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TECHNICAL MANUAL  
for  
RECEIVER SELECTOR  
MODEL RTRS-216



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

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## NOTICE

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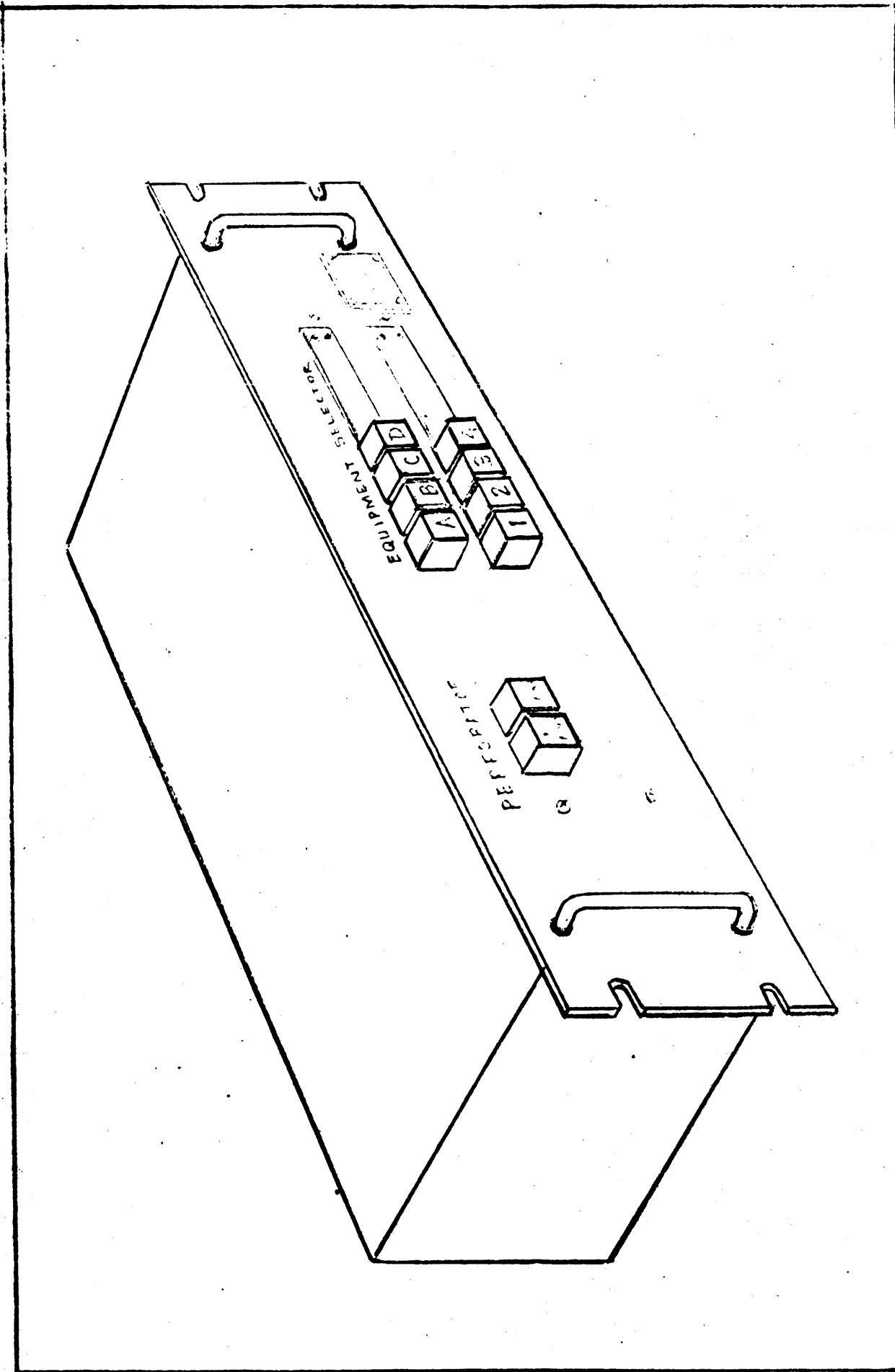


Figure 1-1. Receiver Selector, Model RTRS-216

## SECTION 1 GENERAL DESCRIPTION

### 1-1. FUNCTIONAL DESCRIPTION

Receiver Selector, Model RTRS-216 (figure 1-1) is a receiver selector unit providing manual selection for tuning any one of up to 16 receivers in four remote receiver systems; each system comprising four 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 pushbuttons:
	A - Bits 1, 3, 5
	B - Bits 1, 3, 4
	C - Bits 1, 2, 4
	D - Bits 1, 2, 5
	1 - Bits 2, 4
	2 - Bits 2, 5
	3 - Bits 3, 5
	4 - Bits 3, 4

