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APPENDIX
to
SYSTEM MANUAL
for
MULTI-CHANNEL TRANSMITTER/RECEIVER
MODEL MCTR-350



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y. OTTAWA, ONTARIO

NOTICE

THE CONTENTS AND INFORMATION CONTAINED IN THIS INSTRUCTION MANUAL IS PROPRIETARY TO THE TECHNICAL MATERIEL CORPORATION TO BE USED AS A GUIDE TO THE OPERATION AND MAINTENANCE OF THE EQUIPMENT FOR WHICH THE MANUAL IS ISSUED AND MAY NOT BE DUPLICATED EITHER IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER WITHOUT THE WRITTEN CONSENT OF THE TECHNICAL MATERIEL CORPORATION.



THE TECHNICAL MATERIEL CORPORATION

C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

W a r r a n t y

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

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2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

INTRODUCTION

This appendix contains technical information and diagrams pertaining to various modular and remote units comprising the MCTR-350 system.

The units covered in this appendix are:

1. Speaker Panel, Model LSP-6X.
2. Equipment Connect Panel, Model ECPA-1.
3. Telephone Remote Control, Model TPC-11.
4. Antenna Changeover Relay, RL139-2.

SPEAKER PANEL

MODEL LSP-6X

SPEAKER PANEL

MODEL LSP-6X

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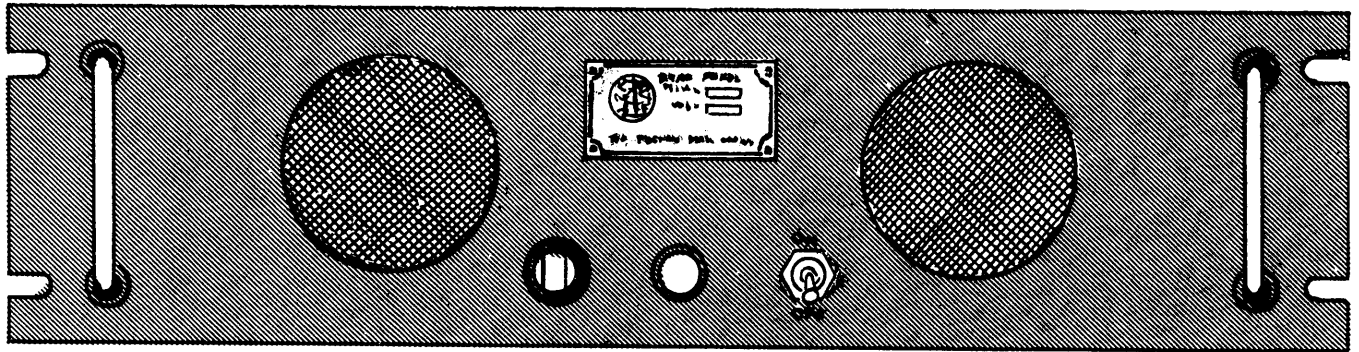
1. DESCRIPTION OF EQUIPMENT

Speaker Panel, Model LSP-6X (figure 1) is a dual-speaker unit, containing a power supply and a motor control stepping switch.

The LSP power supply is used to furnish outputs of 48 volts d-c and 100 volts d-c to associated equipments requiring indicator and control voltages.

The LSP motor control stepping switch is used to control a slave motor control stepping switch in an associated receiver tuner by commands from a remote receiver control unit.

The front panel speakers have no selection or adjustment controls; speaker activation, selection and control must be accomplished remotely.



9008L6-1

Figure 1. Speaker Panel, Model LSP-6X

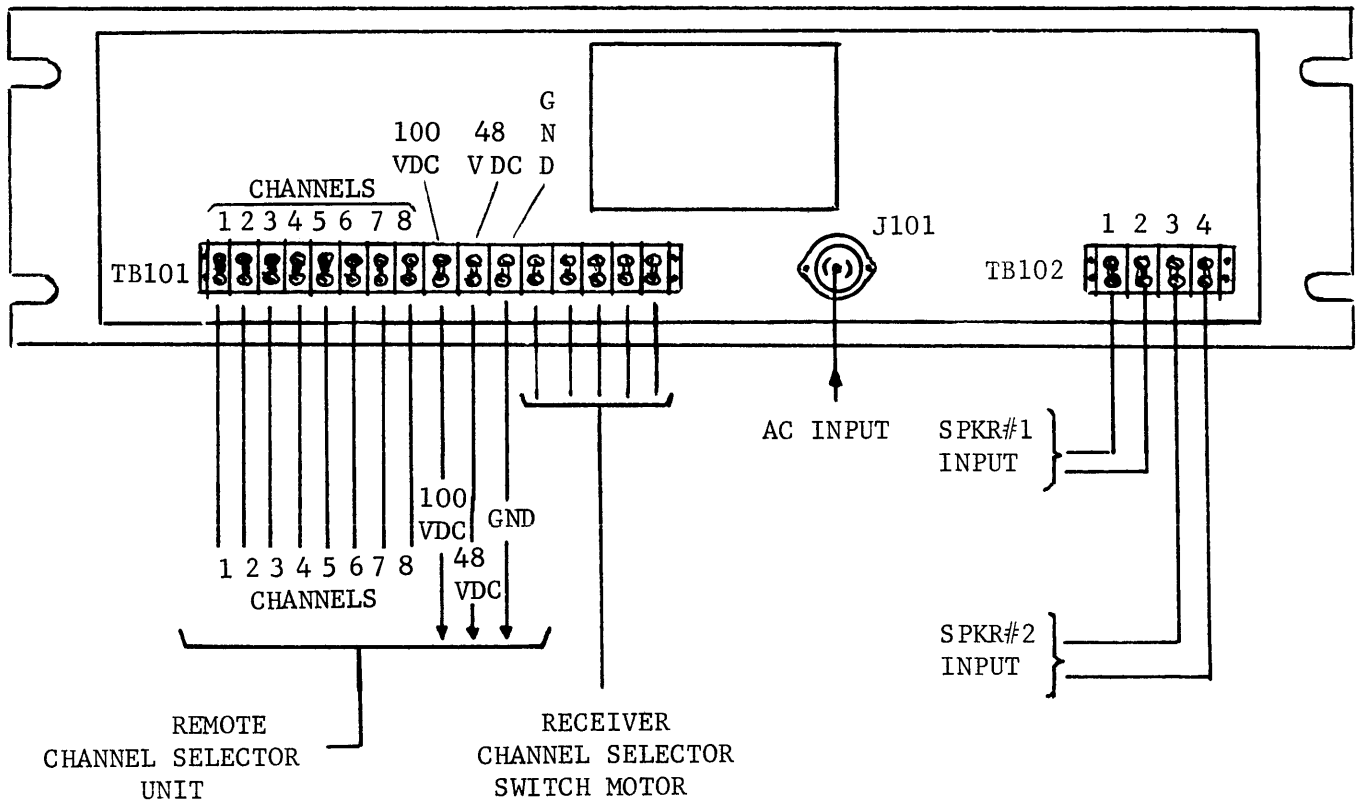
2. INSTALLATION.

