

★  
UNCLASSIFIED

TECHNICAL MANUAL

*for*

TECHNIMATIC TEST SET

MODEL RTDA-1



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N.Y.

OTTAWA, ONTARIO

★

2  
3  
4  
5  
6  
7  
8  
9  
10  
11

★  
UNCLASSIFIED

# TECHNICAL MANUAL

*for*

TECHNIMATIC TEST SET

MODEL RTDA-1



THE TECHNICAL MATERIEL CORPORATION  
MAMARONECK, N.Y.

OTTAWA, ONTARIO

COPYRIGHT 1966  
THE TECHNICAL MATERIEL CORPORATION

## 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:

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.

### *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





# TABLE OF CONTENTS

<u>Paragraph</u>		<u>Page</u>
<u>SECTION 1 - GENERAL DESCRIPTION</u>		
1-1	Description . . . . .	1-1
1-2	Technical Specifications . . . . .	1-1
<u>SECTION 2 - INSTALLATION</u>		
2-1	Initial Inspection . . . . .	2-1
2-2	Mechanical Installation . . . . .	2-1
2-3	Electrical Installation . . . . .	2-1
<u>SECTION 3 - OPERATOR'S INSTRUCTIONS</u>		
3-1	General . . . . .	3-1
3-2	Operator's Instructions . . . . .	3-1
3-3	Operator's Maintenance . . . . .	3-11
<u>SECTION 4 - PRINCIPLES OF OPERATION</u>		
4-1	Introduction . . . . .	4-1
4-2	Circuit Description . . . . .	4-1
<u>SECTION 5 - MAINTENANCE</u>		
5-1	Preventive Maintenance . . . . .	5-1
5-2	Troubleshooting . . . . .	5-2
5-3	Repair and Replacement . . . . .	5-4
<u>SECTION 6 - PARTS LIST</u>		
6-1	Introduction . . . . .	6-1
<u>SECTION 7 - SCHEMATIC DIAGRAMS</u>		

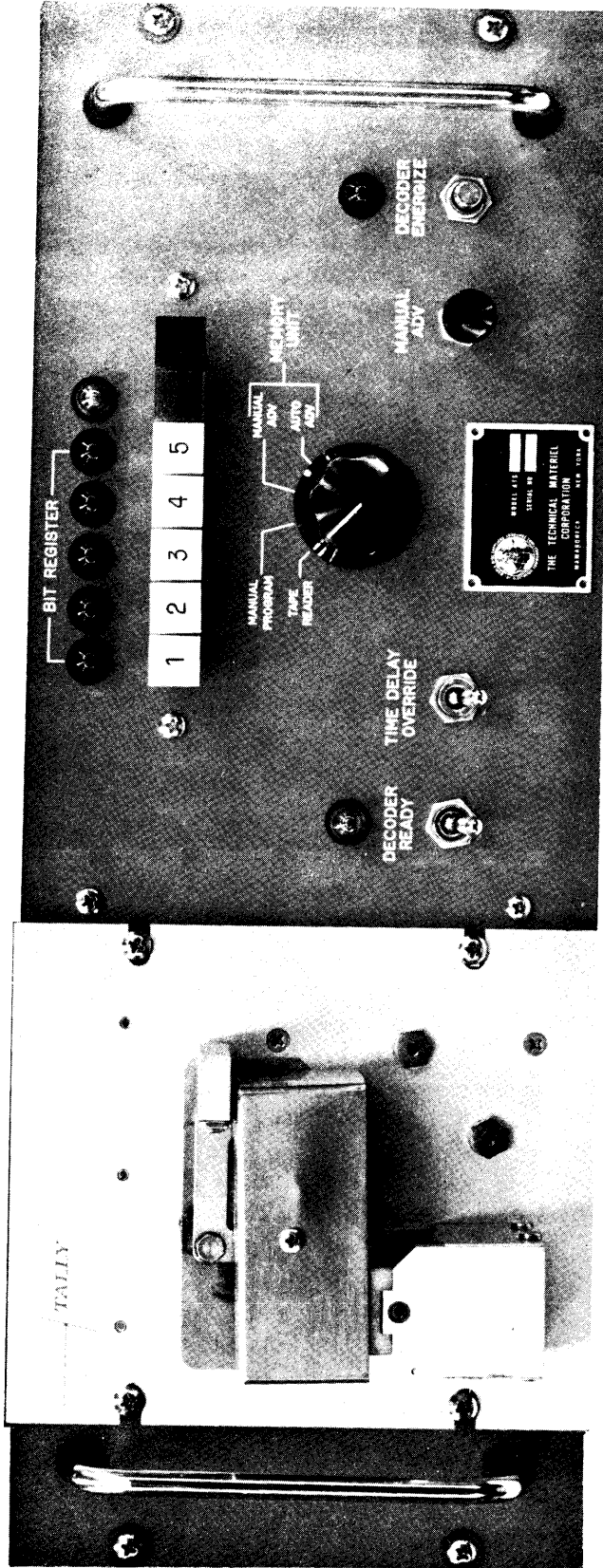
## **LIST OF ILLUSTRATIONS**

<u>Figure</u>		<u>Page</u>
<u>SECTION 1 - GENERAL DESCRIPTION</u>		
1-1	Technimatic Test Set, Model RTDA-1 . . . . .	1-0
<u>SECTION 2 - INSTALLATION</u>		
2-1	Typical Connection Diagram . . . . .	2-2
<u>SECTION 3 - OPERATOR'S SECTION</u>		
3-1	Tape Code Conversions . . . . .	3-10
3-2	Tape Reader Mechanism . . . . .	3-12
3-3	Controls and Indicators . . . . .	3-16
<u>SECTION 4 - PRINCIPLES OF OPERATION</u>		
4-1	Block Diagram . . . . .	4-4
<u>SECTION 5 - MAINTENANCE</u>		
5-1	Operating Mode Block Diagram . . . . .	5-5
5-2	Interconnecting Circuit Diagram . . . . .	5-6
<u>SECTION 7 - SCHEMATIC DIAGRAMS</u>		
7-1	Schematic Diagram, Model RTDA-1 . . . . .	7-2



## LIST OF TABLES

<u>Table</u>		<u>Page</u>
<u>SECTION 3 - OPERATOR'S SECTION</u>		
3-1	Typical Receiver System Decoder Functions .	3-4
3-2	Typical Decoder Code Functions . . . . .	3-5
3-3	Code Standard Conversions . . . . .	3-9
3-4	Controls and Indicators . . . . .	3-13
3-5	Operating Procedure . . . . .	3-17



T101-1

Figure 1-1. Technimatic Test Set, Model RTDA-1.

## SECTION 1 GENERAL DESCRIPTION

### 1-1. DESCRIPTION.

Technimatic Test Set, Model RTDA-1 (figure 1-1) is a test programmer, providing 5-level ASCII code standard signals to a decoder unit under test.

The test program, in the form of character-bit pulses, may be initiated at the RTDA-1 in any one of four modes. These modes include the use of a 5-level perforated tape\*, manual pushbutton programming, and by manually or automatically extracting information stored in an associated memory unit.

The RTDA, equipped with a 19-inch wide front panel, is designed to be mounted into any standard width equipment rack or console. The front panel is 7-inches high and supports a chassis 5-1/2-inches deep. A perforated-tape reader deck and all necessary controls and indicators for test programming are located on the front panel. Interconnections are made at the rear of the unit via two connectors.

### 1-2. TECHNICAL SPECIFICATIONS.

- |                  |                                                          |
|------------------|----------------------------------------------------------|
| OPERATING MODES: | (1) Pre-programmed test tape.<br>**(ASCII code standard) |
|                  | (2) Manual pushbutton programming                        |
|                  | (3) Memory unit stored program<br>(semi-automatic)       |
|                  | (4) Memory unit stored program<br>(fully automatic)      |

---

\* Conversion from a 7-level to a 5-level perforated tape is possible. Refer to section 3.