## **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.



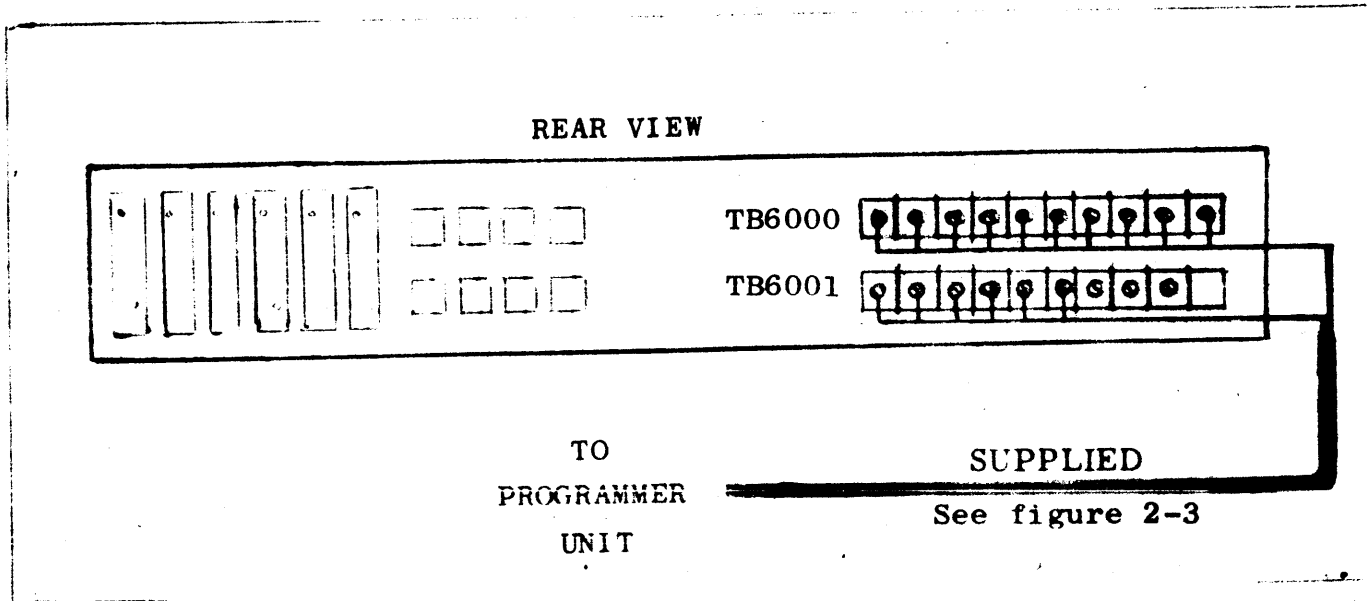


Figure 2-1. Electrical Interconnection Diagram.

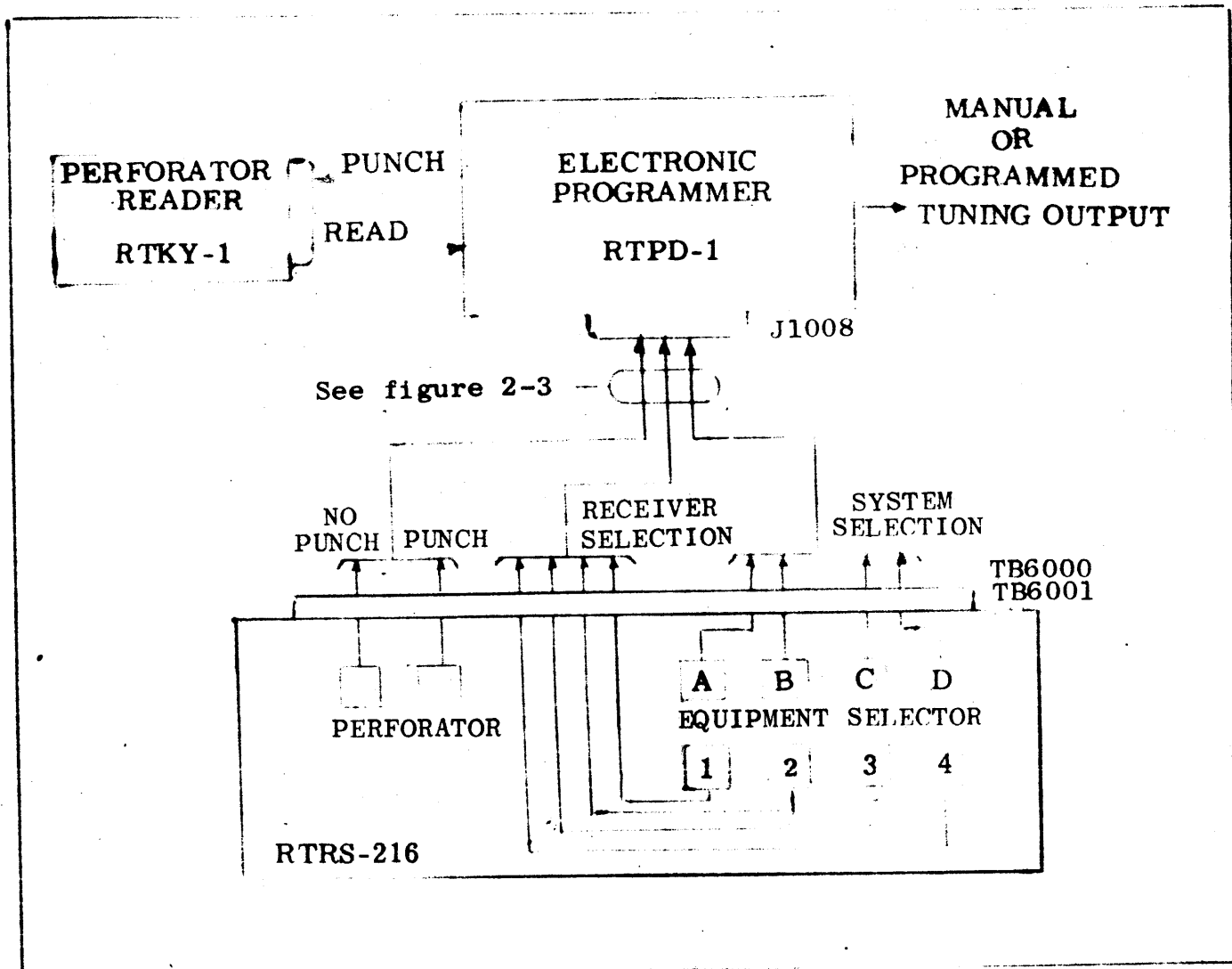


Figure 2-2. Typical Installation Diagram.

