

THE GUIDE TO CITIZENS BAND RADIO

1968 CB YEARBOOK

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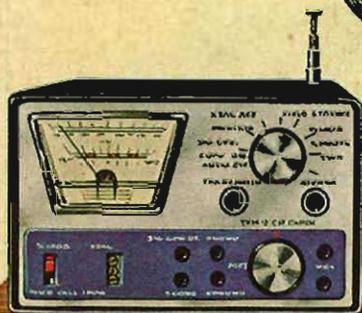
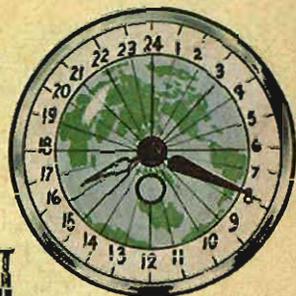
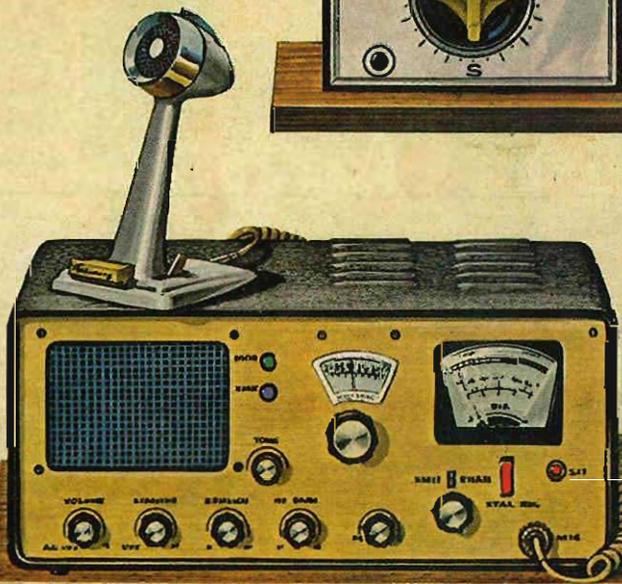
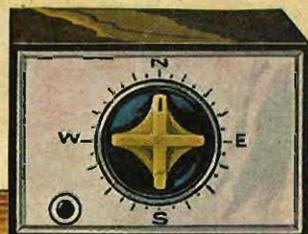
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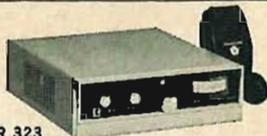
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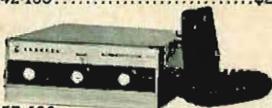
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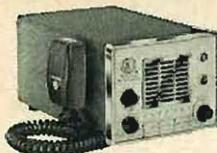


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MESSENGER I and MESSENGER TWO

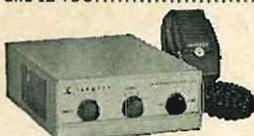
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Cat. No. 239-120-1—In-Converter.....\$22.95 Net



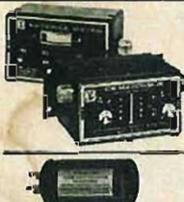
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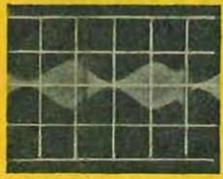
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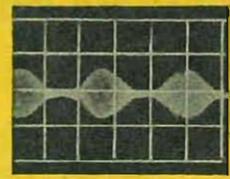
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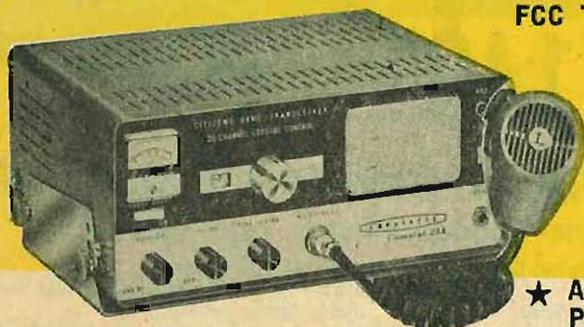
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10-17 with KMD4313



Julian M. Sienkiewicz
KMD4313
EDITOR

WHY DO WE CBers need a yearbook? Certainly there are enough magazines covering CB—foremost among them our own sister publications, RADIO-TV EXPERIMENTER and ELEMENTARY ELECTRONICS. The catch is that the great majority of CB articles lack an enduring quality, which indicates but one thing to this Editor: that every CBer needs one bound copy of basic information to serve as a permanent guide and reference for the entire year.

Now, what to put in a yearly CB guide? First and foremost is Part 95 of the FCC Rules and Regulations. Every CBer must have an up-to-date copy of Part 95, and this we provide for 25¢ less than the government's going price. In other words, now that you've saved 25¢, everything else in the CB YEARBOOK is *free*, so congratulations on a fine purchase!

The Directory portion of the CB YEARBOOK is a realistic presentation of what's available *today* in 5-watt CB transceivers. Please note that we didn't pad the list to include discontinued gear from last year or "paper" products that have yet to be manufactured. If you see it in our Directory, you can be sure you can buy it *today*. In fact, we invite you to write manufacturers for more information—see our list of manufacturers on page 22 for addresses, and be sure to mention the 1968 CB YEARBOOK.

Though the CBer is always looking for ways to improve his rig's performance, jacking a transmitter's output up to 30 watts happens to be illegal. Still, there are a great many highly useful projects he can assemble, and the 1968 CB YEARBOOK contains 13 projects aimed at making CB all the more exciting and valuable.

Last in mention but first in format is our section on CBing during 1968. Indispensable for the beginner and mind-refreshing for the old-timer, the section touches on virtually every facet of CB. As for the future, we'll worry about that in the 1969 CB YEARBOOK. See you then.

Julian M. Sienkiewicz

1968 CB YEARBOOK

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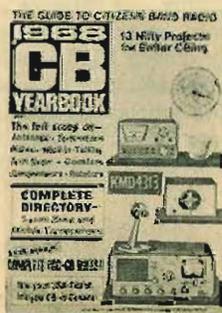
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Cover illustration
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Joe Rak

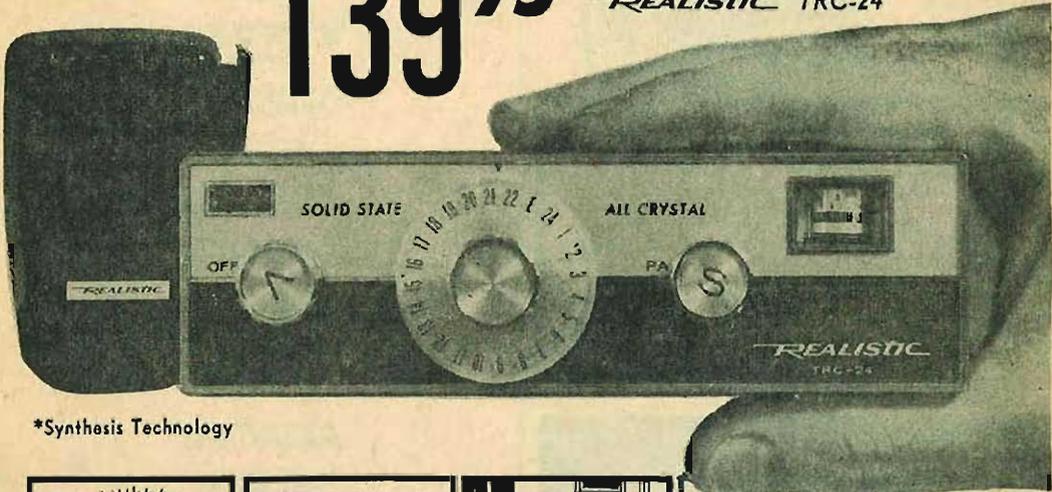
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23 CHANNELS

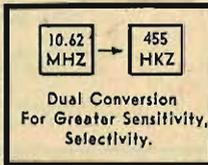
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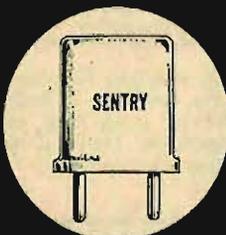
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JULIAN M. SIENKIEWICZ
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Managing Editor

RICHARD A. FLANAGAN
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Communications Editor

W. KRAG BROTTY
KQD2828

Editorial Assistant

HELEN PARKER

Art Director

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Cover Art Director

IRVING BERNSTEIN

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Vice President and Editorial Director

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MPA

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Introducing the world's first 5-channel, solid state, Citizens Band Radio with a Class B push-pull audio amplifier, super-sensitive receiver, and full-powered transmitter, that comes with either palm microphone or telephone handset at no extra cost: **The Sentry II, by Pearce-Simpson.**

Total weight, 3 pounds. Total price, \$99.90.

At \$99.90, Pearce-Simpson introduces a remarkable new CB Radio.

How remarkable? This remarkable:

It features no close range blocking.

A greatly improved noise limiting circuit which virtually eliminates ignition and alternator noise.

Its specifications include 4.0-watt power output, 0.5 uv to open squelch, adjacent channel 50 db down, and cross modulation 80 db down. And it carries a full one year warranty.

Conclusion:

Nobody can make a better radio for \$99.90. Not even Pearce-Simpson.



The Sentry II

At \$139.90 you'd probably call The Sentry II a bargain.

At \$99.90 there's no question about it.

How can anyone put so much radio into so little space without cutting corners? Anyone can't. Pearce-Simpson can.

And at \$139.90, Pearce-Simpson introduces the brand new solid state Companion IV, featuring 10 channels plus P.A.

Plus:

Both front and bottom speakers. An innovation which guarantees unobstructed, distortion-free sound no matter where the radio is mounted.

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No close range blocking.

A greatly improved noise limiting circuit.



Plus:

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Address

City

State

Zip

Overseas military personnel may write for special price list.



CHANNEL 24

1968 CB YEARBOOK
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New York, N.Y. 10022

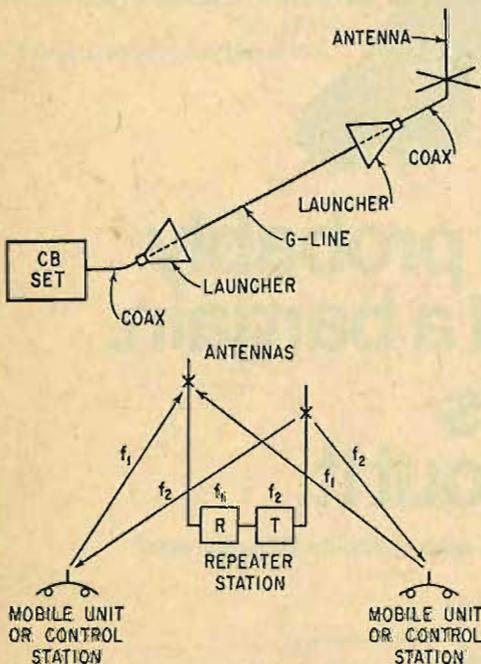


Cowboy CB

How can we get 50-mile range on a large cattle ranch?

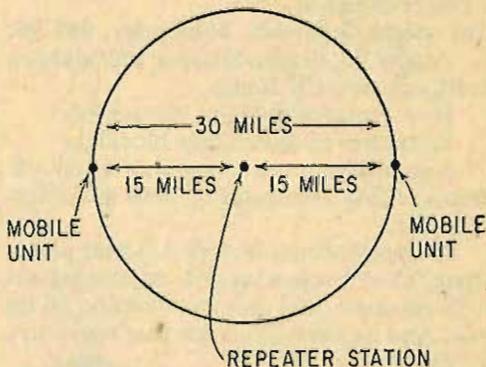
—S. S., Dalhart, Tex.

Unless there is a very tall existing structure on which you can attach your base station antenna, the alternative is to erect a 100-foot or taller tower and install a Class A CB repeater station at its base as shown in the first diagram. On vehicles, install 450-470



MHz band mobile units (RCA, Motorola, COMCO, Kaar, GE, ACR, etc.), licensed under a Class A CB station license. You can also get 450-470 MHz walkie-talkies (Motorola, GE). At fixed locations, use 450-470 MHz base station equipment (same manufacturers as above), licensed as Class A control stations. All communication is via the

automatic repeater station. Maximum range, as shown in the second diagram, is twice the repeater-to-mobile range. Expensive, but effective.



Crystals by the Number

Where can I get crystals for adding channels?

—L. M. Sudbury, Mass.

Your CB dealer should be able to get them for you. Many parts distributors carry crystals in stock. You can also get them by air mail, shipped the same day, from R. S. Puleo, 5 Whittier Street, Lynbrook, L. I., N. Y. When ordering crystals from anyone, specify channel, whether transmit or receive or both, plus make and model of your CB set. The crystals must be ground for use in a particular type of CB set.

Enlist in the Marines!

I want to join the Volunteer Marine Watch. Where can I get information?

—E. A. D., Ventura, Calif.

Write to VMW at P.O. Box 2, Harbor City, Calif. The VMW consists of CBers willing to monitor CB transmissions from pleasure craft.

6 Tubes, a Half Dozen Transistors

Should I buy a tube-type or all-transistor CB set?

—E. J., Pittsburgh, Pa.

At a base station where power consumption is not important, either type should meet your requirements. In a car, boat or plane, a transistor-type set draws much less current than a tube-type set. However tube-type sets don't draw enough current to cause a signifi-

(Continued on page 12)

Complete Tech Data on Over 300 CB Units Now Available in PHOTOFACT[®] CB MANUALS!



Here's everything the CB'er needs for quick service or for comparison in purchase selection: Standard Notation Schematics; CircuitTrace; chassis photos; alignment data; replacement parts lists; special troubleshooting hints, etc. Select the PHOTOFACT Manuals you want from the list below. Order from your Parts Distributor or send coupon.

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ALLSTATE 893.62270	7	GW-21, GWW-21, GW-31, GWW-31	4	RCA: CRM-P2A-5	2
893.62910, 893.62911, 893.62921	6	GW-12A/12D, GWW-12A/12D	5	CRM-P2B-5, CRM-P3A-5	1
893.62931, 893.62941	6	GW-22A/22D, GWW-22A/22D	5	Mark VIII (17704)	7
AMPHENOL: C-75	12	GW-14, GWA-14-1, GWW-14	11	Mark Nine	9
600, 625	11	GWW-30	2	Mark 10 (CB-2601A)	10
AR: AR-9	1	GW-32A/D, GWW-32A/D, GW-42, GWW-42	6	RADSON: RP-115, 612, RT-70A, 75A	1
AR-10	3	MW-34, MWW-34	8	RAYTHEON: Raycom, TWR-2	4
ARKAY: SQ-9, SQ-9W	7	ITT: 320	5	Raycom II, TWR-4	6
B&K: Cobra CAM-88	9	JOHNSON: Messenger II (242-162, 242-163, 250-810, 250-811)	5	TWR-1	1
BENDIX: CB-6, CB-12	2	Messenger III	8	TWR-3	5
BROWNING: R-27, S-23	10	Messenger 100	12	TWR-5	8
CADRE: C-75	11	Personal Messenger (242-101-1)	12	TWR-6	10
500, 500C	1	KAAR: 6/117R333B, 12/117R333B	8	TWR-7	12
510	4	32/TR333B	8	REALISTIC: American 23-Plus	12
510A, 515	6	12TR335 (Skyhawk)	10	TRC-5	7
525 (500-1,520)	7	KNIGHT: KN-2500, KN-2550	7	TRC-8D	6
CAPITOL: ND-309	3	KN-2560	7	TRC-27 (94L595)	1
CHANNEL MASTER: 6553	9	KN-2590	11	TRC-27A	5
CITI-FONE: CD-5/6, CD-5/12, CD-5A/6, CD-5A/12, SS	9	LAFAYETTE: Comstat 23	12	REALTONE: TR-6134	4
CD-6/6, CD-12/12	9	HA-100, HB-111, HB-115A, HB-222	10	TR-6436	2
CD 11/6, CD 11/12, 99/6, 99/12	12	HB-200, HB-501, HB-555	10	REGENCY: CB-27, CB-27-6, CBM-27-12	1
CONCORD: TG-132B	12	HB-333 Series A	8	Range Gain	5
DEMCO: CH-300, Ravalle	11	HB-400, HB-500, HB-501	9	Romper (A-3)	8
Setelite CB-1A, M-10A, R101A	7	HB-444, HB-600	11	SAMPSON: M-10, R101A, R102	5
T110A, VM-12-120	7	HE-15, HE-16, HE-18	1	T110A, VM 12-120	5
Traveller (Series B)	8	HE-15B, HE-20B	4	SEARS: 6550 (Ch. 549, 30500)	10
DEWALD: TR-6, TR-12, TR910	2	HE-20AWX, HE-20WX, HE-29	2	6552 (Ch. 549, 65520), 6553	9
DUO COM: 100	2	HE-20C, HE-90	5	SONAR: E	2
E.C.I.: Courier 1M, 23	8	HE-29A	5	E (Revised)	4
Fleet Courier, 30B	9	LA SALLE: LA-101, 101A	3	FS-23	7
EICO: 740, 771W, 772W	4	LLOYD'S: WT-715, 5A26	1	G	6
760, 761W, 762, 762W	2	MAGNAVOX: WT101	11	H	10
770, 770W	7	MASCO: MCB-9	9	T-2	12
779	9	METROTEK: Mustang, Pacor	9	SONARGOM: CDB	2
FANON: FCB-9	4	MIDLAND: 13-132	12	SONY: CB-901	4
GENERAL: MC-6	4	13-133B	11	SPOKESMAM: 700	2
VS-6, VS-7	11	13-160	8	SQUIRES-SANDERS: S5S	12
GLOBE: CB-100, X-90	2	MONITORADIO: TG-1	4	23'er	11
CB-100A	3	MORROW: CB-1, -2, -3, 5W1-6	1	TELECOM: TMC-206	10
CB-200	6	5W1-12, -117, 5W3-6, -12, -117	1	TRAM: TR-27D, TR-27E, XL-100	10
Globemaster 65-220	6	VP-100-4A	1	TRIUMPH: TC-900, TC-900A	4
65-228 (Pras. VIII)	7	OLSON: RA-530, RA-590	5	TRUESTONE: 512 Series B (DX410)	7
GONSET: G-11-3303, 3304, 3305	1	RA-590 (Side-Bander II) (Rev.)	11	1250A	10
G-12 (3316), (3329)	1	RA-717	10	1250B	11
G-14 (3430), (3433)	3	OSBORN: 300	10	U.S.L.: TR-800	1
G-15 (3428), (3429)	4	OSBORN: I, II, II-S, 5000	12	UTICA: MC-27	2
HALLCRAFTERS: BC-8, CB-8	10	PANASONIC: T-1	4	T & C III	9
CB-1	1	PEARCE-SIMPSON: Companion	4	VIKING: 242-126, -127, -128, -129	1
CB-3, CB-4 (Littlefona)	3	Companion II, Escort	6	VOCALINE: ED-27-6, -12	1
CB-3A, CB-5A	5	Director	10	ED-27M-6, -12	1
CB-5 Mark II, HA-14, P-5-120	6	Escort II	12	ED-276, ED-278	8
CB-7	7	Guardian 23	8	JRC-400, JRC-425	2
CB-9	9	Sentry	11	PT-27	3
CB-10	9	PHILMORE: CC-1, -1W, CT-1, -1W	3	WEBCOR: ET-350	3
CB-12	11	TC-11, -11W, TC-612, -612W	3	WEBSTER: Bandspanner 412	6
CB-14, CB-17	12	POLY-COMM: PC-2-6, PC-2-12	2	Four-Eleven	2
HALLMARK: 512	10	PC-N-6, PC-N-12	2	WT-2	11
1250B	10	PRO	8	540	5
HAMMARLUND: CB-SIX (CB-6)	7	Senior 23	4	450	8
HEATHKIT: CB-1	3				
GW-10A/D, GWW-10A/D	3				

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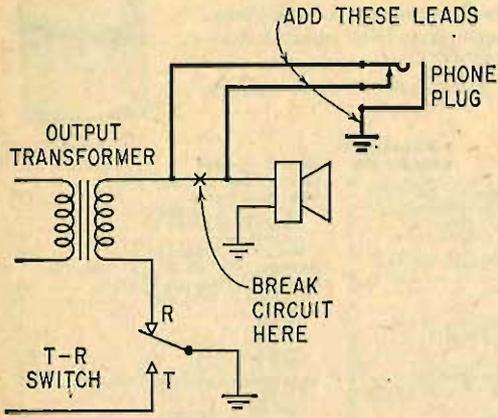
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State _____ Zip _____

BCG-8

cant problem unless the set is left turned on for long periods of time with the vehicle engine not running.

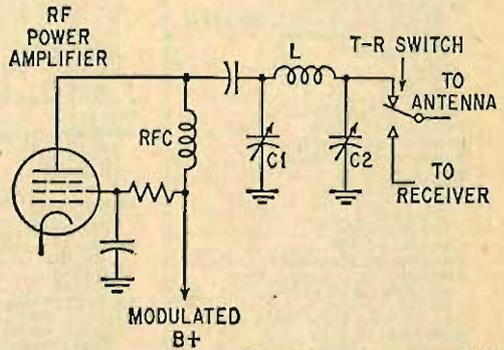
Install a closed-circuit phone jack on the CB set chassis or cabinet and wire it as shown in the diagram. Use a low-impedance headset (Superex, etc.) Plug in the phones to cut off the loudspeaker.



Network Pie

What's a pi network and why do CB set manufacturers list it as a special feature?

—F. B., Yonkers, N. Y.



Getting an Ear Full

How can I connect headphones to a CB set?

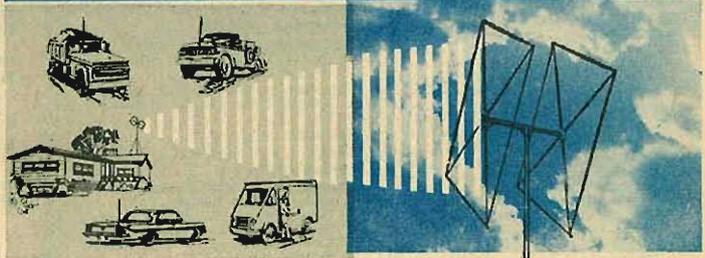
—H. H., San Jose, Calif.

(Continued on page 14)



HEY CB'er!

You're using only half your channel
... the noisy half!



WHY NOT SWITCH TO FULL COMMUNICATION POWER

avanti  ANTENNA



avanti

research & development, inc.

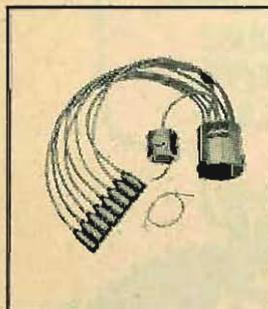
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See the amazing Avanti PDL antenna at your favorite CB dealer—or write direct for information.

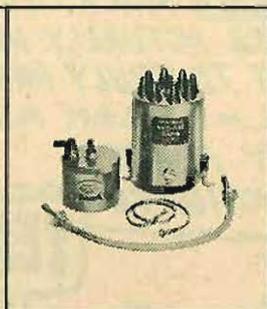
When using only vertical signal polarity, your communication potential is limited to half a channel—the noisy half. With a “flick of a switch”, the Avanti PDL antenna spreads the CB channel to full communication power. By utilizing horizontal as well as vertical signal polarity to transmit or receive—you get out of the “Hash” and into clear, interference-free communication. The PDL's excellent signal directivity also concentrates power for maximum strength and distance. It's performance that counts in CB antennas and the Avanti PDL out performs them all.

4 WAYS TO REMOVE STATIC from your CB RECEIVER

When you eliminate electrical interference (static) you extend your reception range, even double it. And your signal comes through sharper, more clearly. Now Hallett has four products for removing static, each designed to meet a specific interference problem. Prices start at \$3.95, so see your CB dealer today. Let Hallett help you remove annoying static from your mobile receiver.



SIGNAL SAVERS
place a blanketing shield around distributor, coil, spark plugs, high tension leads.



UNIVERSAL SHIELDING KITS
shield interference caused by distributor, coil, and high tension leads.



HASH HUSHERS
filter ignition noise pulses, snap in place between spark plug and leads.

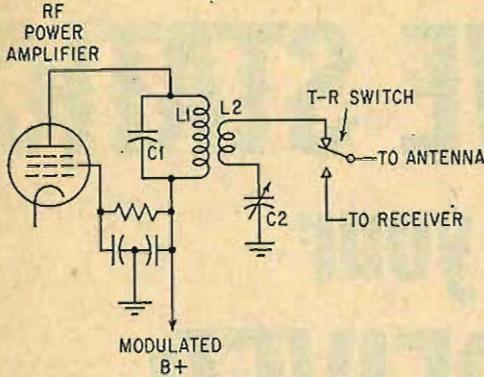


STATIC STRAPS
reduce radiated interference by bonding hood to fire wall, fenders to frame, etc.

Hallett

136 No. Ash St., Inglewood, Calif. 90301

A pi network is a low pass filter and impedance matching network. In the first diagram, C1 is at the high input end of the



network and C2 at the low impedance end to which the antenna is connected. It is resonant within the Citizens Band but attenuates higher frequencies. In some cases the coil (L) is tunable and one or both capacitors fixed.

The alternate circuit is shown in the next diagram. Here L1-C1 form a parallel resonant, high impedance tank circuit (primary) and L2 is a low impedance secondary. Capacitor C2 is used to match the transmitter into the antenna system. The name "pi" network originates from the Greek letter π which the network resembles in shape.

Compressor? Clipper? Booster?

Does a modulation booster adaptor do any good?

—N. H. B., Brookline, Mass.

So-called modulation boosters and range boosters are either audio "compression" amplifiers or speech "clippers." Some CB sets have such a feature built in; most do not. Without one, modulation level depends upon how loud you talk and how you hold the mike. A compression amplifier between the mike and the CB set, as shown in the diagram, provides considerable amplification of weak sounds picked up by the mike. When

(Continued on page 16)

DID YOU KNOW THAT CTS KNIGHTS GOLDEN LINE CRYSTALS HAVE SIMPLY ALWAYS HAD A LIFETIME GUARANTEE? THAT THEY'RE ACTUALLY MADE FROM PURE QUARTZ? CUT TO TRULY PRECISE TOLERANCES? THAT ALL - I MEAN ALL - CTS EMPLOYEES WORRY ABOUT QUALITY? THAT CTS KNIGHTS ARE!

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HIGH BY 8" DEEP

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- Matching adapter base for home or office, with walnut-grained sound reflector and non-skid bottom.

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For 117V AC, 50/60Hz power.

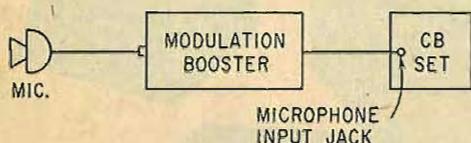
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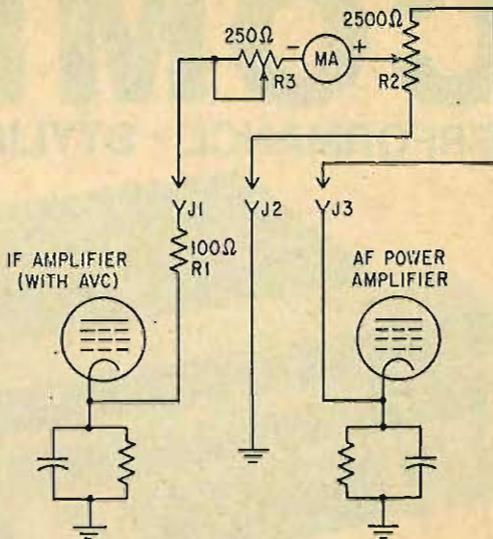
the sound is louder or nearer the mike, the amplifier gain is automatically reduced to prevent over-modulation or distortion. A speech clipper, connected in the same manner provides extra amplification, maintaining essentially constant output level to the CB transmitter input by "clipping" the signal peaks. Either type of modulation booster increases range by raising the average modulation level.



How to Read S9

*How can I add an "S" meter to a CB set?
—S. I. P., San Francisco, Calif.*

Install three tip jacks at the back of the CB set chassis (two insulated from chassis, the other grounded to the chassis). Install a



0-1 DC milliammeter and the two potentiometers in a metal meter case. Wire resistor
(Continued on page 18)

TURNER +2

"Best CB Microphone in the World"



VOLUME CONTROL

That's what many +2 owners say and we're glad they're so enthusiastic. It's the only microphone in the world that actually increases its output up to 50 times at the twist of a dial. It makes a world of difference on CB, so why in the world don't you get one? List Price \$49.50.



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Cedar Rapids, Iowa

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TODAY



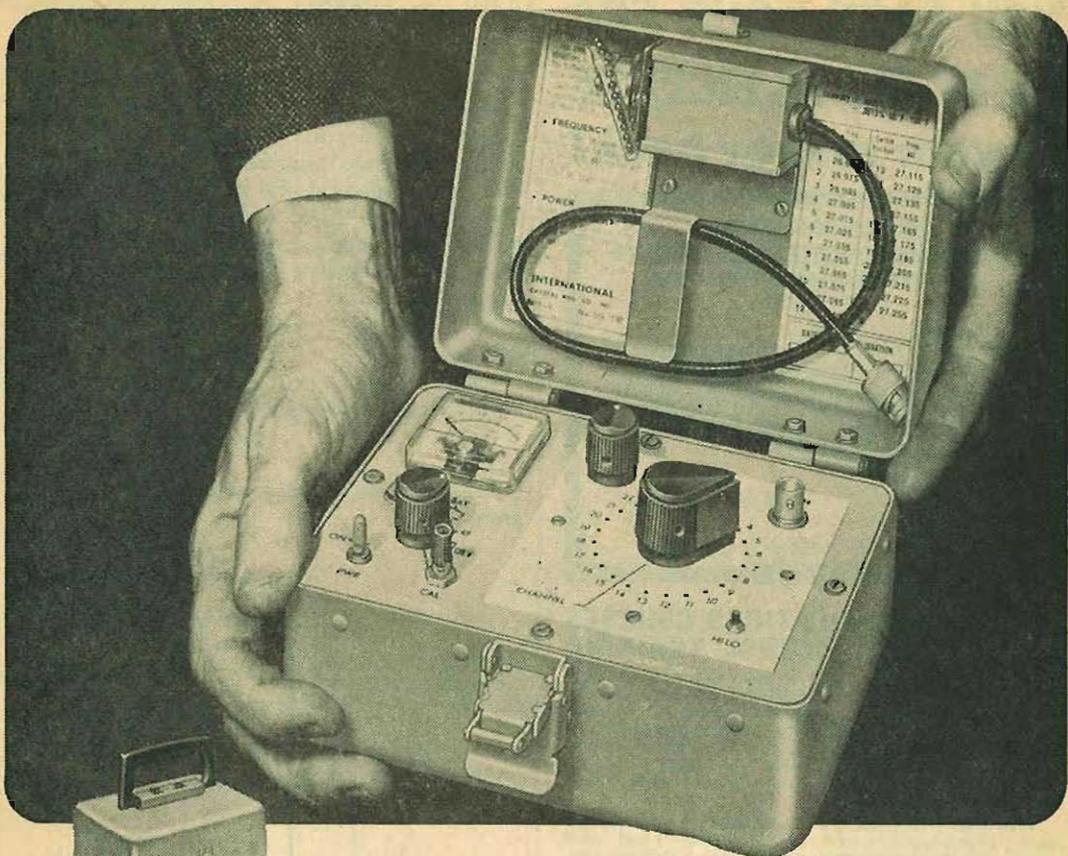
Dear Sirs:
Please send me complete information on the Turner +2 Microphone.

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Address

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My CB Dealer is



... THREE IN ONE

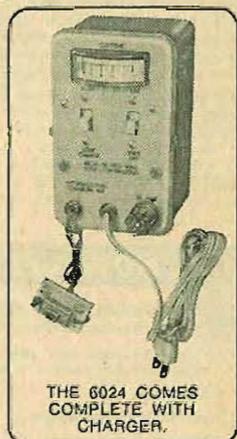
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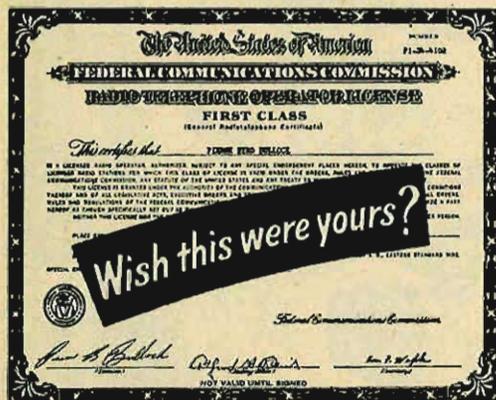
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CB CHANNEL 24

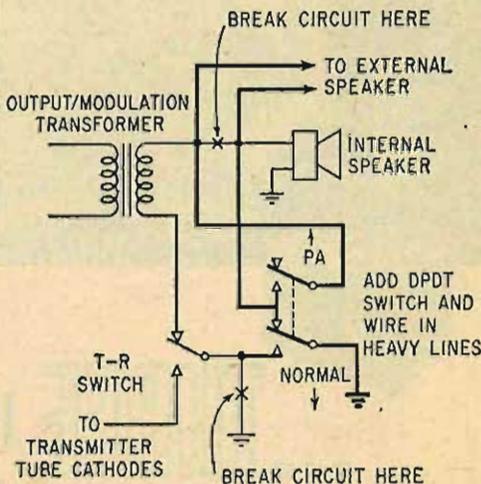
R1 between the cathode of the IF amplifier tube and tip jack J1, and the meter circuit, as shown in the diagram. Use phone tips at the ends of the leads from the "S" meter unit so they can be plugged into the tip jacks at the CB set. Adjust R2 to zero the meter when no signal is being received, and R3 for full-scale meter deflection when receiving a very strong local station.

CB PA

Can I modify my CB set so I can use it as a public address system?

—L. K., Toledo, Ohio

Sure. Rewire the set as shown in the diagram.



CB CD (Cliff Dweller)

What kind of coax should I use for a 200-foot run to the roof of a tall building?

—P. B. T., Kansas City, Mo.

Use a low-loss 50-ohm foam or spiral dielectric coaxial cable such as made by Phelps-Dodge, Andrew and Prodelin.

CB On The Move

I'm going to move. What do I have to do about my CB license?

—T. S. E., Towson, Md.

Simply advise the FCC, Gettysburg, Pa. 17325 of your old and new addresses and the date the new address will be effective.

CB 10-CODE FOR QUICKEST COMMUNICATIONS

10-1	Receiving Poorly	10-37	Wrecker Needed At
10-2	Receiving Well	10-38	Ambulance Needed At
10-3	Stop Transmitting	10-39	Your Message Delivered
10-4	OK, Message Received	10-41	Please Tune To Channel
10-5	Relay Message	10-42	Traffic Accident At
10-6	Busy, Stand By	10-43	Traffic Tieup At
10-7	Out of Service, Leaving Air	10-44	I Have A Message For You (Or
10-8	In Service, Subject To Call	10-45	All Units Within Range Please Report
10-9	Repeat Message	10-50	Break Channel
10-10	Transmission Completed, Standing By	10-60	What Is Next Message Number?
10-11	Talking Too Rapidly	10-62	Unable To Copy, Use Phone
10-12	Visitors Present	10-63	Net Directed To
10-13	Advise Weather/Road Conditions	10-64	Net Clear
10-16	Make Pickup At	10-65	Awaiting Your Next Message/Assignment
10-17	Urgent Business	10-67	All Units Comply
10-18	Anything For Us?	10-70	Fire At
10-19	Nothing For You, Return To Base	10-71	Proceed With Transmission In Sequence
10-20	My Location Is	10-73	Speed Trap At
10-21	Call By Telephone	10-75	You Are Causing Interference
10-22	Report In Person To	10-77	Negative Contact
10-23	Stand By	10-81	Reserve Hotel Room For
10-24	Completed Last Assignment	10-82	Reserve Room For
10-25	Can You Contact	10-84	My Telephone Number Is
10-26	Disregard Last Information	10-85	My Address Is
10-27	I Am Moving To Channel	10-89	Radio Repairman Needed At
10-28	Identify Your Station	10-90	I Have TVI
10-29	Time Is Up For Contact	10-91	Talk Closer To Mike
10-30	Does Not Conform To FCC Rules	10-92	Your Transmitter Is Out Of Adjustment
10-32	I Will Give You A Radio Check	10-93	Check My Frequency On This Channel
10-33	EMERGENCY TRAFFIC AT THIS STATION	10-94	Please Give Me A Long Count
10-34	Trouble At This Station, Help Needed	10-95	Transmit Dead Carrier For 5 Seconds
10-35	Confidential Information	10-99	Mission Completed, All Units Secure
10-36	Correct Time Is	10-200	Police Needed At

NOTE: Any number in the CB 10-Code can also be used to ask a question. For example, 10-20? would mean "What Is Your Location?" and 10-36? would mean "What Is The Correct Time?"

STOP

LOOK, LISTEN!

Everyone's talking about Mosley's new 1968 Catalog of Citizens Band Antennas. Send for your free copy. Dept. 119A.

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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 \pm 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.

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Original	Replace with
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6AQ5	EL90, 6BM5, 6005, 6095, 6669
6AU6	EF94, 6AK5,* 6BA6, 6BD6, 6CB6,* 6DK6,* 5749, 6136, 7543
6AV6	EBC91, 6AQ6, 6AT6, 6BK6, 6066
6BA6	EF93, 6AU6, 6BC5, 6BD6, 6CB6, 5749, 6136, 6660
6BC8	EF93, 6BK7, 6BS8, 6BQ7, 6BZ7, 6BZ8, 6HK8
6BE6	EK90, 6BY6, 6CS6, 1217, 5750, 5915, 6660, 7036, 7502
6BH6	E90F, 6AW6, 6CB6, 6CF6, 6DC6, 6265, 6661
6BJ6	6AS6, 6BA6, 6BC5,* 6BH6, 6662, 7694
6BJ8	6BN8*
6BN8	6BJ8*
6BQ5	EL84, 7189, 7320
6BS8	6BC8, 6BQ7, 6BX8, 6BZ7, 6BZ8, 6HK8
6BZ6	6BA6,* 6CB6, 6DC6, 6DE6, 6DK6, 6HQ6, 6JH6
6BZ8	6BC8, 6BK7, 6BQ7, 6BS8, 6BZ7, 6HK8
6CB6	EF190, 6AG5, 6AK5, 6AW6, 5591, 5654, 6676, 7732
6CM8	6CR8,* 6CS8*
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6T8	6AK8, 6R8
6U8A	ECF82, 6AX8, 6BL8, 6EA8, 6GH8, 6GJ8, 1252, 6678, 7731
6X4	EZ90, 6AV4, 6BX4, 6063, 6202
12AL5	HA A91
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12AT7	ECC81, 12AU7, 12AV7, 12AX7, 12AY7, 12AZ7, 12DF7, 6060, 6201
12AU7	ECC82, ECC186, ECC802, 12AT7, 12AV7, 12AY7, 5814, 5963, 6067
12AX7	ECC83, 12AT7, 12AV7, 12AY7, 12BH7, 12DF7, 5721, 6057
12AZ7	12AT7, 12AV7, 12BH7, 12DT8
12BA6	12AU6, 12BD6
12BE6	HK90, 12CS6

*These tubes should be used only as a last resort as they will not perform nearly as well as the original. Other substitutions should give approximately the same results as the original; in some cases an improvement may be noted.

Note: We presume that these substitutions should work as predicted, as the information was compiled from statistics supplied from tube manufacturers. We do not guarantee the degree of results to be obtained. It should be remembered that slight electrical and mechanical differences probably exist between the "original" tubes and their suggested substitutes.

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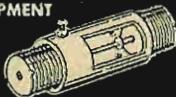
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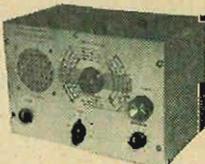
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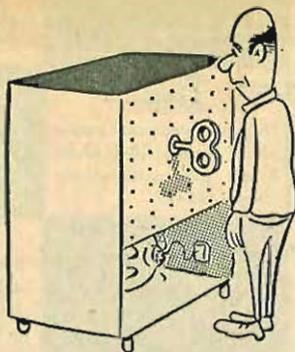
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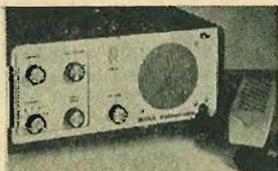
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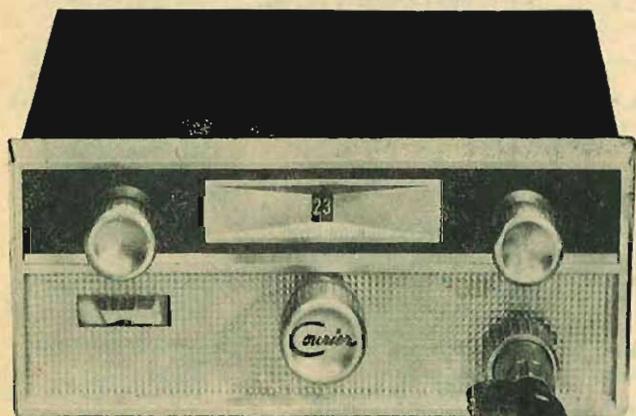
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MASTER MOBILE MOUNTS
(23)
4125 W. Jefferson Blvd.
Los Angeles, Calif.
90016

MCGEE RADIO CO. (24)
1901 McGee St.
Kansas City, Mo. 64108

MERCURY ELECTRONICS
111 Roosevelt Ave.
Mineola, N. Y. 11501

MERLAND MFG. CORP.
122 S. Long Beach Rd.
Rockville Center, N. Y.
11570

MICROWAVE DEVICES, INC.
Farmington Industrial Park
Farmington, Conn. 06032

MIDLAND INTERNATIONAL
CORP.
3519-21 Atlantic St.
N. Kansas City, Mo. 64116

MIDWEST CRYSTAL CO.
1516 Parkwood Rd.
Cleveland, Ohio 44107

MOBILEPHONE
Box 32
Anderson, Ind. 46015

MOSLEY ELECTRONICS,
INC. (19)
4610 N. Lindbergh
Blvd.
Bridgeton, Mo. 63044

MULTI-ELMAC CO.
21470 Coolidge Hwy.
Oak Park, Mich. 48237

N

NATIONAL RADIO INSTI-
TUTE (18)
3939 Wisconsin Ave.
N. W.
Washington, D. C.
20016

NEW-TRONICS CORP.
3495 Vega Ave.
Cleveland, Ohio 44113

NYTRONICS, INC.
550 Springfield Ave.
Berkeley Heights, N. J.
07922

O

OLSON ELECTRONICS, INC.
386 S. Forge St.
Akron, Ohio 44308

OZCO SALES
Granite Ave. Extension
Canaan, Conn. 06018

P

P&H ELECTRONICS, INC.
426 Columbia St.
Lafayette, Ind. 47901

PAGE COMMUNICATIONS CORP.
24049 Frampton Ave.
Harbor City, Calif. 90710

PALOMAR INSTRUMENTS
563 Country Club Dr.
Escondido, Calif. 92025

PEARCE-SIMPSON, INC.
(9)
4710 N. W. 77th Ave.
Miami, Fla. 33100

PETERSEN RADIO CO., INC.
2800 W. Broadway
Council Bluffs, Iowa 51501

POLY-PAKS
Box 942
Lynnfield, Mass. 01900

POLYTRONICS LABS, INC.
900 Burlington Ave.
Silver Spring, Md. 20910

R

R. C. ENTERPRISES (21)
733 W. Carson St.,
Torrance, Calif. 90502

RADIO SHACK CORP.
(6, 7)
730 Commonwealth
Ave.
Boston, Mass. 02215

RADIO SPECIALTY MFG. CO.
2033 S. E. 6th Ave.
Portland, Ore. 97214

RAE CO., INC.
3725 E. 13th St.
Indianapolis, Ind. 46201

RAMBLING REDSKIN
Box 564-D
N. Bergen, N. J. 07047

RAY-TEL (RAYTHEON)
213 E. Grand Ave.
S. San Francisco, Calif.
94084

RAYTHEON CO.
141 Spring St.
Lexington, Mass. 02173

REGENCY ELECTRONICS, INC.
7900 Pendleton Pike
Indianapolis, Ind. 46226

ROANWELL CORP.
180 Varick St.
New York, N. Y. 10014

ROBYN CO.
4303 Kroes Rd.
Rockford, Mich. 49341

S

HERBERT SALCH & CO.
Woodsboro, Tex. 78393

HOWARD W. SAMS & CO. INC. (11)
4300 W. 62nd St.
Indianapolis, Ind.
46206

SAXTON PRODUCTS, INC.
215 N. Rte. 303
Congers, N. Y. 10920

SECO ELECTRONICS
1201 S. Clover Dr.
Minneapolis, Minn. 55420

SECODE CORP.
6414 Cambridge St.
Minneapolis, Minn. 55426

SENCORE
426 S. Westgate Dr.
Addison, Ill. 60101

SENTRY MFG. CO.
Box 12322
Oklahoma City, Okla.
73112

SHURE BROS., INC.
222 Hartrey Ave.
Evanston, Ill. 60202

SIGNALITE INC.
1933 Heck Ave.
Neptune, N. J. 07753

SINCLAIR RADIO LABS
523 Fillmore Ave.
Tonawanda, N. Y. 14150

THE SKYWAY CO.
Hillsboro, Tenn. 37342

SMEA ENGINEERING CORP.
Box 114
Tipton, Ind. 46072

SONAR RADIO CORP.
73 Workman Ave.
Brooklyn, N. Y. 11207

SONIC INDUSTRIES, INC.
2546 W. Michigan St.
Indianapolis, Ind. 46222

SONOTONE CORP.
Elmsford, N. Y. 10523

SONY CORP. OF AMERICA
47-47 Van Dam St.
Long Island City, N. Y.
11101

SPRAGUE PRODUCTS CO.
North Adams, Mass. 01247

SQUIRES SANDERS, INC.
Martinsville Rd.
Millington, N. J. 07946

SSBCO
Box 101
Chicago, Ill. 60645

STELLAR INDUSTRIES, INC.
10 Graham Rd. W.
Ithaca, N. Y. 14850

STINGER ANTENNA CO.
Box 10605
Dallas, Tex. 75205

SUN CRYSTAL CO.
Box 301
N. Miami, Fla. 33142

SUPEREX ELECTRONICS CORP.
4 Radford Pl.
Yonkers, N. Y. 10701

T

TELEX ACOUSTIC PRODUCTS
3054 Excelsior Blvd.
Minneapolis, Minn. 55416

TELREX LABS
Asbury Park, N. J. 07712

TENNA MFG. CO., INC.
19201 Cranwood Pkwy.
Cleveland, Ohio 44128

TENNESSEE PAPER & BOX CO.
Box 198
Gallatin, Tenn. 37066

TEXAS COMMUNICATIONS, INC.
1601 W. Broadway
Lubbock, Tex. 79401

TEXAS CRYSTALS
1000 Crystal Dr.
Fort Myers, Fla. 33901

TRAM ELECTRONICS, INC.
Box 189
Winnisquam, N. H. 03289

TRIPLETT ELECTRICAL INSTRUMENT CO.
286 Harmon Rd.
Bluffton, Ohio 45817

TURNER MICROPHONE CO. (16)
909 17th St. N. E.
Cedar Rapids, Iowa
52402

U

UNITED SAFETY SUPPLY (24)
310 W. 9th St.
Kansas City, Mo. 64105

V

VACO PRODUCTS CO.
317 E. Ontario St.
Chicago, Ill. 60611

VERSA-TRONICS (26)
Rte. 1, Box 264
Marengo, Ill. 60152

VIBRATROL
7845 Merrimac Ave.
Morton Grove, Ill. 60053

VIKOIA
400 9th St.
Hoboken, N. J. 07030

W

WATERS MFG. INC.
Wayland, Mass. 01778

WEBSTER MFG. CO.
317 Roebling Rd.
S. San Francisco, Calif.
90480

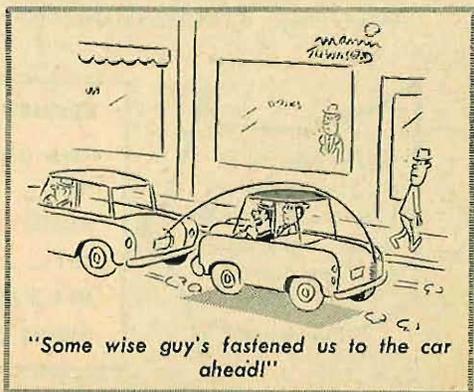
WESTERN RADIO (MIDWAY CO.)
Kearney, Nebr. 68847

WESTINGHOUSE (Television-Radio Div.)
Metuchen, N. J. 08800

WORLD RADIO LABORATORIES, INC. (8)
2415 W. Broadway
Council Bluffs, Iowa
51503

Z

ZEUS PORTABLE GENERATOR CO.
12435 Euclid Ave.
Cleveland, Ohio 44106



LNx CB ANTENNAS

For the first time you can obtain perfectly matched, tunable antennas • Base Station • Base Station Portables • Mobile or Marine*

LNx MOBILE TUNABLE ANTENNAS*

The only mobile antenna that can be perfectly matched to any mounting location on any vehicle.