The LSP measures 5-1/4-inches high with a 19-inch wide front panel, suitable for mounting into any standard width equipment rack or console. The unit is thoroughly checked and tested at the factory prior to shipment.

Upon receipt of the equipment, unpack it carefully and inspect for damage that may have occurred in transit.

With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

Refer to the associated system manual for electrical connection details. See figure 2 for typical interconnections.



9008L6-2

Figure 2. Rear Panel Connections

3. OPERATING INSTRUCTIONS

The LSP front panel displays two speakers, an input line voltage protective fuse, a power ON/OFF toggle switch and an associated power-on indicator lamp.

The two speakers receive audio input via the rear panel terminal board, having no activation or adjustment controls.

The power ON/OFF switch, when set at ON, applies input a-c line voltage to the LSP power supply, enabling remote control capabilities to the associated receiver tuner and remote receiver control units. The front panel fuse and indicator lamp provide protection and activation indication respectively.

4. MAINTENANCE

Maintenance of the LSP will consist mainly of component replacement, requiring no alignment. It should be noted that when replacing components having many wires connected, such as the motor control stepping switch, the wires should be toggled and marked for accurate identification when replacing.

When replacing components, the technician should observe for exact or equivalent replacements by referring to the Parts List.

Polarity and positioning of certain components should be observed before removing so that the replacement component will fit and operate correctly.

5. PRINCIPLES OF OPERATION

The LSP is designed to operate from a line voltage of 115/230 volts a-c, 50/60 cps, single phase. Setting the power toggle switch S101 at ON activates the power supply section. Voltage is thus applied to the motor control stepping switch S102 and to the output terminals 9 and 10 of TB101. These output voltages are supplied to the indicator

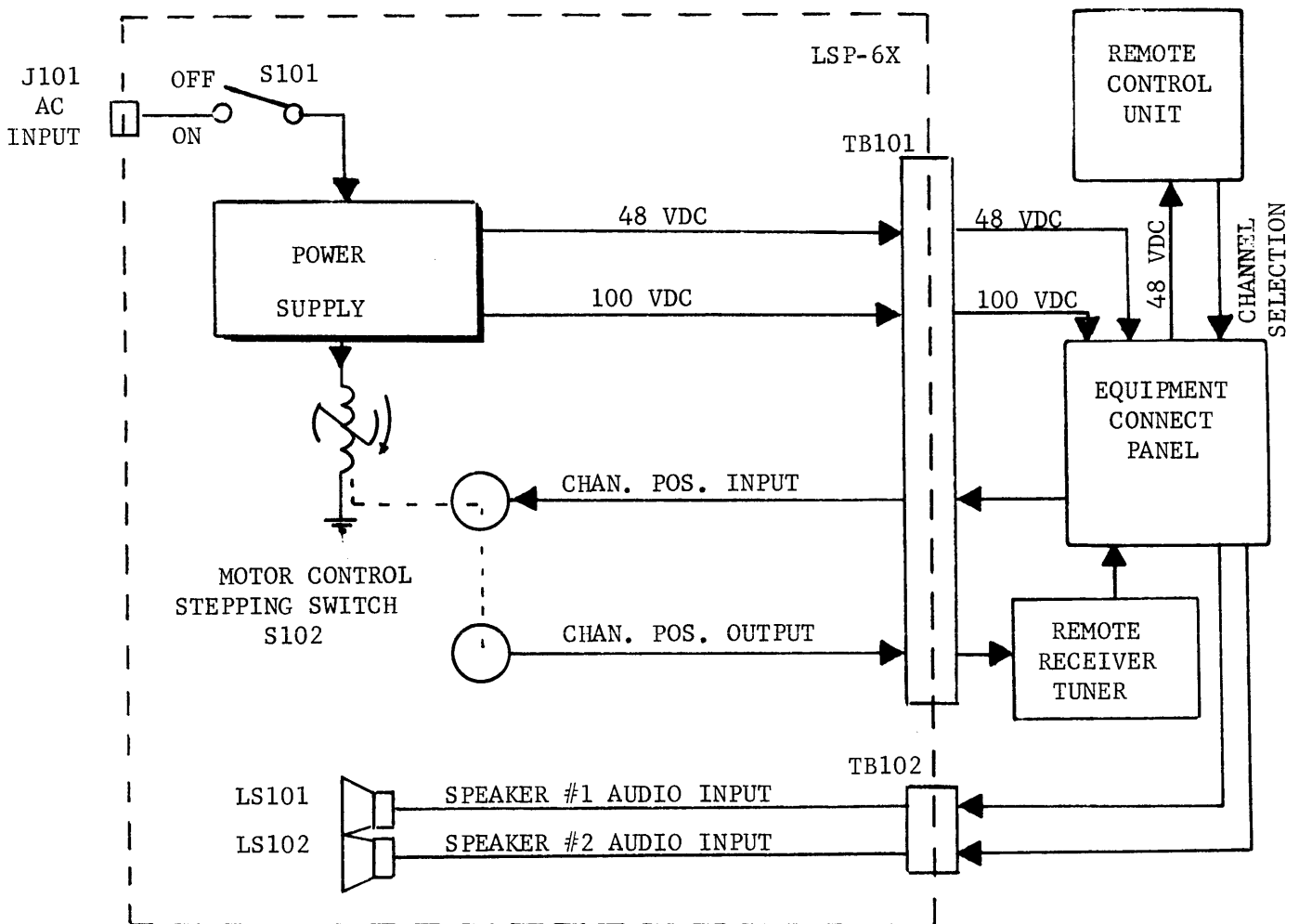
lamp circuitry of the remote control unit and to the slave motor control stepping switch of the remote receiver tuner.

This function provides for remote receiver channel selection from a remote control unit.

When the power toggle switch is set at OFF, controlling voltages are removed, thus disabling remote control capabilities.

The two loudspeakers LS101 and LS102 are connected directly to terminal board TB102, having no controlling components.

See figure 3 for a functional block diagram.



