TAPE READER

REMEX RR-302-RT-S1

Operation and Maintenance Manual

SDS 900573A (OEM)

September 1964

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SDS

SCIENTIFIC DATA SYSTEMS/1649 Seventeenth Street/Santa Monica, California

REMEX

TAPE TRANSPORT

MODEL RR-302-RT-S1 (102870)

OPERATION AND MAINTENANCE MANUAL

SERIAL _____

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REMEX / Rheem Electronics
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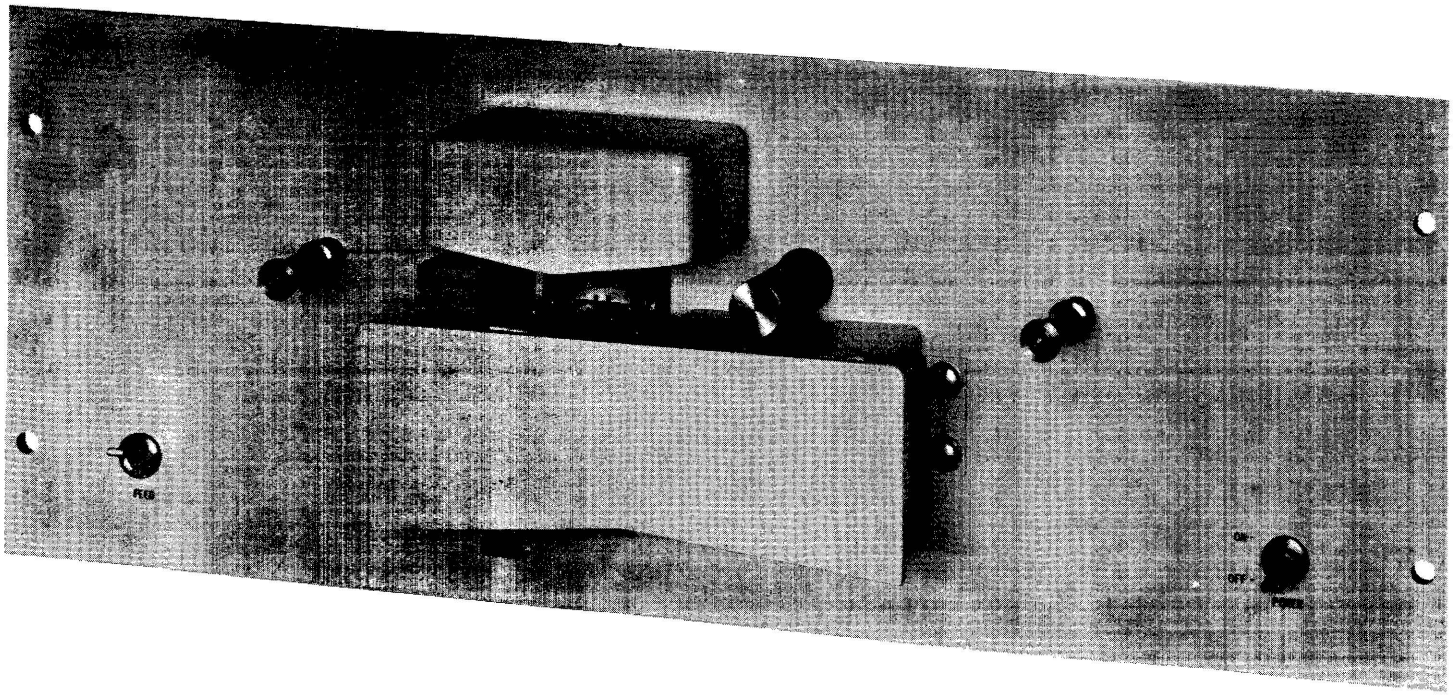
TTM-403A



The REMEX Tape Transport, Model RR-302-RT-S1.

INTRODUCTION

Operating as the input medium, the function of the Tape Transport is to move the punched tape over the photocell block where the information, in the form of tape perforations, is converted into electronic signals. These signals are then routed to a connector for external use. All power and control signals are provided externally through the terminal strip.

This manual has been prepared to assist the customer in operation and maintenance. Its contents are conveniently divided into six sections covering the specifications, operational instructions, technical descriptions, maintenance, schematics and parts list. By necessity, certain sections are written with the assumption of some background knowledge of electrical circuits and the implementation of contemporary semiconductor devices. The contents are of use, however, to those with only minimum training in the electrical and mechanical fields which the transport covers. Finally, any inquiries regarding a particular unit should reference its serial number.

