

# **INSTALLATION AND ADJUSTMENT** **FOR** **MASTR® II RADIO CONTROL BASE STATIONS** **OPTIONS 9555, 9556 & 9589**

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## DESCRIPTION

Radio control base stations are used in two-way mobile radio systems to increase the radio coverage area. A typical system, illustrated in Figure 1, consists of a control station, a repeater station, a repeater base station and the mobile units. In the diagram, "R1" is used to indicate a receiver on frequency F1, "T2" is used to indicate a transmitter on frequency F2, etc. F1 is the mobile frequency; F2 is the up-link frequency and F3 is the down-link frequency. Notice that all calls between the control station and the mobiles are automatically retransmitted by the base station or the repeater station.

The purpose of this publication is to supplement the installation instructions for MASTR® II station combinations to cover radio control base station options. The application of each option is shown in the following chart. The Auxiliary Antenna Relay Option 9641 is covered in LBI30742 (DF8388).

| OPTION NO. | APPLIES TO:                                                                               |
|------------|-------------------------------------------------------------------------------------------|
| 9555       | Repeater Station (Low Band only)                                                          |
| 9556       | Repeater Base Station                                                                     |
| 9589       | Same as OPTION 9556 except for High Power applications, coaxial cable 5491689P100 deleted |
| 9641       | Aux. Ant. Relay (Mid., High & UHF Bands)                                                  |

## OPERATION

**(Refer to Figure 1)**

### "TALK-OUT" OPERATION

To call a mobile unit, the dispatcher transmits on T2 at the control station. This signal is received by R2 at the repeater station and the audio output of the receiver is fed to the audio circuits in the control shelf of the Repeater Station. This control shelf modulates the Repeater Base Station transmitter. The Receiver Unsilenced Sensor (RUS), located on the repeater station control shelf, keys T1, on the Repeater Base Station, retransmitting the call to the mobiles. An adjustable 3-minute limit timer prevents T1 from remaining on the air for longer than 3 minutes.

