2nd INSTALLMENT: PART 15 CALLBOOK! P. 31

S9

MARCH 1963

50c

the citizens band journal

- LATEST FCC NEWS!
- S9's FCC RULE PETITION
- CB CLUBS—UNCENSORED!
- BUILD THE "SIGNA-BOOST"
- REPRINT OF FCC PART 15
- BUILD THE "MINI-VERTER"
- BUILD A 3 ELEMENT BEAM!
- ALL ABOUT SUPERHETS!
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- THE COMPLETE "10-CODE"

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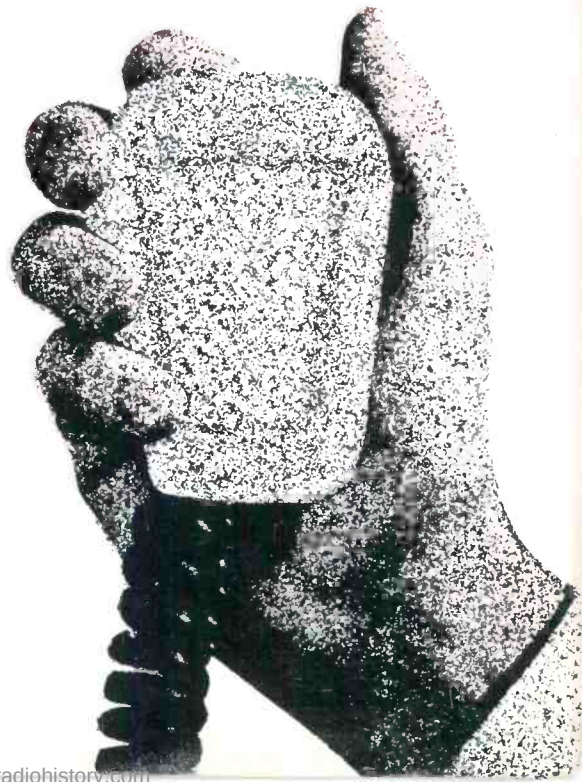

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SEE PAGE 58

Model 1500 . . . *for the Hobbyist . .*

Now . . . you can be on the air, and operate a two-way radio, without a license. The new International Model 1500 Executive transceiver is certified to meet all FCC Part 15 requirements for short range radio communication within the 27 mc frequency range.

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S9
the citizens band journal

Vol. 2, No. 3

March, 1963

S. R. COWAN, PUBLISHER

300 West 43rd Street New York 36, N. Y.

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READER MAIL

IT'S IN THE CARDS

Dear Tom,

You ran an article on CB QSL cards last September, at the beginning of which there was a full page of the cards shown. I obtained many addresses from this, writing many of the CB'ers and asking if they would like to swap cards with me—most of them replied that they were swamped with similar requests as soon as your issue came out.

I think it would be a good idea for you to devote space each month to giving the names and addresses of those readers who wish to swap cards with other readers.

I'm not a CB'ing ham, but I do enjoy the hobby of collecting the cards. What say?

Cal Thomas, KBA3169

OK Cal, we're always open to suggestions from our readers. If any readers want to swap cards, send a postal card to "Card Swap," % S9 Magazine, 300 West 43rd Street, New York 36, N. Y. You must send a separate card for each month you wish to be listed.

WHITHER N.C.R.L.?

TK,

Please send me the address of the National Citizens Radio League. I wrote them at their Chicago address but the letter was returned marked, "moved, left no address."

R. L. Snyder, KCI1041
Mannboro, Va.

At least the Post Office is consistent. They bounced our letter too!

TAGGED BY CB

Dear Tom,

I spoke to the local auto license tag office about securing tags with CB calls on them for 1964. The people there told me that requests for these tags should be sent to: The Hon. Arch Livingston, Motor Vehicle Commissioner, Tallahassee, Fla.

Interested Florida CB'ers should write to him as soon as possible to get the ball rolling. If enough letters come in, it's possible that we'll have "personalized" auto tags.

Roy F. Page, KDH0542
Vero Beach, Fla.

CLASS B — WHAT DAT?

Tom,

I wonder if any S9 readers might have an old Vocaline JRC-400 or JRC-425 Class B CB rig which they want to sell. I've gotten a lot of use from the 465 mc/s Class B CB service and I want to expand my operations there.

David P. Smith, 18W2754
Box 81
Olney, Ill.

If any readers can fix David up with such units, please drop him a line.

THEY LOVE US IN LOCKPORT

Hi Tom,

Enclosed is a list of 31 members of our club who are subscribing to S9 for a year at your low club rates. In accordance with our club's Constitution and By-Laws, each member receives a subscription to S9, which has been designated as the official magazine of the West New York Citi-Banders Club, Inc.

Lloyd L. Bayne
W. N. Y. Citi-Banders Club, Inc.
Lockport, N. Y.

SATISFIED ADVERTISER

Dear Tom,

Just a note to let you know that our QSL card ad (Bogin Printing) in S9 has brought overwhelming results. I have advertised in a number of different media, but never has it been my pleasant experience to receive so much mail from all parts of the country and also Canada.

Samuel R. Bogin, 2A5491
Brooklyn, N. Y.

PART 15'er

Editor:

Thanks for your support of the new Part 15 hobby CB. I'm glad that somebody is finally recognizing and helping us "mighty milliwatts" who aren't old enough for Part 19 licenses.

Richard Gulley, CENTRAL 363
LaPorte, Ind.

We're glad you're glad, Dick. Many CB'ers have written letters similar to yours and we wish to issue a blanket "thank you" because if we tried to print 'em all we wouldn't have room for anything else in this issue. Be sure to read our special Part 15 articles in this and all future issues.

THE FEELING IS MUTUAL!

Editor:

S9 is the best publication for CB'ers I've seen to date. Your brainwashing techniques really get through, here's a check for a year's subscription.

Gary Gonzales,
Sylmar, Calif.

Tom,

S9 is tops in the CB field. Keep it up.

Al Wolgast, KIC3615
Sharon, Pa.

Editor:

Thanks for the complementary copy of S9. Best magazine I've seen so far. My check is enclosed! Best of luck.

Glenn L. Kenan, KCF1582
Alexandria, Va.

Tommy,

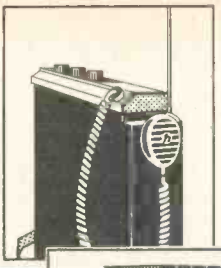
I received my CB license a few months ago. Many companies have mailed me samples of their magazines, but S9 is by far the finest. Your articles are always interesting and educational and don't seem printed just to take up space.

Clem Senna, KBG5362
Mountainside, N. J.

Thanks guys! Send a few more like these and I'll go in and demand a raise!

Watch for next month's big issue

Nothing fits all your CB needs like Hallicrafters' versatile *new transistorized CB-5*



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Wherever and however you use citizens band, no transceiver made gets around with the effortless efficiency and consistent high performance of the new CB-5.

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editorial

KBG4303 rides again!

by TOM KNEITEL
EDITOR, S9
300 WEST 43rd STREET
NEW YORK 36, N. Y.

IMPORTANT FCC NEWS

Within a few weeks, seven men will be seated around a mahogany conference table behind closed doors in Washington. They will exchange amenities and then make a decision regarding the fate of a 290 kilocycle speck of the 30 million kilocycle radio spectrum.

More than just the importance of this infinitesimal dot of space in the unlimited radio spectrum, the decision will affect the investments of the more than 376,000 American citizens who are licensees in the Citizens Radio Service. It is therefore important that these seven men carefully consider the multitude of facts before them so that their decision will be in the best interests of the public which they have been appointed to serve.

A number of manufacturers in the Citizens Radio industry have united into an organization known as "CEMA" (Communications Equipment Manufacturers Association) and will submit their own proposals to the Commission in an effort to protect their interests and the interests of the licensees in the service. As of this writing, they have succeeded in obtaining an extension of the original January 15th comment deadline to the new deadline date of March 4th. The Cowan Publishing Corp., publishers of S9 Magazine, are members of CEMA and are participating in the CEMA petition to the FCC.

But is this enough? We frankly don't know! The "Washington Outlook" column in this issue of S9 contains our editorial position on the new FCC proposals and we are submitting them to the Commission separately, in addition to the CEMA petition.

At first a healthy flood of letters, comments and petitions appeared to be heading towards the Commission and it looked as if the Citizens Radio users were rallying to defend their rights. The mail soon dropped off leaving a total showing of about 400. While many were extremely well thought out and written, it seems as if it is a rather poor showing considering the more than 376,000 Citizens Radio licensees operate some million transceivers. It is our opinion that the licensees are not fully aware that they have the right to file comments on these matters.

Of course, the FCC is not running a popularity contest or election and is under no obligation to tally up or take into account any of the petitions or comments. Asking for the petitions is merely a courtesy which is extended to the public.

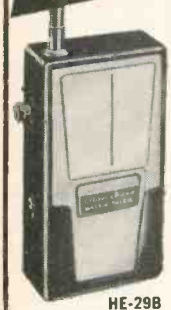
Have you submitted your position to the FCC? Probably not. It is urgent that you *immediately* notify the Commission of your views on the proposed rules (they were outlined in our January issue). This must be done by sending an original and 14 copies (mimeographed, carbon copies, spirit duplicator, etc.) to The Federal Communications Commission, Washington 25, D. C. Be certain to identify your petition with the words "Docket 14843" and to have it in Washington *not later than* March 4th.

If you happen to agree with S9's position, as presented in this month's "Washington Outlook" column, we welcome you to use it for your own, or adapt portions of it to combine with your own thoughts. In any event, *your* support is *urgently* needed! It is needed *NOW! It is not needed in the form of lip*

Continued on page 59

LAFAYETTE CB Spectacular

New! LAFAYETTE 10-TRANSISTOR PORTABLE CITIZENS BAND "WALKIE TALKIE"



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HE-20C

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HE-15

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- Effective Full-Wave Variable Noise Limiter
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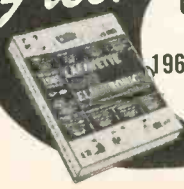

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LET'S LOOK AT MIKES!

by JAMES P. GILLESPIE
SCIENCE DEPARTMENT
MARSHALL UNIVERSITY

A microphone is an instrument used to convert sound energy into electrical energy. These may be made in many ways. Each type has its merits and its definite limitations.

Recently the wife decided to turn the tables and buy *me* a gift for a change. A microphone was selected, but then we had a problem. Wishing to get the biggest value for the least amount, I set out to probe into the character of various microphones. To my amazement, there is scanty information available in the general run of CB literature on this subject. This article is presented in an effort to provide others with a better concept of the various microphones available on the market today.

CARBON MICROPHONES

Carbon microphones are resistance microphones (Fig. 1). An electric current is passed through a mass of carbon granules in an insulated box. A diaphragm activated by sound waves compresses the granules together causing less resistance and, thus, higher voltage to occur through the circuit. As the diaphragm vibrates back and forth the voltage varies in proportion to the sound energy and can be amplified in a vacuum tube. *Advantages:* have high output and are very rugged (valued in mobile installations where they will be banged around a great deal); very good voice frequencies. *Disadvantages:* an external voltage source is required; may be noisy; have definite limitations as to sound fidelity (poor for music, etc.); requires special circuitry not usable with other types of microphones.

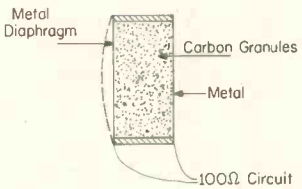


Fig. 1 - Carbon

A double-button carbon microphone is "double," having granules on both sides of

The Turner Model SR90R carbon mike.

the diaphragm. *Differential* microphones are generally of the carbon type and so constructed that they pick up sounds only from a very close vicinity (¼ to ⅜ inch from the mouth) and are used in aircraft, etc., where noise is high.

CRYSTAL MICROPHONES

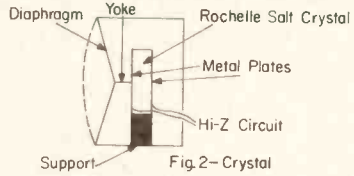
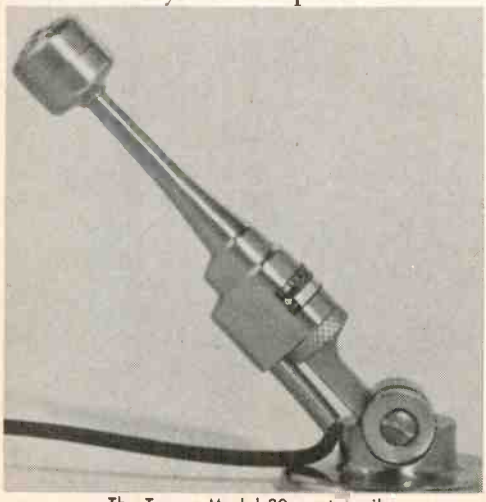


Fig. 2–Crystal

Pierre and Marie Curie (of radium fame) discovered that quartz, when subjected to physical strain produces an electric potential. This so-called piezo-electric effect is also characteristic of other types of crystals. In commercial crystal microphones Rochelle salt is subjected to physical strain to produce a voltage (Fig. 2). This is characteristically a high impedance mircophone. *Advantages:* high output; good frequency response; high sensitivity; no external voltage needed; can be connected directly to the grid of the speech amplifier; low cost. *Disadvantages:* high impedance only; may be damaged by humidity and temperature extremes above 115°F (some have coatings to keep out humidity but are still prone to heat damage); extreme hi-fi critics may find bass notes too bassy but this is not important in CB work; not very rugged.



The Turner Model 80 crystal mike.

CERAMIC MICROPHONES

Pictured here are 5 popular CB ceramic mikes: 1. The Shure Model 201, 2. The Astatic 331, 3. The Euphonics "Hot Head," 4. The Sonotone CM-30M with magnetic back, and 5. The Turner Model 350.

These work on the same principle as the crystal mikes but the crystal has been replaced by a "ceramic" material, barium titanate. *Advantages:* reasonably high output; moderately good frequency response; not generally sensitive to temperature and humidity extremes; low cost. *Disadvantages:* frequency response and output slightly less than in a crystal mircophone (but very adequate for all but the most critical hi-fi CB'ers); not as rugged as carbon mikes; high impedance only.

DYNAMIC MICROPHONES

When a coil of wire moves back and forth through a magnetic field, a potential dif-

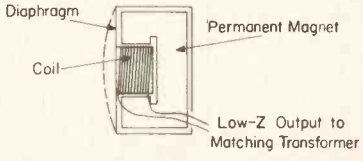
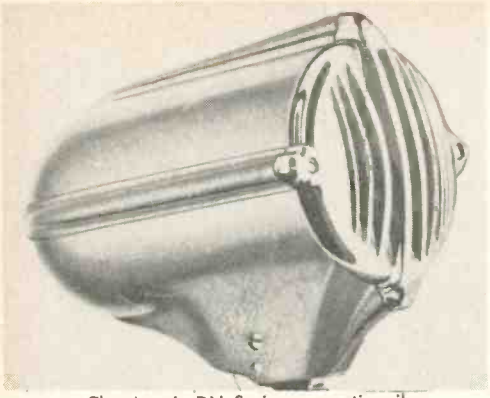


Fig. 3–Dynamic



The Astatic DN Series magnetic mike.

ference is induced into the coil. A diaphragm activated by sound energy moves the coil back and forth in a dynamic microphone (Fig. 3). These are characteristically low impedance microphones but manufacturers generally use a transformer to match dynamic mircophones to a high impedance circuit. *Advantages:* ruggedly constructed; may be matched to high or low impedance circuits (depending on manufactured limits); good frequency response over a moderately wide frequency range; moderate cost. *Disadvantages:* output from a dynamic microphone may be lower than that from crystal or ceramic microphones and in rare cases it is necessary to use a preamplifier between the microphone and speech amplifier.

Because of their modest cost and ruggedness with good frequency response, dynamic microphones have become a valuable asset to the CB market. A small permanent magnet (dynamic) loudspeaker when properly matched through one or two cascaded transformers is sometimes used to make an excellent CB microphone.

RIBBON (VELOCITY) MICROPHONES

A ribbon, or "velocity," microphone is constructed by suspending a small corrugated metal strip between the poles of a horseshoe magnet. When a moving diaphragm (Fig. 4) moves the strip back and forth in the magnetic field a small electric current is induced into it. The impedance of a ribbon microphone is extremely low. It is usually necessary to use two cascaded transformers in conjunction with a ribbon microphone to match it to the grid circuit of a speech amplifier (these are often built into the unit). *Advantages:* rugged; simple; extremely high fidelity response to sound frequencies over the entire audible range; easily made bi- or unidirectional. *Disadvantages:* low output usually requiring one or more stages of preamplification; noisy in wind; susceptable to AC hum pickup; expensive (and thus generally limited to use in broadcast work).

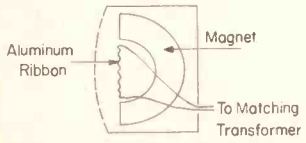


Fig. 4–Ribbon or Velocity

CONDENSER MICROPHONES

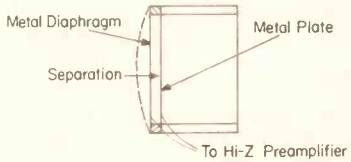


Fig. 5– Condenser

Condenser microphones (Fig. 5) are made by placing an insulated metal strip behind a metal diaphragm. A DC potential is applied to the plates. Movement of the diaphragm produces a change in the DC potential corresponding to the sound frequency. This is then amplified in a vacuum tube. *Advantages:* extremely good frequency response over the entire audible frequency range (sometimes used in calibrating loudspeakers and recorders). *Disadvantages:* low output requiring at least two stages of preamplification (one necessarily near the microphone); extremely high impedance requiring good shielding to prevent RF and AC hum pickup; sensitive to barometric pressure changes; expensive (used mostly in broadcast work).

MAGNETIC (CONTROLLED RELUCTANCE) MICROPHONES

Magnetic microphones (Fig. 6) were developed by Shure Brothers, Inc., for use in the armed services during World War II. These represent a relatively new principle in microphones. The output voltage is induced in a coil of wire by causing a sound wave to modulate the *reluctance* of a magnetic circuit. Sound vibrates a diaphragm back

Continued on page 61

Watch for next month's big issue

CB CLUBS UNCENSORED!

THE LOWDOWN ON

WHY SOME CLUBS JUST DON'T "MAKE IT"

by HERB FRIEDMAN, 2W6045

"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 insure a democratic constitution . . . we cannot stand idly by and submit to such totalitarian methods."

"The chair has given The Group For A Democratic Constitution 3 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 CB'ers, 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 S9 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 club bears this out, this rate is not approached by clubs in any other single field of endeavor.

WHAT'S THE MATTER WITH CLUBS?

Why do so many CB clubs have so much trouble? t's simple, too many CB'ers forget that the majority of CB clubs are basically social organizations whose main purpose is to provide for the enjoyment of their members. Now, a large number of clubs may have all sorts of grandiose window dressing about Civil Defense, mobile emergency pa-

trols, 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.

SO WHAT ABOUT THE CONSTITUTION?

First, and most important, 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 that he stops coming after a few meetings.

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

OTHER CLUB KILLERS

Of the things which particularly annoy club leaders to whom we spoke while researching this report, we found that there was considerable sentiment against meeting-night chit-chat on antennas, rigs, the mother-in-law, 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 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 comes 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, a nice, smooth running organization. This particular organization has been able to make it without aid of a constitution.

MORE PITFALLS

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. Pitfalls of jamborees and conventions are discussed in detail in the October, 1962, issue of S9. Dances 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 — their money sometimes lets the dance just about break even. The trick is to hustle tickets to the people who work in the CB stores, or to other local CB'ers 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! A victim of the fact that they had spent a year and a half building up to the event — in fact it was almost the complete reason for their existence — and 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.

THE SCOOP ON "NATIONAL CLUBS"

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 you to learn

that there have been (and are now) dozens, no, possibly *hundreds* of so-called national organizations for CB'ers.

Ask 75% of the CB clubs if they are "national" and they'll tell you "yes." How much does it cost to say "yes?" In most of the cases the word "national" means that the club has managed to hook in 1 or 2 guys in the next county or state.

"Ah-so," you are now saying, "he certainly can't mean *our* club because we have 58 members from Maine to California – and even 2 in Hawaii." Sorry, I'm afraid that your club still doesn't come up to snuff in the true sense of the expression "national club," 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 CB'ers on a nation-wide scale, one which responds to proposed FCC rule changes with comments, one which has a roster of officers representing all call areas, which conducts business on a national scale, which provides members with a number of services, etc.

Alright, go ahead and tell me about the *National Citizens Radio League*, the *Citizens Band Radio Relay League*, and the handful of others who have attempted to catch the fancy of CB'ers on a national basis. Last time we looked, the NCRL had apparently folded its tent and vanished into the great beyond. The CBRRL is still around but they aren't backing the theory that you must keep national publications informed of your activities if you want to be known.

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. "National" clubs have met with apathy on the part of CB'ers 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.

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THE *Courteous* S-METER

GUARANTEED TO IMPROVE SIGNAL REPORTS

by H. D. IRVIN

The signal-strength meters supplied on CB rigs have not kept pace with modern CB operating practice. Rig manufacturers themselves obviously are aware of this fact, for most of them have taken a small corrective step. Whereas some years ago all S-meters read (with eloquence) from zero to S9, nowadays the practice is to extend the range upward to at least 40 or 50 DB over S9. The manufacturers are to be commended for their effort, of course, but it has not been sufficient. A bold and sweeping departure from the past has become necessary.

