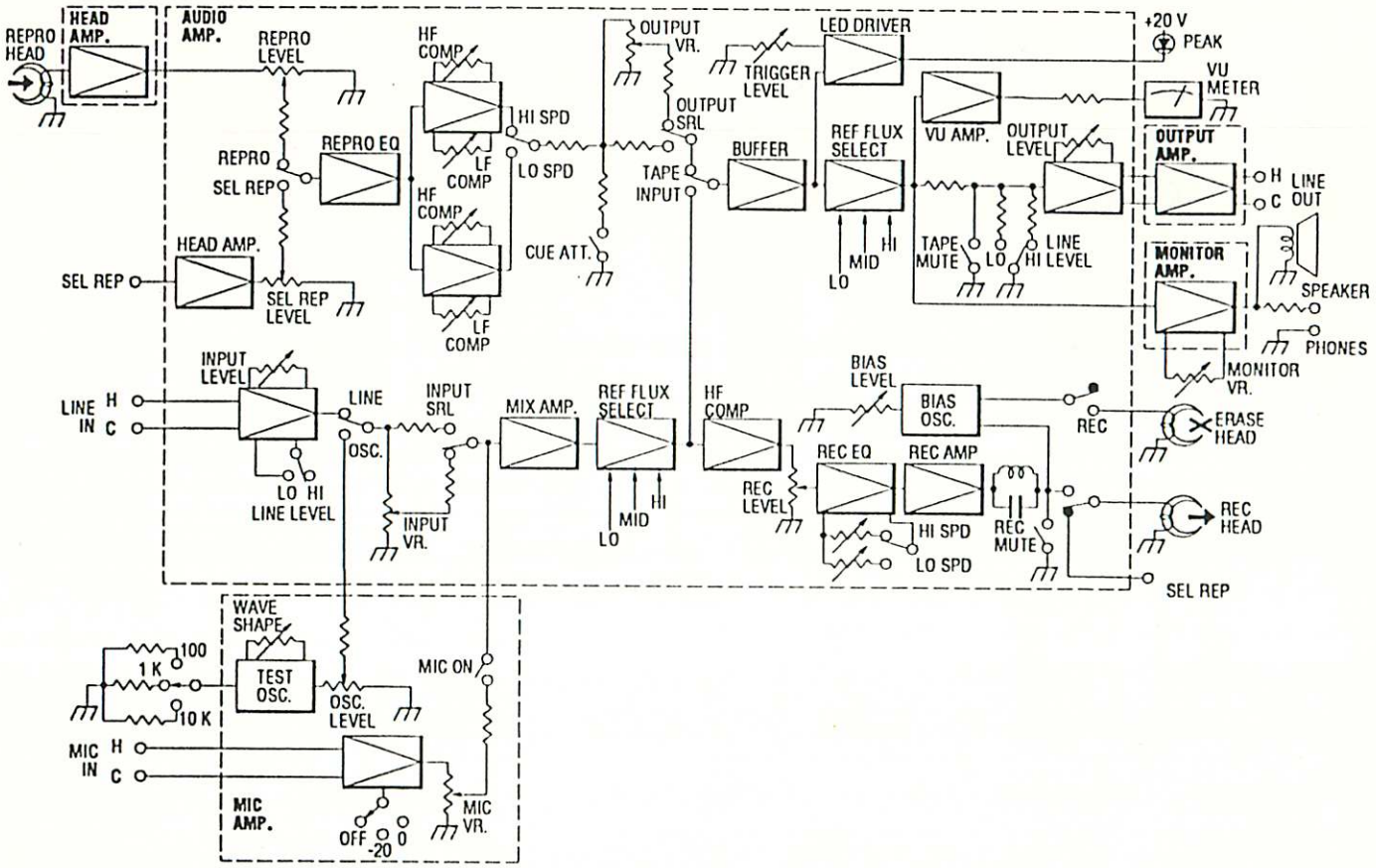


Figure 4-18
Audio Amplifier Block Diagram

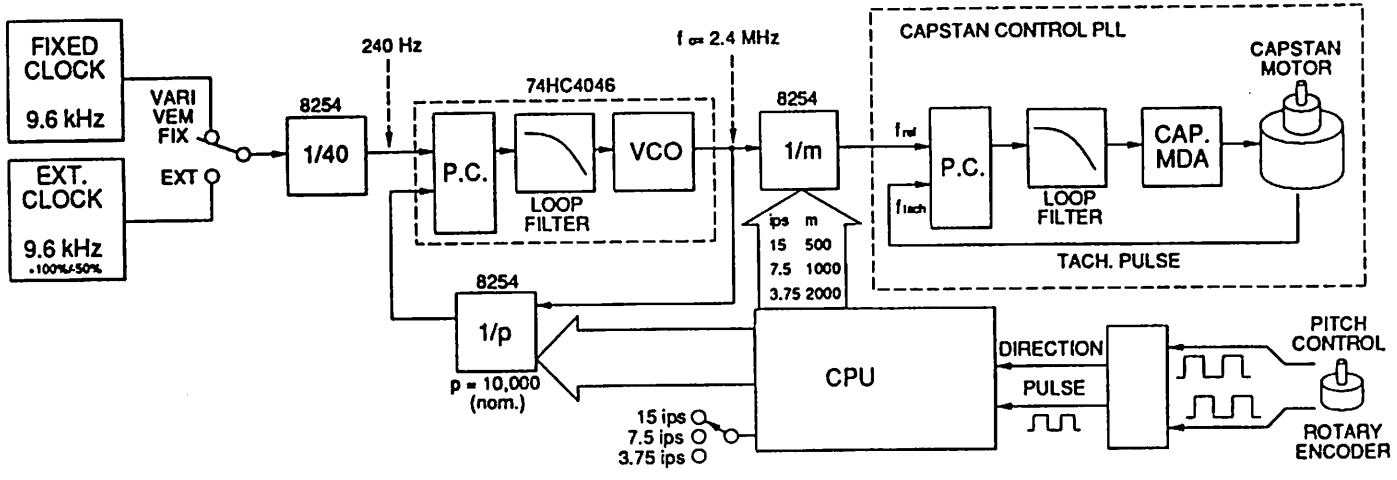
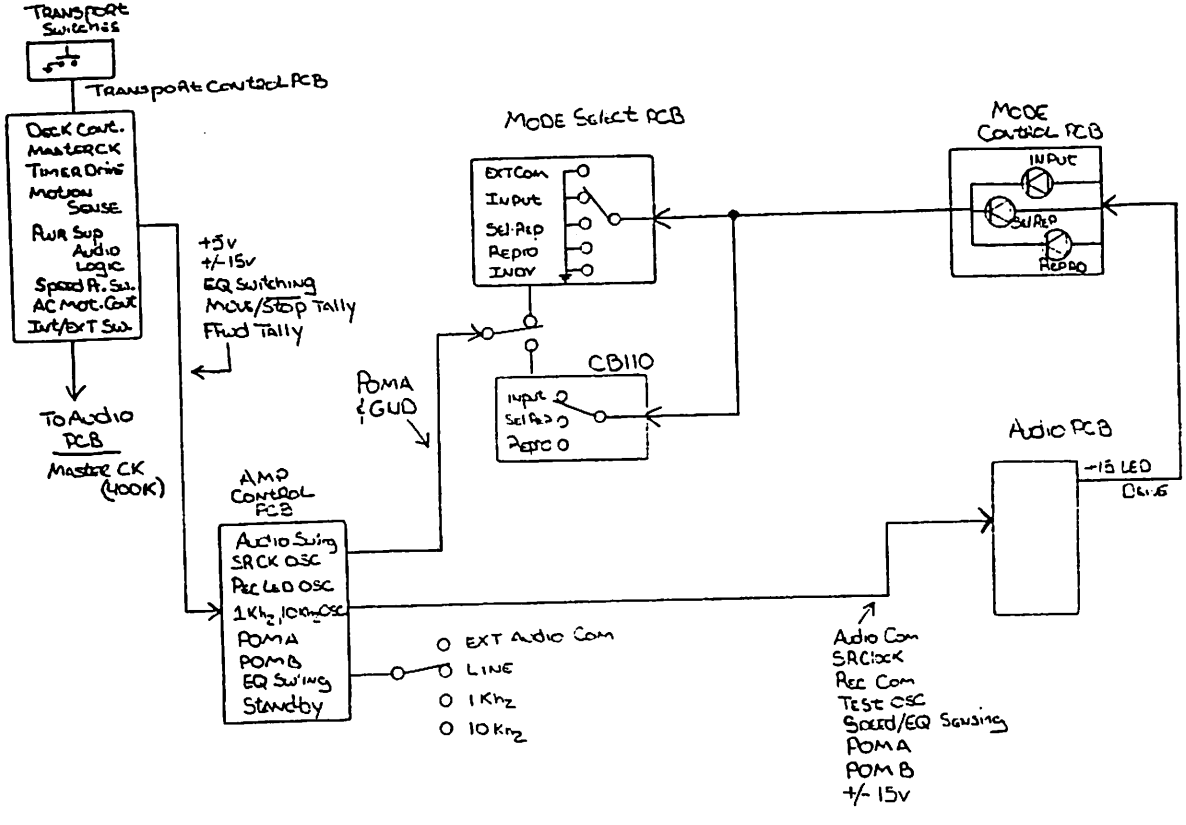


Figure 4-17
Capstan Servo Block Diagram

BQII-2, MIII-4/8 Logic Flow Diagram



MX-5050 CAPSTAN MOTOR SERVO SYSTEM

THEORY OF OPERATION

The Capstan Motor Drive Amplifier contains the circuitry necessary to drive the three-phase, brushless, DC Capstan Motor, as well as signal amplification and conditioning circuitry for the Capstan Tach pulses.

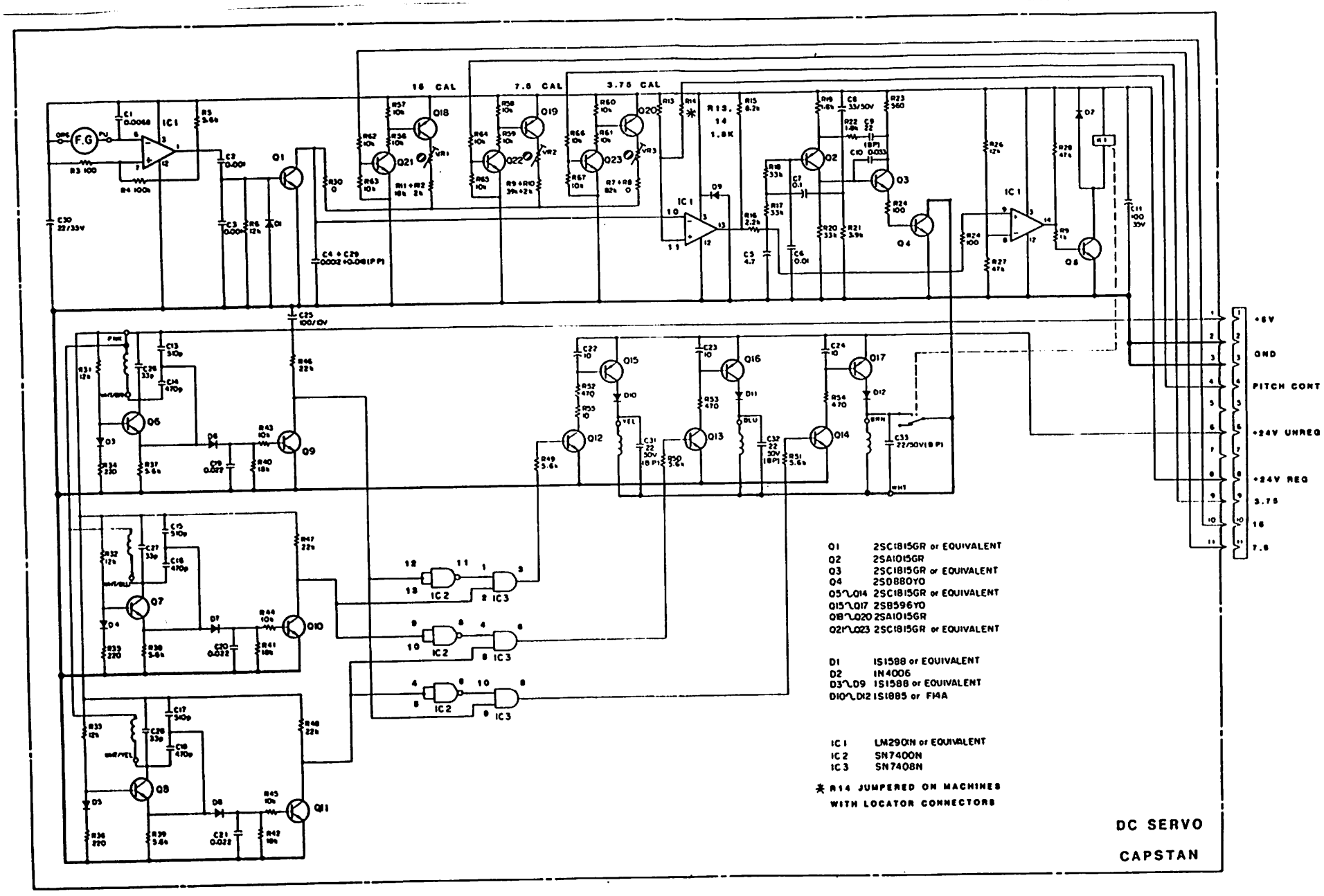
The Capstan Motor rotor contains four sections of non- magnetic material, and there are three Detector coils located in the motor housing. When the motor is stopped, one of the non-magnetic sections will be adjacent to one of the detector coils. Each detector coil is the inductor in an LC oscillator (Q 6 and C 26, Q 7 and C 27, and Q 8 and C 28 being the transistor/capacitor pair associated with each detector coil) which oscillates at approximately 130 kHz. When the non-magnetic portion of the rotor is adjacent to a detector coil, that oscillator becomes detuned, and stops oscillating. When an oscillator stops oscillating, the logic circuitry causes the corresponding Armature coil to be energized, causing the rotor to move towards it. As the rotor turns, the non-magnetic sections cause each oscillator to stop oscillating in turn, causing each armature coil to be energized in sequence.

Changing the capstan motor speed causes the dc voltage applied to the comparator IC 1 to change, changing the pulse width of the signal sent to the pulse-width to voltage converter (Q 2 and Q 3). The resulting voltage change is applied to the Armature coils to change the motor speed. If an abrupt change in motor speed is sensed, relay K 1 is activated which shorts one armature coil until the circuit stabilizes.