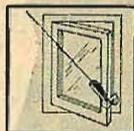
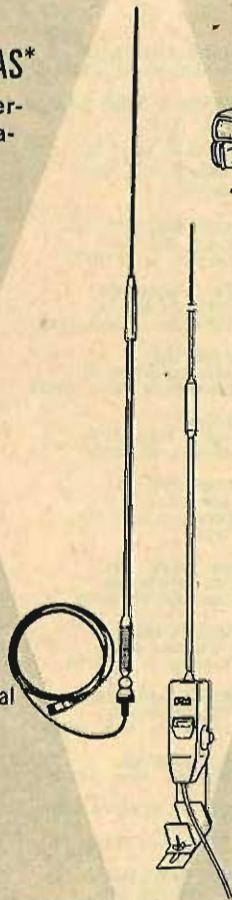
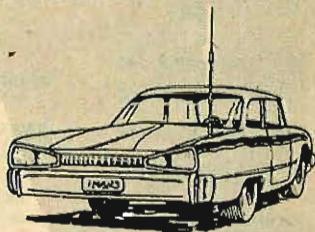
- Can be tuned to ZERO reflected power
- Fits any vehicle
- Can be mounted in any location on the vehicle
- Choice of mounts—rigid, spring or $\frac{3}{8}$ " #24 stand
- Ferrite tuned center loading coil

LNx TIGER TAIL WHIP*†

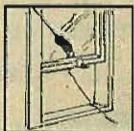
Perfect for that impossible antenna installation. The first truly portable base station antenna for on-the-job communications, offices, apartments, camping, traveling and emergency use.

- Can be installed and on the air in one minute.
- Ferrite turned center loading coil
- Built-in reflected power meter for visual tuning
- Portable—weighs only 3 lbs.
- Complete with 12' lead and connector
- Solid state circuitry

*Patents pending *†A trademark of Elenex, Inc.



CASEMENT WINDOWS
use on windows of large buildings, apart. houses, or offices



DOUBLE HUNG WINDOW MTG
Use at Cottages, Motels, Trailers or Room-to-Room

Send for free catalog that describes complete Elenex line of tunable base station, portable, mobile and marine antennas.

ELENEX, INC., 123 MAIN ST., NAPLES, N. Y.

Please send me more information on your antennas.

NAME

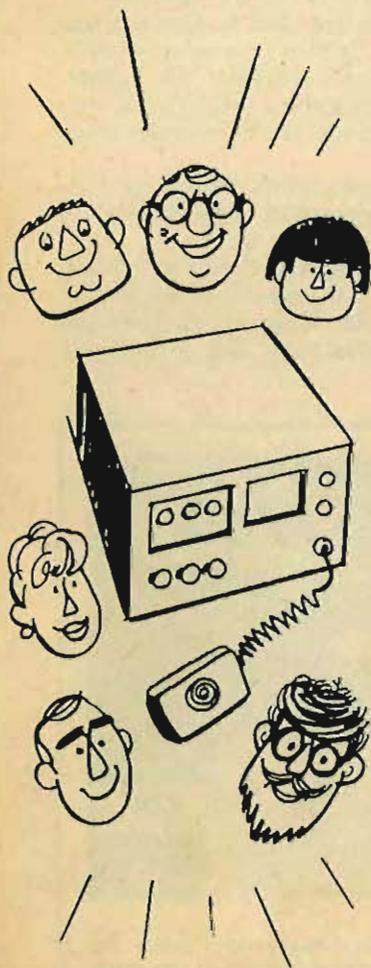
ADDRESS

CITY

MY C. B. DEALER IS

ADDRESS

CITIZENS BAND 1968



Today, roughly ten years after its creation, the Citizens Radio Service is the largest group of licensees regulated by the Federal Communications Commission. In actual fact, there are about 1 million licensees who operate almost 3 million CB transceivers!

The years since 1958 have been hectic, to be sure. But after all, any time a million or more people get interested in *anything* there's bound to be confusion—especially when the millions talk to each other on only 23 channels. That's almost the same as trying to serve a city the size of Los Angeles with only 23 telephone lines! Couple this to the fact that the FCC revises its already difficult-to-understand rules every once in a while and you've got dear old CB.

But think of it this way: for a relatively small investment and a minimum of trouble, you can install and operate your own personal 2-way radio communications network. You can communicate with your home, car, truck, store, factory, shop, office; you can use the equipment to ask for road directions, to summon roadside aid, to make hotel reservations. Your equipment will enable you to communicate 25 to 30 miles under certain conditions. And it's easy to service, simple to use, and easy on the pocketbook.

Really now, what more could you want? Just one thing! You want some inside tips and information on how to install and operate this equipment so that you can get the most

use from it; and that's where we come in.

The purpose of this book is to get you going and *keep* you going with as much ease and as little grief as possible. We'll clue you in on the newest and nicest in the world of CB, and we'll give you some tips used by old-timers as they apply to the latest techniques.

• *Trends.* Before we get to the nitty gritty we might dwell for a few syllables on the current scene. Our aim will be to uncover the latest CB trends and offer a few thoughts as to where the 9-headed dragon is moving.

The hottest items from a commercial standpoint are the teeny-wéeny transistorized CB rigs. They've taken the CB world by storm, especially for mobile installations.

Base-station operators are split in their emotions—many dig the little sets, but others like the awesome-looking larger sets with all of the pretty meters, knobs, and switches. Naturally, selection of the best sets for your specific installation is pretty much up to you.

Sets employing single sideband (SSB) have been gaining in popularity. Therefore, if you should be listening on the band one day and hear something not unlike Donald Duck talking, then you've been introduced to SSB. Actually, it has many advantages, including a better range than standard (AM modulation) rigs and the fact that an SSB rig can "make 2 channels out of 1." Honest!

Whereas your regular CB rig operates on Channel 9, an SSB rig would operate on Channel 9U and Channel 9L (that means the upper and lower half of the channel). This permits two separate conversations to take place in the same location and right on the "same" channel (9U and 9L), and without any interference!

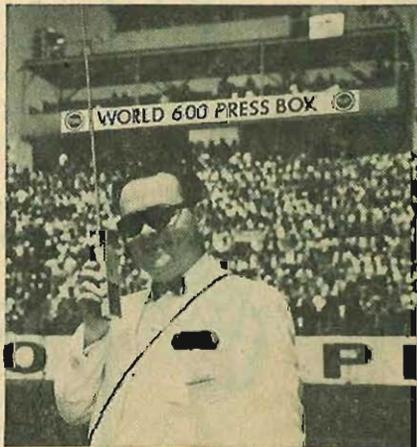
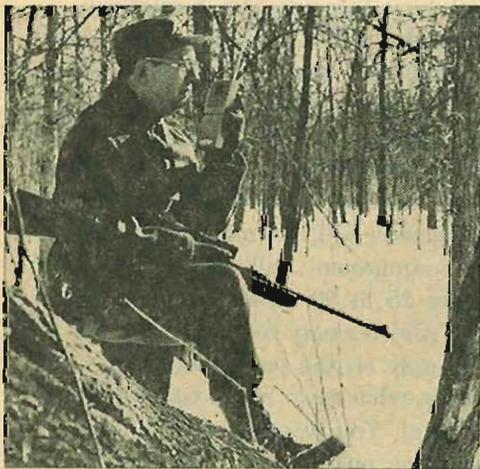
CBers are expressing a growing interest in SSB because it might well turn CB's 23 channels into an effective 46 channels. Big disadvantage to it right now is that SSB stations can't talk with regular (AM) stations. And since most CBers use AM you can't depend on SSB for contacting random CBers to bring roadside assistance.

SSB is catching on, however, and some equipment permits you to operate both SSB and AM. This may bridge the gap.

High-powered walkie-talkies are also on the way in. These are 2-, 3-, 4-, or even 5-watt units which are often no larger in size than the little 1/10-watt peanut whistles which don't require a license. The higher-powered sets do require a regular CB license and you must follow the FCC's rules when using them.

In general, we look forward to these units (SSB and high powered walkie-talkies) to be the coming fads.

Tie this in with CB itself, an already pudgy 10-year-old, growing at the rate of more than 20,000 license applications per month, and you've got a look at tomorrow in CB.



Compact, transistorized CB transceivers are at home just about everywhere which explains why they're a cinch for sportsmen, whether in the field (at left) or at the track.



Pretty miss at left makes like a pro with Courier's Port-a-Pak; beach beauty above relies on new Amphenol 85.

• **THE FCC.** As might be expected, the FCC has had its hands full in trying to manage its prize baby. Though the Commission has tried many different approaches to a workable set of CB rules and regulations (the CB rules are known as "Part 95"), the bulk of the users and the FCC can't seem to get together on anything which is even remotely acceptable to both sides.

The most recent rule change was intended to curb ham-radio (hobby) type idle chit-chat on CB and consisted of a rather lengthy list of "thou shalt nots," including prohibitions against broadcasting music, non-essential messages, cuss words, equipment performance messages, communications spanning more than 150 miles, transmissions not directed to specific stations (except in the case of mobile units seeking aid), etc.

Currently in the works at the FCC is a requirement for CB manufacturers to submit detailed specifications and test reports on their equipment for Commission approval before the equipment may be licensed.

Another FCC stab at improving CB is the plan to deport all low-powered walkie-talkies (the 100-milliwatt unlicensed ones only) out of the 27 MHz CB area and give them their own exclusive channels on 49 MHz. The only way that they would be permitted to operate in the existing 27 MHz band would be by obtaining a regular CB license and conforming with all Part 95 regulations.

Object of the scheme is to cut down on

interference from the hand-held units. Most CB operators, however, feel that any alleged "interference" from these units is either negligible or totally non-existent (except for a few weeks after Christmas each year).

The FCC is faced with a number of perplexing problems regarding CB, and they all boil down to the plain and simple fact that people like to chat. When they get a microphone in their hand and hear someone a few miles away they just do what comes naturally—they say "hello."

The FCC feels that such socializing belongs on the telephone, or at least on the ham radio bands. Seven FCC Commissioners are the only ones who can change the Commission's position in this regard. And it should be noted that much pressure is being brought on them right now from users, manufacturers, publications, and even both Houses of Congress to do just this, and at an early date.

In the meantime, like them or not, we've all got to toe the line with Part 95 and strictly abide by all of its stipulations.

• **A LICENSE.** One of the FCC's little hopes is that you will go through with the formality of obtaining a CB license before you take to the airwaves. If you don't already have one, you will be pleased to learn that getting a license is a relatively simple process and requires only that you be at least 18 years of age (a person of *any* age may operate the rig, but only 18 or over can get the license), that you have the \$8

CB "505" FILLED OUT

license filing fee, and that you are willing to complete a short license application. There is no test or exam involved.

First step in obtaining a CB license for yourself is to write away to your nearest FCC district office (see list on page 110) for a "Form 505." These are free.

While awaiting the Form 505, send a check or money order in the amount of \$1.25 to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Ask them to send you Volume VI of the Federal Communications Commission Rules and Regulations. This will give you a copy of Part 95, something necessary for you to have on hand (and read *and* understand) *before* filing your license application. You can save the \$1.25 if you keep this copy of the CB YEARBOOK since it contains the complete Part 95 and will satisfy the FCC's requirements.

The FCC has a cute little trick that you should be aware of, and by careful reading of what follows you might save yourself \$8. Seems that if you botch up your CB application and send it in filled out to less than their satisfaction they will promptly bounce it back to you—keeping your \$8 as a service charge. When you correct the application and resubmit it, you've got to send them another \$8 all over again. We can't change this ruling, so our only advice is to take every precaution the first time.

The thing to do is to check and double-

check the application several times before you ship it out. Don't forget to enclose the \$8 fee (making the check or money order payable to the Federal Communications Commission). A properly filled-out application appears on the next page. Follow it carefully for style.

If you use airmail in sending your application you may shave a day or two off your wait, but it will still take about a month for processing—maybe even 6 weeks. Don't get impatient, however, and be tempted to "borrow" a buddy's call-sign temporarily, since the FCC frowns upon this bit. In other words, your best bet is to stay off the air until your license comes.

● **CUSTOMIZING A BASE STATION.** Anyone who has operated CB rigs in just about every possible environment and under practically all conditions can reach only one conclusion. And that is that having the equipment arranged for ease of operation makes for the most effective utilization of a station.

Something as apparently inconsequential as a desk or table even enters into the CB picture when you're setting up a station. For instance, it should be at least 30 in. high. And it should have a large enough surface to accommodate at least your transceiver and still afford ample room for writing down messages and taking notes. In fact, you should try to leave at least 16 in. from the chair side of the desk to the front of the rig, with the set slightly to the left.

If the table is shallow, place the rig all the way over to the left and any books and papers you need on the right, leaving the center clear. (Continued)



The Rambling Redskin has do-dads for your car you've never imagined. Channel monitor sticker is left, emergency plate at right.

APPLICATION FOR CLASS B, C, OR D STATION LICENSE IN THE
CITIZENS RADIO SERVICE

- Application for Class A station license must be filed on FCC FORM 400.
- Complete on typewriter or print clearly.
- Be sure application is signed and dated. Mail application to Federal Communications Commission, Gettysburg, Pa. 17536.
- Enclose \$8 fee with application. **DO NOT SUBMIT CASH.** Make check or money order payable to Federal Communications Commission. The fee will not be refunded even if the application is not granted. Also, fee overpayments of \$2 or less will not be refunded. (See fee schedule for an application filed by a governmental entity. For additional exemptions, see Part 95, Volume VI of the FCC Rules.)

DO NOT WRITE IN THIS BLOCK

1 NAME OF APPLICANT

BUSINESS NAME (IF ANY) OR, IF APPLYING ONLY AS AN INDIVIDUAL, GIVE LAST NAME
DOE

FIRST NAME (IF AN INDIVIDUAL) MIDDLE INITIAL
JACQUELINE Z.

2 IF AN INDIVIDUAL OPERATING UNDER A TRADE NAME, GIVE INDIVIDUAL NAME, OR IF PARTNERSHIP, LIST NAMES OF PARTNERS (Do not repeat any name used in item 1)

LAST NAMES	FIRST NAMES	MIDDLE INITIAL

3 PERMANENT MAILING ADDRESS

NUMBER AND STREET
100 MADISON AVE.

CITY STATE
NEW YORK NY.

ZIP CODE COUNTY
10000 NEW YORK

4 CLASSIFICATION OF APPLICANT (See instructions)

INDIVIDUAL ASSOCIATION GOVERNMENTAL ENTITY

INDIVIDUAL/DBA CORPORATION OTHER (Specify):

BUSINESS PARTNERSHIP

5 CLASS OF STATION (Check only one) (See instructions)

CLASS B CLASS C CLASS D

6 IS THIS APPLICATION TO MODIFY OR RENEW AN EXISTING STATION LICENSE? (See specific instruction 4)

YES (Give call sign): NO

IF YES, EXPLAIN UNDER REMARKS

7 DO YOU NOW HOLD ANY STATION LICENSE, OTHER THAN THAT COVERED BY ITEM 5 OF THE SAME CLASS AS THAT REQUESTED BY THIS APPLICATION? (See instructions)

YES NO

IF YES, FURNISH CALL SIGN(S)

8 TOTAL NUMBER OF TRANSMITTERS TO BE AUTHORIZED UNDER REQUESTED STATION LICENSE

5 (Number)

EXPLANATION MAY BE REQUIRED. SEE INSTRUCTIONS.

	YES	NO
9 DOES EACH TRANSMITTER TO BE OPERATED APPEAR ON THE COMMISSION'S "RADIO EQUIPMENT LIST, PART C" OR, IF FOR CLASS C STATIONS USING FREQUENCIES IN THE 28-51 MC/S BAND OR CLASS D STATIONS, IS IT CRISTAL CONTROLLED? (If no, attach detailed description; see subpart C of Part 85)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10 A WILL APPLICANT OWN ALL THE RADIO EQUIPMENT? (If no, specify B and C below)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B NAME OF OWNER	<input type="checkbox"/>	<input type="checkbox"/>
C IS THE APPLICANT A PARTY TO A WRITTEN LEASE OR OTHER AGREEMENT UNDER WHICH THE OWNERSHIP OR CONTROL WILL BE EXERCISED IN THE SAME MANNER AS IF THE EQUIPMENT WERE OWNED BY THE APPLICANT?	<input type="checkbox"/>	<input type="checkbox"/>
11 HAS APPLICANT READ AND UNDERSTOOD THE PROVISIONS OF PART 95, SUBPART D, DEALING WITH PERMISSIBLE COMMUNICATIONS FOR WHICH THIS CLASS OF STATION MAY BE USED?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12 IF THE STATION IS TO BE USED FOR VOICE COMMUNICATION, DOES APPLICANT CERTIFY THAT IT WILL NOT BE USED EITHER FOR COMMUNICATION OVER A DISTANCE EXCEEDING 150 MILES, OR FOR THE EXCHANGE OF CHAT, CHAT, OR CONVERSATION, DISCUSSION OF EQUIPMENT, OR HOBBY-TYPE COMMUNICATIONS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13 WILL ANY PERSON, OTHER THAN (1) THE APPLICANT, (2) MEMBERS OF HIS IMMEDIATE FAMILY LIVING IN THE SAME HOUSEHOLD, OR (3) HIS EMPLOYEES, OPERATE THE STATION? (If yes, attach a separate sheet listing the names and relationships of all such persons and give a detailed reason for their operation of your station)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14 IF APPLICANT IS AN INDIVIDUAL OR A PARTNERSHIP, ARE YOU OR ANY OF THE PARTNERS AN ALIEN? (If the answer is yes, do not file this application because you are not eligible for a license)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15 IS APPLICANT THE REPRESENTATIVE OF AN ALIEN OR ANY FOREIGN GOVERNMENT? (If yes, explain fully)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16 WITHIN 10 YEARS PREVIOUS TO THE DATE OF THIS APPLICATION, HAS THE APPLICANT OR ANY PARTY TO THIS APPLICATION BEEN CONVICTED IN A FEDERAL, STATE, OR LOCAL COURT OF ANY CRIME FOR WHICH THE PENALTY IMPOSED WAS A FINE OF \$500 OR MORE OR AN IMPRISONMENT OF 6 MONTHS OR MORE?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
IF YES, SEE INSTRUCTIONS.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17 IF APPLICANT IS AN INDIVIDUAL OR A PARTNERSHIP, ARE YOU OR ANY PARTNER LESS THAN 18 YEARS OF AGE, LESS THAN 15 YEARS OF AGE IF FOR CLASS C STATION LICENSE? (If the answer is yes, do not file this application. Persons under 18 are not eligible for a Class B or Class D license and persons under 16 are not eligible for a Class C license)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18 IF ITEM 5 SHOWS P.O. BOX OR RFD NUMBER, GIVE A LOCATION WHERE THE LICENSEE OR THE STATION MAY BE FOUND. (DO NOT GIVE POST OFFICE BOX OR RFD NUMBER.)	<input type="checkbox"/>	<input type="checkbox"/>
NUMBER AND STREET SAME	<input type="checkbox"/>	<input type="checkbox"/>
CITY STATE	<input type="checkbox"/>	<input type="checkbox"/>
IF LOCATION CANNOT BE SPECIFIED BY STREET, CITY, AND STATE, GIVE OTHER DESCRIPTION OF LOCATION SUCH AS DISTANCE AND DIRECTION FROM NEAREST MAJOR ROAD (INTERSECTION OR FROM NEAREST TOWN OR CITY)	<input type="checkbox"/>	<input type="checkbox"/>

DO NOT WRITE IN THIS BOX

SCREENING Y N

SIGNATURE Y N

FROM PART OF THE APPLICATION - REVERSE SIDE

ALL THE STATEMENTS AND INFORMATION ON THIS APPLICATION AND EXHIBITS ARE CONSIDERED MATERIAL REPRESENTATION. ALL THE EXHIBITS ARE A MATERIAL PART HEREOF. THE APPLICANT AGREES TO THESE AS IF SET OUT IN FULL IN THE APPLICATION.

I CERTIFY THAT:

- The applicant has (or has ordered from the Government Printing Office) a current copy of Part 95 of the Commission's rules governing the Citizens Radio Service.
- The applicant waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise.
- The applicant accepts full responsibility for the operation of, and will retain control of any citizens radio station licensed to him pursuant to this application.
- The station will be operated in full accordance with the applicable law and the current rules of the Federal Communications Commission. The said station will not be used for any purpose contrary to Federal, State or local law.
- The applicant will have unlimited access to the radio equipment and effective measures will be taken to prevent its use by unauthorized persons, and
- The statements in this application are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

DO NOT OPERATE UNTIL YOU HAVE YOUR OWN LICENSE. USE OF ANY CALL SIGN NOT YOUR OWN IS PROHIBITED.

SIGNATURE: *Jacqueline Doe* DATE SIGNED: *July 5, 1967*

- (Name)
- INDIVIDUAL APPLICANT MEMBER OF APPLICANT PARTNERSHIP OFFICER OF APPLICANT CORPORATION OFFICIAL OF GOVERNMENTAL ENTITY
- OFFICER WHO IS ALSO A MEMBER OF THE APPLICANT ASSOCIATION

CB MOBILE ACCESSORIES

Often it is helpful to actually build a raised platform about 5 in. high at the front and 3 in. high at the back. This will tilt the set up for ease of operation. You may then use the space under the platform for pencils, papers, etc. The platform can be whipped together with 2 x 4 in. pieces of pine to support a plywood platform.

Now to safety precautions, such as bonding all metal cabinets together and hooking them to a good ground. A cold-water pipe is best, and you should use heavy wire.

Be certain that your power source is fused directly from the power meter. You may find that it is best to run a single, well-insulated cord from the outlet to a multiple outlet tap attached to the side or the back of your operating table, rather than run long wires to the wall outlet from everything on your table.

We've always found it handy to have a telephone on the desk—over on the right. Posted near the telephone are the numbers of the Police, Fire Department, and any other necessary emergency numbers.

Other handy things to keep near are a desk lamp (try not to get a fluorescent one because they're noise makers), a pencil sharpener, a digital reading clock, a five minute timer, and a map of the area. A spare set of tubes never hurt anyone, either.

• **MOBILE ACCESSORIES.** Possibly the most essential accessory for mobile CB operation is a high mountain, to be placed under the car before every transmission. This will increase your range surprisingly!

Seriously, mobile work is often affected by the terrain. In cities, tall buildings (or even smaller all-metal structures) can scramble radio waves so thoroughly your receiver won't recognize them. In open country, something called "diffraction effects" frequently cause alternate "hot spots" where range is exceptional and "dead spots" where you will think your rig has gone completely haywire.

If you often drive through these "dead spots," you'll want a field-strength meter installed as a permanent accessory. This device will tell you at all times whether your rig is putting out its maximum RF into the atmosphere. Should you get no replies even though the field-strength meter reading is normal, have no fear—you're just in a "dead spot." On the other hand, should the field-strength meter reading fall off, you have trouble in the rig or the antenna, and should seek service.

Naturally, for peak performance you'll want to make sure the antenna is properly peaked—and the field-strength meter is handy here, too. Most antennas will work well over the entire band, but their performance can be improved on any one channel by proper peaking. To accomplish this, trim down the length of the whip (not more than $\frac{1}{8}$ in. at a time) and check the field strength between each snip. When the strength just begins to fall off, stop—you're tuned.

A more accurate method of tuning the antenna involves another accessory: the SWR bridge. This device measures the perfection of the match between feedline and antenna; if this match is perfect (or nearly so), the rig will deliver its best performance.



Among the first CB rigs on the market, this Vocaline AT-30 opened up the CB bands.



Now pro as pro can be, CB has become rugged, reliable communication means.

Contrary to what you may have heard or read elsewhere, the length of the feedline is immaterial if you have a good match between the coax and the antenna; under this condition, the rig thinks it's feeding a 50-ohm resistor and can't tell how much or how little feedline is present!

The SWR bridge isn't permanently mounted in the car; it's used like a tune-up meter, inserted in the feedline only when needed and used elsewhere if needed. After all, home station rigs need matching, too. The only thing to watch out for in the mobile installation is to make sure the bridge can be inserted in the line; this is no trouble if you make up a pair of jumper cables from the coax with plugs to fit the rig and the antenna on one end of each, and plugs to fit the bridge on the other ends.

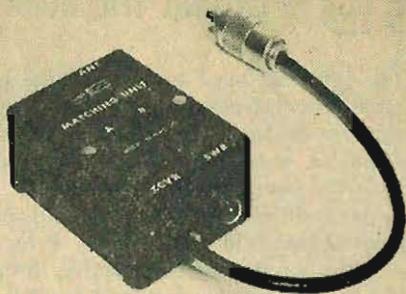
If the rig connector fits the bridge also, only one jumper will be needed. Just unplug the coax from the rig, connect it to the "Load" or "Antenna" side of the bridge, and connect the jumper between the rig and the "Input" side of the bridge. Tune the antenna as described above, trimming until the SWR indication is as close to 1.000 as you can get.

The FCC requires you to have a Form 452-C (Revised) attached to your transceiver. This is a small tag which provides acceptable identification for your unit. They're given free at any FCC office.

Naturally, there are many accessories available which we haven't room to list here. Among these are such things as whip clamps, to hold bumper whips down when they're not in use; chest-type microphones which free both hands for driving; boom-type headsets which combine mike and earphone for the same purpose; and many other items.

However, the basic items we have listed will provide you a complete mobile installation, and give you the key to a new world of communications possibilities. Give them a try!

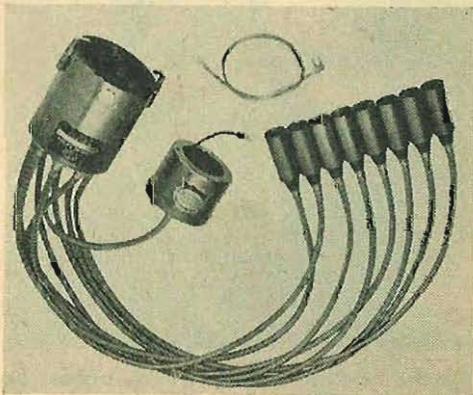
• **BUYING USED GEAR.** The art of horse trading has developed considerably since the days of the wild and woolly west. Though there are now undoubtedly fewer horses around, the art has been passed on to the field of electronics. Fortunes have been made through the applied knowledge of this art. Best of all, you too can enroll in the *Society of Happy Horse Traders*. All that you require is one or more pieces of obsolete or otherwise unwanted CB equipment, and the desire to get something just a little bit better.



Multi Elmac goodie warns of excessive SWR.



Hallett "Hash Husher" reduces sparkplug RF interference.



"Signal Saver," also by Hallett, cuts ignition-system noise.

CB SPENDING THE BUCK

The first and most important step is to locate the local electronic horse trader (used-equipment dealer). Having located this establishment, you would be well advised to prepare the equipment for examination. The exterior condition should be clean and shiny; the working parts in proper order. If for any reason the equipment is defective, be prepared to disclose this fact and furnish the symptoms (most horse-trading emporiums have well staffed repair departments).

If you have made any modifications to the equipment you should similarly be prepared to disclose same and provide a schematic showing the changes. Instruction books, manuals, and similar items should accompany the equipment.

The methods and procedures of horse trading are quite simple. You must first resign yourself to the fact that the allowance that you will receive is below the price that you have paid for the equipment. This can be offset by the reduced price on the used equipment that you will purchase. It may be of interest to note that allowances are higher when new equipment is being purchased.

Bear in mind that most horse-trading es-

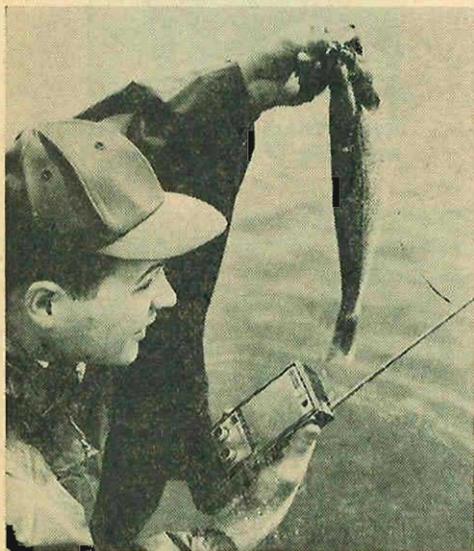
tablishments are in business for the purpose of making money, except for one or two that have since gone bankrupt. The odds on making an even swap for another piece of equipment are therefore nil. As a typical example let us look at the following trade-in allowances on a piece of electronic gear.

Equipment Desired	Allowance	Cash
\$235.00 used	\$175.00	\$60.00
275.00 new	200.00	75.00
119.00 new	100.00	19.00
110.00 used	105.00	5.00
500.00 new	275.00	225.00

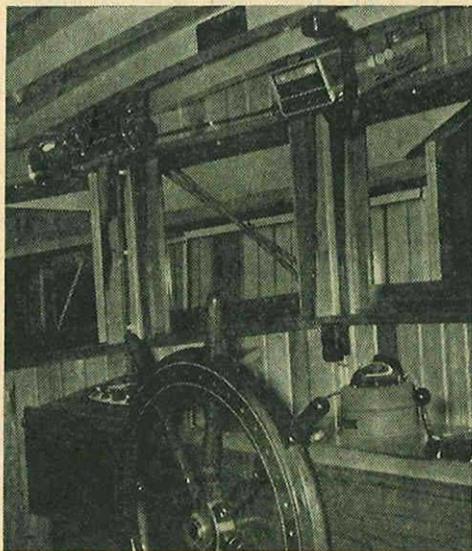
As you can see the allowance made varies quite widely according to the price of the equipment desired. Rarely if ever will you receive change in a trade transaction unless the equipment sought is quite inexpensive. From the data developed you can readily see why most equipment dealers will be reluctant to give you an estimate of the value of your equipment without knowing what you are looking for in return.

The obvious procedure is to first select the equipment you desire and then to discuss the equipment that you wish to trade in. In the majority of cases, the emporium will insist on testing your equipment prior to giving you a price. It is not too wise for you to object to this procedure. Conversely, you should request the same privilege.

The matter of guarantees on the new



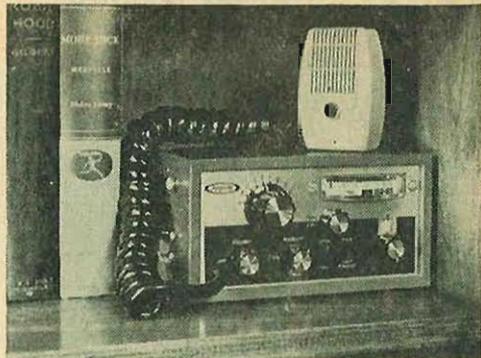
General Electric figures you'll phone up stream to tell the boys about your luck.



Everybody'll know the shrimp boats are coming with a Pearce-Simpson rig aboard.



Handsets are in! Now your car can look like Dick Tracy's with this Companion II.



Pint-sized rigs are good for the home where space is tight—note size of Amphenol unit.

equipment is also quite important. It is not uncommon for equipment to be sold on an "as is" basis. In this case, the price paid should be low enough to provide for any required repairs. If available you should insist on a full list of the symptoms. It is often possible to pick up a rather valuable item for a low price with only a nominal amount of repairs needed. It is advisable to avoid any item where parts availability is poor.

The basic art of horse trading can provide the Citizens Bander with a market for his used equipment; it can also help him take the step to more elaborate equipment at relatively little cost. The rules, as you can see, are quite flexible. The profits can be great. At all times you should remember the expression "Caveat Emptor." Let the buyer beware: the following list should prove helpful.

Equipment Desired

1. Will it fulfill your requirements as to power, frequency sensitivity, selectivity, and size?
2. Is the appearance good, fair, or poor?
3. Is it electrically good, fair, or poor?
4. Has it been modified?
5. Are schematics and or manuals available?
6. Are replacement parts available?
7. Is it factory wired or kit built?
8. Are there any guarantees?
9. Can you test the equipment?
10. If it is an "as is" sale, does the price warrant the risk?
11. Does the present condition or age prevent any possible future resale or trade of the equipment?
12. What is the reputation of the "Horse

Trading Emporium"?

Equipment Being Traded

1-7. (As above.)

8. Is the allowance sufficient to obtain the new equipment with a moderate cash outlay?

9. Has the equipment outlived its usefulness to you?

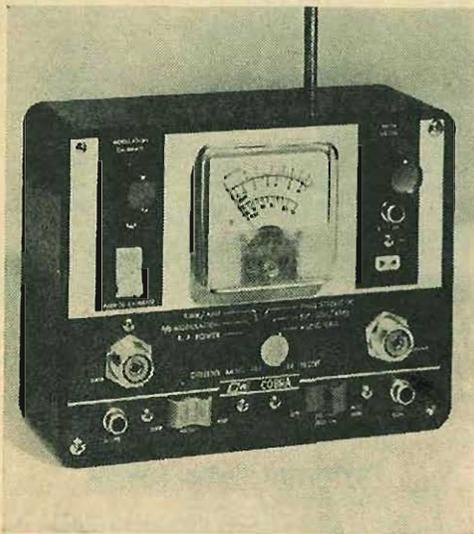
By following the above check list you can be reasonably secure in the knowledge that the trade you make will be satisfying and even lucrative.

• **TROUBLESHOOTING.** From experience, we have found that a great many of the repairs required on CB equipment can be very easily accomplished by even the most rank novice—and done with household tools and other assorted paraphernalia from around the CB shack. While there are a number of repairs on CB gear which should be performed by an experienced (and FCC-licensed) service specialist, it is sheer folly to have these people spend their expensive time doing something which you, yourself, could have taken care of in a few minutes time.

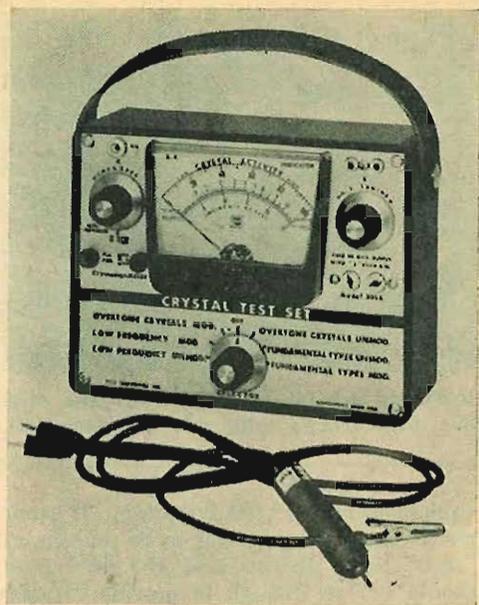
We have therefore made up a list of some of the more frequent simple complaints noted with CB gear, together with some suggestions on how you can squelch the problems.

Let us begin by stating that you should always have a manual for your rig at your station—or at the very least, a schematic. If the manual which came with your set is lost, then write to the manufacturer for another one.

Problem: Set is completely dead—tubes don't even light.



B&K has put all the makings for a complete CB Transmitter Tester into one handy box.



SECO's Crystal Test Set tests your rig's crystals under simulated battle conditions.

Try: Making sure that the unit is connected to the powerline or car battery. Frequently a plug is knocked from the wall by accident, and it's not even thought of as a possible reason for the equipment failure. If the set is connected to the power source, check the fuse to see if it has blown. Check the connections of the wires going to the plug in the wall from the set—perhaps they are broken or the connections have come loose. Also try wiggling the power plug at the power connections at the rear of the chassis.

If all of this still produces no results, go inside the rear of the CB rig and find the rectifier tube in the power supply—your schematic should pinpoint the tube quickly. Chances are that it will be a tube with a type number containing a letter from "W" through "Z" in the alphabet, and located near the power transformer.

Wiggle the tube around in the socket, while the set is plugged in and still turned on. Check this tube on a tube tester if results aren't forthcoming.

Problem: Set lights up, but received signals are very weak.

Try: Checking the coaxial connector to make certain it is connected to the set. If it is connected, check to see that the cable

hasn't been pulled loose from its connections in the plug. Possibly the connections on the other end of the cable, at the antenna, have come loose—or have corroded. If these things check out, then check the tubes in the IF section also the RF amplifier tube.

If they are all lit, then tap them (lightly) a few times with the eraser end of a wooden pencil. Any tube which causes the set to improve when tapped means a tube which needs replacing. This failing, remove these tubes from the set and have them checked on a tube tester.

Problem: Set lights up, but no sound.

Try: Checking the speaker leads. If they are connected, rotate the volume control back and forth a few times. If the sound cuts in and out when you do this, take some *Injector* Tuner Cleaner and squirt it into the control (unplug the set when doing this).

Check all of the tubes associated with the audio section of the rig—first by tapping and then, if needed, on a tube checker.

Also, check to make certain that the T/R relay is functioning properly.

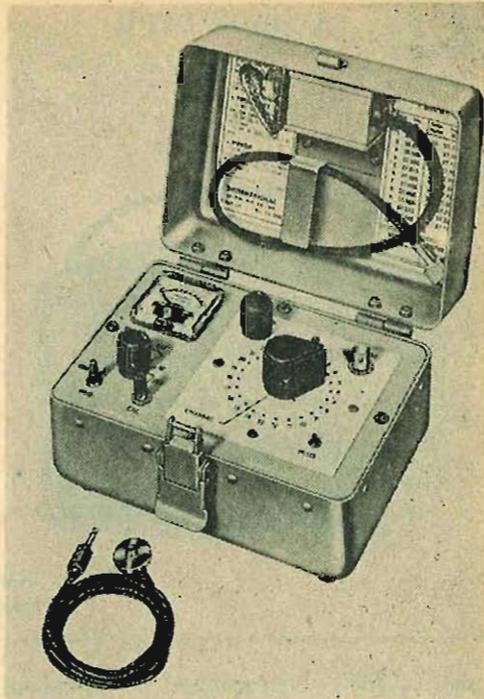
Problem: "Ringing" sound from speaker; set has feedback when volume is turned up.

Try: Looking for a microphonic tube. This is easily accomplished by the pencil tap test.



EICO's 715 Test Set is designed to ring out the entire C.B. transceiver—it's self-powered.

Three in one—that's International Crystal's 6024 Frequency Meter. It's a secondary standard, signal generator and power meter.



A good place to start is in the IF section.

Problem: Station at other end of contact tells you that you have a signal, but no modulation.

Try: Checking the connections inside of the microphone connector—one may have come loose. Check out the tube(s) in the audio circuit, as these are frequently used for double-duty in the modulation circuit. This failing, try another microphone.

Problem: Station on other end tells you that there is a hum or buzz on your modulation.

Try: Looking at the electrolytic capacitors in your set for a defective one. If nothing seems to be leaking out of any of them, you'll have to give up and take the set to someone who can find the bad one with test equipment. Check audio tubes.

Problem: You hear a hum or buzz on stations being received.

Try: Looking for a defective electrolytic capacitor as previously described. That producing no results, look for a loose connection which should be going to ground—or a connection going to ground which doesn't belong there. Test tubes in audio and RF sections.

Problem: All received signals are distorted in quality.

Try: Looking to see if the speaker is still intact—perhaps the cone has become torn or the speaker connections are loose. Check the tubes in the audio section of the rig, also all tubes in the IF circuits.

Problem: Sound from set has a "scratchy" quality, especially when volume is adjusted.

Try: Giving the volume control a few squirts of *Injectoral Tuner Cleaner*, or similar products.

Problem: Set "motorboats," that is, gives off a "putt-putt" sound from speaker.

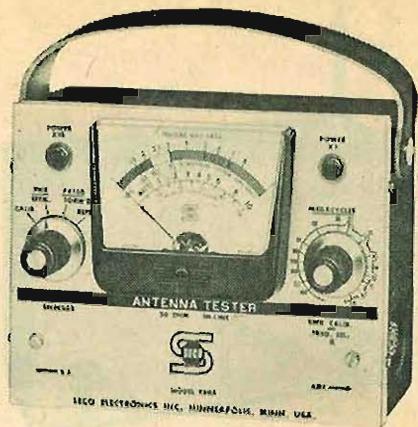
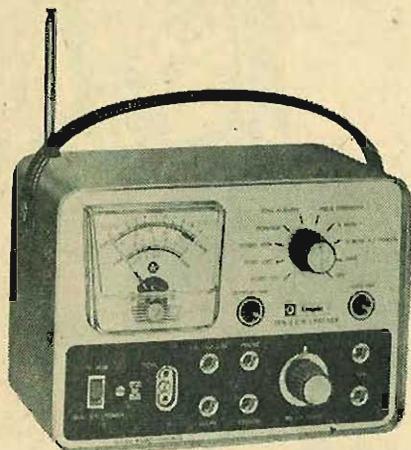
Try: Looking for an electrolytic capacitor going on the fritz.

