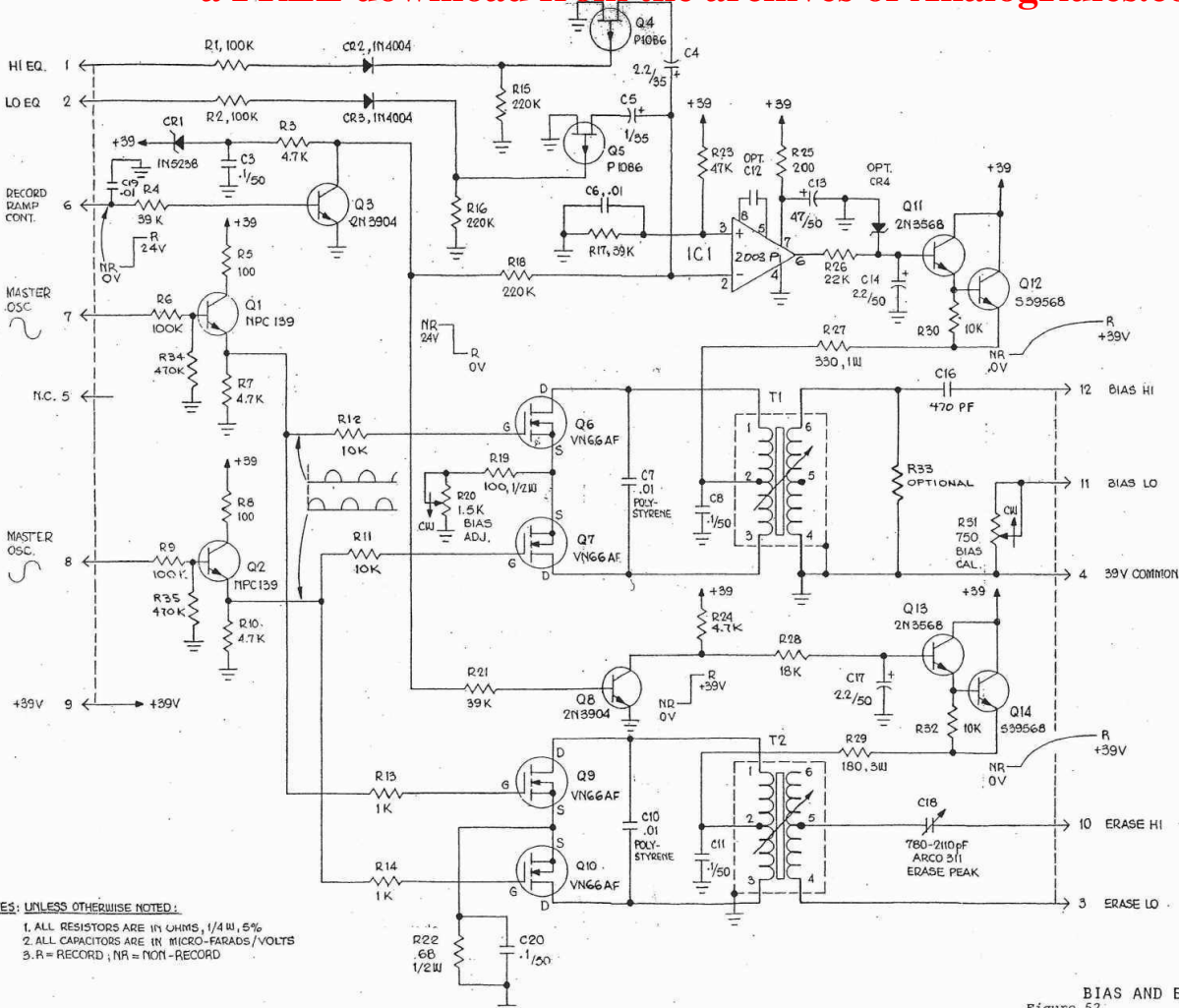


NOTES:

1. L RES. ARE 1/2 W., 5%, UNLESS OTHERWISE SPECIFIED.
2. THIS BOARD IS COMPATABLE WITH WOELKE ERASE HEADS AND AMC RECORD HEADS ONLY.



BIAS AND ERASE BOARD 9C139
 Figure 52 JH-16 Page 10

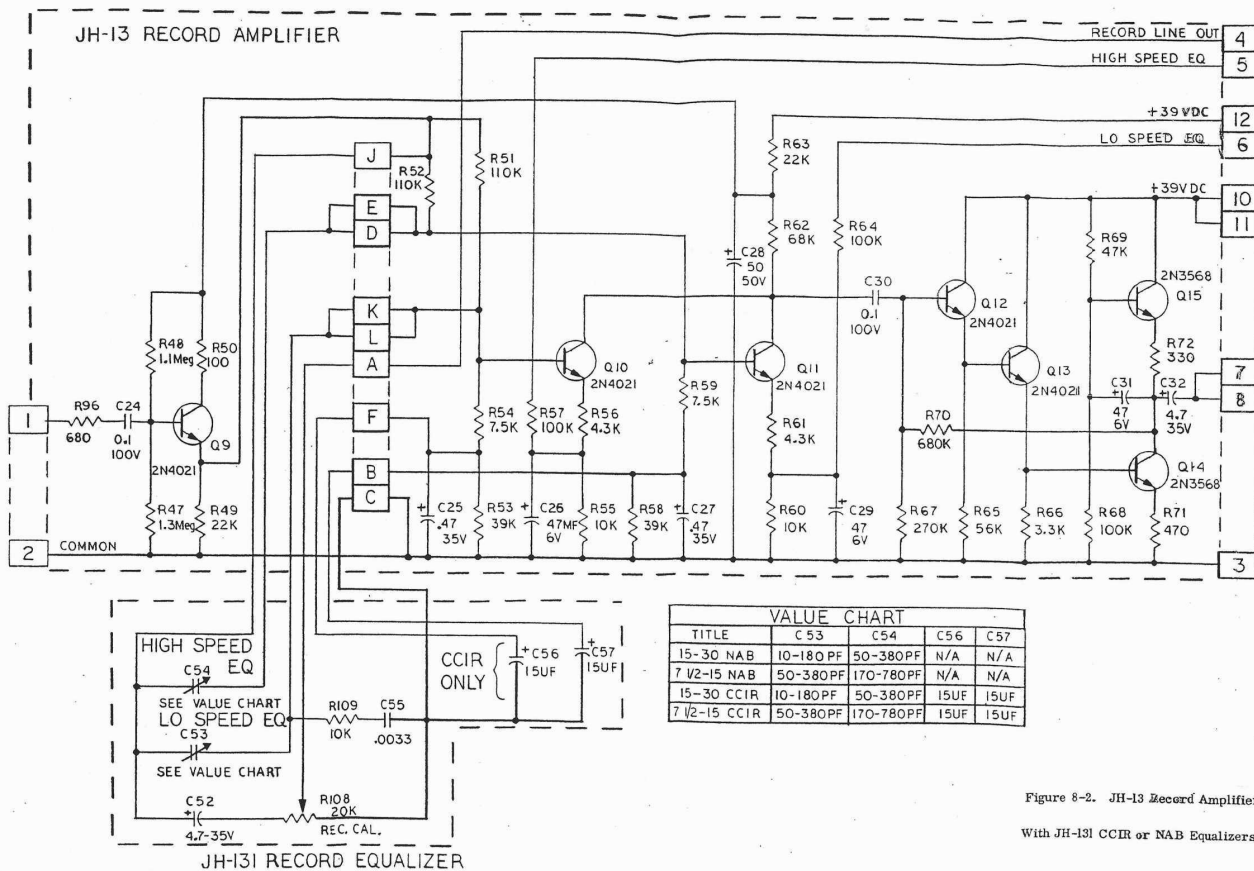


Figure 8-2. JH-13 Record Amplifier
With JH-131 CCIR or NAB Equalizers.

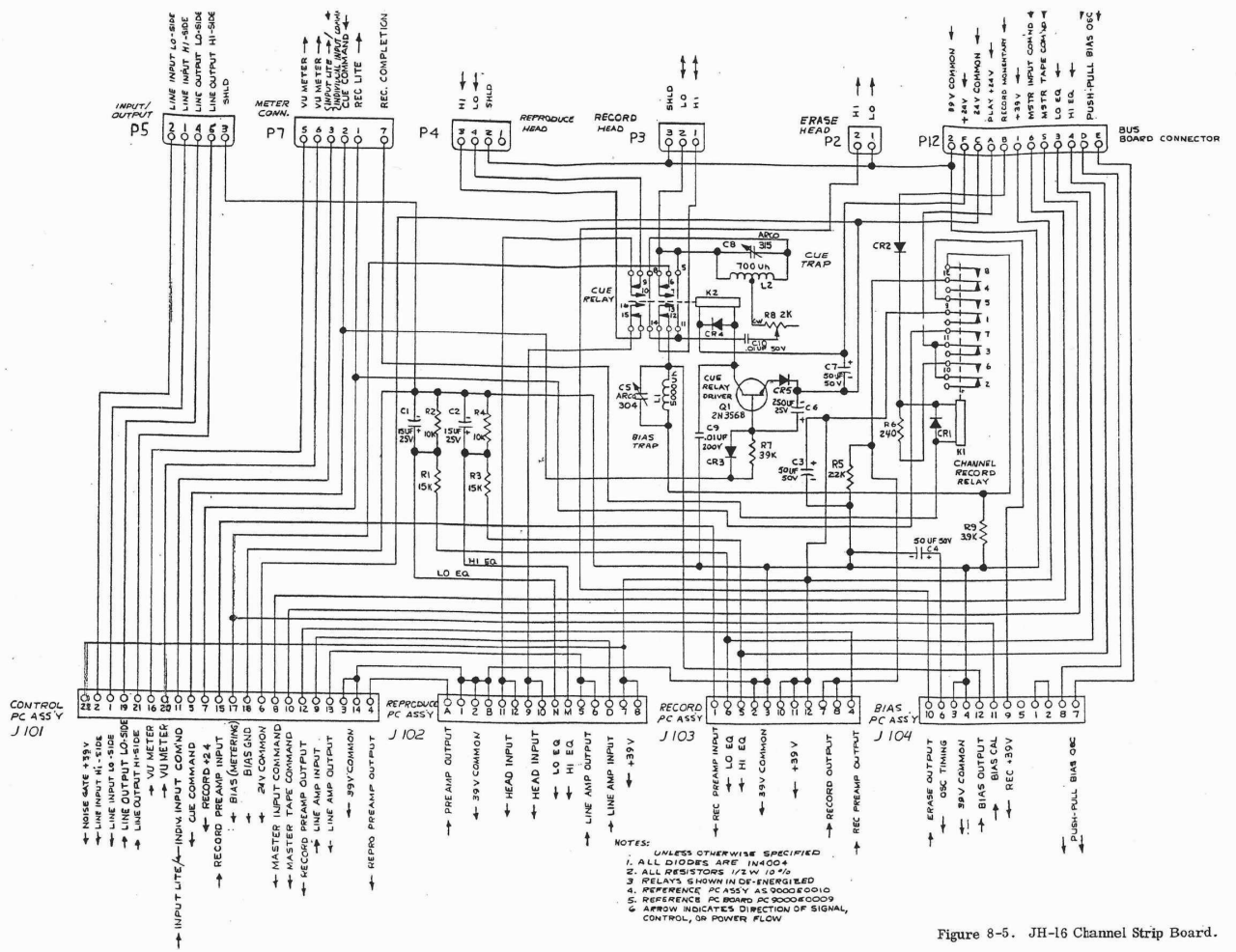
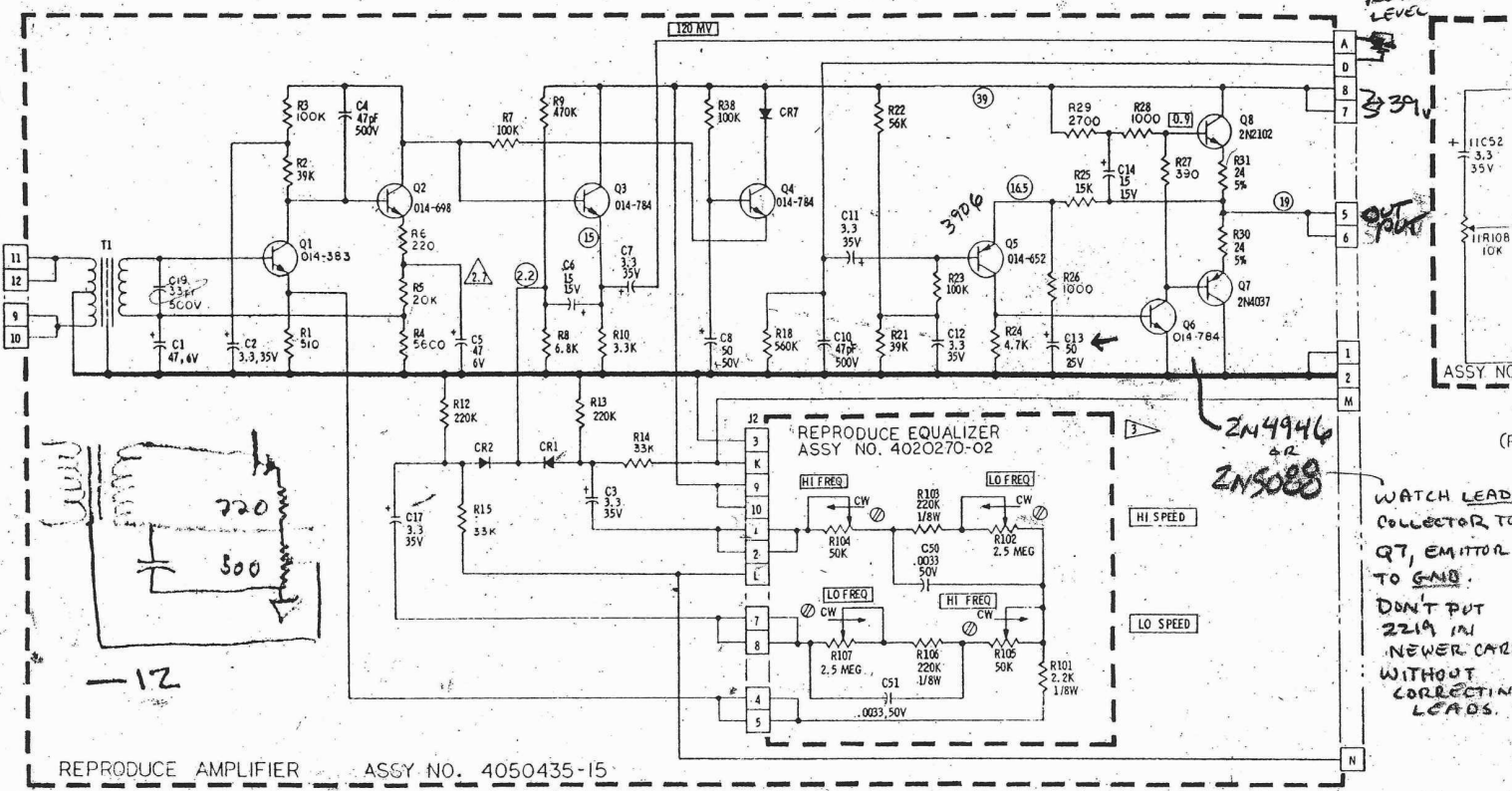
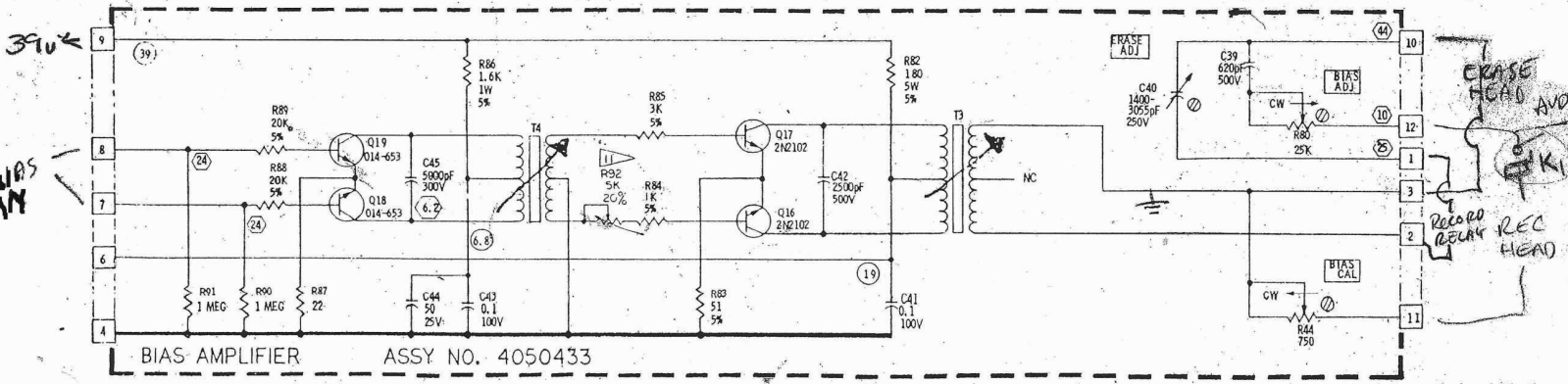
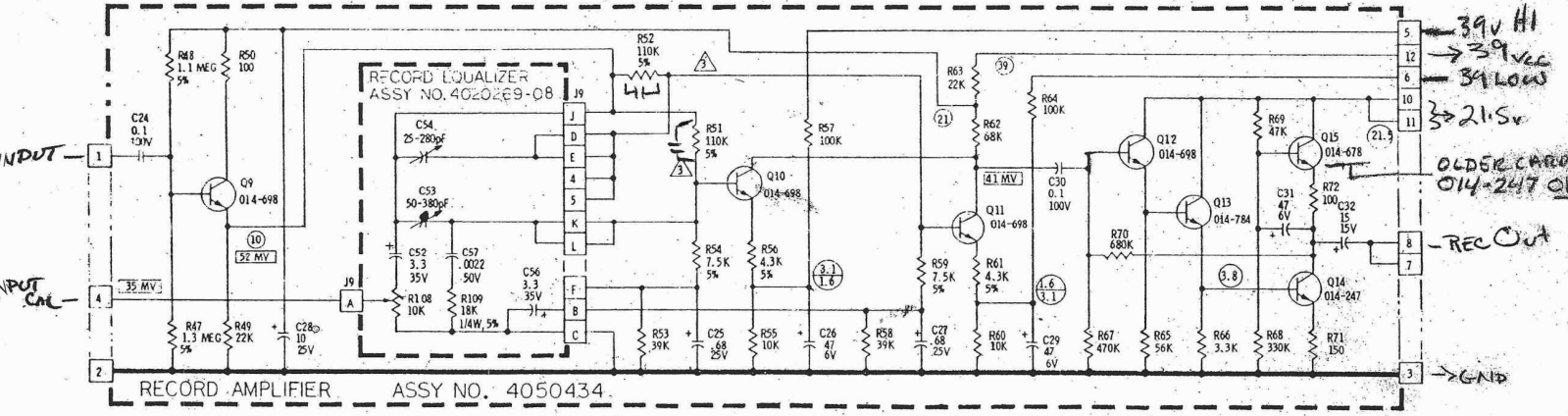


