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TECHNICAL MANUAL

for

RECEIVER SELECTOR

MODEL RTRS-209



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y.

OTTAWA, ONTARIO

★

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IN 0158B

Issue Date: 17 September 1965



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

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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:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
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.

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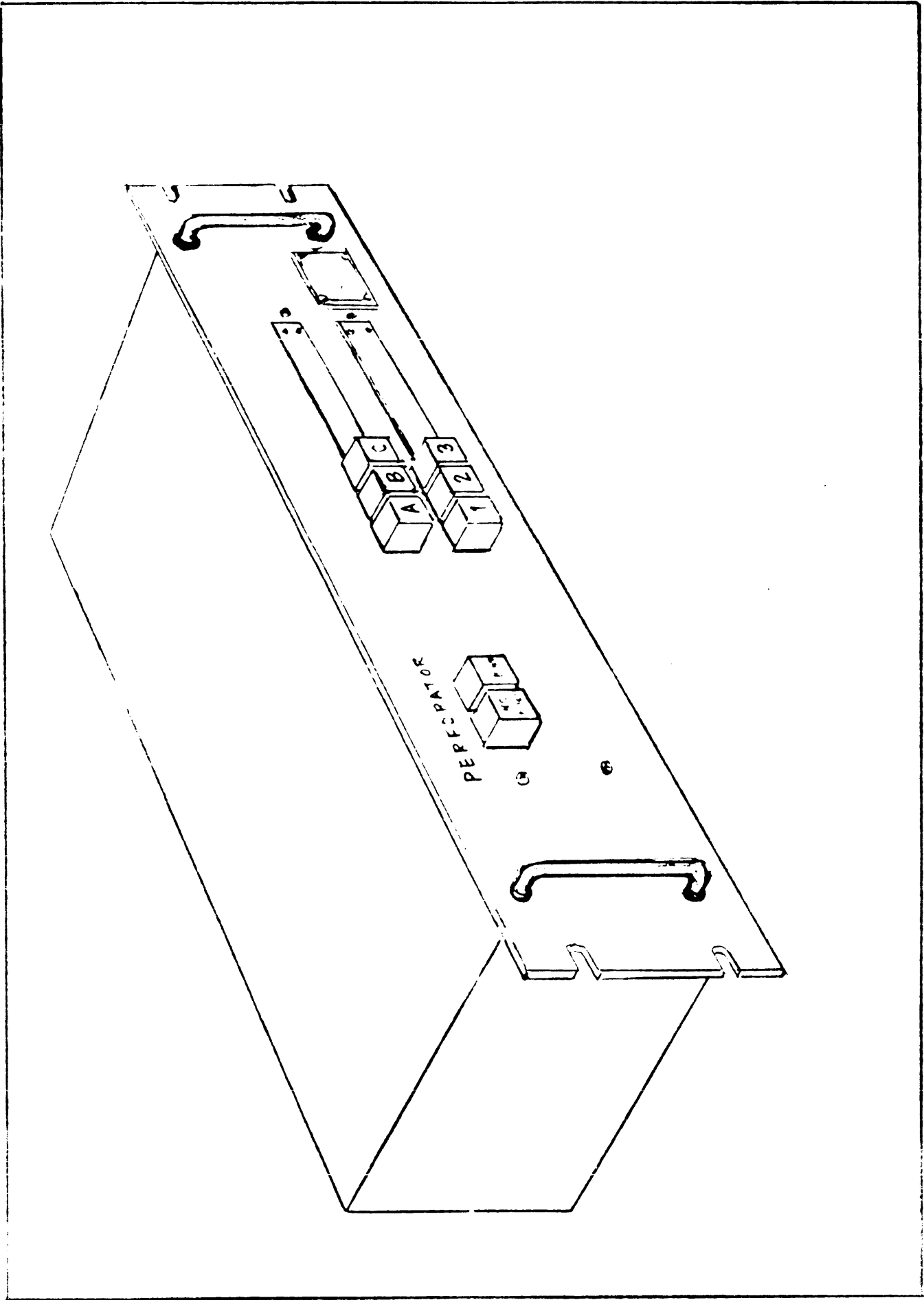


Figure 1-1. Receiver Selector, Model RTRS-209.

SECTION 1

GENERAL DESCRIPTION

1-1. FUNCTIONAL DESCRIPTION

Receiver Selector, Model RTRS-209 (figure 1-1) is a receiver selector unit providing manual selection for tuning any one of up to nine receivers in three remote receiver systems; each system comprising three receivers.

The RTRS routes, by means of front panel mounted pushbutton switches, a tuning code to an associated programming unit to tune or program the selected receiver.

1-2. PHYSICAL DESCRIPTION

The RTRS is equipped with a 19 inch wide front panel suitable for mounting into any standard width equipment rack or console.

The front panel measures 3-1/2 inches high, designed to be screw-fastened to a rack frame.

1-3. TECHNICAL SPECIFICATIONS

PHYSICAL DIMENSIONS:	19-inches wide x 3-1/2-inches high x 7-1/4-inches deep.
INPUT POWER REQUIREMENTS:	Receives all operating voltages from associated external programmer unit.
CODE BIT OUTPUTS:	EQUIPMENT SELECTOR push-buttons: A - Bits 1, 3, 5 B - Bits 1, 3, 4 C - Bits 1, 2, 4 1 - Bits 2, 4 2 - Bits 2, 5 3 - Bits 3, 5

SECTION 2 INSTALLATION

2-1. INITIAL INSPECTION.

Each RTRS has been thoroughly checked and tested at the factory before shipment. Upon arrival at the operating site, inspect the packing case and its contents immediately for possible damage. Unpack the equipment carefully. Inspect all packing material for parts which may have been shipped as loose items.

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.

2-2. MECHANICAL INSTALLATION.

The RTRS is equipped with a 19 inch wide front panel, designed for mounting into any standard width equipment rack or console. The panel, supporting a 7-1/4 inches deep chassis, is to be screw-fastened to the rack frame.

2-3. ELECTRICAL INSTALLATION.

