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RADIO AMATEURS' JOURNAL

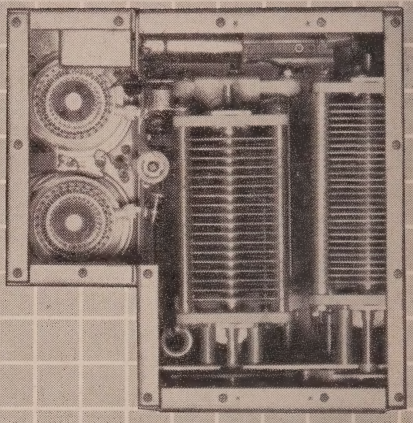
Bill Ruttan.



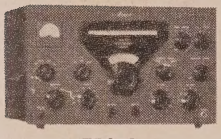
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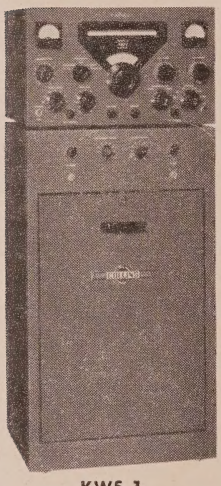
ANOTHER REASON for Top Amateur Performance



Collins KWS-1 SSB LINEAR



75A-4



KWS-1

The reputation for superior performance in the 75A-4 Receiver and KWS-1 Transmitter is no accident. Many problems were met and solved to give you this top Amateur team.

For example: Collins engineers wanted to design a *table-top* kilowatt SSB transmitter. In order to do this, they first had to design a superior linear amplifier in a small package. The result is the Collins KWS-1 linear — efficient, compact, with exceptionally low distortion.

FEATURES

- Inverse r-f feedback used to improve distortion generated in the PA and driver. Third order distortion products better than 35 db down.
- ALC (Automatic Load Control), a circuit similar to AVC in a receiver, prevents modulation peaks from driving the PA into distortion. This permits a high average percentage modulation.
- Bridge neutralizing circuit used to eliminate regeneration and instability.
- Two 4X250B tetrodes used in Class AB1 operation for optimum linearity and low drive requirements.
- Combination Pi-L output network results in excellent harmonic attenuation. This network is continuously tuned and requires no bandswitching

For complete information and specifications plus price data, contact your nearest Collins distributor.

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

COLLINS



W2CJO Supervises Final Testing of G-E Image Orthicons

Amateur background contributes to skill and knowledge needed for highly critical job

THE TV image seen by millions on tonight's hit program, will be clearer, more lifelike because Donald R. Roberts, W2CJO, helped assure top performance by G-E tubes in the studio cameras. Intricate to build, image orthicons get 16 final tests, visual and electrical. All are exacting.

Certain of these tests call for a knowledge of electronic principles as well as a mature understanding of camera-tube design and use. Here both Roberts and G.E. give credit to amateur experience as a source that provides background in practical electronics. "When I test image orthicons for microphonics," says Roberts, "the problem encountered is identical to one every ham wrestles with—except that the eye, not the ear, is affected."

A ham license-holder since 1941, Roberts is active on 2 meters, both phone and CW. Interest in electronics led to his first Schenectady job, as studio and transmitter technician with WRGB, pioneering TV station. Here he gained television experience that further aids him in his present camera-tube assignment.

Radio amateurs like W2CJO are found throughout G.E.'s 7 tube plants, doing key work in the design, production, and testing of transmitting, industrial, and receiving tubes of all types. Your General Electric distributor supplies you with quality tubes to which amateurs have made a direct and important contribution! *Tube Department, General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

166-181

There's a PR for every Service!

AMATEUR



40, 80 and 160 Meters, PR Type Z-2

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed.....**$2.95 Net**



20 Meters, PR Type Z-3

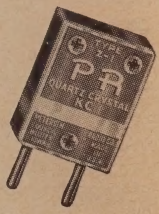
Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. Stable as fundamental oscillators. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation.....**$3.95 Net**

COMMERCIAL



COMMERCIAL, PR Type Z-1

Designed for rigors of all types of commercial service. Calibrated .005 per cent of specified frequency. Weight less than ¾ ounce. Sealed against moisture and contamination. Meets FCC requirements for all types of service.



SPECIAL TYPES

Type Z-1, AIRCRAFT

3023.5 Kc., .005%.....**$3.95 Net**

Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range.
Calibrated to .005%. 1500 to 10000 Kc. **$3.95 Net**

Type Z-6A FREQUENCY STANDARD



To determine band-edge. To keep the VFO and receiver properly calibrated.
100 Kc. . . . . **$6.95 Net**



Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc. (Fund.) ±5 Kc. . . . **$3.95 Net**

12001 to 25000 Kc. (3d Mode) ±10 Kc. . . . **4.95 Net**



VHF Type Z-9A

For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range.

Each . . . . . **$6.95 Net**

Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .04% . . . **$3.95 Net**



Type Z-1 TV Marker Crystals

Channels 2 through 13 . . . . . **$6.95 Net**

4.5 Mc. Intercarrier, .01% . . . **3.95 Net**

5.0 Mc. Sig. Generator, .01% **3.95 Net**

10.7 Mc. FM, IF, .01% . . . **3.95 Net**

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

PR Crystals

Since 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Company, Inc., 8 W. 40th Street, New York 18, N. Y.

CQ, The Radio Amateurs' Journal

January 1956
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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.

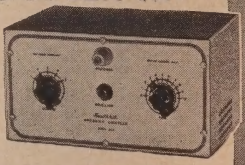
- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic 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 C W. 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 ANTENNA COUPLER KIT



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.

MODEL AC-1

$14.50 Shpg. Wt. 4 lbs.

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 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.

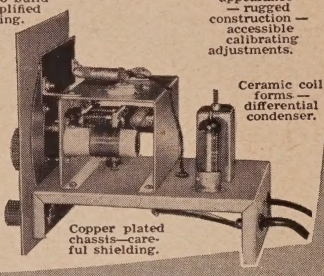
Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design 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.

Open layout,— easy to build — simplified wiring.

Smooth acting illuminated dial drive.

Clean appearance — rugged construction — accessible calibrating adjustments.



Ceramic coil forms — differential condenser.

Copper plated chassis—careful shielding.

Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

$29.50

Ship. Wt. 16 lbs.

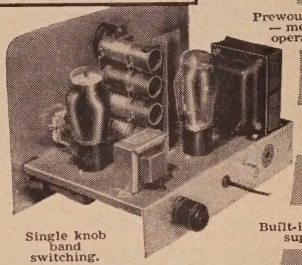
SPECIFICATIONS:

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.

Crystal or VFO excitation.

Prewound coils — metered operation.

Rugged, clean construction.



52 ohm coaxial output.

Built-in power supply.

Single knob band switching.

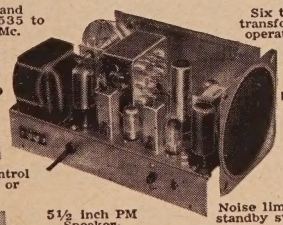
Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up 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

Four band operation 535 to to 35 Mc.

Six tube transformer operation.

Stable BFO oscillator circuit.



Electrical bandspread and scale.

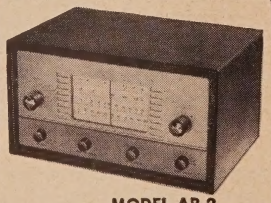
RF gain control with AVC or MVC.

5½ inch PM Speaker-Headphone Jack.

Noise limiter—standby switch.

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. 90651

GRID DIP METER

The No. 90651 MILLEN GRIP DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS



Feenix, Ariz.

Deer Hon. Ed:

Amchoor radio are just not what it used to be. Not by long shots. Of course, Scratchi are just reely finding this out.

Other nite I walking in shack, stepping over cupple cardbord boxes, taking some old catalogs and toobs off chair so can sitting down, then moving magazines and junk on operating table so can putting elbows on table. I leening on Hon. Chin, and looking around. What a mess. It hard to buleeving, Hon. Ed., unless you seeing it with your own to eyes.

Old radio stuff, new radio stuff, war surplus stuff, plain surplus stuff, wood boxes, cardbord boxes, cigar boxes, glass jars full of stuff, stuff full of glass jars full of stuff, new magazines, old magazines, out-of-print magazines, wooden shelves with metal boxes on them, metal shelves with wooden boxes on them—Hackensake!! Scratchi getting idea. All need to doing is finding outs what are in all these boxes, riting ad for your Hon. Mag. and can selling this jun—, stuff.

As soon as ideer of money entering pickshure, Scratchi moving into ackshun like sixties. Desiding that basement are best place to taking inventories. So, I starting the carrying job. Boxes, cartons, bushel baskets, up and down, up and down. Are stopping midway thru for bit of lite refreshment, so are able to cumpleet job with no trubbles.

After all stuff are neetly arranged around basement, next are thinking are 1/c idea if getting all condensers together, all toobs together, and so ons. Are looking like real easy job.

To days later are fineally having everythings sorted. Maybe you intrusted in what I having. Condensers. By Hon. Beard of my Sacred Ant Fuji, I never seeing so many newtralizing condensers in my life. Remembering those neet-looking round plate ones? I got them. Big ones, middle-size ones and little one with plates only three inches across. And remembering the

[*Continued on page 8*]

22 years experience guarantees the best in every price range



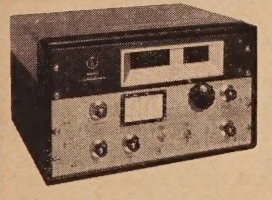
model SX-100
AM-CW-SSB
receiver
$295.00

"Tee-Notch" Filter provides a stable non-regenerative system for the rejection of unwanted heterodyne in SSB. The "Tee-Notch" also produces an effective steepening of the already excellent 50 mc i-f pass band. Upper or lower side band selectable by front panel switch. Notch depth control for maximum null adjustment. Antenna trimmer. Plug-in laboratory type evacuated 100 kc. quartz crystal calibrator—included in price. Second conversion oscillator crystal controlled—greater stability through crystal control and additional temperature compensation of high frequency oscillator circuits.



model HT-30
AM-CW-SSB
transmitter/
exciter
$495.00

Built in V.F.O. reads directly in kilocycles. V.F.O. stability is equal to most crystals—.009%. There are also provisions for 1 crystal for fixed frequency operation. Selective filter system is same used by commercial communications companies for reliable sideband selection to assure continued suppression of unwanted side band energy (down 40 db or more) and distortion products. New 50 db range meter for constant monitoring of r-f output and carrier suppression. Voice control system built in with adjustable delay and anti-trip features. Front panel controls allow selection of AM, CW, and upper or lower side band.



model HT-31
AM-CW-SSB
linear power
amplifier
$395.00

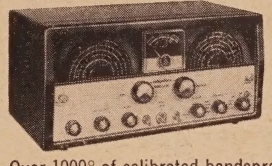
Continuous frequency coverage from 3.5 mc to 30 mc. Pi-network output for efficient harmonic and T.V.I. suppression. Major T.V.I. suppression built in. Does not require an antenna tuner as will feed loads from 50 to 600 ohms. Full metering of all important circuits, including input in watts. Employs 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.

hallicrafters
Chicago 24, Illinois



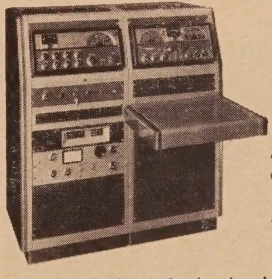
model SX-96
AM-CW-SSB
double conversion
selectable
side band receiver
$249.95

Precision gear drives are used on both main tuning and band spread dials. Double conversion with selectable crystal controlled second oscillators. Selectable side band reception of both suppressed carrier and full carrier transmissions by front panel switch, delayed AVC, CW operation with AVC on or off. Has calibrated bandspread. Double conversion superheterodyne over the entire frequency range. Automatic noise limiter operated from front panel. Carrier level indicator calibrated in "S" units from 1 to 9, decibels to 90 db over S9, microvolts from 1 to 1000 K.



model SX-99
AM-CW receiver
$149.95

Over 1000° of calibrated bandspread over the 10, 11, 15, 20, 40 and 80 meter amateur bands on easy-to-read dial. Separate bandspread tuning condenser, crystal filter, antenna trimmer, "S" meter, one r-f, two i-f stages and new styling. Complete front panel controls: antenna tuning, sensitivity, band selector, main tuning, bandspread tuning, volume, tone, standby, selectivity, crystal phasing, noise limiter.



model SR-500
complete amateur
radio station
$1495.00

A complete radio station in a handsome console cabinet—transmitter/exciter, linear power amplifier, receiver—affording the finest in V.F.O. or crystal. SSB, AM and CW transmission and reception. You need supply only the antenna, microphone and AC power. All the wiring is complete, and external connections are provided for antenna and microphone. A special communications speaker is positioned above the operating shelf. Console is mounted on casters. Three blank panels provide for installation of additional equipment.



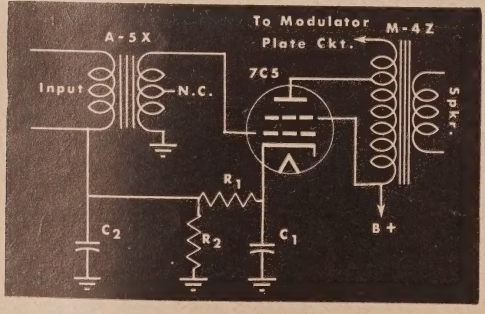
TRIAD

TRANSFORMERS

The TRIAD A-5x high gain microphone transformer eliminates need for audio amplifier with substantial savings in cost and space. TRIAD'S M-4z or M-5z eliminates over-modulation and boosts audio power. Both types are minimum size and low in price.

Type No.	List Price	Application	Primary Impedance Ohms	Turn Ratio	Wt. Lbs.
A-5X	$4.15	Single button mike to p.p. grids—Hi-gain.	100	84	½

Type No.	List Price	Primary	Secondary Impedance	Secondary Ma.	Audio Watts	Wt. Lbs.
M-4Z	$3.40	5000 (Autoformer).	6750 4	100 (total)	10	¾
M-5Z	5.60	5000 (Autoformer).	6750 4	250 (total)	20	1½



Write for Catalog TR-55E

TRIAD TRANSFORMER CORP.

4055 Redwood Ave. • Venice, Calif.

[*from page 6*]

regular type with wide spacing for newtralizing type 10 toobs? Got six of them.

Speaking of toobs. Having nice batch of UV-99's, UX-01A's, 24's, 26's, 37's, 45's and hole box of 80's. Even having toobs with blue glass for bulbs. Finding some metal 6V6 and 6L6 toobs, but as I recalling, these are ones I using in rig one time and they are probably gassy.

Needing toob sockets? I having bewtiful collection of shiny black ones. Four pin, five pin, six pin, seven pin small and seven pin large. Also box of white porselin four pin sockets for using with high voltage toobs like type 10's. Also finding three octal sockets and one 7 pin minychure socket.

Losing any knobs off your 1924 radio? Scratchi can fixing you up. Wooden knobs, all sizes. Bakelite knobs, all sizes. Or maybe you needing resistors which are still soddered to other resistors which are still soddered to rf chokes and odd lengths of wire. Having hole bushel basket full of same, all in 1/c condishun as long as you not needing long leeds on the resistors. Also having to cigar boxes full of resistors with long leeds, but not being able to tell what resistance on acct. they getting so hot they burning off the paper what telling how many omes.

Or maybe you intrusted in carbon mikes? Dubble button, brodcast style, single button tellyfone style? Or maybe a nice cleen looking FB-7 reseever. No coils for it, but reseever in 1/c shape. And with matching earfones.

War surplus? Having reel slicky unit, with external antenna which are wound in form of square with ten turns of wire, which mounting on top of reseever. Box having crank on side for generating power. Evidentally World War I surplus.

Crisstals? Aha, I know you'd be getting intrusted sometime. Having large cardbord carton on them. Mostly of the type with large round white base, with two large pins sticking out which fitting five prong socket. Even having adjusting screw on so can adjusting pressure on crisstal. They taking standard one-inch square crisstal if case you liking to using your own crisstals in them.

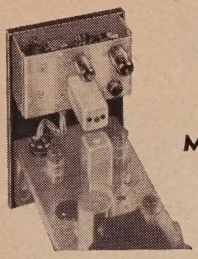
Hon. Ed., what are amchoor radio coming to? What happening to all the triode toobs in rf finals, and newtralizing condensers, and pink beed lamp bulbs to newtralizing with? Where are the big toobs you can getting your hands on when you having to change them? Where are the reseevers you tooning by hand-capacity, by moving your Hon. Hand neer the tooning knob?

I gessing those days are gone forever. Tomorrow I having junk man come and getting all this junk. Or maybe you thinking some Museum be intrusted?

Respectively yours,
Hashafisti Scratchi

NEW MULTIPHASE "Q" MULTIPLIER

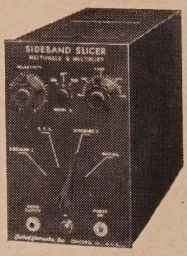
- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB. No Loss in Speech Intelligibility
- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor



MODEL AQ



MODEL DQ



MODEL B SLICER

CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired.....$29.50
Kit.....$22.50

FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

Wired.....$29.50
Kit.....$22.50

BUILT-IN "Q" MULTIPLIER

Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

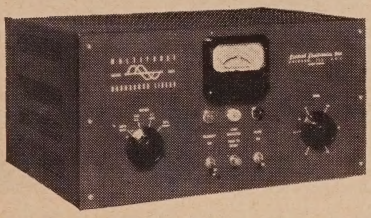
Wired.....$99.50
Kit.....$69.50

MODEL A SLICER

Same as Model B but less "Q" Multiplier

Wired.....$74.50
Kit.....$49.50

A NEW CONCEPT IN LINEARS



MULTIPHASE 600L

BROAD BAND LINEAR AMPLIFIER

NO TUNING CONTROLS!

SINGLE KNOB BANDSWITCHING 10-160 METERS

- Single 813 in Class AB_2. Approx. 2 watts effective or 4 watts peak drive for 500 watts DC input.
- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current, watts input, RF output, reflected power from mismatched load — switch to any position while on the air!
- Completely shielded — TVI suppressed. Free of parasitics! Low intermodulation distortion.
- Choice of grey table model (17⅝"W, 8¾"H, 13"D) or grey or black rack model.

Wired, with tubes.....$349.50

MULTIPHASE EXCITERS

Check These Features



MODEL 20A

- **20 Watts P.E.P. Output SSB, AM, PM and CW**
- **Bandswitched 160 — 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested.....$249.50
Complete kit.....$199.50

NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- Talk yourself on frequency.
- Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- Accessory Power Socket.



MODEL 10B

- **10 Watts P.E.P. Output SSB, AM, PM and CW.**
- **Multiband Operation using plug-in coils.**

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.

Wired and tested.....$179.50
Complete kit.....$129.50

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

WRITE FOR LITERATURE ON THE COMPLETE MULTIPHASE LINE

Take the modern, easy approach to a powerful all-band CW, AM or SSB rig



. . . with one of the EIMAC BIG SIX

The easiest way to build a powerful, all-band CW, AM or SSB transmitter is around an Eimac Big Six radial-beam power tube. A tube from this incomparable selection for ham radio service provides long range operating economy and simplifies initial circuit design. All except the output circuit can be built with common, low level receiver-type components. Driving power is so low that annoying TVI-producing harmonics generated in the exciter are readily controlled. Low feedback capacitances make stabilization of the amplifier stage simple.

Clean internal construction and ability to handle momentary overloads are among the many inherent traits of Eimac tubes that assure unmatched performance and reliability.

Whether rebuilding or starting from scratch, realize the pleasure and more watt-hours per dollar given by an Eimac Big Six radial-beam power tube.

EIMAC BIG SIX OF AMATEUR RADIO APPLICATION		
4X250B	4-65A	4-125A
4-250A	4-400A	4E27A

Write our Amateurs' Service Bureau for free copy of the 24 page booklet, "Single Sideband!"

Eimac

EITEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

Guest Editorial

. . . de K2ORS

The range and roar of ham radio goes on unabated and, in fact seems to grow fatter and more catlike as we "progress". It has occurred to many over the years that all the evils, prejudices, desires, charities, and other assorted and unclasified qualities of Man are present in every act he does. Even the most social. Actually, some have pointed out that the more social the contact he has, the more these various seemingly disparate qualities come into play.

Let's take good old friendly ham radio for an example of the typical social activity of *homo neandertalis*. It is possible to observe every known human failing, and positive quality too, in a couple of hours of casual listening on any band. Provided, of course, the band is reasonably open and busy.

Has it ever occurred to you that a "dead" band in many ways is a thing of beauty? On lucky days it is possible to tune from one end of the ten-meter band to the other and hear not a single splatter or roar of an overmodulated gallon bellowing inanities over three million square miles of earth and even perhaps (we have reason to suspect) a couple or more planets of our solar system who have done nothing to warrant such a blatant invasion of their privacy. In many ways a "dead" band is like a beautiful forest glade before the picknickers arrive prepared to litter the moss with empty beer cans, half-eaten sandwiches, egg shells, and things too revolting to discuss in a family magazine.

However not all picknickers, or hams for that matter, are beer-can throwers, it just seems that way. It is my opinion that there are just as many gentlemen around as ever before, but the egg-shell tossers and beer-can throwers are more plentiful.

Frederick Lewis Allen, the late editor of *Harper's*, said a few months before his death that we had entered the Age of The Slob and our era would be so known in history. It is surprising to note that Allen made this observation without first scanning the forty-meter phone band on a good busy night when the littoral was crowded with fat redfaced beer drinkers dropping potato salad on the trampled forest grass. Too bad he missed it. I shudder to think what he might have written had he known.

But I digress.

My basic theme here is the diverse qualities peculiar to Man that are displayed through the medium of ham radio. And remember, this ham radio of ours is far more than just a hobby. It essentially remains a social contact between two or more human entities regardless of the technical furbelows that might conceal the fact. It is funny, and yet sad in a way, to hear the conversation of two people who would never have spoken had they met in a subway or bar since they both are rather shy introverts with more than a touch of snobbishness in their makeup. Suddenly, thru the medium of ham radio, they find themselves in conversation with each other and both vaguely aware that the other is an utter stranger and quite possibly beyond his own social pale. Immediately the air is filled with stock phony phrases of goodwill such as "Old Man", "call me Jack", "the XYL is ringing the dinner gong", all of these things are as pat as a form letter from *TIME* magazine begging for subscriptions, and just as personal.

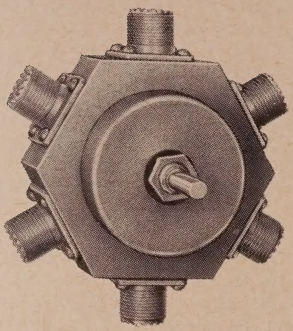
The real use of this guff is to *sound* as tho' our two heroes are having a real conversation without actually having one. But if one of them strays from the beaten path of Worn Cliche for as much as an instant the other immediately clams up and hears the "dinner gong" and "must pull the Big Switch since the QRM is getting rough". Actually if we were to analyze carefully the full transcript (an embarrassing thought!) of the "ragchew" between our two introverts, we would find that a full 99% of the content is a discussion of the *means* by which they were enabled to make contact and the other 1% is a collection of homilies regarding weather conditions and like trivia.

In over seventeen years of ranging the ham bands from 2 to the old 160-meter band (and what a haven for "joiners" that one was! It, in fact, will be subject of my next tirade). I cannot recall more than three or four instances where the conversation became a few ounces heavier than the usual lightweight gabble.

And perhaps the saddest of all is the DX'er. Here is a man who is in nightly contact with the world and yet knows nothing of it. I caught a complete QSO on fifteen this morning between an LA in Oslo and some yokel in Jersey. They "talked" for better than twenty minutes under perfect conditions for a change. Here were two humans separated by thousands of miles, from two widely differing cultures, one from a Monarchy and the other from a Republic, and yet all they spoke of was the inevitable weather and QSL card. Apparently neither had any curiosity about the other and was secure in his own provincialism. I almost felt as tho' I should

[*Continued on page 108*]

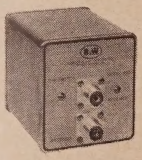
QUALITY PRODUCTS BY B&W



COAXIAL SWITCHES

These multi-position switches eliminate the fumbling and annoyance of screwing and unscrewing coaxial connections. With the Model 550, you can instantly select any one of five antennas, transmitters, exciters, receivers, and other r-f generating devices using 52 or 75 ohm line just by turning a knob. Handles up to 1 KW of modulated power with a maximum crosstalk of –45 db at 30 mc. Model 551 is a 2-pole, 2-position type for switching various devices in or out of series connection with coax lines.

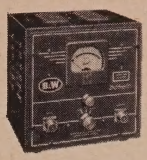
AUTOMATIC T - R ANTENNA SWITCH



Fully automatic electronic antenna changeover from receiver to transmitter and *vice-versa* — suitable for all power applications up to the legal limit. Model 380 is ideal for voice operated SSB — AM phone and break-in CW —all with one antenna.

ALL OF THESE FINE B&W products are available at leading distributors' everywhere.

MATCHMASTER



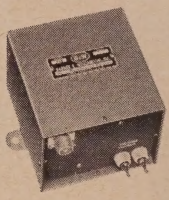
Three valuable instruments in one, the Matchmaster can be used as a dummy load, direct-reading r-f wattmeter, and an integral SWR bridge, for fast measurements on coaxial feed lines, antennas, and transmitting equipment.

DIP METER



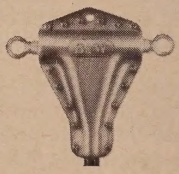
This indispensable instrument serves as a sensitive grid dip meter, signal generator, absorption wave meter, or signal monitor from 1.75 to 260 mc. Saves time in transmitter tuning, neutralizing, antenna loading, etc. Color coded 5 band dial matches five coils supplied.

1 KW BALUNS



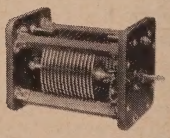
Fill the gap between unbalanced feed lines and balanced antenna loads, provide maximum transfer; low power line radiation on transmission; high signal-to-noise ratio on reception. Models for rotary beam, folded dipole antennas.

COAXIAL CONNECTOR



Permits efficient, watertight, coaxial cable connections for antenna systems. In addition, it serves as a center insulator for a half wave doublet antenna. Ruggedly constructed of aluminum, with steatite insulation, connector withstands a 500 lb. pull.

ROTARY AND FIXED EDGEWOUND INDUCTORS



Rugged inductors, useful for high power transmitters, r-f heating equipment, antenna phasing networks, etc. Available in wide range of inductance and current ratings or may be ordered custom built to individual specifications.

Barker & Williamson, Inc.

237 Fairfield Ave., Upper Darby, Pa.

. . . de W2NSD

NEVER SAY DIE

It never ceases to amaze me how much can frequently be accomplished with very little effort. I took an hour out a few weeks ago and put in a wire from the front seat of the car to the battery. On this I connected the Gonset Communicator power plug. Then I fashioned a whip out of a piece of #6 copper wire 19" long. I mounted the wire on a small standoff insulator and bolted the insulator to an aluminum plate about four inches square. Two short straps of thin aluminum made a clip to slide over the car window to hold the whip at right angles to the car. Some 58U finished the job. The whip can be put in place by rolling down the window and sliding it into place. When the window is rolled up the plate makes contact with the car body and greatly enhances the signal. The Communicator sits in the middle of the front seat, for lack of a more convenient spot.

Results? Incredible! I have just about given up using the lower frequency bands from the car now. In two trips to Boston I found that QSO's could be had almost over the whole trip, with DX over 75 miles in some cases workable right through the car hash, hills, etc. The more I use the Communicator the more I like it.

A Visit to National

On this last trip to Boston Jim and I paid a visit to the National Company in Malden. Mel Hayden and Ed Harrington (W1JEL) rolled out the plush carpet and herded us through their two huge plants. They were concentrating largely on the production of the new NC-300 receiver. We were surprised to see that they make just about everything that goes into the receiver but the tubes. They have their own metal shop turning out the cabinets. They even wind all their own coils and i-f transformers. In a shielded room Ed was putting the finishing touches on the special converters which will soon be available for use with the *300* for 1.4-2-6M reception. Ed is also planning a super-sensitive preamplifier for the converter which will be on the order of those now in use by those few of the VHF gang with unlimited supplies of parts and lab equipment. If the serious VHF DX'er is going to keep ahead he will have to start working on some scheme to get a negative noise figure. Perhaps we will have more details on this line of endeavor in the April *CQ*.

W1HOY Licensed

We all know that Ham Radio is infectious. With some XYL's the exposure results in immunity, with some a "take." Helen Harris, XYL of our VHF Editor, W1FZJ, got her Novice and Technician tickets on her birthday. This was the morning after my visit to National and I happened to be along when she picked it up at the post office. Sam, Helen, and I were out for a quick spin up to visit Carl Evans, W1BFT, about 100 miles away in Concord, N.H., in order to try out Helen's birthday present: a Jaguar. This "present" to the XYL somehow reminds me of the ham who gave his wife a new receiver for her birthday. Helen may get a chance to use it eventually.

This was my first introduction to sport cars and I was impressed. I wore holes in the floorboards bracing for the inevitable pileup. Somehow that car held to the road going at about twice the speed necessary to make my Ford station wagon airborne.

As usual I started out with no idea of the location of our destination. I figured we could find Evans Radio easily. We stopped for a moment at the first large Radio and TV store in town and I hopped out to get final directions. About fifteen minutes later Sam came in to find out what had happened to me. I had met W1JNC, an old Sweepstakes buddy, and was hot in rag chew. Sam, another SS old timer joined in the QSO and we had a wonderful time. Helen finally pried us loose.

Evans Radio

We arrived at Evans Radio shortly after they had closed for the day. They ignored our first taps on the solid glass doors, but as we got out more hefty items to knock with they hastily reconsidered and let us in. Carl had already gone home, but we shifted from one foot to the other until we got a full guided tour of the building. A great percentage of the employees at Evans are hams, which seems pretty risky to me. I was exposed to all those acres of shelves of new equipment and rooms full of used receivers, transmitters, etc, for just a few minutes. I don't understand how anyone can work there full time and withstand the strain. I'll bet they open the lunch-pails *there* at quitting time.

W1BFT

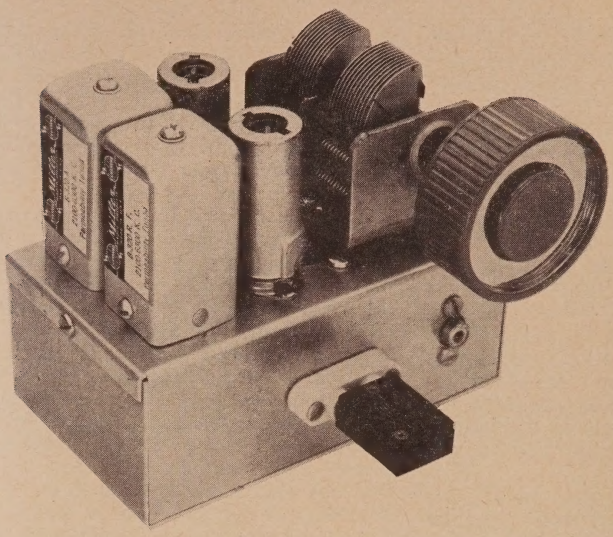
The instructions given us to find Carl were to drive down the road until you come to some antennas. We did. Egad, what an antenna farm we found lurking in those southern New Hampshire hills. Towers, masts, beams and doublets all over the place. We visited Carl and Dot for about an hour before the advancing snow storm worried us into leaving. Carl has quite an operating setup with an elaborate antenna patch panel, etc. It sure is fun to get out and meet the other fellow personally and have a QRM-free QSO using duplex operation.

6 Meters

My remarks last month about Six being dead found several sensitive ears and a few bleats

[*Continued on page 86*]

want $500 rcvr performance at 1/20 the price?



The Novice Q5'er

Donald L. Stoner, W6TNS
Assistant Professor of Electronics, Chaffey College, Ontario, California

How would you like a receiver that doesn't drift? A receiver that is sharper than a double edged razor blade? Not only that, but a receiver that will give your arm a charley horse before you can tune the 40 meter band? If your purse can stand $20.00, it can be yours. Before you mumble something about a babbling idiot and flip the page, read on MacDuff.

About two months ago, I was batting the breeze with KN6HGY. Art has had his ticket 8 months now and hasn't had a solid contact yet. It seems he was getting out fine, but after standing by for a station his receiver had drifted off the station completely. I invited myself over to his shack to see what the trouble was. Sure enough, all I had to do was set the receiver on 7185 and I could hear every station in the novice band. It sounded like the parakeet corner at the local pet shop. As I reached for the dials, the squawks changed and in came W6ZZY calling CQ 40 on 7210. "Boy, this inhaler has flipped its lid, Art," I said. "Looks like you're ready for a new "Blooper 8". "Ha! The treasury is flatter than a cherry red 6L6," said Art. "Looks like I'm off the air until I can afford one".

That night I started thinking. How many Novices and even general class hams were in this boat?

Well after copious pots of coffee, 13 ball point refills, a dozen Weller tips and a near divorce, here is what I came up with: *The Novice Q5'er*. This receiver was stacked up with several commercial receivers and proved to be as good as any and superior to several.

The heart of the receiver is the BC-453 Command receiver. This receiver has 6 tubes and tunes a frequency range of 190 to 550 kilocycles. "This is good?", you say. You bet it is, and here's why.

Selectivity

If we amplify the radio signals that the antenna picks up, at a low frequency, we can increase the selectivity. Increased selectivity means that signals off the side of the station we are trying to copy will not be amplified. Suppose the radio amplifiers were 3 percent of their dial frequency wide. If our receiver had 455 kc amplifiers, they would be 13.6 kc wide. This means that we could hear stations that were 6.8 kilocycles either side of the station we are trying to copy. If we lowered the frequency of the amplifiers to 85 kc, what is

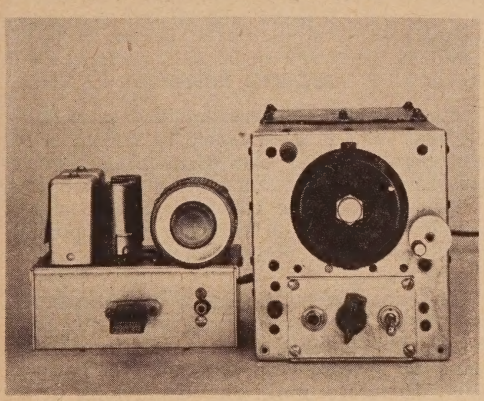
the bandwidth now? Three percent of 85 kilocycles figures out to be 2.5 kc. Now Joe Novice has to be within 1.3 kilocycles of the station we are receiving to cause any interference.

The BC-453 does just that. It amplifies the signals at 85 kilocycles. The above example does not always hold true, but it is a good rule of thumb. By actual measurement the Novice Q5'er is 2.7 kilocycles wide. That compares favorably with most receivers selling for $200 or more.

Stability

What about stability? Well the Novice Q5'er is rock solid. It just doesn't drift. If the receiver is working correctly, and has had a ten minute warm-up, it won't drift over 200 cycles. You can beat on it with an old 304TL and it will never change pitch on CW. The reason for the stability is the low frequency amplifiers again. If the percentage of drift in a receiver stays the same, then as we go lower in frequency with the amplifiers, the number of cycles of drift will be lower. Of course, Uncle Sam did a doggone good job when he designed the command set series.

About this time you are probably wondering if the FCC opened a new ham band somewhere between 190 and 550 kc. Not yet, we are



These two units combine to make a really hot, selective receiver.

interested in 40 and 80 meters. Therefore, we must convert the signals to a frequency that the BC-453 can receive. This is accomplished by a method called heterodyning. Briefly, heterodyning is the mixing of two frequencies to produce a new frequency.

Heterodyning

Assume we are copying a station on 7000 kc. If we mix 7000 kc and 6800 kc in a vacuum tube (we use a mixer tube, of course), we obtain 7000, 6800, plus 200 and 13800 kilocycles, the sum and difference of the two mixed frequencies. This appears at the output of the mixer tube. We don't want the 7000 kc, that's what we started out with. 6800 and 13800 will

Mr. Jim Morrissett, K2OLK
Assistant Editor, CQ
67 West 44th Street
New York 18, New York

Dear Jim:

Oh God! Another Command Set Article, I can hear it all the way to Ontario.

I am sending you this manuscript because so many Novices look to your magazine for guidance and I feel that this receiver and the theory I have worked into the text, may help some of these Novices that might otherwise wind up on 6 meters obtain their General Class license.

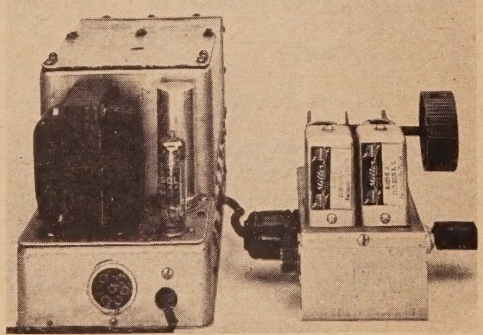
Let me know what you think of it at your earliest convenience.

Sincerely,

Donald L. Stoner

Donald L. Stoner, W6TNS
Box 137
Ontario, California

not help us either. But 200 kc we can use, or rather the BC-453 can use it. You can believe it or not, but that 200 kc signal we obtained from the mixer tube is exactly the same as the 7000 kc signal that went in. Remember those 85-kc amplifiers? How to get 200 kilocycles down to 85 kc? That's right, another mixmaster tube in the command receiver. This time we generate a signal at 285 kc and send it to the mixer tube. In the output of the mixer tube we get 200 kc, 485 kc, 285 kc and you guessed it, 85 kilocycles. Since the amplifiers are tuned to 85 kc, the rest of the signals are rejected and the 85 kilocycle is amplified. This signal is an exact duplicate of the original 7 Mc signal, but greatly amplified. This system is called double conversion, for obvious reasons, and is featured in all the more expensive receivers. Out of sheer modesty, I must admit



Converted BC-453 with Converter.

that Mr. Collins of Cedar Rapids thought of it long before I did.

After the signal has been amplified to a sufficient level, it is detected. This means we remove the intelligence from the carrier. (That's what carried it to our antenna from Joe Novice.) In the case of phone reception it involves removing changes in carrier strength that constitutes the other person's voice. These changes in carrier strength are further amplified in an audio amplifier until they are strong enough to vibrate your speaker or head phones.

For code reception, something different happens. There are no changes in amplitude, only intermittent dots and dashes. We are unable to hear the dots and dashes, so we call on Mr. Hetrodyne again. By generating another signal at 86 kilocycles, we produce a new signal at 1 kc or 1000 cycles. We are able to hear the 1 kc signal and it appears in our phones each time Joe Novice presses his key. That's all there is to it, this hetrodyning deal holds true for any superhetrodyne receiver.

Let's still generate that 6800 kc signal but this time listen for a signal at 7300 kc (the high end of the 40 meter band). Now what happens? 7300 minus 6800 equals 500 kc. Crank the BC-453 dial up to 500 kilocycles and we are hearing 7300 kc. I might mention that it takes 24 turns of the dial and 4 seconds is the record. If the 6800 kilocycle signal we generate is crystal controlled, there will be no noticeable drift in this part of the circuit.

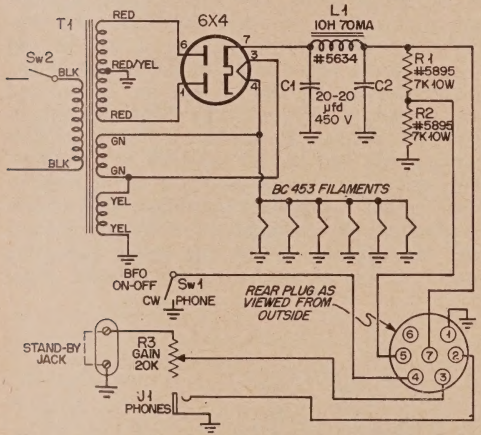


Fig. 1. Power Supply and Parts list

C1, C2—20-20 µfd. 450 WVDC—Sprague TVL-2755

R1, R2—Original part #5895; 7,000 ohms 10 watt.

R3—20,000 ohm pot. with SPST switch

L1—Original part #5634; 10 henrys, 70 ma.

S1—SPST Toggle switch

S2—SPST switch, part of R3

J1—Open circuit phone jack

J2—2 Screw terminal strip

T1—Small receiver power transformer.
250-0-250 volts @ 50 ma.
6.3 volts @ 3 amps.
5.0 volts @ 2 amps.
Chicago PV-40 or Thordarson R-30

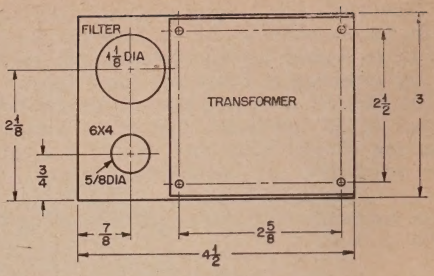


Fig. 2. Power Supply Mounting Plate

80 Meters

Now let's go down to the 80 meter novice band, 3700 to 3750 kc. To do this we insert a 3400 kilocycle crystal. Remember, 3700 minus 3400 kc equals 300 kc. Tune the BC-453 to 300 kc and there you are. Don't forget you could use a 4000 kc crystal also. 4000 kc minus 3700 equals 300 kc too!

Sounds pretty good doesn't it? How can you build this double conversion inhaler for 25 bux? Easy, most of the work has been done already when you buy the BC-453. The Navy version, the R-23 ARC 5 will work as well by the way. Either receiver will sell for about $10, leaving $15 for the converter and BC-453 conversion parts.

BC-453 Power

Since the BC-453 was designed to work on 24 volts d.c., it is necessary to rework it for a-c operation. This involves installing a power transformer, rectifier tube and filter condenser.

The parts for the converter cost a total of $14.70, including the big knob. Quite possibly you could sneak under $14.00 if you use a small knob.

The components necessary to convert the BC-453 to a-c operation will amount to about $6.00. The necessary conversion information has been covered very well in earlier issues of CQ[1]. Therefore, I will only detail some of the refinements that make a professional looking job. About the best conversion uses a small 6 tube radio transformer connected to provide 11.3 volts a.c. This allows the constructor to use the original 12 volt tubes. The schematic of the Q5'er power supply is shown in Figure 1. Be sure to check the voltage between the 5 and 6 volt windings. Connected improperly, the phases will oppose and produce only 1.3 volts. If this should occur, interchange the connections to either winding, but not both. The voltage now will be 11 or 12 volts, a.c. Four digit numbers in the schematic indicate original BC-453 parts that are re-used in the conversion.

To do a professional job, don't use a separate power supply. All the components can be

1. QST Sept. '48
CQ Dec. '50
CQ July '53

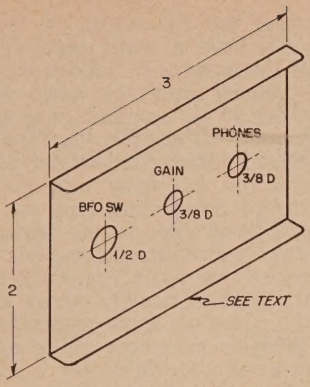
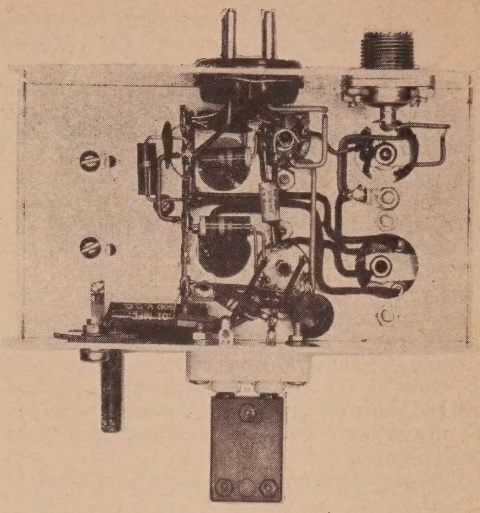


Fig. 3. Detail, Q-5er front plate.



Converter chassis, bottom view.

mounted on the rear apron of the BC-453, after it has been cleared of obstructions such as the dynamotor plug and shock mounts. Cut and drill a piece of aluminum as shown in Figure 2. Then drill holes in the proper places in the BC-453 rear apron and mount the power supply parts.

A phone jack, gain control, and toggle switch can be mounted on the front panel if a small plate of aluminum is drilled as shown in Figure 3. It is a tight squeeze, but they will all fit. Actually, if the two pillars and knob are drilled off the original front plate, the parts can be mounted in these holes after they have been enlarged.

A two screw terminal strip is mounted on the rear apron of the Q5'er. One lug is connected to the ground end of the gain control and the other lug is grounded. During normal operation these lugs are connected together. If a signal pole, single throw switch is connected across the terminals it can be used as a standby switch or it could be connected to an extra set of contacts on the transmitter

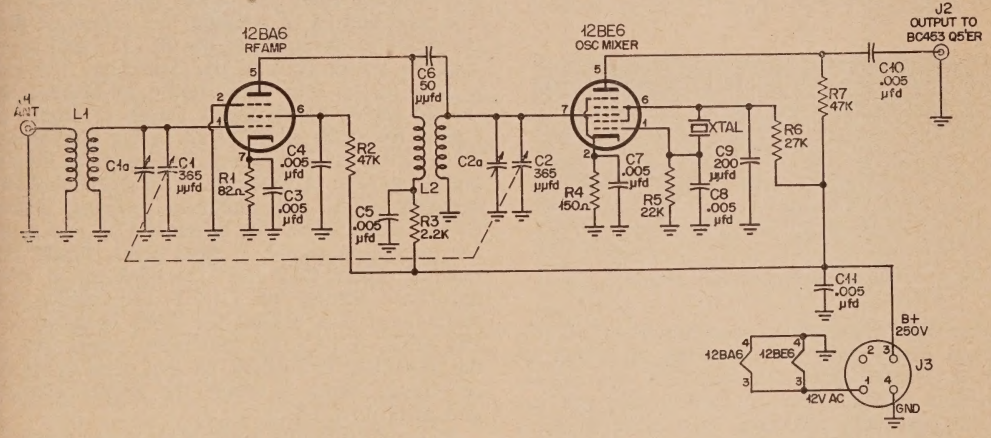


Fig. 4. Converter schematic.

PARTS LIST

C1, C2—Dual section 365 μμfd variable condenser
C3, C4, C5, C7, C8, C10—.005 μfd disc ceramic
C6—50 μμfd disc ceramic
C9—200 μμfd disc ceramic
R1—82 ohms
R2—47 K ohms 1 watt
R3—2.2 K ohms 1 watt
R4—150 ohms
R5—22 K ohms
R6—27 K ohms
R7—47 K ohms
L1—Antenna coil Miller #B 320 A
L2—Mixer coil Miller #B 320 RF
J1—Amphenol coaxial connector
J2—RCA phono jack
J3—Amphenol 4 pin female plug
XTAL—3400 kc or 4200 kc for the 80 meter band
6800 kc or 7500 kc for the 40 meter band

keying relay to mute the receiver whenever the key is pressed. If a 100 K ohm resistor is connected across the keying relay contacts the receiver will function while transmitting, but at a very low volume level. Therefore, the receiver will act as a monitor making it much easier to send good CW. Also, a 4-wire cable is brought out thru the side or rear of the receiver. This supplies 12 volts a.c. to the converter along with 250 volts d.c.

The Q5'er converter is very simple to build. It is diagramed in Figure 4. The 12BA6 functions as an r-f amplifier. The grid circuit is tuned to 80 or 40 meters by means of variable capacitor C1. The antenna is connected to the unit thru an Amphenol coaxial connector. If the constructor desires to use 300 ohm line, the blue and red wires should be brought out the rear apron thru a 2-screw terminal post and the red wire ungrounded.

The signal emerges in the plate circuit of the 12BA6 greatly amplified and is coupled to the 12BE6 through a 50 $\mu\mu$fd capacitor. The crystal is connected to the oscillator section of the 12BE6 in such a manner that it supplies a steady oscillation for heterodyning. Capacitor C9 controls the feedback with 200 $\mu\mu$fd, an average value for crystals with average activity. All the crystals on hand oscillated readily in this circuit.

The converter layout is shown in Figure 5.

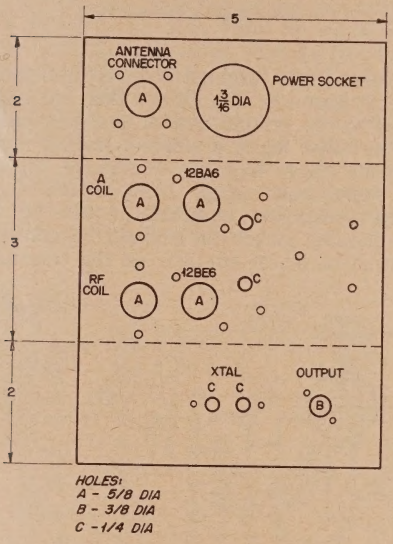


Fig. 5. Detail, Converter chassis.

This size chassis will accommodate all the parts easily with no crowding. Although an L.M. Bender chassis is specified, any chassis with a surface area of 3 x 5 inches will do. This particular chassis is an L.M.B. #136. If a larger or a smaller chassis is used, no trouble will be encountered with placement of parts, the circuit is in no way critical.

Alignment

After the BC-453 conversion is complete, many aircraft beacon signals should be heard with plenty of audio for speaker operation. To align the 85 kc i-f amplifiers, connect an a-c voltmeter from pin 3 of the 12A6 to ground. *Be sure* to use a .01 μfd blocking capacitor in series with the meter. If you neglect to block the d.c. from the a-c section of the meter, someone will have a meter repair job. The purpose of the meter is to indicate the amount of signal coming from the audio amplifier. Naturally, the 85 kc amplifiers are tuned for maximum gain. To do this, tune in a weak tone-modulated beacon station and adjust the gain control for 1/3 scale deflection. Next, unscrew the i-f transformer caps and pull up on the little black rods in the center of the cans. This plunger adjusts the coupling between the primary and the secondary of the i-f transformer. Maximum selectivity occurs when the plungers are pulled out as far as possible. After all three plungers have been pulled up, adjust each screwdriver adjustment for a maximum meter reading, then repeat the process as a double check. This completes the i.f. alignment.

To align the r-f section, the case must be removed. Under this is the tuning condenser cover with 3 holes in the top. The slot in the center adjusts the mixer section, the two at the side are oscillator adjustments. To adjust the r-f section, tune in a broadcast station at the high end of the band and peak up the "Align Input" knob and the mixer adjustment. Maximum signal on the broadcast station should fall exactly on the dial mark. If it does not, the oscillator is probably out of alignment. The Q5'er seems to hold its calibration nicely but if an LM or BC-221 signal generator is available it might be a good idea to check it. The adjustment nearest the front sets the low end of the band (190 kc) and the one toward the rear sets the high end of the band (550 kc). The next step is to connect the output of the converter to the input of the BC-453 and connect the power plug to the converter. The r-f section of the converter should be aligned at the 40 meter band. Don't forget to insert a crystal for 6800 or 7500 kc in the converter. Turn off the b.f.o. and tune in a weak 40 meter phone station. Adjust the setting of variable capacitor C1-C2 for maximum volume. After C1-C2 is set, adjust the trimmer C1a and C2a for maximum signal. A final point should be reached where C1a and C2a peak up at one particular setting of C1-C2. To check 80 meters, insert a crystal for 3400 or 4200 kc and retune C1-C2 for maximum signal. After the alignment is finished, all that need be done to change bands is insert the proper crystal and peak up C1-C2.

Some constructors might want to use a single pole single throw switch to change crystals, and this will work fine. I would prefer to insert crystals rather than be restricted to two bands. The converter will receive any frequency between 3 and 9 megacycles merely by inserting the appropriate crystal.

Well, now you're in business with a *real* receiver. Let's see if you can use it to obtain your general class license and work some DX too. The first station to come back to my CQ on this receiver was a VK2 in Australia. Maybe you'll have better luck.

Aboard the "YASME" Panama to the Galapagos

Danny Weil, VP2VB/P, KZ5WD.

The time spent in the Canal Zone was, as expected, entirely devoted to fitting out the YASME for the next stage of the trip and any rest I thought I'd get was purely imaginary as every spare moment was taken up. Even whilst asleep I would dream of what had to be done the next day. Finally the time arrived when I decided that I was as near ready for sea as I ever would be.

Thanks to KZ5MN, Captain Dick Mann, my stay in the Canal Zone was made a very happy one inasmuch as his car and home were made available to me twenty-four hours a day and, needless to say, this certainly helped to get all the necessary things done in the shortest time. Plans were made to depart on October 1st but a refrigerator I had placed aboard, decided, at the last moment, not to refridge so there was more delay. This fixed, departure was made at noon, October 8th with a favorable tide but with the wind dead against me. KZ5MN and KZ5EM were there in a friend's yacht to pilot me out through the channel. With engine on and all sails set we both made a fair passage for five or six miles after which they decided that they had better turn back.

Well, I was on my own again and ahead was a distance of from five to six thousand miles without sight of land. The weather, of course, was lousy. I had been warned by many sailing skippers and also the book-of-words that the trip to a point south of the Galapagos would be a real stinker and I was prepared for the worst.

The worst arrived immediately, the first night, in the form of gales which made it physically impossible to steer the correct course so I had to resort to that hated system of tacking which invariably means sailing 200 miles to cover 100. Not only did I have this awful weather to contend with but I was also right in the middle of the main shipping route.

My sails, which have been for some time on the rotten side, took a beating from the wind which meant that every hour or so I had to drop either the mainsail or the jib and start sewing. This business of sewing may appear easy to some of you lads sitting comfortably in your shacks thumping a key, but you try to handle 500 square feet of wet canvas in half a gale and then try to sew up a great rip bearing in mind that once the sail is down there is no means of steadying the boat which proceeds to do everything under the sun (rain—that is) except turn upside down. There is no room in which to spread the sail out so that one can ensure that the tear is nice and even before it is sewn so quite often, when the sail is repaired, one finds that there is about a foot of sail over at the end so all has to be unpicked again. The ladies, no doubt, will understand my position better. The actual sewing is another job too. One is compelled to use heavy thread in long



lengths and also a great dirty needle to bung it through the canvas. Naturally the thread is always getting tangled and at the end of the job I wind up with a hand full of holes. Oh yes, sewing at sea is great fun! Well, finally, after four hours of sewing up goes the sail with a sigh of relief. Ten minutes later there is a great ripping sound and there she goes in another place. If it wasn't for this happening, mark you, I might get awfully bored so perhaps it's just as well that sails do tear in gales, especially at night.