\*\* Refer to section 3 for ASCII vs CCIT code standard conversions.

1-2. TECHNICAL SPECIFICATIONS (cont)

TAPE READER INPUT:	5-level perforated paper tape. *(ASCII code standard)
TAPE READER SPEED:	Up to 25 characters per second.
PHYSICAL DIMENSIONS:	19-inches wide x 7-inches high x 5-1/2-inches deep.
POWER REQUIREMENTS:	Receives all operating power from associated unit under test.

---

\* Refer to section 3 for ASCII vs CCIT code standard conversions.

## **SECTION 2**

### **INSTALLATION**

#### 2-1. INITIAL INSPECTION

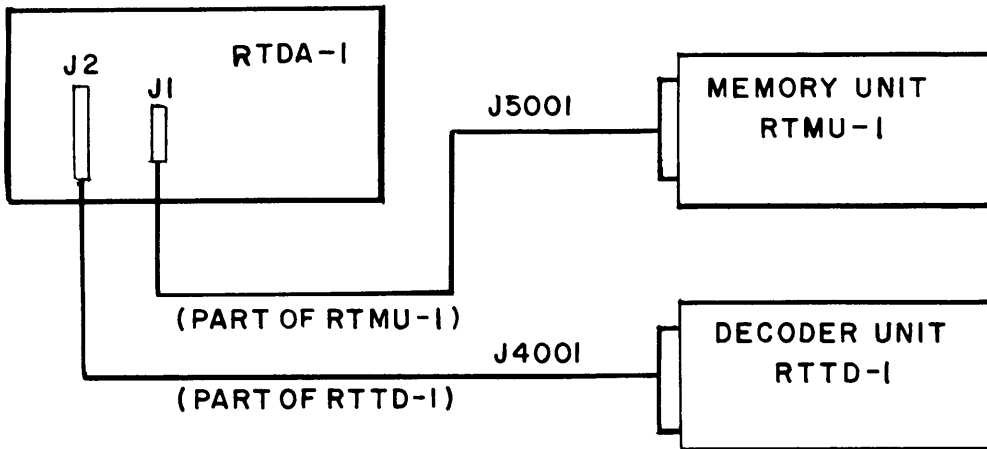
Each RTDA unit has been thoroughly checked and tested at the factory before shipment. When it arrives, at the operating site, inspect the packing case and its contents immediately for possible damage. Unpack the equipment carefully and inspect all packing material for parts that may have been shipped 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 RTDA is equipped with a 19-inch wide front panel designed to be screw fastened to an equipment cabinet or console. When mounting the RTDA, the position selected should be sufficiently clear of any dust or dirt producing area, i.e., close to the floor, adjacent equipment blower exhaust ports, etc. This precaution will prevent dust or dirt from entering and possibly causing faulty operation of the tape reader mechanism.

#### 2-3. ELECTRICAL INSTALLATION

Rear panel mounted connectors J1 and J2 are provided for connecting the RTDA to the decoder unit under test and its associated memory unit. Connect the RTDA as shown in figure 2-1, and perform the initial checkout procedure.



T101-2

Figure 2-1. Typical Connection Diagram

a. Initial Checkout Procedure

1. Connect RTDA as shown in figure 2-1.
2. Set decoder unit "Decoder Ready" switch at OFF.
3. Set RTDA unit DECODER READY switch at ON. DECODER READY indicator lamp on RTDA and on decoder unit will light.
4. Set TIME DELAY OVERRIDE switch at ON, to permit uninterrupted testing.
5. Set mode selector switch at MANUAL PROGRAM.
6. Lift handle on tape reader deck and insert test tape (see paragraph 3-2a.)
7. Press the DECODER ENERGIZE pushbutton switch. The DECODER ENERGIZE indicator lamp should light and the DECODER READY indicator lamp should go off.
8. Set mode selector switch at TAPE READER position. The decoder unit will step the tape reader one character at a time and position the stepping

switch motors to the position indicated on the test tape. When the "E" character (bit #1) is read, the decoder unit will deenergize and the tape reader mechanism will stop. To restart the tape reader mechanism, press the DECODER ENERGIZE pushbutton switch.

#### **NOTE**

The indicators marked BIT REGISTER indicate from left to right, bits 1 through 5, that are fed out of the RTDA in either mode of operation.

9. Set mode selector switch at MANUAL PROGRAM.
10. Press the desired numbered pushbutton switches to program the decoder unit.
11. Press TUNE pushbutton switch to simultaneously read bits selected in step 10.

#### **NOTE**

Press the TUNE RELEASE pushbutton switch to cancel any selected bit.

12. Set mode selector switch at MANUAL ADV. This mode permits information that is stored in memory unit to be fed to decoder unit one character at a time.
13. Press MANUAL ADV pushbutton switch to feed memory unit's stored information to the decoder unit one character at a time.
14. Set mode selector switch at AUTO ADV. This mode permits the decoder unit to extract entire program from memory unit and deenergize when the "E" character is reached.



## SECTION 3

### OPERATOR'S SECTION

#### 3-1. GENERAL

The RTDA enables an operator to test program a decoder unit in a remote controlled receiver system. Test programming may be accomplished either manually by means of the panel pushbuttons or automatically by means of a test tape or memory unit. The test tape is accepted at the front panel mounted tape reader deck. Indicator lamps mounted on the front panel provide visual indication of the programmed bits being fed to the associated decoder unit.

#### 3-2. OPERATOR'S INSTRUCTIONS

A four-position switch on the front panel enables the operator to select the desired mode of testing.

In the TAPE READER mode, a pre-programmed test tape (inserted into the tape reader deck) will be controlled by the decoder unit under test to read the test tape one character at a time. When the "E" character (bit #1) is read from the test tape by the decoder unit, the tape reader mechanism will de-energize and stop. The DECODER ENERGIZE pushbutton switch is used to restart the tape reader mechanism.

In the MANUAL PROGRAM mode, the decoder unit under test is programmed by means of the five numbered panel pushbuttons. If any numbered pushbutton is mistakenly pressed, it may be cancelled or reset by pressing the TUNE RELEASE pushbutton. When

the TUNE pushbutton is pressed, the selected numbered pushbutton bits will be read simultaneously and fed to the decoder unit under test. The five BIT REGISTER indicator lamps provide a visual indication of the bits being fed from the RTDA in all modes of operation.

In the MANUAL ADV mode, the decoder unit under test receives the information stored in the external memory unit. This information is fed one character at any time by pressing the MANUAL ADV pushbutton.

In the AUTO ADV mode, the decoder unit under test will extract the entire program from the external memory unit. When the "E" character is reached, the decoder unit under test will deenergize.

The TIME DELAY toggle switch is used to permit uninterrupted testing when set at ON.

The DECODER READY toggle switch is paralleled with decoder unit's Decoder Ready on/off switch. This permits control of the decoder unit under test by the RTDA. When set at ON, the DECODER READY indicator lamp will light.

See table 3-4 for control and indicator functions, used in conjunction with figure 3-3.

a. Threading Tape (see figure 3-2.) - To thread a test tape through the tape-reader head, the lever handle must be raised. This action raises the read head, exposing and clearing the capstan. Insert the tape from the right (counterclockwise rotational threading), laying the tape across the capstan so

that the pins project through the sprocket holes. Care should be exercised so as not to project pins mistakenly through the data channel holes.

### NOTE

When threading test tape through tape-reader head, be sure that the three-hole tape side faces the operator.

Hold the threaded tape, correctly positioned on the capstan, and lower the lever handle until the read-head locks in place; the tape is now properly positioned and threaded and ready for operation.

b. Code Functions - Tables 3-1 and 3-2 are provided as a guide to the method and technique of decoder programming via the RTDA.

As observed in table 3-2, all codes preceded by a character code bit #1 will command the decoder unit to direct all of the following character code bits to a particular control or function. The following character code bits select the particular action in sequence. This action holds true until a second character code preceded by a code bit #1 is received, thereby directing all of the following character code bits to a second particular control or function.