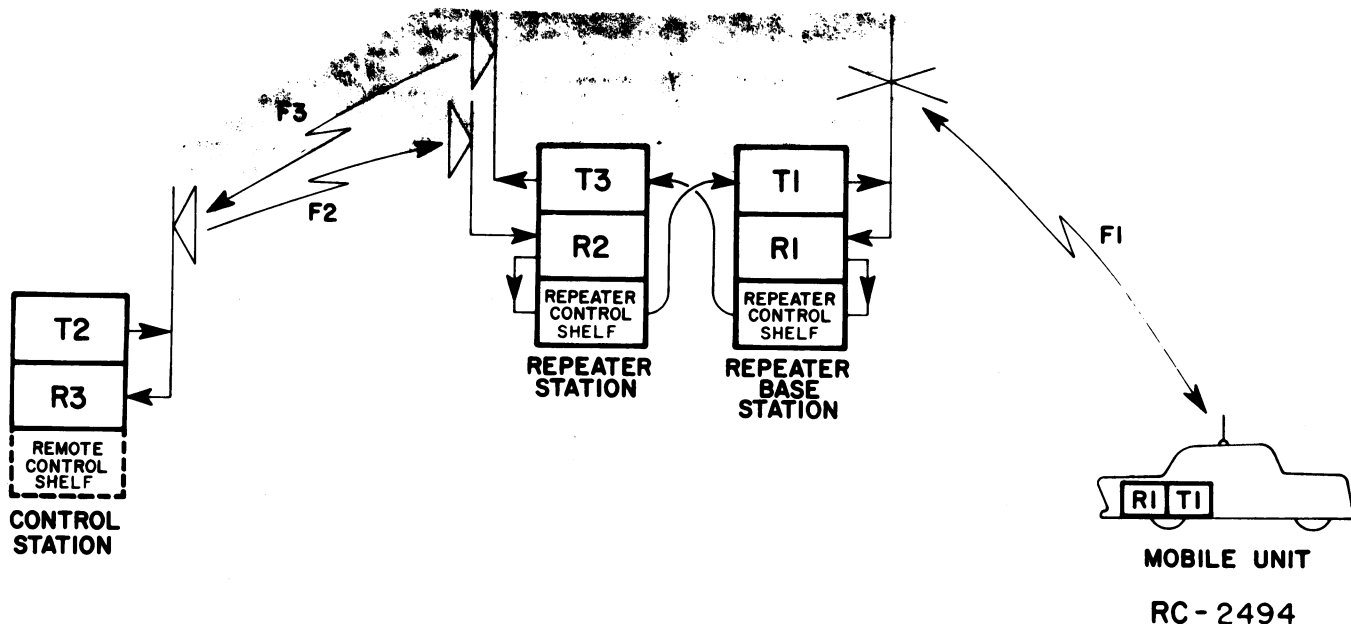


Figure 1 - Typical Radio Control Base Station System

#### "TALK-BACK" OPERATION

When a mobile unit transmits, the call is received by R1 in the Repeater Base Station. The Receiver Unsquelched Sensor (RUS), located on the Repeater Base Station Control Shelf, keys T3, on the Repeater Station, retransmitting the call to the control station, where it is heard by the dispatcher. An adjustable 3-minute timer (on the Repeater Control Board) prevents T3 from remaining keyed for longer than 3-minutes. An adjustable .5 to 5-second delay timer holds T3 keyed for a maximum of 5 seconds after the termination of each transmission from a mobile unit. This improves communications while a mobile unit is transmitting in a "flutter zone" or fringe area.

#### ANTENNAS

Note that directional antennas can be used by the repeater station and the control station to provide more gain and more protection from interference. The repeater station must use separate antennas for the transmitter and receiver; so that the repeater base station transmitter (T1) can always be keyed from the control station (providing supervisory control) --- even if T3 is being keyed by a signal from one of the mobile units. The repeater base station transmitter and receiver usually share an omni-directional antenna in PTT operation.

## INSTALLATION

Install the stations as directed in the standard installation manual. However, make the antenna connections for repeater station (option 9555) as shown in Figure 1. The stations were modified as shown on the 19D417701 Modification Instructions. The two cables W101 (19B226412P1) and W102 (19B226412P2) should be cross-connected as shown on the 19C321316 Interconnection Diagram.

