INSTRUCTION MANUAL

RP-9362/RPF-9362

TAPE READER/PUNCH

EECO

DOC. NO. 11142

INSTRUCTION MANUAL

RP-9362/RPF9362

TAPE READER/PUNCH

EECO

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(Photograph will be supplied at a later date)

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A860

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Figure 1-1. Tape Reader/Punch

SECTION I

GENERAL DESCRIPTION

1-1. SCOPE.

This manual contains operation and maintenance information for the RP-9362/RPF9362 Tape Reader/Punch (reader/punch). This information includes general description, installation and operation procedures, functional description, maintenance procedures, engineering drawings and replaceable parts lists.

1-2. EQUIPMENT DESCRIPTION.

The reader/punch shown in figure 1-1 is a photoelectric punched tape reader and universal tape punch, combined in a single chassis. The reader and punch operate independently, permitting simultaneous operation. Reader/punch operations are controlled by external signal voltages applied to the rear panel input/output connectors, however local front panel switches control auxiliary functions.

The reader employs infrared light-emitting diodes to transmit light through holes in punched tape to be sensed by phototransistors. The phototransistors detect the infrared light and generate electrical signals. After being wave-shaped and amplified, the electrical signals are applied to the input/output connector.

The punch punches one sprocket hole and one row of data holes in response to each punch command. Tape punching speed up to 60 characters per second is established by external control signals.

Model RP-9362 utilizes spools of tape and contains a rewind post controlled by a front panel toggle switch. Model RPF9362 utilizes fan-fold tape with bins for both the supply and take-up tape.

Both models of the reader/punch are designed for rack mounting in a standard 19-inch RETMA equipment rack. Chassis mounted slides are optional.

See table 1-1 for electrical and mechanical specifications.

Table 1-1. Specifications

Parameter	Specification
Dimensions	
Width	19.00 inches (48.26 centimeters)
Height	10.47 inches (26.59 centimeters)
Depth	12.50 inches (31.75 centimeters)
Weight (RPF9362)	42 pounds (19.05 kilograms)
(RP-9362)	32 pounds (14.51 kilograms)
Tape	
Material	Paper, aluminum-Mylar, paper-Mylar, or Mylar-aluminum
Thickness	Up to 0.0045 inches (0.1143 millimeters)
Tolerance	Tape punched per EIA Standard RS-227-A, ECMA, ANSI, or ISO
Width/Levels	1.000 ± 0.003 inches (25.400 ± 0.076 millimeters) 5, 6, 7, or standard 8 track plus sprocket
Transparency	60% transmissivity maximum (40% opaque)
Reader Tape Bin	Accommodates 250 feet (76.2 meters) of fan fold tape
Punch Tape Supply	Accommodates standard 1,000 feet (304.8 meters) carton
Power Requirement	115.0 ± 11.5 Vac, 50-60 Hertz
Power Consumption	
Maximum	300 watts
Typical	200 watts
Peak Inrush Current	10 amperes
Logic Levels	
Positive Logic	Logic 0 = 0.0 to + 0.5 Vdc at 16ma Logic 1 = + 2.4 to + 5.3 Vdc at 400μa
Negative Logic	Logic 0 = + 2.4 to + 5.3 Vdc at 400μa Logic 1 = 0.0 to +0.5 Vdc at 16ma
Reading Modes	
Step	Logic 1 pulse 0 to 300 characters per second (see figure 2-2)
Slew	Logic 1 input for duration of slew, 300 characters per second
Stop	Logic 0
Data (8 channels)	
Hole	Logic 1
No Hole	Logic 0
READ CLOCK (Sprocket)	
Hole	Logic 1
No Hole	Logic 0

Parameter	Specification
RUN STATUS	
LOAD (Head Open)	Logic 1
RUN (Head Closed)	Logic 0
DRIVE ACKNOWLEDGE	
Step or Slew signal received	Logic 1 pulse 80 ±30 μs
Step or Slew signal not received	Logic 0
READER READY	Logic 1 when the reader is ready to accept an input drive command
Punching Modes	
Forward	Data and sprocket holes punched in response to an input PUNCH COMMAND up to 60 characters per second
Reverse	Tape travels in reverse direction without punching data or sprocket holes
Leader	Sprocket holes punched at 60 characters per second
Data (8 channels)	
Hole	Logic 1
No Hole	Logic 0
FEED DIRECTION	
Forward	Logic 1
Reverse	Logic 0
PUNCH COMMAND	Logic 1 for 10 μs minimum, 8ms maximum
MOTOR ON	Logi 1 for 10 μs minimum
MOTOR OFF	Logic 1 for 10 μs minimum
PUNCH READY	Logic 1
TAPE HANDLING ERROR	Logic 1
$\overline{\text{SYSTEM READY}}$	0.0 to + 0.5 Vdc at 16 ma (open collector transistor)

SECTION II

INSTALLATION AND OPERATION

2-1. GENERAL.

This section of the instruction manual contains installation and operation information for the reader/punch. Refer to the Options section of this manual and/or interfacing equipment instruction manuals for special installation requirements.

2-2. INSTALLATION.

Apply power to the reader/punch via the three-pin power connector J1. The power cord, three-wire Belden part number 17258 (EECO part number 346302-05) is supplied in the parts kit.

CAUTION

When connecting the ac line cord to the line, be certain that the grounding pin is connected to a good ground source.

The data and control signals necessary for reader/punch operation are shown in figure 2-1. To interface with other equipment, fabricate appropriate cables using size 22 AWG wire of necessary length not to exceed 10 feet. For noise immunity, use twisted pairs, terminated at both ends of the cable to the ground points.

2-3. Reader Interface.

To synchronize the input drive signals with the reader control signals, observe the timing relationships of figure 2-2. The recommended interface circuits are shown in figure 2-3. In the step mode, apply a 150 ± 50 microsecond (t_1) logic 1 pulse to either DRIVE RIGHT or DRIVE LEFT. Hold the unused drive input at logic 0.

Synchronize on the READER READY signal J1-6 by applying the step pulse only when READER READY is in the logic 1 state. READER READY goes to the logic 0 state when a step input is applied and returns to logic 1 typically 220 microseconds after the READ CLOCK (Sprocket) returns to logic 1 (t_3). The step input repetition rate must be 3.3 milliseconds or more (t_2).

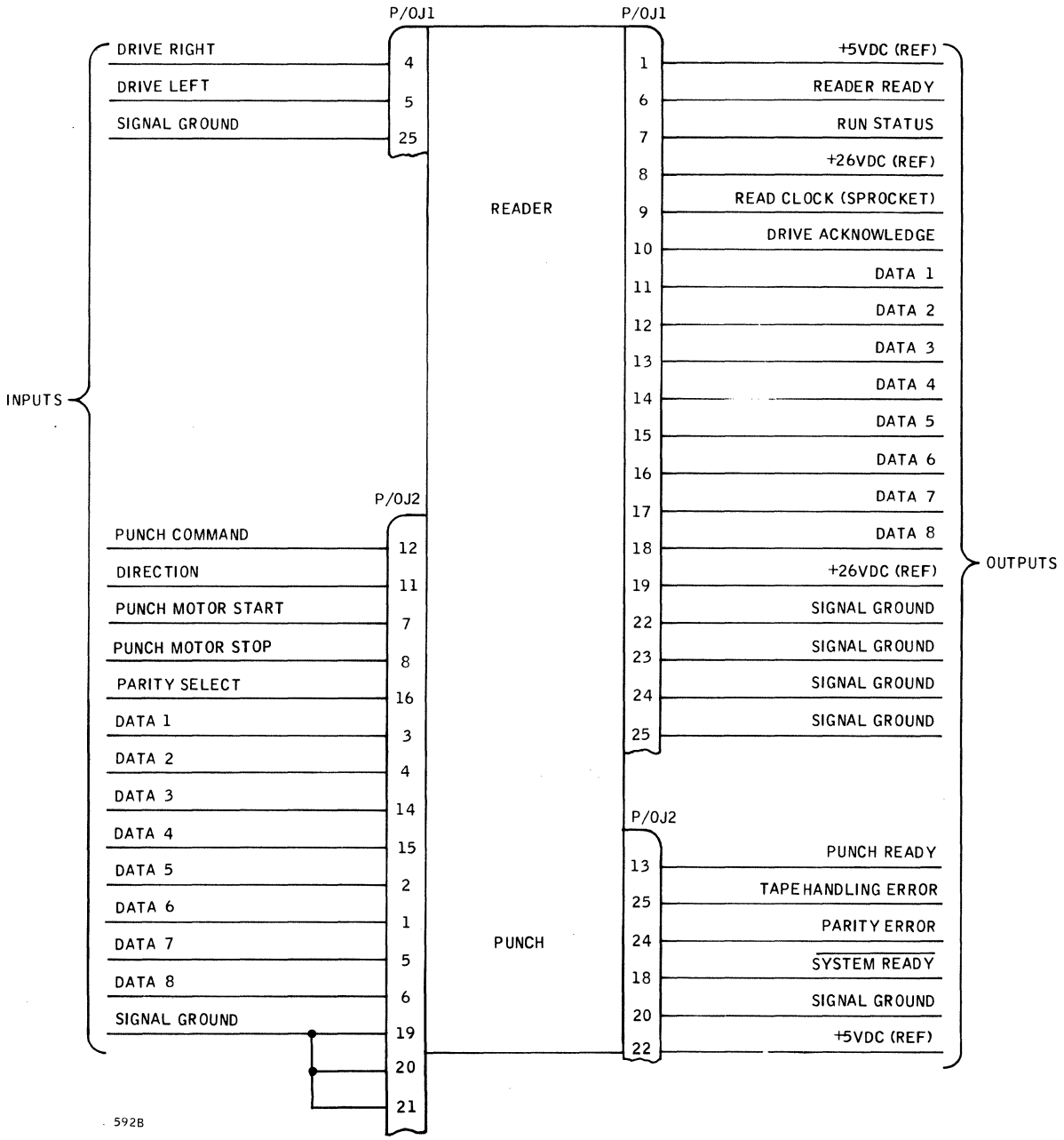


Figure 2-1. Input/Output Signals

The reader can also be operated in the step mode using the DRIVE ACKNOWLEDGE signal. Apply a logic 1 pulse at any time and hold at logic 1 until DRIVE ACKNOWLEDGE signal is received.

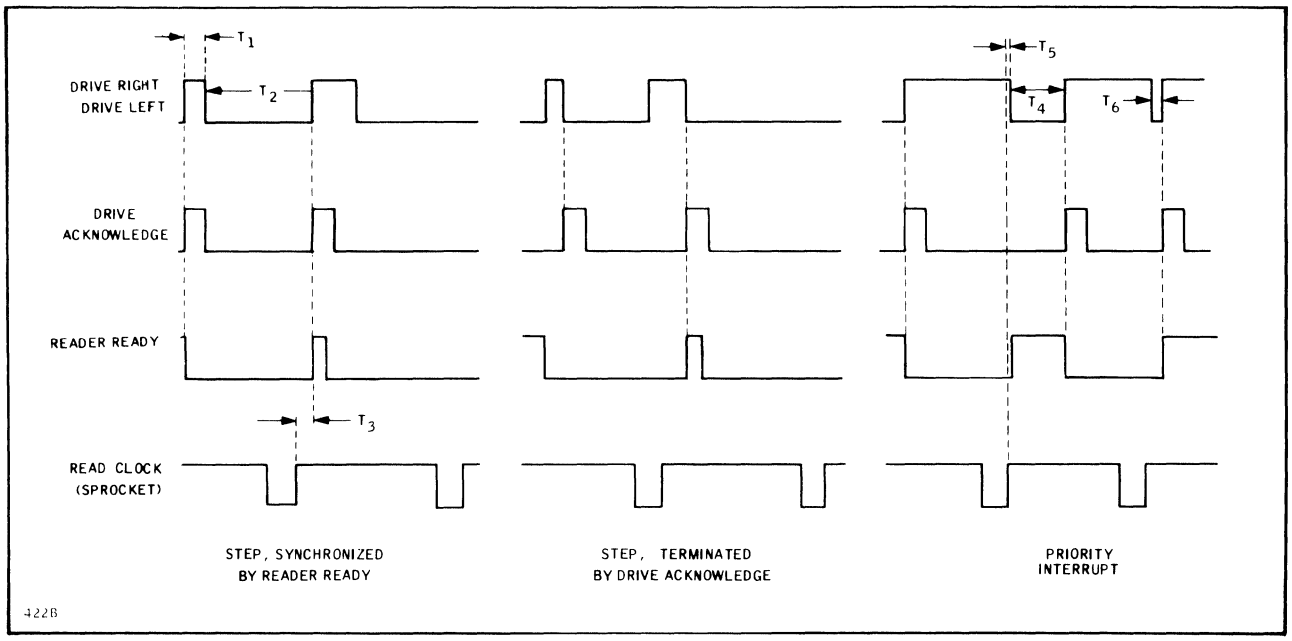


Figure 2-2. Reader Interface Timing Diagram

For slew mode operation, hold DRIVE RIGHT or DRIVE LEFT at a logic 1 level for the duration of slewing. The repetition rate in the slew mode is limited by the reader. In the priority interrupt mode, an interrruption greater than 50 microseconds causes the reader to pause until another DRIVE input is received (t_4). The reader continues to run at maximum speed if the DRIVE input is dropped for less than 50 microseconds (t_6). To stop on-character, remove the DRIVE input within 50 microseconds of the rising edge (hole-going condition) of the READ CLOCK (Sprocket) (t_5).

Note

When switching from a DRIVE RIGHT input to a DRIVE LEFT or vice versa in any mode, hold both inputs at 0 volts for a minimum of 20 microseconds.

Sample the data after READ CLOCK (Sprocket) goes to the logic 1 level (hole condition). The READ CLOCK (Sprocket) may be delayed before sampling the data for higher reliability when using worn or skewed tapes.

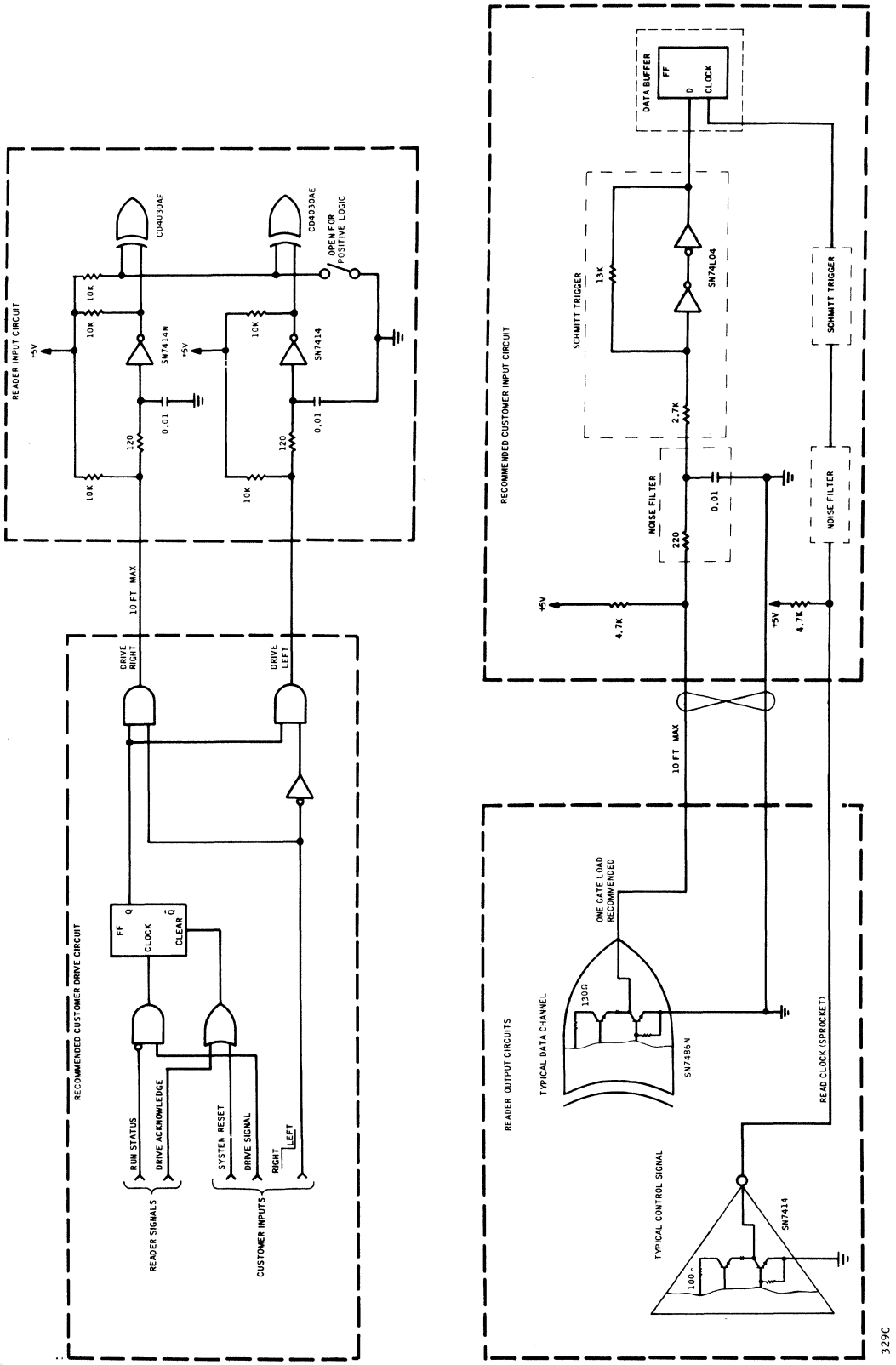


Figure 2-3. Recommended Reader Interface Circuits

2-4. Punch Interface.

The timing relationships for punch operation are shown in figure 2-4 and the recommended interface circuits in figure 2-5. FEED DIRECTION controls tape travel direction, logic 1 for forward and logic 0 for reverse. Apply a PUNCH COMMAND when PUNCH READY is at logic 1 and 1 microsecond or more after FEED DIRECTION is set to logic 1.

Each data channel to be punched must be at a logic 1 level at the time PUNCH COMMAND is initiated and for a minimum of 10 microseconds thereafter.

