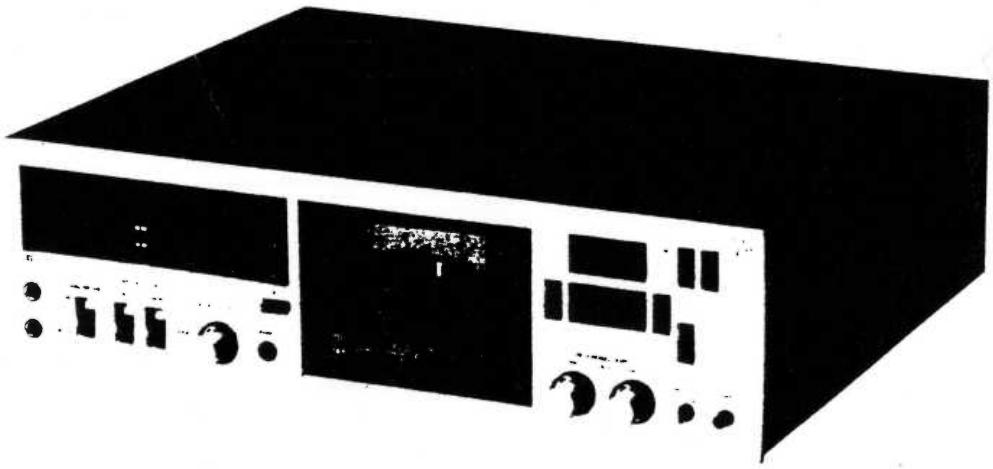
18

SERVICE MANUAL

LUXMAN STEREO CASSETTE DECK K-15

IF PINCH SOLENOID IS INT, CHECK FOR STICKY RUBBER CUSHIONS AROUND CAPSTAN BEARINGS.
(JUST REMOVE CUSHIONS)



SPECIFICATIONS

* **Heads:**	Combination 3 heads Record/Playback: sendust/sendust x 1 Erase: sendust x 1
* **Drive Motor:** **Capstan Drive:** **Reel Drive:**	2 motors FG servo motor Compact DC motor
* **Tape Drive:**	Dual Capstan System
* **Operation:**	Feather Touch Logic Control Operation
* **Amplifier:**	Playback & Recording Amp . . . . . DC amp configuration
* **Wow & Flutter:**	no more than 0.04% (W.R.M.S.)
* **Frequency Response:**	20Hz ~ 18,000Hz (30Hz ~ 16,000Hz ±3dB) . . . LH tape 20Hz ~ 19,000Hz (30Hz ~ 17,000Hz ±3dB) . . . CrO_2 tape 20Hz ~ 20,000Hz (30Hz ~ 18,000Hz ±3dB) . . . METAL tape
* **Signal-to-Noise Ratio:**	better than 63dB (Dolby on) . . . . . LH tape better than 56dB (Dolby off) . . . . . LH tape better than 65dB (Dolby on) . . . . . CrO_2 tape better than 58dB (Dolby off) . . . . . CrO_2 tape better than 65dB (Dolby on) . . . . . METAL tape better tahn 58dB (Dolby off) . . . . . METAL tape
* **Overall Distortion:**	no more than 1.2% (LH tape, 1kHz, 0dB)
* **Input Sensitivity:**	line: 100mV mic: 0.25mV (recommended microphone impedance 600 ohms ~ 10k ohms)
* **Output Level:**	line: 580mV headphone: 1.5mW (8 ohms load)
* **Additional Features:**	14-dot Fluorescent Peak Level Indicator with Peak Hold function, Digital Tape Counter, Bias Fine Control, Dolby NR System (with HX position), Automatic Program Repeat (A.P.R.) System, Timer Recording/Playback function, Monitor Circuit, Remote Control (available with optional remote control box.)
* **Power Consumption:**	30W.
* **Dimensions:**	438(W) x 126(H) x 370(D)mm (17-1/4" x 4-9/16" x 14-9/16")
* **Weight:**	Net 11.5kgs (25.3 lbs.) Gross 13.0kgs (28.6 lbs.)

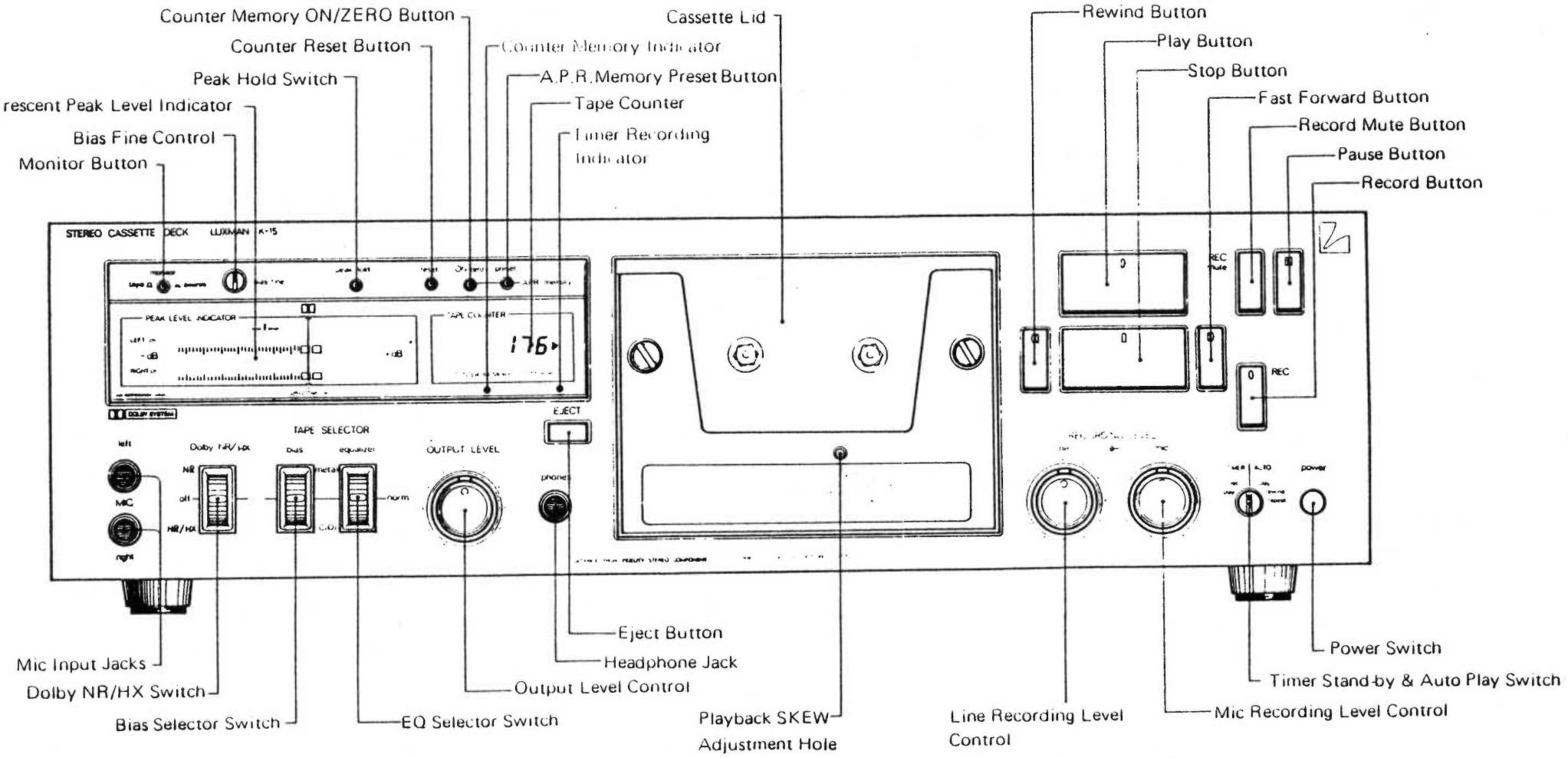
Specifications and appearance design subject to change without notice.

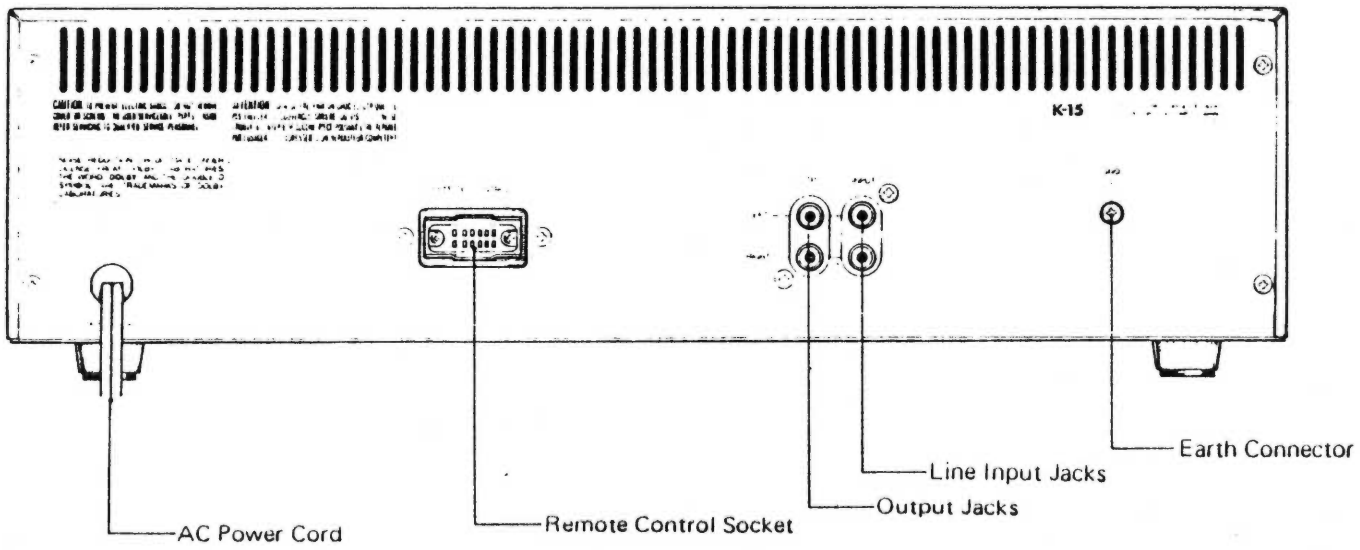
* NOISE REDUCTION CIRCUIT MADE UNDER LICENCE FROM DOLBY LABORATORIES. THE WORLD "DOLBY" AND THE DOUBLE-D SYMBOL ARE THE TRADE MARKS OF DOLBY LABORATORIES.

DESTINATION TABLE

MODEL K-15

	SK	SK.L	SG	EK	EZ	EC	EJ
Destination	Europe Asia	Sweden	England Austria New Zealand	Europe Asia	U. S. A.	Canada	Japan
Safety Standard	DEMKO BS SEV	SEMKO VDE	DEMKO BS SEV		UL LAA	CSA	EJA
Power Transformer	P – 0013			P – 0014			
Voltage Selector				Voltage Selector Plug P2120 – A (A–0009) Voltage Selector Socket M1625 (A–0008)			
Power Switch	SDG5P – E (S – 0016) SEMKO–Mark				SDG5P (S – 0014) UL.CSA–Mark	SDG1P (S–0033)	
Primary Fuse	T315 mA 250 V (SEMKO)				61M – 1A 250 V (UL.CSA)	1A 250 V	
Secondary Fuse		T315 mA 250Vx3 T1.25 A 250Vx4					
Fuse PCB	PCM – 037 Seal–1370	PCM – 038	PCM – 037 Seal–1370		PCM – 037		
Fuse Holder	S – N5053 (B – 0004)				S – N5051 (B – 0005)		
Line Condenser	PME265MA447 – 4700P (C – 0028)				DE7100FZ472P125VAC (C – 0027)		
Power Cord	C – 2 – 4610 (A – 0016)		VRF–777 (A–0025)	C–2–4610 (A–0016)	UL.CSA VW–1 (A–0026)		(A–0004)
MIC.LIN VOL Knob OUTPUT VOL Knob Lever Swtich Knob	Knob Set – 3010 Knob Set – 3007 Mold Knob – 1121	U. J			Knob Set – 3005 Knob Set – 3008 Mold Knob – 3009	Other	


Counter Memory ON/ZERO Button
Counter Reset Button
Peak Hold Switch
rescent Peak Level Indicator
Bias Fine Control
Monitor Button
Counter Memory Indicator
A.P.R. Memory Preset Button
Tape Counter
Timer Recording Indicator
Cassette Lid
Rewind Button
Play Button
Stop Button
Fast Forward Button
Record Mute Button
Pause Button
Record Button
STEREO CASSETTE DECK LUXMAN K-15
PEAK LEVEL INDICATOR
TAPE SELECTOR
OUTPUT LEVEL
EJECT
REC
Mic Input Jacks
Dolby NR/HX Switch
Bias Selector Switch
EQ Selector Switch
Output Level Control
Eject Button
Headphone Jack
Playback SKEW Adjustment Hole
Line Recording Level Control
Mic Recording Level Control
Power Switch
Timer Stand-by & Auto Play Switch


K-15
AC Power Cord
Remote Control Socket
Output Jacks
Line Input Jacks
Earth Connector

Adjustment Specifications

1. Scope of Description

These specifications are to illustrate in detail the adjustment procedures for the Cassette Deck K-15.

2. Test Instruments

Test instruments necessary for the adjustments are as follows:

1) Oscillator 2) Attenuator 3) AC voltmeter, 2ch

4) Frequency counter 5) Automatic distortion factor meter, 2ch

6) 1 KHz band pass filter

3. Playback Test Tapes

1) Azimuth adjustment : MTT-114, 10 KHz

2) Dolby level test : MTT-150, 400 Hz

3) Frequency response adjustment:

3,180 μsec + 120 μsec
MTT-216 (31.5 Hz - 14 KHz) or
MTT-215C (315 Hz, 10 KHz)

4) Frequency response test:

3,180 μsec + 120 μsec
MTT-216 or MTT-217L
(63 Hz, 315 Hz, 6.3 KHz, 10 KHz),
3,180 μsec + 70 μsec
MTT-316 (31.5 Hz - 14 KHz)

4. Recording Alignment Tapes

1) NORMAL position : TDK AC 222

2) CrO2 position : TDK AC 512

3) METAL position : TDK AC 702

5. Test Instrument Connections

1) Signal source impedance is 600 ohms.

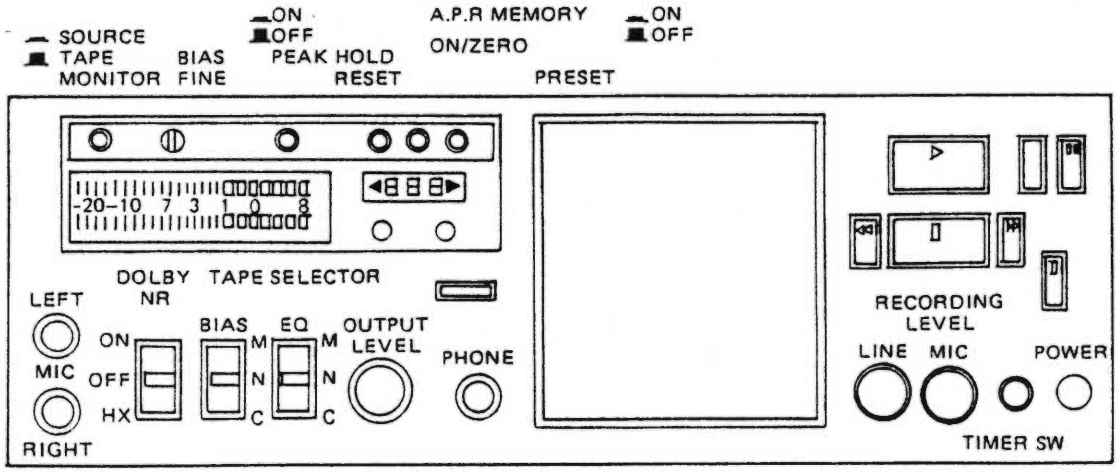
2) Deck output load is 47 K-ohms.

3) Headphone output load is 8 ohms.

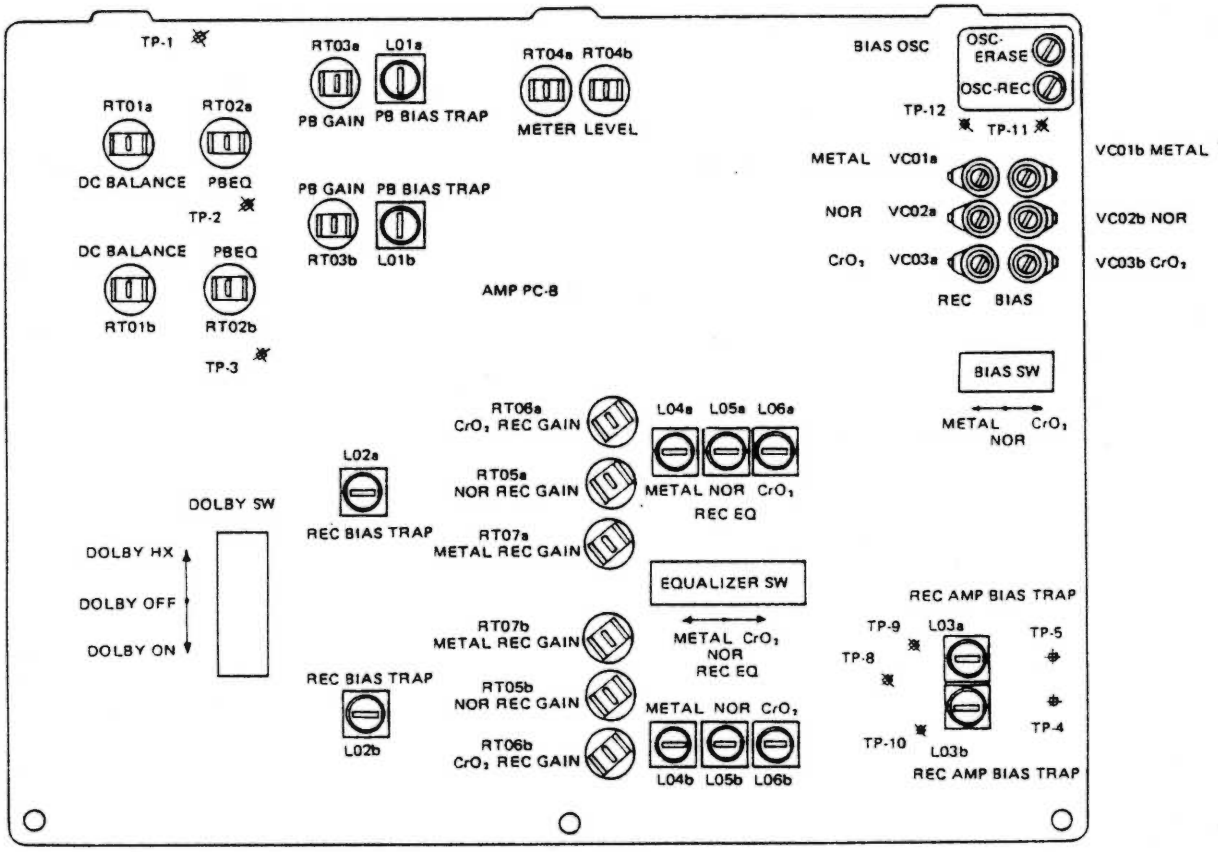
6. Decibel Definition

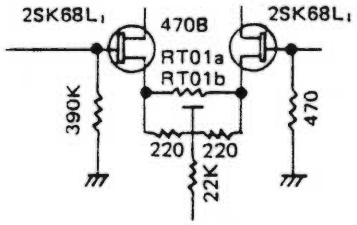
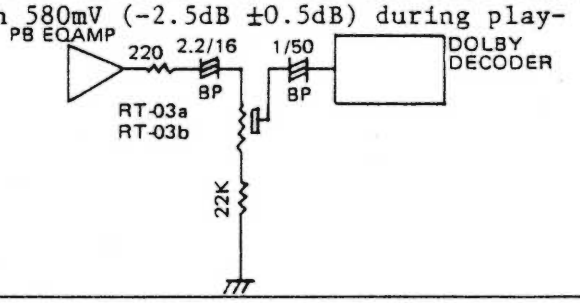
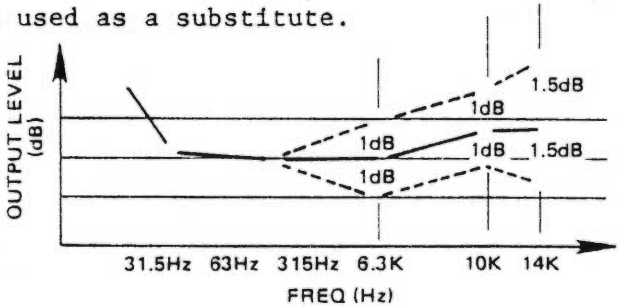
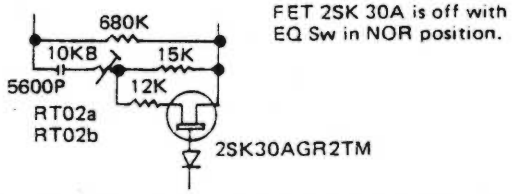
Zero dB is defined as 0.775 V.

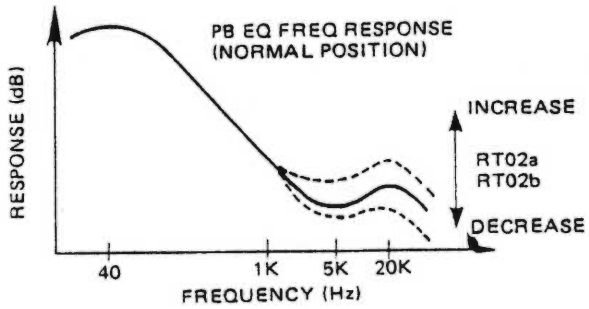
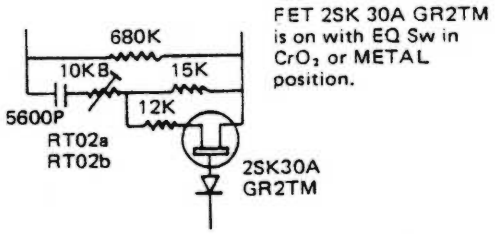
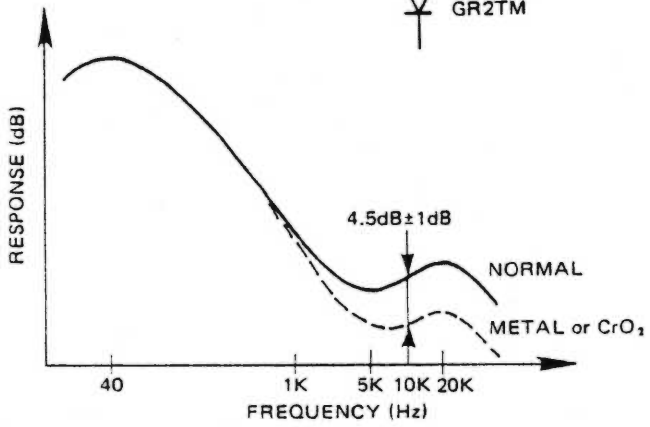
7. Deck Controls



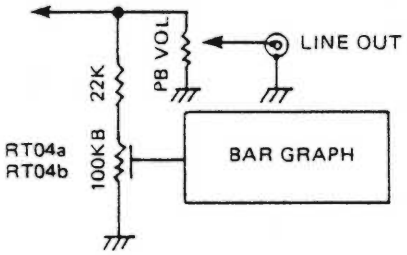
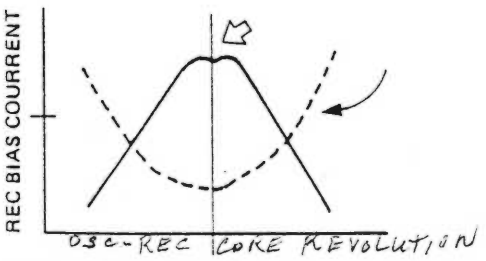
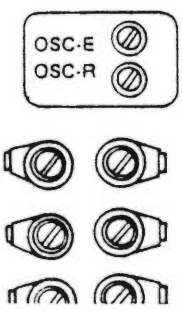
8. Adjusting and Test Points

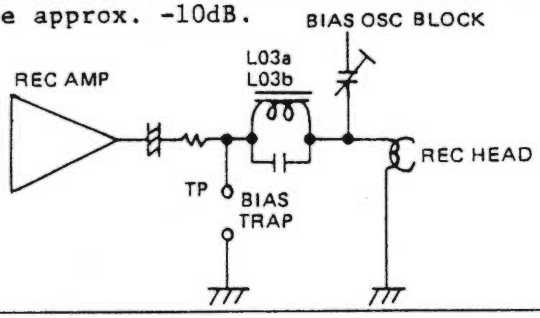
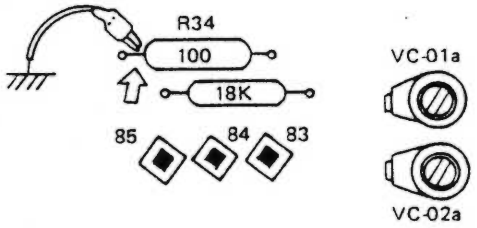


Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Playback Equalizer, Amp, and DC Balance Adjustments	Connect a DC oscillator, DC vacuum-tube voltmeter, or multi-meter to the test points, Lch (H) TP-1, Lch(E) TP-2, Rch(H) TP-3, Rch(E) TP-2, and adjust the semi-fixed resistors, Lch RT01a and Rch RT01b so that the drift center will fall within ±50mV. After all adjustments, check DC balance and adjust as necessary. 	[Adjusting Point] Lch RT01a Rch RT01b
Playback Dolby Level Adjustment	Set a Dolby level test tape MTT-150 (400Hz, 200nWb/m), and adjust the semi-fixed resistors, Lch RT03a and Rch RT03b so that the line output will reach 580mV (-2.5dB ±0.5dB) during playback. 	[Adjusting Point] Lch RT03a Rch RT03b [Mode] PLAY BUTTON ON OUTPUT VOL MAX MON SW TAPE EQ SW NOR DOLBY SW OFF
Playback Frequency Response Adjustment (NOR MODE)	Set a test tape MTT-215C (3,180μsec + 120μsec, 315Hz · 10KHz, -10dB), and adjust the semi-fixed resistors, Lch RT02a and Rch RT02b so that frequency response will be 0dB ± 1dB up at 10KHz with 315Hz as a reference. Next, set a test tape MTT-216 (3,180μsec + 120μsec), and check to see that the f-response falls within the range shown in the graph. If the f-response falls outside the range, readjust the semi-fixed resistors. Note that low-frequency f-response should be 31.5Hz +4.0/-0 dB, 63-250Hz ±2.0dB for 315Hz. A test tape MTT-217L (3,180μsec + 120μsec, 315Hz, 10KHz, 6.3KHz, 63Hz) may be used as a substitute.  	[Adjusting Point] Lch RT02a Rch RT02b [Mode] PLAY BUTTON ON OUTPUT VOL MAX MON SW TAPE EQ SW NOR DOLBY SW OFF

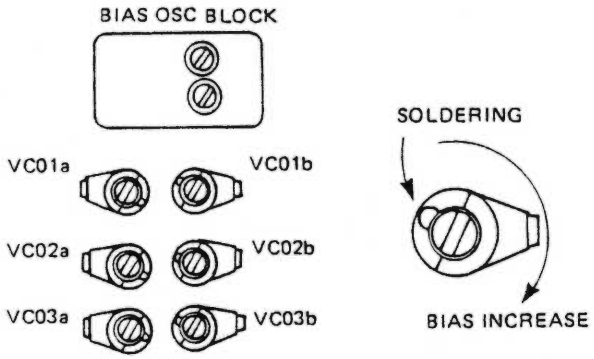
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
		
PB Frequency Response Check (CrO_2 or METAL position)	Set a test tape MTT-114 (3,180μsec + 120μsec, 10KHz, -10dB) and check to see that moving the EQ SW from NORMAL to METAL or CrO_2 will cause 10KHz output to decrease by 4.5dB ±1dB. A test tape MTT-215C (3,180μsec + 120μsec, 10KHz, 315Hz, -10dB) may be used as a substitute.  	[Mode] PLAY BUTTON ON OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF EQ SW NOR/CrO_2 or METAL
PB Muting Check	By playing back then stopping a blank tape, check to see that the line output will not produce any hiss and click.	[Mode] PLAY BUTTON ON/OFF OUTPUT VOL MAX MON SW TAPE EQ SW NOR DOLBY SW OFF

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
PB Noise Check	Play back a blank tape and check to see that the S/N and hum levels fall within the specified range. Noise Level NORMAL position : -51.0dB or less METAL/CrO_2 position : -52.0dB or less Hum Level Hum level shall meet the below specifications using a 500Hz low-pass filter. NORMAL position : -57dB or less METAL/CrO_2 position : -57dB or less	[Mode] PLAY BUTTON ON OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF EQ SW NOR/CrO_2 or METAL
PB Dolby Check	Play back a blank tape, and check to see that moving the Dolby Sw from OFF to ON position will cause a drop in hiss level.	[Mode] PLAY BUTTON ON OUTPUT VOL MAX MON SW TAPE EQ SW NOR DOLBY SW ON/OFF
Line Level Check	Apply a signal of 100mV (-17.8dB), 400Hz to the line input, and check to see that the line output level falls within 580mV (-2.5dB) ±1.5dB and that channel balance between Lch and Rch falls within 2dB.	[Mode] LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX MON SW SOURCE DOLBY SW OFF
MIC Level Check	Apply a signal of 0.25mV (-70dB), 400Hz to the MIC input, and check to see that the output level falls within 580mV (-2.5dB) ±3dB and that channel balance between Lch and Rch, within 3dB.	[Mode] LINE VOL MIN MIC VOL MAX OUTPUT VOL MAX MON SW SOURCE DOLBY SW OFF
SOURCE MON S/N Check	With the Line Vol at MAX and MIC Vol at MIN, the noise level of SOURCE MON shall fall below -70dB. With the MIC Vol at MAX and the Line Vol at MIN, the noise level of SOURCE MON shall fall below -43dB.	[Mode] OUTPUT VOL MAX MON SW SOURCE LINE VOL MAX/MIN MIC VOL MAX/MIN
Mixing Loss Check	Apply a signal of 100mV (-17.8dB), 400Hz to the line output, turn the Mic Vol from MIN to MAX, and check to see that the change in output level falls within ±1dB. Similarly apply a signal of 0.25mV (-70dB), 400Hz to the MIC input, turn the Input Line Vol from MIN to MAX, and check to see that the change in output level falls within ±1db	[Mode] OUTPUT VOL MAX MON SW SOURCE DOLBY SW OFF LINE VOL MAX/MIN MIC VOL MAX/MIN

