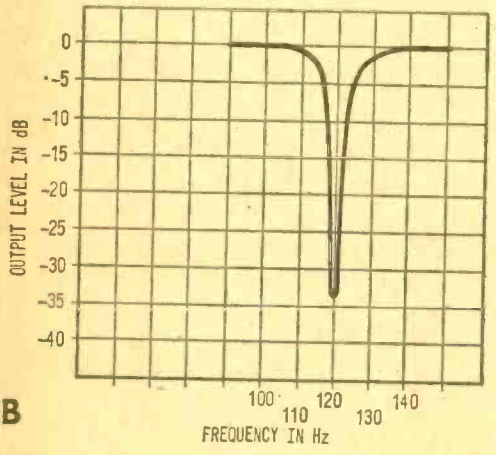
Hum Bug is specifically designed for the tape fan—not a commercial recording studio. The input impedance is moderately high and matches the output impedance of most tape recorder line-level amplifiers. Its output can be terminated in 50,000 ohms or higher. In normal use, the filter would be connected between a tape deck or recorder and another recorder, or it could be used to filter out hum between a turntable or a radio and the recorder.

As shown in the frequency graphs, the filter network is extremely selective. When used to filter 60-Hz hum, the rejection notch is but a few cycles wide (in fact, 57 and

HUMBUG



Hum Bug's sharp rejection of 60- and 120-Hz hum frequencies is shown in curves A and B, respectively. Positive feedback increases effective Q sharpness of parallel-T filter.



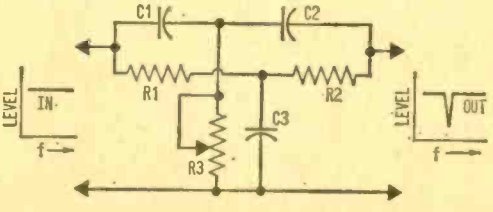
63 Hz are less than 3 dB down). In effect, the hum is removed with no noticeable effect on the remaining low-frequency sound. When 120-Hz hum is being filtered, the 3-dB-down points are 115 and 125 Hz; again, little sound is lost other than at the hum frequency.

The filter amplifier itself contributes no degradation of sound. Its internal noise level is better than 70 dB below 1 volt output, and its total harmonic distortion (THD) is less than 0.1% for a 1 volt output.

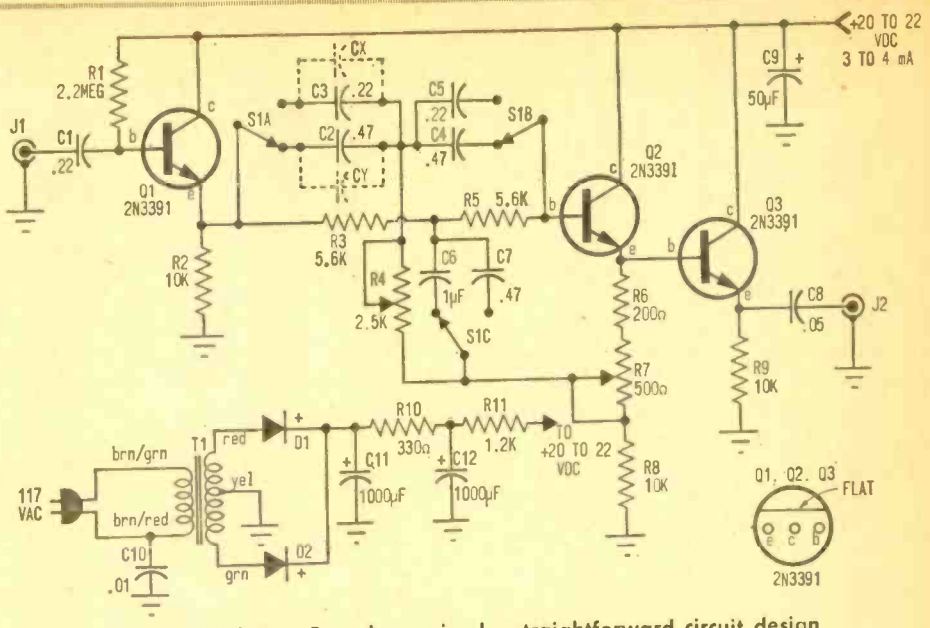
Bugging the Hum. The secret of Hum Bug's success is the parallel-T filter. By proper selection of the component values, the filter can be made to pass all frequencies but one, with very high rejection of the unwanted frequency. When precision components are used, each value can be calculated. However, when experimenter-grade components are used, the filter must be "tuned"; this is accomplished by making R3 variable, and adjusting R3's value for maximum rejection of the unwanted frequency. Hum Bug can be tuned for rejection of frequencies in the 40- to 90- and 100- to 140-Hz range. Two rejection ranges are obtained in the recording filter by switch-selection of the three parallel-T filter capacitors. The 60-Hz filter uses capacitors C2, C4, and C6; the 120-Hz filter uses capacitors C3, C5, and C7. Capacitors Cx and Cy—shown as dotted lines—are "trimmer" capacitors used to "zero in" experimenter-grade capacitors used in the filter. Precision capacitors can be used, thereby eliminating the need for trimmers—but the cost might be prohibitive.

How High the Q. While the parallel-T filter is *relatively* sharp, the key word is relative. Just connecting a parallel-T filter between two amplifiers would reject the undesired frequency, but it would also attenuate other frequencies to below 50 Hz and above 80 Hz in the case of a 60-Hz filter. By adding feedback to the filter, via the connection of R4 and C6 to Q2's emitter, the filter's Q can be sharply increased. The result is a very steep notch with virtually no attenuation of frequencies just a few cycles removed from the rejection frequency.

The Q of the filter, hence the degree of notch sharpness, is determined by the amount of feedback from Q2's emitter. When R7's arm is near R6, maximum feedback is applied to the filter and the notch is extremely sharp. As R7's arm is rotated towards R8, the amount of feedback is reduced and the notch is made wider. By juggling the amount of feedback and the tuning of the parallel-T filter, it is possible to sharply roll-off frequencies below about 100 Hz to reduce room



Secret of Hum Bug's success is the parallel-T filter. Tuning rejection frequency is accomplished by varying setting of R3; positive feedback tends to narrow rejection notch.



Schematic of Hum Bug shows simple, straightforward circuit design.

PARTS LIST FOR HUMBUG

C1—.22- or .25-uF, 25-VDC capacitor
C2, C4—.47-uF capacitor (see text)
C3, C5—.22-uF capacitor (see text)
C6—1-uF, 25-VDC capacitor
C7—.47-uF, 25-VDC capacitor
C8—.05-uF, 25-VDC capacitor
C9—50-uF, 25-VDC capacitor
C10—.01-uF, 500-VDC capacitor
C11, C12—1000-uF, 30-VDC electrolytic capacitor
Cx, Cy—See text
D1, D2—100-PIV, 500-mA silicon diode (Radio Shack 276-659 or equiv.)
J1, J2—Phono jack (Radio Shack 274-339 or equiv.)
Q1, Q2, Q3—2N3391 transistor (available from Allied Radio)
R1—2.2-megohm, ½-watt resistor
R2, R8, R9—10,000-ohm, ½-watt resistor
R3, R5—5600-ohm, ½-watt resistor (5 percent)
R4—2500-ohm potentiometer
R6—200-ohm, ½-watt resistor
R7—500-ohm potentiometer
R10—330-ohm, ½-watt resistor
R11—1200-ohm, ½-watt resistor (see text)
S1—3-pole, 4-position rotary switch (Mallory 3234J, Allied Radio 56B4355 or equiv.)
T1—Multi-voltage power transformer (Allied Radio 54B4731 or equiv.)
1—3x8x6-in. cowl-type chassis box (Bud SC-2132, Allied Radio 42B8686 or equiv.)
Misc.—Perf board and terminals, terminal strips, shielded cable, wire, solder, knobs, etc.

rumble or excessive low-frequency sounds.

Transistor Q3 is simply an emitter-follower output stage used to isolate the load from the filter amplifier.

Construction. Hum Bug is built in a chassis box approximately 3 x 8 x 6 inches. The amplifier itself is wired on a perfboard subassembly using push-in terminals as tie points. Only parallel-T components R3 and R5 are mounted on the perfboard; the capacitors are connected directly at selector switch S1.

Note that no line switch is provided. To prevent the possibility of hum pickup in the filter amplifier from the power leads, the line cord is connected directly to the AC supply since the filter would most likely be removed from the circuit(s) when not in use. If you prefer to have the line switched, mount a switch assembly on the back of attenuation control R7.

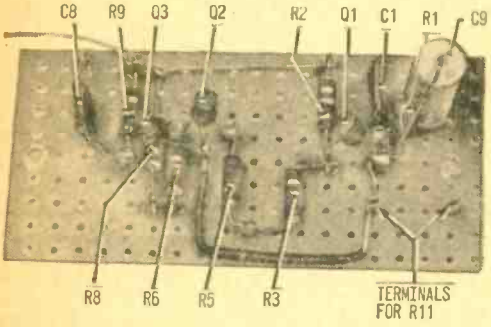
First step is to build the power supply. Mark the chassis to indicate the cabinet's main-section flanges so you don't mount components in the flange areas and thereby prevent the cabinet from being closed. Install power transformer T1 as close as possible to a flange mark—so it is located as far as possible from all other components. Then install the complete power supply including C11, C12, and R10. Resistor R11 is installed on the perfboard after its value is deter-

HUMBUG

mined (more on this later). Keep C11 and C12 as close to the back apron as is possible —squeeze them in so maximum area is available for the perfboard assembly.

The perfboard measures approximately 1¾ x 3⅝ in. (the larger, the better). Components are mounted both flat and "on-end" to avoid a parts jam. All wiring and components are on top of the board, with the exception of C1's ground connection which is made on the bottom of the board to avoid crossing over topside components and leads.

Resistor R11. Install T28 terminals on the perfboard to accommodate R11 but do not install R11. After all other wiring is complete, temporarily install a 1200-ohm resistor for R11. Apply power to the unit and

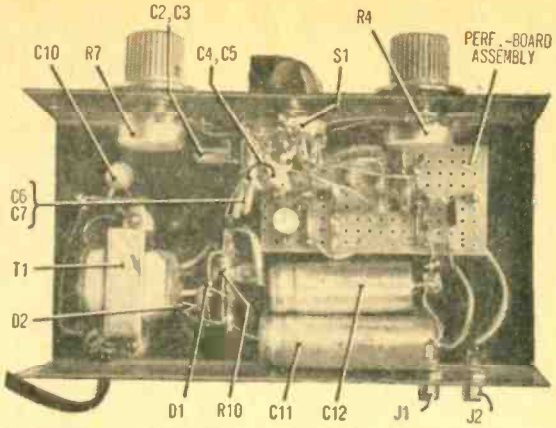


Most components except for power supply are mounted on perfboard subchassis. Follow photo for approximate layout to avoid parts clutter; see text for info on resistor R11.

measure the voltage from the R11-C9 junction to ground. If the meter indicates between 20 and 22 VDC, 1200 ohms is the correct value and the resistor should be soldered in. If the voltage is more or less than the specified voltage range, change R11's value until the voltage falls between 20 and 22.

Complete all amplifier connections except the parallel-T's capacitors which are mounted on switch S1. Install, by soldering to S1's frame, a small terminal strip on the top of S1. The parallel-T capacitors use the terminal strip as a tie point.

Unless you use precision capacitors of 1% tolerance—which are expensive—the parallel-T capacitors must be "trimmed" to compensate for the normal variation in individual capacitor value. With standard grade capacitors and decent trimming you can expect a



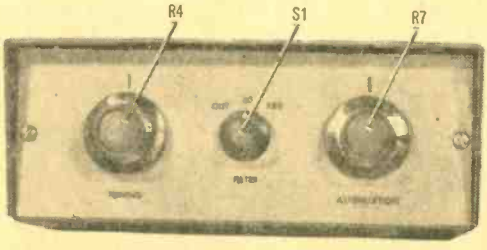
Assembly in chassis is uncrowded and should not present any construction problems. For best results, follow power-supply layout and position transformer well away from circuit.

hum rejection of 30 to 35 dB. With precision capacitors, or a very careful trimming of standard-grade capacitors, you can obtain better than 45 dB rejection.

Matched Pair. If you can obtain a capacity meter or bridge, or a comparison bridge, measure the value of C2 and C4. You are primarily interested in having matched values, not exact value. If C2 and C4 are greater than .47 *u*F, don't worry about it as long as they are the same value. If the capacitors don't match, connect one or more "trimming values" across the smaller capacitor until you have a matched pair.

The trimmers are indicated as Cx and Cy in the schematic. If you don't have a meter or bridge, temporarily connect C2 and C4 (or C3 and C5) into the circuit. Feed 60 Hz into Hum Bug, meter the output at J2, adjust R4 and R7 for maximum rejection (it might be only 10 dB or so) and then add a small trimmer value (say .05 *u*F) across C2. If the output meter shows less 60-Hz rejection, interchange C2 and C4 and then apply trim-

(Continued on page 131)



Finished Hum Bug, willing and able to go to work knocking the audibility out of hum. Front-panel controls provide for tuning frequency and adjusting level of rejection notch.

ALLIED RADIO MODEL 2671
5-Band Solid-State Portable Receiver

■ There have been TV entertainment centers and hi-fi entertainment centers, now we have *Allied Radio's Model 2671* portable radio shortwave entertainment center. No, we're not joking, the 2671 is really an entertainment center for the shortwave listener on the move.

All solid-state, with a choice of AC or battery operation, the radio covers the standard BC, FM, international SW, aircraft and police-fire-public service bands. It contains a built-in loop antenna for AM broadcast and a whip for FM, SW, air and police coverage. A jack is provided for connection of an external antenna for improved SW reception.

The actual frequencies covered are standard BC (550 to 1600 kHz) and FM (88 to 108 MHz), the 5- to 12-MHz international shortwave band, the 108- to 142.7-MHz aircraft band and the 143.8- to 177.38-MHz public service band. The band-selector switch also determines whether an AM or FM detector is used.

When the radio is set to the BC, SW or aircraft bands, the front-end signal is fed through a 455-kHz or 10.7-MHz IF amplifier and on to an AM detector. When FM or public service is selected, the front-end output is fed to a 10.7-MHz IF amplifier and on to an FM ratio detector.

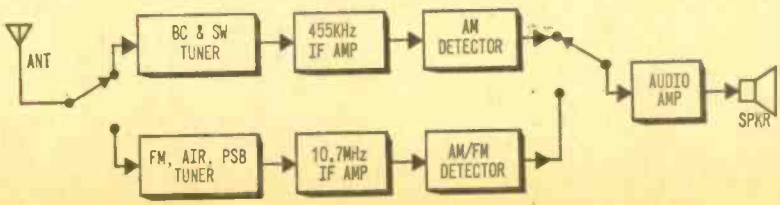
A soft-acting AFC is provided for FM reception. This is sufficient for locking a station exactly on-frequency if the signal is tuned in correctly to start with. It will not lock on if the original tuning was on the edges of the FM signal. Naturally, soft-action AFC permits it to operate on a weak signal adjacent to a strong one.

A fine-tuning control (unusual for portable radios) eliminates the tuning problem common to SW portables—that of separating crowded shortwave signals. The average portable's SW tuning is generally so critical that the width of the dial pointer can represent many stations. This portable's fine tuning control provides about 10 kHz of bandspread, enough to separate crowded signals. The fine tuning is effective only on the SW band.

Other features include a spring-return normally-off dial-lamp switch, an earphone jack and a tone control.

Performance. It is extremely difficult to judge a portable radio's performance in terms of instrument measurements. That's because, quite frankly, even the best portable's performance looks poor alongside the commonly accepted standards for communications equipment. Instead, where necessary, we compared the performance of the Allied 2671 against other portables of similar price or features.

First, due to the relatively large speaker, the sound quality is generally good to ex-



Allied's portable all-band receiver employs two separate IF strips and three detectors for full coverage of five major communications bands.

cellent and distortion is low. On FM, the sound quality is excellent with a good overall frequency balance. Shortwave, aircraft and public service reception is clean and easily readable. Broadcast reception is a bit heavy on the bass, due to the rather sharp selectivity of the AM IF strip.

Of course, the high AM selectivity allows rather good DX reception of night-time BCB signals. All in all, the sound quality and selectivity of the Allied portable equals or surpasses units of similar price.

Typical of good quality solid-state radios, the BCB and FM sensitivity is very high. In fact, the FM performance, because of the automatic volume control, is almost the same with the whip antenna collapsed as with it extended.

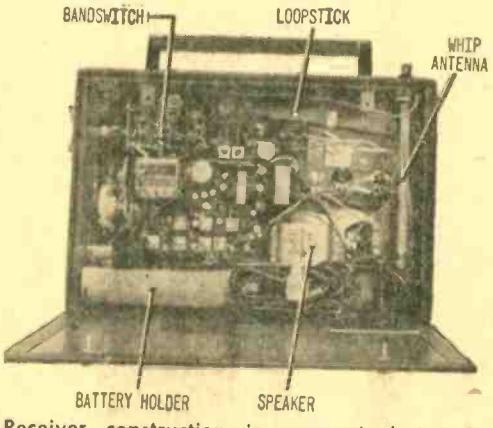
Receiver's versatility is enhanced by operating on battery or AC power.

Shortwave sensitivity through the external antenna jack is nominally 2 μV. Sensitivity on the aircraft and public service bands just about equals that of a $50 radio covering only these frequencies, and is superior to a transistor radio used in combination with a convertor.

Performance is down only with regards to image rejection. Close to a TV transmitter, the sound channel of TV stations can be received on the FM band. Shortwave reception also suffers from image response, but this is typical of any shortwave receiver with 455 kHz single conversion circuit. Even communications receivers priced higher than $100 suffer this problem.

Summing Up. All in all, the Allied 2671 is really a portable shortwave entertainment center whose performance exceeds what would be expected of its $59.50 price tag. Accessories include a shortwave antenna kit priced at $2.19 and a Motorola antenna plug at 11¢. For additional information write to Allied Radio Corp., Dept. JR, 100 N. Western Ave., Chicago, Ill. 60680. ■

When available, external antenna can be used for best SW reception.



Receiver construction is compact, but unit is rugged enough to withstand some abuse.

All Aboard for the Gauss Express!

☐ Can you imagine a 300-mph electric train suspended above the ground by magnetic forces? If you can, you're welcome to the exclusive dreamers' club of Drs. J. R. Powell and G. R. Danby, two scientists at the Brookhaven National Laboratory, Upton, N.Y.

The high-speed train would contain superconducting loops which would act on aluminum wire tracks to create a magnetic repulsion between train and track. The train could be driven by turboprop engines, or by some type of magnetic propulsion.

Small auxiliary wheels would support the train at station stops. Once the train started moving, the current flowing through the superconducting loops would induce a current in the track loops, and the magnetic repulsion between the two currents would lift the train off the ground. Lift-off speed would be about 20 mph.

Two tracks about 10 feet apart would keep the train from rolling over. A separate track loop would be provided to keep the train from moving sideways: if it got a few inches off center, a restoring force half as large as the train's weight would be induced. Riders would feel no bumps—but how about their watches? ■

HAM TRAFFIC
DE W7DQS

NOVICE HAMMING, LUNCHBOX STYLE

■ Transceiver operation is a big thing on the phone bands these days. Matter of fact, everybody who is anybody brags about his complete ham-station-in-a-box. For a time, of course, the Novice was left out of this movement. But now even fellows with WN calls also can brag about their transceivers.

This significant break-through in operating convenience for the beginning ham is due to Heathkit's HW-16 Novice CW transceiver. Operating in the CW portions of the 80-, 40- and 15-meter bands only, it's intended to give the Novice a modern tool to work with while simultaneously giving him room to expand a little when he makes the jump to General.

The transmitter is crystal-controlled, with provision for the addition of a VFO later. It will operate up to 90 watts input, but has a meter scale marking for the 75-watt Novice limit. It is usable over the entire CW portion of the bands it covers, not just the Novice frequencies.

The receiver, a double-conversion superhet with a crystal-controlled first oscillator, has good stability, sensitivity, and selectivity. The receiver is tunable, so a Novice can look for answers to his CQ calls on other than his own transmit frequency.

A neon-bulb oscillator in the receiver lets the operator hear his own sending in case he is transmitting and receiving on different frequencies (Novices often must do so, since they can transmit only on the frequencies for which they have crystals). It also will be handy for higher-class ops working DX, since this, too, often calls for transmitting and receiving on different frequencies.

Built-in Break-in. After building and operating one of these rigs, I find the feature I like best is the "automatic break-in" convenience. I consider the greatest invention since sliced bread.

Most experienced CW operators use break-in, but they generally have to build or buy a separate electronic transmit/receive switch and add it to their existing station. Now Heath has provided this operating advantage as a built-in feature on a station intended for beginning hams.

Break-in permits you to listen whenever you release your key. It eliminates from your life forever antenna relays that stick and QSOs that were lost because interference moved in when you were unaware of it. With automatic break-in, your receiver operates all the time. You hear your own sending in the receiver, and you also hear all incoming signals between your own dits and dahs.

The name comes from the fact that the other operator can "break in" on your transmission any time he chooses. He can interrupt you between words or letters—even be-

Heathkit's new transceiver designed especially for the Novice runs up to 90-watts transmitter input but has meter marking for 75. The rig features break-in operation and a tunable dual-conversion receiver section.

HAM TRAFFIC

tween the dits in the letter *i*! If the other fellow is having trouble copying you, he can stop you instantly to say so. And you can detect any change in band conditions immediately and quickly complete your QSO, if necessary, before you lose contact altogether.

Back-panel Baddie. One operating inconvenience in the rig stems from the fact that key and headphone jacks on the rear of the chassis. This makes the front panel look neat and uncluttered, but it would be handier if these jacks were on the front panel. It's especially inconvenient to have to reach around behind the cabinet to pull out the phone plug so you can use the speaker. The crystal sockets are on the front panel, though, so you can switch rocks quickly.

A feature I hope Heath adds if they someday bring out a new model of this neat piece of gear is a switch to remove B+ from the final amplifier. As it is now, whenever you close the key, you put the transmitter on the air—very handy while operating to be sure, but a feature that also makes it impossible to key only the oscillator while you set the receiver to the transmitter crystal frequency. Whenever you tap key to see where you are on the dial, you radiate a low-power (QRP) signal, possibly interfering with someone else's communication.

Fortunately, there are several ways to sidestep this problem. One is to use a dummy load and have a coax switch in your antenna feed line. This way, you can switch the rig quickly from antenna to dummy load.

All things considered, the HW-16 will make a nice station for many Novices, and a handy spare rig for some old timers as well. (Sure wish they had made it when I was a Novice—I had the spare bedroom half filled with radio gear just to get a signal across town. Now Heath packs the whole works into a single cabinet that's small enough to set on a living room end table!)

Food For Thought. Here's some interesting sidelights on our hobby of ham radio:

When a ham talks about his children and calls them *harmonics* he's indicating fantastic ignorance of the facts of life. Don't you agree they should really be called *heterodynes?*

The tallest antenna a ham ever puts up is always one foot too low. (You may have to think about this one a while.)

Ham radio operating and private flying are the only hobbies requiring federal licenses.

If all the hams in the world were laid out end to end, it would just be a typical Saturday evening on 40 meters.

Handicaps They Aren't. Occasionally you hear a ham complain he can't pass a

Ham Traffic's First Shutterbug Award Photo

Don Quelch, WB2EXP, in his Neptune City, N. J. based shack. Don prefers operating CW but is also an avid rag-chewer according to his nephew Roy Carroll who submitted these photos. At right is Don's antenna installation consisting of a 20-meter beam on a 40-ft. tower. A member of the ARRL, Don has his WAS and WAC certificates, has QSOed 49 countries, and is a member of Navy MARS. Hats off to this active ham.

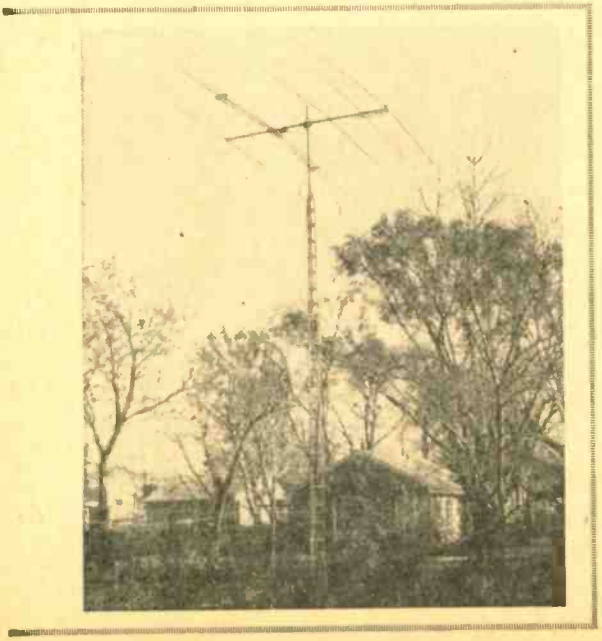
✶ Attention, Ham Shutterbugs! ✶

Are you the kind of ham that snaps pics of gala ham fests, club outings, or even your own ham shack? Why not have your favorite pic published in Ham Traffic? If your photo is selected, we'll send you five rolls of your favorite Eastman Kodak film as your reward.

Here's all you do. Just send us a 5 x 7 (or larger) glossy of your photo, plus a paragraph stating—in addition to your own name, call, and address—the time and place the pic was taken, what it's of, and who's who (reading left to right). Send to Ham Traffic, RADIO-TV EXPERIMENTER, 505 Park Ave., New York, N.Y. 10022. Sorry, but no photos can be returned. ✶

high-class code test in front of an FCC examiner because he has a physical disability which prevents him from writing down the test message as fast as it's sent. These fellows generally are unaware the FCC makes provision for handicapped persons by allowing them to speak the message to the examiner as the code is sent. You might think this would be hard to do—listen to the code and talk at virtually the same time—but it works. I've seen it done in an FCC examining room.

I've also seen something even more impressive in that supposed chamber of horrors—a totally blind boy copying the code with a Braille stylus at 13 words a minute and still passing the exam with flying colors!



Sending the code, though handicapped, generally can be done, too, by the fellows with a genuine desire to do it. Remember the case, described in a ham radio publication a while back, of the fellow without the use of his arms who passed the General exam requirement of sending 13 words a minute by tapping the key with his toes!

Some fellows claim to have a "nervous condition" which keeps them from copying the code fast enough in the exam room, though they have no trouble at home. But let's face it, fellows, every one of us who ever took that test was nervous.

The thing you must do is practice at home until you can copy faster than you will be required to do by the FCC. For example, if you're going up for the General, you should be able to copy at least 15 words a minute at home.

This is good insurance against exam room shakes. With this extra preparation, you can get nervous, lose some copying speed, and still pass the test. The fellow who prepares only for the exact speed required by the exam is asking for trouble.

Honest Injun. The best study guide for any class of ham license still is the ARRL License Manual, at 50¢ one of the best buys in ham radio *if used as intended*. Too many guys with good memories but poor senses of ethics just memorize the answers in the manual without really understanding them. This may get them a license, but it sure doesn't make them true hams.

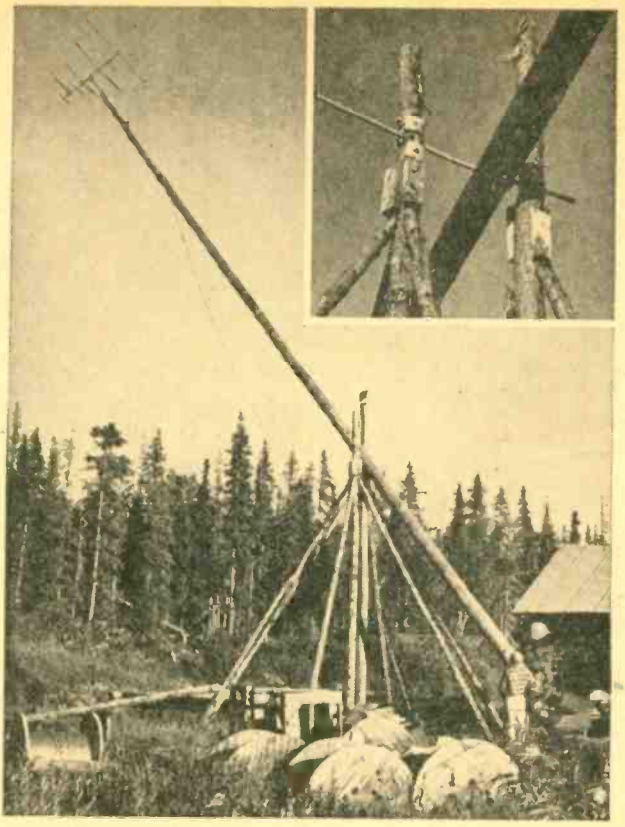
In just about any group of hams chewing the fat after a club meeting, you will find one or two who, if coaxed, finally will admit they passed the FCC exam by memorizing the answers in the License Manual. Usually these guys are sheepish about their "accomplishment," realizing it wasn't really an accomplishment after all. However, it got their tickets, and most of them never cracked a book again to see what they missed.

The whole idea behind the League's license manual, or any other study guide on any subject, is to give you an accurate idea of what you need to *learn* to pass an exam. No study guide is intended as a crib sheet.

To pass an exam honestly, and do yourself some good at the same time, cover up the answer when you read a question in the study manual. Then jot down on a piece of paper what you believe to be the answer. Uncover the answer in the book and com-

(Continued on page 134)

Pivoted 60-ft. pole makes antenna adjustment a cinch. Inset shows pivot arrangement for this unusual antenna installation.



INGENUITY Red White and Blue

With slick savvy, this Alaskan homesteader erects a nifty skyhook.

By Clarence Massey

■ American ingenuity takes many forms and often solves problems that at first may seem insurmountable. Unique television antenna installations throughout the nation are often tangible evidence of such inventive minds at work.

For example, one homesteader in Port Nikiski on the Kenai Peninsula of Alaska regularly gets good reception direct from Anchorage, over 150 miles away. To get this reception, he erected a pole 60-ft. high to hold his antenna.

For the pole, he carefully chose a tall and straight tree from the forest on his homestead. Cutting the tree, peeling the bark, and erecting this 60-ft. antenna looked like a formidable task. But having built two log cabins in Alaska by hand, this homesteader felt that it was just another routine project on his place.

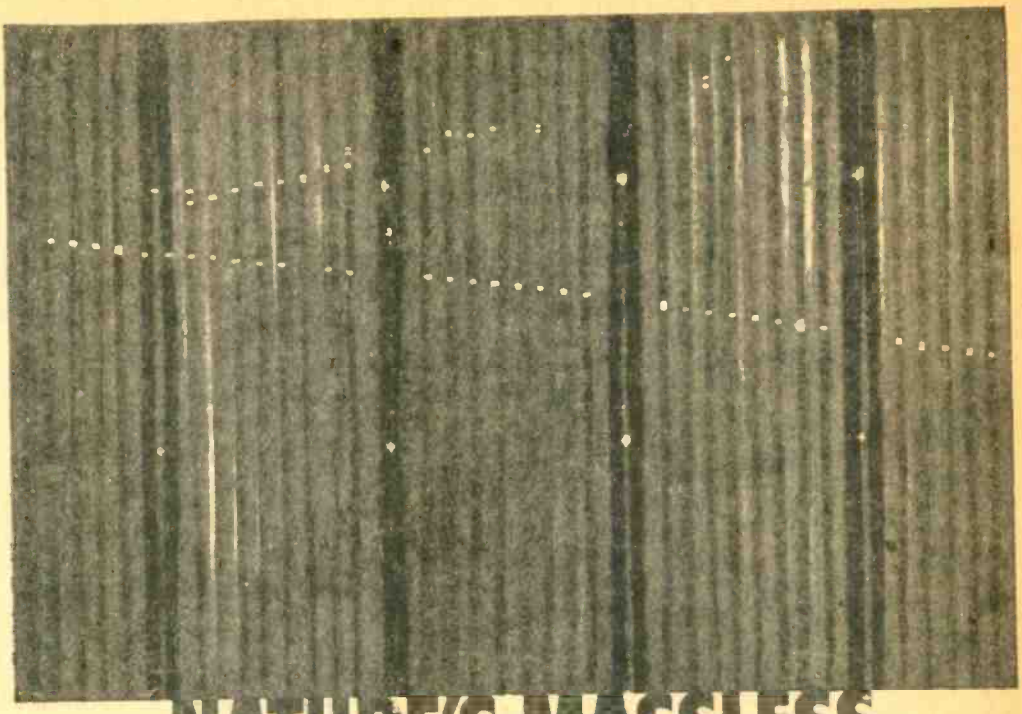
Sitting in his living room discussing television reception, the author asked him how he ever adjusted the antenna at the top of such a tall, slender pole.

Chuckling, he exclaimed, "Why, that's easy. I just lower it to the ground, make my adjustment and push it back up again." Then he said, "Come on outside and I'll show you how I did it. It's really very simple."

Outside, he pointed out how he had drilled a hole through the pole at its balance point. The pole pivoted on a stout steel bar supported by two sturdy log tripods. The pivot point was about 20 ft. above the ground. He released a catch at the base of the pole, gave the pole a slight push and it slowly began to turn to a horizontal position.

With a rope fastened about the butt end of the pole, its descent could easily be controlled, though, as he explained, the pole was so perfectly balanced that the rope was only a safety precaution. In a few seconds the top of the antenna was resting on the ground, convenient for any adjustment.

It was a simple device and yet so cleverly done that one couldn't help but think it was much easier for him to adjust that 60-ft. antenna than it is for most of us city folk to get a ladder and climb to the roof to make an antenna adjustment. ■



NATURE'S MASSLESS CHARGELESS POWERHOUSE

How a spineless little space spook was made to write its name in neon lights

By Jorma Hyypia

■ Silently, the unearthly visitors came speeding through outer space to our planet. We know they came, a billion years ago, because they left their ghostly footprints on our land.

What were these strange visitors? Where did they come from? Do they still haunt our planet? Little by little the answers are being found with the aid of battleships, gold mines, and neon billboards.

We call them neutrinos—literally, "little neutrons." We suspected their presence—in fact *demanded* their existence—long before there was the slightest tangible evidence that they were anything but figments of imagination. We had to have them in order to preserve the foundations of modern physical science. Fortunately, they exist in fantastic numbers, everywhere.

Major Crisis. A major achievement in science, as in other things, often comes about because of the pressure of a sudden major crisis. The discovery of the ubiquitous but elusive neutrino is a notable case in point.

It all started early in this century when atomic physicists faced the appalling need to either rescue or permanently discard the virtually sacrosanct law of conservation of energy. In the course of studying radiations emitted by radioactive materials, someone discovered that the beta particle (identical to an ordinary electron) didn't always have the kinetic zip predicted in theory.

Its kinetic energy was expected to represent exactly the loss in mass suffered by the disintegrating atomic nucleus because of the production of beta rays. But very often this wasn't so. Some of the expected kinetic energy was missing.

For a while, things got so bad that some physicists were talking about abandoning the law of conservation of energy. This would have been catastrophic to the fundamental structure of modern science. Two other laws —the conservation of momentum and of angular momentum—were also in jeopardy.

Prophet Pauli. In 1931 an Austrian physicist, Wolfgang Pauli, met the crisis head on. He made a suggestion which, in retro-

spect, seems all too obvious. In effect, Pauli prophesied: "The missing amount of energy must be carried out of the atomic nucleus by a *second*, unknown particle."

The pronouncements of scientific prophets, like those of religious prophets, are not accepted at face value by all. There were cries that Pauli was only juggling the books to keep scientific accountants from discovering that the business of science was in a ghastly mess. But others saw sense in Pauli's suggestion. Why not? Who dared insist that science had already discovered all the atomic particles that actually exist?

Acceptance on faith alone was unthinkable, even by the most optimistic. There had to be hard, undebatable scientific proof. But how to get it? Atomic eggheads pondered the question for a quarter of a century before the answer was found.

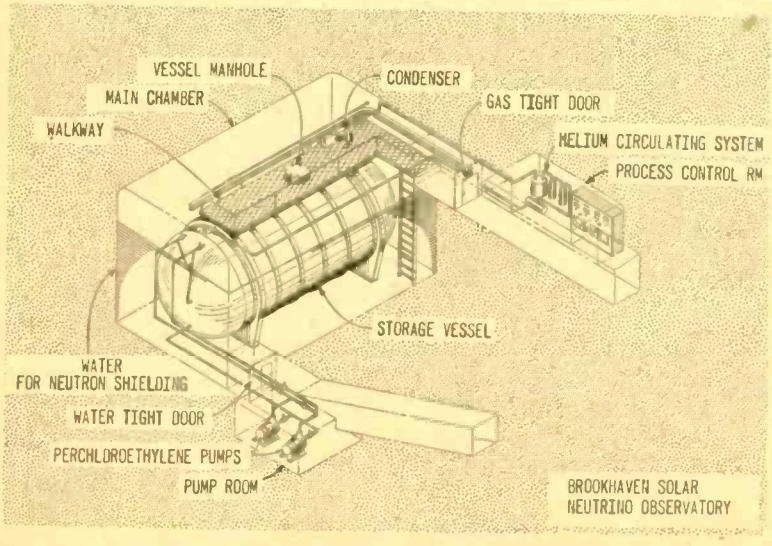
Conjuring the Ghost. American physicists Clyde Cowan Jr. and Frederick Reines were the first successful hunters of antineutrinos, first cousins to neutrinos.

The physicists figured that if a mass of protrons were to be bombarded with a very large number of the theorized antineutrinos, a few antineutrino-proton collisions would occur. They further predicted that the collisions would produce neutrons and positively charged particles called positrons. The positrons would immediately interact with electrons to yield two gamma-ray photons shooting off in opposite directions. The neutrons, on the other hand, could be made to interact with cadmium-chloride atoms to produce additional photons in the predictable manner.

Water was used as a source of target protons. Tanks containing the water were sandwiched between scintillator counters which could detect the expected collision products. The antineutrinos were beamed into this detection equipment from the nuclear fission reactor at Savannah River, S. C.; the reactor generated an estimated 1,000,000,000,000,000,000 (that's a *quadrillion*!) antineutrinos per second.

The results were exactly as predicted. Every now and then pairs of photons were observed shooting off in opposite directions, followed by more photons generated when the neutrons collided with cadmium-chloride atoms.

Unquestionably, antineutrinos did exist! Few if any physicists could any longer doubt the existence of neutrinos per se, though elaborate experiments were later conducted to prove their existence as well. More about that after we take a closer look at these ghost particles to better understand the incredible experimental challenges that physicists had to face.



Drawing of the Brookhaven Solar Neutrino Observatory, located deep in the fabulous Homestake Gold Mine. It detects extraterrestrial neutrinos.

Fantastic Swarms. Though neutrinos are infinitesimally small, their populations in the universe are astronomically large. Not only are new neutrinos being formed continually in fantastic numbers, but most of the neutrinos that have been created since the beginning of the universe are still zipping around someplace. Very few, in terms of the total numbers produced, are ever destroyed.

A super nova (exploding star) is the most prolific known generator of neutrinos. However, super novas statistically occur only about every 350 years.

The sun is the primary source of naturally-formed neutrinos as far as the earth's supply is concerned. Estimates of the number of sun-originating neutrinos striking each square centimeter (less than half the area covered by a dime) range from 10 billion to 60 billion *per second!* However, the sun is an almost negligible source in terms of the total *universal* supply of neutrinos.

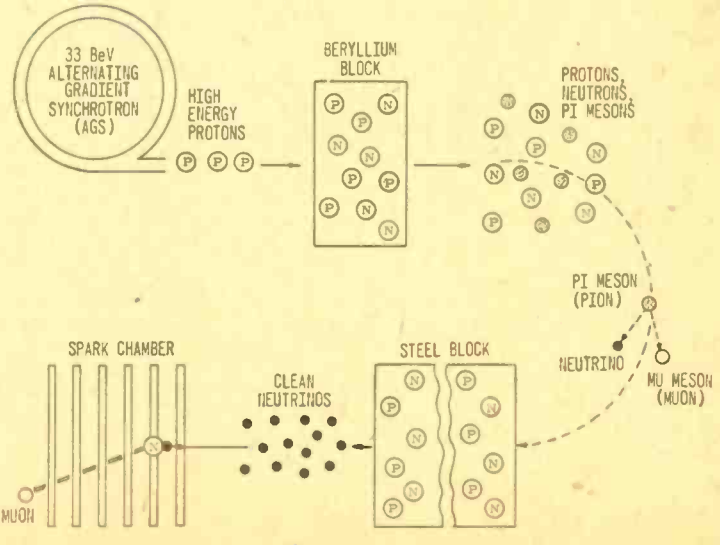
All other stars, most of which are larger than our sun, also produce neutrinos. There are an estimated 100 billion such neutrino generators in our galaxy alone. Moreover, our best telescopes can detect a billion *other* galaxies, each consisting of hundreds of billions of stars. No one knows how many more galaxies exist beyond the reach of our telescopes.

The only reason that our sun is the earth's main source of neutrinos is its closeness to our planet. Even the nearest star is so far away that the earth presents an extremely minute "target" for its neutrino bombardment.

Midges and Chickenwire. The skin of an average adult encompasses over 3000 square inches of surface area. Let's say that most of the time half this area is exposed to the bombardment of neutrinos originating from the sun (it doesn't matter whether you are in direct sunlight or in the depths of a mile-deep gold mine). This 1500 square inches of body cross-section is equivalent to about 10,000 square centimeters. Thus you can assume that anywhere from 100 trillion to 600 trillion sun neutrinos are passing through your body *every second!*

Why don't you feel something? Because the neutrinos are so tiny that they pass through the atomic network of your body like midges swarming through a chickenwire fence. Someone has figured out that statistically only one neutrino is likely to smack into a protoplasmic atom in your body during your lifetime. The neutrinos don't even know you are there!

But what happens to the neutrinos after they pass through your body and hit the more solid substance composing the earth? Usually nothing. The earth, too, is hardly more than a piece of chickenwire to the average neutrino. In fact, a neutrino will pass completely through the earth, from one side to the other, in less than 1/25th of a second—about the length of time the shutter



A flow diagram on how to find the elusive neutrino. Steel block "cleans" neutrinos by stopping all other particles before entry to spark chamber.

NATURE'S POWERHOUSE

on a box camera stays open when you take a snapshot. One second after emerging from the opposite side of the earth, that neutrino will be 186,000 miles out in space, moving into eternity at the speed of light.

Elusive Quarry. It should be pretty obvious now that the physicist who wants to trap a neutrino to see what makes it tick has a seemingly impossible task to perform. It is all the more difficult because he can't detect a neutrino in transit (after all, it has no detectable characteristics such as mass or magnetism). The only hope is to induce a neutrino to collide with another atomic particle and observe the results of the collision.

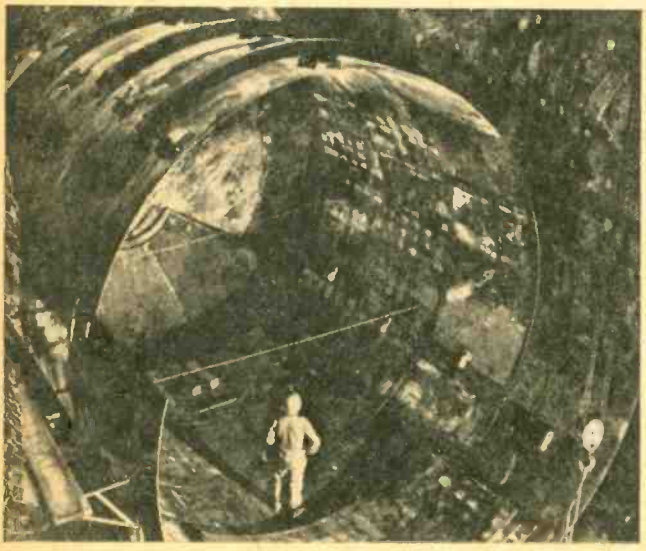
In a sense, the physicist is like a man standing beside a super highway along which, he suspects, thousands of invisible cars are speeding. If, somehow, even one invisible car is induced to smack into a lamp post, the resulting noise or other energy release will prove that something had been moving along the highway. From the sound of the noise, or characteristics of other energy release, he can deduce the nature of the invisible car—perhaps tell whether it is a Ford or a Cadillac. Similarly, the physicist has to create an atomic "accident" and analyze the resulting debris for evidence of neutrinos or other particles.

Is there any kind of material atomic target that might afford sufficient atomic congestion to produce an occasional collision?

Hydrogen atoms are often used as atom-smashing targets. If the hydrogen gas is liquefied, the atoms are crowded closer together to form a more congested target population. What would be the collision odds? On the average, a neutrino would have to travel through 5000 trillion *miles* of liquid hydrogen before there was a reasonable chance of a collision with a hydrogen atom!

Perhaps there is a better target material: lead, for example, can even stop penetrating X rays. Statistically, this doesn't look much better. A neutrino with an energy level of 1 MEV would, on the average, penetrate 50 trillion miles of solid lead before running into a lead atom; a neutrino having a thousand times greater energy level would have to pass through 50 million miles of lead —more than half the distance from the earth to the sun—before impact could be expected.

It all seems pretty hopeless. And yet, the stunt was achieved using aluminum and ordinary neon gas—the kind used in neon signs—as a target medium. To understand how this is possible, we must first see how the physicist can juggle statistical odds in his own favor.



Miner's eye view of the Brookhaven Solar Neutrino Observatory at the bottom of the Homestake Gold Mine during construction. This tank, measuring 20 by 48 feet, holds over 100,000 gallons of perchloroethylene liquid which is used to detect the elusive solar neutrino. Nope, it can't detect gold.

Netting Neutrinos. When a physicist goes fishing for neutrinos he looks for the most highly populated radiation stream available. He then gambles on the probability that even if most of the neutrinos slip through his scientific net, a few will be caught.

The average distance that a neutrino travels through a given substance before collision

is measured in millions, even trillions of miles. But this is only a mathematical average. Some will travel much greater distances; others will be stopped after penetrating the target material only a few inches or feet. The physicist therefore gambles on netting at least a few of the short-trip neutrinos.

To improve the odds, he beams the largest possible number of neutrinos through his equipment. He does so on the theory that the more neutrino fish there are in his scientific stream, the more of them he is likely to trap in his detection net.

