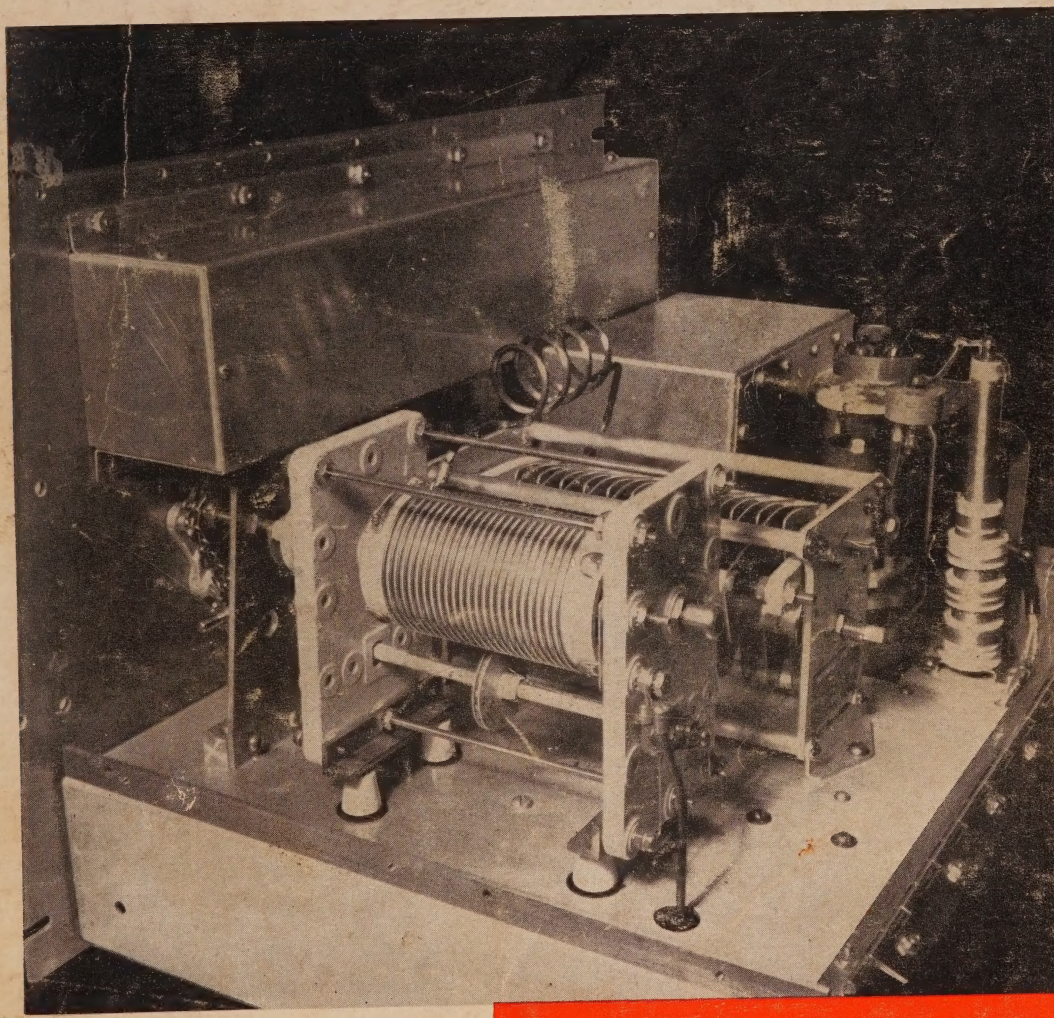
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JULY
1955
35c

CQ RADIO AMATEURS' JOURNAL



In This Issue =

GROUNDED GRID LINEAR

HEATHKIT DX-100 REPORT

813 DELUXE FINAL

SSB ease of operation exclusive with Collins 75A-4



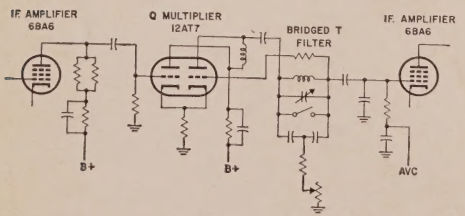
Advanced design features of Collins new 75A-4 receiver provide the greatest ease in SSB, AM, or CW operation ever offered to the amateur. Proven circuitry of the earlier 75A receivers such as crystal controlled first injection oscillator, hermetically sealed VFO and mechanically filtered IF selectivity are retained.

PASSBAND TUNING

The receiver BFO is mechanically ganged and tracked with the main tuning dial. Once a SSSC signal is tuned in, it can be moved around in the passband to tune out interfering signals, and it also allows selection of either sideband for SSB operation. In CW reception the desired signal can be moved around in the passband without changing the received beat note, and at the same time, interfering signals can be pushed off the edge of the steep sided mechanically filtered passband.

REJECTION TUNING

A combination "Q" multiplier and bridged-T rejection notch filter, are used. The filter has a deep, narrow notch and is effective anywhere in the passband. Conventional crystal filters become inoperative at frequencies several hundred cycles on either side of the resonant frequency. The "T" filter does not distort the IF passband seriously as does the crystal filter. Heterodynes are effectively eliminated with little loss of intelligibility.



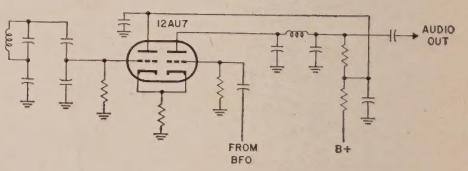
Rejection Tuning Circuits

AVC

A fast attack, slow release AVC system is employed in the 75A-4. It will respond to the first few cycles of a sideband transmission and does not require the presence of a carrier for operation. Fast and slow release times are selectable by means of a panel mounted control. The fast is used normally for AM reception. The slow is used during sideband and CW reception and prevents the receiver from opening up during words and characters.

SEPARATE AM AND SSB DETECTORS

Separate detectors are used for double or single sideband signals. The single sideband detector is a mixer type, which generates much less distortion than a conventional diode detector on a SSSC signal. A diode detector is used for conventional double sideband signals.

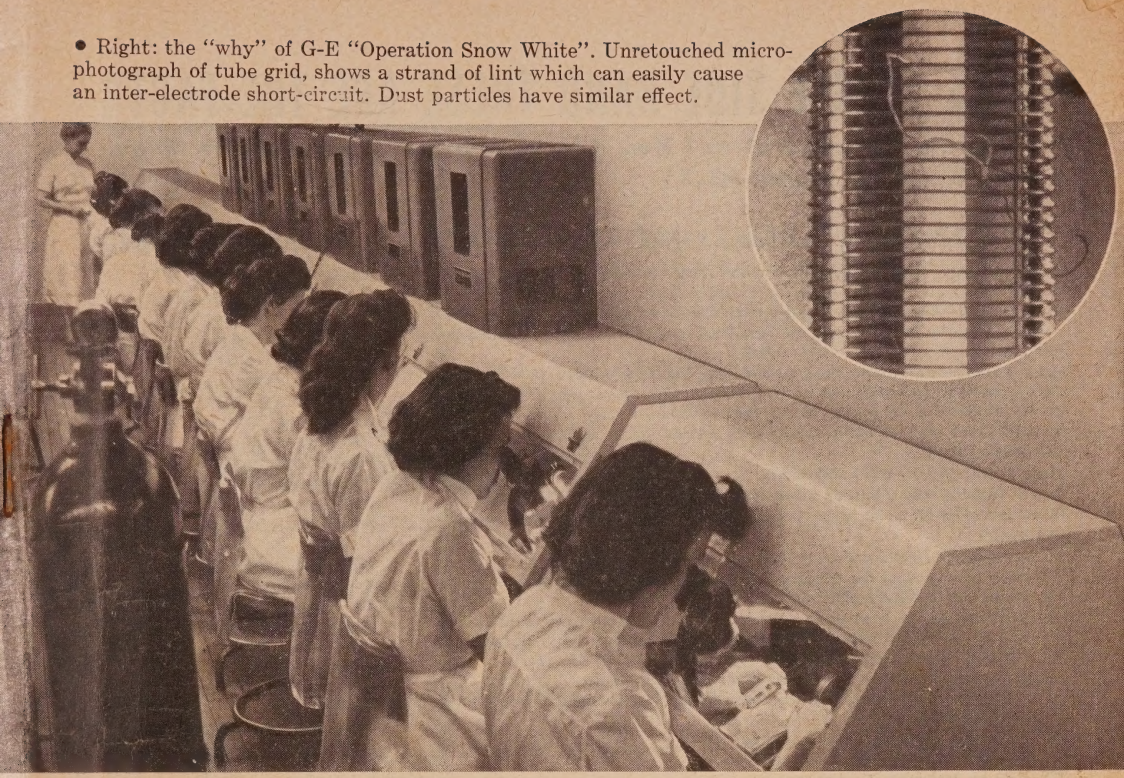


AM and SSB Dectector Circuits

See your nearest Collins distributor

COLLINS

• Right: the "why" of G-E "Operation Snow White". Unretouched micro-photograph of tube grid, shows a strand of lint which can easily cause an inter-electrode short-circuit. Dust particles have similar effect.



• Glass-paneled hoods for General Electric 5-Star Tube assembly and microscope inspection, assure working conditions of optimum cleanliness. Employees wear rubber finger cots, to avoid contaminating tube parts with dirt or moisture. The entire "Snow White" area is air-conditioned and pressurized, and all garments are made of lint-free Nylon and Dacron.

G-E "Operation Snow White" further increases 5-Star Tube high reliability!

Inoperatives among 5-Star Tubes have been cut two-thirds by measures G.E. has taken to provide lint-free, dust-free assembly and inspection. 100% 5-Star factory tests prove this gain in *built-in* tube dependability.

Most tube inoperatives are the result of intermittent "shorts" from lint and dust. G-E "Operation Snow White", by means of pressurized, filtered, and dehumidified air, plus numerous other steps to accent working cleanliness, cuts down on short-circuits at the source. Result: 5-Star Tubes are the most trustworthy types that you can install!

Use them in civil-defense work, where dependable communications are a "must"! Specially designed, built, and tested, they're your foremost protection against rig and receiver failures.

Your G-E tube distributor stocks 5-Star high-reliability tubes. See him for full information! *Tube Department, General Electric Co., Schenectady 5, N. Y.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

166-184

ABOUT SINGLE SIDE BAND THESE ARE THE FACTS

"talk power" equivalent to 1 Kw. AM **in the new Hallicrafters Linear Power Amplifier Model HT-31**

• MORE COMPLETE • MORE RUGGED

More complete—Engineered with a wider range of antenna impedance—50 to 600 ohms.

More rugged—Components surpass even the most rigid commercial specifications. Heavier transformers for less heat, and an exclusive Hallicrafters feature, a blower to further reduce heat!

More reliable—on-the-air tests assure you of dependable performance

Here in one compact package is a full band switch power amplifier covering 80-40-20-15-11 & 10 meters that's easy to drive, highly stable, extremely versatile, and engineered to Hallicrafters world-famous quality.

SPECIFICATIONS

Plate Power Input—500 - 510 watts.

Power Output—330 P.E.P. on 80 meters with slightly less on 10 meters.

Drive Power for 80 meter input 10 watts P.E.P. maximum on lowest frequency.

FEATURES

1. Continuous frequency coverage from 3.4 Mc. to 30 Mc.
2. Pi-network output for efficient harmonic and T.V.I. suppression.
3. Major T.V.I. suppression built in.
4. Does not require an antenna tuner as will feed loads from 50 to 600 ohms.
5. Full power capabilities available on CW because high stable, time proven circuitry does not require trick overload protective devices.
6. No special selection of R.F. amplifier tubes required.
7. Total tube replacement cost including high voltage rectifiers, amateur net only $14.20.
8. Full metering of all important circuits.
9. Power input in watts shown on meter.
10. May be mounted in relay rack.

CIRCUIT DETAILS

This power amplifier employs two 811-A zero bias triodes in parallel. The input system is designed to be fed from a 50 - 70 ohm unbalanced line and requires a maximum of 10 watts drive on 80 meters. The grid tank circuit is balanced to provide all band neutralization. The output tank circuit is a continuously variable pi-network which provides a high degree of harmonic suppression.

• MORE RELIABLE

TUBES
2—811-A Triode amplifiers
2—866-A Rectifiers

POWER OUTPUT
P.E.P.—330 watts
CW—275 watts

PLATE POWER INPUT
P.E.P.—500
CW—450

FRONT CONTROLS
Grid Range
Grid Tuning
Meter—Plate/Grid/Power Input Watts
Plate Voltage On/Off
Power On/Off
PA Tuning
Antenna Loading—Fine
Antenna Loading—Coarse

Physical details:
Grey black steel cabinet and brushed chrome control knobs. Piano hinge top. 10¾" x 19 relay rack panel—over all size 20" wide x 12¼" high x 17¼" deep—shipping weight 100 lbs. approx.

POWER
105/125 V—50/60 cycle AC

hallicrafters
Chicago 24, Illinois

Engineered to performance, not to price!

Model HT-31 Linear
Power Amplifier $395.00



July, 1955
Vol. 11, No. 7

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Cover: W6VZB's hi-Q non-coilswitching 813 final graces this month's cover. For more information on this well-constructed TVI-proof rig, turn to page 24.

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POSTMASTER: SEND FORM 3579 to CQ.
67 WEST 44th ST., NEW YORK 36, N.Y.

New HEATHKIT DX-100 PHONE AND CW TRANSMITTER KIT



MODEL DX-100

Shpg. Wt. 120 lbs.

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, ... 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_P Final I_G, I_P, and E_P, and Modulator I_P. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20⅞" W x 13¾" H x 16" D.

Heathkit GRID DIP METER KIT



MODEL GD-1B

$19.50 Ship. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1¼ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at $3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA COUPLER KIT



MODEL AC-1

$14.50 Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

$14.50 Shpg. Wt. 2 lbs.

Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μa. meter employed. Covers the range from 0 to to 600 ohms. Cabinet is only 7" long, 2½" wide, and 3¼" deep. An instrument of many uses for the amateur.

HEATH COMPANY
A SUBSIDIARY OF DAYSTROM, INC.
BENTON HARBOR 12, MICHIGAN

New Heathkit VFO KIT



MODEL VF-1

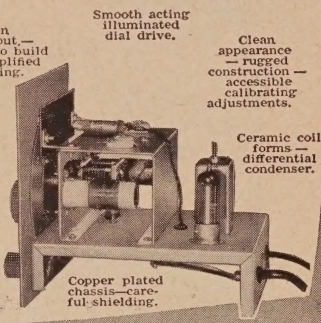
$19.50

Ship. Wt. 7 lbs.

- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



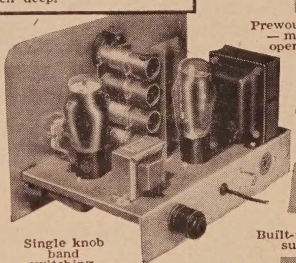
MODEL AT-1

$29.50

Ship. Wt. 16 lbs.

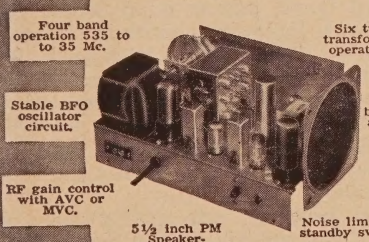
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G ..... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.



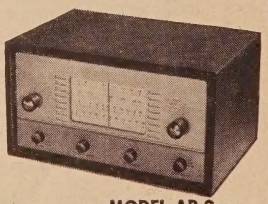
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range..... 535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT .....Rectifier
105-125 volts A. C. 50-60 cycles, 45 watts.



A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY

BENTON HARBOR 12, MICHIGAN

Designed for



Application



The No. 90801

EXCITER-TRANSMITTER

The No. 90801 Exciter-Transmitter is of the most modern design including features and shielding for TVI reduction, band-switching for the 4-7-14-21 and 28 megacycle bands, circuit metering. Conservatively rated for use either as a transmitter or exciter. 5763 oscillator-buffer-multiplier and 6146 power amplifier. 90 watts input for CW. Can be keyed in the oscillator and/or amplifier or by means of keyed external V.F.O. such as the 90711. 67 watts input phone. Rack mounted 3½" panel height.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS





Feenix, Ariz.

Deer Hon. Ed:

Boy am I turbylent. In fackly, you could saying I are just plane mad at your Hon. Magazine. That are reel dirty trick, printing artickle like that. I are thinking that you having reel 1/c technickel magazine, but now the shoe are on the other foot. Aren't you even a little bit ashamed to putting stuff like that in magazine. Reely, Hon. Ed., I so mad I thinking of going out and getting subscription to your Hon. Rag and then canceling it. If you had been here when . . . if you had seen the mess . . . if you had only herd what . . . but I getting aheds of myself.

Cupple weeks ago I desiding I wanted reel slicky rotary beem. I having plenty vee-beems and rombics but wanting sumthing I can pointing. Inasmuchly as knowing what I wanting to using for antenna, only reel problum are what I can using for rotating the beem. Are looking thru sum old copies of your magazine—and that are where are making 1/c mistake, I can seeing—and I running across artickle on how to converting 24 volt d-c prop pitch motor to red-hots beem rotator.

On acct. I knowing amchoor friend who having likesame prop pitch motor, I rushing to his house and trading him out of same. It are reel nice peechy big one so not thinking having any trubble making it turn Hon. Forty Meter Beem.

Getting it home, putting it on bench, and getting to work. Following artickle in magazine word for word. Now, looking back on it, are coming to conkclusion that in middle of artickle it seeming a little confoosing, but at time this not bothering old geenyus Scratchi. I compleeting job, plugging motor into a-c line, and shaft are humming around like sumbuddies business.

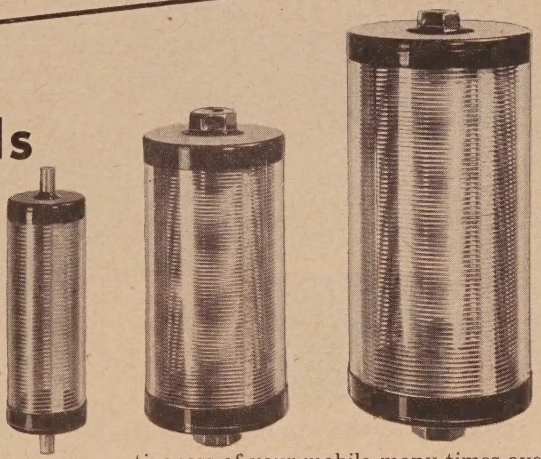
Next day, brite and erly, getting going on rest of job. Are alreddy having tower up in air. It mounted on Hon. Chicken Shack, back neer barn. Are nice 40 foots wood tower, bolted to walls of chicken shack. That not coming down, by gollies!

Climeing to top of tower and pulling prop pitch motor up by rope, then fastening it in

BASSETT

Vacuum Antenna Coils

(PATENT PENDING)

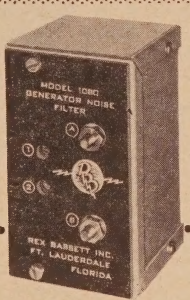


FOR MOBILE and FIXED ANTENNAS

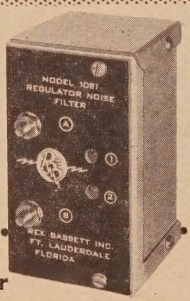
Extremely high "Q" super efficient air-wound loading coils housed in rugged transparent cases from which the air has been removed and replaced with pure helium. Impervious to rain, dust, dirt, and corrosion. Will raise antenna effectiveness of your mobile many times over the usual "run of the mill" low "Q" loading inductor. Engineered for use with your present 60" top rod and 36" bottom rod. Standard ⅜-24 threads. No pruning necessary regardless of antenna location on vehicle. Complete instructions supplied.

Models for the 75, 40, 20, and 15 meter bands and for Civil Air Patrol

Mobile Noise Filters . . . .



Generator Noise Filter Completely shielded generator filter designed to reduce the "whine" and hash of generator commutation. Model 1080 for 10-11-15-20-40. Model 1080A for 2-6-10-11.



Regulator Noise Filter Completely shielded companion unit designed to reduce contact chatter of regulator so difficult to eliminate in the past. Model 1081 for 10-11-15-20-40. Model 1081A for 2-6-10-11.

A postcard will bring you complete information at once

REX BASSETT, INC.

BASSETT BUILDING

FORT LAUDERDALE, FLORIDA

the NEW LOOK in BUD PRODUCTS and new sizes, too!

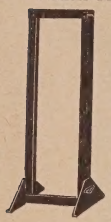
If you take pride in the appearance of your rig, get acquainted with the new look in Bud Products and the new sizes of some of our items.



SLOPING PANEL CABINETS

Now Bud offers 4 new sizes in our Sloping Panel Cabinets. With 9 sizes now in this line, there is sure to be a size to fit your need. In addition, there are quality bonus like the exclusive Bud hinged top providing easy access to components . . . and there's more—you can have light grey hammered finish at no extra cost.

TELEPHONE TYPE RELAY RACKS



Four sizes of these sturdy racks are now available for your convenience instead of two sizes previously offered. Now all standard relay racks may be obtained in light grey hammered finish without extra charge.

The following Bud products are also available in light grey hammered finish:

DESK TYPE RELAY RACKS
METER CASES (Steel and Aluminum)
METAL UTILITY CABINETS (Steel and Aluminum)
CARRYING CASES (Steel and Aluminum)

See these and other fine Bud products at your distributors. If your local distributor does not have these items in stock, send us his name and we'll see you are supplied immediately.

BUD THE MARK OF PERFECTION

BUD RADIO, Inc.

Dept. C

2118 East 55th St. Cleveland 3, Ohio

place. Nextly are doing same with 40 meter rotary antenna boom. Rest of morning are spending putting elements on boom. Elements are some sixty odds feet long, and that, Hon. Ed., are reel long elements. In fackly, rotary antenna are bigger than chicken coop. Wowiee!!

After lunch not waiting to fixing a-c control wires but deciding to trying out rotayshun by plugging into chicken coop a-c wiring sistem. So, stringing wire from prop pitch motor down into chicken shack, putting a-c plug on it, and plugging it into a-c circuit.

Going outsides and looking up. Sure enuf, beem are slowly starting to rotate. Going arounds wunce, twice, and seeming to pick up speed. As I watching beem are going faster, then faster, and finally I desiding I better shutting it off. Suddenly hole chicken shack starting to shudder and prop pitch motor sounding like kitchen disposer with spoon being ground up inside. I dashing for chicken coop door, but just before I getting there hole chicken shack making tremendus noise like wood braking and chicken shack going up in the air.

Hon. Ed., what a site!! As chicken coop slowly going up in air the Hon. Chickens coming to door and windows and bailing out and fluttering down to ground. And chickens making noyses the like of which you never heering before. All this while rotary beem acting like hellycopper and chicken coop going higher and higher.

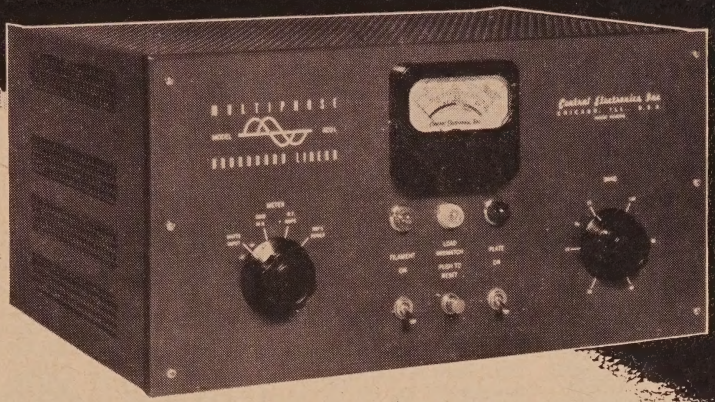
When chicken coop getting abouts 25 feets high, the a-c line are only thing holding it down to ground. What a mess. Prop pitch motor turning over eleventeen thousand RPM's and sounding like jet plane, chickens all over the place, and a-c line slowly stretching, stretching . . . snap! When a-c power going off, coop and beem acting like drunken seegull, weaving and waving, not loosing much altitude, and hedding for parts far away. Last I see of it are glint of sun in chicken coop windows.

So that are what happening when you printing artickle that are all rong. I thinking I can sueing you for ruining chicken coop and slicky new rotary beem. Gracious to Goodness, letting me reeding you what your Hon. Magazine are saying. Looking at bottom of page 37, it saying, and I quoting—conneck the red wire to lug 4 and the yellow—now I turning the page, and rite on top of page 40 it saying . . . . . (excoosing one minutes, Hon. Ed). Bottom of page 37, then next page are page 40. Hon. Ed., can't you even numbering pages rite in Hon. Magazine? Oh oh. Sacremento Boulevard!! Ha ha, Hon. Ed., you knowing what happening? Two pages getting stuck together.

Well I'll be. Of all the. . . . Hon. Ed., you knowing where I can getting same issue with pages 38 and 39 not stuck together. If can ever finding beem out on desert will be needing them to fixing prop pitch motor.

Respectively yours,
Hashafisti Scratchi

NOW a BROAD-BAND* LINEAR

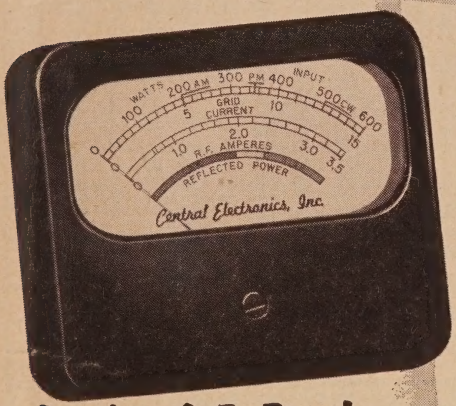


MULTIPHASE
600 L
NO TUNING CONTROLS

SINGLE KNOB
BAND-SWITCHING
10-160

FOR USE ON
SSB, AM, PM & CW

WIRED, WITH TUBES AND BUILT-IN POWER SUPPLY **$349.50**



Another C.E. First!

METER FEATURES NEVER BEFORE FOUND IN A TRANSMITTER

- Reads power input directly in watts
- Reads grid current
- Instantly reads output in RF amperes — no lagging thermocouple
- Indicates reflected power caused by mismatched load
- Calibrated input levels for AM, PM and CW.

. . . and switch the meter to any position while transmitting!

*PATENT PENDING

WRITE FOR LITERATURE

a new concept in linears

CENTRAL ELECTRONICS takes pride in presenting a product of intensive research — the new Multiphase 600L Broadband* Linear. "It is destined to change the entire concept of RF amplifier design in the military, commercial and amateur fields." There are no tuning controls, servos or moving parts other than bandswitch.

- Single 813 in Class AB_2.
- New band-pass couplers provide high linear efficiency: 60 to 65%.
- Designed for 50 — 70 ohm co-axial input and output.
- Easy to drive — Approx. 2 watts effective or 4 watts peak envelope drive power required for 500 watts DC input.
- Built-in power supply — bias and screen regulation, 45 mfd. oil filled paper output capacitor. Excellent static and dynamic regulation.
- Extremely low intermodulation distortion.
- Automatic relay protects 813 and RF couplers.
- Excellent stability — complete freedom from parasitics.
- Effectively TVI suppressed — RF compartments thoroughly shielded and Hypassed.
- Choice of grey table model, grey or black wrinkle finish rack model.
- Table model cabinet size — 17⅝" W, 8¾"H, 13"D.

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

Watch for early announcement of other new CENTRAL ELECTRONICS equipment.

INDIVIDUAL CRYSTALS!

Guaranteed to oscillate!
Your choice of frequencies!
Same day shipment!

ALL CRYSTALS TESTED FOR ACTIVITY!
1-DAY SERVICE FOR EVERYTHING IN STOCK!

NOVICE BAND — FT-243 FUNDAMENTAL FREQUENCIES

99c

Lots of 10 or more. Ea.
Individually. Ea. $1.25

YOUR CHOICE OF FREQUENCIES!

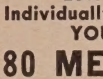
80 METERS — 3701, 3702, 3703 through 3748 in steps of 1 KC.

40 METERS — 7176, 7177, 7178 through 7198 in steps of 1 KC.

DOUBLING TO 40 METERS: 3588, 3589, 3590 through 3599 in steps of 1 KC.

