COMMUNICATIONS

INSTALLATION OF
RADIO CONTROL CENTER
Single and Dual-Station Control

TYPICAL RADIO CONTROL CENTER CONSOLE

The General Electric Radio Control Center is designed to serve the communication requirements of todays busy two-way radio systems. If offers flexibility in styling and control applications to serve individual communication requirements.

The attractively styled console blends with the decor of modern office surroundings. All controls and indicating devices are located on the console turret assembly for maximum convenience to the operator.

PLANNING SPECIFICATIONS

Dimensions	42" H x 60" W x 30" D (Includes Desk & Turret)
Temperature Range	-30°C to +60°C (-22°F to +140°F)
Maximum Power Re-quirements	130 watts, 117 VAC, 50/60 Hz

GENERAL ELECTRIC

Planning Your Installation

The Desk and Turret sections of the Radio Control Center Console are shipped separately. This manual provides assembly, installation and adjustment instructions necessary to place the control center in operation. Study the Manual carefully before starting, for a well planned installation insures neatness, ease of servicing and convenience for the operator.

CONTROL CENTER LOCATION

The control center should be located in an area that is convenient to primary power connections and the telephone line inputs. Select a location that offers maximum convenience for the operator and provides adequate space for future maintenance and servicing operations.

POWER REQUIREMENTS

The console requires 117 VAC, 50/60 Hz for its primary power. An optional 220/117 VAC step down transformer kit is available for locations where the primary power source is 220 VAC. The console power input from the building power distribution system should be made by a circuit protected by its own fuse or circuit breaker.

TELEPHONE LINE REQUIREMENTS

Three types of telephone line connections are commonly used in remote control applications. The single station control console may use any of the methods. However, a dual station control console cannot be connected according to Method 2. Before choosing one of these methods, consider both the cost and performance of each, as one method may be available at a considerably lower rate. In addition, some local telephone companies offer no choice, but will provide an audio pair and a control pair. The following chart contains information to assist in selecting the Control Method and type of telephone line to be leased.

Method	Description	Advantages or Disadvantages
1	One metallic pair: for both audio and control voltages with control voltage simplexed from line to line.	Economical; dependable where earth currents may be large, or where a good earth ground cannot be obtained; keying clicks will be heard in paralleled control consoles.
2	One metallic pair: for both audio and control voltages with control voltage simplexed from line to ground.	Economical; earth ground currents (encountered near power company sub-stations) may interfere with control functions; keying clicks minimized.
3	Two telephone pairs: one for audio voltage and one for control voltage (metallic pair).	Provides best performance; keying clicks will not be heard; least susceptible to earth ground currents which may interfere with control functions.

Installing Your Console

The console installation consists of:

- Mounting the turret assembly on the desk
- Installing the Power Junction Box and Switch Assembly
- Installing terminal board(s) required for external connections
- Making power and control (telephone line) connections

MOUNTING TURRET ASSEMBLY ON DESK

To install the turret assembly, four mounting holes and two cable access holes must be drilled in the desk top. The desk top has a wood core with a laminated plastic cover so a small electric drill (with wood drill bit) or brace and auger bit may be used to drill the holes.

1. Drill two 3/4 inch diameter cable access holes (H1 and H2) in the desk top as shown in Figure 1.
2. Place the turret assembly on the desk top.
3. Remove the rear cover from the turret. (Remove all screws except those holding the bottom of the cover, then loosen the bottom screws and lift out cover.)

4. Remove the two shipping brackets at the rear of the center drawer assembly (brackets are located on the bottom turret brace at each corner of the drawer assembly).

5. Slide out the turret drawer assembly. (Lift drawer assembly when stop is reached to completely remove it from the turret.)

6. Align the turret cabinet with the side and back edges of the desk top.

7. Using the turret cabinet as a template, mark the four mounting hole positions. (Holes are located on the bottom braces, at each corner of the turret.)