Adjustment and Check_Items	Adjusting Procedure	Adjusting Point/Mode
Meter Adjustment (bar graph adjustment)	Apply a signal of approx. 100mV (-17.8dB), 400Hz to the line input, and move the Line Vol until a 580mV (-2.5dB) output develops at the line output. At this point, further microadjust Lch RT04a and Rch RT04b so that the meter will register -1dB when the attenuator reduces the output by 0.6dB. Next restore the line output to 580mV (-2.5dB), operate the attenuator until the output level reaches -3.5dB and -1.5dB, and then check to see that the meter registers -1dB and +1dB respectively. 	[Adjusting Point] Lch RT04a Rch RT04b [Mode] OUTPUT VOL MAX MON SW SOURCE DOLBY SW OFF MIC VOL MIN LINE VOL VARIABLE
Meter Peak Hold Check	Apply a 400Hz signal to the line input, depress the Peak Hold Sw for each of the meter's seven dots ranging from -1dB to +8dB, and check to see that meter pointer is held at each depression of the Peak Hold Sw. In doing this check, use the attenuator to change the input level.	[Mode] LINE VOL MAX OUTPUT VOL MAX MON SW SOURCE
Headphone Output Level Check	Apply a 400Hz signal to the line input, and adjust the Line Vol until the output reaches 580mV (-2.5dB). At this point, connect an 8-ohm load to the headphone output, and check to see that the output level falls within 0.14V (-15dB) ±2.0dB.	[Mode] OUTPUT VOL MAX MON SW SOURCE DOLBY SW OFF
Bias OSC Block Adjustment	Connect a frequency counter to the test points, TP-11(H) and TP-12(E). Set a blank tape, depress the REC/PLAY button, then rotate the OSC block core "OSC-ERASE" until oscillation frequency falls within 105KHz ±0.5KHz. Next, connect the AC voltmeter to Lch TR-5(H), Lch TP-8(E), Rch TP-4(H), and TP-8(E), and adjust the bias OSC block core "OSC-REC" so that bias current reaches a peak. Rotate the core until bias current causes a drop of about 0.1 dB at the center of the curve.  	[Adjusting Point] Lch L03a Rch L03b [Mode] REC/PLAY BUTTON ON (with tape set) BIAS SW METAL DOLBY SW OFF

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Adjusting Bias Trap of Recording Amp	Connect an AC voltmeter to the test points, Lch TP9(H),Lch TP-8(E), Rch TP-10(H), and TP-8(E), and adjust the bias trap coils, Lch L03a and Rch L03b to a minimum of bias leakage. If a recording bias current is 1.3mA, bias leakage will be approx. -10dB. 	[Adjusting Point] Lch L03a Rch L03b [Mode] REC/PLAY ON (with tape set) BIAS SW METAL DOLBY SW OFF
Recording Equalizer Adjustment	Connect an AC voltmeter to the test points, Lch TP-5(H), Lch TP-8(E), Rch TP-4(H), and Rch TP-8 (E). Then, to shut off recording bias, ground the resistor R34 with a clip lead.  Next, apply a 10mV (-37.8dB) signal to the line input, and adjust the recording equalizer coils, Lch METAL L04a, Lch NOR L05a, Lch CrO_2 L06a, Rch METAL L04b, Rch NOR L05b, and Rch CrO_2 L06b so that the peak frequency of the recording equalizer reaches the specified level at each setting of EQ SW (Tape position). Tape Selector Sw (EQ. Bias) / Recording Equalizer Peak Frequency METAL 23 KHz NORMAL 20 KHz CrO_2 20 KHz	[Adjusting Point] Lch Rch MATAL L04a, L04b NOR L05a, L05b CrO_2 L06a, L06b [Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX DOLBY SW OFF BIAS SW · EQ SW NOR/CrO_2/METAL

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Recording Bias Adjustment	Apply a signal of 1KHz -10mV (-37.8dB) to the line input, record the signal at each tape selector position, change bias from High to Low by turning the recording bias control trimmers until an appropriate bias is achieved for each tape selector position. The trimmers are to be set at the positions shown below.	[Adjusting Point] Lch Rch METAL VC01a VC01b NOR VC02a VC02b CrO_2 VC03a VC03b

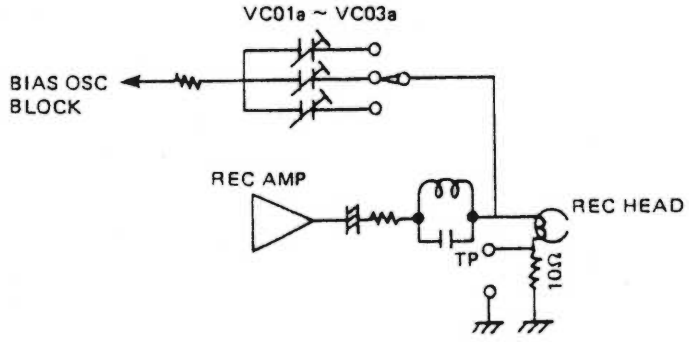


Tape Selector (EQ. Bias) | Tape | Bias Point

Tape Selector (EQ. Bias)	Tape	Bias Point
METAL	TDK-AC702	Peak
NORMAL	TDK-AC222	Peak
CrO_2	TDK-AC512	Peak

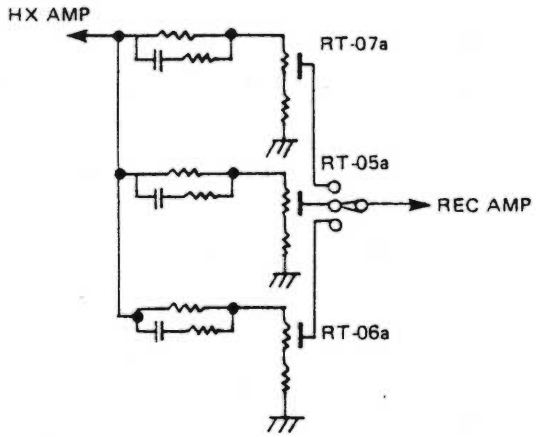
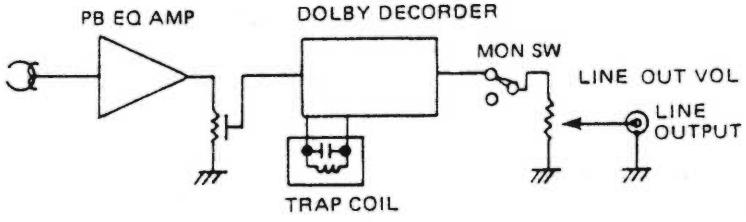
Next, connect an AC voltmeter to the test points, Lch TP-5(H), Lch TP-8(E), Rch TP-4(H), and Rch TP-8(E), and check to see that the following outputs develops with the tape selector switch in respective positions. At this point, no signals are applied to the line and MIC inputs.

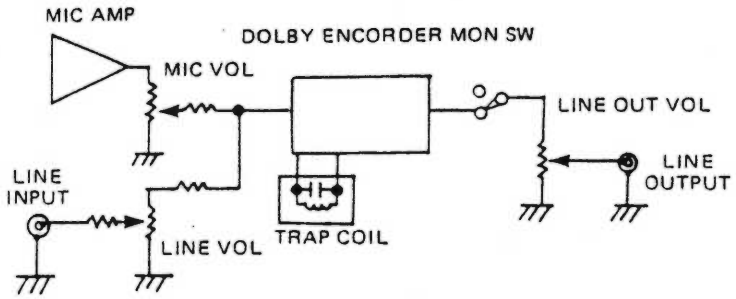
Tape Selector (EQ. Bias)	Standard Bias Current	Range
NORMAL	6.7mV(670μA)	5.3mV∿ 8.2mV
CrO_2	8.7mV(870μA)	7.0mV∿ 10mV
METAL	13mV(1300μA)	11mV∿ 16mV

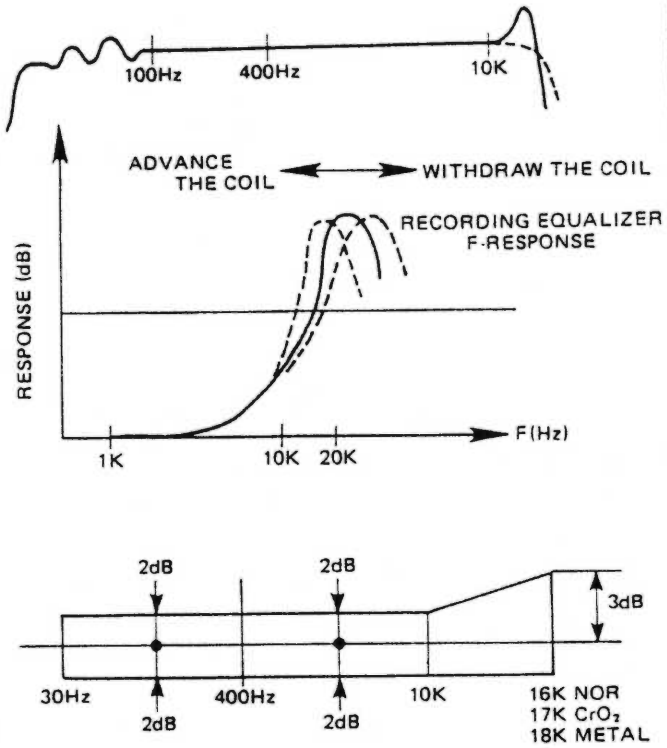


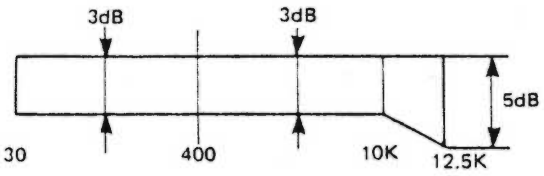
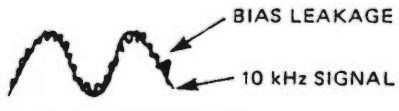
[Mode]

REC/PLAY BUTTON	ON
LINE VOL	MAX
MIC VOL	MIN
OUTPUT VOL	MAX
MON SW	TAPE
DOLBY SW	OFF
BIAS FINE	CENTER
BIAS SW · EQ SW	NOR/CrO_2/METAL

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Recording Gain Adjustment	Apply a signal of approx. 400Hz 100mV (-17.8dB) to the line input, set the MON Sw at SOURCE, and adjust the Line Vol until the line output reaches 580mV (-2.5dB). Next, depress the REC/PLAY button, and adjust the points, Lch METAL RT07a, Lch NOR RT05a, Lch CrO_2 RT06a, Rch METAL RT07b, Rch NOR RT05b, and Rch CrO_2 RT06b so that playback output of 580mV (-2.5dB ±0.5dB) will be obtained.  The above recording gain adjustment should be made again after record/play f-response adjustment has been made.	[Adjusting Point] Lch Rch METAL RT07a RT07b NOR RT05a RT05b CrO_2 RT06a RT06b
REC MUTE Check	Apply a signal of 400Hz 100mV (-17.8dB) to the line input, depress the REC/PLAY button with an alignment test tape set at NORMAL position, and check to see that a depression of the REC MUTE button will provide a muting effect. At this point, make sure that ON-OFF control of the REC MUTE button will produce no obvious clicks.	[Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX DOLBY SW OFF EQ SW NOR BIAS SW NOR REC MUTE BUTTON ON/OFF
PB Bias Trap Adjustment	Depress the REC/PLAY button with a metal tape without applying any signals, and check to see that bias leakage falls below -50dB at the line output. If it exceeds -50dB, adjust the bias trap coils, Lch L01a and Rch L01b.  	[Adjusting Point] Lch L01a Rch L01b [Mode] REC PLAY BUTTON ON OUTPUT VOL MAX LINE VOL MAX MIC VOL MIN MON SW TAPE DOLBY SW OFF BIAS FINE CENTER EQ SW METAL BIAS SW METAL

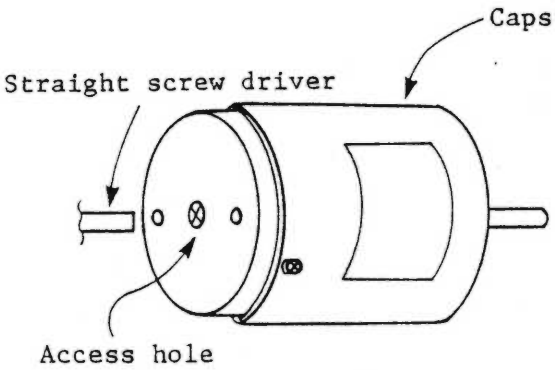
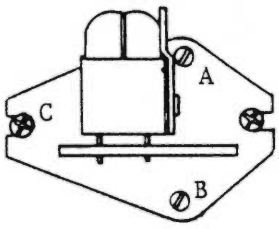
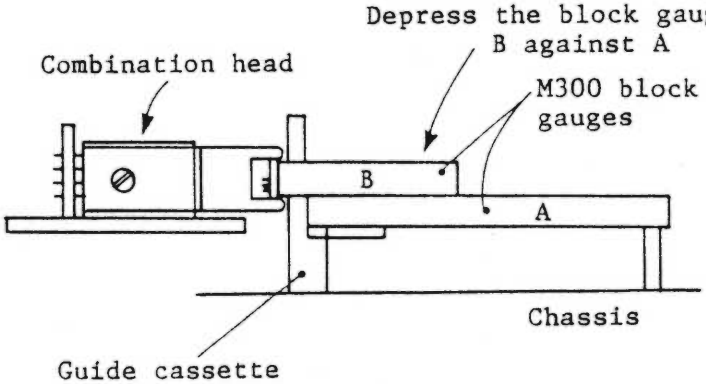
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
SOURCE MON Bias Trap Adjustment	Depress the REC/PLAY button with a metal tape without applying any signal, and check to see that bias leakage falls within -50dB, adjust the bias trap coils, Lch L02a and Rch L02b.  	[Adjusting Point] Lch L02a Rch L02b [Mode] REC/PLAY BUTTON ON OUTPUT VOL MAX LINE VOL MAX MIC VOL MIN MON SW SOURCE DOLBY SW OFF BIAS FINE CENTER EQ SW METAL BIAS SW METAL
Recording /Playback F-response Adjustment	Apply a signal of 400Hz 7mV (-40.8dB), lower than the meter test level of 160nWb/m by 20dB, to the line input, depress the REC/PLAY button with each of the three types of tapes, and adjust f-response to the specified level for each tape. The reference frequency is 400Hz. [IMPORTANT] In the REC/PLAY monitor mode, a signal propagation from the recording head to the playback head at higher than 10KHz will cause an 1dB increase in f-response. Thus recording then rewinding the tape will eliminate this increase in f-response. In addition, this signal propagation will cause the high-frequency REC/PLAY output to fluctuate. To excecute the adjustment, first set the tape selector Sw at the position identical with the type of tape being used, and then record the prescribed level of signal. If the recording equalizer and bias are preset properly, f-response must fall within ±2dB at lower than 10KHz and within approx. ±6dB at approx. 10KHz. In order to accommodate f-response within ±2dB at higher than 10KHz, lock the recording equalizer which controls recording bias. In the event that the f-response becomes the same as shown in the below graph after recording bias is adjusted, the f-response curve shown in the dotted line may be achieved by properly withdrawing the recording equalizer adjusting coil. If the need for raising the recording f-response arises, the method of advancing the recording equalizer coil should be preferably avoided but that of controlling the bias be adopted.	[Adjusting Point] REC Bias Lch Rch METAL VC01a VC01b NOR VC02a VC01b CrO_2 VC03a VC03b REC EQ Lch Rch Metal L04a L04b NOR L05a L05b CrO_2 L06a L06b [Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF BIAS FINE CENTER

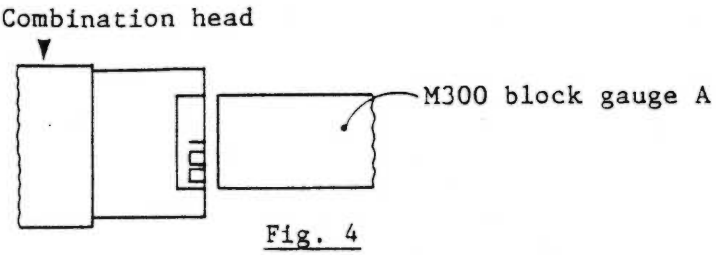
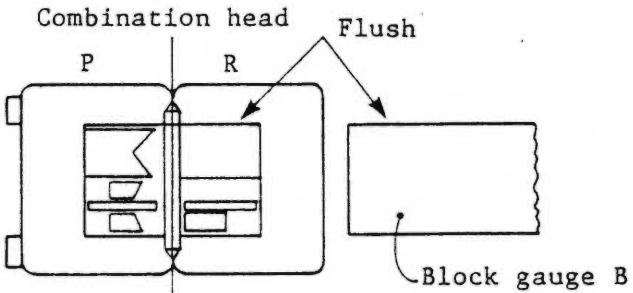
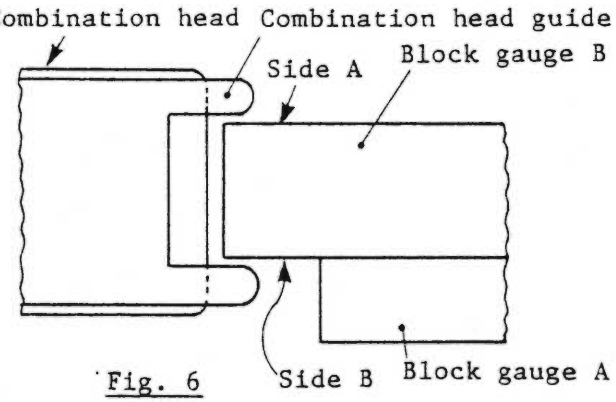
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
	 After REC/PLAY f-response is adjusted, the recording gain adjustment shall be made again.	
Distortion Factor Check	Apply a signal of 1KHz, 70mV (-20.8dB) (ME TER test level 160nWb/m to the line input, and depress the REC/PLAY button with each of the three types of tapes. If distortion factor e exceeds 1.4%, increase the bias, and readjust the record/play f-response.	[Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF BIAS FINE MAX/MIN
Bias Fine Vol Check	Apply a signal of 7mV (-40.8 dB) less than 400 Hz, 100mV (-17.8 dB) by 23 dB. Next set a normal alignment tape, depress the REC/PLAY button, then, while rotating the Bias Fine Vol from MIN to MAX, check to see that a change of ±2 dB or more will occur.	[Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF BIAS FINE MAX/MIN

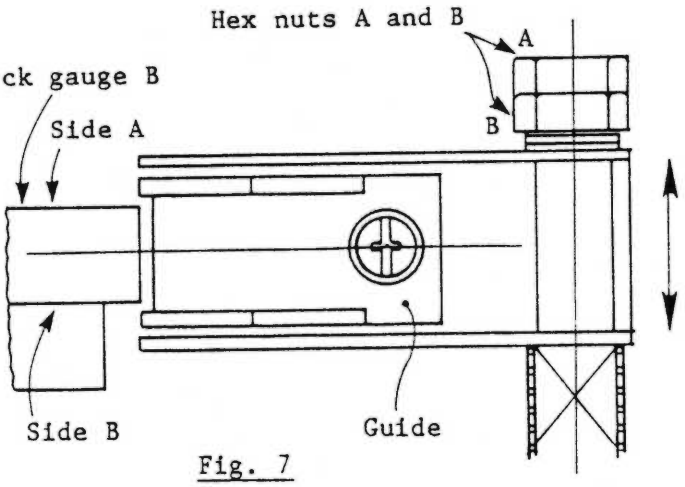
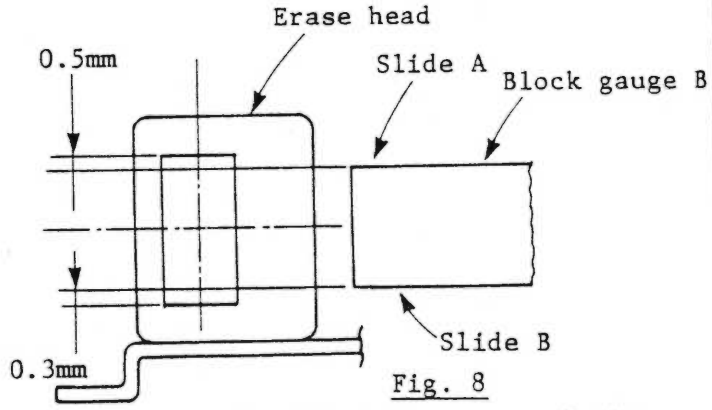
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
REC Dolby Record/Play F-response Check	Apply a signal of 5.6mV (-42.8dB) lower than 400Hz, 100mV (-17.8dB) by 25dB. Next, after setting each of the three types of tapes, depress the REC/PLAY button, and check to see that the specified f-response is achieved with each of the tapes. Reference frequency is 400Hz.  NOR. CrO_2 METAL	[Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX DOLBY SW ON BIAS FINE CENTER MON SW TAPE
Dolby Hx Reference Voltage Adjustment	Connect a DC voltmeter across No.8 pin (H) and No.14 pin (E) of Hx PC-B, and adjust RT02, RT01 and RT03 so that setting Tape Selector at NOR, CrO_2 and METAL will develop 5V, 6V and 13V respectively.	[Adjusting Point] Tape Selector (EQ, Bias) NOR RT02 CrO_2 RT01 METAL RT03
Dolby Hx Recording Equalizer Check	Apply a signal os approx. 400Hz, 100mV (-17.8dB) to the line input, and set the Line Vol at a point where 580mV (-2.5dB) will develop at the line output with the MON Sw and Dolby Sw both off. Next, connect an AC voltmeter to the test points, Lch TP-9(H), Lch TP-8(E), Rch TP-10(H), and Rch TF-8(E), and increase the signal level from 400Hz to one of the below specified frequencies. Then check to see that the following changes in output level can be obtained by moving the Dolby SW from the ON position to Hx position, depending on the type of tape being set. Position / f(HZ) / Dolby ON → Dolby Hx NOR / 10KHZ / approx. 4.5dB down CrO_2 / 10KHZ / approx. 4.5dB down METAL / 14KHZ / approx. 2.5dB down	[Mode] REC/PLAY BUTTON ON LINE OUT VOL MAX MIC VOL MIN LINE VOL VARIABLE MON SW SOURCE DOLBY SW OFF/ON/HX
	The AC voltmeter's output is approx. -4dB for NOR, 0dB for METAL, and -2dB for CrO_2. Remember that if the recording bias tape adjustment is not proper, the bias current and the signal will superimpose, making it impossible to measure.  MEASURING WAVEFORM	

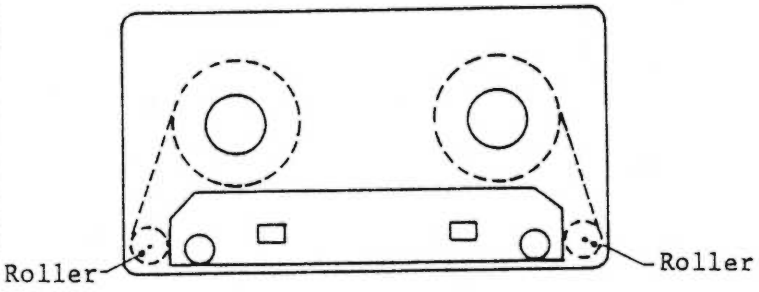
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Dolby Hx Recording Bias Check	Apply a signal of approx 400Hz, 100mV (-17.8dB), set the MON Sw at SOURCE, and the Dolby Sw at OFF, and adjust the Line Vol so that 580mV (-2.5dB) output develops at the line output. Next, connect an AC voltmeter to the test p points, Lch TP-5(H), Lch TP-8, Rch TP-4(H), and Rch TA-8(E), increase the signal level from 400Hz to 20KHz, and depress the REC/PLAY button with a blank tape. Then, while depressing the REC MUTE button, check to see that moving the Dolby Sw from the ON position to the Hx position will cause the bias current to drop to 60% with the Dolby ON level as 100%.	[Mode] REC/PLAY BUTTON ON OUTPUT VOL MAX LINE VOL VARIABLE MIC VOL MIN BIAS FINE CENTER REC MUTE ON MON SW TAPE/SOURCE DOLBY SW OFF/ON/HX
Dolby Hx Record/Play F-Response Check	Apply a signal of approx. 400 Hz, 100mV (-17.8 dB) to the line input, increase the signal level to 10 kHz, then depress the REC/PLAY button. At this point, by switching the Dolby Sw from ON to Hx position, check to see that the output will change as follows: TAPE SELECTOR POSITION — DOLBY ON → DOLBY HX NOR — approx. 4.5 dB up CrO_2 — approx. 4.5 dB up METAL — No change	[MODE] REC/PLAY BUTTON ON LINE VOL VARIABLE MIC VOL MIN OUTPUT VOL MAX BIAS FINE CENTER MON SW TAPE/SOURCE DOLBY SW OFF/ON/HX
Record Play Noise Level Check	Record with respective tapes without applying any signal, and check to see that the record/play noise and hum levels fall within the specified limits. Noise Level NORMAL position : -50.5dB or lower METAL/CrO_2 position : -51.5dB or lower Hum Level A 500Hz low-pass filter is used. NORMAL position : -56dB or lower METAL/CrO_2 position : -56dB or lower	
Erasing Coefficient Check	Apply a signal of 316mV (-7.8dB) higher than 1KHz, 100mV (-17.8dB) by 10dB, and perform recording with a metal tape. Next, after rewinding and erasing it, measure the erasing coefficient through a 1KHz-band-pass filter. The measurement shall be 65dB or higher.	[Mode] REC/PLAY BUTTON ON LINE VOL MAX MIC VOL MIN OUTPUT VOL MAX MON SW TAPE DOLBY SW OFF
Play Action Check	Check to see that the reels do not reverse momentarily at play rise at the start of tape winding. Also check to see that the reels do not reverse momentarily at play fall at the end of tape winding. [Note] It is recommended to mark the test cassette reels as shown in the sketch to ensure easy check for reel reversal.	Visual Check STOP → PLAY PLAY → STOP

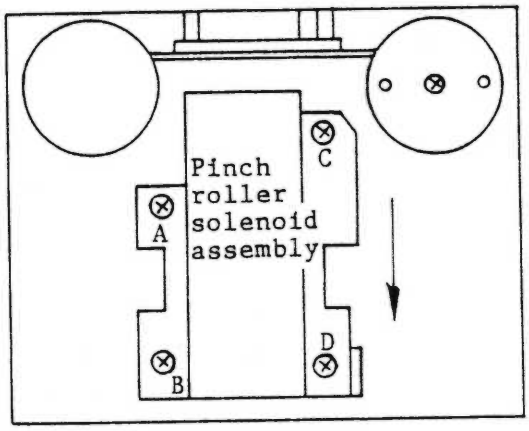
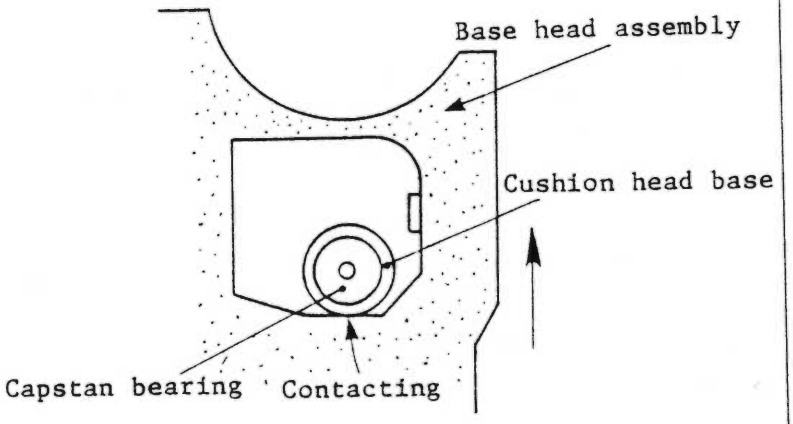
Adjustment and Check_Items	Adjusting Procedure	Adjusting Point/Mode
REC Action Check	Check to see that the left reel backs off 1/8 to 1/4 revolution at the end of tape winding when the REC STOP button or the PAUSE button is depressed.	Visual Check REC → STOP REC → PAUSE ON
Erasing Failure Check after Switching Back and Forth between REC and PAUSE	Record a 1KHz signal on a tape, and repeat switchover between REC and PAUSE at both the start and end of tape winding without applying any signal. Then play it back and check to see that there is no erasing failure on the tape.	Hearing Test REC MODE TAPE MONITOR PAUSE ON/OFF
REC Mute Timing Check	(1) When in the STOP → REC mode, record a 1KHz signal on the leading portion of the REC mute timing tape, then play it back and check to see there is no hunting at the signal rise. (2) Check to see that depressing the REC MUTE key will immediately effect muting.	Hearing Test STOP → REC TAPE MONITOR REC

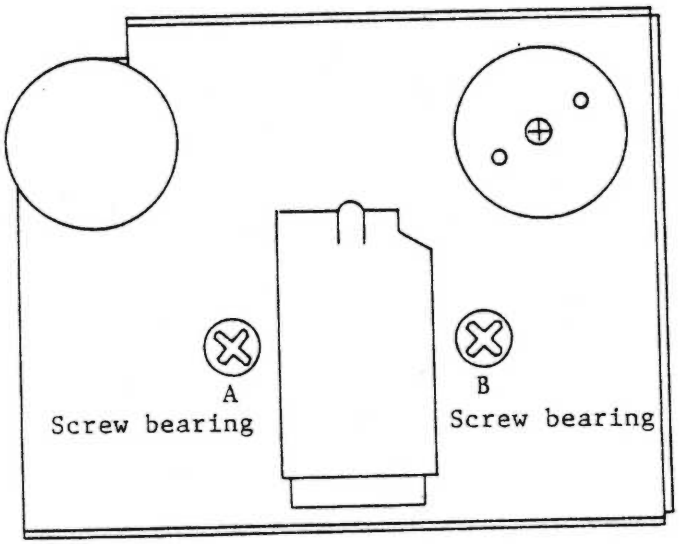
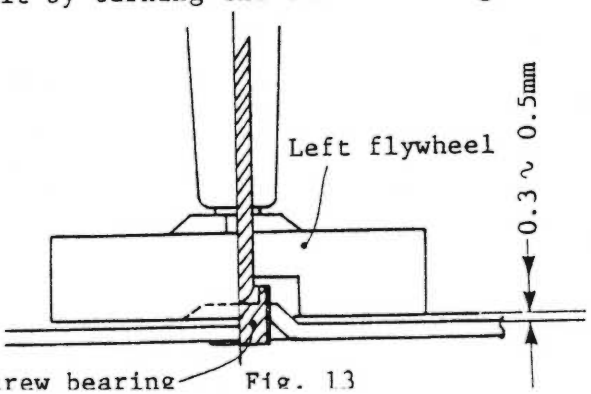
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
Tape Speed Adjustment	Determine tape speed while playing back a recorded MTT-111 test tape (3KHz). Adjust tape speed by turning the semi-fixed resistor with a small straight screw driver (like a clock screwdriver). To gain access to the semi-fixed resistor, the screwdriver should be inserted into the hole on the back of the capstan motor housing. In doing this adjustment, set the tape position selector at 2,990Hz to start tape winding. [IMPORTANT] The capstan motor stabilizes after one hour of run because it has an approx. 20Hz drift. Thus when tape speed is measured on a machine which has run more than one hour, the semi-fixed resistor must be adjusted for 3,000Hz output.  Fig. 1	Adjust the semi-fixed resistor of the capstan motor.
Head Adjustment	Rough-adjust the head with M300 head adjusting block gauges.  Fig. 2 Combination head assembly  Fig. 3 How to use the block gauges	Fig. 2: Screw B for tilt adjustment Screw C for azimuth adjustment Screw A, B, and C for track adjustment Apply the block gauges A and B while depressing the gauge B tightly against the gauge A.