Example: (See table 3-2) - Code 1-2-5 commands the decoder unit to direct all following codes to the Megacycle control on the associated receiver system's r-f tuner, in the 2 to 16 mc range.

Code 2-5 sets the Megacycle control on the associated receiver system's r-f tuner at the 2-mc position.

Code 2 sets the Megacycle control at the 3 mc position, etc.

Table 3-1. Typical Receiver System Decoder Functions.

MODEL RTTD-1 (Used in DDR-5B system)								
DECODER FUNCTIONS								
1	2	3	4	5	6	7	8	9
CH. A IFBW	CH. A DET	CH. B IFBW	CH. B DET	AFC ON-OFF	RF GAIN	SPARE	SPARE	SPARE
MODEL RTTD-1 (Used in DDR-5BR system)								
DECODER FUNCTIONS								
1	2	3	4	5	6	7	8	9
IFBW	DET	AUDIO FIL HI- PASS	AUDIO FIL LO- PASS	SPARE	SPARE	SPARE	SPARE	SPARE
MODEL RTTD-2 (Used in DDR-5B1 system)								
DECODER FUNCTIONS								
1	2	3	4	5	6	7	8	
CH. A IFBW	CH. A DET	CH. B IFBW	CH. B DET	AUDIO FIL LOW	AUDIO FIL HIGH	ANT	SPARE	



Table 3-2. Typical Decoder Code Functions (cont'd)

CODE	FUNCTION	ACTION
1-4 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5	10 KC control	00 kc position 10 kc position 20 kc position 30 kc position 40 kc position 50 kc position 60 kc position 70 kc position 80 kc position 90 kc position
1-3-4-5 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5	1 KC control	0 kc position 1 kc position 2 kc position 3 kc position 4 kc position 5 kc position 6 kc position 7 kc position 8 kc position 9 kc position
1-3-5 2 3 4 2-5 2-3	.1 KC control	.0 kc position .1 kc position .2 kc position .3 kc position .4 kc position .5 kc position .6 kc position .7 kc position .8 kc position .9 kc position
1-2-3-4-5 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5	FUNCTION #1	See table 3-1

Table 3-2. Typical Decoder Code Functions. (cont'd)

CODE	FUNCTION	ACTION
1-2-4-5 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5	FUNCTION #2	See table 3-1
1-3-4 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5	FUNCTION #3	See table 3-1
1-2-3-4 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 3-4-5	FUNCTION #4	See table 3-1
1-2-3 2 4	FUNCTION #5	See table 3-1
1-2-3-5 2 3 4 2-5 2-3 3-4	FUNCTION #6	See table 3-1



Table 3-2. Typical Decoder Code Functions (cont'd)

CODE	FUNCTION	ACTION
2-4-5 2-3-5 2-3-4 3-4-5 4-5 5	FUNCTION #6 (cont'd.)	See table 3-1
1-2 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5 4-5 5	FUNCTION #7	See table 3-1
1-2-4 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5 4-5 5	FUNCTION #8	See table 3-1
1-3 2 3 4 2-5 2-3 3-4 2-4-5 2-3-5 2-3-4 3-4-5 4-5 5 1	FUNCTION #9	See table 3-1

c. Tape Code Conversion Programming. - Table 3-3 provides a list of code standard conversions, CCIT code standards vs ASCII (EIA standard RS227) code standards. This table is provided for use when an ASCII code standard perforated tape is desired using a CCIT code standard teleprinter or tape perforating device.

These conversions will produce a mirror image of the ASCII code standard using the CCIT code standard.

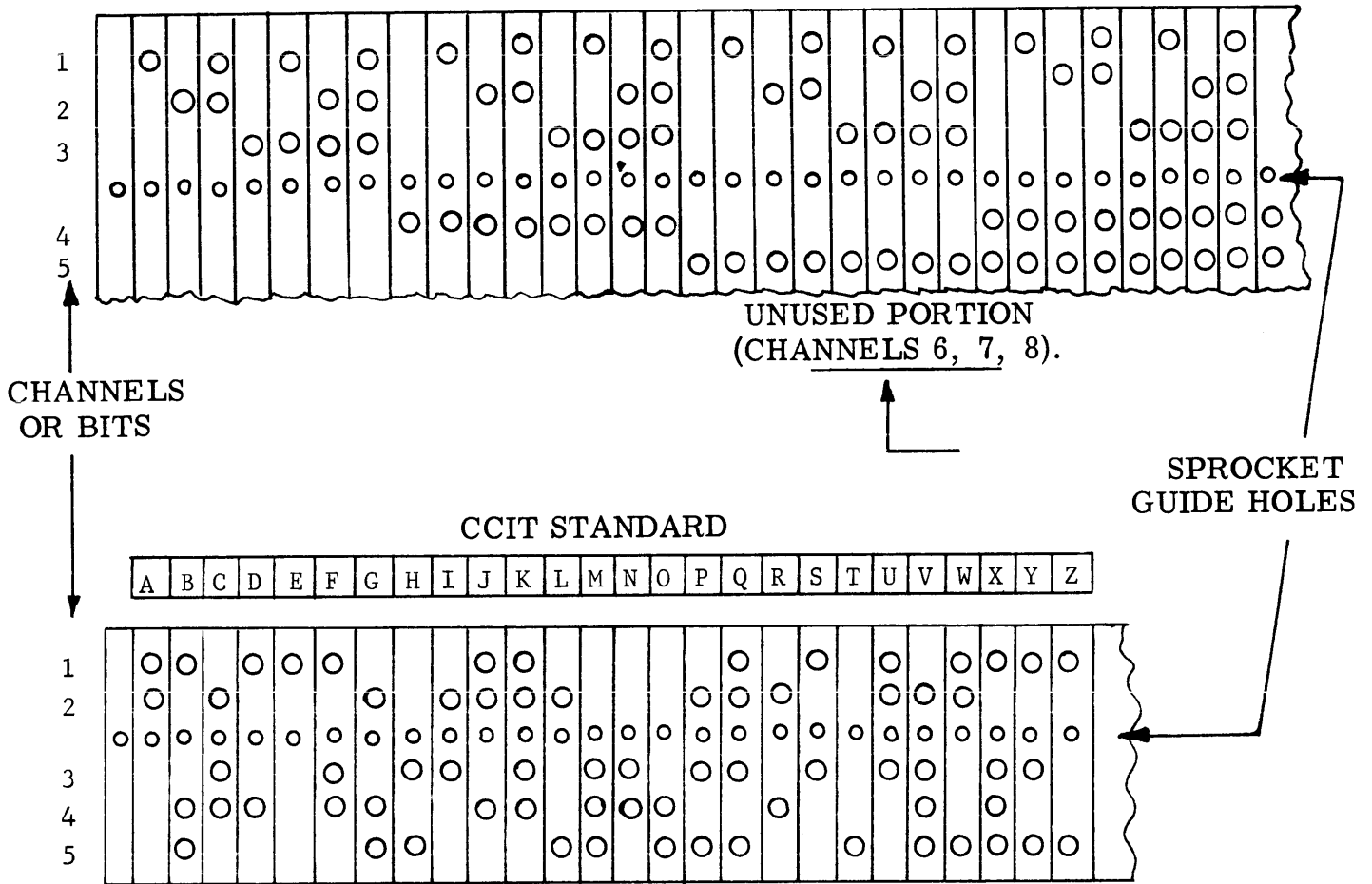
When the code converted perforated tape is fed to the tape reader, the CCIT tape must be reversed, as shown in figure 3-1, i. e., the 3-hole tape side facing the operator.