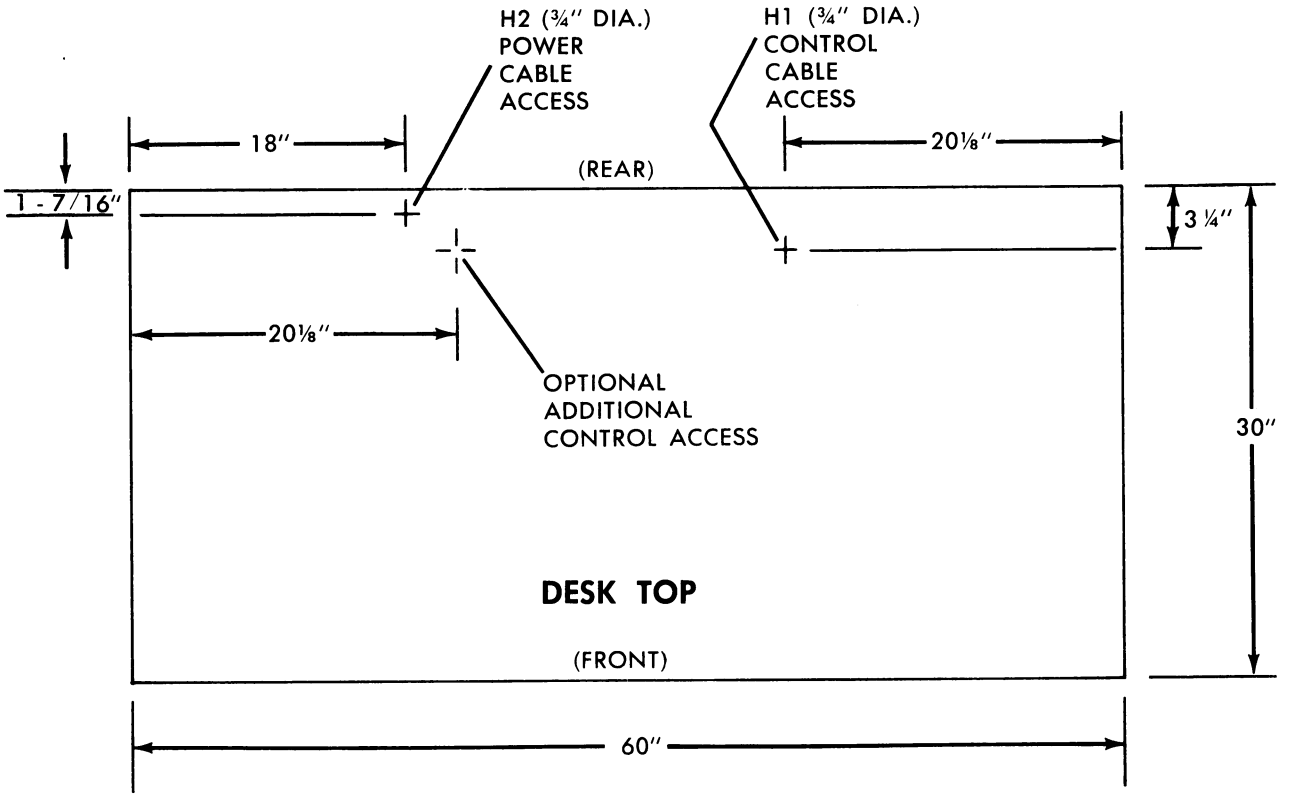


Figure 1 - Drill Plan for Cable Access Holes

8. Replace the drawer assembly and slide the turret assembly forward on the desk.

9. Drill four mounting holes to a minimum depth of 5/8 inch using a #11 (.191-inch dia.) drill or a 3/16-inch drill.
10. Return turret to mounting location. Insert 3-wire, rubber covered, power cable (attached to turret) through hole 2 (H2) in desk top, then secure the turret to the desk with the four #14 x 5/8" thread forming screws and flat washers provided.
11. Route control cable from turret through hole 1 (H1) in the desk top.
12. Replace turret rear cover.

POWER JUNCTION BOX AND TERMINAL BOARD INSTALLATION

The 117-VAC Power Junction Box and Terminal Board(s) for making telephone line connections should be installed on the Distribution Block Panel in the back of the console desk (see Figure 2 for mounting configuration).

