

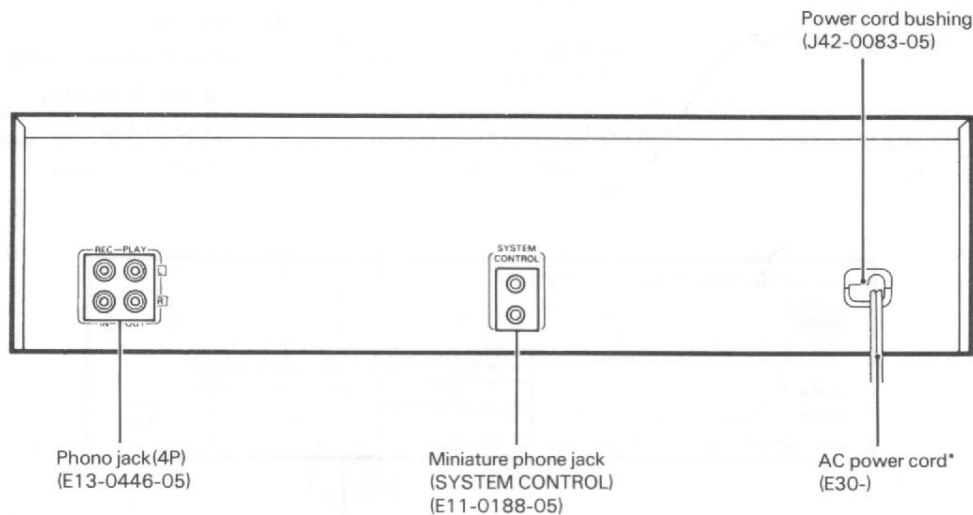
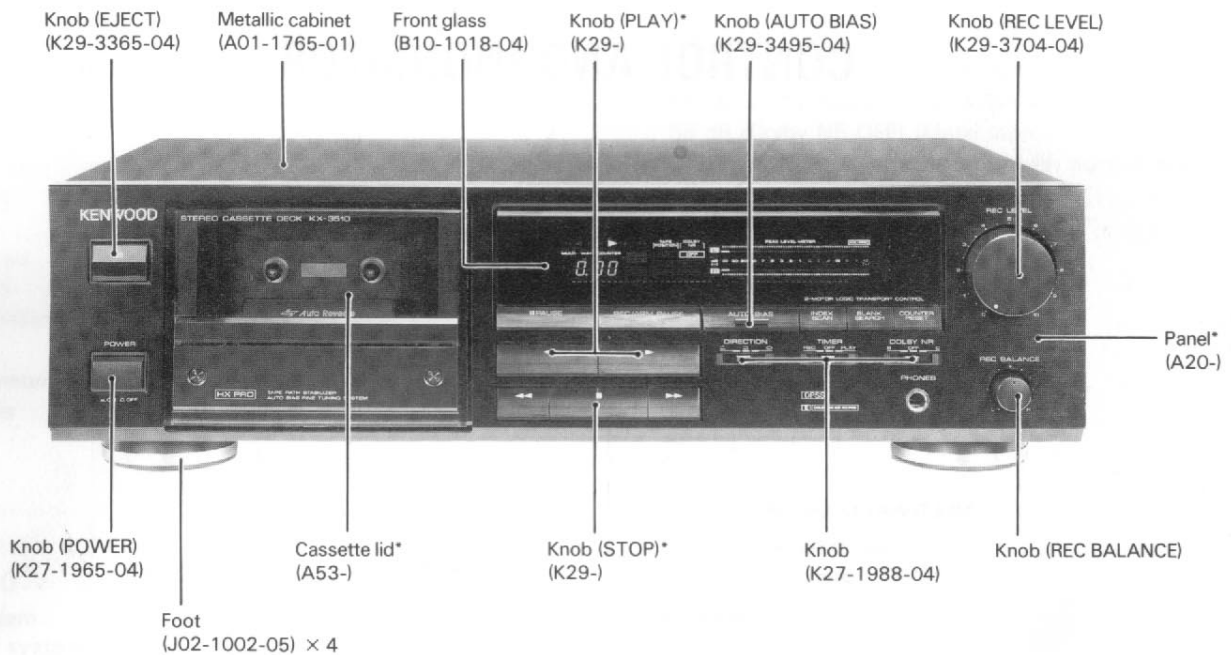
STEREO CASSETTE DECK

# KX-3010/3510

## SERVICE MANUAL

# KENWOOD

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B51-3800-00(B)3021



KX-3010 is not provided with Auto Reverse Function. This description and drawings are based on the Auto Reverse Mechanism.

Shown above is KX-3510  
\*Refer to parts list on page 45.

# KX-3010/3510

## SPECIFICATIONS

### KX-3010

Track system.....	4-Track, 2-channel stereo
Recording system.....	AC Bias System
Head.....	Record/play/erase x 1
Motor.....	x 1
Wow & flutter.....	0.08% (W.R.M.S.) ±0.18% (DIN)
Fast-winding time.....	Approx. 90 seconds (C-60)
Frequency response	
Normal tape:.....	30 ~ 16,000 Hz ±3 dB
CrO <sub>2</sub> tape:.....	30 ~ 17,000 Hz ±3 dB
Metal tape:.....	30 ~ 18,000 Hz ±3 dB
Signal-to-noise ratio.....	73 dB (Dolby C-type NR ON) (Metal tape) 66 dB (Dolby B-type NR ON) (Metal tape) 58 dB (Dolby NR OFF) (Metal tape)
Harmonic distortion.....	0.6% (at 1 kHz, 0 dB, 3rd H.D. with normal tape)
Input jacks	
LINE IN:.....	77.5 mV/50 kohms
Output jacks	
LINE OUT:.....	490 mV/2 kohms
Headphones:.....	3 mW/8 ohms
General	
Power consumption.....	23 W
Dimensions.....	W: 440 mm H: 127 mm D: 327 mm
Weight.....	4.8 kg (net)

### KX-3510

Track system.....	4-track, 2-channel stereo
Recording system.....	AC Bias System
Head.....	Record/play/erase x 1
Motor.....	x 1
Wow & flutter.....	0.08% (W.R.M.S.) ±0.18% (DIN)
Fast-winding time.....	Approx. 90 seconds (C-60)
Frequency response	
Normal tape.....	30 ~ 16,000 Hz ±3 dB
CrO <sub>2</sub> tape.....	30 ~ 17,000 Hz ±3 dB
Metal tape.....	30 ~ 18,000 Hz ±3 dB
Signal-to-noise ratio.....	73 dB (Dolby C-type NR ON) (Metal tape) 66 dB (Dolby B-type NR ON) (Metal tape) 58 dB (Dolby NR OFF) (Metal tape)
Harmonic distortion.....	0.8% (at 1 kHz, 0 dB, 3rd H.D. with normal tape)
Input jacks	
LINE IN.....	77.5 mV/50 kohms
Output jacks	
LINE OUT.....	490 mV/2 kohms
Headphones.....	3 mW/8 ohms
General	
Power consumption.....	23 W
Dimensions.....	W: 440 mm (17-5/16) H: 127 mm (5) D: 327 mm (12-7/8)
Weight.....	4.8 kg (10.6 lb) (net)

Note:

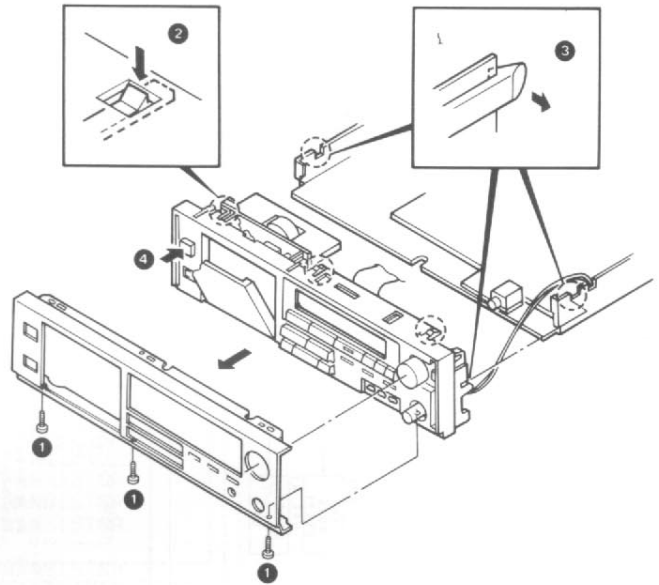
KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

# KX-3010/3510

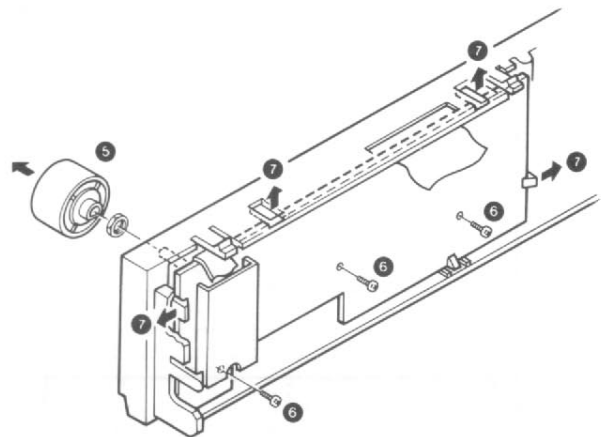
## DISASSEMBLY FOR REPAIR

\* Detach the case before hand.

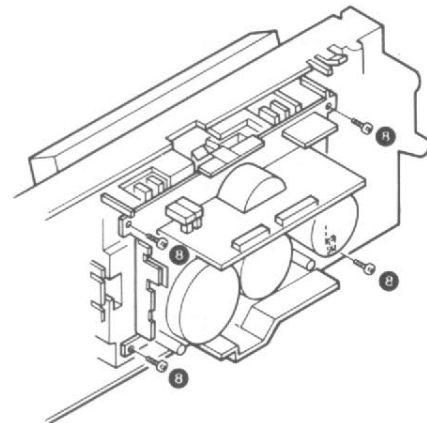
1. Remove the three screws **1** Fixing the front panel.
2. Press the three claws **2** on the upper side, press the two claws **3** on the side, and take out the sub-panel.
3. Press the EJECT key **4** , and open the cassette lid.



4. Take out the REC LEVEL Knob **5** .
5. Remove the hexagonal nut of the REC LEVEL.
6. Remove the three screws **6** .
7. Press the four claws **7** on the sub-panel holding the DISPLAY unit (X25-358).

