Featuring—

GADGET RACK

For your shack

PROBLEM . . . How best to house the many accessory units in the average amateur radio station.

SOLUTION . . . Place each unit on a narrow strip panel, house them all in one large cabinet—and call it the GADGET RACK!

The GADGET RACK offers a partial—but important—solution to arranging accessories in the amateur station for maximum operating convenience and best appearance. Although specific cabinet and accessory dimensions are illustrated, this idea can be applied to any convenient and available material.

A station that has been in operation for several years usually has the following accessories:

1. Keying monitor
2. Frequency standard
3. Conventional receiver
4. Dedicated audio system
5. Outboard ZF system
6. Intercom set
7. Modulation monitor

If these units have been accumulated on a one-at-a-time basis, they probably comprise a collection of miscellaneous size boxes and chassis—some with power supplies and some that obtain their power from the receiver—all of them interconnected with unsightly dangling wires.

One solution to this problem is to construct the above units on one large chassis with its own power supply. This produces a unit that lacks flexibility.}

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TABLE MODEL: GADGET RACK, and accessories ready for action on W9FGS. Left to right COMBO MONITOR, CONEL MONITOR, blank panels, and power supply.

GADGET RACK with COMBO MONITOR requested to illustrate ease of access to units.

INSIDE VIEW of GADGET RACK with rear cover removed.
SURPRISE! A new format for G-E HAM NEWS begins with this issue, including—clean, fresh margins and lines— in the text, a larger type size with greater spacing between lines—and even a new printing process—surely you've noticed by now! We didn't announce the change ahead of time, but ye olde editor hopes you'll be pleased with the increased array of build-yourself stuff—witness the GADGET RACK and accessories herein.

1938 EDISON AWARD

For the seventh consecu- tive year, General Electric is sponsoring the Edison Radio Amateur Award for outstanding public service.

A U.S. RADIO AMATEUR who has distinguished himself through noteworthy public service will receive the Edison Award trophy and a check for $500 at a public ceremony in Washington, D.C., early next year.

ONLY CANDIDATES nominated by letter from any individual, club or association can be considered by the judges. Full details of the public service rendered, as well as the candidate's name, complete address and amateur call letters, should be included in a letter postmarked not later than January 5, 1939.

BASIS FOR JUDGING will be: (1) the greatest benefit to an individual or group, and (2) the amount of ingenuity and sacrifice displayed in performing the service. A panel of distinguished and impartial judges will review all entries.


GOODWIN L. DURHAM, President, American Radio Relay League.

WINNER OF THE AWARD will be announced on or before Thomas A. Edison's birthday, February 11, 1939.

EMPLOYEES of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.

FOR YOUR ELECTRONICS BOOKSHELF...

While we're talking about publications, three new booklets on amateur radio, and an operating aid for DX'ers, are now available.

G-E TRANSISTOR MANUAL—A revised and ex- panded third edition of this most used book in the transistor field; 168 pages stuffed with semi-conductor theory, applications, circuitry and specifications. A plastic binding allows the book to lie flat when open, just like our equally famous Essential Characteristics tube handbook.

See for yourself when you pick up your copy ($1.00) from your local G-E Tube distributor, or directly from G-E's Bemisconductor Products Department, Section S-5884, Electronics Park, Syracuse, N. Y.

SINGLE SIDEBAND for the RADIO AMATEUR—Published by the American Radio Relay League, has blossomed out in a new revised and enlarged second edition. This 230-page plus handbook covers the history, theory and practical aspects of single sideband—generation, detection, modula- tion, linear amplifiers—and related station acces- sories. It's an indispensable—repeat, indispensable—reference to keep you well informed on sideband techniques for only $1.50 in the United States, $1.75 elsewhere.

A BRAND-NEW BOOK—CO-PL by Louise B. Sandi. WR2Z, tells an amazing tale of the YL's contribution to the history of amateur radio, from 1933 to date. Louise, in announcing the book, says it is prédigously illustrated—more than 500 photos—and that it can be ordered directly from her ($3.50, postpaid) at 212 Bemboire Drive, Santa Fe, New Mexico. She'll personally auto- graph your copy if you request it.

DX IBM COMPUTER—A handy, slide-rule type operatimg aid and DIX guide for radio amateurs. Just announced by Electro-Voice, the device lists the different items for each call name prefix: Country, continent, zone, time differential, international postal rates, and great circle bearing for beam antenna alignment.

