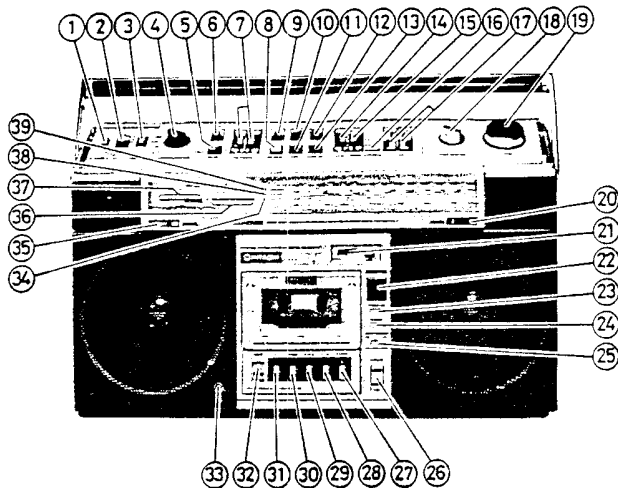


SERVICE MANUAL

No. 1389



KEY TO ILLUSTRATIONS

- | | |
|--------------------------------------|--|
| 1 Dial light button | 21 Tape counter |
| 2 Power switch | 22 Program indicator |
| 3 Timer stand-by mode switch | 23 Program switch |
| 4 Function selector | 24 Repeat switch |
| 5 Meter switch (Tune/Batt./Level) | 25 Auto rewind switch |
| 6 AFC switch | 26 Pause button |
| 7 Record level controls | 27 Stop button |
| 8 REC mute switch | 28 Fast forward button |
| 9 Record mode selector (Auto/Manual) | 29 Playback button |
| 10 Tape selector (Bias) switch | 30 Rewind button |
| 11 Mode switch | 31 Record button |
| 12 Tape selector (Equalizer) switch | 32 Eject button |
| 13 Dolby NR switch | 33 Headphone socket |
| 14 Bass control | 34 Dolby NR indicator |
| 15 Treble control | 35 Built-in microphone (Left) |
| 16 Loudness switch | 36 Level/tuning indicator |
| 17 Volume control | 37 Level/battery indicator |
| 18 Band selector | 38 FM stereo indicator |
| 19 Tuning control | 39 Operation indicator (For E)
AC power indicator [For E(BS)] |
| 20 Built-in microphone (Right) | |

SPECIFICATIONS

GENERAL SECTION

Semi-conductors: IC's: 13
Transistors: 48
Diodes: 43
LED: 23
Varistors: 2

Power (Mains) Supply: AC: 220V, 50 Hz [For E]
240V, 50 Hz [For E (BS)]
DC: 13.5V (IEC R20 x 9)
Car: Use car battery adaptor
5 cm, 4 ohms x 2

Power (Mains) Consumption: 24W
Power output: 8W/CH (Max.), 5W/CH (THD 10%)
Speaker: 16 cm, 3.2 ohms x 2

Dimensions: 556(W) x 318(H) x 173(D) mm
Weight: 8.0 kg (with batteries)

TUNER SECTION

Circuit System: FM/SW/MW/LW 4-band superheterodyne

Tuning Range: FM: 87.5 to 108 MHz
SW: 6.0 to 18 MHz
MW: 530 to 1605 kHz
LW: 150 to 350 kHz

Sensitivity: FM: 10 dB (pra.), 2 dB (max.)
SW: 25 dB (pra.), 20 dB (max.)
MW: 42 dB (pra.), 30 dB (max.)
LW: 52 dB (pra.), 40 dB (max.)

Intermediate Frequency: FM: 10.7 MHz
SW/MW/LW: 468 kHz

Antennas (Aerials): FM/SW: Telescopic antenna or External antenna
MW/LW: Ferrite-core antenna

TAPE RECORDER

Tape: Cassette tape (C-30, 60, 90)
Tape Speed: 4.75 cm/s
Recording System: AC bias, 57 kHz
Erasing System: AC erasing
Frequency Response: Normal: 50~12,000 Hz
CrO₂: 50~14,000 Hz
Metal: 50~15,000 Hz

S/N (Signal to Noise Ratio): 50 dB (Dolby NR OFF)
60 dB (Dolby NR ON)

Wow & Flutter: 0.06% (WRMS)

Cross Talk: Between tracks: 50 dB
Between channels: 25 dB

Erase Ratio: 65 dB

Input sensitivity and Impedance: Microphone: 0.4 mV, 500 ohms
Phono: 3 mV, 50 kohms
Record/Playback(DIN): 6 mV, 12 kohms

Output Level and Impedance: Record/Playback(DIN): 775 mV, 5 kohms
Ext. speaker: 3.2 ohms

Fast Forward or Rewinding Time: 110 sec (Using C-60)
Distortion: 1.5%
Motor: DC micromotor x 2

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* Specifications and schematic diagram are subject to change for performance improvement without notice.

CASSETTE TAPE RECORDER WITH FM/SW/MW/LW RADIO

SAFETY PRECAUTION

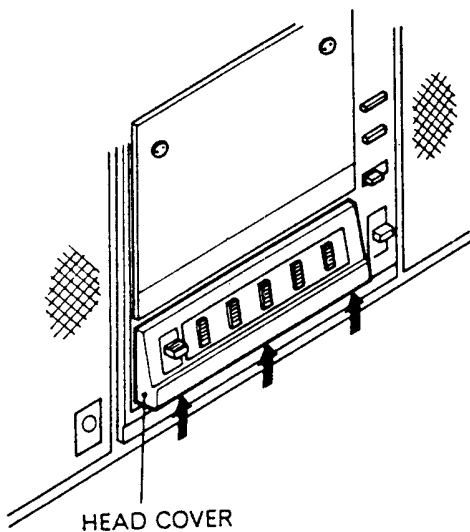
The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi's replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with \triangle in the schematic diagram, and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

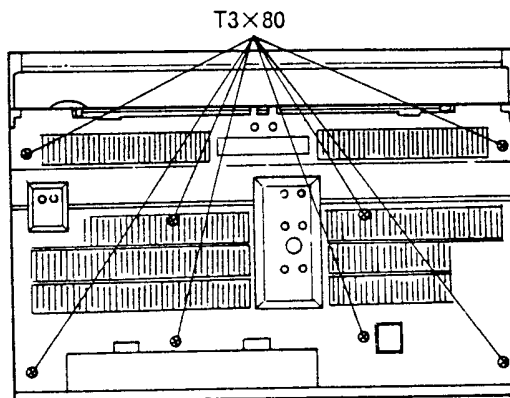
DISASSEMBLY

1. Head Cover

Push up the head cover in the direction of arrow.

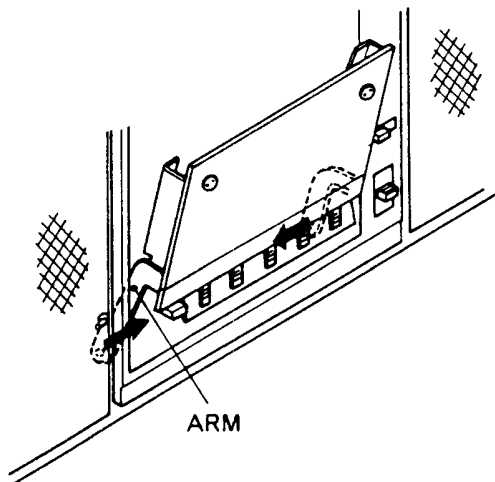


3. Rear Case



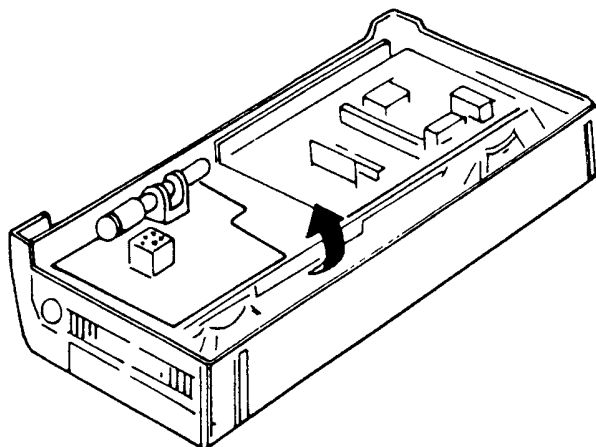
2. Cassette Lid

Press the eject button to release the engagement of the mechanism and cassette lid. Then push the both arms of cassette lid in the direction of arrow.