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
1. Combination Head Rough-Adjustment	A. Tilt adjustment  Fig. 4	
	To do tilt adjustment, set the block gauges A and B as shown in Fig. 3, and turn the screw B until the combination head face goes parallel with the front end of the M300 block guage A. Check visually for parallelism.	Screw B in Fig. 2
	B. Azimuth adjustment  Fig. 5	
	To do azimuth adjustment, turn the screw C shown in Fig. 2 until the arrow pointed plane of the combination head goes flush with that of the block gauge B as shown in Fig. 5.	Screw C in Fig. 2
	C. Track adjustment  Fig. 6	
	The combination head track adjustment should be made in the following manner: Turn the screws A, B and C shown in Fig. 2 the combination head guide is spaced evenly away from both sides A and B of the block gauge B.	Screws A, B and C in Fig. 2

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
2. Pinch Roller Guide Track Adjustment	 Fig. 7 To adjust the pinch roller guide track, turn the hex nut A in Fig. 7 until the pinch roller guide is spaced evenly away from both sides of the block gauge B. After adjustment, tighten the hex nut A against B fully and apply a screw lock compound to the hex nuts A and B. [IMPORTANT] To loosen and tighten the hex nuts, use two wrenches at a time, one for clamping the nut B and the other for tightening or loosening the nut A. Otherwise the pinch roller shaft might be subjected to an excessive force, thus causing the pinch roller pressure to be lost.	Hex nuts A and B in Fig. 7
3 Erase Head Track Check and Adjustment	 Fig. 8 To check the erase head height, approach the block gauge B to the erase head as shown in Fig. 8 and determine the clearances as shown in Fig. 8. If the clearance between the erase head and the side A of the block gauge B is 0.3 or 0.2mm, place two polyslider washers 0.15mm in thickness and 2mm in diameter one at a point under the erase head mount. Remember that this adjustment is not necessary unless an actual record/play test proves erasing performance to be poor.	Check visually. If adjustment is necessary, use polyslider washers.

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
4. Tape Travel Check	 Fig. 9 Skew half [NOTE] A skew half has an opening through which the travelling tape can be seen and contains no guide poles, making it possible to inspect the direct influence of the head, capstan shaft, and pinch roller on the tape. Using a skew half, check the following points for tape travelling conditions. [CHECK POINTS] A. Pinch roller guide Check to see if the tape is forced up and down by the pinch roller guide, thereby being curled by or impinged against it. It does not matter if the tape runs almost on the center of the guide and sometimes gets in slight contact with the guide due to external distrubances. B. Combination head guide Check to see if the tape is forced up and down by the combination head guide, thereby being curled by or impinged against it. It does not matter if the tape runs almost on the center of the guide and sometimes gets in slight contact with the guide due to external disturbances. [NOTE] How to adjust the combination head without the availability of M300 block gauges. Using a skew half, adjust the combination head. A. Pinch roller guide adjustment Follow the above check point A, and if necessary, align the pinch roller guide to the tape path (instead of the block gauge B) as shown in the Item 2 "Pinch roller guide track adjustment"	Hex nuts A and B in Fig. 7

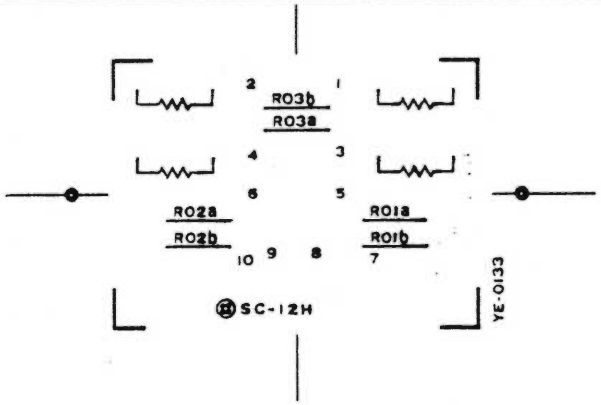
Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
5. Electrical Adjustments of Combination Head	B. Combination head adjustment Follow the check points B in Item 4, and if necessary, execute tilt, azimuth and track adjustments by moving the screws shown in Fig. 2 (refer to "Combination head rough-adjustment" in Item 1) while carefully observing the combination head position relative to tape path. At this point, use a tape in a skew half as an alignment reference as a M300 block gauge is not available.	Screws A, B and C in Fig. 2
	Azimuth adjustment: Play back a recorded test tape TEAD MTT114 (10KHz) and turn the screw C in Fig. 2 until the maximum output level is achieved both in the right and left channels.	Screw C in Fig. 2
Pinch Roller Solenoid Adjustment	 Fig. 10 Back view of the mechanism (1)  Fig. 11	

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
	Loosen the screws A, B, C and D to allow the pinch roller solenoid assembly to move up and down, and then energize the solenoid. Next, depress the pinch roller solenoid assembly (in the direction of the arrow Fig. 10) to an extent where the base head assembly will come in slight contact with the cushion head base. Finally, tighten the screws A, B, C and D on the pinch roller solenoid assembly. [NOTE] Be sure neither to leave any gap between the base head assembly and the cushion head base nor to force the former excessively against the latter. After tightening the screws A, B, C and D, energize the solenoid and make sure that the base head assembly is in good contact with the cushion head base.	Screws in Fig. 10 "Rear view of the mechanism"
Flywheel Thrust Play Adjustment	 Fig. 12 Rear view of the mechanism (2) A. Right flywheel thrust play adjustment (when seen from the front with the mechanism upright). The right flywheel thrust play should be between 0.1 and 0.3mm. If it falls outside the range, adjust it by turning the screw bearing A in Fig. 12.	Screw bearing A in Fig. 12
	 Fig. 13	

Adjustment and Check Items	Adjusting Procedure	Adjusting Point/Mode
	B. Left flywheel screw bearing adjustment (when seen from the front with the mechanism upright) The left flywheel screw bearing should be adjusted as illustrated in Fig. 13 (adjustment range 0.3 to 0.5mm).	Turn the screw bearing B in Fig. 12

BILL OF MATERIAL PCM – 033 VOL PCB Ass'y

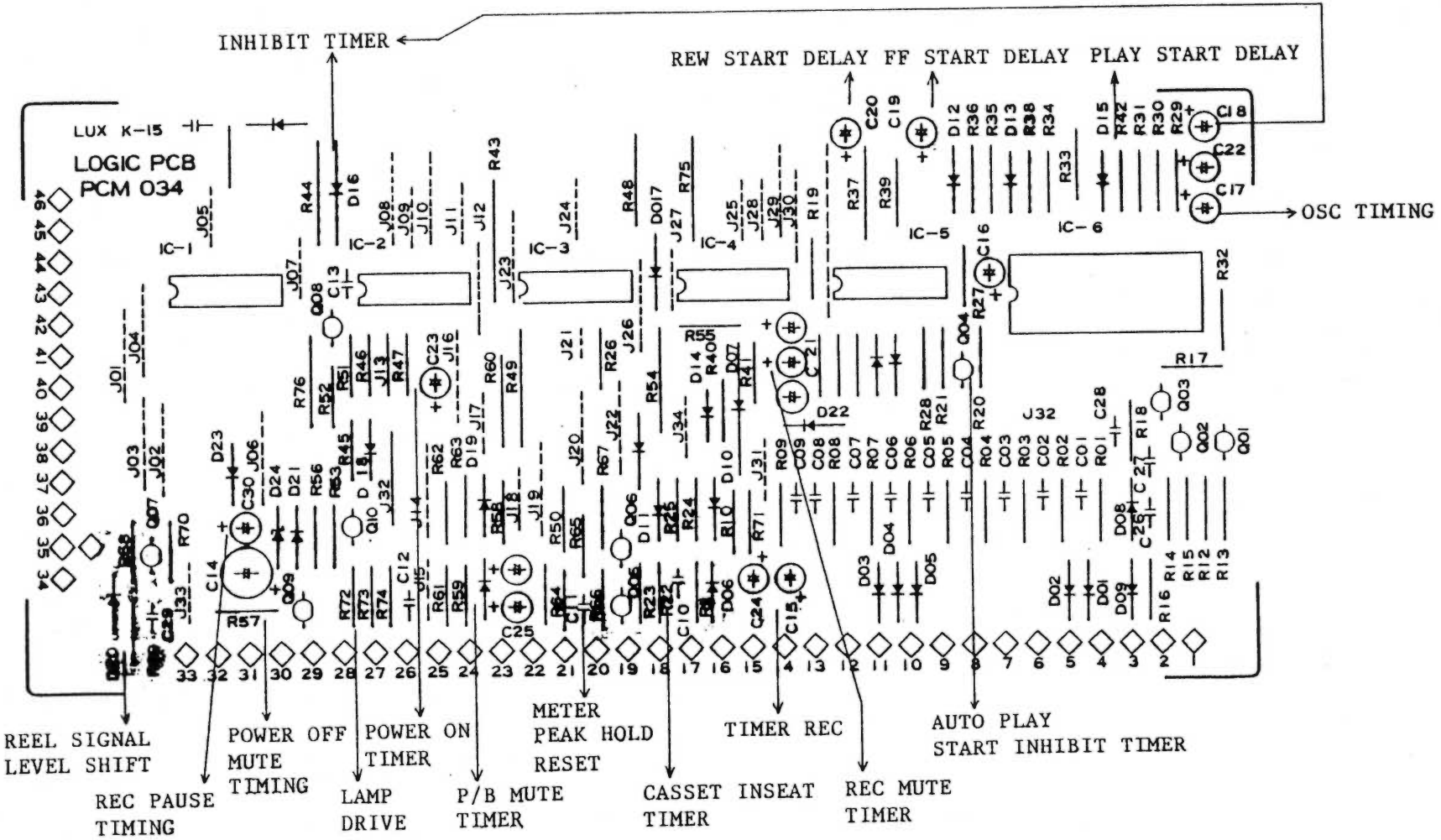
SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	V – 0010	Volume	DM20R748A–10KBX2	16φ–10KBX2	1
	V – 0011	Volume	DM20R748A–50KBX2	16φ–50KBX2	1
R01a, b	R – 0016	Carbon Resistor	CR25–223J	¼W 22K	2
R03a, b	R – 0016	Carbon Resistor	CR25–183J	¼W 18K	2
R02a, b	R – 0016	Carbon Resistor	CR25–103J	¼W 10K	2

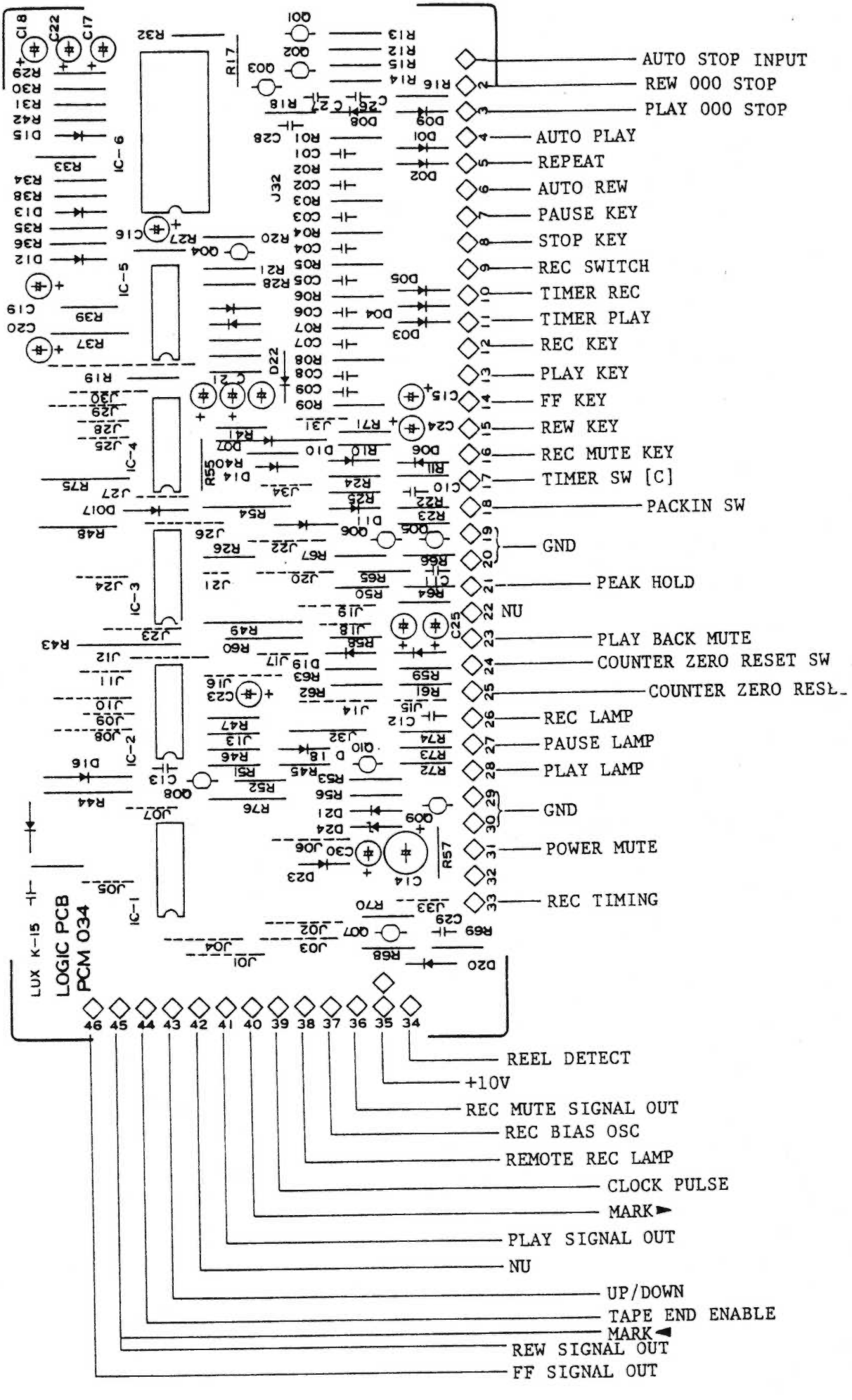


BILL OF MATERIAL PCM – 034 LOGIC PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
IC1, 4	IC – 0019	IC MM74C00N			2
IC2, 5	IC – 0019	IC MM74C04N			2
IC3	IC – 0018	IC MM74C08N			1
IC6	IC – 0023	IC TC9121P			1
D01 ~ 19	T – 0041	Silicon Diode	1N4448		22
D21 ~ 23	or T – 0053		or 1S1588		
D24	T – 0050	Zener Diode	RD7.5EB3		1
D20	T – 0050	"	RD3.6EB1		1
Q01 ~ 09	T – 0027	Transistor	2SC1815GR		9
Q10	T – 0028	"	2SA1015GR or Y		1
C01 ~ 12	C – 0015	Ceramic Capacitor	DD107F103Z50	0.01μ/50V	16
C26 ~ 29					
C13	C – 0012	"	DD312–950BC104Z25	0.1μ/25V	1
C14	C – 0003	Electrolytic Capacitor	SM16VB–100	100μ/16V	1
C15	C – 0003	"	SM16VB–33	33μ16V	1
C16, 18	C – 0024	"	CE04W1C100MD	10μ/16V	6
C23 ~ 25, C30					
C17	C – 0024	"	CE04W1H010MD	1μ/50V	1
C19 ~ 22	C – 0024	"	CE04W1E4R7MD	4.7μ/25V	4
R01 ~ 09	R – 0016	Carbon Resistor	CR25–399J	¼W 39ΩJ	10
R61					
R10~15, 20~23, 36, 38, 40, 42, 44, 62, 66, 67	R – 0016	"	CR25-104J	¼W 100KJ	18

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
R16, 69	R – 0016	Carbon Resistor	CR25–223J	¼W 22KJ	2
R17, 18, 71	R – 0016	"	CR25–224J	¼W 220KJ	3
R19, 26, 28, R31 ~ 35, R37, 39, 41, R43, 46, 49, R51 ~ 55, R63, 70, 75	R – 0016	"	CR25–103J	¼W 10KJ	22
R24, 48, 59, R60, 64, 65 R72 ~ 74	R – 0016	"	CR25–109J	¼W 10ΩJ	9
R25	R – 0016	"	CR25–124J	¼W 120KJ	1
R27, 50	R – 0016	"	CR25–474J	¼W 470KJ	2
R29, 68	R – 0016	"	CR25–563J	¼W 56KJ	2
R30	R – 0016	"	CR25–102J	¼W 1KJ	1
R45	R – 0016	"	CR25–334J	¼W 330KJ	1
R47	R – 0016	"	CR25–824J	¼W 820KJ	1
R56, 57	R – 0016	"	CR25–222J	¼W 2.2KJ	2
R58	R – 0016	"	CR25–105J	¼W 1MJ	1
R76	R – 0013	"	RD½ –820J	½W 82Ω	1
	B – 0015	Lapping Pin		L = 20 m/m	47


INHIBIT TIMER
REW START DELAY
FF START DELAY
PLAY START DELAY
OSC TIMING
LUX K-15
LOGIC PCB
PCM 034
IC-1
IC-2
IC-3
IC-4
IC-5
IC-6
REEL SIGNAL
LEVEL SHIFT
REC PAUSE
TIMING
POWER OFF
MUTE
TIMING
LAMP
DRIVE
POWER ON
TIMER
P/B MUTE
TIMER
METER
PEAK HOLD
RESET
CASSET INSEAT
TIMER
TIMER REC
REC MUTE
TIMER
AUTO PLAY
START INHIBIT TIMER


LUX K-15
LOGIC PCB
PCM 034
IC-1
IC-2
IC-3
IC-4
IC-5
IC-6
1 AUTO STOP INPUT
2 REW 000 STOP
3 PLAY 000 STOP
4 AUTO PLAY
5 REPEAT
6 AUTO REW
7 PAUSE KEY
8 STOP KEY
9 REC SWITCH
10 TIMER REC
11 TIMER PLAY
12 REC KEY
13 PLAY KEY
14 FF KEY
15 REW KEY
16 REC MUTE KEY
17 TIMER SW [C]
18 PACKIN SW
19 20 GND
21 PEAK HOLD
22 NU
23 PLAY BACK MUTE
24 COUNTER ZERO RESET SW
25 COUNTER ZERO RESL
26 REC LAMP
27 PAUSE LAMP
28 PLAY LAMP
29 30 GND
31 POWER MUTE
32
33 REC TIMING
34 REEL DETECT
35 +10V
36 REC MUTE SIGNAL OUT
37 REC BIAS OSC
38 REMOTE REC LAMP
39 CLOCK PULSE
40 MARK►
41 PLAY SIGNAL OUT
42 NU
43 UP/DOWN
44 TAPE END ENABLE
45 MARK◄
46 REW SIGNAL OUT
FF SIGNAL OUT

BILL OF MATERIAL PCM – 035 AMP – PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	S – 0023	Slide Switch	SSR26301D		2
	S – 0024	Slide Switch	SSR22301D		1
	B – 0015	Lapping Pin	L = 20 m/m		62
	B – 0001	Tarminal Pin	NH–49		10
	(POWER SUPPLY)				
	YM – 0412	Heat Sink – 3006			2
	M3 x 8	Binding Head Screw			2
	M3	Hexagon Nut			2
Q08	T – 0045	Transistor	2SD600 F or E		1
Q09	T – 0047	Transistor	2SB631 F or E		1
Q07	T – 0027	Transistor	2SC1815 GR		1
Q10	T – 0028	Transistor	2SA1015 Yor GR		1
D03	T – 0005	Silicon Diode Stack	RB–152		1
ZD01, 02	T – 0050	Zener Diode	RD16EB2		2
C17, 20	C – 0023	Electrolytic Capacitor	CEUSM1E222	2200/25	2
C16, 19	C – 0023	Electrolytic Capacitor	CEUSM1E102	1000/25	2
C15, 18	C – 0003	Electrolytic Capacitor	SM25VB–220	220/25	2
C14	C – 0003	Electrolytic Capacitor	SM16VB–100	100/16	1
R28, 31	R – 0020	Carbon Resistor	RD¼–222J	¼W 2.2K	2
R29, 30	R – 0020	Carbon Resistor	RD¼–471J	¼W 470Ω	2
R23	R – 0008	Fixed Metal Oxide Film Resistor	RS1BFS–101J	1W 100Ω	1
	(MIC AMP)				
IC01	IC – 0022	IC	μPC-4556C		1
C04, 05	C – 0002	Polyester Film Capacitor	AMS50–473K	0.047/50	2
C37a, b, 38a, b	C – 0005	B P Electrolytic Capacitor	16VB–2R2BPD86	BP 2.2/16	4
R24a, b	R – 0020	Carbon Resistor	RD¼–103J	¼W 10K	2
R25a, b	R – 0020	"	RD¼–681J	¼W 680Ω	2
R26a,b, 29a,b	R – 0020	"	RD¼–104J	¼W 100K	4
R27a, b	R – 0020	"	RD¼–274J	¼W 270K	2
R28a, b	R – 0020	"	RD¼–221J	¼W 220Ω	2
R30a, b	R – 0020	"	RD¼–122J	¼W 1.2K	2
	(DOLBY ENCORDER), (REC, DOLBY)				
L02a, b	L – 0013	Bias Trap Coil	42–1168–02		2
IC02a, b	IC – 0020	Dolby NR IC	NE645B		2
D03a, b	T – 0041	Silicon, Diode	1N4448 or 1S1588		2
C17a, b	C – 0002	Polyester Film Capacitor	AMS50–102K	0.001/50V	2
C20a, b	C – 0002	"	AMS50–472J	0.0047/50V	2
C21a, b	C – 0002	"	AMS50–562J	0.0056/50V	2
C23a, b	C – 0002	"	AMS50–273J	0.027/50V	2
C26a, b	C – 0002	"	AMS50–473J	0.047/50V	2
C24a, b	C – 0002	"	AMS50–104J	0.1/50V	2
C25a, b	C – 0002	"	AMS50–334J	0.33/50V	2
C10, 11	C – 0003	Electrolytic Capacitor	SM16VB–220	220/16V	2
C22a, b	C – 0003	"	SM16VB–10	10/16V	2
C16a, b	C – 0005	BP Electrolytic Capacitor	50VB–1BPD86	BP 1/50V	2

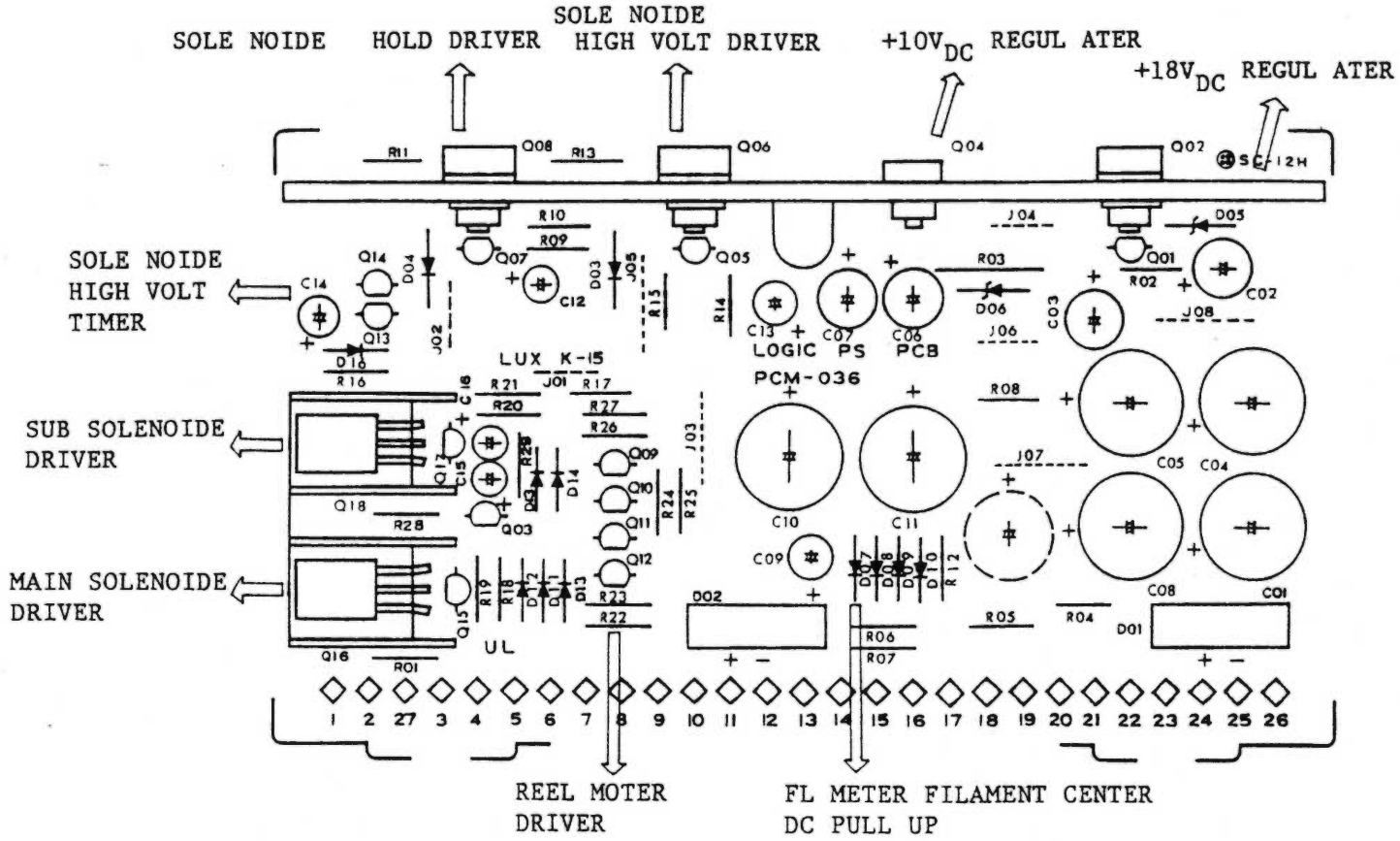
SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
C18a,b 19a,b 27a,b	C – 0005	BP Electrolytic Capacitor	16VB–10BPDB6	BP 10/16V	6
R8, 9	R – 0008	Fixed Metal Oxide Film Resistor	RS2BFS–181J	2W 180Ω	2
R31a, b	R – 0020	Carbon Resistor	RD¼–181J	¼W 180Ω	2
R32a, b	R – 0020	"	RD¼–332J	¼W 3.3K	2
R33a, b	R – 0020	"	RD¼–473J	¼W 47K	2
R34a, b	R – 0020	"	RD¼–274J	¼W 270K	2
R35a, b	R – 0020	"	RD¼–184J	¼W 180K	2
R36a, b	R – 0020	"	RD¼–103J	¼W 10K	2
		(REC EQ AMP)			
L30a, b	L – 0012	Bias Trap Coil	25–2256–13	7 mH	2
L04a, b	L – 0014	Peaking Coil	3–2797–01	3.6 mH	2
L06a, b	L – 0017	"	3–2806–01	7.6 mH	2
L05a, b	L – 0016	"	3–2796–01	8.6 mH	2
RT05a,b ~ 07a,b	R – 0009	Semi–Fixed, volume	SR19R–22KΩB	22 KB	6
IC02	IC – 0022	IC	μPC4556C		1
Q05	T – 0028	Transistor	2SA1015 Y or GR		1
Q06, Q06a,b	T – 0027	"	2SC1815GR		3
D04a, b	T – 0041	Silicon Diode	1N4448 or 1S1588		2
C32a, b	C – 0002	Polyester Film Capacitor	AMS50–104K	0.1/50V	2
C23, 24	C – 0002	"	AMS50–473K	0.047/50V	2
C34a, b	C – 0002	"	AMS50–123J	0.012/50V	2
C36a, b	C – 0002	"	AMS50–103J	0.01/50V	2
C35a, b	C – 0002	"	AMS50–822J	0.0082/50V	2
C29a, b	C – 0022	Polistyrene Film –capacitor	CQ09S–1H–821–J05B	820P/50V	2
C33a, b	C – 0022	"	CQ09S–1H–301–J05B	300P/50V	2
C40a, b	C – 0022	"	CQ09S–1H–221–J05B	220P/50V	2
C30a, b	C – 0022	"	CQ09S–1H–681–J05B	680P/50V	2
C39a, b	C – 0007	FMCON	FM05ZC150J5	15P/50V	2
C13, C31a, b	C – 0005	BP Electrolytic Capacitor	16VB–10BPD6	10/16V	2
C28a, b	C – 0005	"	16VB–2R2BPD6	2.2/16V	3
R15, 17, 18	R – 0020	Carbon Resistor	RD¼–104J	¼W 100K	3
R16	R – 0020	"	RD¼–473J	¼W 47K	1
R20	R – 0020	"	RD¼–152J	¼W 1.5K	1
R37a,b, 39a,b, R40a,b	R – 0020	"	RD¼–683J	¼W 68K	6
R38a,b, 41a,b	R – 0020	"	RD¼–124J	¼W 120K	4
R42a,b, 43a,b, R44a,b, 55a,b R19	R – 0020	"	RD¼–103J	¼W 10K	9
R45a, b	R – 0020	"	RD¼–224J	¼W 220K	2
R47a, b	R – 0020	"	RD¼–273J	¼W 27K	2
R48a, b	R – 0020	"	RD¼–183J	¼W 18K	2
R49a, b	R – 0020	"	RD¼–121J	¼W 120Ω	2
R50a, b	R – 0020	"	RD¼–221J	¼W 220Ω	2
R51a, b	R – 0020	"	RD¼–181J	¼W 180Ω	2
R46a,b, 52a,b	R – 0020	"	RD¼–392J	¼W 3.9K	4