Time is creeping along but, although I look at the log, we don't seem to have gone very far. You must bear in mind that I took on an extra half-ton of gas in Panama which was necessary for running the engine for long periods of time plus the gas generator for radio use, and this extra load was making the YASME very sluggish. To put on the engine was just a waste of time as the seas were breaking over the bow all the time and the horsepower of the engine was far too small to make any appreciable difference. So I just had to put up with this interminable slogging into headseas all the time. By noon, two days later, I had covered the wonderful distance of forty miles and I doubt if you could have found an unhappier person than I. All my great plans for a fast crossing were being blown up in seas and sewing and I was, quite frankly, beginning to get a little fed-up.

By the tenth of October I could still see the glow of the Panama lighthouse and it seemed to me that I would never see the last of it. In fact I felt that for every mile headway I was making the wind and current would push me back two. Needless to say, the amount of sleep I was getting was exactly "nil" and I was being rudely reminded of that wonderful trip from St. Thomas to Panama. Oh well, it was all for good cause and I knew that all the hams would appreciate this effort particularly if I failed to answer their call when I reached a rare spot —hi!

Lost

Days were now slipping past and I was beginning to worry about my actual position and this, without any sun, was impossible to calculate. Believe it or not, here I was in the Tropics and my first ten days from Panama were spent without a sight of Old Sol. This I found hard to believe myself, but there it was and there I was with a lot of very damp water around me and not the faintest idea of where I was. Even my log line had been bitten off by a shark so I couldn't even tell how FAR I had been. Quite a spot to be in! As near as I could judge I was in close proximity to Malpelo Island which, to all you landlubbers, is a good sized piece of rock sticking up out of the sea some 240 miles off the Colombian coast. Naturally it has no light on it and in comparison with the size of the sea it was like the proverbial "needle-in-a-haystack" to locate. I felt that if there were a vague chance of hitting it I probably would, and in the dark!

At this point I put on the old thinking cap and decided to make really good use of the rig. Contacting KZ5JW I asked him to ring the local AFB and request them to get their DF loop cranking and try to give me, at least, a position line. All went well and, during the ceremonials, a KP4 station called in and gave me a bearing from Puerto Rico. Thus I got two lines which, although not dead accurate, did at least give me some idea of where I was and that was—too darned close to Malpelo Island which figured about twenty miles away and a twenty mile bearing error was quite possible.

There I was again, with a sailboat but no sails, an engine without any horses, and a sea running that would have have made even the toughest sailor feel lousy.

My visibility from the deck is three miles and I knew that this island was around 800 feet high so, according to the book-of-rules I should be able to spot it 25 miles off. They failed to mention, however, how far I could see it in a pouring rain and twenty foot seas so I decided that the next best thing to do would be to climb the mast.

I expect many of you have climbed trees, ropes, antenna masts and the like but no man can write in plain English just how to climb an ordinary, everyday, mast. I will now give you my version of this very simple feat.

First you stagger along the deck taking care that an odd wave doesn't wash you over the side. By sheer grit you actually reach the base of the mast. With both arms and legs wrapped around it you look up into the wild grey yonder and, about 3000 feet up, you see the first set of crosstrees or spreaders. These become your first aim in life and the only place that you will be able to take a precarious rest—so—with both eyes closed you dig your nails into the varnish of the mast, clench your knees and pull like blazes. This goes on for what seems like an hour and hopefully you look up expecting to see those crosstrees within hands' grasp but oh no—and when you get up enough nerve to look down you find your progress has been in the order of about eight feet. Well, you won't be beaten so off you go again, eyes closed etc., etc., until, ages later, you do finally reach the crosstrees and, with a gasp, you struggle into a sitting position astride them, hanging on like grim



Canal-Zone friends in boat from which photo of YASME was taken. XYL of KZ-5MN (NM took the picture), KZ5NW, KZ5EM & jr op.

death as each convulsion of the boat below seeks to shake you loose. You might have thought it was rough on deck. Now, twenty to thirty feet higher you feel that each movement is a mile long. You hang there, for how long it is hard to say, in fact you wonder why the heck you are there at all.

Finally it comes back to you that you really climbed up here for a purpose. Feeling really groggy you look around for this confounded island. Can you see it? Not much—not a sight of anything you couldn't see from the deck, except that now you can see more of it. Oh well, no point in staying up here. Since no island is in sight we must be reasonably safe.

Hung From the Yardarm

Getting down sounds easy doesn't it? Just hang around the mast and slide down slowly—but that's what you think! By gosh! Coming down was worse than going up. I was reasonably fresh when I started to climb but by now I felt like I'd been keelhauled. But down I have to go and there it is.

By devious means I managed to swing myself off the crosstrees and get the old fingernails dug into the varnish. I wrapped my legs around in the approved fashion and the trip was started. Half way down I found that I was stuck. A loose rope had gotten itself wrapped around my neck and I was nearly choking. I dared not let go of the mast as the motion of the boat would have thrown me off and, in the meantime, my weight was gradually pulling the rope tighter around my neck! What to do? Drown or get hung? The only solution was to climb up again and release the hangman's knot. (Note by Ed.—Don't worry too much about this guy, gentle reader, he has outlived seven airplane crashes and once was a lone survivor in a light bomber crack-up due to his ability to claw his way right through the side with his bare hands.)

Needless to say, I finally did reach the bottom and, after crawling along the deck scrambled into the cabin and dropped in my bunk feeling more dead than alive.

That night was a bad one for me and, for most part, was spent on deck straining my ears for the sound of surf and with my eyes popping out in the vain endeavor to see through the blinding wind and rain. Well, the night finally used itself up on a very unappreciative audience of one. My luck was in; I hadn't hit the island!

That day, for the first time on the trip the sun broke through and, armed with the sextant, stop-watch, book and pencil I nipped onto the deck ready to shoot the sun. Just as I was about to get some sort of sight the sun hid itself behind a cloud as though it were ashamed to show its face after all this time.

To spare you the technical details and moments of agony: I did finally manage to get that shot and later managed a noon sight too. So for the first time in ten days I actually knew where I was and, I assure you, it wasn't very far from that wretched island.



From that day onward the weather brightened considerably but I was still intensely cold. I wore trousers and a pullover all the time and at night had to use three blankets to keep warm. Who said it was warm around the Equator?

My first visitor aboard was a tiny bird about the size of a sparrow who perched himself on the after-rail looking very tired out. I tried to offer him some water but he flew off. Later, whilst I was doing a spot of chart work, he flew right into the cabin and parked himself on the galley stove. This time I left some "coke" in a saucer with breadcrumbs alongside and before long he was making a real pig of himself. Wonder where he picked up the "coke" habit? At any rate he must have just dropped in for a drink as, about an hour later, he buzzed off again.

Sharks!

Shortly after that I noticed that our friends the sharks were back again. I had had recent experience with them in the Atlantic and Caribbean but never had they come in such large numbers or so close to the ship. I first waved a welcome to them but after hearing some resounding bangs at the stern I went out to investigate and found that the blighters were scratching themselves on my rudder. As these fish represented quite large chunks of sea-food I was afraid that some damage might be done. So out came the 303 rifle and did I have some fun! They were so close I just couldn't miss. The first one I got plumb between the eyes. As the bullet hit a great splash occurred as he

leapt out of the water. Then he swam, upside down, in tight circles, and finally disappeared. The next one didn't get a chance to disappear for I split the nose of the bullet before loading. It tore the tail right off of him and the sea was a real mess of blood. Directly his pals smelled the blood there was a terrific scurry in the water and it seemed that there must have been dozens of them all tearing their disabled brother to pieces. The whole thing only took seconds to happen for shortly afterwards they were all again trailing the boat not seeming to worry that their friends were being periodically potted at. In all I must have put about six of them out of commission before they realized that trailing the boat was not a healthy occupation and all of them scrammed.

I want you to know that I had plenty of things to do besides shooting sharks and feeding "coke" to birds. There was still plenty of canvas to sew, there was cooking to do and, most important, bread to be baked.

Baking bread on a Primus stove with a tin oven can be a very simple thing, at least, that's what I thought. First you get the cook book and read all about it. Flour, water, salt and yeast. I hadn't any yeast so baking powder might do the job. Next, you mix the ingredients into a dough. Naturally, in measuring out the flour, the flour bag fell over when the boat rolled so there was flour on the chart table, chart drawers, all over the floor and on me too. Oh well, what's a spot of flour. Next we pour in the water and mix. I tried mixing with a fork but no go so I decided to use my hand. This was a mistake. In the first place, my hands were pretty dirty through fixing the carburetor on the engine and, as you know, at sea you only wash your hands once a week to conserve fresh water. (That's as good an excuse as any.)

Anyway I wiped my hands fairly clean on a piece of cotton waste and then started to mix the dough. After ten minutes of this I noticed that the bowl was almost empty but there seemed to be plenty on my arms and body and, of course, on the floor. It seemed impossible to get it all off my hands. I scraped it with a knife, but the knife got smothered. Just at that moment the YASME decided to go off course so I had to nip out to the cockpit to attend the tiller, leaving about a half a pound of dough on this member. After a real struggle, however, I did finally get most of the mess back into the bowl and then started on the next step: Heat the oven. OK. I started up the stove, heated the oven, moulded the dough into small balls, placed them on a greased tray and deposited the works in the oven. Things went fairly well for a moment then a lurch of the boat sent me to the deck and all the nicely spaced balls slid back into a corner of the oven and formed a large lump. I tried to get them spaced again but was rewarded with a few burns so I decided to let well enough alone and hope for the best.

Next stage—leave in the oven for thirty minutes and test with a metal skewer. If the skewer comes out dry they are done. Two hours later and the skewer still comes out wet. Another two hours passed during which the stove ran out of kerosene and in the refilling process a pressurized stream of neat kerosene sprayed all my masterpieces. The rolls finally seemed to fulfill the conditions stated in the book and I removed them, placing them on a clean plate. The baking process had seemed to make them strangely heavy. When I tried to cut one through the knife wouldn't touch it. Further efforts with sturdier tools convinced me that my bread baking efforts were not too successful. Not to be outdone, however, I decided to use them for bait and, since that day, I haven't seen a single shark behind the boat!

Islands—Rocks—Fog

Things went fairly steady until the great morning when I woke up and sighted the Galapagos Islands ahead, this was at 6 a.m. on October 31st. Then I began to figure the best way to get past them without hitting any of the tiny islands and reefs in which they abound. Coupled with the fact that the current is not the least bit helpful and although the book-of-words tells you a little, unfortunately it doesn't, or should I say, cannot tell you all the information that one needs to navigate them safely. I decided, owing to a strong northwesterly current which prevails in the northern part of the islands, that I would try to clear them from the north but as I got closer night overtook me and, with it, a lot of worries too. I had known my position almost to an inch in the morning but what with all these queer currents and then a heavy mist that settled over the islands I was at a loss, quite frankly, as to just where I was again. I kept the boat on the prearranged course and tried my very best to work out the strength of the currents and my drift but things just didn't turn out as I planned. Naturally there was no sleep for me that night, but I'm used to that now. Every moment was spent standing at the tiller and straining my eyes to every point of the compass. One minute there wasn't a thing to be seen and the next, out of the mist, a massive great rock would loom up ahead. I had to quickly swing the helm to avoid them and then rush into the cabin to consult the chart and find out who had put the darned thing in the way. The chart was of no help. In frustration I would dash out again and keep the old eyes skinned a little more than before.

Once the mist lifted for a short while and I got a few snap bearings of the landscape and also noticed that I was well clear of any other odd rocks. This gave me a chance to get below and try to figure out where to fit these bearings but, quite honestly, you may as well have given me the first five numbers that came into your minds for all the use of those bearings. I tried

[*Continued on page 110*]

Input Impedances of Grounded-Grid Amplifiers

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Although there are no more impedances to be matched in a grounded-grid amplifier than in a conventional amplifier, impedance matching seems to take on greater importance. This is due to the nature of grounded-grid circuitry, wherein the input *and* output impedances appear to the driver stage as shown in *Figure 1*.

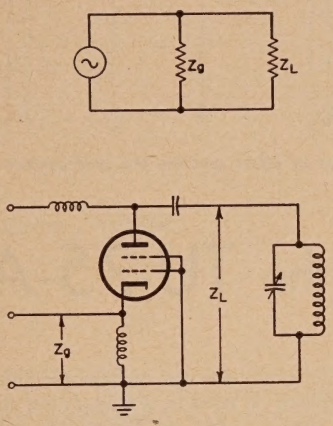


Fig. 1. Impedances in G-G

As may be seen, these impedances are in shunt. Thus a variation or change in one has a profound reaction on the other. Lack of recognition of this fact and the consequent mismatches which resulted are largely responsible for the reportedly high grounded-grid drive requirements.

So far as the load impedance, Z_L, is concerned it can be computed without trouble. Its computation is the same for grounded-grid r-f amplifiers as for conventional amplifiers.

Computing input impedance of a grounded-grid amplifier is either complicated for most amateurs or requires tube functional knowledge which most of us do not possess. No doubt many a slip-stick jockey would whiz through the following without strain.

$$\gamma_1 = j\omega C_{gk} + (1-\gamma) C_{pk} + \frac{1+\mu}{r_p + Z_g}$$

which, lest you've forgotten, is the input admittance of a grounded-grid amplifier[2]. Or, he might relish[3]:

$$Z_g = \frac{E_g}{i_p} = \frac{Z_g + r_p}{\mu + 1}$$

but most of us need something simpler.

Peculiarly, about the simplest means of approximating the input impedance under usual amateur operating conditions is derived from first computing its opposite, conductance. Such a formula does exist and to our non-Univac good fortune, happens to apply under conditions which can be assumed to pertain in grounded-grid amplifiers such as discussed recently.[1]

If the load impedance, Z_L, is small compared to the plate resistance, R_p, and μ (of the tube) remains much greater than unity, input conductance has been shown to be [3]:

$$g_i = \frac{\mu}{R_p} = g_m$$

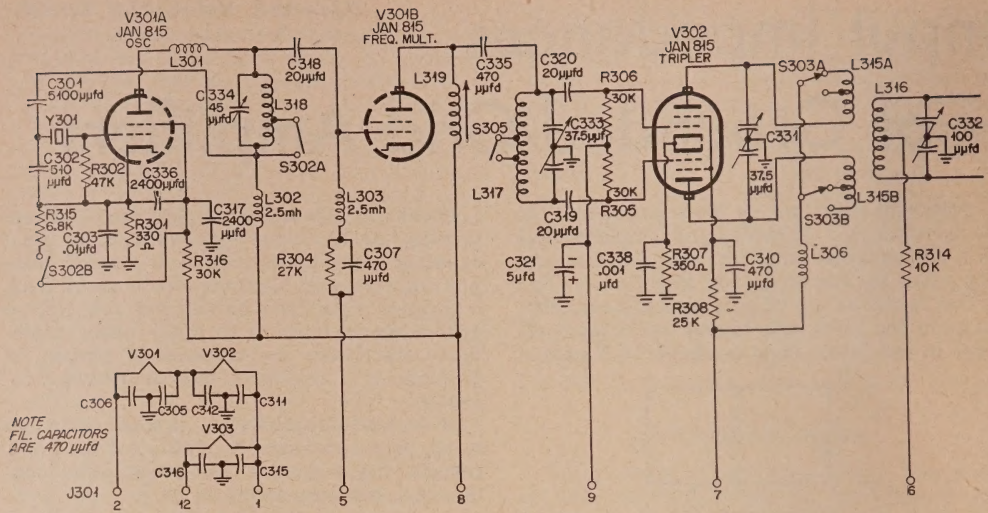
Since this represents the tube's conductance in grounded-grid, then if this is divided into 1 we should get the input impedance, thanks to impedance being the reciprocal of conductance. Tube data sheets supplied by manufacturers give tube transconductance which, when divided into 1, gives us in ohms the input impedances we are looking for.

Thus, in the case of an 837 which has a transconductance of 3400, its input impedance, therefore, is 294 ohms.

Because many readers will find this simple division too time-consuming, *Table I* lists the Z_g of tubes found to be well suited for grounded-grid operation in circuits such as those recently published[1]. In this table transconductance data furnished by manufacturers is used, and covers conditions in which Z_L is small compared to R_p and μ remains greater than unity.

Tube Type	Transconductance in μmhos (g_m)	Input Impedance in ohms (Z_g)
6AG7	11000	90
6V6	3750	266
6L6	5200	192
802	2250	444
837	3400	294
6146	7000	143
4E27	2800	357
4E27A	2150	466
4-125A	2450	408
813	3750	267
803	4000	250
4-250A	4000	250
4X500A	5200	192
4-1000A	10000	100

[*Continued on page 117*]



Transmitter schematic. A small amount of effort converts this war surplus unit into

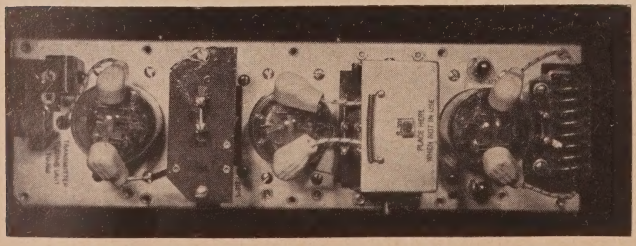
on Six Meters with the TU-75-A

The surplus market has changed the operating habits of a good many hams in recent years. I knew the time when the ham who ran a kilowatt was a scarce one, and the low-power ham ran 20 watts. Now we are all reaping the results of inexpensive components on the surplus market, the low-power ham runs at least 100 watts and kilowatt transmitters are no novelty at all. Surplus has helped many new comers to get started in ham radio—many who would have been only wistful "not on the air yet" hams before surplus was available.

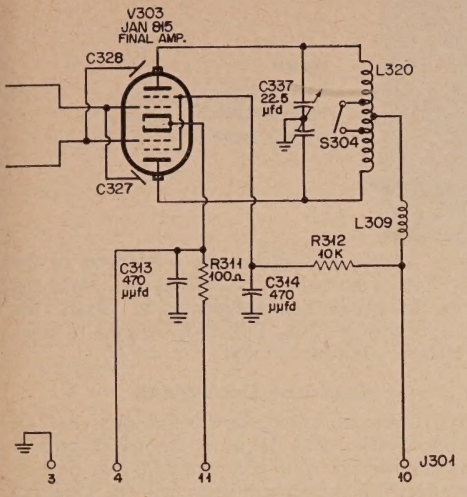
The SCR-522 came on the market at a very reasonable price and helped bring the two-meter band to its high state of occupancy. After the hams tried the two-meter band using the SCR-522 and found that the band could be used for good, solid long-distance QSOs they built better transmitters, passing the 522s on to "younger" hams to start the ball rolling again.

The *TU-75-A* and the *BC-1158* are destined to do the same for the six-meter band. The TU-75-A can be used as a transmitter now and later it can be used as an exciter for high-power final. It has enough power output to drive a tetrode final to a full kilowatt output, and all this behind a 7-inch panel. This unit sells on the surplus market for about fifteen dollars and can be converted for another seven or eight dollars including the cost of an aluminum panel. The output of the TU-75-A is about 40 watts. It can be modulated with a pair of 6L6s and will give a good account of itself in the six-meter band.

We are conspicuous by our absence on the high-frequency bands and this in itself is enough to warrant discontinuing these assignments for amateur use. As I have said before, "Squatter's rights and tradition are not reason enough to warrant the continued assignment of these valuable frequencies to the amateur—we must merit such allotment. If we don't use them we will *loose* them. Let's use the very high fre-



top view of chassis before conversion



a beautiful six-meter transmitter.

Walt Burdine, W8ZCV.
Novice Editor

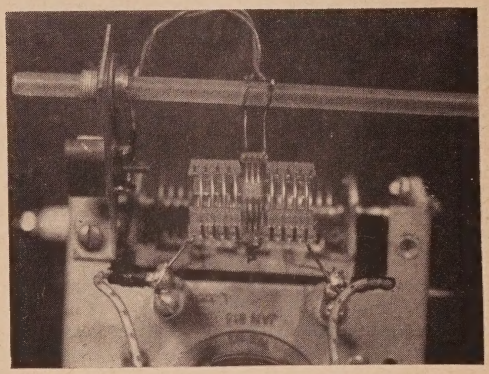
quency amateur bands. Here's an easy way to hold one of the bands that's threatened, and have a lot of fun, besides. Convert a TU-75-A, use six meters for contacts within a hundred miles or so radius, lower the QRM on 75 and 40, and get acquainted with one of the best ground wave and skip bands in amateur radio.

The TU-75-A is the replaceable r-f unit for the BC-1158 Remote-controlled Transmitter-Modulator. The frequency range of the TU-75-A was from 53 to 95 megacycles and this will have to be changed to tune lower in frequency so that we can tune the 50 to 54 Mc. spectrum. This is no task at all and is accomplished very quickly by padding the final amplifier grid circuit and replacing the final amplifier tank coil. The TU-75-A uses three 815 tubes in the r-f unit. The first 815 is used as an oscillator-doubler, the second 815 is a push-pull tripler and the third 815 is a push-pull r-f amplifier. The final runs about 40 watts, with 400 volts on the plate of the last 815 tube. The oscillator uses crystals ranging from 8.333 to 9.000 megacycles and multiplies six times the crystal frequency to get to the six-meter band. The filaments were run at 28 volts and you may do the same or rewire them to operate on 6.3 or 12.6 volts so that you can use your available power supply and modulator. The wiring changes can be made in about an hour but the mechanical changes will take longer depending upon how much you "purty" it up. The conversion of the TU-75-A is our project for the evening.

Mechanical Conversion

First we will do the mechanical conversion and then the electrical conversion of this fine addition to the ham shack. On the back of the unit we will mount a feed-thru insulator to feed the modulated high voltage to the final, a closed circuit jack to use in measuring the total current of the final and for a keying jack in the cathode circuit of the final amplifier. A power plug is the third addition to the back of the unit. Here I used a male 5-prong plug (*Anphenol PM-5*) to feed the filament voltage and the B-plus voltage to the first two 815's. The filaments require 6.3 volts at 4.8 amperes or 12.6 volts at 2.4 amperes and the high voltage should be at least 250 volts at 80 milliamperes. I used 185 volts at 80 ma.

The power plug is mounted in the trippler section 7/8 inch from the bottom lip and 5 inches from the end containing the oscillator section. This will come right behind the condenser *C-333* and will clear all wiring. Mount the jack near plug *J-301*, 3/4 inch from the bottom lip and 3 3/4 from the end containing the final tube. Now drill a hole for your feed-thru insulator in the compartment containing the final condenser *C-337*. The one I converted was ½ inch from the edge both ways. Mount

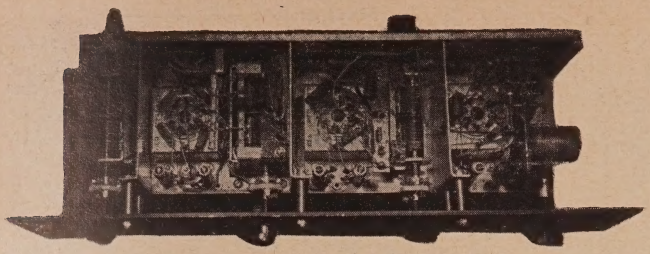


Revamped final tank uses Miniductor stock.

the insulated feed-thru insulator. Remove switch *S-302* in the oscillator section along with resistor *R-315* (either 6.8k or 10k). Cut the two wires from the switch to the coil neatly but leave the wire from the coil to the condenser *C-334*. Cut the resistor and the switch wire from the terminal board, remove and discard the switch. The work on the back of the unit is complete.

Secure a 7- by 19-inch aluminum panel and drill as per front panel diagram, being careful not to mar the finish of the panel. Do not drill hole *A* at the present time as it is the hole for the variable link shaft. You can drill this hole after you locate the position of the coupler shaft.

Obtain 5 *Millen 39006* flexible couplers, some ¼-inch insulated shafting (preferably



chassis bottom view (note mounting on rack panel).

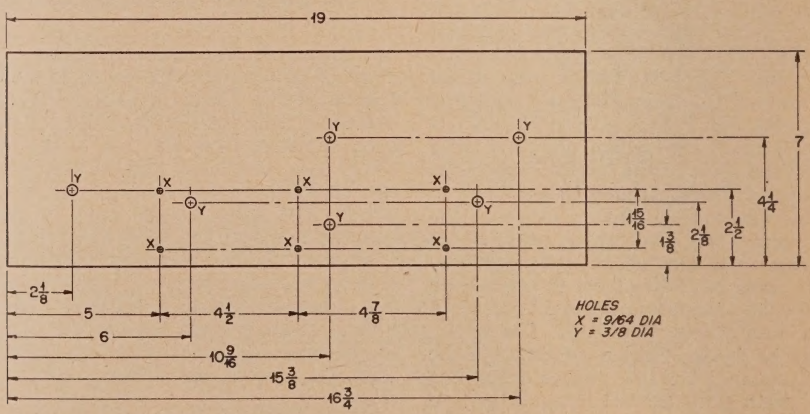
bakelite), a small ¼-inch to ¼-inch shaft coupler to extend the shaft of condenser *C-334* (you might get along without a flexible coupler on this condenser with care). Get 6 spacers at least 3/4 inch long that will pass a #6 bolt (these space the panel out from the transmitter) and get 6 6-32 bolts at least one inch long. Get 7 knobs for the front panel (skirted knobs help the appearance of the finished product). Get a three-position two-pole switch for the meter, and six panel bushings. This is all the material needed except some wire and solder to convert the TU-75-A into a beautiful transmitter for six-meter operation.

Our next task is mounting the front panel and extending the shafts of the tuning condensers through the front panel to make a neat panel-mounted six meter transmitter or exciter. Take a pair of pliers and crack the insulator from the shaft to condenser *C-337* and also from condenser *C-334* and remove the pin from the shaft of *C-334*. Remove the condenser *C-334* and carefully file the hex shaft round to fit the ¼-inch shaft extender. File away as much of the material in the condenser mounting bracket as you can spare to clear the shaft extender, this shaft is at B-plus voltage. Replace the condenser. File one side of a *Millen 39006* flexible coupler to fit the shaft of condenser *C-337* as this shaft is larger than the ¼ inch hole in the coupler. Loosely place the panel in place with the 6-32 bolts and spacers and align the holes on the panel with the condenser shafts and tighten the 6-32 bolts in the TU-75-A. Install shaft extensions and place the knobs in place, not forgetting to install the panel bushings. The TU-75-A begins to look like ham equipment now.

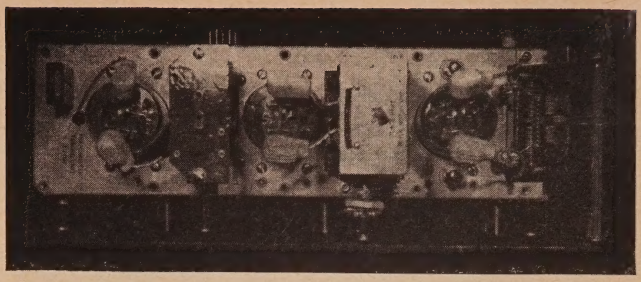
Electrical Conversion

The electrical conversion is the next part of the conversion task. Begin by changing the filament circuit for your convenience. For six-volt operation the conversion is as follows. Connect pins nos. 1 and 8 together at each socket without removing any wires and ground pin 5 of each socket at one of the grounding studs and run a #14 insulated wire from pin 1 of power plug *PM-5* to pin 8 of 815 socket *V-302*. Run a #14 wire from pins 4 and 5 of power plug *PM-5* to the chassis ground. This completes the conversion of the filament circuit to six-volt operation.

For 12-volt operation the following method was used. Remove the wire from pin 1 on socket *V-303*, cut the wire so that it will not short to the chassis and ground pin 1 to grounding stud. The condensers at the grounded pins can be either removed or left as you wish. Remove wire from pin 1 of socket *V-302* and transfer to pin 8 and solder. Ground pin 1 at the grounding stud. On socket *V-301* remove the wire from pin 8 and cut it so that it will not short to the chassis. Ground pin 8 to a grounding stud. Run a #14 insulated wire from pin 8 of socket *V-302* to pin 1 of power plug *PM-5*.



Front panel details



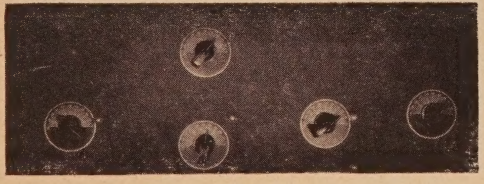
converted transmitter, top view

Run a #14 wire from pins 4 and 5 of power plug *PM-5* to the chassis ground. This completes the wiring of the filament circuit for 12-volt operation.

Cut the wire from pin 11 of plug *J-301* and solder to the closed-circuit jack, connect the other two terminals of the jack together so that it will complete the cathode circuit when the plug is removed, ground these two terminals to the chassis. This jack can be used to measure the total current of the final tube and also as a keying jack. The cathode returns are all complete.

Remove subassembly between second and third 815 tubes by unsoldering the two stiff wires running from the final amplifier grid pins to the stator of the tuning condenser, unsolder at the condenser. Remove the four red screws holding the sub-assembly in place and lift the sub-assembly from the top. It is not necessary to unsolder the wires leading to resistor *R-314*. Carefully remove the **two yellow** posts of switch *S-303* and unsolder the wires leading from these posts to coil *L-315*. Check with a grid-dip meter to see if coil *L-315* will resonate at 50 to 54 megacycles with the plate caps in place. If not, move the taps nearer the end of coil *L-315*. Replace the sub-assembly. Be sure to replace the shorting bars in the remaining posts of switch *S-303*, the **black ones**. Solder the two stiff wires to the final amplifier grid condenser. Pad the final amplifier grid condenser with a 50$\mu\mu$fd ceramicon condenser from each stator to ground, the grid circuit will now resonate in the six-meter band. In the case of a shorted condenser, your attention is called to *C-308* under the terminal board containing *C-319*, *C-320*, *R-305* and *R-306*, near the tripler grid condenser.

Remove switch *S-203* and neatly remove the leads to coil *L-318*. Remove resistor *R-315*, (this is the 6.8k or 10k resistor at the back of switch *S-203*) if this has not been removed



Front panel and controls

earlier. All coils now resonate at frequencies that will get us on the six-meter band, except the coil in the final and this we will rebuild.

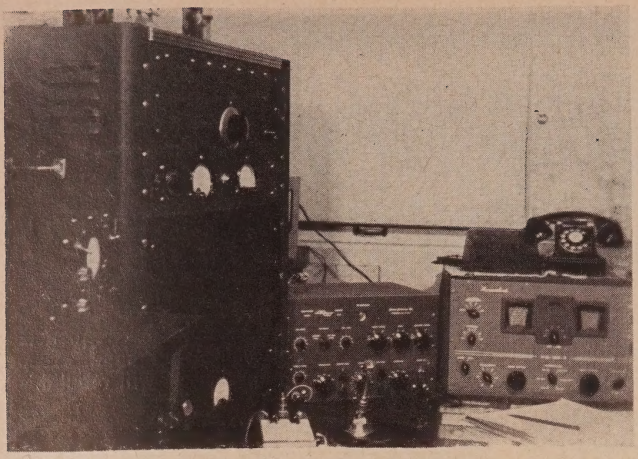
Final Tank

Remove the original final tank coil and remove the plate leads from the coil to use with the new coil. Take two solder lugs and mount loosely on each stand-off insulator to mount the new coil. Make a new coil as follows: Cut a *B & W #3010* to 12 turns in length, cut one wire in the center and with a pair of pin-nosed pliers unwind two turns (one each side of the center) and solder the two turns to make a center tap. Cut two of the polystyrene insulators close to the wires so that the antenna coil will slide in the slot as shown in the photo. Unwind the wire from each end of the coil to leave 4 turns on each side of the center tap. Mount as shown in the photo, connecting the wire from the stator of the condenser and the coil to one solder lug and connect the plate leads to the other solder lug. Position the coil as shown and tighten the two 6-32 screws. For the antenna coil cut a piece of *B & W 3011* to 4½ turns and unwind equal lengths from each side until you have 3 turns left for the link. The coil should be mounted as shown on a piece of ¼-inch bakelite rod and the sides of the link should be filed as smoothly as possible so that it will slide in the space left in the final tank coil. The picture is self-explanatory.

Mount a soldering lug on the insulated feed-thru terminal inside the compartment containing the final amplifier tuning condenser and solder a short wire from this lug to the terminal leading through the insulating panel that has choke *L-309* soldered to that terminal. This wire carries the modulated high voltage for the final. The final is plate- and screen-modulated. The current will be from 90 to 130 milliamperes, at 300 to 400 volts.

The grid circuits can be completed in a short time and then the transmitter is ready to use. To complete the grid circuit of the final, solder a 47-ohm ½-watt resistor from the terminal strip post containing *R-314* to a convenient ground point, you can disconnect the white-orange trace wire if you wish. To complete the grid circuit of the tripler, connect a 47-ohm ½-watt resistor from the junction of resistors

[*Continued on page 108*]



SSB layout at W6BLZ

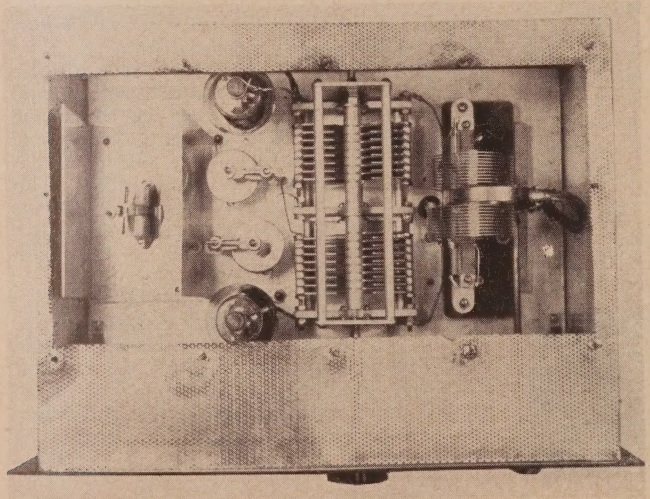
Edmund H. Marriner W6BLZ
528 Colima, La Jolla, Cal.

SSB Linear Amplifier

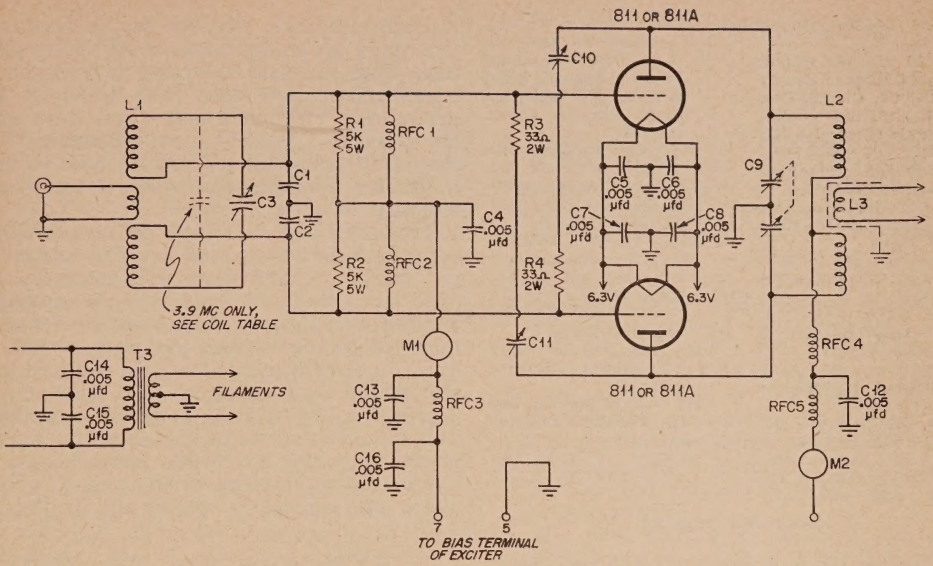
With the trend to single side band operation at it's present pace, it becomes apparent that more and more stations are going to make the switch. Of course the technicalities of SSB are new to most of us, enough so that the majority of stations making the change are going to do it in the conventional ham manner, starting with a low power exciter and working his way up. We have on the market many fine low power SSB devices. Examples are the *Central Electronics 10A and 20A*, or the *Lakeshore Industries Phasemaster Junior*. For the fellow who likes to roll his own, any of the units described in *CQ* or the book *Single Sideband Techniques* will fill the bill.

The amplifier to be described would make an ideal companion to any exciter capable of 10 or 20 watts peak power. It is straightforward and the cost is comparatively low.

Plug in coils are used in the grid and plate tanks for two reasons. To keep the cost at a minimum and to insure the stability that is required for this class of operation. All band tanks can and do accomplish excellent stability.



Top view showing chassis layout. C9 is in the center, the two tubes and neutralizing condensers to left. Grid coil L1 and its shield are on left edge of chassis. L3 and swinging link assembly are on right.



SSB Amplifier schematic

However, the newcomer to SSB should acquaint himself with the complexities of such a system before attempting to build it.

The circuit

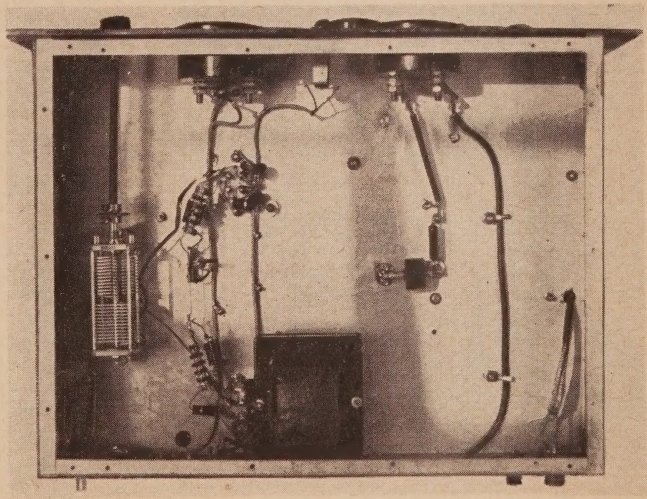
The amplifier uses a grid circuit that was borrowed from another unit described some time ago[1]. This system was chosen because of its proven ability to do the job. The amplifier uses conventional cross neutralization; *C10* and *C11* in *Fig. 1* are the neutralizing condensers. The plate circuit is as old as the proverbial hills, but none the less, an excellent choice for the beginner, or for that matter the old timer who isn't concerned so much about having a lazy man's final. *C9* is the plate tuning condenser.

Bias for class B operation of the 811A's can be taken from the tap on any of the commercial exciters, if voice-control is used. Otherwise zero-bias may be used (see exciter instruction manuals).

RFC3 and *5*, and *C* are VHF harmonic filters inserted in the plate and grid leads to minimize the possibility of TVI.

Construction

A standard 13 x 17 x 3 inch chassis is used to lay out the different parts. The panel is 10½ x 19 inches. There is nothing tricky about the construction, however, good layout practice should be followed. The accompanying photographs should be a great help in the placement of parts. *C9* is centered on the chassis and its



Bottom view showing under-chassis parts placement. The two meters and pilot lamp can be seen on the front drop of the chassis. C3 is at center left. 811A filament transformer T3 is mounted on rear drop of chassis. RFC5 and C12 can be seen in the center with lead to plate-current meter.

C1 and C2—See grid coil table.
C3—100 μμf. per section (Bud CE2036 or equiv.)
C4, C5, C6, C7, C8, C13, C14, C15, C16 — disk ceramic (Centralab MD 502).
C9—200 μμf. per section (Johnson 200DD35).
C10, C11—Disc type neutralizing cond. (Bud NC 853).
C12—500 μμf. 10 KV. ceramic (Centralab TV 3501).
RFC1, RFC2 — 2.5 mh. RF choke (National R 300S or equiv.).
RFC4—5 mh. RF choke (National R 300S or equiv.).
RFC3, RFC5—7.0μh. RF choke (Ohmite Z-50).
L1—3.9 Mc., National AR-17-80S, C1&C2 are 470 μμf. mica units soldered directly to the terminals on the coil form. Note the padder used on 3.9 mc. only, it is 20 μμf. mica soldered directly across the coil.
14 Mc., National AR-17-40S. C1 & C2 are 100 μμf. mica mounted in the same manner as on the 3.9 mc. coil.
L2 — 3.9 Mc., B&W 80 TVL 9 turns removed from each end. 14 Mc., B&W 15TVL.
L3 — B&W Shielded swinging link.
M1—0-50 ma. d.c. meter (Triplett 327T or equiv.).
M2 — 0-500 ma. d.c. meter (Triplett 327T or equiv.).
T3—6.3v. @ 10 a. fil. trans. 2kv. ins.

SSB Amplifier parts list

shaft brought to the panel with a flexible coupling and panel bearing. *L2* and the swinging link assembly is mounted to one side using the mounting plate supplied. On the opposite side of the condenser go the two neutralizing condensers and the tubes. The grid tank is in a line with *C10* and *C11* hidden in a shielded section made from a piece of aluminum. The grid tuning condenser, the two meters, and the filament transformer are placed under the chassis. Their placement can be seen clearly in the bottom view photograph.

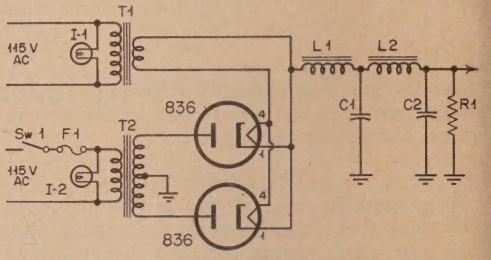
Operation

The first and most important step in firing up a new transmitter is to get it neutralized. In this layout this is reached without too much trouble. With plate voltage disabled and the grid bias lead temporarily grounded, excitation is applied to the amplifier. This can be done in either of two ways. A tone can be fed into the exciter, or enough carrier can be inserted to put the exciter on CW. The grid tuning on the amplifier is adjusted to bring the grid current in the vicinity of 10 ma. Couple a grid dip meter or indicating device to the plate tank of the amplifier and tune the plate condenser through resonance. You will find at resonance that you'll get an indication of RF in the plate tank. Tune the plate condenser to bring this to a maximum. Now start with either of the neutralizing condensers and adjust them until the indication comes to a minimum. You should, for excellent stability, be able to neutralize the amplifier until every trace of r.f. indication is gone.

The grid lead can now be connected to the grid bias return lead on the exciter as per the instructions. Plate voltage can be applied at a reduced rate and the amplifier coupled to a dummy load. With carrier or a tone fed to the exciter, the plate should be tuned to resonance, at this point the grid current should read maximum. If it does not, or is erratic in any way the amplifier is unstable. This should be corrected before putting the rig on the air, either by further neutralization or if necessary by moving components to a spot where the gremlin is routed out. If the rig seems to be stable an antenna can be connected and full plate voltage applied. At this point an oscilloscope is going to be mighty handy; if one is not available, another station should listen to your signal and help you adjust the speech level to the exciter. For preliminary tests, a grid current peak of 20 or 30 ma. will be below the distortion point.

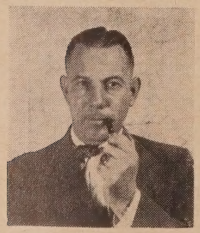
All the information available on the adjustment and operation of an SSB transmitter should be absorbed by the newcomer. Some very good points can be had from *Single Sideband Techniques* or other publications on this subject.

[1] See "The Lazy Linear." G. E. Ham News, July-August, 1949.



T1—2.5v. @ 10a. filament trans. 10kv. ins.
T2—1500-0-1500v. @ 300 ma. plate trans.
L1—Swinging Choke 5-20 hy. @ 30-300 ma.
L2—Filter Choke 10 hy. @ 300 ma.
C1, C2—10 μfd. 1500v. filter capacitor.
R1 — 100,000 ohm wire wound resistor 50w.
I1, I2—115v. 3w. panel lamp.

Any supply capable of 1000-1200 volts can be used. A diagram of the one used here is included for those who may want to go all the way. Current capabilities can be almost anything above 300 ma. 836 rectifiers are used here because of the absence of gas, which can be annoying in the receiver as you use voice-control break-in.



Ed was bitten by the bug 'way back when the only way to hear anything on the air was to tickle the cat's whisker. When ham radio got to the point that it filled young minds with ideas of far-off places, Ed settled down and got the ticket. His first and only call, W6BLZ, was issued in 1931. Today Ed has the extra class ticket, along with an assortment of certificates including RASO, WBE, WAA, WAC, The Old Timers and a 25 wpm code certificate. W6BLZ in the past has been a DX enthusiast on CW, but has recently made the swing to SSB. Ed is on the Advisory Board for Region Ten CD net and his home QTH is 528 Colima Street, La Jolla, California.

Big Blow

The Windblowers VHF Society came up with a novel and successful club activity during discussions at their September meeting at W2GEX's QTH. President W2NUL appointed K2CMB, K2BC, W3CIP and W2ISK as a committee to work out the details. The plan evolved into four two meter stations, set up at good locations and manned for twelve hours with a certificate to all stations who managed to work all four of the stations during the contest period. The date selected was Saturday, October 29, 1955, from 2 p.m. until 2 a.m. Sunday. The only publicity given the event was the mailing of 175 announcements.

The October meeting on the 28th showed that everyone was all set for the Big Blow. The next morning the four stations were set up and at 1:50 p.m. all stations checked in with each other. At 2 p.m. the Big Blow was on.

K2BC was set up at Lake Arcadia, Butler, N. J., about 1000 feet above sea level with the ground plane and twin-five antennas up another fifty feet. The equipment consisted of a crystal converter into a Collins 75A2 and 75 watts to an 829B. Operators at K2BC were W2IMG, W2NLN, W2NUL and K2BC. 134 stations were contacted.

K2CMB worked 139 stations for the highest score from a fine location at the Lookout in Atlantic Highlands, N. J. The ground plane and twin-five were 40 feet above the ground. A crystal converter into a Super-Pro and 90 watts to an 829B were used. Operators were W2IMI, K2KSH, K2CMB, KN2LNO, and KN2PNK.

W2ISK placed third with 128 contacts and was set up at Tenafly, N. J. on the Palisades. They ran 180 watts to 24G's and a crystal converter into a National NC-173. The antennas were a twin-five for vertical and a UHF 32 element beam for horizontal. Operators were W2GEX, W2ESW, W2FPM, and W2ISK.

The hardest to work station was W3CIP who set up at High Knob in Pike County, Pa. on a 2100 foot hill. The 30 watts to a pair of 2E26's, crystal converter to a BC-348 and twin-fives for both horizontal and vertical won them the best DX of the Blow when they worked W1PMC in Nantucket, Mass. Operators were W2ZDR, W2WBY, W3CIP, and K2IDN. 81 stations were contacted.

The total number of different two meter stations contacted by all four Big Blowers was 184. Of these, 68 managed to contact all four and win certificates. 37 worked three Blowers, 20 got just two, and 59 hooked only one. The furthest certificate winner was W1AJR in Rhode Island. 32 Novices participated and 10 won certificates.

Everyone involved enjoyed themselves immensely and another Big Blow is in the works. This one will be held the last Saturday in April and will be called the Four State Jamboree. The four transmitters will be located at Tenafly, N.J., C.D. Hill near Middletown, N.Y., High Knob, Pa., and at some good high point in Connecticut not yet decided.

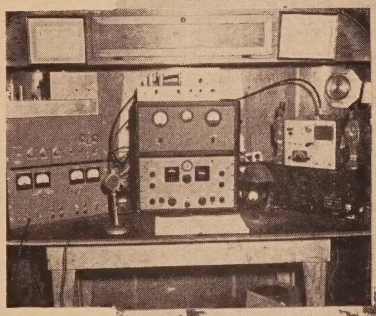
W3CIP at High Knob, Pa.





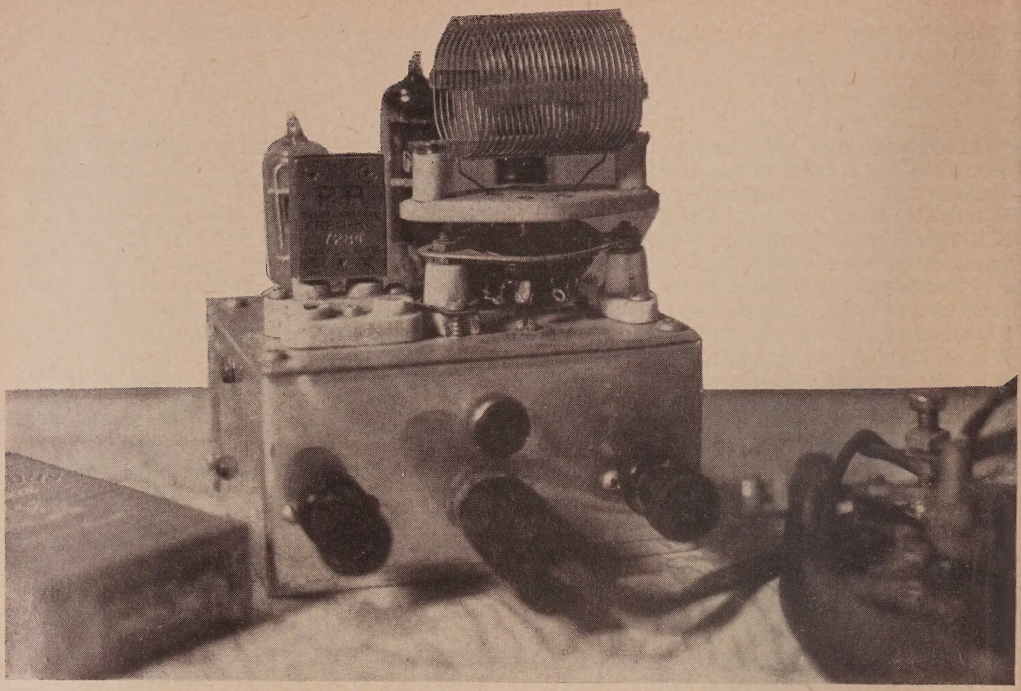
K2BC and W2NLN operating K2BC.

Inset: Operating Position at K2CMB.





K2CMB's trailer.



50B5's: Mighty, Mighty!

Otis Wrench, WØMQB
419 N. Green St. Wichita 7, Kansas

Not wishing to lose readers through electrocution we normally hesitate to publish a.c.-d.c. circuits such as this. A safer approach is to run just one wire to the line plug and have a separate wire to clip onto ground to complete the circuit since one side of the 110 is grounded. In this way you cannot reverse the plug and get flipped on your ear. Make it a practice to always run a good substantial ground connection to every piece of equipment in the shack.—Ed.

This little piece of equipment that I call a transmitter (with certain misgivings concerning my status as a radio "ham" by such indiscriminant misuse of the definition) was built as the result of a state of psychoses in which I found myself after trying to replace the dry rectifier in one certain (let us forget trade-names) ultra-ultra small AC-DC battery type portable. My line of thought was that I could quite possibly recover my rationality by fostering a similar brain-child in which there was no possible way to get at the lower layer of parts without removing all of the layers on top. Not that I am an addict of flea-power or flea-sized transmitters. I am perfectly willing under ordinary circumstances to leave everything that resembles fleas in any sense of the word to Taffy-pooch. Like the guy across town, I like to carry on local rag-chews using five hundred and seventy watts, or maybe cut it down a hundred or two, so it won't blink the lights too much. But this state of mind that I found myself in was psychologically working to my disadvantage. The idea intrigued me to the extent that after a careful sorting of the junk box (yes I've had screwey ideas before) I did some fudging on the number of tubes and parts I had to buy for the receiver, which I didn't want to fix in the first place. I would have preferred to toss it in the trash barrel, because the XYL insisted on reading Love Stories in bed and listening until midnight to the piffle-dribble of one certain disc-jockey to my utter disgust and sleeplessness. I wouldn't have minded the reading, but to hear "Davy Crockett" and

"Hard to Get" seven nights a week, was just too much. So I plunged off the deep end into a spasm of constructional activity. And I do mean activity. To get working space in the kitchen I had to wash and dry the dishes every night for a week. But as all married "hams" know, that was merely part of the "diplomacy" used on the XYL to soft-pedal too close accounting of the expenditures, and too close a scrutiny of a possible failure. Not that there is ever any marital disruption of our household over money spent for ham radio parts. Not since the arbitrary edict that for every dollar spent for radio parts there would be a like amount spent for feminine wearing apparel. But that is merely part of the preliminary ground work that has to be laid to pave the way for such projects. With each succeeding wedding anniversary the real dyed-in-the-wool-enthusiastic ham will meet such obstacles with greater and greater confidence and develop a finesse to his diplomacy that will enable him to eventually move his equipment from the garage to the house.

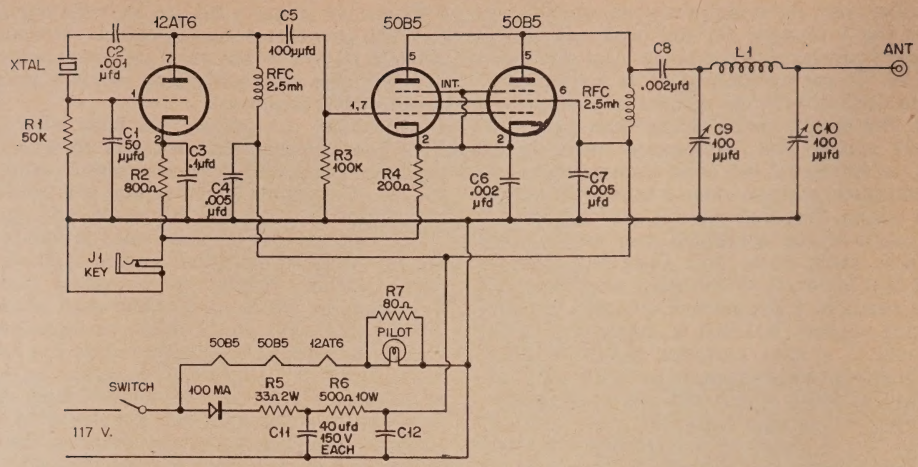
So, assuming that you are a real dyed-in-the-wool ham, the first step in the constructional process is to proceed to either the transmitter or control room of the most likely, convenient or nearest broadcast station. The control room would perhaps be the best bet. Upon getting into the station, you have two courses you can take from there. Announce yourself to the receptionist, usually a young thing full of a lot of silly ideas about the romance and wonder of radio. Tell her your name, that you are a full fledged radio operator, belonging to blah, blah, blah radio clubs and organizations. That you have a radio operators license and a radio station by the call letters W13AZBY or whatever your call letters are. That you are interested in the technical end of radio and would like to visit their control room and converse with the engineer on duty. By this time she is probably so over-awed and impressed that if you don't warn her, she will lead you through studios when the red light is on. She will take you back immediately to the control room and interrupt the engineer in whatever he is doing to introduce you. This always makes a big hit with the engineer on duty. However he doesn't know yet whether you are related to the chief engineer, manager or one of the stockholders, so you will get reasonably civil treatment.

