

651S-1/1A General Purpose HF Receiver

Printed in USA

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NOTICE: This section replaces second edition dated 1 May 1972.

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Record of Revisions

RETAIN THIS RECORD IN THE FRONT OF MANUAL.
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installation

1. UNPACKING AND PACKING

1.1 Unpacking

Carefully remove the 651S-1/1A from the packing material. If feasible, save the original carton and packing material for possible reshipment. Examine the unit for visible damage and check that all controls and switches operate freely. If the receiver has been damaged in shipment, notify the transportation company. Check each item received against the shipping invoice. Be sure the warranty card is included with the receiver.

1.2 Storage

Store the 651S-1/1A in the original carton and packing material, if available. Brace and pad the unit as in the original shipment. Include a dehydrating agent in the packing material to prevent damage from condensation. Be sure to store the unit in an environment that does not exceed the equipment specifications listed in the description and principles of operation section of this instruction book.

1.3 Preparation For Reshipment

Carefully pack the 651S-1/1A in the original carton and packing material, if available. Brace and pad the unit as in the original shipment. Include a dehydrating agent in the packing material to prevent damage from condensation.

2. MOUNTING (699J-1 SPEAKER PANEL)

The 651S-1/1A can be table-top installed or rack mounted in the 699J-1 Speaker Panel. Figure 1 shows outline and mounting dimensions for the 651S-1/1A and figure 3 shows the same for the 699J-1. Mount the receiver in the 699J-1 Speaker Panel as follows:

- a. Remove the two feet and dust cover clips from the bottom front of the receiver. Refer to figure 2, detail C. Retain feet, clips, and hardware for future table-top installation if desired.
- b. Remove the two bumper pads from the bottom rear corners of the receiver dust cover. Refer to figure 2, detail B. Retain the pads for future table-top installation if desired.
- c. Remove the two screws that secure the dust cover. Do not remove the dust cover.
- d. Slide the receiver through the speaker panel hole from the rear. Slide the receiver forward until it touches the speaker panel at point B in figure 2. When sliding the receiver, lift the rear slightly above horizontal to clear the rubber pad (point C, figure 2).
- e. When the receiver is completely forward, lower it into place and secure it to the speaker panel using the hardware supplied (items 1 and 2, figure 2). Insert the tips of the bosses (part of item 1, figure 2) into the holes (point A, figure 2) that the dust cover mounting screws were removed from.
- f. Connect the pendant cable from the speaker to the SPKR 8 OHM jack on the rear panel of the receiver.
- g. Mount the completed assembly in a standard 19-inch rack.