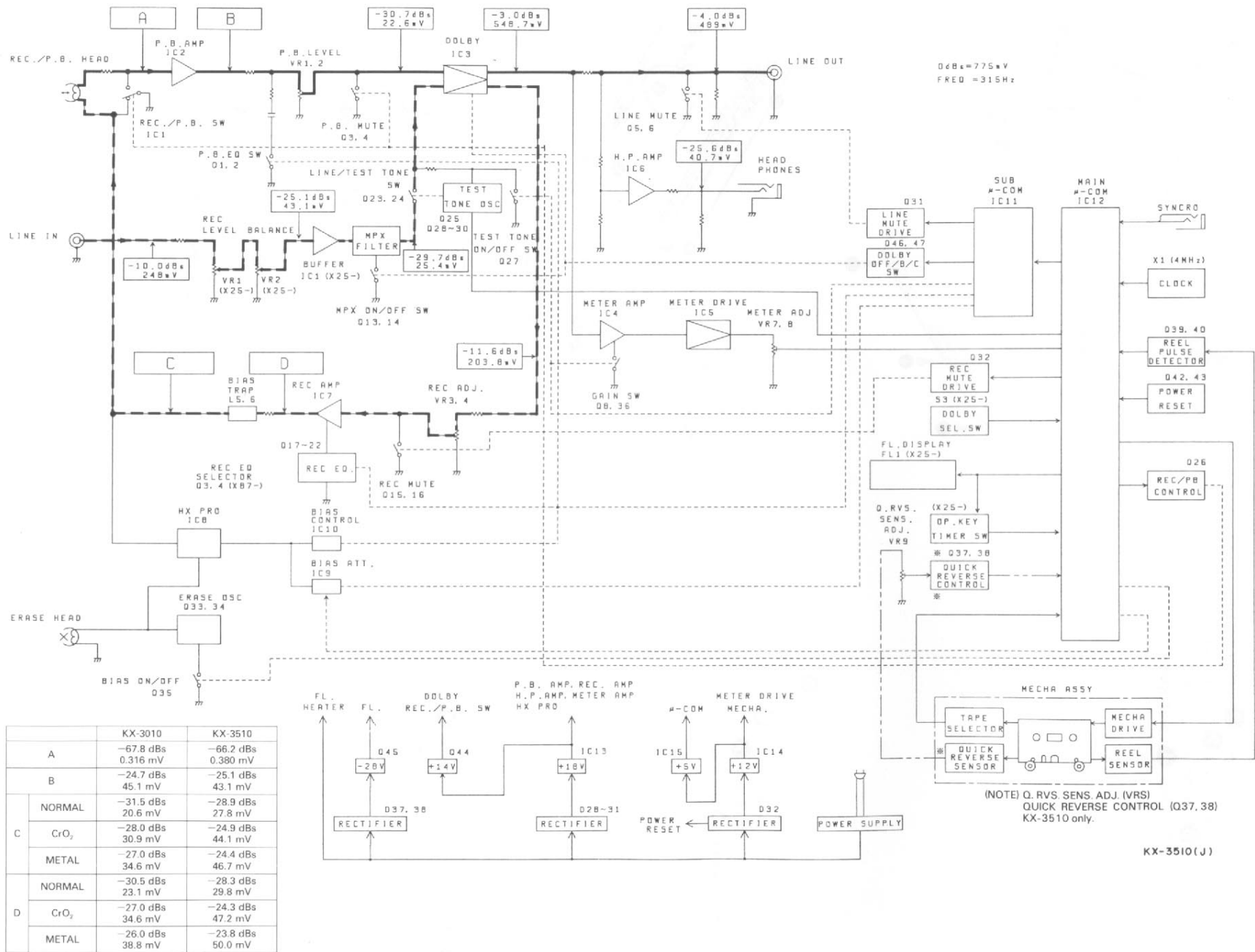


8. Remove the four screws **8** and take out the mechanism ass'y.



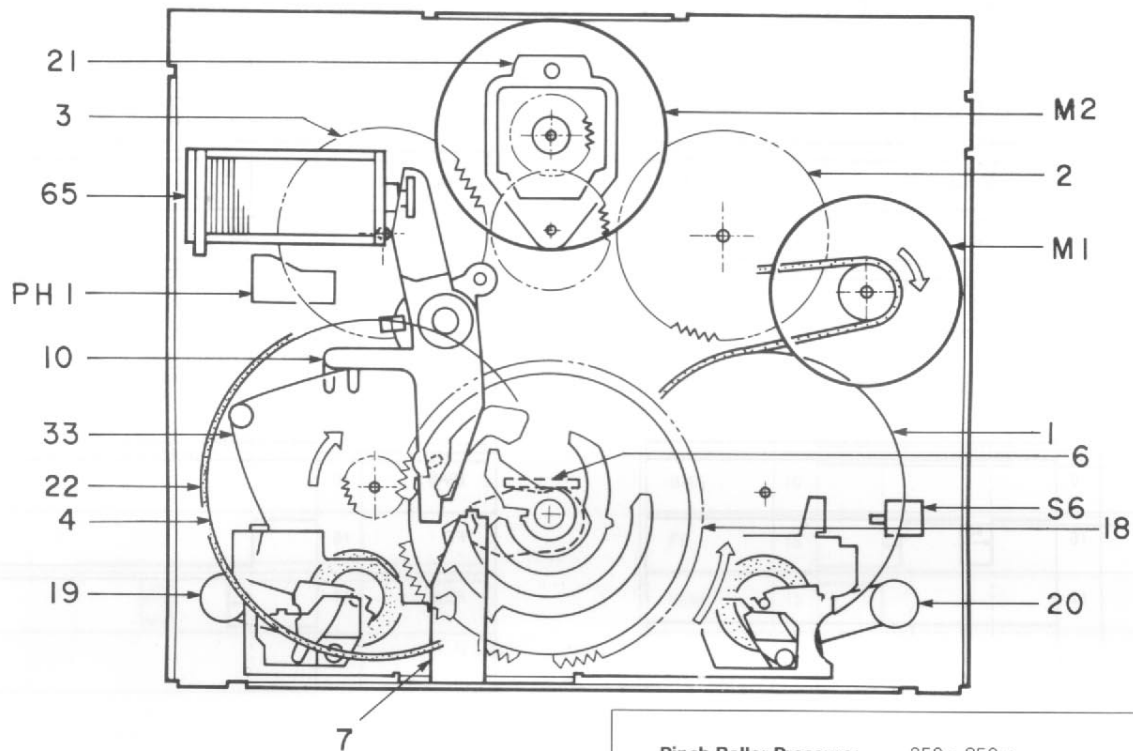
# KX-3010/3510

## BLOCK LEVEL DIAGRAM



# KX-3010/3510

## MECHANISM OPERATION DESCRIPTION



<b>Pinch Roller Pressure:</b>	250~350 g
<b>Take-up Torque:</b>	30~70 g·cm (2.5 V)
<b>FF. REW Torque:</b>	90~180 g·cm (3.8 V)
<b>Back Tension Torque:</b>	2~6 g·cm

KX-3010 is not provided with Auto Reverse Function. This description and drawings are based on the Auto Reverse Mechanism.

### STOP to FWD PLAY/REC Operation

Press the PLAY key.

Only in the STOP to REC mode, the REEL MOTOR rotates in the REW direction for 20 msec. to rewind the tape slightly.

By a signal from the microcomputer, the CAPSTAN MOTOR M1 rotates, and the SOLENOID (65) turns ON. The PLAY ARM (10) swings in the direction of the arrow (➡ **A**).

The pin **B** of the PLAY ARM is released from the stopper section **C** of the CAM GEAR (18).

The CAM GEAR rotates slightly and engages with the gear of the FLYWHEEL (4).

After a while, the SOLENOID turns OFF.

Since the SLIDER (7) is pushed by the torsion spring (33) in the direction of the arrow (➡), the protrusion swings along the orbit **H**.

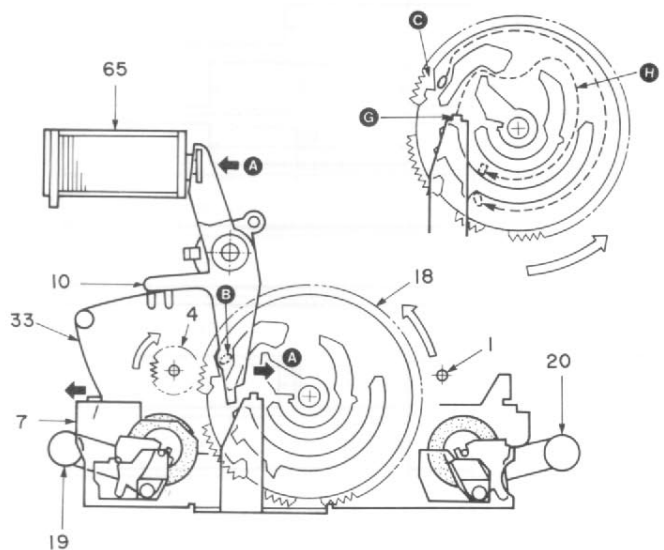


Fig. 2 STOP to FWD (forward) PLAY/REC operation

# KX-3010/3510

## MECHANISM OPERATION DESCRIPTION

The bending section **E** of the HEAD BASE (6) is lifted by the cam **F** of the CAM GEAR and begins moving upward.

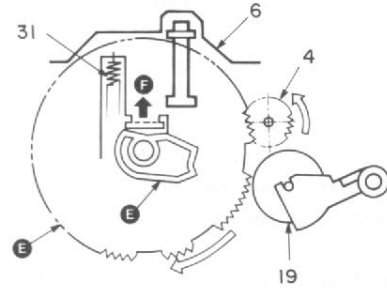


Fig. 3 (Front side view)

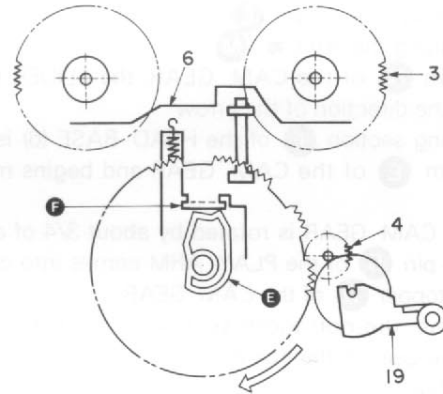


Fig. 4 STOP→PLAY/REC (Front side view)

When the CAM GEAR is rotated by about 3/4 of a revolution, the pin **B** of the PLAY ARM comes into contact with the stopper **D** of the CAM GEAR.

At this time, the non-tooth section of the CAM GEAR reaches the gear of the FLYWHEEL, and the CAM GEAR stops rotating.

When the HEAD BASE comes to the top end, the boss **L** of the pinch roller (L) comes into contact with the edge **J** of the SLIDER and it does not press the capstan.

Since the boss **K** of the pinch roller (R) is inserted into the groove of the SLIDER, it is pressed to the capstan and the deck enters the FWD PLAY mode.

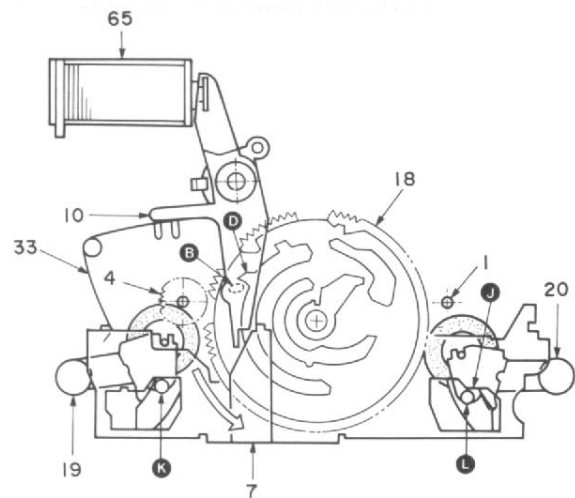


Fig. 5 FWD PLAY status

# KX-3010/3510

## MECHANISM OPERATION DESCRIPTION

### STOP to RVS (reverse) PLAY/REC Operation

Press the PLAY key.

Only in the STOP to REC mode, the REEL MOTOR rotates in the REW direction for 20 msec. to rewind the tape slightly.

By a signal from the microcomputer, the CAPSTAN MOTOR M1 rotates, and the SOLENOID (65) turns ON. The PLAY ARM (10) swings in the direction of the arrow

**A**

The pin **B** of the PLAY ARM is released from the stopper section **C** of the CAM GEAR (18).

The CAM GEAR rotates slightly and engages with the gear of the FLYWHEEL (4).

The SOLENOID turns OFF, and CAM GEAR is still rotating.

When the SOLENOID turns ON again, the protrusion **G** is pushed by the edge **L** of the PLAY ARM, and SWINGS along the orbit **M**.

By the cam **N** of the CAM GEAR, the SLIDER moves largely in the direction of the arrow

The bending section **F** of the HEAD BASE (6) is lifted by the cam **E** of the CAM GEAR and begins moving upward.

When the CAM GEAR is rotated by about 3/4 of a revolution, the pin **B** of the PLAY ARM comes into contact with the stopper **D** of the CAM GEAR.

At this time, the non-tooth section of the CAM GEAR reaches the gear of the FLYWHEEL, and the CAM GEAR stops rotating.

When the HEAD BASE comes to the top end, the boss **K** of the pinch roller (R) comes into contact with the edge **J** of the SLIDER and it does not press the capstan.

Since the boss **J** of the pinch roller (L) is inseted into the groove of the SLIDER, it is pressed to the capstan and the deck enters the RVS (reverse) PLAY mode.

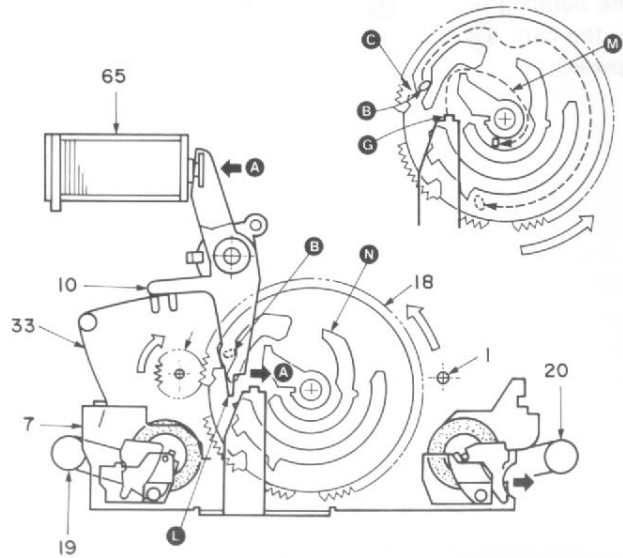


Fig. 6 STOP to RVS PLAY/REC operation

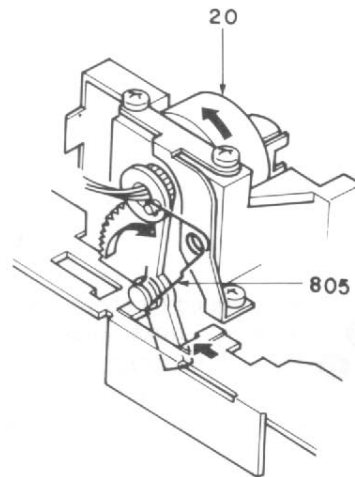


Fig. 7 Head selection (FWD to RVS)

## MECHANISM OPERATION DESCRIPTION

### FWD (forward) PLAY/REC to STOP Operation

Press the STOP key.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow ← **A** by the TORSION SPRING (33), and the pin **B** is released from the stopper **D**.

The CAM GEAR is slightly rotated by the HEAD BASE in the direction of the arrow ↻.

The CAM GEAR is engaged with the gear of the FLY-WHEEL (4) and continues rotating.

The protrusion **G** of the SLIDER (7) passes through the orbit → **P**.

When the pin **B** of the PLAY ARM comes into contact with the stopper **C** of the CAM GEAR, the CAM GEAR stops rotating.

By the signal from the microcomputer, the CAPSTAN MOTOR stops and the deck enters the stop mode.

