The GENERAL RADIO EXPERIMENTER

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ELECTRICAL COMMUNICATIONS TECHNIQUE AND ITS APPLICATIONS IN ALLIED FIELDS

SIMPLIFYING EXPERIMENTAL-EQUIPMENT CONSTRUCTION

IN modern experimental setups the original "bread-board" assembly is rapidly disappearing, especially where high-frequency, multi-tube circuits are involved. For one to properly judge the operating performance of a circuit, the use of metallic panels, bases, and shields is always desirable and in many cases absolutely imperative. To the experimenter lacking machine-shop facilities, the most difficult part of assembling experimental equipment is the mechanical work of cutting, drilling, and finishing panels, base plates, dust covers, shields, and other parts.

The General Radio Company has recently developed new unit-panel equipment designed to facilitate the fabrication of experimental and semi-permanent assemblies. An advantage of the unit-panel idea is that all parts are interchangeable. The complete assembly is mechanically rugged and neat in appearance. The apparatus is equally suited to relay-rack or table mounting. Circuit changes can be made at any time without disfiguring the panel, and the unit is easily disassembled for conversion into an entirely different instrument.

UNIT PANEL CONSTRUCTION

is adapted to all kinds of communications equipment:

- Laboratory apparatus
- Public address systems
- Experimental receivers and transmitters

The parts required for a complete metal box are a base, two end plates, a dust cover, a panel, and the accessories supplied with the panel. All of the principal parts are made of Eraydo, a non-magnetic, non-corrosive alloy of copper, silver, and zinc, which is stronger than materials commonly used for such parts. One side of the Eraydo is satin finished and coated with clear lacquer. Where good contact between surfaces is essential for shielding, the lacquer may be removed with fine sandpaper.

Three standard 1/8-inch panels are

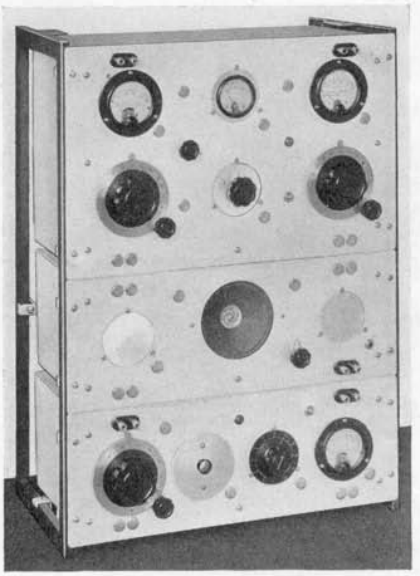


FIGURE 1. Some of the combinations that are possible with General Radio unit-panel construction. The TYPE 660-A Universal Rack and the method of clamping it to wall or table are clearly shown. See page 6 for rack details

available: one, 19 by 12 inches and two, 19 by 7 inches. Type numbers and the location of all holes are shown on page 4. Each panel has several 2⅞-inch diameter holes symmetrically placed. Around each of these holes three small mounting holes are provided, the combination being suitable either for mounting the standard bakelite* (Navy type) meter case, or for fastening the various mounting discs to the panel. Adjacent to each large panel hole is a ½-inch hole for the slow-motion mechanism of the 4-inch TYPE 503 or TYPE 703 Dials.

Other ½-inch holes are machined in each panel. At both top and bottom near either end are located pairs of holes on ¾-inch centers to fit TYPE 274-Y Panel Terminal Insulators and TYPE 138-VD Binding Posts for input and output connections. Other holes are intended for single-hole-mounting parts such as rheostats, neutralizing condensers, telephone jacks, toggle switches, anti-capacitance switches, etc. Bushings for reducing the diameter of the holes to 7/16 inch or ⅜ inch are furnished with the panel. The unused holes are plugged with TYPE 661-P4 Snap Buttons which match the panels in finish and are easily removable.