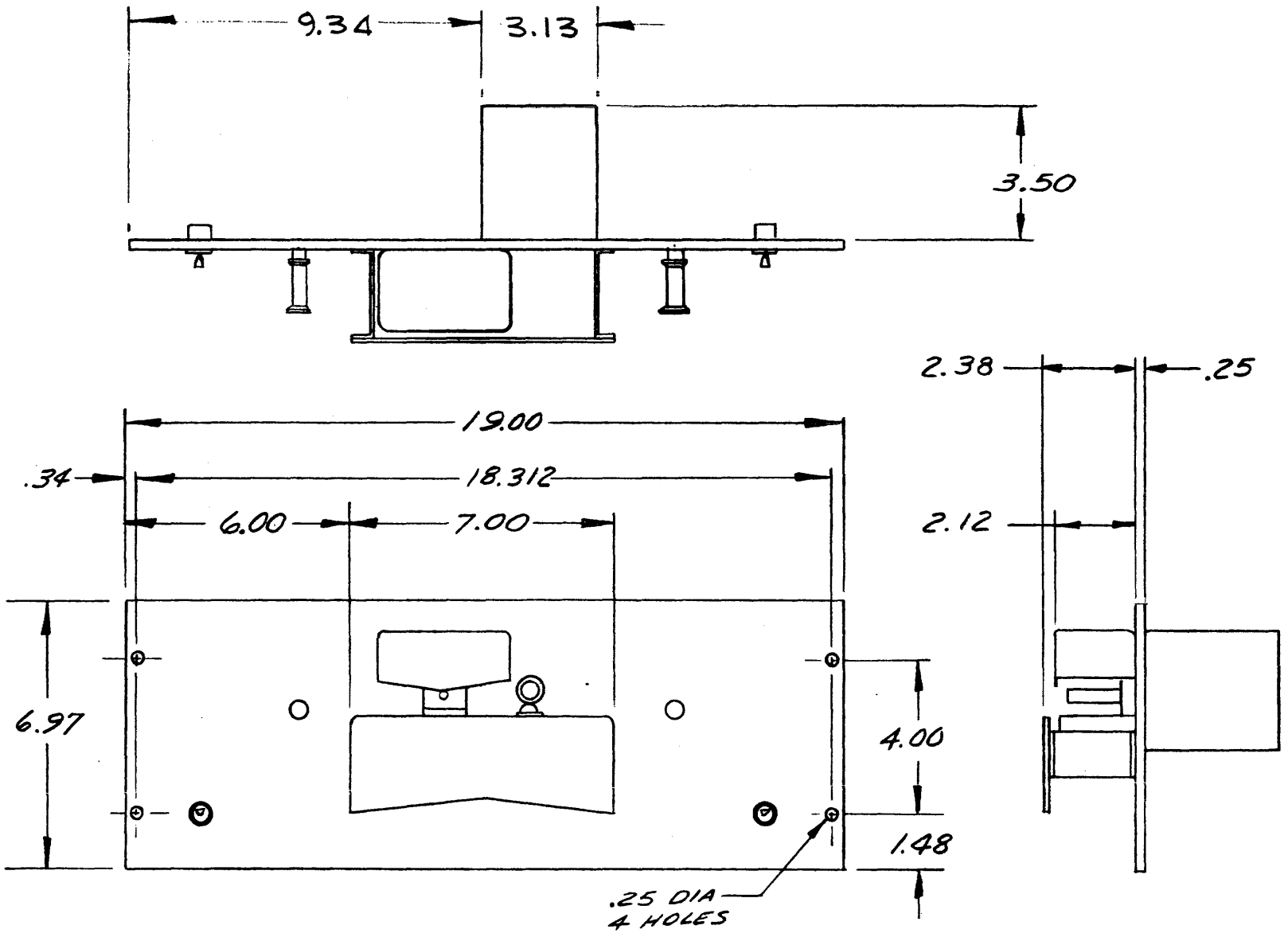
TABLE OF CONTENTS

SECTION 1

SPECIFICATIONS

Listed below are the characteristics, specifications and options which are applicable to the REMEX Tape Transport.

Tape Width	Photocell Block adjustable to 5-channel (11/16 inch), 7-channel (7/8 inch), or 8-channel (1 inch) tape.
Drive Mechanism	Electromagnetic jam roller presses tape against a constant velocity drive roller. Drive magnet requires 600 ma. of current, steady state, to operate.
Brake Mechanism	Electromagnetically operated brake shoe clamps the tape against the brake pad. Brake magnet requires 600 ma. of current, steady state, to operate. A peak current of 1.5 amps is required.
Reading Speed	300 characters/second, continuous feed at 60 cps a.c. power. Up to 100 characters/second, line-at-a-time step mode at 60 cps a.c. power.
Starting Characteristics	6 ms. from rest position, continuous feed mode. Less than 6 ms, line-at-a-time step mode.
Stopping Characteristics	1 ms, on command character or between characters as desired.
Power Requirement	115 $\pm$ 10% VAC, 0.3 amps, single phase, 50-60 $\pm$ 5% cps, in addition to those noted above.
Size	Refer to Figure 1-1, Installation Drawing.



RR-302-RT-SI INSTALLATION DRAWING NO. 102874 (REV A)

FIGURE 1-1

SECTION 2

EQUIPMENT OPERATION AND INSTRUCTIONS

This section contains the necessary information and instructions required for the operation of the tape transport.

2.1 External Connections

All power and input control signals are applied to terminal strip 1 (TB1) located at the rear of the transport. The detail routings of the various signals are shown on the schematic. All track output signals are available at J1 located under the photocell block.

