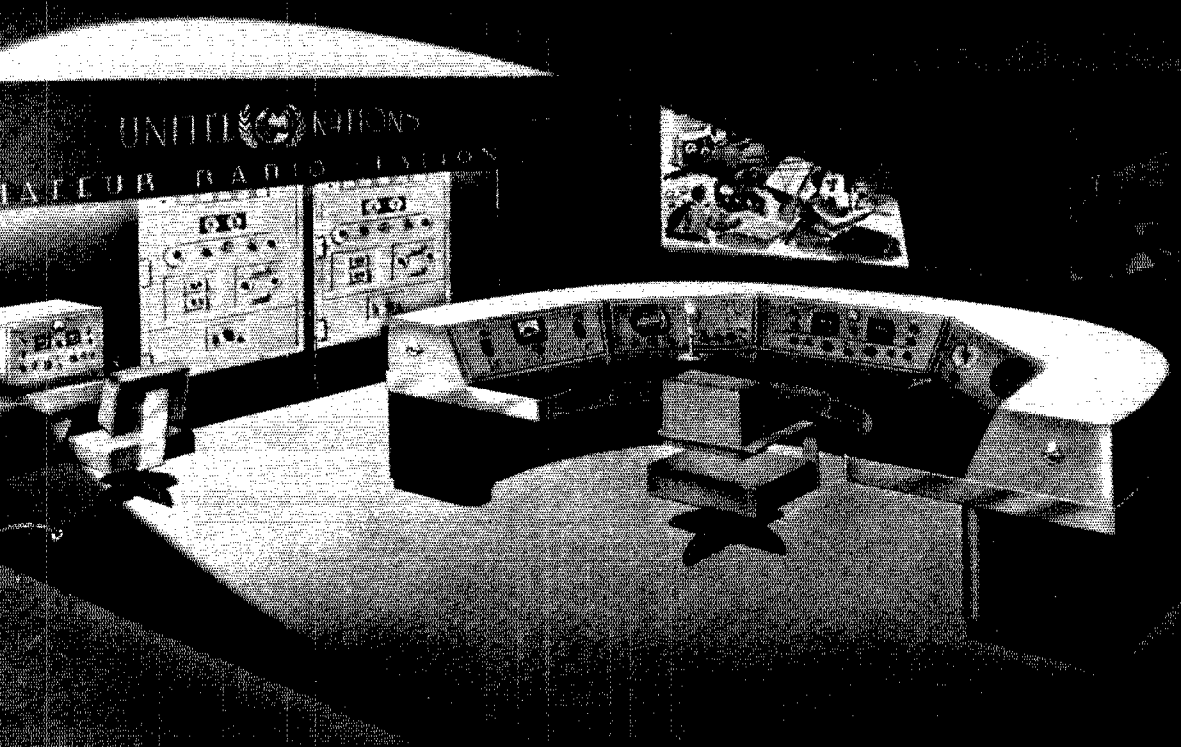
April, 1948
35 Cents

QST

devoted entirely to

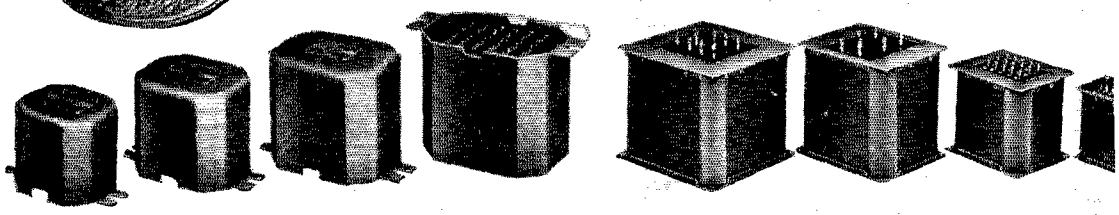
amateur radio



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

UTC ...SPECIAL SERIES

The most popular ham line for a decad



UTC Special Series transformers are specifically designed for amateur and popular priced PA service. Both small units (in drawn steel cases), and large units (in formed steel cases) provide for chassis or above chassis wiring. These units are ruggedly constructed . . . vacuum impregnated . . . compound filled . . . to assure dependabil under the varied operating conditions amateur service. Universal windings provided on driver, matching and outp transformers to assure maximum flexibili

TYPICAL AUDIO COMPONENTS

CLASS A INPUT TRANSFORMERS

Type No.	Application	Ratio	Net Price
S-2	1 plate* to 2 grids	2:1 4:1	$3.80
S-5	Single or double button mike or line to 1 grid hum-bucking type	16:1	4.25
S-6	Single or double button mike or line to 1 grid, compact type	16:1	3.10

UNIVERSAL DRIVER TRANSFORMERS

Type No.	Application	Net Price
S-9	Pushpull driver plates to grids of class B tubes up to 400 watts output	$5.20
S-10	Pushpull 56, 6C6 triode, 6C5, or similar plates to 45's, 2A3's or 6L6's, self of fixed bias.	4.70

UNIVERSAL MODULATION TRANSFORMERS

Secondary carries class C current
Any modulator tubes to any RF load.

Type No.	Audio Power	Net Price
S-18	12 watts	$ 5.00
S-19	30 watts	7.50
S-20	55 watts	11.00
S-21	110 watts	15.50
S-22	250 watts	24.00

UNIVERSAL OUTPUT TRANSFORMERS TO LINE AND VOICE COIL

(Secondary Impedances: 500, 15, 8, 2 ohms)

Type No. Max. Watts	Primary Impedance	Typical Tubes	Net Price
S-14	Single Tubes:		
10 W.	2500 ohms	2A3, 6A3, 6A5, 6B4, 6L6, 6Y6, 25L6, 35L6	
	4000 ohms	31, 43, 45, 48, 6V6, 12A5, 12A6	$4.50
	7000 ohms	33, 47, 42, 47, 59, 89, 2A5, 6AC5, 6F6, 6K6, 6N6, 7B5	
	10,000 ohms	37, 38, 41, 1G5, 3C5, 6A4, 6N7	
S-15	P. P. Tubes:		
12 W.	4000 ohms	6Y6, 25L6,	
	5000 ohms	45, 2A3, 6A3, 6A5, 6B4	4.70
	10,000 ohms	30, 1H1, 6AC5G, 6B5, 19, 49, 53, 79, 89, 6A6, 6N6, 6N7, 6Y7	
S-16	3000 ohms	45, 48, 2A3, 6A3, 6A5, 6B4, 25L6	
30 W.	6000 ohms	42, 2A5, 6F6 triodes	
		46, 59, Parallel 53, 6A6, 6N7	6.20
	9000/10000 ohms	42, 45, 2A5, 6AC5, 6B5, 6F6, 6L6, 6V6	
S-17	3800 ohms	6L6's	
55 W.	4500/5000 ohms	4—6L6's	7.50
		46, 1608, 809	

TYPICAL POWER COMPONENTS

PLATE AND FILAMENT TRANSFORMERS

Primary 115 V. — 50/60 Cycles

Type No.	Voltage	D.C. Voltages*	Rectifier Fil.	Fil. No. 1	Fil. No. 2
S-40	525-425-0-425-525 250 Ma.	400/310	5 V.-3A	6.3 V.C.T. -3A	6.3 V.C.T. 3A
S-41	600-0-600 200 Ma.	475	5 V.-3A	7.5 V. tapped 6.3 V.-3A	6.3 V.C.T. 2A

PLATE TRANSFORMERS

Primary 115 V. — 50/60 Cycles

Type No.	High Voltage	DC Voltages*	DC Current
S-47	1500-1250-1000-0-1000-1250-1500	1275/1050/825	300 Ma.
S-48	1500-1250-1000-0-1000-1250-1500	1300/1075/850	500 Ma.
S-49	2100-1800-1500-0-1500-1800-2100	1815/1540/1275	300 Ma.
S-50	3000-2500-0-2500 3000	2625/2175	300 Ma.

FILAMENT TRANSFORMERS

Primary Tapped 105, 115 Volts — 50/60 Cycles

Type No.	Secondary Volts	Secondary Current	Insulation
S-53	2.5 VCT	10 A.	1500 V.
S-54	5 VCT	4 A.	2500 V.
S-55	6.3 VCT	3 A.	1500 V.
S-57	2.5 VCT	10 A.	10,000 V.
S-59	5 to 5.25 VCT	13 A.	5000 V.
S-62	10 VCT	10 A	3000 V.

No.	Fil 1.	Fil. 2	Fil. 3	Insulation
S-65	2.5 VCT-5A	5 VCT-4A	6.3 VCT-3A	3000 V.
S-67	5 VCT-6A	6.3 VCT-5A		3000 V.
S-70	6.3 VCT-5A	6.3 VCT-5A		3000 V.

FILTER AND SWINGING CHOKES

Type No.	Service	Inductance	Current	Resistance	Insulation
S-26	Filter	15 Hy.	60 Ma.	230 ohms	1500 V.
S-27	Filter	30 Hy.	75 Ma.	350 ohms	1500 V.
S-28	Filter	20 Hy.	100 Ma.	350 ohms	1500 V.
S-29	Filter	10 Hy.	175 Ma.	95 ohms	1500 V.
S-31	Filter	20 Hy.	225 Ma.	120 ohms	2700 V.
S-32	Swinging	5/25 Hy.	225 Ma.	120 ohms	2700 V.
S-33	Filter	20 Hy.	300 Ma.	90 ohms	4000 V.
S-34	Swinging	5/25 Hy.	300 Ma.	90 ohms	4000 V.
S-37	Filter	20 Hy.	550 Ma.	60 ohms	6000 V.
S-38	Swinging	5/25 Hy.	550 Ma.	60 ohms	6000 V.

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United Transformer Corp.
150 VARICK STREET NEW YORK 13, N. Y.
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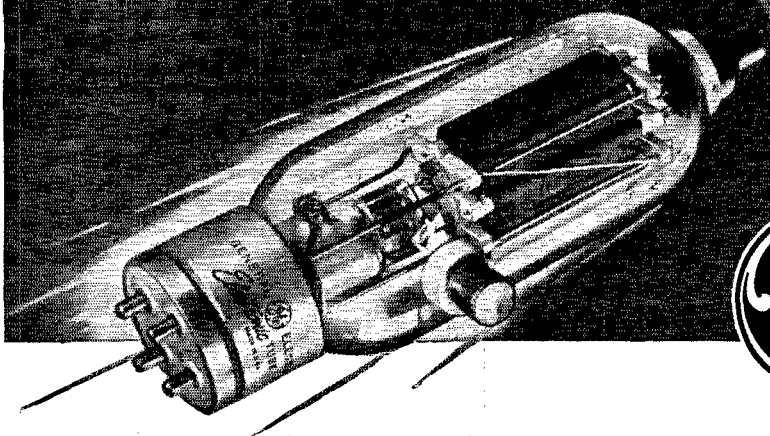

A GRAND tube, the GL-810, with performance that's ideal for the ham using medium to high power! One tube will take 750 w maximum input CW, or 500 w phone. Double these figures for push-pull.

Coverage? All the DX bands from 80 down to 10 meters, at top input. At reduced input add the 6-meter band. Specifically, the tube will operate up to 30 mc at full ratings, or 100 mc at lower ratings.

To well-rounded performance, to compact modern design with short internal leads, add a bulldog ability to "take it". The tube's heavy-duty filament—shielded at both ends to conserve power—has reserve capacity in case of overloading. From cap-terminal down to base, the GL-810 is strongly built, *G-E-built,* for service you can bank on. Put a pair of these stalwarts in your final, and you're "set" for long hours of steady activity with key or mike.

Best of all . . . the tube is economical to buy! Type GL-810 is a watts-per-dollar bargain ranking high among values offered the ham. Check the low price today with your nearby G-E tube distributor. *Electronics Department, General Electric Company, Schenectady 5, New York.*

GL-810 POWER TRIODE

RATINGS, 2 TUBES

Typical Class C Operation (ICAS)

	CW	Phone
Plate voltage	2,500 v	2,000 v
current	600 ma	500 ma
Grid current (approx)	120 ma	140 ma
Driving power (approx)	38 w	70 w
Power output (approx)	1,150 w	760 w

● See your G-E tube distributor for a copy of each bi-monthly issue of "Ham News". Stay posted on what's new, practical, and helpful in amateur work!

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

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FOR AMATEURS

WITH PROFESSIONAL TASTES

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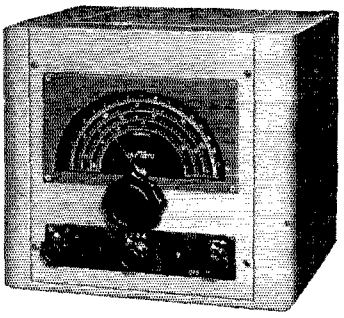
The New DB22A *Preselector*

Coverage .54 to 44 Mc. — Average Gain 30 DB

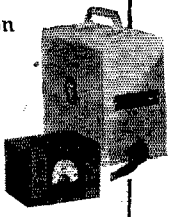
Here's the new DB22A completely redesigned for greater efficiency and higher signal to noise ratio. It uses new 6BA6 miniatures. Image ratio is better than 50 DB with a communications receiver having a single stage of RF. It's calibrated, has smooth planetary tuning, self contained power supply, antenna bypass switch, gain control and many other features. Connect the DB22A to your receiver just like an antenna — no wiring — no plug in coils. It's entirely self-contained — entirely in a class by itself!

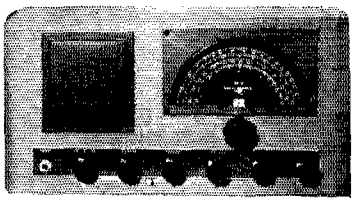


The RME 84

For Home, Portable or Mobile Operation

A quality receiver in the lower price field that will give you the most for your money. Operates from 115 volts AC, batteries or from the VP-2, a six volt power pack, optional with the RME 84. Also optional, and illustrated, is the CM-1 — Carrier Level "S" Meter.

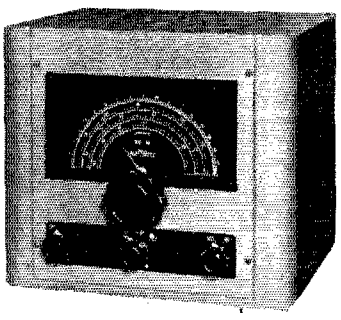




The VHF-152 *Converter*

For Two, Six, Ten and Eleven Meters

At a cost that an amateur can afford — the new VHF-152 used with a communications receiver will give you peak performance on the very high frequency bands, utilizing an efficient double conversion system. Unit has built in power supply, voltage regulator and temperature stabilized oscillator circuits. Provision is made for connection of 4 separate antennas.



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RME

FINE COMMUNICATIONS EQUIPMENT

RADIO MFG. ENGINEERS, INC.

Peoria 6, Illinois U. S. A.

QST

APRIL 1948

VOLUME XXXII • NUMBER 4

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West Hartford 7, Connecticut

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—CONTENTS—

"It Seems to Us . . ." 9

Silent Keys 10

In *QST* 25 Years Ago This Month 10

Selectable Single-Sideband Reception Simplified
J. L. A. McLaughlin 11

An Oscillator for the 1215-Mc. Band
Peter G. Sulzer, W3HFW, and Charles R. Ammerman, W3MLN 16

Selectivity in S.S.S.C. Reception
Oswald G. Villard, jr., W6QYT 19

Better Reception for 2-Meter Mobile
C. Vernon Chambers, W1JEQ 23

An Automatic Keying Monitor . *Ian O. Ebert, W3QED* 27

Our Cover 29

Technical Topics:
S.S.S.C. and S.S.S.R. 29

Happenings of the Month 30

A Balanced-Modulator N.F.M. Exciter
Paul D. Rockwell, W1PDP 33

Self-Filtered Peak Clipping
Howard W. Johnson, W7NU 36

United States Naval Reserve 38

How's DX? 39

Compact 20-Watt Rig for 50 Mc.
Stephen T. Van Esen, W2OXD 44

I.A.R.U. News 47

Surplus Corner
F.M. Reception with the Wilcox F-3
John A. Dinter, W8OAP 48

The World Above 50 Mc. 50

Notes on Push-Pull Triodes . . *I. H. Nixon, VE3ACL* 55

'Phone-Band Phunnies . . . . *John T. Frye, W9EGV* 57

Hints and Kinks 58

Correspondence from Members 60

Operating News 62

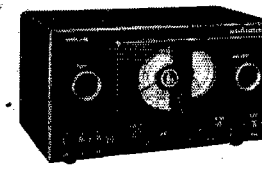
Station Activities 70

ARRL QSL Bureau 124

Feed-Back 126

Hamfest Calendar 126

low priced ham shack $97.00



RECEIVER

S-38

Hallicrafters famous Model S-38. Recognized by hams, beginning hams and all who know the unending fascination of world wide communications, as one of the greatest receiver values on the market today. Overall frequency range from 540 kc to 32 Mc in four bands. Main tuning dial calibrated with precision accuracy. Separate electrical bandspread dial. CW pitch control adjustable from front panel, automatic noise limiter, self-contained PM dynamic speaker. 105-125 volt AC/DC **$47.50**

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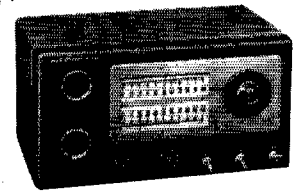

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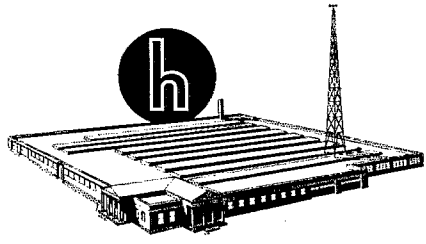
The Model HT-17 is a low power, high quality transmitter now available at a new low price. Heal Hallicrafters performance with maximum convenience and economy. Provides an honest 10 to 20 watts of crystal-controlled CW output on the amateur 3.5, 7, 14, 21 and 28 megacycle bands. A pi-section matching network is an integral part of the plate circuit and, together with an adjustable link, provides coupling to any type of antenna or permits the HT-17 to be used as an exciter for a high power final amplifier. Take advantage of this money saving offer . . . now! 40-meter coils included **$49.50**

YOU SAVE $20.00

BE ON THE AIR FOR LESS THAN $100.00

Build yourself a ham shack with the best equipment available at these low prices. Here's your chance to save money. You save exactly $20.00 at these prices. Your nearest Hallicrafters distributor will tell you what tremendous values these pieces of Hallicrafters represent. See him for demonstration and further details.



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RADIO

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4401 W. Fifth Ave., Chicago 24, Illinois
MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT

EVERYTHING YOU WANT.....in a high quality low cost receiver *Model* hallicrafters NEW S-53

- Coverage: 540 kc to 54.5 Mc
- Five bands
- Accurately calibrated slide rule dials
- Full electrical bandspread
- Series noise limiter
- Universal antenna input
- Built-in PM speaker
- Beat oscillator
- 2.5 watt audio output

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Overall tuning range: 540 kc to 54.5 Mc. Band 1: 540-1630 Kc; Band 2: 2.5-6.3 Mc; Band 3: 6.3-1.6 Mc; Band 4: 14-31 Mc; Band 5: 48-54.5 Mc.

Controls: main tuning, bandspread, bandswitch, RF gain, audio volume, tone control, noise limiter, standby-receive, phone-code switch, speaker-headphone switch and phone jack on rear panel. Input jack for record player pickup connection.

New superhet circuit uses: 1—6C4 oscillator; 1—6BA6 mixer; 2—6BA6 IF's; 6H6 detector-AVC-noise limiter; 6SC7 BFO-1st audio; 6K6GT audio output and SY3 rectifier.

Size: 12⅞" x 6⅞" x 7⅞".

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4401 W. Fifth Ave., Chicago 24, Illinois
MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT

Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in *QST*. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO, and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

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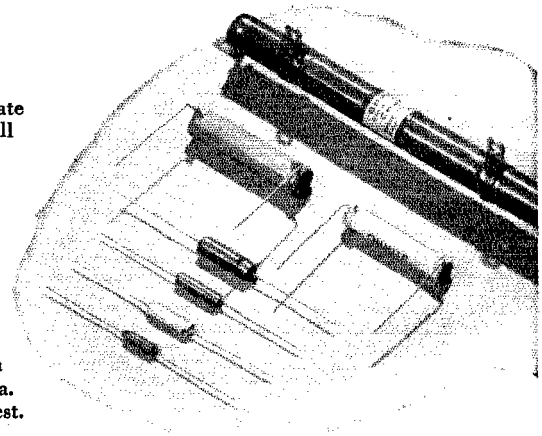

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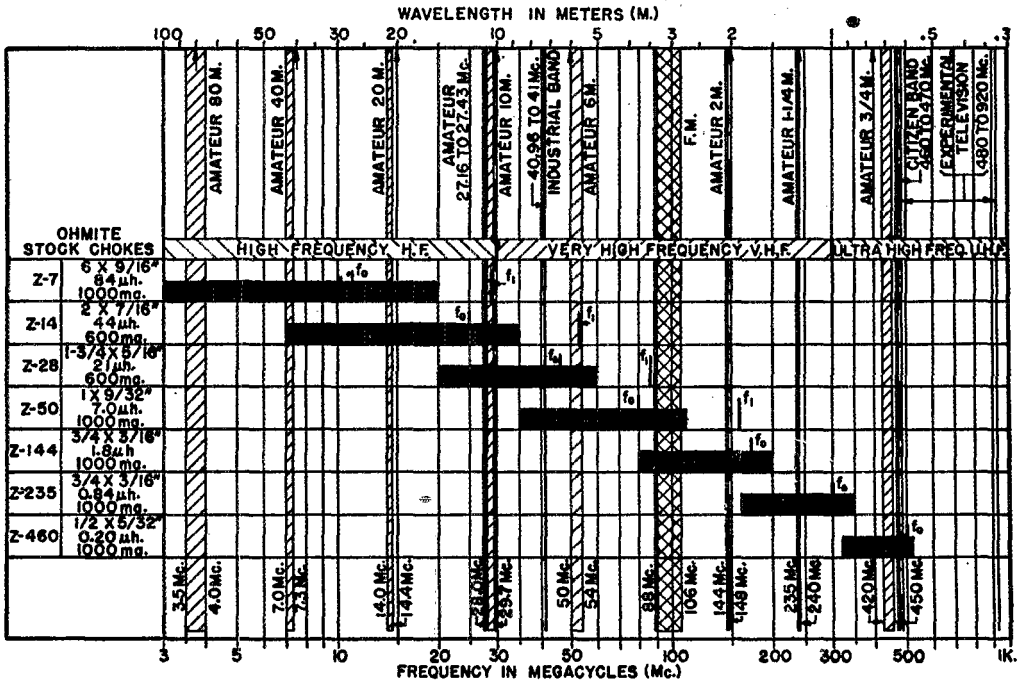

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THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.

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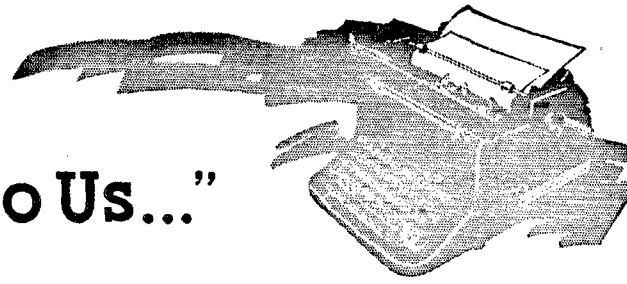


"It Seems to Us..."

YOUR ONE LIFE

The average amateur shack is a potential electrocution chamber. Every year a significant number of amateurs experience narrow escapes from instant death. Others, less fortunate, spend months in a hospital. Some — too many — have paid with their lives for their carelessness. The situation is more dangerous now than it ever was, both because inexpensive war-surplus components make lethal power supplies cheap and because many of us are still using prewar transmitters of now-venerable components. We want to move you to think about this situation as it concerns you and your own station — and your health and your life. You'll have to think it out yourself, because it is something no one can or will do for you. Do you value your one life that much?

Bravery is a virtue but contempt for manifest electrical hazard is folly. Our rigs are full of such hazards and it is probable that most active amateurs have had one or more bare escapes. Such a fellow is fortunate in that he has a chance to find out what bit him and fix it. Others of us have not had that fortune. In some of the fatalities it has been possible to determine the precise cause of death and even to publish a diagram of the fatal circuit as it accidentally existed. How about you? Do you get any satisfaction out of thinking that an investigating committee of your brother amateurs will probably be able to ascertain the cause of your death? That's one circuit diagram in which you're definitely not interested. But do something about it!

The chief requirements in this matter are intelligent thought by each individual amateur, the following of safe construction practices and the development of safe tuning and trouble-shooting habits. It is a very personal matter with you but there is some help we can give you. Shortly before the war the League developed an extensive safety code, dealing both with construction and with safety habits, which was widely publicized at the time. We are dusting it off now to see what revisions it may need in the light of postwar techniques and it will shortly be republished in *QST*. It may give you needed help in the treatment of grounds, shafts, terminals, jacks, meters, bleeders and so on. Such "safetyizing" of apparatus is sometimes difficult and expensive, although it is always worth while because you have only one life. If you can't accomplish it thoroughly, at least dope out and memorize the particular hazards of your own set and be on guard against them. But no construction code can protect you adequately, since components can fail and cause death-dealing voltages to appear at unexpected places. The best reliance you can put anywhere is on the development of personal safety habits. And if you're unwilling either to make your apparatus safe or to train yourself to safe habits, it seems to us that the least you can do for your family is to run a piece of rope out into the clear from your main switch and show them how to operate it. Then when they find you sizzling on your power supply they can at least pull you out without killing themselves too.

Don't say it can't happen to you. If modesty ever becomes a man it is in this matter. It has happened — too often — to our best people, in our best-appointed stations. These things are *always* accidents; remember that. Maybe the operator was careless — but you could be, too. Maybe the circuit was normally safe but just then a filament transformer's insulation broke down or a blocking condenser let go — but do you think your parts are sacred against breakdown just because they belong to you? We must also remember that we amateurs do the craziest things. In a station we visited recently the power-control relay was mounted on the transmitter rack. When the operator changed balky plate coils without killing the rig he had to wrestle the whole rack so violently that that relay was in constant danger of closing and putting 2500 volts on his hands. Making some alterations at our own control position the other night we discovered an old prewar push-to-talk cord rolled up and tucked behind the desk panel, still connected in parallel to the control switch. It was so old that its insulation was flaking off and at the first touch it shorted and put the transmitter on

the air. Out of sight, we had missed it completely in our postwar overhauling and there it lurked, an unexpected mantrap. Our "heaps" are full of such things.

After all, when all the construction codes and all the conduct codes in the world are complied with, you still aren't safe, simply because the unexpected can happen. Our history records all too tragically that it does happen. The ABCs of safety are summarized in the words Always Be Careful and there is only one really safe rule for accomplishing it: always kill the transmitter completely and test the filter bleeders before touching anything behind the panel. The only safe transmitter is a dead transmitter. Even if it does take a few seconds more, a little time isn't worth anything to you if you're stretched out in a box. Dead rig, live ham — and you don't want to be a baked one. When there is no power on the rig and no energy in the filter condensers, it can't hurt you. Under all other circumstances it should be regarded as dangerous and treated accordingly.

Hence that warning picture of a switch, and its accompanying slogan, that you see so often in *QST*. They represent the fundamentals of this matter. We urge you to switch your thinking and your tinkering habits. Make it a rule to switch off the power — all the power — every time. "Switch to Safety!"

"TIME for action, 10 P.M." . . . but perfect quiet on the air nightly from 7 until this hour! Thus we learn from April 1923 *QST* of the ARRL Board's request for voluntary observance of quiet hours. This, it is planned, is to be amateur radio's contribution to "Unscrambling the Eggs" laid by the failure in Congress of the White-Kellogg radio bill, which had been counted on strongly to bring order to the ether and peace between radiophone listeners and amateurs.

The Board had a busy session at its annual get-together, which was held in Chicago this year. Meeting the needs of our rapidly-growing number in the Dominion, a new office was created, to be known as Canadian General Manager. Director W. C. Duncan, 9AW, Toronto, was elected to fill the post. Also taken up at this time was the awarding of the second Department of Commerce Hoover Cup for the best all-around American amateur station of 1922. The Board's committee of judges named as winner Spark 2OM, station of F. B. Ostman, Ridgewood, N. J.; runners-up were 2FZ and last year's winner, 5ZA. Especially revealing is the report to the Board of Traffic Manager Schnell, which shows League field-organization personnel up 400% and c.w. stations handling 72% of all traffic.

Professor L. A. Hazeltine's neutrodyne circuit, described in the leading technical article this issue, is acclaimed by the Editor. Great promise is held for this arrangement which features tuned r.f. coils and neutralization of the stray capacitance existing between stages, the latter condition previously causing troublesome oscillation. In another receiver article, O. A. Kimball, 9RY, tells of his experiences in "Building a Super-

(*Continued on page 130*)

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W2PXP, ex-W8OCY, Ralph Jennings, Elmira, N. Y.
W2RJI, ex-W8HQR, Harold A. Smith, Cortland, N. Y.
Ex-W3FZD, James Newby, Bryn Mawr, Penna.
W3GXX, D4APU, First Lt. Alvin C. Manious, USAF, Hagerstown, Md., Munich, Germany
W3KX, Dr. J. F. Kelley, Scranton, Penna.
W5AMZ, John M. Shaver, sr., Opelousas, La.
W6FAM, Thurston W. Berger, Santa Ana, Calif.
W6NDD, Oscar W. Ericson, San Diego, Calif.
W6SET, Alvin A. Beal, Fontana, Calif.
W7BUF, Merwin Moller, Myrtle Point, Ore.
W8CLC, Frank M. Tarbox, Dunmore, Penna.
Ex-W8DLM, E. Johnson, Rochester, Mich.
W8GLJ, James J. Quinlan, New Philadelphia, Ohio
W8UAZ, Lt. John J. Gerrity, Scranton, Penna.
W9DQA, Burton Robertson, Adams, Wis.
W9FCN, Elmer D. Sweeney, La Grange, Ill.
W9MXG, Lester L. Varner, Seward, Nebraska
PK3JK, J. G. Koerts, Soerabaya
VE3ALZ, Edward Rendall, Toronto, Ont.
VE6WC, William H. Collins, Medicine Hat, Alta.
VP9R, Alfred Redman, St. George

Selectable Single-Sideband Reception Simplified

The "Simple Simon" Adapter Unit

BY J. L. A. McLAUGHLIN *

• This, says the author, is the ultimate simplification of selectable single-sideband reception. It would be hard to disagree, inasmuch as it is a gadget with only three tubes. But it can do an outstanding job in making life in a 'phone band more livable.

WE were certainly not prepared for the deluge of letters from amateurs asking for more dope on the selectable single-sideband adapter unit described in our article in the October, 1947, issue of *QST*.[1] No constructional information was given in that article because the special i.f. transformers and rejector parts were not available. Even if they had been, very few amateurs would have had the necessary laboratory equipment to adjust the 50-kc. bandpass amplifier. The correct adjustment of overcoupled transformers such as these is a ticklish job at best. The fact that this war equipment happened to be more complicated than conventional i.f. systems has led many to the belief that selectable single-sideband reception requires a laboratory-type instrument. Such is not the case, however, as the following will show.

This sudden interest in increased selectivity, brought about by the ever-increasing congestion of the amateur bands, is a very healthy sign and very gratifying to me. I've been preaching this very thing for over ten years with no takers.

There is no trick to getting high selectivity. However, brute-force selectivity (cascade amplifiers) in itself is not going to solve the problem, particularly in 'phone reception. What is required is the type of selectivity characteristic outlined in an article written by Carl Miles and myself in the November, 1937, issue of *QST*,[2] which stated in part:

"Our present method of obtaining extreme high i.f. selectivity with transformer coupling consists fundamentally of cascading resonant circuits using high-*Q* coils in sufficient number to achieve reduction of unwanted signals at some predetermined number of kilocycles either side of the resonance frequency. The resultant selectivity curve is roughly triangular in shape, the apex occurring at resonance frequency.

"It is obvious, then, that if we are going to achieve noteworthy improvement in the elimination of unwanted interference by means of extreme selectivity and yet retain a bandwidth at the nose adequate for intelligible 'phone reception, we must attack the problem of providing a selectivity characteristic radically different from the ones we are now using. The ideal shape, of course, would be rectangular rather than triangular. To achieve this desired rectangular shape, we will have to go to some other method than the one of cascading resonant circuits using high-*Q* coils with present conventional couplers."

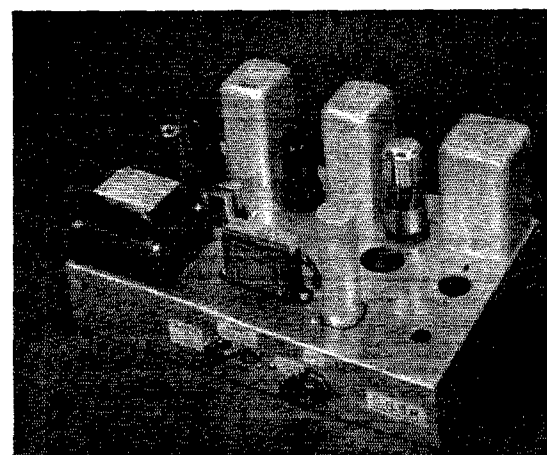
Keep this in mind — it's important! The result of this thinking led me to the development of selectable single-sideband reception (for brevity, hereafter referred to as "s.s.s.r.") for improved freedom from interference. What we need is a fairly rectangular-shaped response curve with a flattened nose just wide enough for intelligible speech. The required bandwidth for s.s.s.r. will be only half as great as for ordinary double-sideband

* P.O. Box 529, La Jolla, Calif.

[1] McLaughlin, "Exit Heterodyne QRM," *QST*, October, 1947.

[2] Miles and McLaughlin, "A New I.F. Amplifier System with Infinite Off-Frequency Rejection," *QST*, November, 1937.

♦



This is "Simple Simon," a three-tube (rectifier excluded) selectable single-sideband adapter. Less complicated to build than a three-tube receiver, it eliminates most of the heterodyne interference in 'phone reception as well as increases selectivity in c.w. reception. The 50-kc. i.f. section is along the rear edge of the chassis, with the crystal-controlled mixer at the left. The two crystals, one 50 kc. above and the other 50 kc. below the receiver's intermediate frequency, plug into an octal socket immediately in front of T_1. The chassis foreground is occupied by the power supply.

reception, for the same received intelligibility. Just how narrow this speech bandwidth can be made while still retaining intelligibility will vary with the individual, but it seems to me that a couple of kilocycles of audio is needed to carry on 'phone communication — for example, the range from about 300 to a little above 2000 cycles. This does not mean that the nose of the curve must be 2 kc. wide. We have found that if the carrier is set from 2 to 5 db. down on the cut-off side of the bandpass, a width (at this level) of but 1 kc. will give the desired audio response.

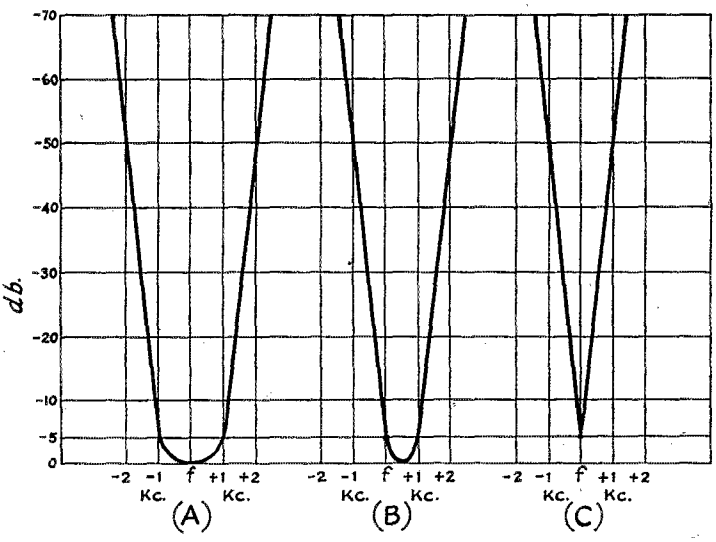


Fig. 1 — Comparison of double- and single-sideband curves, using passbands that give the same intelligibility in both cases. A — double sideband; B — single sideband; C — effective selectivity to off-frequency heterodynes obtainable with curve *B* when the heterodyne appears in only one sideband.

The advantages of single-sideband response over double-sideband response are illustrated in Fig. 1. Fig. 1-A represents a double-sideband response curve with a 2-kc. bandwidth at 5 db. down. This represents roughly the maximum selectivity we can use for decent speech reception. At the edge of this necessary intelligence band, off-frequency carriers will be highly attenuated because of the long narrow skirts of this curve. Such a curve will free the receiver of all high-frequency heterodynes down to, let us say, 2000 cycles. Attenuation of lower-frequency heterodynes will require greater selectivity. As we have stated before, this just cannot be done without loss of intelligibility.

To get rid of heterodynes lower in frequency than 2000 cycles, s.s.s.r. must be employed.

Fig. 1-B shows an s.s.s.r. curve capable of the same intelligibility as Fig. 1-A although the selectivity at the nose has been cut in half to but 1 kc. On this theoretical curve, 2000 cycles on the suppressed-sideband side (the low-frequency side) is now down over 70 db. As we get closer to the carrier frequency we naturally experience less attenuation. Low-frequency heterodynes that are but slightly attenuated in the bandpass (below, say, 300 cycles) can be eliminated in the audio circuit; this can be done by using a high-pass filter having high attenuation to frequencies below 300 cycles. A simple way to achieve this is to use a 0.001-μfd. coupling condenser between audio stages (for example C_{11}, Fig. 2). This low-frequency filter not only removes undesired low-frequency beat notes, but makes speech sound more natural by attenuating the "lows" in proportion to the "highs." It will also take out a great deal of noise, together with 60-cycle hum.

Fig. 1-C is a representation of the effective selectivity of the curve of Fig. 1-B to off-frequency signals. This curve, which is about 200 cycles wide at 5 db. down, shows the rejection available because *either* sideband of the desired signal can be selected. This is the effective selectivity to off-frequency signals whenever the off-frequency interference occurs in only *one* sideband, which is about 75 per cent of the time. But even when heterodyne interference is present on *both* sides of the desired carrier 50 per cent of this effective selectivity is still retained.

Basic Circuit Requirements for S.S.S.R.

Three things are necessary for achieving s.s.s.r.:

1) A bandpass amplifier having a bandwidth just sufficient for one sideband.

2) A carrier locator — a tuning system suitable for locating the carrier at the correct point in the bandpass.

3) A sideband selector (double-oscillator sideband inverter).

The first two can be achieved in a number of circuit combinations. In my earlier system [1] the bandpass was made quite broad (4 kc.) at the nose because the equipment was used for intercepting Japanese speech transmissions. Since the Japanese language contains many words with hissing sounds (high audio frequencies) this broad band was necessary. A sharply-tuned 50-kc. amplifier with a tuning meter at its output was used to meet the second requirement. The third was, of

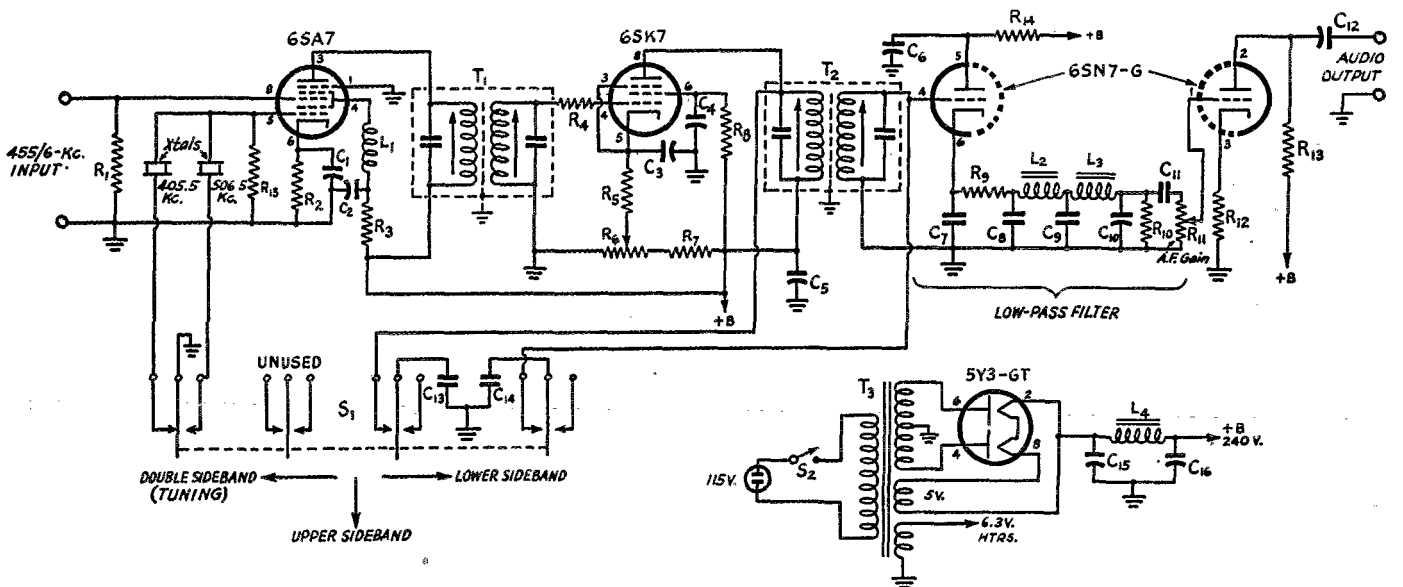


Fig. 2 — Circuit diagram of the "Simple Simon" adapter unit for selectable single-sideband reception.

C_1, C_2, C_3, C_4, C_6, C_{10}, C_{12} — 0.01-μfd. paper, 400 volts.
C_5 — 0.1-μfd. paper, 400 volts.
C_7, C_8 — 470-μμfd. mica.
C_9, C_{11} — 0.001-μfd. mica.
C_{13}, C_{14} — 25-μμfd. mica (10-per-cent tolerance).
C_{15}, C_{16} — 20-μfd. electrolytic, 450 volts.
R_1, R_4 — 0.47 megohm, ½ watt.
R_2 — 470 ohms, ½ watt.
R_3, R_{14} — 22,000 ohms, ½ watt.
R_5 — 1000 ohms, ½ watt.
R_6 — 10,000-ohm potentiometer.
R_7, R_{13} — 47,000 ohms, 1 watt.
R_8, R_{10}, R_{15} — 0.1 megohm, ½ watt.
R_9 — 47,000 ohms, ½ watt.
R_{11} — 0.5-megohm potentiometer.
R_{12} — 2200 ohms, 1 watt.
L_1 — 1 millihenry.
L_2, L_3 — 100 millihenrys.
L_4 — 8.5 henrys, 50 ma. (Merit A-2981).
S_1 — 4-pole 3-position anticapacity switch.
S_2 — S.p.s.t. toggle.
T_1, T_2 — 50-kc. i.f. transformer. (Type 1898-A or 1898-AX. See note.)
T_3 — Power transformer, 240 v. at 40 ma., with 5- and 6.3-volt windings (Merit P-2949).
XTALs — 405 to 406 kc., and 505 to 506. kc. Exact frequency is not important, but the *difference* between the two frequencies chosen should be 100 kc. plus or minus about 100 cycles. The crystals shown in the photograph are Bliley SR-10 units.

Note: The i.f. transformers are not yet directly available from coil manufacturers, but can be obtained in limited quantities from the author.

course, met by our double-oscillator sideband inverter.[3]

The second requirement can be satisfied in many ways, either by tuning meters (amplitude or frequency discriminators) or by aural means. In our last article we used a combination aural system which consisted of first making the band-pass quite narrow and peaked to the carrier, and then beating the two oscillators together to produce zero beat at 50 kc. A third method which has been built into several experimental models has automatic sideband switching. This system [4] automatically switches the sideband as the tuning knob is rocked over the correct carrier position, and results in a very sharp "feel" to the tuning — something like the curve of Fig. 1-C.

Simplified S.S.S.R.

Now to get to the meat of this article. Just how simple can s.s.s.r. equipment be and still meet the three basic requirements? Fig. 2 shows the circuit diagram of a small adapter unit that will do the trick. The circuit is quite simple. There are no complicated parts and any amateur should be able to build the unit and get it working in a couple of evenings. It can be connected to any receiver with 455/6 i.f. without any changes in the receiver. It is only necessary to run a wire from the input of the adapter to the plate of the detector diode in the receiver (or to the "hot" side of the last i.f.-transformer secondary circuit). You do not have to get into the bottom of the receiver to do this. Just pull out the second-detector tube, wrap an insulated wire once or twice around the diode plate pin, and put the tube back in the socket as suggested by Byron Goodman in his "Lazy Man's Q5-er" in January, 1948, *QST*. The audio output of the adapter can be fed back to the final audio output tube through the 'phone jack on most receivers. This gadget is so simple it has been nicknamed "Simple Simon" (for "single sideband").

Two problems, in the past, prevented us from reducing s.s.s.r. to amateur needs. One was obtaining suitable crystals for the sideband inverter at a decent price. The only suitable units we could get, up to a year ago, cost $37.50 each. Since two were required, $75 for two crystals surely would have discouraged most hams. This situation no longer exists; suitable crystals at

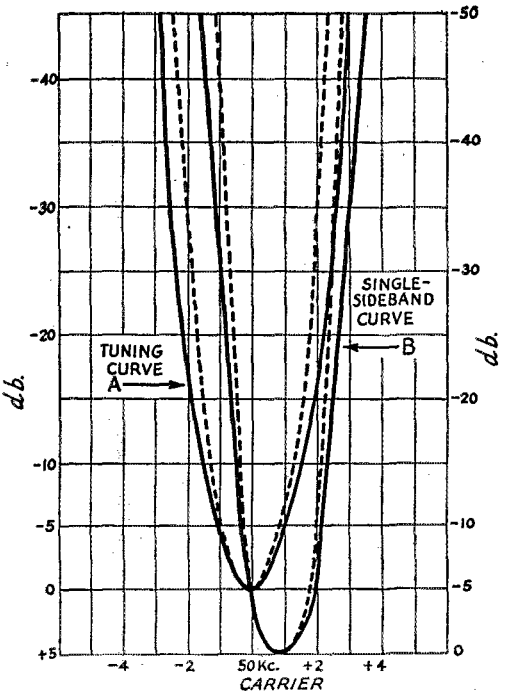


Fig. 3 — Tuning and single-sideband curves of the 50-kc. amplifier in the s.s.s.r. adapter unit. The solid curves show the performance with the 1893-A transformers and the dashed curves the performance with 1898-AX transformers.

these frequencies can be obtained from most crystal manufacturers for a fraction of this price. And, if you are lucky, you can get surplus Signal Corps tank-set crystals for a total of less than two dollars for the pair. Another headache we had to overcome was to find a manufacturer to make up 50-kc. i.f. transformers suitable for a ham job. That problem has also been licked. T_1 and T_2 are compact 50-kc. i.f. transformers critically coupled. This means that alignment is straightforward. You just tune them on the nose. The business of satisfying the second basic requirement (aural tuning) has been met by a simple juggling of circuit values and requires no additional transformers or tubes.

Alignment & Operation

In setting up the adapter circuit shown in Fig. 2, the first thing to do is to align T_1 and T_2 to 50.5 kc. This is done with the switch in the center position ("upper sideband"). The response curve should then look like *B* in Fig. 3; the response at 50 kc. should be about 5 db. down.[5]

After this is done, throw the switch to the left ("tuning") and you should then automatically get curve *A*. What has taken place is that T_2 has been retuned to 49.5 kc. and this (plus T_1, which

[3] U. S. Patent No. 2,364,863.

[4] Patent applied for.

[5] An accurately-calibrated signal generator obviously is needed for tracing such a curve. However, it is not necessary to plot the selectivity characteristic to obtain satisfactory operating results; it will suffice to tune the transformers "on the nose" at 50.5 kc. The test oscillator or signal generator should be set to this frequency as accurately as possible. A simple test oscillator such as described in the chapter on "Measurements" in the 1948 ARRL *Handbook* may be used for this purpose; a 2.5-mh. coil shunted by 0.004 μfd. will resonate at approximately 50.5 kc. The frequency may be set by zero-beating the 20th harmonic of the oscillator to a broadcast station on 1010 kc.

is still tuned to 50.5 kc.) results in a sharp-nosed curve ideally shaped for aural carrier tuning peaked at 50 kc. This double-sideband tuning position can be used for normal operation. Its selectivity is high enough to attenuate most high-frequency heterodynes lying above 2000 cycles.

When the going gets tough and the off-frequency carrier gets in closer so that the beat note drops to 1000 or 500 cycles, then is the time to switch to one of the single-sideband positions. One of the positions should knock out the heterodyne. When in one of the single-sideband positions, rock the tuning control very slightly. If the heterodyne persists, switch to the other sideband and again rock the tuning control slightly. If nothing happens, go back to the tuning position again and try tuning a little more carefully. It may take a little time to get used to this high-selectivity "edge" tuning as compared with tuning your regular receiver. Keep in mind that for maximum rejection we have to climb up slightly on the low-frequency side of curve *B*, Fig. 3, to a point about 5 db. below the peak. That is why we need the sharply-peaked tuning position to locate this point accurately.

This aural tuning and switch system is the fastest and best-operating system used so far. However, it will not tune itself. To make it effective and usable one must learn to tune carefully and accurately to within a hundred cycles. The hand that turns the knob must be connected to something brighter than a Mortimer Snerd!

A final — and important — operating note: Be careful not to overload the "Simple Simon." With the audio gain control full on, adjust the receiver coupling to the minimum required to produce an audio output a little less than the normal gain of your receiver. Unless this is done it will be impossible to realize the full benefits of single-sideband selectivity.

Circuit Notes

One of the problems encountered in low-frequency i.f., not experienced at 455 kc. and higher frequencies, is that of filtering out the r.f. at the output of the last detector. Some sort of low-pass filter is needed because the ratio of carrier frequency to audio frequency is very low, and the condenser-resistor tricks used at 455 kc. do not work. That is the reason for the somewhat elaborate-looking filter between the detector and audio stage in Fig. 2.

♦

In s.s.s.r. the fact that we set the carrier down 5 db. from the peak of the curve results in an emphasis of the higher audio frequencies. To correct this response a 0.01-μfd. by-pass condenser, C_{10}, is shunted across the audio output of the detector (see Fig. 2).

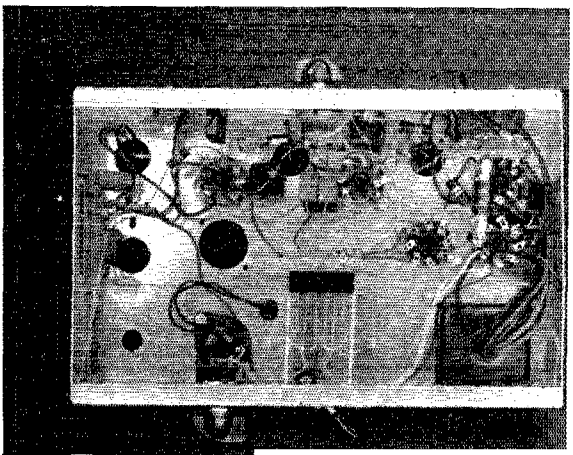
This adapter can be used with receivers with an intermediate frequency other than 455/6 kc. All that is required is to obtain crystals of frequencies equal to your i.f. plus and minus 50 kc. We have found that some of the lower-frequency crystals (405.5 kc.) do not oscillate as readily as the higher (505.5 kc.). In such cases it will be necessary to use the spare contacts on the sideband switch to throw in a separate oscillator plate tuning circuit to replace the 1-mh. coil used. This may be done by switching in a suitable condenser across the 1-mh. coil, or by using a separate coil with a small trimmer across it.

The output jack of the adapter should be connected through a short cable to the grid of the power audio stage. This was easy to do with the receiver we used, a Hallicrafters S-40, as the grid comes out to the tip side of the 'phone jack and all we needed to do was to push the plug in far enough to touch this contact without opening the jack circuit. However, if this is not possible on your receiver, pull out the power-amplifier tube and wrap the bare end of the wire around the grid pin and push the tube back into its socket. If higher audio gain is needed, it can be obtained by using a high-μ triode, with appropriate circuit constants, instead of the 6SN7GT section shown in the circuit diagram. In that event the spare 6SN7GT section could be used as a b.f.o.

The audio control of your receiver must naturally be turned to minimum when the s.s.s.r. adapter is in use. In some receivers strong heterodynes may still leak through when the gain is at minimum. In such cases it will be necessary to disable the first audio tube in some manner. One simple way would be to open the plate voltage to this tube by a switch on the front panel.

The "Simple Simon" represents the ultimate simplification for s.s.s.r. Its sideband suppression is about the same as that of our original 1941 model.[6]

[6] McLaughlin, "The Selectable Single-Sideband Receiving System," *QST*, June, 1941.



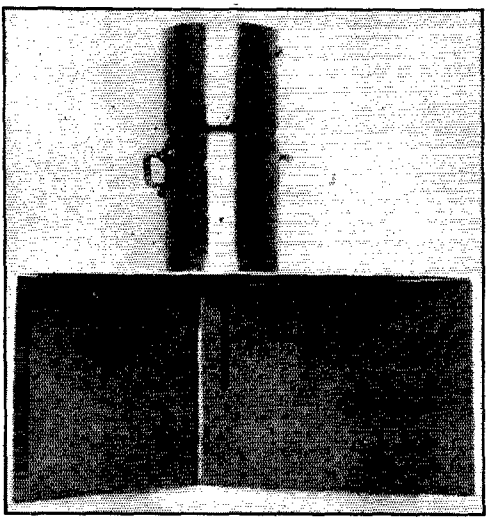
This under-chassis view shows the sideband selector switch at the lower center and the two 25-$\mu\mu$fd. condensers immediately above it. As this is an experimental unit, the unused holes in the left-hand part of the chassis should be ignored. The crystal socket is to the right of the sideband selector switch.

An Oscillator for the 1215-Mc. Band

Combining Transmitter and Antenna System in One Compact Unit

BY PETER G. SULZER,* W3HFW, AND CHARLES R. AMMERMAN,* W3MLN

An inspection of amateur two-way records above 50 Mc. indicated that the 1215-Mc. band had not been fully exploited. The lack of operation on this band probably results from the fact that little if any of the surplus material available can be converted to this frequency range. With this situation in mind, it was thought desirable to investigate the possibility of building a suitable transmitter.



The complete 1215-Mc. oscillator built by W3HFW and W3MLN has a high-gain antenna system built in. The tube and tank circuit are completely shielded, the antenna projecting below the ground-plane base.

There are four types of oscillators usable in the 1215-Mc. band: the klystron, the magnetron, the lighthouse tube with a coaxial resonator, and the doorknob or acorn tube with a linear tank circuit. The first two were not available, and the third appeared difficult to construct, so the fourth was left for consideration. A review of tube characteristics indicated that the 368A, 703A and 6F4 should all be satisfactory in this band. The 6F4 acorn tube was ruled out because of low rated output (45 milliwatts) and very few 368As were seen on the surplus lists. A few 703As were obtained, and after some experimenting, a successful oscillator was constructed. An output of about 1 watt was obtained with an input of 80 milliamperes at 350 volts. Admittedly this is low efficiency, but the output is sufficient to provide good results with the high antenna gain readily obtainable at such high frequencies. The oscillator and antenna are built as one unit, which has the great advantage of being easy to construct; no machining is required.

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Construction

The oscillator consists of a single 703A triode connected to an open-ended transmission line whose electrical length is a half-wave. The schematic diagram is shown in Fig. 1. The antenna, which may be considered part of the oscillator circuit, is a folded quarter-wave with ground plane and corner reflector. The antenna is mounted directly on the bottom surface of the ground plane, as shown in the photograph of the complete assembly. Capacitive coupling is provided by a probe extending through the ground plane and into the transmission-line shield can near the plate rod. The probe and the open end of the transmission line appear in another photo which shows the oscillator assembly de-

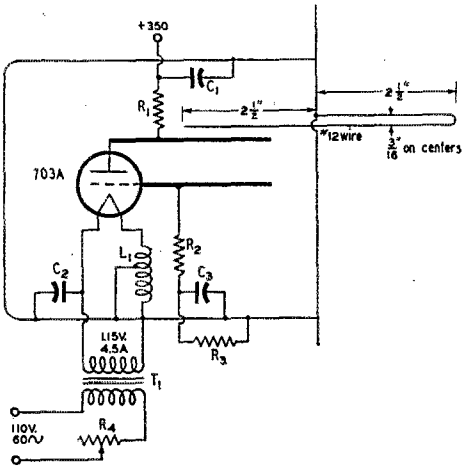


Fig. 1 — Schematic diagram of the 1215-Mc. oscillator.
C1, C2, C3 — 1000-μμfd. feed-through ceramic condenser (Erie Ceramicon).
R1, R2 — 47 ohms, ½ watt (IRC BW-½).
R3 — 4700 ohms, ½ watt (IRC BT-½).
R4 — 500-ohm 5-watt potentiometer.
L1 — 6 turns No. 18, ¼-inch diam., ½ inch long. Adjust tap position as described in text.
T1 — Filament transformer, 2.5 volts a.c., 5 amp.

tached from the ground plane. The extra holes in the ground plane near the probe are for ventilation. The upper end of the transmission-line shield can and the tube ends of the plate and grid rods are shown in detail in a third photo. The plate and grid pins of the tube plug into the holes in the ends of these rods, a fourth photo showing the 703A oscillator in position but with its shield removed.

It should be emphasized that complete shielding of the oscillating circuit (which includes the tube elements themselves) is essential at these frequencies. The circuit will not oscillate at all if the plate and grid rods are removed from their can. Without the tube shield very little grid current is obtained.

The detail drawing, Fig. 2, gives all of the necessary dimensions. The transmission lines are made of brass rod; they should be cut to the exact size shown. The holes in the ends of the rods are drilled somewhat off-center so that a slight rotation of the rods will permit adjustment to allow easy entry of the tube pins. The holes in the bakelite support are cut small so that a tight force-fit is obtained. It is not advisable to substitute polystyrene or Lucite for the bakelite because of the high temperature attained by the rods. The 47-ohm grid and plate resistors are soldered to the rods on the tube side of the bakelite. The feedthrough Ceramicons, C_1, C_2 and C_3, are helpful in preventing radiation, but are not absolutely necessary. If they are not available, the plate, grid and filament leads can be run through the transmission-line shield can by means of small feedthrough insulators.

One filament lead is returned to ground through the choke L_1 which must be trimmed as explained later. The other filament lead passes through the

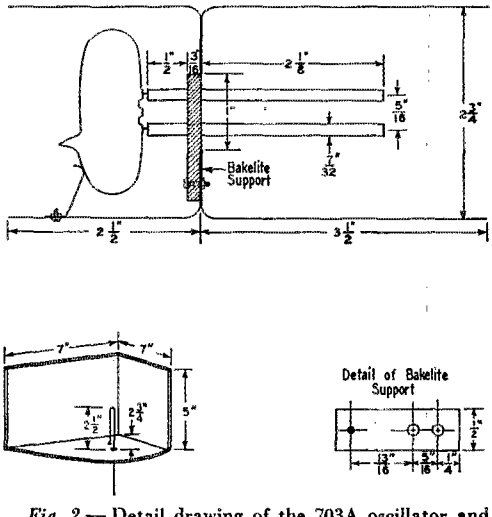
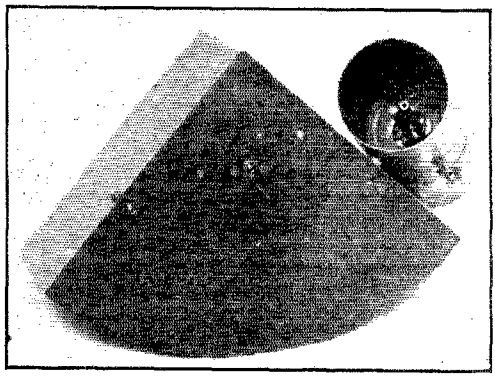


Fig. 2 — Detail drawing of the 703A oscillator and antenna assemblies.



The oscillator and ground plane separated. Capacitive coupling between the antenna and tank circuit is provided by the probe which projects above the ground plane.

top of the transmission-line shield can and connects directly to the inside terminal of C_2. The filament-pin connectors were made from the contacts of a female A-N connector.

Adjustment

After the oscillator is finished the tube can be plugged in with the tube shield omitted. The filament circuit is connected, and R_4 is adjusted for 4.5 amperes of filament current, or 1.15 volts a.c. *at the tube pins*. If a meter is not available, adjust R_4 until the filament is a bright yellow, or nearly white. Next connect a milliammeter in series with R_3 and apply 350 volts to the plate circuit. Some grid current should be indicated, while the plate current should be between 60 and 90 ma. If the plate current is low, try increasing the filament current.

The next step is to ground different turns on L_1 until the maximum grid current is obtained. When the proper turn has been found, as indicated by a grid current of 10 milliamperes or so, a permanent ground can be made directly to the shield can under L_1. The adjustment of L_1 is critical, since it controls the magnitude and phase of the feedback.

When the tube shield is mounted a substantial increase in grid current should be obtained. If so, the oscillator is ready for connection to the antenna. A convenient output indicator can be constructed by connecting a 2-volt 60-milliampere pilot light in the center of a half-wave antenna (5 inches long). Place the antenna assembly on a flat surface with the probe pointing up. Put the transmission-line shield can over the probe, resting on the ground plane, so that the probe is between the plate rod and the transmission-line shield. With the output indicator placed about one foot in front of the antenna move the oscillator so that the plate rod approaches the probe. When maximum output is obtained, mark the position of the oscillator and fasten it to the ground plane by

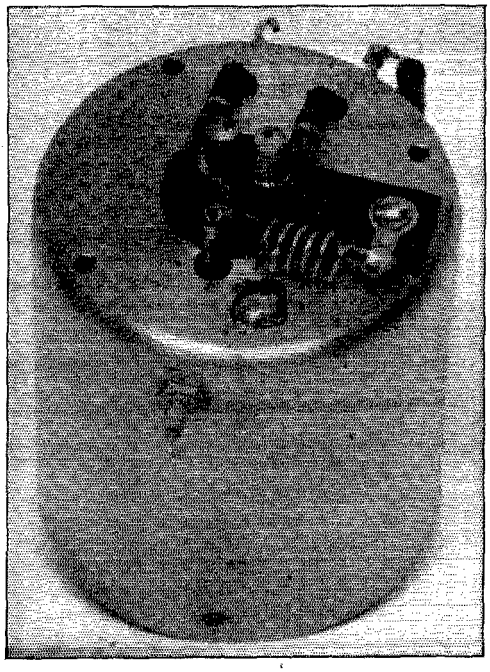
means of spade lugs. The oscillator with its antenna is then ready to go.

Operation

Two oscillators of this type were constructed, and power supplies and modulators from small low-frequency rigs were used. For portable operation, 300-watt 115-volt 60-cycle gasoline-driven generators were used. The receivers were superhets acquired as war surplus, one Type APR-4 and one Type APR-5. The antenna system used for receiving was a folded quarter-wave radiator and ground plane built on a coaxial-cable connector. The height of the antenna is 2½ inches and the ground plate is a piece of aluminum 6½ inches square. Any conveniently-sized plate with its smallest dimension greater than a half-wave should be satisfactory.

In the initial tests, one transmitter was located on the roof of a building and put into operation with a constant tone modulation. A receiver was then carried to several locations and reception was attempted. At five miles good signal strength was still found, and consequently it was decided to try for a record at a much greater range.

For the second test, one set of equipment was located on the side of a mountain, at an elevation of about 1900 feet. The other set was located 12½ miles down the valley at an elevation of about 1000 feet. At this distance the signals were still Readability 5, Strength 9, with slight ignition noise. It is felt that a much greater distance could have been covered had the proper location been available, but the topography was such as to prevent further tests without prohibitive intervening obstructions. Arthur Benner, W3MEM ,provided valuable assistance during these tests.



Close-up of the tube end of the tank-circuit assembly, with the 703A removed.

The oscillator assembly with the 703A in place. The grid leak, R_3, is at the right.

It is interesting to note that over short distances good signals were heard regardless of intervening obstacles. The 1215-Mc. band is definitely not out of reach of the average v.h.f. enthusiast, nor is it limited to next-door contacts.

About the Authors

• Peter G. Sulzer, W3HFW, and Charles R. Ammerman, W3MLN, are both graduates (B.S. in E.E.) of Pennsylvania State College, in 1947 and 1943 respectively. Both are at present connected with this institution, W3HFW working on ionospheric measuring equipment and W3MLN teaching in the Department of Electrical Engineering. Both are interested in v.h.f. experimental work in connection with their hamming, and W3MLN handles quite a bit of traffic at W3YA, the famous station at Penn State.