The other course you can take, after you have gone through the technical formality of explaining your visit to the receptionist, is to ask for the chief engineer. Either way will probably be effective in obtaining the results you desire. What you want is at least one, preferably a couple of dozen discarded sixteen inch aluminum recording blanks. All broadcast stations have them by the hundreds. The chief engineer will probably give you a couple or three immediately, to forestall any further ideas you might have of appropriating tubes, et cetra, that have been taken out of service. Or he might summarily dismiss you with the statement that they don't use discs anymore, now that tape recorders are being used more and more for recording. In this connection, don't go to the more progressive stations in the community, but to the ones who are several years behind the times in the type of equipment they use.

But if the chief engineer happens to be home washing his car that day, you will have to talk the engineer on duty out of the transcriptions, which will be more time consuming. The first step is to ask him if he has a license. Most of them don't. This gives you advantage number one. They would like to be able to get a license so they could work at the transmitter. Probably the engineer on duty will evade the question by telling you that a license is not needed to work in the control room, in which case you will know that he doesn't have one. Next ask him if he also works at the transmitter. To ask this question of a control room man is just like waving a red flag in front of a bull. Don't expect an answer. Next try and make some comment about the great amount of fine looking equipment he has to operate, regardless of how antique and haywire it might appear to you. Profess a little ignorance of all the technical end of audio equipment and let him warm up to the task of explaining some of it to you. He won't



Compare the size of the Mighty 50B5'er to foreground objects. It works out, too!



Schematic for the midget 50B5 Transmitter

think less of you, and it will give him a chance to stop shaking in his boots (he still isn't sure you aren't a relative of the boss) and rationalize the reason for his working in a broadcast station, aside from the romance of radio, a form of monomania particularly peculiar to broadcast station personnel. While he is talking, try and spot some piece of equipment that has obviously been made out of scrap aluminum, such as obtained from record blanks. Make a big fuss over it, again letting tact replace your natural instinct to belittle it as not worthy of the lowest ham station, and if you are lucky enough to be talking to the "engineer" that was forced by the chief to construct it, the records are all but in your possession. Chances are that if he didn't construct it, he will call your attention to something he did build, and when he does, don't spare the words in marvelling over it. Of course, working into the conversation the fact that you would like to have some scraps for a little project you have in mind. If this method doesn't work, then gradually work your way between him and the V.U. Meter and contrive to stand there. Not that he ever bothers to watch it, but he doesn't want any announcer to find out that he can't see it. Increase the tempo and technicality of the questions that you throw at him. Quite soon you will be talking way above his head, and to keep from being further embarrassed he will grudgingly dig up one or two used blanks for you.

Having obtained the records, thank him profusely. Lie like a dirty dog and tell him how you envy him and his ability to work in a wonderful profession like broadcasting every day in the week, and associate with celebrities. Invite him to your home to see your "pile of junk" (he'll never take you up, unless you invite him out for a meal). Invite him to visit your ham club meetings, and tell him you would be glad to propose him for membership. Wink at the receptionist on your way out.

On your way home stop at a lingerie shop and buy a pair of 51 denier nylons in the size your XYL wears. You can afford to anyway, now that you don't have to buy a chassis. This is the part of ham radio that is extra-curricular and promotes a tolerant attitude approaching benevolence and good will toward your hobby. Of course you are also running the chance that such a peace token will precipitate a night of dancing or card playing, but play it safe and postpone actual start of the transmitter until the first available evening. Chances are if you have to flit at the brightly lighted establishments you won't have to wash and dry the dishes that night. If you are able to avoid the drain on the budget and stay home, in all probability the XYL will try the nylons on and display them especially for your benefit right when you are soldering the terminals of the electrolytic condenser. If this does happen, be sure to go back later and check the polarity three or four times. A reverse polarity is very hard on the dry rectifier, and of course like all the radio fraternity you are troubled with a little psychological phenomenon called association, and you will find that every time you look at that electrolytic you will be seeing nicely modeled 51 denier nylons, and never notice that the polarity is reversed. Try and catch yourself off guard sometime when you are thinking about something remote as possible from nylons, such as a beer drinking binge or something on that order, and check the connections while still drinking the beer. Then you can feel reasonably safe concerning your connections.

The first available evening you have free, get the records out on the kitchen table, after you have washed and dried the dishes, and lay out the chassis. Borrow the XYL's ice pick for this purpose. The size of the chassis pictured is 4" long, 3" deep, and 2" high. Lay it out anyway you like, most "hams" have better ways of doing things than any other "hams" have anyway,

so any wordage on that part would just be wasted effort. If you think you can get the parts in a smaller chassis, or a different shaped chassis, go to it. After all it is going to be your baby, the more fun you have in building it, the more fun you will get out of it.

After you have decided on how you are going to assemble the chassis (I used small self-tapping screws) and have laid it out with the aid of the ice pick and a ruler, cut out the parts with a pair of tin snips. Don't worry about drilling the holes, the ice pick will work very nicely for this purpose. Next go through the XYL's assortment of pots and pans, and find one that is large enough to hold the parts of the chassis. Put the parts in the pan selected, cover with water, and put on the stove and bring to a boil. It might be well about this time to send the XYL on an errand that will take the better part of an hour, and to make a mental note not to make any disparaging remarks about the taste of any food cooked in that particular pan, at least not in the immediate future. You can tell when your chassis is "done" because usually the acetate coating used to record on will float away from its aluminum base. You may have to pick it gingerly out of the boiling water with a pair of long nose pliers, and deftly run a thumbnail under the edge of the acetate coating and peel it off It will probably peel off very easily, leaving a nice shiny piece of aluminum. Don't put the peeled off pieces in an ash tray or the wastebasket around the house. Instead shred them into fine pieces with a pair of manicure scissors and take them down to the office and put them in the salesmanager's ash tray. They are highly inflammable and give off a dense smoke and a very obnoxious odor.

Now that you have the chassis finished, figure out your own layout of parts and tubes. Why technical magazines devoted to a highly developed hobby like Amateur Radio, the very nature of which requires a technician of no small skill, should devote wordage and space on how to solder this wire there and that wire someplace else, and put a coil here and a condenser there, has always been a mystery to me. No real dyed-in-the-wool enthusiastic ham ever bothers to lay out his chassis just like the one in the book, or use the same layout of tubes and coils and condensers. To be guilty of that is true indication that you are a rank beginner and a "lid". No two "junk boxes" in the shacks of the various hams are ever the same. The only similarity that exists, generally speaking throughout the amateur fraternity, is a badly depleted budget. So, assuming you are not one of those hams who has enough of the folding stuff to outfit your shack with all of the latest factory-made equipment, if you are, you probably won't even read this far, much less contemplate building anything, you are a true ham. You look down with disdain on those plutocrats of the fraternity who have money enough to buy their equipment, and not enough brains to construct something that will work more efficiently and better than the stuff you can buy. Besides such "store boughten" stuff is usually on the conservative side, too heavy, the transformers are too big, the tubes don't even run red, and the output is too low, considering the cost, and the size of your budget. You also look down with disdain on such plutocrats who buy their ham stuff ready made because they don't get the experience you get in building your own equipment. They don't develop their technical knowledge of the art and their "know how" in getting it to work. At least you are going to try and get this project to work all by yourself, even if most of the hams in town did have a hand in on the trouble-shooting of that last transmitter you made. So why should you bother to read a lot of stuff on layout of parts and wiring instructions? All you need is a schematic diagram, a picture of the finished product and a list of parts, and you will change it to suit your fancy. So for that reason, I am deleting the wiring instructions. Dig down in your junk box and if you come up with a pair of 247's instead of a pair of 50B5's, don't let it bother you. It will only necessitate the addition of a filament transformer and a slightly larger chassis.

Let us assume that you have completed the transmitter with your own modifications, and that it works. And just a word here about modifications. Don't let it bother you or be afraid to modify it. You may turn up with something far superior in quality, efficiency or size. Modification and screwy schematics are synomous with top-notch, big name, radio engineers. Draw your schematics upside down, sideways, anyway but orthodox, and you will be on the right road to one of the higher level technical jobs in radio. To modify equipment is the particular prerogative of every radio man, whether he be a ham or the chief engineer of a broadcast station. Again I hesitate, for I realize I am skating on thin ice when I include chief engineers of broadcast stations within the fraternity of technically inclined radio men. However, for the lack of an appropriate category, and the lack of initiative on the part of those who do know radio backward and forward, technically speaking, or an I-don't-care-attitude, perhaps it would be best let them continue as such. But even chief engineers are imbued with the ham spirit of modification, to the extent that it is seldom will they refrain from drawing up some impossible-to-read schematic, and give it to the lowliest man on their staff, to change the circuit of every new piece of equipment they get. Not that it matters whether their schematic will work, or that the workmen need even bother to follow it. They never do more than take a casual glance to see that the parts have been placed on the panel or chassis or wherever they are supposed to go. RCA or G. E. may have spent millions of dollars in research engineering in developing an amplifier or console or transmitter, but that amounts to nothing to what a chief engineer can do in his idle moments doodling some fantastic schematic that usually winds up as a modification.

The hardest part of the whole modification job (that dreamed up by a chief engineer) is getting your hands on the instruction manual and schematic of the particular piece of equipment to be modified. This data, around a broadcast station is very reminiscent of "hush, hush" and "restricted" information during the last war. After you have obtained the password, been finger-printed and cross-examined, finally you are given the keys that take you through 6 locked doors, and the chief himself opens the safe and hands you the instruction manual. This you are to guard with your life, take it to bed with you, and never let it out of your sight. Some other engineer might get hold of it and find out something about the equipment that is being used, and you, if you are doing the modification, will always be looked upon with suspicion. Suspected, not of mutilation of the instruction manual, but that you might possibly know more about the equipment than the chief engineer, or know enough to know that he doesn't know very much. If you ever work in a broadcast station and reach that stage there is only one thing left for you to do, and that is get another job. Because if you don't you will soon be going down that lonesome road muttering to yourself.

The transmitter we will assume at this stage is now complete, with your own modifications, of which you can be justly proud.

The next problem is what to do with it. Logically the next step would be to connect it to an antenna and call CQ. I personally would like to see the F.C.C. pass a regulation requiring everyone who calls CQ more than 29 times without signing his call letters, or listening for a call, to have to use a transmitter exactly like this one. I will loan the schematic and list of parts. You can try calling CQ if you want to, and if you do raise anyone in or out of town, which I actually have done, it should send goosepimply tingles all up and down your spine. You have previously measured the current drawn by the transmitter by plugging a meter in the key jack, so to find the actual plate current of the final you take one-half of the total plate current (two stages) and divide it by two (to allow for screen current) and assume the plate voltage to be 100 volts, (it is easier to multiply by 100), which will probably give you a plate input of 23 hundredths of a watt, which should be sufficiently low to impress anyone. No one will believe you anyway, when you tell them your input is less than a hundred watts, but they do put you down as a guy with a decidedly different line, and send you a QSL just to see if you will lie through the mails as readily as you lie over the air.

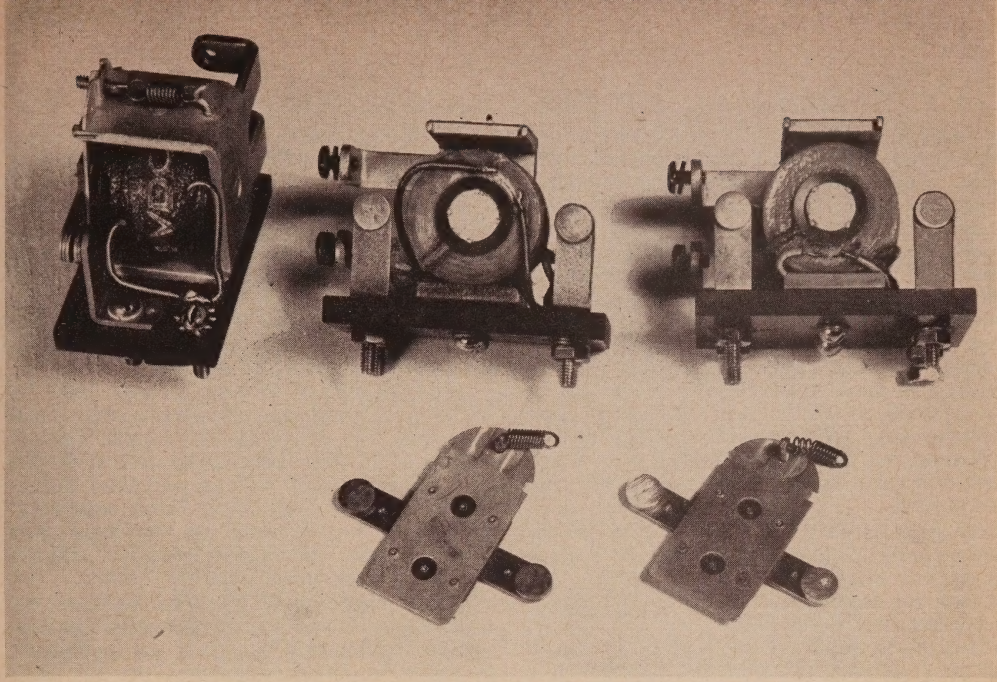
You will get more satisfaction and enjoyment out of the transmitter, however, on those occasions which you have to put up with every so often and which quite often disrupt your radio programs, TV programs, and plans generally. That is, the so called "hen-parties" that drive you out of your cozy home, especially when the conversation turns toward you and your hobby, just dripping with amazement and curiosity as to how anyone like you (meaning of course stupid) could sit in their own home and talk with someone in Timbuctoo and understand all of that complicated maze of wires that make up a radio set, or make any sense out of all of those dots and dashes.

Now here is your chance to really shine. You go to the knife and fork drawer and take your little transmitter from its hiding place. Brush the cards and tea cups aside and set it down in the middle of the card table. Plug it in and dig your neon bulb out of your vest pocket. Better get one of those tiny neon bulbs. Go to the five-and-ten and buy a two-bit plastic nite-lite and tear it up to get the neon bulb. Plug in the key and hold it down and then fasten the neon bulb to the tank coil. Of course it will glow every time you press the key. Next tune yourself in on an ordinary radio set with short wave bands, if you have one, and proceed to send a string of dots and dashes. Produce some QSL's from Timbuctoo, Tibet, Madagascar, even if you have to write letters to fences in those countries to get them. This is proof that you are an Electronic Genius, proof that you talk to your friends on the other side of the world, just as nonchalantly as your hecklers talk to their friends across town. Impress on them that it is just a little idea you had, one of your many, is your own design, made by your own hands.

You may have studied Thaumaturgy for years, and have become quite adept at it, but to the layman this little transmitter demonstration is just as entertaining, and just as mystifying, and accomplishes the same results.

CONELRAD Regulations Passed

The F.C.C. announced that on November 30, 1955 the proposed **CONELRAD** regulations were approved. A full statement of the proposed regulations will be found on page 23 of the November 1955 *CQ*. Amateurs are to comply with the **CONELRAD** provisions on a voluntary basis until January 2, 1957, after which they will just plain comply.



converting 28-volt relays to 6 and 12 volts

Lloyd Mallett, W7GRG 7330 Dibble Ave. N. W. Seattle 7, Wash.

A great many amateurs are unnecessarily depriving themselves of relays that would make their mobile rigs easier and faster to operate, when, lying in their junk boxes gathering dust is a veritable "relay mine" in the form of 28-volt relays removed from various pieces of surplus gear. A great many of these relays have two coils in series and, of course, practically everyone has discovered that by wiring the two coils in parallel operation at 12 volts then becomes possible. A vastly fewer number, however, know that each coil in turn can, in many cases, be split into two sections, the four sections paralleled for operation on 6 volts.

I have inquired of a good many local amateurs and have yet to find one besides myself who has done this, so it occurred to me that I might be guilty of withholding useful information.

The procedure is admittedly tricky and, with the finer sizes of wire on some types of coils, almost impossible, but in the vast majority of cases it can be done. I was led into this process through the fact that, like a good many of my brethren, the portion of the family budget labeled "radio" is not nearly as large as I would like. The situation was "budget zero" when, a couple of years ago it was found that a husky 12-volt relay was needed for the dynamotor control on the new (at that time) mobile rig. After much weeding out, the old reliable junk box turned up three 28-volt starting relays from dissected and, at that time, useless PE-94-A dynamotors that were part of SCR522's. These were just what the doctor ordered contactwise, since they were of the single pole, double break variety, having 3/8" diameter contacts. Since they were useless in their present state it was decided to see what could be done to operate that coil marked 28-V in big letters on a measly 12-V. It seemed reasonable that if the winding could be split into two parts and the two parts wired in parallel in accordance with Mr. Ohm's famous law, a usable relay should result.

Drawing a stool up to the bench, work was begun. I recommend sitting down for this one because the relay coil cannot be held in the hand steadily enough and the top of the bench or table is much more satisfactory.

The pins holding the relay armature were removed and the armature and spring laid aside. The bolts holding the coil terminals in place were next removed. The relay coil was held to the frame with a single machine screw and, with its removal, it became possible to get the coil out in the open and examine it closely. The coils of two of the relays looked similar, but the other appeared to be of a different construction, so it was tackled first.

This one was a coil of enameled wire wound on a bobbin and covered, on the outer diameter only, with cloth tape which was afterward dipped in shellac. As a first step, a thin, and I mean "thin," bladed knife was carefully and slowly worked down between the bobbin end piece and the coil. A very slight twist was applied to the knife blade and the bobbin end popped off. Subsequent operations to other relays indicated that this does not always occur, particularly with bobbin ends of 1/16" and thicker. In these cases, be positive the *end* of the knife blade is sharp and *cut* the end loose without using a rotary motion. If you do you will short out turns on the end of the coil and thus ruin what otherwise would be a successful conversion.

To get back to this coil, the end of the coil had no tendency to ravel, thanks to the soaking in resin or whatever it was they used as a dip in original manufacture. This looked like a cinch and then the thought came that if a coil of two parts would operate on 12 volts a coil of three parts would probably operate on 6 volts. So, the final result desired was three coils or portions of coil having as nearly equal ohmic resistance as possible. Naturally each portion of the coil toward the center should have more turns so that the three concentric rings formed by the three coil portions would be of equal area. I did not go into the mathematics of this, but, judged by eye where the outer diameter of the two inner coil sections should lie. A very sharp pointed layout scrib (or a needle) was used to pick up a single turn of wire at these two diameters and these two turns were slowly lifted up and cut in two. Now, carefully and slowly pull each end out from the coil until it is about 1¼" long. This is the most ticklish part of the job and a close inspection of the exposed coil end surface is needed to select the particular turn of wire that will allow this amount of slack to be pulled out.

The next step is to strip these wire ends of their enamel insulation. I found that holding the wire where it enters the coil with a pair of tweezers or pliers *not* having serrations on their inner surfaces while using 000 sandpaper on the remainder cuts down the casualties resulting from too tight a grip on the sandpaper.

Now, with an Ohmmeter, identify the starting and ending wires of the three coil portions and twist the two "endings" and "startings" together and lay them flat against the coil. Now apply a little shellac or varnish to the inside of the bobbin end, replace it on the coil, bolt the coil back to the relay frame, and attach the original coil terminal wires to their original bolts. Solder a piece of #18 solid hookup wire to each of these terminal lugs and carefully form them around the coil until their ends are adjacent to the double wires now projecting from between the bobbin end and the coil. Trim the hookup wire to exact length, push back the insulation, wrap the double wire around it and solder. Eureka! Conversion completed!

Don't let all the above scare you—it is a lot easier than it sounds.

A quick trip out to the car with a couple of flexible leads proved that the calculations were right—the relay operated perfectly. The armature came down solidly on its stop, bending the contact-carrying spring, proving that sufficient magnetic pull was being created.

Theoretically, of course, it was "off" by 3 1/3 volts, since the three-section coil should operate at 1/3 of 28, or 9 1/3 volts. The car battery at this time was on the nose at 6 volts with the engine not running, and since the relay operated so well under these conditions, no trouble was expected or any lesser performance with the engine generator running and the system voltage at about 7 volts.

Vastly encouraged, I rushed back to the bench to tackle one of the other coils. The next one looked tougher. This coil was apparently originally wound on a mandrel, the coil taped all around, and then the core pressed into it. At any rate, the end of the coil was not easily exposed.

Since I wanted a 12-volt relay this time, a spot a little more than halfway out on the coil was selected and, with the sharp scriber point, the tape and impregnating compound was picked away until a turn of wire was visible. Then the tape was picked away following the turn of wire until sufficient of its surface was exposed to enable it to be lifted up and cut. The same procedure was then followed as with the previous relay until it lay on the bench completely converted. Incidentally, an Ohmmeter check on the two portions of the winding showed a difference of 15 Ohms, which was not too bad considering that the original coil measured 180 Ohms.

A trip to the car, this time to the rear compartment, where the transmitter and 12-volt battery lay. When the juice hit the coil down came the armature with a satisfying "klunk" and we knew we were in business.

Since that time dozens of relays have been converted, using the same technique. I have had some failures, mostly because of lack of patience and trying to hurry the job too much. At any rate, I proved that I had a quick, ready and cheap source for almost any variety of 6 or 12 volt relay might ever be needed. If your junk box is not well stocked, the 28-volt variety of relay are still available at give-away prices compared to the new "store bought" variety.

The accomapnying picture shows on the left the converted relay for 6 volts and the two partially disassembled relays on the right are the 12-volt conversions. The one on the extreme right was done just before writing this, just to convince myself I had not lost my touch. It's really so simple—give it a whirl.





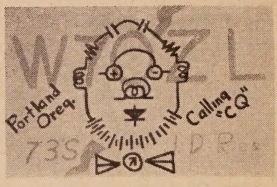


QSL Contest Winner and runners up

Oooo-ee! what a beautiful card from ZS6AJC! Right away we rushed down to the printer to see what it would cost to reproduce it in full color. The result of this interesting conference is the monochrome reproduction seen above.

Use your imagination, though, and pull out all the stops. OK? Got it? Well, it looks even better than *that*.

As you may note, the DX men have outdone the stateside hams this month. Vot giffs? Vell, giffs a 2-year subscription to CQ (new winner each month).





CQ Staff Test On The Hallicrafters

HT-31 Linear Power Amplifier

Amateurs are becoming more and more interested in linear power amplifiers. These are general purpose amplifiers that can be used to provide a fixed power gain between a low level exciter and an antenna without regard to the type of modulation or keying used. The linear amplifier has great utility for the amateur who wishes to experiment with single sideband, frequency modulation, teletype, FSK, and novel methods of amplitude modulation but who does not wish to build a complete new transmitter for each test. In particular, the amateur with a low power AM or CW rig, who hopes some day to switch to SSB, will find that a linear power amplifier will not become obsolete as he changes his mode of operation.

The Hallicrafters model HT-31 is just such a linear amplifier in the medium power class. It has a peak output of from 250 to 300 watts (slightly higher on 80 M.) and a power gain of from 11 db. to 15 db. depending upon the amateur band used. Although designed for the Hallicrafters model HT-30 SSB exciter, the HT-31 linear amplifier can follow any low power transmitter or exciter. For example it will boost a 4 watt AM rig to a carrier output of 80 watts or a 10 watt CW novice transmitter to 300 watts output.

The HT-31 linear amplifier uses two parallel 811A tubes with 1500 volts on the plates and zero bias. Figure 1 is the complete schematic diagram of the unit. A novel Pi-section type tuner is used in that the plate tuning capacitor and the tank coil are ganged together. This feature is important in maintaining proper operating tank Q over the wide frequency range. Coarse and fine adjustments of antenna loading are made with the tap switch S104 and C114. (No, the loading does not increase with clockwise rotation of these controls.) The load resistance may be from 50 ohms to 600 ohms but higher values and highly reactive loads should be avoided. The mica capacitors on S104 will not withstand sustained application of the high circulating currents often associated with light loads or reactive loads. L107 is a safety d-c shunt to prevent high voltage from appearing on the antenna through failure of C112 the plate blocking capacitor. The amplifier is grid neutralized. No trace of instability was found in the unit tested for any conditions of plate and grid tuning. It is quite stable even when completely unloaded, which is more than can be said for most home-built triode amplifiers. The input impedance of the amplifier was found to vary considerably, from 73 ohms at 4 mcs. to 240 ohms at 14 mcs. This may cause some driving problems at the higher frequencies, especially as the coax line from the exciter approaches a quarter wavelength.

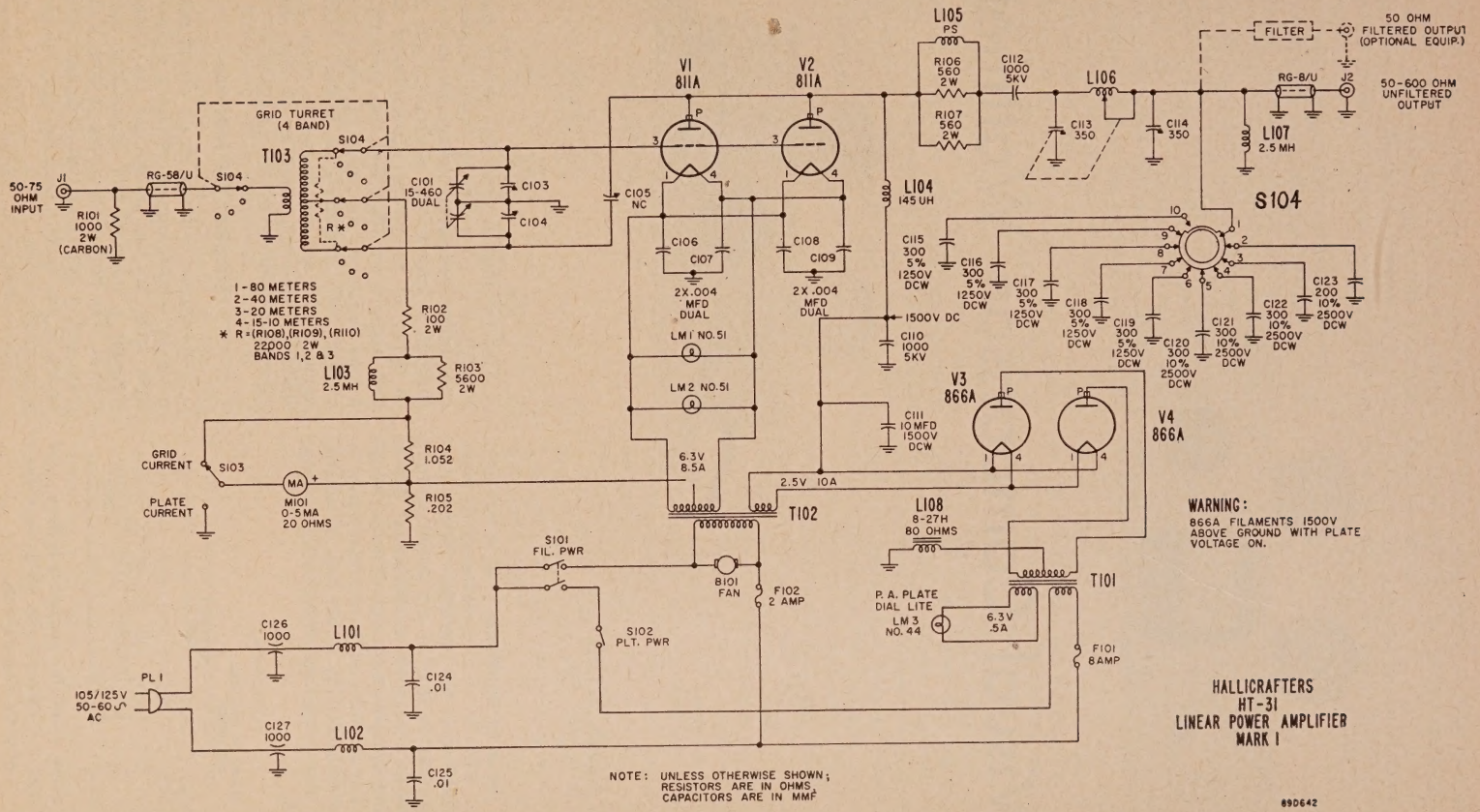
The power supply uses a pair of 866A tubes in a full wave rectifier circuit to produce 1500 volts of filtered D.C. At full load, around 300 ma., the ripple voltage is about 1%. No bleeder resistor is used. A charge of about 400 volts was found to remain in the filter capacitor when operation was interrupted by opening the power switch or by disconnecting the line plug. It is suggested that a half megohm, 10 watt bleeder be soldered across the filter capacitor before this amplifier is placed in operation. At the same time a plate interlock switch could be placed under the cabinet lid as none is now provided.

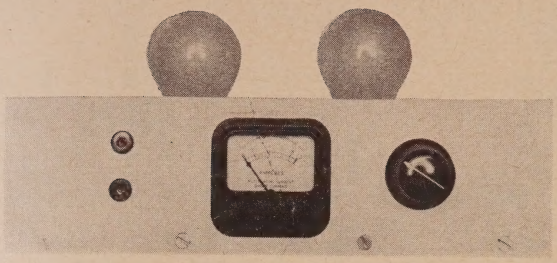
If voice-control SSB operation is desired care should be taken in shunting the plate switch with a relay as the surge current here was found to be of the order of 12 amperes. It was not found possible to operate the amplifier for extended periods with plate voltage applied and no excitation. Such operation was attempted for cycles of one hour *on* followed by 30 minutes *off*. Air temperature in the vicinity of the 811A plate caps rose to 165 degrees farenheit and dropped to 105 degrees when the heaters alone were on. The amplifier has a small exhaust fan which runs continually. During the second cycle of our test the filter capacitor, C111, failed. This is a 10 mfd. oil capacitor rated at 1500 VDCW. and is mounted near the 811As. Since normal line voltage and load fluctuations cause the plate voltage to rise above 1600 it does not seem that this capacitor is sufficiently rated to permit such a temperature rise.

When operating as an SSB amplifier on 80 meters the distortion products of the HT-31 are quite low. Third order distortion is 20 db. below the 330 watt output level and 30 db. below the 285 watt level. This low distortion is characteristic of zero bias amplifier although in this case that does result in a rather high quiescent plate dissipation of 64 watts per tube. (1600 volts at 80 ma. total no signal plate current)

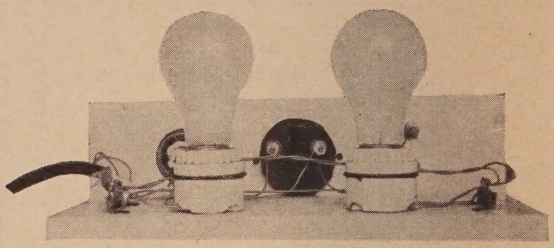
Heavy duty chassis and cabinet construction make the HT-31 a rugged unit. Placement of parts is such that there is enough space beneath the chassis for a TVI filter should one be necessary. However linear amplifiers are noted for their lack of TVI and the HT-31 is excellent in this respect. At moderate power levels of 250 watts or so no TVI was caused by operation without a filter on the 80 meter through 20 meter bands.

Mark Moynahan, W2ALJ


L105
PS
R106
560
2W
R107
560
2W
V1
811A
V2
811A
C112
1000
5KV
L106
FILTER
50 OHM
FILTERED OUTPUT
(OPTIONAL EQUIP.)
RG-8/U
J2
50-600 OHM
UNFILTERED
OUTPUT
C113
350
C114
350
L107
2.5 MH
GRID TURRET
(4 BAND)
S104
T103
J1
50-75
OHM
INPUT
RG-58/U
S104
R101
1000
2W
(CARBON)
C101
15-460
DUAL
C103
C104
C105
NC
L104
145 UH
S104
C106
C107
2X.004
MFD
DUAL
C108
C109
2X.004
MFD
DUAL
C115
300
5%
1250V
DCW
C116
300
5%
1250V
DCW
C117
300
5%
1250V
DCW
C118
300
5%
1250V
DCW
C119
300
5%
1250V
DCW
C120
300
10%
2500V
DCW
C121
300
10%
2500V
DCW
C122
300
10%
2500V
DCW
C123
200
10%
2500V
DCW
1500V DC
C110
1000
5KV
1-80 METERS
2-40 METERS
3-20 METERS
4-15-10 METERS
* R=(R108),(R109),(R110)
22000 2W
BANDS 1,2 &3
R102
100
2W
L103
2.5MH
R103
5600
2W
LM1 NO.51
LM2 NO.51
V3
866A
V4
866A
C111
10 MFD
1500V
DCW
GRID
CURRENT
S103
MA
M101
0-5MA
20 OHMS
PLATE
CURRENT
R104
1.052
R105
.202
6.3V
8.5A
2.5V 10A
T102
L108
8-27H
80 OHMS
WARNING:
866A FILAMENTS 1500V
ABOVE GROUND WITH PLATE
VOLTAGE ON.
S101
FIL. PWR
B101
FAN
F102
2 AMP
T101
P. A. PLATE
DIAL LITE
LM 3
NO. 44
6.3V
.5A
F101
8AMP
C126
1000
L101
S102
PLT. PWR
PL 1
105/125V
50-60 ~
AC
C124
.01
C127
1000
L102
C125
.01
NOTE: UNLESS OTHERWISE SHOWN;
RESISTORS ARE IN OHMS,
CAPACITORS ARE IN MMF
HALLICRAFTERS
HT-31
LINEAR POWER AMPLIFIER
MARK I
89D642



A Visual Comparison Wattmeter



Hector E. French, W1JKZ
9 Davidson Rd., Wakefield, Mass.

One of the most significant and, at the same time, most difficult of measurements to make in connection with the operation of an amateur transmitter is that of r-f power output. The significance of such measurement lies in the fact that it makes the value of each change in transmitter circuitry or adjustment easier to assess. The difficulty lies in the lack of suitable r-f power measuring equipment in the average ham shack.

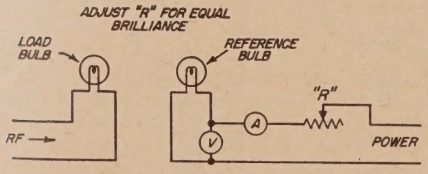


Fig. 1. This simple circuit for comparing brilliancy and color of r-f and a-c lighted bulbs yields surprisingly accurate measurements.

The techniques used for power measurement in d-c, a-c power or audio frequency circuits (measurement of voltage across or current through a known load resistance) are difficult to apply to r-f power measurement because they require r-f ammeters and voltmeters and a load resistance the value of which does not change with frequency or power. These are items which are not found in most amateur stations. However, there is an easy and inexpensive solution to the problem.

Simplest R-F Indicator

The simplest estimate of r-f power output is made by connecting an ordinary incandescent light bulb to the output of the transmitter through a conventional impedance matching circuit. The bulb then serves as both a dummy load and a power output indicator, the brilliance of the bulb indicating *very roughly* the transmitter output.

This procedure is simple and inexpensive,

but has one serious drawback. It is practically impossible to estimate the r-f power by looking at the bulb. Even comparing it with a similar bulb at normal brilliance is useless as far as getting any realistic value of power output is concerned.

The visual comparison wattmeter shown in the photographs and diagram (*Fig. 2*) uses an ordinary light bulb connected to the transmitter output as described above as a dummy r-f load plus a second reference bulb operated at a controllable brilliance. In operation the load bulb is lighted by the r-f power to be measured and the reference bulb is then brought to the same brilliance by adjusting its series rheostat. When the two bulbs are at the same brilliance the power dissipated by each is the same, provided, of course, the bulbs are identical. It is then only necessary to measure the a-c power input to the reference bulb to determine the r-f power input to the load bulb.

Figure 1 is a simplified diagram of the instrument. The ammeter measures the current through the reference bulb and the voltmeter measures the voltage across it. Multiplying the current by the voltage gives the power dissipated in the reference bulb and hence the r-f power dissipated in the load bulb.

Visual Comparison Principle

Satisfactory operation of this system depends on an accurate visual comparison between the two bulbs and in practice can be done to a high degree of accuracy as indicated by the fact that successive readings will consistently be within a few percent of each other. This is

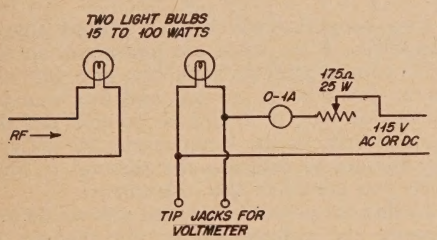


Fig. 2. 15-to-100 watt Comparison Wattmeter

possible because the eye has three variables presented to it in making the comparisons:

1. Brilliance varies as power increases.
2. Subtle color differences are evident as the temperature of the filament in the bulb increases. As power is increased the glow changes from reddish at low power to brilliant white at maximum power.
3. The lighted area of the bulb increases as power increases.

As the photographs show, the wattmeter is built in breadboard style. More elaborate construction is unnecessary since the instrument is normally used for test purposes only. This type of construction makes it easy and economical to build and aids in the reduction of unwanted capacity effects.

The power limits of the instrument, as shown here, are 15 to 100 watts. Methods of using it for higher and lower powers will be considered further on in this article.

Selection of Components

Experience has shown that bulbs in the 40- to 100-watt bracket give the most flexible operation. For use in your wattmeter select a pair of bulbs of the same rating which have been purchased together (same time—same store). This will insure that the bulbs are as nearly matched as is possible. Do not attempt to use a bulb that has already been in service since in use a small amount of the filament material is vaporized and deposited on the inner surface of the bulb. This cuts down the amount of transmitted light and changes the appearance of the bulb. For the same reason, be careful not to overload the bulb. A 100 watt bulb operated at half-power will be much more stable in appearance over a long period than will a bulb run at full rating or beyond.

Note that a 25 watt series rheostat is used. Under most conditions the limits of the resistance element will not be exceeded even though measurement is made of powers as high as 100 watts. At levels near the 100 watt limit the continuous current rating of the control may be exceeded but under these conditions the current is flowing through only a part of the resistance element and the total power dissipation rating is not exceeded. Within reasonable limits this is an allowable condition.

The meter used is an inexpensive unit with an iron-vane solenoid movement. To make the instrument even less expensive the shack's volt-ohm-milliameter is used in place of a built-in voltmeter, the voltage being read through a pair of tip jacks.

The bulb sockets shown in the photographs were selected for the advantages afforded by their particular construction. They are of porcelain construction with mica insulation and a minimum of metal inside the socket. The porcelain and mica give excellent insulation and consequent low r-f loss.

Operation

To operate the wattmeter first select two identical new bulbs of a rating one size larger than the estimated power output of the transmitter. Connect the load bulb to the transmitter output through the usual antenna impedance matching circuit. The matching circuit must be used since the load impedance presented to the transmitter by the bulb will almost certainly not be equal to the impedance of the antenna it replaces. Then connect the

VOM to the tip jacks on the panel using standard test prods. Set the meter for a-c voltage (unless you have a d-c power line). Tune the transmitter in the usual manner to light the load bulb. At this point estimate the power by the appearance of the lighted bulb—you will be surprised to find how wrong you are when you light the reference bulb!

Now connect the reference bulb to the power line and adjust the rheostat until the two bulbs are of equal brilliance. The power dissipation in the two bulbs is now the same and it is only necessary to measure the a-c power input to the reference bulb to find the r-f power in the load bulb. To find this power in watts, multiply the reading on the panel ammeter by the reading on the external voltmeter.

For example, if the panel ammeter reads 0.8 amperes and the external voltmeter reads 75 volts, then 0.8 x 75 = 60 and the power dissipated in the load bulb is 60 watts. To check the accuracy of your visual comparison turn the rheostat knob to one extreme limit of its rotation and then readjust it to again bring the bulbs back to equal brilliance. You will find the power will come out to within a few watts of your first reading.

Computing R-F Stage Efficiency

When the r-f power output of the transmitter is known it is a simple matter to determine the efficiency of the output stage of the transmitter. For example, if in the case in the preceding paragraph, the output stage is operating at a plate voltage of 1000 and is drawing 95 milliamperes of plate current, the plate circuit input power is 1,000 x .095 = 95 watts (ignoring screen and heater circuit power dissipation). To find the plate circuit efficiency it is only necessary to divide the output power by the input power. In our example this is 60/95 or 63% efficiency.

From these examples many ways in which these power measurements can help solve transmitter problems should suggest themselves such as discovering stray power losses, misadjustments, inefficient layout of r-f components, incorrect grid or screen voltages, etc. The experimentally-inclined amateur can even plot his own curves of power output versus grid drive, screen voltage, loading, etc.

Low-Power Unit

The values shown in *Figure 2* are for a power range of 15 to 100 watts. Most fixed-location amateur transmitters have a power output which falls within this range. For measurement of power levels below 15 watts substitute 15 watt bulbs, a 100 ohm, 4 watt, wire wound rheostat, and a 0.150 ammeter. These changes extend the range of the instrument to include the lower-powered portable and mobile installations.

High-Power Unit

To extend the range of the wattmeter above 100 watts simply use as many 100 watt bulbs in the load circuit as are required to dissipate the power being measured. Then make the visual comparison between the reference bulb and one of the load bulbs and multiply the power in the reference bulb by the number of load bulbs to obtain the transmitter power output.

Other Uses

The visual comparison wattmeter can also be used in audio measurements if the output transformer of the audio equipment has a wide selection of taps to permit an accurate impedance match. The bulb impedance at any particular level can be found by dividing the voltage read on the external meter by the current on the panel meter. The bulb resistance is not constant, but instead varies over a wide range as the power input changes. This is a disadvantage in audio measurements, because the audio equipment is designed to operate into a fixed value of load resistance. Audio measurements must therefore be made with a steady tone, to avoid the drastic changes in impedance which would result with a speech or music input signal. This change in resistance with load is no problem in r-f measurements, because adjustment is made in the antenna impedance matching network as a part of the tune-up procedure, and allows matching for any loading impedance over a wide range.

Editor's Comments

Two simplifications of this circuit suggest themselves. First, since a-c ammeters are not at all common in the junk box and you may not be the type to go out and buy one just for this project, it should be pointed out that you can achieve the same results by taking a few minutes to calibrate the rheostat in ohms when you construct the instrument.

To find the power being used you would then measure the voltage across the rheostat instead of the voltage across the bulb (or measure the voltage across the bulb and subtract that from the line voltage). Then square this voltage and divide it by the resistance of the rheostat.

Thus:

$$P = E \times I = \frac{E_r^2}{R_r}$$

To take this one step further, providing your line voltage is dependable you can actually calibrate the rheostat in watts and it will give you reasonably accurate results unless and until you change the comparison bulb.

Narrow-Shift FSK

John Williams W2BFD
38-06 61st Street, Woodside, L. I., N. Y.

There is no mystery connected with the original adoption of 850 cycles as the amount of frequency variation for amateur f-m telegraphy and teletype work. Indeed, it is very simple. When the author set up the first amateur teleprinter station using frequency-shift technique, nearly ten years ago, there were no sources of signals for the frequent demonstrations and lectures on RTTY at radio clubs other than the commercial and military printer transmissions.

When an embryonic amateur radioteletype net finally came into existence in 1946 the pioneer group, which eventually evolved into the national radioteletype organization, decided that it would be necessary for amateur printer stations to "speak the same language" as commercial and military installations if interoperation were to be possible in the event of disaster or a national emergency.

Practically all single-channel commercial radioprinter circuits now use 850-cycle shift to convey the intelligence. By definition the "Mark" signal (Morse key or Teletype keyboard contacts closed) is transmitted as the higher of the two frequencies while the Morse key and printer keyboard open-contact condition shifts the frequency to the lower extreme, 850 cycles away. For multichannel work, and for VHF operation, one or more sub-carriers, generally in the audible range, are placed upon the r-f carrier and each sub-carrier is shifted by a different teleprinter signal. As many as 18 of these sub-carriers may be squeezed within an audio range of 0-3000 cycles.

As in commercial and military systems, when amateur teletype transmission takes place in the VHF portion of the spectrum a sub-carrier is employed and it is the frequency of this audio sub-carrier that is keyed back and forth,

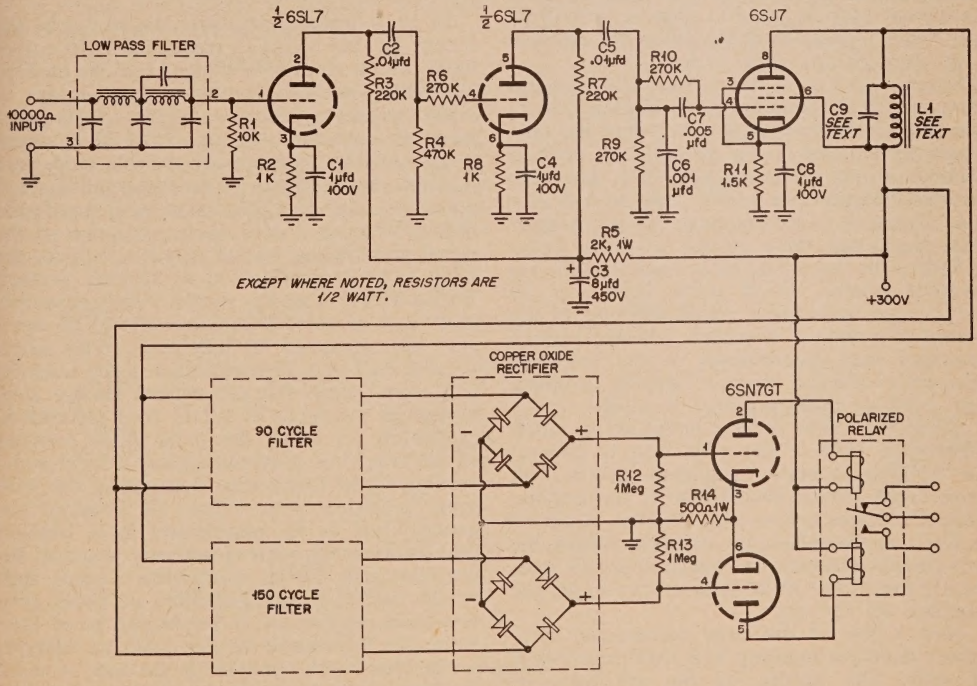
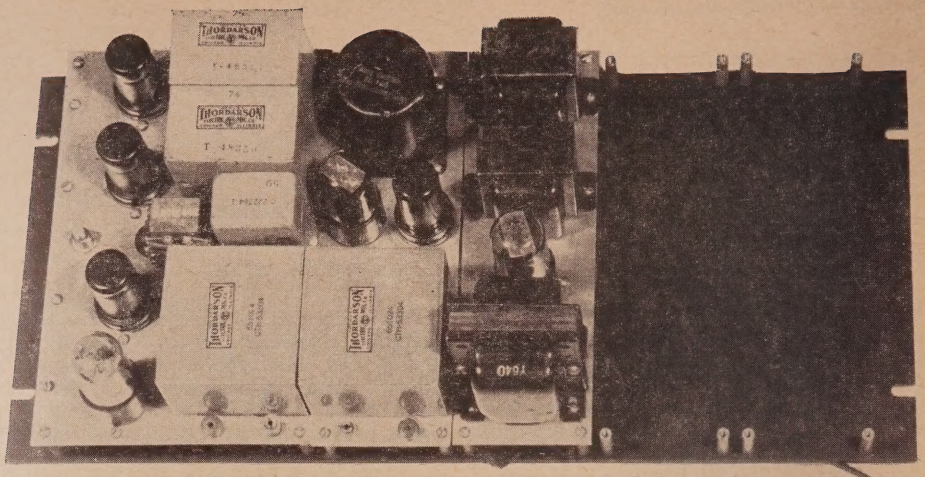


Fig. 1. W2BFD Narrow-Shift FSK & AFSK Receiving Converter.



Experimental Narrow-Shift Equipment. The two 6J5's have since been replaced by a 6SN7, freeing the other socket to accommodate a VR-150 regulator tube. Central unit is Sending Oscillator, with power supply at right.

from Mark to Space, rather than the radio carrier itself. Sub-carrier operation, or AFSK as it is known, preserves most of the terrific advantages of frequency-shift in the reduction of noise, fading and interference yet poses none of the transmitter stability problems that direct carrier-shift would involve in the VHF range. By standardizing on 2125 cycles and 2975 cycles for Mark and Space the same receiving equipment may be used to receive both FSK and AFSK signals, since the difference between 2125 and 2975 is 850 cycles.

Several years ago, as the result of a vigorous campaign by the Amateur Radioteletype Society and *CQ*, all the non-phone portions of the low-frequency amateur bands were thrown open to amateur printer operation and FSK. The only non-VHF bands open to FSK prior to that time was 27 mc. As a consequence all the pioneer FSK work was done on the 11-meter band, including the first transpacific traffic circuits via amateur printer. Much more work was on the 2-meter band using AFSK because of the advent of *auto-start* operation, whereby printed messages may be received in the receiving operator's absence without leaving printers, converters or radio receivers running.

When the writer became interested in radioteletype in 1945 it was quite easy to convert the 1000-cycle shift equipment, which was constructed during World-War II for remote-control purpose and which was later described in *CQ*[1], to the 850-cycle standard. When the first teletype machine was acquired it was, thus, merely the matter of an hour or two to get the machine on the air.

Now a few of the large commercial companies are experimenting with smaller amounts of shift. The claims, by the advocates of narrow-shift, being that smaller spectrum space is taken up and superior performance under conditions of selective fading. Narrow-shift also has its adherents among radio amateurs and there is presently considerable discussion, on the air and at meetings of RTTY men, of the pros and cons of narrow versus wide.

Early Experiments

In 1944 experiments were carried out by the writer on the original frequency-shift equipment, which eventually evolved into the modern "W2BFD" teletype converter, now in use in many amateur teletype stations. Tests were made to determine the minimum shift which it was possible to detect with the selectivity then available in the device. With the amplifiers and polarized relay carefully balanced it was found that *as little as 2 or 3 cycles variation* of the signal was all that was required to transfer the relay from its marking to its spacing contact! With a Morse hand key signals were transmitted that were completely undetectable to an operator not equipped to receive it. This ultra-narrow shift signal sounds like a steady unkeyed CW signal since the ear cannot resolve such miniscule variations of pitch. It is restored to readability by using the polar relay contacts of the receiving converter to key a local audio oscillator and earphones. Because of the very great precision with which the sending frequency has to be maintained it is obvious that ultra-narrow shift is not very practical for everyday use. To be worthwhile 3-cycle shift would require a signal stability of better than one-cycle per second. It would also be of little value for high-speed keying, such as teletype, as the bandwidth occupied is the sum of twice the highest keying component and the deviation in cycles.

1. CQ, Nov. 1946, P18

For practical teletype work a minimum shift would be about three times the basic keying rate of the printer. At standard printer speeds of 60-65 WPM this keying rate is around 23 cycles per second so a frequency shift of 60 to 70 cycles would appear to be the absolute minimum. The "three times" factor, mentioned above, is so that a reasonable approximation of square-wave keying signals may be received. It is possible to print from signals of sine wave-shape but adjustments of the teleprinter become extremely critical. It is also possible to "regenerate" received sine wave signals so they are retransmitted to the printer as reformed and retimed square waves but the amount of equipment involved becomes prohibitive.

In 1950 the author had need of an additional signaling channel on his 169 kc power-line carrier circuit between his home and place-of-business, about 3/4 mile airline, and decided that rather than add a completely new r-f transmitter and receiver, another signal could be transmitted below the normal speech range by modulating a low-frequency sub-carrier onto the r-f circuit and frequency-shifting this sub-carrier. By filtering at the receiving end this sub-carrier was unheard of in the voice channel, which runs from 300-3000 cycles per second. Although it was to be used for other purposes it was decided to design it with sufficient frequency shift to handle teletype signals if ever needed and it was made the "guinea pig" for evaluating the worth of narrow-shift signals for amateur purposes. The apparatus that resulted from these experiments is depicted here and is in daily operation at W2BFD.

Filters

Just as the single sideband boys are faced with the problem of securing adequate filters and phase-shift networks having satisfactory characteristics so are the radioteletype "gang" always confronted with the problems of filters and frequency discriminators working in the audio frequency range. The original "W2BFD" converter took care of the need very satisfactorily by constructing them from small filter chokes and loudspeaker output transformers, yielding a bandwidth of about 100 cycles for each two-stage amplifier (one at the Mark and one at the Space frequency). This was not good enough for the 60-cycle shift chosen for the prototype unit. Also it was desired to reduce the number of tubes in the receiving converter from five to three and make an overall reduction in size.

Almost as if they were specifically designed for the project it was discovered that the miniature 90 and 150 cycle audio filters included as part of the BC-733 localizer receivers and also the R-89/ARN-5 glide-path receivers, available for a few dollars on surplus, were ideally suited to the purpose. These filters were designed to work directly from a vacuum-tube plate circuit and contain a secondary winding, isolated from the filter itself, which makes it convenient to match a copper-oxide or germanium discriminator-rectifier. As a matter of fact the surplus receivers mentioned contain, potted in a single can, two complete fullwave bridge rectifiers perfectly suitable to do the job. The connections remain exactly as they were used in the receivers. In the photograph of the completed narrow-shift converter a different rectifier unit was used but was not superior to the one removed from the surplus receiver. It will also be noticed that originally the d-c amplifier for the polar relay was a pair of 6J5 tubes which was later modified to employ a single 6SN7.

Instead of the separate amplifiers for the Mark and Space signals, required in the standard-shift "W2BFD" converter because of the wide spread between the frequencies, a single selective amplifier, passing both frequencies, was constructed. Selectivity could be obtained by a band-pass filter but since the unit is so close to zero-frequency anyway, a low-pass filter running from zero to 200 or 300 cycles gave about the same results and was considerably smaller and cheaper. These units can be obtained for $3 plus postage from

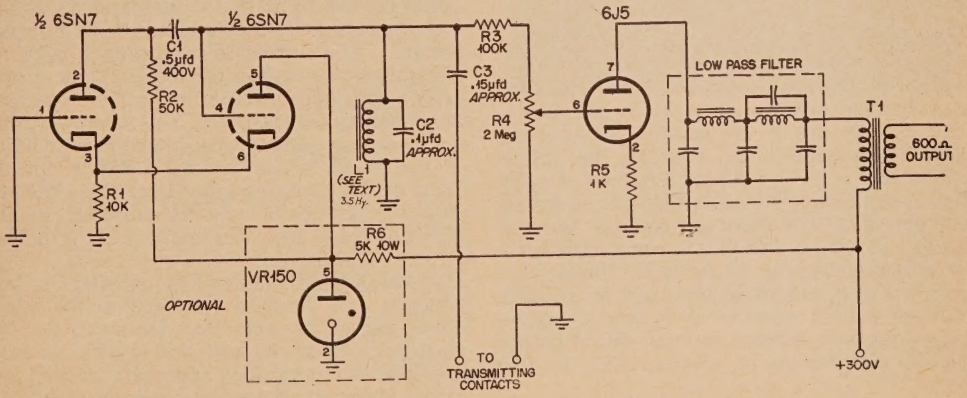


Fig. 2. W2BFD Narrow-Shift AFSK Sending Oscillator.

the RTTY organization[2]. The filters are designed for 10,000 ohm terminations and have an M-derived configuration. Attenuation is very high outside the pass-band and, in the composite voice-signaling circuit mentioned, there was not the slightest tendency toward false relay operation by low-frequency components of the voice signal going over the same carrier even though the voice level was 30 db higher than the signaling level.