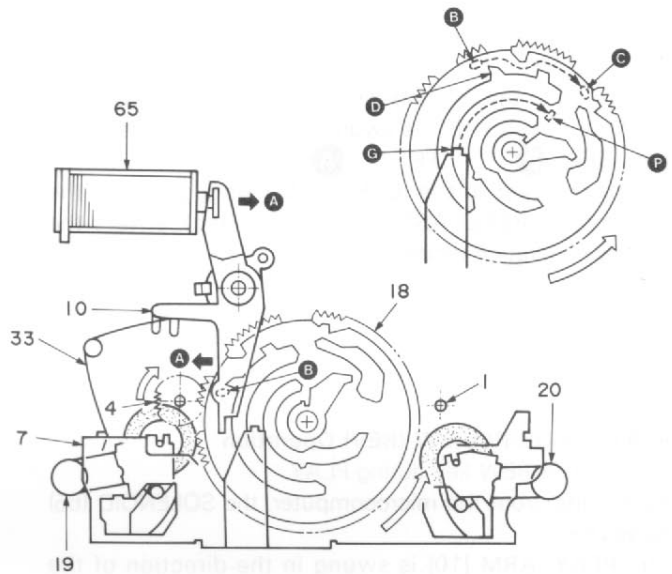


Fig. 8 FWD PLAY/REC to STOP operation

### RVS (reverse) PLAY/REC to STOP Operation

Press the STOP key.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow ← **A** by the TORSION SPRING (33), and the pin **B** is released from the stopper **D**.

The CAM GEAR is slightly rotated by the HEAD BASE in the direction of the arrow ↻.

The CAM GEAR is engaged with the gear of the FLY-WHEEL (4) and continues rotating.

The protrusion **G** of the SLIDER (7) passes through the orbit → **Q**.

When the pin **B** of the PLAY ARM comes into contact with the stopper **C** of the CAM GEAR, the CAM GEAR stops rotating.

By the signal from the microcomputer, the CAPSTAN MOTOR stops and the deck enters the stop mode.

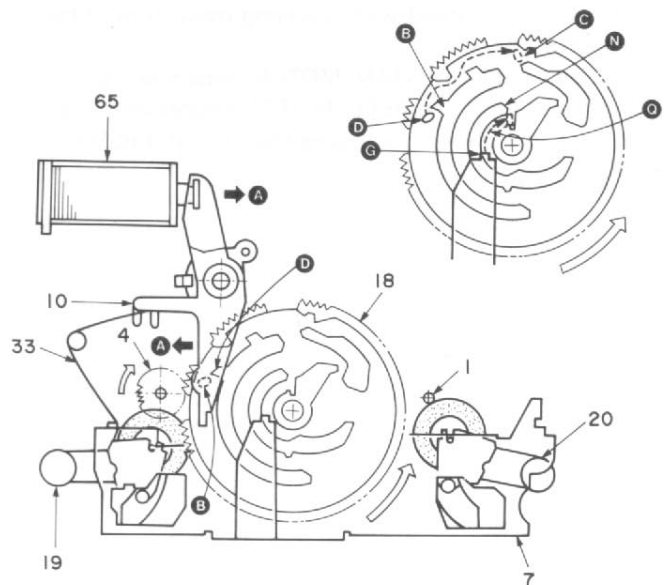


Fig. 9 RVS PLAY/REC to STOP operation



# KX-3010/3510

## MECHANISM OPERATION DESCRIPTION

### STOP to FF/REW Operation

By a signal from the microcomputer, the SOLENOID (65) turns ON. At the same time, the REEL MOTOR M2 starts rotating in the appropriate direction. (REW: CW ↻, FF: ↻ CCW)

According to the rotating direction of the REEL MOTOR, the IDLER ASS'Y (21) is swung in the appropriate direction. (REW: Ⓑ ↻, FF: ↻ Ⓐ)

When the gear of the IDLER ASS'Y engages with the gear of the REEL ASS'Y (2, 3), the deck enters the FF/REW operation mode.

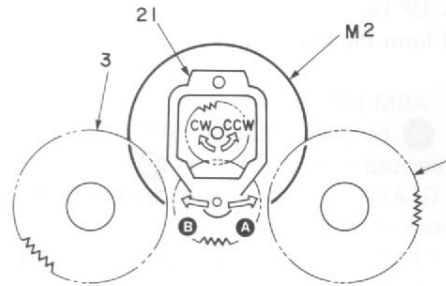


Fig. 10 (FRONT SIDE VIEW)

### PLAY to CUE/REVIEW (REV) Operation

Press the FF/REW key during PLAY.

By a signal from the microcomputer, the SOLENOID (65) turns OFF.

The PLAY ARM (10) is swung in the direction of the arrow Ⓐ by the TORSION SPRING (33), and the pin Ⓑ is released from the stopper Ⓓ. After approx. 40 msec., the SOLENOID is turned ON again.

The pin Ⓑ of the PLAY ARM passed by the internal orbit, and then comes into contact with the stopper Ⓒ of the CAM GEAR.

At this time, the non-tooth section of the CAM GEAR comes to the gear of the FLYWHEEL, and the CAM GEAR stops rotating at the position where the HEAD BASE (6) is lowered slightly to that position.

The PINCH ROLLER (19, 20) is released from the CAPSTAN in accompanied with lowering movement of the HEAD BASE.

After a while, the CAPSTAN MOTOR stops rotating, and at the same time, the REEL MOTOR rotates in the appropriate direction to activate the CUE and REVIEW (REV) operations.

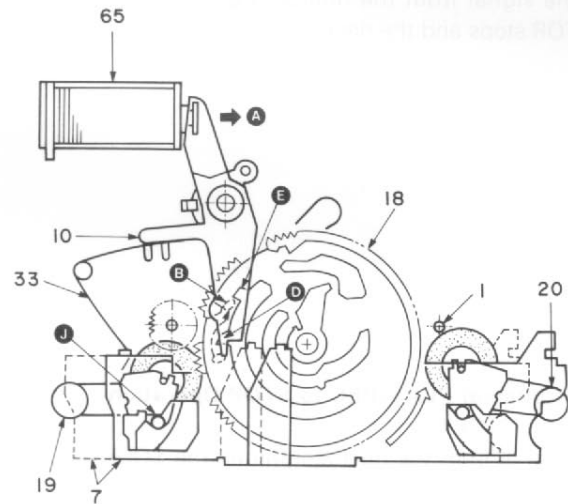


Fig. 11 PLAY to CUE/REV operation

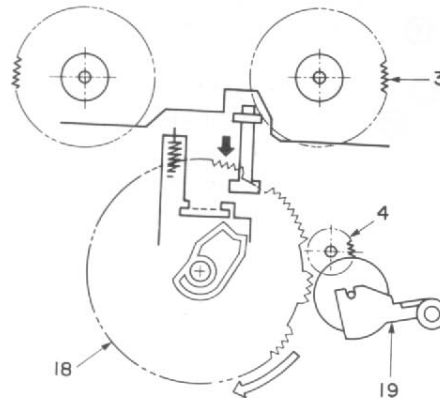


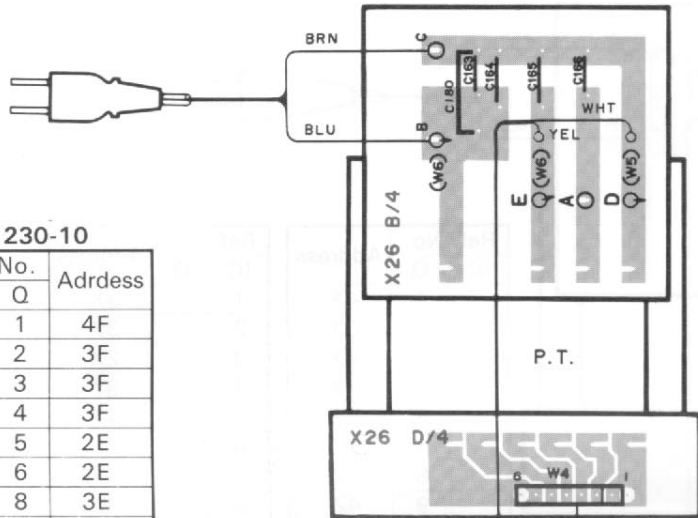
Fig. 12 CUE/REV status (Front side view)

# KX-3010/3510

## ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	CASSETTE TAPE DECK SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
Unless otherwise specified; each switch could be set as follows: TAPE: NORMAL, DOLBY, : OFF, INPUT: LINE I. Cassette mechanism section (REC/PB head adjustment)							0 dBs = 0.775 V
[1]	Demagnetization and cleaning	—	—	Power OFF, demagnetization, cleaning play	REC/PB head, erase head, capstan, pinch roller	Demagnetize the REC/PB head by head eraser. Clean the REC/PB head, erase head, capstan and pinch roller with a cotton swab immersed in alcohol.	
[2]	REC/PB head azimuth	MTT-114, TCC-153 10 kHz, -10 dB	(B)	PLAY	Azimuth adjustment screw	In a setting where the output is maximized, adjust the azimuth adjustment screw so that the Lissajous figure appearing on the oscilloscope screen comes near to a line slanted 45°. Note: The head should be installed in such a manner that it approaches the tape face.	(a)
[3]	Tape speed	MTT-111, TCC-100 3 kHz, -4 dB	(B)	PLAY	Semi-fixed resistor in DC motor assembly	Adjust so that frequency is 3 kHz at the center of the tape.	(b)
II. PC board adjustment (X26-1230-10)							
<1>	Playback level	MTT-150 400 Hz MTT-256 315 Hz MTT-256U, TCC-160 315 Hz	(B)	PLAY	VR1 (L) VR2 (R)	Adjust so that LINE OUT is -1.2 dBs. Adjust so that LINE OUT is -4.0 dBs. Adjust so that LINE OUT is 0 dBs.	
<2>	Bias current	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Adjust the REC VR (LEVEL, BALANCE) so that the REC monitor output is -24 dBs at 1 kHz, and record and playback 1 kHz and 10 kHz alternately.	VR5(L) VR6(R)	Record 1 kHz and 10 kHz alternately, and adjust each bias current adjustment VR so that the 10 kHz play back level is +0.5 dBs against 1 kHz.	
<3>	Recording level	(A) 1 kHz, -30 dBs	(B)	With the situation in above item <2> is kept as it is, record and play back 1 kHz.	VR3(L) VR4(R)	Adjust so that the playback output level is -24 dBs.	
<4>	FL meter 0 dB	(A) 1 kHz, -10 dBs	—	Adjust the REC VR (LEVEL, BALANCE) so that the REC PAUSE monitor output is -4 dBs at 1 kHz.	VR7(L) VR8(R)	Adjust so that "0 dB" lights.	
<5>	Quick reverse sensitivity	Use the leader tape section of the test tape.		PLAY	VR9	With a DC voltmeter connected to TP5, adjust so that 2.5 V appears.	(c)
Note: On item <1> in "II. PC board adjustment"							
Although 3 kinds of tapes are set forth for the playback level adjustment, the use of one tape suffices for adjustment. Here is meant no necessity for the use of all these 3 kinds of tapes. Other than the abovementioned tapes, when a test tape equal in magnetic flux and frequency is available, the adjustment is feasible with this test tape by making the playback output suited to the specified output level of this tape in agreement with the adjustment method.							