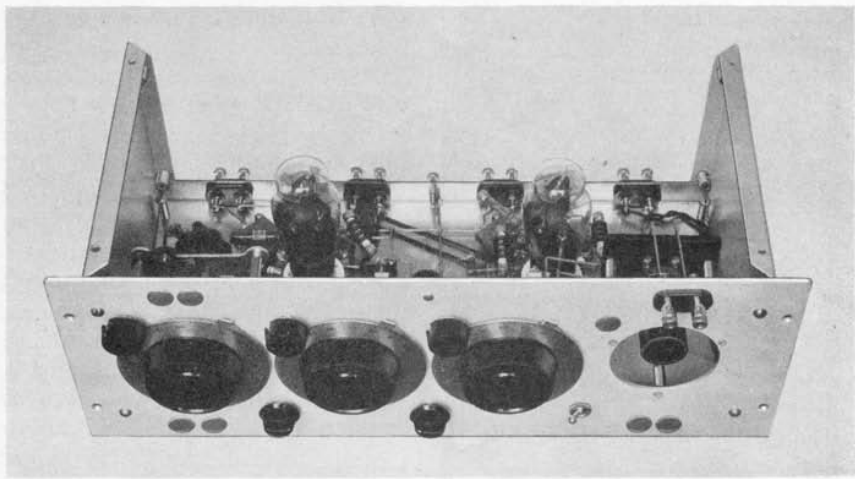
One panel is furnished with a 5-inch permanent-magnet dynamic loudspeaker, the input impedance of which is 3000 ohms.

Four types of mounting discs are available. The TYPE 661-P1 Blank Mounting Disc is a blank fastened to either the front or the back of the panel by means of machine screws and three small holes which line up with the three meter-mounting holes in the panel. The blank discs are used either to cover the large panel holes not in use, or to mount parts other than those manufactured by General Radio. The center of each blank is prick-punched on the reverse side to assist the user in laying out mounting holes.

The TYPE 661-P2 3-Hole Mounting Disc has three small holes drilled on a ⅞-inch radius to mount any standard General Radio part such as condenser, rheostat, potentiometer, etc. Short spacers which are sometimes necessary to provide clearance for the panel-mounting screws are furnished with the

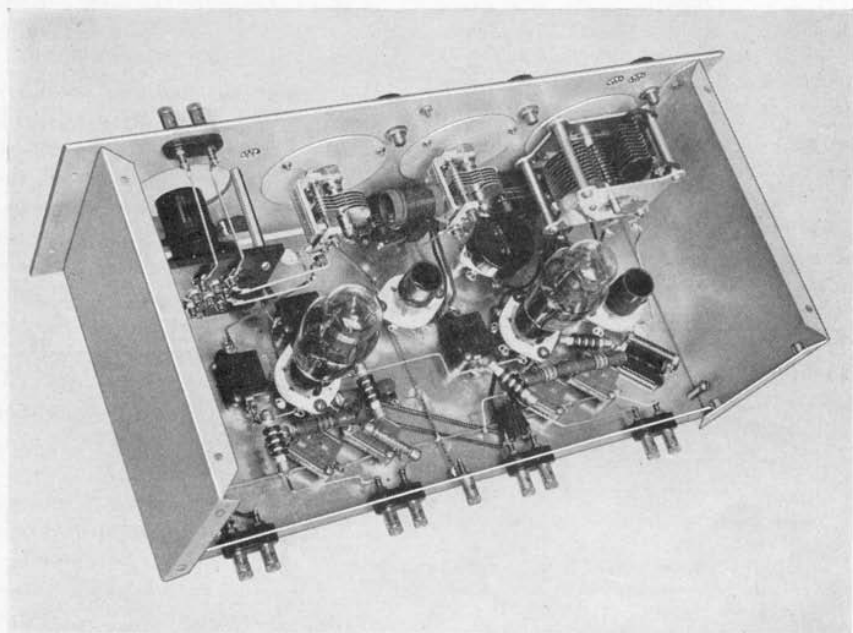
(*Continued on page 6*)

* All bakelite-case meters do not meet the dimension requirements of the Navy specifications, although all, or practically all, meter manufacturers can supply them. Many of the non-standard metal and bakelite cases ordinarily carried in stock by some manufacturers can be mounted satisfactorily.



