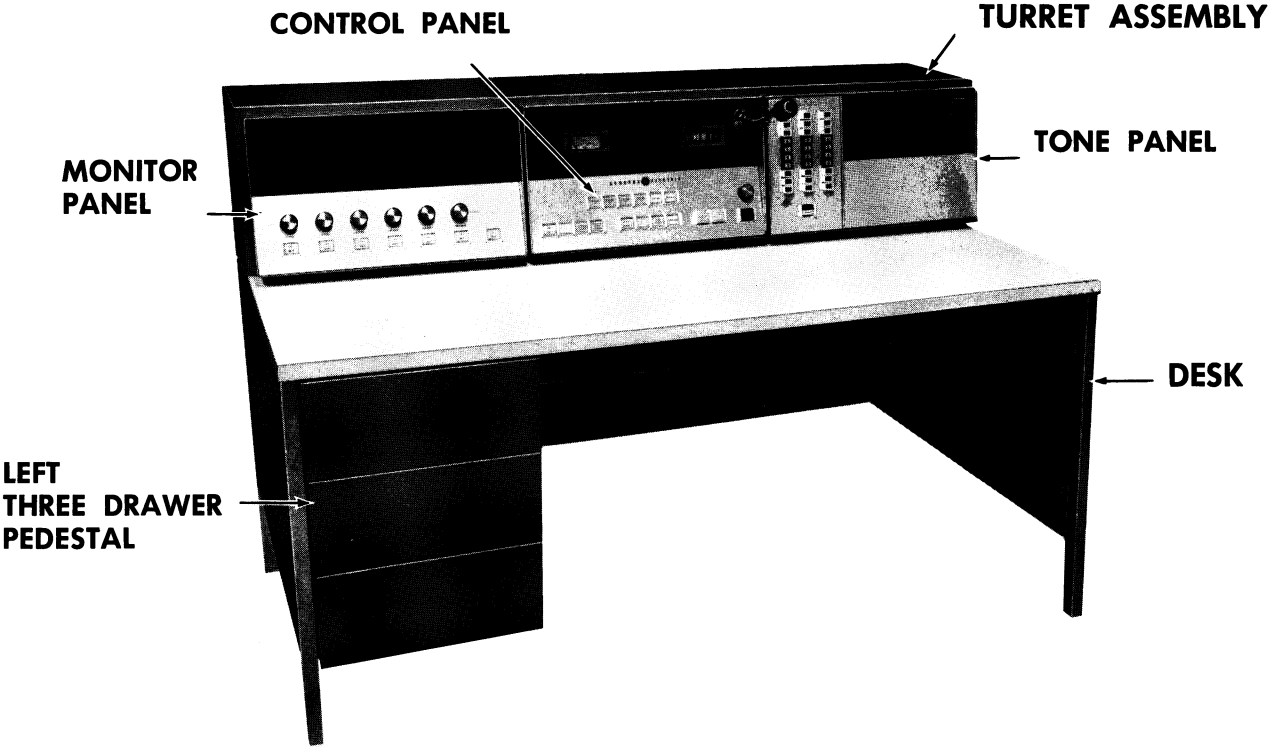
9014

COMMUNICATIONS

INSTALLATION OF
RADIO CONTROL CENTER
Multi-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. It offers flexibility in styling and control applications to serve individual communication requirements.

The attracitvely 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 Requirements	250 watts, 117 VAC, 50/60 Hz (Six-Station Control)

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 the 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. 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 ofno 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 1-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 each drawer assembly (brackets are located on the bottom turret brace at each corner of the drawer assembly).
5. Slide out the turret drawer assemblies. (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.)
8. Replace the drawer assemblies and slide the turret assembly forward on the desk.