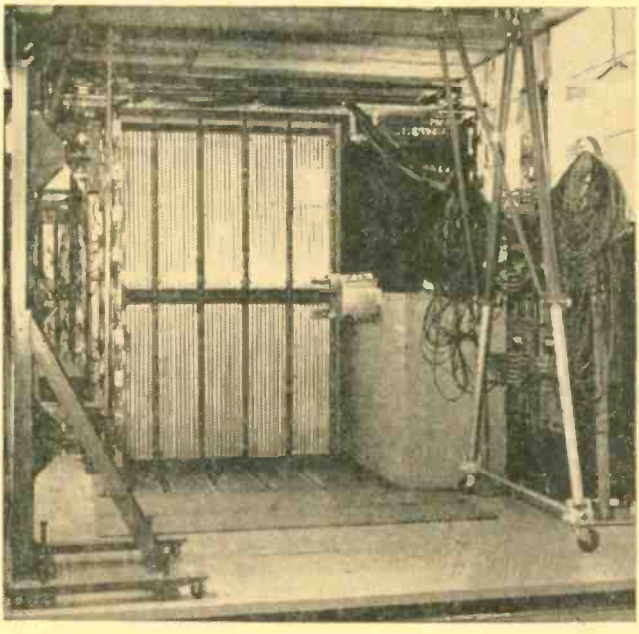
The classic Columbia-Brookhaven neutrino experiment made use of a 33 billion electron volt Alternating Gradient Synchrotron (AGS) particle accelerator. The research team included professors Lederman, Schwartz, and Steinberger of Columbia University; Dr. G. Danby of Brookhaven National Laboratory; and researchers Gaillard, Goulianos, and Mistry, also of Columbia.

Eight For Five. It turns out that a nuclear reactor or a particle accelerator ("atom smasher") is a better source of neutrinos for many experimental purposes than is the sun. For though the sun yields a steady "rain" of neutrinos, an accelerator such as the AGS will produce an intense "intermittent Niagara" of controllable particles.

The intermittency of particle production leads to some curious problems. For example, in the experiment to be described, the AGS particle generator had to be operated for eight *months* in order to do five *seconds* worth of work!

Each burst or pulse of neutrinos produced by the AGS lasts only 25-millionths of a second. The accelerator then needs about a full second (a 40,000 times longer time period than the pulse) to accelerate more particles for the next burst of particles. In other words, the equipment is *on* only 25-millionths of the time the accelerator is working.

A total of 2 million pulses were used over a period of eight months during the Brookhaven experiment. Multiplying the duration of each burst of neutrinos (0.0000025 seconds) by the total number of bursts (2 million) leads to an astonishing conclusion. The finding: that during the eight month experiment period, the neutrino stream was *on* for only five seconds.



Here's the ten-ton Columbia University aluminum spark chamber installed at the Alternating Gradient Synchrotron for the 1962 experiment which showed that there are two types of neutrinos. One type produces only electrons (with positive charge) in collision with protons; the other produces only mu mesons.

Motley Crowd. Of course, the AGS does not of itself produce a nice, neat series of neutrino pulses. It is a bit more complicated than that, as we'll see shortly.

The AGS produces 15 billion electron volt protons which are beamed at a beryllium block target. These high-energy protons smash into the protons and neutrons in the beryllium, ejecting a motley crowd of protons, neutrons, and pi mesons (pions). The pi mesons are created by the reaction of high-energy protons and neutrons.

About 10 percent of the pi mesons thus produced disintegrate in flight into mu

NATURE'S POWERHOUSE

mesons (muons) and the desired neutrinos. The particulate crowd is still bigger now, consisting of neutrons, protons, pions, muons, and neutrinos. The big problem was how to screen out all the particles except the desired neutrinos, a formidable job to say the least.

Navy to the Rescue. The Brookhaven researchers figured that a steel wall 42 feet thick would stop all particles except the neutrinos. But where could one get 5000 tons of steel at reasonable cost? The ingenious physicists solved the problem by raiding the U.S. Navy's junkyard for obsolete armor deck plating, much of which had come from the battleship *U.S.S. Missouri*. The armor plate would now have to stop atomic particles instead of bombs!

(Incidentally, another rather amusing case of pack-ratting by the learned scientists is worth passing mention. While scrounging about the Navy junk yard, the Brookhaven physicists ran into some usable cannons, some of which also may have come from the *Missouri*. These heavy-walled cannon, about 50 ft. long, were just right for building excellent collimators for other experiments planned at Brookhaven. But there were conversion problems. As physicist Leon Lederman laconically observed, "The only trouble is that the cannon had rifling, and we had to have a graduate student crawl in to smooth it out. He quit, and I don't know where we'll find another student of his caliber.")

Charged atomic particles passing through this spark chamber cause high voltage sparks to jump from plate to plate, thus revealing the path of the speeding particles.

Ten-Ton Target. After the 5000-ton steel "screen," supplemented with thousands of tons of concrete, had been sweated into place, the physicists were reasonably certain that they would be able to produce clean pulses of neutrinos. All that remained was to build a suitable detection device capable of trapping the tiny ghost particles.

The trap they built consisted of 90 large sheets of aluminum set slightly apart from one another. The spaces between the sheets of aluminum were filled with a mixture of helium and neon gas. After adding high-voltage equipment used to charge the metal plates, and installing "anticoincidence" devices to warn against cosmic rays that enter the equipment, the so-called spark-chamber neutrino trap was ready for use.

Neon Signature. This monstrously large and elaborate equipment was set up for one purpose: to induce a few vagrant ghost particles to step in and write their signatures in neon lights! Here's how it worked.

During the prolonged experiment, 100 trillion neutrinos were beamed into the spark chamber. The bulk of the ghostly horde passed through completely undetected; only 50 neutrinos slammed into the waiting neutrons in the aluminum atoms. These few catastrophic collisions produced charged mu meson particles and recoil protons.

As the mu mesons sped through the spark chamber, they left invisible trails of free electrons. When electronic counters detected the presence of radiation in the chamber, and if the cosmic ray counters were silent at the same time, a surge of high-voltage current was suddenly applied to the successive pairs of aluminum plates. Immediately, a series of sparks jumped from plate to plate along the invisible electron trail created by the mu meson. Because of the presence of the neon gas, the sparks were red. In effect, the neutrinos had been tricked into signing on the dotted line, in neon lights!

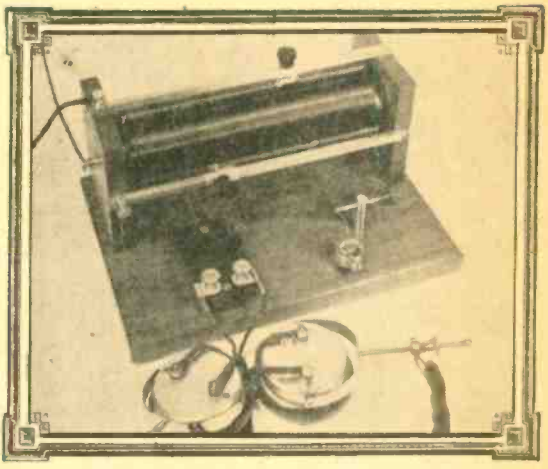
Fast on the Draw. To photographically gun down these occasional colliding particles required some unbelievably fast trigger action. A million particles might be passing through the equipment every second. Once in a rare while a neutrino smacks into a

(Continued on page 106)

GENUINE

Wireless Receiving Apparatus

By Art Trauffer



- *DUAL-SLIDE TUNING CONTROL*
- *FULLY ADJUSTABLE CATSWHISKER*
- *SUPER-SENSITIVE CRYSTAL*

Lots of nostalgia and a little elbow grease are all that's needed to build this replica of a genuine "Wireless Receiving Apparatus" of the early days. Though much used in the spark gap transmitter days for receiving code, this type of receiver is still a good performer for broadcast reception in areas where a great deal of selectivity is not required. And, you'll have fun "tickling the galena" for a sensitive spot!

The historic slide-coil tuning method provides continuous variations in inductance without the use of coil taps or variable capacitors. The "catwhisker and galena" detector is styled after the famous 50¢ detector sold by Hugo Gernsback's company (Electro Importing Co.) 50 years ago. The phone condenser is a wood replica of the famous Murdock No. 358 Receiving Condenser, now a rare collector's item.

Two-Slide Tuning Coil. The drawings and photos show the details for the 2-slide tuning coil. The author's coil form was a 7¾-in. long piece of 2½-in. OD plastic rolling pin covered with black "Contact" adhesive plastic material—but you may find a Bakelite or fiber tube that size.

Enameled copper wire (#22) is used for winding the coil, then the enamel is carefully sanded off with fine sandpaper along the slider paths. (In the old days, they used green silk-covered copper wire for tuning coils, but since you may not be able to find this any more, white cotton-covered wire dyed green could be used. If this route is taken, be sure to give the winding a coat of shellac before sanding off the cotton insulation for the slider paths.) Also, make the sliders smooth so they don't cut grooves in the wire of the coil.

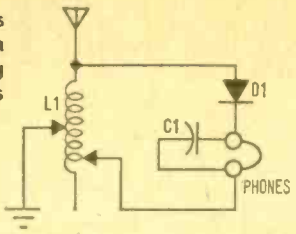
Crystal Detector. Check the drawings and photo for details on making the crystal detector. For the crystal holder, the author used an electrical fixture known as a ⅝- to ¼-adapter having a knurled outer surface, but you can use any brass cup of similar size, or turn one on a metal lathe.

When mounting the cup on the wood baseboard, use a screw the right length so you can put a compression spring between the cup and baseboard—this allows the cup to be revolved one full turn. If you make your own cup, drill the bottom mounting hole a little off-center so the cup revolves on an eccentric.

The author used #26 brass wire for the

GENUINE WIRELESS

Wire up your old-time wireless receiving apparatus as shown in schematic. Parts in this rig aren't critical and substitutions can be made as required.



MATERIALS LIST FOR RECEIVING APPARATUS

1—9 ¼ x 6 ½ x ½-in. hardwood for baseboard

MATERIALS FOR TUNING COIL

2—3 ½ x 3 x ½-in. hardwood for coil end pieces
1—2 ½ OD by 7 ¾-in. long coil form (plastic, fiber, cardboard)
1—Spool #22 enameled copper wire
2—7/32-in. sq. by 8 ¾-in. long brass tubes for slider tracks
1—¼-in. sq. brass tube for sliders
1—4-in. long by 3 ⅛-in. wide by 1/64-in. thick spring brass for sliders
2—8/32 x ¼-in. rh brass machine screws for sliders
2—Knobs for sliders
2—¼-in. thick compoboard disc (outside disc dia. to equal inside dia. of coil form)
2—8/32 x 1-in. rh brass machine screws with hex nuts and ornamental nuts to fit
2—½-in. long rh steel wood screws
1—8/32 x 1 ¼-in. rh brass machine screw with hex nut and ornamental screw
1—⅝-in. long rh steel wood screw
4—1-in. long fh steel wood screws

MATERIALS FOR REPLICA OF MURDOCK NO. 358 PHONE CONDENSER

1—2 ⅝ x 1 ½ x ½-in. hardwood block
2—8/32 x 1-in. rh brass machine screws with washers, hex nuts and ornamental nuts to fit
2—⅞-in. long fh steel wood screws

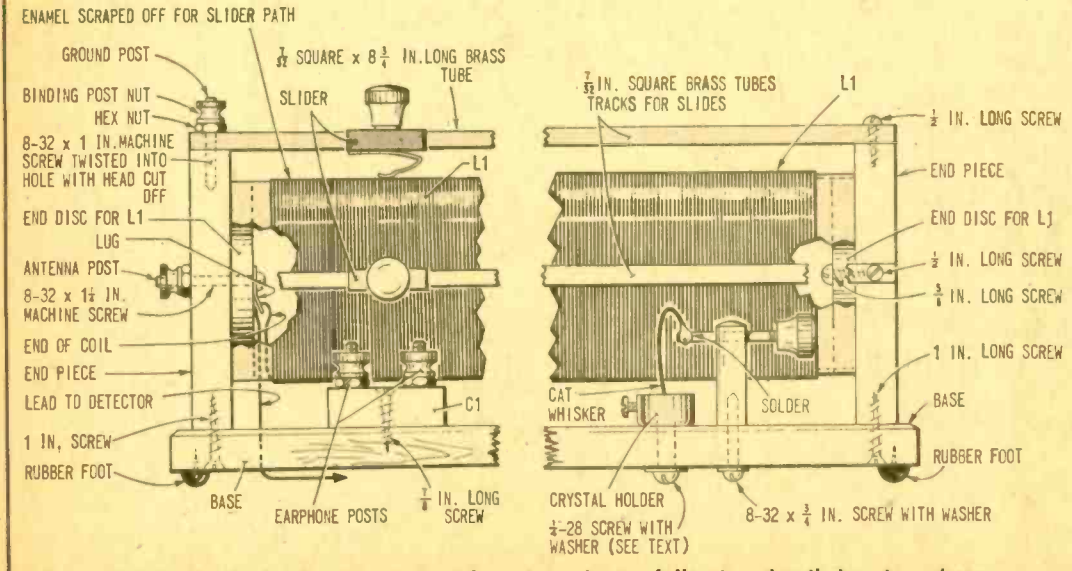
MATERIALS FOR CRYSTAL DETECTOR

1—1 ¼ x ⅜-in. dia. brass rod
1—1 ½ x ⅛-in. dia. brass rod
1—Knob to fit 6/32 threads on catwhisker holder
1—2-in. length of small gauge brass wire for catwhisker
1—8/32 x ¾-in. rh brass machine screw
1—⅜ to ¼ adapter for electrical fixtures (see illus. and text)
1—6-32 x ⅜-in. rh brass screw
1—¼-28 by about ¾-in. rh brass machine screw (see text)
4—Small rubber tack bumpers for bottom of baseboard

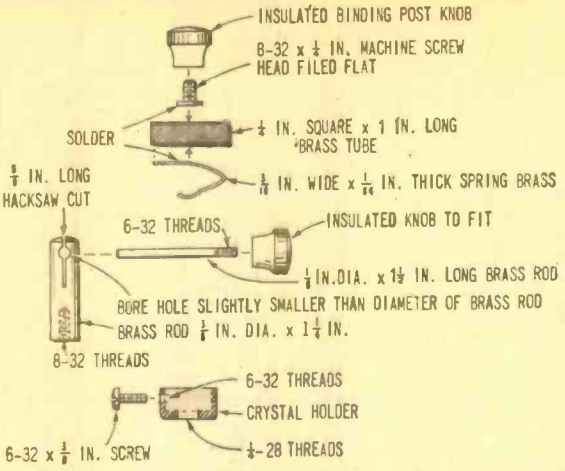
CIRCUIT COMPONENTS

C1—.0003-uF capacitor
D1—Mounted galena or silicon crystal (Available from Modern Radio Labs., 12041 Sheridan Lane, Garden Grove, Calif. 92640 at 75¢ ea., postpaid.)
Misc.—Hookup wire, solder, shellac or varnish, etc.

NOTE: rh is round head, fh is flat head.



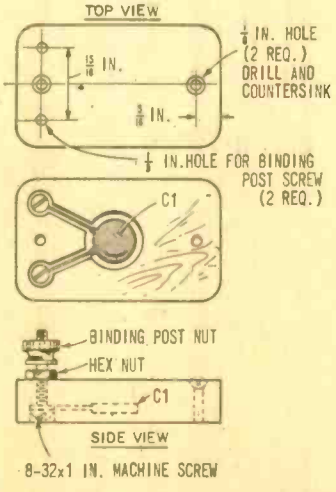
Assemble the finished coil, sliders, crystal, and condenser following detail drawing above.



Construction of sliders is shown at top. Below are details for making adjustable catwhisker assembly. Catwhisker wire is soldered to end of eighth-inch rod after rod is mounted in holder. Here, too, variations can be made as required.

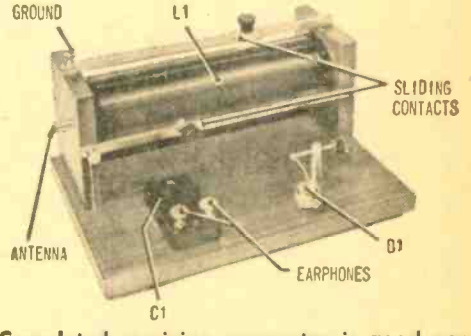
catwhisker, but steel, phosphor bronze, and tungsten wires were also used in the old days. The business end of the catwhisker wire should be pointed with a file. For the detector, you can use a mounted galena or silicon crystal.

Phone Condenser. Next, make the wood replica of the historic Murdock No. 358 Receiving Condenser used across the earphones. The wood block is gouged out on the under side and a small .0003-*u*F ceramic disc capacitor is inserted and wired to the binding posts, as shown. Actually, this phone capacitor does very little good and can be left out if desired, in which case simply use the wood block as a nostalgic dummy to connect the earphones to.



Replica of Murdock phone condenser is made from a wood block drilled to hold a small disc capacitor and phone binding posts. After block has been cut out, drilled, and sanded, paint it flat black for antique appearance.

Hooking It Up. Wire the unit as shown in the schematic diagram. To make a neat job, most of the wiring is done underneath the baseboard. The wire lead from the "antenna" post and the start of the coil go through the baseboard via a small hole, as does the lead from one of the slides.



Completed receiving apparatus is good performer when outdoor antenna and ground are connected. It looks pretty snazzy, too.

If possible, use a long outdoor antenna, a cold water pipe ground, and a pair of sensitive high-impedance magnetic earphones (or crystal phones) for best results. The clips shown holding the earphone cord tips to the phone condenser binding posts is another old Murdock trick. Similar clips can readily be made from a couple of strips of light sheet-metal.

The finished unit works quite well and makes a decorative showpiece as well. And for the old-timers in the crowd, this one should bring back many fond remembrances. ■

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Nature's Powerhouse

Continued from page 98

neutron and sets up an electron trail generated by the collision-born mu meson. This invisible electron trail lasts only 10-millionths of a second at most!

In that extremely short period of time the equipment must do these things: observe that an event of some sort has occurred; check to make sure that it is not caused by a cosmic ray (in which case the event is ignored); slap a high-voltage charge onto the spark chamber plates (if the event is approved); take a photograph of the event as it occurs. It's like trying to shoot one particular bee in a hive filled with a million other bees, without hitting anything except the single target bee.

This kind of sharpshooting by the Columbia-Brookhaven team gave physicists in general an information prize of potentially far-reaching significance. The experiment proved that there are actually *two* kinds of neutrinos —a muon-type neutrino and an electron-type neutrino. This information is basic to furthering the understanding of just why a mu meson (muon) is exactly the same in every respect as an electron, except that it weighs 200 times as much.

Why is a complete understanding of the difference between electrons and mu mesons so important? It is believed that a full comprehension of the transformation of mu mesons to electrons will be as significant to theoretical physics as was the development of the Lorentz transformation to the relationship between electric and magnetic fields.

Neutrino Astronomy. So far we have discussed only experiments utilizing neutrinos generated by man-made equipment—nuclear reactors and particle accelerators. But what about all those naturally formed neutrinos that pepper the universe? Has anyone yet actually proved that neutrinos are streaming steadily from the sun as is claimed? Do stars generate neutrinos? Can the particles penetrate our earth as easily as midges passing through chickenwire?

The wholly new field of neutrino astronomy is now beginning to answer some of these provocative questions. As might be suspected, neutrino astronomy is in many ways very much different from ordinary optical and radio astronomy.

The classic astronomer invariably climbs a mountain to see the heavens more clearly. What does the neutrino astronomer do? Just the opposite, of course. Like a mole, he burrows as far *underground* as he can! After all, who expects to find ghosts out in the open; they traditionally prefer dark, spooky places. Maybe it isn't too surprising that the best place to set up a neutrino "telescope" is in the bottom of a mile-deep mine.

Neutrino Nuggets. What might have the grizzled prospectors of 1877 thought had they known that men would one day descend almost a mile into the fabulous Homestake Gold Mine in Lead, S. D., to seek nuggets from the sun? These strange new prospectors would be indifferent to gold; they would be far more interested in panning for momentary bright flashes of light created by invisible particles originating from the sun. The Homestake Mine was to become the strangest ghost town of the west!

The Homestake experiment is in progress at this moment. It is being performed under the auspices of the U.S. Atomic Energy Commission by Raymond Davis Jr. of the Brookhaven National Laboratory and Don S. Harmer of the Georgia Institute of Technology.

These researchers have placed a large tank in the mine, and have filled it with 100,000 gallons of perchloroethylene weighing 610 tons. The calculated neutrino capture rate by this volume of liquid is six per day.

The elimination of unwanted background effects was a major problem. Cosmic rays are blocked off by taking the equipment into the deep mine. Fast neutrons formed by the spontaneous fission of uranium and thorium minerals contained in the rocks around the mine chamber are excluded by surrounding the perchloroethylene tank with water.

Why the perchloroethylene? Because this chemical contains a very high concentration of chlorine atoms. When a neutrino strikes a chlorine atom, the ensuing reaction produces radioactive argon-37 and an electron. The amount of argon-37 produced can be measured accurately by charting its rate of radioactive decay with a counter. The volume of argon created will reveal just how much solar neutrino activity had taken place in the tank.

Ancient Splashes. Scientists have long used the earth's crust as a giant textbook to read the past history of the earth from pages of rock decorated with the fossilized remains of plants and animals. It now seems that those pages of stone may also tell us what the ghostly neutrinos were doing a billion

(Concluded on page 127)

WHITE'S RADIO LOG

Volume 49, Part 2

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

This is the second part of *White's Radio Log*, published in three parts twice each year. This format permits 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 inserting station changes as they occur.

In this issue of *White's Radio Log* we have included the following listings: U. S. AM Stations by Location, U. S. FM Stations by States, Canadian AM Stations by Location, Canadian FM Stations by Location, and the expanded, up-to-date World-Wide Shortwave Section.

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

In the event you missed any part of the *Log* published earlier this year, you will have a complete copy of *White's Radio Log* by collecting any three consecutive issues of RADIO-TV EXPERIMENTER during 1968. The three consecutive issues comprise a complete volume of *White's Radio Log* that offers complete listings with last minute station change data that cannot be offered in any other magazine or book. If you are a broadcast band DXer, FM station logger, like to photograph distant TV test patterns, or tune the shortwave bands, you will find *White's Radio Log* an unbeatable reference.

WHITE'S QUICK REFERENCE INDEX

WHITE'S

RADIO LOG

U. S. AM Stations by Location

Location	C.L.	kHz
Abbeville, Ala.	WARI	1480
Abbeville, La.	KROF	960
Abbeville, S.C.	WABV	1590
Aberdeen, Md.	WAMD	970
Aberdeen, Miss.	WMPA	1240
Aberdeen, S.Dak.	KSDN	930
	KXRO	1320
Aberdeen, Wash.	KBKW	1450
Abilene, Tex.	KRBC	1470
	KCAD	1560
	KNIT	1280
	KWKC	1340
Abilene, Kansas	KABI	250
Abingdon, Va.	WBBI	1230
Ada, Okla.	KADA	1230
Adel, Ga.	WAAG	1470
Adrian, Mich.	WABJ	1490
Agana, Guam	KUAM	610
Aguadilla, P.R.	WABA	850
	WGRF	1340
Ahoskie, N.C.	WRCS	970
Aiken, S.C.	WAKN	990
	WLDW	1300
Aitkin, Minn.	KKIN	1000
Akron, Ohio	WAKR	1590
	WSLR	1350
	WCUE	1150
	WHLO	640
Alamogordo, N.M.	KALG	1230
	KINN	1270
Alamo Heights, Tex.	KORY	1110
Alamosa, Colo.	KGIW	1450
Albany, Ga.	WALG	1590
	WFAZ	960
	WLYB	1250
	WGPC	1450
	WJAZ	960
Albany, Ky.	WANY	1390
Albany, Minn.	KASM	1150
Albany, N.Y.	WABY	1400
	WOKO	1460
	WPTR	1540
Albany, Oreg.	WROW	590
	KWIL	790
	KRKT	990
Albemarle, N.C.	WABZ	1010
	WZKY	1580
Albert Lea, Minn.	KATE	1450
Albertville, Ala.	WAVU	630
Albion, Mich.	WALM	1260
Albuquerque, N.M.	KABQ	1350
	KDEF	1150
	KGGM	610
	KHIP	1520
	KOB	770
	KPAR	1190
	KQEO	920
	KARA	1310
	KVOD	730
	KLOS	1580
	KRZY	1450
Alcoa, Tenn.	WEAG	1470
Alexander City, Ala.	WRFS	1050
Alexandria, La.	KALB	580
	KDBS	1410
	KSYL	970
Alexandria, Minn.	KXRA	1490
Alexandria, Va.	WPIK	730
Algona, Iowa	KLGA	1600
Alice, Tex.	KOPY	1070
Alisal, Cal.	KRSA	1570
Allendale, S.C.	WDOG	1300
Allentown, Pa.	WHOL	1600
	WAEB	790
	WKAP	1320
	WSAN	1470
Alliance, Nebr.	KCOW	1400
Alliance, Ohio	WFAH	1310
Alisal, Calif.	KRSA	1570
Alma, Ga.	WCQS	1400
Alma, Mich.	WFYC	1280
Alpena Township, Mich.	WATZ	1450
Alpine, Tex.	KVLF	1240
Altavista, Va.	WKDE	1000
Alton, Ill.	WOKZ	1570
Altona, Man.	CFAM	1290
Altoona, Pa.	WFBG	1290
	WRTA	1240
	WVAM	1430
Alturas, Calif.	KCNO	570
Altus, Okla.	KWHW	1450
Alva, Okla.	KALV	1430
Amarillo, Tex.	KVII	1010
	KPUR	1440
	KGNC	710
	KIXZ	940
	KRAY	1360
	KZIP	1310
Ambridge, Pa.	WMBA	1460
Americus, Ga.	WDEC	1290
	WISK	1390
Ames, Iowa	KASI	1430
	WDI	640
Amherst, Mass.	WTTT	1430
Amherst, N.S.	CKDH	1400
Amherst, N.Y.	WUFO	1080
Amite, La.	WABL	1570
Amory, Miss.	WAMY	1580
Amsterdam, N.Y.	WAFS	1570
	WCSS	1490
Anaconda, Mont.	KANA	580
Anacortes, Wash.	KAGT	1340
Anaheim, Calif.	KEZY	1190
Anchorage, Alaska	KBYR	1270
	KFQD	750
	KENI	550
	KYAK	630
Andalusia, Ala.	WCTA	920
	WAAO	1530
Anderson, Cal.	KMRE	1580
Anderson, Ind.	WHUT	1470
	WHBU	1240
Anderson, S.C.	WAIM	1230
	WANS	1280
Andrews, Tex.	KACT	1360
Annapolis, Md.	WANN	1190
	WYRE	810
	WNAV	1430
Ann Arbor, Mich.	WAAM	1600
	WPAG	1050
Anna, Ill.	WRAJ	1440
Anniston, Ala.	WANA	1490
	WONG	1450
	WHMA	1390
Annville-Cleona, Pa.	WAHT	1510
Anoka, Minn.	KANO	1470
Ansonia, Conn.	WAOS	690
Antigo, Wis.	WATK	900
Apollo, Pa.	WAVL	910
Apopka, Fla.	WTLN	1520
Apple Valley, Cal.	KAVR	960
Appleton, Wis.	WAPL	1570
	WHBY	1230
Aquadilla, P. R.	WUNA	1340
Arab, Ala.	WRAB	1380
Arcadia, Fla.	WAPG	1480
Arcata, Calif.	KENL	1340
	KATA	1340
Ardmore, Okla.	KVSO	1240
Ardmore, Tenn.	WSLV	1520
Arecibo, P.R.	WCMN	1280
	WMIA	1070
	WNIK	1230
Argentia, Nfld.	VOUS	1480
Arkadelphia, Ark.	KVRC	1240
Arkan. City, Kans.	KSOK	1280
Arlington, Fla.	WDCJ	1220
Arlington, Va.	WAVA	780
	WEAM	1390
Arroyo Grande, Calif.	KOAG	1280
Artesia, N.M.	KSVP	990
Arvada, Colo.	KQXI	1550
Ashburn, Ga.	WMES	1570
Asbury Park, N.J.	WJLK	1310
Asbury Park-Eatontown, N. J.	WHTG	1410
Asheboro, N.C.	WGWR	1260
Asheville, N.C.	WISE	1310
	WLOS	1380
	WSKY	1230
	WWNC	570
Ashland, Ky.	WCMI	1340
	WTCR	1420
Ashland, Ohio	WNCO	1340
Ashland, Oreg.	KWIN	1400
	KRVC	1350
Ashland, Va.	WIVE	1430
Ashland, Wis.	WATW	1400
Ashtabula, Ohio	WAQI	1600
	WREO	970
Aspen, Colo.	KSNO	1260
Astoria, Oreg.	KAST	1370
	KVAS	1230
Atchison, Kans.	KARE	1470
Athens, Ga.	WGAU	1340
	WDOL	1470
	WKAC	1080
	WRFC	960
	KQXI	790
Athens, Ohio	WATH	970
	WOUB	1340
Athens, Tenn.	WLAR	1450
	WYXI	1390
Athens, Tex.	KBUD	1410
Atlanta, Ga.	WPLO	590
	WIGO	1340
	WADK	1380
	WERD	860
	WGKA	1110
	WGST	920
	WIIN	870
	WQXI	790
	WSB	750
	WYZE	1480
Atlanta-Decatur, Ga.	WGUN	1010
Atlanta, Tex.	KALT	900
Atlantic, Iowa	KJAN	1220
Atlantic Beach, Fla.	WKTX	1600
Atlantic City, N.J.	WFPG	1450
	WLDB	1490
	WMID	1340
Atmore, Ala.	WATM	1590
Atoka, Okla.	KEOR	1110
Attleboro, Mass.	WARA	1320
Auburn, Ala.	WAUD	1230
Auburn, Calif.	KAHI	950
Auburn, N.Y.	WMBO	1340
	WAUB	1590
Auburn, Wash.	KASY	1220
Auburndale, Fla.	WTWB	1570
Auburndale, Wis.	WLBL	930
Augusta, Ga.	WAUG	1050
	WBBQ	1340
	WBIA	1230
	WGAC	580
	WROW	1480
	WTHB	1550
Augusta, Maine	WRDO	1400
	WFAU	1340
Aurora, Colo.	KOSI	1430
Aurora, Ill.	WMRO	1280
	WKKD	1580
Aurora, Mo.	KSWM	940
Austin, Minn.	KAUS	1480
	KQAQ	970
Austin, Tex.	KNOW	1490
	KHFI	970
	KTBC	590
	KOKE	1370
	KVET	1300
Avalon, Cal.	KBIG	740
Avondale Estates, Ga.	WAVO	1420
Aztec, N. Mex.	KHAP	1340
Babylon, N.Y.	WBAB	1440
	WGLI	1290
Bad Axe, Mich.	WLEW	1340
Bainbridge, Ga.	WMGR	930
	WAZA	1360
Baker, Mont.	KFLN	960
Baker, Oreg.	KBKR	1490
Bakersfield, Calif.	KAFY	550
	KBIS	970
	KERN	1410
	KGEE	1230
	KUZZ	800
	KLYD	1350
	KWAC	1490
	KPMC	1560
Bellingham, Wash.	KPUG	1170
Baldwinsville, N.Y.	WSEN	1050
Ballinger, Tex.	KRUN	1400
Baltimore, Md.	WBAL	1090
	WAYE	860
	WBMD	750
	WCAO	600
	WCBM	680
	WEBB	1360
	WFBR	1300
	WITH	1230
	WSID	1010
	WWIN	1400
Bamberg-Denmark, S.C.	WWBD	790
Bangor, Maine	WABI	910
	WGUY	1250
	WLBZ	620
Banning, Calif.	KPAS	1490
Baraboo, Wis.	WBOO	740
Bardstown, Ky.	WBRT	1320
Barbourville, Ky.	WYWY	950
Barnesboro, Pa.	WNCC	950
Barnesville, Ga.	WBAF	1090
Barnwell, S.C.	WBAW	740
Barre, Vt.	WSNO	1450
Barstow, Calif.	KWTC	1230
	KIOT	1310
Bartlesville, Okla.	KWON	1400
Bartow, Fla.	WBAR	1460
Bassett, Va.	WODY	900
Bastrop, La.	KTRY	730
	KVOB	1340
Batavia, N.Y.	WBTA	1490
Batesburg, S.C.	WBLR	1430
Batesville, Ark.	KBTA	1340
Batesville, Miss.	WBLE	1290
Bath, Maine	WJTO	730
Bath, N.Y.	WFSR	1580
Baton Rouge, La.	WAIL	1260
	WLUX	1550
	WYNK	1380
	WIBR	1300
	WJBO	1150
	WLCS	910
	WXOK	1460
Battle Creek, Mich.	WBCK	930
	WKFR	1400
	WVDC	1500
Baxley, Ga.	WHAB	1260
Bayard, N.M.	KNFT	950
Bay City, Mich.	WBCM	1440
	WXDX	1250
Bay City, Tex.	KIDX	1270
Bay Minette, Ala.	WBCA	1110
Bayamon, P.R.	WLUZ	1600
	WRSJ	1560
Baytown, Tex.	KWBA	1360
Beacon, N.Y.	WBNR	1260
Beardstown, Ill.	WRMS	790
Beatrice, Nebr.	KWBE	1450
Beaufort, N.C.	WBMA	1400
Beaufort, S.C.	WBEU	960
	WSIB	1490
Beaumont, Tex.	KLVI	560
	KPYC	1450
	KTRM	990
Beaver Dam, Wis.	WBEV	1430
Beaver Falls, Pa.	WBVP	1230
Beckley, W. Va.	WJLS	560
	WCIR	1060
	WWNR	620
Bedford, Ind.	WBIW	1340
Bedford, Pa.	WBFO	1310
Bedford, Va.	WBLT	1350
Beeville, Tex.	KIBL	1490
Bel Air, Md.	WVOB	1520
Belen, N.Mex.	KARS	860
Belfast, Me.	WBME	1230
Belgrade, Mont.	KGVW	630
Bellaire, Ohio	WOMP	1290
Bellefontaine, Ohio	WOHP	1390
Bellefonte, Pa.	WBLF	1330
Bell Fourche, S.Dak.	KBFS	1450
Belle Glade, Fla.	WSWN	900
Belleville, Ont.	CJBQ	800
Belleville, Ill.	WIBV	1260
Bellevue, Wash.	KFKF	1330
	KFKF	1540
Bellingham, Wash.	KPUG	1170
	KGMI	790
	KOQT	1550
Bellingham-Ferndale, Wash.	KENY	930
Belmont, N.C.	WCGC	1270
Beloit, Wis.	WGEZ	1490
	WBEL	1380
Belton, S.C.	WHPB	1390
Belton, Tex.	KTON	940
Belzoni, Miss.	WELZ	1460
Bemidji, Minn.	KBUN	1450
Bend, Oreg.	KBNO	1110
	KGRL	940
Bennetsville, S.C.	WBSC	1550
Bennington, Vt.	WBTN	1370
Benson, Minn.	KBMO	1290
Benson, N.C.	WPYB	1580
Benton, Ark.	KBBA	690
	KGKO	850
Benton, Ky.	WCBL	1290
Benton Harbor-St. Joseph, Mich.	WHFB	1060
Berkeley, Calif.	KPAT	1400
Berkeley Springs, W.Va.	WCST	1010
Berlin, N.H.	WMOU	1230
	WBRL	1400
Berry Hill, Tenn.	WVOL	1470
Berryville, Ark.	KTHS	1480
Berwick, Pa.	WBRX	1280
Bessemer, Ala.	WYAM	1450
Bethesda, Md.	WUST	1120
Bethesda, Md.	WGMS	570
Bethlehem, Pa.	WGPA	1100
Beverly, Mass.	WMLO	1570
Biddeford, Maine	WIDE	1400
Big Bear Lake, Cal.	KTOT	1050
Big Delta, Alaska	WXLL	980
Big Lake, Tex.	KBLT	1290
Big Rapids, Mich.	WBRN	1460
Big Spring, Tex.	KBST	1490
	KHEM	1270
	KBYG	1400
Big Stone Gap, Va.	WLSD	1220
Biloxi, Miss.	WLOX	1490
	WVMI	570
Billings, Mont.	KBMY	1240

Location	C.L.	kHz
	KGHL	790
	KOOK	970
	KOYN	910
	KURL	730
Binghamton, N.Y.	WINR	680
	WKOP	1360
	WNBF	1290
Birmingham, Ala.	WAPI	1070
	WBRC	960
	WCRT	1260
	WAQY	1220
	WENN	1320
	WATV	900
	WSGN	610
	WYDE	850
	WVOK	690
Bisbee, Ariz.	KSUN	1230
Bishop, Calif.	KIBS	1230
Bishopville, S.C.	WAGS	1380
Bismarck, N/Dak.	KFYR	550
	KBMR	1350
Bismarck-Mandan,	N.Dak.	
	KBOM	1270
Black Mountain, N.C.		
	WBMS	1350
	WFGW	1010
Black River Falls,	Wis.	
	WWIS	1260
Blackfoot, Idaho	KBLI	690
Blackshear, Ga.	WBSG	1350
Blackstone, Va.	WKLV	1440
Blackwell, Okla.	KLTR	1580
Blaine, Wash.	KARI	550
Blakely, Ga.	WBBK	1260
Blanding, Utah	KUTA	790
Bloomington, Ill.	WJBC	1230
Bloomington, Ind.	WTTS	1370
Bloomsburg, Pa.	WCNR	930
	WHLM	550
Blountstown, Fla.	WKMK	1000
Blue Earth, Minn.	KBEW	1560
Bluefield, W.Va.	WHIS	1440
	WKOY	1240
Blythe, Calif.	KYOR	1450
Blytheville, Ark.	KLCN	910
Boaz, Ala.	WBSA	1300
Boca Raton, Fla.	WSBR	740
Bogalusa, La.	WIKC	1490
	WBOX	920
Boise, Ida.	KATN	950
	KEST	790
	KGEM	1140
	KIDO	630
	KYME	740
Bolivar, Mo.	KBLR	1130
Bolivar, Tenn.	WBOL	1560
Bonham, Tex.	KFYN	1420
Boone, Iowa	KFGQ	1260
	KWBG	1590
Boone, N.C.	WATA	1450
Boonville, Ind.	WBNL	1540
Boonville, Mo.	KWRT	1370
Booneville, Miss.	WBIP	1400
Boonville, N.Y.	WBRV	900
Borger, Tex.	KHUZ	1490
	KBBB	1600
Boston, Mass.	WBZ	1030
	WCOP	1150
	WICD	1090
	WEZE	1260
	WEEI	590
	WHDH	850
	WMEX	1510
	WRKO	680
	WRYT	950
Boulder, Colo.	KBOL	1490
Bowie, Tex.	KBAN	1410
Bowling Green, Ky.	WKCT	930
	WBGN	1340
	WLBJ	1410
	KPCR	1530
Bowl. Green, Ohio	WMGS	730
Bozeman, Mont.	KXXL	1450
	KBMN	1230
Bradbury Hgts., Md.	WPGC	1580
Braddock, Pa.	WLOA	1550
Braddocks Heights,	Md.	
	WMHI	1370
Bradenton, Fla.	WTRL	1490
	WBRD	1420
Bradford, Pa.	WESB	1490
Brady, Tex.	KNEL	1490
Brainerd, Minn.	KLIZ	1380
	KVBR	1340
Brandon, Miss.	WRKN	970
Branson, Mo.	KBHM	1220
Brantford, Ont.	CKPC	1380
Brattleboro, Vt.	WTSA	1450
	WKVT	1490
Brawley, Calif.	KROP	1300
Brazil, Ind.	WWCM	1380
Breckenridge, Minn.		
	KBMW	1450
Breckenridge, Tex.	KSTB	1430
Bremen, Ga.	WWCC	1440
Bremerton, Wash.	KBRO	1490
Brenham, Tex.	KWHI	1280
Brevard, N.C.	WPNF	1240
Brewster, N.Y.	WPUT	1510
Brewton, Ala.	WEBJ	1240
Bridgeport, Ala.	WBTS	1480
Bridgeport, Conn.	WICC	600
	WDJZ	1530
	WNAB	1450
Bridgeton, N.J.	WSNJ	1240
Brigham City, Utah	KBUH	800
Brighton, Colo.	KBRN	800
Brinkley, Ark.	KBRI	1570
Bristol, Conn.	WBIS	1440
Bristol, Tenn.	WDPI	1490
	WKYE	1550
Bristol, Va.	WCYB	690
	WFHG	980
Brockton, Mass.	WBET	1460
	WOKW	1410
Brockville, Ont.	CFJR	1450
Broken Bow, Nebr.	KCNI	1280
Bronson, Mo.	KBHM	1220
Brookfield, Conn.	WINE	940
Brookfield, Mo.	KGHM	1470
Brookhaven, Miss.	WCHJ	1470
	WJMB	1340
Brookings, Oreg.	KURY	910
Brookings, S.Dak.	KBRK	1430
Brookline, Mass.	WBOS	1600
Brookneal, Va.	WODI	1230
Brooksville, Fla.	WWJB	1450
Brownfield, Tex.	KKUB	1300
Brownsville, Tenn.	WBHT	1520
Brownsville, Tex.	KBOR	1600
Brownwood, Tex.	KBWD	1380
	KEAN	1240
Brunswick, Ga.	WGIG	1440
	WMOG	1490
	WYNR	790
Brunswick, Maine	WCME	900
Brunswick, Md.	WTRI	1520
Bryan, Ohio	WBNO	1520
Bryan, Tex.	KORA	1240
	WTAW	1150
Bryson City, N.C.	WBHN	1590
Buckhannon, W.Va.	WBUC	1460
Bucyrus, Ohio	WBCO	1540
Buffalo, N.Y.	WBEN	930
	WYSL	1400
	WEBR	970
	WGR	550
	WKBW	1520
	WWOL	1120
Buffalo, Wyo.	KBBS	1450
Buford, Ga.	WDYZ	1460
Burbank, Cal.	KBBQ	1500
Burley, Idaho	KBAR	1230
Burlington, Colo.	KNAB	1140
Burlington, Iowa	KBUR	1490
	KYND	1150
Burlington, N.C.	WBBB	920
	WBAG	1150
Burlington, Vt.	WDOT	1400
	WJOY	1230
	WVMT	620
Burnett, Tex.	KTSL	1340
Burney, Cal.	KAVA	1450
Burns, Oreg.	KRNS	1230
Burnsville, N.C.	WKYK	1540
Butler, Ala.	WPRN	1240
Butler, Mo.	KMAM	1530
Butler, Pa.	WBUT	1050
	WISR	680
Butte, Mont.	KBOW	550
	KXLF	1370
Cabin, John, Potomac, Md.		
	WXLN	950
Cadillac, Mich.	WATT	1240
Cadiz, Ky.	WKDZ	1110
Caguas, P.R.	WNEL	1430
	WVJP	1110
Cairo, Ga.	WGRA	790
Cairo, Ill.	WKRO	1490
Calais, Maine	WQDY	1230
Caldwell, Idaho	KCID	1490
	KBGN	910
	WBYE	1370
Calera, Ala.	KICO	1490
Calexico, Calif.	WCGA	900
Calhoun, Ga.	WEBS	1110
Camas, Wash.	KVAN	1480
Cambridge, Md.	WCEM	1240
Cambridge, Mass.	WCAS	740
Cambridge, Ohio	WILE	1270
Camden, Ark.	KAMD	910
	KJWH	1450
Camden, N.J.	WCAM	1310
	WKDN	800
Camden, S.C.	WACA	1590
Camden, Tenn.	WFWL	1220
Cameron, Tex.	KMIL	1330
Camilla, Ga.	WCLB	1220
Campbell, Ohio	WHOT	1330
Campbellsville, Ky.	WTCO	1450
Canandaigua, N.Y.	WCGR	1550
Cannon City, Colo.	KRLN	1400
Canonsburg, Pa.	WARO	540
Canton, Ga.	WCHK	1290
Canton, Ill.	WBYS	1560
Canton, Miss.	WMGO	1370
Canton, N.C.	WWIT	970
Canton, Ohio	WHBC	1460
	WOIO	1060
	WINW	1520
	WNYN	900
Canyon, Tex.	KCAN	1550
Cape Girardeau, Mo.	KFVS	960
	KZYM	1220
	KGMO	1550
Carbondale, Ill.	WCIL	1020
Carbondale, Pa.	WCDL	1440
Caribou, Maine	WFST	600
Carlisle, Pa.	WHYL	960
	WIOO	1000
Carlsbad, N.Mex.	KAVE	1240
	KCCC	930
	KPBM	740
Carmel, Calif.	KRML	1410
Carmi, Ill.	WROY	1460
Carnegie, Pa.	WZUM	1590
Caro, Mich.	WKYO	1360
Carolina, P.R.	WVOZ	1400
Carrington, N.Dak.	KDAK	1600
Carrizo Springs, Tex.		
	KBEN	1450
Carroll, Iowa	KCIM	1380
Carrollton, Ala.	WRAG	590
Carrollton, Ga.	WLBB	1100
Carrollton, Mo.	KAOL	1430
Carson City, Nev.	KPTL	1300
Cartersville, Ga.	WBHF	1450
	WKRW	1270
Carthage, Ill.	WCAZ	990
Carthage, Mo.	KDMO	1490
Carthage, Miss.	WECP	1480
Carthage, Tenn.	WRKM	1350
Carthage, Tex.	KGAS	1590
Caruthersville, Mo.	KCRV	1370
Casa Grande, Ariz.	KPIN	1260
Casey, Ill.	WKZI	800
Casper, Wyo.	KTWO	1030
	KATI	1400
Cathedral City, Calif.		
	KVOC	1230
	KWXY	1340
Cayce, S.C.	WCAY	620
Cayey, P.R.	WLEY	1080
Cedar City, Utah	KSUB	590
Cedar Falls, Iowa	KCFI	1250
Cedar Rapids, Iowa	KCRG	1600
	KLWW	1450
	WMT	600
	KHAK	1360
Cedartown, Ga.	WGAA	1340
Celina, Ohio	WCSM	1350
Center, Ala.	WEIS	990
	WAGC	1550
Center, Tex.	KDET	930
Centerville, Ala.	WBIB	1590
Centerville, Iowa	KCOG	1400
Centerville, Ind.	WHON	930
Centreville, Miss.	WLBS	1580
Centerville, Tenn.	WHLP	1570
Centerville, Utah	KBBC	1600
Central City, Ky.	WNES	1050
	WMTA	1380
Centralia, Ill.	WILY	1210
Centralia & Chehalis,	Wash.	
	KELA	1470
Central Point, Ore.	KPTN	1400
Centreville, Ala.	WBIB	1110
Ceres, Calif.	KLOC	920
Chadburn, N.C.	WVOE	1590
Chadron, Nebr.	KCSR	610
Chambersburg, Pa.	WCHA	800
	WCBG	1590
	WDWS	1400
Champaign, Ill.	KCRB	1460
Chanute, Kans.	WCHL	1360
Chapel Hill, N.C.	WESA	940
Charleroi, Pa.	KCHA	1580
Charles City, Iowa	WEIC	1270
Charleston, Ill.	KCHR	1350
Charleston, Mo.	WCSC	1390
Charleston, S.C.	WOKE	1340
	WPAL	730
	WQSN	1450
	WTMA	1250
Charleston, W.Va.	WCAW	680
	WCHS	580
	WGKV	1490
	WKAZ	950
	WTIP	1240
	WXVA	1550
Charlotte, Mich.	WCER	1390
Charlotte, N.C.	WBT	1100
	WAYS	610
	WGIV	1600
	WKTC	1310
	WSOC	930
	WIST	1240
	WWOK	1480
	WRPL	1540
Charlotte Amalie, V.I.		
	WBNB	1000
	WSTA	1340
	WBNB	1000
Charlottesville, Va.	WCHV	1260
	WELK	1400
	WINA	1050
Chase City, Va.	WMEK	980
Chatham, Va.	WKBY	1080
Chattahoochee, Fla.		
	WSBP	1580
Chattanooga, Tenn.	WMOC	1450
	WAPO	1150
	WDEF	1370
	WDOD	1310
	WDXB	1490
	WNOO	1260
Chehoygan, Mich.	WCBY	1240
Cheektowaga, N.Y.	WNIA	1230
Chehalis-Centralia,	Wash.	
	KITI	1420
Chelan, Wash.	KOZI	1220
Cheraw, S.C.	WCRE	1420
Cherryville, N. C.	WCSL	1590
Cherokee, Iowa	KCHE	1440
Chesapeake, Va.	WCPK	1600
Chester, Ill.	KSGM	980
Chester, Pa.	WEEZ	1390
	WVCH	740
Chester, S.C.	WGCD	1490
Chester, Va.	WIKI	1410
Chestertown, Md.	WCTR	1530
Cheyenne, Wyo.	KFBC	1240
	KCHY	1530
	KRAE	1480
	KVWO	1370
	KEND	980
Chicago, Ill.	WAIT	820
	WBBM	780
	WCFL	1000
	WCRW	1240
	WEDC	1240
	WGN	720
	WGRT	950
	WIND	560
	WJJD	1160
	WLS	890
	WMAQ	670
	WMBI	1110
	WNUS	1390
	WSBC	1240
Chicago Hgts., Ill.	WMPP	1470
	WCGO	1600
Chickasha, Okla.	KWCO	1560
Chico, Calif.	KHSL	1290
	KPAY	1060
Chicopee, Mass.	WACE	730
Chiefland, Fla.	WKQH	940
Childress, Tex.	KCTX	1510
Chillicothe, Mo.	KCHI	1010
Chillicothe, Ohio	WBEX	1490
	WCHI	1350
Chipley, Fla.	WBGC	1240
Chippewa Falls, Wis.		
	WAXX	1150
Christiansburg, Va.	WJJJ	1260
Christiansted, V.I.	WIVI	970
Church Hill, Tenn.	WMCH	1260
Cicero, Ill.	WVON	1450
Cincinnati, Ohio	WCKY	1530
	WCIN	1480
	WKRC	550
	WLW	700
	WSAI	1360
	WUBE	1230
	WZIP	1050
Clanton, Ala.	WKLF	980
Clare, Mich.	WCRM	990
Claremont, N.H.	WTSV	1230
Claremore, Okla.	KWPR	1270
Clarion, Pa.	WWCH	1300
Clarksburg, W.Va.	WBOY	1400
	WHAR	1340
	WPDX	750
Clarksdale, Miss.	WROX	1450
	WKDL	1600
Clarksville, Ark.	KLYR	1360
Clarksville, Tenn.	WJZM	1400
	WDXN	540
Clarksville, Tex.	KCAR	1350
Claxton, Ga.	WCLA	1470
Clayton, Ga.	WGHC	1570
Clayton, Mo.	KXLW	1320
	KFUO	850
Clayton, N.Mex.	KLMX	1450
Clearfield, Pa.	WCPA	900
Clearwater, Fla.	WTAN	1340
	WAZE	860
Cleburne, Tex.	KCLE	1120
Clermont, Fla.	WSLC	1340
Cleveland, Ga.	WRWH	1350
Cleveland, Miss.	WCLD	1490
	WDSK	1410
Cleveland, Ohio	WKYC	1100
	WIXY	1260
	WERE	1300
	WGAR	1220
	WHK	1420
	WABQ	1540
	WJW	850
Cleveland, Tenn.	WBAC	1340
	WCLE	1570
Cleveland, Tex.	KVLB	1410
Cleve. Hgts., Ohio	WJMO	1490
Clifton, Ariz.	KCLF	1400
Clifton Forge, Va.	WCFV	1280
Clincho, Va.	WDIC	1430
Clinton, Ill.	WHOW	1520
Clinton, Iowa	KCLN	1390
	KROS	1340
Clinton, Mo.	KOKO	1280
Clinton, N.C.	WRRZ	880
Clinton, Okla.	KWOE	1320
Clinton, S.C.	WPCC	1410
Clinton, Tenn.	WYSH	1380
Cloquet, Minn.	WKLK	1230
Clovis, N.Mex.	KCLV	1240
	KICA	980
Coachella, Calif.	KCHV	970
Coalinga, Cal.	KOLI	1470
Coamo, P.R.	WCPR	1450
Coatesville, Pa.	WCOJ	1420
Cochran, Ga.	WVMG	1440
Cocoa, Fla.	WKKO	860
	WEZY	1350