2.2 Operating Instructions

Use the following procedure when loading and operating the transport:

a. Apply the required voltages and current to the capstan motor and lamp. Refer to the Schematic, Section 5, for the proper operating levels. AC power is applied to the motor by placing the POWER switch into its ON position.

b. Lower the tape adjust actuator (item 2, Figure 4-5) to its lowest position. This will result in the word LOAD appearing beneath the lower cover. In addition, this also lowers the tape guide on the photocell block and places the RUN-LOAD switch (S3) into its LOAD position, thereby removing power from the capstan motor and the brake magnet.

c. Inhibit the drive magnet by removing its energizing current.

d. Insert the tape to be read. Proper insertion requires that the edge of the tape nearest the feed hole be placed toward the panel.

e. Check for proper alignment of the tape within the guides.

f. If 8-channel tape is being used, raise the tape adjust actuator to the tape adjust stop (item 15 of Figure 4-5) which will result in the word RUN appearing above the lower cover. This raises the tape guide to its 8-channel position and places the RUN-LOAD switch into its RUN position. When using 7-channel or 5-channel tape, the tape adjust stop must be reoriented. This is accomplished by loosening the screw holding the stop (located near S3 and accessible under the lower cover), rotating the stop 90 degrees (so that the long edge is perpendicular to the panel) and tightening the screw to secure the stop in that position. The tape adjust actuator is then raised two detents of the tape guide for 7-channel and three detents for 5-channel tape.

g. Apply and remove, simultaneously, the following signals, depending upon the movement desired. Refer to the Schematic for the proper terminals on TB1.

   Feed: Energize the drive magnet with a current as described in Section 1 and remove the current from the brake magnet.

   Stop: Energize the brake magnet with a current as described in Section 1 and remove the current from the drive magnet.

h. The FEED switch has been provided to allow the signals described in step g to be applied by holding the switch in its down position. Normally, the switch is used to operate some external switching control which, in turn, generates the proper feed and stop signals.

SECTION 3

EQUIPMENT DESCRIPTION

Technical descriptions explaining the various electrical and mechanical operations of the Transport constitute the material in this section. It is recommended that Section 5, Schematic, be used in conjunction with these descriptions.

3.1 Tape Transport Mechanism

3.1.1 Drive System

The drive system consists of a rotating drive roller and an electromagnetically operated jam roller. Refer to Section 4.2, Figures 4-1 and 4-2. A current, as described in Section 1, applied to the drive magnet causes the rocker arm assembly to be actuated which, in turn, forces the jam roller against the drive roller. The tape is then pulled through the reader at a constant velocity. Adjustment of the drive system is described in Sections 4.2.1 and 4.2.2.

3.1.2 Brake System

The brake is composed of a high speed D.C. electromagnet located below the normal tape path and a brake shoe housed above the tape. Applying a current, as described in Section 1, energizes the magnet which subsequently causes the brake shoe to clamp the tape to the magnet housing. This type of brake requires no adjustment.

3.1.3 Tape Load-Run Switch

Included on this transport is a load-run switch located near and actuated by the movement of the tape guide. When the guide is placed in its tape load position, a microswitch is actuated. One set of contacts is used to remove power from the drive motor and a second set is in series with the brake magnet, thereby removing power from it also during tape loading time.

3.2 Tape Perforation Sensing

Nine photoelectric cells are used to sense the perforations in the tape. A constant light source illuminates the area of the photocells. When a hole, in any given track on the tape, appears over the top of the photocell block, the light, shining through the hole, energizes the cell of that track.

Eight information track cells and one clock (feed hole) track cell constitute the nine cells. The Schematic, Section 5, illustrates how the nine photocells are tied together. The minimum output from these cells with a 1200 ohm load using an SDS lamp 103139 at +20 VDC without the light guide is as follows:

Code cell = 75 mv, minimum
Clock cell = 172 mv, minimum

SECTION 4

MAINTENANCE

The REMEX Tape Transport has been designed in such a manner as to keep maintenance as simple and as infrequent as possible. To prolong the life of the equipment, certain checks and preventative procedures are set up in Section 4.1 with suggested schedules. From time to time, certain adjustments and calibrations may be needed. These are detailed in Section 4.2, accompanied by the necessary diagrams. Section 4.3 contains the component layout of the transport. Finally, some instructions on splicing are contained in Section 4.4.

4.1 Preventative Maintenance

Item	Time	Procedure
Photocell Block	Semi-Weekly	Check the condition of the glass slide covering the aperture plate. This is extremely important since any dirt or foreign material covering an aperture can create errors in readout. A stiff bristle brush is included for general cleaning. Use a cotton swab and water, if necessary, to remove foreign matter.
Jam and Drive Rollers	Weekly	Check for the following: a. Cleanliness of the surface. Cleaning is easily accomplished by abrading their surface with a soft eraser of the "Pink Pearl" type. b. Excessive wear or indentations on the roller surfaces.
Brake Shoe	Weekly	Check for accumulation of foreign matter that might tend to reduce the braking force and clean, if necessary, using the bristle brush.
Motor Pads	Semi-Yearly	Place 1 or 2 drops of 30 weight machine oil on each motor pad.
Motor Gear Train	Yearly	Remove the gear cover and lubricate with Molykote #165X.