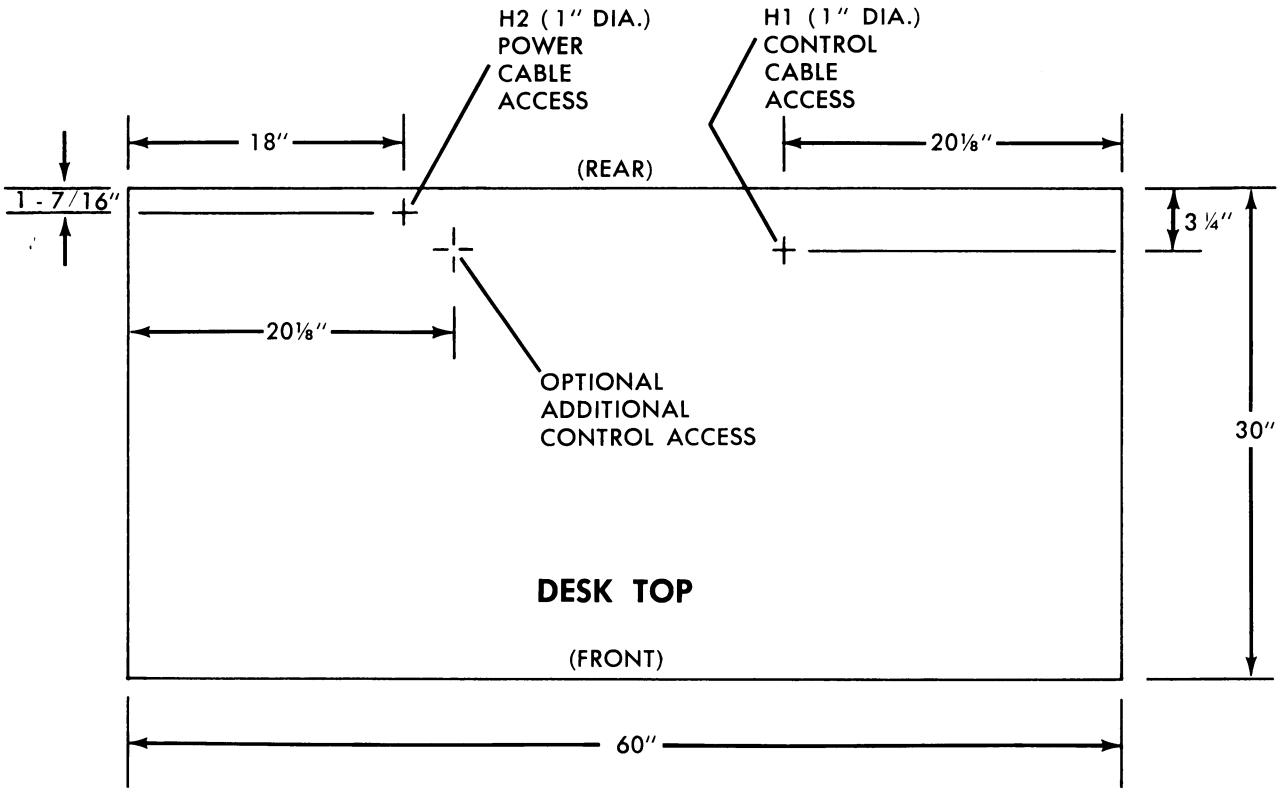


Figure 1 - Drill Plan for Cable Access Holes

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. Route control cable from turret through hole 1 (H1) in the desk top.
11. Secure the turret to the desk with the four #14 x 5/8" thread forming screws and flat washers provided.
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).