WHITE'S RADIO LOG

Location	C.L.	kHz
	WWBC	1510
Cocoa Beach, Fla.	WRKT	1300
Cody, Wyo.	KODI	1400
Coeur d'Alene, Ida.	KVNI	1240
Coffeyville, Kans.	KGGF	690
Colby, Kans.	KXXX	790
Coldwater, Mich.	WTVB	1590
Coleman, Tex.	KSTA	1000
Colfax, Wash.	KCLX	1450
College Park, Ga.	WBAD	1570
Collierville, Tenn.	WPIP	1590
Colonial Heights, Va.	WPVA	1290
Colorado City, Tex.	KVMC	1320
Colo. Sprgs., Colo.	KRDO	1240
	KPIK	1580
	KVOR	1300
	KSSS	740
	KYSN	1460
	KRYT	1530
Columbia, Ky.	WAIN	1270
Columbia, La.	KCTO	1540
Columbia, Miss.	WCJU	1450
Columbia, Mo.	KFRU	1400
	KTGR	1580
Columbia, Pa.	WCOY	1580
Columbia, S.C.	WCOS	1400
	WIS	560
	WOIC	1320
	WNOK	1230
	WQXL	1470
Columbia, Tenn.	WMCP	1280
	WKRM	1340
Columbus, Ga.	WDAK	540
	WRBL	1420
	WHYD	1270
	WCLS	1580
	WOKS	1340
Columbus, Ind.	WCSI	1010
Columbus, Miss.	WACR	1050
	WCBI	550
Columbus, Nebr.	KJSK	900
	KTTT	1510
Columbus, Ohio	WBNS	1460
	WCOL	1230
	WMNI	920
	WOSU	820
	WTVN	610
	WVKO	1580
Colville, Wash.	KCVL	1270
Comanche, Tex.	KCOM	1550
Commerce, Ga.	WJJC	1270
Concord, Calif.	KWUN	1480
Concord, N.H.	WKXL	1450
Concord, N.C.	WEGO	1410
Concordia, Kans.	KNCK	1390
Conneaut, Ohio	WWOW	1360
Connellsville, Pa.	WCVI	1340
Connersville, Ind.	WCNB	1580
Conroe, Tex.	KMCO	900
Conway, Ark.	KCON	1230
	KVEE	1330
Conway, N.H.	WBNC	1050
Conway, S.C.	WLAT	1330
Cookeville, Tenn.	WHUB	1400
	WPTN	1550
Coolidge, Ariz.	KCKY	1150
Coos Bay, Oreg.	KOOS	1230
	KYNG	1420
Copper Hill, Tenn.	WLSB	1400
Coquille, Oreg.	KWRO	630
Coral Gables, Fla.	WRIZ	1550
	WVCG	1080
Corbin, Ky.	WCTT	680
	WYGO	1330
Cordele, Ga.	WMJM	1490
Cordova, Alaska	KLAM	1450
Corinth, Miss.	WCMA	1230
	WKCU	1350
Cornelia, Ga.	WCON	1450
Corning, Ark.	KCCB	1260
Corning, N.Y.	WCBA	1350
	WCLI	1450
Corona, Cal.	KREL	1370
Corpus Christi, Tex.	KCTA	1030
	KCCT	1150
	KEYS	1440
	KRYS	1360
	KSIX	1230
	KUNO	1400
Corry, Pa.	WOTR	1370
Corsicana, Tex.	KAND	1340
Cortez, Colo.	KVFC	740
Cortland, N.Y.	WKRT	920
	KFLY	1240
Corvallis, Ore.	KLOO	1340
Corydon, Ind.	WPDF	1550
Coshocton, Ohio	WTNS	1560
Cottage Grove, Ore.	KNND	1400
Cottonwood, Ariz.	KVRD	1240
	KVIO	1600
Coudersport, Pa.	WFRM	600
Council Bluffs, Iowa	KFNF	920
	KRCB	1360
Courtenay, B.C.	CFCP	1440
Covington, Ga.	WGFS	1430
Covington, Ky.	WCLU	1320
Covington, La.	WARB	730
Covington, Tenn.	WKBL	1250
Covington, Va.	WKEY	1340
Cowan, Tenn.	WZYX	1440
Cozad, Neb.	KAMI	1580
Craig, Colo.	KRAI	550
Crane, Tex.	KCRR	1380
	KBSN	970
Crawfordsville, Ind.	WCVL	1550
Crescent City, Calif.	KPLY	1240
	KPOD	1310
Creston, Iowa	KSIB	1520
Crestview, Fla.	WCNU	1010
	WJSB	1050
Crewe, Va.	WSVS	800
Crockett, Tex.	KIVY	1290
Crookston, Minn.	KROX	1260
Crossett, Ark.	KAGH	800
Crossville, Tenn.	WAEW	1330
Crowley, La.	KSIG	1450
Crystal Lake, Ill.	WCLR	850
Cuero, Tex.	KCFH	1600
Cullman, Ala.	WFMH	1460
	WKUL	1340
Culpeper, Va.	WCVA	1490
Cumberland, Ky.	WCPM	1280
Cumberland, Md.	WCUM	1230
	WKYR	1270
	WTBO	1450
Cummings, Ga.	WSNE	1410
Cushing, Okla.	KUSH	1600
Cuyahoga Falls, Ohio	WCUE	1150
Cypress Gardens, Fla.	WGTO	540
Cynthiana, Ky.	WCYN	1400
Dade City, Fla.	WDCF	1350
Dadeville, Ala.	WDVC	910
Daingerfield, Tex.	KEGG	1560
Dalhart, Tex.	KXIT	1410
Dallas, N.C.	WAAK	960
Dallas, Oreg.	KROW	1460
Dallas, Tex.	KRLD	1080
	KIXL	1040
	KSKY	660
	KLIF	1190
	WFAA	570
	WFAA	820
	KBOX	1480
	WRR	1310
Dalton, Ga.	WBLJ	1230
	WRCD	1430
	WTTI	1530
Danbury, Conn.	WLAD	800
Danville, Ill.	WDAN	1490
	WITY	980
Danville, Ky.	WHIR	1230
Danville, Pa.	WPGM	1570
Danville, Va.	WBTM	1330
	WYPR	970
	WDVA	1250
	WILA	1580
Dardanelle, Ark.	KCAB	980
Darlington, S.C.	WDAR	1350
Davenport, Iowa	WOC	1420
	KWNT	1580
	KSTT	1170
Dawson, Ga.	WDWD	990
Dayton, Ohio	WHIO	1290
	WING	1410
	WONE	980
	WAVI	1210
Dayton, Tenn.	WDNT	1280
Daytona Beach, Fla.	WNDB	1150
	WMFJ	1450
	WRDD	1340
Deadwood, S.Dak.	KDSJ	980
Dearborn, Mich	WKNR	1310
Decatur, Ala.	WHOS	800
	WAJF	1490
	WMSL	1400
Decatur-Atlanta, Ga.	KGUN	1010
	WOMN	1310
Decatur, Ill.	WDZ	1050
	WSOY	1340
Decatur, Ind.	WADM	1540
Decorah, Iowa	KDEC	1240
	KWLC	1240
Deer Lodge, Mont.	KDRG	1400
Deerfield, Va.	WABH	1150
Defiance, Ohio	WONW	1280
De Funiak Springs, Fla.	WDSP	1280
	WZEP	1460
De Kalb, Ill.	WLBK	1360
De Land, Fla.	WJBS	1490
	WOOD	1310
Delano, Calif.	KCHJ	1010
Delaware, Ohio	WDLE	1550
Delray, Bch., Fla.	WDBF	1420
Del Rio, Tex.	KDLK	1230
	KWMC	1490
Delta, Colo.	KDTA	1400
Deming, N.Mex.	KOTS	1230
Demopolis, Ala.	WXAL	1400
Denham Sprgs., La.	WLBI	1220
Denison, Iowa	KDSN	1580
Denison-Sherman, Tex.	KDSX	950
Denmark-Bamberg, S.C.	WWBD	790
Denton, Tex.	KDNT	1440
Denver, Colo.	KDEN	1340
	KFML	1390
	KHOW	630
	KIMN	950
	KLIR	990
	KLZ	560
	KBTR	710
	KOA	850
	KPOF	910
	KFSC	1220
	KTLN	1280
Denver City, Tex.	KKAL	1580
De Queen, Ark.	KDQN	1390
DeRidder, La.	KDLA	1010
Des Moines, Iowa	KCBC	1390
	KIOA	940
	KRNT	1350
	KSO	1460
	KWKY	1150
	WHO	1040
Detroit, Mich.	WCAR	1130
	WJBK	1500
	WJLB	1400
	WJR	760
	WWJ	950
	WXYZ	1270
Detroit Lakes, Minn.	KDLM	1340
Devils Lake, N.Dak.	KDLR	1240
DeWitt, Ark.	KDEW	1470
Dexter, Mo.	KDEX	1590
Diboll, Tex.	KSPL	1260
Dickinson, N.Dak.	KDIX	1230
Dickson, Tenn.	WDKN	1260
Dillon, Mont.	KDBM	1490
Dillon, S.C.	WDSC	800
Dimmitt, Tex.	KDHN	1470
Dinuba, Calif.	KRDU	1130
Dixon, Ill.	WIXN	1460
Dodge City, Kans.	KGNO	1370
	KEDD	1550
Donaldsonville, Ga.	WSEM	1500
Donalsonville, La.	WDLV	1090
Doniphan, Mo.	KDFN	1500
Dothan, Ala.	WAGF	1320
	WDIG	1450
	WOOF	560
Douglas, Ariz.	KAWT	1450
	KAPR	930
Douglas, Ga.	WDMG	860
	WOKA	1310
Douglas, Wyo.	KWIV	1050
Douglasville, Ga.	WDGL	1520
Dover, Del.	WDOV	1410
	WKEN	1600
Dover-Foxcraft, Me.	WDME	1340
Dover, N.J.	WRAN	1510
Dover, N.H.	WTSN	1270
Dover, Ohio	WJER	1450
Dowagiac, Mich.	WDDW	1440
Doylestown, Pa.	WBUX	1570
Dublin, Ga.	WMLT	1330
	WXLI	1230
Du Bois, Pa.	WCED	1420
Dubuque, Iowa	KDTH	1370
	WDBQ	1490
Duluth, Minn.	KDAL	610
	WEBC	560
	KAOH	1390
Dumas, Ark.	KDDA	1560
Dumas, Tex.	KDDD	800
Duncan, Okla.	KRHD	1350
Dundee, N.Y.	WFLR	1570
Dunkirk, N.Y.	WDDE	1410
Dunn, N.C.	WCKB	780
Du Quoin, Ill.	WDQN	1580
Durango, Colo.	KIUP	930
	KDGO	1240
Durant, Okla.	KSFO	750
Durham, N.C.	WDNC	620
	WSRC	1410
	WSSB	1490
	WTIK	1310
Dyersburg, Tenn.	WDSG	1450
	WTRO	1330
Eagle Pass, Tex.	KEPS	1270
Eagle River, Wis.	WERL	950
Easley, S.C.	WELP	1360
E. Grand Forks, Minn.	KRAD	1590
Eastland, Tex.	KERC	1590
E. Lansing, Mich.	WKAR	870
	WVIC	730
E. Liverpool, Ohio	WOHI	1490
East Longmeadow, Mass.	WTYM	1600
Eastman, Ga.	WUFF	710
E. Moline, Ill.	WDLM	960
E. Point, Ga.	WTJH	1260
East Prairie, Mo.	KGCL	1080
E. Syracuse, N.Y.	WPAW	1540
Easton, Md.	WEMD	1460
Easton, Pa.	WEEX	1230
	WEST	1400
Eatonton, Ga.	WXPQ	1520
Eatontown, N.J.	WHTG	1410
Eau Claire, Wis.	WEAQ	790
	WBIZ	1400
	WECL	1050
Eau Gallie, Fla.	WMEG	920
	WTAI	1560
Ebensburg, Pa.	WEND	1580
Edenton, N.C.	WCDJ	1260
Edinburg, Tex.	KURV	710
Edmonds, Wash.	KGDN	630
Effingham, Ill.	WCRA	1090
Elba, Ala.	WELB	1350
Elberton, Ga.	WSGC	1400
El Cajon, Calif.	KDEO	910
El Campo, Tex.	KULP	1390
El Centro, Calif.	KXO	1230
	KAMP	1430
El Dorado, Ark.	KDMS	1290
	KELD	1400
Eldorado, Kans.	KBTO	1360
Eldorado Springs, Mo.	KESM	1580
Eleele, Kanai, Hawaii	KUAI	720
Elgin, Ill.	WRMN	1410
Elizabeth City, N. C.	WCNC	1240
	WGAI	560
Elizabethton, Tenn.	WBEJ	1240
	WIDD	1520
Elizabethtown, Ky.	WIEL	1400
Elizabethtown, N.C.	WBLA	1440
Elizabethtown, Pa.	WHRY	1600
Elk City, Okla.	KBEK	1240
Elkhart, Ind.	WTRC	1340
	WCMR	1270
Elkins, N.C.	WIFM	1540
Elkins, W.Va.	WDNE	1240
Elko, Nev.	KELK	1240
Elkton, Md.	WSER	1550
Ellensburg, Wash.	KXLE	1240
Ellenville, N.Y.	WELV	1370
Ellsworth, Me.	WDEA	1370
Elmira, N.Y.	WELM	1410
	WENY	1230
Elmira Heights-Horseheads, N.Y.	WEHH	1590
El Paso, Tex.	KROD	600
	KELP	920
	KHEY	690
	KINT	1590
	KIZZ	1150
	KSET	1340
	KTSM	1380
El Reno, Okla.	KELR	1460
Ely, Minn.	WELY	1450
Ely, Nev.	KELY	1230
Elyria, Ohio	WEOL	930
Eminence, Ky.	WSTL	1600
Emporia, Kans.	KVOE	1400
Emporia, Va.	WEVA	860
Emporium, Pa.	WLEM	1250
Endicott, N.Y.	WENE	1430
Englewood, Colo.	KGMC	1150
Englewood, Fla.	WENG	1530
Englewood, Tenn.	WENR	1090
Enid, Okla.	KCRC	1390
	KGWA	960
Enterprise, Ala.	WIRB	600
Enterprise, Oreg.	KWVR	1340
Ephrata, Pa.	WGSA	1310
Ephrata, Wash.	KULF	730
Erie, Pa.	WWYN	1260
	WJET	1400
	WRIE	1330
	WWGO	1450
Erwin, Tenn.	WEMB	1420
Escanaba, Mich.	WDBC	680
	WLST	600
Escondido, Calif.	KOWN	1450
Espanola, N. M.	KDCE	970
Estes Park, Colo.	KKEP	1470
Estherville, Ia.	KILR	1070
Etowah, Tenn.	WCPH	1220
Eufaula, Ala.	WULA	1240
Eugene, Ore.	KEED	1450
	KASH	1600
	KATR	1320
	KORE	1050
	KERG	1280
	KPNW	1300
	KUGN	590
	KZEL	1540
Eunice, La.	KEUN	1490
Eureka, Calif.	KINS	980
	KDAN	790
Eustis, Fla.	WLCO	1240
Evanston, Ill.	WEAW	1330
	WNMP	1590
Evanston, Wyo.	KEVA	1240
Evansville, Ind.	WROZ	1400
	WGBF	1280
	WIKY	820
	WJPS	1330
Eveleth, Minn.	WEVE	1340
Everett, Pa.	WWDS	1050
Everett, Wash.	KRKO	1380

Location	C.L.	kHz
	KWYZ	1230
Evergreen, Ala.	WBLO	1470
Excelsior Springs, Mo.	KEXS	1090
Exeter, N.H.	WKXR	1540
Fairbanks, Alaska	KFAR	660
	KFRB	900
Fairbault, Minn.	KDHL	920
Fair Bluff, N.C.	WWKO	1480
Fairbury, Nebr.	KGMT	1310
Fairfax, Va.	WEEL	1310
Fairfield, Ill.	WFIW	1390
Fairfield, Iowa	KMCD	1570
Fairfield, O.	WCNW	1560
Fairhope, Ala.	WABF	1220
Fairmont, Minn.	KSUM	1370
Fairmont, N.C.	WFMO	860
Fairmont, W.Va.	WMMN	920
	WTCS	1490
Fairway, Kan.	KUDL	1380
Fajardo, P.R.	WMOD	1480
Falfurrias, Tex.	KPSO	1260
Fall River, Mass.	WALE	1400
	WSAR	1480
	KVLV	980
Falls Church, Va.	WFAX	1220
Falls City, Nebr.	KTNC	1230
Fargo, N.Dak.	WDAY	970
	KFGO	790
	KFNW	900
	KQWB	1550
Faribault, Minn.	KDHL	920
Farmersville, La.	KTOL	1470
Farmington, Me.	WKTJ	1380
Farmington, Mo.	KREI	800
Farmington, N.M.	KENN	1390
	KWYK	960
	KRZE	1280
Farmville, N.C.	WFAG	1250
Farmville, Va.	WFLO	870
Farrell, Pa.	WFAR	1470
Farwell, Tex.	KZOL	1570
Fayette, Ala.	WWWF	990
Fayetteville, Ark.	KHOG	1440
	KFAY	1250
Fayetteville, N.C.	WFAI	1230
	WFNC	940
	WFLB	1490
	WIDU	1600
Fayetteville, Tenn.	WEKR	1240
Fergus Falls, Minn.	KBRF	1250
	KFIL	1060
Fernandino Beach, Fla.	WFBF	1570
Ferriday, La.	KFNV	1600
Festus, Mo.	KJCF	1400
Festus-St. Louis, Mo.	KXEN	1010
Findlay, Ohio	WFIN	1330
Fisher, W.Va.	WELD	690
Fitchburg, Mass.	WEIM	1280
	WFGL	960
Fitzgerald, Ga.	WBHB	1240
Flagstaff, Ariz.	KCLS	600
	KAFF	930
	KEOS	690
Flat River, Mo.	KFMO	1250
Flint, Mich.	WFDF	910
	WTRX	1330
	WAMM	1420
	WMRP	1570
	WKMF	1470
	WTAC	600
Flomaton, Ala.	WTCB	990
Florence, Ala.	WJOI	1340
	WOWL	1240
Florence, S.C.	WJMX	970
	WOLS	1230
	WYNN	540
Floydada, Tex.	KFLD	900
Foley, Ala.	WHEP	1310
Fond du Lac, Wis.	KFIZ	1450
Fordyce, Ark.	KBJT	1570
Forest, Miss.	WMAG	860
Forest City, N.C.	WBBO	780
	WAGY	1320
Forest Grove, Ore.	KWAY	1570
Forks, Wash.	KVAC	1490
Forrest City, Ark.	KXJK	950
Ft. Atkinson, Wis.	WFAW	940
Ft. Bragg, Calif.	KDAC	1230
Ft. Campbell, Ky.	WABD	1370
Ft. Collins, Colo.	KCOL	1410
	KZIX	600
Ft. Dodge, Iowa	KVFD	1400
	KWMT	540
Ft. Knox, Ky.	WSAC	1470
Ft. Lauderdale, Fla.	WFTL	1400
	WSRF	1580
Ft. Madison, Iowa	KXGI	1360
Ft. Morgan, Colo.	KFTM	1400
Ft. Myers, Fla.	WINK	1240
	WMYR	1410
	WCAI	1350
Ft. Payne, Ala.	WFPA	1400
	WZOB	1250
Ft. Pierce, Fla.	WARN	1330
	WIRA	1400
Ft. Scott, Kans.	KMDO	1600
Ft. Smith, Ark.	KFPW	1230
	KFSA	950

Location	C.L.	kHz
	KTCS	1410
	KWHN	1320
Ft. Stockton, Tex.	KFST	860
Ft. Valley, Ga.	WFPM	1150
Ft. Walton Beach, Fla.	WNUE	1400
	WFTW	1260
Ft. Wayne, Ind.	WGL	1250
	WFWR	1090
	WDWO	1190
	WLYV	1450
	WKJG	1380
Ft. Worth, Tex.	KJIM	870
	KBUY	1540
	KFJZ	1270
	KNOK	970
	WBAP	570
	WBAP	820
	KXOL	1360
Fortuna, Cal.	KIXF	1280
Fosston, Minn.	KEHG	1480
Fostoria, Ohio	WFOB	1430
Fountain City, Tenn.	WGYW	1430
	WROL	1490
Fountain Inn, S.C.	WFIS	1600
Fowler, Calif.	KLIP	1220
Framingham, Mass.	WKOX	1190
Frankfort, Ind.	WILO	1570
Frankfort, Ky.	WFKY	1490
Franklin, Ky.	WFKN	1220
Franklin, La.	KFRA	1390
	WFCG	1110
Franklin, N.C.	WFSC	1050
Franklin, N.H.	WFTN	1240
Franklin, Pa.	WFRA	1450
Franklin, Tenn.	WAGG	950
Franklin, Va.	WYSR	1250
Franklinton, La.	WFCG	1110
Frederick, Md.	WFMD	930
Frederick, Okla.	KTAT	1570
Fredericksburg, Tex.	KNAF	910
Fredericksburg, Va.	WFVA	1230
	WFLS	1350
Fredericktown, Mo.	KFTW	1450
Fredonia, N.Y.	WBUZ	1570
Freeport, Ill.	WFRL	1570
Freeport, N.Y.	WGBB	1240
Freeport, Tex.	KBRZ	1460
Fremont, Mich.	WBFC	1490
	WSHN	1550
Fremont, Nebr.	KHUB	1340
Fremont, Ohio	WFRO	900
Fresno, Calif.	KARM	1430
	KBIF	900
	KIRV	1510
	KEAP	980
	KXEX	1550
	KFRE	940
	KGST	1600
	KMAK	1340
	KMJ	580
	KYNO	1300
Friona, Tex.	KNNN	1070
Front Royal, Va.	WFTR	1450
Frostburg, Md.	WFRB	560
Fulton, Ky.	WFUL	1270
Fulton, Miss.	WFTO	1330
Fulton, Mo.	KFAL	900
Fulton, N.Y.	WOSC	1300
Fuquay Sprgs., N.C.	WAKS	1460
Gadsden, Ala.	WGAD	1350
	WETO	930
	WAAX	570
	WEAC	1500
Gaffney, S.C.	WFGN	1570
Gainesville, Fla.	WDVH	980
	WGGG	1230
	WRUF	850
	WUWU	1390
Gainesville, Ga.	WGGA	550
	WDUN	1240
	WNRJ	1580
Gainesville, Tex.	KGAF	1580
Gaithersburg, Md.	WHMC	1150
Galax, Va.	WBOB	1360
Galesburg, Ill.	WGIL	1400
	WAIK	1590
Gallatin, Tenn.	WHIN	1010
	WAMG	1130
Gallipolis, Ohio	WJEH	990
Gallup, N. Mex.	KGAK	1330
	KYVA	1230
Galveston, Tex.	KILE	1400
	KGBC	1540
Gander, Nfld.	CBG	1450
Garden City, Kan.	KUIL	1240
	KUPK	1050
Garden City, Mich.	WTAK	1090
Gardner, Mass.	WGAW	1340
Gary, Ind.	WWCA	1270
	WLTH	1370
Gastonia, N.C.	WGNC	1450
	WLTC	1370
Gate City, Va.	WGAT	1050
Gaylord, Mich.	WATC	900
Geneseo, Ill.	WGEN	1500
Geneva, Ala.	WGEA	1150
Geneva, Ill.	WGSB	1480

Location	C.L.	kHz
Geneva, N.Y.	WGVA	1240
Georgetown, Del.	WJWL	900
Georgetown, Ky.	WAXU	1580
Georgetown, S.C.	WGTN	1400
	WINH	1470
Georgetown, Tex.	KGTN	1530
Gettysburg, Pa.	WGET	1320
Gillette, Wyo.	KIML	1270
Gilroy, Cal.	KAZA	1290
Gladewater, Tex.	KEES	1430
Glasgow, Ky.	WKAY	1490
	WCDS	1440
Glasgow, Mont.	KLTZ	1240
Glen Burnie, Md.	WISZ	1590
Glendale, Ariz.	KRUX	1360
Glendale, Calif.	KIEV	870
Glendive, Mont.	KXGN	1400
	KGLE	590
Glennallen, Alaska	KCAM	790
Glens Falls, N.Y.	WBZA	1410
	WWSC	1450
Glenville, Ga.	WKIG	1580
Glenwood Sprgs., Colo.	KGLN	980
Globe, Ariz.	KZOW	1240
Gloucester, Va.	WDDY	1420
Gloversville-Johnston, N.Y.	WENT	1340
Gold Beach, Oreg.	KBLY	1220
Golden, Colo.	KICM	1250
Golden Meadow, La.	KLEB	1600
Golden Valley, Minn.	KQRS	1440
	KUXL	1570
Goldsboro, N.C.	WFMC	730
	WGBR	1150
	WGOL	1300
Gonzales, Tex.	KCTI	1450
Goodland, Kans.	KLOE	730
Gordon, Ga.	WCIK	1560
Goshen, Ind.	WKAM	1460
Gouverneur, N.Y.	WIGS	1230
Grafton, N.D.	KGPC	1340
Grafton, W.Va.	WVVW	1260
Graham, N.C.	WSML	1190
Graham, Tex.	KSWA	1330
Grand Coulee, Wash.	KFDR	1360
Grand Forks, N.D.	KFJM	1370
	KILO	1440
	KNOX	1310
Grand Haven, Mich.	WGHN	1370
Grand Island, Nebr.	KMMJ	750
	KRGI	1430
Grand Junction, Colo.	KREX	920
	KEXO	1230
	KSTR	620
	KWSL	1340
Grand Prairie, Tex.	KPCW	730
Grand Rapids, Mich.	WJEF	1230
	WFUR	1570
	WGRD	1410
	WLAV	1340
	WMAX	1480
	WOOD	1300
Grand Rapids, Minn.	KOZY	1490
Grangeville, Idaho	KORT	1230
Granite City, Ill.	WGNU	920
Granite Falls, N. C.	WKJK	900
Grants, N.Mex.	KMIN	980
Grants Pass, Oreg.	KAGI	930
	KAJO	1270
Grayson, Ky.	WGOH	1370
Gt. Barrington, Mass.	WSBS	860
Gt. Bend, Kans.	KVGB	1590
Gt. Falls, Mont.	KFBB	1310
	KUDI	1450
	KMON	560
	KARR	1400
Greeley, Colo.	KFKA	1310
	KYOU	1450
Green Bay, Wis.	WBAY	1360
	WDUZ	1400
	WNFL	1440
Greeneville, Tenn.	WGRV	1340
	WSMG	1450
Greenfield, Mass.	WHAI	1240
Greensboro, N.C.	WBIG	1470
	WCOG	1320
	WEAL	1510
	WKTB	1550
	WGBG	1400
	WPET	950
Greensburg, Ind.	WTRE	1330
Greensburg, Pa.	WHJB	620
Greenville, Ala.	WGYV	1380
Greenville, Ky.	WKYF	1600
Greenville, Mich.	WPLB	1380
Greenville, Miss.	WJPR	1330
	WDDT	900
	WGVM	1260
Greenville, Pa.	WGRP	940
Greenville, N.C.	WNCT	1070
	WOOW	1340
	WPXY	1550

Location	C.L.	kHz
Greenville, S.C.	WESC	660
	WFBC	1330
	WHYZ	1070
	WMRB	1490
	WMUU	1260
	WQOK	1440
Greenville, Tex.	KGVL	1400
Greenwich, Conn.	WGCH	1490
Greenwood, Miss.	WABG	960
	WGRM	1240
	WLEF	1540
Greenwood, S.C.	WCRS	1450
	WGSW	1350
Greer, S.C.	WEAB	800
	WCKI	1300
Grenada, Miss.	WNAG	1400
Gresham, Oreg.	KRDR	1230
Gretna, Va.	WMNA	730
Griffin, Ga.	WKEU	1450
	WHIE	1320
	WGRI	1410
Grinnell, Iowa	KGRN	1410
Groton, Conn.	WSUB	980
Grove City, Pa.	WSAJ	1340
Grundy, Va.	WNRG	940
Guayama, P.R.	WXRF	1590
Gulfport, Miss.	WROA	1390
	WGCM	1240
Gunnison, Colo.	KGUC	1490
Guntersville, Ala.	WGSV	1270
Guthrie, Okla.	KWRW	1490
Guymon, Okla.	KGYN	1220
Hagerstown, Md.	WARK	1490
	WJEJ	1240
Haines City, Fla.	WHAN	930
Haleyville, Ala.	WJBB	1230
Halfway, Md.	WHAG	1410
Hamden, Conn.	WCDQ	1220
Hamilton, Ala.	WERH	970
Hamilton, Mont.	KYLQ	980
Hamilton, Ohio	WMOH	1450
Hamilton, Tex.	KCLW	900
Hamlet, N.C.	WKDX	1250
Hammond, Ind.	WJOB	1230
Hammond, La.	WFPR	1400
Hammonton, N.J.	WNJH	1580
Hampton, S.C.	WBHC	1270
Hampton, Va.	WVEC	1490
Hancock, Mich.	WMPL	920
Hanford, Calif.	KNGS	620
Hannibal, Mo.	KHMO	1070
Hanover, N.H.	WTSL	1400
	WDCR	1340
Hanover, Pa.	WHVR	1280
Hardin, Mont.	KHDN	1230
Harlan, Ky.	WHLN	1410
Harlingen, Tex.	KGBT	1530
Harriman, Tenn.	WHBT	1600
Harrisburg, Ill.	WEBQ	1240
Harrisburg, Pa.	WFEC	1400
	WCMB	1460
	WHP	580
	WKBO	1230
Harrison, Ark.	KHOZ	900
Harrisonburg, Va.	WHBG	1360
	WKCY	1300
	WSVA	550
Harrodsburg, Ky.	WHBN	1420
Hartford, Conn.	WDRC	1360
	WCCC	1290
	WPOP	1410
Hartford, Wis.	WTIC	1080
	WTKM	1540
Hartselle, Ala.	WHRT	860
Hartsville, S.C.	WHSC	1450
Hartsville, Tenn.	WJKM	1090
Hartwell, Ga.	WKLY	980
Harvard, Ill.	WMCW	1600
Harvey, Ill.	WBEE	1570
Hastings, Mich.	WBCH	1220
Hastings, Minn.	KDWA	1460
Hastings, Nebr.	KHAS	1230
	KICS	1550
Hattiesburg, Miss.	WBKH	950
	WFDR	1400
	WHSY	1230
	WXXX	1310
Havelock, N.C.	WUSM	1330
Haverhill, Mass.	WHAV	1490
Havre, Mont.	KOJM	610
Havre de Grace, Md.	WASA	1330
Hawkinsville, Ga.	WCEH	610
Haynesville, La.	KLUV	1580
Hays, Kans.	KAYS	1400
Hayward, Wis.	WHSM	910
Hazard, Ky.	WKIC	1390
Hazelhurst, Ga.	WVOH	920
Hazlehurst, Miss.	WMOC	1220
Hazleton, Pa.	WAZL	1490
Heber Springs, Ark.	KAWW	1370
Helena, Ark.	KFFA	1360
Helena, Mont.	KCAP	1340
	KBLL	1240
Hemet, Calif.	KHSJ	1320
Hemingway, S.C.	WKYB	1000
Hempstead, N.Y.	WHLI	1100
Henderson, Ky.	WSON	860
Henderson, Nev.	KBMI	1400
	KTOO	1280
Henderson, N.C.	WHNC	890
	WIZS	1450

WHITE'S RADIO LOG

Location	C.L.	kHz
Henderson, Tenn.	WHHM	1580
Henderson, Tex.	KGRI	1000
	KWRD	1470
Hendersonville, N.C.	WHKP	1450
	WHVL	1600
Henryetta, Okla.	KHEN	1590
Hereford, Tex.	KPAN	860
Herkimer, N.Y.	WALY	1420
Hermiston, Oreg.	KOHU	1570
Herendon, Va.	WHRN	1440
Herrin, Ill.	WJPF	1340
Hettinger, N.Dak.	KNDC	1490
Hibbing, Minn.	WMFG	1240
Hickory, N.C.	WHKY	1290
	WIRC	650
	WSPF	1000
Highland, Ill.	WINU	1510
Highland Park, Ill.	WEEF	1430
Highland Park, Tex.	KVIL	1150
Highland Springs, Va.	WENZ	1450
High Point, N.C.	WMFR	1230
	WNDS	1590
	WHPE	1070
Hillsboro, Ohio	WSRW	1590
Hillsboro, Oreg.	KUIK	1360
Hillsboro, Tex.	KHBR	1560
Hillsdale, Mich.	WCSR	1340
Hillsville, Va.	WHHV	1400
Hilo, Hawaii	KPUA	970
	KIPA	1110
	KIMD	850
Hinesville, Ga.	KGML	990
Hinton, W. Va.	WMTD	1380
Hobbs, N.Mex.	KWEW	1480
	KHOB	1390
Holbrook, Ariz.	KDJI	1270
Holdenville, Okla.	KVYL	1370
Holdredge, Nebr.	KUVR	1380
Holland, Mich.	WHTC	1450
	WJBL	1260
Hollister, Cal.	KMPG	1520
Hollywood, Fla.	WGMA	1320
Holly Springs, Miss.	WKRA	1110
Holyoke, Mass.	WREB	930
Homestead, Fla.	WIII	1430
Homewood, Ala.	WILO	1400
Hondo, Tex.	KRME	1460
Honolulu, Hawaii	KAIM	870
Honolulu, Hawaii	KCCN	1420
	KGMB	590
	KZOO	1210
	KHAI	1090
	KPOI	1380
	KIKI	830
	KGU	760
	KHVH	1040
	KKUA	690
	KNDI	1270
	KOHO	1170
	KDRL	650
	KTRG	990
	KUMU	1500
Hood River, Oreg.	KIHR	1340
Hope, Ark.	KXAR	1490
Hopewell, Va.	WHAP	1340
Hopkinsville, Ky.	WHOP	1230
	WKOA	1480
Hoquiam, Wash.	KGHO	1560
Hornell, N.Y.	WWHG	1320
	WLEA	1480
Horseheads, N.Y.	WIQT	1000
Hot Springs, Ark.	KBHS	590
	KXOW	1420
	KZNG	1340
Hot Springs, S.Dak.	KOBH	580
Houghton, Mich.	WHDF	1400
Houghton Lake, Mich.	WHGR	1290
Houlton, Maine	WHOU	1340
Houma, La.	KJIN	1490
Houston, Miss.	WCPC	940
Houston, Mo.	KBTC	1250
Houston, Tex.	KCOH	1430
	KENR	1070
	KILT	610
	KNUZ	1230
	KODA	1010
	KPRC	950
	KTHT	790
	KTRH	740
	KXYZ	1320
	KYDK	1590
Howell, Mich.	WHMI	1350
Hudson, N.Y.	WHUC	1230
Hugo, Okla.	KIHN	1340
Humacao, P.R.	WALD	1240
Humboldt, Tenn.	WIRJ	740
Huntingdon, Pa.	WHUN	1150
Huntington, Ind.	WHLT	1300
Huntington, N.Y.	WGSM	740
Huntington, W.Va.	WKEE	800
	WSAZ	930
	WWHY	1470
Huntsville, Ala.	WBHP	1230
	WEUP	1600
	WFIX	1450
	WAAY	1550
Huntsville, Tex.	KSAM	1490
Huron, S.Dak.	KIJV	1340
Hutchinson, Kans.	KWBW	1450
	KWHK	1260
Hutchinson, Minn.	KDUZ	1260
Hyde Park, N.Y.	WHVW	950
Idabel, Okla.	KBEL	1240
Idaho Falls, Idaho	KID	590
	KTEE	1260
Immokalee, Fla.	WCOF	1490
Independence, Ia.	KUPI	980
	KOUR	1220
Independence, Kans.	KIND	1010
Independence, Mo.	KCCX	1510
Indiana, Pa.	WDAD	1450
Indianapolis, Ind.	WATI	810
	WBRI	1500
	WFBM	1260
	WGEE	1590
	WIBC	1070
	WIFE	1310
	WIRE	1430
	WXLW	950
Indianola, Iowa	KBAB	1490
Indianola, Miss.	WNLA	1380
Indian Rocks Beach, Fla.	WGNP	1520
Indio, Calif.	KREO	1400
Inglewood, Calif.	KTYM	1460
Inkster, Mich.	WCHB	1440
International Falls, Minn.	KGHS	1230
Inverness, Fla.	WYSE	1560
Iola, Kansas	KALN	1370
Ionia, Mich.	WION	1430
Iowa City, Iowa	KXIC	800
	WSUI	910
Iowa Falls, Ia.	KIFG	1510
Iron Mtn., Mich.	WMIQ	1450
Iron River, Mich.	WIKB	1230
Ironton, Ohio	WIRO	1230
Ironwood, Mich.	WJMS	630
Irvine, Ky.	WIRV	1550
Isabella, P.R.	WISA	1390
Ishpeming, Mich.	WJPD	1240
	WCKD	970
Islip, N.Y.	WLIX	540
Ithaca, N.Y.	WHCU	870
	WTKO	1470
Iuka, Miss.	WVOM	1270
Jackson, Ala.	WHOD	1290
Jackson, Ga.	WJGA	1540
Jackson, Mich.	WIBM	1450
	WKHM	970
	WJCO	1510
Jackson, Miss.	WJOX	620
	WJQS	1400
	WJXN	1450
	WOKJ	1550
	WWUN	1590
	WRBC	1300
	WSLI	930
Jackson, Ohio	WLMJ	1280
Jackson, Tenn.	WOXI	1310
	WJAK	1460
	WTJS	1390
Jackson, Wis.	WYLO	540
Jackson, Wyo.	KSGT	1340
Jacksonville, Ark.	KGMR	1500
Jacksonville, Fla.	WJAX	930
	WAPE	690
	WBOM	970
	WZOK	1320
	WIVY	1050
	WMBR	1460
	WOBS	1360
	WPDQ	600
	WQIK	1090
	WRHC	1400
Jacksonville, Ill.	WJIL	1550
	WLDS	1180
Jacksonville, Miss.	WJQS	1400
Jacksonville, N.C.	WJNC	1240
	WLAS	910
Jacksonville, Tex.	KEBE	1400
Jacksonville Beh., Fla.	WBIX	1010
Jamestown, Ky.	WJKY	1060
Jamestown, N.Dak.	KEYJ	1400
	KSJB	600
Jamestown, N.Y.	WJTN	1240
	WKSN	1340
Jamestown, Tenn.	WCLC	1260
Janesville, Wis.	WCLO	1230
Jasper, Ala.	WWWB	1360
	WARF	1240
Jasper, Ind.	WITZ	990
Jasper, Tex.	KTXJ	1350
Jefferson City, Mo.	KLIK	950
	KWOS	1240
Jefferson City, Tenn.	WJFC	1480
Jeffersonville, Ind.	WXVW	1450
Jena, La.	KCKW	1480
Jennings, La.	KJEF	1290
Jerome, Idaho	KART	1400
Jerseyville, Ill.	WJBM	1480
Jesup, Ga.	WLOP	1370
John Day, Ore.	KJDY	1400
Johnson City, Tenn.	WJCW	910
	WETB	790
Johnston, S.C.	WJES	1570
Johnstown, N.Y.	WIZR	930
Johnstown, Pa.	WJAC	850
	WARD	1490
	WCRO	1230
Joliet, Ill.	WJOL	1340
	WJRC	1510
Jollette, Que.	CJLM	1350
Jonesboro, Ark.	KBTM	1230
	KNEA	970
Jonesboro, La.	KTOC	920
Jonesboro, Tenn.	WJSO	1590
Jonesville, La.	KANV	1480
Joplin, Mo.	WMBH	1450
	KQYX	1560
	KFSB	1310
	KODE	1230
Joshua Tree, Cal.	KJST	1420
Junction, Tex.	KMBL	1450
June. City, Kans.	KJCK	1420
Juneau, Alaska	KINY	800
	KJNO	630
Jupiter, Fla.	WJTS	1000
Kailua, Hawaii	KLEI	1130
Kalamazoo, Mich.	WKPR	1420
	WKZD	590
	WKLZ	1470
	WKMI	1360
Kalispell, Mont.	KGEZ	600
	KOFI	1180
Kane, Pa.	WKZA	960
Kankakee, Ill.	WKAN	1320
Kannapolis, N.C.	WGTL	870
	WRKB	1460
Kans. City, Kans.	KCKN	1340
Kansas City, Mo.	KCMO	810
	KMBZ	980
	KPRS	1590
	WDAF	610
	WHB	710
Kaukauna, Wis.	WKAU	1050
Kenedy-Karnes City, Texas	KAML	990
Kealakekua, Hawaii	KONA	790
Kearney, Nebr.	KGFW	1340
	KRNY	1460
Keene, N.H.	WKNE	1290
	WKBK	1220
Kelso, Wash.	KLOG	1490
Kemmerer, Wyo.	KMER	950
Kendallville, Ind.	WAWK	1140
Kenedy, Tex.	KAML	990
Kennett, Mo.	KBOA	830
	KBXN	1540
Kennewick, Wash.	KSMK	1340
Kennewick-Pasco-Richland, Wash.	KEPR	610
Kenosha, Wis.	WLIP	1050
Kent, O.	WKNT	1520
Keokuk, Iowa	KOKX	1310
Kermit, Tex.	KERB	600
Kerrville, Tex.	KERV	1230
Kershaw, S.C.	WKSC	1300
Ketchikan, Alaska	KTKN	930
Kewanee, Ill.	WKEI	1450
Keyser, W.Va.	WKLP	1390
Key West, Fla.	WKWF	1600
	WKIZ	1500
Kilgore, Tex.	KOCA	1240
Killeen, Tex.	KLEN	1050
Kimball, Nebr.	KIMB	1260
King, N. C.	WKTE	1090
King City, Calif.	KRKC	1490
Kingman, Ariz.	KAAA	1230
Kings Mountain, N.C.	WKMT	1220
Kingsport, Tenn.	WKPT	1550
	WGOC	1090
Kingston, N.Y.	WBAZ	1550
	WGHQ	920
	WKNY	1490
Kingstree, S.C.	WDKD	1310
	WKSP	1090
Kingsville, Tex.	KINE	1330
Kingwood, W.Va.	WFSP	1560
Kinston, N.C.	WELS	1010
	WFTC	960
	WISP	1230
Kirkland, Wash.	KYAC	1460
	KBLE	1050
Kirksville, Mo.	KIRX	1450
Kissimmee, Fla.	WFIV	1080
	WJPB	1220
Kittanning, Pa.	WACB	1380
Klamath Falls, Oreg.	KAGO	1150
	KFLW	1450
	KLAD	960
Knoxville, Iowa	KNIA	1320
Knoxville, Tenn.	WBIR	1240
	WIVK	850
	WATE	620
	WKKV	900
	WNOX	990
	WROL	1490
Kokomo, Ind.	WIOU	1350
Kosciusko, Miss.	WKOZ	1350
Laconia, N.H.	WLNH	1350
	WEMJ	1490
LaCrosse, Wis.	WKBH	1410
	WLCX	1490
	WKTY	580
Ladysmith, Wis.	WLDY	1340
Lafayette, Ga.	WLFA	1590
Lafayette, Ind.	WASK	1450
	WAZY	1410
	WBAA	920
Lafayette, La.	KPEL	1420
	KVOL	1330
	KXKW	1520
Lafayette, Tenn.	WEEN	1460
LaFollette, Tenn.	WLAF	1450
LaGrande, Oreg.	KLBM	1450
LaGrange, Ga.	WLAG	1240
	WTRP	620
LaGrange, Ill.	WTAQ	1300
LaGrange, Tex.	KVLG	1570
LaJunta, Colo.	KBZZ	1400
Lake Charles, La.	KLOU	1580
	KPLC	1470
	KAOK	1400
Lake City, Fla.	WDSR	1340
	WGRD	960
Lake City, S.C.	WJOT	1260
Lake Geneva, Wis.	WMIR	1550
Lakeland, Fla.	WLAK	1430
	WDNN	1290
	WWAB	1350
Lake Placid, N.Y.	WIRD	920
Lakeport, Cal.	KBLC	1270
Lake Providence, La.	KLPL	1050
Lake Tahoe, Calif.	KOWL	1490
Lakeview, Oreg.	KQIK	1230
Lake Wales, Fla.	WIPC	1280
Lakewood, Colo.	KLAK	1600
Lakewood Center, Wash.	KOOD	1480
Lake Worth, Fla.	WLIZ	1380
Lamar, Colo.	KLMR	920
Lamesa, Tex.	KPET	690
Lampasas, Tex.	KCYL	1450
Lancaster, Calif.	KAVL	610
	KBVM	1380
Lancaster, Ky.	WIXI	1280
Lancaster, N.Y.	WMMJ	1300
Lancaster, Ohio	WHOK	1320
Lancaster, Pa.	WGAL	1490
	WLAN	1390
Lancaster, S.C.	WLCM	1360
	WAGL	1560
Lander, Wyo.	KOVE	1330
Lanett, Ala.	WRLD	1490
Langdon, N.D.	KNOK	1080
Lansdale, Pa.	WNPV	1440
Lansford, Pa.	WLSH	1410
Lansing, Mich.	WILS	1320
	WJIM	1240
	WITL	1010
Lapeer, Mich.	WMPC	1250
	WTHM	1530
LaPlata, Md.	WSMD	1560
LaPorte, Ind.	WLOI	1540
Laramie, Wyo.	KLME	1490
	KOWB	1290
Laredo, Tex.	KGNS	1300
	KVOZ	1490
Larned, Kans.	KANS	1510
LaSalle, Ill.	WLPD	1220
LasCruces, N.Mex.	KOBE	1450
	KGRT	570
Las Vegas, Nev.	KENO	1460
	KLAV	1230
	KORK	1340
	KRAM	920
	KLUC	1050
	KVEG	970
Las Vegas, N.Mex.	KFUN	1230
Latrobe, Pa.	WPKV	1570
	WQTW	1570
	WTRA	1480
Laurel, Md.	WLMO	900
Laurel, Miss.	WAML	1340
	WLAU	1600
	WNSL	1260
Laurens, S.C.	WLBG	860
Laurinburg, N.C.	WEWO	1080
	WLNC	1300
Lawrence, Kans.	KFKU	1250
	KLWN	1320
Lawrence, Mass.	WCCM	800
Lawrenceburg, Tenn.	WDXE	1370
Lawrenceville, Ga.	WLAW	1360
Lawrenceville, Ill.	WAKO	910
Lawrenceville, Va.	WLES	580
Lawton, Okla.	KSWO	1380
	KCCO	1050
Leadville, Colo.	KBRR	1230
Leaksville, N.C.	WLOE	1490
Leavenworth, Kans.	KCLO	1410