Courtesy of *QST*

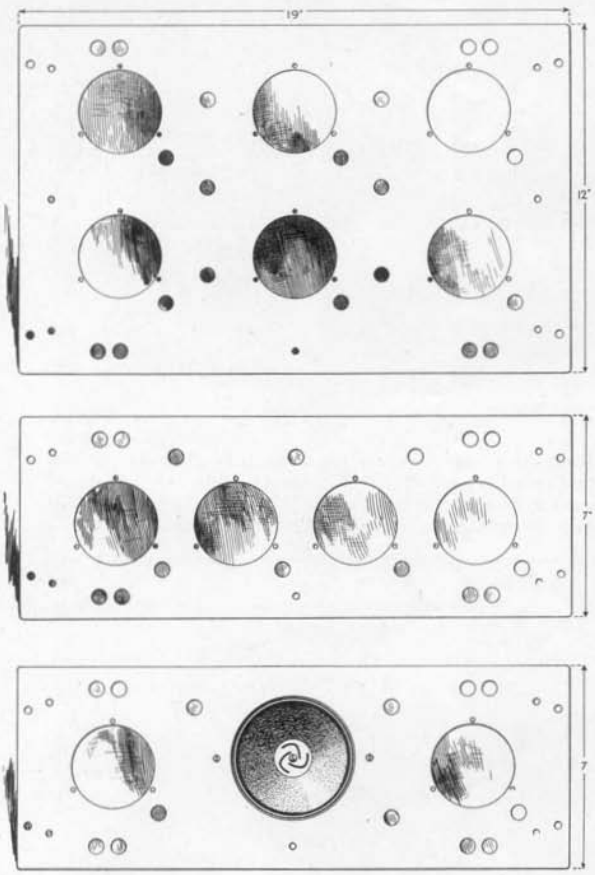
FIGURE 2. A universal exciter unit for 5-band amateur operation as constructed by the editorial staff of *QST*. Everything is mounted on a TYPE 661-B Unit Panel and a TYPE 661-L End- and Base-Plate Assembly. Using the panel upside down as the designer did here in order to get his switches at the bottom is all right, if the assembly calls for no meters!



Courtesy of *QST*

FIGURE 3. The interior of the exciter unit shown in Figure 2. An unshielded TYPE 177-B Inductor Form is plugged into a jack base at the right. Note that General Radio unit-panel construction does not limit you to General Radio parts

Figure 4. UNIT PANELS AND ACCESSORIES (Drawings 1/8th Actual Size)



Type 661-A Unit Panel
(19 x 12 inches) $6.00
Including following accessories

Number Supplied	Type	Description
3	661-P1	Blank Mounting Discs
3	661-P2	3-Hole Mounting Discs
20	661-P4	Snap Buttons
2 pr.	661-P5	Panel Clamps
12	661-P6	Mounting Spacers
6	661-P8	3/8-inch Bushing
6	661-P9	7/16-inch Bushing
25		Machine screws and nuts (for base, ends, and discs)

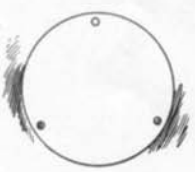
Type 661-B Unit Panel
(19 x 7 inches) $4.00
Including following accessories

2	661-P1	Blank Mounting Discs
2	661-P2	3-Hole Mounting Discs
15	661-P4	Snap Buttons
2 pr.	661-P5	Panel Clamps
9	661-P6	Mounting Spacers
4	661-P8	3/8-inch Bushing
4	661-P9	7/16-inch Bushing
17		Machine screws and nuts (for base, ends, and discs)

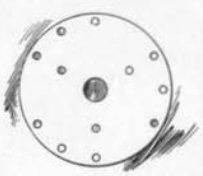
Type 661-C Unit Panel
(19 x 7 inches) $6.50
Including following accessories

1	666-P1	Blank Mounting Discs
1	666-P2	3-Hole Mounting Discs
13	666-P4	Snap Buttons
2 pr.	666-P5	Panel Clamps
6	666-P6	Mounting Spacers
4	666-P8	3/8-inch Bushing
4	666-P9	7/16-inch Bushing
13		Machine screws and nuts (for base, ends, and discs)
1		5-inch Dynamic Speaker and Clamp

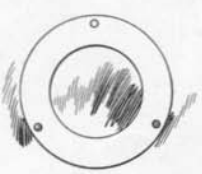
ACCESSORIES (1/3rd Actual Size)



Type 661-P1
Blank Mounting Disc
For use as blank cover or special drilling. Center prick-punched for easy layout. $0.15 each.