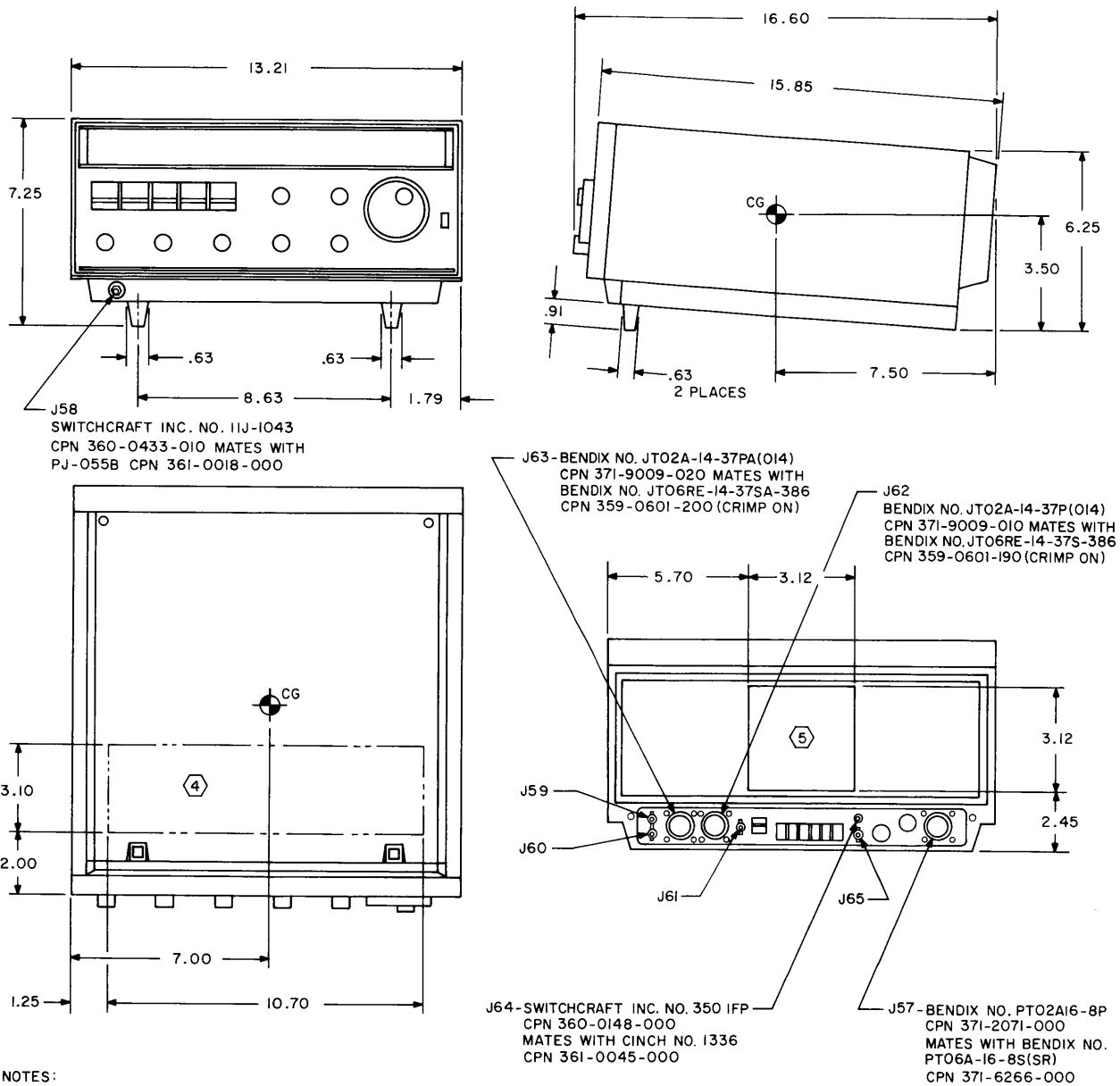
3. CABLING

Connect the 651S-1/1A Receiver as shown in figure 5.

3.1 Power Cable and Fuses

The 651S-1/1A is supplied with 1.5-ampere fuses for 115-volt operation. Replace with 0.75-ampere fuses for 230-volt operation.

Two power cables are available for the 651S-1/1A: 115-volt cable Collins part number 609-0507-001, and 230-volt cable Collins part number 618-3339-001. Connect the desired power cable to multipin PWR connector J57 on the rear panel of the receiver. Plug the power cable into an ac outlet. If the outlet does not have a mating receptacle for the power cable, use a power cable adapter and ground the green wire of the adapter.

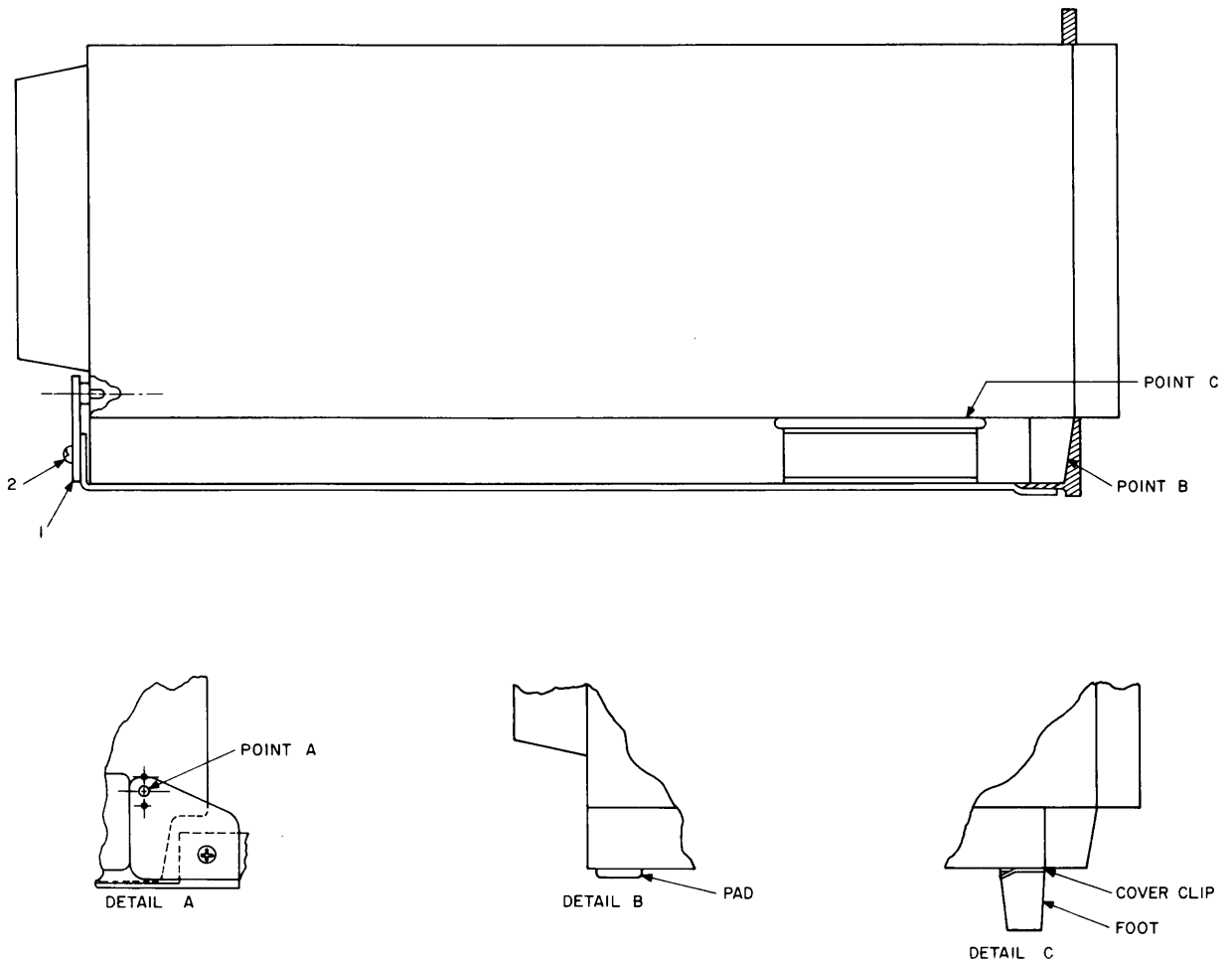


NOTES:

- ① ALL DIMENSIONS ARE IN INCHES.
- ② THIS DRAWING APPLIES TO ALL 651S-1 (CPN 522-4836-XXX)
- ③ UNIT WEIGHT IS APPROXIMATELY 30 LBS.
- ④ AIR INLET AREA, MUST BE UNOBSTRUCTED.
- ⑤ AIR DISCHARGE AREA, MUST BE UNOBSTRUCTED.

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651S-1/1A Outline and Mounting Dimensions
Figure 1



TP2-7133-014

651S-1/1A Mounting in 699J-1 Speaker Panel, Installation Details
Figure 2

Caution

Be sure to use 1.5-ampere fuses for 115-volt operation and 0.75-ampere fuses for 230-volt operation.

3.2 Audio Outputs

An 8-ohm speaker may be connected to the SPKR 8 OHM jack (J64) on the rear panel of the receiver. A phone-type plug on the speaker leads is required. ISB and standard audio (both 600 ohms, center tapped) are also available at the AUDIO LINES terminal strip (TB101) on the rear panel of the receiver, if desired.

High-impedance headphones, having a phone-type plug, may be plugged into the phone jack (J58) on the front panel of the receiver. Plugging in headphones automatically disables the output from the SPKR 8 OHM jack on the rear panel. The 600-ohm, center-tapped ISB and standard audio outputs are not disabled by plugging headphones into the front-panel phone jack.

3.3 Antenna

Connect an antenna to the 50-ohm BNC coaxial connector (J61) on the rear panel of the receiver.

Note

If the receiver is to be operated primarily below 150-kHz, better sensitivity will probably be obtained by changing to the 1000-ohm input impedance tap on the input of the vlf converter in rf module A6 (paragraph 4.5).

3.4 External Battery (For 651S-1/1A With Optional Keep-Alive Circuit).

An external 6-volt battery may be connected to the BATT-6V terminal block (TB106) on the rear panel of the receiver. If an external battery is used, the operating frequency will be retained in storage and not have to be reselected in the event of a momentary line power interruption. However, if operating power is turned off by the front panel POWER switch, the frequency must be reselected, even through an external battery is used.

3.5 Remote Control Interconnect

3.5.1 Processor Version

For remote control operation, connect a serial digital line processor unit to the multipin REMOTE CONTROL INPUT connector (J62) on the rear panel of the receiver. Refer to the chassis schematic in the diagrams section for pin function information. The connector of the rear panel is a type JT02A-14-37P(014), and the mating connector is a type JT06RE-14-37S-386. The three pairs of control, carrier, and monitor function wires in the interconnecting cable should be shielded twisted pairs (typically type 407L). The cable length should not exceed 1,000 feet. Refer to the operation section for address strapping information.

If using Collins 8311A-1 or 8311B-1 processors, three 90-ohm resistors must be added to the interface. At the processor end, connect one resistor between the monitor and monitor return lines. At the 651S-1/1A end, connect one resistor between the control and control return lines, and one between the carrier and carrier return lines. If more than one receiver is being controlled, connect them all in parallel with respect to the control information from the processor, and connect resistors across the control and carrier lines to the last receiver in the group. Only three resistors are neces-

sary no matter how many receivers are being controlled by the processor. Refer to the operation section for remote control operating procedures.

3.5.2 Teletypewriter Signal Version (514S-1 Remote Control Unit)

Note

Refer to paragraph 4.7 for 651S-1/1A strapping and to the 514S-1 instruction book, Collins part number 523-0764187, for 514S-1 strapping.

For remote control operation, connect a 514S-1 Remote Control Unit to the multipin REMOTE CONTROL INPUT connector (J62) on the rear panel of the receiver. A typical 514S-1/651S-1/1A interconnect diagram is shown in figure 4. Refer to the chassis schematic in the diagrams section for pin function information. The connector of the rear panel is a type JT02A-14-37P(014), and the mating connector is a type JT06RE-14-37S-386. The two pairs of TTY receive and transmit wires in the interconnecting cable should be the standard 20-mA TTY loop, and the cable length should not exceed 1,000 feet.

Note

A single pair of standard 20-mA teletypewriter wires may be used by jumpering pin 5 to pin 1 on connector J62 of the 651S-1/1A and jumpering pin 2 to pin 4 on connector J62 of the 514S-1.

Refer to the operation section for address strapping information and remote control operating procedures.