Figure 8-5. JH-16 Channel Strip Board.

LOW REAR GAIN check



.001 R52 R51 TO LOWER HIGH FREQ



BIAS CARD - PIN 10 IS ERASE HIGH PIN 11 IS RECORD HIGH

MM 1200

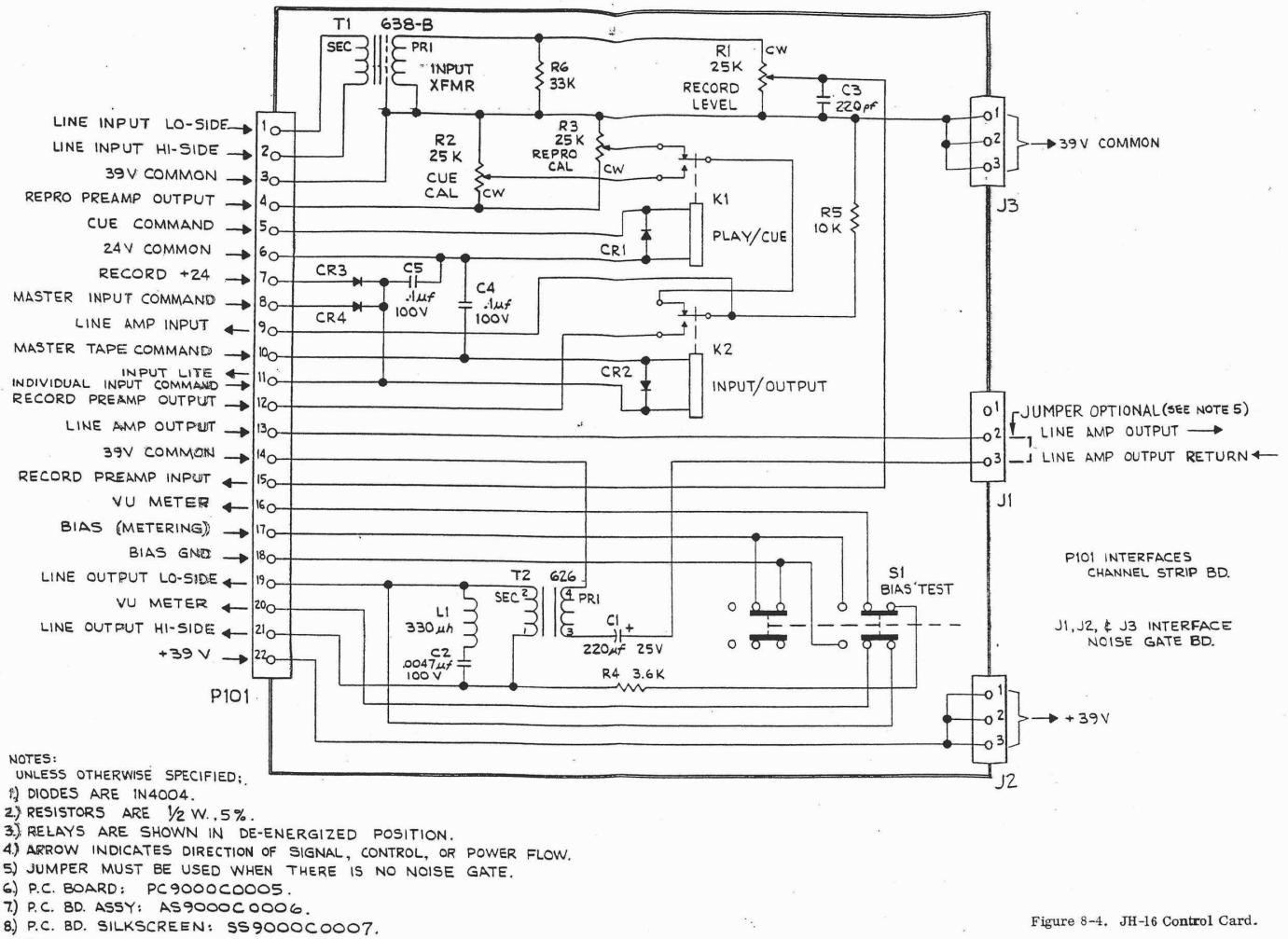
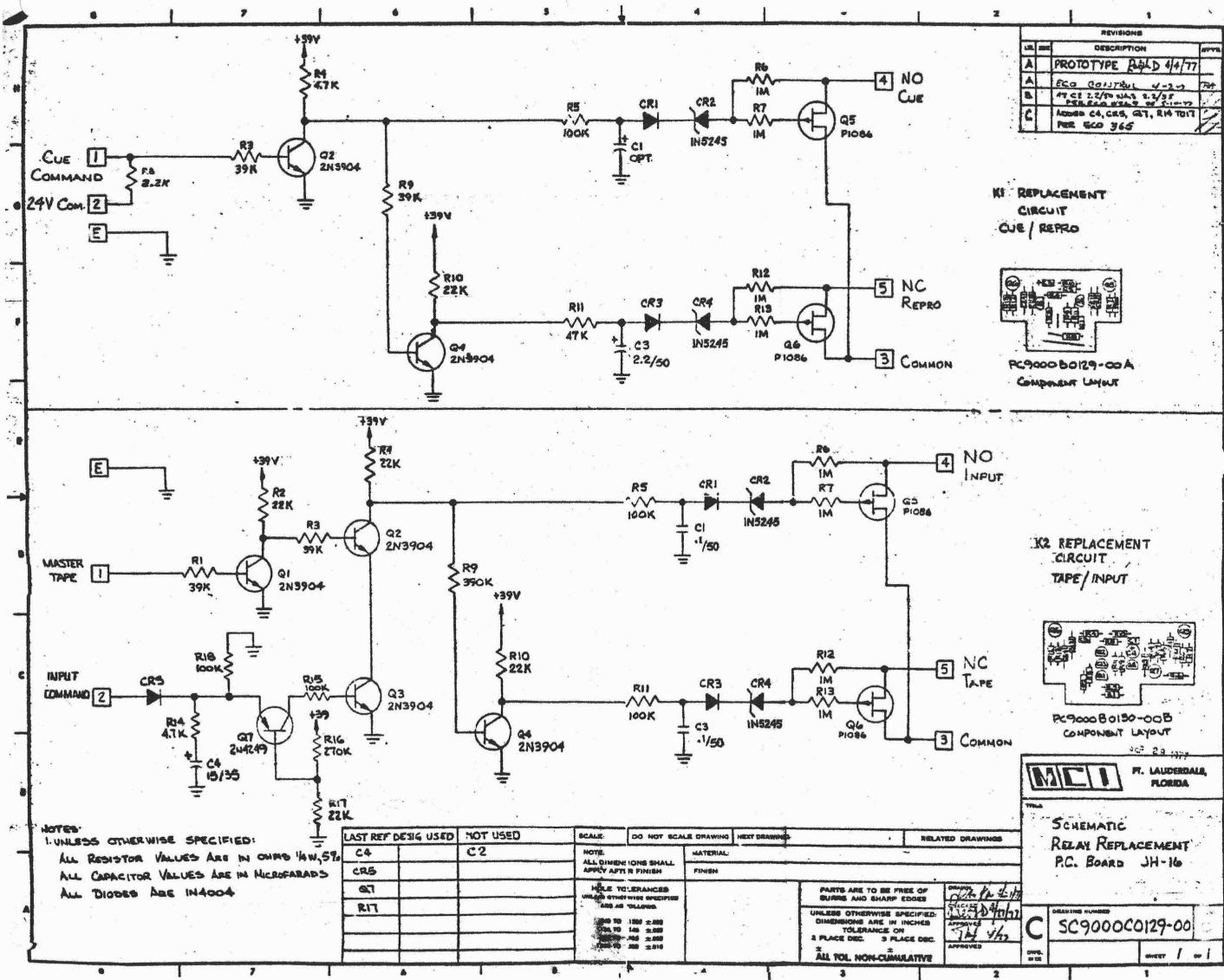
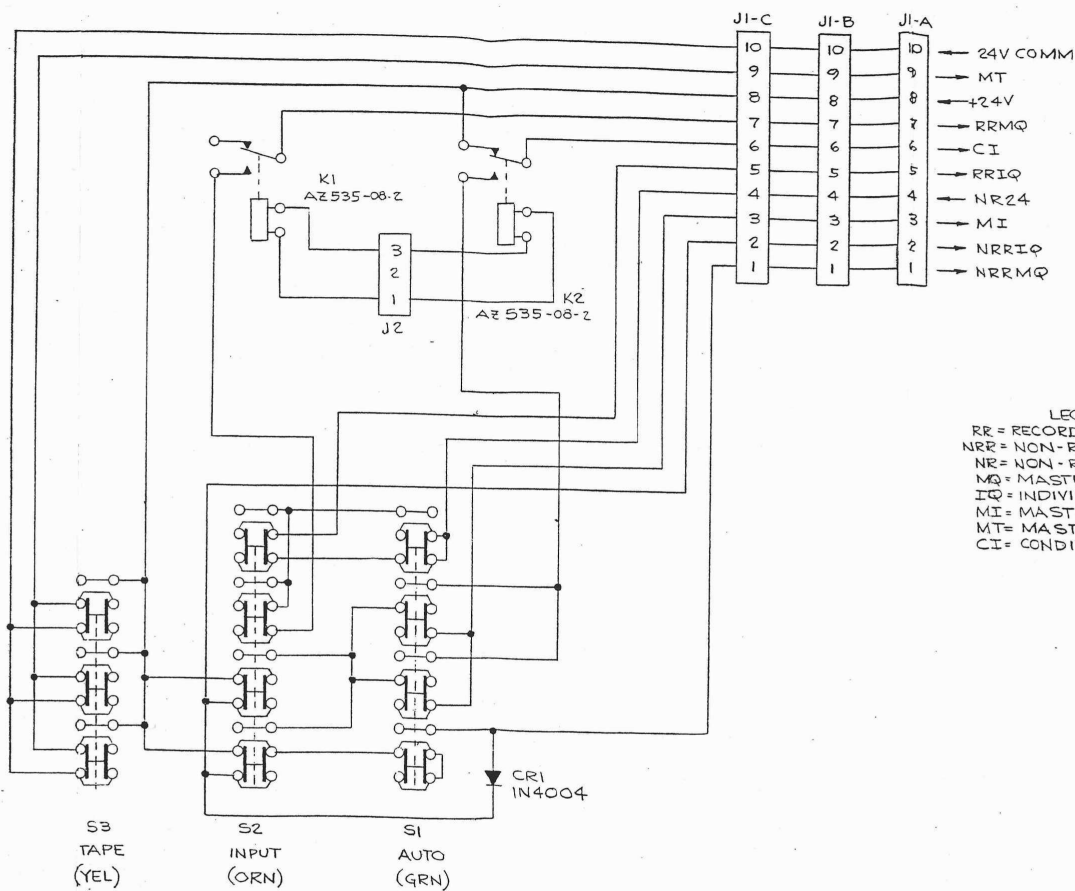


Figure 8-4. JH-16 Control Card.