Type 661-P2
3-Hole Mounting Disc
For 3-hole mounting, 120° apart on 7/8-inch radius. 12 possible positions. $0.20 each.



Type 661-P3
Adapter Disc
For 2 1/16-inch meters (*e.g.*, Weston 506). $0.15 each

Type 661-P11
Cover Plate
For use with TYPE 177-B Inductor Form and TYPE 177-K Inductor Shield. $0.15 each

Figure 5. ENDS, BASES, DUST COVERS (Drawings 1/6th Actual Size)

Type 661-K
End- and Base-Plate Assembly
For 19 x 12-inch Panels
$5.00

Base plate can be mounted in any one of four positions. Machine screws and spacing pillars supplied. Order panel (shown dotted) and dust cover separately.

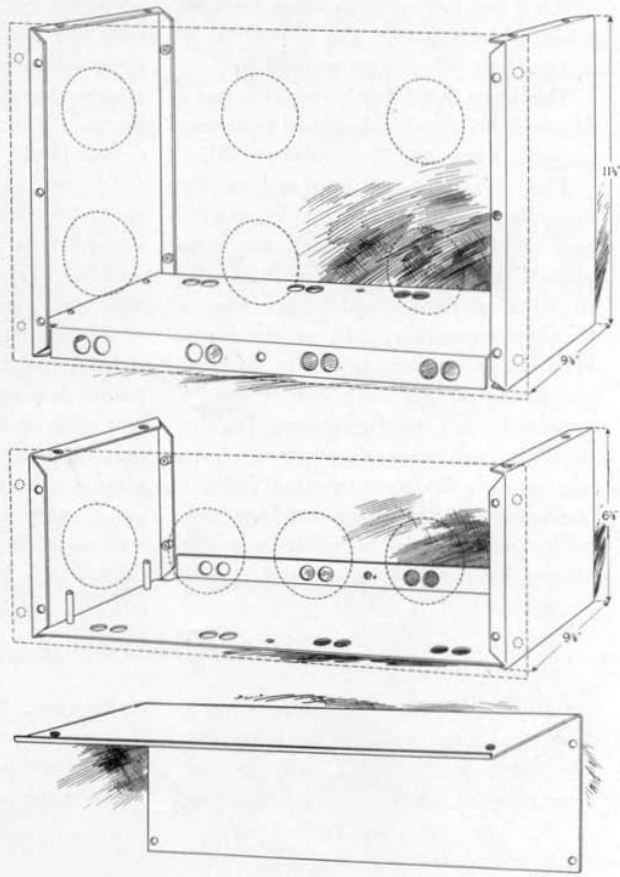
Type 661-L
End- and Base-Plate Assembly
For 19 x 7-inch Panels
$4.00

Base plate can be mounted in any one of four positions. Machine screws and spacing pillars supplied. Order panel (shown dotted) and dust cover separately.

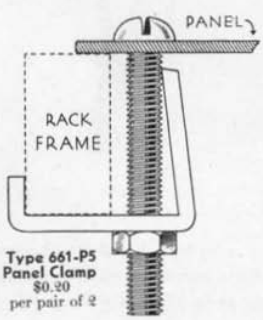
Type 661-R Dust Cover
For 12-inch Panels
$1.50

Type 661-S Dust Cover
For 7-inch Panels
$1.25

Fit closely. Can be attached and removed when panels are mounted one above another on a rack. Machine screws for back supplied.



ACCESSORIES (Shown Actual Size)

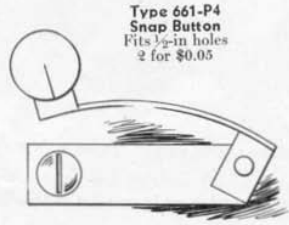


Type 661-P5
Panel Clamp
$0.20
per pair of 2

Type 661-P8
⅜-in Bushing
Fits ½-in holes
4 for $0.10

Type 661-P9
7/16-in Bushing
Fits ½-in holes
4 for $0.10

Type 661-P4
Snap Button
Fits ½-in holes
2 for $0.05



Type 661-P6
Mounting Spacers
Provide clearance for parts interfering with disc-mounting screws
6 for $0.10

Type 661-P7
Dial Indicator
For G. R. dial. Supplied free with each dial when order specifically requests it. $0.10.

panel. Around the edge of the disc, which is finished on both sides, are nine holes which permit the discs to be mounted at 30° angles around 360°.