Location	C.L.	kHz
Lebanon, Ky.	WLBN	1590
Lebanon, Mo.	KLWT	1230
Lebanon, Oreg.	KGAL	920
Lebanon, Pa.	WLBR	1270
Lebanon, Tenn.	WCOR	900
Leesburg, Fla.	WLBE	790
	WZST	1410
Leesburg, Va.	WAGE	1290
Leesville, La.	KLLA	1570
Lehigh Acres, Fla.	WLEH	1440
Lehighton, Pa.	WYNS	1150
Leitchfield, Ky.	WMTL	1580
Leland, Miss.	WESY	1580
LeMars, Iowa	KLEM	1410
Lemmon, S.D.	KBJM	1400
Lemoore, Calif.	KLAN	1320
	KOAD	1240
Lenoir, N.C.	WJRI	1340
Lenoir, Tenn.	WLIL	730
Lenoir City, Tenn.	WBLC	1360
Leominster, Mass.	WLMS	1000
Leonardtown, Md.	WKIK	1370
Levelland, Tex.	KLVT	1230
Levittown, Pa.	WBCB	1490
Lewisburg, Pa.	WUNS	1010
Lewisburg, Tenn.	WJJM	1490
Lewiston, Idaho	KRLC	1350
	KOZE	1300
Lewiston, Maine	WCOU	1240
	WLAM	1470
Lewistown, Mont.	KXLO	1230
Lewistown, Pa.	WKVA	920
	WMRF	1490
Lexington, Ky.	WLAP	630
	WBLG	1300
	WVLK	590
Lexington, Miss.	WXTN	1000
Lexington, Mo.	KLEX	1570
Lexington, Neb.	KRVN	880
Lexington, N.C.	WBUY	1440
Lexington, Tenn.	WDXL	1490
Lexington, Va.	WREL	1450
Lexington Pk., Md.	WPTX	920
Libby, Mont.	KLCB	1230
Liberal, Kans.	KSCB	1270
	KLIB	1470
Liberty, Ky.	WPHN	1560
Liberty, Mo.	KBIL	1140
Liberty, N.Y.	WVOS	1240
Liberty, Tex.	KPXE	1050
Lihue, Hawaii	KTOH	1350
Lima, Ohio	WIMA	1150
	WCIT	940
Lincoln, Ill.	WPRC	1370
Lincoln, Me.	WLKN	1450
Lincoln, Nebr.	KFOR	1240
	KLIN	1400
	KLMS	1480
	KLOL	1530
Lincolnton, N.C.	WLON	1050
Lineville, Ala.	WANL	1540
Linton, Ind.	WBTO	1600
Litchfield, Ill.	WSMI	1540
Litchfield, Minn.	KLFD	1410
Little Falls, Minn.	KLTF	960
Little Falls, N.Y.	WLFH	1230
Littlefield, Tex.	KZZN	1490
Little Rock, Ark.	KARK	920
	KALO	1250
	KLRA	1010
	KOKY	1440
	KAAY	1090
	KVLC	1050
Littleton, Colo.	KOKO	1510
Littleton, N. H.	WLTN	1400
Live Oak, Fla.	WNER	1250
Livingston, Mont.	KPRK	1340
Livingston, Tenn.	WLIV	920
Livingston, Tex.	KETX	1440
Lockhart, Tex.	KHRB	1060
Lock Haven, Pa.	WBPZ	1230
Lockport, N.Y.	WUSJ	1340
Lodi, Calif.	KCVR	1570
Logan, Utah	KBLW	1390
	KSTU	1300
	KVNU	610
Logan, W.Va.	WLOG	1230
	WVOW	1290
Logansport, Ind.	WSAL	1230
Lompoc, Calif.	KKOK	1410
	KLOM	1330
	KNEZ	960
London, Ky.	WFTG	1400
Long Beach, Calif.	KFOX	1280
	KGER	1390
Longmont, Colo.	KLMO	1060
Long Prairie, Minn.	KEYL	1400
Longview, Tex.	KFRO	1370
	KLUE	1280
Longview, Wash.	KEDO	1400
	KBAM	1270
Lookout Mtn., Tenn.	WFLI	1070
Loretto, Pa.	WWSF	1400
Loris, S.C.	WLSC	1570
Los Alamos, N.Mex.	KRSN	1490
Los Angeles, Calif.	KABC	790
	KFI	640
	KHJ	930
	KFWB	980
	KGFJ	1230
	KFAC	1330
	KLAC	570
	KMPC	710
	KNX	1070
	KPOL	1540
	KGBS	1020
	KRKD	1150
Los Banos, Calif.	KLBS	1330
Louisburg, N.C.	WYRN	1480
Louisville, Ga.	WPEH	1420
Louisville, Ky.	WAVE	970
	WAKY	790
	WHAS	840
	WKLO	1080
	WINN	1240
	WFIA	900
	WLOU	1350
	WTMT	620
Louisville, Miss.	WLSM	1270
Loveland, Colo.	KLOV	1570
Loves Park, Ill.	WLUV	1520
Lovington, N.Mex.	KLEA	630
Lowell, Mass.	WCAP	980
	WLLH	1400
Lubbock, Tex.	KCBD	1590
	KDAV	580
	KLBK	1340
	KLFB	1420
	KFYO	790
	KLLL	1460
	KSEL	950
Lucedale, Miss.	WHHT	1440
Ludington, Mich.	WKLA	1450
Lufkin, Tex.	KRBA	1340
	KTRE	1420
Lumberton, N.C.	WAGR	580
	WTSB	1340
Luray, Va.	WRAA	1330
Lynchburg, Va.	WLVA	590
	WLLL	930
	WOMS	1320
	WWOD	1390
	WBRG	1050
Lynn, Mass.	WLYN	1360
Lyons, Ga.	WBBT	1340
Macomb, Ill.	WKAI	1510
Macon, Ga.	WBML	1240
	WCRY	900
	WDEN	1500
	WIBB	1280
	WMAZ	940
	WNEX	1400
Macon, Mo.	KLTI	1560
Madawaska, Me.	WSJR	1230
Madera, Calif.	KHOT	1250
Madill, Okla.	KMAD	1550
Madison, Fla.	WMAF	1230
Madison, Ga.	WYTH	1250
Madison, Ind.	WORX	1270
Madison, S.D.	KJAM	1390
Madison, Tenn.	WENO	1430
Madison, Wis.	WHA	750
	WIBA	1310
	WISM	1480
	WKOW	1070
	WMAD	1550
Madisonville, Ky.	WFMW	730
	WTTL	1310
Madisonville, Tenn.	WKYZ	1250
Magee, Miss.	WSJC	810
Magnolia, Ark.	KVMA	630
Makawao, Hawaii	KNUI	1310
Malden, Mo.	KTCB	1470
Malone, N.Y.	WICY	1490
Malvern, Ark.	KBOK	1310
Manassas, Va.	WPRW	1460
Manati, P.R.	WMNT	1500
Manchester, Ga.	WINF	1230
Manchester, Ga.	WFOR	1370
Manchester, Ky.	WWXL	1450
Manchester, N.H.	WFEA	1370
	WGIR	610
	WKBR	1250
Manchester, Tenn.	WMSR	1320
Manhattan, Kans.	KSAC	580
	KMAN	1350
Manistee, Mich.	WMTE	1340
Manistique, Mich.	WTIQ	1490
Manitou Springs, Colo.	KCMS	1490
Manitowoc, Wis.	WCUB	980
	WOMT	1240
Mankato, Minn.	KYSM	1230
	KTOE	1420
Manning, S.C.	WYMB	1410
Mansfield, La.	KOKI	1360
Mansfield, Ohio	WCLW	1570
Maplewood, Minn.	WJSW	1010
Maquoketa, Iowa	KMAQ	1320
Marathon, Fla.	WFFG	1300
Marianna, Ark.	KZOT	1460
Marianna, Fla.	WTYS	1340
	WTOT	980
Marietta, Ga.	WFOM	1230
	WBIE	1080
Marietta, Ohio	WMOA	1490
	WBRJ	910
Marine City, Mich.	WSMA	1590
	WMAM	570
Marion, Ala.	WJAM	1310
Marion, Ill.	WGGH	1150
Marion, Ind.	WBAT	1400
	WMRI	860
Marion, N.C.	WBRM	1250
Marion, Ohio	WMRN	1490
Marion, S.C.	WATP	1430
Marion, Va.	WMEV	1010
	WOLD	133
Marked Tree, Ark.	KPCA	1580
Marksville, La.	KAPB	1370
Marlborough, Mass.	WSRO	1470
Marquette, Mich.	WDMJ	1320
Marshall, Mich.	WMRR	1540
Marshall, Minn.	KMHL	1400
Marshall, Mo.	KMMO	1300
Marshall, N.C.	WMMH	1460
Marshall, Tex.	KMHT	1450
	KDOX	1410
Marshalltown, Iowa	KFJB	1230
Marshfield, Wis.	WDLB	1450
Martin, Tenn.	WCMT	1410
Martinsville, Ind.	WCBK	1540
Martinsburg, Pa.	WJSM	1110
Martinsburg, W.Va.	WEPM	1340
Martinsville, Va	WHEE	1370
	WMVA	1450
Maryville, Mo.	KNIM	1580
Marysville, Calif.	KMYC	1410
Marysville, Kans	KNDY	1570
Maryville, Tenn.	WGAP	1400
Mason, Mich.	WUNN	1110
Mason City, Iowa	KGLO	1300
	KRIB	1490
	KSMN	1010
Massena, N.Y.	WMSA	1340
	WYBG	1050
Massillon, Ohio	WTIG	990
Matawan, W.Va.	WHJC	1360
Mattoon, Ill.	WLBH	1170
Mauston, Wis.	WRJC	1270
Mayaguez, P.R.	WAEL	600
	WKJB	710
	WORA	760
	WPRA	990
	WTIL	1300
Mayfield, Ky.	WNGO	1320
Mayodan, N.C.	WMYN	1420
Mayville, N.D.	KMAV	1520
Maysville, Ky.	WFTM	1240
McAlester, Okla.	KTMC	1400
	KNED	1150
McAllen, Tex.	KRIO	910
McCall, Ida.	KMCL	1240
McCamey, Tex.	KAMY	1450
McComb, Miss.	WHNY	1250
	WAPF	980
McCook, Nebr.	KBRL	1300
	KICX	1360
McGehee, Ark.	KVSA	1220
McKeesport, Pa.	WEDO	810
	WMCK	1360
McKenzie, Tenn.	WHDM	1440
McKinney, Tex.	KYAL	1600
McLeansboro, Ill.	WMCL	1060
McMinnville, Oreg.	KMCM	1260
McMinnville, Tenn.	WBMC	960
	WAKI	1230
McPherson, Kans.	KNEX	1540
McRae, Ga.	WDAX	1410
Meadville, Pa.	WMGW	1490
Medford, Mass.	WHIL	1430
Medford, Oreg.	KMED	1440
	KSHA	860
	KDOV	1300
	KBOY	730
	KYJC	1230
Medford, Wis.	WIGM	1490
Media, Pa.	WXUR	690
Melbourne, Fla.	WMMB	1240
Memphis, Tenn.	WHBQ	560
	KBGH	1130
	WHER	1430
	WMC	790
	WDIA	1070
	WMPS	680
	WLOK	1340
	WMQM	1480
	WREC	600
	KWAM	990
Memphis, Tex.	KBGH	1130
Mena, Ark.	KENA	1450
Mendota, Ill.	WGLC	1090
Mendocino, Cal.	KMFB	1520
Menominee, Mich.	WAGN	1340
Menomonie, Wis.	WMNE	1360
Merced, Calif.	KYOS	1480
	KWIP	1580
Meriden, Conn.	WMMW	1470
Meridian, Miss.	WCOC	910
	WDAL	1330
	WMOX	1010
	WOKK	1450
	WQIC	1390
Merkle, Tex.	KWFA	1500
Merrill, Wis.	WXMT	730
Mesa, Ariz.	KBUZ	1310
	KALF	1510
Metropolis, Ill.	WMOK	920
Metter, Ga.	WMAC	1360
Mexia, Tex.	KBUS	1590
Mexico, Mo.	KXEO	1340
Mexico, Pa.	WJUN	1220
Miami, Ariz.	KIKO	1340
Miami, Fla.	WGBS	710
	WIOD	610
	WFAB	990
	WAME	1260
	WMIE	1140
	WOAH	1220
	WQAM	560
	WOCN	1450
	WINZ	940
Miami, Okla.	KGLC	910
Miami Beach, Fla.	WMBM	1490
	WKAT	1360
Michigan City, Ind.	WIMS	1420
Middlebury, Vt.	WFAD	1490
Middleport-Pomeroy, Ohio	WMPO	1390
Middlesboro, Ky.	WMIK	560
Middletown, Conn.	WCNX	1150
Middletown, N.Y.	WALL	1340
Middletown, Ohio	WPFB	910
Midland, Mich.	WMDN	1490
Midland, Tex.	KCRS	550
	KJBC	1150
	KWEL	1440
	KABH	1510
Milan, Tenn.	WKBJ	1600
Miles City, Mont.	KATL	1340
Milford, Conn.	WFIF	1500
Milford, Del.	WTHD	930
Milford, Mass.	WMRC	1490
Milledgeville, Ga.	WMVG	1450
Millen, Ga.	WGSR	1570
Millington, Tenn.	WGMM	1380
Millinocket, Me.	WMKR	1240
Millville, N.J.	WMVB	1440
Milton, Fla.	WEBY	1330
	WSRA	1490
Milton, Pa.	WMLP	1380
	WARC	1380
Milwaukee, Wis.	WEMP	1250
	WFOX	860
	WRIT	1340
	WISN	1150
	WMIL	1290
	WOKY	920
	WTMJ	620
Minden, La.	KASO	1240
Mineola, N.Y.	WTHE	1520
Mineola, Tex.	KMOO	1510
Mineral Wells, Tex.	KORC	1140
Minneapolis, Minn.	WCCO	830
	WLOL	1330
	WMIN	1400
	WDGY	1130
	WWTC	1280
	KTCR	690
	KTIS	900
	KUOM	770
	KSTP	1500
Minot, N. Dak.	KLPM	1390
	KHRT	1320
	KCJB	910
Mission, Kans.	KBEA	1480
Mission, Tex.	KIRT	1580
Missoula, Mont.	KGVO	1290
	KGMY	1450
	KYLT	1340
	KYSS	910
Mitchell, S.Dak.	KORN	1490
Moab, Utah	KURA	1450
Moberly, Mo.	KNCM	1230
Mobile, Ala.	WUNI	1410
	WABB	1480
	WGOK	900
	WMOO	1550
	WTUF	840
	WKRG	710
	WLIQ	1360
	WMOZ	960
Mobridge, S.Dak.	KOLY	1300
Mocksville, N.C.	WOSL	1520
Modesto, Calif.	KTRB	860
	KBEE	970
	KFIV	1360
Mojave, Calif.	KDQA	1340
Moline, Ill.	WQUA	1230
Monahans, Tex.	KVKM	1330
Moncks Corner, S. C.	WBER	950
Monett, Mo.	KRMO	990
Monette, Ark.	KBIB	1560
Monmouth, Ill.	WRAM	1330
Monroe, Ga.	WMRE	1490
Monroe, La.	KMLB	1440
	KLIC	1230
	KNOE	540
Monroe, Mich.	WQTE	560
Monroe, N.C.	WMAP	1060
Monroe, Wis.	WEKZ	1260
Monroeville, Ala.	WMFC	1360
Monterey, Calif.	KIDD	630
	KMBY	1240
Montevideo, Minn.	KDMA	1480
Monte Vista, Colo.	KSLV	1240
Montezuma, Ga.	WMNZ	1050
Montgomery, Ala.	WBAM	740
	WAPX	1600
	WCOV	1170
	WFMI	1500
	WHHY	1440
	WMGY	800
	WRMA	950
Montgomery, W.Va.	WMON	1340
Monticello, Ark.	KHBM	1430

WHITE'S RADIO LOG

Location	C.L.	kHz
Monticello, Fla.	WWSD	1090
Monticello, Ky.	WFLW	1360
Montpelier, Ida.	KVSI	1450
Montpelier-Barre, Vt.	WSKI	1240
Montrose, Colo.	KUBC	580
Montrose, Pa.	WPEL	1250
Mooresville, N.C.	WHIP	1350
Moorhead, Minn.	KVOX	1280
Morehead, Ky.	WMOR	1330
Morehead City, N.C.	WMBL	740
Morgan City, La.	KMRC	1430
Morganfield, Ky.	WMSK	1550
Morgantown, N.C.	WMNC	1430
Morgantown, W.Va.	WAJR	1440
	WCLG	1300
Morrilton, Ark.	KVOM	800
Morris, Ill.	WCSJ	1550
Morris, Minn.	KMRS	1230
Morristown, N.J.	WMTR	1250
Morristown, Tenn.	WCRK	1150
	WMTN	1300
Morton, Tex.	KRAN	1280
Moscow, Idaho	KRPL	1400
Moses Lake, Wash.	KSEM	1470
	KWIQ	1260
Moss Point, Miss.	WACY	1460
Moulton, Ala.	WLCB	1530
Moultrie, Ga.	WMGA	1400
	WMTM	1300
Moundsville, W.Va.	WEIF	1370
Mountain City, Tenn.	WMCT	1390
Mountain Grove, Mo.	KLRS	1360
Mountain Home, Ark.	KTLO	1240
Mountain Home, Ida.	KFLI	1240
Mountainlake Terrace, Wash.	KURB	1510
Mt. Airy, N.C.	WPAQ	740
	WSYD	1300
Mt. Carmel, Ill.	WVMC	1360
Mt. Clemens, Mich.	WBRB	1430
Mt. Dora, Fla.	WVGT	1580
Mt. Holly, N.J.	WJJZ	1460
Mt. Jackson, Va.	WSIG	790
Mt. Kisco, N.Y.	WVIP	1310
Mt. Olive, N.C.	WDJS	1430
Mt. Pleasant, Mich.	WCEN	1150
Mt. Pleasant, Tex.	KIMP	960
Mt. Shasta, Calif.	KWSD	620
Mt. Sterling, Ky.	WMST	1150
Mt. Vernon, Ill.	WMIX	940
Mt. Vernon, Ind.	WPCO	1590
Mt. Vernon, Ky.	WRVK	1460
Mt. Vernon, Ohio	WMVO	1300
Mt. Vernon, Wash.	KAPS	1470
	KBRC	1430
Muleshoe, Tex.	KMUL	1380
Mullins, S.C.	WJAY	1280
Muncie, Ind.	WLBC	1340
	WERK	990
Munfordville, Ky.	WLOC	1150
Munising, Mich.	WGON	1400
Murfreesboro, N.C.	WWOR	1080
Murfreesboro, Tenn.	WGNS	1450
	WMTS	810
Murphy, N.C.	WCVP	600
	WKRK	1320
Murphysboro, Ill.	WINI	1420
Murray, Ky.	WNBS	1340
Murray, Utah	KMOR	1230
Muscatine, Iowa	KWPC	860
Muscle Shoals City, Ala.	WLAY	1450
Muskegon, Mich.	WKBZ	850
	WKJR	1520
	WTRU	1600
	WMUS	1090
Muskogee, Okla.	KBIX	1490
	KMUS	1380
Myrtle Beach, S.C.	WMYB	1450
	WTGR	1520
Nacogdoches, Tex.	KEEE	1230
	KSFA	860
Nampa, Idaho	KFXO	580
	KAIN	1340
Nanticoke, Pa.	WNAK	730
Napa, Calif.	KVON	1440
Naples, Fla.	WNOG	1270
Narrows-Pearisburg, Va.	WNRV	990
Nashua, N.H.	WOTW	900
	WSMN	1590
Nashville, Ark.	KBHC	1260
Nashville, Ga.	WNGA	1600
Nashville, Tenn.	WKDA	1240
	WLAC	1510
	WMAK	1300
	WNAH	1360
	WSIX	980
	WSM	650
	WWGM	1560
Nassau, Bahamas	ZNS-2	1240
Natchez, Miss.	WMIS	1240
	WNAT	1450
Natchitoches, La.	KNOC	1450
Natick, Mass.	WGTR	1060
Naugatuck, Conn.	WOWW	1380
Navasota, Tex.	KWBC	1550
Nebraska City, Nebr.	KNCY	1600
Needles, Calif.	KSFE	1340
Neenah, Wis.	WNAM	1280
Neillsville, Wis.	WCCN	1370
Nelsonville, O.	WNAL	940
Neon, Ky.	WNKY	1480
Neosho, Mo.	KBTN	1420
Nevada, Mo.	KNEM	1240
New Albany, Ind.	WHEL	1570
	WREY	1290
New Albany, Miss.	WNAU	1470
Newark, Del.	WNRK	1260
Newark, N.J.	WJRZ	970
	WNJR	1430
	WVNJ	620
Newark, N.Y.	WACK	1420
Newark, Ohio	WCLT	1430
New Bedford, Mass.	WBSM	1420
	WNBH	1340
New Bern, N.C.	WHIT	1450
	WRNB	1490
Newberry, Mich.	WNBY	1450
Newberry, S.C.	WKDK	1240
	WKMG	1520
New Boston, Ohio	WIOI	1010
New Braunfels, Tex.	KGNB	1420
New Britain, Conn.	WRCH	910
	WRYM	840
New Brunswick, N.J.	WCTC	1450
Newburgh, N.Y.	WGNY	1220
Newburyport, Mass.	WNBP	1470
New Castle, Ind.	WCTW	1550
New Castle, Pa.	WKST	1280
Newcastle, Wyo.	KASL	1240
New City, N.Y.	WRKL	910
New Haven, Conn.	WAVZ	1300
	WELI	960
	WNHC	1340
New Iberia, La.	KANE	1240
	KNIR	1360
New Kensington, Pa.	WKPA	1150
New London, Conn.	WNLC	1510
New Martinsville, W.Va.	WETZ	1330
Newnan, Ga.	WCOH	1400
	WNEA	1300
New Orleans, La.	WDSU	1280
	WNNR	990
	WBDK	800
	WNOE	1060
	WSMB	1350
	WNPS	1450
	WSHO	1230
	WTIX	690
	WWL	870
	WWOM	600
	WYLD	940
Newport, Ark.	KNBY	1280
Newport, Ky.	WNOP	740
Newport, N.H.	WCNL	1010
Newport, Oreg.	KNPT	1310
Newport, R.I.	WADK	1540
Newport, Tenn.	WLIK	1270
Newport, Vt.	WIKE	1490
Newport News, Va.	WGH	1310
	WTID	1270
Newport Richey, Fla.	WGUL	1500
New Richmond, Wis.	WIXK	1590
New Roads, La.	KWRG	1500
New Rochelle, N.Y.	WVOX	1460
New Smyrna Beach, Fla.	WSBB	1230
	WOGO	1550
Newton, Iowa	KCOB	1280
Newton, Kans.	KJRG	950
Newton, Miss.	WBKN	1410
Newton, N.J.	WNNJ	1360
Newton, N.C.	WNNC	1230
New Ulm, Minn.	KNUJ	860
New York, N.Y.	WABC	770
	WADO	1280
	WBNX	1380
	WCBS	880
	WEVD	1330
	WHN	1050
	WHOM	1480
	WINS	1010
	WLIB	1190
	WMCA	570
	WNBC	660
	WNEW	1130
	WNYC	830
	WOR	710
	WPOW	1330
	WWRL	1600
Niagara Falls, N.Y.	WHLD	1270
	WJJL	1440
Nicholasville, Ky.	WNVL	1250
Niles, Mich.	WNIL	1290
Niles, Ohio	WNIO	1540
Nogales, Ariz.	KFBR	1340
Nome, Alaska	KICY	850
Norfolk, Nebr.	WJAG	780
Norfolk, Va.	WTAR	790
	WCMS	1050
	WNOR	1230
	WRAP	850
Normal, Ill.	WIOK	1440
Norman, Okla.	WNAD	640
	KNOR	1400
Norristown, Pa.	WNAR	1110
N. Adams, Mass.	WMNB	1230
N. Atlanta, Ga.	WRNG	680
N. Augusta, S.C.	WGUS	1380
	WFNL	1600
N. Bend, Ore.	KBBR	1340
North Charleston, S.C.	WNCG	910
Northampton, Mass.	WHMP	1400
North East, Pa.	WHYP	1530
Northfield, Minn.	WCAL	770
N. Little Rock, Ark.	KOXE	1380
	KXLR	1150
North Platte, Nebr.	KJLT	970
	KNOP	1410
	KODY	1240
North Pole, Alaska	KJNP	1170
No. Syracuse, N.Y.	WSOQ	1220
N. Vernon, Ind.	WOCH	1460
No. Wilkesboro, N.C.	WKBC	810
Norton, Kans.	KNBI	1530
Norton, Va.	WNVA	1350
Norwalk, Conn.	WNLK	1350
Norwalk, O.	WLKR	1510
Norwich, Conn.	WICH	1310
Norwich, N.Y.	WCHN	970
Oakdale, La.	KREH	900
Oakes, N.Dak.	KEYD	1220
Oak Grove, La.	KWCL	1280
Oak Hill, W.Va.	WOAY	860
Oakland, Cal.	KNEW	910
	KABL	960
	KDIA	1310
Oakland, Md.	WMSG	1050
Oakland Park, Fla.	WIXX	1520
Oak Park, Ill.	WOPA	1490
Oak Ridge, Tenn.	WATO	1290
Ocala, Fla.	WMOP	900
	WTMC	1290
	WWKE	1370
Ocean City, Md.	WETT	1590
Ocean City, Somers Pt., N.J.	WSLT	1520
Oceanlake, Oreg.	KBCH	1380
Oceanside, Calif.	KUDE	1320
Ocilla, Ga.	WSIZ	1380
Oconto, Wis.	WOCO	1260
Odessa, Tex.	WBZB	920
	KOSA	1230
	KOYL	1310
	KRIG	1410
Oelwein, Iowa	KOEL	950
Ogallala, Nebr.	KOGA	930
Ogden, Utah	KLO	1430
	KANN	1090
	KSVN	730
	KVOG	1490
Ogdensburg, N.Y	WSLB	1400
Oil City, Pa.	WKRZ	1340
Okeechobee, Fla.	WOKC	1570
Okla. City, Okla.	KBYE	890
	KLPR	1140
	KOCY	1340
	KOMA	1520
	KTOK	1000
	KJEM	800
	WKY	930
Okmulgee, Okla.	KOKL	1240
Old Saybrook, Conn.	WLIS	1420
Olean, N.Y.	WMNS	1360
	WHOL	1450
Olney, Ill.	WVLN	740
Olympia, Wash.	KGY	1240
	KITN	920
Omaha, Nebr.	KBON	1490
	KFAB	1110
	KOIL	1290
	KOOO	1420
	KOWH	660
	WOW	590
Omak, Wash.	KOMW	680
Oneida, N.Y.	WMCR	1600
Oneida, Tenn.	WBNT	1310
O'Neill, Nebr.	KBRX	1350
Oneonta, Ala.	WCRL	1570
Oneonta, N.Y.	WDOS	730
Ontario, Cal.	KSOM	1510
Ontario, Oreg.	KSRV	1380
Opelika, Ala.	WAOA	1520
	WPHO	1400
Opelousas, La.	KSLO	1230
Opp, Ala.	WAMI	860
Opportunity, Wash.	KZUN	630
Orange, Mass.	WCAT	1390
Orange, Tex.	KOGT	1600
Orange, Va.	WJMA	1340
Orangeburg, S.C.	WOIX	1150
	WORG	1580
	WTND	920
Orange Park, Fla.	WAYR	550
Ord, Neb.	KNLV	1060
Oregon City, Ore.	KYXI	1520
Orlando, Fla.	WOBO	580
	WHOO	990
	WHIY	1270
	WLOF	950
	WKIS	740
Ormond Bch., Fla.	WQXQ	1380
Orofino, Idaho	KLER	950
Oroville, Calif.	KAOR	1340
Ortonville, Minn.	KDIO	1350
Osage Bch., Mo.	KRMS	1150
Osceola, Ark.	KOSE	860
Oshkosh, Wis.	WAGO	690
	WOSH	1490
Oskaloosa, Iowa	KBOE	740
Oswego, N.Y.	WSGO	1440
Othello, Wash.	KRSC	1400
Otsego, Mich.	WAOP	980
Ottawa, Ill.	WCMY	1430
Ottawa, Kans.	KOFO	1220
Ottumwa, Iowa	KBIZ	1240
	KLEE	1480
Owatonna, Minn.	KRFO	1390
Owego, N.Y.	WEBO	1330
Owensboro, Ky.	WOMI	1490
	WVJS	1420
Owosso, Mich.	WOAP	1080
Oxford, Miss.	WSUH	1420
Oxford, N.C.	WOXF	1340
Oxnard, Calif.	KOXR	910
Ozark, Ala.	WOZK	900
Paducah, Ky.	WDXR	1560
	WKYX	570
	WPAD	1450
Page, Ariz.	KPGE	1340
Painesville, Ohio	WPVL	1460
Paintsville, Ky.	WSIP	1490
Palatka, Fla.	WWPF	1260
	WSUZ	800
Palestine, Tex.	KNET	1450
Palm Bch., Fla.	WQXT	1340
Palm Sprgs., Calif.	KCMJ	1010
	KDES	920
	KPAL	1450
Palmdale, Calif.	KUTY	1470
Palm Desert, Cal.	KGOL	1270
Palo Alto, Calif.	KIBE	1220
Pampa, Tex.	KPDN	1340
	KGRO	1230
Panama Beach, Fla.	WGNE	1480
	WSCM	1290
Panama City, Fla.	WDLP	590
	WPCF	1430
Paoli, Ind.	WVAK	1560
Paradise, Cal.	KEWQ	930
Paragould, Ark.	KDRS	1490
Paris, Ark.	KCCL	1460
Paris, Ill.	WPRS	1440
Paris, Ky.	WPDE	1440
Paris, Tenn.	WTPR	710
Paris, Tex.	KPLT	1490
	KFTV	1250
Parkersburg, W.Va.	WCEF	1050
	WPAR	1450
	WTAP	1230
Park Falls, Wis.	WPFP	590
Park Rapids, Minn.	KPRM	1240
Parsons, Kans.	KLKC	1540
Pasadena, Cal.	KPPC	1240
	KRLA	1110
	KWKW	1300
Pasadena, Tex.	KLVL	1460
	KIKK	650
Pascagoula-Moss Point, Miss.	WPMP	1580
Pasco, Wash.	KORD	910
Paso Robles, Calif.	KPRL	1230
Pastillo, P.R.	WCGB	1050
Patchogue, L.I., N.Y.	WALK	1370
	WPAC	1580
Paterson, N.J.	WPAT	930
Pauls Valley, Okla.	KVLH	1470
Pawhuska, Okla.	KOSG	1500
Pawtucket, R.I.	WXTR	550
Payette, Ida.	KYET	1450
Pearsall, Tex.	KVWG	1280
Pecos, Tex.	KIUN	1400
Peekskill, N.Y.	WLNA	1420
Pekin, Ill.	WSIV	1140
Pell City, Ala.	WFHK	1430
Pendleton, Oreg.	KTIX	1240
	KUMA	1290
Pennington Gap, Va.	WSWV	1570
Pensacola, Fla.	WBOP	980
	WBSR	1540
	WMEL	610
	WNVY	1230
	WCOA	1370
Peoria, Ill.	WXCL	1350
	WMBO	1470
	WIRL	1290

Location	C.L.	kHz
	WPEO	1020
Perry, Fla.	WPRY	1400
	WGKR	1310
Perry, Ga.	WPGA	980
Perry, Iowa	KDLS	1310
Perryton, Tex.	KEYE	1400
Peru, Ind.	WARU	1600
Petaluma, Calif.	KTOB	1490
Petersburg, Va.	WSSV	1240
Petoskey, Mich.	WMBN	1340
	WJML	1110
Phenix City, Ala.	WPNX	1460
Philadelphia, Miss.	WHOC	1490
Philadelphia, Pa.	KYW	1060
	WCAU	1210
	WDAS	1480
	WFIL	560
	WFLN	900
	WHAT	1340
	WHOC	1490
	WIBG	990
	WIP	610
	WPEN	950
	WRCP	1540
	WTEL	860
Phillipsburg, Pa.	WPHB	1260
Phillipsburg, Kans.	KKAN	1490
Phoenix, Ariz.	KIFN	860
	KASA	1540
	KCAC	1010
	KHAT	1480
	KHEP	1280
	KMEO	740
	KOY	550
	KOOL	960
	KPHO	910
	KRIZ	1230
	KTAR	620
	KXIV	1400
Phoenix City, Ala.	WPNX	1460
Pickens, S.C.	WKKR	1540
Piedmont, Ala.	WPID	1280
Piedmont, Mo.	KPWB	1140
Pierre, S.D.	KGFX	1080
	KCCR	1240
Pikeville, Ky.	WLSI	900
	WPKE	1240
Pine Bluff, Ark.	KCLA	1400
	KADL	1270
	KOTN	1490
	KCAT	1530
	KPBA	1590
Pine City, Minn.	WCMP	1350
Pineville, Ky.	WANO	1230
Pineville, Ky.	WMLF	1230
Pineville, W.Va.	WWYO	970
Pipestone, Minn.	KLOH	1050
Piqua, Ohio	WPTW	1570
Pittsburg, Calif.	KKIS	990
Pittsburg, Kans.	KQAM	860
	KSEK	1340
Pittsburgh, Pa.	KDKA	1020
	KQV	1410
	WAMO	860
	WJAS	1320
	WPIT	730
	WTAE	1250
	WEEP	1080
	WWSW	970
Pittsfield, Ill.	WBBA	1580
Pittsfield, Mass.	WBEC	1420
	WBRK	1340
Pittston, Pa.	WPTS	1540
Plainfield, N.J.	WERA	1590
Plainview, Tex.	KVOP	1400
Plant City, Fla.	WPLA	910
Platteville, Wis.	WSWW	1590
Plattsburg, N.Y.	WEAV	960
	WIRY	1340
	WKDR	1070
Pleasanton, Tex.	KBOP	1380
Pleasantville, N.J.	WOND	1400
Plymouth, Ind.	WTCA	1050
Plymouth, Mass.	WPLM	1390
Plymouth, N.C.	WPNC	1470
Plymouth, N.H.	WPNH	1300
Plymouth, Wis.	WPLY	1420
Pocahontas, Ark.	KPOC	1420
Pocatello, Idaho	KSEI	930
	KWIK	1240
	KSNN	1290
Pocomoke City, Md.	WDMV	540
Pomona, Calif.	KWOW	1600
	KKAR	1220
Pompton Lakes, N. J.	WKER	1500
Pompano Beach, Fla.	WLOD	980
	WRBD	1470
Ponca City, Okla.	WBBZ	1230
Ponce, P.R.	WPRP	910
	WEUC	1420
	WPAB	550
	WLED	1170
	WISO	1260
Pontiac, Ill.	WPOK	1080
Pontiac, Mich.	WPON	1460
Pontotoc, Miss.	WSEL	1440
Pooli, Ind.	WVAK	1560
Poplar Bluff, Mo.	KWOC	930
	KLID	1340
Poplarville, Miss.	WRPM	1530

Location	C.L.	kHz
Portage, Mich.	WTPS	1560
Portage, Pa.	WWML	1470
Portage, Wis.	WPDR	1350
Portageville, Mo.	KMIS	1050
Portales, N.Mex.	KENM	1450
Port Angeles, Wash.	KAPY	1000
	KDNP	1450
Port Arthur, Tex.	KOLE	1340
	KPAC	1250
Porterville, Calif.	KTIP	1450
Port Hueneme, Calif.	KACY	1520
Port Huron, Mich.	WHLS	1450
	WTTH	1380
Port Jervis, N.Y.	WOLC	1490
Port Lavaca, Tex.	KGUL	1560
Portland, Ind.	WPGW	1440
Portland, Maine	WCSH	970
	WGAN	560
	WLOB	1310
	WPOR	1490
Portland, Oreg.	KBPS	1450
	KBEV	1010
	KLIQ	1290
	KEX	1190
	KGW	620
	KOIN	970
	KPAM	1410
	KPDQ	800
	KPOJ	1330
	KWJJ	1080
	KXL	750
Port Neches, Tex.	KPNG	1150
Port St. Joe, Fla.	WJOE	1080
Portsmouth, N.H.	WBBX	1380
	WHEB	750
Portsmouth, Ohio	WPAY	1400
	WNXT	1260
Portsmouth, Va.	WHIH	1400
	WPMH	1010
	WAVY	1350
Port Sulphur, La.	KPBC	1510
Port Washington, Wis.	WGLB	1560
	KPOS	1370
Post, Tex.	KLCO	1280
Poteau, Okla.		
Potomac-Cabin John, Md.	WXLN	950
	KYRO	1280
Potosi, Mo.	WPDM	1470
Potsdam, N.Y.	WPAZ	1370
Pottstown, Pa.	WPAM	1450
Pottsville, Pa.	WPPA	1360
Poughkeepsie, N.Y.	WEOK	1390
	WKIP	1450
Powell, Wyo.	KPOW	1260
Poynette, Wis.	WIBU	1240
Prairie du Chien, Wis.	WPRE	980
	KWNS	1290
Pratt, Kan.	WKPO	1510
Prentiss, Miss.	KYCA	1490
Prescott, Ariz.	KENT	1340
	KNOT	1450
Prescott, Ark.	KTPA	1370
Presque Isle, Me.	WAGM	950
	WEGP	1390
Preston, Idaho	KPST	1340
Preston, Minn.	KFIL	1060
Prestonsburg, Ky.	WPRT	960
	WDOC	1310
Price, Utah	KOAL	1230
Prichard, Ala.	WZAM	1270
Prince Albert, Sask.	CKBI	900
Princeton, Ill.	WZOE	1490
Princeton, Ind.	WRAY	1250
Princeton, Ky.	WKPY	1580
Princeton, Minn.	WKPM	1300
Princeton, N.J.	WHWH	1350
Princeton, W.Va.	WLOH	1490
Prineville, Oreg.	KRCO	690
Prosser, Wash.	KARY	1310
Providence, R.I.	WEAN	790
	WHIM	1110
	WICE	1290
	WJAR	920
	WLKW	990
	WPRO	630
	WRIB	1220
Provo, Utah	KIXX	1400
	KEYY	1450
	KOVO	960
Pryor, Okla.	KOLS	1570
Pueblo, Colo.	KDZA	1230
	KAPI	690
	KCSJ	590
	KFEL	970
Pueblo, Colo.	KKAM	1350
	KPUB	1480
Pulaski, Tenn.	WKSR	1420
Pulaski, Va.	WPUV	1580
Pullman, Wash.	KWSC	1250
	KPUL	1150
Punta Gorda, Fla.	WCCF	1580
Punxsutawney, Pa.	WPME	1540
Putnam, Conn.	WINY	1350
Puyallup, Wash.	KAYE	1450
Quanah, Tex.	KQLJ	1150
Quantico, Va.	WQVA	1530
Quincy, Calif.	KQCY	500
Quincy, Fla.	WCNH	1230
Quincy, Ill.	WGEM	1440
	WTAD	930
Quincy, Mass.	WJDA	1300
Quincy, Wash.	KPOR	1370