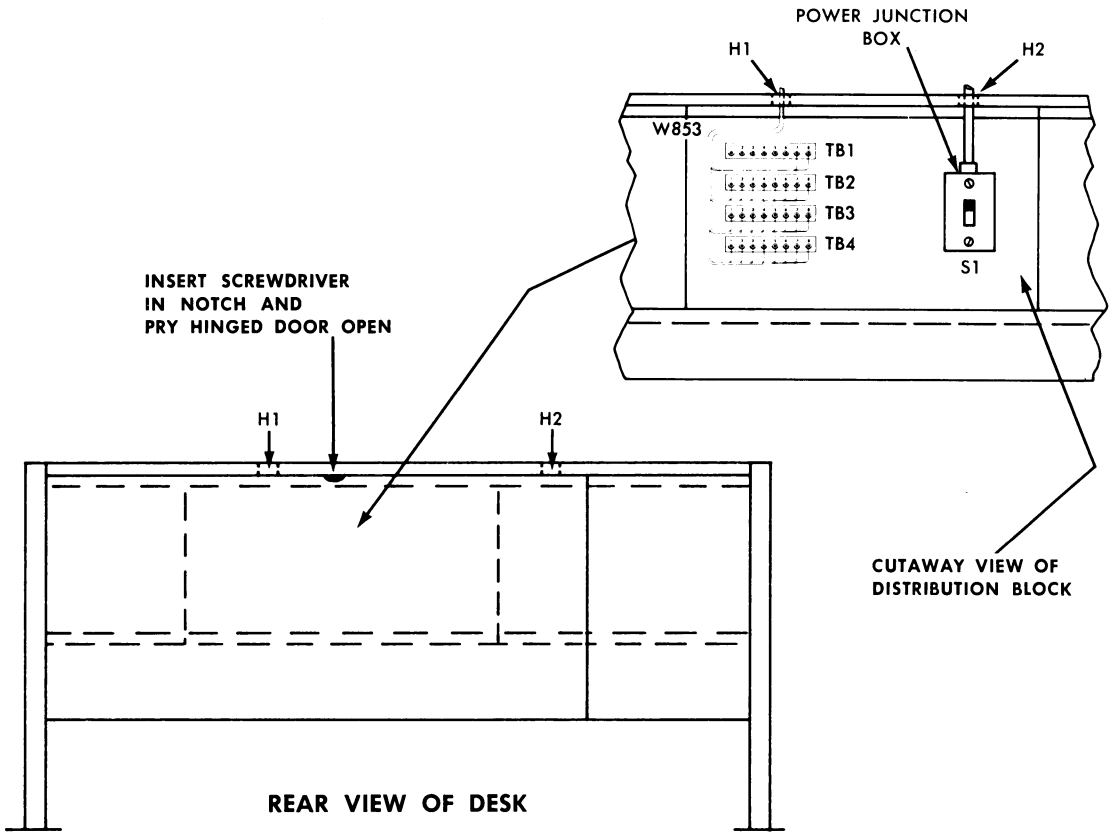


Figure 2 - Location of Power Junction Box and Terminal Boards.

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 boards (TB1, TB2, TB3 and TB4) on the distribution block using two #6 x 5/8" screws for each terminal board. (Use 7/64" or #35 drill bit for drilling pilot holes.)