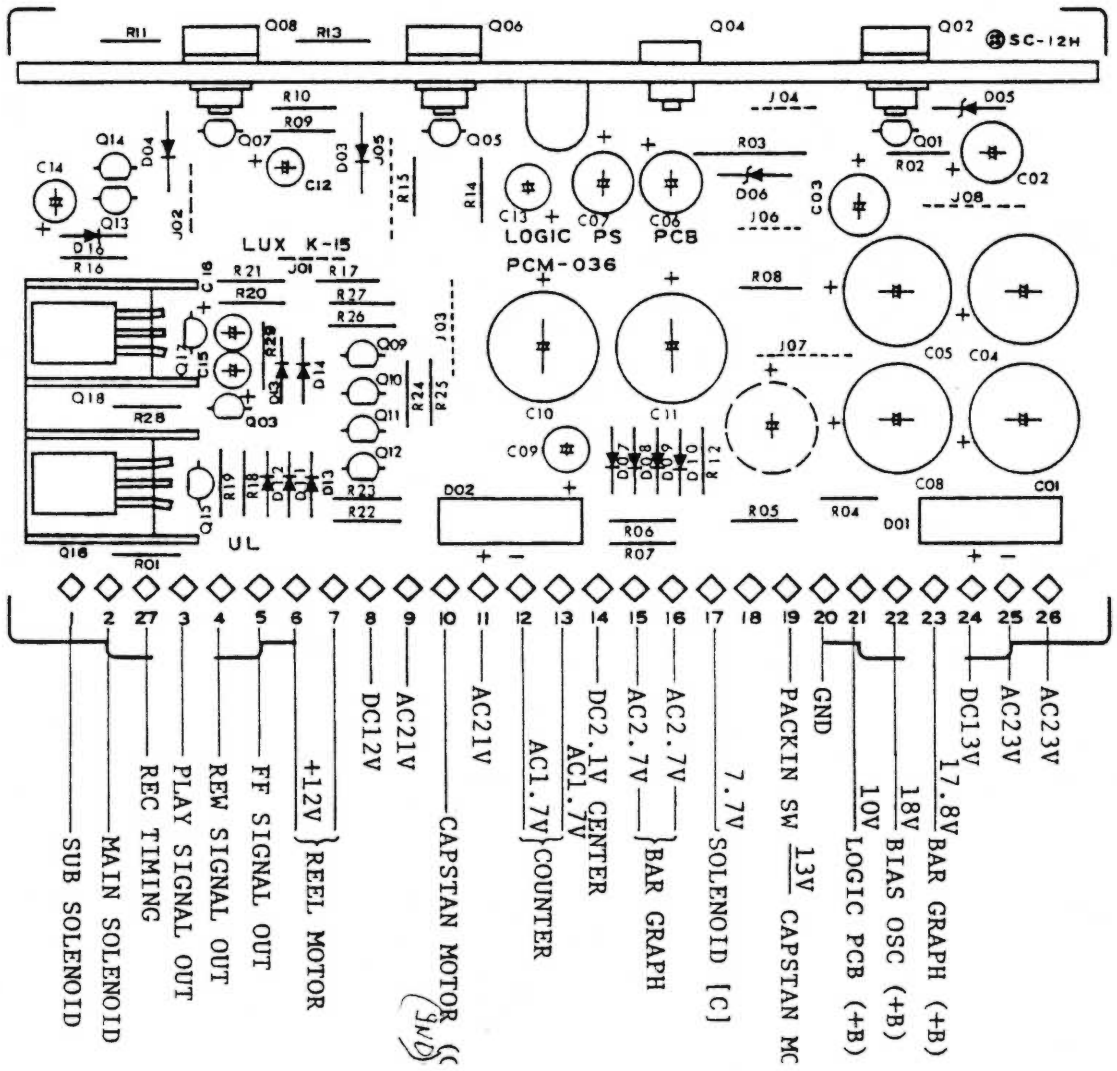
SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	(BIAS OSC)				
–	Z – 0036	Bias Osc Blok			1
Q11, 12	T – 0052	Transistor	2SD863 E or F		2
Q13	T – 0027	"	2SC1815 GR		1
VC01a,b ~ 03a,b	C – 0025	Ceramic Trimmer–capacitor	ECV–1ZW50x32E		6
C21	C – 0003	Electrolytic Capacitor	SM25VB–47	47/25V	1
C22,	C – 0003	"	SM25VB–10	10/25V	1
R21	R – 0020	Carbon Resistor	RD¼–010J	¼W 1Ω	1
R22, 34	R – 0020	"	RD¼–101J	¼W 100Ω	2
R24	R – 0020	"	RD¼–273J	¼W 27K	1
R25	R – 0020	"	RD¼–182J	¼W 1.8K	1
R26	R – 0020	"	RD¼–104J	¼W 100K	1
R27	R – 0020	"	RD¼–103J	¼W 10K	1
R32	R – 0020	"	RD¼–183J	¼W 18K	1
R33	R – 0022	Film Proof Coat–Resistor	RDF50S22ΩJ	½W 22Ω	1
R53a, b	R – 0020	Carbon Resistor	RD¼–100J	¼W 10Ω	2
	(P/B EQ AMP)				
RT01a, b	R – 0010	Semi–fixed volume	CR19R–470ΩB		2
RT02a, b	R – 0009	"	S19R–10KΩB		2
RT03a, b	R – 0009	"	SR19R–22KΩB		2
–	YM – 0306	Transistor, Cap	3046		2
Q01a,b, 02a,b	T – 0040	FET	2SK68AL1		4
Q03a, b	T – 0049	Transistor	2SA798G		2
Q04a, b	T – 0048	Transistor	2SC1222E		2
Q05a, b	T – 0026	FET	2SK30AGR2TM		2
D01a, b	T – 0041	Silicon Diode	1N4448 or 1S1588		2
C01a, b	C – 0022	Polistyrene Film–capacitor	CQ09S–1H–331–J05B	330P/50V	2
C04a, b	C – 0022	"	CQ09S–1H–562–J05B	5600P/50V	2
C2, 3	C – 0002	Polyester, Film Capacitor	AMS50–473K	0.047/50V	2
C01	C – 0005	BP Electrolytic Capacitor	50VB–1BPDB6	BP 1/50V	1
C05a, b	C – 0005	"	16VB–2R2BPDB6	BP 2.2/16V	2
C02a,b, 03a,b	C – 0007	FMCON	FM05ZC150J5	15P/50V	4
R01	R – 0020	Carbon Resistor	RD¼–473J	¼W 47K	1
R01a, b	R – 0020	"	RD¼–394J	¼W 390K	2
R02	R – 0020	"	RD¼–474J	¼W 470K	1
R02a,b, 03a,b	R – 0020	"	RD¼–682J	¼W 6.8K	4
R04a,b, 05a,b R15a,b	R – 0020	"	RD¼–221J	¼W 220Ω	6
R06a,b 16a,b	R – 0020	"	RD¼–223J	¼W 22K	4
R07a, b	R – 0020	"	RD¼–471J	¼W 470Ω	2
R08a, b	R – 0020	"	RD¼–152J	¼W 1.5K	2
R09a,b 10a,b	R – 0020	"	RD¼–273J	¼W 27K	4
R11a, b	R – 0020	"	RD¼–472J	¼W 4.7K	2
R12a, b	R – 0020	"	RD¼–684J	¼W 680K	2
R13a, b	R – 0020	"	RD¼–153J	¼W 15K	2
R14a, b	R – 0020	"	RD¼–123J	¼W 12K	2

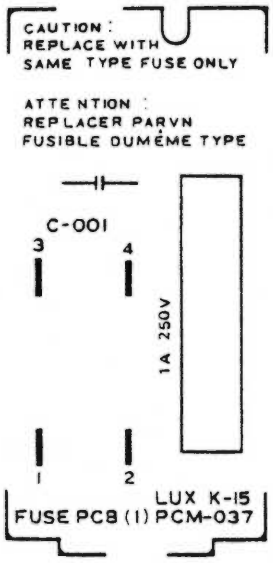
SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	(DOLBY DECORDER), (P/B DOLBY)				
L01a, b	L – 0013	Bias Trap Coil	42–1168–02		2
IC01a, b	IC – 0020	Dolby NR IC	NE645B		2
D02a, b	T – 0041	Silicon Diode	1N4448 or 1S1588		2
Q01	T – 0027	Transistor	2SC1815GR		1
C08a, b	C – 0002	Polyester Film Capacitor	AMS50–102K	0.001/50V	2
C10a, b	C – 0002	"	AMS50–472J	0.0047/50V	2
C09a, b	C – 0002	"	AMS50–562J	0.0056/50V	2
C11a, b	C – 0002	"	AMS50–273J	0.027/50V	2
C14a, b	C – 0002	"	AMS50–473J	0.047/50V	2
C12a, b	C – 0002	"	AMS50–104J	0.1/50V	2
C13a, b	C – 0002	"	AMS50–334J	0.33/50V	2
C08, 09	C – 0003	Electrolytic Capacitor	SM16VB–220	220/16V	2
C07	C – 0003	"	SM16VB–47	47/16V	1
C06	C – 0003	"	SM16VB–10	10/16V	3
C06a, b	C – 0005	BP Electroly Capacitor	50VB–1BPDB6	BP 1/50V	2
C07a,b, R41a, b	C – 0005	"	16VB–108PDB6	BP 10/16V	4
R03	R – 0020	Carbon Resistor	RD¼–154J	¼W 150K	1
R05	R – 0020	"	RD¼–104J	¼W 100K	1
R04, R17a,b	R – 0020	"	RD¼–103J	¼W 10K	3
R06, 07	R – 0008	Fixed Metal Oxide–Film Resistor	RS2BFS–181J	2W 180Ω	2
R18a, b	R – 0020	Carbon Resistor	RD¼–181J	¼W 180Ω	2
R19a, b	R – 0020	"	RD¼–332J	¼W 3.3K	2
R20a, b	R – 0020	Carbon Resistor	RD¼–473J	¼W 47K	2
R21a, b	R – 0020	"	RD¼–274J	¼W 270K	2
R22a, b	R – 0020	"	RD¼–184J	¼W 180K	2
R23a, b	R – 0020	"	RD¼–101J	¼W 100Ω	2
	(MUTING)				
RY01	L – 0001	Relay	BR221D012		1
D01, 02	T – 0041	Silicon Diode	1N4448 or 1S1588		2
Q03, 04	T – 0027	Transistor	2SC1815GR		2
Q02	T – 0028	"	2SA1015 YorGR		1
C12	C – 0003	Electrolytic, Capacitor	SM25VB–R47	0.47/25V	1
R10	R – 0020	Carbon Resistor	RD¼–100J	¼W 10Ω	1
R11	R – 0020	"	RD¼–105J	¼W 1MΩ	1
R13, 14	R – 0020	"	RD¼–103J	¼W 10K	2
R12	R – 0008	Fixed Metal Oxide – Film Resistor	RS1BFS–151J	1W 150Ω	1
	(METER)				
RT04a, b	R – 0009	Semi-fixed volume	SR19R–100KB		2
R54a, b	T – 0020	Carbon Resistor	RD¼–223J	¼W 22K	2

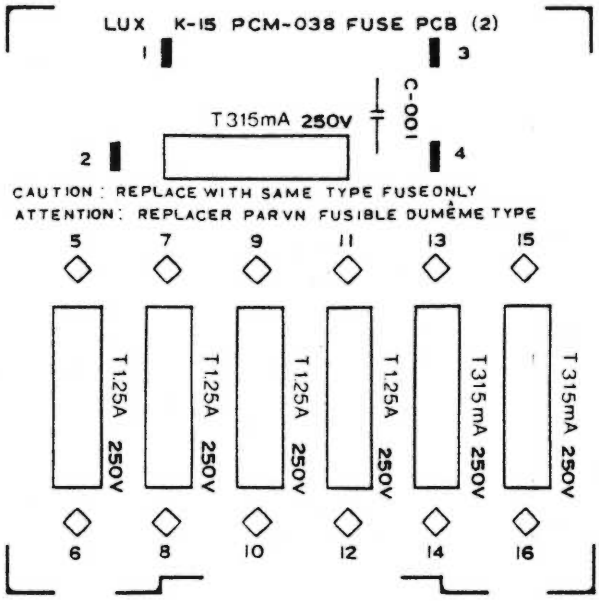
BILL OF MATERIAL PCM – 036 LOGIC P.S. PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	YM – 0412	Heat Sink–3006			2
–	M3x12	Binding Head Screw			2
	M3	Hexagon Nut			5
	3x6x0.5	Washer			3
	ϕ3	Spring Washer			3
	YM – 0434	Heat Sink–3007			1
	M3x4	Binding Head Screw			1
	M3x10	Binding Head Screw			1
Q02, 06, 08	T – 0044	Transistor	2SD313E or F		3
Q04, 16, 18	T – 0045	"	2SD600E or F		3
Q09, 12	T – 0052	"	2SD863E or F		2
Q10, 11	T – 0051	"	2SB764E or F		2
Q01, 03, 05, Q07, 13, 14 Q15, 17	T – 0027	"	2SC1815GR		8
D01, 02	T – 0005	Silicon Diode Stack	RB–152		2
D03	T – 0016	Silicon Diode	GP–15D		1
D04	T – 0015	"	1N4003		1
D07 ~ 16	T – 0041 or T – 0053	"	1N4448 or 1S1588		10
D05	T – 0050	Zener Diode	RD20EB3		1
D06	T – 0050	"	RD11EB3		1
R03	R – 0013	Carbon Resistor	RD½–102J	½W 1KJ	1
R04, 05,	R – 0020	Flame Proof Coat–Resistor	RDF25S10ΩJ	¼W 10ΩJ	2
C01, 09	C – 0023	Electrolytic Capacitor	CEUSM1V102	1000μ/35V	2
C02, 03	C – 0003	Electrolytic Capacitor	SM25VB–100	100μ/25V	2
C04, 05, 10 C08	C – 0023	"	CEUSM1E102	1000μ/25V	4
C06, 07	C – 0003	"	SM16VB–100	100μ/16V	2
C09	C – 0003	"	SM6.3VB–100	100μ/6.3V	1
C12, 14	C – 0003	"	SM16VB–10	10μ/16V	2
C13	C – 0003	"	SM25VB–10	10μ/25V	1
C16	C – 0003	"	SM50VB–4R7	4.7μ/50	1
C15	C – 0024	"	CE04W1HR47MD	0.47μ/50	1
R01, 10 ~ 13 R17, 28	R – 0016	Carbon Resistor	CR25–103J	¼W 10KJ	7
R02, 14	R – 0016	"	CR25–392J	¼W 3.9KJ	2
R06, 07	R – 0016	"	CR25–159J	¼W 15Ω	2
R09	R – 0016	"	CR25–822J	¼W 8.2KJ	1
R15	R – 0016	"	CR25–221J	¼W 220ΩJ	1
R16, 21	R – 0016	"	CR25–104J	¼W 100KJ	2
R18, 19	R – 0016	"	CR25–223J	¼W 22KJ	2
R20	R – 0016	"	CR25–333J	¼W 33KJ	1
R22, 23, 24, R25, 26, 27	R – 0016	"	CR25–222J	¼W 2.2KJ	6
R29	R – 0016	"	CR25–124J	¼W 120KJ	1


SOLE NOIDE
SOLE NOIDE HOLD DRIVER
HIGH VOLT DRIVER
+10V$_{DC}$ REGUL ATER
+18V$_{DC}$ REGUL ATER
SOLE NOIDE
HIGH VOLT
TIMER
SUB SOLENOIDE
DRIVER
MAIN SOLENOIDE
DRIVER
LUX K-15
PCM-036
LOGIC PS
PCB
SC-12H
UL
REEL MOTER
DRIVER
FL METER FILAMENT CENTER
DC PULL UP
1 2 27 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

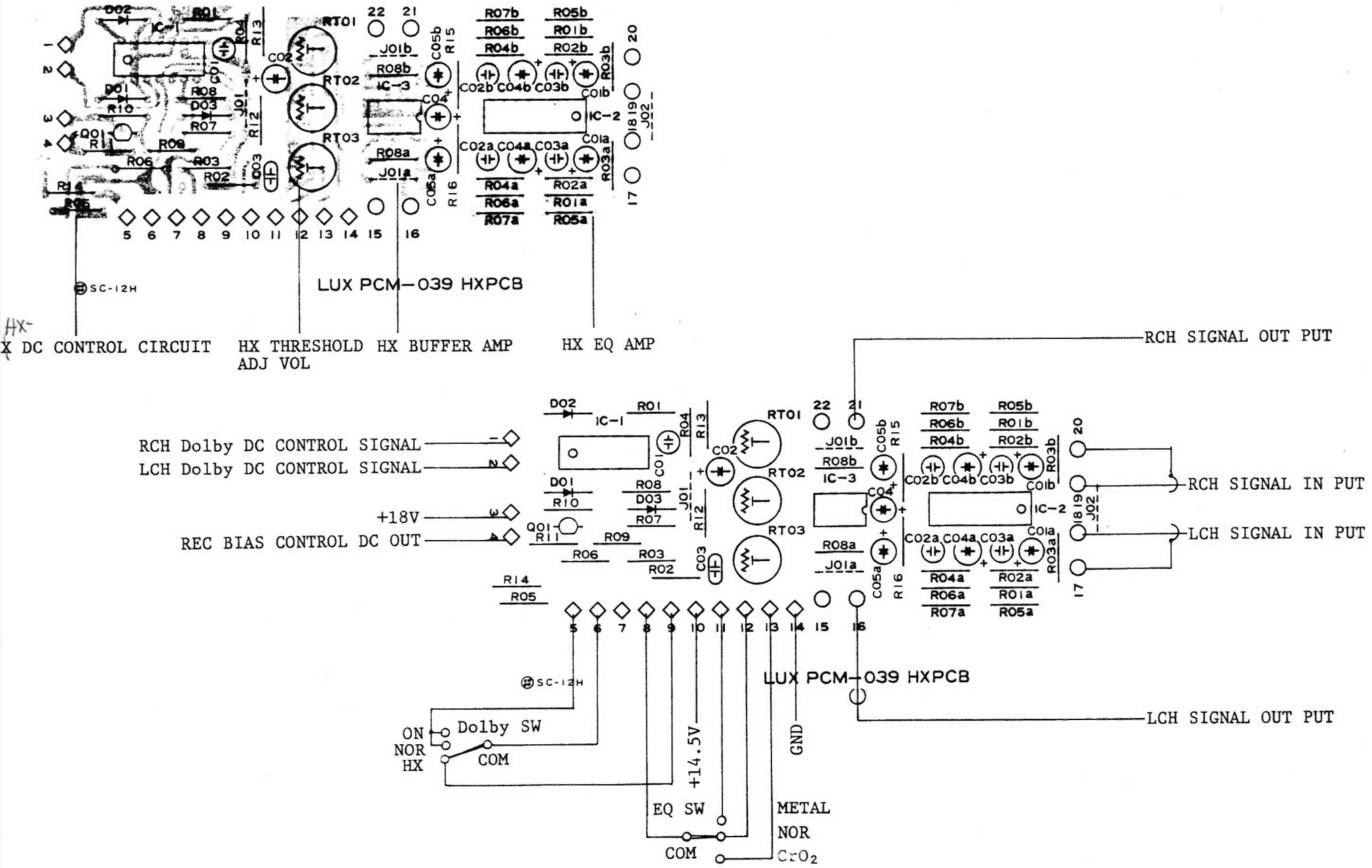

LUX K-15
PCM-036
LOGIC PS
PCB
SC-12H
UL
1 2 27 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
SUB SOLENOID
MAIN SOLENOID
REC TIMING
PLAY SIGNAL OUT
REW SIGNAL OUT
FF SIGNAL OUT
+12V
REEL MOTOR
DC12V
AC21V
AC21V
CAPSTAN MOTOR
AC1.7V
COUNTER
AC1.7V
DC2.1V CENTER
AC2.7V
BAR GRAPH
AC2.7V
7.7V
SOLENOID [C]
PACKIN SW
13V
CAPSTAN MC
GND
10V
LOGIC PCB (+B)
18V
BIAS OSC (+B)
17.8V
BAR GRAPH (+B)
DC13V
AC23V
AC23V

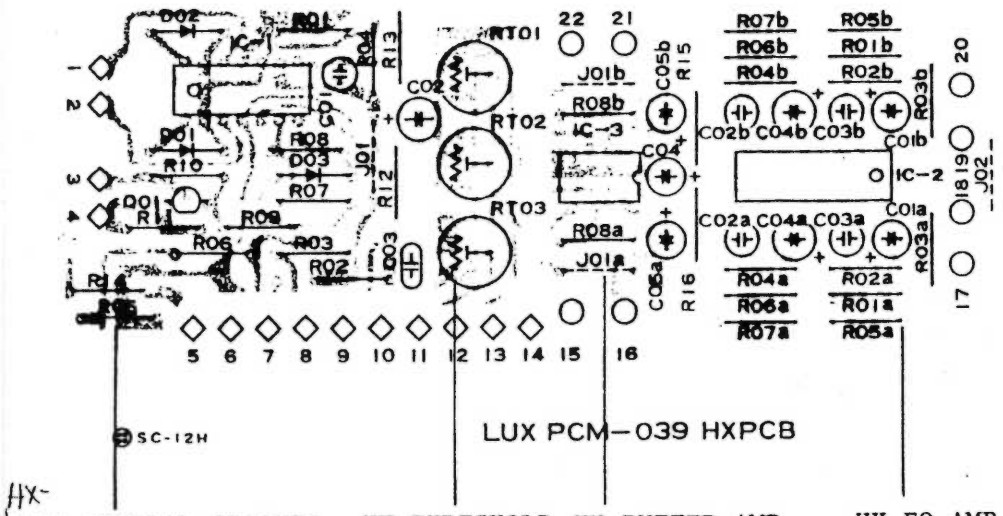




BILL OF MATERIAL PCM – 039 Dolby HX PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
IC1	IC – 0025	IC	LM324N		1
IC2	IC – 0024	IC	LM13600N		1
IC3	IC – 0022	IC	μPC4556C		1
Q01	T – 0027	Transistor	2SC1815GR		1
D01 ~ 03	T – 0041 or T – 0053	Silicon Diode	1N4448 or 1S1588		3
C01	C – 0022	Polistyrene Film Capacitor	CQ09S–1H–361–J05B	360P/50V	1
C02a, b	C – 0022	"	CQ09S–1H–151–J05B	150P/50V	2
C03a, b	C – 0022	"	CQ09S–1H–152–J05B	1500P/50V	2
C01a, b	C – 0023	Electrolytic Capacitor	CEUSM1H2R2	2.2μ/50	2
C02, 04, 05a, b	C – 0023	"	CEUSM1C100	10μ/16	4
C04a, b	C – 0023	"	CEUSM1C470	47μ/16	2
R01, 01a, b R07, 08	R – 0016	Carbon Resistor	CR25–104J	¼W 100KJ	5
R02, 06a, b	R – 0016	"	CR25–473J	¼W 47KJ	3
R03	R – 0016	"	CR25–224J	¼W 220KJ	1
R03a,b, 05a,b	R – 0016	"	CR25–221J	¼W 220ΩJ	4
R04	R – 0016	"	CR25–564J	¼W 560KJ	1
R04a, b	R – 0016	"	CR25–222J	¼W 2.2KJ	2
R05	R – 0016	"	CR25–154J	¼W 150KJ	1
R08a, b, 10	R – 0016	"	CR25–102J	¼W 1KJ	3
R09	R – 0016	"	CR25–122J	¼W 1.2KJ	1
R11	R – 0016	"	CR25–392J	¼W 3.9KJ	1
R14	R – 0016	"	CR25–153J	¼W 15KJ	1
R02a,b, 06, R07a,b, 12, R13, 15, 16	R – 0016	Carbon Resistor	CR25–103J	¼W 10KJ	9
RT01, 02, 03	R – 009	Semi–fixed volume	SR19R–10KB		3


LUX PCM-039 HXPCB
SC-12H
HX DC CONTROL CIRCUIT
HX THRESHOLD ADJ VOL
HX BUFFER AMP
HX EQ AMP
RCH SIGNAL OUT PUT
RCH Dolby DC CONTROL SIGNAL
LCH Dolby DC CONTROL SIGNAL
+18V
REC BIAS CONTROL DC OUT
RCH SIGNAL IN PUT
LCH SIGNAL IN PUT
LCH SIGNAL OUT PUT
Dolby SW
ON
NOR
HX
COM
EQ SW
+14.5V
GND
METAL
NOR
CrO2



HX-
X DC CONTROL CIRCUIT

HX THRESHOLD
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HX BUFFER AMP

HX EQ AMP

RCH SIGNAL OUT PUT

RCH Dolby DC CONTROL SIGNAL

LCH Dolby DC CONTROL SIGNAL

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RCH SIGNAL IN PUT

LCH SIGNAL IN PUT

LCH SIGNAL OUT PUT

ON
NOR
HX

Dolby SW

COM

EQ SW

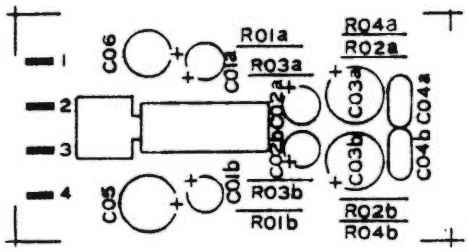
+14.5V

GND

METAL
NOR
CrO_2

BILL OF MATERIAL PCM – 031 H. PH PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	A – 0027	Phone Jack	HLJ0190–01–040		1
	B – 0001	Tarminal Pin	NH–49		4
	IC – 0021	IC	LA4170		1
C01a, b	C – 0003	Electrolytic Capacitor	SM25VB–4R7	4.7μ/25V	2
C02a, b	C – 0003	"	SM25VB–10	10μ/25V	2
C03a,b, 05	C – 0003	"	SM16VB–100	100μ/16V	3
C04a, b	C – 0002	Polyester Film Capacitor	AMS50–103K	0.01μ/50V	2
C06	C – 0003	Electrolytic Capacitor	SM25VB–33	33μ/25V	1
R01a, b	C – 0016	Carbon Resistor	CR25–104J	¼W 100K	2
R02a, b	C – 0016	"	CR25–123J	¼W 12K	2
R03a, b	C – 0016	"	CR25–399J	¼W 39Ω	2
R04a,b	C – 0016	"	CR25–159J	¼W 15Ω	2



LUX PCM-031 HEAD PHONE PCB

BILL OF MATERIAL PCM – 004 KEY SW PCB Ass'y

SCHEMATIC REF. NUMBER	PART NUMBER	DESCRIPTION		NOTE	QUANTITY PER UNIT
	S – 0018	KEY Switch	SCM81102		7
	A – 0031	Lamp	12V40mA		3
	YM – 0199	Bush – 3008			3

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
1	YM–0438	Bottom Plate – 3003		1
2		Foot		4
3	YM–0428	Bonnet – 3004		1
4	YM–0299	Bonnet Himeron – 3011		2
5	YM–0448	Bonnet Himeron – 3013		1
6	YM–0421	Protector – 3009		1
7	YM–0422	Name Plate – 3006		1
8	YM–0423	Ornament Screw – 3063		2
9	YM–0425	Spacer – 3013		2
10	YM–0424	Stand – 3017		2
11	YM–0406	Panel – 3010		1
12	YM–0420	Protecter – 3008		1
13	YM–0408	Name Plate – 3005		1
14	YM–0409	Escutcheon – 3002		3
15	YM–0361	Knob Set		1
16	SE–9610	Protecter – 1066		1
17	YM–0171	Stand – 3005		2
18	YM–0410	Protecter – 3007		1

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
1	YM–0404	Sub. Panel – 3004		1
2	PCM–004	Key SW PCB Ass'y		1
3	YM–0352	Holder – 3035		1
4	M–0005	Meter LB–100–L14		1
5	YM–0413	Holder – 3038		1
6	M–0007	Counter Ass'y		1
7	YM–0440	Bushing – 3019		2
8	T–0046	LED SLP–144B		2
9	YM–0411	Meter Blind Plate – 3062		1
10	YM–0415	Holder – 3040		1
11	PCM–031	Phone Jack PCB Ass'y		1
12	A–0015	Nut HLJ0999–01–250		3
13	YM–0416	Holder – 3041		1
14	A–0015	MIC Jack HLJ0261–01–090		2
15	YM–0417	Holder – 3042		1
16	S–0026	Monitor SW SUF–12		1
17	YM–0414	Holder – 3039		1
18	S–0030	Flex Lever SW SLRW013		3
19	S–0028	Flex Wire L–360		1
20	S–0029	Flex Wire L–168		1
21	S–0031	Flex Wire L–234		1
22	V–0008	Bias Vol. VM10E–5KB		1
23	S–0025	Five Stretch SW SUF–41	Peak Hold, Counter, Reset Zero memoly, Preset memoly	1
24	PCM–033	VOL. PCB Ass'y		1
25	S–0032	Timer SW SRN1026N		1
26	S–0016	Power SW SDG5P–E	SK, SG, EK	1
	S–0014	Power SW SDG5P	UL, CSA	1
	S–0033	Power SW SDG1P	41–10714 ALPS	1
27	YM–0441	Extension Shaft – 3045		1
28	YM–0469	Holder – 4035		1
29	V–0009	Output Vol. GM80A–10KBX2		1
30	Z–0030	Cassette Mechanism FA83M010		1
31	YM–0487	Filter – 3001		1
32	YM–0430	Holder – 3043		1
33	YM–0418	Chassis – 3006		1
34	YM–0435	Side Panel – 3007		1
35	YM–0436	Side Panel – 3008		1
36	A–0009	Voltage Select Plug P2120–A		1
37	A–0008	Voltage Select Socket M1625		1
38	YM–0419	Channel – 3005		1
39	PCM–035	AMP PCB Ass'y		1
40	PCM–037	Fuse PCB Ass'y (1)		1
41	PCM–038	Fuse PCB Ass'y (2)	SEMKO	1
42	PCM–034	LOGIC PCB Ass'y		1
43	PCM–036	LOGIC P.S PCB Ass'y		1
44	YM–0488	Holder – 3047		1
45	YM–0437	Chassis – 3007		1
46	YM–0433	Holder – 3044		1
47	P–0013	Power Trans.	SK, SG	1

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
	P-0014	Power Trans.	EJ, EZ, EK	1
48	PCM-039	HX PCB Ass'y		1
49	YM-0432	Back Panel - 3004		1
50	A-0026	Power Cord VW-1	EZ	1
	A-0004	Power Cord	EJ	1
	A-0016	Power Cord C-2-4610	EK, SK	1
	A-0025	Power Cord VRF-777	SG	1
51	SE-9092	Label - 1131		1
	YM-0462	Seal - 3011 100V		1
	SE-10616	Seal - 1272 220V		1
	SE-10618	Seal - 1275 240V		1
	SE-10934	Seal - 1300 120V		1
	SE-11626	Seal - 1359	SEMKO, DEMKO	1
52	B-0006	Cord Stopper 4N-4		1
	B-0007	Cord Stopper 5N-4	SG	1
53	A-0028	Pin Jack AKB-0570		1
54	A-0007	Remote Connector S-1612A		1
55	A-0007	Remote Connector P-1612A-ST		1
56	YM-0074	Holder - 3008		1
57	YM-0431	Channel - 3006		1
58	YM-0461	Blind R-3065		1
59	YM-0184	Mold Knob - 3002	Eject	1
60	YM-0070	Switch Knob - 3002	Peak Hold, Reset, Monitor Zero memory, Preset memory	5
61	YM-0240	Mold Knob - 3005	Bias fine	1
62	SE-8946	Mold Knob - 1077	Timer	1
63	YM-0392	Knob Set - 3005	MIC, LINE	2
	YM-0454	Knob Set - 3010	EJ, LAA	2
64	YM-0183	Mold Knob - 3003		3
65	YM-0427	Knob Set - 3008		1
	YM-0426	Knob Set - 3007	LAA, EJ	1
66	SE-11277	Mold Knob - 1121	LAA, ET	3
	YM-0453	Mold Knob - 3009		3
67	SE-9607	Mold Knob - 1089		1
68				
69				
70	M2.6 x 6	Binding Head Tapping Screw	ZMC	3
71	M3 x 6	"	ZMC	77
72	M3 x 8	"	ZMC	2
73	M4 x 6	"	ZMC	6
74	M4 x 10	"	ZMC	4
75	M3 x 4	Binding Head Screw	ZMC	22
76	M4 x 6	"	ZMC	4
77	M2 x 4	"	BLACK	4
78	M3 x 4	"	BLACK	11
79	M3 x 8	"	BLACK	1
80	M3 x 6	Binding Head Tapping Screw	BLACK	12
81	M3 x 12	Binding Head Screw	Ni	1
82				
83	M3	Hexagon Nut	ZMC	1

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
84	3 x 8 x 0.5	Washer	Ni	1
85	2.9 x 7.5 x 0.5	"	ZMC	3
86	3 x 0.5	Polyslider Washer		1
87	2 x 0.13	"		2
88	B–0016	Bind metal		21
89		Free Bush		1
90	3 x 7 x 0.5	Washer	BLACK	1
91	M3 x 10	Binding Head Tapping Screw	BLACK	2