Location	C.L.	kHz
Quitman, Ga.	WSFB	1490
Quitman, Miss.	WBFN	1500
Racine, Wis.	WRAC	1460
	WRJN	1400
Radford, Va.	WRAD	1460
Raeford, N.C.	WSHB	1400
Rainsville, Ala.	WVSM	1500
Raleigh, N.C.	WKIX	850
	WYNA	1550
	WPTF	680
	WLLE	570
	WRNC	1240
Ralls, Tex.	KCLR	1530
Rantoul, Ill.	WRTL	1460
Randolph, Vt.	WCVR	1230
Rapid City, S.Dak.	KOTA	1380
	KIMM	1150
	KRSD	1340
	KEZU	920
Raton, N.Mex.	KRTN	1490
Ravenswood, W.Va.	WMDV	1360
Rawlins, Wyo.	KRAL	1240
Raymond, Wash.	KAPA	1340
Raymondville, Tex.	KSOX	1240
Rayville, La.	KRIH	990
Reading, Pa.	WEEU	850
	WHUM	1240
	WRAW	1340
Redding, Calif.	KRDG	1230
	KAHR	1330
	KQMS	1400
	KVCV	600
	KVIP	540
Red Bluff, Calif.	KBLF	1490
Redfield, S.Dak.	KFCB	1380
Redlands, Calif.	KCAL	1410
Red Lion, Pa.	WGCB	1440
Red Lodge, Mont.	KRBN	1450
Redmond, Oreg.	KPRB	1240
Red Oak, Ia.	KOAK	1080
Red Wing, Minn.	KCUE	1250
Redwood Falls, Minn.	KLGR	1490
Reedsburg, Wis.	WRDB	1400
Reedsport, Oreg.	KRAF	1470
Reidsville, N.C.	WFRC	1600
	WREV	1220
Remsen, N.Y.	WADR	1480
Reno, Nev.	KOH	630
	KBET	1340
	KOLO	920
	KONE	1450
	KCBN	1230
Rensselaer, Ind.	WRIN	1560
Rensselaer, N.Y.	WEEE	1300
Renton, Wash.	KREN	1420
Rexburg, Idaho	KRXK	1230
Rhinelander, Wis.	WOBT	1240
Rice Lake, Wis.	WJMC	1240
Richfield, Minn.	WPBC	980
Richfield, Utah	KSVC	980
Richland, Wash.	KALE	960
Richland, Wis.	WRCO	1450
Richlands, Va.	WRIC	540
Richmond, Ind.	WKBV	1490
Richmond, Ky.	WEKY	1340
Richmond, Va.	WANT	990
	WBBL	1380
	WRGM	1540
	WLEE	1480
	WEET	1320
	WGOE	1590
	WTVR	1380
	WRNL	910
	WRVA	1140
	WXGI	950
	WRGM	1540
Richwood, W.Va.	WVAR	600
Ridgecrest, Calif.	KRCK	1360
	KLOA	1240
Ridgeland, S.C.	WBUG	1430
Rifle, Colo.	KWSR	810
Rio Piedras, P.R.	WUNO	1320
	WRAI	1190
Ripley, Miss.	WSCA	1260
Ripley, Tenn.	WTRB	1570
Ripon, Wis.	WCWC	1600
Riverhead, N.Y.	WRIV	1390
	WAPC	1570
Riverside, Calif.	KPRO	1440
	KACE	1570
Riverton, Wyo.	KVOW	1450
Riviera Beach, Fla.	WHEW	1600
Roanoke, Ala.	WELR	1360
Roanoke, Va.	WDBJ	960
	WRIS	1410
	WPXI	910
	WROV	1240
	WSLS	610
Roanoke Rapids, N.C.	WCBT	1230
Roaring Sprgs., Pa.	WKMC	1370
Roberval, Que.	CHRL	910
Robinson, Ill.	WTAY	1570
Robstown, Tex.	KROB	500
Rochelle, Ill.	WRHL	1060
Rochester, Minn.	KROC	1340
	KWEB	1270
	KOLM	1520
Rochester, N.H.	WWNH	930
Rochester, N.Y.	WBBF	950
	WHAM	1180

Location	C.L.	kHz
	WHEC	1460
	WNYR	680
	WSAY	1370
	WROC	1280
Rockford, Ill.	WRDK	1440
	WYFE	1150
	WRRR	1330
Rockford, Mich.	WJPW	810
Rock Hill, S.C.	WRHI	1340
	WTYC	1150
Rockingham, N.C.	WAYN	900
Rock Island, Ill.	WHBF	1270
Rockland, Maine	WRKD	1450
Rockmart, Ga.	WPLK	1220
Rock Springs, Wyo.	KVRS	1360
Rockville, Conn.	WRKV	800
Rockville, Md.	WINX	1600
Rockwood, Tenn.	WRKH	580
Rocky Ford, Colo.	KAVI	1320
Rocky Mount, N.C.	WCEC	810
	WEED	1390
	WRMT	1490
	WKWS	1290
Rocky Mount, Va.	WYTI	1570
Rogers, Ark.	KAMO	1390
Rogers City, Mich.	WHAK	960
Rogersville, Tenn.	WRGS	1370
Rolla, Mo.	KCLU	1390
	KTTR	1490
Rome, Ga.	WLAQ	1410
	WIYN	1360
	WRGA	1470
	WROM	710
Rome, N.Y.	WKAL	1450
	WRNY	1350
Ronceverte, W.Va.	WRON	1400
Roseau, Minn.	KRWB	1410
Roseburg, Oreg.	KRNR	1490
	KQEN	1240
	KRXL	1250
	KYES	950
Rosenberg, Tex.	KFRD	980
Roservelt, N.M.	KRDD	1320
Roseville, Cal.	KPOP	1110
Rossville, Ga.	WRIP	980
Roswell, N.Mex.	KRSY	1230
	KGFL	1430
	KBIM	910
	KRDD	1320
	KRIK	960
	KSWS	1020
Roxboro, N.C.	WRXO	1430
Royal Oak, Mich.	WEXL	1340
Rugby, N. Dak.	KGCA	1450
Ruidoso, N.Mex.	KRRR	1340
Rumford, Me.	WRUM	790
Rupert, Idaho	KAYT	970
Rushton, La.	KRUS	1490
Rusk, Texas	KTLU	1580
Russell, Kans.	KRSL	990
Russellville, Ala.	WWWR	920
Russellville, Ark.	KXRJ	1490
Russellville, Ky.	WRUS	610
Rutland, Vt.	WHWB	1000
	WSYB	1380
Rutherfordton, N.C.	WCAB	590
Sacramento, Calif.	KCRA	1320
	KFBK	1530
	KGMS	1380
	KJAY	1430
	KRAK	1140
	KROY	1240
	KXOA	1470
Safford, Ariz.	KGLU	1480
	KATO	1230
Sag Harbor, N.Y.	WLNG	1600
Saginaw, Mich.	WKNX	1210
	WSAM	1400
	WSGW	790
St. Albans, Vt.	WWSR	1420
St. Albans, W.Va.	WKLC	1300
St. Anthony, Ida.	KIGO	1400
St. Augustine, Fla.	WFOY	1240
	WETH	1420
St. Charles, Mo.	KADY	1460
St. Cloud, Minn.	KFAM	1450
	WJON	1240
Ste. Genevieve, Mo.	KSGM	1340
St. George, S.C.	WQIZ	810
St. George, Utah	KDXU	1450
St. Helen, Mich.	WMIC	1590
St. Helens, Oreg.	KOHI	1600
St. Ignace, Mich.	WIDG	940
St. Johns, Mich.	WRBJ	1580
St. Johnsbury, Vt.	WTWN	1340
St. Joseph, Mich.	WSJM	1400
St. Joseph-Benton Harbor, Mich.	WHFB	1060
St. Joseph, Mo.	KFEQ	680
	KKJO	1550
	KUSN	1270
St. Louis, Mo.	KATZ	1600
	KMOX	1120
	KSD	550
	KSTL	690
	KWK	1380
	KXOK	630
	WEW	770
	WIL	1430
	KXEN	1010
St. Louis Park, Minn.	KRSI	950

WHITE'S RADIO LOG

Location	C.L.	kHz
St. Mary's, Pa.	WKBI	1400
St. Paul, Minn.	KSTP	1500
	KDWB	630
	WMIN	1400
	WMKT	1370
	WCCO	830
St. Pauls, N.C.	WBYB	1060
St. Peter, Minn.	KRBI	1310
St. Petersburg, Fla.	WPIN	680
	WSUN	620
	WLCY	1380
St. Petersburg Beach, Fla.	WILZ	1590
Salamanca, N.Y.	WGGO	1590
Salem, Ill.	WJBD	1350
Salem, Ind.	WSLM	1220
Salem, Mass.	WESX	1230
Salem, Mo.	KSMO	1340
Salem, N. J.	WJIC	1510
Salem, O.	WSOM	600
Salem, Oreg.	KSLM	1390
	KAPT	1220
	KBZY	1490
	KGAY	1430
Salem, Va.	WBLU	1480
Salida, Colo.	KVRH	1340
Salina, Kans.	KSAL	1150
	KFRM	550
	KISI	910
Salinas, Calif.	KDON	1460
	KSBW	1380
Salinas, Calif.	KCTY	980-1000
Salinas, P.R.	WHOY	1210
Saline, Mich.	WOIB	1290
Salisbury, Md.	WBOC	960
	WICO	1320
	WJDY	1470
Salisbury, N.C.	WSTP	1490
	WSAT	1280
Salmon, Idaho	KSRA	960
Salt Lake City, Utah	KALL	910
	KCPX	1320
	KLUB	570
	KNAK	1280
	KRSP	1060
	KSL	1160
	KSOP	1370
	KSXX	630
	KWHO	860
	KWIC	1550
San Angelo, Tex.	KTEO	1340
	KGKL	950
	KPEP	1420
	KWFR	1260
San Antonio, Tex.	KAPE	1480
	KBAT	680
	KBER	1150
	KBUC	1310
	KCOR	1350
	KEOA	1540
	KITE	930
	KUKA	1250
	KMAC	630
	KONO	860
	KTSA	550
	WOAI	1200
San Bernardino, Calif.	KCKC	1350
	KFXM	590
	KRNO	1240
	KMEN	1290
Sandersville, Ga.	WSNT	1490
San Diego, Calif.	KCBQ	1170
	KFMB	760
	KOGO	600
	KGB	1360
	KSON	1240
	KSDO	1130
Sandpoint, Idaho	KSPT	1400
Sand Spring, Okla.	KTOW	1340
Sandusky, Mich.	WMIC	1560
Sandusky, Ohio	WLEC	1450
San Fernando, Calif.	KGIL	1260
Sanford, Fla.	WTRR	1400
Sanford, Me.	WSME	1220
Sanford, N.C.	WEYE	1290
	WWGP	1050
San Francisco, Calif.	KFRC	610
	KCBS	740
	KFAX	1100
	KGO	810
	KNBR	680
	KKHI	1550
	KSAY	1010
	KSFO	560
	KSOL	1450
	KYA	1260
San Gabriel, Cal.	KAIL	1430
San German, P. R.	WRJS	1060
Sanitobia, Miss.	WSAO	1550
San Jose, Calif.	KLOK	1170
	KLIV	1590
	KEEN	1370
	KXRX	1500
San Juan, P.R.	WAPA	680
	WBMJ	1190
	WHOA	870
	WIAC	740
	WIPR	940
	WITA	1140
	WKAQ	580
	WKVM	810
	WKYN	630
	WRAI	1520
San Luis Obispo, Calif.	KATY	1340
	KSLY	1400
	KVEC	920
San Marcos, Tex.	KCNY	1470
San Mateo, Calif.	KOFY	1050
San Rafael, Calif.	KTIM	1510
San Saba, Tex.	KBAL	1410
San Sebastion, P. R.	WFBA	1460
Santa Ana, Calif.	KWIZ	1480
Santa Barbara, Cal.	KDB	1490
	KGUD	990
	KIST	1340
	KTMS	1250
	KACL	1290
Santa Clara, Calif.	KGNU	1430
Santa Cruz, Calif.	KSCO	1080
Santa Fe, N.Mex.	KTRC	1400
	KAFE	810
	KVSF	1260
Santa Maria, Cal.	KCOY	1400
	KSMA	1240
	KSEE	1480
	KZON	1600
Santa Monica, Cal.	KDAY	1580
Santa Paula, Calif.	KSPA	1400
Santa Rosa, Calif.	KSRO	1350
	KHUM	1580
	KVRE	1460
	KJAX	1150
Santa Rosa, N.Mex.	KSYX	1420
Sapulpa, Okla.	KREK	1550
Saranac Lake, N.Y.	WNBZ	1240
Sarasota, Fla.	WKXY	930
	WSAF	1220
	WSPB	1450
	WYND	1280
Saratoga, N.Y.	WSPN	900
Saratoga Springs, N.Y.	WKAJ	900
Sauk Rapids, Minn.	WVAL	800
Sault Ste. Marie, Mich.	WSOO	1230
Savannah, Ga.	WBYG	1450
	WEAS	900
	WSAV	630
	WSGA	1400
	WTOC	1290
Savannah, Tenn.	WSOK	1230
Sayre, Pa.	WORM	1010
Scheffield, Ala.	WATS	960
Schenectady, N.Y.	WSHF	1290
	WGY	810
	WSNY	1240
Scotland Neck, N.C.	WYAL	1280
Scott City, Kans.	KFLA	1310
Scottsbluff, Nebr.	KNEB	960
	KOLT	1320
Scottsboro, Ala.	WCRI	1050
	WROS	1330
Scottsdale, Ariz.	KUOT	1440
Scottsville, Ky.	WLCK	1250
Scranton, Pa.	WARM	590
	WEJL	630
	WGBI	910
	WICK	1400
	WSCR	1320
	WSUX	1280
Searey, Ark.	KWCB	1300
Seaside, Ore.	KSWB	930
Seattle, Wash.	KAYO	1150
	KIXI	910
	KING	1090
	KIRO	710
	KJR	950
	KOL	1300
	KOMO	1000
	KETO	1590
	KTW	1250
	KVI	570
	KXA	770
	KBLE	1050
Sebring, Fla.	WJCM	960
	WSEB	1340
Sedalia, Mo.	KDRU	1340
	KSIS	1050
Sequin, Tex.	KWED	1580
Selinsgrove, Pa.	WSEW	1240
Selma, Ala.	WGWC	1340
	WHBB	1490
	WTQX	1570
Selma, N.C.	WBZB	1090
Selmer, Tenn.	WDTM	1130
Seminole, Tex.	KTFO	1250
Senatobia, Miss.	WSAO	1550
Seneca Township, S.C.	WSNW	1150
Sevierville, Tenn.	WSEV	930
Seward, Alaska	KIBH	950
Seymour, Ind.	WJCD	1390
Seymour, Tex.	KSEY	1230
Shakopee, Minn.	KSMM	1530
Shallotte, N.C.	WVCB	1410
Shamokin, Pa.	WISL	1480
Shamrock, Tex.	KBYP	1580
Sharon, Pa.	WPIC	790
Shawano, Wis.	WTCH	960
Shawnee, Okla.	KGFF	1450
Sheboygan, Wis.	WHBL	1330
	WKTS	950
Sheffield, Ala.	WSHF	1290
Shelby, Mont.	KSEN	1150
Shelby, N.C.	WOHS	730
	WADA	1390
Shelbyville, Ind.	WSVL	1520
Shelbyville, Ky.	WCND	940
Shelbyville, Tenn.	WHAL	1400
	WLIJ	1580
Sheldon, Iowa	KIWA	1550
Shelton, Wash.	KMAS	1280
Shenandoah, Iowa	KMA	960
Shenandoah, Pa.	WMBT	1530
Sheridan, Wyo.	KWYO	1410
	KROE	930
Sherman, Tex.	KRRV	910
	KTXO	1500
Shippensburg, Pa.	WSHP	1480
Show Low, Ariz.	KVSL	1450
	KVWM	970
Shreveport, La.	KBCL	1220
	KEEL	710
	KUKA	1550
	KJOE	1480
	KCIJ	980
	KHMD	1340
	KWKH	1130
Sidney, Mont.	KGCX	1480
Sidney, Nebr.	KSID	1340
Sidney, O.	WMVR	1080
Sierra Vista, Ariz.	KHFH	1420
Sikeston, Mo.	KSIM	1400
	KMPL	1520
Siler City, N.C.	WNCA	1570
Siloam Sprgs., Ark.	KUOA	1290
Silsbee, Tex.	KKAS	1300
Silver City, N.Mex.	KSIL	1340
Silver Sprgs., Md.	WQMR	1050
Simcoe, Ont.	CFRS	1560
Simon, Tex.	KTOD	1590
Sioux City, Iowa	KSCJ	1360
	KMNS	620
	KTRI	1470
Sioux Falls, S.Dak.	KISD	1230
	KELO	1320
	KNWC	1270
Sitka, Alaska	KSOO	1140
	KIFW	1230
	KSEW	1400
Skowhegan, Maine	WGHM	1150
Slaton, Tex.	KCAS	1050
Slidell, La.	WBGS	1560
Smithfield, N.C.	WMPM	1270
Smithville, Tenn.	WJLE	1480
Smyrna, Ga.	WYNX	1550
Snyder, Tex.	KSNY	1450
Socorro, N.Mex.	KSRC	1290
Soda Springs, Ida.	KBRV	790
Soldatna, Alaska	KSRM	920
Somerset, Ky.	WSFC	1240
	WTLQ	1480
Somerset, Pa.	WVSC	990
Sonora, Calif.	KVML	1450
Sonora, Tex.	KCKG	1240
So. Bend, Ind.	WNDU	1490
	WJVA	1580
	WSBT	960
Southbridge, Mass.	WESO	970
So. Boston, Va.	WHLF	1400
Southern Pines, N.C.	WEEB	990
South Charleston, W. Va.	WRDS	1410
South Daytona Beach, Fla.	WELE	1590
So. Gastonia, N.C.	WGAS	1420
So. Haven, Mich.	WJOR	940
So. Knoxville, Tenn.	WSKT	1580
South Lake Tahoe, Cal.	KOWL	1490
	KTHO	590
S. Miami, Fla.	WFUN	790
So. Paris, Me.	WKTQ	1450
So. Pittsburg, Tenn.	WEPG	910
So. St. Paul, Minn.	KDWB	630
	WMKT	1370
So. Williamsport, Pa.	WMPT	1450
Spanish Fork, Utah	KBNU	1480
Sparks, Nev.	KBUB	1270
Sparta, Ill.	WHCO	1230
Sparta, N.C.	WCOK	1060
Sparta, Tenn.	WSMT	1050
Sparta, Wis.	WKLJ	990
	WCOW	1290
Spartanburg, S.C.	WHCQ	1400
	WORD	910
	WSPA	950
	WASC	1530
Spencer, Iowa	KICD	1240
Spencer, W.Va.	WVRC	1400
Spokane, Wash.	KGA	1510
	KDNC	1440
	KSPO	1230
	KPEG	1380
	KHQ	590
	KJRB	790
	KREM	970
	KXLY	920
	KCFA	1330
	KUDY	1280
Springdale, Ark.	KBRS	1340
	KSPR	1590
Springfield, Ill.	WCVS	1450
	WMAY	970
	WTAX	1240
Springfield, Mass.	WHYN	560
	WMAS	1450
	WSPR	1270
Springfield, Mo.	KGBX	1260
	KICK	1340
	KTTS	1400
Springfield, Ohio	KWTO	560
	WIZE	1340
	WBLY	1600
Springfield-Eugene, Ore.	KEED	1450
	KORE	1050
Springfield, Tenn.	WDBL	1590
Springfield, Vt.	WCFR	1480
Springhill, La.	KBSF	1460
Spring Lake, N. C.	WFBS	1450
Spring Valley, N.Y.	WRRC	1300
Spruce Pine, N.C.	WTOE	1470
Stamford, Conn.	WSTC	1400
Stamford, Tex.	KDWT	1400
Stanford, Ky.	WRSL	1320
Starke, Fla.	WPXE	1490
Starkville, Miss.	WSSO	1430
State College, Pa.	WMAJ	1450
	WRSC	1390
Statesboro, Ga.	WWNS	1240
Statesville, N.C.	WSIC	1400
	WDBM	550
Staunton, Va.	WTON	1240
	WAFC	900
Stephenville, Tex.	KSTV	1510
Sterling, Colo.	KGEK	1230
	KOLR	1490
Sterling, Ill.	WSDR	1240
Steubenville, Ohio	WSTV	1340
Stevens Point, Wis.	WSPT	1010
Stillwater, Minn.	WAVN	1220
Stillwater, Okla.	KSPI	780
Stockton, Calif.	KJOY	1280
	KSTN	1420
	KWG	1230
Storm Lake, Iowa	KAYL	990
Streator, Ill.	WIZZ	1250
Stroudsburg, Pa.	WVPO	840
Stuart, Fla.	WSTU	1450
Stuart, Va.	WHEO	1270
Sturgeon Bay, Wis.	WDOR	910
Sturgis, Mich.	WSTR	1230
Sturgis, S.D.	KBHB	810
Stuttgart, Ark.	KWAK	1240
Suffolk, Va.	WLPM	1450
Sullivan, Ind.	WKQV	1550
Sullivan, Mo.	KTUI	1560
Sulphur, La.	KIKS	1310
Sulphur Sprgs., Tex.	KSST	1230
Summerville, Ga.	WGTA	950
Summerville, S.C.	WAZS	980
Sumner, Wash.	KDFL	1560
Sumter, S.C.	WFIG	1290
	WDXY	1240
	WSSC	1340
Sunbury, Pa.	WKOK	1070
Sunnyside, Wash.	KREW	1230
Sun Valley, Ida.	KSKI	1340
Superior, Nebr.	KRFS	1600
Superior, Wis.	WDSM	710
	WAKX	970
	WWJC	1270
	WAXK	1320
Susanville, Calif.	KSUE	1240
Sutton, W. Va.	WSGB	1490
Swainsboro, Ga.	WJAT	800
Sweetwater, Tenn.	WDEH	800
Sweetwater, Tex.	KXOX	1240
Sylacauga, Ala.	WFEB	1340
	WMLS	1290
Sylva, N.C.	WMSJ	1480
Sylvania, Ga.	WSYL	1490
Sylvester, Ga.	WDGA	1540
Syracuse, N.Y.	WHEN	620
	WFBL	1390
	WNDR	1260
	WOLF	1490
	WSYR	570
Tabor City, N.C.	WTAB	1370
Tacoma, Wash.	KMO	1360
	KTAC	850
	KTNT	1400
	KVI	570
Taft, Calif.	KTKR	1310
Tahlequah, Okla.	KTLQ	1350
Tahoe Valley, Calif.	KTHO	590
Talladega, Ala.	WEYY	1580
	WNUZ	1280
Tallahassee, Fla.	WMEN	1330

Location	C.L.	kHz
	WONS	1410
	WTAL	1450
	WTNT	1270
Tallassee, Ala.	WTLS	1300
Tallulah, La.	KTLD	1360
Tampa, Fla.	WALT	1110
	WDAE	1250
	WYOU	1550
	WFLA	970
	WHBO	1050
	WINQ	1010
	WTMP	1150
	WSOL	1300
Taos, N. Mex.	KKIT	1340
Tarboro, N.C.	WCPS	760
Tarpon Springs, Fla.	WCWR	1470
Tasley, Va.	WESR	1330
Taunton, Mass.	WPEP	1570
Tawas City, Mich.	WIOS	1480
Taylor, Tex.	KTAE	1260
Taylorsville, N. C.	WSTH	860
	WTLK	1570
Taylorville, Ill.	WTIM	1410
Tazewell, Tenn.	WNTT	1250
Tazewell, Va.	WTZE	1470
Tell City, Ind.	WTCJ	1230
Tempe, Ariz.	KUPD	1060
	KTUF	1580
Temple, Tex.	KTEM	1400
Terre Haute, Ind.	WBOW	1230
	WAAC	1300
	WTHI	1480
Terrell, Tex.	KTER	1570
Terrytown, Nebr.	KEYR	690
Texarkana, Ark.	KOSY	790
Texarkana, Tex.	KCMC	740
	KATQ	940
	KTFS	1400
Texas City, Tex.	KTLW	920
Thayer, Mo.	KALM	1290
The Dalles, Oreg.	KODL	1440
	KACI	1300
Thermopolis, Wyo.	KRTR	1490
	KTHE	1240
Thief River Falls, Minn.	KTRF	1230
Thibodaux, La.	KTIB	630
Thomaston, Ga.	WSFT	1220
	WTGA	1590
	WTHN	1500
Thomasville, Ala.	WJDB	630
Thomasville, Ga.	WPAX	1240
	WLDR	730
Thomasville, N.C.	WTNC	790
Thomson, Ga.	WTWA	1240
Three Rivers, Mich.	WLKM	1510
Thurmont, Md.	WTHU	1450
Ticonderoga, N.Y.	WIPS	1250
Tiffin, Ohio	WTTF	1600
Tifton, Ga.	WTIF	1340
	WWGS	1430
Tillamook, Oreg.	KTIL	1590
Tioga, N.D.	KTGO	1090
Titusville, Fla.	WRMF	1050
Titusville, Pa.	WTIV	1230
Toccoa, Ga.	WLET	1420
	WNES	630
Toledo, Ohio	WOHO	1470
	WSPD	1370
	WTOD	1560
	WCWA	1230
	WTTO	1520
Toledo, Oreg.	KTDO	1230
Tolleson, Ariz.	KRDS	1190
Tomah, Wis.	WTMB	1460
Tompkinsville, Ky.	WTKY	1370
Tooele, Utah	KDYL	990
Topeka, Kans.	WIBW	580
	KEWI	1440
	WREN	1250
	KTOP	1490
Toppenish, Wash.	KENE	1490
Torrington, Conn.	WTOR	610
Torrington, Wyo.	KGOS	1490
Towanda, Pa.	WTTC	1550
Towson, Md.	WAQE	1580
Trail, B.C.	CJAT	610
Travelers Rest, S.C.	WBBR	1580
Traverse City, Mich.	WTCM	1400
	WCCW	1310
Trenton, Mo.	KTTN	1600
Trenton, N.J.	WAAT	1300
	WBUD	1260
	WTTM	920
Trenton, Tenn.	WTNE	1500
Trinidad, Colo.	KCRT	1240
Troy, Ala.	WTBF	970
Troy, N.Y.	WHAZ	1330
	WTRY	980
	WXKW	1600
Troy, N. C.	WJRM	1390
Truckee, Calif.	KHOE	1400
Trumann, Ark.	KTMN	1530
Truth or Consequences, New Mexico	KCHS	1400
Tryon, N.C.	WTYN	1550
Tucson, Ariz.	KTUC	1400
	KXEW	1600
	KAIR	1490
	KCEE	790
	KIKX	580
	KCUB	1290
	KEVT	690
	KHOS	940
	KMOP	1330
	KTKT	990
	KOLD	1450
	KUAT	1550
Tucumcari, N.Mex.	KTNM	1400
Tulare, Calif.	KCOK	1270
	KGEN	1370
Tulia, Tex.	KTUE	1260
Tullahoma, Tenn.	WJIG	740
Tulsa, Okla.	KAKC	970
	KOME	1300
	KRMG	740
	KELI	1480
	KVOO	1170
	KFMJ	1050
Tupelo, Miss.	WELO	580
	WTUP	1490
Turlock, Calif.	KCEY	1390
Tuscaloosa, Ala.	WJRD	1150
	WACT	1420
	WNPT	1280
	WTUG	790
	WTBC	1230
Tuscumbia, Ala.	WVNA	1590
	WRCK	1410
Tuskegee, Ala.	WABT	580
Twenty-Nine Palms, Calif.	KDHI	1250
Twin Falls, Idaho	KTFI	1270
	KLIX	1310
	KEEP	1450
Two Rivers, Wis.	WTRW	1590
Tyler, Tex.	KZAK	1330
	KDOK	1490
	KTBB	600
	KZEY	690
Tyrone, Pa.	WTRN	1340
Uhrichsville, Ohio	WUND	1540
	WBTC	1540
Ukiah, Calif.	KUKI	1400
	KMSL	1250
	KULY	1420
Ulysses, Kan.	WBCU	1460
Union, S.C.	WENK	1240
Union City, Tenn.	WMBS	590
Uniontown, Pa.	WILL	580
Urbana, Ill.	WKID	1580
Utica, N.Y.	WIBX	950
	WBVM	1550
	WRUN	1150
	WTLB	1310
Utuado, P.R.	WUPR	1530
Uvalde, Tex.	KVOU	1400
Valdese, N.C.	WSVM	1490
Valdosta, Ga.	WGOV	950
	WGAF	910
	WJEM	1150
	WVLD	1450
Valentine, Nebr.	KVSH	940
Vallejo, Calif.	KNBA	1190
Valley City, N.Dak.	KOVC	1490
Valparaiso, Fla.	WFSH	1340
Valparaiso, Ind.	WAKE	1500
	WNWI	1080
Van Buren, Ark.	KFDF	1580
Van Cleve, Ky.	WMTC	730
Vanceburg, Ky.	WKKS	1570
Vancouver, Wash.	KISN	910
	KKEY	1150
	KGAR	1550
Vandalia, Ill.	WPMB	1500
Van Wert, Ohio	WERT	1220
Venice, Fla.	WAMR	1320
Ventura, Calif.	KVEN	1450
	KUDU	1590
Vermillion, S.Dak.	KUSD	690
	KVRA	1570
Vernal, Utah	KVEL	1250
Vernon, Ala.	WVSA	1380
Vernon, Tex.	KVWC	1490
Vero Beach, Fla.	WAXE	1370
	WTTB	1490
Vicksburg, Miss.	WQBC	1420
	WVIM	1490
Victoria, Tex.	KVAL	1410
	KVIC	1340
Victorville, Calif.	KCIN	1590
Vidalia, Ga.	WVOP	970
Vieques, P.R.	WIVV	1370
Ville Platte, La.	KVPI	1050
Vincennes, Ind.	WAOV	1450
Vineland, N.J.	WWBZ	1360
	WDVL	1270
Vinita, Okla.	KVIN	1470
Vinton, Va.	WKBA	1550
Virginia, Minn.	WHLB	1400
Virginia Beach, Va.	WVAB	1550
Virouqua, Wis.	WISV	1360
Visalia, Calif.	KONG	1400
Vista, Cal.	KMLO	1000
Vivian, La.	KNCB	1600
Waco, Tex.	WACO	1580
	KAWA	1010
	KBGO	1580
	KWTX	1230
Wadena, Minn.	KWAD	920
Wadesboro, N.C.	WADE	1210
Wagoner, Okla.	KWLG	1530
Wahpeton, N.D.-Breckenridge, Minn.	KBMW	1450
Wailuku, Hawaii	KMVI	550
Waipahu, Hawaii	KAHU	940
Walhalla, S.C.	WGOG	1000
Wallace, Idaho	KWAL	620
Wallace, N.C.	WLSE	1400
Walla Walla, Wash.	KHIT	1320
	KUJ	1420
	KTEL	1490
Walnut Ridge, Ark.	KRLW	1320
Walsenburg, Colo.	KFLJ	1380
Walterboro, S.C.	WALD	1220
Waltham, Mass.	WCRB	1330
Walton, N.Y.	WDLA	1270
Ward Ridge, Fla.	WJOE	1570
Ware, Mass.	WARE	1250
Warner Robbins, Ga.	WRBN	1600
	WAVC	1350
Warren, Ark.	KWRF	860
Warren, Ohio	WHHH	1440
Warren, Pa.	WNAE	1310
Warrensburg, Mo.	KOKO	1450
Warrenton, Mo.	KWRE	730
Warrenton, Va.	WEER	1570
	WKCW	1420
Warsaw, Ind.	WRSW	1480
Warsaw, Va.	WNNT	690
Warwick-E.Greenwich, R.I.	WARV	1590
Wasco, Calif.	KWSO	1050
Washington, D.C.	WGMS	570
	WMAL	630
	WOL	1450
	WOOK	1340
	WWDC	1260
	WRC	980
	WTOP	1500
Washington, Ga.	WLDV	1370
Washington, Ind.	WAMW	1580
Washington, Iowa	KCII	1380
Washington, N.J.	WCRV	1580
Washington, N.C.	WEEW	1920
	WITN	930
Washington, Pa.	WJPA	1450
Washington Court House, Ohio	WCHO	1250
Walterboro, S.C.	WALD	1060
Waterbury, Conn.	WATR	1320
	WBRY	1590
	WWCO	1240
Waterbury, Vt.	WDEV	550
Waterloo, Iowa	KXEL	1540
	KNWS	1090
	KWWL	1330
Watertown, N.Y.	WATN	1240
	WOTT	1410
	WWNY	790
Watertown, S.Dak.	KSDR	1480
	KWAT	950
Watertown, Wis.	WTTN	1580
Waterville, Me.	WTVL	1490
Watseka, Ill.	WGFA	1360
Watsonville, Calif.	KOMY	1340
Wauchula, Fla.	WAUC	1310
	WPRV	1600
Waukegan, Ill.	WKRS	1220
Waukesha, Wis.	WAUK	1510
Waukon, Ia.	KNEI	1140
Waupaca, Wis.	WDUX	800
Waupun, Wis.	WLKE	1170
Wausau, Wis.	WRIG	1400
	WSAU	550
	WXCO	1230
Waverly, Iowa	KWVY	1470
Waverly, Ohio	WPKO	1380
Waverly, Tenn.	WPHC	1060
Waxahachie, Tex.	KBEC	1390
Waycross, Ga.	WACL	570
	WAYX	1230
Wayne, Neb.	KTCH	1590
Waynesboro, Ga.	WBRO	1310
Waynesboro, Miss.	WABO	990
Waynesboro, Pa.	WAYZ	1380
Waynesboro, Va.	WAYB	1490
	WANV	970
Waynesburg, Pa.	WANB	1580
Waynesville, Mo.	KJPW	1390
Waynesville, N.C.	WHCC	1400
Weatherford, Tex.	KZEE	1220
Webster City, Iowa	KJFJ	1570
Weed, Calif.	KDAD	800
Weirton, W.Va.	WEIR	1430
Weiser, Idaho	KWEI	1260
Welch, W.Va.	WELC	1150
	WOVE	1340
Weldon, N.C.	WSMY	1400
Wellington, Kan.	KLEY	1130
Wellsboro, Pa.	WNBT	1490
Wellston, Ohio	WKOV	1330
Wellsville, N.Y.	WLSV	790
Wenatchee, Wash.	KPQ	560
	KUEN	900
	KMEL	1340
Wendell-Zebulon, N.C.	WETC	540
Weslaco, Tex.	KRGV	1290
West Allis, Wis.	WAWA	1590
W. Bend, Wis.	WBKV	1470
Westbrook, Me.	WJAB	1440
West Chester, Pa.	WCHE	1520
West Covina, Cal.	KGRB	900
W. Frankfort, Ill.	WFRX	1300
W. Hartford, Conn.	WEXT	1550
West Jefferson, N.C.	WKSK	1600
W. Liberty, Ky.	WLKS	1450
West Looma, Cal.	KGRB	900
W. Memphis, Ark.	KSUD	730
W. Monroe, La.	KUZN	1310
W. Palm Beach, Fla.	WEAT	850
	WJNO	1230
	WIRK	1290
West Plains, Mo.	KWPM	1450
West Point, Ga.	WBMK	1310
West Point, Miss.	WROB	1450
Westport, Conn.	WMMM	1260
W. Springfield, Mass.	WTXL	1490
W. Yarmouth, Mass.	WOCB	1240
W. Yellowstone, Mont.	KWYS	920
Westerly, R.I.	WERI	1230
Westfield, Mass.	WDEW	1570
Westminster, Md.	WTTR	1470
Weston, W.Va.	WHAW	980
W. Warwick, R.I.	WWRI	1450
Wetumpka, Ala.	WETU	1250
Wewoka-Seminole, Okla.	KWSH	1260
Wharton, Tex.	KANI	1500
Wheatland, Wyo.	KYCN	1340
Wheaton, Md.	WDON	1540
Wheeling, W.Va.	WHLL	1600
	WBZE	1470
	WKWK	1400
	WWVA	1170
White Castle, La.	KEVL	1590
Whitehall, Mich.	WLRC	1490
White Plains, N.Y.	WFAS	1230
White River Junc., Vt.	WNHV	910
Whitesburg, Ky.	WTCW	920
Whiteville, N.C.	WENC	1220
Wichita, Kans.	KAKE	1240
	KEYN	900
	KLEO	1480
	KFDI	1070
	KFH	1330
	KWBB	1410
Wichita Falls, Tex.	KNIN	990
	KTRN	1290
	KWFT	620
Wickenburg, Ariz.	KAKA	1250
Wickford, R.I.	WKFD	1370
Wiggins, Miss.	WIGG	1420
Wildwood, N.J.	WCMC	1230
Wilkes-Barre, Pa.	WBAX	1240
	WBRE	1340
	WILK	980
Willcox, Ariz.	KHIL	1250
Williams, Ariz.	KCYN	1240
Williamsburg, Ky.	WEZJ	1440
Williamsburg, Va.	WBCI	740
Williamson, W.Va.	WBTH	1400
Williamsport, Pa.	WLYC	1050
	WRAK	1400
	WWPA	1340
Williamston, N.C.	WIAM	900
Willimantic, Conn.	WILI	1400
Williston, N.D.	KEYZ	1360
Willmar, Minn.	KWLM	1340
Willoughby, Ohio	WELW	1330
Willow Springs, Mo.	KUKU	1330
Willows, Calif.	KIQS	1560
Wilmington, Del.	WAMS	1380
	WDEL	1150
	WILM	1450
	WTUX	1290
Wilmington, N.C.	WMFD	630
	WHSL	1490
	WKLM	980
	WGNI	1340
Wilmington, O.	WMWM	1090
Wilson, N.C.	WGTM	590
	WLLY	1350
	WVOT	1420
Winchester, Ky.	WWKY	1380
Winchester, Tenn.	WCDT	1340
Winchester, Va.	WINC	1400
	WHPL	610
Windber, Pa.	WWBR	1350
Winder, Ga.	WIMO	1300
Windermere, Fla.	WVCF	1480
Windom, Minn.	KDOM	1580
Window Rock, Ariz.	KHAC	1300
Windsor, Conn.	WSOR	1480
Winfield, Ala.	WEZQ	1300
Winfield, Kan.	KNIC	1550
Winnemucca, Nev.	KWNA	1400
Winnfield, La.	KVCL	1270
Winner, S.Dak.	KWYR	1260
Winnsboro, La.	KMAR	1570
Winnsboro, S.C.	WCKM	1250
Winona, Minn.	KWNO	1250
	KAGE	1380
Winona, Miss.	WONA	1570
Winslow, Ariz.	KVNC	1010
	KINO	1230
Winston-Salem, N.C.	WAAA	980

WHITE'S RADIO LOG

Location	C.L.	kHz
	WAIR	1340
	WFCM	1550
	WSJS	600
	WTOB	1380
	WKBX	1500
Winter Garden, Fla.	WOKB	1600
Winter Haven, Fla.	WSIR	1490
	WINT	1360
Winter Park, Fla.	WABR	1440
Wisconsin Rapids, Wis.	WFHR	1320
	WRNE	1220
Wolf Pt., Mont.	KVCK	1450
Woodburn, Ore.	KWRC	940
Woodbury, Tenn.	WBFJ	1540
Wood River, Ill.	WRTH	590
Woodruff, S.C.	WSJW	1510
Woodside, N.Y.	WWRL	1600
Woodville, Tex.	KVLL	1220
Woodward, Okla.	KSIW	1450
Woonsocket, R.I.	WNRI	1380
	WWON	1240
Wooster, Ohio	WWST	960
Worcester, Mass.	WAAB	1440
	WNEB	1230
	WORC	1310
	WTAG	580
Worland, Wyo.	KWOR	1340
Worthington, Minn.	KWOA	730
Worthington, Ohio	WRFD	880
Wynne, Ark.	KWYN	1400
Wyoming, Mich.	WERX	1530
Wytheville, Va.	WYVE	1280
Xenia, O.	WELX	1110
	WGIC	1500
Yakima, Wash.	KIT	1280
	KIMA	1460
	KBBO	1390
	KQOT	930
	KUTI	980
	KYAK	1390
Yankton, S.D.	KYNT	1450
	WNAX	570
Yauco, P.R.	WKFE	1550
Yazoo City, Miss.	WAZF	1230
York, Nebr.	KAWL	1370
York, Pa.	WNOW	1250
	WORK	1350
	WSBA	910
York, S.C.	WYCL	980
Youngstown, Ohio	WBBW	1240
	WFMJ	1390
	WKBN	570
Ypsilanti, Mich.	WYSI	1480
	WYNZ	1520
Yreka, Calif.	KSYC	1490
Yuba City, Calif.	KUBA	1600
	KZIN	1450
Yuma, Ariz.	KBLU	1320
	KVOY	1400
	KYUM	560
Zanesville, Ohio	WHIZ	1240
Zarephath, N.J.	WAWZ	1380
Zebulon-Wendell, N.C.	WETC	540
Zephyr Hills, Fla.	WZRH	1400
Zion, Ill.	WZBN	1500

U. S. FM Stations by States

Location	C.L.	MHz
ALABAMA		
Albertville	WQSB	105.1
Alexander City	WRFS-FM	106.1
Andalusia	WNBX	98.1
Anniston	WHMA-FM	100.5
Athens	WJOF	104.3
	WATM-FM	104.1
Bay Minette	WWSM	105.5
Birmingham	WAPI-FM	99.5
	WBRC-FM	106.9
	WCRT-FM	96.5
	WSFM	93.7
	WVSU-FM	91.1
Carrollton	WRAG-FM	94.1
Clanton	WKLF-FM	97.7
Cullman	WFMH-FM	101.1
	WKLN	92.1
Decatur	WDRM	102.1
	WRSA	96.9
Dothan	WOOF-FM	99.7
Enterprise	WIRB-FM	96.9
Fairhope	WABF-FM	92.1
Florence	WQLT	107.3
Gadsden	WLJM	103.7
Hamilton	WERH-FM	92.1
Homewood	WJLN	104.7
Huntsville	WAHR	99.1
	WNDA	92.9
Jackson	WHOD-FM	104.9
Mobile	WKRG-FM	99.9
	WMFC-FM	98.5
	WLPR	96.1
Montgomery	WFMI	98.9
	WAJM	103.3
	WHHY-FM	101.9
Muscle Shoals	WLAY-FM	105.5
Ozark	WOAB	104.9
Scottsboro	WCNA-FM	98.3
Selma	WHBB-FM	100.1
	WTQX-FM	100.9
Sylacauga	WMLS-FM	98.3
Tuscumbia	WVNA	100.3
Tuscaloosa	WTBO-FM	95.7
	WUOA	91.7
	WACT-FM	105.5
ALASKA		
Anchorage	KNIK	105.5
	KAMU	102.1
	KHAR-FM	103.9
College	KUAC	104.9
ARIZONA		
Bisbee	KSUN-FM	92.1
Flagstaff	KAFF-FM	92.9
Globe	KWJB-FM	100.3
Mesa	KBUZ-FM	104.7
	KMND-FM	93.3
Phoenix	KRFM	95.5
	KFCA	91.5
	KITH	101.3
	KMEO-FM	96.9
	KOOL-FM	94.5
	KNIX-FM	102.5
	KOY-FM	92.5
	KTAR-FM	98.7
	KYEW	93.3
	KHEP-FM	101.5
Scottsdale	KDOT-FM	100.7
Show Low	KVWM	93.5
Tempe	KUPD-FM	97.9
Tucson	KFMM	99.5
	KCEE-FM	96.1
	KSOM	92.9
	KVOA-FM	93.7
ARKANSAS		
Blytheville	KLCN-FM	96.1
Camden	KWEH	97.1
Conway	KASC	91.5
	KVEE-FM	105.1
Crossett	KAGH-FM	104.9
Dardanelle	KCAB-FM	102.3
El Dorado	KRIL	99.3
	KELD-FM	103.1
Fayetteville	KFAV	92.1
	KNWA	103.9
Ft. Smith	KFPW-FM	94.9
	KMAG	99.1
	KTCS-FM	99.9
Harrison	KHOZ-FM	103.9
Hot Springs	KBHS-FM	96.7
	KGUS	97.5
Jacksonville	KGMR-FM	100.3
Jonesboro	KBTM-FM	101.9
	KASU	91.9
Little Rock	KARK	103.7
	KAAY-FM	98.5
	KMYO-FM	95.7
Mammoth Springs	KAMS	103.9
Newport	KNBY-FM	105.5
Osceola	KOSE-FM	98.1
Pine Bluff	KOTN-FM	92.3
Siloam Springs	KUOA-FM	105.7
CALIFORNIA		
Akiah	KLIL	94.3
Alameda	KJAZ	92.7
Anaheim	KEZR-FM	95.9
Angwin	KANG	89.9
Apple Valley	KAVR-FM	102.3
Arcata	KTOO	90.5
Atherton	KPEN	101.3
Auburn	KAFI	101.1
Avalon	KBIG	104.3
Bakersfield	KERN-FM	94.1
	KGEE-FM	97.5
	KIFM	96.3
	KUZZ-FM	107.9
Berkeley	KPFA	94.1
	KALX	90.7
	KPFB	89.3
	KPAT-FM	102.9
Bijou	KHUR	99.9
Bishop	KIBS-FM	100.7
Carlsbad	KARL-FM	95.9
Carmel	KRML-FM	101.7
Claremont	KSPC	88.7
Coachella	KCHV-FM	93.7
Davis	KDVS	91.5
El Cajon	KECR	93.3
Escondido	KOWN-FM	92.1
Fremont	KFMR	104.9
Fresno	KARM-FM	101.9
	KCIB-FM	94.5
	KFRE-FM	93.7
	KMJ-FM	97.9
	KXQR	102.7
Garden Grove	KTBT	94.3
Gilroy	KPER-FM	94.3
Glendale	KFMU	97.1
	KUTE	101.9
Hayward	KTUX	101.7
Hemet	KHSJ-FM	105.5
Inglewood	KTYM-FM	103.9
La Canada	KUNF	88.9
LaSierra	KSOA	89.7
Lodi	KCVR-FM	97.7
Lompoc	KLOM-FM	92.7
Long Beach	KJLH	102.3
	KLON	88.1
	KNOB	97.9
Los Altos	KPGM	97.7
	KFJC	88.7
Los Angeles	KABC-FM	95.5
	KBBI	107.5
	KBCA	105.1
	KBMS	105.9
	KCBH	98.7
	KFAC-FM	92.3
	KFOX-FM	100.3
	KGBS-FM	97.1
	KHJ	101.1
	KMET	94.7
	KMLA	100.3
	KNX-FM	93.1
	KOST	103.5
	KPFK	90.7
	KPOL-FM	93.9
	KRHM	102.7
	KRKD-FM	96.3
	KUSC	91.5
	KXLU	89.1
	KHOF	99.5
Los Angeles-Avalon	KBIG-FM	104.3
Los Banos	KLBS-FM	95.9
Los Gatos	KLGS	95.3
Marysville	KRFD	99.9
Mendocino	KMFB-FM	92.7
Merced	KAMB	101.5
Modesto	KBEE-FM	103.3
	KTRB-FM	104.1
	KDOL-FM	97.7
Mojave	KMBY-FM	96.9
Monterey	KOCM	103.1
Newport Beach	KEDC-FM	88.5
Northridge	KAFE	98.1
Oakland	KUDE	102.1
Oceanside	KSOM-FM	93.5
Ontario	KPMJ	104.7
Oxnard	KPCS	89.3
Pasadena	KPPC-FM	106.7
	KGEC	104.7
Palm Springs	KFRW	95.9
Quincy	KEWB	104.3
Redding	KKOP	93.5
Redondo Beach	KCAL-FM	96.7
Redlands	KUOR-FM	88.1
	KLOA-FM	105.5
Ridgecrest	KBBL	99.1
Riverside	KACE-FM	92.7
	KDUO	97.5
Riverside	KUCR	88.1
Sacramento	KCRA-FM	96.1
	KERS	90.7
	KFBK-FM	96.9
	KJML	106.5
	KEBR	100.5
	KHIQ	105.1
	KJML	95.3
	KRAK-FM	92.9
	KSFM	96.9
	KXRQ	98.5
	KXOA-FM	107.9
Salinas	KSBW-FM	102.5
	KRSA-FM	100.7
San Bernardino	KERR	103.9
	KVCR	91.9
	KFMW	99.9
	KEBS	89.5
	KRCS	95.1
San Diego	KOGO-FM	94.1
	KEBS-FM	89.5
	KFMB-FM	100.7
	KFMX	96.5
	KGB-FM	101.5
	KITT	105.3
	KOIG	98.1
	KLRO	94.9
	KPRI	106.5
	KSOS	88.3
	KBBW	102.9
	KSOO-FM	103.7
	KSEA	97.3
San Fernando	KVFM	94.3
San Francisco	KALW	91.7
	KBRG	105.3
	KCBS-FM	98.9
	KDFC	102.1
	KEAR	97.3
	KFOG	104.5
	KFRC-FM	106.1
	KGO-FM	105.7
	KNBR-FM	99.7
	KMPX	106.9
	KOIT	93.3
	KPEN	101.3
	KRON-FM	96.5
	KSFR	94.9
	KXKX	88.5
	KCMA	90.3
	KBRG	105.3
	KABL-FM	98.1
	KKHI-FM	95.7
San Jose	KSJO-FM	92.3
	KBAY	100.3
	KRPM	98.5
	KSJS	90.7
	KPLX	106.5
San Luis Obispo	KATY-FM	96.1
	KSBY-FM	93.3
San Mateo	KCSM	90.9
	KVEZ	107.7
San Rafael	KTIM	100.9
Santa Ana	KWIZ-FM	96.7
	KYMS	106.3
Santa Barbara	KCSB-FM	91.1
	KDB-FM	93.7
	KMUZ	103.3
	KTMS	97.5
Santa Clara	KSCU	90.1
	KREP	105.7
Santa Cruz	KSCO-FM	99.1
Santa Maria	KXFM	99.1
	KSMA-FM	102.5
Santa Monica	KCRW	89.9
	KSRF	103.1
Santa Rosa	KEFM	100.1
Sierra Madre	KMAX	107.1
Stanford	KZSU	90.1
Stockton	KUOP	91.3
	KJOY-FM	99.3
	KWG-FM	105.7
Tahoe Valley	KTHO-FM	103.1
Thousand Oaks	KNJO	92.7
Torrance	KNHS	89.7
Tracy	KSRT	100.9
Tulare	KDFR	106.7
	KBOS	94.9
Turlock	KOSO	93.1
Twenty-Nine Palms	KDHI-FM	95.7
Ukiah	KUKI-FM	93.5
Ventura-Oxnard	KVEN-FM	100.7
Visalia	KONG-FM	92.9
Walnut Creek	KDFM	92.1
West Covina	KBOB	98.3
Woodland	KATT	95.3
COLORADO		
Boulder	KRNW	97.3
Colorado Springs	KRCC	91.5
	KKFM	96.5
	KSHS	90.5
	KVOR-FM	92.9
	KPIK-FM	94.3
	KRDO-FM	95.1
	KRYT-FM	101.9
Cortez	KZFM	94.1
Denver	KFML-FM	98.5
	KLIR-FM	100.3
	KLZ-FM	106.7
	KMYR	95.7
	KDEN-FM	99.5
	KOA-FM	103.5
	KOSI-FM	101.1
	KTGM	105.1
	KBPI	105.9
Ft. Collins	KCSU-FM	90.9
	KFMF	93.9
Ft. Morgan	KFTM-FM	94.3
Grand Junction	KREX-FM	92.3
Greeley	KCBL-FM	91.3
	KGRE	92.3
Lakewood	KLAK-FM	107.5
Longmount	KLMO-FM	104.3
Loveland	KLOV-FM	102.3
Manitou Springs	KCMS-FM	102.7
Pueblo	KVMN	98.9
Rocky Ford	KAVI-FM	95.9