The TYPE 661-P3 Adapter Disc has a 2⅛-inch hole and is designed to mount meters such as the Weston type 506.

The metal base is fastened to the lower flange of the end plates by spacers and machine screws which are supplied. One edge is bent at right angles to form a flange which provides a terminal-mounting strip at the back. It is not necessary, however, to have the flange at the back, for it can be mounted next to the panel. In this position two pairs of mounting holes line up with the lower terminal holes in the panel so that panel and base may be securely clamped together by means of the insulated binding-post assemblies. The base mounts in any of four positions, i.e., flange up, flange down, either at the back or the front. Additional ½-inch holes on ¾-inch spacing are provided for terminals. Small holes for mounting sockets, etc., are easily drilled in the base.

The end plates are sold in combination with the base and are made in two sizes: for the 12-inch and for the 7-inch panels. They are bolted to their respective panels by machine screws which are supplied.

Dust covers for the two sizes of end plates are available. They fit tightly and slide on from the rear so that they may be removed when the panel assemblies are mounted one above another on a relay rack. Only four machine screws at the back of the unit are required to hold the dust cover in place.

UNIVERSAL RELAY RACK

GENERAL RADIO is announcing a new relay rack to be known as the TYPE 660-A Rack and designed especially for the TYPE 661 Unit-Panel equipment. The rack consists of two rectangular steel frames which mount parallel to each other as shown in the illustration on page 2.

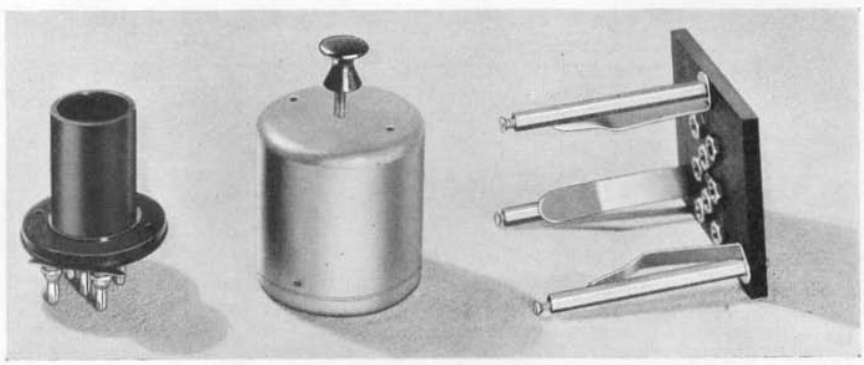


FIGURE 6. These three parts, with a TYPE 661-P11 Cover, make the complete shielded inductor assembly shown in Figures 1, 7, and 8. In addition, the bakelite form can be used alone as in Figures 2 and 3 or it can be fitted with the shield only as in Figure 9

Various methods for obtaining sufficient rigidity suggest themselves. The frames may be screwed to the bench at the proper separation or they may be fastened to the bench and wall by four clamps supplied with each rack. The clamps are similar to the TYPE 661-P5 Panel Clamps except that a long wood screw replaces the machine screw. Holes at the top and bottom of the frames can be used to mount a brace between the frames if it is necessary to increase rigidity of the assembly. The rack can be used for panels of any width.

TYPE 661-P5 Panel Clamps will clamp a panel to the rack in any desired position. Four of these clamps are supplied with each of the TYPE 661 Uniit Panels, but they must be ordered separately when it is desired to mount other panels on the rack.

The height of TYPE 660-A Rack is 26½ inches (fifteen 1¾-inch rack units). Its price is $5.00. Code Word: NINNY.