Selectivity in S.S.S.C. Reception

A Balanced Frequency-Converter Circuit for Communications Receivers

BY OSWALD G. VILLARD, JR.,* W6QYT

• **Single-sideband transmission offers an opportunity for a big improvement in receiver selectivity — far more than the reduction in transmitted bandwidth would indicate. This article explains why, and describes a simple circuit for accomplishing it.**

THE advantages of single sideband over normal amplitude modulation from the standpoint of transmission — i.e., the savings in power, tube capacity, bandwidth, etc. — have been known and understood for many years. However, the fact that single sideband has equally important advantages from the standpoint of reception, at least in amateur work, seems so far to have been overlooked, for it turns out that a shift to single-sideband transmission and reception makes possible a remarkable increase in the effective selectivity of existing receiving equipment — an improvement difficult to achieve in the case of double-sideband transmission without an undesirable increase in cost and complexity. With relatively little difficulty, the amateur can convert his existing receiver for single-sideband reception, and obtain performance rivaling that of the finest commercial installations.

It is the purpose of this article to review the mechanism of detection both in the case of double- and single-sideband reception. The way in which the shortcomings of double-sideband detection can be circumvented by single sideband will then be outlined. It is pointed out that while some of the advantages of single-sideband detection can be realized with unmodified standard communications receivers, a great improvement can be obtained through addition of a simple external single-sideband detector and low-pass audio filter.[1]

The fact that single-sideband transmission makes possible a 50-per-cent saving in transmitted bandwidth is almost academic when considered in the light of the effective selectivity of present-day receivers. It is all very well to halve the spectrum occupied by the transmitter, but if the receiver doesn't show the difference nothing has been gained.

Selectivity

To clarify the concept of selectivity in the case of conventional detection, it is helpful to consider a specific case. Suppose one is listening to a station that is very weak — perhaps one microvolt across the receiver input terminals. For a given i.f. gain, a certain voltage is delivered to the diode detector. Now what we wish to do is to prevent any station on any *other* frequency from delivering a signal of approximately equal strength to the detector. It is a characteristic of linear detection — or rectification, as it is sometimes called — that if another signal, no matter how far it may be separated in frequency from the one being listened to, *does* get through at the same strength, it will also be rectified and the modulation on it, as well as the modulation on the desired signal, will be heard. The two signals may actually be so far apart in frequency that the beat between the carriers is inaudible, yet both modulations will be heard if the two signals are of roughly equal strength at the detector.

Now it is an inherent characteristic of linear diode detectors that if either signal becomes two or three times as strong as the other, the modulation on the weaker tends to be completely suppressed. This is a well-known property.[2] It is a desirable one, in point of fact, because it means that the *effective* selectivity of a receiver with a linear detector — for double-sideband reception — is actually greater than that of the receiver's i.f. circuits alone.

However, suppression of the weaker signal can be very annoying if that signal happens to be a weak DX station, say some five or ten kilocycles away from a strong local. When the local comes on, the DX signal disappears. All that comes out of the loudspeaker is the local's voice. Yet the DX signal is still being received; the suppression effect has simply taken him out.

In order to set up some performance specifications for an "ideal" ham receiver, we might consider what sort of selectivity problem we are actually up against. It is clear that the ideal receiver is one that will receive a barely audible signal without interference on one channel, while the loudest signal we would normally expect to encounter is blasting away on the channel im-

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[1] In a subsequent article a method of improving the performance of this simple arrangement will be described, and complete details of a practical embodiment of the method will be given.

[2] See Terman's *Radio Engineer's Handbook*, Edition 1, page 577.

mediately adjacent. We know that the weakest signal we can receive is approximately one microvolt. To find the strongest signal we are likely to have to reject (locals around the corner excepted) it is necessary to do some estimating, and estimates based on propagation factors as well as actual experience show that the ratio of strongest signal received to weakest signal received may occasionally exceed 1000 to 1.

Now the question is, how much frequency separation is necessary between a 1-microvolt desired signal and a 1000-microvolt undesired signal, in order for the latter to be attenuated down to the 1-microvolt level? The answer will be found in published receiver selectivity curves. For the Super-Pro receiver, which has four i.f. tuned circuits, the response is down 1000 times at plus or minus 8 kilocycles from the center of the passband for the narrowest setting of the "bandwidth" control. For the NC-200 receiver, which has three i.f. tuned circuits, the response is down 1000 times at plus 11 or minus 10 kilocycles. Other communications receivers will, in general, fall in the same range.

This means, then, that if we are listening to a 1-microvolt DX signal, the nearest 1000-microvolt interfering signal must be at least 8 kilocycles away in one case, and 10 to 11 kilocycles away in the other case, in order for both DX and undesired signals to be of equal strength at the second detector. When both signals have equal strength, both stations will be heard; for the undesired signal to be eliminated completely, it must be attenuated still further, until it is less than 1/8 or 1/4 as strong as the desired signal.

The tendency for a strong adjacent station completely to blot out the one to which we are listening is familiar to everyone, and is the reason for the desirability of extra i.f. selectivity such as is provided by arrangements like the Q5-er.[3] Without such extra selectivity we cannot make full use of the frequency space now available to us.

Single-Sideband Detection

The situation is quite different in the case of single-sideband reception, because a fundamentally different process of detection is used. S.s.s.c. or c.w. signals are detected by frequency conversion, rather than by rectification. Here it is helpful to review some theory. A single-sideband voice signal may be thought of as a band of frequencies simply displaced in the frequency spectrum. To each of the frequencies present in the voice wave, a constant frequency is added. Thus a speech sound, which might consist at some instant of three component frequencies — e.g., 500, 1000 and 2500 c.p.s. — can be translated into the radio-frequency spectrum by adding a constant 1,000,000 cycles per second to each component. We then have three new frequencies, namely 1,000,500, 1,001,000 and 1,002,500 cycles per second, forming a voice single sideband which can be transmitted by radio. A single-sideband transmitter, then, is fundamentally a frequency-translating device which shifts the incoming speech frequencies to the desired position in the radio-frequency spectrum. To receive these signals, it is only necessary to reverse this process: by subtracting the constant frequency of 1,000,000 cycles we can recover the original speech frequencies of 500, 1000 and 2500 cycles.

Note that the reception of code signals is carried out by a very similar process. Assume an incoming keyed c.w. signal of 1,000,000 cycles per second. If we subtract exactly 1,000,000 c.p.s., what we have left is, of course, zero frequency, or keyed d.c. In actual practice, something like 999,000 cycles per second is subtracted. The c.w. signal is thereby translated to a frequency of 1000 c.p.s., which, when amplified and fed to a loudspeaker, is heard as an audible tone.

Now, frequency conversion, in reception, is a process with which everyone is familiar. For code reception in the ordinary receiver, the frequency conversion is actually done in two steps: the local oscillator converts the incoming signal to the i.f. frequency; and the beat oscillator, in conjunction with the second detector, converts the i.f. frequency down to an audio frequency. For either c.w. or single-sideband voice reception, the usual diode second detector could equally well be replaced by a 6L7 or 6A8 converter tube. For both types of transmission we are interested in frequency conversion — nothing else. We do not want any normal rectification to take place, particularly in the conversion at the second detector, because this rectification would permit the modulation on undesired amplitude-modulated signals to be heard along with the desired signal resulting from the frequency-translation process.

Overcoming Rectification Effects

One way to suppress the spurious signal resulting from rectification is to make the voltage injected by the beat-frequency oscillator very strong in relation to the incoming r.f. signals. In the ordinary communications receiver the amplitude of the b.f.o. voltage is fixed, and the only way to make it strong in relation to the incoming signals is to weaken the latter. This is why it is always recommended that a.f. gain be on full and r.f. gain be kept at a minimum for single-sideband reception. Under these conditions the audio output resulting from rectification of the incoming signals is small compared to the audio output resulting from the beat between the desired single-sideband signals and the b.f.o.

However, even then the rectified audio is unfortunately not negligible. The usual diode second detector is designed as a rectifier rather than as a

[3] Rand, "The Q5-er," *QST*, December, 1947.

pure frequency converter, and its use in the latter service is a compromise. It is generally considered that the audio output attributable to rectification is negligible in comparison with the desired output when the incoming signal voltage is roughly one-tenth as strong as the local-oscillator voltage. When this ratio is achieved by reducing i.f. gain in the ordinary communications receiver, the audio output from the detector is down quite a bit and the reserve audio gain may not be able to compensate for the loss.

Furthermore, it often happens that although the c.w. or single-sideband signal one is listening to is only one-tenth as strong as the local oscillator, an interfering signal on an adjacent channel may be one-half or one-third as strong. It will therefore be rectified, giving rise to interference that will be equally bad no matter how far the carrier frequency of the interfering signal is separated from that of the desired signal.

An objection to running a receiver at reduced r.f. gain is the resulting reduction in signal-to-noise ratio in the first r.f. stage, unless the set happens to be one in which this stage operates at full gain all the time.

Of course, it is possible to use the opposite approach and increase the amplitude of the injected b.f.o. voltage while keeping the r.f. gain normal. This procedure is to be recommended, but it can only be carried to the point at which the second detector overloads.

For these reasons, it is hard to get the full benefits of single-sideband reception in QRM reduction when using a conventional receiver with b.f.o. But it is not difficult to build an external frequency-converter unit (or detector unit), especially designed for single-sideband reception, which can be added to any communications receiver. The method of operation of such a unit is somewhat different from that of ordinary converters, so here we must digress a moment to review some more theory.

Frequency Conversion vs. Rectification

There are two basic ways in which frequency conversion may be carried out. In the first, the incoming signal is linearly added to the oscillator voltage, and the combination is rectified in a diode detector. It will be found that the envelope of the combination pulsates at a frequency which is the difference between that of the incoming signal (or signals) and the local oscillator. Since a diode detector follows the envelope variations, the audio output is the desired difference frequency. This is how the b.f.o.-second-detector frequency conversion works. In the second method, the local oscillator modulates the incoming radio-frequency signal, thereby setting up two sidebands whose frequencies are the sum and difference of the incoming and oscillator frequencies. The lower sideband, or difference frequency, is the desired audio signal. The 6L7 converter tube, for example, works on this principle: the local oscillator simply suppressor-grid-modulates the signals being carried from the control grid to plate by the electron stream. The 6L7 is essentially a modulated amplifier.

In a modulated-amplifier converter where we are changing the incoming frequencies down into the audio range — instead of into the i.f. range as in most receivers — we must avoid distortion that would cause partial rectification of the incoming signals and thus produce undesired a.f. output. As an amplifier, therefore, the 6L7 must be very linear. The best way to keep nonlinear distortion low in any amplifier is to restrict the amplitude of the incoming signal. But where such a restriction is impractical, as is the case if the frequency converter must operate at a fairly-high signal level, it is possible to use the expedient illustrated in Fig. 1 — the push-pull or balanced frequency converter. In this circuit, each tube produces the same amount of audio output from rectification caused by nonlinearity of the grid-voltage/plate-current curve. But since the tubes are connected in push-pull so far as their outputs are concerned, these audio signals cancel out. The local-oscillator voltage, on the other hand, is fed to the two tubes in push-pull, and consequently the audio outputs resulting from the beat between this oscillator and the incoming signal add up in phase at the output transformer. Thus the desired beats are heard, while undesired signals because of rectification are balanced out.

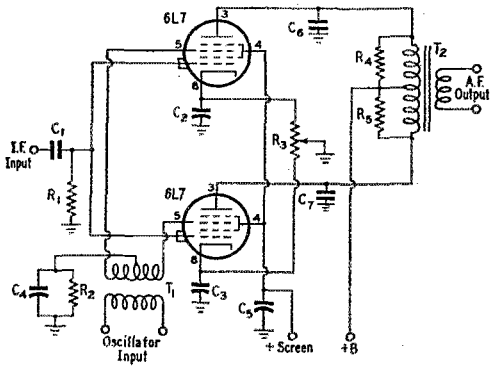


Fig. 1 — Balanced frequency converter for single-sideband reception. This circuit substitutes for the conventional rectifier (usually a diode) serving as a second detector in a superhet receiver.

C_1, C_6, C_7 — 0.0022 μfd.
C_2, C_3 — 50-μfd. electrolytic, 25 volts.
C_4 — 0.01 μfd.
C_5 — 0.1 μfd.
R_1 — 33,000 ohms.
R_2 — 15,000 ohms.
R_3 — 500-ohm variable.
R_4, R_5 — 10,000 ohms.
T_1 — I.f. transformer with center-tapped secondary (coupled to beat oscillator).
T_2 — Audio transformer; push-pull primary capable of carrying about 10 ma.

Actually, the rejection of the unwanted signals cannot be absolutely complete because of the presence of third-order distortion which is not affected by the push-pull connection. However, remote-cut-off tubes such as the 6K7 and 6L7 are especially designed to have low third-order distortion, and their use makes possible a rejection which is quite adequate in practice.

Adjusting for Balance

The correct "balance" of the balanced detector circuit may easily be found. An ordinary modulated signal is applied to the detector, and the beating oscillator is either turned off or, preferably, is detuned so far away from the signal that any beats between it and the signal are above the limit of audibility. Then the amplitude of the signal is increased until the modulation on it just begins to be heard — in other words, the signal just begins to ride through. Disregard any distortion. To balance the detector, the cathode balancing resistor in Fig. 1 is adjusted until the audio output is minimum.

A balanced detector of the type shown in Fig. 1 may easily be added to any standard receiver without disturbing normal operation in any way. A cathode follower will serve to couple energy from the last i.f. stage of the receiver to the external adapter. An external beating oscillator must be provided, however, and likewise a separate audio amplifier, unless the output of the single-sideband detector is fed back into the set's audio system in some way.

In actual operation, a detector of this sort makes possible an enormous improvement over single-sideband reception by means of either a separate r.f. oscillator (for example a BC-221 or LM-8), or the set's own b.f.o. It is no longer necessary to keep the i.f. gain control down low in order to keep the b.f.o. voltage large compared with the signal voltage. Strong adjacent modulated signals no longer ride through and cause distraction by adding another voice to the one being copied; they are heard, if at all, only as "monkey chatter," or scrambled speech.

A Wien bridge or "Hetrofil" [4] may be used with good effect after a detector of this sort to eliminate steady tones caused by the beats between the carriers of interfering double-sideband signals and the conversion oscillator. A sharp-cut-off low-pass filter connected to the output provides an inexpensive way of achieving the 'phone man's dream of a virtually square-topped straight-sided passband. This is possible because the over-all selectivity is largely determined by the audio filter, whose performance can be made very good. To achieve the same square-topped bandpass characteristic through i.f. selectivity alone would probably require conversion to a low i.f. frequency plus use of many cascaded overcoupled tuned circuits, which are awkward to align. Simple selective circuits such as crystal filters, the Q5-er, etc., provide a peaked, rather than a square, response characteristic.

The combination of single-sideband transmission, balanced detector, and low-pass filter has only one drawback, and that is the audio image. Signals on either side of the beating-oscillator frequency can produce an audio output within the passband of the filter. Therefore the combination has twice the effective bandwidth required for single-sideband reception. Nevertheless, even by itself the balanced-detector low-pass filter combination represents a considerable improvement over present-day receiving techniques.[5]

Conclusion

The conclusions reached in this article may be summarized in the following way. With conventional modulation the linear-detection process used, plus finite receiver i.f. selectivity, results in two undesirable features: first, the possibility that the modulation on strong interfering signals quite far from the frequency of the desired signal will ride through; and second, the "suppression" effect which results in complete disappearance of the desired signal when the interfering signal is very strong. These two disadvantages of conventional reception, familiar to all 'phone men, tend to prevent maximum utilization of existing frequency assignments in the sense that very weak stations cannot be copied immediately adjacent to very strong ones. Single-sideband reception by means of the b.f.o., on standard receivers, reduces the suppression effect but still is vulnerable to the modulation on undesired signals because of the possibility of rectification occurring along with frequency conversion. Finally, single-sideband reception by means of a standard receiver equipped with a balanced detector eliminates both the suppression effect *and* the possibility of interference due to rectification. In a combination of this sort, audio selectivity becomes the complete equivalent of i.f. selectivity (except for the audio image), provided that the i.f. selectivity of the receiver is sufficient to prevent strong adjacent interfering signals from actually overloading the balanced detector. Should such overloading become a problem because of insufficient i.f. selectivity, it is possible to reduce the i.f. input to the balanced detector and to make up for the loss by increased audio gain.

[4] Woodward, "Hetrofil — An aid to Selectivity," *QST*, September, 1939.

[5] This image, of course, can be reduced or eliminated if the detector system is preceded by an i.f. system having a bandpass characteristic just wide enough to accommodate a single-sideband signal. The Q5-er in conjunction with a communications receiver can give excellent performance in this respect. However, such a system is more difficult to tune; the received sideband must be properly placed on the rounded nose of the selectivity curve, and the carrier should be reinserted independently of the tuning. — *Ed.*

ing frequencies down into

Better Reception for 2-Meter Mobile

A Simple Converter for Use as a Companion to the "Mobile Midget"

BY C. VERNON CHAMBERS,* W1JEQ

• Though the performance of 144-Mc. receivers for home-station use has been improved greatly in the past year, the sensitivity and selectivity of our mobile jobs have not kept pace. Here is a compact converter for use with a car receiver. It is hardly more difficult to build than the familiar superregen commonly used in mobile work, but its performance is vastly better.

THIS converter was designed as a companion unit for the mobile transmitter described in a recent issue of *QST*.[1] It features compactness and single-control tuning and it may be operated from the transmitter power supply. The output frequency of the converter is 1.6 Mc., permitting it to be used with an automobile broadcast receiver, or it may be used at the fixed station by coupling to any receiver or i.f. system capable of tuning to 1600 kc.

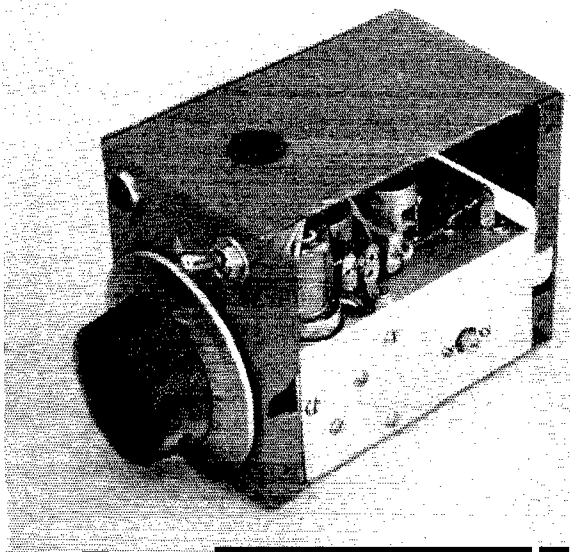
Undoubtedly there are many two-meter operators who have not previously built anything more complicated than a superregenerative receiver and they may question the advisability of tackling more complex circuits. Experience has shown, however, that it is hardly more difficult to build and to adjust a simple converter than it is to construct a superregen and to make it behave properly. The converter will outperform the superregen in every way, and the technique required for its construction is well worth learning.

Two 6J6 twin-triodes are used, each as a mixer-oscillator, the first converting the signal frequency to 11.1 Mc., the second working from this frequency to 1600 kc. The high-frequency oscillator is the only circuit that requires tuning during normal operation, inasmuch as the other tuned circuits are preset at fixed frequencies during the testing and alignment of the converter. The 6J6s and some of the other components are surplus items which may be purchased at bargain prices. Plate voltage for all circuits is stabilized by an 0B2 regulator tube. The sensitivity of the converter is quite good, and satisfactory image rejection is obtained through the double conversion.

Circuit Details

The first mixer has a self-resonant grid coil which is tuned to the center of the 144-Mc. band by the tube and circuit capacitances. Its plate circuit is tuned to 11.1 Mc. by C_1 and L_3. The oscillator tunes from 132.9 to 136.9 Mc. to cover the band. It uses the second section of the first 6J6 and, beating with the incoming signal, produces an i.f. of 11.1 Mc. which is then capacitance coupled by means of C_9 to the grid of the second mixer. Actually, the oscillator covers a somewhat greater range than that given above, in order that the converter may be tuned outside either end of the band. C_4 is the band-set condenser and C_5 is the bandspread capacitor. No coupling condenser is used between the oscillator and mixer, since stray coupling between grid pins at the socket gives adequate injection.

The second 6J6 serves as another mixer-oscillator combination, converting the 11.1-Mc. i.f. to 1600 kc. for working into a car radio at the high end of the broadcast band. Note that a trap (C_2L_4) is connected in series with the coupling condenser between the two mixer circuits. This trap is tuned to 14.3 Mc. and attenuates image response at a frequency removed from the signal



A front view of the mobile converter for 144 Mc. Note how the cabinet, a 3 × 4 × 5-inch utility box, has been modified to allow clearance for the chassis.

* Technical Assistant, *QST*.

[1] "A Mobile Midget for 144 Mc.," *QST*, February, 1948.

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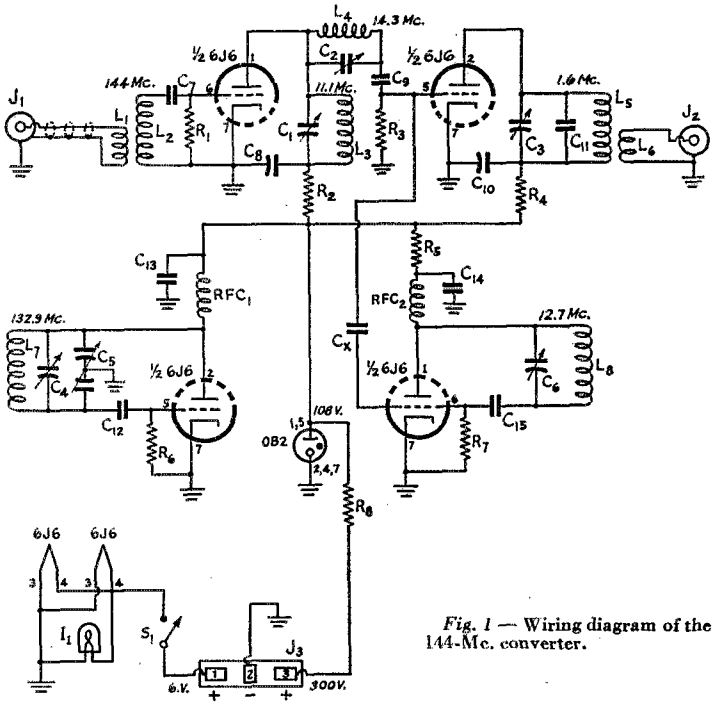


Fig. 1 — Wiring diagram of the 144-Mc. converter.

C_1, C_3, C_6 — 62-$\mu\mu$fd. trimmer (Centralab 823-AZ).
C_2, C_4 — 20-$\mu\mu$fd. trimmer (Centralab 820-B).
C_5 — 5.27-$\mu\mu$fd. "butterfly" variable (Johnson 160-205).
C_7, C_{15} — 47-$\mu\mu$fd. mica.
C_8, C_{10} — 0.01-μfd. paper.
C_9 — 100-$\mu\mu$fd. mica.
C_{11} — 150-$\mu\mu$fd. mica.
C_{12} — 15-$\mu\mu$fd. mica.
C_{13} — 470-$\mu\mu$fd. mica.
C_{14} — 0.0047-μfd. mica.
C_x — Injection coupling, made from 75-ohm Twin-Lead — see text.
R_1, R_3 — 1.5 megohms, ½ watt.
R_2, R_4 — 1000 ohms, ½ watt.
R_5 — 0.22 megohm, ½ watt.
R_6, R_7 — 15,000 ohms, ½ watt.
R_8 — 3500 ohms, 10 watts.
L_1 — 4 turns No. 22 enam., close-wound, 3/16-inch diam.
L_2 — 6 turns No. 14 enam., 5/16-inch diam., ⅝ inch long.
L_3 — 20 turns No. 28 enam., ½-inch diam., 5/16 inch long. Coil wound on a National PRD-2 form.
L_4 — 28 turns No. 28 enam., ⅜-inch diam., ⅜ inch long. Coil wound on a National PRC-3 form.
L_5 — 75 turns No. 28 enam., 9/16-inch diam., 1 inch long. Coil wound on a National PRE-3 form.
L_6 — 10 turns No. 28 enam., close-wound over cold end of L_5.
L_7 — 3 turns No. 14 enam., 5/16-inch diam., approx. ½ inch long. See text for adjustment of length.
L_8 — 20 turns No. 28 enam., ½-inch diam., 5/16 inch long. Coil wound on a National PRD-2 form.
I_1 — 6.3-volt pilot-lamp assembly.
J_1, J_2 — Coaxial-cable jack (Amphenol 75-PC1M).
J_3 — Three-prong cable jack (Jones S-303-AB).
RFC_1 — 1-μh. r.f. choke (National R-33).
RFC_2 — 300-μh. r.f. choke (Millen 34300).
S_1 — S.p.s.t. toggle switch.

frequency by 3200 kc. This image, which falls within the 2-meter band when the converter is tuned to the low edge, can be reduced by 35 to 40 db. through adjustment of the trap.

The plate circuit of the mixer is tuned to 1600 kc. by the trimmer, C_3, and a fixed capacitor, C_{11}, which supplies the additional capacitance required. A low-impedance output link, L_6, terminates at J_2, and a short length of coaxial cable is used between the jack and the receiver.

Circuit details of the low-frequency oscillator are nearly identical to those of the high-frequency oscillator, except that the low-frequency circuit uses only one capacitor, C_6, across the plate coil because the circuit operates at a fixed frequency of 12.7 Mc. Radiation from the oscillator, when the latter was operated with 108 volts applied to the plate of the 6J6, reached the high-frequency mixer and caused numerous spurious responses as the converter was tuned through the band. This condition was eliminated by reducing the oscillator plate voltage (by means of the dropping resistor, R_5) and by placing a copper shield between the two circuits. The reduction in oscillator signal affected the mixer sensitivity and it was necessary to introduce a small amount of capacitive coupling between the oscillator and mixer. A 1½-inch length of 75-ohm Twin-Lead, identi-

fied as C_X on the circuit diagram, provides adequate coupling capacitance.

The 0B2 regulator tube is adjusted (by means of R_8) to pass approximately 12 ma. when the converter is connected to a 300-volt supply. The tube will be badly overloaded if the supply is turned on with the 6J6 tubes removed from their sockets. Otherwise, the tube will operate satisfactorily with a supply output voltage of 250 to 350 volts. The measured output potential of the regulator circuit is 108 volts.

Construction

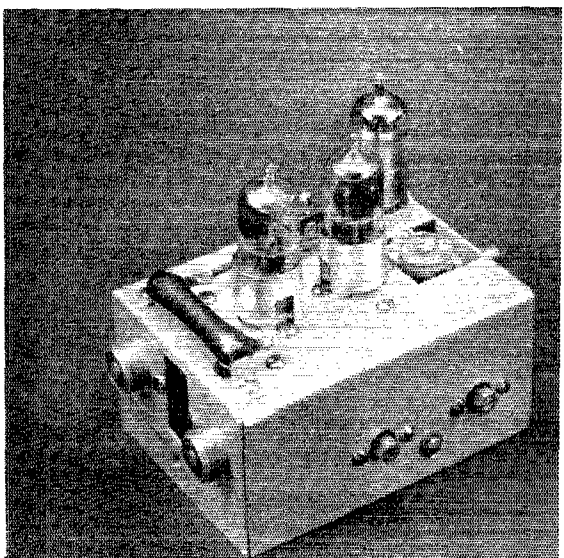
The chassis for the converter measures 1⅞ by 2⅞ by 4 inches and is made from a 6 ⅝ × 7¾-inch sheet of 1/16-inch aluminum stock. A 1⅞-inch square is cut from each corner of the aluminum sheet so that the metal can be bent to form a boxlike chassis. It is recommended that the marking and drilling of mounting holes for parts be done before the chassis is bent into shape. A top view of the converter shows the location of most of the components and the following dimensions are offered for the convenience of those interested in building the unit: The clearance hole for the oscillator band-set condenser (seen at the top of the chassis) is 1 inch square and is centered between the sides of the chassis. The mounting hole for the bandspread condenser is ¼ inch down on the front wall, and a ⅞-inch clearance hole for the regulator-tube socket is centered to the left of the square hole. The high-frequency mixer-oscillator tube is centered on the chassis to the rear of the square hole, and the other r.f. tube is 1¼ inches to the right of the first tube. A mounting hole for the 11.1-Mc. coil is located ¾ inch in from the edge of the chassis directly to the right of the h.f. oscillator tube, and the 12.7-Mc. (second oscillator) coil is ¾ inch in from the rear of the chassis and centered ⅞ inch away from the left edge. The form for L_5 is ⅝ inch from the right edge and ⅞ inch from the rear edge. R_8, J_1, J_2 and J_3 may be seen at the rear of the chassis and the location of these components is not critical. Holes, equipped with rubber grommets, are drilled adjacent to the limiting resistor and the regulator tube to provide feed-through points for the B-plus and heater wiring. A two-terminal lug-strip is located to the rear of the regulator tube for the leads running to the filament switch and the pilot-lamp socket. Trimmer condensers, C_1, C_3 and C_6, are mounted on the side walls of the chassis with their shafts 1⅛ inches from the top of the box. C_1, mounted on the left side, is ¾ inch back from the front wall and C_3 is 1⅜ inches farther toward the rear. C_6 is 1¼ inches from the rear wall on the right side. The mounting hole for the 14.3-Mc. coil is 7/16 inch up from the bottom edge of the chassis and is centered between C_1 and C_3.

The bottom view of the converter shows how the regulator-tube socket is mounted on a small aluminum bracket which is in turn mounted on the side wall of the chassis. An aluminum strip, 1 inch wide, should be bent to form a right angle and the position of the socket mounting hole should be marked after the bracket has been placed inside the chassis against the large clearance hole. Excess material may be cut from the bracket after it has been drilled for the socket. A three-terminal tie-point strip is mounted in a vertical position to the rear of the aluminum bracket, the bottom lug serving as a support point for the grid end of L_2. The coaxial cable and the antenna coupling loop are connected to the remaining two lugs.

A suitable shield for the low-frequency oscillator circuit can be made from a 1½ × 3¾-inch strip of 1/16-inch copper. The strip is bent to form a right angle having sides 1⅞ inches long and covering all of the components located at the top left-hand corner of the chassis. The shield is notched at the bottom corner to allow clearance for the coaxial cable which runs along the left edge of the chassis, and is equipped with a spade lug (the lug is soldered to the copper) for mounting.

The PRE-3 coil form for L_5 should be cut to 1¾ inches before the coil is wound. This and the other forms should then be marked and drilled to accommodate the windings. Terminal holes are drilled straight through the forms and the ends of the windings are passed through these holes. A coat of cement, or some other suitable compound, may be applied to the windings and allowed to dry while other operations are performed.

As shown by the first view of the converter, some work must be done on the metal utility box before it can be used as a cabinet. This modification consists of removing the top and bottom flanges at the right side of the case and then



A top view of the mobile converter, removed from its crackle-finished case.

notching the front and rear flanges to provide clearance for the condenser shaft and the jacks which are mounted on the aluminum chassis. A large slot must be cut in the rear of the case to allow access to the input and output jacks when the unit is assembled, and ¾-inch holes should be cut in the top, bottom, and sides of the box so that the adjustment screws of the trimmer condensers may be reached with an alignment tool. The heater switch and the pilot lamp are mounted as far toward the top of the front panel as possible, and a ¾-inch hole is drilled up from the bottom of the panel for a distance of 1½ inches. This large hole will allow the National AM dial to be positioned correctly with respect to the tuning-condenser shaft after the chassis has been placed inside the cabinet.

The miniature Johnson condenser, C_5, may have a small-diameter control shaft which does not fit a standard dial coupling, in which case a bushing or shim is required. Fortunately, a ¼-inch length of easy-to-work ¼-inch soft-drawn copper tubing can be made to fit the shaft by working the inner surface with a rattail file.

Wiring

Needless to say, the converter is more or less of a *layer-built* job. Its construction is not difficult, however, if the parts are mounted and wired in the following order: First, mount the tube sockets, the three jacks, and the lug strip (the one located on the top of the chassis). Next, complete the heater wiring and mount the grid-leak resistors in place. C_4 can now be soldered across the terminals of C_5 and L_7 can also be mounted on the condenser. This assembly is then mounted on the front wall of the chassis and, in turn, is connected to the tube socket by means of a short length of stiff tinned wire at the plate side and by C_{12} at the grid side. Now, mount the vertically-positioned lug strip on the side wall and connect a short piece of coaxial cable between the top lugs and J_1. C_7 can now be connected between the tube socket and the terminal strip and L_2 (with the small antenna winding slipped inside the cold end of the coil) may be mounted.

Condensers C_1, C_3 and C_6, and coils L_3, L_5 and L_8, are now mounted and wired into their respective circuits and, from here on, the wiring can proceed in any order. The 0.01-μfd. by-pass condensers are mounted in a vertical plane next to C_1 and C_3, respectively, and RFC_1 and R_2 are supported at the B-plus end by Pin 5 of the regulator-tube socket. The small metal post at the center of the rear tube socket is used as the tie-point for the common connection between C_{14}, R_5, RFC_2 and the plate-voltage lead. L_4 is wired to C_2 after the padder condenser has been mounted between the coupling condenser, C_9, and a piece of No. 12 tinned wire which runs down to the stator terminal of C_1.

If the constructor wishes to use noise as a means of making a rough alignment of the converter, it is suggested that the injection-voltage condenser, C_X, and the dropping resistor, R_5, be left out of the circuit at this time. Of course, the plate of the 6J6 must be connected directly to RFC_2 in this case. The converter will have a much higher noise level when wired in this manner and alignment on noise is simplified. Actually, this is a poor method of aligning a double converter and should be used only as a last resort.

Testing

Power requirements for the converter are approximately 300 volts at 50 ma. and 6 volts at 0.9 ampere. The first test consists of plugging the three tubes into the sockets and applying these potentials. In the absence of a voltmeter, it is safe to assume that the mixer and oscillator plate voltages are correct as long as the 0B2 glows when high voltage is turned on. A receiver capable of tuning to 1600 kc. should be coupled to the converter by a short length of coaxial cable and the receiver adjusted for normal operation at this frequency. If a signal generator is to be used, it is connected to the input jack, J_1, and if a generator is not available, the converter should be coupled to a low-impedance antenna system. Remember that C_X and R_5 should both be incorporated in the circuit if the converter is to be aligned with the aid of a test signal.

If preliminary testing is to be done with noise, the converter and the receiver are turned on and the converter output tuning condenser, C_3, ad

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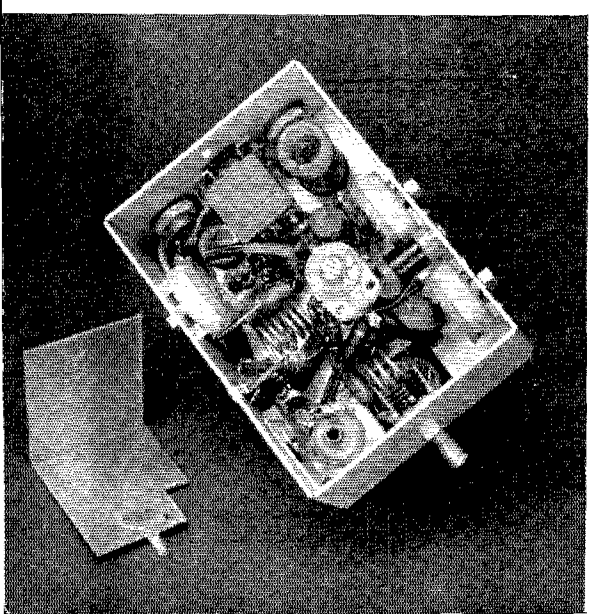


A bottom view of the 144-Mc. converter, showing the small bracket for mounting the regulator-tube socket, located at the lower left-hand corner of the chassis. C_2 is mounted with the adjustment screw facing the observer. The copper shield to the left of the photograph isolates the low-frequency oscillator and prevents "birdies."

An Automatic Keying Monitor

BY IAN O. EBERT,* W3QED

• **Here is a simple little r.f.-actuated keying monitor that can be sandwiched into practically any receiver to give you a constant, accurate check on your fist. The operation is automatic and requires no retuning from band to band.**

It is well recognized that monitoring of one's own keying contributes to readability and, for most amateurs, also increases the ease of operation. Some time ago a need was felt at the author's station for a keying monitor. However, most of the common systems appeared to be too complicated, costly or cumbersome, and served only to indicate that the key was down. With these shortcomings in mind the monitor to be described was developed. This monitor can be adapted to occupy a very small space so that it can be built into almost any receiver. It uses almost no power, and serves as a continuous indicator that the transmitter is actually operating. In a trial of several months' duration, this monitor has proven very satisfactory.

The photographs show a possible construction for use with a BC-348. It is by no means the ultimate in compactness, and suggestions will be given on how the size may be further reduced. It is not necessary to incorporate the monitor into a receiver, although this is the most logical place for it if space is available. Since each application is a unique problem, no effort will be made to describe component layout or chassis construction.

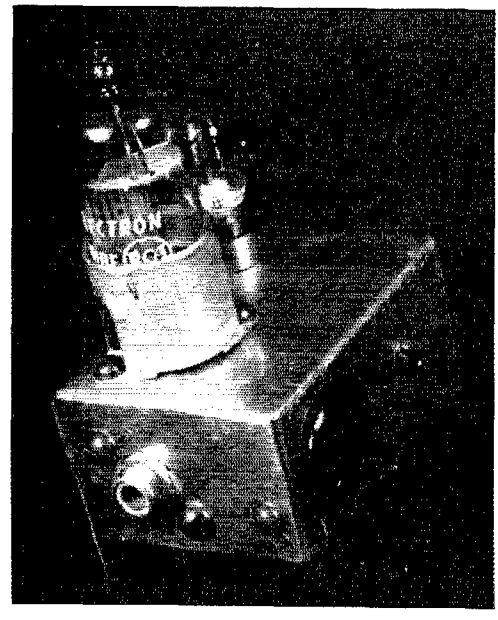
Examination of Fig. 1 will show that the portion of the circuit consisting of the neon lamp, R_3, R_4 and C_2 comprises a relaxation oscillator that is coupled to the receiver audio system through C_3. The triode section of the 6AQ6 tube acts as a "swamper" and permits operation of the relaxation oscillator only when there is a sufficiently-large negative bias on the grid. If a radio-frequency signal is applied to the diode plates, a negative potential is developed across R_1 and appears on the triode grid through R_2. Thus, when the pick-up wire is placed close to the output tank or antenna of a transmitter, the relaxation oscillator will operate under key-down conditions and an audio tone will be heard. When the key is up the tone will not be produced. This is the principle of operation of the monitor.

Typical values are shown for the components in Fig. 1, but these values are not critical. Some of the factors governing the choice of component values will be discussed.

The frequency of the audio tone produced by the monitor is determined by the supply voltage, the resistance R_3 plus R_4, and the condenser C_2. With the values shown and a voltage of 250, a tone near 1000 cycles is produced. To raise the tone, increase the voltage or reduce the resistance or capacitance.

The neon lamp used is the 1/25-watt size and may be either a Type NE-51 or NE-2. The NE-51, which has a miniature single-contact bayonet base and a pilot-lamp size bulb, was used in the monitor shown in the photograph. For more compact construction the NE-2 may be used, as it has a smaller envelope and may be soldered directly into the circuit with the leads provided, eliminating the need for a socket.

When in operation, the voltage swing across the neon lamp is of the order of 20 volts which, when applied to the grid of most audio tubes, is more than sufficient to produce a normal receiving level. The output is therefore taken off only a portion of the load resistance. A trimmer condenser is used for the coupling condenser C_3,



The simple keying monitor can be built so small that it will fit into any receiver. The Jones fitting below the 6AQ6 tube takes the r.f. pick-up line.

* P.O. Box 4703, Anacostia Station, Washington 20, D. C.

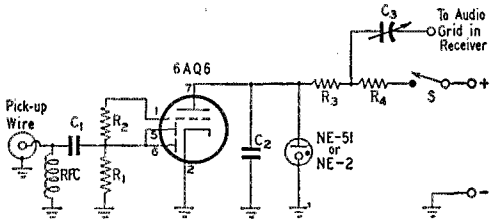


Fig. 1 — Circuit of the automatic keying monitor.

C_1 — 100-$\mu\mu$fd. mica.
C_2 — 0.001-μfd. mica.
C_3 — 150-$\mu\mu$fd. max. trimmer.
R_1 — 1.0 megohm.
R_2 — 56,000 ohms.
R_3, R_4 — 3.3 megohms.
RFC — 2.5-mh. r.f. choke.
S — S.p.s.t. toggle.

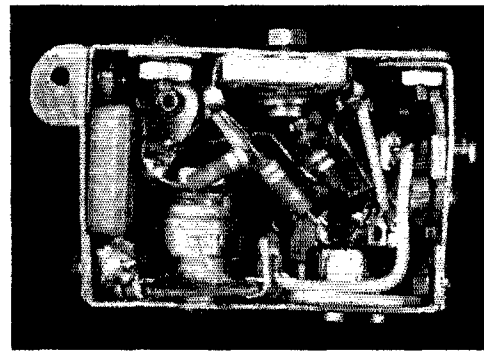
which in turn has some control over the audio level from the monitor. The values shown were satisfactory for headphone reception with a BC-348. The ratio of R_3 to R_4 will probably have to be changed for use with receivers having a different audio system or for operation with a 'speaker. A more compact construction would use a fixed condenser of about 150 $\mu\mu$fd. for C_3 — R_3 and R_4 would then be juggled to give the desired volume level. When changing the resistance ratio the *total* resistance must remain constant or the tone frequency will be changed.

The condenser C_3 is connected directly to the audio grid and not through the audio gain control. This connection permits variation of the audio level of received signals without apparently affecting the level from the monitor.

A 6AQ6 tube was selected because of its small size, low heater current, and comparatively low price. The 150-milliampere heater current required can safely be taken from the 6.3-volt heater circuit of almost any receiver. Other triodes may be substituted for the triode section of this tube. The high-μ type triodes are generally more satisfactory because they require less negative bias for plate-current cut-off.

The value of R_1 has to be a compromise. It should be high so that no appreciable power will be taken from the transmitter in developing the required bias, but on the other hand, it should be kept reasonably low because the triode section acts as an amplifier for audio signals on its grid and becomes more susceptible to hum as the grid-circuit impedance is increased. The purpose of R_2 is to isolate the grid from r.f., and it may be replaced by an r.f. choke if desired.

The condenser C_1 and the r.f. choke serve as a high-pass filter, making the circuit broadly responsive to signals in all amateur bands and relatively insensitive to low-frequency signals such as audio hum. If compact size is an important object, both C_1 and the r.f. choke may be elimi-



An under-chassis view of the monitor, showing how the parts are placed wherever is most convenient. The nut at the top is for adjusting the coupling trimmer condenser.

nated. If this is done, extra care must be taken to insure that the pick-up wire is isolated from all sources of hum.

Any diode may be substituted for the diode sections of the 6AQ6, or one of the readily-available germanium- or silicon-crystal diodes may be used. A suggested circuit utilizing a crystal diode is shown in Fig. 2. This circuit uses a series rectifying circuit, the negative potential being developed across R_1. C_1 is an r.f. by-pass condenser, the remainder of the circuit being identical to the circuit just described.

The sensitivity of these circuits is such that no difficulty should be experienced in using them in conjunction with even very-low-power transmitters. The author has had very satisfactory results using a six-inch pick-up wire about three inches from the tank coil of a 30-watt transmitter. The pick-up wire should be insulated and should not come in contact with the transmitter.

The monitor may be connected to the power supply of any receiver and works satisfactorily on any plate potential above 100 volts. The current

(*Continued on page 29*)

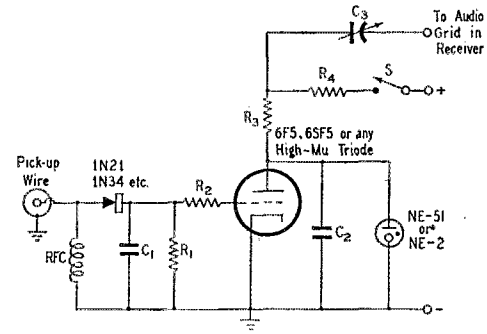


Fig. 2 — An alternative circuit for the keying monitor. C_1 is 470 μfd.; otherwise the values are the same as in Fig. 1.

• Technical Topics —

S.S.S.C. and S.S.S.R.

WHEN we adopted "s.s.s.c." for "single-sideband suppressed-carrier" there was some criticism of the abbreviation on the part of a few old hands in the single-sideband business. It was pointed out that for years the commercials had been getting along well enough with just plain "single sideband" (occasionally cut down to "s.s.b.") so why couldn't we? Everybody understood that "single sideband" implied carrier suppression, so why take the pains to label it?

We like to keep it simple, too, and it would be nice if we could get along with names that, while not strictly accurate, cause no confusion because everybody understands just what is implied. But in this case it seems we're confronted with a situation that calls for more exactness. True, there may be no such thing as amateur carrier-and-single-sideband transmission at the moment. But there definitely is carrier-with-single-sideband *reception:* the "selectable single-sideband reception" that is again the subject of an article by J. L. A. McLaughlin in this issue. The difference is the more marked when the McLaughlin article is compared with the "s.s.s.c." converter described by O. G. Villard, jr., also in this issue.

In both systems single sideband is involved. But in s.s.s.c. reception the carrier must be supplied in the receiver, since none is transmitted. On the other hand, s.s.s.r. takes a conventional carrier-and-double-sideband signal, chops off one sideband, and works on the remaining sideband *plus* carrier. The former is a special kind of receiver for a special kind of transmission; the latter a special kind of receiver for the ordinary kind of transmission. The plain term "single sideband" covers both — but it does not tell you which is under discussion. So it seems that we *do* have to distinguish between single sideband with and without carrier. At the moment, what with Q5-ers and BC-453s, there is far more single-sideband-with-carrier reception than there is s.s.s.c. But even this, without the practically-automatic sideband-selection feature, is not "s.s.s.r."

There is another little problem, too: what to call conventional 'phone transmission, with its carrier and two sidebands. "A.m." does not strike us as being good enough; s.s.s.c. is a.m. too, although not the ordinary kind. We hate the thought of contributing further to the alphabet soup, but something probably will have to be adopted in the interests of avoiding confusion. The best we can think of at the moment is to use the FCC designation, A3, which defines the ordinary system of modulation well enough.

Problems of nomenclature are not really serious; they have a habit of solving themselves after a while. The significant thing is that the mere existence of such "problems" indicates that a lot of new ideas are coming into amateur radio. From what has been published in *QST* in the past several months and what we know is coming up, it is obvious that we are only just beginning to scratch the surface of the possibilities of QRM reduction in 'phone work. It may not be too much of an exaggeration to say that our present-day 'phone methods will be just as obsolete, a few years from now, as spark was a few years after c.w. got its start. "Old-fashioned 'phone" will eventually be something that can be tolerated only where there is plenty of room for it. — *G. G.*

OUR COVER

This month's cover shows an artist's drawing of the design for K2UN, new super amateur station of the United Nations, which is scheduled to be dedicated and formally opened in April.

Keying Monitor

(Continued from page 88)

drain on the plate supply is of the order of fifty *microamperes!* A plate-voltage switch is shown incorporated in the circuit so that the monitor may be turned off when it is desired to use the receiver to check the transmitter frequency or stability.

It should be pointed out that since the monitor circuit is insensitive to frequency variations the steady tone heard on the monitor is no indication that the signal transmitted is even steady enough in frequency to be readable. Other means should be used to check the true condition of the signal as heard by other operators.

This monitor, used in conjunction with a system of clickless break-in such as was described in recent issues of *QST*, will greatly increase the pleasure and accuracy of code operation.

Happenings of the Month

NATIONAL CONVENTION

We have good news! Dig out your calendar and put some big red marks around September 4th, 5th and 6th, Labor Day week-end, for those are the dates of the ARRL National Convention in Milwaukee, first in ten years. Start planning now to attend!

Authorized by the ARRL Board of Directors, the "national" is being staged by and held under the auspices of the famous Milwaukee Radio Amateurs' Club, Inc., oldest amateur club in continuous existence in the country. The scene will be the monumental block-square Milwaukee Auditorium, convenient to everything downtown. For some months numerous committees of skilled and ardent amateurs in MRAC have been quietly at work organizing, making arrangements and blocking out a program, and now it is time to begin to tell about it. Program details of course are not yet worked out but we can give you enough of an outline to show you that it will be the biggest and most interesting and best-attended convention in amateur history. Numerous specialized committees of unpaid Milwaukee amateurs, operating under the general chairmanship of Jack Doyle, W9GPI, are busily licking plans into shape.

The convention begins on Saturday, September 4th, with registration in the morning and a general assembly at 2:30 P.M., at which there will be addresses of welcome by the Governor of Wisconsin and the Mayor of Milwaukee, the Division Director and the MRAC president, responded to by officers of the League and representatives of the armed forces. This affair will probably be unique in amateur conventions in having no formal banquet; Milwaukee too much appreciates good food to believe in the high costs, slow service and poor rations that always accompany a huge banquet. In its stead, Saturday night will be Black Forest Evening at which will be staged one of Milwaukee's famous *Gemütlichkeit* parties, with the things to eat and drink for which Milwaukee is justly famed.

A very special feature of the convention will be a V.H.F. Section which, under the direction of W9TPT, opens at 8:30 P.M. on Saturday and will operate throughout the remainder of the convention with a special program and its own meeting halls. Numerous valuable technical talks are being scheduled for Sunday and Monday forenoons, with facilities for running four lectures simultaneously. There are to be sightseeing tours, including features of technical interest, hidden-transmitter hunts with prizes for the winners, a competition for mobile installations attending the convention, Army and Navy demonstrations, visits to local ham shacks, and special features for the ladies including high tea and a style show. Judging by reports of the activity of a committee on prizes, there is certainly something doing in that direction, too. In 40,000 square feet of floor space in the main hall of the Auditorium, with 192 booths available, there will be a continuously-open exhibit in which manufacturers will display their latest and best products for the ham — everything that you can think of.

One of the main items of the program planned is a general assembly of the convention in the chief hall of the Auditorium on Sunday evening to hear a major address by ARRL President Bailey. Following this will be entertainment which the Milwaukee gang promises will be the biggest floor show in hamdom's history, with both professional and licensed-amateur entertainment, and dancing to a name band. All in all, you can see, the "national" will encompass about everything your heart could desire, everything you would expect at an ARRL national convention.

Joe T. Collins, W9PYM, is chairman for registration and attendance. The registration charge is $7.50 per person, with no extra for children accompanying parents. There are some special inducements for advance registration. Hotel accommodations will be arranged upon request. The Auditorium will maintain a dining room capable of seating a thousand persons, right in the building, where moderately-priced food will be served at all times.

We think there will be at least 4000 hams in Milwaukee come Labor Day, including practically everybody you ever heard of. We know that you'll want to be there and that you'll have the time of your life. Start saving some dough and begin your plans now — let's make it a date for September!

BOARD MEETING

The ARRL Board of Directors will have its annual meeting in West Hartford beginning May 7th. The individual directors desire to hear from the members of their divisions constructive suggestions for the good of the order. Your director's name and address will be found listed in the front of this issue. It is the Board's custom to make as much advance announcement as is possible of the specific proposals that will be pending before it, to aid in obtaining the reaction of members, but

at this early date no notices of proposals have been filed and the annual reports of the officers have not yet been written. The review of the operating assignments for 'phone of course will be a major matter, as extensively reported in our last two issues and on which the poll of advisory amateur opinion has been conducted. Announcement will be made in our next issue of any other known items of Board business.

POSTAL DELAYS

At Hq. we're getting all sorts of squawks from the fellows about delays in the delivery of *QST*, particularly in comparison with chaps in the next city or the next state. Sometimes these complaints come from a member who has only himself to blame because he delayed his renewal and his copy of *QST* is lagging behind the regular mailing. But there are many weird happenings; such as all of the copies for a state or a city coming along a week or more behind their neighbors, or the same individual experiencing such a delay several months in a row. There have been enough of these cases to cause us to examine our methods carefully and this is our report to you:

Although we're not perfect, in none of the reported cases have we found ourselves at fault. *QST* is mailed quite methodically, the same way every month. It takes several days for the whole issue of *QST* to go through the bindery, generally three days, beginning about the 20th of the month preceding the date of issue and generally so arranged as to not involve the break of a week-end. We mail the copies for the West Coast from the first production, progressing east across the country and ending with New England. There is never more than three days between the mailing of the first and last copies of an edition, and the great bulk of them go out in two consecutive days. Mailing is done in postal sacks, according to postal regulations, and all the copies for a given area *go out simultaneously.*

Thereafter the matter is in the laps of the gods. The postal system of the country is very sadly overloaded and is creaking in every wheel as a result. Strange things happen. When post offices are behind in the delivery of letter mail they frequently let magazine mail pile up. Mail cars terminate at major cities and the contents must be broken down and redistributed, frequently with delay and often with more delay on some of the contents than on others. There is nothing whatever that ARRL can do to control these abnormalities and accidents. We can assure you that we are doing our part faithfully and methodically and without any of the crazy scheduling that you would expect from the way magazine mail sometimes gets delivered. There is nothing for us to do but grin and bear it until the postal service becomes better able to cope with its task with a less jerky style of transmission. We hope for early improvement but if your *QST* is delayed, may we beg you to be patient in the confidence that your organization is not at fault and that it will probably show up in a few days more?

ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

CODES & CIPHERS PROHIBITED

International regulations specify that communications between amateur stations, internationally, must be carried on in plain language. Recognizing this principle in a somewhat different approach, FCC has added to our regulations, effective March 8th, a new section prohibiting transmission between amateur stations, either internationally or domestically, in codes or ciphers. The Commission clearly indicates its intention that this shall not interfere with the use of such things as recognized net signals and ham abbreviations "or any other abbreviations or signals where the intent is not to obscure the meaning but only to facilitate communications." The text:

§12.105 Codes and ciphers prohibited. — The transmission by radio of messages in codes or ciphers in domestic and international communications to or between amateur stations is prohibited. All communications regardless of type of emission employed shall be in plain language except that generally recognized abbreviations established by regulation or custom and usage are permissible as are any other abbreviations or signals where the intent is not to obscure the meaning but only to facilitate communications.

VIOLATION NOTICES

In the past, the unhappy recipients of "notices" from the FCC that they have violated some provision of the amateur rules have had the task of sending their replies of explanation to the FCC at Washington, with a copy to the office originating the notice. That procedure is now simplified by an action of the Commission, effective February 12th, so that the reply goes right back to the office from which the notice was received; no copies elsewhere are required. (It is still a good idea to keep a copy for your own files, though!) The change is accomplished by an amendment of the first sentence of §12.155 of the amateur rules, so that it now reads:

§12.155 *Answers to notices of violations.* Any licensee receiving official notice of a violation of the terms of the Communications Act of 1934, as amended, any legislative act, Executive order, treaty to which the United States is a party, or the rules and regulations of the Federal Communications Commission, shall, within 3 days from such receipt, send a written answer direct to the office of the Commission originating the official notice.

7-MC. 'PHONE

From comments added to postcards returned in the current poll of amateur opinion about 'phone-c.w. divisions of our major bands, we gather there is widespread misconception about what League policy toward 'phone in the 7-Mc. band was before the war. A typical remark is, "Why are you asking us again about 40-meter 'phone? We decided this conclusively before Pearl Harbor."

Sorry, but we didn't, OMs. Actually, there were two developments in this matter during that period; they took place several years apart, were entirely separate and distinct, and didn't decide the 40-meter 'phone question. Let us explain briefly.

First, the 1939 poll: At the time of the Board meeting in 1939, the Cairo allocation table had not yet come into effect but the directors were concerned over the possible effects on amateurs if and when broadcasting stations opened up in the European assignment of 7200–7300, which was to become effective in September of that year. It seemed to the Board that *if* interference from foreign broadcasters became so intense that c.w. stations could not work through it, a desirable course *might* be to open that portion of the band to 'phone, solely to protect amateur communications. The language of the poll itself reflects all this: "Should A-3 emission be authorized in the 7200–7300 kc. range, if authority can be obtained, for the purpose only of protecting the regularity of amateur communication in the presence of broadcast interference?"

The answer to this poll was overwhelmingly "yes." But observe that it was not a simple question of 40-meter 'phone, yes or no, but was predicated solely on the possibility of what might happen. Actually, the situation the Board feared did not arise. By mail vote, after the poll results were given it, the Board decided the situation did not warrant action, and decided to take none. At the subsequent Board meeting in 1940, the Board still saw no reason for taking action; the condition they had feared had not developed, so the proposed possible remedy was not invoked. The matter was dropped.

The second development was in 1941. As part of a plan under which, in that year, the military were to take over the portion 3650–3950 kc. of our 80-meter band for training purposes, it was arranged to provide temporary accommodation for 'phone in *50 kc.* of the 7-Mc. band for the stations displaced on "80." In the words of the Commission at that time, ". . . This is made necessary purely by a situation arising out of the national emergency and does not necessarily represent a continuing or permanent situation." Although the League worked out with FCC and the military the program under which the frequencies were to be loaned and adjustments made in our other bands, the establishment of 'phone on 40 did not thus become part of the ARRL's philosophy as a peacetime arrangement. Actually, the plan just mentioned was never put into effect — the war hit us before it could be put into operation, and all amateur radio was closed down as of December 7th of that year. That washed out the plan.

The question of 40-meter 'phone now, so far as League policy is concerned, will be settled by the men you fellows have elected to the Board of Directors. The current poll of amateur opinion is for the purpose of determining how you feel about the matter.

A.F.C.A. SEEKS AMATEURS

The Armed Forces Communications Association will hold its second annual convention at Wright Field, Dayton, Ohio, May 10th and 11th. The Air Force will exhibit and demonstrate the very latest developments in communications, especially radio. The show at Wright Field will be open only to members of the association, an organization formed to assist the Army, Navy and Air Force in their military planning for better communications. Amateurs interested in joining may obtain further information from and make applications to the national headquarters at 1624 Eye Street, N.W., Washington, D. C.

INTERNATIONAL TRAFFIC HANDLING

While amateurs licensed by the United States may handle, within the United States, messages of any type, either on behalf of themselves or on behalf of third parties, provided that compensation does not enter (and with profanity and obscenity of course prohibited), that is not generally true as concerns messages to or from other countries. Some amateurs have been "called" for a violation of regulations. Let us examine what the situation seems to be, strictly as concerns messages between different countries.

This subject has long been treated in the international radio regulations, binding upon all U. S. licensees. Although the Cairo language is effective until the end of this year, slight changes in wording were made at Atlantic City and so it is that language — to endure for five years — that we should examine. It provides that when amateur stations of different countries are in contact, the transmissions "must be made in plain language and must be limited to remarks of a technical nature relating to tests and to remarks of a personal character for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. It is absolutely forbidden for amateur stations to be used for transmitting international communications on behalf of third parties."

In most foreign countries the communications system is a government monopoly. In the inter-

(Continued on page 116)

A Balanced-Modulator N.F.M. Exciter

BY PAUL D. ROCKWELL,* WIPDP, EX-W4AUE, EX-CE3EC

• **Here is a type of f.m. modulator unit in which special care has been taken to preserve the audio quality. It also includes a means for checking one's deviation, an item of interest to every n.f.m. user.**

NEITHER the general increase in average power in amateur transmitters nor the large numbers of a.c.-d.c. broadcast receivers now in use has done much to help the old crowded-area amateur bugaboo, BCI. The buyer of a cheap receiver (or an inferior not-so-cheap one) doesn't realize that his receiver is at fault, and he naturally resents any interference to his reception. More often than not this resentment is accompanied by tangible manifestations such as name-calling, damage to property, threats of lawsuits and, in rare cases, assault and battery. In turn the amateur is forced to adopt such defenses as quiet hours, wavetraps, line filters, shielding and perhaps a new antenna, all at his own expense. Many retreat to higher and higher frequencies, but even on 28 Mc. they are eventually discovered and molested by inopportune telephone calls, door rapping, radiator pounding, and the like. It's no fun for the amateur.

Narrow-band f.m. has been a godsend to the ham troubled by BCI. Many stations use reactance modulators to swing a VFO, while others are using various types of phase modulators. The phase-modulation systems have the advantage of working with crystal control *or* VFOs, and are less likely to introduce a shift of average carrier frequency with modulation. Several novel features are incorporated in the new unit developed by Temco, and it was thought that they might be of interest to the many users of n.f.m. techniques.

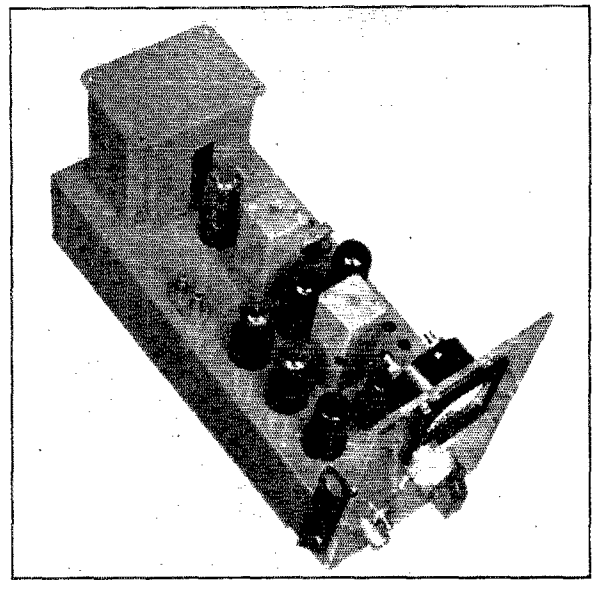
* 308 Westfield Ave., Bridgeport 6, Conn.

♦

The Circuit

The wiring diagram of the unit is shown in Fig. 1. A 6AC7 is used in a grid-screen Pierce-oscillator circuit, and the plate-circuit values permit tuning over the range 3.3 to 4 Mc. Provision for VFO input is included. The plate tank is center-tapped, so that the excitation to the 6SA7 grids would normally be 180° out of phase. But the plates of the two 6SA7 tubes are in parallel, and there would be no output on the excitation frequency if the grid drive were 180° out of phase. To correct this, the excitation to one grid is fed through a 10,000-ohm series resistor which, in conjunction with the 6SA7 input capacitance, causes a lag in voltage to that grid. The excitation to the other grid is fed through small (10 $\mu\mu$fd.) series condensers and a low shunting resistance (15,000 ohms), to give a net advance in phase of the voltage on the grid. There is attenuation in both circuits, and it is proportioned to give practically equal drive at the grids of the 6SA7s, with a phase difference of approximately 120°. Since the grid voltages are not exactly out of phase, a resultant appears in the plate circuit, and this represents the normal unmodulated output. The effect is illustrated in Fig. 2.

Push-pull audio from a phase-inverter stage in the audio section is applied to the No. 3 grids of



A top view of the n.f.m. exciter unit. The Plexiglas panel was for display purposes only.

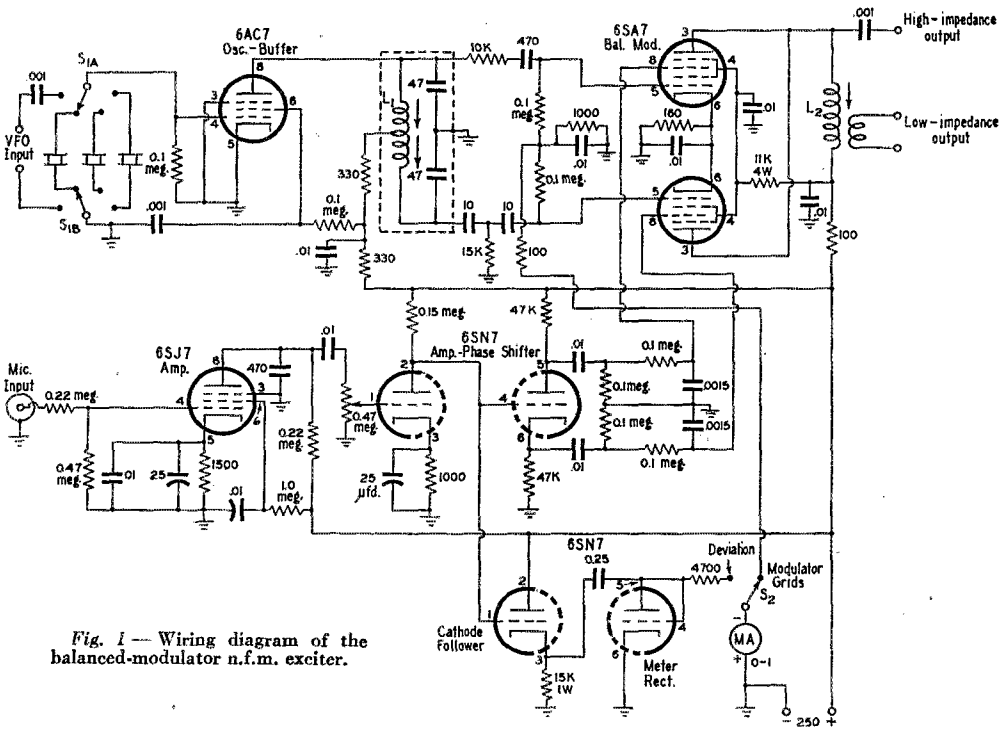


Fig. 1 — Wiring diagram of the balanced-modulator n.f.m. exciter.

the 6SA7 balanced modulators. Thus when an audio signal is going positive on the No. 3 grid of one 6SA7 (and thus increasing the conductance of that tube), it will be going negative on the other. The r.f. output of the tube receiving the positive audio signal will be predominant and the resultant phase of the r.f. will be shifted. Just how close the resultant output approaches the output vector of the 6SA7 receiving the positive audio signal depends upon the magnitude of the audio signal.