9008L6-3

Figure 3. Functional Block Diagram.

6. PARTS LIST

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Reference symbol.
- b. Description as indicated in parts list.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST

for

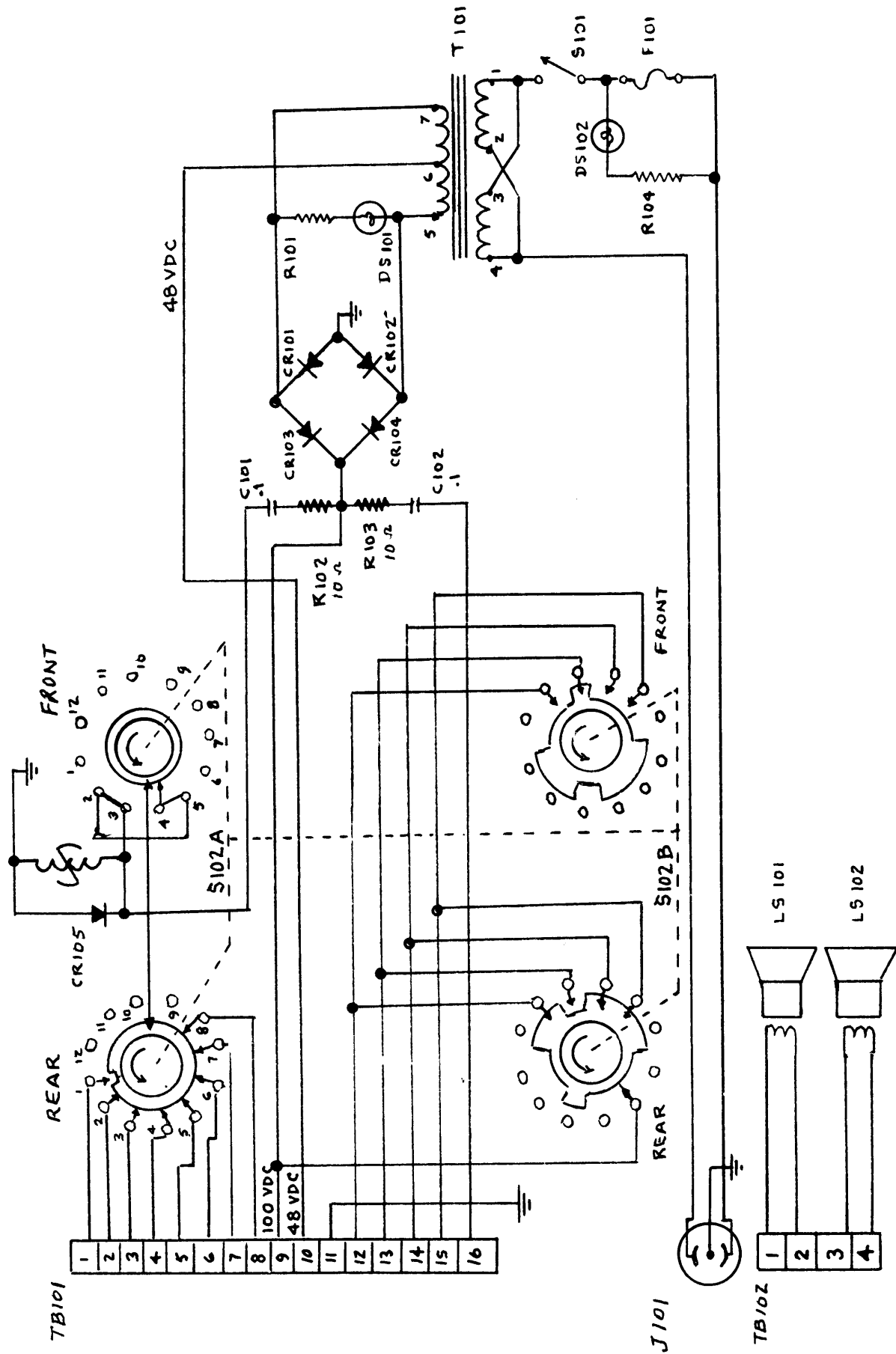
SPEAKER PANEL, MODEL LSP-6X

| REF SYMBOL | DESCRIPTION | TMC PART NUMBER |
|------------------------|---|-----------------|
| C101 | CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 500 WVDC. | CC100-32 |
| C102 | Same as C101. | |
| CR101 | SEMICONDUCTOR DEVICE, DIODE | 1N4366 |
| CR102 thru CR104 | Same as CR101. | |
| CR105 | ABSORBER, OVERVOLTAGE | DD114-2 |
| DS101 | LAMP, NEON: 105/125 V, 1/25 watts; miniature bayonet base, T-3-1/4 bulb. | BI100-51 |
| DS102 | NON-REPLACEABLE ITEM. (Part of XF101) | |
| F101 | FUSE, CARTRIDGE: 1 amp; 1-1/4" long x 1/4" dia.; slow blow. | FU102-1 |
| J101 | CONNECTOR, RECEPTACLE, ELECTRICAL: AC power; 2 contacts rated for 10 amps at 250 V or 15 amps at 125 V; polarized; twist lock type. | JJ175 |
| LS101 | LOUDSPEAKER, PERMANENT MAGNET | LS101 |
| LS102 | Same as LS101. | |
| R101 | RESISTOR, FIXED, COMPOSITION: 220,000 ohms, $\pm 5\%$ 1/2 watt. | RC20GF224J |
| R102 | RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 5\%$; 2 watts. | RC42GF100J |
| R103 | Same as R102. | |
| R104 | NON-REPLACEABLE ITEM. (Part of XF101) | |
| S101 | SWITCH, TOGGLE: DPST; 30° angle of throw; bat type handle. | ST22K |
| S102 | SWITCH SOLENOID, ROTARY: 2 sections, 12 positions; 30° angle of throw. | SW374 |

PARTS LIST (CONT)

SPEAKER PANEL, MODEL LSP-6X

| REF SYMBOL | DESCRIPTION | TMC PART NUMBER |
|---------------|--|--------------------|
| T101 | TRANSFORMER, POWER: primary 115/230 VAC, 50/60 cps, single phase; secondary 123V RMS; current rating 1.1 amp; CT 61.5 V. | TF312 |
| TB101 | TERMINAL STRIP, BARRIER: 16 number 6-32 thd x 1/4" long binder head machine screws; black bakelite body. | TM100-16 |
| TB102 | TERMINAL STRIP, BARRIER: 4 number 6-32 thd x 1/4" long binder head machine screws; black bakelite body. | TM100-4 |
| W101 | WIRING HARNESS, BRANCHED | CA955 |
| XDS101 | LIGHT, INDICATOR: w/red frosted lens; for miniature bayonet base T-3-1/4 bulb. | TS106-1 |
| XF101 | FUSEHOLDER, LAMP INDICATING: accomodates cartridge fuse 1-1/4" long x 1/4" dia.; 90 V to 300 V, 20 amps; neon lamp type with a 220 K ohm lamp resistor; transparent clear flat sided knob; black body. (consists of DS102, R104) | FH104-3 |