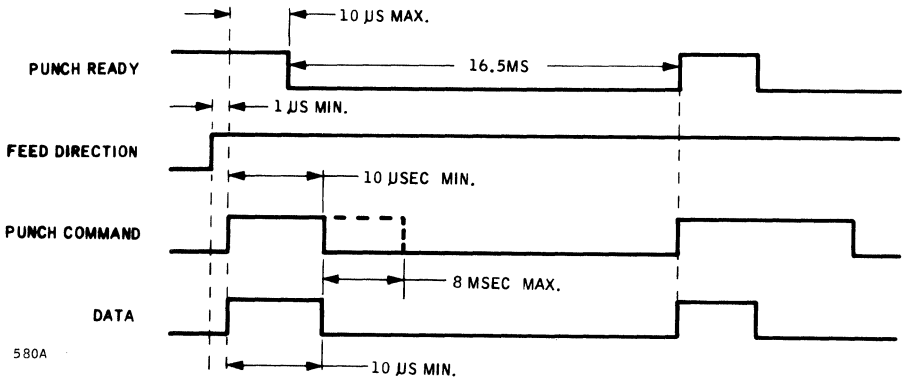


Figure 2-4. Punch Interface Timing Diagram

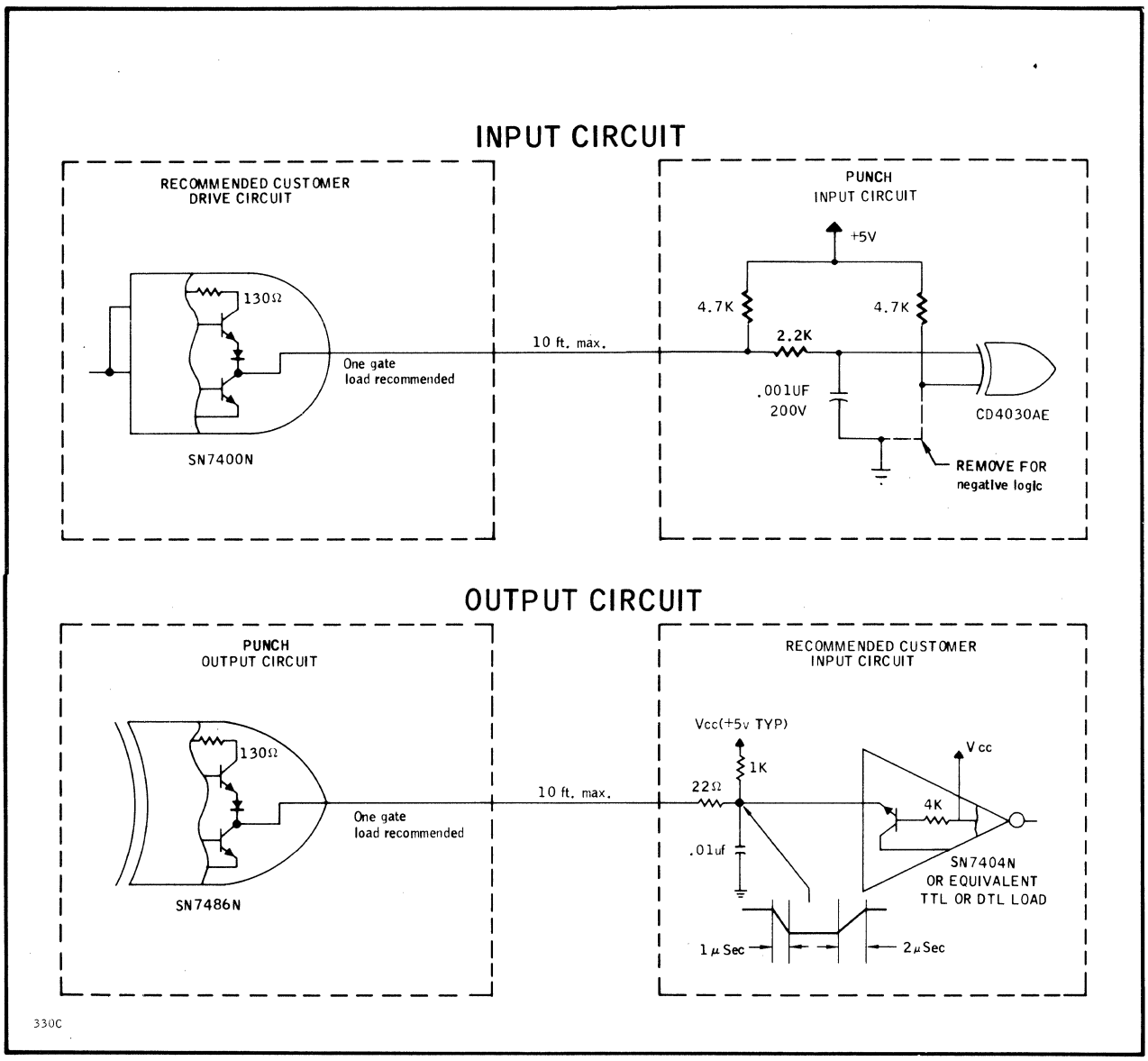


Figure 2-5. Recommended Punch Interface Circuits

2-5. LOGIC MODES.

Input and/or output logic modes may be inverted by adding or removing jumpers on the punch printed circuit card or by changing logic switch settings on the reader printed circuit card. The logic mode options are listed in tables 2-1 and 2-2.

Table 2-1. Reader Logic Options

LOGIC		LOGIC SWITCH POSITION			
Input	Output	Drive Input S1	Reader Ready S2	Sprocket Out S3	Data Output S4
Positive	Positive	Off	On	On	On
Positive	Negative	Off	Off	Off	Off
Negative	Positive	On	On	On	On
Negative	Negative	On	Off	Off	Off

Table 2-2. Punch Logic Options

LOGIC		JUMPER						
Input	Output	Feed Direction A	Punch Command B	Data Inputs C	Parity Error D	Punch Ready E	Tape Handling F	Punch Motor G
Positive	Positive	In	In	In	In	In	Out	In
Positive	Negative	In	In	In	Out	Out	In	In
Negative	Positive	Out	Out	Out	In	In	Out	Out
Negative	Negative	Out	Out	Out	Out	Out	In	Out

2-6. OPERATION.

The reader and punch operations of the reader/punch are completely independent and therefore may be operated individually or simultaneously. Reader and punch operations are controlled for the most part by external signals. The local controls serve mainly to operate auxiliary functions.

Table 2-3 lists all operator controls and indicators and describes the associated function of each.

Table 2-3. Controls and Indicators

Control or Indicator	Location	Function
POWER ON/OFF switch	Front Panel	Applies 115Vac power to both reader and punch circuits.
POWER ON indicator	Front Panel	Indicates reader/punch circuits energized.
◀▶ switch	Front Panel	Momentary switch to control tape rewind direction.
RUN/LOAD switch	Front Panel	RUN for normal reading operation; LOAD to inhibit reader stepping for tape loading, data outputs remain active.
LDR switch	Front Panel	Pushbutton switch to produce a tape leader with sprocket holes. The punch operates at the 60 character per second rate in the forward direction.
TAPE STATUS indicator	Front Panel	Indicates a tape handling problem in the punch only. Does not affect or is not affected by reader operation. The punch tape supply is exhausted or the tape is broken, loose, or too taut.
Data Level switch	Punch printed circuit card	Thumbwheel switch. Blanks unused channels for 5, 6, or 7 level data perforating.

Table 2-3. Controls and Indicators (Continued)

Control or Indicator	Location	Function
Logic Level Option switches	Reader printed circuit card	Four mini switches to select positive or negative logic levels. See table 2-1.
DUPLICATE switch (RPF9362 only)	Front Panel	Option. Allows the punch to duplicate tape in the reader in the DUPLICATE position.
REWIND switch (RP-9362 only)	Front Panel	Controls rewind post to re-wind short strips of tape.

2-7. Reader Tape Loading.

One inch wide, eight-level tape has three rows of information holes toward the reader front panel, the row of sprocket holes, then five rows of information holes on the outside. Narrower tapes have three information holes on the panel side and fewer than five on the other side of the sprocket holes. Place the tape in either fan-fold bin and proceed as follows (see figure 2-6):

1. Open the reader head by carefully lifting the upper section.

2. Turn the variable tape guide in either direction to adjust for the width of tape being used.

3. Route the tape through the reader head ensuring the sprocket teeth engage the sprocket holes (row of smaller holes) and the tape lays between the tape guides.

4. Carefully close the reader head by pressing down on the upper section until it snaps into place.

2-8. Punch Tape Loading.

Refer to figure 2-7 to route the tape, and proceed as follows:

1. Pull the reader/punch out on the extension slides sufficiently to load the tape container.

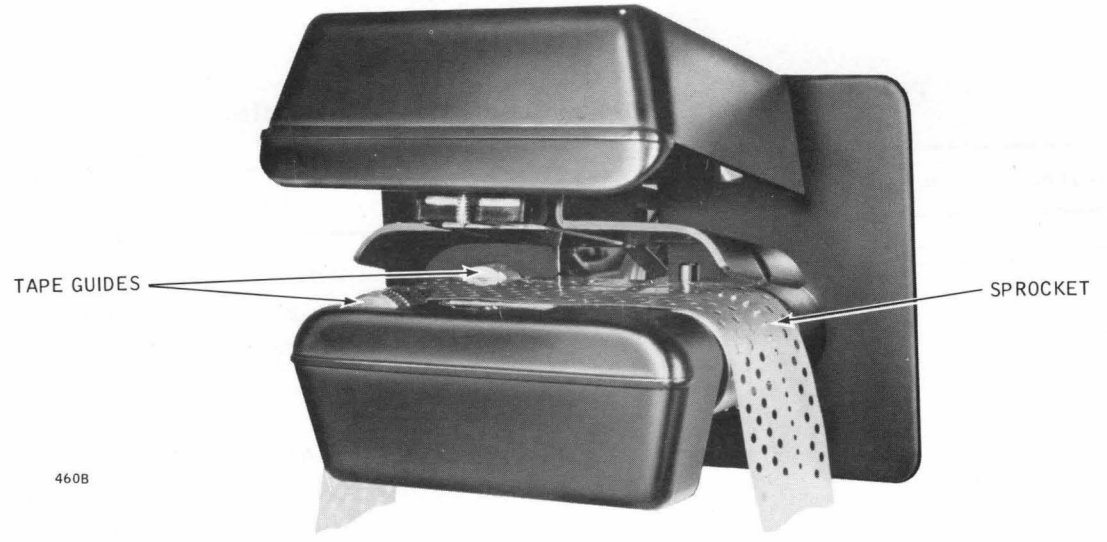


Figure 2-6. Reader Tape Loading

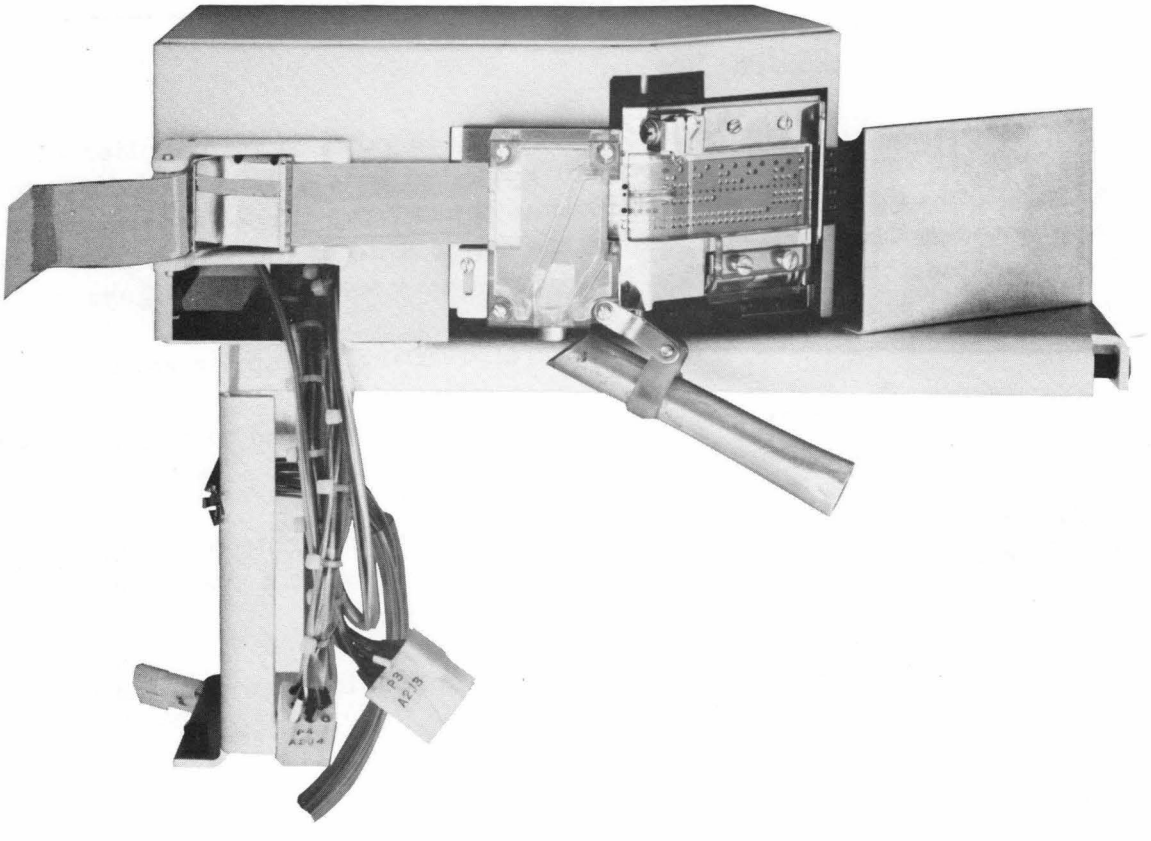


Figure 2-7. Punch Tape Loading

2. Position the tape container on the top shelf within the four corner brackets.

3. Pull the tension release plate forward (toward the chad diverter) to allow easy threading of the tape tension switch.

4. Thread the tape tension switch, drop the tension release plate into position, and direct the tape into the chad diverter.

5. Release the cover by lifting the latch release.

6. Thread the tape through the slot under the chad diverter onto the sprocket.

7. Place the tape under the tape tear plate and into the tape bin.

8. Holding the tape in place, close the cover and lock it in place with the cover latch. This binds the tape against the sprocket.

9. The tape punch is now ready for operation. A tape leader may be prepared by applying power to the unit and pressing the LDR push-button.

2-9. Operating Procedure.

To operate the reader/punch, perform the following:

1. Select the logic options for both the reader and the punch. See tables 2-1 and 2-2.

2. Select the number of data channels to be punched with the data level thumbwheel switch on the punch printed circuit card.

3. Load tape in the reader per paragraph 2-7 and in the punch per paragraph 2-8.

4. Connect reader interfacing signals to J1 and punch interfacing signals to J2 per paragraph 2-2.

5. Apply power to the unit and position POWER switch to ON.

6. Position the RUN/LOAD switch to RUN.

7. Apply control and data signals from external equipment. See figure 2-4 for timing relationships.

2-10. Tape Splicing.

When necessary to splice punched tape, a butt splice is recommended. A butt splice is made by placing the square-cut ends of the tape together without overlapping (see figure 2-8). Care should be taken to maintain the proper distance between holes. The hole spacing should be 0.100 ± 0.001 inches. Punched tape dimensions are shown in figure 2-9. Splicing can best be accomplished by use of a commercial punched tape splicer such as manufactured by the Data-Link Corp. There should also be no lateral shift of the tape ends. Apply contact adhesive splicing material such as silver Scotch tape No. 852 to the top side of the punched tape so that it will be away from the phototransistor array and sprocket wheel. Pre-punched splices are also available from several sources. Be certain the splicing material ends between holes. Trim the splicing material evenly at the edges of the tape. Do not use transparent splices on butt spliced tape.

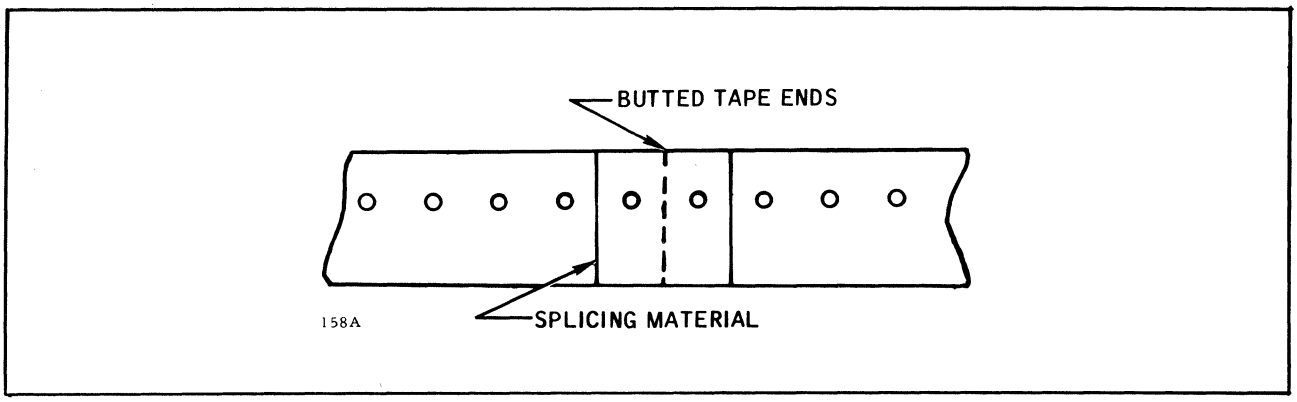
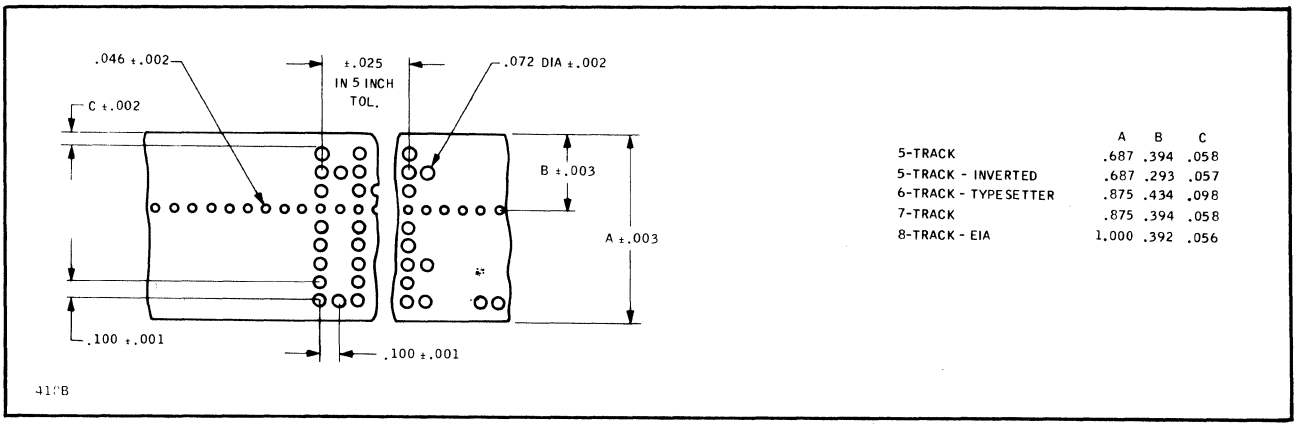


Figure 2-8. Tape Splice



	A	B	C
5-TRACK	.687	.394	.058
5-TRACK - INVERTED	.687	.293	.057
6-TRACK - TYPESETTER	.875	.434	.098
7-TRACK	.875	.394	.058
8-TRACK - EIA	1.000	.392	.056

Figure 2-9. Punched Tape Dimensions

SECTION III

FUNCTIONAL DESCRIPTION

3-1. GENERAL.

This section contains a functional description of the reader/punch. Refer to section V for the engineering drawings and section VI for special customer requirements or options.

3-2. FUNCTIONAL DESCRIPTION.

The reader/punch is a tape reader and tape punch combined in a single chassis. The reader and punch sections are independent and capable of simultaneous operation. A simplified block diagram of the reader/punch is shown in figure 3-1.

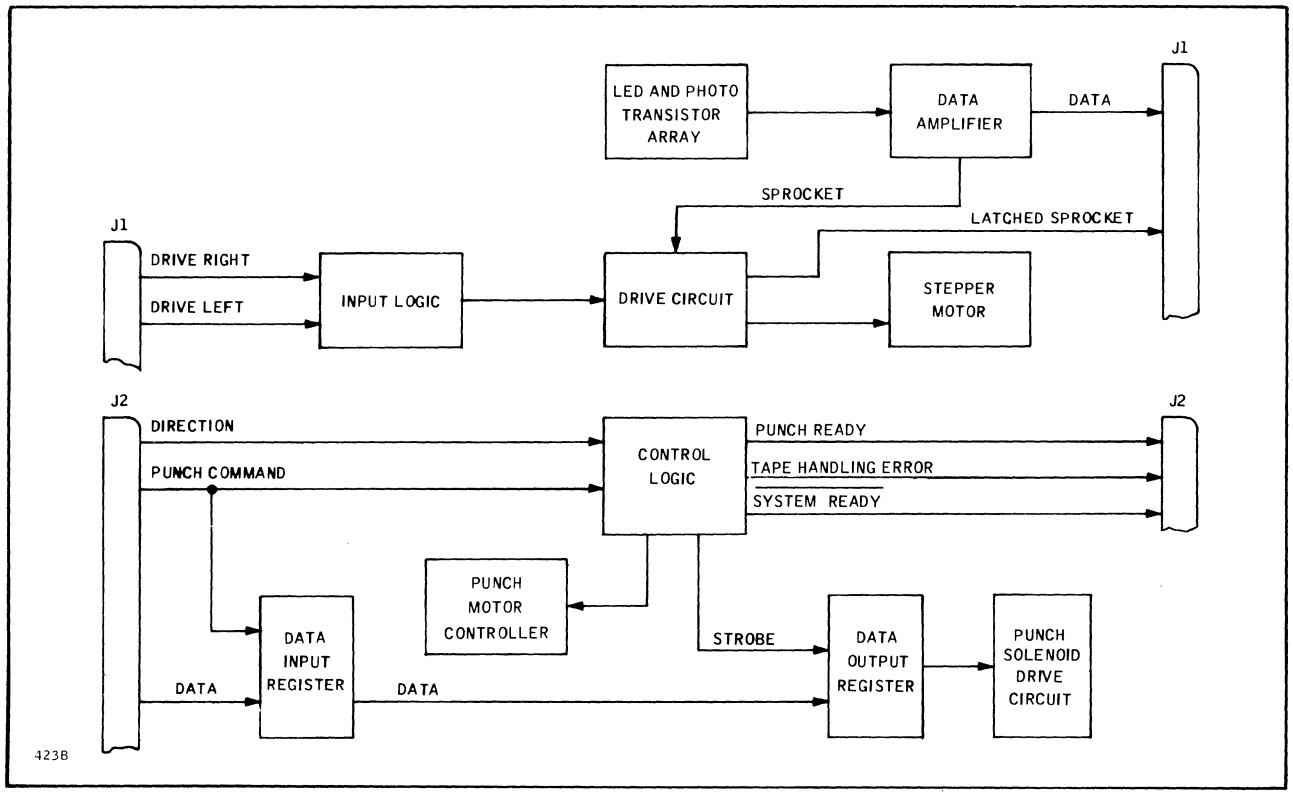


Figure 3-1. Tape Reader/Punch Simplified Block Diagram

3-3. Reader Functional Description.