In the audio circuit, a 6SJ7 is used for the first stage of audio amplification, with a resistance-capacitance network in the input to reduce any r.f. picked up in the microphone leads. A 6SL7, with the two triode units in cascade, was first tried but it was found to be unsatisfactory, tending to oscillate at supersonic frequencies unless the gain was reduced. When the oscillations were eliminated by using two 6SL7s in split functions, the distortion was quite noticeable compared with the final arrangement. Lastly, the 6SL7 is a glass-envelope tube and is not too suitable for low-level work in which exposure to hum and other fields through the glass envelope can be troublesome. Accordingly, a 6SJ7 followed by one section of a 6SN7 was selected as the final arrangement. The gain control is placed after the 6SJ7 stage, to reduce the possibility of noise with adjustment of volume.

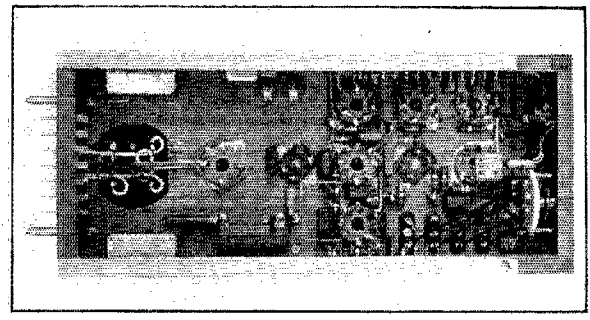
The other half of the 6SN7 is used as a phase-inverter stage to give the necessary push-pull output for the modulator. However, this output is fed through a 0.1-megohm series resistor and a 0.0015-μfd. shunt condenser, to give an attenuation approaching 6 db. per octave in the middle voice-frequency range, so that the inherent phase-modulation characteristic of the modulator will be converted to that of f.m. In other words, this filter changes the transmitter output to an essentially frequency-modulation characteristic, in which deviation is proportional to audio amplitude at any frequency, rather than allowing the deviation to increase with audio frequency as would otherwise be the case (with any true phase modulator).

It will be seen that no coupling condenser is used between the first 6SN7 half and the phase-inverter section. This is possible because the static plate voltage on the first half is about 60 and the drop across the 47,000-ohm plate and cathode resistors is about 70 volts. Hence a bias of about 10 volts is placed on the phase-inverter grid.

In the modulation-metering circuit, a cathode-follower stage taps on the audio channel — the follower stage doesn't load the circuit it is connected to — and the output of the follower drives a diode-connected 6SN7 half for the meter rectifier.

Adjustment

Tuning of both r.f. coils is of the permeability type, each coil having two slugs. The assembly is arranged so that the lower slug can be tuned through a hole in the upper slug, permitting all tuning adjustments to be made without turning over the chassis. A special tuning rod is provided having a small cross-pin at one end (for upper-slug tuning) and a screwdriver taper (for a slot in lower slug) at the other end. The oscillator coil is tuned for maximum current (0.3 to 0.7 ma., depending upon the activity of the crystal) with the meter switch set to "modulator grids." Usually the upper slug alone will provide sufficient range of adjustment. When several crystals are used, a compromise adjustment must be used, but this is not difficult because the tuning is quite broad, as a result of damping from the phase-shift networks. Once the oscillator coil is tuned, the switch may be thrown to "deviation" and left there. Control by additional crystals or a VFO may be had by moving the crystal selector switch.



A view under the chassis shows the crystal switching and the neat arrangement of parts.

Whatever type transmitter is excited by the n.f.m. unit, it must be free from parasitics. The old-time telephone term of "singing" applied to oscillations takes a clear meaning when parasitics are present in the multipliers or power amplifier, as all sorts of singing and frying noises are likely to come through with voice modulation. Such parasitics, incidentally, are frequently responsible for those puzzling cases of carrier hum or ripple which do not respond to additional power-supply filtering. One good test is to reduce fixed bias on the various multipliers until they dissipate rated wattage without excitation. If under these conditions a change of tuning or touching various parts of the circuit with a screwdriver produces a change in plate current, parasitics are present. Neon bulbs and wavemeters will tell the rest of the story.

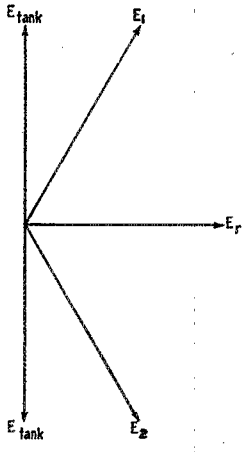


Fig. 2 — A vector diagram of the voltages on the r.f. grids of the balanced-modulator tubes, showing how resultant output is obtained. Under modulation, E_1 increases and E_2 decreases (or vice versa), resulting in a phase shift of E_r, the resultant appearing in the plate circuit.

Deviation-Meter Calibration

The deviation meter was calibrated by using a 30-Mc. f.m. receiver with a calibrated discriminator. The receiver i.f. was 4.4 Mc., and a cascade limiter was used. The discriminator is calibrated first in terms of d.c. volts developed per kilocycle of deviation, by measuring the d.c. voltage developed across the discriminator load resistor. Then a sine-wave audio signal is applied to the unit under test, and the measured deviation as indicated by the peak a.c. voltage developed at the discriminator is plotted against the readings of the "deviation" meter for various input levels. A practical peak-reading a.c. voltmeter might be simply a high-impedance (relative to the discriminator load) diode rectifier circuit used in conjunction with a Volt-Ohmyst — in our case the r.m.s. readings of a Hewlett-Packard 400A v.t.v.m. were converted to peak values.

A meter in the first-limiter grid return assures that sufficient input is present to saturate the cascade limiter. Accuracy of calibration can easily be made twenty per cent by this method; but actually the absolute deviation is not so important as maintaining the deviation at a level found to be most suitable for receiving-end conditions. The deviation meter will rest at a division or two above zero in operation with no speech input because of contact-potential in the rectifier, but this is not important since it is rarely, if ever, desirable to operate at less than ½-kc. deviation. A 3.3-ohm resistor in series with the cathode-follower/meter-rectifier 6SN7 heater holds the residual reading to a reasonable value. Some judgment is necessary in the use of the meter, since it is calibrated with constant sine-wave input. On complex waves such as voice, it is likely to read less than peak deviation. However, a good idea of what is going on at voice frequen-

(Continued on page 120)

Self-Filtered Peak Clipping

An Improved Circuit for Preventing Negative-Peak Splatter

BY HOWARD W. JOHNSON,* W7NU

• **The negative-peak clipper has many advantages in 'phone work. The advantages are reviewed in this article, and an improved circuit is presented.**

MUCH has been said and written about splatter suppression and wide sidebands. Much has also been said and written about the weather. Spinning the dial over one of the amateur 'phone bands sometimes makes one wonder if anyone ever does anything about either!

It may come as a surprise to some amateurs that the weather and broad signals do not necessarily fall in the same category. Although it is generally conceded that the weather holds the upper hand as far as any control by mankind is concerned, broad signals can be controlled very nicely without too much effort.

Let's forget transmitters for the moment and discuss receivers. I wonder how many fellows realize

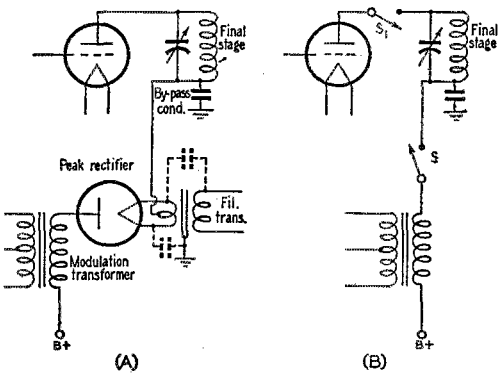


Fig. 1 — **The usual type of high-level negative-peak clipper is shown at A. On negative peaks, the peak rectifier does not conduct, and the circuit is opened as though by *S* in B. With no plate voltage, the output tube is disconnected from the circuit, as though by S_1. The net effect is that the final tank circuit is hit by a negative square wave, and damped waves are generated as in a spark transmitter.**

that no commercial or military service requires a receiver of such exacting performance as an amateur does. It is doubtful if the crystal filter would ever have been developed to the degree it has been if it weren't for the demand by the amateur fraternity for sharper and sharper receivers. For what? — to listen to Joe Grobenschneider with his high-fidelity kilowatt? Commercial and military stations work on assigned channels, and it is common practice in military receivers to load and overcouple the i.f. stages to broaden the response. The communication system with which the author is associated has about three hundred Super-Pro receivers in constant 24-hour service, and to my knowledge no crystal filter has ever been used on a circuit.

Why does the amateur demand narrower and narrower bandwidth in the receiver? Surely it is not so that he can enjoy the beautiful burping sidebands of W-MUT. Perhaps he is starting at the wrong end to correct a bad condition.

Are you lucky enough to own a Super-Pro or some other fine communications receiver? If it happens to be a Pro, why do you pinch the bandwidth control down to three kilocycles? Don't say it's because you want to gather in all of the bell-like tones (plus the tommy-gun negative peaks) of W-SAP with his 200-watt carrier modulated by a pair of 810s!

The receiver manufacturers have done an excellent job and the present-day receiver is about as selective as the state of the art permits,[1] but unfortunately full exploitation of the amateur-band capabilities requires sharp transmitters as well as sharp receivers.

Sharp Transmitter Signals

One excellent way to help control bandwidth is to use a compression amplifier, but if you want to enjoy the maximum modulation capabilities of your transmitter, compression alone is not enough. First, the compression amplifier is not a positive guard against splatter. If the compression ratio is six to one, it means that a 6-db. increase in input signal will produce a 1-db. increase in output signal. Even this ratio is not assured at all times, because proper operation requires that the compression bias have a time constant that is somewhat slower than the syllabic rate of speech. This means that each word spoken after any appreciable pause starts with the amplifier at the full-gain condition, and this can generate some very annoying splatter.

Clipping is the only method that allows full modulation of the carrier at all times without

* 5201 Beach Drive, Seattle 6, Washington.

[1] This isn't strictly true. Present receivers are *not* as selective as the state of the art permits, but manufacturers don't make them that sharp, in some cases, because the demand is for fidelity, not selectivity. — *Ed.*

negative-peak splatter. Only high-level clipping will be discussed, because it is the *only* method of clipping that is a sure preventative of negative-peak splatter. No maladjustment is possible because the operation is entirely automatic.

Any increase in gain after the low-level clipper, or any decrease in input to the modulated stage, can result in overmodulation. Most low-level clippers limit both the positive and negative peaks, but since the negative peak is the only troublemaker, some extension of the positive peaks is desirable, provided the modulator is capable of supplying the necessary undistorted power.

Fig. 1-A shows the typical high-level clipper. To understand its operation consider first what causes negative-peak splatter. Under normal modulation conditions, the final tube may be considered as a stable generator and the plate tank circuit and antenna as a resonant load. At all modulation percentages below 100, the final tube as the stable generator retains control of the tank circuit and the resulting signal is sharp. When overmodulation occurs, and the plate voltage drops to zero or goes negative, the final tube loses control of the tank and load circuits, just as though it were disconnected by switch S_1 in Fig. 1-B. At this instant we have, for all practical purposes, an old-fashioned spark transmitter consisting of an antenna, a tank circuit, and a voltage source (which in this case is the modulator). The voltage applied to the tank circuit during these periods produces damped waves, the duration of which will be proportional to the circuit Q. The spectrum occupied by these waves will be determined by the L and C of the circuit.

In operation, the clipper tube behaves the same as the final tube when the plate voltage reaches zero. It is represented by switch S in Fig. 1-B. Thus, for all practical purposes, the tank and antenna circuits are completely disconnected from the rest of the transmitter during negative overmodulation peaks.

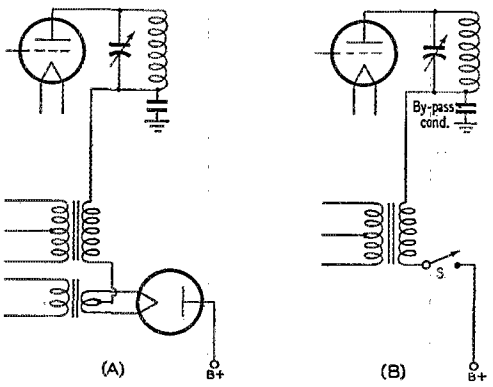


Fig. 2 — **The new type of high-level negative-peak clipper moves the clipper tube to the other side of the modulation-transformer secondary, as shown at A. This has the action of a switch at S in B. In combination with the clipper-tube filament transformer, the inductance of the modulation-transformer secondary and the plate by-pass condenser, a low-pass filter is formed, and no sharp negative square waves reach the modulated stage. (See Fig. 3.)**

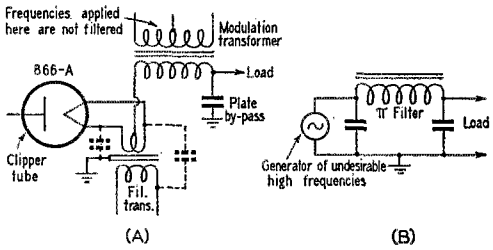


Fig. 3 — **The circuit of Fig. 2-A redrawn to show the filter action. The equivalent diagram is shown in B.**

High-level negative-peak clipping has the following disadvantages:

1) Because of the square-wave trigger characteristics of the rectifier tube (especially the mercury-vapor type[2]) high frequencies are generated which produce broad sidebands, unless the clipper is followed by a low-pass filter.

2) The filament transformer for the clipper tube must be capable of withstanding the peak modulation voltage without insulation breakdown to core or primary.

3) Capacitance of the filament-transformer secondary across the audio results in excessive by-passing.

Improved High-Level Clipping

These three disadvantages were overcome by connecting the clipper tube as in Fig. 2-A. The effect is as shown in Fig. 2-B. Switch S will still disable the modulator, as in Fig. 1-B, but with the following advantages:

1) The capacitance of the filament transformer is no longer a part of the plate by-pass circuit.

2) The voltage insulation of the filament transformer needs only to withstand the plate voltage.

3) Since the clipper tube is the generator of the undesirable high frequencies, the combination of the filament-transformer secondary capacitance, the inductance of the modulation-transformer secondary, and the final plate by-pass condenser forms a low-pass filter (Fig. 3-A).

This combination forms a constant-K π-section low-pass filter, as in Fig. 3-B. The cut-off frequency of this filter is unimportant, so long as it is below the highest speech frequency it is desired to pass, because it attenuates only the high-order frequencies produced by the clipper tube. Similarly, the insertion loss because of the impedance

(*Continued on page 120*)

[2] Use of a high-vacuum high-voltage rectifier such as the 836 will eliminate many of the difficulties associated with mercury-vapor types. See W. W. Smith, H & K, page 59, Feb. 1948 *QST*.

United States Naval Reserve

After the January sleet storm broke down all normal communication with the city of Camden, Arkansas, Naval Reserve radio stations provided that point with contact with the outside world.

The NR radio, N8ABL, Camden, under charge of Lt. (jg) H. S. Steele, jr., got on the air using emergency power and stayed on until Western Union and the local telephone company recovered enough wires (44 hours later) to declare the emergency terminated.

Naval Reserve Radio Station N8NAA, at Little Rock, Arkansas, manned by CRM Franklin Burt, USNR, W5EGX, rendered invaluable service, relaying traffic from Little Rock and Hot Springs through NDF/W5USN at New Orleans.

Several hundred messages were handled for Southern Bell Telephone, Arkansas Light & Power Co., *Camden News*, Western Union, REA, Red Cross, U. S. Weather Bureau, *Arkansas Gazette*, and others.

A partial list of the amateur Reservists operating these stations includes W5s EGX, LRA, NSW and GRG.

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Naval Reserve Battalion 3-18, composed exclusively of electronics and communications personnel, meets Tuesdays and Thursdays at 7:30 P.M., Building 558, New York Naval Shipyard, Brooklyn, N. Y. All amateurs and friends are invited to visit the radio shack by dropping a line or QSL card requesting a pass to Lieutenant A. Stangel, USNR, W2JZH. The commanding officer of this battalion is Cmdr. T. H. Neely, USNR, of Bell Telephone Toll System's development division.

The following Naval Reserve amateur calls have been issued since the list appearing on this page last month:

K1NRN	Newport, R. I.	K4NRU	Northington, Ala.
K1NRO	Manchester, N. H.	K4NRX	Nashville, Tenn.
K4NAJ	Daytona Beach, Fla.	K5NAF	Pawhuska, Okla.
		KØNAH	St. Cloud, Minn.

—•••—

W4OI, Cmdr. McCoy, USNR, on active duty as Reserve communications officer of the Eighth Naval District, recently surrendered his well-known call after twenty years and was issued W5OM by the FCC. Nice going, *OM*!

—•••—

Eighth Naval District Reserve amateurs have mailed out over 20,000 QSLs in the past 18 months, necessitating a reprinting in some instances.

—•••—

Individual Naval Reservists who qualify for the station certificate announced in January 1948 *QST* are now eligible to receive a crystal and some instructional material. District Reserve communications officers can supply more detailed information.

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ARRL Atlantic Division Director Martin, W3QV, Atlantic Division Alternate Director Wickenhiser, W3KWA, and Dakota Division Director Dosland, WØTSN, are all active as officers in Naval Reserve activities.

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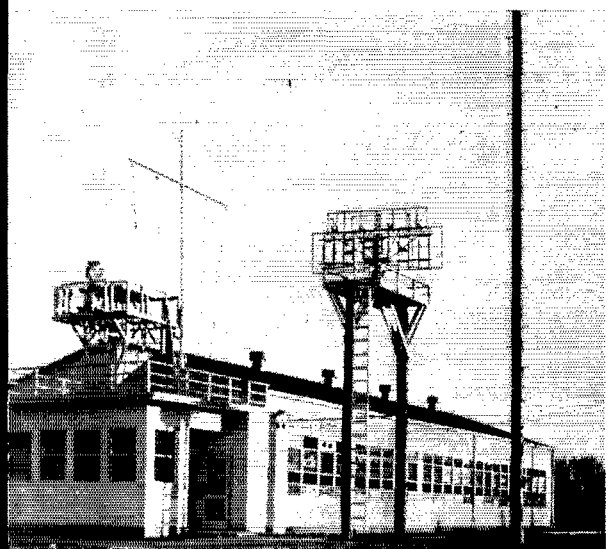
Naval Reserve amateurs are invited to send items suitable for this page *via official channels* to Cmdr. D. S. Wicks, USN, Room 3062, Arlington Annex, Navy Dept., Washington, D. C.



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A section of the Naval Reserve Training Center at Wichita Falls, Texas, showing the radio- and radar-antenna installations. Eight separate antennas are strung aloft via stepped poles. This shipshape station will receive its amateur radio call in the near future.

♦

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD/1

How:

Unpack those bags under your eyes — it's all over! And the only guy who didn't enjoy the Contest in these parts was W1ODY. He's the bird that has to check the incoming logs and every time he heard someone raise something he QRTd and sulked. Man, those c.w. periods sounded not unlike an atomic bomb wheezing through a whistle factory. And the 'phone weekends! Jeeves declares they reminded him of an old argument between his Aunt Harriet and a tobacco auctioneer.

Be that as it may, we have been urged to comment on a particular species of the DX Hog ilk this month. He's the type that, after he messes up a few of your QSOs, guffaws loudly and says, "Nertz, you take your DX too darn seriously." This looks like a spot for a simple analogy.

Suppose one has invested in a few hundred bucks of Izaak Walton gear, and has emerged from the sack in a chilly dawn just to esconce oneself hipdeep in the waters of the Little Muddy near where she rounds Rufus Ridge. And then, just as a silvery four-pounder hits the line, a couple of yeggs show up to poke you with poles, throw rocks in the water, snarl your line and finally swipe your fish.

Should you be inclined to laugh uproariously at this great fun?

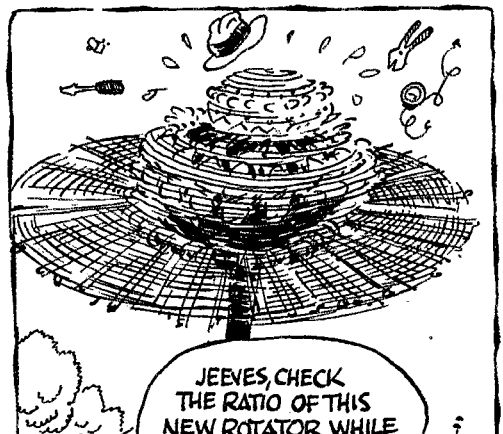
Any shmo who doesn't take his DX seriously enough to treat his competition on the square ought to . . . well, he just ought to.

And so to DX. . . .

What:

Eighty. This "Old Faithful" of our spectrum family was certainly given an enthusiastic workout during the first Contest week-end. W4BRB still appears to lead the 3.5-Mc. marathon at 35 countries this season. Gene's latest: **YU7KX** (3535), **GW8CT** (3540), **GW3AZQ** (3558), **GM5AHQ** (3520) and **KS4AI** (3675). J3AAD is in the heard column — here's a chance for WAC. No WACs have yet been reported postwar on eighty . . . . . A little tougher from W9AND's QTH, but Wes managed G2JT, G6RB, FA8BG, ZL1HM, ZL1DI, ZL4GM and heard UAØKAA. He hears that W7KVU scared up UAØKAA for Asia and now only needs Africa and South America . . . . . Ev of KP4KD sandwiched an FA8, PAØDC and G6CJ in between W skirmishes . . . . . Thirty-five watts at W2AOR beeped through to G5LI, G6ZO and a few more . . . . . W1GKM is scratching his dome about **D4OH** (3624) . . . . . W1HV counted up 34 contacts with 21 different Europeans and FA8 . . . . . A report from G8JT via W1QMI comments upon working W7KVU. The latter was running just 3.8 watts! . . . . . A call from HB9EU woke W4KVM up to the fact that there was DX on the band. So Jim scampered away with many Gs, ON4HC, ON4IE, PAØLB, HB9DD, HB9GQ and ZL1CI . . . . . Jack Brollier (no call) is informed that G8VB now has 29 states on 75 and has heard **PY7EC** (3660f) . . . . . W4KFC is still keeping an eye on 80. Vic reports that W2QHH, W4SU, W4RQR and he have all amassed a country total of around 30 . . . . . The 807 at W1GKU came up with ZS6DW, OZ9Q and DA7AA . . . . . Across the border, VE3AWE joined the fun with an FA8, F3MS, G3AJO and XE1A . . . . . PY4SP notifies us that he hears Ws very well around sun-up on 75 but nobody takes his bait . . . . . A lone West Coast report from W6UTU mentions **ZL1IB** (3506), **ZL1DI** (3510) and **ZL1HM** (3518) being worked . . . . . A neat report from W2EQS lists over a dozen Britishers and **LA7Y** (3596), **SM7YC** (3570), **F9KH** (3525), **OK3SP** (3519) and **ZL4GA** (3500) . . . . . W2QHH garnered KP6AA and GC2AAO.

Forty: With 14 Mc. throwing nightly conniptions, 7 Mc. has really turned into a rip-snorting



* DX Editor, *QST*.

DX band. KP4KD rolled up over 30 countries during January ._._._ W1GKU got three nifties in EK1AA, MD5KW and EA1IR. He'd like to know how to get pasteboards to the latter and also to OE1AX ._._._ Seventy-five watts at VE3AWE knocked loose XE1A, CM2SW (note that, Jeeves), VO6EP and KH6IJ ._._._ Crawling forth from the sack at ungodly hours, W1IIN is making out cards for **VK2ARE** (7050), **VK3FC** (7040), **VK3BC** (7060), **VK2AHB** (7050), **KV4AA** (7001) and **VR5R** (7025) ._._._ **MB9AA** (7033), **EA3OO** (7032), **VO3Z** (7021), **PY7WI** (7040) and **UB5BG** (7049) provided an interesting interlude for W2EQS ._._._ W2VJM got initiated into the DX fraternity by pestering PY2CK ._._._ W1QVF unwound an r.f. choke, flung it out the window over a tree, and conversed with OK2MA, OK1LM, G2WC and others across the pond, with 50 watts. "Nothing to it!" ._._._ Down where the

First Italian postwar DXCC member, IIIR, of Milan, runs a maximum of 50 watts input to the two-stage rig shown at right, c.w. only. Receiver is a converted 8-tube superhet. Antennae: long-wire on 7 Mc. and vertical ground-plane job on 14 Mc. Bob writes up DX for *Il Radiogiornale* when not grabbing new countries or keeping the W gang happy.

balmy breezes blow, W4LXA latched onto GM5IR, SM3EP, VK5JE, HK5CR, CN8MZ and VK7AL. Mike wants to know how can a guy complete a WAS with all this tempting DX around? ._._._ Don at W2GP soft-soaped people such as KS4AF, UB5KBI, GI5HU, LA6U, OE7AH, PY7WI, ZS2A, SM7JM and a jugful of Gs and Fs ._._._ It's not too easy from his spot, but W5HBH's 809 rapped out HB9EI, ON4JW, KG6CP, ZL3FP, ZL2MM, PY1CH, PY2AFS, PY4IE, PY5DZ and many Gs, Fs, KH6s and KL7s ._._._ W2KIR hung around for D4ABC, D4AAF, UA3BD/UP2, UR2KAA, UA3KAA, UA6LA, SM5BX, SM4XM and a ship signing SKZA. And this with a final tube costing 38 cents! [Now if you only hadn't gone and robbed my piggy bank, boss. — *Jeeves*] ._._._ Over 30 countries have succumbed to the shouts of W2GVP. Among them, EA3ZT, D4AZR, KS4AI, VE8OW, ZS1M, UA3BD/UC2, SM5DZ, PY2AJT, GD3UB, ZD3B, LA7Y, KP6AB and OK1JR ._._._ W1IKE tripped over HR1AT ._._._ Gad, an honest man! A W9, too. W9KYX piggybacked in an attempt to nab J2SCS and got a report of RST 349 but couldn't quite pull him through the mire. Shel still needs Asia for 7 Mc. and recently worked KH6OC, KP4CP, ZL1HQ, VK3TX, ZS1Y, HP1YF, HH2CW, OK1RW and 'lebenty-'leben Gs, KL7s and whatnot ._._._ G3CDR/MM, at Singapore, heard W2LVN, W4MOC, W8HUK and W8WXU but was not on the air himself ._._._ W8CVU misses the competition of 20 as he had too easy a time raising many ZSs, UA3AF and HK1AM ._._._ The attic antenna at W2BRC seeped some r.f. through the eaves for **ZC6BK** (7050) to complete Nick's indoor-antenna 7-Mc. WAC. Also contacted were **UB5KBA** (7052), **DA1AF** (7045), **SM5NU** (7031), **HB9CS** (7055), etc. ._._._ Another Jersey man, W2VJN, gobbled up **HB9EU** (7004), **KH6GP** (7016), **PAØPN** (7040), **GM2BUD** (7010) and a PY for continent No. 5 ._._._ FM8AD showed up in time to enrapture W1RY who was vacationing from 20 ._._._ A 6L6 c.c.o. popped the buttons off W3GNW's chest by raising **G8PT** (7150) ._._._ Hoosier W9BRN works ZLs and VKs with ease and also snaffled VS6AG for a rare Asian with his 40 watts ._._._ A try at this band resulted in PY1AHL, F8PK and ZS5FY down at W5ACL ._._._ W1JYH assembled a logful of many Europeans plus GM3BST, UA1YF and some South Americans with his long wire.

Twenty: Spotty conditions or not, there are still a few people on 20. And we ain't just kiddin'! We see that VK4DO beat his recent 41-minute WAC with one within 28 minutes to the tune of HH2X, CN8BA, D4AVL, VK4ZB, CE5BH and C1LM. Ninety watts and a rotary did the trick ._._._ Giving traffic a rest for a moment, W1IIN cavorted with **UA1AR** (14,002), **UA3KAA** (14,095), **OX3GF** (14,104), **DA7AC** (14,015), **VO6Y** (14,090), **VP4TJ** (14,015), **YV4AI** (14,100) and **ZS5BZ** (14,002) ._._._ W6ZZ is still in there pitching with CE3DG, TI1WR, UAØKKB, VQ2GW, KM6AB, KB6AD, ZS5HT, ZS6KG, ZS6LW, CR7AF and CX1NE ._._._ W4IWJ wrapped his folded dipole around VQ3HJP, OX3GR, YI2FDF, UA1KEA, MI6ZJ, VU2BX, YV1AL and ZD4AO ._._._ W1JYH is very prosperous with YA2AB, UA1KED, UA1KEC, CP1AS, ZB2A, CR7BC, EA1A, VQ2GW, VU2GI, ZE2JN, GC2ASO, MD1D, KA6FA, MD5PC, CR9AN, EP1AL, VP8AI, HI8X and others ._._._ Down by the Alamo, W5ACL had to be satisfied with ZC6CH, VU2SJ, VU2ZZ, PZ1OY, VR5PL and VQ8AY. Took Mel 24 years to raise a VU and of course now they're lining up for him ._._._ PX2A has W1RY agog;

also FQ3AT/FE, VQ4EHG, MD1I, VP1AA, C6HH, EK1AA, CR7AF, CR6AN and MD3AB . _ . _ . _ W1IKE whiled away a few moments with YV1AZ, CR6AI and EA3HM . _ . _ . _ Nifties such as **CT2AB** (14,130), **W3LYK/KC4** (14,095), **CT1SX** (14,140), **PZ1AL** (14,120), **OA4BG** (14,060), **HK1FU** (14,050), OX3UD and OX3UE kept W8KPL hopping . _ . _ . _ An indoor dipole amassed UD6AC, UA6UC, UA3BG, VQ3ALT, VQ5JTW, ZD4AM, GC4LI and many ZSs for W1GDY . _ . _ . _ W1MRQ also got the ZD4 and adds UD6AG and VK7LZ . _ . _ . _ W9KOK is presently beamless but pilfered XZ2KM, XZ2DN, PK2RK, VU2PK, VU2SJ (Pakistan), VU7BR, VS1BJ, VQ8AD, GC2RS, GD6IA, UH8AA, UH8AF, ST2JF and ET1IR . _ . _ . _ YN5AV, YN1AA, HP4Q, UA9CC, HS1SS and UA6UC are accounted for by W5GEL . _ . _ . _ Up to 104 is W5CEW with seizures such as W2WMV/C9, CR4AX, J8AAM, GD3BBS, ZB1AB, ZS6OL, ZS4P, HZ1AB and C1MCC . _ . _ . _ TF3AB, UI8AE, PZ1OY, CN8BC, UA3VH and UH8AE were prevailed upon at W8EHH . _ . _ . _ W6MX tried out a new Q5-er on EA7AV, WØCTV/VR1 and VR2AU . _ . _ . _ W9CYU turned the beam north and collected many Russians plus UO5VW and UB5BD. G3BQ, VK5FL, ZL2FA, LU4DQ, CR7AY, VS2CB and a W2 helped John to a fast WAC one afternoon . _ . _ . _ W8DEN has dawdled with YU7KX, ZB1AI, OX3RD, OX5JJ, ZM6AF, ZE1JI and ZD4AB . _ . _ . _ A haywire (?) semivertical at W1ZL rattled the cans of VK7RK, F9LI, CX4CZ, ZS6KO, a VS2 and a W4 for another 2½-hour WAC and now the total is 127 . _ . _ . _ Pickings in January were mighty slim for W5ASG — only 106 countries that month! Among them: EA3OO, VU2HS, WØOZW/KS6, UA9EAA, VS4VR, VP7NK, UJ8AE and SV1RX. Bill varied the amplitude thereafter on ZD2KC, KG6AW/VK9, YS1AC, ZP8AC, AR8AB, MB9AI and OQ5BR . _ . _ . _ W6BIL rejoices in UAØKGA, PY4FI, KB6AD, ZS6IX, OH6NR, LB9BA and OZ4M . _ . _ . _ W6RBQ whittled away on VQ2HC, PK4VD, VP2AA, RV2, VQ4RAW, WØTKK/VK9, FT4AB, HC1ES, ZS6NU and umpteen others . _ . _ . _ Some new 810s brought W2TXB up to 98 with CX1FB and OA4BG . _ . _ . _ It must be tough to have just about worked 'em all, but W1FH was interested in KH6LX/VR1 on Makin Atoll . _ . _ . _ Another member of the never-miss-'em clan, W6SAI, mentions CP5EA, MD7DA, VR3A, ZD1KR, VQ1HJP, plus oodles of Russians . _ . _ . _ OH2NU/M refused to take W2HAZ's advice and get shipwrecked on Barbados, past which he was steaming. Bill needs VP6 badly . _ . _ . _ An exceptional synopsis from W1AB offers **EK1TF** (14,005), **SVØAF** (14,050), **ZC6SM** (14,100), **GD2DF** (14,090), **C3LT** (14,070), **W1PXB/KG6** (14,080), **UN1AA** (14,045), **UB5KAB** (14,120) and **MI6AB** (14,000) to give Horace 115. He and the rest of us would like to see more LM, MH, etc. procedure used by DX . _ . _ . _ A recent visit to W6 has prompted W4DHZ to engage in a rebuilding spree. Meanwhile Nap did business with EK1AZ, EL3A, ET3AF, EP3D, GC4LI, GD2DF/A, J3AAD, KA1AC, KM6AB, KP6AB, MD5DA, UD6BM, VQ2JC, ZB1AH, ZB1BD and others, for 101 . _ . _ . _ VE1OM met up with VP4TAU, CE3DZ, GD2FRV, GC8NO, FA3JY and ZC6WL . _ . _ . _ XE1AC has been sticking to A3 postwar and quibbled with ZM6AF, VR2AP, EK1AD, EA3OS, EA7BA, EA8EDZ, EA9AI, ZD3B, VP1AP, FA8WH, KX6AF, ZE1JX and VR3A . _ . _ . _ W6VFR has hit 185, helped by **WZFH/VR4** (14,290) and **VP2GB** (14,330), both on the vocal . _ . _ . _ People who schedule rare DX for hours night after night are the pet peeves of W2ITD. Steve has been consorting with MD2C, OH3NA, KA1JD, UA1KEB, KL7MH and ZC6JJ on c.w. and crooning to ZS2CL, HK3FAP, ST2CH, VQ4NSH, ZS4P, YN1AJS, VP2GE, VK6DD, CN8BB, HI6EC and CN8AU.

Ten: If you can afford to lounge about in the daytime, here's the band for you. Otherwise, put on a suit of armor and try it week-ends. Or, if you have a call such as XE1AC, you could maybe work ZD4AH, ZD2KC, OQ5BA, CT1QA, LX1JW, VQ4EHG, VQ4HRP, VQ4GWB, ZK1AA, ZP2AC, CP5EA, PZ1A, PZ1M, VP3TR, J2AMA and KZ5AY on 'phone . _ . _ . _ But a call like W4MQV and 50 watts can work VO4P, VK3MC, CE3BA, KP6AA and piles of Europeans . _ . _ . _ W2GMM yakked with CR7AD, ZB1L, EL5A, ZL2BN, and W3NKS/MM (off CR7) and then di-dahed for UA3BM, SP5AB, D6AC, DA7AC, VQ3ALT and CE7AA . _ . _ . _ A half-wave and 20 watts were sufficient to enable W1NKW to be palsy-walsy with GI2AFW, GW8NP,

♦

This looks like a little gathering in some ham shack down the street, but look again — there is rare DX assembled here. The man with the mike is AR1RJ and this is his station, quite newly-active. Guests, left to right: AR1OM/W2BFS, AR1YL/W4CQL, AR1PC/W1KAV, and W1FPD who also operates AR1PC.

♦

April 1948

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We mentioned this young gentleman last month and figured you'd like a look at him. This is W2UFT at his operating position. Don completed his first year of hamming with some 140 countries worked and 90 confirmed. And January 22nd was his *fourteenth* birthday! He won't talk much but his OM is W2ANX, a 7-Mc. man and quite proud of his offspring. A kw. (810s p.p.) helped a lot while the antenna was an unspectacular 14-Mc. half-wave vertical. Don is an outstanding scholar at Brooklyn Tech when not pursuing prefixes.

♦

GM3AKK, D4AVN, HB9HE, OZ3M, OZ4PB, PAØAD, XADW and ZS1T on voice . _ . _ . _ W7LEB has twice that power and successfully pursued CR9AG, G3GW, W2WMV/C9, LU5AX, ZS6RF, VK2KS, ZL2LV, J8AFK and W8JIM/C1 . _ . _ . _ Eighty countries at W3FDH recently include DA7AA, UC2ND, UA3BD/UP2 and SP5AB . _ . _ . _ W6ZZ still likes the band because of J9ABO, J2DON, J2RLK, J8AAV, J5LQK, J2YAB, J9AJB, KX6AF, W6VRF/KG6, KG6CB, W6YOT/C6, HR1MB, CE3DW and even more for Jeeves to drool over . _ . _ . _ A pocket 50L6 outfit at W2WCF hooked EI9G on 'phone . _ . _ . _ W9WCE didn't frown upon ST2MP, MD5LR, EL3A, VQ2DH, VU7BR and LZ1AB, all on A3. He reached 101 with EA7AV, PX1B, FQ3AT/FE, UA3DS and OQ5HR on c.w. . _ . _ . _ Fiddling with a 5-element wide-spacer, W4MRA put the squeeze on MD5GW, MD5BL, MD5KW, CN8BA, CT1IP, CT1PJ, HZ1AB, OK3ID, FF8FP, ZE1JD, OQ5AR, KG6AW/VK9, J9ATT, VQ3EDD and W6VKV/I6.

Where:

There's one or two here you may take with tongue in cheek; lots to pick from, anyway:

C3LT	David Liu, Box 163, Canton, South China
CE7AA	Box 464, Punta Arena, Chile
CP1AS	Casilla 889, La Paz, Bolivia
CR9AM	P.O. Box 504, Macao
DA1AD	DARC, Box 585, Stuttgart, Germany
DA7AC	DARC, Box 585, Stuttgart, Germany
D5AA	(via REF)
D5LX	(via Box 88, Moscow)
D6AC, DARC	Box 585, Stuttgart, Germany
EA1A	(via W1AZW)
EA3OO	Box 12354, Madrid, Spain
EA8EDZ	Apartado 11, Villa Cisneros, Rio de Oro, Spanish West Africa
EK1DI	J. E. Terry, P.O. Box 179, British Post Office, Tangier Zone
ET3AF	Harry Dell, Box 858, Addis Ababa, Ethiopia
HC1KW	Francis A. Crosby, Pan-American Grace Airways, Quito, Ecuador
HC2CC	P.O. Box 1293, Guayaquil, Ecuador
HH1HB	Henry Birmingham, P.O. Box 204, Port-au-Prince, Haiti
HK3FAP	Box 1462, Bogotá, Colombia
J5LQK	APO 929, % PM, San Francisco
KH6KQ/KP6	CAA Administration, Palmyra Island
KH6LX/VR1	(via ARRL)
KX6AF	David Fugman, AACS Det., 775-11, Navy 824, San Francisco
LB9BA	(via NRRL)
MB9AA	(via RSGB)
MD2A	Pete Joubert, % BOAC, Tripoli
MD2B	Chips Carpenter, Tripoli Signals Sqdn., North Africa, M.E.L.F. 7
MD2D	Ken Williams, % BOAC, Tripoli
MD2E	Butch Orrel, % Cable & Wireless, Tripoli
MD2F	Arthur Gover, % BOAC, Tripoli
MD2G	Chalky White, Signals Officer, RAF Stn., Castel Benito, M.E.F. 1
MD2H	Tim Baron, Signals Section, RAF Stn., Castel Benito, M.E.F. 1
MD5GW	Officers Mess, "L" Camp No. 2, Base Workshop, REME, Tel El Kebir, Egypt
OX3MG	Hans Danielson, APO 858, % PM, New York
OX3SF	(via EDR)
PK6TO	Col. Stoop, Box 76, Macassar, Celebes, N.E.I.
PX1B	% Radio Andorra, Andorra, or via REF
ST2JE	RAF Station, Khartoum, Anglo-Egyptian Sudan
SV1RX	(via RSGB)
VO2AX	Lt. J. F. Maloof, USN, Navy 103, Argentia, Newfoundland % PM, N.Y.C.
Ex-VP2AT	Arthur Tibbits, "Braemar," Britton's Hill, St. Michael, Barbados
VP3TR	Ted Rast, Atkinson Field, British Guiana, via APO 857, % PM, Miami, Fla.
VP3TY	Tony Clavier, 25 Norton St., Georgetown, B. G.
VQ4HGB	H. G. Baker, % Barclay's Bank, Nairobi, Kenya
VQ8AZ	P. O. Small, R.N., 15, The Camp, Phœnix, Mauritius
VS4VR	(via VS2AL)
VS6AY	Box 541, Hong Kong
W1PXB/KG6	Box 100, Guam
W2CDJ/J2	70 Signal Co., APO 503, % PM, San Francisco, Calif.
W2EJV/PK3	Box 222, Soerabaya, Java
W2LGZ/KL7	APO 729, % PM, San Francisco, Calif.
W6FMZ/C6	(to home QTH)
XAEG	Major L. Hill, 13 CPS TPS WKSP, C. M F. Trieste, or via RSGB
YA2AB	(via ARRL)
YS1AC	Arcadio Chavez, Villa Delgado, San Salvador, El Salvador
ZC6CH	(via I1LT)
ZC6WL	Bert Ward, % APO 6, Airborne Div., Haifa, Palestine
ZD4AO	(via W2QPV)

For this directory we are indebted to W1s AB, BDI, HDQ, IIN, JYH, PEK, QVF, VG and ZL; W2s EQS, HAZ, ITD and WZ; W4DHZ;

W5s ACL, ALA and DTJ; W6s VFR and ZEN; W9WCE; D4ALN; MD2G; XE1AC; and Fred Berman (no call).

Tidbits:

The Gatti-Hallicrafters Expedition is giving the gang plenty of chances for Kenya (VQ4EHG) and should be popping up in VQ3 and VQ5 in the near future. W4ESP relays information that the Kenya set-up has a rhombic centered on good old Chicago. (Did you pick up those train tickets yet, Jeeves?) [To where, boss — Kenya or Chicago? — *Jeeves*] . _ . _ . _ W6VFR has tracked FK8VB back to ZL and is trying to coax a card from same. Marv also learned that ZS6OL went back home to GM3AFG . _ . _ . _ When KH6KL first reported to us concerning RV2 some months ago we took the tip with a smattering of sodium chloride. The call and the QTH seemed just a trifle bizarre. But we cheerfully bite our lower lip while presenting the following details from an RV2 letter donated by W6VFR. RV2, operated by Roland D'Assignies, has been quite active on 7 and 14 Mc., using a 6L6 Hartley at 15 watts and an S-38 receiver. The label is strictly temporary and an FO call is pending. Roland has been having a tough time pushing through with his improvised transmitter but W6SAI and W6VFR are fixing him up with a neat 50-watt VFO job. Watch for VR2 using A3 soon . _ . _ . _ Despite February *QST*, W3MWV hastens to state that he has nothing to do with C9. People shouldn't have calls like W2WMV/C9, anyway! . _ . _ . _ W2ZJ and W2TXB warn that EP1AL is very close to hot water because of some QSL Hogs trying an RSGB short-cut. QSL EP1AL *only* via W2ZJ. Along this same tack, W2ZI advises all to be careful about VS9KA, ET1IR and HZ2TG — no direct mail. Ed quotes KX6AF as desiring self-addressed envelopes for return cards. He's 1200 behind but trying hard . _ . _ . _ An interesting VR5PL letter via W6RBQ reads in lovely fashion. To wit: "We kept a Pig Pen list but that was too tough as we soon had hundreds of W calls between us and this idea had to be canceled. . . ." "We" means VR5IP, too. Great stuff. Some critter messed up a VR5PL-G2PL QSO for 53 minutes; Noel finally gave the W3 a break. The latter generously gave VR5PL a report and then tried to line up a few more buddies for QSOs! But though you can lead DX to water you can't make 'em drink all of it — so there's one boy who'll never get a card from VR5PL . _ . _ . _ VP2AT has moved to Barbados and is expecting a VP6 call. Therefore, Art no longer handles the VP2 QSL Bureau . _ . _ . _ **VQ4HGB** is moving to the States sometime in the future and meanwhile is making Ws happy on 14,170 c.w. and 14,330 'phone . _ . _ . _ VQ3PIP is a new bride and not active at present. Here's a possibility for someone's YL DXCC! . _ . _ . _ SM5EN is drooling over the New York City surplus market while visiting W2WLW . _ . _ . _ Ex-W2AAL, of prewar DXCC, pops up with W4FVR and still has the old touch — 66 countries in January alone! . _ . _ . _ W2IOP's morale goes way up and then hits the floor when he keeps receiving big envelopes from W2SN's bureau — full of cards for QSP to HA1KK! Larry would like those HA1KK cards direct to his own address . _ . _ . _ MD2G straightens us out on the new prefix change in Libya. He is ex-T1NS. TR1P is now MD2I . _ . _ . _ According to W5HFM, HZ1AB is really and truly closing down this time . _ . _ . _ Ws ordinarily do a load of squawking about DX QSL responses. CR7BC writes to comment upon the fact that he QSLs 100 per cent and has received just a 40-per-cent return! . _ . _ . _ W3DPA understands that there'll be some legal SP boys on the air in the near bye-and-bye. This activity will be the first of its kind in a long time . _ . _ . _ XZ2YT cards are on the way and 1947 contacts should be receiving theirs now . _ . _ . _ VK9BI believes he has accounted for all owed QSLs and offers to oblige anyone possibly overlooked . _ . _ . _ W1PDD changed his spots from OA4AY to HC1KW (QTH listed) . _ . _ . _ The RDXA bulletin lists W2s QCP, PUD, CNT, SYV all well over the century mark in countries worked. RTX has 108 on 'phone alone . _ . _ . _ GC2CNC is active on 7-, 14- and 28-Mc., 'phone and c.w., and a thorough QSLer . _ . _ . _ W6FEX has had over 150 contacts with ZL1GI on 28-Mc. 'phone! . _ . _ . _ KS4AI is checking out of Swan Island. Ralph had a lot of fun and gave the mob plenty to shoot at on all bands. He reports that KS4AF went back to Okla. but that W5NRT dropped

(Continued on page 126)

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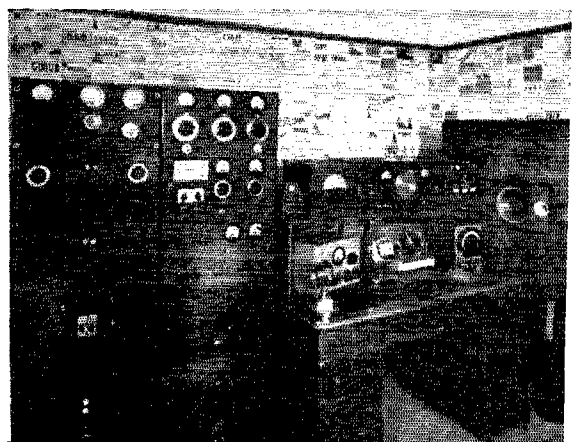


This classical outfit represents G2BB, *a well-known signal on 28 Mc. The station is operated as completely automatic as possible and possesses some unique switching arrangements. Transmitter winds up with p.p. HK54s and a 4-element rotary beam. An elaborate speech amplifier makes overmodulation impossible at* G2BB.

♦

Compact 20-Watt Rig for 50 Mc.

A Complete 'Phone-C.W. Transmitter on Two 5 X 10-Inch Chassis

BY STEPHEN T. VAN ESEN,* W2OXD

ONE Sunday morning the QRM on 10 meters was even worse than usual. Our converter covers six and two as well as ten, so we flipped the switch to six and tuned the band — what a difference! Four beautiful megacycles — a couple of W2s talking to W6s and a W1 chatting away with a W7. No QRM, no heterodynes — just three signals on an otherwise quiet band. "This," we said, "is for us!"

The available space was small and we weren't sure just how we were going to like six, so the rig is compact and the power input less than twenty watts. The first stage is a straight crystal oscillator using a 6AQ5 miniature tube and a 12.7-Mc. crystal. This is followed by a 6AQ5 quadrupler which furnishes sufficient drive (2 to 3 ma.) for the 2E26 final. The full supply voltage (300 volts) is applied to the plate of the 2E26 but is dropped through resistors to hold down the voltage on the 6AQ5s to less than 250 volts.

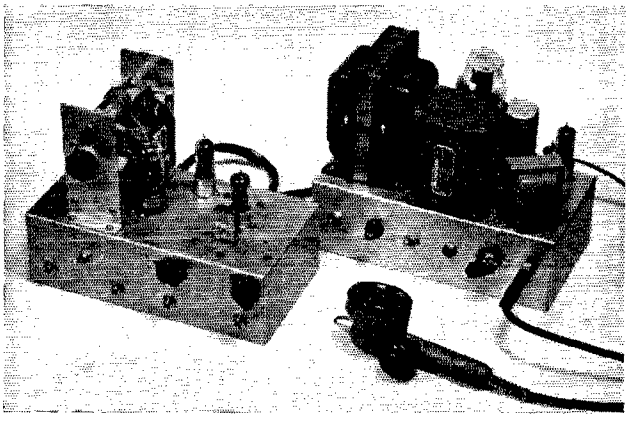
The R.F. Section

The tuning condensers of the oscillator and quadrupler are mounted underneath the chassis and their respective coils are soldered directly to each condenser. The condensers have mounting holes in their ceramic end-pieces enabling them to be mounted by means of small angle brackets, thus keeping the rotors off ground. A small piece of ¼-inch diameter polystyrene rod is coupled to the shaft of each condenser for easy insulation and to prevent grounding the rotors. The oscillator and quadrupler coils are ¾-inch diameter and are self-supporting. The oscillator coil has 13 turns and is 1⅜ inches long. The quadrupler coil has 3 turns and is ⅜ inch long. Four closed-circuit jacks allow for metering the cathode circuits of each of the three stages and the grid circuit of the 2E26. The transmitter may be keyed for c.w. work by inserting a key in the 2E26 cathode jack, J_4.

The final tuning condenser is mounted above the chassis. Two 1½-inch steatite stand-off insulators, one horizontal and one vertical, hold the condenser rigid and bring it high enough so that the lead to the plate of the 2E26 is less than ½ inch long. The final coil is soldered to the condenser and consists of four turns (½ inch long) wound on a ¾-inch polystyrene rod. The polystyrene rod is supported by two pieces of aluminum mounted on the front and rear of the chassis. The rear aluminum bracket also serves as a place to mount two coaxial connectors, one for the antenna, the other for the line going to the receiver antenna post.

• A 20-watter such as the rig herewith described by W2OXD would be pretty well outclassed most of the time on any of our lower-frequency 'phone bands, but on 50 Mc. it is quite capable of giving a good account of itself. A complete 'phone-c.w. rig in less than a cubic foot of space, this transmitter should be popular with the fellows who are looking for an economical way to get started on six meters.

* 10 Soundview Circle, White Plains, New York.



The 6-meter transmitter described by W2OXD is constructed on two small aluminum chassis. At the left is the r.f. section, complete with antenna change-over relay. The other unit contains the power supply and modulator.

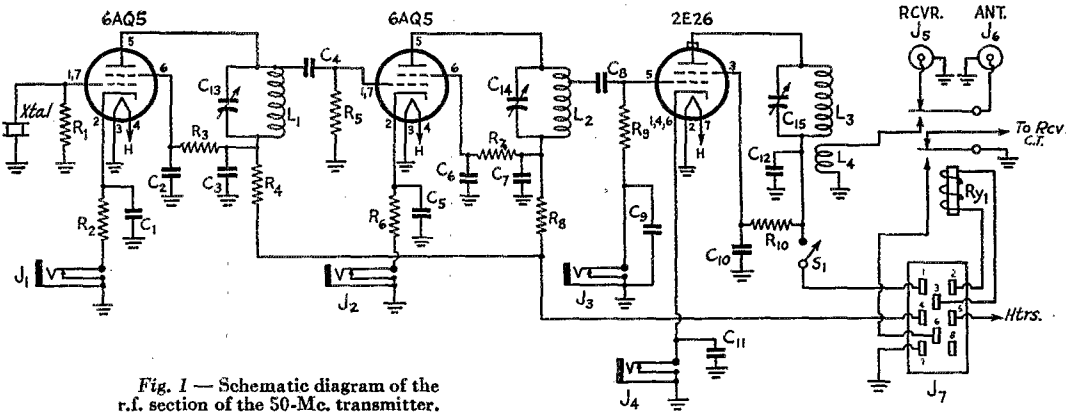


Fig. 1 — Schematic diagram of the r.f. section of the 50-Mc. transmitter.

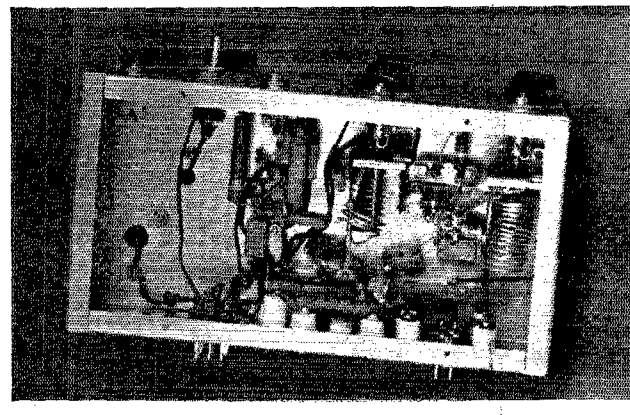
C_1–C_{12} — 0.0022-μfd. mica.
C_{13} — 100-$\mu\mu$fd. variable (Hammarlund HF-100).
C_{14}, C_{15} — 30-$\mu\mu$fd. variable (Hammarlund HF-30X).
R_1 — 0.22 megohm, ½ watt.
R_2 — 220 ohms, 1 watt.
R_3, R_7, R_8 — 10,000 ohms, 10 watts.
R_4 — 5000 ohms, 10 watts.
R_5 — 68,000 ohms, 1 watt.
R_6 — 100 ohms, 1 watt.
R_9 — 15,000 ohms, 1 watt.
R_{10} — 25,000 ohms, 10 watts.
L_1 — 13 turns No. 16, ¾-inch diam., 1⅜ inches long.
L_2 — 3 turns No. 16, ¾-inch diam., ⅜ inch long. Tap down one turn from "hot" end.
L_3 — 4 turns No. 16 wound on ¾-inch diam. polystyrene rod.
L_4 — 2 turns No. 20 push-back, adjacent to L_3.
J_1–J_4 — Closed-circuit jack.
J_5, J_6 — Coaxial fitting.
J_7 — Power socket — 7 or more connectors.
Ry_1 — D.p.d.t. relay, 115 volts a.c.
S_1 — S.p.s.t. toggle switch.

A double-pole double-throw relay is mounted just back of and underneath the final condenser. One pole of the relay grounds the transmitter power-supply center-tap in one position and the receiver power-supply center-tap in the other. The other pole of the relay connects the antenna to the transmitter in one position and to the receiver in the other. The outer conductor of the coaxial cable is grounded in all cases and only the inner conductor is switched by the relay.

Mounting the antenna change-over relay within the transmitter itself does away with the necessity for using the scarce and expensive coaxial relay, which would be required if the relay were to be inserted in the line at a point remote from the transmitter. While a coaxial relay might be slightly more efficient, the system used here takes up less space, is cheaper, and seems to work out very well. The output coupling link consists of two turns of No. 20 push-back wire which can be slid back and forth on the polystyrene rod to vary the coupling.

Power Supply & Modulator

The power supply and modulator are built on a 5 × 10-inch aluminum chassis similar to the chassis used for the r.f. section. These aluminum chassis are now available as stock items and once you use one you will never go back to those black-wrinkled steel jobs. The power supply delivers plate and filament voltages to both the r.f. section and the modulator. The modulator consists of a pair of 6AQ5s in push-pull driven by a carbon microphone. The full 300 volts is applied



Bottom view of the r.f. section. Tank circuits are, right to left, oscillator and quadrupler plate. The final plate circuit is mounted above the chassis.

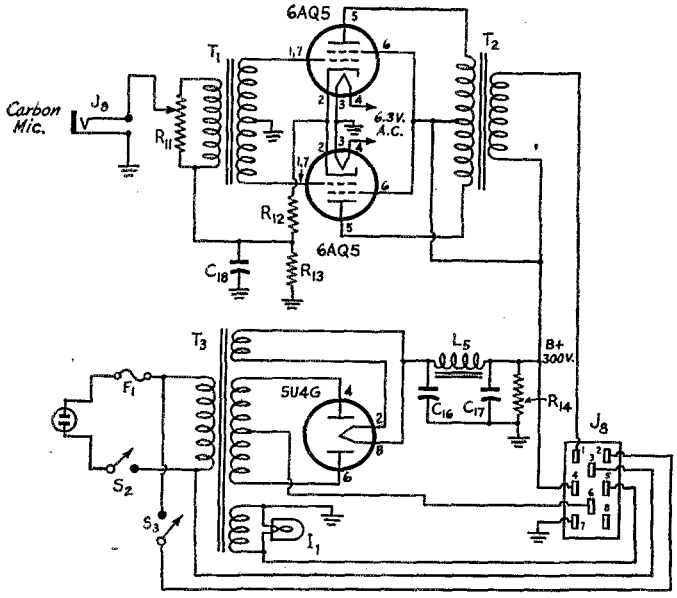


Fig. 2 — Wiring diagram of the power-supply-and-modulator unit for the 50-Mc. transmitter.

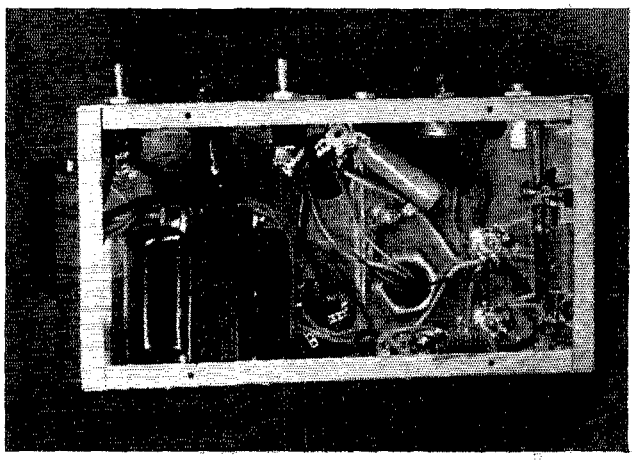
C_{16}, C_{17} — 8-μfd. 450-volt electrolytic.
C_{18} — 25-μfd. 25-volt electrolytic.
R_{11} — 0.1-megohm potentiometer.
R_{12}, R_{13} — 150 ohms, 2 watts.
R_{14} — 30,000 ohms, 10 watts.
L_5 — Filter choke, 10 hy. at 200 ma. (Kenyon T-152).
F_1 — 3-amp. fuse and fuseholder.
I_1 — Indicator lamp, 6.3 volts.
J_8 — Power socket, same as J_7 in Fig. 1.
J_9 — Open-circuit jack.
S_2, S_3 — S.p.s.t. toggle switches.
T_1 — Single-button microphone to push-pull grids (Thordarson T20AO2).
T_2 — Modulation transformer (Stancor A-3891).
T_3 — Power transformer, 675 volts a.c. at 200 ma., c.t.; 5 volts a.c. at 3 amp.; 6.3 volts a.c. at 5 amp. (Utah Y-620).

to the plates and screens of the 6AQ5s in the modulator. This is perhaps more than their maximum rating, but it does not seem to harm them. Microphone voltage is taken from the cathode bias resistors and the gain of the system can be adjusted by a potentiometer across the primary of the microphone transformer. In actual practice we set the gain at maximum and leave it there. Even then we have to keep fairly close to the microphone mouthpiece in order to keep the modulation up.

A seven-conductor cable runs from the modulator/power-supply unit to the r.f. unit. The conductors carry the following: common ground, high side of 6.3-volt filament voltage, B+ to oscillator and quadrupler, modulated B+ to 2E26, a.c. for relay coil (2), and B— lead from power-supply center-tap to relay contact. A two-conductor cable runs from the r.f. unit to the receiver, carrying B— and ground from the receiver to the relay. The on-off switch, pilot light, fuse, and send-receive switch (S_3) are on the front of the modulator chassis. A switch (S_1) on the front of the r.f.-unit chassis allows for breaking the B+ line to the 2E26 so that the plate and screen current of this tube can be cut off while the oscillator and quadrupler are tuned.

There is no difficulty in adjusting the rig. After tuning the oscillator it should be backed away a bit from the sharp side of minimum dip for maximum stability. Very little dip can be ob-

(Continued on page 128)



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Bottom view of the power-supply-and-modulator unit. The left-hand toggle switch applies a.c. to the filaments and heaters of all tubes, while the other serves as a send-receive switch.

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I.A.R.U. News

NORWAY

The *Norsk Radio Relae Liga* reports that the expected postwar increase in amateur radio interest is continuing, total membership having risen from about 900 to approximately 1300. The number of licensed amateurs in Norway has increased correspondingly from 300 to 430. Activities of the N.R.R.L. were formerly performed by the officers and members entirely upon a voluntary, unpaid basis but clerical details in connection with general correspondence, QSL handling and the like now require the services of a full-time paid secretary.

N.R.R.L. has been authorized by the Norwegian authorities to examine applicants for amateur radio licenses and to regulate the amateur radio service. The general power limit is still 50 watts but inputs of up to 150 watts are permitted holders of special licenses who qualify by outstanding amateur achievements and whose applications are approved by the society.

In spite of the difficulties encountered in obtaining components for v.h.f. gear, interest in that portion of the radio-frequency spectrum runs high. Norwegian amateurs have been given temporary permission to operate in the 47.0–47.3 Mc. band. N.R.R.L. will submit a request to the authorities for an additional band beginning at 50 Mc.

The *Norsk Radio Relae Liga* has formed, with coöperation of the Norwegian Red Cross, an emergency corps to furnish radio communications whenever needed, principally to relief expeditions for victims of air accidents.

About twenty young members of N.R.R.L. are now being given additional training to fit them for their part in the emergency set-up. This additional training is to increase their proficiency in high-speed operating, traffic handling and portable work.

A construction program has been inaugurated to build equipment for the emergency corps. The transmitters for portable work are to be small and light. The rigs, powered by dry batteries, have been designed to operate with about 2 watts input and will be adjusted to operate on one net frequency, either 3505 or 3795 kc.

The necessary permission for this type of operation has been granted by the Norwegian authorities. N.R.R.L. has not yet decided what will be used as a distress signal. QRR, the A.R.R.L. traditional signal of distress, was considered but temporarily rejected because of its having been adopted, with another meaning, at the Atlantic City conference as an addition to the international list of Q signals.

PHILIPPINE ISLANDS

The *Philippine Amateur Radio Association* reports that Philippine amateurs are not presently permitted to communicate with foreign amateurs other than those in the United States. The P.A.R.A. was advised that this prohibition by the Philippine government is for security reasons.

Philippine amateurs ardently hope that the ban on their working DX will soon be lifted so that amateur radio progress in the Islands may be encouraged.

Benjamin Kroger, XE1KE, as official emissary of the *Liga Mexicana de Radio Experimentadores*, presented fraternal greetings of the L.M.R.E. and expressions of esteem to A.R.R.L. Secretary Warner, W1EH, in the League's West Hartford office. The mutual esteem and friendliness between the two American societies and their members is exemplified by the "hands-across-the-border" scene depicted here.

C.A.R.L. SHOW

The *Chinese Amateur Radio League* will hold an amateur radio exhibition in Nanking sometime in May of this year. This will be the first such exhibition since 1942. C.A.R.L. has requested amateurs all over the world to send photographs of stations, QSL cards, club emblems or banners and similar items to provide a truly international flavor. If you hurry, there is

(Continued on page 128)

Surplus Corner

F.M. Reception with the Wilcox F-3

BY JOHN A. DINTER,* W8OAP

ONE of the current "good buys" is the Wilcox F-3 receiver, a fixed-frequency crystal-controlled receiver commonly used for monitoring aircraft frequencies. It is a.c. operated, has very good sensitivity, and fairly good selectivity for amateur 'phone work. The unit is self-contained in a chassis built back of a 3¼-inch standard rack panel. The one used by the author cost the great sum of $13.50 complete with tubes and coils.

Very little modification is required to use the receiver as the i.f. amplifier following a converter for a.m. reception. However, it is not especially difficult to go one step further and adapt it for narrow-band f.m. reception as well. Much of the current criticism of n.f.m. can be traced directly to the fact that it is being received on a.m. receivers that do not do justice to the system. The "conversion" described here will allow either true n.f.m. or a.m. reception.

