JVC

SERVICE MANUAL

STEREO CASSETTE DECK

MODEL TD-X321 A/B/C/E/G/J/U

Hans Hilberink

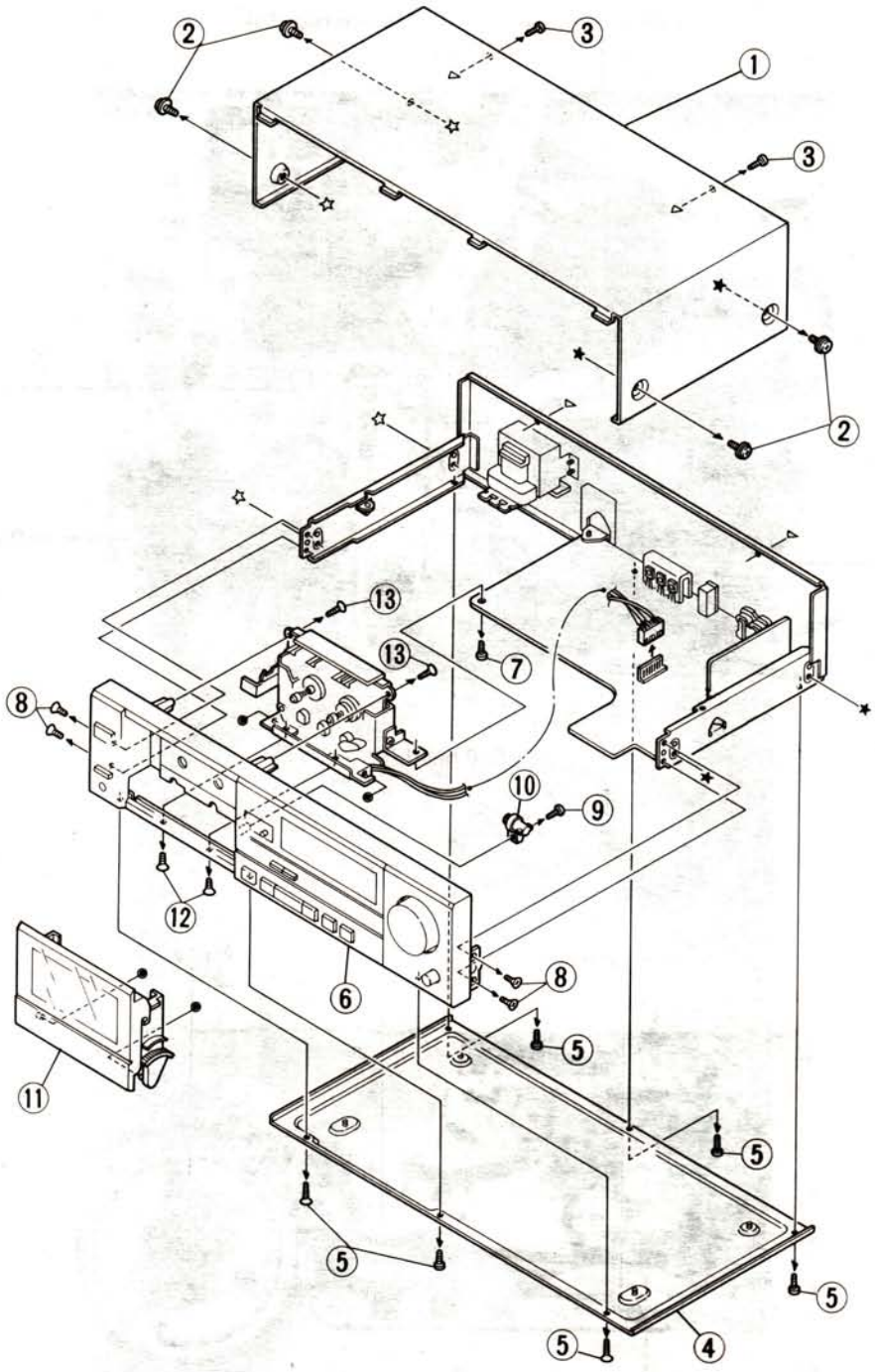
[redacted]

Area suffix	
A	Australia
B	U.K.
C	Canada
E	Continental Europe
G	W. Germany
J	U.S.A.
U	Other Areas

Contents

No. 4305
June 1989

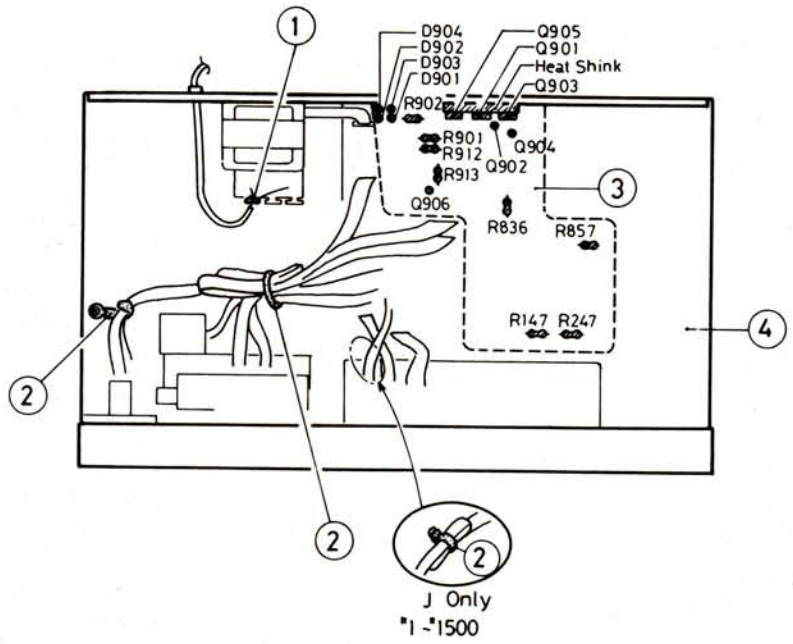
5 Removal of Main Parts



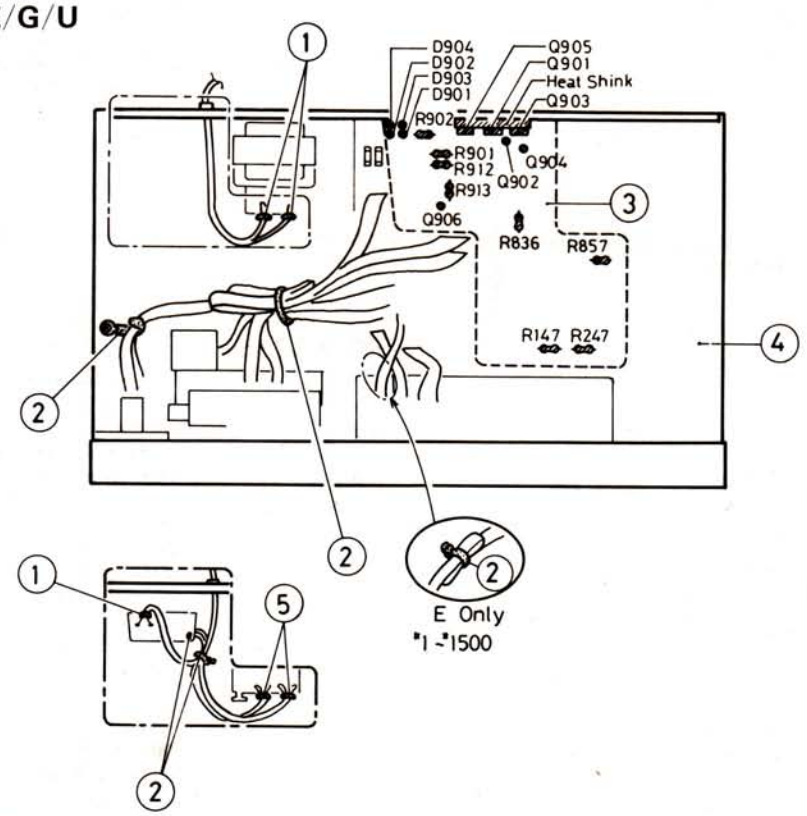
1. **Top cover ①**
   Remove six screws ②, ③ retaining the top cover.
2. **Bottom cover ④**
   Remove six screws ⑤ retaining the bottom cover.
3. **Front panel ⑥**
   (1) Remove one screw ⑦ retaining the mechanism and main P.C. board.
   (2) Remove four screws ⑧ retaining the front panel.
   (3) Remove one screw ⑨ retaining the gear ⑩ and take out the gear.
   (4) Take out the cassette door ⑪.
   (5) Remove two screws ⑫ retaining the bottom side of front panel.
   (6) Remove two screws ⑬ retaining the mechanism and take out the mechanism.
   (7) Pull out the 8-pin connector (CN801) from the main P.C. board.

2 Safety Precaution about TD-X321

TD-X321C/J



TD-X321A/B/E/G/U



SAFETY PRECAUTION

① The power cord should be bound and securely fastened onto the substrate to avoid contacting other parts and shortcircuit in case of breaking of the wire.

②③ All wires should be bound and arranged possibly away from the primary circuit, sharp edges of the chassis and heating parts (shown in ▨ in the diagram) not to touch them.

④ Parts to be attached onto the back of the P.C. board should be fastened down with bond or spacers.

⑤ The primary wires (4 wires) must be tied up in a bundle since the primary circuit is exposed. (TD-X321U only)

COMPU LINK CONTROL SYSTEM

This is a convenient system which has been originated and developed by JVC. The following are the brief explanations of its major performances:

Automatic Source Selection

When the provided remote cables are used for connecting this unit to other components which have COMPU LINK-1/SYNCHRO terminals, the switch-over of all system components is possible with simple one-touch of the source selector button of JVC's amplifier or receiver. By doing this, the corresponding component will start playing automatically. The source select button of the remote control unit or the activation button of the desired component can be also used for this purpose.

When the components have been switched over, the previous component will stop playing within five seconds.

Synchronized Recording

Synchronized recording refers to the process in which the deck starts recording in synchronism with the CD player. Perform the synchronized recording as follows:

1. Set the cassette deck to the record-pause mode in accordance with the recording procedures on page 19.
2. If you want the programmed recording, program the desired tunes in any order you wish to hear.
3. Press the PLAY/PAUSE button of the CD player. By so doing, the cassette deck is placed in the record mode and synchronized with the CD player for recording. Synchronized recording thus can be made possible.

Notes:

- Synchronized recording stops automatically when the CD player stops playing.
- To cancel synchronized recording, press the STOP button of the CD player or cassette deck.
- Synchronized recording does not start except when the record-pause mode is set by simultaneously pressing the ○ REC/REC MUTE and ❚❚ (pause) buttons in the stop mode.
- The source is locked to the CD position during synchronized recording to avoid accidental stops or switch-over to another component. To switch over the components, cancel synchronized recording first.