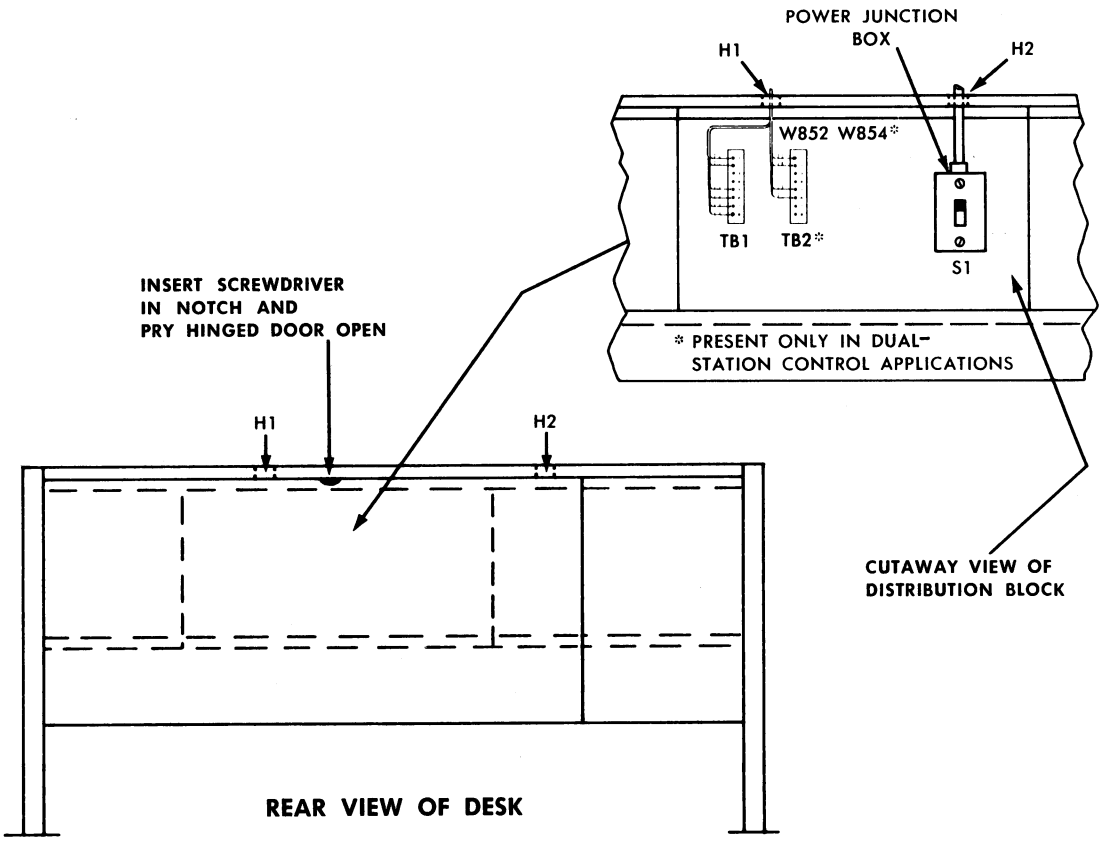


Figure 2 - Location of Power Junction Box and Terminal Boards.

1. Open the door at the rear of the desk to gain access to the distribution block. The distribution block is removable. However, the following installations can be made with the block in the desk if desired.

2. Mount the 8-point terminal board (TB1) on the distribution block using the two #6 x 5/8" threadforming screws provided. If the console is for dual-station control, also mount a second 8-point terminal board (TB2).

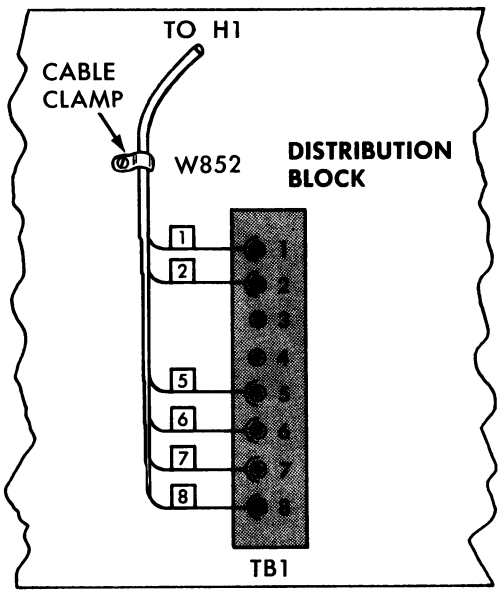


Figure 3A

Control Cable Connections (Single-Station Control)

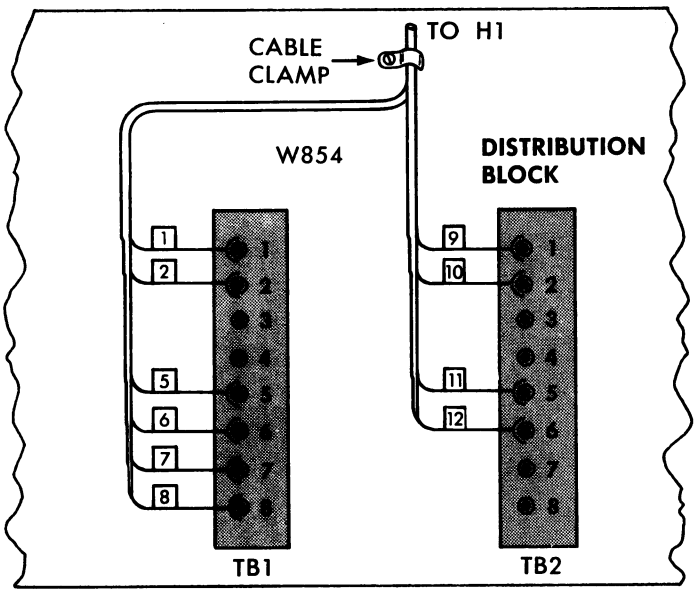


Figure 3B

Control Cable Connections (Dual-Station Control)

3. Connect the control cable (routed from the turret through H1 in the desk top) to the terminal board(s) as shown in Figure 3A (single-station control) or 3B (dual-station control). Mount cable clamp as shown using the #6 x 5/8" threadforming screw provided.