The rotor carries a toothed gear which passes in front of a pickup head flanked by two permanent magnets. As the rotor rotates, the toothed gear passes through the magnetic flux created by the permanent magnets. The resulting fluctuations in the magnetic field are sensed by the pickup head and converted to a pulse train. These pulses are amplified before being applied to the comparator IC 1 where they affect the pulse width of the signal sent to the pulse- width to voltage converter (Q 2 and Q 3) to control the motor speed.

There are three adjustments on the Capstan Motor Drive PCB, VR 1 which adjusts the speed at 15 ips, VR 2 which adjusts the speed at 7.5 ips, and VR 3 which adjusts the speed at 3.75 ips.

The speed of the Capstan Motor can be varied by the Pitch control or from an external source of DC voltage by changing the DC voltage applied to the comparator IC 1.



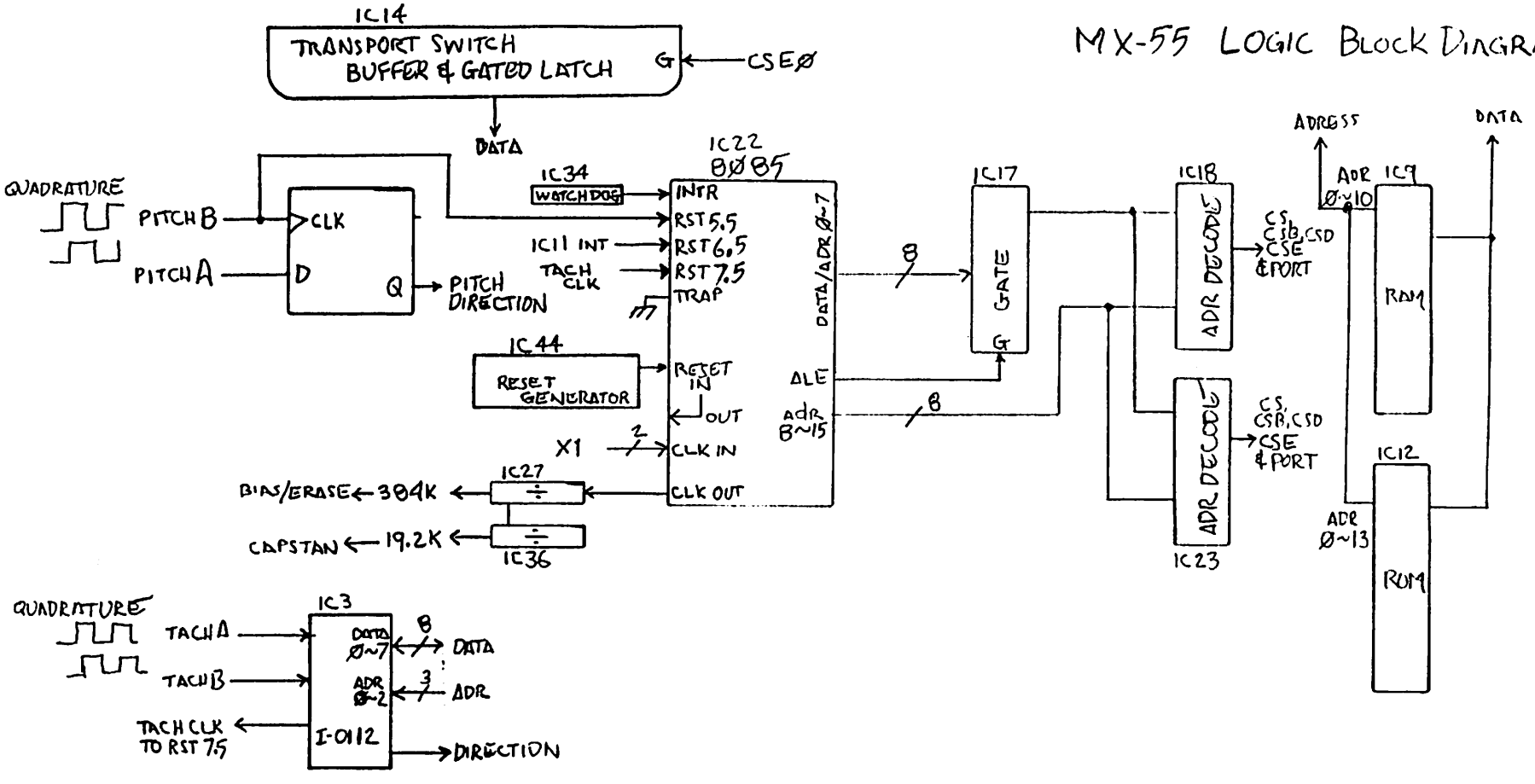
Q1 2SC1815GR or EQUIVALENT
Q2 2SA1015GR
Q3 2SC1815GR or EQUIVALENT
Q4 2SD880YO
Q5~Q14 2SC1815GR or EQUIVALENT
Q15~Q17 2SB596YO
Q18~Q20 2SA1015GR
Q21~Q23 2SC1815GR or EQUIVALENT

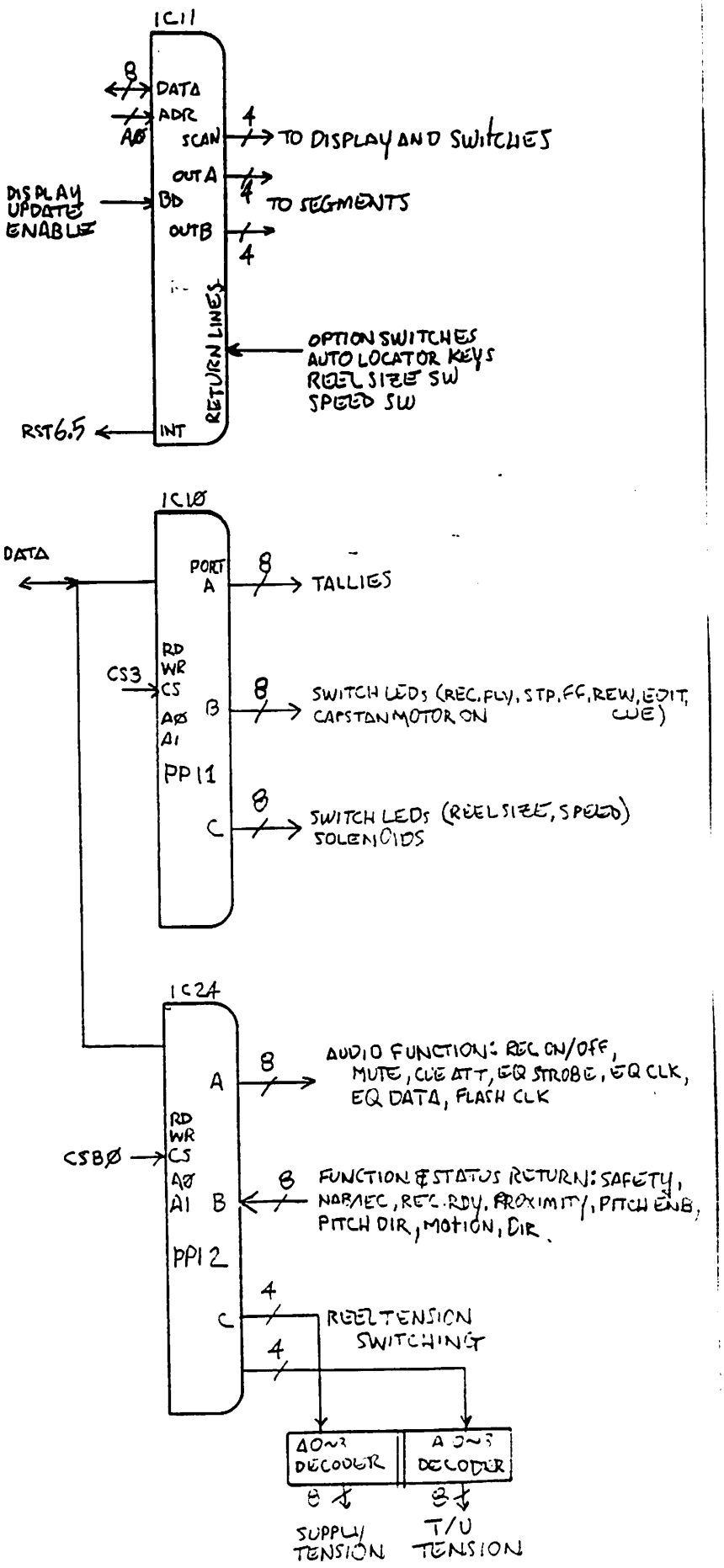
D1 1S1588 or EQUIVALENT
D2 1N4006
D3~D9 1S1588 or EQUIVALENT
D10~D12 1S1885 or FI4A

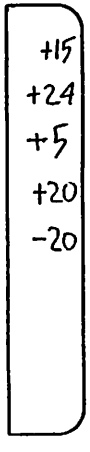
IC1 LM290N or EQUIVALENT
IC2 SN7400N
IC3 SN7408N

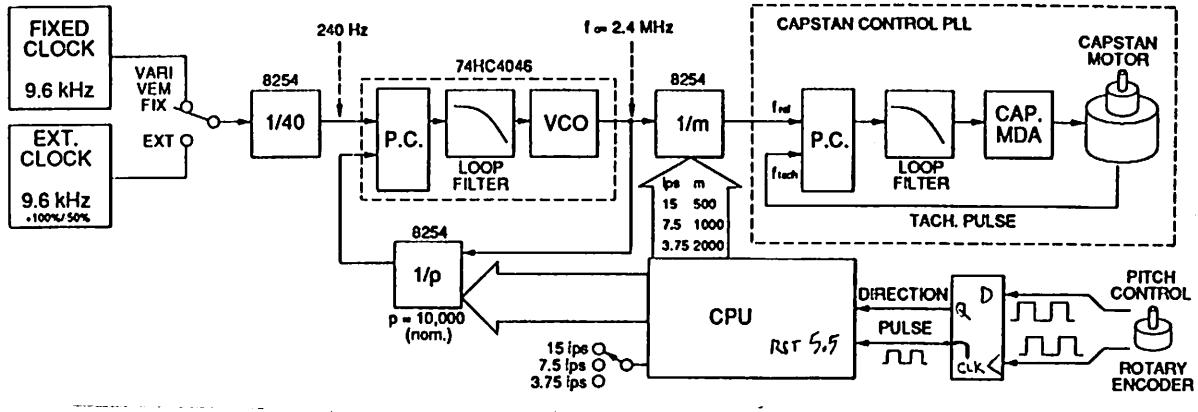
* R14 JUMPERED ON MACHINES WITH LOCATOR CONNECTORS