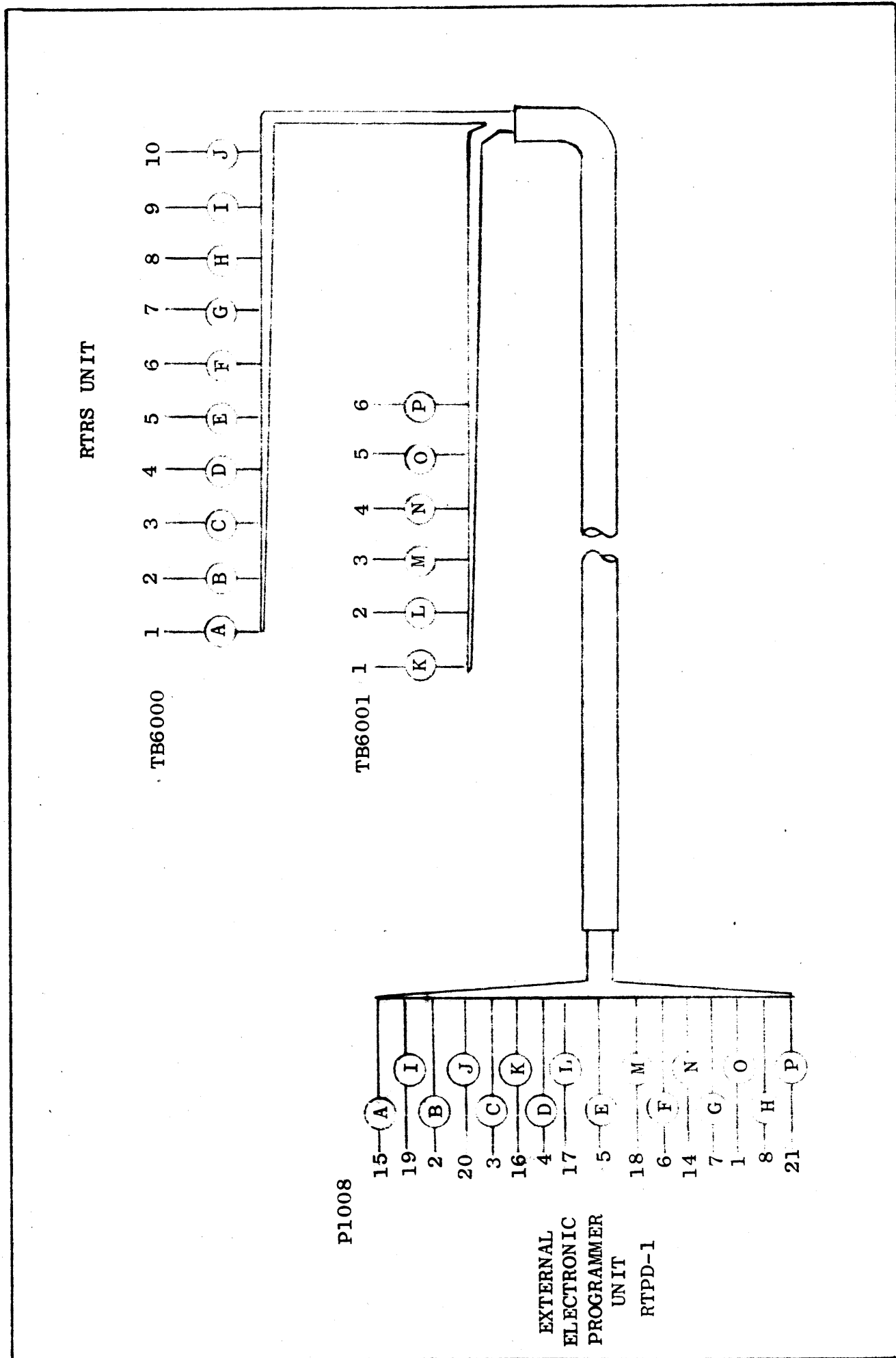


Figure 2-3. Interconnect Cable Wiring.

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, 3, or 4. 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.