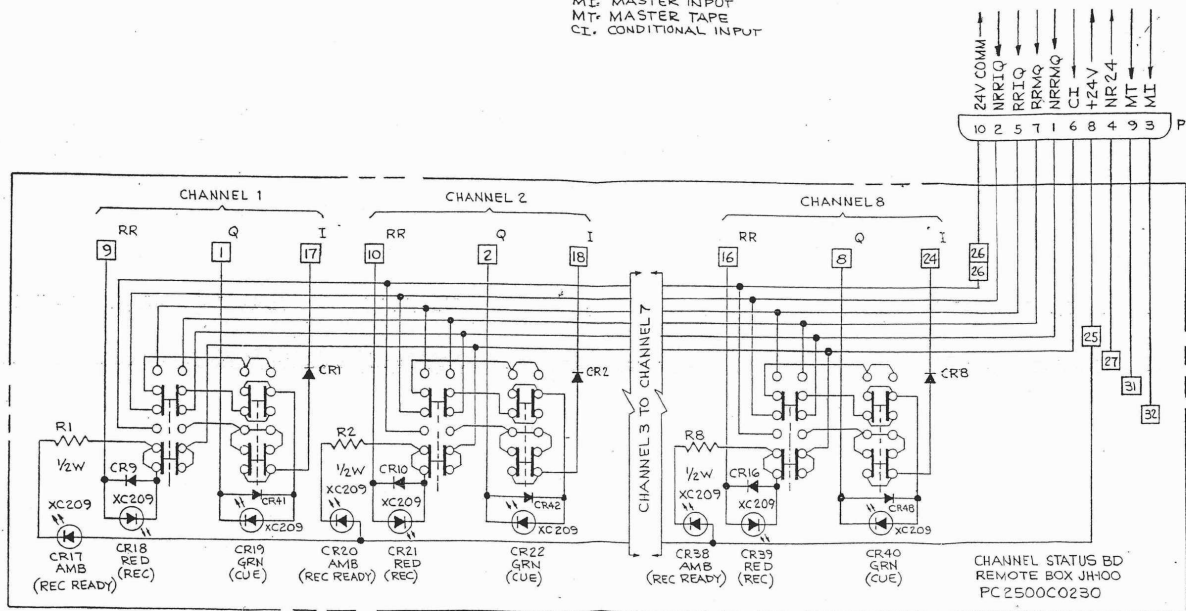


LEGEND
 RR = RECORD READY
 NRR = NON-RECORD READY
 NR = NON-RECORD
 MQ = MASTER CUE
 IQ = INDIVIDUAL CUE
 MI = MASTER INPUT
 MT = MASTER TAPE
 CI = CONDITIONAL INPUT

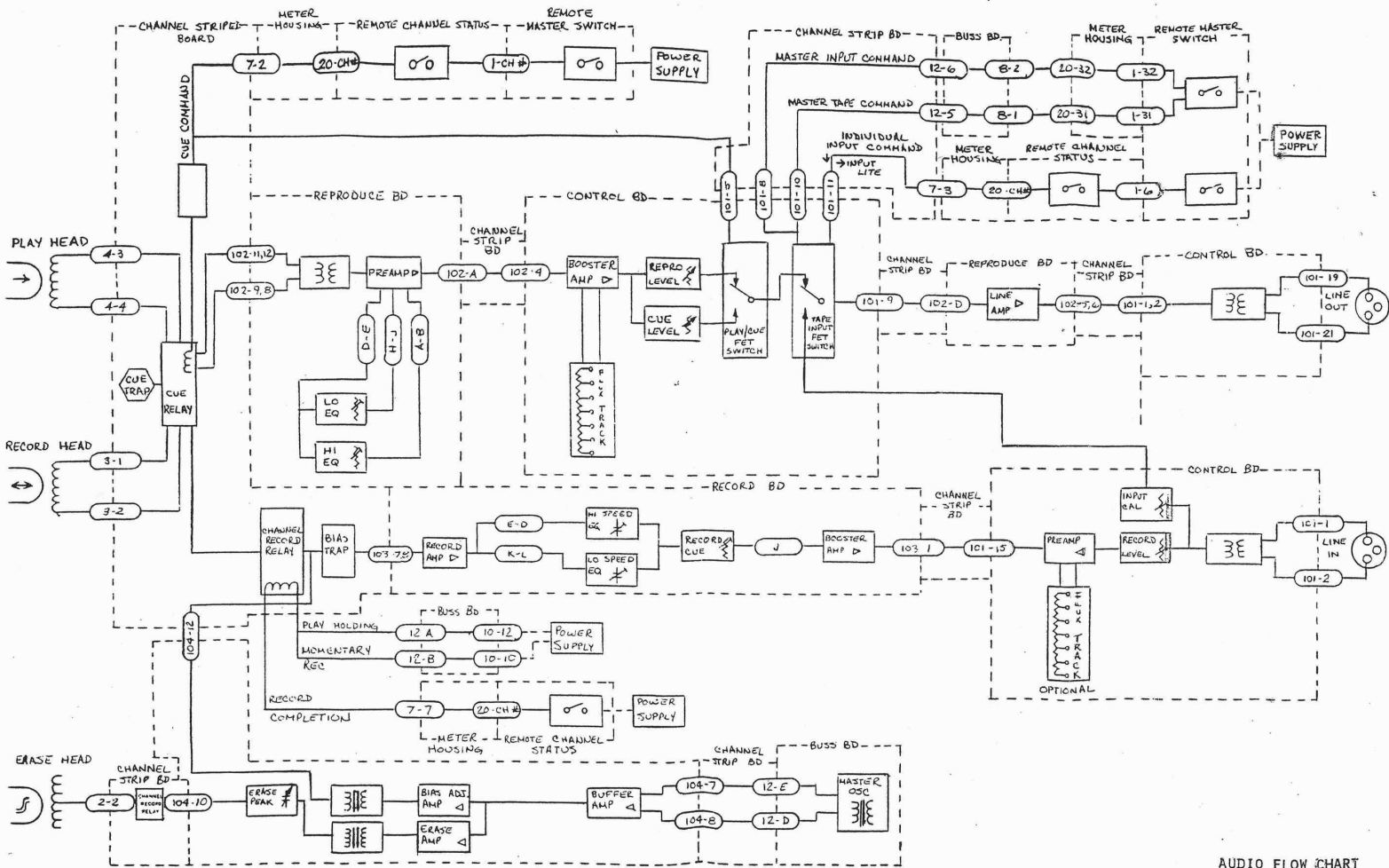
NOTES: UNLESS OTHERWISE SPECIFIED
 1. ALL SWITCHES ARE SHOWN IN THE NON-ENGAGED POSITION.
 2. ARROWS INDICATE DIRECTION OF CONTROL OR POWER FLOW.
 3. INTERFACE CONNECTOR CODING IS DERIVED BY COMBINING
 LEGEND FUNCTIONS.

MASTER SWITCHING BOARD 25C231
 Figure 36

LEGEND
 RR= RECORD READY
 NRR= NON-RECORD READY
 NR= NON-RECORD
 MQ= MASTER CUE
 IQ= INDIVIDUAL CUE
 MI= MASTER INPUT
 MT= MASTER TAPE
 CI= CONDITIONAL INPUT



- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL DIODES ARE IN 4004.
 2. ALL SWITCHES ARE SHOWN IN THE NON-ENGAGED POSITION.
 3. ARROWS INDICATE DIRECTION OF CONTROL OR POWER FLOW.
 4. □ = EYELETS ON CHANNEL STATUS BD.
 5. INTERFACE CONNECTOR CODING IS DERIVED BY COMBINING LEGEND FUNCTIONS.



AUDIO FLOW CHART
Figure 7 JH-16 Page 3-

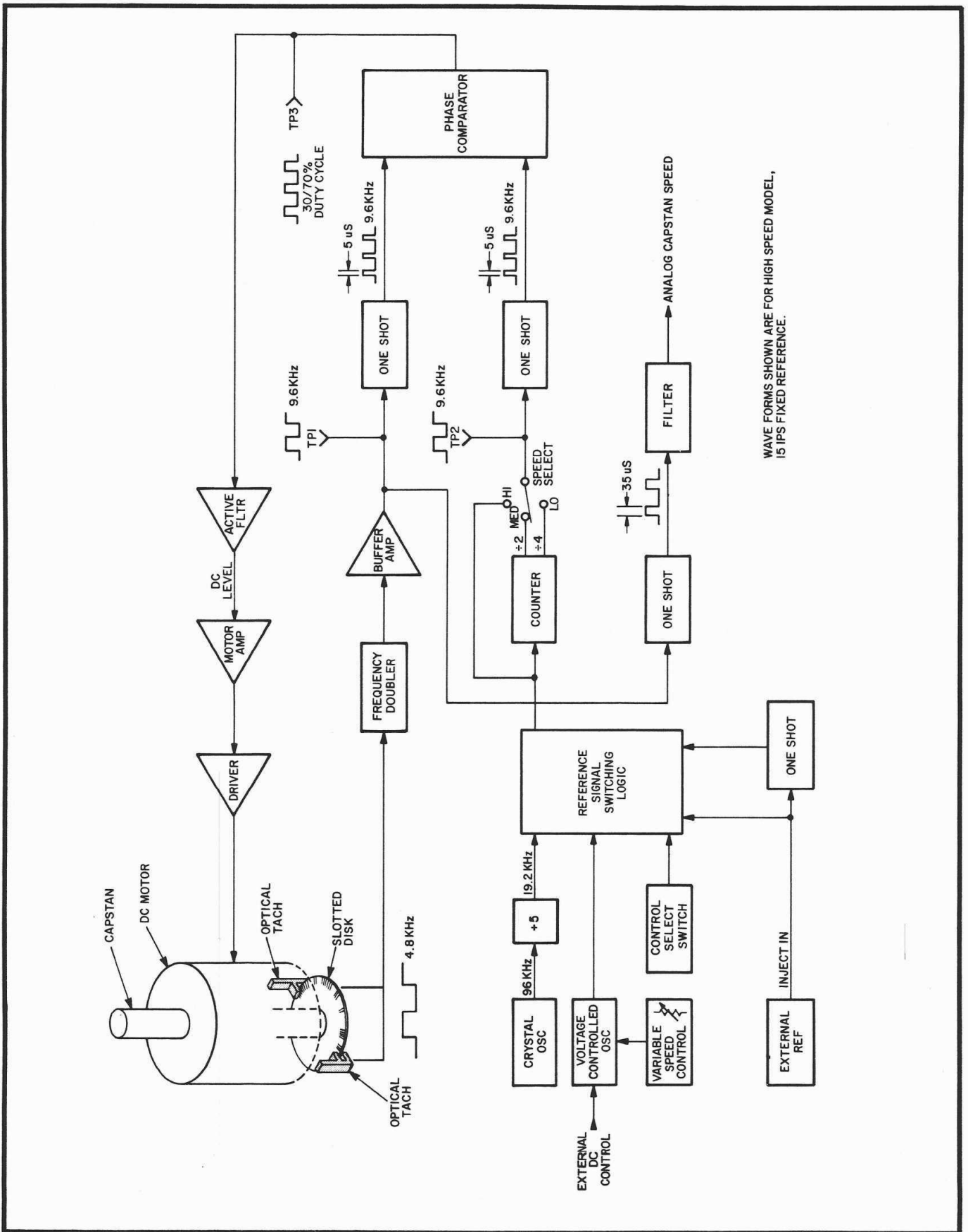


Figure 3-8 Phase Locked Loop Block Diagram

SECTION 8

TROUBLESHOOTING

8.1 Introduction

Do not attempt to troubleshoot or repair this tape machine unless you have a thorough understanding of its operation and circuitry. To familiarize yourself with the tape transport's operation, read this manual and use the block diagrams to follow the signal flow through the schematics.

MCI conducts training seminars at its production facilities covering the theory of operation, alignment, and troubleshooting procedures for all current MCI products. We suggest that technicians involved in the maintenance and repair of MCI equipment attend our training seminar. Contact the Customer Service Department for information on class schedules and enrollment.

It is essential that you have the proper tools and test equipment in order to properly maintain your tape transport. These are listed in Section 3. But remember, the most important troubleshooting tool available is your knowledge of the equipment.

8.2 Control Logic Board

The Control Logic Board comes equipped with its own troubleshooting aid, the Logic Annunciator Board, PC-2500-0177-00. LEDs on this board indicate the logic level of the output commands from the control logic. Each LED is labeled; the following list gives the command signal name corresponding to the abbreviation printed on the PC board.

Table 8-1

Logic Annunciator Board LEDs	
AI Enab	Autolocator enable command
DMVC	Deck manual velocity control
RMVC	Remote manual velocity control (always off)
MVC	Main manual velocity control command
F Fet	Fast FET command
Lifter	Tape Lifter out command
Rw Cmd	Rewind command
Rw Lt	Rewind light command
FF Cmd	Fast forward command
FF Lt	Fast forward light command
Bks	Brake release command
Stop	Stop command
R Idle	Right reel motor idle command
PP Lt	Play preset light command
P Lft	Play left reel motor command
P Rt	Play right reel motor command
Rec	Record command
Rec Mom	Record momentary command
Edit	Edit command
Sh	Shield down command
Sh Lt	Shield light command

A truth table, Table 8-2, summarizes the operation of the Logic Annunciator Board. Each column corresponds to one of the LEDs. To use the board, press the transport control, or remote control, to place the machine in each of the modes listed. In each mode check the condition of the LEDs with

the truth table. Any mismatch between the truth table and the LEDs indicates a problem. Table 8-3 can direct you to the IC on the Control Logic Board which is probably malfunctioning.

The logic diagrams in Section 3, Figures 3-2

through 3-7, detail the logic flow for every control mode. Also, the schematic of the Control Logic Board, SC2500-D-027, indicates the function of each IC chip. Using the logic diagrams and the schematic you can easily trace back from the missing command signal to the faulty IC.

Table 8-2
Logic Annunciator Truth Table

LED	A E n A b	D M V C	R M V C	M V C	F F e t	L i f t e r	R w C m d	R w L t	F F C m d	F F L t	B k s	S t o p	R i d l e	P P L t	P L f t	P R t	R e c	R e c M o m	E d i t	S h ¹	S h L t ¹
RWD	on	on			on	on	on	on			on									on	
FWD	on	on			on	on			on	on	on									on	
STOP	on ²	on									on	on	on							on	
PLAY	on	on									on			on	on	on					
RECORD	on	on									on			on	on	on	on	³			
EDIT		on									on		on		on				on	on	on
MVC		on		on	on						on										
LATCHED MVC	on	on		on	on	on					on									on	
AUTOLOCATE	on	on			on	on		on		on	on									on	
NO TAPE		on																			
MANUAL TAPE LIFTER OUT	on	on									on									on	

¹ Always on if shield is latched.
² Off while STOP is pressed down.
³ On while RECORD is pressed down.