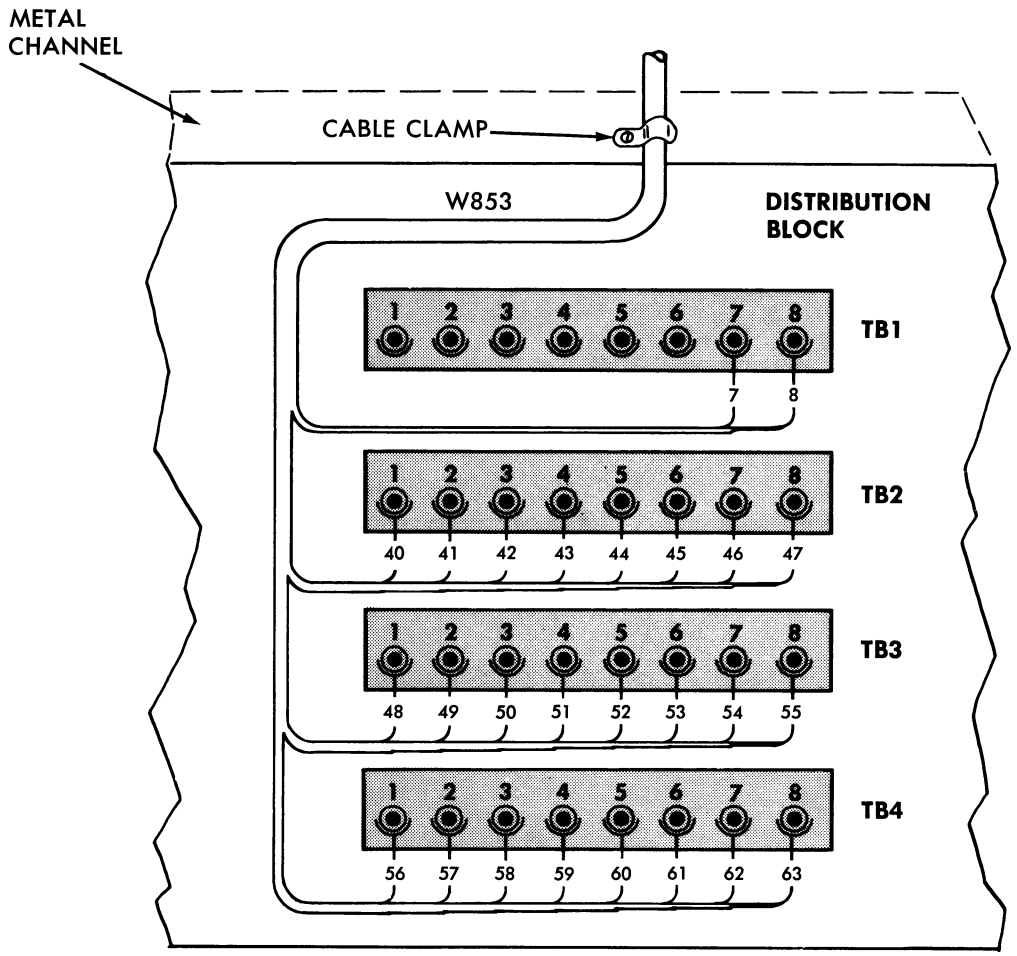


Figure 3 - Control Cable Connections

3. Connect the control cable (routed from the turret through H1 in the desk top) to the terminal boards as shown in Figure 3. Drill a pilot hole through upper metal channel for the distribution block (using 7/64" or #35 drill bit) and mount cable clamp as shown with a #6 x 5/8 thread forming screw.

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" thread forming screws (drill pilot holes with 9/64" or #29 drill bit).

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.

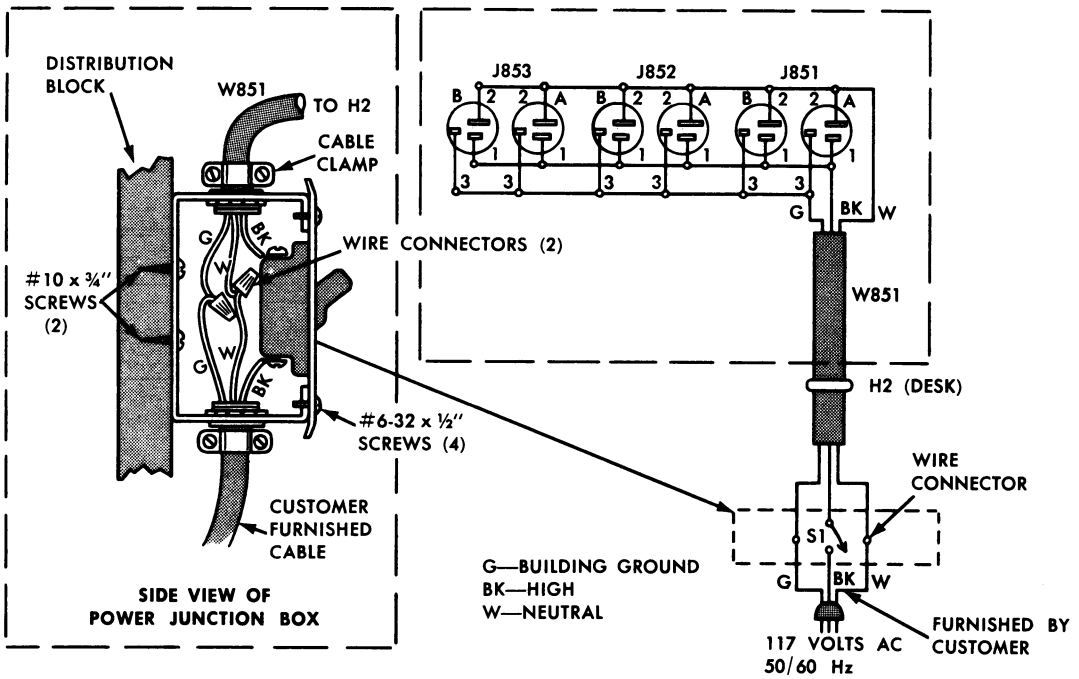


Figure 4 - Power Cable and Junction Box Installation

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.