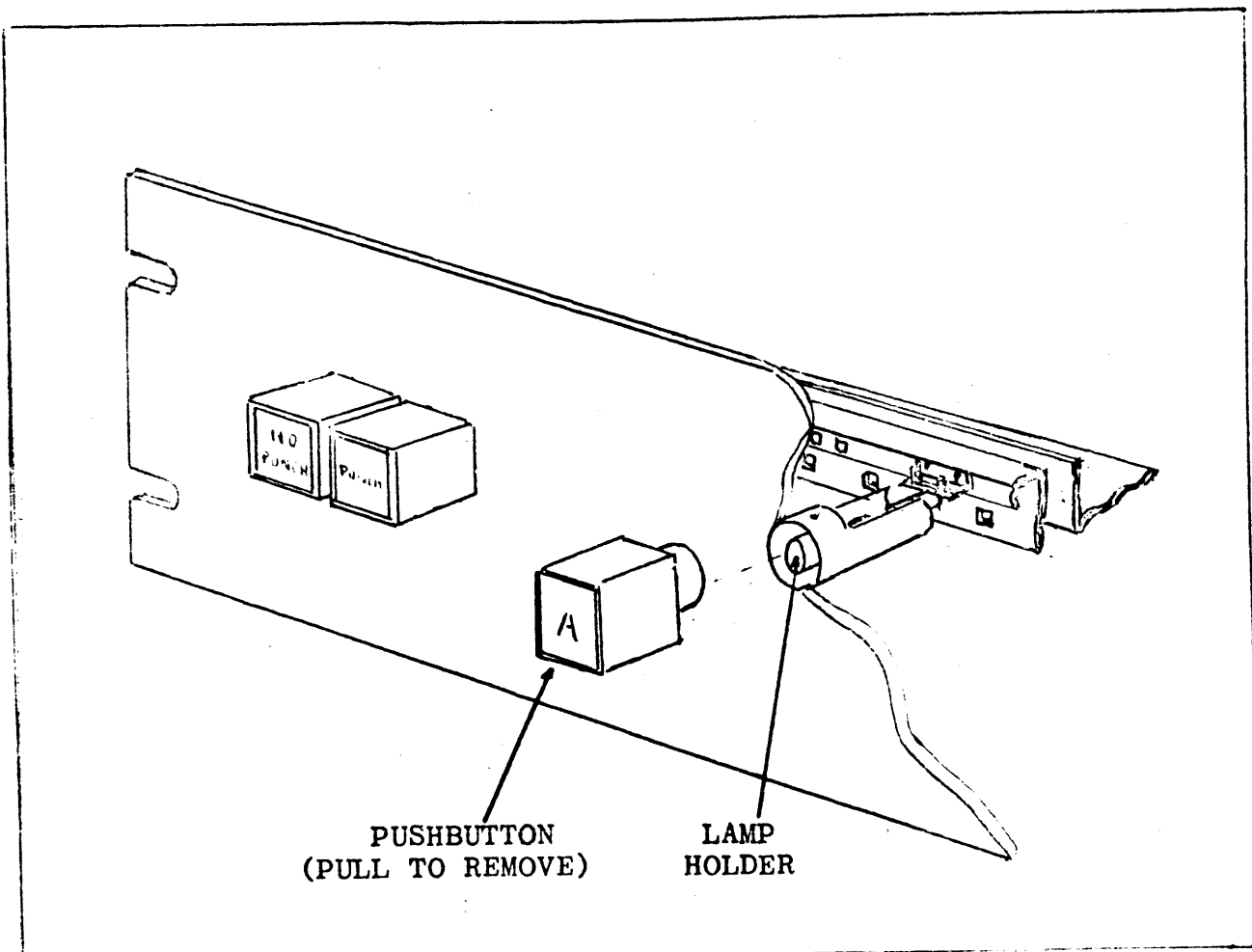


Figure 3-1. Pushbutton Lamp Replacement.

Table 3-1. Operating 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	D	When pressed, permits the tuning process to be routed to receiver system D. Pushbutton lights when pressed.
⑦	1	When pressed, permits the tuning process to be routed to receiver 1. Pushbutton lights when pressed.
⑧	2	When pressed, permits the tuning process to be routed to receiver 2. Pushbutton lights when pressed.
⑨	3	When pressed, permits the tuning process to be routed to receiver 3. Pushbutton lights when pressed.
⑩	4	When pressed, permits the tuning process to be routed to receiver 4. Pushbutton lights when pressed.