4.2 Adjustments and Calibrations

Proper operation depends upon making and maintaining accurate adjustments. The following calibrations and adjustments should be checked periodically and adjusted as needed.

4.2.1 Rocker-Rocker Stop Gap Adjustment

Adjustment of the rocker-rocker stop gap is made with the jam roller and capstan fully engaged as shown in Figure 4-1. This adjustment is performed as follows:

a. De-energize the drive magnet coil.
b. Remove any tape from between the rollers.
c. Loosen the rocker stop lock nut.
d. Rotate the rocker until the rollers are engaged and adjust the rocker stop until the gap is as shown in Figure 4-1.
e. Tighten the lock nut, being careful not to distrub the rocker stop. Recheck the gap size after tightening the lock nut.

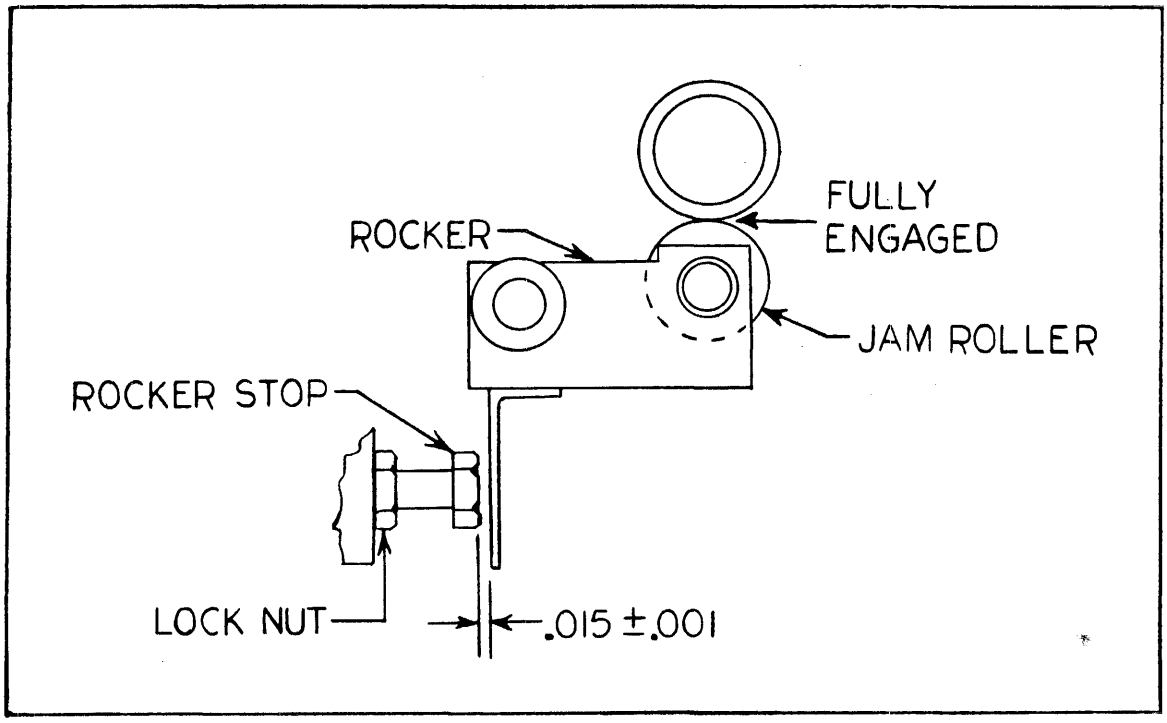


Figure 4-1
Proper adjustment of the gap between the rocker and rocker stop.

4.2.2 Drive Magnet Air Gap Adjustment

Adjustment of the drive magnet air gap is made with the rocker and magnet as shown in Figure 4-2. The adjustment is performed as follows:

a. Remove any tape from between the rollers.
b. Rotate the rocker until the rollers are engaged.
c. Loosen the magnet coil bracket screws and move the magnet until the rocker and magnet appear as shown in Figure 4-2.
d. Tighten the bracket screws, being careful not to distrub the gap size. Recheck the gap size after tightening the screws.