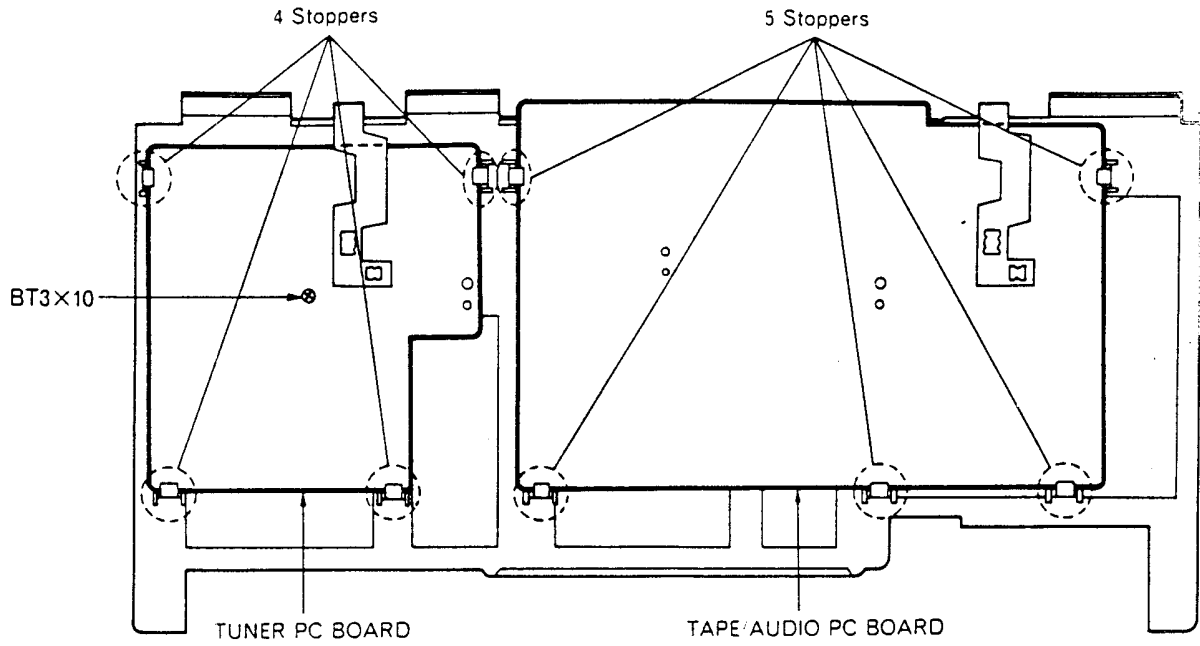


4. Main Chassis

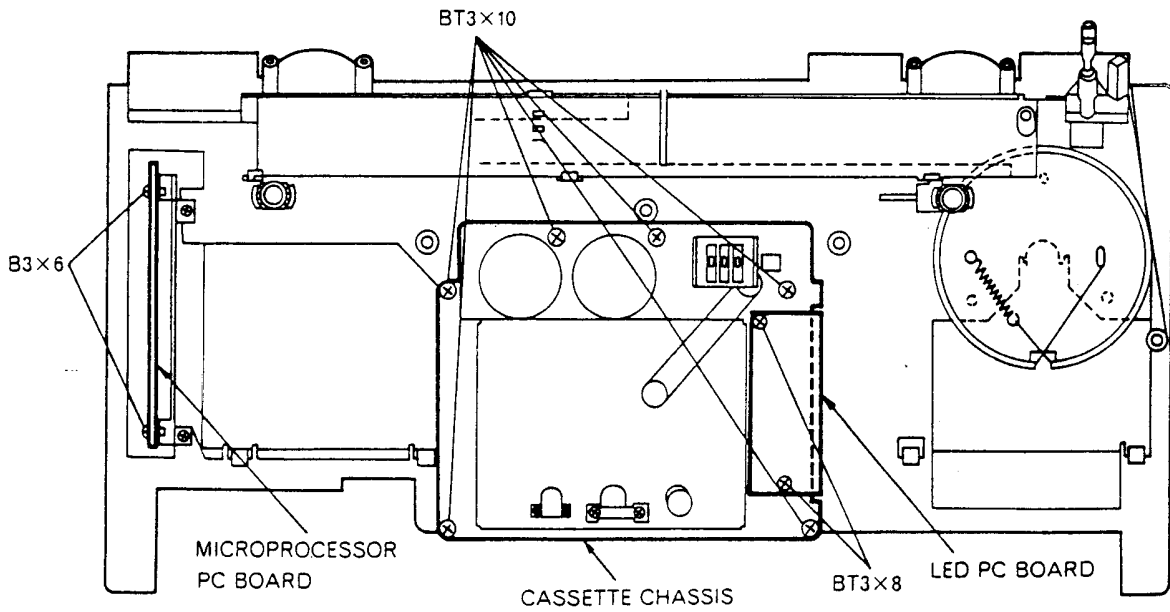
Remove nine knobs (Function, REC Volume, Bass, Treble, Volume, Band, Tuning). Press the eject button to release the engagement of the mechanism and cassette lid. Then lift up the battery side of the main chassis.