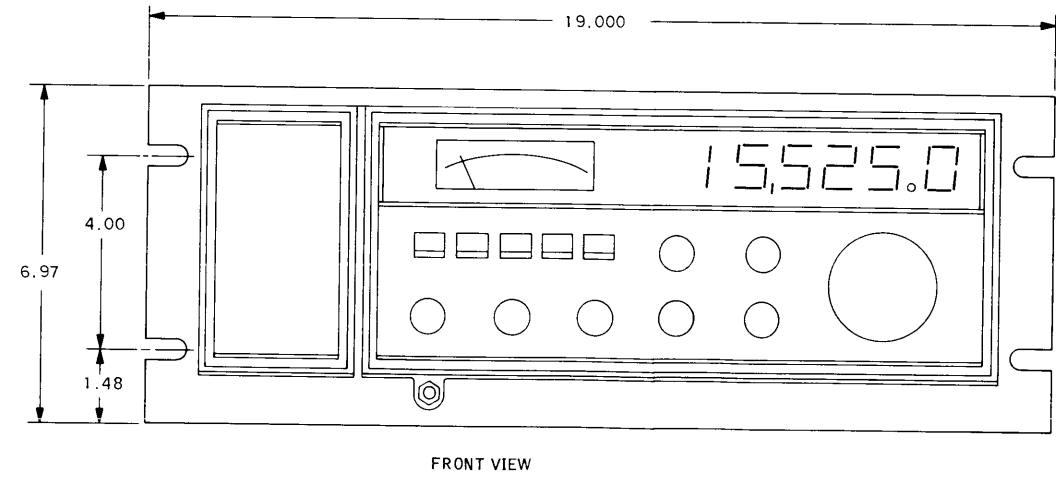
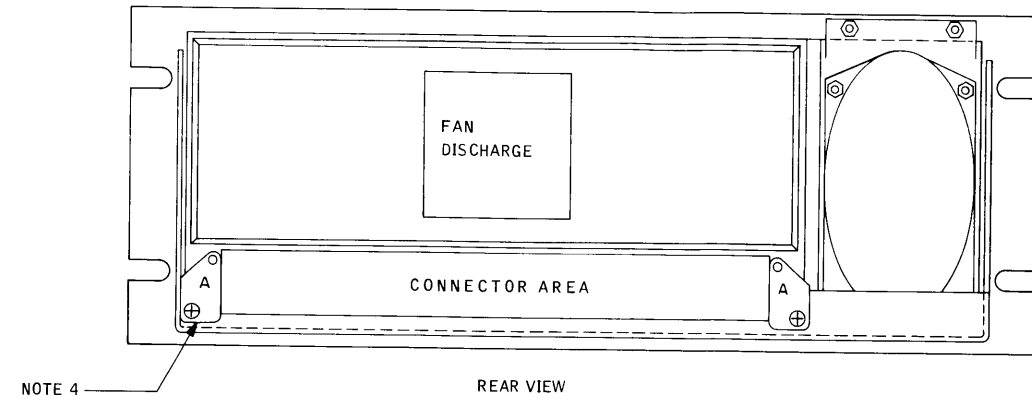
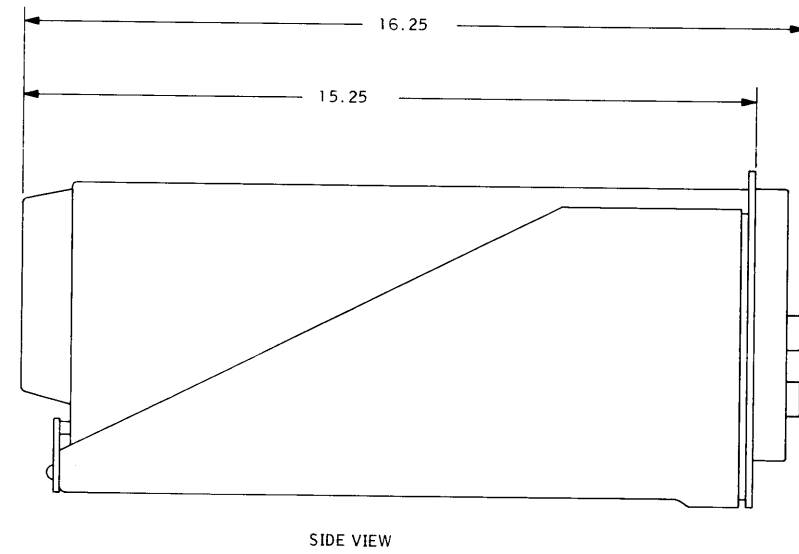
4. SUPPLEMENTARY INSTALLATION DATA

4.1 IF Outputs

The 651S-1/1A contains a standard if output jack (J59) and an ISB if output jack (J60) on the rear panel. These 450-kHz, 50-ohm BNC coaxial outputs may be connected to any RTTY converter, an oscilloscope, or any other device requiring a 450-kHz signal. The if outputs may be used to monitor the standard and ISB if signals.