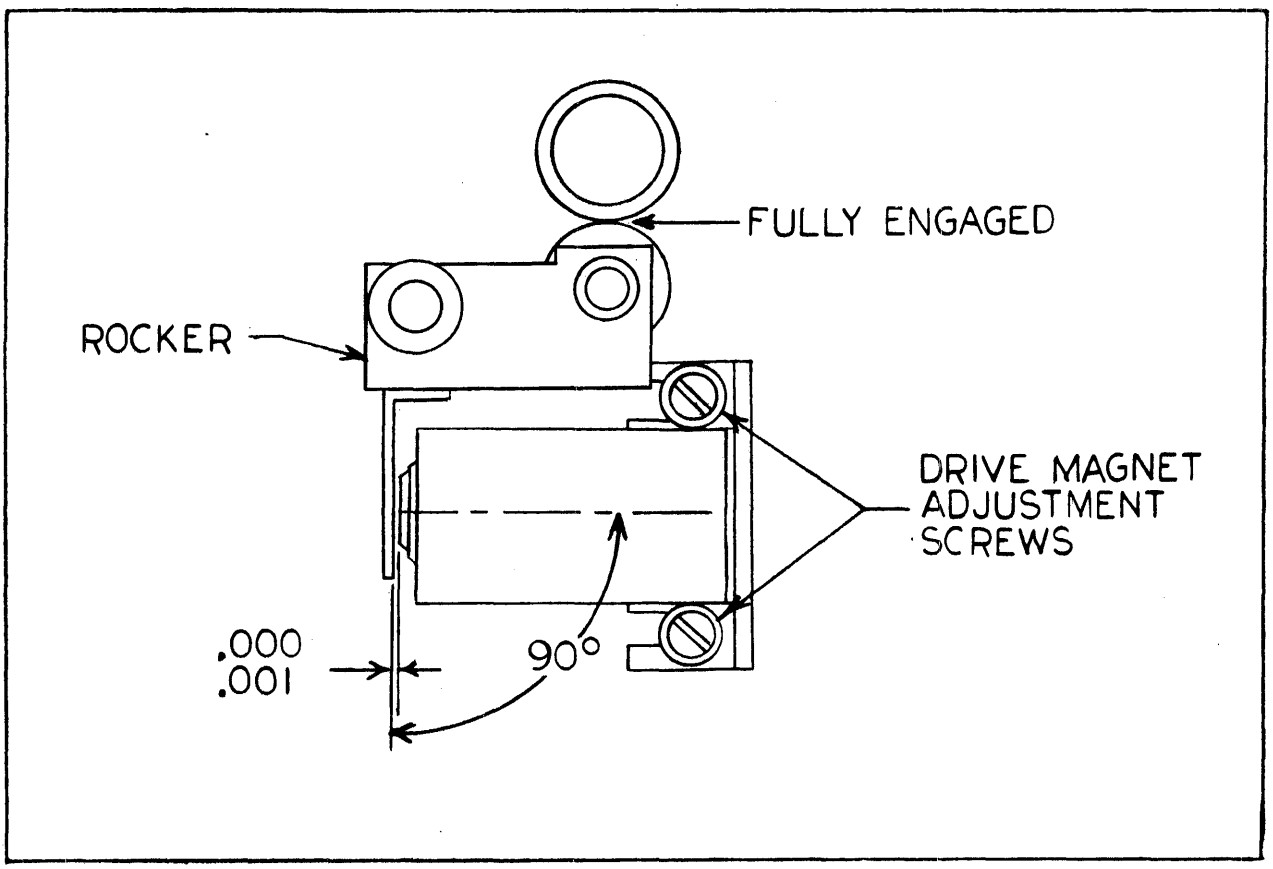


Figure 4-2
Proper adjustment of the drive magnet air gap.

4.3 Identification of Components and Parts

Figures 4-4 and 4-5 illustrate the component layout and the various mechanical subassemblies of the transport. All electronic components are identified by letter-number combinations and correspond to the symbol listings in Section 6.1. Mechanical parts are identified by numbers which refer to the reference numbers listed in Section 6.2. Those items identified by a broken arrow indicate the location of parts not visible in the photograph.

4.4 Tape Splicing Instructions

In the event of tape breakage, it is recommended that a butt splice be used to repair the tape. A butt splice is made by bringing the ends of the tape together without any overlapping and securing them firmly together with the splicing material. Refer to Figure 4-3. A recommended splicing material is the silver Scotch tape #852. Care should be exercised to make certain the splicing material ends between feed holes and that the splicing material is trimmed coincident with the edge of the tape.

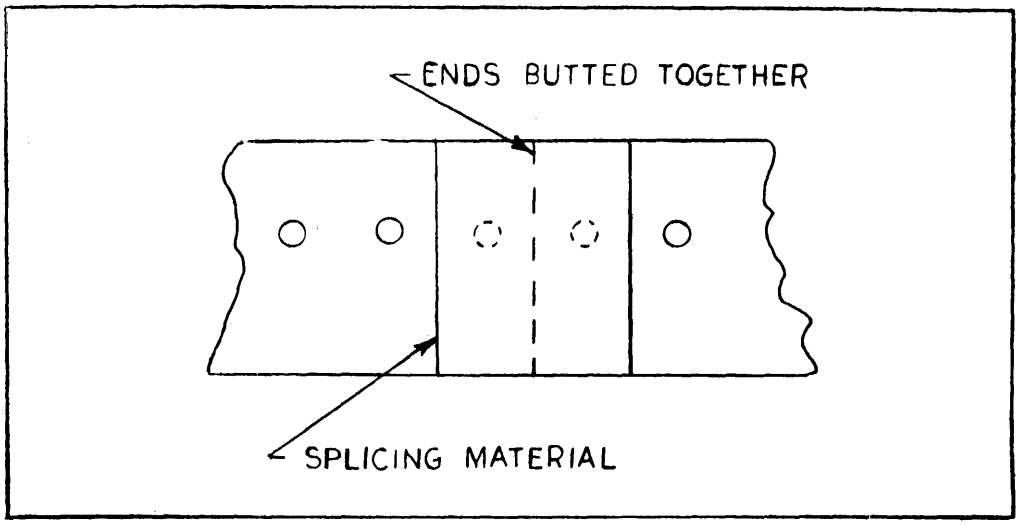


Figure 4-3

A sample tape showing a properly made splice.