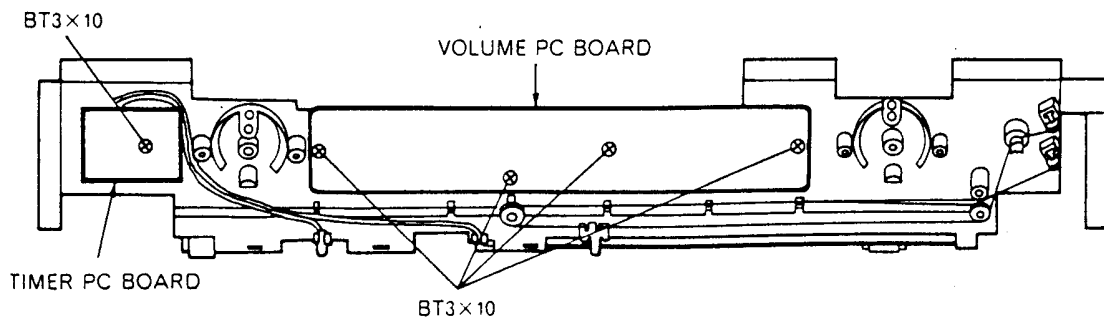
5. Tuner PC Board, Tape/Audio PC Board



6. Cassette Chassis, Microprocessor PC Board, LED PC Board

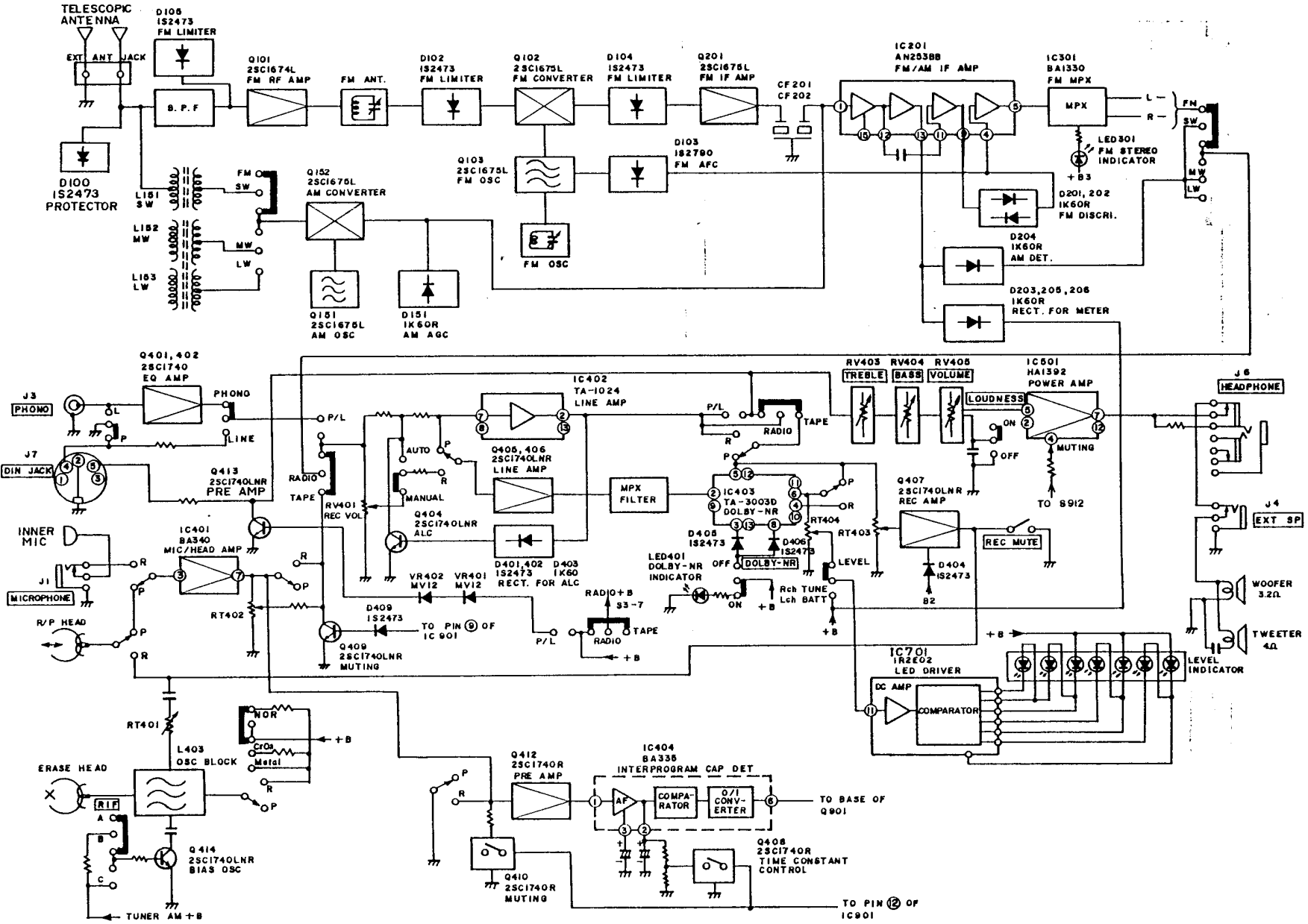


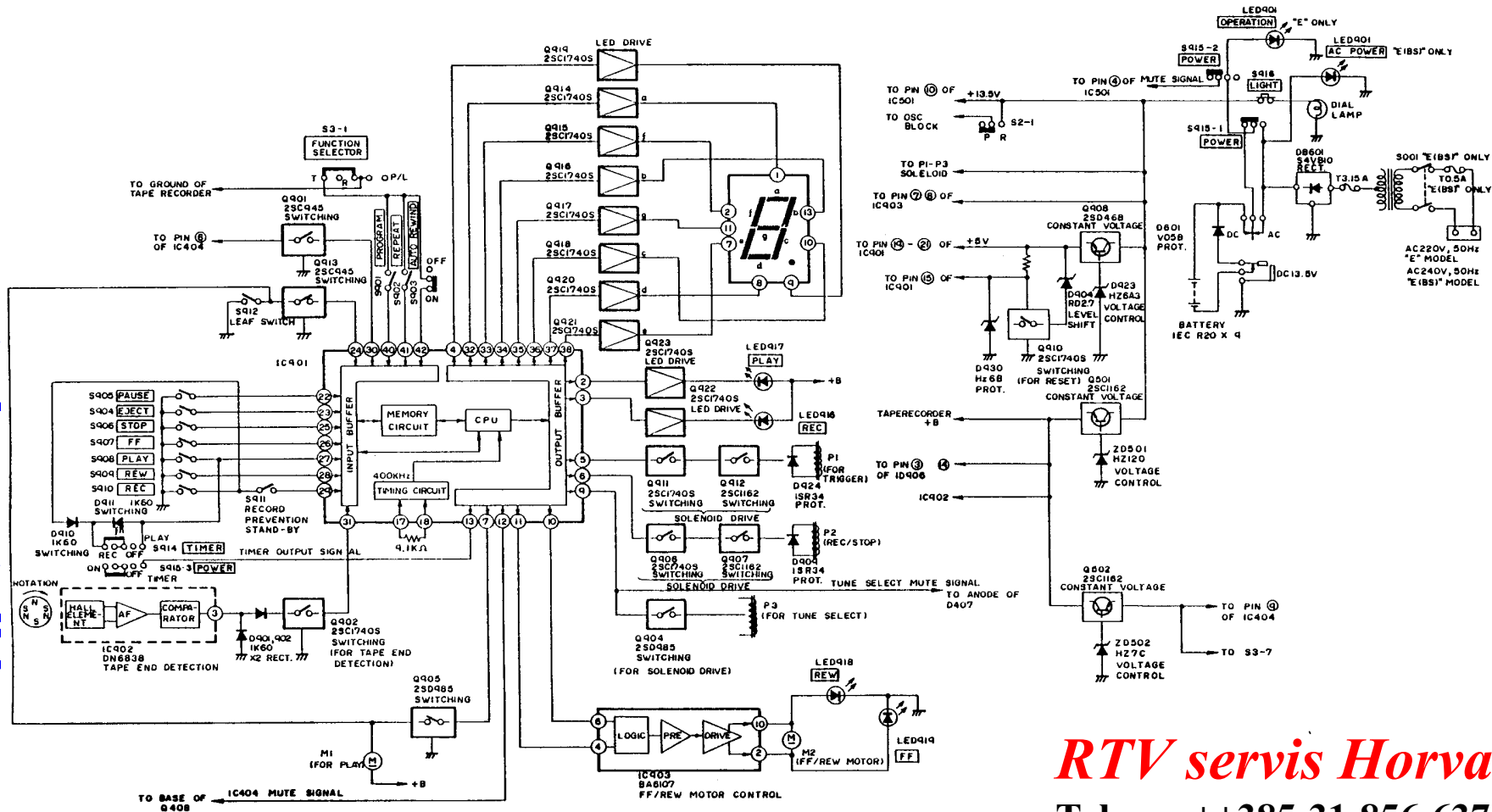
7. Volume PC Board, Timer PC Board



1. Tuner/Tape recorder Section

BLOCK DIAGRAM





2. Microprocessor and peripheral circuit

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ADJUSTMENT

1. Tuner Section

* For West Germany

Step	Adjustment Item	Measuring Instrument and Connection			Genescope or Signal Generator Frequency	Dial Pointer Position	Adjust	Reading
		Measuring Instrument	Input Terminal	Output Terminal				
1	(1) FM IF	Turn T202 fully counterclockwise.						
	(2) S-Curve	• Genescope (10.7 MHz)	TP102	TP201	10.7 MHz	Highest	T101 T201	Note 1
2	(1) FM OSC. (Covering)	• FM signal generator (400Hz 30% mod.) • Oscilloscope • VTVM	TP101 (thru dummy antenna)	Speaker terminal	87 MHz (87.5 MHz*)	Lowest	L103	Max.
					109 MHz (108 MHz*)	Highest	CT102	
					Repeat steps (1) and (2)			
3	(1) FM ANT. (Tracking)				90 MHz	90 MHz	L101	Max.
					106 MHz	106 MHz	CT101	
					Repeat steps (1) and (2)			
4	(1) FM MPX (Multiplex)	• Frequency counter	Connect a 10 μ F 25V electrolytic capacitor between the No.2 pin of IC301 and ground.	TP301	—	—	RT302	19 kHz \pm 200 Hz (Note 3)
5	(1) FM Stereo Separation	• FM signal generator [98MHz, L+R(1kHz): 30% mod. Pilot (19kHz) : 10% mod.] • Oscilloscope • VTVM	TP101 (thru dummy antenna)	Speaker terminal	98 MHz 60 dB	98 MHz	RT301	Note 4
6	(1) AM IF	• Genescope (468 kHz)		TP251	468 kHz	Highest	T151 T204	Note 5
					Repeat step (1)			
7	(1) MW OSC. (Covering)		Ferrite antenna	Speaker terminal	515 kHz	Lowest	L155	Max.
					1650 kHz	Highest	CT155	
					Repeat steps (1) and (2)			
8	(1) MW ANT. (Tracking)	• AM signal generator (400Hz, 30% mod.) • VTVM	Ferrite antenna	Speaker terminal	600 kHz	600 kHz	L152	Max.
					1400 kHz	1400 kHz	CT152	
					Repeat steps (1) and (2)			
9	(1) LW OSC. (Covering)				145 kHz	Lowest	L156	Max.
					360 kHz	Highest	CT156	
					Repeat steps (1) and (2)			
10	(1) LW ANT. (Tracking)				160 kHz	160 kHz	L153	Max.
					330 kHz	330 kHz	CT153	
					Repeat steps (1) and (2)			