Problem: Constant crackling sound from speaker, usually accompanied by sharply fluctuating signal strength.

Try: Look for a bad connection in the antenna or coaxial cable. Also, one of the antenna elements could be loose.

These ideas should solve many of the major complaints which you will come across in normal CBing, but there are other maintenance steps which you should take to keep the set perking along at an acceptable peak.

For instance, remove the set from its cabinet from time to time and use a vacuum cleaner to clean out the dust. Remove all of the tubes and stick the vacuum cleaner nozzle into each tube socket, also into the



Like most antenna testers, SECO's unit is completely self-contained and self-powered.

Here's a gimmick—Knight's Ten-2 CB Checker (left) includes a code-practice oscillator for hams-to-be.

plates of the tuning capacitor (be careful not to knock it against the capacitor plates so as to bend them). Shoot Tuner Cleaner fluid into all controls and into the relay. Do not fool around with screwdriver adjustments on IF cans or anywhere else. Check beneath the set to see that all connections are still intact.

When you replace the tubes, be certain that they all go back into their proper sockets. It might be a good idea to mark the appropriate tube type in grease pencil next to each socket.

• **THE ANTENNA.** Your ol' sky hook can cause you a lot more problems, if it's neglected, than you might imagine—besides smothering your signal, it can cut into incoming signals and also make quite an awful racket in your receiver.

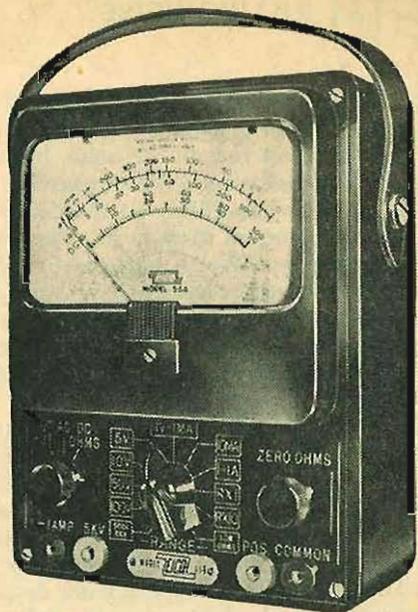
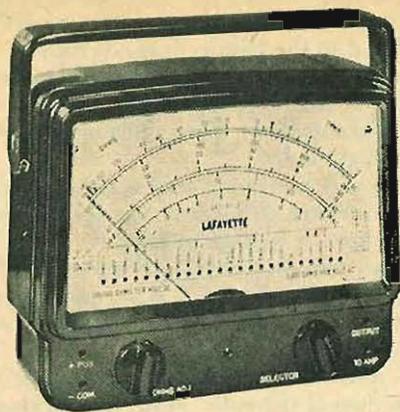
Periodic lowering and inspection of the antenna is always advisable. And should you live within a few miles of the sea, this inspection is mandatory at least once or twice a year. Salt corrosion can really put the whammy on your antenna.

When you get your antenna down, take it apart. *Completely* dismantle it as if you had just taken it out of the carton! If you have trouble getting any of the screws or nuts and bolts apart (many manufacturers give you a fancy, non-rusting antenna for which they supply connecting hardware which rusts almost immediately), get a can

of a product called *Liquid Wrench* and squirt it onto the stuck screws or nuts. *Liquid Wrench* is made by the Radiator Specialty Company of Charlotte, N.C. and it's sold in most hardware stores—it eats through rust and corrosion in nothing flat. Rusted bolts and parts are then easily taken apart.

With a fine sandpaper (or SOS soap pads, even *Brillo*), give all of the antenna elements a going over to free them of oxidation, grit, grime, soot, salt, rust, etc. Don't forget that while antennas don't rust, they do corrode and oxidize eventually. Squirt some of your *Injector* cleaning juice around the portion of the antenna where the coaxial cable is attached, then wipe thoroughly with a bath towel to get it clean. You might give the whole antenna a coat of aluminum paint to try to slow down weathering effects. Just be careful not to get any of the paint on the plastic insulating material found on CB antennas.

If your coaxial cable is connected to the antenna by means of a PL-259 connector, snip off the old connector and install a new one. If your cable is attached to screw terminals, then cut the cable down an inch or two and scrape new leads. Then, either wrap the connector with plastic electrical tape when it has been placed back on the antenna, or coat the leads to the antenna terminals with *Krylon* plastic spray.



Everybody needs a multimeter sooner or later, so pick out one today before you find yourself unarmed for the next troubleshooting match. Above is Lafayette's 100K ohms-per-volt job that outperforms some VTVMs. Right is EICO's 556 VOM workhorse.

While these measures may sound like a lot of bother to you, they are a necessity. You'll probably notice an immediate improvement in your communications from the antenna work alone—especially if your sky hook has been up (and unattended) for a year or two.

When working inside the set, remember that electricity can give you quite a severe sting. Unless it's absolutely necessary for the particular test you are doing, keep the set unplugged. If the set is on and you are working in its innards, keep one hand in your pocket to make certain that you don't accidentally ground yourself with fatal results. Respect electricity—when working with it use extreme caution.

Also, when you have a monumental problem with your equipment—trouble in the frequency determining circuits or final amplifier, say—it's best to leave the tinkering to a professional. We have attempted here to only offer some of the most basic first-aid advice to help you maintain your trusty CB station.

• **MOBILE NOISE ELIMINATION.** Complete elimination of radio noise coming from the car's mechanical and electrical system is impossible. Don't let anyone tell you differently. When some genius brags about eliminating *all* mobile noise, you might candidly ask him how his car is running. It probably isn't . . . or he is stretching the truth a bit.

Radio-frequency noise, which we hear on our CB sets when the auto motor is running, is the direct result of the fact that the motor obtains its power from igniting fuel. It is the development of this electricity (ignition coil) in the engine, and the firing of that electricity (spark plug and chamber) in a gasoline vapor that moves your car. The electrical sparking in your car is done at radio frequencies. As a matter of fact, you may have heard of the "spark-gap transmitters" of old, used by the earliest hams. These transmitters had nothing on your car's ignition system (except perhaps an antenna).

So be it resolved . . . if we do completely away with auto noise, we have done away with the auto's power plant. Without the noise . . . (a result of an efficiently running engine) . . . we would be without motion because we would be without power.

Disappointed? Read on.

All of this is not to say that mobile noise cannot be curtailed. It can, and in many ways. Let's look at a few.

Generator hash appears in the form of a low- or high-pitched whine that varies with the speed of the motor. It may be just as loud at 30 miles per hour in second gear as it is at 50 miles per hour in high gear. The generator will make noise, or it won't work. We don't *really* care if the generator makes this noise, as long as we don't hear it!

To suppress that noise, keeping it out of

CB KILLING NOISE

our receiver, we try to keep it away from the leads on the generator. The generator by itself will not radiate the noise, but the leads will. So we place a 0.1 μ F coaxial type capacitor (Sprague 80P3) on the dynamotor frame connected directly in series with the armature lead. Worth noting is that most cars with auto radios already have large paper-type capacitors in this position. However, these capacitors poop out at about 2 MHz, so they are best replaced with the coax type.

In some cars, this will not be enough to stop generator whine. The next step is a special generator filter. This little gadget is a resonant circuit consisting of a coil and a variable capacitor which you place in series with the armature lead on the generator.

Last but not least in the generator department is shaft hash. It sounds ugly, and it is! Shaft hash is caused by static electricity building up on the rotating shaft of the generator. It is rare, but it can occur. You eliminate this type of noise by mounting a grounding brush (available at auto electrical supply stores) so it rides on the pulley of the generator. The brush will drain off the accumulating charge of electricity.

With the generator department well under control, let's investigate the voltage regulator. This is a small box usually mounted on the firewall of the car in front of the driver's compartment. Its purpose is to provide an even flow of voltage from the generator to the car's electrical system.

Noise in the regulator is caused by sparking at the regulator points. It is an intermittent noise and can appear only when the

regulator is working. To eliminate the noise, a 0.1 μ F coaxial capacitor (Sprague 80P3) is placed in the battery lead, directly at the regulator. A second 0.1 μ F coaxial capacitor should be placed in the armature lead directly at the regulator. The regulator case must be well grounded.

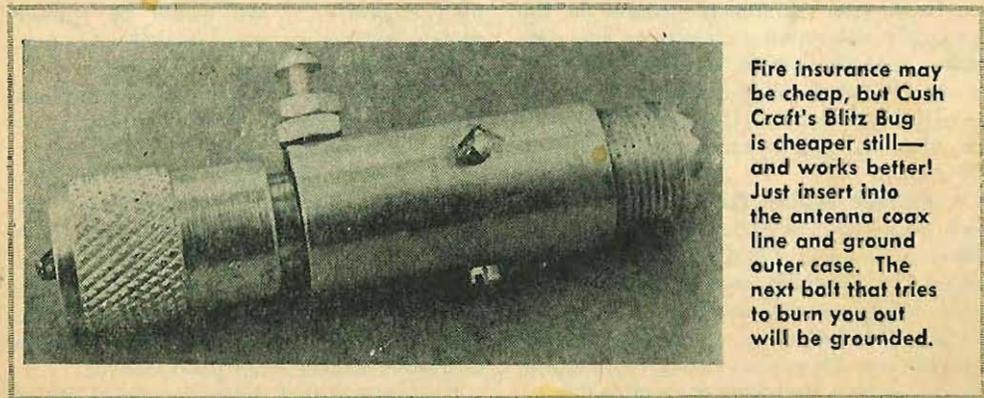
The only remaining lead is the field lead. Don't attempt to by-pass this lead, or you won't have a voltage regulator! However, you can wire in a 0.002 μ F mica capacitor in series with a 4-ohm, 1 watt, carbon resistor from the lead to ground. This will suppress the noise in this lead.

So much for the so-called primary electrical system of the auto. Now, let's tackle the secondary electrical system and examine the sources of noise in this department.

The ignition coil frequently radiates considerable noise. A 0.1 μ F coaxial capacitor (Sprague 80P3) should be mounted on the car frame and the primary lead from the coil run through the capacitor (in series) to the primary ignition circuit.

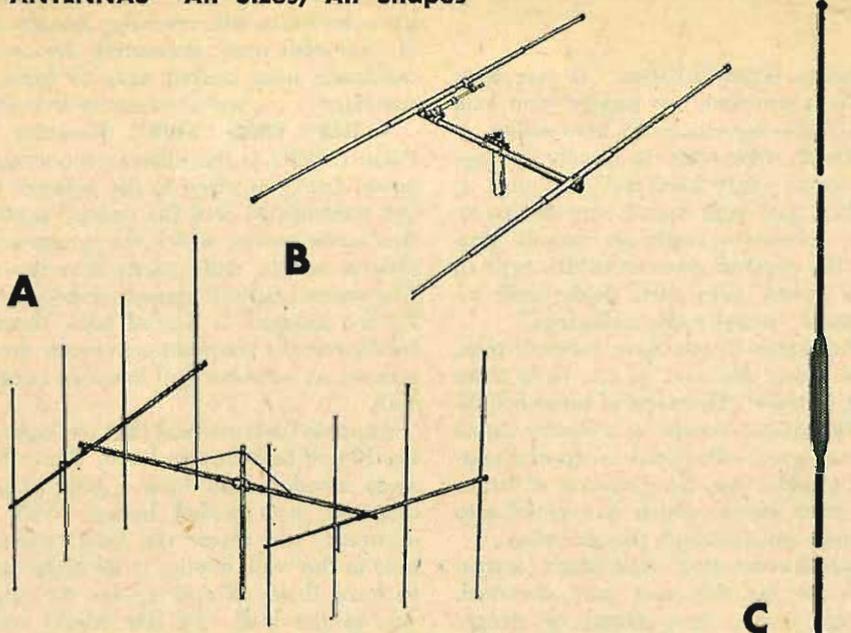
The distributor is another source of trouble. Its purpose is to distribute the firing spark to the proper plug in proper firing sequence. Place a 10,000-ohm suppressor (Erie L7VR-10ME) in the center distributor arm lead, and 5000-ohm suppressors (Erie L7VR-5ME) in each spark plug lead, as the lead leaves the distributor cap.

Spark plugs are amazing devices. They can be likened to the final amplifier tube in your transmitter. Picture this. The spark plug potential varies rapidly between 1500 volts when firing and 8000 volts when not. These rapid changes in potential generate a tremendous amount of radio noise, which sounds not unlike a machine gun firing in rapid succession, increasing in crescendo as the car's engine speeds up. At high speeds



Fire insurance may be cheap, but Cush Craft's Blitz Bug is cheaper still—and works better! Just insert into the antenna coax line and ground outer case. The next bolt that tries to burn you out will be grounded.

ANTENNAS—All Sizes, All Shapes



An old Greek once said, "Each face is different." Well, so are antennas. From a simple 100-inch-plus whip design antennas have become rod-bender's nightmares. Cush Craft's Dual Beam CB-11 (A) really socks the soup from your rig down a narrow beam, effectively increasing power without a "pink ticket" from the FCC. A relatively simple job by Mosley (B) looks like a TV setup and is just as simple to set up. Antenna Specialist shortened the whip design (C) with a loading coil and added a fold-down joint for boat. Oh well, the old Greek makes good hero sandwiches.

the firings come so close together that the noise seems to be almost constant, as one plug's firing overlaps the next.

There are three methods available for killing spark-plug noise.

1. Use resistor spark plugs which have built-in suppressors.
2. Place 10,000-ohm suppressors (Erie L7VR-10ME) at each plug just above the cap on the plug, in the lead from the distributor.
3. Use resistive ignition cables. This allows the noise generated in the spark plugs to back up into the spark-plug cabling, but because of the shielding in the cable, the noise will not radiate away from the cable to your CB set.

The high voltage-ignition wiring is frequently a source of noise radiation. Remember that in the auto there are a number of noise makers (i.e., generator, voltage regulator, distributor, spark plugs). However,

these will seldom cause noise that you can hear, until they are connected to some type of radiating surface. The car's wiring is that radiating surface, much like your CB antenna responds to your CB transmitted signal. If you eliminate the noise at the source (generator, etc.) you won't have to worry about the wiring. You should keep the wiring clean free from oil, and above all, keep all contacts rigid, solid, and clean. Dirty contact points at any spot in the wiring can cause trouble and radiate noise.

After all is said and done, you may still have auto noise. Remember that without the noise generators (i.e., the generator, voltage regulator, distributor, and spark plugs) there would be no possibility of the engine working. You can't completely eliminate noise . . . but you can eliminate noise radiation!

There are occasions when the best tried-and-true methods of noise suppression fail

CB THE BOUNCING BALLS

to eliminate noise radiation. If you have just such a problem, we suggest you look into the following sources of auto noise:

1. Wheel static—this is usually a popping sound (very loud and annoying) at medium and high speeds on dry pavement. Concrete roadways usually produce the greatest amount of this type of noise. Every auto parts dealer sells inexpensive "wheel static collectors."

2. Tire static—if you have tubeless tires, forget about this one. If you have inner tubes, beware! This type of noise is difficult to explain, except as a steady drone that increases with speed. A special anti-static powder can be procured at larger auto parts stores, which is injected into the inner tube through the air valve.

3. Instruments—your dashboard instruments are for the most part electrical. The gas gauge, heat gauge, oil gauge, and others can cause radio noise. The best way to trace such noise is to disconnect one at a time with the motor running and the CB set on. If you find one or more that reduce the noise level when disconnected, connect a 0.1 μ F coaxial capacitor from the meter contact point to car ground, grounding the capacitor case to the auto body.

So there you have the major problem areas in CB mobile. If it makes you feel any bet-

ter about your own particular problem, 11 meters is one of the worst possible frequencies for mobile operation because many of your car's noise generating devices have maximum noise output near 27 MHz. But somehow . . . we all seem to live with it.

• **THAT WILD "SWR"**. Standing Wave Ratio (SWR) is the difference between the power being supplied to the antenna (from the transmitter) and the unused portion of that same power, which the antenna is unable to accept and radiate into the ether. The unused radio-frequency energy rejected by the antenna is passed back down the feedline to the transmitter in much the same manner as a rubber ball bounces back off a wall.

Suppose for a moment that you were holding 10 golf balls in your hand. Some 20 feet away stood a wall with a hole in it, the diameter of a bushel basket. With great accuracy, you threw the balls toward the hole in the wall, hoping to be lucky enough to have them all end up on the opposite side of the wall. As fate would have it, five of the balls went through the hole and five hit around the edges of the hole, bouncing back toward you.

The ratio between the balls which succeeded in reaching their destination as compared to the number of balls which you threw, is 5:10 . . . or a loss of 50 per cent. Had the hole in the wall been larger, it would have matched the dispersed pattern of the golf balls and chances are, all of them would have made it to the opposite



A swinging new mobile antenna that clamps on in seconds, Antenna Specialists' M-180 "Flipper" is actually adjusted from inside your car.

side of the wall. Had this happened . . . your score would have been 100 percent. In SWR terms, you would have a 1:1 match.

Like golf balls, radio-frequency energy must be able to arrive at the antenna and be accepted, rather than being bounced back down the feedline to the transmitter. Such unused energy is wasted, causing a loss in your signal's strength at the other end of the line. The amount of signal loss is proportional to the power which the mismatched antenna cannot digest and radiate toward the station you are in contact with.

Thinking along these lines, it is conceivable that a mis-match could be so severe that none of your transmitter's power would ever be radiated by the antenna. Fortunately, instances of this variety are few and far between. An absurd situation of this type might occur if the antenna feed point was accidentally "shorted" or "grounded" to the metal supporting structure.

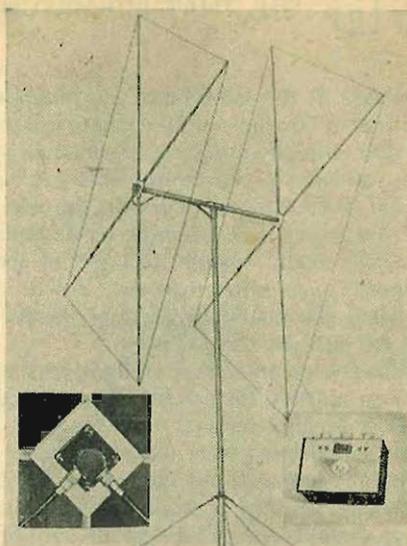
Some fellows are confused by antenna terminology. The power which is returned back down the feedline in cases of high SWR, is known as "reflected power." For clarity, it is best that you think of the unused power in this manner. The five golf balls which bounced off the wall can be classified as "reflected power."

Earlier, we mentioned the term, "mismatched." This is precisely what causes a standing wave ratio of other than 1:1. A mismatch will occur any time an antenna of a given impedance (resistance) is attached to a feedline having a different characteristic impedance. (Audio and RF energy are AC in nature, hence resistance is referred to as impedance.)

Suppose you purchased a 3-element beam antenna of commercial origin. The advertised specifications state that the feed-point impedance of the product is 50 ohms. When you install it, you mistakenly attach a 75-ohm coaxial feedline. Your SWR bridge meter shows a standing wave ratio of 1.5:1. This means that a small portion of your power is being reflected back down the feedline, and wasted.

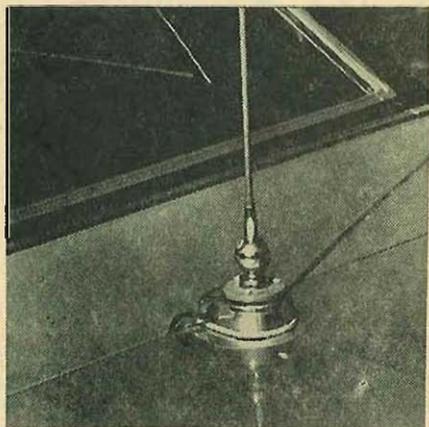
If you had installed the correct type of line (50 ohms), it would have matched the 50-ohm antenna and your SWR reading would have been a proper 1:1. A 50-ohm antenna and a 50-ohm feedline, connected together, represent a theoretically perfect match; hence, no reflected power.

Now, let's imagine you bought a quality antenna whose resistance was known to be



Avanti PDL-27A base-station skyhook.

Devoted entirely to CB antennas, new CB antenna guidebook by David Hicks tells how to set up an efficient antenna system. It's published by Howard W. Sams.



Rustproof antenna mount by E-Z Mobile.

CB OH, THAT MISMATCH!

50 ohms. At the same time, you purchased 100 feet of 50-ohm coaxial cable to use with it. After carefully installing the antenna system, you learn to your horror, that you have a 2.5:1 SWR. You tell yourself, "this cannot be!" Yet, there it is, defying you to explain its origin. Sadly enough, this sort of thing happens, more often than not. Before you condemn the poor manufacturer, however, let's see just how this can occur.

When a manufacturer designs and perfects an antenna for use by CBers, he does it under ideal conditions. That is to say, he makes engineering tests and adjustments on a specially prepared test range. The antenna is usually situated a wavelength or more above ground level. There are no surrounding objects such as power lines, trees, buildings, and utility poles. He attempts to simulate a "free space" condition for the antenna under test.

After carefully determining the final design considerations and adjustments, he arrives at a set of conditions which will result in a 50-, 75-, or 300-ohm terminal impedance. The antennas are then manufactured to these test range specifications and advertised to have a certain impedance.

Fine and dandy! You're impressed and

rush out to buy one of these "super-duper, signal scoopers." But being an average "city dweller," you are compelled to mount the antenna a few feet from a tree and quite near the roof of your house. Other "clutter" is within a few feet of your antenna.

You turn your transmitter on and discover a 3.5:1 SWR. You gasp as you realize that 30 percent of your power is being reflected back down the feedline and wasted. The reason? The close proximity of the objects near your antenna have de-tuned it, introducing considerable reactance, which has shown up as SWR. Without proper measuring equipment, it would be difficult to determine just what impedance the antenna had become, at your operating frequency.

The SWR bridge is inserted between the transmitter (or transceiver) and the transmission line going to the antenna. A short length of coaxial cable (same impedance as your feedline), connects the bridge to your equipment. Place the bridge's "Forward-Reflected" switch in the "Forward" position. The sensitivity control, which regulates the "swing" of the meter, should be set at minimum.

The transmitter is turned on and the sensitivity control is advanced until the meter reads "full-scale." By switching next to "reflected," you may read the SWR, directly from the meter scale. If the meter falls to zero, you're in good shape and have a proper

MIKES FOR EVERYBODY



Actually there is no choice—hand-held mikes are best for mobile use, and table jobs are best for the shack. Typical units are the Astatic noise-cancelling unit (above) and the Turner transistorized mike (right).



"match." If it doesn't your antenna and feedline need attention.

If the antenna is properly "matched," you have what is known as a "flat" line . . . permitting you to insert the SWR bridge into it, at any random point. Regardless of where it is placed, your readings should be accurate. A mis-matched antenna will give you different readings, depending upon the point at which it is installed in the line, due to the location of current and voltage nodes present on the line.

In order to accurately measure the SWR in an antenna system where standing waves exist, it's necessary to insert the instrument into the line at a point which is one half-wave from the feed point of the antenna; or an even multiple of half waves from it. This enables the transmission line to repeat what it "sees" at the antenna.

For example, if you were operating a 2-meter ham rig on 145 MHz, one half wave would be approximately 38.5 in. long. In computing the length of coaxial lines in terms of wavelengths, you must first calculate the length by dividing the frequency of operation (in MHz) into 468, which gives you a half wave dimension. However, since a half wave of coax is different than a "free space" half wavelength, due to its capacity between conductors and other related conditions, a velocity factor of 0.66 must be included in the formula.

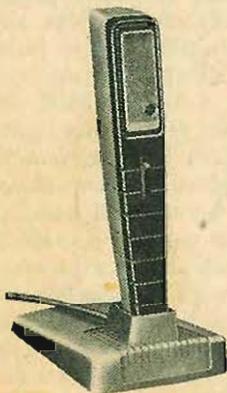
Therefore, 145 MHz, divided into 468 . . . times 0.66 = 2.17 feet (26.13 in.), which is the proper length for a half-wave section of coax cable at 145 MHz. Installing the SWR bridge in the feedline at any multiple of this figure will result in accurate readings, telling you if your antenna is properly matched to the feedline.

Normally, a standing wave ratio less than 2:1, will not seriously deteriorate the performance of CB gear, or any other equipment operating below 50 MHz. As you enter the VHF/UHF spectrum, losses of this type become more intolerable and one should strive to secure a perfect match. A 2:1 SWR indicates a 10 percent power loss. If your transmitter delivers 10 watts to the input of the feedline, 9 watts will reach the antenna.

A 6:1 standing wave condition represents a 50 percent power loss, a significant drop in signal level, especially under marginal conditions. Worse yet, the receiver suffers a similar loss in efficiency, when attached to the same antenna. For this reason, correcting the mismatch could mean the difference between being "copied" and not being heard at all.

The higher the quantity of reflected power, the more difficult it becomes to transfer the power from the transmitter to the antenna. With high-powered equipment, excessive reflected power can cause heating of the final tank circuit, damage to the output

Mikes, mikes, mikes—lots to pick from but only one will fit your station's needs and your personality. Left is EV's snazzy 7275R desk mike; center is Radio Shack's rugged, high-impact job; right is EV's noise-cancelling mike—each designed to work best on a specific job.



tubes, or actual melting of the transmission line. At VHF and UHF, receiver performance becomes impaired through reduced sensitivity and higher SNR (signal-to-noise ratio), as the mis-matched condition is reflected into the receiver's input circuit.

In some instances, the transmitter's operation becomes erratic, causing TVI. Also, the RF energy being reflected back down the line is often "forced" into the audio section of the transmitter, causing howling and squealing while you are transmitting. None of these effects should occur, if the SWR is within reasonable limits.

CB operators cannot afford to waste power through poor performance in the antenna system, since they are limited to low power by law. Every watt counts and proper antenna matching is *vital*.

• **AVOIDING SWR.** The following rules will resolve most SWR problems.

1. Avoid purchasing "bargain" priced antennas (few are properly engineered).
2. If possible, purchase or build an antenna which has an adjustable matching network such as a gamma or "T" match. This will enable you to compensate for reactance which may crop up in your particular installation.
3. Do not splice sections of transmission line unless you use coaxial fittings at each junction.
4. Use top-quality transmission line (poly-foam type preferred).
5. Mount antenna as high and in the clear, as possible. (Avoid placing it near trees, power lines, etc., by at least several wavelengths.)

One final word of caution: if your transmitter has a higher than average quantity of harmonic energy in its output, false SWR readings will be obtained. Example: our transmitter is operating at 27 MHz. You have a strong second harmonic at 54 MHz. The antenna is designed to operate at 27 MHz, hence the 54-MHz energy is repelled when it reaches the antenna. This energy is reflected back down the feedline and shows up as SWR. In a situation of this type, you could actually have a perfect 1:1 SWR at the operating frequency, but the harmonic energy would cause you to secure an SWR reading of 2:1, or higher.

• **YOUR CB CLUB.** "Now that the minutes

have been read and accepted we will hear a report from the interim committee on 'Improving The Podunk County CB Mobile Monitoring Service.'"

"Mr. Chairman, point of order!"

"Yes?"

"We cannot consider any new business until the issue of the second comma in the third paragraph of our constitution is finally resolved. Week after week you have silenced those of us who wish to ensure a democratic constitution . . . we cannot stand idly by and submit to such totalitarian methods."

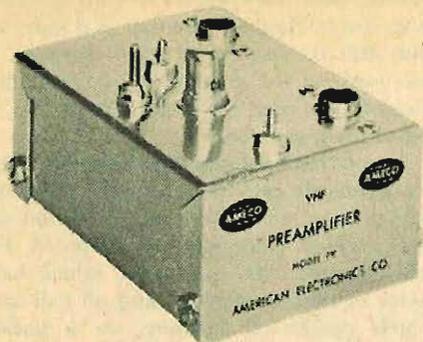
"The chair has given The Group For A Democratic Constitution three hours per meeting for 10 consecutive meetings to discuss this particular comma . . . at every meeting you have been outvoted 98 to 3 . . . don't you think it's time to either wait a few meetings or give up? Or, if you don't like the opinions of our members, you can get out of the club!"

"A-ha! That's exactly what The Group For A Democratic Constitution has been trying to show . . . the high-handedness of the Chairman . . . you see, fellow CBers, those who disagree with the chairman must forever stifle their ideas. If you disagree with the Chairman he throws you out of the club."

And so the camera slowly fades out as the Podunk County CB Club holds what is to be its last meeting—and still another CB club bites the dust. Maybe the above conversation was exaggerated a bit, but there is hardly one CB club member who has not witnessed a similar demonstration. The fantastic birth-and-death rate among CB clubs bears this out, since this rate isn't approached by clubs in any other single field of endeavor.

Why do so many CB clubs have so much trouble? Perhaps because too many CBers forget that the majority of CB clubs are basically social organizations whose main purpose is to provide for the enjoyment of their members. True, a large number of clubs may have all sorts of grandiose window dressing about Civil Defense, mobile emergency patrols, and so on (and many actually have done a lot of good work in these fields). But when you call a spade a spade, a CB club is basically an expression of the age-old human need for belonging to a group for enjoyment of a common interest.

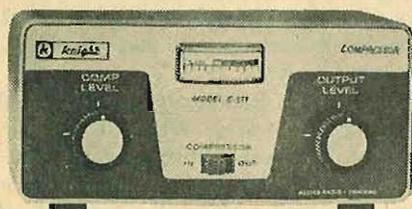
At any rate, a CB club (whatever be its expressed goals and intentions) is *not* a debating society; it *should* be an action group.



Ameco preamp steps up receiver sensitivity.



Lafayette 42-0123 low-pass filter cuts TVI.



Knight C-577 Compressor boosts talk power.



Johnson Matchbox matches rig and antenna.

For this reason, meetings should be devoted to accomplishing things which the members cannot do alone. Involved discussions on constitutions, rules, and whatever are a complete waste of time. One or two meetings should forever silence any comments on these subjects. All too often members take a Sunday evening from their families and devote it to a CB club meeting only to be forced to sit through a boring and bogged down discussion on these subjects. It's no wonder they stop coming after a few meetings.

While a constitution is a nice thing for a club to have, its importance is often stressed far too much. Great Britain has been able to manage pretty well without a written one for a number of centuries, and the United States itself has one of amazing brevity.

Of the things which particularly annoy club leaders, there seems to be considerable sentiment against meeting-night chit-chat on antennas, rigs, mother-in-laws, etc. Surely we are all familiar with club leaders who thump on the desk and shout, "We came

here to do business, not to talk!" Well, what business is more important than that which interests and/or entertains the majority of the members?

One of the better clubs avoids this problem by starting each meeting with a "coffee klatch." For an hour or so before the business part of the meeting the members consume a few quarts of coffee and several dozen Danish pastries (provided courtesy of a local CB dealer). This starts the evening off on a nice friendly kick (try being nasty with your fingers sticky from a Danish!).

After everyone has talked themselves out, the formal portion of the meeting is always a breeze, and you can almost hear a transistor drop—yes, *no loud arguments!* "Nonsense business" (what kind of envelopes to purchase, status of ink supply for club papers, etc.) is usually dispatched in less than a half hour.

Then come the highlights of the evening: committee reports and discussions of future activities.

After these, there is a 15-minute break for some rag-chewing and for late-comers to catch some coffee. This is followed by the guest speaker, a film, or any other special attraction of the evening. By the way, every single meeting has had a "special attraction."

All in all, the group constitutes a nice, smooth-running organization. And it has been able to make it without aid of a constitution.

Perhaps one of the major contributing factors to the demise of a club is the manner in which dances, jamborees, and other social functions are handled. Dances often flop because there never seems to be enough "push" on the part of the club to get out and sell tickets. Sure, most of the members attend, though their money seldom lets the dance break even. The trick is to hustle tickets to the people who work in the CB stores, or to other local CBers who don't belong to the club.

After the fizzle of a jamboree or dance, the club invariably falls apart because of lack of funds, dissension among members accusing each other of causing the disaster, or because of just plain lack of member interest in a club which pulled a boo-boo. One of the most thriving clubs in the New York City area all but dropped completely dead after their jamboree flopped in the summer of 1961—and they had been around since the end of 1959! In essence, the club was victim of the fact that it had spent a year and a half building up to the event—it was in fact almost the complete reason for the club's existence. When it turned out to be a failure, most of the members called it quits in disappointment. Yet the club still limps along with a skeleton membership.

A commonly asked question in CB circles is, "Why isn't there a national CB organization?" Brace yourself for a shock. It will probably come as a surprise to learn that there have been (and are now) possibly *hundreds* of so-called national organizations for CBers.

Ask 75 per cent of the CB clubs if they are "national" and they'll tell you "yes." How much does it cost to say "yes?" In most cases the word "national" means that the club has managed to hook in one or two guys in the next county or state.

"Ah-so," you are now saying, "that cer-

tainly can't mean *our* club because we have 58 members from Maine to California—and even two in Hawaii." Be that as it may, your club still doesn't come up to snuff in the true sense of the expression "national club." Instead, you're still a local club with a few out-of-town members.

A truly national club would be one which was primarily established for the purpose of representing all CBers on a nation-wide scale, which responded to proposed FCC rule changes with comments, which had a roster of officers representing all call areas, which conducted business on a national scale, which provided members with a number of services, etc.

Alright, go ahead and tell us about *your* "National Club" and the handful of others who have attempted to catch the fancy of CBers on a national basis. Last time we looked, the noisiest of these groups had apparently folded its tent and vanished into the great beyond.

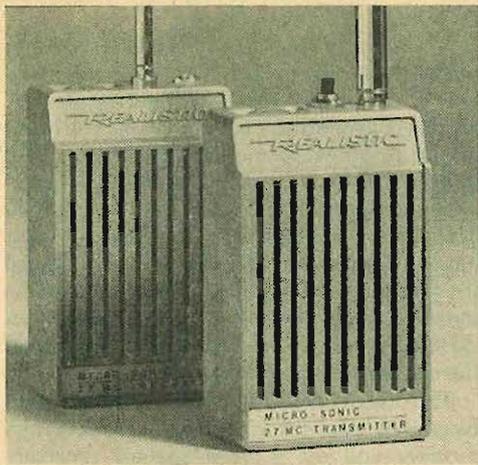
Perhaps CB isn't ready for a national organization right now. Who is to say? At any rate, local clubs should spend their time concentrating on local issues and cultivating local members. After all, "national" clubs to date have met with apathy on the part of CBers. And there's every chance in the world that many more "national" clubs will bite the dust before one clicks, if ever.

Let's not take our CB clubs so seriously that we get a distorted picture of their purpose, thereby ruining their effectiveness. Leave most of the legal footwork to a few selected members to be handled before or after meetings; thoroughly plan all club social functions and promote them to the fullest; and think twice before becoming one of the numerous "national" failure statistics.

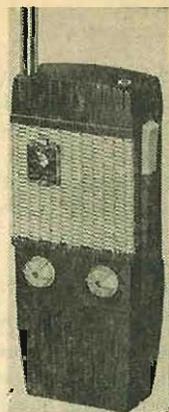
• **A CLUB EMERGENCY SET UP.** Probably one of the best pieces of advice we can give to anyone who is interested in maximum CB communications is: transmit as little as possible, and listen carefully before transmitting.

Now transmitting isn't generally the problem, since we all know full well what it is we wish to send. The stickler lies in determining the meaning of the transmission from the other station, especially if his signal is "in the mud" or is being clobbered. Half of the frantic "emergencies" handled by CBers could be either avoided or greatly simplified if the operators would just take the time to listen carefully before grabbing the mike button.

If you're really interested in helping out



Never say No to a walkie-talkie—unless you want to be heard ten blocks away! Real go-getters for local, personal communications, W-Ts belong in every well-stocked station.



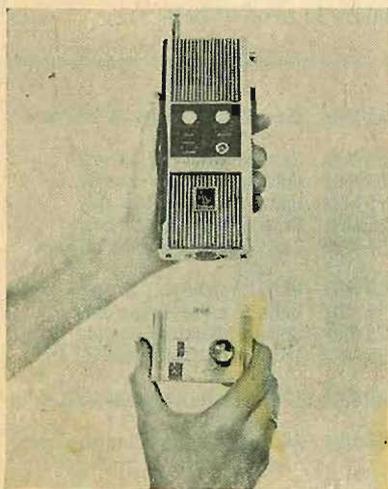
in emergencies we'll be happy to pass along some hints on how to set up a *real* CB communications/emergency monitoring station—together with how to perform a public service with this equipment.

Hopefully, the CBers in your club or in your area have decided to go along with the idea that Channel 9 is the *National CB Calling and Emergency Channel*. This means that it is to be used only for making an initial contact before switching to another channel to pass along the actual message.

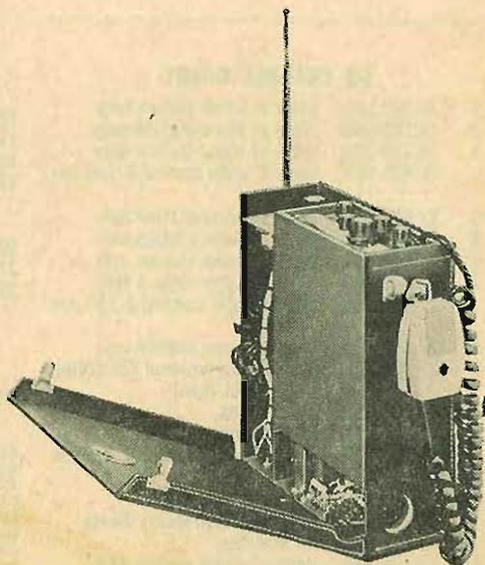
The only other proper use of the channel

would be for communicating with itinerant mobile units seeking aid or advice, where the mobile unit might not have any other channel in common with the base station. Anyway, we presume that if you've gotten this far into this article you are sufficiently interested in better CB communications to have already adopted Channel 9 for local monitoring, so there's no point in belaboring the subject here.

We suggest that for maximum efficiency in monitoring Channel 9 you have a rig constantly tuned to 9—and by this we mean a



Transceivers with a difference, many Fanon models sport built-in sockets for call-tone selectors. At right, Amphenol's 600-1 Porta-pak, complete with the 650 transceiver.





second rig other than the one normally used for your communications. While it's always good to have a stand-by transceiver hanging around the shack in case of minor disaster with the main rig, it's sort of an expensive deal to go out and purchase a new transceiver which has no function other than to monitor 9.

But what about a second-hand unit? (Most dealers always have a few in stock.) And what about borrowing an unused unit from a friend? If it is a club which is to do the monitoring, surely some member has a rig which is no longer being used. The reason we are suggesting a transceiver rather than just a receiver alone is that it's far more convenient to communicate with the fellow who needs help on 9 while still being able to contact other units (perhaps to direct them to the scene of an accident, etc.) on a secondary channel.

Actually, you can do a lot with a communications receiver other than simply monitoring Channel 9. Besides the advantage of being able to tune the international short-wave broadcasting bands, you can monitor the marine calling and distress channel, 2182 kHz; or possibly one of the Coast Guard channels, or any of the many other emergency service frequencies. Many's the time an alert CBer was able to assist safety agen-

cies by bringing an emergency to their attention.

For monitoring police and fire services, or aircraft emergency services, you will need one of the many low cost "special service" receivers available. The bands you will want are 30 to 50 MHz and 150 to 170 MHz for police, fire, power utility, and other emergency services. You'll also want 110 to 140 MHz for aeronautical. Contrary to what many people will tell you, it is *not* illegal for you to monitor police calls (some states have regulations against such receivers in cars, however) so long as you do not reveal the contents of the transmissions.

The ideal monitoring station would then consist of two CB rigs, a general-coverage receiver, and one or more "special" receivers for VHF communications services.

Next thing to think about is where to listen for emergency communications. We have mentioned some channels used by the more interesting emergency services. The exact frequency assignment for your own local or state police, fire, power utility, etc. station can be obtained by contacting the agency directly.

At your monitoring station you would do well to keep a list of the following telephone numbers: Doctor, Automobile Emergency Truck, local REACT, Sheriff, Police (local and state), Hospital, Power and Light Company, also the numbers of monitoring stations in outlying areas which might be closer to a station in need of help.

CB CHANNEL CHART

1	26.965 MHz	Units of same station only
2	26.975 MHz	Units of same station only
3	26.985 MHz	Units of same station only
	26.995 MHz	Class C radio control & 100 mw units
4	27.005 MHz	Units of same station only
5	27.015 MHz	Units of same station only
6	27.025 MHz	Units of same station only
7	27.035 MHz	Units of same station only
	27.045 MHz	Class C radio control & 100 mw units
8	27.055 MHz	Units of same station only
9	27.065 MHz	All stations/national CB calling channel/react
10	27.075 MHz	All stations
11	27.085 MHz	All stations
	27.095 MHz	Class C radio control & 100 mw units
12	27.105 MHz	All stations
13	27.115 MHz	All stations/pleasure boats
14	27.125 MHz	All stations
15	27.135 MHz	Units of same station only

	27.145 MHz	Class C radio control & 100 mw units
16	27.155 MHz	Units of same station only
17	27.165 MHz	Units of same station only
18	27.175 MHz	Units of same station only
19	27.185 MHz	Units of same station only
	27.195 MHz	Class C radio control & 100 mw units
20	27.205 MHz	Units of same station only
21	27.215 MHz	Units of same station only
22	27.225 MHz	Units of same station only
	27.235 MHz	100 mw units (proposed H.E.L.P. channel)
	27.245 MHz	100 mw units (proposed H.E.L.P. channel)
23	27.255 MHz	All stations/class C radio control

Note: 100 mw stations are unlicensed walkie-talkies, which are permitted operation on any frequency within the edges of the band, including frequencies lying between CB channels. Licensed Class D stations are not permitted to communicate with unlicensed walkie-talkies. Walkie-talkies may be licensed only if they meet the technical standards established by the FCC for Class D.

Projects for Better CBing

It's pretty much agreed that there's nothing like accessories for making the CBER's life much, much brighter. Here are 13 extras specifically designed to do just that.

BECAUSE OF THE 5-watt input stipulation, CB rigs often rely heavily on accessories to deliver the last smidgeon of talk power or signal-to-noise ratio. For great as today's rigs are, few come customized in the manner most dedicated CBers desire. A manufacturer's first duty, after all, must lie in building in such qualities as stability and operating ease, while still maintaining as low a price as possible in a field that is highly competitive. As a result, a truly customized installation remains a matter for the individual CBER.

But far from being an unrelished chore, customizing a CB setup is an undertaking most CBers tackle eagerly. And this is just as it should be, for it is largely the accessory equipment that spells the difference between a first-class CB installation and a mediocre one. Remember: CBers are prohibited from testing or adjusting the transmit portion of their rigs except under the immediate supervision of a person holding a first- or second-class commercial operator license. But accessories are another matter altogether, and that's where this chapter of the 1968 CB YEARBOOK comes in.

All told, we have included some 13 projects. They range from a Speech Processor (to help you cut through that ever-present QRM) to a Cube Tester (a device that is as simple as it is useful). Fun to build and a pleasure to use, all 13 are certain to add to the effectiveness of any CB installation.



BUILD THE **CB** SQUEAKER

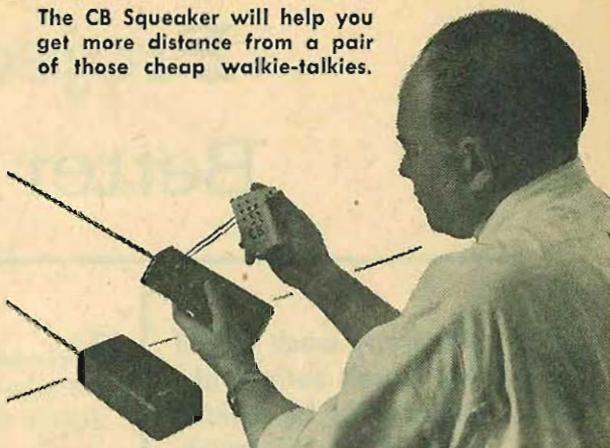
■ A common cause of poor walkie-talkie performance is simply that each unit of a pair is rarely tuned to its companion, even though they are supposedly on the same channel. Of course, hard knocks haven't helped them much either. But you can get them perking good as new, probably better than new, by matching them together with the *CB Squeaker*.

Just place the output speaker of the *Squeaker* face-to-face with the walkie-talkie's speaker-mike, thereby generating a constant modulation level. Receive the *Squeaker*'s signal on the second walkie-talkie and adjust the second unit for maximum signal output. Move the *Squeaker* to the second walkie-talkie, repeat the tuning procedure, and the pair is matched.

Construction. Any small box can be used. It doesn't matter whether it's plastic or metal. Within the outline of the speaker, drill 8 evenly spaced $\frac{1}{4}$ in. holes to allow the signal tone to come through.

Assembly. Mount the tiny speaker first. Attach a 2-terminal tie strip above it and

The *CB Squeaker* will help you get more distance from a pair of those cheap walkie-talkies.