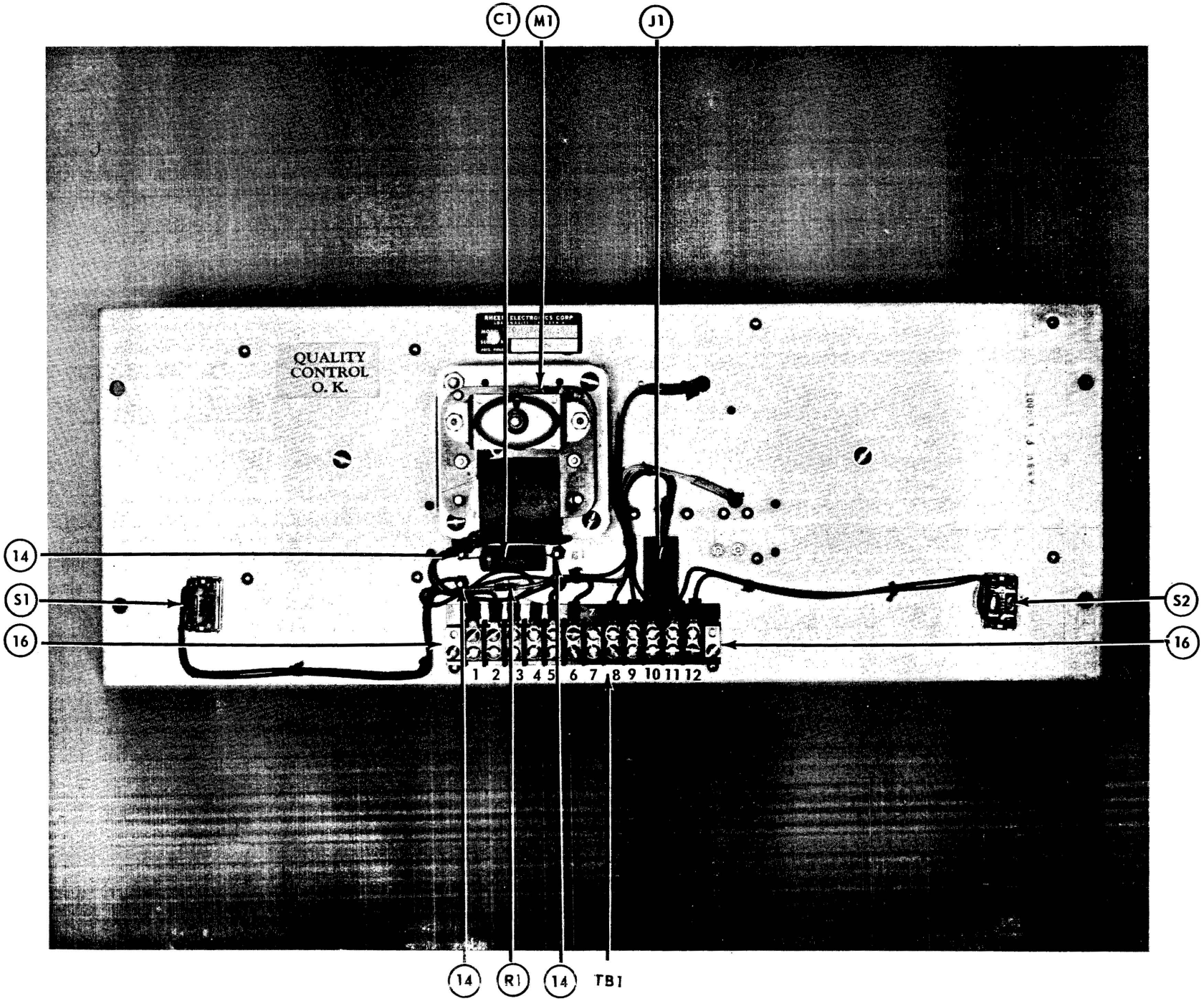


Figure 4-4. Rear view of the Transport showing various electronic components and mechanical parts.