4. Install the power junction box on the distribution block as shown in Figures 2 & 4 and as described in the following instructions.

NOTE

If it is desirable to switch console power ON and OFF from the front of the desk, use the alternate location shown in Figure 5 for installation of the junction box.

5. Remove an end "knockout" on the power junction box. Then orient the box so that the hole is up, and mount the box to the distribution block using two #10 x 3/4" threadforming screws (see Figure 4).

6. Install the cable clamp in the hole at the top of the junction box. Connect three-wire power cable (routed from the console turret through H2 in the desk) to the power junction box as shown in Figure 4.

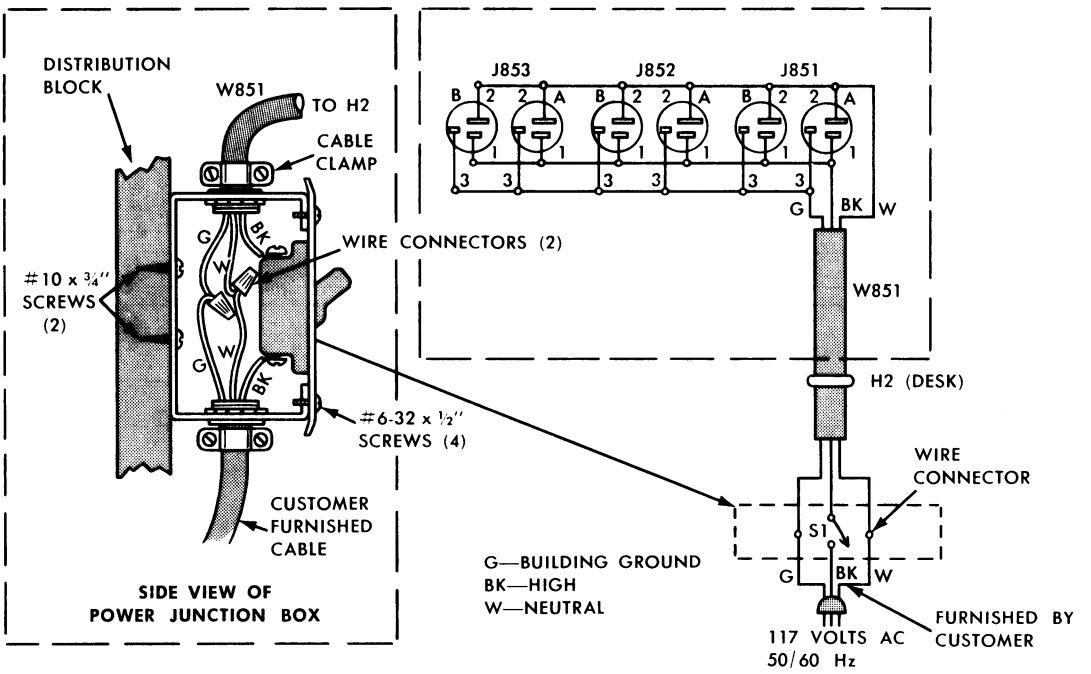


Figure 4 - Power Cable and Junction Box Installation

7. Connect the power input cable (customer furnished) to the power junction box. This installation may consist of conduit, flexible armored cable, or a "pigtail" cable as desired. Do not connect the other end of the cable to 117 VAC power at this time.

IMPORTANT

Check your electrical code to be sure that you comply with all local ordinances.

ALTERNATE LOCATION OF POWER JUNCTION BOX

The power junction box may be installed on the metal divider wall, as shown in Figure 5, to permit control of the power ON-OFF function from the front of the console.

1. Use the power junction box as a template and drill two 9/64-inch mounting holes in the metal divider wall with a #29 drill. (Make sure that the distribution block is moved aside to clear all accesses.)

2. Remove two "knockouts" from the power junction box for input and output cable connections. (Refer to Figure 5 for suggested cable entrance locations.)