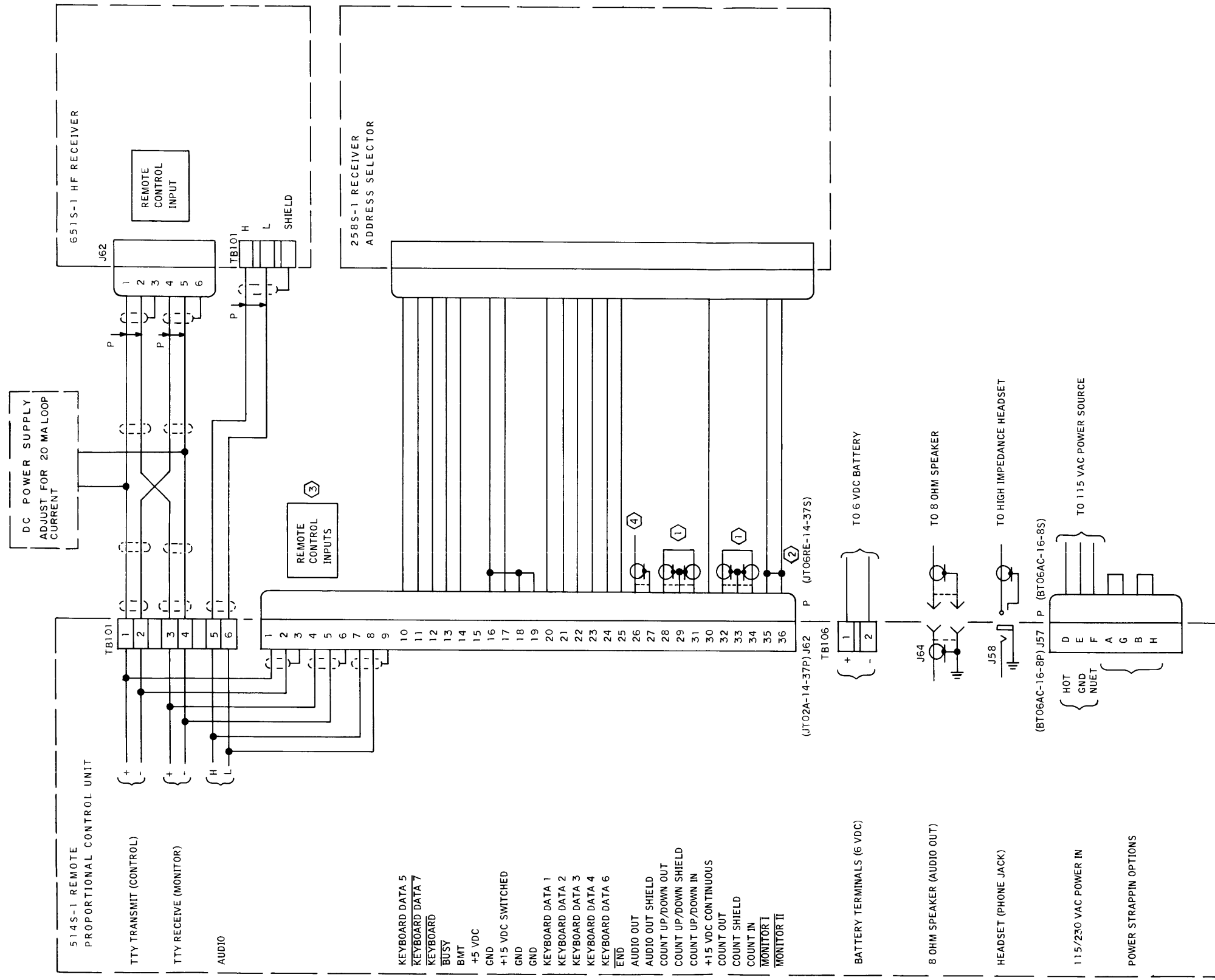
NOTES:

1. DIMENSIONS ARE IN INCHES.
2. UNLESS OTHERWISE SPECIFIED - TOLERANCES ON:
 DECIMAL DIMENSIONS - .XX = ± .02, .XXX = ± .008
 HOLE DIAMETERS - UNDER .251 DIA = + .005 - .005
 .251 TO .500 DIA = + .006 - .005
 OVER .500 DIA = + .008 - .005
 ANGLES = ± 1.0°
3. ECCENTRICITY BETWEEN DIAMETER ON AN AXIS NOT TO EXCEED .010 DIA.
4. REMOVE TWO FRONT FEET AND TWO REAR RUBBER PADS FROM RECEIVER. SLIDE RECEIVER, WITH DUST COVER IN PLACE, INTO ADAPTER PANEL AS SHOWN, AND SECURE WITH TWO RETAINER PLATES "A". PINS ON RETAINERS MATE WITH HOLES IN COVER, ON SOME STATUSES OF THE RADIO, PINS ON THE RETAINERS MATE WITH HOLES FOR COVER MOUNTING SCREWS FROM WHICH SCREWS HAVE BEEN REMOVED.
5. 699J-1 COLLINS PART NUMBER 792-6980-001 IS SHOWN. PART NUMBER 792-6980-002 IS ALSO AVAILABLE THAT HAS THE SPEAKER ON THE RIGHT HAND SIDE.