Step	Adjustment Item	Measuring Instrument and Connection			Genescope or Signal Generator Frequency	Dial Pointer Position	Adjust	Reading
		Measuring Instrument	Input Terminal	Output Terminal				
11	SW OSC. (Covering)	• AM signal generator (400Hz, 30% mod.)	TP101 (thru dummy antenna)	Speaker terminal	5.8 MHz	Lowest	L154	Max.
					18.5 MHz	Highest	CT154	
					Repeat steps (1) and (2)			
12	SW ANT. (Tracking)	• VTVM	TP101 (thru dummy antenna)	Speaker terminal	6.5 MHz	6.5 MHz	L151	Max.
					16.0 MHz	16.0 MHz	CT151	
					Repeat steps (1) and (2)			
13	FM Tuning level	• Genescope (10.7 MHz)	TP102	TP252	10.7 MHz	Highest	T203	Max.

Note:

1. Feed in a weak signal to TP102 from the genescope. Adjust T101, T201 for maximum gain and the wave form indicated in Figure 1. If the center of the wave form cannot be lined up on the marker, adjust the right/left balance.
2. Use the T202 core to form the S-curve shown in Figure 2. Adjust the symmetry of A and B about point C for linearity.
3. Connect the frequency counter to TP301 via a resistor of 100 kΩ.
4. Feed the signal for each channel and adjust RT301 so that an optimum separation can be obtained.
5. Feed in a weak signal from the genescope. Adjust T151 and T204 for maximum gain and the waveform of Figure 3.

Adjust the genescope output so that there is a little noise riding on the leading edge.

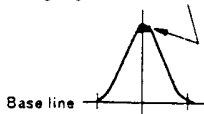


Fig. 1

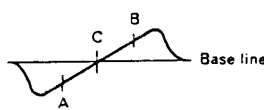
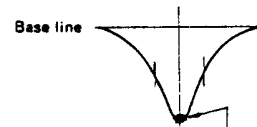


Fig. 2



Adjust the genescope output so that there is a little noise riding on the leading edge.

Fig. 3


2. Tape Recorder Section

Perform the following adjustments in the sequence stated after cleaning the head, pressure roller, and capstan with a head cleaning stick moistened in alcohol.

Step	Adjustment Item	Measuring Instrument and connection			Check Tape	Mode	Adjusted Position	Adjusted Value	Remarks
		Measuring Instrument	Input Terminal	Output Terminal					
1	Tape speed	• Frequency counter	—	Record/ Playback socket (output)	MTT-111, 3,000 Hz	Playback	Semivariable resistor in the motor	3000 Hz + 90 Hz - 10 Hz	Note 1
2	Head azimuth	• VTVM	—		MTT-316 or 216 12.5 kHz		Azimuth adjusting screw	Output Max.	Note 2
3	Playback gain	Set the tape selector (EQ) switch to Normal position.			MTT-150, 400 Hz 20 m Maxwell	Playback	RT402L,R	0.775V (0 dBm)	—
4	Level indicator	• VTVM	—	TP401L,R			RT404L,R	0 dB	Note 3

Step	Adjustment Item	Measuring Instrument and Connection			Check Tape	Mode	Adjusted Position	Adjusted Value	Remarks
		Measuring Instrument	Input Terminal	Output Terminal					
5	Bias leakage	Set the tape selector (Bias) switch to Metal position.							
		•VTVM	—	TP403L,R	—	Record	L401L,R	Output Min.	—
6	Bias current	① Set the tape selector (Bias, EQ) switch to Normal position. ② Adjust RT403L,R to middle position. ③ Next, turn L402L,R fully clockwise.							
		•Audio oscillator (1.25kHz/12.5kHz, 0 dB -20 dB) •Frequency counter •VTVM	Record/playback socket (input)	Record/playback socket (output)	Hitachi ER/UD tape	Record/playback	RT401L,R	Output difference : within ± 2 dB	Note 4
7	Record/playback output	Set the tape selector (Bias, EQ) switch to Normal position.							
		•Audio oscillator (400 Hz, 0 dB) •Frequency counter •VTVM	Record/playback socket (input)	Record/playback socket (output)	Hitachi ER/UD tape	Record/playback	RT403L,R	0 dB ± 1 dB	Note 5
8	Dolby NR check	•Audio oscillator (5 kHz, level of -30.4 dBm ± 0.1 dB at TP401L,R) •Frequency counter •VTVM	Record/playback socket (input)	TP401L,R	—	Record	Set the Dolby NR switch to ON.	8dB ± 0.2 dB boost	Note 6
9	DRPS level	Connect a VTVM between pin ⑥ of IC404 and the ground. Load test tape TMT-6261 (500 Hz, -40 dB/ -35 dB) and set the unit to the DRPS mode (FF) from the playback mode. Play the recorded signal section (500 Hz, -40 dB) of the test tape in the DRPS mode (FF), and adjust RT405 so that output voltage becomes Hi (8.5V) to Lo (0V). Check that the output voltage of IC404 pin ⑥ is Hi potential at the -35 dB section, and Lo potential at the -40 dB section.							
10	Checking STOP	Load test tape TMT-6262 (for checking Stop/Non-stop) and set the unit to the DRPS mode (FF) after the tape fully rewound. Check that the tape does not stop at non-signal sections (0.8 sec), but stops at the next 3.0 sec non-signal section. Since the 0.8 sec and 3.0 sec non-signal sections are present at 9 positions with equal intervals, it can be checked continuously 9 times. Set the DRPS program to "9" and check that the playback mode at indication "0".							

Note:

- Adjust within 30 sec. after heat-running for more than 20 minutes.
- When the maximum values of both channels are different, tune to the maximum value of the L channel. In this case, the difference between the maximum values of both channels should be within 2 dB.
- With the condition shown in step 3, adjust RT404L,R so that the level indicator lamp ( mark) lights up.
- Record a 1.25kHz and 12.5kHz signals at a level of 0 dB -20 dB on Hitachi ER/UD tape. Then, playback this

tape and adjust RT401L,R so that the output difference is within ± 2 dB.

- Record a signal of 400 Hz, 0 dB on a Hitachi ER/UD tape. Playback the tape and adjust RT403L,R for a playback output of 0 dB ± 1 dB.
- Supply a 5 kHz signal to the Record/Playback socket (input) to obtain the level of -30.4 dBm ± 0.1 dB at test points TP401L,R. Confirm that the level is boosted by 8 dBm ± 0.2 dB when the Dolby NR switch is set to ON.