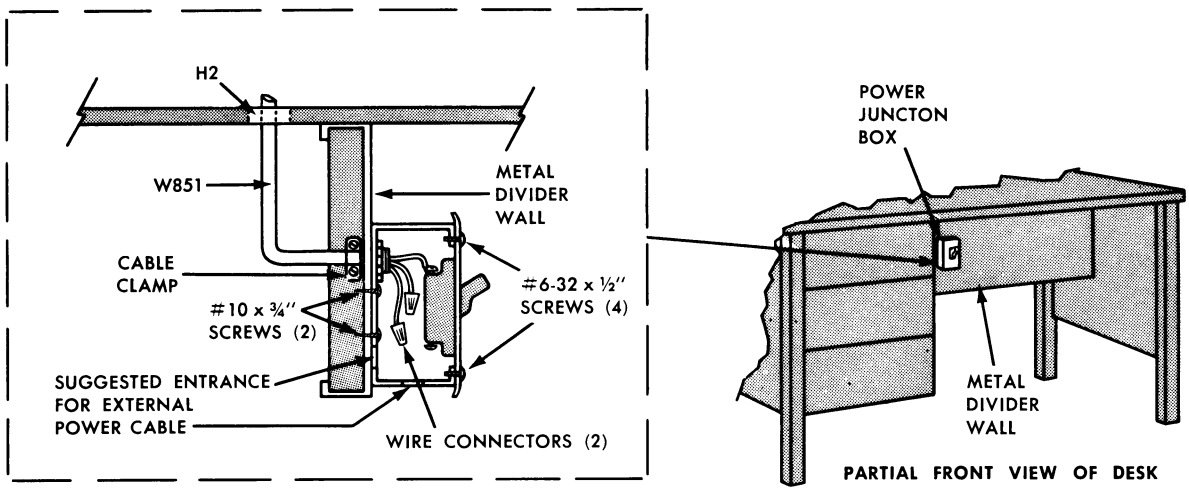


Figure 5 - Alternate Location for Power Junction Box

TELEPHONE LINE CONNECTIONS

Telephone lines are to be connected to TB2, TB3 and TB4 on the distribution block (see Figure 6). All lines must be connected using the same control method.

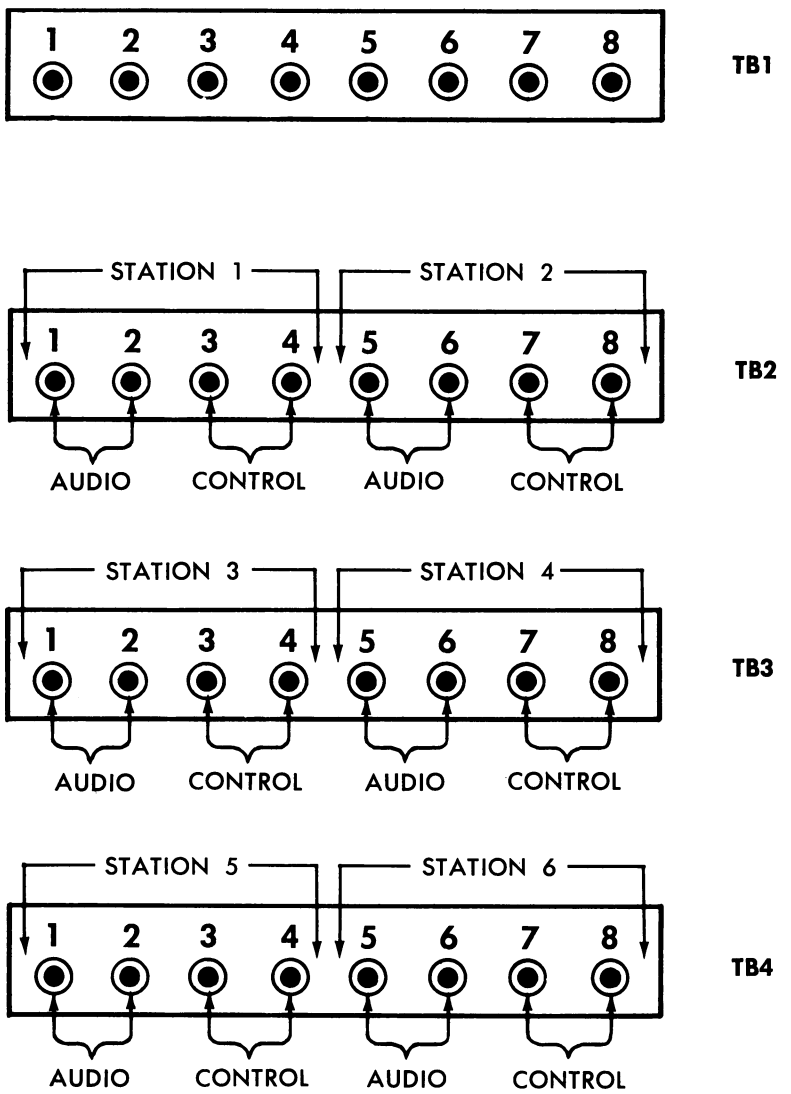
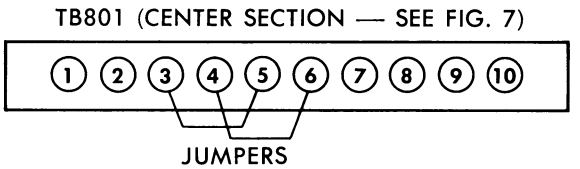