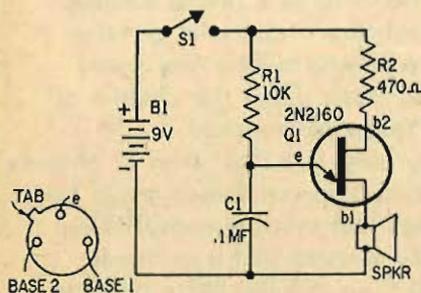
then mount the toggle switch in the cover. All of the smaller parts are mounted by their leads as they are soldered into the circuit.

Wiring the Circuit. Connect the components as shown in the pictorial. Use spaghetti liberally to avoid short circuits.

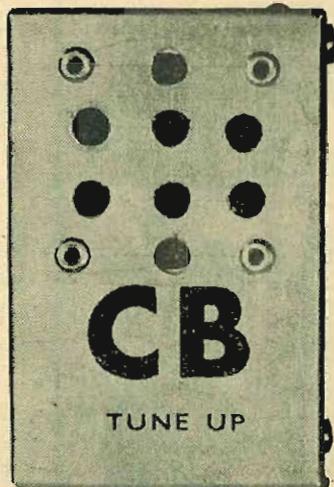
Tone Modulation. With the speaker side of the audio generator covered with plastic

PARTS LIST

- B1—9-volt battery (Eveready 216 or equiv.)
- C1—0.1- μ F capacitor (see text)
- Q1—Unijunction transistor (GE 2N2160 or equiv.)
- R1—10,000-ohm, $\frac{1}{2}$ -watt resistor
- R2—470-ohm, $\frac{1}{2}$ -watt resistor
- S1—S.p.s.t. toggle, slide or see-saw switch
- SPKR—10-ohm speaker (Radio Shack 40-245)
- 1— $3\frac{1}{4} \times 2\frac{1}{8} \times 1\frac{1}{2}$ -in. chassis box (Premier AMC-1001; Bud CU-3001-A or equiv.)
- Misc.—Battery connector, wire, solder, spaghetti tubing, machine screws and nuts (or rivets), etc.



Schematic diagram is simple and easy for a beginner to compare with pictorial diagram on next page.



Looking almost like a walkie-talkie itself, the *CB Squeaker* is compact, pocket portable.

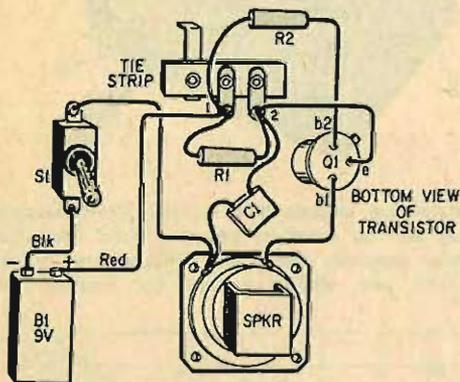
tape or adhesive-backed weather stripping (so you don't mar the plastic case of the handie-talkie) you can attach the test unit to the handie-talkie with a large rubberband or two.

To radiate a *weak* signal do not extend the antenna fully on the hand-held *CB* unit

that is transmitting. The antenna on the unit being tuned must be extended fully since this often affects the tuning of the receiver.

You must keep the CB rig transmitting while adjustments are being made.

Using the proper *alignment tool* adjust the slug in the coil for loudest tone from the speaker of the CB handie-talkie. On single-coil superregenerative rigs (about three transistors) you will find that the point of maximum tone output is very sharp—so adjust

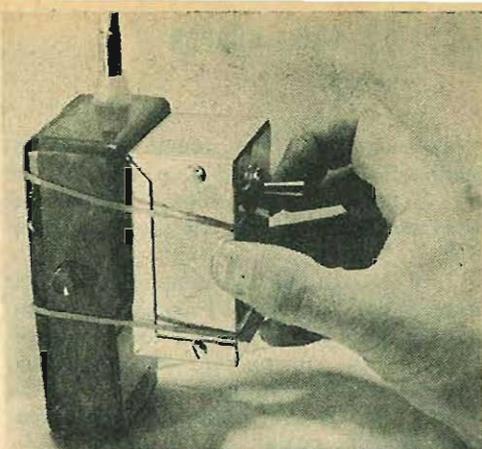


Pictorial diagram makes it easy for just about anyone to build CB Squeaker—even as a first-time project.

very slowly. Tune past the point of loudest tone and then come back. Repeating this adjustment several times helps to find the critical point.

Repeat the process for the other handie-talkie—tune the receiver of the rig that had just been used for transmitting. You'll find that making this one adjustment on each of the rigs will improve reception—sometimes you can actually double the previous communication range.

Remember, only tune up the receiver por-



Pair of rubberbands will hold lightweight CB Squeaker in place on transmitting unit while you retune the receiver.

tion of the CB unit; *do not touch the transmitting coils unless you have at least a 2nd Class Radiotelephone license.*

When working on larger (4- to 6-transistor handie-talkies) you'll find separate receiving and transmitting coils. There are also IF transformers that should be adjusted for maximum sensitivity and selectivity.

Use a Meter. If you want to be extra critical you can hookup an output meter across the speaker and tune for maximum indication on the meter. The main thing is to keep the signal from the transmitting CB rig as weak as possible. Reduce the amount of transmitting antenna that is extended or put more distance between you and the other rig. If you want to receive weak signals (signals from a distance) you'll have to tune the receiver with an equally weak signal. And the weaker the signal the more critical the tuning. †††

CB VOICE SHAPER

Unfortunately, your voice's maximum power is in the lower frequency range, rather than the intelligence-producing higher frequencies. The *Voice Shaper*—a device that attenuates the lower frequencies—can sharply increase your *talk power* by using the modulator's power only for the intelligence-carrying high frequencies.

When the Voice Shaper is doing its job, the transmitted voice will sound very much like what you hear over telephone circuits.

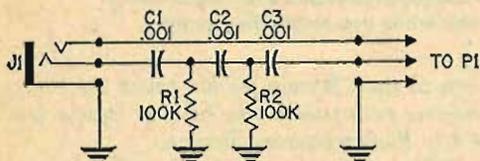
It will be crisper and more understandable than before, but your voice may not be so easily recognized.

The Circuit. The Voice Shaper consists of a three section high-pass filter designed for either crystal, ceramic or dynamic microphones. It's best used with an outboard clipper or accessory preamplifier. If used alone it has a very slight (almost undetectable) loss which the clipper or preamp will make up.

CB VOICE SHAPER

Construction. The circuit can be installed in a small aluminum cabinet, and circuit layout is not critical. The cabinet itself serves as the common ground connection.

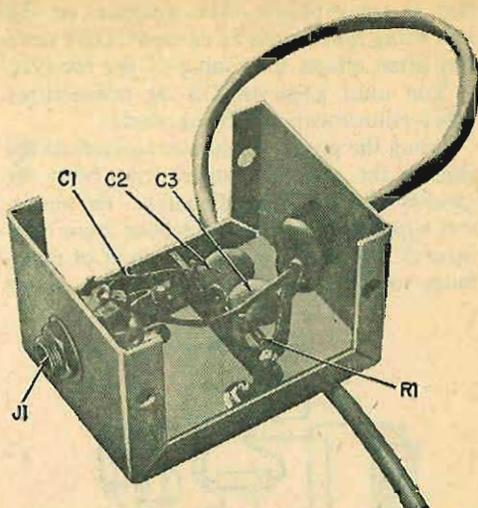
Jack J1 matches the existing transceiver microphone plug; plug P1 matches the transceiver's microphone jack. If the transceiver does not use microphone connectors, and the microphone connects directly to the transceiver, the Voice Shaper can be spliced into the mike cable.



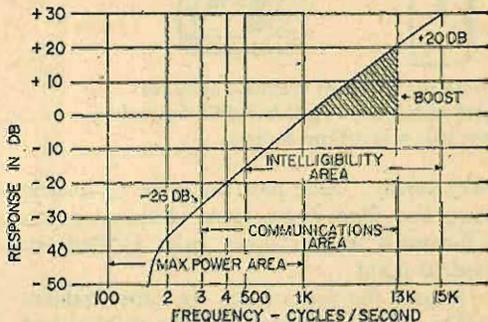
Schematic diagram of the Voice Shaper has a very familiar appearance since its circuit is a basic high-pass filter. Series capacitors have low impedance at high frequencies.

PARTS LIST

- C1, C2, C3—.001-uF disc capacitor rated 15 VDC or higher
 J1—See text
 P1—See text
 R1, R2—100,000-ohm, 1/2-watt, resistor
 Misc.—Aluminum cabinet, hardware, wire, solder, terminal strip, etc.



Aluminum chassis box for the Voice Shaper can be the smallest you can find. Terminal strip supports the filter components, all of which are visible except for resistor R2.

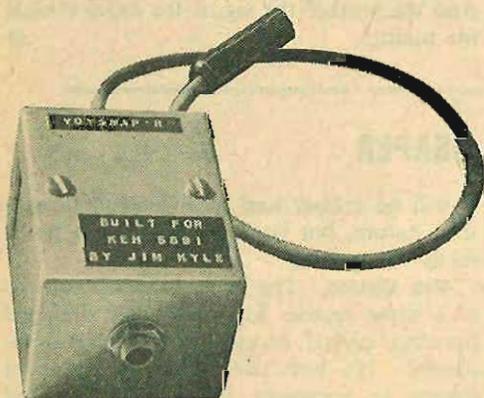


Here's what the CB Voice Shaper will do to the average male voice. (No, it will not make you sound like a dame.) By adding boost to the highs and taking oomph from the lows, the CB Voice Shaper plus the modulation effect of your CB set will give you a "telephone-like" voice that is easily understood.

Added Boost. Should the treble boost effect not be great enough to suit you, R1 and R2 can be replaced with resistors of 1/10 the specified value. This will almost completely eliminate all traces of bass response. However, a preamp will probably be necessary if this is done since the energy loss will be some 10 times greater and will probably cause a noticeable reduction of modulation percentage.

The preamp or clipper, if used, should be between the Voice Shaper and the transceiver for maximum effect. No other accessory should be connected *ahead* of the Voice Shaper.

†††



Here's the completed CB Voice Shaper. It's small enough to hide or display at your base station or mobile-mount under the dash.

CB SPEECH PROCESSOR

■ The *Speech Processor* combines most methods of improving talk power in one, easy-to-build package. This gadget is simply connected between the microphone and the microphone input jack of the CB rig. Almost 40 db of speech AGC is available to insure full modulation from lip to arm length. And from no-clipping to 20 db of clipping is available with the turn of a knob. Both high-frequency and low-frequency response can be adjusted to suit personal preference.

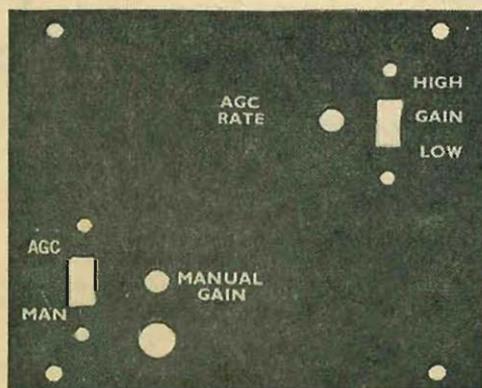
Construction. The *Speech Processor* can be built quite easily on two pieces of perforated-phenolic circuit board, the power supply on one and the audio circuits on the other. Due to the high gain, the input and output leads and all signal leads going to controls should be shielded with the shield grounded on one end. The input stage should be well separated from the output stage and all signal leads must be as short as possible. To avoid overcrowding, place components on both sides of the board. After completion of both boards, "hay wire" in required controls and check for proper operation. First check both power supply voltages. Be sure of power supply, electrolytic capacitor and diode polarities. The voltage measured at each transistor collector (except emitter follower and DC amp) should be approximately half that measured between ground and supply-voltage point. If any stage is completely *on* (collector at ground), or *off*, (collector at supply voltage), recheck wiring and capacitor polarities. If all DC potentials seem normal connect a microphone or audio-



Completed Speech Processor, shown here with mike. Unit provides 40 dB of audio AGC.

signal generator to the input (J1) and follow the AC voltage through each stage. It should reach its highest peak-to-peak level in the second or high-level amplifier stage, and finally the output level at J2 should be slightly larger than the audio input level at J1.

Change the level at the input (by shouting into the microphone or upping the signal-generator output voltage). The output should



Rear panel of Speech Processor (left) shows location of the least used circuit adjustments. Use miniature switches and controls wherever possible. Actually all controls, including those



on front panel (right) could be screwdriver adjustments or locking-type potentiometers since none of the controls are varied constantly—once set they need not be changed again.

CB SPEECH PROCESSOR

increase momentarily then fall quickly to the original value. If not, check closely the circuits associated with the DC amp and rectifying diodes.

When all seems well, mount the two circuit boards in a suitable metal box. Builder's skill and amount of money spent for electrolytic

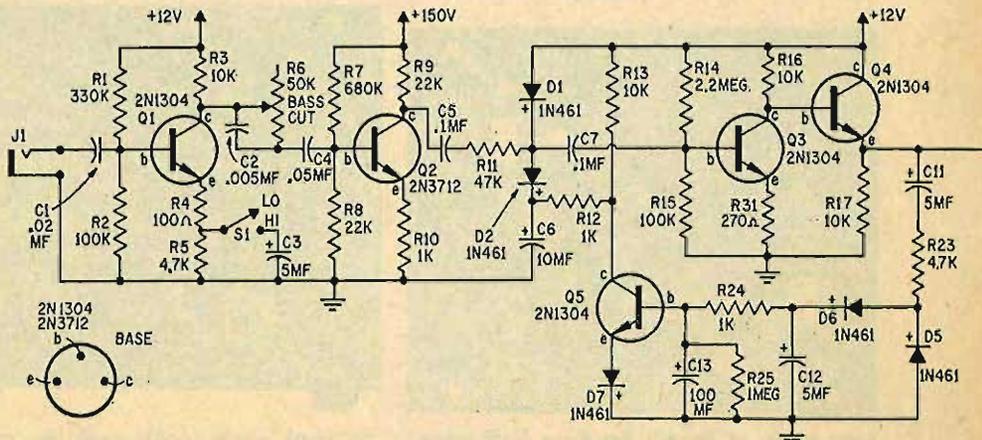
capacitors will determine the final size (small capacitors are more expensive). The model shown is installed in a 3 x 4 x 5-inch cabinet; however, a somewhat larger box, such as a 5 x 7 x 3-inch would result in a bit easier final construction.

Using the Speech Processor. To use the speech processor simply unplug the microphone from the transceiver and plug the microphone into the *Speech Processor*. Then plug the *Speech Processor* into the

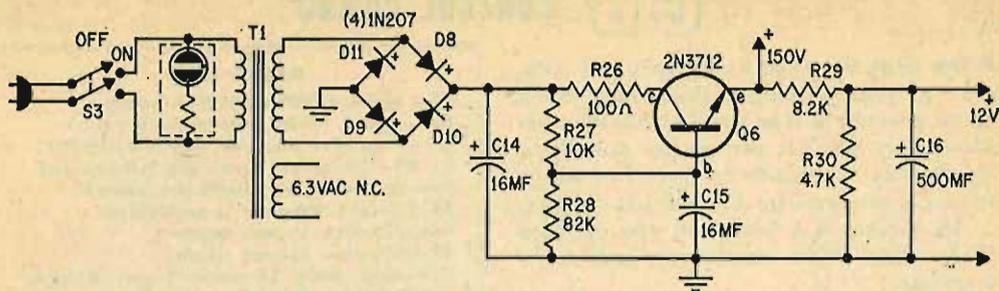
PARTS LIST FOR CB SPEECH PROCESSOR

C1, C9, C10—.02 μ f, 500 VDC disc capacitor
 C2—.005 μ f, 15 VDC disc capacitor
 C3, C11, C12—5 μ f, 25 VDC electrolytic capacitor (Radio Shack 272-959)
 C4—.05 μ f, 500 VDC disc capacitor
 C5—.1 μ f, 15 VDC capacitor
 C6—10 μ f, 25 VDC capacitor (Radio Shack 272-960)
 C7, C8—.1 μ f, 75 VDC disc capacitor
 C13—100 μ f, 3 VDC electrolytic capacitor
 C14, C15—30 μ f, 150 VDC electrolytic (Radio Shack 71-5666)
 C16—500 μ f, 50 VDC electrolytic
 D1, D2, D3, D4, D5, D6, D7—1N461 silicon diode
 D8, D9, D10, D11—400 PIV, 500 ma. silicon diode (Radio Shack 276-549)
 J1, J2—Jack, 2-conductor shielded (to suit builder)
 Q1, Q3, Q4, Q5—npn transistor, 2N1304, GE-5, 5K3011, or equiv.
 Q2, Q6—npn transistor, 2N3712, or equiv.
 R1—330,000-ohm, 1/2-watt resistor
 R2, R15—100,000 ohm, 1/2-watt resistor
 R3, R13, R16, R17, R20, R27—10,000-ohm, 1/2-watt resistor
 R4, R26—100-ohm, 1/2-watt resistor

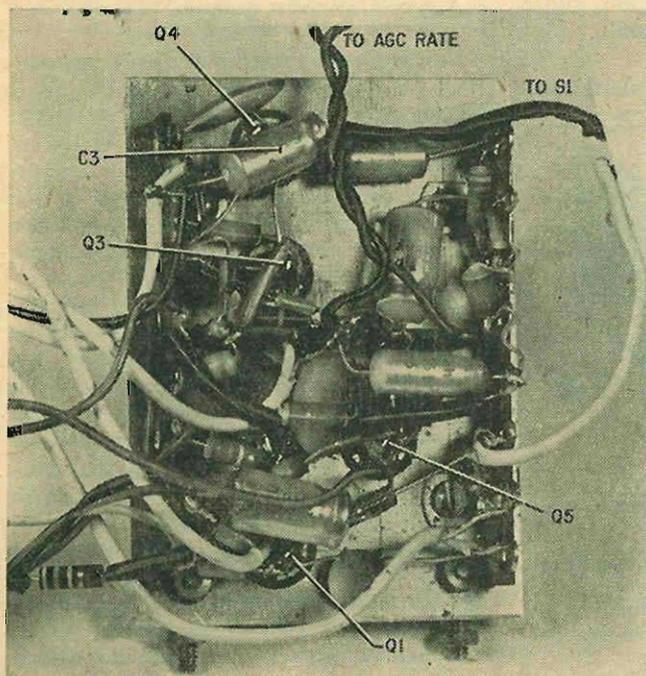
R5, R23, R30—4,700-ohm, 1/2-watt resistor
 R6—50,000-ohm, 2-watt potentiometer
 R7—680,000-ohm, 1/2-watt resistor
 R8, R9—22,000-ohm, 1/2-watt resistor
 R10, R12, R24—1,000-ohm, 1/2-watt resistor
 R11—47,000-ohm, 1/2-watt resistor
 R14—2,200,000-ohm, 1/2-watt resistor
 R18—10,000-ohm, 2-watt potentiometer with s.p.s.t. switch (S2)
 R19—1,500-ohm, 1/2-watt resistor
 R21—100,000-ohm, 2-watt potentiometer
 R22—100,000-ohm, 2-watt potentiometer
 R25—1,000,000-ohm, 1/2-watt resistor
 R28—82,000-ohm, 1/2-watt resistor
 R29—8,200-ohm, 1-watt resistor
 R31—270-ohm, 1/2-watt resistor
 S1—S.p.s.t. slide switch
 S2—S.p.s.t. switch (part of R18)
 S3—D.p.s.t. slide switch
 T1—125-volt, 15-ma secondary, power transformer (Stancor 8415)
 1—3 x 4 x 5-in. utility cabinet—see text (Bud AU1028 or equiv.)
 Misc.—Pilot light assembly (optional) perforated phenolic board, machine screws, nuts, knobs, line cord and AC plug, wire, solder, etc.



Since Speech Processor and its power supply presented above, that of associated power supply gain of preamp Q1, pots R6 and R21 amount of



The power supply circuit diagram can fool you. It looks like a typical transistor power supply but voltage from collector of transistor Q6 is 150 volts. Unit can be hooked to CB mobile rig if you can get 150 volts somewhere.



Packaging can be a problem if you use standard-sized parts to wire the Speech Processor. Use miniature components wherever possible. Since current is no problem use AWG-22 or AWG-24 wire—use stranded wire for all connections between subchassis and panel mounted controls, etc. Miniature components will boost the price considerably unless you shop carefully. All five of the transistors on the other side of this sub-chassis can be wired directly into the circuit. The main reason for the sockets was to make substitution easier—to test many transistors in circuit.

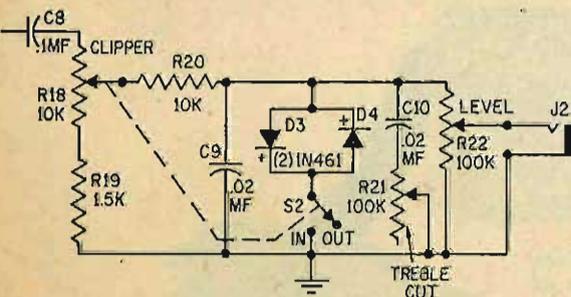
transceiver's mike input. Turn on the power, wait a few seconds for the voltages to stabilize, and, with the level control set to about mid-range, speak into the microphone in a normal voice. (Unless a low-output dynamic mike is used the Hi-Lo switch, S1, can be left in the low gain position.) With an oscilloscope, or other peak modulation meter, adjust level control R22 for just slightly under 100% modulation.

Next, move the mike to arm's length and, still talking in a normal voice, check the percent modulation; it should stay the same.

The bass and treble controls are adjusted to suit individual preferences and band conditions. With both controls fully advanced the voice should sound less natural and more penetrating.

##

are wired separately, schematic of Processor is pply at top of right-hand page. Switch S1 controls bass and treble cut, pot R18 amount of clipping.

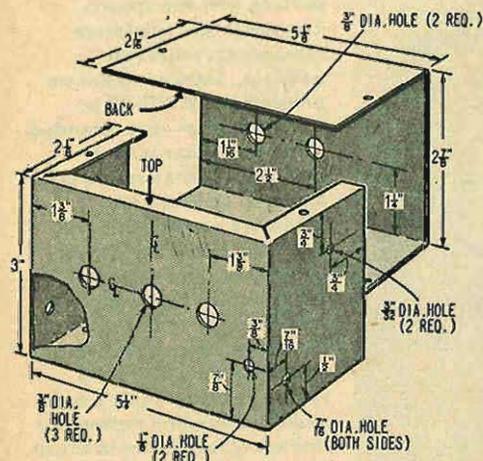


CB CONTROL COMBO

■ **The next time** you have to pass the mike over to your passenger, think how much better it would be if he (or she) had his own. Most every one has two phones nowadays, so it's only reasonable to have two mikes for a CB set—one for Pa, and one for Ma.

All it takes is a few parts, one of those FETs (field effect transistors), and some know-how.

The one-FET circuit lets you hook up two ceramic mikes to a high-impedance input network. Gain turns out to be unity, so the input signal to the CB set is the same as for one mike. And, if your CB rig uses a relay circuit in its press-to-talk operation, either mike can switch the rig to transmit.



First step in building control combo is to lay out and drill chassis box. Use of a perf-board simplifies construction; heat-sink semiconductors when soldering.

PARTS LIST

- C1—50-mf, 15VDC electrolytic capacitor
- C2—.05-mf, 15VDC or better disc capacitor
- Q1—Field effect transistor, Motorola HEP-801
- R1, R3—1-megohm, linear-taper potentiometer
- R2—5000-ohm, linear-taper potentiometer
- R4, R5—270,000-ohm, 1/2-watt resistor
- R6—220-ohm, 1/2-watt resistor
- R7—100-ohm, 1/2-watt resistor
- Z1—Zener diode, 12-volt at 1-watt (Motorola HEP-105 or equiv.)
- 1—Ceramic microphone with coiled cord and press-to-talk switch (Lafayette 99C-4562 or equiv.)
- 1—Aluminum chassis box, 5 1/4 x 3 x 2 1/8-in. (Bud CU3006A or equiv.)
- Misc.—Perf-board, solder lugs, nylon cable clamps, grommets, hardware, wire, mike, etc.

Construction. Since the gain of the one-stage FET circuit is unity (by design), parts placement is not critical. All parts except potentiometers are mounted on a 5 x 1 3/4-in. perf-board. Install leads from circuit points on the perf-board for connection to the front-panel potentiometers. Have these leads at least 3 in. long from where they break out from the bottom of the perf-board.

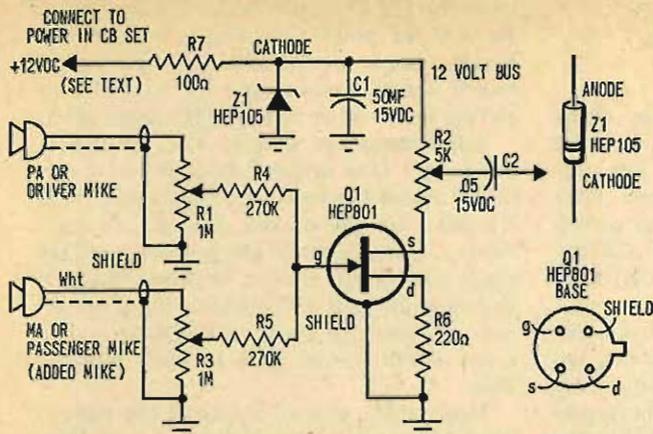
Be sure to install a power lead for connection to the CB set. This wire should be stranded with a tough plastic insulation. No fuse is needed in this lead since it will tap into the 12-volt power circuit fused in the CB set. Refer to the FET base diagram and Zener diode outline drawing in the schematic diagram to be sure you connect these parts correctly into the circuit.

Drill all necessary holes in the cover and chassis of the aluminum chassis box. Follow the detail drawing or go at it yourself; placement isn't critical, as already noted.

Mount controls R1, R2, and R3 with a



Completed Control Combo with both mikes attached. Unit can be powered from any 12-VDC source and can be mounted almost anywhere.

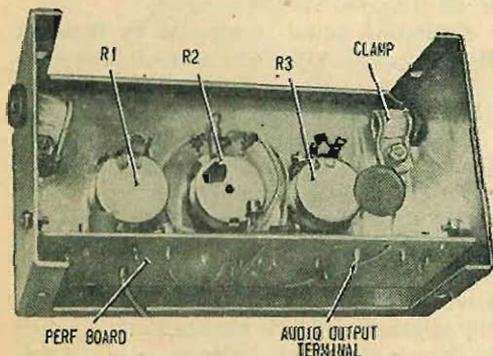


Circuit is straightforward and parts location non-critical.

ground lug located on the threaded section of R2 between the control body and the chassis. Use this lug as a common ground for all audio circuits. Insert the completed perf-board in place but do not secure it. Connect the leads from the perf-board to the controls' lug terminals. Now, connect the mike leads after passing the cable ends through the grommet holes provided in the sides of the unit.

Mind Your Colors. One mike is purchased and one is taken from the CB rig that is getting the CB Control Combo attached to it. Be sure to note the mike's color-coded wires so reconnection will be easier and there will be less chance of mistakes later on.

The new mike cartridge leads (white-hot, shield-ground) in the cable should be connected immediately to the CB Control Combo to avoid confusion with press-to-talk leads. Refer to the specification sheet that comes with the mike to determine which



Chassis box specified has plenty of room for pots and perf-board, so wiring is easy.

color lead goes where. The color references in the text and schematic diagrams agree with the leads on the Lafayette 99C-4562 push-to-talk ceramic microphone. If you use another microphone that is color-coded differently, write in the new colors in the diagrams before you proceed any further. Also, write in the colors for the original equipment mike if they differ.

Secure the mike cables in place with 3/4-in. cable clamps located flush against the grommet holes. The mike cable that connects the CB set and the CB Combo

will not normally receive any tugs so clamping isn't too demanding.

Push-To-Talk. You must determine what kind of push-to-talk circuit your CB rig has—*electronic switching* or *relay switching*. If the mike on your present rig has only a three-wire cable (shield plus two other leads), your rig uses relay switching. You can check this out by looking for the relay. The manufacturer's specifications and the schematic diagrams will also give this information. If your rig has a four-wire cable (3 wires plus shield), the chances are the set is electronically switched, but don't bet on it. One wire may not be used; so check the rig carefully.

ELECTRONIC SWITCHING

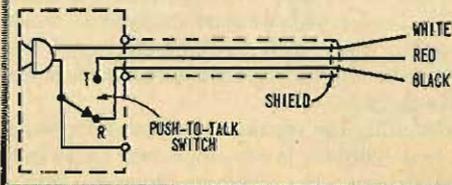
For transceivers employing electronic transmit-receive switching, the four leads on the microphone should be connected to the following points in the transceiver circuit:

- WHITE LEAD This is the "hot" lead; connects to the input circuit of the mike preamplifier stage.
- RED LEAD To line in receiver section which is grounded only on transmit.
- BLACK LEAD To ungrounded side of speaker voice coil or secondary of output transformer.
- SHIELD LEAD To chassis ground.

RELAY SWITCHING

For transceivers employing relay switching for transmit-receive, the four leads on the microphone should be connected to the following points in the transceiver circuit:

- WHITE LEAD This is the "hot" lead; connects to the input circuit of the mike preamplifier stage.
- RED LEAD To side of relay coil which is grounded only on transmit.
- BLACK LEAD No connection required to transceiver.
- SHIELD LEAD To chassis ground.



With relay switching in your rig, either mike can be used to switch the rig from *receive* to *transmit*. Wiring is easy; just connect the original mike and second mike press-to-talk leads in parallel to the corresponding leads in the cable to the CB rig. Now, either mike can switch the CB rig to the *transmit* mode.

Electronically switched sets can have only one mike in control of the press-to-talk operation. The press-to-talk leads of the extra mikes are taped together and tucked in a corner of the chassis. Use the rig's original mike as a guide, and you should have no problem connecting the press-to-talk leads.

Now Finish It. Secure the perf-board in place, using two soldering lugs as brackets. Bolt each to the side of the chassis cover, then bend the open ends of the lugs straight out. The open ends of the lugs are secured to the perf-board with flea clips passed through the lugs and soldered.

Connect the mike cable and power lead

from the CB Control Combo to the CB rig. Be sure the power lead tap is made at the correct point so that the CB rig's on/off switch controls power and the fuse will interrupt power when removed from its holder.

Adjustments are simple! Use the master mike only (the original mike or drive-side mike) to set the level of audio input to the CB set. Set the middle pot, R2, to mid-range. Then adjust the left pot, R1, until the rig is putting out a clear, undistorted signal that does not spill out into the adjacent channels. If you can check modulation with a scope adjust overall gain to 85% modulation.

Now adjust control R3 until the passenger's mike and the driver's both deliver identical output. If you can't get enough gain, increase the setting of R2. This will mean resetting control R1, because the driver's mike will be set too high. A little give-and-take between the controls will bring both mikes to the same level. If you wish, remove the knobs and lock the setting in place with a few drops of airplane glue. After all, once set, no further adjustments will be needed. #

REACT ELECTRONIC HAILER

■ The price of commercially available loudhailers is generally prohibitive for most Cbers. But you can build your own for less than \$25, and an excellent one at that. The unit includes a miniature horn speaker, a ceramic microphone, and an electronic siren. The siren circuit drives the speaker well enough to be heard over 200 yards; and the voice amplifier drives it to carry in excess of 150 yards!

Both the horn-speaker and the electronic chassis are equipped with 3-point suction cup mounts, which facilitate placement in almost any location and provide for stowing the units rigidly, preventing damage in rough weather.

The loudhailer contains two separate pre-packaged electronic modules, one each for the loudhailer and the electronic siren. Each module is a complete working electronic circuit containing all the necessary components to do the job.

Switching the speaker and power between the two modules is accomplished by switch S2 as shown in the schematic diagram. When

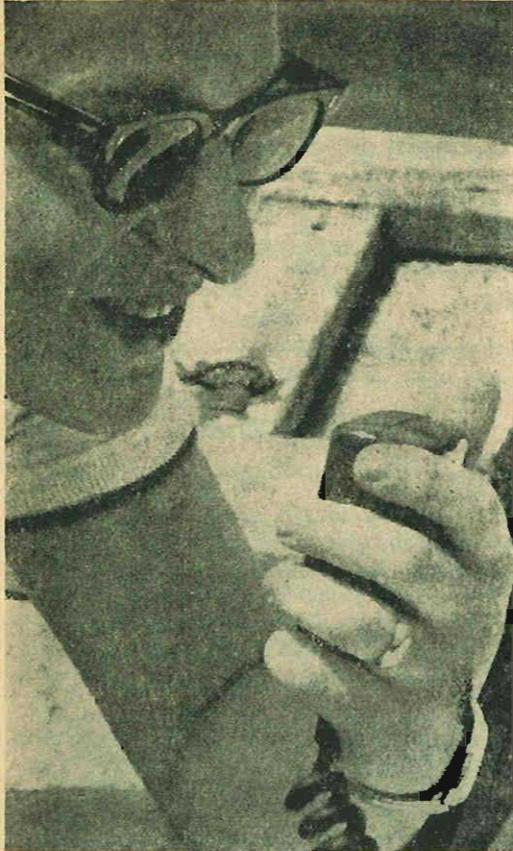
switch S2 is in the up or AMPLIFIER position, the speaker is connected to the amplifier module, and power is connected to it.

When switch S2 is in the down or SIREN position, both the speaker and power are connected to the electronic siren module. With switch S2 in the center position, both modules are disconnected from the speaker and power. The switch has a spring return to off from the SIREN position.

Operating power is supplied by batteries B1 through B4 which are connected in series to obtain 6 volts to power the modules; or a 12 v. auto battery can be tapped at 6 volts.

Mechanical Construction. Start construction by laying out centers for all the holes to be drilled in the small chassis box. Refer to the detail drawings and photograph.

Depending on the type of suction cups you get, you will either have to glue, or screw them onto the chassis bottom. Jack J1 for the external speaker is mounted on a 7/8-inch by 1-inch piece of bakelite so as to insulate it from the metal case and ground. The jack itself is mounted in a hole drilled in the



A bullhorn that includes an electronic siren, the REACT hailer is built around two pre-wired solid-state modules and a horn speaker.



PARTS LIST

- B1, B2, B3, B4—Size C batteries (Eveready No. E-93 or equiv.)
- J1—Phono jack
- P1—Amphenol 91-MPM5L plug (included in purchase of microphone listed below)
- P2—Phono plug
- S1—S.p.s.t. toggle switch
- S2—Four-pole, double-throw lever switch, 3 position: on, off, momentary on (Lafayette Radio 99R6158 or equiv.)
- S3—Push-to-talk switch (part of microphone listed below)
- SO1—Amphenol connector No. PCG-6 (Lafayette 32R1962 or equiv.)
- TS1—6-conductor terminal strip
- 1—Push-to-talk ceramic microphone for relay switching (Lafayette 42R0115 — includes coiled cord, plug, and hang-up bracket — or equiv.)
- 1—Miniature horn speaker (Lafayette 99R4508 — 8-ohm, 8 watts max. includes mounting bracket and 2-conductor cable — or equiv.)
- 2—Solid-state modules, phonograph amplifier and electronic siren, respectively (Cardover PH-7 and SM-1, or Lafayette 19R0111 and 19R0105 or equiv.)

ALTERNATE WIRING

The modules used in this unit are the Cardover models listed above, and shown in the schematic diagram. If the Lafayette modules are used, wire them into the Loudhailer by making the following modifications.

LAFAYETTE AMPLIFIER MODULE 19R0111:

With an ohmmeter, determine which of the two green leads on the Lafayette module is connected to the black lead within the module. This green lead corresponds to that from terminal C as shown on the schematic. Clip off the black lead. The remaining green lead corresponds to that from terminal A. The yellow lead on the Lafayette module corresponds to that from terminal D. Clip off the brown lead. The red lead corresponds to that from terminal B on the schematic.

LAFAYETTE SIREN MODULE 19R0105:

Determine which green lead connects to the black lead. This green lead corresponds to that from terminal C. The other green lead corresponds to that from terminal D on the schematic. Determine which yellow lead is connected to the red lead. The red lead is from terminal A. Clip off the yellow lead that connects to the red. The remaining yellow lead corresponds to that from terminal B. Do not connect it to terminal C, however; connect it to terminal A.

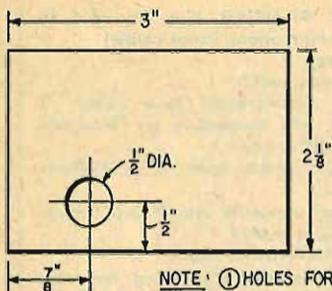
1—5 1/4" x 3" x 2 1/2" aluminum chassis box (Lafayette 12R8373 or equiv.)

2—Battery clips for 2 size C cells

Misc.—6 1 3/8-inch diameter suction cups, 1" x 7/8" piece of bakelite, epoxy cement, hardware, hookup wire, spray paint, solder, etc.

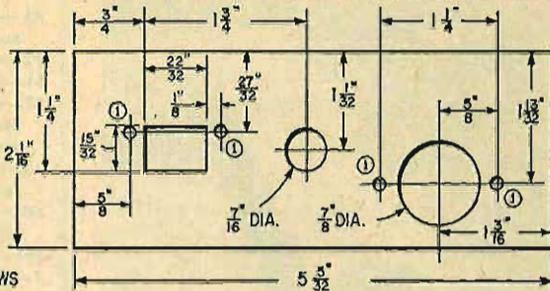
center of the strip. The jack and strip are then mounted in the hole provided for it in the side of the case using epoxy or some other suitable cement. Again, take care that the jack is centered in the hole in the case, and that it does not touch the sides of the

The drawings below provide exact locations for cutting the chassis to receive J1, S2, S1, and SO1.



NOTE: ① HOLES FOR #4 SCREWS

CHASSIS COVER
(RIGHT SIDE VIEW)



CHASSIS FRONT PANEL

hole at any point. Now mount the two battery clips using 4-40 hardware. STAND-BY-OFF switch S1 is mounted in its proper position on the front panel.

Locate and fix the Amplifier and Siren modules in position using epoxy cement. The proper position for the modules can be seen from the photo.

Electrical Construction.

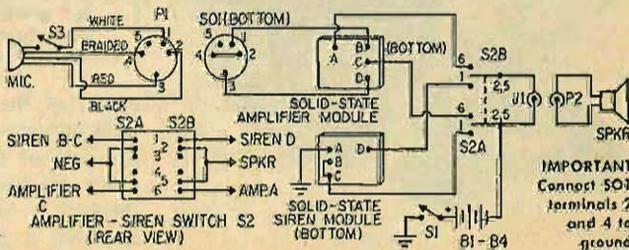
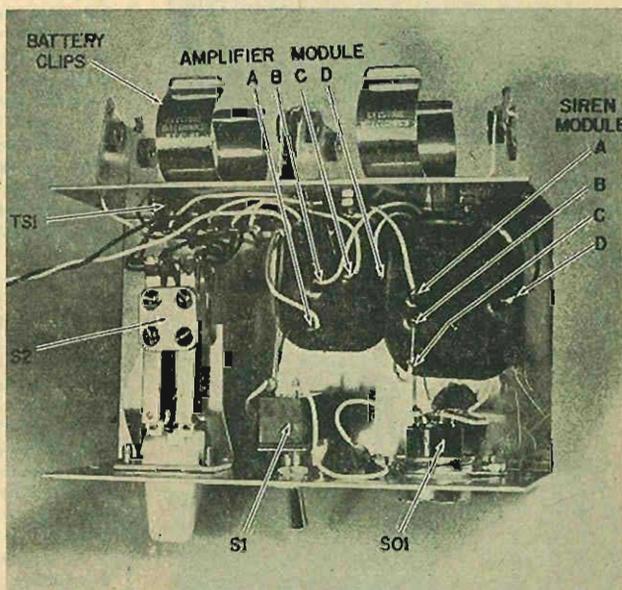
While the epoxy mounting the circuit modules is curing, attach leads to the terminal of AMPLIFIER-SIREN switch S2. Attempting to wire the switch once it's been mounted can be a difficult job, so attach and solder the leads first. Just leave the leads long enough to make connections to the terminal strip.

To make certain the switch is wired correctly, hold the switch so that the terminals face you. The mounting holes should be on top. Switch section A will then be on your left, section B on your right. Terminals 1-6 are numbered consecutively from top of each section downward.

Mount and wire microphone socket SO1. Continue to wire the remainder of the

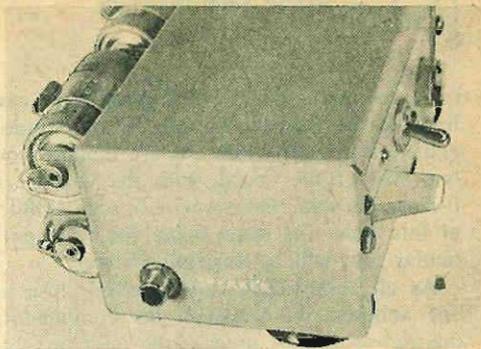
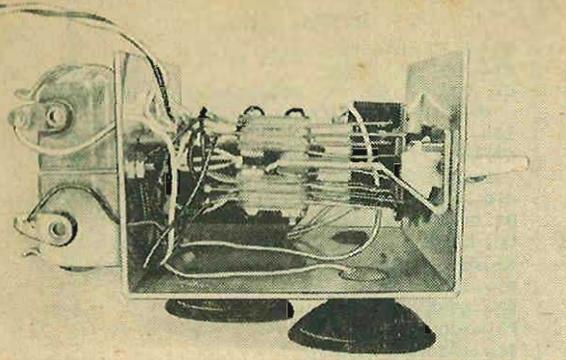
unit according to the schematic diagram. Terminate the end of the speaker lead in an RCA plug and recheck the wiring when you're finished to detect any possible errors.

If you plan on using a microphone other than the one specified in the parts list, you may have to rewire or change microphone



Cover-off view of the chassis box shows encapsulated solid-state modules with their protruding connectors called out. Schematic diagram is at right.

IMPORTANT
Connect SO1
terminals 2
and 4 to
ground



Side view of REACT Hailer chassis with cover removed (left) shows placement of lever switch S2. Leads running from rear of chassis connect to jack J1, mounted on chassis cover (see photo at right).

socket SO1. If the microphone you plan on using does not have a push-to-operate feature, ground terminal B on the amplifier module. Connect terminal D to the hot lead from the microphone. The shield lead on the microphone connects to ground.

Testing the Unit. After you've assured yourself that the unit is wired correctly, install the four C cells in the battery holders. A spot of paint can be used to denote the positive terminal in each section of the battery clip, and prevent possible damage to the modules due to an incorrect battery polarity installation.

Plug the speaker plug, P1, into J1, and the microphone into SO1. Set switch S1 to the STANDBY position. Flip switch S2 into the up position—the loudhailer AMPLIFIER position. Depress the push-to-operate switch S3 in the handset and give the 'ol *Testing . . . 1, 2, 3 . . .*; you should come through loud and clear.

Next press switch S2 downward to the SIREN position and hold it there. After about two seconds, the siren will start to wail

upward in pitch and the neighbors will know you've successfully completed your loudhailer.

Operation. In normal use, set switch S1 to STANDBY, and forget it. It's meant to prevent accidental operation while the unit's being transported. No current drain on the batteries is possible with it in the STANDBY position as long as switch S2 remains in the center off position.

For use as a loudhailer, set switch S2 to the AMPLIFIER position—the switch will lock in this position. Depressing the push to talk switch, S3, in the handset, applies power to the amplifier module. Speak directly into the microphone in a slow distinct, slightly louder than normal voice for the most effective results.

To use the siren, press switch S2 down, and hold it there as long as you want the siren to sound. The switch is under spring tension to return to the center off position. By keeping the siren in short bursts, you'll get a sound not unlike that used by emergency vehicles. #

CB VOICE COMPRESSOR

■ The *CB Voice Compressor* is a small, compact unit that can be built right into the transceiver it's to be used with. Its modest cost, less than \$10.00, won't crimp a small budget. Easy to build, it can be assembled in several hours time.

Construction. The use of perforated board simplifies the construction of the CB

Voice Compressor. All components are inserted upright, with their leads passing through the holes in the board. Miniature eyelets, inserted in the proper holes, serve to anchor leads and to provide additional rigidity to the wiring. All capacitors used are miniature types designed for upright mounting. Resistors are mounted on end to

CB VOICE COMPRESSOR

conserve space. The general parts layout can be seen in the photographs. All components, except capacitor C1, are mounted on one side of the board, with the wiring on the reverse side. Do not wire in resistor R15 at this time—its exact value for your particular unit will be determined later.