The call letter prefix column has extra space to fill in your QSL cards, and is self-correcting. The DX COMPUTER, measuring about 13 x 5 inches over-all, is available from most electronic parts distributors for $1.00, amateur net.

HOW TO GET G-E HAM NEWS—It's free of charge from your G-E Tube distributor. A subscription plan at $1 per year is available to persons with no address in the United States, Alaska, Hawaii, Panama Canal Zone, or APO and FPO military. Write to the address on the back page.

Subscriptions in Canada—at $1 per year—are available from the Canadian General Electric Co., Ltd., Electronic Tube Marketing Section, 189 Dufferin Street, Toronto 3, Ont.

In other countries, G-E HAM NEWS may be ob- tained through International General Electric distributors and representatives.

—Lighthouse Lorry
Continued from page 1

GADGET RACK

The first requirement ruled out the use of any case or box obtained as surplus equipment, for availability at a given time or place or in the future is always doubtful. The enclosure finally selected was the 7" x 9" x 15" crate-finished still box with removable cover—shown in the views on page 1—produced by several chassis manufacturers. This enclosure is inexpensive and lends itself to packing if the removable covers are used as the front and back of the unit. (Editor's note: Any convenient and available cabinets will serve as the GADGET RACK; if it will house your accessories. A GADGET RACK designed for mounting in a standard relay rack—and a different table cabinet model—will be described in the next issue of QST.)

FIG. 1. SCHEMATIC DIAGRAM showing the box-bar system of interconnections for power and signal circuits between accessory units in the GADGET RACK. The circuit for a suggested power supply is also included.

FIG. 2. ACCESSORY SOCKETS were first fastened to the outside of the cabinet bottom, wired and then mounted inside the box. Cut metal spacers to length that allows access onto a clear metal box.

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THE INTERCONNECTION PROBLEM among the accessory units, external circuits and power supply was solved with a bar-bar system. After listing all the required connections—and allowing for a spare or two—11-pin octal plugs and sockets were selected. Several sockets, J8-J18 wired accord- ing to the schematic diagram, Fig. 2, were mounted along the bottom rear corner of the cabinet. The Assembly Procedure is outlined under the view of these sockets, Fig. 2. Still another 11-pin socket, J2, mounted in any convenient location inside or outside the cabinet, is used for external connec-
tions.

External connections on each accessory unit are brought out through a short cable terminating in an 11-pin octal plug (Pn), as shown in Fig. 3. Thus, a unit at any location in the enclosure can connect to the power and other external circuits simply by soldering cable wires into the proper plug pins. If more bar-bar connections are re-
quired, other connectors having more pins may be substituted (Amphenol, Cannon, Jones, Eico Varicon, etc.).

SEVERAL TYPES OF CHASSIS may be used for the individual units, but the models described in this issue utilize plate-and-post chassis. Dimensions of a typical chassis are shown in Fig. 6. If a unit requires shielding, strips of perforated aluminum sheet may be cut to fit the side openings and fastened to the corner posts.

Corner posts may be cut from aluminum or brass rod, whatever is available. Round rod should be 3/16 of an inch in diameter; square rod, 3/16 of an inch on a side.

Panel widths were cut in multiples of one-half of an inch. Corresponding rear chassis plates were cut one-quarter of an inch narrower to provide clearance between adjacent units when installed in the rack. Although the plates can be cut with a hacksaw (or filesnips if they do not bend the panel), better appearance will result if all the plates can be sheared at a local sheet metal shop. An assortment of panels and chassis can be cut at one time to anticipate future needs; next month's QST or CQ may carry a story on a gadget that you must have in your station.

Other gadget chassis may be made from utility boxes, Mitool, Channel-Slot boxes, small opens end chassis—even a flat aluminum plate fastened to the panel with a strip of aluminum angle stock—whatever fits the requirements of the unit to be constructed.

Commercially made gadgets also can be incorpo-
rated into a GADGET RACK. Either drill a rack panel to match the controls, or cut a hole in the panel so that the front of the unit can be seen. Small angle brackets will help support a gadget mounted in this manner.

Gadget rack construction possibilities are limited only by your imagination. Even a metal bread box might make a good enclosure!