The amplifier following the selective filter is one half of a 6SL7 high-mu double triode tube, operating strictly class A with zero grid current. The output of this stage, where the signal is some fifty times higher in level, is applied to the second half of the 6SL7, driving the triode into the grid-current region on signals exceeding a volt or two. This causes limiting on the positive half-cycles because of the 270K series resistor in the grid. The lop-sided output of the first limiter is fed to the grid of the 6SJ7 second limiter which limits in the same manner, but because of the 180 degree phase-reversal in the first limiter, takes care of the opposite half-cycle, thus yielding symmetrical limiting. The plate current of the 6SJ7 would be a square wave, from the limiting action, were it not for the effect of the loading by the paralleled inputs of the two discriminator filters. Over more than a 50 db range of signal levels at the converter input there will be no noticeable change in the output level from the 6SJ7. This takes care of fading and amplitude-modulated noise very nicely.

The secondaries of the two discriminator filters are connected across the input terminals of the pair of rectifier-bridges. The d-c outputs of the bridges, on the order of 7-10 volts, are connected *in opposition* so that noise, appearing simultaneously on mark and space channels, balances out whereas signals, appearing on *only* mark or space frequency, but not both, drive one grid of the 6SN7 d-c amplifier plus and the other one minus. Thus the grids are positive or negative, depending whether a mark or space signal is coming through. FSK and AFSK is extremely effective on completely random noise.

Polar Relays

With a sensitive high-resistance polarized relay having twin windings it is possible to work directly out of the rectifiers without the 6SN7 d-c amplifier stage, reducing the unit to a 6SL7 and a 6SJ7, but much improved operation is possible by the use of the d-c amplifier. The amplifier will drive a standard Western Electric 215-A or 255-A polarized relay without difficulty but the $1.50 W.E. 206-AH relays[2], are less expensive and easy to modify. The coil bobbin removes with several screws and a long bolt, pushed through the armature hole, is chucked in an electric drill or drill press or even a hand drill clamped in a vise, and rewound with a double winding of about 1000 ohms each or more. The windings are bifilar, that is wire is drawn from two spools at once and put on in the same winding operation, resulting in four coil-leads when you are done. The windings must be connected to the converter so that marking signals pull the armature toward one contact and spacing signals toward the other. If the relay is properly adjusted the armature will remain on whichever side it is moved to, even though the current is then shut off. One precaution! Make sure a steel strip or "keeper" is put across the small horseshoe magnet before disassembling, otherwise its strength will be weakened. The contacts of the polar relay are connected in conventional fashion to the teletypewriter, continental code oscillator and earphones, or to the remote-controlled circuit, if that is to be the use of the converter.

It was found that, for equal mark and space intensities, different d-c voltages were obtained from the discriminator output. In order to equalize this discrepancy the plate choke, supplying d.c. to the plate of the 6SJ7, was tuned to a frequency between mark and space that would result in the same output from both sides of the discriminator. The choke was also taken from the surplus glide-path receiver. (Very little was wasted in the receiver. The 200 Mc tunable coaxial cavities were slightly modified and put to work on 420 Mc with exceptionally good "Q".)

The receiving converter can be used for both AFSK and FSK. For AFSK transmission, and for testing the unit as a signal generator, an audio oscillator, shifted by the keying contacts from 90 to 150 cycles, is also part of the setup. Right at the outset an obstacle was encountered that, for awhile, appeared insurmountable. If oscillator feedback was made sufficiently great so that the unit would key properly and rapidly then the harmonic content of its output was very high indeed. In fact it resembled a square wave on the 'scope. If feedback was reduced until a good sinewave was displayed then it would not key to mark, the oscillations stopping with the contacts closed and commencing when opened. The situation improved, after a struggle, by increasing the feedback for proper keying and then filtering the output to remove the bothersome harmonics. This solution turned out to be a good one because of the availability of the filters, which are the same as for the input of the receiving converter. The oscillator tube is followed by a buffer amplifier so that changing load does not cause a shift in frequency calibration.

Calibration of the sending oscillator is particularly easy because the oscilloscope sweep can be set at 30 cycles and locked to AC-line frequency. Since 90 and 150 cycles are both multiples of 30 cycles a stationary pattern will result when oscillator is properly tuned up.

[*Continued on page 100*]

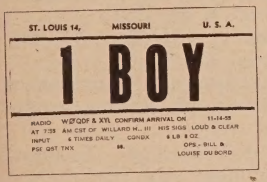
2. Radioteletype Society, 3806 61 St., Woodside 77, N. Y.

Letters . . . to the editor

Dear Wayne,

Please accept my thanks for your part in making possible the DX Test of the past two weekends. I enjoyed myself thoroughly, but owing to the demands of my work (Pediatrician)—that's a bellboy with a stethoscope—I didn't get to spend enough time on the air to actually compete. I picked up 10 new countries, learned a world of savvy in snagging 'em, learned some of the vagaries of my beams and the bands, and got many a belly laugh to hear the boys piling up hundreds deep on the rare ones. It's so easy to work 'em if you'll just back off about 5-7 kc and do your calling there while the multitudes jam each other. I heard Larry in there working a few, and I've already written my thanks to him. I hope that many of the participants take time to send their thanks to you. An old aphorism says "frequently those who play do not pay, while those who have played do not pay." Your pay ought certainly to be increased circulation and a sackful of thank-you letters.

Arthur W. Woods, M.D. W4GJW
Birmingham, Ala.



Ever work this one? If you haven't done a double-take yet, now is the time. From WØQDF (Ham Shack manager at Walter Ashe) and XYL.

C.A.P.

Dear Sir:

First of all I wish to compliment you and your staff for the fine issues of *CQ* that you have been putting out. They're all very good and have good information in them.

One thng that I have missed in your monthly editions is anything about C.A.P. The cadets in C.A.P. are proud of our communication network throughout the U.S.A. I'd like to invite you to listen to any of our nets. Our assigned frequencies are 4507.5 kc, 4585 kc, and 5508 kc. Wyoming nets are one 2507.5 kc. These nets may sound dry to you experienced hams but they do worlds of good and lots of practice for us beginners. Wyoming's nets are held from 7:30 to 8:00 and 12:30 to 13:00 hours daily except Sundays.

C.A.P. is found almost anywhere. All big cities have at least one squadron. Our most important job is assisting on search and rescue missions. Our jobs vary on these missions from Communications to serving food.

I could gab on C.A.P. for another three or four pages, but that's too much.

Stanley Beckle
Comm. Sgt. (QUEEN 33) Cheyenne Squadron
Cheyenne, Wyoming

Experimenter's Column

Dear OM:

By all means devote a column or two for the experimenter. I like to look at the various circuits that appear in *CQ* and perhaps build some of the stuff that looks good, BUT I would like to see a column where I could ask questions about some method or approach to circuitry that might look stupid to some, but might have possibilities of being developed through your column. Incidentally, *CQ* sure is a good magazine now.

Bob Davis, W6HAN
San Jose, Calif.

Looks like such a column might develop to such proportions that we'd need another editor . . . a ham really hep on circuitry and kinks. Any nominations? We have it on good authority that hams get a big kick out of editorial work with CQ.*—Ed.*

160 Meters

Dear Ed,

I notice that different firms are advertising for sale short beams using center-loading coils. I also see offered for sale loading coils alone, so that the amateur can build his own 40 or 75 meter doublet. I have not see any coils for sale made to be used on 160 meters.

It seems to me that a lot more hams, including myself, would get on 160 meters if it were possible to put up a respectable antenna in the limited space found in the average city lot.

I would like to see an article in *CQ* Magazine giving the formulas and design data that would enable the novice and rank-and-file amateur to design and put up shortened antennas for the different amateur bands.

Mack D. Baxter, W5LZI
Baytown, Texas

Another QSL Runner-Up



Dear Sir:

Here is my contribution to the bizarre in the QSL card business. I think it is beautiful, and it does look like me.

For whatever distinction there may be in the fact, I believe I am the farthest northwest ham under the United States flag. There are American hams north and west of me, but not a one northwest of me I'm certain. All that lies between us and the Asiatic mainland is a large body of water, and there is darn little DX coming from that direction that we could or would work.

Hamming here has its advantages, as well as disadvantages. Among the former are such things as no one-eyed monsters within 600 miles, unlimited space for antennas, a "water bounce" for all signals beamed stateside, and no particular BCI problems. On the debit side of matters we have horrible and persistent winds that blow down such antennas as icing misses, and much, much QRM from the Russian and other Asiatic commercial stations on 75 and 40 meters. Our nearest neighbors are fifty miles



away, and the nearest hams are 150 miles to the eastward. We are active on all bands, and can be found on ten, fifteen, and twenty working stateside when openings permit, and ragchewing on 75 nights with the rest of the KL7's in the evenings and on into the night. Our reason for being up here is that we teach school. We have been dog-team mobile. The station gear consists, in the main, of a Viking 1, Cloverleaf and 20 meter shortbeam antennas, and a NC 183-D receiver. Our shack looks like a spider's nest and is located in the kitchen pantry, which it shares with baby food and pickles. Enclosed is a picture, should you care to use it. I don't know whether or not we qualify as DX.

Robert B. Gibson,
"Gib", KL7AYZ
Mekoryuk, Alaska

[*Continued on page 84*]

RTTY

as reported by

Byron H. Kretzman W2JTP
9620 160th Ave., Howard Beach 14, N. Y.

Happy New Year! Hope each of you found a Model 15 in your Christmas stocking. 1955 wasn't a bad year for RTTY. We got the ARRL to petition the FCC for a change in regulations to permit us to use *any* amount of frequency shift less than 900 cycles; the old sun-spot cycle moved around enough to make 15 meters pretty good for long-haul RTTY work; and a real fine RTTY get-together, with RTTYers from all across the nation, was held in Chicago. Technical highlights of 1955 might be W6MTJ's "Tape Distributor for the Model 26" (Aug. *RTTY* Bulletin), KL7CK's "AFC for RTTY" (Nov. *CQ*), and W9TCJ's "Tone Quadrupler for Narrow Shift" (Dec. *CQ RTTY* column). Any other nominations?

The new year will provide us narrow shift, we believe. Converter technique still poses the ubiquitous (What's that? Ed.) question: Which is best, polar relay or direct selector magnet operation? Disregarding the way the converter circuit ends up, there is a definite trend toward the i-f type of converter. Hallicrafter's Fritz Franke's i-f converter (Nov. '54 *RTTY* Bulletin) and W2BDI's version are among the first to use this approach. Now the surplus market disgorges the Navy Type FRF. W2AKE has latched on to a few of these. By the way, how many of you who attended the Chicago RTTY Meeting saw the Signal Corps exhibit at the National Electronics Conference? They had on display a developmental model of a *transistorized* miniature converter which was of the i-f type. It was set up for either narrow shift *or* wide shift.

Just about all of the mail received of late has been from fellows that would like to get started, but don't know just what books on the subject are available. Well, the truth of the matter is that not much *is* available in the way of books. A check with the Government Printing Office and the Department of the Army came up with a small list of Technical Manuals, most of which are *not* obtainable from the Superintendent of Documents. Since many letters come from potential RTTYers who are in the military service, here is the list:

TM 11-352	Printers TG-7A, B, etc. (Model 15)
TM 11-353	Installation and Maintenance of Telegraph Printer Equipment
TM 11-356	Radio Teletype Terminal Equipment AN/FGC-1(X)
TM 11-680	Teletypewriter Circuits and Equipment (Fundamentals)
TM 11-872	Diversity Receiving Equipment AN/FRR-3A
TM 11-2210	132A2 Teletypewriter Subscriber Set

One of these, TM 11-680, is available for $1.00, postpaid, from the ARTS, 163 West 13th Street, New York 11, N. Y. This is just about the best book available, to the best of my knowledge, on the subject of Teletype itself.

For the fellow new to radio as well as RTTY, the Government Printing Office has available an interesting Navy publication entitled, "General Communications." The catalog number is D208.11/2:C73/2 and it may be obtained by sending 75 cents to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Beginning with this first issue of *CQ* in the new year, we are going to set aside each month a section of your *RTTY* column especially for the newcomer, and the potential RTTYer. This is what you have asked for by your letters. Much of the material will be gleaned from Wayne Green's old *Amateur Teletype* columns and will be in the form of answers to questions that actually have been asked. You old-timers can skip this part of the column, but stick around; we still will find space enough to print a TU schematic, or some other worthy technical tidbit of teleprinter technology.

AMATEUR RADIOTELETYPE CHANNELS

National, FSK (mark frequencies; space 850 cycles lower) 3620, 7140, 27,200, 29,160, 52,600 kc.

National, AFSK (2125 cycles mark; 2975 cycles space) 27,200, 147,960 kc. calling & autostart; 144,138 kc. repeater & duplex

California, AFSK 147,850 kc. calling & working

Washington, D. C. AFSK 147,960 kc. calling & autostart; 147,495 kc. working

Chicago, AFSK (FM) 147,700 kc. calling & working

Detroit, AFSK (FM) 147,300 kc. calling & working

New York, AFSK (FM) 53,160 kc. calling & working; **(AM)** 147,960 kc. calling & working

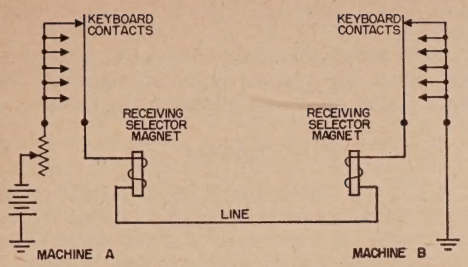


Fig. 1. Simple d-c Teletypewriter Circuit

RTTY Principles & Practice

Part 1—RTTY in 1955

Amateurs using radioteletype today number around 3,000; and more are being added every day. On what bands? 80, 40, 20, 15, 6, and 2 meters for the greater part. On the lower frequencies, in the "CW exclusively" parts of the bands, frequency-shift-keying (FSK) is used. This the FCC calls type *F-1* emission, and they specify, at this time, that the shift be 850 cycles plus or minus 50 cycles at the carrier frequency. This means, simply, that in key-up condition (space), the r-f *carrier* should be 850 cycles away from the key-down (mark) condition. Standard practice puts the space *lower* than the mark. On VHF, 6 and 2 meters mostly, Audio-Frequency-Shift (AFSK) is used. This the FCC calls type *F-2* emission, and they specify, at this time, that the audio frequencies should not exceed 3,000 cycles and that an 850 cycle shift, plus or minus 50 cycles, be used. In other words, an audio oscillator is frequency-shifted and fed into the modulator of the v-h-f transmitter. AFSK is not legal, by the way, except on 11 meters, 6 meters, and the higher frequency v-h-f bands.

Before going into the actual make-up of a radioteletype station, let's see what a Teletype machine is, and roughly how it works over a wire line. For the record, "Teletype" is the registered trade-mark name of the *Teletype Corporation,* the manufacturer of just about all of the machines used by amateurs today. We will ignore tape equipment for the time being, and discuss the "page printer" with keyboard. This machine prints, like a typewriter, on a roll of paper and the keyboard is very similar to the keyboard of a regular typewriter except that the functions of keyboard and printer are mechanically separated in the Teletype machine. Electrically, the simple circuit between the machines is very similar to the old telegraph "neutral" circuit. See *Fig. 1.* The similarity is that when no messages are being sent there is current in the line. Instead of the Morse code, a "five-unit permutation code" is used. Each letter or character sent is made up of a start pulse (always *space*), five selecting pulses, and a stop pulse (always *mark*). *Fig. 2* shows the line current for the letter *Y*. Note that the start pulse and the 5 selecting pulses are 22 milliseconds long while the stop pulse is 31 milliseconds long. Therefore each character is 163 milliseconds long, limiting the maximum number to 368 per minute, or 60 words per minute. When a character is sent, the pulses are stored and then accurately sent in correct time relation by a *distributor,* a mechanical device operated by a synchronous motor. When received, the pulses are again stored and released to the printer mechanism through a receiving distributor when the seventh or stop pulse is received.

Now, how do we send and receive by radio? Very simple. Look at *Fig. 3.* Let's take the FSK set-up first, *Fig. 3A.* In sending, the d-c pulses from the machine operate a relay which connects (on *space*) extra capacity across the LC circuit of the oscillator, lowering the oscillator

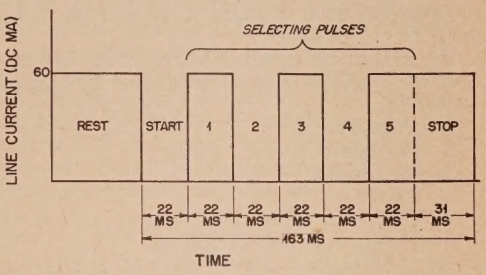


Fig. 2. Line Current for Letter Y

frequency enough to move the transmitter *carrier* frequency 850 cycles lower on *space.* This is *basically* what happens. There are many, many variations of exactly how this is accomplished. Notice that the *mark* is the *higher* frequency at r.f. When FSK is received on a regular communications receiver, the b.f.o. is adjusted so that the *mark* produces an audio frequency of 2125 cycles and the *space* produces 2975 cycles—note that the *mark* is the *lower* frequency now. These two audio frequencies are then fed to a *converter,* sometimes referred to as a Terminal Unit or TU, which

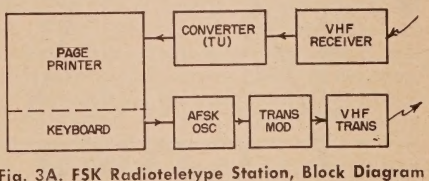


Fig. 3A. FSK Radioteletype Station, Block Diagram

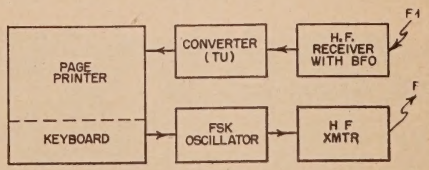


Fig. 3B. AFSK Radioteletype Station, Block Diagram

converts the two tones into the d-c pulses required to operate the selector magnets of the printer.

For AFSK operation, the procedure is somewhat similar to FSK except that an *audio* frequency oscillator is frequency-shifted. *See Fig. 3B.* Present standards set by the amateur RTTYers call for a 2975 cycle space and a 2125 cycle mark. (Such an oscillator circuit was included with the *RTTY* column in the Nov. '55 issue of *CQ*.) The output from this oscillator is then fed to the modulator of the v-h-f transmitter. Amplitude modulation is most common; however, Chicago and Detroit use FM on 2 meters. When AFSK is received, no b.f.o. is used, and the two-tone (2125 and 2975 cycles) audio detected is fed into the converter, or TU. Consequently, the same TU used for FSK reception, on 80 for example, is used for AFSK reception on VHF. Only the receiver has been changed to protect the innocent.

So, to sum up, here is what you need in addition to a receiver and transmitter to operate on RTTY:

1—Page Printer
2—Keyboard
3—Distributor
4—Cover
5—Converter (Terminal Unit)
6—Frequency-shift Oscillator

Items 1 through 4 are all part of a Teletype machine but are listed separately because some availability lists of equipment list a machine in that manner. Make sure you order all the parts. Also, a standard "table" is usually available, and it is a good idea to obtain one if at all possible.

Next month's column will go into a little detail about the various types of machines that have found their way into amateur hands.

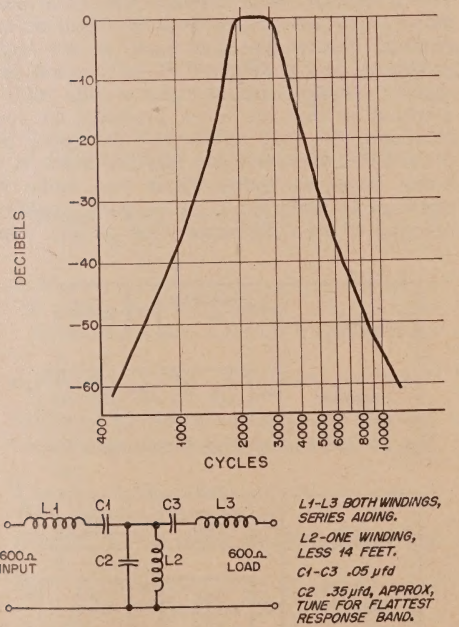


Fig. 4. Band-Pass Input Filter

Toroids

KL7CK's "AFC for RTTY" article in the Nov. '55 issue of *CQ* contained a list of sources of toroids, so I promptly ordered some. Most of these are potted in pitch and encased in bakelite or metal cases with a hinged cover. They are marked C-114A, generally, and were used as loading coils on field wire telephone circuits. It may appear to be a hard job to unpot these, but it's really quite simple—if the XYL will let you use the oven! The first step is to take a hacksaw and make a cut all around the case, about halfway down. Then, with a large screwdriver pry off the bottom. Now with two pieces of coat-hanger wire, about 6" long, locked in the binding posts, support the bottom-less case (on the wires and bottom down) over the open end of a large tomato or coffee can and put it in the oven. Make *sure* the pitch will drip *only* into the can, or both you and I will incur the wrath of the XYL. Eventually, just about all the pitch drips away from the toroid leaving it hanging down suspended by its own wires. These toroids have two windings, each about .22 to 25 mh. When connected in series-aiding, the result is an inductor of about 88 to 92 mh. and with a Q of around 100—just what the "doc" ordered for filters.

Figure 4 shows the schematic of a band-pass filter for use as an input filter to an audio-type converter. This filter, developed by W2JAV, makes very good use of the C-114 loading coil toroids. "Don't expect miracles," Phil says, but it should sure help a lot, say I. (Look at the frequency response curve.) The series coils each use both windings of the toroid connected in series *aiding,* that is, for the maximum inductance. The shunt coil uses only one of the windings, and 14 feet of that is removed. Make sure that there is no connection or short on the unused winding. *C2* is built up by paralleling capacitors to obtain the flattest possible pass band. When adjusting the filter it is a good idea to use a 600-ohm resistive pad between the audio oscillator and the input of the filter. Of course, the test load should be 600 ohms resistance. In actual use, the filter is connected between the receiver and the converter. If your set-up can stand the loss, a 3 or 6 db. resistive pad on each side will counteract, to some extent, the reactive component of the audio transformers which reduces the effectiveness of such a filter.

Ralph Leland, W8DLT, also sent me some toroids that didn't require any "operation." These were clean one-winding uncased toroids about 1¼ inches in diameter and with an inductance of around .6 hy. The Q was 60,

measured at 1,000 cycles. Ralph also has some two-winding toroids with an inductance of 12.5 mh. for each winding and 50 mh. when connected in series.

Across the Nation

Late in October we took a week's vacation and made a quick but extremely pleasant tour through New England. Among the RTTYers visited was Al Hughes, W1FGL, in Belmont, Massachusetts. W1WEW showed up and we had a fine discussion of converters. Al has tried many different types, including the surplus FRA, and always goes back to the W2PAT job. He believes in getting his selectivity in the i-f amplifier of his receiver. Incidentally, Tom Howard, W1AFN, is now marketing a converter kit of this type for $59.50.

Caryl Baldwin, W1EFF, writes from Gray, Maine, that he has been gradually getting going in spite of his obstreperous Model 12. Things should get better now that he has found out that W1SEJ is a Bell Teletype expert.

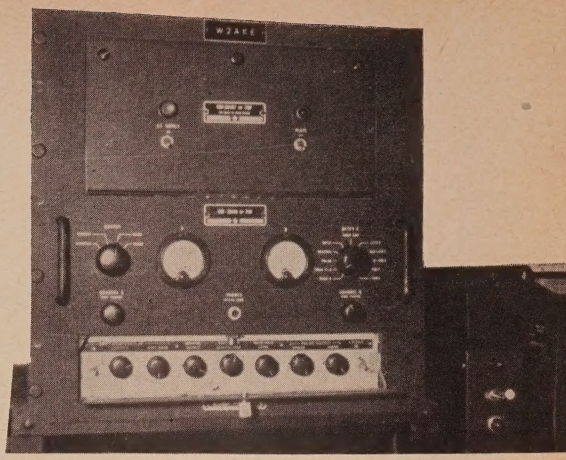
Frank White, W3PYW, comes up with a wonderful idea to help the newcomer to RTTY. Frank suggests that we call for and publish a list of "volunteers" that are willing to help the newcomer in *their* particular area. Getting in touch with an active RTTYer, a fellow you can visit and talk to, can be a whale of a help in getting started. Frank starts the ball rolling by volunteering for the Washington area, mainly the District and nearby Maryland. I'll add W2JTP for the Long Island area. Step right up, fellows. Who is next?

According to W3PYW, the ARRL has been asked to consider petitioning the FCC for FSK privileges for 160 meters. Informal contacts with the U. S. Coast Guard, responsible for the navigational service on the band, indicates no objection to FSK. Apparently it is on-off keying or amplitude modulation that bothers the service, and ". . . FSK has neither shortcoming."

Remember all the picture-taking at the Chicago RTTY Meeting back in October? Well, quite a few prints are available to anyone interested. Contact Don DeJong, W9KUJ, 3933 North Seely Avenue, Chicago 18, Illinois. He has many group pictures as well as some candid shots that might interest those of you who attended.

2 Meters

W1VIY in Trumbull, Connecticut, is now on 2 meters and is poking a good signal into the New York area. Another new station is W2GHH in Bronxville, N. Y. W1BGW and



Navy Surplus Type FRF Converter at W2AKE

W1FGL are now set up for autostart, and others in the Boston area are getting ready. They hope to be able to work W2JAV in the not-too-distant future. This is quite possible, as W2JAV's scheduled call for W2PAT very often starts the printer at W2JTP in Howard Beach, which is quite a little hop. Phil has a "flop-over" beam permitting either vertical or horizontal polarization, plus an 829B in the final.

Comments

W1ZF renewed his subscription to *CQ* with the remark that, ". . . RTTY would get more interest if the RTTYers would obey FCC rules and sign the station identifications (in International Morse Code)." They *do*, OM. Those radioteletype stations you hear that don't sign are foreign *commercials*, operating there legally, according to international treaty agreements. Wonder how many of you have copied that South American on 80 meters who sends over and over, with tape, a short bit of text followed by 17 line feeds?!!*!

Last month we suggested that the national amateur RTTY frequency on 40 meters be changed to 7150 kc. which is the edge of the Novice Band. From some of the comments received from non-RTTYers, some explanation is in order. Standard operating procedure for amateur FSK operation is to zero-beat the mark on the net frequency. The space frequency is 850 cycles *lower*. Now, if we zero-beat on 7150.000 kc. the space will be 7149.150 kc. which is out of the Novice Band. Hence our nomination for a new national RTTY frequency. Anybody got another idea for a new frequency on 40?



NY/RTS Meeting Nov. 4, 1955, Back row, left to right: W2MIB, W2PBG, W2EBZ. Front row: W2AKE, Rudy (no call), W2IRT, W2QQG. →

YL

Monitored by

Louisa B. Sando, W5RZJ

Jicarilla Apache School,
Dulce, New Mexico



W6NZP, Evelyn, and ZS6GH, Diana, with an 8-week old lion cub near Johannesburg, So. Africa.

W6NZP, Evelyn, and **ZS6GH, Diana**, pictured together near Johannesburg with a lion cub are quite differently occupied these days. Instead of a lion cub, Diana now bounces a baby son born to her and OM ZS6J on July 12. And Evelyn and her OM at latest reports were in New Zealand. While in Western Samoa Evelyn was granted a special permit with the assigned call ZM6AB. She used this call from the station of ZM6AT, logging about 100 DX contacts, largely W6's, among them W6UHA, Maxine.

With the Younger YLs

Making another bid for "youngest YL" is KN6MTQ, Ann Deck, of Palo Alto, aged 8 (see photo). Ann has been active on 80 CW since she got her ticket July 21, using a TBS-50D, an NC57 and an end-fed antenna (her grandfather's Field Day gear). He is W9PHE. Her dad is W9JVI. Ann is in the third grade, fond of gymnastics, swimming and her pets, and is a member of the YLRC/San Francisco.

WØVGE, Rebecca Jain, started with a Novice ticket in June '54 at the age of 14. Her General came along a year later and now, at 16, she is active on the Kansas 75-meter phone net and Colorado Hi Noon Net. She also likes to rag-chew and has RCC. She works 80, 75, 40 and 20, phone and CW, using the station she shares with her dad, WØLOW. This is a Viking II with VFO, HQ-129X receiver and dipole antenna. Becky is a junior at the Colby, Kansas high school. Another hobby is photography and she and WØLOW use homemade photographic QSLs.



16-yr. old Becky Jain, WØVGE, operating rig she shares with her dad, WØLOW.

YLRL Certificates

WAC/YL Custodian W6PCA announces that WAC/YL certificate No. 3 has been awarded to G4ZU, Dick Bird. Formal rules for the WAC/YL award have been drawn up and are presented in the separate box.

YLCC Custodian W4SGD informs us that a decision has been reached in cases where a person has earned YLCC and then moves to another location. The rule is as follows: *Gold* stickers will be awarded to applicants who have worked 50 additional contacts from the same location (or within a 25-mile radius). *Silver* stickers will be awarded to those with 50 additional YL contacts who have moved from the location in which they earned their original certificate. No stickers can be recalled that have been awarded, but as of Oct. 19, 1955, this new system is in effect.

W4SGD also calls attention to the fact that the rules for YLCC state that when applying for a YLCC certificate or endorsement stickers, the *full names* of the operators (*alphabetically arranged*) and the dates and times of the contacts *must* be included. Katherine says the checking problem is terrific when the names are not listed.

YLRL Books Available

YLRL Publicity Chairman W1TRE, Barbara, reminds us that the YLRL album and scrapbook are available to any club or person who wants to use them, especially for conventions or other gatherings. They will be sent *Express collect* and must be returned to W1TRE *postpaid*.

Conventions

The Southwestern Division Convention held at San Diego Oct. 1-2 included an open lounge, tour of Scripps Institute of Oceanography, jewelry and floral displays, technical film and songs by the Guildmen, headed by W6IOK, OM of W6MWU, all for the ladies. Over 70 women enjoyed the luncheon for YLs and XYLs, at which table decorations were toy cars with mobile whips.

Seventeen licensed YLs registered for the Central Division Convention at South Bend, Ind. Oct. 15-16. Included were: W9's YWH, RTH, AQB, MMO, RUJ, SJR, LKD, WYZ, CNW, LOY, MLE, PFO, LGR, IDJ; WN9's MAS, MPX, W8FPT. W9AQB, Norma, and



Enjoying the YL breakfast at the Midwest Division Convention are: At left across table KØBEZ; clockwise around table: KNØBRT; WØ's QZF, SAT, UDU, LHP, MJK, SZH, QXA, QXF, IXR, NUY.



Left, W9LOY, Cris, YLRL's president, is introduced to the YLs at the Central Division Convention by W9AQB, Norma, W9 D/C.

WN9MAS, Peg, were hostesses to the girls at a luncheon on Sat. at which W9LOY, Cris, president of YLRL, was introduced to the girls. The XYL auxiliaries of several of the Indiana radio clubs, with Eleanor Darling of South Bend as chairman were hostesses to the ladies and each YL and XYL registering received a gift. Entertainment included a "koffee klatch," games, prizes, and a tour of Notre Dame. YLs were distinguished by cutout tags of a YL atop the world, taken from W2JZX's design for the cover of *YL Harmonics*. Executed in red, grey and blue, with calls lettered below the globe, and tied with blue ribbon, they are most attractive. W9AQB, Norma, who sent us one, suggests this design be used at all conventions and other gatherings to identify YL operators.

The Midwest Division Convention at Omaha, Neb. on Oct. 22-23 drew sixteen licensed YLs. Those registering: WØ's IXR, KQD, LHP, MJK, NUY, PIK, QXA, QXF, QZF, SAT, SHF, UDU; KNØ's AOM, BRT, BEZ. WØMJK, Marion, tells us each YL received a Corsage for identification. These were made with resistors and condensers mounted on a small terminal strip, with a whip antenna and ribbon bow at the bottom. A breakfast was held for the YLs on Sun. at which WØUDU, Marge, won the prize, a D-104 mike.

YL Clubs

More new YL clubs! On Oct. 15 New England YLs met at the Hotel Kenmore in Boston and formed a club to be known as the *Women Radio Operators of New England*. The 31 licensed YLs attending became charter members and the following girls were elected to the executive committee: W1TRE, Barbara Harrington, chairman; W1SVN, Millie Doremus, secretary-treasurer; W1QON, Eleanor Wilson; W1RYJ, Esther Routhier, and W1VOS, Marge Snow. The club will hold two business meetings throughout the year, the next one scheduled for



8-year old Ann Deck, KN6MTQ.

February. A third meeting, strictly social, will be held in Boston in the form of a luncheon (such as the luncheons held during the past five years). They also are planning a YL-OM dinner-dance and possibly a family picnic.

Since one of the aims of the club is for members to become better acquainted, the girls formed a 75-meter net to meet Mon. at 7:30 p.m. EST on 3890 with W1RLQ as NCS. Also, the frequency of 3820 kc was decided upon to be a monitoring frequency for the girls to gather for QSOs at 1 p.m. any afternoon. Any girls in New England who hold an amateur radio license are invited to join the club. Dues are $1 and should be sent to W1SVN, Millie Doremus, 177 Essex St., Lynnfield Center, Mass.

YL Nets

Phone

Band	Freq. (kc)	Day	Time	NCS
75	3970	Mon.	10.00 a.m. CST	WØUDU
			(alternates WØBFW, WØPIK)	
	3900	Mon.	3.00 p.m. PST	W7HHH
			(alternate W7NJS)	
	3890	Mon.	7:30 p.m. EST	W1RLQ
	3900	Tues.	8.00 a.m. EST	W4HLF
	3838	Tues.	9.00 a.m. CST	WØKJZ
	3900	Wed.	8:00 a.m. EST	W1YPT
	3900	Wed.	9:30 a.m. EST	W8ATB
	3915	Wed.	9:00 a.m. PST	W6PJF
			(alternate W6GQZ)	
	3820	Wed.	9:00 a.m. PST	Rotates
			(W7QYN NYLON Manager)	
	3880	Thurs.	8:30 a.m. CST	W5WXY
			(Texas YL Round-Up Net) (alternate W5ZPD)	
40	7215	Thurs.	9:00 a.m. EST	K2IWO
20	14,240	Thurs.	11:00 a.m. PST	W9RUJ
			(alternate W7IDO)	
10	29,000	Tues.	1:00 p.m. EST	W9GME
	28,900	First Tues. each month 9 p.m. EST		
			(QRMary Round-table)	

CW

80	3610	Wed.	9:00 p.m. EST	W1WPX

On Oct. 22 sixteen YLs from the Washington, D.C. area met, at the invitation of W3MSU, Ethel, with the purpose of forming a YL amateur radio club. The girls decided to hold meetings every six weeks and set up two nets: Wed. at 2130 on 7100 kc., and Thurs. at 2000 on 3900 kc. Activities under discussion are code practice, theory classes, demonstrations to various organizations, assistance to worthy causes, adoption of a foreign member. The YLs present: W3's AKB, CDQ, CNC, CZT, DHL, MSU, QOG, RXJ, TSC, UXU, VHF; W4's AHN, DEE, ENC, ENG, ETR.

Here and There

Congratulations to these YLs and their OMs on the arrival of new jr. ops: W1YYM, Ellen, and OM W1WPO, a son born Nov. 8; to W1WNT, Evelyn, and OM W1KPX, a son, Aug. 12; to K6EOG, Billie, and OM a son born Oct. 8; to K6HVC, Marge, and OM K6GKM a son born Oct. 13; to W7SFS, Vera, and OM W7QVH a son on Sept. 8; and to W7XKY, Dee, and OM W7DLR a son born Sept. 9.

Congratulations to Helen, XYL of Sam, W1FZJ (*CQ*'s VHF Editor) who received her Novice and Technician Class licenses Nov. 19. Since Sam would have been hard put to reduce his KW 4-125A's to 75 watts input, the Gonset Communicator II of visiting W2NSD was commandeered, and WN1HOY's first contact was promptly made on two meters. W1HOY plans to be on very soon with a KW on Six, with we don't know how many elements in a typical Sam-built high-gain antenna (Sam uses 128 elements at 120 feet on Two). Listen for her on Six (start with your r-f gain turned down a little).

W1CEW, Mary, left in mid-Sept. for a 6-week tour of Europe. . . . W1 girls attending the Montreal Hamfest were W1CML, Meg; CMY, Marion; UKR, Eunice. . . . W1MCW, Lou, has left Maine for Florida. . . . The QTH of W1UZV, Theo, suffered severe damage from the flood caused by hurricane Diane. W1YGX, Eva, has moved from Mass. to Iowa.

W2OWL, Ruth, met many YLs on her vacation trip including: W8's UFZ, HWX, HUX, SPU, RZN, MBE, TBT; W9's LOY, SJR, SYK, BCA. Later she attended the Big Meadows picnic and met many more YLs. . . . W2KEB, Georgie, is active as NCS of New York Civil Defense freq. of 3993, on twice a day, plus traffic skeds on 75 and 40. . . . K2IWO, Hilda, is NCS of Thurs. 40-meter YL net and SRPN on 3980 other mornings.

W3UKJ, Mena, returned recently from a three-month trip to Chile. While there she worked home from CE3JJ and CE2HD, and visited several other Hams, rode in horse events, did mountain climbing and "had a wonderful time." . . . W3VLX, Lolly, is active on 15 keeping in touch with her OM who has gone

[*Continued on page 90*]

DX

Gathered and reported by

R. C. "DICK" SPENCELEY, KV4AA

Box 403, St. Thomas, Virgin Islands.

NEW YEAR'S GREETINGS!

Heartiest congratulations to the following station upon his achievement of WAZ:

No. 313 GEORGE L. DEGRENIER
W1GKK 40-233

Thanks to an overdue QSL from UAØKCE WIGKK is the third W1 to join this select group.

We also welcome the following newcomers to the HONOR ROLL:

W9FDX	**37-187**
W4QCW	**36-177**
K2GMO	**35-160**
CR6AI	**35-133**
W6YMH	**35-127**

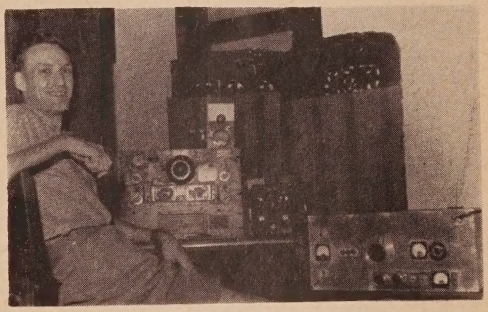
MONACO, 3A2BH (HB9KB): This expedition by Ernst Hausheer, HB9KB, was active from Monaco from October 6th to 19th and was instrumental in giving many a much sought for 3A2 contact. The gear consisted of a home-made transmitter running an 813 in the final, a 75A-1 receiver and a ground plane 20 meter antenna which also served on 15. A random length long wire was used for 40 and 80. (Here we let Etienne, HE9RDX, continue with the story).

"The expedition was greeted by Mr. Passeron, in charge of Telecommunications, who issued the license 3A2BH to HB9KB at no cost and wished him good luck. The station was set up in the same room which served as a shack for 3A2AD in 1951. When the transmitter was tuned up a flash-over occurred in the 2500 volt feed-through insulator of the high voltage transformer. This delayed us two hours while the transformer cover was unsoldered and repairs made.

"On October 6th at 1600 GMT 3A2 BH went on the air for the first time working G3JBR, FA9RV, DL7AU, VS6CG and ZC4IP as first contacts. The first W QSO was with W4ML. Eight hours later the transformer between the 110 volt mains and the 220 volt equipment blew up. Thanks to 3A2AH another transformer was furnished and after a 20 hour QRX operations were resumed (the wires of the 110 volt hotel installation remained very hot during our stay!).

"The Principality of Monaco is not well situated for propagation with 4000 foot mountains close by. Conditions were very erratic and many openings to W-land lasted only a few minutes allowing three or four contacts. In fourteen days of operation 2008 CW contacts were made as follows: 80 meters 211, 40 meters 476, 20 meters 1229, 15 meters 92. The station closed down on October 19th at 2259 GMT.

"A very friendly welcome was extended by the native 3A2's who offered all assistance possible. The following amateurs, really interested in ham radio, are 3A2AH, 3A2AJ, 3A2AM, 3A2AU, 3A2BA, 3A2BE, 3A2BF, 3A2BJ and 3A2BL (sister of 3A2AM). A few more calls have been issued but are inactive. All the above stations work phone exclusively the most active being 3A2BE and 3A2BF. Any CW 3A2 is either a pirate or expedition.



4S7PT, manned by Pete Rudd, Colombo, Ceylon, runs 45 watts to an 807. Rx is an HRO and the skywire a folded dipole. Pete was D2IX in '47.

"The radio op of one of the two U.S. mine sweepers, anchored in the harbor, was met and turned out to be W1MXA, ex-CN8EM/I1IY. A contact was made with F9LT/MM the oceanographic ship "Calypso", also in the harbor, after which we visited the ship and collected a QSL from operator F9TB.

"All QSL's for 3A2BH should be sent via the USKA and will be answered "direct" if return postage is enclosed.

"Many thanks are owed to the 3A2 gang for

their friendly welcome, hospitality and assistance."

BHUTAN, AC5PN: This station has been noted on two frequencies, 14052 and 14013, around 1200 GMT. Contacts were logged by XW8AB, VK4YP, W4CEN and KV4AA. Chhawna runs about 25 watts to a 6L6 at present but expects to go QRO in the near future. AC5PN is a good op and has a T9X QRI. Full QTH may be seen in the "address" column (He is active each Sunday at 0400 GMT).

BEAR ISLAND: This spot, located approximately half way between Norway and Spitzbergen,, has an operator who is presently awaiting a ham license (might be on by now). Bear Island seems to be far enough away from the mainland to qualify as a separate one or, possibly, count the same as Spitzbergen (Tks LA6U).

COMORO ISLANDS: The oceanographic ship "CALYPSO", as we write, should now be in the vicinity of this group. On board is **F9LT/MM** who, we understand, will do some hamming from the Comoros. Other operation from this spot is promised by **FB8BR** who makes periodic flights there. (Tks CN8MM)

ANDAMAN AND NICOBAR ISLANDS, VU5: Two RAF operators are awaiting their VU5 licenses from the Indian Government and should have been on in early December. Whether phone or CW will be used is not yet known (Tks CN8MM).

EASTER ISLAND, CEØAD: This station should now be active again and, if he sticks to his former habits, will be found around 14007 in the evenings.

YASME EXPEDITION, VP2VB/P: Via daily contact with Danny and in continuance to his story which appears on other pages of this issue we can say that VP2VB/P has been encountering much better weather and is now (Nov. 16th) approximately 2200 miles Southwest of Panama. He expects to sight the Marquesas about November 30th but may continue directly on to Papeete without stop. Christmas should be spent in Papeete and a BBC overseas hookup is being prepared so that he may speak to his mother in Christchurch, England, on that day. Danny has been very active on 21 Mc phone and CW besides 14 Mc skeds. (Two-day stop may be made at Marquesas)

SARAWAK, VS4BA: This station is active 14050, 1230 GMT, and is believed to be ST2NW. See QTH's. (Also phone near 14100 same time)

KUWAIT, MP4KAC: Bill, MP4KAC, was due on again from this spot about December first. He is mostly on phone.

QATAR, MP4QAL: Fergus was QSO'd on Nov. 15th giving his QTH as the northern part of Qatar. 40 miles north of the capital, Doha.

KERMADEC ISLANDS, ZL1: This is a reminder that there is a distinct possibility that ZL2GX and ZL1PA may DX'spedition to this spot in January. It will count a new country.

LAST MINUTE ITEMS

Via LU5AQ we are advised further regarding activity from the South Sandwich Islands. Station **LU1ZY** should be on the air with 100 watts during the latter part of December and will be active for two weeks in January. Two operators will be in attendance with Jose, LU8CW, handling the phone end and Miguel taking care of CW. QSL's should go via the LU bureau. . . . **YA5C** has been handing out a considerable number of QSO's and says: QSL via RSGB (not sure if he is OK yet). . . . From Formosa **C3PK** has been heard on 14100 at 1130 GMT. His QTH is: P. K. Chi, Box 71, Taipeh, Taiwan. . . . A minor furor was caused by the appearance of **3W8AA** on 14075 with a 598 signal around 1145 GMT. He gave his name as "Phan" and QTH as Box (Boite Postale) 109-B, Hanoi, Viet-Nam. He is a good op but went QRT under pressure of QRM on each occasion (Nov. 21/22). We have had no word of the lifting of the FCC ban on contacts with Viet-Nam as yet but noted that a considerable number of W stations were calling him. As Hanoi is in the communist section of Viet-Nam it is questionable if the ban applies in this case. We suggest you keep on the safe side until this is clarified. . . . **ZS9O** has been QSO'ed and gives QTH as Box 23, Francistown, Bechuanaland. . . . **ZA1A** has been active, 14031, giving his name as Zvef and QTH Box 144, Tirana (Hope for the best on this one). . . . A newcomer to Liberia is **EL2B** whose name is Ruhni (Swedish) and QTH Box 69, Monrovia. . . . Via CN8MM and FB8ZZ we hear that **FB8XX** is snowed under with commercial traffic but will appear on the ham bands whenever he gets a chance. . . . KT1EXO was due to visit Madrid in November to arrange license for his IFNI expedition. If all goes well KT1EXO, accompanied by KT1UX, should be heard with an EA9 call from IFNI sometime in January. . . . Via HA5KBA we hear that **UA4KPA, UAØAG, UB5KPA** and **UC2AA** have permission to contact W's. . . . VK2GW reports that **FB8ZZ** is heard daily, 1400 GMT, 14030 or 14008. . . . G6YQ advises that the Gough Island Expedition, **ZD9AD,** arrived on November 14th and will be active as soon as they can get a roof over their heads. . . . **MP4QAL** may appear from Trucial Oman in January but plans are unsettled yet. . . . Macquarie relief ship was due to sail about December 3rd. Doug, VK3IJ, will be heard as VK1IJ from this spot in 1956. The Mawson relief ship should leave December 23rd bearing VK1GA and VK1NL to that Antarctic Base. Plans for 1957 call for the opening of a new base 300 miles east of Mawson. . . . W9KQB reports QSO with **ZC2CC** on 7020, 1100 GMT. . . . VK5TL is active in



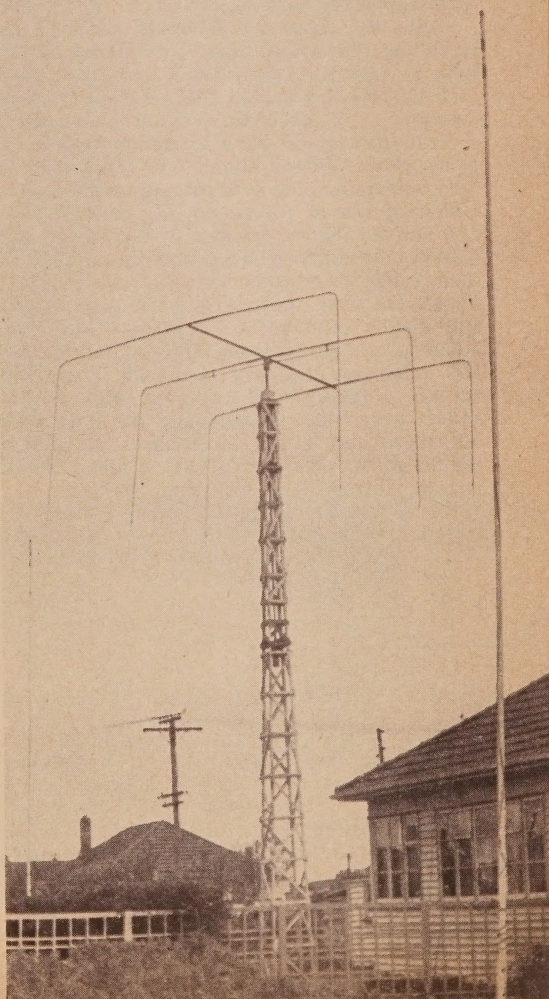
ZL2AFZ, George Studd, of Napier, N. Z. needs no introduction to the DX fraternity as his signals have been advertisement enough. George runs 25 to 75 watts with Geloso VFO and McMurdo Silver 701 rig. Receiver is an Eddystone 640. 150 countries and 38 zones have been worked.

The somewhat startling design of ZL2AFZ's beam might be described as the "weeping willow" or "one-half cubical quad" type. It seems to combine vertical with horizontal polarization and reports, says George, are "very good." It's 33 feet high and fed by 600 ohm line to a "T" match. The "downward" portions of the elements are 8 feet long.

Australia's Northern Territory, 14090, this will be a good one for WAVKA certificate seekers. . . . Re ZD9AD again, contacts were reported with W8PUD and W8KAK on Thanksgiving day, 14060. . . . ET3TRC is a station at the Addis Abbaba exhibition. QSO's will be rewarded with a special QSL approved by the Emperor! ! . QSL via Box 114, Addis Abbaba. . . . As we write, **VP2VB/P** on the "YASME" expects to sight the Marquesas today (Nov. 28th) thus completing his longest over-water hop. Present plans call for a departure from Papeete, sometime in January, for Tokelau and Canton (British Phoenix) Islands.

DX Jottings

Marcel, XW8AB, advises that new operators are now established at **FB8ZZ** and **FB8XX.** Much activity is expected from the former and limited activity from the latter. . . . By this time, according to CN8MM, 4S7WM should have been heard as **ZC5ML** on phone. . . . **MP4BBE** was worked, 14060, 1230 GMT. . . . **VQ8CB** has been quite active, 1130 to 1300 GMT, various 14 Mc CW freqs. T8. . . . **UC2AA** has been making W contacts and advises all to QSL via DL7AA. . . . Via the West Gulf DX Bulletin WØAIW advises he skeds **FP8AP** every Saturday and Sunday at 1500 GMT. WØAIW is on 14260, A3, and Gus is on 14343. Lee will help anyone needing an FP8 contact with WG members taking precedence. . . . Change of personnel took place on the VK1 outposts in December. We hope to list the new VK1 calls in the "last minute items". . . . Guess there's no need to give a sales talk about 21 Mc, but in short it has been hotter than a one-cylinder engine of late and really seems to be coming into its own. Activity, at times, rivals 14 Mc. . . . 3.5 Mc DX also comes into its own at this time of year, and following a request by W3AXT, we enter a plea that the





CX5CO, Yamandu Luzardo Sierra, of Montevideo, Uruguay.

CW rag-chewers keep clear of the frequencies 3500 to 3525 so that this stuff can come through. Especially on week-ends!! . . . LA6U tells us that ALL **LA8YB** QSL's have now gone forward via bureaus. . . . **XW8AB** requests that no dollar bills be sent him as they have a habit of disappearing enroute. IRC's will fill the bill. . . . VR2BZ states that **FW8AB** did NOT receive the new transformer yet but he should have it at the time this is read. Receipt of same at FW8AB will result in QRO and much more activity. . . . **YK1AC** is again active after several years lay-off. He is located in Damascus, Syria. He is VFO on phone (CW ??). . . . Some nice frustrating stuff was roaring in during the USSR contest of Nov. 13th. My embryo Nos. 249 and 250 in the persons of **UH8KAA** and **UJ8AG** wouldn't nibble altho the timing of their "QRZ?" indicated that we had an equal signal. Oh well, these guys have their orders and maybe shouldn't be heckled——! Brian, **VK4IA**, holds forth from Willis Island, located 300 miles east of Cairns, Australia. There will be NO outgoing mail contacts until a ship arrives next June. Occasionally the RAF fiies out there and drops incoming stuff. QSL's should go to VK4IA c/o OIC, Coastal Radio Station, Townsville, Queensland, Australia. . . .