After several years of monitoring, the writer concludes that not only should S-meters have greater range, but also the region of the scale below S9 is not only unnecessary, but actually undesirable. Two excerpts of signal reports given by CB'ers will demonstrate this.

Example 1. "Boy, you've got a terrific signal there, old man . . . 60 DB over 9 . . . the meter is really pinned . . . solid copy . . . By the way, I didn't quite get the handle and 10-20 so over to you again . . . I'm pretty sure you said your call is . . ."

Obviously this meter should have a higher range than a mere 60 DB. And this particular gentleman-CB'er, who has never, *never* given anything less than "20 DB over" could do very well without the range from zero to S9.

Example 2. "Well George, you're running about S7 and I didn't miss a word. Gosh, I'm sorry I can't give you a real reading, but the darned rig has an awfully 'scotch'-S-meter . . ."

In spite of the apology, George was naturally so insulted when he heard the S7 that he immediately went 10-7. Not only that, as soon as word got around about this guy's bad reports he was all but run out of town on a rail.

Figure 1. The Courteous S-meter.

He is weaving baskets at Happy Haven mumbling "S9, S9, S9 . . ."*

But no longer does this need to happen, the Courteous S-meter shown in Figure 1 is guaranteed to be politely prevaricative to everyone. The scale begins very sensibly at 20 DB above S9 and then proceeds more-or-less logarithmically to 200 DB.** Note that the pointer is permanently bent in a complete circle so that the operator may report truthfully in each contact.

The most important feature, however, is that the pointer is adjustable over its entire range from the front panel. This eliminates the need for any meter-movement within the case, and therefore it is unnecessary to connect the Courteous S-meter to the transceiver circuit.

*I understand that the Editor of this magazine mumbles the same thing in his sleep, but perhaps for different reasons.

**Plans call for higher ranges to be made available as progress demands.

THE CB-10 CODE

If you happen to eavesdrop on a citizens band radio some evening, you might hear cryptic messages that sound like this:

"Advise 10-20"
"Cicero near Cermak"
"10-4" – – –
"10-16 groceries"
"10-19"
"10-4"

What you're hearing isn't really a dramatic police episode nor is it even the audio portion of an old TV show. The conversation reported above is translated as:

"Where are you now"
"I'm on Cicero Avenue near Cermak."
"OK" – – –
"I went to the store as you requested and picked up the groceries."
"Hurry home, we're having a steak cookout. The guests are here and the fire is started."
"OK"

Business men, taxi drivers, farmers, and wives with grocery lists and car pool problems all seem to be talking like policemen, Catterall observes. With more than one-third million citizens band users all across the nation, many have adopted the police radiotelephone abbreviations to shorten their conversations.

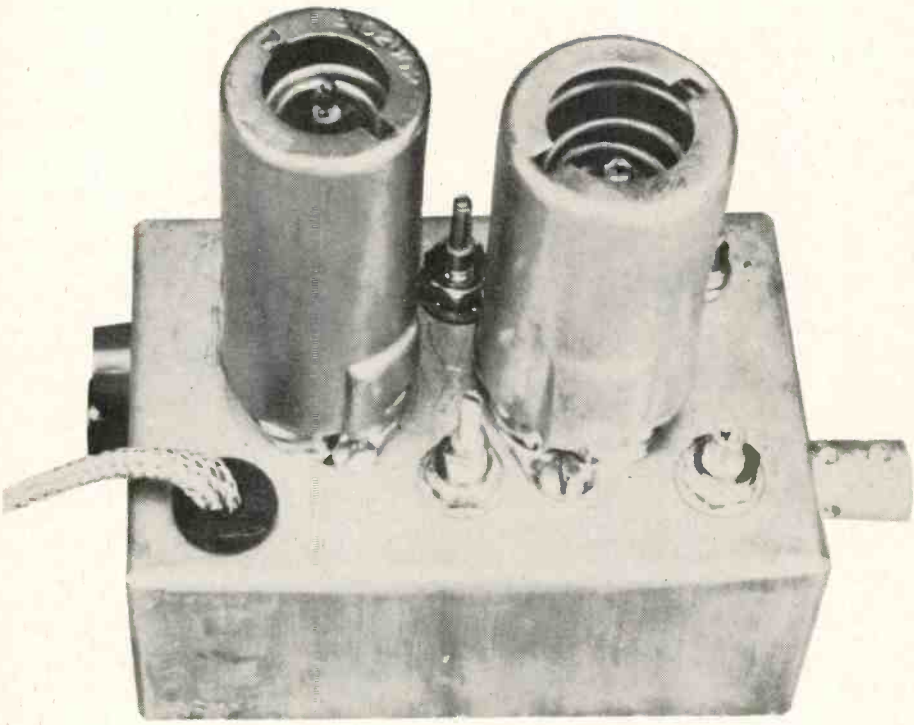
The Citizens Band operators have generally agreed on the following more common mutual signals:

10-1	Reception poor; can't understand you
10-2	Reception good
10-3	Affirmative—will do
10-4	"OK" or yes
10-5	Need your assistance to relay a message or I am relaying a message
10-6	Busy, can't talk now
10-7	Going off the air
10-8	Coming on the air, station is manned
10-9	Repeat your last message
10-10	Finished transmitting
10-12	Visitors present
10-13	Give road and weather information
10-15	Make a pick-up of_____at_____
10-16	I have picked up_____
10-18	Do you have a message for me?
10-19	Return to station
10-20	Position report
10-21	Call me by telephone
10-23	Arrived at scene
10-24	Finished with last assignment
10-33	I have an emergency message
10-37	What is your call sign and name
10-70	Fire

BUILD THE SIGNA-BOOST

A HIGH GAIN, LOW NOISE PREAMP

by JOSEPH TARTAS



The preamplifier to be described, was the result of seeing many articles in the past, in which all sorts of claims were made for preamps and preselectors, and yet were not backed up by actual figures arising from measurements. A few, gave their results in gain figures only, and most writers gave their results in the amount of increases seen on the receiver S-meter. Lack of noise, which was sometimes given as an advantage, still did not satisfy me. The lack of proper matching at input and output, and the necessity of returning each time the receiver frequency was changed, were additional reasons for my attempts at a good preamp, with results obtained by actual measurements.

Having had considerable experience in the development of high-gain IF amplifiers in the neighborhood of 60 mc/s, I was well acquainted with the problems involved, and the results to expect from this particular circuit. If it could work so well at the higher frequencies, I decided to try adapting it to the lower frequencies and see what would result.

The unit to be described, has overcome the above mentioned problems, and at the same time provides better than 22 DB of voltage gain, with a very low noise figure. More will be said later about the noise figure.

The first unit was built without regard to the output circuits in respect to matching and tuning. A bench test, into a 10k ohm load, indicated a voltage gain of 12.5, which is equal to 22 DB. The output circuit tuned sharply, and had to be retuned each time

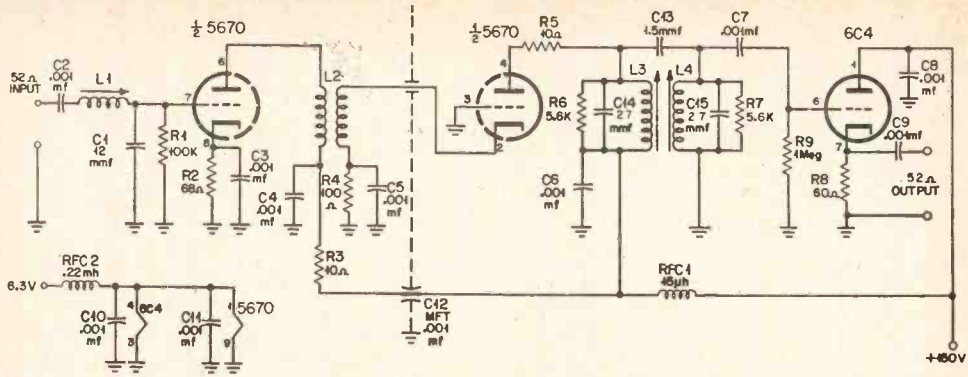


Fig. 1. Final circuit using cathode-follower output. Although not shown, pin 5 of the 5670 should be soldered to the shield.

the input frequency was changed. When it was connected to an NC-125 receiver the weaker signals were increased by 4 S-units, with a noticeable decrease in background noise. Stronger signals, increased from S-7 to 20 DB over S-9.

Because of the encouraging results, it was decided to build another unit, adding two desirable features, eliminating tuning by broad-banding, and properly matching the output impedance. This was accomplished by use of a broad-band overcoupled circuit in the output of the cascode circuit, and adding a cathode follower.

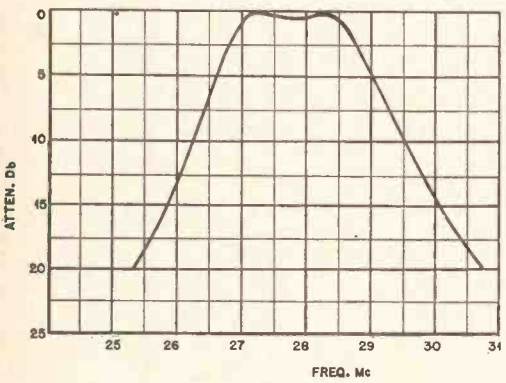


Fig. 2. Overall response of preamp.

A few (but not simple) calculations resulted in the circuit shown in *Fig. 1*. The measured response is shown in *Fig. 2*. For the range of 26.9 to 27.2 mc/s, the maximum attenuation is 1.0 DB.

CIRCUIT DESCRIPTION

The first two triodes are halves of a 5670 (or 6185, 6385, 6386), and are used in the familiar cascode circuit with two deviations from the generally used arrangement: the use of a series tuned input, and the cathode coupled circuit. The 5670 lends itself well to this type of a circuit, since the two halves of the tube are laid out symmetrically and have an internal shield terminating centrally at the socket.

The input coil, *L1*, forms a series resonant circuit with the capacity of *C1* in parallel with the tube and wiring capacities. The impedance of this combination is approximately 250 ohms for the value given, and provides a voltage step-up of 5:1 at the grid. With the antenna connected, the series circuit provides a low impedance input at resonance.

PARTS LIST

C_1 12 mmfd, NPO, tubular ceramic
C_2, C_3, C_4, C_5, C_6, C_7, C_8, C_9, C_{10}, C_{11} .001 mfd disc ceramic
C_{13} 1.5 mmfd ± .25 mmfd, tubular ceramic
C_{14}, C_{15} 27 mmfd, NPO *(RMC Type C disc ceramic or equiv.)*
C_{12} 1000 mmfd, Feed-through bypass *(Centralab MFT-1000)*
R_1 100,000 ohms
R_2 68 ohms
R_3, R_5 10 ohms, composition
R_4 100 ohms
R_6, R_7 5600 ohms
R_8 60 ohms
(All resistors are ½ watt)
RFC_1 15.0 μh. r-f choke *(Jeffers 10102-36 or Ohmite Z-28)*
RFC_2 0.22 μh. r-f choke *(Jeffers 10100-22 or Ohmite Z-460)*
L_1 17 turns #24 Formex wire, closewound
L_2 22 turns #32, each winding, Formex wire, closewound (See text)
L_3, L_4 15 turns #24 Formex wire, closewound
Forms used, ¼" ceramic slug-tuned, iron core *(CTC-LS6, 2C2L for all but L_2. For L_2, a CTC-LS6, 2C4L, was used, since this has four terminals)*

Watch for next month's big issue

Should the antenna become shorted,the input end of *L1* becomes grounded, and the grid becomes a high impedance point with the tuned circuit in parallel resonance. Should the antenna become open or disconnected, which is more likely, the input becomes the impedance of the capacities alone, since *L1* is no longer in the circuit. Under these conditions the grid is practically bypassed by the capacity of *C1* to ground. This prevents any possibility of oscillation. While not of great importance as used here, the same circuit can become a headache when followed by amplifiers with a total of 100 DB gain, as it is normally used at the higher frequencies.

The use of a bifilar coil (two windings with the turns of one winding adjacent to the turns of the other winding) to couple the plate of the first section to the cathode of the second section eliminates the loss of gain normally encountered in a cascode amplifier when the two elements are directly tied together. Under these conditions the plate voltage is divided across the two sections in series, and full gain of the sections are not realized. With full plate voltage on each half of the tube, the plate is still directly coupled for RF to the following cathode by the 1:1 turns and unity coupling of the bifilar winding. The 100 ohms resistor in series with the secondary of this coil provides bias for the grounded grid section. This winding is loaded by the approximately 350 ohm impedance of the cathode, and results in a low Q, broadly tuned circuit. Because of this the slug has been omitted, as it does not require tuning. The primary is tuned by the plate capacity of the first section, and is loaded by the reflected impedance of the heavily loaded secondary.

The ouput load of the second section is a double-tuned overcoupled bandpass circuit, and is loaded by the 5600 ohm resistors across each coil to give a flat response over the required frequency range. Coupling is provided by the 1.5 mmfd condenser, *C13*.

The cathode follower was designed to provide a proper match to the receiver input, which is nominally 300 ohms.

It might be noted at this point, that better control of strong signals might be obtained by returning the 100K grid leak of the first triode, to the AVC line of the receiver after bypassing with a 1000 mmfd condenser. in-

stead of returning it to ground.

The 10 ohm resistor in the plate lead of the second section was put in to prevent a possibility of oscillation around 450 mc/s, the internal resonant frequency of the tube. Experience has shown that it successfully damps out any tendency toward this oscillation, but does not affect the normal operation of the tube, so it was included as a matter of course.

It may appear to those unfamiliar with high frequency wiring that there is an excessive use of bypasses and chokes. However, I have learned by bitter experience that it is better to put them in at the start, rather than find out they are necessary after wiring is completed and all the components are in place.

CONSTRUCTION

The original chassis was made from 1/32" sheet brass, but is very close in size to the two smallest sizes of *Bud Mini-boxes*. The layout used can be adapted to either of these chassis by working away from the center line in the drawing.

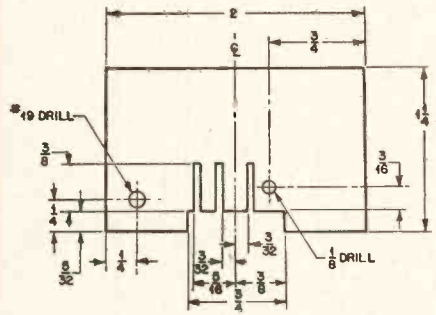


Fig. 3. Layout of interstage shield.

A .020" thick brass shield partition separates the two sections of the tube, and is connected to the filament, shield, and grid terminals, which in turn are grounded by the shield. The shield should be soldered all the way around, as well as to the socket center post and the tube terminals that are grounded. If an aluminum chassis is used, the shield should make good contact with the chassis in several places, and grounded by solder lugs mounted on the socket mounting screws. The shield dimension used is shown in *Fig. 3*.

The chassis layout is shown in *Fig. 4*, and should be followed as closely as possible since the position of the components allows for easiest wiring and best results. This layout is similar to that used at the higher frequencies and has proven to be quite trouble-free.

The center hole for the input connector is shown, but the type used is left up to the builder. For 50 or 75 ohm input, it should be of coaxial type. The output connector may be of any type; banana jacks being used in the original unit to facilitate testing and measuring.

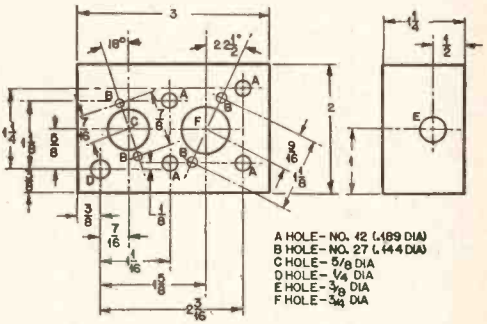


Fig. 4. Chassis layout; top view.

The #19 hole shown in *Fig. 3* is for mounting the feed-through bypass condenser *C12*. The 1/8" hole is for the lead connecting the second cathode to the secondary of the bifilar coil. The shield, if made of thin material, can be easily cut with a pair of small sharp scissors or a coping saw with a fine blade.

WINDING THE BIFILAR COIL

For those not familiar with winding a bifilar coil, the task may seem quite difficult. After having sworn at quite a few myself, I found that it can be done quite easily if it is done systematically. The method is as follows:

1. Use a piece of the proper size wire that is longer than twice the length of a single winding.

2. Clean the insulation off each end and tin them.

3. Connect each end to the two tie lugs on one end of the coil form.

4. Wind the wire onto the form, or the form onto the wire, by either of these methods:

a. Chuck the coil form in a hand-drill that is clamped horizontally in a vice. The wires can be guided onto the form with the fingers as a guide providing the proper tension as the drill is turned.

b. Loop the center of the wire around a piece of rod clamped vertically in a vice. This keeps each lead parallel and closely wound.

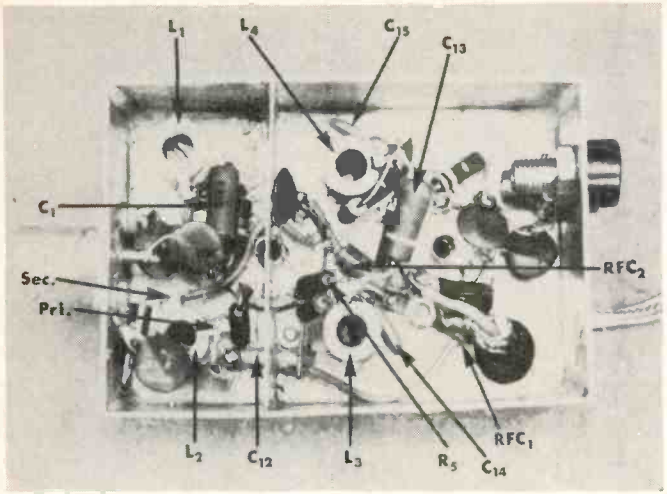


Fig. 5. Bottom view of wired chassis. Main components and their locations are identified.

The coil form is held in the hand and turned so that the form rolls up the wires. Be sure to keep proper tension while winding.

5. When the proper number of turns have been wound on the form, wrap the wires lightly around the terminating lugs to keep the turns from unwinding, and cut them off leaving an extra inch or so. Coat the coil with coil dope, and when dry, the leads can be unwound from the lugs, skinned, and soldered.

WIRING

The layout of the chassis and components can be seen from the photographs, the major components are identified in *Fig. 5*, with the windings of *L2* identified. *Fig. 1* shows the ends of the coils that are connected to the tube terminals and ground, the tops and bottoms being indicated by a *T* or *B* respectively. An additional resistor may be noticed in the bottom view of the chassis, connecting the primary of *L2* to the plate of the first section. This was used to kill an oscillation that showed up with a high impedance antenna connected, but can be left out.

In wiring it is best to leave the coils out until the components have been wired to the socket terminals. A ground lug under each socket mounting screw facilitates the connection of grounds. These should be in addition to lugs used to ground the shield mentioned under *Construction*.

The lead from the bottom of the secondary of *L2* to the cathode is seen in the photograph, *Fig. 5*, and is a piece of #22 bus wire covered with a piece of small diameter spaghetti. The wiring on all other components except the cathode lead and the choke leads should be kept as short as possible, and wired as directly as can be done.

Where chokes are used the importance of using the shortest lead length does not apply. Since chokes are resonant circuits by themselves it is more important to place them away from the coils, and as near to ground as possible. Here again, experience has been the best teacher.

The filament and plate supply leads consist of a double shielded wire, and is brought out through a small rubber grommet. Separate unshielded leads may be used, but a good ground connection must be made with the power supply or receiver.

POWER REQUIREMENTS

The power requirements are 6.3 v. at .45 amp. for the filaments, and a maximum of 150 v. for the plate. The total plate current at this voltage is 25 ma., with the 5670 drawing 20 ma. A lower plate voltage may be used with a slight sacrifice in gain, but should the maximum indicated be exceeded, the plate dissipation of the tube would be excessive.

CONNECTING THE SIGNA-BOOST

The unit may be connected to any transceiver between the receiver side of the T/R switch or relay and the grid of the receiver's RF amplifier tube. In no case should you

Continued on page 50

FURTHER FACTS ON FIFTEEN

IN RESPONSE TO YOUR LETTERS, MORE INFORMATION ON PART 15

by TOM KNEITEL, KBG4303/NORTHERN 13
EDITOR

An avalanche of reader mail has caused your weary Editor to dig through musty FCC records to supply milling throngs of Part 15 fans with further information on this most interesting aspect of CB.

As you will recall from the in-depth coverage of Part 15 we had in our December, 1962, issue (that issue can still be purchased for 50¢ from good old "Happy Hal" Weisner, KBG4528, our Circulation Manager), the FCC's Part 15 is a separate radio service, not connected with Part 19 CB except for the fact that Part 15 stations may operate on frequencies within the standard Part 19 regular CB band. Although there are regulations which establish a relatively low RF power input of the transmitters used for Part 15, the FCC permits full hobby use of the frequencies—this includes working skip, using either fone or CW (code), VFO's, etc. Transmitters need not be licensed by the government because of their relatively low power, and they operate on the condition that they will cause no interference to any licensed radio stations (which means Class C and Class D CB stations).