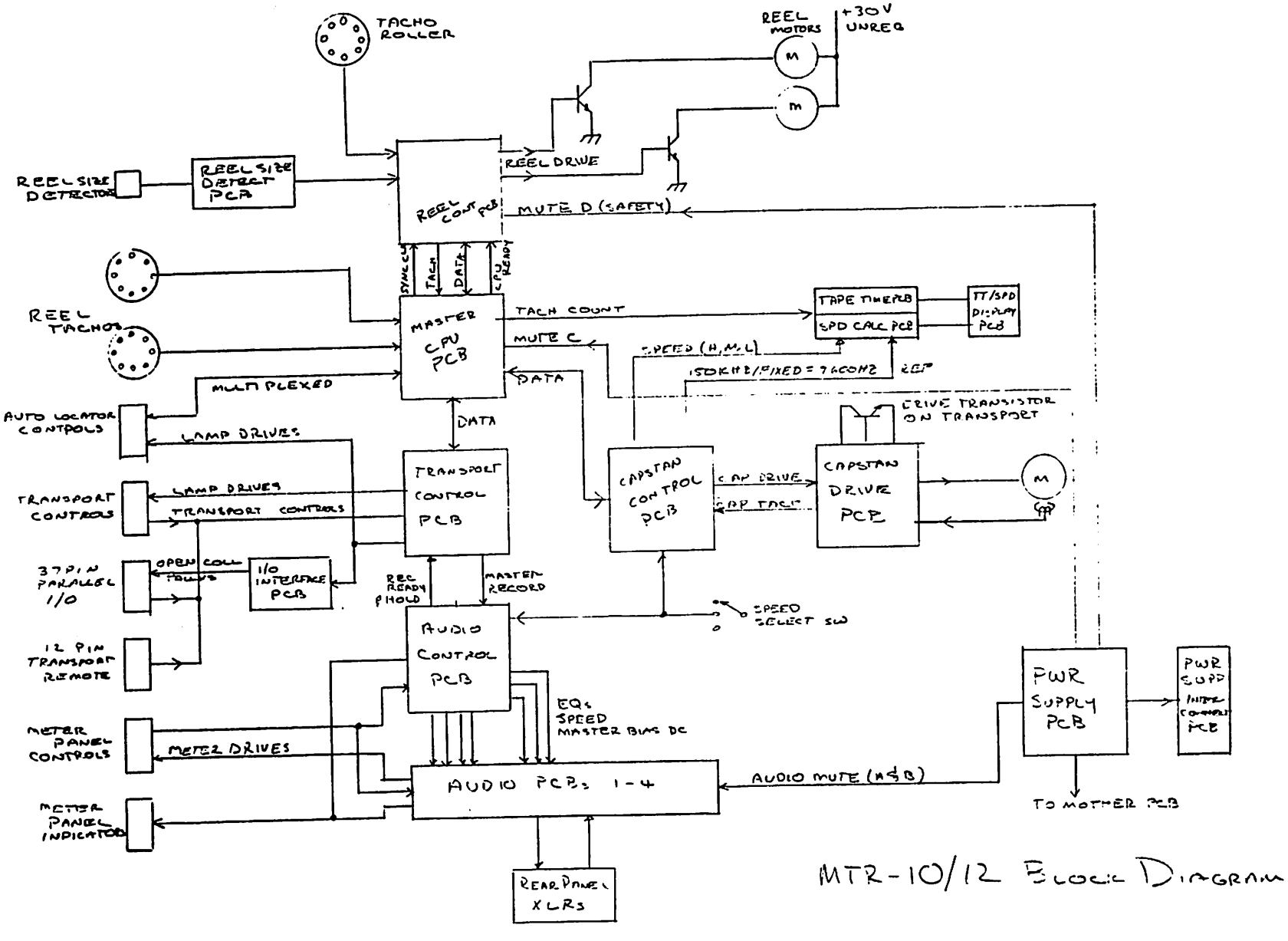
MX-55 LOGIC BLOCK DIAGRAM



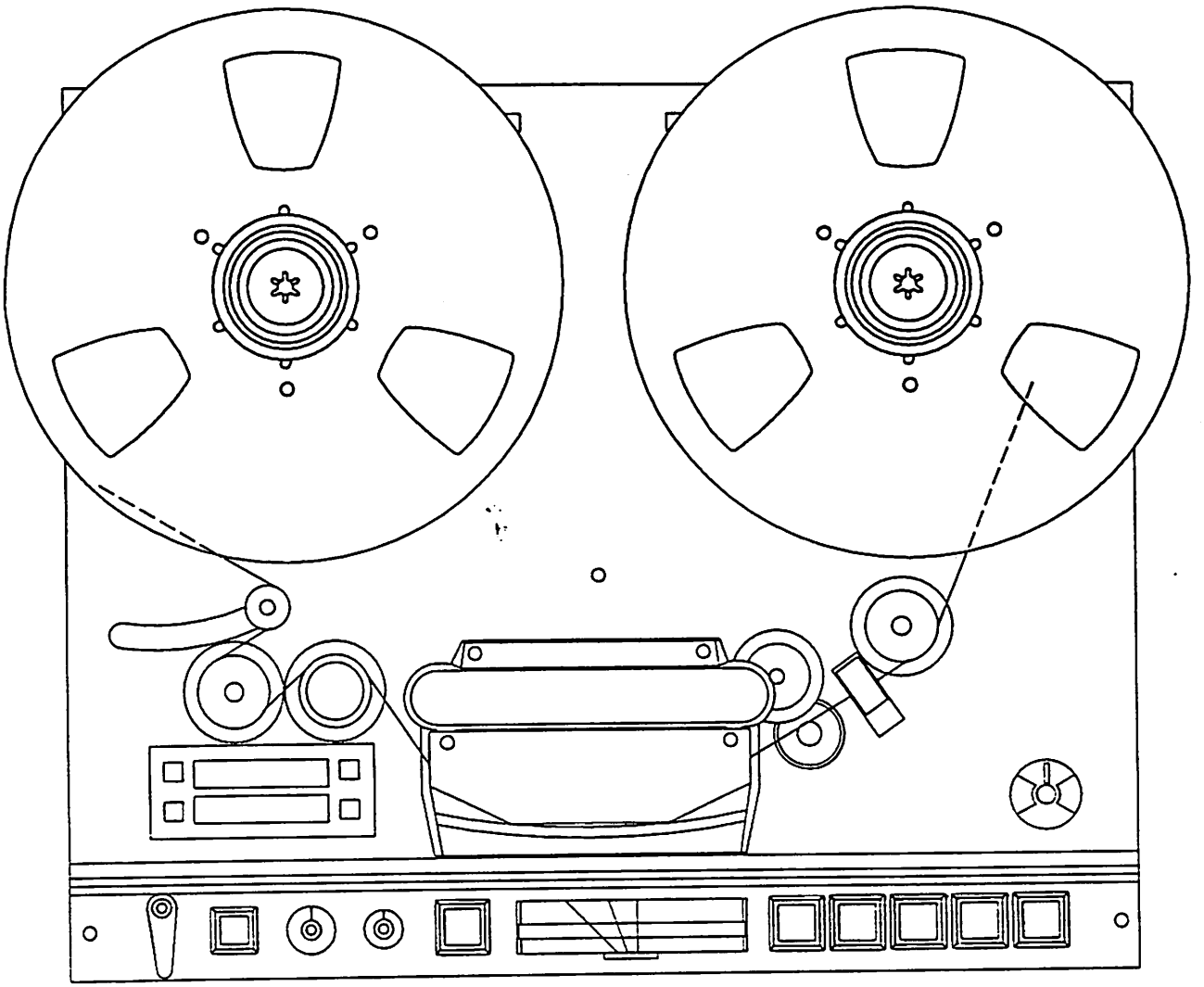

IC11
8
DATA
ADR
A0
SCAN
4
TO DISPLAY AND SWITCHES
OUT A
4
TO SEGMENTS
DISPLAY UPDATE ENABLE
B0
OUT B
4
RETURN LINES
OPTION SWITCHES
AUTO LOCATOR KEYS
REEL SIZE SW
SPEED SW
RST6.5
INT
IC10
DATA
PORT A
8
TALLIES
RD
WR
CS3
CS
A0
A1
B
8
SWITCH LEDs (REC, PLY, STP, FF, REW, EDIT, CUE)
CAPSTAN MOTOR ON
PPI 1
C
8
SWITCH LEDs (REEL SIZE, SPEED)
SOLENOIDS
IC24
A
8
AUDIO FUNCTION: REC ON/OFF, MUTE, CUE ATT, EQ STROBE, EQ CLK, EQ DATA, FLASH CLK
RD
WR
CSB0
CS
A0
A1
B
8
FUNCTION & STATUS RETURN: SAFETY, NAB/AEC, REC. RDY, PROXIMITY, PITCH ENB, PITCH DIR, MOTION, DIR.
PPI 2
C
4
REEL TENSION SWITCHING
4
A0~2 DECODER
A 3~5 DECODER
8
8
SUPPLY TENSION
T/U TENSION


+15
+24
+5
+20
-20
PSU


FIXED CLOCK
9.6 kHz
EXT. CLOCK
9.6 kHz
VARI
VEM
FIX
EXT
8254
1/40
240 Hz
74HC4046
P.C.
LOOP FILTER
VCO
f = 2.4 MHz
8254
1/m
fps m
15 500
7.5 1000
3.75 2000
CAPSTAN CONTROL PLL
P.C.
LOOP FILTER
CAP. MDA
CAPSTAN MOTOR
TACH. PULSE
8254
1/p
p = 10,000 (nom.)
CPU
RST 5.5
15 ips
7.5 ips
3.75 ips
DIRECTION
PULSE
D
Q
CLK
PITCH CONTROL
ROTARY ENCODER



MTR-10/12 Block Diagram

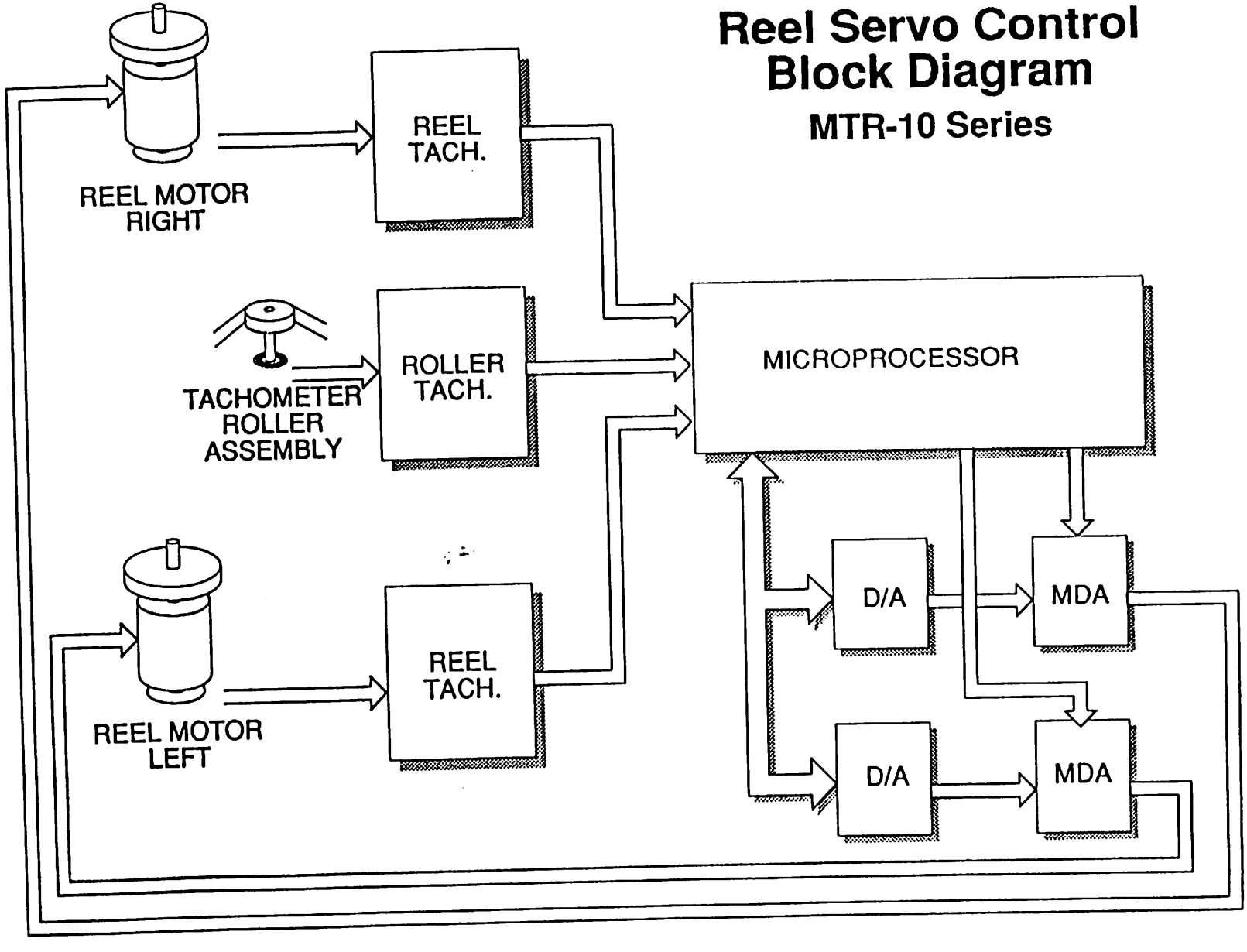


MTR-10/12 Tape Transport

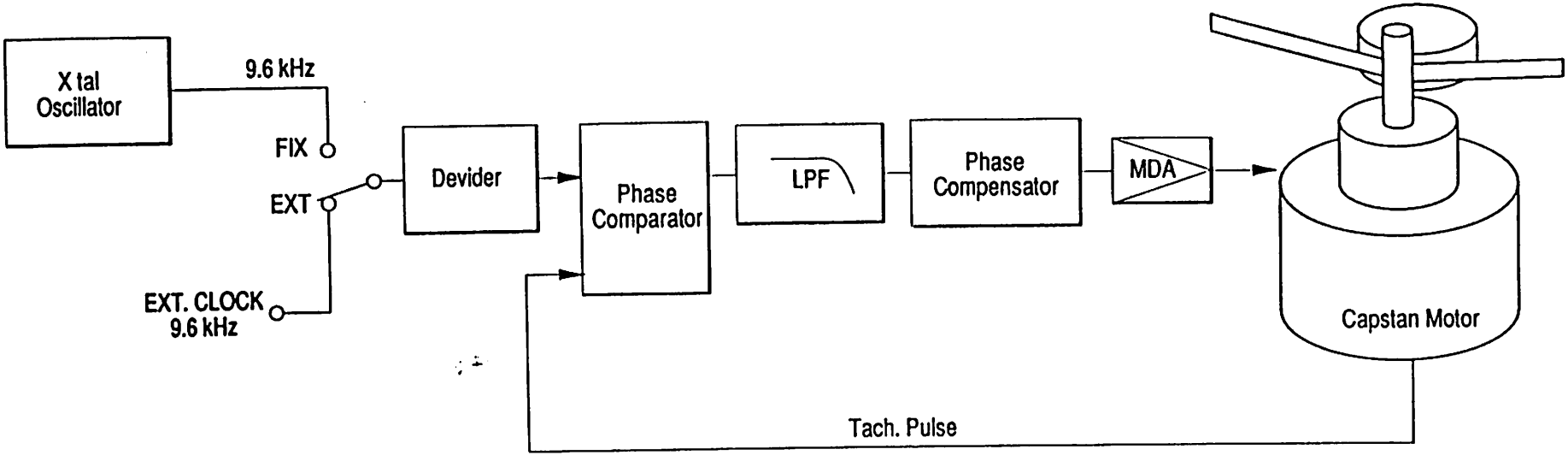
* PLL Capstan Servo Control
* Micro Processor Controlled Tension Servo