FIG. 3. CONNECTION PLUG for accessory units. Loop made from tinned wire, soldered into pin 1, provides chassis connection for outer conductor of shielded wire in cable.

FIG. 4. BASIC PLATE-AND-POST CHASSIS for accessory units. COMBO MONITOR and COMET MONITOR use this type chassis.

COMBO MONITOR

THE FIRST GADGET RACK ACCESSORY is a combination keying monitor, modulation indicator and field strength measuring instrument.

CONTINUOUSLY checking your transmitter sig-
na—and your fit too—is easy with this versatile unit. It requires only three tubes and two germanium diodes. A plate and post chassis, shown in the side view, Fig. 1, automatically provides a thru-panel mounting for the 6E6 indicator eye tube.

The signal to be monitored is fed into the unit from an external pickup antenna on pin 10 of the interconnection cable system, as shown in the schematic diagram, Fig. 2. A 100-ohm potenti-
ometer adjusts the signal level applied to the 68RE mixer tube. The position of the function
switch, Sl, determines the operation of the re-
maning circuits, as follows:

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CONEL MONITOR

SOLVE YOUR CONELRAD MONITORING PROBLEM WITH this combination Conelrad receiver and WWV converter accessory unit. Makebeliev Conelrad monitoring arrangements have no place in the modern amateur radio station. The simplest circuits are usually blocked or triggered by your own transmitter and thus are not reliable.

It's easy to build this dual-purpose unit from old broadcast receiver parts. Or, insert our alarm and WWV converter circuits into a receiver you may now be using as a Conelrad monitor and have the following features:

1. Self-contained; no external receiver required.
2. Sufficiently selective to prevent blocking from nearby transmitters.
3. Little external antenna required.
4. Tunable over entire broadcast band.
5. Has sufficient audio output for speaker reception, when needed.
6. Monitors signal from WWV to check frequency standards, clocks, etc.

THE BASIC RECEIVER CIRCUIT, shown in the schematic diagram, Fig. 1, is a conventional AC-powered transformerless type that can be used to pick up the broadcast band signals from a short antenna or from the radio. On the right side is the 6BE6 mixer (upper left-hand corner of Fig. 1) through L2 and Le—Cu. If this circuit is tuned to 1000 kilocycles, for instance, the local oscillator circuit, Le—Cu, will be tuned to 1455 kilocycles. Transformers T1 and T2 are peaked at 455 kilocycles and permit the 6BA6 to amplify this frequency, the difference between 1455 and 1000 kilocycles. Modulation on the 455-kilocycle signal is demodulated in a 1N34 diode. The diode also rectifies the RF signal, developing a negative bias (AVC voltage) which is applied to the control grid of the 6BA6, controlling its amplification in inverse proportion to the signal level.

The bias also holds a 2D31 miniature Thyatron tube nonconducting whenever the station signal is present. When the signal is interrupted (as it would be in a Conelrad alert), the 2D31 conducts. This causes the NE61 neon lamp, L1, to light, giving visual indication of the signal interruption.

The cathode circuit of the 6CK7 (triode section) fast audio amplifier is also completed when the 2D31 conducts. This permits audio to be heard in the headphones and speaker circuits, including miscellaneous relays, or, the modulation on the broadcast signal when it reappears. Open S1 to mute the audio system and turn off L1.

THE WWV CONVERTER section of the receiver (lower left-hand corner of Fig. 1) is activated by turning S6 to the WWV position. The 10-megacycle signal from WWV is fed from the pickup antenna through L4 and L6 to the signal grid of a second 6BE6 mixer. The crystal oscillator, operating at 8.5 megacycles, begins with the 10-megacycle signal and produces a 1.5-megacycle difference signal at the plate of the 6BE6. The WWV signal will be heard with the Conelrad receiver tuned to 1.5 megacycles.

A PLATE-AND-POST CHASSIS was also used for the Conel Monitor model shown in the side view, Fig. 1, and in the GADGET RACK on page 1. A panel width of at least 3 inches is recommended, but this will depend upon the size of the components actually used in constructing the unit.