The reader section of the reader/punch is a photoelectric punched tape reader. Nine light emitting diodes (LED array) arranged to transmit light through holes in punched tape bias nine corresponding phototransistors. Current through the LED array is adjusted to bias the phototransistors into full conduction for holes in the tape and into cutoff for no holes. The phototransistor outputs are amplified, wave shaped and applied to the output connector as data signals. These eight data signals, corresponding to tape holes, are available at the output connector along with several interface control signals.

The punched tape passes between the LED array and phototransistor array one row of holes at a time. The sprocket, driven by the stepper motor, engages the sprocket holes in the tape and propels the tape in the direction controlled by external control signals. External control signals are applied through the input/output connector to the input logic circuit. The input logic circuit activates the motor driver circuit to the power level necessary to activate the stepper motor. As the stepper motor drives the tape to a new row of holes, the sprocket hole initiates several control signals. The control signals are available at the input/output connector to control operation of the reader.

3-4. Punch Circuit Description.

The tape punch section punches paper tape with data and sprocket holes in response to an input PUNCH COMMAND, a FEED DIRECTION signal and from five to eight data bits. Input data is clocked in the data input register by the PUNCH COMMAND. A programmable-read-only memory (PROM) is employed to assess the input conditions of the tape punch. When all necessary inputs of the PROM are logic 1 each latch of the data output register containing data, biases an associated transistor drive circuit. Each transistor drive circuit energizes an associated punch solenoid to activate a punch magnet. The inputs needed to provide the PROM with the proper punch conditions are PUNCH COMMAND signal, tape tension switch signal, LDR switch signal and DIRECTION signal.

The punch motor is started externally by a PUNCH COMMAND, MOTOR ON, or manually by the front panel LDR switch. Power is continuously applied to the motor if a PUNCH COMMAND occurs at least once every 6 seconds. Data can be punched 150 milliseconds after the motor is initially turned on. When the punch motor is started by MOTOR ON, MOTOR OFF is required to stop it.

Data must be applied at the time PUNCH COMMAND is initiated and for a minimum of 10 microseconds thereafter. Up to eight channels of data may be punched and each must be a logic 1 to punch a hole.

Each PUNCH COMMAND advances the tape one row, punches a sprocket hole, and punches data holes when FEED DIRECTION signal is at logic 1. A backspace is initiated when FEED DIRECTION is at logic 0. The punch cycle requires 16.5 milliseconds, limiting the punching rate to 60 characters per second. To punch at full speed, PUNCH COMMAND must be synchronized with PUNCH READY. Speeds up to 55 characters per second may be achieved without synchronizing.

SECTION IV

MAINTENANCE

4-1. GENERAL.

This section contains maintenance information for the reader/punch. Instructions include preventive maintenance, reader alignment, and adjustment procedures.

4-2. PREVENTIVE MAINTENANCE.

Preventive maintenance consists primarily of visual inspection, cleaning, and lubrication. When performed as a regular routine, reader/punch breakdown may be prevented and reliability improved.

4-3. Cleaning.

The reader/punch should be cleaned as often as required to maintain appearance and performance. Excessive accumulation of dirt or paper dust on the reader head sensors can cause misreads.

CAUTION

Do not use chemical cleaning agents which contain acetone, xylene, benzene, toluene or methyl ethyl ketone (MEK). Use of these solvents may cause damage to the polycarbonate parts in the reader head requiring major repair. Do not immerse the reader/punch in cleaning solvents nor ultrasonic cleaners.

Tape motion across the glass-covered phototransistors tends to self clean the reader head; however, paper dust can accumulate in the phototransistor cavity. Stubborn deposits may be brushed out using the brush supplied (P/N 341201-01) or other soft artist brush. Extremely stubborn deposits on the head or glass surfaces may be removed by using cleaning agents such as water, a solution of water and detergent, isopropyl alcohol, Freon TE, or Freon TF.

4-4. Lubrication.

Lubrication, in the reader, is required on the read head cover hinge and ball detent holes. A small amount of Dow Corning 33 lubricant may be used in the locations pointed out in figure 4-1.

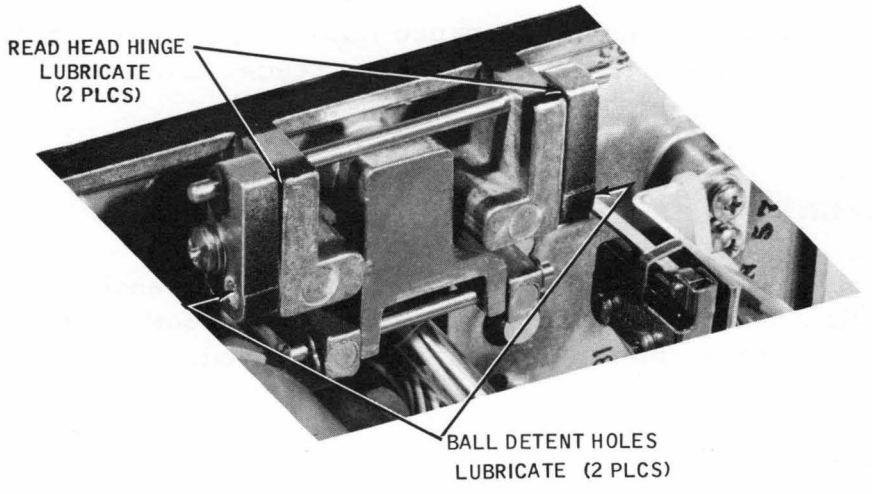


Figure 4-1. Read Head Lubrication Points

Lubrication points in the punch are identified by the callouts in figures 4-2 to 4-5. The numeral identifies the lubricant listed in table 4-1. Equivalent grade lubricants may be substituted. Apply lubricants sparingly.

Table 4-1. Lubricants

Item Number	Type Lubricant
1	Custom Lube 700
2	Gulflex "A" Grease
3	Custom Lube 700 Mixed With Gulflex "A" Grease

1. Ratchets, Gears, and Pawl (figure 4-2)

   a. Lubricate the inside bearing surfaces for the sprocket shafts in both punch side frames.

   b. Lubricate both holes in each ratchet shaft pivot link.

   c. Grease the tooth surfaces of both the ratchet and sprocket shaft spur gears.

   d. Grease the tooth surfaces of the forward ratchet.

CAUTION

DO NOT remove the ball detent from the shaft.

   e. Grease the tooth surfaces of the detent gear WITH THE BALL DETENT IN PLACE. Latch the forward feed solenoid by hand or electrically energize it to rotate the sprocket shaft. Pack the entire inside area of the detent.

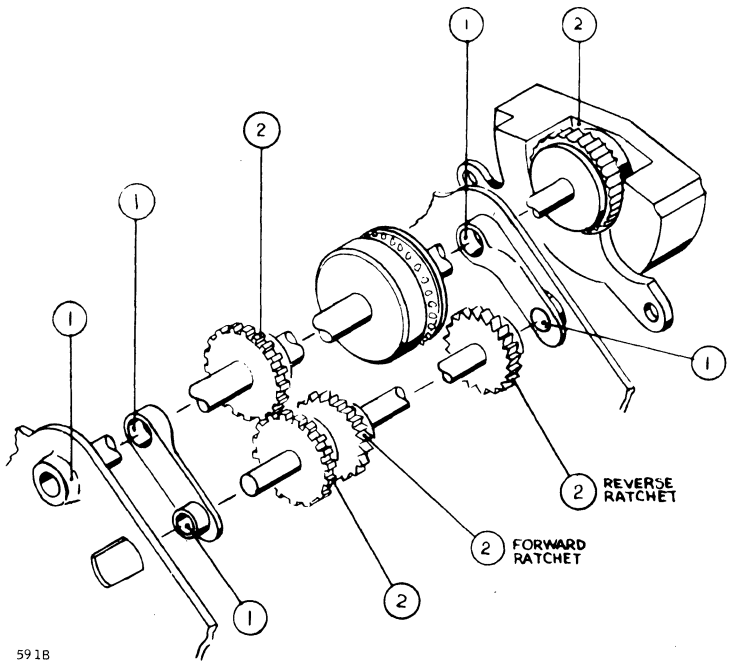


Figure 4-2. Ratchet, Gear, and Pawl Lubrication Points

2. Pawl and Punch Assembly (figure 4-3)

   a. Lubricate the surface of the pawl carrier eccentric shaft.

   b. Lubricate the pivot hole of each one of the nine pawls.

   c. Lubricate the tip of each pawl.

   d. Grease the contact points of each one of the nine punch driver arms.

   e. Grease the pawl contact notch on each one of the punch driver arms.

   f. Grease the ends of the pawl yoke return springs and their attachment holes in the pawl yoke and spring anchor bracket.

   g. Lubricate the upper surface of the punch driver arm stop that contacts the tip of each punch driver arm.

   h. Lubricate the contact surface at the end of each one of the punch driver arms.

   i. Lubricate the top and bottom of each slot for the index punch and all eight code hole punches.

   j. Lubricate the punch guide holes for all nine punches in the lower die plate.

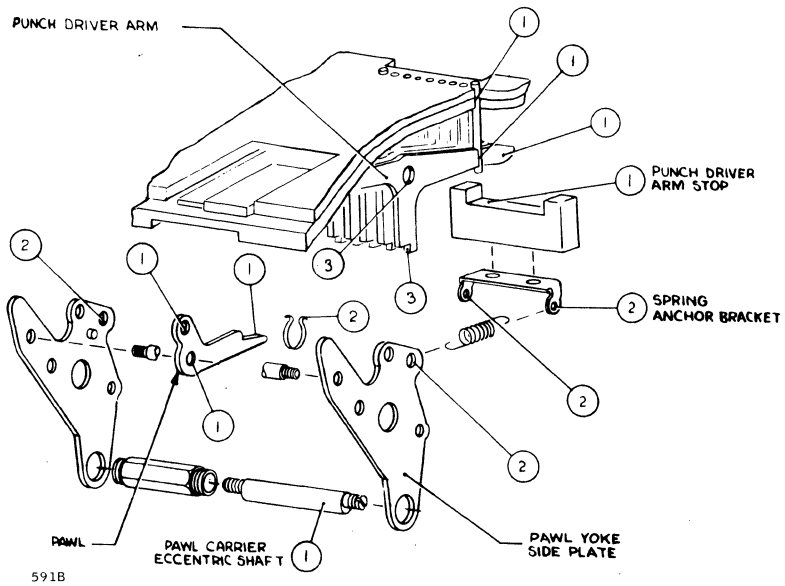


Figure 4-3. Pawl and Punch Lubrication Points

3. Solenoid Armatures, Feed Solenoid and Ratchet (figure 4-4)

   a. Lubricate both sides of each armature spacer. This must be done on all nine punch solenoid armatures.

   b. Lubricate the armature points and link pivot points on all nine solenoids.

CAUTION

DO NOT get lubricant on armature surfaces, solenoid cores, or solenoid frames.

   c. Lubricate the inside surfaces of armature pivot holes.

   d. Lubricate the interposer armature tip.

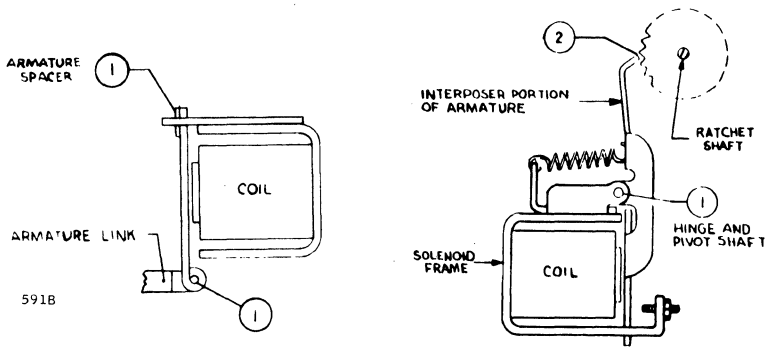


Figure 4-4. Armature, Solenoid, and Ratchet Lubrication Points

4. Shaft and Index Link

   a. Lubricate the upper bearing surfaces in both index links.

   b. Lubricate both sides of each washer and spacer shown.

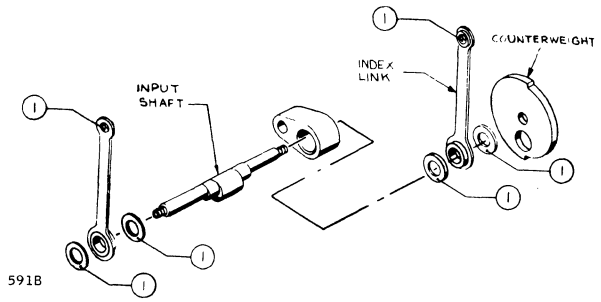


Figure 4-5. Shaft and Index Link Lubrication Points

4-5. READER/PUNCH ALIGNMENT AND ADJUSTMENT PROCEDURES.

All alignments and adjustments, both mechanical and electrical, are carried out initially at the factory. Readjustments should not normally be necessary; however, due to wear or replacement of parts and components, some readjustments may be required. Test equipment and special tools required to perform alignment and adjustments are listed in table 4-2. Equivalent test equipment and tools may be substituted.

Table 4-2. Test Equipment and Special Tools

Item No.	Tool or Test Equipment	Model or Part No.	Characteristics
1	Oscilloscope	Tektronix 545A	Dual channel pre-amplifier
2	Digital Voltmeter	Fluke 8000A	0.5% accuracy
3	Pulse Generator	Systron-Donner 100A	Variable pulse width and repetition rate
4	Loop of tape; half metalized-Mylar and half translucent paper-Mylar spliced end to end	Friden 1046518 and Arvey R-V-CT52H	Every other hole punched (checker-board pattern). Use the most translucent tape available
5	Loop of metalized-Mylar tape	Arvey R-V-CT52H	All holes punched
6	Test Clip (Dual-in-line IC)	EECO 117228-01	Extends IC pins for test and is used for extraction of IC
7	Translucent Tape Standard	EECO 325007	Kodak Photographic Step tablet No. 3, Step #4

Alignment of the read head and adjustment of the reader circuits are performed as follows: (The punch circuits require no adjustment.)

1. Tape Guide Alignment (figure 4-6)

   a. Loosen the setscrews on each tape guide.

   b. Align the tape guides to provide 0.005 inch clearance between each tape guide and the edge of the tape.

   c. Tighten the locking setscrew to secure the tape guide in position.

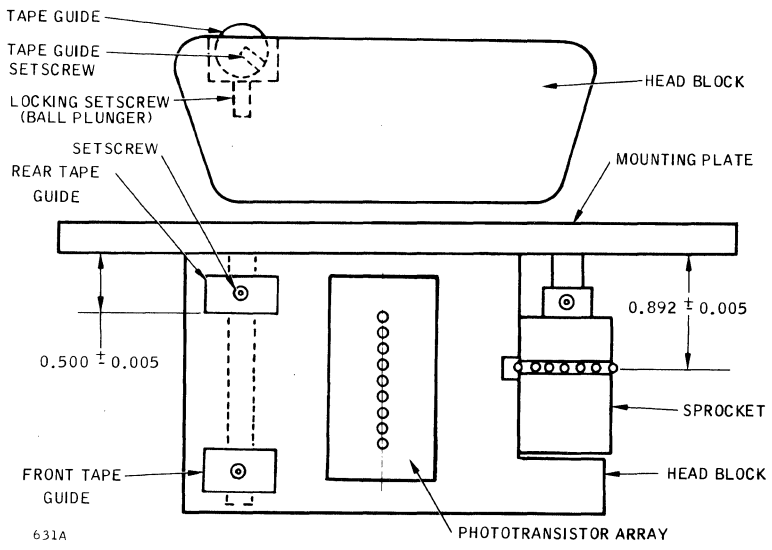


Figure 4-6. Tape Guide Alignment

2. LED Current Adjustment

   a. On the positive logic PCB (figure 4-7), adjust the LED potentiometer for 2.5 Vdc measured across resistor R63.

   b. If the requirements of step 3 cannot be met, adjust to a higher value.

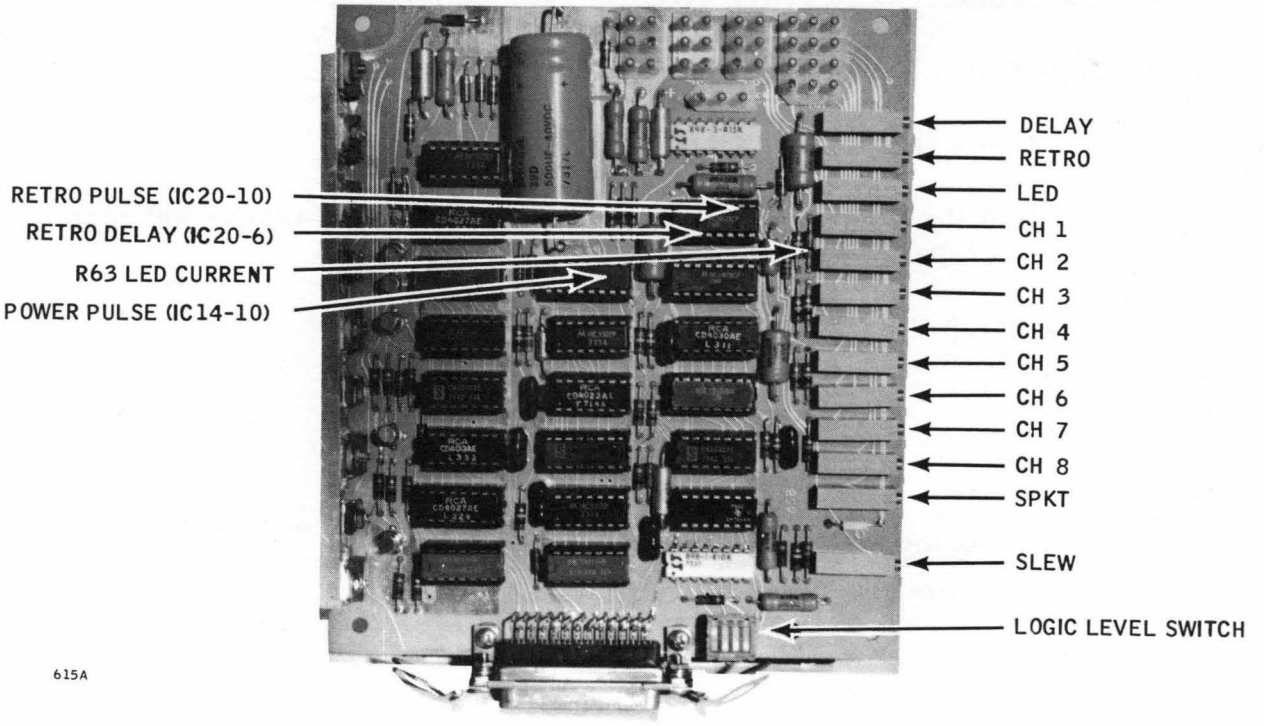


Figure 4-7. Positive Logic PCB Potentiometers and Test Points

3. Phototransistor Output Adjustment

   a. Insert the translucent tape standard (item 7 of table 4-2) between the LED and phototransistor arrays.

   b. On the positive logic PCB (figure 4-7), adjust the SPKT potentiometer for 3.7 Vdc at J5-9.