Electrical installation of the RTRS requires connection of TB6000 and TB6001 to an external programmer unit. This is accomplished by the supplied interconnect cable shown in figure 2-1. The RTRS receives all operating voltages from the associated programmer unit. See figure 2-2 for a typical installation diagram.

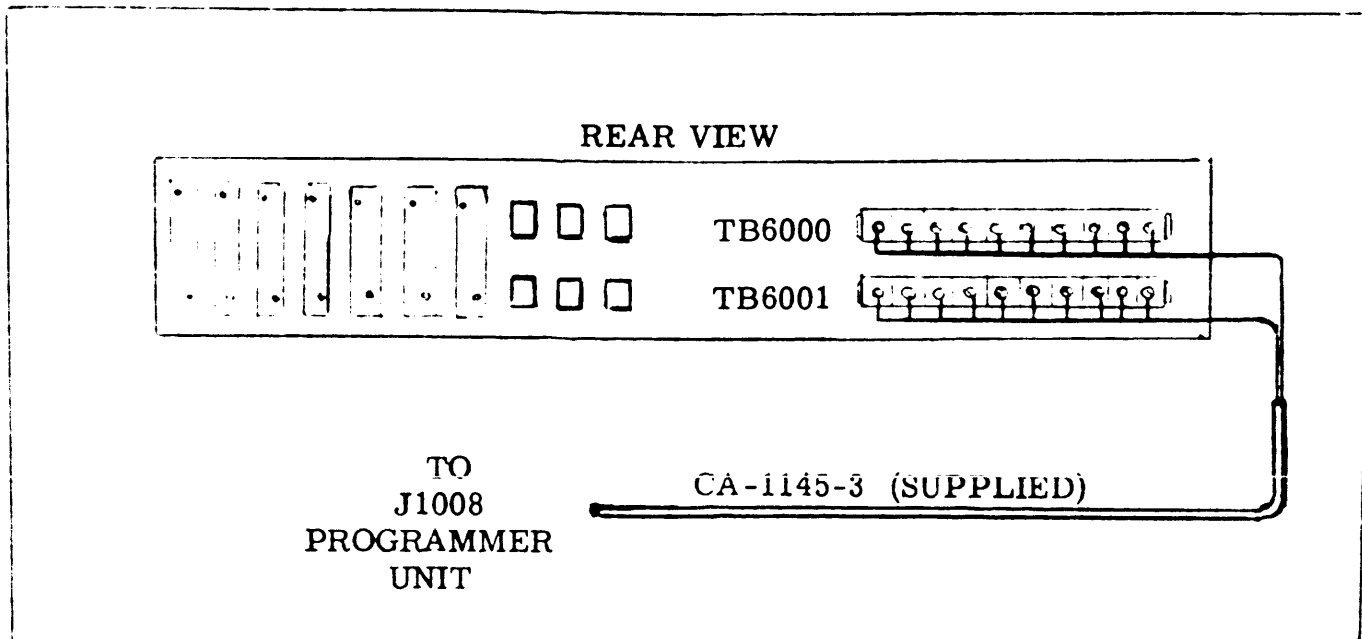


Figure 2-1. Electrical Interconnection Diagram

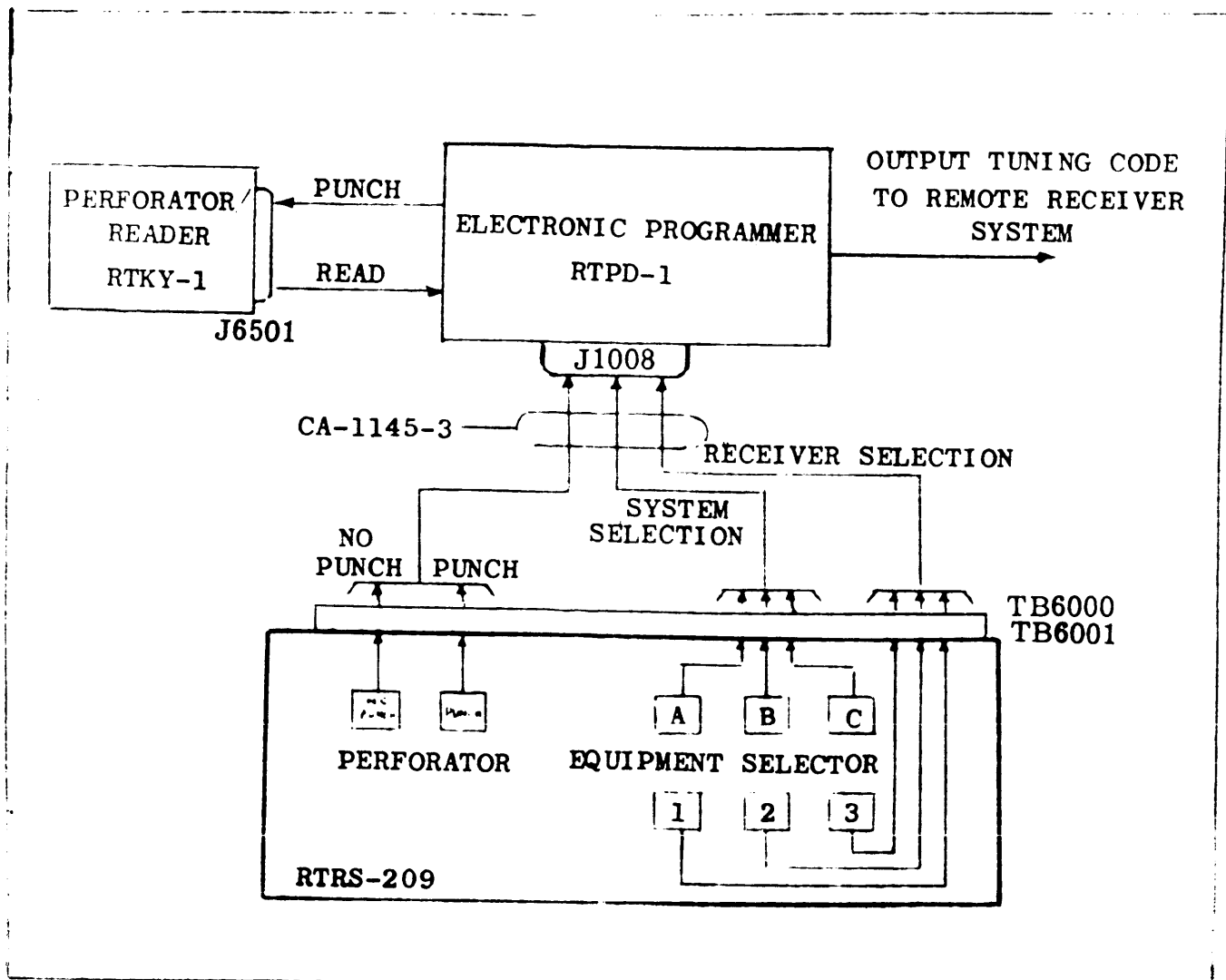


Figure 2-2. Typical Installation Diagram

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL

The RTRS is designed to route a tuning code to the input of a programming unit (such as TMC model RTPD-1). The tuning code indicates to the programming unit, which one of the three receivers in any one of the three remote receiver systems is to be tuned or programmed. This tuning code is initiated by pressing the particular receiver 1, 2 or 3 pushbutton and the particular receiver system A, B or C pushbutton.

The NO PUNCH pushbutton is used to deactivate the associated tape punch unit, permitting the selected receiver to be tuned without punching a tape.

When a punched tape of the tuning program is desired, press the PUNCH pushbutton. The PUNCH pushbutton mechanically releases the NO PUNCH pushbutton when pressed. Both pushbuttons light when pressed.

3-2. OPERATOR'S INSTRUCTIONS

The RTRS front panel displays six equipment selector pushbuttons, one for each of three receivers in a single receiver system (1, 2, 3).

The three lettered pushbuttons in the top row are used to select any one of up to three remote receiver systems A, B or C. When the desired remote receiver system to be tuned