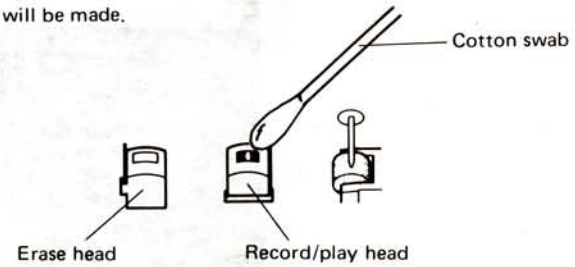
MAINTENANCE

The importance of cleaning

When the tape is moving, magnetic powder and dust naturally accumulate on the heads, capstan and pinch roller. When they become too dirty,

- tone quality deteriorates.
- the output sound level drops.
- the previous sound is not erased satisfactorily.
- recordings are not satisfactory.

Because of this, clean the heads, etc. every 10 hours of use so that optimum recordings will be made.

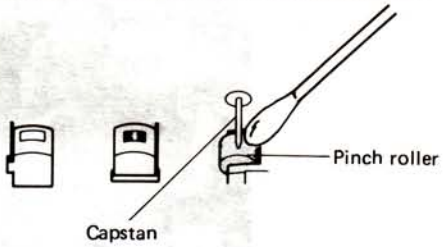


Cleaning the heads, pinch roller and capstan

Wipe the heads, the capstan, etc. with a cotton swab with its tip dipped in alcohol.

For effective cleaning, use a cleaning kit available from your audio store.

After cleaning, be sure that the cleaning fluid has completely dried before loading a cassette.

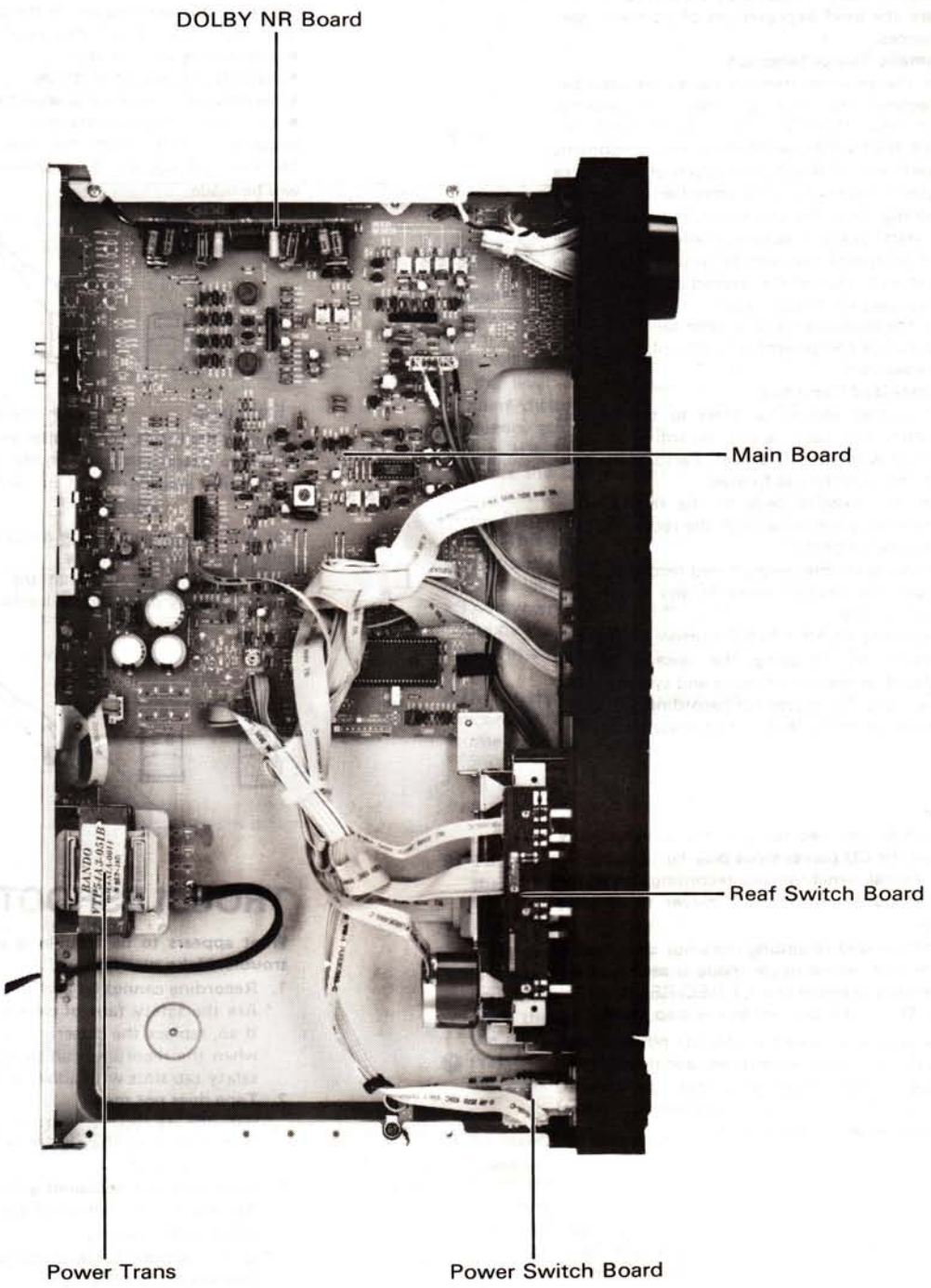


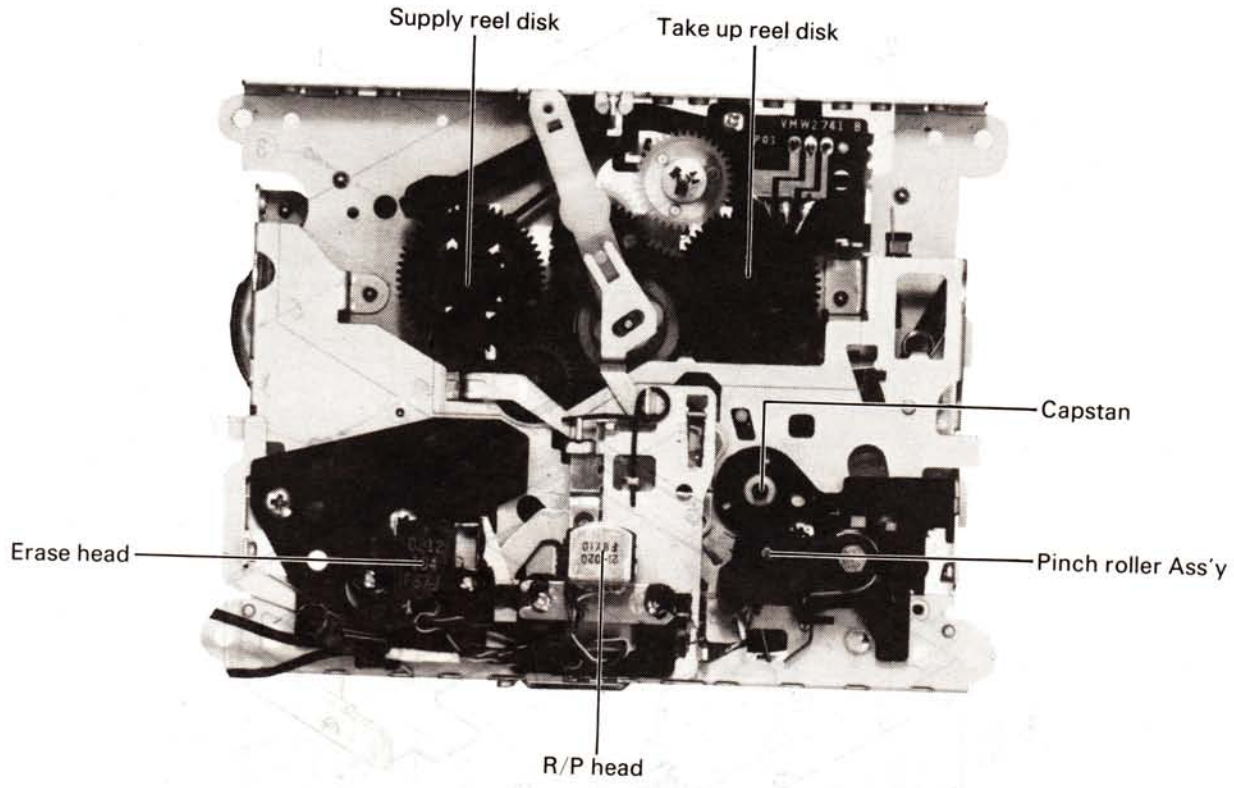
TROUBLESHOOTING

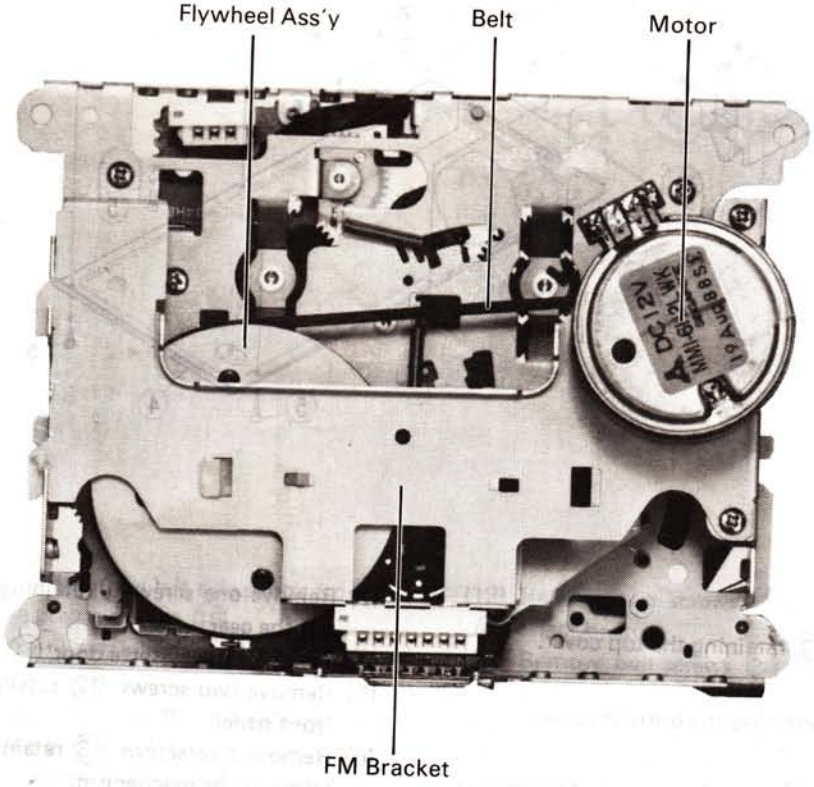
What appears to be trouble is not always real trouble. Make sure first . . . .