Even with the power limitations imposed on Part 15 stations, it is possible to cover considerable distances with a good installation. Many CB'ers who were uneasy about their using their 5-watt Part 19 Class D stations for hobby use have found that losing a few S-units to switch over to Part 15 use has been not only worth the trouble, but amply rewarded with the fun of actual electronic experimentation and the adventure of making a distant contact using "QRP," or low power.

So that brings us up to date on Part 15, but you, the readers, keep asking for more. Here is additional information, including all portions of Part 15 which will bear on your operation.

WHY PART 15?

Section 301 of the Communications Act of 1934, as amended, contains 6 criteria for determining whether a transmitter must be licensed by the FCC. However, this Section can be construed in such a way that a license is not required for apparatus that emits RF energy but does not fall within any of the 6 criteria given. Pursuant to this, the FCC has worked up Part 15 which sets out the conditions under which such equipment may be operated without a license.

Part 15 is based upon the reasoning that if radiation is kept within specified fixed limitations, a general assumption can be made that such operation will not normally cause interference to regularly licensed radio stations. It is the FCC's position that those operations, as long as they do not exceed the radiation limitations specified, and do not cause actual interference, may lawfully be carried on without a license.

INCIDENTAL AND RESTRICTED RADIATION DEVICES

The FCC rules covering Incidental and Restricted Radiation Devices, now known

as Part 15, date from 1938. The radiation permitted under Part 15 operation is set at a level which will eliminate interference in most cases and reduce the complaints of harmful interference to such a small number that they can be handled individually, on a case-by-case basis. In the event a Part 15 station is found to be causing interference, the FCC will require the operator of the station to modify either his operation or his equipment to correct the situation.

Restricted Radiation Devices include radio receivers; carrier current systems (including community antenna TV systems and campus radio systems); and low power communication devices such as wireless microphones, garage door openers, most hand held transceivers, all specially designed "Part 15 CB rigs."

PART 15 --- LOW POWER COMMUNICATION DEVICES			
FREQUENCY	RADIATED LIMIT		OTHER LIMIT
10 - 160 Kc	$\frac{2400}{F}$ uv/m at 1000 ft.		
160 - 190 Kc	$\frac{2400}{F}$ uv/m at 1000 ft.	OR	1 WATT INPUT 50 FOOT ANTENNA
190 - 490 Kc	$\frac{2400}{F}$ uv/m at 1000 ft.		
510 - 1600 Kc	$\frac{24000}{F}$ uv/m at 100 ft.	OR	100 MILLIWATTS INPUT 10 FOOT ANTENNA
26.97 - 27.27 Mc			100 MILLIWATTS INPUT 5 FOOT ANTENNA
ABOVE 70 Mc	RADIATED LIMIT FOR RECEIVERS	AND	1 SECOND ON ONCE IN 30 SECONDS

Table 1. All of the Part 15 bands. In the computations shown, "F" equals the frequency (in kc/s) of the transmitter.

These Restricted Radiation devices are permitted to operate in several frequency ranges in addition to frequencies within the Citizens Band, and each Part 15 band has its own specific technical requirements as to power input, antenna, amount of permissible radiation, and transmission time (or combination of several). A chart showing the various Part 15 bands and their individual technical specifications is shown in Table 1.

THE GOSPEL

While it is possible to purchase the complete Part 15 from the *Superintendent of Documents* in Washington (ask for FCC Vol. II, $2.00), it is *not* necessary for you to have a copy in your possession when operating (as is the case with Part 19). Much of Part 15 is devoted to things which would be of no interest or importance to you. We reproduce here *all* sections of Part 15 which will be of interest to you and bear upon your "Part 15 CB" operation:

EXCERPTS FROM FEDERAL COMMUNICATIONS COMMISSION PART 15 INCIDENTAL AND RESTRICTED RADIATION 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 and that interference must be accepted that may be caused by other incidental or restricted radiation devices, industrial scientific, or medical equipment, or from any authorized radio service.

15.4 General Definitions

(b) *Harmful Interference.* Any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio-communication service operating in accordance with this chapter.

(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.

SUBPART E—LOW POWER COMMUNICATION DEVICES

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

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

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

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

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

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

15.207 Class B Emission Prohibited

Operation of low power communication devices that produce Class B emissions (damped waves) is prohibited.

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.

Continued on page 60

PLANTRONICS OFFERS AERO-SPACE DEVELOPED HEADSETS

CLARITY. PACIFIC PLANTRONICS, MANUFACTURER AND SUPPLIER OF MICROPHONE EQUIPMENT TO PROJECT MERCURY ASTRONAUTS, provides Radio Operators with the world's finest headsets and a concept of clarity previously unavailable in revolutionary MS-30 Microphone-Receivers and MS-20 (Microphone only) units. With the exclusive Acoustical Transfer Tube* PPI engineers make it possible to broadcast in a low speaking voice and always be clearly understood. At the same time annoying sibilants and distortions have been eliminated.

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build the mini-verter

A CB CONVERTER IN YOUR CAR'S ASH TRAY

by BASIL BARBEE, 9WO831

Why build a converter in car's ash-tray? You might want to do so for the sake of novelty, just as there was once a fad of building radio receivers in lunch-boxes, brief-cases, hats, and even coffeepots! Even today, radios in old-fashioned telephone cabinets are the rage. But in this case the reason was a practical one: The converter has to be housed in something for support, shielding, and appearance. As the Beatnik found in the closet said, "Well, man, like you gotta be *somewhere!*" Available cabinets either are too large or have sharp, square corners so that they are hard on knees. We never used the ash-tray anyhow. It was close to the BC receiver, to which the converter must connect and it was easy to remove and replace.

So we built the converter in the ash-tray, as can be seen in Fig. 1.

Two of the new *Philco* T-2163 "universal" PNP transistors are used, one as a mixed and one as a crystal-controlled oscillator. Parts of the converter proper are mounted on a chassis or subpanel of 0.021" aluminum cut to fit snugly inside the ash-tray and riveted to its bottom. Connectors for the CB antenna, the BC antenna, and the BC receiver are mounted on the rear wall of the "cabinet," along with a rubber grommet through which the 12-volt power lead passes. This lead is bypassed with an 1800 pf. disc ceramic condenser, C_5, as close as possible to the point of entry to help deter ignition noise. The converter on-off switch is mounted on the front and is the only part visible when installed in the car. The photograph, Fig. 1, shows the appearance of the finished converter, although of course if your car is some other make or model (doesn't everyone have a '56 Ford?) the appearance will be slightly different.

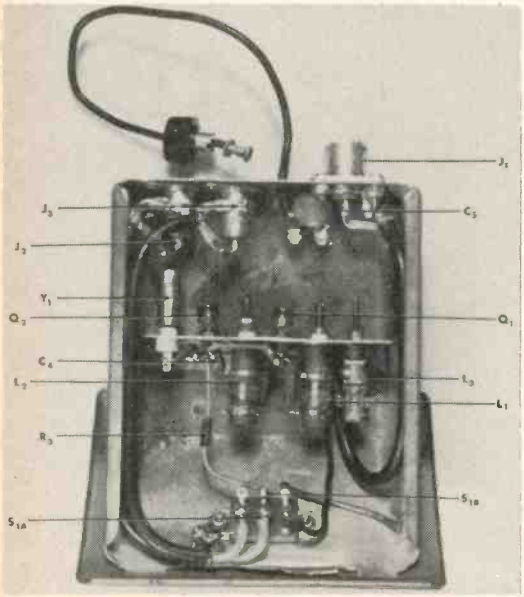

Fig. 1. Here's the "mini-verter" built into a car's ashtray.

HOW IT WORKS

Fig. 2 shows the electrical connections. When the switch S_1 is "off," the BC antenna, which is plugged into J_3, is connected through switch S_{1A} to J_2, from which a very short length of very low-capacity cable (such as is used for car-radio leadins) connects to the antenna socket of the BC receiver, so that normal broadcast reception occurs. With the converter switch turned "on," J_2 is transferred by S_{3A} to the output of the converter instead of the BC antenna, while S_{1B} applies power to the transistors through the 1500 ohm resistor R_3, which reduces the 12-volt supply to 9 volts, the rated operating voltage of the T-2163's. Current drain is only 2 ma. The smallest fuse we could find, 175 ma., is much too large to protect the transistors, but does afford protection to the car's dash wiring in case of shorts in the converter and provides a convenient way of disconnecting the power lead for removing the converter. The CB antenna (after first going through the antenna relay of the transmitter, if any), plugs into J_1, an SO-239 coax receptacle, which is connected to a tap on L_1, the antenna coil. C_1 and L_1 form a series resonant circuit tuned to the center of the CB band, 27045 kc. The values of L_1 and C_1 were chosen to take advantage of the low input resistance characteristic of transistors to broaden the response of the antenna circuit and give nearly uniform

Watch for next month's big issue

response across the entire band of 26965 to 27225 kc. R_1, the bias resistor for Q_1, was chosen empirically to give maximum conversion gain.

Q_2, another T-2163 transistor, operates as a conventional overtone crystal oscillator whose emitter bypass condenser C_4 is also the emitter bypass of Q_1, providing injection of the oscillator signal into the mixer circuit. This condenser was made as small as possible consistent with dependable oscillation of Q_1 on order to get plenty of injection. Some injection no doubt occurs due to coupling between L_2 and L_1.

The oscillator and signal frequencies having mixed in Q_1, their difference frequency (1340 to 1600 kc.) is selected by the tuned circuit C_3L_3 and passed on through S_{1A} and J_2 to the BC receiver which selects the desired channel. Here again the resistance of the transistor collector circuit is used to broaden the response of the tuned circuit to cover the whole 260-kc. band, but since the collector resistance is relatively high, a parallel-tuned circuit is used. L_3 is an ordinary miniature adjustable broadcast oscillator coil, whose secondary alone is used, the primary and "gimmick" being left unconnected. On the *Miller* 70-OSC coil, the secondary lugs are those on either side of the color dot. L_1 and L_2 are close-wound with #20 enameled wire on CTC LS3/B forms, which are ⅜" diameter, 1⅛" long, and slug-tuned. L_1 has 14 turns with a tap at 2 turns from the ground end, while L_2 has 9 turns, untapped.

ALIGNMENT

The oscillator coil L_2 should first be tuned for oscillation as evidenced by a dip in current of Q_1, which can be indirectly measured by connecting a voltmeter across R_3. When the crystal is oscillating, it should be possible to pick up its signal on a nearby receiver tuned to its frequency, 25625 kc. It will be found that approaching resonance from one side as L_2's slug is turned, the oscillations will start gradually; from the other side, abruptly. The adjustment for strongest oscillation consistent with stability is about ¼ turn past the point where oscillation *suddenly* starts.

After final installation in the car, with the converter switched off, the antenna trimmer of the BC receiver should be touched up to compensate for the additional capacity of the cable connecting it to the converter. If

CB IN ACTION

By Len Haas, Sales Manager, Pearce-Simpson, KBG7527

There has been a great deal of conversation in communications circles about increasing the role of Citizens Band in intrastation communications (conversations among employees of a single business or members of the same family) and severely limiting interstation communications (conversations between channels not regularly in contact).

In addition, further proposals have been made to limit conversation time and reduce the number of channels allocated to interstation conversation from the 23 existing channels to a limited 5 channels.

The theory behind all of these plans is to relieve the air jam and to convert CB into more of a business and traffic regulating medium.

It is true that CB abuses do occur and we should try to enhance the usefulness of our equipment by helping to curtail unnecessary radio checks and equipment tests through our CB clubs and personal contacts.

But it is also true that most of the parties to these restrictive proposals are not fully aware of the tremendous amount of useful benefits which have accrued from CB in the past and of the invaluable assistance CB is providing communities daily.

YOU CAN WIN A "COMPANION-CB" AND HELP AT THE SAME TIME

As concerned CB'ers, we would like you or your CB club to help us tell the "CB in Action" story. Write us a letter and tell us how your CB club or how you as an individual have helped serve your community with CB. We will publicize the best of these stories in this column and in our Pearce Simpson advertising. *Beginning in May and every four months thereafter, we will award a brand new Companion CB Radiophone for the best story submitted (all letters become the property of Pearce-Simpson).*

Simply write Len Haas, Pearce-Simpson, 2295 N. W. 14th Street, Miami 35, Florida. Help tell the "CB in Action" story and win a Companion CB Radiophone too! *(Advertisement)*

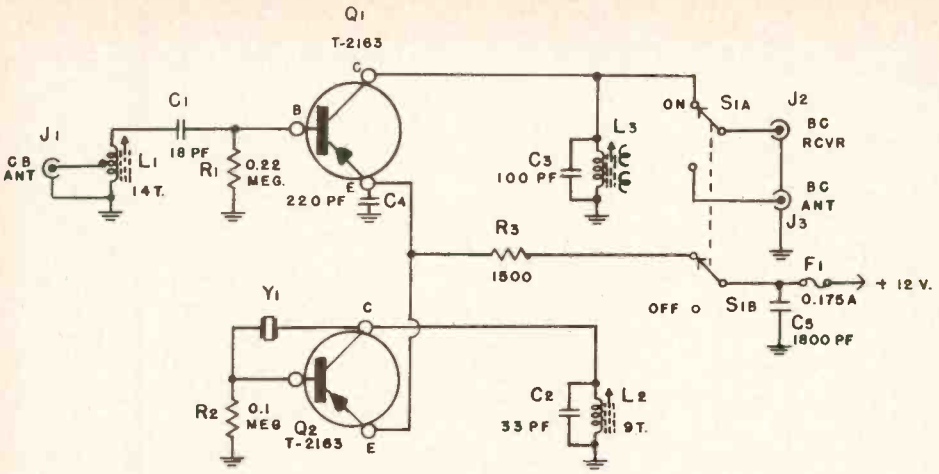

Fig. 2. Schematic diagram of 9W0831's "mini-verter."

this cable is too long or is made of shielded wire having too much capacity, the trimmer will not have enough range to peak. This adjustment should be made *before* tuning L_3, and should be done as recommended for the particular BC receiver; usually with antenna fully extended on a weak station around 1400 kc.

Then with the converter turned on (it comes on instantly; transistors require no warmup) tune in a weak station near the center of the Citizens Band (around 1470 on the BC dial), and adjust L_1 and L_3 for maximum response. If only strong signals can be heard on channels near the center of the band, some other channel will do, as tuning is non-critical with a broad-band converter.

The frequency of the crystal Y_1 was chosen to yield a difference frequency (signal frequency minus oscillator frequency) of 1340

Continued on page 60

PARTS LIST

C_1 18 pf miniature mica condenser
C_2 33 pf miniature mica condenser
C_3 100 pf mica condenser
C_4 220 pf mica or ceramic condenser
C_5 1800 pf disc ceramic condenser
F_1 0.175 amp., 3AG fuse in in-line holder
J_1 SO-239 coax receptacle
J_2, J_3 Car-radio antenna receptacles
L_1 14 t. #20 E. on CTC LS3/B form; tap 2 t. from ground end
L_2 9 t. #20 E. on CTC LS3/B form
L_3 *Miller* 70-OSC adjustable midget BC oscillator coil; use secondary only
Q_1, Q_2 *Philco* T-2163 PNP transistors (Allied, Lafayette supplies them).
R_1 0.22 meg., ½ watt resistor
R_2 0.1 meg., ½ watt resistor
R_3 1500 ohm, ½ watt resistor
S_{1A}, $_B$ DPDT slide switch
X_1, X_2 3-pin transistor sockets
XY_1 Crystal sockets, *Millen* 33302
Y_1 25625 kc. 3rd overtone crystal
Cabinet: Your car's ash-tray.

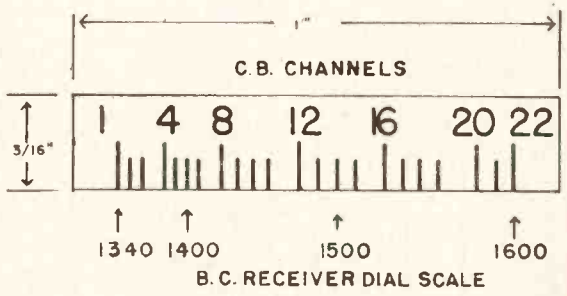

Fig. 3. Sample of the dial scale used by 9W0831. Each car's radio will require a somewhat different scale.

PART 15 CALLBOOK

Well here we are again with the second installment of the S9 Part 15 CB Callbook. This month we'll knock off the EXTERIOR stations and as many NORTHERN stations for which there is room. Next month we'll do the PACIFIC, ROYAL and SOUTHERN stations. We will be keeping this on a constantly revolving basis, calling on each call area every few months to bring it up to date with the latest additions. If you subscribe to S9 you will be assured of having a complete Part 15 callbook as we have no plans at present to issue these calls in one single volume.

Exterior

		Ch
11-12	F.A. Armstrong, 4210 Cope, Spenard, Alaska	7, 16
13-14	L. Tate, 1711 Nakula St., Wahiawa, Hawaii	A, B
15-17	Electro Marine of Puerto Rico, Inc., 1476 Ashford Ave., Santurce, Puerto Rico	7
18-19	S.M. Van Wyck, 1476 Ashford Ave., Santurce, P.R.	7
20-23	R.D. Wedertz, P.O.Box 2158, Juneau, Alaska	A