BILL OF MATERIAL FIA 83M010

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
1	1A42045U01	Ass'y, Riv, Bkt, Door		1
2	43A42035U01	Spacer, Door		2
3	3S44205G04	Scr., Tpg. M3 x 0.5 x 5		6
4	30S43803G05	Dial Cord		1
5	4C42091G05	Washer C		9
6	1A42944F01	Ass'y, Riv. Bkt. Door L		1
7	37S44468G16	Vinyl Tube		1
8	Not Used			
9	Not Used			
10	45A42942F01	Lever, Eject		1
11	4S40070G05	Washer 3.3 x 8 x 0.5		1
12	41B41497U13	Spring Pull		1
13	1A42054U01	Ass'y, Frame Door		1
14	15C41130U01	Holder, Chassis		1
15	15C41130U01	Holder, Chassis		1
16	1B42046U01	Ass'y, Riv. Arm Door		1
17	1B42046U01	Ass'y, Riv. Arm Door		1
18	1A42951F01	Ass'y, Riv. Support Chassis		1
19	61A41165U01	Lens Back Light		1
20	7A41942U01	Bkt. Micro Sw.		1
21	7A41944U01	Bkt. Record Sencor		1
22	45B42011U01	Arm, Sw.		1
23	47A41173U02	Shaft, Record Sensor		2
24	41B41492U12	Spring, Pull		2
25	3S40011G85	Mch. Scr. M2 x 0.4 x 15		2
26	1A42047U01	Ass'y, Riv. Base HD.		1
27	46B41972U01	Block, HD		1
28	3S42155U01	Screw, Set (–)		2
29	3S40019G08	Screws M2 x 0.8 x 10		1
30	3C40014G07	Mch. Screw M2 x 0.4 x 4		2
31	41A41490U01	Spring, Azimuth		1
32	3C40014G04	Mch. Screw M3 x 0.5		10
33	7A41971U01	Bkt. Motor		1
34	49A42113U01	Pulley, Motor		1
35	Not Used			
36	3C40121T04	Screw, Mch. M2.6 x 7		8
37	43A41289U02	Sleeve, Cushion		6
38	75A41685U01	Cushion, Motor		7
39	22B40232G02	Pin Spring		2
40	7A41950U01	Bkt., Solenoid M		1
41	46A41940U01	Stopper, Plunger		1
42	1A42050U01	Ass'y, Riv. Lever Solenoid		1
43	1B42042U01	Ass'y, Riv. Sub Chassis		1
44	44B4020BT01	Gear Drive		1
45	44B40207T01	Gear Drive		1
46	Not Used			
47	4A41345P01	Washer Lock		2
48	Not Used			
49	Not Used			
50	3A411U01	Screw, Bearing		2

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
51	7A41936U01	Bkt., Pinch Roller		1
52	45A41938U01	Arm, Idler A		1
53	45A41939U01	Arm, Idler B		1
54	45A41946U01	Arm, Chassis Holder		1
55	41A41947U01	Spring, Head Base		1
56	Not Used			
57	49A41954U01	Flywheel, Capstan L		1
58	49B41955U01	Flywheel, Capstan R		1
59	15A41956U01	Housing, Capstan		2
60	45A41958U01	Cam, Clutch Idler		1
61	45A41959U01	Link, Fwd.		1
62	42A41960U01	Belt, Motor		1
63	42A41961U01	Belt, Sub		1
64	Not Used			
65	7A41963U01	Bkt., Pinch Roller		1
66	45B41935U01	Lever, Brake		1
67	45T41964U01	Clutch, Play		1
68	45T41967U01	Clutch, FF		1
69	49T41970U01	Pulley, FF Idler		1
70	43A41096U01	Guide Cassette		2
71	49T41629F01	Reel, Take Up		1
72	49T41448U01	Reel, Supply		1
73	49A42898U01	Wheel, Tention A		1
74	49B42899U01	Wheel, Tention B		1
75	45A41095U01	Arm, Brake		2
76	43A41182P02	Ball Steel		5
77	41A42895U02	Spring, Push		1
78	41A41491U02	Spring, Push		1
79	41A42109U01	Spring, Cam Clutch		1
80				
81	41A42111U01	Spring, Clutch		1
82	41A42112U01	Spring, Arm Idler		1
83	41A42114U01	Spring, Pully Idler		1
84	43A42040U01	Sleeve, Idler Shaft		1
85	43A42023U01	Sleeve		2
86	41B43676U02	Spring, Pull		1
87	43A42115U01	Spacer, Head Base		2
88	41B41492U03	Spring, Pull		2
89	41B41492U05	Spring, Pull		1
90	41B43676U06	Spring, Pull		1
91	41B43676U01	Spring, Pull		1
92	2S40000G12	Nut Hex, M3 x 0.5		2
93	41B44327P07	Spring, Pull		1
94	65C42544U02	Lamp, Pilot		1
95	40C43472J01	Micro Sw. S		2
96	4A41345P02	Washer Lock		2
97	4A41345P03	Washer Lock		3
98	4A41345P05	Washer Lock		2
99	4S40075G07	Washer P. S.		1
100	4S40075G10	Washer P. S.		2

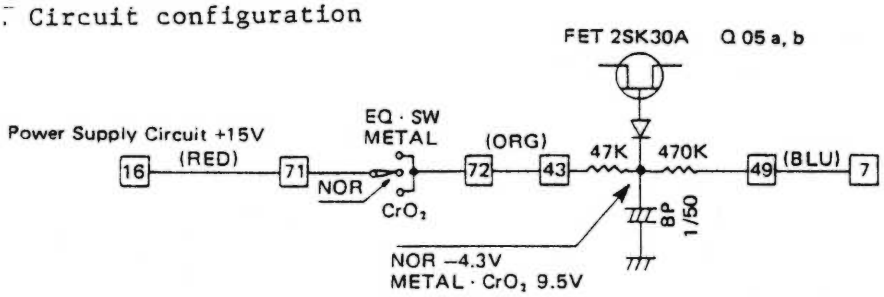
SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
101	43A44303P01	Washer Oil Shiel		2
102	3S44205G03	Screw Tap Tite M3 x 8		2
103	1C42041U01	Ass'y, Riv. Chassis		1
104	1A41990U01	Ass'y, Bkt. Pinch Roller		1
105	1A42048U01	Ass'y, Riv. Cam		1
106	1A42947F01	Ass'y, Riv. Stopper Eject		1
107	1A42051U01	Ass'y, Riv. Lever Solenoid Main		1
108	1A41516U01	Ass'y, Pinch Roller		1
109	43B43738U01	Tape, Guide		1
110	3S40019G03	Screw, F—Locks		2
111	41B43676U03	Spring Pull		1
112	41A43688U01	Spring Cord		1
113	41A43685U01	Spring Dumper		1
114	3S40019G32	Screw, F—Lock		4
115	88T42954F01	Head, R/P Combi		1
116	4S40075G18	Washer, S. T. W.		4
117	41A43675U01	Spring, Pinch Push		1
118	41A42351U02	Spring, Pinch Roller Br		1
119	88T44524U01	Head, Erase		1
120	3S40019G01	Screw, F—Lock		1
121	59T42144U01	Motor DC		
122	4S40075G12	Washer 3.1 x 5.4		1
123	59T42145U01	Motor DC		1
124	4C42091G05	Washer "C"		6
125	75A44238P01	Pad Brake		1
126	4S40075G05	Washer 2.1 x 4 x 0.13		2
127	4S40011G75	Mch., Scr. M2 x 0.4 x 14		1
128	4S40075G19	Washer 4.1 x 6.5 x 0.5		6
129	3S40019G29	Scr., F—Lock		10
130	4S40075G13	Washer S. T. W.		2
131	29A737272	Lug Wrap Around		1
132	48C40235U01	Diode 10E1		2
133	43A43689U01	Sleeve Idrer Shaft		1
134	48S42931U23	Thermistor		1
135	3S44205G01	Scr., Tpg. M3 x 0.5 x 6		4
136	3S44205G12	Scr., T. M3 x 4		5
137	4C42091G06	Washer "C"		3
138	4S40075G06	Washer S. T. W.		3
139	4S40075G24	Washer		2
140	75A44231U01	Cusion HD. Base		1
141	42A44230U01	Lug, Wrap Through		1
142	41A44528U01	Spring Flyweel		1
143	41A40594F01	Spring Eject Lever		1
144	3C40014G06	Mch., Scr., M2.6		1
145	1V42600F01	Ass'y, Panel Term		1
146	1V42600F41	Ass'y, Photo Senser		1
147	15A41630F01	Cover Sensor		1
148	1T42117U01	Ass'y, Solenoid		1
or	1T42752U01	Ass'y, Solenoid		1
149	1T42119U01	Ass'y, Solenoid		1
or	1T42754U01	Ass'y, Solenoid		1

SYMBOL NO.	PART NUMBER	DESCRIPTION	NOTE	QUANTITY PER UNIT
-		(Ass'y, Photo Sensor)		
	84A41631F01	Panel, Sensor		1
	48T41632F01	L. E. D.		1
	48T41633F01	TR. Photo		1
		(Ass'y, Panel Terminal)		
	84B43706U01	Panel, Terminal		1
	48T40412F01	Posistor 47		1
	48C40235G01	Diode 10E1		1
	6S41802P19	Res., F.C. 82 – 1/4		1
	6D40802G84	Res., F.C. 33 – 1/2		1
	6S41801P31	Res., F.C. 820 – 1/4		1
	6S41801P34	Res., F.C. 1.5K – 1/4		1

EXPLANATION OF K-15 AMP CIRCUIT OPERATION

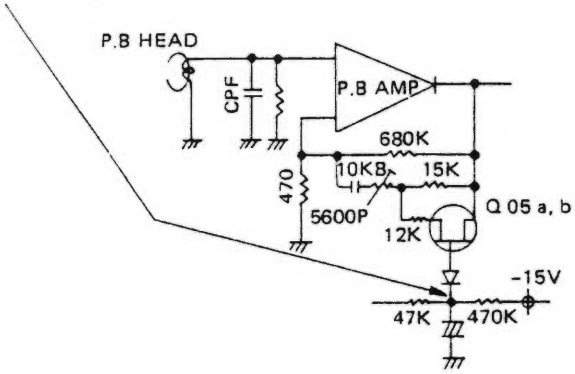
1. PB/EQ Operation

a. Circuit configuration

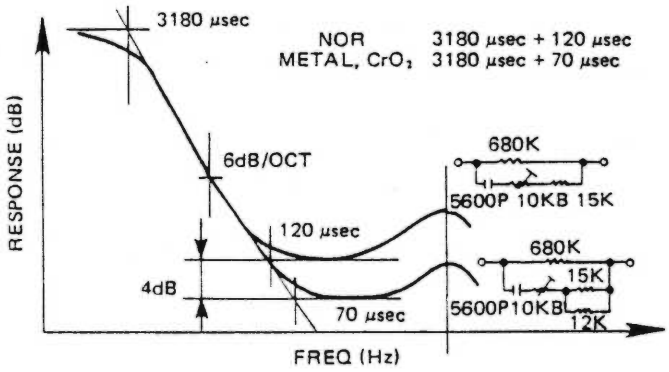


b. Circuit operation

FET turns off when EQ Sw is set at NOR; it turns on when EQ Sw is set at METAL or CrO_2. The PB and EQ circuits operate as shown in the figure.



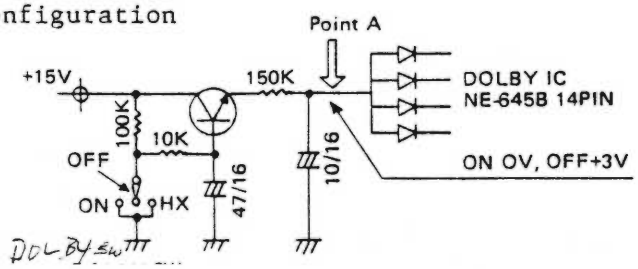
A pair of FETs are required for the PB amp differential circuit (ΔV_{GS} selection)



Peak frequency is determined both by "L" of the head "C" of the resonance capacitor; rise in frequency response is determined both by "Q" of the head and the input impedance of the amp.

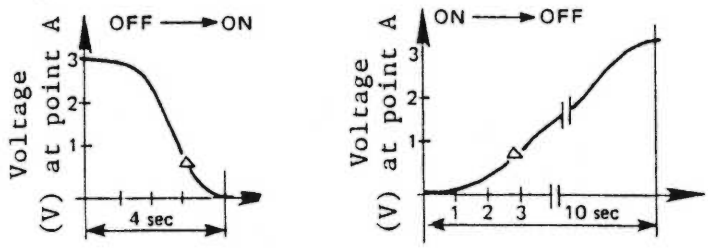
2. Dolby NR ON-OFF Control Circuit

a. Circuit configuration



b. Circuit operation

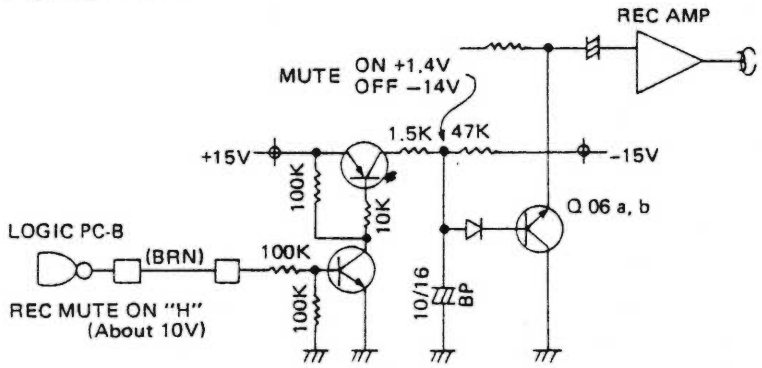
Voltage change at point A



When a direct current is applied to the Dolby IC 14 pin, the Dolby circuit operates as if it received a large input signal, and the Dolby encoder/decoder characteristics do not work out. To eliminate a click caused by the abrupt application of DC voltage. ON-OFF time constant is determined to about 3 seconds.

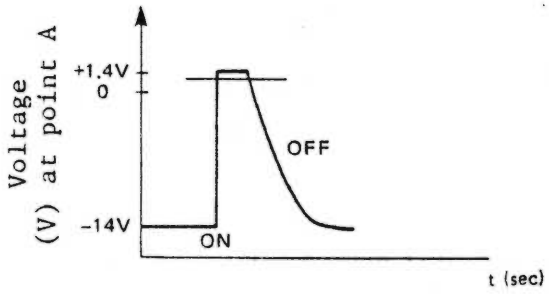
3. REC Mute Operation

a. Circuit configuration



b. Circuit operation

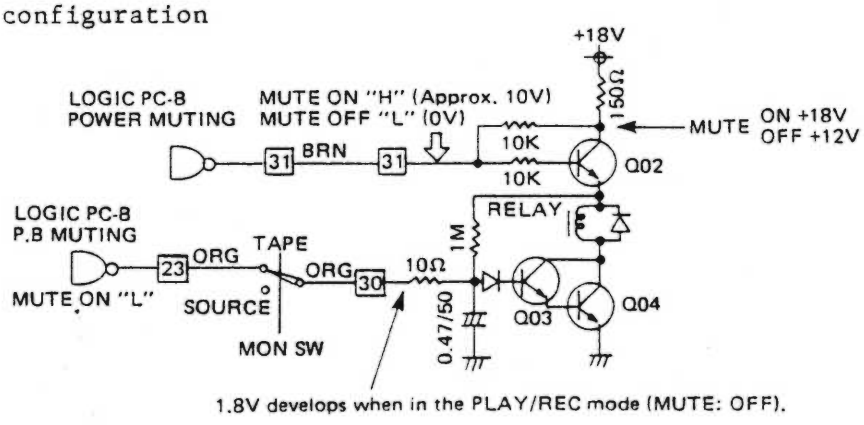
Time constant of muting ON-OFF is almost zero.



Transistors Q06 and Q07 turn on when voltage exceeds +1.2V at point A.

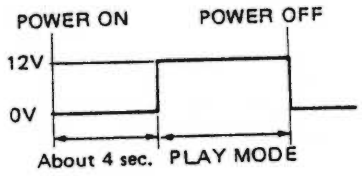
4. Muting Circuits

a. Circuit configuration



b. Circuit operation

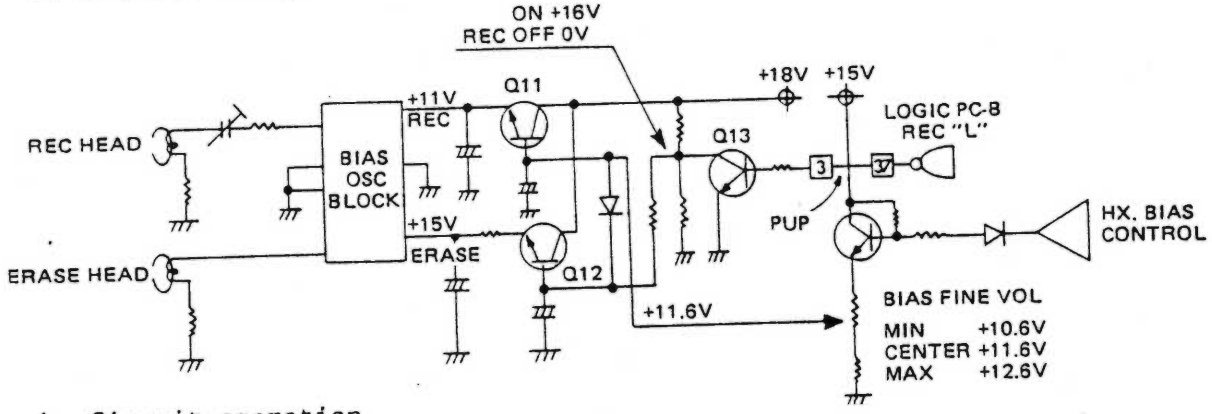
(1) Power-OFF muting
When power is switched off, the power-OFF muting circuit turns Q02 off to mute clicks on the fall of respective amp signals.
Voltage waveform across the relay is shown below (tape monitor and timer/play on).



(2) PB muting
PB muting is provided by depressing the stop or pause key with the MON Sw set at TAPE. In addition, when power is switched on, another muting is provided until respective amps stabilize.

5. Bias OSC ON-OFF Control Circuit

a. Circuit configuration

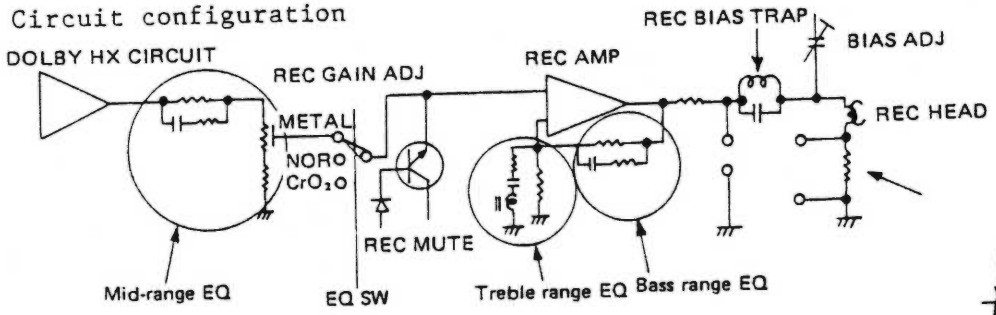


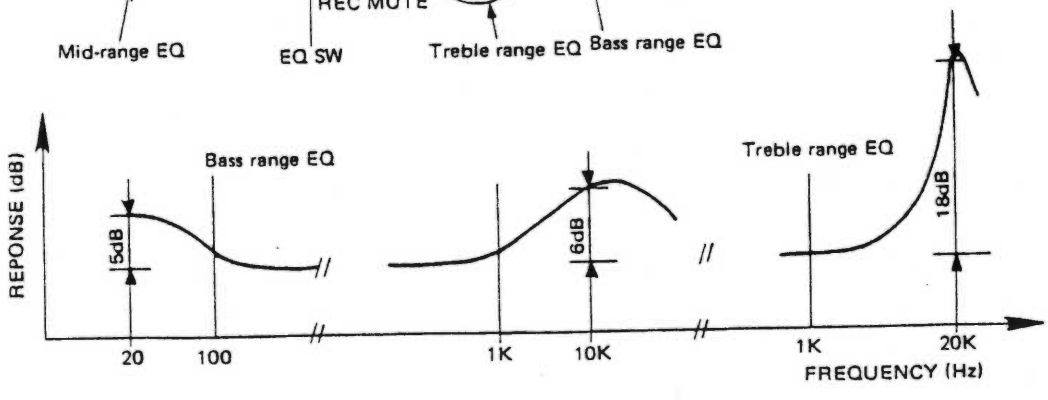
b. Circuit operation

The bias OSC block consists of a recording bias oscillator and an erase oscillator. The recording bias oscillator is controlled by transistor Q11 while the erase oscillator, by transistor Q12. A bias current is controlled by varying the base voltage of Q11 by the bias fine vol. Therefore, the erase head's current is not affected by moving the bias fine vol.

6. REC EQ

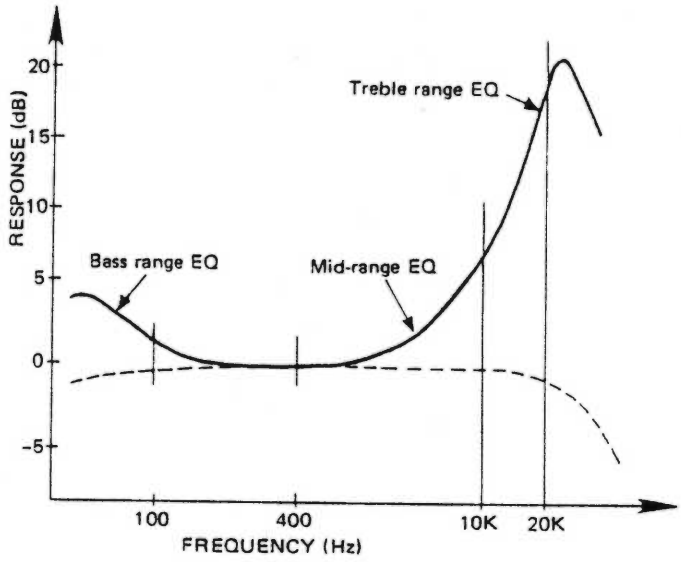
a. Circuit configuration





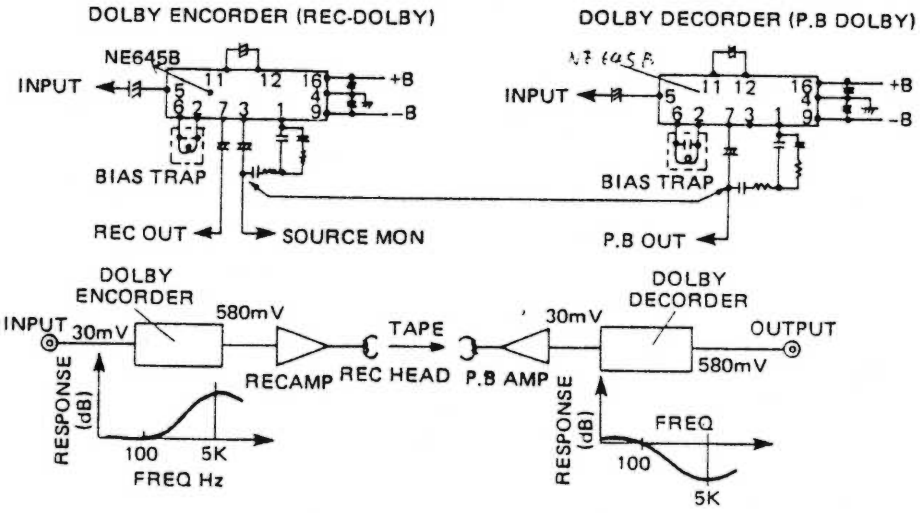
b. Circuit operation

EQ (recording equalization) may be represented by the solid line in the below figure. Without EQ, frequency response may be shown by the dotted line. EQ must differ with the types of tapes and be determined according to EQ Sw setting, METAL, CrO_2 or NOR.



7. Dolby Circuit

a. Circuit configuration



b. Circuit operation

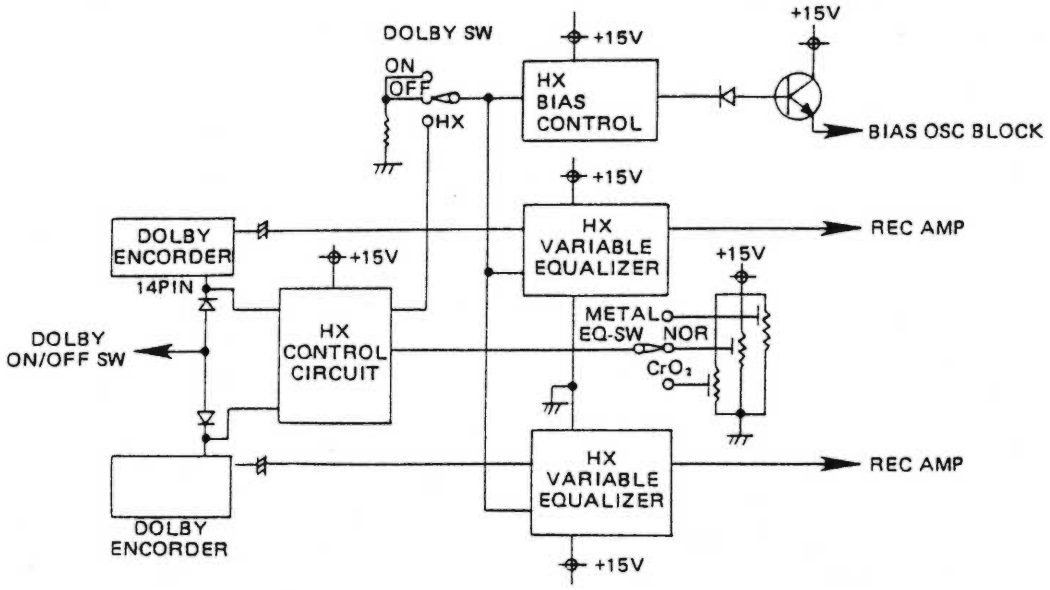
If recording level is raised in the treble range and if the playback level is then lowered inversely as shown in the above figures, tape hiss will be reduced with the Dolby Sw on accordingly. This noise reduction method, however, is not effective for noises inherent to the REC amp, musics, and sources.

As shown by the frequency response curves of the Dolby encoder/decoder in the above figures, an amount of compensation decreases with rise in recording level, so that the curves go flat at OVU (200 nWb/m) recording level.

In order to positively alter an amount of compensation in accordance with this level, it is necessary to adjust Dolby output level to 580mV. In additi·, in the K15 cassette deck, optimum encode characteristics have been selected according to the variance of Dolby ICs, which are marked orange, red, white, yellow or green for pairing.

8. Dolby Hx Circuit

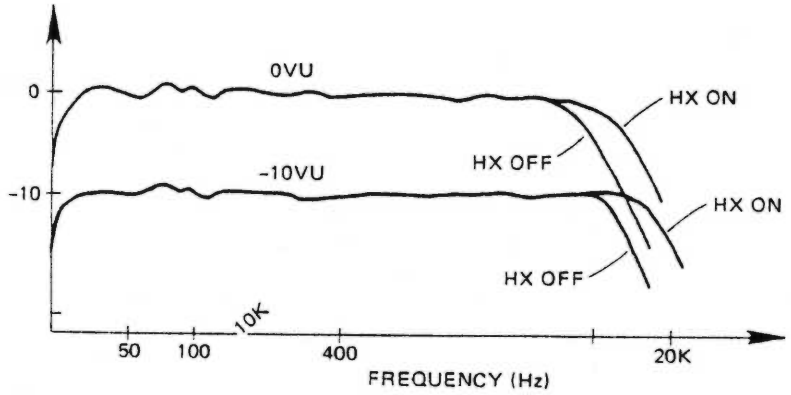
a. Circuit configuration



b. Circuit operation

The instant an input signal happens to contains abnormal treble range characteristics, the Dolby Hx circuit will reduce recording bias and an amount of compensation at the same time, thereby improving treble-range characteristics. The Dolby Hx circuit uses a conventional signal from the Dolby NR IC as a control signal. The circuit configuration includes a control circuit, variable equalizer circuit, and variable bias circuit.

Sample treble range characteristics improved by the Dolby Hx system



A newly designed bias OSC block has been introduced together with the Dolby Hx system because a conventional bias OSC circuit allows an erasure current to change when the recording bias is changed, thus causing a failure in erasure. The new bias OSC block contains two oscillators, one for recording bias and the other for erasure.

Explanation of Mechanism Control Circuit

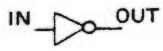
1. Logic control circuit

1-1. The supply voltage V_{CC} to the logic circuit is +10V.

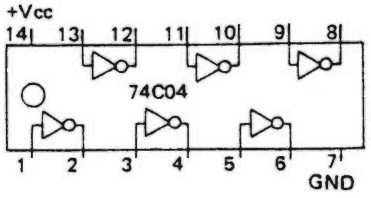
"H" level means +9 to 10 V.
"L" level means 0 to +1 V.

1-2. Logic Tables and packages (top view) of ICs used

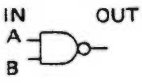
1) 74C04



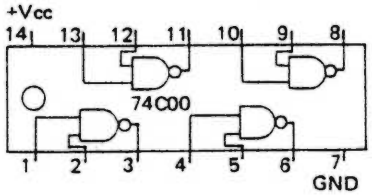
Input	Output
L	H
H	L



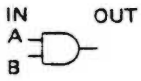
2) 74C00



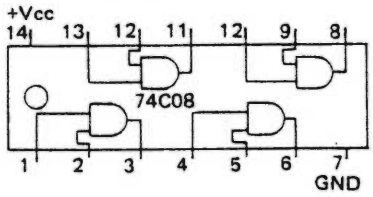
Input A B	Output
L L	H
L H	H
H L	H
H H	L



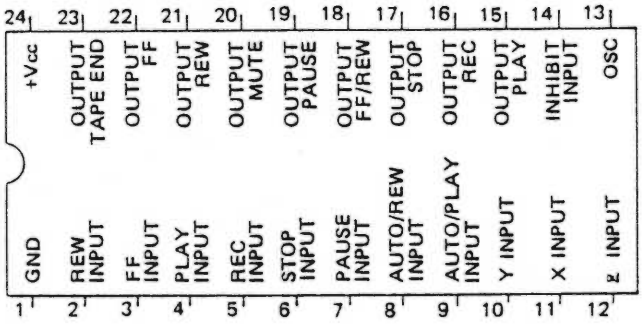
3) 74C08



Input A B	Output
L L	L
L H	L
H L	L
H H	H



4) TC9121P (IC6)



1-3. Fundamental operation

A key input to the logic circuit is pulled up to "H" at all times, and is switched to "L" by a keystroke. Key input signals are stored in TC9121P, and are output as drive signals for respective operating modes. The logic table of modes is shown in Table 1.