## ADJUSTMENT AND TEST

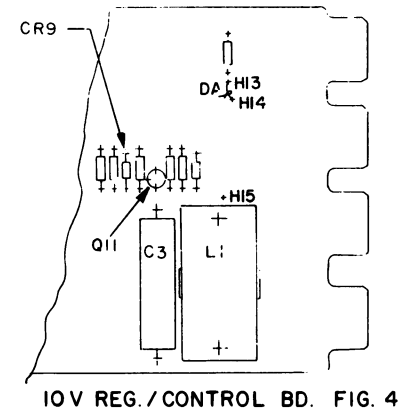
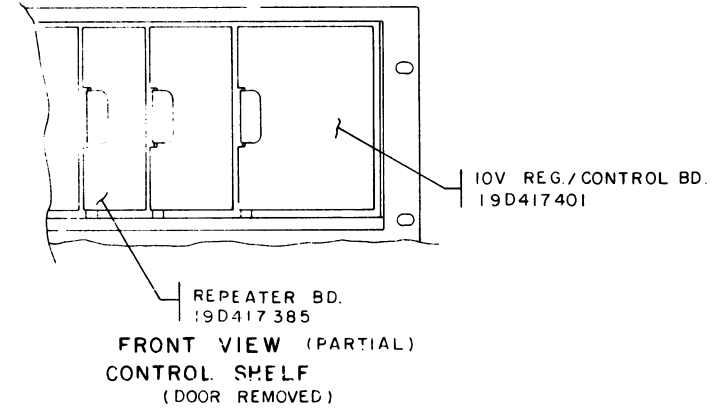
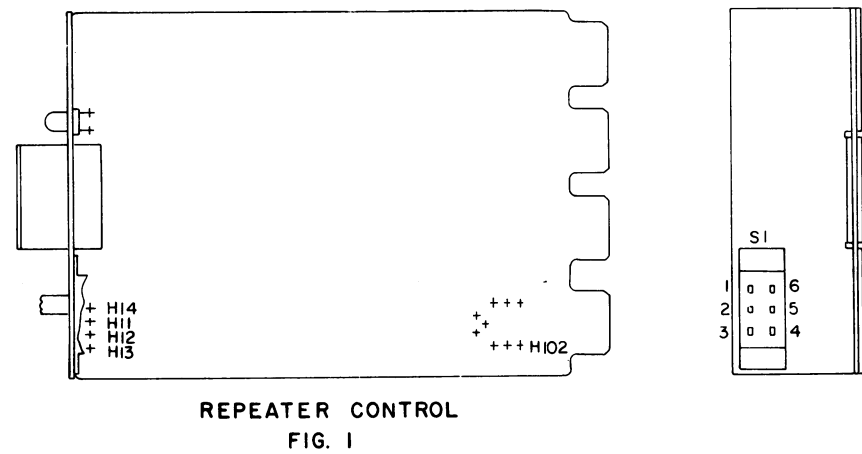
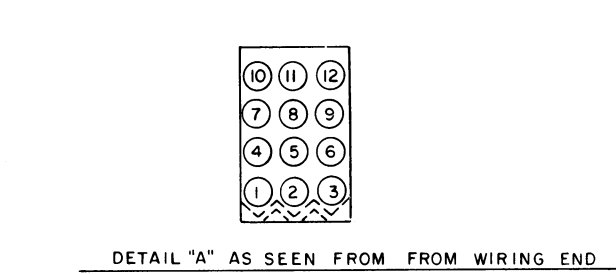
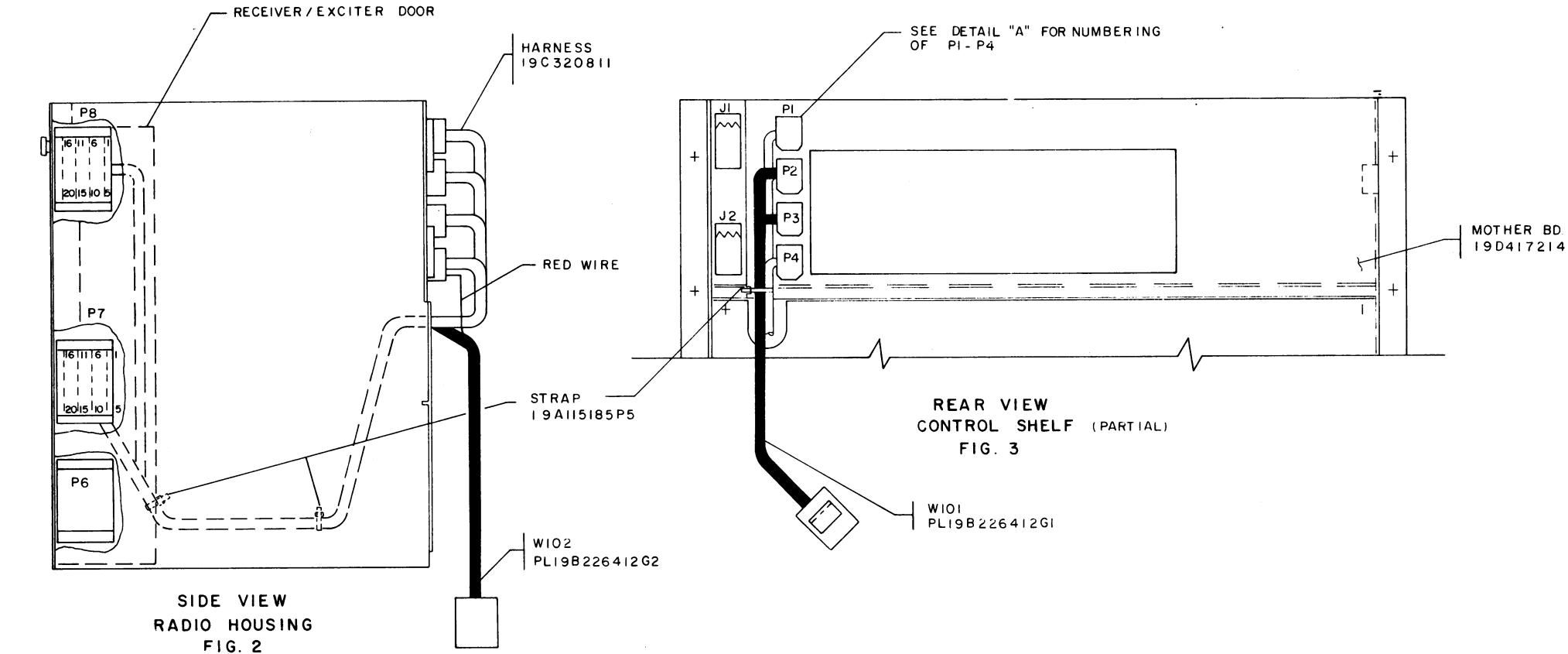
Follow the standard adjustment procedure in the maintenance manuals for the base station and repeater station, except for the adjustment of R14 (Tx Mod.) on the Repeater Audio Board on each Base Station Control Shelf. After all other adjustments have been completed, adjust the transmitter Modulation Control (R14) on both stations as follows:

| PROCEDURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CHECK OUT                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Feed test signal with 60% (3.0 kHz) of system deviation at 1000 Hz into the Repeater on R2. Use Channel Guard (CG) if repeater has CG.</p> <p>Adjust the transmitter Modulation Control (R14) on the Repeater Audio Board in the repeater station for 3.0 kHz deviation on the T1 frequency.</p> <p>Remove signal.</p> <p>Feed test signal with 60% (3.0 kHz) of system deviation at 1000 Hz into the Repeater Base on R1. Use Channel Guard (CG) if Repeater Base has CG.</p> <p>Adjust the transmitter Modulation Control (R14) on the Repeater Audio Board in the repeater base station for 3.0 kHz deviation on the T3 frequency.</p> <p>Remove signal.</p> | <p>The Repeater base station should key on T1.</p> <p>Transmitter should un-key immediately.</p> <p>The repeater station should key on T3.</p> <p>The transmitter will un-key after the Delay Timer times out. (.5-5 seconds)</p> |

## NOTE

The control shelf is directly connected to the receiver in the same cabinet. The audio and keying functions are "cross-connected" to the transmitter in the other station.

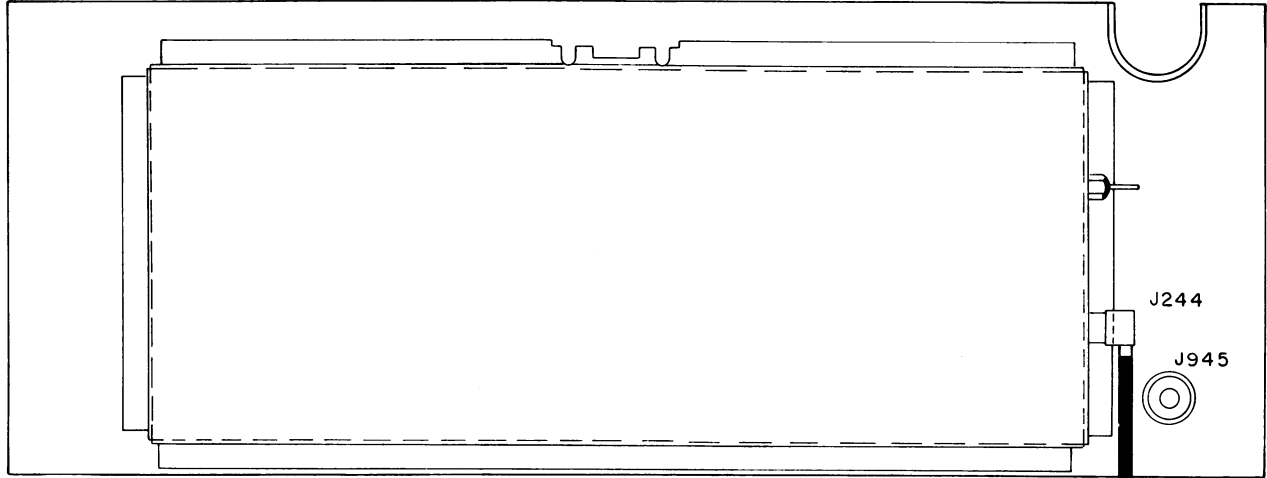




- THESE MODIFICATION INSTRUCTIONS ARE FOR THE RADIO CONTROL BASE STATION.  
OPTION 9555, 9556, 9589  
INSTRUCTIONS FOR MODIFICATION OF BOTH REPEATER STATION AND REPEATER BASE STATION.
- P1**
- MOD. TO REPEATER BOARD (19D417385).  
A. REMOVE REPEATER BOARD FROM CONTROL SHELF.  
B. ON REPEATER BOARD, REMOVE WIRE FROM S1-2 TO H12 AND DISCARD. (SEE FIGURE 1)  
C. CONNECT SP22 WIRE FROM S1-2 TO H102.  
D. PLACE REPEATER BOARD IN CONTROL SHELF.
  - MOD. TO HARNESS 19C320811.  
A. REMOVE WIRE FROM P2-8 ON CONTROL SHELF AND TAPE WIRE (SEE FIGURE 3).  
B. REMOVE WIRE FROM P3-7 ON CONTROL SHELF AND INSERT INTO P4-2 (SEE FIGURE 3).
  - INSTALLATION OF W101  
A. CONNECT RED WIRE IN P2-2 ON CONTROL SHELF (SEE FIGURE 3).  
B. CONNECT WHITE WIRE IN P3-7 ON CONTROL SHELF (SEE FIGURE 3).  
C. CONNECT SHIELD WIRE IN P2-8 ON CONTROL SHELF (SEE FIGURE 3).  
D. LET BLACK WIRE HANG (SEE FIGURE 3).  
E. INSTALL (19A115185P5) STRAP TO SECURE W101 TO STATION HARNESS (19C320811) (SEE FIGURE 3).
  - INSTALLATION OF W102  
A. CONNECT RED WIRE IN P4-9 ON CONTROL SHELF (SEE FIGURES 2 & 3).  
B. SOLDER WHITE WIRE TO P8-6 ON RECEIVER/EXCITER DOOR (SEE FIGURE 2).  
C. SOLDER SHIELD WIRE TO P8-5 ON RECEIVER/EXCITER DOOR (SEE FIGURE 2).  
D. INSTALL (19A115185P5) STRAPS AS SHOWN IN (FIGURE 2) TO SECURE W102 TO STATION HARNESS (19C320811).
  - MODIFICATION TO 10V REGULATOR BOARD (19D417401)  
A. REMOVE "DA" WIRE JUMPER BETWEEN H13 & H14 AND ADD V22-BK WIRE JUMPER BETWEEN H13 AND H15.
- NOTE: USE MOLEX HAND EXTRACTOR HT2033 OR EQUIVALENT TO REMOVE TERMINALS FROM P1-P4, HARNESS (19C320811).
- P2**
- OPTION 9556, 9589, ONLY  
INSTRUCTIONS FOR MODIFICATION OF REPEATER BASE STATION ONLY:
- REMOVE 19A129312G5 CABLE FROM J945 ON POWER AMPLIFIER TO J937 ON RECEIVER/EXCITER DOOR AND INSTALL 5491689P10C CABLE FROM J244 ON POWER AMPLIFIER TO J937 ON RECEIVER/EXCITER DOOR (SEE FIGURES 5 & 6 ON SHEET 2).
  - REMOVE 10V REGULATOR/CONTROL BOARD (19D417401) FROM CONTROL SHELF. REMOVE AND DISCARD CR9 (FROM 19D417401) BOARD AND REPLACE BOARD (19D417401) IN CONTROL SHELF (SEE FIGURE 4).
  - MODIFY PER P1.
  - FOR SIMPLEX OPERATION OF THIS STATION WITH CHANNEL GUARD, DO NOT DISCONNECT THE COLLECTOR OF Q12 ON THE 10V REGULATOR BOARD (19D417401). REPLACE IF IT HAS BEEN DISCONNECTED.