9008L6-4 (CK895A)

Figure 4. Schematic Diagram, Model LSP-6X

EQUIPMENT CONNECT PANEL

MODEL ECPA-1

EQUIPMENT CONNECT PANEL

MODEL ECPA-1

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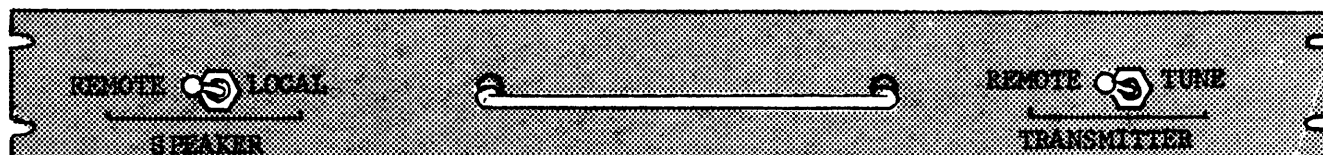
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1. DESCRIPTION OF EQUIPMENT.

Equipment Connect Panel, Model ECPA-1 (figure 1) is an equipment junction and switching unit, enabling equipment operating configuration changeover from a central point.

Various modular units of a particular transmitter/receiver system, when connected to the ECPA, may be easily switched from a remote to a tune configuration and from remote audio monitoring to local audio monitoring. These functions are accomplished by two front panel mounted toggle switches.

The ECPA, being a passive unit, requires no operating voltage.



9820-1

Figure 1. Equipment Connect Panel, Model ECPA-1

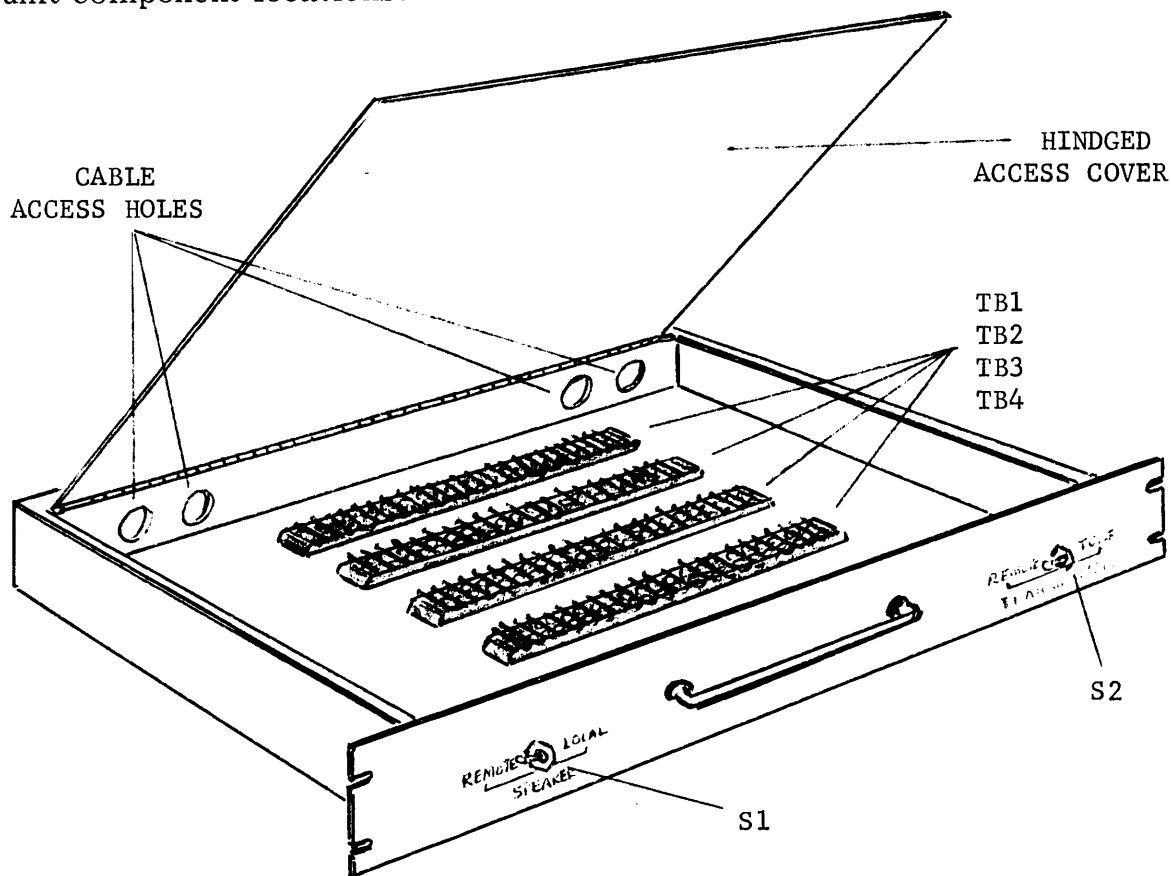
2. INSTALLATION .

The ECPA measures 1-3/4-inches high with a 19-inch wide front panel, suitable for mounting into any standard width equipment rack or console. The unit is thoroughly checked and tested at the factory prior to shipment.

Upon receipt of the equipment, unpack it carefully and inspect for damage that may have occurred in transit.

With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

Refer to the associated system manual for electrical connection details. See figure 4 schematic diagram for typical interconnections. See figure 2 for unit component locations.



9820-2

Figure 2. Component Locations

3. OPERATING INSTRUCTIONS

The ECPA front panel displays two toggle switches, **SPEAKER** and **TRANSMITTER**. The **SPEAKER** toggle switch enables either **REMOTE** or **LOCAL** receiver audio monitoring. The **TRANSMITTER** toggle switch enables either **REMOTE** or **TUNE** system operation.

When the **SPEAKER** toggle switch is set at **REMOTE**, receiver audio is applied to a remote control monitoring unit.

When set at **LOCAL**, receiver audio is applied to the local system speaker modular unit.