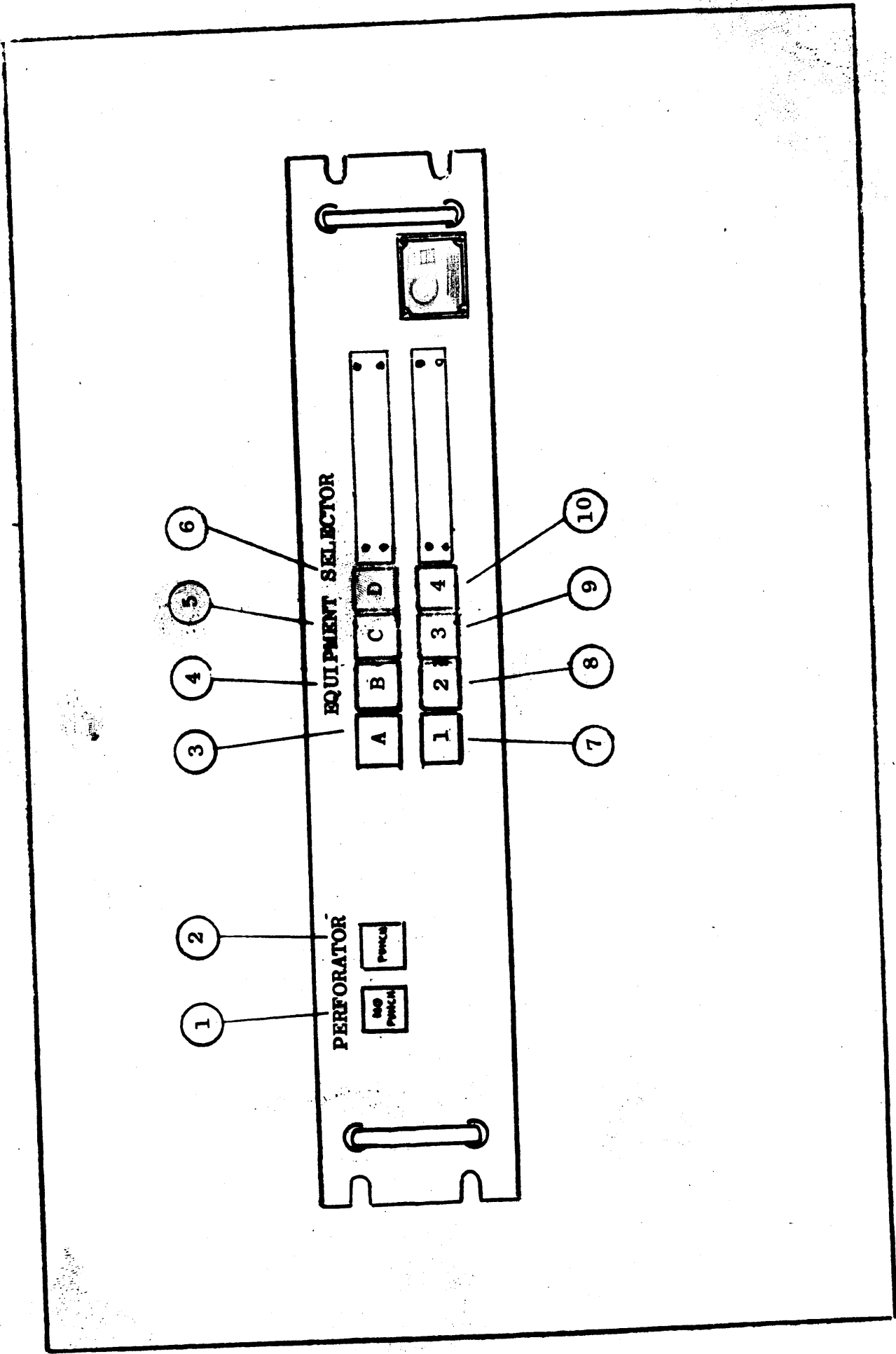


Figure 3-2. Front Pan 1 Controls

## 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 four receiver selector pushbuttons (1, 2, 3 or 4) and one of the four receiver system selector pushbuttons (A, B, C or D) 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 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.



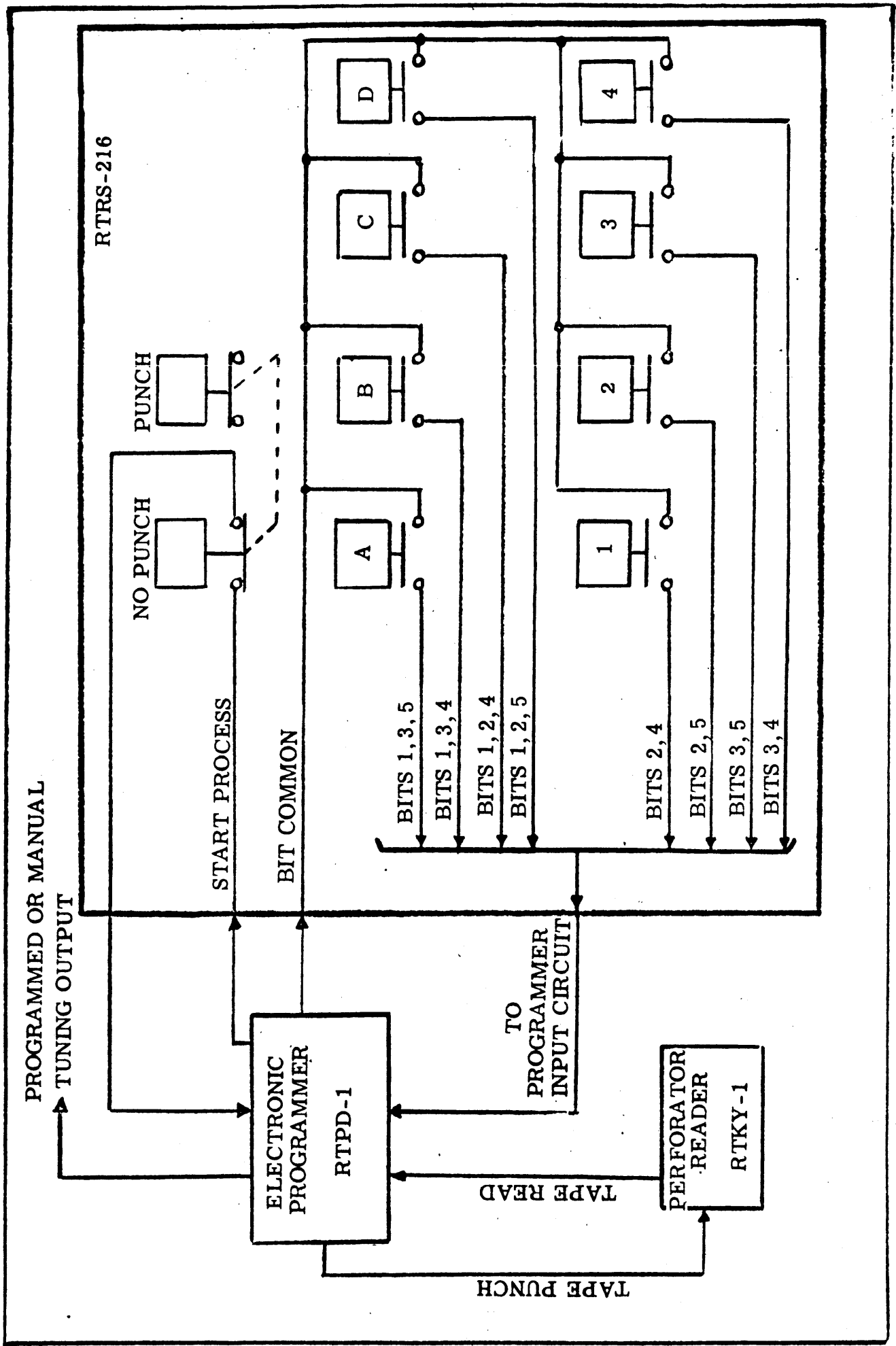


Figure 4-1. Functional Block Diagram

## **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

The following troubleshooting aids are provided.

- a. Functional block diagram (Figure 4-1.)
- b. Schematic diagram (Figure 7-1.)
- c. Pushbutton deck assembly diagram (Figure 5-1.)

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 wires are secure.

If the above mentioned checks fail to locate the fault, the unit should be removed from the cabinet and visually checked for corrosion, dirt, dampness or any other harmful conditions.

The troubleshooting procedures listed in table 5-1 provide normal indications of all the control functions of the RTRS. If a normal indication is not observed, perform the procedures listed in the third column. 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 the schematic diagram, figure 7-1.