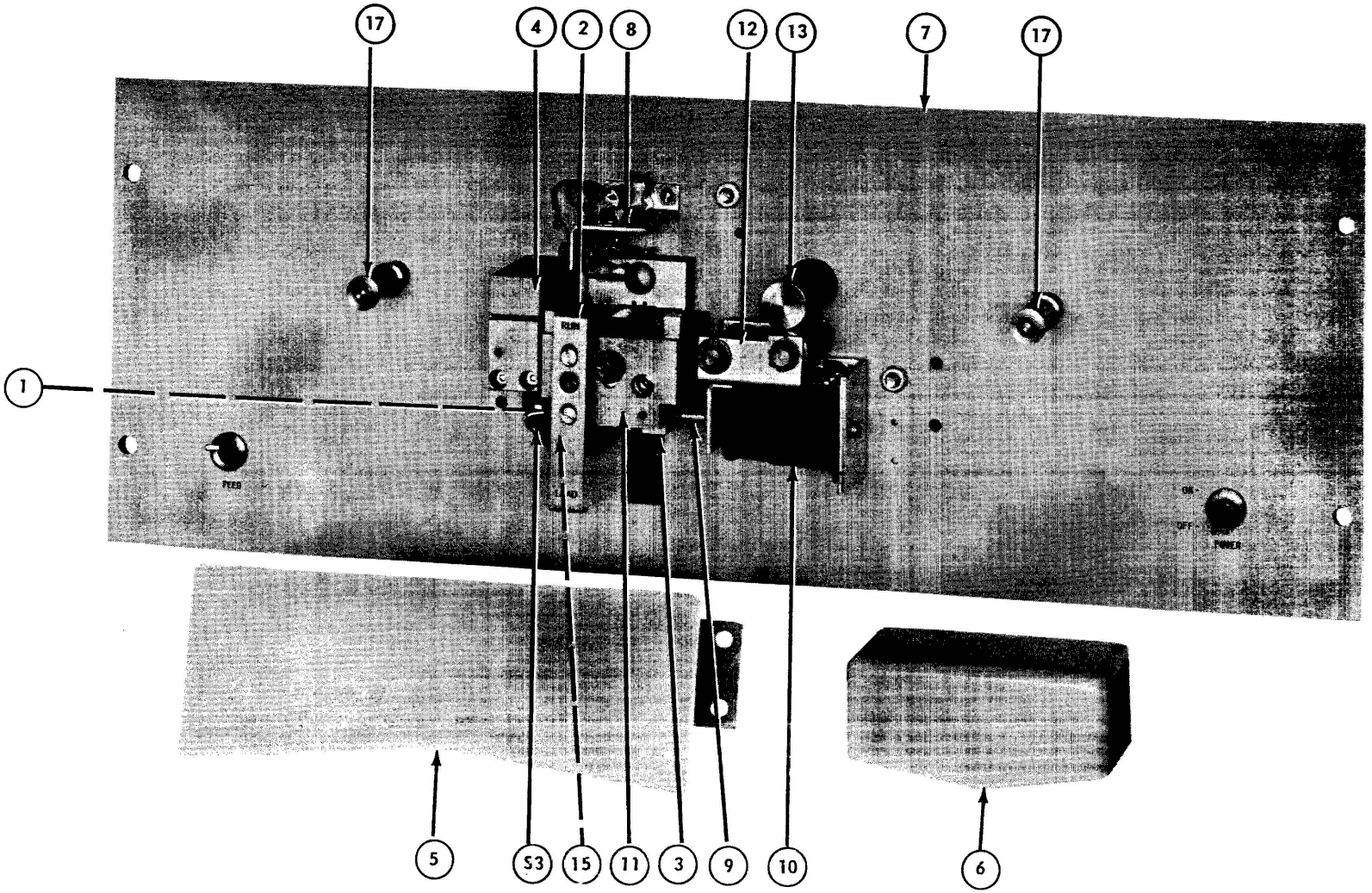
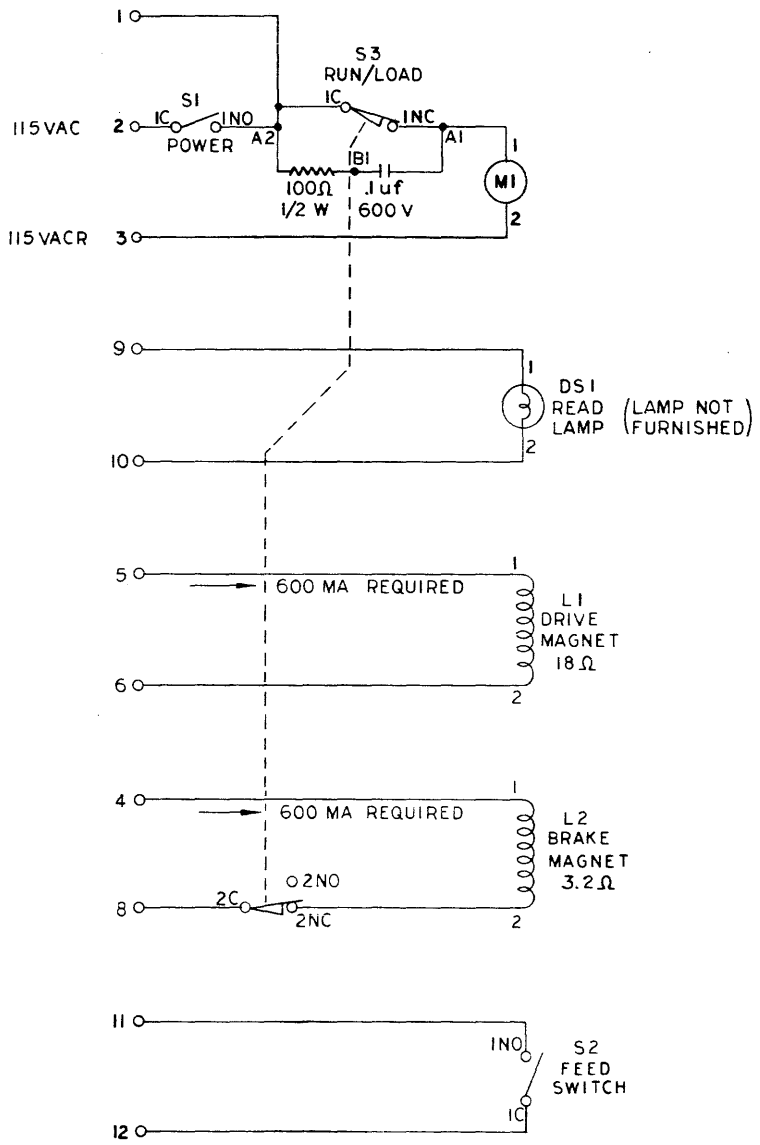
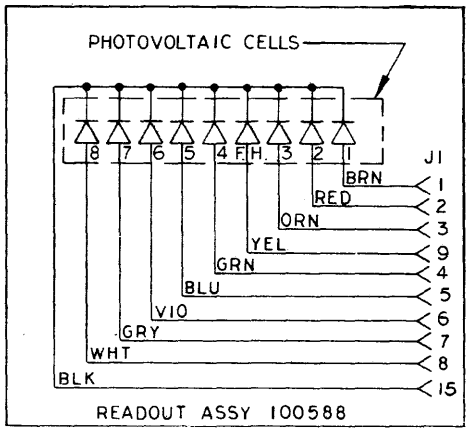