When the **TRANSMITTER** toggle switch is set at **REMOTE**, the transmitter system is placed in a "remote" configuration, enabling remote transmitter control from a remote control unit.

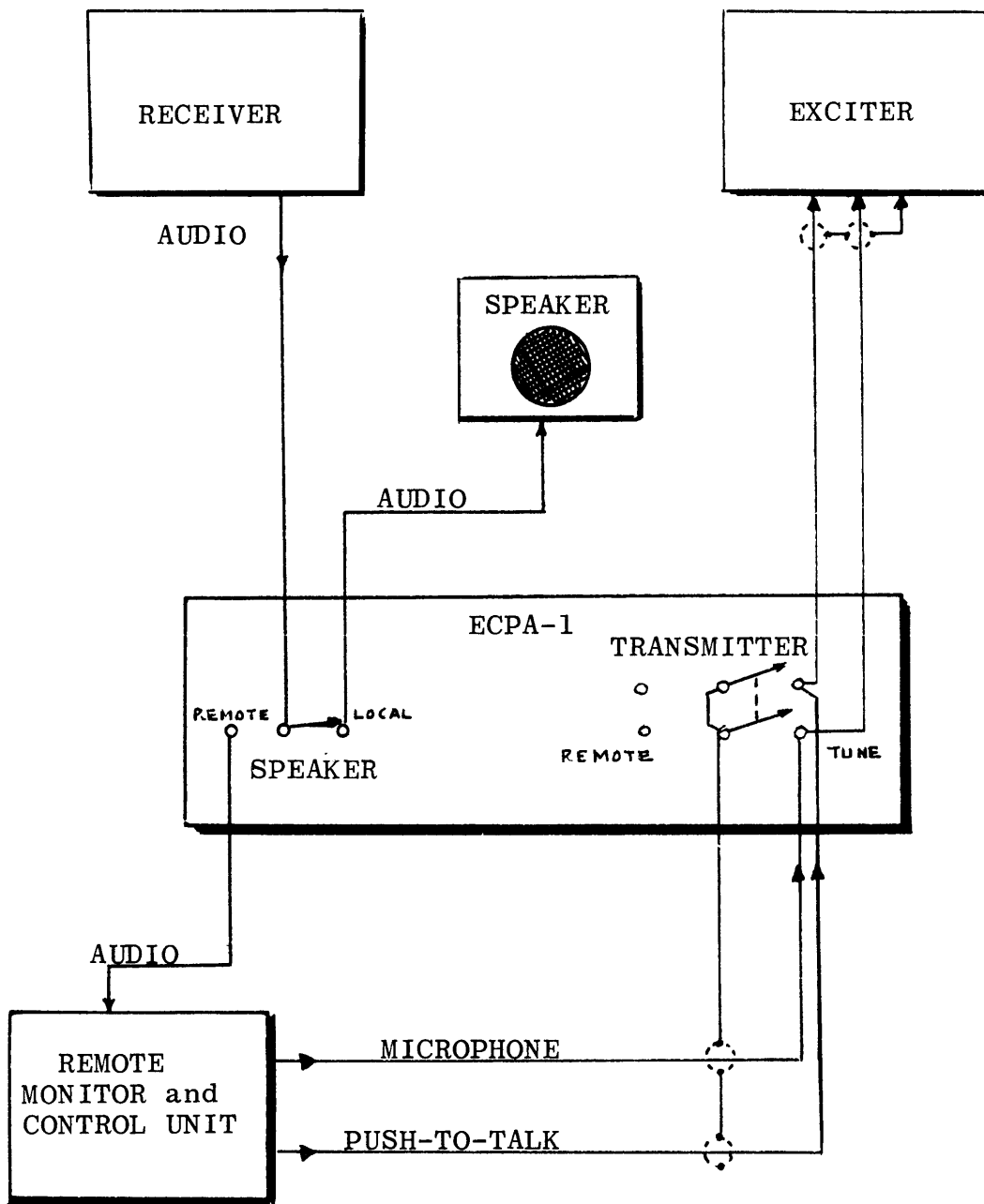
When set at **TUNE**, the system is placed in a "tune" configuration, enabling local system tuning.

4. MAINTENANCE

Maintenance of the ECPA requires nothing more than observing for unit cleanliness and secure interconnections.

5. PRINCIPLES OF OPERATION

The ECPA is a passive unit, requiring no operating voltages. Unit interconnections are made at the four terminal boards, switching control accomplished by the two front panel toggle switches. See figure 3 for a functional block diagram, illustrating typical interconnections.



9820-3

Figure 3. Functional Block Diagram.

6. PARTS LIST

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Reference symbol.
- b. Description as indicated in parts list.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

| REF SYMBOL | DESCRIPTION | TMC PART NUMBER |
|--------------------|---|-----------------|
| S1 | SWITCH, TOGGLE: SPDT; 30° angle of throw; bat type handle. | ST12D |
| S2 | SWITCH, TOGGLE: DPST; 30° angle of throw; bat type handle. | ST22K |
| TB1 | TERMINAL BOARD, BARRIER: 20 number 6-32 thd x 1/4" long binding head machine screws; black phenolic body. | TM102-20 |
| TB2 thru TB4 | Same as TB1. | |

TELEPHONE REMOTE CONTROL

MODEL TPC-11

TELEPHONE REMOTE CONTROL

MODEL TPC-11

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1. DESCRIPTION OF EQUIPMENT

Telephone Remote Control, Model TPC-11 (figure 1) is a remote control unit, providing pushbutton switches to remotely activate, monitor and control a remote transmitter/receiver system.

Remote transmitter control capabilities include transmitter "on" and transmitter "standby" conditions.

Remote receiver control capabilities include individual receiver channel selection (8 channels) and sideband selection (USB and LSB).

Audio monitoring may be accomplished either by the TPC-11 speaker, with an associated volume control, or by use of the telephone handset earpiece.



2998-1

Figure 1. Telephone Remote Control, Model TPC-11.

2. INSTALLATION

The TPC is physically slightly larger than a normal desk type telephone, making it suitable for desk-top or control console use. The choice of location is restricted only to the length of the interconnecting cable in use. The unit is thoroughly checked and tested at the factory prior to shipment.

Upon receipt of the equipment, unpack it carefully and inspect for damage that may have occurred in transit.

With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

Refer to the associated system manual for electrical connection details.