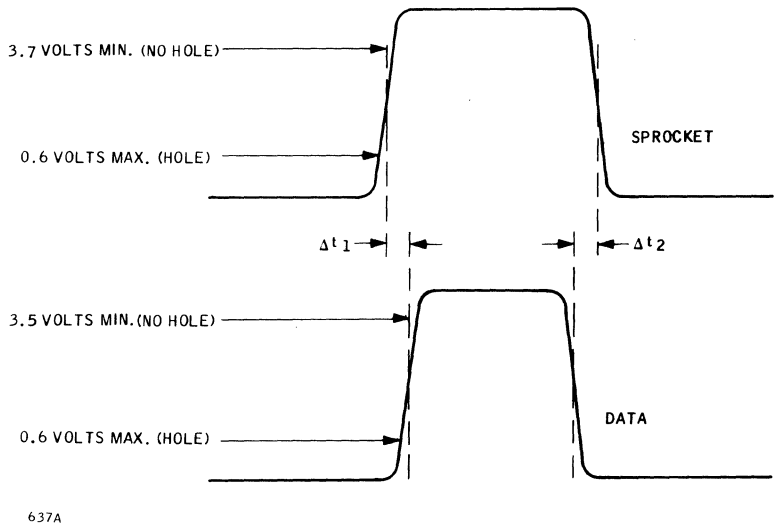
   c. Adjust CH1 through CH8 potentiometers for 3.5 Vdc at J5-1 through J5-8 respectively.

4. Data/Sprocket Timing.

   a. Load the checkerboard tape loop (item 4 of table 4-2) and operate in the slew mode.

   b. Monitor each phototransistor output at J5 relative to SPKT at J5-9 for the characteristics shown.

      Δt_1 is approximately equal to Δt_2.



5. Stepper Motor Driver Logic Adjustments (figure 4-8)

   a. Load the metalized-Mylar tape loop (item 5 of table 4-2) and operate in the step mode.

   b. On the positive logic PCB (figure 4-7), adjust the DELAY potentiometer for a RETRO DELAY pulse width of 1.0 milliseconds.

   c. Adjust the RETRO potentiometer for a RETRO pulse width of 2.0 milliseconds.

   d. Alternately re-adjust the DELAY and RETRO potentiometers to eliminate any sprocket overshoot over the entire 0-300 characters per second step range.

   e. Verify the POWER pulse width to be 10 ± 3 milliseconds.

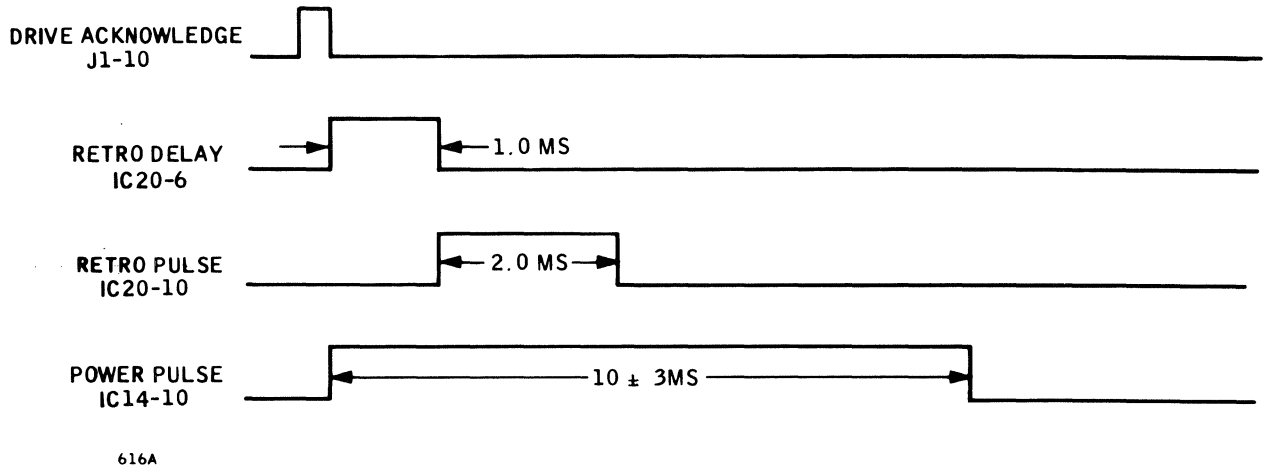


Figure 4-8. Stepper Motor Driver Logic Waveforms

6. Slew Speed Adjustment

   a. Monitor DRIVE ACKNOWLEDGE on J1-10 while operating in the slew mode.

   b. Adjust the SLEW potentiometer for 300 pulses per second.

4-6. TROUBLESHOOTING.

Troubleshooting to isolate a defective component is required should the reader/punch fail to perform a designed function. Before troubleshooting the reader/punch, read and understand the operation and functional description sections of this manual. The reader and punch in the unit, function independently and share only the input power. Therefore, determine which section is not performing correctly and refer to table 4-3 for troubleshooting the reader and to table 4-4 for the punch. Each table lists possible indications of trouble and possible solutions. If the trouble indication is not listed in the troubleshooting tables, refer to the drawings in section V.

Note

Logic levels must be measured using an oscilloscope or digital voltmeter, not a multimeter. Access to integrated circuit pins is gained by attaching the dual-in-line IC test clip to the integrated circuit package. The IC test clip is also used to remove IC packages from the printed circuit board.

Table 4-3. Reader Troubleshooting

Item	Symptom	Remedy
1	Stepper Motor does not step.	a. Thread tape correctly. See paragraph 2-7. b. Ensure RUN/LOAD switch is in RUN position. c. Check RUN STATUS signal (J1-7). d. Check control signal interface circuits and connections. See paragraph 2-2. e. Check logic level options. See paragraph 2-3. f. Check power supply voltages. See schematic 124843. g. Check the winding resistance of each phase of the motor to J3-4 for 10 ± 1 ohm. See schematic 127584 or 127717.
2	Stepper Motor steps in one direction only.	a. Check DRIVE RIGHT and DRIVE LEFT signal levels. J1-4 at +5 volts for the right tape travel, J1-5 at +5 volts for left tape travel with the remaining input at 0 volts. b. Check ◀▶ switch.
3	Motor steps erratically.	a. Perform stepper motor driver logic adjustment procedure per paragraph 4-5, step 5. b. Check chassis resistor R2, 7.5Ω between J4 pin 1 and 2. c. Check power pulse at J3-4. See schematics 124843 and 127584 or 127717.
4	Incorrect reading rate.	a. Check slew speed adjustment procedure per paragraph 4-5, step 6. b. Check stepper motor driver logic adjustment per paragraph 4-5, step 5.

Table 4-3. Reader Troubleshooting (Continued)

Item	Symptom	Remedy
5	Tape not aligned with tape guides or sprocket teeth.	a. Perform tape guide alignment procedure per paragraph 4-5, step 1. b. Check tape dimensions to specifications. See table 1-1.
6	No data output.	a. Verify proper LED current. See paragraph 4-5, step 2. b. Check logic level switches. See paragraph 2-5. c. Check phototransistor outputs per paragraph 4-5, step 3 and 4.
7	Erroneous data output.	a. Clean read head. See cleaning procedure in paragraph 4-3. b. Check individual phototransistor outputs at connector J5, then connector J2. See schematic 124843 and 127584 or 127717.

Table 4-4. Punch Troubleshooting

Item	Symptom	Remedy
1	Punch Motor does not operate.	a. Check fuse F2. b. Check for PUNCH COMMAND signal at J2-12 or PUNCH MOTOR START signal at J2-7. c. Check logic level jumpers. See table 2-2. d. Check for 115 Vac on J5-2 of the punch printed circuit card. If present, disconnect power and check relay K1 and the motor windings for continuity. See schematic 127584 or 127717. If no voltage present on J5-2 and input power is available at J5-3, replace the punch printed circuit card.
2	TAPE STATUS lamp is illuminated.	a. Check for adequate tape supply. b. Check proper tape routing. See paragraph 2-8.
3	Less than 8 data columns punched.	a. Check DATA LEVEL thumbwheel switch on the punch printed circuit card. b. Check input data lines.
4	Punch motor on, but no data is punched.	a. Check input signal timing relationships. See figure 2-4. b. Check for +24 Vdc on J3-3 of the punch printed circuit card. c. Check for +5 Vdc on J2-22. d. Check for +5 Vdc on tape tension input J4-5. See schematic 127584 or 127717.

SECTION V

DRAWINGS AND PARTS LISTS

5-1. GENERAL.

This section contains the engineering drawings and parts lists pertinent to the operation and maintenance of the RP-9362/RPF9362 Tape Reader/Punch.

Drawing	Title
127717	Schematic, RP-9362
127584	Schematic, RPF9362
127715	Final Assembly RP-9362
127715-01	Parts List, RP-9362
127581	Final Assembly RPF9362
127581-01	Parts List, RPF9362
124843	Schematic/Assembly Positive Logic Card
124843-01	Parts List, Positive Logic Card
127140	Schematic/Assembly Punch Logic Card
127140-01	Parts List, Punch Logic Card
127718	Outline Dimensions RP-9362
127585	Outline Dimensions RPF9362

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	9/14/77	

127425-01

PART OF CHASSIS ASSY
F2
4 AMP SLO BLO

PART OF FRONT PANEL ASSY
S1A ON OFF

PUNCH MOTOR ASSY
B1 RED BLU YEL GRN
C1

PART OF CHASSIS ASSY
F1
2 AMP SLO BLO

S1B ON OFF
PART OF FRONT PANEL ASSY

T1
BLK BLK WHT YEL BRN
VIO N.C. VIO N.C.

PART OF CHASSIS ASSY

REGULATOR BRKT ASSY
CR1 VM2480
R2 1.5K 1W
C2 .01 uf 200V
VR1
R3 300Ω 1/4 W
C4 .22 uf 35 V
CR2 IN5250
Q1 2N 3715
R7 75Ω 50W

PART OF CHASSIS ASSY
C1 9000 uf 50V

PART OF FRONT PANEL ASSY.
POWER DS1
TAPE STATUS DS2 WHT BLK

PUNCH MECHALISM
+24V L11 L1 L2 L3 L4 L5 L6 L7 L8 L10 L9

S4 TAPE STORAGE ASSY.
NO NC

SENSOR ASSY. FILID TAPE
S14 COM NO NC
J8 P8

PUNCH BOARD ASSY
A2

P3 P1(A2P3)	(A1J3)P5 J3	
3 3	3 3	+24 VDC
8 8	8 8	INDEX SPROCKET
11 11	11 11	CH 1
7 7	7 7	CH 2
5 5	5 5	CH 3
12 12	12 12	CH 4
2 2	2 2	CH 5
4 4	4 4	CH 6
16 1	1 1	CH 7
10 10	10 10	CH 8
6 6	6 6	REV FEED
9 9	9 9	FOR FEED

P1 P1(A2P4)	(A1J4) P4 J4	
8 8	8 8	+24 VDC
3* 3	3 3	* TIMING PULSE -
6 6	6 6	TIMING PULSE +
4 4	4 4	+24 VDC
9 9	9 9	SPARE
1 1	1 1	GND
7 7	7 7	+5 VDC
5 5	5 5	TAPE T +
2 2	2 2	TAPE FEED

J2	
DATA 6	1
DATA 5	2
DATA 1	3
DATA 2	4
DATA 7	5
DATA 8	6
PUNCH MOTOR SPEED	7
PUNCH MOTOR STOP	8
SPARE	9
SPARE	10
FDIRC +	11
P COMP +	12
P READ +	13
DATA 3	14
DATA 4	15
PARITY BIT (INPUT)	16
SPARE	17
S READ	18
SIG GND	19
SIG GND	20
SIG GND	21
+5 VDC	22
SPARE	23
PARITY +	24
TAPE H +	25

127426-01

POSITIVE LOGIC BOARD ASSY
A1

P9 J4	
1 1	MV
2 2	+26V
3 3	GND
4 4	+26V
5 5	* SPARE
6 6	SPARE

P5 J5	
1 1	* CH 1
2 2	CH 2
3 3	CH 3
9 9	SPROCKET
4 4	CH 4
5 5	CH 5
6 6	CH 6
7 7	CH 7
8 8	CH 8
10 10	GND

J1	
+5 VDC	1
SPARE	2
SPARE	3
DRIVE RIGHT	4
DRIVE LEFT	5
READER READY	6
RUN STATUS	7
+26 VDC	8
READ CLK (SPROCKET)	9
DRIVE ACKNOWLEDGE	10
DATA CH 1	11
DATA CH 2	12
DATA CH 3	13
DATA CH 4	14
DATA CH 5	15
DATA CH 6	16
DATA CH 7	17
DATA CH 8	18
+26 VDC	19
SPARE	20
SPARE	21
SIG GND	22
SIG GND	23
SIG GND	24
SIG GND	25

READ HEAD ASSY.
TRANSISTOR ARRAY 338925-03
MATCHED PAIR
LED ARRAY 338925-02

P2 J2	
1 1	* DATA CATHODE
2 2	SPROCKET ANODE
3 3	N.C.

P3 J3	
1 1	A
2 2	B
3 3	C
5 5	SPARE
4 4	MOTOR VOLTAGE
6 6	* SPARE

P6 J6	
6 6	DRIVE LEFT
5 5	DRIVE RIGHT
4 4	+5VDC
3 3	* LOAD
2 2	LOAD
1 1	GND

B1 STEPPER MOTOR ASSY
A B C MV MV MV
BRN RED ORN GRN OR BLK BLU YEL

S6 C N.O. N.C. HEAD OPEN
P20

PART OF FRONT PANEL ASSY.
S4A LDR RUN LOAD
S2A
S3A

P6 P7 1 2 3 4 5 6

KEY
REAR VIEW S1,2,3,4
REAR VIEW XP1, XP2
REAR VIEW J1

1. ASTERISK * DENOTES KEY LOCATION IN CONNECTOR
NOTES: UNLESS OTHERWISE SPECIFIED

"THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

QTY REQD	ITEM NO.	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS ANGLE .XX±.02 .XXX±.005 ± 1/2°
DO NOT SCALE DRAWING
BREAK SHARP EDGES
MATERIAL
FINISH
NEXT ASSY 230250
USED ON APPLICATION

CONTRACT NO.

	APPROVED	DATE
DRAWN		
CHECK	W. Gail	9/14/77
ENGR		
MGR		

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE
SCHEMATIC. RPF9362

SIZE E | CODE IDENT NO. 97525 | DWG NO. 127584

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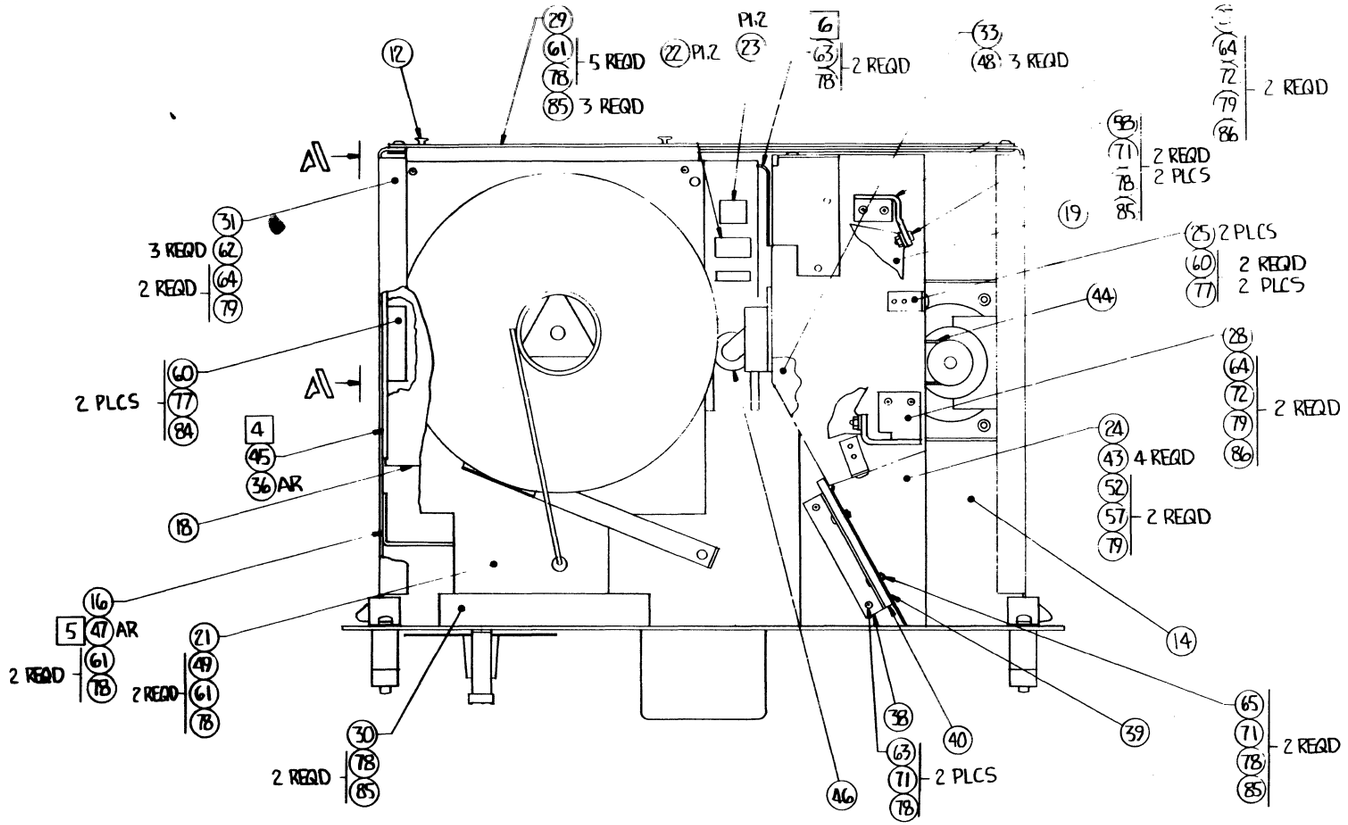
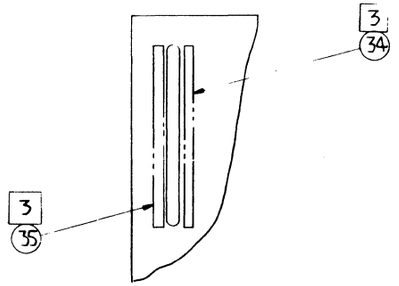
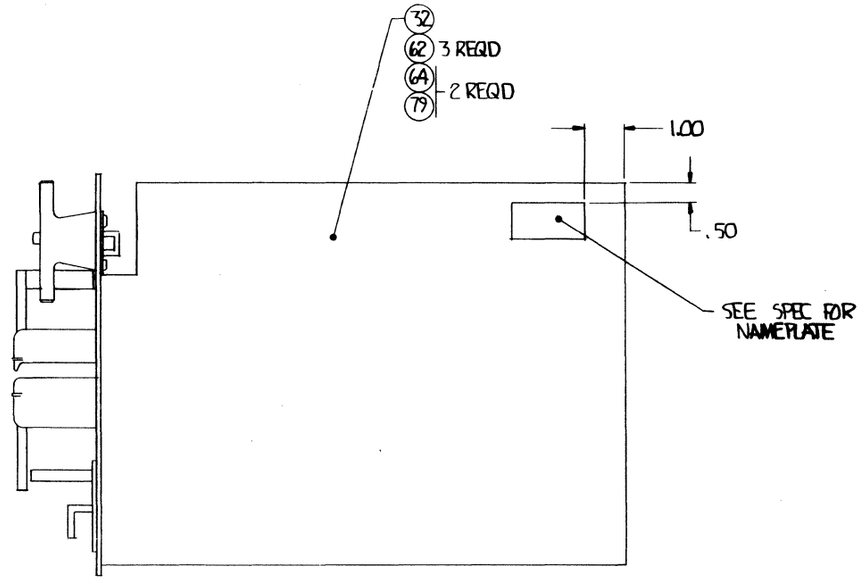
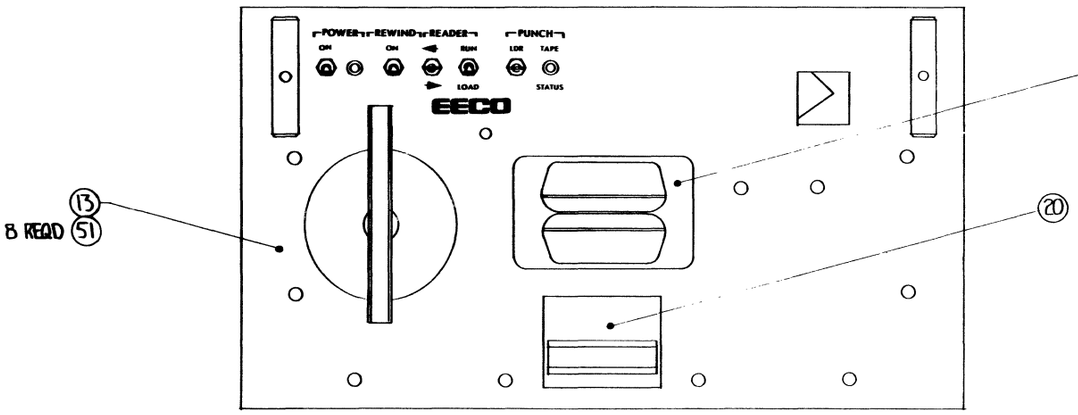
	A	RELEASED	7/10/75	





VIEW A1-A1





SEE SEPARATE PARTS LIST 127715-01

6 (ITEMS 63 & 78) MTG HDW TO INSTALL SELSOR ASSY PART OF (ITEM 19) PUNCH ASSY WIRED

5 APPLY (ITEM 47) HEATSINK CMPD TO MATING MTG SURFACES AS INDICATED PER EECO WORKMANSHIP MANUAL.

4 APPLY (ITEM 36) ADHESIVE OVER ENTIRE INNER MATING SURFACE OF (ITEM 45) CARD GUIDE BEFORE SNAPPING INTO PLACE.

3. ALIGN NOMENCLATURE MARKS WITH THEIR REF OBJECTS BEFORE AFFIXING DECAL

2. PARTS KIT, ITEM 37, TO BE SHIPPED WITH UNIT

1. REF SCHEMATIC 127717

NOTES: UNLESS OTHERWISE SPECIFIED

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QTY REQD	ITEM NO.	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

NEXT ASSY	230952
USED ON	
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS ANGLE .XX± — .XXX± — ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

CONTRACT NO.