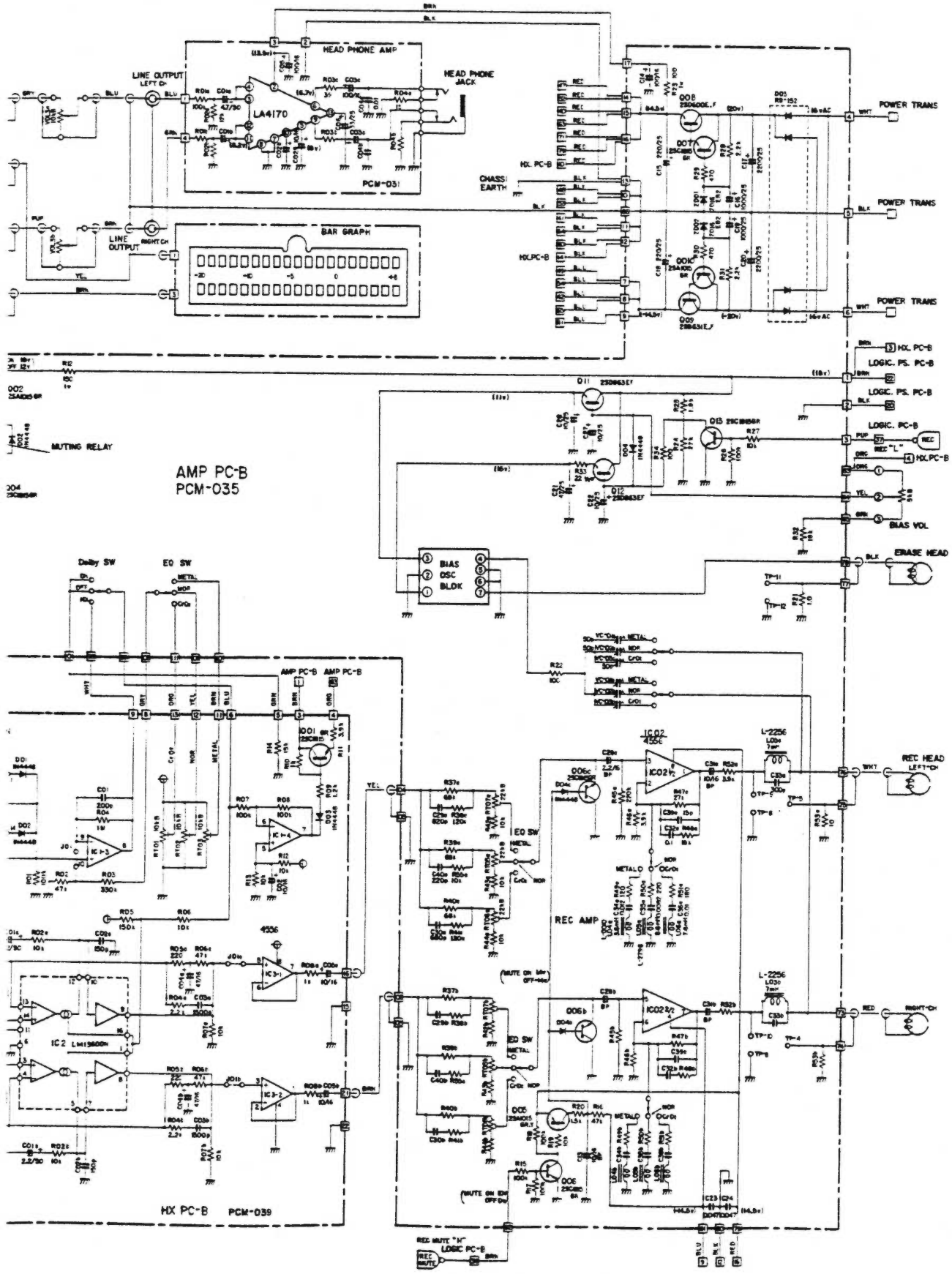
Table 1

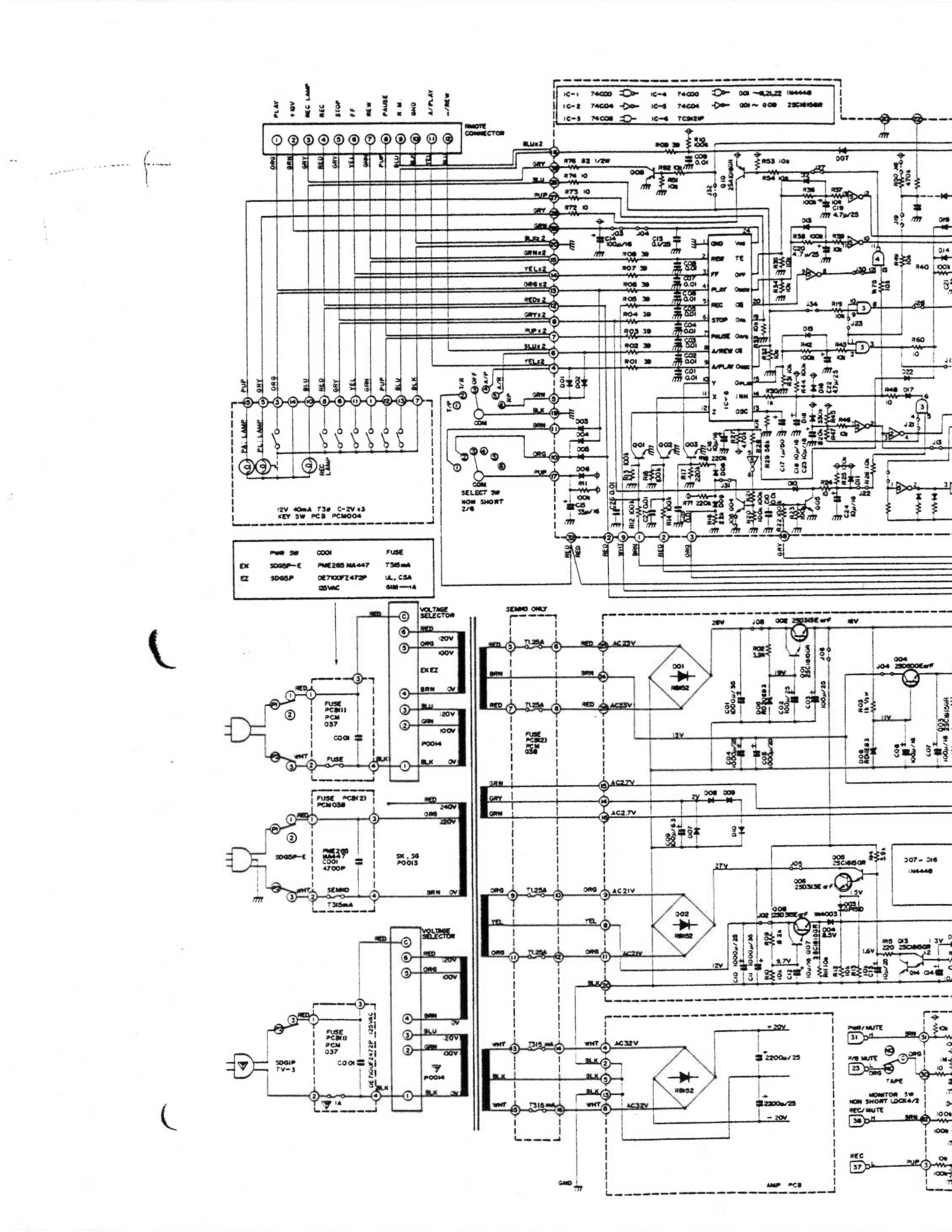
Mode Symbols

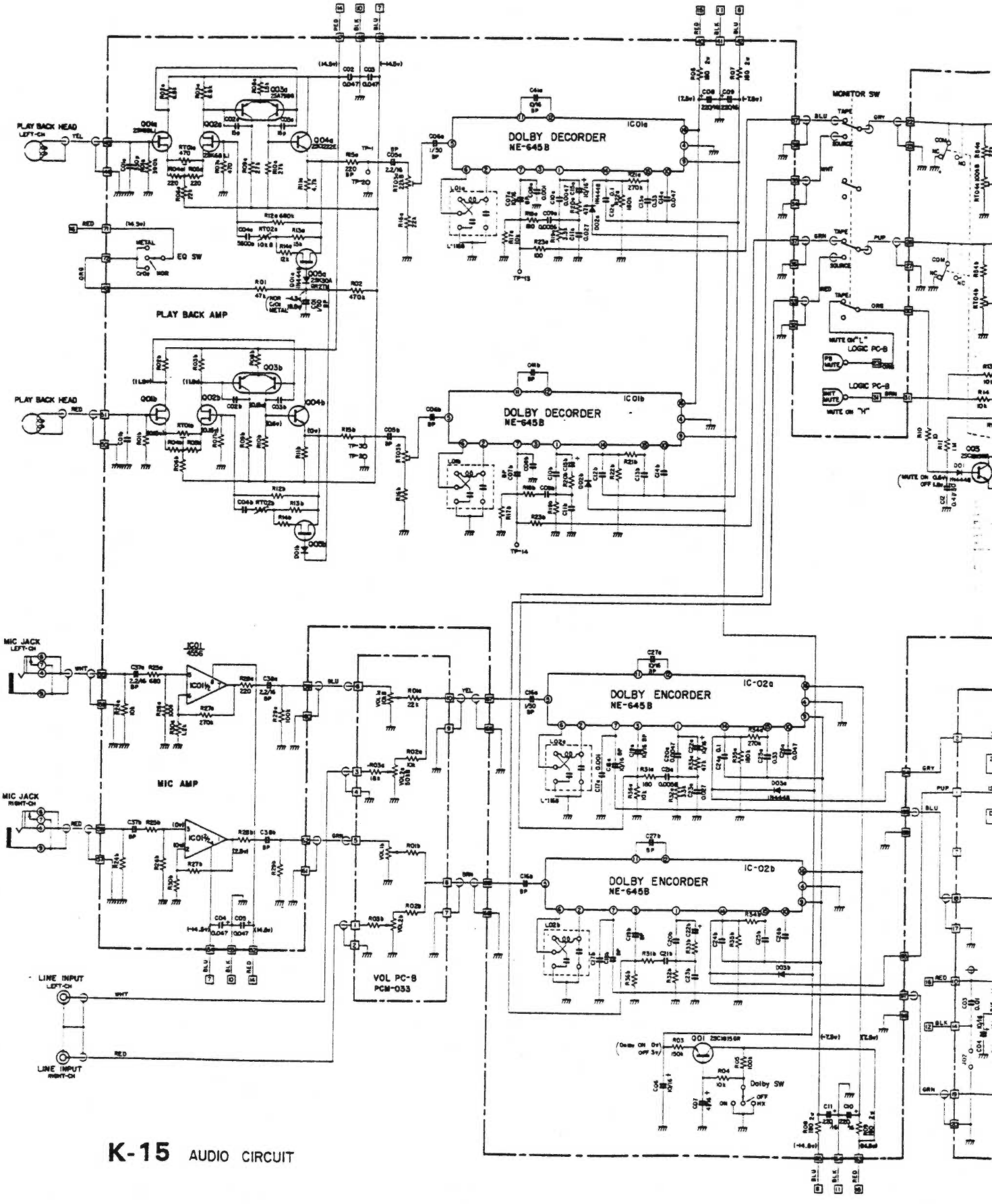
REC : Record
FF : Fast forward
REW : Rewind

KEY CONTROL / TEST POINT / MODE	STOP KEY	PAUSE KEY	REC KEY PLAY KEY	PAUSE KEY	REC MUTE KEY	REW KEY	F.F. KEY	PLAY KEY	PAUSE KEY
	STOP	STOP PAUSE	REC PAUSE	REC	REC	REW	F.F.	PLAY	PLAY PAUSE
IC6-15 OUTPUT PLAY	L	L	L	H	H	L	L	H	L
IC6-16 OUTPUT REC	L	L	H	H	H	L	L	L	L
IC6-19 OUTPUT PAUSE	L	H	H	L	L	L	L	L	H
IC6-20 OUTPUT MUTE	H	H	L	L	L	H	H	L	L
IC6-21 OUTPUT REW	L	L	L	L	L	H	L	L	L
IC6-22 OUTPUT F.F.	L	L	L	L	L	L	H	L	L
LOGICPCB PIN 41 PLAY	L	L	L	H	H	L	L	H	L
PIN 45 REW ◁MARKER	L	L	L	L	L	H	L	L	L
PIN 46 F.F.	L	L	L	L	L	L	H	L	L
PIN 28 PLAY LAMP	L	L	H	H	H	L	L	H	H
PIN 27 PAUSE LAMP	L	H	H	L	L	L	L	L	H
PIN 26 REC LAMP	L	L	H	H	H	L	L	L	L
PIN 23 P/B MUTE	L	L	L	H*	H*	L	L	H*	L
PIN 37 REC BIAS	H	H	L	L	L	H	H	H	H
PIN 36 REC MUTE	H	H	H	L	H	H	H	H	H
PIN 44 TAPE END ENABLE	L	L	L	H	H	H	H	H	H
PIN 43 COUNTER UP/DOWN			H	H	H	L	H	H	H
PIN 40 △ MARKER	L	L		H L ⊓⊓	H L ⊓⊓	L	H	H L ⊓⊓	

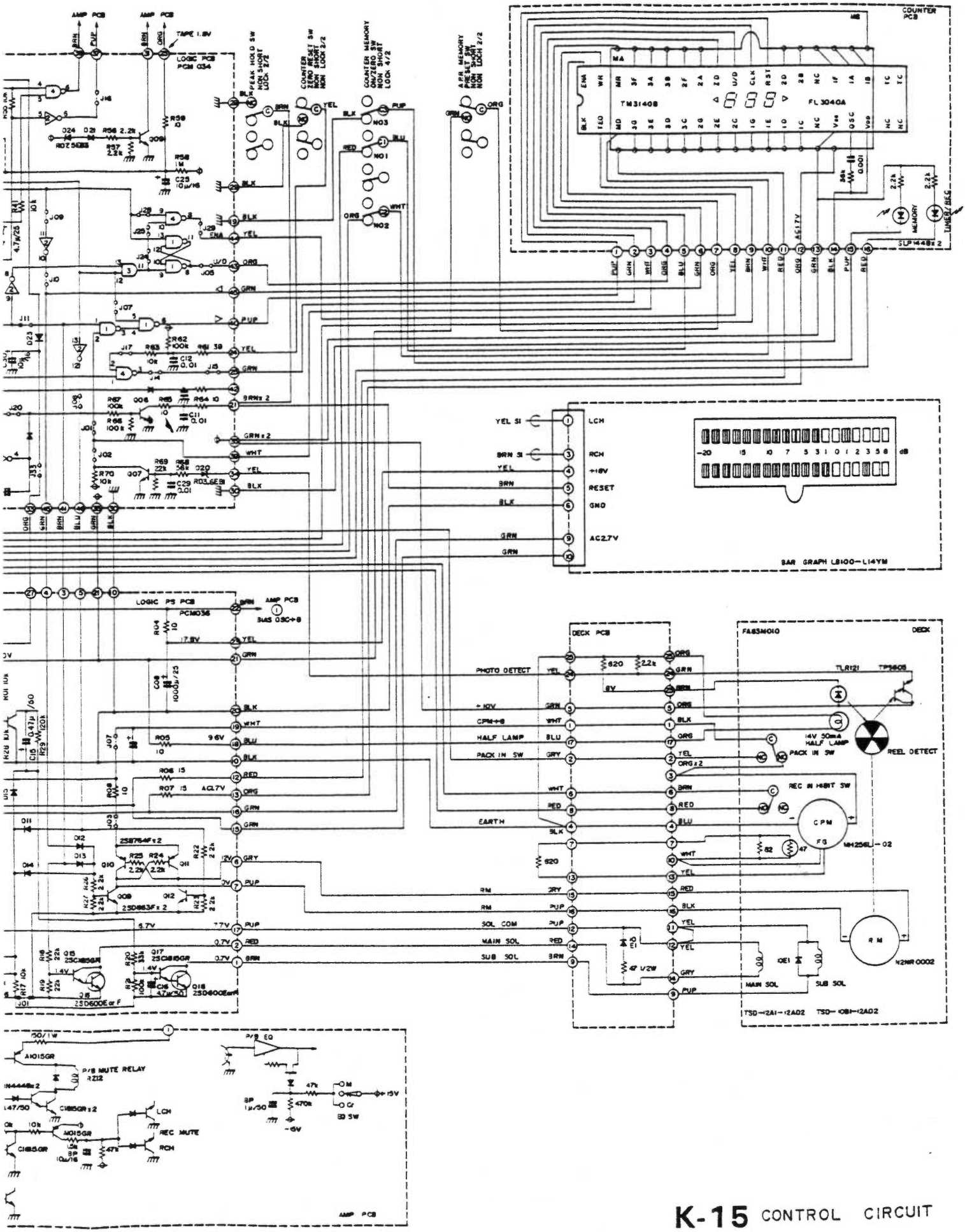
(NOTE) H* : "H" level is 1.8V with the tape monitor ON.


HEAD PHONE AMP
LINE OUTPUT
LEFT CH
HEAD PHONE JACK
LA4170
PCM-031
BAR GRAPH
LINE OUTPUT
RIGHT CH
CHASSIS EARTH
POWER TRANS
POWER TRANS
POWER TRANS
HX. PC-B
LOGIC. PS. PC-B
LOGIC. PS. PC-B
LOGIC. PC-B
HX.PC-B
BIAS VOL
ERASE HEAD
MUTING RELAY
AMP PC-B
PCM-035
BIAS OSC BLOK
Dolby SW
EQ SW
AMP PC-B
AMP PC-B
REC HEAD
LEFT-CH
REC HEAD
RIGHT-CH
EQ SW
REC AMP
IC2 LM1036DN
HX PC-B PCM-039
REC MUTE "H"
LOGIC PC-B


PLAY
+10V
REC LAMP
REC
STOP
FF
REW
PAUSE
R.M.
GND
A/PLAY
-/REW
REMOTE CONNECTOR
IC-1 74C00
IC-2 74C04
IC-3 74C08
IC-4 74C00
IC-5 74C04
IC-6 TC9212P
D01 ~ 8,21,22 1N4448
D01 ~ D08 2SC1815GR
PA LAMP
PL LAMP
REC LAMP
12V 40mA T3φ C-2V±3
KEY SW PCB PCM004
SELECT SW
NON SHORT
2/6
PWR SW
CO01
FUSE
EX
SD65P-E
PME265 MA447
T315mA
EZ
SD65P
0E7100FZ472P
UL, CSA
125VAC
6AM—1A
VOLTAGE SELECTOR
120V
100V
240V
220V
FUSE PCB(1) PCM 037
FUSE PCB(2) PCM038
SEMKO ONLY
SK, SG
P0013
P0014
SDG1P TV-3
AC23V
AC2.7V
AC21V
AC32V
RB152
AMP PCB
PWR/MUTE
P/B MUTE
TAPE
MONITOR SW
NON SHORT LOCK4/2
REC/MUTE
REC



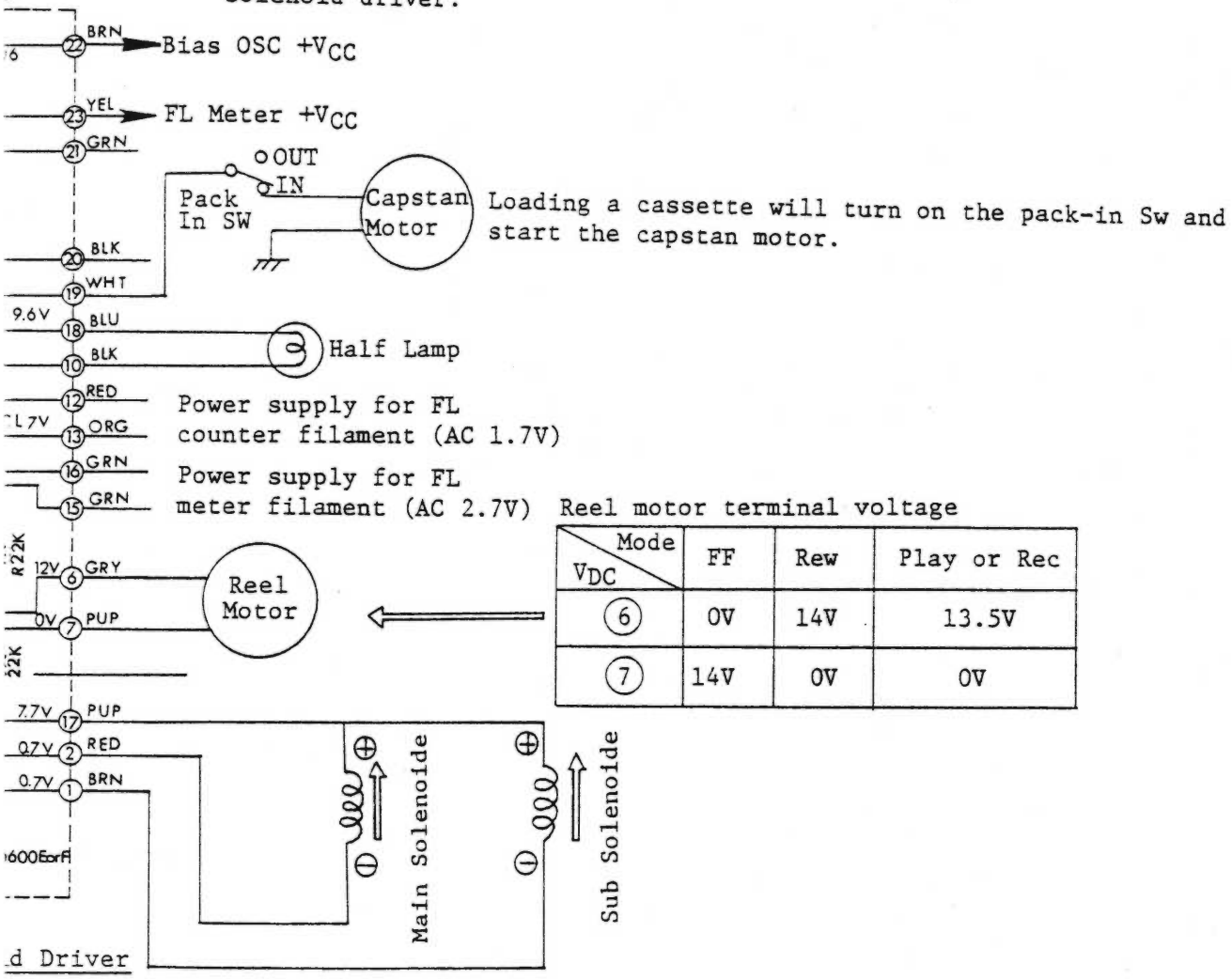
K-15 AUDIO CIRCUIT



K-15 CONTROL CIRCUIT

Tape Position Control Timing for REC/Pause "ON"

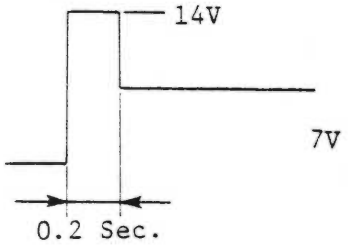
When Q03 turns on in the REC mode and the pause button is depressed, the tape is backed off a little by delaying the off timing of the secondary solenoid driver.



Mode / V_{DC}	FF	Rew	Play or Rec
6	0V	14V	13.5V
7	14V	0V	0V

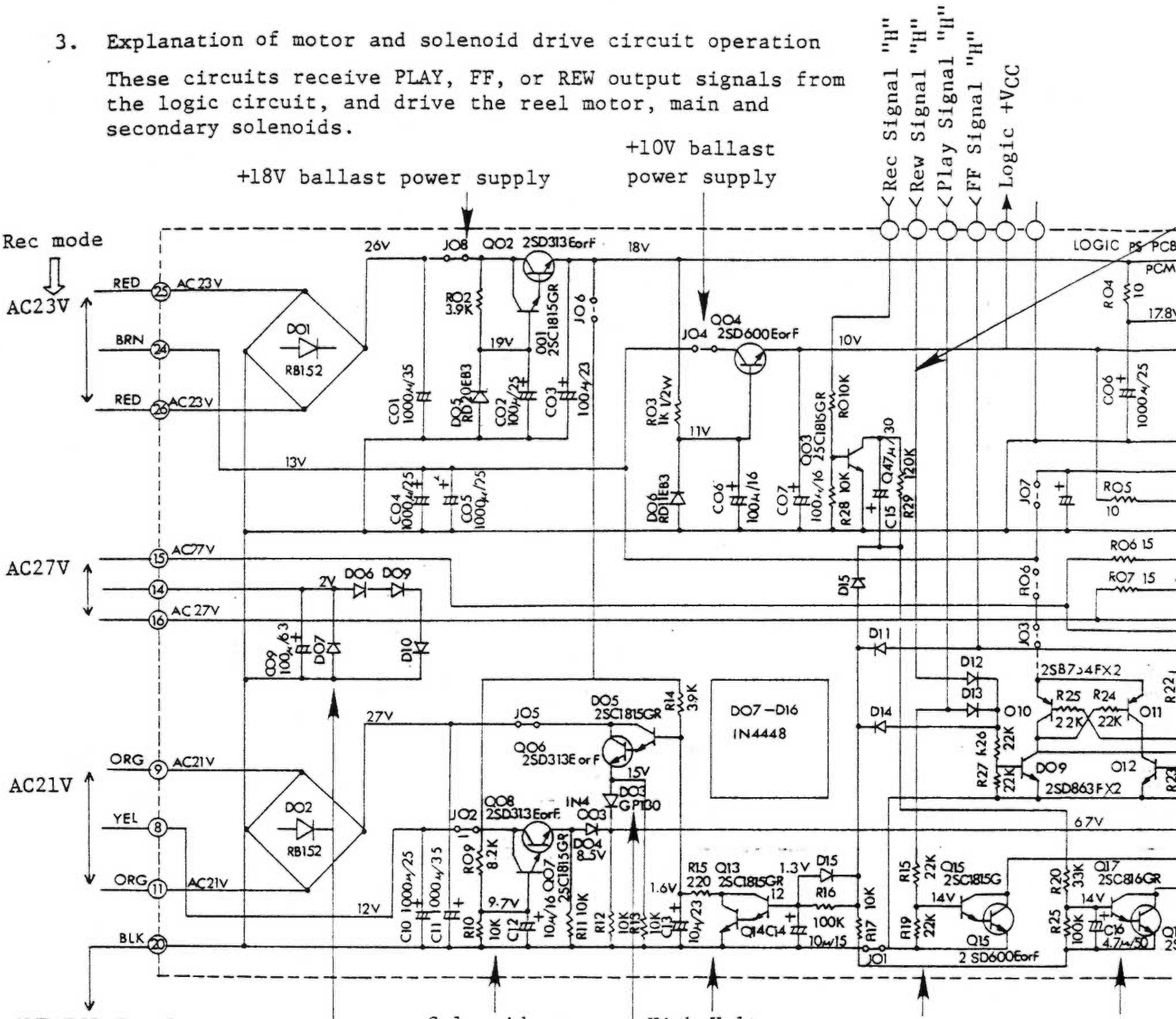
PLAY or REW signal goes "H".

wing voltage waveform occurs across
solenoid on the rise of the REC mode.
Pin, Cold 2 Pin

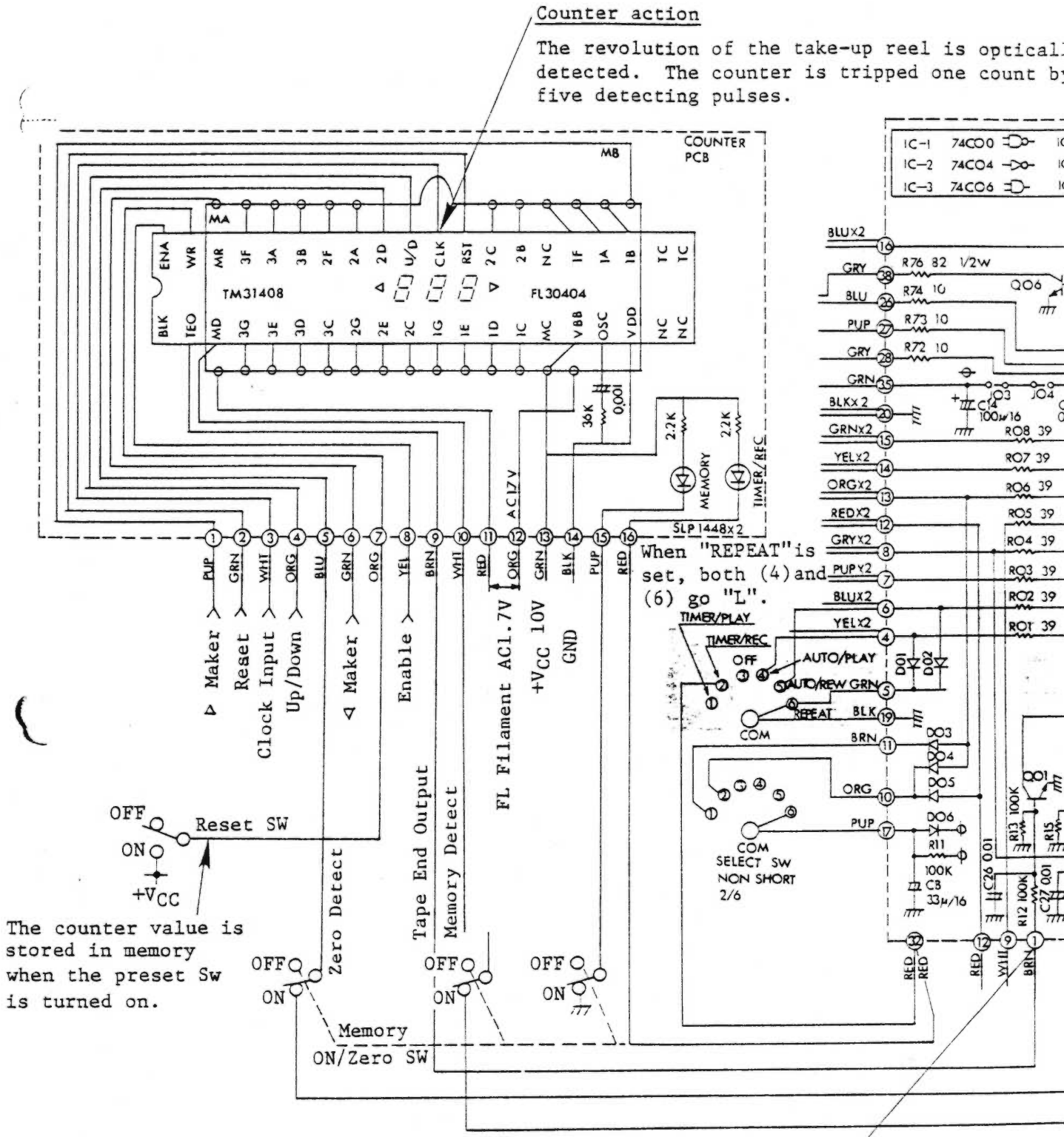


3. Explanation of motor and solenoid drive circuit operation

These circuits receive PLAY, FF, or REW output signals from the logic circuit, and drive the reel motor, main and secondary solenoids.