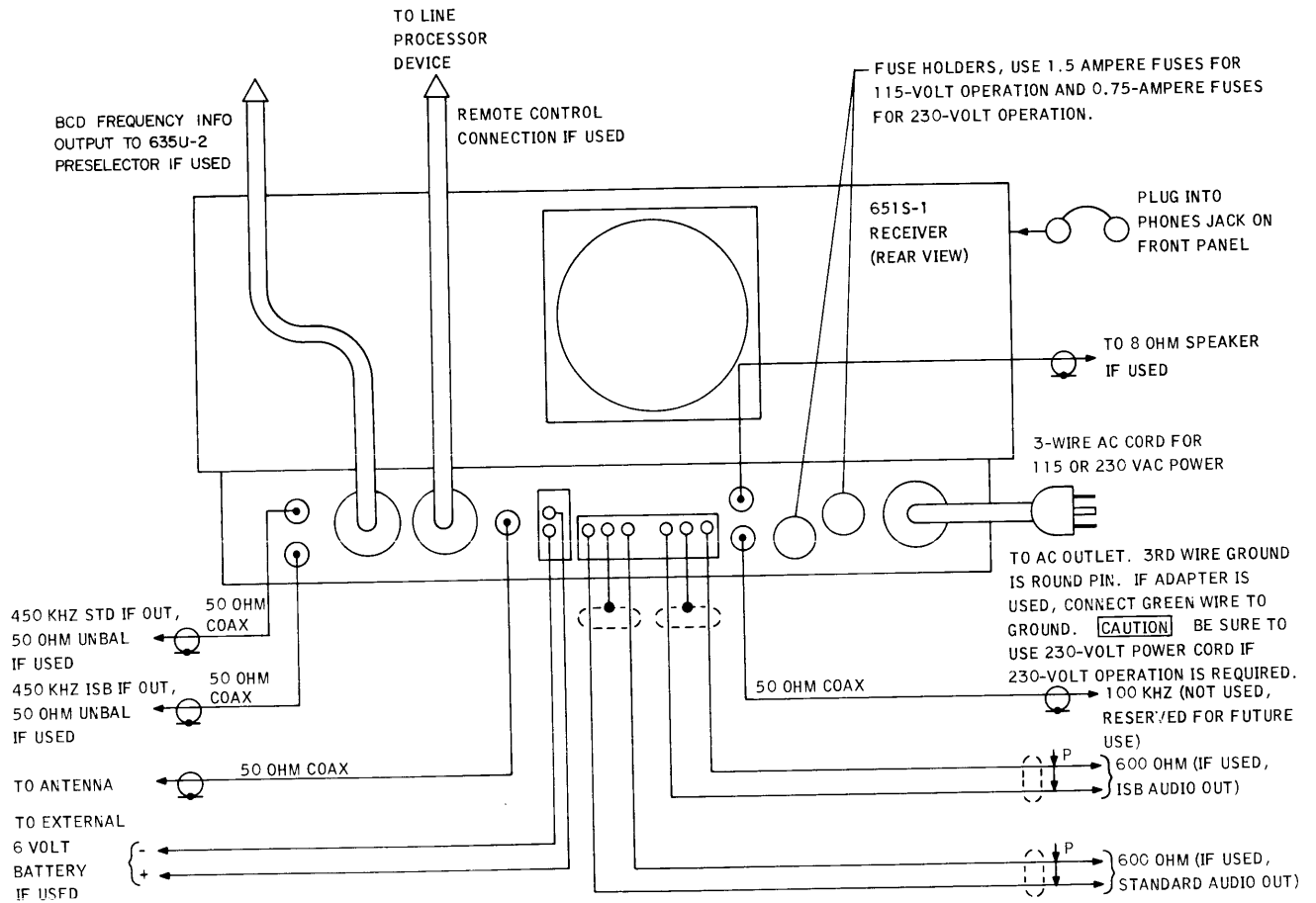
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651S-1/1A in 699J-1, Outline and Mounting Dimensions
 Figure 3



- NOTES:
- ① RESERVED FOR REMOTE FREQUENCY CONTROL. MUST BE STRAPPED AS SHOWN FOR NORMAL OPERATION.
 - ② MUST BE STRAPPED AS SHOWN FOR NORMAL OPERATION.
 - ③ REMOTE CONTROL LINES TO 651S-1 MAY BE CONNECTED TO J62, PINS 1 THROUGH 9, OR TO TB106 AS SHOWN.
 - ④ AUDIO OUT FUNCTIONS IN PARALLEL WITH J64.

514S-1/651S-1/1A Interconnect Diagram
Figure 4



TP2-7213-014

External Connections to 651S-1/1A
Figure 5

4.2 Remote Control Output

The multipin REMOTE CONTROL OUTPUT connector (J63) on the rear panel of the receiver provides bcd frequency information for controlling the 635U-2 RF Preselector. Refer to the chassis schematic in the diagrams section for connector pin function information. The connector on the rear panel is type JT02A-14-37PA(014), and the mating connector is type JT06RE-14-37SA-386.

4.3 100-kHz Input/Output Connector

The 100-kHz BNC coaxial connector (J65) on the rear panel of the receiver is not used (reserved for future use).