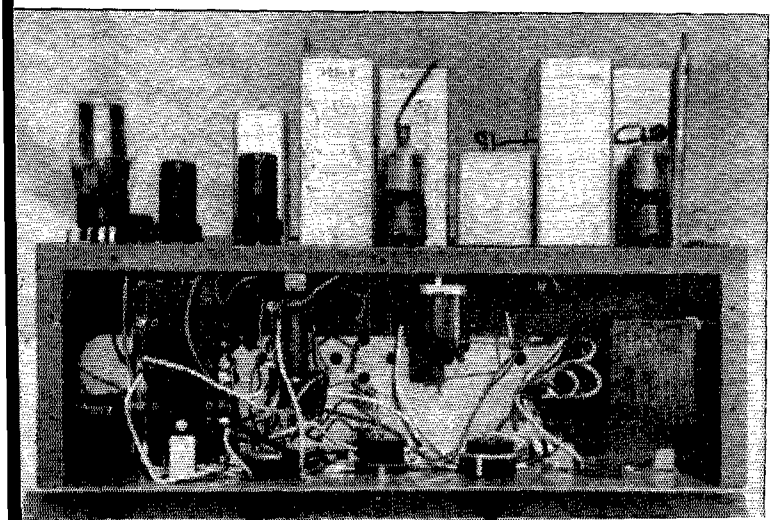
The first step is to remove the protective shield box that covers the tubes and coils. The top and bottom of the chassis follow and then the front panel itself. This leaves the inside of the receiver nicely exposed so that any work to be done can be completed easily. The power transformer must be set back to provide a little depth behind the panel at one side, so two new holes should be drilled one inch to the rear of the present ones that hold the unit in place. This leaves ample space to mount a switch behind the panel on the right-hand side. This switch, mounted on the spot formerly occupied by the frequency nameplate, is a s.p.s.t. unit used to break the high-voltage center-tap lead from the transformer for send-receive control. The center control, marked "Noise Control," should be removed from the circuit and from the panel and the hole enlarged to take a d.p.d.t. switch for a.m.-f.m. change-over. In the f.m. position, the switch also shorts out the a.v.c. bus to give a little extra gain.

The next step is to change the crystal socket from the three-pronged aircraft type to an octal of the wafer variety. This requires drilling two holes, but in replacing the crystal shield can it will be found that two bolts will be enough. While the oscillator can be made self-excited, crystal control seemed a good idea because it provides an i.f. channel that is not going to wander in frequency when the set is jarred or the line voltage fluctuates. The crystal used in this unit was 3845 kc., with the oscillator below the signal frequency. This gives an i.f. of 4.3 Mc. (This frequency was used here because the existing converter had been built for use with a 4.3-Mc. wide-band i.f. for f.m. broadcast reception.) This i.f. is high enough to provide good image rejection but still low enough to have good gain. The converter was placed on 235 Mc. and its oscillator did not pull, so it was a natural conclusion that the unit would be just as satisfactory on the 28-, 50- and 144-Mc. amateur bands. It works beautifully on the forestry stations in the 74.5-Mc. region!

F.M. Reception

To make the unit function as an n.f.m. receiver, the 6C8 tube is removed and with it all of the socket wiring with the exception of the heater leads. This tube, formerly used for squelch and audio, is replaced by a 6SJ7, used as an f.m. limiter. Fig. 1 shows the revised circuit. Do *not* remove resistors R_{14} and R_{15} of the original circuit diagram shown in the book of

* F.M. Station WCFC, Beckley, W. Va.



A view of the modified receiver with the cover off the chassis. The 6J5 audio tube is just to the right of the 80 rectifier. To the right of the 6J5 is the 6SJ7 limiter, and behind the 6SJ7 is the discriminator assembly.

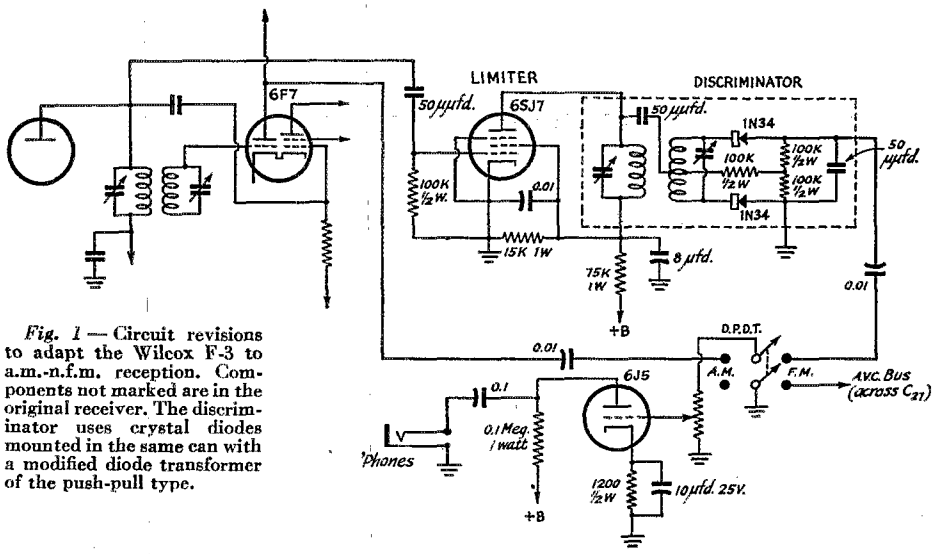


Fig. 1 — Circuit revisions to adapt the Wilcox F-3 to a.m.-n.f.m. reception. Components not marked are in the original receiver. The discriminator uses crystal diodes mounted in the same can with a modified diode transformer of the push-pull type.

directions furnished with the receiver. These resistors are necessary for the correct operation of the a.v.c. amplifier.

Next, remove the small coverplate beside the ex-6C8 socket. This will expose two knockouts, one for a tube and the other for an i.f. can. The tube cut-out should be fitted with an octal socket and wired for the 6J5 audio stage shown in Fig. 1. The i.f. cut-out may be used for the discriminator transformer, a modified full-wave diode i.f. transformer. The modification is simple: take the transformer out of the can, then remove the two diode plate leads and mount a three-lug tie-point at the bottom of the wood dowel by a small wood screw. Then solder a 1N34 to each end of the secondary winding where the ends are attached to the trimmer lugs, with the negative terminal of the 1N34 at the coil. The other terminals of the 1N34s are soldered to two of the lugs at the tie-point. As shown in Fig. 1, two 0.1-megohm resistors are connected in series between the same lugs, and a 50-$\mu\mu$fd. condenser is also connected between the same two points. One lug is grounded and the other lug is the connection for the audio output. A 0.1-megohm resistor and a 50-$\mu\mu$fd. condenser are connected to the center-tap of the secondary winding, as shown in the diagram. The other terminal of the resistor goes to the common connection between the two 0.1-megohm resistors while the other terminal of the condenser goes to the plate end of the primary winding. This gives a well-shielded and compact discriminator assembly.

The 6J5 audio stage shown in Fig. 1 is resistance coupled for working into an external audio stage to drive a 'speaker.

Alignment of the i.f. is easy using a signal generator and output meter for the a.m. section The f.m. discriminator may be lined up by using a high-resistance meter or a vacuum-tube voltmeter connected across the discriminator output.[1] The bandwidth with the f.m. section in use very nicely handles the 30-kc. swing used commercially in the 30- to 42-Mc. band. On a.m. the bandwidth is narrow enough for good selectivity, but wide enough to take care of signal drift when using the receiver on 2 meters.

One word of caution: Be careful not to mess up the a.v.c. circuit; it uses an a.v.c. amplifier operating from negative voltages developed across the lower end of the voltage-divider string. Also, when taking the limiter input from the i.f. amplifier-stage output transformer, connect to the primary rather than secondary. This avoids loading the secondary and gives a better peak on a.m. reception, but does not affect the f.m. performance.

After using the unit on n.f.m. on 10 meters, especially on a signal that really saturates the limiter, you will definitely come to the conclusion that n.f.m. is not just something to read about — or to cuss about!

[1] Alignment procedure for f.m. receivers is described in the *Handbook*.

The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,* W1HDQ

As is usually the case, February was a quiet month for the v.h.f. gang; quiet, that is, from the standpoint of activity heard on the air in most localities. Unlike some previous years, however, this seeming quiet did not mean that interest in v.h.f. matters was low. The correspondence received by this department in the past month refutes that! "Not many contacts to report, but —," and follows a recital of beam building in the basement, of conversion of surplus gear underway, of adding r.f. stages, of tending to the thousand-and-one items of fence mending that the up-and-coming v.h.f. man finds to do at this time of year, in preparation for the big season coming up.

And spring, 1948, is going to be a *big* season. If our V.H.F. Sweepstakes could bring out literally thousands of stations in January, when conditions were at rock bottom, what may be expected when the coming of spring stretches out our operating ranges? One thing is in immediate prospect for the 50-Mc. gang — the culmination of the race for 50-Mc. WAS. Activity is now ready and waiting in practically all the hard-to-get states, and the bronze trophy may well be won this year. If you've not worked too much heretofore, don't feel that you have no chance, as the first 40 or so can be worked within a month or two, once the spring sporadic-*E* season gets underway. Starting from scratch, right now, you'll be up with the leaders before they are able to knock off their last few hard ones.

On 144 Mc. we find more stations than ever before on any v.h.f. band, in many places where no v.h.f. activity formerly existed. The 522 and similar rigs, available at low cost on the surplus market, have encouraged hams in many areas to give 2 meters a try, triggering off a boom in 144-Mc. activity that cannot help but produce interesting results this spring. With thousands of stations active in the right places, and with ever-increasing interest in high-gain antennas, the 144-Mc. record is almost certain to be broken before long. And whether you get into any record-breaking DX or not, one thing is certain: you're in for plenty of fun and excitement this year.

The next two higher bands appear headed for greater things also. The anticipated change to 220 from 235 Mc. has held that band back, but the interest is there, and when the change is announced (it may be before this appears in print) an appreciable amount of activity is expected to develop. The 420-Mc. band is already getting quite a bit of attention. In only a few places has it yet reached the point where contacts are made other than by prearrangement, but the flood of surplus gear that is capable of being used there is expected to help in populating this band this summer. By concentrating activity on certain agreed-upon nights, various local groups have succeeded in developing interest within a community area, and tests conducted in connection with an established channel on 2 or 6 meters have shown up interesting results.

Whatever may be your particular field of interest in connection with v.h.f., now is certainly the time to be polishing off the details. Those new beams should be put up without delay, for instance, for the sporadic-*E* skip and the tropospheric bending will be upon us before we know it. And don't forget the big week-end, May 22nd and 23rd, the occasion of the Spring V.H.F. Party, details of which will be announced in May *QST*. This contest will follow the principles which made the V.H.F. SS so popular, and will include incentives for multiband operation and a worth-while multiplier for use of the frequencies higher than 148 Mc. As before, standard reporting forms will be sent without charge to anyone requesting them. Plan now to be on deck!

50-Mc. DX News

Though the 50-Mc. DX picture faded for most of the United States in January, and February activity seemed to be running in direct proportion to the m.u.f., there was an appreciable amount of DX worked in other countries during the month. The South American summer season was producing its quota of sporadic-*E* skip. PY2QK, Santos, Brazil, worked Argentine stations almost nightly, and on Feb. 17th he had his first contact with OA4AE, Lima, Peru. CE1AH, Chuquicamata, Chile, has been working PY2QK and the LUs in the Buenos Aires area quite frequently. On the 22nd the band was open over this path until after midnight, and LUs were working XE1KE at the time, but the latter was not audible at CE1AH. Ida reports that Uruguay is now represented on 50 Mc. by CX1AA, CX1AQ and CX1AY.

* V.H.F. Editor, *QST*

The Mexico City 50-Mc. group now comprises five stations, including XE1A, XE1FE, XE1GE, XE1KE and XE1QE. From the time of his return, on Jan. 28th, from a visit to this country, XE1KE had heard nothing on 6 until Feb. 18th, when he worked LU9MA, Mendoza, Argentina, at 8:25 P.M. CST. At 7:50 that same evening he heard W7K?D (possibly W7KAD?) calling CQ six. LU9MA was first heard at 7:58, and LU1AM was heard shortly after, both while the array at XE1KE was still pointed northwest. LU9MA was heard later calling OA4AE. LU9MA has not been heard at CE1AH when other Argentine stations are coming through, a point of interest, since Mendoza is directly south of Chuquicamata, and only about 750 miles distant, as compared to about 1500 miles for Buenos Aires, to the southeast.

Though the predictions indicate that corresponding paths to these in Africa should be open, there is no news of 50-Mc. DX from the Dark Continent this month. The ZS stations now have permanent permission for 50-Mc. operation, and ZE1JM, Southern Rhodesia, is reported by VQ4EHG to be active on 6. While not licensed presently for 50-Mc. work the Gatti-Hallicrafters Expedition, now operating in Tanganyika as VQ3HGE, is willing to listen on 50 Mc. for possible crossband contacts. Both operators, W6PBV and WØLHS, were active on 50 Mc. before signing up with the expedition. Via W2BIA we learn that FA8BG is on daily on 50.2 Mc., between 1330 and 1500 GCT. He and MD5KW should be in a position to make contacts with stations in southern and central Africa during March, and possibly April. The path across the South Atlantic looks fairly good on the March predictions, the indicated m.u.f. being above that shown on the North Atlantic charts for some of the times that path has been open for 50-Mc. work.

A Broad-Band Antenna for 50 Mc.

Last month we were propagandizing for use of more of the 50-Mc. band, the region above 51 Mc. going almost unused at present. One reason for this concentration of activity at the low end is the sharpness of the frequency response of most antenna systems having any appreciable gain. Even a wide-spaced 4-element array such as the one described in these pages last year cannot be expected to cover more than half of the band, and at the high end of its coverage (where the directors start to act as reflectors) the performance drops suddenly to well below that of a simple dipole.

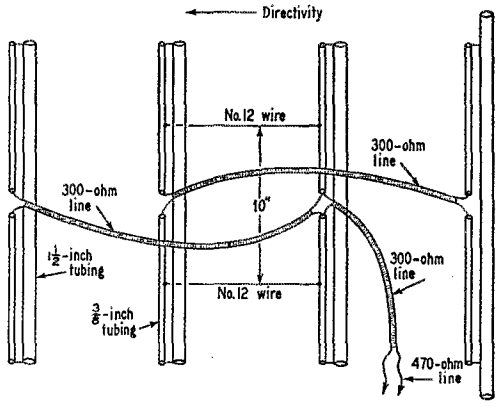
Because he wanted to operate in the high half of the band, and still be able to do a creditable job of receiving at the low end, W1EYM, Fairfield, Conn., developed the array pictured herewith. It consists of four similar folded dipoles, each cut for the center of the band (108 inches long) except for the reflector unit which has 4-inch extensions at each end. The dipoles are mounted a quarter wavelength apart, and fed as shown in the drawing. Though work with the antenna system is still in the experimental phase, W1EYM has established the following facts regarding its performance:

1) It provides a reasonably flat match to a 470-ohm line over the entire 50–54 Mc. band.

2) It has an average gain over the whole band of 8 db. over a half-wave antenna cut for 52 Mc.

3) The front-to-back ratio varies from approximately 3 db. at the low end to about 12 to 15 db. at the high end, this fairly-high front-to-back continuing on up to 60 Mc.

The dipoles are each 108 inches long. If they were cut for the low-frequency end of the band



Detail drawing of the broad-band 50-Mc. antenna system worked out by W1EYM. Four folded dipoles, 54 inches apart, are driven as shown, the impedance at the feed-point being approximately 470 ohms. The dipoles are 108 inches long, except for the reflector element, which has 4-inch extensions at each end. Interconnecting sections of 300-ohm line are approximately 108 inches long. The section of 300-ohm line inserted between the 470-ohm transmission line and the second dipole is a half-wave long (minus propagation-factor shortening) and is used to provide a flexible section rather than for matching purposes. The sections of each dipole are 2.94 inches apart, center to center. Performance characteristics are given in the text.

(about 110 inches) it is believed that the good front-to-back ratio would extend throughout the band. As climbing up and down the tower for each adjustment became quite an arduous proposition, Nat has been working with scale models on 420 Mc. Reflections have been bothering him in making accurate measurements on this frequency, and the project is being held up until tests can be conducted in an open field which will be devoid of the reflection problems.

144-Mc. News

Things are picking up, and we have a goodly supply of reports from the 2-meter contingent

Standings as of February 29th

W1CLS	44	W5VY	40	W9ZHL	43
W3CIR/1	42	W5ML	38	W9JMS	36
W1LLL	40	W5AJG	38	W9QKM	33
W1HDQ	39	W5JLY	38	W9ALU	32
W1CGY	38	W5FRD	38	W9UIA	30
W1HMS	36	W5FSC	34	W9AB	23
W1JLK	35	W5LIU	24		
W1LSN	33			WØUSI	45
W1CLH	32	**W6UXN**	**46**	WØQIN	43
W1CJL	30	W6OVK	38	WØZJB	43
W1AF	27	W6ANN	38	WØDZM	42
W1NF	25	W6BPT	34	WØTQK	42
W1EIO	24	W6FPV	31	WØSV	42
W1HIL	21	W6WNN	24	WØBJV	42
		W6EUL	22		
W2BYM	39	W6HZ	13	WØHXY	41
W2AMJ	38	W6BWG	12	WØINI	41
W2IDZ	37			WØYUQ	39
W2QVH	37			WØJHS	38
W2RLV	37	W7BQX	43	WØPKD	36
		W7ERA	43		
W3OR	35	W7HEA	40	VE1QY	28
W1KMZ/3	33	W7DYD	37	VE3ANY	27
W3MKL	33	W7FDJ	36	VE1QZ	24
W3RUE	31	W7FFE	35	G5BY	24
W3MQU	15	W7KAD	35	VE2KH	17
W3GKP	12	W7JPA	34	VE2GT	14
				XE1KE	13
W4GJO	**46**	W7QAP	30		
W4QN	40	W7ACD	27		
W4GIY	40	W7JPN	19		
W4EID	38	W7OWX	15		
W4WMI	33				
W4FBH	31	W8QYD	38		
W4HVV	29	W8RFW	25		
W4FJ	26	W8TDJ	22		
W4FNR	25				
W4EMM	25	**W9DWU**	**46**		
W4JML	20	W9PK	43		

Note: This list covers states worked since March 1, 1946. Send in monthly reports of states worked in 1948 on 50, 144, and 235 Mc. and higher, for entry in the 1948 Most-States-Worked Contest. See January *QST*, page 150, for details.

this month. Many thanks, gang, and keep the news coming. The 144-Mc. band can have the representation it deserves in these pages only if you take the trouble to write in and let us know what you are doing.

Here's an announcement that will be greeted with groans or cheers, depending upon which side you take in the polarization argument: W4FJ, in a mimeographed notice which is being mailed out far and wide, lists the calls of more than 50 stations who have agreed to go horizontal on 144 Mc. early this spring. The list includes stations in Cape Henry, Chesapeake Beach, Buckroe Beach, Norfolk, Hampton, Newport News, Parksley, Accomac, Lynchburg, Appomattox, Roanoke, Ashland, Richmond, and Arlington, Virginia, as well as others farther up the Atlantic Seaboard. Most of them already have multielement arrays, and all have crystal-controlled transmitters and superhet receivers.

Early spring talk, which is about as far as antenna work goes in New England in February, indicates that quite a few W1s will join in the switch to horizontal. But we hasten to warn any overconfident proponents of the laying-down school that conversion of the Eastern Seaboard to horizontal polarization will be no mere push-over. If the boys who are willing to try can demonstrate any real superiority for horizontal, most of the rest will follow, willingly, but we know from past experience that no great number will change merely because somebody *thought* it a good idea. So let's see some *results*, for only they will turn the trick.

How about f.m.? One of the penalties of increasing power on 144 Mc. in city locations is the development of a "listening public" in the broadcast band. The cure, as with lower bands, is the use of f.m., but the receiver problem is more troublesome on 144 Mc. than on 50 or 28 Mc. On the lower bands almost everyone uses a communications receiver, with resulting standardization of the passband. You can set up your deviation for the average and not be too far off. On 2 it's a different matter. With receivers differing in passband all the way from about one megacycle for some superregens to as little as 5 kc. for the converter-communications-receiver combinations, it is impossible to strike a happy medium for all. Even a swing that is suitable for a 522 receiver will sound like so much hash on a communications receiver with a 455-kc. i.f.

In some areas, where the 2-meter population is fairly limited, there is a considerable standardization in receiver techniques, and thus the life of the n.f.m. enthusiast is made easier. Such is the case on the Minneapolis-Champlin-St. Cloud circuit, according to WØSV, who is running 800 watts to a pair of 4-125-As and using crystal-controlled phase modulation, as described in July, 1947, *QST*. Originally he had been using reactance-modulated f.m., but the signal was not stable enough to suit him. For some time after installing this system he was having "insufficient deviation" trouble, until WØJHS came to the rescue with a limiter and discriminator added to his i.f.

Results with this receiving arrangement were so good that others began to follow suit, and now WØRIL and WØHXY have gone over to phase modulation, putting St. Cloud on a 100-per-cent non-a.m. basis. WØHCY in Minneapolis was next, followed by WØBHY and WØTOZ in St. Paul. Without help from favorable conditions, the 65-mile hop between St. Cloud and the Twin Cities is spanned regularly, and with many of the receivers in the area now equipped for f.m. detec-

tion, everybody (including the BCLs) is happy. Of course, things may be different when tropospheric propagation improves, and the signals start getting out to the 522 territories, when it will be a matter of "very low modulation, OM!" again. Other stations in this territory, using a.m., are WØUYU, Ogilvie, WØQHC and WØQIN, Minneapolis, WØZNE, Waite Park, and WØBBL, St. Paul.

The receiving system at WØSV is really something: two-stage lighthouse preamplifier (surplus), 954 r.f. (with concentric line), 6AK5 triode-connected mixer, Cardwell oscillator unit, Wilcox F-3 crystal-controlled receiver on 5.5 Mc., and an RME NBF-4 ratio-detector adapter unit. This gang in the upper Mississippi Valley region look like good prospects for a new DX record from the Erie area, come the hot summer nights.

One word of warning in connection with 2-meter DX: never take it for granted that all the activity is in any particular direction. In this day of 522s everywhere there is apt to be a group of 2-meter enthusiasts in any direction. With sharp beams, we are inclined to listen only in the directions from which we have been accustomed to hear activity. Worried on this score is a growing group of 2-meter men in Winnipeg, Manitoba. Several crystal-controlled stations are now active and some high-gain beams will be in service before the DX season begins. VE4FU passes along the information that this group, the High-Frequency Club of Winnipeg, is active nightly at 9 P.M. A mere 400 miles from Minneapolis, these fellows hope to be the first VE4s to work 2-meter DX. The Twin Cities, and even the Chicago area, would not seem impossible, in view of last year's phenomenal results.

The development of reliable relay routes is always a worth-while endeavor, and it is particularly helpful during the off-season, when the lure of DX is missing, and many of the gang tend to abandon regular operating on the band unless some incentive to get on is provided. One such network which has gotten well underway during the winter season is the Atlantic Coast 2-Meter Trunk Line. In its first message-handling session, February 1st, a message originated by W1JFF, Newport, R. I., reached W2VQR, Asbury Park, N. J., in 15 minutes. The routing was W1JFF, W1PEA, E. Norwalk, Conn., W2RH, Port Chester, N. Y., W2QUF, W. Orange, N. J., W2DFV, Fords, N. J., and W2VQR. A round trip over the same route was completed on Feb. 22nd in 40 minutes.

The objectives of this group include the establishment of a *reliable* chain that will function regardless of conditions. Stations at each end are looking for additional reliable outlets to the north and south, with a view to extending the range of operation. Candidates should be able to work at least the last *two* stations in the network, so that reliable communication can be carried on if one of the terminal stations is missing. The principle of maintaining at least one alternate station is carried out throughout the chain. The network operates each Sunday between 7 and 8 P.M., and trunk-line stations are asked to devote this entire period to trunk-line activity, regardless of band openings and other distractions. Anyone interested in joining this trunk-line activity is asked to get in touch with W2RH, R.F.D. 1, Port Chester, N. Y.

RECORDS

Two-Way Work

50 Mc.: CE1AH — J9AAO
10,500 Miles — October 17, 1947

144 Mc.: W3GV — WØWGZ
660 Miles — September 18, 1947

235 Mc.: W1CTW — W2HWX
210 Miles — October 12, 1947

420 Mc.: W6VIX/6 — W6ZRN/6
186 Miles — July 27, 1947

1215 Mc.: W3MLN/3 — W3HFW/3
12.5 Miles — September 24, 1947

2300 Mc.: W1JSM/1 — W1ILS/1
66 Miles — October 5, 1947

3300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947

5250 Mc.: W2LGF/2 — W7FQF/2
31 Miles — December 2, 1945

10,000 Mc.: W4HPJ/3 — W6IFE/3
7.65 Miles — July 11, 1946

21,000 Mc.: W1NVL/2 — W9SAD/2
300 Feet — May 18, 1946

A 2-meter emergency net in operation with 18 units is reported by W9AFT, Milwaukee, Wis. This group operates each Monday night at 8 P.M., CST. Another emergency group is that conducted in the Memphis, Tenn., area each Sunday night by W4DI. Reporting stations include W4s JJT, BOR, BAQ, GZT and VT. Attempts to work W4FWX at Somerville have not yet succeeded, according to W4VT, who included the above information in his current OES report.

And here's a batch of local groups in various parts of the country, to conclude this month's 2-meter news, which has shown a heartening turn upward:

Emporium, Penna. — W3NMJ, W3MEP and W8GLH/3 are talking to themselves nightly, and wondering if there may be other groups in the north-central Pennsylvania hills who might be doing likewise.

Sheperdsville, Kentucky — W4FBJ has been hearing weak unidentifiable signals from the north. He is on each night from 7 P.M. on, working stations in the Louisville area, some 27 miles distant. Most of the stations thereabouts are vertical at present, but will change if necessary.

W4FBJ also has 100 watts on 50.02 Mc., and a 4-element array for that band.

Auburn, Ala. — W4LRE reports W4DBG, W4LJF and W4MMK active nearly every night on 144.126 Mc. The first three have 522 rigs. All are using stacked vertical antennas at present, but will change to horizontal shortly. Auburn is close to the Georgia border, just below the middle of the state, and should be within the range of the gang up around Atlanta. Florida stations should be workable from there under good conditions also.

Steubenville, Ohio — W8ZEI lists W8CHE, W8TW, W8ZRI and W8SFI as active on 144 Mc., coöperating with EC nets on lower frequencies. Distances up to 10 blocks are covered solidly with walkie-talkie gear, tying in with 10-meter mobile units, which in turn work the Fort Steubenville Radio Club station, which is in the statewide net on 80.

Los Angeles, Calif. — Does anyone know about the station signing XE2KA heard in the Los Angeles area on several occasions and reported by W9BZN/6? In connection with XEs on 144 Mc., XE1KE says that he got all set for 2-meter operation before finding out that his license did not include 2-meter work, a condition he hopes to have rectified soon.

Ogden, Iowa — WØAEH reports that 3920 kc. is used throughout the Middle West to report the condition of the 2-meter band. Interested parties check in on this frequency at 9 P.M. CST.

Maritime-Mobile — W4AYE/MM works on 144 Mc. while making a coastal run from the Gulf to Fall River, Mass., and return. He makes a special effort to be on hourly, on the hour, starting at 7 P.M. The 2-meter band should provide some mighty interesting contacts for the fellows who work maritime mobile on similar coastal runs, particularly if they have facilities for good 2-meter antenna systems.

Doings on the Higher Bands

Having found things pretty quiet on 6 and 2 this winter, VE1QZ, Halifax, N. S., has been working on gear for 235 (or 220) Mc. He has converted an aircraft radar receiver that uses two stages of r.f. (956s), and has removed the loading resistors on the 30-Mc. i.f. unit, reducing the bandwidth materially. The mixer output can also be run into his HQ-129, for reception of crystal-controlled signals. He will have crystal control on whichever band is to be used this summer.

Several of those radar receivers which were originally converted for use on 144 Mc. can be made to work on 235 or 220 very nicely. W1HDF, Elmwood, Conn., has done a job on a BC-406, and it performs beautifully on 220 Mc. Since it originally tuned up to about 200 Mc., anyway, it is no trick at all to get it to go higher, and those two r.f. stages do no harm at all!

W8PYY, Jackson, Mich., takes us to task for our lack of dope on gear for 1¼-meter use. It's coming, OM, and soon. He has 100 watts on 144 and 235 Mc., and worked 7 states and 4 call areas last year on 144 Mc.

W9BAY, Chicago Heights, Ill., would like to see stabilization of gear for 144 Mc. made mandatory, forcing those who wish to use the simplest form of gear to move on to higher bands. Well, the present condition of activity on 144 Mc. has almost produced the result without legal action, the modulated oscillator having almost been forced out of business on 2 meters, a condition which was not prevalent when stabilization of 5-meter rigs was made mandatory back in 1938. The problem would seem to be well on the way toward taking care of itself.

At what frequency does ignition noise peak? There seems to be a difference of opinion — W4VT says there is no ignition noise when using a superregen on 420, and W6PIV says that ignition noise is worse than on lower bands! Certainly receiver noise goes up with frequency, and signal strength tends to go down, so the signal-to-noise ratio is due to drop as we go higher. The ease of erection of high-gain antennas, and possibly improved tropospheric bending, will help to counteract this, however. W6PIV reports the first two-way 420-Mc. QSO between Sacramento (W6PIV) and Berkeley Hills (W6VSV) during the SS contest, a distance of 65 miles. The next shot is the crystal-controlled signal of W6OVK at Redwood City. The Redwood City-Sacramento path has been solid on 144 Mc. for two years, so it is expected that the right antennas will turn the trick on 420 before long.

From Memphis, Tenn., W4VT reports that there is more interest in the possibilities of the 420-Mc. band, now that he and W4GPV have heard each other.

Since last summer's vacation on Martha's Vineyard Island, your conductor has held the Cape Cod DX record for 420 Mc. — 7 miles, from Vineyard Haven to Woods Hole, but we've got to do better another time, for W1JLK is now working W1HMS, Fairhaven, Mass., a distance of 15 miles across Buzzards Bay. The rigs are converted APS-13s, and the antennas are 16-element horizontal arrays. Horizontal, did you say, Deke? Shades of the Minutemen!

More than a year ago we asked if there was anyone in the New York area interested in 2400 Mc. W2VQA has gear for 2400 and 1215 Mc. and would like to get in touch with others who are similarly equipped.

The Official Experimental Station idea, slow at first in getting started, is now taking hold. Much of the information contained in this month's department was gleaned from OES station reports, and there is more, some of which will be reproduced in the special bulletins sent regularly to OES appointees.

Notes on Push-Pull Triodes

Avoiding Trouble in Balanced Class C Amplifiers

BY I. H. NIXON,* VE3ACL

• **This article treats three of the most common troubles in push-pull Class C amplifiers — parasitics, neutralization and uneven load distribution. The remedies suggested are simple and effective.**

JUDGING from the popularity of push-pull Class C stages as final amplifiers in amateur transmitters, many an unsuspecting ham has looked at the schematic diagram of such a stage, shown in Fig. 1, and has been impressed by the advantages which its symmetry seems to offer. At first glance there are indeed many desirable features. The possibility of unbalance as a result of stray capacitances and inductances is minimized; neutralization, in the case of triodes, is simplified, and the push-pull circuit tends to reduce the generation of even-multiple harmonics. For these reasons it is not uncommon to find two tubes in the final amplifier when one would be capable of handling the desired input without exceeding ratings.

It is not intended here to attempt a comparison of the merits of single-ended *versus* push-pull circuits, but merely to point out, for the guidance of those who favor the latter type, some of the major troubles that may be expected to develop in a push-pull Class C stage, especially when triodes are used. Contrary to popular opinion, modern high-perveance three-element tubes can cause almost as much grief as tetrodes or pentodes. Accordingly they form the subject of this article, although some of the remarks which follow can be applied to all types.

Unfortunately, it is necessary to dampen the prospective builder's initial enthusiasm. The chances are excellent that his newly-constructed amplifier, far from being trouble-free in operation, will have at least three undesirable tendencies. It may develop parasitic oscillations. If the transmitter is to be operated on three or more bands, one neutralization adjustment may not be correct for all of them. The circuit may not be balanced, i.e., one tube may dissipate more power than the other. The aggregate result can be spurious signals, key clicks, little or no attenuation of harmonics, and band changing hampered by the need to reneutralize — all of which are not calculated to lower the blood pressure. The average ham would do well to anticipate such bugs so that he may make allowances for such preventive measures as are possible during construction.

* 143 Royal York Rd. North, Toronto, Ont., Canada.

Parasitic Oscillation

In the course of initial testing of the amplifier, trouble-shooting should follow a definite pattern, with the elimination of parasitic oscillation receiving first attention because remedial action taken in this direction may have an effect upon neutralization and balance. Oscillation, whether at the operating frequency or at frequencies remote from the operating frequency, can best be detected by removing excitation from the amplifier, applying plate voltage with the grid bias adjusted to the point where the plate current drawn does not result in a plate dissipation in excess of the rating for the two tubes. When the grid and plate tank condensers are rotated under these conditions, the plate current should remain constant and there should be no sign of grid current with the amplifier neutralized. If this is not the case, parasitic oscillation is taking place.

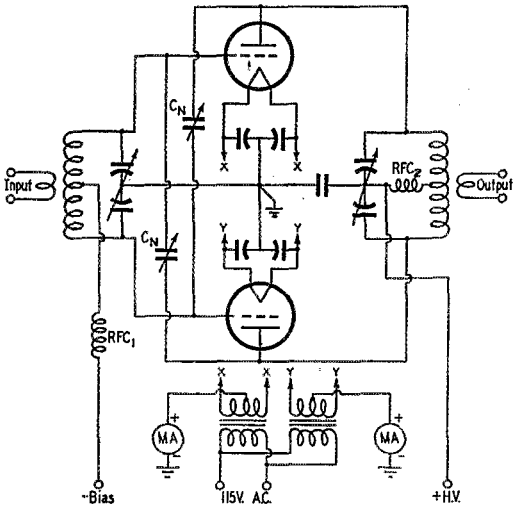


Fig. 1 — Typical neutralized push-pull triode amplifier circuit.

The next step is to determine the frequency of oscillation. For this an absorption wavemeter is ideal. The tuning range of the meter must be very wide — something like 200 kc. to 200 Mc. In the absence of such an instrument, a neon bulb will give a rough approximation when brought near a part of the circuit carrying r.f. The neon bulb

will glow with a predominantly orange color if the parasitic is of low frequency, or violet if it is of very-high frequency.

Low-frequency parasitics are almost always the result of resonance in plate and grid r.f. chokes. The obvious remedy is to eliminate one of the chokes.

V.h.f. oscillations sometimes present more of a problem, since the leads which serve to make up the tank circuits are not always easily determined. But regardless of how the circuit is formed, a trap circuit tuned to the frequency of the parasitic, connected in series with either grid lead at the socket terminal, usually will suffice to suppress the oscillation. A trap, simply constructed by winding a 10-turn coil of No. 14 wire on a ¼-inch diameter form (such as a pencil), tuned by a ceramic or compression mica trimmer of about 30 $\mu\mu$fd. maximum capacitance, usually will hit the parasitic frequency somewhere within its tuning range. If it does not, the tuning range may have to be shifted by altering the coil by a turn or two. Depending upon which leads are forming the oscillatory circuit, it may be preferable to feed the lead to the neutralizing condenser through the trap or alternatively directly to the grid terminal. Under other conditions placing the trap in the plate lead, rather than in the grid lead, may be most effective. In general, however, a trap should be used in one tube only, since the object is to unbalance the parasitic circuit.

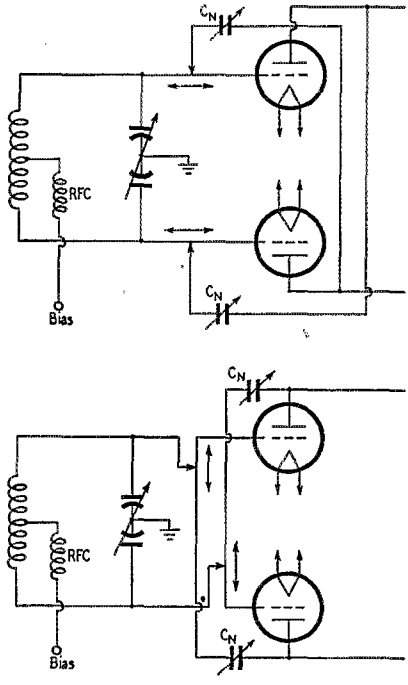


Fig. 2 — Showing how the taps are made to maintain effective neutralization over a wide range of frequencies.

Neutralization

So much for parasitics. Making certain that they cannot exist in your final amplifier is good insurance toward a clean signal, whether you key the amplifier or the oscillator, or operate only on 'phone. Turning now to the neutralization of the amplifier, you may find that the adjustment varies from band to band, especially if it has been found necessary to bring one of the neutralizing leads through a parasitic trap. The amplifier should first be neutralized for the lowest-frequency band to be used and the settings of the neutralizing condensers noted. All subsequent experimenting should now be done at the highest-frequency band. When an adjustment has been found where neutralization at the highest frequency prevails with the neutralizing condensers set as they were for the lowest frequency, the adjustment should hold for intermediate frequencies. The recommended method of accomplishing this is to tap both neutralizing-condenser leads along various points on the grid leads, as indicated in Fig. 2, starting as close to the tube sockets as possible and working back toward the grid tank condenser. In extreme cases, it may be necessary to try lengthening or shortening all leads; a little work usually will reveal the steps necessary to bring about the desired result.

Circuit Balance

The measures outlined above to discourage parasitics and to achieve stable neutralization can be counted upon to upset the balance in a push-pull amplifier. This is characterized by the condition where one bottle carries far more than its share of the load. If you are running close to the maximum rated input, this condition can shorten tube life considerably. It is definitely good practice to use separate filament transformers so that individual cathode currents can be checked. It is often easier to mount two small units as compared to a single large one, and they may even cost less. Meters inserted between filament center-tap and ground will read the sum of grid and plate currents, but the balance in grid current can be determined by removing plate voltage and reading grid current alone.

Balanced grid current doesn't always mean balanced plate current, however, especially at the higher frequencies. Proper balance is most easily obtained by adjusting — not necessarily equalizing — the grid drive to each tube so that the cathode currents are balanced.

The adjustment procedure to be followed will depend upon the arrangement of the grid tank circuit. In the circuit of Fig. 3A, the nodal point or electrical center is established by grounding the center of the tank condenser. If the r.f. choke is effective, its point of connection to the coil has

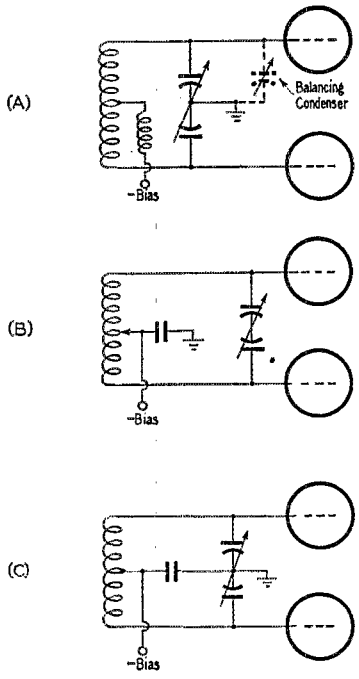


Fig. 3 — Methods of adjusting for balance. If the tank-condenser rotor is grounded as in A, a compensating condenser should be used across one side of the circuit; if the center of the coil is grounded, as in B, the center-tap may be adjusted. Grounding of both condenser rotor and coil center-tap, as shown in C, is not recommended.

negligible effect on the balance of the circuit. Such a circuit can be balanced by connecting a small variable condenser across the section of the tank condenser connected to the tube drawing more current and adjusting its capacitance until cathode currents balance. The circuit should be kept at resonance, of course, by readjusting the tank condenser as found necessary. If the balance does not remain constant with frequency, it will be found that the neutralizing condensers provide the answer. With the compensating condenser adjusted for balance with the tank circuit tuned to resonance on the lowest-frequency band, any unbalance at the highest frequency can be compensated for by increasing the capacitance of one neutralizing condenser and correspondingly decreasing the capacitance of the other to maintain neutralization. This will have only a minor effect on the low-frequency adjustment. Needless to say, the balance should be checked whenever a tube is replaced.

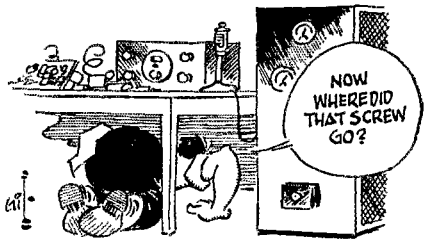
If the electrical center is located at the center of the coil, as shown in Fig. 3B, the procedure will be the same, except that the tap on the coil should be moved one way or the other until balance is obtained. This connection may be used when it becomes necessary to eliminate the r.f. choke.

The arrangement shown in Fig. 3C is sometimes used, but in general is not to be recommended since it may serve to set up a parasitic close to the operating frequency.

An amplifier which has been tested and adjusted as described should reward the builder by performing as it is supposed to do, regardless of how you key or modulate the rig. But if you neglect these fundamental considerations, you're not giving your push-pull stage a chance. Remember, your final generates the signal that goes into the antenna — don't take it for granted.

'Phone-Band Phunnies

The Busy Bee



THIS bird tries to outdo Teddy Roosevelt, who is said to have been able to read a book, dictate a letter, and carry on an interview all at the same time. While he is in QSO with you, he is invariably doing several other things as well, things such as drilling a chassis, repairing a broadcast set, or papering the shack. He runs the gain wide open so he can talk to you from any place in the house, and his conversation, liberally salted with grunts and pauses, goes something like this:

"Sorry I was so slow in coming back, Old Man. When you turned it over to me, I was out in the yard taking up a little slack in the feeders. I did not get much of what you said, for I had the drill going most of the time you were talking. Wait a minute now while I punch out this socket hole. [There is an ear-shattering crash.]

"Did you hear that? I'll bet you did. When I smacked the punch with the sledge, it really made the old Class B meter jump.

"Wups! I dropped a screw. [The voice becomes muffled.] I'm down here on my hands and knees under the bench now. Where the heck did the cussed thing roll to? Oh well, I may as well go upstairs and get a jar of them I have up there. I'll turn it over to you, Old Man, and you can be transmitting while I am gone. Take her away!"

It is a great inspiration to you to know that you have his undivided attention.

— *John T. Frye, W9EGV*

Hints and Kinks For the Experimenter

PROTECTING SCREEN-GRID TUBES

A SIMPLE method of protecting the large screen-grid tube against failure has been described in the past for the case where the screen current is supplied to the tube through a series dropping resistor from the plate supply.[1] A different and more serious problem is introduced when the screen current is supplied from a low-voltage source of comparatively good regulation such as the exciter power supply. In this instance, loss of plate or bias voltage is almost always fatal to the amplifier tube if the full screen potential is still applied.

The circuit shown in Fig. 1 offers a simple method for protecting the tube against failure of the plate supply, and at the same time eliminates the need for fixed bias. First consider the circuit

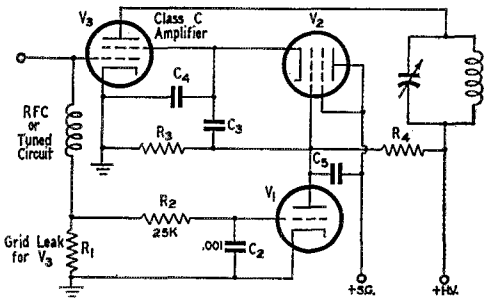


Fig. 1 — **Protective circuit for screen-grid tubes when a separate screen supply is used. The "clamper-tube" idea is applied through a series tube to reduce screen voltage automatically whenever excitation or plate voltage is removed.**

with the amplifier tube V_3 operating under normal conditions. The negative grid bias developed across R_1 is applied to the grid of V_1, thereby cutting off its plate current, so for the moment this tube may be disregarded. R_3 and R_4 act as a voltage divider across the plate supply of the amplifier tube. Their values are such that the voltage at their junction point is approximately equal to the desired operating voltage for the screen of the amplifier tube.

If a sufficiently-high voltage is applied to the plate of V_2, it will conduct, and the potential applied to the plate of V_2 (less tube drop) will appear at its cathode, serving as the screen voltage of V_3. This in turn is controlled by the grid voltage of V_2, which is determined by R_3R_4. If, however, the plate voltage of V_3 is removed, the grid of V_2 falls to ground potential, approximately, tending to reduce sharply the conductivity of V_2, thus reducing the screen potential on the amplifier tube. Thus V_2 serves to protect the tube against failure of the plate supply while excitation and screen voltage are applied.

The function of V_1 is to protect the amplifier tube against failure of excitation while plate and screen voltages are still applied. If the excitation is removed from the grid of the amplifier tube, V_3, the grid of V_1 returns to zero, and plate current is drawn through R_4. This reduces the voltage on the grid of V_2, causing its conductivity to be decreased, thus lowering the screen voltage on the amplifier tube to a point where plate and screen dissipation are not excessive.

For a practical case, assume that the desired amplifier screen voltage is of the order of 300 to 400 volts. A 6J5 tube may be used for V_1, and a 6L6G, with the screen and plate tied together, may be used for V_2. If the screen current in the amplifier tube is about 30 or 40 ma., the drop across V_2 will be 75 to 100 volts. Thus the screen supply will have to furnish this extra voltage. R_3 and R_4 should be about 500 ohms per volt. Since the current through them is small, they may be made up of a number of 2-watt carbon resistors in series, the value of each resistor being 0.25 megohm or less. This allows a reasonable factor of safety in the matter of allowable dissipation and voltage drop across each resistor. A separate filament transformer is required for V_2. If the screen current supplied to V_3 is modulated, C_3 and C_5 must be large enough to pass the modulation frequencies.

— *W. B. Bernard, W1QUR, ex-W3LWX*

BUILT-IN OSCILLOSCOPE FOR MODULATION MONITORING

THE availability of 3-inch cathode-ray tubes (3AP1, 3BP1, etc.) and 8016 high-voltage rectifier tubes on the surplus market makes it possible for every amateur who operates 'phone to equip his transmitter with a built-in 'scope for modulation monitoring.

The circuit shown in Fig. 2 has two novel features. Accelerating voltage for the cathode-ray tube is obtained from one of the high-voltage supplies in the transmitter, eliminating the need for a separate supply. The filament voltage for

[1] "A Medium-Power Bandswitching Transmitter," Smith, *QST*, October, 1946. "Screen Safety Ballast for Large Beam Tetrodes and Pentodes," *CQ*, November, 1947.

the 8016 rectifier is obtained by link coupling it to the tank coil of a low-power r.f. stage. Thus during stand-by periods the 'scope tube is inoperative, eliminating the danger of burning the screen.

Since the 8016 operates at only 1.25 volts and is easily damaged by overloads, it is suggested that the initial adjustment of the link be made using a No. 112 flashlight lamp across the link in place of the 8016 filament. Use a one-turn link

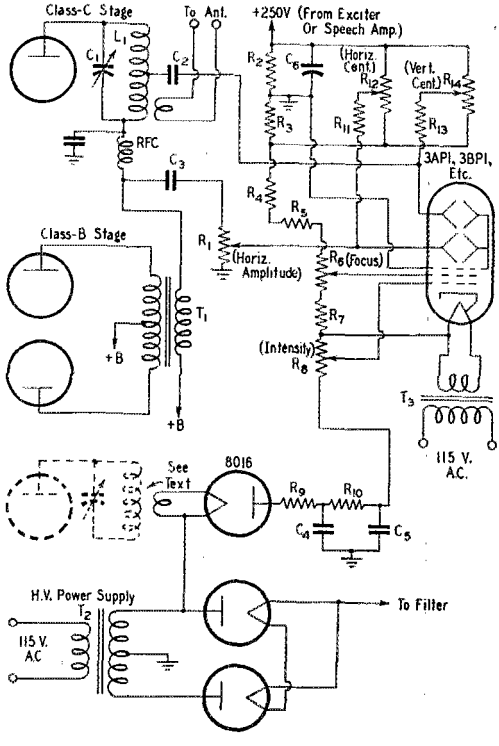


Fig. 2 — Circuit diagram of a built-in 'scope that costs little, utilizes the transmitter power supply, and can be added to any medium- or high-power 'phone transmitter.

C_1 — Final-amplifier tuning condenser.
C_2 — 50-$\mu\mu$fd. 5000-volt mica.
C_3 — 0.01-μfd. high-voltage mica or paper (oil-filled).
C_4, C_5 — 0.05-μfd. 1500-volt paper.
C_6 — 1.0 μfd. 600-volt paper.
R_1 — 1-megohm potentiometer.
R_2, R_3 — 2.7 megohms, 1 watt.
R_4, R_5 — 1.8 megohms, 1 watt.
R_6 — 2-megohm potentiometer.
R_7 — 1 megohm, 1 watt.
R_8 — 0.5-megohm potentiometer.
R_9 — 47,000 ohms, 1 watt.
R_{10} — 0.15 megohm, 1 watt.
R_{11}, R_{13} — 1 megohm, ½ watt.
R_{12}, R_{14} — 3-megohm potentiometer.
L_1 — Final-amplifier tank coil.
RFC — Final-amplifier r.f. choke.
T_1 — Modulation transformer.
T_2 — Power transformer (about 1000 volts each side c.t.)
T_3 — Filament transformer (depends upon type of 'scope tube used).

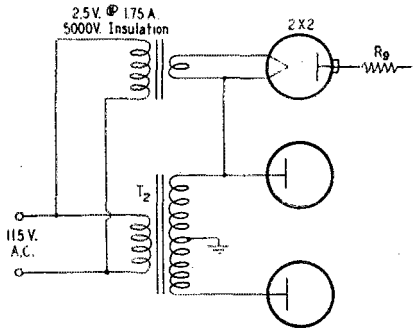


Fig. 3 — Alternate connections for the built-in oscilloscope when using a 2X2 high-voltage rectifier with transformer for filament supply.

and start with very loose coupling. Increase the coupling until the lamp reaches full brilliance. *Caution!* The lead from the high-voltage transformer to the link must be opened during this adjustment, because otherwise the link would be at the full plate potential! All wiring associated with the 8016 filament should be insulated for several thousand volts.

Should a more conventional filament circuit be desired, any of a number of the high-voltage rectifiers (2X2, 2V3-G, etc.) may be used with a well-insulated filament transformer. A modification of this type is shown in Fig. 3.

In operation, this modulation indicator produces the familiar trapezoidal pattern (in many ways superior to any other for this purpose). Should a "leaning" pattern appear, it is probable that some r.f. voltage is appearing at the horizontal-deflection plates of the tube. This effect can be minimized by insertion of a 2.5-mh. r.f. choke in the lead to the rotor arm of R_1.

General information on the adjustment and operation of cathode-ray tubes, and on the interpretation of the trapezoidal patterns obtained, may be found in *The Radio Amateur's Handbook*.

— John V. Ellison, W4MID

FIELD-STRENGTH MEASUREMENTS WITH A VOLT-OHMMETER

After pondering some length of time in an effort to avoid having to build a permanent field-strength meter to tune a beam antenna, the following brain child resulted.

Using your volt-ohmmeter, or a 0–1 ma. meter, tie a 1N34 crystal diode across the ends of the test leads where they enter the meter box. Place the ohmmeter, with the leads attached, a half-wavelength or more from the antenna that is to be adjusted. Spread the test leads out on the ground to resemble a dipole with the ohmmeter at the center. Set the ohmmeter to the 0–1 ma. scale, aim the beam at the meter, and turn the transmitter on. The position of the meter may

(Continued on page 130)

Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

'PHONE FREQUENCIES

1544 Johnson St., Klamath Falls, Oregon

Editor, *QST:*

Our friend W4JOH is guilty of overlooking one important fact: lots of us prefer c.w. to 'phone. Why wouldn't it be just as reasonable for me to argue for "the Utopia where 'phone signals are a federal offense except for emergency purposes"? I suppose Mr. Cook would demand the right-of-way to the entire highway if he should choose to buy a car three or four times as wide as the normal vehicle.

I've been a c.w. man since I received my license in 1938, but I certainly feel that the 'phone boys are entitled to a fair portion of available ham frequencies. Why not a 50–50 split? If the 'phone men insist on using a means of transmission which requires a much broader channel, thus, in effect narrowing their split of the frequencies, that's their hard luck.

— *Gib Walters, W7HDU*

Rt. 3, Box 990, Portland 2, Oregon

Editor, *QST:*

I understand that the Planning Committee has already made its recommendations to the Board of Directors, which makes this poll seem superfluous, the probability being that, as is its custom, the Board will act according to the recommendations of this Planning Committee. . . .

— *F. P. McKay, W7HJI*

[EDITOR'S NOTE: Not necessarily, OM. In numerous instances the Board, after extensive examination and discussion, has declined to act in accordance with Planning Committee recommendations.]

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14 Kingsland Rd., No. Tarrytown, N. Y.

Editor, *QST:*

. . . At the present time, the top 100 kilocycles of the 7-megacycle band is so afflicted by QRM from foreign broadcast transmitters that it is practically abandoned so far as c.w. operation is concerned. It is my sincere suggestion that these 100 kilocycles be assigned to American 'phones with the suggestion to our Canadian friends that they make a similar assignment. There is some justification to the assertion that foreign 'phone operation would probably increase in the remainder of the 7-megacycle band as a result of such an allocation in these countries; however, I believe that such interference as is thus caused to c.w. operation will be tolerable and that it is not sufficient reason for denying Canadian and American amateur 'phone operators an opportunity to show what they can do with even a small and inadequate 7-megacycle assignment. . . .

— *George M. Brown, W2CVY*

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21 Rochester St., Scottsville, N. Y.

Editor, *QST:*

. . . I do not feel that a 'phone allotment from 7250 to 7300 kc. would have the dire effects outlined by the Board. Forty meters is not primarily a DX band in my estimation (others will probably violently disagree with this) and while the 'phone QRM situation does exist and will probably be made worse by the increase in foreign 'phone stations desiring to communicate with the U. S. and Canadian stations, they, by the Board's own admission, will occupy only a small portion of the band and only during a limited time of the year and day as governed by propagation conditions.

I am strongly against the change in the 14-Mc. 'phone allotment for several reasons. Anyone who works 14-Mc. 'phone for the purpose of attempting to work DX is well aware of the fact that the 100 kc. from 14,300 to 14,400 is quite well populated by foreign 'phones. At times the QRM situation becomes objectionable at least, because there are quite a large number of foreign 'phones on the air today. If this portion of the band is opened to U. S. and Canada, the foreign 'phones will move to the low-frequency side of 14,200 and will probably have to spread out to at least 14,100. This will mean that both 'phone and c.w. operators will suffer — the c.w. fellows will be working through 'phone QRM from foreign 'phones, while the 'phone operators will be trying to pull the foreign 'phones through the heavy domestic c.w. QRM. . . .

— *R. B. Haner, jr., W2FBA*

4024 N. Pioneer, Chicago, Illinois

Editor, *QST:*

. . . The approach being made by Headquarters to the problem of channel space saving through fostering narrower bandwidths for 'phone is commendable because, like time which can't be reallocated, kilocycles are unalterable. Since there are no more, better use must be made of the available ones for greater occupancy. Like TV, present-day 'phone appears to be wasteful of frequencies.

— *Ero Erickson, W9HPJ*

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213 Davis Hall, University of Va., University, Va.

Editor, *QST:*

The League has just been pleading in our behalf for maximum spectrum space to ease our interference problem. Shall we follow this up by an expansion of a service less economical in spectrum space? Such a move will certainly make our over-all interference problem more severe. Radiotelegraph training is an amateur activity of great benefit to the public interest and should be encouraged. This operator training does much to justify our continued existence. A solution to present 'phone-band congestion should be sought in modes of 'phone communication more economical in spectrum requirements, rather than by expanding the present bands.

— *Leonard O. Hayden, W4IWS*

2851–43rd Ave., West, Seattle 99, Wash.

Editor, *QST:*

At first it seemed okay extending 14,300 to 14,400, but no — that would bring even more foreign 'phones on our little remaining c.w., 14,000–14,150. It is now impractical to use 14,300–14,400 c.w. due to foreign 'phone interference.

— *E. P. R. Eukenbrack, W7VY*

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736 Garland, Palo Alto, California

Editor, *QST:*

I would like to suggest that 'phone operation be restricted to 10 meters and above, with the possible exception of 75 'phone. . . .

— *F. A. Streib, W6QPM*

3501 Central Avenue, Tampa 3, Florida

Editor, *QST:*

. . . Why should 7000 to 7300 kc. be the only band where 'phone operation is not permitted? The old argument about crowding the band doesn't hold water. The same argument should then apply to all bands. Give the 'phone enthusiasts

equal opportunities on all frequencies. C.w. operation is fast losing popularity. Modern trends tend toward 'phone. Fifty years from this date, c.w. operation will be a thing of the past.

— *Victor Strinck, W4IRP*

5930 No. Kolmar Ave., Chicago, Illinois

Editor, *QST:*

There is something the matter with our licensing system when so many of today's young squirts are solidly on 'phone and talk about c.w. being an outmoded form of communication. They obviously haven't any experience in the delights of real and solid communication. They don't know what they're missing, and that's a pity.

Now it's one of the inconsistencies of human nature that nothing makes a man so want and appreciate something as to deny it to him. I therefore propose that all new licensees be obliged to spend a probationary year on 'phone — preferably in the 14-Mc. band on Sunday mornings — before being *permitted* to use c.w.

— *F. H. Schnell, W9UZ*

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305 North Washington, Falls Church, Va.

Editor, *QST:*

. . . In my opinion there has been only one major change in c.w. and 'phone ranks within the past 15 years. C.w. was required by FCC to use d.c. and no modulation, to narrow carrier space, and 'phone was denied the use of loop modulation in order to narrow carrier and sideband space.

The true nature of an amateur station is for experimental purposes, true, and crystal selectivity in receivers has allowed a maximum of c.w. in any allotted space. This cannot very well be applied to 'phone, granted, but widening the 'phone bands isn't the question or solution. N.f.m. or single sideband will probably be the answer, though that remains to be seen. . . .

— *Frank F. Merrill, W4JFE*

Glendale, Arizona

Editor, *QST:*

. . . In the old spark days code was all-important but with the advancement of the art I advanced to 'phone. I have no use for c.w. today except that it should be a necessity that every ham should be able to operate c.w. for emergency use. It has no place in 'phone bands except for emergency use. I think every ham should be required to work six months c.w., then six months 'phone, and then after passing an examination, which should be required at that time, become a Class A amateur. Considering the allocation of present frequencies, 'phone should be given the major share. 'Phone frequencies should also be divided for different classes of service and operating technique and procedure should be regulated. Priority should be allowed for parts of 'phone bands for third-party schedules where members of families talk to each other. Also DX should have priority in another part of the 'phone bands and a third part of the bands used for QSOs. Traffic nets should have their part. . . .

— *Dave Curtis, W7AIV*

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505 Barker Avenue, Peoria, Illinois

Editor, *QST:*

The proposition for giving 'phone stations more frequencies is shameful. Are you fellows at Headquarters really interested in reducing interference as indicated by all your late schemes such as single-sideband transmission? If you are, the answer is c.w. Why do you try, year after year and grunt by grunt, to close in on the bandwidth by complex systems when, after a long time, you will approach the bandwidth necessary for a c.w. station, something that is now available for use without the grunting?

— *Wilson D. Speight, W9FST*

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448 Ontario St., Buffalo 7, N. Y.

Editor, *QST:*

. . . This high end of 20 is valueless for c.w. because of the widespread use by foreign 'phones. I firmly believe it is to the best interests of all 20-meter hams that 'phones be allotted 200 kc. at the high end of the band. This will give c.w. a chance to utilize a few more kc. and will definitely give 'phones a lot more territory. . . .

— *Milton F. Dee, W2VTG*

Lee Street, Tewksbury, Mass.

Editor, *QST:*

. . . My experience has been that in working DX 'phone on the low-frequency end of the band, namely 14,000 to 14,200 kc., the c.w. stations occupy the lower end of this spectrum. Consequently, many DX contacts are broken up by Canadian QRM. I would propose that if additional 'phone frequencies are to be sought in the 20-meter band that they be on the low-frequency end, such as 14,150 to 14,300 kc. . . .

— *D. S. Bennett, W1BPH*

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34 Pine Grove, London, N. 20, England

Editor, *QST:*

I understand there is talk of increasing the 14-Mc. U. S. A. 'phone band to include 14,300–14,400. This will *inevitably* have the effect of shifting *all* foreign 'phones back to the low-frequency end and our already too-narrow and abused c.w. band will just cease to exist. In these days of vastly-increased ham activity all over the world it is my own humble view that 'phone on 7 and 14 Mc. is an extremely selfish form of communication — every average 'phone station occupies enough kc. for a couple of dozen or more c.w. stations. Surely 28 Mc. is the natural place for 'phone where acres of space exist in comparison? Presumably, although I personally *hate* the idea, 21 Mc. will *partly* be open to 'phone and therefore the present proposal to ruin 14 Mc. is quite uncalled for.

— *J. M. Kirk, G6ZO*

Cumberland, Maryland

Editor, *QST:*

. . . When you have a super saturation, as exists between 14,200 and 14,300 kc., doubling the spectrum space still leaves saturation. The channels 14,300 to 14,400, soon to be lopped in half by international agreement, offer almost the only opportunity for a W station to have satisfactory contacts with overseas stations. I have tried to work foreigners in the W band. This works out fine at times when an almost complete W skip is on the band. Unfortunately, this condition is rare. The rest of the time a nice little S7 foreign station hasn't a chance when some 1-kw. American single-hops into my receiver with a 40-db-over-S9 signal. This *always* happens, you may be sure.

True, the foreigners can shift to 14,150–14,200. But the Canadian activity is very intense, too, and the possibility of 100% foreign QSOs would be greatly lessened if they had to plow through the many ½-kw. Canadians. Please give this angle of a rose-strewn path for the foreigners every consideration before you decide to make the W QRM not half as thick, but *twice as wide.* I can get out okay on the present 100-kc. band, but I can't hear foreigners through its QRM.

— *David W. Jefferies, W3PA*

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26 Spring Dell, Rutherford, N. J.

Editor, *QST:*

. . . The 14-Mc. band is our best band for DX, as everyone will agree, and must therefore be considered on a world-wide basis, and not only from the viewpoint of the American 'phone man. The picture now stands as follows:

14,150 to 14,200 kc. — Canadian 'phones
14,200 to 14,300 kc. — American 'phones
14,300 to 14,400 kc. — foreign 'phones

Thus it can be readily seen that the 'phones are using 14,150 to 14,400 kc. True, the American portion is only 100 kc., but it is to their advantage that the bands are separated as they are at present. If they weren't, the 'phone man would never work any DX. Remember — 14 Mc. must,

(Continued on page 132)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
J. A. MOSKEY, W1JMY, Asst. Comm. Mgr.
ALBERT HAYES, W1IIN, Natl. Emerg. Coördinator

GEORGE HART, W1NJM, Communications Asst.
A. F. HILL, JR., W1QMI, Communications Asst.
LILLIAN M. SALTER, Communications Asst.

Some amateurs look on amateur radio only as a hobby, though it has become a great deal more than that. . . . Our appreciation of our responsibilities is reflected by the way we use our bands. . . . The frequencies we use have a public-service value. This does not permit indulgence without real justification.

— *Dade Radio Club (W4BYF)*

Rules for Annual Field Day, June 12th–13th. Are you ready for the ARRL FD? The detailed rules for this year will focus some additional attention on battery work. They were detailed in the Affiliated-Club Bulletin issued in early February, in order to give full time for advance equipment building and preparation. As always, the ARRL Field Day will be dedicated to giving equipment and operators a real workout, to make us better able to serve in communications emergencies!

This year's FD is scheduled to start as usual at 4 P.M. local *standard* time, Saturday, June 12th. However, the test period will be shortened to end at 4 P.M. local standard time, Sunday, to facilitate earlier return from afield, instead of continuing until 6 P.M. as last year. In this year's affair "one point per completed contact for all different stations" assures just as much credit for working fixed or home stations as for working other portables. Portable, not mobile work, is entered in the FD. A v.h.f.-only listing will give separate credit to those submitting FD scores in such a category. Car rigs should be FCC-reported (§12.92) as to their FD location *as portables*. The originated-message credit (25) before multiplier remains the same as well as the multipliers for below 30 watts (3), and for 30–100 watts (2), crediting low-power effort. *All* power must be independent of commercial mains to rate the 3 multiplier allowed for that factor. Score points this year will be subject to an additional multiplier of 1.5 for use of batteries on *all equipment*. If batteries are connected to a transmitter or receiver while they are charged from commercial mains, that voids the independence-from-mains multiplier.

Club plans will, we hope, encourage the testing of as many individual emergency equipments as possible during the FD opportunity. Last year some clubs gave loving cups to their high men. At least one club arranged operating tours of two hours each, with two operators to a transmitter to give everyone his operating chance! Some operators had had their tickets only two weeks! A power-checking-and-frequency-monitoring committee constantly supervised operations, insuring good signals and an honest accounting. We suggest one for each big club group. The ARTS "shoe-box-size" transmitter group turned in their highest score! The trend to try out more than one transmitter is a good one. How many simultaneously-working units are available is a measure of the ability of that group to cover different points, if deployed with as many separate power supplies in actual major emergency.

Individual Participation Welcomed! In addition to club and group FD work, which will be compared in the usual ways and which we believe will again prove fascinating, we hope that the increased emphasis on small-rig-with-battery-supply will encourage many licensees to try out on an *individual* basis (one or two operators) at the numerous points where there is no formal club or organized group activity. Our full geographical coverage as amateurs will not be available in public emergencies until many more units, workable from automobile batteries and other sources, are ready to go in ham shacks. Complete equipments with standardized plug connections and handles will be found ideal for summertime mountain and seashore vacation enjoyment, in addition to providing emergency utility and FD availability! "Surplus" dynamotors and vibrator supplies that can run from any car battery are cheaper for individual-unit outfitting than the gasoline power plants.