FIG. 1. COMPLETE SCHEMATIC DIAGRAM of the combination Conelrad monitor and WWV converter. The latter circuit, enclosed in the dotted lines, can be eliminated or incorporated into an existing receiver. All capacitors are in microfarads; all resistances in ohms, unless otherwise specified.
When planning the overall size of your monitor- ing unit, first lay out the larger components, including tubes, at the approximate positions indicated in the layout sketch, Fig. 3. If T2, and T1 are 1½ inches square or larger, move them close together near one edge of the chassis and shift the 6BQ5 off center next to them. If the 6BQ5 converter tube will not be included, the 6K56 Convertor mixer tube can be placed in the center of the chassis.

Signal varying leads in the 6BQ5 and 6BQ6 stages should be cut as short as possible. Generous use of terminal strips provides tie points for junctions between wires and the smaller compo-
nents. Most small parts and wiring around the tube sockets should be assembled before the chassis plate is fastened to the panel. Leads run-
ning to controls on the panel can be cut to length by holding the panel in position temporarily while measuring them. Lengths of No. 26 hookup wire and No. 18 shielded single conductor wire were used for the interconnecting cable.

ALIGNING THE CONEL MONITOR follows the standard procedure for any superhet receiver. First apply power and check for heater and plate voltages in each stage. If the 6BQ6 oscillator section is working, a local broadcast signal should be located when tuning C4. Adjust the trimmer cap-
acitors (or tuning slugs) in T3 and T2, in that order for maximum signal.

Next, adjust the small trimmer capacitor on C4 (not shown on the schematic diagram) so that the receiver will tune from about 550 to 1600 kilocycles. Locate a weak signal near 1490 kilo-
cycles and adjust the trimmer on C4, for maximum signal. Recheck the adjustments in T2 and T3, for maximum signal. A signal generator can be used for alignment instead of broadcast signals.

CONEL MONITOR PARTS LIST

C1, C2, C3, C4, C5, C6, C7— two-section broadcast receiver variable; C8, 10–355 microfarads C9, 8–130 microfarads.
L1— 16 inch long, 3⁄8-inch-diameter iron core slug tuned coil form (National Signal).
L2— male 11-pin octal plug (Amphenol 86-

P1— 3-pole, 2-position, single section rotary tap
switch (Malloy No. 3211).
S1— round, central operator push-button switch.
T1, T2— 455-kilocycle IF transformers.
T3, T4— Universal output transformers, tube to speaker voice coil.
XTAL— quartz crystal, 8.5 megacycles.

FIG. 2. SIDE VIEW of the Conel monitor unit. Locations of principal components have been marked. The corner posts are 4 inches long, made from 1/4-inch diameter aluminum rod, threaded at both ends.

FIG. 3. PANEL AND CHASSIS parts layout for the Conel monitor. The IF transformer on this model is 1 ½ inches square. The 6BQ6 aether tube for the Conel receiver can be centered on the chassis plate if the 6BQ6 WWV converter tube and L4–L6 will not be included in the unit.

ALIGNING THE WWV CONVERSÉT in very simple. Turn Si to the WWV position, tune the Conel receiver around 1.5 megacycles and the charac-
teristic signal from WWV should be heard. Adjust the tuning slug in L4 for maximum signal. It should be possible to hear a number of short wave broadcast signals in the 9.5–10 megacycle range by tuning the Conrad receiver between 1.0 and 1.5 megacycles.
ADJUSTMENT IS SIMPLE, once all circuits in the COMBO MONITOR are working properly. Plug in a coil for the band on which the transmitter is operating before applying power to the unit. Modulate the transmitter 100 percent (check this with an oscilloscope, borrowed or otherwise), turn knob 8 to MODULATION and adjust the 100-ohm signal level potentiometer until the 685-ohm barely closes.

Remove the modulation from the transmitter, turn knob 8 to CARRIER LEVEL, and adjust the 1-megohm potentiometer so that the 685-ohm just closes, but does not overlap. The monitor is now calibrated to indicate 100 percent amplitude modulation of the transmitted. The 1-megohm potentiometer can now be locked in position.

Each time the monitor is used on a different band, simply turn knob 8 to CARRIER LEVEL and adjust the 100-ohm signal level control so that the 685-ohm barely closes. Then return knob 8 to the MODULATION position and the monitor is ready for use on a modulated signal.

FIG. 3. PANEL AND CHASSIS PARTS LAYOUT used for the model. Small holes for socket and terminal strip hardware are not shown and should be located from those parts.

I. A. Neal, W2/ZE—Edly.

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