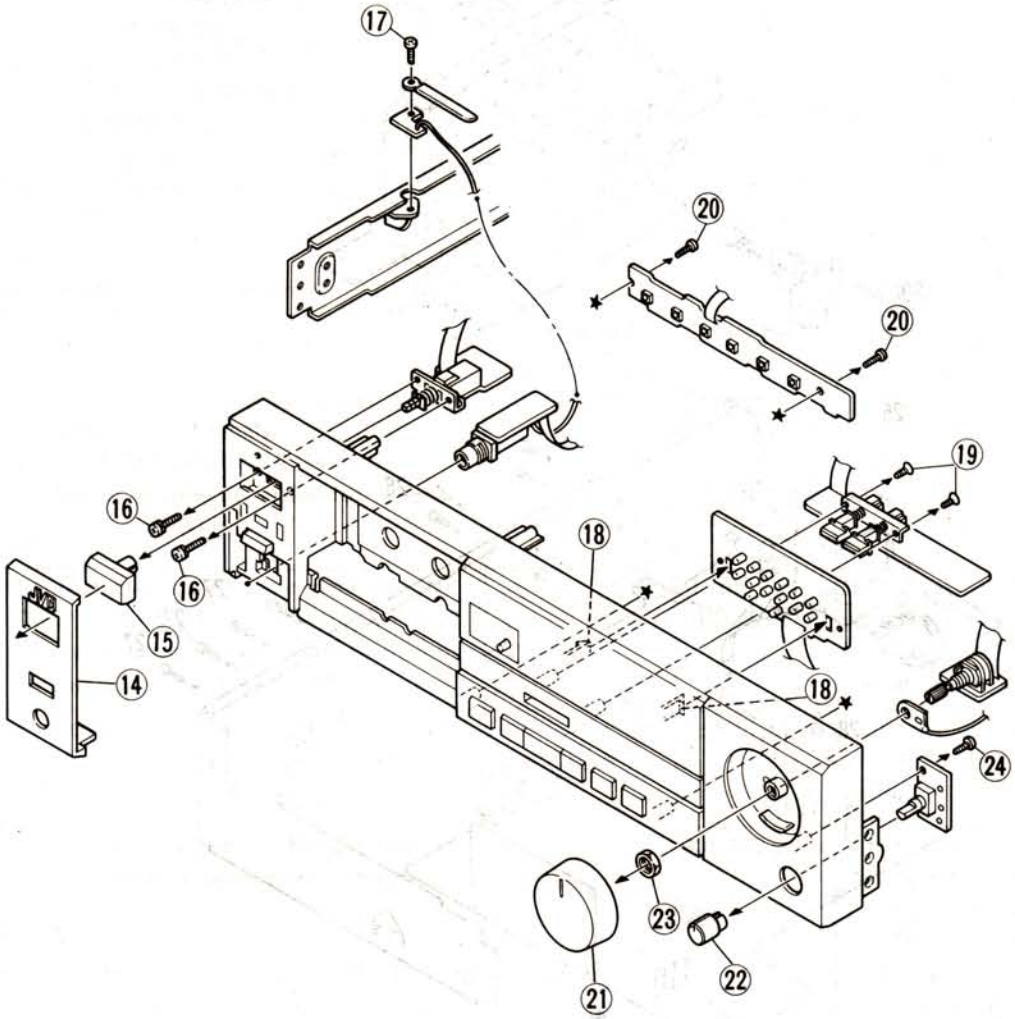
1. **Recording cannot be performed.**
   * Are the safety tabs of cassette tape broken? If so, replace the cassette with a new one, or when the recording can be erased, cover the safety tab slots with adhesive tape.
2. **Tape does not move.**
   * Has the ❚❚ PAUSE button been pressed? If it has, press the PLAY button to cancel the pause mode.
3. **Tape runs, but no sound is heard.**
   * Are the cords connected correctly? If not, insert again securely.
   * Is the remote cable disconnected? If so, connect it correctly.
   * Is the VOLUME control of the stereo amplifier set to MIN? If it is, adjust the control to an appropriate volume.
4. **Sound is too low, unstable or broken.**
   * Are the heads, pinch roller and capstan dirty? If so, clean them.
5. **Hiss noise is heard, and high-frequencies are attenuated.**
   * Is the record/playback head magnetized? If so, demagnetize it.
6. **Previously recording is not completely erased.**
   * Is the erase head dirty? If so, clean it.

4 Location of Main Parts

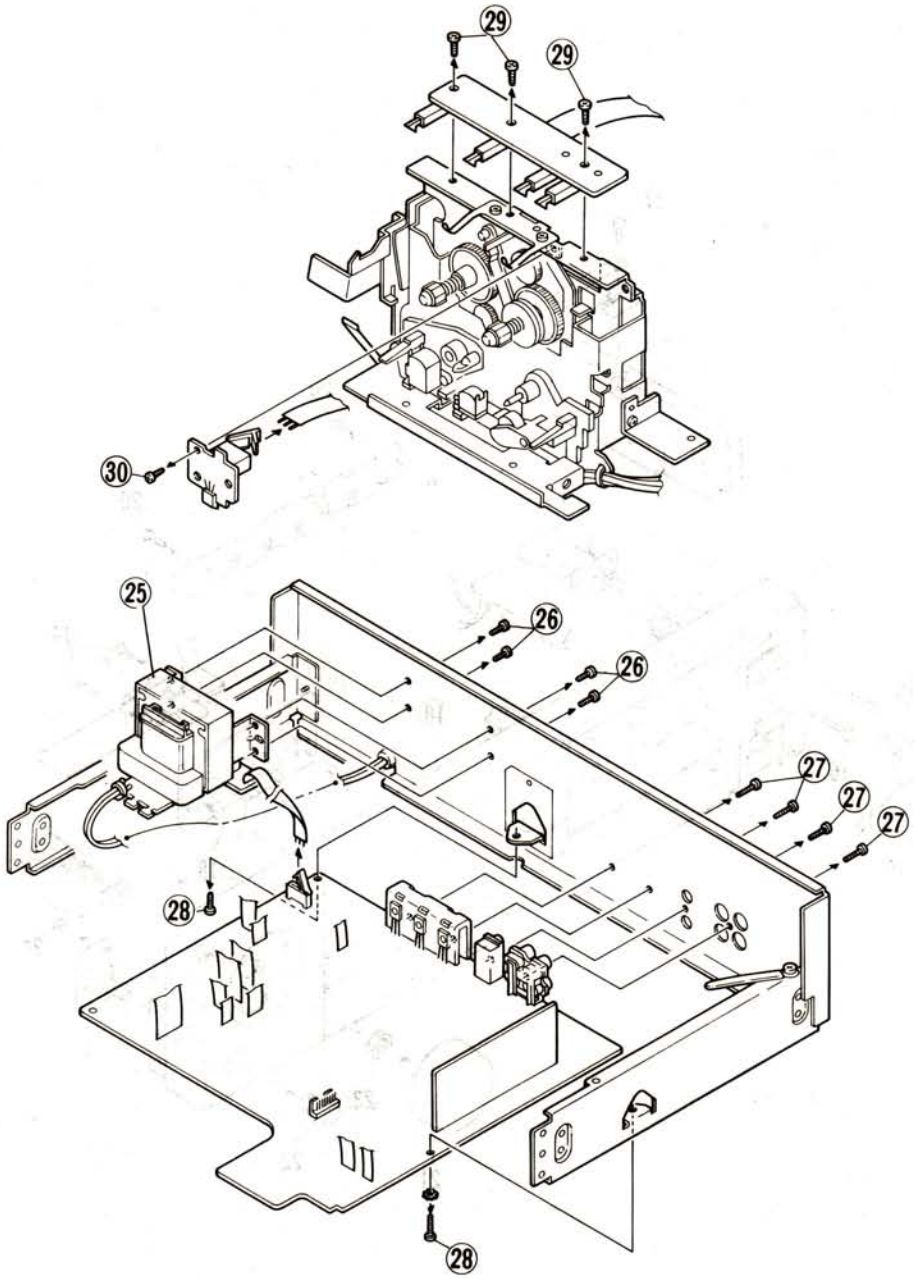



Supply reel disk
Take up reel disk
Capstan
Erase head
Pinch roller Ass'y
R/P head


Flywheel Ass'y
Belt
Motor
FM Bracket



(8) Take out the panel (14) from the left side of the front panel and pull out the power button (15).
(9) Remove two screws (16) retaining the power switch board.
(10) Remove one screw (17) retaining the left side of the chassis and pull out the phone jack board.
(11) Remove two joining points (18) retaining the LED indicator board.
(12) Remove two screws (19) retaining the DOLBY NR select board.
(13) Remove two screws (20) retaining the operation key board.
(14) Pull out the volume (21) and balance (22) knobs.
(15) Remove the hexagonal nut (23) and take out the volume board.
(16) Remove one screw (24) retaining the balance board.



4. Power transformer (25)

(1) Remove four screws (26) retaining the power transformer.

(2) Pull out the 5-pin wire (FW901) from the main P.C. board.

5. Main P.C. board

Remove six screws (27), (28) retaining the main P.C. board.

6. Other P.C. boards

- **Leaf switch board**
  Remove three screws (29) retaining the leaf switch board.
- **Hall IC board**
  Remove one screw (30) retaining the hall IC board.

6 Main Adjustments

1. Equipment and measuring instruments used for adjustments

1) Electronic voltmeter
2) Audio frequency oscillator
   (range: 50 – 20 kHz and output 0 dB with impedance of 600 Ω)
3) Attenuator (impedance: 600 Ω)
4) Standard tape for REC/PB
   Maxell UD1 (TS-9) – Normal (SF) tape
   TDK SA – Chroma (SA) tape – or equivalent
   JVC ME – Metal tape
5) Reference tape for playback (JVC Test Tape)
   VTT712 (for tape speed, wow flutter adj.)
   VTT724 (for playback level)
   VTT739 (for playback frequency response)
   VTT703L (10 kHz) (for head azimuth adj.)
6) Resistor 600 Ω (for attenuator matching)
7) Distortion meter (bandpass filter)
8) Wow flutter meter
9) Frequency counter

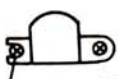
■ **Power sources**

Set the line voltage selector switch to 240 V/230 V/220 V/127 V/120 V/110 V according to your local voltage.