Here are a couple of 1955 contest scores:

Phone:	W2HJR (W2SKE, W2HJR)	455,000
	W6YY (Single op)	194,600
CW:	W2HJR (W3GRF)	520,000
	K2EDL	455,000
	W4DHZ	350,000
	W8JIN	336,823
	W6AM (MO)	292,134
	W6DFY	225,000
	W6ITA	208,000
	W4KVX	197,610
	W7VY	168,000

DX'ploits

Andy, **W6ENV**, leads off this month adding XW8AB, FB8XX and YA1AM for a 259 total. . . . Don, **W6AM**, hits 257, thanks to XW8AB, as Howy, **W2AGW**, pulled in YA1AM for 252. . . . Roger, **W3EVW**, went to 248 with XW8AB while Gene, **W6EBG**, rose to 242 with FB8BR, YA1AM, MP4QAL/B and FB8XX. . . . Ozzie, **W9VND**, with YA1AM, 3A2BH and MP4QAL/B, went to 241 as Vince, **W5KC**, made it 235 thanks to LZ1KPR, 3A2BH and XW8AB. . . . John, **W6EFM**, rests on 228 with ZS2MI, VQ6LQ, YI2AM and VP2DL as Lee, **W7HXG**, adds FB8XX, YA1AM and 3A2BH for 233 and also enters the "phone only" listings with 35-137. . . . Ed, **W6LDD**, snapped up PZ1BS, LZ1KAB, EA6AF and FB8BR to hit 206 while "Casey", **W6RLN**, submits revised list for a 204 total. . . . Don, **W6BVM**, rises to 184 with a new list as Dan, **W6PH**, ups to 172 with such as FB8BU, ZS8L, XW8AB and VP5DC. . . . George, **W6BIL**, goes to 159 with ZP9AY, LZ1KAA, YJ1DL, HE1JO, I1DCO/M1, XW8AB, ET3LF, MP4QAL and FB8BR while Glenn, **W8KIA**, with VS4BA and FB8XX is neck and neck with W5ASG for the top 39 zone position with a solid 251. . . . Yours truly, KV4AA, added YA1AM and AC5PN (!!) for 248 while Stan, **W1CLX**, also nabbed YA1AM for No. 242. . . . Howy, **W2QHH**, goes to 231 with XW8AB while Norm, **W1HX**, with KC6CG, 3A2BH, XW8AB and PJ2MA rises to 230. . . . Rex, **W5MPG**, comes up to date with 12 additions for a 223 total as Joe, **W8UAS**, A3'd with ZS2MI for No. 223. . . . Ray, **W2BJ**, goes to 221 with help from MP4QAL and KC6CG while Chas, **W3DKT**, hits 215 with FB8BR. . . . Guy, **W6DI**, nabbed XW8AB and enters the CW/phone listings with 215. His phone total moved to 214 with the acquisition of FB8BC and OY2Z. . . . Buzz, **W9ABA**, upped to 204 with VQ8CB, MP4QAL/B, ZC5CT and YA1AM while Pat, **W2GVZ**, added zone 26 with XW8AB and went on to snag VS6CG for a 197 total. . . . A new list from Bob, **W1KFV**, puts him on 184 while Bob, **WØQVZ**, moves to 177 with VR3A, XW8AB, VK1AC and BV1US. . . . Jim, **WØRBA**, pulled in FY7YE,

ZP5GM and CE7ZJ to rise to 161 while Ray, **VK4FJ**, hits 219 with VS4BA. . . . Gus, **W2HMJ**, had a big day on Oct. 16th when he moved to 217 with VS1GX, ZC5GT and XW8AB while Alan, **VK3XO**, added VQ6LQ, YJ1DL, PX1EX, CS3AC, 3A2BH and ZB2I for a 180 total. . . . Rip, **W4EPA**, from his new QTH, snagged VS6CQ, VS1GX, XW8AB, 4S7MR and VP8BC (Falklands) to reach 180. . . . John, **W4HA**, keyed with VQ8CB, VQ8AG, XW8AB and 3A2BH putting him on 198 as Fred, **W8KML**, nicked SP5FM for No. 192 and moved his phone total to the same figure with XZ2OM and ZS2MI. . . . Glenn, **W7ADS**, ups to 179 with 3A2BH, CR7AD, FB8BC, SU1DD and GI3CWY while Bayard, **W3AYS**, submits new list with a 172 total. . . . Jim, **W5FXN**, goes to 189 with LZ1KPZ, MP4JO, ST2AC and YA1AM. His Jr. op, K5ABW, has nabbed 65 countries and 30 zones in six weeks of DX'ing! . . . **W2HSZ** ups to 160 with XZ2OM while Ev, **WØCU**, comes up to date with such as CR9AH, KB6AO and YI3ECU for 145. . . . Bill, **W8JGU**, adds 3A2BH and PZ1BS to reach 175 as Ray, **WØNCG**, boosts his phone total to 174 with ZS9G, ZC5CT and OY2Z. . . . Ralph, **W6CHV**, goes to 154 on phone with such as VS5CT, VS4CT, VK9OK, KC6UZ, YU1GM, ZC5CT, TF2WAH, 4X4CX and 5A1TL. . . . Late all-band DX at **DL4ZC** includes contacts with KP4KD on 3.5, CT2BO, TF2WAY, PJ2AA on 7, FB8BE, ZS7D, JA6FB, CX6CM and VQ2AS on 14, VK6RU, VS6DE, CR7LU, PJ2AA and JA3JM on 15 plus W9AVJ and W4IWB on 28 Mc. . . . Al, CE3DZ, goes to 224 with FB8XX, YA1AM and XW8AB and has become South America's first FOC member. . . . W7PEY whs a "first" for **VP2VB/P** on 21 phone. . . . FB8XX and YA1AM were welcome additions at **W8ZL**. . . . Steve, **K2CJN**, augments his phone total with YO3GM, F9YP/FC, SP5AH, FY7YE and VQ3DQ to reach 122. CW catches included LZ1KPT and HA5KBA. . . . **G6VC** goes to 134 with YN1PM. . . . Ernie, **W3MDO**, hits 129 with VS6CG, LU6ZT, MP4QAL/B, 3A2BH, VS1GX, DU7SV, ZS7H and ZC4RX. . . . Dick, **W6TKX**, reports nice European



Activity at W6AM during the recent DX brawl was handled by (l. to r.) W6AM, W6YMD, W6BXL and W6KPC. The five finals are to the right (One plate supply and one modulator). Everybody brought their own receiver and ECO. Anti-capacity switches in each position allowed anyone to use any final while a 24 point rotary switch enables the selection of any rhombic direction. This combo came up with a 162,360 point total on phone.

Lower photo shows the W6AM team by the "shack" entrance. L. to R.: W6AM, W6KPC, W6YMD and W6BXL.



openings to Europe on 7 Mc which resulted in QSO's with G5RI, PAØNN, EA3JE and F3NB between 0500 and 0630 GMT. . . . Louie, **K4BYN**, is up to 58 with such as TF3AB, FF8BI, LA8MD and SL5CN (The last mentioned is a Swedish Army station, Louie. QSL Via SSA). . . . Stan, **W9IFZ**, is up to 14 with such as VP6PJ, VK3VJ and KP4AAZ with his 75-watter. . . . Marcel, **XW8AB**, in four months time, has raised his total to 117 with such stuff as XE1AX, EL2L, PZ1BS, FY7YE, AC5PN etc. During this time he has worked exactly 500 different W stations and has a total of 3000 QSO's (Truly a DX man's DX man). . . . Aaron, **W2SUC**, advanced to 123 with VS6CG, FP8AP, ZC4IP and GC3KAV. . . .

ADDRESSES

AC5PN	The Dechen, Choling Palace, Thimphu, Bhutan, c/o Postoffice, Kalimpong, India. Via Calcutta.
AP2BP	R. J. Price, Telecomms. Training Centre, Haripur, Hazara Northwest Frontier Province, Pakistan.
CR6CV	Box 3078, Luanda, Angola, PWA.
CR6CW	Tel, Box 1400, Luanda, Angola, PWA.
CT1 Bureau	R.E.P. Servico QSL. Rua D. Pedro V, 7-4, Lisbon, Portugal.
DL4YH	Chas. E. Biele W2AOS/W3ENK, Via DL4 Bureau.
EL2D	Dan, Box 48, Monrovia, Liberia.
FF8AK	Box 1697, Dakar, French West Africa.
HC1LE	Box 2229, Quito, Ecuador.
TA2EFO	Navy Group OSTU, APO 206A, Postmaster, N.Y.
TG9CR	Box 15, Guatemala City, Guatemala.
UC2AA	Via DL7AA.
VK3 Bureau	c/o WIA, Victoria Div. 191 Queen St., Melbourne, Australia.
VK4IA	Willis Island, Via OIC, Coastal Radio, Townsville, Queensld, Australia.
ex-VK9OK	VE2AOK, 24 Anderson St., Chatswood, NSW, Australia.
VP5GB	Turks Island, Via WØOUZ.
VQ5EK	Bill Campling, Box 1803, Kampala, Uganda.
VS4BA	c/o Postmaster, Kuching, Sarawak. Via Singapore.
VS4NW	(ex-ST2NW) C. Norman Webber, c/o Int. Aeradio, PM, Kuching, Sarawak.
W1MCW/4	Mrs. Lou Littlefield, Box 5098, Ft. Lauderdale, Fla.
XZ2OM	Flt Lt. Aung Myint, P.O. Box 1490, Rangoon, Burma. (He will handle other XZ cards)
YV6BF	Luis, Marine Radio OMC, Puerto Ordaz, Venezuela.
ZB1EB	Eric Briggs, 75th AMQ, BFPO 51, RAF Stn. Luqa, Malta.
ZS6ANZ	96 College St., Mayfair, Johannesburg, Union of South Africa.
4S7WM	Capt. Jack Mitchell, RAF Stn., China Bay, Ceylon.

Thanks to: West Gulf Bulletin, K2CJN, W8MWL, W8KML, DL4ZC, K2OAH, W3OIV and XW8AB.

3A2BH, Monaco, with Op. Ernst, HB9KB →

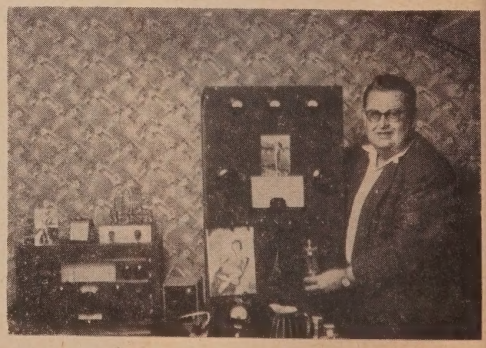
160 Meters

This is a reminder that the top band tests are under way each Sunday 0500 to 0800 GMT. Every Saturday night will be a test-night through February. ZL3RB has been keeping faithfully to his skeds which have resulted in a QSO with G3PU on Oct. 2nd, EI9J Oct. 9th and G6GM on Oct. 12th. ZL3RB is on 1882/1886 and listens between 1800/1830 only. ZL1AH has worked G6CJ three times and ZL3GQ has worked him once. Oct. 9th witnessed QSO's between W3EIS and G6GM/-KZ5PB while G3GGN hooked W3RGQ. . . . YN1AA now has his DX-100 rig and WILL be on 160. . . . Others expected to be active are VS6CQ, VS6CW, GD3BFC, ST2NG, ZP5GM and some ZC4's, to mention a few. . . . Give it a try, gang! !

Here and There

Additional QTH: VP8BC, Box 117, Port Stanley, Falkland Is. . . . The Coast Guard ice-breaker "East Wind" recently left for Antarctica, via Panama and New Zealand, to join operation "Deep-freeze". Some forty hams were aboard. They will be heard from in 1956 under the call block **KC4USA** and **KC4USZ** from various bases. Seems the accent will be on A3 operation and all hams are requested to stand by and lend a hand with traffic etc. . . . Nothing has been heard further regards activity by an LU-Z station on the **South Sandwich** group but they are supposed to be active for two weeks during January according to LU5AQ. . . . W6KYG is active from new QTH on ranch near Poway, 25 miles north of San Diego. . . . VK1GA will be on from the **Mawson Antarctic Base** during 1956. QSL's go via VK3IB. . . . All QSL's from VK1AC are now on their way. . . . W7KVU visited WØELA, W9IOP, W8DUS and WØBFY. . . . Don't give up hope for that VK3 QSL. It seems the bureau went Phutt— but cards are now arriving at distant points covering 1951-2 and 3 contacts. See new bureau in QTH column. . . . At a recent Cincy get-together were DX'ers W8KIA, W8ZY, W8DUY, W8BRA, W8FGX, W8JIN and W8BHW. . . . After a visit to KG4 Bill, W6CIW/KP4, reports the

[*Continued on page 104*]



WAZ Honor Roll

CW AND PHONE	
W1FH	264
W6VFR	259
W6ENV	259
W6AM	257
PY2CK	256
W8SYG	256
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W8PQQ	254
W6MX	253
WØYXO	252
W6MEK	252
W2AGW	252
W8HGW	251
W5KUC	251
W6SN	251
W8BRA	251
G6ZO	250
W9NDA	250
W2BXA	250
W8NBK	249
W3GHD	249
W6DZZ	249
W8BHW	248
W3EVW	248
W8JIN	247
G6RH	247
W6ADP	247
W3BES	246
W3KT	246
ZL2GX	246
W7AMX	245
W3JNN	243
VE4RO	242
W6EBG	242
W6VE	241
W9VND	241
W3JTC	240
W3GAU	239
W6GDJ	239
W7BD	239
W6GRL	238
W6TS	237
CE3AG	236
W3CPV	235
W5KC	235
LU6DJX	234
F8BS	234
W6AMA	233
SM5LL	233
WIGKK	233
G2LB	232
G4CP	232
W7DL	232
VK2ACX	230
W7GUI	229
WØELA	229
W6TI	228
W6EFM	228
W6DLY	227
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W6BUD	225
W6SAI	224
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DL1FF	223
VK3BZ	223
OE1ER	223
W6UHA	223
ZL1BY	223
WØDU	223
W7HXG	223
W3LOE	222
W6FSJ	222
W3BHV	222
W6MVQ	221
W6PB	221
G6QB	221
CE3DZ	221
SM5KP	220
W6CYI	220
W6EPZ	220
W6ITA	219
G8IG	219
W6TT	218
WØNUC	218
W6PQT	218

CW AND PHONE	
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KH6IJ	218
W6PKO	218
W9DUY	217
W2PEO	215
W6SR	215
W3IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
W6DI	214
W6CEG	213
WØUOX	213
VE6KW	177
W6UZX	177
CX1FY	176
KH6CD	176
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7FZA	174
W6KUT	174
W6TZD	173
W6JK	173
G5YV	172
OK1LM	172
W6PH	172
G3AAE	172
OK1HI	171
W6BAM	170
DL1AB	170
W6PZ	170
W5AFX	169
G2VD	169
W6CTL	169
W6JZP	168
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W6BZE	165
W6ID	165
ZS6A	164
W6EAK	163
W6YZU	163
G5BK	163
VE7VO	162
ZS6DW	162
I1IR	162
W6PDB	161
OK1SV	160
VE3EK	160
W6PUY	160
JA2KG	160
KH6MG	160
W6ONZ	160
OH5NK	159
W6BIL	159
WØFFV	158
WØOUH	157
G3TK	157
W6BUY	157
W6QD	157
ZS6FN	157
W7RE	156
KH6IG	136
DL1DC	155
VK5KO	155
G3AAM	154
G2IO	154
W6RLQ	154
W6KEV	153
OK1RW	153
W6FHW	153
G3YF	152
KP6AA	152
VK2QL	151
VK2AM	151
W6LEE	150

CW AND PHONE	
W6FHE	150
W6EYR	150
W6LER	150
W6NZ	148
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W6LS	147
W7KWC	147
KH6PY	147
W7DXZ	146
W6AYZ	146
VE6GD	146
VS6AE	146
W6AOD	146
W9NRB	145
W6MUC	145
OK2SO	145
ON4TA	144
G3BI	144
W7LYL	143
KG6GD	145
W3IXN	141
VK2PV	140
ZC1CL	138
OK1WX	135
W7BTH	135
G3AZ	133
W6TEU	133
W6RDR	133
W6AUT	133
VE7KC	133
W6OBD	131
ZS2CR	131
CR9AN	131
W6IDZ	130
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
VK6SA	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
ZL2CU	120
ZS2EC	116
ZS6CT	113
W6DVB	104
KG6AL	103
W7KWA	98
W6DUB	89
W7IYA	59

39 ZONES

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W8KIA	251
KV4AA	248
W2WZ	244
W1CLX	242
W9LMN	236
W1BIH	236
W2EPV	234
W2NSZ	232
W2QHH	231
W9IBI	230
W9IUZ	230
W1HX	230
W9FKC	227
4X4RE	227
W8DMD	225
W3OCU	224
W1JYH	224
W5MPG	223
W8UAS	223
W2BJ	221
W3DRD	220
W4GG	220
W5FFW	220
W1HA	220
VK4FJ	219
W9MXX	215
W3KDP	215
W6DI	215
W3DKT	215

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CO2SW	213
W1ZL	212
KP4KD	210
W6GPB	209
W2HHF	208
W8HFE	207
W4LVV	205
W4RBQ	205
W9ABA	204
W2EMW	201
W2GVZ	197
VE3AAZ	192
W2IMU	192
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W6WO	190
G3FXB	187
W5MET	187
W1KFV	184
VK3XO	180
W2RGV	178
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WØQVZ	177
W4DKA	172
W7CNM	171
W9NZZ	169
G6QX	162
W6CAE	161
WØRBA	161
ZL4BO	157
W6CUL	154
W6MUF	149
TF3SF	145
W9ALI	144

38 ZONES

W8JBI	225
TI2TG	221
W2HMJ	217
PY4IE	215
GM3EST	203
W8KPL	196
W5KUJ	191
WØTKX	189
W6TXL	182
W2SHZ	180
W4EPA	180
W3AXT	178
W9VP	177
W1BFT	174
W9LI	173
F9AH	170
W4LQN	164
W9FNR	162
OE1FF	158
W3LVJ	157
DL1YA	153
W6ETJ	144
JA1CR	137
VE6MN	131

37 ZONES

W6KYG	200
KP4CC	200
W4HA	198
W8KML	192
OZ7BG	186
W7ADS	179
W1WY	176
W3AYS	172
W2OST	169
W3WU	169
VE3LJ	167
W1APA	138
OH3OE	124
I1ER	114

36 ZONES

W5JUF	206
W5FXN	189
W2ZVS	180
W4QCW	177
WØAIH	176
DØANF	172
W2HSZ	160

CW AND PHONE	
W9FNR	156
WØCU	145
WØQBA	141

35 ZONES

W8YIN	189
KV4BB	185
KG4AF	182
W8JGU	175
K2GMO	160
LU5AQ	158
W1RAN	154
W2AZS	142
EA4BH	127
W6ZZ	135
CR6AI	133
ON4QX	128
W6YMH	127
W5AWT	125
ZL3CP	121
W6HJ	121
W2HAZ	115

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VQ4ERR	223
G8IG	193

39 ZONES

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XE1AC	217
W6DI	214
W3LTU	206
W6VFR	186
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W7HTS	161
W8HUD	161
F9BO	158

38 ZONES

W9NDA	210
W2BXA	204
W9RBI	202
SM5KP	199
W6KQY	190
W6AM	188
W4CYU	160
ZL1HY	157
W1HKK	153

37 ZONES

W3JNN	212
ZS6Q	192
W8KML	192
W3BES	190
W1JCX	189
CE3AB	186
W3GHD	184
W8BF	183
G3DO	183
W8REP	176
VK3BZ	173
W6PX	159
WØHX	157
W6TT	145

36 ZONES

W1MCW	222
W1NWO	209
W4HA	191
W5ASG	188
TI2TG	182
WØNCG	174
W1BEQ	164
GM2DBX	163
W9BVX	160
W4ESP	159
W2DYR	140

35 ZONES

HC2JR	178
W5JUF	171
W3EVW	169
W9RNX	155
W6CHV	154
W6PCK	152
W2RGV	148
WØANF	145
PY2JU	140
W7HXG	137

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

ALL TIMES IN EST

EASTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	0900-1200 (3)	0230-0830 (3) 0830-1300 (4) 1300-1430 (2)	0630-1200 (3) 1200-1430 (4) 1430-1600 (2)	1530-1630 (3) 1630-2300 (4) 2300-0330 (2) 1730-0300 (3)*
Southern Europe & North Africa	0830-1300 (3)	0700-0830 (3) 0830-1400 (4) 1400-1530 (2)	0600-1200 (3) 1200-1530 (4) 1530-1700 (2)	1600-0100 (4) 0100-0330 (3) 1700-0300 (3)*
Near & Middle East	0800-1100 (2)	0700-1000 (2) 1000-1130 (3)	0600-1100 (1) 1100-1230 (3) 1230-1400 (2)	1630-2000 (3) 2000-0100 (2) 1800-0000 (2)*
Central & South Africa	0830-1000 (2) 1000-1400 (3)	0730-1200 (1) 1200-1530 (4) 1530-1630 (2)	0600-0730 (2) 0730-1300 (1) 1300-1700 (3) 1700-1900 (2)	1630-2300 (3) 1700-2200 (2)*
Central & South America	0730-1000 (2) 1000-1500 (4) 1500-1700 (2)	0630-1500 (3) 1500-1700 (4) 1700-1830 (2)	0600-0900 (2) 0900-1500 (1) 1500-1930 (4) 1930-0300 (2)	1700-0430 (4) 0430-0800 (3) 1800-0700 (3)*
South East Asia	NIL	1700-1830 (1) 0800-1000 (1)	0600-0900 (1) 1730-2000 (1)	0500-0700 (1)
Australasia	1600-1800 (1)	0900-1130 (2) 1500-1900 (2)	0630-0930 (3) 0930-1900 (1) 1900-2100 (3)	0100-0300 (2) 0300-0800 (3) 0330-0700 (2)*
Guam & Pacific	1530-1800 (2)	1600-1900 (3)	0600-0900 (2) 0900-1530 (1) 1530-1730 (2) 1730-2100 (3)	0230-0830 (3) 0300-0800 (2)*
Japan & Far East	NIL	1630-2030 (1)	0630-0900 (1) 1530-2030 (3)	0330-0400 (2) 0400-0700 (1) 0330-0700 (2)*

ALL TIMES IN CST

CENTRAL USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	0800-1100 (2)	1730-1130 (3)	0630-0730 (2) 0730-1130 (3) 1130-1330 (2)	1530-2000 (3) 2000-0230 (2) 1730-0200 (2)*
Southern Europe & North Africa	0800-1230 (2)	0700-0800 (3) 0800-1300 (4) 1300-1500 (2)	0600-1100 (2) 1100-1400 (4) 1400-1600 (2)	1600-0230 (3) 1730-0200 (2)*
Central & South Africa	0730-0900 (2) 0900-1200 (3) 1200-1300 (2)	0600-1200 (2) 1200-1430 (4) 1430-1630 (2)	0500-0630 (2) 0630-1300 (1) 1300-1530 (3) 1530-1800 (2)	1700-0000 (3) 1800-2300 (2)*
Central America & Northern S. America	0800-0930 (2) 0930-1300 (3) 1300-1500 (2)	0700-1100 (4) 1100-1400 (3) 1400-1600 (4) 1600-1730 (2)	0630-1500 (3) 1500-1800 (5) 1800-0300 (2)	1700-0500 (4) 0500-0800 (3) 1800-0430 (3)*
South America	0800-1300 (2) 1300-1530 (3)	0700-1500 (3) 1500-1630 (4) 1630-1800 (2)	0600-0730 (2) 0730-1500 (1) 1500-1800 (4) 1800-0200 (3)	1730-0300 (4) 0300-0430 (3) 1900-0400 (3)*
Japan & Far East	NIL	1600-2000 (2)	0700-0900 (1) 1500-2030 (2)	0230-0730 (3) 0300-0700 (2)*
South East Asia	NIL	1700-1900 (2) 0700-0930 (1)	0700-0930 (1) 1600-2000 (2)	0200-0600 (1)
Hawaii	1130-1300 (3) 1300-1600 (4) 1600-1730 (3)	1100-1900 (4)	1000-1700 (3) 1700-2030 (4) 2030-2130 (2)	2030-0300 (4) 0300-0800 (2) 2130-0600 (4)*
Australasia	1700-2000 (2)	0900-1100 (2) 1500-2000 (3)	0700-1000 (3) 1000-1700 (1) 1700-2100 (3)	0100-0800 (3) 2030-0700 (2)*
Greenland	1100-1500 (1)	1000-1500 (3) 1500-1630 (2)	0900-1400 (3) 1400-1630 (4) 1630-1800 (3)	1500-0900 (3) 1630-0700 (2)*

ALL TIMES IN PST

WESTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	NIL	0700-1000 (2)	0630-1200 (3) 2030-2130 (1)	1500-1700 (2) 1700-0030 (1) 0030-0130 (2) 1800-2300 (1)*

ALL TIMES IN PST

WESTERN USA TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Central & South Africa	0830-1500 (2)	0700-1000 (1) 1000-1300 (2) 1300-1600 (3)	0600-0730 (3) 0730-1200 (1) 1200-1830 (3)	1700-2300 (2) 1830-2230 (1)*
South America	0800-0930 (2) 0930-1300 (3) 1300-1430 (2)	0700-1300 (2) 1300-1600 (4) 1600-1730 (2)	0500-0630 (3) 0630-1400 (2) 1400-1730 (4) 1730-0500 (2)	1700-0330 (3) 1800-0230 (2)*
Guam & Mariana Islands	1300-1530 (3) 1530-1830 (2)	1300-1800 (3) 1800-1900 (4) 1900-2000 (2)	1200-1330 (3) 1330-1800 (2) 1800-2000 (3) 2000-2130 (2)	2300-0830 (3) 0000-0730 (2)*
Australasia	1400-1530 (2) 1530-1800 (3)	1030-1330 (3) 1330-1800 (2) 1800-2000 (3)	0930-1100 (3) 1100-1900 (1) 1900-2130 (3)	0000-0730 (3) 0100-0630 (3)
Japan, Okinawa & Far East	1430-1700 (2)	1400-1630 (3) 1630-1800 (4) 1800-1930 (2)	1330-1730 (3) 1730-1930 (4) 1930-2100 (2)	2200-1100 (3) 2300-0700 (2)*
Philippine Islands & East Indies	1500-1730 (2)	1400-1930 (3)	0900-1100 (1) 1330-2100 (2)	0100-0800 (2) 0200-0630 (1)*
Malaya & South East Asia	1600-1800 (1)	1530-1900 (3)	0830-1200 (1) 1500-2030 (2)	0200-0800 (2) 0400-0600 (1)*
Hong Kong, Macao & Formosa	1500-1800 (2)	1430-1930 (3)	1400-1800 (2) 1800-2030 (3)	0000-0800 (3) 0100-0700 (2)*

(SHORT-SKIP) CQ PROPAGATION CHART

BAND (METERS)	DISTANCE (MILES) 50-250	250-750	750-1300	1300-2400
10	--	--	--	1200-1700 (3)
15	--	--	1100-1700 (3)	1000-1300 (3) 1300-1700 (4) 1700-1900 (3)
20	--	1200-1600 (1)	0900-1200 (3) 1200-1500 (5) 1500-1900 (3)	0900-1600 (3) 1600-1900 (4) 1900-2100 (3)
40	0900-1800 (4)	0800-1100 (5) 1100-1700 (3) 1700-1900 (4)	0800-1000 (4) 1000-1800 (2) 1800-2000 (5) 2000-0800 (2)	0800-1200 (2) 1800-2100 (2) 2100-2300 (4) 2300-0800 (3)
80	0800-1100 (5) 1100-1900 (4) 1900-0500 (2)	0700-0900 (5) 0900-1700 (2) 1700-2000 (4) 2000-0700 (3)	1000-1800 (1) 1800-2200 (3) 2200-0700 (5) 0700-0900 (3)	2000-2200 (3) 2200-0600 (4) 0600-0900 (2)
160	1700-0800 (5)	1800-0700 (5)	1900-0600 (4)	2100-0600 (3)

Symbols For Number Of Days Circuit Predicted To Open:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 days

*Indicates time of possible 80-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, Mo., and Sacramento, California. These forecasts are calculated from basic ionospheric data published by the CRPL of the National Bureau of Standards and are valid through February 15th, 1956.

PROPAGATION

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

Propagation Forecast, January

The new Year is expected to begin with a rapid increase in solar activity. The *smoothed* sunspot number predicted for January, 1956 varies between 50 and 60. This is an increase of approximately 40 since January, 1955 and should be the highest number recorded in January since January, 1951. Associated with this continued increase in the sunspot numbers will be a general improvement in short wave radio propagation conditions, especially during the daytime hours on the 10, 15 and 20 meter amateur bands.

The following is an overall picture of band conditions forecast for January and a discussion of the qualitative changes in each amateur band from month to month. For specific times of band openings for a particular circuit, refer to the *CQ DX Propagation Charts* on the opposite page and the *CQ Short-Skip Propagation Chart* on the following page.

6 Meters: It will be at least another year before the sunspot numbers will be high enough to permit regular layer openings on this band. An occasional short-skip type opening may occur during periods of sporadic-E or auroral activity.

10 Meters: Fair to good world-wide DX is expected during the daylight hours on several days during January and early February. Regular layer short-skip openings between distances of 1300 and 2400 miles is also expected on several days during this period.

15 Meters: Daytime propagation conditions remain excellent for this band and good DX, with relatively low-power, should be possible to most areas of the world almost every day. Regular layer short-skip propagation is expected on most days between distances of 750 and 2400 miles.

20 Meters: One of the advantages of high solar activity is the fact that *three* bands are available for daytime DX. Good worldwide DX possible on 20 meters from shortly after sunrise to after sunset, local standard time. Regular layer propagation between distances of 250 to 2400 miles will also be possible during the daylight hours. As the spring months approach, with longer hours of daylight, the 20 meter band will remain open for longer periods of time.

40 Meters: Fair to good DX expected to most areas of the world from a few hours before sunset, through the evening hours, to a few hours after sunrise. Static levels will be low on many nights and signal strengths exceptionally strong. Regular layer short-skip propagation possible almost around the clock.

80 Meters: Ionospheric absorption and static levels are still at seasonally low values and fair DX should be possible to many areas of the world during the hours of darkness. Short-skip propagation should be possible around the clock.

160 Meters: On evenings when static levels are low, fair DX should be possible to many areas of the world from a few hours after sunset to shortly before sunrise. Regular layer propagation should be possible during the late afternoon and evening hours. Because of extremely high solar absorption, ionospheric propagation is generally not possible on this band during the daylight hours.

CQ Short-Skip Propagation Chart

The following *Chart* indicates the times of day that the various amateur bands are expected to open for distances between 50 and 2400 miles. The *Chart* will appear in *CQ* every month, with the forecast covering a two month period. This month's *Chart* can be used during January and February. The short-skip propagation forecast is based upon a CW radiated power of 75 watts, using a dipole antenna a half-wave length above ground. Calculations are based upon the approximate center latitude of the United States and actual band conditions in almost any area of the United States should not vary more than an hour or so from the times shown in the *Chart*. The hours of day that short-skip skywave propagation conditions will be optimum in a particular band for a certain distance are given in *Local Standard Time*. This means that if you live in California and use these *Charts*, the times given are PST.

If you live in NYC, the times given are EST, etc. The symbols for the number of days that a particular path is expected to open are the same as those appearing on the *DX Chart* on the first page of this column. The author would appreciate comments and suggestions from readers and users of this particular *Chart*.

Review of Shortwave Propagation Fundamentals (Con't)

Ionospheric Storms

In previous discussions the daily, seasonal and sunspot variation in the ionosphere have been reviewed. These variations, brought about by the regular variations in the sun's ultraviolet radiation, accounts for the normal characteristics of the ionosphere. Solar activity however, also produces other effects in the ionosphere. There occurs from time to time great explosions of some sort on the face of the sun. During these solar eruptions the sun emits *more* radiation than it normally does. This extra radiation causes abrupt changes in the normal structure of the ionosphere. This gives rise to abnormal conditions generally termed *ionospheric disturbance*. There are two distinct types of ionospheric disturbances. In November's column, the *sudden ionospheric disturbance* or SID was discussed. SID's occur suddenly and are almost always associated with a visual solar flare on the face of the sun. The SID is thought to be caused by excess ultraviolet radiation from the sun and therefore is observed only on transmission paths passing through the daylight areas of the world. The SID lasts for a short period of time upwards to two hours or so and disappears as the solar flare dies out. The other type of disturbance, the one that will be discussed this month, is the *ionospheric storm*. Ionospheric storms develop over a day or two and generally continue for several days. Because of its longer duration the ionospheric storm presents a more serious problem to shortwave communications than does the SID. These storms are believed to have their origin in the explosions that occur on the face of the sun in the vicinity of certain types of sunspots. Those sunspots which appear to be associated with violent solar eruptions are called *active* sunspots to distinguish them from the regular type which are thought to be responsible for the normal ultraviolet radiation from the sun. Sunspots may occur any place on the face of the sun and they move across the face of the sun as the sun rotates. There appears to be a critical area near the center of the sun's surface where active sunspots have a more disturbing effect than at any other location on the surface of the sun. We shall see shortly that there is a reason for this.

The sun normally emits ultraviolet radiation. However, during periods of solar eruptions the sun also emits streams of corpuscular radiation. Corpuscular radiation differs from ultraviolet in several respects. Ultraviolet radiation travels with the speed of light, corpuscles travel at a considerably slower velocity. Corpuscular radiation also contains a much higher energy level than ultraviolet and because of this greater energy level corpuscles are often referred to as "heavy particles." Corpuscles are believed to leave active areas of the sun in cone-shaped streams. The stream is so narrow that unless it is emitted from a position on the sun that is more or less facing the earth, it may miss the earth's atmosphere entirely. This accounts for the active sunspots being more disturbing when they pass near the center of the sun's surface since it is this area that is facing directly toward the earth.

It has already been pointed out that there is strong evidence that SID's occur simultaneously with visible solar flares, and are produced by the ultraviolet radiation from these flares. There is also strong evidence that the corpuscular stream is also emitted at the time of occurrence of a bright solar flare. If the solar flare is located near the center of the sun's surface it is often followed, within 17 to 36 hours later, by an ionospheric storm. The delay between the visual observation of the flare and the onset of the storm is due to the slower velocity of the corpuscular radiation, which therefore takes a longer period of time to reach the earth than does the visual light from the flare. Active sunspot groups, or bright solar flares, located near the central meridian of the sun therefore appear to be responsible for causing the stream of corpuscular radiation beamed towards the earth's atmosphere. On reaching the earth's atmosphere several things happen to these heavy particles. They are influenced by the magnetic field that surrounds the earth. The earth's magnetic fields tend to direct the corpuscles towards the earth's magnetic poles. As a result, the effects of this radiation is more intense in areas around the magnetic poles. The high energy particles saturate the ionosphere, considerably increasing ionospheric absorption thus resulting in weaker-than-normal signal

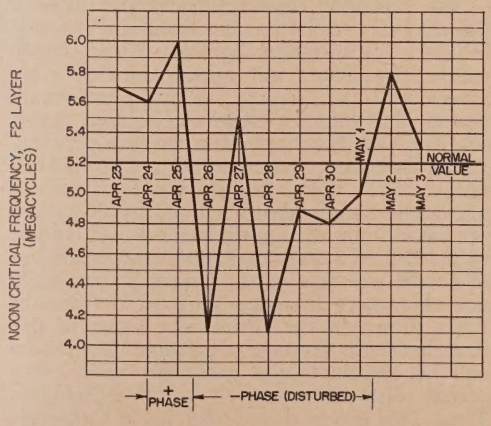
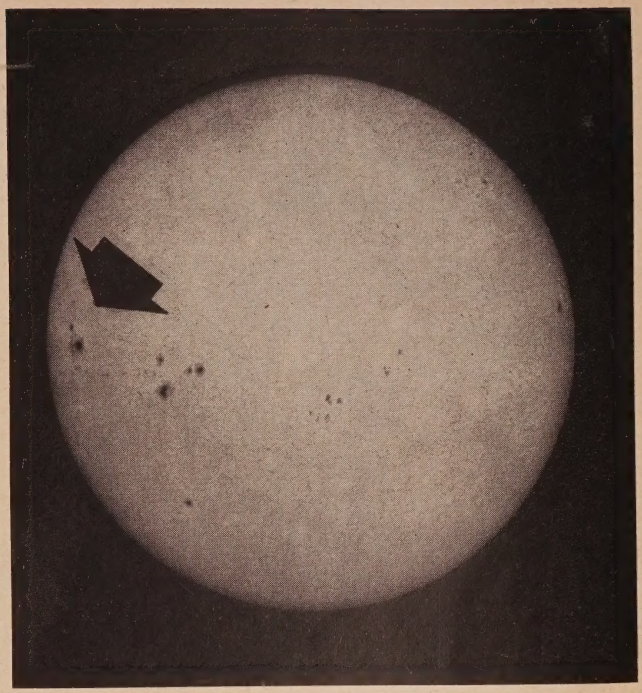


Table 1.



Arrow points to an active sunspot group associated with a severe ionospheric storm. (U.S. Navy photo)

strengths. These radiations also set up a turbulence in the ionosphere, particularly in the *F*-layers and to a lesser extent in the *E*-layer, leading to erratic conditions for the reflection or refraction of high frequency radio waves. There is also a considerable increase in fading and the storm produces a unique type of *flutter fading*. The expansion and rapid rise of the *F*-layer as a result of the turbulence, reduces the ionization density of the layer so that waves which are normally reflected begin to penetrate and do not return to earth. During storms, the highest frequency which the *F*-layer will reflect may be reduced by as much as 50 percent below normal. Maximum usable frequencies are therefore much lower than normal and under extreme conditions, the combination of a weaker ionosphere and increased absorption results in a radio "blackout" during which time long distance communications to various parts of the world become impossible. Shown herewith is an official U.S. Navy photograph taken of the sun during such a blackout. The arrow points to the active sunspot groups believed to be responsible for the storm.

Unlike the SID, and because it is caused by corpuscular rather than ultraviolet radiation, the ionospheric storm affects circuits both in the daylight and dark parts of the world. The storm is world-wide in character and is most intense in areas near the earth's magnetic poles, becoming less intense in more southern latitudes. In the northern hemisphere the area of greatest disturbance centers around northern Greenland and swings in an arc across central Canada, Iceland, Scandinavia, the northern limits of the USSR and Alaska.

The ionospheric storm is best detected by measurement of the *critical frequency* and height of the ionosphere. The critical frequency is the highest frequency that will be reflected from the ionosphere when the wave is transmitted vertically upwards. The critical frequency is actually the maximum usable frequency for zero distance and is related to the MUF for any oblique distance by the

[*Continued on page 88*]

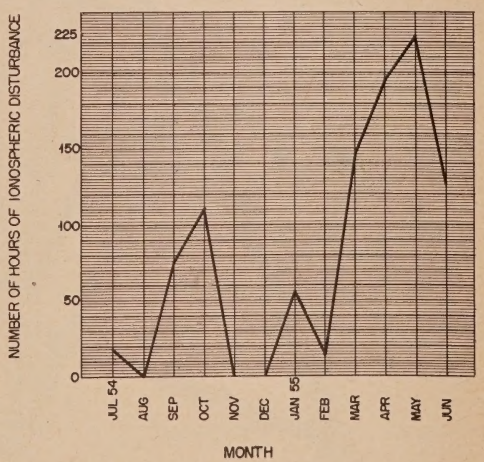


Table 2.



VHF

Reported by Sam Harris, W1FZJ
P.O. Box 2502, Medfield, Mass.

Bob Rafuse (W1RUD) and Paul Day (W1PYM) stopped in last column-writing time and got trapped into the writing of a word or two of their own. Bob after a long talk with Tony (VE3DIR) and Jack (W5HEZ) sez:

"Here's d' News:

"At the time of writing, plans have been formulated by VE3DIR, W5HEZ, W5HCM, W1RUD, and W1FZJ for a message to be handled from New Orleans (W5HCM) to Medfield's glorious Rhododendron Swamps (W1FZJ) by way of, and this is tentative, W5JTI, W4HHK, WØETJ, W9EMX, W9EQC, W9WOK, W8RMH, W2ALR, W2OPQ, W1FZJ with alternates of W8LAH, W8SFG, W8KAY, W8SVI, VE3DIR. First try is to be made on Friday, November 25th. Subsequent tries will be made each Friday thereafter and results will be in the column as soon as possible.

"There is a strange new feeling in New England. Ever since several fellows went to high power and big beams and began to make and hold skeds over rugged terrain, the move is on. Plans are being made all over the place for 32, 48, 64, 128-and-up-element beams and higher power. The ability to work all New England states, New York and New Jersey on a normal night would have been thought fantastic only two or three years ago, but now, with the possible exception of Vermont, where activity is lagging, this can be done almost every night from normal locations with the new hot converters and big beams with high power. It pays off, fellows.

"Up here in Massachusetts we have been chewing over the possibility of more power allowance on the VHF bands. Up to now the suggestions seem to be in the direction of 10 KW on 50 Mc and above. The reasons for this are obvious. Once a ham has done his best by his antenna and is running a KW, and has a receiver with a very low noise figure, ten db more is jest about impossible. (?) Also, although many hams are still contributing to the state of the art on the VHF bands, we are beginning to reach the limit of endurance and rigs. A new power limit of 10 KW might just fill in some of the gaps between those meteor bursts and increase tropospheric ranges by nearly a factor of two. Therefore, let's hear from some of you fellows on this and hear your opinions on a new power limit for VHF, where by the way, most of the old arguments against over 1 KW don't hold water any more. The problem of mutual interference is no longer a problem with 4 Mc on Six and 4 Mc on Two, and so forth, to play around with. So let's see what the VHF opinions are on this point, and, perhaps if we apply enough pressure to show the want and need, it can be done. 73, Bob (W1RUD)."

Paul commented on the last VHF contest as follows:

"What do you do at W1MHL/1 during a contest? How do you work it? That's what everyone asks me. Let me end speculation once and for all. The general procedure is to start tuning at 144 and work up, starting from the station worked each time until the high end is reached and then start working down again. I kept that up all contest and W1MHL/1 worked 334 stations in thirty-three hours. Why didn't

---

S.S.W. Contest
Scores for October

Station	States	Contacts	Final Score
W1AQE	11	84	8,584
W2NSD/1 Mass.	1	14	140
W1PYM	6	42	1,176
W1RUD	1	20	40
W2NSD/1 Conn.	1	6	60
W2NSD/1 Ver.	5	22	572
K2APS	15	282	11,562
W2WFB	13	288	11,232
KN2KET	3	62	1,860
K2DDK	6	155	5,180
W2NSD	7	254	7,620
W3DEX	12	152	5,776
WN3BJG	7	162	4,960
K6KCI	1	562	5,620
W7LHL	1	210	4,620
W8LOF	16	580	24,360
W9KLD	10	138	4,968
VE3DIR	15	50	2,400

we work more? I know dozens of people from Boston to Norfolk who are wailing because we never heard 'em. All I can answer is that (a) they weren't calling in the part of the band we were tuning at the right time. (b) they didn't allow enough time for us to tune to their frequency before signing or (c) they just weren't getting a signal to us. Actually, we were using a KW and it is conceivable that we could be heard and not worked by someone using less. Particularly if they weren't where we had the sixty-four element beam pointed at the moment. We had the best receiving equipment available, but even the best won't make up for a ten times reduction in power. I usually announced what frequency I was tuning from and in which direction, after each contact. We worked everyone we heard calling, no matter how long it took. Still, for future reference, it would be nice if call time were proportional to distance in frequency away from the last contact. It takes almost five minutes to tune 4 Mc with all the signals a guy has to tune over anywhere in the Northeast. To anyone who wants to work W1MHL or any other station in demand during a contest, I have only one thing to say. Keep trying. Persistence pays off."

Ye honorable "Ed" and assistant came up to usher in our first snow storm of the season.

(W5CVW) trying for a corker. 16-element 2M beam and 3-element 10M beam in use at W5CVW.

Wayne (W2NSD) brought a six-meter transmitter (Harristahl Labs) and a couple of six-meter convertors. *(WRL* and *Marshall.)* By an odd coincidence my XYL got her ticket the same day. Guess who's trying out the six-meter gear?

Wayne, Helen and I spent Saturday afternoon visiting with Carl Evans (Evans Radio) in Concord, New Hampshire. Carl has a beautiful store and hoo-ee what an antenna farm. Only one thing wrong. No VHF equipment.

No shortage of VHF at our next stop though. Wayne and I paid a call on Mr. VHF himself. Hank (W1OOP) showed us the proper way to keep the bands going. The secret is very simple. Get a transmitter, a receiver and an antenna working on each band. Then sit down and use them. You don't need a kilowatt, you don't need a hundred-foot tower and you don't need a fifty-element beam. Just some equipment that works when you push the button, and a sincere desire to talk to somebody. And then, if you're a perfectionist like Hank, you milk the last watt of output from your transmitter, squeeze the last db out of your antenna, make your receiver work like a receiver should and you are in business. Hank's antennas are simple, rugged, impressive and numerous. And most important of all, they work.

Six Meters

Finally! Six Meters here we come, with signals coming in from right and left even with the two-meter beam for an antenna. The XYL





Drawing for the big prize at the Syracuse VHF roundup. K2PKK, ten year old General Class licensee doing the drawing, while host W2UFI looks on.

has received her ticket and from henceforth on shall be known as W1HOY, located in the Rhododendron Swamps and also on six meters.

The ticket fooled us and arrived sooner than expected so we weren't quite prepared for it and didn't have the six-meter antenna raised when "Hoy" arrived. At writing time the sixty-four element beam for Two Meters is being used on six, but by reading time, the XYL should have a proper six-meter beam.

Now, as to signals coming in: There surely are a lot of them. Many, many more than we expected to hear. About thirty stations logged in five days of activity on Six, most of them from Massachusetts (of course) but several



Well-Known VHF'er W2-RHQ helped dispense loot at the Syracuse 'fest

from Rhode Island and a couple from New Hampshire.

As soon as the beam is up and rotating, we expect to work a great many more locals. As it is we hear them but Helen being new on the air is reluctant to call the weak ones for fear of not being able to read them *if* they should come back to her.

So far we have discovered two nets in New England on Six Meters. The "Night-Owls Net" which comes on at 11 p.m. and lasts until everyone gives up for the night, and also the "Horse-Trader's Net" which is on in the early evening. We heard this last net and called into it shortly after 9 p.m. but haven't learned yet if it is a nightly affair or not. Helen hoped to get a new state (Connecticut) when she called into this net but the low power, wrong antenna, etc, put the kibosh on that idea. She heard Ed (W1HDQ), a member of the net, but couldn't read him too well and he couldn't hear her at all. Could be called a ten-percent QSO.

Already rumors are spreading that now I will no longer be heard on Two Meters, and I'd like to scotch that idea in the bud. We've managed to get along with ham radio (the XYL and myself) for a number of years now, and expect to continue to do so with *both of us on the air. (Oh, I don't know now. Signed—W1HOY.)*

K2JIM and VE3DIH looking over the loot at the Syracuse VHF roundup.

Pen (W1UNB) suggests that single sideband operation would be very good for Six meters. What's your opinion on the subject?

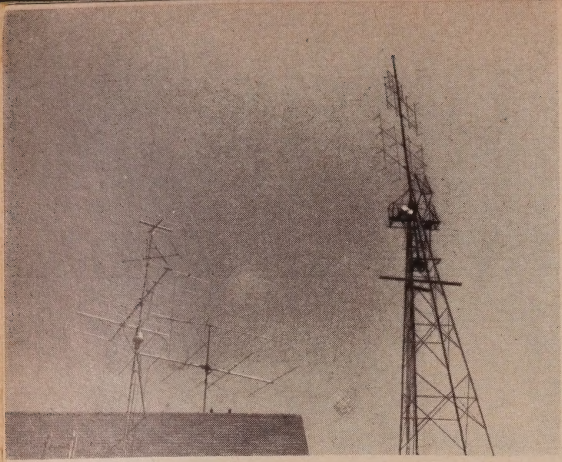
Ghost Band

Reference to the ghost band (on page 100 of our last issue) hit the six-meter boys square in the empty bread-basket of activity. From the standpoint of VHF-conscious New England boys, the remarks produced the desired results. Everybody immediately checked the band for ghosts and found, among other things, Wayne Green operating W2NSD/1 from the Rhododendron Swamps. Wayne, much to his surprise, managed to scare up a fine round table at 3 a.m. Sunday morning. The crunching sound heard emanating from W2NSD/1 was ye honorable "Ed" eating page 100.

Syracuse Round-up

In spite of the floods and inclement weather, the first annual VHF get-to-gether sponsored by the Syracuse VHF Club was a bang-up success. Total attendance for the "DO" was one hundred and twenty. W2SHT of Ithaca, New York and K2DBB went home with the sixteen element



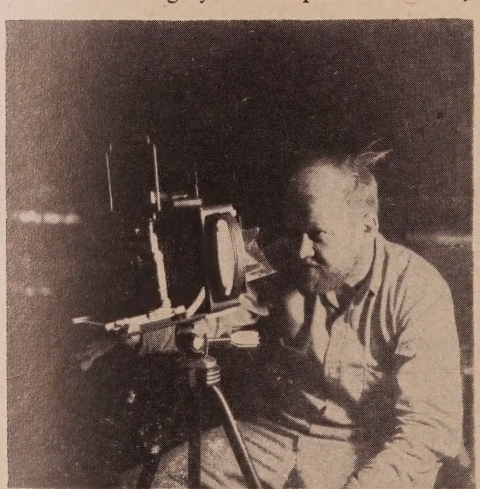


Antennas at W2UF!. Home-constructed tower holds three 32-element beams: 2M, 1.4M and 0.7M. Junk on roof includes 9-element 2-meter Yagi and 4-element wide-spaced 6M beam.

beams, Charley (W2RHQ) came up with a 2-6-10 RME mobile converter. There will be a few boys on with some 4x150A's too. These were sprinkled with some 4-125A, 4-65A, 6146'S, Gonset two-meter converters, Simpson Volt-Ohmeters, UHF converters, more antennas and dozens of other prizes all worth many times the price of admission. Next Year the club plans to make it for the entire eastern seaboard. We wish them lots of success and hope to be there ourselves.

Reading the Mail on Ten

W1PYM went slumming on Thanksgiving Day and worked a little Ten Meters. In the process, a fine ragchew about Two Meters developed. Seems W5VKH is on Two and very interested but hasn't had time to write about it. Sparky says his equipment is about minimum for the area. He's using a Tecraft converter and an 829B with eighty watts input. He also says there are an awful lot of people down there wasting time on 75 meters working locals, when they could do the same thing on Two without the QRM. Seems to me that the same thing is true all over the country. Any comments?



W1FZJ trying to photograph his equipment for those long overdue QSL cards.

A Novice Speaks

"Two Meters is fun! I was on for six weeks this summer and worked over a hundred and twenty contacts, all of them very enjoyable. I like to talk, so I chewed the rag. I like to work DX, so I *tried* to work DX. But it seems that 145.38 is way, way up in no-man's land as far as stations in New York, New Jersey, and Pennsylvania are concerned. Maybe it was because I was running lower power than they were. (A 522 running thirty watts.) It certainly was discouraging to hear stations three to four hundred miles away with S5 to S9 signals and not be able to work them. At first it was my fault for not calling long enough, but when I did call them for five minutes, with breaks, they still didn't come back. I don't know what the answer is but I would like to propose the following operating techniques for use on Two Meters:

1. A station calling *CQ* should indicate the portion of the band he intends to tune.
2. As a matter of courtesy, an occasional effort should be made to contact stations above 145 Mc.
3. Stations using receivers which will not cover the Novice Band should so state when calling CQ.
4. Stations operating above 145 Mc should use the 3x3 and break technique when calling stations on the low end of the band."

We squeezed this out of Southard Lippincott (W1DDN) whose home station is in Newton, Massachusetts, on his last visit. Any comments from others operating above 145 Mc are solicited.

Letters to Ye Editor

Dillsburg, Pennsylvania: The State of Pennsylvania is represented this month by a few words from Dave (WN3BJG), who sent us the following information:

"I'm using a 522 transmitter, running about fifteen watts input, receiver is also a 522, and the antenna is a five over five beam about twenty-five feet high. I worked some of the New England States on two-meters through the several band openings we had last month. Got some good reports too for my peanut whistle. I've heard all of the New England States on two but have only worked New York, Connecticut, and Massachusetts.

"As to activity in this section of the country; I am very active. Usually on from 7:00 p.m.

[*Continued on page 92*]

NOVICE

for the novice and technician

Reported by

Walt Burdine, W8ZCV
RFD 3, Waynesville, Ohio

Dear Readers of Novice Shack:

I would like to expres my heartiest wishes for a Joyous and Successful 1956. With songs of "Peace on Earth" still ringing in our ears, let's hold on to a little of the Christmas spirit and project it into the New Year by renewing our resolve to practice Good Will via amateur radio.

I wish to take this opportunity to thank each and every one of my readers that have taken time to write in during 1955. The suggestions that you have passed along have helped the novice column grow to its present size. With your communication we can make it even better. I'll do my best to print what you want, if you will write. My long-distance mind-reading is a little weak, but letters are R5.

You may rest assured that any circuit I put in this column will work and that I have personally built at least one copy here at W8-ZCV. Sometimes it takes a little time to get just the circuit you want fixed up so that you will not have too much trouble getting it to work correctly.

I'd like you to know that ham radio is not "hard" if you are as willing to work for it as it is to work for you. The worst trouble anyone trying to get a ham license runs into is a "mental block." If he starts with the idea that learning the code is a "hard job", that in itself retards his progress. Just don't approach learning radio with a negative attitude. If you practice and study you can get a ham license in a very short time and start to enjoy the fruits of your labors. I'm sure you will never be sorry that you started to study radio as a hobby or as a business. People from all walks of life are hams. So this year plan on becoming a ham and you can visit with others the world over who found the exams not so tough.

I have been asked by a good many of my readers to list all the novice nets and their frequencies. I will list all novice or teen-ager nets that I hear about. Write me about these nets and I will list them as fast as I can. One net we will announce right now is the "Little Egypt Teenagers Net". The net operates on 7250 kc every Wednesday at 4:15 p.m. CST. Interested parties can contact Kenny Windland, W9ITM, Mounds, Illinois or Gene Unfried, W9ITV, 106 West Olive Street, McLeansboro, Illinois. Thanks, Gene, for the information on this net.

The president of the National Novice Technician Association, John Markovich, K6HTG, 4490 Van Ness, Fresno, California writes: "I wish to thank you and *CQ* for the wonderful write-up you gave the N.N.T.A. in the November issue of *CQ*. It is quite a task to set up a QSL bureau for the novices but I feel it is necessary for the good of novice radio operators. This is how the N.N.T.A. QSL bureau works: All novices are expected to mail to their NNQB area office a self-addressed stamped envelope. These envelopes will be put on file by the bureau managers. When a QSL is delivered to the bureau the manager will put the QSL in that envelope and when it is filled, it will then be mailed to the novice and he will send another envelope to the NNQB.

"The National Novice QSL Bureau was set up so that the new novice can get better service on his QSL's since the callbook will not have the novice call until the call is nearly expired. Send your call to the QSL manager in your district and send along an envelope while you are at it. When you don't get the address of the novice station you can send the QSL card to the bureau in that district. The location of the

Last Minute Item
Help Wanted

10-year old shut-in Jay Colby, 101 Toronto Ave., Massapequa, N. Y. needs help in getting a Novice License. His phone number is PY 8-6755. How about it, fellows?

district QSL Bureaus follows:

W1 . . . None at present.
W2 . . . Fred Randal, 1 Terrace Street, Maplewood, New Jersey.
W3 . . . Nelson Meyers, WN3DGY, 1204 Broadway, Hanover, Pennsylvania.
W4 . . . Hunter Jones, K4DWP, 154 Claredon Circle, Danville, Va.
W5 . . . Tom Devine, K5ATT, 554 Hermine, San Antonio, Texas.
W6 . . . John Markovich, K6HTG, 4490 Van Ness, Fresno, California.
W7 . . . Barry Joseph, W7ZSE, 4542 East 20th Street, Tucson, Arizona.
W8 . . . Jim Tullis, WN8CZN, R.R. #3, Waynesville, Ohio.
W9 . . . Jim O'Connell, 4224 Bobolink, Skokie, Illinois.
WØ . . . Gene Hohenshell, KNØCFH, 202 N. Russell Avenue, Ames, Iowa.

We still need managers for the W1 area and for the possessions, if you can take this please write to N.N.T.A. at the above address."