For the big community station or message center the gas-electric power plant, most easily maintained by a club or wealthier individual, is ideal. For the hundreds of cities and towns that have smaller groups of amateurs, and sometimes no club at all, the battery-driven rigs with versatile more-portable transmitters might well be the main reliance for any emergency. Something less than a truck is required to move stations really *designed* for portable use, too. Among other things we wonder who, this year, will run up most points with the *lightest-weight* transmitter. Individual entries in the HB (Swiss) FD usually have a "pound" limitation and we believe that some of our receivers and transmitters are as light as anyone's. "Points per pound" (exclusive of batteries) may have some general interest in connection with the building programs that go for-

ward in different live club groups. We invite you to give us weight statistics on transmitters and receivers with reports, so we can note performance of the lightest reported.

Emergency Corps Note. This year the messages originating with different portable stations under test will not be directed to ARRL Headquarters. Each message will be directed to one's Section Emergency Coördinator or SCM whose address is given on page 6 of *QST*. Each message will give the number of licensed operators afield, the location (QTH) of the portable, and the *number of AEC members* at the FD station. All ECs, where possible, are urged to get out in the field with operating groups and to take with them any necessary Form 7A registration blanks, records and member cards, so that new licensees with equipment can be signed up, and AEC cards previously issued endorsed as is necessary on an annual basis. This FD should be a fine opportunity to lay the groundwork (equipment readiness) for full organization under proper community plans, and for designation of just where future and present rigs tried out in the ARRL FD will fit in any real emergency that may require amateur communications *between* Field Days. Adventuring afield with communications brings fresh experiences and discloses new qualities and possibilities in operating organization and fraternalism.

About 29-Mc. Harmonics. An Army officer who is a good friend of the amateur writes: "A new type of interference believed caused by 29-Mc. amateur stations has been observed repeatedly while listening to Channel A (116.10 Mc.) while flying aircraft in different parts of the country. This channel is used jointly by the military services, the airlines, CAA communications stations and private pilots as an airways communications facility. It is used for reporting fixes while on instrument-flying rules."

It is imperative that the channel be kept as free from interference as possible. The fourth harmonic of 29.025 Mc. falls in this channel. The obvious first solution is the reduction of fourth-harmonic radiation from amateur 10-meter transmitters. Faraday-screened couplings (page 47, January *QST*) will reduce harmonic output, and copper screening and grounding, as in the Table-Top Kilowatt (May '47 *QST*), may prevent direct radiation, often the difficulty where tank coils have the identical conductor length of a 116-Mc. radiator! An immediate remedy is to avoid using 29.025 Mc. or to shift frequency. But if there are strong transmitter harmonics they will hinder legitimate use of other channels and invite FCC citation! No 10-meter amateur should be satisfied until he has made honest checks himself or has been checked by a near-by operator whose receiving equipment can cover this frequency. FCC §12.133 is applicable!

— *F. E. H.*

WANTED — EXPEDITION RADIO OPERATOR

Once again, in June, Commander Donald B. MacMillan will journey to the Arctic region on another of the expeditions whose history goes back to the early days of amateur radio when W1TS, W1QP and other amateurs went along as radio operator of WNP. The 1948 plans for a three months expedition include the taking along of a radio operator to perform the function of keeping the *Bowdoin* in radio contact with the U. S. via schedules with amateur stations. The operator will share with other crew members the expenses of the expedition. In view of the importance of communications, however, the operator's share will be assessed at five hundred dollars instead of the customary one thousand. If you're interested in the opportunity for adventure in the North as a member of the '48 MacMillan Expedition, address your application for the post of radio operator to Commander Donald B. MacMillan, 48 Beacon St., Boston, Mass. Applicants must hold a commercial radiotelegraph license.

Y.L.R.L. NOTES

Climax of the three-month membership drive was the February 26th–29th YLRL On-the-Air QSO Party. Scores gained in this competition were to be added to the points derived in the membership drive, with substantial prizes going to the winning district chairman and high c.w. and 'phone scorers.

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Winners of the YLRL Christmas Party On-the-Air, held early last December, were: 1st prize, Annette Thompson, W4LKM (operating the OM's station, W4CWV, Miami, Fla., on 28-Mc. 'phone); 2nd prize, Lou Littlefield, W1MCW, Cape Elizabeth, Me.; 3rd prize, Lily Mae Hester, W7KAE, Douglas, Ariz.

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Howy, W2QHH, has presented his 47 YL QSLs to the custodian of WAS/YL Certificates, W1MCW, for scrutiny. He is now frantically looking for a YL op in West Virginia so that he will be the first to obtain the club's new certificate.

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Fourteen-year-old Jane Hodgson, W4MKP of Miami, is YLRL's youngest member. The gals would like to know if she is the youngest licensed YL op in the United States or perhaps the world.

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New address of the YLRL secretary is Louise Willomitzer, W6VWR, 515 South 3rd Ave., Arcadia, Calif.

BRIEF

College amateurs are invited to join a net for students in Midwestern colleges and universities. Listen for "CQ college net" every Saturday at 1:00 P.M. CST on 7106 kc.

Frank J. Cuevas, jr., W6AOA, is an old hand in the Communications Department field organization. He has held practically every ARRL appointment, currently is RM and OBS. His interest in traffic centers about long-haul message handling; in recent months he has been relaying traffic to and from Pacific points. As an important link in the network of stations that handled traffic for Expedition Kon-Tiki last summer, W6AOA contributed heavily to the fine record of success in providing amateur communications for that venture. During the many schedules he kept with the Expedition, Frank used a double triplex beam, running east and west, which enabled him to radiate a walloping signal to the raft. The very neat station layout consists of a Collins 310-B exciter driving a home-built 1-kw. p.p. HK454-H amplifier, and a 75A receiver. A crack c.w. operator, Frank holds a 35-w.p.m. Code Proficiency Certificate and is a member of the A-1 Operator Club.

TRAFFIC TOPICS

The Tennessee C.W. Net is now in operation on 3737 kc. at 7:30 P.M. EST, Monday, Thursday and Friday.

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Operation has been resumed on another ARRL trunk line. TL "G" is now operating on 3600 kc., Monday through Friday, 8:00 P.M. EST. This line provides a route between Massachusetts and Oregon. The trunk manager is W1CCF.

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Atlantic-Pacific Trunk Line is maintaining a monitoring station on tap nightly for anyone wishing to place traffic on this net. The monitor guards the frequency for a period of one-half hour before net time each evening. If you have traffic for TLAP, call CQ TLAP on 3630 kc. between 9:00 and 9:30 P.M. EST and a member station will clear you.

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The Washington State Net on 3695 kc. is looking for stations in the Grays Harbor area. Any amateur in this area wishing to join the WSN is requested to check into the net or to contact W7ACF.

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The Buckeye Net (Ohio) is looking for stations in the Springfield area. This net operates on 3750 kc. at 7:30 P.M. EST, Monday through Friday. Those interested should check into the net or contact W8BFP.

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The Western Mass. Net is now operating on a full five-day-per-week schedule, Monday through Friday, on 3760 kc. at 7:00 P.M. EST.

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The Slow-Speed Trunk Line is receiving quite a number of applications for membership. Those interested in getting started in traffic work or handling traffic at 15 w.p.m. are cordially invited to contact Dale F. Brock, W8UKV, 4213 Western, Detroit, Mich.

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OLZ, the Oklahoma Traffic Net bulletin, has made some rules for net membership. It is thought these rules will give other nets an idea for their net membership requirements. They are as follows:

1. Each member is to report to his NCS by radio on assigned frequency at least once each week.
2. If for any reason whatsoever a net member is unable to make roll call, he may report in by radio at any time during the prescribed time limit and maintain his activity status.
3. Members who find it impossible to maintain activity on the basis outlined will be dropped from roll call and placed on inactive status until again qualified for active-status rating.
4. A report by radio in message form may be given any net member for relay to the NCS and will fulfill membership requirements.
5. Reports by mail are acceptable for leave-of-absence periods or where activity may be temporarily discontinued for other reasons beyond a one-week period.

BRASS POUNDERS LEAGUE

(January Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W2OEC*	59	15	1479	12	1565
W7FST	73	89	835	87	1084
W6REB	5	18	928	10	961
W4KDE*	63	44	422	37	566
W2LFR*	48	39	472	24	583
W2TYU	18	29	450	9	506

The following make the BPL with over 1000 "deliveries plus extra delivery credits":

W1INF 141	WØFP 126	W1IIN* 102
W1NJM 136	W9SYZ 112	W2RTZ 100
W2ITX 128	W5KTE 109	W4CFL 100
	W3ECP 103	

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put *you* in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "*honor roll*."

*December Traffic.

A.R.R.L.-MEMBER PARTY HIGH CLAIMED SCORES

The Sixth Annual ARRL-Member Party, in keeping with the pattern set by similar operating competitions since the war, produced an abundant crop of record-breaking scores and stations-worked records. W4KFC, who has made quite a name for himself as a star performer in postwar contests, submitted the highest claimed score and made the greatest number of contacts yet reported in a member party. Contest maestro W3BES wound up with a score just slightly lower than Vic's. W8WZ (ex-W8OFN), another old hand at the game, seems assured of an easy third place. There were at least ten participants who topped the highest score made last year. A complete report listing the various section winners will appear in a later issue. Listed below are some of the highest scores received as of mid-February. The figures following the calls in the tabulation represent the claimed score, members worked, and sections worked in each case.

W4KFC	75208-503-68	W8PZA	42012-280-64
W3BES	73372-490-68	W2PGT	41416-284-62
W8WZ	71829-472-69	W3MOT	41391-279-63
W1ORP	61203-395-69	W1KYK	41168-282-62
W6BQJ	60166-399-67	W1JYH	40950-275-63
W6EPZ/5	58926-377-69	W3IWM	40560-262-65
W9JRI	58888-408-68	W1EOB	40194-255-66
W3FQZ	57486-315-67	W9WEN	40176-324-62
W8ROX	57270-375-69	W4GOG	39065-303-65
W7ONG	56232-376-66	W3NCJ	38544-242-66
W9LVR	55677-366-67	W9TH	38220-244-65
W2BBK	53516-344-68	W1NXX	37376-242-64
W5LUY	53440-368-64	W8DAE	36580-245-62
VE3EF	53300-360-65	W2GFG	35760-248-60
W5KC	52000-350-65	W1CJH	35490-275-65
W4KVX	51272-377-68	W2PZE	35105-273-59
W4BRB	50987-331-67	W2CWK	34998-257-57
W1BFT	49640-315-68	W7DIS	34099-231-61
W2MEI	49010-327-65	W9NH	33960-233-60
W6WNI	48972-321-66	W3KWL	33920-215-64
W9CYU	47124-324-63	W5WG	33852-248-62
W2PWP	46096-319-67	W1AQE	33097-254-61
W1IKE	45506-323-61	W8TZO	33000-225-60
W9IGN	45012-291-66	W5AQE	32830-224-60
W7ZN	44928-301-64	W5ACL	32760-210-63
W1BIH	44764-311-62	W1OJM	32736-254-62
W3EIS	44268-308-62	W1LHE	32248-228-58
W9WFS	43956-283-66	W3NF/2	32025-238-61
W8UZJ	43276-299-62	W8AQ	31590-193-65
W3FUF	42588-313-63	VE5QZ	30856-216-58
W8SCW	42496-282-64	W9VBQ	30444-208-59
W9GKS	42438-297-66	W9HUV	30317-200-61
W9CMH	42296-245-68	W3LWN	30028-242-62
VE3AEM	42098-288-62	W9QVA	30024-228-54

BRIEF

The Frankford Radio Club of Philadelphia and the Coventry, England, Amateur Radio Society coöperated in conducting what is believed to be the first activity of its kind on record — a successful international on-the-air meeting between two radio clubs. At the English end of the circuit 30 club members gathered at three amateur stations; those who could not be present operated their own transmitters and were relayed by G5PP. On the U. S. side, W2SAI provided the transmission facilities and relayed the 50-Mc. signals of various Frankford member-stations. The proceedings were opened by Deputy Mayor W. H. Malcom of Coventry, an amateur and president of the Coventry society. His message of greeting was clearly received and acknowledged in turn by several Frankford members, after which the participants engaged in a discussion concerning their respective cities and amateur radio activities. Contact was maintained successfully over a two-hour period.

TRAINING AIDS

Four new film strips have been added to the ARRL Film Library. They are available to affiliated clubs *only* upon request in accordance with the rules. Reviews are also available upon request. The listing below gives code numbers, title, number of frames, title of lecture outline (if different), and approximate presentation time, in that order. These film strips are all U. S. Navy surplus.

FS13. "Tuning." 27. "Receiver Tuning and Selectivity." 20 minutes.

FS14. "Regeneration." 23. 20 minutes.

FS15. "Maintenance of Storage Batteries." 51. 30 minutes.

FS16. "Special Purpose Vacuum Tubes." 75. One hour.

The slide collection, "The ARRL Headquarters Station" (SC2), has been receiving widespread use by affiliated clubs. We'd like to see it used even more. The slides can be shown on any projector that will project 2 × 2 slides. A lecture outline is provided with each set. We recommend that clubs who want a good meeting program of general-interest value lasting about an hour try SC2. We have three copies of it and it is usually available.

A.R.R.L. ACTIVITIES CALENDAR

Apr. 13th: CP Qualifying Run
Apr. 24th-25th: CD QSO Party
May 14th: CP Qualifying Run
May 22nd: V.H.F. Contest
June 12th-13th: ARRL Field Day
June 21st: CP Qualifying Run
July 14th: CP Qualifying Run
July 24th-25th: CD QSO Party
Aug. 19th: CP Qualifying Run
Sept. 14th: CP Qualifying Run
Sept. 25th: V.H.F. Contest

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Jan. 1st-Dec. 31st: Most-States V.H.F. Contest
First Saturday night each month: ARRL Officials Nite (Get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

Disaster Strikes – AEC Strikes Back!

Two occasions in which amateurs assisted their communities by the supplying of emergency communications during and after the long New Year's holiday illustrate, as no amount of indoctrination could, the fact that there are two general classes of emergency in which we may be called upon to serve the public interest. In a *disaster* emergency, as exemplified by the tornado which struck Cotton Valley, Louisiana, on December 31st, considerable public suffering and personal hardship accompanied the disruption of regular communications services. In the blizzard-ice storm, a *communications* emergency, which struck parts of Iowa and Illinois on the following day, the loss of life and property was slight even though virtually all communications and transportation were paralyzed. In both instances amateur radio functioned in the public interest, and in each case the operators involved quickly aligned themselves in the most efficient manner for the type of situation in which they found themselves.

The Louisiana Tornado

Until the war, Cotton Valley, Louisiana, was a sleepy village of seven or eight hundred people. During the war two oil refineries and recycling plants were built, increasing the town's population to about 2000. Cotton Valley had never tasted real disaster until the closing hours of 1947, when a tornado roared out of the West. Robert Barr, W5GHF, ARRL emergency coördinator of Springhill, Louisiana, visited Cotton Valley after the tornado had passed, and reports, "I have personally viewed the wreckage there, and cannot conceive of how a living being could survive such destruction."

Shortly after the tornado hit, at 4:30 P.M., W5HHT, New Orleans, NCS of the Pelican Net, contacted W5GHF at Springhill, 15 miles north of Cotton Valley, to determine whether assistance could be rendered by amateur radio, and shortly thereafter W5AXU, W5CEW, W5EB, W5FDC, W5GMR, W5HEJ and W5KTE, all of the Pelican Net frequency in the 75-meter band, had communications circuits established into the devastated area. W5BLQ, W5CNG, W5KIHH and W5KUZ rushed a portable emergency-powered transmitter to the offices of the power company at Haynesville which had been cut off by the storm and began the long vigil during which countless messages directed toward restoration of power to the stricken area were handled.

The Rebel Net, including W4PL, W5IGW, W5KTE, W5LSN and W5VT, worked closely with W5CNG/5, Haynesville, and the valuable link to Shreveport was supplied by W5VT, SCM of Louisiana, who was responsible for the prompt handling of requests for relief supplies to be sent from Barksdale Field, near Shreveport, into Cotton Valley and Haynesville.

In the meantime a 28-Mc. group, including W5ADM, Cotton Valley, W5GCS/5, operating mobile in Cotton Valley, and W5CMQ, W5HGZ, W5JPG, W5KKI and W5NPG, handled a considerable quantity of urgent traffic for the Louisiana State Police, the Red Cross, and local civic officials. W5ADM was located 2 miles from the devastated area, and had emergency power supplied by the generators of the petroleum refining plant there. This group remained at their posts until 2:30 A.M. on January 1st, at which time it was felt that the immediate emergency had ended.

The Associated Press, having heard that Gillham, Arkansas, had also been struck by the tornado, received reassuring information from W5JAP, near Gillham, via WØJRJ.

W5CEW, with W5QH assisting as second operator, together with W5LN, provided a valuable communications circuit for both the Red Cross and the Louisiana State Police.

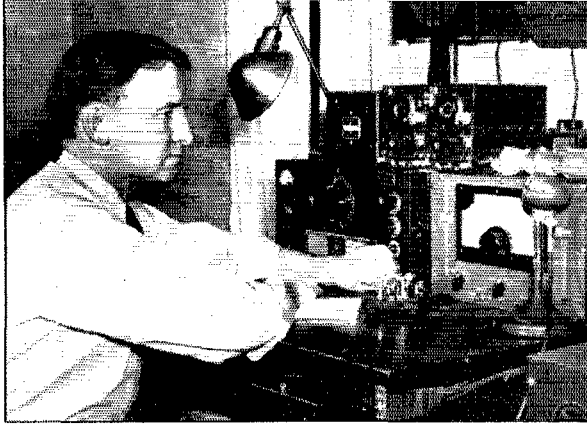
When it became apparent that the few stations in and near Cotton Valley were being overloaded by the pressing requirements for communications circuits, a group from Shreveport, including W5BFX, W5BQD, W5LQV and W5MEJ, traveled into the Cotton Valley area with an emergency-powered station and provided another invaluable link with the outside world.

♦

Emergency Coördinator Robert Barr, W5GHF, of Springhill, Louisiana, who provided some of the first factual information to leave the tornado-stricken area on New Year's Eve.

♦

QST for



Emergency Coördinator R. N. Lyons, W9AWA, who, operating on both 'phone and c.w., was a part of the vital ham link which dispatched all trains on the Chicago & Northwestern Railway's Galena Division.

Many stations, in addition to those mentioned above, assisted, either by keeping interference from casual operators to a minimum or by acting as relay stations when conditions made contact between the key stations difficult. Among these were W1AW, W1FOF, W1INF, W4BOL, W4DTV, W5ANP, W5BFA, W5BSR, W5DHE, W5DLA, W5FNY, W5FQI, W5FSS, W5HAV, W5HOT, W5IC, W5IU, W5JAX, W5JBZ, W5JPM, W5LTY, W5MAW, W5QI, W5WA, W9QJR, WØJRJ and WØVMP.

Illinois-Iowa Blizzard

The storm that struck parts of Iowa and Illinois on January 1st turned out to be no ordinary winter blow. The high winds combined with a mixture of sleet and freezing rain to knock out virtually all power, communication and transportation facilities. In Chicago some of the tallest radio towers in the country, b.c., that is, were bent double by the force of the wind. In northern Illinois and Iowa hundreds of miles of telephone and telegraph wires were snapped as their ice coating grew heavier by the hour. The electrical circuits operating the block signals on many of the railroads running through the area were similarly cut, and all train-dispatching lines were either severely overloaded or entirely useless.

Into this breach stepped one of the largest forces of radio amateurs ever to render public service in an emergency. Since there was little immediate danger to the population, and little need, save in isolated instances, for relief or medical supplies, the hams of the Middle West offered their services to a myriad of communications and transportation companies to facilitate their continued operations during their time of need, and to speed the restoration of normal operations. Countless amateurs operated with emergency power — literally dozens of groups traveled many miles with portables and mobiles to render communications to isolated key spots, and hundreds of others, many of whom must go unheralded, operated for hours on end at their home locations assisting the fellows in the portion of the area which had been isolated.

Many organized groups participated in this superb demonstration of the amateur's ability to serve, among which were: Iowa 75 Net, Iowa C.W. Net, Illinois Emergency Net, and the Illinois Traffic Net. Several club groups operated under emergency conditions for several hours, and the performance of the Starved Rock Radio Club has been especially praised by many services.

The following is a partial list of the amateurs who took part in this undertaking: W9s AEQ, AEX, AEZ, AHV, AND, AOV, ARD, ARN, ATA, AUU, AWA, BCQ, BIK, BIN, BJE, BKJ, BOQ, BRY, CDG, CEO, CFV, CVM, DBQ, DTB, DTL, EAP, EBY, ECS, ECZ, EEM, ENQ, EOP, EQT, EQX, ERE, EVJ, FCX, FGN, FID, FIF, FXB, GBT, HBG, HVZ, IAW, IBS, IWE, IYK, JAH, JGC, JMG, JTX, KCW, KPT, KQL, KSF, KYX, LHU, LIP, LJP, LQP, LXD, MAG, MKS, MXD, NCJ, NGG, NHK, NIU, NOO, NRF, NRT, OER, PEK, PJJ, PLY, PNV, QIE, QJR, QKL, QLZ, QOQ, QRL, RCJ, RNM, RNW, RPL, RWC, SSP, SUV, SW, SYZ, TFY, TLC, TMM, TMW, UAZ, UBS, UHD, UQT, UWC, VPD, YBY, YPS, YYE, ZEN, ZMV, ZSN; WØs ACL, AFQ, ALC, ANR, AUL, BHY, CJH, CPU, DSV, DVP, ETJ, ETQ, FP, FSH, GEP, HBG, HMM, IGL, JRJ, KYX, KZI, LAC, LLN, NYU, PJR, PP, PZP, QVA, SFH, SWI, TMY, TWX, VMP, WMP, WNL and ZXG.

Also WØs SCA, WMT, TIX, QFY, OM, LJF, ETT and WML.

A partial list of the agencies served includes: Chicago & Northwestern Railway, Illinois Power Co., Illinois Central Railroad, Illinois State Police, Northwestern Bell Telephone Co., Iowa Southern Utilities Co., Chicago, Burlington & Quincy Railroad, Public Service Company of Illinois, Associated Press, United Press, American Telephone & Telegraph Co., Burlington Trailways Co., Burlington *Hawkeye-Gazette*, Station KBUR, St. Francis Hospital (Burlington, Ia.), Burlington High School, Western Union Telegraph Co., Hannibal-Quincy Truck Line, Braniff Airways, H. B. Green Transfer Co., Plymouth Well Co., U. S. Weather Bureau, Illinois Northern Utilities Co., La Salle County (Ill.) Police, FCC, telephone company, power company, State Police at Bartonville, Ill., and Radio Station WGIL. — *A. H.*

DX CENTURY CLUB

Presented on this page is a listing, complete as of February 15th, of those who have qualified for the postwar DXCC Award. Figures in parentheses following each call indicate certificate numbers or the order in which awards were issued.

The next complete DXCC listing is scheduled for August *QST*. Award holders who wish their countries-confirmed totals as up-to-date as possible in that issue should submit additional confirmations for credit no later than June 10th.

MEET THE SCMs

Our Iowa SCM, William G. Davis, WØPP, is a real old-time radio man. In January, 1917, he became a licensed ham, since 1922 has held commercial licenses, for the past fifteen years has worked in broadcast radio, and for a time ran his own radio repair shop. Since receipt of his first license he has held the calls W9PP, W9AXA, W9ZZBX, W9AEP, WØAEP and WØPP.

The current transmitting line-up in WØPP's shack is 6V6-813-p.p. 327As, 600 watts input. A BC-654 is on hand for emergency work. Receiver is an SX-28 and antennas in regular use are a 3.85-Mc. doublet and a three-element beam for 28 Mc. Most of WØPP's operating time at present is spent on 3.85-Mc. 'phone, but plans are being made for future use of 28 Mc.

SCM Davis is the proud possessor of Old Timers Club and Rag Chewers Club certificates, and of a prewar ORS certificate; he now holds appointment as OPS and EC. His station is at present Net Control of the Iowa 75 Net. At the time of the 1947 spring emergencies he engaged in organizing communications facilities. He has been awarded a Public Service Certificate for his work in the early-1948 Midwest blizzard-ice storm, as recounted elsewhere in this issue.

A graduate of Harvard Radio School (Navy) and Ground School Naval Aviation School, M.I.T., Davis presently is transmitter engineer for Central Broadcasting Company.

Photography and traveling claim some of his leisure time and his favorite sport is football. However, Bill's first and chief interest since 1912 has been radio, and although he says he has made no outstanding contribution to the art, he is one of the pluggers who keep things going in spite of all difficulties.

DX CENTURY CLUB AWARDS

W1FH	(1)..179	W3TIF	(68)..111
W8HGW	(7)..167	W9ERU	(80)..111
W6VFR	(3)..164	PAØJQ	(86)..111
W4BPD	(4)..164	VE3QD	(91)..111
W3BES	(16)..160	W1BIH	(111)..111
G2PL	(90)..160	PY1AJ	(124)..111
G6ZO	(10)..158	W6TI	(77)..110
W8RDZ	(20)..154	WØNTA	(79)..110
W1TW	(11)..151	W4JXM	(92)..110
W1CH	(5)..150	W6MHH	(98)..110
W2BXA	(6)..150	W6BPD	(99)..110
W2AGW	(29)..150	W2ALO	(103)..110
W9ANT	(32)..149	W6LER	(109)..110
W1IAS	(8)..148	W3JTC	(112)..110
W1AXA	(9)..141	W2DS	(122)..110
W6GHU	(23)..141	ZS6DW	(55)..109
W2GWE	(37)..140	W3EPV	(56)..109
W3JNN	(48)..139	I1IR	(96)..107
W2QKS	(25)..135	W6FSJ	(101)..107
W4CYU	(53)..135	W6WKU	(113)..107
W6QJU	(70)..134	W6LJR	(125)..107
W1ADM	(22)..133	W3LNE	(58)..106
W2CYS	(2)..131	G2AJ	(100)..106
W8LEC	(24)..131	W9DUY	(52)..105
ZS2X	(28)..131	W3DRD	(63)..104
W3KT	(57)..131	W6KRI	(81)..104
W5ASG	(26)..130	G3FJ	(104)..104
W4AIT	(35)..129	W7DL	(118)..104
W6TT	(43)..127	W6GAL	(18)..103
NY4CM	(75)..127	W8FJN	(49)..103
GW3ZV	(84)..127	W3RCQ	(67)..103
W2COK	(40)..126	W4DKA	(76)..103
W6SAI	(17)..125	W6WB	(106)..103
W3GHD	(65)..125	W6OMC	(127)..103
W6SN	(72)..125	W7DXZ	(129)..103
W7AMX	(42)..124	PAØUN	(30)..102
WØYXO	(60)..123	W8LYQ	(31)..102
W7FZA	(85)..123	W8FJL	(83)..102
W3KQF	(117)..123	W6ANN	(120)..102
ZL1HY	(12)..122	CE3AG	(123)..102
W8NBK	(46)..122	OK1FF	(130)..102
W9NDA	(93)..122	W1ENE	(133)..102
W2GUM	(39)..121	HB9CX	(13)..101
WØNUC	(50)..121	W6AMA	(41)..101
LA7Y	(59)..121	W8CVU	(69)..101
HB9CE	(19)..120	W8HRV	(74)..101
W8JIN	(27)..120	W1JYH	(82)..101
W5KC	(36)..120	W2QKE	(95)..101
W1ME	(44)..120	W6SC	(102)..101
W4PN	(45)..120	W4JV	(107)..101
W4MR	(54)..120	W6BAM	(119)..101
WØGKS	(71)..120	W9TWC	(121)..101
W2IOP	(34)..118	W2AFU	(128)..101
W9KOK	(73)..118	W6PB	(132)..101
W3DPA	(47)..117	W2HHF	(14)..100
W7BD	(33)..116	W6MJB	(21)..100
W3EVW	(51)..115	G8KP	(66)..100
W5FNA	(61)..115	W8FGX	(78)..100
W2MEL	(88)..115	W1BUX	(87)..100
W3IYE	(94)..115	W6MEK	(105)..100
W4BRB	(38)..114	W5CPI	(108)..100
W2SAI	(97)..114	W4FIJ	(110)..100
W9RBI	(62)..112	W6GFE	(115)..100
W3BXE	(64)..112	W3CPV	(116)..100
W4OM	(89)..112	W6DUC	(126)..100
W2BRV	(114)..112	W3DKT	(131)..100

RADIOTELEPHONE

W1FH	(1)..141	W1NWO	(9)..106
W1JCX	(2)..127	VQ4ERR	(10)..105
W4CYU	(5)..124	W2BXA	(6)..103
W1HKK	(3)..121	G3YM	(11)..101
G2PL	(7)..113	W9NDA	(8)..100
W2ZW	(4)..110		

BRIEFS

Our DX Editor takes us to task for omitting the score of W9BRD/9 from the final results of the Eleventh Field Day. We hasten to credit the excellent performance of his FD group. Operators W9BUD, W9BRD and W9MFY worked 106 stations for a score of 2025 to place twelfth in the one-transmitter nonclub class. Our apologies for the inadvertent omission, OMs.

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The Mount Baker Radio Club of Bellingham, Wash., did a bang-up job demonstrating amateur radio at a hobby show held at the YMCA in their city. Traffic was handled through the Washington State Net.

CODE PROFICIENCY AWARDS

Special transmissions are made once each month to enable you to qualify for a Code Proficiency Certificate at a speed of 15, 20, 25, 30 or 35 w.p.m. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers indicating progress above the first certified speeds. The next qualifying transmissions will be made on April 13th at 10:00 P.M. EST. Identical texts will be sent simultaneously from W1AW and WØCO. W1AW will transmit on 3555, 7215, 14,150, 28,060, 52,000 and 146,000 kc., WØCO on 3534, 7053 and 14,040 kc. Either station may be copied. Send your copies to ARRL for grading, indicating the call of the station whose transmissions were employed.

Code-practice material is transmitted from W1AW each evening, Monday through Friday, at 10:00 P.M. EST, on the frequencies listed above. Tuesday and Thursday transmissions are made at speeds of 15 through 35 w.p.m. in 5-w.p.m. steps. On Monday, Wednesday and Friday, practice is at 9, 12, 18, 25 and 35 w.p.m. References to texts used on several of these practice transmissions appear below. These make it possible to check your copy.

Date	Subject of Practice Text from February *QST:*
Apr. 1st:	*Simplified Oscillators for 2300 Mc.*, p. 11
Apr. 7th:	*Windmill Towers*, p. 15
Apr. 9th:	*Field Testing 75-Meter Beams*, p. 18
Apr. 12th:	*A Mobile Midget for 144 Mc.*, p. 21
Apr. 13th:	Qualifying Run, 10:00 P.M. EST
Apr. 15th:	*An Answer to N.F.M. Reception*, p. 28
Apr. 20th:	*An Easily-Constructed Buffer and Final Amplifier*, p. 30
Apr. 23rd:	*A Small Reactance Modulator for N.F.M.*, p. 34
Apr. 26th:	*Grounded-Grid Technique at 50 Mc.*, p. 44
Apr. 28th:	*A 'Scope for the Ham Shack*, p. 51

ELECTION NOTICE

(To all ARRL Members residing in the Sections listed below:)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested:

Communications Manager, ARRL (Place and date)
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Maritime*	April 15, 1948	Arthur M. Crowell	.....
Manitoba*	April 15, 1948	A. W. Morley	Resigned
San Joaquin Valley	April 15, 1948	James F. Wakefield	Jan. 15, 1948
Alberta*	April 15, 1948	William W. Butchart	May 1, 1948
Ontario*	April 15, 1948	David S. Hutchinson	May 1, 1948
British Columbia*	April 15, 1948	W. W. Storey	May 1, 1948
Alaska	May 3, 1948	August G. Hiebert	Jan. 15, 1948
Eastern Massachusetts	May 3, 1948	Frank L. Baker, jr.	May 15, 1948
Montana	May 17, 1948	Albert Beck	June 1, 1948
Arkansas	June 1, 1948	Marshall Riggs	June 14, 1948
North Carolina	June 1, 1948	W. J. Wortman	June 14, 1948
Virginia	June 1, 1948	Walter R. Bullington	June 14, 1948
Nevada	June 1, 1948	N. Arthur Sowle	June 15, 1948
Northern New Jersey	June 1, 1948	John J. Vitale	June 17, 1948
Idaho	June 1, 1948	Alan K. Ross	June 17, 1948

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* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

New Hampshire	Gilman K. Crowell, W1AOQ	Dec. 15, 1947
West Indies	Everett Mayer, KP4KD	Dec. 15, 1947
Los Angeles	Vincent J. Haggerty, W6IOX	Jan. 15, 1948
South Dakota	J. S. Foasberg, WØNGM	Jan. 15, 1948
Connecticut	Walter L. Glover, W1VB	Feb. 15, 1948
San Francisco	Samuel C. Van Liew, W6NL	Feb. 15, 1948
West Virginia	Donald B. Morris, W8JM	Feb. 15, 1948
Washington	Clifford C. Cavanaugh, W7ACF	Feb. 16, 1948

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BES — High scores in the ARRL Party were made by BXE, FUF, and BES. HFD has four rotary beams stacked one over the other for 144, 50, 28, and 14 Mc. BES added a 532-ft. long wire and a 7-Mc. reversible beam for the DX Contest. EER has an 814 in the final with about 175 watts input. GHD worked five continents in two hours on 7 Mc. GRS built a new VFO as per BXE's *QST* article. EKK, NAH, and BES made over 100 contacts apiece mostly on 144 Mc. in the VHF SS. IZU, ISE, NAH, and BES have VFOs working on 144 Mc. The vertical colinear antennas sponsored by EKK are becoming very popular on 144 Mc. MQU worked an airborne mobile over Washington, D. C., on 144 Mc., receiving S9 plus report. The York Road Club is trying to get going on 50 Mc. GYV and HRD have new Collins receivers and HRD has a new Collins 150 transmitter. New officers of the Frankford Radio Club are: 2HEH, pres.; KT, vice-pres.; IXN, secy.-treas.; and BES, act. mgr. In the ARRL Party HXA worked with ease stations that he has struggled for in previous contests. DZ alternates with YA on T.L. "L." NTD is a new station on the E. Pa. Net. ID took part in the VHF SS and the Member Party. New officers of the Schuylkill Amateur Club are: KJJ, pres.; H. Fleischut, vice-pres.; VMF, secy.; S. Eva, treas.; AKF, act. mgr. EU worked all districts but W7 on 3.5 Mc. in the ARRL Party. QP rotates his 14-Mc. beam by hand. KFA and LCY are new Section Net members. KLZ, Throop, schedules QEW, Scranton, nightly on 144 Mc. QEW reports traffic slower this month. AQN and the York Club are doing commendable work in the emergency communication field. They have 22 stations lined up for AEC activity. HA developed relay trouble during the ARRL Party. The lads in the neighborhood of Lehighton have formed the CAR-LE Radio Club. The officers: OP, pres.; AIW, secy.-treas. Other members are: SNZ, JPR, AVM, TCC, KVD, and HA. The club meets at a different member's home each month. Most of the activity in the SVARC is on 144 Mc., with 14 and 3.85 Mc. next. FGB made his DXCC. MET has moved to Winston-Salem, N. C. ASW turned in quite a lengthy OO report. KT, the QSL Manager, urges all W3 stations to keep a self-addressed envelope on file at Post Box No. 34, Philadelphia 5, Pa. Traffic: W3VMF 148, ELI 91, QEW 52, DZ 43, AQN 27, EU 23, OMI 18, KT 6, NTD 5, HCT 4, GHD 2, CAU 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Eppa W. Darne, W3BWT — The Capitol Key and Mike Club, at its annual election, placed the following in office: JZW, pres.; Mr. Joseph Fletcher, vice-pres.; EIL, secy.; GVG, treas. The club station has received the call DIM, which formerly was that of the late Captain Herbert Orr, a member who died in the Pacific area during the war. An ART-13 transmitter has been purchased for the club station. The Washington Radio Club held but one meeting in January, which was a v.h.f. symposium, presided over by GKP. The Delaware Amateur Radio Club now meets at the State Armory, 10th and DuPont Streets, Wilmington. The Radio Club of the University of Maryland now has 40 members and is on the air with some loaned equipment pending installation of a BC-610 rig. LVJ is a newly-appointed ORS. AQV has received appointments as OPS and PAM for the Cumberland, Md., area. Has also made WAS on 3.85-Mc. 'phone. HB has a ten-element Yagi on 144 Mc. KDN gets out well on 14 Mc. NIH has moved to Philadelphia, Pa. MJQ has been appointed RM for the Baltimore, Md., area. JZY has been appointed ORS, OPS, and OBS, and operates on 3.5-Mc. c.w., 3.85-Mc. 'phone, and 7-Mc. c.w. ISF is rebuilding to use VFO on 7 and 14 Mc. VT gets out nicely on 28 Mc., and is getting equipment ready for 3.5-Mc. operation. We regret the loss of HUM, who has moved to Hartford, Conn. AKR gets out nicely on 7 and 14 Mc., and schedules Albuquerque, N. M., daily. EFZ is up to 60 countries using 14-Mc. c.w. GEB is back on the air using 14-Mc. c.w. JVG is on 3.5 Mc. with VFO at new QTH. CDQ is back on the air with 7- and 14-Mc. c.w. 6TCA/3 now is operating on 7 Mc. 2NDL/3 keeps up his traffic work despite an unheated shack. Could we suggest an igloo, OM? MHW and MSK are out of town on business. MKS has recovered from his recent operation and is heard regularly on 28 Mc. HBK received his Rag Chewers' Club Certificate and is on 3.85 Mc. consistently. EIS, BHK, GA, HN, and ECP recently received Public Service Certificates from ARRL for emergency work in the past Florida hurricane. MPP has a new jr. operator. MAX has been away on business in New England; he expects to be in his new QTH shortly. LQK is on 28 Mc. with a folded dipole antenna. LSX now is a member of the Rag Chewers' Club. EYX is back on the air on 3.5, 14, and 28 Mc. HUA is moving to Silver Spring. HHN now is at Hopkins Lab. in Silver Spring. INR lost his 14-Mc. beam in a windstorm. MJZ and NMD, of Bethesda, schedule D4APN regularly on week ends. Traffic: W3ECP 264, 2NDL/3 160, 3HUM 96, AKB 72, MJQ 51, BWT 47, QL 13, EFZ 6, AKR 5, AQV 3, JZY 3.

SOUTHERN NEW JERSEY — SCM, G. W. (Bill) Tunnell, W2OXX — RPH is the alternate for Trunk Line "L" and still finds 7-Mc. DX fascinating. SUG has new WAC Certificate and 73 countries toward DXCC. RG is testing automatic roll call at the Wednesday evening drill of the 3700-kc. net. CFB is building a 1-kw. rig. QUH is NCS for the 3.5-Mc. Sunday afternoon net of the Hamilton Township Club. New officers of the club are GSP, pres.; TGC, vice-pres.; his XYL, TXD, secy.; UNT, treas.; QUH, sergeant at arms. BEI soon will give a beam-raising party. BAY will be on 28 and 14 Mc. in the near future if the sailboat urge does not predominate. ORS now is Emergency Coördinator for Burlington County. Give him some help, fellows. HAZ is on a vacation from 3.5 Mc. SAK has new NC-183 receiver. The following are new officers of the Hunterdon County club: PSB, pres.; AZZ, vice-pres.; WBE, secy.; PKE, treas.; SUG, activities director. IMA is Assistant Emergency Coördinator to SAK. RXL is not very active because of business pressure. HEH is new president of the Frankford Radio Club. WTJ is new ham in Somerville. The South Jersey Club was honored by a speech from our new Director, 3QV, at the January meeting. Traffic: W2RPH 127, SUG 109, ZI 63, RG 19, CFB 14, QUH 13, BEI 11, BAY 6, HAZ 4, ORS 4, SXK 2, WTJ 1.

WESTERN NEW YORK — SCM, Harding A. Clark, W2PGT — SEC: SJV. New appointments: ORS: AOR, BLO, VIQ, WOE. EAP has been appointed EC for Jefferson County. Many stations are reporting in the Friday night AEC drills on 3720 kc. at 8 P.M. All ECs are urged to have some station in their organization join in these drills regularly in order that their areas will have an outlet for outgoing traffic. Newly-elected officers of the Oneida Amateur Radio Club are PGU, pres.; OVT, vice-pres.; and QXF, secy.-treas. The club meets the first Wednesday of each month in the Masonic Hall and all amateurs in the area are welcome. The Ithaca Mike and Key Club's simulated emer-

gency broadcast over WHCU/f.m. has drawn many favorable comments from the public. A. L. Budlong, from ARRL Headquarters, was recent guest speaker at special meeting of Niagara Falls Club. WOE keeps two rigs on the air, one at home and the other at Princeton University. VIQ now is Class A and is giving 3.85 Mc. a whirl with low power. ABV is back on at his new QTH. I6USA surprised PGT with a personal QSO. VJP and QXE have new VFOs. TEP visited the Oneida gang. RXW has SCR-522 going on 144 Mc. OVT is heard regularly on 3.85 and 28 Mc. VMS, TTU, QBZ, QJT, TGZ, PW, TTZ, UUI, and VZL keep things humming in the Ithaca area on 144 Mc. VEN is working 7-Mc. c.w. and 28-Mc. 'phone. BLP has added lazy man's Q5-er and is working Europeans on 3.85 Mc. AOR knocks off Europeans with 35 watts on 3.5 Mc. FMH is getting good results with n.f.m. on 3.85 Mc. QHH takes traffic for Puerto Rico. BLO and RUF have been appointed to Trunk Line "G." The Syracuse Amateur Radio Club is installing station in local Red Cross building for disaster communications. Come on, gang, send in those reports and let us know what you are doing. Traffic: W2PGT 188, RUF 164, FCG 121, SJV 80, NAI 68, VIQ 60, BLO 52, WOE 45, AOR 41, GWY 41, WFU 28, SZK 27, BLP 20, QHH 18, UYG 12, PZC 10, QNA 8.

WESTERN PENNSYLVANIA — SCM, Ernest J. Hlinsky, W3KWL — In Mercer County the following club members took part in the VHF SS, with all but one on 144 Mc.: NCD, LBZ, GEG, 8SFG, KQA, LNA, MQW, CJF, VNL, AH, OAJ, NDD, TNG, KXI, LIE, KQN, and KWL. 8SFG took honors with 48 contacts in 4 sections. TFX reports from up Erie way. At a special RAE meeting 1BUD appeared as guest and spoke of his experiences as U.S. representative at Rio, Bermuda, Moscow, and Atlantic City Conferences. JEB and MZI had charge of the meeting. SER, WBA, and MZI are 28-Mc. fixtures. KVB is QRL with 813 final. QN takes time out from work to give 28 Mc. a try. LTY is a city patrolman and is "private-eyeing" 50 Mc. MMH, MMI, and LVV are working DX on 28 Mc. like mad. NCJ says that 7-Mc. DX is hot. He snagged CX, KV, KS, KL, G, and OX. QN reports new Lake Erie Network on 28 Mc. It is with deep regret that we record the passing of BOZ's wife last December. BOZ, TOJ, and LFV can be heard on 144 Mc. RMM is proud of his new Supreme transmitter. LRE is rebuilding to 813 final. KSI is experimenting with 35TGs. QEM has fixed and mobile SCR-522 rig. RAT hopes his surplus mine detector rig will discover a gold mine for him. VNE is reported as toying with a "full gallon" rig. LIW says his 10-watter worked 185 contacts in 51 sections in ARRL Party. LWT is sporting a new call, 5OBG, in Texas. KWA's XYL got tired of the OM's bragging so she got herself a new call, JSH. BKS makes first traffic report in 20 years. YDJ is conducting slow speed c.w. net for local interest. NUG says the line filter in Feb. *QST* is FB. CEO is interested in net operation again. AER's new n.f.m. is doing well through QRM. RIS has a new Collins exciter. AEV is sporting p.p. 813 in final. LQQ keeps regular ORS traffic schedule. LWN says his country QTH puts out better signals. CB is DXing the 3.5-Mc. band. NHF has new 'phone rig on 28 Mc. Please have appointment certificates endorsed, if necessary. Traffic: (Dec.) W3YA 129, BKS 40, LIW 10. (Jan.) W3KWL 101, YA 64, MJK 60, RAT 18, NCJ 11, LQQ 8, LWN 8, LIW 6, LGM 5, QN 4.

CENTRAL DIVISION

ILLINOIS — SCM, Wesley E. Marriner, W9AND — Chief RM: EVJ. RM: SXL. PAM: UQT. Nets: "ILN," 3765 kc. "IEN," 3940 kc. After much rebuilding LBL will be back on the air with 200-watt 'phone/c.w. rig. The Illinois Valley Radio Assn. has organized a code class at LaSalle. Future club meetings will include a raffle. APK became a new member of club. JVC is a clerk at local Post Office. ZHB lost several towers and v.h.f. gear in ice storm, as did IQC and JVC. QKL, like many others, was the only means of communication for his home town. WEA has a new Collins 75-A receiver. Clyde is chief supervisor at WGN. FIN has added an RME-VHF-152A converter and an ARC-5 transmitter for 144- and 50-Mc. operation. DTZ wants to know the whereabouts of IEU, formerly of Lostant. CHV has been assigned to duty at Great Lakes where he is on the air with Meissner 150-B rig and HRO (Navy RAS-2) and SX-32 receivers. HON plans new antenna for 3.5 Mc. LMJ has a new jr. operator. CFV, SXL, and BPU are on 144 Mc. SXL has new e.c.o. and 274Ns converted. LNI is busy improving the old homestead. WDD has 500 watts, 813 final, on 7 Mc. He is building an 807 rig for 28-Mc. 'phone. CTZ is new net member on 3765 kc. EBX and JQT kept stand-by schedule during emergency. KQL operates with an indoor antenna on rig. He is using a BC-453A coupled to his HQ-129X to cut QRM. YTV has a 522 on 144 Mc. SYZ says he is trying to get VFO built for 3.5 Mc. and that the River Park Radio Club has a good-sized code class at 7:30 P.M. on Monday nights at Park Field House, 5100 N. Francisco Ave. ZPC is new traffic man in Elgin. EVJ handled traffic Jan. 1st for Ill. Central R.R. during the storm. KQL is alternate on TL "L." New "ILN" stations are EEM, IAJ, and CTZ. BON is trying n.f.m. on 3.85 Mc. and is building 28-Mc. mobile rig. LQP has six new HK24Gs. On 14 Mc. BRX is plagued with poor antenna and B.C.I. QBH received his Class A ticket. BRY plans to retire 12-year-old final and modulators. Would like to hear more 144-Mc. activity. TAL worked KS4AF on 3650-kc. c.w. and G8VB on 3.85-Mc. 'phone. QCK and KPT installed police radio in Dixon. AHV keeps taxi radio operating and has new TBS-50 Harvey-Wells transmitter. FUR is back on the air at Sterling. GNU is rebuilding. AWA has new VX-101 VFO. He worked FA8BG on 3.5-Mc. c.w. The new 9th District DX QSL Manager is CFT, John F. Schneider, 311 W. Ross Ave., Wausau, Wisc. He writes to say, "Keep plenty of envelopes on hand at the Bureau and I will send cards out as fast as they come in. Put only three-cent stamp on each envelope." The Illinois Northern Utilities Power Co. gave a dinner at the Country Club in Dixon to show appreciation for emergency work of TFY, EQX, AWA, AHV, and AND. Hams present were: GBT, FUR, TFY, EQX, AWA, AND, AHV, VJN, ZHB, GNU, 7NGD/9, QCK, OMA, and HOC. News items for this column must be received by your SCM by the 7th of the month. This means they will have to be mailed by the 5th to reach me before going to press. NGG says the various receiving antennas on WQPP tower look like pretzels. YBY bought NIU's 654A and has it perking on batteries. The Starved Rock Radio Club generator saw its first actual service during the New Year's Day emergency pinch-hitting for county transmitter which was off the air. ATA and TAY are on 28 Mc. JAU had the mumps. AND worked G2EC, G2JT, G6GB, FA8BG, ZL1HM, ZL1DI, and ZL4GM on 3503 kc. The XYL at KOK is studying for her ham ticket. KOK has new HRO-7 receiver. Traffic: W9EVJ 313, SYZ 153, AND 117, KQL 114, ZPC 49, FKI 40, SXL 35, JTX 21, BRY 15, YTV 12, CTZ 8.

INDIANA — SCM, Ted K. Clifton, W9SWH — SEC: 9WNM. QIN, 3656 kc., and INP, 3905 kc. MVZ writes, "My thanks to all for your confidence in electing me as chairman of the Indiana Radio Club Council. I shall strive to merit this confidence and, with the help of the other officers and delegates, do my utmost to make the Council of value to all its members and promote the cause of amateur radio throughout the State." BKJ and QLW have new operating tables. 1BUD gave a talk to the boys at Ft. Wayne on Jan. 11th. BHV has rig with pair of 813s. JBQ is back after six years. DGA is now on 'phone, 50 Mc. FMJ has new mobile rig. UKT received his WAS and advises that three of the Purdue boys are starting a 420-Mc. net with BC-654s. New officers of the Indianapolis RC are: HNS, pres.; EJH, vice-pres.; BNS, secy.; CCJ, treas.; DSC, chief operator; DNQ and CYQ, directors. CLF spoke at the Jan. 23rd meeting of the Ft. Wayne Club on "Modulation." 1PJK has his old call, WSF, and is on 7 Mc. mostly, using a 6L6 with 35 watts. Howard received a Millen exciter for Christmas. HUV has a new antenna 278 ft. long with single wire feed. FSG announces a new jr. YL. TT is on the air with 9 to 12 watts from B batteries. He worked 29 sections in the ARRL Member Party. LJI worked G2JI on 3501 kc. with 70 watts. LNH has over 75 countries. NKB has WAC and 40 countries. The Michigan City Amateur RC has applied for affiliation with the ARRL. UGH is NCS of the Southern Indiana 'Phone Net. KMI and ANG received a nice write-up and pictures of their mobile rig in the *Sunday Courier and*

Press of Evansville. Ft. Wayne RC held a stag on Jan. 29th at the Candle-Lite Restaurant. ANT made the Century Club. The Magnavox boys presented UUN with a beam rotator. HHI has a single section 8JK on 14 Mc. with 65 watts to an 807. Look for NH in the ARRL Family Album Sheet 21. MBL is running 20 watts to crystal oscillator on 14 Mc. and is getting BC-654A ready for emergency use. Traffic: W9NH 128, TT 44, BCJ 33, BKJ 32, EGV 30, HUV 28, PMT 28, CLF 23, KTX 20, LXI 20, VNV 18, WNM 15, DOK 9, RE 9, UKT 9, KSF 6, QLW 1.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — QHR is knocking them cold on 28 and 50 Mc. BCV sent in nice report for his area. New officers of Rock River Radio Club are: IZG, pres.; BFV, vice-pres.; SLJ, secy.-treas.; HDL, interference chairman. J7ELS schedules BCV on 29,300 kc. and is looking for Green Bay schedule. VLG is operating portable W6 in California. VKM is active on 7 Mc. TPY is remodeling his RME-69. SLJ is doing FB on 7 Mc. with 6F6. BFV has new Hammarlund 4–20. IBY has new 28 Mc. beam at Fox Lake. RHS is servicing radios in Berlin. BDU and EWC get FB results on WTMJ-t.v. APU is rebuilding surplus gear for emergency use. OOY is converting propeller pitch motor for 28-Mc. beam. IZG has n.f.m. on 28 Mc. NJT has three-element beam on 50 Mc. DIG is looking for new receiver. DKH is getting set for 50-Mc. operation. JAW is building new exciter. KQB has new BC-459A. LBC is looking for a QSO on 50 Mc. OVE has radio contact with daughter in Madison. QFC is rebuilding. RKT is on 7 Mc. TQV has mobile on 28 Mc. TVA works 3.5 Mc. using converted SCR-274N. BZU has rig working on 50 Mc. GI is on 3.5-Mc. 'phone and c.w. ESJ has been Acting NCS of Badger Emergency Net on 3950 kc. UFX has completed new 28- over 14-Mc. beam. FHU has 829-B with 100 watts and 24-element beam on 144 Mc. The Wisconsin Valley Radio Assn. has 28 Mc. EC net at 9 P.M. each Thursday and wants to extend ground-wave coverage from Wausau. VHA is NCS. CFT, W9 QSL Manager, has been deluged with DX cards. OUT is building s.a.s.c. rig. IXQ is Chippewa Falls area EC. AH is building 3.5-Mc. VFO. Milwaukee EC Net on 144 Mc. has 18 units enrolled, and meets Mondays at 8 P.M. We regret to report DQA as a Silent Key. Traffic: W9DKH 174, LFK 130, ESJ 74, UFX 71, CBE 42, IQW 22, RQM 16, SZL 15, DND 11, FHU 4, VHA 4, FZC 2, HEE 2.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossoletti, WØGZD — EOZ has new n.f.m. with 600 watts on 14 Mc. and 150 watts on 28 Mc. The Jamestown club is going strong. ZCM, in Hebron, is treating the net to his ARC-5 signals. AFK broke her antenna pole! SSW is the outstanding traffic hound. CAQ is working on new 500-watter. YSJ and EGC got SCR-522 going in Fargo. BCH, new net member, finds time for 'phone on all bands. FCA won both the WAS and WAD Contests sponsored by the Fargo Club. John worked 1630 hams during 1947, and made 277 DX contacts in 43 countries. RGT has new 50-ft. pole. SHI is using WBY's rig while Jack is at UND. TUF is buying ARC-5s like mad! The Red River boys are all set for Field Day. The Forx Club has movies and code classes every meeting night. Would like to hear from those interested in the Emergency Corps or the North Dakota Net. Traffic: WØSSW 66, GZD 23, BCH 11, ZCM 3.

SOUTH DAKOTA — SCM, J. S. Fosaberg, WØNGM — DB now has his 304TL final on the air doing double duty as a room heater. CJS, DB, TI, BJV, USI, MZJ, and DIY have a 50- and 144-Mc. net that meets every Sunday and during the week by appointment. PVE is now on 3.85, 14, and 28 Mc. with a pair of 813s and a 28- and 50-Mc. standby transmitter. UVL spends his spare time on the South Dakota Net and reports in on the Iowa 'Phone Net. The Huron Club has code and theory classes every other Monday at the High School. The Aberdeen Club, under DKJ, has a station on the air and uses it in its training classes. The 'phone net is in need of a net control. No traffic was reported to your SCM.

MINNESOTA — SCM, Walter G. Hasskamp, WØCWB — JRI keeps weekly schedules with KL7MH. NCS has new job so has moved to Cedar Rapids, Iowa. DSF keeps daily schedule with 6BIP. 144 clicks again! GKO, at Duluth, and QM, at Grand Marais, worked two ways, over 125 miles. The Minneapolis and St. Paul Clubs are putting out a twin-cities call book. RJF took part in January Frequency Measuring Test and ARRL Party. BXC is back on 3.85-Mc. 'phone. WSB has an SCR-522 receiver working. The Jackson County and Fairmont Radio Clubs attended each other's meetings to coördinate their emergency programs. They also are going to organize a net to be made up of representatives of all the clubs in Minnesota. The Jackson County Club already has a net of its own which meets each Monday at 7:00 P.M. on 3530 kc. YBM is building a 5" 'scope. CWB has acquired a complete BC-654 unit for emergency gear. TGF, of Willmar, now is at Worthington. ORJ has a BC-375E for VFO and uses a 457A for a driver to his final. OTU uses a BC-696 for a driver on 3.85-Mc. 'phone. URQ is building a 75-watt rig on 144 Mc. using an 829. On Jan. 7th the St. Paul Club sponsored a meeting at the Midway Club at which Mr. Budlong from ARRL Headquarters was the main speaker. Out-of-cities attendance was good. UWW attended from Flint, Mich. He drove your SCM to the meeting. New or renewed ORS appointments in January were: JRI, ITQ, RPT, HEN, and FUJ. New OBS are MLM and IZA. New MSN 'Phone Net members are GKC, HY, MZU, and PSD. MSN C.W. Net has new members in FUJ, HFF, TUO, and RJF. Our SEC, JIE, is hard at work on the organization of the Emergency Corps in Minnesota. Please give him your fullest support and answer any and all inquiries at once. Promptness and coöperation are essential on your part in aiding the Emergency Corps. Traffic: WØITQ 87, VJH 55, CWB 52, RPT 51, YBM 45, DSF 38, JDO 30, JIE 28, HEO 16, EPJ 13, GKC 12, FAH 12, ORJ 10, BMX 10, PSD 8, RJF 8, BBL 7, HEN 7, QXI 4.

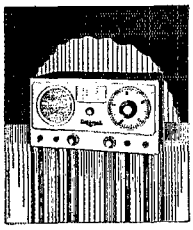
DELTA DIVISION

ARKANSAS — SCM, Marshall Riggs, W5JIC — Thanks, boys, for the nice work in getting in reports. FMF wants to swap for 3695-kc. crystal so he can get in the middle of things. LUY has new DB22A. He sure went to town in ARRL Party. MRD has code class with 30 members going in grand style. AQF has been under the weather. BJH is getting better results out of his BC-375. DSW reports that DHG is getting on after an absence of ten years. KMA, over Wynne way, is having trouble getting power supply together for BC-696. EA is devoting more time to State activities. DSW, JAP, ITW, AQF, FPD, and JMZ were active in recent ice emergency. Thanks for your good work, boys. Traffic: W5FMF 88, LUY 27, EA 26, JIC 13, MRD 8, AQF 4, BJH 4, DSW 4.

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — KTE, SEC, is working with Pelican Net. He needs ECs for Baton Rouge and Alexandria. CEW, PAM, is about to make the grade for DXCC with 94 confirmations. WG has been active in Baton Rouge and KC going full blast on 14, 7 and 3.5 Mc. LCA is attending Notre Dame and his call is 9SQZ. He schedules his brother, 2SQZ. Officers of the Caddo Amateur Radio Club of Shreveport for the coming year are JFF, pres.; KXO, vice-pres.; JHY, secy.-treas. BFX is sponsoring a code and theory class, so if you want to improve your copying or your technical ability make plans to attend. JET finds little time for ham activity until after midnight on 7 Mc. GMD is a new-comer to Monroe. IVT is building a 42-ft. tower for his 28-Mc. beam. The Amateur Radio Club of Southwest Louisiana (Lake Charles is the home base) has members from Maplewood, Sulphur, Jennings, Kinder, Lake Arthur, and Hackberry. There are 29 members at present and 13 prospective members. MJT is active on a limited basis. BSR wants opinions of all hams on questions to be discussed at the Board of Directors Meeting this year. He'd like to hear from you. HHT is NCS for the Pelican Net. This Net is the Louisiana section of the Tri-State Emergency Net. The net has done a whale of a job in the several emergencies which have arisen this fall and winter. Join up if you operate on 3.85-Mc. 'phone. Traffic: W5KTE 177, CEW 16, VT 15.

MISSISSIPPI — SCM, Harold Day, W5IGW — The Gulf Coast Radio Club has been reorganized with DLA, pres.; ANP, vice-pres.; MJL, secy. The Gulf Coast gang has an emergency net and is working out successfully on 29.2 Mc. JHS is NCS and members of the net are ANP, DLA, MJL, JHS, IBO, HAV, VS, GIA, WA, and LBY. MJL runs 250 watts to a pair of 808s. WZ has a new NC-57 receiver. KUT has a folded dipole on 3.5 Mc. During a recent cold wave GG kept communications going for the IC Railroad between his QTH and Memphis, Tenn. K5NAE is the new Naval Reserve station aboard the LST at Greenville. HYV has been heard operating it. JHS desires some good EC appointees. Members of the Mississippi section of the Tri-

(Continued on page 74)



THE truly modern amateur receiver could be quite a monstrosity if it had provisions for all the various modes of operation available to the amateur of today.

The receiver would have to be able to receive the conventional AM phone, on-off keyed CW, narrow band FM and PM, single side-band suppressed carrier, and frequency shift telegraphy signals and cover the broadcast and short-wave bands up to 30 or 55 mc. and also FM broadcast on both the 43 mc. and new 100 mc. bands. The reader might also add, "What, no television?"

It is obvious that a receiver for all these types of reception could be quite large and very expensive. The average amateur probably is not interested in all of these modes of reception and as a result such a piece of equipment would not be too popular because of its relatively high price. Obviously, if the price is kept down and a variety of these modes of reception is offered in a single unit, either quality or performance (or both) must have suffered.

The techniques of most of these various methods of reception center around the final detector. Receivers like the NC-173, NC-183, HRO-7, etc. which have an accessory connector with IF and other circuits available at this connector are truly basic pieces of equipment whose IF output can be connected to the appropriate type of demodulator that is of interest at the moment. For example, NFM adaptors which plug into this output connector are available for the NC-173, NC-183 and HRO-7 to provide for narrow band FM or PM reception.

The frequency range of these basic receivers is continuous from the low frequency end of the broadcast band up through 30 or 55 mc. With the growing interest in the VHF bands (30 to 300 mc.) National has brought out the HFS Receiver-Converter.

The HFS is a complete VHF Receiver for AM phone and relatively wide FM phone reception and provides continuous coverage from 27 to 250 mc. A noteworthy feature of the HFS is that it can also be used as a converter with 10.7 mc. output to extend the frequency range of a basic receiver. Used in this manner on the 6 and 10 meter bands the HFS will considerably improve the image rejection of typical communication receivers which cover these bands. The IF selectivity of the HFS by itself is broader than that of the usual communications receiver but when used as a converter the adjacent channel selectivity becomes that of the receiver used with it. Thus, the operator has a choice of two degrees of selectivity in the VHF range.

National advertisements will keep you posted on the basic equipments and accessories available.

— W. A. READY

State Emergency Net operating on 3.85-Mc. 'phone are: ANP, BOT, CUU, DLA, DNV, FCH, GIA, HAV, HEJ, HMZ, IGW, JHS, KUT, LBY, LN, NNZ, IGD, and WA. LN is NCS, DLA and JHS are Alternates. Traffic: W5LAK 144, IGW 63, LN 20.

TENNESSEE — SCM, James W. Watkins, W4FLS — The NARC had a very interesting program at its regular meeting. "The Lazy Man's Q5-er" was demonstrated by EBQ and GQQ. NARC officers for 1948 are: GQQ, pres.; MKB, vice-pres.; HOJ, secy.; DDF, treas. AAW is on 28 Mc. and is helping MKB clear up trouble in speech and modulator. BMC is converting an ARC-5 for VFO. DKX is active on 27 and 28 Mc. with a new kw. EBQ hopes to double power with a pair of 812H8s in place of the old 812s. GXD is on 7 and 14 Mc. with a new rig that dials up the frequency wanted. GQQ is building an n.f.m. rig. HWC is trying out a new folded dipole on 7 Mc. JEH now is with CAA. KH has been working 112 Mc. since Thanksgiving. MOV is trying 50 Mc. with an 832 running about 30 watts. NEF is a new call in Chattanooga. AL will be heard on 7-Mc. c.w. and 28-Mc. 'phone. FLW has two projects under way, an 829 rig for 144, 50, and 28 Mc. and a new modulator for his 812 rig. EDC, LOJ, and FLW helped the Martin Rotary Club put on an amateur radio program. DIY, BCA, and FCF have new shipboard transmitter on air. Memphis AEC helped the light company and railroad during the snow storm in North Mississippi. VT and GHP have rigs on 400 Mc. The Mid South Amateur Radio Assn. has more than 100 members in good standing. PL recently was visited by AYV, from Florida. 5MKL/4 is located at Millington and has Collins 32V-1 and Super-Pro. Traffic: W4PL 407, BAQ 85, LNN 57, FCF 29, W5MKL/4 15, W4FLW 6, MEV 4.

GREAT LAKES DIVISION

KENTUCKY — SCM, W. C. Alcock, W4CDA — Co-operation from Kentucky radio amateurs in submitting monthly reports is excellent. Keep them coming in. New appointments include: HAV (OPS), KKG (OBS), BEW (EC). Kentucky has six ham clubs: Lexington, Louisville, Univ. of Kentucky, Fort Knox, Ashland, and Owensboro. TFG, 450 watts on 3.85-Mc. 'phone, claims a G2 contact. MSE and JTO have new rotary beam mechanisms. MWX, Henderson, and MSC, Ashland, responded to call for more KYNet members. BPE and FBJ say 7-to-10 P.M. 144-Mc. net is building up with the following members: MFH, MRI, LVL, NJY, JEI, KMX, KFI, and 5IEZ/4. FKM is pleased with KYNet work. MRT has 500 watts on 7 Mc. and is heading for 28-Mc. 'phone. JCG has VFO on 7 Mc. QKG is building 15-tube bandswitching receiver. LYZ is running 250 watts on 28 Mc. 'phone. LIZ has Collins 32V-1. JQQ, Pineville, asks the fellows to breeze up his way with their trading pants on! IZU moved to Cynthiana. JSY is new president of the Lexington Club, with TFK, vice-president, and KTF, secretary. BEW is doing fine on emergency work in Ashland. KZF is working to complete the big rig for KYPhone Net, using SCR-522 in the meantime on 27 and 28 Mc. Contact him for information on converting SCR-522s. KTC installed three-element 14-Mc. beam during snowstorm. NBY is new call of Rev. C. Lynn White, Harlan. The SCM needs a key station in each community for ECs. Traffic: W4BAZ 199, FQQ 46, CDA 33, TXC 32, FKM 10, IXN 7, MSC 6.