AC 240 V, 50/60 Hz (TD-X321A/B)
AC 220 V, 50/60 Hz (TD-X321E/G)
AC 120 V, 60 Hz (TD-X321C/J)
AC 230 V/127 V/110 V, 50/60 Hz (TD-X321U)

2. Mechanism adjustment procedure

● Notice: 0 dBs = 0.775 (V)

Item	Adjustment	Adjusting point	Standard value	Remarks
Adjusting motor speed	1. Connect a frequency counter to the LINE OUT terminals. 2. Play back the VTT712 test tape. 3. Adjust volume in motor for normal speed at 3000 Hz.	VR501	Normal speed: 3000 ± 15 Hz	
Checking wow and flutter	Connect a wow and flutter meter to LINE OUT terminals. Play back the VTT712 test tape. Check to see if the reading of the meter is within 0.16% (WRMS).		0.16% (JIS WRMS)	If the reading becomes moving value even if confirming to the standard, a reclaim may be raised. Repairs are necessary.
Checking playback torque	Employ a torque testing cassette tape for the checking, or remove the cassette cover and use a torque gauge.		25~70 gr-cm	If the standard torque is not obtained, replace the take-up disk assembly.
Checking fast forward torque	Measure the torque in the fast forward mode in the same manner as in the above.		90~150 gr-cm	If the standard torque is not obtained, perform the following. 1. Clean the capstan belt, the idler circumference, the motor pulley, the take-up reel disk circumference, the flywheel circumference, etc. 2. Replace the belt and idler.
Checking rewind torque	Measure the torque in the rewind mode in the same manner as in the above.		90~150 gr-cm	If the standard torque is not obtained, clean the capstan belt, idler, motor pulley, flywheel circumference, rewinding idler circumference, left reel disk circumference, etc.
Adjusting Head azimuth	1. Connect an electronic voltmeter to the LINE OUT terminals. 2. Playback the VTT703L test tape. 3. Adjust the head angle with the screw Ⓐ until the reading of the electronic voltmeter becomes maximum for both channels.	Screw Ⓐ	Maximum output	 Adjust screw Ⓐ (Turn to clockwise)

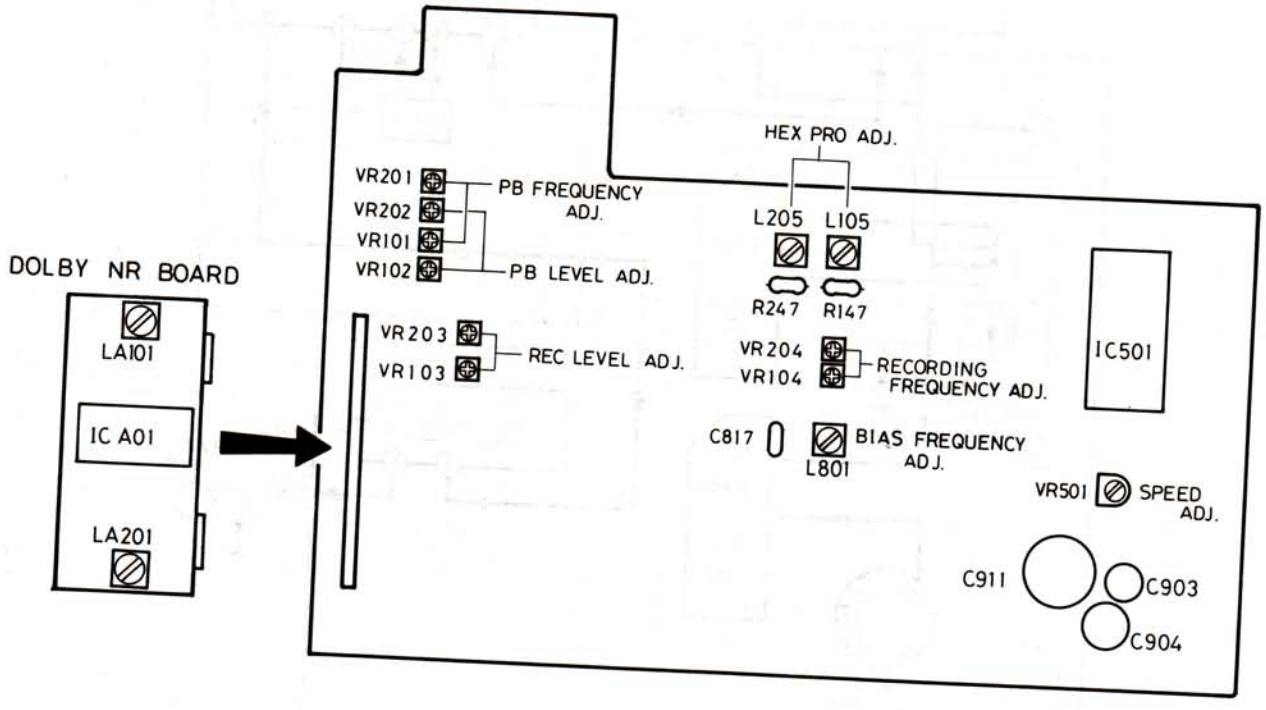
3. **Routine of electrical circuit adjustment**

Perform the tape transport checks and head azimuth adjustment before following checks and adjustments.
Adjustment should be performed in the order of adjustment steps.
In the steps marked with an asterisk (*), adjustment should be performed after replacing the heads.
Perform this adjustment with the NR switch set to OFF.

No.	Item	Check point	Adjustment position	Condition	Adjustment, Confirmation
*1	Playback level adjustment (When the head is replaced, adjust playback level.)	LINE OUT	L : VR102 R : VR202	VTT724	1) Play back the VTT724 test tape. 2) Adjust VR102, VR202 so that LINE OUT level becomes –8 dBs. 3) Headphone OUT: –24 dBs ± 3 dB 4) DIN OUT : –8 dBs ± 2 dB (TD-X321G)
*2	Playback frequency response adjustment		L : VR101 R : VR201	TMT735	1) Play back the TMT735 test tape. 2) Adjust VR101, VR201 so that LINE OUT level becomes +0.5 ± 0.5 dB (1 kHz – 12.5 kHz).
*3	Bias frequency adjustment	Connect the body of C817.	L801	METAL tape	1) Connect the frequency counter to the LINE OUT terminals. 2) Adjust L801 so that the counter reads 95 kHz. • Standard value : 95 kHz ± 2 kHz
*4	Adjustment of HX pro.	R147 R247	L105 L205	METAL tape	1) Record with METAL tape and play it back. 2) Adjust L105 and L205 to minimize voltages at R147 and R247 respectively with the tape being played back.
*5	Rec/PB frequency response adjustment	LINE IN LINE OUT	L : VR104 R : VR204	NORMAL Blank tape	1) NR switch : OFF 2) Record a 1.25 kHz signal at an input reference level of –20 dB. 3) Record 1.25 kHz and 12.5 kHz signals and play them back. 4) Adjust VR104 and VR204 so that the deviations of 1.25 kHz and 12.5 kHz outputs satisfy the standard values with respect to 1 kHz output. • With respect to 1 kHz reference At 12.5 kHz : 0.5 ± 0.5 dB (Adjustment)
*6	Recording gain adjustment	LINE IN LINE OUT	L : VR103 R : VR203	NORMAL, CrO_2, METAL Blank tapes	1) Apply a 1 kHz signal to the LINE IN terminals. 2) Adjust VR103, VR203 so that LINE OUT terminal level becomes –8 dBs ± 0.5 dB. • CrO_2 : –8 dBs ± 2 dB (Confirm) • METAL: –8 dBs ± 2 dB (Confirm)
7	Rec/PB distortion check	LINE IN LINE OUT	–	NORMAL, CrO_2, METAL Blank tapes	1) Record a 1 kHz, –8 dBs signal through LINE OUT terminals. 2) Play back the recorded part. 3) Check the output with a distortion meter to see if the value conforms to the standard value. • Standard value [NORMAL]: Less than 2% THD [CrO_2] : Less than 3% THD [METAL] : Less than 2% THD

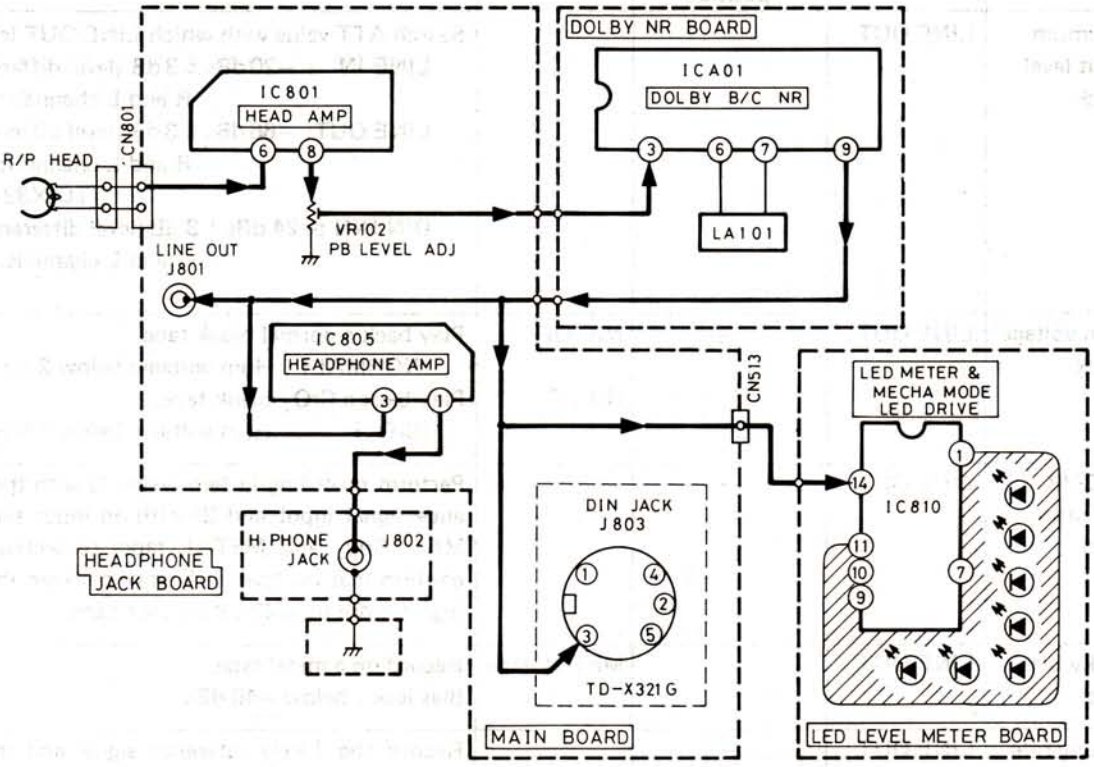
No.	Item	Check point	Adjustment position	Condition	Adjustment, Confirmation
8	Minimum input level check	LINE OUT	–	–	Search ATT value with which LINE OUT level is –8 dBs. LINE IN : –20 dBs ± 3 dB (level difference between R and L channels: within 3 dB) LINE OUT: –66 dBs ± 3 dB (level difference between R and L channels: within 3 dB) (TD-X321A/B/E/G/U) DIN INN :–24 dBs ± 3 dB (level difference between R and L channels: within 3 dB) (TD-X321G)
9	Hum voltage check	LINE OUT	–	NR: OFF NR : C	Play back a normal blank tape. [NORMAL] Hum voltage: below 2.5 mV Play back a CrO_2 blank tape. [CrO_2] Hum voltage: below 1.5 mV
10	REC/PB S/N ratio check	LINE OUT	–		Perform recording in two ways: 1) with the 1 kHz reference signal input and 2) with no input signal on NORMAL, CrO_2 and METAL tapes respectively, and then confirm that the level difference between the two recordings is more than 42 dB on each tape.
11	Leaky bias check	LINE OUT	–	METAL tape	Record on a metal tape. Bias leak : below –40 dBs
12	Erasing rate check	LINE OUT	–		Record the 1 kHz reference signal and then erase the recording. Residual sound in the erased part: more than 60 dB