Table 3-3. Code Standard Conversions

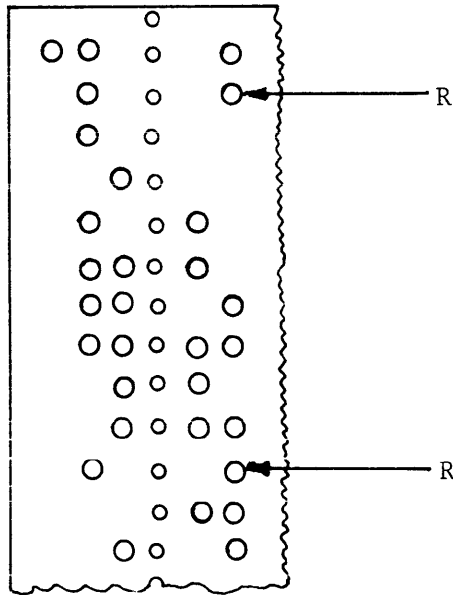
CCIT	ASCII	ASCII	CCIT
A	X	A	T
B	S	B	Carriage Return
C	N	C	O
D	R	D	Space
E	P	E	H
F	V	F	N
G	K	G	M
H	E	H	Line Feed
I	L	I	L
J	Z	J	R
K	↑	K	G
L	I	L	I
M	G	M	P
N	F	N	C
O	C	O	V
P	M	P	E
Q	]	Q	Z
R	J	R	D
S	T	S	B
T	A	T	S
U	/	U	Y
V	O	V	F
W	Y	W	X
X	W	X	A
Y	U	Y	W
Z	Q	Z	J

ASCII STANDARD  
(EIA STANDARD RS227)

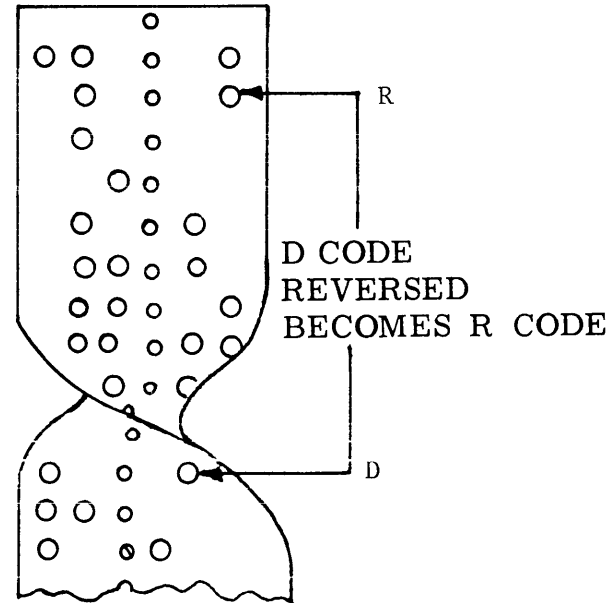
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	↑	←
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



ASCII STANDARD  
(UTILIZING 5-BITS)



CCIT STANDARD  
(REVERSED READING)



T101-3

Figure 3-1. Tape Code Conversions

### 3-3. OPERATOR'S MAINTENANCE.

Operator's maintenance of the RTDA consists mainly of keeping the unit, especially the tape reader mechanism, free from dirt, dust and other destructive elements. Rear panel connected cables should also be observed for secure connections. When an indicator lamp is known to be defective, the operator is required to replace the defective lamp, referring to the parts list in section 6 for proper replacement type.

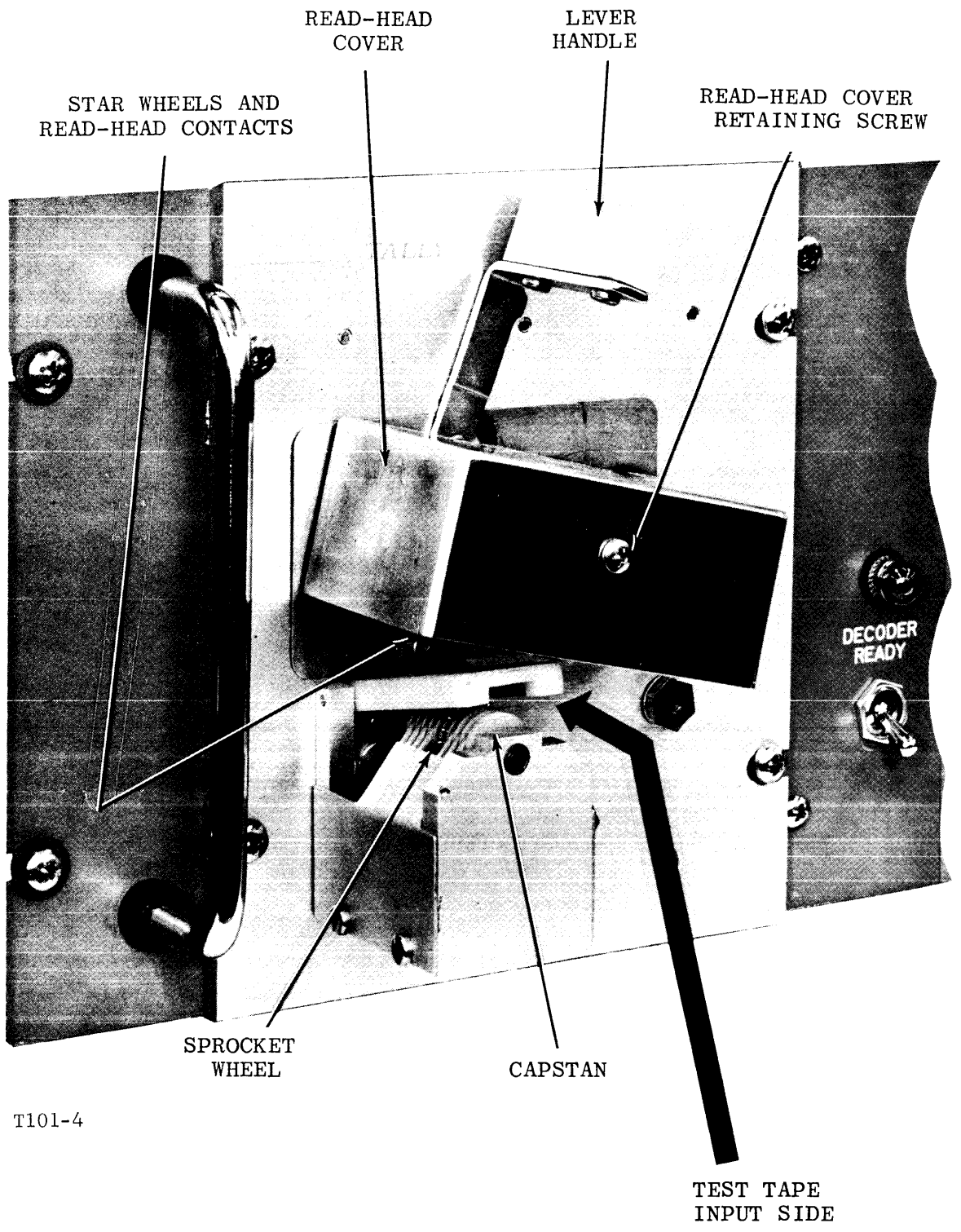
Should normal operating procedures produce unsatisfactory results, a check of the interconnecting cables and associated equipment levels to the RTDA may locate the fault.

#### a. Tape Reader Mechanism Cleaning (See figure 3-2)

1. Lift lever handle to expose tape reader contacts and star wheels. For greater accessibility, the read head cover may be removed by withdrawing the one retaining screw.
2. Inspect the read head contacts for dirt, dust, etc. Clean with soft brush exercising extreme care so as not to bend the small movable contacts.
3. Inspect star wheels for dust, lint, hair, etc. Clean with a soft brush.

Refer to tape reader manufacturer's instruction manual for further cleaning requirements and instructions.