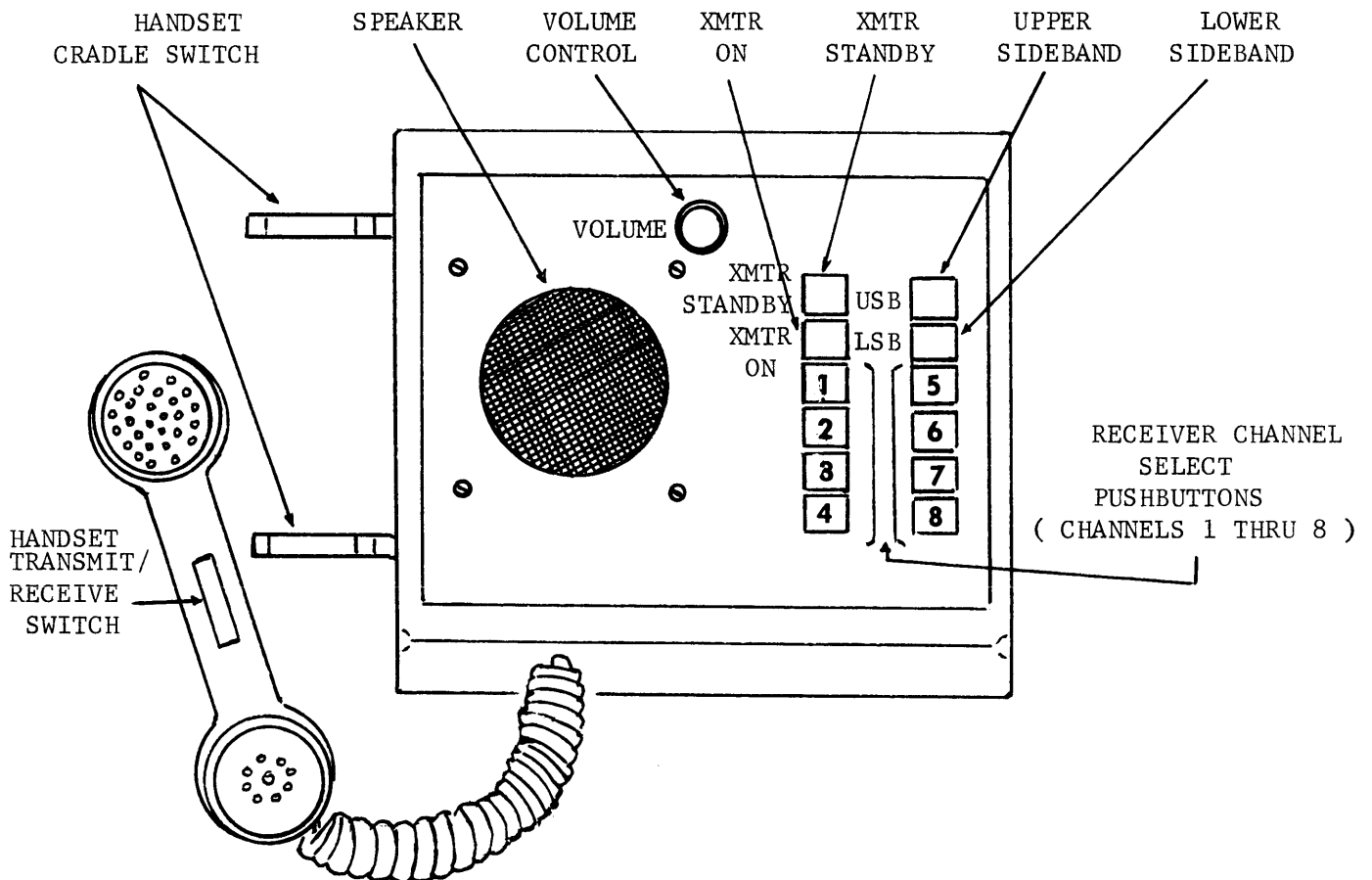
3. OPERATING INSTRUCTIONS

The TPC pushbutton deck displays eight receiver channel pushbutton switches (CHAN 1 through CHAN 8), two receiver sideband select pushbuttons (USB and LSB) and two transmitter control pushbuttons (XMTR ON and XMTR STANDBY). Each of the twelve pushbuttons light when depressed, indicating activation.

The receiver channel to be monitored is selected by depressing the desired CHAN selector pushbutton; the channel number corresponding to the eight remote receiver channels. When the desired receiver channel is selected, the audio output may be monitored either by the TPC speaker, controlled by its associated VOLUME control, or by use of the handset earpiece. When the handset is lifted from its cradle, the speaker is disconnected, applying the audio to the handset earpiece. Selection of the desired channel sideband is also pushbutton selectable, by depressing either the USB (upper sideband) or the LSB (lower sideband) pushbutton.

Remote transmitter activation is accomplished by depressing the XMTR STAND-

BY and XMTR ON pushbuttons. When the XMTR STANDBY pushbutton is depressed, the remote transmitter is placed in a "standby" configuration, ready for activation. When the XMTR ON pushbutton is depressed, the remote transmitter is activated. Transmitter keying is accomplished by use of the handset transmit/receive switch. When the handset is removed from its cradle, the handset is in a receive configuration. When the handset transmit/receive switch is depressed, the handset is in a transmit configuration. Therefore, transmitter keying is accomplished by depressing the handset switch to speak or transmit and releasing it to listen or receive via the handset microphone and earpiece respectively. See figure 2 for control and indicator locations.



2998-2

Figure 2. Control and Indicator Locations.

4. MAINTENANCE.

Maintenance of the TPC will consist mainly of component replacement, observing for unit cleanliness and secure interconnections.

5. PRINCIPLES OF OPERATION.

The TPC is designed to operate from voltages received from an associated remote unit, requiring 48 volts d-c for indicator lamp activation. The unit speakers LSI output level is controlled by an L-pad attenuator control R1.

When the handset cradle switch is actuated, by lifting the handset off the cradle, the selected receiver audio is disconnected from the speaker and applied to the handset earpiece. The handset transmit/receive switch, when pressed, operates in a push-to-talk configuration providing simplex operation. To transmit, the switch is pressed; to receive, the switch is released.

The channel select pushbuttons, sideband select pushbuttons and transmitter power control pushbuttons are basically an extension of the corresponding remote unit controls. See figure 3 schematic diagram for circuit layout.