4. Location of Adjustment

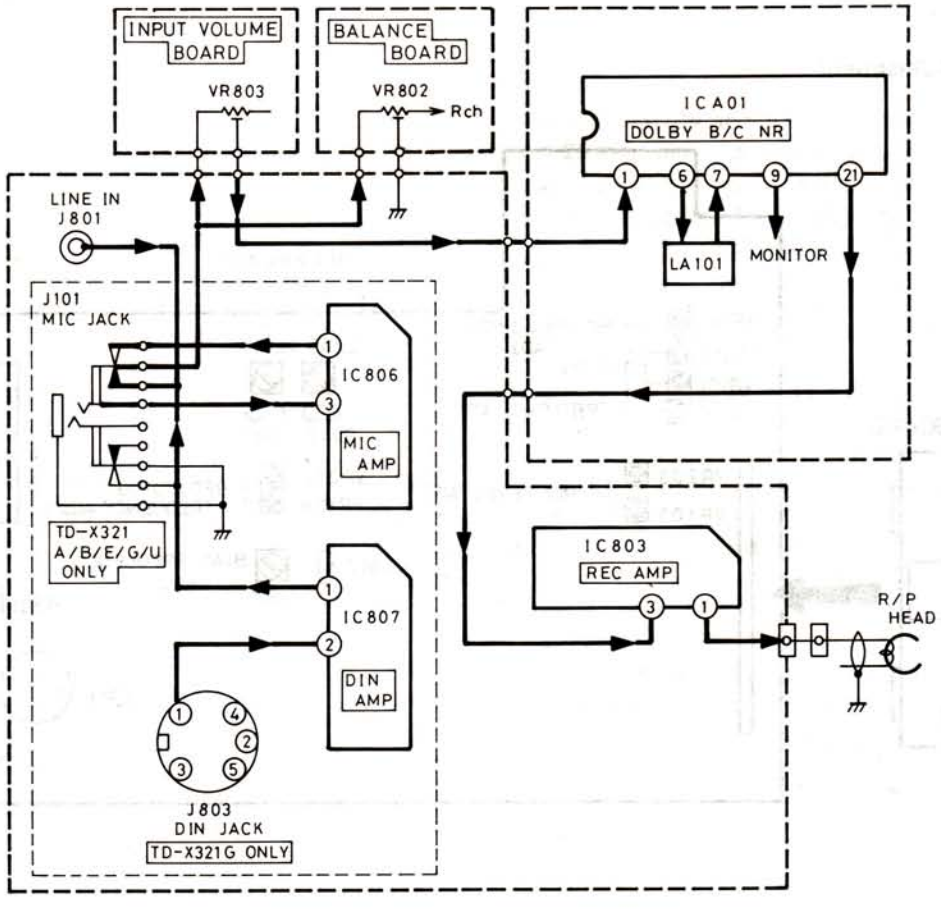


7 Block Diagram

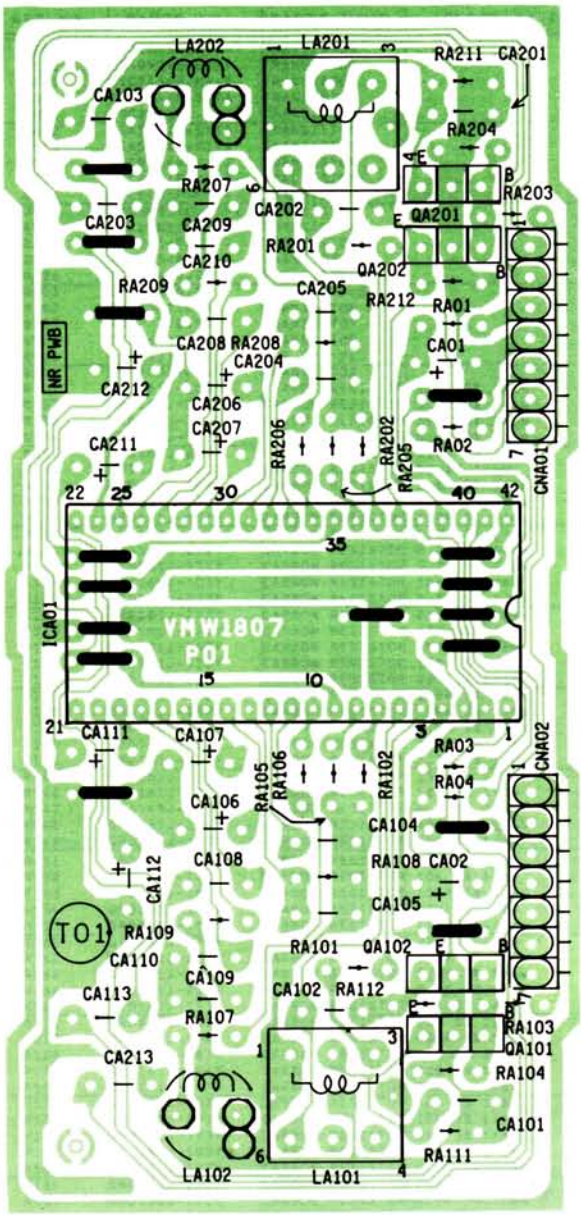
‹Playback Channel›



‹Recording Channel›

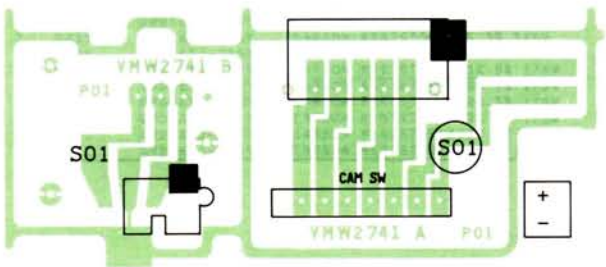


■ Dolby NR Board

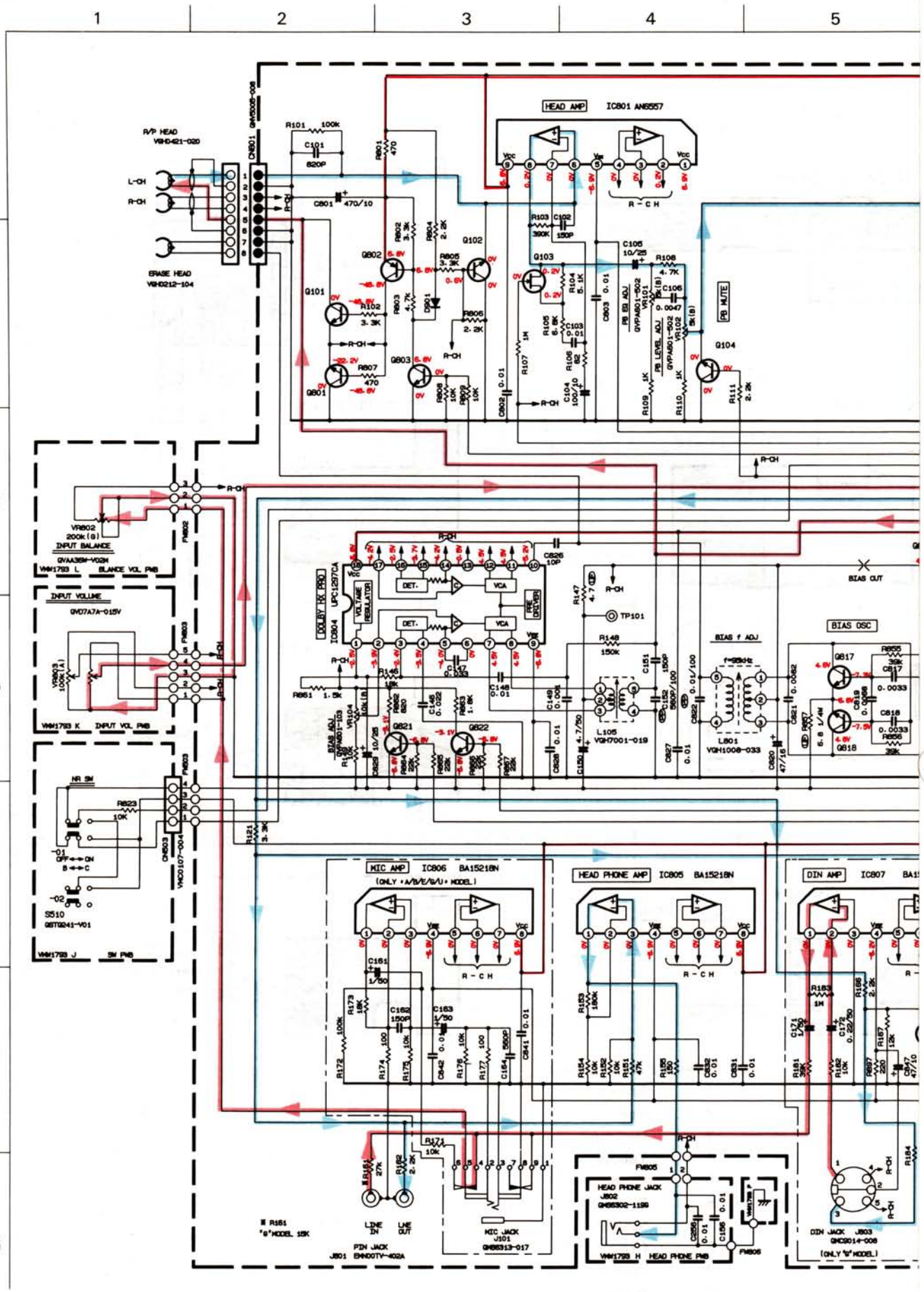


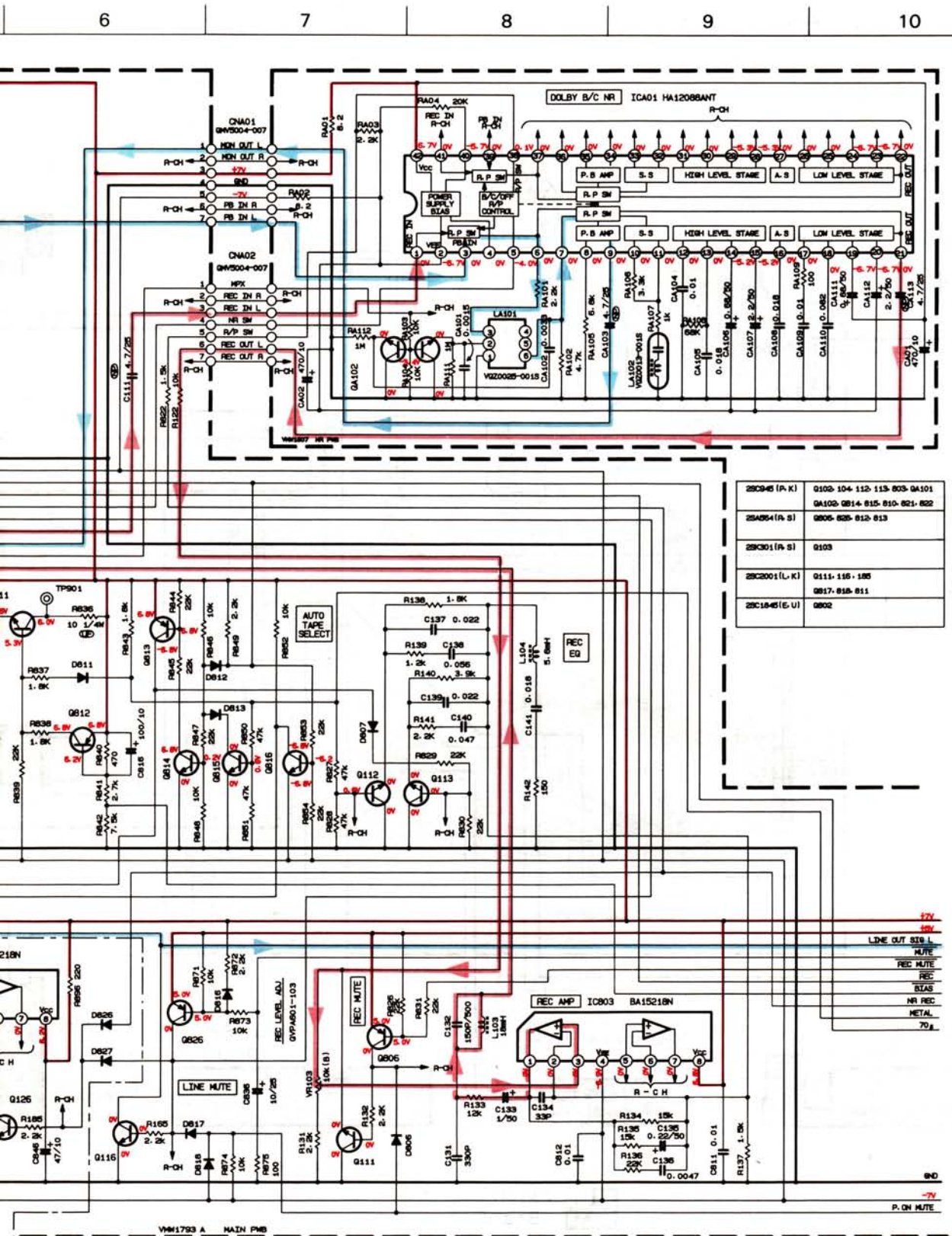
⚠	REF. NO	PARTS NO.	PARTS NAME	DESCRIPTION
	CA01	QETC1AM-477ZN	E.CAPACITOR	470MF 20% 10V
	CA02	QETC1AM-477ZN	E.CAPACITOR	470MF 20% 10V
	CA101	QFN31HJ-152Z	M.CAPACITOR	1500PF 5% 50V
	CA102	QFN31HJ-332Z	M.CAPACITOR	3300PF 5% 50V
	CA103	QEN61EM-475Z	NP.E.CAPACITOR	4.7MF 20% 25V
	CA104	QFV71HJ-103ZM	TF.CAPACITOR	.010MF 5% 50V
	CA105	QFV71HJ-183ZM	TF.CAPACITOR	.018MF 5% 50V
	CA106	QETC1HM-684ZN	E.CAPACITOR	.68MF 20% 50V
	CA107	QETC1HM-225ZN	E.CAPACITOR	2.2MF 20% 50V
	CA108	QFV71HJ-183ZM	TF.CAPACITOR	.018MF 5% 50V
	CA109	QFV71HJ-103ZM	TF.CAPACITOR	.010MF 5% 50V
	CA110	QFV71HJ-823ZM	TF.CAPACITOR	.082MF 5% 50V
	CA111	QETC1HM-684ZN	E.CAPACITOR	.68MF 20% 50V
	CA112	QETC1HM-225ZN	E.CAPACITOR	2.2MF 20% 50V
	CA113	QEN61EM-475Z	NP.E.CAPACITOR	4.7MF 20% 25V
	CA201	QFN31HJ-152Z	M.CAPACITOR	1500PF 5% 50V
	CA202	QFN31HJ-332Z	M.CAPACITOR	3300PF 5% 50V
	CA203	QEN61EM-475Z	NP.E.CAPACITOR	4.7MF 20% 25V
	CA204	QFV71HJ-103ZM	TF.CAPACITOR	.010MF 5% 50V
	CA205	QFV71HJ-183ZM	TF.CAPACITOR	.018MF 5% 50V
	CA206	QETC1HM-684ZN	E.CAPACITOR	.68MF 20% 50V
	CA207	QETC1HM-225ZN	E.CAPACITOR	2.2MF 20% 50V
	CA208	QFV71HJ-183ZM	TF.CAPACITOR	.018MF 5% 50V
	CA209	QFV71HJ-103ZM	TF.CAPACITOR	.010MF 5% 50V
	CA210	QFV71HJ-823ZM	TF.CAPACITOR	.082MF 5% 50V
	CA211	QETC1HM-684ZN	E.CAPACITOR	.68MF 20% 50V
	CA212	QETC1HM-225ZN	E.CAPACITOR	2.2MF 20% 50V
	CA213	QEN61EM-475Z	NP.E.CAPACITOR	4.7MF 20% 25V
	CNA01	QMV5004-007	CONNECTOR	
	CNA02	QMV5004-007	CONNECTOR	
	ICA01	HA1208BANT	DOLBY NR I.C	