657.23-3



T101-4

Figure 3-2. Tape Reader Mechanism

TABLE 3-4. CONTROLS AND INDICATORS

REF. DESIG.	PANEL DESIGNATION	COMPONENT DESCRIPTION	FUNCTION
①	1, 2, 3, 4, 5	5 white pushbutton switches	Numbers on the push-buttons are same as bit that pushbutton will program when pressed.
②	BIT REGISTER	5 green indicator lamps.	Indicator lamps will light to indicate selected bits being programmed.
③		Amber indicator lamp	Indicator lamp lights to indicate programming is in process. Activated either by TUNE pushbutton or by a programmed tape.
④	TUNE	Green pushbutton switch	When pressed, reads selected bits simultaneously.
⑤	TUNE RELEASE	Red pushbutton switch	When pressed, cancels any selected bits without feeding information out.
⑥	DECODER READY	Amber indicator lamp	Lights when DECODER READY toggle switch is set at ON.
⑦	DECODER READY	Toggle switch	Switch paralleled with external decoder unit DECODER READY switch. Used to control external decoder unit from RTDA unit.
⑧	TIME DELAY OVERRIDE	Toggle switch	When set at ON, permits uninterrupted testing.
⑨	TAPE READER	4-position rotary selector switch	External decoder unit will step tape-reader mechanism to read the programmed tape one character at a time and position the stepping

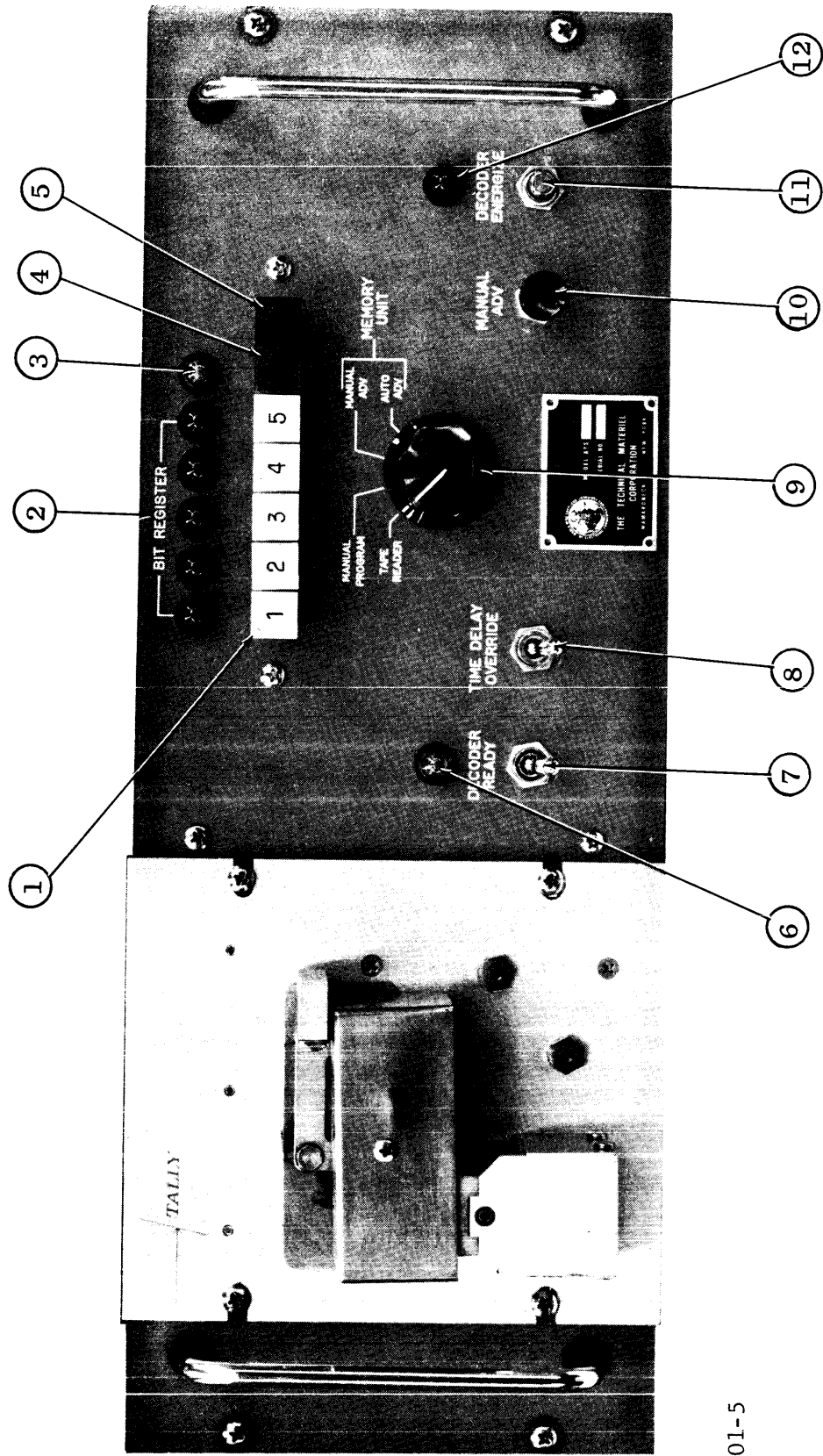
TABLE 3-4. CONTROLS AND INDICATORS (CONT)

REF. DESIG.	PANEL DESIGNATION	COMPONENT DESCRIPTION	FUNCTION
<p>⑨ (cont)</p>			<p>switches to the tape programmed positions.</p> <p>When the "E" character (bit #1) is read, decoder unit will deenergize and tape-reader mechanism will stop.</p>
	<p>MANUAL PROGRAM</p>		<p>This position enables the operator to manually program by means of the numbered pushbuttons.</p>
	<p>MANUAL ADV</p>		<p>This position enables the information stored in the external memory unit to be fed to the external decoder unit one character at any time by use of the MANUAL ADV pushbutton.</p>
	<p>AUTO ADV</p>		<p>This position enables the external decoder unit to extract the entire program from the external memory unit. When the "E" character is reached the external decoder unit will deenergize.</p>
<p>⑩</p>	<p>MANUAL ADV</p>	<p>Pushbutton switch</p>	<p>Used in conjunction with MANUAL ADV position of selector switch ⑨.</p>
<p>⑪</p>	<p>DECODER ENERGIZE</p>	<p>Pushbutton switch</p>	<p>Used to start tape reader mechanism by restarting external decoder unit.</p>
<p>⑫</p>	<p>DECODER ENERGIZE</p>	<p>Red indicator lamp.</p>	<p>Lights when external decoder is energized.</p>



TABLE 3-4. CONTROLS AND INDICATORS (CONT)

REF. DESIG.	PANEL DESIGNATION	COMPONENT DESCRIPTION	FUNCTION
⑬	J2 (rear panel)	Connector	Used for connection of external decoder unit.
⑭	J1 (rear panel)	Connector	Used for connection of external memory unit.



TI101-5

FRONT VIEW

Figure 3-3. Controls and Indicators

TABLE 3-5. OPERATING PROCEDURE

STEP	PROCEDURE (see figure 3-3)
1	Ensure that RTDA is connected as shown in figure 2-1.
2	Set decoder unit "Decoder Ready" switch at OFF.
3	Set DECODER READY toggle switch (7) at ON. DECODER READY indicator lamp (6) on RTDA and on decoder unit should light.
4	Set TIME DELAY OVERRIDE toggle switch (8) at ON.
5	<p>Set mode selector switch for desired operating mode. (See table 3-4, (9)).</p> <p><u>TAPE READER mode of operation:</u></p> <p>(a) Set mode selector switch (9) at MANUAL PROGRAM.</p> <p>(b) Lift lever handle on tape reader deck and insert test tape.</p> <p>(c) Lower lever handle to secure test tape in tape read head.</p> <p>(d) Press DECODER ENERGIZE pushbutton (11). The DECODER ENERGIZE indicator lamp (12) will light and the DECODER READY indicator lamp (6) will extinguish.</p> <p>(e) Set mode selector switch (9) at TAPE READER position. The tape reader mechanism will now energize and start stepping until a programmed "E" character is read. At this point, the decoder unit will deenergize and the tape reader mechanism will stop.</p> <p>To restart the decoder unit and the tape reader mechanism, press the DECODER ENERGIZE pushbutton (11).</p> <p><u>MANUAL PROGRAM mode of operation:</u></p> <p>(a) Set mode selector switch (9) at MANUAL PROGRAM.</p> <p>(b) Press the numbered pushbuttons (1) corresponding to the character bit code desired.</p>