Figure 4-5. The front panel of the Transport with covers removed.

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
7-23-63	A	RELEASED			JV
12-27-63	B	L2, 3.2Ω WAS 32Ω	6082	MG	JV
12-31-63	C	J1 16, 15 WAS 16, 10	6776	MG	JV

TBI





RHEEM ELECTRONICS

NEXT ASSY 102870		DRAWN	12-17-63
USED ON RR-302-RT-S1		CHECKED JV	DATE 12-31-63
SCALE —		APPROVED WG	DATE 12-31-63

TITLE
SCHEMATIC RR 302 RT-S1
READER TRANSPORT

DWG NO. 102872

SHEET ____ OF ____

SECTION 6

PART LIST

Listed in this section are the various electronic components and mechanical parts which are used in the REMEX Tape Transport. All items are available from REMEX/Rheem Electronics, 5250 W. El Segundo Boulevard, Hawthorne, California, 90251.

6.1 Electronic Parts List

Description	Rheem Part No.	Symbol
Capacitor, .1 uf, 600V	602160-106	C1
Connector, Cannon DA-15P	606500-117	J1
Connector, Cannon DA-15S	606500-118	P1
Junction Shell (P1), Cannon DA-51211-1	609910-102	-
Magnet Assembly, Drive	100349	L1
Magnet Assembly, Brake	101777	L2
Motor	100455	M1
Resistor, 100 ohm, ½W, 5%	601004-101	R1
Switch, SPST	605100-108	S1
Switch, SPST	605100-107	S2
Switch, Microswitch 115M1-T2	605500-124	S3
Terminal Board	609300-125	TB1

6.2 Mechanical Parts

Description	Rheem Part No.	Quantity	Symbol
Actuator	605510-105	1	1
Actuator, Tape Adjust	103176	1	2
Block, Lower	102546	1	3
Brake Assembly	101777	1	4
Brake Shoe	101780	1	
Brake Shoe Housing	101781	1	
Mounting Block Assembly	102115	1	
Spring	101783	1	
Cover, Lower	102868	1	5
Cover, Upper	102869	1	6
Front Panel	102871	1	7
Lamp Bracket Assembly	102530-2	1	8
Bracket	102543	1	
Clip	609350-108	2	
Mounting Plate	100696-2	1	
Machine Screw, Hex Head 10-24 x 7/8	609106-135	1	9
Magnet Assembly	100349	1	10
Bracket	100334	1	
Coil	607100-100	1	
Core	100355	1	
Spacer	609150-104	1	

Description	Rheem Part No.	Quantity	Symbol
Photocell Block Assembly	102529-5	1	11
Block, Upper	102545	2	
Mounting Block	102535	1	
Readout Assembly (Photocells)	100588	1	
Rear Tape Guide	102544	1	
Spring	100531	1	
6 Steel Ball, 3/32 Diameter	611100-109	1	
Tape Adjustor	102389	1	
Tape Clip	100797	1	
Tape Guide	102390	2	
Rocker Assembly	102919	1	12
Bearing, Jam Roller	611100-124	2	
Jam Roller	100756	1	
Insulator	102920	2	
Retaining Ring	611400-107	3	
Rocker	100248	1	
Shaft, Pivot	100251-1	1	
Shaft, Roller	100251-2	1	
Torsion Spring	100324	1	
Roller, Drive	100254-2	1	13
Stand Off Terminal	612150-103	3	14
Stop, Tape Adjust	103177	1	15
Straddle Plate	609350-121	2	16
Tape-Roller Assembly	102202	2	17
Bearing	611100-112	2	
Retaining Ring	611400-111	1	
Shaft-Roller	101836	1	
Tape Roller	101837	1	