Northern

		Ch
11-12	H. Hurwitz, 3451 3rd St., Oceanside, N.Y.	
13	T. Kneitel, c/o S9, 300 W. 43 St. N.Y., N.Y.	
14	H. Friedman, 2271 Knapp St., Brooklyn 29, N.Y.	
16	H. Weisner, c/o S9, 300 W. 43 St. N.Y., N.Y.	
17	D. Detton, c/o S9, 300 W. 43 St., N.Y., N.Y.	
18	J. Fairclough, 119-37 Metropolitan Ave. Kew Gardens 15, N.Y.	10
19-20	M. Portnoff, 29 Porter Rd., West Orange, N.J.	
21-24	N.B. Dudiak, 25 Pearl Brook Dr., Clifton, N.J.	10, 12, 18
25-26	Shadowbrook Kennels, 239 Grove Ave., Cedar Grove, N.J.	B, D, E
27-29	D.S. Madrick, 84-57 126 St., Kew Gardens, N.Y.	A, B
30-32	K. Birmingham, 413 Holmes Dr., Burlington, N.J.	
33-35	R. Patton, 19 Edgemere Dr., Matawan, N.J.	A
36	C. Spinelli, 90 Main St., Lodi, N.J.	5
37-38	G. Auerbach, 150-51 58 Ave., Queens 55, N.Y.	D
39-43	A. Martin, 172 Prospect Ave., Hartford, Conn.	1, 22
44-47	G. Kennedy, 89 Ivy St., Kearny, N.J.	B
48-49	D. Gayk, 1135 North St., Rochester 21, N.Y.	12
50-53	D. Zuza, 257 Belgrove Dr., Kearny, N.J.	H
54-56	M. Krisburg, 250 Sharpe Ave., Staten Island, N.Y.	A, B
57-58	A. Ferretti, 75 Whiteman Ave., Uniontown, Pa.	11
59-61	G.E. Putman, 5 Canyon La., Westbury, N.Y.	9, 10, 13
62	A.C. Myers 1408 Whitesboro St. Utica 3, N.Y.	H
63-64	D.J. Klimeck, 218 Ottawa St., Johnstown, Pa.	A
65-67	L. Chase, 14 Glen St., Concord, N.H.	F, G, H
68-70	T.R. Lemieux Jr., 6 Oak St., Derry, N.H.	
71-72	J. Flohr, 222 Phila. Ave., Waynesboro, Pa.	4
73-77	P. Brazil, 5 Sherry St., Norwalk, Conn.	19
78-79	R. Hoinowski, 310 Lanesdowne Ave., Clarks Summit 20, Pa.	6
80-84	W.E. Jones, 127 Grove St., Putnam, Conn.	9
85-86	K.J. Baldwin, P.O.Box 492, Darien, Conn.	11
87-88	G. Thomas, 22 Asbury Ct., Binghamton, N.Y.	10
89-90	F.C. Springsteel, 132 W. Lincoln Ave., Mt. Vernon, N.Y.	10
91	J. Steinberg, 203 Bay State Rd., Boston 15, Mass.	11
92-93	R. Vernon, R.D.3, Butler, Pa.	7, 15
94-95	D. Vernon, R.D.3, Butler, Pa.	17
96-97	J.J. Mazur Jr., 149 Kirby Ave. Lackawanna, N.Y.	A
98	H. Chin, 119 Elizabeth St., N.Y.13, N.Y.	14
99	E.S. Decker, 36 Hampden St., Westfield, Mass.	
100-101	J.M. Lepkowski, 99 Elkhart St. Lekawanna 18, N.Y.	A
102-107	C.R. Connell, 310 Mason St., Woomsocket, R.I.	B
108-111	G. Goodman, 1058 Rankine Ave., Erie 7, Pa.	
112-113	J.A. Baker, S. Harbor Rd., Southold, N.Y.	10
114-115	J. Russo, 348 W. 48 St., N.Y.36, N.Y.	10
116-117	J.J. Miller, 184 Fairfield Ave. Mineola, N.Y.	6
118-120	E. Fornelius, 72 Harrison Pl., Clifton, N.J.	A, B
121-124	J. Beal, 72 Flint St., Rochester 8, N.Y.	A, B
125-128	R.E. King, Jones Ave., Portsmouth N.H.	A
129-130	J. Siviski, 229 Hoyt St., Kearny, N.J.	10
131-133	R.S. Bein, 69 Runyon Pl., Scarsdale, N.Y.	10
134	L.D. Aspinall, 20 Forest Ave., North Haven, Conn.	10
135-138	R.L. Plouffe, P.O.Box NN, Pocasset, Mass.	13
139-140	J. Trudeau, 1088 South St., Dalton, Mass.	4
141-145	J. Astrowski, 994 Ave.D, Rochester 21, N.Y.	1, 23
146	S.B. Weinberg, 1800 Ocean Pkwy, Bklyn 23, N.Y.	15
147-149	L.W. Weston, P.O.Box 13, Wintrop, Maine	6, 11, 20
150-151	J. Herman Jr., 81-20 266 St., Floral Park, N.Y.	10
152-153	R. Pousson, 64 Ebony Ct., Bklyn 29, N.Y.	10
154-155	E.G. Kenlon, 143 S. 12 Ave., Mt. Vernon, N.Y.	10
156-157	J.J. Brennan, 43-23 40 St., Sunnyside 4, N.Y.	10
158-159	L. Bichler, 59-35 Shore Pkwy., Bklyn 36, N.Y.	10
160-161	J.F. Porta, 72 1st Pl., Bklyn 31, N.Y.	10
162-163	G.Y. Nilson, 675 Hudson St., New York 14, N.Y.	10
164-165	W.H. Gunther, 56-43 194 St. Flushing 65, N.Y.	10
166-167	G.K. Rathjen, 149-52 17 Ave., Whitestone 57, N.Y.	10
168	A.V. Matthews, 48-05 42 St., L.I.C. 4, N.Y.	10
169	H.I. Gold, 10 E.198 St., Bronx 58, N.Y.	10
170-171	S. Cea, 35-21 21 St. L.I.C. 6, N.Y.	10
172	F.R. Fitz, 66-24 53 Rd., Maspeth 78, N.Y.	10
173-174	G. Sharkey, 83-15 98 St., Woodhaven, N.Y.	10
175-176	G.E. Perkins, 67 Michelle Dr., Rochester 17, N.Y.	9
177-179	W. Guggenheim, Hollow Rd., Clinton Corners, N.Y.	
180-181	B. Muckelmann, 18 O'Hara St., Fords, N.J.	14
182-184	R.E.Gaskill, 5218 N. Fairhill St. Philadelphia, Pa.	
185-186	G.J. Dolicker, Mustato Rd., Katonah, N.Y.	7
187-190	R.C. Cousins, 46 Cottage St., Sharon, Mass.	17
191-194	B. Abrams, Jr., 414 National Blvd., Long Beach, N.Y.	7
195	D. Dlugokencki, 30 Redwood Ave., Paterson 2, N.J.	
196	E. Dlugokencki, 30 Redwood Ave., Paterson 2, N.J.	
197	H. Dlugokencki, 30 Redwood Ave., Paterson 2, N.J.	
198	A.H. Carver, 49 Fairview Ave., Verona, N.J.	
199	A. Carver, 97 Sykes Ave., Livingston, N.J.	
200	B. Singer, 203 Bay State Rd., Boston 15, Mass.	13
201	A.H. Dean, 144 Warner Rd., North Haven, Conn.	10
202-205	D.E. LaMore, 65 Church St., Thompsonville, Conn.	11
206-209	D. LaMore, 65 Church St., Thompsonville, Conn.	11
210-211	R.V. Patton, 19 Edgemere Dr., Matawan, N.J.	B
212	F. Weiss Jr., 60-73 56 St., Maspeth, N.Y.	
213-217	R. Pschirrer, 13 Perine St., Dansville, N.Y.	6, 11, 12
218	S. Nussbaum, 1440-54 St., Bklyn, N.Y.	A, B
219-221	C.N.Kleinfield, 81 Van Cleve St, Maywood, N.J.	9
222-223	J.B. Tenaglia, R.D.L Box 50, New Paltz, N.Y.	2
224-227	J.A. Hoskins, 338 W. Main St., Palmyra, N.Y.	10
228	S. Pefley, 120 S. 3 St., Chambersburg, Pa.	11
229	P. Pefley, 120 S 3 St., Chambersburg, Pa.	11
230-231	G.A. Lemire, 59 Summer St., Berlin, N.H.	1, 11
232-235	M.S. Mendelson, 1089 Central Ave. Plainfield, N.J.	10
236-238	D.M. Neely Jr., 208 Main St., Lake City, Pa.	11
239-240	E. Paull, 701 Hope St., Bristol, R.I.	21
241-245	S.B. Paull, 701 Hope St., Bristol, R.I.	10, 21
246-249	R. DuBois, 22 John St., Thompsonville, Conn.	11
250-253	G.W. Dye, Wildwood, New Jersey	11
254-256	Blue Ribbon TV Svce., 1849 Stratford Ave., Bridgeport, Conn.	9
257-261	Stratford Vol. Fire Co. No.3, Prospect Dr., Stratford, Conn.	9

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262 F. Pirrello, Jr., 243 Grove Ave., Cedar Grove, N.J. 9
263-264 B. Kunzog, 123 Thayer St., Jamestown, N.Y. 7
265-266 E.D. Sicotte, RFD 2, Oakdale, Conn. D
267 P. Bassiri, 29 Grant St., Morristown, N.J. 18
268-271 A.J. Mulvey, 2077 Shelley Pl., E. Meadow, N.Y. 10, 14
272-273 W.B. Fisher, 930 N. Plum St., Lancaster, Pa. 7
274-278 J. Sankovich, 9 Eicher St. Uniontown, Pa. 7, 9, 11
279-282 J. Gross, 21 Morey Ave., Dansville 3, N.Y. 12, 14
283-284 J. Gorman, 48 Whitman St., Willimansett, Mass. A
285-286 R.C. Hughes, R.F.D., Pittsford, Vermont 2
287-289 P.M. Rosenberry, Box 208, St. Thomas, Pa. 11
290-291 R. Leech, Box 401, Salisbury, Conn. 7
292 R.E. Liskom, 190 Johnson Ave., Stratford, Conn. 7
293-294 W.E. Decker, 246 Front St., Binghamton, N.Y. 9
295-298 W.C. O'Brien, 1534 S. Ave., Syracuse 7, N.Y. 7, 11
299 M. Werboff, 881 Berkshire Dr., Westbury, N.Y.
300-303 W. Sharples, 286 Schuyler Ave., Kearny, N.J.
304-306 P.J. Low, Jr. Cornwallville, N.Y. 9
307-313 T.J. Grimke, 1262 E. 94 St., Bklyn 36, N.Y. 10
314-315 M. Spiegel, 180 Barlow Dr. S, Bklyn 34, N.Y. A, 7
316-318 K.S. Van Horn, Jr. 203 5 St., Glens Falls 5, N.Y. A, B, D
319-320 G.E. Singer, 1901 Peck La., Cheshire, Conn, 2
321-322 G.T. Dreibelbis, R.D. 1, Shoemakersville, Pa. A
323-324 J. Doyle, 472 Sterling St., Uniondale, N.Y. 1, 10
325-326 R. Romeo, 90 Stuyvesant Ave., Jersey City, N.J. 10
327 E.A. Togni, 713 Hudson St., Solvay 9, N.Y. 14
328 J. Togni, 210 Huron Ave., Lakeland, N.Y. 14
329 R. Barrington, 201 Sunny Brook Dr., N. Syracuse, N.Y. 14
330 J. Smith, 324 Innwd. Dr. Solvay 9, N.Y. 14
331-332 F. Gutkowsky, P.O. Box 83, Uncasville, Conn. 11
333 B. Rimer, 212-03 53 Ave., Bayside 64, N.Y. 22
334-335 E. Lesko, 122 Tappan St., Kearny, N.J.
336-340 D.C. Fraraccio, 121 Hill St., Shelton, Conn. 15, 20
341-347 G. Hyman, 19 Sicard Ave., New Rochelle, N.Y. 9
348-349 T.K. McGuire, RD 1, Rimersburg, Pa. 7
350-351 R. Bauer, 2304 N.Y. Ave., Huntington, L.I., N.Y. 7
352-353 R. Mays, Hill St., Evans City, Pa.
354-358 J.S. Young, 40 Center St., Milton, Pa. 11
359 D. Boyer, Maxatawny, Pa. 10
360-361 W.F. Kingsbury, 22 Winfield St., Dedham, Mass.
362-364 H.F. Lang, 1038 Woodcliff Dr., Franklin Square, N.Y. 2
365-367 J.R. Gardner, 275 Bement Ave., Staten Island, N.Y. H
368 K.L. Adams, 99 Broadway, S. Portland, Maine
369-370 F.J. Fiske, 185 Washington St., Binghamton, N.Y. 9
371-380 R.W. Nichelini, 45 North St., Erving, Mass. 22
381-384 R. DeLong, 3 Nursery St., Rochester, N.Y. 11
385-386 S.L. Green, 63-93 Woodhaven Blvd, Rego Park, N.Y. 11
387-390 C.W. Davis, Rt 1, Box 170, Shippenville, Pa. 15
391 V. Annabel, Stillwater Ave., Cutchogue, N.Y. 9, 16
392-394 Ssgt. D.C. Peck, 961st AEW&CON Sq. Otis AFB, Mass. C
395-404 D.W. Gould, 40 William St., Dansville, N.Y. 12, 14
405-406 F. Carlin, Jr. 1615 Front St., Binghamton, N.Y. 9
407-408 B. Schaffer, 35 Hillside Ave., N.Y. 40, N.Y. 10
409-410 L. Rasansky, 1181 C. Phil-Ellenast, Philadelphia, Pa 2
411-414 J. Cahill, 380 Boston St., Lynn, Mass. A
415-416 G.R. Hoover, 315 S. Second St., Chambersburg, Pa. 10
417-418 S.M. Bennett, 318 W. Green St., Millville, N.J. 10, 11
419-421 R. Beauregard, P.O. Box 197 Derry, N.H.
422-423 E. Telep, R.D. 1, Jermyn, Pa. 18
424-426 E.F. Hodgins, 100 Caya Ave., W. Hartford, Conn.
427-428 W.J. Thomas, 22 West 4 Ave., Latrobe, Pa. A
429 P.S. Cherry, 6532 N. 16 St., Philadelphia 26, Pa. A
430 A. Rubin, 7928 Rugby St., Philadelphia 50, Pa. 2, 9
431 A.J. Lavallee, Greenwood Ave., Winthrop, Maine 7
432 J. Green, Greenwood Park, Winthrop, Maine 7
433-434 J.A. Miller, 125 S. 3 St., Chambersburg, Pa. 5
435-438 J. Fee, 105 West Side Dr., Hamden, Conn. 22
439-442 W. Sharples, 190 Stover Ave., N. Arlington, N.J.
443-446 S. Cangiano, 88 Maplewood Terrace, Hamden, N.J. 22
447 D. Zonia, 21 Batten St., Webster, Mass. 4, 9
448-450 E.C. Van Beusichem, 42 Payn Ave., Chatham, N.Y. 7
451 A. Penkala, 6 Batten St., Webster, Mass. 4, 9, 14
452-454 R.R. McSherry, 324 North St., Millersburg, Pa. 11
455 W. Ruch, Maxatawny, Pa. 10
456-457 M. Badler, 310 Windsor Pl., Brooklyn 18, N.Y.
458-459 R.A. Ross, 4512 217 St., N.Y. 61, N.Y. A
460-462 A. Keddle, 27 St. James Pl., Buffalo 22, N.Y. A
463-464 H. Holland, 6116 Robinson Rd., Lockport N.Y. 11
465-468 M. Polisson, 1029 Washington St. Gloucester, Mass. All
469 W.J. Sheaffer, 738 Fairground Ave. Chambersburg, Pa.
470-471 P.G. Corcoran, 734 Pennington St., Elizabeth, N.J.
472-473 S. Ercolano, 42-11 Corp. Kennedy St., N.Y. 61, N.Y.
474-477 C.B. Smith, 3818 Chestnut St., Philadelphia 4, Pa. All
478-479 W. Baldwin, Sugartown Rd., Devereux Hedges, Sugartown, Pa. 7
480-481 K. Knelly, 93 S. Cedar St., Hazleton, Pa. 7
482-483 W. Ringleben, 305 E. Elm St., Hazleton, Pa. 7
484-486 D.J. Pace, 431 E 155 St., Bronx 55, N.Y. A, H
487-488 W.E. Stitzer, R.D. 1, Box 366, Fleetwood, Pa. 10
489-490 P. Bucko, 25 Lower St., Morea Colliery 2, Pa. A
491-495 J. Abdallah, 4 Abdallah Ave., Cortland, N.Y. 7, 11
496-500 J.C. Maltese, 810 E. 181 St., Bronx 60, N.Y. A, B
501-502 J.H. Parmenter III, 34 Washington St. Beverly, Mass. A, H
503 R. Matheson, 15 Overlook Dr., New Canaan, Conn. 10
504-505 D. Couture, 12 Washington St., Monson, Mass. 9
506 M.E. Paskey, 208 Thompson Ave., Roselle, N.J. 16
507 J.E. Mosman, 1 University Pl., N.Y. 3, N.Y. A
508-509 A.M. Wolgast, Box 325, Farrell, Pa. 9
510-513 R. Gutfinski, P.O. Box 62, Florence, Mass. A
514 J.F. Krejc, 40 Lanza Ave., Garfield, N.J. 1
515-516 D.A. Young, 39 Burnside St., Nashua, N.H. 7
517 W. Brown, R.D. 1, Mayfield, N.Y. 7
518-519 C.E. Edwards, 209 N. Washington St. Herkimer, N.Y. A
520 J. Avallone, 131 Nelson Ave., Jersey 7, N.J.
521 L. Avallone, 131 Nelson Ave., Jersey 7, N.J.
522 B.L. Shalit, 94 Crabtree Rd., N. Quincy 71, Mass.
523 C.R. Howell, P.O. Box 607, Randolph, N.Y. 7
524-525 D. Hutchins, Quarters 242, West Point, N.Y. 7
526-529 R.C. Desruisseau, 42 Center St., Putnam, Conn. 7
530-533 J. Bean, 30 Smith St., Auburn, Maine A, B, C
534-535 J.A. Harriger, 114 Demar Blvd., Canonsburg, Pa. A, B
536-537 E.J. Haines, 204 Curry Hill Rd. Canonsburg, Pa. A, B
538-539 S. Dufford, 99 Sherman Ave., Cedar Grove, N.J. E
540-544 R.T. Evans, 54 Johnston Ave., Kearny, N.J. A, B, C
545-546 E.O. Finucane, 695 Fairfield Dr. Sharon, Pa. 7
547 M.G. Quinn, 54 Helstrom Rd., East Haven, Conn. 16
548-550 J.T. Chaffee, P.O. Box 62, Girard, Pa. C
551-552 R.M. Palmatier, 451 Liberty St., Beacon, N.Y. 10
553-556 H.B. Holt, 203 Clutter St., Canonsburg, Pa. 7
557-558 H.L. Snyder, 2185 Sampson St. Pittsburgh 35, Pa. All
559-563 H. Fishbough, 407 Schuyler Ave., Elmira, N.Y. A
564-565 J. Panicaro, Washington St., Rocky Hill 1. N.J. A, B
566-568 R. Greene, 344 Bellevue Ave., Trenton, N.J. D
569-570 J. Sasso, 42 Bristol St. Cambridge 41, Mass. A
571-572 F. Sasso, 42 Bristol St. Cambridge 41, Mass. A
573-577 H. Cohen, 420 Center Ave., Greensburg, Pa. All
578-579 T.D. Taconet, 600 Eastern Pkwy, Bklyn 25, N.Y. A
580-583 M.A. Dodge, 52 Tower Rd. Dalton, Mass. A, C
584 C.W. Surran, 800 W. Somerdale Rd., Somerdale, N.J. B
585-587 R.O. Geiger, 38 Rose St., Bridgeport 10, Conn. 17
588-589 H.G. Lewis, 95 Deering Rd., Mattapan 26, Mass. D
590-591 C. Starr, 3724 Oceanic Ave., Bklyn 24, N.Y.
592-593 R.K. Bates, Box 32, Preston Hollow, N.Y. D
594-595 A. Swicinski, 224 Munn Ave., Irvington, N.J. 9
596 I. Mottley, 116-48 142 St., S. Ozone Park, N.Y
597 J.H. Mottley, 116-48 142 St., S. Ozone Park, N.Y.
598-600 P.W. Shultz, P.O. Box 302, Salisbury, Pa. C
601-602 S.J. Dunning, 49 Purchase St., Newburyport, Mass. 19
603 L. Cala, 445 Elton St., Bklyn 8, N.Y. 16
604 J. Cala, 445 Elton St., Bklyn 8, N.Y. 16
605 C.E. Yering, 197 Boston Post Rd., Waterford, Conn.
606-607 J.W. Wunderlich, 209 N. Washington St. Herkimer, N.Y. A
608-611 J. Palmatier, 278 Washington Ave. Beacon, N.Y. 11
612-615 D.J. Grandchamp, RFD 4, Uncasville, Conn. 9
616-617 R. Bagnell, 35 Leslie Ave., Florham Park, N.J. A, C
618-619 P. Leary, 312 Howk St., Watertown, N.Y. A, B
620 A. Barylski, P.O. Box 93, Grosvenor Dale, Conn. A
621-622 K.J. Reuben, P.O. Box 142, Wallingford, Conn. 9
623-625 I. Beltsky, 422 4 Ave. Brooklyn 15, N.Y. 9
626-627 F. McCoy, 110 Suncrest Rd., S. Norwalk, Conn. 21
628-629 R. Mull Jr., 447 Cumberland Ave. Chambersburg, Pa. 11
630 P. Bergmann, 144-30 35 Ave., Flushing 54, N.Y. 22
631-632 J. Ashworth, 157 Washington St., Berlin, N.H. A, B
633-635 J. Harbove, 217 Cattell St., Easton, Pa. 7
636 H.W. Gross, 444 Flamingo St. Philadelphia, Pa. 4
637-638 A.R. Jones, 102 Court St., Houlton, Maine A
639-640 S. Williams, 250 Union St. Millersburg, Pa. 7, 22
641 J.B. Drury, 39 Sagamore Rd., Bronxville, N.Y. 7, 10, 11
642 K. Olson, 20 Rockne Rd., Kenmore 23, N.Y. All
643 J. Miller, 273 Union St., Lodi, N.J. 9
644-645 P.J. Rooney, 207 Grove St., Stratford, Conn. A
646-647 H.M. Harlow, 22 Lehigh Rd., Wellesley 81, Mass. 9

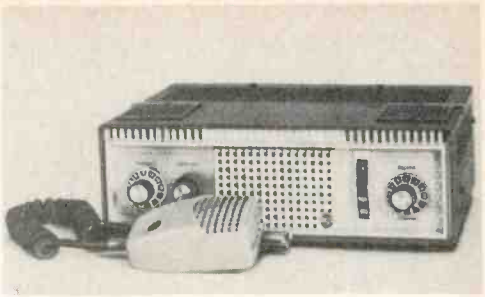
ON THE COUNTERS

This month we're pleased to note that *Concord Electronics Corp.* of Los Angeles has a new hand held transistorized CB rig on the market. The unit, known as the TG-093 runs 100 mw through its 9 transistor circuit. BUT! The company has some new innovations in the circuitry which gives the little rig a claimed 20% increase in output power over similar 100 mw hand held units. Concord claims the unit is effective to 5 miles over land and to 20 miles over water (depending on terrain and operating conditions).

Comes with leather carrying case, optional AC power supply for base station use, and is equipped with a Channel 9 rock (although any channel is available upon specific request). The price was not announced at press time.

Hey, lookee here! Remember the Regency CB rig? The company has brought out a radical new design in a rig called the *Regency Range Gain Transceiver*. Bascially, the rig does not use standard AM emission, but rather double sideband reduced carrier. According to company spokesmen, this enables the user to "enjoy 2 to 3 times the coverage of previous units." The unit also features 23 channels, adjustable impedance antenna output, squelch, external speaker terminals, 6/12 VDC and 117 VAC power supply, 5 kc/s fine tuner to bring in off-channel stations, adjustable automatic noise limiter, 4-way meter, transmit light, and ultra-modern styling. The unit is priced for sale in the $250 class. For more information, write to Tom Barry, *Regency Electronics*, 7900 Pendleton Pike, Indianapolis 26, Ind., or fill in the reader service card between pages 16 and 17 of this issue and send it to our office.

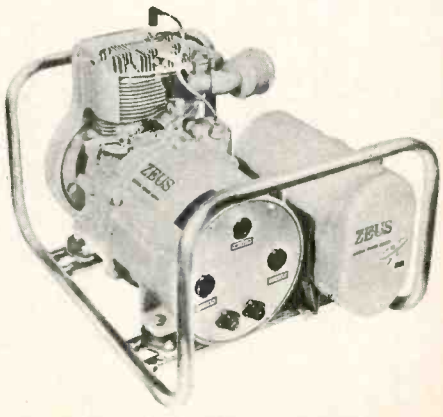
RCA's new MARK VIII (that means "8") is beginning to pop up in CB stations across



the country of late and they sound pretty sharp. In case you live with your head in the sand, the unit was designed with compactness and efficiency in mind. It is available in a 115 VAC version with optional 6 and 12 VDC supplies available also. You get 9 transmit and receive channels (plus tunable), TVI trap (everyone needs one), 3 watts (or better) output, squelch, illuminated channel indicator, electronic switching, and it weighs but a mere 8 pounds. It goes for about $150. The company is located at 415 South Fifth Street, Harrison, N. J. You can get details from Harold Bersche. Or, if you're lazy, you can use the reader service card up front in this issue.