is selected, by pushing the appropriate lettered pushbutton, the programmed or tuning information will be routed to that selected receiver system. The next step is to select which receiver in the selected receiver system is to be tuned or programmed. This is accomplished by pushing the appropriate numbered pushbutton, 1, 2 or 3. Therefore, if pushbuttons A and 1 are pushed, a tuning code is routed to the associated programmer unit indicating that all tuning or programming will be routed or directed to receiver 1 in remote receiver system A.

The two PERFORATOR pushbuttons PUNCH and NO PUNCH are used to determine if a perforated tape of the tuning instructions is to be produced. The NO PUNCH pushbutton is used when the operator desires to disengage the external tape punch unit. This feature enables the operator to program a selected receiver, at the programming unit, without punching a tape. Therefore, the NO PUNCH pushbutton is pushed when a receiver is to be programmed and a punched tape is not desired.

When a punched tape is desired, the PUNCH pushbutton is pushed, mechanically resetting the NO PUNCH pushbutton allowing the start process to be routed to the tape punch unit.

3-3. OPERATOR'S MAINTENANCE

The operator may, at certain times, be required to perform various aspects of operator's maintenance. This type of maintenance may consist of simply keeping the unit clean and observing for secure interconnections.

However, should normal operating procedures produce unsatisfactory results, a check of the interconnections and associated equipment levels to the RTRS may clear the fault.

When a pushbutton indicator lamp is known to be defective, the operator is to replace the defective lamp by pulling the appropriate pushbutton straight out, exposing the lamp and its socket. Refer to section 6 parts list for proper replacement lamp part number and type. See figure 3-1.