MICHIGAN — SCM, Joseph R. Beljan, jr. W8SCW — SEC: PVB. RM: NOH, PVB, and UKV. WFA and UAS are new OBS appointees. Section Net Certificates have been issued to BCX, IV, UBF, and ZWN. GSJ has been appointed to T.L. "AP." ARJ is Michigan outlet on traffic outlet net. The Saginaw Valley Amateur Radio Club elected LNE, pres.; and IJS, secy. NZ is on 144 and 50 Mc. BHU, ex-9HBW, is at Charlevoix. BQQ is new call at Charlevoix. ZHT schedules J2LPG on 28 Mc. COW is building gear for 28 and 144 Mc. ARJ is rebuilding and adding power. DWB is back on QMN after a long session in the hospital. YEY has new rotary beam. EYC has his beam going again. CLL is QRL building t.v. receiver. KSL is rebuilding his 28-Mc. exciter. FLA is having his HRO overhauled. PLC plans to be active again and will be on QMN. AVI took Class A exam. ZWM is getting interested in traffic work. The Adrian Amateur Radio Club has been recommended for ARRL affiliation. RER is completing his big 28-Mc. rig. Congrats to BHL on the arrival of the YL jr. operator. AJB is working out nicely with his Command transmitter on 7 Mc. AYA is back on 28 Mc. and is planning an addition to the garage for his shack. LFA will be on shortly with p.p. 1625s. NYV moved to Grand Rapids. GNJ and IAE are converting SCR-522s for 144 Mc. AIQ, AGQ, HTB, and ZML are new calls on QMN. The Grand Rapids Hamfest enjoyed an excellent turnout despite the bad weather. The annual DARA Hamfest will be held at Ypsilanti on May 23rd. Plan to attend and meet the gang. Traffic: (Dec.) W8CPY 72, CYH 55, RTN 12, HAN 3. (Jan.) W8GSJ 137, PVB 93, SCW 88, SAY 87, ARJ 82, NOH 81, UKV 79, ATB 70, CYH 68, TRN 48, QBO 42, RJC 39, AQA 35, DPE 29, ZWN 28, YNG 19, IV 18, DNM 15, BBJ 14, SH 13, UFR 13, ABH 12, FX 11, DED 8, IHR 8, SWF 7, VPE 7, KSL 4, EGI 3, RYP 3, MGQ 2.

OHIO — SCM, William D. Montgomery, W8PNQ — The total traffic for January was 1421. Nice going, gang, keep it up. APC recently was appointed ORS. From the *CARASCOPE* we see that QQ now is the proud papa of a new YL, and that the Columbus 144-Mc. gang is growing rapidly, with ZHS, WRN, IJV, UZ, YHQ, BDY, CCS, and YBF regularly taking part in Monday night drills. CBI now is a writer — we recommend that all of you check his article on the conversion of the SCR-274N transmitters which is being circulated by SREPCO in Dayton. ZEI reports that the Fort Steuben Radio Club is holding an electronics course on Monday evenings, and that the club now has two new receivers — an S-20 and an NC-101X. YFJ reports the receipt of a new Globe Trotter; that AFG is breaking in a new HT-9; and that 1LV is a new face in Fremont — from Connecticut. WRN reports that Columbus 144-Mc. stations are being heard in Marion, Findlay, Springfield, and Dayton. JFC reports that UFF has a new first harmonic — a YL, and that ZRV has a new 80-ft. tower up which "helps a little." TMA reports that BWN is a new ham in Shaker Heights. Our crystal ball tells us that WAB has worked Garden City, N.J., and Clarksville, Tenn., with ½ watt to a 3S4 on 3.5-Mc. c.w. with 599X reports. PBX tried to put up a beam rotator on his roof, but the roof started to cave in so Al took it down quickly. DAE now is "all time DXCC." ROX is BWA for the club transmitter of the Cleveland Brasspounders Assn. PUN holds the Ohio "long-wind" award with a 43-minute straight talk to ØBUL punctuated only by the required station announcements. PUN reports BLS and BLU are new hams around Chillicothe. TAQ was going good in the CD Party until some Sunday driver knocked over a fire hydrant in front of his house. Streets were flooded, pipes and sidewalks frozen, and TAQ got cold. WE says the Findlay Radio Club now holds meetings in the club house, and members are responding well to pleas for furniture and equipment donations. QBF had two frozen antennas — one was a pin sheared on the beam rotator, and the other was a 14-Mc. antenna that gathered too much ice. EBJ reports that SFI, ZEI, and LJH now are working the Buckeye Net. FNX has finished a new 300-watt final (812s) and is using it on 3945 kc. VWX reports that calculus and physics tend to replace hamming at times for him. From the *Listening Post* we see that the Queen City Emergency Net, which meets Monday nights at 8:00, now has about 22 regular stations checking in. Traffic: W8TKS 332, PIH 182, RN 116, EBJ 108, PNY 63, QBF 59, WE 58, TAQ 58, PZA 56, WXA 49, UPB 48, UZJ 46, FFK 44, CBI 36, IVC 23, PUN 22, ZAU 20, EQN 17, QIE 15, ROX 11, BEW 10, AYS 8, DAE 8, BCJ 6, DZO 5, TMA 5, APC 4, PBX 4, WSC 3, EFW 2, NDN 2, WAB 1.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Ernest E. George W2HZL — Emergency and traffic nets in this area are reaching an all-time high for activity. The NYS has added 26 member stations, and 41 outside stations participated in January activity. A 144-Mc. emergency net covering Westchester County is being formed, to be known as the Westchester Public Service Net, and will operate on 5 channels. RH and QUF started a relay net to operate on 144 Mc. that will extend Maine to Washington, D. C., which is known as the X Net. The first message of 43 words left Newport, R. I., to Asbury Park, N. J., and back in 15 minutes. Original members are 1JFF, 1SF, 1PEA, 2RH, 2QUF, 2DFV, 2VQB. Reliable stations are wanted for both ends of this net. The Tri-City area does not lack for 144-Mc. activity on Thursday nights. Twenty-nine hams are beating their brains out there with SCR-522s, etc. RMA has a 16' truncated parabola and hopes to work New York City. FZW now is communication officer, Upper Hudson Divi-

(*Continued on page 76*)

...Spots Before Your Eyes

Oh me! Oh me! What will my frequency be? Do you have spots before your eyes and kilocycles on the brain? The best cure for instability—sometimes known as "where-am-I-hope-it's-in-the-band" — is positive CRYSTAL CONTROL WITH PRs! Yes, PR Precision CRYSTALS give you peace of mind, because when you have a PR in your rig you KNOW WHERE YOU ARE . . . and your friends do, too! You can get PRs at your jobber's for the exact frequency you want (integral kilocycle) within amateur bands at no extra cost! Tens of thousands of amateurs all over the world use and boost PR Precision CRYSTALS for accuracy, stability, low cost, dependability and activity. They're unconditionally guaranteed. — Petersen Radio Company, Inc., 2800 W. Broadway, Council Bluffs, Iowa. (Telephone 2760)

SINCE 1934

PR *Precision* CRYSTALS

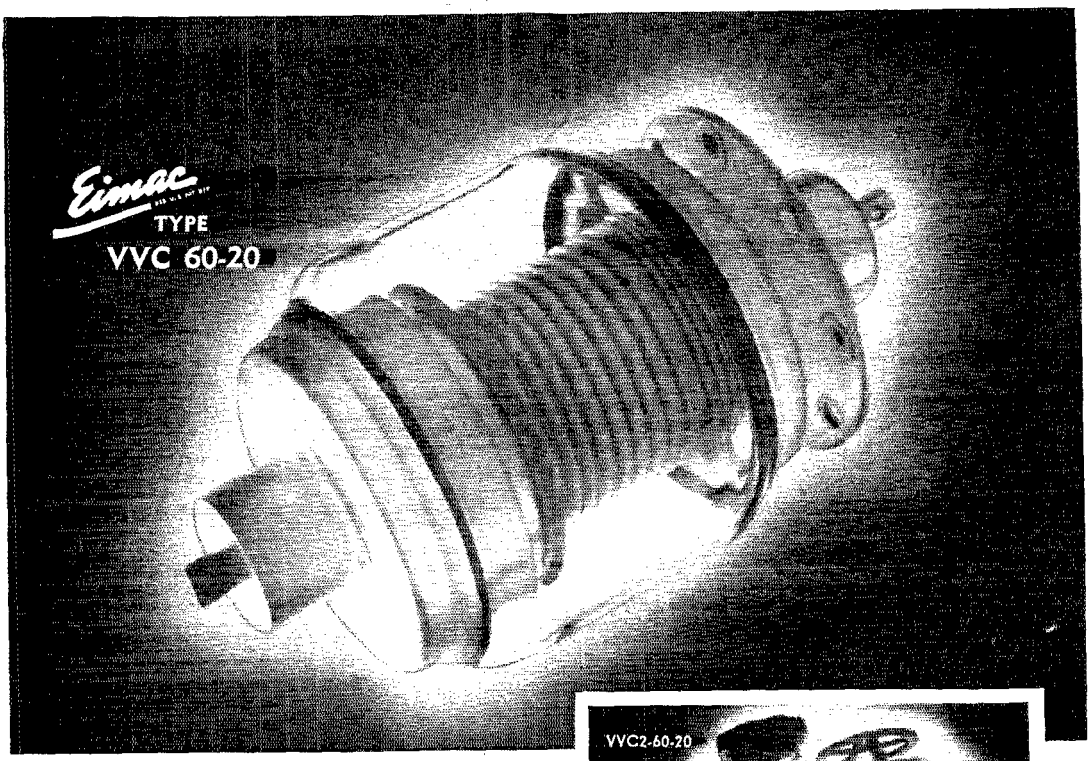
10 METERS PR Type Z-5.	Harmonic oscillator. Ideal for "straight through" mobile operation. High activity. Heavy drive without damage in our special circuit $5.00
20 METERS PR Type Z-3.	Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. High power output. Just as stable as fundamental oscillators $3.75
40 & 80 METERS PR Type Z-2.	Rugged, low drift fundamental oscillators. High activity and power output with maximum crystal currents. Accurate calibration.. $2.75

sion, U.S. Coast Guard Auxiliary. Those interested (Catskill to Glens Falls) should contact him for details. FK and ITX soon will be on 144 Mc. BIQ will join them from his new QRA in Lewiston. WPO spent ten hours in CD Party to knock off 11,000 points from 41 sections. Local round table in the evenings are popular in the Amsterdam area. KUJ is building 14-Mc. single sideband 'phone. NOF finally cracked the Middletown-Poughkeepsie path on 144 Mc. TDT is using up lots of solder on his 420-Mc. television. VHF SS was well participated in by Schenectady area hams. GYV was outstanding entrant. NCW is scheduling 2LUB, Marine, now in English waters, on 28 Mc. A long list of new hams and hams in training around Amsterdam shows a lot of good training programs in area. Traffic: W2LRW 342, ITX 322, RH 168, EQD 102, WPO 96.

NEW YORK CITY-LONG ISLAND — SCM, Charles Ham, jr., W2KDC — Brooklyn: The hidden mobile hunt was successful as a 144-Mc. problem in OHE's territory. An average of ten stations report into the net for weekly drills. JBQ divides his time between 144 and 3.5 Mc. HQT is heard again. DZR also is back. BFD advances a method of teletype exchanges without a receiving operator. PFX is doing swell now that the 522 has been converted. OHE claims a score of 1240 points in the VHF SS. Nassau: The 144-Mc. net includes CMU, NBQ, FQW, MBB, VL, LPA, CHK, GG, GQP, OBH, CET, LPJ, QBS, IGP, ANN, NI, HOL, JPY, WKR, QAN, RH, ADT, IER, UGO, MDB, AYW, UOL, ORZ, RZ, and CB, with FI as Net Control. T.V.I. has closed SMX for the time being. Suffolk: Red Cross affiliation is progressing with another chapter coöperating, working with Coast Guard Power Squadron in Great South Bay for possible activity in the near future. MZB has been appointed Field Day chairman for SCRC. The club has authorized purchase of four low-power 3.5-Mc. transmitter-receiver units to be set up and ready to go at four different locations in the county. UX has been able to converse with his sister by keeping regular schedules with Sweden. PDU is on 28, 14, 3.85, and 3.5 Mc. with a new 250-watt rig; he also is heard on 144 Mc. with 829B final. OQI's VHF-152A receives on 144, 50, and 28 Mc. PIA is a new 144-Mc. AEC member. Western Suffolk is going good with NXZ, PIA, SAH, WGZ, and WLS all in the net with 522 transmitters. DOG uses a pair of 24Gs at 150 watts on 144 Mc. MFJ is on 144 Mc. with a 522. In the 3.5-Mc. c.w. net regular drills are held every week on 3600 kc. with consistent stations being EQD, UZX, UGV, TUK, RTZ, NVB, BSP, KTF, OXM, SMQ, VAF, QYZ, VOS, and WFL. UZX has been appointed NCS for Group One, following the resignation of EQD. URX is an addition to 3.5-Mc. c.w. net. During the special AEC test on Feb. 8th traffic was handled from Newington on 3.5 Mc. with difficulty but EQD came through. The Queens liaison (144 to 3.5 Mc.) stayed on the air for three hours, which was just enough to overheat the 522 rig. No direct 144-Mc. relays were tried from Queens to Connecticut, but Nassau had excellent results with this type of traffic relay. KJY found time to make OO for the tenth straight year. KD replaced the old portable 210 rig with an 829. KV4AF/2 keeps schedule with KV4AA in St. Thomas every night. RTZ beat her former QSO record with 3¼ hours with TWY. VVP has d.c. mains but manages some QSP with 75 watts. TUK got fast service on his Class A ticket. LGK had good results in SS on 144 Mc. Joe says the Tu-Boro RC welcomes visitors. URX lost his Zepp in a storm and now uses folded dipole. US needs professional advice on how to get his 24-element beam up in the sky. ESO worked a couple of Gs on 3.5 Mc. VVZ is working on a pair of 8005s for all bands. RQJ is working with n.f.m., wire recorder, and miniature transmitter. EC says T.L. "AP" will monitor 2100 to 2130 EST for incoming traffic. OUT is on 28-Mc. 'phone. WHB is on 144 Mc. with a 522. Dave also reports that Stuyvesant HSRC has its old call, CLE. TUK worked 18½ hours in the CD Contest. JZX snagged 352 points in the VHF SS. PRE has a 35-w.p.m. certificate. BO handled much traffic from Army exhibit at Christmas, particularly with D4AND. TYU, QYZ, and OBU worked 1GFK on 3.5 Mc. while the latter was 8000 feet over Shannon, Eire. Traffic: W2TYU 506, BO 187, RTZ 158, LPJ 154, TUK 144, OBU 116, LR 114, EC 105, QYZ 102, BGO 48, MJO 39, PRE 24, OUT 16, LGK 11, ESO 9, SXT 7, RQJ 5, URX 5.

NORTHERN NEW JERSEY — SCM, John J. Vitale, W2IIN — Asst. SCM, T. J. Lydon, 2ANW. SEC; GMN. QEM is PAM of 3.9-Mc. Emergency Net; ANW is EC of NNJ (3630 kc.) Net, daily except Sunday at 7 P.M. The

(Continued on page 78)



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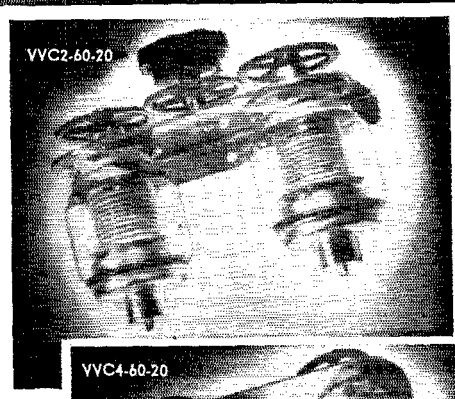

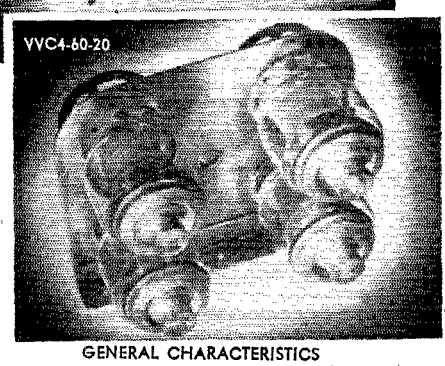

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	Capacity	R-F Peak Voltage	Maximum RMS Current
VVC 60-20	10-60 mmf.	20-KV	40 amp.
VVC2-60-20			
Parallel	20-120 mmf.	20-KV	80 amp.
Split-stator	5-30 mmf.	40-KV	40 amp.
VVC4-60-20			
Parallel	40-240 mmf.	20-KV	160 amp.
Split-stator	10-60 mmf.	40-KV	80 amp.

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'Phone 3.9-Mc. Net meets at 9 A.M. Sundays. QEM, NCS and EC of the 'Phone Net, now has two assistants, DRA and BEI. QEM is in charge of Sector A, between State Highway 22 to S40, 40 and Manahawkin; DRA is in charge of Sector B, North Jersey to State Highway 22: and BEI is in charge of Sector C, which is everything south of Sector A. BF and MRG, OOs, are doing a swell job on splitting the cycles in the FM Tests. Ben now has a single sideband adapter added to his station. UCARA holds meetings at American Red Cross Headquarters in Elizabeth, and will establish an Emergency Communication Center. IIN has donated a 522 for 144-Mc. operation. The club now owns surplus tape recorder and keyer and is running a code class under the direction of SGV. The v.h.f. group entered the club in the VHF SS. PIY is chairman of the Constitution Revision Committee, PIX is president, NKD is publicity manager. The Monmouth County Emergency Net drills every Monday at 8 P.M. on 145.8 Mc., and covers Red Bank, Asbury Park, Ocean Grove, Interlaken, Belmar, and Sea Girt with OOC, 5UD/2, NZC, BYK, NIE, CQB, OUS, and VQR as NCS and County Coördinator. PAT is Assistant EC for Red Bank. NUL is chairman of emergency committee of NNJARA in Hackensack. WCF is on 28 Mc. with 8 watts to a 50L6 and worked EI9G with folded dipole. Members of the Ridgewood RC are going strong for v.h.f., with UZK, VNA, TWO, KRO, and VJM on 144 Mc. UZN has sixteen-element beam on 420 Mc. and is playing with 50 Mc. UZK has WAC. OCC has finished remote-tuned, bandswitching 304T, 3.5- to 14-Mc. c.w. MO, FFQ, IRF, WEY, and UWN, of Livingston, are on 144 Mc. When ANW's antennas came down, Tom worked the nets and trunk lines from BLS's rig. BLS is now a regular operator on the nets and TO. BZJ has new VFO and is now Class A. BRC, on 7 Mc., made WAC when he worked ZC6BK. NCY is now n.f.m. on 3.85 and 28 Mc. BGH is Assistant EC and is working on 144- and 28-Mc. emergency rigs. LFR has Q5-er for his BC-342. COT worked 83 stations in VHF SS on 50 and 144 Mc. ABL reports he is WAS. KMK is on 7 Mc. with an ARC-5. HZY has contacted 147 countries. UWK is on 28-Mc. 'phone. Stations active in the N.J. Emergency 'Phone Net on Sunday mornings are QEM, as NCS, EGM as Alternate NCS, MKN, PPH, HX, QLP, SAK, ZI, LZZ, KMK, SFT, BEI, 3NF/2, OXX, BUX, ECD, GVU, EJB, JN, DRA, RYI, and ESX. If interested in joining the AEC, get in touch with the SCM, or your local EC, or any of the following County Coördinators: PCX, Essex Co.; CQD, Union Co.; BAI, Middlesex Co.; DZA, Bergen Co.; VQR, Monmouth Co; QEM, 75 Meter 'Phone Net; ANW, of NNJ C.W. Net; GMN, as SEC. Traffic: W2CGG 232, OEC 158, ANW 149, NKD 119, LFR 102, NCY 87, CQB 74, BLS 62, MTV 31, NIY 31, BWI 24, BZJ 22, CJX 16, QEM 15, EWL 14, PPH 13, BRC 12, HZY 12, OXL 12, IIN 10, UWK 8, OSQ 6, GVZ 5, KMK 5, OOC 4, DRA 2, UWN 2, VJM 2, WCF 2, UZN 1, MIG 1.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, WØPP — LAC, Burlington, AFQ, Keokuk, and ETJ, Ft. Madison, started the new year with a bang by handling emergency traffic from within the storm area. FP did a fine job in his capacity as SEC during this emergency. HMM, of Davenport, was on the air without rest for 64 hours handling c.w. traffic out of the storm area and as a result contracted pneumonia. AFQ is new EC for Keokuk and vicinity. BJL is trying out original idea for s.s.b. AEH has hot converter on 144 Mc. and is putting up a twelve-element beam for this band. AUL, Net Control for Tall Corn Net, is reporting in to Iowa 75 Net daily. This makes for fine coöperation between the two nets. THD, EC for Forest City area, passed away Jan. 28th. WML brought the Newton Radio Club on a visit to WHO transmitter and PP's ham shack. FDL and the boys at Muscatine are organizing radio club. VUA, FDL, and TTL are new members of Iowa 75 Net. SQQ has new Federal 167 transmitter on the air and is doing FB. TGK is on 14 Mc. using Signal Shifter. GFZ reports from Council Bluffs and is looking to his OES appointment. He has been working with 144, 235, and 430 Mc. FRH is getting new QTH with a couple of 60-ft. trees 140 feet apart. Could be he has plans for new antenna. PP has new 696 driving his p.p. 327s. KSS has new r.f. section for 28 and 14 Mc. using 127As. QFY is instructing in A. T. & T. school at Joliet, Ill. Traffic: WØFP 260, HMM 137, PP 76, TIU 23, SEF 23, WML 11, SQQ 6, QFZ 5.

(*Continued on page 80*)

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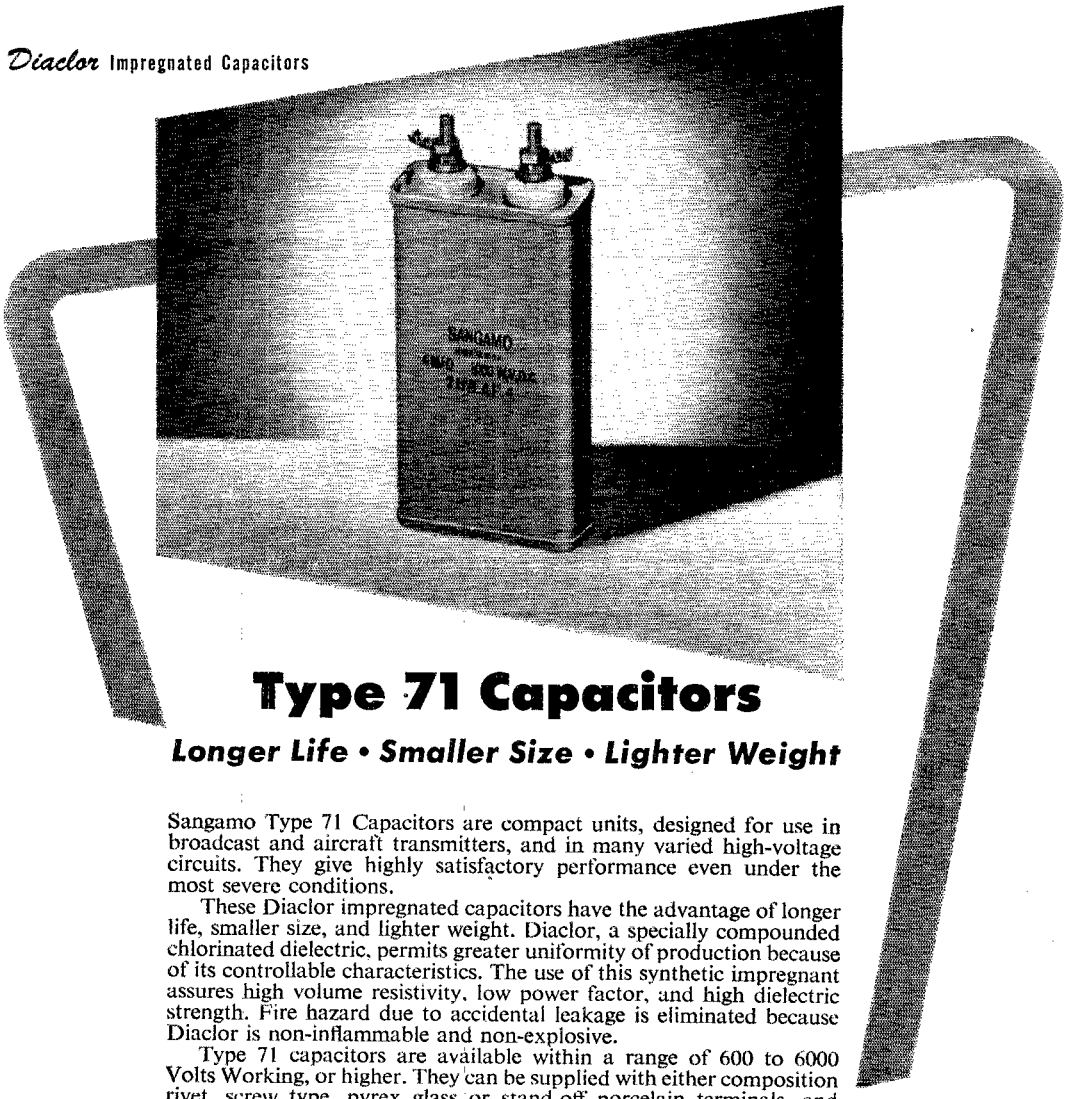

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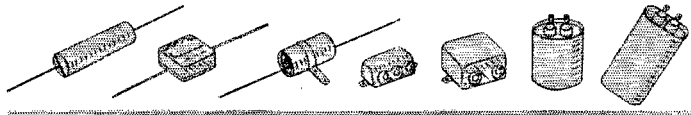

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KANSAS — SCM, Alvin B. Unruh, WØAWP — The State Emergency Net meets monthly on 3920-kc. 'phone and 3610-kc. c.w. NCV, Topeka EC, will coördinate 'phone-c.w. activities. YOS is EC for Zone 2. VBQ says NSB will be Asst. EC, Zone 6. CUL, Zone 30 EC, has 150-watt band-switching rig on emergency power plant and 35-watt rig on battery power. FEE has 28-Mc. portable-mobile. RHQ has four-element beam on 64-ft. tower. OAQ has new VFO. ZAT has new NC-183. New beam owners are VDH, DAC, and DMN. Topeka club officers: NCV, pres.; ICV, vice-pres.; AHG, secy. KRZ has new VHF-152; WGM has an HT-18; 5AZZ/Ø has a VFX-680; WIT has an HQ-129X; UPU has wide-spaced three-element beam; KSY has three-element beam; ZMC has Premax beam. Wichita Club officers: RVM, pres.; UUS, vice-pres.; CCL, secy.; LSY, treas.; GUO, pub. dir. ZKF is active on 235 Mc. UNQ has dual 50-28-Mc. beam on 65-ft. tower. CLN has five-element rotary and kw. on 28 Mc. OZN replaced 810 with p.p. HK-54s. CQC has HT-9 and dual 28-14-Mc. beam. MAR organized 28-Mc. code class. CCL has p.p. 100THs. IFR uses BC-696 for 3.5-Mc. c.w. NXJ is on 7 Mc. with 6L6. GOV and MAE work in 'phone net. PNN works in c.w. net. YOS is working on new e.c.o. with n.f.m. We need more towns in QKS. Drop in Mon.-Wed.-Fri. at 6:45 P.M. on 3610 kc. Traffic: (Dec.) WØWKA 29, (Jan.) WØWKA 60, GOV 45, NJS 45, OZN 41, OAQ 36, MAE 34, AWP 33, ICV 32, PZP 27, IFR 22, FER 19, BDU 15, AWB 12, EQD 12, AHM 6, VBQ 6, FRK 5, ZMC 4, LFL 1.

MISSOURI — SCM, Mrs. Letha A. Dangerfield, WØOUD — CGZ, who operated with a W5 call for some time, has his original call back and will be on 3.5 Mc. in Springfield. AQB, across the street, paralyzes his receiver on 7 Mc. CRM didn't have such a good month in January — he worked 2246 stations in '47. GHD has moved to Memphis. KIK has transmitter worries trying to put the Meissner down on 14 Mc. and keep the Stancor on MON. GCL worked 4 in QSO Party and the 813 went purple. Sleet broke T-match on ARH's 28-Mc. beam. TGN worked 291 in 66 sections in CD Party. DEA worked 225 stations in 61 sections in CD Party and bought crystals for all Midwest nets. He is very busy as new Director. CMH received new HRO as Christmas gift. MBE is on 7 Mc. and is not a YL as stated in last month's column. That note should have read "BEM is first YL to join AEC." Very sorry for mistake and apologies to both. VMI recommends KSR as OPS and QMF as EC for Perryville and sends list of members of the 3802 Net. OOP/4 took rig to his Florida winter home and has 2LMH as guest. With two 75-ft. trees as masts they are knocking off much DX and working all bands and all types of transmissions, even f.m. SKA went to Topeka to meet DEA and got a lot of ideas on traffic operation from other traffic men, including the virtue of checking message count and being prompt for net. DPO is back on 3.5 and 7 Mc. in Kansas City and is working on a rig with 811s in final. ZAO is all set up now as SEC and has plans for AEC bulletin. OUD and QSO have schedule at 7:20 A.M. on State Net, 3755 kc., and invite others to join. MON meets on 3755 kc. each night at 7 P.M. CST. Traffic: WØQXO 115, YSM 89, ARH 66, OUD 49, SKA 21, CRM 16, VMO 14, VMI 3.

NEBRASKA — SCM, William T. Gemmer, WØRQK — Nebraska C.W. Net needs more outlets around the State. How about you AARS operators? TQD is NCS on 3745 kc. Mon., Wed., and Fri. at 7 P.M. CST. Call in if interested. BVZ is on 3.85-Mc. 'phone. FHA is on 7 Mc. with 100 watts to a BC-459A. NXF has a new DB-22A and is using it to look for Vermont on 7 Mc. WAS. IJF now is 7LXW. UFD has 50-ft. steel tower on which to put a 10 over 20 beam. MKP is on 28 Mc. with 807. The Ak-Sar-Ben Radio Club elected QXR, pres.; PIT, vice-pres.; FQB, secy.; VHS, treas. CZK is going to higher power. UZF has new NC-173. LJO built new 28-Mc. beam. LZO made WAS on 28 Mc. with home-made beam. RUG has new S-40 receiver. SAI is on 28-Mc. 'phone with 40 watts. COU was host to out-of-town visitors CBH, OHU, DNW, EXP, GPX, BBS, BIW, UBN, SAI, VHP, QXR, VMP, RWV, UHT, DPE, and CMO. ZFK has a full gallon to 304TL. EXU is on 14-Mc. 'phone. ETZ is on 144 Mc. POB is using McMurdo Silver transmitter. VHP is running 300 watts to 24Gs on 28 Mc. ESX, RKC, and RQK are attending A. T. & T. school at Joliet, Ill. ZOQ has new QTH. OED reports the following: RCH is experimenting with v.h.f. AZC is on 7-Mc. c.w. and 28-Mc. 'phone with new rhombic. PSX is working all bands. NVE and VMP are active on 3.85-Mc. 'phone. DHO, FXS, and

(Continued on page 82)

DHT were guests at Pioneer Radio Club meeting. AYO is on 28-Mc. 'phone with beam. OED is active on 3.5-Mc. c.w. while rebuilding for all-band operation. Traffic: WØSAI 12, CMO 4.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Walter L. Glover, W1VB — New appointments: KUO as ORS and LKF as EC for Hartford and East Hartford. PLI, confined to New Haven Hospital, is improving. JRV bought a new house. APA is too busy for much hamming. QOT is welcomed into the ham fraternity. HYF has BC-696A working FB. BHM has new Collins receiver. BDI worked 20 stations in VHF SS, and made 120 contacts in 40 sections in CD Party. AW schedules 3BWT daily. JMY, we hear, has forsaken c.w. for 'phone. INF/QMI is trying new antenna and keying combinations. SARC has a column in the local paper through the efforts of Andy Dietz. CARA is making plans for Field Day. IKE is back on the air and reports into Nutmeg Net. NLM received some publicity in *Bridgeport Post*. KQY lost one mast in recent storm. KUO is working on new break-in unit. TD has trouble with b.c. harmonic on Nutmeg Net. LGN has new three-element beam on 28 Mc. KXM, KJC, and MBK renewed EC appointments. LKF says Connecticut River Valley Net is shaping up. VB visited KQY. ORP ran up a high score in CD Party. We would appreciate more news and reports, especially from the 'phone gang. This is your column, fellows, so let's make it a good one. Traffic: (Dec.) W1IIN 143, MHT 8, APA 7. (Jan.) W1INF 271, NJM 218, EFW 201, DAV 181, AW 155, VB 124, LKF 107, ORP 71, BDI 69, FTX 57, ADW 35, IKE 17, KUO 13, BHM 11, DXT 9, HYF 8, JJR 3.

MAINE — SCM, F. Norman Davis, W1GKJ — RM: NXX. SEC: LNI. PAM: FBJ. 9NNI/1 now is QXS. BTG is 2BTG in New Jersey and wants the Maine gang to keep an ear open for him on 3.85-Mc. 'phone. ADC is running 400 watts to an 813 on 'phone and c.w. KMM and MLP have been chasing DX on 7 Mc. QLU is on 3.85 Mc. with n.f.m. OCU and CZ keep Houlton represented on 3.85-Mc. 'phone. PTL is new Class A licensee in Bingham. JNL, GQ, and MFK are on 28-Mc. 'phone. PLB is on 144 Mc. and 3.5-Mc. c.w. QWQ was badly hurt while erecting a mast. CPS has new VFO and is after DX. HXQ is operating on 28-Mc. portable in Florida. FBJ also is in Florida. GCB has two-element rotary on 28 and 14 Mc. ACW has three-element rotary on 28 Mc. and new rig operating four bands. JSY is working DX with plumber's delight. Anyone interested in forming an Aroostook 3.85-Mc. 'phone net, drop a card to ACW, 11 Turner St., Presque Isle. NXX is busy on five traffic nets and needs more help on the P.T.N. LNI and EFR provided 144-Mc. communication for timing at the ski trials on Mount Pleasant, Bridgton. OKU has 274N on 7 Mc. QDO expects to be on from KP4 Land soon on 28- and 14-Mc. 'phone with both ears wide open for Maine contacts. LHX and 2CDS were visitors at the PAWA and 2CDS gave an amusing talk on the trials of being a radio amateur in New York City. GKU has worked ten European countries and Africa on 3.5-Mc. c.w. running 30 watts to an 807. Traffic: W1NXX 241, GKJ 90, OHY 46, FBJ 37, LKP 37, AFT 19, JAS 16, QHA 14, VV 13, ODA 10, AWN 5, AMR 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New ECs: PFA for Methuen, DW for Westwood, PMC for Nantucket. ORT is now ORS. QW is back on 3.5-Mc. c.w. NWL has 21 states on 50 Mc. BIY is on 3.5- and 7-Mc. c.w. QMD is on 7 Mc. Officers of Merrimac Valley Amateur Radio Club are: MQN, pres.; CBY, vice-pres.; QKH, secy.; IQH, treas.; PFA, act. mgr.; and Matthew Leshner, assistant. On Jan. 25th an emergency test between Eastern and Western Massachusetts ECs was held. Messages were received here from IZN and BKG, and ALP gave NY messages for UD and AZW. PMC is on 28-Mc. 'phone and 14- and 7-Mc. c.w. FH, JCX, HKK, and NWO have been issued DXCC Certificates for 'phone work. JAS gets on in the Sea Gull Net. PZ says that the Pocahontas Radio Club meets every other Tuesday night. Alternate Tuesday nights the members are on 29,600 kc. at 8 P.M. MCD, MGN, CBY, NNG, IGO, NON, PFA, and JDK set up radio gear in City of Lawrence headquarters and helped one of the Walter snow fighters in emergency plowing. BLO has 125 countries. QNC schedules Scotland. PFA is on 28 Mc. with four-element beam and HT-9. KNU has 50th country on 14 Mc. JDK is on 144 Mc. CBY is on 28 Mc. with a BC-610.

(*Continued on page 84*)

Model VH-15 Speech Master, a new *completely weatherproof* 15-inch Hypex, is the latest addition to the JENSEN Hypex family, thus expanding this line of projectors to cover a wide range of sizes and prices. Designed only for speech reproduction, without compromise to music requirements, it affords greater naturalness in the low frequencies than do other Speech Masters. Model VH-15 is recommended for sound reinforcement, indoors and out, where distinct natural speech reproduction is required to carry through high noise levels.

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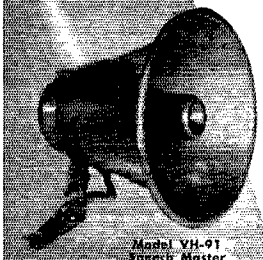

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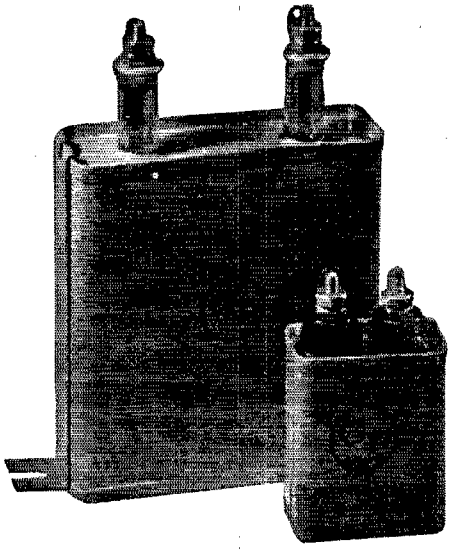
LBH is on 3.9 Mc. with a new Collins rig. BWH, EC, held a meeting for Attleboro hams. Newton Emergency Net was on Jan. 25th with BL, EK, RM, LMU, and OMU. LMU had 40 QSOs in UHF SS. AGR will be on with 1-kw. on 3.9 Mc. BR has a 522 and a Workshop beam on 144 Mc. KVX is rebuilding for 144 Mc. with an 829. At Eastern Mass. Club meeting BUD, from ARRL, gave a talk on Atlantic City Conference and MQ spoke on "Television Interference Problems." New officers of Brockton Amateur Radio Club are: LJT, pres.; EYY, vice-pres.; OEG, secy.; LWI, treas.; OBL, sgt. at arms. South Shore Club had open forum on B.C.I. HIL has 21 states on 50 Mc. The T-9 Radio Club held a meeting at Kennedy's QTH in Danvers. AYG is working lots of DX on 3.5 Mc. DJ has 25 states and eight districts on 50 Mc. NFQ has new gear on 144 Mc. QGO is on 7 Mc. and has Mark II and BC-375E. QXM is on 28 Mc. MRQ has 49 countries. QXQ is on 7 Mc. PYM is operating portable at Newton High. LMB worked his 100th country on 'phone. QKJ put up a "V" beam for contest. OBE has new antenna. QUY is on 28 Mc. and has HT-9 and NC-173 receivers. HNC is on 7 Mc. HHG is working on n.f.m. for 28 Mc. JJS is on 144 and 3.5 Mc. PZG worked 30 new countries. AAR has new beam on 28 Mc. LAO has new 'scope. QPG has new final on 14-Mc. c.w. BWN has new beam on 28 Mc. RD is on 27 Mc. GA, DDI, and HCH are on 28 Mc. MHK is running mobile on 28, 50, and 144 Mc. The Eastern Mass. Net on 3745 kc. is very active, both the new section at 6:15 P.M. and the old section at 7 P.M. CCF is doing a swell job in keeping things going. Traffic: (Dec.) W1AAL 42, PZG 30, BMW 9, JOJ 4, (Jan.) W1JCK 125, LML 104, PYM 77, BDU 53, DWO 48, LM 48, EMG 44, TY 34, AAL 32, UE 27, NBS 27, BB 26, KKJ 20, PLQ 19, ALP 12, MDV 12, AAR 8, LAO 7, QMJ 6, JOJ 5, HA 5, AGX 3, MRQ 3, RCQ 3, LMB 2, LMU 2, MDU 2, QHC 2, QGO 1.

WESTERN MASSACHUSETTS — SCM, Prentiss M. Bailey, W1AZW — RM: BVR. SEC: UD. AMI is new ORS. OMJ is OBS and sends official bulletins Mon. and Wed. on 3920 kc. and Tues. and Fri. on 3522 kc. at 7 P.M. IBZ, another OBS, sends bulletins on 28,576 kc. Mon., Wed., and Fri. at 10 P.M. George now has VFO and a.m. and f.m. COI renewed OPS appointment. BVR wants to form a 7-Mc. traffic and emergency net. An E. Mass.-W. Mass. emergency drill failed because of inability to get across the State on 3.5 Mc. during the day. K1NRU is active and Vic is looking for recruits in Naval Reserve around Springfield area. JE reports KG6BT/1 soon will be on from Rockdale. BDV is operating remote control from downstairs room. Transmitter is "refrigerated" in attic. Jim is a member of Sea Gull Net. COI has new six-element 144-Mc. beam for SCR-522. QXE is a new ham in Westboro on 145 Mc. and is looking for schedules with Worcester and Springfield. QGG is at So. Lancaster and reports forming a club at college with a Temco transmitter on the air. UD threatens to report into 3760 kc. with c.w. A new net on 29 Mc. is operating, including Worcester and Springfield stations. In the first test 33 stations took part. QCC is Asst. EC for 144 Mc. in Hampshire County. PNQ is new engineer at WBEC in Pittsfield. QNI and PXR are new hams in Pittsfield. The Pittsfield Radio Club lost its meeting place and all its equipment, including a 2½-kw. gas-driven generator, in a fire which raged through the building they occupied. PHZ, in Adams, has VFO and 807 final. BIV is leaving West. Mass. to take a fine position at his company's Tennessee plant. BKG, LUD, KVN, QCA, EZT, IZN, OBA, COI, and ØSRP took part in timing Eastern Amateur Title Ski Races on Mt. Greylock. Traffic: W1BVR 65, NY 39, JE 28, AZW 26, BDV 19, UD 17, JGY 4, K1NRU 3, W1EOB 2, LUA 1.

NEW HAMPSHIRE — SCM, Gilman K. Crowell, W1AOQ — The New Hampshire 'Phone Net (3980 kc.) is on every Sunday at 9:30 A.M. The C.W. Net now operates on 3685 kc. 7–8 P.M., Mon. through Fri., with CRW as Net Control. The following clubs announce new officers: Concord Brasspounders; APK, pres.; JNC, vice-pres.; AIJ, secy.-treas. Manchester Radio Club: GDE, pres.; GMH, vice-pres.; KYG, secy.; QWH, treas.; AUY, member at large. Nashua Mike and Key: HTO, pres.; DUB, vice-pres.; PQK, treas. JNC has a new 28-Mc. beam with rotator, also an e.c.o. The Nashua boys converted HTO to 'phone. MUJ and OFR have nightly schedules on 50 Mc. MRN has a new 28-Mc. beam. MUJ, OFR, and IIQ assisted *greatly* on 50 Mc. during the Wakefield fire. IP, AVJ, and AVL are red hot on 14 Mc. CRW is doing a fine job on the C.W. Net. Those who want evening activity and do not hold an A

(Continued on page 88)



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Plastic Film Oil-Filled
CAPACITORS

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2. Smaller—Lighter

3. Better Electrical Characteristics

1. More Economical

MFD.	Volts DC	*List Price* Paper Capacitor	*List Price* Plasticon AOC	Saving
10	1000	$15.18	$10.67	$4.51
4	2000	13.67	9.24	4.43
2	3000	22.78	15.40	7.38
1	4000	33.54	27.50	6.04
2	5000	48.73	41.25	7.48

Above are typical examples.

PLASTICONS are the result of technological advances . . . cost less to manufacture, give better performance

2. Smaller—Lighter

MFD.	Volts DC	*Approx. Weight*		*Approx. Cubic Dimensions*	
		Paper Capacitors	Plasticons	Paper Capacitors	Plasticons
10	1000	1.95 lbs.	1.7 lbs.	31 cu. in.	30 cu. in.
4	2000	2.0	1.23	31	23
2	3000	2.0	1.21	31	19
1	4000	1.77	.94	28	19
2	5000	5.2	2.9	70	60

3. Better Electrical Characteristics

	Paper Capacitors	*Plasticons*
Power Factor at 85°C 60 cycles	0.7%	0.3%
Resistance at 85°C megohms per Mfd.	40	100
Capacitance Temp. Coefficient 100% at 25°	−40°C = 73% +85°C = 97%	−40°C = 94% +85°C = 103%

PLASTICON CAPACITORS given are Type AOC, mineral oil-filled.
PLASTICON ASC silicone-filled have better characteristics.
Paper Capacitors given are chlorinated diphenyl impregnated.

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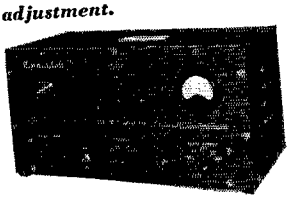
MANUFACTURERS of GLASSMIKE CAPACITORS and HIGH VOLTAGE POWER SUPPLIES

RADIO SHACK

SAVE UP TO 2/3 ON HAMMARLUND GEAR

SEE THESE VALUES IN POPULAR XMTG EQUIPMENT. Kits include all parts, punched chassis, cabinet, tubes, sockets, resistors, capacitors, wire, insulation, switches, knobs, and *detailed illustrated instructions for wiring and adjustment.*



FOUR—20 XMTR

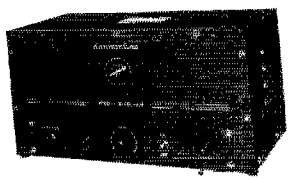
WAS $120.00

Radio Shack Kit Price $39.50

Gives you all this: all-band operation — 80-40-20-11-10 meters; crystal control (3.5-4 mc fundamental); CW or phone operation with four-11 built-in, self-powered, high-speed keying relay; efficient, sharply tuned oscillator and multiplier circuits; single-dial tuning; four-gang condenser tunes xtal and three doublers; variable output matches 50-600 ohms; 100-mil meter switches to meter each r.f. tube; power input 35 watts at 105-120 volts 50/60 cycles; tubes include 7C5LT (4) ocs., 1st, 2nd, and 3rd mult., 807 final amp., 5U4G rect.

Coils for 11-20-40-80 meters .....each **$1.70**

Crystal for FOUR-20 (Bliley or Valpey) .....each **$2.80**



FOUR-11 MODULATOR

was $72.50

RADIO SHACK KIT PRICE $29.50

Use it with your present rig or your new Four-20. Gives you eleven watts of audio with, less than 5% distortion; substantially flat in speech range 200-3000 cycles; drops off sharply above and below; high-impedance mike input; 8000-ohm output to match Four-20 transmitter; 110 DB gain; works on 105-120 volts 50/60 cycles; tubes furnished are: 6SL7GT 1st and 2nd AF; 6C5 phase inverter; 2—7C5LT PP pwr output; 5U4G rectifier.

88¢

AAF HAND MIKE

Type T-17 mike with push-to-talk switch, cord, and plug. This is a carbon mike.

FACTORY-WIRED KITS

We have a limited number of factory-wired Four-20's and Four-11's. While they last, they're yours for

Four-20 .....$59.50

Four-11 .....$49.50

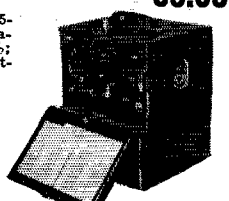
Protect your rig with this HEINEMANN CIRCUIT BREAKER

89¢ each 10 for $8.50

Better than fuses. Carries starting surges but trips on sustained overloads. Resets at finger touch. Can be tripped manually and used as on-off switch. SPST; 4, 15, or 20 amp. ratings at 117 volts. Specify current. Brand new.

BC-221 FREQUENCY STANDARD $36.95

Fundamental ranges 125-250 and 2000-4000 kc; stability better than 0.005%; works on 110 vac, batteries, or vibrapack. Use it for a signal generator or to make a wonderful VFO. Complete with tubes, original crystal and calibration charts. Used but excellent working condition.



BC-221-AK with built-in modulation $79.50

$6.95

Brand New J-36

You'll be pleasantly surprised at this value . . . its counterpart has been sold by a well-known speed key manufacturer at more than double our bargain price. Made for the Signal Corps by Lionel Corp.; supplied complete with cord, wedge plug, and switch.

Take a Year to Pay

It's easy now to fit up your ham shack with new, modern gear. Just choose what you want . . . whether it's a receiver, transmitter, amplifier, wire recorder, or test instrument . . . and send us only 10% of its price. Start using your new equipment right away . . . while you take a full year to pay for it.

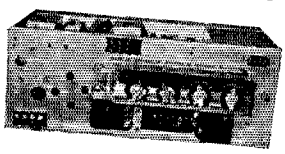
Model No.	Equipment Code	Net Price	Down Payment	Per Mo. for 12 Months
NATIONAL				
NC-33		$66.95	6.59	5.25
NC-46		107.40	10.74	8.54
NC-57		89.50	8.95	7.12
NC-173		189.50	18.95	15.07
NC-183		269.00	26.90	21.39
NC-240D		241.44	24.14	19.20
HRO-7		311.36	31.14	24.75
HALLICRAFTERS				
S-38		47.50	4.75	7.55*
S-40A		89.50	8.95	7.12
SX-42		275.00	27.50	21.86
SX-43		189.00	18.90	15.03
S-47		200.00	20.00	15.90
S-53		79.50	7.95	6.32
HT-9		350.00	35.00	27.83
Coils: 10M—$10.50; 20M—$15.50; 40M—$11.75; 80M—$10.85				
HT-17		69.50	6.95	5.53
Coils: 80M or 40M—$3.50 per set; 20M or 10M—$7.00 per set				
HT-18		110.00	11.00	8.75
HAMMARLUND				
HQ-129X		189.15	18.92	15.04
R.M.E.				
RME-84		98.70	9.87	7.85
RME-43		198.70	19.87	15.80
RME-152A		86.60	8.66	6.89 or 13.77*
RME-DB-22A		66.00	6.60	5.25
MEISSNER				
Signal Shifter		66.00	6.60	5.25
Coils: any band — $4.00 per set				
Power supply — $13.00				
SONAR				
VFX-680		87.45	8.75	6.95
Coils: any band — $1.50 per set				
MB-611		72.45	7.25	5.76
HARVEY-WELLS				
TBS-50		99.50	9.95	7.91
50-watt xmtr with tubes and coils for 8 bands; less power supply				
WEBSTER				
Wire Recorder		149.50	14.95	11.89
SYLVANIA				
7" 'Scope		124.50	12.45	9.90
R.C.A.				
Voltohmyst 195A		79.50	7.95	6.32
Voltohmyst WV75A		125.00	12.50	9.94
Chanalyst 162C		162.50	16.25	12.92
5" 'Scope 155C		115.00	11.50	9.14
5" 'Scope WO79A		550.00	55.00	43.73

We carry a full line of test equipment by RCA, Simpson, Supreme, Triplett, Precision, Dumont, Hickok . . . All available on our easy 10%-down deferred-payment plan.

BUY THE RADIO SHACK WAY . . . AND PLAY AS YOU PAY.

Speed delivery and save C. O. D charges — send full amount with order. 50% deposit required on all C. O. D. orders.

BRAND NEW! BC-625



100-156 MC Crystal-Controlled XMTR Complete with Tubes $11.95

Temperature-stabilized 15 watt XMTR delivers 15 watts. Uses two 832s, three 12A6s, one 6G6G, one 6SG7. 28 volt d-c dynamotor powers entire rig. Complete with tubes, plugs, instructions for conversion to 110 volt a-c operation.

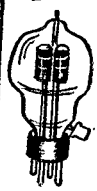
SUPER VALUES—Brand New

Westinghouse 807 .....$0.90 each
4 for $3.10
826 ..... .50 each; 3 for 1.45
832A ..... 1.50 each
866/866A ..... .75 each; 6 for 4.10
872/872A ..... 1.13 each; 3 for 3.23
3 C24/G ..... .49 each; 6 for 2.25
316A .....$0.45 each 805 .....$3.75 each
814 ..... 2.95 each 815 ..... 1.49 each
6C4 .....10 for $1.50

NEW LOW PRICES ON POPULAR TUBES

Type	Net	Type	Net	Type	Net	Type	Net
2C34	$0.45	813	6.00	874	1.95	1624	.45
2C40	.45	959	.38	931A	1.87	1626	.25
2D21	.60	211	.37	954	.23	1629	.15
2AP-1	2.25	6AG5	.68	955	.23	1651	.75
3B24	.75	6J5	.53	957	.30	8005	3.15
3BP1	1.50	6C21	13.50	958	.38	9001	.24
3AP-1	1.50	3E29	1.50	830B	4.50	9002	.30
3E29/829B		2X2	.30	VR105	.75	9003	.24
	3.95	801	.75	VR150	.75	9004	.24
5BP4	1.73	803	9.00	1619	.15	9006	.24
6AK5	.60	809	1.50	1625	.15		
811	1.95	836	.75				

EIMAC TUBES



BRAND NEW
304-TH $3.95 each
6 for $23.20
plus a limited number of
450-TL $30.00 each
304-TL $3.72 each
2 for $7.00

RADIO PHONE HANDSETS

Carbon mike, push-to-talk switch, rubber cord, plugs.
TS-11 or TS-13
$3.50
H-23-U $4.95

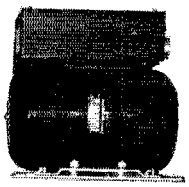
BRAND NEW GE SELSYNS $4.95 PER PAIR

Ideal for beam position indicators and many other uses. You can run these splendid selsyn control transformers at 35 volts 60 cycles and they'll give you permanent, efficient performance.

C-D DYKANOL XMTG CAPACITOR

TQ-30020
3000 vdc
2 mfd
$3.45 each

DYNAMOTOR SPECIAL—BRAND NEW! $9.00



An amazing value. Type PE-55, complete with filters, relays, mtg. 500 volt 400 ma. d.c. output. 12 volt d.c. input. Quantity is limited so ORDER NOW.

BRAND NEW: BC-442 ANTENNA RELAY UNIT $1.95

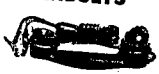
Complete, compact unit includes 0-10 ampere r.f. meter, antenna-switching relay with 28-volt winding, and 5000-volt, 50 mmfd. blocking capacitor; all in metal case with porcelain insulators. *Don't miss this buy.*

BRAND NEW! RADIO RECEIVER BC-1206-A

$4.95 with tubes

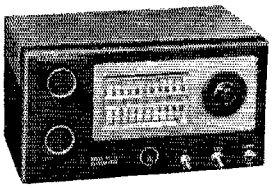
Handy, all-'round revr in metal case; tunes 200-400 KC; five tubes give preselector, converter, oscillator, 175 KC I.F., 2nd det., and A.F. Takes 900 mils at 28 vdc. Filtered and shielded battery lead.

TS-10 SOUND-POWERED HANDSETS



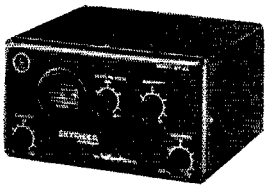
No batteries needed . . . yet these handsets let you talk up to 12 miles. Use them outdoors, indoors, anywhere . . . they're sturdy, dependable, trouble-free. Order yours today . . .
BRAND NEW
$15.00 each
$27.95 per pair

SAVE ON HALLICRAFTERS



HT-17 TRANSMITTER
NOW ONLY $49.50

You save $20.00 on this popular 15-watt crystal-controlled CW xmtr. All amateur bands from 3.5 to 30 mc. Full 15-watt output at 3.5 and 7 mc; 10 watts on 14, 21, and 28 mc. 115 volt 50/60 cycle operation. Furnished with tubes and 40-meter coils.

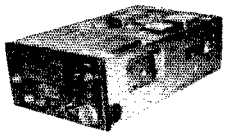


SKYRIDER PANORAMIC
was $99.50
NOW ONLY $49.50

You save $50.00 on this visual monitor usable with any receiver. Tunes electronically; has self-contained scope; works up to 200 Kc; complete with 10 tubes, for 115 volt 60 cycles.

R-5/ARN-7 RADIO COMPASS UNIT $11.95

Complete with tubes and instruction book. For 100-1750 Kc service. 28-vdc operation. Good used condition.

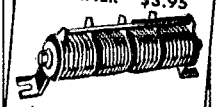


XMTG CAPACITORS

Nationally known, high-voltage, oil xmtg capacitors, all in rectangular cases, with stand-off insulators.

Mfd.	Volts d-c	Net Ea.	Mfd.	Volts d-c	Net Ea.
4	600	$0.71	2	1500	$1.20
6	600	.79	8	1000	1.49
8	600	1.19	6	1500	1.79
10	600	1.29	2	2000	2.95
2	1000	.71	8	2000	3.75
4	1000	1.19	2	2500	3.25
12	1000	2.50	4	1500	2.35

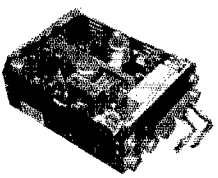
SELENIUM FULL-WAVE RECTIFIER $3.95



A-c input 35 volts; d-c output 28 volts, 3.5 amperes.

BRAND NEW G.E. BC-645A — ONLY $9.95

Get going on 420 with this "hot" xmtr-rcvr for phone and i.c.w. Originally priced over $2000, they cost you less than the price of the 15 tubes you get with the outfit. Full conversion instructions furnished.



(*Continued from page 84*)

ticket, should tune in on 28-Mc. 'phone after 7 P.M. BFT worked WAC in four hours. CNX just cleared his WAS and WAC. The Concord Brasspounders made a tape recording of the club's activities to be sent to the Newark Radio Club. The Manchester Club meets at the local YMCA. Traffic: W1CRW 112, AOQ 8, APQ 7, CDX 7, AUY 4, QEU 4.

RHODE ISLAND — SCM, Clayton C. Gordon, W1HRC — LCH, now D4ABC in Nuremberg, Germany, is on every Sunday 9 to 11 A.M. near 28,200-kc. 'phone. BGM operates Joe's home rig on this schedule while Joe talks to the folks. LQL is on 28-Mc. mobile with Sonar rig and Gon-Set converter. KYK is on late nights on 14 and 7 Mc. AJQ is now in Texas. ODJ is a new ORS. HRC's HRO has had a face-lifting. I took out the 2½-volt tubes and installed metal tubes per the HRO-5T circuit with good results, but it is time-consuming and you had better have plenty of test equipment if you plan to do it. Also I finally got a BC-221-Q. In order to keep the heat down in it I am using a selenium rectifier, and to keep the shock hazard down I am using a low-ratio audio-ouput transformer as an isolation unit between the light-line supply and the power supply. A nice letter was received from QNA, who is shipkeeper at K1NR, the Naval Reserve Armory in Providence. One 500-watt job and five 70-watters are in operation there at present. Of course, the fellows at the Armory want you to get in with them and they offer $2.50 a week for two hours of drill. MIJ is your new SEC. Traffic: W1BTV 76, QR 66, ODJ 30.

VERMONT — SCM, Gerald Benedict, W1NDL — KRV, on 7 and 3.5 Mc., reports 33 countries confirmed. PSD is building new VFO. PSD also is on CRN. Rus would like to have much more activity on the VT Net. KP4FN, ex-W1BHR, reports he now is in San Juan and had 32 contacts with OKH from Oct. 15th to Jan. 15th on 28 Mc. EKU reports into Green Mountain Net, 28-Mc. 'phone, as well as OKH, MCQ, MMV, QMN, and NDL. OKH reports hearing some 6s and 7s on 28 Mc. during January, and will have rig on 28 Mc. NXE from Massachusetts is now in Montpelier and will have rig on 7 and 3.5 Mc. MCQ has Command-type receivers and transmitters to use as emergency rigs, and OKH uses one as e.c.o. OQB is stationed at Guam. Traffic: W1PSD 24, EKU 11.

NORTHWESTERN DIVISION

ALASKA — SCM, August G. Hiebert, K7CBF — The stork delivered AO's latest DX, a jr. YL operator, who operates regularly now with raw a.c. sigs at 2 A.M. BD is rebuilding to a 400-watt 4-stage table-top job for VFO and crystal. MH is back home in St. Paul for a vacation from the Williwaw Country. Before leaving he was working Europe on 7 Mc. between 8:00 and 11:00 A.M. (Aleutian Time) regularly. BK has moved ham gear, baggage, and XYL to Anchorage for construction of KENI. GT visited home-town Anchorage from Barrow and reports he expects to be out of the Army soon. BE is Stateside on a radio equipment shopping trip. Traffic: KL7MH 11, BD 4, K7CBF 2.

IDAHO — SCM, Alan K. Ross, W7IWU — American Falls: DMZ is new OPS and permanent NCS of the FARM (Friendly Amateur Radio Missions) Net on 3935 kc. Jerome: GFW is Alternate NC Number 3 for the FARM Net. Twin Falls: New EC is KEK, and with IOA as Assistant EC, is after AEC members. KEK also is on 50 Mc. now with an 832A final. JMX participated in the ARRL FMT. He is putting an SCR-522 on 146 Mc. now. Mountain Home: IY is working 28-Mc. c.w. Boise: FOF moved to California. GTN meets with the FARM Net. HPH has new 14-Mc. beam. Ex-7ESO, now 1NYG, writes from KP4 Land and is on 14 and 28 Mc. with a BC-610 and three rhombics. Let's have some Idaho participation in the June Field Day this year. Drop me a line of your plans and we will arrange to work each other during the contest. Traffic: W7GTN 30, DMZ 22, EMT 14, IWU 14, GFW 8, BAA 4, HPH 3.

MONTANA — SCM, Albert Beck, W7EQM — SEC: 7EMF. GZA is building a small portable rig. BOZ has new frequency meter. CPY reports four portable outfits in the east end ready at all times for emergency work. FIN is remodeling his station. The Billings gang is attempting to organize an emergency net. JIZ has 250 watts input. AMK is building a kw. DPK is organizing CAP radio net. CVQ deserted tetrodes and went back to triodes. CPY visited his son, CBY, during the holidays. BSU has bandswitching

(*Continued on page 90*)

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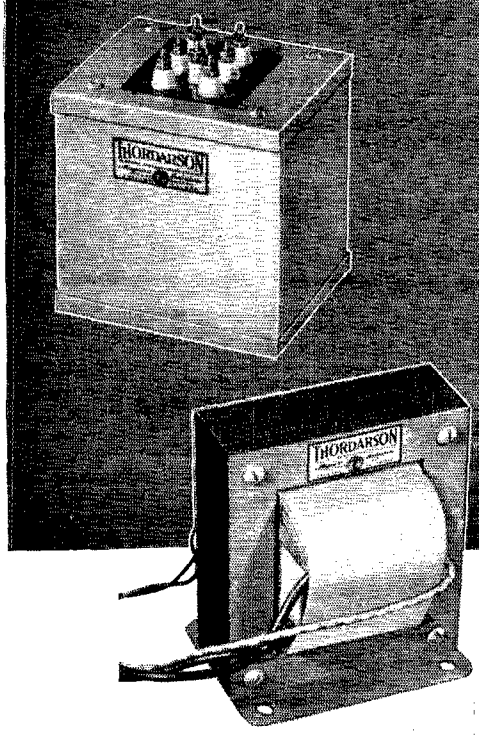
807 with VFO exciter. KJX visited EQM in Butte. COH has a 4E27 on the air. FL is n.f.m. New officers of BARC are: KKB, pres.; CJN, vice-pres.; LNS, secy.-treas. A banquet and annual installation of officers was held at Casino in Butte. QB arrived from Spokane to work for CAA in Lewistown. HBM is working on a pair of 813s. LVJ is with KXLO. JRM is having modulation trouble on 28 Mc. FTO is planning a 5BPL modulation 'scope to keep check on the 250THs in the final. FXO and IQX visited Capital City Radio Club. Officers of the club are: IVY, pres.; HIZ, vice-pres.; BIS, secy.-treas. FXO reported working 40 states on 51 Mc. with a converted 522. FGB blew up Class B transformer. Traffic: W7CT 20, FGB 14.