	LA101	VQZ0025-001S	FILTER	
	LA102	VQZ0013-001S	FILTER	
	LA201	VQZ0025-001S	FILTER	
	LA202	VQZ0013-001S	FILTER	
	QA101	2SC945(P,K)-T	TRANSISTOR	
	QA102	2SC945(P,K)-T	TRANSISTOR	
	QA201	2SC945(P,K)-T	TRANSISTOR	
	QA202	2SC945(P,K)-T	TRANSISTOR	
	RA01	QRD161J-8R2Y	C RESISTOR	8.2 5% 1/6W
	RA02	QRD161J-8R2Y	C RESISTOR	8.2 5% 1/6W
	RA03	QRD161J-222Y	CARBON RESISTOR	2.2K 5% 1/6W
	RA04	QRD161J-203Y	CARBON RESISTOR	20K 5% 1/6W
	RA101	QRD161J-222Y	CARBON RESISTOR	2.2K 5% 1/6W
	RA102	QRD161J-472Y	CARBON RESISTOR	4.7K 5% 1/6W
	RA103	QRD161J-103Y	CARBON RESISTOR	10K 5% 1/6W
	RA104	QRD161J-103Y	CARBON RESISTOR	10K 5% 1/6W
	RA105	QRD161J-682Y	CARBON RESISTOR	6.8K 5% 1/6W
	RA106	QRD161J-332Y	CARBON RESISTOR	3.3K 5% 1/6W
	RA107	QRD161J-102Y	CARBON RESISTOR	1.0K 5% 1/6W
	RA108	QRD161J-683Y	CARBON RESISTOR	68K 5% 1/6W
	RA109	QRD161J-101Y	CARBON RESISTOR	100 5% 1/6W
	RA111	QRD161J-105Y	CARBON RESISTOR	1.0M 5% 1/6W
	RA112	QRD161J-105Y	CARBON RESISTOR	1.0M 5% 1/6W
	RA201	QRD161J-222Y	CARBON RESISTOR	2.2K 5% 1/6W
	RA202	QRD161J-472Y	CARBON RESISTOR	4.7K 5% 1/6W
	RA203	QRD161J-103Y	CARBON RESISTOR	10K 5% 1/6W
	RA204	QRD161J-103Y	CARBON RESISTOR	10K 5% 1/6W
	RA205	QRD161J-682Y	CARBON RESISTOR	6.8K 5% 1/6W
	RA206	QRD161J-332Y	CARBON RESISTOR	3.3K 5% 1/6W
	RA207	QRD161J-102Y	CARBON RESISTOR	1.0K 5% 1/6W
	RA208	QRD161J-683Y	CARBON RESISTOR	68K 5% 1/6W
	RA209	QRD161J-101Y	CARBON RESISTOR	100 5% 1/6W
	RA211	QRD161J-105Y	CARBON RESISTOR	1.0M 5% 1/6W
	RA212	QRD161J-105Y	CARBON RESISTOR	1.0M 5% 1/6W

■ Cam Switch/Holl IC Board



8 9 Standard Schematic Diagram





2SC945 (A-K)	Q102, 104, 112, 113, 803, QA101 QA102, QB14, 815, 810, 821, 822
2SA954 (A-S)	Q805, 825, 812, 813
2SK301 (A-S)	Q103
2SC2001 (L-K)	Q111, 116, 185 Q817, 818, 811
2SC1845 (E-U)	Q802