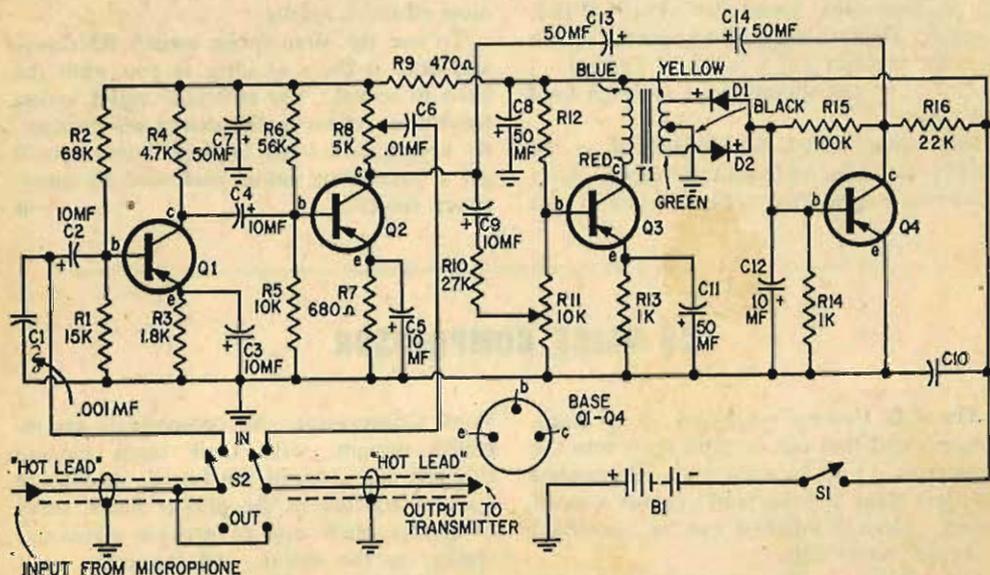
As all components are mounted close to one another, the leads on the components themselves can be used as the interconnecting wiring. Use plastic insulation (spaghetti) where necessary to prevent accidental shorts.

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

Initial Adjustment. Once the compressor has been wired and checked for errors, connect a 39,000-ohm resistor in series with a 250,000-ohm potentiometer. Wire this combination into the circuit in place of resistor R15. With the OUTPUT control at mid-position, and the COMPRESSION control fully counterclockwise, whistle into the micro-

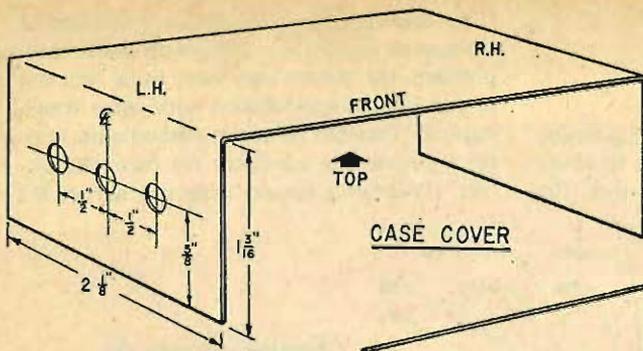
PARTS LIST

- B1—9-12 volt battery, see text
- C1—.001 mf., 15VDC
- C2, C3, C4, C5, C9, C12—10 mf, 15 VDC (Radio Shack 272-727 or equiv.)
- C6—.01 mf, 15 VDC
- C7, C8, C11, C13, C14—50 mf, 15 VDC (Radio Shack 272-729 or equiv.)
- C10—.05 mf, 15 VDC
- D1, D2—Diode, 1N34A
- Q1, Q2, Q3, Q4—Transistor, pnp, RCA 2N217
- Resistors 1/2-watt, 5% unless otherwise noted
- R1—15,000-ohm resistor
- R2—68,000-ohm resistor
- R3—1800-ohm resistor
- R4—4700-ohm resistor
- R5—10,000-ohm resistor
- R6—56,000-ohm resistor
- R7—680-ohm resistor
- R8—5000-ohm miniature potentiometer
- R9—470-ohm resistor
- R10—27,000-ohm resistor
- R11—10,000-ohm miniature potentiometer
- R12—100,000-ohm resistor
- R13, R14—1000-ohm resistor
- R15—100,000-ohm resistor (See text)
- R16—22,000-ohm resistor
- S1—switch, SPST, see text
- T1—Miniature audio transformer—10,000-ohm primary; 2000-ohm secondary (Radio Shack 273-2378 or equiv.)
- 1—Aluminum chassis box, 3 1/4 x 2 1/8 x 1 5/8 inches
- Misc.—Solder, eyelets, perforated board, wire, etc.

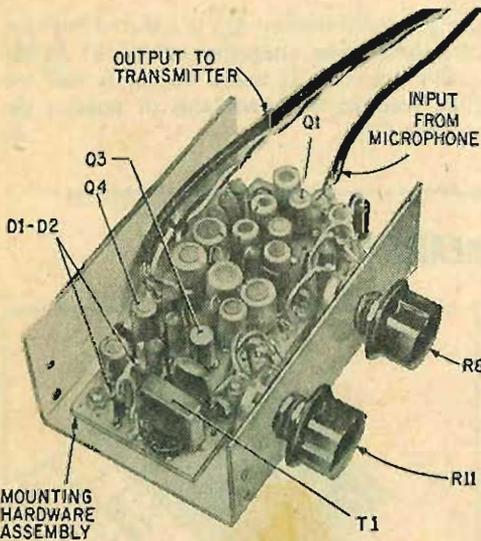
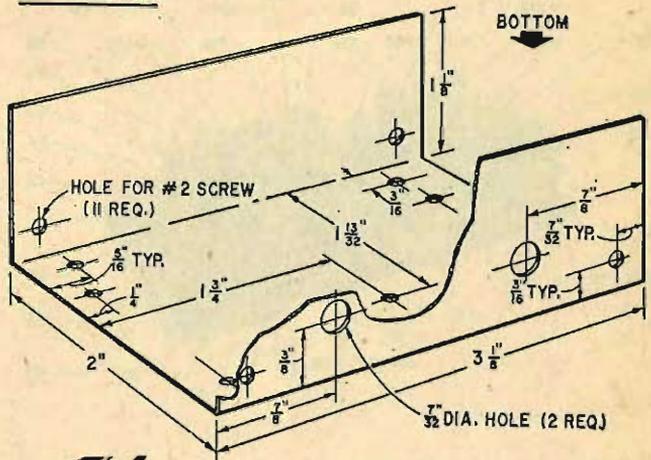


Switch S2 can be eliminated if you want the Compressor to be in the circuit at all times.

phone and reduce the resistance value of the potentiometer until the output level just drops. Remove the combination from the circuit and measure their combined resist-



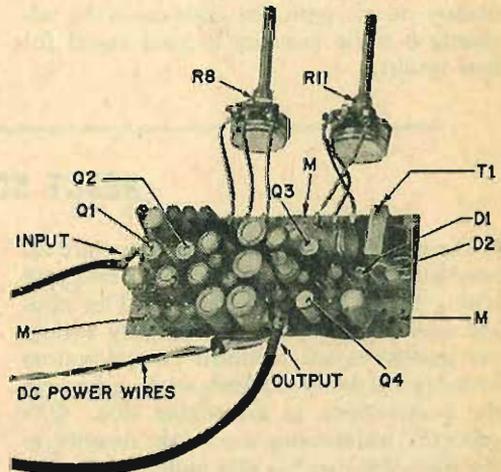
Layout of chassis box is not critical. Holes in case cover can be either on right or on left. Placement of front-panel controls is also subject to a change or two in spacing and position.



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

ance with an ohmmeter. Replace the combination with a resistor which comes the closest to the measured value. Typical values will range from 50,000 ohms to 150,000 ohms, depending upon the individual characteristics of the transistor used for Q4.

Some Modifications. If the compressor is to be used with a high-impedance microphone, a transformer will be needed to match



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

the high impedance of the microphone to the low-impedance input of the compressor.

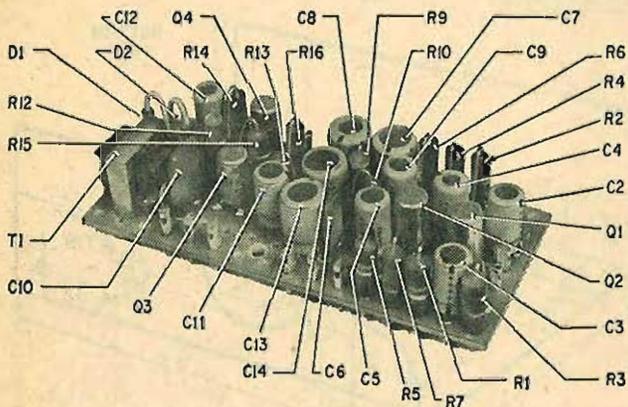
When the compressor is to be used with a low-impedance microphone, replace C6 with a 2- μ F electrolytic capacitor.

Operation. With the OUTPUT control (R8) and the COMPRESSION control (R11) fully counterclockwise, advance the output control until the modulation reaches 100%

CB REACT SCREAMER

on peaks. Next, advance the compression control until the modulation drops to about 60%. Now bring up the output control. Re-

As this compressor provides a substantial amount of audio gain, along with voice compression, the output may have to be reduced to prevent overmodulation with some transmitters. This can be accomplished quite simply by removing capacitor C3 from the circuit. Without a bypass capacitor across R3



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

peat this process until optimum results are obtained. If you don't have access to a modulation meter, peak the compressor by adjusting it while listening to your signal for best results.

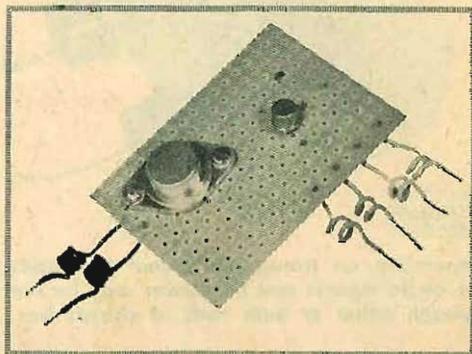
the gain of transistor Q1 is reduced because of degeneration (negative feedback) in the emitter circuit. If audio output is still too high readjust the modulator or remove capacitor C5. #

REACT SCREAMER

■ The guts for the REACT Screamer are assembled on a stock size piece of perforated wiring board $2\frac{1}{16} \times 3\frac{3}{8}$ inches. Flea clips are used as tie points. To simplify wiring, the transistors are mounted on the bottom of the board with their leads sticking through the perforations to the wiring side. Q2's collector connections are made directly to the transistor case via lugs under the mounting screws.

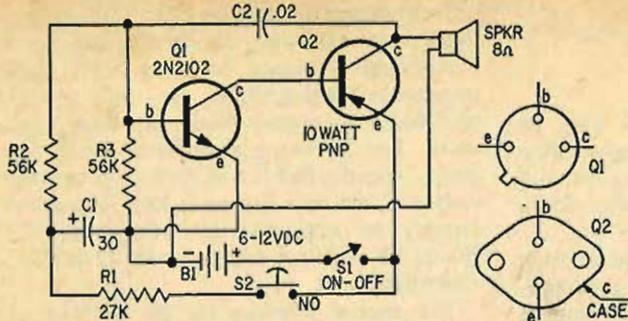
While Q1 and Q2 are specified in the parts list, any low cost equivalents can be used; just make certain Q1 is npn and Q2, pnp. It is possible for a Q1 with high leakage current to cause the Screamer to pulse a tone burst every few seconds even with trigger switch PB1 in the off position; if it happens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

Resistor and capacitor values are not necessarily critical and the REACT Screamer will work with anything close to the



Assembled on a piece of stock perf-board, tiny REACT SCREAMER mounts most anywhere.

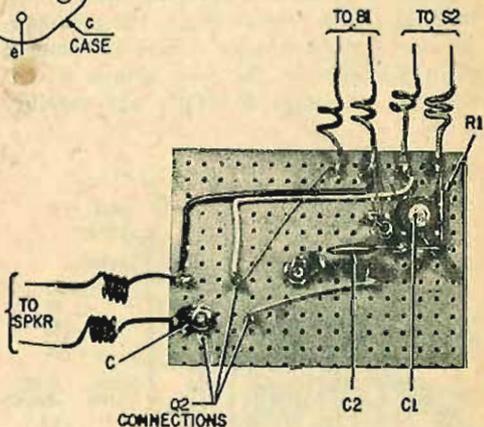
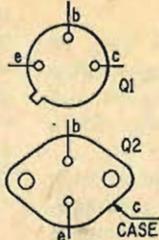
specified values. While the resistance values determine the output frequency(s) to some degree, C2 has the greatest effect. The specified value of .02 mf. produces a high pitched tone just about equal to that of the new police type electronic sirens. To lower the



PARTS LIST

- B1—6 or 12-volt battery (See text)
 C1—30-mf., 15-WVDC electrolytic capacitor
 C2—.02-mf., 75-WVDC or higher (See text)
 Q1—2N2102 or any general purpose npn audio transistor
 Q2—10-watt, pnp power transistor (Lafayette 19R1501 or equiv.)
 R1—27,000-ohm, 1/2-watt resistor
 R2, R3—56,000-ohm, 1/2-watt resistor
 S1—S.p.s.t. on-off switch
 S2—Normally off push-button switch
 SPKR—8-ohm loudspeaker (See text)
 Misc.—Perf-board, Flea clips, wire, solder, etc.

Capacitor C2 provides the necessary feedback to bring the audio amplifier circuit into oscillation. Try different values for C2 (see text) to alter the Screamer's output pitch. The finished Screamer (below) is relatively flat and will fit nicely into a plastic jewel box.



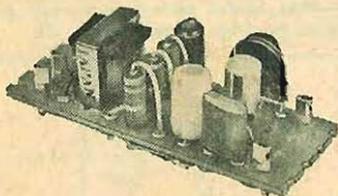
tone increase C2's value; to raise the pitch decrease C2.—any value from .01 to .1 mf. will work.

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

and opened the output will be a rising and falling wail.

Just one note of caution. The police of most communities frown on the average citizen (even a REACT CBer) opening up holes in bumper-to-bumper traffic with a siren. If you get any ideas about sticking one in your car just make certain you hold some position that entitles you to a siren. #

MADMOD BOOSTER



■ Even with all new parts, the MadMod Booster should cost less than \$4, but it will give your modulation an invaluable boost in talk power. Put a fine tip on your soldering iron and you can make it small enough to fit into the base of a stand-type microphone.

Construction. The MadMod Booster (preamplifier) is built on a small strip of

perforated phenolic board. Miniature eyelets and flea clips serve as parts anchors and terminal points.

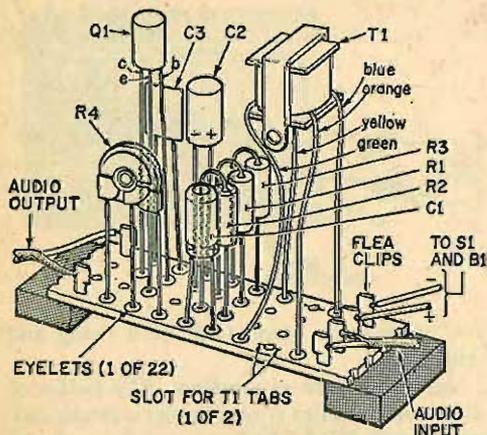
Since the components are mounted fairly close together, the leads on the components themselves serve as the major portion of the wiring. Insulation should be slipped over those leads where there is a chance of an accidental short.

Switch S1 is a pair of normally-open switching contacts on the mike's push-to-talk switch. If your mike won't permit such an arrangement a miniature slide or toggle switch can be installed. Since the preamplifier has exceedingly low current drain, (un-

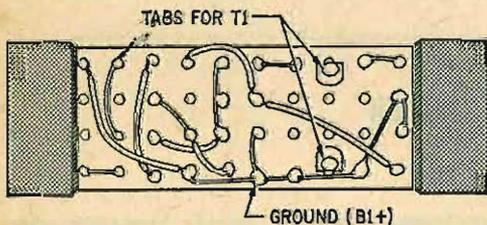
CB MADMOD BOOSTER

der one milliampere) switch S1 may be eliminated entirely. (The inexpensive alkaline cell, recommended in the parts list, will continuously power the preamplifier for a period of over three months!)

Using a somewhat different construction technique, and power source, the preamplifier can be constructed inside a common palm microphone, the type almost all CB rigs use. A single Eveready 625 mercury



Pictorial of Booster's layout shows positions of components on perforated board. A piece of self-adhesive foam weather strip is used to shock mount the Booster in base.



Wiring on underside of perforated board is with thin wire although a printed circuit could be designed. Plastic tubing is used to prevent shorts at crossover connections.

Circuit of Booster is simple and should present few problems even as a first project. If there is too much gain in amplifier C2 can be removed.

cell will power the unit for over 350 hours—that's over one year, in normal use.

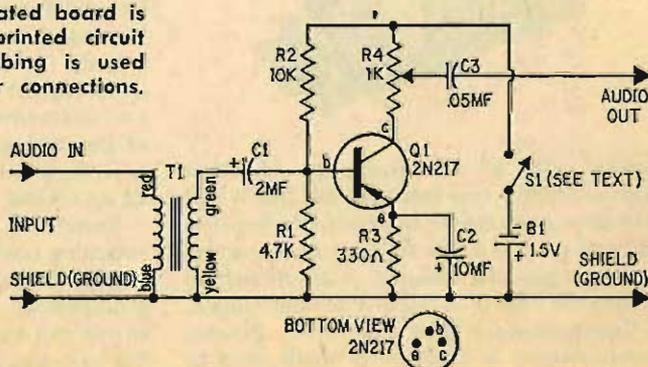
Although designed to work with high-impedance microphones, the unit can be modified to operate with low-impedance units. For low-impedance microphone elements, transformer T1 is removed, and the output of the microphone is then connected directly to capacitor C1. Capacitor C3 should be replaced with a 2-mf, 12-WVDC electrolytic unit.

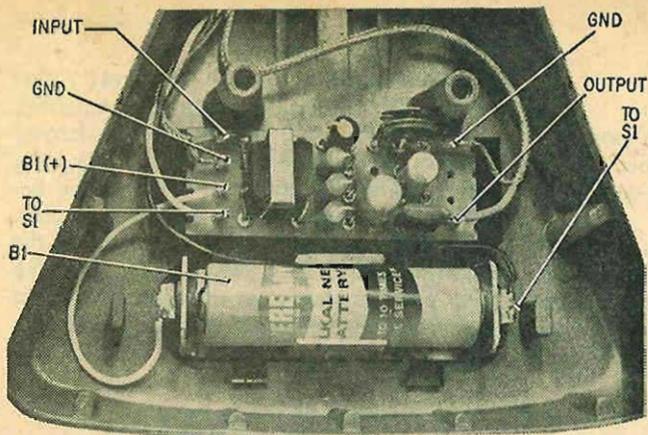
Pay special attention to the polarity of components, when indicated, and to the wiring of the transistor. Reverse voltages can quickly ruin the miniature electrolytics or drain the dry cell.

Adjustment and use. After the MadMod Booster has been checked over for possible wiring errors, the preamplifier must be adjusted for proper operation with the par-

PARTS LIST

- B1—1.5-volt alkaline cell (Eveready E91, or equiv.)
- C1—1-mf., 6-wvdc, miniature electrolytic capacitor (Lafayette # 99R6070, or equiv.)
- C2—10-mf., 6-wvdc, miniature electrolytic capacitor (Lafayette # 99R6074, or equiv.)
- C3—.05-mf., 75-wvdc, miniature ceramic capacitor
- Q1—Pnp transistor (2N217, 5K3004, 2N316A, 2N404, 2N567 or equiv.)
- R1—47,000-ohms
- R2—10,000-ohms
- R3—330-ohms
- NOTE: All resistors are 1/2 watt, 10% unless otherwise specified.
- R4—1,000-ohm miniature potentiometer, (Lafayette # 99R6142, or equiv.)
- S1—S.p.s.t. switch (see text)
- T1—Miniature audio transformer. 100,000-ohm primary, 1,000-ohm center tapped secondary. (center tap not used) (Lafayette # 99R6125, or equiv.)
- Misc.—Wire, solder, perforated-phenolic board, eyelets, flea clips, battery holder, etc.





All desk-stand microphones do not have as much space in the base as this Electro-Voice. A change in the perforated-board layout may be necessary to fit components in space.

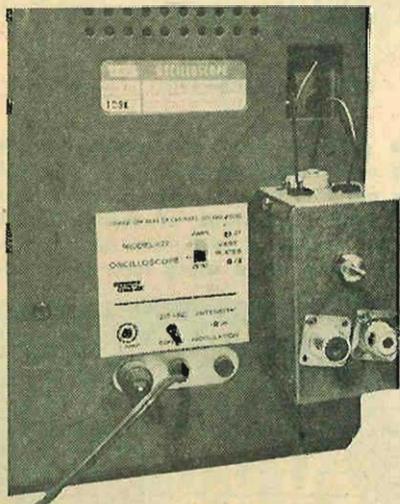
ticular transmitter it is to be used with.

With the transmitter in operation, adjust potentiometer R4, so that when speaking in a normal tone of voice, 100% modulation is reached on intermittent voice peaks. Modulation percentage can be checked with the aid of a multipurpose CB transceiver tester,

or, alternatively, by means of an oscilloscope.

Care must be taken to avoid setting the potentiometer too high, or overmodulation will occur. Modulation in excess of 100% will cause distortion to your signal, and interference to adjacent channels; this is in violation of the F.C.C. rules and regulations. ##

CB MODAPTOR



■ The oscilloscope, because it indicates peaks, is the best CB modulation meter the CBER can use. Unfortunately, the low-voltage output from a CB rig hardly gives a usable pattern. But add our onboard CB Modaptor to your scope and even a 1-watt output will fill a 5-inch scope.

The CB Modaptor mounts on the back

of the scope and its output leads connect to the CRT's direct vertical plate connections.

The CB Modaptor shown in the photos is built on the main section of a 2¼ x 2¼ x 4 inch aluminum chassis box. While parts layout isn't particularly critical, try to follow the photograph as closely as possible. Do not substitute for any component values, and use the specified parts.

T1 is wound on a stock coil form. The form is supplied with a three turn winding which is used as L2, the secondary of T1. Between the top of L2 and the mounting flange, wrap a three-turn link (L1) made of AWG-22 solid, plastic insulation hook-up wire. L1 is not critical—position it approximately midway between L2 and the flange; just wrap three turns and give it a twist to hold the coil together. If the coil appears loose, cement it in place with coil dope or household cement.

Variable capacitor C3 is rigidly mounted to the top of the cabinet. Do not substitute any other type trimmer capacitor for the type given in the parts list. You must use a type that mounts with screws—the ordinary, inexpensive type, that hangs by its lugs.

CB MODAPTOR

will change value as the scope is moved.

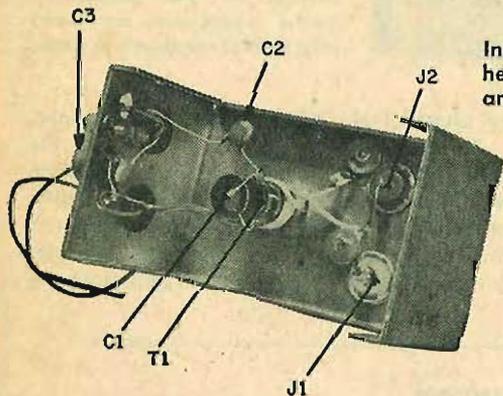
C3's lugs pass into the cabinet through $\frac{5}{16}$ -inch holes drilled at opposite ends of the trimmer.

The output leads are short lengths of stranded wire passing through $\frac{3}{8}$ -inch rubber grommets at the top of the cabinet. Connect phone tips or banana plugs at the ends

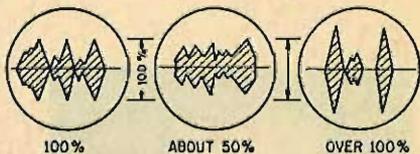
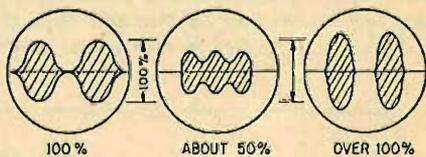
of the wires—whatever matches the scope's vertical input jacks.

Adjustment. For the moment, forget about C3's setting. Connect the transceiver to either J1 or J2 and connect a dummy load or the antenna system to the remaining jack. An SWR meter *must* be connected between the transceiver and the CB Modaptor.

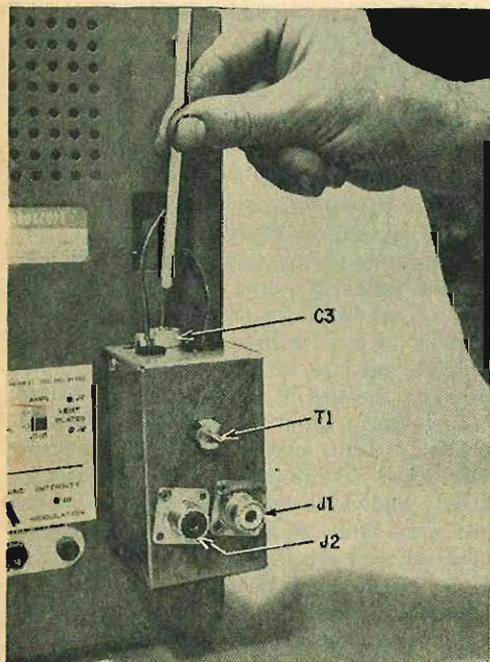
Activate the transmitter by depressing the push-to-talk (PTT) switch, and (ignoring any patterns shown on the scope) using an insulated alignment screwdriver adjust T1's



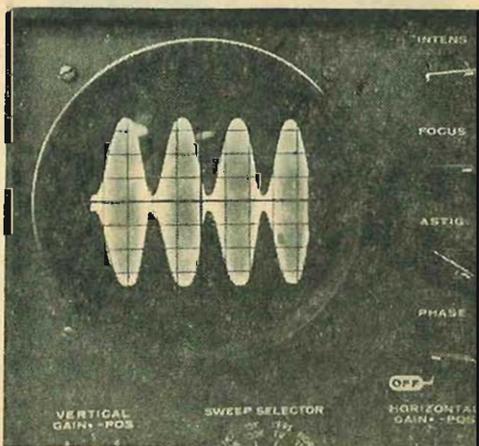
Internal view of the CB Modaptor shows heavy-wire jumper between jacks J1, J2 and 3-turn coil (L1) added to make T1.



Scope patterns show the modulation tests made with tone (top and below) and voice. Voice patterns keep jumping around on the screen and percentage of modulation can only be estimated. Accurate measurements can be made when using tone modulation.



Capacitor C3 is adjusted according to the details in the text. For easier testing a dummy load (phantom antenna) can be built in—eliminating one of the coax connectors on the CB Modaptor.

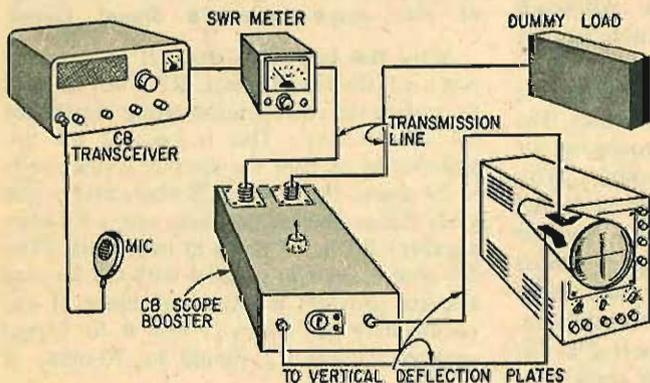
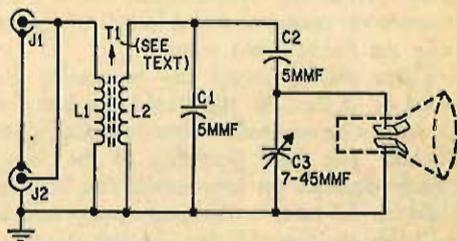


slug for *minimum* SWR reading. At the instant the transmitter is turned *on* (keyed) the SWR may read infinity, but don't panic—adjusting T1 will reduce it. With T1 adjusted so the SWR meter dips at the lowest reading, the SWR may still be slightly higher than normal—but by very little. If the SWR is normally 1:1 it might rise to 1.1:1 or 1.2:1. The rise is caused predominantly by opening the cable at the shorting connection between J1 and J2. Don't worry about an insignificant SWR rise—anything less than 2:1 is okay.

PARTS LIST

- C1, C2—5-mmf., ceramic disc capacitor
- C3—7-45 mmf., trimmer capacitor (Centralab 825-BN or equiv.)
- J1, J2—coaxial connectors (PL-259 or equiv.)
- L1—3-turns AWG-22 solid hookup wire (see text)
- L2—3-turn transmitter oscillator coil (Lafayette 32R0911 or equiv.)
- T1—primary winding L1; secondary winding L2 (see text)
- 1—chassis box, 2 1/4 x 2 1/4 x 4-inch (Bud CU-2103-A or equiv.)
- Misc.—wire, solder, hardware, etc.

Although circuitry is simple, wiring at the 27 MHz CB frequencies is critical.



Setup for checking the CB rig's percentage of modulation requires considerable equipment—CWR meter, dummy load (to replace antenna), and scope. Size of CB Scope Booster, as shown here, is greatly exaggerated. All interconnections should be made as short as possible for testing purposes.

Turn the transmitter *off*, center the CRT baseline, and then turn the transmitter *on*. Using an insulated alignment screwdriver adjust C3 so only the RF carrier (no modulation) falls on a convenient reference line; for example, it is most convenient to have the trace cover four vertical divisions, two above and two below the baseline. There is a slight interaction between C3 and T1's adjustment so each time you adjust C3 go back and adjust T1 for minimum SWR.

Testing. An easy way to check the overall modulation is to feed a low-level tone into the transceiver's mike—place the microphone in front of a speaker and adjust the Hi-Fi (or P.A.) amplifier's gain while you observe the transceiver's modulation pattern.

For straight modulator tests, disconnect the microphone and connect an audio-signal generator, or some other tone source, direct-

ly into the transceiver's microphone preamp.

A complete, and interesting explanation, complete with CRT patterns obtained, is given in the *Radio Amateur's Handbook*, published by the ARRL. Since the scope, under proper analysis, will show up hum, noise and distortion, as well as frequency response, we suggest you latch onto the *Handbook*—not only is it a good text book it's a great reference for antennas and other parts of low-power installations.

One testing technique detailed is trapezoidal-pattern modulation measurement. The linear time base of the scope is replaced with the audio frequency of modulation. With audio fed to the horizontal input of the scope and audio-modulated RF fed to the vertical plates it is even easier to calculate modulation after measuring the vertical edges of the trapezoidal pattern. #

CB SIGNAL CENTER

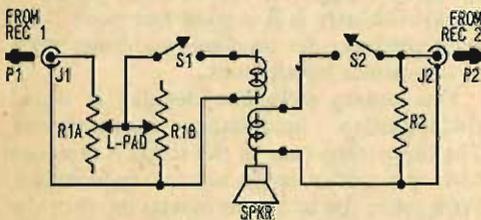
■ One pathway to a clutter-free communications center is through the CB Signal Center. The Signal Center has but a *single* 6-inch speaker, yet it can be connected to *two* separate receivers, or transceivers) at the same time because the speaker has *two* voice coils! The levels can be preset so that one signal source is reproduced at a background level—such as music from a radio—while the second signal, from a CB transceiver, comes in much louder and overrides the background signal.

Either signal circuit can be totally disabled or, if desired, the level from each receiver can be controlled directly at the Signal Center. The total flexibility of the Signal Center depends on how much you want to build in. In fact, total signal control can be built into the Signal Center so that all equipment can be placed in a closet. All you'll need is a remote (long cord) cable for the push-to-talk microphone.

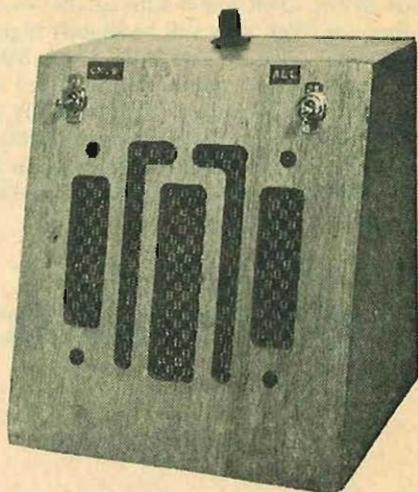
The schematic of the Signal Center shows two possible connections you can utilize. The connections for REC 1 have provisions for controlling the volume at the speaker. With the volume control of REC 1 set $\frac{3}{4}$ to full open, the volume is adjusted at the speaker by the L-pad (R1)—a speaker-level volume control that provides proper impedance match to the receiver's output transformer.

If you don't need volume control at the speaker, you can use the circuit shown for REC 2; a switch to cut the speaker in and out (S2) and a load resistor (R2).

If you have no need to completely disable either signal source the switches can be eliminated. Of course, an L-pad can be used in both circuits to provide individual remote volume control.



Signal Center schematic diagram shows two methods of connecting to the receivers. A load resistor (R2) can be used in place of the pad (R1) or two pads can be wired in the circuit.



Special, dual-voice-coil speaker forms heart of this easy-to-build CB Signal Center.

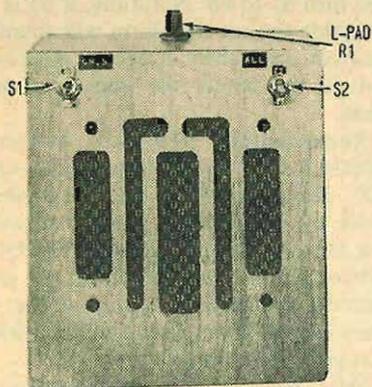
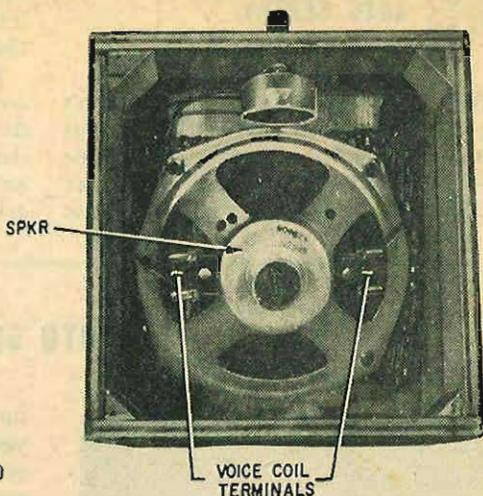
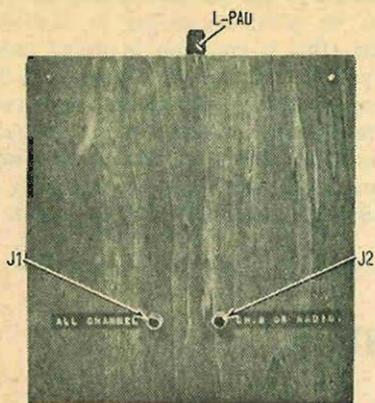
Why The Load Resistor. If an L-pad is not used, the load resistor, R2, *must* be used to provide the correct terminating impedance for the receiver. This is because the impedance of each of the speaker's voice coils is 20 ohms. For 5-watt CB transceivers and table radios (which normally use a 3.2-ohm speaker) R2 is 3.9 ohms at two watts. (The 3.9-ohm resistor in parallel with the 20-ohm speaker provides a total impedance of approximately 3.2 ohms.) For 6 to 8-ohm speaker circuits R2 should be 10-ohms at 2 watts.

Resistor R2 isn't needed when an L-pad is used as the pad will "compensate" for the 20-ohm speaker voice coil mismatch as long as the L-pad isn't set "wide open." Just keep the L-pad backed-off slightly from full-open and you'll have no mismatch problems at all.

Keep in mind that the matching resistor

PARTS LIST

- J1, J2—Phono jack
- P1, P2—Phono plug to match J1, J2
- R1—L-pad; 4-ohm for 3.2- or 4-ohm circuits; (Lafayette 33C1376 or equiv.) 8-ohm for 6- or 8-ohm circuits (Lafayette 33C1378 or equiv.)
- R2—Load resistor (see text)
- S1, S2—S.p.s.t. switch
- SPKR—6-in. dual voice-coil speaker (Utah SP6D-M1, Lafayette 32C2205 or equiv.)
- 1—Speaker enclosure
- Misc.—Terminal strips, lugs, solder, hookup wire, speaker wire, etc.



Rear cover of CB Signal Center (above left) shows input jacks (J1, J2). Internal view (above) shows location of L-pad. Switches S1, S2 are the dark squares in the upper corners. Front of CB Signal Center (left) is complete with switches and L-pad for one channel.

does "eat up" some output level, and the receiver's volume control will have to be advanced slightly from the usual setting to obtain the "normal" speaker level.

Building the Signal Center. The unit shown in the illustrations incorporates the circuits shown in the schematic diagram; an L-pad control on REC 1 and a matching resistor for REC 2. It is housed in a 6-inch wooden speaker baffle.

If your speaker baffle doesn't come complete with a back panel cut one from a piece of plywood. If the speaker sounds boxy or hollow with the back on, simply drill two or three 1/2-in. holes in the back panel.

Install input jacks J1 and J2 on the back panel. If you don't use an L-pad solder the load resistors (R2) directly across the jacks. The load resistor (not shown in the photographs) is wired directly across the solder terminals of J2. Connect about 12 inches of two-wire zip-type (thin parallel) speaker wire to each of the jacks and then set the panel aside.

Connecting the Receivers. If both speaker circuits are to be connected to CB or communications receivers make up a patch cord with a phono plug at one end (for J1 and J2) and a plug at the other end that matches the headphone or remote speaker jack on the receiver. Simply plug the one end of the cord into the Signal Center and the other into the receiver.

If the receiver doesn't have a headphone or remote speaker jack, or if you're connecting to a radio, you'll have to make a slight modification to that speaker circuit.

Disconnect the leads at the radio's (or receiver's) speaker, and solder a terminal strip to one speaker terminal. Re-install the speaker but connect one lead from the speaker to the insulated terminal (disabling the internal speaker). Then solder a length of zip or speaker wire to the speaker terminal having the output transformer lead, and to the insulated terminal.

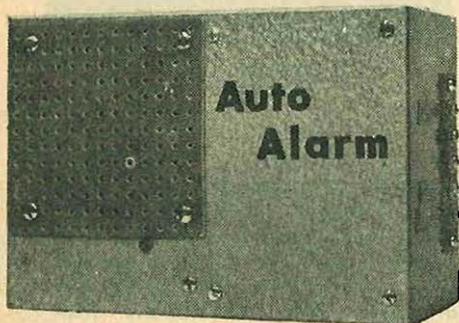
If the receiver or radio doesn't have a power transformer, and is the so-called AC-

DC type, you must make certain you don't bring out a "grounded" speaker lead as this might create a shock hazard by making the shell of P1 or P2 one side of the AC power line. Check that one speaker terminal is not

connected to the speaker frame—with the frame, in turn, connected to the radio's chassis (this is common in many radios).

If you do find a ground strap, or a direct connection between the speaker terminal and the frame, make certain it is this connection that is opened and connected to the insulated terminal strip. Otherwise an extremely dangerous shock hazard could be the result. #

CB AUTO SENTRY



■ The CB Auto Sentry fights theft and break-in two ways. Firstly, on the fender is a *key switch* which in any man's language means "Watch Out," this car is wired for sound.

Secondly, the instant anyone tries to open a door, the hood or the trunk, a *screaming* siren fills the neighborhood; and it can only be turned off with a key.

Protecting The User. Since key-switch S1 is mounted on the fender—and you want it there for all to see—it protects you against the embarrassment which might be caused by the siren going off as you attempt to leave the car (which will happen if the alarm switch is mounted inside the car). After you leave the car, the alarm is set by

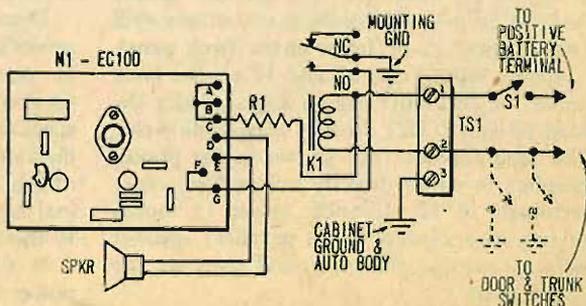
turning S1 to *on*. Before getting into the car, you turn S1 to *off*. Naturally, if S1 is mounted inside the car the alarm will sound whenever you enter the car. Mount the key switch out on the fender for your own peace of mind.

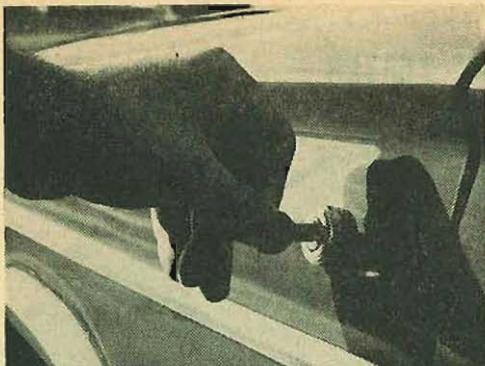
Construction. The siren module is an *EICOCRAFT* Siren Module Kit—type EC-100. However, there are many siren modules on the market place that will work just as well. Assemble only the *EICOCRAFT* printed circuit board itself, do not make the external connections given in the instructions as the Sentry uses simpler wiring than that given with the module.

After the module is completed, connect a 10-inch length of black wire to terminal *G*. loop the wire under the board and solder the end to *F*. Connect a 1-inch length of bare wire to *C*. Connect a bare-wire jumper from point *A* to point *B*. Then connect two wires of the same color to *D* and *E*, the speaker terminals. Note that the board shows the battery connections to *A* and *B*; ignore these instructions. In the CB Auto Sentry the positive battery connection is the short bare wire at *C* while the negative battery connection is the black wire going to *F* and *G*.

After all cabinet holes are cut in the main

Noisemaker of the Auto Siren Sentry is the Eico EC100 (M1) module that drives the speaker. Relay K1 keeps siren sounding.



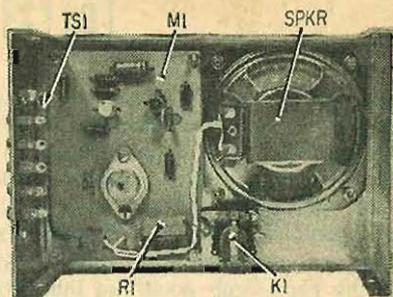


Inexpensive key-lock switch set in fender advertises burglar alarm. Presence of lock alone will tend to provide some theft protection.

section of a 3 x 5 x 7-in. aluminum cabinet, mount the siren module as shown in the photographs, on the bottom as close as possible to one side; use stand-offs between the board and the cabinet to avoid shorting the printed-circuit wiring. The stand-offs as well as the necessary mounting hardware are supplied with the module.

The speaker is a three-inch waterproof type. The speaker specified in the Parts List is supplied in a metal cabinet having an integral gimbal bracket. If the speaker is installed as shown, in an aluminum cabinet, place a piece of perforated phenolic board in front of the speaker, to prevent possible damage to the cone. (If desired, the speaker can be used in the cabinet supplied.) Mount the speaker cabinet near the radiator, facing outwards, and connect the speaker leads from the module to the terminals on the speaker cabinet.

The wiper contact on K1 is *automatically grounded* when the relay is mounted in the cabinet—the wiper contact should be con-



Internal view of Auto Siren Sentry shows location of major components. Much smaller box can be used if speaker is outside.

nected directly to the frame of relay K1.

Install the CB Auto Sentry on any convenient surface under the hood.

Installing The Switches. Any existing door switch automatically becomes part of the CB Auto Sentry when the wire from terminal 2 of TS1 is connected to the courtesy light circuit. These switches are the self grounding type, always switching the ground lead of the courtesy lights; therefore, when you look at these switches you will see only *one* connecting wire. All other switches which may be added should be of the same type, self grounding, with their leads connected to the wiring of any of the original door switches. Additional switches for the hood, trunk or rear doors can be purchased from your car dealer at nominal cost. Obviously, for full protection, you should see to it that switches exist or are installed at every possible point of entry.

Install the key-switch on part of the *double fender*. Part of each fender, near the door, is shielded by the sides of the firewall, and access to the space between the fender and firewall is only through a small area which is exposed when the door is open. Place the switch so that its terminals are in the concealed space.

Positive Grounds. The circuit shown is for cars with the more common *negative* ground battery. If your car uses an electrical system that has a positive ground, simply reverse the connections to siren module terminals C and G.

6-Volt Systems. If your car uses 6-volts eliminate R1—use a direct connection from terminal 1 or TS1 and use the alternate Potter and Brumfield 6-volt relay specified in the parts list.