OREGON — SCM, Raleigh A. Munkres, W7HAZ — Portland: DIS ran up an imposing score in VHF SS. JMZ is active on Oregon Net. JLU is getting BC-459 on the air from Portland University. Astoria: COZ reports EBD has forsaken c.w. for 28-Mc. 'phone. KQN had contact with Korea as first QSO with new beam. Pendleton: The club has passed two new resolutions. First, members to return the *QST* poll 100 per cent. Second, the correspondent to send a report each month to the SCM. DQX works Europeans on 14 Mc. with a vertical when he can't hear them on a horizontal. BUS increased his local signal on 28 Mc. by using a vertical. FLS is getting a BC-654 ready to go with a.c. power supply. Salem: New officers of the Salem Amateur Radio Club: ARZ, pres.; ASG, vice-pres.; DZT, secy.-treas. Klamath Falls: QP says Medford can hear him on 28 Mc. but he can't hear Medford. HMG schedules GML, a professor at the University of Wyoming. JWM, our blind ham, is studying for his Class A license and building a 28-Mc. converter. Medford: HLF, EC, reports a very active emergency set-up with some fine drills. Oregon has been lacking in emergency organization and it is very gratifying to see the Medford gang turning out. Cutler City: RM APF has agreed to handle the Western terminus of Trunk Line "G." This Trunk should become our best outlet for Eastern and Midwest traffic. Don advises that the Oregon Net, on 3540 kc. nightly, has several new members. Traffic: W7APF 124, JMZ 23, FNZ 15, LBV 7.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — JFB is hard at work with the "WARTs," 3955 kc. LIL sends in his last report before heading South for school. HAD is busy putting up three-element beam for that pair of VT127s of his. He reports that Bremerton has a net on 14-Mc. 'phone called Squeeky Gate. It is rumored that a real old-timer, GP, is going to take over the SEC job for the State. Red is a hard worker who knows his stuff and will be a real help to you ECs. FWD is back from the sunny South and going great guns on WSNET. JPX, the PAM, is busy on Mission Trail Net and building three-element 14-Mc. beam. We hear that a BCL cut down ETK's pole. DRT has a new alternate in Ellensburg — AAH, who has helped out on WSNET there before. KKI is handling a lot of "WART" traffic besides conducting AEC drills. FRU, our RM, states that Trunk Line "A" will be ready to go any day now as membership is nearly complete. George, manager of this line, has really worked hard to get it set up and going and deserves a good hand from all of us. CZY, in sanitarium at Snohomish, is on the air every night with receiver only and would like to hear from some of his old pals. Larry was the first station on WSNET and he deserves all the credit for building it up to its present state-wide coverage. KHL is busy on all bands and WSNET with 7 Japanese meters reading everything except parasitic voltages. DGN has moved to a new QRA where BCLs don't know him. APS wonders what's happened to all the Seattle traffic. JBH keeps Mt. Vernon on the map. JC made a big score in the ARRL CD Party. DXZ sent in a big volume of OO reports. BTV is having beam trouble. FXD is on with new VFO and 500 watts. LFA is living for the day when he can get on 3.85-Mc. 'phone. KGV bought a new Supreme AF100. Hope he gets it on WSNET. LAN wonders why breadboard style works better than a nice rack job. EYS reports his 50-Mc. antenna blew down so he is back on 14 and 28 Mc. ETO is having trouble hitting all frequencies on 7 and 3.5 Mc. with his new Millen e.c.o. RAO now is the call of JYQ, who is Alternate NCS of WSNET. BG, a real old-timer, is back on 3.5-Mc. c.w. after an absence of six years from this band. We're glad to see a good spark man on again, Karl. Traffic: W7CKT 338, FRU 230, KKI 66, ACF 54, KHL 49, FWD 41, LFA 37, JFB 34, LIL 19, JPX 18, EYS 16, JC 15, DGN 13, LLV 11, ETO 8, DRT 5, APS 2, HAD 1.

(Continued on page 92)

THORDARSON



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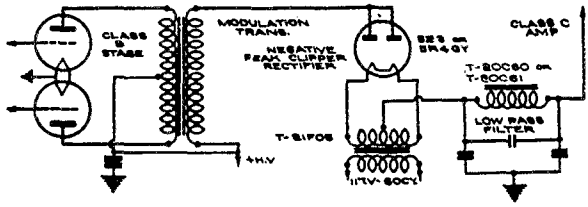

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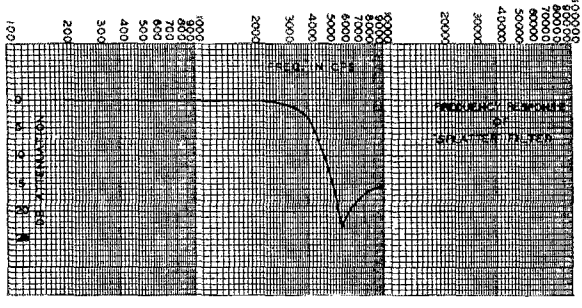

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PACIFIC DIVISION

HAWAII — SCM, John Souza, KH6EL — New officers of Honolulu Radio Club are: DU, pres.; KW, vice-pres.; GH, secy.; AN, treas.; BX, KS, and KA, directors. The Oahu Emergency Net meets every Thursday on 29 Mc. Net Control Station is AS, with present members BI, CM, FC, IB, LD, JB, KW, MI, NP, and W6NBC. Operations at DF are picking up with operators returning from Christmas leaves. K6GZI is using TCS on 7 Mc. and BC-223AX on 3.5-Mc. c.w. into Hertz antennas. Active stations on the Pineapple Net are BW, Net Control, LF, HW, K6GZI, and W6VWX/KH6. This net meets on 3725 kc. Monday through Friday. LF is rebuilding to higher power. DK is using a pair of 4-65As on all bands. EM is having fun with p.p. 807s. KX has new 28-Mc. beam with rotator to radiate his n.f.m. MG is trying out new antenna called "Qubicle Quard" and having good results on 28 Mc. Traffic: K6GZI 23, KH6LF 22, 6BW 21, 6DF 5.

SANTA CLARA VALLEY — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, 6TBK. RM: CIS. PAM: QLP. EC: CFK. The Palo Alto Amateur Radio Association members have purchased 25 SCR-522s and they plan to convert them to 144 Mc. to be used in an emergency net. At the club's February meeting, QYT gave a very interesting talk on s.s.s.c. transmission with a demonstration of receiving from station YX. There were 86 present at the meeting. WNI rolled up a total of 48,972 points in last ARRL Party. He is using a BC-453 as a lazy man's Q-5er. QPM has a new jr. operator at his QTH. YHL assisted GD in putting up sixteen-element beam for 144 Mc. YHL also has new harmonic at his shack. BXM is a new call in San Jose. BUM, in Salinas, slipped and fell while on a ladder adjusting his beam. He now has his right arm in a sling. YPE had his hand and face burned from a flash fire while inside plane servicing radio equipment. NUL installed filter on ZZ's beam-rotating motor and has eliminated the brush hash to some extent. AVJ now is running 120 watts to an 829-B on 28-Mc. 'phone. CFK was interviewed on local radio program and gave emergency net for the Red Cross a good plug. TAN has raised his beam up to a height of 35 feet. Traffic: W6WJM 199, BO 198, WNI 28, ZZ 8, DZE 3.

EAST BAY — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, AHW, EHS, NNS, IT, IDY, QDE, WGN. V.h.f. and u.h.f. news by WAB. 144 Mc. is 90 per cent crystal-control. VSV has 50 watts and sixteen-element beam. UOV has 24-element beam with 200 watts. UHM has 150 watts and 24-element beam. WAB uses an extended double Zepp with 25 watts. VHN is building new crystal rig. VSV, UHM, VNA, WZR, UOV, and WAB have made various field trips to Mt. Lassen and Mt. Saint Helena with FB results. Active on 144 Mc. crystal-controlled are: SYO, ZRH, VQV, ZDJ, FQZ, EDR, YTO, OJB, QT, VNI, AHW, NNS, NDN, VJN, VSV, UOV, UHM, VHN, FQA, and WAB. 420 Mc. is a popular band for the following, all using APS13s: VSV, UOV, ZDJ, QT, and JLE. The gang around San Leandro has formed a new radio club known as the San Leandro Amateur Radio Club with MRM, pres.; GIZ, treas.; KTI, secy.; OU, chief op.; YBQ and QBL, directors. The North Bay Amateur Radio Assn. in Vallejo is very active. RRG, WGM, WGN, BPC, WXU, ZHU, CHA, EUL, AFC, and Seth Hodson enjoyed a windy week end atop Mt. Saint Helena on Jan. 17–18 with 50-, 144-, and 420-Mc. gear. CAN reports that a new club is being formed in Napa and will meet the 2nd Tuesday of each month at 7th and Burnell Sts., Napa. VTF, in Guam, writes he is using a portable 60-watt job using a 6AG7 oscillator, 807 amplifier. The speech amplifier is a 6SQ7, 6SC7 with a pair of 616s as modulator. OJU is new president of the Richmond Radio Club. On Jan. 20th the Mission Trail 11th Birthday was celebrated on 3.85-Mc. 'phone. The SARO gang coöperated by adding its mobile 28-Mc. f.m. circuit to the 3.85-Mc. 'phone net through the Net Control, NTU, and SARO Net Control, LCG. AKB and OBJ have been making some good tests with their mobile equipment on week ends. TT has new 28-Mc. tower up with beam. PB finally has his 14-Mc. beam turning. TI holds certificate Nr. 14 for all zones worked. QXN is active once again on the Pioneer Net. EJA has new p.p. 250THs in final. ZUI has gone high power and is chasing DX. YDI keeps schedule with SXK/MM. CRF spends lots of time on the Buzzard Net. FXX likes his new NC-183 receiver. The Oakland Radio Club meets the first and third Thursdays at Red Cross Chapter Headquarters. Traffic: (Dec.)

(Continued on page 94)

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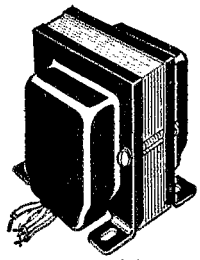

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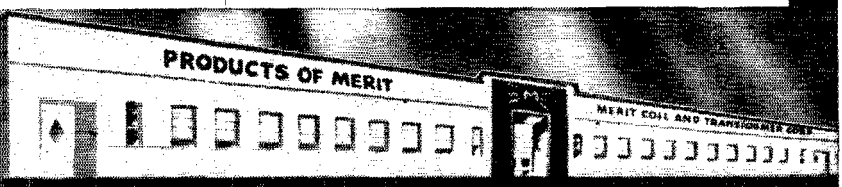

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W6BF 9. (Jan.) W6QXN 161, VDR/6 96, FDR 89, VKJ 24, YDI 15, TI 13, BF 9, CRF 6, RMM 4, EJA 2.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457. The gang was busy putting the final touches to antennas and gear for the DX Contest. Among them were WB, BIP, DOT, WN, LV, MHF, CIS, RBQ. RBQ now is among the DX immortals; he has a total of 140 countries, with 100 confirmed, and is eligible for DXCC. B. Goodman's Q5-er is giving those who have tried it a thrill. Ask CIS, RBQ, or WB. MHF is handling OBS on 14,150 kc. at 8 P.M. and 7020 kc. at 8:30 P.M. week nights. EBY wants to know why some of the gang shoot the breeze on these frequencies while *QST* is being sent. Let's all give Dave a hand and stay clear. It's only a short period and it could be to your advantage to listen. BYS is handling the San Francisco end of the San Francisco-Sacramento Red Cross Emergency Net. VCG is building 144-Mc. crystal control rack and panel transmitter. WGD has new 28-Mc. rotary but is battling diathermy QRM. OCB is on 14 Mc. VGE, VBP, and VUH now schedule the East Coast. LE has just finished building a stone shack, the latest in soundproofing. JUH had solid one-hour contact with AJ9 Thanksgiving Day. AEU is increasing power. SLX is going strong for surplus gear. CWR is giving the new receivers the once over. NAO is very busy with not much time for hamming. JWF, of Mission Trail Net, says 7YN of Gardnerville, Nev., is conducting code practice classes tone modulated on Mon., Wed., Fri., at 7:00 P.M. PST, on 3898 kc. J3GNX advises that G.I. overseas traffic need no longer have full G.I. address but only A.P.O. number. 6HJP, Minnesota University, and BIP have been enjoying some fine schedules. YHI, of Vallejo, with the aid of UYK, UGI and 5CQH/6, tried airborne experiment on 144 Mc. for the VHF SS on Jan. 17th, working many of the 144-Mc. stations in this and the valley sections. John says the reaction of the gang to our airborne operation was truly impressive as the entire band was calling YHI airborne. The flight was over Marin County at an altitude of 14,000 ft. A sincere effort was made to answer all stations calling but at this altitude even stations as far as Corning and Turlock were 5/9. The band was just too small for so many strong signals. John will QSL all of his airborne contacts. The receiver used was a BC-639 Superhet and the transmitter was an ARC-3. YHI adds a word of caution for anyone attempting this at a later date. The receiver used must have extreme selectivity even at a sacrifice of sensitivity if there is any activity on the band. At the January meeting of the San Francisco Radio Club the mobile clubs were given a splendid treat of an interesting talk by Mr. E. H. Hildbrand, whose subject was "Mobile radiotelephone service as used in the Bell Telephone system." The usual raffle was held. The Humboldt Radio Club had a get-together and brought their XYLs and YLs. Door prizes were given to the ladies. The San Francisco Naval Shipyard Radio Club held a banquet dinner and dance with the usual prizes. Traffic: W6MHF 205, JWF 55, NL 25, BYS 24, RBQ 22.

SACRAMENTO VALLEY — SCM, John R. Kinney, W6MGC — Asst. SCM, R. G. Martin, 6ZF. SEC: KME. RM: REB. OES: PIV. OOs: ZF, OJW, and ZQD. OBS: OJW and AF. The membership of the SARC, Inc., elected a very fine group of officers for the coming year, with WSI, pres.; WRD, vice-pres.; OOR, secy.; GZY, treas.; OJW, sgt. of arms. GUV reports from Chico that the Golden Empire Radio Club held its January meeting with a surplus sale at Smithy's Radio Service Shop, and that GHG is attending telephone school in Sacramento. GUV has a 7-Mc. Zepp because of help from ZNU. RAQ is building an FB shack and plans to go on 28-Mc. 'phone soon. ZF reports using coax link between final and antenna tuner, which makes a fine Faraday Shield system for inductive coupling rather than capacity, and he has a new BC-453LF receiver and claims real selectivity. OJW reports making 6386 points in ARRL Member QSO Party. PIV reports he had a very enjoyable and successful fling at the ARRL CD Party on 14, 7-, and 3.5-Mc. c.w. and hopes to win the pin for this section although he thinks that OMR did better than PIV. PIV is an EC on the 144-Mc. net now. RYJ sent in an FB traffic report. ZQD reports from Los Angeles, where he is operating portable on the Mission Trail Net daily. WTL worked KH6SC and KH6HV on 27 Mc. and intends to go on 50 Mc. with the arrival of a VHF-1-52A to be used with his HRO. WTL tells us that YTN is on 28-Mc. 'phone. Traffic: W6REB 961, ZQD 63, ZF 57, PIV 46, RYJ 40, WTL 2.

(*Continued on page 98*)

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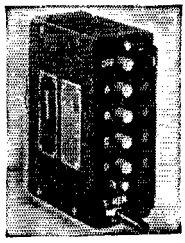

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(Continued from page 94)

ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — Thanks to the Key and Mike gang for the swell hamfest. MFK has advised of the formation of the 1330 Club, which meets daily at 1330 on 3900 kc. Those active are MFK, LR, CYN, HEF, IFP, BLU, and BLV. 1MMM is a new-comer to Durham. New officers of the Asheville club are: WL, pres.; MUV, vice-pres.; George Netherton, secy.; DPF, asst. secy.; KTB, treas.; and MIQ, custodian. MOE, the club station, operates Monday and Thursday nights on 3930 kc. How about putting that rock crusher on 3605 kc. a couple of nights a week for Asheville traffic? Thanks to OG for a report on the WSARC. New club transmitters are underway for everything down through 28 Mc. ABT is active on 3.5 Mc. AHF is burning up 14-Mc. 'phone and boasting an all-time total of 118 countries. CTP keeps to 3.85-Mc. 'phone. BOH did recent emergency work during the ice storm. LZF has 99 countries postwar, and OG has 80. The Greensboro boys have a new line-up with AJT, pres.; BML, vice-pres.; HEH, secy.; GG, treas., and CS, director. AGD is EC for the Greensboro area. JPY advises that BLV, DYX, GBD, HPP, JIG, JZF, LCV, MDC, NBR, BVM, LLQ, KL7EI, and 5IQI/4 have formed a club in Elizabeth City known as the Northeast Carolina Amateur Radio Club. New officers of the Charlotte Club are HUJ, pres.; EYF, vice-pres.; J. T. Land, secy.-treas. and HGC, custodian. You are all invited to join the North Carolina Net on 3605 kc. nightly. Traffic: W4CFL 495, FXU 287, IMH 203, KJS 115, CYB 37.

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE/ANG — LAT works mobile on 28-Mc. 'phone. MAP works 7-Mc. c.w. MAQ is to be heard on 28-Mc. 'phone. MAO spends his time on 7 Mc. HEV is busy with the club equipment. KIM has his Bendix TA-12 on the air. GKD's shack was destroyed by fire and all equipment was lost. CZN reports little activity on 3.5, 7, and 14 Mc. IZD is interested in short skip on 28 Mc. AVG/4 changed his QTH to North Charleston. The Charleston 28-Mc. 'phone net consists of the following: CXE, KOD, KLD, CZA, ANK, DFC, HTR, IZD, LMB, FCK, CE, DBK, BWV, and PG. MJ is back in Columbia. EDQ says n.f.m. is FB on 14 Mc. KLD has low wattage on 28-, 14-, and 3.85-Mc. 'phone. CE is sweating it out with a three-element beam. LMB is the outstanding beam builder in Charleston. ANK now is terminal on T.L. "C," with IYA alternate. Anyone interested in Official Relay Station appointment, please contact FNS. Those interested in Official Phone Station appointment should contact AZT. More reports, please.

VIRGINIA — SCM, Walter R. Bullington, W4JHK — JFW is putting up a 60-ft. steel tower for a 144-Mc. rotary. He plans running 800 watts. DHZ is running 800 watts on 14-Mc. c.w. and has 103 countries now. HPC has 99 Hampton Roads stations confirmed on 28-Mc. 'phone. JZQ has a new e.c.o. and 400 watts on 14-Mc. c.w. DX hounds in Norfolk on 14-Mc. c.w. are GR, DHZ, JZQ, KRR, JJL, ML, OM, and INJ. OM recently received his DXCC Certificate. Congrats, PB. KDE made the BPL for December traffic and also has a new baby girl. Congrats, BW. So far, KFC has won the SS Contest for the U. S. A. That's quite an achievement and FB, Vic. The Virginia Net is going strong on 3680 kc. and anyone interested in traffic-handling is always welcome. Here's a plug for the 144-Mc. boys. During December, traffic for Richmond could not get through on 3.5 Mc. so it was handled via 144 Mc. between CLY, in Norfolk, and CYW, in Richmond. During the Wilmington emergency the only contact with Norfolk was via 144 Mc. Why not get a traffic net going there, fellows? KFT has a new jr. operator, a girl. Congrats, Nort. KXN has been sweating over a hot iron getting ready for the DX Tests. NBA has 10 watts on 7 Mc. IEM/4 is operating from Hampden-Sydney and the club there expects its call soon. KWZ is on 420 Mc. GWW has 35 watts on 3.5 Mc. KDE schedules N.C. Net, Indiana Net, TL "C," NTL every night, plus the VN. KVM has a brand-new Class A ticket and is working some good DX on 3.5-Mc. c.w. with 80 watts. JHK has new Q5-er. Traffic: (Dec.) W4KDE 566, KFC 54, WO 42, KSW 8, MLH 3. (Jan.) W4KDE 208, IA 130, WO 68, KFC 39, KVM 17, JHK 16, ITA 9.

WEST VIRGINIA — SCM, Donald B. Morris, W8JM, HUG, Parkersburg, now reports into the W. Va. 3770 Net regularly, giving the Net a reliable outlet in this Ohio River city. GBF, after years of operation from the "shop," has

(Continued on page 100)

installed remote control equipment and runs the W. Va. Net from the house. CSF has new preselector for 28-Mc. DX and is interested in increasing the efficiency of the Kanawha Valley Emergency Net. QHG is rebuilding with a 813 final. DFC keeps dependable schedules for traffic work. KWI has new kw. rig on 14- and 28-Mc. 'phone and c.w. VAB has new radio cottage with an antenna running from one side of a hill to the other. AUJ represents Weston on the W. Va. Net. PZT, of Weston, now is BYN in Fairmont and reports new amateurs in Weston area are BVH, BWI, and BWD. QG takes foreign traffic on 28 Mc. and clears through W. Va. Net. JM has 84 countries toward DXCC. PQQ with his new kw. rig, has 151 countries confirmed for West Virginia's leading DX station. Don't forget the West Va. QSO Party starting April 1st for all W. Va. amateurs. This will be an excellent opportunity to renew old acquaintances and pick up some new counties for the WACWV. Traffic: W8GBF 123, CSF 62, DFC 36, FMU 18, JM 11.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, Glen Bond, WØQYT — Short skip is starting to break through on 28 Mc. and should give us a chance to work some of the stations near home. ØRHM, in Trinidad, has been on 28 Mc. since last March with an 807 but is building a new rig. SGG, in Colorado Springs, is building another rig with an 829B in the final, with provision for low-power 'phone. Otto handled Kansas ice-storm traffic in December. GKW, Grand Junction, is getting his AEC Net in line and will be ready to go soon. ICR was able to help in an emergency network as relay station between mobile stations helping the sheriff in small towns near Ft. Wayne, Ind., and relayed traffic back to Ft. Wayne. LZY, in Colorado Springs, is using p.p. 807 final. The San Isabel ARA and the Pueblo Junior College sponsored a class to enable interested persons to get a ham ticket. Leon Dudley, a blind fellow, joined the class and did so well he came to Denver Jan. 8th, took the exam, and now is ØGEX. You may find Leon on 3.5-Mc. c.w. DRB, in Canon City, is planning a better 3.5-Mc. antenna as soon as weather permits. DYS, in Morley, is manager of the Colorado Utility Net. Dick is doing a fine job and the net is getting a good start. The early morning Coffee Cup Club on 3.85-Mc. 'phone has PGX, MGY, WRS, OWP, 5DVH, and 7FLO as regular customers. Traffic: WØDRB 412, DYS 95, MOM 72, SSG 37, LZY 17, QHI 4, QYT 4.

UTAH-WYOMING — SCM, Alvin M. Phillips, W7NPU — MQL's new speech clipper works FB against QRM. JPN participated in VHF SS and has been working 7-Mc. c.w. and the SLC 28-Mc. round table every Thurs. at 8 P.M. New officers of UARC are ex-6NMK, 7JHM, and OOK. JQU worked 122 stations in 40 sections during ARRL Party. The UASC Radio Club will have 1-kw. on 14- and 3.85-Mc. 'phone. LRZ is on 28-Mc. 'phone. LCB has new antenna and QTH. LBY is new activity manager for USAC Club. TAR is working 28- and 3.85-Mc. 'phone. DLR, using a BC-453 with his RME, reports true single signal reception. IWH has a new Collins transmitter. KIY has 48 states but lacks one QSL. Dave made 30-w.p.m. copy of WØCO for ARRL Party. DAD is doing an FB job as OO. TST has applied for OPS appointment. LQE is on 14-Mc. 'phone and operates LQC during lunch time at the UASF Depot at Ogden. LWC is on 28-Mc. 'phone and 3.5-Mc. c.w. with an 807. The FARM Net handles lots of traffic. New net controls are DMZ, NCS; TST, NCS-1; RPX, NCS-2; GFW, NCS-3. FST is busy with heavy traffic, net management, and getting the *Grid Leak* out on time. Traffic: W7FST 1084, UTM 116, KIY 92, DLR 39, IWH 26, TST 16, JPN 14, RPX 7, KHI 5, MQL 1.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Dr. Arthur W. Woods, W4GJW — SEC: KCQ. PAM: BA. RM: DD. Many appointments still are vacant. If interested, please write for information. At Auburn University are the following: LJP with 6L6 transmitter and S-38 receiver, MIH with station completed from surplus gear, MNK on 7 and 28 Mc. with low power, KUQ on 3.85-Mc., LHU and LHW with joint station, MFA on 7 Mc. with 100 watts, FJN ready for 28 Mc., and DBG on 7 Mc. with 6 watts to a Signal Shifter. The club at Auburn is preparing a 450-watt all-band rig. MUW, in Gadsden, is on 7 and 28 Mc. JYB has nearly converted an ART-13 for mobile use. He schedules Js daily. FZC is on in Sheffield. GDO writes of increased 50-Mc. activity in Mont-

(Continued on page 108)

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2X2/879	.30	838/RK58 HF130	3.75
3API	1.50	843	.38
6AG5	.68	845	3.75
6AK5	.60	865	.75
6C4	.15	931A	1.87
6J6	.53	954	.25
10Y	.25	955	.25
12A6	.15	957/VT237	.30
VR105/30	.75	958A	.38
VR150/30	.75	959	.38
211	.38	1616	1.50
316A	.45	1619	.15
801A/801	.75	1624/VT165	.45
803	9.00	1625/VT136	.15
805/VT143	3.75	1626/VT137	.25
809	1.50	1629/VT138	.15
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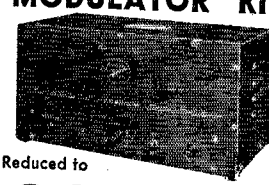

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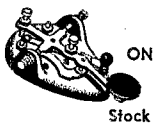

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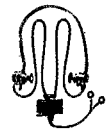

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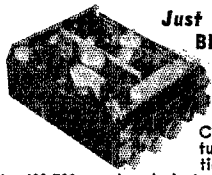

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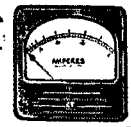

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gomery. AUP is going broke buying surplus to save money. In Tuscaloosa, KDP is on 144, 28, and 3.85 Mc. GJW is doctor to EBZ's new jr. operator. ELX is making a reputation on 7 Mc. while MAB is on 3.85 Mc. ATF works traffic 75 per cent of the time. KCQ needs more applicants for Emergency Corps Net. Traffic: W4ATF 22, GJW 3.

EASTERN FLORIDA — SCM, John W. Hollister, W4FWZ — Time to think of our emergency gear and check over the mobile gear. Brookesville: MNT is on 3675-kc. net and on 14 Mc. snagged VOZAT and G8GB. Cortez: DQW relayed plenty of traffic for State Fair. CCR is on 144 Mc. EEW is running 1-kw., 3.5 to 28 Mc. Deland: WS is redesigning to get rid of B.C.I. on 3910 kc. LXA is new member on Gator Net. KOA is active on 3910-kc. net. PEI is back on the air with plenty of stuff on 3.85 Mc. but is oiling up the bug for c.w. Daytona: MSP is snagging more QSOs with Q-5er on receiver and says its FB for crowded band. ASR is back from a spell in the hospital. Jax: JKI is EC. AEC set-up looks good. LKY is Memphis QTH now. FJC has husky rig on 3.85 Mc. The good programs arranged by EKU are bringing them out for the JARS meetings. Lakeland: DRH is regular on 3675-kc. net. AQV has FB signal on 3910-kc. net. Lake City: IQV, NCS on 3675-kc. net, gets credit for bangup organization plus publishing a fine ham bulletin. Miami: The Dade Club WAS Contest is a good example of club activity. BYF has Collins 75A1 and 310B2 plus 5514s. MKP is active on 3675- and 7290-kc. nets but finds time to work 14-Mc. DX. BXL, with cold cure in one hand, worked two stations and the operators were Tom and Jerry. BXL got D4ABF. BT sends official bulletins at 11 P.M. on 7170 kc. Orlando: GIP now is OBS. Sanford: IMJ is proud of Collins 75A receiver. SCM says "Get on a net. Let's have the emergency crew lined up in advance! See your EC, or write JQ or DQW. 'Phone: 3910 kc., Tues., 6 P.M. c.w.: 3675 kc., 7:30 P.M. Mon.–Fri.; 7290 kc. 7 P.M. Mon.–Fri. They will QRS for your QTC." Traffic: W4IQV 325, AAR 76, AYV 70, DQW 66, FWZ 57, BT 52, ZC 47, MKP 37, IKI 35, LCZ 29, BYF 22, LJM 21, LXX 13, BXL 5, KHY 1.

CANAL ZONE (Special report) — CZARA elected officers for 1948 as follows: KZ5GD, pres.; Capt. Marshall Waller, U. S. Army, vice-pres.; FS, secy.; CG, treas. Forty-seven certificates have been issued to stations working ten KZ5s, the first was snared by OA4BI. AY rendered valuable assistance with his 28-Mc. 'phone during an air search following a crash in Peru. Beating gums with AY on 28 Mc. are AO, AP, AW, BA, BD, CG, EL, ES, FB, FW, GD, LN, SW, and WB, with PW alone on 28-Mc. n.f.m. AU unpacked a new NC-183 and is rebuilding his rig. AK, AW, BE, and CG keep busy with traffic but take time out occasionally to poke around for DX. RB is rebuilding. AY is converting a couple of SCR-522s for 50 and 144 Mc. and is cutting the elements for a two-over-six beam. FW has his VHF-152 and a 50-Mc. rig about ready to go. AQ butchered an SCR-522 for parts to make an amplifier for his HT-6. CZARA's first hamfest was held February 22 at Howard Field.

WESTERN FLORIDA — SCM, Luther M. Holt, W4DAO — RM: AXP. SEC: ACB. DXQ has new National 173. MEN moved to 28-Mc. 'phone. MFY schedules FDL. DZX scheduled his brother in Minnesota. JV burned the midnight oil in DX Contest. AXP is building 14-Mc. rotary beam. New Pensacola calls include NFM and NFN. ØSAA now is 4SAA. NDB is kingpin in Goslin Radio Club at NAS. MS attended PARC meeting. COS is active at Eglin Field. KIK is building mobile rig for his car. ACB is looking for AEC members for the section. BGO moved to Quincy from Alabama. Welcome, OM. JM is attempting 144-Mc. contact with St. Petersburg from Valparaiso. DNA visited Pensacola gang. LT keeps 3.85-Mc. 'phone hot. MUN built new rig. MUQ is building new speech amplifier. Traffic: W4AXP 56.

GEORGIA — SCM, Thomas M. Moss, W4HYW — Valdosta Amateur Radio Club officers for the new year are: BVK, pres.; AAZ, vice-pres.; BQT, secy.-treas. The club is making plans for code classes under AAZ and BVK. KGI is on 7 Mc. JZV has a big rig on 28-Mc. 'phone. BQT also is on 28 Mc. AJ and APS are hanging out on 14 Mc. DJA is on 7 Mc. and MMP hangs out there when time permits. The Valdosta gang is really active down there. Officers of the Georgia Hams Amateur Radio Club, at Warner Robins, are: Lawrence Halsell, jr., pres.; Geo. W. Miller, secy.; MIN, trustee of the club station, MJI. Most of the members are prospective hams, and the club is conducting classes. A BC-452 and BC-610 transmitter is in use, thanks to the

(Continued on page 104)

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HS23A—Used but in A-1 electrical condition, 8000 ohms impedance. Complete with leather headband and rubber cushions. Shpg. Wt. 3 lbs.

ONLY **98c**

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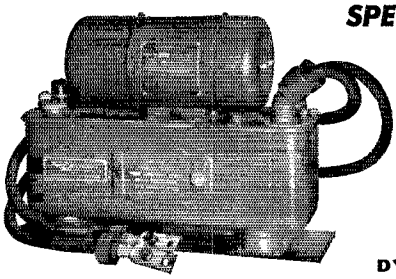

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BRAND NEW PE-103 DYNAMOTOR

Will deliver 500 VDC at 160 MA with either 6 or 12 VDC input. Complete with overload circuits, filter and connecting cable. In original overseas shipping crate. Shpg. Wt. 81 lbs.

ONLY **$9.95**

Output plug for above: Cannon P8-CG-12S. Shpg. Wt. ½ lb. ..... ONLY **95c**

SURPLUS SPARE TUBE KIT

Complete set of spare tubes for BC-459-A or similar unit. Consists of 1—1626, 2—1625 and 1—1629. Brand new in original boxes. Shpg. Wt. 2 lbs.

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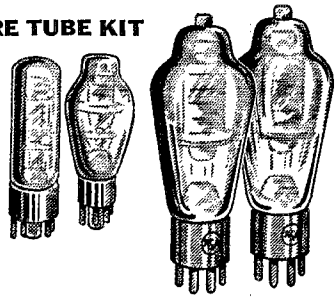

SURPLUS KEY

Type J-37 Ruggedly built. ¼" silver contacts. Bakelite base. Shpg. Wt. 2 lbs.

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WITH A SURPRISE TRADE-IN ALLOWANCE ON YOUR USED COMMUNICATIONS EQUIPMENT

For sensational trade-in values on your used factory-built communication equipment, contact Walter Ashe right away. Simply tell us what you have to trade. We'll respond with an extra liberal offer that's sure to please you. Write, wire or phone today!

ONLY **69c**

SURPLUS T-17 HANDMIKES

S. B. Carbon Mike with push-to-talk switch on handle. Complete with cord and plug. Brand New—in Original Cartons. Shpg. Wt. 3 lbs.

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6500 ohm, 2 MA coil. SPST contacts. Shpg. Wt. ½ lb.

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EACH **5c**

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Similar or equal to the MIP-8. Molded in plate 8 prong socket. Shpg. Wt. 1 lb.

12 for **50c**

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Brand New . . .
Original Cartons

3C24/24 G	$1.10
811	1.95
813	5.95
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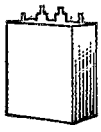


No. 5269—4.5 HY x 150 MA. 79 ohms DC Res. Shpg. Wt. 6 lbs.

Two for **79c** ea.

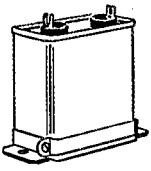
One only ... **99c**

No. 2785—Dual 12 HY x 250 MA. 150 ohms DC Res. per section. Shpg. Wt. 17 lbs.

ONLY.... **$4.95**

No. 6317—4 HY x 300 MA. 40 ohms DC RES. Shpg. Wt. 13 lbs.

ONLY... **$4.95**



FILTER CONDENSER

3 MFD. x 400 VAC. Good for about 1500 VDC. Metal can. Shpg. Wt. 3 lbs.

ONLY..... **98c**

TRANSFORMER

No. 4891 — 1200/1400 VCT x 200 MA. PRI. 115 VAC 60 cy. Shpg. Wt. 18 lbs.

ONLY..... **$7.45**

Write for complete list of Super Bargains in Surplus Equipment.

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Army at Warner Robins. The Albany Amateur Radio Club has recommended as ARRL appointees: HKA, OPS; GLB, OBS; and ATP, ORS. Would like to have the gangs in other clubs recommend local appointees. AGI now is at Maxwell Field. MWF is new station at Cochran. LNG has 18 states and FBH 34 states on 144 Mc. IWP and LWN are on 144 Mc. Section Net Certificates have been issued to the following stations in Cracker Emergency Net: HDC, GLX, FVT, CYC, CJO, BIA, UL, TO, SK, NAR, JPQ, IZV, IUC, JNL, IDZ, INP, HX, and HKA. The Net held a get-together at Cochran in October. Various agencies of the government continue to recognize the efficiency of this group. Thanks to the clubs for the dope. Traffic: W4KV 120, IRL 11, FKE 10, LNG 8, GGD 7.

WEST INDIES — SCM, Everett Mayer, KP4KD — AM operated 26.8 hours with HC, G3, and GM for DX. BE also added GM for new country, with G3 and G2 for DX. Both were on 28-Mc. 'phone. EW installed 28-Mc. 'phone rig in car with 25 watts. FP moved to new QTH. ED is trustee for KP4USA, Ft. Brooke, San Juan. EZ's new beam got him 22 countries with over 45 different G stations worked on 28-Mc. 'phone. FX's CE schedule is running perfectly. 7-Mc. c.w. produced 32 countries for KD. On Feb. 1st the Puerto Rico Amateur Radio Club held a ham gathering in honor of Dr. Serge Korff, of N.Y.U., and Dr. A. Cobas, of the U. of P.R., who directed the recent experiment in connection with cosmic rays conducted at San Juan, and in which the KP4s coöperated. The club issued the first number of the *Ground Wave*. FN keeps schedule with W1OKH near his hometown, Burlington, Vt., and worked D4AWC, also a Vermonter.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, V. J. Haggerty, W6IOX. Asst. SCM, W. J. Schuch, 6CMN. FYW submitted a fine report from the Paso Robles Radio Club. 7MSG/6 is the club's newest member. The Popcorn Net operates with low power on 3650 kc. Fridays at 8:30 P.M. for Paso Robles round table. The PRRC radio training class started the first of the year and is going fine. Its slogan is, "A Ham Ticket by March 17th." FYW works traffic on the Pioneer and Southern California Nets. HJL schedules his brother, EU, on Paso Robles rig. EBK sandwiches one or two nights a week hamming between his two jobs and operates on six bands. Busy man! ON operates on 50 and 144 Mc. and expects to be on 28 and 3.5 Mc. soon. His 50-54-Mc. DX includes 7 states in 4 districts. EP is on 28 Mc. with a four-element beam. UVB is QRL school and YLs. ETI is a smoke-eater. HE has kw. on 14-Mc. 'phone. PSX has separate rigs on all bands. PQD is set for 144 Mc. RAD, ZMZ, FYW, and FMG are active on Southern California Net and need additional traffic outlets in Los Angeles area. CMN reports no traffic this month. The doc said, "Take it easy," so Bill's YF coöperated by confiscating his radio tubes. Bill now has a new folded dipole on 3.5 Mc., feels better, and is back in the saddle again. New officers of Santa Barbara Amateur Radio Club are: AMD, pres.; and PJR, secy. The club meets the last Friday of each month in the Recreation Center at 7:30 P.M. and visitors are welcome. QIW reports from Ventura. He works traffic on the SCN and has made application for ORS appointment. ZEN is working DX on 7 and 14 Mc. Thanks to all whose coöperation helped me to get started on this job. Your continued support is solicited. Traffic: (Dec.) W6FYW 147. (Jan.) W6IOX 257, FYW 100, FMG 14, QIW 10, ON 5.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — RNB is running a Russian Tank rig from a 12-volt battery. KAG is operating all bands with p.p. 6L6s at Casa Grande. JJN is running a kw. on 3.85 Mc. VOZ handles traffic on all bands from Tucson. UPW is handling G.I. person-to-person traffic to Guam. 1MKJ/7 is on 28-Mc. 'phone at Davis Monthan Field. LIB has a 6L6 on 7 Mc. KWF gets out on all bands with a 9-ft. indoor whip on a Hammarlund 4–20. KFD is on 28 Mc. with a Meck. BFA has p.p. 812 on 28 Mc. LBN worked 25 countries in 2½ months with an 807. JNN, using only 8 watts, worked a D4. LUK has a kw. on the air. RU is working 28-Mc. 'phone as well as 3.5-Mc. c.w. LIJ has a new beam on 28 Mc. GYK has upped his power to 500 watts. NRI is on 3.85 Mc. MLL has 250 watts on 3.5-Mc. c.w. LFE put a 4-65A in his Supreme and is working 7-Mc. c.w. KAD is on 7-Mc. c.w. KAE is running a kw. on 28-Mc. 'phone. JXL/KRH had a 274N on 7-Mc. c.w. GBN, Gila Bend, is on 3.5-Mc. c.w. DPS, Yuma, is on 3.5-

(Continued on page 106)

HARVEY FOR HAM NEEDS . .

WEBSTER MODEL 79 WIRE RECORDER, chassis only, for building your own portable or permanently installed wire recorder. Extremely useful for recording QSO's, transmitting telephone conversations, checking your signal speech quality, etc. 15 minute spool of wire included. Hook to your own amplifier....**$44.10**

Recording wire, 15 min. $2.00; 30 min. $3.00; 1 hour $5.00 per spool.

BRUSH TAPE RECORDING chassis BK-407. Same unit as used in Brush SoundMirror. Complete with built-in pre-amplifiers, erase oscillator, tubes, etc., all that is needed to make this a complete tape recording unit is power supply (furnishing 250 volts at approx. 60 mils and 6.3 volts at approx. 2 amps.), speaker and power amplifier to drive speaker. **Net....$131.25**

HARVEY'S HITS OF THE MONTH

Harvey has 20 meter crystals for a buck! Mounted in holder with ½" pin spacing. Also 40 and 80 meter and 6 and 13 mc. bands at the same low price.....$1.00
Special 8 mc. xtals for 2 meter xtal control, only.....$1.50
Also in stock complete line of Bliley AX-2 xtals. Include 10¢ postage with your crystal order.

HARVEY'S HAMFESTIVAL OF VALUES

Type 1616 tube; Half wave, high vacuum rectifier. Filament 2.5 volts, 5 amps; peak inverse 5500 volts; peak current .8 amps; surge current 2.5 amps; average plate current .130 amps. **List price $7.50, Harvey special price, *while they last*.....95c**
Still A Few Left!

Hammarlund FS-135-C Frequency Standard. Makes your receiver an accurate frequency standard with marker signals every 100 kc. Includes low-drift, silver plated 100 kc. crystal, 6AU6G tube, complete instructions for hook-up. Can be adjusted to zero beat with WWV. **Brand New.....$6.95**
Order a spare ***6AU6G tube*** with your F-135-C at **65c**
Brand New ***717A tubes,*** octal base 6AK5, excellent for RF stages of BC-1068A receiver and many communications receivers. Minimum order of 6.
Net price.....6 for $2.94

Thordarson 75C49 chokes, 8 H at 120 mils....**79c**

Cornell-Dubilier TJ20040 filter condenser, rated 4 mfd. at 2000 volts DC working.....**$3.75**

RCA Sound Powered Phones, Navy type, self-contained, work up to 2000 feet without batteries. Many uses around transmitter, home, plant or farm. Brand New, in original cartons. **Each.....$15.00 per pair.....$24.50**

Harvey has a very complete line of all makes and types of ***TV components, tubes and kits*** in stock such as RCA coils and transformers, Transvision kits, Vision Assembly kits, Telectron coils and transformers, Mallory inducto tuners, RCA front ends, Essex RF power supply coils and others too numerous to mention. Immediate delivery from stock. Send your order in for same day shipment.

In stock, the new **Spencer recording wire,** can be used with Webster wire recorders, etc. **15 min. $1.60; 30 min. $2.40; 1 hour $4.00**

Telephone: LOngacre 3-1800

NOTE: All prices are Net, F.O.B. NYC and are subject to change without notice.

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Get Your Order In Early For Immediate Delivery.

Mc. c.w. UPF is trying out the Taylor plate modulation system with a pair of 4-125As. UKK divides his time between 7-Mc. c.w. and 28-Mc. 'phone. If you want to get on c.w. but are scared of the high speed boys, try 3552 at 9 P.M.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCM and SEC, Gordon Brown, 6APG. WUW is OBS, while FMJ makes Class I OO. BAM schedules 1QMI Sundays at 4 P.M. Orange County Club is forming a c.w. net on 3550 kc. Mondays at 7 P.M. FMJ is holding down the southern end of the Mission Trail Net. LKB is getting an SCR-522 operating on 144 Mc. 5LPZ/6 is building a new 14-Mc. plumber's delight. NF/CFN schedules QUF daily on 3820 kc. BCU sends in highest traffic score for an XYL. San Diego Amateur Radio Club thanks its retiring secretary, YYM, for the splendid job she did. BSD, Naval Amphibious Base, Coronado, is operating schedules to the Pacific with WZL, YND, and 8VGZ as operators. 5GAA/6 is active on 28-, 14-, and 3.85-Mc. 'phone from Air Force Detachment at Fort Rosecrans. YTH is building new p.p. 304TL final. OGY is working 7-Mc. c.w. VCD and YTH are conducting field tests with mobile rigs for best point-to-point operation. ZV is operating 28-Mc. with a 20-element array! MI gets out better with new elements in his 28-Mc. beam. The Helix 474 Club meets every Sunday at 9 A.M. on 3900 kc. with the following amateurs using BC-474s: WNN, FMJ, QNM, EPW, OQU, NBJ, KSE, BZE, and EOP. The 522 Club is going strong. The Imperial Valley Amateur Radio Association conducts code classes every other night on 3551 kc. TIK, VIH, QKT, and ZWY are active on 28-Mc. 'phone, while AWE, JQX, TDE, and SCO show up on 7 Mc. Active AEC members under APG are: DUP, DWE, BTP, YRK, ATZ, YLH, AHU, SKZ, YQW, YNZ, BWM, CAB, GRD, LOL, RMN, RAN, TBI, TIX, VWN, VXF, VTS, VTV, WPA, YCP, WHN, WZZ, BW/6, ADK, PG, PQQ, WUW, WXW, GC, YXI, VJQ, YQK, OZD, YTH, VCD, WGS, UWE, VDQ, LCC, YZV, BOS, YPR, SEV, KSS, HRI, IV, LYF, FMJ, SKZ, OBD, and MI. San Diego YLRI's new president is YZD. Traffic: W6BCU 39, PG 24, WUW 18, FMJ 11, NF/CFN 7, DEY 4, GC 4, MI 3, BGF 2.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/MNL — NWY is a new call in Commerce. Helen, LGY, is OO and OBS. AAK and SH have new Collins 32-V rigs. IRP, MIV, MUX, and LRP are active from Lufkin. 3NOU is ex-5HCS, and reports S9 signals from the balloon-supported vertical of DAS. BFF will have a kw. going on 14- and 3.85-Mc. 'phone. FOQ is a new-comer in Abilene and hopes to become proficient in c.w. traffic-handling. QA is bolstering up the EC 'Phone Nets and issuing new certificates. EFC is hauling in the DX with a new beam, Collins receiver, and the limit of power. NFT welcomed a brand-new jr. operator into the family. Watch for CY from HK5EM on 7007, 7010, or 7086 kc. signing Gilberto. ENE is going to town with his new beam. CSU is active on 3.85-Mc. 'phone. MQH works 28 Mc. when not piloting a DC-4. RG has 28-Mc. mobile. NTX reports attendance on drill nights averages nearly 100 per cent. New officers of Ft. Worth Radio Club are: CVW, pres.; LAR, vice-pres.; COK, secy.; KSX, treas.; NAJ, act. mgr. Dallas Radio Club elected the following: LTP, pres.; GGD, vice-pres.; CAE, secy.-treas. FOY works 3.85-Mc. 'phone. NPU works 28 Mc. GZH has rig trouble cleared up and is working 3.85- and 28-Mc. 'phone. The new ARRL *Handbook* is worth an extra plug. The Ft. Worth Club operated mobile rig at the Stock Show. LSN continues to keep traffic moving into and through Dallas. HAJ has new 32-V Collins. IYJ is building and rebuilding. Traffic: W5LSN 388, GZU 70, CDU 62, ISD 36, ARK 14, ILZ 4.

OKLAHOMA — SCM, Bert Weidner, W5HXI — Asst. SCM, George Bird, 5HGC. SEC: AHT. OLZ has 26 reporting stations. The Oklahoma Emergency 'Phone Net has 28 reporting stations. Either net will gladly welcome new stations. CAT is new on the 'phone net. LFT and MHS are new to OLZ. AHT, ATJ, HGC, and PA report to both nets. TARC new officers are: HUI, pres.; HKI, vice-pres.; KYG, secy.; DFU, treas.; FXD, public relations. HXU now is KL7NQ and is heard on 7022 kc. at 2300. EGA is now in Oklahoma City. YJ has its gallon on from the Engineering Building at Oklahoma A. and M. FJ is building a de luxe console operating position. BDX will be glad to check your frequency. EZK is a 144-Mc. convert and is looking for DX. HLD has 300 watts on 50 Mc. and uses a VHF receiver.

(*Continued on page 108*)

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All Regular Lines? — You bet!
Receivers? — *Every* set!
Bargain prices? — Lowest yet!
Fast service? — *JET!*

If you can't visit either of my well-stocked stores, phone or mail in your orders for really superior SERVICE. **All** standard lines at lowest prices.

73, *Bil Harrison*, W2AVA

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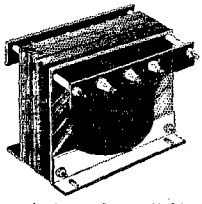

A *super Surplus Value* in a rugged xformer to power your entire rig! 1170 Volt CT secondary will deliver *up to* 500 Volts DC at 750 MA with choke input filter, or 600 Volts DC at 600 MA with condenser input. (Use branch or duplex rectifiers and filters for added flexibility and stability). With half-wave or bridge rectifier will give 1200 Volts, 300 MA. TWO, with secondary windings in series, will economically make available 1200 Volts at 600 MA!

Primary is 115 or 230 Volt, 60 cycle, with taps to reduce output 10% and 20%.

FB regulation! — plenty of good grade iron and copper. Compact! — 6¾" wide x 6" high x 6½" deep (overall, including ceramic HV feedthru insulators). *Husky!* — 22¾ lbs. *Dependable!* — made to *Gov't* spec. by reputable manufacturer. Sensationally Priced! — lots of FOUR in one original wood case ..... (Tell your friends or club!) ..... **$4.99** EACH

Less than four — $5.94, plus repacking charge of 80¢ each

Don't forget to include in your order the *rest of the items you need for that new* power supply — filament xformers, rectifiers, sockets, bleeders, condensers, switches, chassis, etc! *Harrison has it!*

PRECISION RESISTORS

Finest grade 1% accurate Wire Wound. WW4, WW5, etc. 750, 1K, 5K, 10K, 20K, 100K, 400K, 600K, 750K, 800K

FOUR for $1.98

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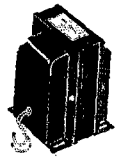
ARC-5

BC-454B Receiver. 3 to 6 MC. Brand new, complete with tubes. **$4.95**

3C24/24G Tubes **Six for $2.36**

FILTER CHOKE BARGAIN



Smooth away your ripple with this 15 Henry, 175 MA reactor. 200 ohm resistance. Fully shielded. 3½" x 3½" x 4¾" high. Weighs 5 lbs. *You'll recognize the good name!* **$1.94**

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A "natural" for hams, labs, utilities, fire buffs, etc.! Successor to the i-10, National's new HFS is a 27 to 250 MC *super-het with 10.7 MC IF and super-regen* second detector. A good AM — FM — CW 7 tube receiver with built-in speaker and phone jack. May also be used as a converter for dual-conversion, image free reception. Complete with coils, less power supply..... **$125**

AC pack — $22.43 **6V DC Vibrapack — $34.16**

SSSC

National's new F-22 Sideband Filter. See page 44, March *QST*. First delivery scheduled for March. Includes balanced input and output transformer. Price will be around.....**$50–$60**
Mounted 550 KC Crystal.....**$5.95**
465 KC Double slug tuned IF's.....**$2.40**
New developments? *We'll have the very* newest things as they come out!

NIGHT SHOPPING

For your convenience, and ease of parking

New York — Wednesdays

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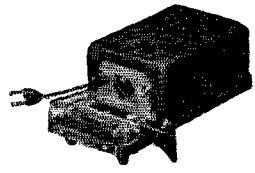
(Bring the YF and kiddies!)



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Why monkey around with an old fashioned key when you can gorilla to town with this new electronic MONitor-KEYer and be a champion operator! Have at ape-perfect *tist* without simian to exert yourself. Your dashes won't swing by their tails!

No fooling! It really is a darn good key. We're selling a barrel-ful of 'em and their users are enthusiastic about *the ease of keying. Get yours now and enjoy a new* pleasure. Considering the value, the cost is really peanuts..... **$29.95**

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TV Wanna look, too? If you *are* keeping quiet hours a/c TVI you might as well see what's going on.

Hallicrafters new T-54 is a complete 7-inch receiver with 13 channel push button, AFC, and many other improvements. All in the SX-42 cabinet, ready to throw the fighter right into your *lap*..... **$169.50**

Like to roll your own? Get one of the magnetic deflection Television Assembly Co. kits. Complete — *30* tubes, 12" speaker, chassis, *antenna*, wired and pre-tuned RF and IF sections. Even a lid can finish the wiring and get results *equal* to factory-built jobs costing much more! 10" — $229.50 12" — $259.50

***Get ready for summer fun on* 2 METERS!**

Abbott BM-2. Five element all alum. beam. List $23.50 Special! — $8.82

Abbott TR-4B. Latest type. Transmitter — Receiver. Good for mobile. Regular net $52. A buy!.....$29.95

E-L 2606 Vibrator Pack. 6V DC to 300 Volts 100 MA, filtered.....$14.97

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[JAMAICA BRANCH—172-31 Hillside Ave.—REpublic 9-4102]

KWG is on 3.5 Mc. LHO is building a new bandswitching rig. KWQ and his son, LFL, are always to be found on 7 Mc. LTE is on 28 and 14 Mc. MFX has a new ham shack and had to rebuild his rig to fit. KWE and ØCRC are playing chess on 7 Mc. and would like to contact others interested. FIY now is 2SLJ. LXH and MNM have new rigs on 28 Mc. NUT is on 7 Mc. GNQ operates on 50 Mc. LRZ and GKG are on 28 Mc. HEV is starting on s.s.s.c. transmitter. HXT has a new antenna. MPW is hot on double conversion. The Bartlesville Club had a birthday party for GTU at the home of JKS. Traffic: W5IGO 140, AHT 98, MBV 58, HGC 49, GVS 43, AQE 30, PA 23, YJ 22, ATJ 19, HXC 19, FRB 11, HXG 11, ITF 10, ACD 9, KDH 9, IOW 8, IWJ 4, WQ 3.

SOUTHERN TEXAS — SCM, Ted Chastain, W5HIF — SEC: BUV. RM: DAA. PAM: EYV. EQK reports that the Port Arthur Amateur Radio Club elected the following officers: HRU, pres.; LTU, vice-pres.; EQK, secy.-treas. Regular meetings are held the 2nd Wednesday of each month. The club also plans a weekly 144-Mc. 'fest Wednesday evening at 7:30. NNK has Bliley SMC-100 crystal. IPE reports all Wharton amateurs are enrolled in AEC. JYQ is on 3.85 Mc. AHK has moved his kw. to 3.85 Mc. DUQ is conducting a bang-up code class and working towards 50 Mc. MFV has p.p. 24Gs behind his BC-696. IG is back on, running a BC-459 on 7-Mc. c.w. with an S-40 receiver. In Bay City, CNX is rebuilding his modulators. GLD is building new rig with 813s in final. BZO is on 3.85 Mc. KEM has 814 in final and is attending night classes at U. of Houston. IPE runs 500 watts on all bands. BAJ, EVL, JHW, and KSW, in Brownsville, are looking for 50-Mc. contacts. Congrats to CXS on the new jr. operator. DAA, in Kingsville, is RM for this section, and is organizing a South Texas Traffic Net which meets Mon., Wed., and Fri. at 8 P.M. on 3750 kc. Henry would like outlets in every town in this section. How about you traffic-handlers reporting into this Net? NIY has worked Asia and Africa on 7 Mc. HZJ has new 28-Mc. beam. JPC is back on after breakdown. NXZ is new call in Del Rio; he has BC-348 and BC-459A on 7-Mc. c.w. The Kingsville Radio Club's new officers are: LGL, pres.; JKB, vice-pres.; and NQI, secy.-treas. The annual business meeting and convention of the South Texas Emergency Net will be held in Cuero, May 29th and 30th. Headquarters will be at the American Legion Hall and activities will start promptly at 1 P.M. Everybody come! The c.w. section of STEN is conducting weekly drills, using emergency power. CIX, EYV, and IVU are going seriously for 50 Mc. BVG, one of the old-timers in San Antonio, writes from California that he is alive and kicking and intends to settle down in San Antonio when he retires from the Army. Traffic: W5MN 218, DAA 47, MXV 39, ACL 12, MJN 11, IC 9, KSW 8, MWN 6, CCD 4.

NEW MEXICO — SCM, Lawrence R. Walsh, W5SMA — We extend hearty congratulations and a welcome to NZQ on his new ticket. JYW plans 100-kc. marker oscillator for frequency measurements. MXF has moved to St. Louis to attend Washington University. HJF, our RM, recommended the following for ORS appointment: GXL, JYW JXK, KWR, KWP, KXX, DVH, HOX, NRK, and NXE. Congratulations, gang. Activity in Albuquerque on 144 and 435 Mc. is getting organized by FAG. A State drill on 7266 kc. was held Jan. 11th. MXF, Clovis, is leaving New Mexico. DER, Clovis, is EC. Roswell is being organized for emergency work by ZU. The Los Alamos Radio Club met Feb. 4. Plans were discussed for ARRL Field Day. NVR has his new kw. on 28 Mc. UFA is debugging his 813s. NXE is breaking eardrums on 3.5-Mc. c.w. ZU still is attempting to mail in his reports without postage. MVP is going great guns with his 28-Mc. mobile. Traffic: W5ZU 96, NXE 78, HJF 38, JYW 3, SMA 2.

CANADA

MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — High traffic man this month is GL, with 70 to his credit. HJ still manages to get on 3.5 Mc. occasionally to handle a few. DB keeps schedules on Sundays with VO2AJ and EY. JK has gone high frequency now, working 28 and 50 Mc. QZ reports 50 Mc. is dead so he now is doing some work on the p.p. 813 14-Mc. c.w. rig. He still schedules VO6J and VO2Z. DQ, FQ, and PX have been handling quite a bit of personal

(Continued on page 110)

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traffic for the Halifax and St. John boys stationed at VE8NB and VE8OE, Resolution and Nottingham Islands, in Hudson Straits. The former had the ill fortune to crack his favorite crystal and had to change frequency. There has been quite a swing to n.f.m. among the Halifax and Dartmouth 'phone gang. Converts already are: TA, DS, DQ, HD, QR, MS, and LZ. Then there is our pioneer mobile n.f.m. station, NT, who is still keeping the 28-Mc. 'phone band hot. New president of HARC is PR; SF was reëlected treasurer. There was a great dearth of news this month, with few club notes received. Club secretaries, please note. Traffic: VE1GL 70, DQ 24, HJ 17, FQ 12, DB 10, QZ 6.

ONTARIO DIVISION

ONTARIO — SCM, David S. Hutchinson, VE3DU — AIU now has 96 countries on 28 Mc. AUE is back on 3.5-Mc. c.w. BLC will be on 3.85-Mc. 'phone from Earlton using a single 807. AWI is handling traffic. OJ managed to get the following stations on for the VHF SS: BBW, EK, BCN, MX, BDY, PC, and 2WA. OJ is on 144, 50, 28, 14, and 3.5 Mc. At the January meeting of the London Club, P. A. Fields, chief engineer of CFPL, spoke on Wave Propagation on both High and Low Frequencies. The amateurs of Western Ontario held a hamfest at the William Pitt Hotel, Chatham, on Jan. 24th, sponsored by the Kent County Radio Club. Windsor, Sarnia, Chatham, St. Thomas, and London clubs were represented. Alex Reid, our genial CGM, was guest speaker. BMI has new SX-25. BOP is working 3.5- and 7-Mc. c.w. and 50-Mc. 'phone. AWP has 19 set on 7 and 3.5 Mc. BAX worked New York and Florida on 50 Mc. with six-element beam. RH schedules VE1VV on 14 Mc. AVN is building a Q-5er for VC-312. BAV is on 50 Mc. with an 807. The TARC already is discussing Field Day plans. BMG attended Scarboro Radio Club Hamfest on Jan. 24th. CY is new EC for K-W Club. The following was received from AQB: BDB is working plenty of DX on 28 Mc.; ANS and MJ are doing well on 14-Mc. 'phone; CI is using co-ax line on Faraday Shield; Wallaceburg has four active hams on c.w.; BM, BSM, BOK, and BSL; AQE and BSK are getting out on 28 Mc.; LB and AUB both have new beams. The following came from North Shore Club: ADD works 3.5- through 28-Mc. c.w.; JV, BQW, AZV, AZT, AIY, BAD, and BIE make up the Oshawa 50-Mc. net. BAJ has 30 watts on an 807 on 3559 kc. AWJ schedules BGF and 2HY. GI is new ORS. AWE and AUW have new VFOs. Traffic: (Dec.) VE3SF 339, ADC 44. (Jan.) VE3TM 79, ATR 74, XO 47, GI 39, DU 36, AWJ 21, DH 21, KM 17, AQB 16, AWE 14, BMG 12, OI 12, BCP 8, AWI 6.

QUEBEC DIVISION

QUEBEC — SCM, Gordon A. Lynn, VE2GL — IQ has 807 on 14-Mc. c.w. and is building VFO. UC is rebuilding using 813 in final. CR is on 28 Mc. with 807, 35 watts. He and WD are building modulator frequency meter. GK is building a frequency meter. QV has new 'scope in operation. OG still is not satisfied with beam but uses it on 28 Mc.; he also has new 6J6 preamplifier and finds it excellent. NM has 807 on 3.5, 7, and 14 Mc. and also is building 'scope. BB has new rig on 7 Mc. and schedules W2OUT and VE2LO. RZ has built new monitor with directly-calibrated dial crystal calibrator and 28-Mc. multivibrator. RL changed antennas to tuned center feeders and is trying to feed new Bliley CCO-2A into TA12C transmitter for 28 Mc. CA is looking over s.s.s.c. LO is on 3.5-Mc. c.w. TD is new in Drummondville. XO and ACS are new in Yamachiche. KT has rebuilt using 807s. WR is rebuilding and will have 150 watts on all bands. RJ schedules 3BSA. AC has drifting VFO. TM schedules 1FQ, 2DL, and 3AWF. TN has remote-controlled rig. EC reports continued activity on Quebec 'Phone Net. QL has been transferred to Lachine but goes home week ends to operate rig. BE finds n.f.m. on 14 Mc. excellent. FG has VFO 15 watts on 3.5-Mc. c.w. The Montreal Amateur Radio Club collected $135.00 at the last three meetings and sent 30 food parcels to U.K. hams. Traffic: VE2EC 45, GL 32, TM 21, BB 14, CA 7, RJ 2, WR 2, HH 1.

VANALTA DIVISION

ALBERTA — SCM, W. W. Butchart, VE6LQ — CARA requests n.f.m. on all bands. HQ holds out for more social activity. New calls in Calgary are WH, LK, and NW.

(*Continued on page 112*)

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YL is going high power. AW got back on the air after a prolonged absence. FB works out on 3.5-Mc. c.w. EH has pair of 814s final, and keeps 'phone-c.w. schedule with brother, YN, at Provost. EW has FB signal on 3.5-Mc. c.w. VJ has very high noise level with which to contend. FR is working 28, 14, 7, and 3.5 Mc. FM works 7-Mc. c.w. FG starts out on 7-Mc. c.w. AE finds B.C.I. bad in a.c.-d.c. radios! WS is sporting five-element beam on 28 Mc. BN built keying oscillator to check on his fist with new bug. QS sports AR-88LF receiver. He still is working on that VFO. Both BN and QS are showing up well on Alberta Net activities. WC, of Medicine Hat, passed away on January 31 from injuries received in the line of duty as a fireman. Alberta, B. C., Saskatchewan, and Manitoba 3.8-Mc. 'phone men observed a ten-minute silence in his honor on Feb. 2nd, and SR read a very appropriate poem composed for the occasion. MJ had an FB time in ARRL Member Party. WG is doing yeoman service on T.L. "I." Traffic: VE6WG 119, LQ 12, BN 10.

BRITISH COLUMBIA — SCM, W. W. Storey, VE7WS — Club Thirteen reports a bang-up social on Jan. 21st. President AC railroaded ZZ, VC, HC, and AIY into the newly-formed "dishwashing committee." Secretary TE finally got on 50 Mc. with a pair of VT-127As. ZZ is designing a new rotary to buck poor location. VC got 7 Mc. S8 from G but is rebuilding to 813s for S9. AIY is on 7 Mc. with p.p. 813s. LT is heard punching away on 7 Mc. MO is rebuilding for 14-Mc. 'phone and c.w., while XH and GR are going n.f.m. HI is manufacturing wide range 'phone pickups similar to WE type 9A, also precision pickup arms. ACG, on 7 Mc., soon will be heard behind a mike on 28 Mc. SR puts out a nice signal on 14- and 28-Mc. 'phone and c.w. HC was heard by FA8BG and G2PL on 3.5 Mc. while trying for WAC. The Vancouver Amateur Radio Club will hold its annual dance in April. The Collingwood Club year-end party was a roaring success. VD was guest from West Vancouver. WH brought wire recorder from C.B.C. UU is building converters. AZ has 274N receiver. OJ is active on 14-Mc. c.w. AIH had new four-element beam and 50-ft. mast crash onto his porch. AKK is rebuilding for more power. LF is working on 28-Mc. 'phone rig. ADV, AME, and HF are on 144 Mc. UU has surplus 312 receiver. AIH is building A.M.C. unit. AKW is building converter for 28-Mc. 'phone. AGP is going VFO. XT is trying to muscle in on our 14-Mc. DX men, MH and OJ. RS is going after DX on 14 and 28 Mc.

PRAIRIE DIVISION

MANITOBA — SCM, A. W. Morley, VE4AM — CI, at Brandon, is on 3.8 Mc. with lovely quality. GV, new in Minnedosa, is on 7 Mc. HS, at Miami, got Hydro Power and turns up on 3.8 Mc. EK and FU have heard WØs on 144 Mc. but none have been worked as yet. EA and 5MW have schedule on 3.8 Mc. First night on 14-Mc. 'phone for GW he worked 3BON and had 3BON's mother in shack. IF/GE are again active on 3.8 Mc. AD is recovering from operation. SS is having trouble with 807s in final. AM/JM have new BC-457A for exciter. GQ is running weekly schedule with 2JA on 28 Mc. In November a message was addressed to me from Scotland. The message was put direct into Winnipeg although the originating station could have put it on the Trunk Line through a VE3. The Winnipeg station, however, preferred to handle it. So far I haven't received the message. The originator is back in Canada and I know the contents of it, so don't bother delivering it. The point I'm getting at, however, is DON'T ACCEPT TRAFFIC IF YOU CAN'T DELIVER IT. And when you do handle it report it each month on the first of the month. Traffic: VE4AM 52, GQ 23.