Location	C.L.	MHz
CONNECTICUT		
Bridgeport	WJZZ	99.9
	WPKN	89.5
Brookfield	WGHF	95.1
Danbury	WLAD-FM	98.3
Fairfield	WSHU	91.1
Hamden	WDEE	101.3
Hartford	WHCN	105.9
	WDRC-FM	102.9
	WCCC-FM	106.9
	WLAE	93.7
	WRTC-FM	89.3
	WTIC-FM	96.5
Meriden	WBMI	95.7
Middletown	WESU	88.1
	WIHS	104.9
New Haven	WNHC-FM	99.1
	WYBC-FM	94.3
Norwalk	WLKW	95.9
Norwich	WICH-FM	97.7
Stamford	WSTC-FM	96.7
Storrs	WHUS	91.7
Waterbury	WATR-FM	92.5
	WWCO-FM	104.1
Westport	WMMM	107.9
DELAWARE		
Dover	WDOV-FM	94.7
Georgetown	WFEM	93.5
Wilmington	WDEL-FM	93.7
	WJBR	99.5
D. C.		
Washington	WASH	97.1
	WAMU-FM	88.5
	WETA-FM	90.9
	WFAN	100.3
	WGAY	99.5
	WGMS-FM	103.5
	WGTB	90.1
	WMAL-FM	107.3
	WOL-FM	98.7
	WRC-FM	93.9
	WTOP-FM	96.3
	WWDC-FM	101.1
FLORIDA		
Atlantic Beach	WKTZ-FM	96.1
	WAQB-FM	104.9
Belle Glade	WSWN-FM	93.5
Boca Ratan	WWOG	99.9
Bradenton	WBRD-FM	103.3
Clear Water	WTAN-FM	95.7
	WQXM	97.9
Cocoa	WEZY-FM	99.3
Cocoa Beach	WCKS	101.1
	WRKT-FM	104.3
Coral Gables	WYOR	105.1
Crestview	WAAZ-FM	104.9
Daytona Beach	WNDB-FM	94.5
	WMFJ-FM	101.9
De Funiak Springs	WZEP-FM	103.1
DeLand	WOOO-FM	105.9
Ft. Lauderdale	WFLM	105.9
	WFTL-FM	106.7
	WMJR	100.7
	WSRF-FM	103.5
Ft. Meyers	WINK-FM	96.9
	WMYR-FM	101.9
Ft. Pierce	WARN-FM	98.7
Ft. Walton Beach	WFTW-FM	99.3
Gainesville	WRUF-FM	103.7
Hialeah	WHMS	92.1
Immokalee	WCOF-FM	95.9
Jacksonville	WJAX-FM	95.1
	WQIK-FM	99.1
	WRLJ	96.9
	WIVY-FM	92.5
	WKTZ-FM	96.1
Jacksonville-Atlantic Bch	WKAT-FM	93.1
Key West	WFYN-FM	92.5
Lakeland	WVFM	94.1
Maitland	WTLN-FM	95.3
Marianna	WTOT-FM	100.9
Melbourne	WYRL	102.3
Miami	WKAT	93.1
	WGBS-FM	96.3
	WGDS-FM	93.9
	WIOD-FM	97.3
	WTHS-FM	91.7
	WEDR	99.1
	WWPB	101.5
Miami Beach	WAEZ	94.9
Milton	WXBM-FM	102.3
Mt. Dora	WHIY-FM	107.7
Naples	WNFM	94.5
Ocala	WMOP-FM	93.7
Okeechobee	WLMC	103.1
Orlando	WDBO-FM	92.3
	WHOO-FM	96.5
	WKIS-FM	100.3
	WWOS	105.1
Palm Beach	WWOS-FM	97.9
Panama City	WPBA-FM	107.1
	WMAI-FM	107.9
	WDLP-FM	92.5
Pensacola	WPEX-FM	94.1
	WCOA-FM	102.7
	WONF	101.5
Plantation Key	WPLC	100.3
Quincy	WCNH-FM	101.7
St. Augustine	WFOY-FM	97.7
St. Petersburg	WGNB	101.5
	WTCX	99.5
	WPIN-FM	107.3
Sarasota	WSAF-FM	102.5
	WSPB-FM	106.3
Sebring	WSEB	105.5
Stuart	WMCF	92.7
Tallahassee	WFSU-FM	91.5
	WBGM-FM	98.9
	WMEN-FM	104.1
	WOMA	94.9
Tampa	WATL-FM	100.7
	WFLA-FM	93.3
	WPKM	104.7
	WUSF	89.7
Titusville	WRMF-FM	98.3
West Palm Beach	WPBF	107.9
Winter Haven	WXKL	97.5
Winter Park	WPRK	91.5
	WLOQ	103.1
GEORGIA		
Albany	WGPC-FM	104.5
	WJIZ	96.3
Americus	WDEC-FM	94.3
Athens	WGAU-FM	102.5
	WDOL-FM	104.7
Atlanta	WABE	90.1
	WPLO-FM	103.3
	WGKA-FM	92.9
	WSB-FM	98.5
	WLTA-FM	99.7
Auburn	WFRI	97.7
Augusta	WAUG-FM	105.7
	WBBQ-FM	104.3
	WGUS-FM	102.3
	WTHB-FM	103.1
Brunswick	WGIG-FM	100.7
	WYNR-FM	101.5
Canton	WCHK-FM	105.5
Carrollton	WLBB-FM	102.3
Cochran	KVMG-FM	96.7
Columbus	WRBL-FM	102.9
	WGBA-FM	107.3
	WWRH	104.9
Cornelia	WCON-FM	99.3
Decatur	WAVO-FM	94.9
Dublin	WXLI-FM	92.7
Gainesville	WDUN-FM	103.9
	WWQT	97.1
Griffin	WKEU-FM	97.7
Jackson	WJGA-FM	92.1
Lagrange	WLAG-FM	104.1
Macon	WDEN-FM	105.3
	WMAZ-FM	99.1
Manchester	WFDR-FM	93.3
Marietta	WBIE-FM	101.5
	WKLS	96.1
Milledgeville	WMVG-FM	102.3
Moultrie	WMTM-FM	93.9
Newnan	WCOH-FM	96.7
Perry	WPGA-FM	100.9
Rome	WRGA-FM	102.3
	WROM-FM	97.7
Rossville	WRIP-FM	105.5
Savannah	WTOC-FM	94.1
	WEAS-FM	98.1
	WKXI	94.1
Smyrna	WMCD	100.1
Statesboro	WJAT-FM	98.3
Swainsboro	WLET-FM	106.1
Toccoa	WGOV-FM	92.9
Valdosta	WCJM	100.9
W. Point		
HAWAII		
Honolulu	KAIM-FM	95.5
	KFOA	94.7
	KGMB-FM	93.1
	KHVH-FM	93.9
	KPOI-FM	97.5
	KVOK	88.1
	KUOH	90.5
IDAHO		
Boise	KBOI-FM	97.9
Idaho Falls	KID-FM	96.1
	KGVM-FM	99.1
	KOZE-FM	96.7
Lewiston	KUID	91.7
Moscow	KCRH	91.5
Nampa	KBGL	88.7
Pocatello		
ILLINOIS		
Alton	WOKZ-FM	100.3
Anna	WRAJ-FM	92.7
Arlington Heights	WNWC	92.7
Aurora	WKKD-FM	95.9
	WMRO-FM	107.9
Bloomington	WBNQ	101.5
Carbondale	WSIU	91.9
Carmi	WROY-FM	97.3
Centralia	WCNT-FM	95.3
Champaign	WDWS-FM	97.5
	WLRW-FM	94.5
Charleston	WEIC-FM	92.1
Chicago	WBBM-FM	96.3
	WBEZ	91.5
	WCLM	101.9
	WHPK-FM	88.3
	WLS-FM	94.7
	WDHF	95.5
	WEBH	93.9
	WEFM	99.5
	WSDM	97.9
	WFMF	100.3
	WNUS-FM	107.5
	WFMT	98.7
	WKFM	103.5
	WMAQ-FM	101.1
	WMBI-FM	90.1
	WNIB	97.1
	WXRT	93.1
	WJJD-FM	104.3
	WCBW	104.9
Columbia	WTAS	102.3
Crete	WDAN-FM	102.1
Danville	WSOY-FM	102.9
Decatur	WNIC	89.7
DeKalb	WLBK-FM	92.5
	WIXN-FM	101.7
Dixon	WVFV	103.9
Dundee	WMRY	101.1
E. St. Louis	WGRA-FM	95.7
Effingham	WELG	103.9
	WRMN-FM	94.3
Elgin	WEPS	88.1
	WELG	103.9
	WRMN-FM	94.3
Elmhurst	WRSE-FM	88.7
Elmwood Park	WXFM	105.9
Evanston	WEAW	105.1
	WNUR	88.7
Fairfield	WFIW-FM	104.9
Flossmoor	WHFH	88.5
Freeport	WELL-FM	98.5
Galesburg	WYKC-FM	88.1
	WGIL-FM	94.9
Glen Ellyn	WELF	107.1
Greenville	WGRN	89.3
Harrisburg	WEBQ-FM	99.9
Highland Park	WEEF-FM	103.1
Jacksonville	WLDS-FM	100.5
	WAJP	93.5
Joliet	WJOL-FM	96.7
Kankakee	WKAK-FM	99.9
	WKOC	88.3
Kewanee	WKEI-FM	92.1
Lansing	WLNR-FM	106.3
LaSalle	WLPO-FM	99.3
Lawrenceville	WAKO-FM	103.1
Litchfield	WSMI-FM	106.1
Loves Park	WLUV-FM	96.7
Macomb	WWKS	91.3
	WKAI-FM	100.1
Madison	WGNU-FM	106.5
Mattoon	WLBH-FM	96.9
Mendota	WGLC-FM	100.9
Monmouth	WVPC-FM	96.7
Morris	WRMI-FM	104.7
Morrison	WMHS	91.5
Mt. Carmel	WSAB	94.9
	WVMC-FM	101.1
Mt. Vernon	WMIX-FM	94.1
Normal	WGLT	91.7
Oak Park	WOPA-FM	102.7
Olney	WSEI-FM	92.9
Ottawa	WOLI	98.3
Paris	WPRS-FM	98.3
Park Forest	WRHS	88.1
Park Ridge	WMTH	88.5
Pekin	WSIV-FM	95.3
Peoria	WMBD-FM	93.3
	WIVC	106.9
Pittsfield	WBBA-FM	97.7
Quincy	WGEM-FM	105.1
	WTAD-FM	99.5
Robinson	WTAY-FM	100.7
Rockford	WROK-FM	97.5
Rock Island	WHBF-FM	96.9
	WVIK	90.9
Skokie	WRSV	98.3
S. Beloit	WRWC	103.1
Springfield	WTAX-FM	103.7
	WFMB	104.5
Sterling	WVEM	101.9
Streator	WJVM	94.3
Taylorville	WIZZ-FM	97.7
Urbana	WGGM	95.0
	WILL-FM	90.9
Waukegan	WPGU	107.1
Wheaton	WEFA	102.3
Winnebago	WETN-FM	88.1
Winnetka	WRVI	95.3
Woodstock	WNTH	88.1
	WREK	105.5
INDIANA		
Anderson	WAFM	97.9
Auburn	WIFF	105.5
Bloomington	WFIU	103.7
	WTTV-FM	92.3
Bluffton	WCRD	100.1
Boonville	WBNL-FM	107.1
Columbia City	WFDT	106.3
Columbus	WCSI-FM	98.3
Connersville	WCNB-FM	100.3
Crawfordsville	WNDY	106.3
Decatur	WADM-FM	92.7
Elkhart	WCMR-FM	104.7
	WTRC-FM	100.7
	WXAX	104.7
Elwood	WBMP	101.7
Evansville	WIKY-FM	104.1
	WEVC	91.5
	WPSR	90.7
	WVHI	105.3
Fort Wayne	WPTH	95.1
	WKJG-FM	97.3
Franklin	WFCI	89.3
	WIFN	95.9
Frankfort	WILO-FM	99.7
Gary	WGVE	88.1
Goshen	WGCS	91.1
Greencastle	WGRE	91.7
	WXTA	94.3
Greenfield	WSMJ	99.5
Greensburg	WTRE-FM	107.3
Hammond	WYCA	92.3
Hartford City	WHCI	91.9
	WWHC	104.9
Huntington	WVSH	91.9
	WHLT-FM	103.1
Indianapolis	WAJC	104.5
	WBDG	90.9
	WICR	88.7
	WISH-FM	107.9
	WAIV	105.7
	WFBM-FM	94.7
	WFMS	95.5
	WGEE-FM	103.3
	WIAN	90.1
	WIBC-FM	93.1
JasPer	WITZ-FM	104.7
Kendallville, Ind.	WAWK-FM	93.3
Kokomo	WFKO	100.5
	WKMO	93.5
Lafayette	WASK-FM	105.3
	WAZY-FM	96.7
La Porte	WLOI-FM	96.7
Lebanon	WNDX	100.9
Logansport	WSAL-FM	102.3
Madison	WORX-FM	96.7
Marion	WMRI-FM	106.9
	WBST	90.7
Michigan City	WMCB-FM	95.9
Monticello	WVTL	95.3
Muncie	WMUN	104.1
	WWHI	91.5
New Albany	WNAS	88.1
New Castle	WCTW-FM	102.5
	WYSN	91.1
North Vernon	WOCH-FM	106.1
Peru	WARU-FM	98.3
Plainfield	WJMK	98.3
Plymouth	WTCA-FM	94.3
Princeton	WRAY-FM	98.1
Richmond	WGLM	96.1
	WECI	91.5
	WKBV-FM	101.3
Salem	WSLM-FM	98.9
Scottsburg	WMPI	100.9
Seymour	WJOD	93.7
Shelbyville	WSVL-FM	97.1
South Bend	WETL	91.9
	WHME	103.1
	WNDU-FM	92.9
	WPFR	102.7
	WJVA-FM	103.9
	WSBT-FM	101.5
Terre Haute	WTHI-FM	99.9
	WBOW-FM	107.5
	WPFR	102.7
	WVTS	100.7
	WISU	89.7
Wabash	WSKS	91.3
	WKUZ	95.9
Warsaw	WRSW-FM	107.3
Washington	WFML	106.5
West Lafayette	WBAA-FM	99.1
W. Terre Haute	WWVR	105.5
Valparaiso	WAKE-FM	105.5
	WVUR	89.5
Vincennes	WAOV-FM	96.7
Winchester	WIUC	98.3
IOWA		
Ames	WOI-FM	90.1
	KLFM	104.1
Atlantic	KJAN-FM	103.7
Boone	KFGQ-FM	98.9
Burlington	KBUR-FM	107.3
Carroll	KCIM-FM	93.7
Cedar Falls	KTCF	88.1
Cedar Rapids	KHAK-FM	98.1
	WMT-FM	104.5
Clarion	KRIT	96.9
Clinton	KROS-FM	96.1
Creston	KSIB-FM	101.7
Davenport	WOC-FM	103.7
	KALA	90.1
	KWNT-FM	106.5
Denison	KDSN-FM	107.1
Des Moines	KDPS	88.1
	KDMI-FM	97.3
	WHO-FM	100.3
	KFMG	94.9
	KRNT-FM	102.5
	KWDM	93.3

WHITE'S RADIO LOG

Location	C.L.	MHz
Dubuque	WDBQ-FM	105.3
	KFMD	92.9
Ft. Dodge	KWMT-FM	94.5
Iowa City	KSUI	91.7
	KXIC-FM	100.7
Iowa Falls	KIFG-FM	95.3
LeMars	KLEM-FM	99.5
Maquoketa	KMAQ-FM	95.3
Marshalltown	KFJB-FM	101.1
Mason City	KLSS	106.1
Mt. Vernon	KRNL-FM	89.7
Muscatine	KWPC-FM	99.7
Newton	KUWS-FM	95.9
Oskaloosa	KBOE-FM	104.9
Sioux Center	KDCR	91.3
Sioux City	KDVR	97.9
	KTFC	103.3
Spencer	KICD-FM	107.7
Storm Lake	KAYL-FM	101.5
Waterloo	KNWS-FM	101.9
	KXEL-FM	105.7
Waverly	KWAR	89.1

KANSAS

Baldwin	KNBU	88.9
Dodge City	KGNO-FM	95.5
Emporia	KSTE	88.7
	KVOE-FM	104.9
Garden City	KUPK-FM	97.3
Junction City	KJCK-FM	94.5
Kansas City	KCJC	98.1
	KCKN-FM	94.1
Larned	KANS.FM	96.7
Lawrence	KANU	91.5
	KLWN-FM	105.9
Leavenworth	KCLO-FM	98.9
Manhattan	KSDB-FM	88.1
Newton	KJRG-FM	92.3
Ottawa	KTJO-FM	88.1
	KOFO-FM	95.7
Parsons	KPPS-FM	91.1
Pratt	KWNS-FM	93.1
Russell	KRSL-FM	95.9
Salina	KAFM	99.9
Scott City	KFLA-FM	94.5
Topeka	KTOP	100.3
	WIBW-FM	97.3
Wichita	KFH-FM	100.3
	KARD	107.3
	KQTY	101.3
	KMUW	89.1
Winfield	KSWC	88.3

KENTUCKY

Albany	WANY-FM	106.3
Ashland	WCMI-FM	93.7
Beattyville	WLJC	102.3
Benton	WCBL-FM	102.3
Bowling Green	WLBJ-FM	96.7
Campbellsville	WTCO-FM	103.9
Carrollton	WVCM	100.1
Central City	WNES-FM	101.9
Corbin	WCTT-FM	107.1
	WYGO-FM	99.3
Erlanger	WKKY-FM	100.9
Ft. Knox	WSAC-FM	105.5
Frankfort	WKYW	104.9
Fulton	WFUL-FM	104.9
Georgetown	WRVG	90.1
Glasgow	WGGC	95.1
Grayson	WGOH-FM	102.3
Greenville	WKYF-FM	106.3
Hazard	WKIC-FM	101.1
Henderson	WSON-FM	99.5
Hopkinsville	WHOP-FM	98.7
	WKOF	100.3
Jamestown	WJRS-FM	103.1
Leitchfield	WMTL-FM	104.9
Lexington	WBKY	91.3
	WLAP-FM	94.5
	WLEX-FM	98.1
	WVLK-FM	92.9
Louisville	WFPK	91.9
	WFPL	89.3
	WHAS-FM	97.5
	WKLO-FM	99.7
	WKRX	106.9
	WLRS	102.3
	WXEL	103.9
Madisonville	WFMW-FM	93.9
	WNGO-FM	94.7
Manfordville	WLOC-FM	102.3
Manchester	WWXL-FM	103.1
Maysville	WFTM-FM	95.9
Monticello	WFLW-FM	101.7
Morehead	WMOR-FM	92.1
	WMKY-FM	91.1
Morganfield	WMSK-FM	95.3
Murray	WAWW	103.7
Owensboro	WDMI-FM	92.5
	WVJS-FM	96.1
Paducah	WPAD-FM	96.9
	WKYX-FM	93.3
Paintsville	WSIP-FM	100.1
Paris	WPDE-FM	96.7
Pikeville	WPKE-FM	92.1
Prestonburg	WDOC-FM	95.5
	WPRT-FM	105.5
Richmond	WEKU-FM	88.9
Russellville	WRUS-FM	101.1
St. Mathews	WSTM	103.1
Scottsville	WLCK-FM	99.3
Somerset	WSEK	96.7
	WSCC	90.7
Stanford	WRSL-FM	95.9
Whitesburg	WTCW-FM	104.9

LOUISIANA

Alexandria	KALB-FM	96.9
Ames	KLFM	104.1
Baton Rouge	WJBO-FM	102.5
	WAFB-FM	98.1
	WQXY-FM	100.7
DeRiddor	KDLA-FM	101.7
Golden Meadow	KLEB-FM	94.3
Hammond	WTGI	103.3
Houma	KCIL	107.1
Jennings	KJEF-FM	92.7
Jonesboro	KTOC-FM	104.9
Lafayette	KRVS-FM	88.3
	KPEL-FM	99.9
	KSMB	94.5
Lake Charles	KPLC-FM	99.5
	KIKS-FM	96.1
La Place	WCKW	92.3
Monroe	KMLB-FM	104.1
	KNOE-FM	101.9
	KREB	106.1
Morgan City	KMRC-FM	96.7
Mt. Vernon	KRNL-FM	105.3
Natchitoches	KNOC-FM	97.7
New Iberia	KNIR-FM	99.1
New Orleans	WBEH	89.3
	WDSU-FM	105.3
	WNNR-FM	97.1
	WRNO	99.5
	WWOM-FM	98.5
	WMMT	95.7
Opelousas	KSLO-FM	107.1
Ruston	KRUS-FM	107.1
Shreveport	KRMD-FM	101.1
	KBCL-FM	96.5
	KWKH-FM	94.5
Thibodaux	KTIB-FM	106.3
Ville Platte	KVPI-FM	93.5
W. Monroe	KUZN-FM	98.3
Winnfield	KVCL-FM	92.1

MAINE

Augusta	WFAU-FM	101.3
Bangor	WABI-FM	97.1
Brunswick	WBOR	91.1
	WCME-FM	98.9
Caribou	WFST-FM	97.7
Ellsworth	WOEA-FM	95.7
Lewiston	WCOU-FM	93.9
	WRJR	91.5
Orono	WMEB-FM	91.9
Poland Springs	WMTW-FM	94.9
Portland	WLOB-FM	97.9
	WPOR-FM	101.9
	WGAN-FM	102.9
Rockland	WRKD-FM	93.5
Waterville	WTVL-FM	98.3

MARYLAND

Annapolis	WNAV-FM	99.1
	WXTC	107.9
	WAQE-FM	101.9
Baltimore	WBJC	91.5
	WCAO-FM	102.7
	WCBM-FM	106.5
	WFMM-FM	98.1
	WRBS	95.1
	WBAL-FM	97.9
	WITH-FM	104.3
	WSID-FM	92.3
	WTOW-FM	101.9
Bethesda	WJMO	94.7
	WHFS	102.3
Bradbury Heights	WPGC	95.5
Cambridge	WCEM-FM	106.3
Catonsville, Md.	WCBC	105.7
Cumberland	WCUM-FM	102.9
Frederick	WFMD-FM	99.9
Frostburg	WFRB-FM	105.3
Glen Burnie	WISZ-FM	95.9
Hagerstown	WJEJ-FM	104.7
	WARK-FM	106.9
Halfway	WHAG-FM	96.7
Havre de Grace	WASA-FM	103.7
Oakland	WBUZ	95.5
	WMSG-FM	92.1
Salisbury	WBOC-FM	104.7
Tacoma Park	WGTS-FM	91.9
Waldorf	WSMD-FM	104.1
Westminster	WTTR-FM	100.2

MASSACHUSETTS

Amherst	WAMF	88.1
Andover	WFCR	88.5
	WMUA	91.1
Boston	WPAA	91.7
	WBUR	90.9
	WBCN	104.1
	WBZ-FM	106.7
	WCOP-FM	100.7
	WEEI-FM	103.3
	WERS	88.9
	WHDH-FM	94.5
	WRKO-FM	98.5
	WBET-FM	97.7
	WBOS-FM	92.9
	WGBH-FM	89.7
	WHRB-FM	95.3
	WJIB	96.9
	WTBS	88.1
	WBNE	104.5
Brockton	WKOX-FM	105.7
Brookline	WVCA-FM	104.9
Cambridge	WHAI-FM	98.3
	WHAV-FM	92.5
	WCOD-FM	106.1
Fitchburg	WCCM-FM	93.7
Framingham	WLLH-FM	99.5
Gloucester	WLTI	91.5
Greenfield	WLYM-FM	101.7
Haverhill	WHIL-FM	107.9
Hyannis	WBSM-FM	97.3
Lawrence	WNBH-FM	98.1
Lowell	WMNB-FM	100.1
	WHMP-FM	99.3
Lynn	WQRB	105.5
Medford	WBRK-FM	101.7
New Bedford	WPLM-FM	99.1
	WMHC	88.5
N. Adams	WHYN-FM	93.1
Northampton	WAIC	91.9
Pittsfield	WCRX	102.1
	WSCB	88.9
Plymouth	WMAS-FM	94.7
S. Hadley	WRLM	93.3
Springfield	WBRS	91.7
	WCRB-FM	102.5
Taunton	WOCB-FM	94.9
Waltham	WCFM	91.3
	WHSR-FM	91.9
W. Yarmouth	WAAB	107.3
Williamstown	WSRS	96.1
Winchester		
Worcester		

MICHIGAN

Adrian	WLEN	103.9
	WVAC	88.1
Alma	WFYC-FM	104.9
Alpena	WHSB	107.7
	WATZ-FM	93.5
Battle Creek	WKFR-FM	103.3
Big Rapids	WBRN-FM	100.9
Ann Arbor	WUOM	91.7
	WPAG-FM	107.1
Bad Axe	WLEW-FM	92.1
Bay City	WBCM-FM	96.1
	WNEM-FM	102.5
Benton Hrbr.	WHFB-FM	99.9
Birmingham	WHFI	94.7
Charlotte	WCER-FM	92.7
Cheboygan	WCBY-FM	105.1
Clare	WCRM-FM	95.3
Coldwater	WTVB-FM	98.3
Dearborn	WKNR-FM	100.3
Detroit	WDET-FM	101.9
	WBFG	98.7
	WCHD	105.9
	WDTM	106.7
	WABX	99.5
	WDTR	90.9
	WGPM	107.5
	WJBK-FM	93.1
	WMUZ	103.5
	WGPR	97.9
	WJR-FM	96.3
	WOMC-FM	104.3
	WQRS-FM	105.1
	WRMK-FM	98.7
	WWJ-FM	97.1
	WXYZ-FM	101.1
	WCAR-FM	92.3
	WKAR-FM	90.5
E. Lansing	WITL-FM	100.7
	WSWM	99.1
	WVIC-FM	95.7
Flint	WFBE	95.1
	WGMZ-FM	107.9
	WMRP-FM	105.5
Grand Rapids	WFUR-FM	102.9
	WJFM	93.7
	WLAV-FM	96.9
	WYON	101.3
	WOOD-FM	105.7 (s)
	WVGA-FM	104.1
	WXTO-FM	97.9
	WZZM-FM	95.7
Greenville, Mich.		
	WPLB-FM	107.3
Hancock	WMPL-FM	93.5
Hastings	WBCH-FM	100.1
Highland Pk.	WHPR	88.1
Holland	WJBL-FM	94.5
	WHTC-FM	96.1
Houghton Lake	WJGS	98.5
Interlochen	WGYA	103.1
	WIAA	88.3
Jackson	WBBC	94.1
	WKHM-FM	106.1
Kalamazoo	WMUK	102.1
	WSEO-FM	106.5
Lansing	WJIM-FM	97.5
	WILS-FM	101.7
Mackinaw City	WRIW	94.3
Marquette	WNMR	90.1
	WDMJ-FM	95.7
Marshall	WALM-FM	96.7
	WMRR-FM	104.9
Midland	WQDC-FM	99.7
Monroe	WVMO	98.3
Mount Clemens	WBRB-FM	102.7
Mount Pleasant	WCMU	90.1
	WCEN-FM	94.5
Muskegon	WFFM	106.9
Oak Park	WLDM	95.5
Owasso	WOAP-FM	103.9
Petoskey	WJML	98.9
	WMBN-FM	96.7
Port Huron	WHLS-FM	107.1
Royal Oak	WOAK	89.3
	WOMC	104.3
Saginaw	WSAM-FM	98.1
St. Johns	WRBJ-FM	92.1
St. Joseph	WSJM-FM	107.1
Sandusky	WMIC-FM	97.7
Southfield	WSHJ	88.3
Spring Arbor	WSAE	89.3
Sturgis	WSTR-FM	103.1
Traverse City	WLDR-FM	101.9
	WCCW-FM	92.1
	WTCM-FM	103.5
Warren	WPHS	91.5
Ypsilanti	WEMU	88.1

MINNESOTA

Alexandria	KXRA-FM	92.7
Austin	KAUS-FM	99.9
Anoka	KTWN	107.9
Blue Earth	KBEW-FM	100.9
Brainerd	KLIZ-FM	95.9
Collegeville	KSJR-FM	90.1
Faribault	KDHL-FM	95.9
Golden Valley	KQRS-FM	92.5
Mankato	KMSO	90.5
	KYSM-FM	103.5
Marshall	KMHL-FM	100.1
Minneapolis-St. Paul		
	KTIS-FM	98.5
	WLOL-FM	99.5
	KWFM	97.1
	KNOF	95.3
	WPBC-FM	101.3
	WAYL	98.7
	WCTS-FM	100.3
Moorhead	KVOX-FM	99.9
	KQWB-FM	98.7
New Brighton	KSJN-FM	91.1
New Ulm	WNUJ-FM	93.1
Northfield	WCAL-FM	89.3
Owatonna	KRFO-FM	104.9
Park Rapids	WPRM-FM	103.7
Red Wing	KCUE-FM	105.5
Richfield	WPBC-FM	101.3
Rochester	KROC-FM	106.9
	KNXR	97.5
	KOLM-FM	96.7
	KWEB-FM	101.7
St. Cloud	KFAM-FM	104.7
	KVSC	88.5
St. Louis Park	KRSI-FM	104.1
St. Paul	WMIN-FM	102.1
	KSTP-FM	94.5
St. Peter	KRBI-FM	105.5
Wilmar	KWLM-FM	102.5
	KWOA-FM	95.1

MISSISSIPPI

Biloxi	WVMI-FM	106.3
Columbia	WFFF-FM	96.7
Corinth	WKCU-FM	94.3
Forest	WQST	92.5
Greenwood	WSWG	99.1
Gulfport	WRDA-FM	107.1
Hattiesburg	WHSY-FM	104.5
	WFOR-FM	103.7
Houston	WCPC-FM	93.3
Jackson	WJDX-FM	102.9
	KFXM	95.5
	WJMI	99.7
	WSLI-FM	96.3
	WWHD	94.7
Kosciusko	WKOZ-FM	105.1
Laurel	WNSL-FM	100.3
Louisville	WLSM-FM	107.1
Magee	WSJC-FM	107.5
McComb	WCCA	94.1
Meridian	WMMI	88.1
	WDKK-FM	97.1
Moss Point	WACY-FM	104.9
Natchez	WNAT-FM	95.1
New Albany	WNAU-FM	103.5
Pascagoula	WPMP-FM	99.1
Poplarville	WRPM-FM	107.9
Pontotoc	WSEL-FM	96.7
Tupelo	WELO-FM	98.5
Vicksburg	WQMV	98.7
Yazoo City	WJNS-FM	92.1

MISSOURI

Location	C.L.	MHz
Bolivar	KLTB	106.3
Buffalo	KBFL	90.3
Cape Girardeau	KZYM-FM	102.9
Carrollton	KAOL-FM	101.1
Clayton	KFUO-FM	99.1
Columbia	KWWC-FM	90.5
	KBIA-FM	91.3
Crestwood	KSHE	94.7
Dexter	KDEX-FM	107.3
El Dorado Springs	KESM-FM	101.7
Houston	KBTC-FM	99.3
Joplin	WMBH-FM	96.1
	KSYN	92.5
Kansas City	KCMO-FM	94.9
	KBEY	104.3
	KTSR	90.1
	WDAF-FM	102.1
	KCUR-FM	89.3
	KMBR-FM	99.7
	KPRS-FM	103.3
	KXTR	96.5
	KWKI	93.3
Kennett	KBOA-FM	98.9
Kirksville	KRXL	94.5
Marshall	KMFL-FM	102.9
Mexico	KWWR-FM	95.7
Moberly	KRES	104.7
Osage Beach	KRMS-FM	93.5
Point Lookout	KSOZ	88.1
Poplar Bluff	KWOC-FM	94.5
Rolla	KCLU-FM	94.3
	KMSM	88.5
St. Charles	KCLC	90.1
Ste. Genevieve	KSGM-FM	105.7
St. Joseph	KUSN-FM	105.1
St. Louis	KCFM	93.7
	KACO	107.7
	KADI	96.5
	WAMV-FM	101.1
	WIL-FM	92.3
	KNDA	102.5
	KRCH	98.1
	KSLH	91.5
	KRFD	106.9
Sedalia	KSIS-FM	92.1
Springfield	KTTS-FM	94.7
	KTXR	101.5
	KWTO-FM	98.7
	KLPW-FM	101.9
	KFBD	97.7
Waynesville	KWPM-FM	93.9
West Plains		

MONTANA

Belgrade	KGVW-FM	96.1
Billings	KURL-FM	97.1
Bozeman	KBHF	93.7
Great Falls	KOPR-FM	106.3
Missoula	KUFM	88.1
Plentywood	KPWD	100.1

NEBRASKA

Aurora	KROA	103.1
Beatrice	KWRE-FM	92.9
Columbus	KJSK-FM	101.1
Hastings	KICS-FM	93.5
Kearney	KOVF-FM	91.3
Kearney-Holdrege	KRNY-FM	98.9
Lexington	KRUN-FM	93.1
Lincoln	KFMQ	95.3
	KLIN-FM	107.3
	KUCV	91.3
	KWHG	102.7
Omaha	KFAB-FM	99.9
	KFBI-FM	100.7
	KOIL-FM	96.1
	KOWH-FM	94.1
	WOW-FM	92.3
Scottsbluff	KNEW-FM	94.1
York	KAWL-FM	104.9

NEVADA

Fallon	KVLV-FM	99.3
Las Vegas	KORK-FM	97.1
	KRGN	101.9
	KLUC-FM	98.5
	KVEG-FM	92.3
Reno	KNEV	95.5
	KUNR	88.1
	KSRN	104.5

NEW HAMPSHIRE

Berlin	WMOU-FM	103.7
Claremont	WTSV-FM	106.1
Conway	WBNC-FM	93.5
Durham	WUNH	90.3
Exeter	WPEA	90.1
Laconia	WLNH-FM	98.3
Keene	WKNE-FM	103.7
Manchester	WKBR-FM	95.7
	WGIR-FM	101.1
Mt. Washington	WMTW-FM	94.9
Nashua	WOTW-FM	106.3
Portsmouth	WPFM	100.3

NEW JERSEY

Asbury Park	WJLK-FM	94.3
	WHTG-FM	105.5
Atlantic City	WFPG-FM	96.9
	WMGM	103.7
	WRNJ	95.1
Bridgeton	WSNJ-FM	107.7
Camden	WKDN-FM	106.9
Cape May	WRIO-FM	99.7
Dover	WDHA-FM	105.5
E. Orange	WFMU	91.1
Eatontown	WHTG-FM	106.3
Franklin	WLVP	102.3
Franklin Lakes	WRRH	88.7
Glassboro	WGLS-FM	89.7
Hackettstown	WNTI	91.9
Hanover	WHPH	90.3
Long Branch	WRLB	107.1
Millville	WMVB-FM	97.3
Newark	WHBI	105.9
	WFME	94.7
	WVNJ-FM	100.3
	WBGO	88.3
New Brunswk.	WCTC-FM	98.3
Newton	WIXL-FM	103.7
Paterson	WPAT-FM	93.1
Princeton	WPRB	103.3
Red Bank	WFHA-FM	106.3
South Orange	WSOU	89.5
Toms River	WOBM	92.7
Trenton	WBJH	101.5
	WTOA	97.5
	WTSR	89.7
	WTTM-FM	94.5
Wildwood	WCMC-FM	100.7
Zarephath	WAWZ-FM	99.1

NEW MEXICO

Alamogordo	KXXI	94.3
	KOTO	105.5
Albuquerque	KANW	89.1
	KBNM	99.5
	KDEF-FM	94.1
	KRST	92.3
	KHFM	96.3
	KOAT-FM	100.3
	KOB-FM	93.3
	KUMN	90.1
Artesia	KSVP-FM	92.9
Carlsbad	KCNM	92.1
Clovis	KTQM-FM	99.9
Hobbs	KHOB-FM	95.7
Los Alamos	KRSN-FM	98.5
Las Cruces	KGRD-FM	103.9
Las Vegas	KEDP	91.1
Lovington	KLEA-FM	101.7
Mountain Park	KMFM	97.9
Roswell	KBIM-FM	94.9
Santa Fe	KAFE-FM	97.3
	KSNM	95.5
Taos	KKIT-FM	99.3
Tucumcari	KTNM-FM	92.7
University Park	KRWG	91.7

NEW YORK

Albany	WAMC	90.3
	WHRL	103.1
	WROW-FM	95.5
Auburn	WMBO-FM	106.9
Babylon	WTFM	103.5
	WGSM-FM	94.3
	WBAB-FM	102.3
Binghamton	WNBF-FM	98.1
	WHRW	90.5
	WKOP-FM	99.1
	WSEN-FM	92.1
	WNYE	91.5
	WCWP	88.1
	WBEN-FM	102.5
	WDCX	99.5
	WBFO	88.7
	WRUF	93.3
	WEBR	94.5
	WGR-FM	96.9
	WTSL-FM	103.3
	WWOL-FM	104.1
	WYSL-FM	103.3
	WBNY-FM	96.1
	WSLU	96.7
Canton	WCSQ	89.3
Central Square	WJIV	101.9
Cherry Valley	WHCL-FM	88.7
Clinton	WCLI-FM	106.1
Corning	WKRT-FM	99.9
Cortland	WBLK-FM	93.7
Depew	WOIV	105.1
DeRuyter	WECW	88.1
Elmira	WEHH-FM	94.3
	WENY-FM	92.7
Floral Park	WSHS	90.3
Garden City	WLIR	92.7
Geneseo	WGSU	89.3
Glen Falls	WWSC-FM	95.9
	WXQL	107.1
Gouverneur	WIGS-FM	92.7
Hempstead	WHLI-FM	98.3
	WVHC	88.7
Hornell	WWHG-FM	105.3
Hudson	WHUC-FM	93.5
Ithaca	WHCU-FM	97.3
	WICB	91.7
	WEIV	103.7
	WVBR-FM	93.5
Jamestown	WJTN-FM	93.3
	WKSN-FM	101.7
	WIZR-FM	104.9
Johnstown	WYSL-FM	103.3
Kenmore	WGHQ-FM	94.3
Kingston	WNDN	97.7
	WSHR	89.7
Lake Ronkonkoma	WTFM	103.5
Lake Success	WVOS-FM	95.9
Liberty	WVCR-FM	89.1
Loudonville	WALL-FM	92.7
Middletown	WRNW	107.1
Mt. Kisco	WVIP-FM	106.3
	WFMN	103.1
Newburgh	WVOX-FM	93.5
New Rochelle	WABC-FM	95.5
New York	WBAI	99.5
	WCBS-FM	101.1
	WEVD-FM	97.9
	WFUV	90.7
	WHOM-FM	92.3
	WKCR-FM	89.9
	WLIB-FM	107.5
	WNCN	104.3
	WNEW-FM	102.7
	WNBC-FM	97.1
	WNYC-FM	93.9
	WNYE	91.5
	WOR-FM	98.7
	WPIX-FM	101.9
	WQXR-FM	96.3
	WRFM	105.1
	WRVR	106.7
Niagara Falls	WHLD-FM	98.5
Norwich	WCHN-FM	93.9
Olean	WHDL-FM	95.7
Oswego	WOSE	104.9
Plattsburg	WEAV-FM	99.9
Patchogue	WALK-FM	97.5(s)
	WPAC-FM	106.1
	WLNA-FM	100.7
Peekskill	WTSC-FM	91.1
Potsdam	WKIP-FM	104.7
Poughkeepsie	WEOK-FM	101.5
	WAPC-FM	103.9(s)
Riverhead	WHFM	98.9
Rochester	WBBF-FM	92.5
	WCMF	96.5
	WIRQ	90.9
	WNYR-FM	101.3
	WROC-FM	97.9
	WRUR-FM	90.1
	WVOR	100.5
Sag Harbor	WLNG-GM	92.1
Schenectady	WGFM	99.5
South Bristol	WMIV	95.1
Springville	WSPE	88.1
Syracuse	WAER	88.1
	WDDS-FM	93.1
	WONO	107.9
	WSRV	100.9
	WSYR-FM	94.5
Troy	WFLY	92.3
	WRPI	91.5
Utica	WRUN-FM	105.7
	WIBQ-FM	94.9
	WOUR	96.9
Wethersfield	WBIV	105.7
White Plains	WFAS-FM	103.9