Reel Servo Control Block Diagram

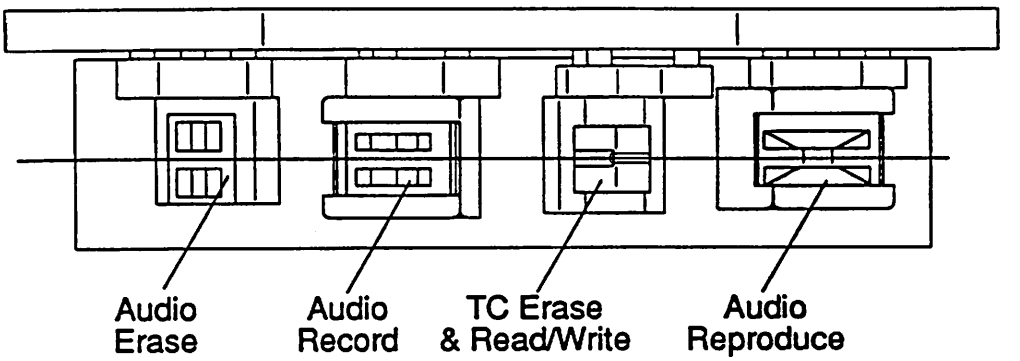
MTR-10 Series



Phase Locked Loop Capstan Servo

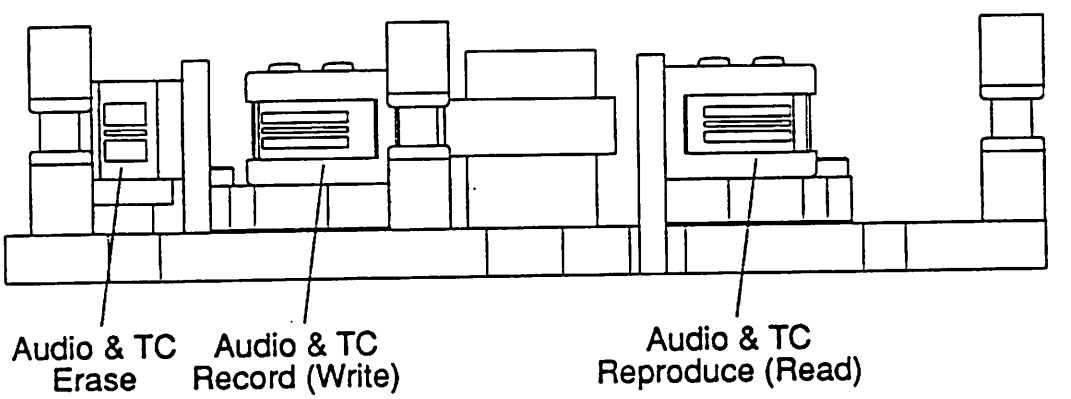


MTR-10 Time Code Version Head Assembly

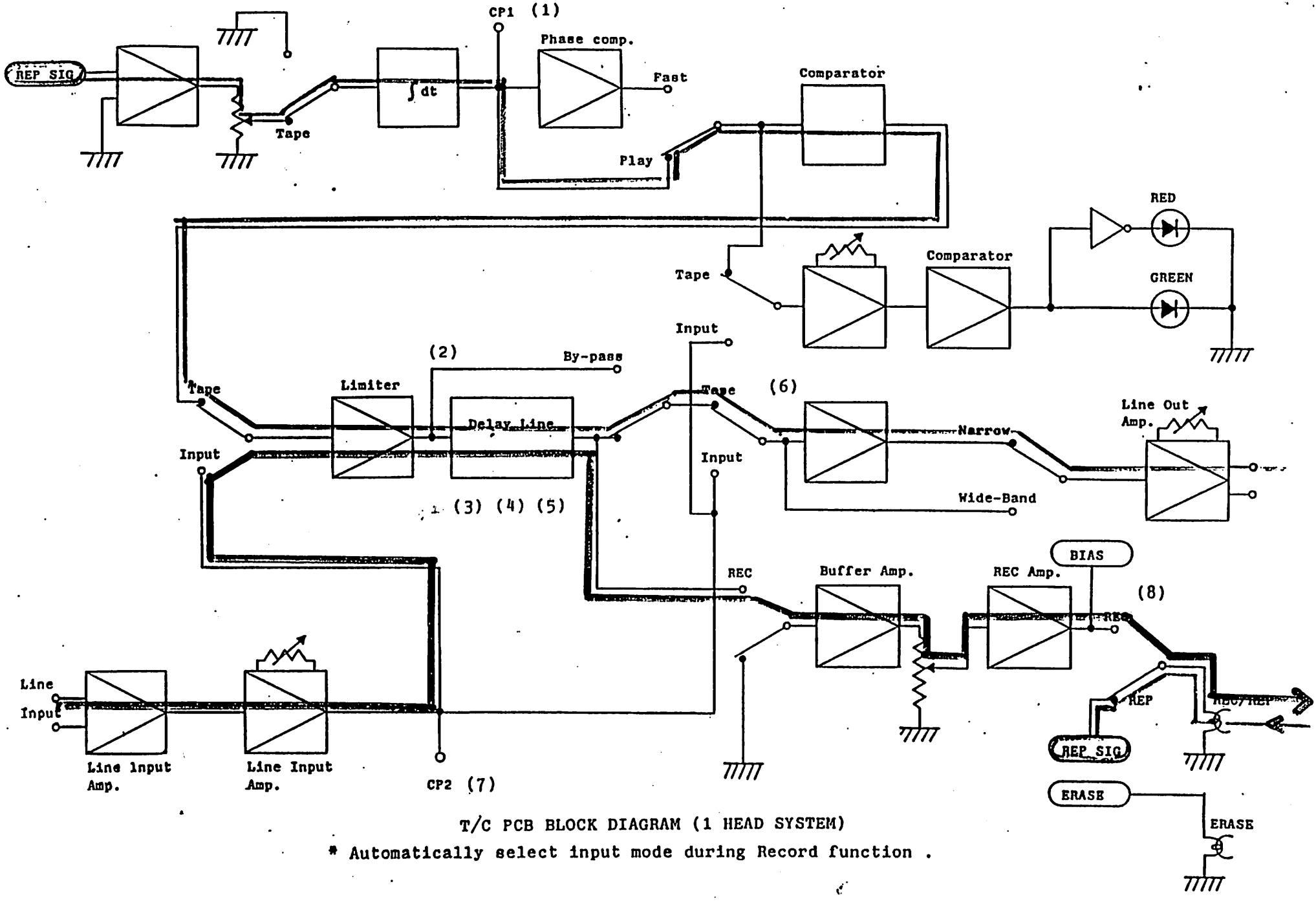


* Independent TC head is used to reduce crosstalk between audio and TC tracks.
* The coincidence of audio and TC tracks is controlled by microprocessor.

MX-55 Time Code Version Head Assembly



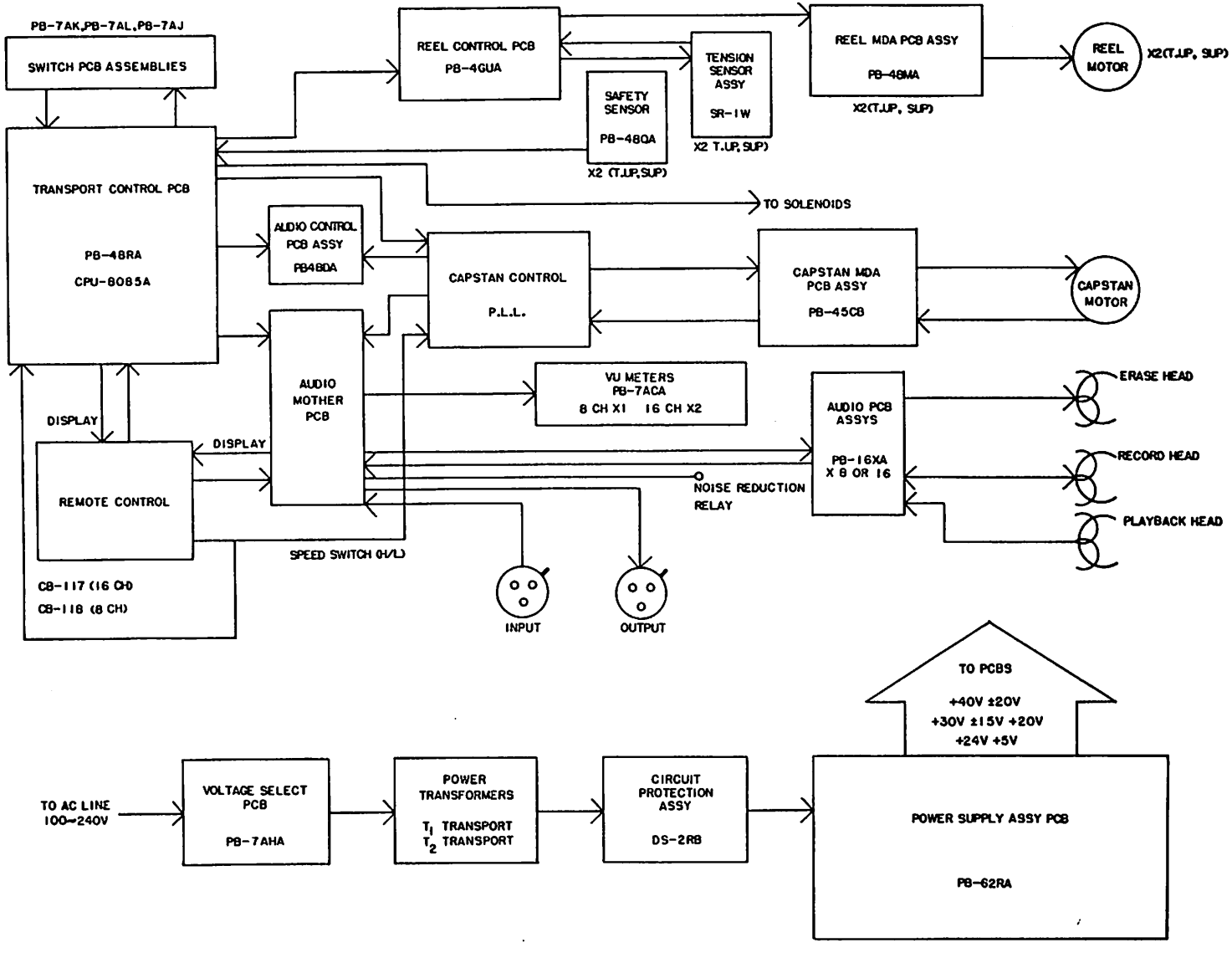
* All heads are in-line type.
* Crosstalk between audio and TC tracks is reduced by crosstalk canceller circuit.
* Because of in-line type heads, coincidence of audio and TC tracks is always constant



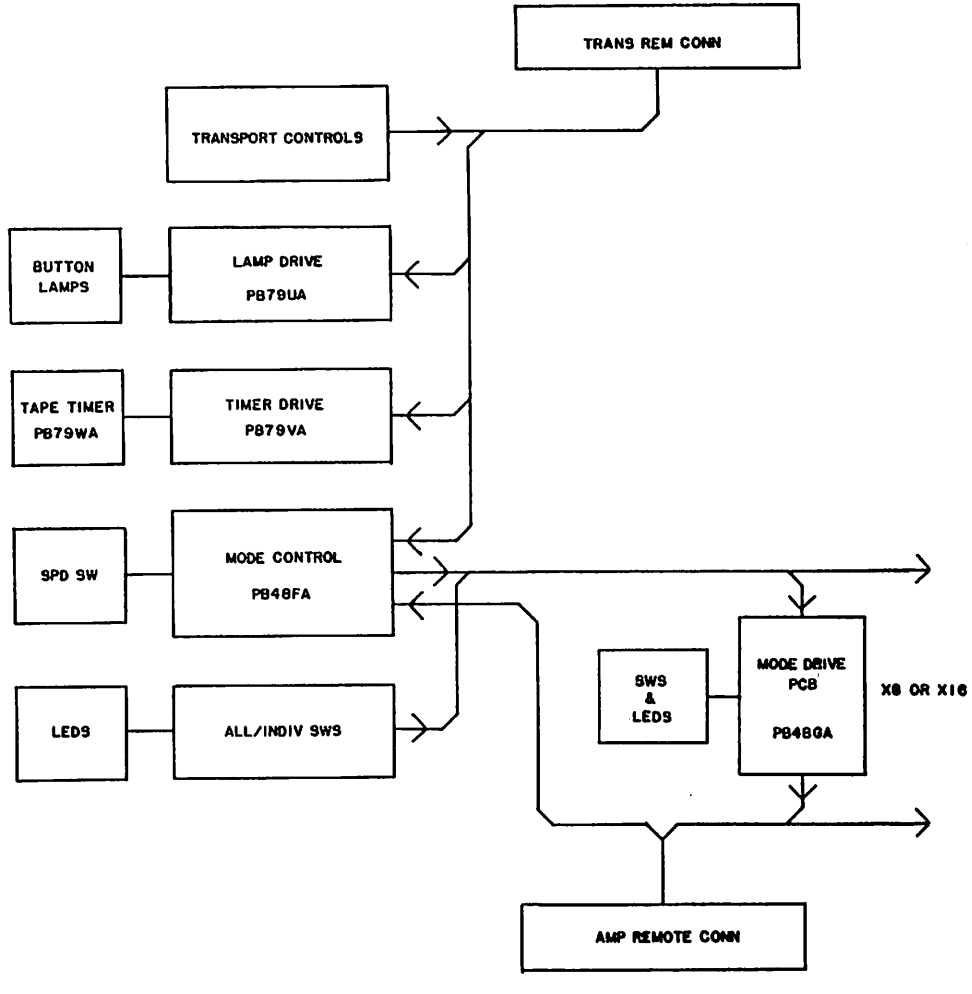
T/C PCB BLOCK DIAGRAM (1 HEAD SYSTEM)

* Automatically select input mode during Record function .