SINGLE SIDE BAND—FT-241-A

Low Frequency Crystals 79c



Lots of 10 or more. Each 89c
Lots of 5 or more. Each 89c
Individually. Each 99c

400	442	446	450	453	456	459	463	466	470	474	477
440	444	447	451	454	457	461	464	468	472	475	479
441	445	448	452	455	458	462	465	469	473	476	480

MISCELLANEOUS & SHIP BAND FREQUENCIES

81.95 KC. Octal tube type (Used in SCR-584 & SPM-7) $3.99
200 KC. FT-241 CR2/U 1.99
200 KC. Type DC-15 in octal tube base type holder 1.99
327.8 KC. No. D-168342. (Used in TS-102/AP) 9.95
500 KC. FT-241 ..... 1.99
1000 KC. Type DC-9, in octal tube base type holder 3.45
2009 KC. DC-34 ..... 2.99
2110 KC. DC-34 ..... 2.99
2126 KC. DC-34 ..... 2.99
2142 KC. DC-34 ..... 2.99
2166 KC. DC-34 ..... 2.99
2174 KC. DC-34 ..... 2.99
2182 KC. DC-34 ..... 2.99
2182 KC. FT-243 ..... 2.99
2206 KC. DC-34 ..... 2.99
2406 KC. FT-243 & DC-34 ..... 2.99
2500 KC. FT-243 ..... 1.99
2559 KC. DC-34 ..... 2.99
2567 KC. FT-243 & DC-34 ..... 2.99
2629 KC. DC-34 ..... 2.99
2632 KC. FT-243 ..... 2.99
2637 KC. DC-34 ..... 2.99
2657 KC. FT-243 ..... 2.99
2658 KC. DC-34 ..... 2.99
2658 KC. FT-243 ..... 2.99
2670 KC. FT-243 ..... 2.99
2647 KC. FT-243 ..... 2.99
2670 KC. DC-34 ..... 2.99
2738 KC. Type 4-C. 2.99
2738 KC. FT-243 ..... 2.99
2738 KC. MC-7 ..... 2.99
2891 KC. DC-34 ..... 2.99
2907 KC. DC-34 ..... 2.99
2951 KC. DC-34 ..... 2.99
2973 KC. DC-34 ..... 2.99
2977 KC. DC-34 ..... 2.99
2983 KC. DC-34 ..... 2.99
3000 KC. FT-243 ..... 1.99
3021 KC. DC-34 ..... 2.99
3023 KC. DC-34 ..... 2.99
3043 KC. DC-34 ..... 2.99
3053 KC. DC-34 ..... 2.99
3055 KC. DC-34 ..... 2.99
3088 KC. FT-243 ..... 2.99
3093 KC. DC-34 ..... 2.99
3093 KC. FT-243 ..... 2.99
3098 KC. FT-243 ..... 2.99
3103 KC. FT-243 ..... 2.99
3123 KC. DC-34 ..... 2.99
3123 KC. DC-34 ..... 2.99
3188 KC. FT-243 ..... 2.99
3193 KC. DC-34 ..... 2.99
3193 KC. FT-243 ..... 2.99
3198 KC. FT-243 ..... 2.99
3203 KC. FT-243 ..... 2.99
5000 KC. FT-243 ..... 1.99
10.000 KC. Type SR-5 Billey, in CR-1 holder 1.99

NUMBERS LISTED ARE FUNDAMENTAL FREQUENCIES IN KILOCYCLES



FT-243

Lots of 10 or more. Ea. .....
Lots of 5 or more. Ea... 79c
Individually. Ea. 99c

69c

1110	2520	2910	3320	4695	5825	6375	7125	7533 3	7780	8025	8270	8510
1129	2525	2915	3340	4710	5840	6400	7140	7540	7783 3	8030	8273 3	8516 7
1150	2530	2920	3410	4735	5850	6405	7150	7541 7	7790	8033 3	8275	8520
1195	2535	2925	3420	4780	5852 5	6406 6	7160	7550	7791 7	8040	8280	8525
1525	2545	2930	3455	4785	5860	6425	7173 3	7558 3	7800	8041 7	8283 3	8530
1915	2550	2935	3465	4815	5873 5	6440	7175	7560	7806 6	8050	8290	8533 3
1930	2557	2940	3510	4820 -	5875	6450	7200	7566 7	7808 3	8058 3	8291 7	8540
1940	2560	2945	3525	4840	5880	6473 3	7206 6	7570	7810	8060	8300	8541 7
1950	2565	2950	3640	4845	5892 5	6475	7225	7573 3	7816 7	8066 7	8306 6	8550
1965	2570	2955	3655	4852 5	5900	6500	7240	7575	7820	8070	8308 3	8558 3
2015	2575	2960	3680	4880	5906 7	6506 6	7250	7580	7825	8073 3	8310	8560
2017	2580	2965	3700	4900	5907 5	6525	7273 3	7583 3	7830	8075	8316 7	8566 7
2020	2585	2975	3760	4930	5925	6540	7275	7590	7833 3	8080	8320	8570
2025	2590	2980	3800	4950	5940	6550	7300	7591 7	7840	8083 3	8325	8573 3
2035	2595	2985	3885	4980	5950	6573 3	7306 6	7600	7841 7	8090	8330	8575
2040	2650	2990	3940	4995	5955	6575	7308 3	7606 6	7850	8091 7	8333 3	8580
2055	2655	2995	3955	5030	5973 3	6600	7316 7	7608 3	7858 3	8100	8340	8583 3
2060	2660	3005	3980	5035	5975	6606 6	7325	7610	7860	8106 6	8341 7	8590
2065	2665	3010	3990	5090	5995	6625	7333 3	7616 7	7866 7	8108 3	8350	8591 7
2090	2680	3015	3995	5127 5	6000	6640	7340	7620	7870	8110	8358 3	8600
2105	2685	3020	4035	5165	6006 6	6650	7341 7	7625	7873 3	8116 7	8360	8606 6
2125	2690	3025	4045	5180	6025	6673 3	7350	7630	7875	8120	8366 7	8608 3
2130	2695	3030	4080	5205	6040	6675	7358 3	7640	7880	8125	8370	8610
2135	2705	3035	4095	5235	6042	6700	7366 7	7641 7	7883 3	8130	8375	8616 7
2140	2710	3040	4110	5245	6050	6706 6	7633 3	7650	7890	8133 3	8380	8620
2195	2715	3045	4135	5285	6073 3	6725	7373 3	7658 3	7891 7	8140	8383 3	8625
2300	2720	3050	4165	5295	6075	6740	7375	7660	7900	8141 7	8390	8630
2305	2750	3055	4175	5300	6100	6750	7383 3	7666 7	7906 6	8150	8391 7	8633 3
2320	2755	3060	4190	5305	6106 6	6773 3	7391 7	7670	7908 3	8158 3	8400	8640
2350	2760	3065	4215	5327 5	6125	6775	7400	7673 3	7910	8160	8406 6	8641 7
2355	2765	3070	4220	5335	6140	6800	7406 6	7675	7916 7	8166 7	8408 3	8650
2360	2770	3075	4255	5385	6142	6806 6	7406 6	7680	7920	8166 7	8410	8658 3
2365	2775	3095	4280	5397 5	6150	6815	7408 3	7683 3	7925	8170	8416 7	8660
2370	2780	3110	4295	5435	6173 3	6825	7416 7	7690	7930	8173 3	8420	8666 7
2375	2785	3130	4300	5437 5	6175	6840	7425	7691 7	7933 3	8175	8425	8675
2390	2790	3135	4330	5485	6185	6850	7433 3	7700	7940	8180	8430	8673 3
2415	2795	3140	4340	5500	6200	6873 3	7440	7706 6	7941 7	8183 3	8433 3	8675
2430	2815	3145	4395	5545	6206 6	6875	7441 7	7708 3	7950	8190	8440	8680
2435	2825	3150	4397 5	5582 5	6225	6900	7450	7710	7958 3	8191 7	8441 7	8683 3
2440	2830	3155	4445	5587 5	6235	6906 6	7458 3	7716 7	7960	8200	8450	8690
2442	2835	3160	4450	5645	6240	6925	7466 7	7720	7966 7	8206 6	8458 3	8691 7
2450	2840	3165	4490	5660	6250	6940	7473 3	7725	7970	8208 3	8460	8700
2455	2845	3170	4495	5675	6273 3	6950	7475	7730	7973 3	8210	8466 7	8706 6
2460	2850	3175	4535	5687 5	6273 5	6973 3	7483 3	7733 3	7975	8216 7	8470	8708 3
2465	2855	3202	4540	5700	6275	6975	7491 7	7740	7980	8220	8473 3	8710
2470	2860	3205	4580	5706 7	6300	7000	7500	7741 7	7983 3	8225	8475	8716 7
2475	2865	3210	4610	5725	6306 6	7006 6	7506 6	7750	7990	8233 3	8480	8720
2480	2870	3220	4620	5730	6315	7025	7508 3	7758 3	7991 7	8240	8483 3	8725
2485	2875	3225	4635	5740	6325	7040	7510	7760	8000	8241 7	8490	8730
2490	2880	3230	4680	5750	6335	7050	7516 7	7766 7	8006 6	8250	8491 7	8733 3
2495	2885	3235	5782 5	5760	6340	7073 3	7520	7770	8010	8258 3	8500	8740
2505	2890	3240	5800	5773 3	6350	7075	7525	7773 3	8016 7	8260	8506 6	8741 7
2510	2895	3290	5806 7	5775	6362	7100	7530	7775	8020	8266 7	8508 3	8750
2515	2905	3310	5820	5780	6373 3	7106 6						

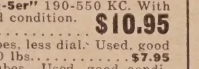
ZENITH MODEL DC-18-A 1,000 KC CRYSTAL

Built-in 12 V. automatic thermostatic controlled heating unit. 8-pin octal base. Ea. (Shipping wt. ½ lb.) **$5.95**

TERMS: All items subject to prior sale and change of price without notice. Minimum order: $2.50. ALL crystal orders MUST be accompanied by check, cash or M.O. WITH PAYMENT IN FULL. NO C.O.D. IN ORDERING INDIVIDUAL CRYSTALS, INCLUDE APPROX. 5c PER CRYSTAL FOR POSTAGE. Also indicate second choice frequencies wherever substitution may be made. Calif. buyers add sales tax.

U. S. CRYSTALS JUNE MISCELLANEOUS SPECIALS

RK-65 IDEAL FOR SINGLE SIDE BAND



500 WATTS RAYTHEON TETRODE TUBE
Guaranteed! Brand New!

Ideal for use in grounded grid circuit. Requires only 6 W. grid driving power. Operates similar to 4-250A. (See Radio Ham Book for complete details.) Guaranteed. Brand new. Original box. Shipping wt. 3 lbs. **$9.95**

SENSATIONAL PACKAGE OFFER OF 3 RECEIVERS COMPLETE WITH TUBES & DYNAMOTORS!

75 MC RECEIVER	COMMAND RECEIVER	ARC-5 RECEIVER	ALL THREE RECEIVERS
Used, clean. Ship. wt. 14 lbs. Ea. $4.95	6-9 MC. With tubes, used, good cond. Wt. 10 lbs. Ea. $4.95	3-6 MC. Less dial plate. Ship. wt. 10 lbs. Used, clean. Ea. $4.95	(Wt 40 lbs.) ONLY $9.95

TUBES—NEW! GUARANTEED

Eimac 35TG Ea. $2.95 | 5CP1 $2.95 | ANY 2 TUBES
VT-127A ..... 2.95 | 78P7 2.95 | **$5.00**

COMMAND EQUIPMENT

THE FAMOUS "Q-5er" 190-550 KC. With tubes. Used, good condition. Wt. 10 lbs. **$10.95**

3-6 MC. With tubes, less dial. Used, good condition. Wt. 10 lbs. **$7.95**

6-9 MC. With tubes. Used, good condition. A hot buy! Wt. 10 lbs. **$4.95**

BC-456 MODULATOR. With tubes, good condition. Reduced! Wt. 20 lbs. **$2.45**

CONDENSER SPECIALS!

2 MFD. 6,000 V. CONDENSER. Used. Ea. Ship. wt. 17 lbs. $6.95
2 MFD. 6,000 V. CONDENSER. Oil filled. BRAND NEW. Each. Ship. wt. 7 lbs. $5.95

POWER SUPPLY COMBINATION SPECIAL

1 EA. POWER TRANSFORMER: Input: 115 VAC 60 cycles. 525 Kva. Output: 1120-0-1120 V. 500 MA. Manufactured by American Trans. Co. Ship. Wt. 60 lbs. BRAND NEW—Ea. **$14.95**

1 EA. SWINGING CHOKE: 5—25 henry. 350 MA. Brand New. Ship. Wt. 19 lbs. Ea. **$8.95**

4 EA. FILTER CONDENSERS: 4 Mfd. 1500 VDC. Each, $1.95. Brand New. All 4. Ship. Wt. 12 lbs. **$7.80**

Regular Value—$31.70

COMBINATION PRICE— ALL 6 ITEMS $27.95

Total Ship. Wt. 91 Lbs.

Items may be purchased separately at individual prices.

CODE PRACTICE TAPE—NEW!

REELS NO. 10, 13, 14. Ship. wt. 1½ lbs. ea. **$1.25**



LELAND ELECTRIC MOTOR

Complete with Reduction Gear Box; reduces to approx. 60 R.P.M. Motor Rating 110/220 V AC 60 Cycles. 1725 R.P.M. ¼a h.p. BRAND NEW. Wt. 80 lbs. **$29.95**

METALLIC RECTIFIER

Magnesium copper sulphide. Input 18 VAC. Output 12.6 VDC @ 4 amps. Ea. $1.95

SELENIUM RECTIFIER

Input 115 VAC. Output 28 VDC @ 1.5 amps. New. $3.95

MD-7 MODULATOR

Complete with tubes and dynamotor. Excellent cond. Ship. wt. 19 lbs. $7.95

MARINE BAND RECEIVER

1.5 to 3 MC. With 28 V. dynamotor. Brand new in original box. Ship. wt. 10 lbs. $14.95

ARR-2 RECEIVER

234-258 MC. Complete with tubes and dynamotor. Can be converted to 220 MC band. Tube line-up: 3-6AK5; 7-1001; 1-12A6. Clean condition. Ship. wt. 11 lbs. .$7.95

455 KC IF TRANSFORMER

Iron powder sleeving. Brand new. Each ..... 59¢
2 for only $1.00

NOTE: All orders must be accompanied by check, cash or money order with payment in full. No C.O.D. California buyers: Add sales tax. Check your postal zone and add sufficient postage. For items weighing more than parcel post limit (20 lbs.) shipment will be made via railway express freight collect.

U.S. CRYSTALS, INC.

805 SOUTH UNION AVENUE
LOS ANGELES 17, CALIF.

CRYSTAL PACKAGE SALE!

Genuine Govt. Surplus Crystals! Same day shipment! Assorted frequencies!

START YOUR OWN CRYSTAL BANK NOW!

U. S. CRYSTALS OFFERS THIS GIGANTIC BARGAIN! SET UP YOUR OWN CRYSTAL RESERVE!

SAME DAY SHIPMENT! SATISFACTION GUARANTEED!

WARRANTY! Crystals in all packages on this page are GENUINE government surplus crystals manufactured by NATIONALLY-KNOWN companies such as Bliley, Piazza, Monitor, John Meck, Cecor, Telicon, etc. U. S. CRYSTALS, INC. GUARANTEES YOUR SATISFACTION OR YOUR MONEY BACK IN FULL!

SPECIAL PACKAGE DEAL NO. 1



100 CRYSTALS!

SPECIAL PACKAGE DEAL NO. 1 CONSISTS OF:

80.....FT-243 10.....FT-171 10.....DC-34-35

MIXED FREQUENCIES! At least 20 HAM BAND frequencies! For operation on 160, 80, 40, 20, 10, 6 and 2 meters on either FUNDAMENTAL or HARMONIC frequencies.

SHIPPING TERMS: Same day shipment! Shipping wt.: 5¾ lbs. Check postal zone and ADD SUFFICIENT POSTAGE to cover cost of mailing.

SPECIAL PACKAGE DEAL NO. 1 Regular value $69.00! **$9.95**

SPECIAL PACKAGE DEAL NO. 2

Guaranteed to oscillate! **Consists of 5 choice crystals:**

1—ZENITH MODEL DC-18-A 1,000 KC CRYSTAL: Built-in 12 V. automatic thermostatic controlled heating unit. 8-pin octal base. Reg. value $5.95

1—SR-5 BLILEY. 10,000 Kc. Reg. value.....$1.99

1—FT-243. 5,000 Kc. Reg. value. 1.99

1—FT-241. 200 Kc. Reg. value.. 1.99

1—FT-241. 500 Kc. Reg. value.. 1.99

Total regular value $13.91

SPECIAL PACKAGE DEAL NO. 2 **$8.95** *POSTPAID!* Satisfaction guaranteed!

SPECIAL PACKAGE DEAL NO. 3

36 FT-241 LOW FREQUENCY CRYSTALS

FOR SINGLE SIDE BAND

Frequency range from 370.370 Kc. to 435.185 Kc. in steps of every 1.852 Kc. approximately. Channels: 0 to 35.

SPECIAL PACKAGE DEAL NO. 3 **$3.95** *POSTPAID!* Satisfaction guaranteed!

Regular value $14.04

SPECIAL PACKAGE DEAL NO. 4

The Biggest Crystal Bargain Ever Offered! Consists of:

1 Special Pkg. No. 1. Reg. value $9.95
1 Special Pkg. No. 2. Reg. value 8.95
1 Special Pkg. No. 3. Reg. value $3.95
Total value $22.85

SPECIAL PRICE FOR ALL 3 PACKAGES ..... **$19.95** *POSTPAID!* Satisfaction guaranteed!

SPECIAL PACKAGE DEAL NO. 5

Guaranteed to oscillate! Includes 2 ea. 455 Kc. IF transformers

22 FT-241—SINGLE SIDE BAND LATTICE FILTER PACKAGE

Channel	Crystal Frequency (KC)	Channel	Crystal Frequency (KC)	Channel	Crystal Frequency (KC)	Channel	Crystal Frequency (KC)	Channel	Crystal Frequency (KC)	Channel	Crystal Frequency (KC)
38	440.741	42	448.148	46	455.556	50	462.963	54	470.370	58	477.778
39	442.593	43	450.000	47	457.407	51	464.815	55	472.222	59	479.630
40	444.444	44	451.852	48	459.259	52	466.667	56	474.074		
41	446.296	45	453.704	49	461.111	53	468.519	57	475.926		

Regular value: $19.38 Same day shipment. Satisfaction guaranteed. SPECIAL PACKAGE NO. 5 POSTPAID **$9.95**

SPECIAL PACKAGE DEAL NO. 6 — FOR SINGLE SIDE BAND

80 FT-241—LOW FREQUENCY CRYSTALS Including One Channel 70, 500 Kc.

ONE EACH of frequencies from 370.370 to 516.667 Kc. in steps of every 1.852 Kc.

Regular value: $63.20 Same day shipment. Satisfaction guaranteed. SPECIAL PACKAGE NO. 6 POSTPAID **$14.95**

SPECIAL PACKAGE DEAL NO. 7

4035	5205	6373.3	7373.3
4045	5235	6406.7	7406.7
4080	5305	6440	7440
4095	5327	6473.3	7473.3
4110	5335	6506.7	7506.7
4135	5397.5	6540	7540
4175	5437.5	6573.3	7573.3
4190	5485	6606.7	7606.7
4215	5500	6640	7640
4255	5587.5	6673.3	7673.3
4280	5706.7	6706.7	7706.7
4295	5740	6740	7740
4340	5773.3	6773.3	7773.3
4395	5806.7	6808.7	7806.7
4397.5	5840	6840	7840
4445	5873.3	6873.3	7873.3
4450	5906.7	6906.7	7906.7
4490	5940	6940	7940
4495	5973.3	6973.3	7973.3
4535	6006.7	7006.7	8006.7
4620	6040	7040	8040
4680	6073.3	7073.3	8073.3
4695	6106.7	7106.7	8106.7
4735	6140	7140	8140
4840	6173.3	7173.3	8173.3
4845	6206.7	7206.7	8206.7
4852	6240	7240	8240
4930	6273.3	7273.3	8273.3
4950	6306.7	7306.7	8306.7
5030	6340	7340	8340

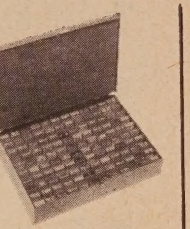
120 FT-243

Complete with **CRYSTAL *storage box***

Regular value $87.75

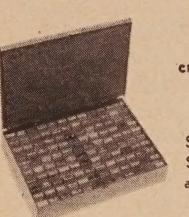
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SPECIAL PACKAGE NO. 7 Ship. Wt. 9 lbs.

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5675	6425	7175	7925
5700	6450	7200	7950
5725	6475	7225	7975
5750	6500	7250	8000
5775	6525	7275	8025
5800	6550	7300	8050
5825	6575	7325	8075
5850	6600	7350	8100
5875	6625	7375	8125
5900	6650	7400	8150
5925	6675	7425	8175
5950	6700	7450	8200
5975	6725	7475	8225
6000	6750	7500	8250
6025	6775	7525	8275
6050	6800	7550	8300
6075	6825	7575	8325
6100	6850	7600	8350
6125	6875	7625	8375
6150	6900	7650	8400
6175	6925	7675	8425
6200	6950	7700	8450
6225	6975	7725	8475
6250	7000	7750	8500
6275	7025	7775	8525
6300	7050	7800	8550
6325	7075	7825	8575
6350	7100	7850	8600
6375	7125	7875	8625
6400	7150	7900	8650

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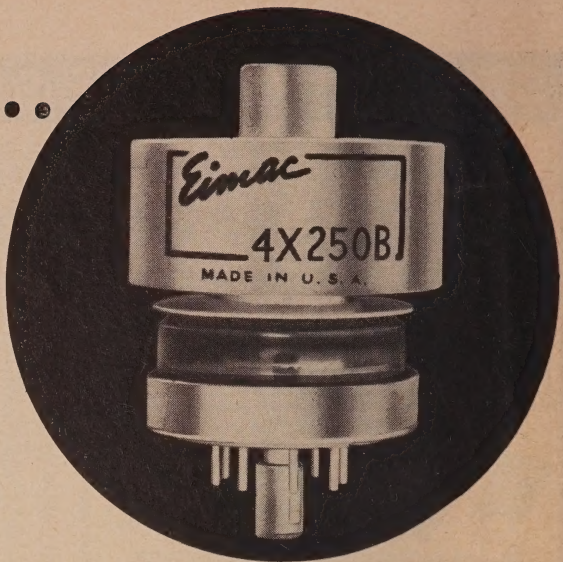
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EASIER COOLING—Development of the Eimac integral-finned anode makes cooling so easy that only one-third the air-pressure and one-half the cubic feet of air are required. Forced air is unnecessary during standby periods.

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(per tube, frequencies to 175mc)
4X250B radial-beam power tetrode

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D-C Plate Voltage	2000v	1500v	2000v
D-C Screen Voltage	250v	250v	350v
D-C Grid Voltage	-90v	-100v	-60v
Zero Sig D-C Plate Current	—	—	50ma
D-C Plate Current	250ma	200ma	250ma*
D-C Screen Current	12ma	10ma	5ma*
D-C Grid Current	22ma	23ma	0ma*
Peak RF Grid Voltage	114v	125v	60v*
Driving Power	2.5w	2.9w	—
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Guest Editorial

...de W2ZGU

A theory is a way of thinking about things; a new theory is simply a new way of thinking about things—and a darned nuisance, when you've already got a way of thinking about the problem. Why bother?

Well, for one thing, the amateur in any field is the one who's most apt to come up with new theories. Ham radio has a great tradition in that respect; it was by developing new ways of tackling problems that hams made the "useless" frequencies above 2 megacycles useful. It was by new theories, new ways-of-thinking about problems that the hams, not the professionals, cracked one after another of the borderline problems.

There's lots of ways and reasons for being a ham; we aren't professionals, which gives us certain peculiar privileges, while at the same time denying us certain comfortable-looking rights. No professional station can operate in a whole region of the radio spectrum; it's stuck with one, two, or at most a very few very precisely determined spots. Of course, it's also assured free use of that channel; no other local station is permitted on the frequency. And, moreover, that station is permitted to do practically NO experimenting. The exact type of transmission, the exact method of use, the frequency pass band . . . everything is meticulously prescribed.

We have privileges; we can try some remarkably slap-happy ideas. We can do practically anything we happen to think of above 30,000 megacycles. Below, we can try transmissions in so many areas of the radio spectrum that almost any phenomenon of radio transmission is within the scope of our free access.

No professional has that privilege.

Also, if you make an honest mistake—if an experiment goes sour in a way you couldn't, with reasonable judgment, have predicted, you'll get your ears slapped down for carelessness—but part of the Inherent Right of Being An Amateur is that of making mistakes. If a professional station gets a bit off frequency, there's the Devil to pay—and the FCC does more than send a little notice. We've got privileges, as well as limitations.

We've also got duties; those duties aren't written in on your ticket; they aren't written in the license manual, or the FCC regulations . . . but they're there.

One of those duties is the subtle one of establishing an absolutely unbreakable communication system. One that no storm, no catastrophe, either natural or man-induced, can ever, under any conditions short of breaking up the planet, knock out completely. No professional system can do that; the hams have done it. Destroy every ham transmitter, and every ham receiver in the country at 8 AM on Saturday morning—and the bands would be a howling madhouse of signals by noon that day! Knock out every power generating plant in the nation—and the bands would be more crowded than they are now.

You and I both know what would happen. Destroy the ham transmitters and receivers—and the family receivers, TV sets, and what-not would be pirated. There'd be 10,000 hams on the air within 24 hours. Knock out the power plants, and hams that had never gone mobile, or thought of it, would have jack-leg power-supplies going somehow in a matter of hours . . . just *because* they couldn't get on the air!

Emergency message handling is one of the ham duties; we're allowed to handle message traffic during non-emergency periods as a privilege in return. (Many foreign hams are not allowed to handle—or pass along—third-party messages, you know. It's decidedly unethical and unkind to ask a foreign ham, who is so limited, to do so as a favor.)

You don't have to be a technician-experimenter to be a ham; some hams must be, to fulfill hamdom's obligations, however.

You don't have to be a message-handler to be a real ham; *some* must be, however, or the gang as a whole wouldn't be handling their end of the bargain.

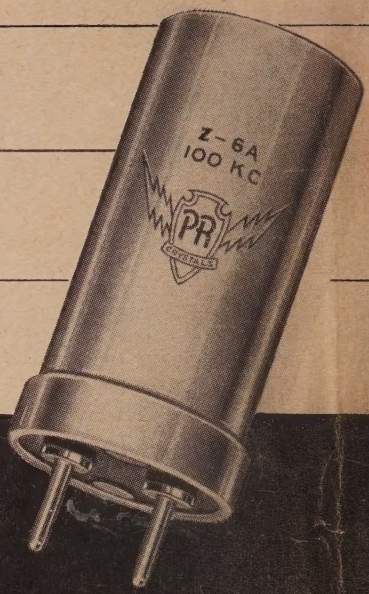
You don't have to invent new techniques to be a ham—but *some* hams must.

But you do—if you're going to be an honest ham—have to do something with purpose in return for the privileges and rights the government gives you. Winning your ticket isn't enough; what have you done for the privilege lately? Learned more about the subject, so you could help in a real emergency? Handled traffic, so you can be part of the emergency net? Developed some genuinely new techniques that can be used in the whole science of electronic physics?

Somebody's got to pay for those bands of ours—pay with a real value to the society that holds them against commercial-professional pressure and need. What's your way of being a ham?

John W. Campbell, Jr.,
W2ZGU

Calibration on the nose...



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Improving the

Class B Driver

John W. Campbell, Jr., W2ZGU

Chain reactions causing trouble are not confined solely to atomic bombs. It can happen in the ham-shack, too, without being half so spectacular, or even destructive. It happened this way:—

It says right here in the books that a modulator for plate modulating an r-f load should have 50% of the power capability of the r-f stage, but that since the human voice doesn't make with the sine waves, a modulator having 25% of the r-f power stage capability can handle the job.

It can, too . . . provided you stick to the rather "thin" characteristics of a normal human voice. But that means you're not getting all the signal that you're entitled to; your modulation is 100% so far as peaks go, but it isn't a "full" modulation envelope.

So, having set up a pair of 813's, modulated by a pair of 811's, I wanted to see if a full modulation envelope made a real difference.

It did. By building a speech compressor-limiter, I cut down the sharp peaks of the voice signal, produced a slight alteration in voice quality—and almost doubled the average energy content! Yoicks! I could, with 500 watts to the 813's, lay in a more readable signal than some of the full-gallon stations that were not using compression.

But . . . the 811's were getting very red in the face doing it. The plate current to the modulators was running nice and steady, with that compressor in action—steadily more than the 811's could handle, too.

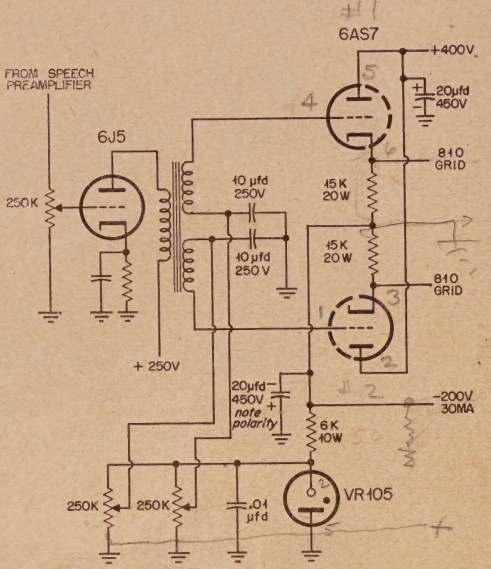
The answer to that was easy, though. A pair of those 810's I brought back in the dear old surplus days at $2 a copy would come in handy. Same power supply, and they'd yield all the audio I wanted! Fifty percent of r-f—stage power? Heck—they could give about 70% of the r-f power stage output!

So they were installed in place of the 811's, fired up, and put on the air.

The reports weren't so hot, though. The modulation was full, all right, but checking at the other end myself indicated that the XYL seemed to have turned the mike over to Gravel Gertie.

A slight investigation showed why. The 810 is a very nice triode; with —35 volts on the grid, it makes a very nice Class-B modulator. Only it calls for a peak grid-swing of 175 volts positive, and at that point the dear old grid is drawing *one quarter of an ampere,* solid. I had a pair of 807's in AB_1 driving the 810's, but they didn't have a chance with that load. Also, the driver transformer was incapable of pushing anything that stubborn around, even when the primary was excited by a really low-impedance source like a 60-cycle power line.