NORTH CAROLINA

Albemarle	WABZ-FM	100.9
Asheboro	WGWR-FM	92.3
Asheville	WLOS-FM	104.3
Bridgeton	WVWB-FM	97.7
Burlington	WBBB-FM	101.1
	WFNS-FM	93.9
Black Mountain	WMIT	106.9
Burgaw	WPGF-FM	99.9
Burlington-Graham	WBAG-FM	92.9
Chapel Hill	WUNC	91.5
Charlotte	WBT-FM	107.9
	WRNA	95.1
	WSOC-FM	103.7
	WYFM	104.7
	WMIT	106.9
Clingman's Pk.	WRRZ-FM	107.1
Clinton	WEGO-FM	97.9
Concord	WDNC-FM	105.1
Durham	WSRC-FM	107.1
	WIFM-FM	100.9
Elkin	WFNC-FM	98.1
Fayetteville	WBBO-FM	93.3
Forest City	WAGY-FM	105.3
	WFSC-FM	96.7
Franklin	WGNC-FM	101.9
Gastonia	WEQR	96.9
Goldsboro	WMDE	98.7
Greensboro	WQMG-FM	97.1
	WUAG	89.9
Greenville	WNCT-FM	107.7
Grifton	WITN-FM	93.3
Henderson	WHNC-FM	92.5
	WHKP-FM	102.5
Hendersonville	WHKP-FM	102.5
Hickory	WHKY-FM	102.9
	WXRC	95.7
High Point	WHPE-FM	95.5
	WMFR-FM	99.5
	WNOS-FM	100.3
Jacksonville	WJNC-FM	92.1
	WXQR-FM	105.5
Kannapolis	WRKB-FM	99.7
Kinston	WFTC-FM	95.1
Laurinburg	WEWO-FM	96.5
Leaksville	WLOE-FM	94.5
Lexington	WBUY-FM	94.3
Lumberton	WTSB-FM	95.7
	WAGR-FM	102.3
North Wilkesboro	WKBC-FM	97.3
Raleigh	WKIX-FM	96.1
	WKNC-FM	88.1
	WPTF-FM	94.7
	WRAL-FM	101.5
Reidsville	WWMO-FM	102.1
Rocky Mount	WEED-FM	92.1
	WFMA	100.7
Rochester	WVOR	92.5
Roxboro	WRXO-FM	96.7
Salisbury	WSTP-FM	106.5
Sanford	WWGP-FM	105.5
Shelby	WOHS-FM	96.1
Statesville	WFMX	105.7
Tabor City	WTAB-FM	104.9
Tarboro	WCPS-FM	104.3
Thomasville	WTNC-FM	98.3
Washington	WITN-FM	93.3
Williamston	WIAM	103.7
Wilmington	WPRV	93.9
	WHSL-FM	97.3
Wilson	WVOT-FM	106.1
Winston-Salem	WAAA-FM	107.5
	WFDD-FM	88.1
	WEPL	93.1
	WSJS-FM	104.1

NORTH DAKOTA

Bismarck	KFYR-FM	92.9
Devils Lake	KDLR-FM	96.7
Fargo	KFNW-FM	97.9
	WDAY-FM	93.7
	KDSU	91.9
Grand Forks	KVBC	94.7
Jamestown	KSJM	93.3
Minot	KCJB-FM	97.1

OHIO

Akron	WAKR-FM	97.5
	WAPS	89.1
	WAUP	88.1
	WCUE-FM	96.5
	WFAH-FM	101.7
Alliance	WNCO-FM	101.3
Ashland	WRDL	88.1
Ashtabula	WREO-FM	97.1
Athens	WOUB-FM	91.3
	WATH-FM	105.5
	WOMP-FM	100.5
Bellaire	WBWC	88.3
Berea	WAWR-FM	93.5
Bowling Green	WBGU	88.1
	WBNO-FM	100.9
Bryan	WBCO-FM	92.7
Bucyrus	WILE-FM	96.7
Cambridge	WHBC-FM	94.1
Canton	WNYN-FM	106.9
	WTOF	98.1
Cedarville	WCDR-FM	90.1
Celina	WMER-FM	94.3
	WCSM-FM	96.7
Chillicothe	WBEX-FM	93.3
Cincinnati	WAEF	98.5
	WCPO-FM	105.1
	WEBN-FM	102.7
	WAKW-FM	93.3
	WGUC	90.9
	WKRC-FM	101.9
	WZIP-FM	92.5
Circleville	WNRE	104.9
Cleveland	WBOE	90.3
	WCRF-FM	103.3
	WCLV	95.5
	WDOK	102.1
	WERE-FM	98.5
	WGAR-FM	99.5
	WHK-FM	100.7
	WJW-FM	104.1
	WKYC-FM	105.7
	WNOB	107.9
	WRUW-FM	91.1
	WXEN	106.5
	WZAK	93.1
Cleveland Hts.	WCUY-FM	92.3
Columbus	WCBE	90.5
	WBNS-FM	97.1
	WCOL-FM	92.3
	WMNI-FM	99.7
	WNCI	97.9
	WOSU-FM	89.7
	WTVN-FM	96.3
	WVKO	94.7
Conneaut	WFIZ	105.5
Dayton	WHIO-FM	99.1
	WONE-FM	104.7
	WDAO	107.7
DeGraff	WDEQ-FM	91.1
Delaware	WSLN	88.7
E. Liverpool	WRTS	104.3

WHITE'S RADIO LOG

Location	C.L.	MHz
Eaton	WCTM	92.9
Elyria	WBEA	107.3
Fairfield	WCNW-FM	94.9
Findlay	WFIN-FM	100.5
Fostoria	WFDB	96.7
Fremont	WFRO-FM	99.3
Gallipolis	WJEH-FM	101.5
Granville	WDUB	90.9
Greenville	WORK-FM	106.5
Hamilton	WQMS	96.7
	WHOH	103.5
Hillsboro	WSRW-FM	106.7
Holland	WPOS-FM	102.3
Kent	WKSU	89.7
	WKNT-FM	100.1
Kenton	WKTN-FM	98.3
Kettering	WVUD-FM	99.9
Lancaster	WHOK-FM	95.5
Lima	WIMA-FM	102.1
	WTGN	97.7
Logan	WLGN-FM	98.3
London	WLNO	106.3
Mansfield	WVNO	106.1
	WCLW-FM	105.3
Marietta	WCMO	89.3
	WMOA-FM	94.3
Marion	WMRN-FM	106.9
Medina	WDBN	94.9
Miamisburg	WFCJ	98.9
Middletown	WPFB-FM	105.9
Mt. Vernon	WMVO-FM	93.7
New Concord	WMCO	90.7
Newark	WCLT-FM	100.3
Norwalk	WLKR-FM	95.3
Oberlin	WOBC	88.7
Oxford	WMUB	88.5
	WOXR	97.7
Piqua	WPTW-FM	95.7
Port Clinton	WRWR-FM	94.5
Portsmouth	WPAY-FM	104.1
	WNXT-FM	99.3
Salem	WSOM-FM	105.1
Sandusky	WLEC-FM	102.7
Sidney	WMVR-FM	105.5
Springfield	WBLY-FM	103.9
	WEEC-FM	100.7
	WUSO	89.1
Steubenville	WSTV-FM	103.5
Struthers	WKTL	90.7
Tiffin	WTTF-FM	103.7
Toledo	WSPD-FM	101.5
	WCWA-FM	104.7
	WMHE	92.5
	WTDS	91.3
	WTRT	99.9
Urbana	WCOM-FM	101.7
Van Wert	WERT-FM	98.9
Wapakoneta	WERM	92.1
Washington Court House		
	WCHO-FM	105.5
Westerville	WOBN	91.5
Wilberforce	WCSU-FM	88.9
Wilmington	WKIT	102.3
Wooster	WWST-FM	104.5
Worthington-Columbus		
	WRFD-FM	97.9
Xenia	WHBM-FM	103.9
	WBZI	95.3
Yellow Springs	WYSO	91.5
Youngstown	WKBN-FM	98.9
	WBBW-FM	93.3
	WRED	101.1
Zanesville	WHIZ-FM	102.5

OKLAHOMA

Bethany	KNBQ	104.9
Chickasha	KNDR	105.5
Durant	KSED-FM	107.3
Edmond	KWHB	97.7
	KCSC	88.1
Enid	KCRC-FM	96.9
Eufaula	KCES	102.3
Henryetta	KHEN-FM	99.5
Lawton	KLAW	101.5
McAlester	KNED-FM	101.3
Midwest City	KTEA-FM	92.5
Muskogee	KMMM-FM	106.9
Norman	WNAD-FM	90.9
Nowata	KNFB	94.3
Oklahoma City	KOKH	88.9
	KEBC	94.7
	KIOD	100.5
	KJEM-FM	102.7
	KOCY-FM	96.1
	KOFM	104.1
	KYFM	98.9
	KFNB	101.9
Ponca City	KLOR-FM	99.3
Shawnee	KBGC	89.9
Stillwater	KOSU-FM	91.7
	KSPI-FM	93.9
	KVRO	105.5
Tahlequah	KTLQ-FM	101.7
Tulsa	KWGS	90.5
	KRMG-FM	95.5
	KOCW	97.5
	KOGM-FM	92.9
	KORU	103.3
	KRAV	96.5
Weatherford	KCCE	95.3

OREGON

Corvallis	KFLY-FM	101.5
	KBVR	90.1
Eugene	KRVM	91.9
	KORE-FM	93.1
	KFMY	97.9
	KLCC	90.3
	KUGN-FM	99.1
	KWAX	91.1
	KBMC	94.5
	KZEL-FM	96.1
Grants Pass	KGPO	96.9
Medford	KBOY-FM	95.3
Oretech	KTEC	88.3
Portland	KBOO	90.7
	KGMG	95.5
	KOAP-FM	92.3
	KOIN-FM	101.1
	KPDQ-FM	105.3
	KPFM	97.1
	KPOJ-FM	98.5
	KQFM	100.3
	KRRC	89.3

PENNSYLVANIA

Allentown	WFMZ	100.7
	WAEB-FM	104.1
	WMUH	89.7
Altoona	WVAM-FM	100.1
	WFBG-FM	98.1
Beaver Falls	WBVP-FM	106.7
	WGEV	88.3
Bedford	WAKM	100.9
Bellwood	WHGM	103.9
Bethlehem	WGPA-FM	95.1
Bloomsburg	WHLM-FM	106.5
Boyertown	WBYC-FM	107.5
Braddock	WLOA-FM	96.9
Butler	WBUT-FM	97.7
Carbondale	WODL-FM	94.3
Carlisle	WHYL-FM	102.3
Chambersburg	WCHA-FM	95.1(s)
Charleroi	WESA-FM	98.3
Clearfield	WCPA-FM	93.5
DuBois	WCED-FM	102.1
Easton	WEST-FM	96.1
	WJRH	90.5
	WEEX-FM	99.9
Ebensburg	WEND-FM	99.1
Elizabethtown	WMSH-FM	106.7
Erie	WWYN-FM	99.9
Gettysburg	WGET-FM	107.7
Greencastle	WKSL	94.3
Greensburg	WOKU-FM	107.1
Greenville	WGRP-FM	107.1
Grove City	WEDA-FM	
Harrisburg	WHP-FM	97.3
	WMSP	94.9
	WTPA-FM	104.1
	WCMB-FM	99.3
Havertown	WHHS	89.3
Hazleton	WAZL-FM	97.9
Huntingdon	WHUN-FM	106.3
Jenkintown	WIBF-FM	103.9
Johnstown	WARD-FM	92.1
	WJAC-FM	95.5
Lancaster	WGAL-FM	101.3
	WDAC	94.5
	WLAN-FM	96.9
Lebanon	WLBR-FM	100.1
Lewisburg	WVBU-FM	90.5
Lewiston	WMRF-FM	95.9
Lock Haven	WBPZ-FM	92.1
Martinsburg	WJSM-FM	92.7
Meadville	WARC	90.3
	WMGW-FM	100.3
Media	WXUR-FM	100.3
Milton	WMLP-FM	100.9
Montrose	WPEL-FM	96.5
New Kensington-Tarentum	WYDD	100.7
Oil City	WDJR	98.5
Palmyre	WRLC	92.1
Philadelphia	WCAU-FM	98.1
	WPBS-FM	105.3
	WDAS-FM	105.3
	WRCP-FM	104.5
	WFIL-FM	102.1
	WDVR	101.1
	WFLN	95.7
	WHAT-FM	96.5
	WUHY-FM	90.9
	WIFI	92.5
	WIBG-FM	94.1
	WMMR	93.3
	WPEN-FM	102.9
	WPWT	91.7
	WQAL	106.1
	WRTI-FM	90.1
	WXPN	88.9
Pittsburgh	KDKA-FM	92.9
	WAMO	105.9
	WEEP-FM	107.9
	WTAE-FM	96.1
	KQV-FM	102.5
	WDUQ	91.5
	WJAS-FM	99.7
	WKJF	93.7
	WPIT-FM	101.5
	WWSW-FM	94.5
	WYDD	104.7
Pottsville	WPPA-FM	101.9
Reading	WRFY-FM	102.5
	WXAC	91.3
Red Lion	WGCB-FM	96.1
Ridgeway	WKBI-FM	94.3
Scranton	WGBI-FM	101.3
	WUSV	88.9
	WWDL-FM	104.9
Selinsgrove	WQSU	91.5
Sharon	WPIC-FM	102.9
Somerset	WVSC-FM	97.7
State College	WMAJ-FM	103.1
	WDFM	91.1
Stroudsburg	WRSC-FM	96.7
Sunbury	WVPO-FM	98.5
Tamaqua	WKOK-FM	94.1
Telford	WSVB	105.5
Towanda	WBMR	89.7
Tyrone	WTTC-FM	95.3
Union City	WGMR-FM	102.3
University Park	WBVB	106.3
Warren	WDFM	91.1
Washington	WRRN	92.3
Waynesboro	WJPA-FM	95.3
Wilkes-Barre	WAYZ-FM	101.5
	WBRE-FM	98.5
	WYZZ	92.9
Williamsport	WLYC-FM	105.1
	WRAK-FM	100.3
York	WNOW-FM	105.7
	WSBA-FM	103.3
York-Hanover	WYCR	98.5

RHODE ISLAND

Kingston	WRIU	91.1
Providence	WPJB-FM	105.1
	WBRU	95.5
	WDOM	91.3
	WICE-FM	107.7
	WHIM-FM	94.1
	WPRO-FM	92.3
	WCRQ	101.5
Warwick	WBHS	90.5
Woonsocket	WWON-FM	106.3

SOUTH CAROLINA

Aiken	WLOW-FM	95.9
	WAKN-FM	99.3
Anderson	WCAC	101.1
	WANS-FM	107.3
Bamberg	WWBD-FM	92.7
Barnwell	WBAW-FM	101.7
Batesburg	WBLR-FM	92.1
Beaufort	WBEU-FM	98.7
Charleston	WCSC-FM	96.9
	WTMA-FM	95.1
Clemson	WSBF-FM	88.1
Columbia	WCOS-FM	97.9
	WNOK-FM	104.7
	WUSC-FM	89.9
Conway	WLAT-FM	104.1
Darlington	WDAR-FM	105.5
Dillon	WDSC-FM	92.9
Easley	WELP-FM	103.9
Florence	WJMX-FM	103.1
Greenville	WESC-FM	92.5
	WFBC-FM	93.7
	WMUU-FM	94.5
Greenwood	WCRS-FM	96.7
Kingstree	WDKD-FM	100.1
Lancaster	WLCM-FM	102.1
Laurens-Clinton	WLBG-FM	100.5
Myrtle Beach	WMYB-FM	92.1
N. Charleston	WKTM	102.5
Orangeburg	WDIX-FM	106.7
Rock Hill	WRHI-FM	98.3
Seneca	WBFM	98.1
Spartanburg	WSPA-FM	98.9
Sumter	WFIG-FM	101.3

SOUTH DAKOTA

Brookings	KBRK-FM	101.7
	KESD	88.3
Hot Springs	KDBH-FM	96.7
Sioux Falls	KELO-FM	92.5
Vermillion	KUSD-FM	89.9
	KVRF	102.3

TENNESSEE

Bristol	WDPI-FM	96.9
Brownsville	WBHT-FM	95.3
Chattanooga	WDOD-FM	96.5
	WLOM	106.5
	WDEF-FM	92.3
Cleveland	WCLE-FM	100.7
Clinton	WYSH-FM	104.9
Collegedale	WSMC	90.7
Columbia	WYFY-FM	101.7
Cookeville	WHUB-FM	98.3
	WPTN-FM	94.3
Covington	WKBL-FM	93.5
Crossville	WAEW-FM	99.3
Dickson	WDKN-FM	102.3
Dyersburg	WTRO-FM	100.1
Franklin	WFLT-FM	100.1
Gallatin	WFMG	104.5
Greeneville	WOFM	94.9
Henderson	WFHC-FM	91.5
Humboldt	WIRJ-FM	102.3
Jackson	WTJS-FM	104.1
Jamestown	WDEB	100.1
Johnson City	WJCW-FM	101.5
Kingsport	WKPT-FM	98.5
Knoxville	WBIR-FM	93.5
	WEZK	97.5
	WIVK-FM	107.7
	WKCS	91.1
	WUOT	91.9
Lawreneeburg	WOXE-FM	95.9
Lebanon	WFMQ	91.3
Lexington	WOXL-FM	99.3
Livingston	WLIV-FM	95.9
Manchester	WMSR-FM	99.7
Martin	WCMT-FM	101.7
McKenzie	WKTA	106.9
McMinnville	WHNR	101.7
Memphis	WMC-FM	99.7
	WCBD	91.1
	WDIA-FM	104.5
	KLYX	101.1
	WMPS-FM	97.1
	WREC-FM	102.7
Milan	WKBJ-FM	92.3
Morristown	WMTN-FM	95.9
Murfreesboro	WMTS-FM	96.3
Nashville	WLAC-FM	105.9
	WKDA-FM	103.3
	WPLN	90.3
	WLWM	95.5
	WNAZ-FM	88.9
	WSET	92.9
	WSIX-FM	97.9
	WATO-FM	94.3
	WBNT-FM	105.5
Oneida	WORM-FM	101.9
Sevierville	WSEV-FM	102.1
Sparta	WSMT-FM	105.5
Springfield	WDBL-FM	94.3
Sweetwater	WDEH-FM	95.3
Tullahoma	WJIG-FM	93.3

TEXAS

Abernathy	KWGO-FM	99.5
Abilene	KACC-FM	91.1
	KFMN	99.3
	KWKC-FM	105.1
Amarillo	KGNC-FM	93.1
	KVII-FM	94.1
Austin	KHFI-FM	98.3
	KAZZ	95.5
	KMFA	89.5
	KTBC-FM	93.7
	KUT-FM	90.7
	KVET-FM	100.7
Beaumont	KHCB-FM	105.7
	KAYD-FM	97.5
	KBPO	94.1
	KTRM-FM	95.1
	KJET-FM	107.7
Big Spring	KFNE	95.3
Borger	KBBB-FM	104.3
Brenham	KWHI-FM	106.3
Brownwood	KHPC	88.1
	KFRN-FM	99.3
Bryan	KORA-FM	98.3
Clear Lake City	KMSC	102.1
Cleburne	KCLE-FM	94.9
College Station	WTAW-FM	92.1
Conroe	KNRO	106.9
	KNRO-FM	106.5
Corpus Christi	KZFM	95.5
	KIOU	96.5
	KSIX-FM	93.9
Dalhart	KXIT-FM	94.3
Dallas	KIXL-FM	104.5
	KEIR	102.9
	KMAP	105.3
	KNER	88.1
	KNUS	98.7
	KRLD-FM	92.5
	WFAA-FM	97.9
	WRR-FM	101.1
	KVTT	91.7
	KBOX-FM	100.3
Del Rio	KDLK-FM	94.3
Denison-Sherman		
	KDSX-FM	101.7
Denton	KDNT-FM	106.1
DiBoll	KSPL-FM	95.5
Dumas	KDDD-FM	95.3
El Campo	KULP-FM	96.9
El Paso	KVOF-FM	88.5
	KPAK	94.7
	KTSM-FM	99.9
Ft. Worth	WBAP-FM	96.3
	KBUY-FM	93.9
	KFJZ-FM	97.1
	KFWT-FM	102.1
	KNOK-FM	107.5
	KTCU-FM	89.1
Gainesville	KGAF-FM	94.5

Location	C.L.	MHz
Galveston	KGBC-FM	106.5
Harlingen	KELT	94.5
Henderson	KGRI-FM	100.1
Hereford	KPAN-FM	106.3
Highland Park-Dallas	KVIL-FM	103.7
Hillsboro	KHBR-FM	102.3
Houston	KHGM	102.9
	KHCB-FM	105.7
	KIKK-FM	95.7
	KFMK	97.9
	KODA-FM	99.1
	KLEF	94.5
	KQUE	102.9
	KRBE	104.1
	KXYZ-FM	96.5
	KTRH-FM	101.1
	KUHF	91.3
	KBNO	93.7
	KZAP	100.3
Hilleen	KLEN-FM	93.3
Humboldt	WIRJ-FM	102.3
Huntsville	KSAM-FM	101.7
Jacksonville	KEBE-FM	106.5
Jasper	KTXJ-FM	102.3
Lake Jackson	KLJT	107.3
Lamesa	KPET-FM	100.3
Longview	KLUE-FM	105.7
Lubbock	KSEL-FM	93.7
	KBFM	96.3
	KLBK-FM	94.5
	KTXT-FM	91.9
Marshall	KMHT-FM	97.3
McAllen	KQXX	98.5
Memphis	KBGH-FM	103.7
Midland	KNFM	92.3
	KMOD-FM	93.3
Mt. Pleasant	KIMP-FM	100.7
Muleshoe	KMUL-FM	103.1
Nacogdoches	KSFA-FM	92.1
	KEEE-FM	103.3
Odessa	KQIP	96.7
	KOCV	91.3
	KOYL-FM	97.9
Paris	KPLT-FM	99.3
Pasadena	KLVL-FM	92.5
Plainview	KHBL	88.1
Port Arthur	KFMP	93.3
	KPAC-FM	98.5
Robstown	KROB-FM	99.9
San Angelo	KWLW	93.9
	KSJT	97.5
San Antonio	KISS	99.5
	KBER-FM	100.3
	KEEZ	97.3
	KAKI-FM	98.1
	KITY	92.9
	KMFM	96.1
	KWFR-FM	94.5
	KCOR-FM	101.9
	KITE-FM	104.5
	KSYM	90.3
Sinton	KTOD-FM	101.3
Spearman	KBMF-FM	98.3
Temple	KYLE-FM	104.9
Texarkana	KTAL-FM	97.9
	KOSY-FM	102.5
Tyler	KZAK-FM	93.1
	KDOK-FM	101.5
Victoria	KTXN-FM	92.1
Waco	KEFC	95.5
	KWBU	89.9
Wichita Falls	KLUR	99.9
	KNTO	95.1

UTAH

Cedar City	KCDR-FM	88.1
Ephraim	KEPH	88.9
Logan	KUSU-FM	91.5
Ogden	KBOC	101.9
	KWCR-FM	88.1
Provo	KBYU-FM	88.9
	KFMC	96.1
Salt Lake City	KCPX-FM	98.7
	KALL-FM	94.1
	KLUB-FM	97.1
	KRSP-FM	103.5
	KSL-FM	100.3

Location	C.L.	MHz
	KSOP-FM	104.3
	KWHO-FM	93.3
Spanish Fork	KONI-FM	106.3

VERMONT

Burlington	WJOY-FM	98.9
	WRUV	90.1
Northfield	WNUB-FM	89.1

VIRGINIA

Abingdon	WBBI-FM	92.7
Arlington	WAVA-FM	105.1
	WCCV-FM	97.5
Ashland	WIVE-FM	100.1
Blacksburg	WVVV	104.9
Charlottesville	WINA-FM	95.3
	WTJU	91.3
Chesapeake	WFOS	90.5
Covington	WKEY-FM	100.9
Crewe	WSVS-FM	104.7
Farmville	WFLO-FM	95.7
Fredericksburg	WFVA-FM	101.5
Gretna	WMNA-FM	103.3
Grundy	WNRG-FM	97.7
Hampton	WVEC-FM	101.3
	WHOV	88.3
Harrisonburg	WEMC	91.7
	WSVA-FM	100.7
	WLUR	91.5
Lynchburg	WWOO-FM	100.1
	WDMS-FM	101.7
Manassas	WPRW-FM	106.7
Marion	WMEV-FM	93.9
Martinsville	WMVA-FM	96.3
Newport News	WGH-FM	97.3
Norfolk	WMTI	91.5
	WCMS-FM	100.5
	WNOR-FM	98.7
	WRVC	102.5
	WTAR-FM	95.7
	WTID-FM	104.5
	WXRI	105.3
	WYFI-FM	99.7
Petersburg	WSSV-FM	99.3
	WSML	95.3
Portsmouth	WAVY-FM	96.9
Radford	WRAD-FM	101.7
Richmond	WTVR-FM	98.1
	WRFK	91.1
	WRVA-FM	94.5
	WRNL-FM	102.1
Roanoke	WDBJ-FM	94.9
	WLRJ	92.3
	WROV-FM	103.7
	WSLS-FM	99.1
South Boston	WHLF-FM	97.5
South Hill	WJWS-FM	105.5
Staunton	WSGM-FM	93.5
Suffolk	WXYW	92.9
Tappahannock	WRAR-FM	105.5
Warrenton	WEER-FM	107.7
Warsaw	WNNT-FM	100.9
Williamsburg	WCWM	89.1
	WRCI	96.5
Winchester	WRFL	92.5
	WEFG	102.5
Woodbridge	WXRA	105.9
Yorktown	WYCS	91.5

WASHINGTON

Bellevue	KFKF-FM	92.5
Bellingham	KGMI-FM	92.9
	KERI	104.3
Bremerton	KBRO-FM	106.9
Centralia	KGME-FM	102.9
Cheney	KEWC-FM	89.1
College Place	KGTS	91.3
Edmonds	KBIQ	105.3
Ellensburg	KCWS-FM	91.5
Eugene	KBMC	104.5
Hoquiam	KGHO-FM	103.9
Longview	KLYK	105.5
Lynden	KLYN-FM	106.5
Opportunity	KZUN-FM	96.1
Prosser	KACA	101.7
Pullman	KPUL-FM	104.9
Richland	KCYS	102.7
Seattle	KING-FM	98.1

Location	C.L.	MHz
	KBBX	98.9
	KBLE-FM	93.3
	KETO-FM	101.5
	KIRO-FM	100.7
	KISW	99.9
	KLSN	96.5
	KOL-FM	94.1
	KRAB	107.7
	KTW-FM	102.5
	KUOW	94.9
	KIXI-FM	95.7
Spokane	KREM-FM	92.9
	KCFA-FM	107.9
	KDNC-FM	93.7
	KTWD	105.7
	KXLY-FM	99.9
	KHQ-FM	98.1
	KUDY-FM	98.9
Tacoma	KCPS	90.9
	KLAY-FM	106.1
	KPLU	88.5
	KTNT-FM	97.3
	KTOY	91.7
	KTAC-FM	103.9
	KPQ-FM	102.1
Wenatchee	KNDX	104.1
Yakima		

WEST VIRGINIA

Beckley	WBKW	99.5
Berkeley Springs	WSCF-FM	93.5
Bethany	WVBC	88.1
Bluefield	WHIS-FM	104.5
Buckhannon	WVWC	88.9
Charleston	WKAZ-FM	97.5
	WCHS-FM	96.1
	WKNA	98.5
	WTIO	102.7
	WVAF	99.9
	WZFM	98.3
Charlestown	WKEE-FM	100.5
Huntington	WMUL	88.1
	WVQM	103.3
	WEPM-FM	97.5
Martinsburg	WAJR-FM	101.9
Morgantown	WOAY-FM	94.1
Oak Hill	WTAP-FM	103.1
Parkersburg	WCEF-FM	99.3
	WKLC-FM	105.1
St. Albans	WOVE	106.3
Welch	WKWK-FM	97.3
Wheeling	WWVA-FM	98.7
	WTRF-FM	107.5

WISCONSIN

Appleton	WLFM	91.1
	WAPL-FM	105.7
	WBCR-FM	88.1
Beloit	WHKW	89.3
Chilton	WHWC	88.3
Colfax	WHAD	90.7
Delafield	WIAL	94.1
Eau Claire	WEAU-FM	104.5
	WFON	107.1
Fond du Lac	WFAW	107.3
Fort Atkinson	WBAY-FM	101.1
Green Bay	WDUZ-FM	94.5
	WWCF	94.9
Greenfield Twp.	WHHI	91.3
Highland	WHSA	89.9
Highland Twp.	WCLO-FM	99.9
Janesville	WAXO	96.9
Kenosha	WLIP	95.1
	WHLA	90.3
La Crosse	WWLA	93.3
	WHA-FM	88.7
Madison	WIBA-FM	101.5
	WISM-FM	98.1
	WMFM	104.1(s)
	WRVB-FM	102.5
Manitowoc	WKUB	92.1
Marinette	WHMD	91.5
Marshfield	WDLB-FM	106.5
	WHRM	91.9
	WZMF	98.3
Menominee	WDMW	92.1
	WLIN	100.7
Merrill	WFMR	96.5
Milwaukee	WMIL-FM	95.7
	WISN-FM	97.3
	WRIT-FM	102.9
	WAWA-FM	102.1
	WQFM	93.3
	WTMJ	94.5
	WBON	107.7
	WEMP-FM	99.1
	WUWM	89.7
Monroe	WEKZ-FM	93.7
Mt. Horeb	WFMK	92.3
Neenah	WNAM-FM	99.3
Nellsville	WCCN-FM	107.5
New London	WLIH-FM	93.5
New Richmond	WIXK-FM	107.1
Oconto	WOCO-FM	107.1
Oshkosh	WMKC	96.7
	WRST-FM	88.1
	WOSH-FM	103.9
Platteville	WSUP	90.5
	WSWW-FM	99.3
Portage	WPDR-FM	100.1
Port Washington	WGLB-FM	100.1
Racine	WRJN-FM	100.7
	WFNY	92.1
Rhinelander	WOBT-FM	107.9
Rice Lake	WJMC-FM	96.3
Richland Center	WRCO-FM	100.9
Ripon	WCWC-FM	95.9
River Falls	WRVF	106.3
Rudsburg	WRDB-FM	104.9
Sauk City	WVLR	96.7
Shawano	WTCH-FM	100.1
Sparta	WCOW-FM	97.1
Stevens Point	WSPT-FM	97.9
Sturgeon Bay	WDOR-FM	95.9
Superior	WWJC-FM	105.1
	WSSU	91.3
Suring	WRVM	102.7
Tomah	WTMB-FM	98.9
Two Rivers	WTRW-FM	102.3
Viroqua	WGBM	102.3
Watertown	WTTN-FM	104.7
Waukesha	WAUK-FM	106.1
Waupaca	WDUX-FM	92.7
Wausau	WRIG-FM	101.9
	WSAU-FM	95.5
Wauwatosa	WTOS	103.7
West Bend	WBKV-FM	92.5
Whitewater	WSUW	91.7
Wisc. Rapids	WFHR-FM	103.3

WYOMING

Casper	KAWY	94.5
Cheyenne	KVWO-FM	106.3
	KFBC-FM	97.9
Laramie	KUWR	91.5

GUAM

Agana	KUAM-FM	93.9

PUERTO RICO

Arecibo	WCMN-FM	107.3
	WNIK-FM	107.3
Aguadilla	WABA-FM	100.3
Bayamon	WRSJ-FM	100.7
Caguas	WVJP-FM	103.3
Camuy	WCHQ	102.9
Carolina	WVOZ-FM	107.7
Corozal	WORO	92.5
Fajardo	WMDD-FM	96.5
Guayama	WXRF-FM	96.5
Mayaguez	WKJB-FM	99.1
	WORA-FM	97.5
	WOYE-FM	94.1
Ponce	WLEO-FM	101.9
	WPAB-FM	93.3
San Juan	WIPR-FM	91.3
	WIAC-FM	102.3
	WITA-FM	107.7
	WOLA	105.7

VIRGIN ISLANDS

St. Croix, Christiansted	WIVI-FM	99.5
Christiansted, St. Croix	WIVI-FM	99.5

Canadian AM Stations by Location

Location	C.L.	kHz
Abbotsford, B.C.	CFVR	1240
Alma, Que.	CFGT	1270
Altona, Man.	CFAM	1290
Amherst, N.S.	CKDH	900
Amos, Que.	CHAD	1340
Antigonish, N.S.	CJFX	580
Barrie, Ont.	CKBB	950
Bathurst, N.B.	CKBC	1360
Belleville, Ont.	CJBQ	800
Blind River, Ont.	CJNR	730
Brampton, Ont.	CHIC	790
Brandon, Man.	CKX	1150
Brantford, Ont.	CKPC	1380
Bridgewater, N.S.	CKBW	1000
Brockville, Ont.	CFJR	1450
Burns Lake, B.C.	CFLD	1400
Cabano, Que.	CJAF	1240
Calgary, Alta.	CBR	1010
	CFAC	960
	CFCN	1060
	CHQR	810
	CKXL	1140
Callander, Ont.	CFCH	600
Campbell River, B.C.	CFWB	1490
Campbellton, N.B.	CKNB	950
Camrose, Alta.	CFCW	790
Causapscal, Que.	CJBM	1450
Charlottetown, P.E.I.	CFCY	630
Chatham, Ont.	CFCO	630
Chicoutimi, Que.	CBJ	1580
	CJMT	1420
Chilliwack, B.C.	CHWK	1270
Churchill, Man.	CHFC	1230
Cobourg, Ont.	CHUC	1450
Collingwood, Ont.	CKCB	1400
Corner Brook, Nfld.	CBY	990
	CFCB	570
Cornwall, Ont.	CFML	1110
	CJSS	1220
Courtenay, B.C.	CFCV	1440
Cranbrook, B.C.	CKEK	570
Dartmouth, N.S.	CFDR	790
Dauphin, Man.	CKDM	730
Dawson Creek, B.C.	CJDC	1350
Dolbeau, Que.	CHVD	1230
Drumheller, Alta.	CJDV	910
Drummondville, Que.	CHRD	1480
Dryden, Ont.	CKDR	900
Duncan, B.C.	CKAY	1500
Edmonton, Alta.	CBX	740
	CFRN	1260
	CHED	630
	CHFA	680
	CHQT	1110
	CJCA	930
	CKUA	580
Edmundston, N.B.	CJEM	570
Elliott Lake, Ont.	CKNR	1340
Estevan, Sask.	CJSL	1280
Flin Flon, Man.	CFAR	590
Fort Frances, Ont.	CFOB	800
Fort Simpson, N.W.T.	CFMR	1490
Fort St. John, B.C.	CKNL	560

Location	C.L.	kHz
Fort William, Ont.	CJLX	800
Fredericton, N.B.	CBZ	970
	CFNB	550
Galt, Ont.	CFTJ	1110
Gander, Nfld.	CBG	1450
Goose Bay, Nfld.	CFGB	1340
Granby, Que.	CHEF	1450
Grande Prairie, Alta.	CFGP	1050
Grand Bank, Nfld.	CJDX	710
Grand Falls, Nfld.	CBT	540
	CKCM	620
	CJCN	680
Gravelbourg, Sask.	CFRG	710
	CFGR	1230
Guelph, Ont.	CJOY	1460
Halifax, N.S.	CBH	860
	CHNS	960
	CJCH	920
Hamilton, Ont.	CHML	900
	CKOC	1150
	CHIQ	1280
Hauterive, Que.	CHLC	580
Hearst, Ont.	CFLH	1340
Huntsville, Ont.	CKAR	630
Hull, Que.	CKCH	970
Inuvik, N.W.T.	CHAK	860
Joliette, Que.	CJLM	1350
Jonquiere, Que.	CKRS	590
Kamloops, B.C.	CFJC	910
Kapuskasing, Ont.	CFLK	1230
	CKAP	580
Kelowna, B.C.	CKOV	630
Kenora, Ont.	CJRL	1220
Kentville, N.S.	CKEN	1350
Kingston, Ont.	CFRC	1490
	CKLC	1380
	CKWS	960
Kirkland Lake, Ont.	CJKL	560
Kitchener, Ont.	CHYM	1490
	CKKW	1320
Kitimat, B.C.	CKTK	1230
Langley, B.C.	CJJC	850
La Pocatiere, Que.	CHGB	1310
La Sarre, Que.	CKLS	1240
La Tuque, Que.	CFLM	1240
Leamington, Ont.	CHIR	730
	CHYR	710
Lethbridge, Alta.	CHEC	1090
	CJOC	1220
Lindsay, Ont.	CKLY	910
Lloydminster, Alta.	CKSA	1080
London, Ont.	CFPL	980
	CJOE	1290
	CKSL	1410
Marystown, Nfld.	CHCM	560
Matane, Que.	CKBL	1250
Medicine Hat, Alta.	CHAT	1270
Melfort, Sask.	CJVR	1420
Middleton, N.S.	CKAD	1490
Midland, Ont.	CKMP	1230
Moncton, N.B.	CBAF	1300
	CKCW	1220
Mont Laurier, Que.	CKML	610
Montmagny, Que.	CKBM	1490
Montreal, Que.	CBF	690
	CBM	940
	CFCF	600
	CFMB	1410
	CJAD	800
	CJMS	1280
	CKAC	730
	CKLM	1570
	CKGM	980
Moose Jaw, Sask.	CHAB	800
Nanaimo, B.C.	CHUB	1570
Nelson, B.C.	CKLN	1390
New Carlisle, Que.	CHNC	610
Newcastle, N.B.	CKMR	790
New Glasgow, N.S.	CKEC	1320
New Liskeard, Ont.	CJTT	1230
New Westminster, B.C.		
	CKNW	980
Niagara Falls, Ont.	CJRN	1600
North Battleford, Sask.		
	CJNB	1050
North Vancouver, B.C.		
	CKLG	730
Oakville, Ont.	CHWO	1250
Orillia, Ont.	CFOR	1570
Oshawa, Ont.	CKLB	1350
Osoyoos, B.C.	CKOO	1240
Ottawa, Ont.	CBO	910
	CBOF	1250
	CFRA	580
	CKOY	1310
	CKPM	1440
Owen Sound, Ont.	CFOS	560
Parry Sound, Ont.	CKAR-I	1340
Peace River, Alta.	CKYL	610
Pembroke, Ont.	CHOV	1350
Penticton, B.C.	CKOK	800
Peterborough, Ont.	CHEX	980
	CKPT	1420
Pointe Claire, Que.	CFOX	1470
Portage La Prairie, Man.		
	CFRY	920
Port Alberni, B.C.	CJAV	1240
Port Arthur, Ont.	CFPA	1230
	CKPR	580
Powell River, B.C.	CHQB	1280
Prince Albert, Sask.	CKBI	900
Prince George, B.C.	CKPG	550
Prince Rupert, B.C.	CFPR	860
	CHTK	560
Quebec, Que.	CBV	980
	CHRC	800
	CJLR	1060
	CKCV	1280
Quesnel, B.C.	CKCQ	570
Red Deer, Alta.	CKRD	850
Regina, Sask.	CBK	540
	CJME	1300
	CKCK	620
	CKRM	980
Revelstoke, B.C.	CKCR	1340
Richmond Hill, Ont.	CFGM	1310
Rimouski, Que.	CJBR	900
Riviere du Loup, Que.	CJFP	1400
Roberval, Que.	CHRL	910
Rosetown, Sask.	CKKR	1330
Rouyn, Que.	CKRN	1400
Ste. Agathe des Monts, Que.	CJSA	1230
St. Boniface, Man.	CKSB	1050
St. Catharines, Ont.	CHSC	1220
	CKTB	610
St. Hyacinthe, Que.	CKBS	1240
St. Jean, Que.	CHRS	1090
St. Jerome, Que.	CKJL	900
Saint John, N.B.	CBD	1110
	CFBC	930
	CHSJ	1150
St. John's, Nfld.	CBN	640
	CJON	930
	VOAR	1230
	VOCM	590
	VOWR	800
St. Thomas, Ont.	CHLO	680
Sackville, N.B.	CBA	1070
Salmon Arm, B.C.	CKXR	580
Sarnia, Ont.	CHOK	1070
Saskatoon, Sask.	CFNS	1170
	CFQC	600
	CKOM	1250
Sault Ste. Marie, Ont.	CJIC	1050
	CKCY	920
Schefferville, Que.	CBDR	1230
Sept-Iles, Que.	CKCN	560
Shaunavon, Sask.	CJSN	1490
Shawinigan, Que.	CKSM	1220
Sherbrooke, Que.	CHLT	630
	CJRS	1510
	CKTS	900
Simcoe, Ont.	CFRS	1560
Smiths Falls, Ont.	CJET	630
Smithers, B.C.	CFBV	1230
Sorel, Que.	CJSO	1320
Stratford, Ont.	CJCS	1240
Steinbach, Man.	CHSM	1250
Stephenville, Nfld.	CFSX	910
Sudbury, Ont.	CFBR	550
	CHNO	900
	CKSO	790
Summerside, P.E.I.	CJRW	1240
Swift Current, Sask.	CKSW	1400
Sydney, N.S.	CBI	1140
	CHER	950
	CJCB	1270
Terrace, B.C.	CFTK	590
Thetford Mines, Que.	CKLD	1230
Thompson, Man.	CHTM	610
Trois-Rivieres, Que.	CHLN	550
	CKTR	1150
Tillsonburg, Ont.	CKOT	1510
Timmins, Ont.	CFCL	620
	CKGB	680
Toronto, Ont.	CBL	740
	CFRB	1010
	CHFI	680
	CHIN	1540
	CHUM	1050
	CJBC	860
	CKEY	590
	CKFH	1430
Trail, B.C.	CJAT	610
Truro, N.S.	CKCL	600
Val d'Or, Que.	CKVD	900
Valleyfield, Que.	CFLV	1370
Vancouver, B.C.	CBU	690
	CFUN	1410
	CHQM	1320
	CJOR	600
	CKLG	730
	CKWX	1130
Verdun, Que.	CKVL	850
Vernon, B.C.	CJIB	940
Victoria, B.C.	CFAX	1070
	CJVI	900
	CKDA	1220
Victoriaville, Que.	CFDA	1380
Ville Marie, Que.	CKVM	710
Ville St. Georges, Que.	CKRB	1460
Ville Vanier, Que.	CFOM	1340
Wawa, Ont.	CJWA	1240
Welland, Ont.	CHOW	1470
Weyburn, Sask.	CFSL	1340
Whitehorse, Y.T.	CFWH	570
Williams Lake, B.C.	CKWL	1240
Windsor, N.S.	CFAB	1450
Windsor, Ont.	CBE	1550
	CKLW	800
	CKWW	580
Wingham, Ont.	CKNX	920
Winnipeg, Man.	CBW	990
	CFRW	1470
	CJOB	680
	CKRC	630
	CKY	580
Woodstock, N.B.	CJCJ	920
Woodstock, Ont.	CKOX	1340
Yarmouth, N.S.	CJLS	1340
Yellowknife, N.W.T.	CFYK	1340
Yorkton, Sask.	CJGX	940

Canadian FM Stations by Location

Location	C.L.	MHz
Belleville, Ont.	CJBQ-FM	97.1
Brampton, Ont.	CHIC-FM	102.1
Brandon, Man.	CKX-FM	96.1
Brantford, Ont.	CKPC-FM	92.1
Calgary, Alta.	CHFM-FM	95.9
Clearwater, B.C.	CFFM-FM-2	92.7
Clinton, B.C.	CFFM-FM-4	106.5
Cornwall, Ont.	CJSS-FM	104.5
Edmonton, Alta.	CFRN-FM	100.3
	CJCA-FM	99.5
	CKUA-FM	98.1
Halifax, N.S.	CHNS-FM	96.1
Hamilton, Ont.	CHML-FM	95.3
Kamloops, B.C.	CFFM-FM	98.3
Kelowna, B.C.	CJOV-FM	104.7
Kentville, N.S.	CKWM-FM	97.7
Kingston, Ont.	CFRC-FM	91.9
	CKLC-FM	98.3
	CKWS-FM	96.3
Kitchener, Ont.	CFCA-FM	105.3
	CHYM-FM	96.7
La Pocatiere, Que.	CHGB-FM	102.9
Lethbridge, Alta.	CHEC-FM	100.9
London, Ont.	CFPL-FM	95.9
Merritt, B.C.	CFFM-FM-3	103.9
Montreal, Que.	CBF-FM	95.1
	CBM-FM	100.7
	CFQR-FM	92.5
	CJFM-FM	95.9
	CJMS-FM	94.3
	CKGM-FM	97.7
Mount Timothy, B.C.	CFFM-FM-5	99.7
North Bay, Ont.	CKAT-FM	93.7
Oshawa, Ont.	CKQS-FM	94.9
Ottawa, Ont.	CBO-FM	103.3
	CFMO-FM	93.9
Penticton, B.C.	CKOK-FM	97.1
Port Arthur, Ont.	CKPR-FM	94.3
Quebec, Que.	CHRC-FM	98.1
Red Deer, Alta.	CKRD-FM	98.9
Regina, Sask.	CFMQ-FM	92.1
Rimouski, Que.	CJBR-FM	101.5
Saint John, N.B.	CFBC-FM	98.9
Saskatoon, Sask.	CFMC-FM	103.9
	CJUS-FM	89.7
Sault Ste. Marie, Ont.	CJIC-FM	100.5
	CKCY-FM	104.3
Savona, B.C.	CFFM-FM-1	101.9
Sherbrooke, Que.	CHLT-FM	102.7
St. Catharines, Ont.	CHSC-FM	105.7
	CKTB-FM	97.7
Sudbury, Ont.	CKSO-FM	92.7
Sydney, N.S.	CJCB-FM	94.9
Tillsonburg, Ont.	CKOT-FM	100.5
Timmins, Ont.	CKGB-FM	94.5
Toronto, Ont.	CBC-FM	94.1
	CHFI-FM	98.1
	CHIN-FM	100.7
	CHUM-FM	104.5
	CJRT-FM	91.1
	CKFM-FM	99.9
Truro, N.S.	CKCL-FM	100.9
Vancouver, B.C.	CBU-FM	105.7
	CHQM-FM	103.5
	CKGL-FM	99.3
Verdun, Que.	CKVL-FM	96.9
Victoria, B.C.	CFMS-FM	98.5
Windsor, Ont.	CKLW-FM	93.9
	CKWW-FM	88.7
Winnipeg, Man.	CBW-FM	98.3
	CFRW-FM	94.3
	CJOB-FM	97.5
	CKY-FM	92.1

World-Wide Shortwave Stations

■ Are you ready for your monthly quickie quiz? It's the greatest contest of all time since it involves prizes, no boxtops, nothing to buy, nothing to complete in 25 words or less. All you do is turn on, tune in (your receiver, that is) and see if you can drop these stations into your DX basket. Your score will give you some indication as to how you're stacking up. Scoring instructions are found at the end of the quiz:

1. Afar and Issa? Yup, that's the new handle for the spot in Africa which was formerly called French Somali, and you can be the first one on your block to hear it! Look

for Radio Djibouti on Monday through Saturday 0300 to 0415, 0900 to 1145, 1445 to 2000, Sundays 0315 to 1900 GMT. They operate on 4780 kHz.

2. Gabon is another seldom heard spot in Africa. Just a wrist spin away on your dial from Radio Djibouti is a station in Libreville (Gabon, natch) which is now being heard at about 2100 on 3550 kHz. Can you hear it?