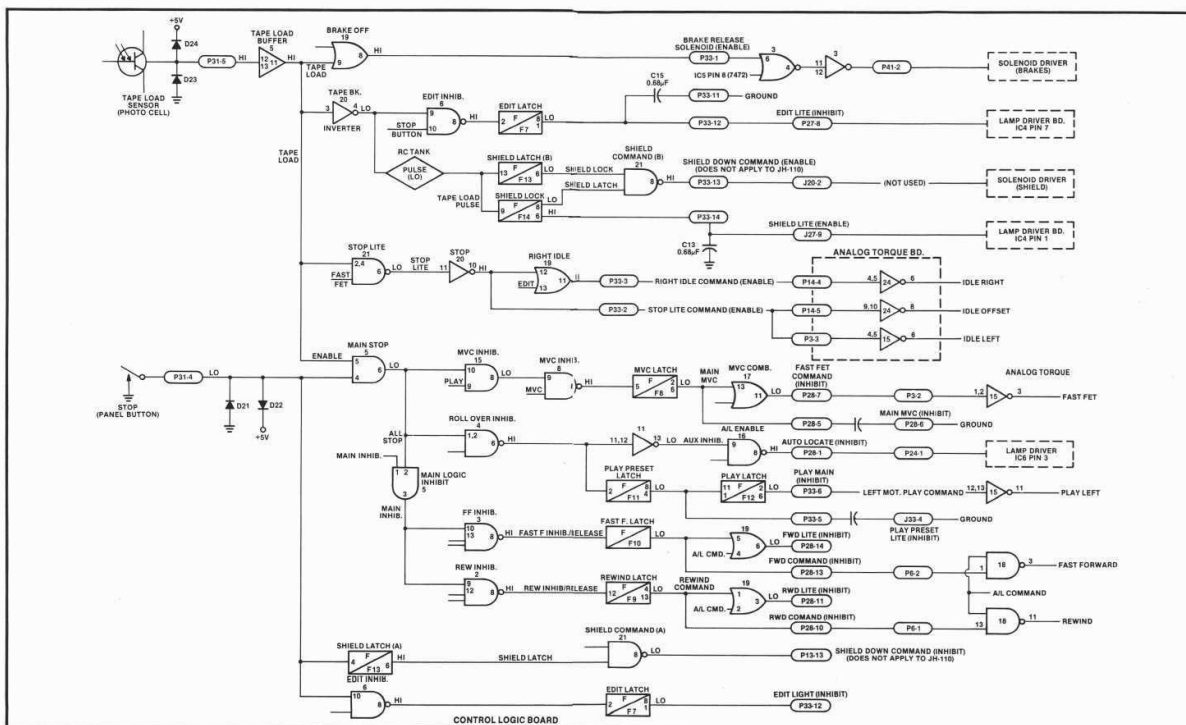


Figure 3-2 Stop Mode Logic

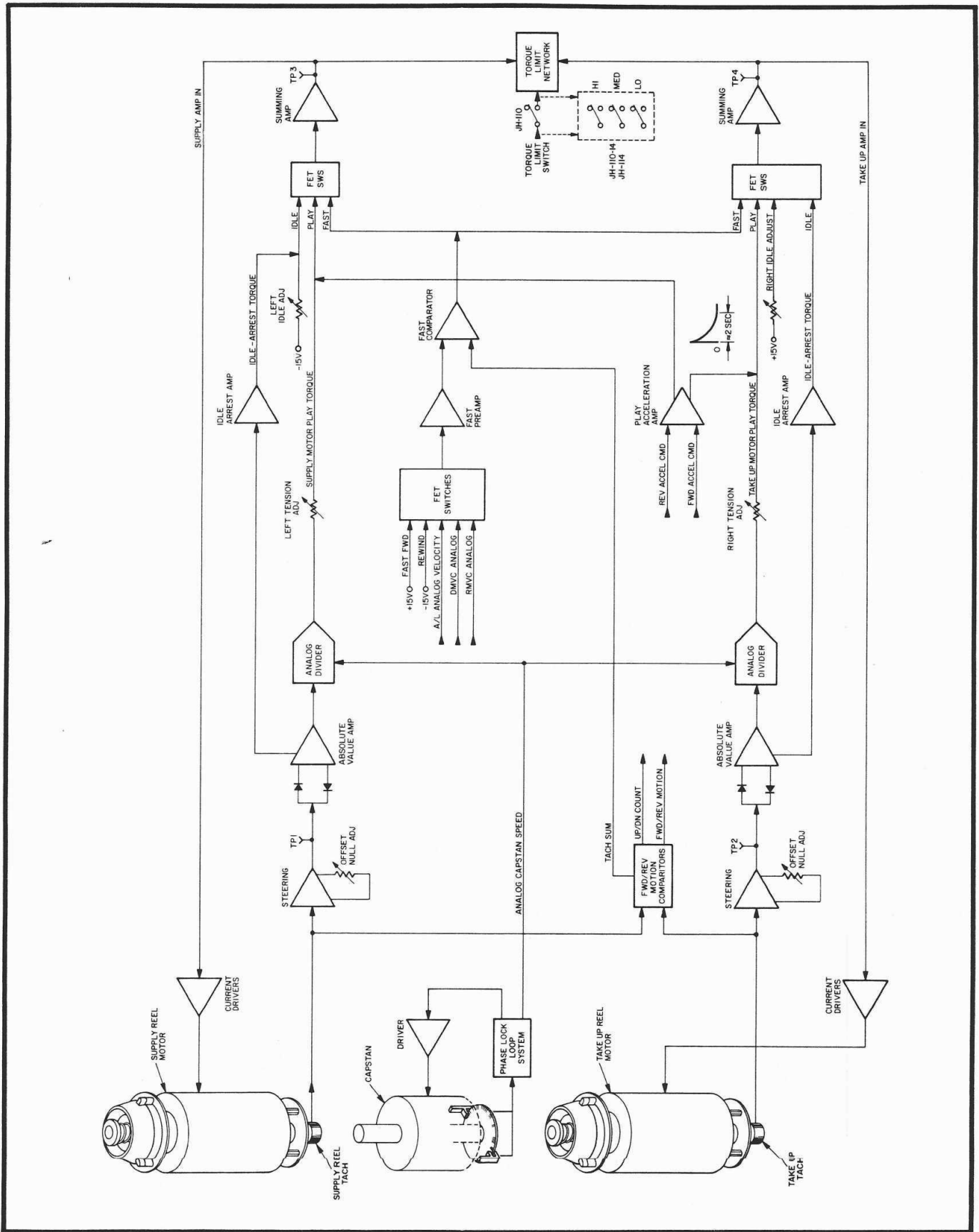


Figure 3-13 Tape Tension Servo Block Diagram

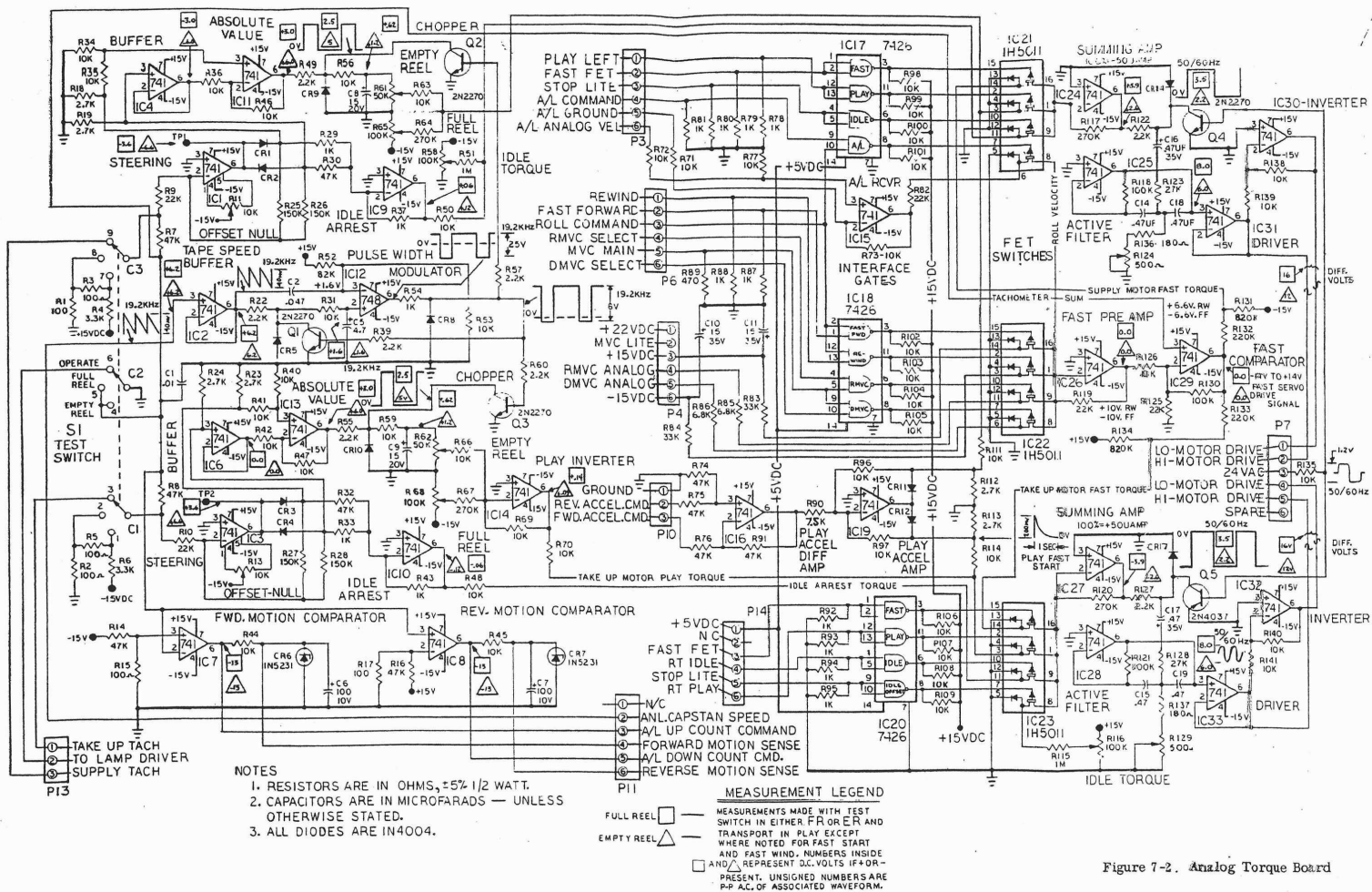
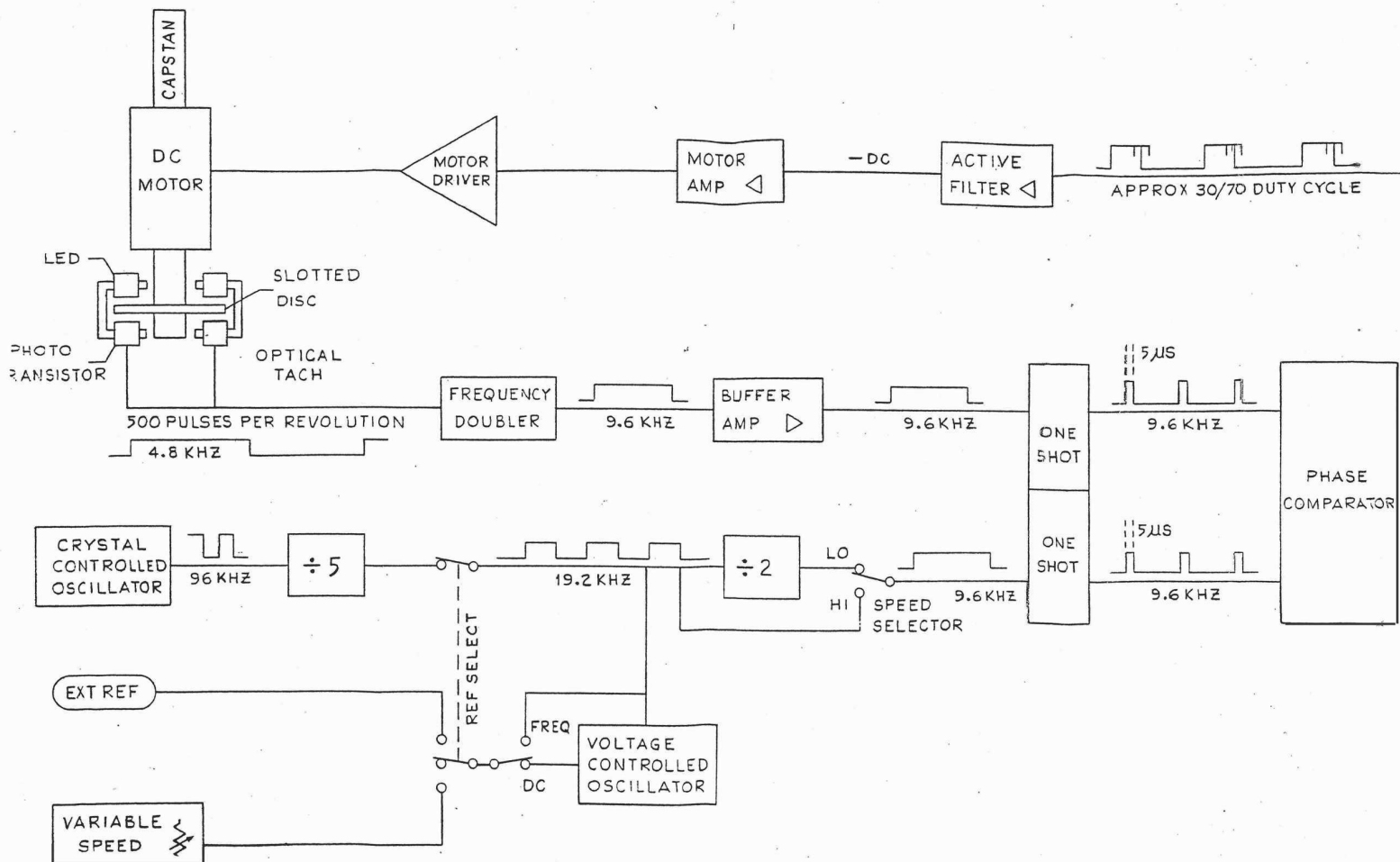
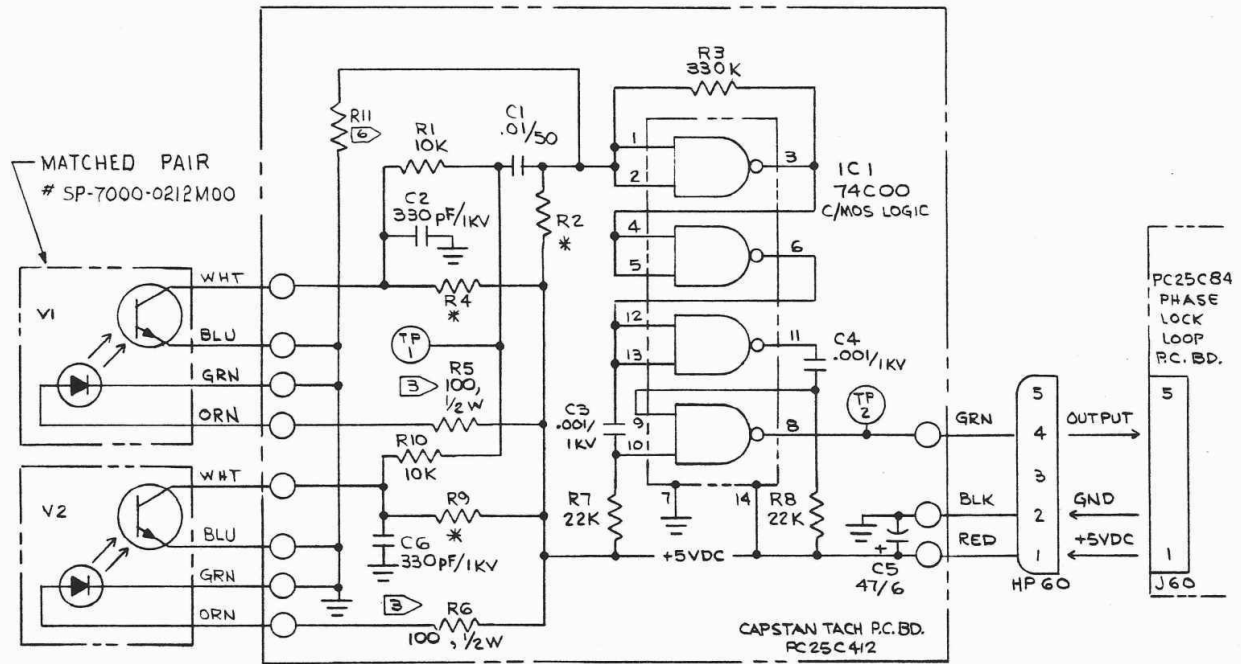


Figure 7-2. Analog Torque Board



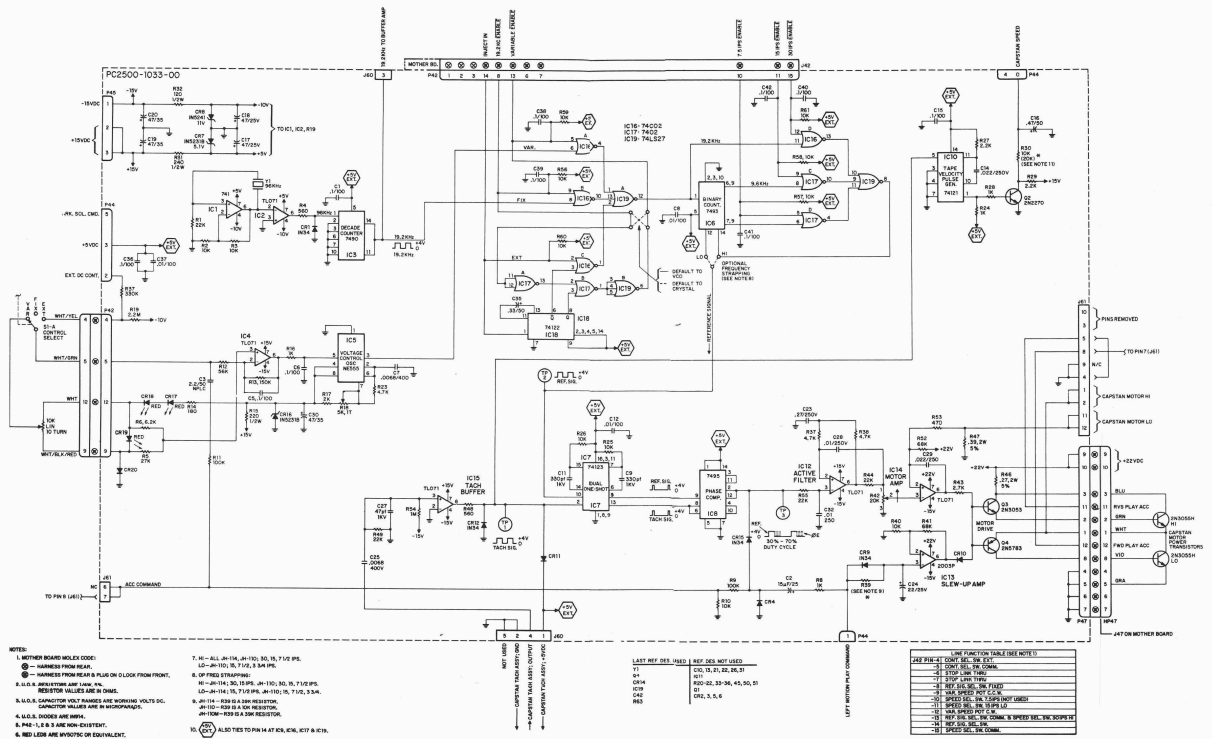
CAPSTAN SPEED CONTROL SYSTEM
Figure 14 JH-16 Pag