Now let's see . . . ¼ amp at 175 volts means a



peak power demand of . . . call it 45 watts. To handle a Class-B grid-type load, we should have some swamping load on it, and negative feedback, so that means . . . hmmmm. Now look; let's not be silly! A hundred-watt transformer is a modulator transformer itself, not a *driver* transformer! No wonder we had Gravel Gertie at the mike!

But how in blazes do you get 175-volt grid drive that can take a 250-mil grid current without minding it? We're not trying for a hi-fidelity prize, and won't insist on less-than-½% distortion, but the neatly clipped wave-crests we've been getting won't do.

Investigation showed no satisfactory driver-transformer of the required characteristics anyway. But this chain-reaction had gone too darned far now to back all the way down to the 811's again.

Regulation was the problem—getting the 175 volts was easy. Regulation . . . hmmm. The current involved . . . and the voltage . . . yup! A voltage regulation circuit it shall be! With a 6AS7 voltage regulator!

The circuit that evolved is shown.

The two halves of the 6AS7 are acting purely as cathode followers; their input impedance is, in consequence, extremely high—and, I hasten to add thankfully, *stays* high throughout the audio cycle. The 810 grids are directly connected to the 6AS7 cathodes; the massive 810 grid current now appears as cathode current in the 6AS7, and the 6AS7 is completely competent to handle that slug

[Continued on page 56]

Heathkit



DX-100

Jim Morrissett, W8BAJ/2
Assistant Editor

After using and ab-using the new DX-100 in every conceivable manner we've decided it's worth talking about. So
here
you
are . . .

The Heath Company has sort of crept up on most of us. We read their ads for kit-form test equipment in the various radio magazines for quite some time with the suspicion developed from being bit time and again by good looking ads for low-priced equipment which somehow just didn't live up to the glowing accounts given. After hearing nothing but compliments on the units put out by the Heath Company most of us went for their grid-dip meter and found that it was all they said it was, and even more. The antenna meter convinced more. Many Novices have tried the Heath AT-1 transmitter kit and the AR-2 receiver kit and all seemed to be very happy with the results.

So here they are with something that just about all of us have been wanting, a really good medium power transmitter all in one package, complete with VFO. The rating referred to in the designation DX-100 is 100 watts *output*. Our tests indicate that this is a mighty cool rating, too, for we were able to run it at considerably higher power—well over 150 watts input on all bands, on phone—which lights a 100-watt lamp on the output to much greater than normal brilliancy.

Assembling The Kit

When the kit came it took two men and a small boy to move the three packages from the hall to the cellar workshop for assembly. Opening the packages and unwrapping all of the hundreds of parts was a lot like Christmas and before long there were parts from here to there . . . coils, tubes, switches, sockets, etc., what a bunch of parts! The cost of the parts alone certainly must be more than the price of the complete kit.

Assembly was started on Friday afternoon with the idea of getting the kit together and testing it Saturday afternoon. By late Friday night it became obvious that some sort of modification of this timetable would have to be made for only the VFO unit had been completed. Sure enough, what with working for a living and a few other concessions to our society (shaving, changing clothes, etc.) the kit arrived at the actual testing stage by the following weekend. Figure a week of spare time for it.

With the exception of a winding in an r-f choke which may have been bunged in assembly and which was easily repaired the transmitter worked right off the bat. The VFO was quickly calibrated by means of the station receiver and a 100 kc marker. The calibration has held to date, despite much carrying of the rig to ham club meetings, and operation in the hot humidity of Brooklyn.

The rig was first tried on 75, and the signal reports were immediately gratifying. From the first nearly everyone went out of his way to comment on how terrific the audio sounded. An inexpensive tape-recorder mike was being used. 'Scope checks showed that modulation was quite adequate with the control 2/3 open but that no peaks were hitting over 100%. The gain was then experimentally run wide open. The average level increased, but overmodulation still did not occur. In fact, it was nearly impossible to overmodulate at normal input power, though the modulation was solid, with plenty of "sock". Top-quality full modulation was obtained with the control ¾ open.

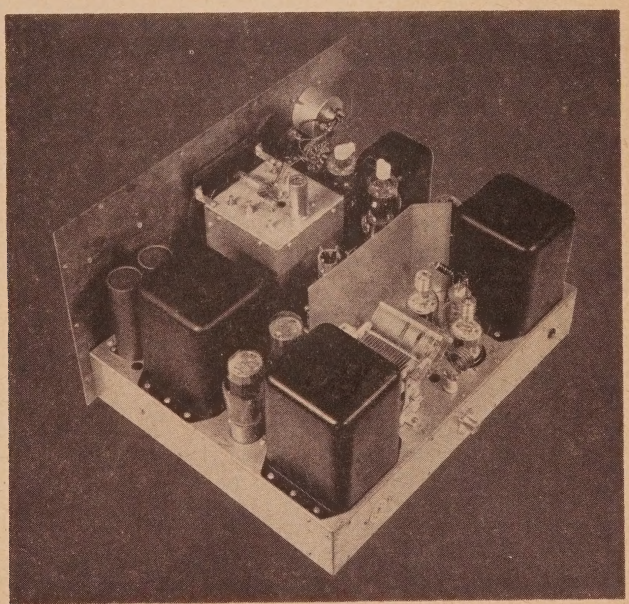
The transmitter loaded easily to 200 watts on phone, with apparently no ill effects. But since there is negligible increase in signal between 150 and 200 watts, such practice merely shortens tube life. Checks showed the best modulation quality to be at 150-160 watts input.

VFO

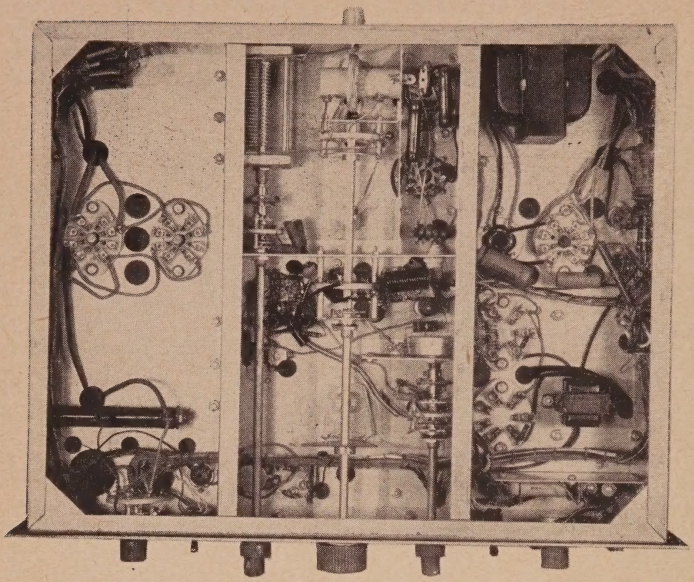
The VFO uses a 6AU6 Clapp oscillator operating in the ranges 1750-2000 kc, 7000-7425 kc and 6740-6807.5 kc. All frequency-determining components are mounted rigidly inside the completely-shielded v-f-o enclosure, with the shielded 6AU6 mounted on top and outside to prevent undue heating effects. The frequency control is a double-bearing differential-type tuning capacitor with two stator assemblies of different capacity, which allows a large bandspread at high frequencies as well as at the lower frequencies. Components of exceptional quality are used to assure high Q and to minimize the effects of temperature and humidity variations. Even these low-drift components are chosen so that the small amounts of negative and positive drift will cancel out. Any effect of tube-capacitance shift is minimized in the low-impedance Clapp circuit. The 6AU6 operates as an electron-coupled oscillator with the screen (oscillator "plate") voltage-stabilized by an OA2.

XTAL Oscillator-Buffer

A 12BY7 is used as a modified Pierce crystal oscillator. The XTAL-VFO switch allows selection of four crystals. In the fifth position the VFO is in operation, with the 12BY7 acting as a buffer.



DX-100
Rear View



DX-100
Bottom View

Driver

The 5763 driver uses a combination of fixed and automatic bias for optimum tube conditions during key-up and key-down periods. Potentiometer control of the driver screen voltage allows complete control of the grid drive to the final amplifier without decoupling or detuning. Pi interstage coupling between the driver and final helps reduce the harmonic output of the transmitter.

Final

The final uses two 6146's in parallel, plus a 6AQ5 clamp tube. In addition to the clamp, the combination of fixed and automatic bias is used to protect the tubes. Sub-mounting of the 6146's allows compact circuitry, better isolation of input and output circuits, and provides a "chimney" for better air flow. The tank circuit of the 6146's is pi-coupled to the antenna, using a variable capacitor, tapped inductance, and a unique switching system on the output side allowing selection of from 0 to 2000 $\mu\mu$fd in 200 $\mu\mu$fd steps. A 250 $\mu\mu$fd variable acts as fine loading control, permitting smooth control of loading capacitance from 15 $\mu\mu$fd to 2250 $\mu\mu$fd. Thus the output is easily matched to nonreactive loads of from 50 to 600 ohms.

Modulator

A cascaded 12AX7 provides plenty of gain for low-level xtal or dynamic mikes. To obtain optimum communication quality, frequencies below 250 cycles are attenuated in this stage by the use of small (500 $\mu\mu$fd) coupling condensers. The range above 3000 cycles is eliminated in the modulator stage.

A well-designed 12BY7 circuit drives the two 1625 modulators. The 1625's, operating in AB_2, are capable of 120 watts output but are normally operated at an 80 to 90 watt level. Series resistors prevent the modulator grids from swinging too far positive, thus exerting a limiting action.

The primary of the modulation transformer has a higher impedance than the 1625's would normally work into. This introduces some high-level speech clipping, which in turn increases the average modulation percentage. To eliminate any splatter as a result of speech clipping, the modulation transformer has been "built out" as a low pass filter, and attenuates the high frequencies above the voice range.

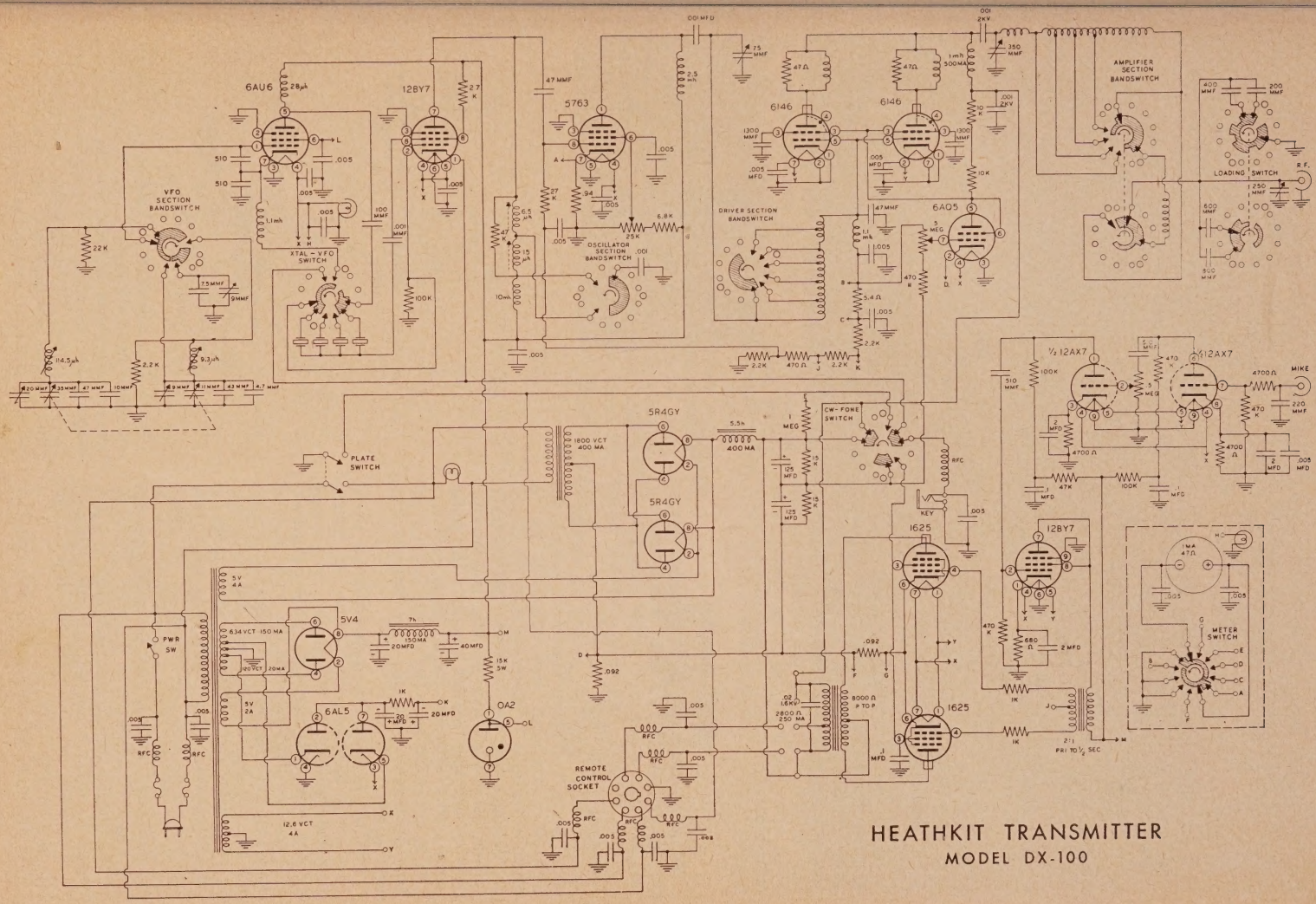
Power Supply

5, 6, and 12-volt filaments, the bias supply and low voltage are supplied by one transformer, the high voltage for the final and modulators by another. In the unit tested here, the plate voltage varied between 790 and 725 volts as the final loading was varied from 70 to 200 watts input. This is pretty good regulation. However it should be noted that the *instantaneous* regulation is practically unshakeable because of the use of a 62.5 μfd filter condenser.

Both sides of the a-c line are fused in a special line plug. All circuits entering or leaving the transmitter chassis have LC harmonic filters.

Novice Use

The DX-100 is an excellent rig for the Novice-Planning-to-go-General Class Ham. Until the treasured "all-purpose" ticket comes thru,



HEATHKIT TRANSMITTER
MODEL DX-100

the DX-100 may be used as a 75-watt crystal-controlled c-w transmitter, with final plate loading reduced to 90-95 ma.

Keying

The oscillator and buffer cathodes are keyed simultaneously, the driver and final stages being protected during key-up periods by the combined fixed and automatic bias. Both on XTAL and VFO, RST's were very good on all c-w bands, including 20 meters. On 10 meters (using the VFO) some chirpiness was noticed in the monitor receiver, comparable to the note of a "good" crystal-controlled 10-meter transmitter using a 40-meter crystal. The rig runs a very cool 180 watts input on CW.

Panel Design

Besides being an efficient and reliable signal-emitter on all bands, the DX-100 is housed compactly in an attractive cabinet. A well-planned panel makes for ease of changing frequencies and modes of operation. To provide maximum flexibility without a front panel like the ENIAC, four of the controls are combined in two co-axial sets. Thus tuning is accomplished easily, with a minimum of wasted motion.

Operation

We advise the use of a good external ground for this or any other rig using unbalanced output. Although Balun coils would minimize the necessity for this, and more correctly match "balanced" feed lines, establishing a good, low-resistance external ground is always a good practice. Without benefit of baluns, the DX-100 was loaded very effectively on all bands to a simple 20-meter doublet. On 20 and 10, the open-wire feed line was fed normally, and on the lower bands the feed line was tied together and fed "against ground". The transmitter's 50-to-600 ohm output lends itself very well to operation with any of the popular all-band antennas, or to use with separate one-band arrays.

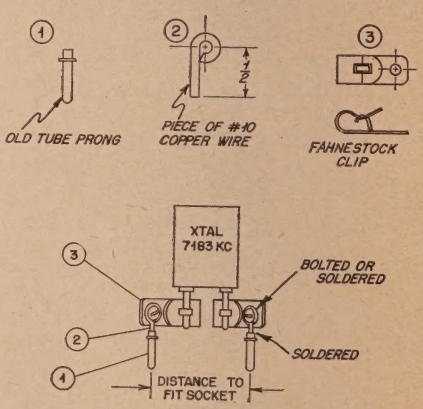
VFO'ing to zero-beat with a desired signal is very easy. Switching the "Phone-CW" switch momentarily to the "CW" position, or pressing the key down when on CW, turns on the exciter without the final, and the VFO may be zeroed on the other fellow's frequency without fear of any shifting when the final is turned on. We checked this very carefully, and the voltage-regulated VFO holds, solid as a rock. Checked again after several weeks of rough usage—on the air, then bouncing around in the alternately hot and cold posterior of a station wagon—calibration of the VFO was right on the button. Set at zero beat with a stable frequency meter a few minutes after turning the transmitter on, the VFO was still at zero beat half an hour later.

The Heath people reported a few cases of heating of the 160-meter coil which occurred while the coil was switched out of the circuit for transmitter operation on 20 meters. Checks revealed that about one out of ten of the 160-meter coils used in the first models were self-resonant at 20 meters, and would pick up and dissipate 20-meter energy. The coil design was changed slightly to bring the self-resonant frequency down to about 11 Mc, thus eliminating the problem.

TVI

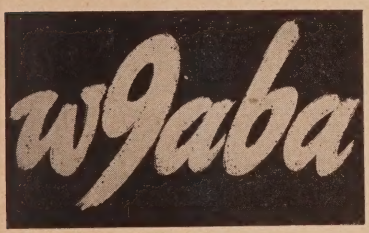
To particularly aggravate the situation, TVI checks were made with the transmitter removed from the shielded cabinet. The TV set was about 25 feet away. A slight cross-hatching was noticed on several channels, but in all cases the signal was insufficient to cause noticeable interference with the picture or sound on any of the channels in use (2, 4, 5, 7, 9, 11, 13). Low-harmonic circuitry plus the generous use of r-f chokes and .005 discaps probably accounts for this happy situation. However it is advised that the transmitter be operated inside the shielded cabinet, with a good external ground and an efficient antenna system—at which point you can safely assume that any interference problem is the fault of the TV receiver.

So, there it is—a complete medium-power amateur transmitter for less than $200—something we didn't think could be done. But fortunately in this age there are always people around consistently doing the things that can't be done. And if the amateur benefits thereby, we're for it.



Here's one submitted by OM Ward, W3IMT, and is just about self-explanatory. He says that the different pin-centers on Bliley and PR crystals no longer bother him since this quickly-made adapter has been in use. The gadget should take care of your problems also until those new sponge-rubber xtal sockets hit the commercial market.





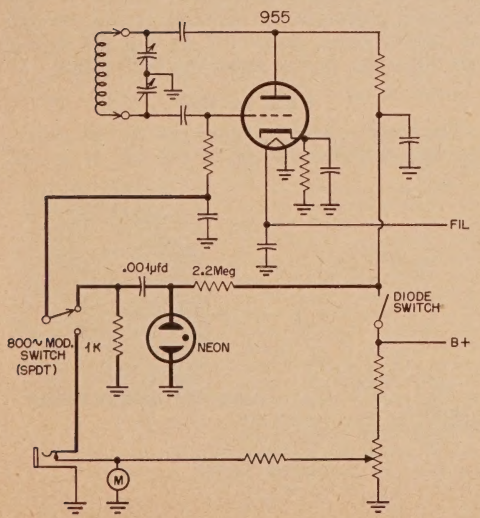
QSL

CONTEST

WINNER

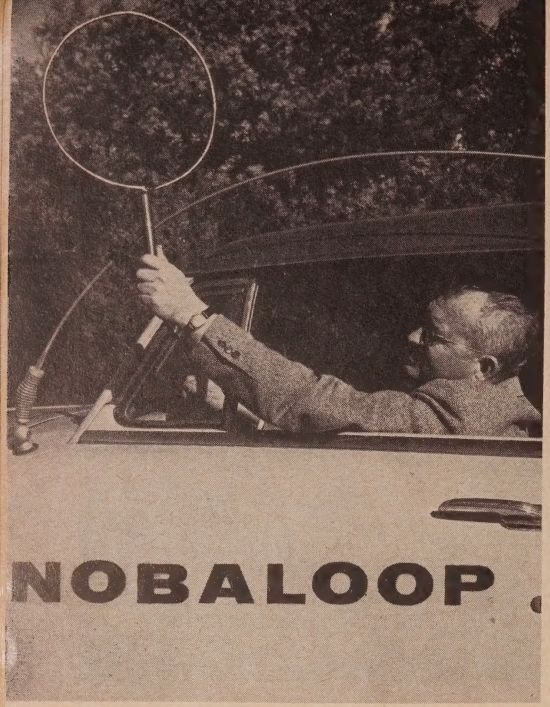
and runners up





Tone Modulate Your Grid-Dipper

By adding four simple parts to his B&W Model 600 grid-dip meter, W6EWC/YN1WC has obtained tone modulation, which he feels doubles the usefulness of the unit. The components listed here are for an audio frequency of 800 cycles. Different tone may be obtained by employing different values in place of the .001 ufd condenser or the 2.2 meg resistor. The 1K resistor determines the amount of grid modulation. Too large a value will broaden the signal with excessive modulation. Added circuitry is shown by heavy lines. A 1/25-watt pigtail-type neon bulb may be used.



NOBALOOP

J. Roy Smith, W6WYA

Herein described is the simplest of DF loops, with no ambiguity of direction. It has but a single direction of maximum signal and a single null. It was designed for locating signals on the ten meter band but has been used with reasonable success on the lower frequency bands. The writer has used this loop in no less than 80 transmitter hunts, winning 15 first place findings and placing within the first 25 percent of early arrivals in nearly all the remaining hunts, which is excellent considering random factors involved in transmitter hunting—navigation, condition of roads and traffic laws.

And in San Diego there are more than a dozen of these loops in service, so hunting competition is really keen.

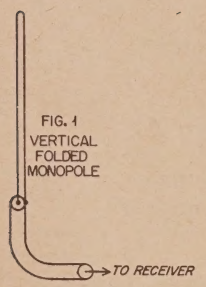
The business end of the Nobaloop is a 38- to 46-inch length of copper tubing (¼-inch gasline is fine) bent into a neat circle. The ends are flattened for about half an inch in a plane perpendicular to the radius. Number 28 holes are drilled through the flattened tubing about ¼-inch in from the ends. The loop is attached to a coax receptacle such as Amphenol 83-IR or military type SO239. One loop end is attached to the outer conductor by a 6-32 screw through one of the four holes. The other loop end is placed over the receptacle's center-conductor lug and soldered heavily. This completes the loop.

Approximately 70 inches of RG-59U coax is used to connect the loop to the receiver, with appropriate coaxial plugs attached.

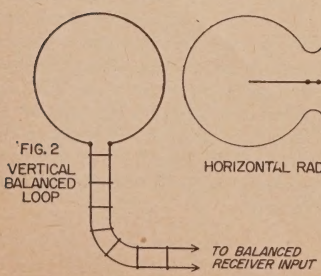
A suitable handle for the Nobaloop may be made of ⅝-inch brass or copper tubing 8 inches or so in length. This is secured to the knurled part of the loop's coax plug by solder. If both the cable plugs are too large to be fed through the tubing used, remember to slip the tubing over the cable before attaching both plugs.

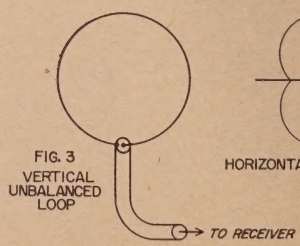
How to Use

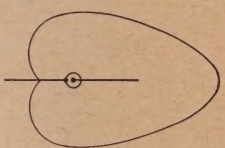
The loop is held by hand out the window a few inches above the top of the car. It is held

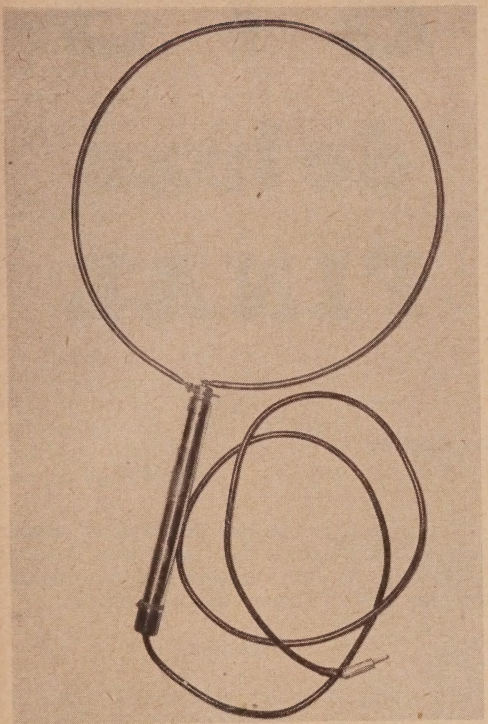












with the hand near the loop for technical as well as practical reasons. With the loop held out the window, the receiver is tuned to the desired signal. Rotating the loop causes the signal to vary. Maximum signal is in the plane of the loop, in the direction of the ungrounded end of the loop. Minimum signal is in the same plane but in the reverse direction, the direction of the grounded loop end.

When the received signal is weak, maximum signal is used for direction finding. When the signal becomes strong the sharper minimum signal, or null side may be used.

The signal received via the loop is about 25 percent of that received by the standard whip. Usually the signals are sufficiently close and strong at the start so that this is no disadvantage.



W6WYA was first licensed in 1935 as W4DOT. Designer of the popular "28-9" and "28-28" transmitters, Roy is strictly a 10-meter man. He prefers designing and construction to operating, the fruits of such effort appearing now for the fourth time in the pages of this magazine. EE graduate of N. C. State College (1940), he served as a radar officer during WW II, and is now a senior Electronics Engineer at the Navy Electronics Lab, San Diego; is EC for the San Diego AREC; XYL Deane is K6BPK, jr. op Roger, age 9, is KN6IHN. Home Address: 2052 Venice St., San Diego 7, Calif.

Theory of Operation

Let's consider a folded monopole (half of a dipole) about 20 inches high attached to the center and outer conductors of a coaxial line connected to a receiver. *See Fig. 1.* With the monopole held vertically, this simply becomes a vertical folded type of antenna and signals will be received equally well in all directions. Its horizontal radiation pattern is said to be nondirectional or circular.

Next, suppose we take this same folded monopole, pull the sides apart, and form it into a circular loop. Connect it now to a balanced line to a receiver. Now hold this loop in a vertical plane. If the loop is rotated, as signal received will vary with two areas of maximum signal and two points of minimum signal. It's horizontal radiation pattern describes a figure "8". This radiation pattern is explained in nearly all radio text books. Refer to *Fig. 2.*

Now let us connect this loop to the original coaxial transmission line and receiver. We still have the folded monopole antenna and, in addition, this folded antenna is also an unbalanced loop (by use of unbalanced line). The basic figure "8" radiation pattern of the loop is still there but it is combined with the circular radiation pattern of folded monopole. The amplitude and phase of the two induced voltages are just so naturally proportioned that a cardioid pattern results. The folded monopole part serves as the "sense" antenna while the loop part performs its normal directional function. When the loop consists of a single turn and is connected in an unbalanced manner the phase and amplitude relationships of the voltages are just right for the single max and single min. See *Fig. 3.*

There are just two words of caution. First, there must not be any antenna effect in the coaxial line such as resulting from standing waves in the line. After all, the antenna is almost entirely inductive with but little resistance and there is no approach at an impedance match. Such antenna effect on the line can be nullified by either grounding the coax at the loop by means of a short wire to the car or by hand grounding, in effect, by holding the loop handle in your hand. Second, all vertical antennas on the car must be lowered or tied down close to the car body. Such antennas pick additional sense voltage and by parasitic action reflect them into the loop. In such a case the phase and amplitude of the sense voltage is changed to the point that maximum and minimum signal directions are unpredictable.

When working on the null direction in hilly terrain or in the vicinity of metal objects the null may be difficult to ascertain because of multiple signal-direction paths caused by reflections.

This dependable loop has but a single maximum signal direction and a single minimum. The max is about 30 degrees wide and the min is about 5 degrees wide. As you chase down upon the hidden station at shorter and shorter range you will find these bearings advantageously sharp.

Michigan Hamfest

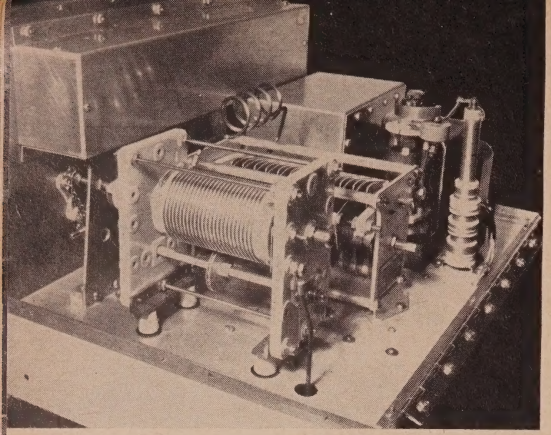
Sunday, July 30th, at Warren Dunes State Park, 15 miles south of St. Joseph, Michigan, on U. S. Highway 12—Annual Picnic and Hamfest of the Blossomland Amateur Radio Association. Bring your family, a basket lunch, and swimming gear; also usable radio equipment for swap and shop. Ten-meter transmitter hunt. No admission charge to the park or picnic. Registration fee $1.00 in advance or $1.25 at the park. Please make reservation in advance through R. T. Hatch, W8JFW, 3225 Cleveland, St. Joseph, Michigan.