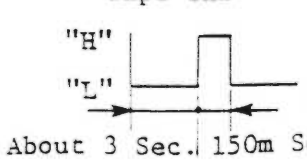


2. Explanation of tape counter circuit operation



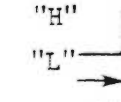
Tape End Auto Stop

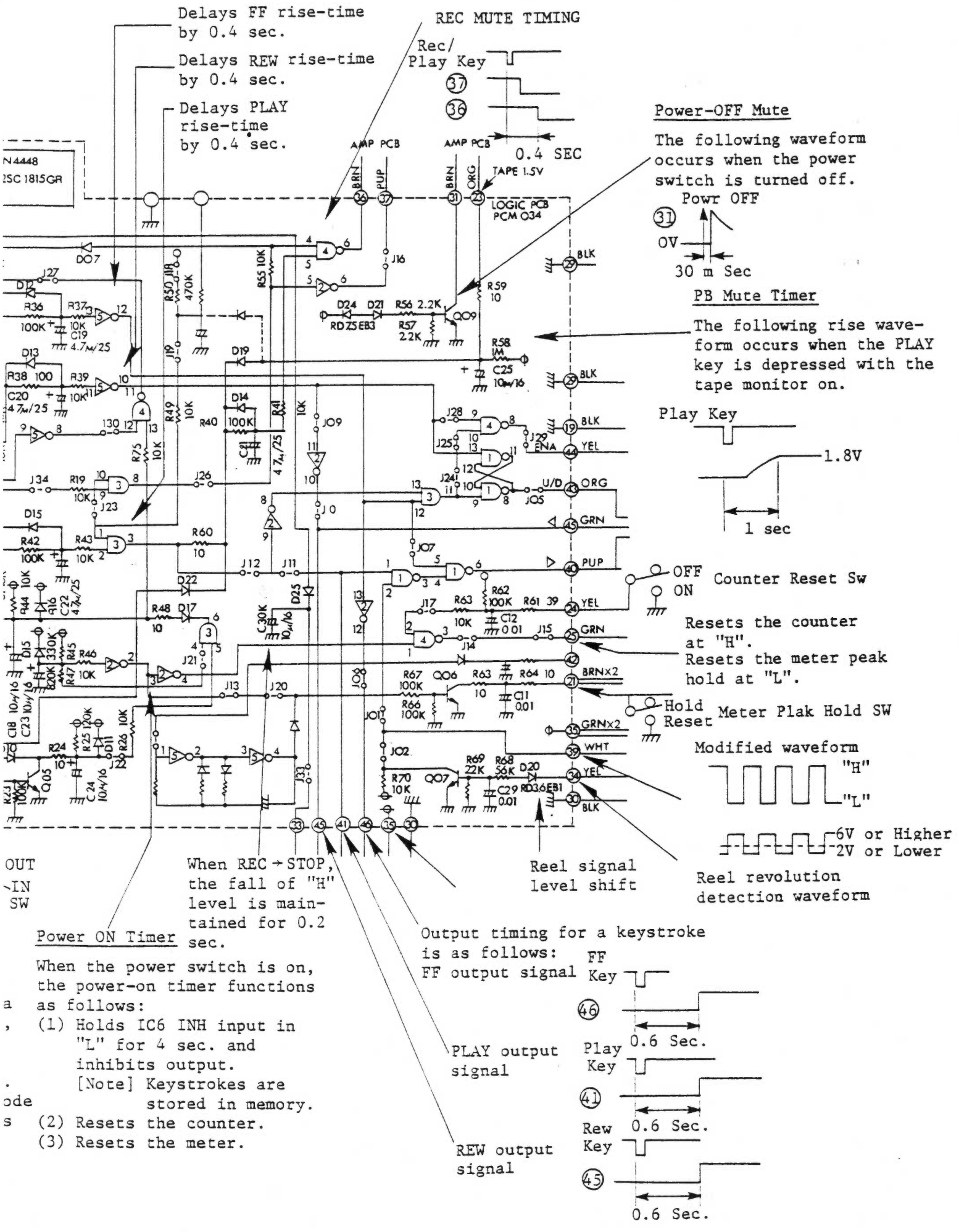
The following waveform is applied when tape end is detected in the PLAY, FF, or REW mode.

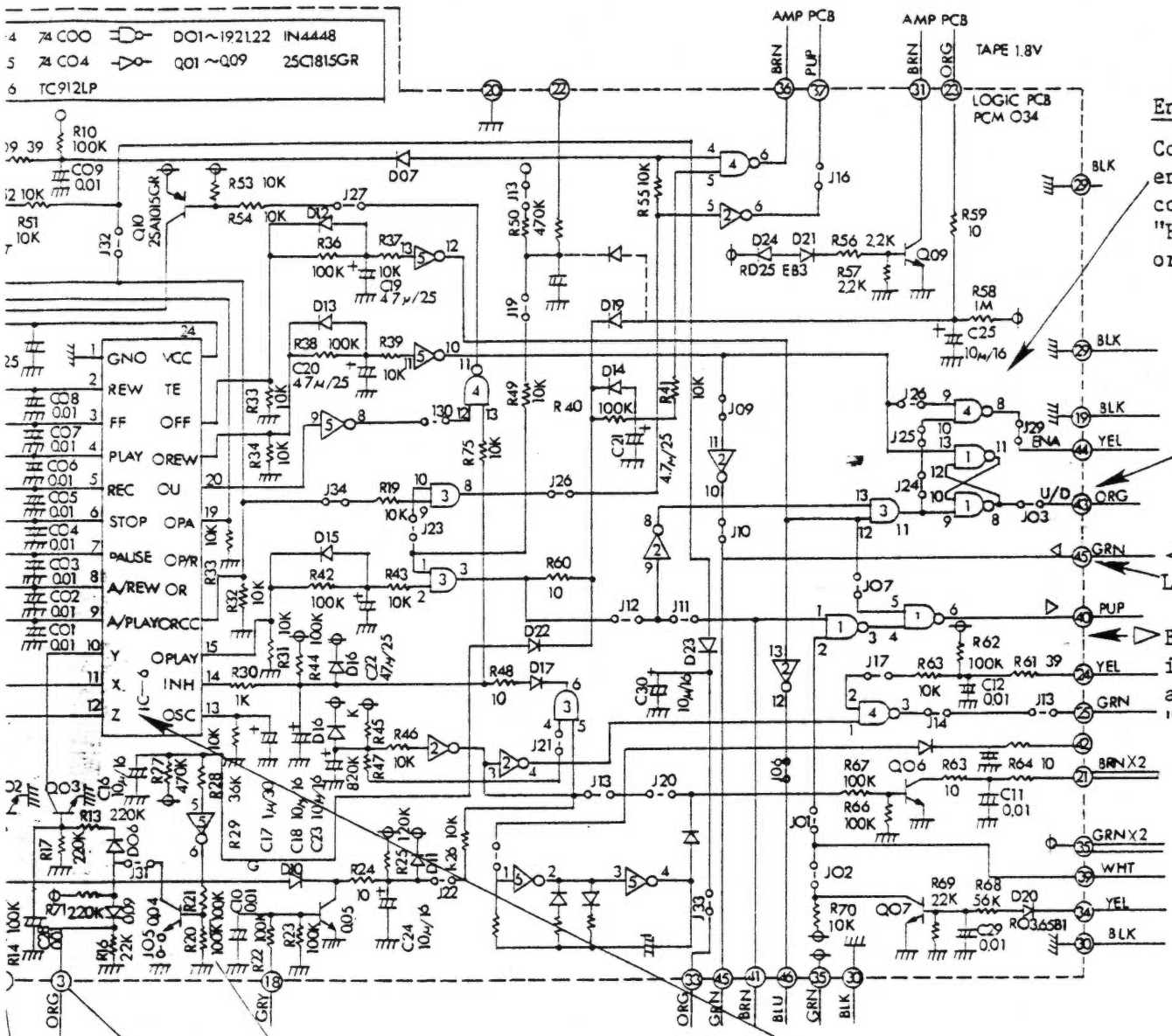


Acts as AU
pin when t
The follow
only in th

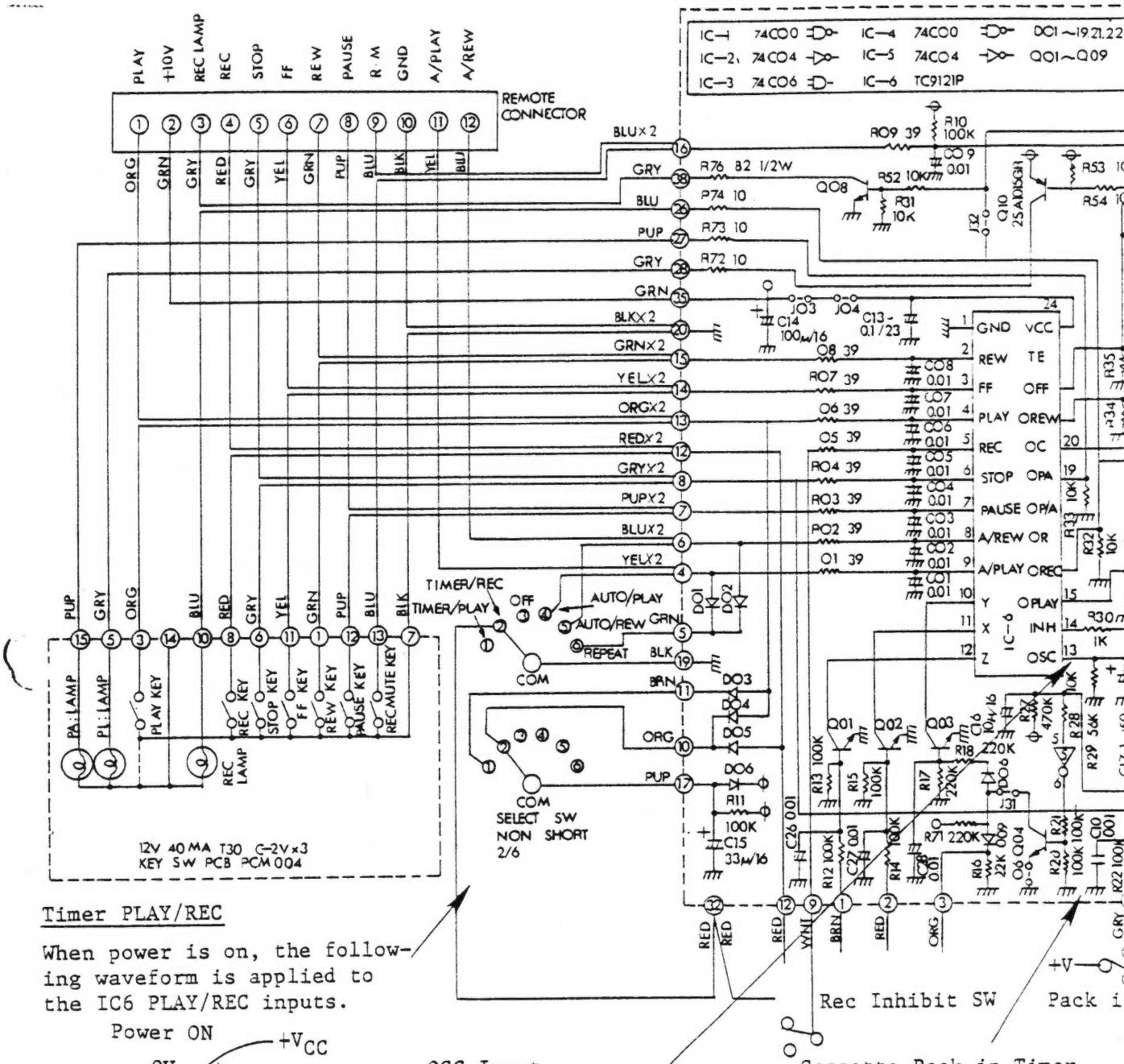
Counter ze




Delays FF rise-time by 0.4 sec.
Delays REW rise-time by 0.4 sec.
Delays PLAY rise-time by 0.4 sec.
REC MUTE TIMING
Rec/ Play Key
0.4 SEC
AMP PCB
TAPE 1.5V
LOGIC PCB PCM 034
Power-OFF Mute
The following waveform occurs when the power switch is turned off.
Powr OFF
OV
30 m Sec
PB Mute Timer
The following rise waveform occurs when the PLAY key is depressed with the tape monitor on.
Play Key
1.8V
1 sec
OFF
ON
Counter Reset Sw
Resets the counter at "H".
Resets the meter peak hold at "L".
Hold
Reset
Meter Plak Hold SW
Modified waveform
"H"
"L"
6V or Higher
2V or Lower
Reel revolution detection waveform
Reel signal level shift
When REC → STOP, the fall of "H" level is maintained for 0.2 sec.
Power ON Timer
When the power switch is on, the power-on timer functions as follows:
(1) Holds IC6 INH input in "L" for 4 sec. and inhibits output.
[Note] Keystrokes are stored in memory.
(2) Resets the counter.
(3) Resets the meter.
Output timing for a keystroke is as follows:
FF output signal
PLAY output signal
REW output signal
FF Key
0.6 Sec.
Play Key
Rew Key
0.6 Sec.
0.6 Sec.

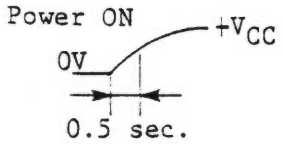

AMP PCB
AMP PCB
TAPE 1.8V
LOGIC PCB
PCM 034
Enable
Controls the tape end output from the counter, and is ke "H" in the FF, REW or PLAY mode.
Controls up coun and down count. (up in "H" and down in "L".)
Marker
Lights up in "H".
Blinks the ▷ mar in the PLAY mode, and lights it "H".
Auto REW Inhibit Timer
Inhibits Auto REW input for about 4 seconds after the rise of the PLAY mode.
(1) Tape start ∿ Tape end repeat
Actuate when ⊓⊔ pulses are applied to the Z input of TC9121P.
(2) Counter zero ∿ preset memory repeat
Actuates when ⊓⊔ pulses are applied to the X and Y inputs of TC9121P.
/PLAY or AUTO/PLAY input
counter indicates zero.
g waveform is applied
REW mode.
Acts as AUTO/REW input pin when APR memory is in the preset position.
The following waveform is applied to the input in the PLAY/REC mode.
position
Counter preset position
"H"
"L"
Sec
150m Sec

1-4. Explanation of logic control circuit operation (Fig. 1)



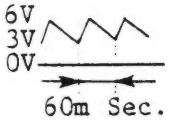
Timer PLAY/REC

When power is on, the following waveform is applied to the IC6 PLAY/REC inputs.



OSC Input

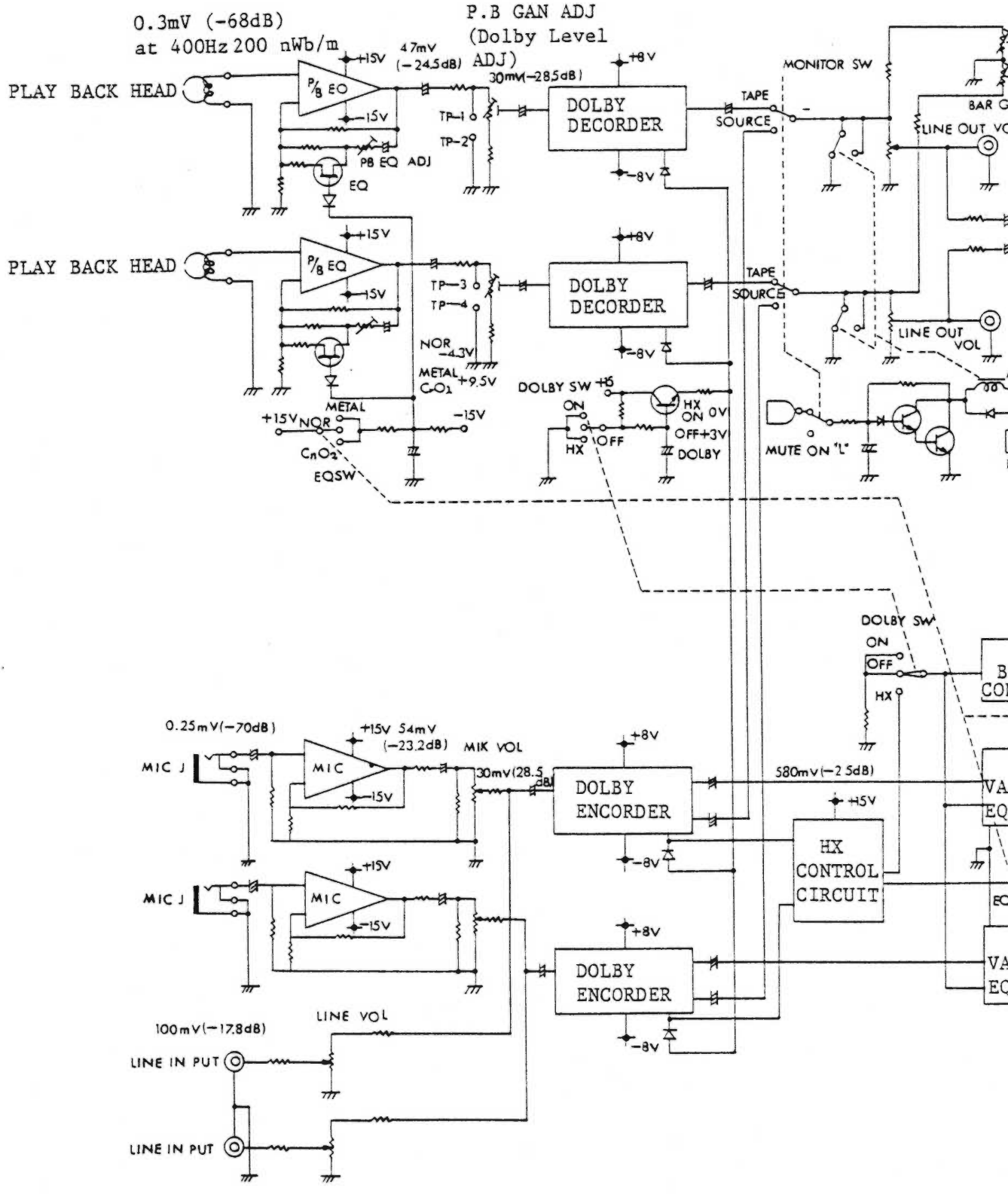
Oscillation waveform for IC6 internal clock is generated at all times.



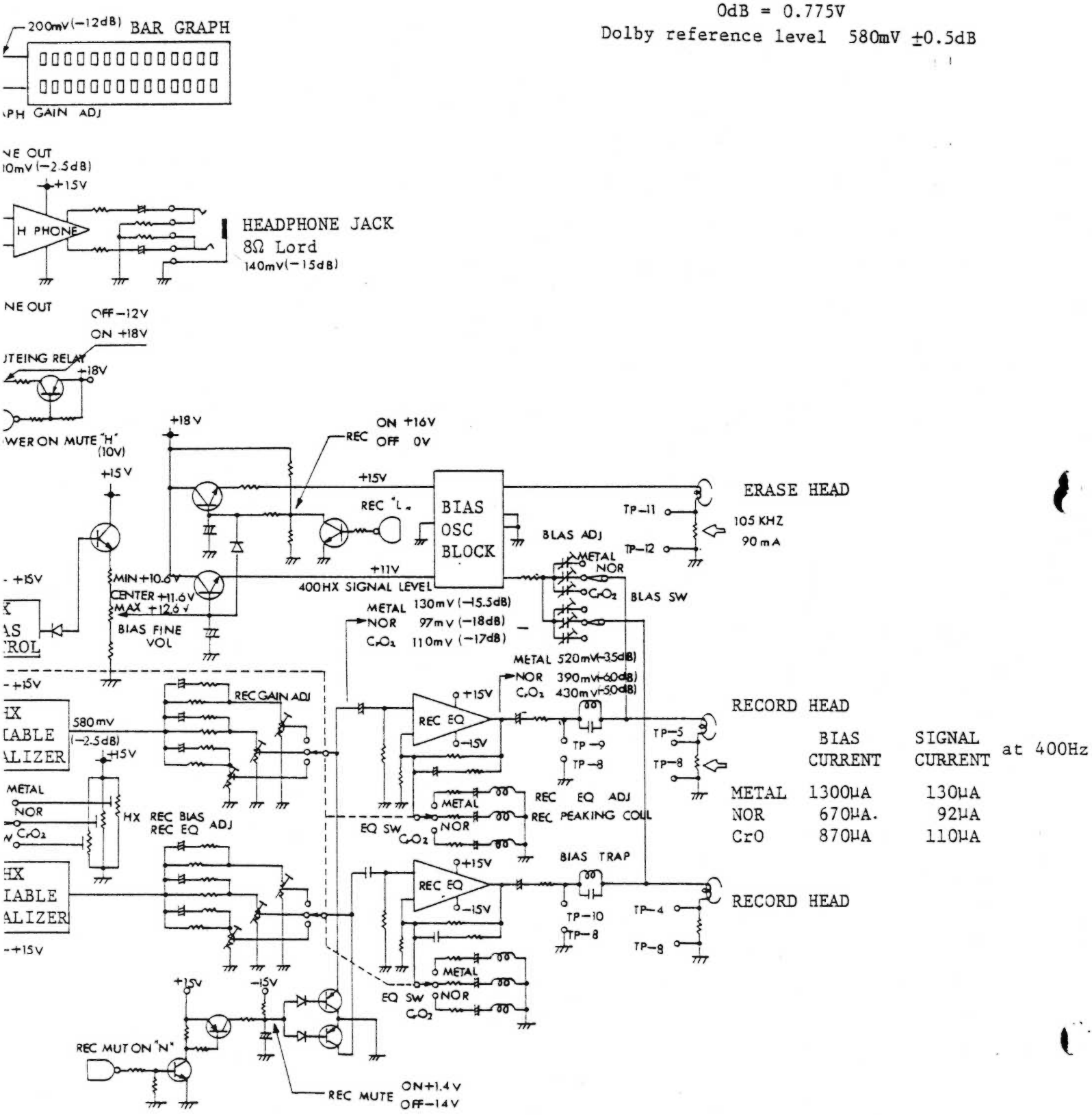
Cassette Pack in Timer

(1) Holds IC6 INH input in "L" about 1 sec. after cassette half is loade and inhibits output.
[Note] Keystrokes are stored in memor

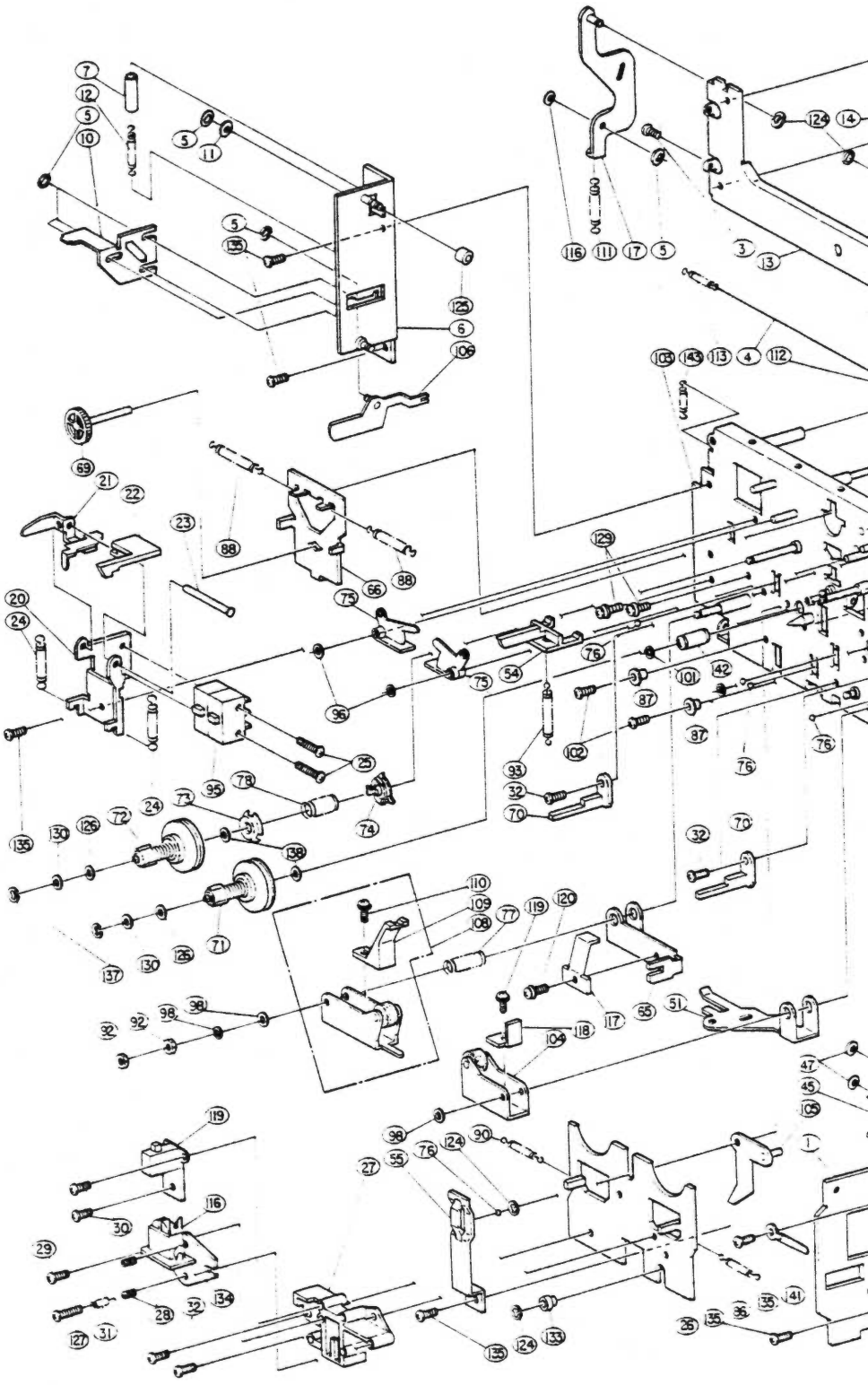
(2) Locks IC6 in the stop when no cassette half loaded.

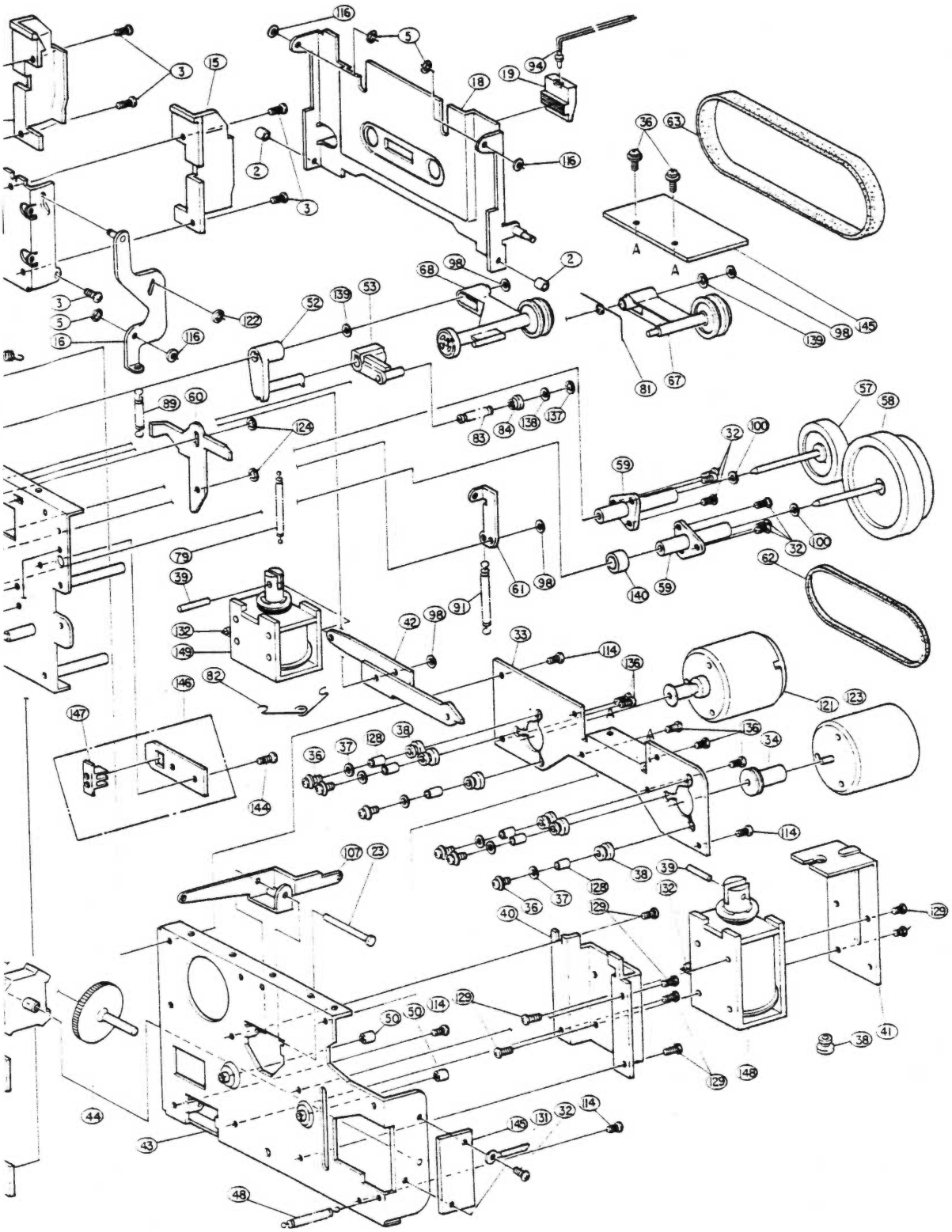

0.3mV (-68dB)
at 400Hz 200 nWb/m
PLAY BACK HEAD
P/B EQ
+15V
-15V
47mV
(-24.5dB)
P.B GAN ADJ
(Dolby Level
ADJ)
30mV(-28.5dB)
TP-1
TP-2
PB EQ ADJ
EQ
DOLBY
DECORDER
+8V
-8V
TAPE
SOURCE
MONITOR SW
BAR G
LINE OUT VO
PLAY BACK HEAD
TP-3
TP-4
NOR -4.3V
METAL +9.5V
METAL
NOR
CrO2
EQSW
LINE OUT
VOL
DOLBY SW
ON
OFF
HX
HX ON 0V
OFF+3V
DOLBY
MUTE ON "L"
0.25mV(-70dB)
MIC J
MIC
+15V 54mV
(-23.2dB)
MIK VOL
30mV(28.5
DOLBY
ENCORDER
580mV(-2.5dB)
HX
CONTROL
CIRCUIT
100mV(-17.8dB)
LINE VOL
LINE IN PUT