Did you ever realize that we talk a foreign language, that the jargon we speak is not understood by the casual listener and that often the things we say are misunderstood by the person that just happens across one of our conversations on the air? Also the new radio operator has considerable trouble getting the hang of our ragchewing methods. We blissfully talk about QSOs with YL and OM operators, of a "QSO with an OZ7, He was using SSB and an HRO7" etc. They don't know that CQ is a general inquiry call as well as The Radio Amateur's Journal. We talk about slicers, Q-multipliers, sideband generators, lattice filters, crystal filters, RTTY, ground planes, rhombics, NBFM, AM, PM and CW. We talk about DX, W6s, XYLs, junior ops, harmonics and propagation. Of two meters, 7 megacycles, bottles, a full gallon, a KW, feedlines, standing waves, baluns, hams, handles, clippers and preselectors. We can rattle on for hours with this mumbo-jumbo. The next OM we QSO will QRX while we QSY to the 40 meter band at 7.255 Megs. Do you work the VHF bands or are you a DC bug? Some fellow will tell about his wife, I mean XYL, breaking her leg and then he will say HI. What the heck was so funny about that? Is there any wonder if an uninitiated person thinks all hams are screwballs? We are truly speaking a different language, no less than a specialist in any other profession, but ours can be heard in most homes by anyone who will switch his multi-band radio to our channels and listen. Lots of new comers have to learn this new language and then they can get the hang of our QSOs. You went through this process of learning the slanguage of the ham a while back and you have probably forgotten the trouble it was for you to get the gist of the QSO, but you did and now you can talk like an old-timer. For those who are still fighting this battle, we will go into a few of the terms used by hams, and explain their uses.

I strongly suggest that you new hams make a thorough study of the pages of the *Radio Handbook* (published by Editors & Engineers, Santa Barbara, Cal.). I can say that there is absolutely no need to write me to ask what kind of a socket to use for a 6C4, or what are the pin connections for a 5763. Other questions: what voltage ratings should I use on my 250 volt power supply? How many mils does a 6L6 draw? What are its filament voltage and current ratings? Does a 6L6 fit into the same socket as a 6V6 or a 6K6? There is a tube characteristic chart in the back of the handbook that will answer all these questions about tubes and their characteristics. The chart shows tube basing, filament voltage and current ratings, plate and screen voltages and currents as well as the position of these elements in the inside of the tube itself. The filament is shown below, the cathode next and the numerous grids are shown progressively from the cathode to the plate or anode, above. The grids will likely be labeled G_1, G_2 or G_3 as they near the plate. These tube charts contain an amazing amount of valuable information. With this chart and a knowledge of circuit fundamentals you can



Al Gregoritsch, KN2PHC, (15) of 230 Lenox Road, Huntington Station, New York, rebuilt the NC88 to include an S meter and a crystal to help drag in the 15 meter DX. The DX-100 runs 70 watts. Stand by DX here he comes.

design just about any circuit you might possibly need in ham radio, and then some.

The chapter on reference data contains valuable information: The Q signals needed to communicate via c-w transmission with people using a different language. These are used to speed up the transmission of radio signals by telegraphy. The use of the Q-signal has oddly been adapted for use in the phone bands and we hear the Q-signals that were created for the facility of the c-w operator spoken quite a lot.

This chapter has the RST table in place for our use. New hams wonder how we can figure whether a signal is *Q5 S9* and how we arrive at this conclusion. Read it and find out.

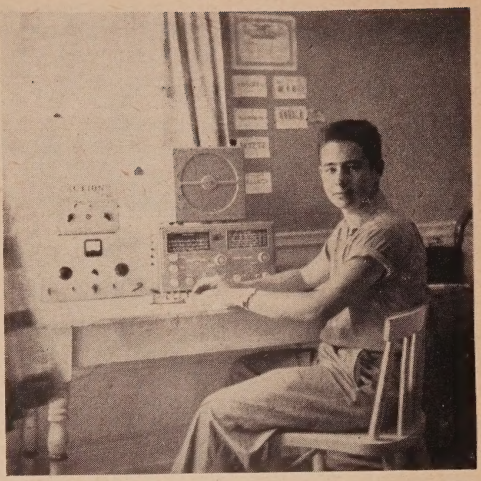
In using the handbook don't forget to read the sections on power supplies as this will explain the use of all the various components that go together to power our transmitter with which we are going to talk to hams all over the world. Don't forget, you will be known



Larry Poorman, WN8VKO, Drayton Plains, Michigan, is a senior and says ham radio will suffer at his house this winter as he wants to make this "a good one." He works 40 most of the time, but is getting on 15 meters soon.

by the signal you put out . . . by the hum level of the signal, the keying characteristic on CW or the quality of modulation on phone, we can be recognized the world over. The power supply is the most expensive section of your new transmitter. You should use the best components you can afford at the time. It is better to run lower power, using good components to put out a good clean signal.

Transmitter Construction is a good night's reading. Transmitters of different power levels are covered in this chapter. Read this chapter carefully before you decide to go ahead. All of the reading in the handbook should be followed by reading some of the articles in the magazines devoted to the amateur's problem.



Jimmy Robin (14) KN6OVK, 1759 Holt Avenue, Los Angeles, California, received his ticket October 29 and is all ready going. He will QSL 100 per cent.

The five chapters on antennas and transmission lines are the most important part of the book. The best transmitter in the world won't do a good job without a good antenna. That is one of the reasons that the major portion of talk on the ham bands concerns antenna construction and practice. With a good antenna, a low-power station can consistently work plenty of DX. Many of our top DX men run 100 watts or less!

This covers the contents of the handbook in brief and I would insist that you make a habit of going to the book for your information and the answers to your many questions. The book won't answer all of your questions but most of them are there. "It's In The Book."

If the foregoing seems just a bit elementary, don't forget that this column is for both the fellow that is just hankering for a license and for the new ham that is willing to learn more of the mysteries of radio (he too wants to be an old-timer someday). You and I know that the person interested in radio will never get caught up with the advancements of the radio art. Even quite a few old-timers can learn from the Handbook. Some of us quit studying when the 804 was a subject of conversation, but many are now holding positions of importance in the field of radio and are so busy that they don't have time to grow old. Industry is worrying about some one to replace them when they do quit. Will you be the one? The world is badly in need of scientists of all kinds.

Since the article on six meters appeared in the November issue of *CQ* I have been deluged with letters asking how to convert the wonderful little *Heathkit AT-1* to Six. I am a farmer and the fall work has kept me so busy that I just haven't had time to answer each and every letter, so next month I will try to have

some news for all interested in this conversion. I had intended to get this ready for this month but for the pressure of the farm work. Also there will be a 15-meter preselector for those that have requested such an article. So, you see, as I have said, ask for it and soon you will see it in *CQ*. I will be expecting a letter from you.

Letters To The Editor

It really makes me feel good to get a letter like this one from Mr. and Mrs. B. C. Sadler of **Pittsburgh, Pennsylvania:**

"Dear Walt: After trying for a month and a half to get those "almighty 5 w.p. m's" and following every lead on where we might get some help, had almost given up when the XYL suggested a letter to your Help Wanted column.

One week after the October issue "hit" my home, I received a phone call from Ron Egnitz, of W3YNZ, offering the XYL and OM some help.

Just came home today from mailing our Certified 5 w.p.m. application to FCC so, to *CQ* we say "thanks for the ad" and to Ron—we are very grateful.

Ron is not letting us go with the 5 w.p.m., but is going to help us along with the general.

Mighty Nice Fellows read *CQ*."

I finally got to paint the map red to indicate I had received a letter from South Carolina. Milton I. Faivre, **K4EBT**, 1916 Bull Street, **Columbia, South Carolina** writes:

"Dear Walt: My sincere congratulations on the fine operation of the Novice Shack. I have been reading the column very regularly, but until now I haven't taken the time to write. The QTH here is Columbia, South Carolina. I am running 50 watts to a homebrew transmitter and the receiver is a *BC-455*. I work exclusively on the 40-meter band and since beginning operation September 20th I have made 82 contacts in 22 states.

During many of my QSOs I have had the gang say that I was their first South Carolina QSO on CW. CW operation in South Carolina seems to be below par and because of this I will be glad to make a sked with any one needing South Carolina for WAS. I operate between 1400 and 1600 EST Monday through Friday. I QSL one hundred per cent and am badly in need of contacts with W5, W6, W7 and W1s. I will also listen at the times specified for all possible calls. Again I want to emphasize that I operate on 40 CW only. 73, Milt."

Robert Slater (12) **W3ZEG**, 436 Taylor Street, **Pittsburgh, Pennsylvania** writes:

"I am W3ZEG, 12 years old, and have been licensed for two years (well, almost 2). I work 80 and 20 CW. The 80 meter rig is a v.f.o.-6AG7-616 unit running 25 watts. The 20 meter rig is an 807-311CH combination running about 175 watts. I use an *HQ-140-X* receiver. I've worked 44 states and 18 countries in all. Who says low power won't get out? With 25 watts on 80 meter CW I've worked YV5BJ. The antenna is nothing special, just a long wire 135 feet long end fed with a pi-network. I could copy 20 words per minute but have dropped down to about 18. I will sked any crossband or otherwise if they can't hear me any other way. I must say 73 for now and I'll still be reading novice shack, Bob."

I have said I wanted to hear from you and that I wanted you to tell me what you wanted in this column. Well, here's what I meant. Carl Smith, **WØYET**, 3131 Delavan Avenue, **Kansas City, Kansas** sends these suggestions:

"Hi Walt: After reading the Novice Shack in the October issue I decided to write you a few lines. I would like to see more to help fellows get their tickets. I am a general and work a lot of 20-meter phone and CW. We've got a radio club going at school but I am the only member that has a ticket as yet. We have our meetings at night. The purpose of the *CQ Club* is to help get more of the younger guys on the air. If you could use a little more space to explain some of the technical terms, to be truthful I don't know too much about technical terms etc. I could do with some more technical data myself. I don't know whether this will be of any help or not but here's hoping. I run 25 watts to a two-element beam and have 47 states and 18 countries. 73, Carl."

John M. Anthony, **KN4BFN**, 1402 Branch Street, **Wilson, North Carolina** says:

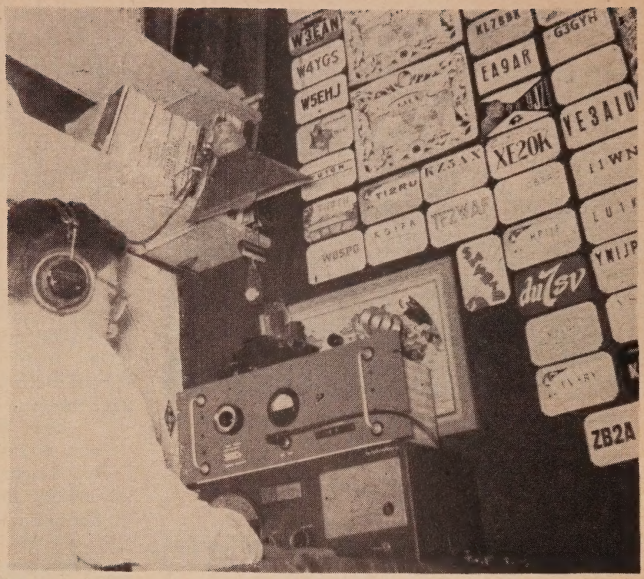
"Dear Walt: I have had my ticket since last December and since then have worked WH6, VE1, VE2, VE3 and 39 states on the 80- and 40-meter bands. I have worked Utah on 80 meters. The rig is a *Heathkit AT-1* and the receiver is an *NC-88*. My antenna is doublet for 80 meters and a quarter-wave long wire for 40 meters. I will be glad to sked anyone needing North Carolina for WAS and I QSL one hundred percent. 73, John."

The first letter to novice shack from Mississippi comes from Jimmy "Buddy" Rankin, **KN5BQS**, 1605 13th Street, **Pascagoula, Mississippi.** He writes:

"Dear Walt: I haven't seen much in the Novice Shack from good old Mississippi for a

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The Radio Handbook, Thirteenth Edition, published by Editors and Engineers, Santa Barbara, California, costs $6.00 from your local radio supply house. This book is by far the most complete and comprehensive handbook available both for the beginner and the advanced amateur. There are 734 pages, covering the entire field from learning the code to the tuning of antennas.



Help Wanted in August, Now KNØCRV, is Jack Cohen, (16) of Denver, Colorado. That looks like a very nice layout, Jack, you should be able to work some nice DX and have a lot of fun.

long time. I have had my novice license for about four months, and haven't been on the air since July 18. I have made only 30 contacts in 4 states. My transmitter was a command transmitter running 70 watts. My receiver is an S-72. My transmitter "blew up," so I am getting a *Heathkit AT-1*. I would like some information about this transmitter, if anyone will please write me.

"I am now building a 150-watt transmitter, a pair of 807's in parallel, v.f.o.-controlled. It is supposed to work, but I doubt if it will, because it is my first construction job. I hope to go for my general in December. (*Don't be a pessimist.—Ed*)

I am 16 years old, in the 10th grade. I will be glad to hear from some YLs or someone who has a *Heathkit* transmitter. I would like some pen-pals and will answer all letters.

There are three new novices here in Pascagoula. They are Robert Conner, KN5BQT, Joe Cook, KN5BQK and me, KN5BQS. 73 and best of DX. Jimmy."

Dave Storey, **KN2KMQ,** 116 Lenora Drive, **Hamburg, New York** writes:

"Dear Walt: I am very much interested in building that 15-meter converter that you talked about in the September issue of *CQ*. I need some information on the use and construction of converters.

I have had my ticket since January. I finally got going in March. The rig is a *TR-75-TV* and a *BC-455-B*. I have 34 states, all confirmed. I need most of the western states and that is why I want to get on the 15-meter band.

We have formed a radio club at school here and I am the president of the club. We are having a paper drive to buy equipment and will have a club station then.

"I hope to drop the *N* out of my call this week. That's about all for now, Walt. I really enjoy the Novice Shack and think you are doing a swell job. 73, Dave."

Ohio is represented this time by, Richard S. Long, **WN8CAN/W8CAN,** 294 Towerview Road, **Dayton 9, Ohio.** Richard writes:

"Dear Walt: I've read the novice shack for a long time now and enjoy it very much. Here goes with my statistics. I've been on since June, 1955, and in that time I've racked up 43 states with 38 of them confirmed on 40 meters. I need Vermont, New Hampshire, North Dakota, Idaho and Wyoming. I will answer all letters about skeds with those states.

"I run 65 watts to a forty meter dipole and the receiver is an *SX-99*.

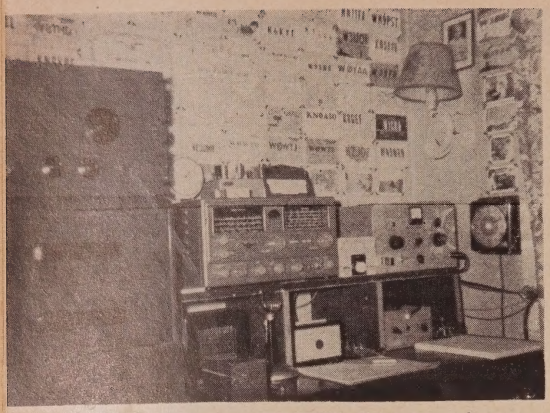
"I have my technician class license and hope to get on 6 meters soon. I have the W1AW CP-15 award for 15 words per minute code. So good DX and I QSL 100% for all cards received. 73, Richard."

Bart Fay, **K4CEF,** 1110 Magnolia, **Panama City, Florida,** (Phone: POplar 39943) sends along this letter:

"Dear Walt: I have been reading the Novice Shack and enjoy it very much, in fact I think your section is worth the 50¢.

"I have read with much pleasure about some of the hams I have worked and decided to get my name in it too.

"I use a *Philmore NT-200* running 25 watts to a 6V6 in the final. The receiver is a *National SW-54*. As I am only 13 years old, I had a hard time getting enough money to get on the air and that's why my stuff isn't like a KW. I will be glad to answer any letters and cards and will schedule anyone needing Florida for WAS or



Bob Reisenweber, WN3BBO, Erie, Pennsylvania works 40 and 15 meters with this neat layout and has worked KH6AUJ and thinks 15 is the best band.

just a good rag-chew. I will soon have 75 watts.

"I just got my Conditional Class license and would like a sked with a W/WN8 or WN3. I have been on the air since February and have worked 17 states and 5 call areas.

"See if you can scare up some more Florida correspondence and I hope you can help me out with the schedules. Well I'll be reading your column all the time. 73, Bart."

Texas is in there pitchin' this month as usual. Bobby McCain, **KN5CAO,** 1901 Thomas Place, **Arlington, Texas** writes:

"Dear Walt: I have been following your column closely and I think it is tops. I enjoy the helpful tips and the news of the other hams.

"I am 13 years old and in the 8th grade at Arlington. I have had my ticket since 9-1-55. The rig here is a *Globe Scout* running 65 watts to a ¼-wave vertical antenna on 40 meters. The receiver is an S-38-C. I have worked 17 states. I have worked all call areas except 1, 2 and 4. I've got DX fever right now, although I haven't worked any other country except the U.S.A. as yet. I would like to hear from other hams and will answer all letters promptly. Any letters from DX would be greatly appreciated. Well, BCNU, Walt. 73, Bobby."

Lawrence "Professor" Poorman, **W8VKO,** RFD. 3, 3325 Worringham, **Drayton Plains, Michigan** writes this letter.

"Dear Walt: I am on 40 meters most of the time but get on 80 most of the balance. I have just found out what a nice band 15 meters is from my friend, W8URO, an ex-novice, and I hope to be on as soon as I can get some crystals. I have worked 40 states, a VE3 and a VK2.

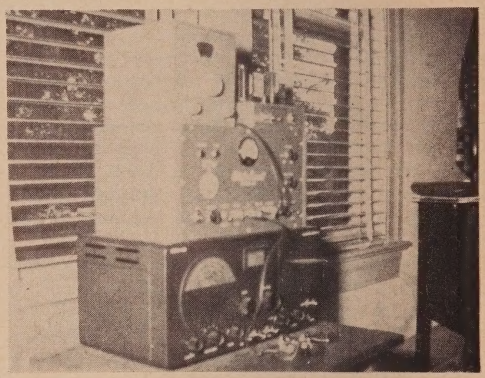
"My rig here is an *SX-71* receiver and an *AT-1* feeding a 300-foot long wire antenna. My best DX is all of the West Coast states but I need all of the other W7 states. I sure wish I could get a sked with some of them. I will be glad to make a sked with anyone needing Michigan for WAS. I QSL 100% for all cards received and then some.

"W8URO, Roger tells me that KV4BK who used to call novices on 40 meters lost his beam in the hurricane weather they had this fall.

"I agree with you on how to work DX by listening. I would like to see more articles on theory, as I am working on my general and could use them. Well that's about all for this time and keep up the good work. 73, Larry."

The Novice Shack is being read by DX and some of our W novices are being heard on the other side of the ocean as reported by this letter from John Whitington, ISWL-G3719, RSGB-BRS-19771, 45 London Street, **Worthing, Sussex, England.** He writes:

"Dear Walt: Just a few lines to let you know how much I liked your *Novice Shack* section of *CQ* Magazine and also to tell you about all the novices that I've been hearing over here in Southern England. 21 Mc has been wide open



George Reeves, W5HJQ, (16), Jackson, Mississippi used this rig for 17 countries and 47 states. He needs YLs for YLWAS to add to his QSL collection. He is 16.

and the best DX novice so far has been WNØZQV who has already QSL'd me. I don't have too many of them in the callbook here so can not send them reports. I find the reply ratio via the QSL bureaus over there is too low, *even with return postage enclosed.* Maybe you could mention a few of the calls I mention and the fellows would drop me a line. I am a very keen SWL and in time I hope to become another of you hams. Until then I am listening to all the DX calls I can and also to all the novices in the hope that the reports that I send will tell them a little that will help.

The 40-meter band here is rather tough due to the broadcast stations in the novice section, however on the morning GMT of 16th October, I was very pleased to find the novice calls mentioned for my very first on the 7-Mc band. Other DX on 21-Mc fone has been RH1LW, HR3HH, HK4CO, HP1CC, ZB2P, EA6AS, W5RLY(N.

Mex.), W6BYB, W6ZNT/VE8, W7SFA, W7BVV, VO6U, VK4TN, VK9DB, KH6AR, CR9AH and many ZLs around 0800-0900 G.M.T. On 14 Mc FO8AM and FK8AM have been heard at 0800 recently on CW.

"28 Mc has been wide open to W8-land, EA8, CN8, 5A2, LU, CX, PY, and other station have been logged here on both fone and CW. These items in case you are interested, wishing you and all there, best DX and 73, John."

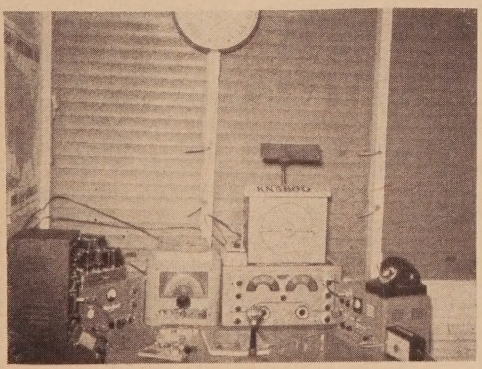
P.S. Here is the list of novices heard in England on 15 and 40 meters. On 15 meters: WN3CKR, KN2MZM, WN3CDK, WN8UKG, KN2LIY, KN4EMV, WN1GNJ, WN1FFV, WN1GDB, WNØZQV, KN2MHJ, WN3ARN, WN3DJW, WN8ELU or F, WN8WA?O. Heard October 16th on 40 meters: WN2OGP, KN2MFD, KN2LDG, KN2LQL, KN4CVI, WN1EWS, WN1EZX, WN1FNK, WN3AWA, WN3ARC, WN3CDK, and WN8AVO.

"All the above was logged on a 6-tube superhet and a 14-Mc dipole 20 feet high orientated East-West and a 5-tube super and a long wire on 7 Mc.

"These calls below, heard at G3FXB using a cubical quad antenna and an *SX-24* with a 2-stage converter. KN5AIQ, KNØCER, WN1ELW, WN1EOA and WN1GYN." *Thanks John for the reports and I'm sure all of those mentioned will thank you too. Your report proves that you can work DX with low power and the right conditions.*

Lowell Dickson, SWL, 110 Linden Street, **West Pittston, Pennsylvania** sends a card to say,

"Dear Walt: I enjoy reading the Novice Shack very much. I think if you wrote more about SWLs like me and published it, it would be pretty nice. I am 13 and have an *AR-2* receiver, I think I can pass my novice license but I would rather wait until I get my transmitter finished. Please try and get more information about SWLs. I would like to hear from some SWLs. Thanks and 73, Lowell."



Len Morgan, KN5BGG, Baton Rouge, Louisiana has this nice layout and it sure looks nice, Len. Len's bands are 40, 15 and 2 meters. I'm open for a sked with you on two meters any time, Len.

Chuck Schneider, **KNØCHZ,** 1336 Laurel. **St. Louis 12, Missouri** writes.

"Dear Walt: This is just a word of encouragement to keep up the good work in the Novice section.

"I am 19 years old and a sophomore in Electrical Engineering at Washington University here in St. Louis. I am planning to go general as soon as my code improves.

"The rig here is a *Johnson "Adventurer,"* an *HQ-140-X* receiver and a 40-meter folded dipole. With this rig I have worked 30 states and all call areas in 30 days on the air. Best DX is Maine and the state of Washington.

"As I am going to college I don't spend much time on the air during the week but I try to make up for it on weekends.

"My only complaint is about the guys that don't QSL.

"I will sked and QSL anyone needing a Missouri QSO for WAS. 73, Chuck."

SWL Ed Elgart, 60 Parkman Street, **Brookline 46, Massachusetts** writes to remind me to say that there is a very nice QSL card for the new novice and SWL available from the General Electric Company, Tube Department, Schenectady, New York. The price is 300 for one dollar, postpaid. The card is known as form 73A and must be ordered in lots of 300 or multiples of it. Money must accompany the order. The place for the call and address is blank and can be rubber stamped or printed in by hand. *(Thanks Ed for the note and I sure hope you pass the novice test. Let me nkow how you do and what call you get.)*

The Help Wanted column has been of help to some as is evidenced by this letter from Jack Cohen. Jack's help wanted letter appeared in the August issue of *CQ*. Here is the letter from Jack Cohen (16) **KNØCRV,** 2626 Monaco Parkway, **Denver 7, Colorado.**

"Dear Walt: Just a brief note to tell you what a good job you're doing. It isn't easy to step into the steps of the former editor and make a bigger and better column of it but you're doing it in fine style. I especially like your little articles at the beginning of each month's edition. (*Do you pay for the new hat, Jack, or do you dress me up in a cowboy's ten gallon hat? huh?*)

"In the August section of Help Wanted my name appeared, and many new friends have been made by that one little space 5⅝" by ½". I have since received my call which is **KNØCRV.** I owe it all to the help and patience of Mr. Taylor, WØSPO and to Mr. Adams, WØAEE. If it weren't for these two I wouldn't be on the air.

"The rig is an *S-40-A* receiver and a 6AG7-6L6 transmitter. The antenna is a 40-meter vertical. The frequency is 7177. I would be glad to make a sked with anyone. Thanks and 73, Jack."

[*Continued on page 83*]

This article may not be of more than nostalgic interest to the bulk of our licensed brethren, however, just about every one of us knows at least one incipient ham who could do well to bone up on how to pass the license exam. Why not mark this article for reading by some of these fellows? It will be doing them a big favor.—Ed.

Al Ayling, W6LFM
5074 Niagara Ave., San Diego, Calif.

How to pass Exams

The world is full of would-be amateurs who do not own the coveted ticket through fear of the examination. It has been my experience that anyone interested enough in amateur radio to think about getting a license has one or more strong points upon which to build his radio knowledge. Using them as a base, the balance of the knowledge required is soon acquired, largely because of the very fascination of the art of radio.

Passing the examination is quite another sort of communication skill. It behooves us, who aspire to a new or higher-grade amateur license, to learn a few simple facts about them.

Each amateur examination consists of two parts, a code test and a written examination. It is designed to determine the ability of the applicant to operate an amateur radio station of a certain type. It is made as simple as possible while still being comprehensive enough to do its job.

Aside from technical considerations, passing the written examination is a matter of reading, writing, bookkeeping, doing some simple figuring, and (except in the Novice Class examination) drawing a couple of diagrams, and most of all, the applicant checking his own work. If these facts seem self evident, consult anyone who grades examinations of any sort. You will discover that mechanical errors in executing the examination itself frequently lose more points for candidates than lack of technical knowledge.

Assuming that you know the ropes on the technical side, give yourself a chance to learn the mechanical details of communicating your knowledge to the examiner via paper and telegraph key. To do so, you should duplicate, insofar as you are able, the form of the examination you will encounter. Exactly how to do this will depend somewhat on the license you are interested in.

Novice and Technician Examinations

Novice and Technician Class examinations, as well as Conditional Class examinations,* are now given by mail only. This gives the applicant for one of them the advantage of taking the examination in the familiar surroundings of his own home. In addition, the ham who has been tutoring him in code may give him the official code test (if he has a General Class or higher license) as well as witness the written examination (if he is over 21). At any rate, he can help with the simulated examination.

Ask your code teacher to send you a sample code test at the exact speed required by the grade of license you are aiming for (5 w.p.m. for the Novice and Technician Class and 13 w.p.m. for the Conditional and General Class) for a full five minutes. Immediately after the receiving test, take a sending test, with your teacher (or preferably your personal enemy) copying what you send and giving you a critical analysis of your sending ability. This is a test, remember; so do not fool yourself.

After the "code test," take a written examination, again trying to duplicate the real "McCoy." Make it up in the "objective form," consisting of a question and five answers, one of which is correct. If you are studying with a partner, you and he can make up similar tests based upon the FCC study questions found in various amateur license study manuals and exchange them.** Then you can grade each other's paper.

*Conditional Class licenses grant the same privileges as the General Class license. They are issued by mail to applicants living over 75 miles from the nearest point where the FCC examination is given at least four times a year and to applicants physically unable to appear at an FCC examining point—Editor.

**There is at least one booklet available in which typical FCC "examinations" are given in multiple-choice form. It is the AMECO "Amateur License Guide," available through amateur supply houses—Editor.

I admit that this approach entails some work. In fact, you'll be weary of the King's English as applied to things radio long before you finish. But after it, you will be so familiar with the examination form that you could not be nervous about it if you wanted to be. Later I will suggest how to check your work for avoidable errors.

General Class Examination

Besides being more comprehensive, the General Class examination is given by an FCC representative in an FCC office. If possible, visit the office ahead of time. Find out who the examiner is, how the code table is set up, how the code test is given, whether head sets or a loud speaker are used, the type of handkeys used, how much space is available in which to write, and so forth. Incidentally, pick up an application blank while you are there. Have it filled out and *notarized* before you go to the FCC office on examination day.

If your code learning has followed the usual pattern, you have copied your partner or teacher pounding out excerpts from articles in the nearest radio magazine, and you have copied ham and commercial stations from over the air. Take my word for it. Any of these bears only the slightest resemblance to what you will hear on examination day.

To eliminate the bad effects of this unfamiliarity, treat yourself to some strange copy from a strange oscillator. Most offices use head sets; so you should use them too, preferably with the volume level set too loud. If the examination is given by tape machine,* try to borrow a tape machine or an unfamiliar set of code records; they will give you that cold, impersonal sound.

Appearing For The Examination

The night before appearing at the FCC office for the examination lay out the following items; so that you can find them easily in the morning:

Your application papers, including the small card.
Pen (ball point o.k.).
2 black pencils, medium lead.
1 red pencil.
Slide rule, if you use one.
Small triangle or ruler for use in drawing diagrams.

Get downtown in plenty of time to park your car, have a cup of coffee, etc., and still be at the FCC office on *time*. Since you are going to *pass* this examination, do not work yourself into a sweat about it. Doing so will not get you any points.

When you get to the office, give the examiner your papers and sit down at the code table. You can be adjusting your head set and making yourself comfortable while the jokers who do not have their applications properly filled out are having them taken care of.

After you glide through the code test, the examiner will hand you a sealed envelope containing the written examination. On it will be printed full instructions. Read them carefully, They are simple, but you must follow them to the letter.

Open the envelope and check to see that you have the correct examination. See that no pages are stuck together and that all pages are there. Sign each sheet in ink in the space provided.

Start executing the examination by answering all questions of which you are sure, skipping any on which you may have any doubts. Then make a second trip through the examination answering the qustions that require more thought and figuring. Finally, go through the examination a third time and answer the few remaining questions, which may have you "stuck" as well as you are able. Put down an answer for every question, and be certain that you have not skipped an entire page. It has happened.

To make sure that you copy correctly the answers to questions requiring calculations (calculations are done on the back of the question sheets), I recommend this procedure:

Write the number of the question you are



". . . become familiar with the examination procedure . . ."

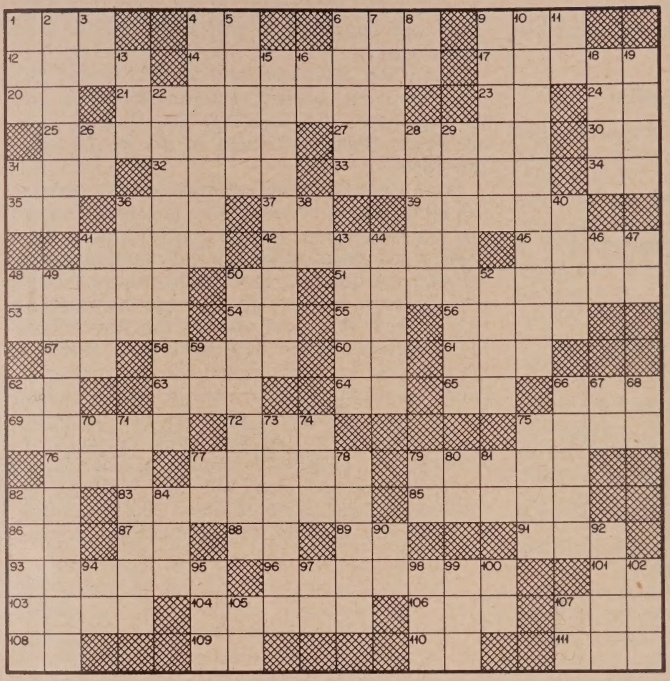
answering on the left-hand edge of the computation sheet. Then, on a line with this number, copy the essential data from the question, such as "Xtal, negative drift, 20 parts/million/° C, from 50° to 60°." Under this, solve the problem in your favorite way and underline the answer in red. Then, run this red line over to the question number at the edge of the sheet. This will nip in the bud any chance of hooking up the right answer to the wrong question. It also aids in checking.

[*Continued on page 83*]

*It usually is—Ed.

assuming that you are still somewhat debilitated by Holiday activities, we thought some of you might like to sit quietly and work our

HAM XWD PZL



ACROSS

1. "Who dat say who dat?"
4. Prefix of stations in Kuala Lumpur.
6. S3 describes a weak one.
9. G8APN's time zone.
12. G2MI calls this a valve.
14. QTH of W6TI.
17. Received solid.
20. Prefix of stations in Berne.
21. Unit of electrical measurement.
23. Prefix of stations in Antwerp.
24. Former prefix for Lybia.
25. Group of islands off "LA" land.
27. We would like this to be 100%.
30. Prefix of stations in Sr. Franco's country.
31. We're waiting for this band to open up again.
32. Handle.
33. QTH of "SV" QSL Bureau.
34. The last word in radio operation.
35. Sassari stations have this prefix.
36. Station record.
37. It's Greek to me.
39. VK3RJ is one of the boys from "down ————."
41. Part of an 807.
42. Magnetic metal.
45. QTH of many I1 stations.
48. A "T" report that's strictly for the birds.
50. Prefix of Goose Bay stations.
51. Commutator for reversing a current.
53. Nationality of GW3ZY.
54. Prefix of Shah Pahlevi's country.
55. Method of radio trans. and recept.
56. What you might be after years of QRN, heterodynes and QRM.
57. This makes "SK" final.
58. Pat and Mike are common handles in this country.
60. Beam heading.
61. W2 time zone.
62. Prefix of Lisbon stations.
63. Signal report factors.
64. State in WØ area. (abbr.)
65. Prefix of stations in Khartoum.
66. "——— QSL."
69. Inventor in field of telegraphy.
72. Iceland's QSL Bureau.
75. Type of antenna.
76. This keeps you on frequency.
77. We see trapezoids on this.
79. "CQ's" DX Editor.
82. Edwin Armstrong perfected this method of radio transmission and reception.
83. You use this to change 60 across.
85. These on the sun affect radio operation.
86. Prefix of stations in Karachi.
87. Stations in 58 across use this prefix.
88. Article in XE2OK's language.
89. Frequencies above 15,000 cycles.
91. Ecuador's international radio zone.
93. What one electron does to another.
96. You'd need acreage for this antenna.
101. Prefix of stations in Addis Ababa.
103. Island group off EI land.
104. The latest type has a "memory circuit."
106. Type of transmission.
107. OK1MB's QSL Bureau.
108. This precedes station call when transmitting.
109. Senorita or mademoiselle.
110. Article in F"BS's language.
111. Query made only about CW Transmission.

DOWN

1. Sir Anthony's is 10 Downing Street.
2. Ivan buys spare parts and vodka with these.
3. Prefix of British colony in Mediterranean.
4. This can be shocking.
5. Port city in W1 area.
6. Pago Pago is here.
7. Legal limit is 1 KW.
8. Prefix of British island in Irish sea.
9. G3AAM's term for it is "earth."
10. Island in VP group.
11. Prefix of a country in zone 7.
13. I × R = ?
15. Television stations find this handy for "doing today what they can put on tomorrow."
16. Prefix of "Kon-Tiki's" author's country.
18. Result of an experiment with a kite and key.
19. Monetary unit of EQ land.
22. If it weren't up there, we wouldn't be working DX down here.
26. Prefix of King Baudouin's realm.
28. Site of U.S. air base in OX land.
29. Some of these have "sharp cut-off."
31. Ex-CP1BX now uses this prefix.
36. Handle of LA2BC.
38. Prefix of a Canadian province.
40. This is probably over your head.
41. Common OM handle.
43. Those who pound this have a league.
44. Handle (or title) of HZ1HZ.
46. Prefix of Kuwait hams.
47. College degree.
48. There are plenty of bugs on this.
49. Unit of electrical measurement.
50. You'll see this on a /M.
52. Di-di-di-da, di-di-di-da, di-di-di-da.
59. Prefix of an island in Mediterranean.
62. Caribbean prefix.
66. When this is "in" you'll get feed-back.
67. It means "yes" to XE1JG.
68. Prefix of country once known as Persia.
70. This burns.
71. This made the Neutrodyne obsolete.
73. This would describe spark gaps and beams.
74. Army personnel get their QSL's here.
75. A unit of electrical measurement.
77. NE African prefix.
78. A series of dots signify this.
79. Samoan prefix.
80. Prefix of several British possessions in the western hemisphere.
81. Still the most popular band.
82. A unit of electrical measurement.
84. Chief export of EP land.
90. Static-free system of broadcasting.
92. Yt, SV and TA are in the —— East.
94. You'll be in Dutch here. (Prefix)
95. ——— waves are bent back to earth upon reaching 22 Down.
97. Prefix of a tiny principality in Central Europe.
98. Handle of W2AVA.
99. Composition of KF3AB's island.
100. A1 type of transmission.
102. This is a situation "up with which your neighbors will not put."
105. Prefix of a country in W. Africa.
107. *"Radio Amateur's Journal."*

[Answers on 102. Don't Peak]

[*from page 81*]

Leave enough space between problems; so that you do not have the calculations connected with one draped through the next one.

Checking

Now comes the most important part of the examination. After you have answered all questions, cover the answer to each one with your hand and think out the answer again. This time, check for double negatives, and unclear questions, and answers that are almost, but not quite, right. Look over your diagrams and calculations, too. Somehow, this checking job seems to be the hardest thing to bring yourself to do, but nothing else may bring you as big dividends.

Slip the papers back into the envelope, making sure none have fallen on the floor and hand the envelope to the examiner. Then, go home and get your station ready; you will soon need it.

Examinations At Home

The procedure in taking examinations at home is exactly the same as in an FCC office, except that it is even more important to read and follow all instructions exactly. For example, your code examiner must certify on the application blank that you have passed the code test before you may open the envelope containing the written examination in the presence of the person who is to witness the written examination.

Then, on completion of the written examination, the witness certifies that you executed it in his presence without help, and all papers are mailed to the FCC for processing. An error in following instructions probably will hold up the entire procedure, until it is corrected.

NOVICE

[*from page 79*]

Bob Hartley, **KN6MRR,** 3053 Paraiso Way, **LaCrescenta, California** writes:

"Dear Walt: Having read the *Novice Shack* and seeing some of my ham pals in it I thought I would write, too.

"The rig is a *Viking Adventurer* running 50 watts and the receiver is an SX-99. I operate on 40 meters most of the time, where I have worked 13 states and Hawaii. I have been on 2 months and am studying for my general with the help of **K6HMG.**

"I also think that a QSL contest could be put on for the benefit of the novice. I enjoy reading the Novice Shack and hope you keep up the good work. I will sked anyone needing California for WAS or for any other reason, I QSL 100%. 73, Bob."

[*Continued on page 88*]



CQ World Globe

By special arrangement with C. S. Hammond & Co., world-famous manufacturer of classroom and professional maps, *CQ* can now make available to its readers this 18" world globe at a fraction of the cost of similar globes.

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CQ-1

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Litigation & Misery Dept.

Dear Editor:

A letter in your November issue describing the plight of litigation being suffered by W6YMD, with regard to the erection of an antenna, has aroused my sympathy. It also created an envy because I know he will have strong forces rallying to his aid. You see, I actually went through a similar experience, but the ironic, if not amusing part of it is: I am not a Ham. I am an SWL.

Twenty years ago I retired from the sea and a commercial ticket. Never had a real yen for amateur operation but enjoyed listening, particularly in copying, CW.

For those twenty years I have had a long wire on the roof of an apartment dwelling in the Borough of the Bronx in the City of New York. During many of those years it was the only antenna on that roof or surrounding roofs. It was unnoticed because at that time it was of no concern to the present day self-styled electronic and television experts, but then came "The Eye". Antennas by the dozen crowded my lonesome lone wire. Still it was unnoticed. In fact, it was buried. It was then that I became foolhardy, erected a doublet placing it securely and well above the leafless limbs of the man-made trees. Immediately I was recognized. I was——"*A HAM.*"

I was the baby that caused channel 2—to whinny
" 4—to shimmy
" 5—to hiss
" 7—to miss
" 9—to flutter
" 11—to mutter
" 13—the worst of all

Subpoenaed, was I, by a group of these experts, with the landlord as their champion, to appear in a magistrate's court in Bronx County for a violation of the multiple housing act. My simple doublet was in violation. Broken, bent, rusted and sagging television spectres seemingly carried legal blessing.

My first appearance in court made me realize that I needed legal assistance. I secured an adjournment and got a "Mouthpiece". At the trial, after much argument, the judge blandly but truthfully admitted that he knew nothing of radio or television. While he could find no violation on my part, with reference to the housing act, he suggested that the matter be brought before a municipal court for further examination and a federal court for a technical ruling. Me, a simple short-wave listener was becoming a test case between "Ham Radio and TVI" —and at my expense. Nobody, as in the "6YMD" matter, rushed to my aid.

I took down my antenna, folded my tent and stole away. I moved.

Laugh, you "Hams"—Laugh at my expense. I will add it to my accounts payable ledger that shows the entries of aggravation, two days from business, a seventy-five-dollar legal fee and a one-hundred-dollar moving bill.

Many will say a "SWL" got his just desserts. When they called me a "Ham" I tried to act like one—but I lost.

Harold Nesbitt
White Plains, New York

Ham Courtesy

Dear Wayne:

While looking through the October issue of *CQ*, I ran across the letter to you on page 68.

I think Mr. Konold, K6AHL, has hit upon a real keen idea for your magazine to develop. I haven't recently heard of any outstanding cases of exceptional courtesies on the bands, but I know that if *CQ* was to appoint a few spotters to look out for just that kind of thing, along with their daily ham activities, that some of our fraternal brothers and sisters would surely obtain some well deserved recognition for their outstanding services.

I will keep my eyes and ears open around the El Paso area and if I find anything which would make for an interesting article for *CQ* I'll surely pass it along to you.

I am certainly looking forward to another "good big issue of *CQ*" next month, till then very 73 and we'll BCNU SOON!

Aubrey Stewart, W5ZWT
El Paso, Texas

O. T. Transmitter

Dear Wayne:

I am gradually getting settled at my new QTH and have reported for duty at the Bureau of Ships. To my surprise there was a considerable amount of mail awaiting me regarding my article in the September issue, all very complimentary.

It was divided into two groups; several letters from old timers welcomed me back into the "CQ ranks", and were delighted to see a supporter make his voice known in favor of the lowly triode. The other, and by far the largest group also liked the article but questioned the value of grid resistor, R1, in the wiring diagram. The error slipped by me when I read the article, but instead of 10,000 ohms it should have been 1,000 ohms. I suggest you run a squib, to save me needless correspondence, stating that the correct values are:

R—1,000 ohms
RFC 1 is 1 Mh, 400 or 500 mils (Johnson 102-752)
RFC 2 is Ohmite Z50
CH is 2500 volt mica (not 3KV Cer)

Readers picked up the other errors from the picture.

Gilbert L. Countryman, W3HH
Captain, U.S. Navy
Washington, D.C.

Dear Wayne,

This is just a note to let you know I think you're doing a swell job. Keep up the good work. Incidentally, the Detroit gang seem to be delighted to see, once again, a Radio Amateur as Editor of CQ.

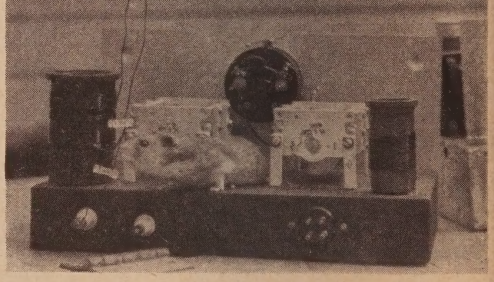
Before closing I would like to mention a couple of articles I would like to see in CQ. Some time back at the local club I mentioned getting a Speaker to give a talk on how to find a good location. Like the one W4FU has! The mention of picking a good QTH brought cheers from the group but unfortunately no Speaker could be found. The idea would have to include something better than just driving around with a mobile receiver but not necessarily requiring $4,000 worth of measuring equipment.

The other article pertains to a self enclosed Antennascope and Signal Generator. The Generator should be battery operated and bandswitching with an isolator stage so that antenna loading would not change the frequency more than a very few K.C. As you no doubt know, using a Grid Dip Meter for a generator is strictly for the birds. Also the transmitter output may not be favorable for coupling into the Antennascope either from a power level or circuit wise. Then too, I hate climbing a 75 foot tower with A.C. lines draped over everything and hanging to the ground.

Just one more before closing Wayne. New tubes appear on the market, for Television, each month. It usually takes about two years before these types begin to appear in Amateur equipment either in CQ or QST. Why not have a small Department devoted to a discussion of these new types as pertaining to their use in Amateur equipment on a strictly current basis?

Hope we can click on the air someday soon Wayne.

Bill McNeil, W8OCT
(Only Cash Talks!!)
Berkley, Michigan



Dear Editor:

Occasioned by the ham shack's location next to the nature shack at camp this summer, we were in the habit of letting our hamsters gambol amongst the equipment—the power of course being off at the time. Hamsters, as you may know, are extremely inquisitive creatures, and the complexities of our gear seemed to stimulate them no end. Some of the results are enclosed for the benefit of correspondingly inquisitive ham readers. No, Milton (pictured) is not licensed, but perhaps someday . . .

Rick Levy, KC2ID/1
Harvard University
Cambridge, Mass.



THE NEW

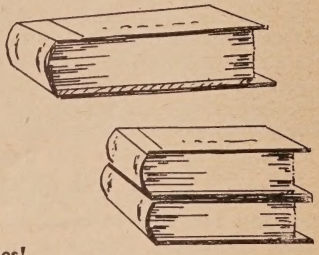
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[*from page 13*]

have been reported. Since I was visiting the VHF editor for the weekend I naturally brought along all the latest VHF equipment from my shack. This included the Marshall 6M converter, the World Radio Labs 6M converter and the Harristahl 6M transmitter. Helen threatened not to feed us if we didn't get her going on Six so she could use her new Technician license. After a few false starts, interrupted by some of the better TV entertainment, we hooked up the WRL converter to the 2M antenna and heard someone in QSO. Not bad for one o'clock in the morning! A few minutes later we had connected the Harristahl transmitter to the 200 volt preamplifier supply and had it on the air. Since it has an antenna relay built in the connections were simple and quick to make.

The first call brought us a QSO with W1VSV in Wakefield, Mass. Within a few minutes W1UVB in North Reading, Mass., and W1ULU in Derry, N.H. (works at Evans Radio) had called in. The QSO continued until about 3 a.m. All stations reported that we had a strong and well-modulated signal. I'll try to have a brief writeup on the Harristahl transmitter for you next month. Definitely newsworthy. It's a beauty.

a Peek into the 1955 DX Contest Results

It is still far too early to bring you any complete tabulation of the contest results, but we don't want things to drag on like they did last year to where a lot of people forgot about the contest before the results got into print.

The general gist of the comments accompanying the logs was that this was the greatest contest ever held. Some 500 logs have already been received, so this may well be. Few of the participants managed to avoid working a rash of new countries. The band that surprised everyone was 10. Several phone contestants managed scores over 15,000 on 10M with the CW contingent not far behind. W4DHZ scored 14,560 on 10M CW, which gives us an indication of what was possible. W8BKP/W8WFB claims 21,910 on 10M phone for the present high score.

Apparently everyone listened on 80M for DX, but few actually used the band. From all over the world have come cries of, "Where was all the 80M DX?" DL4ZC pulled 2,666 on 80M CW, leaving all other contenders about 1500 behind. On phone he hit 375, exceeded so far by W9EWC with 483. Since both of them are in the all-band race these scores are merely indicative and the winners for the 80M honors may well have much lower scores. Maybe next year we will have to suggest some sort of co-ordination for better 80M work.

80M was a beehive compared to the Top Band. So far only a couple of logs give any indication that there was such a band. VP7NG reported a mighty score of 6 on 160M CW!

The predictions about 15M are being borne out in practice. This band pushed good old standby 20M pretty hard this year. W4YK came up with 77,112 on 15M phone while W2WZ hit 66,913 on 15 CW. Conditions around the world were reported good on this band and some really good DX turned up for the contest.

The highest scores still are turned in by the 20M contingent. W3JTC has a single-band 108,295 on 20M CW with W3JNN just behind him at 102,362. The W3JNN phone score of 60,713 is way out in front so far, but I'll bet some of those late scores will change the whole picture.

Forty was used as a supplementary band almost universally and few one-band scores have been received for it. The one outstanding exception is W6BYB with 13,865 on 40M CW.

All-band scores over 100,000 on CW were turned in so far by: W4DHZ (354K), W8JIN, HB9NL, DL4ZC, W6ITA, W9HUZ, W4KVX, 4X4CK, KP4JE, W7VY, W4KXV, W8RQ, W3MFW, ZE3JP, HB9RW, W8EV, W1ODW, VE4RO, SM6ID, KP4KD. Multiple-operator stations W2HJR (521K), KA8AB, W9IOP, and W6NJU also scored over 100,000. KA8AB turned in the highest multi-op phone score too with 169,136. Single-operator phone scores over 100,000 were claimed by: CX2CO (341K), CO2BL, W8JIN, W4YK, W9EWC, W4KWY and PY2CK.

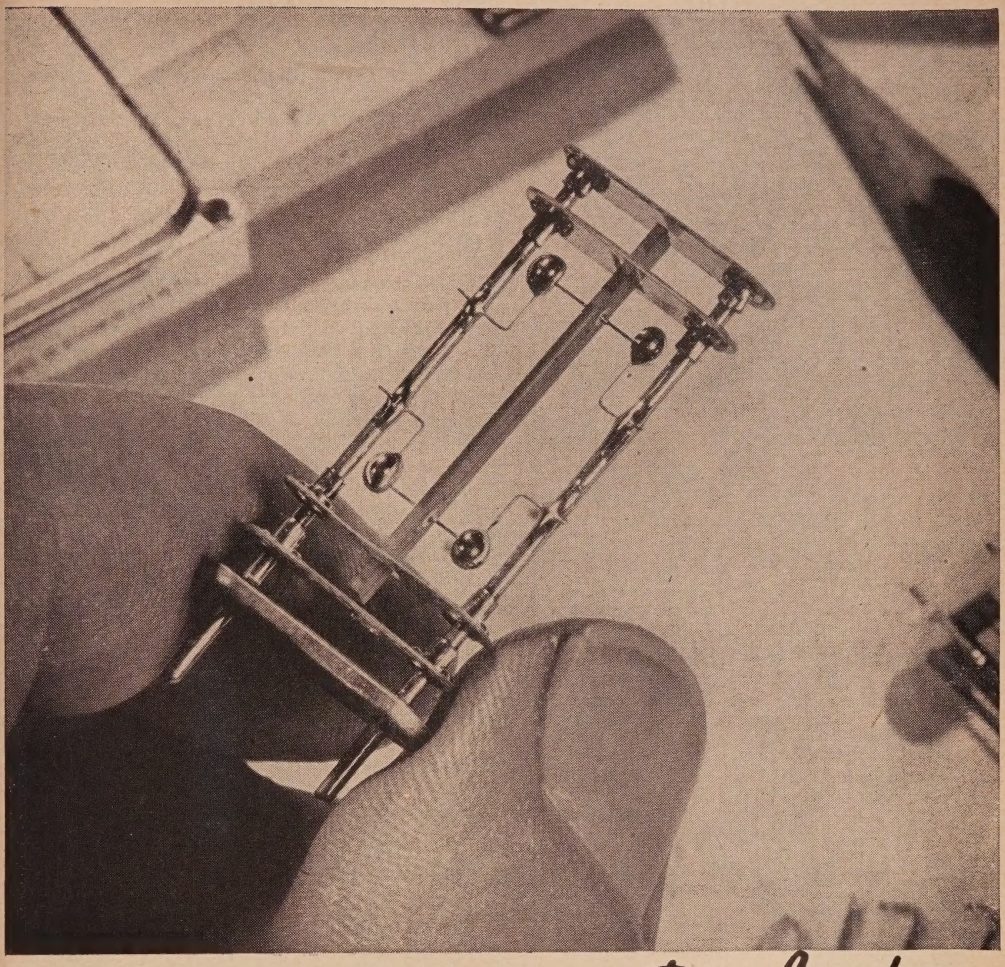
Looking at random through the logs submitted, some pretty good DX calls turn up. For instance, you might have worked: OD5LX, ZL1MQ, FA8DD, EA8BO, KA8AB, CR9AH, SP5AR, 4X4CK, ZP5CF, FB8BC, KA2WV, ZE3JP, KN6JIV, VU2AK, FA3JY, KV4AA (?), I1BNU Trieste, XZ2OM, OK1KKH, VS2BD, etc.

The deadline for mailing logs is still two weeks away as of this writing so many of the top scoring logs may not be received by us for another month. As soon as they are all in we will start the cross-checking and will bring you the final results at the earliest possible moment. This might mean they could be ready in time to go in the March *CQ*, but I expect I'd better save room in the May issue if the usual normal emergencies crop up. We'll do the best we can, anyway.

There have been some questions about the Certificates for previous years. Please note that no Certificates are issued to winners with less than 50 contacts or with less than five hours operation. If you have been a winner, have met these requirements and have not gotten a Certificate then drop *CQ* a line with the particulars and we'll see what we can do about it.

$1^4 + 2^3 \times 3^2 \times 4^0$,

Wayne, W2NSD



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Bliley CRYSTALS

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[from page 83]

Help Wanted

Robert Mix, Apt 304, 610 North Imboden Street, Alexandria, Virginia. Robert needs help in code and theory.

Jim Polk, Box 185, Hunter, New York. Jim needs someone to give him the test. He would also like some pen-pals.

C.S. Lindsay, 412 Corona Street, Winston-Salem, North Carolina. Mr Lindsay needs help in code and theory.

Norris Sapp, 365 East 4th South, Green River, Wyoming, Norris is taking a correspondence course in radio but needs help in code and theory.

Dennis Skiffington (15), 15340 Clark, San Lorenzo, California. Phone: EL-1-1791. Dennis needs help in code and theory.