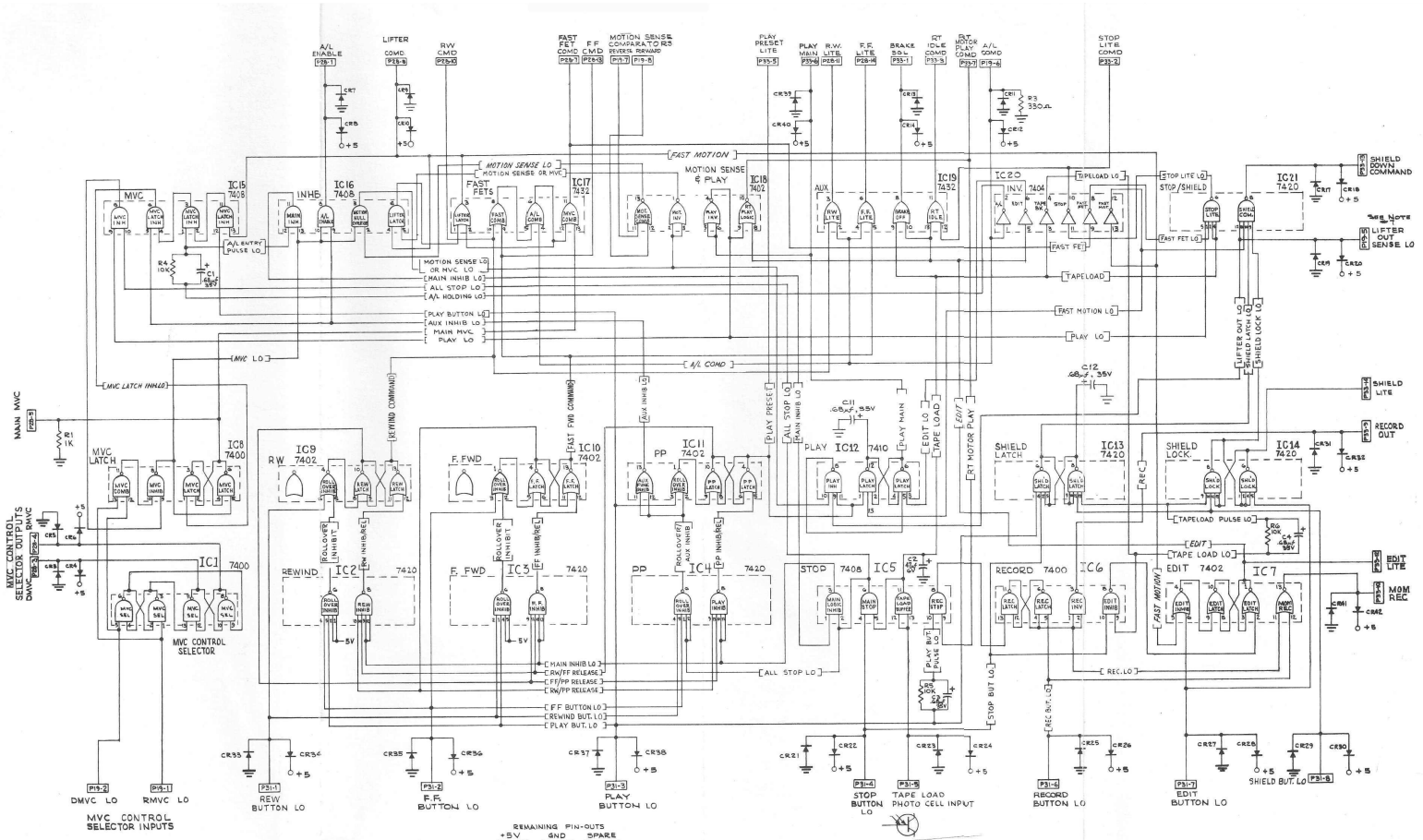
NOTES:

- 1) UNLESS OTHERWISE SPECIFIED:
ALL RESISTOR VALUES ARE IN OHMS
1/4 W, 5%.
ALL CAPACITOR VALUES ARE IN
MICROFARADS/VOLTS.
- 2) TP1 & TP2 ARE SWAGED TERM POSTS.
- 3) R5 & R6 ARE NOMINAL VALUES;
MAY CHANGE AT FINAL CHECKOUT.
- 4) USE LEADS AS SUPPLIED WITH V1 & V2.
- 5) WIRES TO HP60 ARE 22AWG, 7 STRAND
- 6) VALUE SELECTED AT FINAL CHECKOUT

7) * R4, R9 & R2 SELECTIVE TEST COMPONENTS



Phase Locked Loop Board
SC2500E1033 rev B



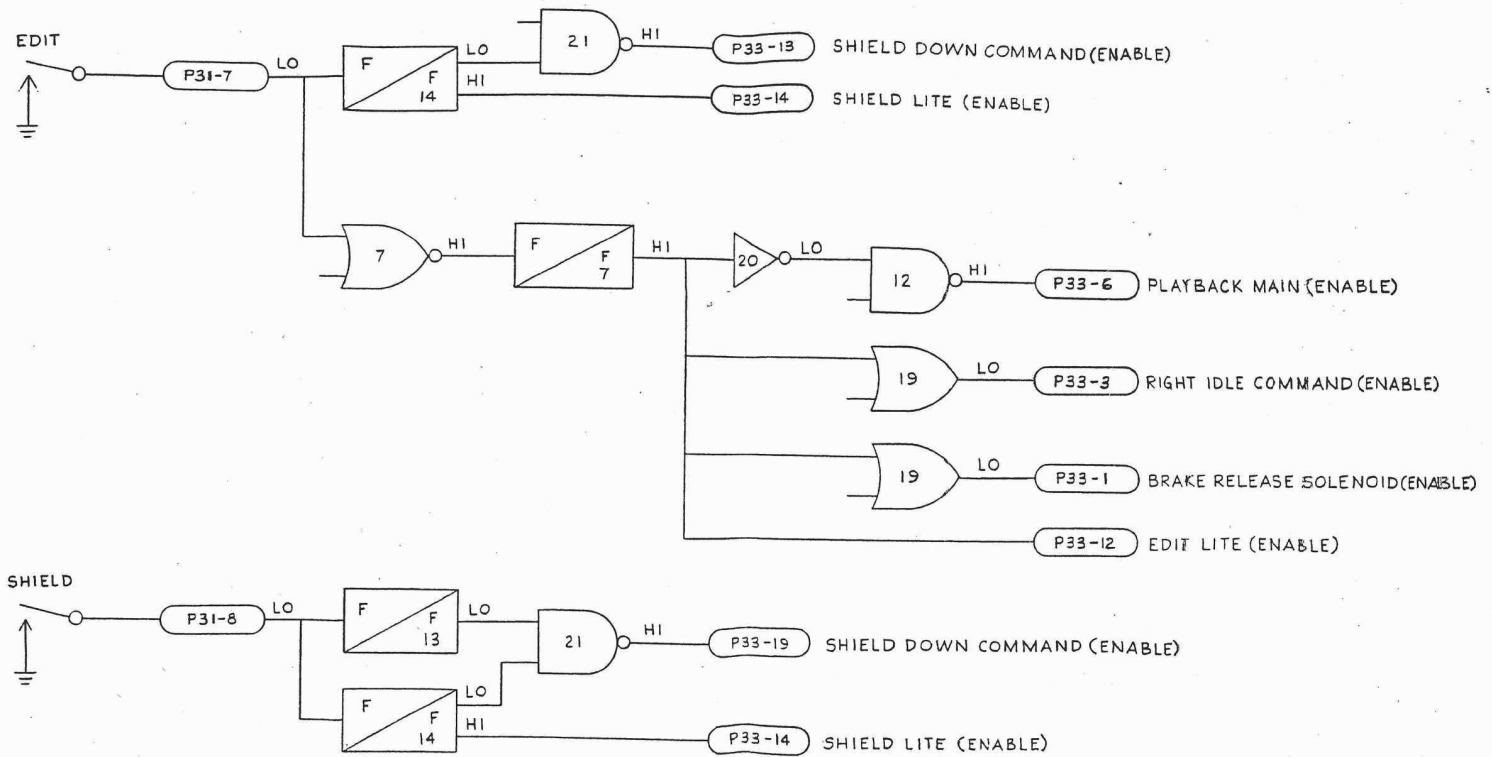
NOTES:

- 1) ALL DIODES ARE 1N4004.
- 2) ALL RESISTORS ARE 1/2 W, 5%, TOL.
- 3) ALL CAPACITORS ARE TANTALUMS. (C1-C4)
- 4) ALL IC'S RECEIVE +5V AT PIN 14 & GND AT PIN 7
- 5) USE DECOUPLING CAPS (C1-C4) AS NOTED ON ASSY DWG. (C5-C10) THEY ARE NOT SHOWN HERE.
6. ALL FUNCTION CALLOUTS ARE ACTIVE HI UNLESS "LO" IS DESIGNATED.
7. UN-110 USES NEGATIVE COMMAND FROM RTZ BOARD FOR LIFTER OUT SENSE

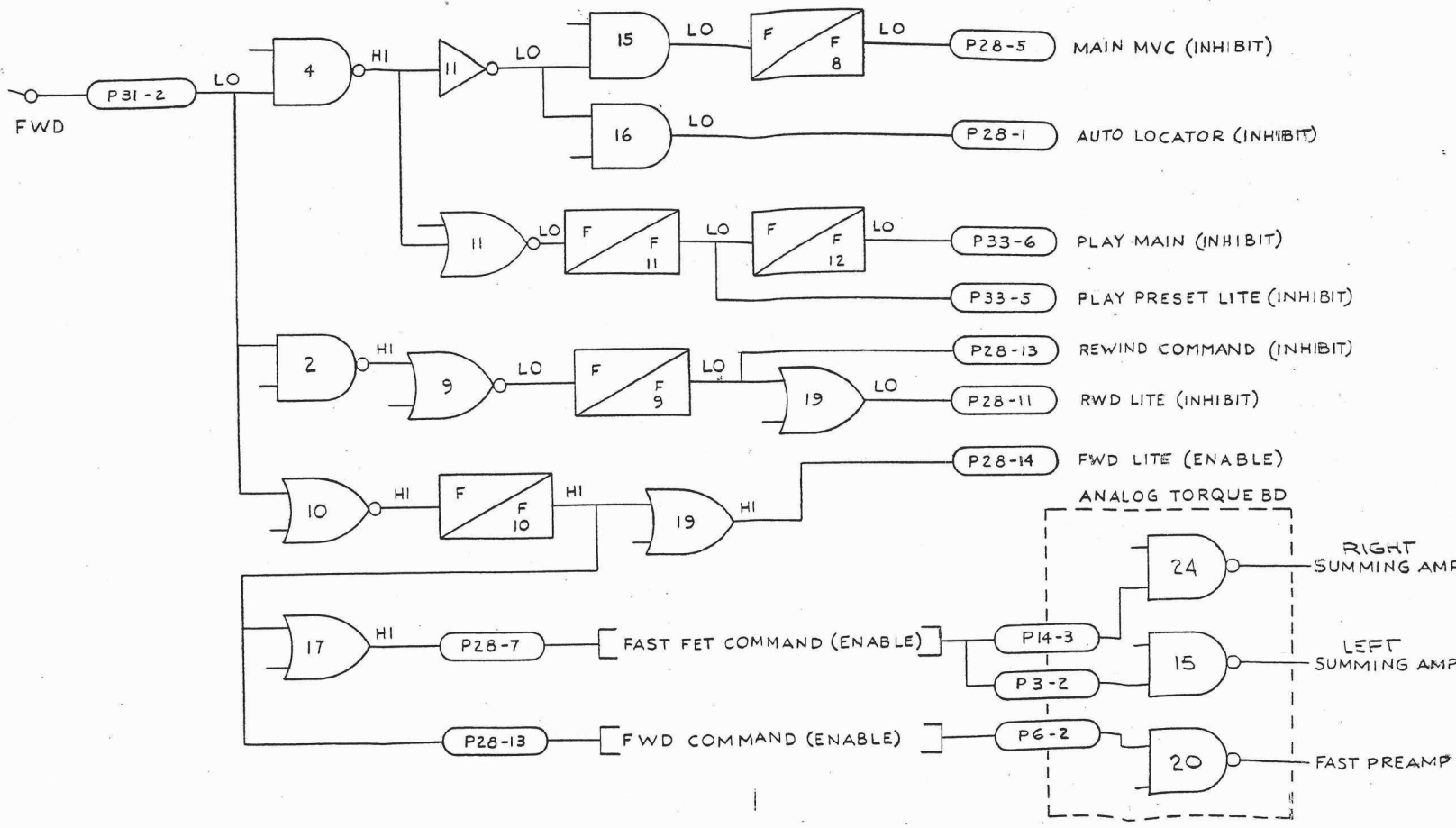
REMAINING PIN-OUTS
 +5V GND SPARE
 P19-3 P19-4 P19-5
 P28-2 P28-4 P28-5
 P28-9 P28-10 P28-15
 P33-2 P33-5 P33-15
 P33-8 P33-11