Maryland EPN Picnic

July 24th, at Gambrill State Park, Frederick, Maryland, the Maryland Emergency Phone Net will hold its annual picnic, 10 a.m. til ??p.m. Prizes, auction, soft drinks, Bingo for the ladies, children admitted free, adults 50¢. Get tickets from Ken Teeple, W3PSP, Baltimore, Md. Mobileers look for HQ stations on 3820 kc, 29520 kc, & 145.68 Mc.

Hawaiian ARC Convention

First prize of a Viking Ranger, plus many other prizes, sweet breads, technical talks, a trip around the island of Hawaii and a side trip to Puna with her recent backyard volcano promise to make the Hamfest of the Hilo Amateur Radio Club well worth attending. The date: July 2-3-4. Write P. O. Box 1659, Hilo, Hawaii.



813 de luxe FINAL

Willard Wehe, W6VZB

Using a half-kw. tube still available under ten dollars, this unit provides highly efficient r-f power amplification from eighty thru ten meters without coil switching. All adjustments including the antenna loading are made from the front panel. The unit is well-shielded and can be operated on all bands without fear of harmonic-type TVI.

The amplifier was originally built just to see how the pi-section coupler works as a tank circuit on the ham bands. It has proved to be the most versatile, trouble-free final ever used at this station. The facility with which it skips from band to band has proven a very agreeable operating feature.

The method used to separate the input and output sections of the pi coupler pays well in attenuation of high-order harmonics. The system of neutralization, though not new, seems seldom to have been used to its greatest advantage in other single-ended stages.

Layout

Only five knobs are used on the front panel: Three above for grid bandswitching, plate capacitor tuning, and plate inductor tuning; two below, for grid tuning and plate loading. The only non-standard part used is a counter for plate-inductor turns, which was taken from a Navy TBY packset. Originally this read 0-12 revolutions, but with the addition of a new scale reading 0-24 the counter indicates directly how many turns of the inductor are in use. Several similar counters are available commercially.

The four meters are General Electric 3-inch square instruments for reading filament voltage, grid current, screen current and cathode current. All meters are enclosed by an aluminum shield, and connections to them are made with shielded hookup wire which runs through a ½-inch hole in one end of the meter shield down to the chassis. This same wire is used throughout the entire amplifier in accordance with the latest TVI-prevention techniques.

Chassis

The entire amplifier is enclosed within a shield made of 16-gage aluminum. This is tightly screwed to the front panel and to brass angles fastened to the chassis. This enclosure in addition to the shielding it provides is the means of securing the 12¼ inch panel to the chassis. The rear door is fastened at the bottom by a length of piano hinge and at the top by 5 #6-32 machine screws threaded into the aluminum. Hinging the door provides easy access to the amplifier for tube replacement and still does not impair the shield r-f-wise. Ventilation is provided by a small Barber Colman fan motor with the blades reversed so as to pull air into the chassis. When a tight fitting bottom plate is in place the air is directed through a cut out around the tube, and exhausts through 18 screen-covered 1" holes near the top of the door. Long periods of operation have shown that the ventilation is more than adequate, with none of the components overheating.

Neutralization

Grid neutralization is used due to the difficulty of obtaining out-of-phase voltage from a pi-section tank circuit. The grid tuning circuit consists of a B&W BTCL turret mounted within an aluminum shield on top of the chassis. This is tuned with a dual 100 $\mu\mu$fd. variable capacitor mounted below the chassis. One end of the coil is coupled to the grid of the 813 with a wide brass or copper strap, the other end being fed through an insulator to a small aluminum tab outside the turret shield. This tab and

the plate of the 813 comprise the neutralizing capacitor.

Anyone who has used 813's in the past is probably aware of the difference in individual tubes. Some of the newer ones are built with a large metal shield near the base which can be grounded. These tubes have been used without neutralization, showing no signs of spurious oscillation. Many of the 813's appearing on the surplus market are not so well shielded and will show a tendency toward instability in this amplifier if not neutralized.

Plate Circuit

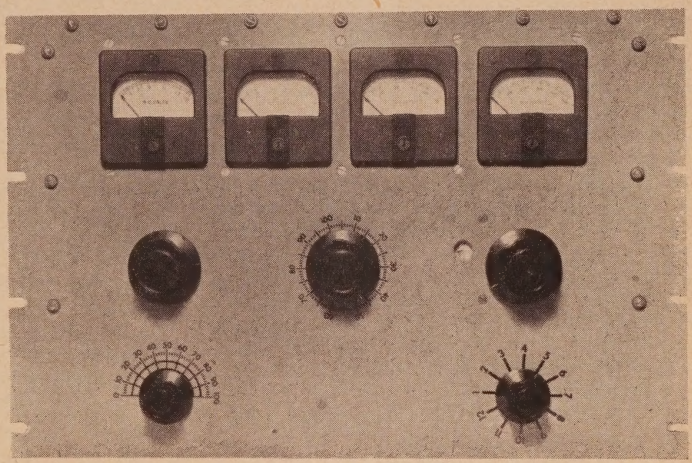
Careful planning of the plate circuit pays dividends in stability and efficiency. In this amplifier large conductors and low-inductance copper strip are used. The plate capacitor is a Johnson 150D70 which has a fair ratio of maximum-to-minimum capacity. Considering the large output capacity of the 813 (14 $\mu\mu$fd.) one can see how important is a low minimum on the tuning capacitor for the 10- and 15-meter bands.

Plate voltage is supplied thru a National R175A choke. This new choke has been redesigned to eliminate a harmful resonance appearing near the 15 meter band. A check with a grid-dip oscillator after the choke was mounted and wired up showed no resonances near the frequencies to be used. Different layouts may affect this, however, and it is best to check before applying power.

RF is coupled from the tube to the tank circuit thru TV high voltage ceramic capacitors. These capacitors have amazingly high breakdown voltages and are small enough to allow very short leads. The manufacturers say nothing about current-carrying capacity of these units but they seem to hold up. Little temperature rise is noticed after a long period of operation. All high voltage r-f filtering and bypassing is also done with these capacitors.

The plate inductance is a B&W 3852 roller coil in series with a four-turn coil wound with ⅛" copper tubing. On 28 Mc this small coil becomes the principal inductance with about one turn of the roller coil used as a loading adjustment.

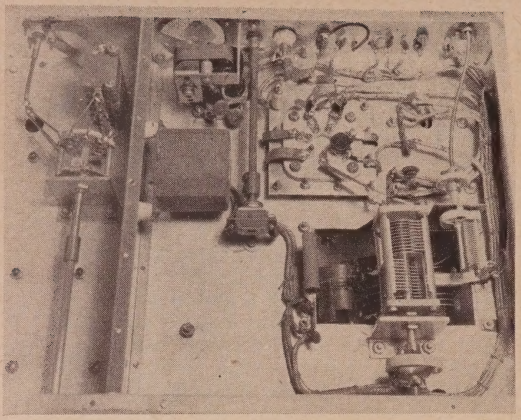
The output section of the circuit is a stack of CM45 mica capacitors. They are mounted direct to the underside of the chassis with two #6-32 screws. These are switched in and out with a Centralab P1S wafer switch. This switch is somewhat small in contact area for the job, but will work without trouble if all switching is done while no RF is in the tank circuit. The three arm wiper contacts are connected in parallel for greater contact area. Wiring to each of the mica capacitors is made with #12 bus bar. The grounded sides of each capacitor are connected together with heavy wire and a piece of flat brass strap goes from each end of the capacitor stack to the mounting bolts of a SO-239 co-ax fitting. The entire output section is in a separate compartment of the chassis shielded by an aluminum partition and the bottom plate.



Front panel of the 813 "Deluxe," featuring minimum-effort all-band tuning.

D-C Ground

It has been pointed out in other articles that a d-c path to ground is desirable across the output of a circuit of this type as protection against failure of the plate blocking capacitor. This was not done here due to the antenna coupling circuit used. However a small r-f choke could be easily mounted and wired across the co-ax fitting.



Bottom view, 813 "Deluxe"

Screen Circuit

The screen is bypassed directly to ground thru a 1000 $\mu\mu$fd. discap. D-C voltage is supplied thru a 10-henry choke for AM and this can be shorted out by a switch for other types of service. Screen voltage can be supplied either thru a dropping resistor or from a separate supply. A separate supply is probably the most flexible, but care must be taken to see that the screen dissipation is not exceeded. This element of the 813 is not very rugged and a screen current meter is important. The beam-forming plates are grounded directly thru a length of brass strap. The filaments are bypassed thru 1000 $\mu\mu$fd. discaps, and lengths of flexible braid are slipped over the heavy filament leads. These are grounded inside the filament transformer and at the tube.

Sub-Mounting

The tube was sub-mounted for two reasons. First to lower the tube and shorten the plate lead. Second: Due to the flexibility of the pi-type tank, a tube substitution could be very easily made, without any metal work on the chassis proper.

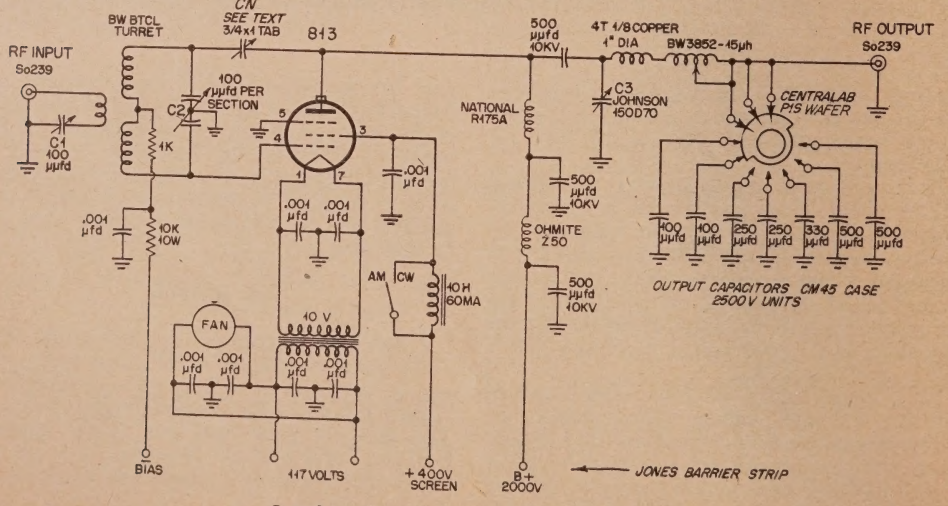
Preparing the Panel

All metal used was obtained from standard distributor stock except the shield for the meters, the grid turret shield and the chassis enclosure. These were bent from 16 gage half-hard aluminum. The panel was purchased painted, then all holes drilled and paint remover applied to one side. The remover leaked to the front of the panel, spoiling the wrinkle finish, and the entire panel had to be repainted. It would be better to strip one side of the panel first, then drill the holes. This way you would have to be careful only of the edges of the panel.

Adjustment

When first setting this amplifier up one must decide what L/C ratio is desired, set the plate capacitor to the value needed, then tune to resonance with the variable inductor. At 3.5 Mc. with 2000 volts on the plate and the 813 loaded to 150 Ma., an operating Q of 15 is attained with 111 $\mu\mu$fd of tank capacitance. This value will be halved for 7 Mc. for the same L/C ratio. It can be seen that the ratio can be varied somewhat except at 28 Mc., where the output capacity of the tube becomes the limiting factor.

[Continued on page 52]



Complete schematic for the 813 "Deluxe" final

The 100 kc. Sub-band Theorem

By George Bonadio, W2WLR

With a minimum of explanations, here is a challenging idea. It suggests higher efficiency of utilization of our bands.

The figures are almost completely self-explanatory to those skilled in the art. Several points should be noted here to be sure that other readers will not miss them.

The ratio of U.S. hams to others is about 63% to 37%.

Our singular DX sub-band edges or "fronts" cause displays of manners which feed anti-freedom advocates with a living proof that, "there is the way which gives all the choicest spoils to the strongest while the leftovers are fought for by the rest." However, with this, the struggling beginner has as logical a chance at success as his personal efficiency in the art allows. The smothering of the freedom of other hams would no longer be the surest way to DX success.

These sub-bands are all at crystal marker frequencies.

Fronts are more numerous. Kilowatt corners are gone.

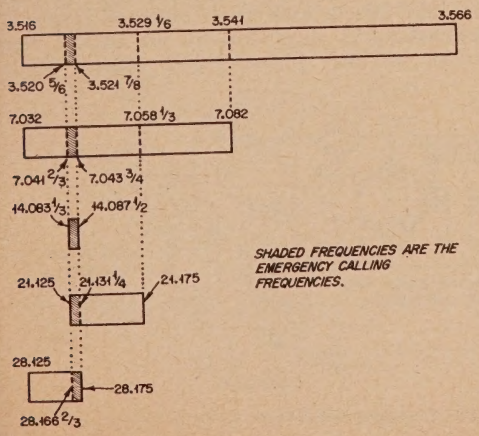
Beams can be peaked and used very near peak in lieu of present frequency spread.

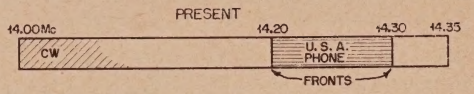
Novice emergency calling frequencies are instituted for the first time, as are one crystal harmonic operations thru 5 bands.

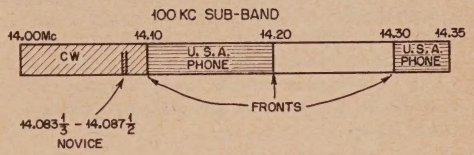
Chances to avoid TVI to 21 Mc. sound on 15 meter phone is greatly improved.

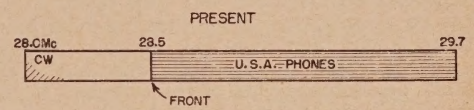
Future phone expansion on 75 and 40 would not disrupt novices.

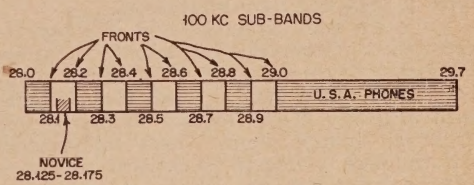
I would appreciate hearing comments from active club discussions on this, and will acknowledge and tabulate all of these, reporting by letter to CQ. The critics will write automatically, so I need also to hear from those who would support it. What say?

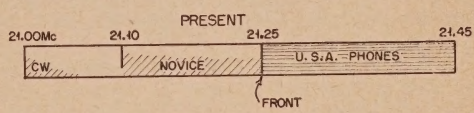


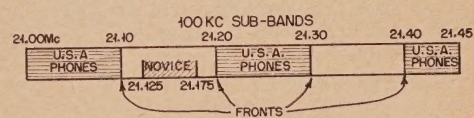












CQ is neither for nor against changes in our frequency allocations by the FCC. We do believe that it is our function as a communication medium to publicize ideas. This page may give you something to talk about for a minute or two between the exchange of signal reports and the 73 of your next QSO.

Grounded-Grid Linear Amplifiers

Norman R. McLaughlin, W6GEG

The Amateur considering higher power will find grounded-grid a simple, efficient means of getting power amplification with a minimum of parts and effort. Performance-wise, it is difficult to find a grounded-cathode amplifier that will match the distortionless output of the grounded-grid circuit.

Despite the fact that grounded-grid linear amplifiers are not new, very little seems to be known about them. Much that has been published about them does not appear to agree with the facts. Undoubtedly this has done much to discourage use of this circuitry, while the facts indicate that grounded-grid amplifiers are ideal for SSB, and afford numerous advantages in AM and c-w applications.

To begin with, grounded-grid is simplicity personified. Grounded-grid amplifiers require no neutralization regardless of frequency. They require no tuned input circuit. Certain tubes used in grounded-grid require no bias supply or screen voltage supply. They are virtually distortionless, a feature particularly attractive in s.s.b. linear amplifier design.

Possibly because of these advantages the s.s.b. gang on the Pacific Coast has made grounded-grid the preferred linear amplifier circuitry. If a check were made it would doubtless be found that there are as many grounded-grid amplifiers on SSB in W6- and W7-land as there are conventional linears.

Drive Requirements

It is true that grounded-grid amplifiers require more drive than the same tube would in a conventional circuit. However, the author's observation is that the increase in drive is no where near that recently reported by Puckett[1]. As evidence: W6GGM's 304TL grounded-grid linear talks up to a kilowatt with about one-third of the 270 watts said to be necessary; W6IRF drives his grounded-grid 4-250A final to a kilowatt with a pair of 6146's; W6JPU formerly drove a 4-125A to very close to a kw. with a grounded-grid 829B; and the writer found a grounded-grid 829B to be more than adequate to drive a pair of 813's or a single 4-250A to a kilowatt in grounded-grid.

Circuits

No trick circuitry is used in any of these instances. The coupling methods, however, were not those described by Puckett. Instead, drive is applied directly to the center tap of the filament transformer. It is possible that this type of coupling is more efficient than those Puckett used, which might account for the wide variation in drive requirement.

As the tubes cited might suggest, there seems to be little validity to the statement of Brown[2] to the effect that tetrodes and pentodes cannot be used successfully in grounded-grid service. Quite to the contrary, pentodes and tetrodes are the preferred tubes for this service. With their grids grounded they assume the characteristics of high-mu triodes and become zero-bias tubes. As a result they drive easily, requiring no bias voltage or screen voltage. Instead of oscillating on the signal frequency as Brown suggests their stability exceeds that of grounded-cathode circuits.

Likewise it must be pointed out that no harmful effects have been observed where a grounded-grid stage follows an exciter and drives another grounded-grid stage. While

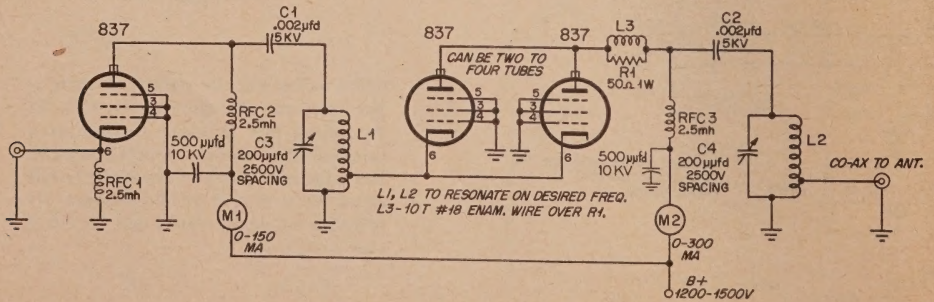


Fig. 1. Schematic of the popular 837 G-G linear amplifier.

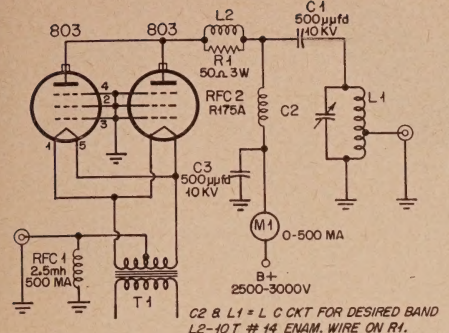


Fig. 2. G-G 803's, triode connection.

Brown's admonishment is not entirely clear, it has caused many amateurs to fear dire results. These results do not materialize, due possibly to the fact that the output stage of most exciters operates in Class A. Class A stages seem to ignore whatever reaction grounded-grid stages reflect upon them.

Popular 837 Circuit

The most popular driver-final arrangement on the West Coast is a grounded-grid 837 driving a pair of grounded-grid 837's. The output stage has its tubes in parallel, as shown in *Figure 1*. Not only is neither a screen nor a grid-bias supply needed, but both the driver and final operate from the same power supply. Since 837's are cathode-type tubes, both stages operate satisfactorily from the same filament transformer.

This unit is simplicity in itself. Only the output circuits are tuned. No trick circuits are used and parts required are a minimum.

The only critical adjustment is in loading the driver and the final. Usually a three- or four-turn link around the exciter's output tank coil sufficies for coupling to the driver. But in coupling from the driver to the final, the tap must be very carefully adjusted until maximum output from the final amplifier is obtained. As little as half a turn can make a great difference in the efficiency of power transferred.

This combination with from 1,200 to 1,500 volts on the plates will handle inputs of 300 watts or so with ease. If even more input is desired, more 837's are added. W6DMK has four 837's in parallel in his final, which, by the way, works equally well on 15 meters and 75 meters.

A popular higher-power version uses a pair of 803's in the final (See *Fig. 2*). These surplus tubes with 3,000 volts on the plates handle a kilowatt with no strain. At this plate voltage, static plate current will be 30 ma. or less. In most instances it will be hardly readable, yet occasionally a pair of 803's that draw 30 ma. or so is found. Tubes with either characteristic work equally well.

Since 803's are not cathode-type tubes, the drive is applied to the center tap of the filament transformer. The latter may be a surplus low-capacity transformer or a conventional transformer with an "open"-wound secondary. Up to 14 megacycles both transformers work equally well. Above 14 megacycles the low-capacity transformer requires a little less drive. Transformers that are "tar-filled" should be avoided regardless of frequency.

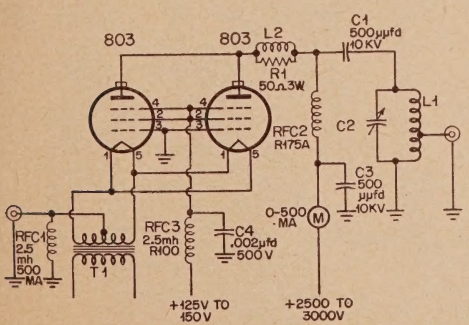


Fig. 3. G-G 803's, tetrode connection.

Grounded-Grid Tetrode Circuits

W6GGM and W6BHH have found that these 803's also perform very well as grounded-grid tetrodes. The principles advantage of such operation is that it reduces drive requirements to that approaching grounded-cathode operation. W6BHH is of the opinion that it might be possible to drive a pair of 803's to a full kilowatt directly from a 20A or an s.s.b. exciter of equivalent output.

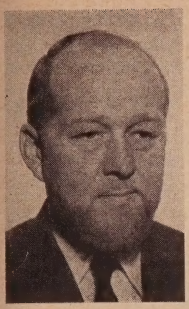
Both W6BHH and W6GGM have experimented extensively with various values of screen and suppressor voltages. Between 125 and 150 volts of positive voltage on both suppressor and screen seems to be about the right value. To pin-point the actual voltage to be used the voltage might well be adjusted so that the static plate dissipation reaches the value described in Linear Tips.[3] *Figure 3* shows how the screen and suppressor grids are lifted above d-c ground.

Grounded-grid amplifiers are degenerative since the plate current (including the a-c component) has to flow through the signal source to reach the cathode. Because this source always has appreciable impedance and the a-c plate current causes a voltage drop that is out of phase with the signal, degeneration occurs. This degeneration is a boon to s.s.b. linears since it virtually eliminates any distortion generated in the plate circuit of the amplifier and also provides a flat audio frequency response for faithful speech reproduction.

The advantages of a distortionless amplifier should be obvious. In SSB it means that only distortion products developed in the exciter it-

[Continued on page 49]





VHF

Reported by Sam Harris, W8UKS/1
P.O. Box 2502, Medfield, Mass.

Corner Reflections

The column you are about to read is yours. It's here because you asked for it. Naturally its continuance s dependent upon you! Our only measure of your interest is your response. So-oo-o, let's hear from you. Write that letter. Voice that complaint. Speak a little closer to the mike, I can't quite hear you.

Uncharted Course

Seriously, we would like to get your comments on what you'd like to see and read in your column. F'rinstance, would you like a States Worked certificate? A mileage per watts contest? A receiver noise figure contest? Or how about a visit to somebody's shack where we dig out the secrets and expose the final in the attic?

Speaking of visits, how many of you have been to the "High Point in Summit County"? We stopped in last week and found not Jerry and Margaret, (W8WJC and W8BFQ) but Dink and Dotty (W8IJG and XYL). Seems as how Jerry wants to see if Davey Crocket left any R.F. in them thar hills. Meanwhile, the showplace of Ohio, home of the big signal is still going strong. Only the call has been changed to protect the innocent (and comply with FCC rule number umpty-ump).

Certainly no more worthy VHF couple than the Darrel E. Withington's could have been picked to uphold the honors won at this location by Jerry and Margaret. Just remember, Dink, Margaret may have been the "Bare Foot Queen" but she left some mighty big shoes to fill. And watch out for that Jerry fellow. He has a disconcerting habit of always taking his "good location" with him.

While we're on the subject of good locations and in case you haven't heard, I just moved mine from the "Berkshires of Ohio" to the "Wilds of Medfield, Mass". I managed to corral thirty-two acres of swamp and rock-piles, generously sprinkled with woods and hill-tops. At this writing I'm still "sweating out" my new W1 call, but by the time you read this I should be talking to you on six and two. (For those of you located west of the Mississippi, *Be Patient.* I'll be on two-twenty before the summer is over.)

Note the photo of I1ER holding his 144 Mc. preselector. Remember the one you were going to build last winter? How did it work? We'd like to hear about it if you get time. If it's really hot it ought to be in pictures with a story to match, in which case you get paid for your efforts. And then you can buy some more parts and build a better one; and then you can write another article and get some more money with which you can buy some more parts, etc. Besides which the rest of us would be able to benefit by your experience (and mistakes) and then maybe *we* could build something and write an article, etc., etc. (I don't get paid by the word so there's no point in carrying that any further.)



Incidently, while you are noting the photo of Mario (I1ER), note also the lack of information and please excuse. More details about his station and the general status of VHF work in Italy are on the way.

Back to photos and a *Big Prize offer.* During July and August we are offering a pair of 6J4's, *Brand New! Never been used!,* as a reward for the best equipment or antenna photograph to be submitted. Pictures must be accompanied by a brief description (in case the judges can't figure it out). The honorable editor prefers 8x10 glossy prints, but send what you've got and let him worry about how to print it. After all, whose 6J4's are these? 6AJ4's are available in case the winners don't appreciate the sterling qualities of the 6J4.

Entries must be post-marked before the last day of the month for which submitted. Opinion of the judges will be final. All entries become the property of my XYL who will mount them in an album where they may be seen at any time by unwary visitors.

Visits

We stopped in to see John and Terry (W9WOK and XYL) at Bensonville, Illinois the last time we were in Chicago. Got some pretty pictures of John's antenna (see inset) and lots of news and views. Among other things John was pretty sad about losing his schedules with W8BFQ and W8WXV in Ohio. He still schedules W4HHK in Tennessee and is setting up a sked with Minnesota. Seems like he ought to be able to set up a sked with someone in Ohio. (How about it Dink? Got that general yet?) John took me on a tour of his new QTH (yes, he's moving too) where we saw lots of pretty flowers, many large trees, a real good view and part of a windmill tower that came with the place. (What, no house?) On the way back we stopped at Blackie's new location. W9BBU, long missing from the VHF ranks, has finally moved onto another hilltop. From the looks of that location we should be hearing from Blackie soon.

So, let us hear from you. 73,

Sam Harris, W8UKS/1
P.O. Box 2502, Medfield, Mass.

S.S.W. CONTEST

ANNOUNCING the First Annual CQ SSW Contest: A "*States and Stations Worked*" contest for two-meter operators . . .

WHAT

The SSW is a contest designed primarily for two meter operators.
We have long felt that any VHF contest should be scored in such a manner that patience, hard work and continued activity will play as important a part in the final score as good locations, high power and big beams.
Scoring has been set up so that the biggest factor in a high score is activity.

WHO

SSW is open to all licensed amateurs. Provinces in Canada, the District of Columbia and all recognized countries are considered as separate states, and licensed amateurs residing therein are eligible.

Station W_____ SSW Monthly Score Sheet

States worked in contest to date ..... _____

New states worked this month ..... _____

Station	Time	Date	State	Points	Station	Time	Date	State	Points
W9WOK	0300	4-4-55	Ill.	2	W2ORI	2200	4-11-55	N. Y.	2
W4HHK	0400	4-4-55	Tenn.	2	W2NSD	0200	4-12-55	N. Y.	2
W9WOK	2300	4-4-55	Ill.	2	W2NSD	0200	4-13-55	N. Y.	2
W100P	2100	4-5-55	Mass.	2	W2NSD	0200	4-14-55	N. Y.	2
W100P	2000	4-6-55	Mass.	2	W2NSD	0200	4-15-55	N. Y.	10
W2NSD	0200	4-10-55	N. Y.	2	W1TUD	2200	4-16-55	Mass.	2

Total contact points 14

Total contact points 20

Total contact points for month of _____April 34

States worked multiplier 26

Total final score 884

WHEN

SSW is scored on a monthly basis. Contest for 1955 begins at 0001 local time July 1. Contest closes at midnight local time on the last day of each month. Certificates will be awarded monthly to each state's first and second place winners.
High scorers for the year in each state will receive special yearly certificates (and prizes?). Yearly contest closes at 2400 local time, December 31, 1955.

HOW

All that is required to enter the SSW is to turn in your monthly score on or before the 10th of the following month. Log sheets may be obtained by addressing the "Log Department, P.O. Box 2502, Medfield, Mass."

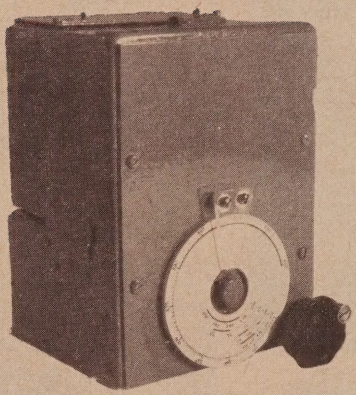
SCORING

Stations may be contacted up to five times per month for credit. Two points are counted per contact per station per day up to four contacts a month (total 8 points) and ten points for the fifth contact, making it possible to make 18 points per station per month. Contestants claiming three states or less are allowed an additional five contacts with each station per month, (on separate days) for a maximum of 28 points per station per month.