3. While we're still in Africa, let's see how many countries you can log tonight on the aeronautical communications frequency of 6552 kHz. Without straining your eardrums you should be able to log Malawai, Botswana, Tanzania, Rhodesia, and Zambia—others too! You've got an hour in which to score.

4. Hopping aboard the magic carpet of your receiver we now fly to the Ryukyu Islands in the Pacific Ocean. Listen for The Voice of the U.N. Command which runs 20 kilowatts from their location in Deragawa. They can be found on 14459 kHz holding down the fort at 0600 GMT.

5. Like fruit? How about Raspberries and Cherries? There's an interesting U.S. Navy aeronautical network operating daily on 6723 kHz. Some of the callsigns include Cherry Point (N.C.), Raspberry (Alameda, Calif.), and Raspberry Rosy (Roosevelt Roads, P.R.). How many planes and aircraft can you log in 1 hour?

6. Somebody goofed! The record books list Radio Jornal do Comercio in Recife, Brazil, as inactive. It's to be heard, however, on both 9565 and 11825 kHz at 0030 GMT. Did you log it?

7. Like some jam with the fruity stations shown in question #5? You can get plenty if you tune to 6025 kHz at about 1730 GMT —it's especially great if you happen to like the tune "My Blue Heaven"; a jamming station in the USSR plays this song over and over to jam Radio Peking.

8. New station hereabouts is HIKZ, Radifusora Popular, in Santo Domingo, Dominican Republic. Running 500 watts it is being reported on 4980 kHz evenings.

9. The DX program of Radio Denmark is something new on the shortwave scene. It runs for 20 minutes each Sunday (in English) at 1015 GMT on 9520 kHz.

10. How many different Voice of America relay transmitters (overseas) can you log in 1 hour? Each different frequency heard from the same location counts separately. Each must be identified.

Grade yourself as follows: 10 points for questions 1, 2, 4, 6, 7, 8, 9. Other questions bring 1 point for each station monitored. If you score below 25, forget it. 26 to 50—keep trying. Above 50, pretty good. Above 75—excellent. Above 85, nobody likes a showoff!

By the way, many of you have written asking for information on government, military, police, emergency, aeronautical, overseas telephone, maritime, etc. radio communications networks. The best source of this information we've yet seen is in the new edition of the Confidential Frequency List. This was compiled from the private files of DXer Tom Kneitel and contains literally thousands of such listings including frequencies, callsigns, locations, and (in many instances) even the addresses of the stations. There's even a section on how to decode spy broadcasts. Copies are available at $2 from Gilfer Associates, Inc., P.O. Box 239, Park Ridge, N.J. 07656.

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kHz	Call	Name	Location	GMT
90-Meter Band—3200 to 3400 kHz				
3230		Fiji I. BC	Suva, Fiji Is.	1100
3265	—	R. Demerara	Georgetown, Guyana	0230
3280	—	Windward Is. BC	St. Georges, Grenada	0130
3305	YVKX	V. de la Patria	Caracas, Venez.	0130
3315	—	R-TV Francaise	Ft. de France, Martinique	2315

kHz	Call	Name	Location	GMT
3365	HIRL	R. Exitos	Santiago, D.R.	2300
3395	YVOJ	R. Universidad	Merida, Venez.	0200
3910	CR4AC	R. Barlavento	Cape Verde Is.	2330
4680	—	R. Nacional Espejo	Quito, Ecuador	0345

60-Meter Band—4750 to 5060 kHz

4755	ZYV3	R. Brasil	Campinas, Brazil	2220
4765	—	R. Brazzaville	Brazzaville, Congo	2150
4770	—ELWA	R. Village	Monrovia, Liberia	2220
4777	—	R. Libreville	Libreville, Gabon	2240
4795	—	R. Comercial	Sa Da Banderia, Angola	2325
4843	—	R. Bucaramanga	Bucaramanga	0230
4855	YDK	RRI	Palembang, Indonesia	1215
4890	—	R. du Senegal	Dakar, Senegal	0710
4923	—	R. Quito	Quito, Ecuador	0200
4980	YVOT	R. Junin	San Cristobal, Venez.	0200
4940	YVPA	R. Yaracuy	San Felipe, Venez.	0130
4955	HJCQ	R. Nacional	Bogota, Colombia	0200
4980	—	Ghana BC	Accra, Ghana	2230
4985	CP75	La Cruz del Sur	La Paz, Bolivia	0200
4990	—	NBC	Lagos, Nigeria	2230
	—	R. Barquisimeto	Barquisimeto, Venez.	0330
5010	—	R. Garoua	Garoua, Cameroons	2145
	—	R. Eco	Iquitos, Peru	0330
5015	—	Windward Is. BC	St. Georges, Grenada	2230
5020	HJFW	Tras. Caldas	Manizales, Colombia	0340
5035	—	R. Bangui	Central Afr. Rep.	2200
5040	—	R. Maturin	Maturin, Venez.	0030
5044	—	E. de Guine	Port. Guinea	2345
5047	—	RRI	Jogjakarta, Indonesia	1120
5930	—	R. Prague	Prague, Czech.	0230

49-Meter Band—5950 to 6200 kHz

5980	ZFY	R. Demerara	Georgetown, Guyana	0950
5995	—	V. America	Greenville, N.C.	0230
	HJGR	R. Pereira	Pereira, Colombia	2315
6000	PRK5	R. Inconfidencia	Belo Horizonte, Brazil	2320
6010	YSS	R. Nacional	San Salvador, El Salv.	0210
6015	PRA8	R. Clube Pernambuco	Recife, Brazil	0810
6020	XEUW	Eco de Sotavento	Vera Cruz, Mexico	0200
6030	DZH6	Far East BC	Manila, Phil.	1035
6035	ZYZ26	R. Globo	Rio de Janeiro	2330
6045	HOU31	V. de Baru	David, Dom. Rep.	1100
6082	OAX4Z	R. Nacional	Lima, Peru	0310
6090	HISD	R-TV Dominicana	Santo Domingo, D.R.	2300
6095	XECMT	R. Mante	Cd. Mante, Mexico	0230
6100	—	R. Malaysia	Kuala Lumpur, Malaysia	1430
6110	—	BBC	London, England	2300
6115	—	R. Union	Lima, Peru	0730
6120	4VEH	V. Evangelique	Cap Haitien, Haiti	2130
6125	—	V. America	Greenville, N.C.	0345
6130	—	R. Nacional	Madrid, Spain	0215
6155	—	Far East N.	Tokyo, Japan	0615
6170	YVKG	—	Caracas, Venez.	1045
6215	—	R. Reloj	San Jose, C.R.	0120
6600	—	R. Pyongyang	Pyongyang, N. Korea	1120

41-Meter Band—7100 to 7300 Kc/s

7118	YDU6	RRI	Denpassar, Indonesia	1100
7120	—	BBC Far East	Tabrau, Malaysia	2300
7125	—	R. Conakry	Conagry, Guinea	2315
7130	—	V. America	Rhodes I., Greece	0330
7140	—	BBC	London, England	0400
7160	—	R. Malaysia	Kuching, Sarawak	1100
7180	—	R. Baghdad	Baghdad, Iraq	2200
7195	—	NHK	Tokyo, Japan	1145
7200	—	R. Belgrade	Belgrade, Yugo.	0100
7225	—	R-TV Marocaine	Rabat, Morocco	2300
7292	—	V. Ethiopia	Addis Ababa, Ethiopia	0345
7300	—	R. Malaysia	Penang, Malaysia	1400
9009	—	Kol Yisrael	Tel Aviv, Israel	2110
9360	—	R. Nacional	Madrid, Spain	2315
9410	—	BBC	London, England	2345

kHz	Call	Name	Location	GMT

31-Meter Band—9500 to 9775 kHz

9515	XEWW	XEWW	Mexico DF, Mex.	0145
9520	ZLI8	R. New Zealand	Wellington, N.Z.	0745
9525	—	R. RSA	Capetown, S. Africa	2140
9535	—	Swiss BC	Berne, Switz.	0800
9545	DMQ9	Deutsche Welle	Cologne, W. Germ.	0445
9600	CE960	R. Pres. Balmaceda	Santiago, Chile	1010
9605	—	Trans World R.	Bonaire, Neth. Ant.	2330
9610	VLW9	Australian BC	Perth, Austral.	1100
9615	—	Belgian Radio	Brussels, Belg.	2230
9620	—	R. Sweden	Stockholm, Sweden	0330
9625	—	R. Habana	Havana, Cuba	0415
9640	YVPG	Ecos del Torbes	San Cristobal, Venez.	0045
9645	TIFC	Faro del Caribe	San Jose, C.R.	1215
9650	—	R. Berlin Int'l.	Berlin, E. Germ.	0345
9655	BED91	V. Free China	Taipei, Formosa	1050
9665	HEU3	Swiss BC	Berne, Switz.	2000
9675	—	R. Warsaw	Warsaw, Poland	0540
9700	—	R. Sofia	Sofia, Bulgaria	0010
9705	—	R. RSA	Johannesburg, S. Afr.	2340
9710	—	Trans World R.	Bonaire, Neth. Ant.	1035
9715	PCJ	R. Nederland	Hilversum, Netherlands	0100
9720	PRL7	R. Nacional	Rio de Janeiro, Braz.	0310
9730	—	R. Berlin Int'l.	Berlin, E. Germ.	2310
9735	DMQ9	Deutsche Welle	Cologne, W. Germ.	0020
9745	HCJB	V. Andes	Quito, Ecuador	0345
9760	—	V. America	Munich, W. Germ.	2105
9770	—	Viennese Radio	Vienna, Austria	2335
9833	—	R. Budapest	Budapest, Hungary	2315

25-Meter Band—11700 to 11975 kHz

11715	—	Swiss BC	Berne, Switz.	0330
11760	—	Vatican R.	Vatican City	0000
11775	HEI6	Swiss BC	Berne, Switz.	2310
11780	—	R. Lourenco Marques	Lourenco Marques, Moz.	0510
11800	—	R. Ghana	Accra, Ghana	2045
11806	—	R. Lubumbashi	Lubumbashi, Congo	1910
11820	PJB	—	Bonaire, Neth. Ant.	1235
11835	4VEH	V. Evangelique	Cap Haitien, Haiti	0310
11850	LLK	R. Norway	Oslo, Norway	0200
11895	ORU	Belgian R.	Brussels, Belg.	2107
11910	—	R. Budapest	Budapest, Hungary	0315
11915	HCJB	V. Andes	Quito, Ecuador	0300
11925	—	R. Tashkent	Tashkent, USSR	1410
11945	ZPA5	R. Encarnacion	Asuncion, Paraguay	0100
11950	PRL3	R. Educacao	Rio de Janeiro, Braz.	0110
11970	—	West Indies BC	St. Georges, Grenada	2250
12005	—	United Arab BC	Cairo, Egypt	2300
15040	—	R. Peking	Peking, China	1415
15050	—	R. Libertad	(clandestine)	0455
15060	—	R. Peking	Peking, China	0000

19-Meter Band—15100 to 15450 kHz

15110	ZL2I	R. New Zealand	Wellington, N.Z.	0520
	XERR	R. Comerciales	Mexico DF, Mex.	1730
	HCJB	V. Andes	Quito, Ecu.	0350
15135	—	Vatican R.	Vatican City	1615
15150	—	Arabian BC	Djeddah, Saudi Arabia	1800
15190	—	R. Brazzaville	Brazzaville, Congo	1730
15225	ZYN30	—	Salvador, Brazil	0220
15230	—	R. Ceylon	Colombo, Ceylon	1530
15235	—	R. Japan	Tokyo, Japan	0230
15250	—	R. Bucharest	Bucharest, Rumania	1330
15280	—	Trans World R.	Bonaire, Neth. Ant.	2345
15285	—	Vatican R.	Vatican City	0030
15290	—	V. America	Tangiers, Morocco	1400
15300	—	R. Habana	Havana, Cuba	1345
15305	—	Swiss BC	Berne, Switz.	1335
15332	—	R. Pakistan	Karachi, Pakistan	0130
15370	ZYC9	R. Tupi	Rio de Janeiro, Braz.	2040

(Continued on page 133)

Nature's Powerhouse

Continued from page 106

years ago, and thus provide a unique glimpse of the past history of the universe.

This new chapter in paleo-physics was opened recently by Dr. F.M. Russell, a British physicist whose hobby is the study of minerals. It all began when the scientist noticed some minute lines in mica he collected while visiting North Carolina.

He knew, of course, that mica normally has so-called dislocation lines in its planes of crystal cleavage. What puzzled the scientist were a few other lines that did not quite lie in the normal cleavage planes. They bothered him so much that he sat down and did some hard thinking—and came up with a brand new theory. The lines, says Dr. Russell, were very likely caused by extraterrestrial neutrinos.

Stripped of its supporting scientific testimony, this is how the scientist believes the lines were formed. Perhaps a billion years ago, when the mica was still in a molten, viscous state, solar neutrinos slammed into the melt. Every now and then one would collide with an atom and generate a mu meson. This, in turn, would set up a trail of bubbles in the liquid mineral in much the same way that charged particles will produce trails in "bubble chambers" used in physics laboratories.

These bubble trails catalyzed the separation of excess iron in the melt, along the trail. As the mica hardened, the trails remained "frozen" in place for posterity.

Assuming that Dr. Russell is right, what is the significance of the discovery? By studying the markings found on mica laid down during different geologic times, it may be possible to determine just how steadily the earth has been bombarded with neutrinos throughout the ages. This information, together with knowledge obtained by means of neutrino astronomy, may help provide answers to some very intriguing questions asked by our nuclear scientists.

For example: What is the true nature of the nuclear reaction taking place in the interior of the sun? Are we really living in a perpetual "sea" of neutrinos? Are neutrinos actually the "ashes" left over after the disintegration of ordinary matter? Are neutrinos the stuff from which all matter is created?

These silent ghosts of the universe may some day give us the answers to these questions and, perhaps, to the most provocative one of all: How and when was the universe originally created? ■

ssssShush Box

Continued from page 56

B). This is a rather ticklish job, so proceed with care.

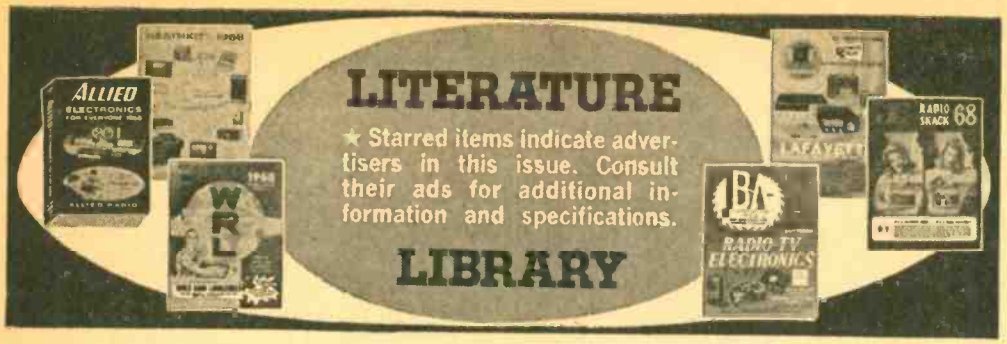
Use a light-duty iron designed for printed-circuit work, and don't overheat V33. The connection should be made just above the spot where the terminal goes through a hole in the circuit board. Solder the other end of this wire to the terminal of J1 which mates with the tip of P1. You can twist the two 7-in. wires into a cable to make a neater installation.

Replace the four Phillips-type screws and the slotted bushing. Put the knob back on the volume control, making sure that its white marker is centered in the volume-control window when the set is switched off. See to it that the wires on J1 are kept near the bottom of the case, well away from the receiver tuning capacitor and the tiny bare wire coils located between the capacitor and the external antenna jack. Carefully check your work and put the cover back on the receiver.

Shush Box Checkout. Plug P1 into J1 and P2 into the receiver's earphone jack. Turn on the receiver. With S1 in the OFF position, sound should come from Shush Box. Tune to the frequency of the desired station. When it comes on the air, set the volume control at a comfortable listening level.

After the transmission has been concluded and only receiver hiss can be heard, set R2 at the maximum clockwise position. Switch on S1. You should still hear the hiss. Slowly turn R2 in a counterclockwise direction (increase its resistance) until relay K1 opens and kills the speaker. Now, whenever the station comes on the air, K1 will close and the speaker will be activated. Between transmissions, Shush Box will be as silent as a mouse.

Should K1 fail to close even with R2 at minimum resistance, carefully check for a wiring error. If none is found, try a different battery. If all else fails, go completely through the relay and adjusting procedure once more. ■



CB—AMATEUR RADIO—SHORTWAVE RADIO

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

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

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

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

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

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

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

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

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

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

121. Going CB? Then go *CB Center of America*. Get their catalog and discover the *big bonus* offered with each major product—serves all 50 states.

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

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

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

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

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

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

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

ELECTRONIC PARTS

133. Discover instant hi-fi! Delve into the *Amperex* line of completely wired, solid-state amplifiers for the experimenter or hobbyist. Good old USA products—no additional parts needed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ELECTRONIC PRODUCTS

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

★44. Get your copy of *EICO's* colorful 36-page catalog on 200 "best buys" products. Ham radio, CB, hi-fi, test gear, both wired and kit, are illustrated.

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

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

★125. Need TV camera kit, touch control lamp, hi-fi component, test unit or shop gear? Then you need *Conar's* latest catalog. Born from NRI, *Conar* has become a major supplier of electronics hobbyist parts.

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

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

TOOLS

★78. Color-coded, regular, and hollow-shaft *Xcelite* nutdriver sets are now offered in sturdy, molded plastic cases—great for stowing. Get *Xcelite's* bulletin N567 for details.

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

SCHOOLS AND EDUCATIONAL

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

★61. *ICS (International Correspondence Schools)* wants to send you a 64-page booklet on the most often asked questions on preparing for an electronics career. You also get "How to Succeed" and a sample *ICS* lesson.

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

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*.

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

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

HI-FI/AUDIO

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

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

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

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

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

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

16. *Garrard's* Comparator Guide clues you in on the new Synchro-Lab turntable/changer series. Discover how *Garrard* locks on to the correct disc speed.

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

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

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

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

TAPE RECORDERS AND TAPE

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

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

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

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

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

HI-FI ACCESSORIES

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

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

TELEVISION

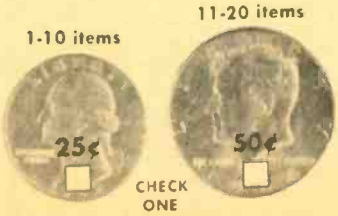
★70. Need a new TV set? Then assemble a *Heath* TV kit. *Heath* has all sizes, B&W and color, portable and fixed. Why not build the next TV you watch?

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

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

RADIO-TV EXPERIMENTER
Dept. 468
505 Park Avenue
New York, N. Y. 10022

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



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☐ Indicate total number of booklets requested

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16	17	19	23	26	27	31	32	34	35
42	44	45	46	48	50	54	59	61	66
70	74	78	85	95	96	97	99	100	101
102	103	104	105	106	107	109	111	112	114
115	116	117	118	119	120	121	122	123	124
125	126	127	128	129	130	131	132	133	

NAME (Print clearly)_____

ADDRESS_____

CITY_____

STATE_____ ZIP_____

VHF Police Frequencies

Continued from page 51

City	Channels (kHz)		
Rochester, N. Y.	154,830	154,890	155,370
	156,090	159,030	159,090
			159,210
Rockford, Ill.			155,370
Sacramento, Calif.	154,680	154,845	155,070
	155,460	155,520	155,670
			159,030
St. Louis, Mo.	154,845	155,130	155,610
	155,850	155,910	158,790
		159,030	159,210
St. Paul, Minn.	154,770	156,150	158,730
	158,970	159,090	159,210
St. Petersburg, Fla.		155,910	156,090
Salt Lake City, Utah	154,725	154,830	155,010
	155,130	158,790	159,150
			159,210
San Antonio, Tex.			155,670
San Diego, Calif.	154,680	154,950	155,430
	155,460	155,550	155,685
			158,730
San Francisco, Calif.	154,680	155,460	155,550
		155,670	155,730
San Jose, Calif.	154,740	155,070	155,130
	155,670	156,150	156,210
Savannah, Ga.			155,130
Seattle, Wash.	154,650	154,770	155,010
	155,190	155,250	155,430
	155,580	155,640	155,970
			158,730
South Bend, Ind.	155,370	155,490	155,980
Spokane, Wash.	155,130	155,475	155,580
			159,210
Syracuse, N. Y.		155,415	159,150
Tacoma, Wash.	154,650	154,770	154,920
	154,935	154,950	155,475
		155,520	158,970
Tampa, Fla.	154,785	155,190	155,370
	155,970	156,150	156,210
Toledo, O.	155,970	156,150	158,790
Topeka, Kan.	154,830	155,520	155,730
		155,970	158,910
Tucson, Ariz.	154,680	154,935	155,250
	155,730	156,030	158,910
			159,210
Tulsa, Okla.	155,070	155,310	155,670
	155,730	155,970	156,030
	158,850	158,910	159,090
Washington, D. C.	154,890	154,920	155,250
	155,415	156,030	156,090
	158,850	159,030	159,150
Wichita, Kan.	154,830	155,130	155,430
	155,970	156,150	158,910
			159,030
Yonkers, N. Y.			159,150
Youngstown, O.	156,090	156,150	158,730
		158,910	159,030

One-Tube Multibander

Continued from page 81

rigid and as short as possible. Tuning range for the coil is: L2A, 600 to 1850 kHz; L2B, 1500 to 4500 kHz; L2C, 4.4 to 14 MHz; L2D, 11.5 to 38 MHz.

Operation and Calibration. Plug in the desired frequency coil, turn on the set and allow it a few minutes to warm up. Set the main tuning capacity and the bandspread scale to zero. Turn the volume control all the way up and plug a pair of high-impedance phones into J2. Adjust the regen control to the point just before the set breaks into oscillation. Then, using a signal generator, tune the coil slug until you hear the signal generator; its frequency setting should agree with those given in the preceeding paragraph. The other coils can be calibrated in the same manner.

For the local broadcast stations, use 25 feet of hook-up wire for an antenna. For reception of weaker stations, use a long, high outside antenna and a cold-water pipe ground.

Tune the main capacitor for signals while adjusting R2. If there is too much regeneration, the circuit will oscillate and stations will come in as whistles. If whistles occur, turn the regen control back below the point of oscillation. With a little more practice at using this rig, you'll find around-the-world reception an everyday occurrence. ■

CB Valkyrie

Continued from page 67

There was something in the background of her transmission but I couldn't make it out.

As I approached a ridge, Lorma's signal dipped slightly.

"And I'm a Valkyrie." She laughed. "You know, one of those girls that used to carry Viking warriors off to the sky."

Atop the ridge her signal picked up again. "Just what does a Val-what-you-call-it look like? Don't think I've ever met one of them before." Lorma was putting me on but she did know how to beat the FCC, I kept telling myself.

"A Valkyrie is 5 foot 6, 120 pounds, blonde, 36-22-36 figure, and wears a helmet with horns on it." Lorma hesitated. "You know, I think you're gaining on me. But there's a fork in the road just ahead which should make it interesting."

There was. "How did you know?"

Lorma sounded a little bored. "The League of Radio Masters maintains its own system of triangulation stations. We've been tracking you ever since this conversation began."

"Has anyone ever received a LORM QSL?" I stopped at the fork and checked my direction finder, which she probably didn't know I had. Her bearing was southeast now so I took the south fork. A rough road and I couldn't make much time.

"No, you'd be the first." Some music could be clearly heard in the background whenever she transmitted.

I tried to identify it and at the same time not let on I noticed. "LORM-7, how come the FCC has never found your headquarters?" Decided to take a chance and speeded up again. The gravel really sprayed.

"Told you, I'm a Valkyrie." Reached 20 dB over S9. "Our headquarters are in the sky." The background music became louder, then stopped. Someone announced "This is Radio RSA." Her on top. "Are you still there, 4313?" Underneath I made out "Republic of South Africa."

Just keep her talking. "You're fading a little." Tried to remember what frequency Radio RSA used at that time of day. "Did you say LORM's headquarters is in the sky?" Took a guess at RSA's frequency and switched my DF/general-coverage receiver down to 15215 kHz.

"That's right, in the sky." Her signal was loud and clear right there on 15215. "But you're getting very close so we'll have to cut this short." Lorma sighed. "I'll let you ask just one more question."

I squinted into the southeast sky and spotted it, a balloon glinting silver in the sun. Suddenly I got the whole picture. *Her* transmitter must be on 15215, and it was being picked up by a CB relay suspended from that balloon! Slammed on my brakes and came to a dead stop. "One more question—any chance of that QSL being life-sized?"

"Could be."

Her 15215-kHz signal continued to gain on the S-meter. I checked the DF. She's on this road and coming up behind me fast. All I have to do is sit here and wait for her. Just one thing bothers me—what exactly happens when a CB warrior catches himself a Valkyrie? ■

Hum Bug

Continued from page 86

mers to C2 until you obtain the maximum 60-Hz rejection. If adding the trimmer across C2 causes the output meter to indicate greater 60-Hz rejection, simply trim C2 for maximum rejection.

Just trimming C2 and C4 (and C3 and C5) should produce a minimum of 30-dB rejection at 60 and 120 Hz. This is more than adequate for most applications. If you want greater rejection, try trimming C6 and C7 so they are exactly one-half the value of the associated C2 or C3.

Using Hum Bug. Switch S1 determines whether the 60- or 120-Hz filter is incircuit, or whether the filter circuit is bypassed.

To reject hum, connect the signal source to J1 and the tape recorder to J2. Feed in the source signal and set S1 to the hum frequency. Set attenuation control R7 to slightly more than ¾ clockwise. Then adjust tuning control R4 for minimum hum. Juggle R4 and R7 till you obtain maximum hum rejection. If the hum frequency appears to "drift," (as happens with tape from some low-quality recorders where speed isn't constant), reduce the amount of feedback so the rejection null is less sharp; the rejection will not be as great but a wider band will be rejected. ■

DX On Wings

Continued from page 66

riod, they, like the flying 1040 station, were forced to pick programs off the air.

Thus, while 1040 was relaying RA, the setup went like this: The signal was originally broadcast by a U.S. based SW transmitter, received by RA (such a procedure automatically reducing the audio quality), rebroadcast through heavy jamming to the airborne station which in turn rebroadcast it again to Cuba on 1040 where the programming was again subject to heavy jamming. Obviously, RA's facilities must have been blessed with some secret attraction for that airborne station. Possibly this "attraction" was a VHF link transmitter not audible on the ground in Cuba but with clear (unjammed) signals 12,000 feet above certain areas. In any event, we know that R. Americas has been involved in, and to some extent at least, was equipped for, airborne broadcasting.

And Now. Recent airborne broadcast activities are still further cloaked in mystery. During the summer and fall of 1965, a station, or stations calling themselves Blue Eagle tested on BCB, SW and TV. The U.S. Navy subsequently announced that these were airborne stations to be used by the Armed Forces R. & TV service in Vietnam. As in the Cuban missile crisis, most of the info released pertained to TV. According to a USN spokesman, only one of the aircraft was intended for radio broadcasting—Blue Eagle I.

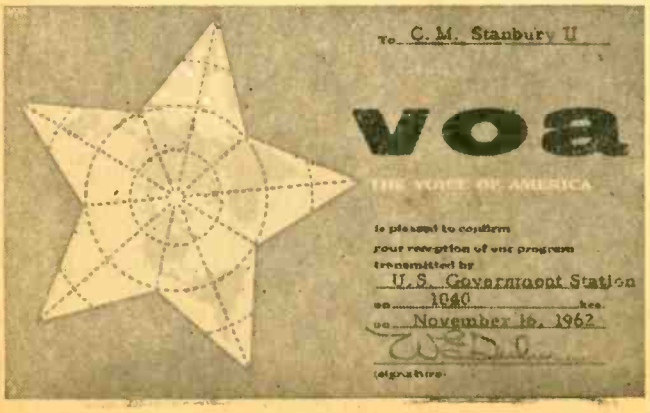
On Sept. 20, 1966 at the peak of that controversy over its location, R. Americas silenced its SW unit. On Oct. 8, just 2½ weeks later, a SW station calling itself Blue Eagle tested over the Manitowoc, Wisconsin area relaying local BCBer WCUB.

About this the USN spokesman told the North American SW Association (1) the original Blue Eagle was disassembled at the time, and (2) their airborne stations never relay local BCB stations. That latter statement is indeed peculiar, because during the original 1965 tests, a station calling itself Blue Eagle was heard on 532 kHz relaying local Atlantic City stations WLDB and WMID!

From all this, the only reasonable conclusion would be that there is not just one airborne broadcasting station but several—including the former R. Americas rig—in various parts of the world. Exactly where they are operating is a matter of speculation. One prospect is the Voice of Patriotic Militiaman's Front, a U.S. psychological warfare operation aimed at Hanoi which was first reported a couple of months after that last mysterious Blue Eagle test. VPMF announced its SW schedule (in Vietnamese, of course) as 2300-2400, 0300-0400 and 0800-1000 EST on approximately 7216 and 9430 kHz.

Meanwhile, the AFRTS version of Blue Eagle was reported by an Australian SWL on 7460 kHz signing off abruptly at 0900 EST. Then in Africa, where the British Broadcasting Corp. uses American equipment against Rhodesia, a mysterious BBC transmitter has been heard on 7295 around 2300 EST. London would give its location only as "Africa." Unlisted VOA transmissions have also been reported on this same channel.

How many flying broadcasters there really are and their whereabouts is a matter for continued speculation; only time will tell for sure. Meanwhile, it's something to think about, isn't it? ■



QSL card from original VOA Sugar Loaf outlet failed to give location, further indicating that original transmissions came from Navy-equipped flying broadcast stations operating in the Caribbean area.

Transistor Almost Ran

Continued from page 60

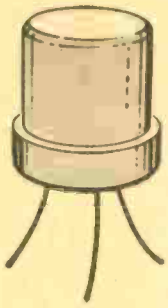


Fig. 4. After reinserting the center or base slab, remove any and all accumulated dust and free electrons to prevent unnecessary fouling of carrier charge action, then replace the lid and solder. The finished product should resemble this.

no goggles are available, keep your eyes squinted so as to protect them from emitter-emitted electrons.) Grasp the base at the top (some of the cheaper Japanese germaniums are not clearly marked, *this side up*), and gently but firmly wedge it between the two *p*-type crystals. Scrape off any excess electrons or holes. (Note: this last step is essential if the transistor is to be able to rectify AC to DC.)

Replace the cover with bottom facing down, soldering around the edges so that the cover doesn't slip or wiggle. Your rebuilt transistor should resemble (if only vaguely) the one pictured in Fig. 4, q.v.

Having analyzed the transistor, you may restore it to its original place inside your pocket-size radio.

If the radio does not play, you have been careless and allowed dust to settle inside the transistor. But do not despair; the radio can be salvaged without buying another transistor. Simply procure a vacuum tube similar to the faulty transistor. (Instead of an *n*-type semiconductor, you will notice a cathode; and in the place of a *p*-type crystal, there should be a grid.)

By ingeniously trimming the vacuum tube; adequately increasing the electrical output; adding sufficient adaptations to cope with the tube's inherent heat; and exercising virtuous patience in allowing the radio ample time to warm up, you can compensate for the loss of the transistor. The resulting receiver may very well be like the set depicted in Fig. 5, q.v.

Granted, such a setup will be a bit more cumbersome than your original transistor radio, and less easy to fit into your shirt pocket. But from the standpoint of performance, it should afford just as much listening satisfaction, even if its state is not quite as 'solid' as formerly. Difficult to believe? Not if you reread it on April 1st! ■

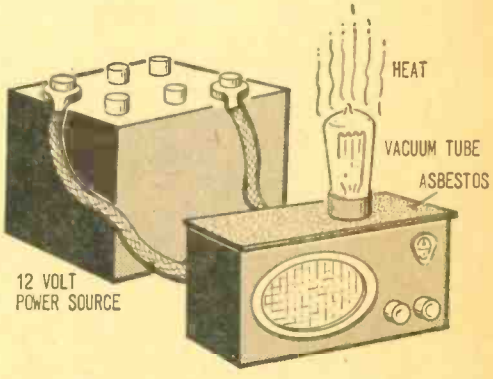


Fig. 5. Follow the above layout (more or less) when substituting a vacuum tube for the transistor you ruined by careless handling.

Shortwave Stations

Continued from page 126

kHz	Call	Name	Location	GMT
15400	ETLF	R. V. Gospel	Addis Ababa, Ethiopia	1330
15410	ETLF	R. Voice Gospel	Addis Ababa, Ethiopia	1415
15430	—	Armed Forces R-TV	Greenville, N.C.	2000
15445	—	R. Brazzaville	Brazzaville, Congo	0530
17695	—	BBC	London, England	1700

16-Meter Band—17770 to 17900 Kc/s

17735	—	R. Free Europe	Munich, W. Germany	1945
17740	—	BBC	London, England	2010
17775	—	R. Nederland	Hilversum, Netherlands	2210
17785	—	R. Japan	Tokyo, Japan	2300
17790	—	BBC	London, England	2145
17810	—	R. Nederland	Hilversum, Netherlands	2145
17820	—	R. Canada	Montreal, P.Q.	2145
17825	—	R. Japan	Tokyo, Japan	0000
	LLN	R. Norway	Oslo, Norway	2150
17840	—	R. Prague	Prague, Czech.	2125
17855	—	R. Habana	Havana, Cuba	2245
17875	—	V. America	Greenville, N.C.	1550
17890	HCJB	V. Andes	Quito, Ecuador	1845
	BED40	V. Free China	Taipei, Formosa	1110
17895	CSA66	V. of West	Lisbon, Port.	1330
17910	—	R. Ghana	Accra, Ghana	1530

13-Meter Band—21450 to 21750 kHz

21520	—	Swiss BC	Berne, Switz.	1330
21540	—	Swiss BC	Berne, Switz.	1600
21580	—	R-TV Francaise	Brazzaville, Congo	1900
21730	—	R. Norway	Oslo, Norway	1810
25650	—	BBC	London, England	1335
25730	LLL	R. Norway	Oslo, Norway	1803

Ham Traffic

Continued from page 91

pare with yours. If you goofed, this will show you what your mistake was. You can't correct this mistake by memorizing the answer in the manual. Go back to the text you studied so you can understand *why* the answer is what it is. When you know this, you can feel qualified to answer the question when you see it on the FCC exam.

Pro-signs. If you ever have a chance to visit a commercial communications station where top-notch operators handle hundreds of messages daily, you'll be amazed at how much they can do in a short space of time.

Having fancy equipment and being able to copy high-speed CW is only part of the reason these guys can make contacts and move radio messages at a breath-taking rate. Another part of the story is their ability to use "radio shorthand."

The professional operators never send two words when one word or even one letter will do. An important part of their operating skill is their ability to use "pro-signs," which stands for "procedure signs."

Many of these same radio shortcuts are also usable by hams, and the really sharp operator makes full use of them. Not only can they speed up your operating, but they often make it easier for you to express certain exact thoughts.

One pro-sign we all use on CW, without giving it a thought, is the letter *K*, which means "go ahead." How much easier it is to just send *dahdidah* than to spell out "go ahead!"

Another common one, which often gets misused, is *R*. The true meaning of this pro sign is "I copied your entire transmission." (On phone, the word *roger* carries the same meaning, though it also gets misused frequently.)

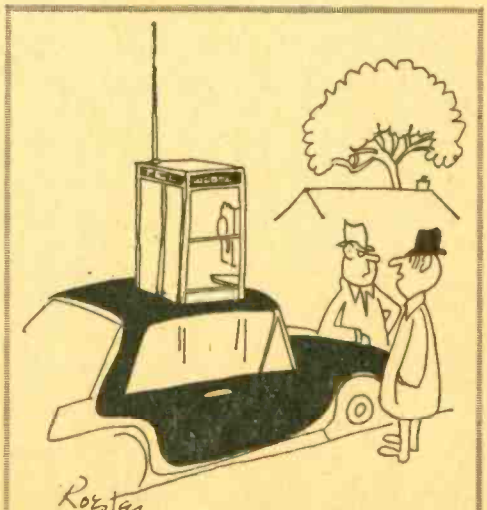
Whenever you start off your comments to a station on CW by sending *R*, you are telling the other fellow you understood everything he sent to you. Of course, if you didn't understand *everything* he sent, you shouldn't send *R*. If you do, you're giving him false information. Maybe you'd like to ask him to repeat something, but if you send *R* he will immediately believe no repetitions are necessary.

What are some other pro-signs you can put to use? Well, there is *BT* sent as if the letters were run together, like this: "*dahdidididah*." This is the Morse code equivalent of a dash in written text; operators generally use it between thoughts in a transmission. (It's also used to separate the parts of a formal message, such as are sent on the traffic nets.)

Since radio operators often send just phrases or casually expressed thoughts instead of formal sentences, there is no need for sending a period at the end of each thought—just send a dash, then move on to the next thing on your mind. The fact of the matter is that the fellows who send periods are branded as greenhorns by the more experienced operators.

Probably many beginning operators picked up the habit of sending periods (*didahdidahdidah*") from listening to the code-practice transmissions from W1AW. That station uses them to give code students experience in copying periods, as well as commas and question marks, in preparation for the FCC exams. Thing is, listen to the fellows at W1AW carrying on an informal QSO with other hams, and you'll find them using dashes instead of periods.

There are many other pro-signs that the really sharp ham uses to give his operating the professional touch, but I've run out of room. If you have any questions or comments about some of the abbreviations and procedures you hear on the air, send 'em in to Marshall Lincoln, % RADIO-TV EXPERIMENTER and I'll try to get you the answers. ■



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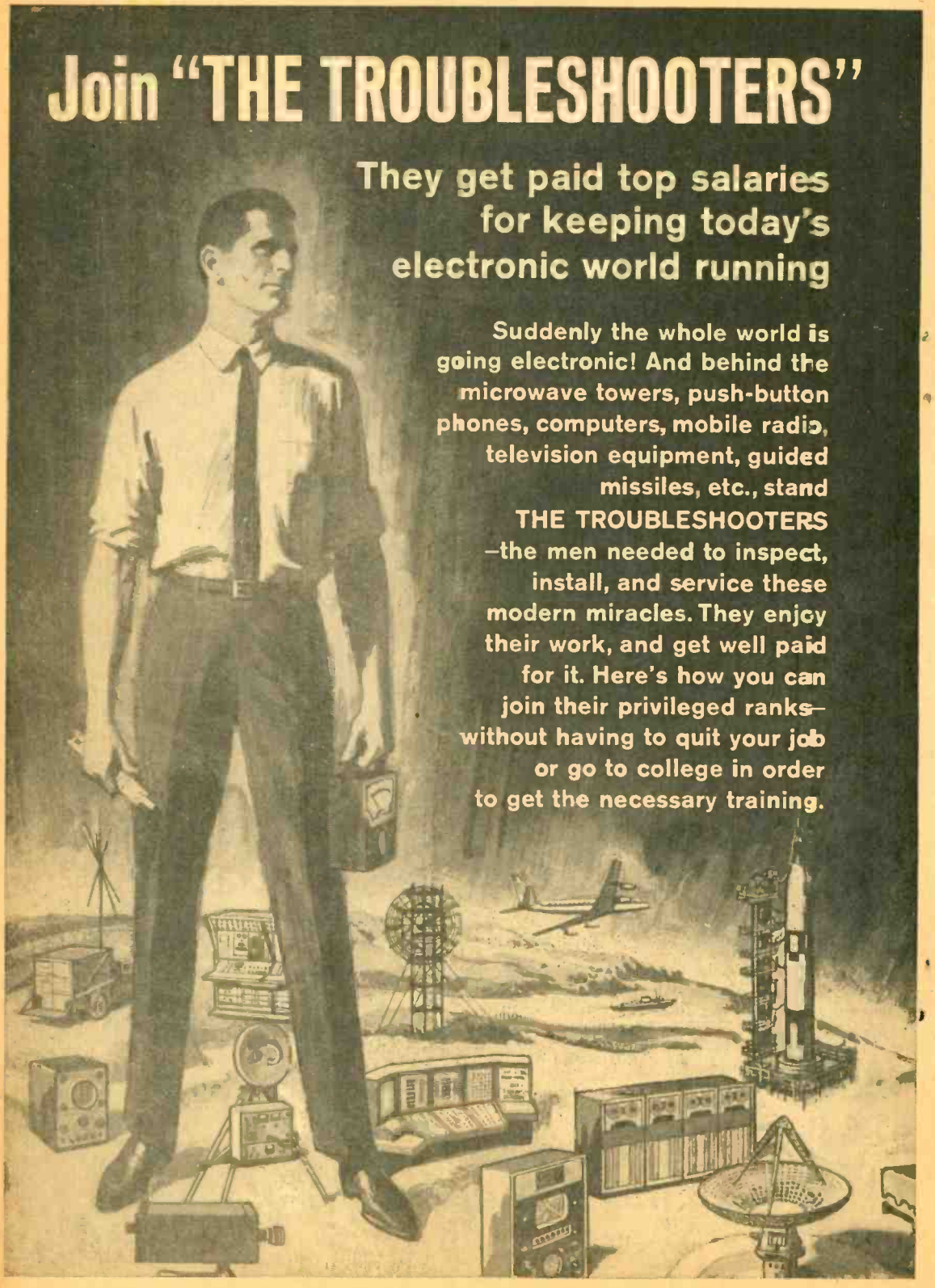

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Included in the "Edu-Kit" course are Receiver, Transmitter, Code Oscillator, Signal Tracer, Square Wave Generator and Signal Injector Circuits. These are not unprofessional "breadboard" experiments, but genuine radio circuits, constructed by means of professional wiring and soldering on metal chassis, plus the new method of radio construction known as "Printed Circuitry." These circuits operate on your regular AC or DC house current.

THE "EDU-KIT" IS COMPLETE

You will receive all parts and instructions necessary to build twenty different radio and electronics circuits, each guaranteed to operate. Our Kits contain tubes, tube sockets, variable, electrolytic, mica, ceramic and paper dielectric condensers, resistors, tie strips, hardware, tubing, punched metal chassis, instruction manuals, hook-up wire, solder, selenium rectifiers, coils, volume controls and switches, etc.

In addition, you receive Printed Circuit materials, including Printed Circuit chassis, special tube sockets, hardware and instructions. You also receive a useful set of tools, a professional electric soldering iron, and a self-powered Dynamic Radio and Electronics Tester. The "Edu-Kit" also includes Code Instructions and the Progressive Code Oscillator, in addition to F.C.C. Radio Amateur License training. You will also receive lessons for servicing with the Progressive Signal Tracer and the Progressive Signal Injector, a High Fidelity Guide and a Quiz Book. You receive Membership in Radio-TV Club, Free Consultation Service, Certificate of Merit and Discount Privileges. You receive all parts, tools, instructions, etc. Everything is yours to keep.

Progressive "Edu-Kits" Inc., 1186 Broadway, Dept. 547NN, Hewlett, N. Y. 11557

FREE EXTRAS

• SET OF TOOLS

- SOLDERING IRON
- ELECTRONICS TESTER
- PLIERS-CUTTERS
- VALUABLE DISCOUNT CARD
- CERTIFICATE OF MERIT
- TESTER INSTRUCTION MANUAL
- HIGH FIDELITY GUIDE • QUIZZES
- TELEVISION BOOK • RADIO TROUBLE-SHOOTING BOOK
- MEMBERSHIP IN RADIO-TV CLUB: CONSULTATION SERVICE • FCC AMATEUR LICENSE TRAINING
- PRINTED CIRCUITRY

SERVICING LESSONS

You will learn trouble-shooting and servicing in a progressive manner. You will practice repairs on the sets that you construct. You will learn symptoms and causes of trouble in home, portable and car radios. You will learn how to use the professional Signal Tracer, the unique Signal Injector and the dynamic Radio & Electronics Tester. While you are learning in this practical way, you will be able to do many a repair job for your friends and neighbors, and charge fees which will far exceed the price of the "Edu-Kit." Our Consultation Service will help you with any technical problems you may have.

FROM OUR MAIL BAG

J. Stataitis, of 25 Poplar Pl., Waterbury, Conn., writes: "I have repaired several sets for my friends, and made money. The "Edu-Kit" paid for itself. I was ready to spend $240 for a Course, but I found your ad and sent for your Kit."

Ben Valerio, P. O. Box 21, Magna, Utah: "The Edu-Kits are wonderful. Here I am sending you the questions and also the answers for them. I have been in Radio for the last seven years, but like to work with Radio Kits, and like to build Radio Testing Equipment. I enjoyed every minute I worked with the different kits; the Signal Tracer works fine. Also like to let you know that I feel proud of becoming a member of your Radio-TV Club."

Robert L. Shuff, 1534 Monroe Ave., Huntington, W. Va.: "Thought I would drop you a few lines to say that I received my Edu-Kit, and was really amazed that such a bargain can be had at such a low price. I have already started repairing radios and phonographs. My friends were really surprised to see me get into the swing of it so quickly. The Trouble-shooting Tester that comes with the Kit is really swell, and finds the trouble, if there is any to be found."

UNCONDITIONAL MONEY-BACK GUARANTEE

Please rush my Progressive Radio "Edu-Kit" to me, as indicated below:
Check one box to indicate choice of model

- ☐ Regular model $26.95.
- ☐ Deluxe model $31.95 (same as regular model, except with superior parts and tools plus Radio & TV Parts Jackpot worth $15.)

Check one box to indicate manner of payment

- ☐ I enclose full payment. Ship "Edu-Kit" post paid.
- ☐ Ship "Edu-Kit" C.O.D. I will pay postage.
- ☐ Send me FREE additional information describing "Edu-Kit."

Name .....

Address .....

City .....

PROGRESSIVE "EDU-KITS" INC.

1186 Broadway, Dept. 547NN, Hewlett, N. Y. 11557

PRINTED CIRCUITRY

At no increase in price, the "Edu-Kit" now includes Printed Circuitry. You build a Printed Circuit Signal Injector, a unique servicing instrument that can detect many Radio and TV troubles. This revolutionary new technique of radio construction is now becoming popular in commercial radio and TV sets.

A Printed Circuit is a special insulated chassis on which has been deposited a conducting material which takes the place of wiring. The various parts are merely plugged in and soldered to terminals.

Printed Circuitry is the basis of modern Automation Electronics. A knowledge of this subject is a necessity today for anyone interested in Electronics.