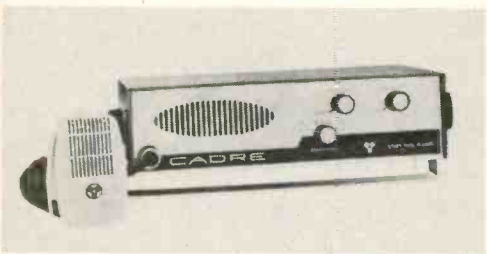
Palomar Instruments (563 Country Club Drive, Escondido, Calif.) has a new and novel SWR indicator. You can plug the unit in your line and leave it there. If all is OK you get a nice bright green light (the brighter the better, or vice versa depending on if you're left handed), but if you're getting any power reflected back into the rig you'll be horrified by the sight of a sinister red light in the device. This really is clever and it sells for less than $7. Mr. S. I. Lewis at the company can fill you in.

Zeus Generators (12435 Euclid Avenue,



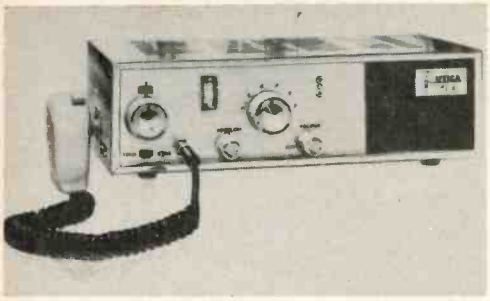
Cleveland 6, Ohio) have a line of emergency power generators which will be of interest to all CB'ers. The ASP-1000 generates 1000 watts of 110 VAC, the ASP-1250 gives out with 1250 watts of the same, and the ASP-3000 with 3 kilowatts of both 115 and 230 VAC. They run on either gasoline or liquid propane (except the ASP-1000, which is gasoline only). Prices start real low for the ASP-1000 and run to about $690 for super deluxe models of the ASP-3000. Paul M. Cornell (19W4629) at the company can give you loads of details on these units. Every club should have one kicking around.

Browing Labs (100 Union Ave., Laconia, N. H.) announced that they are offering an informative newsletter called the "CBeat." It covers all new advancements in the field of CB communications. It's available free to all clubs wishing same. Send your requests to Gar Greene, Sr. (1W1978) at *Browning* and he'll place you on the mailing list.



Cadre Industries' (20 Valley St., Endicott, N. Y.) announces their new Model 515 CB rig—another all-transistorized unit to add to their interesting line. The Model 515 meets DOT regulations so it should be of interest to XM's as well as us guys "south of the border." Joe Gibbs at Cadre tells us that the rig features modular construction of the transmitter, receiver, audio section and power supply, *plus* built-in speech limiting, *plus* squelch, *plus* automatic gain control, *plus* noise limiting. Also AC and DC line cords, mounting bracket, dynamic mike. It is styled in charcoal and silver. Other than that, if you're still skeptical, it features 5 channels, and a rechargeable battery pack (optional). Selling for about $190, the unit looks like a real winner from early information received at the S9 offices.

Utica's new Town and Country II seems to be generating quite a bit of talk in CB circles, as you may have noticed if you do any listening on the band. The unit is a 6 channel baby which has tunable as a bonus



and an added bonus of a crystal socket on the front panel. The receiver is a dual conversion job with a high-gain RF stage. It has both an S-meter and output modulation indicator, all chrome cabinet, auxiliary speaker terminals, and the usual Utica fine workmanship and styling. We've seen a few of these in action and everyone seems pretty delighted with the rig. For all sorts of facts on the rig you can send a card to Ed Chubin, *Utica Communications Corp.*, 2917 W. Irving Park Rd., Chicago 18, Ill.

Speaking of *Utica*, an outfit called *Electronic Servicenter of N. Y.* at 65-37 Queens Blvd., Woodside 77, N. Y., has just been appointed as an authorized warranty and service center for the New York Metropolitan area. We did a little checking and found that this place is run by Irv Strauber—a guy we'd trust with the life of our last 6L6. Irv's got a nice place in Woodside, drop in and say "hello" if your over there and you've got a defunct rig under your arm.

Finally, we wish to note the appointment of Charles M. Kirkland as President of the *Heath Company* of Benton Harbor, Mich. Lots of luck, and keep us rolling in those fine *Heathkits*, Mr. Kirkland. We love ya!

S9 Lab Reports

THE GENERAL RADIOTELEPHONE MC-5

One of the most talked about units is the General Radiotelephone Model MC 5. This

Watch for next month's big issue

rather compact transceiver is designed and built for 15 watt operation although it has been factory pre-set for the legal five. The use of high rated components that are operating far below their maximum capability results in greatly extended operating life with relative freedom from repairs.

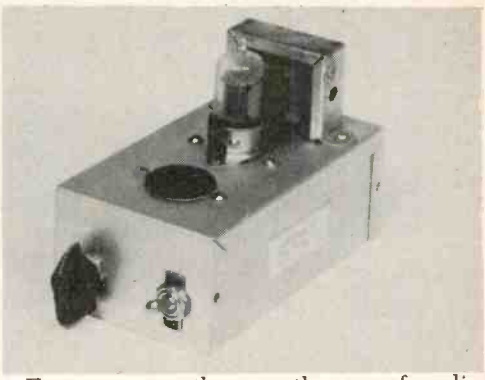
The transmitter circuitry uses a 6EA8 oscillator utilizing fundamental type crystals. This tube also doubles as the receiver oscillator. The RF power amplifier is a 6EM5 operating at the five watt level. Power output into a 52 ohm load measures at about 3.2 watts. Modulation capability is a full 100% with 3.5 watts of audio available. The receiver is a single conversion superhet, IF 452.1 KC with a carcode RF amplifier in the front end. A Local-Distant switch enables the operator to vary the gain of the receiver as desired. A dual gang variable permits tuning of both the local oscillator and mixer stages. Mixing is accomplished in a 1N295 diode. A high number of tuned circuits provides 6 kc/s selectivity at points 6 DB removed from center channel. The illuminated S-Meter and choice of four crystal controlled or one variable tune channel make operation quite simple.

Receiver and transmitter channel selection is accomplished on an independent basis with six channels being available for transmitting. An accessory external crystal socket is provided for quick change of frequency. A new type Zener diode noise clamp and gated limiter circuit provide excellent noise suppression. The unit is available with a built in three way power supply allowing operation on 6-12 volt DC and 117 volt AC.

All in all, a *very* hot rig, with extremely nice gold and black styling.

The set sells in the $200 category and is manufactured by General Radiotelephone Co., Dept. S, 3501 West Burbank Blvd., Burbank, Calif.

THE BAINBRIDGE SPEECH CLIPPER



For many months now the use of audio preamplifiers, clippers and compressors has been discussed, written about, and argued over. One of the characteristic features of most of the devices discussed is that they were designed to operate only with and in conjunction with the microphone circuitry. The audio characteristics of your receiver remained unchanged. In fact, some of the units available did little more then cause extreme overmodulation.

The new *Bainbridge Speech Clipper* performs a number of functions in both the transmitter and receiver audio sections. Basically it is designed to clip both the high and low frequency portions of the audio spectrum. This, in effect, enables you to concentrate your audio in the most effective portion of the spectrum between 500 and 2500 CPS. The built-in compression amplifier then enables you to impress this shaped audio on your carrier for an efficiency increase of up to 250% in talk power. So far there is little difference between this and other commercially available units.

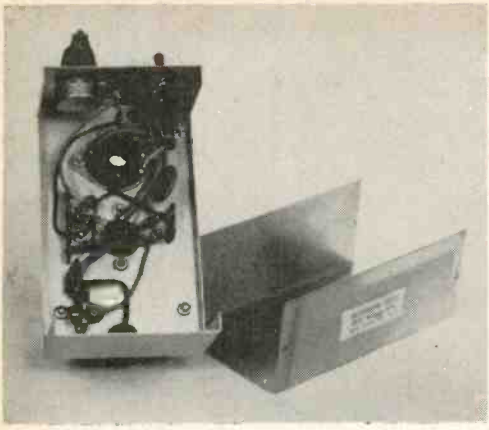
Now let's take a look at the bonus features. This unit performs the same function for your receiver. The received audio is clipped, filtered, and compressed before it reaches the speaker. This action reduces the amount of background hiss noise, limits or eliminates heterodynes and provides an apparent improvement in the overall noise figure of the system. The end result being that you can now read a station that had been buried in the background previously.

Installation of the unit is quite simple. The basic design allows this unit to be used with virtually every type of CB unit regardless of the type of microphone used. In essence and much simplified a typical installa-

tion consists of the following steps: Locate the modultor tube grid in your transciever. Remove the .001 or similar disc capacitor that is connected to this point. Connect and solder the black shielded cable center conductor to this lug. Connect the shield to ground. The other end of the .001 capacitor that you removed was connected to the plate of the preceding audio tube. Connect the center conductor of the grey shielded cable to this point. Connect the shield to any convenient ground point. Connect the red lead from the cable to the B plus line. Connect the black and one brown wire to ground. Connect the remaining brown wire to the filament line. (Instructions are provided for either 6 or 12 volt operation.) This completes the installation.

Operation of the unit is again quite simple. Turn on the rig and place the clipper switch in the Off position. Your transceiver should operate normally at this time. Turn the gain control on the clipper fully counterclockwise and switch on the clipper. There should be little change in the receiver audio at this point. Slowly rotate the gain control clockwise. You will note a marked increase in audio power with a sharp loss in high frequency hiss and response. The signals should be quite a bit more readable than before. To adjust for optimum results on both transmit and receive it is suggested that an oscilliscope or RF analyzer be used although it is not entirely necessary. If no scope is available you may perform the adjustments with the aid of another station. You simply adjust the gain control until the listening station reports maximum talk power with the least distortion being apparent. This is the optimum setting for both receiving and transmitting.

The circuitry used in the clipper itself represents a departure from the commonly used configurations. The use of a Zener Diode as a clipper provides for a more constant level of clipping control. The block diagram provided will enable you to follow the audio signal through stage by stage. The basic audio signal developed by your transceiver is fed into a high pass filter, clipper and amplifier. From there the signal is fed through the Zener diode clipper and into the low pass filter. From here it is then amplified and fed into the grid of your present modulator and audio output amplifier tube. The placing of this unit between the existing audio driver



and modulator enables it to perform on both receive and transmit with equal facility.

Assembly of the unit from kit form proved to be quite straightforward, the only critical portions being the diode speechclipper assembly. This is now provided in the form of a prewired subassembly. Typical construction and installation time on this unit should be about three hours.

Performance tests were made utilizing both a Lafayette HE-20C and a Polycom II G. The increased readability of weak signals and the elimination of heterodyne interference as the clipper shaped the received signals increased the apparent selectivity of both sets to a marked degree. Listening stations reported a sharp gain in readability and audio power without any noticable distortion. Effective range of the writers base station has been increased by a marked amount. The *Bainbridge Speech Clipper* looks like a most desirable item and should prove quite popular.

Manufacturer is Bainbridge Radio Electronics, Box 9, 2839 Briggs Avenue, New York 58, N. Y.

The unit sells for $17.85 complete. Our tests showed that the unit is *not* to be recommended for use with the following units because of circuitry within the transceivers: Apelco AR-9, Globe CB-100, Vocaline ED-27, e.c.i. Courier, and Sonar Model E. All of these sets, with the possible exception of the Sonar Model E, work well even without the clipper so don't be too upset.

DO NOT LOOK AT PAGE 18

PART 15 KORNER

by DEAN DETTON, NORTHERN 17

% S9 MAGAZINE
300 WEST 43 ST.
NEW YORK 36, N. Y.

PART 15 CHANNELS	
Channel A	26.995 mc/s
Channel B	27.045 mc/s
Channel C	27.095 mc/s
Channel D	27.145 mc/s
Channel E	27.195 mc/s
Channel F	27.235 mc/s
Channel G	27.245 mc/s
Channel H	27.265 mc/s

This month shows a big increase in Part 15 interest—and in the Part 15 mail too!

Jim Ashworth, NORTHERN 631, of Berlin, N. H. constructed the Part 15 "Roof Hopper" rig from the December, 1961, issue of POPULAR ELECTRONICS and reports good results. The "Roof Hopper" which was designed by Hart Smith, CENTRAL 11.

Here's a novel Part 15'er, Richie Casey, CENTRAL 573, of Morton Grove, Ill.; Richie operates a *Remco Caravelle* using CW on the standard broadcasting band. His mighty 981 kc/s signal has been heard about 2 miles distant, and there's a whole network of these Part 15 broadcast band CW stations in his area. Anyone else on this band out there yet? Let's hear from you!

Brian Kunzog, NORTHERN 263, of Jamestown, N. Y. has an interesting question. He wants to know why S9 doesn't form a national club. Well, we have always considered all of S9's regular readers as belong-

APPLICATION FOR FREE PART 15 STATION IDENTIFIER CERTIFICATE

To register your Part 15 "unlicensed" CB station with S9 and receive your special station identifier certificate, do the following:

A. Fill in the application below, or facsimile if you don't want to cut your copy of S9.

B. Enclose your completed application form together with a self-addressed stamped (5¢) envelope, in another envelope addressed as follows:

Part 15 Department
S9 Magazine
300 West 43rd Street
New York 36, N. Y.

C. Please do not request special identifying words for your station as all identifiers are issued in alphabetical rotation for ease of recording on our records.

APPLICATION FOR PART 15 IDENTIFIER

Name:_____ CB Call:_____

Address:_____

City:_____ Zone:_____ State:_____

Part 15 Channel:_____ Type of unit:_____

No. of units:_____ Date:_____

Signature:_____

ing to a big club, and we hope that our readers will feel the same way. Just one big family (happy, I hope) of CB'ers, from Part 15'ers to "Commercials"—S9'ers all! Brian also wants to see some photos of Part 15 shacks, and so do we. How about it? Send them in, if they're good, we'll probably run them. If yours is *extra* good we might even be able to talk Tom Kneitel into running it on the cover, and that's worth about $10 cold cash in your direction.

A2/c Peter S. Carr, KIC7005, of Crane, Ind., asks if he can use a Part 15 callsign for his *Allied C-100* hand held transceiver when he is communicating with his regular Part 19 5 watt CB base station. The answer is an emphatic "no." Part 15 stations may communicate only, repeat *only*, with other Part 15 stations. To use a 100 mw unit for communicating with a Part 19 station the unit must be technically qualified to operate under Part 19 and you must use a Part 19 callsign. S9's station identifiers may *not* be used for this purpose.

Mark Langenfeld, CENTRAL 186, Racine, Wisc., stands-by on Channel 20 each night after 7 P.M. CST. He asks where he can purchase Part 15 channel crystals. Easy, just order crystals for the Class C Radio Control CB channels, they correspond with the Part 15 channels exactly. Check the ads and crystal manufacturers.

Andrew Demartini, NORTHERN 717, Cresskill, N. J. asks about the most popular phone and CW channels in the New York City area. The CW boys favor Channel B, the phone hobbyists seem to congregate on Channel A. Those are the favorites, some of the other channels seem to be showing signs of life too of late, however.

NORTHERN 400, Dennis Gould of Dansville, N. Y. operates Part 15 on Channels 12 and 14 from 1 to 11 P.M. and most of the day on Saturday and Sunday. He's looking for skeds.

Peter W. Ryder, PACIFIC 180, of John Day, Ore., asks if he can operate his Class D station on Part 15 channels, and also if a Part 15 station can be both base and mobile. The answers: no to question #1, yest to the second question.

Jeff Eaton, NORTHERN 736, Wilmington, Del., asks about a Part 15 callbook. By now, Jeff, you know that we give our S9'ers a Part 15 CB callbook as part of each monthly edition of S9 at no additional charge. Of course we've got a sneaky motive, you'll have to buy S9 each month to get the entire listings. You can strike back at us by subscribing, this saves you a buck a year over the newsstand price!

Electro Marine of Puerto Rico, Inc., EXTERIOR 15, of Santurce, P. R. commends S9 for the Part 15 station identifier program. They run *Heathkit* hand held units on both phone and CW for servicing industrial and broadcast electronics installations. Head man at Electro-Marine is Samuel M. Van Wyck, EXTERIOR 18, better known on the Ham bands as KP4BDS, or on the Part 19 channels as KII0287. By the way, you can get *your* Part 15 station identifier FREE by filling out the form in this issue and returning it to our office with a stamped (5¢) self addressed envelope.

Gary Blauth, KCC2859, Hoboken, N. J. asks if he can convert his 5 watt Lafayette HE20C and Colinear antenna for Part 15 use. There's hope for the transceiver, but the antenna—WOW! A Part 15 antenna can't be more than 5 feet long.

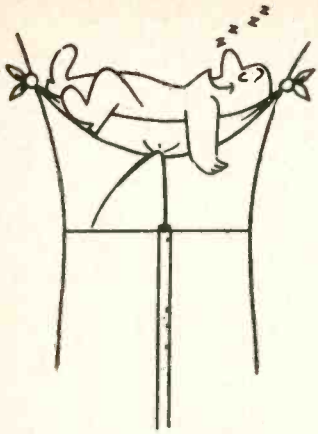
Hey, here's real DX. Jean-Pierre Beaulieu of Sherbrooke, Quebec, Canada. He is ROYAL 11 on Part 15 channels, XM53023 on the regular GRS channels in Canada.

Arden Coulter, 2Q2109, of Staten Island, N. Y. is interested in Part 15 and wants to know about available equipment for a base station. S'matter with the *International Crystal EXEC 1500?*

The *Kankakee Valley Hi-Banders Association* of Bonfield, Ill. is organizing for Part 15 action. They asked a number of interesting questions in their letter. The answers are found elsewhere in this column, and in the special Part 15 feature story elsewhere in this issue of S9. Let us know of your progress Jerry, we're interested.

Finally, Paul F. Runge, of *Ace Radio Control, Inc.*, of Higginsville, Mo., reminds Part 15'ers that they share their channels on a non-interference basis with Class C CB stations (radio control). If a Class C station is in operation on the channel when you want to go on the air, you'll either have to stand-by or move to another channel. That's not just courtesy, it's actually the law. Be especially careful on weekends as the Class C boys are generally out in full force on Saturdays and Sundays. One careless transmission might

Continued on page 61



ANTENNAS

ED NOLL
BOX 23
CHALFONT, PA.

A 3 ELEMENT BEAM

The most popular beam antenna in CB use is the three-element type shown in Fig. 1. It consists of a driven element (dipole) plus a single parasitic reflector and a single parasitic director. In general the gain is some 50 percent better than that obtained in using just a single reflector or director element. The maximum gain and pick-up sensitivity are in the direction indicated by the arrow. Although the three-element style is the most popular type of CB beam antenna there are really not too many in operation. There is good reason when one considers that it occupies a plane of some 150 square feet. Typically, the boom to which the three elements are attached is 8-10 feet long while the longest element (reflector) is better than 18 feet long. To this space problem you must add the problems of the considerable amount of weight that must be supported and, if the beam is to be directed at more than one compass angle, a rotating arrangement.

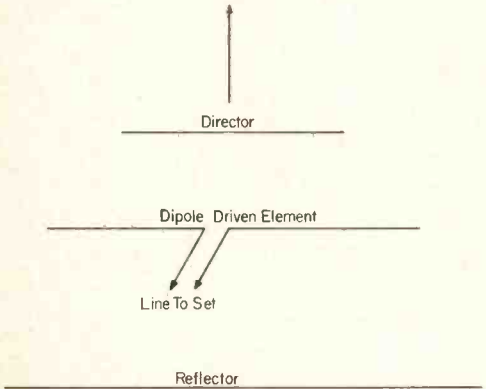


Fig. 1 The Three Element Beam Antenna

Despite these conditions there are beams in operation and, a great many CB'ers have and are considering the purchase of a three-element beam antenna.

Such a beam can be mounted horizontally or vertically. The horizontal mounting, in general, provides a sharper beam pattern and good pin-pointing is possible. The vertically mounted beam has a broader horizontal beamwidth; but, is more favorable for communicating with vehicles which use low vertically-polarized antennas.

The advantages of beam operation have become more and more attractive to the CB'er, and, in recent months, there has been an increasing number of inquiries about beam characteristics.

Gain improvement is a significant factor. Perhaps more important to practical operation is the ability to pin-point communications between two points with a minimum of interference from stations operating off the direct line. The latter is perhaps the most important advantage of beam operation; you receive less interference and you cause less interference.

SPECIFICATIONS

The CB'er has become increasingly interested in the electrical and mechanical specifications of beam antennas. Typical specifications are as follows:

Gain	9 db
Front-To-Back Ratio	20 db
Front-To-Side Ratio	30 db
Antenna Impedance	52 ohms
SWR	1.0521
Boom Length	8 feet
Longest Element	18 feet
Turning Radius	10 feet
Net Weight	15 lbs.

Watch for next month's big issue

Several antenna specifications are given in decibels or db's. The decibel presentation is simply a convenient means of comparing voltage, current, power, gain, sensitivity, etc. in electronics and electrical work. It provides figures that can be handled readily in making calculations. A db comparison corresponds in many ways to the manner in which electronic and electric parameters change under variable conditions. The decibel and power ratio chart demonstrates the manner in which a decibel scale is used to indicate power ratio in antenna specifications.