PLUG-IN INDUCTORS

ANYONE who has ever been up against a short-wave coil design problem will appreciate the advantages of these new plug-in inductor forms after a glance at the accompanying photographs. There are four basic components, and these can be assembled in three ways. The bakelite form can be

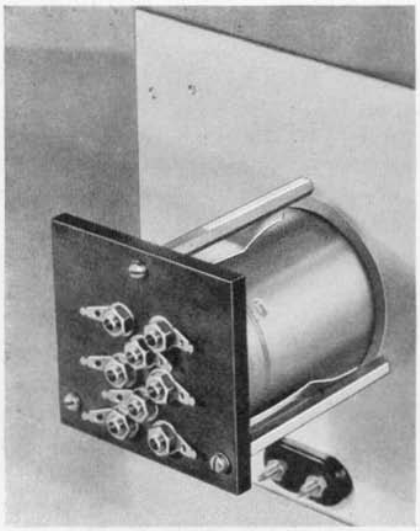


FIGURE 7. The complete shielded inductor (Figure 8) mounts in this manner on a unit panel. The three springs on the TYPE 661-P10 Jack Base guide the inductor into place. See the bottom panel of Figure 1, second position from the left, for a front-of-panel view of this assembly

FIGURE 8. The shield base is securely locked to the shield top by the three bayonet catches to make a single unit. In the center is the threaded rod which engages a threaded insert in the jack base and draws the cover plate firmly against the panel. One plug has been removed to show small holes for lead wires

used alone, or, if desired, the shield can be attached to make one integral unit. Then, when a shielded inductor is required for use with unit-panel assemblies, the cover plate is added. The jack base can be used behind the unit panel, or mounted horizontally on a shelf.

An important feature in short-wave work is the excellent noise-free contact provided by the use of spring-type plugs and jacks. The eight sets of contacts are adequate for the most elaborate circuit. When fewer circuits are needed, the plugs and jacks can, if desired, be removed.

Figure 8 shows how the shielded inductor is assembled for use with unit panels. As the inductor is plugged into the base plate, the end of the threaded rod engages a threaded insert. Then a turn of the knob draws the cover plate firmly against the panel to make a joint that is electrically and mechanically tight. All holes are carefully aligned, and there is absolutely no difficulty in slipping the inductor into position or in clamping it in place.

If the shielded inductor is to be used in the manner shown in Figure 9, the bakelite base can be fastened firmly to the rod by means of two nuts (supplied with the shield). One is placed on the inside, and one on the bottom outside face of the form.

TYPE 177-B Inductor Form: Can be used alone, with shield, or with shield and cover plate for unit-panel mounting. See photographs. Supplied with eight removable plugs (with lockwashers and lugs). Winding form: 1¼ inches (diameter), 1¾ inches (length). Moulded bakelite. Price: $0.85. Code Word: INDUCTBOAT.

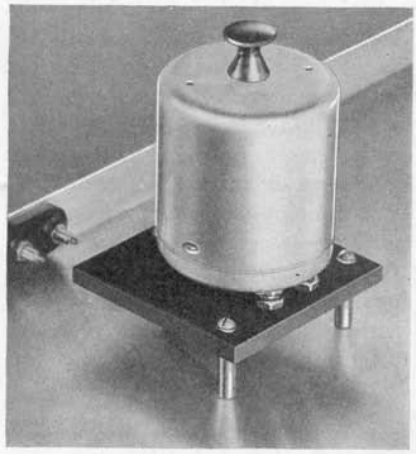


FIGURE 9. The jack base can, if desired, be mounted on a horizontal base plate to accommodate a shielded inductor as shown here. Note also that the unshielded inductor unit can be used in this jack base

TYPE 177-K Inductor Shield: Aluminum. Fastens to TYPE 177-B Inductor Form with two machine screws supplied. The knob, clamping rod, and nuts (see photographs) are included together with assembly instructions. See page 4 for description of TYPE 661-P11 Cover Plate. Price: $0.65. Code Word: INDUCTKEMP.

TYPE 661-P10 Jack Base: Includes eight removable jacks and lugs. Unique locating device makes plugging in coils extremely easy. Spacer bars fit unit panels. Base can, if desired, be mounted on shelf base (spacers not included). Designed for shielded or unshielded TYPE 177-B Inductor Form. Price: $1.50. Code Word: UNIPANBASE.

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