TABLE 3-5. OPERATING PROCEDURE (CONT)

STEP	PROCEDURE (see figure 3-3)
<p>5 (cont)</p>	<p style="text-align: center;">NOTE</p> <p>If numbered pushbuttons (1) are mistakenly punched, press the TUNE RELEASE pushbutton (5) to cancel. Repeat step (b).</p> <p>(c) Press the TUNE pushbutton (4) to relay the selected character bit code to the decoder unit.</p>
	<p><u>MANUAL ADV mode of operation:</u></p> <p>(a) Set mode selector switch (9) at MANUAL ADV.</p> <p>(b) Press the MANUAL ADV pushbutton (10) to feed the stored memory unit programmed information to the decoder unit one character at a time.</p>
	<p><u>AUTO ADV mode of operation:</u></p> <p>(a) Set mode selector switch (9) at AUTO ADV. The decoder unit will automatically extract the entire stored programmed information from the memory unit and deenergize when the "E" character is reached.</p>

## **SECTION 4**

### **PRINCIPLES OF OPERATION**

#### 4-1. INTRODUCTION

The RTDA is a programming test set, used to test a decoder unit by means of character bit pulses. These character bit pulses may be initiated either manually, by means of the front panel push-button switches or automatically. Automatic character bit pulses are initiated by a pre-programmed test tape fed through the tape reader deck. Visual indication of the character bits being sent out of the RTDA are presented by the five BIT REGISTER indicator lamps, each representing a character bit 1 through 5.

#### 4-2. CIRCUIT DESCRIPTION (See figure 4-1).

When the front panel selector switch is set at the TAPE READER position, the tape reader mechanism is introduced. Pressing the DECODER ENERGIZE pushbutton will energize the decoder unit causing activation of the tape reader mechanism. The decoder unit will then step the tape reader mechanism to read the programmed test tape one character at a time. When the "E" character (bit #1) is read, the decoder unit will deenergize and deactivate the tape reader mechanism. To restart the decoder unit and the tape reader mechanism, the DECODER ENERGIZE pushbutton must be pressed. The DECODER ENERGIZE indicator lamp will light when the DECODER ENERGIZE pushbutton switch is pressed, indicating that the decoder unit is energized.

When the front panel selector switch is set at MANUAL PROGRAM, the five numbered character bit pushbuttons are introduced. The numbers on the pushbuttons are the same as the bit that the pushbutton will program when pressed, i.e., pushbutton #1 will program a character bit #1 when pressed. When a pushbutton is mistakenly pressed, the entire set of pushbuttons may be cancelled by pressing the TUNE RELEASE pushbutton which is mechanically linked. After the desired combination of character bits is selected, the TUNE pushbutton, when pressed, will read the selected character bit combination simultaneously and feed it to the decoder unit.

The five BIT REGISTER indicator lamps will light, corresponding to the character bits selected, in all four TAPE READER, MANUAL PROGRAM, MANUAL ADV and AUTO ADV operating modes.

When the front panel selector switch is set at MANUAL ADV, the programmed information stored in the associated memory unit under test is utilized. When the MANUAL ADV pushbutton is pressed, the stored memory unit programmed information is fed to the decoder unit one character at a time.

When the front panel selector switch is set at AUTO ADV, the entire stored memory unit programmed information is fed to the decoder unit. When the "E" character is reached, the decoder unit will deenergize.

The TIME DELAY OVERRIDE toggle switch, when set at ON, over-

rides the time delay circuitry in the decoder unit, allowing uninterrupted testing.

The DECODER READY toggle switch is electrically paralleled with the Decoder Ready switch on the decoder unit under test. For proper operation of this switch, the Decoder Ready switch on the decoder unit must be in the OFF position, providing full control by the RTDA. The associated DECODER READY indicator lamp will light when the decoder unit is activated by the DECODER READY toggle switch.

In essence, the primary function of the RTDA is to provide a ground return for activation of the bit selector relay solenoids in the decoder unit. These ground returns, corresponding to the character bits selected, are initiated in the following manner. When in the MANUAL PROGRAM mode, the selected ground returns are initiated by the 5-numbered pushbutton switches. When in the TAPE READER mode, the tape reader relay contacts, acting upon the tape-punched holes, initiate the selected ground returns. When in the MEMORY UNIT mode, both MANUAL ADV and AUTO ADV positions, the associated memory unit initiates the pre-selected ground returns.



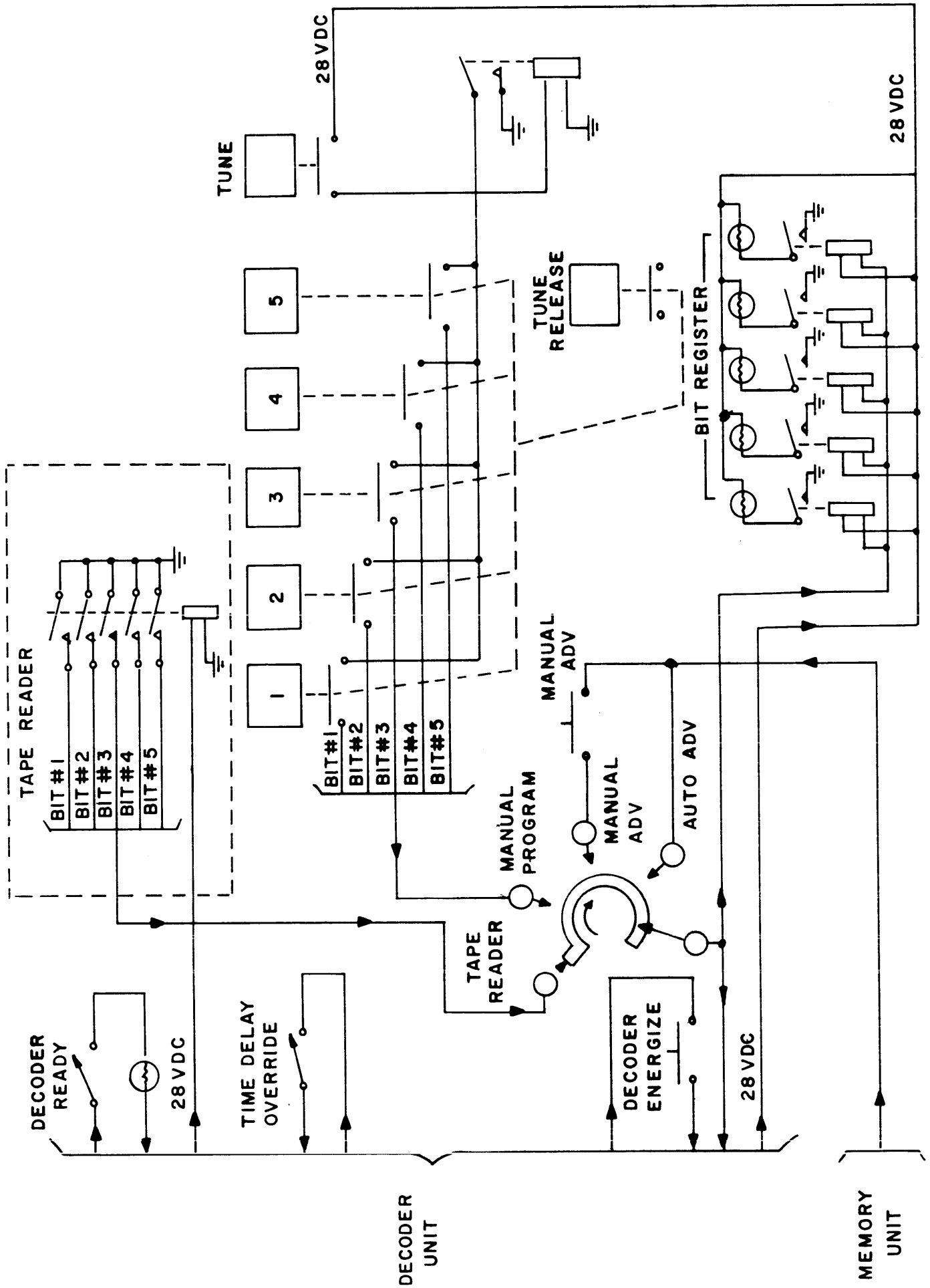


Figure 4-1. Block Diagram

## **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

Troubleshooting the RTDA requires a familiarity of the various unit control functions as used in conjunction with the associated equipment under test. Therefore, before attempting to troubleshoot the RTDA, a knowledge of the unit functions and use of the schematic diagram is a primary requirement.