6. PARTS LIST

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Reference symbol.
- b. Description as indicated in parts list.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST
for
TELEPHONE REMOTE CONTROL, MODEL TPC-11

| REF SYMBOL | DESCRIPTION | TMC PART NUMBER |
|---------------|---|--------------------|
| LS1 | LOUDSPEAKER, PERMANENT MAGNET: operating frequency range 200 to 5,000 cps; voice coil impedance 3.2 ohms; nominal input wattage 1 watt. | LS106 |
| P1 | CONNECTOR, PLUG, ELECTRICAL: 24 round No.20 male contacts; straight type. | PL212-3 |
| R1 | ATTENUATOR, VARIABLE: L pad resistive type; input and output impedance 4 ohms; 0 to 36 db attenuation. | RV107L4 |
| R2 | RESISTOR, FIXED, COMPOSITION: 3.3 ohms, $\pm 5\%$; 1 watt. | RC32GF3R3J |
| TB1 | NOT USED | |
| TB2 | TERMINAL BOARD, BARRIER: six number 6-32 thd x 1/4" long binding head machine screws; black phenolic body. | TM102-6 |

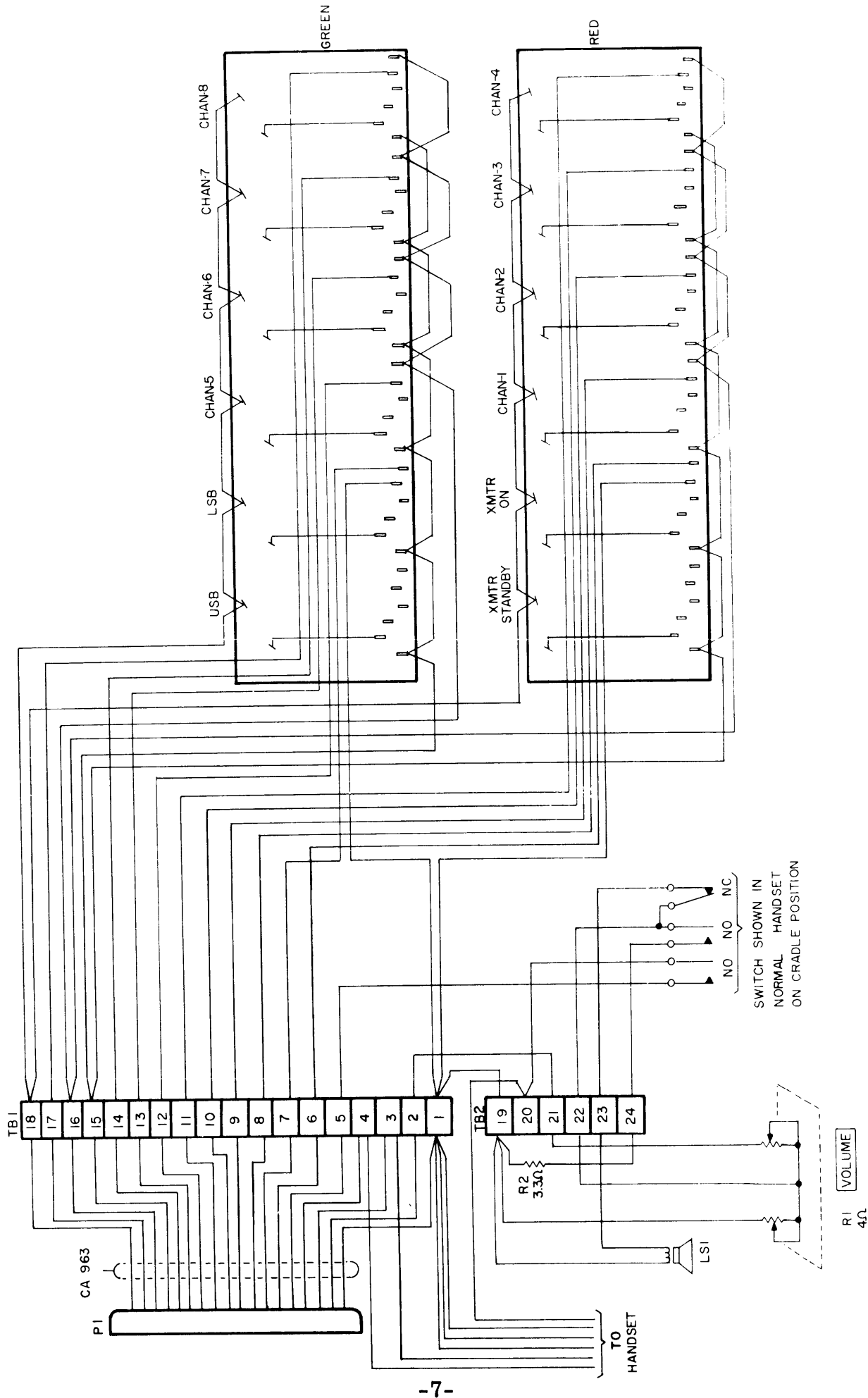


Figure 3. Schematic Diagram, TPC-11

ANTENNA CHANGEOVER RELAY

RL139-2

ANTENNA CHANGEOVER RELAY

RL139-2

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1. DESCRIPTION OF EQUIPMENT.

Antenna Changeover Relay RL139-2 is an r-f switching unit, used to connect one antenna to either a receiver tuner input or to a transmitter exciter output, selected by an external switching device.

The RL139-2 enables a single antenna to be used for receiving and transmitting in a simplex configuration. Antenna switching (from either to a receiver tuner input or to a transmitter exciter output) is accomplished by an externally generated voltage source used to control the RL139-2 r-f switch solenoid.