Control Logic Board SC25D027

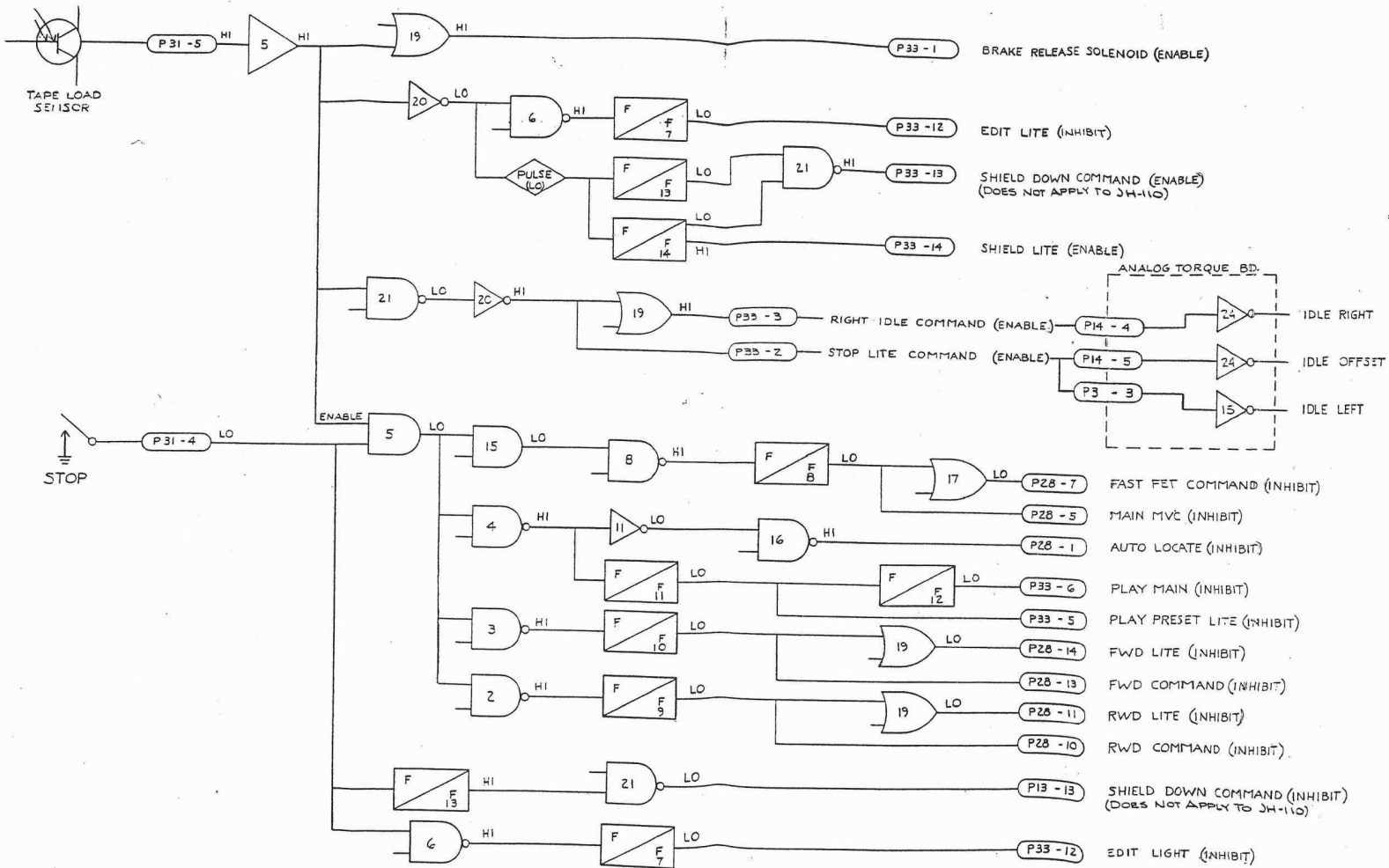
Schematic 1



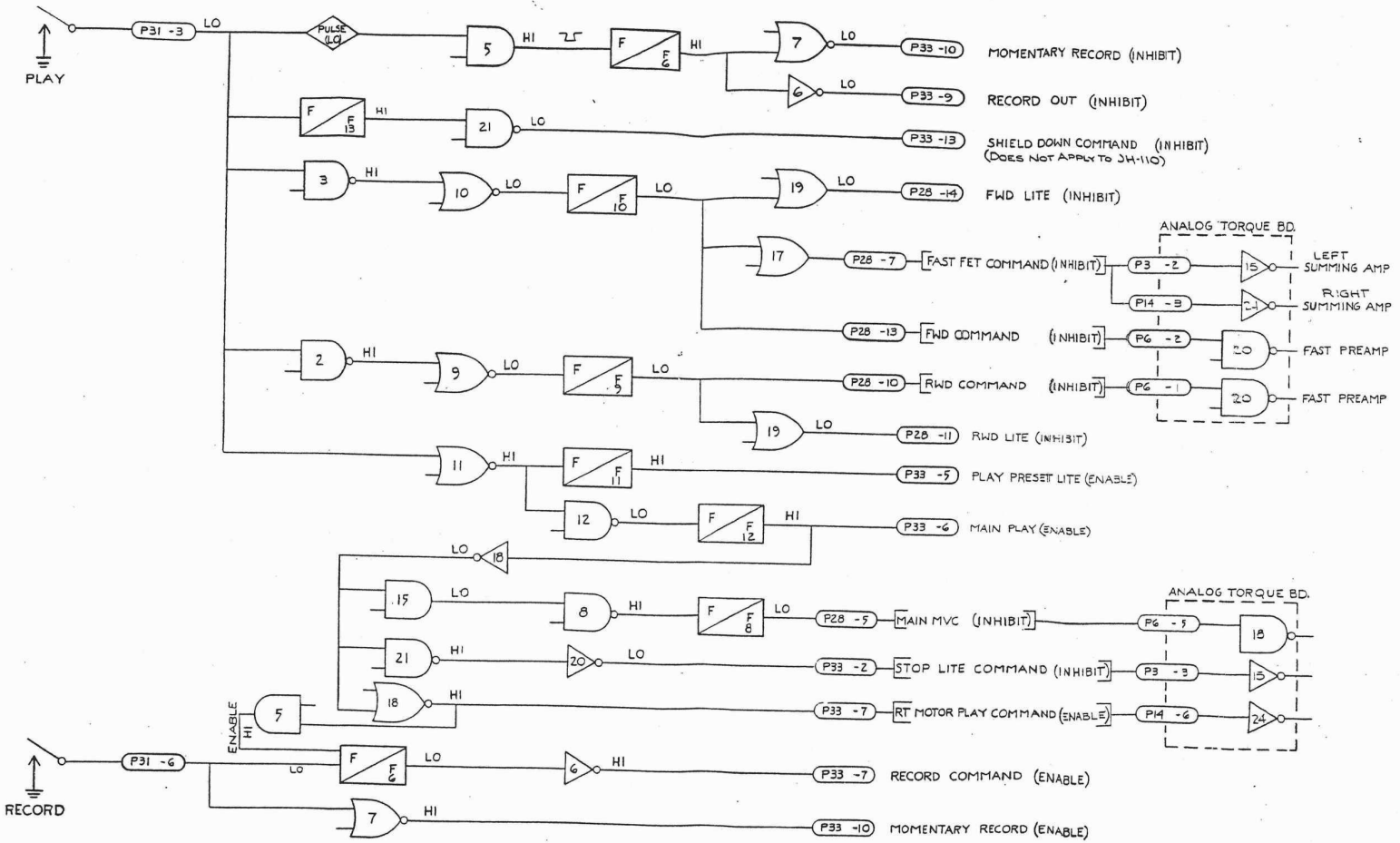
EDIT AND SHIELD COMMAND
Figure 12 JH-16 Page 3-1



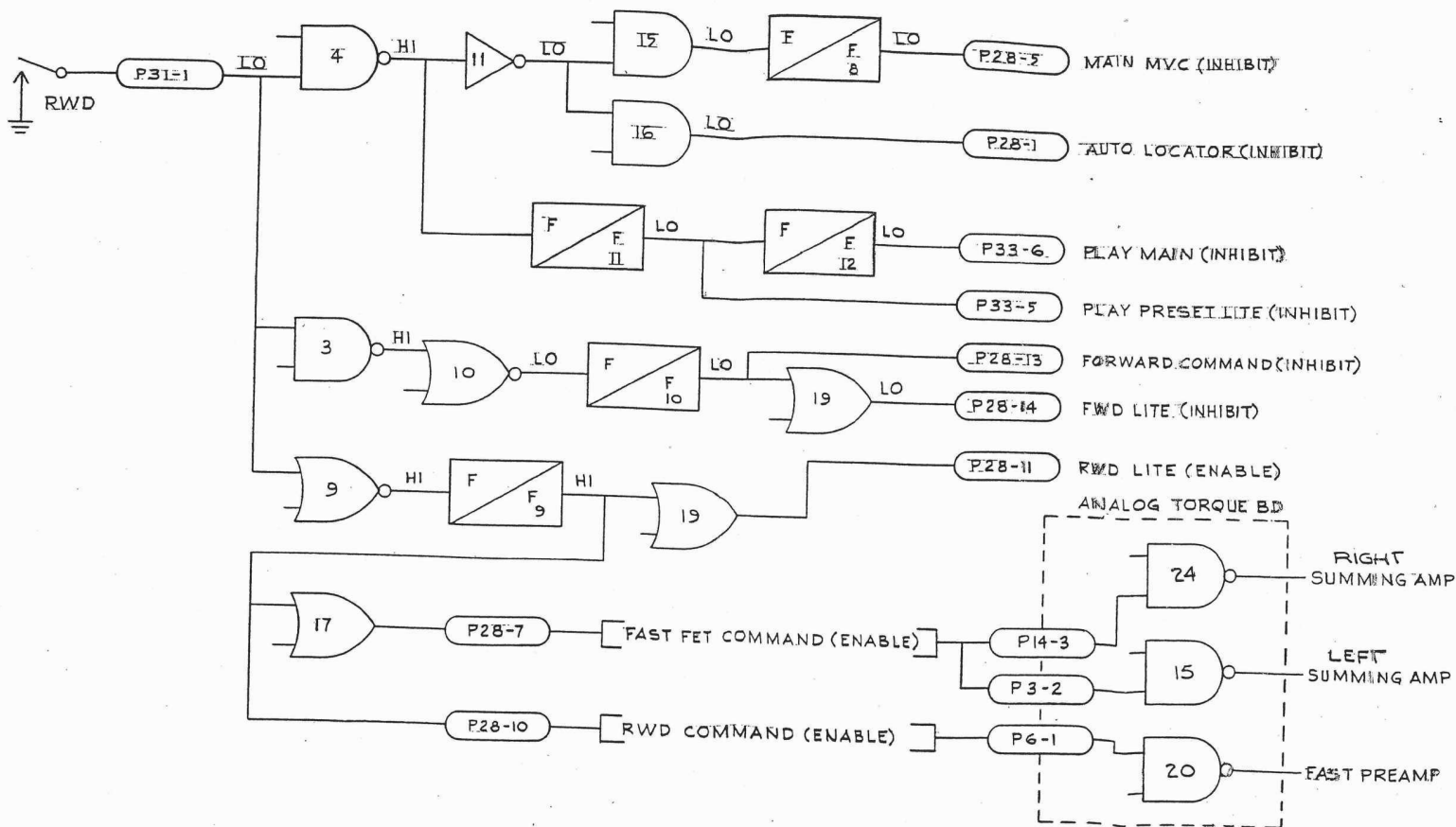
FAST FORWARD COMMAND
Figure 10 JH-16 Page 3-1

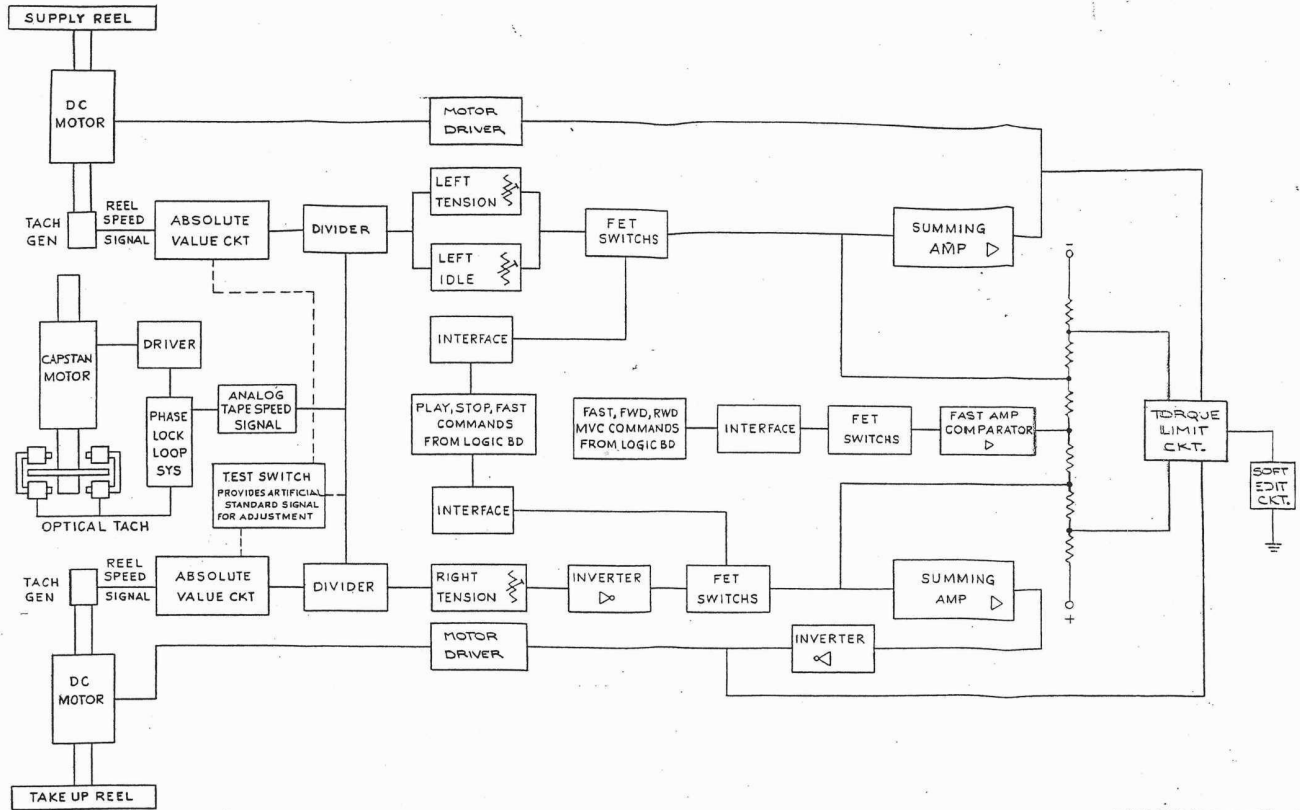


TAPE LOAD AND STOP COMMANDS
Figure 8 JH-16 Page 3-



PLAY AND RECORD COMMANDS
Figure 9
TM-1-C





TAPE TENSION SYSTEM
Figure 18 JH-16 Page 3-29

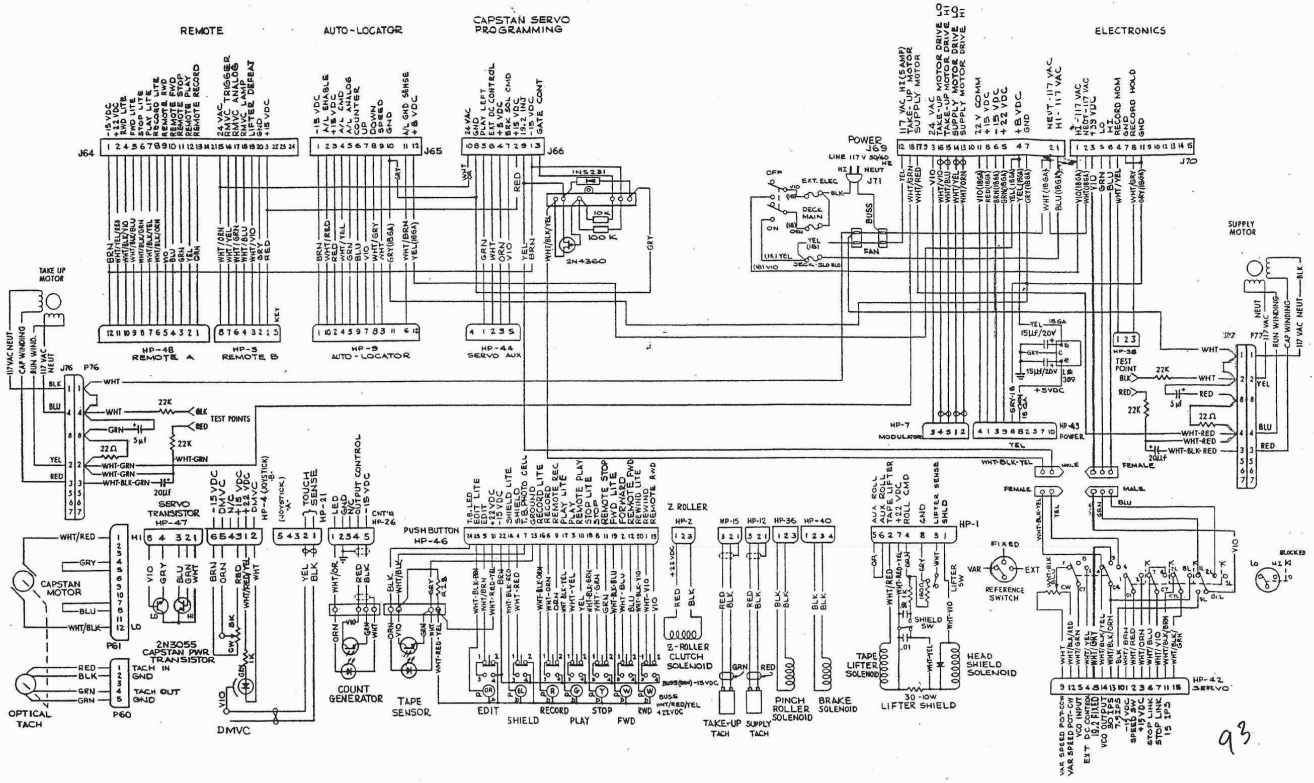
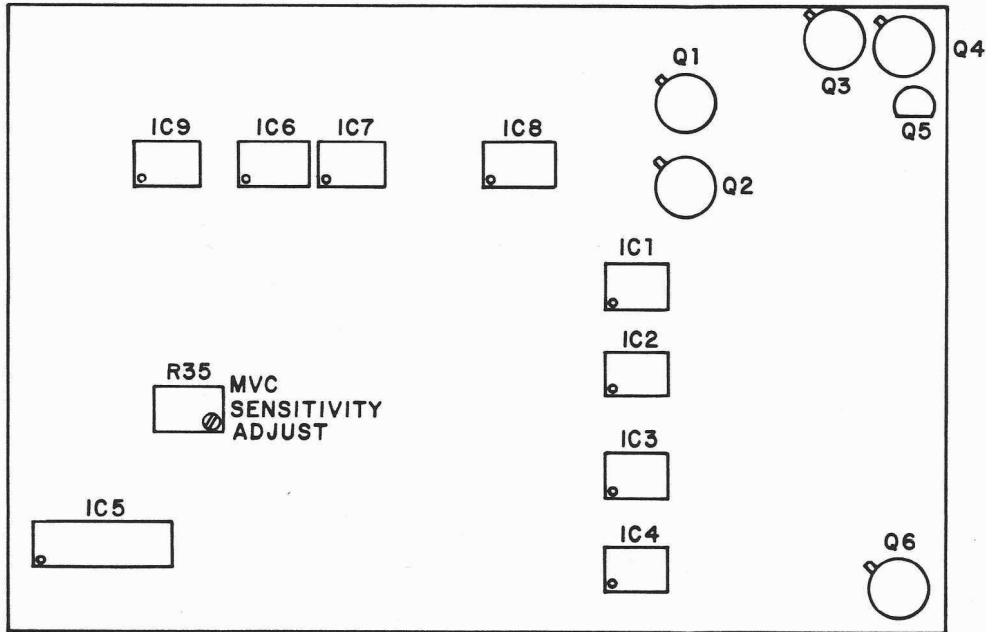


Figure 7-7. Interconnect Harnessing.