At the first indication of a fault, the technician should ascertain that all interconnections to the RTDA are correct and operational.

The RTDA may be divided into four circuit configurations, one for each mode of operation. By use of the operating mode block diagram (figure 5-1) and the schematic diagram (figure 7-1), the technician can quickly localize the unit or circuit at fault.

One method of troubleshooting is to ascertain that the decoder unit under test is receiving the test program. Initiating a test program at the RTDA, either manually or automatically, should cause a corresponding affect at the decoder unit, i. e. , any test bit code initiated at the RTDA should cause the same bit code to function in the decoder unit. If the decoder unit does not react properly to the test program initiated by the RTDA, another test program may be fed to the decoder unit by using another mode of test programming. If the decoder unit still does not react properly to the RTDA test program, the decoder unit may be suspected as being faulty. Refer to the applicable decoder unit instruction manual for troubleshooting.

However, if the decoder unit reacts properly to the RTDA test program in the second mode of test programming, the fault may lie in the first programming mode circuitry of the RTDA or associated circuits.

Further troubleshooting, by isolating the RTDA, may be made by use of the associated system memory unit. Initiating a test program at the RTDA in the MEMORY UNIT mode will isolate the RTDA and provide test programming from the memory unit directly to the decoder unit under test. However, since all test program information passing through the RTDA activate the BIT REGISTER indicator lamps, visual means of indication as to the test program being supplied to the decoder unit under test is provided. This visual indication may also be used to check the output of the associated memory unit.

Similar testing and circuit localizing may be performed, using the aforementioned method, to troubleshoot or verify memory unit or decoder unit operation.

This type of unit isolation and verification testing enables the technician to locate a fault without the use of external test equipment. The aforementioned test and troubleshooting methods may be enhanced by the technicians own troubleshooting methods and variations.

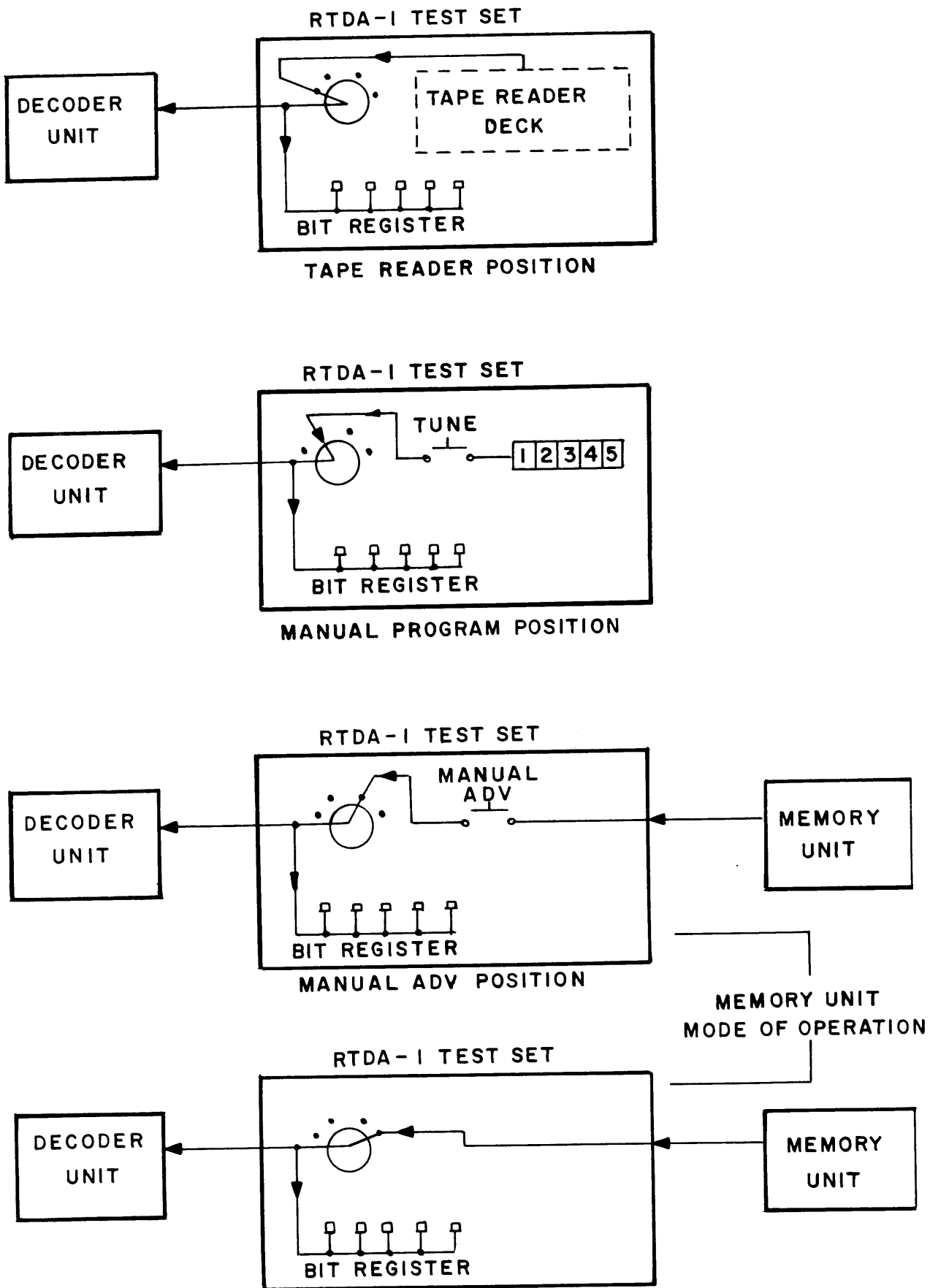
Figure 5-2 is provided to clarify the inter-circuit relationship when used in conjunction with schematic diagram figure 7-1 .

### 5-3. REPAIR AND REPLACEMENT

Corrective maintenance of the RTDA will consist mainly of component replacement. It should be noted that when replacing components, the technician should observe for exact or equivalent replacements by referring to the parts list in section 6. Polarity and positioning of certain components should be observed before removing so that the replacement component will fit and operate correctly.

a. Tape Reader Adjustments and Repair. - The tape reader mechanism may, at one time or another, require minor repairs and adjustments. These adjustments may include the stepping device armature gap and spring tension adjustments, ratchet wheel pressure, read head and contact adjustments and star-wheel positioning. Lubrication and necessary repair and adjustments should be made in accordance with the tape reader manufacturer's instruction manual.

b. Rotary Selector Switch Replacement. - Replacement of the rotary selector switch requires extreme care in removing and replacing wires from the wafer pins. When removing wires, either for replacement or repair, label or tag each wire removed for proper identification when replacing. Check for poor or cold solder connections. Care should be exercised so as not to burn adjacent wires or letting solder drop into the switch wafers. Rotate rotary selector switch through all positions before replacing, observing for sticking or binding contacts.