MULTIPLIERS

A multiplier of 10 is used for the first state contacted. A multiplier of 20 is used when two states have been contacted. Add two more to the multiplier for each state additional worked up to ten states (multiplier of 36) and then one more for each state over ten states. Provinces of Canada and the District of Columbia count as states. The states worked multiplier is carried over from month to month. Only one contact per year with each state is required for use as a multiplier.

low cost VFO



Paul Lee, W2EWP
252 Genessee Park Drive
Syracuse, New York

Here is a VFO that is a real dandy for stability, is reasonably compact, is easy to build, and since it is made primarily from the ARC-5 is certainly economical.

A kilowatt transmitter is a mighty handy thing to have around the ham bands. Around the house it is not quite so handy, and if you happen to be in the armed forces it is a half-ton liability. After several moves from one duty station to another the old behemoth was traded in for one of the lower power commercial rigs, one that was considerably more portable, but which was crystal-controlled.

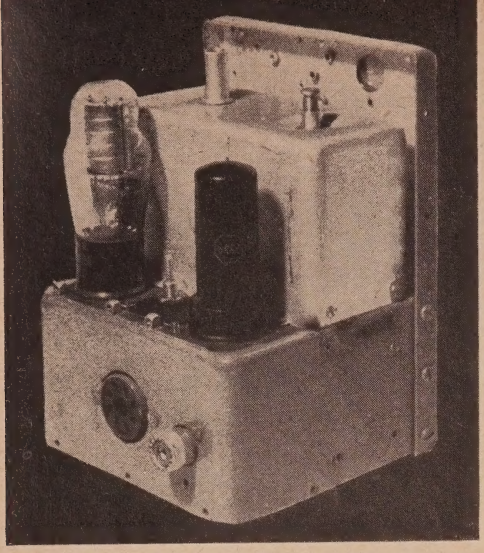
Crystal controlled operation may be alright for some people, but after having used a VFO for several years this "frequency-binding" was distinctly uncomfortable and seemed to be a serious limiting factor in making contacts. A VFO was definitely in order.

Commercial VFO's come through at commercial prices and this fact led to the decision to home-brew the VFO. Since the most important part of any VFO is the coil, with the use of an inferior coil or coil-form resulting in drift and instability in general, the logical solution was to use some sort of commercially manufactured unit for this purpose. Most Hams by now have one or more of the ARC-5/SCR-274N transmitters around. The VFO coil in this unit was well known to us for its stability (see *CQ* May 1952).

Since no operation was contemplated on 160 meters the 3 to 4 Mc. version of the ARC-5 was selected. These units can still be obtained as surplus at a reasonable price. Even the units marked "as is" seem to have the VFO unit still intact, and that is all that is needed for our purposes. If you have a choice try to pick out a unit with the dial in good shape so you can use it in this conversion.

The Conversion

The first operation is a bit brutal and may be painful until you get used to it: Remove the top and bottom covers, the oscillator cover, and ALL THE WIRING BELOW THE CHASSIS. Next remove the two power amplifier tube sockets, the flexible tuning shaft, the power amplifier padder condenser (the one not attached to the tuning shaft), the power ampli-



Rear view, "Collapsed" ARC-5

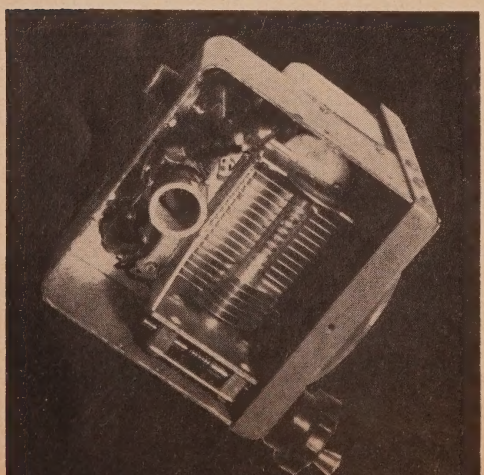
fier tank coil, and the r-f choke. Remove the dial, window frame, and all projecting hardware and knobs from the front panel. Grind or drill the heads of the rivets which hold the front panel to the chassis down to where they can be punched out with a center punch.

Remove the front panel and cut a piece of 1/16" sheet aluminum to fit over it as a false front. In this false front cut a 2" diameter hole to clear the tuning dial hub, and a hole in the lower right corner just large enough to clear the tuning shaft. Mount the false front on the front panel by means of 6-32 screws.

The oscillator tuning condenser (from below the chassis) can be removed and added to your junk box. Remove the p.a. tuning condenser with its associated gears. Use care, for this condenser will be used to replace the oscillator tuning condenser.

With a husky pair of tin snips or a hacksaw you can now cut the chassis down to 4½" depth. The cut will come about ⅛" ahead of the rear edges of the two p.a. socket holes. Remember, you are using the rear part of the chassis, not the front.

Economy VFO, bottom view



Mount the former p.a. tuning condenser in the space left vacant by removal of the oscillator condenser. Try the front panel on for fit. There should be sufficient clearance between the front panel and the gears to permit them to turn freely. Once this clearance has been established the panel can be secured to the sides of the chassis by means of "C" clamps. Drill and tap through the rivet holes, then mount the panel on the chassis with ¼" 6-32 screws. Top and bottom covers should be cut to size.

The former crystal socket should be removed, and the hole covered by a 1⅛" square piece of 1/16" sheet aluminum. The power socket on the rear of the chassis should be replaced with an octal socket. A coaxial chassis-type connector should be installed beside the octal socket. Using the oscillator tube socket for the 6AG7, and the "magic-eye" socket for the VR-150, wire up the unit as shown in the schematic.

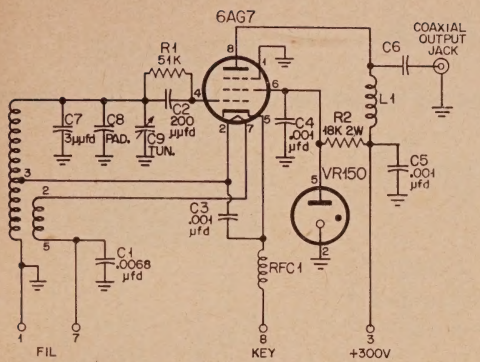
The output coil is mounted in the former crystal socket space with the adjustment screw upward, as shown in the photographs. Use solid No. 14 wire for all leads between the 6AG7 and the oscillator tank circuit. The 6800 $\mu\mu$fd bypass condenser, the 51,000 ohm grid leak, and the 200 $\mu\mu$fd. grid condenser, are original parts. Use short direct leads, especially on the 1000 $\mu\mu$fd. ceramic bypasses.

When all connections have been made, the unit is ready for test. A 24" 4-conductor power cable should be made up to connect the VFO to the transmitter. A source of 300 volts plate power and 6.3 volts filament power will be required. A 24" piece of RG-59/U coaxial cable is used as the r.f. connection to the transmitter.

Put back the old dial, and the tuning shaft knob. Set the dial at 4.0 Mc., and loosen the screws which hold the shaft of the oscillator padding condenser on top of the chassis. Replace the oscillator cover and fasten it down with several screws.

Turn on the power, and after warm-up, adjust the oscillator padder until the signal is heard in the station receiver at 4.0 Mc. Set the v-f-o dial at 3.5 Mc. and check the calibration. The band-spread may be adjusted by means of the oscillator tank coil slug and the padder condenser. When the tuning tracks satisfactorily, the padder shaft can be locked in position, and the covers replaced and secured with all screws. Fine adjustment may now be made with the trimmer at the top of the condenser, and the slug.

For those who are interested only in the 3.5- to 4.0-Mc. band, the unit may now be considered complete. The slug-tuned output coil *L1* may now be peaked for maximum grid drive to the transmitter. The capacity of the co-ax cable forms a part of the output circuit. Should a different length of cable be used, it



NOTE: C1, C2, C7, C8, C9, & R1 ARE ORIGINAL ARC-5 PARTS. .001 CONDENSERS ARE 600V CERAMIC.

Figure 1

R1—51,000 ohms.
R2—18,000 ohms, 2w.
RFC1—2.5 mh. r-f choke.
L1—3.5 mc., 20 turns #28 enam. closewound on National XR-62 form.
C1—6800 μμfd.
C2—200 μμfd.
C3, C4, C5—1000 μμfd.
C6—1000 μμfd. 600v. mica.
C7—3 μμfd.
C8—Oscillator padder.
C9—Former p.a. tuning condenser.

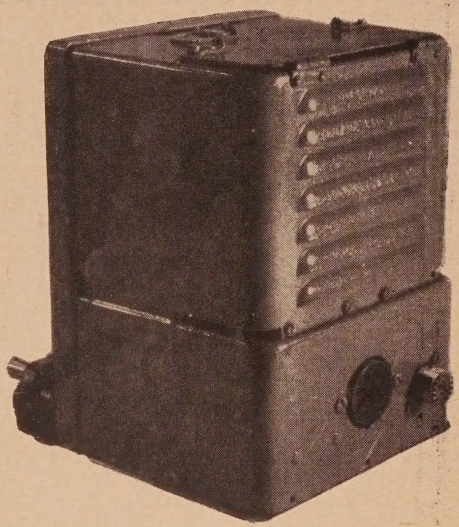
will be necessary to adjust the number of turns in *L1* accordingly, to assure resonance in the 3.5 to 4 Mc. band.

In our case, we use 14- and 21-Mc. 'phone most of the time, so it was deemed desirable to make a new dial, and to spread the 3.5- to 4.0-Mc. band over about 330 degrees of rotation, to avoid cramped readings at the higher frequencies.

To accomplish this band spread, first remove 9 rotor plates from the bearing end, and 1 rotor plate from the gear end of the oscillator condenser. This leaves 6 rotor plates. This can be done with a pair of long-nose pliers. Be careful not to disturb the stator or to dislodge the pyrex bead insulators. Adjust the padder condenser until 3.5 Mc. appears at the low end of the tuning dial, and 4.0 Mc. at the high end. The exact location of these points relative to the old dial scale is not important, as we have to make a new dial scale.

Remove the old dial. Using a piece of ⅛" lucite, cut a circular piece 3¼" in diameter, and another one 1¾" in diameter. The larger piece is the dial face, and the smaller one the hub. Cut a 1" hole in the dial face, and using the old dial as a template, cut a hole in the center of the hub to fit the dial mounting. Drill the hole for the alignment pin. Try the hub for size on the dial mounting. The face may be cemented to the hub at this time, using Duco cement.

Using small spots of rubber cement, secure a piece of heavy white paper or cardboard to the dial for a scale, and calibrate the new scale using the station receiver and frequency meter, marking the calibration right on the paper. Begin at 3.5 Mc. and make a small mark every 5 kc. The 50 kc. points should be marked with figures, such as 3.50, 3.55, 3.60,



etc. Mark the 3.5-Mc. and 4.0-Mc. points on the edge of the lucite. With the aid of a draftsman, the marks and figures may be neatly inked in, with the paper scale removed from the dial.

The other amateur bands may be shown in the proper harmonic relationship, as shown in *Fig. 2*. The 'phone bands may be shown by heavy inked lines. This figure is not intended to be an accurate calibration but is merely included as a guide to the reader. After the inking is done, the scale may be cemented to the dial face by means of Duco cement, and the whole dial should be sprayed with Krylon clear plastic spray to protect it.

The calibration should be rechecked, with the oscillator padder locked and the covers in place and secured with all screws. Slight variations in calibration can be made with the slug and trimmer.

The VFO unit, from its 3.5- to 4.0-Mc. output, will give sufficient excitation to drive most

[Continued on page 53]

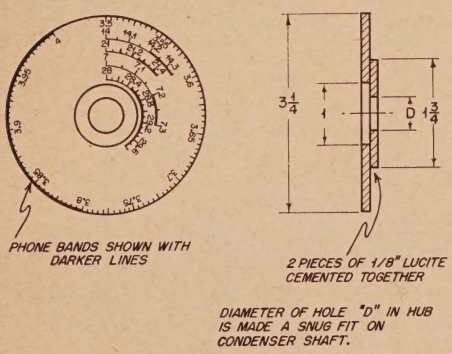


Fig. 2. VFO dial. Note harmonic relationships of bands.

ALL TIMES IN EST

EASTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Northern & Central Europe	1600-1800 (0-1)	0600-1500 (3) 1500-1700 (4) 1700-2000 (2)	1900-2300 (3-4) 2300-0100 (2-3)	2000-2300 (2-3)
Southern Europe & North Africa	1500-1830 (1)	0600-1430 (3) 1430-1800 (3-4) 1800-2030 (1-2)	1830-2300 (3-4) 2300-0030 (2-3)	1930-2330 (2-3)
Near & Middle East	NIL	0600-1400 (1) 1400-1900 (2-3)	1930-2300 (2)	2030-2230 (1)
Central & South Africa	1600-1900 (0-1)	0600-1200 (1) 1200-1500 (1-2) 1500-2030 (3) 2030-2130 (1)	1830-0100 (2-3)	1930-0000 (1-2)
South America	1500-1730 (0-1) * 1230-1600 (2-3) 1600-1830 (3-4) 1830-1930 (1-2)	0600-1600 (1-2) 1600-1800 (2-3) 1800-2130 (3-4) 2130-0200 (2)	1900-0430 (3) 0430-0700 (2)	2000-0400 (1-2)
South East Asia	NIL	0700-1030 (1) 1030-2100 (0-1)	0300-0600 (0-1)	NIL
Australasia	1900-2200 (0-1)	0700-0930 (0-1) 1730-2030 (1) 2030-2300 (1-2)	0000-0700 (2-3)	0130-0630 (1-2)
Guam & Pacific	NIL	0630-1100 (2) 1500-2000 (0-1) 2000-2200 (2-3)	2300-0730 (2-3)	0030-0600 (1-2)
Japan & Far East	NIL	0630-1000 (1-2) 1700-2130 (1)	0200-0630 (1)	0330-0500 (0-1)

ALL TIMES IN CST

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe	NIL	0600-1730 (3) 1730-1930 (1-2)	1900-0000 (2-3)	2000-2300 (1-2)
Southern Europe & North Africa	1500-1700 (0-1)	0600-1400 (2-3) 1400-1830 (3-4) 1830-2000 (1-2)	1830-0030 (3)	1930-0000 (2)
Central & South Africa	1400-1800 (1)	0600-1400 (1) 1400-1700 (2) 1700-2000 (2-3)	1800-2300 (2-3)	1930-2200 (1-2)
Central America & Northern S. America	1500-1800 (0-1)* 1100-1800 (3-4) 1800-2000 (1-2)	0630-1600 (3-4) 1600-2100 (4-5) 2100-0100 (2)	1730-0500 (4-5) 0500-0700 (2-3)	1830-0400 (2-3)
South America	1400-1700 (1-2)* 1200-1500 (2) 1500-1830 (3) 1830-1930 (1-2)	0600-1500 (2) 1500-2100 (3-4) 2100-0200 (2-3)	1830-0430 (3)	1930-0330 (2)
Japan & Far East	NIL	0600-0930 (2) 1000-1930 (0-1) 1930-2230 (2)	0200-0600 (2)	0300-0500 (0-1)
South East Asia	NIL	0730-1030 (1) 1030-2000 (0-1) 2000-2230 (1)	0400-0600 (0-1)	NIL
Hawaii	1900-2200 (1-2)	0930-1900 (2-3) 1900-0000 (3-4)	2200-0430 (4) 0430-0830 (2-3)	2330-0600 (3)

ALL TIMES IN CST

CENTRAL USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Australasia	1900-2200 (1)	0630-1000 (1) 1500-1800 (1) 1800-2100 (1-2) 2100-2330 (2-3)	2300-0400 (3) 0400-0630 (2-3)	0030-0600 (2)

ALL TIMES IN PST

WESTERN USA TO:	15 Meters	20 Meters	40 Meters	80 Meters
Europe & North Africa	NIL	0700-1330 (1) 1330-1700 (1-2)	1900-2200 (1)	1930-2130 (0-1)
Central & South Africa	NIL	0600-1330 (0-1) 1330-1600 (1) 1900-2100 (1)	1830-2330 (2)	1900-2230 (1-2)
South America	1200-1800 (0-1)* 1130-1500 (2) 1500-1830 (3-4) 1830-1930 (1-2)	0600-1500 (2) 1500-1700 (2-3) 1700-2000 (3-4) 2000-0100 (1-2)	1900-0300 (3)	2000-0130 (2)
Guam & Mariana Islands	1900-2100 (1-2)	0700-0900 (1-2) 1030-2000 (2) 2000-0000 (3-4) 0000-0200 (1)	0100-0430 (3)	0130-0400 (2)
Australasia	1500-1900 (0-1)* 1300-1800 (2) 1800-2030 (3)	1200-1900 (1) 1900-2100 (1-2) 2100-2300 (3-4)	2200-0500 (3)	2300-0430 (2)
Japan, Okinawa & Far East	1300-1700 (0-1) 1700-2200 (1) 2200-0100 (0-1)	0700-0900 (3) 0900-2000 (2-3) 2000-0300 (3-4)	0100-0430 (3-4)	0130-0400 (2)
Philippine Islands & East Indies	1900-2300 (1)	0700-1000 (2) 1200-2130 (0-1) 2130-0130 (2)	0300-0600 (1)	NIL
Malaya & South East Asia	2000-2300 (1)	0700-1000 (2) 1000-2300 (0-1) 2300-0100 (2)	0300-0700 (0-1)	NIL
Hong Kong, Macao & Formosa	1800-2230 (0-1)	0700-0900 (1-2) 1200-2100 (1-2) 2100-0200 (3)	0230-0600 (2-3)	0300-0530 (1)

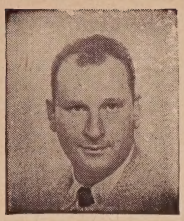
Symbols For Number Of Days Path Forecast To Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

* Indicates time of possible ten-meter openings.

The CQ Propagation Charts are based upon a CW radiated power of 150 watts and are centered on Washington, D. C., St. Louis, Missouri, and Sacramento, California. These forecasts are, for the most part, calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards and are valid through August 15th, 1955.

Ionospheric Propagation Conditions



Forecasts by
George Jacobs, W2PAJ/W3ASK
607 Beacon Road, Silver Spring, Md.

General Shortwave Propagation Conditions —July

During July, ionospheric conditions are generally considered as optimum for shortwave radio propagation. Ionospheric disturbances tend to occur less frequently during July resulting in a comparatively stable ionosphere. In addition, since the sun reaches its highest point in the northern skies during late June and July, night time useable frequencies are at their highest values of the year. On the other hand, daytime useable frequencies, while not as high as during the winter months, are nevertheless high enough to permit world wide DX on 20-meters from dawn to considerably after sunset. A peak in the occurrence of sporadic-E type propagation also generally occurs during July resulting in considerable "short-skip" propagation on frequencies as high as the 6-meter band.

The following is an overall picture of band conditions intended to indicate qualitative changes in each amateur band from month to month for both DX and short-skip propagation conditions. For specific times of band openings on many popular DX ciruits refer to the *CQ Propagation Charts* on the opposite page.

6 Meters: Occasional short-skip openings between 1000 to 1400 miles expected as a result of sporadic-E propagation.

10 Meters: DX conditions poor with only a slight chance for an erratic opening to South America on a very small percentage of the days. However sporadic-E layer short-skip openings are expected to occur on most days with the skip distance between 500 and 1300 miles.

15 Meters: Fair daytime DX to South America and other southern locations. Sporadic-E layer openings expected on most days with the skip between 400 and 1300 miles. Regular layer F-2 short skip openings expected during the daylight hours of some days from approximately 1100 to 2100 *local standard time*, with the skip distance greater than 2000 miles.

20 Meters: World-wide DX possible from shortly after sunrise to considerably after sunset, *local standard time*. Regular layer F-2 short-skip, with the skip distance between 1000 and 2200 miles, should be possible on most days between 0600 and 2200 *local standard time*. Frequent sporadic-E openings are expected around the clock on many days, with the skip distance between 300 and 1400 miles.

40 Meters: Despite seasonally higher static levels, fairly good DX possible from a few hours before sunset to a few hours after sunrise. Daytime short-skip openings between 100 and 400 miles can be expected every day, with the skip distance extending beyond 600 miles during the hours of darkness.

80 Meters: Seasonally higher static levels and ionospheric absorption will result in poorer DX propagation conditions on this band. However, fair DX should still be possible to many areas of the world during the night time hours. During the daytime hours, propagation will be limited to within approximately 200 miles from the transmitter, extending out beyond 2000 miles during hours of darkness.

160 Meters: Daytime propagation limited to about 50 miles. Night time propagation increasing to distances up to about 1500 miles when static levels are low.

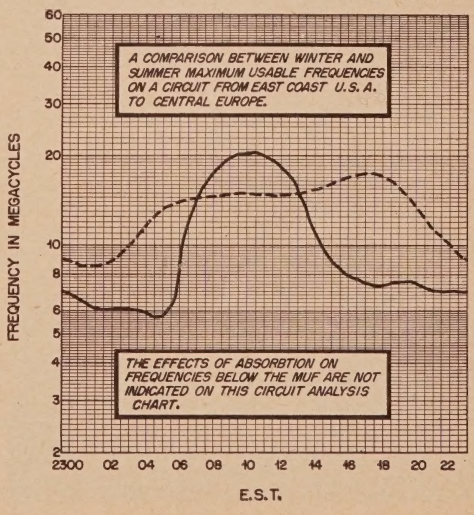
Sunspot Cycle

This month's forecasts are based upon a predicted smoothed sunspot number of 20 centered on July, 1955. The monthly Zurich sunspot number observed during April, 1955 was 11.3 resulting in a provisional 13-month running smoothed sunspot number of 7.4 centered on October, 1954.

Review of Shortwave Propagation Fundamentals (Con't)

In previous months' columns we have discussed the role of the ionosphere in shortwave propagation, and the fact that strongly ionized layers will reflect higher frequencies than will weakly ionized layers and that the degree of ionization of the various layers of the ionosphere is dependent for the most part upon the ultra-violet radiation from the sun. Last month we discussed the fact that the degree of ionization of the layers varied diurnally (day and night) and seasonally, being ionized to a greater degree during the daytime than during the evening hours, and greater during winter days than summer days and during summer nights than winter nights.

[Continued on page 50]



Letters . . . to the editor

Dear OM,

I have just completed converting my Tri-band to 40 meters as per W4SWI's excellent article in the May 1955 issue of CQ. I have a Deluxe Tri-band and found no difficulty in adapting the conversion instructions to this model, with the exception of two additional notes. When converting the deluxe model it is a good idea to temporarily unsolder the hi-low 75 meter antenna switch leads from the rear cover. This facilitates drilling the panel and mounting of the coil and switch. Also in the "step-by-step" instructions no "step" is listed for mounting C3, the 50mmfd silver mica, across the 40 meter coil. I mounted mine from pin 8 of the bandswitch to the lug at the rear of the tuning capacitor, where the ground end of the 40 meter coil is soldered.

The converted tri-band worked perfect the first time and in just a few minutes I logged 40 meter phone signals in from all over the U.S.A.

Keep up the good work, your "new" CQ is tops.

George L. Tyler, Jr. W6CUI

Dear Editor:

On page 14 of the May, 1955 issue of "CQ" there is a picture and write-up that might lead to some misunderstanding.

For the purpose of preventing any mobile hams from getting an inferiority complex, I am enclosing a few pictures that I took showing more clearly how W6IWJ/MOBILE works "DX".

The 30 ft. mast and the 3 element 15 meter beam (all of which is mounted on a hill in the Santa Monica Mts., 1000 ft. above sea level) is a tribute to the resourcefulness of any mobile ham.

As near as the gang out here can tell, Ol' Uncle Herb has been using this variety of "quarter-wave whip" since August of 1954.

George M. Knight, W6CAL



Dear Editor:

If my wife had not snatched from me the April CQ, I would have had some kind of laughing convulsion from WØWET's ABSEM. I was 2 minutes gaining enough composure to ask for it back. Don't change WØWET.

George Bonadio, W2WLR

Dear Wayne,

In the last few months you've made CQ the BEST HAM technical journal available. In spite of this you haven't lost your sense of humor. It had to be pointed out to many people, but the way you signed "73" last month evoked a good many laughs.

Byron G. Wells, K2AVB

Dear O. M.

Although I am a confirmed phone man (I took the code test 6 times) and would like to see the phone bands expanded, I feel that two points in W2ZGU's letter in the June CQ need clarification.

In the first place, we are hardly in a position to ask for more band space until we can show that we are making maximum utilization of the space we already have. In the present "state of the art" SSB provides at least twice as many channels per band as AM so that we should not complain to FCC of crowding until we have our own house in order, i.e., fully converted to SSB.

In the second place, one could get the impression from W2ZGU's letter that since an AM station is occupying 6 kc it is conveying 6,000 bits of information per second. Such is not the case, largely because the same information is repeated over and over on present day phone. An extreme example would be that of a flute player who sounded a 3,000 cycle note for one second. Such a transmission would occupy 6 kc on the air but actually only 4 bits of information per second would be provided: start, stop, frequency and intensity. Admittedly, the complex sound of the human voice conveys more information than the sine wave output of a flute, but analysis will show that, at most, the information imparted by the voice is a few hundred bits per second. Therefore, the phone men should press forward with an efficient coding or compression system, since there is no real reason why speech can not be compressed to a few hundred cycles per second. I feel that this will be the next significant advance in ham radio and the logical development of SSB. The commercial laboratories are far ahead of the hams in this regard. When a workable coding system for voice is developed, coded voice and ordinary code will occupy about the same channel width.

Based on phone techniques now available and to come, perhaps it would be wise to wait for a while before reallocating the phone and CW bands.

Robert G. Slick, W6PBX

Dear Mr. Green:

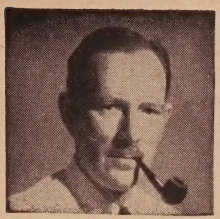
Just finished reading the excellent article by Charles T. Miser, W9MDC about his motor-driven loading coil. I noticed on page 37 that you suggest, in a footnote, the Johnson #229-201 rotary inductor for the application.

You, and CQ readers, may be interested in knowing that we have introduced two new rotary inductors to the #229 series. The #229-202 has a 15 uh inductance and is wound with #12 wire and the #229-203 has 25 uh inductance and is wound with #12 wire. The #229-201 with 10 uh and #14 wire will of course still be available. These new inductors should be on distributors' shelves within the next two or three months. The new models, with the #12 windings, should be useful for many amateur transmitter applications as they will handle considerably more power than the #229-201.

Winston Puttick
Advertising & Sales Promotion Mgr.
E. F. JOHNSON COMPANY

40-Meter Novice Band Doubled

Effective June 22, 1955, Novice Privileges on 40 meters are extended by official order of the FCC to include the portion 7150-7200 kc.



DX and Overseas News

Gathered and reported by
R. C. "Dick" Spenceley, KV4AA
Box 403, St. Thomas, Virgin Islands

Hams will be glad to hear that Bob Ford, AC4RF, walked over the border to freedom in Hong Kong on May 30th.

EXPEDITION "YASME," VP2VB: We are happy to report that Danny Weil (G7DW/MM) has been issued a ham license under the call letters VP2VB (British Virgin Islands). This will be used as a basis to further his "round the world" plans for a two year long DX expedition which will call at all rare DX spots that can be reached. Interest in this project has been indicated by a top U.S. manufacturer of ham radio equipment. Danny returns to KV4-land on May 18th when further steps will be taken to push this venture.

TURKS AND CAICOS, VP5BM, VP5DC: May 5th marked the appearance of VP5BM (ex-W5HJI) and VP5DC (W4NMO) from this comparatively rare spot. They are both located on Grand Turks Island and have been very active near 14010. VP5BM gives his xtl frequencies as 14009, 14050 and 14080. VP5AE, who has been very busy giving phone contacts from this QTH, now returns stateside for re-assignment and any missing QSL's may be sent via W8LMO. See QTH column.

DIRECTION ISLAND, COCOS-KEELING, ZC2PJ: After some mix-up on bands (He was transmitting on 7 Mc. and listening on 14 Mc.) Jim Reeves was heard contacting such W6's as W6MUR, W6GFE, W6SYG, W6CUQ and W6BXL on 14045 around 1500 GMT, May 7th.

THULE BASE, GREENLAND, KG1AA: This station has been quite active under various operators. KG1AA came on the air May 3rd and various frequencies on the 14 Mc. band have been used. Seems like this one could qualify as a separate country much in the manner of KG4-land. See QTH's.

SAN DOMINGO, HI8WF: This station was heard on May 7th in contact with W8KIA, W6NHZ, W8JBI, W9FID, W8DFQ, W9TGY, W9RMH and many others on 14018. He gave his name as Bill, QTH, Boca Chica, and stated that he had just got back from Miami with 5000 QSL cards. We hope he is OK and we note that his QTH is OK in the Callbook.

BRUNEI, SARAWAK, BRITISH NORTH BORNEO, VS5CT: Pete, VS5CT, was scheduled to leave Brunei in June for Sarawak for a two months stay at VS4-land. He will then go to ZC5-land for a four months stay. QSL's have been printed and those covering VS5CT operation should now be out.