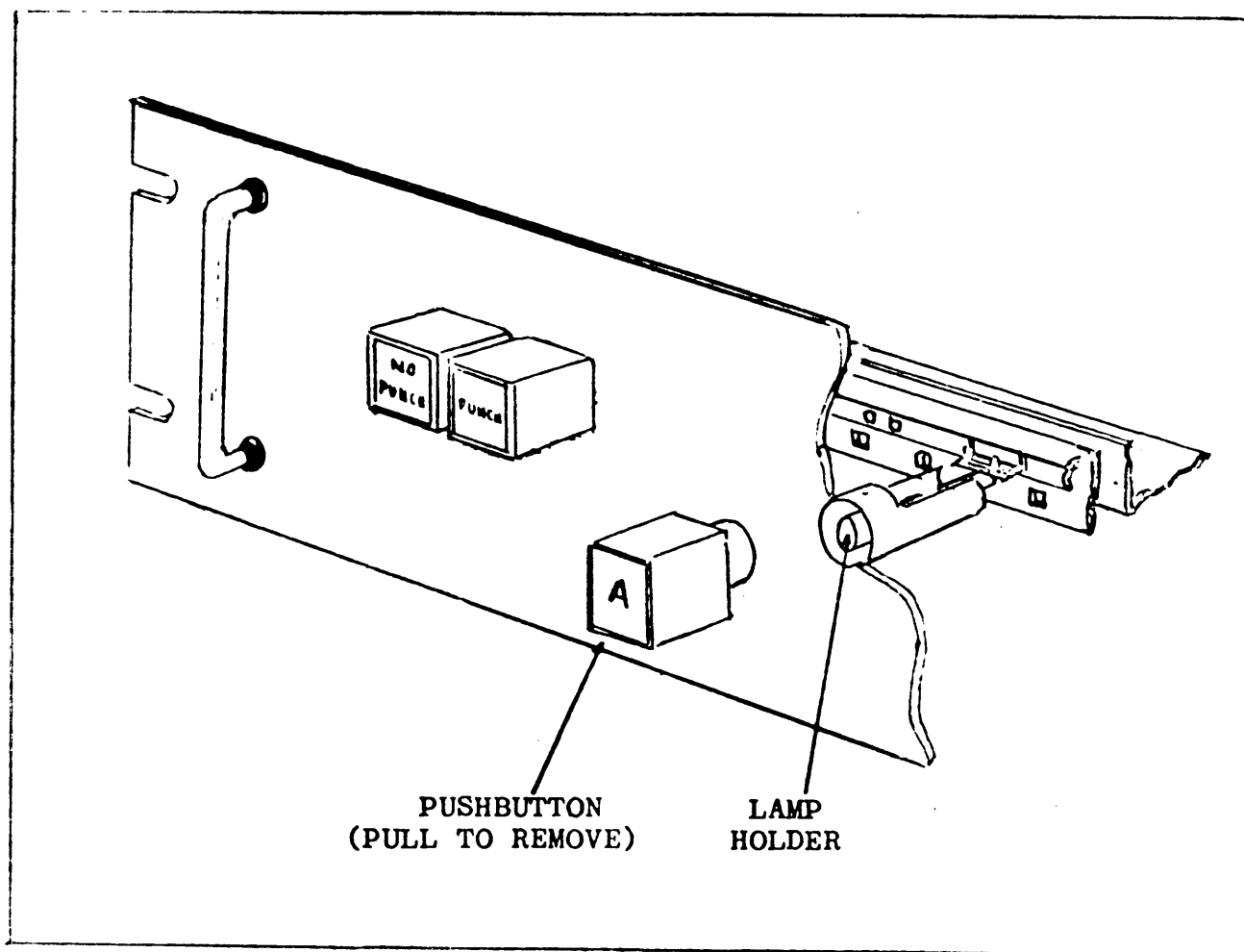


Figure 3-1. Pushbutton Lamp Replacement

Tabl 3-1. Op rating Controls

SERIAL DESIGNATION (Figure 3-2)	PANEL DESIGNATION	FUNCTION
1)	NO PUNCH	When pressed, permits tuning or programming the selected receiver without punching a tape; disconnects external tape punch unit from circuit. Pushbutton lights when pressed.
2)	PUNCH	When pressed, permits a tape to be punched while tuning or programming the selected receiver. Pushbutton lights when pressed.
3)	A	When pressed, permits the tuning process to be routed to receiver system A. Pushbutton lights when pressed.
4)	B	When pressed, permits the tuning process to be routed to receiver system B. Pushbutton lights when pressed.
5)	C	When pressed, permits the tuning process to be routed to receiver system C. Pushbutton lights when pressed.
6)	1	When pressed, permits the tuning process to be routed to receiver 1. Pushbutton lights when pressed.
7)	2	When pressed, permits the tuning process to be routed to receiver 2. Pushbutton lights when pressed.
8)	3	When pressed, permits the tuning process to be routed to receiver 3. Pushbutton lights when pressed.

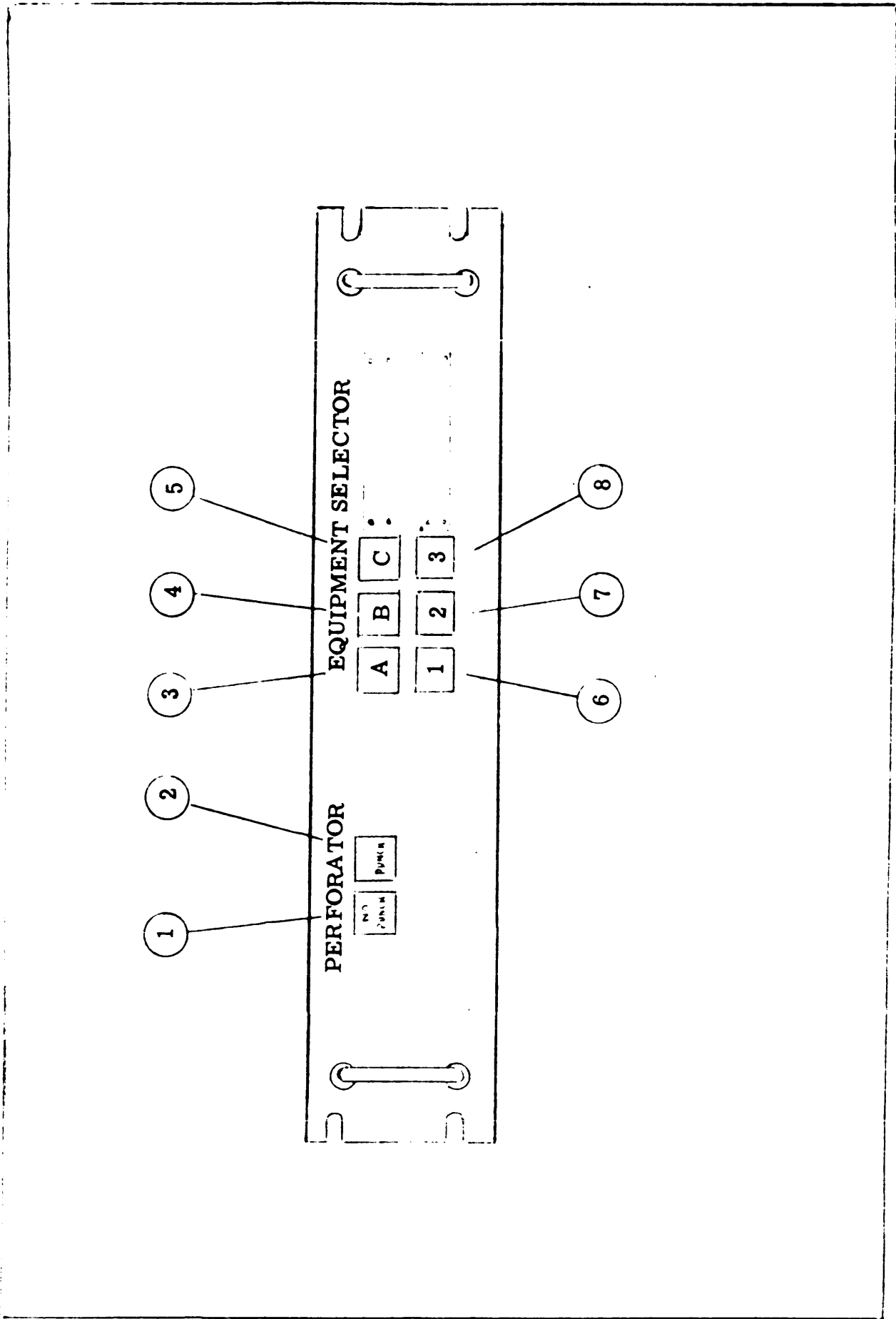


Figure 3-2. Front Panel Controls

SECTION 4

PRINCIPLES OF OPERATION

4-1. INTRODUCTION.