	APPROVED	DATE
DRAWN	[illegible]	6/12/75
CHECK	[illegible]	9/29/75
ENGR	[illegible]	9/19/75
MGR	[illegible]	9/19/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE: RDR/PCH ASSY, W/ RWD POST

SIZE	CODE IDENT NO.	DWG NO.
D	97525	127715

SCALE 1/2 SHEET OF 1

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1	230952	SPECIFICATION		R	E	F								
2	127717	SCHEMATIC		R	E	F								
3	127718	DIMENSION DWG		R	E	F								
4	127720	ACCEPTANCE TEST CRITERIA		R	E	F								
5	127719	ACCEPTANCE TEST PROCEDURE		R	E	F								
6	123859	PUNCH COVER MODIFICATION		R	E	F								
7	124095	CHAD TUBE ASY PROCEDURE		R	E	F								
8	124667	VERTICAL ALIGNMENT PROCEDURE		R	E	F								
9														
10														
11	127715-01	RDR/PCH, W/RWD POST	1											
12	127588-01	RDR LOGIC/HEATSINK ASSY		1								SEE SEPARATE P/L		
13	127716-01	PANEL ASSY, FRONT		1								SEE SEPARATE P/L		
14	127583-01	CHASSIS ASSY, RDR PCH		1								SEE SEPARATE P/L		
15	124656-01	READ HD ASSY		1								SEE SEPARATE P/L		
16	126604-01	REGULATOR BRKT ASSY		1								SEE SEPARATE P/L		
17														
18	127140-01	PCB ASSY, PUNCH LOGIC		1								SEE SEPARATE P/L		
19	126509-01	PUNCH ASSY, WIRED		1								SEE SEPARATE P/L		
20	126469-01	CHAD BIN ASSY		1								SEE SEPARATE P/L		
21	126524-01	TAPE STOR SHELF ASSY		1								SEE SEPARATE P/L		
22	127425-01	CABLE ASSY, EXTENDER - 12 PIN		1							P1,2	SEE SEPARATE P/L		
23	127426-01	CABLE ASSY, EXTENDER - 9 PIN		1							P1,2	SEE SEPARATE P/L		
24	124697-01	BRKT, PUNCH		1										
25	124692-01	BRKT, FRONT COVER MTG		2										
26	123753-01	SPACER, READ HD		2										

* REVISION CODE
ADD — ADDITION
DEL — DELETION
SUB — SUBSTITUTION
INFO — ADDITIONAL INFORMATION
QY — QUANTITY CHANGED

REV	E.O. *	DATE	ISSUED BY
A	REL	9/10/75	

APPROVED	DATE
DR	
CHK	9/15/75
APPD	9/16/75
APPD	9/19/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE PARTS LIST-
RDR/PCH ASSY, W/RWD POST

SIZE B | CODE IDENT NO 97525 | DWG NO. 127715-01 | REV A

SHEET 1 OF 3

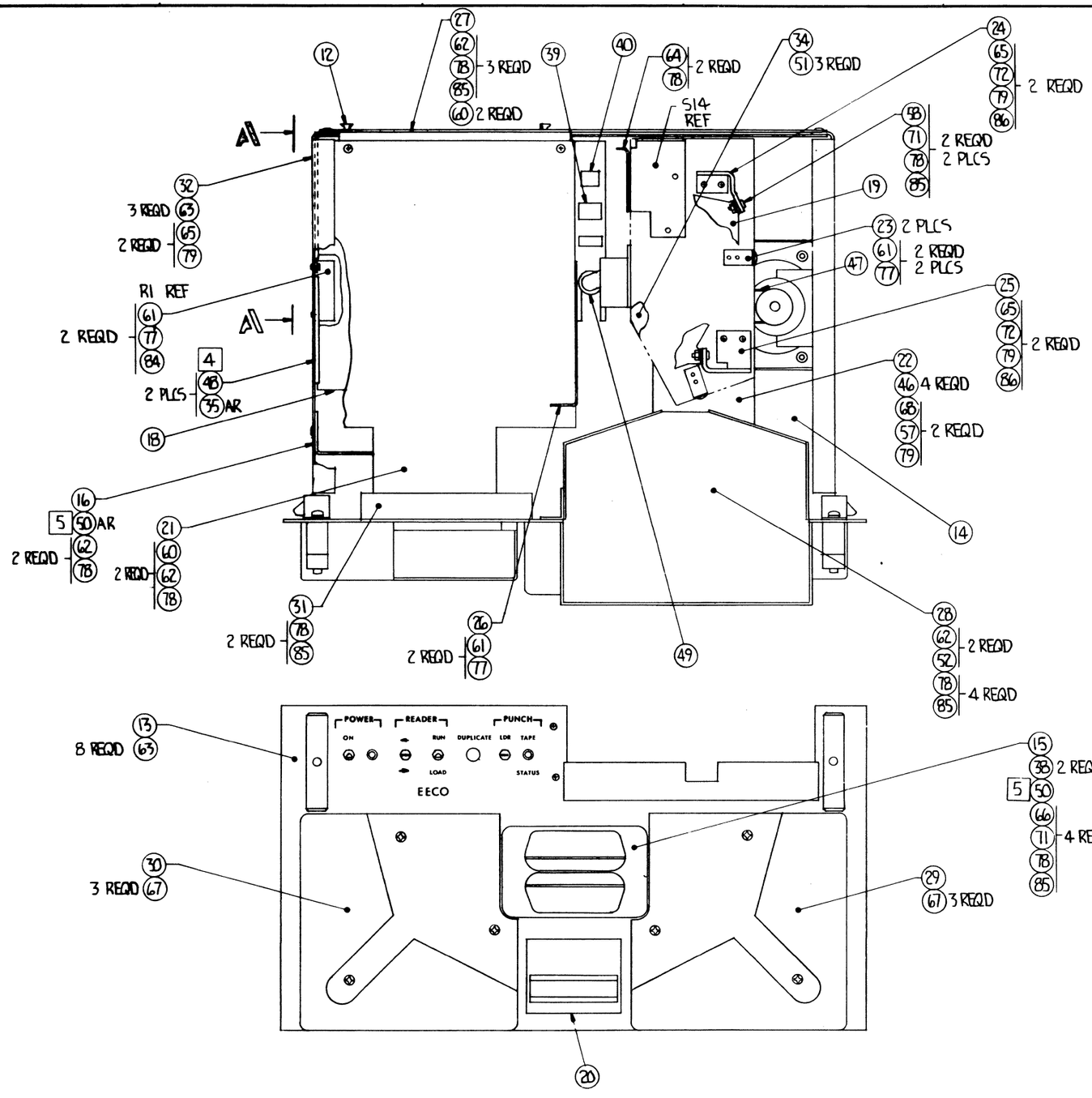
LINE NO.	PART NO.	DESCRIPTION	QTY PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
27	124195-01	BRKT, SUPPORT-MOD (RIGHT)		1										
28	124196-01	BRKT, SUPPORT-MOD (LEFT)		1										
29	126984-01	BRACE, TAPE STORAGE SHELF		1										
30	124870-02	COVER, PROTECTIVE		1										
31	126491-01	PANEL, CHASSIS - L.H.		1										
32	126492-01	PANEL, CHASSIS - R.H.		1										
33	125367-01	COVER, TAPE PUNCH		1										
34	126283-01	LABEL, CHASSIS - LEFT (TOP)		1										
35	126283-02	LABEL, CHASSIS - LEFT (BOTTOM)		1										
36	111105	ADHESIVE, DB-27-1		AR										
37	127672-01	PARTS KIT		1								TO BE SHIPPED WITH UNIT		
38	127270-01	BRKT, TAPE GUIDE		1										
39	127832-01	GUIDE, TAPE		1										
40	127833-01	CHANNEL, TAPE GUIDE		1										
41														
42														
43	322608-02	NUT, WEL NO. 8-32		4										
44	328025-02	BELT, TIMING		1										
45	323554-02	GUIDE, CARD		1										
46	323601-43	GROMMET, RUBBER - SPLIT		1										
47	306351-02	CMPD, SILICONE - HEATSINK		AR										
48	322029-01	SCR, TRUSS HD 6-32 X 1/4		3										
49	322008-05	SCR, OVAL HD 6-32 X 3/8		2										
50														
51	322046-02	SCR, OVAL HD 8-32 X 3/8		8										
52	322046-01	SCR, OVAL HD 8-32 X 5/8		2										
53														
54														
55														
56														

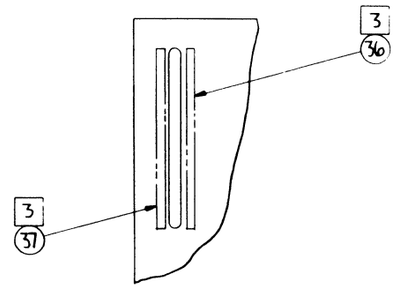
97525 | 127715-01

SHEET 2 OF 3

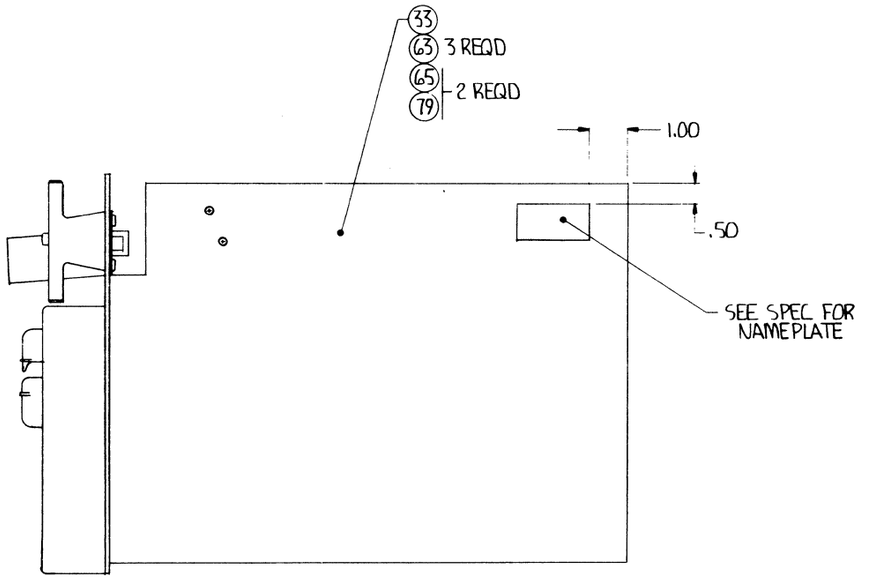
LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
57	110640-07	SCR, PAN HD 8-32 X 1/2		2										
58	110641-06	SCR, PAN HD 6-32 X 7/16		4										
59														
60	110642-04	SCR, PAN HD 4-40 X 5/16		6										
61	110641-05	SCR, PAN HD 6-32 X 3/8		9										
62	110658-03	SCR, FLAT HD 8-32 X 3/8 100°		6										
63	110641-04	SCR, PAN HD 6-32 X 5/16		4										
64	110640-05	SCR, PAN HD 8-32 X 3/8		8										
65	110641-07	SCR, PAN HD 6-32 X 1/2		2										
66														
67														
68														
69														
70														
71	110662-04	WASHER, FLAT NO. 6		12										
72	110662-07	WASHER, FLAT NO. 8		4										
73														
74														
75														
76														
77	110659-02	WASHER, INTL TOOTH NO. 4		6										
78	110659-03	WASHER, INTL TOOTH NO. 6		25										
79	110659-04	WASHER, INTL TOOTH NO. 8		10										
80														
81														
82														
83														
84	110664-03	NUT, HEX NO. 4-40		2										
85	110664-05	NUT, HEX NO. 6-32		15										
86	110664-08	NUT, HEX NO. 8-32 SM		4										

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	7/14/75	





VIEW A-A



SEE SEPARATE PARTS LIST 127581-01

5 APPLY (ITEM 50) HEATSINK CMPD TO MATING MOUNTING SURFACES AS INDICATED PER EECO WORKMANSHIP MANUAL.

4 APPLY (ITEM 35) ADHESIVE OVER ENTIRE INNER MATING SURFACE OF (ITEM 48) CARD GUIDE BEFORE SNAPPING INTO PLACE.

3 ALIGN NOMENCLATURE MARKS WITH THEIR REF OBJECTS BEFORE AFFIXING DECAL.

2. PARTS KIT 127672-01 ITEM 41 TO BE SHIPPED WITH UNIT.

1. REF SCHEMATIC 127584

NOTES: UNLESS OTHERWISE SPECIFIED

"THE INFORMATION CONTAINED HEREON IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

QTY REQD	ITEM NO.	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

NEXT ASSY	230950
USED ON	
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS ANGLE .XX± — .XXX± — ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

CONTRACT NO.

	APPROVED	DATE
DRAWN		7/4/75
CHECK		7/14/75
ENGR		7/14/75
MGR		7/14/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE
RDR/PCH
FANFOLD ASSY

SIZE	CODE IDENT NO.	DWG NO.
D	97525	127581

SCALE 1/2 SHEET 1 OF 1

LINE NO.	PART NO.	DESCRIPTION	QTY PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS	TYPE *	REV SYM
1	230950	SPECIFICATION		R	E	F								
2	127584	SCHEMATIC		R	E	F								
3	127585	DIMENSION DWG		R	E	F								
4	124961	ACCEPTANCE TEST CRITERIA		R	E	F								
5	126056	ACCEPTANCE TEST PROCEDURE		R	E	F								
6	123859	PUNCH COVER MODIFICATION		R	E	F								
7	124095	CHAD TUBE ASSY PROCEDURE		R	E	F								
8	124667	VERTICAL ALIGNMENT PROCEDURE		R	E	F								
9														
10														
11	127581-01	RDR/PCH FANFOLD ASSY	1											
12	127588-01	RDR LGC/HEATSINK ASSY		1								SEE SEPARATE P/L		
13	127582-01	PANEL ASSY, FRONT		1								SEE SEPARATE P/L		
14	127583-01	CHASSIS ASSY		1								SEE SEPARATE P/L		
15	124656-01	READ HEAD ASSY		1								SEE SEPARATE P/L		
16	126604-01	REGULATOR BRKT ASSY		1								SEE SEPARATE P/L		
17														
18	127140-01	PCB ASSY, PUNCH LOGIC		1								SEE SEPARATE P/L		
19	126509-01	PUNCH ASSY, WIRED		1								SEE SEPARATE P/L		
20	126469-01	CHAD BIN ASSY		1								SEE SEPARATE P/L		
21	126500-01	TAPE STORAGE SHELF		1										
22	124652-01	BRKT, PUNCH		1										
23	124692-01	BRKT, FRONT COVER MTG		2										
24	124195-01	BRKT, SUPPORT-MOD (RIGHT)		1										
25	124196-01	BRKT, SUPPORT-MOD (LEFT)		1										
26	125425-01	BRKT, CORNER		1										

* REVISION CODE
ADD — ADDITION
DEL — DELETION
SUB — SUBSTITUTION
INFO — ADDITIONAL INFORMATION
QY — QUANTITY CHANGED

REV	E.O. #	DATE	ISSUED BY
A	REL	7/14/75	

APPROVED
DR — DATE 6/4/75
CHK — DATE 7/14/75
MFG — DATE 7/14/75
ENG — DATE 7/14/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE PARTS LIST-
RDR/PCH FANFOLD ASSY

SIZE	CODE IDENT NO.	DWG NO.	REV
B	97525	127581-01	A

SHEET 1 OF 3

LINE NO.	PART NO.	DESCRIPTION	QTY PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
27	126984-01	BRACE, TAPE STORAGE SHELF		1										
28	125408-01	TAPE RECEIVER BIN		1										
29	123924-03	BIN ASSY, FAN FOLD R.H.		1										
30	123924-04	BIN ASSY, FAN FOLD L.H.		1										
31	124870-02	COVER, PROTECTIVE		1										
32	126491-01	PANEL, CHASSIS - LH		1										
33	126492-01	PANEL, CHASSIS - RH		1										
34	125367-01	COVER, TAPE PUNCH		1										
35	111105	ADHESIVE, DB-27-1		AR										
36	126283-01	LABEL, CHASSIS - LEFT (TOP)		1										
37	126283-02	LABEL, CHASSIS - LEFT (BOTTOM)		1										
38	123753-01	SPACER, READ HEAD		2										
39	127425-01	CABLE ASSY, EXTENDER - 12 PIN		1							(P1,2)	SEE SEPARATE P/L		
40	127426-01	CABLE ASSY, EXTENDER - 9 PIN		1							(P1,2)	SEE SEPARATE P/L		
41	127672-01	PARTS KIT		1								TO BE SHIPPED WITH UNIT		
42														
43														
44														
45														
46	322608-02	NUT WEL NO. 8-32		4										
47	328025-02	BELT, TIMING		1										
48	323554-02	GUIDE, CARD		2										
49	323601-43	GROMMET, RUBBER-SPLIT		1										
50	306351-02	CMPD, SILICONE-HEATSINK		AR										
51	322029-01	SCR, TRUSS HD 6-32 X 1/4		3										
52	322008-05	SCR, OVAL HD 6-32 X 3/8		2										
53														
54														
55														
56														