JOHNSTON ISLAND, KJ6BG: (West Gulf Bulletin) This is apparently a new station from this spot. He gives his name as "Kirk" from Houston, Tex. KJ6BG may be found around 14030 usually after 0230 GMT. See QTH's

JAN MAYEN, LB1LF, LB8YB: (West Gulf Bulletin) The activities of LB1LF were unfortunately cut short when operator Arne was attacked by a mad dog and his hand severely bitten. Efforts to pick him up via Catalina aircraft were unsuccessful when the plane was unable to land on Jan Mayen. After a few days, however, Arne was picked up by a Norwegian Naval vessel and brought to the hospital at Harstad, Northern Norway, where he is now doing OK and working as a wireless operator at Harstad. See QTH's. Finn, LB8YB, operated from Jan Mayen from August 24th 1953 until about July 20th 1954. Before and after these dates he used the same call at Myggbukta, Northeastern Greenland. Finn is due to return to Norway about August 1st.

FANNING ISLAND, VR3A: (North California DX'er) Ray is happy to state that he is all caught up with QSL's as of May. VR3A will QRT about the end of November and visit the states about Xmas with his logs. Cards for contacts with VR3A after May should be sent to his home QTH: 79 Bealiba Road, South Caulfield, S.E. 8, Vic. Australia.

PITCAIRN ISLAND, VR6AC: W7HXG advises that he contacted VR6AC on 14,143, A3, at 2047 PST, May 11th. Floyd, VR6AC, told Lee that he was his first post-war contact and that he was just finishing a ZL-special antenna. Modulation was good.

ALBANIA, ZA1BB: In answer to many inquiries regarding QSL's from this station, who was very active during

the latter half of 1954 and gave his QTH as "Box 2, Korce, Albania," we can only say that some cards have been coming through but they are of the BCL type and make no mention of ZA1BB altho they are certainly mailed from Tirana. One such card recevied by W8YIN reads, "We received your post-card and we thank you for the interest you show in listening to our broadcasts. Sincerely yours, RADIO TIRANA." In view of this we would hazard three guesses: 1. Radio Tirana is receiving QSLs and think they are BCL reports. 2. ZA1BB doesn't know his call should appear on the card for credit. 3. He doesn't want it known, locally, that ZA1BB was active at all.

BRITISH HONDURAS, VP1FL: This station has been heard many times putting out a strong signal from this QTH near 14060 around 1200 GHT (and other times). The ops name is Frank. See QTH's. 135 watts is run to a dipole.

FORMOSA, BV1US: This station is operating from the U.S. Embassy and has official permission to operate on the ham bands. He is on 14,250, A3, only. This station was old AB1US who operated unofficially. His first east coast contact was with W3ECR on May 3rd. See QTH's.

DX Notes

G6ZO advises that GM3AIM is active on 7, 14 and 21 from the Outer Hebrides which is a useful catch for WAE fans. . . . Also, from an "worked all Europe" angle we are told by DL7AB that OH9NV was due to open up from the Finnish Polar Zone on May 23rd and will be on 3.5, 7 and 14 Mc. (3525, 7040, 14050). . . . W3YIV tells us that a visitor to Dutch St. Martin went on the air with the unofficial call of PJ2MA on March 9th. When the "legal" PJ2MA arrived he switched his call to PJ2MB. In all 113 contacts were made with a 5 watt rig and very poor BC receiver. W3YIV has his log and operator Pete, of PJ2MB is now back in Sweden. . . . DL6TQ reports working one SV7AL who gave his QTH as Rhodes. . . . F9RS nabbed FD8AB on 14020 at 1730 4/28. See QTH's also heard from was FD8AC who gave his name as Pierre and said he was on a jungle expedition in Togoland. . . . W5WZQ reports FK8AH active on 14070 around 0400 GMT. . . . W6NTR reports KC6AI active from Ulithi Atoll, Western Carolines. . . . W3JTC is handling QSL's for HKØAI for DX contest contacts. . . . Some VP9's plan a DX'pedition to the Caribbean which they are keeping hush-hush. It may have come off by now. . . . K6CIT nabbed YJ8AA on 7022, 4/17 at 0729 GMT. . . . W2MZB ponders a contact with XG6AX, 7020, 4/28, Guapo (?) Island. . . . ON4QX had a QSO with Peter, at ON4QX/AC4, at 0600 GMT, 14100 CW. He also reports the first W contact with ON4QX/AC4 which was with W8QJR on 4/21 at 0603 GMT. ON4QX says he may fly to Tibet in July for two weeks operation at ON4QX/AC4 but it is very uncertain. Main activity will be from Tibet and not Nepal as previously thought. Nepal activity is possible but no authorization has been granted for this as yet. VU2RC may help for skeds. . . . W8KIA reports contact with a station in Spitzbergen signing 5JBA on 14060 at 1300 GMT. He gave his name as "Konvo" and said he was a Russian Military WX station. QSL via Capt. E. Knut, Pearyland. . . . W9QQG reports FO8AL on 7 Mc. around 0530 GMT. . . . Here's further word on VS5CT via VS2DQ and K6GAK: Pete, VS5CT, is in the jungle on oil exploration and has to travel many miles by boat to pick up his mail. At the earliest Pete will receive his QSL's by June 20th and the earliest anyone will receive any from him will be around July 20th. Jim, VS2DQ, wishes it known that the MARTS QSL bureau has been extended to include the areas of VS1, VS2, VS4, VS5, ZC2, ZC3 and ZC5. See QTH's. . . . Word from Bob, WØQVZ, states that Webster's Geographical Dictionary, 1949 Edition, says that the Corn Islands were CEDED by Nicaragua to the United States on Feb. 18th, 1916 with no later change in status being recorded. . . . EA9DF advises he makes monthly trips to IFNI. He can take along a small receiver but has no transmitter that is portable. Any help? . . . Kurk, HB1MX/HE has now wound up his weekly trips to Liechenstein where 1998 contacts were made in 91 countries. 1500 QSL's were sent out with only a nine, repeat nine, percent return from the USA! 100% returns came from YO, LZ, SP, HA, OK and YU (Don't send 'em until you receive them Kurt or you sure are going to lose faith in human nature. The exception is, of course, unless it's a new country for you!). . . . Notes from the West Gulf Bulletin advise that KC6ZB and XYL, KC6ZC will be back on the air from YAP Island in early July upon return from W7, KH6 and KG6-lands. KC6CG showed up on 14 Mc. with a KW and new Sterba antenna on May 9th. The new beam for PX1YR has arrived in Spain and Yves should be on the air with it around April 1st. VK4IC has a nice phone signal from Willis Islet (400 yards square) off the Northeast Barrier Reef of VK4. Ships call at this WX station once per year (no separate status). XZ2OM runs 20 watts and is most active on 14, CW and phone. Operating times are given by G6QB as follows: Daily 1230 to 1530 GMT (Also 7 Mc. A1/A3). Sundays 0200 to 0600 and 1100 to 1230 GMT. 21 Mc. between 0730 and 1030 at times. MP4QAL daily on 14060 from 1730 to 1900 GMT. Good op. Fergus runs a VFO into parallel 807's for 125 watts and ground-plane antenna. EA9AR will go to IFNI if he gets tx from CO2BL. HC8HM is new station, 14317, on Galapagos. MP4QAM, who operated from Trucial Oman was due to return to Qatar in May. . . . Bill, W6SAI, has received over 100 QSL's for the recent, mysterious, 3A2AF

We welcome the following stations who are making their first appearance on the HONOR ROLL:

G4MJ	40-207
W8JBI	38-219
ON4QX	35-128

activity. Bill holds the call, 3A2AF, which is still in good standing, and has been QRT, from that QTH, since 1950. Some "mittle europa joker" I guess. . . . W9PCF ponders QTH of ZC6AA contacted on 14040 at 2030 GMT, May 8th. . . . FM7WN is now in France and will return in September. . . . We understand that license delays are holding up the activities of some 50 hams on ZD7 and ZD8. . . . Presently active from VK1, via G2DPY, are Eric, VK1EM, Bob, VK1RA and Hugh, VK1AWI, at the MacRobertson (Antarctica) Base. On Macquarie Island are: Harry, VK1HN, Bernie, VK1ZM and David, VK1DC. . . . G3FXB reports working VK4SWL who gave his QTH as Box 47, Guadalcanal. . . . W6NZW reports that YJ1DL comes on 14005 around 0700 GMT. . . .

New DX Addresses

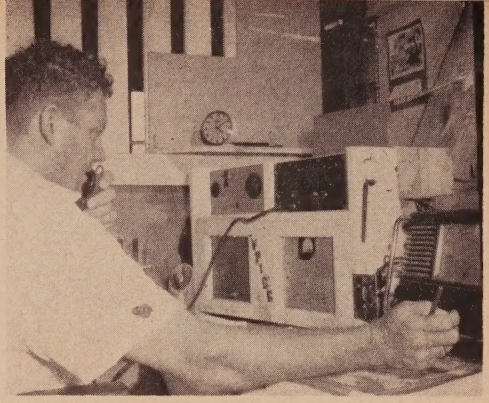
AP2U——Noor Mohamed, 6 Roberts Market, Quetta, Pakistan.
BV1US——MAAG FORMOSA, APO 63, San Francisco, Calif.
C3WV——C/O U.S. Embassy, Formosa.
FD8AB——Roland Novel, Box 185, Lome, French Togoland.
FK8AJ——Marcel Jerome, Box 104, Noumea, New Caledonia.
KA7GB——Post Signal Officer, APO 45, PM, San Francisco, Calif.
ex-KF3AB——M/Sgt Cyril L. Hull, 804th Opns. Sq. Box A-5, Hunter AFB, Savannah, Ga.
KG1AA——931 Sqdn. Thule, APO 23, PM, New York, N. Y.
KG6SB——P. O. Box 14, Navy 935, F.P.O. San Francisco, Calif.
KJ6BG——Kirk, APO 105, San Francisco, Calif.
LB1BF/LA1BF——Arne Moen, SB/DKN, Harstad, Norway.
OY7ML——Martin Haasen, Box 141, Thorshavn, Faeroe Islands.
TF2WAC——Via W1WMS, Box III, Salem, N. H.
TF2WAF——1971 AACS, APO 81, P.M. New York, N. Y.
TF2WAG——932 AC & W Sqdn. APO 81, P.M. New York, N. Y.
VE8QL——Elvin C. Veale, Box 310, Yellow Knife, Dist. of McKenzie, Canada.
ex-VK1AC——VK3IB, A. C. Hawker, Box 35, Dimboola, Vic. Australia.
VP1FL——Frank Locke, Telecomm Dept. Belize, British Honduras.
VP5BM——(Grand Turk Island) via Route 1, Box 53E, Bay Minette, Alabama.
VP5DC——(Grand Turk Island) via W4NMO.
VQ3CF——Sailor, Box 35, Songea, Tanganiyika.
VQ8AG——Frank McCaughran, 180 Route Royale, Beau Bassin, Mauritius.
VS5CT——VS2 Bureau, Box 600, Penang, Malaya.
VS1, VS2, VS4, VS5, ZC2, ZC3, ZC5——Via MARTS, VS2DQ, Box 600, Penang, Malaya.
ZC4JA——230, Orpheus St., Nicosia, Cyprus.
ZD4BT—Sid Browne, Radio Div. Posts and Telecomms, Accra, Gold Coast.

(Thanks to The West Gulf Bulletin, W5EFC, W5KBU, WØCPM, W9NDA, W6MUR, W1JOJ, W6YY, W1BIL, W5HDS, F9RS, W5FXN, W5UUK, W5YLL, YU1AD, W4ZFE and VP5AE.)

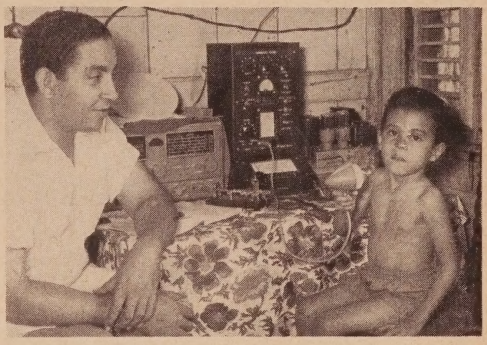
DX'ploits

Frank, **W6AOA**, goes to 251 thanks to PJ2MA. . . . Howy, **W2AGW**, upped to 250, with help from the same party. . . . Lindy, **W8BHW**, hooked TI9MHB, HKØAI and KC4AB for a 247 total while Bob, **G6RH**, added PJ2MA and KC6AA for a like score. . . . Roger, **W3EVW**, went

[Continued on page 53]



Greg, VP1GG, British Honduras, ran 25 watts which put a surprisingly good signal on the phone bands. VP1GG went QRT in May and after a spell of leave in G-land hopes to appear with a VR2 call around January 1956. Other active VP1 stations reported by Greg are: VP1AA, VP1AB, VP1BOY, VP1FL, VP1SD, VP1SJC, VJ1OJF, VP1VR and VP1ZU.



A very popular catch, these days, is FY7NE of Cayenna, French Guiana. Photo shows Mario Sr. and Mario Jr. at the operating position. The Harvy-Wells TBS-50-D, recently donated by U.S. hams, may be seen to the right. Receiver is a National NC-98. Antenna, 40 meter long wire. QSL go via W4ML.

CR6CS, Pedro Almeida Lopes, runs 50 watts to an 807 in Calulo, Angola. Receiver, as seen, is a Hallicrafters S-40-B.



the Novice Shack



Conducted by

Herbert "Herb" S. Brier, W9EGQ

The question of the month is "Do vertical antennas have any advantage over horizontal ones for Novice and General-Class use on the amateur bands between 3.5 and 21.5 Mc?"

To establish a basis for comparison, most experienced amateurs will agree that all horizontal antennas used by amateurs have directional properties. Often, it seems that when one is erected in the only position possible, it transmits its strongest signal in the least desired direction and vice versa. A height of 35 feet is a good compromise for a "general-purpose" horizontal antenna, while a height of 50 to 70 feet is about optimum for a DX antenna.* A horizontal antenna requires two supports.

In contrast, a vertical antenna radiates equally in all compass directions. When it is mounted with its base near the ground and is less than ⅝-wavelengths long, maximum radiation occurs at a vertical elevation of zero degrees and gradually decreases as the angle is increased. Only one support is required.

Obviously, if practice and theory agree, the vertical antenna does have some important advan-

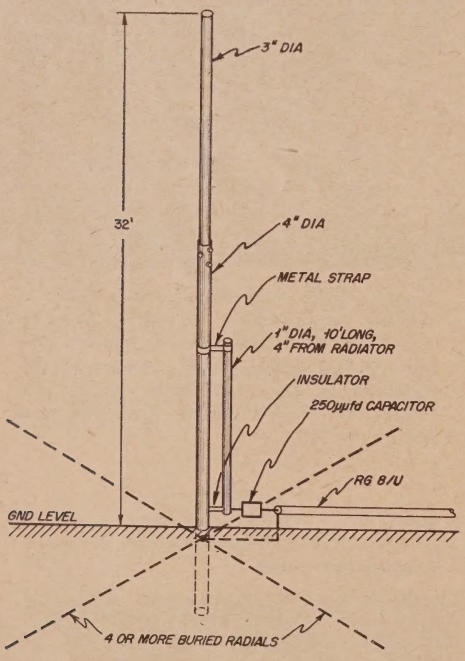


Fig. 1. Essential details of a simple, 40-meter vertical antenna, which will also work on 15 meters. It may be installed with its base a few inches from the ground and the ground radials buried a couple of inches under the surface of the earth. When its base and the radials are some distance above the ground and insulated from it as shown, a "ground-plane" vertical is formed. In either event, a minimum of four radials are recommended.

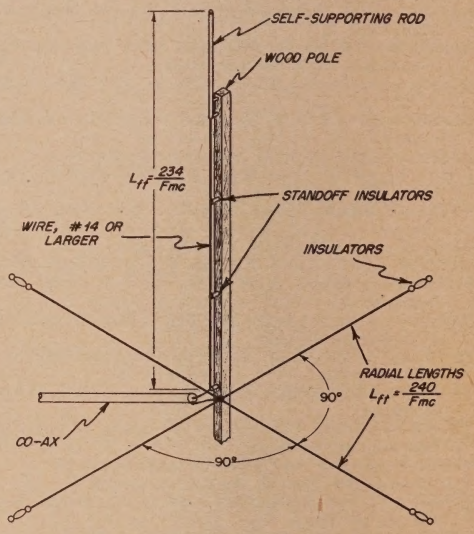


Fig. 2. A "shunt-fed," 40-meter vertical antenna. Because of the large diameter of the radiator, which may be aluminum "irrigation tubing" or galvanized rain pipe, its length is slightly less than that determined by the formula, $L_{ft} = 234/F_{Mc}$, usually used to calculate the resonant length of a ¼-wave antenna. The capacitor between the center conductor of the coaxial line and the matching bar may be made variable and adjusted for minimum line SWR.

*A height of 70 feet (½ wavelength at 40 meters) centers the lowest lobes of radiation at the following vertical angles: 40 meters, 32 degrees; 20 meters, 15 degrees; 15 meters, 10 degrees; 10 meters; 8-9 degrees. These are the measured, median angles at which DX signals are transmitted and received on these bands. Greater height would be optimum for an 80-meter DX horizontal.

tages. Combining a bit of research reading with some personal experience with verticals indicates the following:

On the average, a properly installed vertical antenna is a better "DX" antenna than is a simple, horizontal antenna 35 feet or less high. The horizontal antenna normally produces stronger signals over medium distances, especially on 80 and 40 meters.[1, 8]

As the height of the horizontal antenna is increased, the difference in DX results between the two types becomes less. The late W9LM, for example, reported that on 40 meters there was no essential difference in DX results between a ¼-wave ground-plane vertical antenna and a ½-wave dipole 67 feet high, except that the horizontal was an "S" unit or so better broadside than it was off the ends.[1]

On the debit side, it must be stressed that putting up an efficient vertical antenna entails a lot more effort than hanging a piece of wire from an upstairs window and tieing a feedline to it.

Designing A Vertical Antenna

To show what must be done, let us examine a 40-meter vertical more closely. This band was chosen, because the resulting dimensions are reasonable.

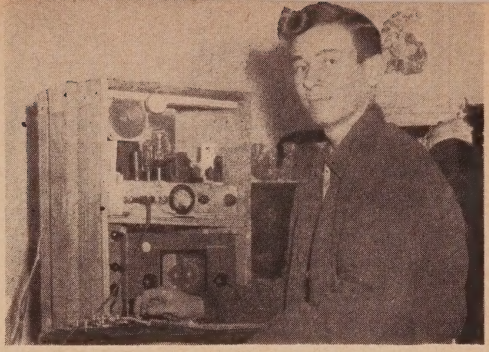
To halve the required height, we will operate the antenna against ground, making its length 32 to 33 feet. Besides being shorter, a grounded, ¼-wave vertical antenna differs in two characteristics, compared to a ½-wave one.

The point of maximum current is lowered from the center of the antenna to its base. As maximum radiation occurs from the part of the antenna carrying the greatest current, this means that maximum radiation will occur from the bottom of the antenna. Also, the percentage of power radiated at medium-high angles of elevation will be increased. A ½-wave vertical radiates little energy at angles above about 25 degrees, while the ¼-wave one radiates a fair amount at angle approaching 60 degrees.

Obviously, it becomes very important to install the ¼-wave vertical antenna where it is not surrounded by power-absorbing utility wires, rain gutters, metal-frame buildings, large, leafy trees, and the like. If this precaution is not observed, its efficiency will be quite low.

The power radiated at relatively high angles by a ¼-wave vertical is an advantage on 40 and 80 meters. Remember, you do not operate a broadcast station, from which you are primarily interested in maximum ground-wave range. It is entirely possible to obtain too low an angle of radiation from a ½-wave vertical antenna on these frequencies for best results.[1]

It is fortunate that extremely low-angle radiation is not required on the amateur bands up to about 25 Mc. On frequencies above about three Mc, all



Roy Griffin, (17), K4ABZ, Pinetops, N. C., a week before obtaining his 'General.' He runs about 25 watts to a home-built 80-meter transmitter and has a much-modified S-41G receiver.



Now that Steve Chase, WN7WSS, Vernal, Utah, has worked the 48 states and ten countries as a Novice, he is ready to try for his 'General.'



Sixty-five watts to a Globe Scout transmitter, abetted by an NC-98 receiver and a 75-foot antenna has earned Dave Corsair, KN2KHZ, Newark, New Jersey, 21 states and Canada in a few months on 80.



Ronald McCloud, WN1DVT, Shelburne Falls, Mass. His *Lettine* 240 transmitter and *Hallicrafter's* S-53A receiver gets him many contacts on 80 meters.

energy radiated by an antenna at angles much below 10 degrees is absorbed by the earth within a short distance from the antenna, anyway.

This is true whether the antenna is horizontal or vertical. But, as horizontal antennas do not radiate energy at such low angles, unless they are a couple of wavelengths high, it is seldom a factor with them. With verticals, however, the power so lost reduces the amount that can be radiated at more-useful angles. But, do not become too alarmed about it. Horizontals waste their share of power by radiating it at angles too high to be useful.

The Vertical Antenna Ground System

The value of a low-loss ground system for use with any vertical antenna cannot be overestimated. The feed-point (radiation) resistance of a ¼-wave grounded antenna is 35 ohms or less. If the ground resistance is also 35 ohms, and it can easily be more,[2, 3] only half of the power delivered to the antenna terminals can be radiated. The other half will be wasted in heating the earth around the ground connection.

Equally as important as the losses directly below the antenna are those in the earth surrounding it for a considerable distance, because they absorb r-f energy from the field around the antenna.

Undoubtedly, the best way to reduce both types of losses is to bury a number of wires, called *radials*, extending from the base of the antenna like spokes in a wheel. They should be ¼-wave long and be connected together under the antenna, to form the ground connection. They need be buried only deep enough to protect them from mechanical damage.

Broadcast stations use 90 to 120 buried radials. This many is not required in an amateur station. The rate of improvement goes down as the number is increased above four, equally spaced. Few amateurs use more than 20. A length of ¼-wave (35 feet at 40 meters) is recommended, but radials as short as 1/10th wavelength (15 feet at 40 meters) help. They may be constructed of No. 12 or larger, copper or aluminum wire.

The Ground-Plane Vertical

When the radials are exactly ¼-wavelength each and are mounted above the earth and insulated from it, the *Ground-Plane Vertical Antenna* is formed. Usually, four, equally-spaced radials are used in one. This configuration is useful when it is desired to raise the base of the antenna above power-absorbing objects by mounting it on a post or on the roof of a building. Doing so has little effect on the angle or radiation from the antenna. The radials can slant downward towards the ends 20 degrees or so, if necessary.

Feeding the Vertical Antenna

A simple and effective method of feeding a ¼-wave vertical antenna is with 52-ohm coaxial cable (RG-8/U), which may be buried. Connect its center conductor to the base of the antenna and the shield to the ground terminal or to the center of the radials.

In installations in which the antenna is a self-supporting metal tube with its base buried in the ground, it may be fed through a system similar to the *gamma* match used on rotary beams.[4] *Figures 1* and *2* give essential data on the two systems.

Using the Vertical Antenna on Several Bands

Basically, simple vertical antennas are one-band radiators; however, one designed for 40-meter operation usually does a pretty fair job on the 15-meter band. Extending operation to more bands becomes a matter of making the radiator a compromise length and adding loading coils or resonant circuits to it and similar expedients,[3, 5, 6, 7, 8] which I do not have room to discuss here.

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3. "The Truth About The Vertical Antenna," B. W. Griffith, W5CSU, *QST*, May, 1952, page 11.

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7. "Three Bands, One Vertical," William Harrison, W6ULD, *Radio And Television News*, June, 1954, page 66.

8. "Vertical Multiband Antennas," L. L. Taylor, W8LVK, *QST*, May, 1955, page 19.

See also the antenna chapters in the ARRL and "Radio" Handbooks, *Radio Engineering*, F. E. Terman, and the *Antenna Book* (ARRL), and the *Antenna Manual*, Woodrow Smith.

News For and About Novices

Stephen Case, WN7WSS, RFD #1. Vernal, Utah, writes, "After you printed my last letter, I was swamped with offers for skeds. It appears that everyone needs Utah. I try to meet all offers.

"I worked my 48th state—North Dakota—last Sunday. He promised to QSL airmail, but I cannot seem to beg, borrow, or steal a card from my only New Hampshire contact.

"I agree 100% with your article on working DX in the March column. I don't spend too much time hamming, but what time I do spend, I spend listening, listening, listening. My DX on 40 meters is KV4BK, KH6, KL7, WP4, VE2,3,5,6,7. On 15, I picked up TI9MHB, JA8AQ, and KZ5. 73."

Bob Heroux, W9SQP, 220 South 17th Ave., Maywood, Ill., brings up an interesting question. "I was wondering if I was the first, or one of the first, former Novices to get an Extra Class license. I would sure like to hear from any others. 73."

An even shorter one from KN4CHK (Address in 'Help Wanted'): "Why not start putting the 'QSL of the Month' in the *Novice Shack*?"

Donn Fisher, KN6KRK, P. O. Box 344, Ft. Ord, Calif., had about the same experience with his first contact as most of us did. "I got my license yesterday and had my first contact last night. At the end of 45 minutes, I got the other fellow's name and QTH! The other fellow, KN6JZS, copied me solid.

"I'd appreciate a few pen pals, and I'd like to hear from anyone around Fort Ord or Salinas, Calif., who is interested in 2 meters. 73."

Chas. Morenus, KV4BK, P.O. Box 618, Christiansted, St. Croix, U.S. Virgin Islands, reports, "Since you published my letter in March, I have had lots of fun giving the Novice ranks their first KV4 or any DX at all. The comments in the letters and cards received has been very gratifying. However, there is one thnig that I think you should stress. Repetition after receiving an R5 report from the other fellow is not only unnecessary, it is downright tiresome to the other fellow. Only when the readability report is below R3 is it necessary to repeat (QSZ).

"As an example, this morning I called CQ WN KN at 0530 EST (just below the low-frequency end of the 40-meter Novice band—Herb) as usual. A KN4 answered me, calling KV4BK for a minute before signing his call for the first time! The band is very narrow, and it takes me only a few seconds to hear anyone calling. When he stood by at 0535, I gave him a 569X report. He replied with about a 6 X 6 call, 5 or 6 R's, Tnx several times, his name 6 times, name of town and state and U.S.A.! twice, all with punctuation marks thrown in for good measure. All the while, I was tapping the desk with my fingertips, waiting for him to finish; so that I could work a few more Novices before I went to work.

[Continued on page 56]

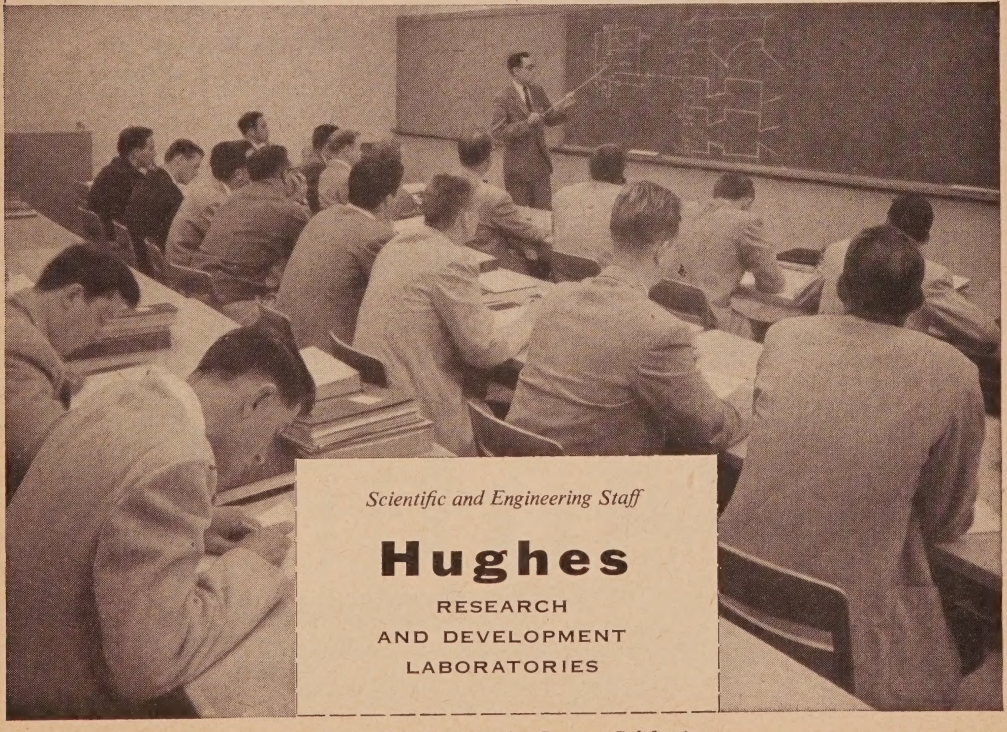
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Results 6th Annual YL-OM Contest

"The thrill of a century," was the comment of one OM. It *was* fun, and each year finds many more participants—so many, in fact, that reporting the contest results is now a major undertaking.

When the rules for this year's YL-OM contest were drawn up, mention of the sweepstakes awards for highest YL and OM scores was inadvertently omitted. However, YLRL Vice President W6KER, Gilda, informs us that these awards will be made as in previous years, and are for the highest aggregate scores (totalling phone and CW), or a single-section entry can win if it is *higher* than aggregate scores.