SASKATCHEWAN — SCM, Norman Thompson, VE5CO — The Rosetown Radio Club meets once a month, The following are members: BU, MC, EN, IE, AQ, KO. EM, MZ, BA, and CD. BU has been ironing out some B.C.I. KO and MZ are putting up beams. MC worked VP6 and VK9. BA is talking antennas. KJ, on T.L. "I," 3690 kc., worked both ends the same night with maximum power of 49 watts. KJ is doing an FB job as ORS. JS is doing very well on 28- and 14-Mc. 'phone with an input of 12 watts. Archie Wicks reports OM is putting a good consistent signal in Toronto. HR spends the early morning hours on 7-Mc. c.w. CW is looking for more excitation to drive his final on 28 Mc. The Moose Jaw ARC wishes to express its deepest sympathy to the bereaved family of the late W. Collins.

(Continued on page 114)

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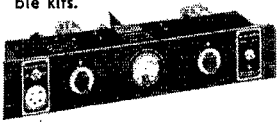

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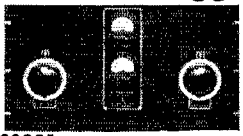

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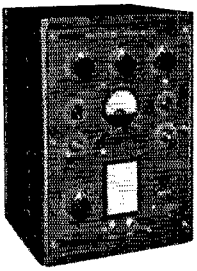

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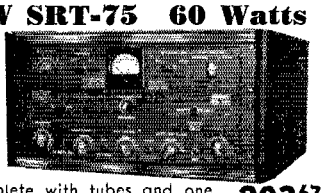

SRT-75—Sonar's new 60 watt all-band transmitter for NBFM and CW operation matches any type antenna or load impedance. Attractively self-contained are VFX-680 link-coupled to AMP-50 amplifier, powered by PS-50 power supply. Complete with tubes and one set of coils, less crystal..... **203.67**

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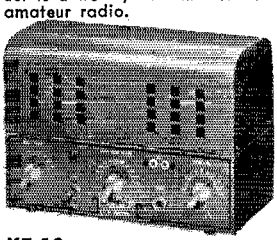

XE-10 — Converts any CW or AM rig (regardless of power) to NBFM-Fone. Can be received on any AM receiver, eliminates BCI and the need for costly modulators. For operation in 40, 20, 15, 11, 10, 6 and 2 meter bands. Complete with tubes, less crystal..... **39.45**

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VE6WC, of Medicine Hat, Alta. Two members of the MJARC, OM and OP, attended a meeting of the Regina Club Feb. 2nd, at which LM and W. Marshall, ex-4WL, gave interesting talks. The main discussion of the evening was the hamfest, which will be held at Boggy Creek, Regina, with registration on May 22nd and the big event on May 23rd. The Saskatoon and Moose Jaw clubs will assist. Traffic: VE5KJ 57, CZ 2.

Strays

"New Electronics Terms" Department:

Philadelphia *Sunday Bulletin*, via W3ELH: "*Conventors* and *inventors* for ship-to-shore radio, $75."

Oakland (Calif.) *Post-Enquirer*, thanks to W6OFS: "S-40 *Helicopter* receiver, $70."

Houghton (Mich.) *Mining Gazette*, spotted by W8YFT: "New kinds of broadcasting — frequency *moderation* and television — are short in range. . . ."

(Italics ours.)

—···—

The IBM Selective Sequence Electronic Calculator, just announced, contains 12,500 tubes, 21,400 relays, and 40,000 pluggable connections. The mammoth device, which can "remember" as many as 400,000 digits, is expected to work out in a period of days problems whose solving heretofore required a lifetime of work by scientists.

—···—

Resourceful people, hams. VE3AWW, stationed in the Canadian army at Ottawa, recently proposed to his YL back home in Winnipeg — and received acceptance — via ham radio. Aiding Dan Cupid in this maneuver were VE3BOC, VE4LC, and VE4LF.

2-Meter Mobile

(Continued from page 26)

justed until the noise level is at maximum. The low-frequency oscillator should now be adjusted by means of C_6 until a further increase in noise level is heard. C_4, the h.f. oscillator padder, should also be adjusted to produce maximum receiver output and this should occur with the padder adjusted to approximately half capacitance.

At this stage of the game, it is necessary to introduce a test signal of known frequency, and it is helpful if the signal can be set at 146 Mc. — the center of the band. With such a signal fed to the converter, and with C_5 set at half capacitance, C_4 is adjusted until the test signal is heard. It is advisable to check the frequency of the high-frequency oscillator at this point to make sure that it is adjusted to the low-frequency side of the input mixer circuit. Condensers C_1, C_2 and C_6 should now be tuned for maximum converter sensitivity. Incidentally, the frequency of the second oscillator can be checked by tuning the range around 12.7 Mc. with an all-band receiver.

The converter bandspread can be adjusted by changing the L/C ratio of the first oscillator, by altering the spacing between turns of L_7. Of course, C_4 must be reset each time the inductance of the coil is varied. Because the first mixer has a broad frequency response, it is only necessary to peak the input coil, L_2, at the center of the band by varying the length of the coil. The coupling between the antenna link and L_2 should be adjusted for maximum response.

When all of the circuits have been aligned, it is time to adjust the 14.3-Mc. trap. This is done by tuning to the high side of the signal frequency until the image is heard, and by then adjusting C_2 until the image response is attenuated to the greatest degree.

It is to be expected that the various circuits will need slight readjustment after the chassis has been enclosed in the cabinet. However, this presents no difficulty as all of the tuning controls are accessible. *QST* for February, 1948, presents control-circuit diagrams that show how a converter of this type may be tied in as part of a complete mobile station.

Happenings

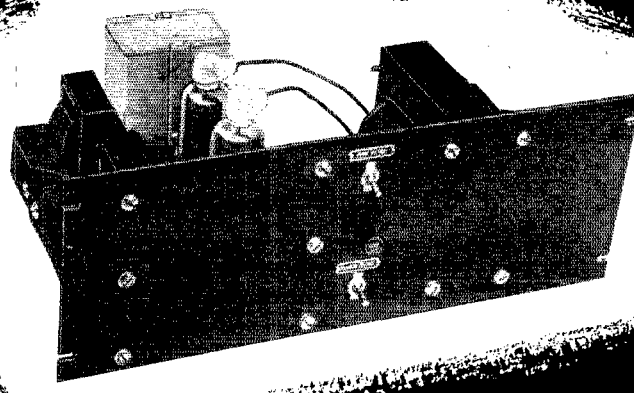
(Continued from page 32)

ests of revenue and censorship, such foreign governments commonly forbid their amateurs to handle any formal messages or any communications on behalf of third parties, even friendly greetings. The international regulations providing that this arrangement can be modified by special arrangements between nations, the United States Government, at the request of ARRL, has approached the governments of many foreign countries with a proposal to relax this restriction. Most of the other countries have refused. There are a few exceptions, which we report:

(Continued on page 118)

ANNOUNCING

ARROW'S NEW ECONOMY LINE



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Canada. (1) We may handle messages on behalf of third parties provided that they are of the character that would not normally be sent by any existing means of electrical communication or except for the availability of the amateur stations. (2) We may handle messages from radio stations in isolated points not connected into the regular electrical communication network, such messages to be handed to the local office of the commercial telegraph company for transmission to final destination. (3) In cases of emergency, where the regular communication system is interrupted, amateurs may handle messages of any importance, same to be handed to the nearest point on the commercial telegraph system remaining in operation.

Chile. Same as (1) for Canada above.

Peru. Same as (1) for Canada above.

—···—

Traffic may be freely handled with the outlying territories and possessions of the United States where amateur stations are licensed by FCC. The same is true of KZ5 stations in the Canal Zone.

G.I. Stations. The amateur stations operated by U. S. military personnel all over the world are to be regarded as located in little parts of the good old U.S.A. By common acquiescence, message traffic to and from military personnel is not only permitted but encouraged. However, the orders of the local military commanders commonly confine such traffic strictly to persons in the United States military service, to the absolute exclusion of traffic to or from the natives, particularly enemy nationals. In some theaters, messages relating to business transactions may not be handled by military-amateur stations and in such a case it is well for the American amateur to make inquiry first whether such a message can be accepted, although there is no bar under our FCC rules to our own handling of such a message to a G.I. station.

Australia. Although traffic is normally prohibited, certain official traffic stations of the Wireless Institute of Australia are authorized to handle messages concerning WIA internal administration, and this is deemed to permit the exchange of messages between WIA Headquarters and ARRL Headquarters concerning relations between the two societies, arrangements for contests, etc. Absolutely no third-party personal traffic is permitted, however.

Philippines. Messages could be handled freely with the Philippines while they were a U.S. possession. The establishment of the Republic of the Philippines made the islands an independent country, and as a technical legal matter the right to handle traffic no longer exists. The League has requested the Department of State to undertake a treaty with the new government to reaffirm the traffic-handling right.

Rest of the World. In general, traffic is prohibited with amateur stations in the rest of the world, not through reluctance on the part of the

(*Continued on page 120*)

is your

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VT-25A	(Special 10) .69
VT-52	(Special 45) .69
6J6	Twin Triode .69
717A	(6AK5 w/octal base) .98
9002	Miniature UHF Triode .95

Transmitting

2C22	UHF Triode $.79
5D21	Tetrode 9.95
15E	UHF Triode 2.95
24G	UHF Triode - Plate Diss. 25W. - 2000V. at 75 ma. good up to 300 Mc. .69
VT-158A.	UHF Triode with Tuned Circuits Built-in 4.90
388A	Door Knob Triode 4.95
GL434A	Lighthouse 7.95
GL446A	Lighthouse (2C40) .74
WL530	Water Cooled Triode 39.50
715B	Tetrode 9.95
804	Pentode 3.75
807	Beam Power Tetrode 1.19
813	Beam Power Tetrode 6.95
829	Beam Power Tetrode 2.95
841	Triode .69
1625	Beam Power Tetrode .49
1626	Low Drift Osc. Triode .49
7193	UHF Triode .39
8011	(VT-90) Micro-Pup .98

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1B24	T-R Tube 2.95
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U. S. Government but because of prohibitions by the other governments concerned. The amateur at the other end is commonly forbidden all traffic handling. We advise amateurs to abide by this restriction and to have no participation in the handling of third-party traffic in such cases.

N.F.M. Exciter

(Continued from page 35)

cies is given by setting the gain so that the occasional peaks that occur in ordinary speech cause the meter just to hit the desired average deviation.

The deviation-meter scale is graduated 0-10, indicating kilocycles deviation at 29 megacycles (or any output frequency using a multiplication of 8 from the phase-modulated stage) for 1000-c.p.s. input. The face of the meter is colored green from 0 to 3 kc., orange from 3 to 5 kc., and red from 5 to 10 kc.

The r.f. output of the unit is approximately 50 volts, at high impedance, in the 3.5- to 4.0-Mc. range.

Construction

Mechanically, the apparatus is laid out so that the audio circuits extend from the front panel down one side of the unit, while the r.f. circuits occupy the other side and center of the chassis. Power supply and power plug are at the rear. A twelve-terminal plug is used to permit the unit to be plugged into a standard assembly in place of the VFO. The breakaway levers shown in the photograph have since been replaced by a simpler device, and the Plexiglas panel used for the photograph is normally 0.125-inch 24ST duralumin.

Results were highly gratifying, showing symmetrical sidebands for sine-wave modulation at high deviations. The audio quality heard in a normal a.m. receiver is clear and the critical adjustments sometimes found necessary for this type of reception were entirely absent. Furthermore, checks on various types of broadcast receivers in the immediate vicinity indicated complete freedom from BCI, the goal of all crowded-area amateur 'phone operators.

Peak Clipping

(Continued from page 37)

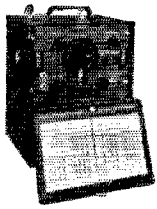
characteristics of the filter is of no consequence, since the pass frequency is zero.

Assuming an inductance of 20 henrys in the modulation-transformer secondary, a capacitance of 0.002 μfd. in the filament transformer and a 0.004-μfd. plate by-pass condenser, the cut-off frequency would be approximately 900 cycles.

It must be remembered that the filter in this case need only pass direct current and attenuate frequencies below about 3000 cycles, and this allows considerable latitude. Because the cut-off frequency is well below 3000 cycles, the sloping characteristic of the constant-K configuration is of no disadvantage, for the attenuation is ample in the upper voice range and above. This eliminates the necessity for any M-derived sections.

(Continued on page 122)

HOT RADIO VALUES at Sun Radio



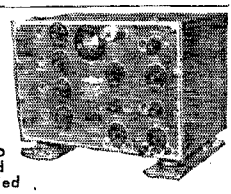
BC-221 FREQUENCY METER

We have just received another shipment of these meters, probably our last. Complete with tubes, crystal, calibration chart (from 125kc to 20,000kc) and guaranteed accuracy of .01% or 500 cycles whichever is greater. These are slightly used but guaranteed perfect and A-1 ..... **$36.75**

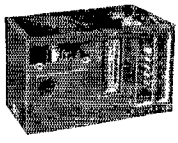
SCR-522 VHF TRANSCEIVER

The finest all purpose equipment on the surplus market. Tunes 100–156 MC. Don't confuse these with other incomplete and abused 522s. Sun Radio offers electronically perfect and guaranteed 522s . . . AND COMPLETE with tubes (one 10 tube superhet receiver squelch circuit and one 7 tube transmitter), remote control box, 28 volt dynamotor (can be converted to 110 V operation), 4 crystals and ALL CABLE CONNECTORS but less cable **$24.95**

100 WATT BENDIX TRANSMITTER 4 SEPARATE E.C.O.

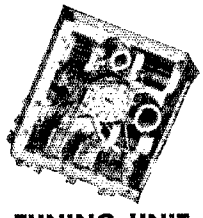


These can be easily converted to 20–40–80 meters Crystal required for 10 meters. Each electronic coupled oscillator dial has 3000 divisions enabling quick precision shifting. This transmitter was constructed of the highest quality of precision parts, with laboratory precision. Four separate output tanks; one 4-position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. — BRAND NEW, complete with tubes **$49.95**



FM TRANSMITTER BC-684

These units are BRAND NEW, providing 35-watt output, 10 channel push button crystal control employing NON-LINEAR MODULATING COIL. This unit tunes from 27 to 38.9 mc. These units come complete with tubes less power supply, covers, and crystals. Excellent 10 meter FM transmitter for "Ham" or Police use **$24.95**



TUNING UNIT

A wealth of expensive parts. Contains: 6-A.P.C. Condensers, 6-coils, 3 or more mica condensers and resistors, 1-porcelain two gang wafer switch and dozens of other useful units. . . . **$1.19**

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CRYSTALS WITH A MILLION USES

Fractions Omitted

kc	kc	kc	kc	kc	kc	kc	kc	kc	kc	kc
412	420	429	437	445	458	470	479	490	497	506	516
413	422	430	438	446	459	472	481	491	498	507	518
414	423	431	440	447	462	473	483	492	501	508	519
415	424	433	441	448	466	474	484	493	502	509	522
416	425	434	442	451	468	475	485	494	503	511	523
418	426	435	443	453		477	487	495	504	512	
419	427	436	444				488	496	505	515	

49¢ each

I.F. Frequency Standards

kc	kc	kc
450	454.166	461.111
451.388	455.556	464.815
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527.777	533.333	537.500
529.166	534.722	538.888
530.555		

99¢ each

ASSORTED MISCELLANEOUS CRYSTALS

Fractions Omitted

372kc	376kc	381kc	384kc	387kc
374	377	383	386	388
375	379			

39¢ each

priced at a fraction of the cost of their holders alone.

FOR HAM AND GENERAL USE

Fractions Omitted

390kc	395kc	402kc	405kc	408kc
391	396	403	406	409
392	398	404	407	411
393	401			
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79¢ each

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• Crystals are shipped packed in cloth bags inasmuch as they are shock mounted. All shipments guaranteed.

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Sun	2" Round	0–300 D.C.-V.	2.97
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SUN RADIO

OF WASHINGTON, D. C.

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Reference has been made above to 3000 cycles as a frequency limit for modulation. While this may seem narrow to some of the high-fidelity advocates, it should be remembered that the Bell System has established that limit as adequate for both male and female voices. No intelligibility will be lost with this upper frequency limit if the lows below 200 cycles are also attenuated. Dividing 500,000 by the upper cut-off frequency gives the proper low cut-off for natural speech.[3] It is therefore strongly recommended that even a smoothly-operating clipper circuit be augmented with a 3000-cycle low-pass filter and a compression amplifier. The filter is inexpensive when designed for low-level operation, and the subject has been well covered in various publications recently.[4] When used with a dependable clipper, the time constant of the compression circuit may be made slow enough to adjust the amplifier gain to a good average high level without fear of overmodulation. Slow recovery is desirable for conversational purposes.

After the clipper has been installed, a check with the oscilloscope will prove its value. It is impossible to put a tail on the trapezoid pattern, provided that the audio applied to the horizontal plates is taken from the load side of the clipper. One of the checks used at W7NU with this clipper was to set the gain for 100-per-cent modulation with 600 watts input, and then to drop the input to 300 watts and shout into the microphone! Checks with the oscilloscope and with hams a few blocks away revealed no splatter, even with this severe test.

Let me reiterate that the filter formed by the circuit constants mentioned is *not* a filter for the modulator, and only attenuates frequencies produced by the clipper tube acting as a generator. It need not have a sharp cut-off, because the pass frequency is zero (direct current). Its attenuation at the highest voice frequency used is the only critical criterion of its value. Also we should bear in mind that using a 3000-cycle low-pass filter gives us a channel-width of 6 kilocycles on the band. Divide the 100 kilocyles of the 20-meter 'phone band by the number of hams operating there and then try to pick your 6-kc. spot!

If the amateur were as critical about the frequency-response curve of his transmitter as he is with his receiver, it would prove that he still has some of that "Do Unto Others" spirit in his system.

A final word of caution: the clipper is not a cure-all. Wide sidebands can occur for other reasons than extended negative peaks. Even a low-pass filter does not preclude the possibility of spurious frequencies in subsequent stages because of resonant transformers, etc. It is therefore essential that the speech amplifier and modulator be relatively free from distortion before any type of suppression is attempted.

---

[3] Grammer, "House Cleaning the Low-Frequency 'Phone Bands," *QST*, May, 1947.

[4] Smith, "More on Speech Clipping," *QST*, March, 1947. Smith and Hale, "Let's Not Overmodulate — It Isn't Necessary!" *QST*, November, 1946.

De MAMBRO'S CARTOON CONTEST

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- 2. A FEW WORDS ON WHY YOU LIKE DeMAMBRO CARTOONS.

CONTEST ENDS MIDNITE APRIL 15, 1948. — WINNER TO BE ANNOUNCED IN Q.S.T.

SEND ALL ENTRIES TO OUR BOSTON STORE.

A.R.R.L. QSL BUREAU

For the convenience of American and Canadian amateurs, the League maintains a QSL-card distributing system which operates through volunteer district QSL managers in each call area. To secure such foreign cards as may be received for you, send your district manager a stationer's-size No. 10 stamped self-addressed envelope. If you have reason to expect a considerable number of cards, put on an extra stamp so that it has a total of six cents postage. Your own name and address go in the customary place on the face, and your station call should be printed prominently in the upper left-hand corner. If you have held other calls in previous years, submit an envelope for each such call to the proper manager — there are many thousands of uncalled-for cards in the files. All incoming cards are routed by Hq. to the *home district* of the call shown in the address. Therefore, cards for portable operation in other districts should be obtained from the home-district manager.

W1, K1 — Charles Mellen, W1FH, 320 Cornell St., Boston Mass.
W2, K2 — Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.
W4, K4 — Johnny Dortch, W4DDF, 1611 East Cahal Ave., Nashville, Tenn.
W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas.
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.
W7, K7 — Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.
W8, K8 — Fred W. Allen, W8GER, 1959 Riverside Drive, Dayton 5, Ohio.
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N.S.
VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 329 15th St. North, Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B.C.
VE8 — Yukon A. R. C., P. O. Box 268, Whitehorse, Y.T.
KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P.R.
KZ5 — C.Z.A.R.A., Box 407, Balboa, Canal Zone.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T.H.
KL7 — J. W. McKinley, KL7CK, Box 1533, Juneau, Alaska.

Strays

Glyptol, bane of those converting war surplus, can be softened temporarily by the application of heat — a heavy-duty soldering iron is a good source. However, fast work is necessary once a setscrew or coupling has been freed in this manner, because the stuff "sets up" rapidly. — *W4JWG.*

FEED-BACK

A drafting error in Fig. 2B of L. H. Allen's article, "An Answer to N.F.M. Reception," February *QST*, grounded the plate of the upper half-section of the 6H6 ratio detector instead of the cathode of the lower half. We regret any inconvenience caused constructors of this unit.

HAMFEST CALENDAR

NEW JERSEY — The Northern New Jersey Radio Association announces its Second Annual Dinner Dance, to be held on April 28th at the White Beeches Country Club, Haworth, New Jersey. Music by Bud Page and his orchestra; entertainment and prizes. Amateurs and their friends are cordially invited to attend. Tickets, $4 per person. Instructions for reaching the club are available from Chairman L. F. Nordblom, W2NUL, 26 Grant Ave., Totowa, N. J., or from Secretary K. LePine, W2FKA, 80 Surrey Lane, River Edge, N. J.

Strays

FCC has waived §12.81 of its Rules Governing Amateur Radio Service to allow Theron W. Wigton to change his call from W9FGN to W9UA, in memory of his father who used the latter combination more than a quarter century ago. In making this grant, the Commission reiterated that it is not relaxing its long policy against transfer of amateur calls or requests for particular calls.

How's DX?

(Continued from page 43)

in and may draw KS4AK. Looks as if they're going right on through the alphabet as the replacements come in — wonder if Goodman will show up down there when they get close to 4DX! . _ . _ . _ VR2AQ took time out to slip us the lowdown on the Fiji fellows. Seems as how VR2s AO, AQ and AY stick pretty close to 28 Mc., AP holds forth on 14 Mc. and AS likes his QRP on 7 Mc. AR went back to New Zealand for a ZL call . _ . _ . _ W8RDZ would like to catch up with former operators of VP5PU in the South Caicos. For QSL purposes, of course . _ . _ . _ D4ALN is keeping schedules with W2OEC for traffic as well as rolling up a stack of snappy DX contacts . _ . _ . _ A note from ZC6SM stresses that he's in Palestine all right and will QSL all contacts via the Cairo bureau . _ . _ . _ W5ALA and J8AAG ran a dead heat in pointing out that Korean stations are now using the HL1 prefix. Present stations will drop the first letter after the number, i.e., J8AAG becomes HL1AG. Neat, eh? . _ . _ . _ HA8Z is okay but strictly under cover; QSL via ARRL. And the same goes for any others of our overseas brethren about whom you are in doubt! . _ . _ . _ W6FMZ/C6 won't answer his cards until he hits Stateside around July, but he intends to do a thorough job at that time . _ . _ . _ Senor Juan Lobo y Lobo fooled plenty of us again, judging from the mailbag. To all concerned: XF1A is XE1A's favorite contest call and is not a new country unless you need Mexico. [Like we do. —

(Continued on page 128)

Jeeves] . _ . _ . _ Watch for a flurry of activity in ZD6 (Nyasaland). New regulations there should result in a few new juicy calls before long.

—•••—

We bow to W6TI and the Northern California DX Club for this gem:

Old Ham: "Sa OM, cud u give me the freq of tt choice DX stn ur calling?"

New Ham: "Sri, OM, I am luking fer him myself."

Old Ham: "Hw come?"

New Ham: "Just picked call fm *Call Book* at random es thot I wud give the guy a call as need all new countries I cn get."

Old Ham: "Don't ferget to send him QSL so he wi send u one."

New Ham: "No, OM, I won't. I hve one already made out to send him."

Any resemblance to persons living or dead is purely discombooberating.

Rig for 50 Mc.

(*Continued from page 46*)

tained in the plate circuit of the quadrupler; it can best be tuned by watching for maximum grid current in the 2E26. Cathode current in the oscillator and quadrupler runs around 20 to 25 ma. each, and the cathode current of the 2E26 about 60 ma. when loaded. The 6AQ5s in the modulator draw about 35 to 40 ma. each.

To those kind readers who have ventured this far, we hasten to impart some highly confidential information. It relates to the small though plainly-visible hole which appears on the chassis just to the right of the crystal. This hole has several important advantages. Aside from its ventilating function, it serves as a newly devised type of parasitic trap and on occasion has been used as a convenient receptacle for unwanted pencil sharpenings. More about this in our forthcoming IRE paper!

We have had good results with the rig since putting it on the air and we are becoming increasingly fond of six. According to reports the signal is reasonably clean. No hurry at all to get back to that 10-meter QRM — we're enjoying those four beautiful megacycles that suddenly loomed onto our horizon one Sunday morning not so long ago.

I.A.R.U. News

(*Continued from page 47*)

still time to provide such items, which should be sent immediately to C.A.R.L., 40 May Yuan Villa, Kuo-Fu Road, East, Nanking (2), China.

Members of the Chinese society are experiencing considerable economic difficulties, principally because of the devastating effects of the late war. The *Chinese Amateur Radio League* is very active at present and would welcome the financial help of American amateurs as supporting members. Such members will receive the League's emblem, membership card and circular. Lifetime membership dues for supporting members of C.A.R.L. are $5.00. Applicants should make remittance in

(*Continued on page 130*)

this amount payable to "A/C No. 1162 (which is the account number of C.A.R.L.), Bank of China, 40 Wall Street, New York." The Bank of China will issue a receipt to the applicant which should be presented to C.A.R.L. with his membership application.

ITALY

On December 15th last, the call of XADW was changed to I1AAA. Thus ended the last of the XA calls in Italy proper. Amateurs in the status of former holders of XA calls will henceforth be assigned calls with the normal prefix for Italy.

Hints & Kinks

(*Continued from page 59*)

be changed to provide more, or less, deflection of the meter as required. Beam adjustments can then be made as usual.

If the meter registers backward, reverse the connection of the crystal diode. Variations on this may consist of lengthening the test leads to a total length of a half-wave at the operating frequency to increase the "deflection sensitivity" of the set-up. A remote-indicating device may be made by using Twin-Lead to connect a pick-up dipole at some distance to an ohmmeter located at the beam to make one-man adjustment possible.

— *Frederick L. Moore, W4JYB*

25 Years Ago

(*Continued from page 10*)

heterodyne and Making It Work." The author successfully makes use of transformer-coupled i.f. stages, with performance much improved over the common resistance-coupled circuit. For the amateur who wants to wean his receiver from its battery diet, there is S. T. Woodhull's description in this issue of a "Receiver Plate Supply from A.C.," which provides practical data on doing the job with S tubes and homemade chokes and power transformers.

The Headquarters' campaign for utilization of shorter waves continues. Technical Editor Kruse discusses "Getting the Transmitter Down to 100 Meters," and appraises in detail the successful circuits used by 9ZN, 3ALN and 1QP. Mr. Kruse debunks the illusion that tube efficiency falls off at low wavelengths, and cites that pioneers on 100 meters are putting through better signals than they did on 200! There's sound advice also in L. W. Hatry's "How To Make a 5-Watt Tube Reach Out." Circuit voltages, antenna-coupling methods, and the antenna itself, are critical, 5XV states. Revealing too is the discourse by M. G. Goldberg, 9APW, on electrolytic rectifiers and filter circuits. In an article replete with oscillograms, the author discloses that simple low-pass filters are quite suitable for amateur needs.

QST's new department, International Amateur Radio, is crammed with news of amateur activity

(*Continued on page 132*)

around the world: From Britain comes word that British 5AT is inaugurating nightly transmissions in an attempt at two-way contact with American amateurs; from Mexico, via 5QY, 1TS, and others, Headquarters has received a radiogram telling of progress in that country; and from New Zealand there is a new report of additional U. S. stations being heard "down under."

Portraits of our esteemed vice-president, Charles A. Stewart, 3ZS, and A. A. Hudgins, 6IZ, with biographical notes, spotlight the Who's Who in Amateur Wireless department, while Station Descriptions features the c.w. stations of Transatlanticer Robert S. Johnson's 2AWL, Red Bank, N. J., Bryan S. Flather's 3LR, Washington, D. C., Robert M. Stevens' 9AVC, Hastings, Neb., and F. J. Quement's 6NX, San Jose, Calif.

Random gleanings: Assistant Editor Boyd Phelps has resigned from the *QST* staff to join the C. D. Tuska Co., and has been succeeded by Howard F. Mason, 7BK, of Seattle. Another newcomer to the staff, as assistant editor in charge of promotion, is Willard B. Cowles, prewar 1DE. . . . Recent Ham-Ad: "For Sale, immense Clapp-Eastham condenser, capacity one gallon. — K. B. Warner."

Correspondence

(*Continued from page 61*)

and can, only be considered on a world-wide basis. For the 'phone man not interested in DX, he has plenty of other frequencies for local QSOs and he shouldn't be occupying the 20-meter band in the first place.

— *Jules Obester, W2ALO*

Kenedy, Texas

Editor, *QST:*

I see not a reason in the world why 7200–7300 should not be opened to 'phone on a sunrise-to-sunset basis; seems to me this would be entirely feasible and certainly would fill a dire need for a daylight 'phone band for local and up-to-500-mile work during daylight hours. We have simply got to make every use we can of free time on the bands. This daytime operation would certainly put no hardship on the c.w. in 40 as during daylight there is plenty of room.

— *W. O. Porter, W5FAH*

Brooklyn, Iowa

Editor, *QST:*

. . . You make the statement that 40 carries a high percentage of beginner telegraphy; well, I would like you to know that I am one of those beginners. My 5 watts may not be much, but it provides me with a lot of fun. QRM from foreign 'phones in the band would be a real mess.

— *Randall C. Goff, W9NRY*

111 South Emery Ave., Peshtigo, Wisconsin

Editor, *QST:*

If anything, *more* than 50 kc. should be added to this 75-meter 'phone band. There isn't anywhere near the amount of c.w. activity in this band as 'phone if one is to judge by the signals I pick up here. Why not give us a break on 'phone unless the c.w. boys show the need for the space by putting it to use.

— *Donald MacLaughlin, W9TWR*

Dubuque, Iowa

Editor, *QST:*

In the Midwest there is scarcely a c.w. signal on the 80-meter band until late afternoon or evening. My suggestion is that the 'phone band be opened a little more in the day than at night. . . .

— *Francis J. Phelan, W9AXH*

(*Continued on page 134*)

1450 Addison Road, Cleveland 3, Ohio

Editor, *QST*:

. . . In checking over the list of active traffic nets as registered at Headquarters I found that out of 74 nets so listed, 21 of them are 'phone nets, and 53, or better than twice as many, are c.w. nets. Also within the frequencies affected by the proposed frequency change in the 3.5-megacycle band I found that 15 active nets will have to change their operating frequencies, including two national trunk lines. In other words, better than 30% of the active nets are going to have to change frequency or nearly 75% as many as the total of the 'phone nets so listed — assuming that it is not possible to operate a net within 5 kc. of a 'phone-band edge because of splatter, etc.

By further analysis of this net list we find that 11 nets or nearly 50% of the 'phone nets so listed work only one day per week. The majority of this last named group work two days per week. Of the 53 c.w. nets so listed I found that 36 nets or nearly 75% of them work five days to six days per week and 12 of these daily nets operate in the proposed 50 kc. to be allocated for 'phone use, assuming that the Canadian 'phone allocation will be extended to 3750 kc.

So assuming, and the statistics bear out the assumption, that the c.w. amateur is the backbone of the Communications Department of the ARRL, and as the Communications Department of the League is a major activity, we can see that there is some cockeyed discrimination being waged against the c.w. amateur. His volume of work in ARRL organizational work makes him deserving of more consideration by the ARRL Board regardless of polls. Percentage of activity rather than percentage of occupancy should be the deciding factor.

It seems to me that the Board of Directors has to consider beyond all else the future of the League. Any policy line that they should formulate should necessarily end in benefiting the ARRL, and not any group of individuals who do not take an active part in their organization's planned activities.

— *D. L. Howe, W8EBJ*

1016 Hamilton Boulevard, Hagerstown, Md.

Editor, *QST*:

. . . Why not solve the problem by making it compulsory to use single sideband? This would be in accordance with the policy of the FCC in reducing interference to a minimum by following modern engineering practices. It seems to me that this would provide at least 300% more space in the 'phone bands.

— *B. F. Green, W3BEN*

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50 E. Sonoma Ave., Stockton, California

Editor, *QST*:

. . . I am unalterably opposed to any and all restrictions relative to limiting the audio frequency to 3000 cycles. Such a proposal smacks of senility and a return to 1924 ham radio. . . .

— *Taubuer G. Hamma, W6FRH*

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201 Cherry Street, West Newton 65, Mass.

Editor, *QST*:

. . . We have the answer to the whole problem in January *QST*. Why horse around, fiddling with frequency allotments, when it's so simple to double the 'phone band capacity (at the very least) by use of single sideband?

Some people are bound to insist that "what was good enough for pappy is good enough for me," but if pappy hadn't been an experimenter, the ham band would still be 200 meters. All it takes is a little of the old ham spirit to get things going on the transmitter end and a stable b.f.o. on the other.

How about doing it right from the beginning in the new 21-Mc. band? Then the c.w. men can stay where they are, the 'phone bands will be effectively doubled (at least), and everybody will be happy with the present allotments.

— *Walter L. Pragnell*

2008 Truman Road, Charlotte, N. C.

Editor, *QST*:

. . . I have always believed, and still do, in a logical, sensible, and coherent pattern of c.w. and voice communication for the amateur bands which would satisfy as well as possible (1) the needs of the public and (2) the desires of the

(*Continued on page 156*)

greatest number of amateurs. I place them in that order deliberately. If the ideal frequency allocation can do both, wonderful. If it can do only one, then I feel that public good takes precedence.

I do not stand on the existing division of the bands. While I do not necessarily agree with one popular solution advanced by some 'phone men in N. C. — that each and every amateur band be divided 50-50 between 'phone and c.w. and left that way for all time — I can see certain merit in it. I think the ARRL is exceedingly wise to reëxamine amateur frequency allocations at this time, and I can assure you that any decision reached by the directors after due study and contemplation will be accepted by me without criticism, and that I will support the Board's recommendations against any and all challengers. . . .

The average c.w. man feels that the 75-meter 'phone men have not yet cleaned up their own backyard, and doubts that they should be given additional property until the rubbish and undergrowth are cleared away from their present premises. I speak specifically of unduly broad signals; overmodulation; lack of adequate clipping of superfluous voice frequencies; clumsy operating practices, with tedious calling, excessive verbosity, and unneeded repeats; a craze for high power, for the "California Kilowatt" type of signal; unwillingness (especially in North Carolina) to do anything in the public good.

The 'phone men in North Carolina, by and large, have done nothing and are doing nothing to prepare for their supreme privilege — and duty: viz., the establishing and operation of an efficient network of well-qualified traffic experts which could move into action rapidly and operate in the most effective manner in the event of a possible disaster in our state. There have been spasmodic efforts to establish a 'phone traffic net in this state in the past several months, but they have failed because there is no interest. That, I think, is one of the cardinal sins of the 75-meter 'phone group.

Those, I consider as "underbrush" in the 75-meter 'phone's backyard which should be cleared away before the 'phone men demand more of the c.w. frequencies. If it were cleaned up, I am sure that their pleas for more frequencies would fall on more receptive ears. And by that, I do not mean to imply that the c.w. band is without sin. On the contrary, it is woefully full of unnecessary key clicks, broad, raspy and chirpy signals, bad fists, etc., and I would be one of the first to admit, and deplore, our own shortcomings. . . .

. . . I personally do not think another 50 kilocycles will make any appreciable difference in the QRM on the 75-meter 'phone band. Even another 100 kilocycles would still not open up the 'phone frequencies sufficiently to make all the 'phone men happy. And we must remember that an extra 50 kilocycles for 75 meters in this country will mean an extra 100 kilocycles, for the Canadian 'phones will surely move right on down. So, I am against any further increase in 80-meter frequencies for 'phone operation at this time. And I think the day is rapidly coming when 'phone operation must be limited to 21 megacycles and higher, and I believe that an even more stringent examination should be necessary before any amateur is permitted to put a voice transmitter on the air.

But whatever decision you may reach, be sure that I will stand behind you, and that there will be no criticism and backbiting from me.

— *Pete McKnight, W4CFL*

Strays

Terman and handbook writers, take note! Here is Article II, Section 6, of the constitution of the Farmers' Mutual Telephone System, Shenandoah County, Virginia, as printed in their 1946–47 telephone directory:

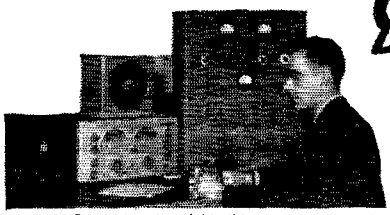
Do not whistle, sing or play a musical instrument on the lines when they are in use, neither use sweet talk, lest you soften the wire.

— *W4YEJ*

—•••—

Robert D. Smith, pictured on page 10 of February *QST*, is W6AUW, not W6QUW as we identified him. Sorry!

More Watts Per Dollar

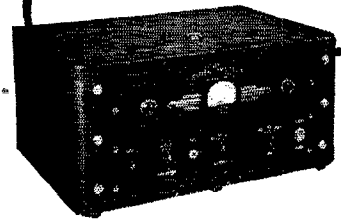


JIM NOLAND WØAWX Omaha, Nebr.

Superintendent Electronic Radio Television Institute "We have here at the school selected both the Globe King and the Globe Trotter because after very critical inspection we decided that these two transmitters were the best for the money anywhere. Since the installation of this equipment hundreds of our students have been keenly impressed with the construction, appearance and D.X. contacts made.

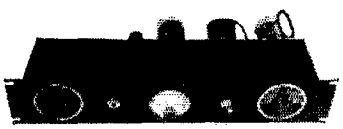
IT'S A SWEETHEART

Horace M. Whittlesey, Balderas Num. 32-217, Mexico, D. F. writes: "I have been testing the GLOBE TROTTER and had the transmitter on the air for a week and have contacted New Zealand, Australia, Peru, Venezuela, Canada, all U. S. districts, and a mobile marine in Venezuela. We contacted Hawaii also all to the credit of the Globe Trotter on 10 meter band,



WRL Globe Trotter XMTR Kit

Amateurs the world over are praising the performance of this high quality, low cost rig. It's a 40 watt input kit including all parts, power supply, chassis, panel and streamlined cabinet. Write for export prices.
Cat. No. 70-300 less tubes.....$69.95
Cat. No. 70-312 same as above, wired..$79.50
1 set of coils, meters, tubes, extra.....$17.49



WRL Exciter Kit

From our own labs. Uses 6L6 regenerative Osc. into an 807 driver or final. Similar to unit described in A.R.R.L. Handbook. Output 35 to 40 watts. Comes mounted on standard relay rack panel 3½"x19".
Cat. No. 70-302 less accessories.....$19.95
Cat. No. 70-310 same as above, wired..$25.95
Set of coils, meter tubes.....extra, $10.78
Power Supply wired with tubes.....$22.75

UNCONDITIONALLY GUARANTEED

The WRL-275 watt "Globe King" is a versatile advanced design transmitter kit which will give you efficient performance on 6, 10, 20, 40, and 80 meter band on phone and CW. COMPARE THESE FEATURES AND TAKE ANOTHER LOOK AT THE PRICE. Front panel control of link to final input—automatic fixed bias for good regulation—voltage controlled buffer and oscillator stages—provisions for ECO—new speech modulator circuit—modulates up to 350 watts—dual power supply for oscillator buffer and RF stage—most compact transmitter on the market—stands 28¼" high. **Write for complete detailed description and trade-in price on your present equipment.**

WRL 275 Watt

This new WRL 275 Watt GLOBE KING Transmitter kit is available as a complete unit, or individual sections may be purchased separately—Write for prices. Complete with tubes, meters, cabinet, one set of coils.

Kit Form $366.45

Wired $386.45

QUICK DELIVERY
It takes about a week to wire this kit

VALUES, LARGE STOCKS, FAST, DEPENDABLE SERVICE.

Hams all over the world are enjoying our personal service, fast delivery, liberal trade-ins and easy payment plan. We make it easy for you to buy and easy for you to pay. Just write and tell us what you want, the make and models you now have and I will answer your inquiry the same day giving you trade in allowances. Many times it will serve as a down payment on new gear. Dollar for Dollar you will get more at WRL. We carry a large stock of all national merchandise such as **Hallicrafter, National, Hammarlund, RME, Millen, Sonar,** receivers, transmitters, test equipment, beams, etc. Write me for anything you want. We can fill your order quickly.

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ST202 STANCOR XMITTER KIT	$ 90.85	National NC 173	$189.50
Wired by our engineers	119.95	National NC 183	269.00
Hallicrafter HT18	110.00	Bud VFO-21	52.50
Hallicrafter HT17	49.50	Meissner Signal Shifter	99.50
Hallicrafter S 38	47.50	Gonset 6-15 Converter	75.00
Hallicrafter S 53	79.50	Gonset 10-11 meter "	39.95
Hallicrafter SX 43	169.50	Harvey Wells TBS-50	99.50
RME VHF 152A	86.50	Sonar MB 611	72.45
RME H.F. 10-20	77.00	Sonar VFX-680	87.45
National NC 33	65.95	Sonar's New CFC	59.75
National NC 57	89.50	Hammarland HQ 129X	177.30
		Millen 90810 H. F. Xmtr.	69.75

SAVINGS

LOTS OF BARGAINS TOO - - -

BC458A VFO XMTR 274N series. Ideal for 40 meters—quadruples to 11 & 10-calibrated 5.3 to 7—actually tunes 7.5 mc. BRAND NEW, original carton, complete with tubes & conversion instructions $5.95
BC456A modulator for all 274N XMTRS. Brand new with 3 tubes, less dynamotor, your cost $3.95

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Just right for your control room wall. Size 28" x 42". Contains world-wide short wave broadcast station, world radio amateur prefixes, United States amateur zones, time zones, monitoring stations, etc.

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(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.
(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.
(4) **Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.**
(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.
(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2), (4) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) Because error is more easily avoided, it is requested signature and address be printed plainly.
(8) No advertiser may use more than 75 words in any one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

QSLs, 100 for $1.50. Stamp for samples. Glenn Griffeth, W3FSW. 1042 Pine Heights Ave., Baltimore 29, Md.

COMMERCIAL radio operators examination, question-and-answers. One dollar per element. G. C. Waller, W5ATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

AMATEUR radio licenses. Complete code or theory preparations for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

BEAM control cable, new material: 2 #16; 6 #20 rubber insulated, coded, tinned conductors. Weatherproof rubber jacket. Heavy overall braided shield. ½" diameter. Value 30¢ ft. Real buy 11¢ foot. F.o.b. Chicago. Associated Industries, 6639 Aberdeen Street, Chicago 21, Ill.

ERECO Beam Rotator, 110 VAC, heavy duty, variable speed, selsyn indicator, weatherproofed. Complete indicator and rotator ready to plug in, $69.95. Satisfied users all over the country. Buy from your dealer or direct. Free literature. Dick Rose, Ereco, 2912 Hewitt, Everett, Washington.

HAMS, Experimenters! Now you can get specialized technical training in radio, electronics, and frequency modulation. For complete information, write Department N 1, Louisville Radio School, 413 W. Jefferson, Louisville, Ky.

CRYSTALS: Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. $1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

QSLS, Samples, Albertson, W4HUD, P.O. Box 322, High Point, N. C.

PANELS, magnesium, machined, painted, engraved. Gilpin. Box 638R4, Mt. Clemens, Michigan.

CLEVER, tube-shaped "Birth-O-Grams" announce junior operator. Unique! 60¢ dozen postpaid. Samples. W9TSX, 1033 Spaight Street, Madison 3, Wis.

NEW or used: all popular brands in stock. Hallicrafters, National, Hammarlund, RME, Gon-set, Millen, Meissner, others. Send deposit for new gear or write for list of used or surplus. Van Sickle Radio Supply, Indianapolis 6, Ind.

QSLS, Kromkote cards at fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

DON'S QSI S: "Leaders in the Field." Samples. 2106 South Sixteenth Ave., Maywood, Illinois.

PATENT attorney, Registered U. S. Patent Office, Electronics, mechanics, chemistry. I. Jordan Kunik, 75-S Pearl, Hartford, Conn.

WANTED: Early wireless equipment, and literature prior to 1925. Franklin Wingard, Rock Island, Illinois.

SUBSCRIPTIONS to all radio magazines. Earl Mead, Huntley, Montana, W7LCM.

HT-9 Transmitter for sale. New condition. Complete with tubes crystals, and coils for 10-, 20-, 40-, 80-meter operation. Price $325.00. W. D. Penn, W5AAK, 4845 Nakoma Drive, Dallas, Texas.

WANTED: NC-240C or 240D rack mounted receiver less speaker. 547-A General Radio temperature control box complete, 575-D General Radio oscillator (oscillator unit of 581-A frequency-deviation meter) oven must be in good condition. State condition and best offer for each. Claude M. Gray, Box 602, Birmingham, Ala.

BC-348-J, N, Q OWNERS. Special Service Manual now available. Contains schematic, wiring diagrams, alignment, etc. Martin, 3516 Sacramento, El Paso, Texas.

SELL: NC-200, HRO, FB7, Millen VFO, Exciter, Bliley Vari-X, KW final 810s B & W coils cond., "B" & "C" supplies, misc. tubes and coils. W3QP, Blue Bell, Pa.

SURPLUS — Deluxe crystal finishing kits containing holders, quartz blanks, abrasive, etching fluid, complete instructions. Only a few hundred left at $2.00 each postpaid. Formerly sold $8.75. Vesto Company, Department A, Parkville, Missouri.

QSLs. Quality cards, priced right. Samples. Ham stationery. W9UTL, 1768 Fruitdale, Indianapolis, Ind.

WANTED: old wireless gear from 1905 on up. State condition, price, details. W1CPI.

HARRISON'S Jamaica branch saves time and money for Long Islanders!

FOR Sale: S-40, bought last September, $75. Apply: R. McFarlane, 53 Bernard St., Farmingdale, N. Y.

HALLICRAFTERS SX-17 will swap for Sonar VFX-680 or $50. Ed Ritvo, 20 Dudley, Harvard College, Cambridge, Mass.

DUBILIER Type 9-ALS Mica (low loss). 0.005 μfd condensers. Test 2500, working 1200. Postpaid $1.00 each. Norton Co., 1 Market St., Lynn, Mass.

EXCITERS: 6L6G-807; 6L6G-6L6G; breadboard 42-6Y6G, each with coils for 20 and 10. Best offer. Take RK25 and 803 in trade. W1HWR.

FOR Sale: HRO-W, complete with 5 sets coils, including Type F. Used about 1 year, $150. Wm. R. Gifford, York Harbor, Me.

SELL or trade: 125-watt phone transmitter, PP807s in final and modulator, 10 and 20 meter coils. Make offer. Row Sawdey, jr., 3406 E. 125th St., Cleveland, Ohio.

FOR Sale: Meissner Signal Shifter, Deluxe, all coils but 10 meters, very good condition. Price: $50. Lile Wismer, Sellersville, Penna. W3DKR.

FOR Sale: Abbott TR-4, Mallory Vibrapak and mike. Ready to operate on 2. Excellent condition, $35. Complete N.R.I. radio course (latest edition), $29. Sig. Gen. (all-wave) $15. Sky-rider, jr. S-41-W, new condition. $27.50. Al Stark, W1PZS, R.F.D. No. 1, Hubbardston, Mass.

SELL Pierson KP-81 complete, 20 tubes, excellent condition, best offer over $290. Morton Savada, 1115 Broadway, N. Y. C. 10.

SURPLUS antenna masts, 40 ft. 10 in. high, in 5 sections of tubular steel. Shipping weight, 50 lbs., $12.95 each. f.o.b. Dallas. Write for Ham Bulletin. Globe Radio, Inc., 2922 Elm, Dallas 1, Texas.

SELLING out complete Kw xmtter and lots of parts. Write for list and price. W9BYN, P.O. Box 389, Kokomo, Ind.

WANTED: complete cabinets, cabinet parts, final plate supply decks, complete or chassis, final plate supply transformers and other parts for BC61OD or E Model transmitters. What have you? Give cabinet dimensions, finish, condition and price. Walter Straesser, W8BLR, 15384 Birwood Ave., Detroit 21, Mich.

SELL: New BC-375E complete; coils, dynamotor, microphone. 28 v.d.c. filament supply, $50. or less. Want TCS, W8QMN.

THORDARSON T19P58 dual secondary 2400 VCT/200 Ma. 1800VCT/150 Ma. Excellent condition, $12.50. Wise, W0AAL, Rembrandt, Iowa.

SELL: Hallicrafters HT-9 Transmitter, like-new, all coils and crystals for 80-40-20-10. $275.00. New Meck 60 w. transmitter, coils and crystals for two bands, $100. Noble F. Doyle, W2SCL, Millbrook, N. Y.

SELL RME 152A $67.50, Skyrider Panoramic model SP44, $38.00, both units in new condition with cartons and data. M. Jacobson, W2RJF, 1614 Ave. R, Brooklyn 29, N. Y.

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BEST offer by June 1 takes *QST* 1939 to 1946, comp. run, plus 60 back copies of Radio, Radio News, Proc. IRE, Miller, WØCDP, Limon, Colo.

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Index to Advertisers

Advance Electric & Relay Co. ... 127
Allied Radio Corporation ... 111
American Phenolic Corporation ... 78
American Radio Institute ... 133
Amplifier Corp. of America ... 122
Arrow Electronics, Inc. ... 117
Ashe Radio Co., Walter ... 103
Astatic Corporation, The ... 125

Barker & Williamson, Inc. ... 133
Browning Laboratories, Inc. ... 128, 134, 136
Burgess Battery Company ... 82
Burlington Instrument Co. ... 125
Burstein-Applebee Co. ... 130

Candler System Co. ... 130
Capitol Radio Engineering Inst. ... 81, 137
Central Radio Parts Co. ... 128
Chicago Industrial Instrument Co. ... 131
Cleveland Inst. of Radio Electronics ... 92
Clippard Instrument Laboratories ... 137
Collins Radio Company ... 144
Commercial Radio Institute ... 137
Condenser Products Company ... 85
Continental Sales Company ... 124

Delehanty School ... 134
DeMambro Radio Supply Co. ... 123
Drake Manufacturing Co. ... 84

Eitel-McCullough, Inc. ... 77
Electric Eye Equipment Co. ... 116
Electronic Indicator Corp. ... 122
Electronic Marketers, Inc. ... 108
Electronic Navigation ... 136
El-Tronics, Inc. ... 102
Espey Mfg. Company ... 118

Gardiner & Company ... 124
General Electric Co. ... 1

Hallicrafters Company, The ... 4, 5
Harrison Radio Corporation ... 107
Harvey Radio Co., Inc. ... 105
Harvey-Wells Electronics, Inc. ... 94
Henry Radio Stores ... 109
Hy-Lite Studios ... 126

Instructograph Co., The ... 126

Jensen Mfg. Company ... 83
Johnson Co., E. F. ... 129
Johnson Sales, Art A. ... 114
Jones Electronics Company, M. C. ... 135

Knights Co., James ... 120

Leeds Radio Company ... 96, 97

MacMillan Company, The ... 99
McGraw-Hill Book Company ... 120
M. & H. Sporting Goods Co. ... 137
Maguire Industries, Inc. ... 91
Mallory & Co., Inc., P. R. ... 76
Mass. Radio and Telegraph School ... 126
Melville Radio Institute ... 122
Merit Coil & Transformer Corp. ... 93
Millen Mfg. Co., Inc., James ... 142
Munger Co., Rex L. ... 98

National Company ... 73, 80, 88, 118, Cov. III
Newark Electric Company ... 101

Ohmite Mfg. Co. ... 7
Onan & Sons, D. W. ... 128

P & H Sales Co. ... 133
Par-Metal Products Co. ... 114
Peerless Radio Distrib., Inc. ... 110
Petersen Radio Co. ... 75
Premax Products Co. ... 131
Port Arthur College ... 132

RCA Institutes ... 132
Radio Corporation of America ... Cov. IV
Radio Electric Service Co. of Penna., Inc. ... 104
Radio Manufacturing Engineers ... 2
Radio Parts Distributing Co. ... 135
Radio Products Sales, Inc. ... 112
Radio Shack Corp., The ... 86, 87
Radio Transceiver Laboratories ... 130
Richardson Laboratories, Ken ... 135

Sangamo Electric Co. ... 79
Shure Brothers, Inc. ... 90
Signal Electric Mfg. Co. ... 132
Silver Co., McMurdo ... 100
Sonar Radio Corp. ... 143
Sperti, Incorporated ... 129
Standard Electrical Prod. Co. ... 131
Standard Radio & Elec. Prod. Co. ... 119
Steinbergs ... 106
Sun Radio of Washington ... 121

Terminal Radio Corp. ... 113
Turner Co., The ... 127

U H F Resonator Co. ... 124
United Transformer Corp. ... Cov. II

Valparaiso Technical Inst. ... 137
Valpey Crystal Corp. ... 133
Vibroplex Co., Inc., The ... 114

Webster-Chicago Corp. ... 89
Western Radio Commun. Inst. ... 136
Wind Turbine Company ... 134
Winters Radio Laboratory ... 133
Workshop Associates ... 135
World Radio Laboratories ... 138

Zenith Radio Corp. ... 95

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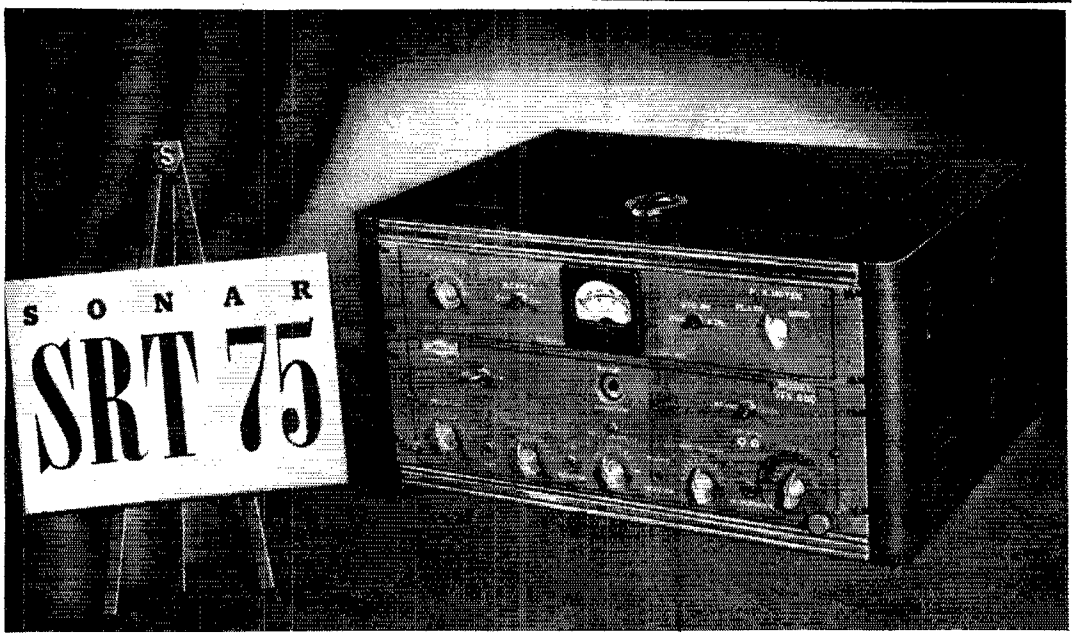

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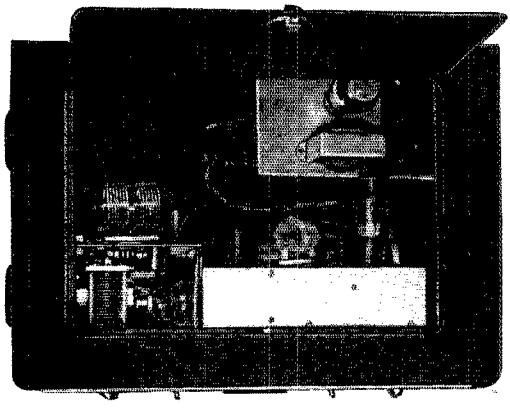

Capable of delivering 50 WATTS OUTPUT (ccs rating) 75 WATTS INPUT to any type antenna or load impedance, the SRT 75 employs the famous VFX 680 NBFM-CW-VFO-XTAL exciter (incorporating the exclusive SONAR phase modulated circuit for eliminating BCI). The VFX 680 is link coupled to SONAR's new AMP 50 amplifier, which is powered by the PS 50.

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The PS 50 supplies the necessary voltages (plate and filament) for maximum ccs rating of the 2E22.

All these attractive units are assembled in a handsome, crackle-finished, rack-size, chrome-trimmed, table cabinet. Plug in the power cord, a key or mike, an antenna and tune for many pleasant QSO's and DX.

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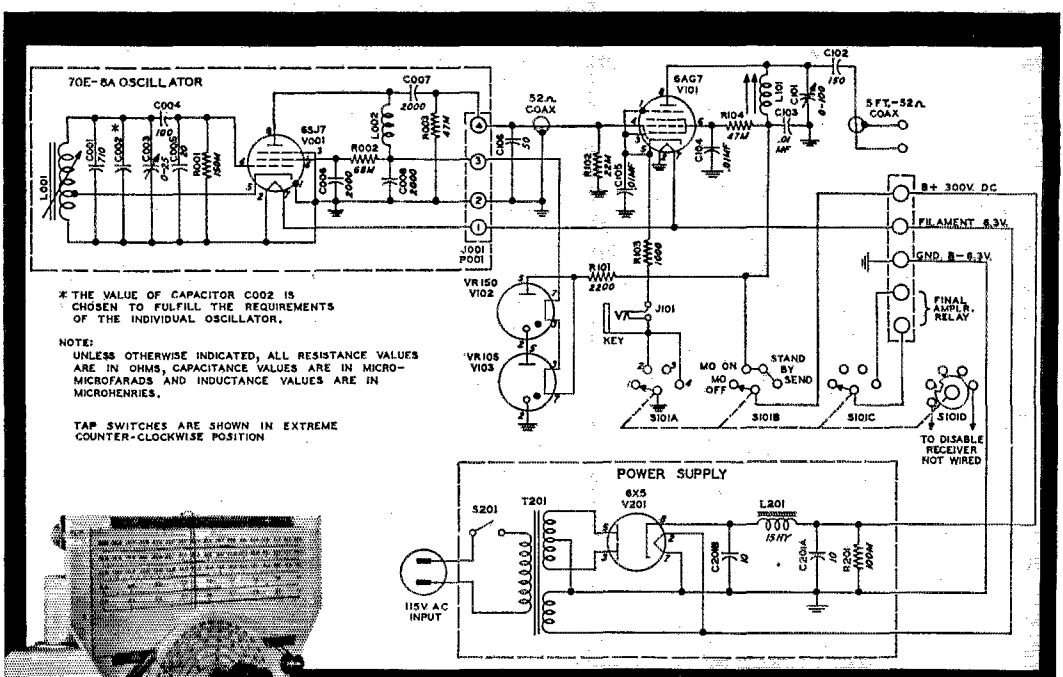

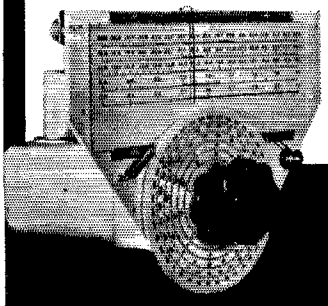

Collins 70E-8A

Tops for transmitter frequency control

The permeability tuned 70E-8A is a frequency generating device around which you can build an excellent r-f exciter with such features as direct dial calibration, excellent keying characteristics, even on 10 meters, practically no frequency drift, and stability that is usually associated with a crystal controlled exciter.

Each 70E-8A is individually calibrated to factory standards which specify that every 100 kilocycle check point from 3.5 to 4 megacycles must be set to within 500 cycles of the dial reading. To assure operation free from humidity effects this oscillator is baked until thoroughly dry, then completely sealed and moisture proofed. As an added protection against leakage a silica-gel capsule is factory inserted.

In order to achieve excellent keying characteristics in a r-f exciter it is desirable for the oscillator to run continuously, and for the keying to take place in a following stage. Due to the fact that the 70E-8A is completely shielded, it is possible to accomplish this without undue back wave interference, even when working break-in on the operating frequency.

The schematic shown here is suggested for a suitable exciter. The output of this exciter is on 80 meters, necessitating the use of the multiplier stages in your present rig to tune the higher frequency bands. The output will be approximately 80 volts across 40,000 ohms—ample to drive a 6L6 oscillator stage or an 807 buffer stage. Write for 70E-8A descriptive bulletin.

Net domestic cash price, complete with slide-rule dial, tube and instruction book, exclusive of state and local taxes, $40.00 F.O.B. Cedar Rapids, Iowa.

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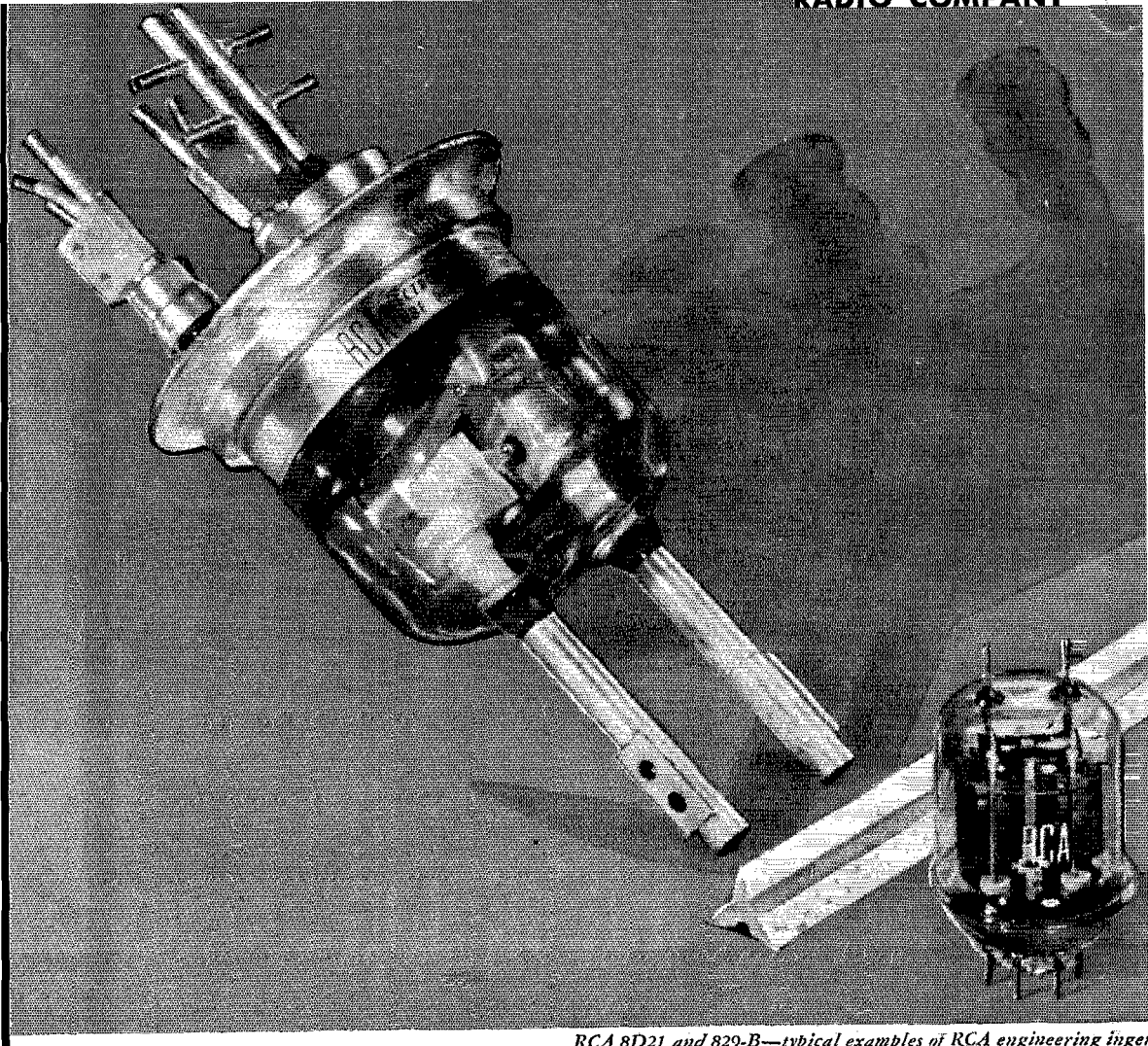

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