The tuning start process from the external programmer is routed to the external tape punch unit through the contacts of a relay, controlled by the NO PUNCH and PUNCH pushbuttons. When the NO PUNCH pushbutton is pressed, the tuning start process is removed from the tape punch unit, permitting manual tuning without punching a tape. Pressing the PUNCH pushbutton, resets the relay, allowing the start process to be routed directly to the tape punch unit. Both NO PUNCH and PUNCH pushbuttons light when pressed, indicating activation.

Pressing either one of the three receiver selector pushbuttons (1, 2 or 3) and one of the three receiver system selector pushbuttons (A, B or C) will route a code back to the input circuit of the programmer unit, indicating the particular receiver system to be tuned.

4-2. CIRCUIT DESCRIPTION

The tuning start process signal, from connector J1007 of the programmer unit, is routed to the tape punch unit through the contacts of a relay, activated by the NO PUNCH pushbutton. Pressing the NO PUNCH pushbutton energizes the relay solenoid, opening the contacts in series with the tuning start process signal to the tape punch unit. This action causes the tape punch unit to be deactivated, indicated by the NO PUNCH pushbut-

pushbutton lamp being lit.

Pressing the PUNCH pushbutton mechanically resets the NO PUNCH pushbutton, thereby deenergizing the relay and permitting the tuning start process signal to be routed to the tape punch unit. When the PUNCH pushbutton is pressed, it will light, indicating that the punch process is activated.

The lettered receiver system selector pushbuttons, when pressed, initiate a bit-code signal to the input of the external programmer unit. The initiated bit-code signal, prefixed by a bit #1 code, is used by the programmer unit to direct all tuning or programming to a particular receiver system.

The numbered receiver selector pushbuttons, when pressed, also initiate a bit-code signal to the programmer unit. The initiated bit-code directs all tuning or programming to a particular receiver in the selected receiver system.

All numbered and lettered selector pushbuttons light when pressed, to indicate selection activation. See figure 4-1 for a functional block diagram showing the particular code-bits in relation to the various pushbuttons.

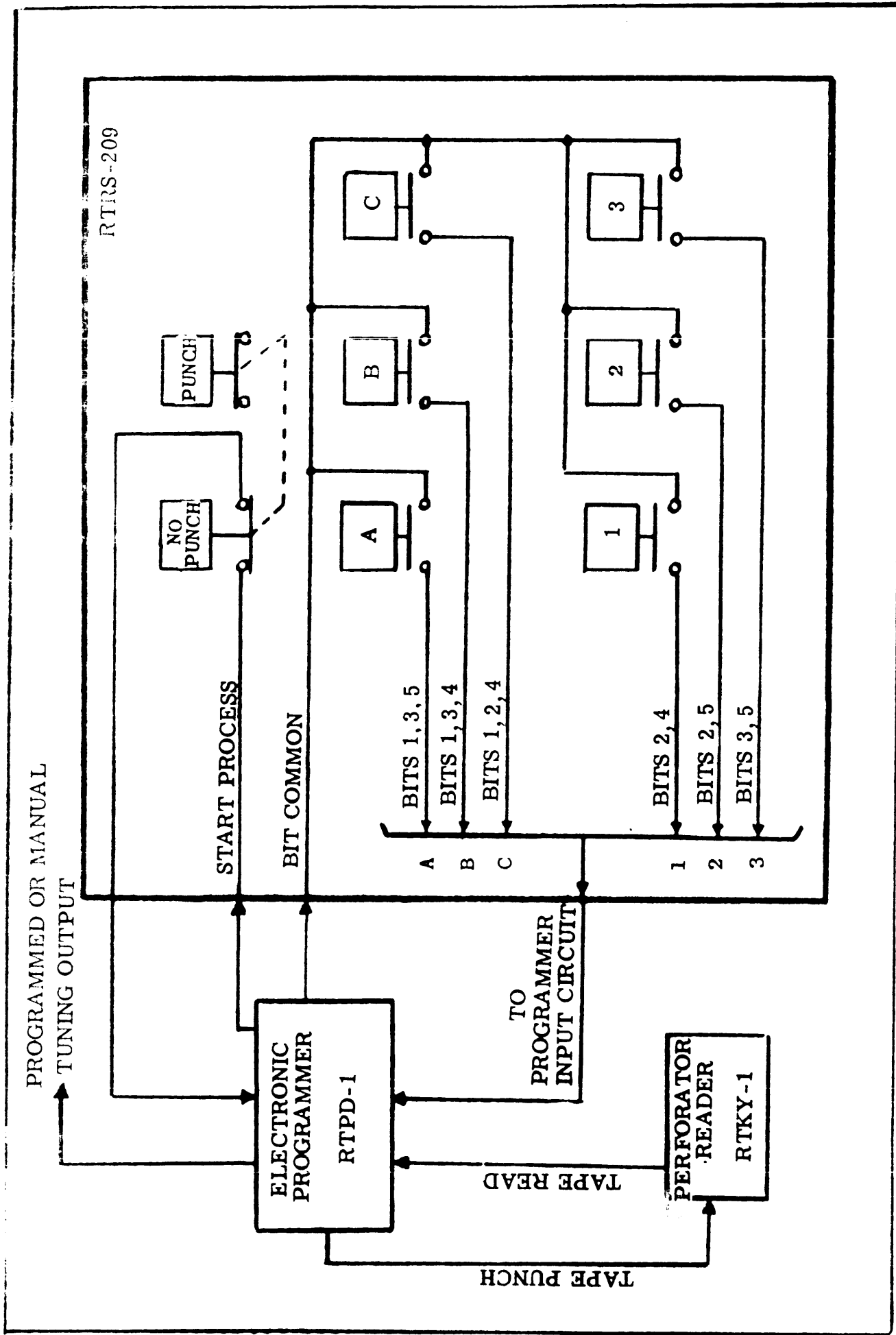


Figure 4-1. Functional Block Diagram

SECTION 5 MAINTENANCE

5-1. PREVENTIVE MAINTENANCE

In order to prevent equipment failure due to dust, dirt or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

At periodic intervals, the equipment should be removed from its mounting for cleaning and inspection. The wiring and all components should be inspected for dirt, dust, corrosion, grease or other harmful conditions. Remove dust with a soft brush or vacuum cleaner. Remove dirt or grease with any suitable cleaning solvent. Use of carbon tetrachloride should be avoided due to its highly toxic effects. Trichlorethylene or methyl chloroform may be used, providing the necessary precautions are observed.