3. Drill one or two 1/2-inch holes (as required) in the metal divider wall for cable entrance.

4. Install the power junction box on the metal divider wall and make power connections.

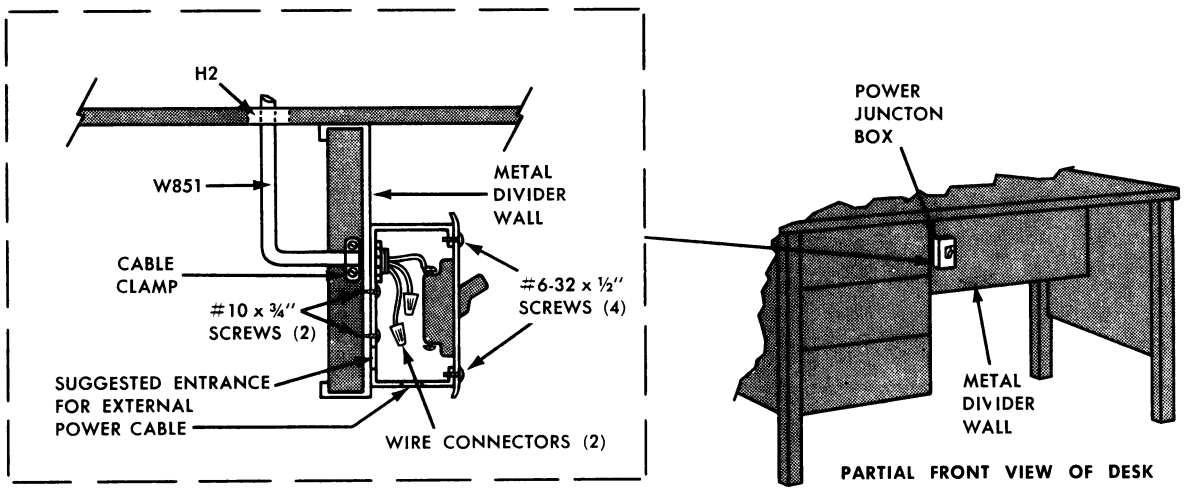


Figure 5 - Alternate Location for Power Junction Box

TELEPHONE LINE CONNECTIONS

Telephone lines are to be connected to TB1 on the distribution block. If the console is for dual-station control, lines for controlling the second station are to be connected to TB2.

1. After the control method has been selected, connect telephone lines and make jumper connections as described in this section.

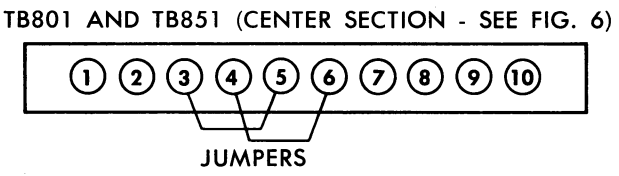
> **NOTE**
>
> Before connecting the telephone pair, it is necessary to identify each end of the wires that will carry the control voltage. Temporarily connect one of the wires at the remote control panel to a good earth ground, and measure the resistance of each of the wires to ground at the control console. Make sure that each control line is connected to corresponding terminals on both the control console and the remote control panel (i.e., TB1-1 to TB701-1 and TB1-2 to TB701-2).

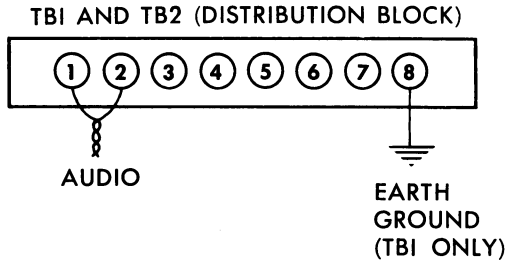
Method 1 - Single Telephone Pair (Control Voltage Simplexed Line to Line

a. Connect telephone pair to TB1-1 and TB1-2. Connect a second telephone pair to TB2-1 and TB2-2 if the console is for dual-station control.

b. Connect jumper between TB801-3 and TB801-5. For dual-station control consoles, also connect jumper between TB851-3 and TB851-5.

c. Connect jumper between TB801-4 and TB801-6. For dual-station control consoles, also connect jumper between TB851-4 and TB851-6.





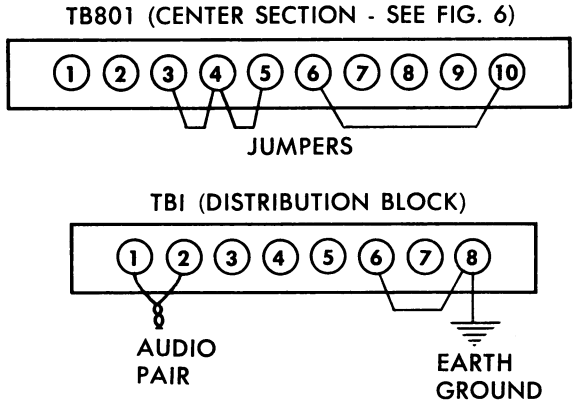
Method 2 - Single Telephone Pair (Control Voltage Simplexed Line to Ground). This Method is not compatible with dual-station control consoles.

a. Connect telephone pair to TB1-1 and TB1-2.

b. Connect jumper between TB801-3 and TB801-4.

c. Connect jumper between TB801-4 and TB801-5.

d. Connect jumper between TB1-6 and TB1-8.