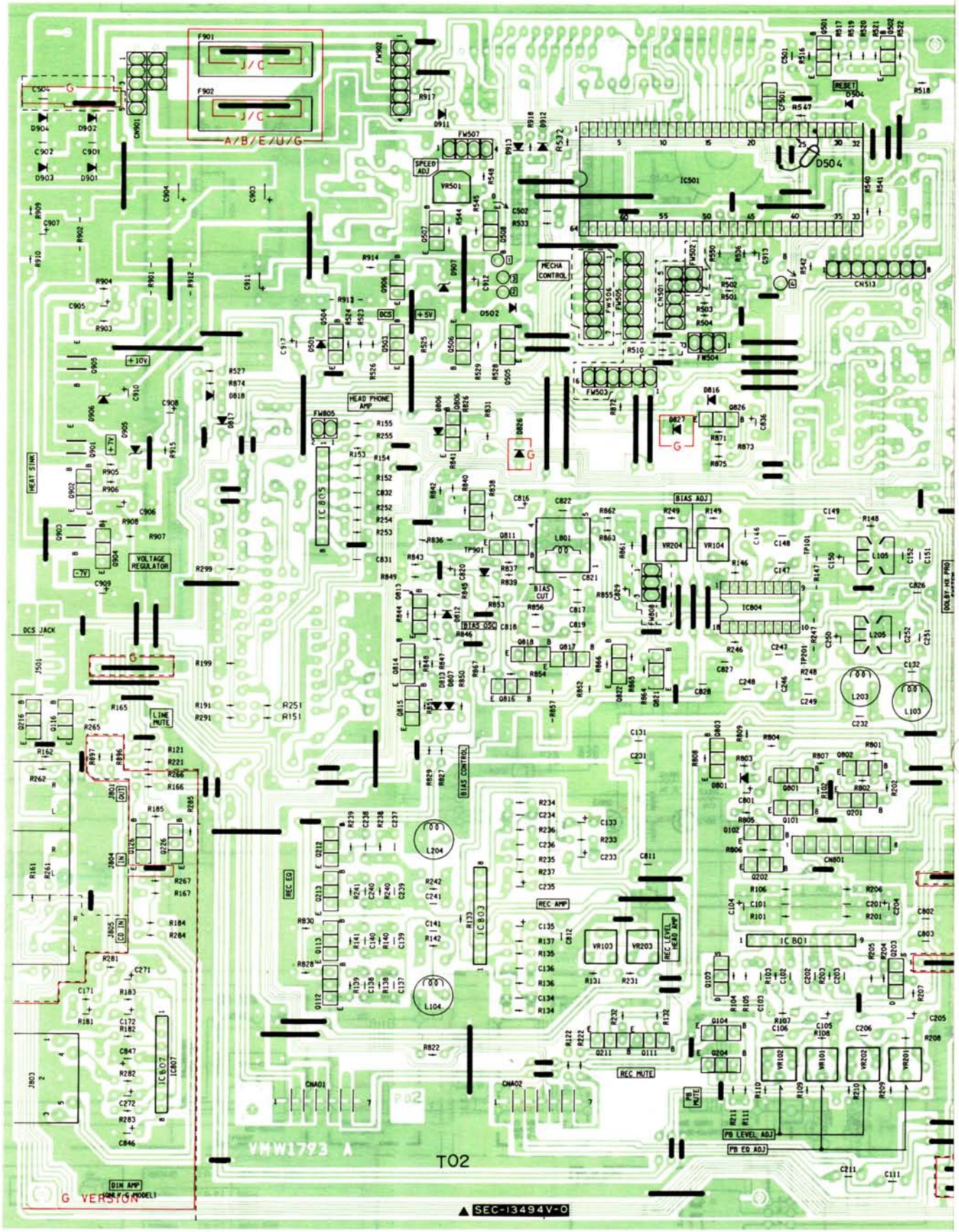
NOTES

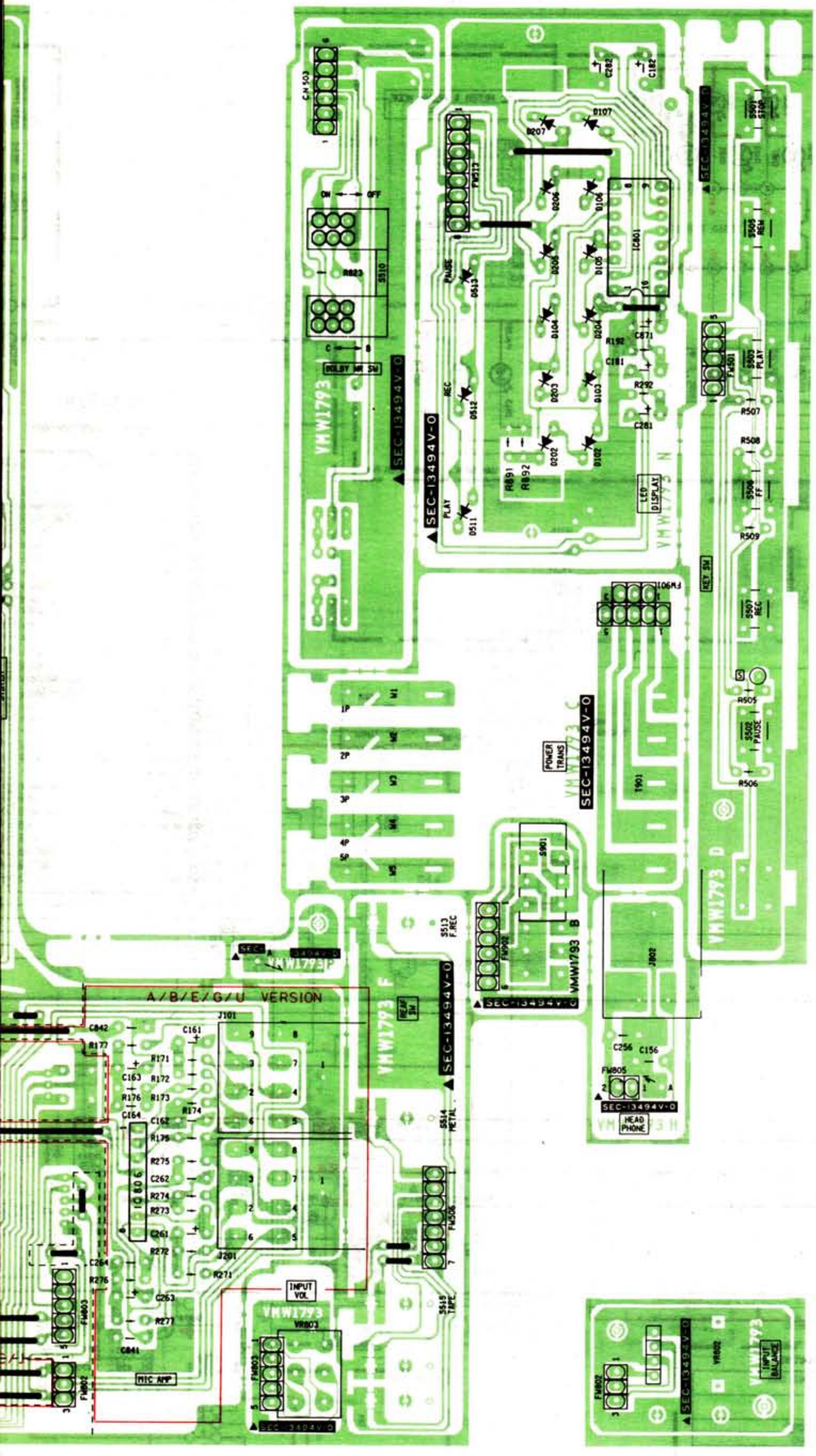
1. VOLTAGES ARE DC-MEASURED WITH A DIGITAL VOLT METER WITHOUT INPUT SIGNAL.
   CONDITION : MODE : REC; NR : OFF; TAPE : METAL
2. UNLESS OTHERWISE SPECIFIED.
   ALL RESISTORS ARE 1/8W ±5% CARBON RESISTOR.
   ALL CAPACITORS ARE 50V CERAMIC CAPACITOR OR 50V MYLAR CAPACITOR.
   ALL RESISTANCE VALUES ARE IN OHM (Ω).
   ALL CAPACITANCE VALUES ARE IN μF (P=pF).
   ALL E. CAPACITORS ARE SHOWN IN THE FORM OF CAPACITANCE (μF)/RATED VOLTAGE (V).
   ALL DIODES ARE HA185 OR HSS104
3. THE RESISTORS LISTED BELOW ARE FUSIBLE RESISTOR IN THE MODEL TD-X321 BK A/B/E/G/U -R836, R901, R902, R913

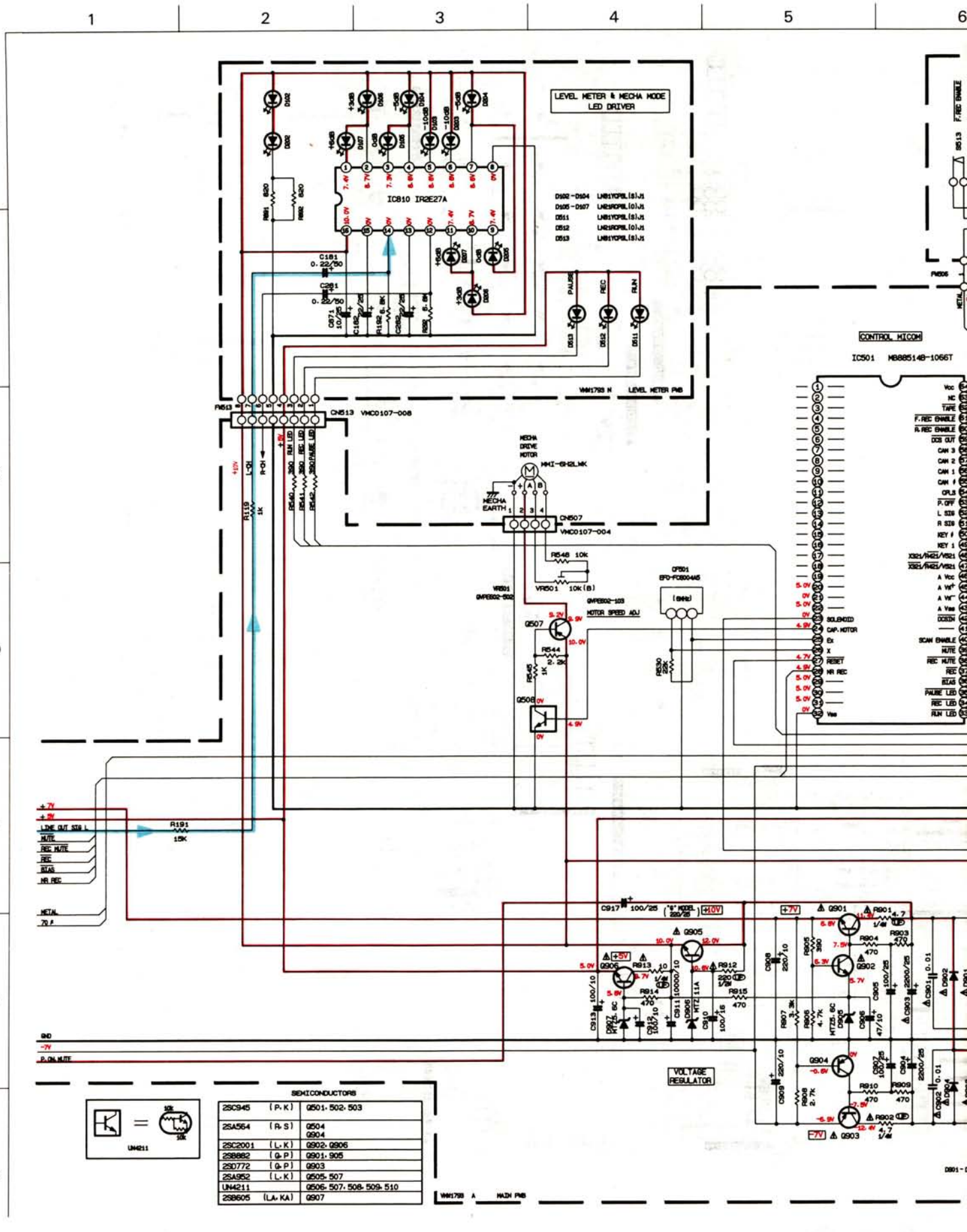
(1/2) UNFLAMMABLE CARBON RESISTOR
(SE) NON-POLARISED ELECTROLYTIC CAPACITOR
(PP) POLYPROPYLINE CAPACITOR

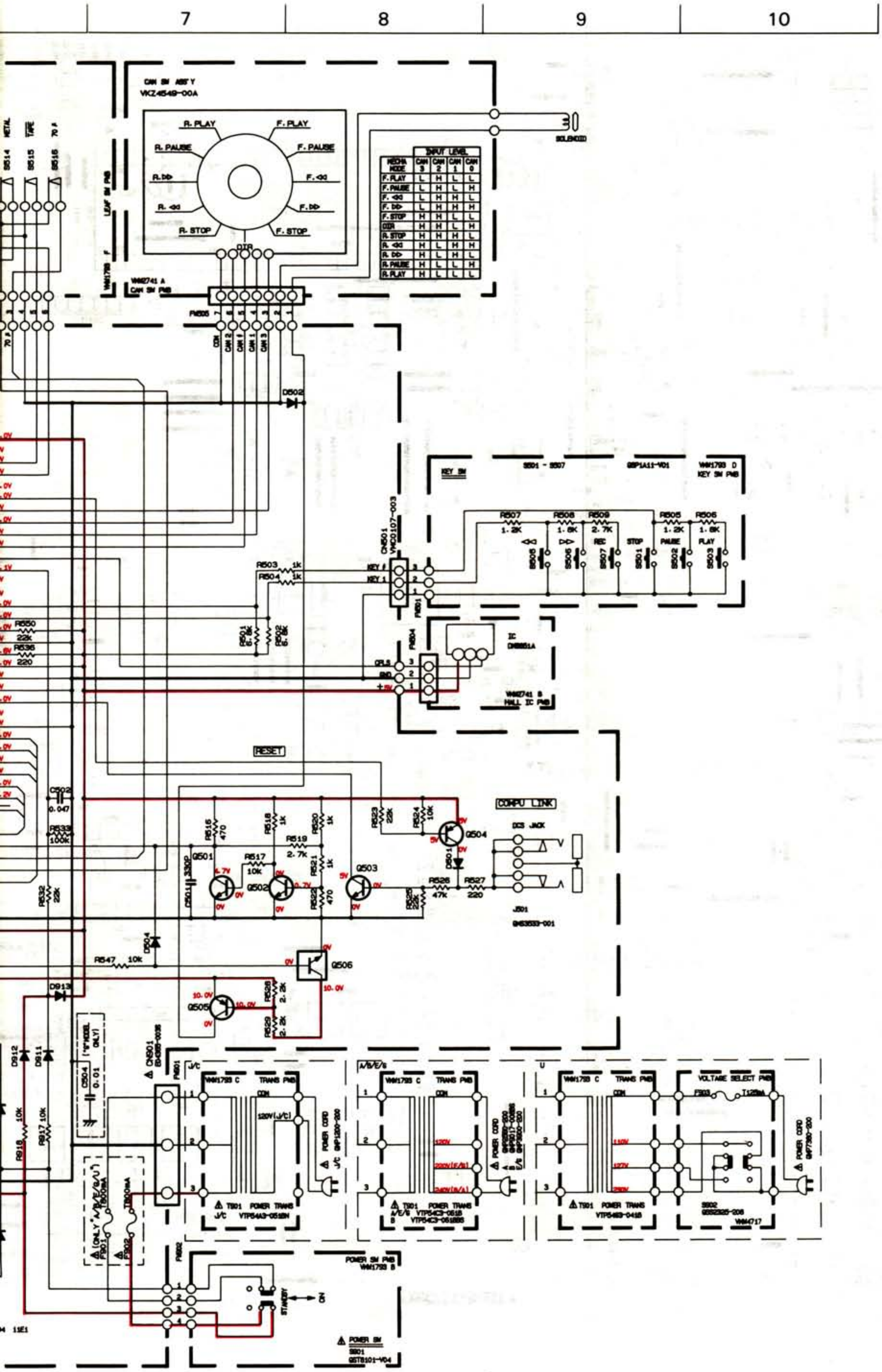
Playback Signal
Recording Signal
+7V Line
+5V Line