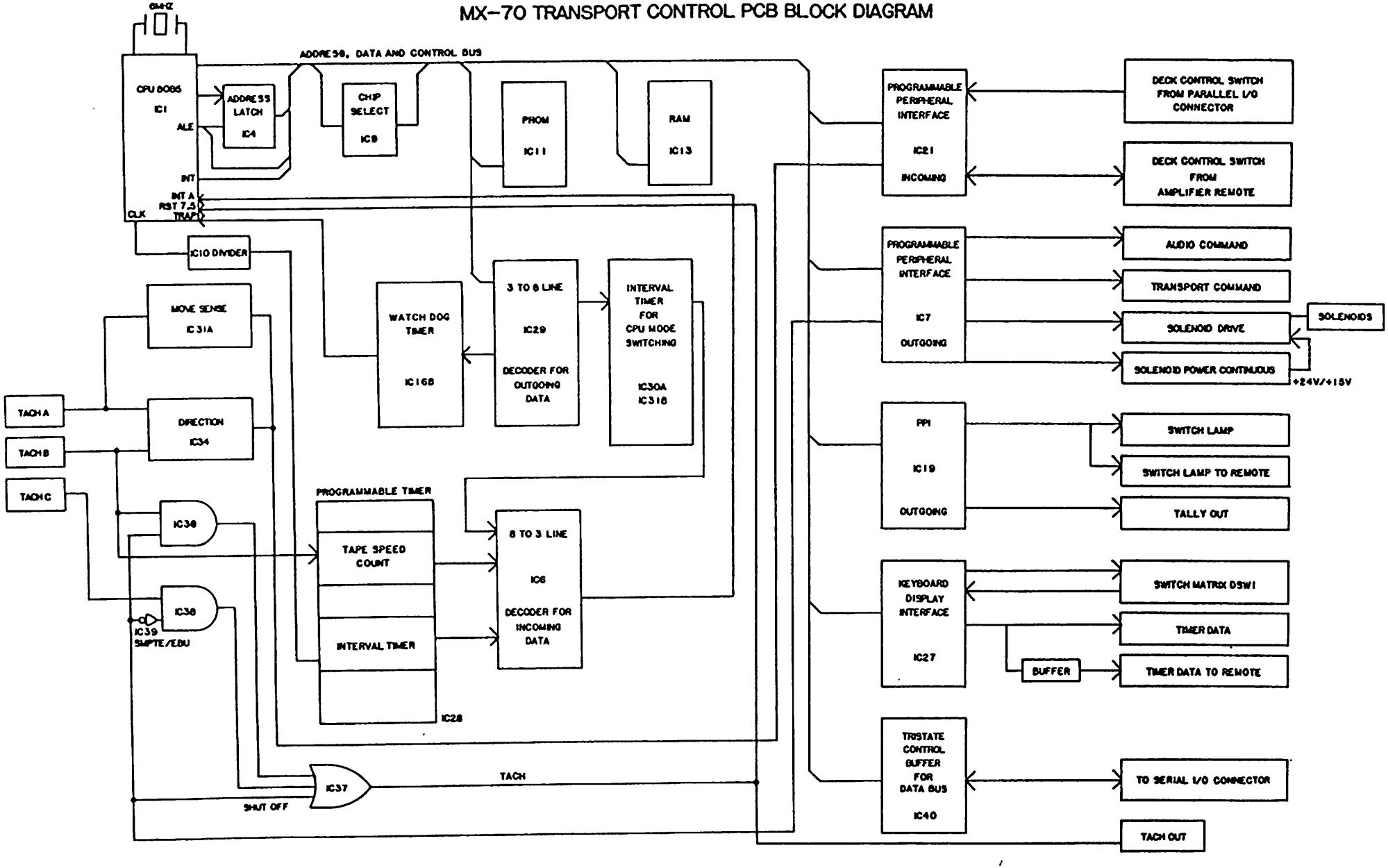
MX-70 BLOCK DIAGRAM

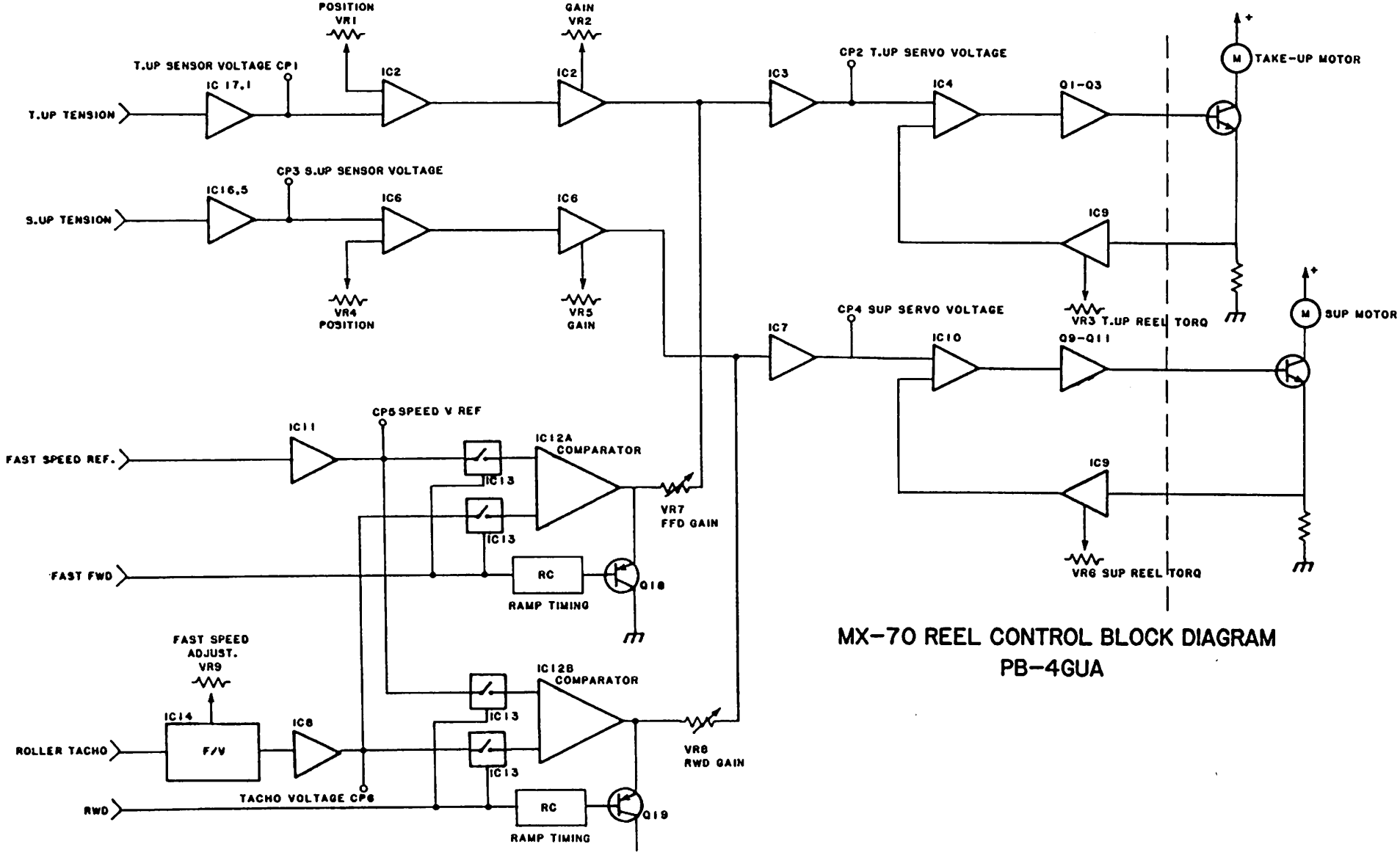


MX-70 REMOTE CONTROL UNIT



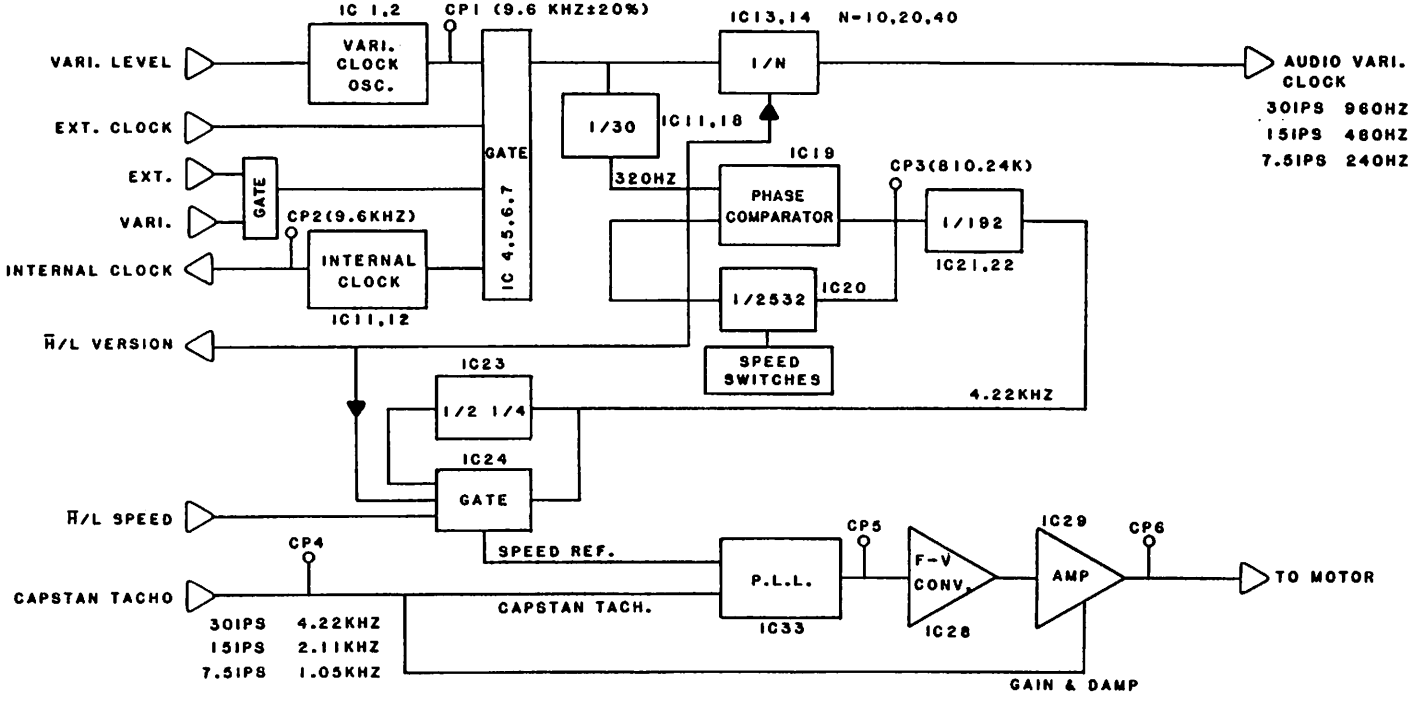
MX-70 TRANSPORT CONTROL PCB BLOCK DIAGRAM



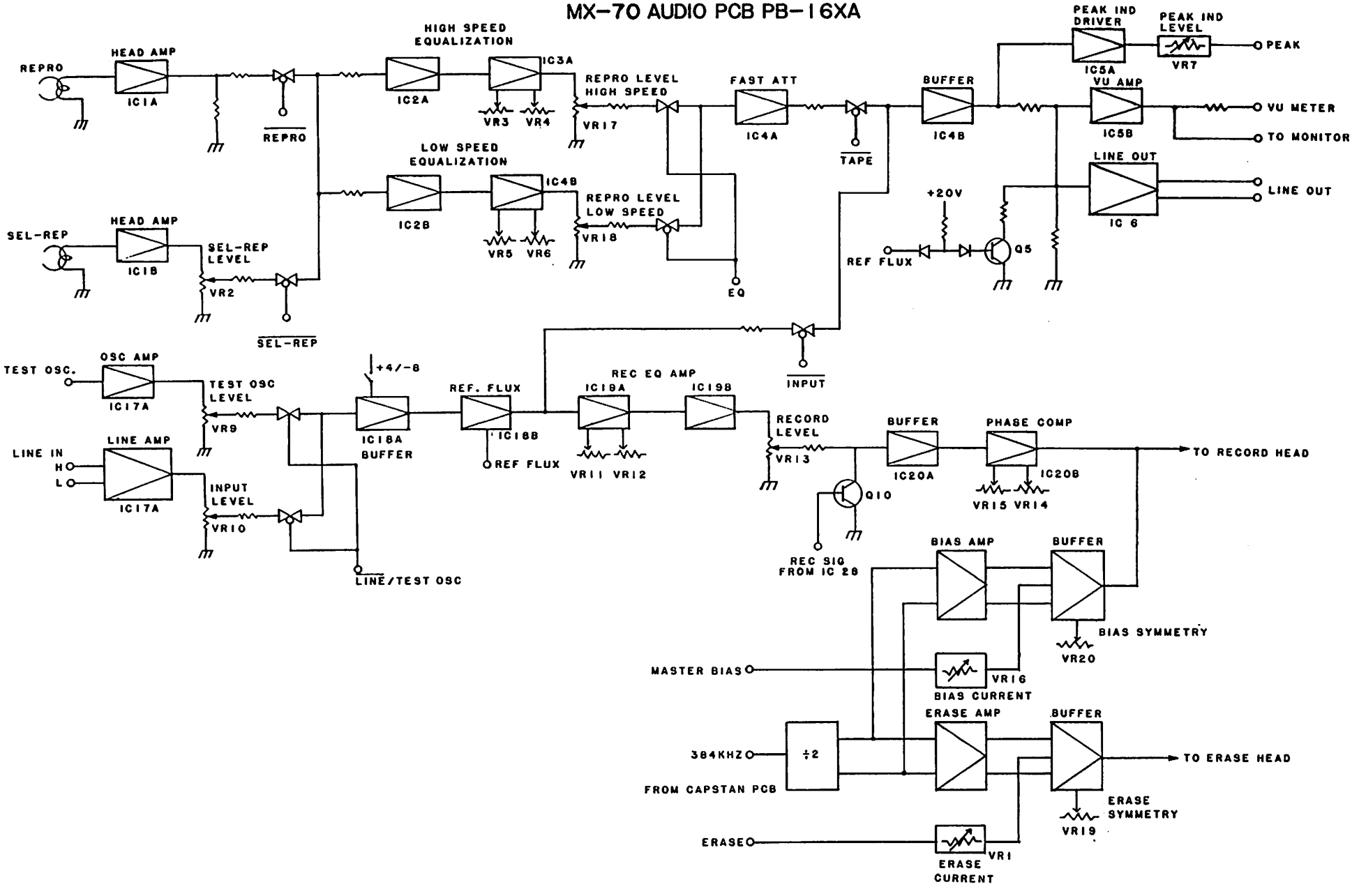


MX-70 REEL CONTROL BLOCK DIAGRAM
PB-4GUA

CAPSTAN CONTROL BLOCK DIAGRAM



MX-70 AUDIO PCB PB-16XA



TRIMMERS, TEST POINTS AND JUMPERS ON THE MX-70 TRANSPORT CONTROL PCB (PB-48RB)

Trimmers

VR1 Fast Wind Speed VREF Adj - adjust for +5.0V at TP 4

VR2 Fast Wind Speed VREF Offset - Adjust for 0V @ TP 4 while holding SW 1

Test Points

TP1 - TP3 Ground

TP4 Fast Wind Speed VREF

TP5 Tacho A

TP6 Tacho B

TP7 Tacho C

Jumpers

J1 - J4 ROM Select

ROM Type	Jumper Setting
64 kB (2 pc)	J2, J3 (Shorted)
128 kB (1 pc)	J1 *
128 kB (2 pc)	J1, J3, J4
256 kB (1 pc)	J1, J2, J3, J4

J5 Selects Dynamic Only or Mechanical and Dynamic Brakes during Fast Wind to Stop transitions

J5 Open - Dynamic Only *
J5 Shorted - Mechanical and Dynamic

J6 & J7 Lifter Solenoid Voltage Select

J6 Shorted, J7 Open - +24V then +15V *
J6 Open, J7 Shorted - +24V only

J8 & J9 ROM Size Select

J8 Shorted - 256 kByte
J9 Shorted - 128 kByte *

J10 & J11 Rehearse Select

J10 Shorted, J11 Shorted - Fast Standby must be selected for Rehearse to function *

J10 Open, J11 Open - Rehearse functions with Fast Standby Off

NOTE: * *indicates factory setting.*

TRIMMERS AND TEST POINTS ON MX-70 REEL CONTROL PCBs

Trimmers

Lot Number	A - H	I - J	L -
PCB Part Number	PB-48LA	PB-48LA with PB-7KUA	PB-4GUA
Take Up Position " Gain	VR1 VR2	VR1 VR2	VR1 VR2
Supply Position " Gain	VR3 VR4	VR3 VR4	VR4 VR5
Take Up Torque Supply Torque	VR9 VR10	VR9 VR10	VR3 VR6
F.Fwd Gain Rewind Gain	VR6 VR7	VR6 VR7	VR7 VR8
Fast Wind Speed	VR8	VR8	VR9

Test Points (All versions)

CP1	Take Up sensor Voltage
CP2	Take Up Servo Voltage
CP3	Supply Sensor Voltage
CP4	Supply Servo Voltage
CP5	Speed Reference Voltage
CP6	Tach Voltage
CP7	Gnd
CP8	Gnd

TRIMMERS, TEST POINTS, AND SWITCHES ON MX-70 CAPSTAN CONTROL PCB (PB-48KA)

Trimmers

VR1	Vari-Speed adjust. Set for 9.6 kHz +/1 50 Hz at TP1.
VR2	Low Speed Damping adjust. Set for fast recovery of waveform at TP6 (or minimum Wow and Flutter).
VR3	High Speed Damping adjust. Set for fast recovery of waveform at TP6 (or minimum Wow and Flutter).
VR4	Low Speed Gain adjust. Set for 50% duty cycle at TP6.
VR5	High Speed Gain adjust. Set for 50% duty cycle at TP6.