WARNING

When using toxic solvents, make certain that adequate ventilation exists. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with skin. Flammable solvents shall not be used on energized equipment or near any equipment from which a spark may be received. Smoking, "hot work", etc. is prohibited in the immediate area.

CAUTION

When using trichlorethylene, avoid contact with painted surfaces, due to its paint removing effects.

5-2. TROUBLESHOOTING.

When a piece of equipment has been operating satisfactorily and suddenly fails, the cause of failure may be due to circumstances occurring at the time of failure or due to symptoms of past failures. Therefore, the first check is to ascertain that proper equipment voltages are present and that all interconnecting cables are secure and operational. If the unit is still at fault, the unit should be removed from its mounting and visually checked for signs of corrosion, dirt, dampness or other harmful conditions.

The troubleshooting procedures listed in tables 5-1 and 5-2 provide normal indications of all the control functions of the RTRS. When performing ohmmeter checks listed in table 5-2 the rear panel connections should be removed, ensuring removal of power.

If a particular equipment selector pushbutton does not perform its prescribed function, the cause may be due to a faulty relay. This fault may be checked by relay substitution. This is accomplished by removing the suspected relay and replacing it with a similar relay from the same pushbutton relay row.

If the fault cannot be located after a thorough check of the RTRS, check the input levels to the RTRS from all associated equipment. When troubleshooting, refer to schematic diagram, figure 7-1.

5-3. REPAIR AND REPLACEMENT

Maintenance of the RTRS will consist mainly of component replacement. It should be noted that when replacing components having many wires connected, such as switches, relays, etc., the wires should be tagged and marked for accurate identification when replacing. When replacing components, refer to the parts list in section 6 for exact or equivalent replacements. Use of the schematic diagram in section 7 is advisable when replacing or disconnecting components.

When a replacement part of the switch deck assembly SW411 is ordered, the customer must clearly identify the particular part to be replaced. This is accomplished by specifying the unit model number, the appropriate row position, section and switch position. See figure 5-1 for descriptive parts locations.

TABLE 5-1. TROUBLESHOOTING PROCEDURES

CONTROL FUNCTION	NORMAL INDICATION	PROBABLE CAUSE OF MALFUNCTION
NO PUNCH pushbutton pressed	NO PUNCH pushbutton should lock and light. External tape punch should not operate.	<p>If NO PUNCH pushbutton does not lock, check condition of locking mechanism and PUNCH mechanism. If the pushbutton lamp does not light, check condition of lamp. Check condition of relay solenoid and associated contacts. Check for 26 volts a-c input.</p> <p>If tape punch unit operates, check condition of NO PUNCH pushbutton contacts. Check for 12 volts d-c at switch contacts.</p>
PUNCH pushbutton pressed	PUNCH pushbutton should lock and light. NO PUNCH pushbutton should release. Tape punch unit should operate.	<p>If PUNCH pushbutton does not lock, check condition of locking mechanism and NO PUNCH pushbutton mechanism. If the pushbutton lamp does not light, check condition of lamp. Check condition of relay solenoid and associated contacts. Check for 26 volts a-c input.</p> <p>Check for proper input and output wiring connections.</p>

Table 5-2. Pushbutton Switch Ohmmeter Checks.

ACTION	FROM	TO	INDICATION
NO PUNCH pushbutton pressed.	TB6001-1	TB6001-6	Continuity
EQUIPMENT SELECTOR pushbutton A pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-2	Continuity
	TB6001-6	TB6000-4	Continuity
	TB6001-6	TB6000-6	Continuity
	TB6000-8	TB6000-1	Continuity
EQUIPMENT SELECTOR pushbutton B pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-2	Continuity
	TB6001-6	TB6000-4	Continuity
	TB6001-6	TB6000-5	Continuity
	TB6000-8	TB6000-1	Continuity
EQUIPMENT SELECTOR pushbutton C pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-2	Continuity
	TB6001-6	TB6000-3	Continuity
	TB6001-6	TB6000-5	Continuity
	TB6000-8	TB6000-1	Continuity
EQUIPMENT SELECTOR pushbutton 1 pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-3	Continuity
	TB6001-6	TB6000-5	Continuity
EQUIPMENT SELECTOR pushbutton 2 pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-3	Continuity
	TB6001-6	TB6000-6	Continuity
EQUIPMENT SELECTOR pushbutton 3 pressed.	TB6000-9	TB6000-10	Continuity
	TB6001-6	TB6000-4	Continuity
	TB6001-6	TB6000-5	Continuity