Figure 6 - Telephone Line Connections

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. The ungrounded wire will appear as an open circuit. The grounded wire will show a resistance. Identify the wires at both ends. Then observe line polarity as indicated in the following procedure.

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



a. Connect a jumper between TB801-3 and TB801-5.

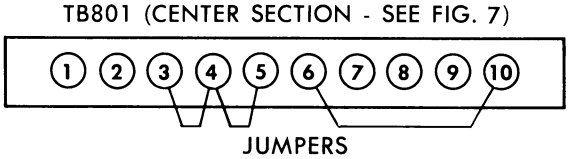
b. Connect a jumper between TB801-4 and TB801-6.

c. Connect telephone pair(s) to audio terminals of TB2, TB3, and TB4 as shown in Figure 6. Observe the following line polarities:

   Stations 1, 3, and 5 - Terminal 1 connects to TB701-1 at the station.

   Stations 2, 4, and 6 - Terminal 5 connects to TB701-TB701-1 at the station.

Method 2 - Single Telephone Pair (Control Voltage Simplexed Line to Ground)



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

b. Connect a jumper between TB801-4 and TB801-5.

c. Connect telephone pair(s) to audio terminals of TB2, TB3 and TB4 as shown in Figure 6. Observe the following line polarities:

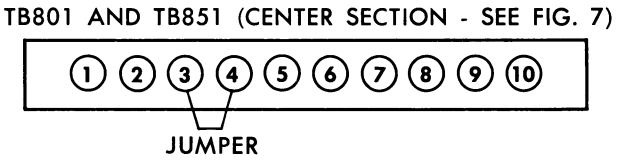
   Stations 1, 3 and 5 - Terminal 1 connects to TB701-1 at the station.

   Stations 2, 4 and 6 - Terminal 5 connects to TB701-1 at the station.

d. Make connections to earth ground for each station as follows:

   Station 1 - TB2-4
   Station 2 - TB2-8
   Station 3 - TB3-4
   Station 4 - TB3-8
   Station 5 - TB4-4
   Station 6 - TB4-8

Method 3 - Separate Control and Audio Pairs



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

b. Connect audio pairs to audio terminals of TB2, TB3 and TB4 as shown in Figure 6.

c. Connect control pairs to terminals of TB2, TB3 and TB4 as shown in Figure 6. Observe the following line polarities:

   Stations 1, 3 and 5 - Terminal 3 connects to TB701-5 at the station.

   Stations 2, 4 and 6 - Terminal 7 connects to TB701-5 at the station.

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

CENTER SECTION

The following adjustments are made to controls on the center drawer assembly (4EC76A14) 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 7 shows the adjustable components involved in the adjustment as well as the jacks and terminal boards required for meter connections.

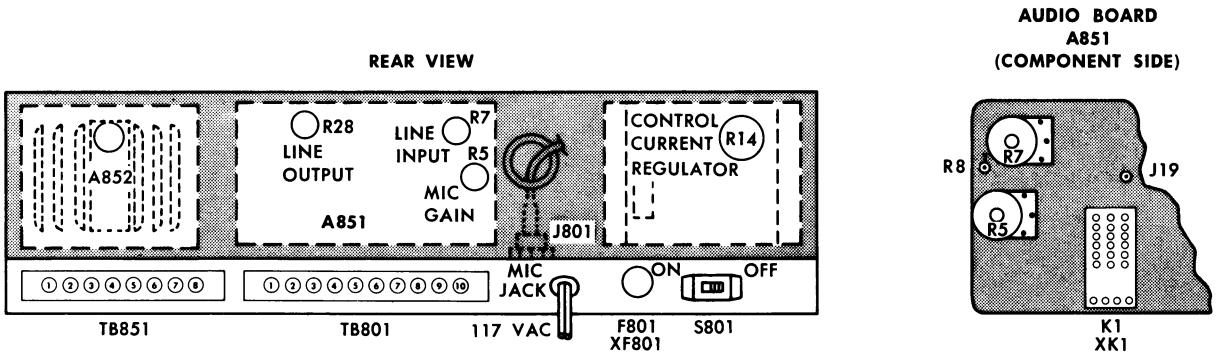


Figure 7 - Center Section of Control Console

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.