# PC BOARD (Component Side View)



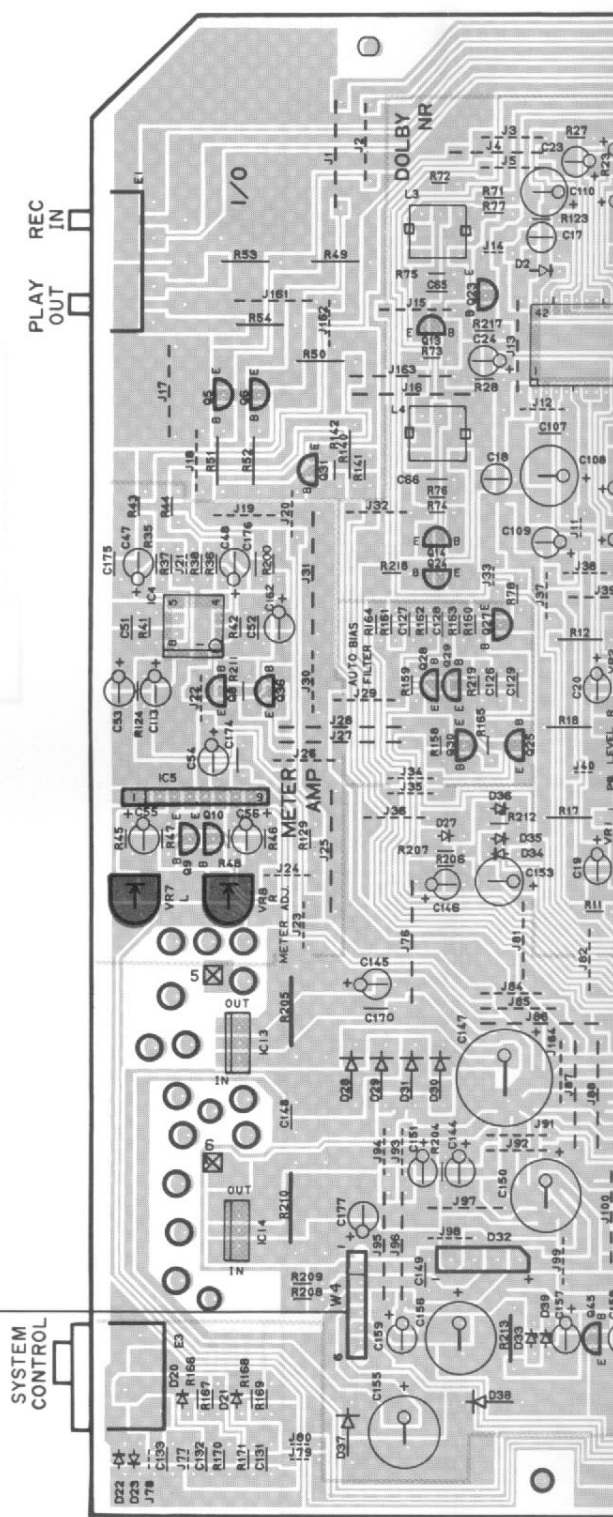
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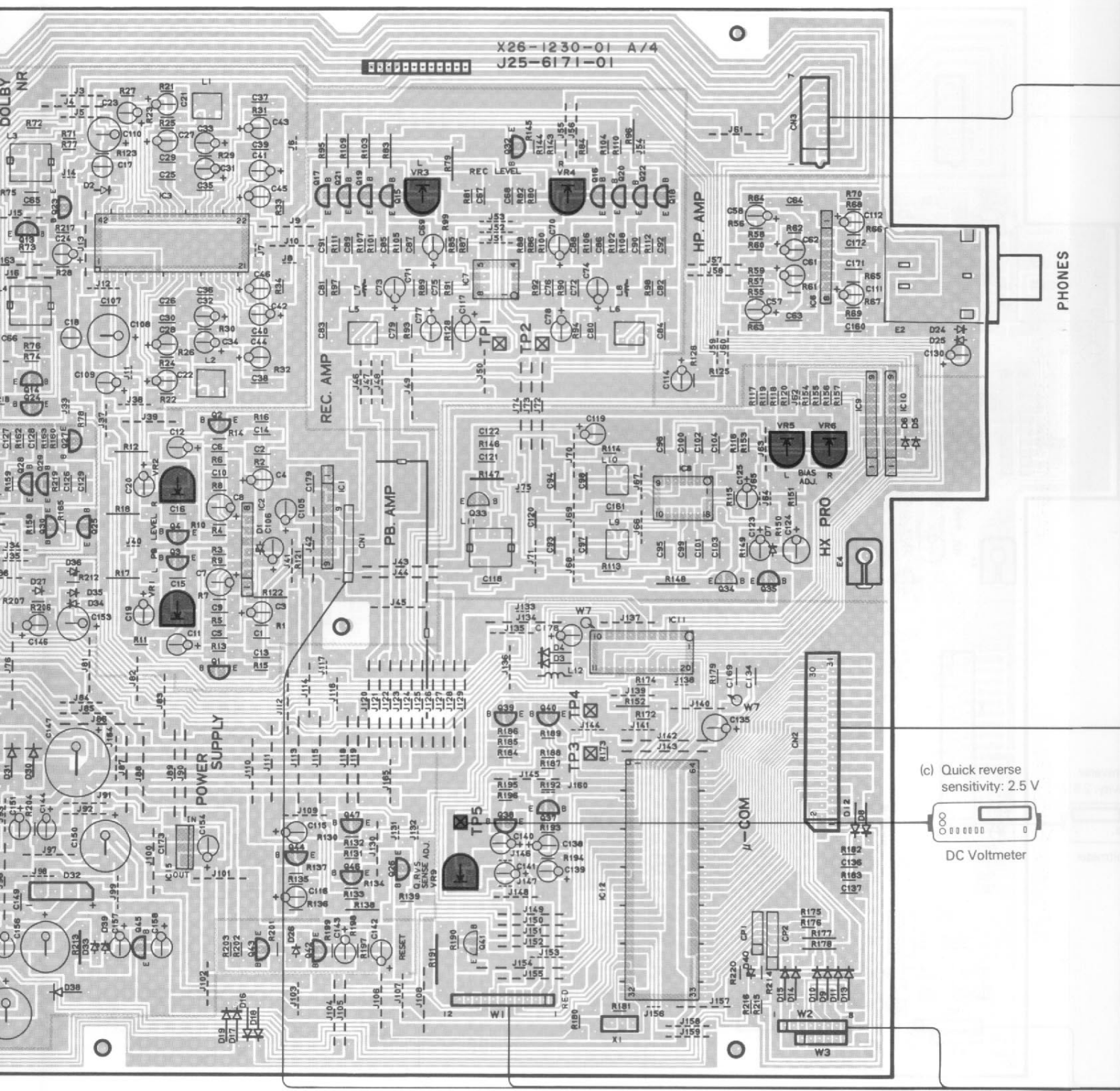
Ref. No.	IC	Q	Address
1			4F
2			3F
3			3F
4			3F
5			2E
6			2E
8			3E
9			4E
10			4E
13			2F
14			3F
15			2G
16			2H
17			2G
18			2I
19			2G
20			3G
21			2G
22			2I
23			2F
24			3F
25			3F
26			5G
27			3F
28			3F
29			3F
30			3F
31			2E
32			1H
33			3H
34			4I
35			4I
36			3E
37			5H
38			5H
39			4H
40			4H
41			5H
42			5G
43			5G
44			5G
45			5F
46			5G
47			5G

Ref. No.	IC	Q	Address
1			3G
2			3G
3			2F
4			3E
5			3E
6			2I
7			2H
8			3I
9			3J
10			3J
11			4I
12			5I
13			4E
14			5E
15			5F

## X25-3580-11

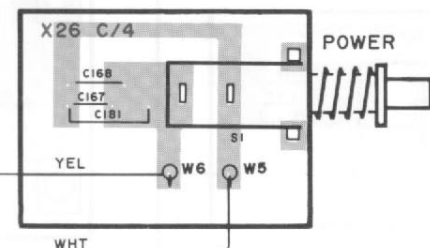
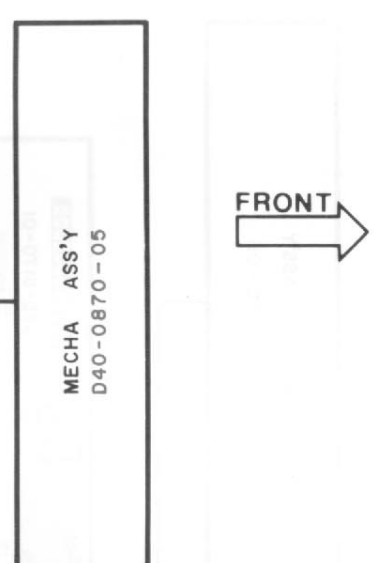
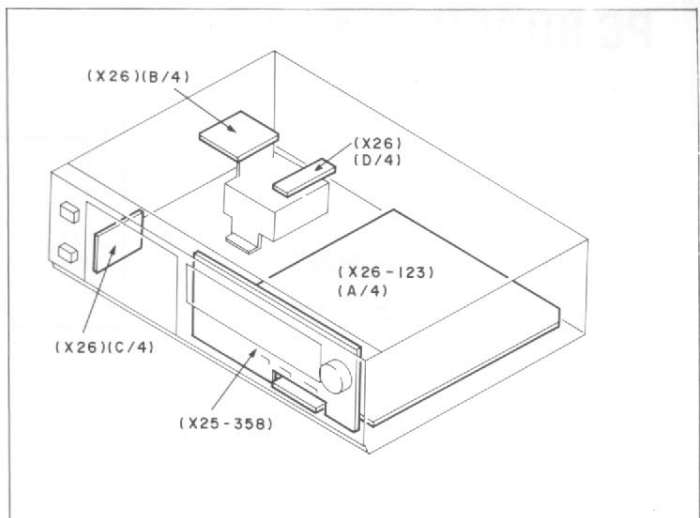
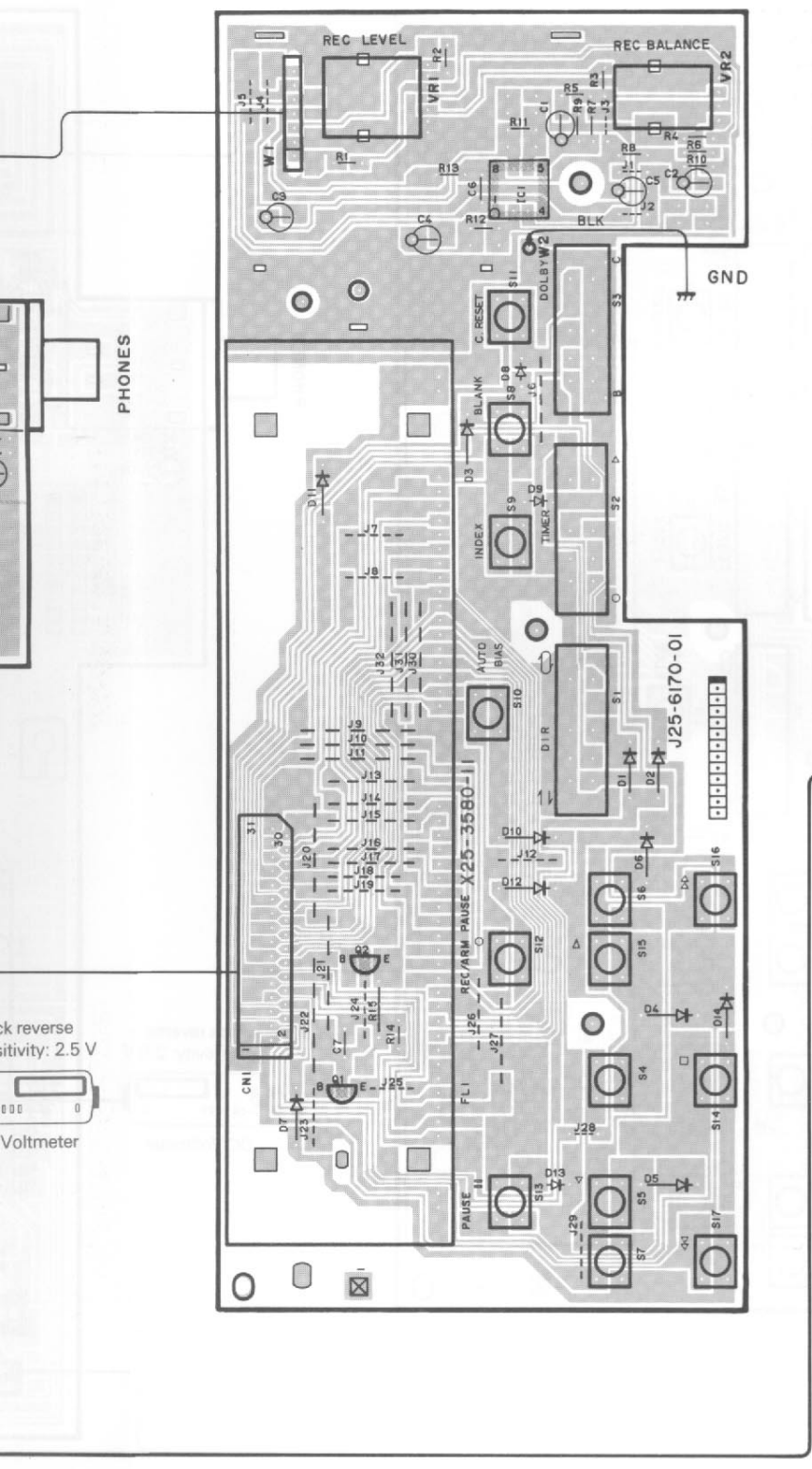
Ref. No.	IC	Q	Address
1			5K
2			4K
1			1L