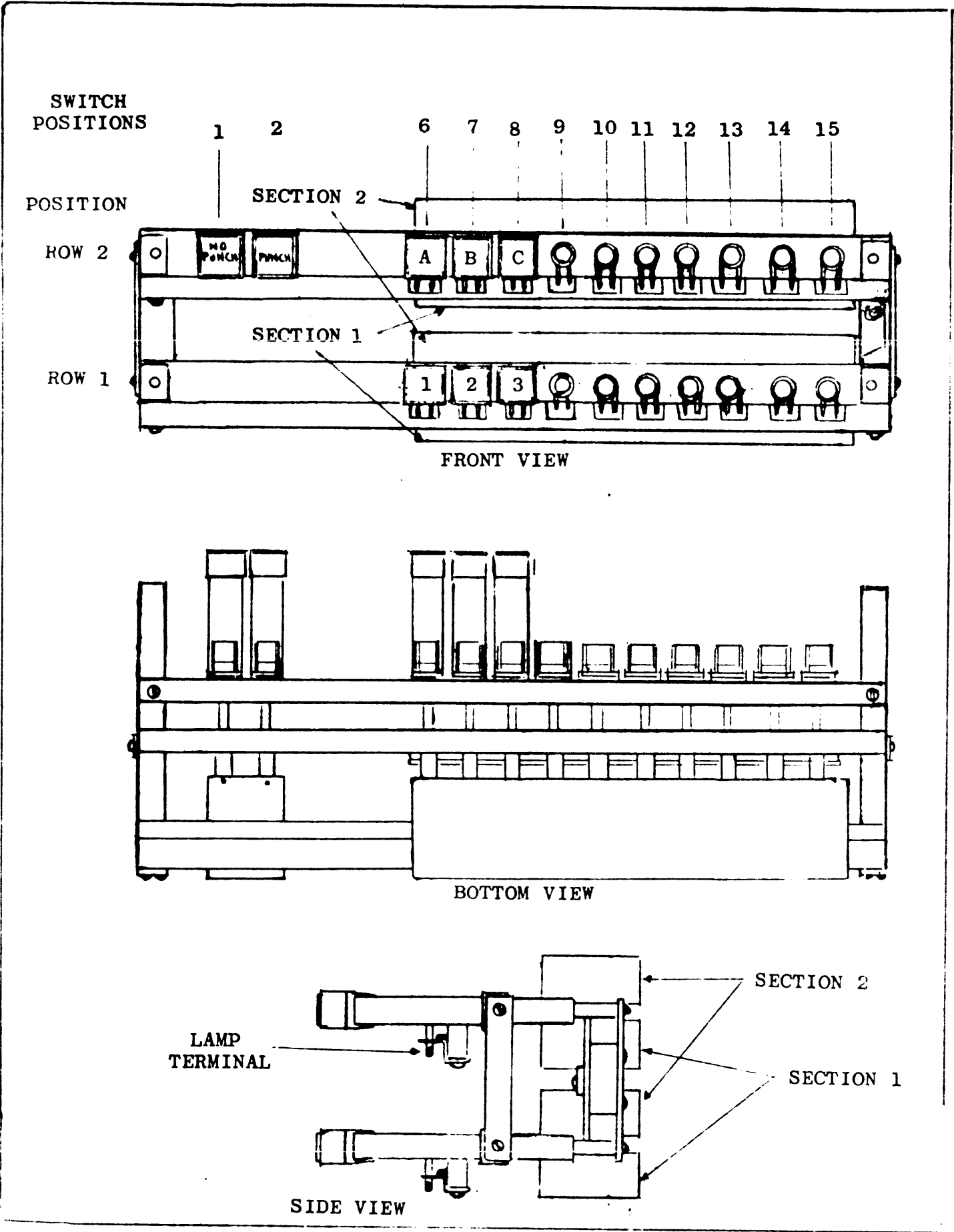


Figure 5-1. Switch Deck Assembly, SW411-3.

SECTION 6 PARTS LIST

6-1. INTRODUCTION.

The parts list presented in this section is a cross-reference list of parts identified by 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. Generic name.
- b. Reference designation.
- 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 the 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
DS6000	LAMP, INCANDESCENT: 28 volts ac/dc; .04 amps; single contact, T-1-3/4.	BI110-7
DS6001 thru DS6007	Same as DS6000.	
K6000	RELAY, ARMATURE: DPDT; 5,000 ohms, $\pm 10\%$ dc resistance; operating voltage 20.5 vdc; current rating 4.1 ma; 85 mu at 25°C; 8 contacts rated for 1 amp at 29 vdc res.; clear high impact styrene dust cover case.	RL156-4
K6001 thru K6005	Same as K6000.	
S6000	SWITCH, PUSHBUTTON: double row, 6 sections; contact rating 3 amps 110 vac, 1 amp 28 vdc non-inductive.	SW411-3
TB6000	TERMINAL BOARD, BARRIER: ten 6-32 x 1/4" binding head machine screws; phenolic body.	TM100-10
TB6001	Same as TB6000.	
XK6000	SOCKET, RELAY: with retainer; 6 male type contacts.	TS171-1
XK6001 thru XK6005	Same as XK6000.	

SECTION 7
SCHEMATIC DIAGRAMS

NOTE:
 SCHEMATIC IS REPRESENTATIVE
 OF MAX. EQUIPMENT SELECTION.
 FOR EXAMPLE: AN RTSRS-216
 WOULD USE ONLY A-1, B-2, C-3 &
 D-4. ONE ALPHABETICAL AND
 ONE NUMERICAL CHARACTER
 MAKE A SET TO INCREASE THE
 EQUIPMENT SELECTION
 CAPABILITY OF THE UNIT.

UNLESS OTHERWISE SPECIFIED
 1- ALL CAPACITOR VALUES ARE IN μf .
 2- ALL RESISTOR VALUES ARE IN
 OHMS, 1/2 W.