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 output to the maximum allowable amplitude (up to +16 dBm).
2. Press the Station Select Switch on the center section for the line being used.
3. Adjust LINE INPUT control R7 on A851 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 A851-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 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 A851-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). 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. Select the line with the greatest loss by pressing the appropriate Station Select Switch on the front of the center section.
2. Feed a 1000 Hz, 30-millivolt signal onto pins 1 and 2 of microphone jack J801.
3. Connect a AC-VTVM across the audio pair selected. Use a 0.5-mfd capacitor in series with the meter if DC is being simplexed line-to-line.
4. Adjust LINE OUTPUT control R28 for the maximum allowable level (up to +16 dBm).

NOTE

If the selected station has parallel control consoles, adjust the LINE LEVEL to maximum (up to +16 dBm) at the control point that is farthest from the station. When no compressor is used at the station, adjust all other parallel control consoles to produce the same level at the station as the first console. When a compressor is used at the station, it is still desirable to adjust each console to produce the same level at the station. However, if line losses do not allow this, adjust the line level at each console to just produce threshold of compression at the farthest control point from the console being adjusted.

CONTROL VOLTAGES

Two-Frequency Transmit

1. Select the control pair with the greatest line loss by pressing the associated Station Select Switch on the center section.
2. Connect a DC milliammeter in series with the control line (positive lead of meter to TB801-5).
3. Select XMIT 1. Key the transmitter and set CONTROL CURRENT regulator R14 for 6 milliamps.

Two Separate Receivers or Receiver with Search-Lock Monitor

1. Select the control pair with the greatest line loss by pressing the associated Station Select Switch on the center section.
2. Connect a DC milliammeter in series with the control line (negative lead of meter to TB801-5).
3. Push in RECEIVER 1 push button and set R14 for 6 milliamps.

Channel Guard

1. Select the control pair with the greatest line loss by pressing the associated Station Select Switch on the center section.
2. Connect a DC milliammeter in series with the control line (positive lead of the meter to TB801-5).
3. Push in the CHANNEL GUARD MONITOR switch on the center section and adjust the CONTROL CURRENT regulator R14 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 20 milliamps.

SETTING THE CLOCK

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.

LEFT SECTION (MONITOR PANEL)

The following adjustments are made to controls on the left drawer assembly (4EC77A10—14) 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 8 shows the adjustable components involved in the procedures.