(c) Quick reverse  
sensitivity: 2.5 V

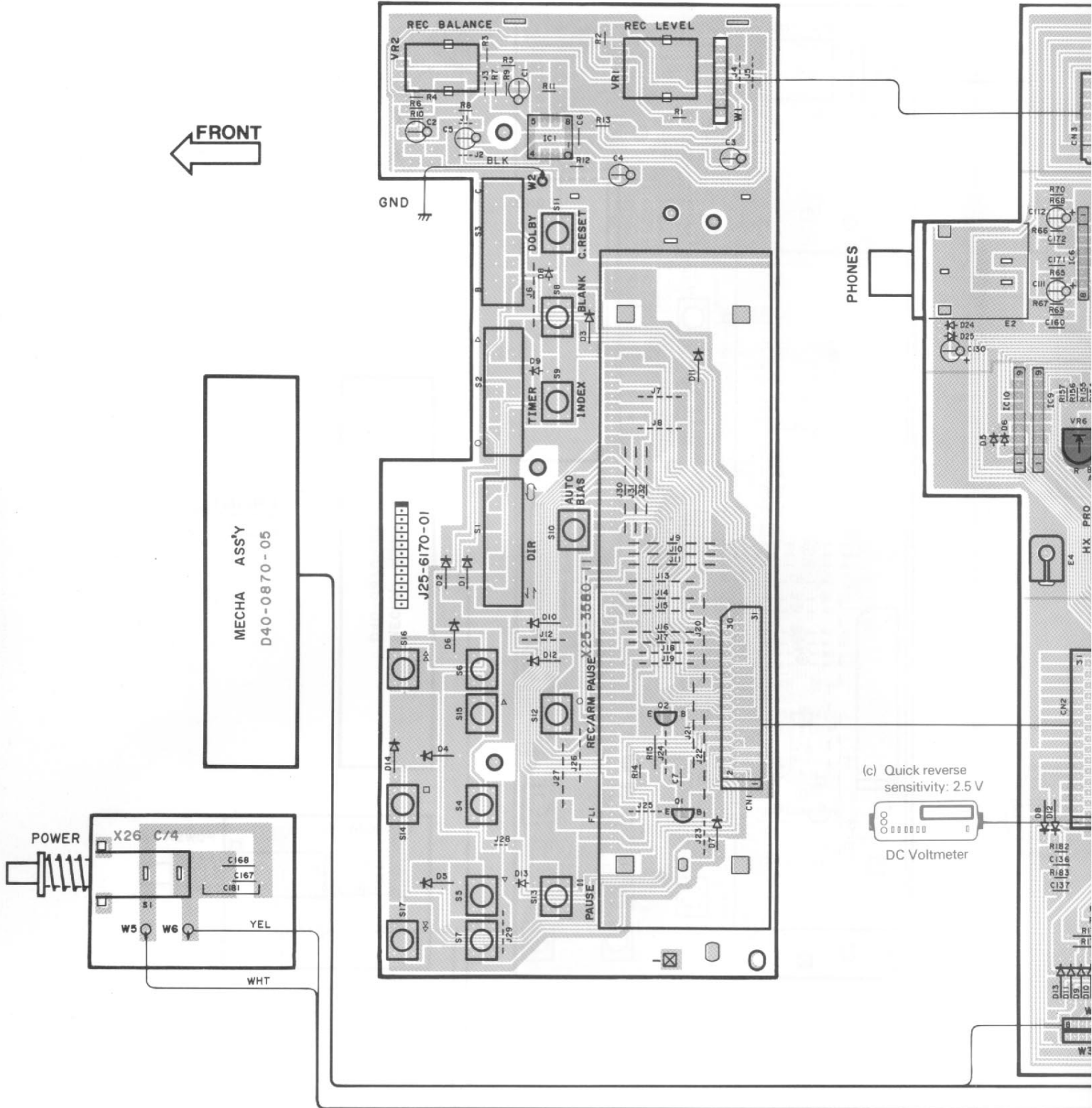
DC Voltmeter

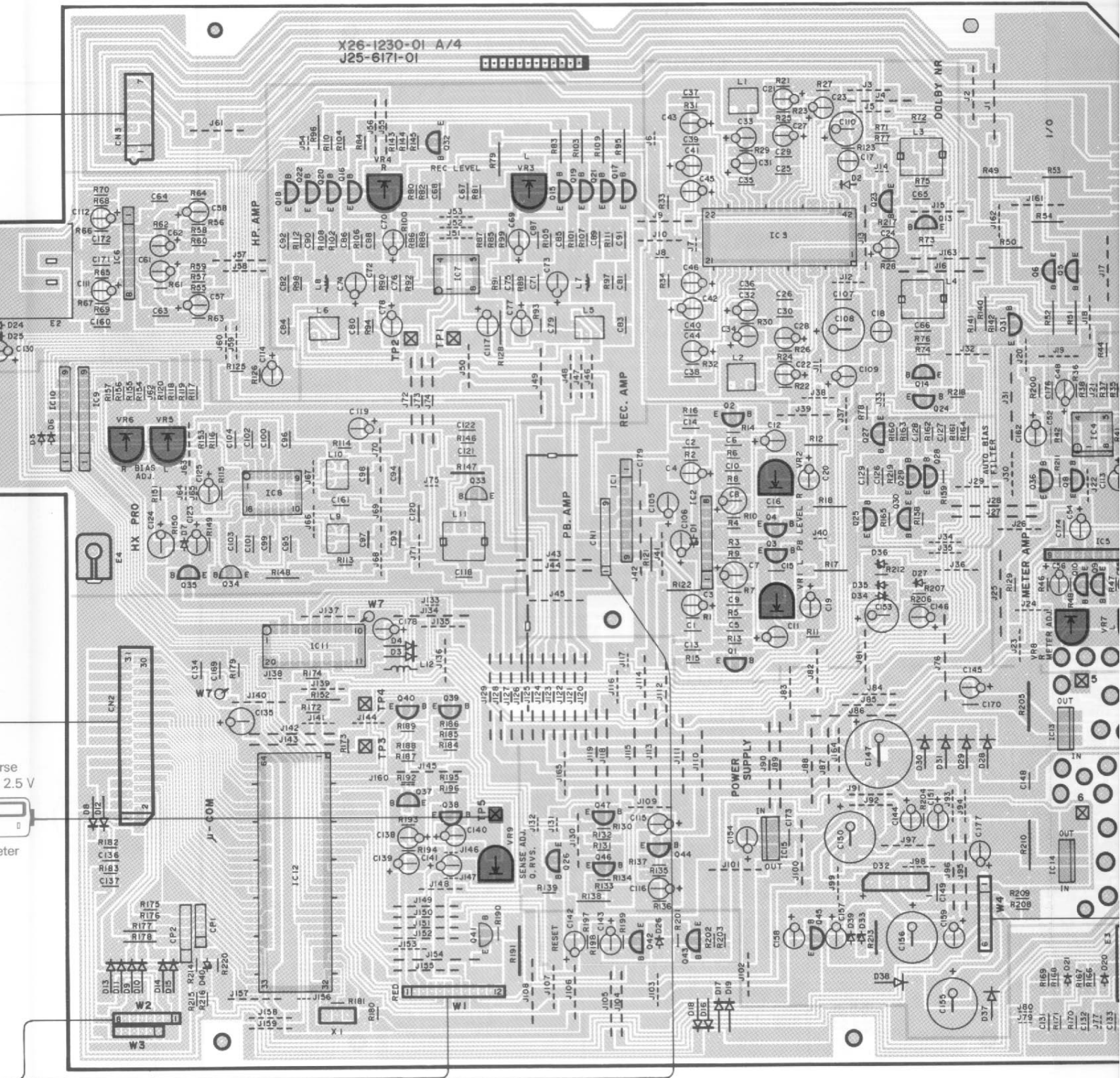


Refer to the schematic diagram for the values of resistors and capacitors.

ack reverse  
sitivity: 2.5 V  
Voltmeter

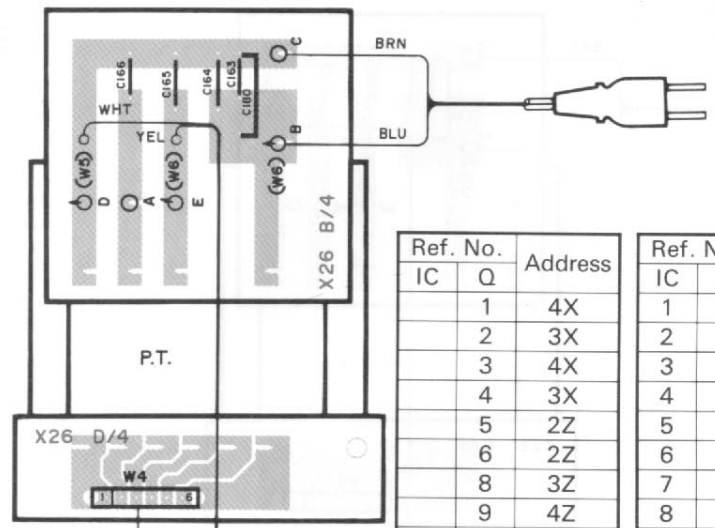
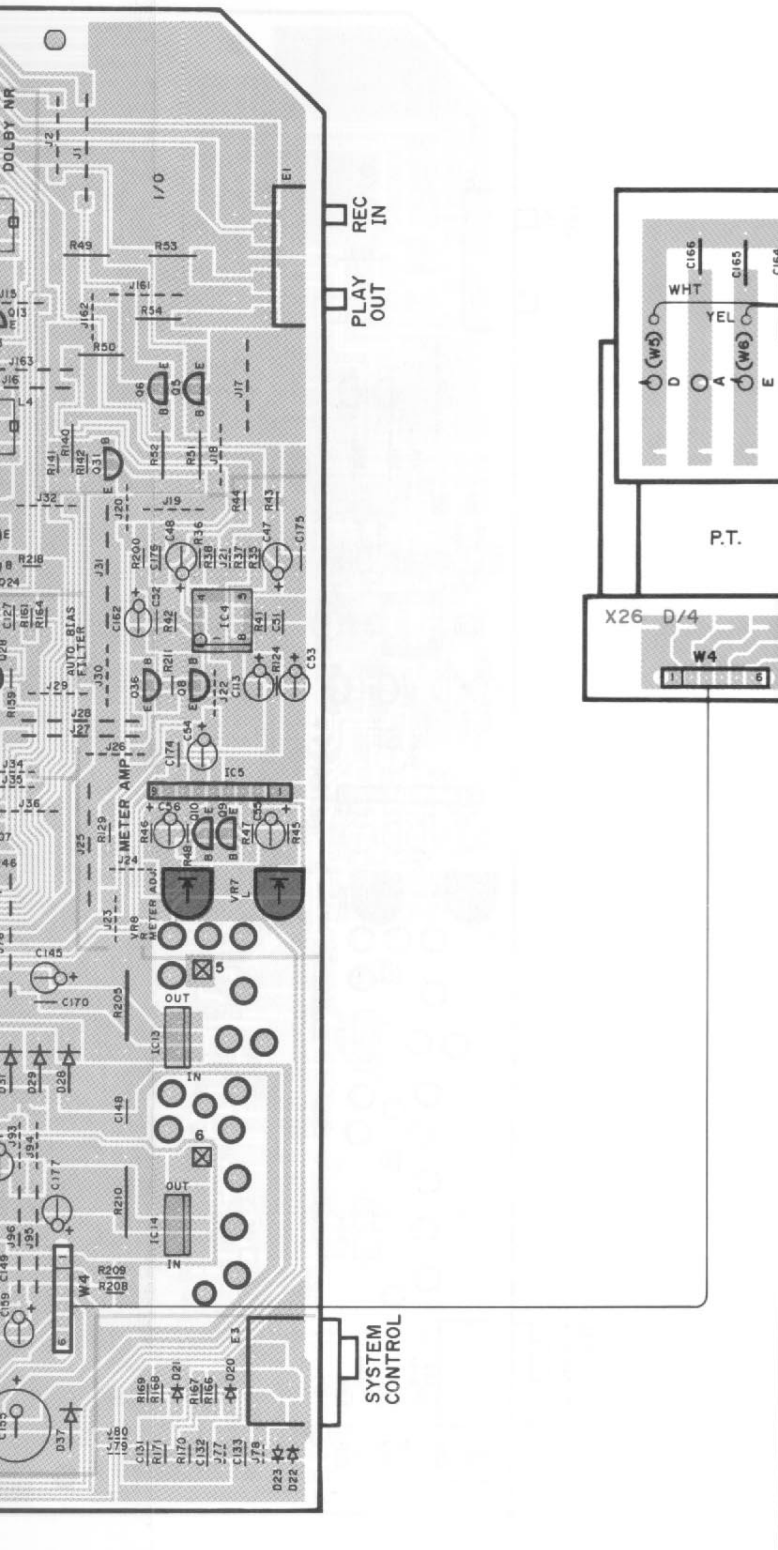
# PC BOARD (Foil Side View)





X26-1230-01 A/4  
 J25-6171-01

Refer to the



Ref. No.	IC	Q	Address
		1	4X
		2	3X
		3	4X
		4	3X
		5	2Z
		6	2Z
		8	3Z
		9	4Z
		10	4Z
		13	2Y
		14	3Y
		15	2W
		16	2V
		17	2X
		18	2V
		19	2W
		20	2V
		21	2W
		22	2V
		23	2Y
		24	3Y
		25	3Y
		26	5W
		27	3Y
		28	3Y
		29	3Y
		30	3Y
		31	2Y
		32	2W
		33	3W
		34	4V
		35	4U
		36	3Z
		37	5V
		38	5W
		39	4W
		40	4V
		41	5W
		42	5X
		43	5X
		44	5X
		45	5Y
		46	5W
		47	5W

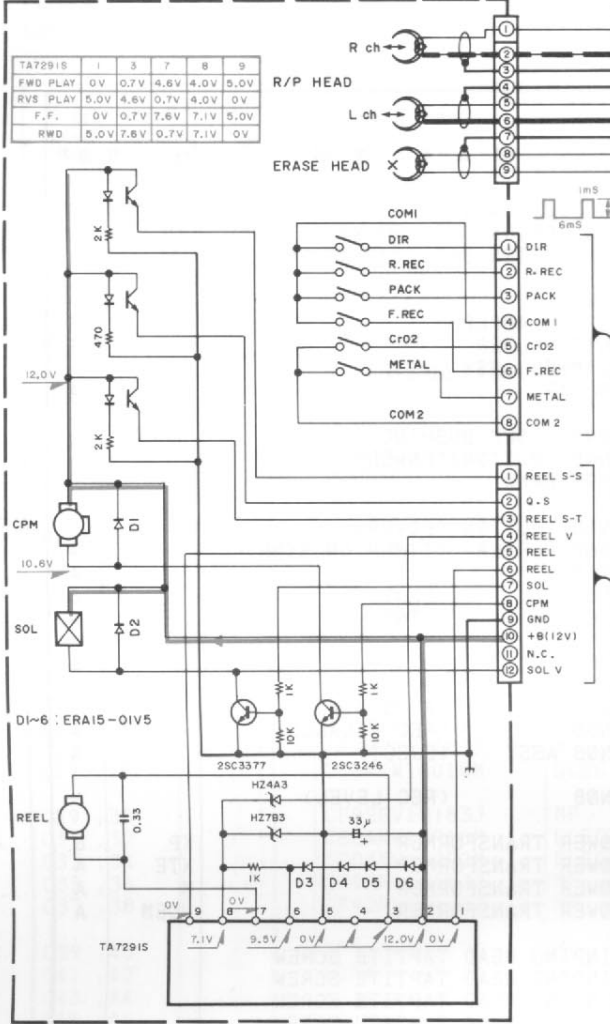
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		3	2X
		4	3Z
		5	4Z
		6	2U
		7	2W
		8	3V
		9	3U
		10	3U
		11	4V
		12	5V
		13	4Z
		14	5Z
		15	5X