Test Points

TP1	Vari-Speed frequency - 9.6 kHz +/- 20%.
TP2	Internal clock frequency - 9.6 kHz.
TP3	Phase Locked Loop frequency - 810.24 kHz.
TP4	Capstan Tach -
TP5	Capstan Tach frequency - 0-15 V square wave.
TP6	Capstan Drive voltage - varying DC voltage.
TP7	Gnd.
TP8	Gnd.

Switches

SW1	Speed Pair - High/Low.
SW2	Capstan Speed adjust - 0.035%/step.
SW3	Capstan Speed adjust - 0.35%/step.

TRIMMERS, TEST POINTS, AND SWITCHES/JUMPERS ON MX-70 AUDIO PCBs (PB-16XA)

Trimmers

VR1	Erase Current
VR2	Sel-Rep Level
VR3	High Speed - Low Freq. Compensation
VR4	High Speed - High Freq. Repro EQ
VR5	Low Speed - Low Freq. Compensation
VR6	Low Speed - High Freq. Repro EQ
VR7	Peak Indicator Level
VR8	VU Meter Level
VR9	Test Oscillator Level
VR10	Input Level
VR11	High Speed - High Freq. Record EQ
VR12	Low Speed - High Freq. Record EQ
VR13	Record Level
VR14	High Speed - Phase Comp
VR15	Low Speed - Phase Comp
VR16	Record Bias Current
VR17	High Speed - Repro Level
VR18	Low Speed - Repro Level
VR19	Erase Bias Symmetry
VR20	Record Bias Symmetry

Test Points

TP1	Record Head Bias
TP2	Record Head Gnd
TP3	Erase Head Bias
TP4	Erase Head Gnd
TP5	Audio Gnd
TP6	Audio Gnd
TP7	Record Bias Drive
TP8	Erase Bias Drive

Switches and Jumpers

SW1	Balanced/Unbalanced
SW2	Gapless Punch In/Out Timing
SW3	Output Level +4/-8 dBm
SW4	Input Level +4/-8 dBm
J1	Cue Attenuation
CN2	High Speed Repro EQ Select
CN3	Low Speed Repro EQ Select
CN6	Record EQ NAB/IEC Select
CN7	High/Low Record Speed Pair

MX-70 ERROR CODES

Err 00	ROM Checksum Error
Err 01	RAM Read/Write Error
Err 02	PB-48RA IC 21 Error
Err 03	PB-48RA IC 19 Error
Err 04	PB-48RA IC 7 Error
CPUEr	Abnormal Program State

SOFTWARE VERSION TEST

Hold STOP button pressed while turning On the Power to the machine; the software program number will be shown on the Tape Time display.

BRAKE TEST

Press all five Transport buttons and the EDIT button simultaneously.

RUNNING TEST

Press all five Transport buttons and the CUE button simultaneously.

INSTRUCTIONS FOR SETTING THE EQUALIZATION JUMPERS ON MX-70 AUDIO CHANNEL PCBs

Set the jumpers on each Audio PCB to the following positions:

For 1" 16 Channel Machines

High Speed Pair (30/15 ips) Machines

AES Equalization at 30 ips, IEC Equalization at 15 ips (1" 16 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- ∞ & 35
CN2 High Speed Repro (2 Jumpers)	- ∞ & 17.5
CN6 Record EQ (2 Jumpers)	- IEC & IEC
CN7 Record Speed Pair (3 Jumpers)	- H, H, & H

Low Speed Pair (15/7.5 ips) Machines

IEC Equalization at both speeds (1" 16 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- ∞ & 70
CN2 High Speed Repro (2 Jumpers)	- ∞ & 35
CN6 Record EQ (2 Jumpers)	- IEC & IEC
CN7 Record Speed Pair (3 Jumpers)	- L, L, & L

For 1" 8 Channel Machines

High Speed Pair (30/15 ips) Machines

AES Equalization at 30 ips, NAB Equalization at 15 ips (1" 8 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- 3180 & 50
CN2 High Speed Repro (2 Jumpers)	- ∞ & 17.5
CN6 Record EQ (2 Jumpers)	- NAB & NAB H
CN7 Record Speed Pair (3 Jumpers)	- H, H, & H

Low Speed Pair (15/7.5 ips) Machines

NAB Equalization at both speeds (1" 8 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- 3180 & 50
CN2 High Speed Repro (2 Jumpers)	- 3180 & 50
CN6 Record EQ (2 Jumpers)	- NAB & NAB L
CN7 Record Speed Pair (3 Jumpers)	- L, L, & L

EQUALIZATION JUMPER INSTRUCTIONS CONTINUED

For 1/2" 8 Channel MX-70s

High Speed Pair (30/15 ips) Machines

AES Equalization at 30 ips, IEC Equalization at 15 ips (1/2" 8 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- ∞ & 35
CN2 High Speed Repro (2 Jumpers)	- ∞ & 17.5
CN6 Record EQ (2 Jumpers)	- IEC & IEC
CN7 Record Speed Pair (3 Jumpers)	- H, H, & H

Low Speed Pair (15/7.5 ips) Machines

IEC Equalization at both speeds (1/2" 8 Channel Standard)

CN3 Low Speed Repro (2 Jumpers)	- ∞ & 70
CN2 High Speed Repro (2 Jumpers)	- ∞ & 35
CN6 Record EQ (2 Jumpers)	- IEC & IEC
CN7 Record Speed Pair (3 Jumpers)	- L, L, & L

It is possible to operate the 1/2" 8 Channel MX-70 using NAB equalization, however, this does not conform to industry standards for this format.

High Speed Pair (30/15 ips) Machines

AES Equalization at 30 ips, NAB Equalization at 15 ips **(Non-Standard EQ)**

CN3 Low Speed Repro (2 Jumpers)	- 3180 & 50
CN2 High Speed Repro (2 Jumpers)	- ∞ & 17.5
CN6 Record EQ (2 Jumpers)	- NAB & NAB H
CN7 Record Speed Pair (3 Jumpers)	- H, H, & H

Low Speed Pair (15/7.5 ips) Machines

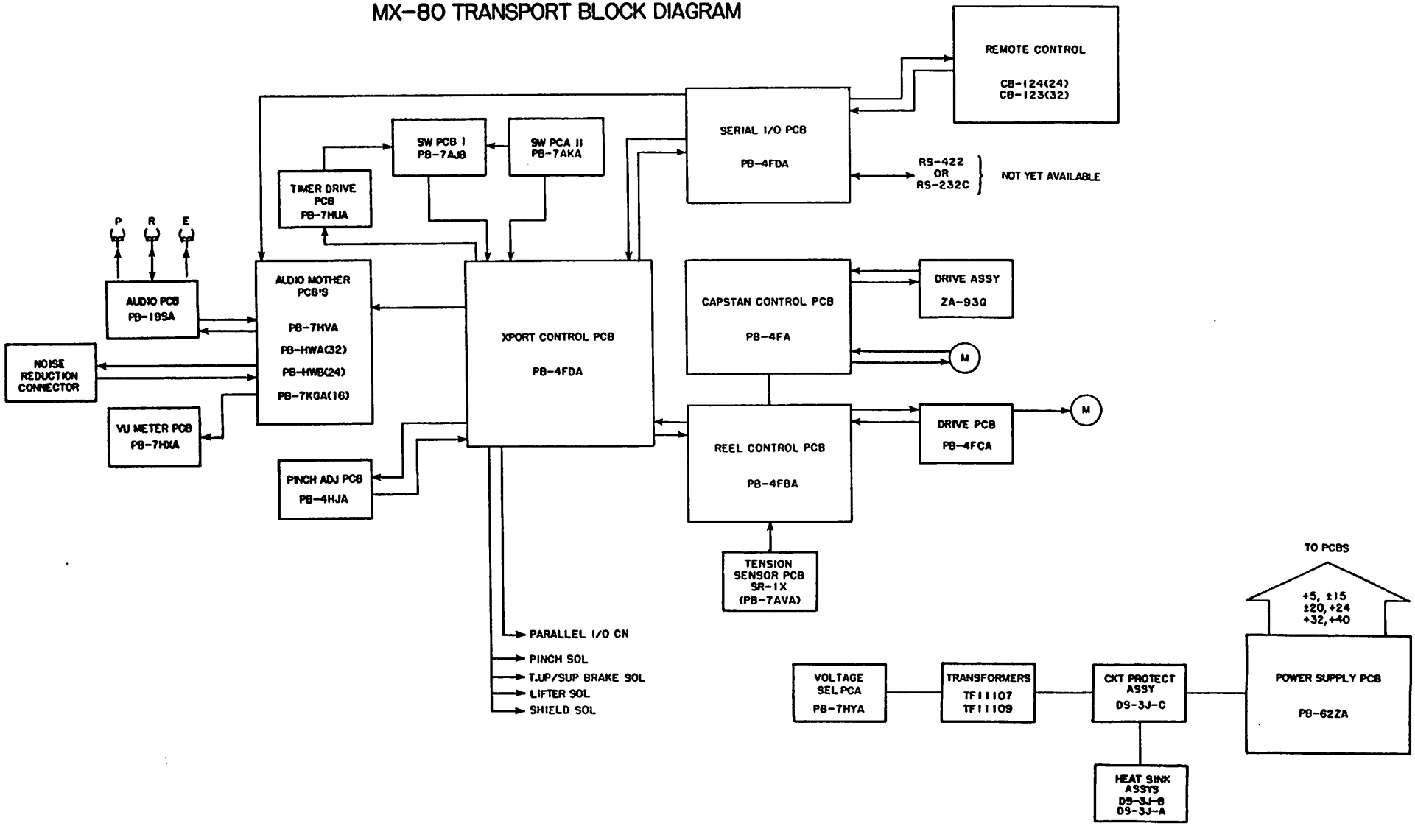
NAB Equalization at both speeds **(Non-Standard EQ)**

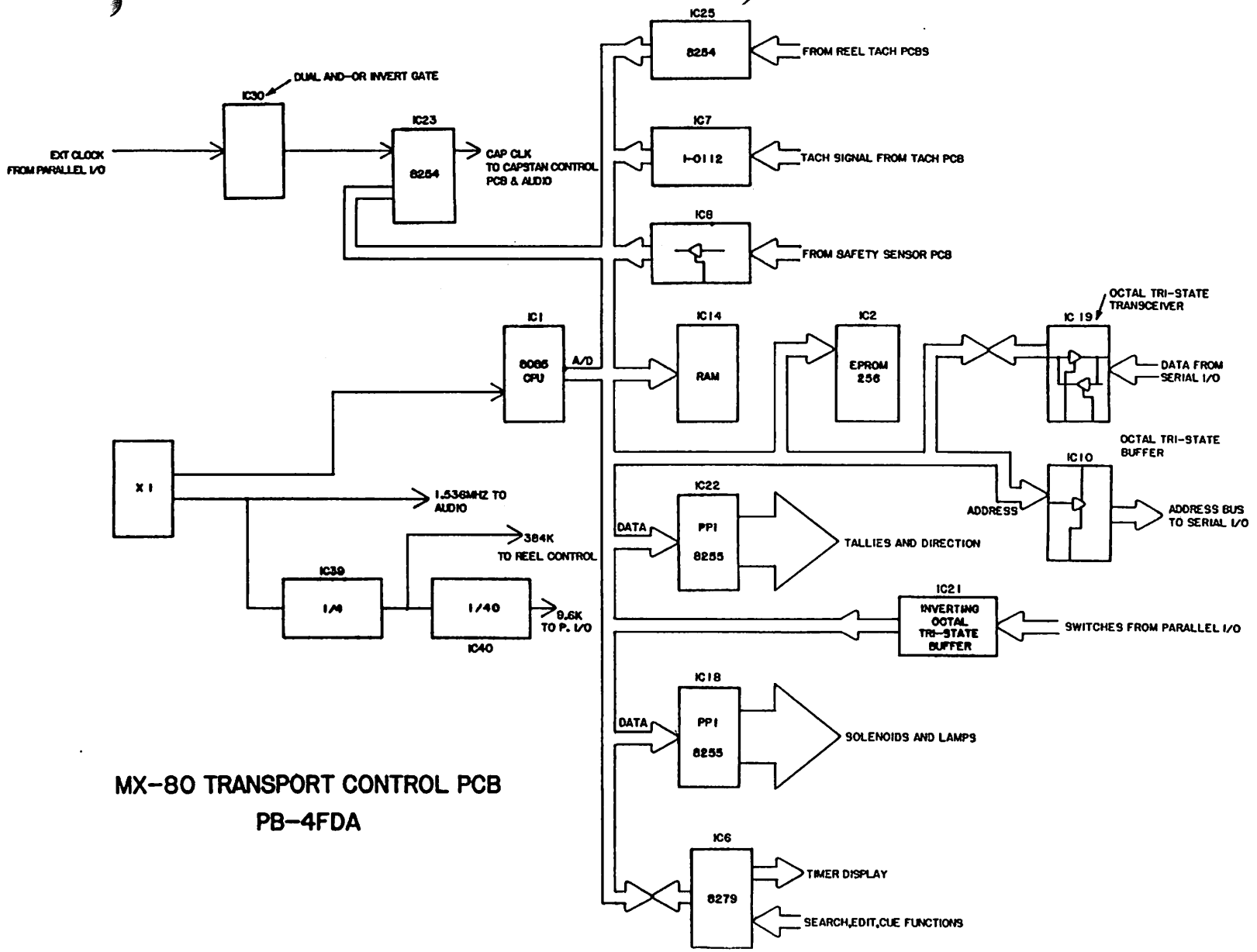
CN3 Low Speed Repro (2 Jumpers)	- 3180 & 50
CN2 High Speed Repro (2 Jumpers)	- 3180 & 50
CN6 Record EQ (2 Jumpers)	- NAB & NAB L
CN7 Record Speed Pair (3 Jumpers)	- L, L, & L

NOTE: *If mixed EQ operation (IEC @ 15 ips - NAB @ 7.5 ips) is required, modifications must be made to each Audio Channel PCB. Please contact OTARI Corp. for further information.*