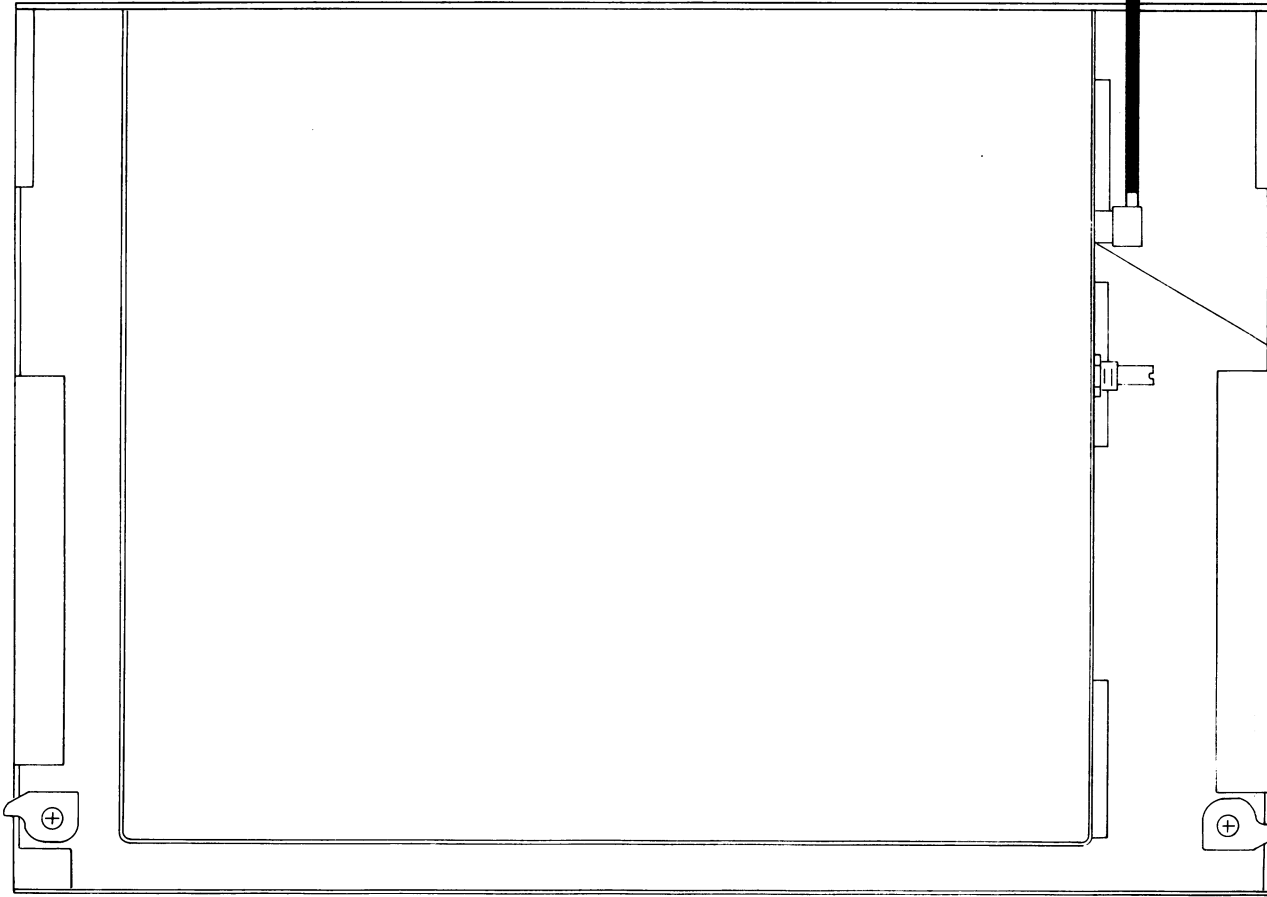
## MODIFICATION INSTRUCTIONS

### RADIO CONTROL BASE STATIONS



FRONT VIEW POWER AMPLIFIER  
FIGURE 5

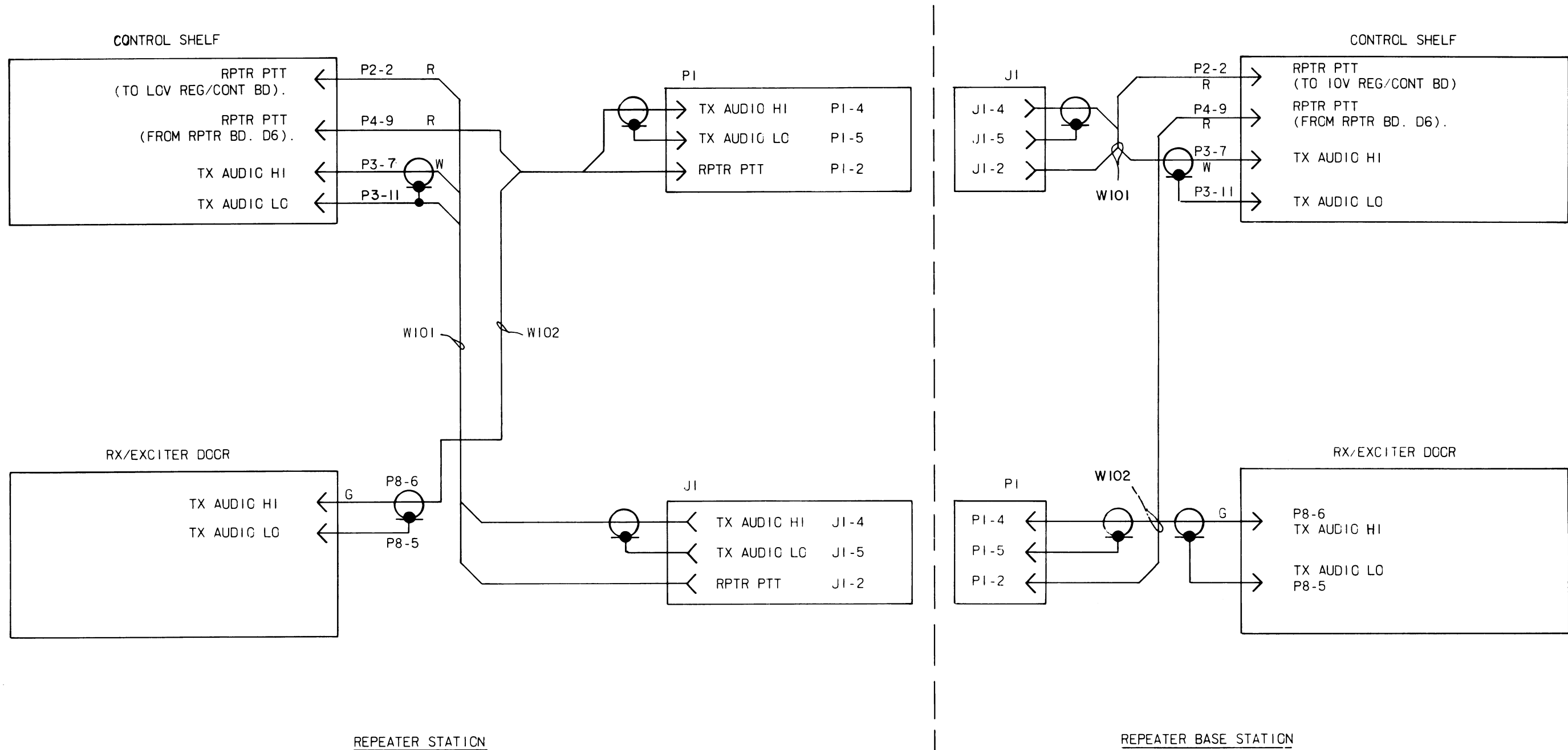
CABLE  
5491689 P100



RECEIVER / EXCITER DOOR  
FIGURE 6

**MODIFICATION INSTRUCTIONS**

RADIO CONTROL BASE STATIONS



NOTES:

- EXISTING WIRES IN 19C320811 TO P3-7, P3-11, P8-6 & P8-5 ARE DISCONNECTED AND TAPED BACK.
- RPTR PTT ON REPEATER BOARD IS BROUGHT OUT ON REPEATER BOARD AT D6 WHICH CONNECTS TO P4-9.
- SEE MODF. INST. 19D417701.

(19C321316, Rev. 1)

**INTERCONNECTION DIAGRAM**

RADIO CONTROL BASE STATIONS

Issue 1