Ref. No.	IC	Q	Address
		1	4S
		2	5S
1			2S

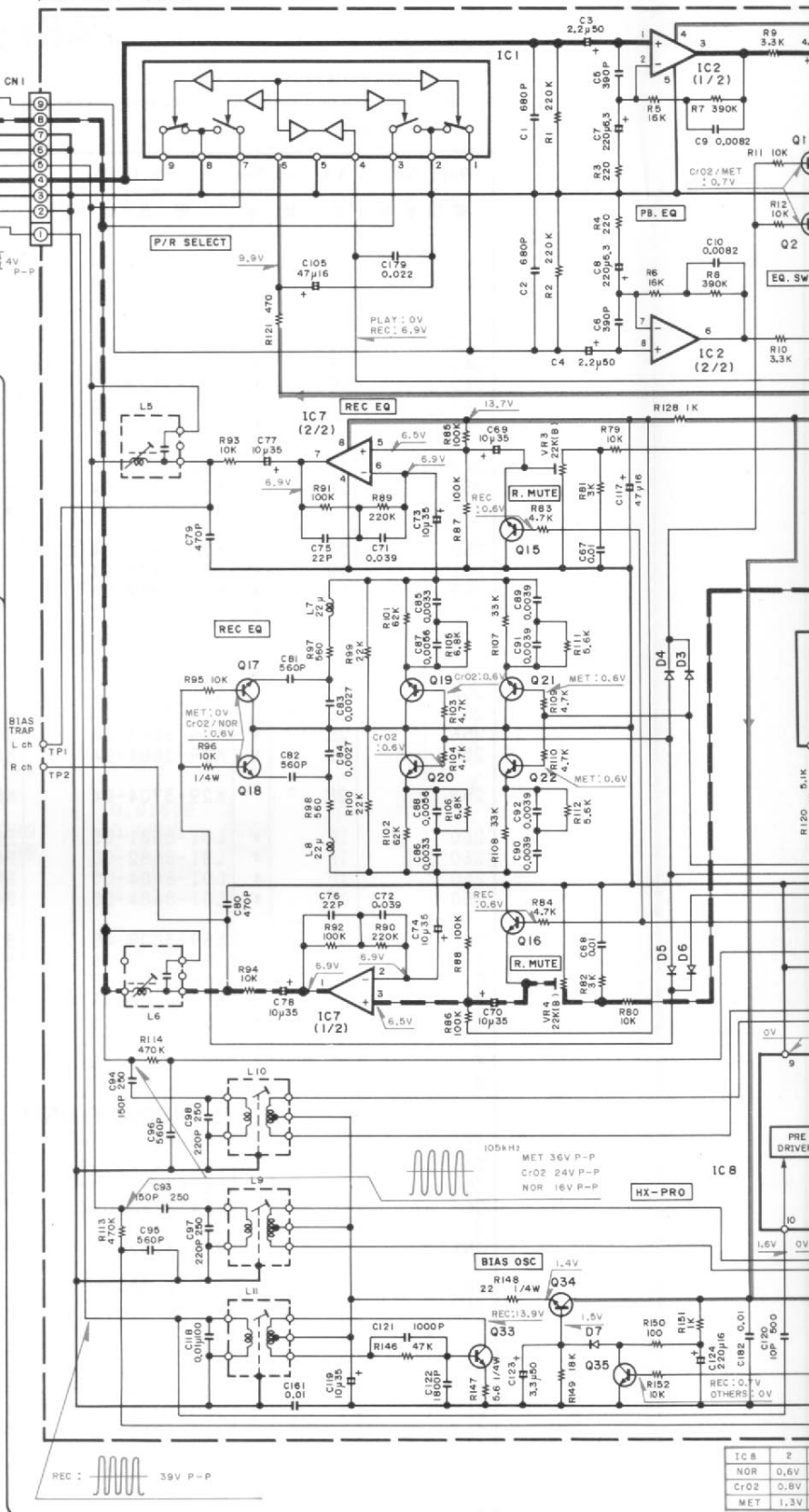
Refer to the schematic diagram for the values of resistors and capacitors.



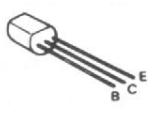
MECHANISM ASS'Y



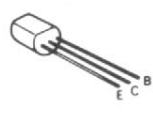
- IC1 :  $\mu$ PC1330HA
  - IC2 :  $\mu$ PC1228HA
  - IC3 : HAI2088ANT
  - IC4,7 : NUM4560D-A or M5218P-A
  - IC5 : BA6138
  - IC6 : M5218L
  - IC8 :  $\mu$ PC1297CA
  - IC9,10 : TD62554S
  - IC11 : CXD1067P
  - IC12 : M50941-171SP
  - IC13 :  $\mu$ PC7818HF or  $\mu$ PC7818H
  - IC14 :  $\mu$ PC7812HF or  $\mu$ PC7812H
  - IC15 :  $\mu$ PC7805HF or  $\mu$ PC7805H
- Q1 ~ 4, 8 ~ 10, 13, 14, 17 ~ 24, 26 ~ 30, 35, 39, 42, 43, 46, 47 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
  - Q5, 6, 15, 16 : 2SD1302(S,T) or 2SC2878(B)
  - Q25, 36 : DTA124EN
  - Q31, 32, 37, 45 : 2SA733(A)(Q,P) or 2SA933S(Q,R)
  - Q33, 34, 41 : 2SD863(E,F)
  - Q38 : 2SC1845(F,E)
  - Q44 : 2SC2003(L,K)
- D1 : RD11ES(B2) or HZSI1N(B2)
  - D2 : ISS199
  - D3 ~ 27, 34, 35 : HSS104 or ISS133
  - D28 ~ 31, 37, 38 : S5565B
  - D32 : KBPO2ML-6127
  - D33 : RD13ES(B2) or HZSI3N(B2)
  - D36 : RD3.9ES(B2) or HZS3.9N(B2)
  - D39 : RD16ES(B2) or HZSI6N(B2)
  - D40 : RD6.2ES(B2) or HZS6.2N(B2)



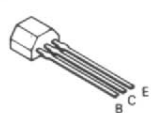
DTA124EN



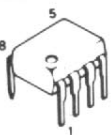
DTC124EN  
2SA733(A)  
2SC1845  
2SC2003  
2SC2878  
2SC945(A)  
2SD1302  
2SD863



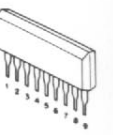
2SA933S  
2SC1740S



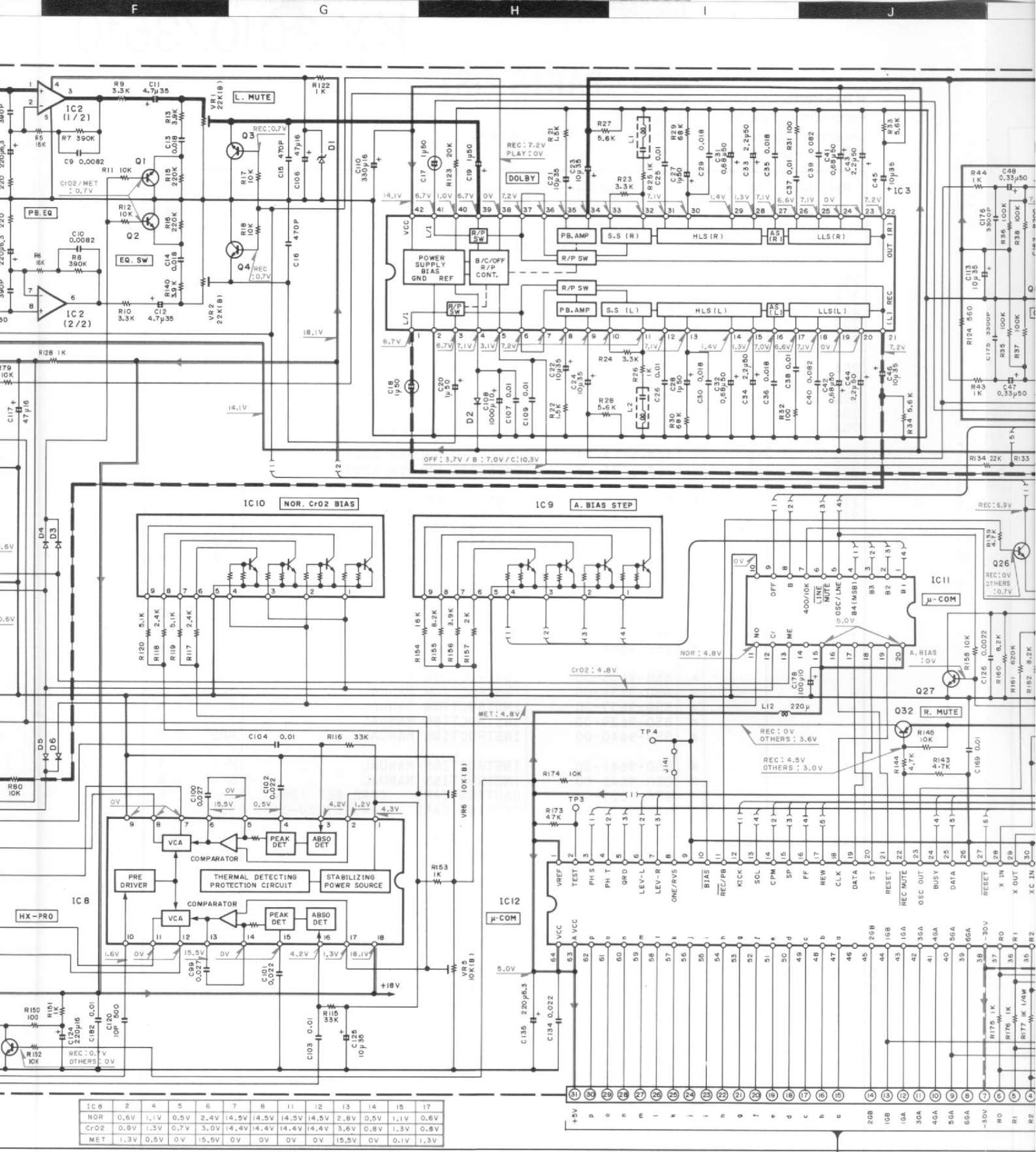
NJM4558D-A  
NJM4560D-A



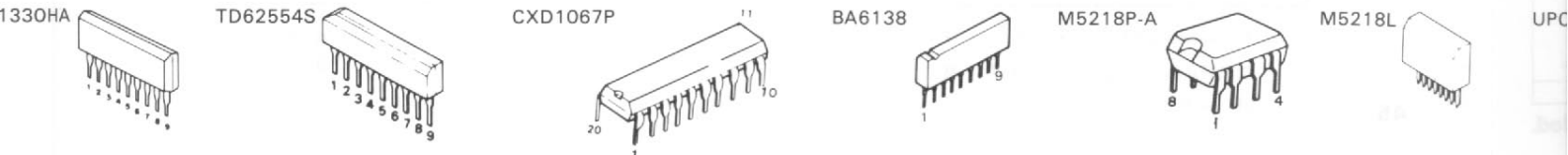
UPC1330HA

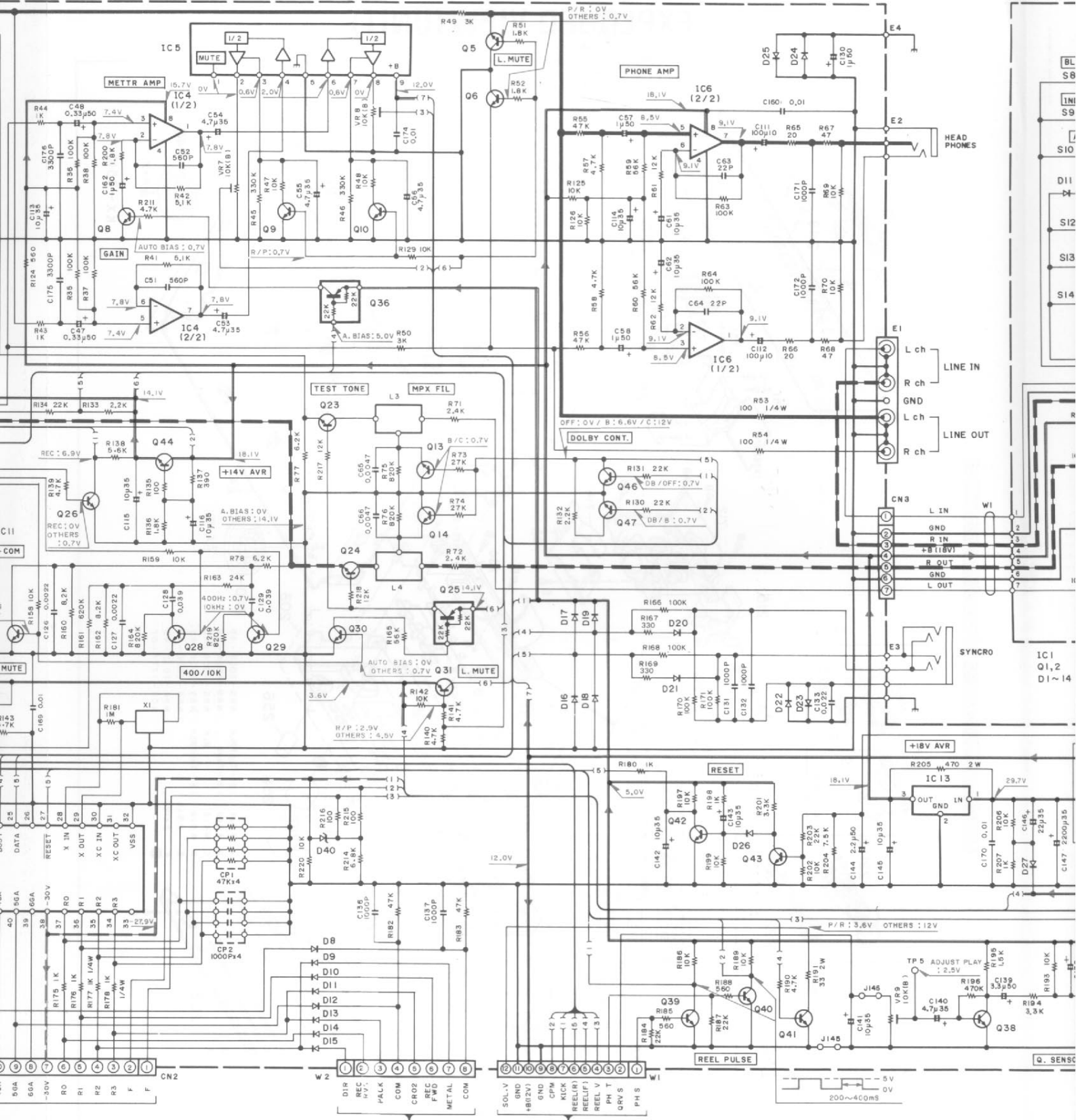


IC 8	2
NOR	0.6V
CR02	0.8V
MET	1.3V

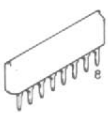


IC8	2	4	5	6	7	8	11	12	13	14	15	17
NOR	0.6V	1.1V	0.5V	2.4V	14.5V	14.5V	14.5V	14.5V	2.8V	0.5V	1.1V	0.6V
CrO2	0.8V	1.3V	0.7V	3.0V	14.4V	14.4V	14.4V	14.4V	3.6V	0.8V	1.3V	0.8V
MET	1.3V	0.5V	0V	15.5V	0V	0V	0V	0V	15.5V	0V	0.1V	1.3V