Anthony L. Anderson, 57 Elmhurst Road, Newton 58, Massachusetts. Anthony would like to have some SWL pen-pals, any state or country.

Mike Gulley, 2502 West Mulberry, San Antonio, Texas. Mike would like to have some one give him the novice test, he would also like to have some pen-pals interested in ham radio, best of all a YL.

M. R. Simpers Jr. (13), 1164 Dancy Street, Jacksonville, Florida. Telephone: EV 86731 needs help with the theory.

Edward Corbeil, C/O Nursing Service, V. A. Hospital Davis Park, Providence, Rhode Island. Telephone: JA-11700 ext. 249 needs help in getting prepared for his test. He would like some help with the bug.

Robert J. Stewart, 2027 Tulip Street, San Diego 5, California. Telephone: COngress 2-1031. Bob needs some help in code and theory. Some of you good California boys help this "Buckeye" boy.

Listing in Novice Shack Help Wanted ads are for your use to get help in getting some one in your city to help you with your studies for an amateur radio operator's license. There is no cost involved, just drop a line to me and ask for help. Your name will appear as soon as the delays in printing will allow (about two months will elapse from your letter to the time that your ad will be on the newsstand). The ads should be in my hands by the 13th of the month to allow me time to write them up. Thank you.

As we are entering another year, let's resolve to get that General Class license and do something that will make amateur radio better for all of us.

I will be seeing you from the same newsstand (why don't you *subscribe*?) next month.

Good luck for 1956.
73,
Walt.

[from page 67]

geometry of the circuit. The critical frequency and the height of the ionosphere are continuously measured at nearly 100 *ionospheric sounder* stations located throughout the world.

An ionospheric storm usually becomes observable, in varying degrees of intensity, at ionospheric measuring stations throughout the world within a few hours of each other. The typical storm consists of two phases. During the initial, or *positive* phase of the storm, the critical frequency generally *increases* considerably from normal values. This means that most storms actually begin with an *improvement* in high frequency propagation conditions. *Table 1* is a plot of noon-time critical frequencies measured by the ionospheric sounder located near Washington, D.C. during a disturbance that began on April 25th, 1955. On April 25th an increase in the critical frequency was observed. A day later, the critical frequency nose-dived sharply by almost 2 Mc. This began the second, or *negative* phase of the storm. Associated with this decline in critical frequency was a sharp increase in the height of the *F*-layer. The normal height of the *F-layer* at noon time during April was approximately 225 miles. The height during the negative phase of the storm rose to approximately 350 miles. Conditions remained erratic during the negative phase for about 3 days then began to slowly recover. By May 2nd the storm was over, having lasted almost six days. In general, most ionospheric storms follow a similar pattern beginning with a positive phase of improved conditions lasting a day or two, followed by the negative phase of disturbed conditions lasting several days and then followed by a recovery period of about two days.

During the period July 1, 1954 to June 30, 1955, 964 disturbed hours were recorded at Washington, D.C. Storm conditions therefore existed a little more than 10% of the time. Storms tend to follow a seasonal pattern as can be seen from *Table 2*. They occur more often during the spring and fall (equinox months) than during the winter and summer. They also tend to occur far more often during periods of high sunspot activity than during the low part of the cycle. This means that a much higher percentage of disturbed hours will probably occur during the next few years than the 10% observed at Washington, D.C. during the low period of the present sunspot cycle.

Since ionospheric storms can seriously disrupt communications for several days, it would be advantageous to be able to forecast such disturbances so that communicators may be able to plan alternate means of communication during these periods. Methods for the forecasting of ionospheric storms are now in the process of development. At the present stage of the art, long and short term forecasts can be made with moderate success. Next month the various

[*Continued on page 90*]



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methods of forecasting ionospheric storms will be discussed.

Sunspot Cycle

This month's forecasts are based upon a predicted smoothed sunspot number of 50 centered on January, 1956. The observed monthly Zurich sunspot number for October was 58.7. This results in a 12-month provisional *smoothed* sunspot number of 23.3 centered on April, 1955.

YL

[*from page 56*]

back to sea. . . . W3WUE, Adelaide, is helping her OM organize the Delaware Valley Emergency Net. . . . KP4WI, Mildred, is now W3DHL at Wheaton, Md. . . . W3NNS, Anabel, greatly enjoyed a visit from W5IZL, Ruth, after many years of daily QSOs on 10 meters. Ruth also met W3's QPQ, YHP and ATF. . . . W3TSC, Camille, has an interesting job as a conference reporter at the Pentagon.

K4BUN, Florence, is ex-KL7AZJ. She is now living in Arlington, Va. and working for the government as a geologist. . . . W4BWR, Ruth, is EC for South Brevard Co., Fla. and in charge of CD communications in the area. . . . W4's WTJ, Betty, and HMJ, Florence, were on a TV program devoted to Ham radio. . . . YLs at the North Ala. Hamfest were W4's VDL, RLG, CMK, WJX, TOG, K4APF, W5AVD.

Our sympathy to W5GUC, Mildred, whose OM, W5BTM, passed away in Sept. . . . Many YLs attended the Amateur Radio Day at the State Fair, Dallas. In prize drawing WN5JLX, Hazel, won an SX-100 receiver. . . . Via W5SYL, Iva, we learn that W5TTU, Pat, was hospitalized with a serious heart condition, but at writing (mid-Nov.) was on the mend.

Congratulations to W6WSV, Carol, for winning second prize in a Los Angeles department store essay contest. The prize was a 2-yr. scholarship for her 7-yr. old jr. YL, Marcia. . . . K6ELO, Roxy, is happy over the little slip of paper granting her General privileges. . . . W6QMO, Jeri, is now employed as radio operator at A6USA, Presidio of San Francisco (MARS station), the first YL op to be hired since the War when WACs were operating there. . . . K6HWB, Vivian, is active on 10 after two months off the air due to an auto collision in which both their station wagon and mobile rig were a total loss.

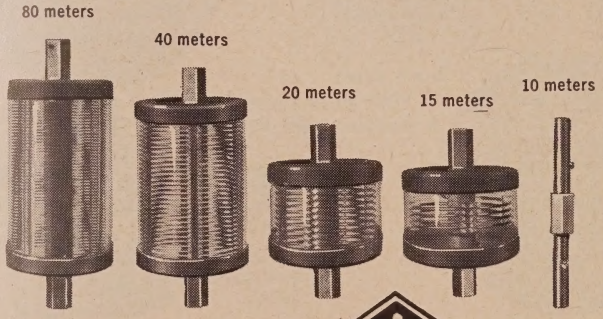
WN7ZMN, Phyllis, and her OM are leaving Portland in Nov. for a year's trip with car and trailer. . . . With WN7ZMN away, W7QXH, Eileen, has taken over the office of secretary and publicity chairman of the "Portland Roses."

Former W3LSX, Kay, has the call KØBTV. Without the Ø that's a Denver TV station—Kay wonders if their fan mail will get mixed. . . .

KZ5DG, Grace has 98 stations confirmed

[*Continued on page 92*]

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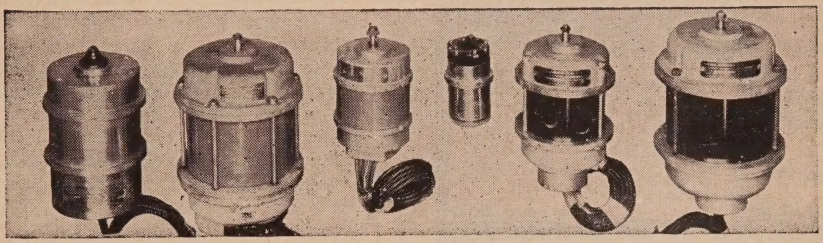


TABLE OF TYPES AND PRICES—All 110 V. 60 Cycle Units

Size & Type	Approx. Wgt. (lbs.)	Approx. length (inches)	Approx. dia. (inches)	Price New
5F	5	6.0-6.8	3.4-3.6	15.00
5G	5	6.0-6.8	3.4-3.6	15.00
5DG	5	6.0-6.8	3.4-3.6	15.00
5D	5	6.0-6.8	3.4-3.6	15.00
5CT	5	6.0-6.8	3.4-3.6	15.00
6F	8	6.4-7.5	4.5	20.00
6G	8	6.4-7.5	4.5	20.00
6DG	8	6.4-7.5	4.5	20.00
6CT	8	6.4-7.5	4.5	20.00
7G	18	8.9-9.2	5.8	25.00
7DG	18	8.9-9.2	5.8	25.00
110 V. 400 Cycle Units				
5F	5	6.0-6.8	3.4-3.6	9.50
5G	5	6.0-6.8	3.4-3.6	9.50
5DG	5	6.0-6.8	3.4-3.6	9.50

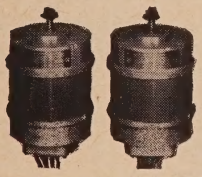
G-Generator: F-Motor (Follower): DG-Differential generator:
D-Differential Motor: CT-Control Transformer

The function of the synchro is to impart accurately motion from one shaft to another shaft where direct connection is not feasible either because of distance or because of need for torque amplification. Synchros are used extensively for remote-indicating and data-transsion, such as compass repeaters and other systems, and are combined with servomechanisms for hundreds of uses such as aiming guns, pointing searchlights, automatic steering, remote control, etc.

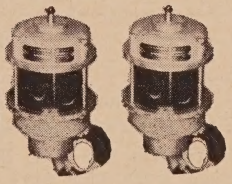
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All 110 V. 60 cycle units.

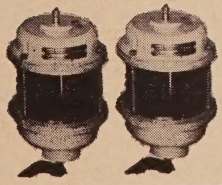
Below are listed synchros removed from equipment and sold as used to provide you added savings.



Size 5 motor & generator combination suitable for TV beam, weather vane, indicator and other light applications. set **$17.50**

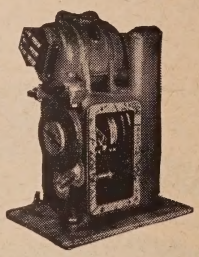


Size 6 generator & motor for medium size beams and greater torques. set **$25.00**



Size 7 generator & motor combination which is suitable for all but the heaviest beams and can be used with suitable gear ratios for these. Provides the maximum of torque ..... set **$35.00**

TORQUE AMPLIFIER — NEW — $9.75



Ideal unit for use with synchros size 5-6-7. To provide torque amplification and allow ease in rotation of input shaft. (Works similar to power steering). Small amount of rotating power applied to input shaft is reproduced in any direction on the output shaft, the torque being supplied entirely by a 1/40 HP 110 V. AC motor through a gear and planetary drive hookup. Speed varies directly with rotation of input shaft with no noticeable loss of accuracy. Motor requires capacitor of 85-120 mfd. for starting. These units originally used on gun control device and cost the Gvnmt. hundreds of dollars to mfg. Unit fully enclosed in cast aluminum case, size all 12" h. x 5⅝" w. x 7½" d. Wgt. 23 lbs. Packed in original wood box, total shipping wght. 45 lbs. Brand New **$9.75**

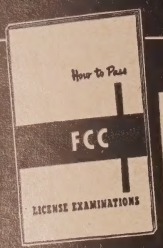
Starting capacitor for above Torque Amplifier, New **$1.00**

TERMS: CASH WITH ORDER EXCEPT RATED CONCERNS. ALL MERCHANDISE GUARANTEED TO YOUR SATISFACTION OR MONEY REFUNDED IF RETURNED WITHIN 10 DAYS. PLEASE INCLUDE SHIPPING CHARGE: OTHERWISE ORDER WILL BE SHIPPED EXPRESS OR FREIGHT COLLECT.

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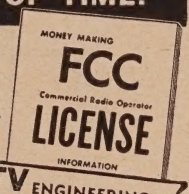


Free . . .

Tells where to apply and take FCC examinations, location of examining office, scope of knowledge required, approved way to prepare for FCC examinations, positive method of checking your knowledge before taking the examination.

GET YOUR FCC TICKET IN A MINIMUM OF TIME!

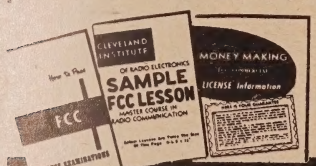
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Electronic Training also available to Canadian Residents

[*from page 90*]

for DXCC on 15 meters, while KZ5KA, Kay, has 83, also mostly on 15.

33 es CUL—*W5RZJ.*

WAC/YL AWARD

1. The Young Ladies Radio League issues a Worked All Continent-YL certificate to any licensed amateur in the world.
2. Two-way communication must be established on the amateur radio bands with the six continents: North America, South America, Europe, Africa, Asia, and Oceania. Any and all authorized amateur radio bands may be used. Cross-band contacts are permitted; contacts may have been made over any period of years.
3. Contacts with all six continents must be made with duly licensed woman operators.
4. Contacts with all six continents must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.
5. Six QSL cards or other written confirmations, showing proof of contacts, must be submitted with application. IRC's, or the equivalent thereof, must be sent with the confirmations to finance their return by first-class mail. The YLRL will not be responsible for any loss or damage to same.
6. Decisions of the WAC/YL custodian regarding interpretations of these rules as here stated, or later amended, shall be final.
7. Send applications and confirmations for this award to: Opal Jones, W6PCA, WAC/YL Custodian, Route 1, Box 180, Esparto, California.

VHF

[*from page 72*]

to anywhere between 12:00 midnight and 3:00 a.m. most every night.

Sounds just like home, Dave, such hours these VHF men keep.

"Usually work East, South or South-west, but if conditions are good I turn my antenna north-east and try to work any New England States I can.

Try turning the antenna this way when the band isn't so good, Dave. Sometimes you have a better chance because of less QRM.

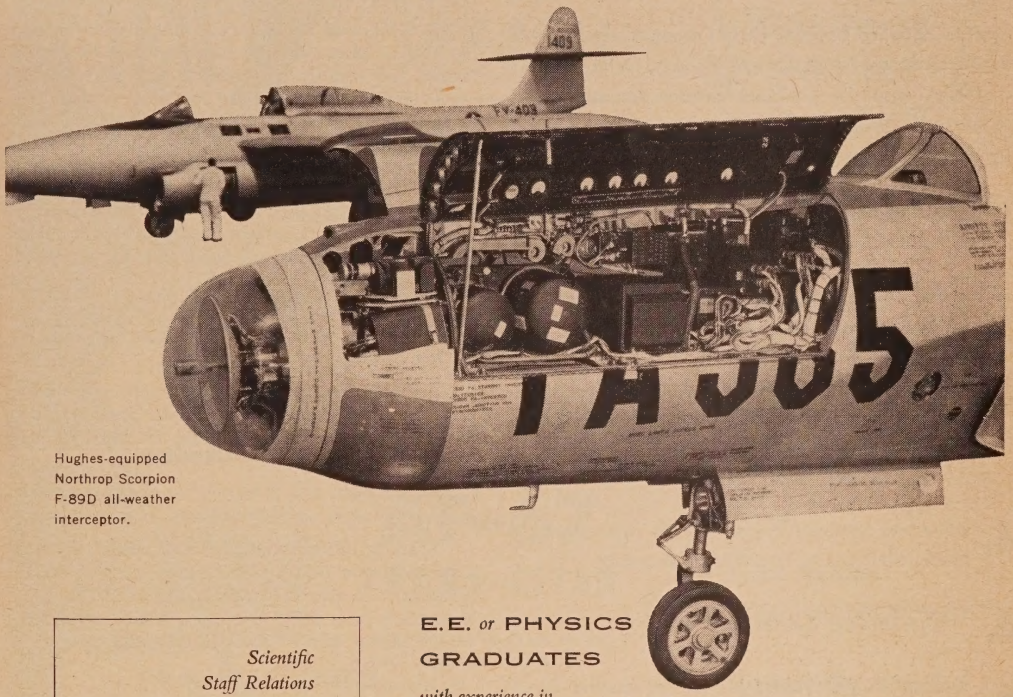
"I work W3DEX approximately forty-five times a month, as far as I know, W3DEX and myself are the only ones from this section to enter your contest.

Now look Dave, the contest says FIVE contacts a month, and just because W3DEX is a

[*Continued on page 94*]

Use Your Military Training

The time was never more opportune than now for becoming associated with the field of advanced electronics. Because of military emphasis this is the most rapidly growing and promising sphere of endeavor for the young electrical engineer or physicist.



Hughes-equipped Northrop Scorpion F-89D all-weather interceptor.

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Since 1948 Hughes Research and Development Laboratories have been engaged in an expanding program for design, development and manufacture of highly complex radar fire control systems for fighter and interceptor aircraft. This requires Hughes technical advisors in the field to serve companies and military agencies employing the equipment.

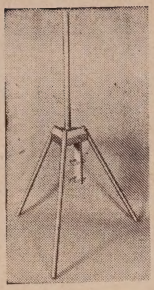
As one of these field engineers *you will become familiar with the entire systems* involved, including the most advanced electronic computers. With this advantage you will be ideally situated to broaden your experience and learning more quickly for future application to advanced electronics activity in either the military or the commercial field.

Positions are available in the continental United States for married and single men under 35 years of age. Overseas assignments are open to single men only.

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DELTA-TENNA



custom engineered for all VHF and UHF applications including 2, 6 and 10-11 meters 220 and 432 MC

Manufactured by Western Gear Corporation and expertly engineered for maximum efficiency, Delta-Tenna is a new, vertically polarized antenna for amateur, commercial and military installations. Here are some features of the new Delta-Tenna:

1. Low standing wave ratio, excellent match to 52 ohm RG8U Coax.
2. Gold anodized elements, assuring extra long life in adverse weather conditions.
3. 1" diameter driven elements and ¾" radials offer a maximum of radiation surface and uniformly excellent loading for the entire amateur band for which it was designed.
4. Attractive appearance, an aid to overcoming usual objections to transmitting antennas.
5. Light weight, low wind loading.
6. Built-in coaxial fitting. U-bolts on bracket for simple attachment to vertical pole.
7. Unusually rugged design enables these antennas to comfortably handle in excess of a kilowatt of power.

2-meter—$19.95, 6-meter—$24.95, 10-11 meter—$29.95
220 megacycles—$18.95, 432 megacycles—$16.95

See your distributor or write

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Electro Products Division
132 W. Colorado St., Pasadena 1, Calif.
Phone RYan 1-6604

[*from page 92*]

YL doesn't mean you can nab on to her every-time she gets on the air.

"Rosalie, W3DEX, is running a little more power and has a better location than I do but we still have a contest between ourselves to see who can work the most stations, and also the longest DX. She worked more initial contacts than I have, 125 to 157; but to date, I have the DX record.

"W3HFG is one of many hams in this section who belongs to the 'Midnight Maniacs Net', sometimes known as the 'Flashnight Net'. This net consists mainly of fellows who get on the air about 1:00 a.m. after they get off work. More active hams on this net are W3's OWW, DEX, HFG, QFM, SST, KCA, YPL, SXO, HFZ, CAJ, GJG, and some others who are not quite as active. Most of these hams are not on every night, but usually you can be sure of working at least two or them every morning. Sometimes a three or four way QSO in the morning will last up till 3:30 or 4:00 A.M.

"This 'Midnight Maniacs Net' has a hidden transmitter hunt every two to three weeks, usually starting about 1:00 a.m. in the morning, thus the name 'Flashlight Net'. We really enjoy these get-to-gethers and can't wait till the next one rolls around."

Trumansburg, New York: Hank (W2SHT) gives his opinion of the column:

"Enjoy your column very much, especially the sked box. We would like to have a sked with anyone in West Virginia if there is any activity there at all.

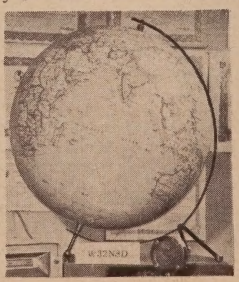
Careful Hank, you'll surely hear from someone now, be they willing or not to keep skeds.

"I am on 144085 phone or CW, with a sixteen element beam that I won at the Syracuse VHF gathering. I run 120 watts to an 829B. My converter is a 5670 cascode, 6AK5 amplifier, 6AK5 mixer, 12AT7 oscillator crystal.

[*Continued on page 96*]

Do You Mean

you still don't? Hundreds do. Do not persist in such a negative attitude. Join the Thousands (.29 x 10^3) of Happy Owners of the CQ World Globe (see page 83). For the *Ambassador* World Atlas see page 101.





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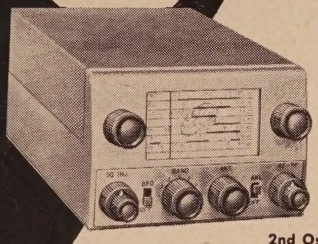
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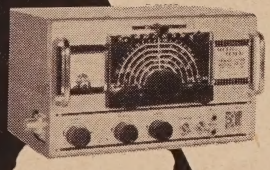
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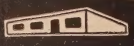
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CQ Magazine

67 West 44 St. New York 36, N. Y.

[*from page 94*]

"Wonder what you think of a calls heard section for two and one and a quarter? Something like the calls heard section in the old days. If the boys would send in the calls of any station over two hundred or two hundred and fifty miles and also the day and time, it might help to predict future openings etc."

We may try it, Hank, seems like a number of the boys have suggested it.

New Orleans, Louisiana: W5JGV sends a few lines to enlighten us as to activity on six:

"Just a few lines to say that there are more boys on six down here than just W5HEZ, who says he thought he was the only ham on six in this state last year.

Give it to him Ralph.

"To my knowledge, there are at least three more followers of this method of DX hunting in Louisiana. W5JTO/5 fixed portable Lee Carpenter, W5WCJ Paul Mayrone, and myself are also operating this band.

Start hunting Jack.

"I am running a hundred and twenty-five watts to a pair of 826's, driven by a Harvey Wells Bandmaster TBS-50-D; feeding to a four element wide spaced beam on the top of a forty foot telephone pole. My receiving gear is the two tube converter in QST several months ago, feeding into a new SX-99.

"Lee, W5JTO/5 is running sixty-five watts to a four element beam about thirty feet up, and has a similar receiver set-up. Paul, W5WCJ, has been on for a much longer time, and runs about a hundred watts to a four element beam. His receiving equipment is also similar to mine.

"I am willing to make and keep skeds with anyone who wants to try, week-ends preferred, as I am a senior in high school. We also have two other fellows here who are working on some gear for six. We hope to have them on soon.

We hope so too, 'cause we hope to be on by the time this is in print.

"Just a note here to Bill (W8SLE) on his transmitter troubles. The Harvey Wells is a little tricky to load up on six if your feed line is the slightest bit mismatched; at least it seemed so in my case. I am feeding my beam with 300 ohm twin lead, and until I matched the line, all I was doing was heating the insulation so much it melted. The plate and grid current did strange gyrations—70 ma. on the plate, and between one half and ten ma. on the grid as I modulated. All of this vanished when I matched the line to the antenna. Best of luck to you Bill."

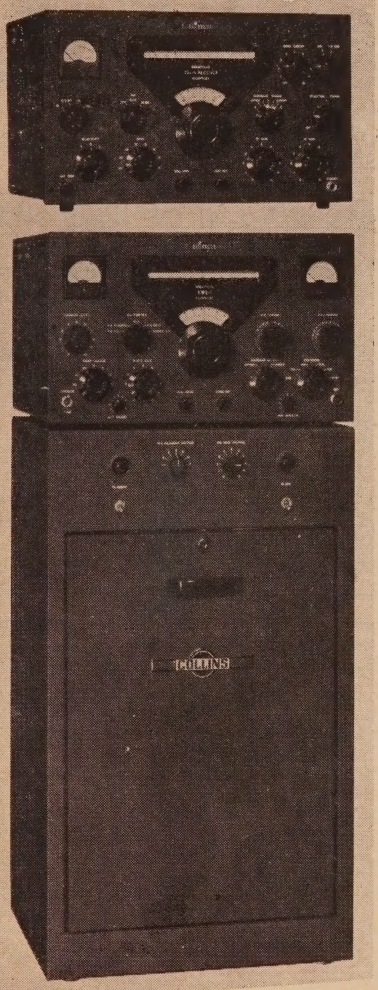
Let us know Bill, if this helps your problems.

[*Continued on page 98*]

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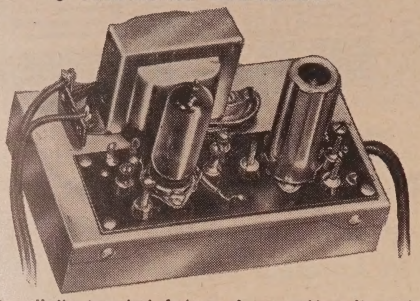
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[*from page 96*]

Endicott, New York: Bob (W2YLM) is interested in skeds on six-meters:

"For your schedule department, I would like to know of any station desiring skeds with Binghamton, New York on six-meters (50.4) Friday nights from 7.30 p.m. on to any hour. I have my fifteen watt 2E26 rig at our club location K2ERQ. The antenna is a three element beam and receiver is a VHF152A-NCA183D set up with a crystal controlled converter in the works. Refer anyone possibly desiring a schedule to contact me through K2ERQ or my home QTH. W2YLM."

Three cheers, another six meter station ready for skeds.

Riverton, New Jersey: From Joe (K2ITP), we received the following:

"My brother, K2ITQ, and myself run ten watts (6J6-6J6-5763) on two and sure envy a kw and sixty-four element.

We had to build up to it too Joe, it wasn't an overnight job by any means. We've been VHFing for fifteen years now and should have something to show for it.

"We have a ten element vertical, can be flipped to horizontal but then it is really hard to rotate it, but can set it in a general direction.

"Have worked nine states on two, Virginia, all W3's, all W2's, Rhode Island, Connecticut and New Hampshire. Would like to know about having a sked with you to raise that to ten."

We're looking for skeds down your way, so just let us know what time is best for you. Any time week-ends or evenings is O.K. with us. Meanwhile I'll be listening at the time you mentioned, 9:30 p.m. Friday and Saturday on 144.318.

Baton Rouge, Louisiana: KN5BGG, Len Morgan assures us that Louisiana is still alive on two-meters too:

"Just recently, through the invaluable assistance of W5HEZ, W5GIX and W5EVQ, we

[*Continued on page 100*]

Amateur Radio Show

Almo Radio will sponsor the third annual Philadelphia Industrial and Amateur Show at the Penn-Sherwood Hotel, 39th & Chestnut, on Wednesday and Thursday, January 25th and 26th. The latest in industrial and ham equipment will be on demonstration. Admission is by ticket only, however tickets are available upon request from any Almo store.

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[*from page 98*]

have developed a nice little ragchewing session each night at 20:30 CST. Here in southern Louisiana at the present time we have, in addition to the previously mentioned stations, W5IVI, W5UJK, W5HCM, W5MXJ, W5WLF, W5ZRL, and in the novice class WN5KRT, WN5KRU, KN5AZT and myself KN5BGG. Our frequencies range from 145.35 down to 144.45.

"The rig here is a Lettine Model 242, forty-five watts to a sixteen element rotated beam sixty feet in the air. The receiver is a NC-183D with a 152A converter ahead of it.

"I'd like to hear from anyone who would like to get in our nightly ragchews."

Glad to know how many of you there are down that-a-way Len. Hope to work you soon.

Aurora, Illinois: Dick (W9EQC) sends us the following anent 144 Mc and 220 Mc:

"Worked two new States recently, Alabama and Arkansas, making my total twenty-four, on two-meters. Am still keeping skeds with Bill, W8SVI, on 144 and 220 every night. Have worked Bill several times on two-twenty, also W8IJG, Dink at West Richfield, Ohio.

"Two-twenty is picking up around here. Several new stations on just recently, worked W9QHN in Hammond, Indiana and W9RQG in Gary, Indiana and I understand there is going to be a lot more fellows on before long.

"Last night I worked W8OQY at White Hall, Michigan on two-meters and he said there were eighteen fellows on two in the Muskeegon area and the operating frequency for most of them is 145.080."

This is good news, the more the merrier and the further along we get with VHF experimenting.

Toronto, Canada: Tony (VE3DIR) comes through as usual, with the following:

"Score for SSW isn't too good this month because I have been working pretty steadily on the four to twelve shift. However, I was pretty lucky that I was off the night the band was open; and I picked up seven states for SSW and four states for national standings."

Lucky, huh! Funny thing Tony, that you had that particular night off.

NARROW FSK

[*from page 48*]

After the oscillator is calibrated it can be used to excite the receiving converter in testing, and in the equalization mentioned before, of the discriminator outputs. The oscillator output transformer is mounted with the speech amplifier of the RF equipment in the case of an

AFSK installation.

Physically the narrow-shift equipment is built unit-style in the manner most of the author's gear has been constructed in the past ten or twelve years and described in a recent article in *CQ*[3]. A common "universal" 300-volt 60-ma supply takes care of the needs of both sending and receiving units. As large an output filter condenser as possible should be used in the power supply because of the low audio frequencies involved. No less than 16 μfd. should be employed.

Now as for results: They were very fine on AFSK, giving reliable relay operation under conditions of very heavy noise and the accompanying speech channel fully voice modulated. On FSK operation was just as good when drifting of the radio receiver and/or transmitter could be minimized but this is not easy to accomplish when it is recognized that a drift of anything over 30 cycles can convert a mark signal into a space signal or vice-versa. How many of us have receivers and transmitters that will not drift this much in the course of a QSO, or even during a single transmission? Using a fixed-frequency channel technique with the local oscillator in the receiver quartz-controlled, using a variable air-gap crystal, everything was fine but the writer's receiver simply could not make the grade in normal tunable procedure.

Even 850-shift is difficult to hold without constant retuning unless the receiver used for RTTY has low drift characteristics. It may be assumed that only those RTTY enthusiasts possessed of exceptionally stable receivers will obtain worthwhile results from ultra-narrow shift. It is possible that 170-cycle shift would be about the narrowest practicable for FSK because of the drift headache. No such difficulty exists, of course, on AFSK where subcarriers can be kept within a single cycle if necessary.

So there we have it. Standard shift is the

[*Continued on next page*]

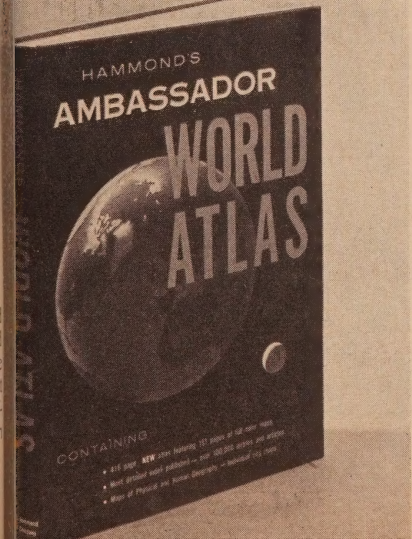
3. CQ, Aug, 1955, P23

CQ World Atlas

Oh, man! If you're a Ham, or just an innocent bystander, here's something you really need: Hammond's New Ambassador World Atlas.

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- Detailed maps of every country and geographical area
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CQ-1

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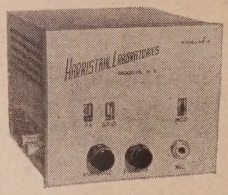
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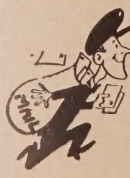
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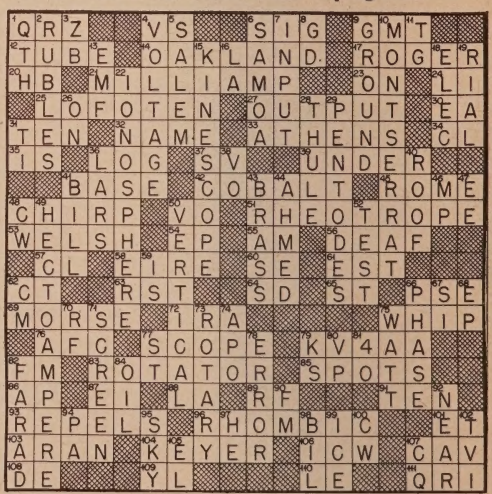
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maximum permitted by regulation and the described equipment is the minimum for proper printer operation. Certainly somewhere between 60 cycles and 850 cycles may be a happy compromise if we decide to change at all.

Incidentally, the rapid flutter frequently had on long distance signals often mutilates c-w signals to the point of complete unintelligibility while printer circuits, with their 50 or 60 DB of instantaneous limiting, are rarely bothered. Many of our commercial friends have mentioned handling printer traffic when c-w circuits had to be closed down. This would seem to indicate that DX CW hams might profit from the employment of narrow-shift FSK techniques. Imagine copying a solid signal from a local audio oscillator keyed by an incoming signal chock full o' noise and fading from ear-splitting strength to inaudibility!

The RADIOTELETYPE SOCIETY recently petitioned ARRL, through its Board of Directors, to file a request with the FCC for permission to use smaller frequency deviations than the present 850-cycle shifts now standard in all amateur RTTY work. This proposal has now been filed by the League with the Commission. It is quite likely that permission will soon be forthcoming and this event is awaited with considerable impatience by those proponents of narrow-shift who feel that its advantages outweigh its disadvantages.

Solution to XWD PZL — page 82



. . . de Mrs. W3PGB



SINGLE SIDEBAND TECHNIQUES

by Jack N. Brown, W3SHY

This is the latest addition to the "*CQ* Technical Series," Over 2000 Hams took advantage of our pre-publication offer and are now probably sitting back enjoying Jack's breezy style of telling the full story of SSB. This book is a continuation of Jack's series "Getting Started on Single Sideband." In this book he goes on to describe two different SSB transmitters and several items of useful test equipment, and throws in a good background on how to keep your SSB signal clean. This is the only book of its kind on the market. Some may try last-minute imitations, but they'll never equal it.

112 pages $1.50

Radio Amateurs'

MOBILE HANDBOOK

by William I. Orr, W6SAI

Going Mobile? This manual is indispensable It covers in logical step by step form all facets of Mobile Operation. This book is the only complete source of such information and is not just a collection of reprints of magazine articles. No other book or manual tells you how to adjust your car regulator, information worth many times the price of the book and little known even in automotive circles. Written in the usual Orr style, the book is both thorough and easy to understand. The book is filled with valuable information nowhere else available and is profusely illustrated with photographs and diagrams. Invaluable.

192 pages $2.00

CQ, THE RADIO AMATEURS' JOURNAL

by well-known Hams and authors from around the world

New format, new cover, new material, better articles are the by-words at the *CQ* Editorial offices. Reacting to the hundreds of letters received during the past summer on "what I want in *CQ*," the editors put their heads together and came up the this NEW looking *CQ*. Regardless of what month you choose out of the next 12 or 24, *CQ* will contain first-rate material from the best authors in the Ham game. Your subscription is a guarantee (a money saving one at that) you will be among the first to see these features.

(See Page 119 for subscription blank)

CQ YEARLY BINDERS

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Wondering what to do with your loose copies of CQ? That's easy. Get a CQ binder at a ridiculously cheap price and have them at your fingertips. Why dig around under the desk, or in some old box to find an important CQ schematic? Put your CQ issues immediately in a steel reinforced red fabricord binder and keep them orderly and handy. When ordering be sure to specify whether you want yours stamped for a particular year, or just plain.

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67 West 44th Street, New York 36, N.Y.

I enclose $_____ for which please send me:

_____ copies of your "Mobile Handbook" at $2.00/copy.

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Add 3% Sales Tax in New York City.

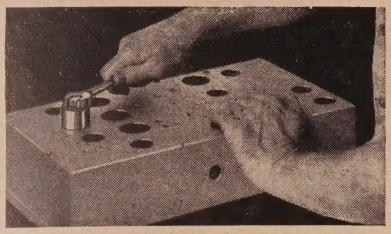
My correct address is: (Please Print)

_____
(name) (call)

_____
(street or avenue)

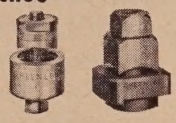
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(city) (zone) (state)

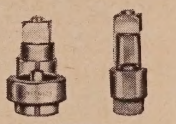
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DX

[*from page 62*]

following stations active: KG4AA (Club Station), KG4AD, KG4AE, KG4AF, KG4AH, KG4AK, KG4AN, KG4AO (Club Station), KG4AQ, KG4AT, KG4AV and KG4AY. . . . Via G6QB we hear that the MP4T- block will be used in **Trucial Oman**. MP4TAA has been heard from **Sharjah**. . . . SU1DD is now G3HDD again after a six month stay in SU-land. . . . 4X4CJ is on 3505/3520 from 0415-0445 daily except Saturdays. . . . KV4AA logged visit from W3AXT who seeks an EP1C QSL. The stateside QTH of old EQ3FM would be much appreciated if anyone can help. . . . VK9RH is active on **Norfolk Island** but VK9OK has returned to VK2AOK. . . . CN8DS (K2DS) wishes it known that many QSL's for ex-CN8 stations are on hand. Same will be mailed upon receipt of self-addressed stamped envelope. Feb. 1st is the deadline, after which, the QSL's will be destroyed. Address Col. C. R. Offringa USAF., HQ 17th Airforce, APO 118, PM., N.Y. . . .

Growing Menace

Without wishing to start the New Year off with a sour note we think it timely to say a few words about that unfortunate character, The *"TESTER"*. This creature may be classed as one, who with full power on, spends from five to fifteen minutes, with key down, in an attempt to get the last iota of power into the antenna. He will sometimes send a series of "TEST TEST TEST etc." or even "ABC ABC ABC etc." The latter may make him feel like a big commercial station. He rarely signs until this dastardly deed is complete and then can be identified by the lengthy "CQ DX" which usually follows. His signal strength, incidentally, remains about the same from start to finish.

The incidence of such occurences are such as to make CW operating decidedly uncomfortable and, of course, such operation is a violation of FCC rulings as applied to unnecessary QRM.

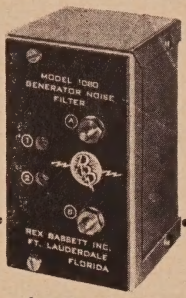
On week-ends and most other days it seems impossible to hold any sort of DX contact without the inevitable "TESTER" appearing at some time during the QSO. Just put your receiver on any random CW frequency and you won't have long to wait before a "BLAH BLAH" announces the arrival of one of this breed.

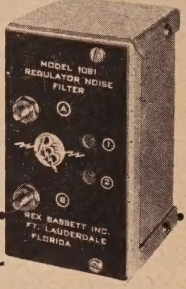
We do not think they really mean to interfere but, by some strange alchemy, they seem to feel that their signal is "invisible" or unheard during the testing process.

IT MIGHT BE WELL TO BEAR IN MIND THAT ANY TESTING, WHEN THE CROWDED DX BANDS ARE OPEN, IS BOUND TO CAUSE QRM TO SOME QSO IN PROGRESS. IF YOU *MUST* DO IT, PLEASE *MAKE IT AS BRIEF AS POSSIBLE*.

[*Continued on page 106*]

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

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15 Assorted FT-171B 15 Assorted CR-1A

100 Crystals $8.95

Assorted.....Regular value $66.00

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FT-241A Crystals for Single Sideband
370 KC-538 KC

35 Crystals $3.49

Assorted .....Regular Value $14.00

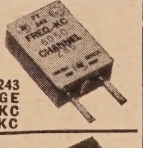
PACKAGE DEAL No. 3

HAM BAND CRYSTALS — FT-243

For operating on 80, 40, 20, 15, 10 6 and 2 meters—on either fundamentals or harmonics.

25 Crystals $6.95

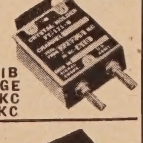
Assorted.....Regular Value $20.00



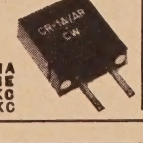
FT-243 RANGE 1015 KC -8733 KC



FT-241A RANGE 370 KC -538 KC



FT-171B RANGE 2030 KC -3995 KC



CR-1A RANGE 5910 KC -7930 KC

INDIVIDUAL CRYSTALS • Indicate 2nd Choice—Substitution May Be Necessary

Low Frequency—FT-2412A for SSB, Lattice Filter etc., .093", .486" SPC, marked in Channel Nos. 0 to 79, 54th Harmonic and 270 to 389, 72nd Harmonic. Listed below by Fundamental Frequencies, fractions omitted.

FT-243 — .093" Dia. — .486" SPC

49¢ each—10 for $4.00

370	393	414	483	506	529		440	459
372	394	415	484	507	530		440	461
374	395	416	485	508	531		441	462
375	396	418	487	509	533		442	463
376	397	419	488	511	534		444	464
377	398	420	490	512	536		445	465
379	401	422	491	513	537		446	466
380	402	423	492	514	538		447	468
381	403	424	493	515			448	469
383	404	425	494	516			450	470
384	405	426	495	518			451	472
385	406	427	496	519			452	473
386	407	431	497	520			453	474
387	408	433	498	522				475
388	409	435	501	523			455	476
390	411	436	502	525				477
391	412	438	503	526			457	479
392		481	504	527			458	480

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CR-1A SCR 522-⅛ Pin, ½" SP		FT-171B — BC-610 Banana Plugs, ¾" SPC				
5910	7350	2030	2220	2360	3202	3945
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6450	7390	2065	2260	2415	3237	3995
6470	7480	2082	2282	2435	3250	
6497	7580	2105	2290	2442	3322	
6522	7810	2125	2300	2532	3520	
6547	7930	2145	2305	2545	3550	
6610		2155	2320	2557	3570	

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4280	5485	5973	6775	7641	7940
4330	5500	6206	6800	7650	7950
4340	5660	6225	6825	7660	7975
4397	5675	6240	6850	7673	8240
4445	5677	6250	6875	7675	8250
	5700	6273	6900	7700	8273
4490	5706	6275	6925	7706	8280
4495	5740	6300	6950	7710	8300
4535	5750	6306	6975	7725	8306
		6325	7450	7740	8310
4735	5773	6340	7473	7750	8316
4840	5775	6350	7475	7766	8320
4852	5780	6373	7500	7773	8325
4930	5806	6375	7506	7775	8630
4950	5840	6400	7520	7800	8683
5030	5852	6406	7525	7806	8690
5205	5873	6425	7540	7825	
5295	5875	6673	7550	7840	
5305	5880	6675	7573	7841	
5327	5892	6700	7575	7850	
5360		6706	7583	7873	

79¢ each—10 for $6.50

	6100	6540	7150	8173	8550
3655	6106	6550	7250	8175	8558
	6125	6573	7300	8200	8566
3735	6140	6575	7306	8225	8575
3800	6150	6600	7325	8275	8583
3885	6173	6606	7340	8280	8600
3940	6175	6625	7350	8350	8625
3990	6185	6640	7375	8375	8650
6000	6200	6650	7425	8380	8680
6006	6440	7000	7440	8383	8700
6025	6450	7025	8000	8400	8733
6040	6473	7050	8025	8425	
6042	6475	7075	8050	8450	
6050	6500	7100	8100	8475	
6073	6506	7125	8125	8500	
6075	6525	7140	8150	8525	

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Sale R4/ARR—2, 11 Tube Superhetrodyne Receiver with Dynamotor DY 2/ARR-2. Tubes are: 7 ea. 9001, 3 ea. 6AK5, 1 ea. 12A6. 300 available at **$2.50**

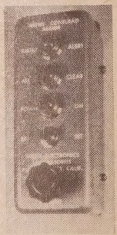
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Attaches to any b.c. receiver and employs a unique audio muting system to eliminate unwanted radio audio-signals on All-Clear conditions.

Power Requirements: 6.3 vac, 1 a; 250 vdc, 15 ma; 2 volts AVC.

Easy to follow construction data.

$29.50 in Kit Form Postpaid
$39.50 completely wired and tested

WIENS ELECTRONICS LABORATORIES
130 Crest Road • Redwood City, Calif.



[*from page 104*]

Some time ago we read a letter which suggested that from five to ten kc in the center of each DX band be set aside for "TESTERS". As second glance we feel that this would be an admirable idea IF all tuning-up processes would be confined to the designated frequencies. Such a regulation, or unwritten law, reasonably adhered to, would add operating pleasure for the more ethically-minded hams far offsetting the loss of a few kcs.

KA CERTIFICATES

Two new awards are being offered by the Far East Auxiliary Radio League (Military). These replace the old WFJS and WAJAD awards.

WFKAS (Worked five KA Stations) will be issued to any ham applicant upon receipt of QSL's confirming same.
WSKAD (Worked Seven KA Districts) will be issued to any ham applicant upon presentation of QSL's confirming contacts with seven KA districts. KA districts are KA2 through KA9 and KAØ (Iwo Jima).

In lieu of QSL cards, a letter, written by a recognized Radio League, Club or association and signed by an officer of same, giving all pertinent data, will be accepted.

Certificates will be sent post-paid by FEARL but sufficient funds should be enclosed to assure prompt return of QSL cards. JA contacts do NOT count.

Applicants should apply via FEARL, P.O. Box 111, APO 500, PM, San Francisco, Attention: Awards Manager (KA2CA).

DIPLOMA CUBA

The Radio Club of Cuba offers the "DIPLOMA CUBA" to any ham whose country is a member of the I.A.R.U. as follows:

Awards are phone-to-phone or CW-to-CW. QSL's must be submitted confirming a certain number of contacts with Cuban stations according to the ZONE of the applicant.

100 QSO's for stations in Zones 2, 4, 5, 6, 7, 8 and 9.
80 QSO's for stations in Zones 3, 10, 11, 12 and 13.
60 QSO's for stations in Zones 1, 14, 15, 29, 30, 31, 32, 33, 35, 36, 38 and 40.
40 QSO's for stations in Zones 20, 21, 24, 25, 27, 28, 34, 37 and 39.
20 QSO's for stations in Zones 16, 17, 18, 19, 22, 23 and 26.

Contacts must be made AFTER January 1st, 1953. 50% of the QSL's will be accepted if accompanied by list and data of the other 50%. Address: Radio Club de Cuba, Lealtad 660, Habana, Cuba.

73, Dick KV4AA

If you have read this far, you are a bona fide DX Man and can hardly do without either the CQ World Globe or the beautiful new Atlas. See pages 83 and 101.—Ed.

LONG TIME NO SEE!!!!
DM-35 Mighty Mite 12 V. Mobile Power Supply
Delivers over 130 W. to final. So small will actually fit glove compartment. Output voltages 625 V. @ 225 MA. These are brand new. And confidentially, you won't have to worry about THESE bearings! Brand new. Guaranteed. $12.49. 2 for only $21.00.

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B....Buy
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If you're one of these guys who like to get $1.50 in value for every $1.00 you spend — THIS DEAL IS FOR YOU!
1 NEW BOXED T-22/ARC-5 TRANSMITTER
1 NEW BOXED R-27/ARC-5 RECEIVER
1 NEW BOXED MD-7/ARC-5 PLATE MODULATOR
Plate modulated series. Complete with tubes & dynamotors. The COMPLETE SET.... $19.95
With USED Receiver and USED Modulator. Less dynamotors $14.95

Brand new! **ARC-4 TRANSCEIVER** Not Used!

Gleaming, beaming, spanking new! Shiny, sharp and downright terrific! Sensational remote, mobile, or fixed installation. SEE NOV./55 C.Q. PAGES 40-43 FOR COMPLETE EASY-TO-DIG CONVERSION WRITE-UP FOR 2 METERS. We bought 'em special and we're selling them at out-they-go-prices! Pick yer favorite deal:
DEAL NUMBER ONE: ARC-4 Transceiver complete with all tubes, remote control box, junction box fuse block..... $27.95
DEAL NUMBER TWO: ARC-4 TRANSCEIVER as above BUT PLUS a shock-mounted rack with plug for mobile. All new..... $32.95
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DEAL NUMBER FOUR: ARC-4 TRANSCEIVER same as No. 2 BUT PLUS AC power supply kit delivering 385 VDC @ 300 MA and 12 V. filament. Less Racks. $34.95
AC POWER SUPPLY KIT for above, alone $9.95
SHOCK-MOUNTED RACK for above, with plug. New $7.95
12 VDC PLUG-IN MOBILE DYNAMOTOR. For above..... $9.50

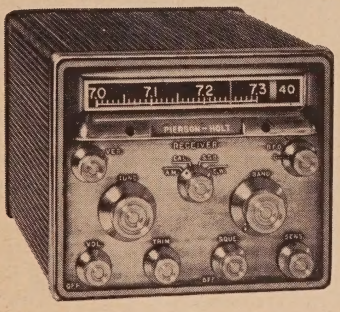
OIL CAPACITORS! ALL BRAND NEW!

Mfd	WVDC	Price	Mfd	WVDC	Price
1	400	$ .10	30	600	$1.95
4	500	.30	42	600	2.95
1	600	.29	1	1,000	.39
2	600	.35	2	1,000	.49
4	600	.39	8	1,000	1.49
3 for $1.00			15	1,000	2.49
5	600	.49	.5	1,500	.49
6	600	.59	1	1,500	.69
7.5	600	.69	8	1,500	1.95
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4" outside diameter. Hollow center to provide for co-ax lead or rotator shaft. When dis-assembled, collapses to 5 eleven-feet sections. Complete with all hardware, base, top, corkscrew guy anchors and ground stake. New in overseas crate. By truck shipment only **$19.95**
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Ideal for amateur or commercial service. 5.5-6 VDC input. Output 400 V @ 175 ma cont. or 275 ma intermittent duty, comes complete with A & B filters, R.F. hash filter and internal cooling fan $19.97
Same as above with 11.5—12 VDC input $12.97

12 VOLT DYNAMOTOR CONTACTOR

Solenoid type, fully encased. Heavy contacts up to 50 amps. Contacts isolated from ground. Will start any 12 volt Dynamotor. NEW, IN ORIGINAL GOV'T PACKING $1.75 ea.

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2 MFD 600 VDC	$.50	2 MFD 2000 VDC	$1.50
4 MFD 600 VDC	.75	4 MFD 2000 VDC	3.50
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Converting TU-75-A for 6

[*from page 27*]

R-305 and *R-306* and ground. The center plates of the tuning condensers are not at ground potential in these compartments. The oscillator-doubler grid can be completed by placing a 47-ohm ½-watt resistor between the post through the terminal board that has the 27K resistor and the small condenser fastened to it and a wire (White and brown tracer) going back into the cable. Remove the wire and place resistor from terminal to nearby ground stud. This resistor and condenser is located in the compartment containing socket *V-301* and is the nearest to the back from the terminal board. This completes all grid returns.

If you plan to use CR-1 crystals you can use the crystal socket in the unit. If you have FT-243 crystals you can replace the present crystal socket with a *Millen 33102* socket. Remove the shield from the crystal socket to make changing crystals easier. You can place the crystal socket on the front panel if you wish.

You can now tune up the rig and apply modulation. Get on six meters and have a good QRM-free QSO for a change! W8ZCV is open for schedules. Helen, W1HOY (Mrs. Sam, W1FZJ) will be on there with a gallon, from Boston.

BCNU on six.

73, Walt.

The TU-75-A shown was obtained from *Lapirow Brothers of Cincinnati, Ohio,* and I wish to express my thanks for their help. They have been selling the unit for $14.95, a real bargain for a complete six meter transmitter.

. . . de K2ORS

[*from page 11*]

apologize to my beautiful new NC-300 for all this much ado about nothing.

Not more than thirty minutes later I heard a friend of mine in contact with a bird in Johannesburg and the same thing happened. However, the real tragedy of this contact was that I knew my friend was a normal, intelligent human being and not more than three days before we had discussed over a drink the miserable political situation that now is blighting South Africa. He was tremendously interested in that mess but it apparently never entered his head to ask this guy in Johannesburg what *he* thought about it. I guess ham radio does that to a person. It is simple and natural to forget that you are actually in contact with another human cipher. A contact becomes a technical thing and not a social act. Too bad. If there is anything we need more than increased understanding between people in the world today, I don't know of it. And understanding comes from knowledge which in turn results from familiarity with others. In short, "contacts" between people.

Ham radio has become a sort of classic example of that old human failing. That of confusing *means* and *ends.*

[*Continued on page 110*]

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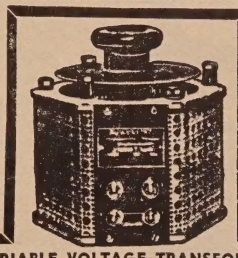
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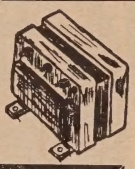


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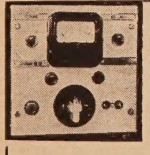
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[*from page 108*]

Even as I write this, my *300* is tuned to twenty where some lout is "tuning up" what he calls "a full gallon" which actually means two. He has been doing this for over an hour on the high end of the phone band. He probably is a wispy thin breath of a man who is low man on the totem pole at the office and is married to an ex-lady wrestler who has taken up bridge in later life and who runs over him like a Juggernaut. But at the high end of twenty he is King and it is there he really can spread himself! I'd dare say about fifteen kc (unmodulated). Poor little man. He has found *his* means to his own private end. "Be the first in your neighborhood. . . ."

Jean Shepherd K2ORS

YASME

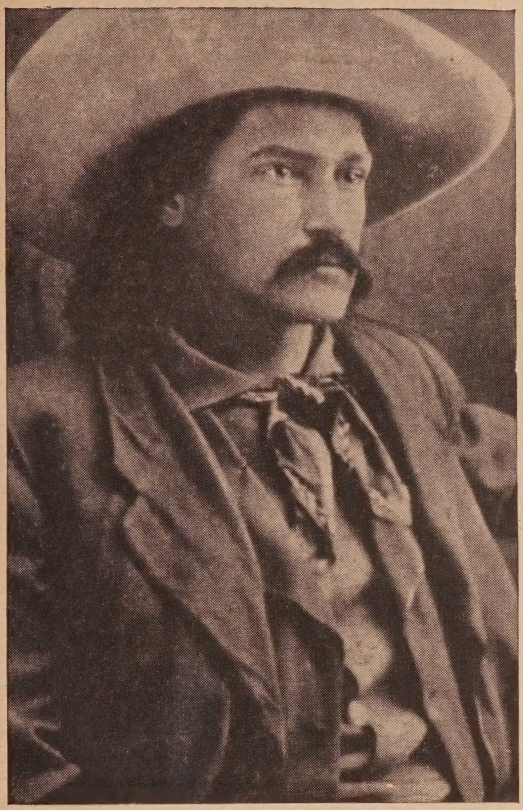
[*from page 22*]

as hard as I could to get them to fit into the local picture but it was no go. So like anyone else would have done I blamed the chart and the compass, someone had to be wrong and it couldn't be me. That's one of the snags of being alone on a boat, you can't blame anyone else so you resort to inanimate objects, which for one thing, can't argue back! Anyway, that wasn't helping me in this predicament so I took my own advice and stayed on course. The entire night was spent in avoiding rocks and islands. Heaven knows how many reefs I must have unwittingly passed over without touching. How I prayed for that mist to lift as there was a full moon and I could be reasonably safe whilst I could still keep my eyes open and, of course, my night glasses were continually glued to my eyes for any change in the surface of the water which would denote reefs.