CODE IDENT NO.	DWG NO.
97525	127581-01

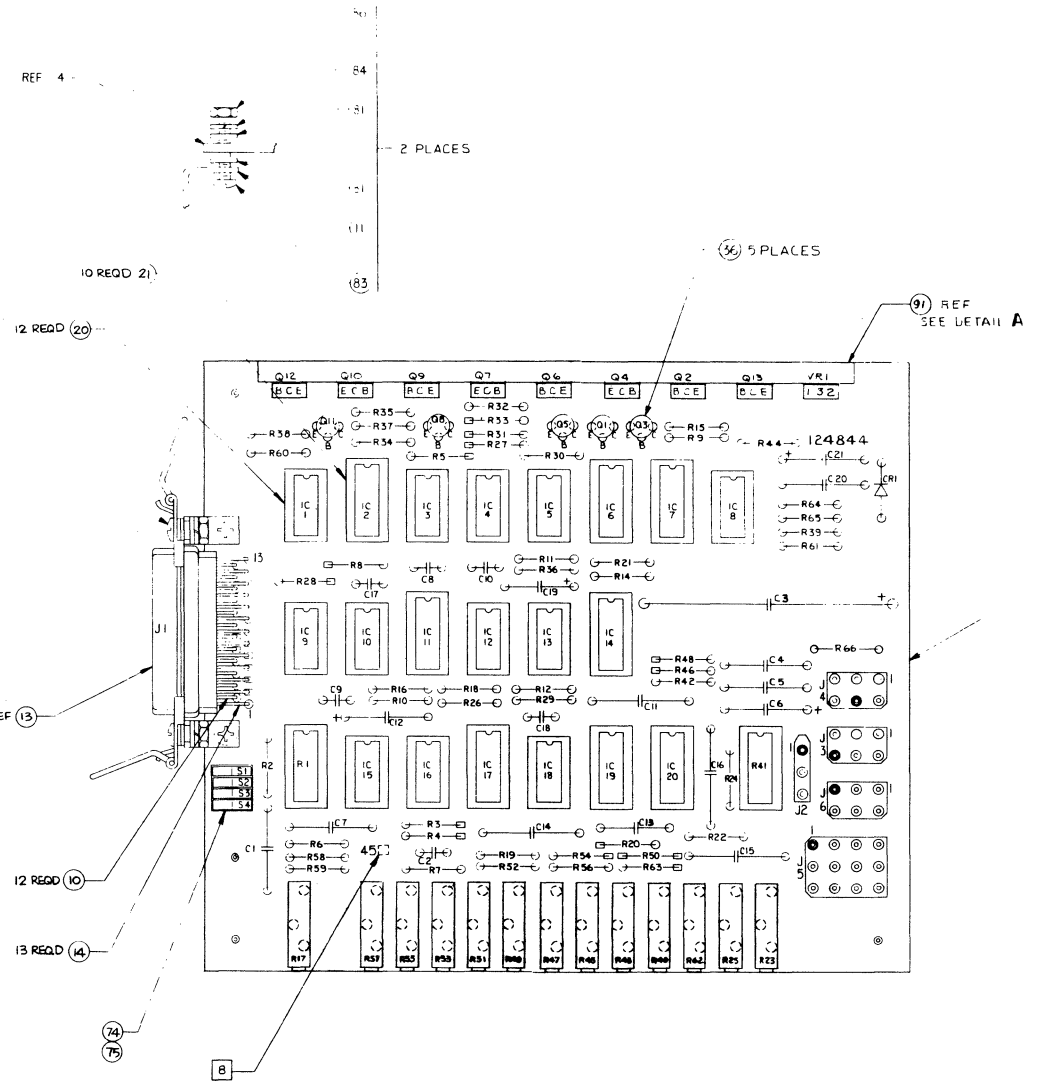
SHEET 2 OF 3

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1 2 3 4 5 6 7	UNIT QTY	REF NO.	REMARKS		REV SYM
57	110640-07	SCR, PAN HD 8-32 X 1/2	2					
58	110641-06	SCR, PAN HD 6-32 X 7/16	4					
59	110650-03	SCR, FLAT HD 8-32 X 5/8 100°	2					
60	110651-04	SCR, FLAT HD 6-32 X 3/8 100°	4					
61	110642-04	SCR, PAN HD 4-40 X 5/16	8					
62	110641-05	SCR, PAN HD 6-32 X 3/8	9					
63	110650-03	SCR, FLAT HD 8-32 X 3/8 100°	14					
64	110641-04	SCR, PAN HD 6-32 X 5/16	2					
65	110640-05	SCR, PAN HD 8-32 X 3/8	8					
66	110651-07	SCR, FLAT HD 6-32 X 5/8 100°	4					
67	110651-08	SCR, FLAT HD 6-32 X 3/4 100°	6					
68	110650-06	SCR, FLAT HD 8-32x5/8	2					
69								
70								
71	110662-04	WASHER, FLAT NO. 6	8					
72	110662-07	WASHER, FLAT NO. 8	4					
73								
74								
75								
76								
77	110659-02	WASHER, INTL TOOTH NO. 4	8					
78	110659-03	WASHER, INTL TOOTH NO. 6	23					
79	110659-04	WASHER, INTL TOOTH NO. 8	10					
80								
81								
82								
83								
84	110664-03	NUT, HEX NO. 4-40	2					
85	110664-05	NUT, HEX NO. 6-32	17					
86	110664-08	NUT, HEX NO. 8-32	4			SMALL PATTERN		

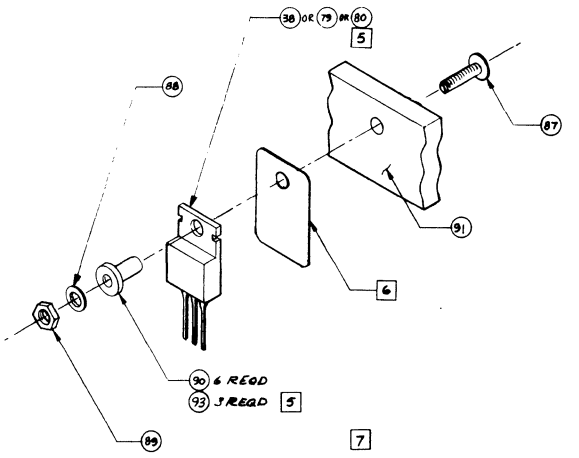
NOTES: UNLESS OTHERWISE SPECIFIED.

1. SOLDER INSTALLED COMPONENTS TO PRINTED WIRING BOARD.
2. COMPONENTS DESIGNATIONS ARE FOR REFERENCE ONLY AND DO NOT APPEAR ON COMPONENTS OR BOARD.
3. NOTCH OR DOT ON IC INDICATES PIN NO.1 LOCATION. REF ONLY.
4. FOR SCHEMATIC NOTES SEE SHEET 2.
5. ITEM 90, SHOULDER WASHER, NOT USED WHEN ASSEMBLING ITEM 80 TO ITEM 91, TRANSISTOR SPACER (3 PLACES)
6. MICA WASHER SUPPLIED WITH ITEMS 38, 79 & 80. APPLY A THIN LAYER OF HEAT SINK COMPOUND, ITEM 92, TO FRONT & REAR.
7. BEFORE SOLDERING, ASSEMBLE CIRCUIT BOARD (ITEM 4), TRANSISTORS & VOLT REGULATOR (ITEMS 38, 79 & 80), AND SPACER (ITEM 91) IN ASSEMBLY FIXTURE. TIGHTEN SCREW HEAD, NOT HEX NUT, TO 4 TO 8 MAX INCH POUNDS TORQUE. NO DEFORMATION OF NYLON WASHER ALLOWED.
8. FOR LATEST REV SEE ARTWORK ITEM 5.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APP'D
	A	RELEASED	12/24/73	
	B	EO 3488A	3/25/74	
	C	EO 3638	4/5/74	
	D	EO 3953A	8/1/74	
	E	EO # 4120	11/25/74	
	F	EO 4419A	9/20/74	
	G	EC 4546	3/4/75	
	H	EO 5200	6/27/75	



COMPONENT SIDE OF BOARD



DETAIL A
INSTALLATION OF ITEMS 38, 79 & 80
(9 PLACES)

FOR SEPARATE PARTS LIST SEE PL 124843-01

QTY REQD	ITEM NO	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS ANGLE .XX±.02 .XXX±.005 ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION

CONTRACT NO.

	APPROVED	DATE
DRAWN	L. Meador	10/15/73
CHECK		10/15/73
ENGR		7/14/72
MGR		10/19/73

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE
SCHEMATIC/ASSEMBLY
POSITIVE LOGIC CARD

SIZE E | CODE IDENT NO. 97525 | DWG NO. 124843

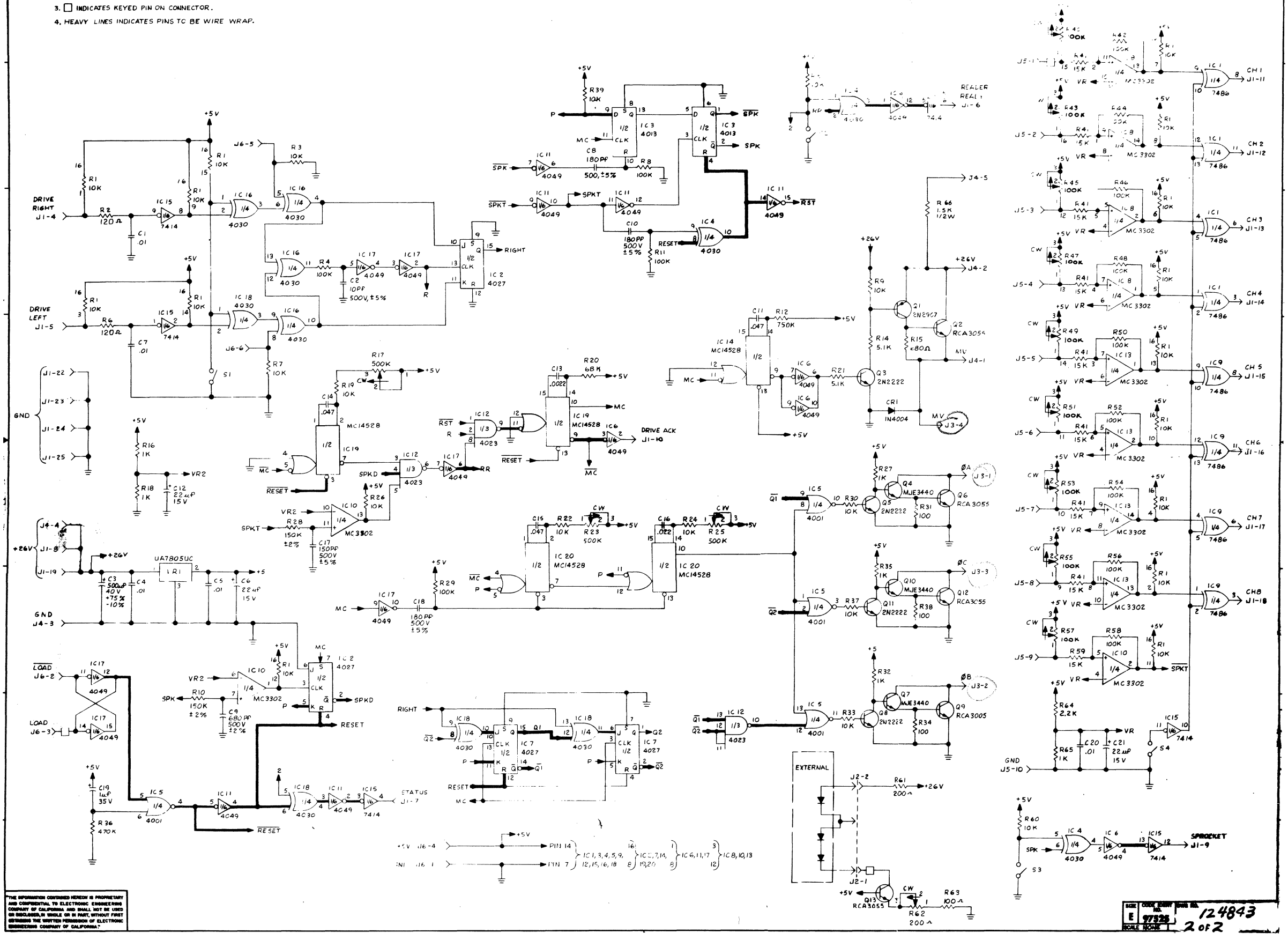
SCALE 2/1 | SHEET | OF

"THE INFORMATION CONTAINED HEREON IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

SEE SH 1 FOR REVISIONS

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL CAPACITORS ARE IN MICROFARADS 200V, ±10%.
2. ALL RESISTORS ARE IN OHMS 1/4 W, ±5%.
3. □ INDICATES KEYED PIN ON CONNECTOR.
4. HEAVY LINES INDICATES PINS TO BE WIRE WRAP.



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SIZE	CODE IDENT NO.	DWG NO.
E	97325	124843
SCALE NONE		2 OF 2

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1 2 3 4 5 6 7	UNIT QTY	REF NO.	REMARKS	TYPE *	REV SYM
1	124843-01	POSITIVE LOGIC CARD ASSY/SCHEMATIC	1					
2								
3								
4	124844-01	PRINTED WIRING BOARD	1					
5	124845	ARTWORK	REF					
6	111073	PROCESS SPEC.	REF					
7	126844-01	STRING LIST	REF					
8	126845-01	WIRE LIST	REF					
9	126846-01	TAPE PUNCHED	REF					
10	311015-05	TERMINAL	12					
11	311015-06	BRACKET	2					
12	311006-02	SPRING, LATCH	2					
13	311015-02	CONNECTOR	1		J1			
14	311015-04	TERMINAL	13					
15	311035-13	CONNECTOR, 3 PIN WAFER KEY #1	1		J2			
16	311035-03	CONNECTOR, 6 PIN WAFER KEY #6	1		J3			
17	311035-22	CONNECTOR, 6 PIN WAFER KEY #5	1		J4			
18	311035-04	CONNECTOR, 6 PIN WAFER KEY #3	1		J6			
19	311035-01	CONNECTOR, 12 PIN WAFER KEY #1	1		J5			
20	311151-33	SOCKET, 14 PIN 2 LEVEL	12					
21	311151-34	SOCKET, 16 PIN, 2 LEVEL	10					
22								
23								
24	304451-08	CAPACITOR, 10pf, 500V, ±5	1		C2			
25	304451-36	CAPACITOR, 180pf, 500V, ±5	3		C8,10 18			
26	304451-34	CAPACITOR, 150pf, 500V, ±5	1		C17			

* REVISION CODE
ADD — ADDITION
DEL — DELETION
SUB — SUBSTITUTION
INFO — ADDITIONAL INFORMATION
QY — QUANTITY CHANGED

F	4419A	12/20/74	
G	OMITTED		
H	5200	6/23/75	

REV	E.O. *	DATE	ISSUED BY
A	REL	12/14/73	
B	3453B	3/20/74	
C	3636	6/13/74	
D	3953A	8/7/74	
E	4120	9/25/74	

APPROVED	DATE
DR	10/9/73
CHK	10/8/73
APPD	10/4/73
APPD	10/4/73

SHEET 1 OF 4

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE PARTS LIST-
POSITIVE LOGIC CARD
(124843-01)

SIZE	CODE IDENT NO	DWG NO.
B	97525	124843-C1

F258

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1 2 3 4 5 6 7	UNIT QTY	REF NO.	REMARKS		REV SYM
27	304453-02	CAPACITOR, 680pf, 500V, ±2	1		C9			
28	304850-09	CAPACITOR, .0022 f, 200V, ±10	1		C13			
29	304850-17	CAPACITOR, .01 f, 200V, ±10	5		C1,4,5 7,20			
30	304850-21	CAPACITOR, .022 f, 200V, ±10	1		C16			
31	304850-25	CAPACITOR .047 f 200V, ±10	3		C11,14 15			
32	304951-24	CAPACITOR, 1 f, 35V, ±10	1		C19			
33	304951-10	CAPACITOR, 22 f, 15V, ±10	3		C6,12 21			
34	304969-30	CAPACITOR, 500 f, 40V, +75 -10	1		C3			
35								
36	325406-01	TRANSIPAD	5					
37								
38	326910-05	VOLTAGE REGULATOR 5V	1		VR1	UGH7805393		
39	326710-01	I.C. QUAD COMPARATOR	3		IC8,10 13	MC3302P		
40	326018-01	I.C QUAD 2-INPUT NOR GATE	1		IC5	CD4001AE		
41	326018-13	I.C. DUAL "D" FLIP FLOP	1		IC3	CD4013AE		
42	326018-23	I.C. TRIPLE 3-INPUT NAND GATE	1		IC12	CD4023AE		
43	326018-27	I.C. DUAL J-K MASTER SLAVE FLIP FLOP	2		IC2,7	CD4027AE		
44	326018-30	I.C. QUAD EXCLUSIVE - OR GATE	3		IC4,16 18	CD4030AE		
45	326018-49	I.C. HEX BUFF/CONVERTER(INVERTING)	3		IC6,11 17	CD4049AE		
46	326207-06	I.C HEX SCHMITT TRIGGER	1		IC15	SN7414N		
47	326010-04	I.C. QUAD 2-INPUT EXCLUSIVE-OR-GATE	2		IC1,9	SN7486N		
48	326711-02	I.C. DUAL RETRIGGERABLE MULTIVIBRATOR	3		IC14 19,20	MC14528CP		
49								
50								
51	335005-57	RESISTOR, 2.2K, 1/4W, ±5%	1		R64			
52	335005-27	RESISTOR, 120Ω, 1/4W, ±5%	2		R2,6			
53	335005-25	RESISTOR, 100Ω, 1/4W, ±5%	4		R31,34 38,63			
54	335005-32	RESISTOR, 200Ω, 1/4W, ±5%	1		R61			
55	335005-45	RESISTOR, 680Ω, 1/4W, ±5%	1		R15			
56	335005-49	RESISTOR, 1K, 1/4W, ±5%	6		R16,18,27 32,35,65			

CODE IDENT NO	DWG NO.
97525	124843-C1

SHEET 2 OF 4

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
57	335005-66	RESISTOR, 5.1K, 1/4W, .5		2							R14,21			
58	335005-77	RESISTOR, 15K, 1/4W, .5		1							R59			
59	335006-01	RESISTOR, 100K, 1/4W, .5		13							R4,8,17,29,42 4,46,48,50,52,54,56,58			
60	335018-84	RESISTOR, 150K, 1/4W, .2		2							R10, 28			
61	335006-17	RESISTOR, 470K, 1/4W, .5		1							R36			
62	335005-73	RESISTOR, 10K, 1/4W, .5		13							R3,5,7,9,,19,22,24 26,30,33,37,39,60			
63	335004-43	RESISTOR, 1.5K, 1.2W .5		1							R66			
64	335546-61	RESISTOR ARRAY (8 RES)		1							R41	898-3-R15K BECKMAN		
65	335546-56	RESISTOR ARRAY (15 RES)		1							R1	898-1-R10K BECKMAN		
66	335005-93	RESISTOR 68K 1/4W .5		1							R20			
67	335006-22	RESISTOR 750K 1/4W .5		1							R12			
68														
69	337418-05	POTENTIOMETER, 200Ω		1							R62	89PR200 BECKMAN		
70	337418-14	POTENTIOMETER, 100K		9							R40,43,45,47 49,51,53,55,57	89PR100K BECKMAN		
71	337418-17	POTENTIOMETER, 500K		3							R17 23,25	89PR500K BECKMAN		
72														
73	338311-04	DIODE		1							CR1	1N4004		
74	339327-01	SWITCH 4 POSITION		1								435166-2 AMP		
75	339327-08	SWITCH COVER (4 POSITION)		1								435238-1 AMP		
76														
77	338701-03	TRANSISTOR		4							Q3,5 8,11	2N2222		
78	338506-07	TRANSISTOR		1							Q1	2N2907		
79	338700-02	TRANSISTOR		5							Q2,6 9,12,13	RCA3055 RCA		
80	338724-02	TRANSISTOR		3							Q4,7 10	MJE3440 MOTOROLA		
81	322775-09	WASHER, NYLON 4		4										
82	110642-03	SCREW, PAN HEAD, 4-40 X 1/4 LONG		2										
83	110642-05	SCREW, PAN HEAD, 4-40 X 3/8 LONG		2										
84	110660-02	WASHER, SPRING LOCK 4		4										
85	110663-03	WASHER, FLAT 4		4										
86	110664-04	NUT, HEX 4-40		4										