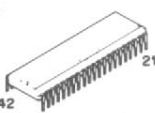




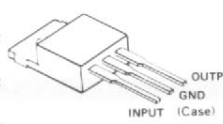
UPC1228HA



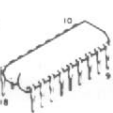
HA12088ANT



μPC7805H  
 μPC7805HF  
 μPC7812H  
 μPC7812HF  
 μPC7818H  
 μPC7818HF

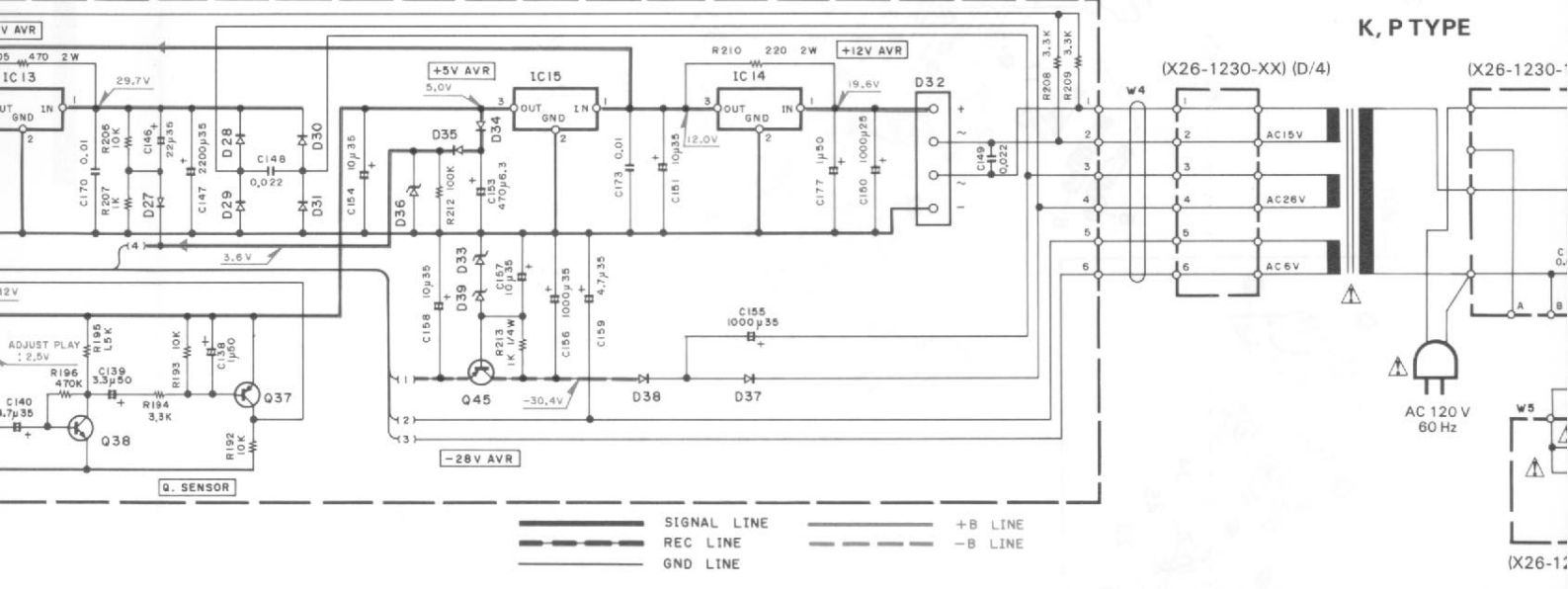
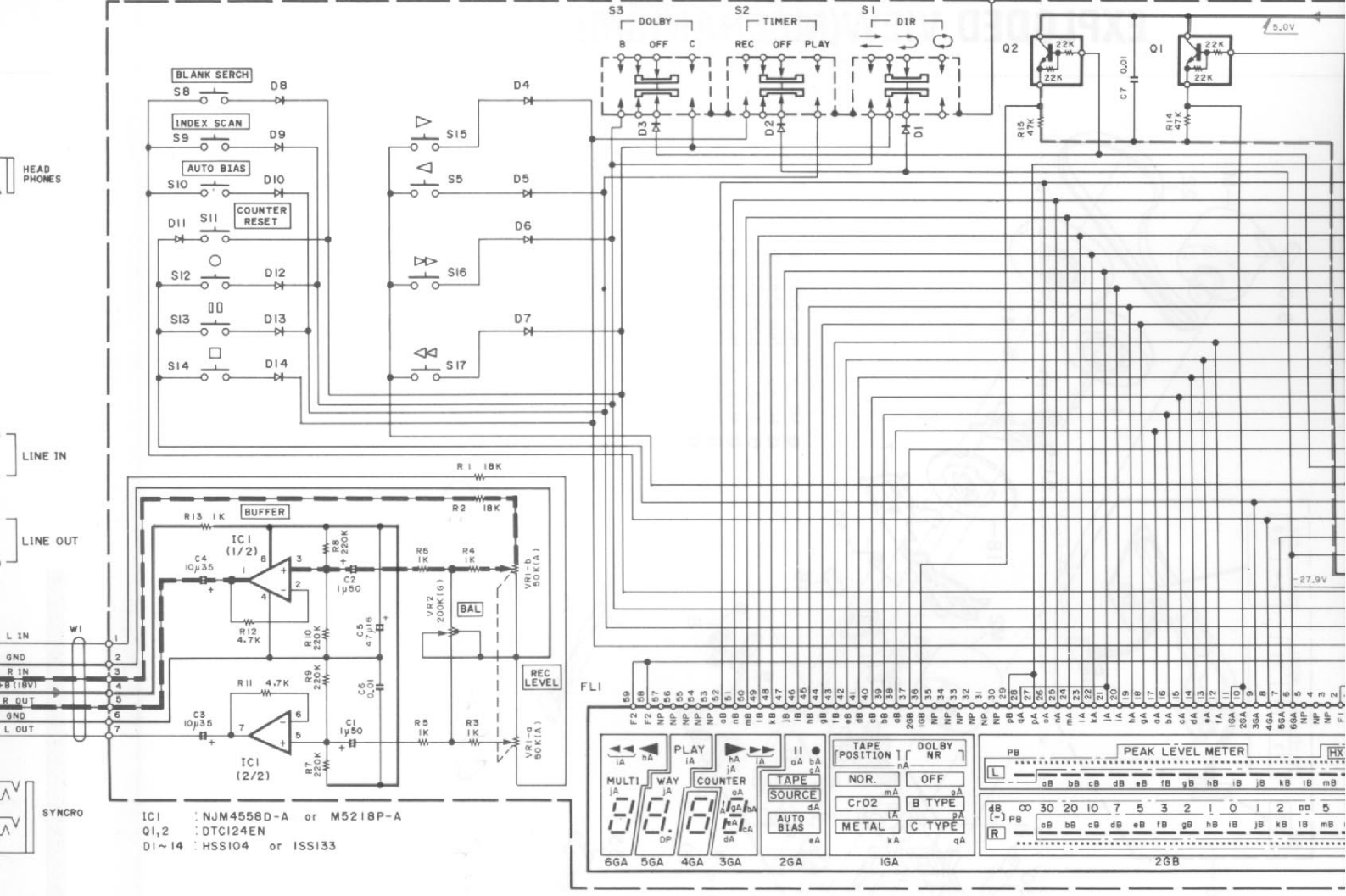


μPC1297CA



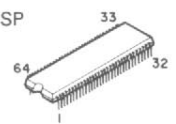
M50941-171SP

(X25-3580-11)



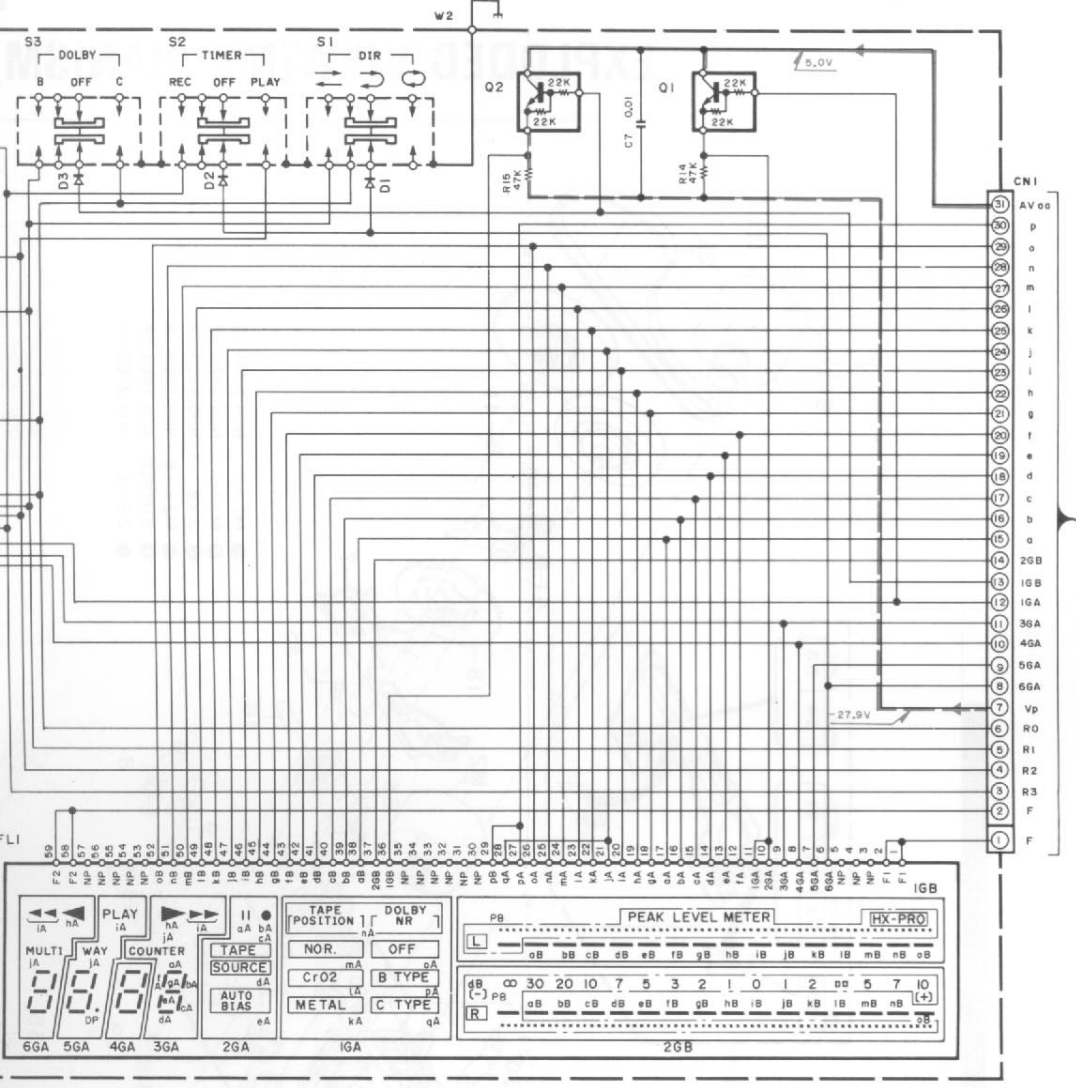
— SIGNAL LINE  
 — REC LINE  
 — GND LINE  
 — +B LINE  
 — -B LINE

M50941-171SP

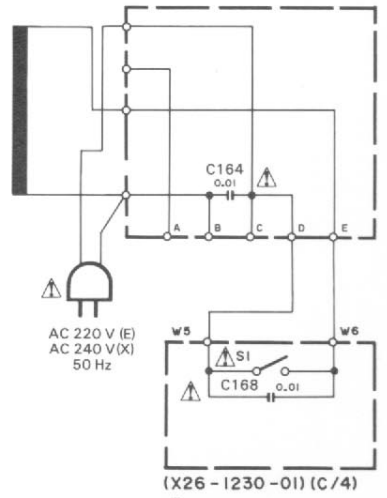


**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

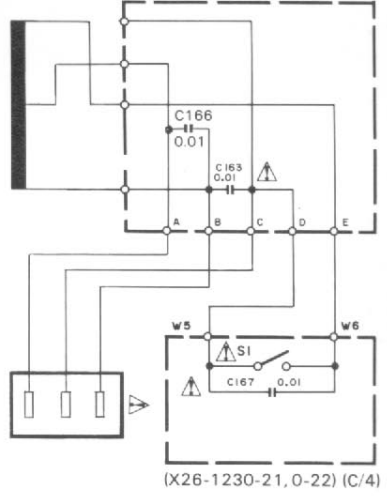
DC voltages are as measured with a high impedance meter with a cassette loaded at playback mode. Value slightly due to variations between individual units or/and units. Bias circuit DC voltages are as measured with the record mode.