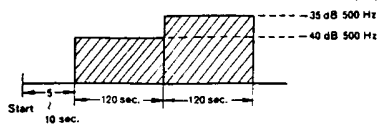


Fig. 4 TMT-6261

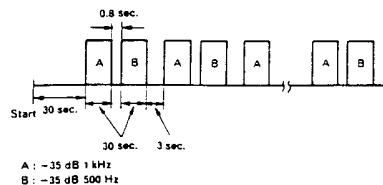


Fig. 5 TMT-6262

INSPECTION OF MECHANISM

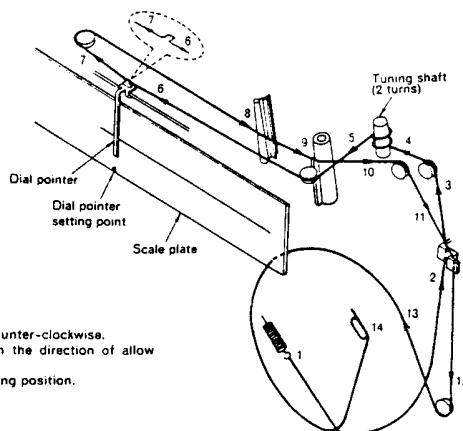
Check Item	Reference Value	Remarks
1 Pressure of pressure roller	330 ± 50 gr	Measure in playback mode
2 Torque		
Take-up	30 to 55 gr-cm	Measure in FF mode
FF	80 to 110 gr-cm	
Rewind	80 to 110 gr-cm	
3 Back-tension		With counter
Take-up side	1 to 4 gr-cm	
Supply side	1.5 to 4 gr-cm	Without counter
4 Pressure of take-up roller	100 ± 30 gr	Measure in playback mode
5 Brake force	More than 10 gr-cm	
6 Pressing force of buttons		Measure in tip of buttons
Pause button	Less than 1.2 kg	
Eject button	Less than 1.2 kg	

LUBRICATIONS

Lubricate one or two drops of oil to rotating point or lubricate grease to sliding point.
Lubricate the respective parts listed once every 1000 hours or once a year under normal conditions of use.
Avoid oiling them excessively, or rotation may become irregular because of oil splashes.

	Lubrication	Oil or Grease
Rotary section	Metal and metal	Pan motor oil (10W-40)
	Mold and metal	Sonic slider oil (#1600)
Sliding section	Metal and metal	Hitasol (MO-13B)
	Mold and mold Mold and metal	White grease (FL-LUBE-A)
Spring resonance prevention Froil (GB-TS-1)		

DIAL CORD STRINGING



STRINGING METHOD
1. Turn the pulley fully counter-clockwise.
2. String the dial cord in the direction of arrow (No. 1~14).
3. Set the pointer to setting position.

REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
CAPACITORS					
CT101-102	9052391	PLASTIC FILM VARIABLE	C168	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
CT151	5058191	TRIMMER 10PF	C261	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
CT153	5058191	TRIMMER 10PF	C202	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
CT154	5058191	TRIMMER 10PF	C203	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
CT156	5058102	VARIABLE	C204	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
CV101-102	9052391	PLASTIC FILM VARIABLE	C205	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
CV151-152	9052391	PLASTIC FILM VARIABLE	C206	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
C101	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10	C207	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
C102	0208133	CERAMIC DISC (RESISTOR SHAPE) 22PF ±5%	C208	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
C103	0208125	CERAMIC DISC (RESISTOR SHAPE) 4.7PF ±5%	C209	0209011	CERAMIC DISC (RESISTOR SHAPE) 150PF ±10%
C104	0208124	CERAMIC DISC (RESISTOR SHAPE) 3.3PF ±5%	C210	0208133	CERAMIC DISC (RESISTOR SHAPE) 22PF ±5%
C105	0209004	CERAMIC DISC (RESISTOR SHAPE) 330PF ±10%	C212	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
C106	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30	C214	0208138	CERAMIC DISC (RESISTOR SHAPE) 680PF ±16%
C107	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3	C216	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
C108	0208174	CERAMIC DISC 15PF ±5%	C218	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
C109	0208157	CERAMIC DISC (RESISTOR SHAPE) 6.8PF ±10% (NP-0)	C219	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
C110	0208161	CERAMIC DISC (RESISTOR SHAPE) 15PF ±10% (NP-0)	C221	0209011	CERAMIC DISC (RESISTOR SHAPE) 150PF ±10%
C111	0208161	CERAMIC DISC (RESISTOR SHAPE) 15PF ±10% (NP-0)	C222	0209004	CERAMIC DISC (RESISTOR SHAPE) 330PF ±10%
C112	0208161	CERAMIC DISC (RESISTOR SHAPE) 15PF ±10% (NP-0)	C225	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3
C113	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3	C226	0209005	CERAMIC DISC (RESISTOR SHAPE) 390PF ±10%
C114	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10	C227	0209005	CERAMIC DISC (RESISTOR SHAPE) 390PF ±10%
C115	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10	C308LR	0209025	CERAMIC DISC (RESISTOR SHAPE) 6800P F ±30
C116	0208141	CERAMIC DISC (RESISTOR SHAPE) 100PF ±5%	C412LR	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10
C117	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30	C413LR	0209021	CERAMIC DISC (RESISTOR SHAPE) 1500PF ±10%
C118	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10	C415LR	0209001	CERAMIC DISC (RESISTOR SHAPE) 180PF ±10%
C119	0208127	CERAMIC DISC (RESISTOR SHAPE) 6.8PF ±5%	C416R	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30
C120	0208134	CERAMIC DISC (RESISTOR SHAPE) 27PF ±5%	C436LR	0209003	CERAMIC DISC (RESISTOR SHAPE) 270PF ±10%
C121	0208129	CERAMIC DISC (RESISTOR SHAPE) 10PF ±5%	C438LR	0209022	CERAMIC DISC (RESISTOR SHAPE) 0.002 2MF ±
C122	0208131	CERAMIC DISC (RESISTOR SHAPE) 15PF ±5%	C442LR	0209003	CERAMIC DISC (RESISTOR SHAPE) 270PF ±10%
C123	0208141	CERAMIC DISC (RESISTOR SHAPE) 100PF ±5%	C444LR	0209022	CERAMIC DISC (RESISTOR SHAPE) 0.002 2MF ±
C124	0209010	CERAMIC DISC (RESISTOR SHAPE) 1000P F ±10	C447LR	0209025	CERAMIC DISC (RESISTOR SHAPE) 6800P F ±30
C125	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30	C451LR	0209002	CERAMIC DISC (RESISTOR SHAPE) 220PF ±10%
C126	0209026	CERAMIC DISC (RESISTOR SHAPE) 0.01M F ±30	C469	0256367	TANTALUM ELECTROLYTIC 1.5MF 25V
C127	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3			
C128	0209027	CERAMIC DISC (RESISTOR SHAPE) 0.015 MF ±3			
C129	0208125	CERAMIC DISC (RESISTOR SHAPE) 4.7PF ±5%			

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SCHMATIC DIAGRAM (Tuner Section)