0dB = 0.775V
Dolby reference level 580mV ±0.5dB



	BIAS CURRENT	SIGNAL CURRENT	at 400Hz
METAL	1300μA	130μA	
NOR	670μA.	92μA	
CrO	870μA	110μA	

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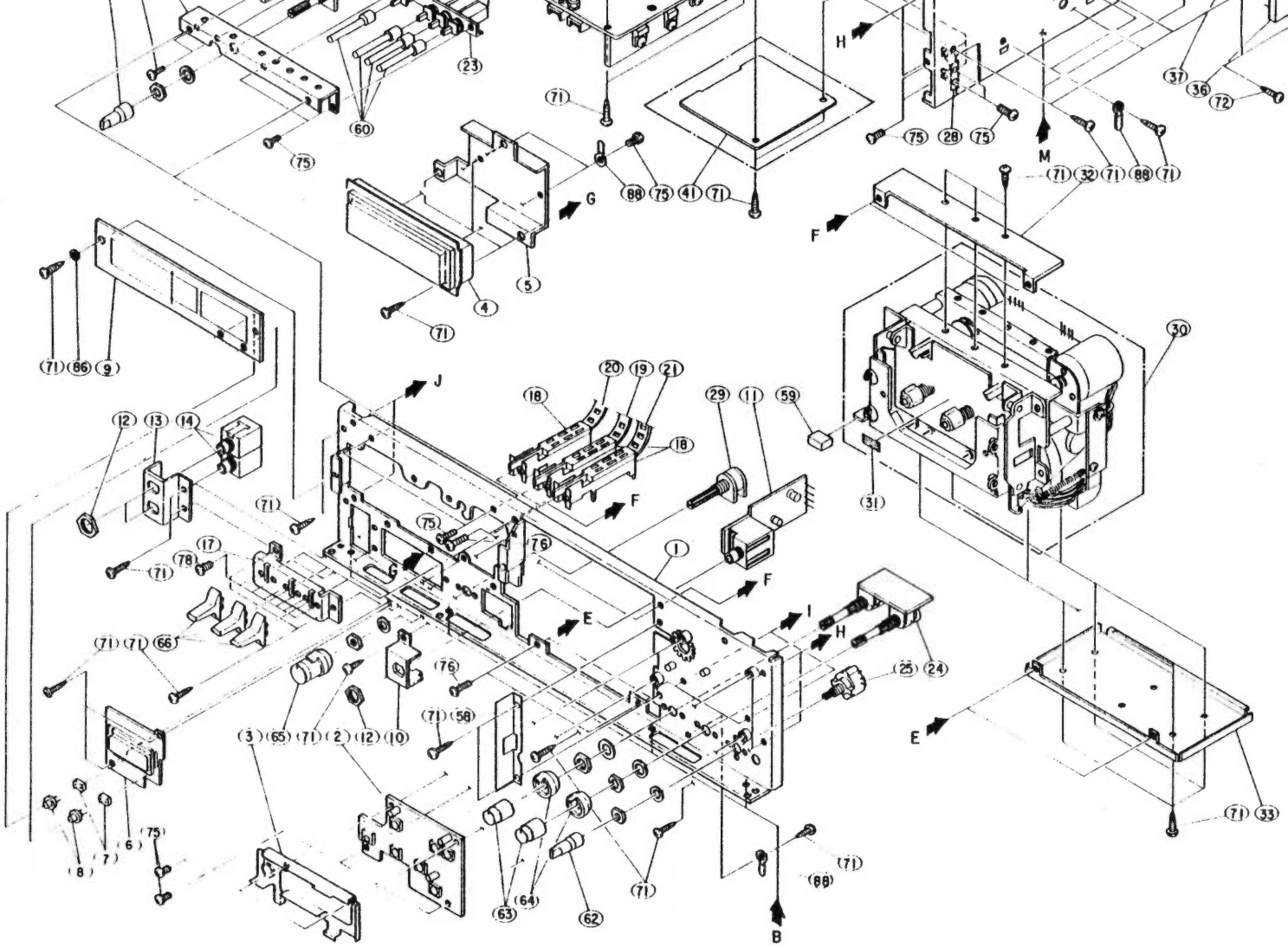
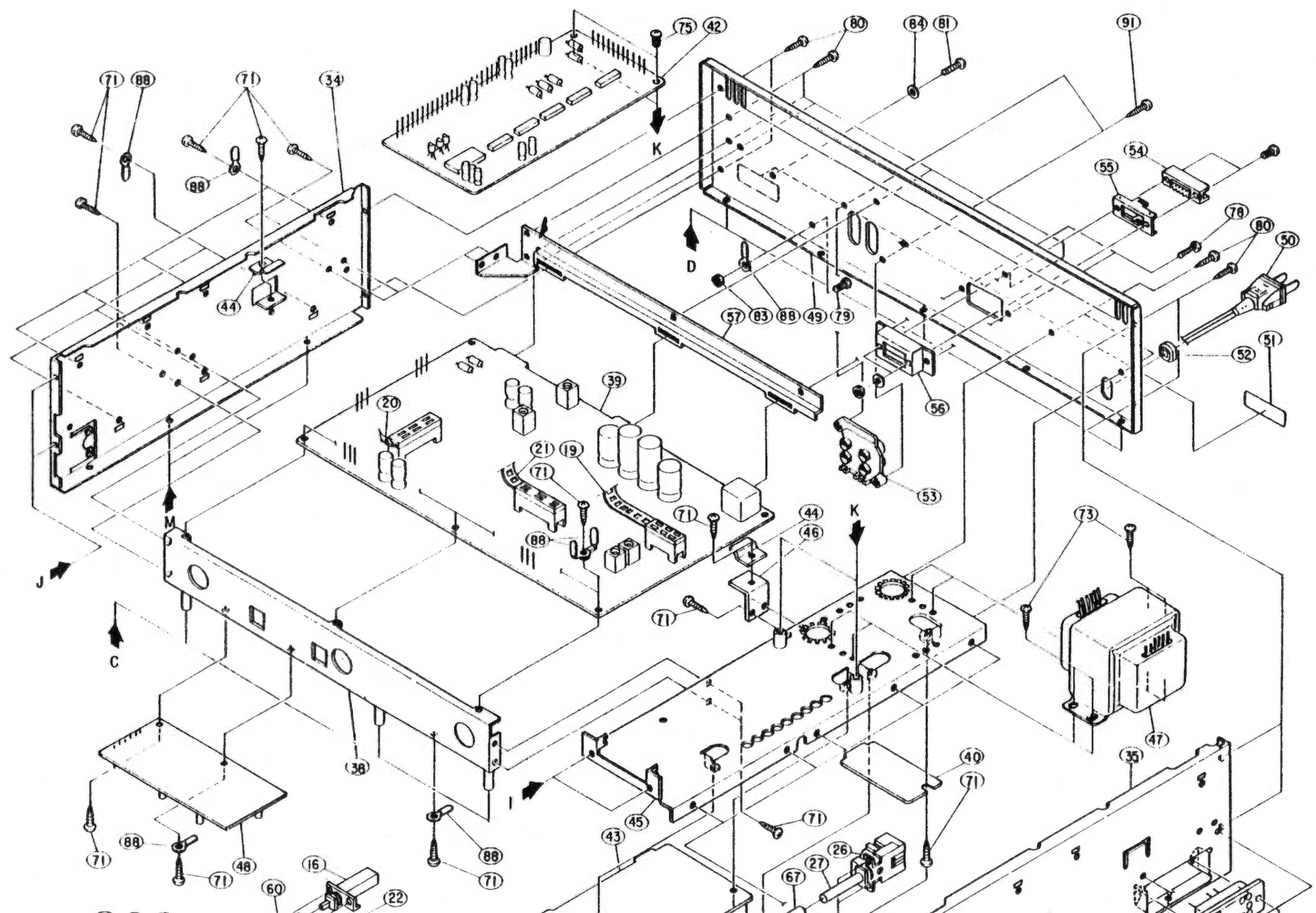

K-15 1979.12



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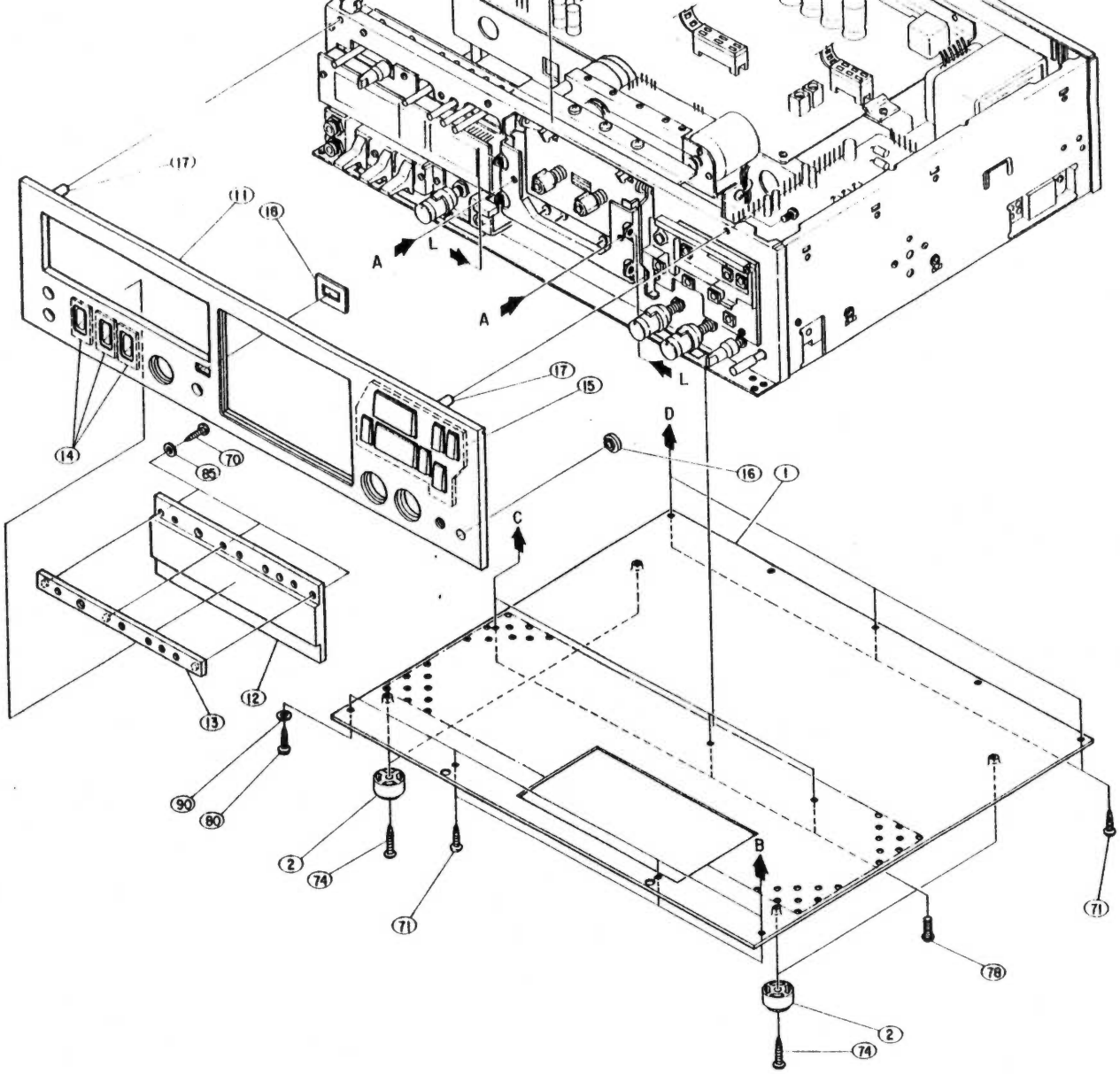

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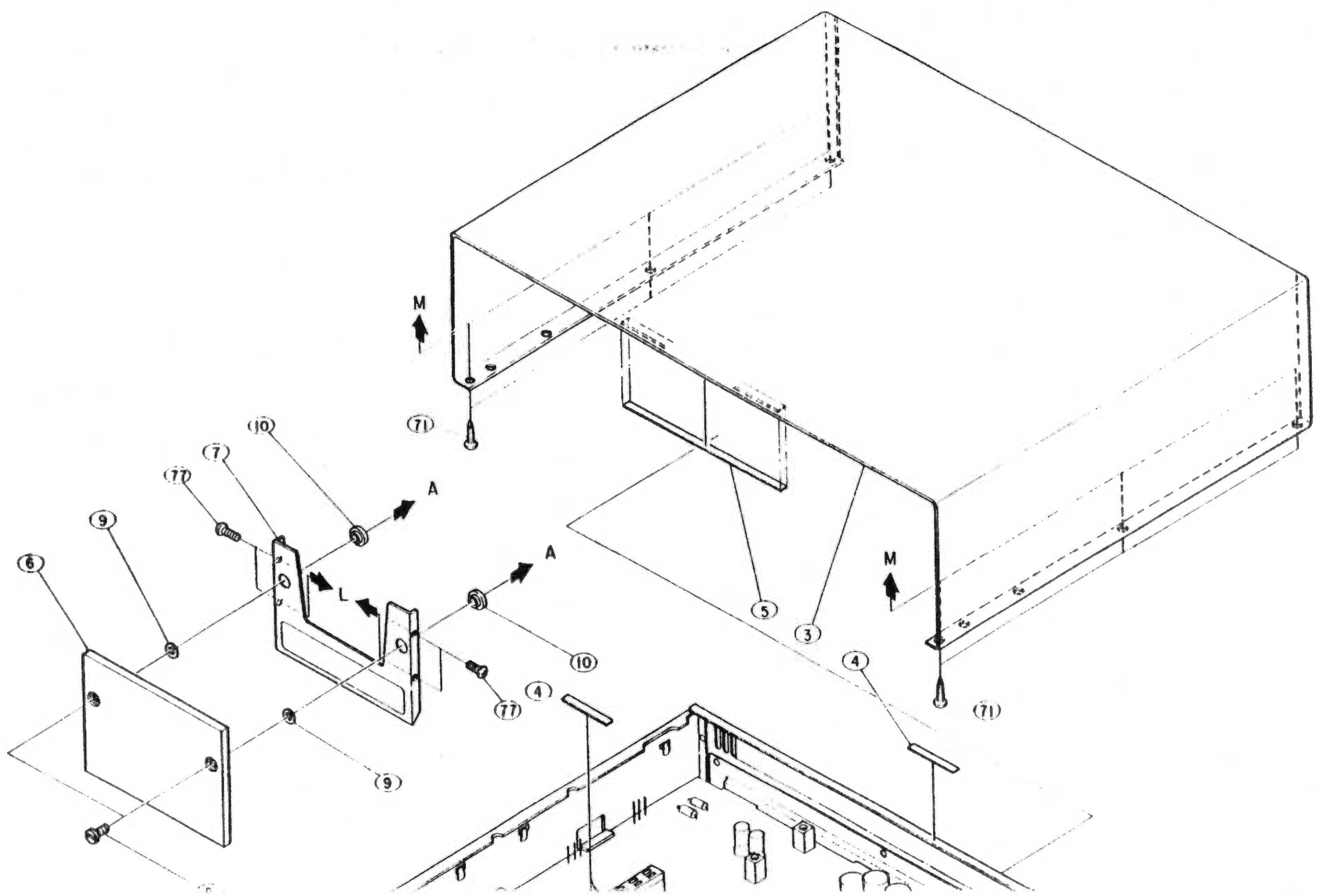

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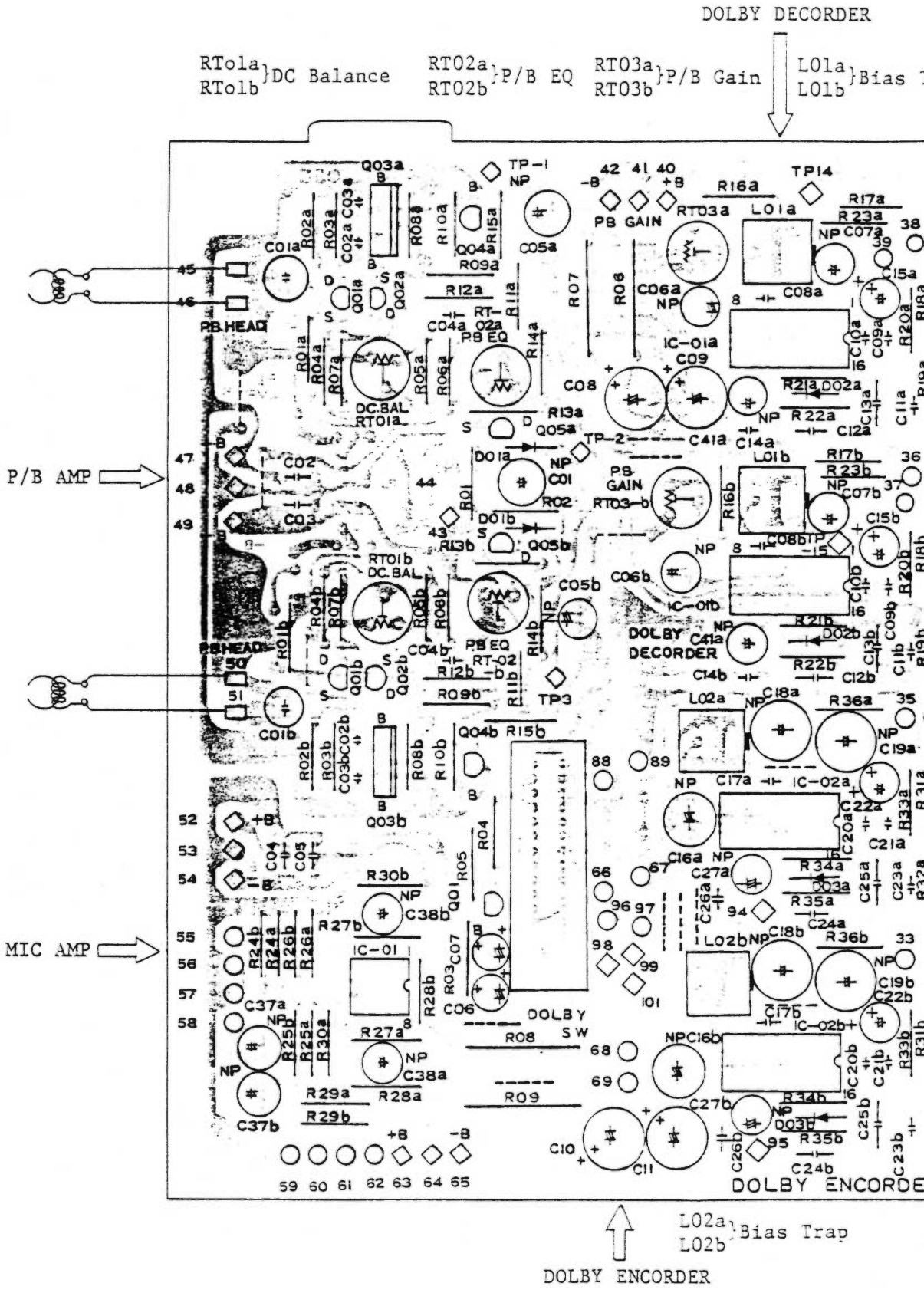
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RTo1b
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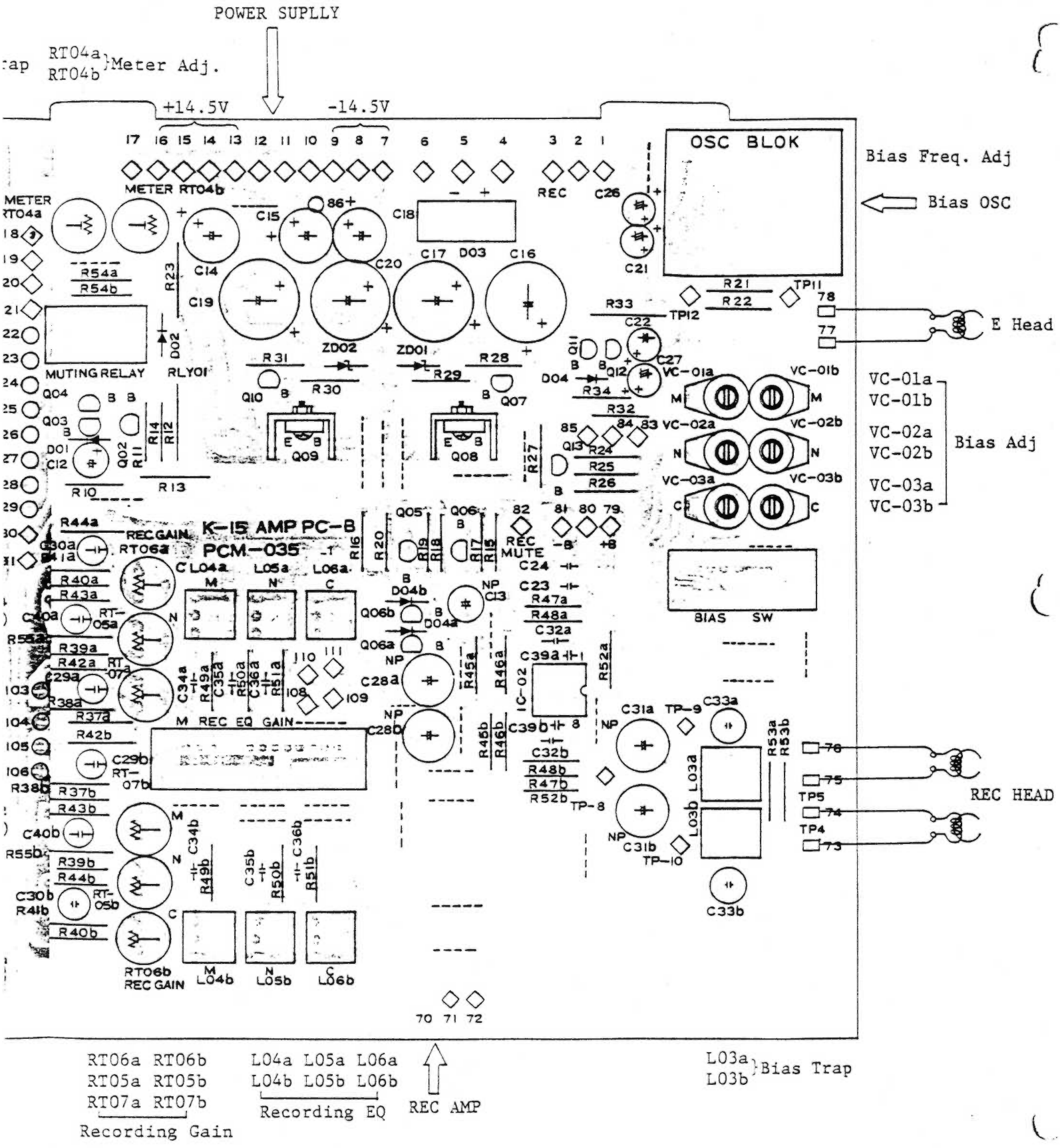
RT02a
RT02b
P/B EQ
RT03a
RT03b
P/B Gain
L01a
L01b
Bias
P/B AMP
MIC AMP
PB HEAD
PB GAIN
DC BAL
PB EQ
DOLBY
SW
DOLBY DECORDER
DOLBY ENCORDE
L02a
L02b
Bias Trap
DOLBY ENCORDER

From 301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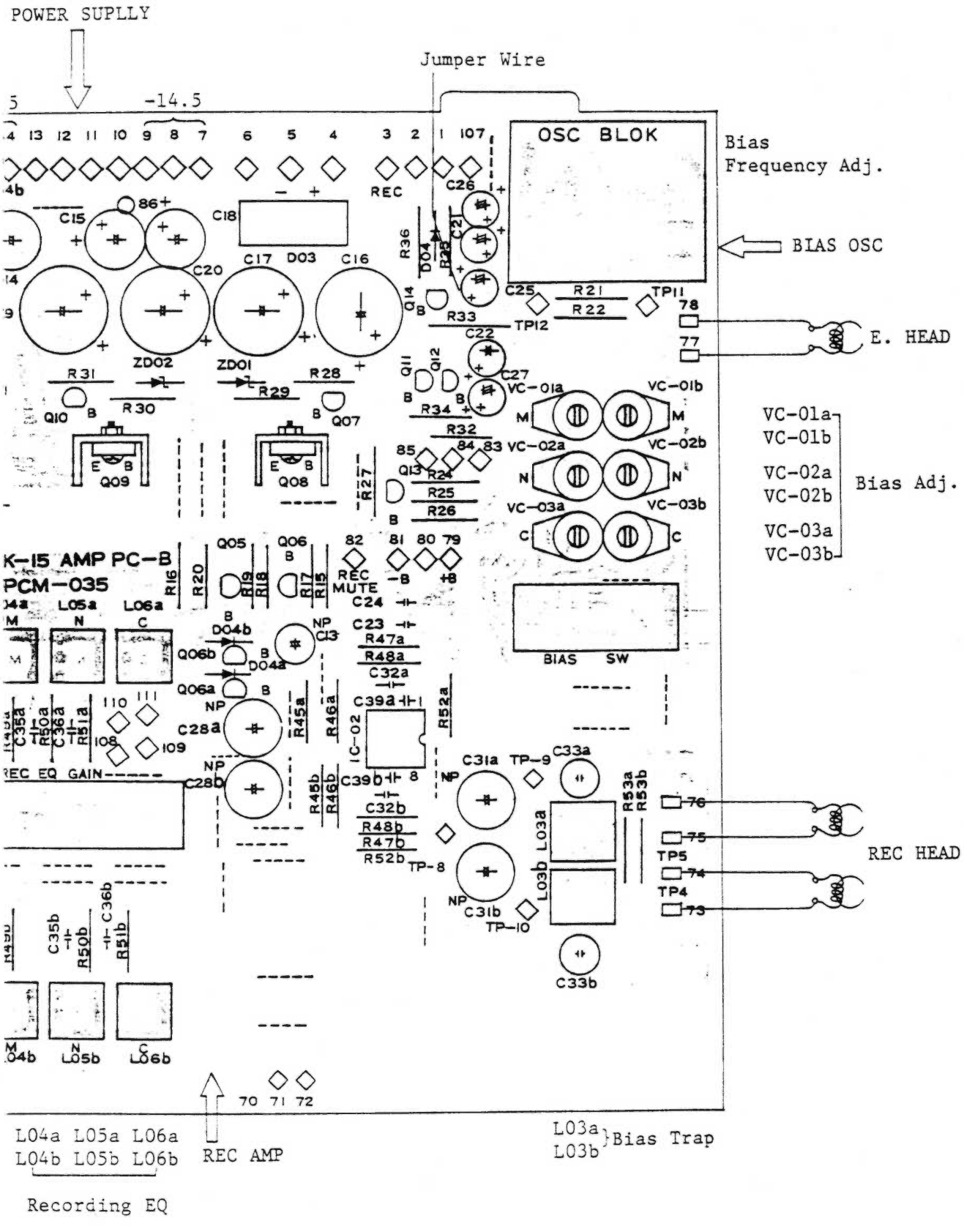
RT04b
Meter Adj.
+14.5V
-14.5V
OSC BLOK
Bias Freq. Adj
Bias OSC
METER
METER RT04a
METER RT04b
MUTING RELAY
RLY01
K-15 AMP PC-B
PCM-035
REC GAIN
RT06a
RT06b
REC GAIN
REC MUTE
BIAS SW
M REC EQ GAIN
E Head
REC HEAD
VC-01a
VC-01b
VC-02a
VC-02b
VC-03a
VC-03b
Bias Adj
L04a L05a L06a
L04b L05b L06b
Recording EQ
REC AMP
RT06a RT06b
RT05a RT05b
RT07a RT07b
Recording Gain
L03a
L03b
Bias Trap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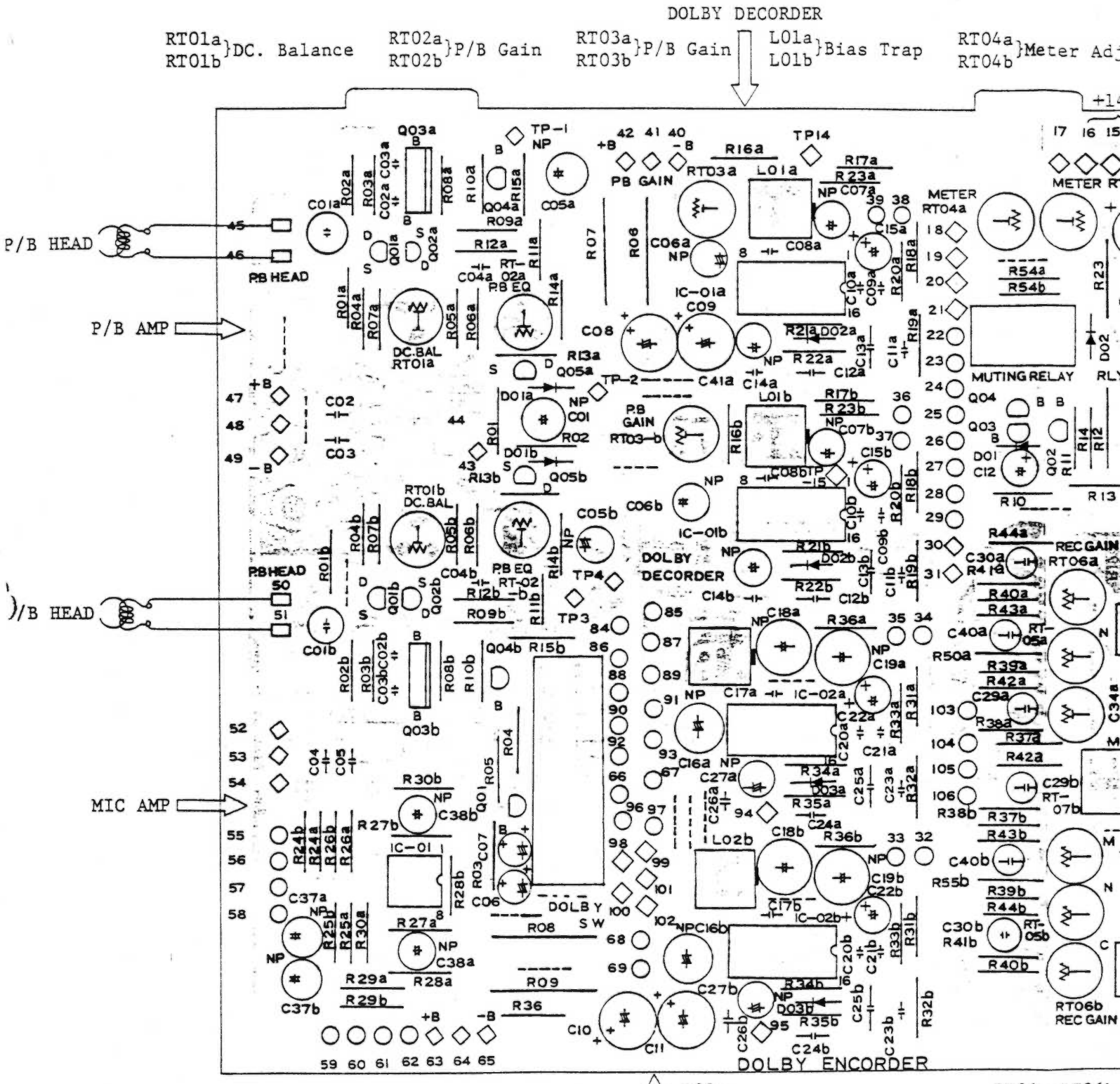
Jumper Wire
-14.5
OSC BLOK
Bias
Frequency Adj.
BIAS OSC
E. HEAD
VC-01a
VC-01b
VC-02a
VC-02b
VC-03a
VC-03b
Bias Adj.
REC HEAD
BIAS SW
REC MUTE
REC EQ GAIN
L04a L05a L06a
L04b L05b L06b
Recording EQ
REC AMP
L03a
L03b
Bias Trap


DOLBY DECORDER
RT01a RT01b }DC. Balance
RT02a RT02b }P/B Gain
RT03a RT03b }P/B Gain
L01a L01b }Bias Trap
RT04a RT04b }Meter Adj
P/B HEAD
P/B AMP
P/B HEAD
P/B HEAD
MIC AMP
DOLBY ENCORDER
L02a L02b }Bias Trap
DOLBY ENCORDER
RT06a RT06b
RT05a RT05b
RT07a RT07b
Recording Gai

From 1 to 300

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