PCA2500-0416



LAMP DRIVER

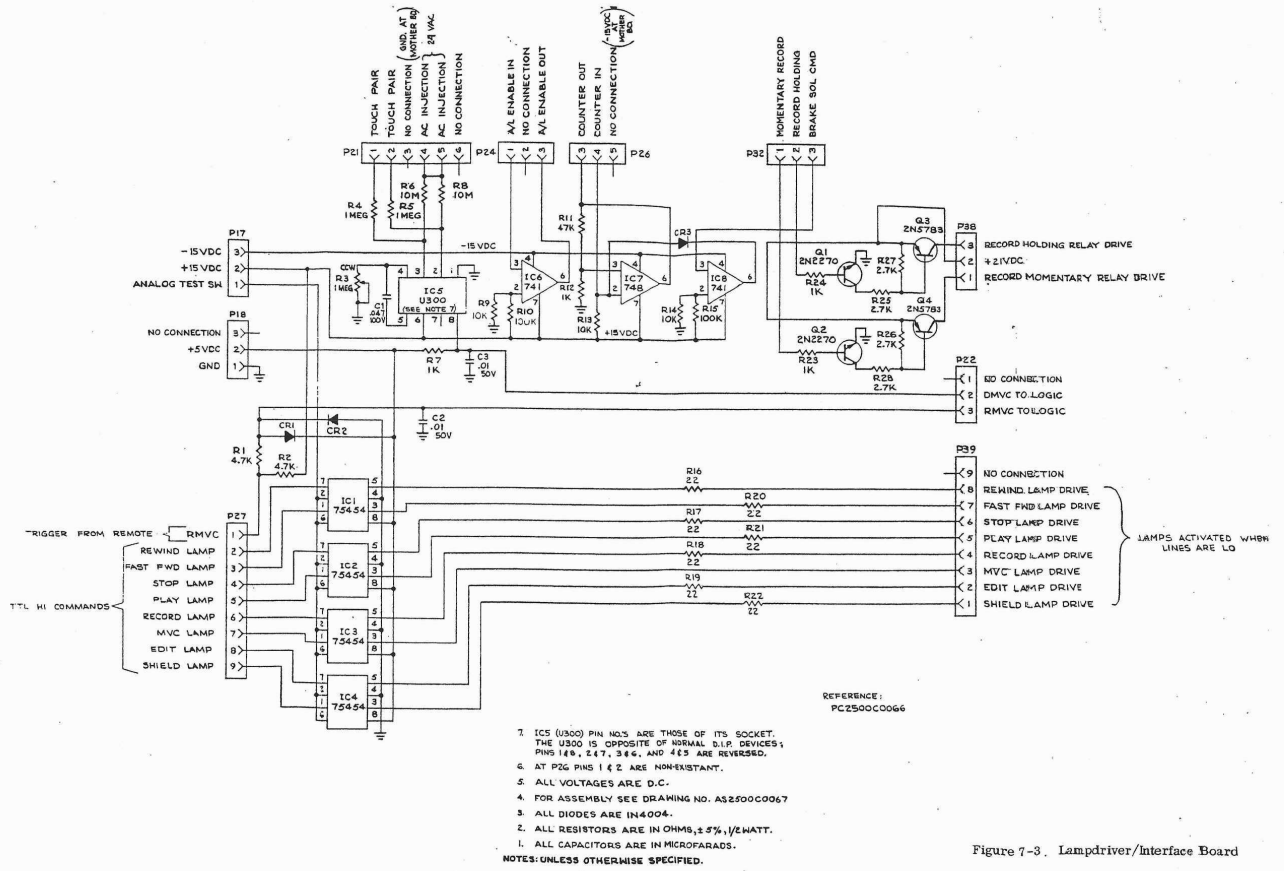
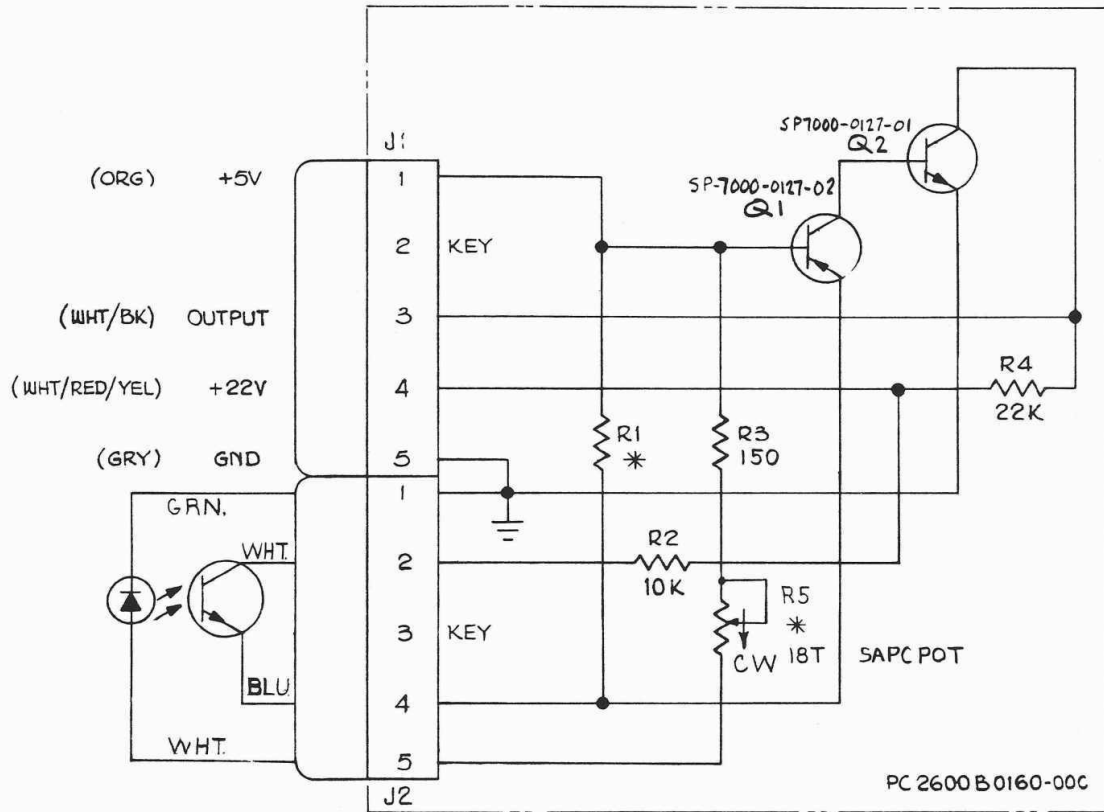


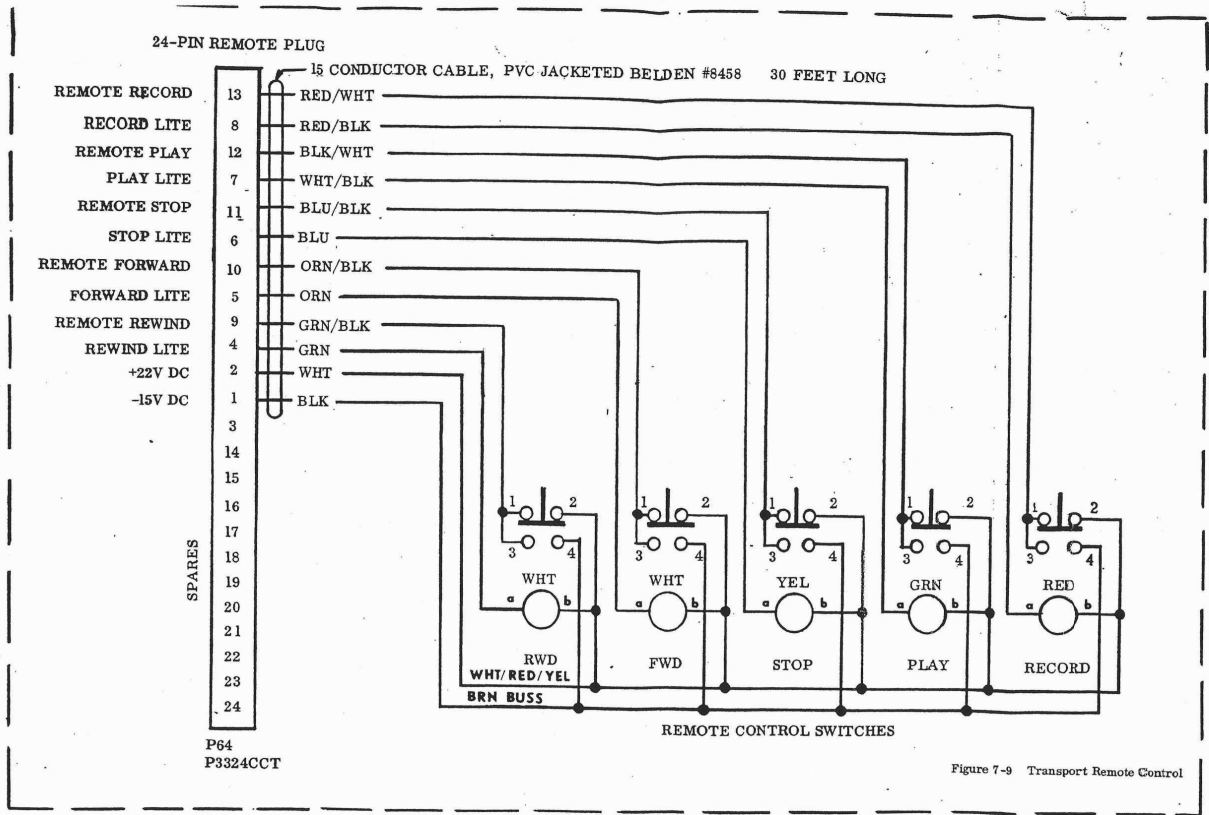
Figure 7-3. Lampdriver/Interface Board



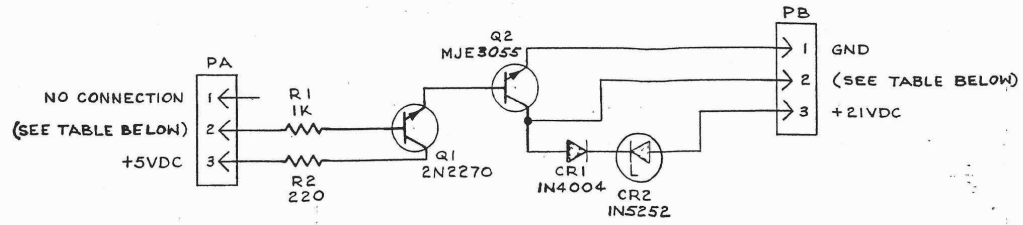
*	-00	-10
R1	6800	1000
R5	2000	5000

NOTE:

1. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%.
2. -10 FOR JH-24 TAPE MACHINE ONLY



REMOTE II MOTION CONTROL SCHEMATIC



DRIVER BD	PA	PA-2 FUNCTION	PB	PB-2 FUNCTION
BRAKE SOL.	P20	BRAKE LOGIC COMM.	P16	BRAKE SOL. DRIVE
PLAY SOL.	P25	PLAY LOGIC COMMAND	P23	PLAY SOL. DRIVE
Z ROLLER SOL.	P30	Z ROLLER LOGIC COMM.	P29	Z ROLLER SOL. DRIVE
LIFTER SOL.	P35	LIFTER LOGIC COMM.	P34	LIFTER SOL. DRIVE
SHIELD SOL.	P41	SHIELD LOGIC COMM.	P37	SHIELD SOL. DRIVE