4.4 Mute

The receiver may be muted by removing the strapping option from TB103 (refer to the chassis schematic in the diagrams section). The receiver is muted when J62-22 is open; reception is normal when J62-22 is jumpered to J62-24.

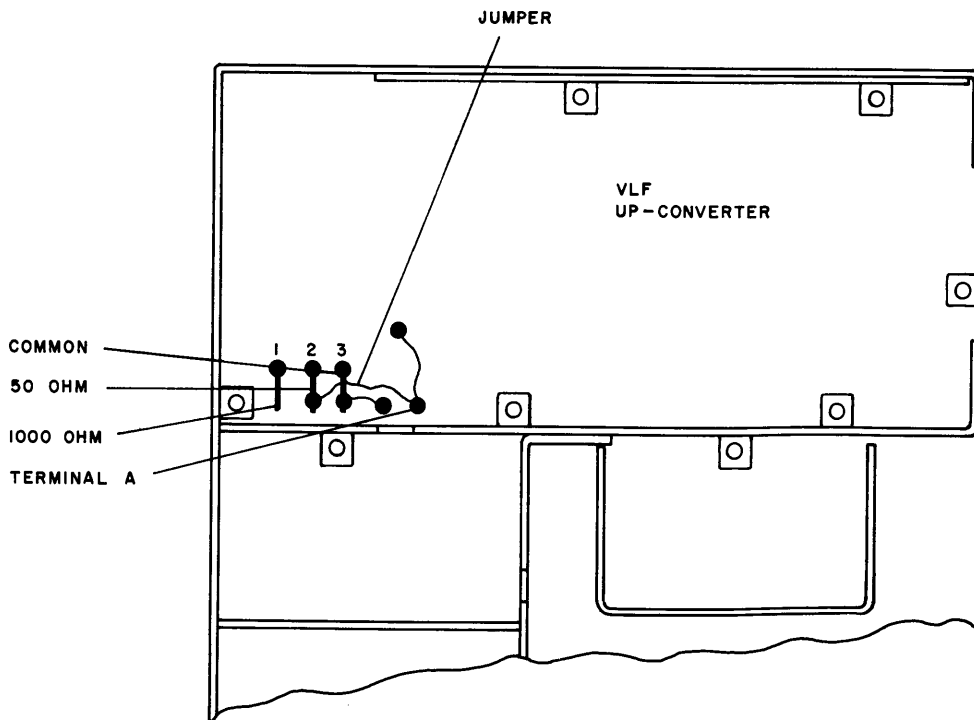
4.5 VLF Antenna Input Strapping (VLF Converter Only)

The input impedance of the receiver below 560 kHz may be changed from 50 ohms to 1000 ohms to obtain good performance from electrically very short antennas. In rf module A6 (790-1048-010), change jumper on terminal A from 50-ohm terminal to 1000-ohm terminal of filter FL601 (refer to figure 6).

4.6 Auto Scan Card A9, Installation and Strapping

4.6.1 Internal Strapping (Figure 7)

Strapping is accomplished by installing jumper clips (provided) in predetermined positions on the jackfield (J1) on the card. The odd-numbered pins of J1 are the programming input lines to the scan range dividers; even-numbered pins are ground. Jumper clips are used to ground the appropriate pins to set up the desired scan frequency and dwell time.



TP3-0903-012

RF Module A6, VLF Version (790-1048-010, -021), Input Strapping Option
Figure 6

Note

An open input line is logic 1 and a grounded line is logic 0.

To program the scan range (frequency), subtract the desired scan range (in 100-Hz increments) from 1000 (100 kHz). Program the difference at J1 by installing grounding clips on the appropriate pins.

Example: A scan range of 9 kHz is desired.