CODE IDENT NO. 97525 DWG NO. 124843-01

SHEET 3 OF 4

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
87	110652-05	SCREW, FLAT HD # 4-40 x 7/16		9										
88	110659-02	WASHER, INTERNAL TOOTH #4		9										
89	110664-04	NUT, HEX # 4-40		9										
90	322712-01	SHOULDER, WASHER		6										
91	124654-01	SPACER, TRANSISTOR		1										
92	306351-02	HEAT SINK COMPOUND		AR										
93	322775-02	WASHER, FLAT NYLON		3										

CODE IDENT NO. 97525 DWG NO. 124843-01

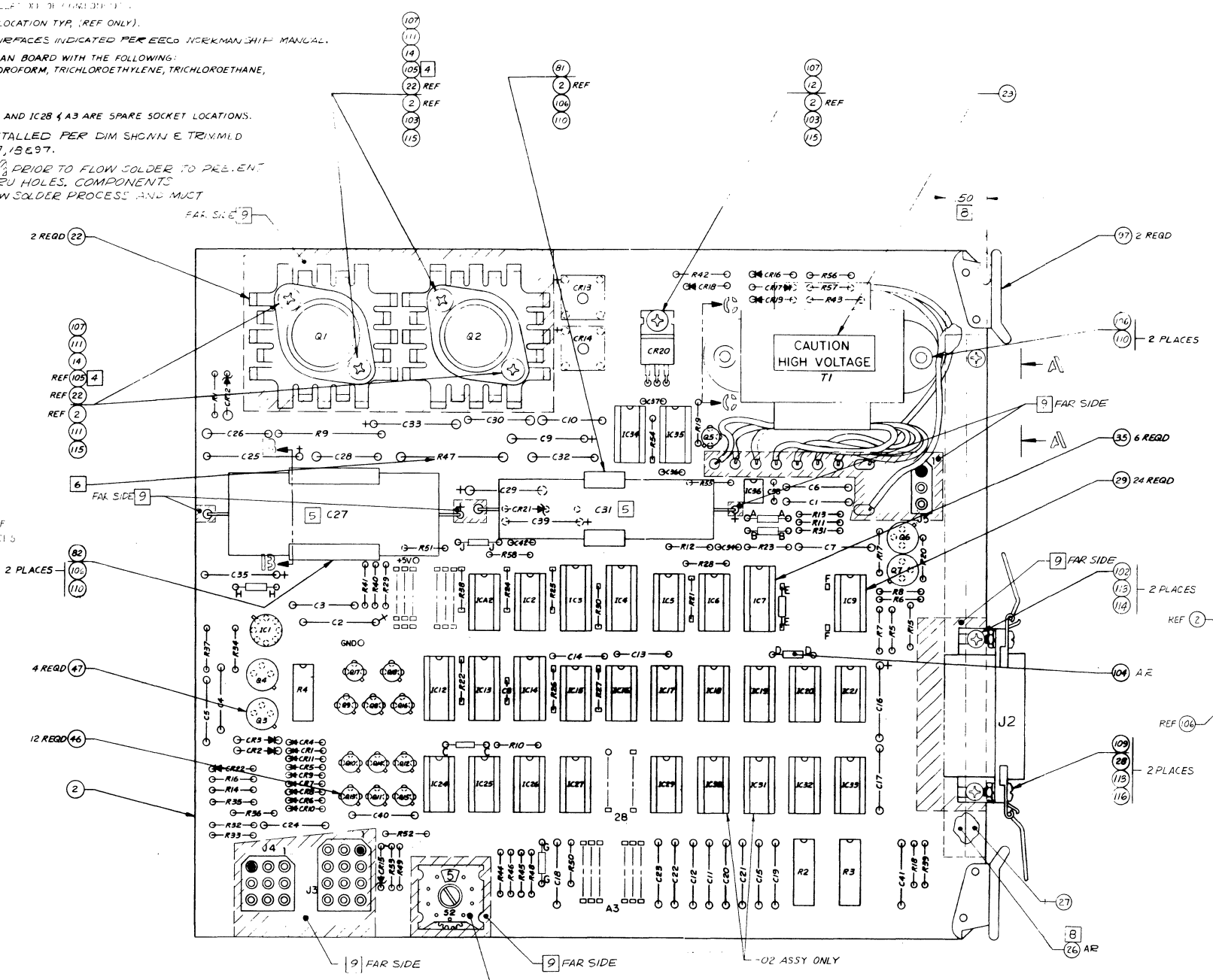
SHEET 4 OF 4

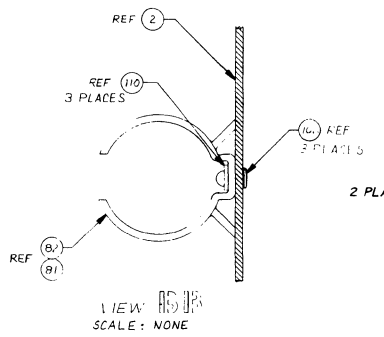
F201

NOTES: UNLESS OTHERWISE SPECIFIED.

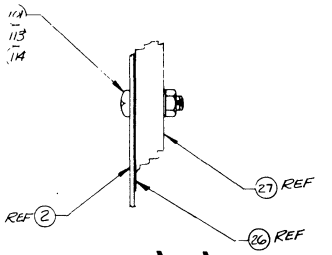
1. THE HIGH VOLTAGE AREA OF P.C. BOARD MUST HAVE INSULATING FILM SILKSCREEN NEAR SIDE . USING ITEM 4, PRIOR TO INSTALLING AND SOLDERING OF COMPONENTS.
2. P.C. BOARD MUST HAVE SILKSCREEN [illegible] DESIGNATIONS ON NEAR SIDE PRIOR TO [illegible] OF COMPONENTS.
3. NOTCH OR DOT ON I.C. INDICATES PIN NO. 1 LOCATION TYP. (REF ONLY).
4. APPLY HEATSINK COMPOUND ITEM 105 TO SURFACES INDICATED PER EECo WORKMANSHIP MANUAL.
5. AFTER INSTALLING C27 AND C31, DO NOT CLEAN BOARD WITH THE FOLLOWING: FREON TF, TMC, CARBON TETRACHLORIDE, CHLOROFORM, TRICHLOROETHYLENE, TRICHLOROETHANE, ALL (DETERGENTS), METHYLENE CHLORIDE.
6. R47 TO BE INSTALLED .06 OFF THE BOARD.
7. IC'S 8, 10, 11, 22, 23 ARE DELETED FROM BOARD AND IC28 & A3 ARE SPARE SOCKET LOCATIONS.
8. ITEM 26 (POLYIMIDE TAPE) TO BE INSTALLED PER DIM SHOWN E TRIMMED PRIOR TO INSTALLATION OF ITEMS 27, 18 & 97.
9. MASK ALL AREAS SHOWN THUS [illegible] PRIOR TO FLOW SOLDER TO PREVENT SOLDER BUILD UP IN PLATED THRU HOLES. COMPONENTS SUBJECT TO HEAT DAMAGE IN FLOW SOLDER PROCESS AND MUST BE HAND SOLDERED.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	1/7/15	

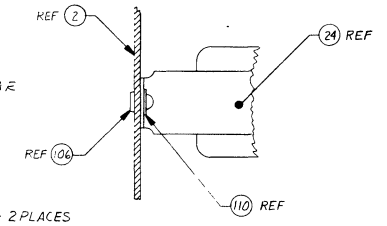




VIEW A5-A5
SCALE: NONE



VIEW A-A
COMPONENTS REMOVED FOR CLARITY



VIEW B0-B0
SCALE: NONE

COMPONENT SIDE

99 DO NOT INSTALL (S2) UNTIL PCB ASSY HAS BEEN CLEANED THOROUGHLY. SPRAY OR BRUSH CLEAN USING ALCOHOL ONLY

SEE SEPARATE PARTS LIST PL-127140-01 & -02

POSITIVE LOGIC SHOWN

QTY REQD	ITEM NO	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

NEXT ASSY	USED ON
23092**	BP9326
23092[illegible]	BPE9326
23093[illegible]	1P59967

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS ANGLE XX±.06 ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

CONTRACT NO.

	APPROVED	DATE
DRAWN	R. Jocum	1/28/15
CHECK	W. Gaul	1/28/15
ENGR		
MGR		

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE: PCB ASSY, PUNCH LOGIC

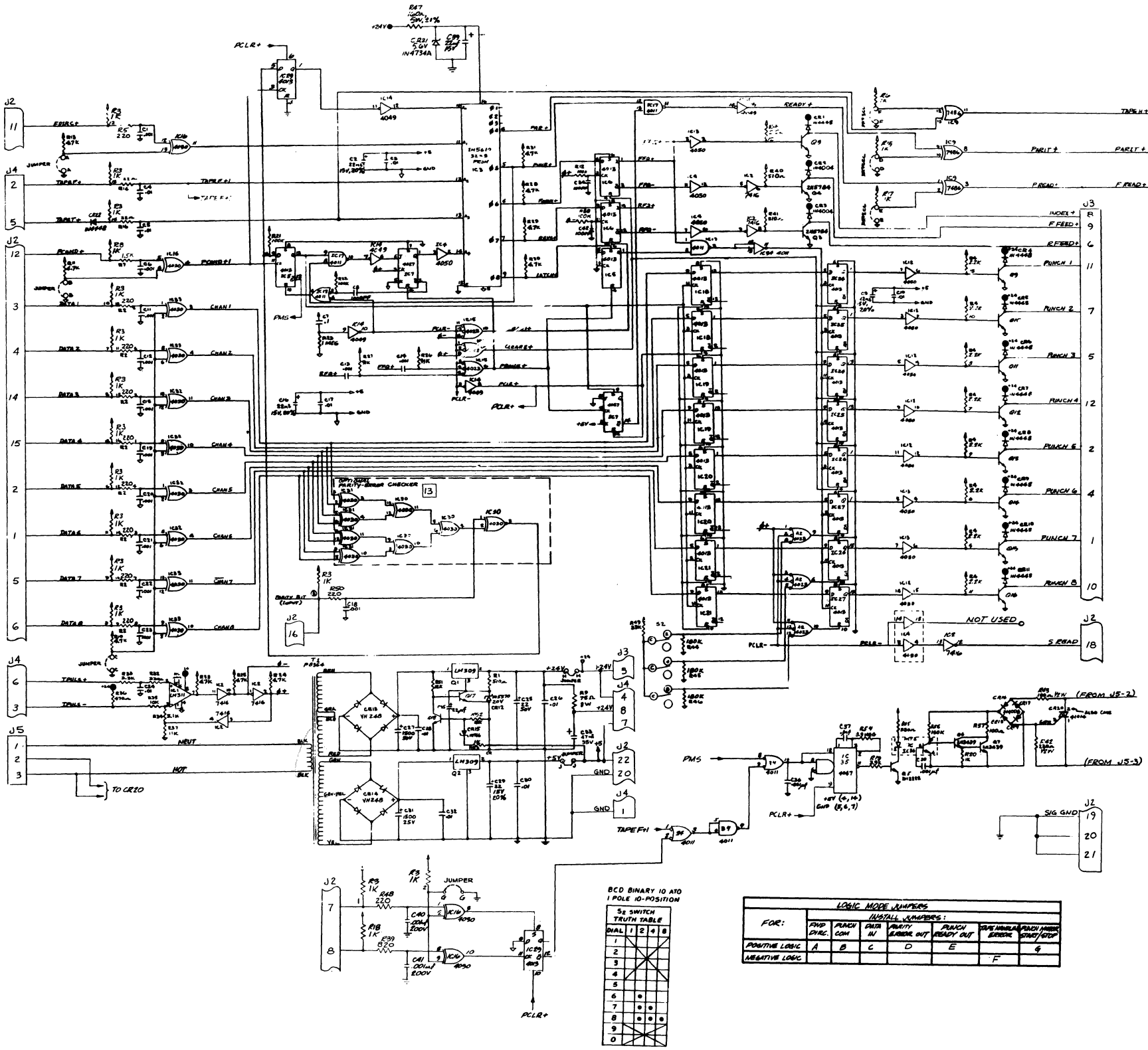
SIZE	CODE IDENT NO.	DWG NO.
E	97525	127140

SCALE: 2/1 SHEET 1 OF 2

"THE INFORMATION CONTAINED HEREON IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

NOTES: UNLESS OTHERWISE SPECIFIED:

10. ALL TRANSISTORS ARE 2N2222.
11. ALL CAPACITORS ARE IN MICROFARADS, 200V, ± 10%.
12. ALL RESISTORS ARE 1/4 W, ± 5%
13. IC30 & 31 ARE USED ON -OE ONLY.



DIAL	1	2	4	8
1				
2				
3				
4				
5				
6	•			
7	•	•		
8	•		•	
9	•	•	•	
0				

LOGIC MODE JUMPERS

FOR:	INSTALL JUMPERS:						
	READ DISC.	PUNCH COM	DATA IN	PARITY ERROR OUT	PUNCH READY OUT	TAPE MOTION ERROR	PUNCH MOTION START/STOP
POSITIVE LOGIC	A	B	C	D	E		4
NEGATIVE LOGIC						F	

"THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

SIZE	CODE IDENT NO.	DWG NO.
E	97525	127140

SCALE: NONE

LINE NO.	PART NO.	DESCRIPTION	QTY PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS	TYPE *	REV SYM
1	127140-01	PCB ASSY, PUNCH LOGIC	1			-								
2	127141-01	PCB, PUNCH LOGIC		1										
3	127142	ARTWORK PCB, PUNCH LOGIC			REF									
4	126226	SILKSCREEN ARTWORK			REF									
5	127335	SILKSCREEN ARTWORK, REF DESIGNATIONS			REF									
6	127144	ACCEPTANCE TEST CRITERIA	REF											
7	127143	ACCEPTANCE TEST PROCEDURE	REF											
8	338316-01	DIODE, BRIDGE		2							CR13 CR14	VM-248		
9	338101-14	DIODE		10							CR1, 6-11, 22	1N4448		
10	338311-04	DIODE, SILICON RECT		6							CR2, 16-19	1N4004		
11	338213-04	DIODE, ZENER, 3.3V		1							CR15	1N746A		
12	338912-01	TRIAC		1							CR20	RCA 41014 CN3H		
13	338215-07	DIODE, ZENER, 5.6V, 1W		1							CR21	1N4734A		
14	330665-01	VOLTAGE REGULATOR		2							Q1 Q2	LM309		
15	338704-05	TRANSISTOR		2							Q3 Q4	2N5784		
16	338701-03	TRANSISTOR		12							Q5, 8-18	2N2222		
17	338704-02	TRANSISTOR		2							Q6, 7	2N3439		
18	311182-02	CONN, 25 POSN RCPT RTANG		1							J2	206584-1		
19	311035-13	CONNECTOR, 3 PIN		1							J5	MOLEX KEYED AT PIN 1		
20	311035-21	CONNECTOR, 9 PIN		1							J4	MOLEX KEYED AT PIN 3		
21	311035-01	CONNECTOR, 12 PIN		1							J3	MOLEX KEYED AT PIN 1		
22	317803-03	HEAT SINK		2								(FOR Q1 & Q2) UP-T038		
23	122459-01	DECAL, HIGH VOLTAGE		1										
24	343025-01	TRANSFORMER,		1							T1	P8364 STANCOR		
25	338219-01	DIODE, ZENER, 20V		1							CR12	1N5570A		
26	306019-02	TAPE, POLYIMIDE THERMOSETTING		AR										

* REVISION CODE
ADD — ADDITION
DEL — DELETION
SUB — SUBSTITUTION
INFO — ADDITIONAL INFORMATION
QY — QUANTITY CHANGED

REV	E.O. #	DATE	ISSUED BY
A	REL	6/17/75	WP
B	5512	9/29/75	WP

		DATE
APPROVED	DR RXocom	1-28-75
CHK		1-29-75
ENGR		2/11/75
MFG		3/4/75

SHEET 1 OF 4

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE: PARTS LIST - PCB ASSY, PUNCH LOGIC

SIZE B | CODE IDENT NO 97525 | DWG NO 127140-01

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1	2	3	4	5	6	7	UNIT QTY	REF NO.	REMARKS		REV SYM
27	126795-01	SUPPORT, PUNCH CARD		1										
28	311006-02	SPRING LATCH		2										
29	312202-03	SOCKET, I C (14 PIN)		24										
30	326911-01	VOLTAGE COMPARATOR, I C.		1							IC1		LM311	
31	326207-03	I/C HEX INVERTER (OPEN COLLECTOR)		1							IC2		SN7416N	
32	326810-01	I/C ROM 32 X 8		1							IC3		IM5610CPE	
33	326018-50	I/C, HEX BUFFER/CON		3							IC4 12, 13	RCA	CD4050AE	
34	326018-49	I/C, HEX BUFFER/CON		1							IC 14	RCA	CD4049AE	
35	312202-04	SOCKET, I C (16 PIN)		6										
36	326018-13	I/C 2D" FLIP-FLOP		11							IC5, 6, 18-21, 24-27, 29	RCA	CD4013AE	
37														
38	326018-11	I/C, 4,2-INPUT NAND		2							IC17, 34	RCA	CD4011AE	
39	326018-23	I/C, 3,3-INPUT NAND		2							IC15, A2	RCA	CD4023AE	
40	326018-27	I/C, 2,J-KM/S FLIP-FLOP		1							IC7	RCA	CD4027AE	
41	326018-30	I/C, 4, EXCLUSIVE-OR		3							IC16 32, 33	RCA	CD4030AE	
42	326018-47	I/C, MULTIVIBRATOR		1							IC35	RCA	CD4047AE	
43														
44	338921-01	I/C OPTICAL ISOLATOR		1							IC36		MCT2	
45	326010-04	I/C EXCLUSIVE - OR GATE		1							IC9		SN7486N	
46	325406-01	TRANSISTOR PAD (FOR Q5, 8-18)		12										
47	325402-01	TRANSISTOR PAD (FOR Q3,4,6,7)		4										
48	335037-01	RESISTOR, 160Ω, 5W, ±1%		1							R47			
49	335005-42	RESISTOR, 510Ω, 1/4W ± 5%		3							R1, 40 41			
50	335546-62	RESISTOR, NETWORK, [illegible]		1							R2	BECKMAN	898-3-R220	
51	335546-3	RESISTOR, NETWORK, 2.2K		1							R4	BECKMAN	899-1 R2.2K	
52	335546-	RESISTOR, NETWORK, [illegible]		1							R3	BECKMAN	898-1-R1K	
53	335005-61	RESISTOR, 3.3K, 1/4W, ±5%		1							R33			
54	335005-09	RESISTOR, 22 Ω, 1/4W, ±5%		2							R14, 16	ALLEN BRADLEY		
55	335005-65	RESISTOR, 4.7K, 1/4W, ± 5%									R5, 7, 8, 10, 11, 13 24, 25, 28-31, 38			
56														

CODE IDENT NO 97525 | DWG NO 127140-01

SHEET 2 OF 4

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1 2 3 4 5 6 7	UNIT QTY	REF NO.	REMARKS		REV SYM
57	335005-96	RESISTOR, 91K, 1/4W, ± 5%	2		R26, 27			
58	335006-07	RESISTOR, 180K	3		R44-46			
59	335006-01	RESISTOR, 100K	4		RT2 21, 22, 58			
60	335006-25	RESISTOR, 1.0 MEG	1		R23			
61	335005-37	RESISTOR, 330Ω	2		R32, 55			
62	335005-66	RESISTOR, 5.1K	1		R34			
63	335005-73	RESISTOR, 10K	2		R35 52			
64	335005-41	RESISTOR, 470Ω	1		R36			
65	335005-74	RESISTOR, 11K	1		R37			
66	335005-75	RESISTOR, 12K	1		R51			
67	335005-49	RESISTOR, 1K	7		R6 15, 17, 53 20, 8, 18			
68	335005-63	RESISTOR, 3.9K	1		R19			
69	335005-25	RESISTOR, 100Ω	1		R57			
70	335005-85	RESISTOR, 33K	1		R49			
71	335006-33	RESISTOR, 3.9 MEG	1		R54			
	335005-54	RESISTOR 1.5K 1/4W ±5%	1		R7			
73	335915-01	RESISTOR, 75Ω 8W	1		R9	N.1515 G-72		
74	335006-06	RESISTOR, 160K	1		R56			
75	335009-33	RESISTOR, 220Ω 1/2W, ± 5%	1		R42			
76	335005-47	RESISTOR, 820Ω, 1/4W, ±5%	1		R39			
77								
78	335009-25	RESISTOR, 190Ω, 1/2W, ±5%	1		R43			
79	304951-34	CAPACITOR, 47μF, 35V, ±10%	1		C33	CS13BF476K		
80	335005-33	RESISTOR, 220 Ω, 1/4W, ±5%	3		R5, 48, 50			
81	323414-9	MOUNTING CLIP, CAPACITOR	1					
82	323414-11	MOUNTING CLIP, CAPACITOR	1					
83								
84	304951-01	CAPACITOR, 22 μf, 15V	5		C29, 16, 24, 39			
85	304951-43	CAPACITOR, 22 μf, 50V	2		C25, 35			
86	304850-05	CAPACITOR, .001μf, 200V	15		C1, 6, 11-15, 18-23, 50, 41			