1. ALL RESISTORS IN OHMS, ± 5%, 1/2W.
 NOTES: UNLESS OTHERWISE SPECIFIED

Figure 7-4. Solenoid Driver Board

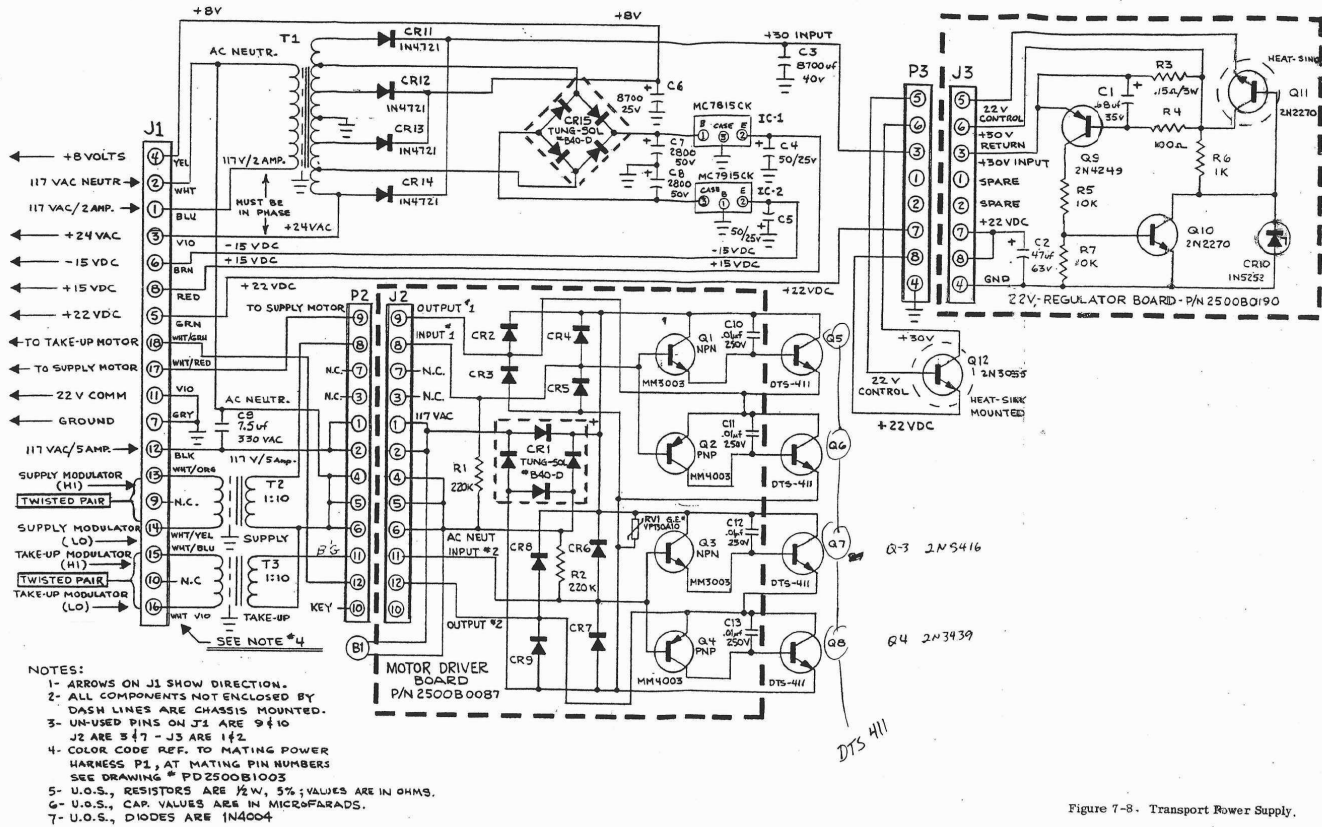
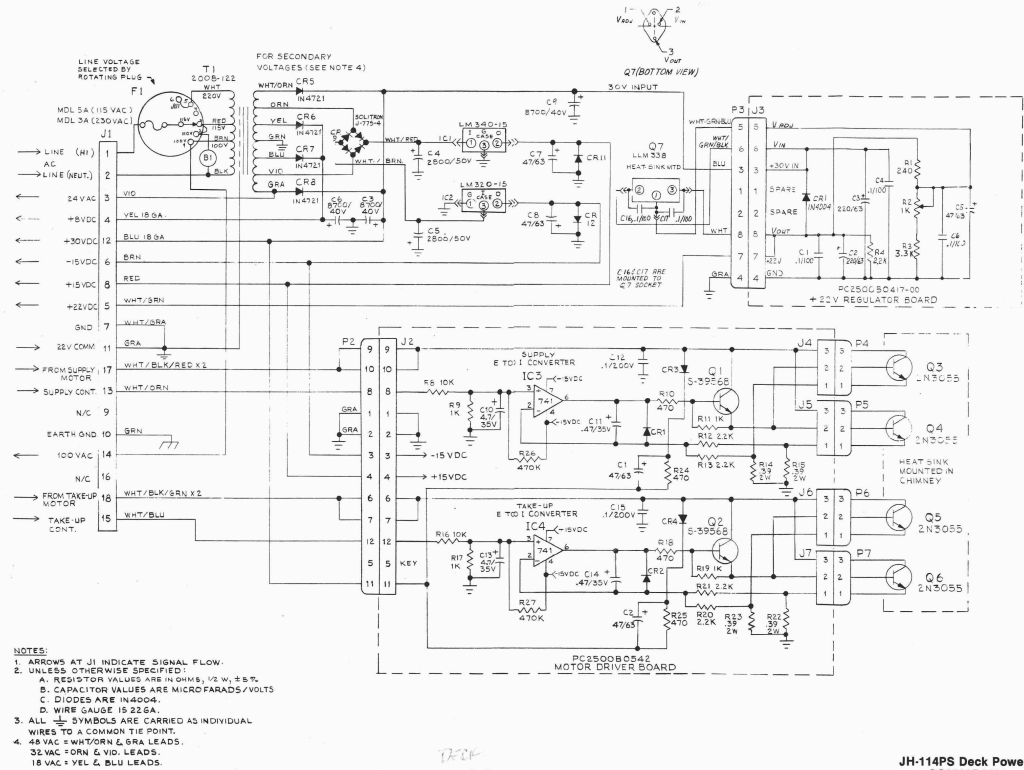
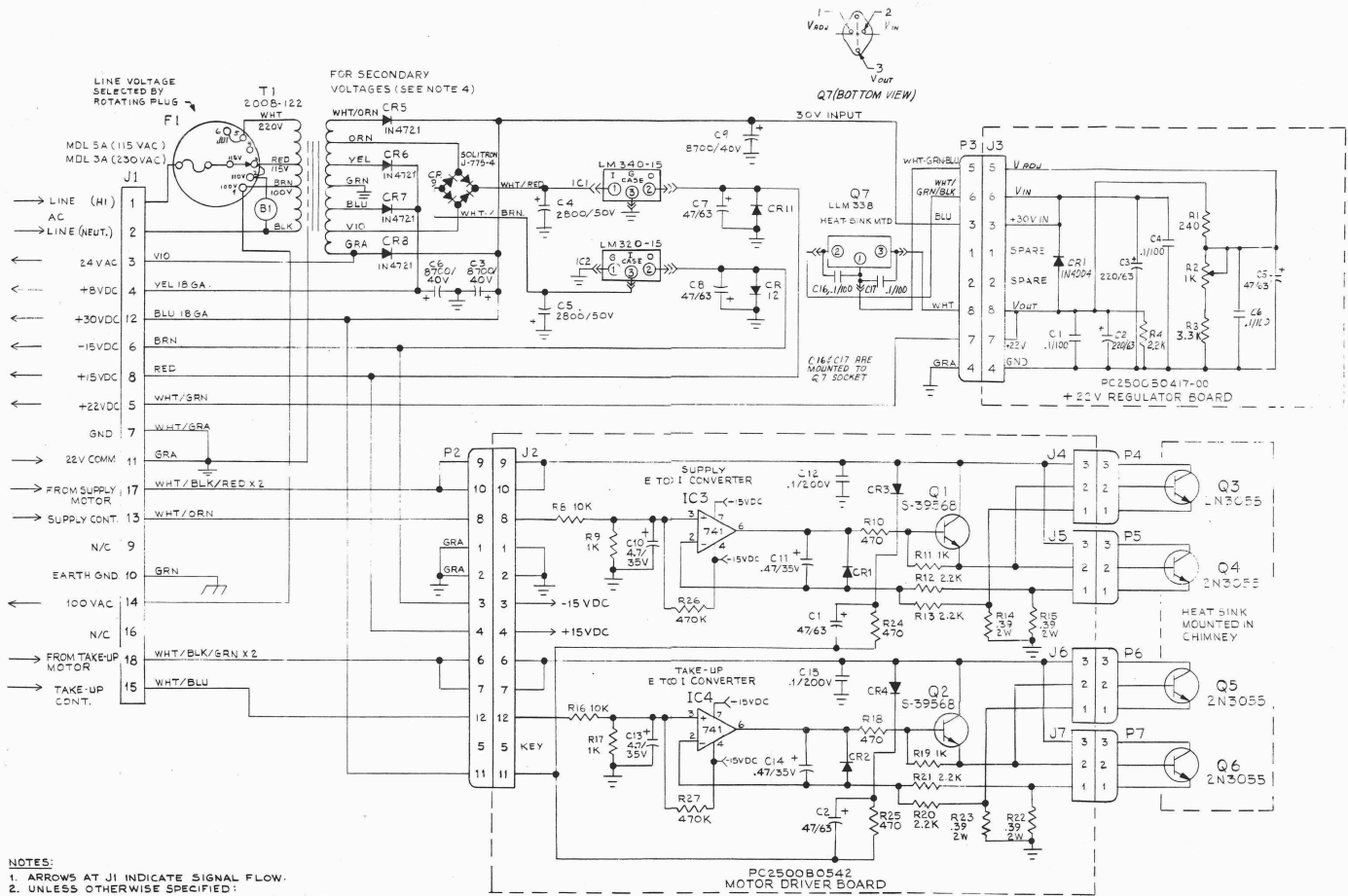


Figure 7-B. Transport Power Supply.





Deck Power

JH-114PS Deck Power Supply
SC2500D0630 rev G

JH-24

Page 6

SECTION 6

POWER SUPPLIES

6.1 General Description

The JH-24 contains two power supplies, the JH-114PS tape transport power supply and the JH-24D audio electronics power supply. Each power supply is housed in its own chassis. All connections to the power supplies are made via multipin connectors.

Input power for both supplies comes from the transport chassis. A single power cord plugs into the transport chassis at the rear of the cabinet. From the power cord, the input voltage is wired to two fuses in parallel; one is labeled DECK, the other is labeled AUDIO. Both fuses connect to the transport's power switch. Turning the power switch to ON applies the line voltage to both power supplies.

Input power to the JH-114PS is applied at the POWER connector on the transport chassis. The regulated and unregulated outputs from the power supply also enter the transport via this connector. Input power to the JH-24D is applied at the ELECTRONICS connector. The output voltages and control signals to the audio electronics arrive at the channel electronics via cables which are part of the Bus Boards. There is one cable harness for each set of eight channels.

Figure 6-1, the power distribution diagram, shows the interconnections between the transport and both power supplies. The internal harnessing of the power supplies is also shown. For detailed information of the circuitry of the power supplies, refer to the schematics at the end of this section.

6.2 JH-114PS Power Supply

The JH-114 PS is located toward the right side of the transport cabinet as viewed from the back of the machine. The fuse holder plug on the power supply chassis plugs in to select the available line voltage. For 115 and 100vac operation, the holder must contain a 5 amp fuse; for the 230vac operation the holder must contain a 3 amp fuse.

Power for the fan is obtained from the transformer's primary. The 115vac for the fan is also brought back to the two fan outlets on the transport chassis. The cabinet fan plugs into one of these outlets.

The power supply fan is part of the chimney assembly. The entire chimney assembly can be removed from the power supply by turning the four quick release fasteners. Sufficient cable slack is provided so that the power supply can be operated with the chimney removed. The inside of the chimney assembly contains the reel motor driver printed circuit board and four heat sink mounted transistors. These are not shown in the power distribution diagram since they are part of the reel motor servo circuitry. These components are, however, shown on the power supply's schematic.

The transformer's secondary windings feed four full wave rectifier circuits and supply the 24vac signal for the MVC touch sense. The 8 volt rectified output is not regulated. It is sent to the 5 volt regulator on the mother board frame. The 8 volt output also goes to the AutoLocator III via connectors J65 and J66.



The +15 and -15 volt rectifier outputs are regulated by LM 340 and LM 320 devices respectively. These regulators are mounted on the back of the power supply chassis. The 30 volt rectifier output is sent directly to the supply and take-up reel motors (+30vdc unreg) and to the 22 volt regulator board. This printed circuit board is mounted inside the back cover of the power supply chassis. The pass transistor for the 22 volt regulator is mounted on the heat sink just below the circuit board. Over current protection is provided by this regulator. The 30 volt input to the regulator is shunted to ground if the current exceeds approximately 5 amps.

6.3 JH-24D Power Supply

The JH-24D power supply is located in the left side of the transport cabinet. It, like the JH-114PS, has a fuse holder plug which selects the available line voltage. For 100 and 115vac operation the fuse holder must contain a 6.25 amp fuse; for 220vac operation the fuse holder must contain a 4 amp fuse. Three more fuse holders are also mounted on the power supply front panel. For all voltage ranges these must be 10 amp fuses.

The audio power supply contains three printed circuit boards, the ± 18 volt regulator PC board, the +24 volt regulator board, and the relay and power distribution board. The ± 18 volt PC board is mounted on the chimney assembly. The chimney assembly, just as the one in the JH-114PS, removes from the power supply by turning the four quick release fasteners. Located inside the chimney are four series pass transistors mounted on heat sinks. The 24 volt regulator PC board mounts on the inside of the rear panel directly behind the chimney assembly. The pass transistors for this regulator are mounted on the rear panel. The relay board is fastened to the power supply's top cover. In order to access the relays on this board you must remove the top cover. The ± 18 volt regulator receives its input from two full

wave rectifiers. Each output from the rectifier is fused, these fuses are located on the front panel. Both are 10 amp fuses.

The reference voltage for the 18 volt regulators is provided by a zener diode and resistor network. Potentiometer R6, located near the center of the board, sets the reference voltage used by the comparators in both the +18 volt regulator and the -18 volt regulator. R6 adjusts both the positive and negative output voltage levels.

Both 18 volt regulators are over current limited. A current limiting transistor prevents the output current from exceeding 8 amps. Over voltage protection is provided by crowbar SCRs at both outputs. The SCRs fire if the regulated output voltage exceeds 24 volts. Once the SCR fires, the transport must be powered down to reset it.

An internal harness carries the +18 volt and -18 volt outputs to the relay and distribution board. The +18 volt output goes to the transport's speed select switch. This is the source of the high speed and low speed equalization signals. The regulated output voltages reach the audio bus boards via cable harnesses that are part of the bus board assemblies. These harnesses plug into connectors on the top cover of the power supply. The connections to all three connectors are identical.

The 24 volt regulator receives approximately 39 volts from a rectifier through a ten amp fuse located on the front panel. Its regulated output goes to the relays on the relay and distribution board. The relays, record hold and momentary record, switch the regulated 24 volts to the audio bus boards in response to signals from the Interface/Lamp Driver Board.

A zener diode and a resistor divider network provide the reference for the comparator in the regulator. Potentiometer R2, located near the bottom of the circuit board, adjusts the regulated output voltage. The ± 18 volt chimney assembly must be removed to reach the voltage adjustment.

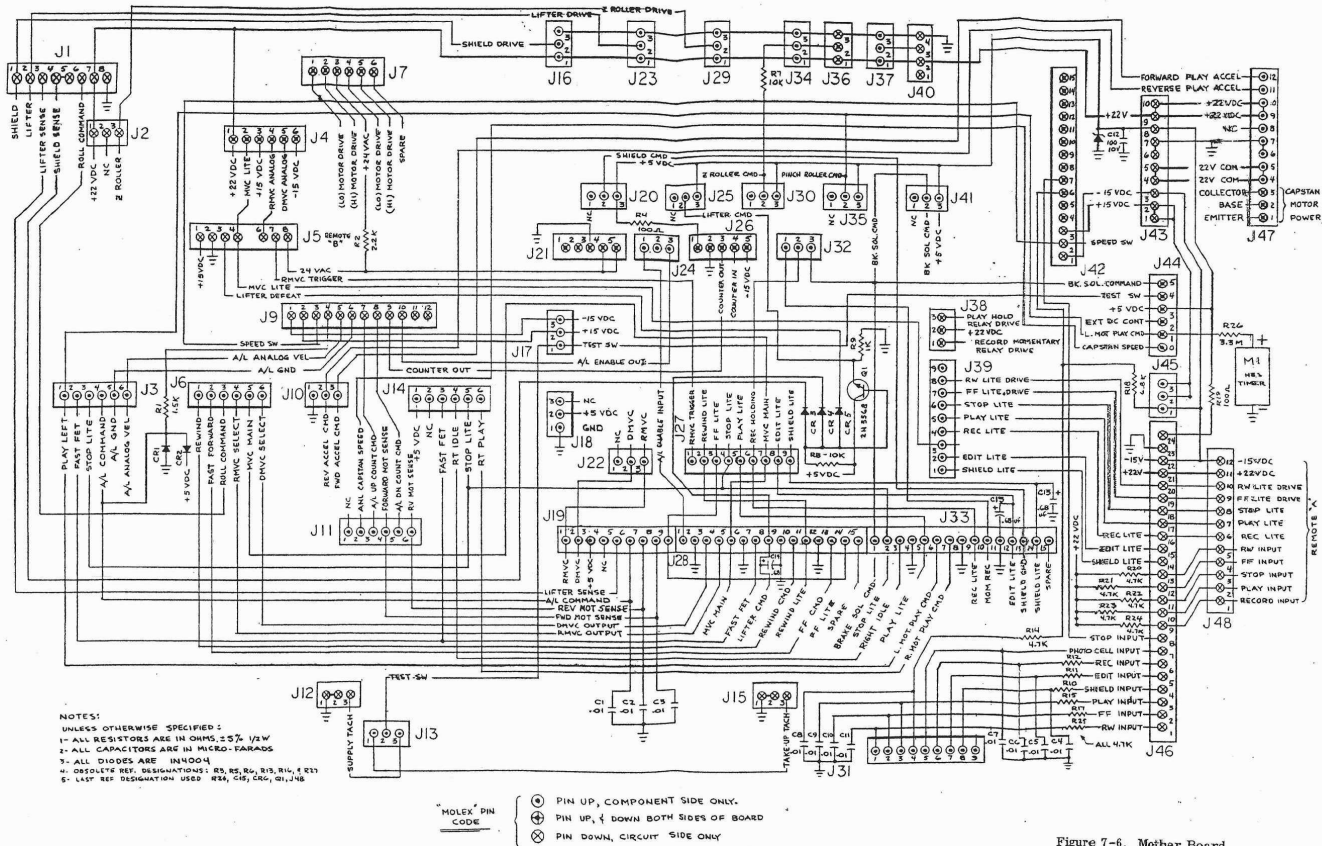


Figure 7-6. Mother Board