On this basis sweepstakes winner for the YLs in the contest held in March is W4HLF, Arlie Hager. Arlie had 17,550 points on phone and 10,132 on CW for a total of 27,682 points. She therefore reclaims the big silver cup won by W4KYI last year, but which Arlie won in '53 as



Some of the YLs attending the Dayton Hamvention April 2. L. to r., seated: W8VWL, 3UUG, 8OSD, 8HPP; standing: W8SPU, 8RZN, 8LGY, KL7BHE.

W8HLF. Top score among the OMs was earned by W1BFT, Carl Evans, with 1,885 points on phone and 1,820 on CW for a total of 3,705 points. Carl wins return of the big cup which he also won in '53, but relinquished to W4ARR last year. This makes the fifth year that Carl has placed first in this contest. Congratulations to both W4HLF and W1BFT, and to these other winners:

Highest Phone Awards

1st YL phone—W4KYI, Frances Krepp—25,818.75 (cup)
2nd YL phone—W1SCS, Ruthe Ferguson—24,096 (cup)
3rd YL phone—W4HLF, Arlie Hager—17,550 (cert.)
1st OM phone—W4ARR, Robert Crane—2,287.5 (cup)
2nd OM phone—W1BFT, Carl Evans—1,885 (cert.)
3rd OM phone—W9CMC, Dr. R. Starkweather—1,295 (cup)

Highest CW Awards

1st YL CW—W4BLR, Kay Anderson—10,755 (cup)
2nd YL CW—W4HLF, Arlie Hager—10,132 (certificate)
3rd YL CW—W9JUJ, Peggy Coulter—7,880 (cup)
1st OM CW—W8AJW, Jack Siringer—1,820
W1BFT, Carl Evans—1,820
(tied: W8AJW will receive cup; W1BFT certificate)
2nd OM CW—W4IA, Everett Battey—1,102.5 (cup)
3rd OM CW—W4JUJ, Charles Justice—892.5 (cert.)

For additional scores, see page 51



W4HLF, Arlie Hager, YL sweepstakes winner in this year's YL-OM contest.

With the Winners

W4HLF, Arlie Hager, who had the highest aggregate score in the '55 YL-OM contest, is active on all bands, both phone and CW. She entered the Ham game with a General ticket in '51 and in Nov. '52 received Advance Class for W8HLF in W. Va. In June of '54 she moved to Va. with OM W4VPO and their five jr. ops—two girls 11 and 13; three boys, 7, 12, 15. Here they live on a 2000-acre cattle farm (only rent the house), and Arlie says it's a Ham's paradise.

Arlie really enjoys the contests. Last year she won 1st place phone in YL-OM contest, and in YLRL A.P. tied for 2nd place on CW. Arlie holds YLCC No. 4 with four stickers. She needs only Wyo., Idaho and N. Dak. for WAS/YL. She has WAS on 75 phone; holds a public service certificate for work during forest fires in W. Va. in '53, has worked 35 maritime mobiles and is "Witch Nr. 8" with the MM boys.



W1BFT, Carl Evans, sweepstakes winner among the OMs in the YL-OM contest. Carl, who has been active on the air for over 30 years, is an avid contest participant.

In addition W4HLF has been NCS of the 75-meter YL net that meets Tuesdays 8 a.m. EST on 3.9 since Oct. '53.

[Continued on page 48]

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W4KYI, Frances Krepp, won first place among the YLs on phone in '55 contest. Here she holds the sweepstakes cup she won last year.

YLs from Fla. to New England check in. Arlie is now making a crazy quilt from silk patches the net members embroider with their calls. Other hobbies include collecting pictures of Hams and their families and sewing, making most of the clothes for herself, her girls and some for the boys.

W4KYI, Frances Krepp, made the highest score on phone in this year's YL-OM contest, after being Sweepstakes winner last year. Frances has held her ticket since 1946. She spends most of her time on 75 phone, operating after 11 p.m. till 3 a.m. or so, following work on the 3 to 11 p.m. shift at a Cannon textile plant. She and OM W4SIB also spend some time on 40 and 20 and work mobile. W4KYI holds an Edison award called Hurricane Citation for her work during "Hazel," and has YLCC (has worked 222 YLs). Her mother is W4ZOI,



K6CQT, Louise "Ann" Brierley, 12-year-old former Novice worked over 200 OMs in the contest.

father is W4CXI, and she has one daughter.

W4BLR, Kay Anderson, who placed first on CW in the contest, has been going great guns ever since she and her OM, W4BVB, got their tickets in Aug. '53. In Nov. '53 she won Va. section award in SS and in Jan. '54 was high YL scorer in Novice Round-up. Her General came along in Feb. '54. Kay is ORS, YL reporter for Va. Section Bulletin, secretary of Richmnod Amateur Radio Club. She holds YLCC and likes to handle traffic. Operating is done on 20, 40, 80 CW and phone. Rig is home-made running 90 watts (70 watts during the contest), receiver a BC348-R and the antenna an end-fed long wire. Completing the picture are three jr. ops, 6, 5 and 4 years old.

Highest YL scorer outside the continental U.S. was KZ5DG, Grace Dunlap. KZ5DG has been on the air since 1951 and works 10, 15 and 20 with a 50-watt home-built rig using 3-element beams. Grace likes DX and has 102 countries confirmed for DXCC, most of them worked on 15 phone. She is in MARS, is phone activities mgr. for CZ, enjoys maritime mobile QSOs, and likes to sew and paint. Grace, her OM, KZ5GD, and two sons are visiting stateside this summer and will be operating mobile from Mass. to Calif. and Wash. and fixed from Colorado where her call is WØDLU.

Though not a winner, K6CQT, Louise "Ann" Brierley, made over 200 contacts in the YL-OM contest. K6CQT started out as a Novice in Sept. '53 at the age of 10. She decided then that Louise was too long for CW, so goes by the handle "Ann." In the Jan. '54 Novice Round-up she won for the San Joaquin Valley section. Ann got her General in June '54 and now operates 40 CW and phone and 75 phone, sharing an Eldico TR1 and HQ129-X with her Dad, W6UPS. K6CQT has 38 states confirmed on CW and holds a 20 wpm CPC.

YL Get-Togethers

Set for July 31 is the picnic for the Tuesday 75-meter YL net members. W4HLF, Arlie, NCS, tells us the place will be Big Meadow on the Sky Line Drive in Va. and all licensed YLs and families are welcome. YLs are requested to make a gift to bring for a prize. Each family to provide picnic lunch. Camping area for those who wish and lodge and cabins near by.

The Dayton Hamvention on April 2 brought together about 20 YLs. Following the technical program in the



W4BLR, Kay Anderson, earned the highest YL score on CW.

a.m. the ladies enjoyed a luncheon with costume jewelry show and prizes. The YL ops then met at W8SPU's room for a get-acquainted session. YLs at the meeting were W8's SPU, OSD, VWL, RZN, LGY, MVA, HPP; KL7BHE/W8, W4's WJP, UDQ; W9JUJ, W8UUG, WN8TXL, and WN8???, Anne (awaiting her call). Prizes were won by W8UUG and W8's VWL, RZN, OSD.

W8SPU tells us she and her family won a prize for being the biggest Ham family present at the Hamvention —W8SPU, Helen; OM W8QOV; W8OSD, daughter Virginia (who operates portable at Ohio Wesleyan Univ. where she is a freshman majoring in chemistry and physics); and W8KGL, son Don (who operates portable at Cincinnati where he is a freshman at the U. of C. Medical School). Doc and Helen, who were licensed in 1937-38, also have three nephews who are Hams. QOV-SPU are active on VHF and Helen's favorite pastime is working mobiles with over 200 mobile stations logged in the last three years.

The New England YL Get-together in Boston April 23 was attended by 74, all but 10 of them licensed YLs. W1HUH, Sister Emiliana, was guest of honor. W1ZOK, Norma, won the main prize, an SW-54. The YLs decided to try to organize a New England YL Club and the first meeting will be held Sept. 24 in Boston. Other YLs attending: W1's ZEJ, QON, VFK, YAN, RYJ, ZIB, SCS, VOS, VXC, WED, FOF, UQA, NUO, YNI, RLQ, WIT, YPH, YYM, ZUR, ZEN, WOS, ZID, ZHO, YCU, DQG, ZJS, FTJ, VVS, WJA, TUD, OME, BFC, VBT, TRE, VYH, NHN, ASM, ULF, UKR, COL, UPK, YPG, SVN,

[Continued on page 50]



KZ5DG, Grace Dunlap, highest YL scorer outside the continental U.S. Grace has 102 countries confirmed for DXCC, most of them on 15 phone.

GROUNDED GRID AMPLIFIERS

[from page 29]

self will appear in the output. Since such distortion products are virtually negligible in well designed and constructed exciters it is possible to have virtually distortionless signals with a grounded-grid linear.

Efficiency

Amateurs of Scotch ancestry will find still another (and perhaps even greater, hoot mon!) dividend in grounded-grid linears. That is the appearance of much of the driving power in the output of the final itself. Thus, theoretically, a 100% efficient final amplifier is possible. This would be brought about by utilizing tubes in the final whose drive requirements equal the tube and circuit losses. For example, a final amplifier running at 70% efficiency will deliver 350 watts with 500 watts input. Now if a tube or tubes were picked that required 150 watts drive and that power appeared in the output of the final, the total output then becomes 500 watts—efficiency 100%. Actually there is not much point in such an arrangement, but this does well illustrate how drive appears in the output of grounded-grid final amplifiers.

High-Power Tubes

While only 837's and 803's have been mentioned there are a great number of other tubes that work very well in grounded-grid service and as zero-bias tubes. These include 4-250A's, 4-125A's, 813's, 4E27's, 4E27A's, and RK-65's. There are a number of triodes that work well, too, including 304TL's and 304TH's. Since bias supplies are required with these tubes the pentodes and tetrodes mentioned above are much simpler to use.

or Low-Power Tubes

Low-power tubes such as the 6L6 and 6AG7 also work well in grounded-grid. K6AAQ has been doing wonders with four 6L6's in parallel at his home station and a grounded-grid 6AG7 in his mobile.

1. Notes of Grounded Grid RF Power Amplifiers—Dec. '54 QST p. 38
2. Single Sideband Techniques—p. 33
3. Linear Tips—March '55 CQ, p. 17

Wyoming Hamfest

The ANNUAL WYOMING HAMFEST will be held at the South Fork Inn area, 18 miles west of Buffalo, Wyoming on Highway 16, on July 23-24. Cabins or camping available. The Sheridan Radio Amateur Club has prepared a full program including banquet, Wyoming Trading Post, and valuable prizes. Registrations, including banquet, $3.50. Hams vacationing in the Yellowstone Park area are invited to join with the Wyoming hams in this get-together. Register with W7QPP, 362 E. Loucks St, Sheridan, Wyo., or contact any Wyoming ham for further information.

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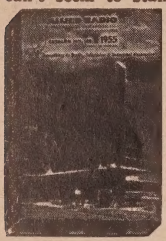
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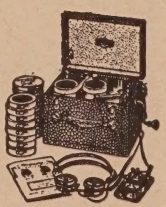
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PROPAGATION

[from page 37]

The influence of these daily and seasonal variations upon an actual transmission path are shown in *Figure 1*, a *circuit analysis* curve comparing maximum useable frequencies on a circuit from the Eastern area of the United States to Central Europe for the months of January and July, 1955.

At this point it would be appropriate to define the term *Maximum useable frequency*, often abbreviated as MUF. The MUF is the highest frequency that the ionosphere will reflect back to earth at a specific time for a given circuit. The exact value of MUF, at any specific time for a given circuit, will vary somewhat from day to day being dependent only upon the height and degree of ionization of the layers of the ionosphere. The *Monthly median value of MUF* is the highest frequency that will be reflected at a particular time, on a specific circuit, for 50% of the days of the month. The *circuit analysis* curve is a plot of the monthly median values of MUF for a particular circuit versus the time of day. If a frequency above the MUF is used it will penetrate the ionosphere and be lost in outer space, or be reflected back at a greater distance than the intedned reception area.

Flash Forecast

Exceptionally good shortwave propagation conditions are forecast for July 11-16. No significant ionospheric disturbances are expected during July but the period July 17-20 may be somewhat unstable.

It is interesting to note from *Figure 1* that during the winter daylight hours, the MUF is considerably higher than during the daylight hours of the summer months, but that during the remaining hours of the day, summer MUF's are higher than they are during the corresponding periods of the winter months. This is due to the diurnal and seasonal variations of the ionosphere.

Next month ionospheric variations due to sunspot activity will be discussed as well as an indication of the present trend of the sunspot cycle.

YL's FREQUENCY

[from page 48]

VPF, YPT, ZOK, MUW, PRF, UET, HUH, MCW, WJJ, WNT; WN1's EEW, EIU, DAJ, BBS, DBX; W2KEB; KN2KFB. Tnx to W1QON for this news.

On April 24 the East Texas Ham Club held a Hamfest at Longview with 10 licensed YLs QRMing the grounds. Included were W5's UYI, UUS, RYX, TKM, VYI, LGY, YRT, YAJ, VSN, WN5FDR. W5YRT, Maxine, tells us many of these girls check into the Texas YL Round-up Net. Prizes were won by W5's RYX, YRT and TKM. W5TKM, Clara, proudly displayed a 30-year service pin received the day before the Hamfest from the telephone company for which she works.

Addendum

In the May issue we congratulated Mary Anne, W4UDI, on the arrival of a little girl. Her call should have been W4UTO, as her proud OM, W4OMW, points out. Mary Anne has been on the air since 1935 and works CW mostly on 80 and 40. They have four other jr. ops, ages 18, 16, 8 and 6. Oldest daughter Joyce, who recently made her folks grandparents, is ex-WN4AUE. Bobby, 16, is W4UNH.

No sooner had we listed YLCC awards (June CQ) than W7GLK informed us she had received cards from W9GME, Grace; W9LOY, Cris; W9YBC, Gloria; W6PCA, Opal, and W3VLX, Alverda.

YL-OM Contest Scores

YL Phone

W1SCS	24,096
W1RLQ	4,792.5
W1UKR	4,531.25
W1ZUR	2,291.25
W1VOS	1,068.25
W1YPH	987.5
W1QON	315
W1VYH	192
W2BNC	2,006
W2EEO	1,080
W3MDJ	7,992
W3MAX	7,950
W4KYI	25,818.75
W4HLF	17,550
W4HLN	1,954
W4UTO	860
W4DWP	837.5
W5WUX	4,522
W5WXY	2,625
W5EGD	2,441.25
W5RZJ	225
W6JZA	13,991.25
W6CQT	4,162.5
W6EHA	3,753.75
W6QMO	1,991.25
W6QGX	119
W6QGZ	90
W7OOY	4,120
W7SNP	1,870
W8HUX	1,175
W8HWX	997.5
W8BIQ	742.5
W9LOY	7,038
W9AQB	3,685
W9FRW	200
WØOMM	3,750
WØPQB	2,968
WØFVE	375
KZ5DG	14,520
KP4ZV	4,356
VE1ABT	1,657.5

YL CW

W1YYR	5,605
W1RLG	5,460
W1WPX	3,250
W1YPH	2,190
W1UKR	595
W1OAK	528
W1YNI	193
K2DXD	2,316.25
W2BNC	1,692
K2INQ	1,500
K2CUQ	1,237.5
K2DSL	750
W2EMU	658.75
K2DKL	120
W3QPJ	5,328.75
W3YTM	4,752
W3MAX	1,190
W3ISU	1,162.5
W3UTR	1,040
W4BLR	10,755
W4HLF	10,132
W4DWP	3,240
W4HLN	1,836.75
W4AHN	1,181.25
W4RIG	585
W5EGD	5,625
W5WXY	581.25
W6QMO	1,338.75
W6EHA	855
W6NAZ	420
W6QYL	375
KN6EIG	125
W7SNP	1,017.5
W7QYA	130
W7RHM	11
W8HWX	3,625
W8KLZ	330
W9JUJ	7,880
W9WZL	4,305
W9MYC	1,286.25
W9MLE	878.75
W9SYX	743.75
WØLGG	2,210
WØFVE	1,937.5
WØKJZ	1,840
WØOMM	168
VE2AOB	1,225

OM Phone

W1BFT	1,885
W1JYH	168
W1OPZ	150
K2BWP	637.5
W2MCO	308.75
W2WDP	302.5
K2COB	262.5
W3RRI	640
W3QLW	385
W3AXT	228
W3CDG	125
W3YWT	120
W4ARR	2,287.5
W4JUJ	450
W4IA	308.75
W4KIS	255
W4TFD	220
W5DXW	61.25
W6UTZ	387.5
W6MES	176
W7SFK	527
W7VIU	131
W8OMK	1,245
W8AJW	593
W8JHH	375
W8JPE	336
W8LAQ	195
W9CMC	1,295
W9OMM	977.5
W9PQA	630
W9FYM	616
W9EDV	208
W9GMT	125
WØHFP	665
WØGAX	276.25
WØIUB	165

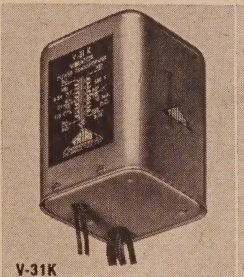
OM CW

W1BFT	1,820
W1JYH	468
W1SSZ	292.5
W1RFC	275
W1YNI	193
W1OPZ	166.25
W1IP	108
K2AFQ	828.75
K2DSW	701.25
W2EMV	658.75
W2NIY	543
W2WDP	341.25
K2EVP	261.25
K2KDW	253.75
K2EIU	227.5
W2HZZ	200
W2UAP	165
W3TYC	875
W3WKX	542.5
W3CDG	540
W3PWN	540
W3SIJ	487
W3MDO	384
W3OP	300
W3STV	270
W3AXT	198
W3YUW	110
W4IA	1,102.5
W4JUJ	892.5
W4TFD	680
W4ZQK	260
W4KL	245
W4OMV	168
K4ATD	112.5
W4AAR	5
K6AUC	90
W7VIU	187
W8AJW	1,820
W8FRD	308.75
W8JHH	297.5
W8RGF	200
W8MQQ	123.75
W9CMC	935
W9KLD	675
W9OMM	552.5
W9VBZ	468.75
W9SVZ	439
W9DIK	341.25
W9CHD	308.75
W9CCO	150
WØIUB	546
WØGAX	315
WØIIU	261.5
VE3AVS	275
VE3BNQ	120
VO6N	120

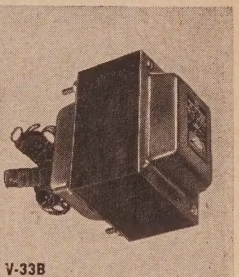
In addition to the scores listed above, the following YLs sent in logs for confirmation only: W3CDQ, 4RLG, 6ANG, 7RRM, VE3's DDA and AJR, all on CW. For Phone: W1YNI, 2OWL, K2UTZ, W5YRT, K6CYZ, K6ELI, W6DXI, 6NAZ, K6ANG, W7TGG. These OMs sent in logs for confirmation on CW: W1's VBR, YUN, BOW, JZA, NLM, YGR; W2's NEP, REP, OLT, CVW, BUN; K2's BUP, BUE, MTA, CMV; W3's RRI, NRE, KUN, QLW, WG, ZID; W4's FPX, RXI, WRH, GMY; K6's CUK, DYM, W6PQK, KN6INU; W8's GQD, DAE; W9's RKP, FYM, EDH, SIE, PQA, UDK; WØ's VRN, JBM; VE6SX. On Phone: W1's LQ, PO, BUD, YGR; W2's IFI, CYK, CVW, CYK, BVN, UAP; K2's AFG, EUI, HID, KID, AFQ, DSW; W3's YUT, WG; W4's FPX, MG, WRH/4; W5ZWR; K6DYW; W8's FAD, FRD, VQD; W9's KLD, SIE; WØ's IIU, VRN, YQR, LOW; VE2APC.

New

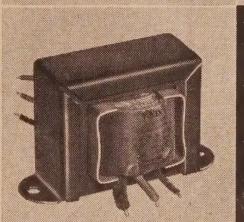
TRIAD VIBRATOR POWER TRANSFORMERS



V-31K



V-33B



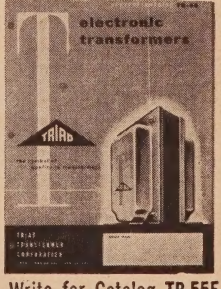
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V-31K	9.60	12-16	450 C.T.	65	3⅝	2⅜	2¾	1 3/16	1⅞	2½
V-33B	7.50	12-16	390 C.T.	65	1⅞	2⅝	2 3/16	2 3/16	1¾	2
V-35X	5.70	12-16	310 C.T.	65	2	3¼	2	2 3/16		1¼

AS LISTED IN TRIAD'S NEW 1955 GENERAL CATALOG



Write for Catalog TR-55E

TRIAD TRANSFORMER CORP.

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813 DELUXE FINAL

[from page 26]

Loading

Loading the amplifier is very easy with the Pi output circuit. However care should be taken to see that the roller coil is not adjusted while more than 1000 volts appears on the plate of the tube. The output loading switch should always be changed with the plate voltage off. The pitting of silver contacts and rollers such as those on this type of inductor seems to be aggravated as the parts become tarnished. To prevent this a handful of naptha flakes or ordinary moth balls can be put inside the chassis. This will keep all silvered parts bright and tarnish-free.



W6VZB, first licensed in 1944, now hold Class A Amateur, Radiotelephone First and Radiotelegraph Second Class licenses. Recently quite active on RTTY, Willard also favors rag-chewing and DX on 15, 20, and 40 CW and 6 phone. Principal occupation: Sergeant Radio technician for Sheriff Alameda County, Calif. Also relief operator for police radiotelegraph. Home address: 16080 Cambrian Dr., San Leandro, Calif.

This final has been used for several classes of service. As a c-w amplifier it can be operated either class B or class C, depending on available bias and drive. It can be plate-modulated quite successfully up to about 90% modulation, at which point the modulation envelope flattens slightly unless the screen is modulated by a winding of the modulation transformer. However this is as much as many AM stations use anyway. With a stiff bias and screen supply it works well as a Class B linear. The chief use to which it has been put is for Radio-teletype on 3.5 and 7 Mc. This application is the same as key-down CW or NBFM and at 2000 volts an input of 400 watts has been run continuously.

For over a year the amplifier has been used at this station, driven by a "home-brew" exciter of modern design. Along with the smoothness of tuning and operation and the ease of drive, there is one other thing that is a joy to discover. . . . My tele-viewing neighbors never know when I am on the air.

Next step is neutralization. With a piece of heavy wire or strap short the r-f output connector directly at the co-ax fitting. This will enable the plate tank circuit to act as a standard parallel-tuned network. With r-f drive applied and grid current flowing thru the self-bias resistor but plate and screen voltages off, bend the neutralizing tab until no change occurs in grid current while the plate capacitor is tuned thru resonance. This should be done at 28 Mc. and will hold for all lower frequencies.

Now remove the strap from the r-f output terminal and connect a dummy load. Lamp bulbs are good up to about 200 watts output but for any greater dissipation they should be corrected to present a resistive load or the mica capacitors used in the output section may be

Starting in September CQ will have a minimum of over 100 pages per month. This means a considerably thicker book, about double the size of this issue. This also means that we will be able to print many many more articles.

This means that the newsstand price of the magazine will have to be raised to 50¢ per copy. This ought to provide enough pressure to get you to send in your subscription right now, or at least extend your present subscription while the present rates still hold.

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CQ-7

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damaged. Some method of varying bias from about –20 to –100 volts is needed, and since no grid current will flow it can be a simple potentiometer across a source of d.c. such as a small power pack. With no r-f drive, and with the bias at about –100 volts, apply 1000 volts to the plate and 350-400 volts to the screen. Lower the bias until the plate dissipation is reached. At no setting of the plate capacitor should there be any evidence of grid current. If all is OK so far, raise the plate voltage to 2000 and make the same check. This is a very severe test for the 813 in any amplifier, but even without parasitic suppression this final proved perfectly stable.

LOW COST VFO

[*from page 35*]

transmitters on all bands from 3.5 to 28 Mc. Its frequency stability is exceptionally good, due to the use of the electron-coupled circuit and the retention of the original temperature compensating condenser, *C7*. It represents quite a saving over the cost of the commercial model. Besides, it gave us the enjoyment of making it and the pride of workmanship, which makes it even more valuable to us.

Rubber feet under the bottom cover give it sufficient clearance from the table top to permit use of a spinner knob for ease in tuning. We painted the unit gray to match the receiver, and it makes a very attractive little companion.



Paul, first licensed in 1931, has held the calls: W8EWP, W4RXO, VP4TJ, and is presently W2EWP. Now working in Caracas, Venezuela as Assistant Chief Engineer of Interlec. He has to stay off the air since alients are unable to obtain licenses in Venezuela. When active prefers 20 and 75 meter phone.

DX NEWS

[*from page 41*]

to 245 with ZD8AA as Art, **W7AMX,** jumped ten to reach 245 with such as VS4RO, KC4AB, MP4QAL, EA9DD and OD5AB. . . . Dewey, **W6VE,** reached 237 with ZD8AA while Horace, **W6TI,** hit 228 with HKØAI. . . . Bert, **G8IG,** went to 217 with PJ2MA and raised his phone total to 191 with FR7ZB. . . . Clay, **W6LGD,** rested on 177 with FY7YE and TI9MHB while Vaughn, **W6ID,** upped to 158 with FY7YE and YNØN (Nicaragua). . . . Bill, **W5ASG,** lengthens his lead in the 39 zone column with PJ2MA for No. 249! His phone total reached 184 with HB1MX/HE, PJ2MA and 3V8BL. . . . Dick (me), **KV4AA** upped to 245 with PJ2MA while Al, **W2WZ,** added TI9MHB, MP4QAL, ZD8AA and PJ2MA for 243. . . . Stan, **W1CLX,** hit 237 with PJ2MA and ZD8AA while

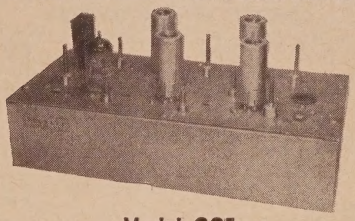
[Continued on next page]

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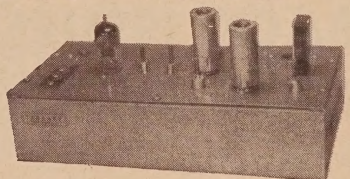


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Any Model, any I.F. Complete $42.50

Model CC5-50, 144 and 148
in kit form. $29.75

CC5-50	50-54 Mc.
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CC5-148	CAP intercom.
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Choose I.F. frequency—6-10, 7-11, 8-12, 10-14, 12-16, 14-18 or for COLLINS, 26-30 Mc. Model CC5-220 with I.F. 14 to 19 Mc. only. These are Cascode models—4 db noise figure. (144 Mc) Tube line up: 6BZ7, 2 6CB6, 2 6J6.



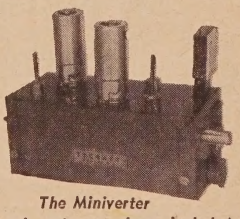
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C3-26	(1-6DC6 6CB6 6J6)	10-11 meters
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CC3-144	(1-6BZ7 2-6J6)	2 meters
CC3-220	(1-6BZ7 26J6)	1¼ meters

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CQ Magazine

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[from preceding page]

Norm, **W1HX**, rose to 226 with MP4QAL. . . . Sergio, **CO2SW**, added VK1AC, FB8BR, ZD8AA, PJ2MA and MP4QAL to hit 213 while Gunnar, **SM7QY**, added twenty to reach 178 and, as he just got a QSL from AC4NC, his WAZ cards are expected momentarily. . . . Roy, **ZL4BO**, added MP4BBL fro No. 157 and seeks QSL from VR1A

DX FLASH

VR6AC QSL's should go via W6SYG. He was due to have first logs in his hands by June 1st. . . . MP4QAL contacted CR8AB on May 25th, 1100 GMT, 14020. CR8AB stated he was on again after a five month layoff. TS, QRS. . . . G6ZO reports SVØWU as active on Rhodes. QTH is: Cal Casale, c/o AMERICAN COURIER, Rhodes, via Athens, Greece. . . . AC3PT was worked by W6NZW and W6AOA, 14018, 1030 GMT, QRS. . . . MP4QAL's cards were due to leave around May 30th. . . . Bari, VR2BZ, is on again from Naudi Airport, Fiji, after a three months QRT. . . . A move is being made in ZL-land to have separate status given to the Kermadec Islands. . . . W4FIJ heard W3CTJ working one HV1AA (OK1MB couldn't hear him) and also reports MX1AC on 14020, 0300 GMT. . . . Others reported of unconfirmed legality have been TI9AC, ZA1KAD and PX1AA. . . . Beda, OK1MB, reports VQ8AN, 14035, M1H, 14077 and YK1AK on 14063. . . . DL7BA recently upped his 21 Mc. total to 115 (101 on phone) with the addition of MP4KAC, VP5SC, PZ1RM, CX5AD, JA1CJ and TG9AZ and reports ZD3BFC, ZD8AA, OY7ML and FY7YE as being active on fifteen. Gunther also says that 3A2AW may be found on 14110 (14230 phone) and will also try 7 Mc. CW QRS. . . . More on MX1AC comes from OK3EA who was visited, last winter, by two Mongolian Postoffice officials who stated that there is NO ham activity there. . . . Regarding the recent activity of HI8WF word comes from W5WZQ who received a letter from Walt Fox (The original HI8WF), who is now stateside, saying that HI8WF ceased activity on July 1st 1954 and the other HI8WF is NG. . . . VQ5FS has been heard from Uganda, 14059, 2000 GMT, giving his name as Terry and QTH as Box 118, Jinja. . . . ZC6AA has recently been active and says QSL via W5FGE (Tks W6PYH). . . . VK1AC, now VK3IB, reiterates he will QSL for all Macquarie contacts when cards arrive from printer. . . . Dave, YJ1DL, says he is on mostly from 0130 to 0230 GMT and at 0600 GMT, 14006. . . . QSL to KG1JB via W4KVM and to JZØPS via Box 52, Hollandia, Dutch New Guinea (Tks W4JII). . . . W8MWL advises that KAØIJ, Iwo Jima, is operated by Bob Clark and is on phone only. The CW KAØIJ is NG!