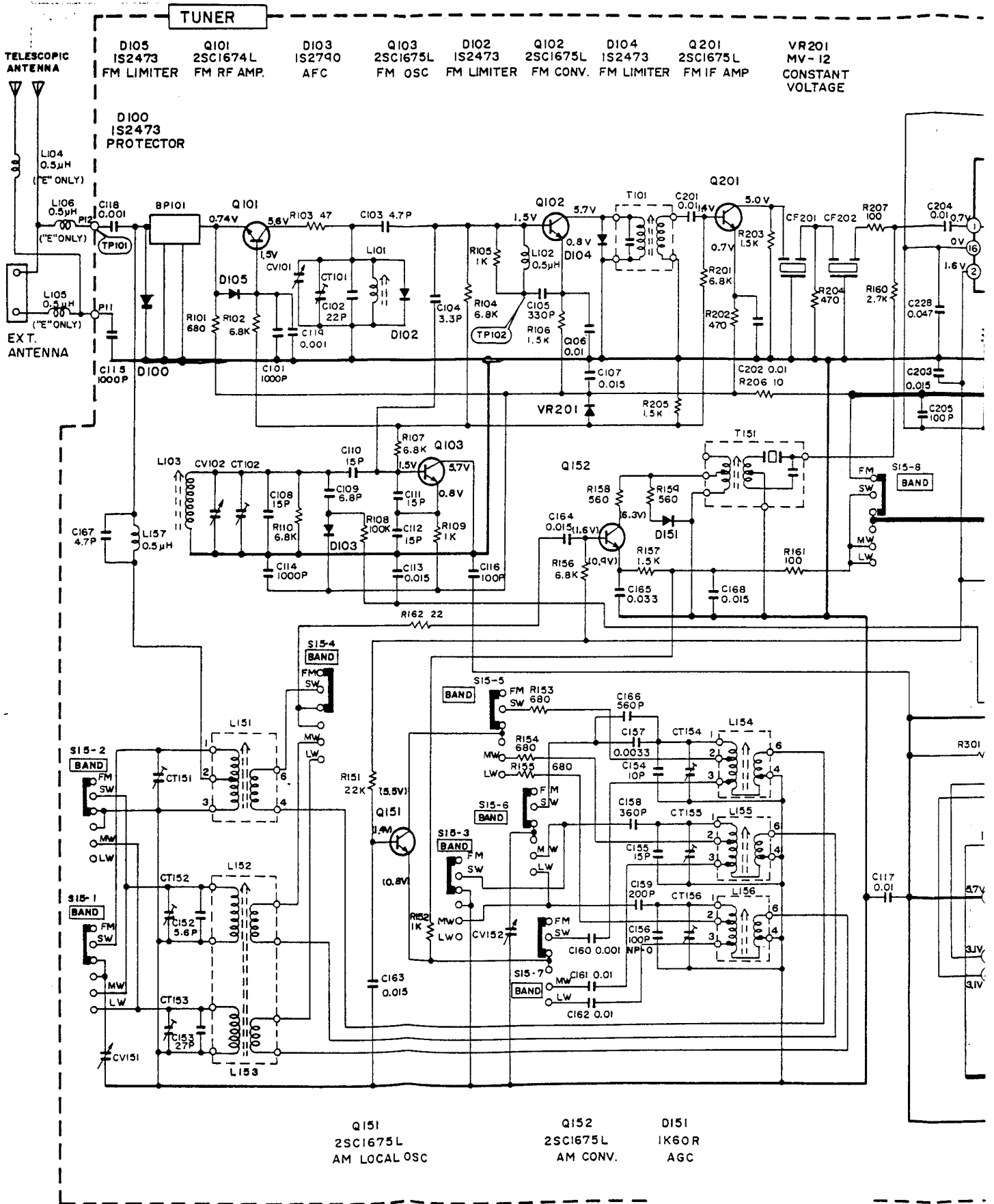
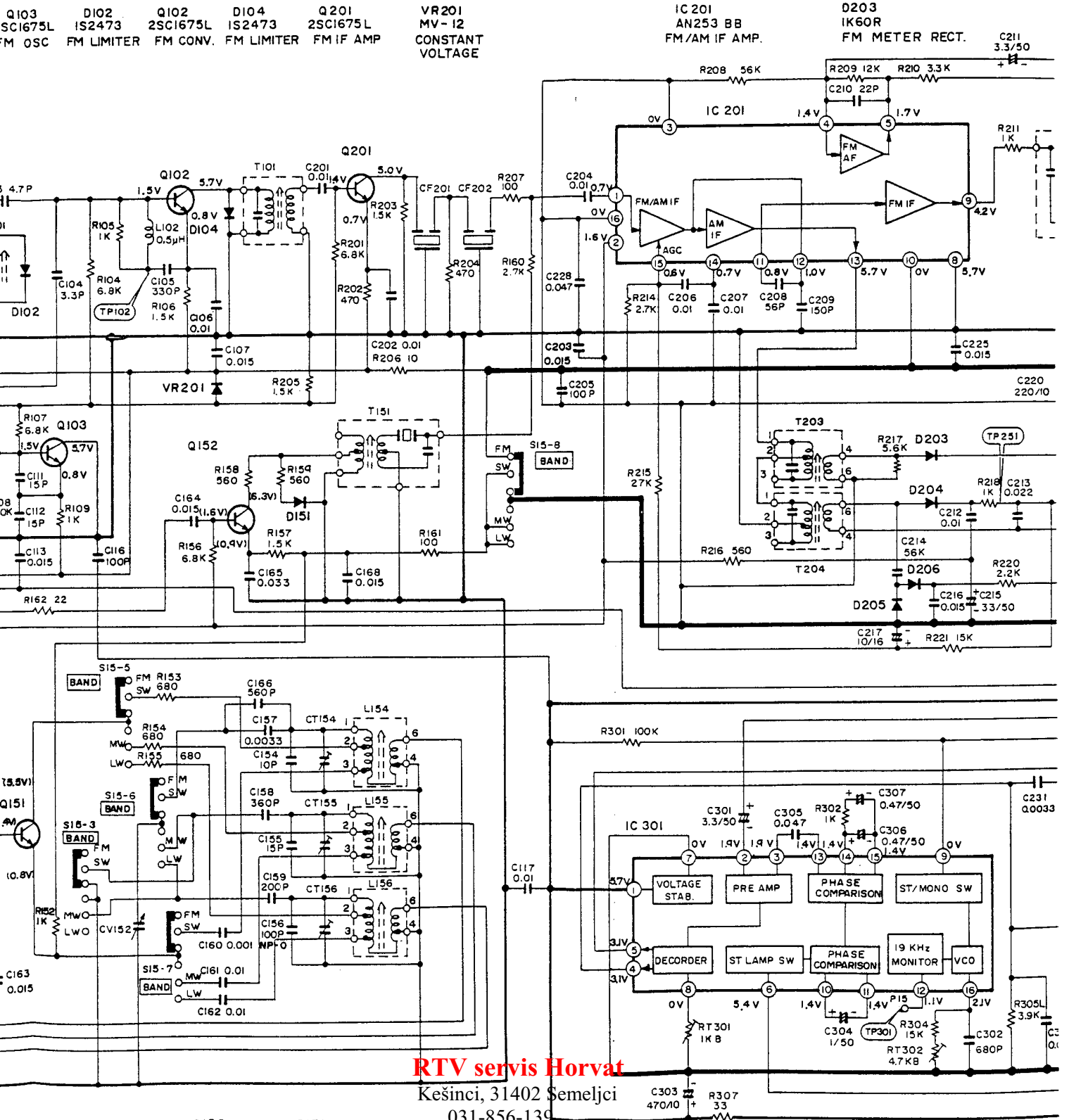


DIAGRAM (Tuner Section)