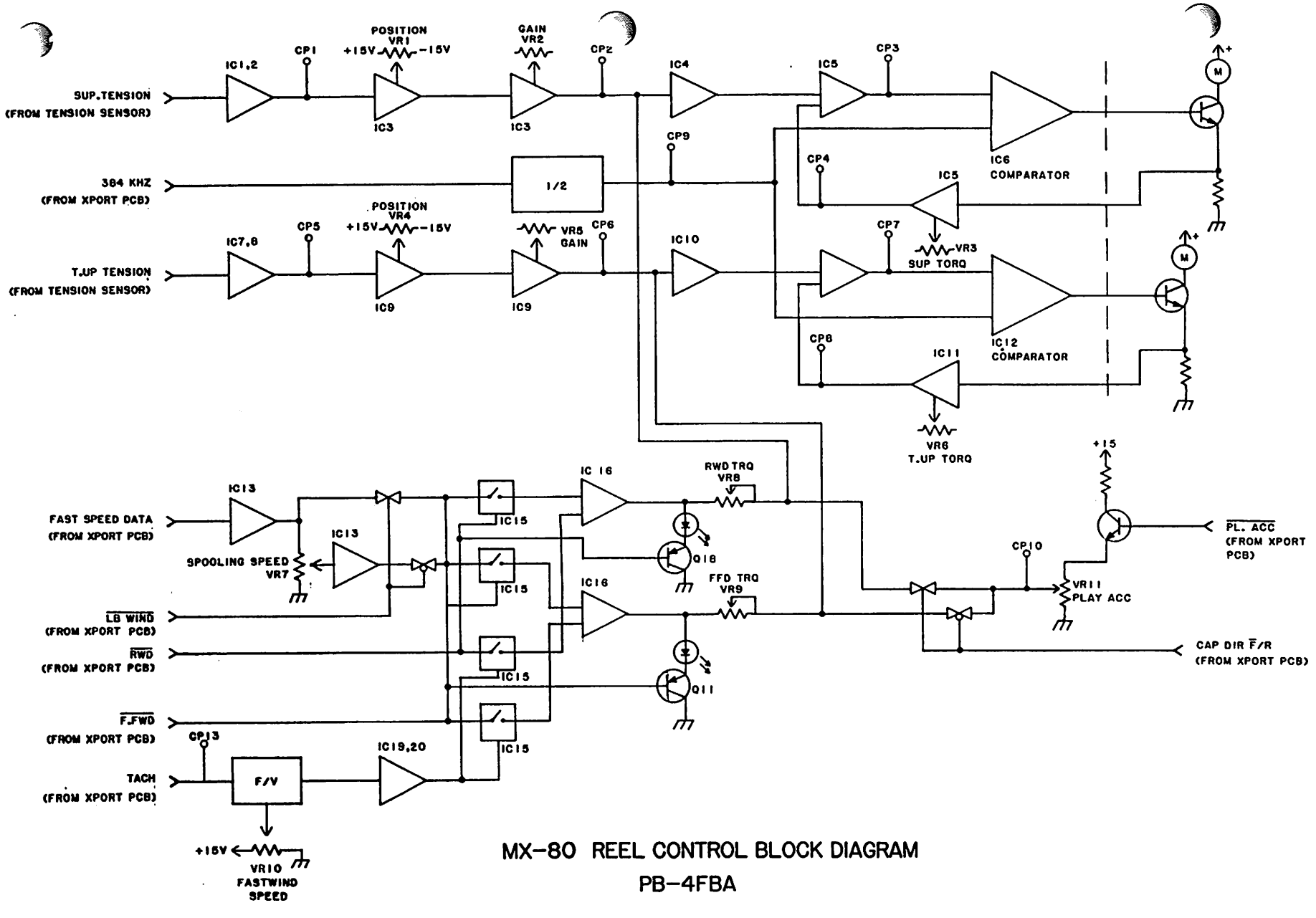
LOCATION OF JUMPER CONNECTOR					
EQ	SPEED PAIR	LOW SPEED CN3 REPRO EQ	HIGH SPEED CN2 REPRO EQ	CN6 REC EQ	CN7 SPEED PAIR
NAB/AES	H (30/15ips)	3180 ∞ 70 50 35	3180 ∞ 50 35 17.5	NAB H NAB L IEC NAB IEC	H L H L H L
	L (15/7.5ips)	3180 ∞ 70 50 35	3180 ∞ 50 35 17.5	NAB H NAB L IEC NAB IEC	H L H L H L
IEC/AES	H (30/15ips)	3180 ∞ 70 50 35	3180 ∞ 50 35 17.5	NAB H NAB L IEC NAB IEC	H L H L H L
	L (15/7.5ips)	3180 ∞ 70 50 35	3180 ∞ 50 35 17.5	NAB H NAB L IEC NAB IEC	H L H L H L

MX-80 TRANSPORT BLOCK DIAGRAM



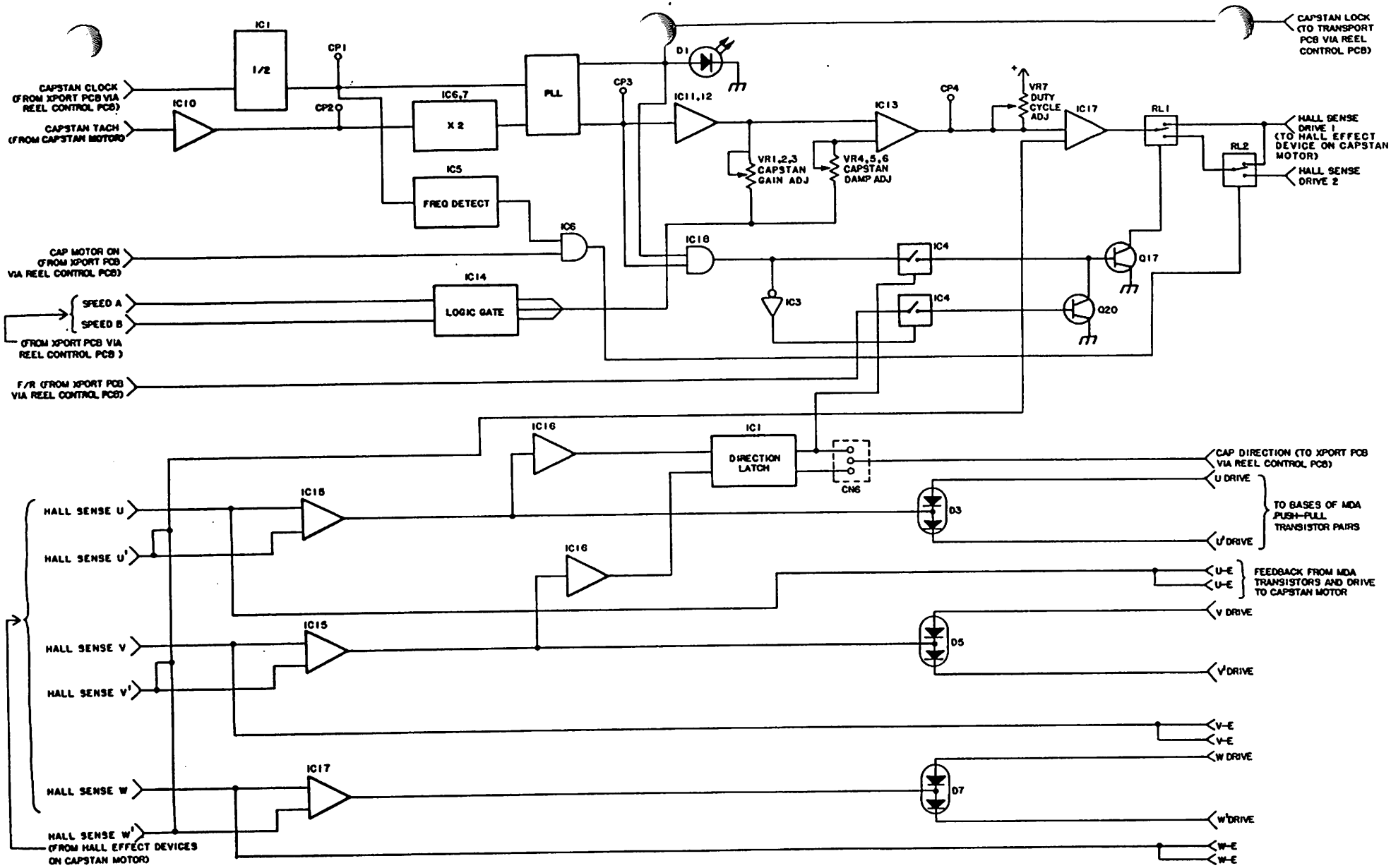


MX-80 TRANSPORT CONTROL PCB
PB-4FDA



MX-80 REEL CONTROL BLOCK DIAGRAM

PB-4FBA



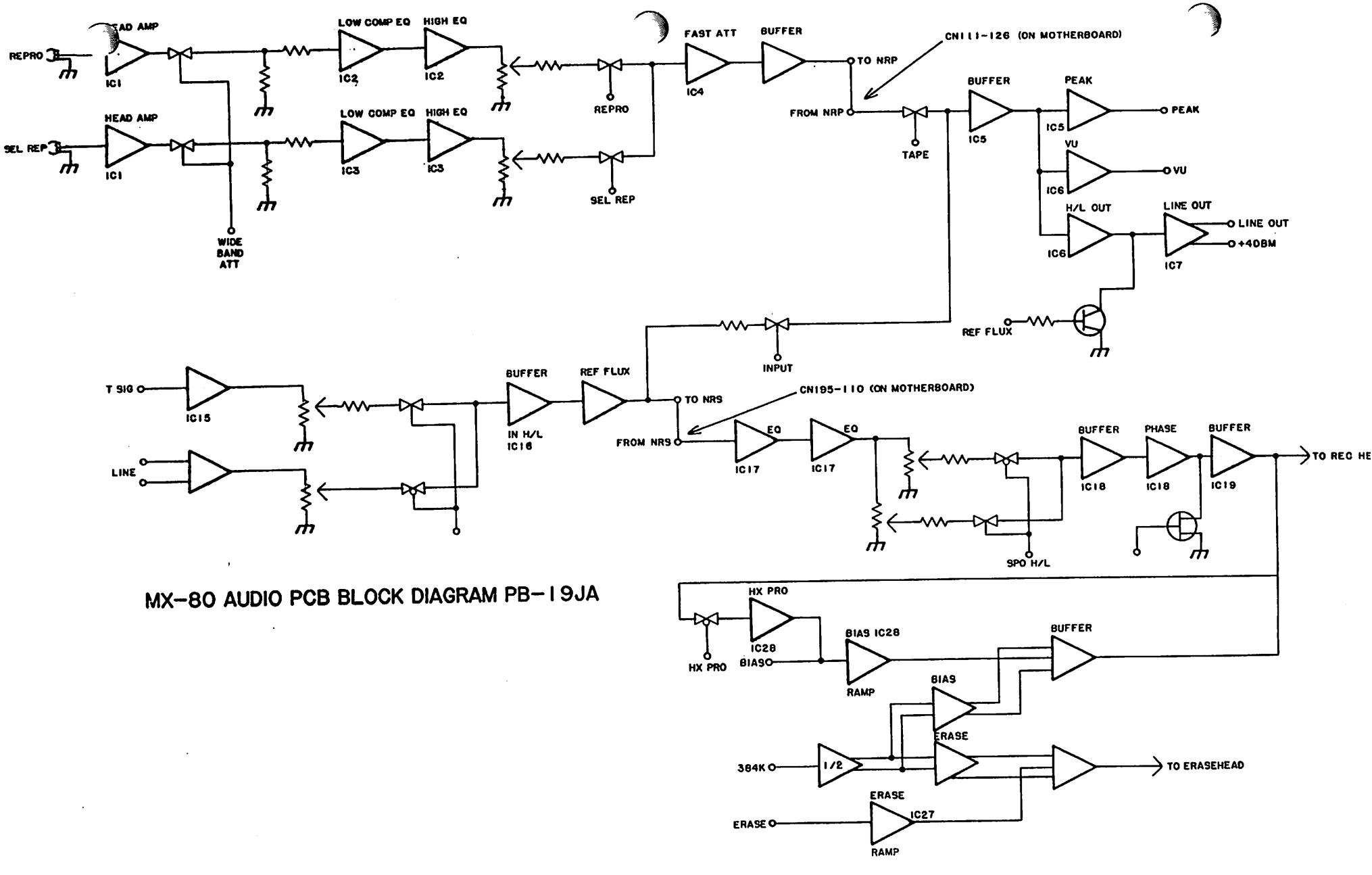
IC14 TRUTH TABLE

CAPSTAN SPEED	INPUT	
	SPEED A	SPEED B
7.5	0V	+15V
15	+15V	0V
30	0V	0V

CAPSTAN DIRECTION TRUTH TABLE

CN6 POSITION	OUTPUT	
	REV	FWD
1-2	0V	+5V
2-3	+5V	0V

MX-80 CAPSTAN CONTROL PCB BLOCK DIAGRAM PB-4FAA



MX-80 AUDIO PCB BLOCK DIAGRAM PB-19JA

MX-80 ERROR CODES

ERROR CODE #	DESCRIPTION
0	PROGRAM CHECK SUM ERROR
1	RAM READ/WRITE ERROR
2	TRANSPORT PCB IC18 ERROR (M5L8255)
3	TRANSPORT PCB IC22 ERROR (M5L8255)
4	SERIAL I/O PCB IC25 ERROR (M5L8255)
5	SERIAL I/O PCB NOT PLUGGED IN
20	TRANSPORT WILL NOT WIND PAST REPEAT POINTS
21	CUE POINTS SELECTED FOR REPEAT FUNCTION ARE IDENTICAL
70	TIME OUT ERROR IN COMMUNICATION WITH SERIAL I/O PCB
71	TIME OUT ERROR IN COMMUNICATION WITH OPTIONAL SERIAL I/O PCB #1
72	TIME OUT ERROR IN COMMUNICATION WITH OPTIONAL SERIAL I/O PCB #2

MX-80 REMOTE ERROR CODES

ERROR CODE #	DESCRIPTION
90	INITIAL COMMUNICATION ERROR
91	TIME OUT ERROR EX: MX-80 AND REMOTE ARE RECEIVING DIFFERENT INFORMATION
92	UNDEFINE ERROR EX: REMOTE RECEIVES UNDEFINED DATA OR GLITCHES
93	CHECK SUM ERROR
94	NO ACKNOWLEDGE SIGNAL RECEIVED
95	PARITY ERROR
96	OVER RUN ERROR
97	FRAMING ERROR
98	TRANSMIT BUFFER FULL
99	STX ERROR

NOTE: Dip switches 1-5 inside remote on CPU PCB will defeat indication of error codes 91-99. Error 90 will indicate with this switch in either ON or OFF position.