If a particular receiver 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 by a similar relay from the same relay pushbutton row.

### 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
<p>NO PUNCH pushbutton pressed</p>	<p>NO PUNCH pushbutton should lock and light. External tape punch should not operate.</p>	<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. If tape punch unit operates, check condition of NO PUNCH pushbutton contacts. Check for 12 volts d-c at switch contacts.</p>
<p>PUNCH pushbutton pressed</p>	<p>PUNCH pushbutton should lock and light. NO PUNCH pushbutton should release. Tape punch unit should operate.</p>	<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. 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 TB6001-6 TB6001-6 TB6001-6 TB6000-8	TB6000-10 TB6000-2 TB6000-4 TB6000-6 TB5000-1	Continuity Continuity Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton B pressed.	TB6000-9 TB6001-6 TB6001-6 TB6001-6 TB6000-8	TB6000-10 TB6000-2 TB6000-4 TB6000-5 TB6000-1	Continuity Continuity Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton C pressed.	TB6000-9 TB6001-6 TB6001-6 TB6001-6 TB6000-8	TB6000-10 TB6000-2 TB6000-3 TB6000-5 TB6000-1	Continuity Continuity Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton D pressed.	TB6000-9 TB6001-6 TB6001-6 TB6001-6 TB6000-8	TB6000-10 TB6000-2 TB6000-3 TB6000-6 TB6000-1	Continuity Continuity Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton 1 pressed.	TB6000-9 TB6001-6 TB6001-6	TB6000-10 TB6000-3 TB6000-5	Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton 2 pressed.	TB6000-9 TB6001-6 TB6001-6	TB6000-10 TB6000-3 TB6000-6	Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton 3 pressed.	TB6000-9 TB6001-6 TB6001-6	TB6000-10 TB6000-4 TB6000-6	Continuity Continuity Continuity
EQUIPMENT SELECTOR pushbutton 4 pressed.	TB6000-9 TB6001-6 TB6001-6	TB6000-10 TB6000-4 TB6000-5	Continuity Continuity Continuity

SWITCH  
POSITIONS

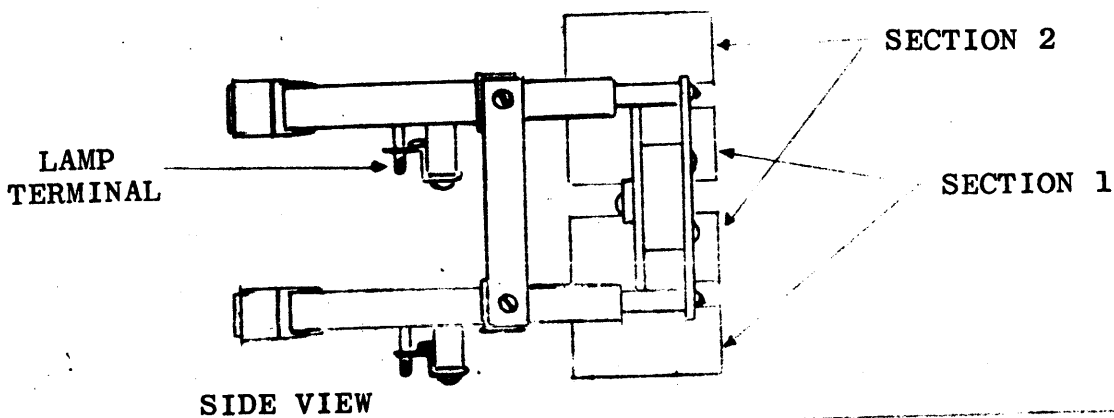
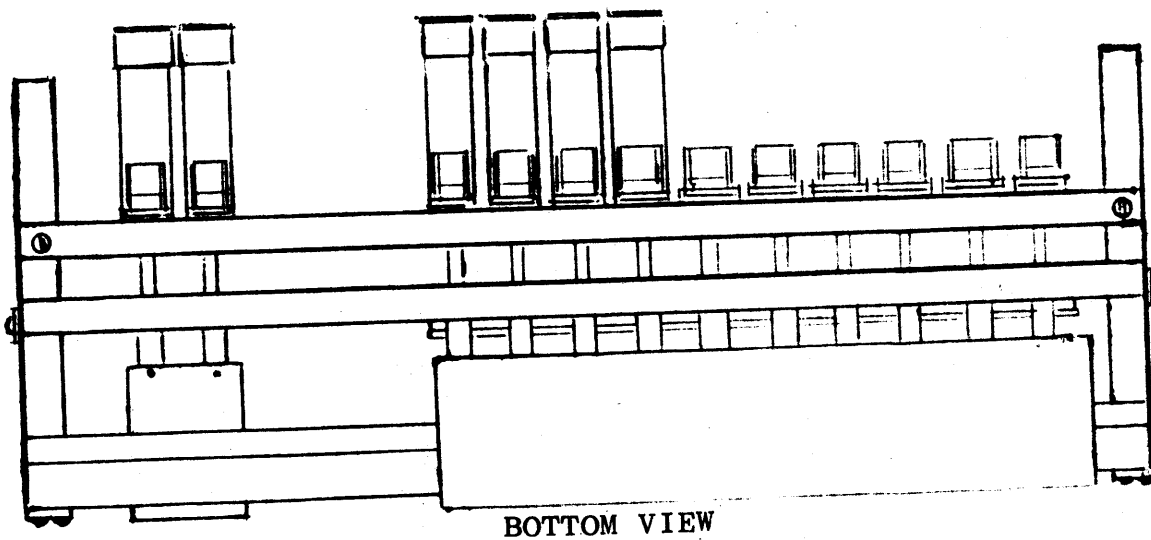
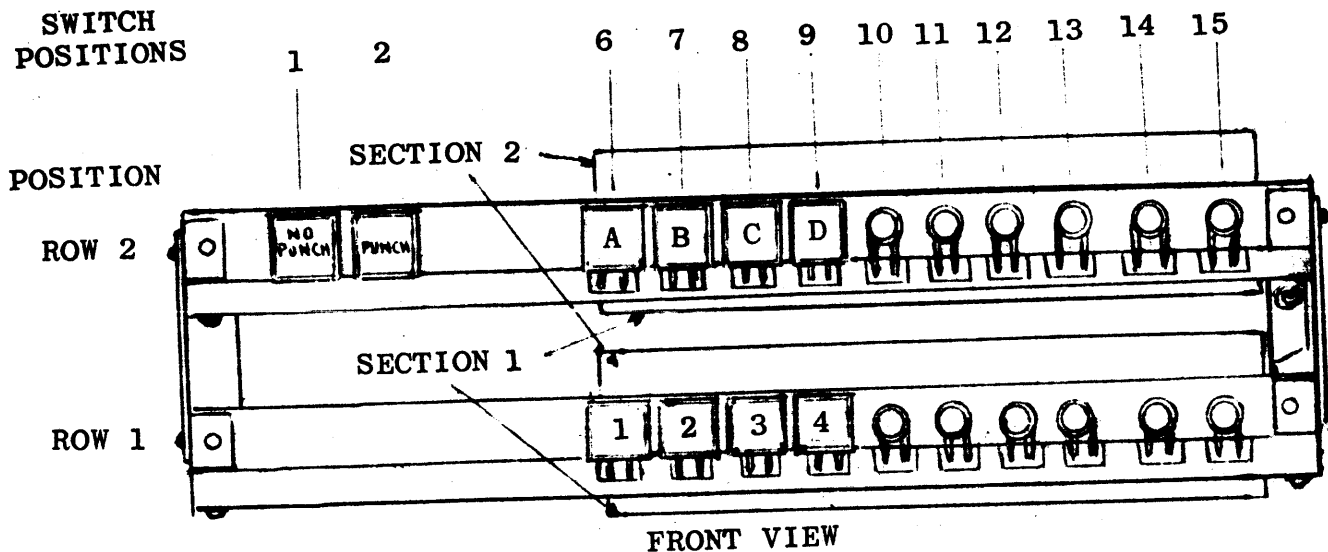