---

and VR1C. . . . Gus, **W2HMJ**, made it 207 with HKØAI while Carl, **W1BFT**, submitted new list putting him on 174. . . . Hal, **W6TXL**, goes to 170 with such as KT1EXO, ZB2A, FM7WQ and HKØAI while Bob, **WØQVZ**, ups to 156 with PJ2MA, HKØAI and YI2AM. . . . Juan, **KP4CC**, hits the double century mark thanks to KJ6AZ as Frank, **W1WY** (ex-W2WC) goes to 174. . . . Jim, **W9LI**, comes up to date with such as HKØAI, FY7YE, TI9MHB, FG7XA, F9QV/FC and FK8AL to reach 164 while Sam, **W3AXT**, brought his list right down to the shack here for a check-up which resulted in a new total of 167. . . . Guy, **W6DI**, nipped VS5CT for a phone total of 205 while Don, **W6AM**, went, A3, to 183 with EA9AR. . . . **ZL1AH** heard HK4DP on 160 meters during the ARRL test. . . . Among the contacts at **DL4ZC** (W4KE) during April were FB8BE, KG6AFY, ZD6EF, ZD9AB, LU1ZV, FI8BG and UF6KAE on 14 Mc. 3.5 Mc. accounted for W1WLW, W2GGL, W3AXT and W4KXV. . . . **W9ZTD** has 90 countries to show for ten months operation. . . . **VK4YP** nabbed **VP5BM**. . . . Frank, **W1DSF**, has 144 confirmed with the arrival of QSL's from TI9MHB, VQ5CL and ET3GB. . . . **W2QHH** now holds a six band WAS the last being on 160 meters. Howie also nabbed VK9RH for No. 113 on 3.5 Mc. . . . Dick, **W3YIV**, is up to 83 after keying with MP4QAL, VP5BM, KR6KS, EL2X, CR6AI and VU2OK. Dick also offers to assist with QSL's for any DX station so needing. . . . Ted, **TI2BX**, goes to 91 with VS5CT and

YO6VG. . . . Gene, W7VY, claims 254 with MP4QAL and HKØAI. . . . On April 8th QSO's were noted between ZD8AA and W6ISA/W6CUQ/W6AOA/W6RW and

Honor Roll Endorsements

(To May 15th 1955)

Phone and CW		W5ASG	39-249	KP4CC	37-200
W6AOA	40-251	KV4AA	39-245	W1WY	37-174
W2AGW	40-250	W2WZ	39-243	W9LI	37-164
W8BHW	40-247	W1CLX	39-237	W3AXT	36-167
G6RH	40-247	W1HX	39-226	WØANF	36-161
V3EVW	40-245	CO2SW	39-213	ON4QX	35-128
W7AMX	40-245	SM7QY	39-178		
W6VE	40-237	ZL4BO	39-157	Phone Only	
W6TI	40-228	W8JBI	38-219	W6DI	39-205
G8IG	40-217	W2HMJ	38-207	G8IG	39-191
G4MJ	40-207	W1BFT	38-174	W6AM	38-183
W6LGD	40-177	W6TXL	38-170	W5ASG	36-184
W6ID	40-158	WØQVZ	38-156		

Last complete HONOR ROLL appeared in the May issue. Next complete HONOR ROLL will appear in the September issue.

W6MUR. . . . K2DDK's 35 watter and indoor antenna have now accounted for 13 zones and 26 countries. . . . W8BHW now has 134 on 21 Mc., 116 of 'em being on phone. . . . VP9BL made it 100 with KS4AW. He returns to WØDVN in August. . . . Nap, W4DHZ, has 171 confirmed with ZD6BX, ZS7D, FG7XB, VR2BZ, MP4BBL, HKØAI and 9S4AX. . . .

Here and There

UA4KPA seems to be another Soviet station to which "WSEM" limits do not apply. He was heard contacting F9RS and 4X4BD. . . . HB9QO keys from Swiss Army station, HB4FE. . . . John, ZL3OA, now ops from ZL2AG. . . . W1BB reports the 160 meter band was "wide open" on Easter morning, April 10th, as good as any night during the Winter. Stew contacted G5JU, G3ERN and GI3IOS with G5JU's signal peaking 589. Thus, this band may be operative for DX later than you think. Also, it should be remembered that when it is Summer here it's Winter "down under." . . . Ned, W1RAN, is now undergoing psychological warfare training at Ft. Bragg, N. C. . . . VE2GQ vitsied OK1MB. . . . Chas., W9QT/9, keys from Scott AFB, Ill. . . Jack, W9KCY, is now W2FRO while KP4UE, Jim, keys from K2USA. . . . Lindy, W8BHW, was laid low anl separated from twenty pounds by, of all things, the mumps! . . . KV4AA logged visits from VP2AN, VP2VA, W1AO, W2GJX and W3AXT. . . . We regret to report the passing of Earl Chang, VE7ZZ, from heart trouble on May 12th. . . . Frank, W3BOU, ex-W4BOU, now keys from K2MER. . . . Bora, YU1BKL, is now YU1KC. . . . Gene, W6TZD, is now in new QTH of Lakewood, near Long Beach. . . . DL4OZ is now home at K2GMO. . . . KV4AA is on 14080 daily at 2230 GMT and invites short contacts for DX news etc. . . . August DX column closes on June 15th. Last minute items, June 27th.

73's

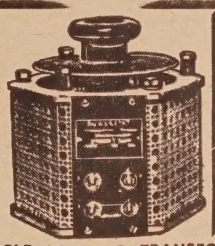
Dick, KV4AA

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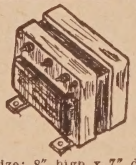
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4-1,000A	95.00	471A	1.50	956	.30
4C36	30.00	705A	.50	957	.35
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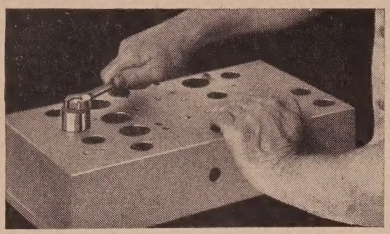
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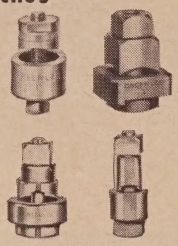
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[from page 15]

of electrons. Don't be fooled by the 15,000 ohm cathode resistors; all they do is pull the 6AS7 cathodes back down on the down-swing of the audio wave. It's going uphill that's the tough job; the 6AS7 plate current does that job.

Since no two 6AS7 halves will exactly match, and the cathode potential is the grid potential on the 810's, a split secondary transformer was called for. Adjusting the two potentiometers allows you to adjust the 810 grid bias to exactly what you want it to be—in this case, –35 volts.

Incidentally, the 6AS7 isn't supposed to have 600 volts across it; that's perfectly satisfied by the fact that most of the negative 200 volts appears across those 15,000 ohm resistors.

The transformer I had allowed me to use a 6J5; a 6V6 triode connected would have done as well, or a 6SN7. Since the 6AS7 is acting as a cathode follower, it takes no driving power—it just calls for about 250 volts.

The circuit's essentially about as simple as a circuit can get, yet was designed to handle the toughest driver problem you're apt to meet, so long as you stay within the 1-kw. law. This modulator driver circuit will, because of the cathode-follower feature, drive any pair of modulator tubes, so long as they don't call for more than about 200 volts of grid drive—which is enough to drive 810's modulating a full kilowatt. The same circuit, with a 6SN7 plugged in the 6AS7 socket, will drive a pair of 807's. It comes as close to being the universal modulator-driver system as any, and supplies the bias required for the modulator tubes.

With that final link of the chain nailed down solid—Gravel Gertie moved out, and the reports started sounding sweet in the receiver again. And the full-modulation signal definitely gets through where the uncompressed signal won't. There's a switch on my pre-amp that cuts out the compressor circuit . . . naturally. How could you be sure the thing worked if you couldn't try it with and without on the same contact, under the same conditions?

NOVICE SHACK

[Continued from page 44]

When he stood by, I told him it was unnecessary to repeat everything, signed and called QRZ?

Another KN4 called. I gave him 579X, but the whole thing was repeated again. I finally signed with him at 0556, to leave for work. Two QSO's in 30 minutes, when a 1 X 1 call, Tnx, RST, QTH, and name sent singly would have done just as well, and I would have been able to give a half dozen more Novices a KV4 QSO.

"I do not mind slowing down to a couple words a minute for those who are obviously new and need the slow down and repeats to complete the contact, but I do get impatient with those who do not use their heads a little and consult an RST table. 73."

The RST method of giving signal reports is described in the front of the ARRL log book, in the *Call Book*, and in various handbooks.

Doug Brown, WN3BXM (12), 101 Primrose St., Chevy Chase, Md., writes, "In four weeks on the air I have worked 23 states and Canada. I use a *Johnson* Adventurer

transmitter, an S-38C receiver, and a 95-foot antenna. Most of my work has been on 40 meters. I would like to hear from other Hams. 73."

Dickey Black K4AYC, (14), 4211 15th Ave., Columbus, Ga., says, "I have had my Conditional license about four days, after being a Novice for five months. I had lots of fun as a Novice, working 30 states, VE2, 3, and WH6. I have worked California nine times, but still looking for my first W7. Most of my work was on 40 meters, with a Globe Scout transmitter and an S-38B receiver. 73."

"Rich" Karl, WN3ZUH, 419 N. Market St., Ligonier, Pa., says, "I wonder if it would be possible to include the time when some of these Novice DX contacts are made. I get on only in the early morning hours, because of severe TVI, although I have a high-pass filter on the TV receiver and a line filter on the transmitter. I'd like to hear from anyone with ideas on how to cure it.

"Running about 30 watts, I've worked 34 states and KH6AUJ. I would like to make skeds with stations west of the Mississippi river and those needing W3 or Pennsylvania contacts. 73."

Ron Faulkner, KN2IQH, Box 272, Sherburne, N.Y., reports, "I have worked 25 states and Canada with my 15 watts on 80 meters and eight watts on 40 meters. My transmitter is an HT-17 and my receiver is an S-38C.

"I wonder if there is any possibility of running a 'QSL card of the year' contest? 73."

Ames Schroeder, W4GSJ, 303 Bridges Ave., Portsmouth, Va., advises, "I strongly recommend the 15-meter Novice band. It was on this band that I worked most of my DX. It is on the upsurge now after the low point of the sunspot cycle, and it will be well to get established on it for the good conditions to come.

"I passed my 'General' three weeks ago and am now waiting for the license. In my five months as a Novice—I've been licensed ten months, but didn't get on the air right away—I worked 32 states and Cuba, using an AT-1 transmitter and an NC-125, which I won in the 1953 *Boys Life* SWL contest. Now I have a Viking Ranger all ready to go. 73."

Dave Barton, W7VJT, Rt 3, Box 383-C, McMinnville, Ore., forwarded the description of his 40-meter vertical antenna some months ago, but not until now have I been able to use it. "Purchase an 18-foot, knot-free 2 X 4 and an 18-foot, 1½-inch hardwood dowel from the lumber yard. The dowel is standard 'closet-rod' material.

"Drill holes about six inches apart in the bottom three feet of the dowel. Fasten it to the 2 X 4 with some husky wood screws, giving you a 33-foot mast. Mount TV stand-off insulators along it every three feet, and run a 33-foot length of wire from one end to the other. Set the mast up vertically. Feed the bottom of the wire from the center conductor of a coaxial cable feed line. Connect the cable shield to a good ground connection.

"If you must guy the pole, use nylon rope, as wires will upset the radiation pattern of the antenna. (Unless they are broken up about every ten feet with strain insulators —Herb.) The whole installation costs less than $5.00, and makes a good 40-meter DX antenna. 73."

By making the 2 X 4 slightly longer than 18 feet, you will probably have a better opportunity for mounting the antenna.

The Watauga Amateur Radio Club located in Johnson City, Tenn., offers assistance to anyone desiring to obtain an amateur license. Meetings are held the 2nd and 4th Monday of the month. New code classes begin every three months. Anyone living in the vicinity of eastern Tennessee is invited to attend the classes.

All correspondence will be answered and should be addressed to: Mack C. Greene, KN4ARZ, Secretary, Watauga Amateur Radio Club, Route 1, Box 582, Johnson City, Tennessee.

In letters received within a few days of each other, Doug Mulhair, WOVCQ, 1002 Twelfth St., North, Fargo, North Dakota, and Dick Halladay, WOWRK, 223 Roberts St., Fargo, North Dakota, offered to schedule anybody requiring North Dakota for WAS. Take your pick. Both are 15.

[Continued on next page]

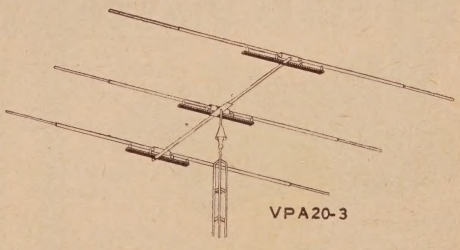
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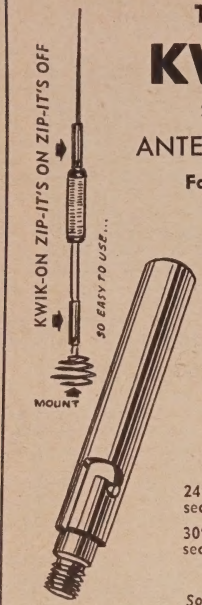
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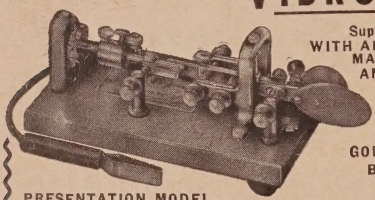
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[from preceding page]

Help Wanted

Tom Petersen (15), 1423 Eliza Street, **Green Bay, Wisc.**

Billy Tennill (13), **Simpsonville, Ky.**

Jim Hughes (12), Box 135, **Simpsonville, Ky.**

Ronnie Penrod (13), Box 11, **Simpsonville, Ky.**

Eddie McCray (13), R.R. #1, **Finchville, Ky.**

Woody Fields, **Simpsonville, Ky.**

Mike Mitchell, KN4CHK, Box 28, **Simpsonville, Ky.** (The last six names are members of the new Simpsonville Amateur Radio Club. They are looking for pen pals and for help in getting their licenses.)

Harry Cohen, 1006 North 19th Ave., East, **Duluth 5, Minn.**, Phone: RA 4-7337.

Ray Surowski (33), 1000 Arlington Ave., **Compton 2, Calif.** Phone: NE 2-8226. (Was prisoner of war in Germany for 15 months. Has had urge to learn radio ever since seeing crude radio one of his fellow P.O.W's built in camp.)

Larry Marcus (12), 320 No. Stanley Ave., **Los Angeles 36, Calif.** Phone: WE 1-9277.

——— (14), R.D. #2, Box 201, **Kent, Ohio.** Phone: AX 6-4755. (Is very anxious to get his Novice license, but does not know of anyone to give him the code test. He forgot to tell us his name.)

Bob Organ (13), 229 North Gilbert St., **Iowa City, Iowa.** Phone: 5972.

Richard Weingarten (16), 73-39 188 St., **Flushing, N.Y.**

Robert Wood, New Men's Dorm, Southwest Texas State Teacher's College, **San Marcos, Texas.**

Joe Vorwerk, 810 S. 8th St., **Burlington, Iowa.**

Bill Turner (16), 111 Carter Street, **Beckley, W. Va.** Phone: 3129.

Bob Hand (16), WN8WQS, 4401 Howard Rd., **Port Huron, Mich.** (Would like to sked someone, to bring up his code speed. Will answer all letters received.)

Ward C. Trent, Sta. A, Box 2176, **Charleston, S. C.**

Bill Durkin, 1108 McQueen St., **Charleston 2, W. Va.** Phone: 2-5537.

Each month CQ lists the names of those requesting help in obtaining an amateur license. To have your request listed, send your name and address to: Walt Burdine, W8ZCV, RFD 2, Waynesville, Ohio. Requests received by July 15 will be listed in the September column.

Mary E. Olendorff, WL7BJD, Star Route, Box 363, Spenard Branch, Anchorage, Alaska, reports, "We have been working hard to get the women hams of Alaska organized. Three nights a week, Monday, Wednesday, and Thursday, at 8:00 p.m., we send code practice on 3690 Kc. A different General Class operator sends it each week, and it is sent under his call for that week.

"I hope to pass my 'General' the last of May and hope to work you then. My oldest son, Ed, is KL7BCH. He hopes this news will stir up some hams in Maine, Delaware and Alabama, states he needs for his WAS. 73."

Not only is the above letter the last that there is room for in the *Novice Shack*, this month, it is also the last item that I will write for the *Novice Shack*. Starting with the August column, Walt Burdine, W8ZCV will be in charge of this department. I hope you all treat him as well as you have treated me. As for me, if you look around your news stand, you will probably run across my byline from time to time. Until we meet again, good luck and may you all soon be 'Generals.' 73, Herb.

Shielding Hints

—Bob Gunderson, W2JIO

Good shielding is essential for the proper performance of high-gain equipment. Many of us wonder just how to make a good connection to the shield or braid around standard mike or coax cable. If the insulation between the center conductor and the outside shield can withstand the heat, a piece of hook-up wire can be wrapped around the outside braid and soldered, but this is a poor method, particularly when a large amount of heat is to be applied.

Another method is to unweave the shield, making a tab which may then be connected to ground. This too means considerable work, and leaves a frayed end on the shield which might cause accidental shorting.

The best and neatest way to get a good electrical and mechanical contact to the shield is to separate the shield with a scribe or a screwdriver, making a hole in the side without breaking the strands. Next bend the cable and force the inner conductor through the hole. Then stretch the remaining empty braid tightly, pulling the hole together and forming a neat tab for your ground connection.

A final note: Always use ground lugs with *teeth* in them; insulate braid with spaghetti whenever there is possibility of contact with points other than the intended ground, to prevent hum loops.

KC6CG Saves Life

(As reported by W6PKI via KA5WW)

KC6CG operated by Ed Pitta on Falalop Island, Ulithi Atoll, Western Carolines, was instrumental in saving the life of a Pharmacist Mate, the only medical man on the island, who had been accidentally run over by a vehicle and who was bleeding badly from internal injuries and skull fractures, on March 6th. KC6CG's call for help was immedaitely answered by KA3MD in Japan who contacted U.S. Military Doctors for medical advice which was relayed to Ed Pitta who, with the help of a native girl nurse, was able to perform emergency treatment. In the meantime KA3MD contacted Guam via Capt. Comstock, operator of KG6AA who instigated an emergency air flight, with Doctor, to Falalop Island, some 400 miles distant. The landing was made on Falalop on a runway lit by hand lanterns and auto headlights. The Doctor congratulated KC6CG for his help, without which, the victim would not have lived the four hours it took for the Doctor to reach him. The injured man was then flown to the Guam Hospital and we are happy to learn he is doing OK.

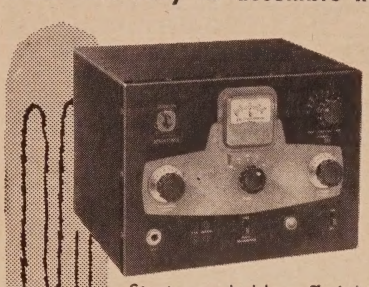
Battery Connection for a.c. Receiver

For that receiver which does not have an accessory socket, here is a simple way of providing a battery connection.

The unused socket connections in the receiver's rectifier tube socket are used to connect to ground and the 6-volt filament connections. An adaptor cable, plugging into this socket, brings in filament and plate supply from the external source. If a dynamotor is used for plate supply it will be filtered by the built-in power filter in the receiver. Next time you want to use the shack receiver for field day or emergency work go right ahead. The receiver will not be harmed.

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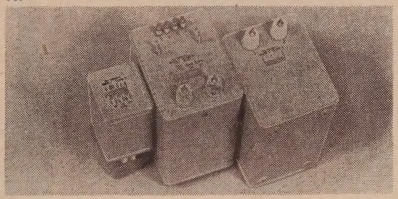
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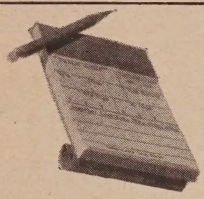
SELL: 400 watt fone, CW xmtr. less VFO. Pair T55's final, TZ40 buffer, pair TZ40's modulators. Coils for 10, 20, 40, 80 meters, all in 6 ft. black cabinet. Good condition. Highest bidder over $320. Also factory wired Hart 75 watt CW xmtr. Used only 3 hours. Excellent condition, $55. Roger Vonier, W8UAG, Box 33, Archbold, Ohio.

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REMEMBER BLOSSOMLAND Amateur Radio Association's hamfest picnic, July 30 at Warren Dunes State Park, 15 miles south of St. Joseph, Michigan on U.S. 12. 10-meter transmitter hunt. Bring gear for swap and shop. Registration fee, $1.00 in advance or $1.25 at park. Advance registration through R. T. Hatch, W8JFW, 3225 Cleveland, St. Joseph, Michigan.

THIS WILL BE the big one! Central Division ARRL Convention. South Bend, Indiana. Oct. 15-16. Advance registration, $3.50. Special prizes for early birds! Write Box 551.

WYOMING HAMFEST: July 23-24 at South Fork Inn. Watch for mobiles on Highway 16 west of Buffalo, Wyoming. Call any Wyoming Ham for information. W7QPP.

SEE YOU at Hamfesters Radio Club's 21st annual picnic and air mobile meet at Mance Park near Chicago on Sunday, August 14th. Donations: $1.00 in advance, $1.25 at the gate.

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KILOWATT modulation transformer needed. Prefer multi-match. Box 35W, CQ Magazine, 67 West 44th Street, New York 36, N. Y.

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WANTED: for cash . . . old wireless spark equipment, battery radios, crystal detectors, crystal sets, transmitters and receivers made from kits, old parts, anything before 1928. W6MEA, 2341 Ivyland, Arcadia, California.

WANTED: TUBES—boxed and unboxed transmitting, receiving, and special-purpose industrial types such as Klystrons, etc. Also will buy excess test gear, Hickok tube checkers, Variacs, etc. Will pay cash or swap you for choice equipment and tubes. B. N. Gensler, W2LNI, 330 West 11th Street, New York 14, N. Y.

WANTED: USED instructograph or a code oscillator any type AC. Write: J. A. Conroy, 684 Comm Ave., Newton 59, Mass.

WANTED: AMATEUR, surplus receivers, transmitters, radar, Loran, ADF, especially 75-A, 32-V, ARC-1, ART-13, ARN-7, APR-4, BC-348, BC-342, BC-221, BC-610, BC-614, BC-939, DY-12, Teletype, Boehme, perforators, TDQ, technical manuals. Cash or trade for new Viking Ranger, B&W, National, H-W, Hallicrafters, Gonset, Elmac, Morrow, Fisher, Nucleonic Geiger Counters, Telrex, RME, etc. Write: Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048. (W1AFN) Stores: 44 Canal, Boston. 60 Spring, Newport, R. I.

WANTED: MOBILE TRANSMITTER. Prefer Elmac AF67 or Sonar SRT-120 with power supply. Box 27W, CQ Magazine, 67 West 44th Street, N.Y. 36.

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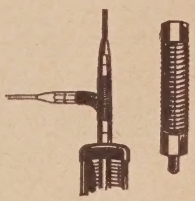


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VAARO—ORIGINAL "WHIP FLEXOR" STANDARD & DELUXE

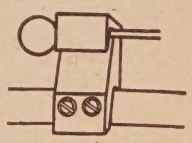


Since 75 meters and other low frequencies began, a new problem has arisen. Any change of antenna (voltage portion) in relation to car body, changes loading and therefore changes output tremendously. This problem has been overcome by the "WHIP FLEXOR" which serves a dual purpose. . . . It is designed to keep the whip perpendicular at extremely high speeds while allowing the whip to be brought down in a horizontal plane for garage storage, etc. This elimination of a base section spring prevents bad "QSB" action on the receiver end. . . . Don't be mislead by inferior imitations.

Standard Model V110-S **$1.95**

DeLuxe Heavy Duty Model V110-D **$3.95**

VAARO "WHIP CLAMP"



ANOTHER VAARO FIRST! The Vaaro "Whip Clamp" securely fastens to the roof water drain of any make car without damage to the paint or metal. Allows the whip to be fastened down to car roof level for garage storage, heavy low wooded areas, etc., etc.
Brass construction, Chrome plated.

Model V-109 Price: $1.79

ADDITIONAL QUALITY PRODUCTS IN THE VAARO-DAVIS LINE INCLUDE:

BUMPER MOUNT (with Tailored Inset to fit exactly), FIBREGLAS WHIPS:—6'—$8.50, 7'—$8.75 and 8'—$8.95. Also BASE SECTIONS (Solid Hex): 12"—$3.75, 24"—$3.95 and 36"—$4.95.

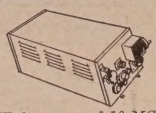
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DAVIS ELECTRONICS

VAARO ELECTRONICS DIVISION

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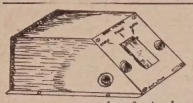
46ACJ UHF (A S B) RECEIVER



13 tube double conversion receivers, frequency range 450-600 MC. This unit employs 446A lighthouse tubes in the RF section, mixer and oscillator circuits. First IF frequency of 55 MC has two stages of amplifications, second IF frequency of 16 MC has 4 stages of amplification. Two video stages follow the second detector. With schematic and tubes 8-6AC7, 3-446, 1-6AG7, 1-6H6.
New Condition $9.95

Less 8 6AC7 Tubes. Wt. 15 lbs. $6.95

Q-5'ER NAVY TYPE BEAM FILTER



Can be used same as the FL-8. This unit has a selector knob which will select or reject a 1020 cycle note. Two phone jacks for plugging your headsets in series with the receiver. Wt. 3 lbs.
New, with schematic. ONLY $1.95

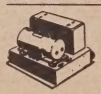
R4/ARR-2 RECEIVER



11 tube UHF tuneable receiver for operation on 1¼ meter band. 6AK5 RF cascade, broad band detector, low frequency preselection, and audio stages. Six preset frequency channels and variable tuning. Other purposes double modulation on the transmitter to eliminate QRM and effect confidential communications; remote control applications; preselector on 50 MC, 144 MC or 220 MC and TV signal booster. With tubes, schematic, less dynamotor. $5.95

Excellent condition. Wt.: 10 lbs. .....

MD-7 MODULATOR



Provides plate and screen modulation for any transmitter of the AN/ARC-5 equip. with 28 VDC plug-in dynamotor. Has receptacle for cables to the receiver mounting rack and all units of transmitting equipment. With 4 tubes.
Excellent condition. Wt.: 21 lbs. $7.95
SPECIAL WITH DYNAMOTOR .....

SPRING COIL CORD

3-conductor mike cable with lugs in both ends. Normal length: 18 in. Expands to over 5 ft. Heavy rubber casing. Wt. 1 lb. Excel . . . 95c ea. 6 for . . . $5.00

FM WOBULATOR CAPACITOR

Frequency modulation unit with permanent magnetic field and a moving coil mechanism driving a metal diaphragm supported at its rim. This diaphragm acts as a moving plate of the frequency modulator capacitor. With schematic. See Dec. Radio TV News for data. Wt. 5 lbs. ea.
BRAND NEW $2.75
2 for . . . $4.95

PANADAPTER and SCOPE ID-60/APA-10



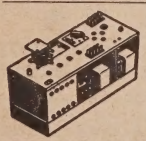
A combined Panoramic Adapter and Oscilloscope. Has 3 coax input connectors for feeding in from receivers having I.F. of 455kc., 5.2 mc or 30 mc. Designed also to be used as regular oscilloscope for testing other equipment. Has both vertical and horizontal push-pull amplifier inputs, etc. Complete with 21 tubes including 3" CR scope tube. For operation on 115V. 400 Cy. with Schematic Excellent condition. Price $49.50
Shipping Wt. approx. 55 lbs.

New 1D60/APA-10! Large Shipment Just Arrived!
Slightly de-militarized. Same as above except IF cans dented and ceramic wafers in switch cracked with schematic AS IS CONDITION. F.O.B. CHICAGO $29.50

UHF TRANSMITTER-RECEIVER

APS-13 $3.95 2 for $6.00

Freq. range 415-420 MC. 5 stages of 30MC. IF amplifier. Complete with R.F. and I.F. sections. Less dynamotor, tubes, tube shields with conversion data. Excel. cond. Weight 14 lbs.



C.A.P. SPECIAL

BC-625 VHF TRANSMITTER: Frequency range: 110-156 MC. With Modulation section and speech amplifier. Less tubes and crystals. With conversion dope.
Used, good cond. Wt. 17 lbs. $9.95

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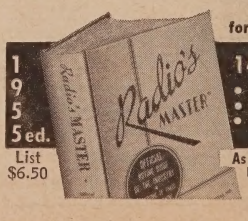
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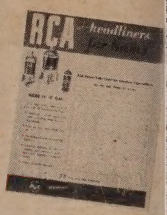
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