97525 127140-01

Sheet 3 of 4

LINE NO.	PART NO.	DESCRIPTION	QTY REQ'D PER ASSY 1 2 3 4 5 6 7	UNIT QTY	REF NO.	REMARKS		REV SYM
87	304850-17	CAPACITOR, .01μf, 200V	10		C3, 4, 5, 10, 17, 24, 26, 28, 30, 32			
88	304061-25	CAPACITOR, .001μF, 200V	2		C36, 38			
89	304850-29	CAPACITOR, .1μf, 200V	1		C7			
90	304451-30	CAPACITOR, 100pf., 500V	2		C34, 42			
91	304451-56	CAPACITOR, 1000PF, 100V	1		C8			
92	304969-26	CAPACITOR, 1500μf, 25V	1		C31	39D158G025GP4		
93	304969-27	CAPACITOR, 1500 μf, 50V	1		C27	39D158G050JP4		
94	304061-49	CAPACITOR, .1μf, 50V	1		C37			
95	110663-04	WASHER, FLAT #6	14					
96								
97	303903-01	HANDLE, CARD	2			LP-06		
98								
99	211457-01	SPECIAL STRIPSWITCH			S2			
100								
101	110642-07	SCREW, PAN HD 4-40 x 1/2	1					
102	110642-08	SCREW, PAN HD 4-40 x 5/8	2					
103	110660-03	WASHER, SPRING LOCK #6	3					
104	346502-01	JUMPER, LEAD INSULATED	AR			"D" & "E" (FOR OPTIONS)		
105	306351-02	CMPD, SILICON HEATSINK	AR			DOW CORNING #340 (USED ON ITEM 12 & 14		
106	322917-07	RIVET, POP, AL	5					
107	110641-07	SCREW, PAN HEAD, 6-32 x 1/2	5					
108								
109	110642-03	SCREW, PAN HEAD, 4-40 x 1/4	2					
110	110662-02	WASHER, FLAT #4	5					
111	110659-03	WASHER, INT STAR, #6	6					
112								
113	110660-02	WASHER, SPRING LOCK #4	5					
114	110664-03	NUT, HEX 4-40	3					
115	110664-06	NUT, HEX #6-32	5					
116	110664-04	NUT, HEX #4-40	2			(SMALL PATTERN)		

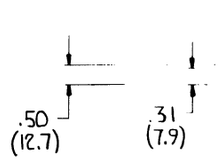
97525 127140-01

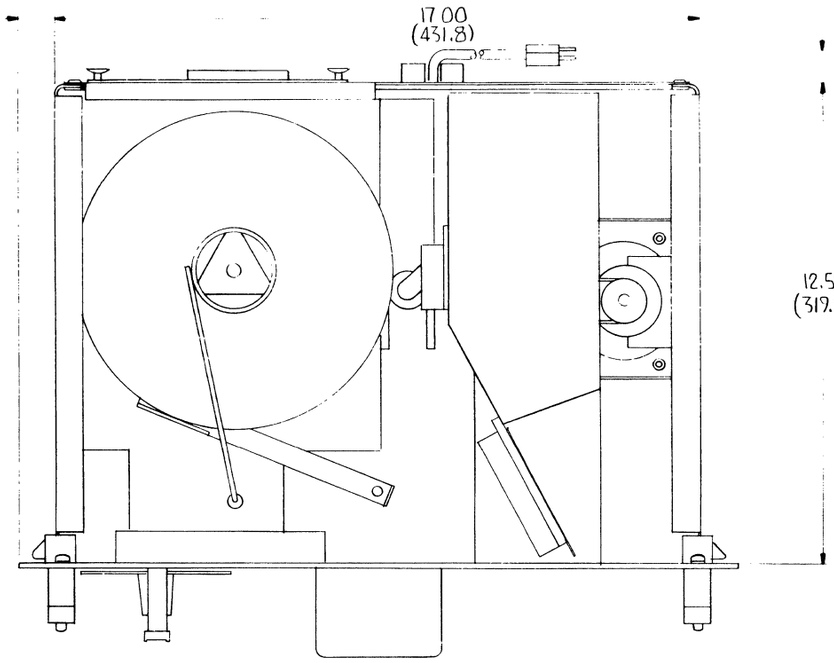
Sheet 4 of 4

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.

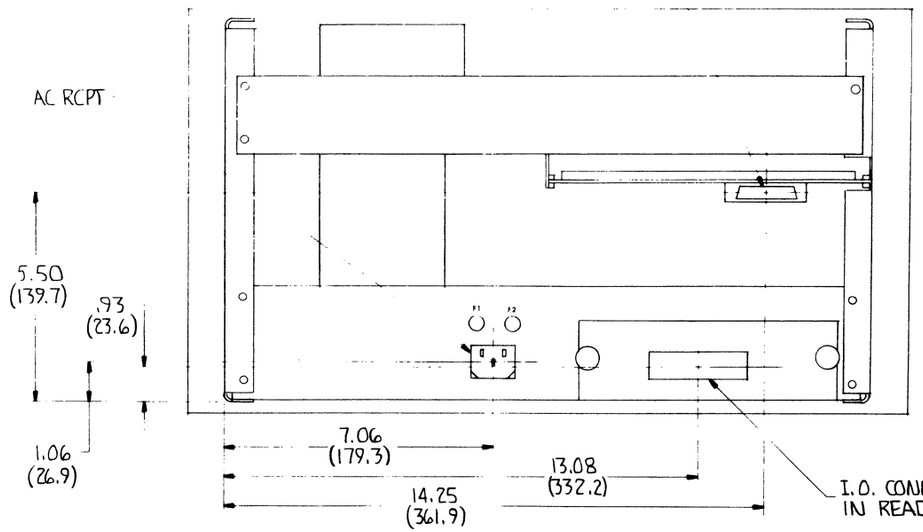
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	7/10/75	



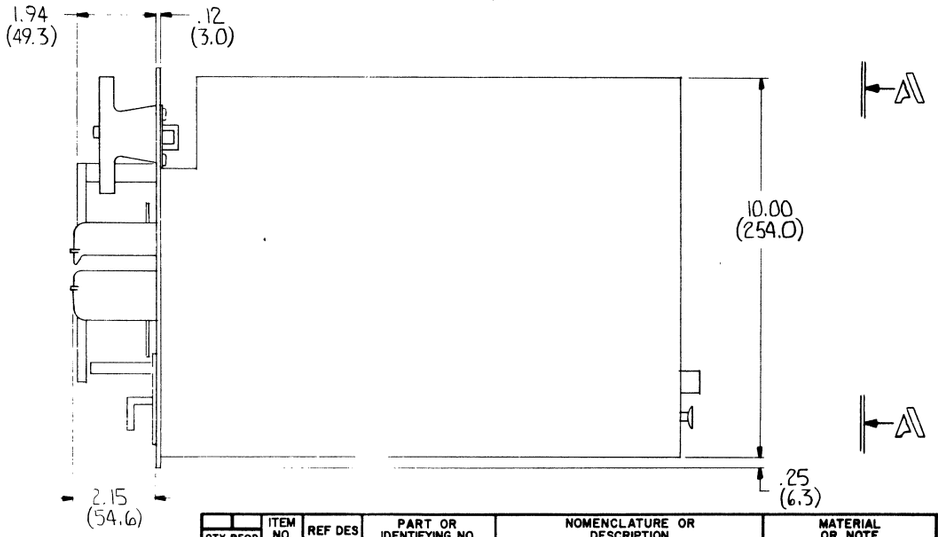


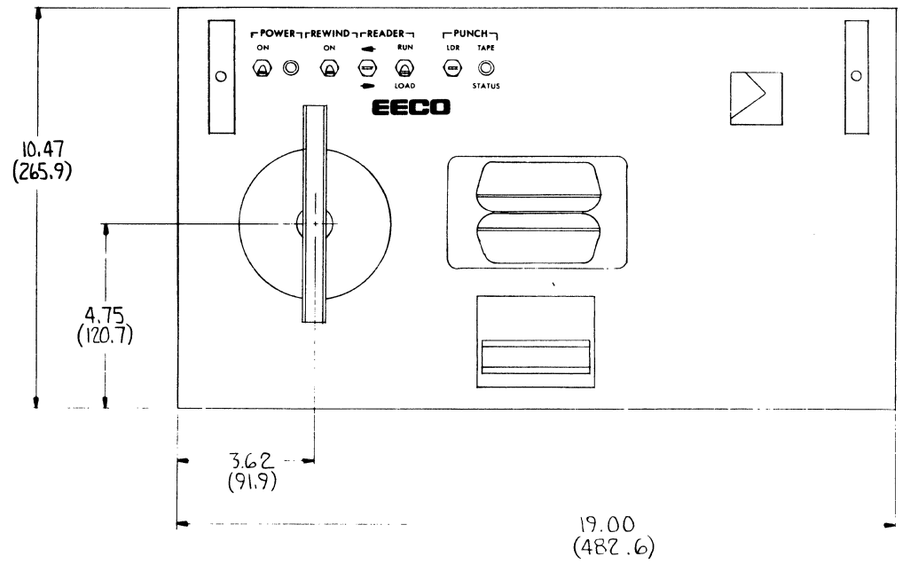
4.5 LOOP ON POWER (38.1) CORD

I.O. CONNECTOR OF SLIDE-IN PUNCH LOGIC P.C. CARD



VIEW A-A





QTY REQD	ITEM NO.	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

NEXT ASSY	230952
USED ON APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS .XX± .03 .XXX± ANGLE ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

CONTRACT NO.

	APPROVED	DATE
DRAWN		9/4/75
CHECK	W. Grant	9/10/75
ENGR		9/10/75
MGR		9/16/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE: DIM DWG, RDR PCH W/ RWD POST

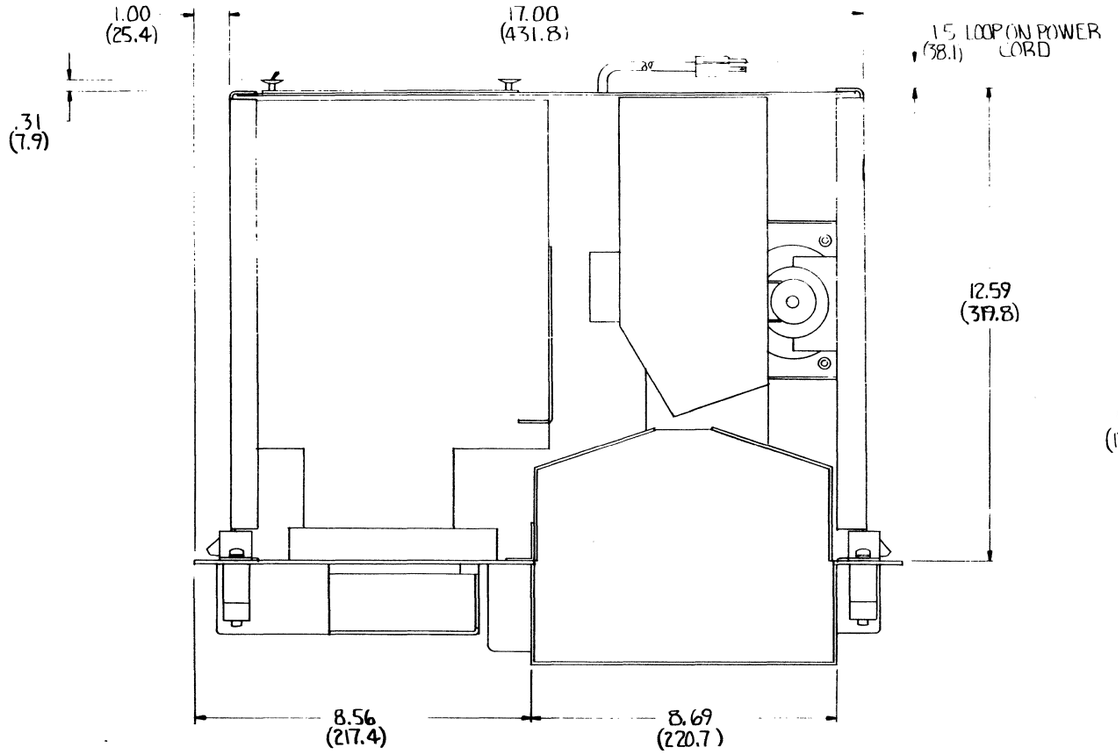
SIZE	CODE IDENT NO.	DWG NO.
D	97525	127718

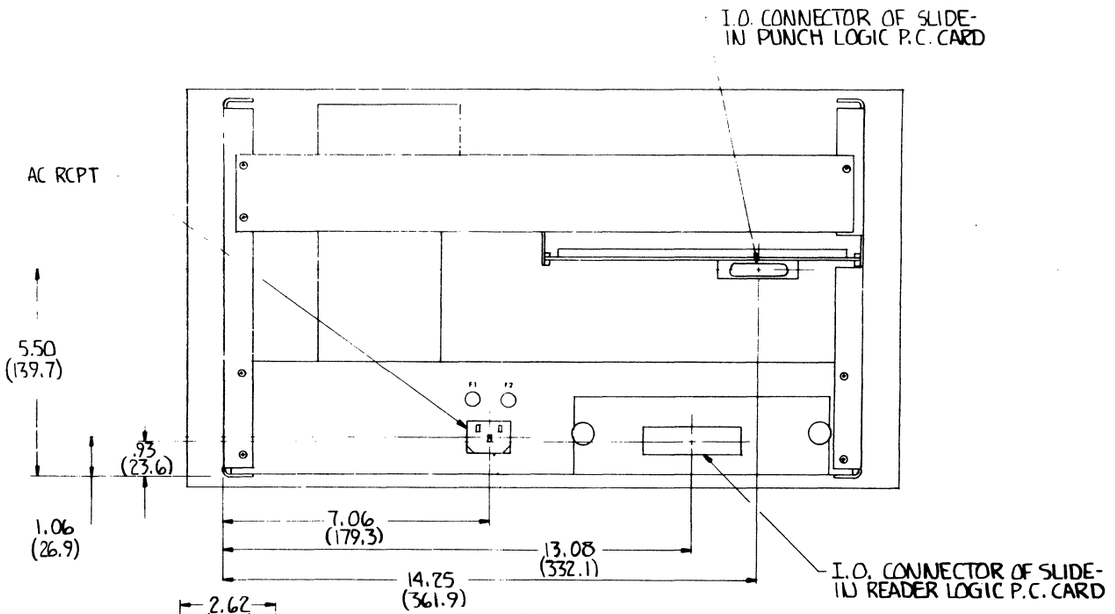
SCALE 1/2 SHEET 1 OF 1

"THE INFORMATION CONTAINED HEREON IS PROPRIETARY AND CONFIDENTIAL TO ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA AND SHALL NOT BE USED OR DISCLOSED, IN WHOLE OR IN PART, WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION OF ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA."

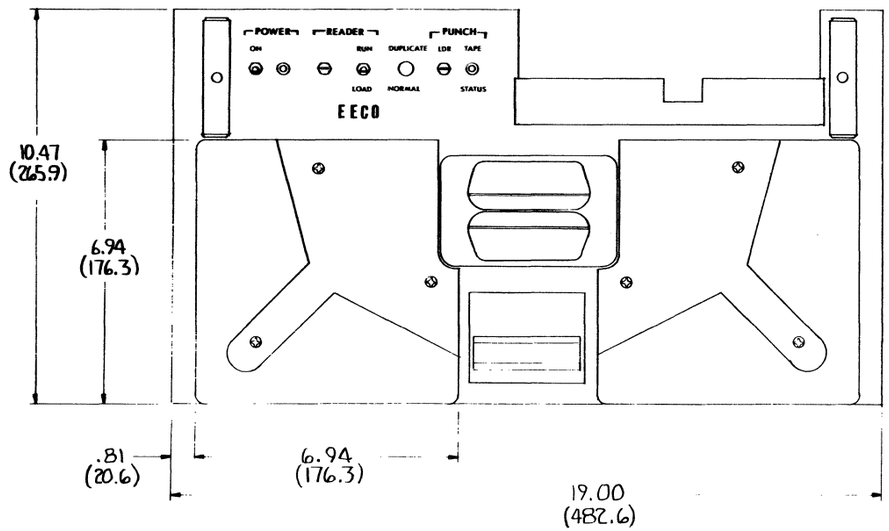
NOTES: UNLESS OTHERWISE SPECIFIED
1. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS

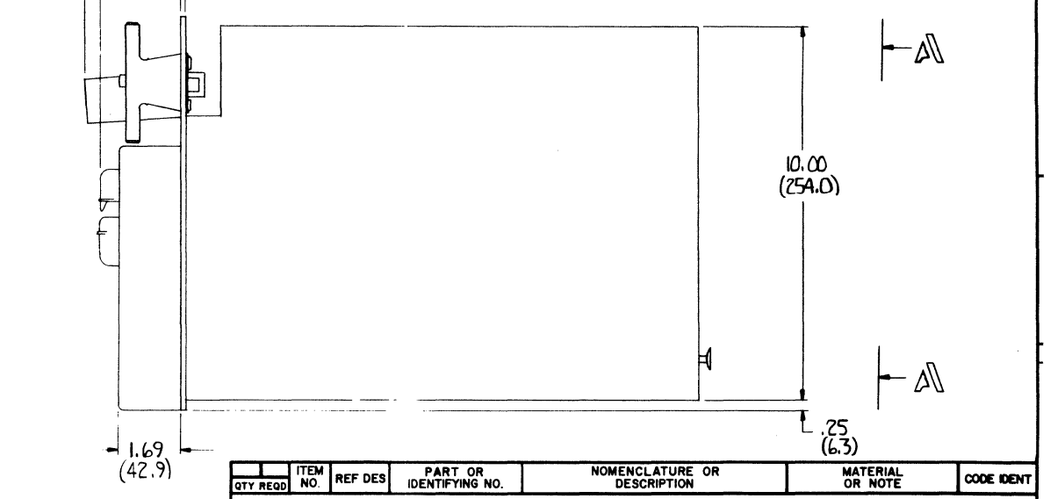
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	RELEASED	7/14/75	





VIEW A-A





QTY REQD	ITEM NO.	REF DES	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE	CODE IDENT

PARTS LIST

NEXT ASSY	230950
USED ON	
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. TOLERANCES ON DECIMALS .XX ± .03 .XXX ± ANGLE ± 1/2°

DO NOT SCALE DRAWING

BREAK SHARP EDGES

MATERIAL

FINISH

CONTRACT NO.

APPROVED	DATE
DRAWN	5/8/75
CHECK	7/14/75
ENGR	7/14/75
MGR	7/14/75

ELECTRONIC PRODUCTS DIVISION
ELECTRONIC ENGINEERING COMPANY OF CALIFORNIA

TITLE
DIMENSION DWG.
RDR/PCH FAN FOLD

SIZE	CODE IDENT NO.	DWG NO.
D	97525	127585

SCALE 1/2 SHEET OF 1

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SECTION VI

OPTIONS

ELECTRONIC ENGINEERING
COMPANY OF CALIFORNIA