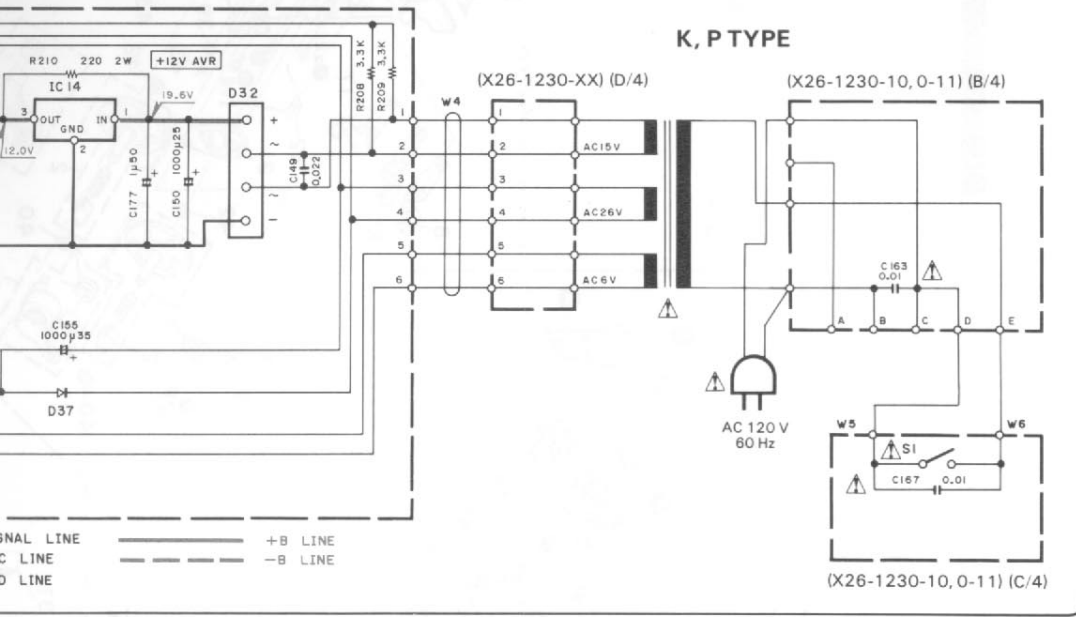
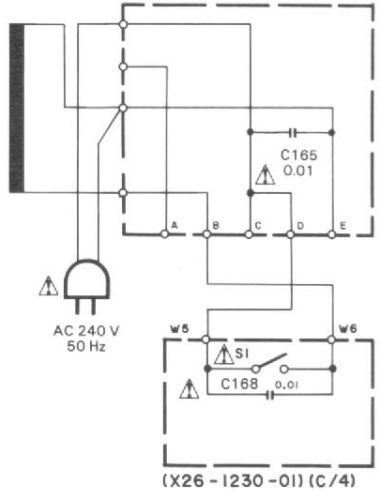
**X, E TYPE**  
(X26-1232-71, 2-72) (B/4)



**M, U, UE TYPE**  
(X26-1230-21, 0-22) (B/4)



**T TYPE**  
(X26-1230-51, 0-52)



**K, P TYPE**  
(X26-1230-XX) (D/4) (X26-1230-10, 0-11) (B/4)

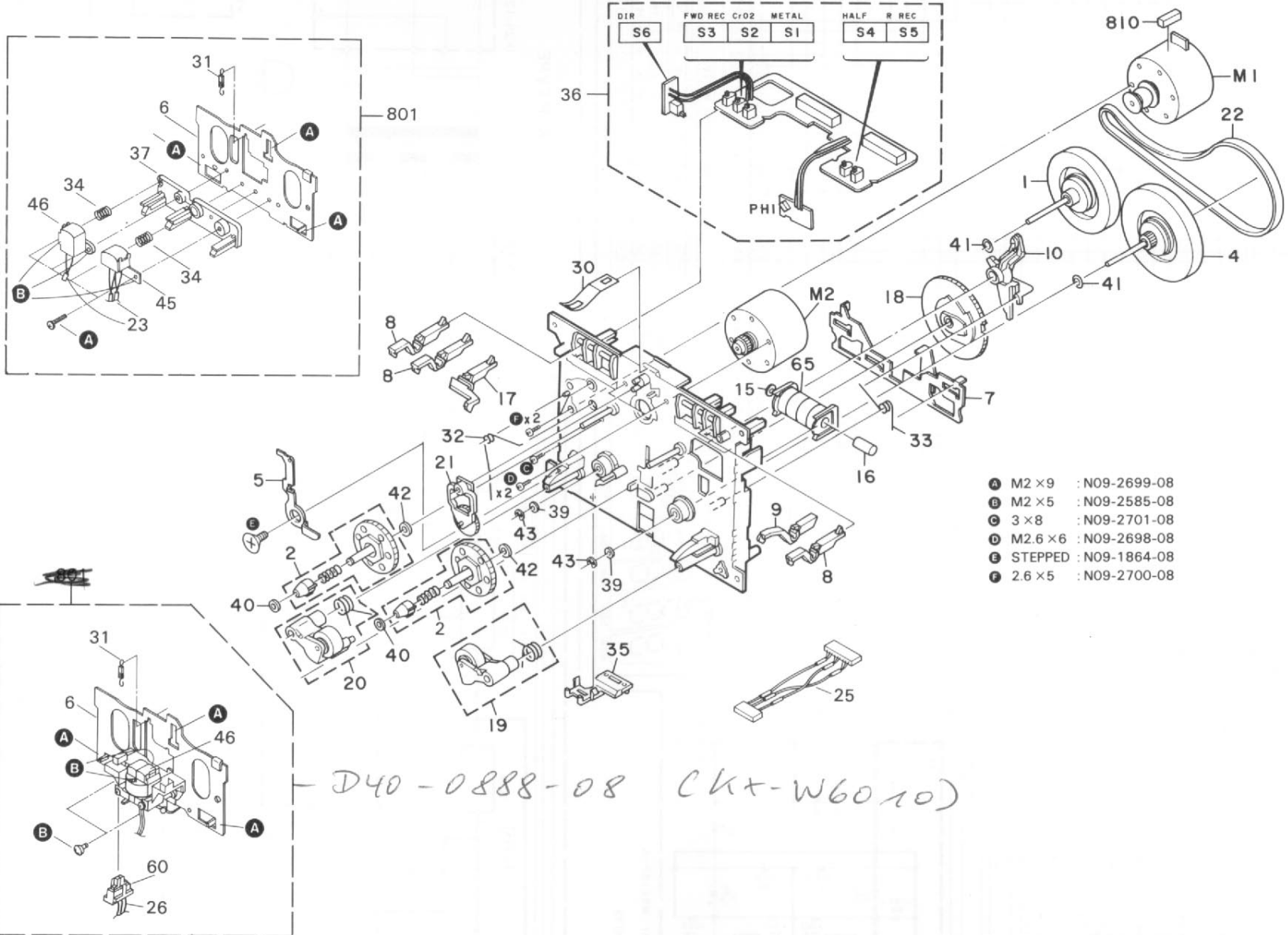
(X26-1230-10, 0-11) (C/4)

For continued safety, replace safety critical components with manufacturer's recommended parts (refer to the manual for details). A triangle symbol indicates safety critical components. To reduce the risk of fire or electric shock, leakage-current or resistance measurements should be made on exposed parts as acceptably insulated from the ground (before the appliance is returned to the customer).

DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

**EXPLODED VIEW(MECHANISM)**

**KX-3010/3510**

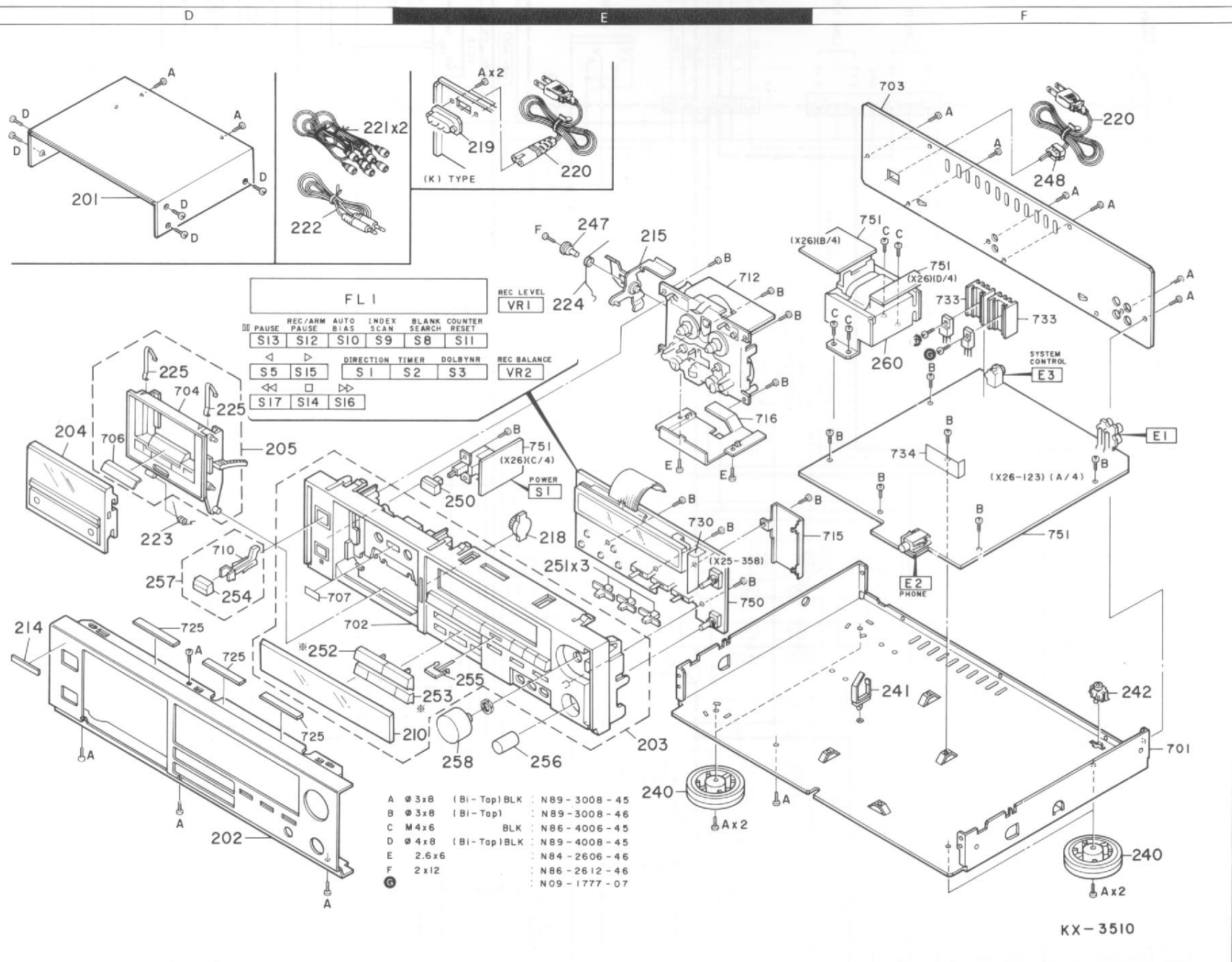


- Ⓐ M2 × 9 : N09-2699-08
- Ⓑ M2 × 5 : N09-2585-08
- Ⓒ 3 × 8 : N09-2701-08
- Ⓓ M2.6 × 6 : N09-2698-08
- Ⓔ STEPPED : N09-1864-08
- Ⓕ 2.6 × 5 : N09-2700-08

*D40-0888-08 (KX-W6010)*

Parts with the exploded numbers larger than 700 are not supplied.

EXPLODED VIEW (UNIT)



FL I									
PAUSE	REC/ARM	AUTO	INDEX	BLANK	COUNTER				
PAUSE	PAUSE	BIAS	SCAN	SEARCH	RESET				
S13	S12	S10	S9	S8	S11				
DIRECTION			TIMER		DOLBY NR		REC BALANCE		
S5	S15	S1	S2	S3	VR2				
S17	S14	S16							

- A  $\varnothing$  3x8 (Bi-Top) BLK : N89-3008-45
- B  $\varnothing$  3x8 (Bi-Top) : N89-3008-46
- C M4x6 BLK : N86-4006-45
- D  $\varnothing$  4x8 (Bi-Top) BLK : N89-4008-45
- E 2.6x6 : N84-2606-46
- F 2x12 : N86-2612-46
- $\odot$  : N09-1777-07

Parts with the exploded numbers larger than 700 are not supplied.