PARTS LIST

- K1—S.p.d.t. relay (Potter and Brumfield R55D-12VDC, Allied 41D5504—P & B R55D-6VDC, Allied 41D5896 or equiv.)
- M1—Siren Module (EICOCRAFT EC-100 or equiv.)
- R1—10-ohm, 5-watt resistor (see text)
- S1—Key-lock switch (Lafayette 33C6401 or equiv.)
- SPKR—Weatherproof speaker (Lafayette 44C-5201 or equiv.)
- TS1—Terminal strip (see text)
- 1—3 x 5 x 7-in. aluminum chassis box
- Misc. Wire, solder, mounting hardware, solder lugs, etc.

CB CUBE TESTER

■ One look at the CB Cube Tester can be deceiving. It may look like the electronic answer to dice, but it is not. The CB Cube Tester is an inexpensive, knock-about, tube-filament continuity tester that is carved from a solid block of wood. The CB Cube Tester operates on ordinary line voltage, which lights the neon-lamp good/bad indicator.

Construction. Cut the cube from a good piece of 2 x 2-inch stock—sand all sides smooth and round the edges.

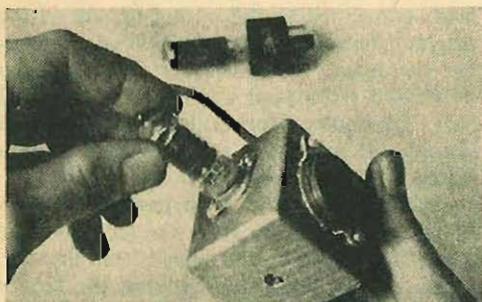
Three sockets are needed; a 7-pin miniature, a 9-pin miniature and an 8-pin octal.

Determine the diameter of the tube-socket mounting holes for the sockets you intend to use, and select the wood bits to match. Generally, molded octal sockets require 1½-inch mounting holes; 7-pin miniature ¾-inch mounting holes; and 9-pin miniature require ¾-inch holes.

All holes are drilled in the *centers* of the sides involved. Only one side remains blank. First, drill the hole for the line cord and neon lamp with a ¼-inch bit. The ¾-inch hole is bored for the 7- and 9-pin sockets, and then the hole for the 9-pin socket is enlarged with a round file until the socket fits. But, if you



Made from a single piece of 2 x 2-in. stock, CB Cube Tester checks most tubes for open filaments.

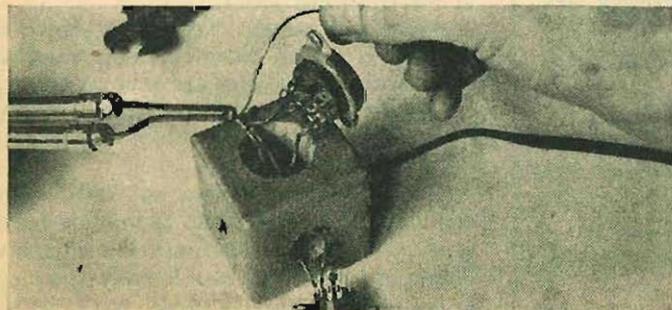


Tester is simplicity itself to use: simply plug Tester into outlet, tube into Tester.

have the proper-size bit, use it to avoid whittling time.

The last hole, the one for the octal socket, is drilled *half-way* through the cube, the side opposite remains solid. Use a 1-inch wood bit, then enlarge the hole with a round file or pen knife to take the octal socket if you can't get hold of an 1½-inch bit.

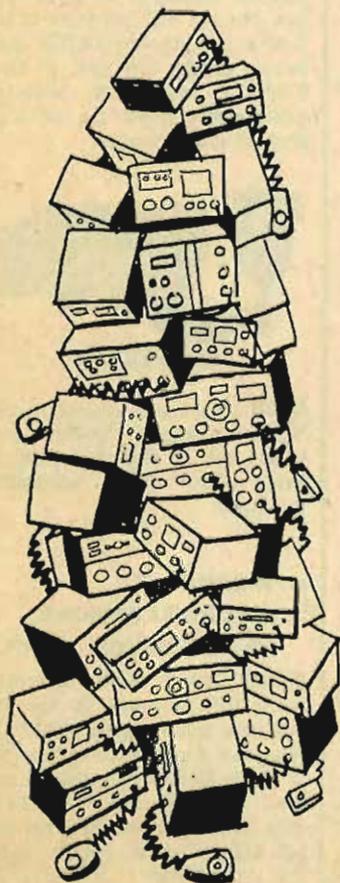
Wire the sockets and indicator lamp as shown in the schematic diagram. You'll have to solder leads (about 2 inches long) to the sockets and do the final connections inside
(Continued on page 109)



Wiring Tester is a trifle tedious because of cramped quarters, but circuit fortunately calls for only a very few connections. Be sure to use spaghetti or tape on bare leads to prevent possibility of shorts.

Introducing the . . . 1968 CB Base and Mobile Transceivers

Here it is . . .
your complete CB Directory
for base and mobile rigs!



HERE ARE CB transceivers you'll be seeing on dealer shelves or reading about in catalogs throughout 1968. These are full-power 5-watt sets designed for base-station use in the home, or mounted in a car for mobile operation. Most can be used either way. The trend, though, is decidedly toward the use of compact, all-transistor rigs for the automobile. They're easy to mount and usually pull less power than a car's dome light. And you can listen for hours with the motor shut off without emptying the car battery.

CBers seem to be split over what to buy for the base station. Some still swear by big tube sets, others like the space-age feel of the transistor models. Since power and size are rarely a factor in home operation, take your choice. When you buy a tube set, chances are it will have a built-in power supply that operates on either 117-volt house current (AC) or 12-volt DC from a car or boat. You merely change the power cord to make the switch. Transistor sets usually arrive equipped only for 12-volt DC operation. They need an optional AC supply to work at home.

The most CB channels you can get for a standard rig is 23. And there are many all-channel units described in the directory. If the set is a "frequency synthesis" type you won't have to buy additional crystals. But in some instances, there's a 23-position channel switch and empty crystal sockets (except for one channel supplied by the

manufacturer). If you wish to operate on other channels, you must purchase pairs of crystals—one for transmit and one for receive. This is also true of sets offering fewer channels, say 5 or 7. These figures mean that 5 or 7 switch positions are supplied, but you must install crystals on desired channels. Often, the manufacturer provides crystals for channel 9 or 11.

Prices shown in the following listing are

subject to some variation. It might pay to shop around. Also, lively competition between manufacturers produces an occasional price drop that might not be reflected in our directory.

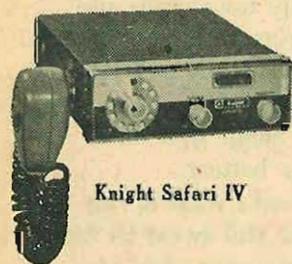
If some rig described on the following pages happens to strike your fancy, ask the manufacturer for more details. Many producers will supply colorful, informative brochures with complete specifications, accessories and options on their products. A list of CB manufacturers and their addresses is included in the **CB YEARBOOK**—check the *Table of Contents*.

1968 CB BASE AND MOBILE TRANSCEIVER DIRECTORY

● ALLIED RADIO CORP.

KNIGHT & KNIGHT-KIT

Safari IV. Safari's the word again this year from the Allied "Knight-kit" line with a host of solid-state CB sisters to back her up. Latest



Knight Safari IV

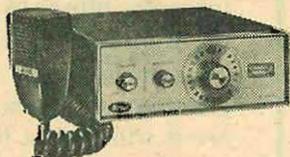
is the popularly-priced Safari IV at \$79.95 and equipped with a wide variety of power source capability. Completely transistorized, this 12-channel baby comes in kit form, though critical transmitter/receiver parts are preassembled.

Safari III. This rig's a 23-channel version that sells for only \$89.95 and is so small you can literally hold it in one hand. Completely solid-state, it keeps the 5-watt capability of all the Allied CB rigs and is available with a host of optional accessories. In kit form.

Safari II. Is perhaps one of the easiest kits to build yet, particularly attractive for the enthusiastic CB newcomer who'd like to "roll his own." Priced at only \$69.95 with 5-channel capability, the Safari II is within range of all pocketbooks.

A-2533. Now if you're not interested in lugging your set around town like a walkie-talkie, this rig's for you. Dubbed the A-2533, she's ready to go on any of the 23 CB channels and can be used on 12 VDC (for car or boat) and 117 VAC for use around the home. Solid-state? Sure. Priced at \$149.95, complete.

A-2530. Another year-round beauty that can be thrown in the car, run by batteries at camp, or utilized as a full-scale, 5-watt base station at home is the all-new for '68 A-2530 Allied CB rig. Complete with 10-channel capability. Price \$109.95.



Allied A-2533

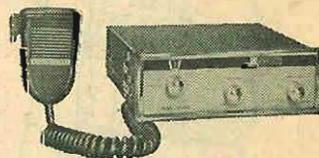
Safari I. The original Safari I continues to be a leader for the Knight-kit line of CB kits with a full 23-channel capability over the entire CB band. Priced at \$139.95.

A-2567. This one's pretty much like the preceding except that it does contain the frequently-desired lug-about capability of "universal operation." With complete power supply versatility and full 23-channel operation, she sells for \$179.95.

KN-2522. This is a deluxe 23-channel rig with an S-meter that'll operate

on house current or 12 VDC. Cost of this factory-wired unit is \$109.95.

KN-2520. Topping of the wired sets (yes, you can also buy them in kit form) is the 5-channel KN-2520 that was so popular last year. At only \$79.95 it comes with universal power supply, so you can use it at home or in the mobile.



Knight KN-2520

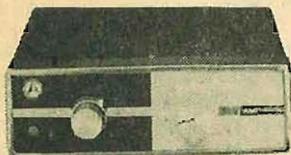
A-2507. Brand new this year is the \$89.95 12-channel KN-2507 mobileer, with 12 VDC input arrangements. Yep, she's solid-state throughout.

● AMERICAN RADIOTELEPHONE ELECTRONICS CORP.

Coming. Though they're not ready yet to spill the beans, we have inside-word that American Radiotelephone has a quite exciting new line of 5-watt Class D rigs ready to roll soon for 1968 sales. Suggestion: drop them a line and see if you can get KEJ5174 to fill you in. Worst that could happen is that you'd be the first to know when the production lines start churning out sets.

● AMPHENOL CORP.

Model 725. For a truly lightweight mobile rig, this one's worth looking into. She pumps in the full 5 watts on 8 channels and is all set to mount under your dashboard. Priced at \$109.95.



Amphenol 725

Model 675. Here's another mobile rig, sort of a 12-volt version of some of the others. With low-styled chassis and attractive packaging, the Amphenol 675 will function over the full CB spectrum on any 10 channels you like. Priced at \$159.95.

Model 650. Here's that handsome rig you've seen pictured in many magazines lately—in fact, ever since it came out a while back. It contains variable tuning (something becoming increasingly unusual these days), universal power supply, and 10-channel versatility. Priced at \$179.95, it'll look great in your den or library.

Model 625. Here's a rig that's so much like the Model 650 it's kind of hard to describe by itself, except to say that it doesn't have the variable receiving feature, but snaps into position on the desired channel of operation. With all the other desirables, she sells for \$169.95.

Model 600. An item Amphenol's been selling for some time now (quite successfully, too, it appears) the "600" is a 12-volt mobileer's delight. Has 10-channel capability on both receive and transmit, and is just the thing for the polished CBER with \$129.95 to spend.

Model 510-B. The tried-and-true 510-B continues to be a big item for Amphenol, even though it was one of their first CB entries. Smartly designed for the discriminating user, the 510-B sells for \$129.95, comes with a universal power supply arrangement, and functions over 10 CB channels.



Amphenol 625

Model 500-1. For a limited time only, Amphenol's trusty CB Division is making available an 8-channel CB rig you can carry about without breaking your shoulder. Essentially a modified version of the popular 510-B, this baby is completely self-contained and portable. Price? \$139.95.

● APELCO COMPANY

AR-16. Versatile power provision equips this one for any type operation. Comes with 12 VDC supply, but 32 VDC and 117 VAC plug-ins are available. With 10-channel capability and pushbutton operation, cost is \$159.95.

AR-15. Designed mainly for marine CB as a base station at a yacht club, gas dock or marina, the AR-15 is a 9-channel set operating on 117 VAC. There's no dangling cord since the speaker doubles as the microphone. Price is \$99.95.



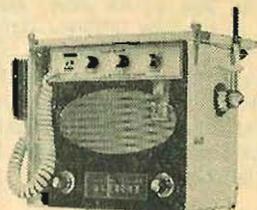
Apelco AR-15

565. In a book-size cabinet, the 565 is a solid-state 5-channel rig primarily for marine work. Gimbal bracket is supplied for convenient boat mounting. With one set of crystals for channel 11, price is \$129.95.

● AUTOMATIC RADIO MFG. CO.

TRE-6500. Designed to mount on a farm tractor this entry is an unusual rig. It's a full-power (5-watt) 2-channel CB transmitter and receiver as well as a regular AM radio. Contains all desired CB features, plus a rare

10-watts of audio output from either receiver. Although she comes with 12-volt DC power supply, a 117-VAC version is also available. Price not known at press time.



Automatic Radio TRE-6500

● AUTRONICS CORP.

Buddy. Though not as yet well known on a national scale, Autronics has an extensive line of tube-type CB gear which includes this leading model. Containing—get this—17 tubes and providing full 23-channel versatility, the Buddy is a 117-VAC base station job with S-meter and all the rest. Price not available at press time.

TX-11B. Another 23-channel CB rig is the Autronics TX-11B that contains 7 tubes and sells for \$124.95. Essentially a base station, the set can be adapted for portable use in the field or mobile through use of a power inverter.

RC-11B. A complex set that provides a great degree of sophistication, the Autronics RC-11B is a 6-channel rig designed solely for use as a base station. With everything, \$179.95.

Spartan. A versatile CB set that can be used both at home and in the car, the Spartan works over any 4 CB channels and is a combination tube, transistor and diode transceiver. With 12 VDC and 117 VAC power supplies, it can be yours for \$149.95.

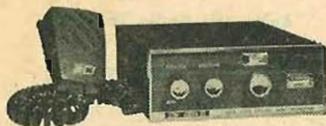
Deluxe. Sort of a little sister to the Buddy, the Autronics Deluxe contains both a mobile and AC power arrangement and affords the CB enthusiast 10-channel operation. Also a mixture of vacuum tubes and solid-state components, she sells for \$169.95.

● B&K MANUFACTURING CO.

Cobra 23. The newest of the B&K

CB DIRECTORY: B-H

transistorized transceivers, the Cobra 23 is a swinging mobile rig for the CBer on the move. Along with all the other features—including full 23-channel operation—the Cobra 23 allows you to peak the transmitter's output for best overall performance to your particular antenna setup. It can be yours for only \$169.95.



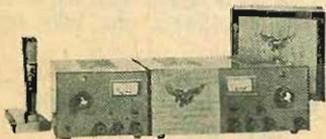
B&K Cobra 23

Cobra V. A sort of scaled-down version of the "23," the B&K Cobra V is just that: a five-channel mobile (12 VDC) CB rig. Solid-state throughout, the transceiver sells for \$99.95 complete.

CAM-88. Topping off the B&K lineup is the first rig so far described that sells over \$200, marking its entry as one of those that represent hot items for the dyed-in-the-wool CBER who knows the ropes. With universal power supply capability, this 23-channel rig offers considerable features as a base station transceiver or in the car. Price: \$214.95.

● BROWNING LABORATORIES, INC.

Golden Eagle. Here's where a manufacturer took a super CB station and stepped it up in quality and features. The Golden Eagle supersedes the Eagle with many of the former features retained and many desirable new features added. A Collins mechanical filter brings over 80 dB adjacent-channel rejection to the receiver. Unit has facilities for paging and remote speakers with separate volume controls. Price, complete with microphone: \$395.00.

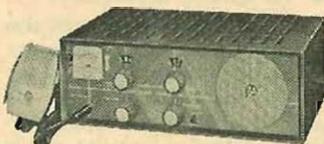


Browning Golden Eagle

The Eagle. A hefty two-part professional CB station for the discriminating base operator, the Browning Eagle offers every describable feature a CB rig can have. Featuring dual oscillator convertor for selectivity and a host of "specials" too numerous to go into here, this station complex (touted as "the ultimate CB rig") sells for \$359.00. Your best bet is to write to the manufacturer and get all the dope.

● BURSTEIN-APPLEBEE

BA-23X. Both 117 VAC and 12 VDC supplies are in this 23-channel tube-type transceiver. Comes with crystals for all 23 channels. Spotting switch lets you calibrate the continuously-tuned receiver. Cost: \$119.95.

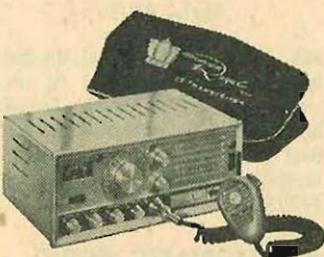


Burstein-Applebee BA-23X

BA-8. This 8-channel rig has a tunable receiver and front-panel socket for quick-change of transmit crystal. Can be used in car or home. The tab is only \$79.95.

● COURIER COMMUNICATIONS, INC.

Courier Royale. A CB rig fit for a king (or maybe your boss)? Well that's what the White Plains firm is saying about their custom-built tube set, the Royale. With a Collins mechani-



Courier Royale

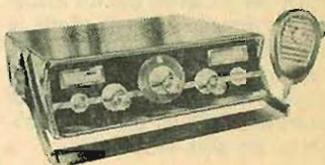
cal receiving filter and many, many extras, the Royale can run either in the car or house (or both) and work over the entire CB band. Priced at \$249.00.

Courier 23. This famous e.c.i rig (they've changed their name now to Courier Communications) has been slashed more than \$20 this year to an amazing \$169.00, yet it still retains all the features that made it appealing a while back. Full 23-channel operation, power versatility, the works.

Courier 23-Plus. New from the company this year is the Courier 23-Plus, another tube transceiver very similar in design to the popular "23." This one, however, contains a souped-up receiver guaranteed to hear anything that's on the band at the moment—no matter how far away. Price? \$189.00, just 50¢ cheaper than the Courier 23 used to be.

Courier Classic. Aha! Guaranteed for 10 years, they say? You bet. This transistorized compact unit is designed for long-term mobile use and will get you on all 23 CB channels in a jiffy. Priced at \$189.00 with an optional power pack for carry-about versatility in the field.

Courier TR-23S. Seems they all start with "Courier" . . . hmm. (No wonder they changed their name). Another guaranteed 23-channel rig, this one's a base operator's delight, and styled for maximum good looks in the den. Priced at \$169.00.



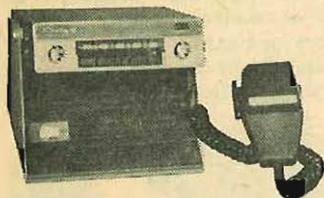
Courier TR-23S

Courier TR-5. If you haven't guessed by now "TR" means transistor, and this one's got plenty. Ideal for the young fellow just getting started, the TR-5 provides 5-channel capability, works on regular house current, and can be had for a mere \$99.00.

● CRAIG PANORAMA, INC.

Craig 4301. Hot off the presses—or production lines as it were—is this company's first entry into the Class D 5-watt CB world. The new

Craig 4301 is designed primarily as a mobile item, and provides 5 channel operation on the band. Want AC power too? Look into the Model 9212 power supply, an optional item. This solid-state transceiver is priced at \$99.95.



Craig 4301

● **DEMCO ELECTRONICS, INC.**

Satelite. This progressive midwestern firm continues to make inroads into upper-echelon CB circles with this item, truly a custom-tailored rig. Available in a wide variety of versions depending upon the features you select (many accessories also to complement the Satelite), the deluxe version goes for around \$395.00.

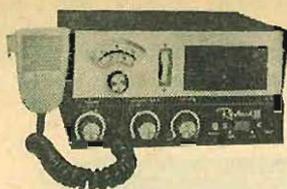


Demco Satelite

Chalet. This popular \$129.50 CB transceiver can be purchased with any number of accessories, or simply purchased "as-is" and utilized on any six standard CB channels. Designed for operation in the car (12 VDC), the Chalet is completely solid-state and ready to put on the air.

Ravelle. Here's a genuine Demco that you can use just about anywhere. With a universal power supply configuration, she blasts her 5-watts onto whatever 6 CB channels you pick. Priced at \$134.50.

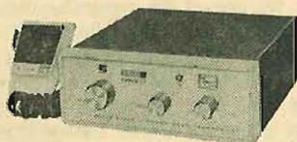
Ravelle 23. Hardly requiring any explanation, this big brother to the Ravelle puts you on the air over the entire 23-channel band. With identical power features, the Ravelle 23 makes a handsome base station or mobile rig—take your choice. Priced at \$224.50 complete.



Demco Ravelle 23

● **EICO ELECTRONICS INSTRUMENT CO., INC.**

Nova-23. Amid the flurry of excitement in that all-but-unprintable city where EICO is headquartered we've learned that their all-new Nova-23 CB transceiver is literally selling like hotcakes. With heavy emphasis on the receiver section and transistors throughout the rig, the set comes with 12-volt mobile supply and offers the user full 23-channel versatility. If you want AC, you can get this too: Just ask for the Model 791 power supply. The Nova-23 goes for \$189.95.



EICO Nova-23

Sentinel 12. Moving to EICO's tube sets, which have been dependable transceivers for a long time now, the Sentinel 12 is a versatile 12-channel 5-watter that sells for only \$99.95. Though EICO's famous for its electronic kits, all these sets come completely wired and ready for on-the-air action.

Sentinel Pro. Pretty much the same as the "12," only expanded for full 23-channel capability, the EICO Sentinel Pro is still a big-selling rig over the counters. With literally everything, she sells for \$169.95 complete.

● **GC ELECTRONICS CO.**

Master. Topping off GC's line of tube-type Class D CB equipment is the Master, a hefty transceiver that is available in two models: one for operation on 117 VAC and 12 VDC and the other for 117 VAC and 6 VDC (in case there are any old VW's

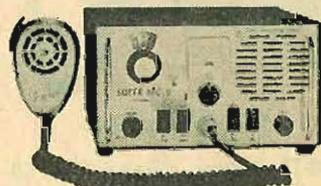
still kicking around). With 11-channel capability and a variable-tuned receiver, the Master checks in at \$229.95 either way.

Star. This set's been around for some time, yet is still provoking interest in CB circles. With 5-channel provision the receiver is a double-conversion, and (overall) the Star is said to put forth "16-tube power." Price is not available at press time.

President VIII. A 12-tube CB set with built-in P.A. system, the President VIII bows in with all the extras (yes, it has an S-meter). With universal power supply, the set's designed for 8-channel transmit and tunable receive. Price not available at press time.

● **GENERAL RADIO-TELEPHONE CO.**

Super MC-9. The tried-and-true "General" has been revamped, modified, and updated for 1968 in the form of the Super MC-9. With improved circuitry, increased receiver selectivity, a new fine-tuning control and lots more, she sells for \$189.50 complete.



General Super MC-9

VS-6. This ruggedized 5-channel transceiver which General built "to take a beating" is popular with a lot of CBers. With 5-watts input and standard rig features, the General Radiotelephone VS-6 comes complete with universal power supply for a modest \$89.50.

● **THE HALLICRAFTERS CO.**



Hallicrafters Reactor III (CB-24)

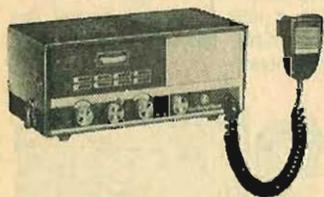
CB DIRECTORY: H-L

Reacter III (CB-24). Essentially a somewhat beefed up (23-channel) version of the slim unit described below, the Hallicrafters Reacter III sells for \$199.95.

Reacter II (CB-21). Hottest item from Hallicrafters for '68 is their sleek new Reacter II, also known in manufacturers' circles as the CB-21. An eight-channel solid-state CB transceiver, the Reacter II contains 17 transistors. With 12-volt power supply, she sells for \$139.95.

CB-20. Hallicrafters' 5-channel 12-volt rig is still captivating many CBers. Sells for \$99.95 complete.

CB-19. An eight-channel versatile unit, the CB-19 makes a dandy base or mobile station requiring no optional power supply add-ons to do the job. Receiver can be tuned variably. Priced at \$149.95.



Hallicrafters CB-19

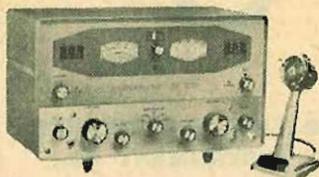
CB-17. Another universal type CB unit, this one can also be used in the car or as a base station. With 6-channel transmit and receive, she's a good-looker and priced to move at \$99.95.

PS-20. If you haven't guessed already, "PS" in the minds of many means power supply, and Hallicrafters cleverly makes one to use on any of its non-117-VAC-equipped CB rigs to convert them to reliable base or fixed stations. Price? Why, it's only \$34.95.

● HAMMARLUND MFG. CO.

CB-205. An unusual base unit that's been revamped for the 1968 market, the Hammarlund CB-205 is a combination shortwave receiver (540 kHz-30 MHz) and CB transmitter with

full 5-watt capability. With 6-channel transmit and full-band tunable receive, the unit contains its own receiving Q-multiplier. Priced at \$259.95.

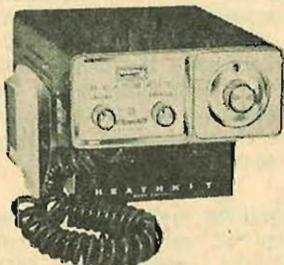


Hammarlund CB-205

● HEATH COMPANY

GW-22A. Essentially a carry-over from years past, this unit continues to be a big seller for Heath and quite popular with younger CBers. A tube set you can put together yourself, the 5-channel rig can be purchased as a mobile unit for \$49.95, or as a 117 VAC base station for \$47.95.

GW-14. Heath continues popularity on its line of CB transceiver kits with this unit, an all solid-state 23-channel rig. With 14 transistors and complete instructions for rolling your own, the entire package can be had for \$76.95, slashed from last year's \$89.95. Comes with 12 VDC power supply for mobile purposes.

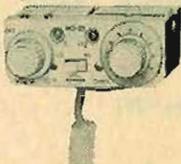


Heathkit GW-14

GW12A. A complete 5-watt CB transceiver for \$34.95? You bet, with this Heathkit best-seller. It comes with crystals for any single channel you choose and with its own built-in AC power supply for just under \$35.00. Of course if you'd rather build yours as a mobile talkie, send them \$39.95 and you'll get the AC and DC universal supply. Gee, it's great to be handy.

● INTERNATIONAL CRYSTAL MFG. CO., INC.

Model MO-23. Here's the only remote control CB rig you can buy this year—International's new MO-23 combination tube and transistor mobile transceiver. Designed to be trunk-mounted with only the control head and microphone under the dash, the 12-volt set will put you on all 23 channels. Priced at \$210.00.

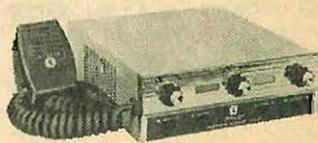


International Crystal MO-23

Model 660. In a standard package, this rig tunes any channel from 1 to 23. An illuminated channel selector has 12 positions, but a HI-LO switch sets it up for 1-12 or 13-23. A built-in power supply covers 6 and 12 VDC, as well as house current. With crystals, mike and AC power cord, the 660 is priced at \$205.00.

● E. F. JOHNSON CO.

Messenger 350. Like no other, this transceiver affords many unusual features, not the least being its single sideband (SSB) transmit/receive capability. With 2-channel transceiving capability, she is completely transistorized and designed for operation in the car. Complete price, \$299.95.

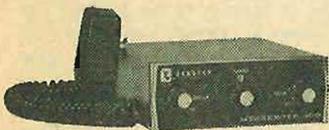


E.F. Johnson Messenger 350

AC Supply. All the Johnson Messengers can be base-stationed in a jiffy with the addition of a handy 117 VAC power supply. This unit costs \$32.95.

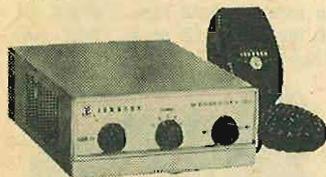
Messenger 323. Ever see so many Messengers? Well even this dandy unit isn't the last of them. Perhaps one of the most versatile Johnson rigs, the Messenger 323 will put you on all 23 channels and is just the ticket for the more sophisticated mobileer. Solid-state throughout, she sells for \$229.95.

Messenger 300. With double the channel capability of the Johnson Messenger 100, this popular transceiver provides the full 5-watt input power of the entire company line and is transistorized throughout. Receiving? The best ever, with a thoroughly souped-up section with greatly improved selectivity. With 12-volt supply, she sells for \$189.95.



E.F. Johnson Messenger 300

Messenger 110. With speech compression, plenty of transmit/receive pizzazz and complete with a 14-transistor circuit, the all-new Messenger 110 is the latest rolling off the Johnson production lines. With 5 channel construction, it's priced to move at \$99.95. (Mobile 12-volt supply.)



E.F. Johnson Messenger 110

Messenger 100. More solid-state marks this medium-priced Johnson unit. Also designed primarily for use in the car, the set provides 6-channel operation and sells for \$129.50.

Messenger III. Looking for an all-transistorized mobile rig? This may be it. It's Johnson's 12-channel CB transceiver, popular last year and probably will continue to be a hot item throughout 1968. Priced at \$159.95 with 12-volt power supply.

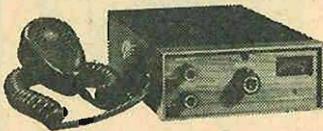
Messenger II. Sort of a souped-up version of its predecessor, the "II" will put you on any ten of the 23 available CRS channels for a mere \$149.95. Oh yes, she's equipped with a universal power supply.

Messenger I. The famous 5-channel Messenger I is still being manufac-

tured this year, and comes with all the known Johnson features including universal power supply. Priced at \$99.95.

● KAAR ELECTRONICS CORP.

Skyhawk Mark II. A sleek, new transistorized CB rig designed for 12-volt operation, the Kaar Mark II has full 23-channel transmit/receive capability and is so small it can be comfortably held in one hand. With a 2-year guarantee and your choice of seven color panels (even includes a wood grain panel for your den or library), the exciting set sells for \$219.95. Base station pedestal and regulated 117 VAC power supply for the Skyhawk Mark II and the Skylark models can be had for \$39.95.

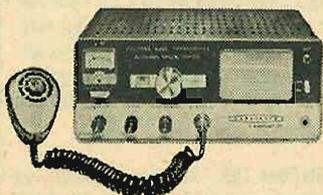


Kaar Skyhawk Mark II

Skylark. Little sister to the unit described above, this one also has the choice of front panel colors at no extra charge. Ruggedly constructed and solid-state throughout, she provides 11-channel capability at the full 5-watt input rating. Priced at \$179.95.

● LAFAYETTE RADIO ELECTRONICS CORP.

Comstat 25A. Known as the top of the Comstat line to Lafayette addicts, the 25A has been completely redesigned for 1968. With 23-chan-



Lafayette Comstat 25A

nel transmit/receive capability and equipped with universal power supply, the attractive transceiver sells for \$139.95.

Comstat 23. All crystals are supplied with this 23-channel tube-type transceiver. It works on 117 VAC (or 12 volts with an optional adaptor). Receiver section has dual conversion for sharp reception, and an output jack for tape recording signals. Cost is \$114.95.

Comstat 19. Mid-range in the Comstat line is the 9-channel Comstat 19, which comes ready to operate as a base station with its own 117 VAC supply. Also slashed in price for '68 (about \$10, in fact), this transceiver now sells for \$59.95.

Comstat 9. This popular little 9-channel CB rig has been slashed in price for 1968 sales, yet retains all the features that originally were responsible for wide acceptance in CB circles. In kit form and with a universal power supply, she now sells for \$54.95.

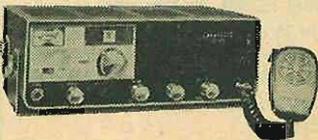
Telstat-23. All-channel operation is possible with the Telstat. And it's ready to go on either 117 VAC or 12-volt mobile. Inside are 17 transistors and an IC which brings the total to 22. Rig is complete for \$159.95.

HB-625. You get all channels with this one, plus an elaborate 3-stage noise silencer and IC microcircuit for "Range Boost." This 12-volt all-transistor set is priced at \$189.95.



Lafayette HB-625

HB-600. Felt by many to be the ultimate CB rig around these days, the HB-600 boasts a selective receiver and powerful transmitter section as well as universal power supply. With full 23-channel possibilities, all crystals are supplied at time of purchase. Priced at \$219.95.



Lafayette HB-600

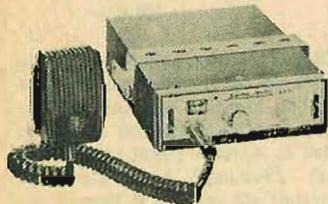
HB-555. Another sleek-line transistorized rig (14 transistors, in fact), the 555, has been slashed to \$89.95 this time around. With mechanical filter, 12-channel capability, and built-in mobile power supply, the HB-555 puts in an attractive appearance.

HB-525C. A CB transceiver using IC's (integrated circuits)? You bet, and Lafayette Radio has it. Dubbed as the "electronic miracle of the space age," the new IC transceiver comes with all 23 CB channel crystals supplied, something quite unusual these days. With 23-transistor construction and built-in 12-volt supply, the HB-525C is priced at \$149.95 complete.

HB-23. This compact solid-state rig boasts an IC—an integrated circuit of pinhead size to boost performance. You'll also find a mechanical filter to sharpen reception and a 23-channel selector. Supplied with crystals for channels 9, 13, and 19, the HB-23 goes for \$99.95. Too, there's an all-channel version for \$124.95. Works on 12 VDC, but an AC pack is available.

● MIDLAND INTERNATIONAL CORP.

Model 13-870. The most versatile of all the Midland Class D sets is this 23-channel mobile transceiver, which the firm is selling through many U. S. over-the-counter outlets for \$149.95. Completely transistorized, you can also use it as a base station if you buy the company's AC power supply, Model 18-805.



Midland Model 13-870

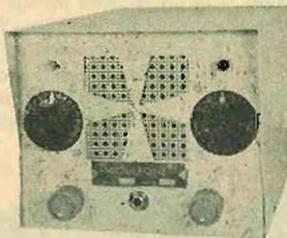
Model 13-860. Another mobileer's delight is this model, sort of a souped-up version of the 13-150 described below. With 12-channel transmit/receive operation, she clocks in at \$99.95.

Model 13-150. Several new imported

CB rigs are being made available for the first time in 1967-68 by Midland, including this completely transistorized 8-channel transceiver. With 12-volt mobile supply, she sells for \$84.95, complete.

● MOBILEFONE

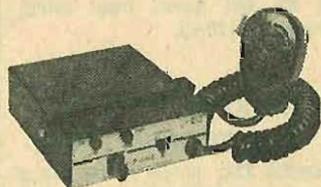
Model 27. Can't tell you the price on this one (unavailable at press time), but suffice it to say that Mobilefone's CB entry contains a universal power supply, is essentially a tube-type set, and has full 23-channel transmit/receive capability.



Mobilefone Model 27

● MULTI-ELMAC CO.

Citi-Fone II. The exciting rig that started the big boom in low-cost Project HELP type operation is at it again this year with its ever-popular Citi-Fone II. Not a transceiver and not a walkie-talkie, the unique unit is designed for installation under the



Multi-Elmac Citi-Fone II

dash. Press a switch, and your AM auto radio converts to a CB receiver. Press another switch (your push-to-talk button), and you're on the air. Solid-state throughout, this unique set is priced to move at \$49.95 and ready for 2-channel transmit.

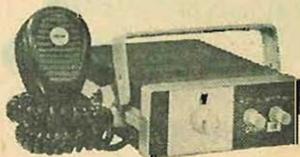
Citi-Fone 99. Another popular rig being brought back to the forefront this year is Multi-Elmac's Citi-Fone 99, an 8-channel 5-watter that comes complete with universal power supply, for operation both at home and in the family buggy. Priced at a low \$99.95.

Citi-Fone SS. A souped-up version of the "99," this set has everything Multi-Elmac can offer, including full 23-channel operation. With universal power supply, the tab is \$169.95.

● OLSON ELECTRONICS, INC.

Olson 8. We do not know whether that "8" refers to the set's \$80 price tag, or perhaps to the 5-watter's 8-channel transmit/receive capability, but we can tell you that it's completely transistorized and ready to mount under the dashboard of your buggy. Pay an extra 1¢, and Olson will throw in 5 sets of crystals!

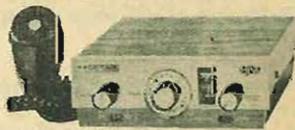
Olson 12. Well, this one does not sell for \$120, but it does provide 12-channel operation over the entire 27 MHz CB band. With squelch and P.A. facilities, the set is designed primarily for 12 VDC operation. As with the above, this one also comes with a 1¢ offer: three sets of crystals. Priced to move at \$99.95 complete. The CB-77 117 VAC power supply can be used to make base stations out of the Olson 12 or 8. Costs only \$19.95.



Olson 12

● PACE COMMUNICATIONS CORP.

Pace 2300. Topping the new ones from Pace this year is the Pace 2300, a set that comes complete with all 23 transmit and receive crystals, a rare item these days. With P.A. facility, squelch, and a host of others, the all-transistor set bows in big at \$219.95.



Pace 2300

The Pace Plus-23. Another? Unbelievable. Yes, this unit, too, comes with all the crystals you'll ever need for full-band 23-channel operation. Similar to the above, only not con-

taining the 2300's local/long distance receiving feature, the Plus-23 bows in at \$199.95. Solid-state, natch.

Pace 200. What a line of new rigs! With 12-channel capability, this sleek solid-state CB rig contains the P.A. feature and many others, including "S" meter. Attractively finished, she sells for \$159.00.

Pace 100. Moving down the price scale a smidgen, we come to Pace's new 6-channel rig (comes with a channel 11 crystal). Less the P.A. and local/distance switches of the Pace 200, this one sells for \$129.95. Transistors throughout.

The Auto-Mate. Here's another unusual set that converts your car radio into a full-scale CB receiver at the flick of a switch, and also provides push-to-talk 5-watt transmitting from an under-the-dash adaptor. Priced to move at \$69.95.

● PEARCE-SIMPSON, INC.

Director 23. Heading the Pearce-Simpson roster is the low-silhouette Director 23, which comes with all required crystals for full-channel usage of the set on 27 MHz. With "4 watts" output assured by the manufacturer, the set employs HetroSync[®] frequency synthesizing techniques, an exclusive with this company. With 12 volt DC power supply built in (a host of accessories are available for all P/S gear), this solid-state unit goes for \$269.90.

Guardian 23B. Another \$269.90 top-of-the-line entry, this set employs nuvistors for a super-sharp, double-conversion receiver. With universal power supply, this set comes complete with all the crystals you'll ever need on CB. Has a host of features and optional accessories.



Pearce-Simpson Guardian 23B

Companion II. This middle-priced CB set comes with a telephone-type handset instead of conventional push-to-talk mike for an extra \$5.00,

or with regular carbon hand mike if you'd rather go the regular route. Tunable receive, with 5 fixed transmit/receive channels. Output is said to be on the order of "3.5 watts" and the set comes with built-in universal power supply. Price: \$159.90.

Companion IV. Another set that offers an optional telephone handset mike (no extra charge for this one), the Companion IV is a 10-channel solid-state unit with many extra features. Essentially a mobileer's delight, it is said that it "will operate even when the battery is too low to start the car." Priced at \$139.90.



Pearce-Simpson Companion IV

Sentry II. One of the hottest little rigs going, P/S's Sentry II is completely solid-state and will accept that extra feature of a telephone handset if desired. It's equipped for 5-channel operation, is lightweight, and is said to plunk out "4 watts into a 52-ohm load." A 12-volt model, it affords the same low-voltage operation as the Companion IV, since it will run on only 9 VDC if required. Priced at \$99.90.



Pearce-Simpson Sentry II

● POLYTRONICS COMMUNICATIONS

Poly-Comm 23C. This versatile Polytronics rig tops the list of new items from Silver Spring, with full 23-channel capability, completely transistorized construction throughout, and quite attractive packaging. With a souped-up receiver section, the unit's been designed to retail for \$199.50, complete with built-in 12-volt mobile supply.

Poly-Comm 23. The big brother of the Polytronics CB sets has for a

long time been this unit, which is available in a series of models priced from \$299.50 to \$379.95, depending upon the features you want. Basic set is tube design (including nuvistors), 23-channel construction, and includes "exclusive spectramatic tuning." With universal power supply, P.A. facility.



Polytronics Poly-Comm 23

Poly-Pup. This little cutie has been revamped for the big '68 market and is an attractive model to boot. Comes with 7-channel versatility and mobile supply, though you can go AC for an additional \$29.95 investment in Polytronics' power converter. Transistors throughout, she sells for \$149.50.



Polytronics Poly-Pup

Poly Otter. Billed as the first CB rig for motorcycles, this one is sealed against the elements and bolts to the bike's rear rack or replaces one saddle bag. It's remotely controlled from the handlebars and features 7-channel operation. Price of this 5-watter is \$199.50.

Utility 5. Rugged aluminum case and weatherproofing equip this 5-watt portable for heavy-duty industrial use in the field. With special rechargeable batteries, this workhorse prices out at \$259.95. A similar model for ranch or farm, the Poly-Communicator is priced at \$243.95.

● RADIO SHACK CORP. (REALISTIC)

Americana 23-Plus. This entry tops the Radio Shack line this year and includes all crystals (one of very few transceivers that do), for full 23-channel operation. Includes uni-

CB DIRECTORY: R-S

versal power supply, metering, and a host of extra features. Selling price: \$169.95.



Realistic Americana 23-Plus

TRC-24. Another solid-state newie, the TRC-24 is one of the best mobile buys going. It is a full 23-channel transceiver, yet costs only \$139.95.

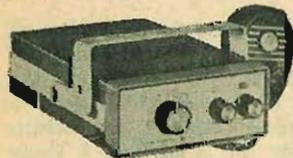


Realistic TRC-24

TRC-18. One of Radio Shack's newest items, the "18" affords you 12 channels of operation with a built-in 12-volt DC power supply. Transistorized throughout, she costs \$99.95.

TRC-15. Here's an all-solid state rig for you mobileers. With 12-channel transmit/receive capability and built-in 12-volt power supply, the TRC-15 (a slim-line styled rig) bows in at \$88.44.

TRC-14. Is strikingly similar to the one above, though this one is equipped for 8-channel operation. An American-made mobile set, the TRC-14 is completely solid state (13 transistors, 4 diodes) and retails at \$79.95.



Realistic TRC-14

● RAYTHEON (RAY-TEL) COMPANY

TWR-11. Newest from Raytheon is their glistening "super-star transceiver," the TWR-11, pictured in ads at Tiffany & Co. jewelers with a girl

in leopard-skin jacket. Ten-channel operation, 12-volt DC power supply, host of options. The set is solid-state throughout and sells for \$159.95 complete with push-button tuning.

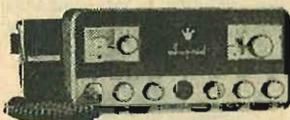


Ray-Tel TWR-11

TWR-9. One of many more in this series being continued into 1968, the TWR-9 is a six-channel radio with base station application capability, due to its handy built-in 117 VAC power supply. Smartly styled, she sells for \$99.95 complete.

● REGENCY ELECTRONICS, INC.

Imperial. Another rather unusual entry is the Regency Imperial, subject of many lavish 4-color ads recently. Why is it unusual? Because it's one of very few SSB (single sideband) transceivers on the market. Actually transmitting double-sideband, it can receive either one, hence a total effect of providing 46 usable CB channels! Otherwise, it's very much like the Range-Gain II. Priced at \$299.00 complete.



Regency Imperial

Range-Gain II. A nifty 23-channel double sideband transceiver (DSB), the Range-Gain II comes with universal power supply (so you can go mobile if you like). Priced at \$235.00 complete.

Ranger. A medium-priced mobileer's rig, the Regency Ranger offers the prospective buyer 11 channels, 12-volt power supply, and solid-state construction throughout. A handsome rig, it sells for \$175.00.

Charger. Here's a delight of a 12-channel CB rig designed expressly for the CBER on the go. With built-in 12 VDC power supply and full 5-

watt capabilities, the Charger is completely solid state. Priced at \$110.00.

Pacer II. Previously part of the "Metrotek" line of medium-priced equipment, the Pacer II is now considered a full-fledged Regency product (as are the next two transceivers). It's an 11-channel base or mobile (or both, since it has a built-in universal power supply) CB rig, priced to move at \$110.00.

Bronco. The most inexpensive of all the present Regency CB models, the Bronco is an all-transistor 8-channel rig with all the extras you'd want for the price. With built-in 12 volt power supply, she sells for \$89.95.

● ROBYN COMPANY

Robyn 24 Range Gainer. With a name like that, it has to be good. With full 23-channel capability, this set looks like a hot one. Comes with universal power supply built right in; priced to sell at \$189.50.