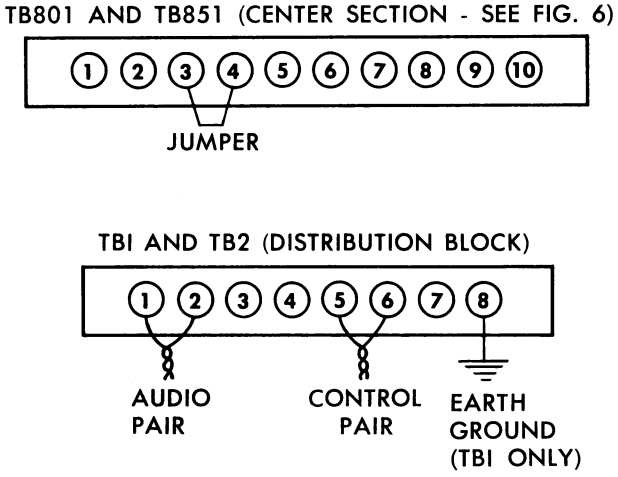


Method 3 - Separate Control and Audio Pairs

a. Connect audio pair to TB1-1 and TB1-2. Connect a second audio pair to TB2-1 and TB2-2 if the console is for dual-station control.

b. Connect control pair to TB1-5 and TB1-6. Connect a second control pair to TB2-5 and TB2-6 if console is for dual-station control.

c. Connect jumper between TB801-3 and TB801-4. For dual-station control consoles, also connect jumper between TB851-3 and TB851-4.



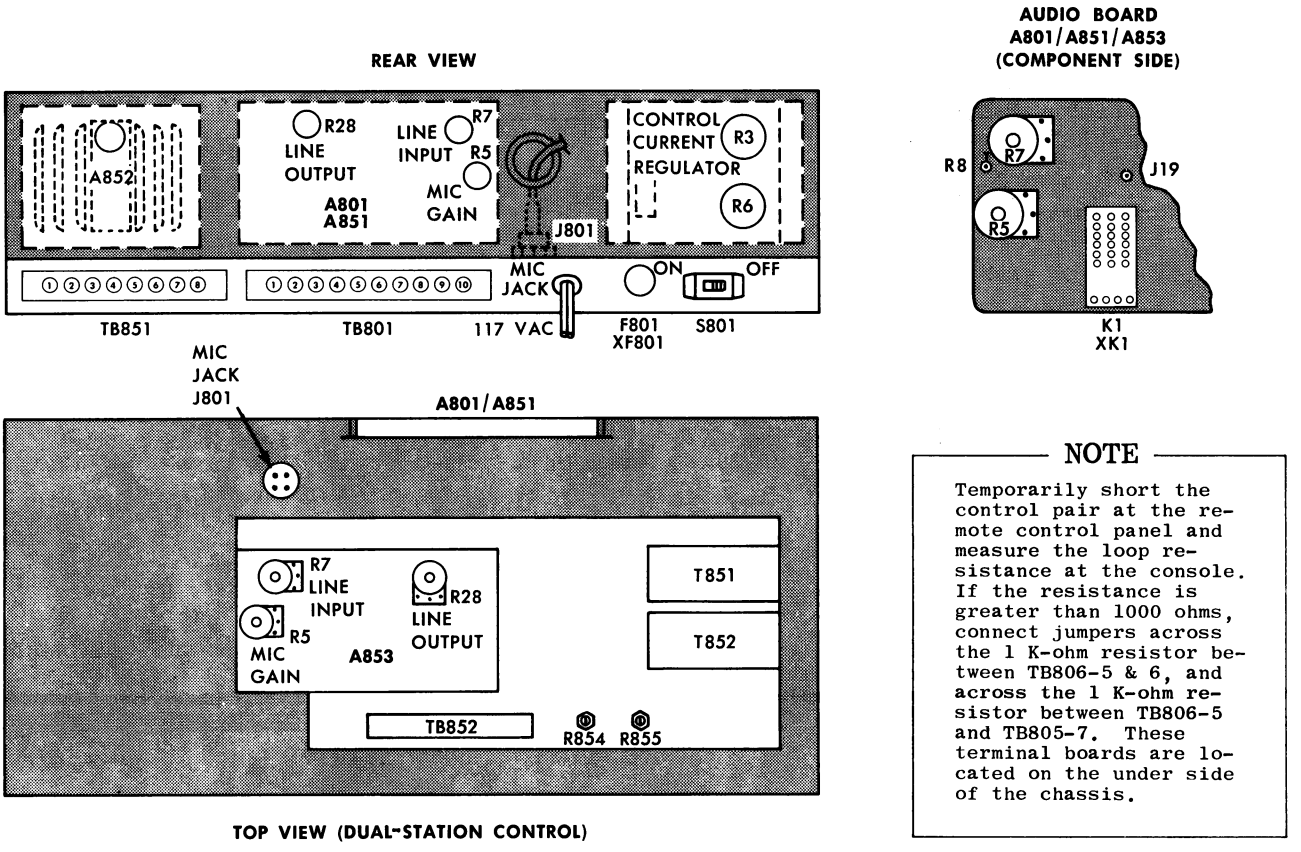
2. Connect terminal 8 of TB1 to a good earth ground such as a cold water pipe or an electrical conduit. This is required as a safety measure for the operator, regardless of the control method used.