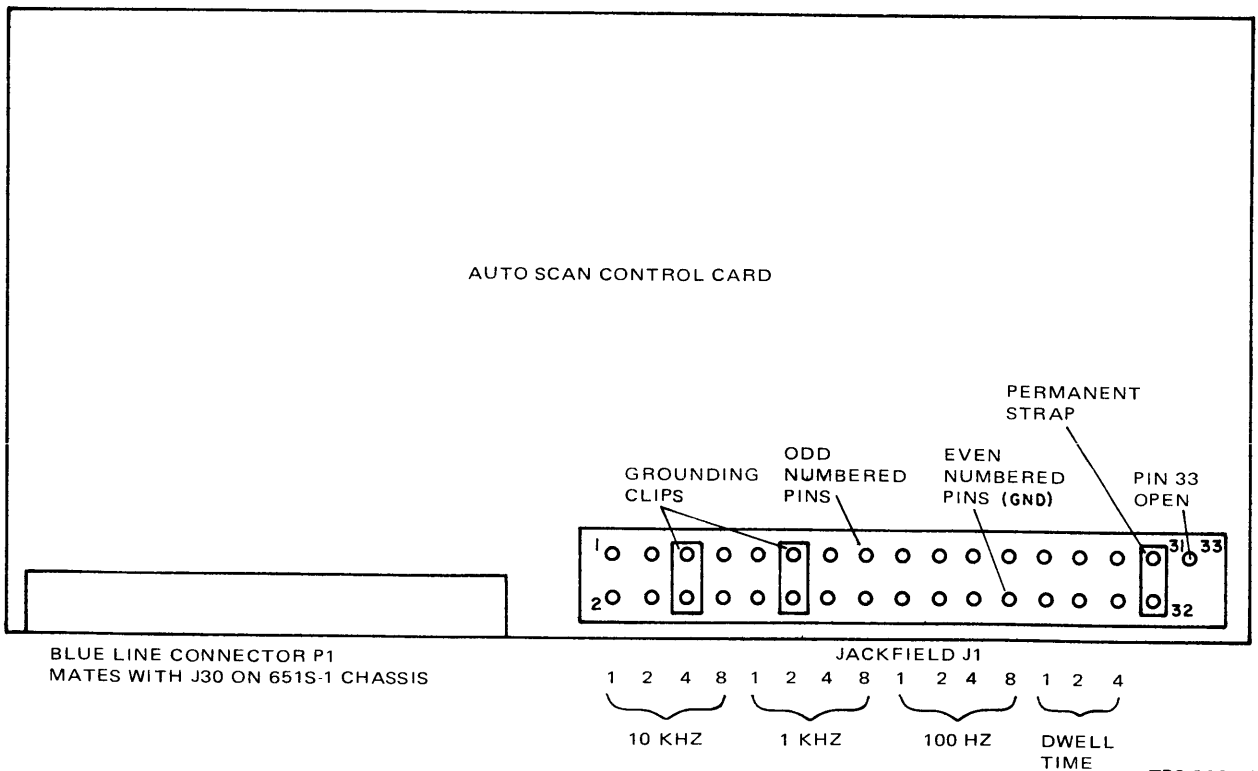
$$\begin{array}{r}
 1000 \text{ (100 kHz in 100-Hz increments)} \\
 \underline{-90 \text{ (9 kHz in 100-Hz increments)}} \\
 910
 \end{array}$$

Program digits 9, 1, and 0 at the 10-kHz, 1-kHz and 100-Hz input lines respectively. (Refer to table 1 and figure 7.)

Table 1. Digit Code for 10-kHz, 1-kHz, 100-Hz, and Dwell-Time Inputs.

DIGIT	WT			
	1	2	4	8
0	X	X	X	X
1	-	X	X	X
2	X	-	X	X
3	-	-	X	X
4	X	X	-	X
5	-	X	-	X
6	X	-	-	X
7	-	-	-	X
8	X	X	X	-
9	-	X	X	-

- Indicates open line (logic 1)
X Indicates grounded by jumper clip (logic 0)



Auto Scan Control Card A9, Internal Strapping
Figure 7

To program dwell time (period in which the receiver remains on a discrete frequency), subtract the desired dwell time (in 100-millisecond increments) from 7 (700 milliseconds). Program the difference at J1 by installing grounding clips on the appropriate pins.

Example: A dwell time of 200 milliseconds is desired.

7 (700 milliseconds)

-2 (200 milliseconds)

5

Program the digit 5 at the dwell time program input lines (table 1 and figure 7).

The grounding clip on J1-31 to J1-32 must be installed and J1-33 must be open at all times for proper operation of the scan card.

4.6.2 External Strapping

External programming of the audio scan card is accomplished by using the 775L-1 Local Scan Control panel, Collins part number 620-9030-001, interfaced through rear connector J62 on the 651S-1/1A. External programming provides a variable frequency scan range and dwell time. Remove all grounding clips from J1 except put clips on the 100-Hz input lines; J1-17 to 18, J1-19 to 20, J1-21 to 22, J1-23 to 24, and the permanent clip J1-31 to 32.

4.6.3 Installation

4.6.3.1 Auto Scan Card Only

The auto scan card can be purchased as part of a modification kit or as an individual sub-assembly. To install card, perform the following:

- a. Remove jumper straps from J30-29 to 31 and J30-32 to 34 on 651S-1/1A chassis sideboard.
- b. Assure that card is properly strapped, refer to paragraph 4.6.1 or 4.6.2.
- c. Insert card into 651S-1/1A chassis; make sure P1 on card mates properly with J30 on chassis.

4.6.3.2 Auto Scan Control Modification Kit

Installation Kit, Collins part number 609-1565-001, consists of an auto scan control card, a front panel switch plate, and an adapter card. To install, perform the following:

- a. To install auto scan card, refer to paragraph 4.6.3.1.
- b. Install switch plate on the REMOTE/LOCAL switch located on the 651S-1/1A front panel.
- c. The adapter card permits normal operation of the 651S-1/1A when the auto scan card is removed without restrapping the chassis sideboard. To install, remove auto scan card from chassis and insert adapter card into J30.

4.7 TCU Card A9 Installation

Before installing the TCU card, remove the following jumpers from J30 on the 651S-1/1A sideboard:

- a. J30-15 to -47
- b. J30-29 to -31
- c. J30-32 to -34
- d. J30-42 to -43

On mating connector for J62 (from the 514S-1 control) jumper pin 2 to pin 4 (refer to paragraph 3.5.2). Ensure that a jumper is connected from J30-46 to J31-47 on the 651S-1/1A sideboard. Install TCU card by inserting it into J30 on the 651S-1/1A chassis.