Bronco 7 Plus 4. Everybody's got a "plus-something" lately, and Robyn's not going to let a good thing get away either. This one's a hot new all-transistor CB rig with 11 channels of operation on the 27 MHz band. Designed for use in the family buggy, it has an interesting feature of using the microphone as a private listening speaker when the user so desires. Priced at \$139.50.

● SONAR RADIO CORP.

FS-23. Frequency synthesis is used in this 23-channel tube rig to obtain one-control switching. Selective call is easy to add later if you need this feature. Cost is \$299.95.



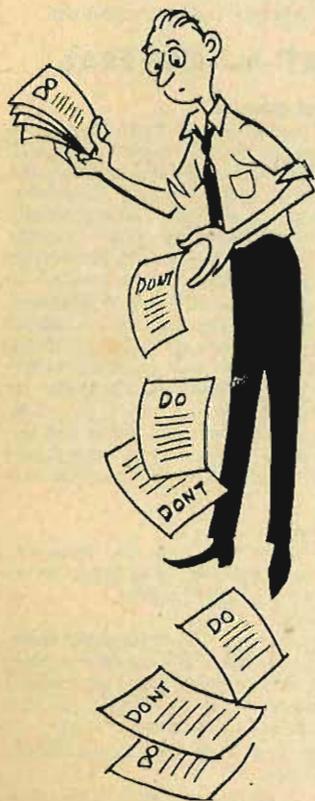
Sonar FS-23

I-23. A brand-new-for-1968 entry from Sonar is this tiny transistorized CB transceiver, dubbed the I-23. It
(Continued on page 110)

SPECIAL BONUS!

Complete CB Rules & Regs

Here's all of FCC Part 95, plus complete data for Canadian licensees as well as U. S. tourists who wish to operate while in Canada



YOU CAN'T tell the players without a scorecard, and you can't play the CB "game" without one, either. True, CB's scorecard is a mite more complicated than the ones they pass out for the World Series. But it's so basic you can't *legally* play the CB game without one.

The "scorecard" for CB is, of course, Part 95 of the Federal Communications Commission Rules and Regulations. Every applicant for a CB license must certify that he has (or has ordered) a current copy of Part 95 and that he has "read and understood" the provisions of subpart D. What's more, every licensee "shall maintain as part of his station records a current copy of Part 95" (Section 95.105, Vol. VI, FCC Rules and Regulations).

Purchased from the U.S. Government Printing Office, a copy will cost you \$1.25. But we have included one here as a free bonus to all purchasers of the 1968 CB YEARBOOK. And that isn't all. Also included for the benefit of Canadian readers are the complete regulations issued by the Canadian Department of Transport for the General Radio Service. And U.S. citizens planning a visit to Canada will find DOT's Tourist Radio Service Regulations reprinted in their entirety.

For future changes or modifications to these rules and regs, we suggest you follow CB features in our sister publications, RADIO-TV EXPERIMENTER and ELEMENTARY ELECTRONICS. In the meantime, good CBing! (Turn page)

CB FCC RULES AND REGULATIONS

Part 95—Citizens Radio Service

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SUBPART A—GENERAL

§ 95.1 Basis and purpose.

The rules and regulations set forth in this part are issued pursuant to the provisions of Title III of the Communications Act of 1934, as amended, which vests authority in the Federal Communications Commission to regulate radio transmissions and to issue licenses for radio stations. These rules are designed to provide for private short-distance radiocommunications service for the business or personal activities of licensees, for radio signaling, for the control of remote objects or devices by means of radio; all to the extent that these uses are not specifically prohibited in this part. They also provide for procedures whereby manufacturers of radio equipment to be used or operated in the Citizens Radio Service may obtain type acceptance and/or type approval of such equipment as may be appropriate.

§ 95.3 Definitions.

For the purpose of this part, the following definitions shall be applicable. For other definitions, refer to Part 2 of this chapter.

(a) Definitions of services.

Citizens Radio Service. A radiocommunications service of fixed, land, and mobile stations intended for short-distance personal or business radiocommunications, radio signaling, and control of remote objects or devices by radio; all to the extent that these uses are not specifically prohibited in this part.

Fixed service. A service of radiocommunications between specified fixed points.

Mobile service. A service of radiocommunications between mobile and land stations or between mobile stations.

(b) Definitions of stations.

Base station. A land station in the land mobile service carrying on a service with land mobile stations.

Class A station. A station in the Citizens Radio Service licensed to be operated on an assigned frequency in the 460-470 Mc/s band and with input power of 60 watts or less.

Class B station. A station in the Citizens Radio Service licensed to be operated on an authorized frequency in the 460-470 Mc/s band and with input power of 5 watts or less.

Class C station. A station in the Citizens Radio Service licensed to be operated on an authorized frequency in the 26.96-27.23 Mc/s band, or on the frequency 27.255 Mc/s, for the control of remote objects or devices by radio, or for the remote actuation of devices which are used solely as a means of attracting attention, or on an authorized frequency in the 72-76 Mc/s band for the control of model aircraft only.

Class D station. A station in the Citizens Radio Service licensed to be operated on an authorized frequency in the 26.96-27.23 Mc/s band or on the frequency 27.255 Mc/s, with input power of 5 watts or less, and for radiotelephony only.

Fixed station. A station in the fixed service.

Land station. A station in the mobile service not intended for operation while in motion. (Of the various types of land stations, only the base station is pertinent to this part.)

Mobile station. A station in the mobile service intended to be used while in motion or during halts at unspecified points. (For the purposes of this part, the term includes hand-carried and pack-carried units.)

(c) Miscellaneous definitions.

Antenna structure. The term "antenna structure" includes the radiating system, its supporting structures, and any surmounting apertures.

Assigned frequency. The frequency appearing on a station authorization from which the carrier frequency may deviate by an amount not to exceed that permitted by the frequency tolerance.

Authorized bandwidth. The maximum width of the band of frequencies, as specified in the authorization, to be occupied by an emission.

Bandwidth occupied by an emission. The band of frequencies comprising 99 percent of the total radiated power extended to include any discrete frequency on which the power is at least 0.25% of the total radiated power.

Control point. A control point is an operating position which is under the control and supervision of the licensee, at which a person immediately responsible for the proper operation of the transmitter is stationed, and at which adequate means are available to aurally monitor all transmissions and to render the transmitter inoperative.

Dispatch point. A dispatch point is any position from which messages may be transmitted under the supervision of the person at a control point.

Harmful interference. Any emission, radiation or induction which endangers the functioning of a radio-navigation service or other safety service or seriously degrades, obstructs or repeatedly interrupts a radio-communication service operat-

ing in accordance with applicable laws, treaties, and regulations.

Landing area. A landing area means any locality, either of land or water, including airports and intermediate landing fields, which is used or approved for use for the landing and take-off of aircraft, whether or not facilities are provided for the shelter, servicing, or repair of aircraft, or for receiving or discharging passengers or cargo.

Man-made structure. Any construction other than a tower, mast or pole.

Person. The term "person" includes an individual, partnership, association, joint-stock company, trust or corporation.

Remote control. The term "remote control" when applied to the use or operation of a citizens radio station means control of the transmitting equipment of that station from any place other than the location of the transmitting equipment, except that direct mechanical control or direct electrical control by wired connections of transmitting equipment from some other point on the same premises, craft or vehicle shall not be considered to be remote control.

Station authorization. Any construction permit, license, or special temporary authorization issued by the Commission.

§ 95.5 Policy governing the assignment of frequencies.

(a) The frequencies which may be assigned to Class A stations in the Citizens Radio Service, and the frequencies which are available for use by Class B, Class C, or Class D stations, are listed in Subpart C of this part. Each frequency available for assignment to, or use by, stations in this service is available on a shared basis only, and will not be assigned for the exclusive use of any one applicant; however, the use of a particular frequency may be restricted to (or in) one or more specified geographical areas.

(b) In no case will more than one frequency be assigned to Class A stations for the use of a single applicant in any given area until it has been demonstrated conclusively to the Commission that the assignment of an additional frequency is essential to the operation proposed.

(c) All applicants and licensees in this service shall cooperate in the selection and use of the frequencies assigned or authorized, in order to minimize interference and thereby obtain the most effective use of the authorized facilities.

(d) Simultaneous operation on more than one frequency in the 72-76 Mc/s band by a transmitter or transmitters of a single licensee is prohibited whenever such operation will cause harmful interference to the operation of other licensees in this service.

§ 95.6 Types of operation authorized.

(a) Class A stations may be authorized as mobile stations, as base stations, as fixed stations, or as base or fixed stations to be operated at unspecified or temporary locations.

(b) Class B, Class C, and Class D stations are authorized as mobile stations only; however, they may be operated at fixed locations in accordance with other provisions of this part.

§ 95.7 General citizenship restrictions.

A station license may not be granted to or

held by:

(a) Any alien or the representative of any alien;

(b) Any foreign government or the representative thereof;

(c) Any corporation organized under the laws of any foreign government;

(d) Any corporation of which any officer or director is an alien;

(e) Any corporation of which more than one-fifth of the capital stock is owned of record or voted by: Aliens or their representatives; a foreign government or representative thereof; or any corporation organized under the laws of a foreign country;

(f) Any corporation directly or indirectly controlled by any other corporation of which any officer or more than one-fourth of the directors are aliens, if the Commission finds that the public interest will be served by the refusal or revocation of such license; or

(g) Any corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by: Aliens or their representatives; a foreign government or representative thereof; or any corporation organized under the laws of a foreign government, if the Commission finds that the public interest will be served by the refusal or revocation of such license.

SUBPART B—APPLICATIONS AND LICENSES

§ 95.11 Station authorization required.

No radio station shall be operated in the Citizens Radio Service except under and in accordance with an authorization granted by the Federal Communications Commission.

§ 95.13 Eligibility for station license.

(a) Subject to the general restrictions of § 95.7, any person, other than an unincorporated association in the case of a Class D station, is eligible to hold an authorization to operate a station in the Citizens Radio Service: *Provided*, That if an applicant for a Class A, Class B or Class D station authorization is an individual or partnership, such individual or each partner is eighteen or more years of age; or if an applicant for a Class C station authorization is an individual or partnership, such individual or each partner is twelve or more years of age.

NOTE: While the basis of eligibility in this service includes any state, territorial, or local governmental entity, or any agency operating by the authority of such governmental entity, including any duly authorized state, territorial, or local civil defense agency, it should be noted that the frequencies available to stations in this service are shared without distinction between all licensees and that no protection is afforded to the communications of any station in this service from interference which may be caused by the authorized operation of other licensed stations.

(b) Notwithstanding the provisions of paragraph (a) of this section, an unincorporated

association may be authorized to operate a Class D station in this service upon a showing satisfactory to the Commission that the proposed radio operations are not feasible, or may not be as efficient or economical, when conducted under station licenses issued to the individual members. A station license shall not be issued to an unincorporated association solely to avoid the operating restrictions on communications between stations licensed to different persons, contained elsewhere in this part. Unincorporated associations which hold Class D station licenses in this service as of November 1, 1964, must make the showing required by this paragraph upon application for renewal and/or modification of license. An unincorporated association, when licensed under the provisions of this paragraph, may upon specific prior approval of the Commission provide radiocommunications for its members.

(c) No person shall hold more than one Class B, one Class C, and one Class D station license.

§ 95.15 Filing of applications.

(a) To assure that necessary information is supplied in a consistent manner by all persons, standard forms are prescribed for use in connection with the majority of applications and reports submitted for Commission consideration. Standard numbered forms applicable to the Citizens Radio Service are discussed in § 95.19 and may be obtained from the Washington, D.C., 20554, office of the Commission, or from any of its engineering field offices.

(b) All formal applications for Class B, Class C, or Class D new, modified, or renewal station authorizations shall be submitted to the Commission's office at 334 York Street, Gettysburg, Pa., 17325. Applications for Class A station authorizations, applications for consent to transfer of control of a corporation holding any citizens radio station authorization, requests for special temporary authority or other special requests, and correspondence relating to an application for any class citizens radio station authorization shall be submitted to the Commission's Office at Washington, D.C., 20554, and should be directed to the attention of the Secretary. Applications involving Class C or Class D station equipment which is neither type approved nor crystal controlled, whether of commercial or home construction, shall be accompanied by supplemental data describing in detail the design and construction of the transmitter and methods employed in testing it to determine compliance with the technical requirements set forth in Subpart C of this part.

(c) Unless otherwise specified, an application shall be filed at least 60 days prior to the date on which it is desired that Commission action thereon be completed. In any case where the applicant has made timely and sufficient application for renewal of license, in accordance with the Commission's rules, no license with reference to any activity of a continuing nature shall expire until such application shall have been finally determined.

(d) Failure on the part of the applicant to provide all the information required by the application form, or to supply the necessary exhibits or supplementary statements may con-

suit a defect in the application.

(c) Applicants proposing to construct a radio station on a site located on land under the jurisdiction of the U.S. Forest Service, U.S. Department of Agriculture, or the Bureau of Land Management, U.S. Department of the Interior, must supply the information and must follow the procedure prescribed by § 1.70 of this chapter.

§ 95.17 Who may sign applications.

(a) Except as provided in paragraph (b) of this section, applications, amendments thereto, and related statements of fact required by the Commission shall be personally signed by the applicant, if the applicant is an individual; by one of the partners, if the applicant is a partnership; by an officer, if the applicant is a corporation; or by a member who is an officer, if the applicant is an unincorporated association. Applications, amendments, and related statements of fact filed on behalf of eligible government entities, such as states and territories of the United States and political subdivisions thereof, the District of Columbia, and units of local government, including incorporated municipalities, shall be signed by such duly elected or appointed officials as may be competent to do so under the laws of the applicable jurisdiction.

(b) Applications, amendments thereto, and related statements of fact required by the Commission may be signed by the applicant's attorney in case of the applicant's physical disability or of his absence from the United States. The attorney shall in that event separately set forth the reason why the application is not signed by the applicant. In addition, if any matter is stated on the basis of the attorney's belief only (rather than his knowledge), he shall separately set forth his reasons for believing that such statements are true.

(c) Only the original of applications, amendments, or related statements of fact need be signed; copies may be conformed.

(d) Applications, amendments, and related statements of fact need not be signed under oath. Willful false statements made therein, however, are punishable by fine and imprisonment, U.S. Code, Title 18, section 1001, and by appropriate administrative sanctions, including revocation of station license pursuant to section 312(a) (1) of the Communications Act of 1934, as amended.

§ 95.19 Standard forms to be used.

(a) *FCC Form 505, Application for Class B, C, or D Station License in the Citizens Radio Service.* This form shall be used when:

(1) Application is made for a new Class B, Class C, or Class D station authorization for any required number of transmitters to be operated as a group in a single radiocommunication system in a particular area. A separate application shall be submitted for each proposed class of station.

(2) Application is made for modification of any existing Class B, Class C, or Class D station authorization in those cases where prior Commission approval of certain changes is required (see § 95.35).

(3) Application is made for renewal of an existing Class B, Class C, or Class D station

authorization, or for reinstatement of such an expired authorization.

(b) *FCC Form 400, Application for Radio Station Authorization in the Safety and Special Radio Services.* This form shall be used when:

(1) Application is made for a new Class A base station or fixed station authorization. Separate applications shall be submitted for each proposed base or fixed station at different fixed locations; however, all equipment intended to be operated at a single fixed location is considered to be one station which may, if necessary, be classed as both a base station and a fixed station.

(2) Application is made for a new Class A station authorization for any required number of mobile units (including hand-carried and pack-carried units) to be operated as a group in a single radiocommunication system in a particular area. An application for Class A mobile station authorization may be combined with the application for a single Class A base station authorization when such mobile units are to be operated with that base station only.

(3) Application is made for station license of any Class A base station or fixed station upon completion of construction or installation in accordance with the terms and conditions set forth in any construction permit required to be issued for that station, or application for extension of time within which to construct such a station.

(4) Application is made for modification of any existing Class A station authorization in those cases where prior Commission approval of certain changes is required (see § 95.35).

(5) Application is made for renewal of an existing Class A station authorization, or for reinstatement of such an expired authorization.

(6) [Reserved]

(7) Application is made for an authorization for a new Class A base or fixed station to be operated at unspecified or temporary locations. When one or more individual transmitters are each intended to be operated as a base station or as a fixed station at unspecified or temporary locations for indeterminate periods, such transmitters may be considered to comprise a single station intended to be operated at temporary locations. The application shall specify the general geographic area within which the operation will be confined. Sufficient data must be submitted to show the need for the proposed area of operation.

(c) *FCC Form 703, Application for Consent to Transfer of Control of Corporation Holding Construction Permit or Station License.* This form shall be used when application is made for consent to transfer control of a corporation holding any citizens radio station authorization.

§ 95.25 Amendment or dismissal of application.

(a) Any application may be amended upon request of the applicant as a matter of right prior to the time the application is granted or designated for hearing. Each amendment to an application shall be signed and submitted in the same manner and with the same number of copies as required for the original application.

(b) Any application may, upon written request signed by the applicant or his attorney, be dismissed without prejudice as a matter of right

prior to the time the application is granted or designated for hearing.

§ 95.27 Transfer of license prohibited.

A station authorization in the Citizens Radio Service may not be transferred or assigned. In lieu of such transfer or assignment, an application for new station authorization shall be filed in each case, and the previous authorization shall be forwarded to the Commission for cancellation.

§ 95.29 Defective applications.

(a) If an applicant is requested by the Commission to file any documents or information not included in the prescribed application form, a failure to comply with such request will constitute a defect in the application.

(b) When an application is considered to be incomplete or defective, such application will be returned to the applicant, unless the Commission may otherwise direct. The reason for return of the applications will be indicated, and if appropriate, necessary additions or corrections will be suggested.

§ 95.31 Partial grant.

Where the Commission, without a hearing, grants an application in part, or with any privileges, terms, or conditions other than those requested, the action of the Commission shall be considered as a grant of such application unless the applicant shall, within 30 days from the date on which such grant is made, or from its effective date if a later date is specified, file with the Commission a written rejection of the grant as made. Upon receipt of such rejection, the Commission will vacate its original action upon the application and, if appropriate, set the application for hearing.

§ 95.33 License period.

Unless otherwise stated in the authorization, licenses for all stations in the Citizens Radio Service will normally be issued for a term of 5 years from the date of original issuance, renewal, or modification.

§ 95.35 Changes in authorized stations.

Authority for certain changes in authorized stations must be obtained from the Commission before the changes are made, while other changes do not require prior Commission approval. The following paragraphs of this section describe the conditions under which prior Commission approval is or is not necessary.

(a) Proposed changes which will result in operation inconsistent with any of the terms of the current authorization require that an application for modification of license be submitted to the Commission. Application for modification shall be submitted in the same manner as an application for a new station license, and the licensee shall forward his existing authorization to the Commission for cancellation immediately upon receipt of the superseding authorization. Any of the following changes to authorized stations may be made only upon approval by the

Commission:

(1) Increase the overall number of transmitters authorized.

(2) Change the presently authorized location of a Class A fixed or base station or control point.

(3) Move, change the height of, or erect a Class A station antenna structure of the type which requires prior approval from the Commission as set forth in § 95.37.

(4) Make any change in the type of emission or any increase in bandwidth of emission or power of a Class A station.

(5) Addition or deletion of control point(s) for an authorized transmitter of a Class A station.

(6) Change or increase the area of operation of a Class A mobile station or a Class A base or fixed station authorized to be operated at temporary locations.

(7) Change the operating frequency of a Class A station.

(b) When the name of a licensee is changed (without changes in the ownership, control or corporate structure), or when the mailing address of the licensee is changed (without changing the authorized location of the base or fixed Class A station) a formal application for modification of the license is not required. However, the licensee shall notify the Commission promptly of these changes. The notice, which may be in letter form, shall contain the name and address of the licensee as they appear in the Commission's records, the new name and/or address, as the case may be, and the call signs and classes of all radio stations authorized to the licensee under this part. The notice concerning Class B, C, or D radio stations shall be sent to Federal Communications Commission, Gettysburg, Pa., 17325, and a copy shall be maintained with the records of the station. The notice concerning Class A stations shall be sent to (1) Secretary, Federal Communications Commission, Washington, D.C., 20554, and (2) to Engineer in Charge of the Radio District in which the station is located, and a copy shall be maintained with the license of the station until a new license is issued.

(c) Proposed changes which will not depart from any of the terms of the outstanding authorization for the station involved may be made without prior Commission approval. Included in such changes is the substitution of various makes of transmitting equipment at any station, provided that the particular equipment to be installed is included in the Commission's "Radio Equipment List, Part C" and is listed as acceptable for use under this part or, in the case of a Class C or Class D station using crystal control on authorized frequencies in the 26.96-27.26 Mc/s band, the substitute equipment is crystal controlled; and further provided the substitute equipment employs the same type of emission and does not exceed the frequency tolerance and power limitation prescribed for the particular class of station involved.

§ 95.37 Limitations on antenna structures.

(a) No new antenna or antenna structures shall be erected for use by any Class A station licensed, or proposed to be licensed, in this service, and no change shall be made in any

existing antenna or antenna structure used, or intended to be used, by any Class A station licensed, or proposed to be licensed, in this service so as to increase its overall height above ground level, without prior approval from the Commission in any case when either:

(1) The antenna structures proposed to be erected will exceed an overall height of 170 feet above ground level, except where the antenna is mounted on top of an existing man-made structure, other than antenna structure, and does not increase the overall height of such man-made structure by more than 20 feet; or

(2) The antenna structures proposed to be erected will exceed an overall height of 1 foot above the established airport (landing area) elevation for each 200 feet of distance or fraction thereof from the nearest boundary of such landing area except where the antenna does not exceed 20 feet above the ground or where the height of the antenna is mounted on top of an existing man-made structure, other than an antenna structure, or natural formation and does not increase the overall height of such man-made structure or natural formation by more than 20 feet. Application for Commission approval, if required, shall be submitted on FCC Form 400.

(b) [Reserved]

(c) A Class B, Class C or Class D station operated at a fixed location shall employ a transmitting antenna which complies with at least one of the following:

(1) The antenna and its supporting structure does not exceed 20 feet in height above ground level; or

(2) The antenna and its supporting structure does not exceed by more than 20 feet the height of any natural formation, tree or man-made structure on which it is mounted; or

(3) The antenna is mounted on the transmitting antenna structure of another authorized radio station and does not exceed the height of the antenna supporting structure of the other station; or

(4) The antenna is mounted on and does not exceed the height of an antenna structure otherwise used solely for receiving purposes, which structure itself complies with subparagraph (1) or (2) of this paragraph.

NOTE: A man-made structure is any construction other than a tower, mast or pole.

(d) Class C stations operated on frequencies in the 72-76 Mc/s band shall employ a transmitting antenna which complies with all of the following:

(1) The gain of the antenna shall not exceed that of a half-wave dipole;

(2) The antenna shall be immediately attached to, and an integral part of, the transmitter; and

(3) Only vertical polarization shall be used.

SUBPART C—TECHNICAL REGULATIONS

§ 95.41 Frequencies available.

(a) The following frequencies are available for assignment to Class A base, mobile, or fixed stations, on a shared basis with other stations in the Citizens Radio Service:

<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>
462.55	463.15	465.30	465.90
462.60	463.20	465.35	465.95
462.65	464.75	465.40	466.00
462.70	464.80	465.45	466.05
462.75	464.85	465.50	466.10
462.80	464.90	465.55	466.15
462.85	464.95	465.60	466.20
462.90	465.05	465.65	466.25
462.95	465.10	465.70	466.30
463.00	465.15	465.75	466.35
463.05	465.20	465.80	466.40
463.10	465.25	465.85	466.45

(b) The frequency 465.00 Mc/s is available for use by Class B mobile stations under the conditions specified in §§ 95.45, 95.47, and 95.49 on a shared basis with other stations in the Citizens Radio Service. In addition, a Class B mobile station employing equipment which has been type accepted for use by Class A citizens radio stations, is authorized to be operated on any of the frequencies listed in paragraph (a) of this section.

(c) Class C mobile stations may employ only amplitude tone modulation or on-off keying of the unmodulated carrier, on a shared basis with other stations in the Citizens Radio Service on the frequencies and under the conditions specified in the following tables:

(1) For the control of remote objects or devices by radio, or for the remote actuation of devices which are used solely as a means of attracting attention and subject to no protection from interference due to the operation of industrial, scientific, or medical devices within the 26.96-27.28 Mc/s band, the following frequencies are available:

<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>
26.995	27.095	27.195
27.045	27.145	27.255

¹ The frequency 27.255 Mc/s also is shared with stations in other services.

(2) Solely for the radio control of model aircraft and subject to the conditions (i) that interference will not be caused to the remote control of industrial equipment operating on the same or adjacent frequencies and the reception of television transmissions on channels 4 or 5 and (ii) that no protection will be afforded from interference due to the operation of fixed and mobile stations in other services assigned to the same or adjacent frequencies in the band, the following frequencies are available.

<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>
72.08	72.40	75.64
72.24	72.96	

(d) The frequencies listed in the following tables are available for use by Class D mobile stations employing radiotelephony only, on a shared basis with other stations in the Citizens Radio Service, and subject to no protection from interference due to the operation of industrial, scientific, or medical devices within the 26.96-27.28 Mc/s band.

(1) The following frequencies, commonly known as channels 1 through 23, may be used for communications between units of the same station:

CB FCC RULES AND REGS

<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>	<i>Mc/s</i>
26.965	27.035	27.115	27.185
26.975	27.055	27.125	27.205
26.985	27.065	27.135	27.215
27.005	27.075	27.155	27.225
27.015	27.085	27.165	27.255
27.025	27.105	27.175	

¹ The frequency 27.255 Mc/s is also shared with stations in other services.

(2) Only the following frequencies may be used for communication between units of different stations:

<i>Mc/s</i>	<i>Channel</i>	<i>Mc/s</i>	<i>Channel</i>
27.065	9	27.115	13
27.075	10	27.125	14
27.085	11	27.255	23
27.105	12		

(e) Upon specific request accompanying application for renewal of station authorization, a Class A station in this service, which was authorized to operate on a frequency in the 460-461 Mc/s band until March 31, 1967, may be assigned that frequency for continued use until not later than March 31, 1968, subject to all other provisions of this part.

§ 95.43 Station power.

Neither the average power input to the plate or collector circuit or circuits which contribute radio frequency energy to the radiating system nor the average radio frequency power supplied to the radiating system of a station operating in this service shall exceed the following maximum values:

Class of station	Power input (average watts) ²	Power input (average watts) ³
A.....	60	48
B.....	5	4
C ³	5	4
D.....	5	4

¹ On 27.255 Mc/s the average power permitted for Class C stations shall not exceed 30 watts input and 24 watts output. On frequencies in the 72-76 Mc/s band the average power for Class C stations shall not exceed 1 watt input and 0.75 watt output.

² For the purpose of this section, power measurement shall be made during maximum peaks of modulation using meters having a full scale accuracy of 2 percent or better and having a maximum time constant of not more than 0.25 of a second. Where the average unmodulated carrier power is increased by modulation applied to the circuit or circuits which contribute radio frequency energy to the radiating system, the sum of the unmodulated carrier power input and the average power output of the modulator shall not exceed the values specified in this table by more than 25 percent.

³ Power output shall be measured at the transmitter.

§ 95.45 Frequency tolerance.

The carrier frequency of a station in this

service shall be maintained within the following percentage of the authorized frequency:

Class of station	Maximum authorized power input	Frequency tolerance	
		Fixed and base	Mobile
A.....	3 watts or less.....	¹ 0.00025	¹ 0.0005
A.....	Over 3 watts.....	¹ .00025	¹ .0005
B.....	3 watts or less.....		.5
B.....	Over 3 watts.....		.3
C.....	5 watts or less ²005
C.....	Over 5 watts.....		
D.....	(27.255 Mc/s only)		.005
D.....	5 watts or less.....		.005

¹ Effective Nov. 1, 1967. Stations authorized before Nov. 1, 1967, may continue to operate with tolerance of 0.001 percent, or .005 for mobile stations, with 3 watts or less power until Nov. 1, 1971.

² Class C stations operating on authorized frequencies between 26.99 and 27.26 Mc/s with 3 watts or less power input which are used solely for the control of remote objects or devices by radio (other than devices used solely as a means of attracting attention) are permitted a frequency tolerance of 0.01 percent.

§ 95.47 Types of emission.

(a) Except as provided in paragraph (e) of this section, Class A stations in this service will normally be authorized to transmit radiotelephony only. However, the use of tone signals or signaling devices solely to actuate receiver circuits, such as tone operated squelch or selective calling circuits, the primary function of which is to establish or establish and maintain voice communications, is permitted. The use of tone signals solely to attract attention is prohibited.

(b) Class B stations in this service are authorized to use amplitude or frequency modulation, or on-off unmodulated carrier, and may be used for radiotelephony, to control remote objects or devices by means of radio, or to remotely actuate devices which are used as a means of attracting attention.

(c) Class C stations in this service are authorized to use amplitude tone modulation or on-off unmodulated carrier only, for the control of remote objects or devices by radio or for the remote actuation of devices which are used solely as a means of attracting attention. The transmission of any form of telegraphy, telephony or record communications by a Class C station is prohibited. Telemetering, except for the transmission of simple, short duration signals indicating the presence or absence of a condition or the occurrence of an event, is also prohibited.

(d) Class D stations in this service are authorized to use amplitude voice modulation, including single side-band and/or reduced or suppressed carrier, for radiotelephone communications only. However, the use of tone signals or signaling devices solely to actuate receiver circuits, such as tone operated squelch or selective calling circuits, the primary function of which is to establish or establish and maintain voice communications, is permitted. The use of

tone signals solely to attract attention or for the control of remote objects or devices is prohibited.

(e) Other types of emission not described in paragraph (a) of this section may be authorized for Class A citizens radio stations upon a showing of need therefor. An application requesting such authorization shall fully describe the emission desired, shall indicate the bandwidth required for satisfactory communication, and shall state the purpose for which such emission is required. For information regarding the classification of emissions and the calculation of bandwidth, reference should be made to Part 2 of this chapter.

§ 95.49 Emission limitations.

(a) Each authorization issued to a Class A citizens radio station will show, as a prefix to the classification of the authorized emission, a figure specifying the maximum bandwidth to be occupied by the emission.

(b) All operation of a Class B citizens radio station (including tolerance and bandwidth occupied by the emission) shall be confined to the frequency band 462.525-467.475 Mc/s.

(c) (1) Except as provided in subparagraph (2) of this paragraph and except in the case of Class B citizens radio stations operating only on the frequency 465.00 Mc/s (see § 95.41 (b)), the maximum authorized bandwidth of the emission of any station employing amplitude modulation (Type A2 or A3 emission) shall be 8 kc/s and the maximum authorized bandwidth of the emission of any station employing frequency or phase modulation (Type F2 or F3 emission) shall be 40 kc/s. The use of Type F2 or F3 emission in the frequency band 26.96-27.28 Mc/s is not authorized.

(2) Effective November 1, 1967, the maximum authorized bandwidth of Class A stations employing frequency or phase modulation (Type F2 or F3 emission) will be 20 kc/s. Class A stations authorized before November 1, 1967, may continue to operate with maximum 40 kc/s bandwidth until November 1, 1971.

(d) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 decibels;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 decibels;

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth, at least the amounts indicated in the following table:

Maximum authorized power input to final radio frequency stage:	Attenuation (db)
Over 3 watts.....	50
3 watts or less.....	40

¹ In the case of Class B stations having a maximum power input to the final radio frequency stage of 3 watts or less, any emission appearing on any frequency within a band allocated to industrial, sci-

entific, and medical equipment under the provisions of Part 2 of this chapter shall be attenuated at least 30 db.

(e) When an unauthorized emission results in harmful interference, the Commission may, in its discretion, require appropriate technical changes in equipment to alleviate the interference.

§ 95.51 Modulation requirements.

(a) When the radio frequency carrier of a station in this service is amplitude modulated, such modulation shall not exceed 100 percent on positive or negative peaks.

(b) Except as provided in paragraph (c) of this section and except in the case of Class B citizens radio stations operating only on the frequency 465.00 Mc/s (see § 95.41 (b)), the frequency deviation of any frequency modulated transmitter operated in this service shall not exceed ± 15 kc/s and the simultaneous amplitude modulation and frequency or phase modulation of a transmitter is not authorized.

(c) Effective June 1, 1967, the maximum frequency deviation for all Class A stations employing F2 or F3 emission will be ± 5 kc/s.

(d) Class A stations authorized on or after November 1, 1967, shall be provided with a device which automatically will prevent modulation in excess of that specified in this subpart which may be caused by greater than normal audio level. Class A stations authorized before November 1, 1967, will be required to comply with the provisions of this paragraph by November 1, 1971: *Provided, however,* That the requirements of this paragraph shall not apply to transmitters authorized to operate as mobile stations with a maximum plate power input to the final radio frequency stage of 3 watts or less.

(e) Each transmitter of a Class A station which is equipped with a modulation limiter in accordance with the provisions of paragraph (d) of this section shall also be equipped with an audio low-pass filter. This audio low-pass filter shall be installed between the modulation limiter and the modulated stage and, at audio frequencies between 3 kc/s and 20 kc/s, shall have an attenuation greater than the attenuation at 1 kc/s by at least:

$$60 \log_{10} (f/3) \text{ decibels}$$

where "f" is the audiofrequency in kc/s. At audio frequencies above 20 kc/s, the attenuation shall be at least 50 decibels greater than the attenuation at 1 kc/s.

§ 95.53 Compliance with technical requirements.

(a) Upon receipt of notification from the Commission of a deviation from the technical requirements of the rules in this part, the radiations of the transmitter involved shall be suspended immediately, except for necessary tests and adjustments, and shall not be resumed until such deviation has been corrected.

(b) When any citizens radio station licensee receives a notice of violation indicating that the station has been operated contrary to any of the provisions contained in Subpart C of this part,

or where it otherwise appears that operation of a station in this service may not be in accordance with applicable technical standards, the Commission may require the licensee to conduct such tests as may be necessary to determine whether the equipment is capable of meeting these standards and to make such adjustments as may be necessary to assure compliance therewith. A licensee who is notified that he is required to conduct such tests and/or make adjustments must, within the time limit specified in the notice, report to the Commission the results thereof.

(c) All tests and adjustments which may be required in accordance with paragraph (b) of this section shall be made by, or under the immediate supervision of, a person holding a first- or second-class commercial operator license, either radiotelephone or radio telegraph as may be appropriate for the type of emission employed. In each case, the report which is submitted to the Commission shall be signed by the licensed commercial operator. Such report shall describe the results of the tests and adjustments, the test equipment and procedures used, and shall state the type, class, and serial number of the operator's license. A copy of this report shall also be kept with the station records.

§ 95.55 Acceptability of transmitters for licensing.

(a) Except as provided in § 95.69, transmitters authorized for operation at Class B stations, and noncrystal controlled transmitters authorized for operation at Class C and Class D stations in the band 26.96–27.26 Mc/s under this part shall be type approved by the Commission.

(b) Transmitters authorized for operation under this part at Class A stations, and at Class C stations in the band 72–76 Mc/s, shall be type accepted by the Commission.

(c) Type approved and type accepted transmitters for use under this part are included in the Commission's Radio Equipment List, Part C. Copies of this list are available for public reference at the Commission's Washington, D.C., offices and field offices.

§ 95.57 Type acceptance of equipment.

(a) Any manufacturer of a transmitter to be built for use in this service, except Class B station equipment and noncrystal controlled Class C and Class D equipment for operation in the band 26.96–27.26 Mc/s, may request type acceptance for such equipment by following the type acceptance procedure set forth in Subpart F of Part 2 of this chapter.

(b) Type acceptance for an individual transmitter may also be requested by an applicant for a station authorization by following the type acceptance procedures set forth in Part 2 of this chapter. Such transmitters, if accepted, will not normally be included on the Commission's "Radio Equipment List, Part C", but will be individually enumerated on the station authorization.

(c) Additional rules with respect to type acceptance are set forth in Part 2 of this chapter.

These rules include formation with respect to withdrawal of type acceptance, modification of type-accepted equipment, and limitations on the findings upon which type acceptance is based.

§ 95.59 Submission of Class C or non-crystal controlled Class C or Class D station equipment for type approval.

(a) Manufacturers of equipment capable of being used or operated in this service may submit units of such equipment to the Commission for type approval, upon grant of request therefor made in writing by the manufacturer to the Secretary of the Commission. Such a request normally will not be granted unless at least 100 units of the model to be submitted are scheduled for manufacture. When advised by the Commission, the applicant must send a typical production model or prototype of the particular equipment complete with tubes and power supply to the Commission's laboratory at Laurel, Maryland, for tests. All instructions which are intended to be supplied to the purchaser of the equipment shall be included. Transportation of the equipment and associated documents to and from the laboratory shall be at no cost to the Government.

(b) Prior to approval or rejection of the equipment the results of these tests will be made known only to the responsible Government officials and to the Commission. An official report of the tests will be made available only to the manufacturer involved; however, the Commission will publish from time to time lists of approved equipment.

(c) The prescribed tests may be conducted by the Federal Communications Commission or by any other cooperating Government department. In addition, field tests, as deemed necessary or desirable by the Commission, may be carried out by authorized Government personnel to determine the reliability of the equipment under operating conditions comparable to those expected to be encountered in actual service.

(d) Type-approval is not required for Class C or Class D station equipment employing crystal control; however, the manufacturer of a crystal-controlled transmitter to be built for use at a Class C or Class D station may request "type-acceptance" for such transmitter in accordance with the provisions of § 95.57. The licensee of a Class C or Class D station utilizing crystal-controlled equipment may be required to certify that the frequency stability of the transmitter is within the tolerance specified elsewhere in this part.

§ 95.61 Type approval of receiver-transmitter combinations.

Type approval will not be issued for transmitting equipment for operation under this part when such equipment is enclosed in the same cabinet, is constructed on the same chassis in whole or in part, or is identified with a common type or model number with a radio receiver, unless such receiver has been certificated to the Commission as complying with the requirements of Part 15 of this chapter.

§ 95.63 Minimum equipment specifications.

Equipment submitted for type approval in this service shall be capable of meeting the technical

specifications contained in this part for Class B, Class C, or Class D stations, and, in addition, shall comply with the following:

(a) Any basic instructions concerning the proper adjustment, use, or operation of the equipment that may be necessary shall be attached to the equipment in a suitable manner and in such positions as to be easily read by the operator.

(b) A durable nameplate shall be mounted on each transmitter showing the name of the manufacturer, the type or model designation, and providing suitable space for permanently displaying the transmitter serial number, FCC type approval number, and the class of station for which approved.

(c) The transmitter shall be designed, constructed, and adjusted by the manufacturer to operate on a frequency or frequencies available to the class of station for which type approval is sought. In designing the equipment, every reasonable precaution shall be taken to protect the user from high voltage shock and radio frequency burns. Connections to batteries (if used) shall be made in such a manner as to permit replacement by the user without causing improper operation of the transmitter. Generally accepted modern engineering principles shall be utilized in the generation of radio frequency currents so as to guard against unnecessary interference to other services. In cases of harmful interference arising from the design, construction, or operation of the equipment, the Commission may require appropriate technical changes in equipment to alleviate interference.

(d) Controls which may effect changes in the carrier frequency of the transmitter shall not be accessible from the exterior of any unit unless such accessibility is specifically approved by the Commission.

§ 95.65 Test procedure.

Type approval tests to determine whether radio equipment meets the technical specifications contained in this part will be conducted under the following conditions:

(a) Gradual ambient temperature variations from 0° to 125° F.

(b) Relative ambient humidity from 20 to 95 percent. This test will normally consist of subjecting the equipment for at least three consecutive periods of 24 hours each, to a relative ambient humidity of 20, 60, and 95 percent, respectively, at a temperature of approximately 80° F.

(c) Movement of transmitter or objects in the immediate vicinity thereof.

(d) Power supply voltage variations normally to be encountered under actual operating conditions.

(e) Additional tests as may be prescribed, if considered necessary or desirable.

§ 95.67 Certificate of type approval.

A certificate or notice of type approval, when issued to the manufacturer of equipment intended to be used or operated in the Citizens Radio Service, constitutes a recognition that on the basis of the test made, the particular type of equipment appears to have the capability of functioning in accordance with the technical specifications and regulations contained in this

part: *Provided*, That all such additional equipment of the same type is properly constructed, maintained, and operated: *And provided further*, That no change whatsoever is made in the design or construction of such equipment except upon specific approval by the Commission.

§ 95.69 Acceptance of composite equipment.

(a) Class B and non-crystal controlled Class C or Class D station equipment constructed by a manufacturer in lots of less than 100 units will not, in the usual case, be tested by the Commission for the purpose of granting type approval. Except as provided in paragraph (b) of this section, an applicant in this service who proposes to use or operate composite or other equipment which has not been type approved shall supply complete information showing that the equipment fully complies with appropriate station requirements using supplementary sheets which shall accompany the standard application form. The Commission may, at its discretion, require that such equipment or a prototype thereof be made available to its laboratory at Laurel, Maryland, for testing in accordance with the procedures described elsewhere in this part, as applicable to equipment to be manufactured in lots of more than 100 units. In addition, field tests as deemed necessary or desirable may be carried out by authorized Government personnel to determine the reliability of the equipment under operating conditions comparable to those encountered in actual service.

(b) In the case of crystal controlled Class C or Class D equipment to be operated on an authorized frequency in the band 26.96-27.26 Mc/s, supplemental technical information is not required to accompany the standard application form: *Provided, however*, That it is clearly indicated that the equipment employs crystal control: *And provided further*, That the Commission may require the applicant to certify that the frequency stability of the crystal-controlled transmitter is within the tolerance specified elsewhere in this part.

(c) In the case of nontype accepted Class C equipment to be operated on an authorized frequency in the band 72-76 Mc/s, the information and measurement data required under Subpart F of Part 2 of this chapter for type acceptance, shall, if not on file with the Commission, accompany the application for station license.

SUBPART D—STATION OPERATING REQUIREMENTS

§ 95.83 Prohibited uses.

(a) A Citizens radio-station shall not be used:

(1) For engaging in radio communications as a hobby or diversion, i.e., operating the radio station as an activity in and of itself.

NOTE: The following are typical, but not all inclusive, examples of the types of communications evidencing a use of Citizens radio as a hobby or diversion which are prohibited under this rule:

"You want to give me your handle and I'll ship you out a card the first thing in the morning;" or "Give me your 10-20 so I can ship you some wallpaper." (Communications to other licensees for the

purpose of exchanging so-called "QSL" cards.)

"I'm just checking to see who is on the air."

"Just calling to see if you can hear me. I'm at Main and Broadway."

"Just heard your call sign and thought I'd like to get acquainted;" or "Just passing through and heard your call sign so I thought I'd give you a shout."

"Just sitting here copying the mail and thought I'd give you a call to see how you were doing." (Referring to an intent to communicate based solely on hearing another person engaged in the use of his radio.)

"My 10-20 is Main and Broad Streets. Thought I'd call so I can see how well this new rig is getting out."

"Got a new mike on this rig and thought I'd give you a call to find out how my modulation is."

"Just thought I would give you a shout and let you know I am still around. Thanks for coming back."

"Clear with Venezuela. Just thought I'd let you know I was copying you up here."

"Thought I'd give you a shout and see if you knew where the unmodulated carrier was coming from."

"Just thought I'd give you a call to find out how the skip is coming in over at your location."

"Go ahead breaker. What kind of a rig are you using? Come back with your 10-20."

(2) For any purpose, or in connection with any activity, which is contrary to Federal, State, or local law.

(3) For the transmission of communications containing obscene, indecent, or profane words, language, or meaning.

(4) To carry communications for hire, whether the remuneration or benefit received is direct or indirect.

(5) To communicate with stations authorized or operated under the provisions of other parts of this chapter, with unlicensed stations, or with U.S. Government or foreign stations, except for communications pursuant to §§ 95.85(b) and 95.121 and, in the case of Class A stations, for communications with U.S. Government stations in those cases which require cooperation or coordination of activities.

(6) For any communication not directed to specific stations or persons, except for: (i) Emergency and civil defense communications as provided in §§ 95.85(b) and 95.121, respectively, (ii) test transmissions pursuant to § 95.93, and (iii) communications from a mobile unit to other units or stations for the sole purpose of requesting routing directions, assistance to disabled vehicles or vessels, information concerning the availability of food or lodging, or any other assistance necessary to a licensee in transit.

(7) To convey program material for retransmission, live or delayed, on a broadcast facility.

NOTE: A Class A, Class B, or Class D station may be used in connection with the administrative, engineering, or maintenance activities of a broadcasting station; a Class A, Class B, or Class C station may be used for control functions by radio which do not involve the transmission of program material; and a Class A, Class B, or Class D station may be used in the gathering of news items or preparation of programs: *Provided*, That the actual or recorded transmissions of the Citizens radio station are not broadcast at any time in whole or in part.