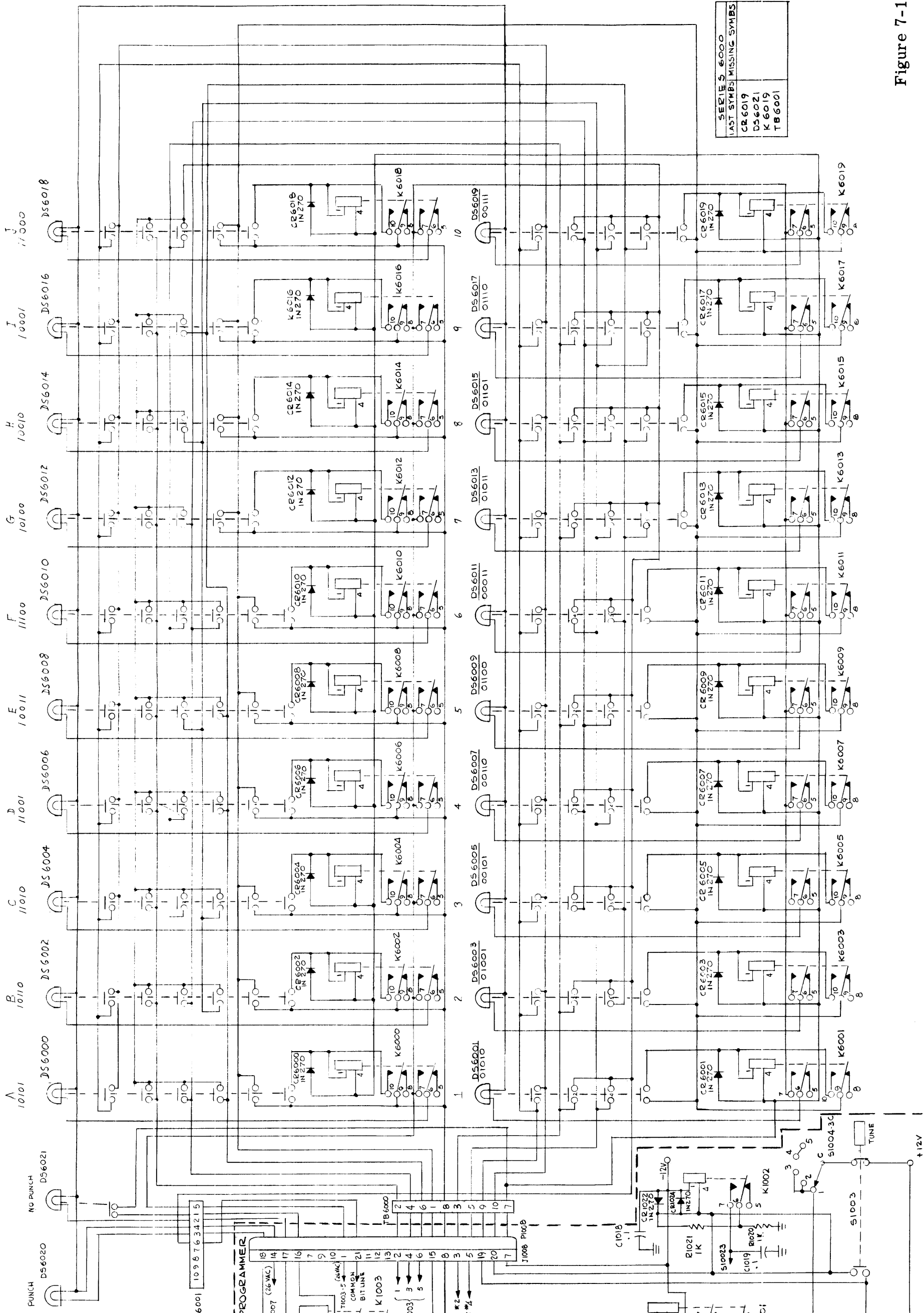
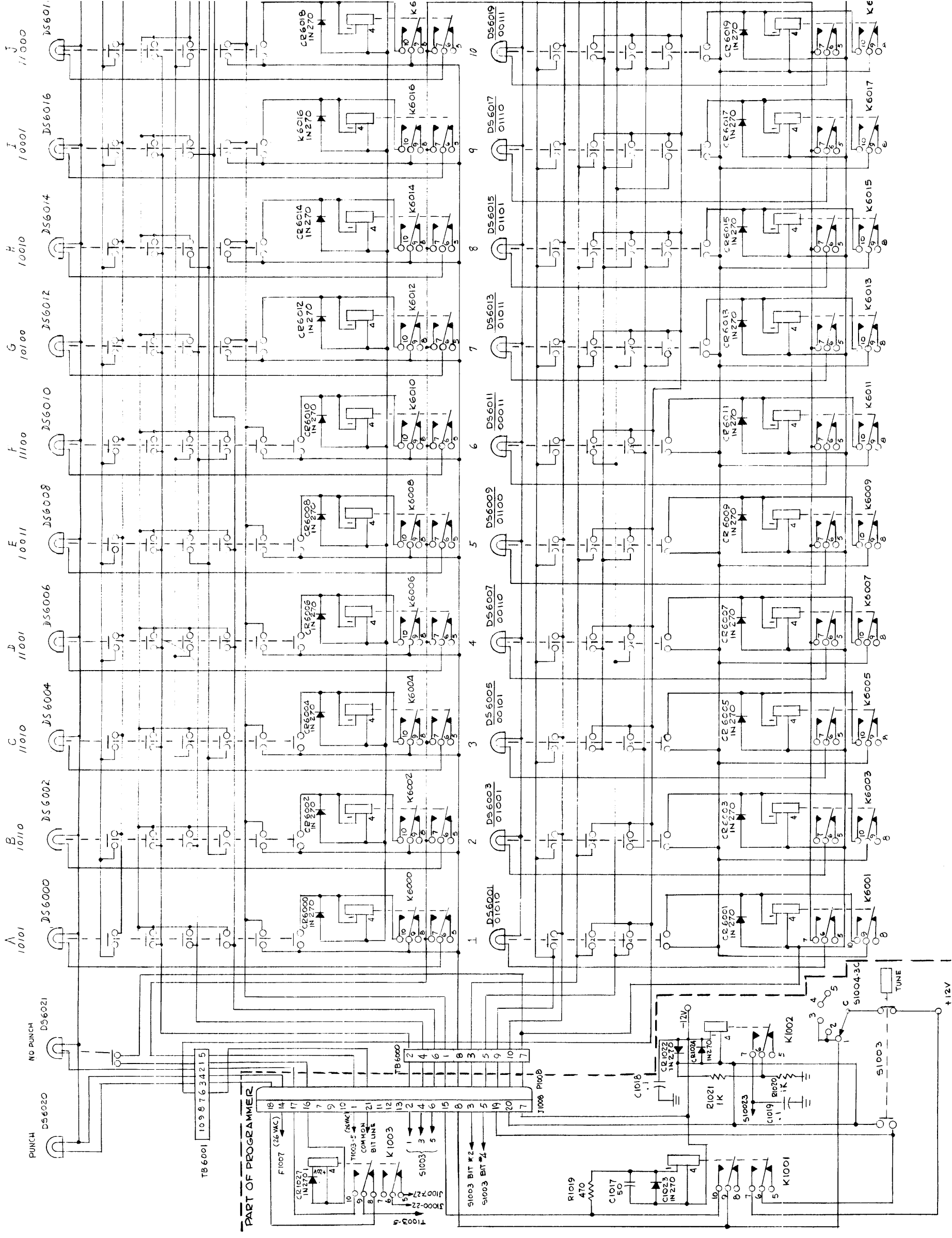


Figure 7-1. Schematic Diagram,



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