DB	Power Ratio
1	1.26
2	1.58
3	2
4	2.5
5	3.16
6	4
7	5
8	6.31
9	8
10	10
13	30
20	100
30	1000
40	10,000
50	1000,000
60	1,000,000

ELEMENT SPACING AND LENGTH

As in the case of the single reflector or single director combination described in last month's column, spacings vary between 0.1 and 0.25 wavelength. Practical dimensioning dictates the use of close spacing so that the overall boom length is kept somewhere between 0.25 or 0.3 wavelength. Although there are some advantages to wider spacings the area of antenna space becomes impractical for the usual 27 megacycle operation. The above electrical length corresponds to a physical boom length of 8-11 feet.

The presence of reflector and director causes a drop in the antenna resistance. As you recall the antenna resistance of a simple dipole is some 70 ohms. The presence of a director and a reflector lowers this antenna resistance to 30 ohms and often considerably less depending upon the operating conditions that are desired.

In general the closer the spacing between dipole and driven element the lower the antenna resistance. Some adjustment in antenna resistance can be made by regulating the element length as the parasitics are brought nearer to the dipoles. When the antenna resistance is low it is possible to use a matching arrangement between the antenna terminals and the transmission line. Usually very simple matching devices suffice for CB operation.

Element lengths are related to element spacings, gain desired, front-to-back ratio desired and the acceptable antenna resistance. The element dimensions that provide maximum gain and the best front-to-back ratio are not exactly the same. A compromise is usually in order. The front-to-back ratio is improved with some loss in gain when the reflector is made somewhat longer and the director somewhat shorter than those values calculated for maximum gain operation.

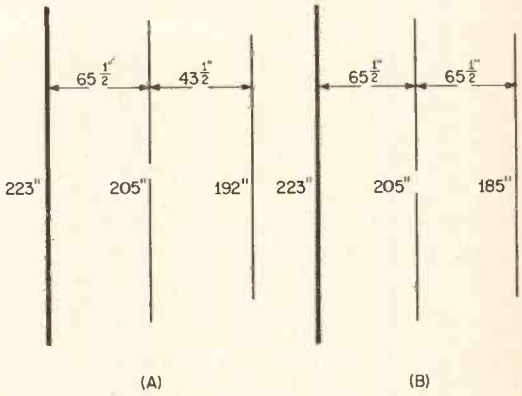


Fig. 2. Beam Antenna Dimensions

PRACTICAL BEAM DIMENSIONS

The dimensions for typical three-element beams are given in Fig. 2. In example A the spacing between dipole and reflector is 0.15 wavelength; the spacing between dipole and director is 0.1 wavelength. The dimensions are planned for high gain operation with some slight sacrifice in favor of maintaining a good front-to-back ratio.

The antenna impedance drops to some 15-20 ohms. Therefore some form of matching arrangement is needed for use with standard 52 ohm cable.

A popular matching arrangement for Citizen band beam antennas is shown in Fig. 3. The impedance at the very center of a driven half-wave antenna is at its very lowest. In the case of the three element beam this antenna resistance may be as low as ten ohms. As shown in the impedance curve, the an-

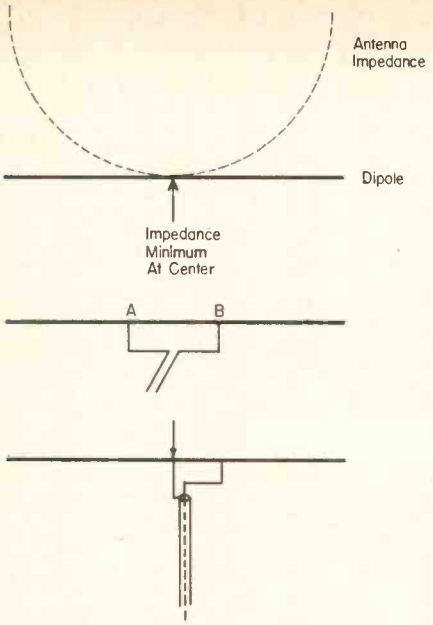


Fig. 3. The Gamma Match For A Beam Antenna

tenna impedance rises in both directions away from the center point. Thus if the impedance of the antenna is measured between points A and B it would be higher than at the center. Thus a simple matching unit called a gamma-match can be used to extend the two conductors of the transmission line so that the connection is made between points A and B; A and B positions are chosen carefully so that they display approximately the same antenna resistance as the characteristic impedance of the transmission line.

Example B shows how a one-side gamma-match is quite often used to match coaxial transmission lines to a beam dipole. The outer conductor of the coaxial line is connected to the dead center of the dipole. The inner conductor is moved along the dipole out to the point at which an impedance match can be established.

It is important to realize that by taking some slight loss in gain it is possible to design an antenna that provides a good 50 ohm match to the regular CB transmission line. Such an antenna is shown in Fig. 2B. The increase in antenna resistance is accomplished by increasing the director spacing and decreasing the director length.

REDUCING BEAM ANTENNA DIMENSIONS

There are a number of possible ways of cutting down the size and/or complexity of

a directional antenna system. One possibility is to provide a much closer spacing between parasitic elements and dipole; spacings of only 0.05 and less may be feasible for practical CB use. Of course, the antenna resistance drops to a very low value and an adequate impedance matching arrangement would be necessary. One possibility along these lines is the folded dipole structure of Fig. 4. Special dipoles of this type function as impedance transformers. By regulating the spacing between the two dipole sections and their relative diameters almost any amount of impedance transformation can be made. For example with the dimensions shown an impedance transformation of 11 can be obtained. This means that an antenna with a low resistance of only 4.5 ohms can be stepped up to a 50 ohm figure.

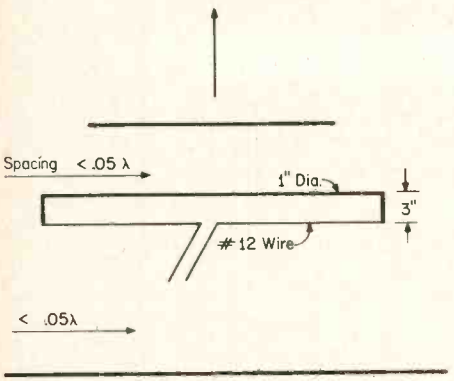


Fig. 4. Closed-Spaced Beam

The coaxial beam of Fig. 5 also has possibilities. In this arrangement the driven element is a coaxial dipole which in itself provides an impedance transformation. Beam action can be obtained in a vertically polarized arrangement by using reflector and director only in association with the top quarterwave segment of the coaxial design.

Instead of using a single dipole or driven element there are many combinations of more than one driven element that can be used to establish desired directional characteristics. Often a simple switching arrangement permits the directional pattern to be altered at will. Two or more conventional antennas and separate lines run down to the base station switching position can be used to establish various directional configurations. A coaxial switching arrangement and several precise sections of coaxial transmission lines that can be switched in and out can provide directional radiation characteristics without the need for rotating a large massive antenna.

High gain bidirectional antennas would find a definite application in citizens band service. Many business enterprises with CB facilities are found along main highways and their communications are almost entirely with respect to vehicles that move along these arteries. Consequently a two-lobe directional pattern that sprays out maximum signal along such a right-of-way in both directions could do much to provide better and more extended service.

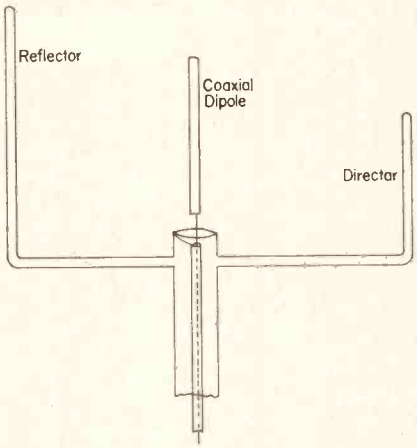


Fig. 5. Vertical Beam Antenna With Coaxial Dipole

The trend toward directional antenna systems is quite definite because of crowded channels and the variety of specialized functions provided by Citizens Band operations. Higher reliability and less interference are the advantages of tailoring the radiation of the base station antenna system to fit the specific needs of your citizens radio service.

We will keep you abreast of the new trends in directional antenna systems. Next month we will give some practical construction data on fixed-beam and space-saving directional antenna types.

CB ANSWERMAN

by LEN BUCKWALTER, KBA4480

Editor's Note: Readers are invited to ask the CB ANSWERMAN any questions which they have regarding the CB service. Address your questions to Len Buckwalter, KBA4480, Wilridge Road, Georgetown, Conn.

NOISY BEETLE

I own a 1955 Volkswagen and eliminated all noise from the ignition system except from the spark plugs. Clip-on suppressors have cut down on part of the noise but I'd rather use resistor-type plugs. Every dealer claims he's sold out. Where can I get them for my car?

R. P., Roseburg, Oregon

Never take no for an answer. Many dealers who are "sold out" usually need a little prodding. The trick is to nudge him over to his dusty catalog. VW's original-equipment manufacturer, Robert Bosch, will happily provide resistor plugs at the uncommon market price of $1.75 each. Be certain to get the suppressor, too, that fits in the center post of the distributor cap.

This is only part of the battle. Late-model VW's are electrically, very quiet, but that '55 produces more noise than hailstones falling on a tin roof. If the resistor plugs don't reduce interference satisfactorily, continue with these measures: The shield of your antenna co-ax must ground to the car frame. Use hollow shield to cover the two thin wires from the ignition coil (and ground the shield to car frame). Also, the rear hood, over the engine, should be electrically grounded to the car body when closed. You can add a length of shield near the hood hinge for this.

In nasty, cases, bypass capacitors should be installed on leads that emerge from the engine compartment; to ignition key, lighting switch, etc. This shunts off noise currents that might be radiating from these wires.

A BARGAIN?

Could you tell me if the surplus receiver BC-603 and transmitter BC-604 can be used for CB operation?

L. A. L., Pittsburg, Kansas

While the surplus market offers some great buys, the BC-603 and BC-605 hold little value for the CB'er. Converting such equipment to FCC specs is as efficient as plucking your eyebrows with a pliers. The BC-603 will receive 27 MC—but on FM, *not AM. The only AM I've ever heard on an FM set happens when my 1-year old sticks pins into the AC wall outlet. It makes static on the hi-fi tuner. You'd have to rework the BC-603 detector stage to hear CB signals. The BC-604 transmitter naturally transmits FM. Other CB'ers hearing you would say "This guy's using FM—Fantastic Modulation!" An FM signal in a CB receiver sounds as clear as a voice submerged in a bowl of mush.*

But you'd have the best RF carrier on the block. The BC-604 transmitter is rated at 30 watts. This would have to be reduced to five, a whole new modulator (of the AM type) installed, and a conventional power supply constructed. Meanwhile, you're studying for a commercial ticket; required by law to touch the oscillator section. Thus, you can see, that the process would be as profitable as packaging belly-button lint.

RECEIVER SELECTIVITY

If tune my receiver to channel 9 it also picks up stations on channel 8 and 11 at the same time. Do you think that converting the receiver to crystal control will tighten it up?

F. K., St. Louis, Mo.

HOBBY CB

I read an article about hobby use of CB in a previous issue. Can I operate a class D rig for hobby purposes on a license-free (Part 15) frequency?

J. B., Deer Park, N. Y.

Although the license-free unit and class D rig do share some frequencies, the answer is negative. You cannot legally operate a class D unit except under the rules of Part 19. Class D sets have far too much power for Part 15 specs.

Most manufacturers of license-free units, however, do design them so they can be used either way. Usually the sets are 100-milliwatt handie-talkies. The law here says that if the handie-talkie is used for communication with a class D unit, it must be operated under the regulations of Part 19.

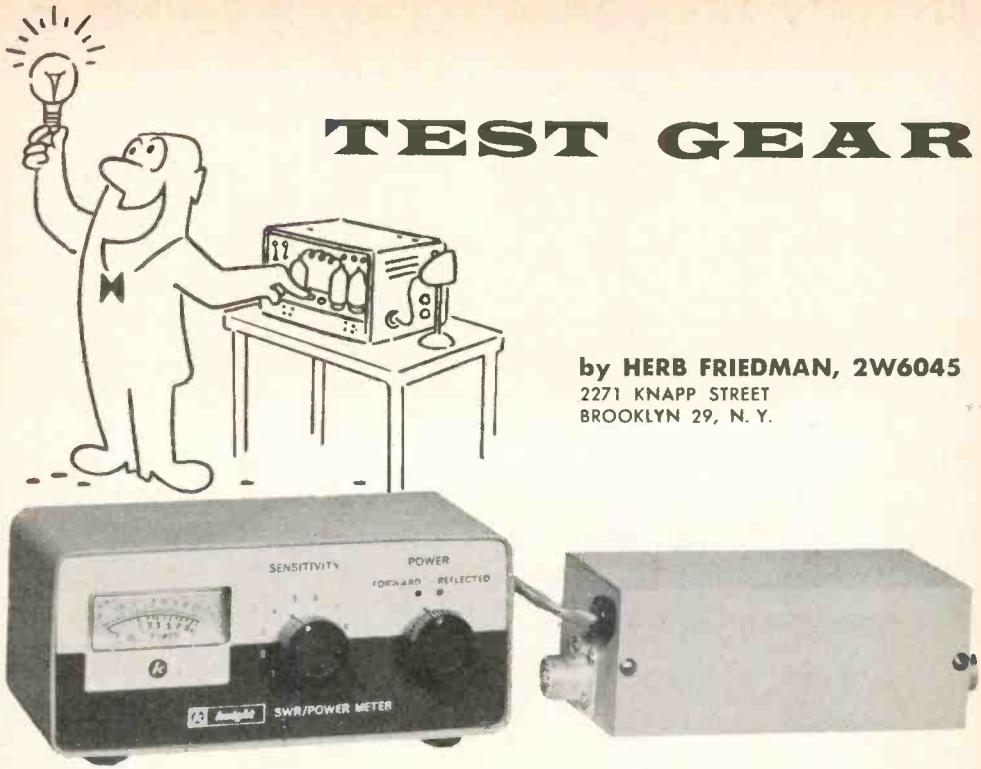
Your letter also requests the source of Part 15 rules. See the feature article in this issue.

The selectivity, or ability of a receiver to reject adjacent-channel interference, is the same whether it's continuously tunable or crystal controlled. Thus, converting to crystal control won't improve your unit. The answer lies in the receiver's IF strip. If there is only one IF amplifier, probably true in your case, selectivity is bound to be relatively poor. There are simply too few tuned circuits (IF transformers) to narrow down the receiver's response. Conditions improve with two IF's while a double-conversion circuit delivers razor sharpness.

A possible approach to the problem is modifying the set for double conversion. There are commercially available kits with complete instructions for installing the circuit in several popular rigs. (See "CB Shop" section)

TEST GEAR

by **HERB FRIEDMAN, 2W6045**
2271 KNAPP STREET
BROOKLYN 29, N. Y.



SWR Bridges (or meters) are available in many sizes, shapes and prices. In the CB power range they are usually so low priced it is not illogical to assume that every CB'er should own one. The cost of the SWR meter is perhaps more easily justified than any other accessory, because in addition to indicating antenna system performance it is the most accurate of transmitter tuning indicators. When an SWR meter "peaks" (in the forward power position) the transmitter is tuned on-the-nose, regardless of what a plate meter may indicate.

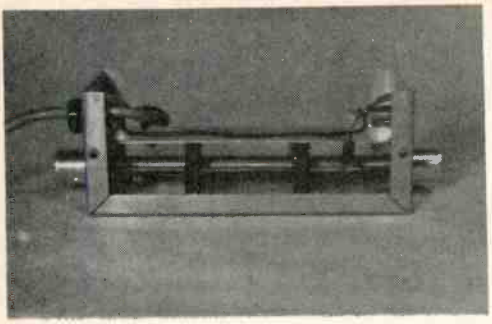
Most SWRM's connect directly into the coax cable and are designed to be mounted on the wall. Or at best, they sit on the desk, back wherever the transmission line is routed. However, since the SWRM indicates transmitter tuning it should be at the transceiver, within easy viewing. To meet this need several manufacturers have models which are remote indicating. A pick-up box (connected into the coax), which can be mounted under the table, feeds indicating voltages to a small control box which is mounted directly on the transceiver.

A remote indicating SWRM is usually expensive; but now, Allied Radio has made available a remote indicating SWRM at the rock-bottom price of $14.95. The *Knight-Kit Model P-2* SWR/Power Meter is a kit which takes less than an evening's work from unpacking to use. The P-2 is designed to be used with either 52 or 72 ohm lines. The correct components for both impedances are supplied and you install the ones to match your antenna system.

The pick-up box is more a mechanical assembly than electrical. As shown in the photograph it consists primarily of several lengths of heavy wire and the means to hold them in place. Both input and output connectors are of the SO-239 type. A steel plate forms a shielded compartment for the transmission line and the pick-up leads. The rectifiers for forward and reflected power are above the shield. The control cable to the pick-up box is about four feet long, permitting you to hide the pick-up box out of sight if desired. If you like to have your equipment on display don't worry about appearance because the pick-up box has a Decorator Blue cover.

The control box, which mounts on the transceiver, contains only the meter, calibrate control, and forward/relected power switch. It's blue shadow/line cabinet will enhance the appearance of your shack.

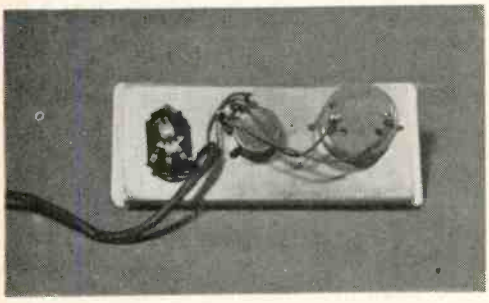
The calibrate control (labeled sensitivity control) is used to set forward power reading



The pickup box is primarily a mechanical assembly. Reasonable care during assembly will assure perfect meter calibration.

to the full scale (calibrate position). By reducing the sensitivity, say to half-scale, there is "scale room" enabling you to peak the transmitter. The reflected power position is calibrated directly in standing wave ratio, it is not a relative indicator.

When built according to the instructions in the profusely illustrated instruction manual the meter is self-calibrated. Nothing is really critical, and with just reasonable care the calibration is identical to the more expensive wired units.



Control (box) panel wiring couldn't be easier.

Since the control unit is right at the transmitter it is second nature to keep a daily track of the transmitter's performance. If the forward (output) power drops, you see it instantly. By checking against the SWR reading you know immediately whether the problem is antenna deficiency (such as caused by damp weather) or transmitter tubes (or crystal) going "soft."

If you want to give your shack a professional appearance and also have convenient metering look into the P-2 SWR Power Meter.

SIGNA-BOOST

Continued from page 23

attempt to place the unit at the antenna plug on the rear of the transceiver. If you do this you will be feeding your transmitter's RF into the unit when you transmit and this will ruin the unit.

The unit's input goes to the T/R switch or relay, the output to the tube grid. Use 52 ohm cable to make these connections.

TUNING UP

Tune in a signal on or near Channel 9 and detune *L3* and *L4* for minimum signal. Peak *L1* for maximum output, then tune *L3* for maximum. *L4* is then tuned for maximum, and *L1* repeaked if necessary. Be sure that the signal used is low enough to prevent overloading of the preamp or the receiver. The response shown in *Fig. 2* was the result of tuning with a signal, and using the latter method.

GAIN AND NOISE MEASUREMENTS

Using a Hammarlund HQ-129X with the preamp connected to it, signals were increased by 5 S-units. According to the manufacturer, one S-unit is equal to an increase of 6 DB, but is probably less. This also gives a figure of 25 DB average.

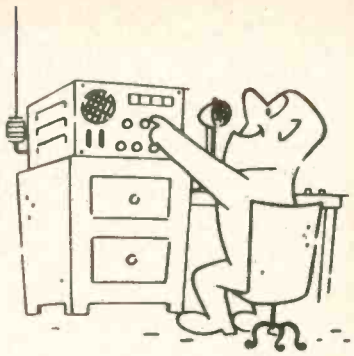
For noise measurements, using the receiver, the generator output required to give the same output from the receiver without the preamp was 16.4 times the voltage required with the preamp connected. This is equal to slightly more than 24 DB. For equal signals with and without the preamp, the noise was down 20 times when modulation was removed. Although not conclusive, they aid in coordinating the results.

The final method of measuring the noise was with a noise generator of commercial make, with the preamp connected to a *Super-Pro* receiver. Although "noise-figure measurement" may sound like a complicated deal, it is only a matter of hooking up the equipment, setting the noise generator for a 1.4 increase in noise output voltage, and reading the noise figure in DB directly from the generator. In the case of the preamp two sets of figures were obtained:

1. 3 DB, with the audio gain tuned up all the way, and the RF gain set for 1.0 volt out of the receiver.

2. 4 DB, with the RF gain up all the way, and the audio gain set for the same output voltage.

CB CASEBOOK



by LEE AURICK, 2W2870
MT. PLEASANT RD. RFD 1
COLUMBIA, PA.

WOULD YOU LIKE TO READ ABOUT YOUR COMMERCIAL USE OF CB IN S9? IF SO, WRITE TO US.

It was a pretty cold and windy day to be roaming around on the banks of the Sesquehanna River. Nevertheless, your S9 reporter had been promised a visit to Welsh's Boatyard, R.D. #1, Wrightsville, Penna. The snow was piled up to a foot or more in places as we drove up and met Don Baker, a friend who volunteered to introduce us to Tim Wadsworth, 3W4962, President of the yard. The broad expanse of the Susquehanna was frozen hard and snow covered, and from the warmth of Tim's office gave an impression not unlike a desert. Only the occasional fleeting glimpse of an ice-boat further down the river served to remind one of the real nature of what lay before us, as we gazed through the window with Tim, and tried to get on the outside of a steaming cup of coffee.