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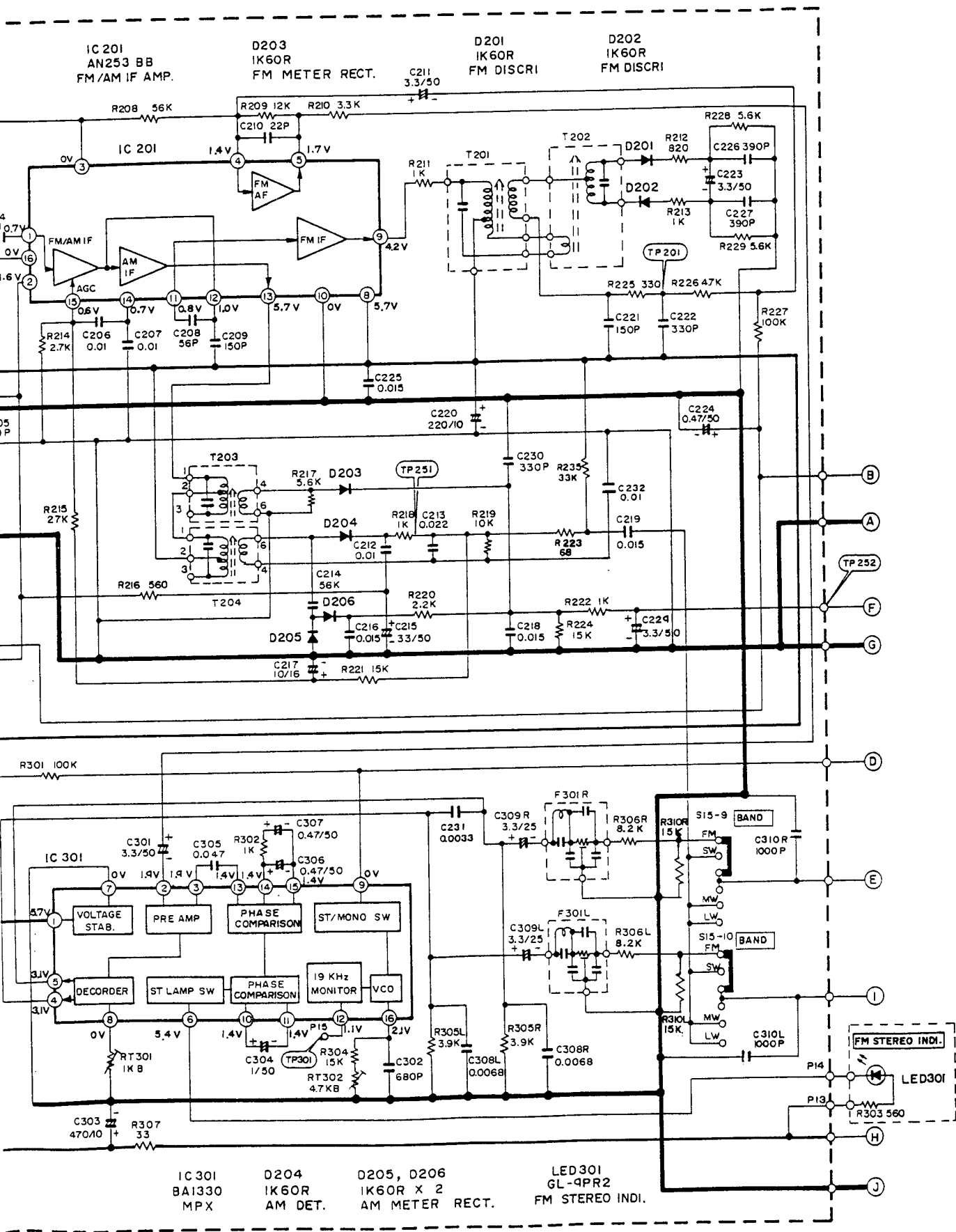
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Croatia

IC 301
BA1330
MPX

D204
1K60R
AM DET.

D205, D206
1K60R X 2
AM METER REC








IC 301 BA1330 MPX
 D204 1K60R AM DET.
 D205, D206 1K60R X 2 AM METER RECT.
 LED301 GL-4PR2 FM STEREO INDI.

CIRCUIT BOARD DIAGRAM

Note

1. Voltage measured at base of chassis with minimum volume control and no signal.
2. Nomenclature of Resistors and Capacitors.

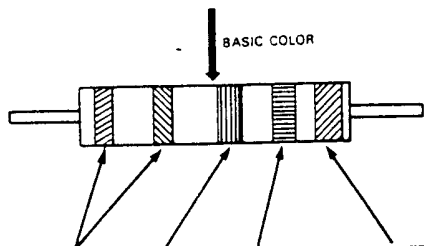
Circuit No.	
Value	No indicated Ω(Ohm) M : 1000 kΩ
Tolerance	No indicated ±5% K : ±10% M : ±20%
Wattage	No indicated ¼W
Sort	No indicated Carbon film RC : Composition RW : Wire wound RS : Oxide metal film RN : Fixed metal film

Circuit No.	
Value	No indicated μF P : pF
Tolerance	No indicated ±10% J : ± 5% M : ±20% Z : +80% - 20% D : ±0.5pF C : ±0.25pF
Sort	 Ceramic
	 Electrolytic
	 Mylar
	 Polyester
	 Styrol
Voltage	No indicated 50WV

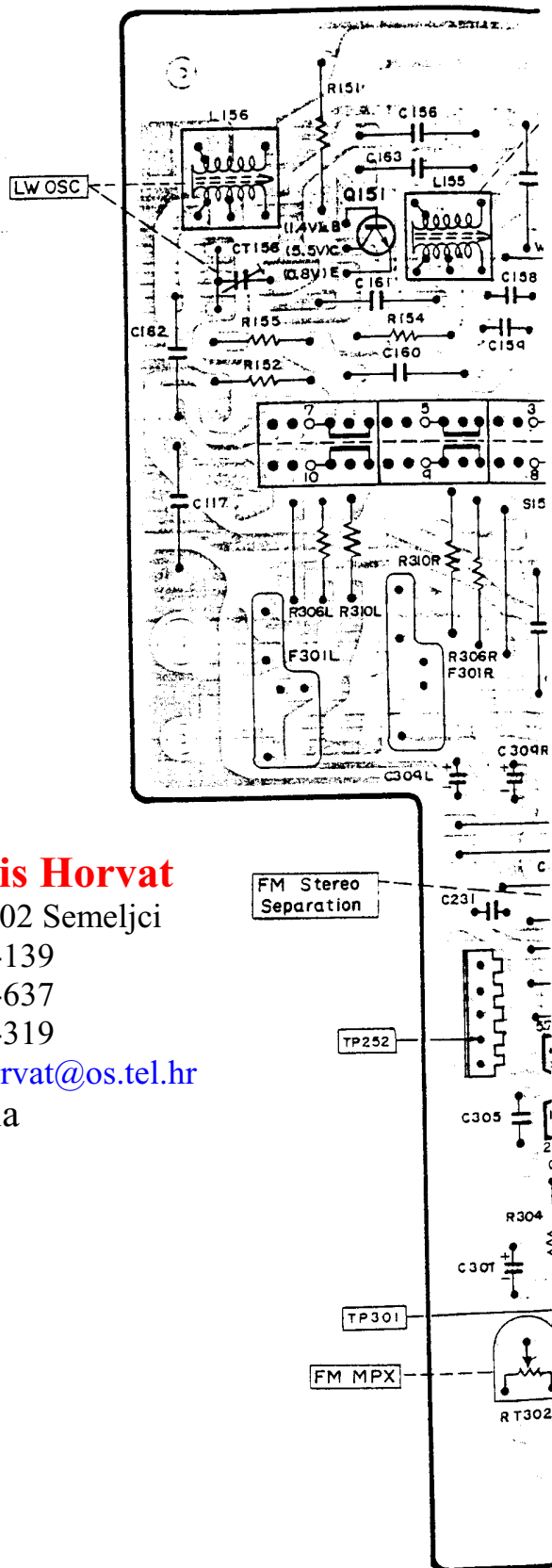
3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
4. When replacing capacitors marked with +, use specified ones stated on parts list since required temperature characteristics.

HOW TO READ CAPACITY OF RESISTOR SHAPE CAPACITORS

COLOR	RATED VOLTAGE
Pink	25V
Light green	50V



COLOR	CAPACITY	MULTIPLE	TOLERANCE	CHARACTERISTICS
Black	0	10 ⁰	±20%	For temperature compensation
Brown	1	10 ¹		
Red	2	10 ²		
Orange	3	10 ³		
Yellow	4	10 ⁴		
Green	5	10 ⁵		
Blue	6			
Violet	7			
Grey	8		±30%	High dielectric constant type
White	9			For temperature compensation
Gold		10 ⁻¹	±5%	
Silver			±10%	High dielectric constant type



RTV servis Horvat

Kešinci, 31402 Semeljci

031-856-139

031-856-637

098-788-319

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Croatia

CIRCUIT BOARD DIAGRAM

Substrate with minimum

Capacitors	
Part No.	
Indicated Ω (Ohm)	
M: 1000k Ω	
Indicated $\pm 5\%$	
K: $\pm 10\%$	
M: $\pm 20\%$	
Indicated $\frac{1}{4}W$	
Indicated Carbon film	
RC: Composition	
RW: Wire wound	
RS: Oxide metal film	
RN: Fixed metal film	
Resistors	
Part No.	
Indicated μF	
P: PF	
Indicated $\pm 10\%$	
J: $\pm 5\%$	
M: $\pm 20\%$	
Z: -80% , -20%	
D: $\pm 0.5pF$	
C: $\pm 0.25pF$	
Material	
Ceramic	
Electrolytic	
Mylar	
Polyester	
Styrol	
Indicated 50WV	