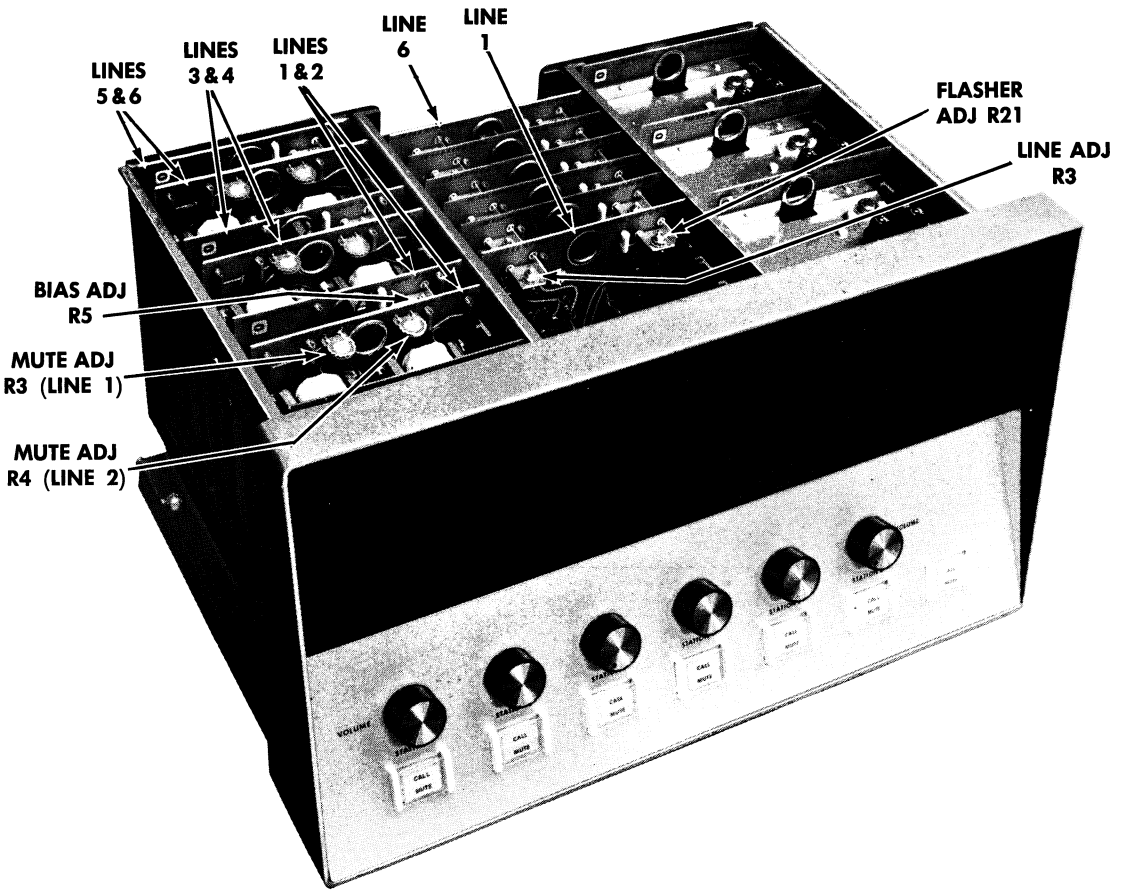


Figure 8 - Left Section of the Control Console.

LINE INPUT AND LIGHT FLASHER

The line Input (or threshold of compression) and light flasher must be set for each line input to the Monitor Panel. Start with any line for the order of adjustment is not important. Do not select the line (or station) from the center section while making the adjustment.

PROCEDURE:

1. Apply a 1000 Hz signal to the audio pair from the source with the largest line loss (this may be the base station or another control location). Adjust the audio generator for maximum allowable amplitude (up to +16 dBm).

2. Set the LINE ADJ control R3 on the COMP/LIGHT FLASHER board for an output of 1-volt measured from J1 (Green) to ground.
3. Adjust Flasher Control R21 until the call light for that particular line just starts to flash. (This setting may need readjusting using voice input, to ensure flashing with voice.)
4. Repeat steps 1 through 3 for each line.

MUTE CONTROL

Mute controls R3 (Stations 1, 3, 5) and R4 (Stations 2, 4, 6) on the Line Termination board have been set at the factory for 40-dB muting. They may be readjusted for any desired muting level between 0 and 40-dB in the following manner.

PROCEDURE:

1. Select the mute function for the desired station with the CALL/MUTE switch on the front of the Monitor Panel.
2. Apply a 300 MV RMS signal at 1000 Hz to the audio pair for the selected station (see Figure 6 for audio pair connections).
3. Adjust the MUTE control (R3 or R4) for the desired mute level.

SPEAKER AMPLIFIER BIAS CONTROL

The Bias control (R5) on each Speaker Amplifier board is pre-set at the factory and should not require further adjustment. However, if adjustment is necessary, use the following procedure.

PROCEDURE:

1. Remove the Speaker Amplifier from its position in the card bay, and install the Extender Board in its place.
2. Install the Speaker Amplifier in the connector provided on the extender.
3. Remove jumpers between J2 & J3 and J4 & J5 on the extender.

4. Connect a DC milliammeter between J2 and J3.
5. With no signal input, adjust BIAS ADJ control R5 for a meter reading of 20 ma.
6. Remove the extender and reinstall the Speaker Amplifier board in the card bay.

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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COMMUNICATION PRODUCTS DEPARTMENT, LYNCHBURG, VIRGINIA

(In Canada, Canadian General Electric Company, Ltd., 100 Wingold Ave., Toronto 19, Ontario)

PRINTED IN U.S.A.