(8) To interfere maliciously with the com-

munications of another station.

(9) For the direct transmission of any material to the public through public address systems or similar means.

(10) To transmit superfluous communications, i.e., any transmissions which are not necessary to communications which are permissible.

(11) For the transmission of music, whistling, sound effects, or any material for amusement or entertainment purposes, or solely to attract attention.

(12) To transmit the word "MAYDAY" or other international distress signals, except when a ship, aircraft, or other vehicle is threatened by grave and imminent danger and requests immediate assistance.

(13) For transmitting communications to stations of other licensees which relate to the technical performance, capabilities, or testing of any transmitter or other radio equipment, including transmissions concerning the signal strength or frequency stability of a transmitter, except as necessary to establish or maintain the specific communication.

(14) For relaying messages or transmitting communications for a person other than the licensee or members of his immediate family, except: (1) Communications transmitted pursuant to §§ 95.85(b), 95.87(b) (7), and 95.121; and, (ii) upon specific prior Commission approval, communications between citizens radio stations at fixed locations where public telephone service is not provided.

(15) For advertising or soliciting the sale of any goods or services.

(16) For transmitting messages in other than plain language. Abbreviations, including nationally or internationally recognized operating signals, may be used only if a list of all such abbreviations and their meaning is kept in the station records and made available to any Commission representative on demand.

(b) A Class D station may not be used to communicate with, or attempt to communicate with, any unit of the same or another station over a distance of more than 150 miles.

(c) A licensee of a Citizens radio station who is engaged in the business of selling Citizens radio transmitting equipment shall not allow a customer to operate under his station license. In addition, all communications by the licensee for the purpose of demonstrating such equipment shall consist only of brief messages addressed to other units of the same station.

§ 95.85 Emergency use.

(a) All Citizens radio stations shall give priority to the emergency communications of other stations which involve the immediate safety of life of individuals or the immediate protection of property.

(b) Any station in this service may be utilized during an emergency involving the immediate safety of life or the immediate protection of property for the transmission of emergency communications. When so used, certain provisions in this part concerning use of frequencies (§ 95.41(d)); prohibited uses (§ 95.83(a) (5) and (6)); operation by or on behalf of persons other than the licensee (§ 95.87); and duration of transmissions (§ 95.91 (a) and (b)) shall not apply. However, any emergency use which

necessitates taking advantage of these exceptions to usual requirements shall be subject to the following conditions:

(1) As soon as possible after the beginning of such emergency use, notice shall be sent to the Commission in Washington, D.C., and to the Engineer in Charge of the radio district in which the station is located, stating the nature of the emergency and the use to which the station is being put.

(2) The emergency use of the station shall be discontinued as soon as possible, and the Commission in Washington, D.C., and the Engineer in Charge shall be notified immediately when such special use of the station is terminated. If the emergency use is of less than 24-hour duration, a single notice containing all of the required information will serve to comply with the notice requirements of this paragraph.

(3) The Commission may at any time order discontinuance of such special use of the authorized facilities.

§ 95.87 Operation by, or on behalf of, persons other than the licensee.

(a) Transmitters authorized in this service must be under the control of the licensee at all times. A licensee shall not transfer, assign, or dispose of, in any manner, directly or indirectly, the operating authority under his station license, and shall be responsible for the proper operation of all units of the station.

(b) Citizens radio stations may be operated only by the following persons, except as provided in paragraph (c) of this section:

(1) The licensee;

(2) Members of the licensee's immediate family living in the same household;

(3) The partners, if the licensee is a partnership, provided the communications relate to the business of the partnership;

(4) The members, if the licensee is an unincorporated association, provided the communications relate to the business of the association;

(5) Employees of the licensee only while acting within the scope of their employment;

(6) Any person under the control or supervision of the licensee when the station is used solely for the control of remote objects or devices, other than devices used only as a means of attracting attention; and

(7) Other persons, upon specific prior approval of the Commission shown on or attached to the station license, under the following circumstances:

(i) Licensee is a corporation and proposes to provide private radiocommunication facilities for the transmission of messages or signals by or on behalf of its parent corporation, another subsidiary of the parent corporation, or its own subsidiary. Any remuneration or compensation received by the licensee for the use of the radiocommunication facilities shall be governed by a contract entered into by the parties concerned and the total of the compensation shall not exceed the cost of providing the facilities. Records which show the cost of service and its nonprofit or cost-sharing basis shall be maintained by the licensee.

(ii) Licensee proposes the shared or cooperative use of a Class A station with one or more other licensees in this service for the purpose of

communicating on a regular basis with units of their respective Class A stations, or with units of other Class A stations if the communications transmitted are otherwise permissible. The use of these private radiocommunication facilities shall be conducted pursuant to a written contract which shall provide that contributions to capital and operating expense shall be made on a nonprofit, cost-sharing basis, the cost to be divided on an equitable basis among all parties to the agreement. Records which show the cost of service and its nonprofit, cost-sharing basis shall be maintained by the licensee. In any case, however, licensee must show a separate and independent need for the particular units proposed to be shared to fulfill his own communications requirements.

(iii) Other cases where there is a need for other persons to operate a unit of licensee's radio station. Requests for authority may be made either at the time of the filing of the application for station license or thereafter by letter. In either case, the licensee must show the nature of the proposed use and that it relates to an activity of the licensee, how he proposes to maintain control over the transmitters at all times, and why it is not appropriate for such other person to obtain a station license in his own name. The authority, if granted, may be specific with respect to the names of the persons who are permitted to operate, or may authorize operation by unnamed persons for specific purposes. This authority may be revoked by the Commission, in its discretion, at any time.

(c) An individual who was formerly a citizens radio station licensee shall not be permitted to operate any citizens radio station of the same class licensed to another person until such time as he again has been issued a valid radio station license of that class, when his license has been:

(1) Revoked by the Commission.

(2) Surrendered for cancellation after the institution of revocation proceedings by the Commission.

(3) Surrendered for cancellation after a notice of apparent liability to forfeiture has been served by the Commission.

§ 95.89 Telephone answering services.

(a) Notwithstanding the provisions of § 95.87, a licensee may install a transmitting unit of his station on the premises of a telephone answering service. The same unit may not be operated under the authorization of more than one licensee. In all cases, the licensee must enter into a written agreement with the answering service. This agreement must be kept with the licensee's station records and must provide, as a minimum, that:

(1) The licensee will have control over the operation of the radio unit at all times;

(2) The licensee will have full and unrestricted access to the transmitter to enable him to carry out his responsibilities under his license;

(3) Both parties understand that the licensee is fully responsible for the proper operation of the citizens radio station; and

(4) The unit so furnished shall be used only for the transmission of communications to other units belonging to the licensee's station.

(b) A citizens radio station licensed to a telephone answering service shall not be used to

relay messages or transmit signals to its customers.

§ 95.91 Duration of transmissions.

(a) All communications or signals, regardless of their nature, shall be restricted to the minimum practicable transmission time. The radiation of energy shall be limited to transmissions modulated or keyed for actual permissible communications, tests, or control signals. Continuous or uninterrupted transmissions from a single station or between a number of communicating stations is prohibited, except for communications involving the immediate safety of life or property.

(b) Communications between or among Class D stations shall not exceed 5 consecutive minutes. At the conclusion of this 5-minute period, or upon termination of the exchange if less than 5 minutes, the station transmitting and the stations participating in the exchange shall remain silent for a period of at least 5 minutes and monitor the frequency or frequencies involved before any further transmissions are made. However, for the limited purpose of acknowledging receipt of a call, such a station or stations may answer a calling station and request that it stand by for the duration of the silent period. The time limitations contained in this paragraph may not be avoided by changing the operating frequency of the station and shall apply to all the transmissions of an operator who, under other provisions of this part, may operate a unit of more than one citizens radio station.

(c) The transmission of audible tone signals or a sequence of tone signals for the operation of the tone operated squelch or selective calling circuits in accordance with § 95.47 shall not exceed a total of 15 seconds duration. Continuous transmission of a subaudible tone for this purpose is permitted. For the purposes of this section, any tone or combination of tones having no frequency above 150 cycles per second shall be considered subaudible.

(d) The transmission of permissible control signals shall be limited to the minimum practicable time necessary to accomplish the desired control or actuation of remote objects or devices. The continuous radiation of energy for periods exceeding 3 minutes duration for the purpose of transmission of control signals shall be limited to control functions requiring at least one or more changes during each minute of such transmission. However, while it is actually being used to control model aircraft in flight by means of interrupted tone modulation of its carrier, a citizens radio station may transmit a continuous carrier without being simultaneously modulated if the presence or absence of the carrier also performs a control function. An exception to the limitations contained in this paragraph may be authorized upon a satisfactory showing that a continuous control signal is required to perform a control function which is necessary to insure the safety of life or property.

§ 95.93 Tests and adjustments.

All tests or adjustments of citizens radio transmitting equipment involving an external connection to the radio frequency output circuit shall be made using a non-radiating dummy antenna. However, a brief test signal, either with or without modulation, as appropriate, may be transmitted when it is necessary to adjust a transmitter to an antenna for a new station installation or for existing installation involving a change of antenna or change of transmitters, or when necessary for the detection, measurement, and suppression of harmonic or other spurious radiation. Test transmissions using a radiating antenna shall not exceed a total of 1 minute during any 5-minute period, shall not interfere with communications already in progress on the operating frequency, and shall be properly identified as required by § 95.95, but may otherwise be unmodulated as appropriate.

§ 95.95 Station identification.

(a) The serial number on each citizens radio station license is the call sign assigned to such station. Except in the case of Class A stations having call signs in the international series, there shall be no continuity in the call sign assigned to a particular station, and a new call sign will be assigned on renewal or modification.

(b) Each transmission of the station call sign shall be made in the English language by each unit, shall be complete, and each letter and digit shall be separately and distinctly transmitted. Only standard phonetic alphabets, nationally or internationally recognized, may be used in lieu of pronunciation of letters for voice transmission of call signs. A unit designator or special identification may be used in addition to the station call sign but not as a substitute therefor.

(c) Except as provided in paragraph (d) of this section, all transmissions from each unit of a citizens radio station shall be identified by the transmission of its assigned call sign at the beginning and end of each transmission or series of transmissions directed to or exchanged with a unit of the same station or units of other stations. Each required identification shall include not only the call sign of the station unit transmitting, but also the call sign of the station or stations with which the transmitting unit is communicating, or attempting to communicate. In the case of communications between units of the same station (intrastation), after identifying itself by its assigned call sign, the transmitting unit may identify the other units by unit designators. For communications between units of different stations (interstation), the complete sign of all stations involved must be transmitted. If the call sign of the station being called is not known, the name or trade name may be used, but when contact has been made the called station shall thereafter be identified by its call sign. Examples of proper identification procedure are set forth at the end of this paragraph. Where transmissions or exchanges of transmissions of greater length are permitted by this part, the identification shall also be transmitted at least every 15 minutes. Each transmission or exchange of transmissions conducted on different frequencies shall be fully and separately identified in accordance with the foregoing on each frequency used.

EXAMPLES OF PROPER IDENTIFICATION

Intrastation communications:

(1) Calling: "KZZ 0001 base, calling unit 2,"

Response: "KZZ 0001 unit 2, to base, over."

Clearing: "KZZ 0001 base, clear with unit 2" and "KZZ 0001 unit 2, clear with base."

(2) Calling: "KZZ 0001 unit 1, calling unit 3."

Response: "KZZ 0001 unit 3, to unit 1, over."

Clearing: "KZZ 0001 unit 1, clear with unit 3" and "KZZ 0001 unit 3, clear with unit 1."

Interstation communications:

Calling: "KZZ 0001 calling KZZ 0002," or "KZZ 0001 calling KZZ 0002 unit 3" (if appropriate).

Response: "KZZ 0002 to KZZ 0001, over."

Clearing: "KZZ 0001 clear with KZZ 0002," and "KZZ 0002 clear with KZZ 0001."

(d) Unless specifically required by the station authorization, the transmissions of a citizens radio station need not be identified when the station (1) is a Class A station which automatically retransmits the information received by radio from another station which is properly identified or (2) is not being used for telephony emission.

§ 95.97 Operator license requirements.

(a) No operator license is required for the operation of a citizens radio station except that stations manually transmitting Morse Code shall be operated by the holders of a third or higher class radiotelegraph operator license.

(b) Except as provided in paragraph (c) of this section, all transmitter adjustments or tests while radiating energy during or coincident with the construction, installation, servicing, or maintenance of a radio station in this service, which may affect the proper operation of such stations, shall be made by or under the immediate supervision and responsibility of a person holding a first- or second-class commercial radio operator license, either radiotelephone or radio telegraph, as may be appropriate for the type of emission employed, and such person shall be responsible for the proper functioning of the station equipment at the conclusion of such adjustments or tests. Further, in any case where a transmitter adjustment which may affect the proper operation of the transmitter has been made while not radiating energy by a person not the holder of the required commercial radio operator license or not under the supervision of such licensed operator, other than the factory assembling or repair of equipment, the transmitter shall be checked for compliance with the technical requirements of the rules by a commercial radio operator of the proper grade before it is placed on the air.

(c) Except as provided in § 95.53 and in paragraph (d) of this section, no commercial radio operator license is required to be held by the person performing transmitter adjustments or tests during or coincident with the construction, installation, servicing, or maintenance of Class C or Class D stations in this service: *Provided*, That there is compliance with all of the following conditions:

(1) The transmitting equipment shall be crystal-controlled with a crystal capable of maintaining the station frequency within the prescribed tolerance;

(2) The transmitting equipment either shall have been factory assembled or shall have been provided in kit form by a manufacturer who

provided all components together with full and detailed instructions for their assembly by non-factory personnel;

(3) The frequency determining elements of the transmitter, including the crystal(s) and all other components of the crystal oscillator circuit, shall have been preassembled by the manufacturer, pretuned to a specific available frequency, and sealed by the manufacturer so that replacement of any component or any adjustment which might cause off-frequency operation cannot be made without breaking such seal and thereby voiding the certification of the manufacturer required by this paragraph;

(4) The transmitting equipment shall have been so designed that none of the transmitter adjustments or tests normally performed during or coincident with the installation, servicing, or maintenance of the station, or during the normal rendition of the service of the station, or during the final assembly of kits or partially pre-assembled units, may reasonably be expected to result in off-frequency operation, excessive input power, overmodulation, or excessive harmonics or other spurious emissions; and

(5) The manufacturer of the transmitting equipment or of the kit from which the transmitting equipment is assembled shall have certified in writing to the purchaser of the equipment (and to the Commission upon request) that the equipment has been designed, manufactured, and furnished in accordance with the specifications contained in the foregoing subparagraphs of this paragraph. The manufacturer's certification concerning design and construction features of Class C or Class D station transmitting equipment, as required if the provisions of this paragraph are invoked, may be specific as to a particular unit of transmitting equipment or general as to a group or model of such equipment, and may be in any form adequate to assure the purchaser of the equipment or the Commission that the conditions described in this paragraph have been fulfilled.

(d) Any tests and adjustments necessary to correct any deviation of a transmitter of any Class of station in this service from the technical requirements of the rules in this part shall be made by, or under the immediate supervision of, a person holding a first- or second-class commercial operator license, either radiotelephone or radiotelegraph, as may be appropriate for the type of emission employed.

§ 95.101 Posting station licenses and transmitter identification cards or plates.

(a) The current authorization for each station (including units of a Class B, Class C or Class D station) operated at a fixed location shall be posted at a conspicuous place at the principal fixed location from which such station is controlled, and a photocopy of such authorization shall be posted at all other fixed locations from which the station is controlled. In addition, an executed Transmitter Identification Card (FCC Form 452-C) or a plate of metal or other durable substance, legibly indicating the call sign and the licensee's name and address, shall be affixed, readily visible for inspection, to each transmitter operated at a fixed location when such transmitter is not in view of, or is not

readily accessible to, the operator of at least one of the locations at which the station authorization or a photocopy thereof is required to be posted.

(b) The current authorization for each station operated as a mobile station shall be retained as a permanent part of the station records, but need not be posted. In addition, an executed Transmitter Identification Card (FCC Form 452-C) or a plate of metal or other durable substance, legibly indicating the call sign and the licensee's name and address, shall be affixed, readily visible for inspection, to each of such transmitters: *Provided*, That, if the transmitter is not in view of the location from which it is controlled, or is not readily accessible for inspection, then such card or plate shall be affixed to the control equipment at the transmitter operating position or posted adjacent thereto.

§ 95.103 Inspection of stations and station records.

All stations and records of stations in the Citizens Radio Service shall be made available for inspection upon the request of an authorized representative of the Commission made to the licensee or to his representative (see § 1.6 of this chapter). Unless otherwise stated in this part, all required station records shall be maintained for a period of at least 1 year.

§ 95.105 Current copy of rules required.

Each licensee in this service shall maintain as a part of his station records a current copy of Part 95, Citizens Radio Service, of this chapter.

§ 95.107 Inspection and maintenance of tower marking and associated control equipment.

The licensee of any radio station which has an antenna structure required to be painted or illuminated pursuant to the provisions of section 303(q) of the Communications Act of 1934, as amended, and/or Part 17 of this chapter shall operate and maintain the tower marking and associated control equipment in accordance with the following paragraphs of this section.

(a) The tower lights shall be observed at least once each 24 hours, either visually or by observing an automatic and properly maintained indicator designed to register any failure of such lights, to insure that all such lights are functioning properly as required; or, alternatively, there shall be provided and properly maintained an automatic alarm system designed to detect any failure of the tower lights and to provide indication of such failure to the licensee.

(b) Any observed or otherwise known failure of a code or rotating beacon light or top light not corrected within 30 minutes, regardless of the cause of such failure, shall be reported immediately by telephone or telegraph to the nearest Air Traffic Communications Station or office of the Federal Aviation Agency. Further notification by telephone or telegraph shall be given immediately upon resumption of the required illumination.

(c) All automatic or mechanical control devices, indicators, and alarm systems associated

with the tower lights shall be inspected at intervals not to exceed 3 months, to insure that such apparatus is functioning properly.

(d) All lighting shall be exhibited from sunset to sunrise unless otherwise specified in the instrument of station authorization.

(e) A sufficient supply of spare lamps shall be maintained for immediate replacement purposes at all times.

(f) All towers shall be cleaned or repainted as often as is necessary to maintain good visibility.

§ 95.111 Recording of tower light inspections.

When a station in this service has an antenna structure which is required to be illuminated, appropriate entries shall be made in the station records, as follows:

(a) The time the tower lights are turned on and off each day, if manually controlled.

(b) The time the daily check of proper operation of the tower lights was made.

(c) In the event of any observed or otherwise known failure of a tower light:

(1) Nature of such failure.

(2) Date and time the failure was observed or otherwise noted.

(3) Date, time, and nature of the adjustments, repairs, or replacements made.

(4) Identification of the Air Traffic Communications Station (or office of the Federal Aviation Agency) notified of the failure of any code or rotating beacon light not corrected within 30 minutes, and the date and time such notice was given.

(5) Date and time notice was given to the Air Traffic Communications Station (or office of the Federal Aviation Agency) that the required illumination was resumed.

(d) Upon completion of the 3-month periodic inspection required by § 95.107(c):

(1) The date of the inspection and the condition of all tower lights and associated tower lighting control devices, indicators, and alarms systems.

(2) Any adjustments, replacements, or repairs made to insure compliance with the lighting requirements and the date such adjustments, replacements, or repairs were made.

§ 95.113 Answers to notices of violations.

(a) Any licensee who appears to have violated any provision of the Communications Act or any provision of this chapter shall be served with a written notice calling the facts to his attention and requesting a statement concerning the matter. FCC Form 793 may be used for this purpose.

(b) Within 10 days from receipt of notice or such other period as may be specified, the licensee shall send a written answer, in duplicate, direct to the office of the Commission originating the notice. If an answer cannot be sent nor an acknowledgment made within such period by reason of illness or other unavoidable circumstances, acknowledgment and answer shall be made at the earliest practicable date with a satisfactory explanation of the delay.

(c) The answer to each notice shall be complete in itself and shall not be abbreviated by reference to other communications or answers to other notices. In every instance the answer

shall contain a statement of the action taken to correct the condition or omission complained of and to preclude its recurrence. If the notice relates to violations that may be due to the physical or electrical characteristics of transmitting apparatus, the licensee must comply with the provisions of § 95.53, and the answer to the notice shall state fully what steps, if any, have been taken to prevent future violations, and, if any new apparatus is to be installed, the date such apparatus was ordered, the name of the manufacturer, and the promised date of delivery. If the installation of such apparatus requires a construction permit, the file number of the application shall be given, or if a file number has not been assigned by the Commission, such identification shall be given as will permit ready identification of the application. If the notice of violation relates to lack of attention to or improper operation of the transmitter, the name and license number of the operator in charge, if any, shall also be given.

§ 95.115 False signals.

No person shall transmit false or deceptive communications by radio or identify the station he is operating by means of a call sign which has not been assigned to that station.

§ 95.117 Station location.

(a) The specific location of each Class A base station and each Class A fixed station and the specific area of operation of each Class A mobile station shall be indicated in the application for license. An authorization may be granted for the operation of a Class A base station or fixed station in this service at unspecified temporary fixed locations within a specified general area of operation. However, when any unit or units of a base station or fixed station authorized to be operated at temporary locations actually remains or is intended to remain at the same location for a period of over a year, application for separate authorization specifying the fixed location shall be made as soon as possible but not later than 30 days after the expiration of the 1-year period.

(b) A Class A mobile station authorized in this service may be used or operated anywhere in the United States subject to the provisions of paragraph (d) of this section: *Provided*, That when the area of operation is changed for a period exceeding 7 days, the following procedure shall be observed:

(1) When the change of area of operation occurs inside the same Radio District, the Engineer in Charge of the Radio District involved and the Commission's office, Washington, D.C., 20554, shall be notified.

(2) When the station is moved from one Radio District to another, the Engineers in Charge of the two Radio Districts involved and the Commission's office, Washington, D.C., 20554, shall be notified.

(c) A Class B, Class C or Class D mobile station may be used or operated anywhere in the United States subject to the provisions of paragraph (d) of this section.

(d) A mobile station authorized in this service may be used or operated on any vessel, aircraft, or vehicle of the United States: *Provided*, That when such vessel, aircraft, or vehicle is

outside the territorial limits of the United States, the station, its operation, and its operator shall be subject to the governing provisions of any treaty concerning telecommunications to which the United States is a party, and when within the territorial limits of any foreign country, the station shall be subject also to such laws and regulations of that country as may be applicable.

§ 95.119 Control points, dispatch points, and remote control.

(a) A control point is an operating position which is under the control and supervision of the licensee, at which a person immediately responsible for the proper operation of the transmitter is stationed, and at which adequate means are available to aurally monitor all transmissions and to render the transmitter inoperative. Each Class A base or fixed station shall be provided with a control point, the location of which will be specified in the license. The location of the control point must be the same as the transmitting equipment unless the application includes a request for a different location. Exception to the requirement for a control point may be made by the Commission upon specific request and justification therefor in the case of certain unattended Class A stations employing special emissions pursuant to § 95.47(e). Authority for such exception must be shown on the license.

(b) A dispatch point is any position from which messages may be transmitted under the supervision of the person at a control point who is responsible for the proper operation of the transmitter. No authorization is required to install dispatch points.

(c) Remote control of a citizens radio station means the control of the transmitting equipment of that station from any place other than the location of the transmitting equipment, except that direct mechanical control or direct electrical control by wired connections of transmitting equipment from some other point or the same premises, craft, or vehicle shall not be considered remote control. A Class A base or fixed station may be authorized to be used or operated by remote control from another fixed location or from mobile units: *Provided*, That adequate means are available to enable the person using or operating the station to render the transmitting equipment inoperative from each remote control position should improper operation occur.

(d) Operation of any Class B, Class C or Class D station by remote control is prohibited.

§ 95.121 Civil defense communications.

A licensee of a station authorized under this part may use the licensed radio facilities for the transmission of messages relating to civil defense activities in connection with official tests or drills conducted by, or actual emergencies proclaimed by, the civil defense agency having jurisdiction over the area in which the station is located: *Provided*, That:

(a) The operation of the radio station shall be on a voluntary basis.

(b) [Reserved]

(c) Such communications are conducted under the direction of civil defense authorities.

(d) As soon as possible after the beginning of such use, the licensee shall send notice to

the Commission in Washington, D.C., and to the Engineer in Charge of the Radio District in which the station is located, stating the nature of the communications being transmitted and the duration of the special use of the station. In addition, the Engineer in Charge shall be notified as soon as possible of any change in the nature of or termination of such use.

(e) In the event such use is to be a series of pre-planned tests or drills of the same or similar

nature which are scheduled in advance for specific times or at certain intervals of time, the licensee may send a single notice to the Commission in Washington, D.C., and to the Engineer in Charge of the Radio District in which the station is located, stating the nature of the communications to be transmitted, the duration of each such test, and the times scheduled for such use. Notice shall likewise be given in the event of any change in the nature of or termination of any such series of tests.

(f) The Commission may, at any time, order the discontinuance of such special use of the authorized facilities. (END)

CANADIAN DEPARTMENT OF TRANSPORT

General Radio Service Regulations

Operation

70. (1) Subject to these Regulations, a licence for a station performing a General Radio Service shall expire on the thirty-first day of March three years following the first day of April of the fiscal year in which it is issued.

(2) In this section "fiscal year" means a twelve-month period commencing on the first day of April and ending on the thirty-first day of March following.

(3) In sections 71 to 80 "licensed station" means a station licensed to perform a General Radio Service.

71. A licence for a station performing a General Radio Service may authorize the licensed station to be operated

- (a) in any craft or vehicle;
- (b) at fixed locations; or
- (c) while carried on the person.

72. The frequencies authorized to be used by each licensed station on a shared basis, subject to no protection from the operation of industrial, scientific and medical apparatus in the frequency band 26.96-27.28 Mc/s, are as follows:

27.005 Mc/s	27.085 Mc/s	27.165 Mc/s
27.015 Mc/s	27.105 Mc/s	27.175 Mc/s
27.025 Mc/s	27.115 Mc/s	27.185 Mc/s
27.035 Mc/s	27.125 Mc/s	27.205 Mc/s
27.055 Mc/s	27.135 Mc/s	27.215 Mc/s
27.065 Mc/s	27.155 Mc/s	27.225 Mc/s
27.075 Mc/s		

73. (1) A licensed station may carry on two-way radiotelephone communication only with another licensed station that is

- (a) licensed in the name of the same licensee; or
- (b) licensed in the name of a different licensee where the business or personal activities of the licensees concerned are of mutual interest.

(2) The type of communications referred to in subsection (1) may include transmission of signals for the actuation of radio receivers to establish and maintain voice communication.

74. (1) A licensed station shall be used only for communication concerning the business activities and personal affairs of the licensee.

(2) A licensed station shall not be used for any of the following purposes:

- (a) activity contrary to federal or provincial law or municipal by-laws;

(b) the transmission of music or other material for amusement or entertainment;

(c) broadcasting or any transmission in connection with broadcasting;

(d) transmissions of any nature to the public through a public address system;

(e) transmission of a frivolous nature; or

(f) transmissions directed to any person or station beyond the ground wave coverage range of the station.

(3) No tolls shall be levied or collected on account of any business transacted or messages transmitted or received by means of a licensed station.

75. (1) Each exchange of communications between licensed stations shall not exceed five consecutive minutes duration and upon the termination of an exchange of communications no further transmission shall be made until the lapse of two minutes or until interference will not be caused to other stations using the same frequency.

(2) The emission of a carrier wave is prohibited except when actual communications are being transmitted or for making brief test transmissions.

(3) A licensed station shall transmit its assigned call sign

- (a) at the beginning and at the end of each exchange of communications in which it is engaged, and
- (b) at the end of each test transmission.

76. (1) No transmission by a licensed station shall

- (a) cause any interference to any other licensed radio stations operating outside the frequency band 27.00-27.23 Mc/s, or
- (b) cause any interference to a private receiving station.

(2) In the event of interference as referred to in subsection (1) being caused by a licensed station, the licensee may be required by a departmental radio inspector to take such steps as are necessary for the prevention of further interference or to restrict or cease operation of the station pending a satisfactory adjustment of the radio apparatus of the station.

77. (1) Each licensee shall be responsible at all times for the control and operation of his

licensed station.

(2) Subject to section 10 of the *General Radio Regulations, Part 1*, the operator of a licensed station shall be

- (a) the licensee of the station; or
- (b) any person twelve years of age or over who is a British subject, a United States citizen or a landed immigrant,

and notwithstanding anything in these Regulations, such operator is not required to be the holder of any certificate of proficiency in radio.

78. (1) Stations performing a General Radio Service are authorized to use type A3 and F3 emissions.

(2) The emissions referred to in subsection (1) shall be construed as including the use of tone signals whose sole function is to actuate receivers to establish and maintain voice communication.

(3) The maximum d.c. power input to the anode or collector circuit of the transmitter amplifier stage supplying radio frequency energy to the antenna shall not exceed five watts or alternatively the r.f. carrier power output shall not exceed three watts.

(4) The carrier frequency of the transmitter shall be maintained within a tolerance of plus or minus .005 per cent of any authorized frequency.

(5) Transmitter emissions necessary for communication shall occupy a bandwidth not exceeding twelve kilocycles.

(6) The r.f. power of transmitter spurious or harmonic outputs shall not exceed thirty microwatts.

(7) The r.f. power measured across the antenna terminals of the radio receiving apparatus used shall not exceed 20,000 picowatts.

(8) The use of radio receiving apparatus

employing a super-regenerative circuit is prohibited.

79. For the purpose of complying with section 78, the radio apparatus of a licensed station shall be of a type that has been approved in accordance with the applicable Radio Standards Specifications issued by the Minister, as evidenced by its bearing the departmental type-approved number assigned to such radio apparatus.

80. The provisions of section 14 do not apply with respect to the antenna structure of any station performing a General Radio Service if

(a) the antenna structure is erected between three and six miles distant from the center of a land or water aerodrome,

(i) is on an existing structure and does not exceed twenty feet in height above that structure, or

(ii) is self-supporting and does not exceed seventy-five feet in height above ground level and does not exceed twenty feet in height above any terrain features or existing structures within a radius of one thousand feet; or

(b) the antenna structure is erected more than six miles distant from the center of a land or water aerodrome,

(i) is on an existing structure and does not exceed thirty feet in height above that structure, or

(ii) is self-supporting and does not exceed seventy-five feet in height above ground level and does not exceed thirty feet in height above any terrain features or existing structures within a radius of one thousand feet.

CANADIAN DEPARTMENT OF TRANSPORT

Tourist Radio Service Regulations

Short Title.

1. These Regulations may be cited as the *Tourist Radio Service Regulations*.

Interpretation.

2. In these regulations,
 - (a) "department" means the Department of Transport;
 - (b) "licence" means a licence for a radio station performing a Tourist Radio Service;
 - (c) "licensed station" means a radio station to which these Regulations apply and in respect of which a licence is in effect;
 - (d) "radio inspector" means a radio inspector of the department; and
 - (e) "Tourist Radio Service" means any radio service performed by a radio station to which these Regulations apply.

Application.

3. These Regulations apply to any land or mobile radio station operated by a citizen of the United States of America, temporarily in Canada as a tourist or visitor, for private radiotelephone communications of a personal non-business nature in the frequency band 27.00-27.23

Mc/s. and the *General Radio Regulations, Part II* do not apply to any such station.

Licences.

4. (1) A licence for a radio station performing a Tourist Radio Service may be issued to a person who is a citizen of the United States of America, temporarily in Canada as a tourist or visitor if that person is licensed by the Government of the United States to operate the station in the Citizens Radio Service as a Class D station.

(2) An application for a licence shall be made to the Regional Superintendent, Radio Regulations, of the Department who is located nearest the port of entry at which the applicant will enter Canada, as set out in the Schedule, at least thirty days prior to the date the applicant will enter Canada.

(3) A licence may be issued under subsection (1) for the duration of the visit of the licensee in Canada except that no licence shall be issued for a period in excess of one year.

(4) A licensee may apply to a Regional Superintendent, Radio Regulations, for renewal of a licence issued under this section and the licence may be renewed for a further period not

in excess of one year.

5. (1) No licence shall be transferred or assigned.

(2) Each licence shall be kept available for production to a radio inspector who may inspect the licensed station at all reasonable times.

(3) Where a radio inspector is satisfied that there has occurred any breach, non-observance or non-performance by or on the part of the licensee, his servants or agents, of any of the terms or conditions contained in the licence or in these Regulations, he may require the licensee to surrender his licence for suspension and may suspend the licence for a temporary period or for the duration of the licence by notice in writing to the licensee.

(4) A licensee shall comply with the request of an inspector to surrender his licence and shall not operate or permit to be operated the licensed station while the licence is suspended.

(5) A licensee may appeal the suspension to the Minister of Transport and the Minister may re-instate or revoke the licence.

Operation.

6. A licence may authorize the licensed station to be operated

(a) in any craft or vehicle;

(b) at fixed locations; or

(c) while carried on the person.

7. (1) The frequencies authorized to be used by each licensed station on a shared basis are as follows:

27.005 Mc/s	27.075 Mc/s	27.155 Mc/s
27.015 Mc/s	27.085 Mc/s	27.165 Mc/s
27.025 Mc/s	27.105 Mc/s	27.175 Mc/s
27.035 Mc/s	27.115 Mc/s	27.185 Mc/s
27.055 Mc/s	27.125 Mc/s	27.205 Mc/s
27.065 Mc/s	27.135 Mc/s	27.215 Mc/s
		27.225 Mc/s

(2) The frequencies authorized to be used by a licensed station are not subject to protection from the operation of industrial, scientific and medical apparatus in the frequency band 26.96-27.28 Mc/s.

8. Each licensed station may be used for two-way radiotelephone communication using type A3 emission which may include the transmission of tone signals whose sole function is to actuate receivers to establish and maintain voice communication.

9. A licensed station may communicate only with

(a) another licensed station that is

(i) licensed in the name of the same licensee, or

(ii) licensed in the name of a different licensee if the personal activities of the licensees are of mutual interest; and

(b) a station licensed to perform a General Radio Service under the *General Radio Regulations, Part II* if the personal activities of the licensees are of mutual interest.

10. (1) A licensed station shall be used only for communication concerning the per-

sonal affairs or activities of the licensee.

(2) A licensed station shall not be used for

(a) any activity contrary to federal or provincial law or municipal by-laws;

(b) the transmission of music or other material for amusement or entertainment;

(c) broadcasting or any transmission in connection with broadcasting;

(d) transmissions of any nature to the public through a public address system;

(e) transmissions of a frivolous nature; or

(f) transmissions directed to any person or station beyond the ground wave coverage range of the station.

(3) No person shall transmit or make a signal containing profane or obscene words or language by means of a licensed station.

(4) No tolls shall be levied or collected on account of any business transacted or messages transmitted or received by means of a licensed station.

11. (1) No exchange of communications between licensed stations shall exceed five consecutive minutes duration and upon the termination of an exchange of communications no further transmission shall be made until two minutes has elapsed or until interference will not be caused to other stations using the same frequency, whichever occurs later.

(2) The emission of a carrier wave is prohibited except when actual communications are being transmitted or for making brief test transmissions.

(3) A licensed station shall transmit its assigned call sign

(a) at the beginning and at the end of each exchange of communications in which it is engaged; and

(b) at the end of each test transmission.

12. (1) No transmission by a licensed station shall cause any interference to

(a) a private receiving station;

or

(b) any radio station licensed to operate outside the frequency band 27.00-27.23 Mc/s.

(2) In the event of interference referred to in subsection (1) being caused by a licensed station, the licensee may be required by a radio inspector to take such steps as are necessary for the prevention of further interference or to restrict or cease operation of the station pending a satisfactory adjustment of the radio apparatus of the station.

13. (1) Each licensee shall be responsible at all times for the control and operation of his licensed station.

(2) No person shall operate a licensed station unless he is

(a) the licensee of the station;

or

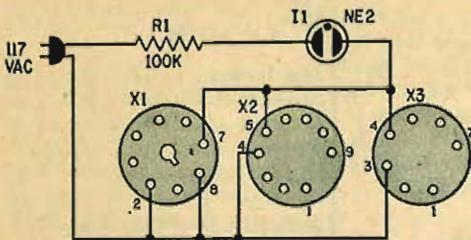
(b) a person twelve years of age or over who is a British subject, a United States citizen or a landed immigrant, and such operator is not required to be the holder of any certificate of proficiency in radio.

14. (1) No person shall erect any antenna structure for a licensed station except an antenna structure that may be erected under sub-

(Continued on page 112)

CB Cube Tester

Continued from page 78



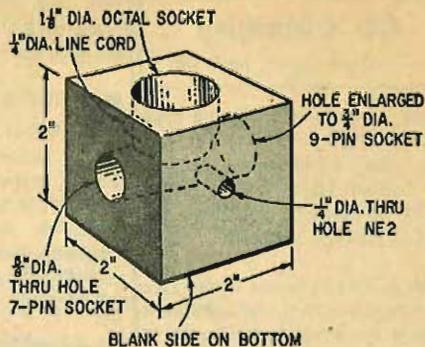
The circuit (above), is simple but you must remember it won't check all of the tubes—filaments on many 5-volt rectifier tubes are pins 2 and 8.

PARTS LIST

- I1—NE2 neon lamp
- R1—100,000-ohm, 1/2-watt resistor
- X1—8-pin octal socket
- X2—9-pin miniature tube socket
- X3—7-pin miniature tube socket
- 1—Line cord and plug
- 1—Block wood 2x2x2 inches approx.
- Misc.—plastic electrical tape, stranded hookup wire, solder, wood screws.

the 1 1/8-inch hole for the octal socket. Carefully insulate all bare leads and solder joints to prevent shorts. Use plastic tubing and electrical tape.

Completion. Finish the job by maneuver-



If you're not sure of your carpentry, drill the 1/4-in. holes from each side to the center and drill the 1 1/8-in. hole past center to be sure of having all other holes bore into it.

ing the NE2 lamp down into the 1/4-inch hole provided for it and push it in place. Before mounting the sockets, check the tester for proper operation. Plug in a vacuum tube that is known to be good, and the NE2 should glow. Removing the tube will cause the NE2 to extinguish. If all is OK, go ahead and secure the sockets with small roundhead wood screws.

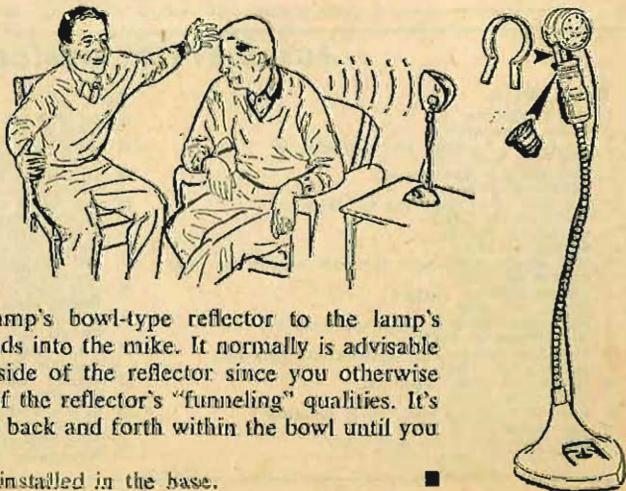
A Final Note. The CB Cube Tester will check most common tubes for open filaments. However, there are some tubes which have different pin connections to the filament element, so if in doubt, always check with a tube manual. ■

CB MIKE-IN-A-LAMP

■ A microphone stand for CB hand mikes can be improvised from a flexible-neck desk lamp with its cord removed (or at least disconnected), a plug to fit the lamp's socket, and a 1/8 x 3/8-in. metal strip. Bend the metal strip to the size necessary for the mike in question, and use as shown.

For best results, attach the lamp's bowl-type reflector to the lamp's socket to "funnel" or focus sounds into the mike. It normally is advisable to face the mike toward the inside of the reflector since you otherwise won't be taking full advantage of the reflector's "funneling" qualities. It's also wise to try moving the mike back and forth within the bowl until you achieve best sound pickup.

A push-to-talk switch can be installed in the base. ■



CB Directory

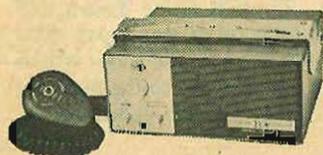
Continued from page 88

comes complete with all the crystals you'll ever need, has P.A. feature, a long list of special features, and built-in 12-volt mobile power supply. A top-of-the-crop item, she sells for \$239.95 complete.

Model H. This 7-channel rig provides an external socket for additional crystals and works from 12 volts in the car or 117-volt AC on base. Price is \$159.95.

● SQUIRES-SANDERS, INC.

Model 23'er. Still a real big item for S-S, this set is a dandy all-transistor transceiver that is so small and efficient it has to be seen to be truly appreciated. It can be had with a wide variety of extras and options (example: AC power adapter for \$19.50—reasonably priced, we might add). With full 23-channel capabilities and built-in mobile supply, the set sells for \$235.00.



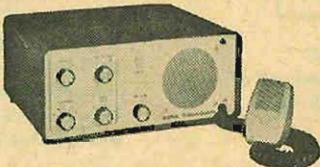
Squires-Sanders Model 23'er

Model S5S. A sort of trimmed down version of its famous 23'er big brother, the S5S affords 5-channel operation and mobile power facilities.

ties. Also adaptable to the same group of accessories as the 23'er, the solid state S5S sells for \$185.00.

● SSBCO

Model ASB-11. Here's a set that's been a sleeper for some time, but it's still worth investigating if you're in the market for an AM and SSB transceiver all in one package. A handsome-appearing set, 5 channels, uses Collins mechanical filter, 12-volt operation. Price is \$277.50.



SSBCO Model ASB-11

Model ASB-11A. A de-luxe version of the Model ASB-11. Has built-in noise blanker. Price \$322.50.

Model SSB-27. Similar to Model ASB-11 without AM feature. Only \$249.95.

Model SSB-27A. A de-luxe version of the Model SSB-27. Has built-in noise blanker. Price, \$299.50.

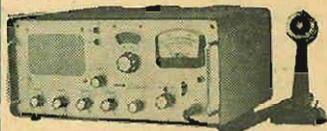
PS-1. Yep, it's the 117 VAC power supply for the four above units that lets you operate out of the outlet. Price, \$25.00.

● TRAM ELECTRONICS, INC.

The Titan. One of the very few CB rigs in this price category, it goes virtually unchallenged as one of the

finest base station transceivers on the market today. With a 117 VAC power supply, and full 23-channel capability, it is regarded highly in CB circles, and is sort of a compatible base mate to the XL-100. Priced at \$434.00.

Titan II. Here's a brand new rig featuring single-sideband operation as well as AM—like two complete transceivers in one cabinet. A "complete" rig packed with features every operator wants. Its \$482.00 price tag seems low for the package that's offered.



Tram Titan II

The XL-100. Go to Tram and you'll see some of CB's finest equipment. Generally appealing to the dyed-in-the-wool, experienced CB'er who knows the ropes, this XL-100 lights up flashing the channel you're operating on a large dial, comes with a host of special features, and is designed just for in-car work. Extremely small, the unit is equipped for all 23-channels and sells at \$318.00.

● WORLD RADIO LABORATORIES

Rustler II. All new and a top CB buy. Has a tunable receiver with spot stitch and squelch control plus noise limiter. An 11-channel job with one xtal socket on the front panel. Comes with AC and DC power cords. Price with mounting bracket is only \$79.95.

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Baltimore, Md. 21202
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Norfolk, Va. 23510
- 6 2010 Atlanta Merchandise Mart, 240 Peachtree St. N.E.
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- 16 208 Federal Courts Building, 6th and Market Sts.
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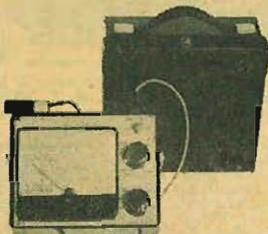
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Canadian Tourist Regulations

Continued from page 108

section (2) or the erection of which has been authorized by a Regional Superintendent, Radio Regulations, upon application to him.

(2) An antenna structure may be erected for a licensed station if,

(a) in the case of an antenna structure erected between three and six miles distance from the centre of a land or water aerodrome, it

(i) is on an existing structure and does not exceed twenty feet in height above that structure, or

(ii) is self-supporting and does not exceed seventy-five feet in height above ground level and does not exceed twenty feet in height above any terrain features or existing structures within a radius of one thousand feet; or

(b) in the case of an antenna structure erected more than six miles distance from the centre of a land or water aerodrome, it

(i) is on an existing structure and does not exceed thirty feet in height above that structure, or

(ii) is self-supporting and does not exceed seventy-five feet in height above ground level and does not exceed thirty feet in height above any terrain features or existing structures within a radius of one thousand feet.

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RADIO REGULATIONS.

*Nearest Regional
Superintendent, Radio
Regulations.*

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