3. After the telephone line connections have been completed, a few adjustments may be required before placing the unit in service. Before applying power to the console, make sure that the station installation and adjustment has been completed, and that all telephone lines have been connected to the remote control panel. Then connect the power cable to a 117-volt, 50/60 Hz AC source, and turn the console power switches S1 (on the power Junction box) and S801 (on the center section) to the ON position.

4. Make the necessary adjustments as shown in the ADJUSTMENT PROCEDURE that follows. Before starting adjustment, make sure that the station VOLUME control (R511 on the EP-38-A) has been set for no more than 6 volts RMS at the audio pair with maximum system deviation.

Adjustment Procedure

Most of the following adjustments are made to controls on the center drawer assembly of the console turret. To gain access to the inside of this assembly, grasp the drawer frame and pull the drawer forward allowing it to rest on the desk top. Figure 6 shows the adjustable components involved in the adjustment as well as the jacks and terminal boards required for meter connections.



NOTE

Temporarily short the control pair at the remote control panel and measure the loop resistance at the console. If the resistance is greater than 1000 ohms, connect jumpers across the 1 K-ohm resistor between TB806-5 & 6, and across the 1 K-ohm resistor between TB806-5 and TB805-7. These terminal boards are located on the under side of the chassis.

Figure 6 - Center Section of Control Console

LINE INPUT

The LINE INPUT has been adjusted at the factory for an input of 180 millivolts RMS (-12 dbm) for threshold of compression. Use of excessive compression will accent background and line noise during pauses in transmission.

NOTE

In the following procedure, when two audio pair are connected to the console (dual-station control applications) individual LINE INPUT control adjustments must be made for both audio lines.

PROCEDURE:

1. Feed a 1000-Hz signal onto the audio pair from the source with the largest line loss (this may be the base station or another console). Adjust the audio generator to produce +18 dbm on the audio pair. However, if the source has been adjusted for less than +18 dbm on the line, set the audio generator to this lower level.
2. Make adjustment of the appropriate LINE INPUT control as follows:
   (a) If the audio signal is on audio pair #1 (connected at TB1-1 and TB1-2), adjust the LINE INPUT control (R7) on A801 or A851 for the threshold of compression as indicated by the line between the red and green area on the Compression Meter, or by a reading of 0.4 volt DC on a 20,000 ohm-per-volt meter connected from A801/A851-J19 to ground.
   (b) If the audio signal is on audio pair #2 (connected at TB2-1 and TB2-2), adjust the LINE INPUT control (R7) on A853 for threshold of compression as indicated by the line between the red and green area on the Compression Meter, or by a reading of 0.4 volt DC on a 20,000 ohm-per-volt meter connected from A853-J19 to ground.

MIC GAIN

The MIC GAIN Control (R5) has been adjusted at the factory according to the type microphone ordered with the console. Setting this control for excessive compression will accent background noise during pauses in transmission.

PROCEDURE:

1. Key the microphone and speak into it from a normal distance (12 to 15 inches for the Desk or Boom Microphone).
2. Adjust MIC GAIN control R5 on A801/A851 for threshold of compression as indicated by the Compression Meter or by a reading of 0.4 volt DC on a 20,000 ohm-per-volt meter connected from A801/A851-J19 to ground. If the console is for dual-station control, also adjust MIC GAIN control R5 on A853 for threshold of compression as indicated by the Compression Meter or by a reading of 0.4 volt on a 20,000 ohm-per-volt meter connected from A853-J19 to ground.

LINE OUTPUT

The control Console has been set at the factory for a maximum line output of 4.8 volts RMS (+16 dbm) when a Model 4EC76A14 or 4EC76A18 Center Panel is used, or at 6.0 volts RMS (+18 dbm) when an optional Model 4EC76A10 Center Panel is used. (Model numbers are located on the underside of the center panel frame). The line output may be reduced when required by local telephone company regulations or whenever line losses and noise pickup permit an adequate signal-to-noise ratio.