T101-7

Figure 5-1. Operating Mode Block Diagram

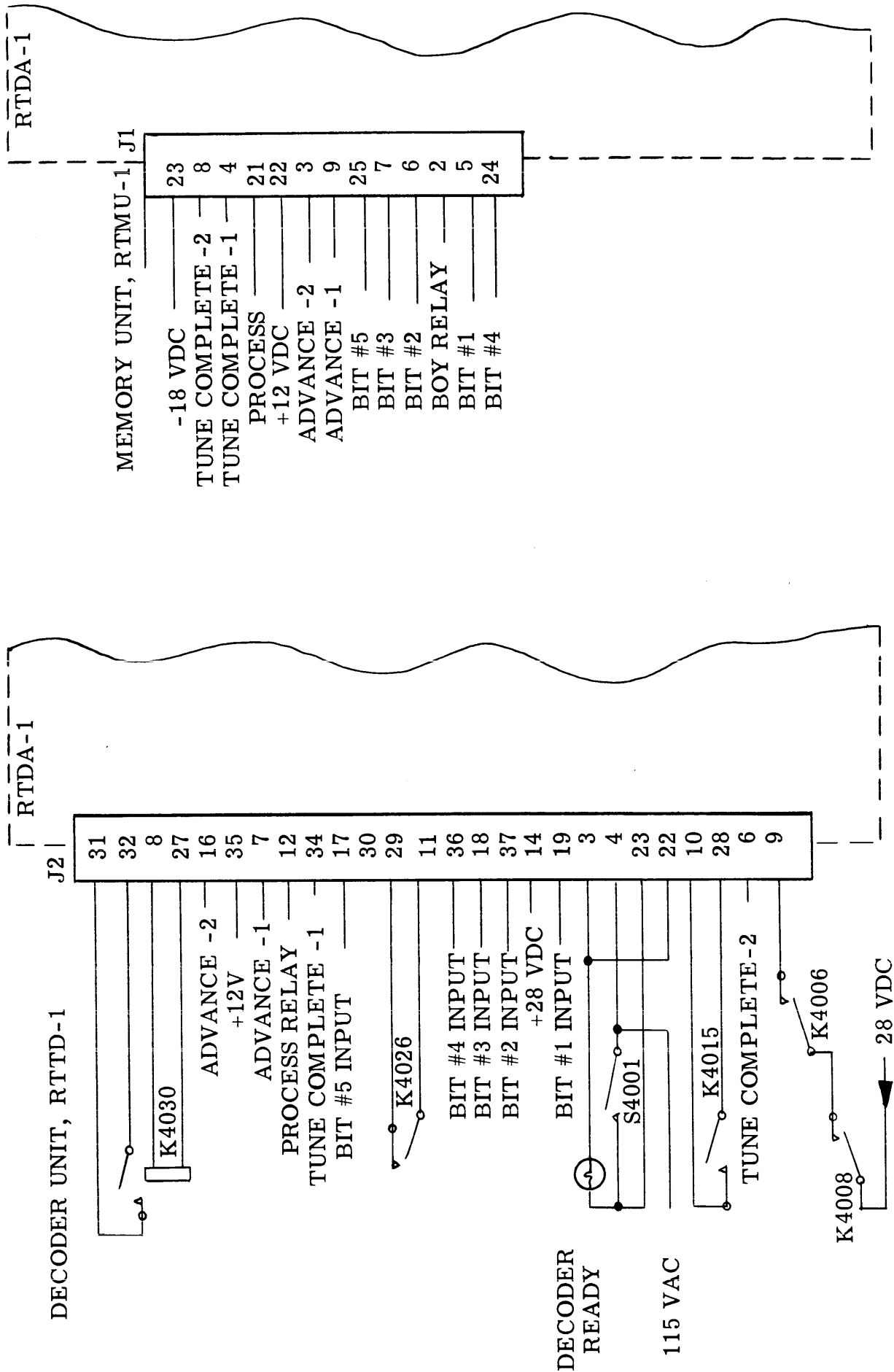


Figure 5-2. Interconnecting Circuit Diagram

## **SECTION 6**

### **PARTS LIST**

#### 6-1. INTRODUCTION

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

## TECHNIMATIC TEST SET, MODEL RTDA-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
A1	TAPE, READER: self-contained low speed uni-directional (counter-clockwise) tape reader; reads any 5 to 8 level perforated paper asynchronously at speeds up to 25 characters per second; operating temperature 50°F to 131°F; humidity rating 20% to 95% relative.	TD100
CR1	SEMICONDUCTOR DEVICE, DIODE: germanium; peak inverse voltage 100 V; min. forward current 200 ma at 1.0 V; max. reverse current 100 ua at 25°C; max. power dissipation 80 mw at 25°C; operating temperature 90°C; JEDEC type DO-7 case.	1N270
CR2 thru CR7	Same as CR1.	
DS1	LAMP, INCANDESCENT: 28.0 VAC/VDC, 0.20 amp; single contact, T-1-3/4 bulb.	BI110-7
DS2 thru DS8	Same as DS1.	
J1	CONNECTOR, RECEPTACLE, ELECTRICAL: 25 female contacts, removeable crimp pin style, rated for 5 amps at 500 V RMS; connector shape polarization.	JJ310-2
J2	CONNECTOR, RECEPTACLE, ELECTRICAL: 37 female contacts, removeable crimp pin style, rated for 5 amps at 500 V RMS; connector shape polarization.	JJ310-3
K1	RELAY, ARMATURE: DPDT; 5,000 ohms, $\pm 10\%$ DC resistance; operating voltage 20.5 VDC; current rating 4.1 ma; power rating 85 mw at 25°C; 8 contacts rated for 1 amp at 29 VDC; clear high impact styrene dust cover case.	RL156-4
K2 thru K6	Same as K1.	
K7	RELAY, ARMATURE: 6PDT; 430 ohms, $\pm 10\%$ DC resistance; operating voltage 24 VDC; current rating 56 ma; power rating 1,500 mw at 25°C; 20 contacts rated for 5 amps at 29 VDC; clear high impact styrene dust cover case.	RL156-5
R1	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, $\pm 5\%$ ; 1/2 watt.	RC20GF102J

## PARTS LIST (CONT)

## TECHNIMATIC TEST SET, MODEL RTDA-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
R2 thru R5	Same as R1.	
R6	RESISTOR, FIXED, WIREWOUND: 3,000 ohms; current rating 58 ma; 10 watts.	RW109-30
S1	SWITCH, TOGGLE: SPST; bat type handle.	ST103-1-62
S2	Same as S1.	
S3	SWITCH, ROTARY: 4 wafers, 4 positions; 3 sections each wafer.	SW402
S4	SWITCH, PUSHBUTTON: DPST; momentary contact; 2 solder lug type contacts rated for 1 amp at 250 V or 3 amps at 125 V; black bakelite snap on button type w/bakelite base.	SW168DPST2N- OBB
S5	SWITCH, PUSHBUTTON: DPST; momentary contact; 2 solder lug type contacts rated for 1 amp at 250 V or 3 amps at 125 V; red bakelite snap on button type w/bakelite base.	SW168DPST2N- OBR
S6	SWITCH, PUSHBUTTON: 1 section, 7 position; contacts rated for 2 amps at positions 1-5; white, green, red buttons as required, 5/8 center to center; two 8-32 tapped mounting holes.	SW404
XDS1	LIGH, INDICATOR: w/green lens, sub-miniature type.	TS153-2
XDS2 thru XDS5	Same as XDS1.	
XDS6	LIGHT, INDICATOR: w/amber lens, sub-miniature type.	TS153-3
XDS7	LIGHT, INDICATOR: w/white translucent lens, sub-miniature type.	TS153-5
XDS8	Same as XDS6.	
XK1	SOCKET, RELAY: w/retainer; 6 male beryllium copper gold plated contacts; black phenolic body.	TS171-1
XK2 thru XK6	Same as XK1.	



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