Finally daylight broke, without a sound, and the mist also departed in peace. All around me were islands, some big, some small, and not one of them seemed to tally up with my assumed position. I want to impress on all of you that my position had to be "assumed" at all times as there were no lights on these islands to aid navigation, the land was obscured by mist 99 percent of the time, and celestial navigation was out of the question. Add all these together and mix in a rough sea, uncertain currents and not much wind and you have me, a single-handed sailor who wondered if he would be around to see the next dawn! So I kept southwest knowing that, with luck, I would eventually reach the open sea .

When the sun came up, out came the sextant. Now, I thought, I shall know exactly where we are. In my log I had entered that I had passed the Equator about an hour ago according to my reckoning, but when I had worked out my sights they just wouldn't tally up with my assumed position. Again I took sights and they

[*Continued on page 116*]



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ATTENTION MOBILEERS: Leece-Neville 6-volt 100 amp system. Alternator Rectifier and Regulator, $60.00. Also Leece-Neville 12-volt 100 amp system. Alternator, Rectifier and Regulator, $85.00. Good condition. H. A. Zimmermann, Jr., K2PAT, 570 Jamaica Avenue, Brooklyn 8, N. Y. UL 2-3472.

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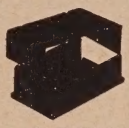
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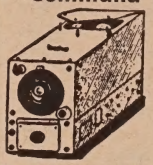
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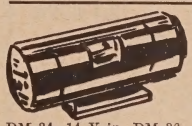
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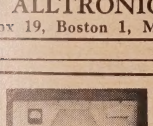
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YASME

[*from page 110*]

worked out about the same. I might doubt the chart and doubt the compass but I will never doubt the sun and these sights revealed that the current plus my very erratic course through the night had taken me through the whole Galapagos Island group and, at the time of taking those sights, I was about ten miles west of Isla Santa Maria which, if you care to look on the map, will show you that I had cleared the whole lot safely and had, in actual fact, crossed the Equator some twelve hours ago. My actual distance, covered in 24 hours, was just on 200 miles, perhaps this will give you some idea of the rate of those currents. I had figured that I had covered about 75 miles! Well, that was that, and now I was all set for the little 4000 mile hop to Tahiti.

Now, as you have noticed, I have not made any mention of ham radio previously as I felt it would not fit in too nicely with the incidents mentioned. However, as many of you know, I was on the air daily, holding many contacts and maintaining a sked with KV4AA, on 14080 kc four times per day. I must say that the little ELMAC AF-67 rig was a most faithful companion to me during the whole journey and never let me down once. It took a caning during the very bad weather I had and has stood up to the excessive humidity encountered 24 hours per day in these latitudes without the failure of a component. Those who have heard and QSD'ed VP2VB/P can bear witness as to the potency of its RST. The ONAN gas generator, installed in a housing on the forward deck during my stay in Panama also was called on to take a beating in excess of what it should. In spite of seas washing over the deck in heavy weather this machine plugged happily away giving me the current for the radio gear and refrigerator without let-down. Only on one occasion did she stop and at that time the YASME was heeling over to such an extent that the gas wasn't reaching the carburetor, altho the tank was half full. My suggestion to others who might use a similar set-up would be to have the gas tank located inside the cabin, along with a small gas pump, and feed the engine via flexible tube.

One last thing before I wind up this little episode. Many of you are considerate enough not to hold me in a long QSO but there are a few that insist on holding me for as long as 15 minutes or more telling me all about your gear, antennas, weather and so forth. This would all be very interesting to listen to if I had unlimited gas aboard. I do enjoy the contacts and they help me considerably at sea but I just have to ask you to keep 'em short and similar to the contest type QSO.

Now, lads and lassies, my next stop is Tahiti and when I get there—well—that's another story—so—cheerio for now and cu agn - - -.

Danny, VP2VB/P

G-G [*from page 23*]

With the exception of the 4X500A and the 4-1000A all tubes listed in *Table I* have been found to work well in grounded-grid. The big jugs have not been tried and have been listed simply because they appear to have interesting grounded-grid characteristics. Anyway, a fellow can dream, can't he?

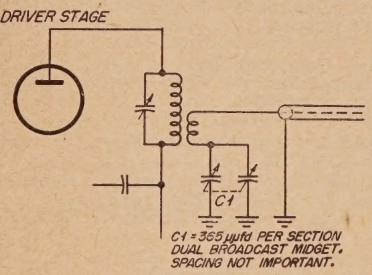
Noticeably absent from the list are some poor performers whose performance has left much to be desired. These include the 807, which for some reason seems to forget it's "just an overgrown 6L6." Whereas the 6L6 is an excellent performer, the 807 is a dud.

The 829B and 832A have been omitted from the table because they become wild above 7 megacycles. Countless theories have been advanced to account for this unusual behavior. None of them offered much hope for correcting the "wildness" so there is little point in reviewing them here. It is much simpler to substitute tubes.

Triodes have also been omitted, not because they aren't good performers. The triode is the preferred tube in commercial service. Commercials can tolerate complications amateurs want to avoid. Power gains of 6 or less which seem satisfactory in commercial circles fall far short of the amateur's requirements of low drive and simplicity.

Triodes must be biased in grounded-grid. Use of pentodes or tetrodes eliminates the bias requirement.

Owners of *10A* and *10B* SSB exciters, after reviewing *Table I*, might well warm up soldering irons and move taps on the output tank up a few turns. Unless their exciters are driving grounded-grid 6AG7's a lot of r. f. is being wasted. Others using just a turn or two in a pickup loop might find that time trying different size loops is well spent.



A simple arrangement that is flexible and convenient to tune is shown in *Figure 2*. The only problem with it is in finding room for the variable condenser. If this can be solved impedance matching into the grounded-grid stage is no longer a problem.

References
1. Norman R. McLaughlin, Grounded Grid, Linears, *CQ*, July 1955
2. Federal Telephone and Radio Corp., *Reference Data for Radio Engineers*, 3rd Edition
3. Keith Henney, *Radio Engineering Handbook*, 4th Edition

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Apr 50-12 Conversion
Apr 48-38 Direction Ind for P-P
Aug 49-20 Quick Change for P-P

Publicity
Feb 50-14 General
Apr 50-17 Michiana Radio Club
Jun 50-32 Ham Radio & Press
Jun 51-19 Faye Emerson Show
Jun 55-29 Texas Telethon

Q-Multiplier
Oct 53-31 Ckt & Gen Discussion
Jan 55-11 Q-Multiplier
Mar 55-29 More on Q-Mult
Apr 55-26 More on Q-Mult

QSL's
Apr 45-25 General
Aug 45-32 General
Jan 50-16 Designing your QSL
Apr 48-78 W2SN QSL Mgr Report
Apr 49-21 $7400 for Old Call Book
Oct 53-10 QSL % Returns
Dec 53-11 QSL % Returns
Feb 54-59 QSL %

Q-5er
Jul 53-25 Simple Q-5er
Dec 50-14 Xtal-Controlled Q-5er
Jun 49-35 Coupling BC453 as Q-5er
Feb 49-21 Double Conv with BC453

Racks Equipment
Jan 47-25 Build a Relay Rack
Dec 49-15 6' Wood Rack
Dec 55-22 Table-Top Relay Racks
Aug 55-23 Unit Construction

Radar
Nov 45-15 General
Dec 45-27 Radar at Work
Jan 46-25 Radar & Loran, General

Radio Control
Oct 51-11 Garage-Door Opener
Apr 49-18 Model Control

Receivers
Feb 48-23 Beginner's Rcvr
Oct 48-29 -1-tube AC-DC
Jul 45-23 Superregen
May 50-25 2-tube Superhet
Dec 47-31 2-tube Regen
Jan 52-26 1-tube Rcvr
Oct 47-39 3-20 Mc Regen
Apr 54-13 2-tube Xmtr/Rcvr
Nov 50-18 3-tube Regen
Dec 50-14 Xtal-Controlled Q-5er
Dec 47-27 10M Mobile Converter
Nov 51-11 4-144 Mc Mobile Rcvr
Jun 51-20 10-11-15M Xtal Conv
Jun 47-27 Simple Rcvr
Sep 52-40 10M Converter 6J6
May 53-37 Converterettes
Mar 55-26 15M Converter
Dec 55-89 10M Xtal Rcvr
Jun 47-31 BC-6-10-15M Pres/Conv
Jan 49-22 Simple Conv 6-10-11M
Feb 49-21 Double Conv with BC453
May 49-37 160M Converter
Jan 54-13 Double-Conv 6-Band Rcvr
Mar 46-12 2-10M Converter
Sep 48-47 Portable Xtal Rcvr
Aug 48-15 2M Superhet
Sep 46-20 2M Mobile Rcvr
Dec 46-14 R-C Superhet 1.4-2M
Sep 47-27 2M Superhet
Nov 47-15 2M Rcvr
Oct 53-21 2M Superregen Superhet
Aug 45-10 2M FM Superhet
Nov 45-07 2M R-C Superhet
Feb 46-07 2M Superhet Converter
Feb 46-18 2M BC406 Conversion
Apr 47-36 .7M Mixer Unit
Jul 49-16 Dual Conv Superhet
Dec 48-26 20-40-80M Superhet
Sep 48-34 Deluxe Regen Rcvr
Oct 50-12 Advanced Rcvr
Dec 54-33 Ultimate Mobile Rcvr
Dec 45-23 AM Double-Con Super
May 45-11 Triple Detection
Mar 46-18 Improving Selectivity
Aug 54-19 Antenna Matcher
Jul 48-13 Diversity Adapter
Jul 47-30 S-Meter Operation
Oct 55-32 New Life for Old Super
Jun 49-30 Silver 100-kc Amp

Receivers, Commercial
Mar 49-22 Choosing a Rcvr
Sep 51-21 Collins 75A-1 Imprvmnt
Oct 49-30 Improved 75A Noise Lim
May 53-42 Gonset Converters
Apr 52-24 Improving HQ129X
Feb 49-20 Improving SX-25 on 10M
Sep 54-19 Improving SX-71
Dec 55-64 Harvey-Wells R-9
Feb 46-38 National NC-46
Aug 47-21 National NC-173
Oct 55-20 National NC-300

Recorder (See Tape Recording)

Relays
Sep 49-31 A-C Relays on DC
Oct 51-38 Quieting A-C Relays
Apr 48-29 A-C Relay Hum hint
Feb 49-20 Using 28v Relays
Feb 49-20 12v to 6v Conversion
Dec 47-35 Using 28v Relays
May 52-40 Mobile Push-to-Talk
Jan 53-27 Automatic Ant Switch

Remote Control (see Radio Control)

Rotary Beams (see Antennas, Beam)

RTTY (Radioteletype)
Aug 52-29 Basic System, Printers
Dec 51-20 Basics
Jan 52-56 Docket 10073
Aug 46-15 Know Your QRM
Nov 46-18 Osc & Conv: W2BFD
Sep 52-25 Converter: W4OLL
Dec 52-32 Converter: W6AEE
Jun 52-48 Polar Relays, FSK
Apr 52-18 Diode FSK
Feb 52-26 Model 12, Tape Equip
Apr 52-33 V-T Keyers, Tape Dist
Nov 55-76 AFSK Osc
May 52-46 Mobile TT
Oct 52-37 709D-1 FSK Exciter
Jan 53-29 Model 12 Keyboard
Jan 53-29 Tone Standards
Apr 53-28 FSK Osc
Sep 53-18 End-of-Line Indicators
Sep 54-36 Home-Made Keyboard Pt 1
Nov 54-21 Home-Made Keyboard Pt 2
Nov 55-56 AFC for RTTY
Apr 55-13 Automatic Code
Aug 55-32 2M Cavity Filter
Dec 55-43 Narrow Shift
Dec 55-60 Tone Quadrupler

S-Meters
Jul 47-30 General
Nov 53-28 Mobile S-Meter
May 55-54 Mobile, & Xtal Marker
Aug 49-26 Mobile S- & Mod Meter

Selectivity
Mar 46-18 Improving
Jun 49-21 Audio Filter: FL-8
Sep 48-27 Audio: FL-8
Aug 49-31 More FL-8 Filter
Feb 51-24 Audio: Hetronull
Jun 48-15 Audio: FL-8, etc
Jun 48-20 Peaked Audio: Filters
Apr 49-26 Xtal Filters, General
Dec 55-39 Var Band-Width Filter
Nov 55-44 Lattice Filter: Var Sel
May 49-13 3-kc-wide I-F Filter
Dec 50-14 Xtal-Controlled Q-5er
Mar 53-13 Collins Mech Filter
Oct 53-31 Q-Multiplier
Jan 55-11 Q-Multiplier
Mar 55-29 Q-Multiplier Q & A
Apr 55-26 Q-Multiplier Q & A

Selenium Rectifiers
Jan 50-33 General
Oct 49-31 Sel PS for 274N Rcvrs
Nov 55-24 75w Sel-Pwrd Xmtr

Selsyn
May 46-29 General
Nov 53-13 Servo Rotators
Feb 48-27 Selsyn Beam Rotator
Mar 48-17 Selsyn-Driven VFO
Apr 48-38 Dir Ind for Prop-Pitch

Shacks
Jan 49-35 W1BB
Oct 47-31 W2SAI
Aug 48-20 K2UN
Jun 50-13 W3DF
Dec 47-30 W3GV
Mar 48-38 W3OR
May 49-19 W4AB
Nov 47-44 W5VV
Dec 48-34 W6DEG

Shock, Electric
Nov 47-32 Artificial Resp & Shock

Shock-Proof Mounting
Jul 45-28 How to

Speech Clipping
May 48-19 Overload Mod to Clip
May 52-19 6L6 Clipper
Oct 48-46 Clipper Distortion

Spurious Emission (see TVI)
Feb 54-26 General

Squelch (see Noise Limiters)
Sep 45-28 Limiters & Squelch Ckts
Oct 53-33 Simple Squelch Ckt
May 53-28 Twin Noise Squelch
May 54-48 More TNS

SSB (Single Sideband)
May 48-42 Pros & Cons
Sep 49-23 Understanding SSB
Mar 53-27 Basics (1) Rcvr Adap
Apr 53-19 Basics (2) Exciters
Jun 53-27 Basics (3) Voice Control
Jul 53-32 Basics (4)
Aug 53-22 Basics (5) G-G Linears
Sep 53-19 Basics (6) KW Linear
Dec 55-56 SSB Early History
Mar 49-34 Exciter Pt 1
Apr 49-28 Exciter Pt 2
Jan 55-25 75w Exciter Pt 1
Feb 55-19 75w Exciter Pt 2
Nov 48-17 Phase-Shift Xmtr
Sep 48-15 400w Xmtr (44-65A's)
Jan 52-23 Modified "Single-Sider"
Dec 54-39 Log-Linear Detector
Jan 52-23 Modified "Single-Sider"
May 53-15 SSB Mobile
Oct 54-14 Adding SSB to Viking
May 55-52 Lakeshore SSB Equipment
Jun 55-16 Eldico SSB-100

Apr 55-20 Collins KWS-1
Nov 55-44 Lattice Filter
Dec 55-39 Var Band-Width Filter
May 49-13 3-kc-wide I-F Filter
Jul 55-28 G-G Linear Amps, Gen'l
Mar 55-17 Linear Tips
Sep 55-16 More on G-G Linear
Dec 55-68 G-G Tune-up tip

Sunspots
Apr 46-14 General
Nov 46-30 General

Superheterodynes (see Receivers)
Superregenerative Receivers (see Receivers)
Jul 45-23 Basic Theory

Surplus (except Command Sets)
Dec 45-34 General
Mar 46-27 General
Apr 46-26 Misc Units
Nov 50-26 BC348 Triple Conversion
Apr 49-36 BC348P Gain & Selec
Apr 48-25 BC348Q Conversion
Dec 48-39 BC348 Bandspread
Oct 52-55 BC779 Rcvr Stabilizing
May 48-32 BC779A Impr Stability
Jun 47-31 Converter for Surp Rcvrs
Oct 46-28 SCR-284A
Mar 47-26 SCR-284A notes
Nov 46-13 ART-13
Feb 47-33 ART-13
Dec 47-19 ART-13 Speech
Sep 49-23 BC-610 Tank Coil Data
May 49-26 BC-375E
Mar 54-20 BC-746 VFO
Aug 50-22 Using 304TL's
Jun 48-28 SCR-522 to 10M
Jul 47-27 SCR-522 Xmtr & Rcvr
May 48-22 More Audio from 522
Feb 49-29 SCR-522 on 6M
Jul 49-25 Noise Lim for 522
Nov 53-17 SCR-522 Rcvr on 1.4M
Dec 53-31 R28/ARC-5 2M Rcvr
Nov 55-40 ARC-4 to 2M (Xmtr-Rcvr)
Jun 47-25 BC-1068A to 2M (Rcvr)
Feb 46-18 BC-406 2M Rcvr
Mar 47-32 BC-1284 2M preamp
Oct 55-36 APS-13 on .7M
Feb 50-18 APQ-9 on .7M
Aug 49-20 Prop-Pitch (Rotator)
Apr 50-12 Prop-Pitch
Feb 50-28 Ant Tuner from BC375E
May 55-31 PE-101C
Aug 52-25 PE-101C
Dec 52-25 Additional PE-101C data
Jan 48-28 BC-221 Freq Meter
Aug 49-14 Tone-Mod BC-221
Apr 47-30 Pwr Supply for BC-221
Jan 49-18 Freq Mtr from ART-13 CFI
Mar 50-24 Using Surplus Meters
Feb 49-20 12v Relays to 6v
Feb 49-20 Using 28v Relays
Dec 47-35 Using 28v Relays
Mar 50-28 FL-8 Audio Filter
Jun 49-21 FL-8 Audio Filter
Aug 49-31 FL-8 more info
Feb 49-20 Improving T-17 Mike
May 52-40 Improving TS-30 Mike

Surplus, Command Sets—
ARC-5/274S Series, includes: BC-453-4-5-6-7-8-9, BC-696, R28. (X=Transmitter, R=Receiver)
Jan 49-36 R Tuning Knobs
Jan 48-28 R Tuning Knobs
Oct 49-31 R Selenium Pwr Supply
Aug 48-22 R Output Plug
Nov 47-24 R Conversion
Apr 50-38 R Substitute Plug
Nov 48-50 R Bandspreading BC-455
Jun 48-28 R More Bandspreading
Aug 48-23 R Bandspreading
Mar 53-50 R Bandspread Dial
Jan 49-36 R Noise Limiter
Jun 49-35 R BC-453 as Q-5er
Feb 49-21 R BC-453 Doubl Con Rcvr
Mar 53-37 R BC-454 40M Converter
Sep 48-44 R BC-455 on 10M
Mar 55-13 R Repackaged
Jan 50-34 R Monitor from Rcvr
Oct 49-30 R BC-453 to BC Band
Dec 53-31 R 2M R28
May 52-55 XR 10-20-75M Mobile
Mar 53-62 XR 40M Mobile
May 51-23 X 6M Mobile (458 or 459)
Apr 51-11 X 10M Mobile (457 or 459)
Jul 55-33 X Sawed-off VFO
Jan 48-22 X 10M Mobile Mod & PS
Mar 48-31 X 20 & 40M 459 note
Jul 48-42 X 80 (696), 40 (459)
Jul 48-43 X Original Schematic
Jul 48-44 X 10-11M (458 or 459)
Jun 50-27 X 40M 459 TVI-free
Mar 50-18 X TVI-Proofing
Aug 52-42 X 15M (459 or 458)
Feb 54-13 X Command Set Roundup
May 46-18 X Transmitters
Oct 48-44 XR HV Pwr Supply
Feb 50-20 X Hi-Power Modulator
Aug 50-24 X Mod, Kaying, etc
Jun 53-55 X 160M (457)
Feb 49-20 X 20M (459)
Apr 49-36 X Key Filter
Jun 49-35 X Voltage Regulator
Aug 54-14 X Break-in Keying
Sep 49-35 X Screen Modulator
Nov 49-18 X Gen Data. Keving PS
Mar 53-21 X Rcvr as Het Exciter
Dec 50-16 X All-Band Het VFO

Tank Circuits
Jun 47-19 Resonant-Line Type
May 49-36 All-Band
Sep 49-24 Data on BC-610 Coils
Sep 50-26 Pi-Network type
May 51-50 Pi-Network, more data
Nov 53-24 Pi-Network Design
Jun 53-19 Pruning Miniductors
Sep 55-36 Pi-Net to Balanced Ant

Tape Recording
Aug 54-35 in Ham Station
Jul 49-26 Automatic Tape Xmtr
Feb 45-16 to Help Code

Television
Feb 45-28 Future of TV
Sep 45-22 Scanning & Sync
Nov 45-22 Iconoscopes

Test Equipment (also see Oscilloscopes, Freq Meters & Field Strength Meters)
Feb 45-19 R-C Tuned AF Osc
Jan 54-24 Audio Generators; Heath
Mar 50-20 Amp, Tone Gen, Pwr Supp
Sep 50-13 Antennascope
Feb 54-52 Ant'scope Faraday shield
Jun 54-23 Antennascope
Jul 54-17 Antennascope
Dec 51-27 "Match-Maker" (Ants)
Dec 52-12 "True-Matcher" (Ants)
Jul 53-30 more on "True-Matcher"
Mar 47-13 Grid-Dip Oscillators
May 47-15 "The Dipper" (GDO)
Jan 49-30 GDO Applications
Feb 49-14 Improved GDO
Jan 50-30 Simple GDO
Mar 51-20 Simple GDO
Apr 50-28 Extending GDO Range
Jan 53-12 GDO's, general
Jun 52-25 Noise Generator (Xtal)
Dec 53-23 Test Eq, Tube Checkers
Jun 45-20 Emission Tube Checker
Mar 51-33 R-F Sniffer
Mar 49-42 Calibrated TVI Trap
Dec 49-29 Sensitive R-F Indicator
Aug 54-18 R-F Probe for VTVM
Oct 45-09 R-F Impedance Meas Set
Feb 46-27 Impedance Meas Set
Apr 54-44 Q-Meter
Oct 47-37 R & C Tester
Jul 54-21 Condenser Checkers
Mar 48-31 Condenser Tester
Sep 54-43 Impedance Bridges; Heath
Jan 46-07 Meter Shunts & Mults
Jul 46-19 Multi-Meter
Jul 48-22 Ma.-Meter for Blind
Aug 49-24 Ma.-Meter for Blind
Jun 55-28 Ma.-Meter from VTVM
Aug 54-25 VTVM's; Heath
Jun 54-31 Signal Tracers; Heath
Feb 54-50 Signal Generators; Heath
Dec 47-39 Absorption Wave-Meter
Jun 55-13 Neg Peak Indicator
Jun 46-17 Neg Peak Indicator
Aug 55-14 VHF SWR Measurer

Theory, Basic
Nov 54-40 Tubes
Dec 54-29 Triodes
Jan 48-29 Antennas
Jan 50-24 Resistors
May 50-22 Condensers
Jun 52-36 Basic Electricity
Jun 45-27 Rectification
Jan 46-12 Meters, Mults & Shunts
Jan 50-33 Selenium Rectifiers
Nov 53-33 Amplitude Modulation
Sep 49-20 Color Code
Aug 48-38 Modulation
Apr 48-30 R-F Amplifiers
Feb 48-30 R-F Oscs & Amps
Jan 46-31 Potentiometers
Aug 47-35 Power Supplies
Jun 46-32 The Plate Dip
Feb 46-32 Thermal Agitation
Jan 52-24 Superheterodynes
Jul 45-23 Superregen Rcvrs
Feb 54-26 Spurious Emissions
May 50-11 Class-C Design
Aug 50-11 Neutralizing Tetrodes
Aug 45-24 Mods & Detectors
Dec 45-16 Class-B Modulators
Dec 45-36 AVC
Nov 45-34 FM Discriminators
Feb 46-34 Push-Pull Oscillation
Feb 48-29 Harmonic Prevention
Oct 45-30 Coupling TRF Circuits
Sep 45-11 Phase
Jan 46-31 Multiphase Communication
Feb 46-49 The Electron Gun
Feb 48-39 Bifilar Condensers
Sep 50-26 Pi-Network Tank Ckts
Nov 53-24 Pi-Network Design

Tower (see Antenna Towers)

Transistors
Sep 54-31 Theory & Experiments
Oct 55-68 Field-Strength Meter

Transmission Lines (also see Antenna Tuning)
Sep 54-28 Theory
Oct 50-19 Tuning Feeders
Feb 47-19 Coax Feeders
Jul 47-22 Beware of Bum Coax
May 51-20 Impedance Matcher
Oct 51-22 Double Coax Matching
Feb 52-24 Balun
Jul 49-29 Coax & Balanced Feeders
Oct 53-15 T & Gamma Match
Mar 49-41 Attaching Spreaders

Transmitters
Nov 49-29 AllBand 100w VFO 4E27
Nov 55-24 BandSw 75w Selenium-Pwrd
Aug 46-25 AllBand 225w 4E27
Sep 47-22 BandSw 100w 4D32
Sep 50-34 4-Band 815 Mobile
May 53-43 5-Band 35w 2E26

Dec 53-15 AllBand 70w 6146
Feb 54-25 Correction on 70w 6146
Oct 54-28 6-Band Mobile 5763
Oct 54-35 Geloso VFO 60w 6146
Dec 45-13 5-Band VFO 807
Oct 48-20 Gold-Plated Special
Oct 49-15 Impr Gold-Plated Special
Oct 51-16 10-80M VFO 50w 807
Oct 51-20 Novice 2w 6AG7
Mar 52-38 Novice 75w 6L6's
Nov 52-45 Novice 40-80M 6L6
Mar 51-11 Novice 80M 2E26
Jan 52-19 Novice 11 & 80M 807
Oct 53-28 40M TVI-free 807
Nov 53-50 Novice 40-80M 17w 6V6
May 53-59 VFO Mobile 2E26 Pt 1
Jun 53-20 VFO Mobile 2E26 Pt 2
Jul 53-33 25w CW 50B5's
May 54-33 20w Mobile 815
May 54-37 10M Midget, 5763
Dec 54-15 Het VFO 6146
Mar 48-27 35w Midget, 2E26
May 48-23 6V6-6L6 CW
Jun 48-29 Portable 2E25
Jul 48-16 Portable 20-40-80M 2E24
Jan 55-17 25w 2E26
Aug 55-26 Simple Mobile, 6L6
Jan 48-39 50w Portable CW 807
Sep 46-12 6V6-807
Dec 46-11 117L7GT
Jan 47-11 60w Phone 807
Apr 47-15 10M Mobile 829B
May 47-28 10M 2w 70L7
Mar 50-24 25w Phone 6L6
Apr 50-15 80M 25w CW 6L6
Apr 50-18 10M Mobile 2E24
Apr 50-20 160M Phone 6L6
Apr 50-22 BandSw 60w 807
Jun 50-15 10M VFO Mobile 6AQ5
Nov 48-36 CW 809
May 52-47 10M "28-9"
Oct 55-26 More on 28-9
Feb 50-10 225w 24G's & Exciter
Jun 50-23 150w VFO 826
May 46-09 2-80M 100w 829B
Jul 50-23 75M Mobile 6AQ5
Jul 50-26 40-80M 25w 6L6
Nov 50-22 75w VFO 829B
Feb 51-13 10M TVI-proof Exciter
May 52-24 W2AEF Special 2E26 Pt 1
Jun 52-17 W2AEF Special Pt 2
May 52-65 10-20-75M Mobile Xtal
Jul 52-13 Heterodyne Exciter 807
Sep 52-11 10-20-75 Mobile VFO 5763
Nov 52-15 50w Phone VFO
Sep 51-11 40w TVI-less 829B
Feb 52-15 20M 275w no-TVI 813
Aug 48-44 20w CW 50B5's
Jun 48-25 100w CW 807's
Sep 48-40 10M 813
Jan 45-22 250w Phone 812's
Apr 45-13 Life-Raft Xmtr 1Q5GT
May 45-15 5-Band 150w T-40
Jun 45-17 Wired Wireless 200 kc
Jun 49-24 Four 24G Finals
Oct 49-11 10M TVI-free 813
Oct 46-30 NBFM Exciter 6V6
Nov 46-09 125w 807's
Nov 47-41 75w Phone-CW 815
Jan 50-11 120w 807's
Jul 55-24 813 Deluxe Final
Sep 55-31 OT Xmtr P-P Triodes
Mar 50-15 500w 812H's
Mar 46-30 450w CW 811's
Apr 46-09 360w NBFM 813
Jun 51-11 500w Phone 814's Pt 1
Jul 51-16 500w Phone 814's Pt 2
Sep 48-15 400w SSB Four 4-65A's
Jul 49-34 500w 812's
Dec 49-11 160M 200w TVI-free 813
Sep 46-25 813's, Phone
May 47-21 Cathode-Modulated 812's
Oct 47-32 500w 5514's
Jun 46-21 KW AT-340's
Jul 46-11 KW 4-250A's
Feb 53-12 KW 4-250A's
Dec 47-36 KW 4-250A's
Dec 48-15 KW 4-250A's
Mar 49-30 KW 4-250A
Aug 53-14 KW 4E27A's
Apr 48-34 KW Shunt-Fed 250TH's
Jan 48-19 Auto-Tune KW 4-125A's
Feb 48-34 Auto-Tune KW Part 2
Dec 46-17 KW 250TH's
Mar 46-34 6M 6C4
Dec 51-23 "28-28" 10M 28w
Dec 51-13 6M 900w 4E27A's
May 49-28 2-6M 829B AM-FM
Oct 45-07 2, 6, 10M Xmtrs, Xtal 815
Aug 45-16 2M Mobile 832A
Sep 45-07 2M 832
Oct 45-14 2M 60w 815 MOPA
Jul 47-13 2M Mod Osc P-P 6C4's
Nov 48-46 2M Mobile
Feb 46-23 2M 15w 815
Apr 46-34 2M 400w HK-54's
Jun 52-28 2M 400w 4-65's
Dec 52-28 2M Phone 2E26 Pt 1
Jan 53-23 2M Phone 2E26 Pt 2
Feb 52-19 2M NBFM 75w VFO 9903
Sep 48-31 .7M 2C40's
Jun 51-16 1.4M 832
Apr 52-13 .7M 50w Xtal 4X150
May 53-15 SSB Mobile 6146
Mar 49-19 Designing Finals
May 50-11 Class-C Design Data
Aug 50-11 Neutralizing Tetrodes
Jun 46-23 Preventing Flashover
Aug 46-11 Using Vacuum Condensers

Transmitters, Commercial

Nov 50-31 Collins KW-1
Apr 55-20 Collins KWS-1
Jun 53-13 Collins 310B Improvement
Feb 55-37 Collins 32V-1 Impr
May 53-70 Dixon 75 Kit
Jun 55-16 Eldico SSB-100
May 48-29 Hallicrafters HT-18
Jan 48-36 Harvey-Wells TBS-50
Oct 55-34 More Mod for TBS-50
Dec 55-64 Harvey-Wells T-90
Apr 54-26 Heath AT-1
Jul 55-16 Heath DX-100
Feb 55-15 Johnson Viking KW
Aug 54-13 VT Keyer for Viking
Oct 54-14 Adding SSB to Viking
May 55-52 Lakeshore Phasemaster Jr
Aug 50-20 Lysco Transmaster
Apr 48-48 Millen 90811 HF Xmtr
Sep 47-32 Silver 701 6AQ5-807
Apr 48-48 Stancor ST-202A
Apr 48-48 Temco RA (KW)

Transmitter-Receivers

Jun 45-07 2½M Mobile HY615
Aug 45-07 2½M Mobile P-P 3Q4's
Nov 45-26 .7M Transceiver
May 50-16 2M Walkie-Talkie
Jan 46-07 2M Handie-Talkie
Jan 46-30 2M 6L6
May 52-68 2M Mobile 6J6
Jan 55-22 6M "Strapset"
Apr 51-30 Billfold Station 1-watt
Apr 45-13 Life-Raft 1Q5GT
Apr 47-15 10M Mobile 829B
Jul 53-47 10M Handie-Talkie
May 54-17 10M Mobile
Mar 52-33 10M Xmtr & Converter
May 54-52 6 or 10M Packset Pt 1
Jul 54-26 6 or 10M Packset Pt 2
Jan 51-11 10-20M 6AQ5's
Nov 54-34 20-40M CW Briefcase 2E26
Aug 49-28 Regen Rcvr AC-DC Phone
Oct 46-23 20-40-80M 6L6
Apr 50-15 80M 25w 6L6
Jul 50-26 40-80M 25w & Superhet

T-R (Transmit-Receive) Switches

Oct 55-41 Transitron T-R
Oct 55-43 Practical T-R
Oct 55-45 B & W T-R

Tubes

Apr 47-20 Xmtg Ratings Rcvng Tubes
Dec 53-28 6CL6
Jun 45-30 6J6 Raytheon Dual Triode
May 45-36 6N4 Raytheon UHF Triode
Sep 47-50 3D24 Sylvania
Aug 50-22 304TL's, using
Oct 45-40 4-250A Eimac
Apr 48-60 4-400A Eimac
Apr 46-42 GL592 GE
Apr 50-26 807W
Jan 45-34 813 Taylor
Feb 46-38 833A Taylor
Mar 53-20 6146, taming Parasitics
Apr 52-26 6155 Amperex
Jun 54-19 6216 Clamp Tube

Tubes, Final (Xmtrs using)

Oct 51-20 6AG7 2w Novice
May 52-47 6AQ5 28-9 (10M 9w)
Oct 55-26 6AQ5 28-9 Improved
Jun 50-15 6AQ5 10M Mobile VFO
Jul 50-23 6AQ5 75M Mobile
Mar 50-26 6L6 25w Phone
Apr 50-15 6L6 80M CW 25w
Apr 50-20 6L6 160M Phone
Jul 50-26 6L6 40-80M 25w
May 48-23 6L6 Novice
Aug 55-26 6L6 Simple Mobile
Nov 52-45 6L6 40-80M Novice
Mar 52-38 6L6's 75w Xtal Osc
Nov 53-50 6V6 40-80M Novice 17w
May 54-24 12BH7 2M Mobile
Aug 48-44 50B5's 20w CW
Jul 53-33 50B5's 25w CW
May 47-28 70L7 2w 10M
Dec 46-11 117L7GT
Sep 48-31 2C40's .7M
Apr 50-18 2E24 10M Mobile
Jul 48-16 2E24 20-40-80M CW Port
Jun 48-29 2E25 Portable
Mar 48-27 2E26 35w Midget
Dec 51-23 2E26 "28-28"
May 52-24 2E26 W2AEF Special
Mar 51-11 2E26 80M Novice
May 52-65 2E26 10-20-75M Mobile
Nov 52-15 2E26 30w Phone
Dec 52-28 2E26 Novice 2M Phone
May 53-43 2E26 Mobile 35w 5-Band
May 53-59 2E26 Mobile VFO Pt 1
Jun 53-20 2E26 Mobile VFO Pt 2
Jan 55-17 2E26 25w Phone
Nov 54-34 2E26 20-40M CW Briefcase
Sep 47-22 4D32 100w BandSwitching
Aug 46-25 4E27 225w AllBand
Nov 49-29 4E27 100w AllBand VFO
Dec 51-13 4E27A's 900w 6M
Aug 53-14 4E27A's KW
Dec 45-13 807 5-Band VFO
Sep 46-12 807-6V6
Nov 46-09 807's 125w
Jan 47-11 807 60w Phone
Jan 48-39 807 50w CW Portable
Jun 48-25 807's 100w CW
Jan 50-11 807's 120w
Apr 50-22 807 60w BandSwitching
Oct 51-16 807 50w 10-80M VFO
Jan 52-19 807 11 & 80M Novice
Jul 52-13 807 Het Exciter
Oct 53-28 807 40M TVI-free
Nov 48-36 809 CW Xmtr
Mar 46-30 811's 450w CW
Jan 45-22 812's 250w Phone
May 47-21 812's Cathode-Mod
Jul 49-34 812H's 500w
Mar 50-15 812H's 500w
Apr 46-09 813 360w NBFM
Sep 46-25 813's Phone
Sep 48-40 813 10M
Jul 55-24 813
Oct 49-11 813 10M TVI-free
Dec 49-11 813 160M 200w no TVI
Feb 52-15 813 20M 275w no TVI

Jun 51-16 814's 500w Phone Pt 1
Jul 51-16 814's 500w Phone Pt 2
Oct 45-14 815 2M 60w MOPA
Nov 47-41 815 75w Phone-CW
Sep 50-34 815 4-Band Mobile
May 54-33 815 20w Mobile
Feb 46-23 815 2M 15w
Jun 50-23 826 150w VFO
Apr 46-09 829B 2-80M 100w
Apr 47-15 829B 10M Mobile
May 49-28 829B 2-6M
Nov 55-24 829B 75w Selenium-Pwrd
Nov 50-22 829B 75w VFO
Sept 51-11 829B 40w Phone no TVI
Aug 45-07 832 2M
May 51-11 832 2M Mobile
Jun 51-16 832 1.4M
Nov 52-34 832 1.4M 30w
Oct 47-32 5514's 500w
May 54-37 5763 10M Midget
Oct 54-28 5763 6-Band Mobile
Dec 54-15 6146 Het VFO
May 53-15 6146 SSB Mobile
Nov 52-43 6146 2M40w
Dec 53-15 6146 AllBand 70w
Oct 54-35 6146 Geloso 60w VFO
Nov 54-13 9903 2M
Feb 52-19 9903 2M 75w VFO
Feb 50-10 24G's 225w (& Exciter)
Jun 49-24 24G's Four Finals
May 45-15 T-40 5-Band 150w
Apr 46-35 HK54's 2M 400w
Sep 48-15 4-65A's (4) SSB 400w
Oct 48-20 4-65 Gold-Plated Special
Jan 48-19 4-125A's Autotune KW (1)
Feb 48-34 4-125A's Autotune KW (2)
June 46-21 AT-340's KW
Dec 46-17 250TH's KW
Apr 48-34 250TH's KW
Jul 46-11 4-250A's KW
Dec 47-36 4-250A's KW
Dec 48-15 4-250A's KW
Mar 49-30 4-250A KW
Feb 53-12 4-250A's KW

Tube Tester (see Test Equipment)

TVI

Jun 50-09 TVI Elimination
Jun 48-33 General Pt 1
Jun 48-36 General Pt 2
Jul 48-31 General
Aug 48-34 General
May 49-20 General
Jun 49-31 Shielding Experiments
Oct 47-36 R-F Line Filter
Aug 51-22 Power Line Filter
Aug 55-25 Power-Line Filter
Jan 50-22 Lo-Pass Filter: Coax
May 52-43 Lo-Pass Filter Mobile
Oct 54-46 Bud Lo-Pass Filter
Sep 53-44 Hi-Pass Filter
Aug 54-16 Coax ByPass Condenser
Feb 54-26 Suprious Emissions
Jul 52-20 Light-Bulb TVI
Jul 54-14 2M TVI Filter
Jul 54-36 Antenna-to-Filter Connx
Mar 49-42 Calibrated Filter Trap
Apr 49-22 Sensitive F-S Meter
Mar 50-18 de-TVI Command Sets
May 50-18 de-TVI 10M Xmtr
Sep 49-29 de-TVI 20M Xmtr
Oct 49-11 TVI-free 10M Xmtr Pt 1
Nov 49-23 TVI-free 10M Xmtr Pt 2
Feb 51-13 TVI-free 10M Exciter
Feb 52-15 TVI-free 20M 275w 813
Oct 53-28 TVI-free 40M 807
Sep 51-11 TVI-free 40w Xmtr
Dec 49-11 TVI-free 160M Xmtr

VFO

Mar 49-26 Clapp Osc Theory & App
Sep 55-26 VFO Stability
Feb 50-24 Stabilizing the VFO
Aug 47-17 "Swishless" VFO
Jun 55-19 Temp Stabilization
Jul 52-13 Het Exciter 807
Mar 53-21 Het Exciter ARC-5 Rcvr
Dec 54-15 Het VFO Exciter 6146
Dec 50-16 AllBand Het VFO
Mar 54-19 160M VFO
Apr 50-38 Freq Halving for 160M
Jul 48-20 Permeability-Tuned
Jul 55-33 VFO from ARC-5
Aug 49-11 Mobile VFO
Oct 52-53 Outboard VFO
Oct 54-35 Geloso 60w VFO
Dec 45-13 5-Band VFO
Jun 50-15 10M VFO-Xmtr Mobile
May 53-31 Dial-less Mobile VFO
May 53-59 VFO Mobile 2E26
Oct 51-16 50w 10-80M
Apr 48-17 T-9er: VFO, Mon, etc
Nov 49-29 AllBand 100w VFO
Mar 48-17 Selsyn-Driven VFO
Jul 48-39 G-G VFO Coupler
Sep 47-15 Cathode-Follower VFO
Feb 47-37 VFO Freq Indicator
May 47-35 NBFM Mod for VFO

VHF Antennas (see Antennas, VHF)

VHF Receivers

Jan 48-15 10-6-2M Converter
Jun 47-31 BC-15-10-6M Converter
Mar 46-12 10 & 2M Converter
Jan 49-22 11-10-6M Converter
Nov 55-52 6M Converter
Sep 50-24 6M 6J6 Converter
Apr 52-45 6M 6J6 Converter
May 53-52 6M Rcvr Mobile
Feb 54-44 6M Booster
Apr 48-39 6M DX Converter
Jun 53-22 6 & 2M Preamp
Sep 49-13 2 & 6M Converters W1KIM
Mar 49-13 2M Converter W1KIM
Nov 49-22 2M more on W1KIM Conv
Aug 45-10 2M FM Superhet
Nov 45-07 2M R-C Superhet
Feb 46-07 2M Superhet Converter
Feb 46-18 2M BC-406 Conversion
Sep 46-20 2M Rcvr
Oct 53-21 2M Superregen Superhet
May 52-30 2M Converter Mobile
Nov 52-20 2M Converter 2-tube
Oct 53-44 2M 3.3db NR Converter
Dec 53-31 2M R28/ARC-5 Conversion
Jun 47-25 2M BC-1068A Conversion
Jul 47-27 2M SCR-522 Conversion
Sep 47-27 2M Superhet
Nov 47-15 2M Superhet
Dec 49-18 2M R-9er Preamp
Jan 54-43 2M Preamp 6J6
Aug 48-15 2M Superhet
Jan 54-41 2M Xmtr-Hunt Sniffer
Dec 46-14 1.4 2M R-C Superhet
Nov 49-16 44-216 Mc Converter
Sep 54-39 1.4M Preamp
Apr 47-36 .7M Mixer Unit
Apr 52-42 .7M Converter
Feb 50-28 Automatic Bandsweeping
Apr 50-36 Another Band-Scanner

VHF Transceivers

Jan 46-07 2M Handie-Talkie
May 50-16 2M Walkie-Talkie
Jan 46-30 2M Transmitter-Rcvr
Nov 45-26 .7M Transceiver 9002
Oct 55-36 .7M Xmtr-Rcvr APS-13

VHF Transmitters

Mar 46-34 6M Xtal 6C4
Dec 51-13 6M 900w 4E27A's
May 53-52 6M Mobile
Feb 49-29 6M using SCR-522
Nov 55-52 6M 5763
Oct 45-07 6 & 2M Xtal 815
May 49-28 6 & 2M 829B FM-AM
Aug 45-07 2M Xtal 832
Oct 45-14 2M MOPA 60w 815
Feb 46-23 2M 15w 815
May 51-11 2M Mobile 832A
Dec 52-28 2M Phone 2E26 Pt 1
Jan 53-23 2M Phone 2E26 Pt 2
May 54-24 2M Mobile 12BH7
Nov 48-46 2M Mobile
Jul 47-13 2M 6C4's Mod Osc
Nov 52-43 2M 40w 6146
Oct 53-44 2M Improving 6146 Xmtr
Nov 54-13 2M 9903
Feb 52-19 2M 75w VFO 9903
Jun 52-28 2M 400w 4-65's
Nov 55-40 ARC-4 to 2M
Jul 47-27 2M SCR-522 Conversion
Apr 46-34 2M 400w HK254's
Jun 51-16 1.4M 10w 832
Nov 52-34 1.4M 30w 832
Nov 53-17 1.4M SCR-522 Conversion
Feb 50-18 .7M APQ-9 Conversion
Sep 48-31 .7M 2C40's
Apr 52-13 .7M 50w Xtal

Voltage Regulation

Jan 45-18 V-R Pwr Supply
Jun 45-25 V-R Pwr Supply
Mar 55-22 V-R Pwr Supply
Dec 51-17 Miniature Reg Pwr Supply
Jan 50-20 Automatic VR for Xmtr
Jun 49-35 VR for ARC-5 Xmtrs
Jan 50-37 Reg Filament Supply

Walkie-Talkie

Jun 45-10 2½M Packset 2-tube
Jul 45-10 Lo-Freq WERS Unit
Jan 46-07 2M Handie-Talkie
May 50-16 2M Walkie-Talkie
Oct 48-39 2M Superhet, Xmtr
Jan 55-22 6M Strapset
Nov 51-21 10M CD Units
Jul 53-47 10M Handie-Talkie
Apr 51-30 Billfold Station 1 watt

War Surplus (see Surplus)

Wattmeter

Jan 54-58 R-F Wattmeter
Jan 51-30 Bulbs for Pwr Measuring
Feb 47-37 Bulbs for Pwr Measuring

Wave-Guide (see Microwaves)

WAZ

Jan 47-22 WAZ Rules
Jan 47-36 WAZ Map
Dec 55-25 WAZ Map & Continents

Wired Wireless

Jun 45-17 6L6 Xmtr 200 kc

WWV

Mar 45-28 General
Mar 47-33 Schedules
Mar 48-65 Schedules
Aug 52-46 New Warning
Sep 53-41 Using WWV

YASME

Sep 55-72 Danny & Deborrah Kerr
Oct 55-16 St. Thomas to Panama

YL Features

Feb 45-13 Meet the YL
Aug 45-22 YL Ops
Oct 54-09 Powder-Puff Derby '54
Oct 55-63 Powder-Puff Derby '55
Jul 46-18 Wife's Eye View
Sep 55-46 First Int'l Convention
Dec 55-37 Converting the XYL

world famous *for quality dependability and value*

. . . National Receivers set the standard for the industry—
with a complete line for novice, SWL or old timer



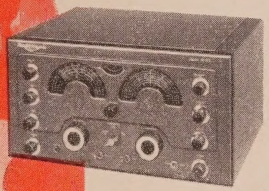
NC-300

The NC-300 incorporates all the features most hams want . . . at a price most hams are willing to pay! It features a sensitivity of 3-6 db noise figure on all amateur bands. Warm-up drift less than .01%. It has the longest slide rule dial ever . . . with 10 dial scales for coverage of 160 to 1¼ meters with National's exclusive new converter provision for 6, 2, 1¼ meters. These are only a few of the highlights!



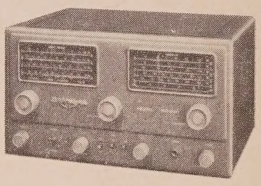
HRO-60

Latest and greatest of a great series! Frequency range: 1.7 to 30 mcs., additional coils available from 50 kc to 35 mcs. Gives you dual conversion on all frequencies above 7 mcs plus 12 permeability-tuned circuits in the three 456-kcs IF stages! Has current-regulated heaters in the high-frequency oscillator and the 6BE6 mixer. High-frequency oscillator and S-meter amplifier are voltage regulated.



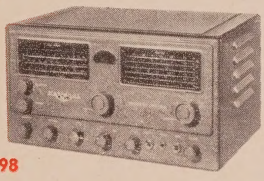
NC-183D

Has dual conversion above 4.4 mcs . . . steep-sided skirt selectivity with 3 IF stages (16 tuned circuits on the 3 high bands—12 on all other bands) plus a new crystal filter. Approximately 1 microvolt sensitivity on 6 meters for a 10db signal-to-noise ratio! Frequency range: .54 mcs to 31 mcs plus 47–55 mcs.



NC-88

Compare these features! Calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . .tuned RF stage . . . two IF stages . . . 2 audio stages with phono input and two position tone control . . . built-in speaker . . . antenna trimmer . . . separate high frequency oscillator . . . sensitivity control . . . series valve noise limiter . . . delayed A. V. C. . . . headphone jack . . . standby-receive switch.



NC-98

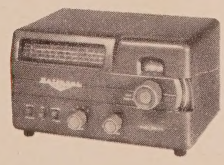
The lowest priced receiver with a crystal filter, the NC-98 has calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . . tuned RF stage . . . two IF stages and 2 audio stages with phono input and two position tone control. ALSO, antenna trimmer, separate high frequency oscillator, sensitivity control, series valve noise limiter, delayed A. V. C., headphone jack, standby-receive switch. Available with a calibrated bandspread scale for the SWL bands.



NC-125

Frequency range: .56 to 35 mcs. Has built-in SELECT-O-JECT audio filter. Average sensitivity 3 microvolts for 10 db signal to noise ratio. Has AVC, noise limiter, voltage regulated stabilized oscillator. Audio system essentially flat to 10,000 cps. Provision for NFM Adaptor.

SW-54



The most astonishing little receiver on the market today! Covers broadcast and 3 shortwave bands—540 kcs to 30 mcs. Receives voice or code. Police, ship, amateur, foreign stations clearly marked. Uses new miniature tubes for improved sensitivity. Easy-to-read indirectly lighted scale. Accurate "logging scale" also provided. Provision for headphones. Send-Receive switch for "ham" use with transmitter. Measures only 11" x 7". AC-DC operation.

Write for National's New Receiver Catalog

tuned to tomorrow **National** NC®

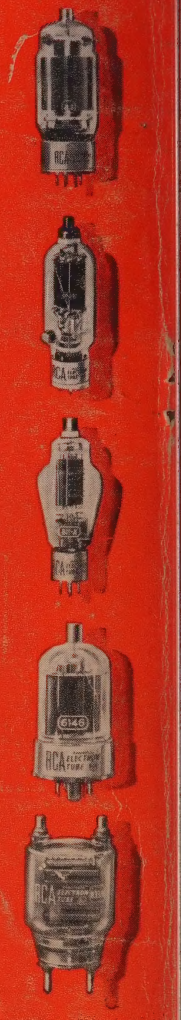
NATIONAL COMPANY, INC.
62 SHERMAN STREET, MALDEN 48, MASSACHUSETTS

WHICH RCA TUBE FOR YOUR SSB "FINAL"?

RCA Tubes for RF Linear Amplifier Service (Single-Sideband)

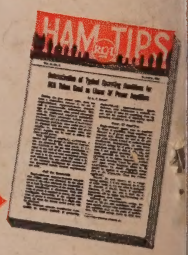
RCA Type	Class of Operation	Max. Frequency for full Input Mc	Amplification Factor*	Heater (H) or Filament Volts	Typical Operating Conditions (Per Tube)							
					DC Plate Volts	DC Grid-No. 2 Volts	DC Grid-No. 1 Volts	Peak RF Grid-No. 1 Signal Volts	Zero-Signal DC Plate Current Ma.	Max. Signal DC Plate Current Ma.	Approx. Max.-Sig. Driving Power Watts	Approx. Max.-Sig. Power Output Watts
6AQ5	AB_1	60	10	6.3(H)	250	250	−15	15	35	40	—	5
6V6	AB_1	30	9	6.3(H)	285	285	−19	19	35	46	—	7
6N7	B	30	35	6.3(H)	300	—	0	82†	35	70	—	10
6L6	AB_1	30	8	6.3(H)	360	270	−22.5	22	44	66	—	13
	AB_2				360	270	−22.5	36	44	102	—	23
2E26	AB_1	125	6.5	6.3(H)	500	200	−25	25	9	45	—	15
	AB_2				500	125	−15	30	11	75	0.2	25
2E24	AB_2	125	7.5	6.3	500	125	−15	41	10	75	0.23	27
807 and 1625	AB_1	60	8	6.3(H)	750	300	−35	35	15	70	—	35
	AB_2			12.6(H)	750	300	−35	48	15	120	0.2	60
829-B	AB_1	200	9	6.3 12.6(H)	750	200	−21	42†	20	100	—	55
	AB_2				750	200	−19	50†	32	160	0.5	85
6524	AB_2	100	8.5	6.3(H)	600	200	−26	76†	21	135	0.1	57
832-A	AB_1	200	6.5	6.3 12.6(H)	750	150	−32	64†	24	120	—	60
6146 and 6159	AB_1	60	4.5	6.3(H)	750	195	−50	50	12	110	—	60
	AB_2			26.5(H)	750	165	−46	54	11	120	0.4	65
4-65A	AB_1	50	5	6.0	1750	500	−90	90	10	85	—	85
	AB_2				1800	250	−35	90	25	110	1	135
4-125A/ 4D21	AB_1	120	5.9	5.0	2500	600	−96	96	25	115	—	165
	AB_2				2500	350	−43	139	47	130	2.5	200
811-A	B	30	160	6.3	1500	—	−4.5	85	16	156	2.2	170
813	AB_1#	30	8.5	10.0	2500	750	−95	90	25	145	—	245
8000	B	30	16.5	10.0	2250	—	−130	280	33	225	4	360
4-250A/ 5D22	AB_1	75	5.1	5.0	3000	500	−93	93	60	205	—	370
	AB_2				3000	300	−53	100	62	236	4.5	520
833-A	B	30	35	10.0	3300	—	−80	190	60	300	20	710

#Grid No. 3 connected to filament center-tap. †Grid No. 1 to grid No. 1 signal voltage for push-pull operation.
*For beam power tubes and pentodes, the value shown is the Mu-Factor, Grid No. 2 to Grid No. 1.



The *right* RCA Tube for your single-sideband amplifier is listed in this chart. For the power you want, simply read down the column on the right. For the corresponding RCA Tube type, read the column on the left. When you make your choice—let the Typical Operating Conditions be your guide.

Known for their tremendous reserve of filament emission, RCA Tubes meet the requirements for single-sideband transmission—to the letter. They literally "loaf along" on the power peaks. And they have the power sensitivity it takes to build a signal up to full power in one stage—from low input signals. When you go SSB . . . any power from a few watts to the limit . . . remember, you can do it better *with RCA Tubes.*



For more SSB data on RCA Tubes, see RCA HAM TIPS, December, 1954. If you do not have a copy, write RCA, Commercial Engineering, Section A-15, Harrison, N. J.

RCA®

TUBES for AMATEURS

RADIO CORPORATION OF AMERICA