Error 90 indication on power up is common due to the different boot-up routines of the remote CPU and the serial I/O PCB.

MX-80 LIST O' TRICKS

I. SOFTWARE CHECKS

A. TRANSPORT SOFTWARE PG08211

Turn On power while pressing STOP switch. Machine Displays software number and version on tape counter. Example: PG08211C ——> 082 03

B. REMOTE SOFTWARE PG08411

Power up while pressing STOP on remote. Machine displays software number and version on tape counter.

C. SERIAL I/O/SOFTWARE PG08311

Remove serial I/O PCB and perform visual check.

II. TEST MODES

A. Hold down all five transport buttons on machine and press SEARCH ZERO button then release. After a short pause, machine will perform full-function test.

B. Hold down all 5 transport buttons on the machine and press SEARCH ZERO. Release SEARCH ZERO and press EDIT/UNLOAD while still holding down transport buttons then release. Machine will toggle between F.fwd and Rwd.

To exit test modes, press CLEAR. Tape control will display -A.Err-- until TIME/IPS/% button is pressed.

MX-80 SERIAL REMOTE PCB (PB-4FEA)

Sw 5 is an 8 position DIP Switch having the following functions:
Sw 5-1, 5-2, and 5-3: Baud Rate Select (NOTE: Must be set for 38.4 bps, 1 Stop bit, 8 bit characters, Parity On, Parity Even, and Point to Point Protocol to insure proper communication with the CB-123 or CB-124 Remote Control unit.

5-1	5-2	5-3	Baud Rate	TP 2
0	0	0	110	1.76 kHz
1	0	0	300	4.8 kHz
0	1	0	1200	19.2 kHz
1	1	0	2400	38.4 kHz
0	0	1	4800	76.8 kHz
1	0	1	9600	153.6 kHz
0	1	1	19200	307.2 kHz
1	1	1	38400	614.4 kHz

Sw 5-4: Number of Stop Bits
On - 2 Stop Bits
Off- 1 Stop Bit

Sw 5-5: Character Length Assign
On - 8 Bit Characters
Off- 7 Bit Characters

Sw 5-6: Parity Bit
On - Parity On
Off- Parity Off

Sw 5-7: Parity Select
On - Even Parity
Off- Odd Parity

Sw 5-8: Serial Protocol Select
On - Multi-Point (RS-422)
Off- Point to Point (RS-232C)

Factory Settings:

5-1	5-2	5-3	5-4	5-5	5-6	5-7	5-8
ON	ON	ON	OFF	ON	ON	ON	OFF

MX-80 TEST POINTS, POTS AND VOLTAGES
QUICK REFERENCE GUIDE

I. TRANSPORT PCB

A. TACH QUADRATURE ADJUSTMENT:
1. TP2 - Tach A from PB-7LAA(front tach PCB)
2. TP3 - Tach B from PB-7DSA(rear tach PCB)
3. TP4 - Tach C from PB-7LAA(front tach PCB) EBU

B. FAST WIND SPEED REFERENCE ADJUSTMENT:
1. TP5 - adjust VR2 for 0 V in Unload
2. TP5 - adjust VR1 for +7.0 in FFD

C. SYSTEM CLOCK
1. TP6 - 400 kHz clock

II. REEL CONTROL PCB

A. TENSION ARM GAIN ADJUSTMENT:
1. CP6 - adjust VR4 for 0 V with Take-up arm at top of travel
   - adjust VR5 for +10.0 V with Take-up arm at bottom of travel
2. CP2 - adjust VR1 for 0 V w/Supply arm at top of travel
   adjust VR2 for 10.0 V w/Supply arm at bottom of travel

B. PLAY ACCELERATION ADJUSTMENT:
1. CP10 - adjust VR11 for +7.0 V with both Arms at top in Play Mode

C. FASTWIND TORQUE ADJUSTMENT:
1. Top of R27 - adjust VR8 for -8.0 V in Rwd
2. Top of R71 - adjust VR9 for -8.0 V in F.fwd

D. REEL MOTOR TORQUE ADJUSTMENT:
1. CP4 - adjust VR3 for +7.5 V in Rwd holding Supply reel table
2. CP8 - adjust VR6 for +7.5 V in F.fwd holding Take-up reel table

E. TENSION ARM POSITION/TAPE TENSION ADJUSTMENT:
1. Adjust VR4 to align Take-up tension arm with deck plate drill mark while tape is loaded in Stop mode, or adjust for 320 g in Stop mode.
2. Adjust VR1 to align Supply Tension Arm with deck plate drill mark while tape is loaded in Stop mode, or adjust for 320 g in Stop mode

F. FASTWIND/SPOOLING SPEED ADJUSTMENT:
1. CP13 - adjust VR10 for 3 kHz in Fastwind mode
2. CP13 - adjust VR7 for 1 kHz in in Spool mode

III. CAPSTAN CONTROL PCB

A. CAPSTAN CLOCK:
   1. CP1 - 9.6 kHz at 30 ips from Transport PCB

B. CAPSTAN TACH:
   1. CP2 - 4.8 kHz at 30 ips from Capstan Motor

C. PHASE LOCKED LOOP DUTY CYCLE ADJ
   1. CP3 - 9.6 kHz at 30 ips from IC8

D. CAPSTAN GAIN ADJUSTMENT:
   1. CP3 - adjust: VR4 - 30ips
      VR5 - 15ips for 50% duty
      VR6 - 7.5ips cycle

E. CAPSTAN DAMP ADJUSTMENT:
   1. CP4 - 1.0V when locked
      - Adj VR1- 30ips for fast recovery of
      VR2- 15ips waveform when capstan
      VR3- 7.3ips is held and released
      -OR-
   2. Adjust VR1, 2, and 3 for minimum wow/flutter

IV. AUDIO PCB ON BOARD TRIMMERS

A. TEST SIGNAL LEVEL:
   1. Adjust VR13 for 0 VU with reference signal applied to Test Jack

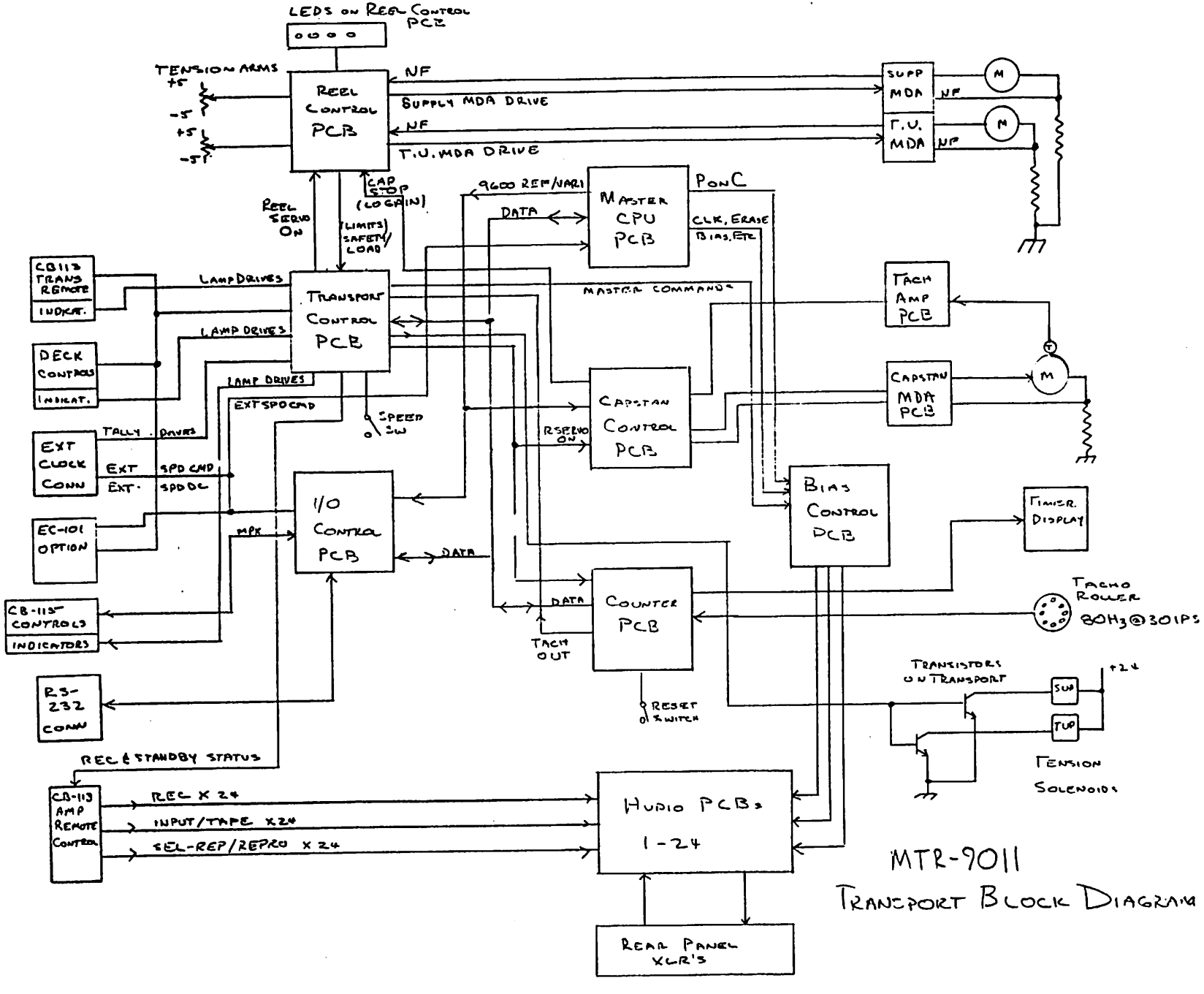
B. INPUT LEVEL:
   1. Adjust VR14 for 0 VU with reference signal applied to Line Input

C. PEAK INDICATOR:
   1. Adjust VR11 for peak LED illumination at +14dBm input level

D. OUTPUT LEVEL:
   1. Adjust VR12 for output reference level

E. RECORD BIAS SYMMETRY:
   1. Adjust VR22 for minimum thump in Record mode; erase head disconnected

F. ERASE BIAS SYMMETRY:
   1. Adjust VR23 for minimum thump in Record mode; record head disconnected



MTR-9011

Transport Block Diagram

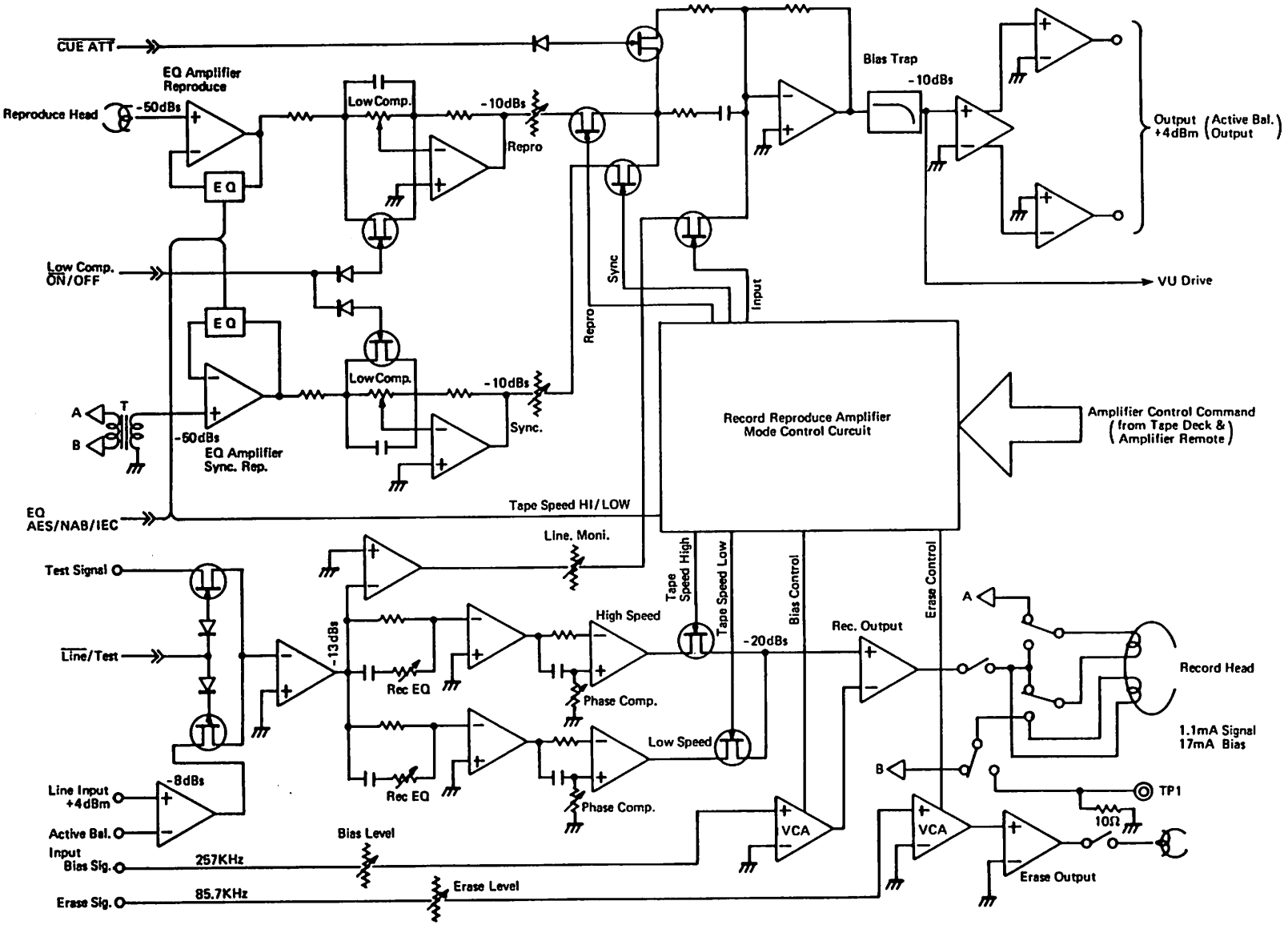


Figure 4-6. MTR-90 block diagram showing audio levels, 24-channel model. (Based on 1 kHz signal, NAB EQ, 30 ips speed.)