2. INSTALLATION.

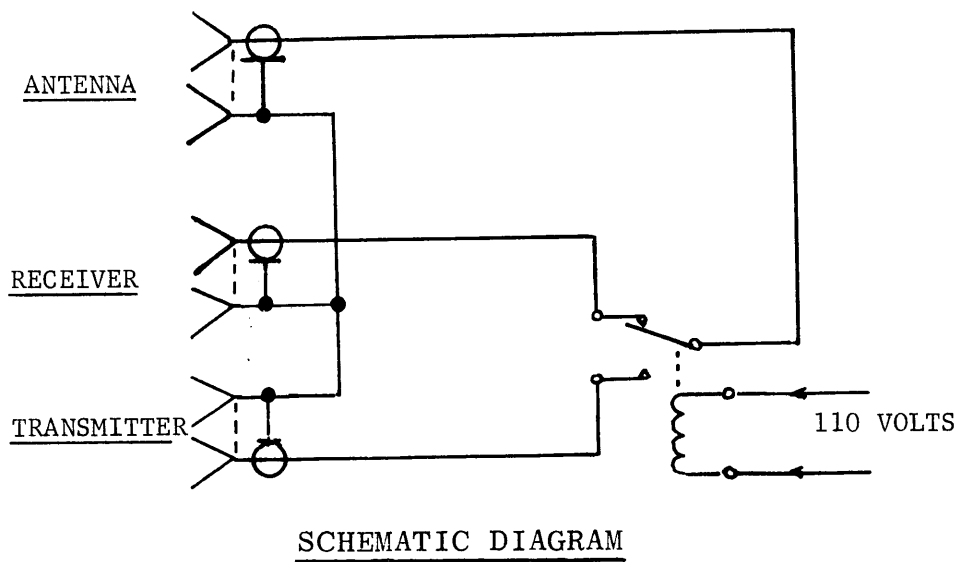
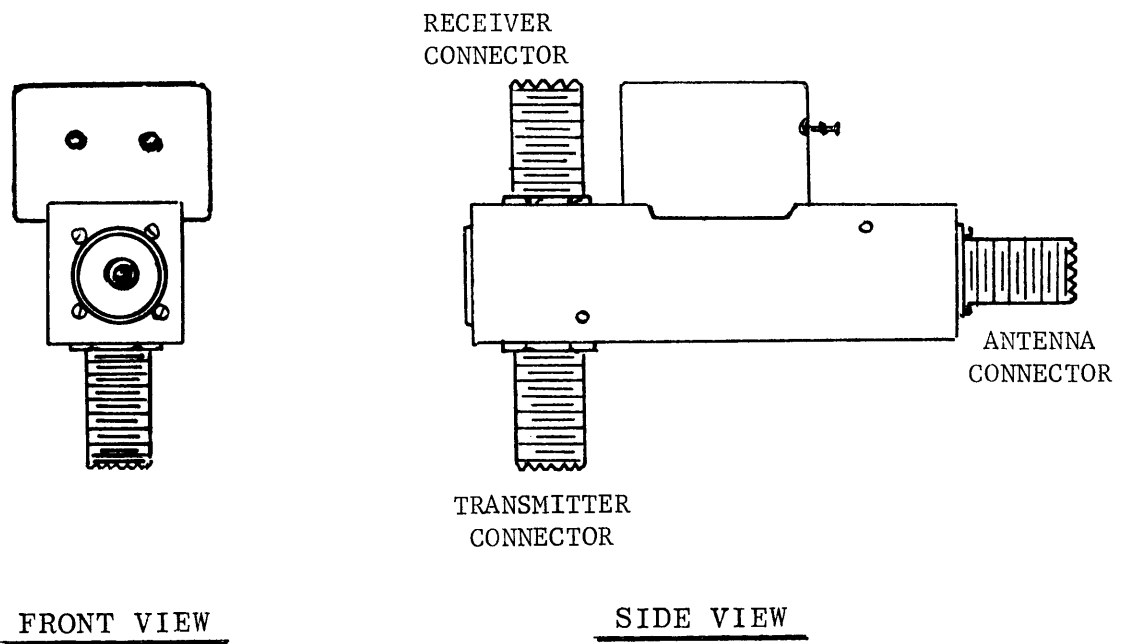
The RL139-2 is thoroughly checked and tested at the factory prior to shipment and is normally pre-mounted in the particular system equipment cabinet.

With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

Refer to the particular system manual for wiring details. See figure 1 for RL139-2 pictorial and schematic diagram.

3. OPERATING INSTRUCTIONS.

The RL139-2 is electrically operated, requiring no manual operations or adjustments. Antenna switching is accomplished by a voltage source, externally supplied, energizing a deenergizing the r-f switch solenoid.



374A-1

Figure 1. Antenna Changeover Relay, RL139-2

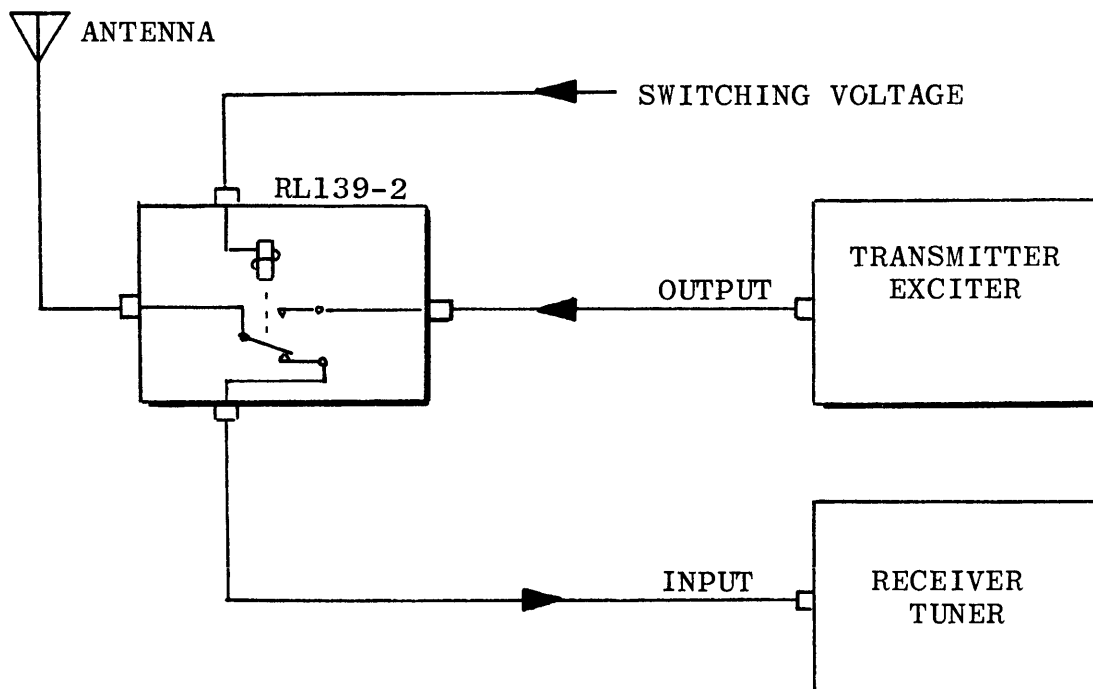
4. MAINTENANCE.

The RL139-2 requires no maintenance other than observing for unit cleanliness and secure interconnections.

5. PRINCIPLES OF OPERATION.

The RL139-2 operates on the connect/disconnect principle; the receiver tuner antenna input connection is normally connected to the antenna input connection and disconnected when the r-f switch is energized. Energizing the r-f switch, via an externally generated 110 volts a-c/d-c, connects the antenna input connection to the transmitter exciter output connection.

See figure 2 for a functional block diagram.



374A-2

Figure 2. Functional Block Diagram.