Geologist by profession, and a boat lover by nature, Tim decided a few years ago to forsake the rock bit and indulge a full-time hobby by being as near to boats as he could. Pieces of unusual mineral and rock formations around the office attest to the fact that Tim hasn't completely broken with the past.

Tim, and his partner, Jim McCormack, sell boats, accessories, fuel, and I suspect—give—a considerable amount of friendly interest and advice to many of the hundreds of boating enthusiasts who sail the river in summer.

"We take CB radio so much for granted now that it's even difficult for me to tell you all the uses we do make of it," Tim told us.

"Practically everyone here on the river operates or monitors on channel 11, and we try to tie-in with the Lake Clark Boat Club. We use CB as a service to our customers, and many of them belong to the club. It is very convenient for them if they are on their way out for some fun on the river to call us for what ever they might need. The club also has an eleven-man emergency rescue organization that we cooperate with. Once in a while someone gets into trouble on the river. Then all hands pitch in to help out.

"We have a terrific view of the river at this point, and with their seven units in boats and one in an ambulance, we feel we have pretty good coverage for most of our needs.

"About a year ago, a group of small sailboats set out for a race on the river during a period when they had been advised that bad weather was likely. This part of the Susquemanna can brew-up a squall as big as any in the Bay, and just as suddenly. It wasn't too long before I noticed first one, and then another, tip over. In a few minutes everybody was in the water. I grabbed the mike and alerted some of the power boats down the river. It wasn't more than a few minutes before all hands were safe aboard the power boats with the sail boats in tow. I can't say CB saved any lives that day, but it certainly added to the peace of mind of a great many people by getting them pulled out faster, and very likely did save quite a few boats before they sank completely.

"Last summer we played a small part in a rather unusual 'short-to-second-to first' double play that really didn't involve the river directly. There had been an automobile

accident on the Lancaster County side of the river, and just a short distance from the shore line. One of my customers was tied up over there and heard the accident. After investigating, he called me and said that perhaps the quickest way to get the injured to the hospital would be by way of the Lake Clark Boat Club ambulance. I called them, relayed the exact location of the accident to them, and they made the trip over the bridge in record time and brought the victims safely to the hospital.

"My three units are never turned off in the summer. The base unit here in the office, and the units in two of our cars are in steady operation, practically around the clock. My customers know this, and they rely on being able to get in touch with me at all kinds of hours. After all, we sell many services here at the yard, and we consider it essential that we make ourselves as available to our customers as possible. CB radio sure helps us do this. This summer, we plan to install another unit right on the beach. There will be many uses for this, including guiding people in to our beach during fog and at night.

"Since most everyone on the river recognizes the importance of our radios, there is practically no fooling around, and very little actual interference. Messages are passed, and then each station closes down. CB radio, to us, is both a convenience and a safety item, and we treat it just that way. I have had occasion to call in from the metropolitan area, nearby, just to check on some supplies and parts. What a shock that was. A dozen stations on each frequency, and everybody talking at once. We can't afford that kind of nonsense here.

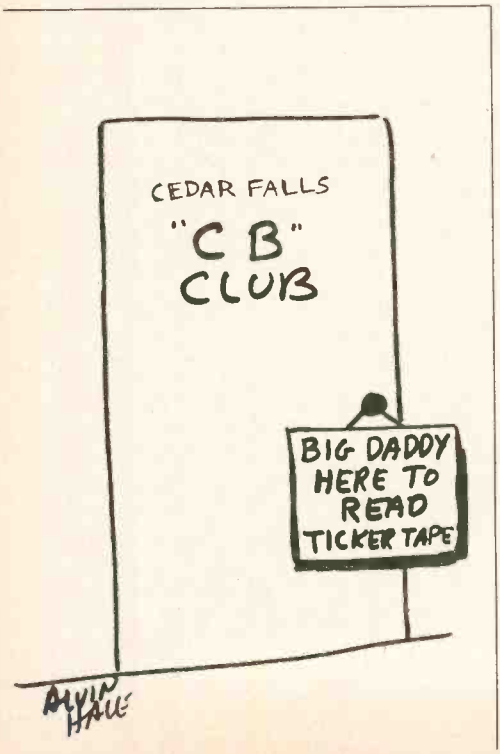
"Though we only have three units, we frequently have occasion to use some of our other vehicles. To meet this demand, we have installed whip antennas on each car and truck. That way, it's a simple matter to have the radio in any vehicle we wish, and in just a few minutes.

"Boat owners are very sociable people, and they just love having visitors on board. They sure don't like to wait around for them though. Often, they'll show up very early, and will be out at mooring working on the boat, or someplace on the river boating. When the visitors show up at the yard, we call the customer and tell him to pick up his guests. People appreciate little things like this, and it has helped to make the yard a meeting place for many of them. Frankly, this means business to us, and this is just one of the rewards that CB radio has brought.

"In the few years that we have enjoyed the privilege of CB radio I can recall an instance in which our radios very likely saved one life. In attempting to start his outboard, (the fuel line was disconnected), a man suffered a heart attack. We tried by telephone to reach the nearest doctor a few miles away. Repeated attempts only brought a 'busy' signal. Suddenly we remembered that the doctor was a member of a clinic and maintained a unit in his car and office so that he could be immediately available to other members of the clinic. He responded with a call just as soon as we had finished calling him. A few minutes later he was in the yard and administering to the stricken man. Minutes certainly counted that day, and the radios came in for their fair share of the credit.

"As I told you Lee, we take CB radio so for granted, it's even difficult for me to tell you all the uses we do make of it."

S9



WOULD YOU LIKE TO READ ABOUT YOUR COMMERCIAL USE OF CB IN S9? IF SO, WRITE TO US.

Watch for next month's big issue

ELECTRONICS 'N STUFF

by DON STONER, 11W1507
BOX 7388
ALTA LOMA, CALIF.

Sam looked up from his work as Mort, KEV5301, came bounding into the shop with a bundle of "joy" under his arm. "Oh boy," said Sam, "just what I've always wanted to work on—a mail order monstrosity." "Aw, cut the kidding Sam, this is the hottest set you've ever heard," said Mort as he patted the rig on the "head" with one hand and plugged it in with the other.

"If this clunker is so good, what's it doing in here?" Sam's words were cut off by a roar of hiss plummeting from the speaker. "It sure sounds peppy," Sam continued, "but like I said—what ails it?"

Mort's face took on a wistful look. "Actually it only sounds hot, Sam. I can only hear one or two stations and they are just a few blocks away!" Sam connected his signal generator, rotated the dial to 27 mc/s and read the dial. "Phew," he whistled, "it won't receive a signal weaker than 100 microvolts!" When he spoke, Sam's voice carried a suspicious tone. "This set was working last month. Come on Mort, you're holding back. Let's have the whole story."

"Yeah, I guess I goofed Samuel. After I got the set back from you, it didn't seem as hot as it should. I peaked it up!" "You're partly right," Sam said, with a twinkle in his eye. "Sounds more like you loused it up."

Something didn't add up. All that hiss indicated a pretty hot receiver, yet it was deader than Hogan's goat! With sudden inspiration, Sam tuned the generator around and the receiver suddenly sprang to life when the generator was near 26 mc/s.

"How did you do whatever you did to this schlock box?", Sam inquired. "I just peaked it for maximum noise," replied Mort, somewhat sheepishly. "And a good job you did too, but unfortunately you peaked it to the image frequency. There aren't any CB stations on that frequency." Mort looked confused. "I don't dig, Sam, please elucidate." Sam held up his hands in mock horror. "Grandmother, what big words you have. Come on over to the blackboard, I'll explain."

"Most of the signals you receive on the 27 mc/s Citizens Band induce only a few millionths of a volt (microvolt) across the antenna terminal of your receiver. Obviously, the strength of the signal must be increased to be useful. This is done in a process of amplification. Each stage boosts the signals and passes it on to the next stage for additional amplification. By the time it reaches the detector (which converts the signal from a radio to an audio frequency) a one microvolt signal may develop a volt or more.

"Although the signal can be amplified at 27 mc/s, there are many disadvantages to doing this. Generally it is easier to convert the 27 mc/s radio frequency energy to some lower or intermediate frequency. Amplification at a lower frequency increases the ability to separate stations and provides more amplification per stage. Some sets convert the original signal twice to successively lower frequencies, hence the term double conversion.

"Here's how the conversion process works in the block diagram of a typical CB receiver (figure 1). First, the signal is amplified at 27 mc/s, to give it an initial 'shot in the arm.' It is then applied to a mixer or converter stage. Along with this signal, the mixer receives energy from a circuit which generates a steady radio frequency signal, called the local oscillator. Let's say that we are receiving a signal on channel 14 (27.125 mc/s). To hear this channel, the local oscillator would generate a frequency of 26.670 mc/s. These two signals are applied to the mixer. Whenever this occurs, four frequencies appear in the output of the mixer. These are the original signal, (27.125 mc/s); the local

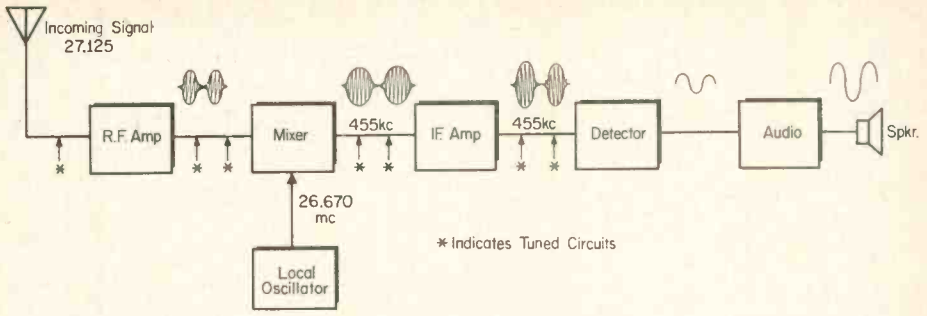


Fig. 1. Block diagram of a typical CB receiver.

oscillator, (26.670 mc/s); the sum of these two (53.795 mc/s); and the difference of the original two (0.455 mc/s or 455 kc/s). This process is called heterodyning, hence the origin of the term superheterodyne. The discovery of the heterodyne phenomena and invention of the superheterodyne circuit to utilize this effect really revolutionized the radio industry. It made possible receivers of phenomenal sensitivity and selectivity.

"The input to the intermediate frequency amplifier (which is also the output of the mixer) is tuned to reject all but 455 kilocycles, which is the standard IF in this country. The succeeding amplifier stages are all tuned to accentuate this frequency and reject all others.

"It is interesting that the newly created 455 kc/s signal has all the characteristics of the original signal. The modulation envelope, its individual peaks and valleys are all retained intact. Only the carrier frequency is changed from 27.125 mc/s to 455 kilocycles.

"From this explanation, you can see that the incoming signal is 455 kc/s above the local oscillator. However, if a signal 455 kc/s below the local oscillator (26.215 mc/s) arrives at the antenna terminal, it can also beat or heterodyne with the local oscillator to produce a difference frequency of 455 kilocycles. This other signal, which has the mathematical ability to produce a 455 kc/s difference frequency, is called the image. If you stop to think about it, the image will always be two times the IF frequency away from the incoming signal frequency. If the local oscillator is on the low side of the incoming signal, there will always be an image 910 kc/s below the signal. If the crystal is on the high side, the image will be above the signal by the same amount.

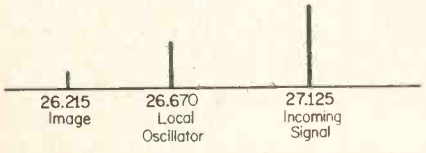


Fig. 2. The use of "hetrodyning" in a CB receiver.

"The tuned circuits in the radio frequency amplifier section (see figure 1) are always tuned to accentuate the incoming signal. However, unless these coils in these two circuits are perfect (which is impossible), the radio frequency amplifier will also pass and possibly even amplify a small amount of the image frequency. The more coils that are used in this part of the circuit, the better the image rejection.

"In this case, Mort, you had the right idea, but the wrong approach. Peaking the tuned circuits for maximum noise will correspond very closely to maximum gain in the RF amplifier circuit. Somehow, tho, when you peaked it for maximum noise, you did so at the image frequency. The receiver was hotter than a firecracker down around 26 mc/s, which made the CB band become the image frequency, (455 kc/s above the crystal frequency). Fortunately, you have a pretty good set which has the ability to reject images. This is why it was very difficut to receive any signals on the CB band."

While all this was going on, Sam was setting up the generator, vacuum tube volt meter and unwrapped the tools in his alignment wrench kit. "It's not too difficult to align the receiver when you have the right tools. It's not too expensive, either," he said looking at Mort with a grin.

CLUB NOTES

INDIVIDUALS AND CLUB MEMBERS!! SEND US ITEMS FOR THIS COLUMN!

TO JOHN KREJC, 2W4586

40 LANZA AVE.
GARFIELD, N. J.

WANT TO MAKE MONEY? S9 has a nationwide staff of AREA PUBLIC RELATIONS EDITORS who act as our representatives in the field. We are always looking to expand this force with good workers. Our A.P.R.E.'s can earn some nice money too, and many are already supplementing their regular incomes substantially by representing us. We're especially interested in persons to act in this capacity in the following call areas: 2, 6, 9, 14, 16, 17, 18, 19, 22, and 23, although ambitious S9'ers in all other areas will also be most welcome. Drop us a note and tell us about yourself.

Hospitalized boy get's Citizens Band Radio . . . James Cundiff of Decatur who has been confined for several months because of serious burns, obtained in an accident, has been rewarded with the radio to help in communications with his parents, and CB club. Donations made by Central Illinois CB clubs helped with the purchase of the radio and antenna. Donations will also help the 19 year old boy toward an Electronics Scholarship. Fire Department in this city furnished the ladders and other equipment to help with the antenna. News of this article comes from Clyde A. Davis, KHB1151, who is a member of the Family Citizens Band Club of Decatur.

President of the Citizens Radio club of Worthington, Ohio, is Jack Rensch, 19A9850.

The members of the Queen City 5 Watters CB club of greater Cumberland, plan to help the citizens of this city in any way possible by use of two-way radios. Members of this club are located in many different areas in and around Cumberland. There are mobile and base stations in use by many of the group.

Right under my nose is the Watchung Range Radio Club of Hawthorne, N. J. President of the fine group is Rich Leyman, 2Q4132.

The Silver State CB Association of Reno, Nevada, is presently monitoring channel 9. Net Control is operated from 6 P.M. to 11 P.M. every evening.

The Western New York Emergency Net aided in the recovery of two lost children in the Seventeen Mile Creek of N. Y., on November 12th. Frank Persichini, KIC4015. who is a volunteer fireman received word that help was needed. Net operations was started and within minutes 15 mobile units were on there way. Glenn Gibson, KIC4987, was one of the first units to arrive and to aid in the search. The Western New York Emergency Net has joined The Radio Amateur Civil Emergency Service, RACES, which is a part of the Civil Defense, to help serve the area.

Let's hear more from the Catawba Citizens Band Radio club, P.O. Box 201, Rock Hill, S. C.

The Lafayette CB Radio club on Dec. 2nd, 1962, with Vice President, Russ Williams, KBG5030, who led a crew of fellow CB'ers in supplying communications for over 200 volunteer searchers. The night-long search began when an 11 year old boy was reported missing by his parents. The search was called off the next day, when the boy was found in a field near his home. The boy told his parents that he had spent the night in a closet in his home. The only casualty was Russ's car battery.

From Van Churchwell, comes the news of a new CB club in Florida called, Crest Radio Club. Good luck to you Van, and the club.

Maryland Staff member for REACT in Hagerstown area, Jim Cross, KCF0823, and the REACT coordinators have spent some time visiting other towns in the area and are setting-up REACT teams and monitoring stations. Membership of the Hagerstown Unit of REACT is now 25 strong. Any person interested in joining the unit write REACT, 755 S. Potomac St., Hagerstown, Maryland.

The Cumberland, Maryland area has a fine club with John Kastner, 4Q1390 as president. He heads the Mountaineer CB club with 9 as their monitoring channel. Persons interested can contact John at 617 Patterson Ave., Cumberland, Md.

Also in Maryland is the Hub Citizens Band Club headed by president Nelson Garling. Club channel is 2 and 11.

Halfway between Hagerstown and Cumberland another REACT team is forming, consisting of members from Maryland, West Virginia and Penna. This will be a club and REACT team combined, with Bud Murry, KCF1954 as president.

CB Rangers Incorporate. In keeping with their efforts to continually improve the club, the CB Rangers of Butler, Penna., have started the necessary proceedings to have the club incorporated as a non-profit organization. Being incorporated is desirable for a number of reasons. It gives official and legal recognition to the club and lays the ground work so that the club may some day purchase land and erect a club house.

At the last meeting of the Citizens Radio club of Rochester, N. Y., the following officers were elected for the coming year. President, George Greene, 20W1853; Vice President, Dave Ferguson, 20W4270; Treas., Gay Louth, 20Q2568; Sec'y., Ruth Louth, KIC2972; Program Director, Joe Martin, 20W1766. A big year is expected by all members. Hi— Lyle . . .

New President of the Dixie Communication club of Decatur, Georgia, is Bud Horton, 6W1458. Monthly

publication of the club is "The Dixie Citation." Any club that wishes to exchange paper with them write: P.O. Box 136, Decatur, Ga. Let's see the list grow even bigger.

Lots of luck to the Macomb CB'ers and their news letter. Looks good. Meetings are held every 2nd and 4th Wednesday of each month at the Club Room, Terrace Gardens, Crocker and Jefferson, Mount Clemens, Michigan. President of the unit is Vince Cuker, 19W9224.

Little SOO Smoke Signals, club paper of the Little Soo CB club of Cherokee, Iowa. Eldred Frick is the new president of the group. Ron Feller was appointed to the post of Good and Welfare.

Writers—we need writers. Editor and president, Robert F. Durnin, 1W7200, of the Tri-County Emergency Communications Net, Inc., Dover, N. H., would still like some more assistance with the Bulletin. If someone would take just one column and send it in each month, it would help more than you think. They have 3 members who help each month and I want them to know that it is appreciated very much. How 'bout it, give him a few more. Thanks.

Ocean County Emergency Aid Network officers for the coming year are President, Bill Klingenstein, 3Q1090; Vice President, Steve Finkle, 3Q2024; Treas., Ruth Greene, 3Q1138 and Secretary, Bill Sneddon, KCC1833. The club meets the 2nd Wednesday of each month at the Ocean County Court House, Toms River, and invites any CB'er to attend or apply for membership. It is primarily a service organization, with social doings at a local diner after each official meeting. Thanks to Bobbi Steele, KCC0625 for the above news. Keep it coming.

The Southern California Radio Assistance Unit has been in existence since June, 1961. Their purpose is to promote, expand and perpetuate the use of the service. Most recent radio assistance was given to parade and festival days for the city of La Mirada, Sabine on Sunday, bicycle race for the city of Paramount and Christmas parade for the city of Lynwood, California. The unit isn't strictly a CB club but have a few ham operators as members. Publicity Officer of the unit is James B. Ulrich, KEJ1708, P.O. Box 115, Bellbower, Calif.

Looks like every CB paper has the new changes to FCC Part 19 printed in their news.

The President of the 5 Watt Wizards Citizens Band Radio Club of San Bernardino Valley, California, Walt Belknap, KEJ0922-U2, would like to thank every member and officer who has given so much for the club. The club has made great strides in finding a place in the community and their accomplishments for the year are, I think "par for the course." We at S9 are looking for a even greater 1963 from the club. Keep up the great work Jack.

News from the Hudson-Essex Chapter of the CBRRL tells of the gala dinner and dance held at the Friar Tuck, Cedar Grove, N. J. on January 19th. The new National CBRRL officers were installed, but we don't have news of that yet.

The Citizens Radio Assn. of Lake County met at the Libertville Legion Hall on December 6th to vote on various changes to the clubs by-laws. The club was on the job during the Halloween onslaught of ghosts and goblins to lend a helping hand to the police of four nearby communities. President is Bill Cashmore, KHB-1109.

The Citizens Radio Associates of the 11th area combined their monthly meeting with a gala Christmas party on December 6th. Their November meeting, 61 people attended. President, Hal Hasbrouck, 11W3330; Vice President, Bill Tucker, 11Q3258; Sec'y.-Treas., Larry Long, 11Q3165.

Sea rescue drama from the middle of the sun-scorched Arizona desert? Hard to believe, but it happened in Tucson. What's more, Mrs. Ann Hall did without leaving her home. Recently Mrs. Hall was operating her CB radio when an unfamiliar voice broke in—"This is KDH1298 out of Fort Myers, Fla. Please does anybody copy? This is an emergency." All I could make out from our conversation was that the man, who identified himself only as Carl, was a seaman aboard either a trawler or a cargo ship named the "Mildred"—which had run aground on a reef 200 miles south and east of Corpus Christi, Texas. There was a salvage ship 500 yards away, she added, and all but two of the crew members had left the ship. At Carl's request, Mrs. Hall tried in vain to contact the owner of the ship, but could not reach him and then called the Coast Guard station in Corpus Christi, Texas. They went to the rescue. Mrs. Hall was aware that it was only due to freak weather conditions that she had received the message, and did not expect to hear any more. The unusual weather conditions remained for two day's, however, and she had a second conversation with Carl. Will there be a reward? Mrs. Hall says Carl has promised to let her know when he arrives safely in Florida. That will be all the reward I want, she added. I didn't do anything that anybody else wouldn't have done. I think this has showed that these radios can perform a public service—they are more than just a toy. The above story was submitted by Jim Berry, 1801 W. Camelot Rd., Tucson, Arizona.