10 Location of P.C. Board Parts and Parts List



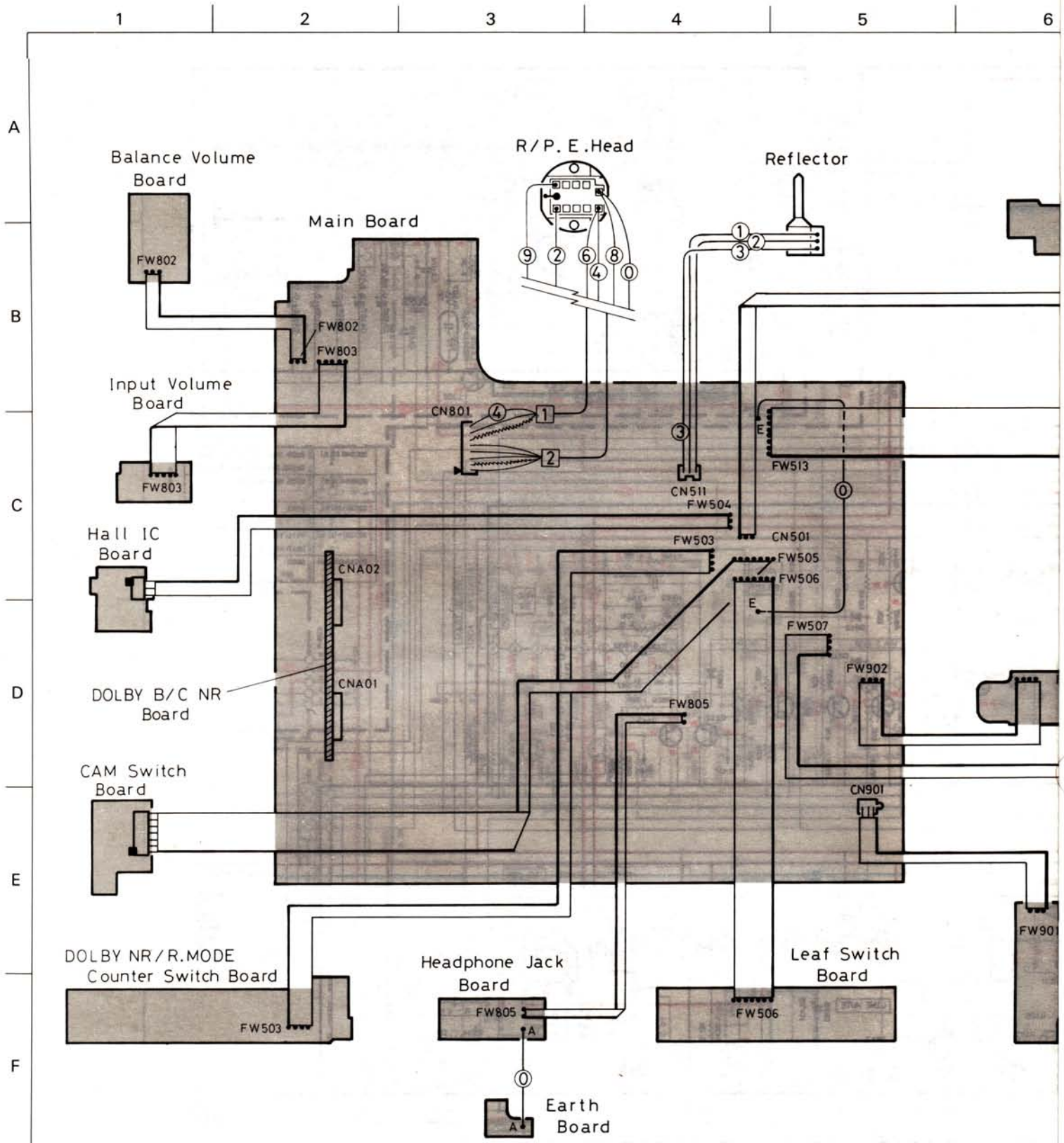

A/B/E/G/U VERSION
SEC-13494V-0
VMW1793
DOLBY NR SW
LED DISPLAY
KEY SW
POWER TRANS
HEAD PHONE
MIC AMP
INPUT VOL
INPUT BALANCE
REAR SW
IC801
IC806
J101
J201
J802
T901
S901
VR802
VR803
FW802
FW803
FW805
FW901
FW902
FW501
FW506
FW512
CN503
S510
S501 STOP
S505 REW
S503 PLAY
S506 FF
S507 REC
S502 PAUSE
S513 F.REC
S514 METAL
S518 TAPE
R505
R506
R507
R508
R509
C256
C156
C182
C282


LEVEL METER & MECHA MODE LED DRIVER
IC810 IR2E27A
VWM1793 N LEVEL METER PWB
CN513 VHC0107-008
MECHA DRIVE MOTOR
MMI-6H2LMK
CN507 VHC0107-004
CONTROL MICOM
IC501 MB88514B-1066T
VR501 10k(B)
MOTOR SPEED ADJ
Q507
Q508
CF501 EFO-FC8004A5
LINE OUT SIG L
MUTE
REC MUTE
REC
BIAS
NR REC
P.ON MUTE
VOLTAGE REGULATOR
VWM1798 A MAIN PWB
SEMICONDUCTORS
2SC945 (P,K) Q501,502,503
2SA564 (R,S) Q504 Q904
2SC2001 (L,K) Q902,Q906
2SB882 (Q,P) Q901,905
2SD772 (Q,P) Q903
2SA952 (L,K) Q505-507
UN4211 Q506-507-508-509-510
2SB605 (LA,KA) Q907

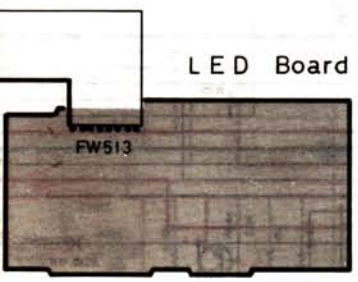


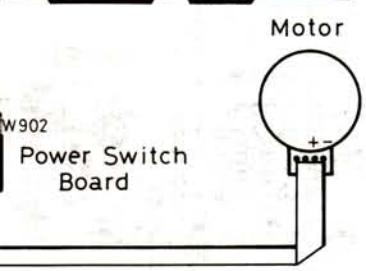
MECHA MODE	INPUT LEVEL CAM 3	CAM 2	CAM 1	CAM 0
F. PLAY	L	H	L	L
F. PAUSE	L	H	L	H
F. ◁◁	L	H	H	L
F. ▷▷	L	H	H	H
F. STOP	H	H	L	L
DIR	H	H	L	H
R. STOP	H	H	H	L
R. ◁◁	H	L	H	H
R. ▷▷	H	L	H	L
R. PAUSE	H	L	L	H
R. PLAY	H	L	L	L

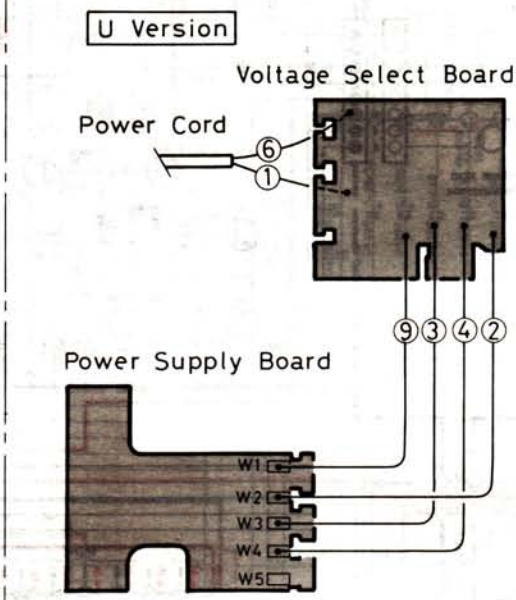
8 Wiring Connections

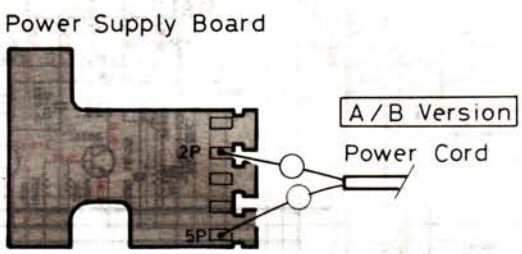


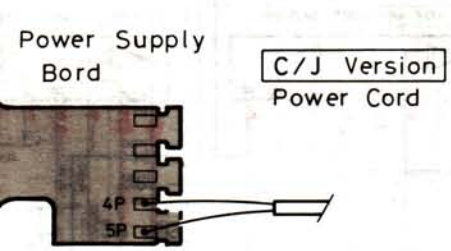
7 8 9 10

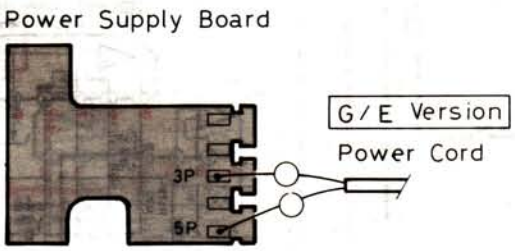












Color codes are shown below.

1 . . . . . Brown
2 . . . . . Red
3 . . . . . Orange
4 . . . . . Yellow
5 . . . . . Green
6 . . . . . Blue
7 . . . . . Violet
8 . . . . . Grey
9 . . . . . White
0 . . . . . Black