Figure 5-1. Switch Deck Ass mbly, SW411-4.

## **SECTION 6 PARTS LIST**

### **7-1. INTRODUCTION**

Reference designations have been assigned to identify all electrical parts of the equipment. These designations are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group. Sockets associated with a particular plug-in device, such as transistor or fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for crystal Y501 is designated XY501. To expedite delivery, when ordering replacement parts, specify the TMC part number and the model number of the equipment.



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 DS6009	Same as DS6000.	
K6000	RELAY, ARMATURE: DPDT; 5,000 ohms, +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.	RL156-7
K6001 thru K6007	Same as K6000.	
S6000	SWITCH, PUSHBUTTON: double row, 8 sections; contact rating 3 amps 110 vac, 1 amp 28 vdc non-inductive.	SW411-4
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 XK6007	Same as XK6000.	

**SECTION 7**  
**SCHEMATIC DIAGRAMS**

NOTE:  
 SCHEMATIC IS REPRESENTATIVE  
 OF MAX. EQUIPMENT SELECTION.  
 FOR EXAMPLE: AN RTSR5-216  
 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  $\mu$ f.  
 2- ALL RESISTOR VALUES ARE IN  
 OHMS, 1/2 W.

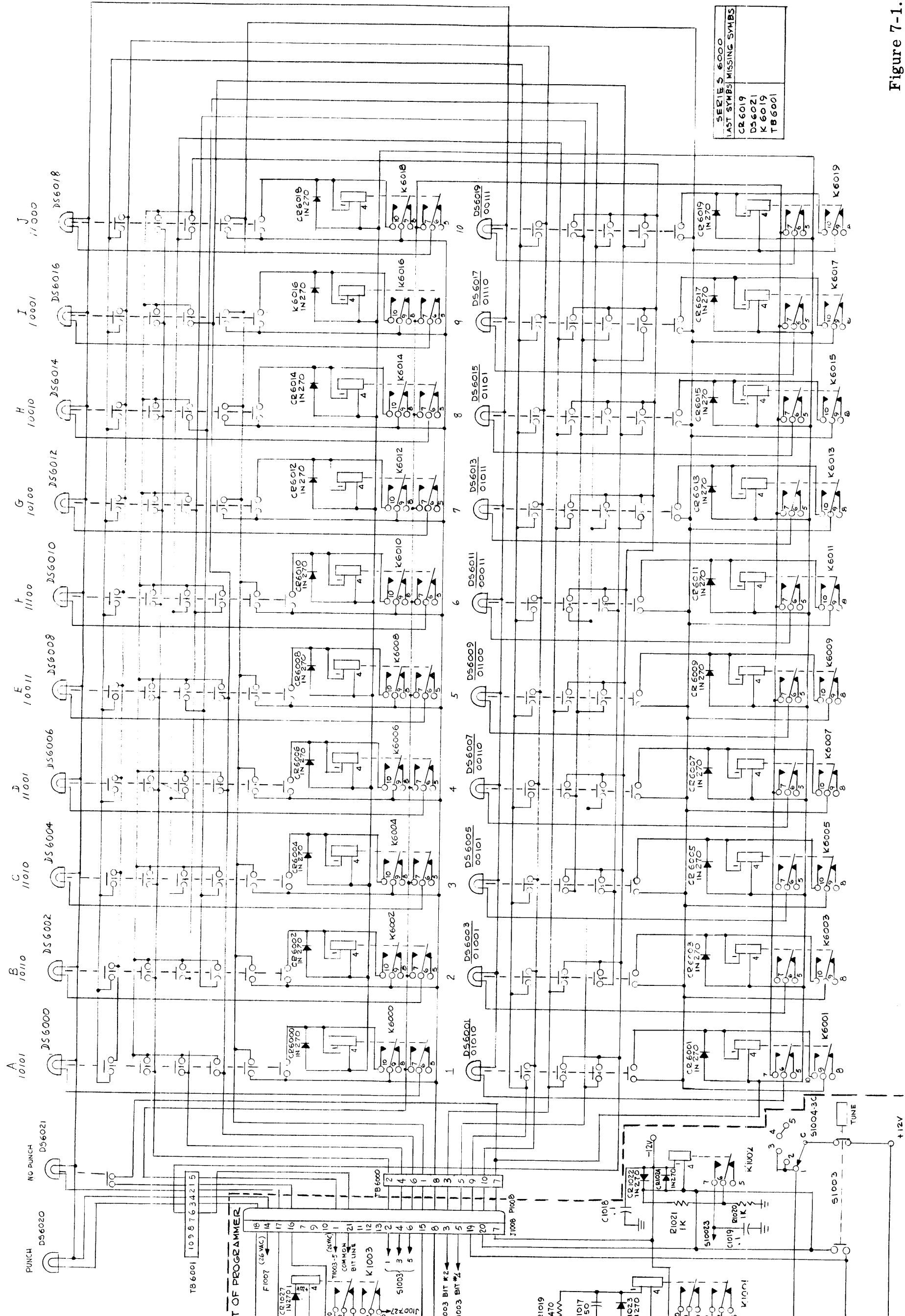
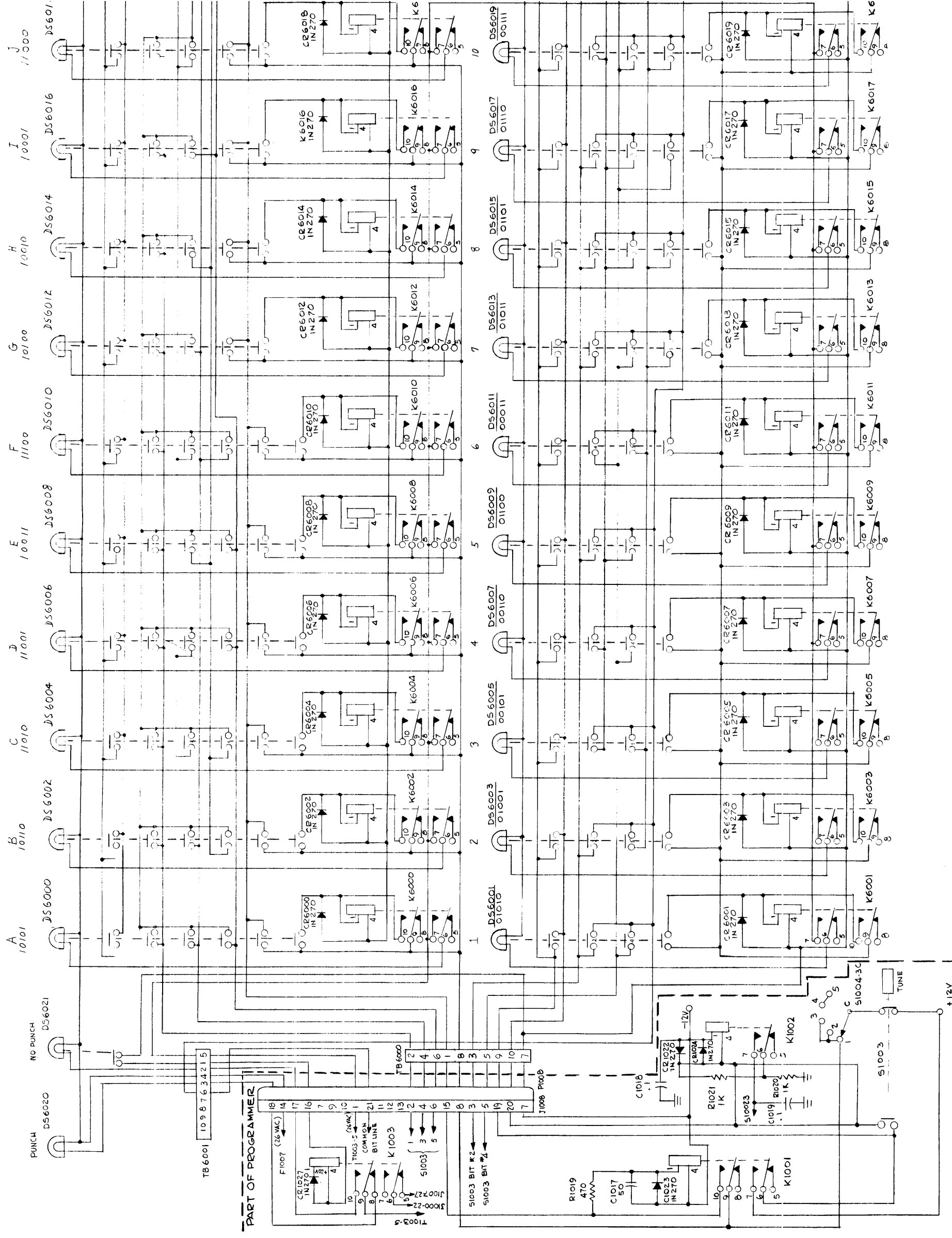


Figure 7-1. Schematic Diagram,



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