The Alaska 49'ers donated their time and equipment to the Alaska Sports Car Association on December 2nd for their ice races on Sand Lake. The persons participating used their radios for safety communications along the track. There were no accidents and everything went as smooth as could be. Channel 18 is their emergency channel and is monitored all night. President of the group is Ray Williams, KJB0035; Vice President, Cliff Anderson, KJB0022; Secretary, Lenny Hartman, KJB0233; Treasurer, Clyde Bloker, KJB0231.

Congratulations to James Bendall, 6W2392, from the Memphis Radio Citizens Band Club, on being elected Mr. Courtesy of the club. Bendall has been on the air for quite a long time and I can honestly say that I have never known a more courteous man then him. What happened to the Rescue Unit news?

The Metropolitan CB Radio Assn., Inc., of Northlake, Illinois welcomes 11 new members this month. Chairman Joe Perry, 18W5527, announced that 25 points will be given to each member who brought in his copy of their newspaper marked with the rubber stamp of an advertiser on advertiser's. These points are applied to the 500 points required for a Gift Certificate worth $10.00. It will really pay you to patronize your advertisers.

The Citizen Banders Journal extends an invitation to all CB'ers, clubs or papers to use any part of the information for the betterment of CB Radio. Clubs who wish to exchange write: Citizen Banders Journal, Illinois Valley Citizen Banders, P.O. Box 141, Peoria, Illinois.

"The CB Modulator," club paper of the Citizens Communications Club of Savannah, Georgia, was founded the 20th of October, 1962. The paper is published by and for the members of the club to be distributed at the meetings to be held the third Saturday of each month. President of the club from the deep south is B. A. Haupt, KDB6987. Editor of their fine club paper is Jack Belmar, KDB8278. They also are looking for more assistance for the paper.

Once again—the Fay-West CB club of the Laurel Highlands will start with the third Sunday in February to assist the Aero Scout Squadron 403 and the Sportsman with the Aero game feed program in the Laurel mountains. The club now boasts a membership of over 100.

The Tri-County Citizens Radio Association from the 3 area have a membership of 88 and a bigger and better year in '63 is expected. The club is shooting for 100. Club personality of the month was Walt Pruszenski, 3W2847. Walt is a member of the Board of Directors and serves as Chairman of the Finance Committee.

"Squelch" club paper of the Broward Citizens Radio club from Lauderdale, Fla. President of the club is

Bud Collins, KDH0879; Vice President, Joe Lankford, 7Q2263; Secretary, Butch Wolfe, 7Q0527; Treasurer, Willie Van Antwerp, 7W1594. The paper tells that Pier 66 in Ft. Lauderdale is operating CB outfits and is on standby for calls relating to their operation.

Safety belts, topic of the safety first column in the Modulator, official voice of the Five-Eleven Radio club of Pittsburgh, Pa. Since the club is primarily a service organization, we will publish from time to time articles on items of public interest to CB'ers. According to highway safety authorities the seat belt is the most effective single item of protective equipment available today to reduce injuries and fatalities from highway accidents. How about that, all you mobile CB'ers. Clubs who wish to exchange papers write: The Modulator, 868 Glass Run Road, Pittsburgh 36, Pa.

Feb. 2, 1963 the Five Watter of Lake County Inc., held their Pot Luck supper and meeting. Next meeting will be on March 2, 1963.

Congratulations to President Jack Hartman, 3W2205 on his recent engagement to Mary Lou Rehberg. The Keystone 11 Meter League will use channel 19 for emergencies, Red Cross classes will start on Feb. 5th and will end March 12th. All members are urged to attend.

The Lycoming CB Radio Club, Inc., in 1962 increased its membership from 65 to 83. January was the month of their elections, and we are still waiting for the news. As far as we know Bob Shearer is president. A vote of thanks to the Christmas committee and Don Camp for their hard work. It was reported that a good time was had by all.

Those CB operators near Hancock, Md., and Needmore, Pa., will be glad to know that a REACT team will be booming soon with Bud Murry, KCF1954 leading the parade as president. Their coverage is great due to the mountains around this area. Good luck fellows with the club and REACT team.

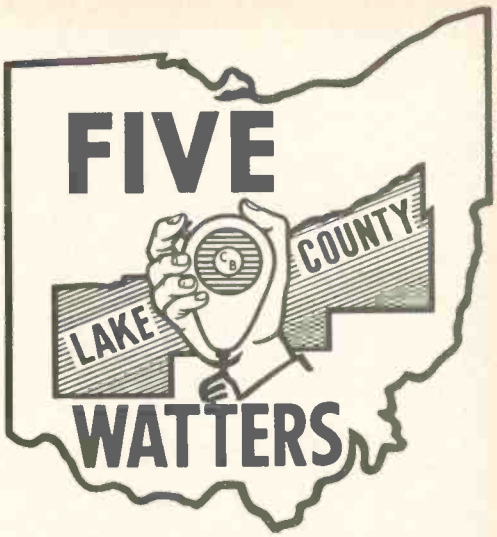
During a recent election of the Hub Citizens Band club in Hagerstown, Maryland, members again electing Nelson Garling, 4Q1028 as president for the second time. Good luck for the coming year Nel's. Ellie Peek, KCF2474, was voted the Secretary-Treasurer of the club. Thanks to A.P.R.E., Jim Cross, KCF0823, 73's.

A special hello from the Valley Wide CB club of Lake Isabella, Calif. The club was organized in July, 1959 and was the first CB club of its kind started in Kern County. The club is sponsored by the local Veterans of Foreign Wars who operates a non-profit ambulance service since 1946 and is connected with many emergency type organizations. The club monitors ch. 9 and has direct contact with the State Highway Patrol, Kern County Sheriff's Office, local Fire Dept. and State Division of Forestry by two-way radio. In the past year the Search and Rescue Team has participated in three drownings. two plane crashes, six lost hunters and numerous other misc. jobs. President of the working group is James W. Crump; Vice President, Chuck Evans; Sec'y.-Treas., Jack Scott.

A recently formed new CB club, the Oregon Citizen Band Association. The club provided help recently when a jet fighter crashed in the Portland area. The unit assisted in keeping the traffic and sight-seers away. President is Ed Green.

Citizens Band Radio Helped During Storm, was the leadlines of a paper in the Greater Cleveland area when the big snowstorm of Dec. 6 and 7 struck. Lenny Retberg, 19Q2335, received a call for help and started the ball rolling. Some of the citizens band men logged over 15 hours at their sets. The Eddys, KHH3565, who gathered the news wishes to thank all who helped keep the emergency channel open and who remained on standby.

Members of the Alaska 49'ers CB Association recently tracked down an illegal CB transmitter in the area. Led by Ray Williams, KJB0035 and assisted by Cliff Anderson, KJB0022, La Verne Hartman, KJB0233 and Bob White, KIC6327 the group found the operator who



was not aware that he was transmitting and upon being advised, agreed to keep off the air. The FCC District office was informed of the incident and they were appreciative of the action taken by the club.

A few changes in the Redwood Citizen Banders of Eureka, Calif., is that Ronald V. Smith, 12W3367 is President and P. Wayne Walker, KFC0435, Vice President.

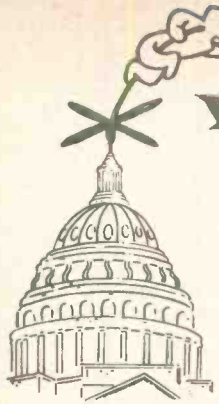
Jim Stratton, KEJ0294, Transportation Chairman of the Southern Calif. 11 Meter League, does yoeman service for motorists, homeward bound on the Santa Ana Freeway during the evening rush hours. Jim monitors Channel 9. CB'ers that plan to visit the area in and around Los Angeles would do well to make a note of the fact that directions and information can be at their mike side by contacting ch. 5 in the Pasadena area, or ch. 9 in the south eastern area, also channels 1, 5, 7 or 9 in Hollywood, Burbank and San Fernando Valley areas. Two well known active CB'ers in So. Calif. are Wendell and Rene Spencer. KEJ1576, Windy, to his friends, is a member of the So. Calif. 11 Meter League. Both are active in the "Norwalk Trailer Tramps" and have always advocated CB rigs for all club members, pointing out the many advantages of this type of communications for trailer and camper travelers. Thanks once more to R. M. Forster, KEJ5806.

Sunday night, January 6th, four members of the Tri-County Emergency Communications Net, Inc., enjoyed a pleasant trip to Andover, N. H. to join with the Lake Sunapee CB Radio Alert Unit in their "CB Dinner and Get Together." Bob Durnin, 1W7200, president of the Tri-County club, Marge Senecal, Dick and Ann Brooks made the trip and had a very enjoyable evening.

Election results from the South-Eastern Pennsylvania Citizens Radio club still shows Chet Zubrzycki, KCC-4044, President; Vice President, Ed Baxter, 3Q1295; Secretary, Frank Denney, KCC3299; Treasurer, Al Zubrzycki, 3W3960-U2. Their first dance was held on December 8th. Music was furnished by the "Telestars." A buffet dinner was served.

The Breaker, monthly publication of the Warren-Washington-Saratoga Chapter of M.C.E.U. is loaded with articles of interest. The chapter is busy getting together the emergency equipment and compiling the forms of who has what.

INDIVIDUALS AND CLUB MEMBERS!! SEND US ITEMS FOR THIS COLUMN!



WASHINGTON OUTLOOK

S9's COMMENTS & SUGGESTIONS TO THE FCC

It is most difficult to determine the reasoning behind the current attitude towards the Citizens Radio users being shown by the FCC.

First, it is generally understood that the frequencies were taken away from the Amateurs because they weren't using them. Now the battle cry has been reversed – there are *too many* people using the frequencies. It seems that it is impossible to strike a happy medium which will bring about contentment for persons licensed for operation on 11 meters (whoever they may be).

Many persons cannot accept the idea that the proposals offered in FCC Docket 14843 were composed with the best interests of the public (and more specifically, the Citizens Radio users) in mind. They show little understanding of, or concern for, the established assets of the service such as the National Calling Channel or the traveler-aid monitoring stations now in operation. They disregard the good work which has been done in the public interest by both individual licensees and clubs. They ignore, no, actually *stifle*, the numerous ways in which the licensees have discovered to benefit from the convenience of low cost two-way radio communication offered *only* by the Citizens Radio Service.

A close examination of the proposed rules, in fact, reveals that their *unmodified* passage would severely limit the usefulness of the service both in everday and emergency uses for all licensees, and moreover, it would destroy the investments of the majority of the 376,000 licensees. Certainly, this would not be in the public interest, convenience, or necessity – the basic tenets of the Commission.

There have been "abuses" of existing FCC regulations. Perhaps when the rules were created several years ago the FCC had certain ideas on what it wanted for the Citizens Radio Service. When the service came into use it was found that there were many more uses for it than the FCC had envisioned.

Of the rule-abuses, the most annoying violations were, and are, perpetrated by a very small minority of users. It is up to the Commission to enforce its existing regulations and take whatever actions be necessary on these few people, rather than penalize all users with the rules proposed in Docket 14843.

However, the Commission decided that the public's wishes for the Citizens Radio Service were "illegal" because they did not coincide with the previously established rules. To draw an analogy, when the authorities found that cars were capable of operation at speeds over 15 mph, did they cut the speed limits back to 10 mph or did they increase them to meet the *public interest, convenience, and necessity?*

It would appear that since the American public has found that the regulations for the Citizens Radio Service have become outmoded and even oppressive, the Commission should expand them to comfortably accommodate *all* of the various interests now utilizing the service. This can, and *should* be done in a manner which will afford each particular interest and equitable chance for the use of frequencies. In other words, erase the antiquated regulations now forcing *citizens* to use the Citizens Radio Service in a manner which places them in the position of being on the wrong side of federal regulations.

The FCC has a definite obligation to serve the public. It seems to us that the

public should not be arbitrarily forced to submit to unpopular and seemingly unfair regulatory measures. Certainly there is no just cause for the severe remedies the Commission is now seeking to impose on the Citizens Radio Service in Docket 14843.

There are a number of roads to travel, short of Docket 14843 as it now stands, to turn Part 19 into a workable and effective document – suitable to the Commission while still protecting the investments and interests of *all* licensees.

Specifically, we offer the following brief suggestions as a method of achieving this harmony:

1. Channel 9 be established as the National Calling Channel to be used by itinerant mobile units seeking assistance in strange territories, by persons making reservations, by stations calling other licensees.

2. Channels 6, 7, 8, 10, 11 and 12 be set aside for communications between stations of different licensees subject to 19.61 (as proposed), with the following exception:

Between the hours of 7 PM and 7 AM (local time), Monday through Saturday, and all day on Sunday, Sections 19.61(a)1, 19.62(a)9, 13, 14, (b) and 19.66(a)(b) be suspended on channels 6, 7, 11 and 12. It is suggested that channels 6, 7, 8, 10, 11 and 12 be used for this inter-station communication to make maximum use of existing equipment components.

3. All remaining channels be set aside for the exclusive use of stations communicating with units of their own license.

4. Section 19.32 be changed to indicate that the only power limitations to be placed on Class D stations be 3.5 watts output for A3 emission and 7 watts peak envelope power for stations using single sideband.

5. Section 19.66(d) be changed to specify 5 minutes transmitting and 5 minutes standing-by.

6. Section 19.2(b) be modified to read ". . . on any authorized frequency . . ."

7. Section 19.92(b) be changed so as to permit telephone patches to be used only for communications from fixed stations to stations located in vehicles.

8. Section 19.93(d) be changed to permit 4 Hours Civil Defense operation per month.

9. Section 19.25(c)3, the word "transmitting" to be omitted.

10. Section 19.25(c)4, omitted.

We agree with and endorse all other Commission proposals in the matter of Docket 14843. Modifications such as we have proposed will greatly improve utilization of the Citizens Radio Service frequencies for all interests.

Further, S9's executives would be most anxious to sit with members of the Commission and any other parties suggested by the Commission at an informal conference to discuss in detail any additional or alternate solutions to the situation, should the above 10 suggestions be unacceptable. Such a meeting would be beneficial to the Commission in their further understanding of the needs and desires of Citizens Radio licensees. It would be beneficial to S9 Magazine, the largest representative voice for and of the Citizens Radio licensees, in our understanding of the desires of the Commission.

(Be sure to read TK's editorial on Page 7 of this issue!)

S9

4303 RIDES AGAIN

Continued from page 7

service, you must take a few minutes of time to take the trouble to notify the FCC of your opinions.

When writing your comments to the FCC, please *do not* attempt to angrily berate or threaten them. This psychology won't work, and, in fact, *may do* considerable harm. Some of the communications received by the Commission have been most harsh and hostile. We understand that one group has even gone so far as to "snap their fingers in the Commission's face and tweak their nose" by commencing open letters to specific FCC officials (who are not personally responsible for Docket 14843 in the first place), and even starting an idiotic Class D DX'ing and skip contest, in open violation of both Part 19 and the Communications Act of 1934, as amended. This alone could offset 20 "good" petitions—so you can see why each "sane" petition we can muster is *most* important.

We know that many of the officials at the Commission read S9 each month – we hope that they will consider our comments as being presented with the utmost sincerity.

S9

PART 15

Continued from page 26

(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.

15.211 Date When Certification Is Required

. . . All low frequency communication devices which operate on frequencies below 70 Mc/s, manufactured after December 31, 1957, shall comply with the certification requirements of this subpart.

As you can see, the rules are quite small by comparison to Part 19's regulations for Class D stations. Part 15 does not regulate the content or length of 27 mc/s transmissions, nor does it limit in any way, the type of use to which the station may be put.

Since Part 15 does not provide for the stations to have any method of identification, S9 Magazine has undertaken to register all Part 15 transmitters to make for easier separation of the different stations while in operation. These identifiers are unofficial and indicate no official FCC recognition, and they are currently in use by more than 3000 Part 15 fans. If you haven't gotten yours, there's a form in this issue for you to fill in and return to us with a stamped (5¢) self-addressed envelope. They are issued without charge as a reader service of S9.

A "Callbook" listing of the station identifiers issued by S9 runs in rotating installments each month in S9.

MINI-VERTER

Continued from page 30

kc. for Channel 1 and 1600 kc. for Channel 22 to place the tuning range at the high end of the BC dial where there are usually no strong local BC stations to interfere and to get better image rejection due to the high first IF. In other localities, it may be desirable to use a higher crystal frequency to shift the tuning range to a lower part of the dial to avoid strong locals.

A dial scale was drawn on a narrow strip of white adhesive tape and stuck on the BC dial just above the original numbers. The scale shown for reference in Fig. 3 was drawn to fit our own car's radio and will not necessarily fit other makes and models. It was included to point out that there are 5 gaps, one channel wide, between Channels 3 & 4, 7 & 8, 11 & 12, 15 & 16, and 19 & 20. These gaps are due not in quirks in converter design, but to the manner in which the Class D channels were assigned. In drawing dial scales calibrated in channels, it is of course necessary to include these gaps if the calibration is to be accurate. The table below shows the CB channel numbers and their actual frequencies in relation to the markings on the dial of any BC receiver when the converter's crystal frequency is 25625 kc.:

BC Dial	Chan. No.	Freq., kc.
1340	1	26965
1350	2	26975
1360	3	26985
1370	A	26995
1380	4	27005
1390	5	27015
1400	6	27025
1410	7	27035
1420	B	27045
1430	8	27055
1440	9	27065
1450	10	27075
1460	11	27085
1470	C	27095
1480	12	27105
1490	13	27115
1500	14	27125
1510	15	27135
1520	D	27145
1530	16	27155
1540	17	27165
1550	18	27175
1560	19	27185
1570	E	27195
1580	20	27205
1590	21	27215
1600	22	27225

From the table it may readily be seen

Watch for next month's big issue

that by judicious selection of the crystal frequency one or more local BC stations may be placed in the gaps between channels where, if the BC receiver with which the converter is used has sufficient selectivity, they can do no harm. Most car-radios, due to the low (262.5 kc.) intermediate frequency, have excellent selectivity. S9

PART 15

Continued from page 42

destroy the hard work of a fellow hobbyist, to say nothing of several hundred dollars worth of radio controlled model gear.

Whew! We just don't have the room we really need. Let's swamp S9 with Part 15 letters this month and maybe they'll give us some more space. Send in those skeds, photos, questions, news items. Do it now. See you on the band! S9

MICROPHONES

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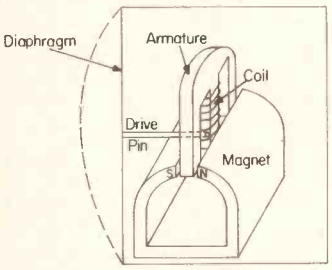

Fig.6– Controlled Magnetic

and forth moving a drive pin which in turn moves a three-legged armature back and forth in the field of a horseshoe magnet. The center leg of the armature is encircled by a stationary coil of wire. Magnetic lines of force always move from the north to south pole of a magnet. Here they follow the path of least resistance. When pressure of the sound wave moves the armature toward the north pole, the lines of force will flow through the center leg to the outer legs. As the "rarified" part of the sound wave makes the armature swing toward the south pole of the magnet, lines of force move from the outer legs to the center leg of the armature. This action induces into the coil an alternating current corresponding to the voice frequency. *Advantages:* very rugged; the stationary coil can be wound for any impedance, eliminat-

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CB SHOP

Rates for CB SHOP are 10¢ per word for advertising which, in our opinion, is obviously of a non-commercial nature. A charge of 25¢ per word is made to all commercial advertisers or business organizations. A 5% discount is in effect for an advance insertion order for six consecutive months.

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SELLING—Good cond. Hallicrafters S-96 receiver. Hear police and emergency calls 152-173 mc/s. Only $25. S. Nussbaum, KBG4903, 1440 54th Street, Brooklyn 19, N. Y.

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CB QSL CARDS—100 two color $3.00 postpaid, samples 10¢. Rusprint, Box 7507, Kansas City 16, Missouri.

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MICROPHONES

Continued from page 61

The Shure Model 440SL magnetic mike.

ing matching transformers (the standard impedance for a hi-Z microphone of this type is 15,000 ohms—adequate for most CB high impedance circuits). *Disadvantages:* the highest response quality is difficult to obtain (the frequency response varies but the range of 60 to 10,000 c.p.s. is characteristic—adequate for all CB communication but may lack something when recording music, etc.); not available in directional types.

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The term *cardioid* does not apply to any one type of microphone but applies to any type so constructed as to have a maximum pickup in one direction (giving a heart-shaped pattern). These may be of several of the types listed above. They are highly desirable for vox control (where the XYL washing dishes or the junior operator banging toys together might otherwise throw the transmitter on the air).

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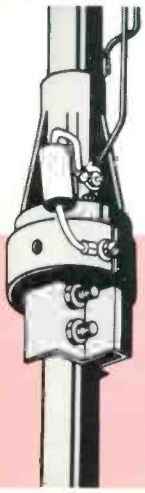

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Under present rules part 19.32 the FCC does not provide for more than (5) Watt input in the Citizens Radio Service (26.965-27.225 MC Band)

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