PROCEDURE:

1. Feed a 1000-Hz, 30-millivolt signal into pins 1 and 2 of microphone jack J801.
2. Connect an AC-VTVM across the audio pair. Use a 0.5-mfd capacitor in series with the meter if DC is being simplexed line-to-line.
3. For single Control Consoles or Parallel Consoles (with Compression-Amplifier or Intercom accessory at the station):
   a) With Model 4EC76A10 Center Panel: Adjust LINE OUTPUT control R28 on A801 for 6.0 volts RMS (or as required by local regulations). Adjust LINE OUTPUT controls on any parallel consoles for 6.0 volts RMS (or as required by local regulations).

b) With a Model 4EC76A14 or Model 4EC76A18 Center Panel: Adjust LINE OUTPUT control R28 on A851 (Audio Line #1) and R28 on A853 (Audio Line #2) for 4.8 volts RMS (or as required by local regulations). Adjust the LINE OUTPUT controls on any parallel consoles for 4.8 volts RMS (or as required by local regulations).

4. For Paralleled Control Consoles (and no Compression-Amplifier or Intercom accessory at the station):

a) With Model 4EC76A10 Center Panel: Set the console with the highest line loss for 6.0 volts RMS (or as required by local requlations) as described in steps 2 and 3a above. Measure the RMS voltage at the station with an AC-VTVM. Then set the LINE OUTPUT control on the remaining control consoles to produce the same level at the station as the first console.

b) With a Model 4EC76A14 or Model 4EC76A18 Center Panel: Set the console with the highest line loss for 4.8 volts RMS (or as required by local regulations) as described in steps 2 and 3b above. Then set the LINE OUTPUT control on the remaining control consoles to produce the same level at the station as the first console.

CONTROL VOLTAGES

Two-Frequency Transmit

1. Connect a DC milliammeter in series with the control line (positive lead of meter to TB801-5).
2. Select XMIT 1 (and STATION 1 if for dual control console). Key the transmitter and set CONTROL CURRENT regulator R3 for 6 milliamps.
3. For dual-station control consoles, also make the following adjustment:
   (a) Connect the meter in series with control line #2 (positive lead of the meter to TB851-5).
   (b) Select XMIT 1 (and STATION 2). Key the transmitter and set CURRENT CONTROL regulator R6 for 6 milliamps.

Two Separate Receivers or Receiver with Search-Lock Monitor (Single-station control consoles only)

1. Connect a DC milliammeter in series with control line (negative lead to TB801-5).
2. Push in RECEIVER 1 pushbutton and set R2 (located above the pushbutton switch assembly) for 6 milliamps.

Channel Guard

1. Connect a DC milliammeter in series with the control line (positive lead to TB801-5).
2. Push in the CHANNEL GUARD MONITOR switch on the console center panel (and Station 1 pushbutton if for dual control console) and adjust the CONTROL CURRENT regulator (R3) for 6 milliamps.
3. For dual station control consoles, also make the following adjustment:
   (a) Connect the meter in series with control line #2 (positive lead to TB851-5).
   (b) Push in the CHANNEL GUARD MONITOR switch (Station 2) and adjust the CONTROL CURRENT regulator (R6) for 6 milliamps.

SPEAKER AMPLIFIER BIAS CONTROL

BIAS ADJ control R5 on A852 is pre-set at the factory and should not require further adjustment. However, if adjustment is necessary, use the following procedure.

1. Disconnect the wire from J3 and insert a milliammeter in series with J3 and the wire.
2. With no signal input, adjust BIAS ADJ control for 18 milliamps.

MUTE CONTROL
(Dual-Station Control Consoles only)

Mute controls R854 and R855 have been set at the factory for 20-db muting. They may be re-adjusted for any desired muting level between 0 and 40-db in the following manner.

1. Select the station 1 mute function with the Station 1 CALL-MUTE switch (MUTE portion of the CALL-MUTE switch lighted).
2. With a signal input on Audio Line #1 (connected at TB1-1 and -2), adjust R854 for the desired mute level.
3. Select the Station 2 mute function with Station 2 CALL-MUTE switch.
4. With a signal input on Audio Line #2 (connected at TB2-1 and -2), adjust R855 for the desired mute level.

CLOCK SETTING

To set the clock, pull out the console center panel and turn the power OFF. Then turn the indicator wheels in either direction until the correct time shows in the window.

Accessory Installation

DESK MICROPHONE MODEL 4EM28A10 or 4EM28B10

If a desk microphone is used, install as follows:

1. Run cable through slot in the bottom of the center drawer frame, and secure with clamp and screw provided.
2. Plug cable connector into J801.
3. For 4EM28B10 only: Remove black wire between J801-4 and TB806-2.

FOOTSWITCH MODEL 4KC1C1

If footswitch Model 4KC1C1 is used, connect the leads to terminals TB1-7 and TB1-8 on the distribution block at the rear of the desk.

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