Values of resistors and tolerance and sort. Marked with +, use list since required

IDENTIFICATION OF RESISTOR SHAPE

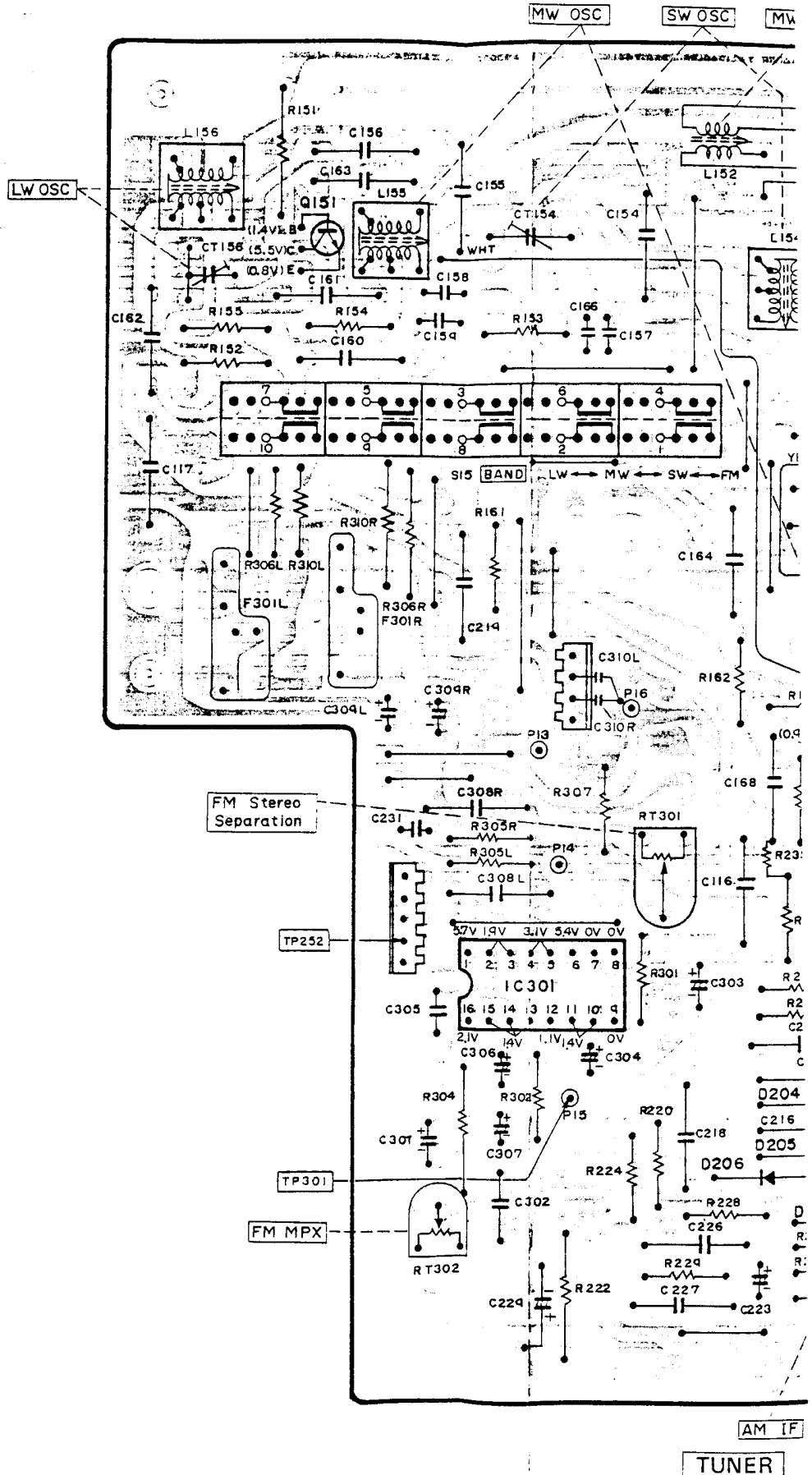
TESTED VOLTAGE

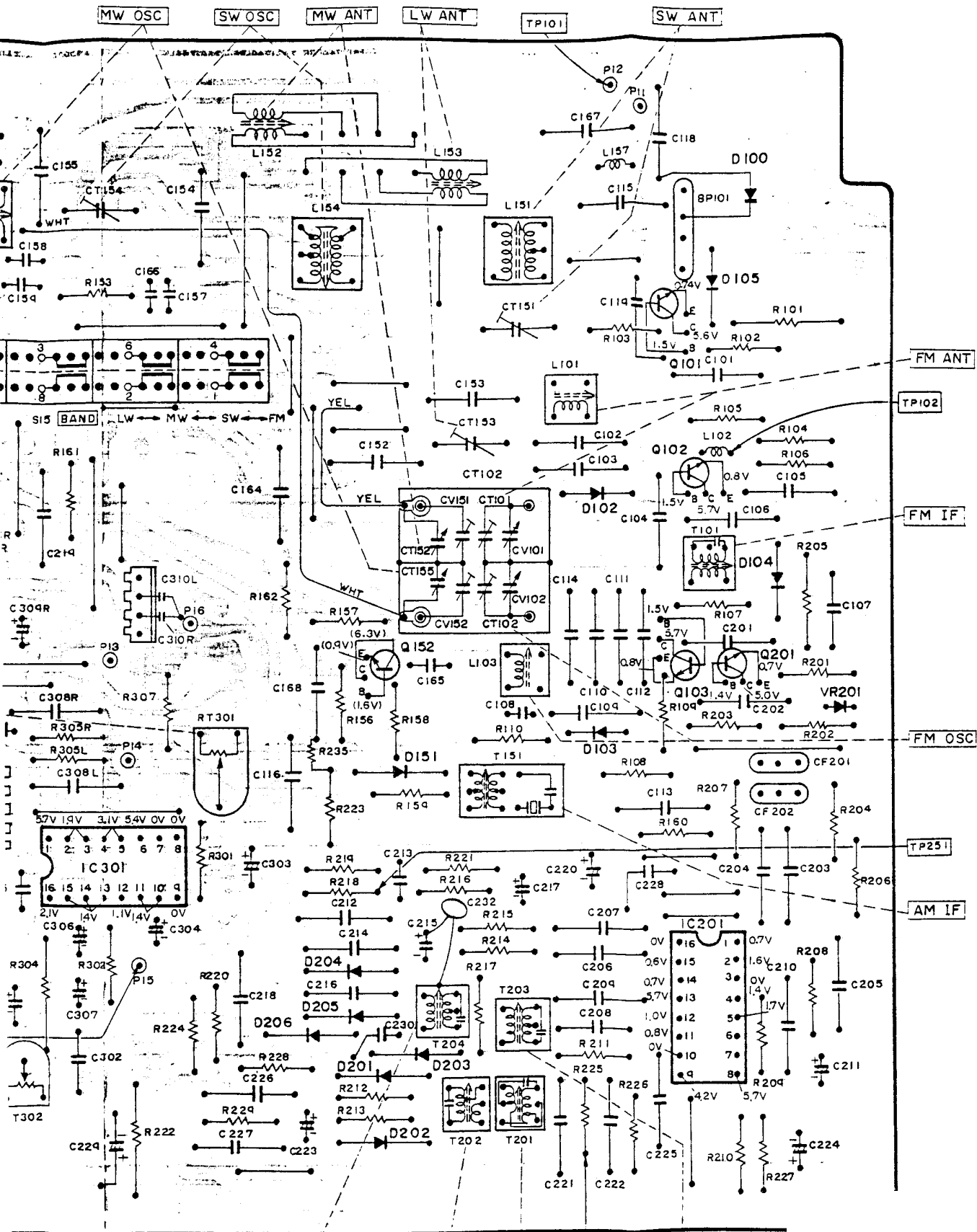
25V
50V

BASIC COLOR



TOLERANCE	CHARACTERISTICS
$\pm 20\%$	For temperature compensation
$\pm 30\%$	High dielectric constant type For temperature compensation
$\pm 5\%$	High dielectric constant type
-10%	High dielectric constant type

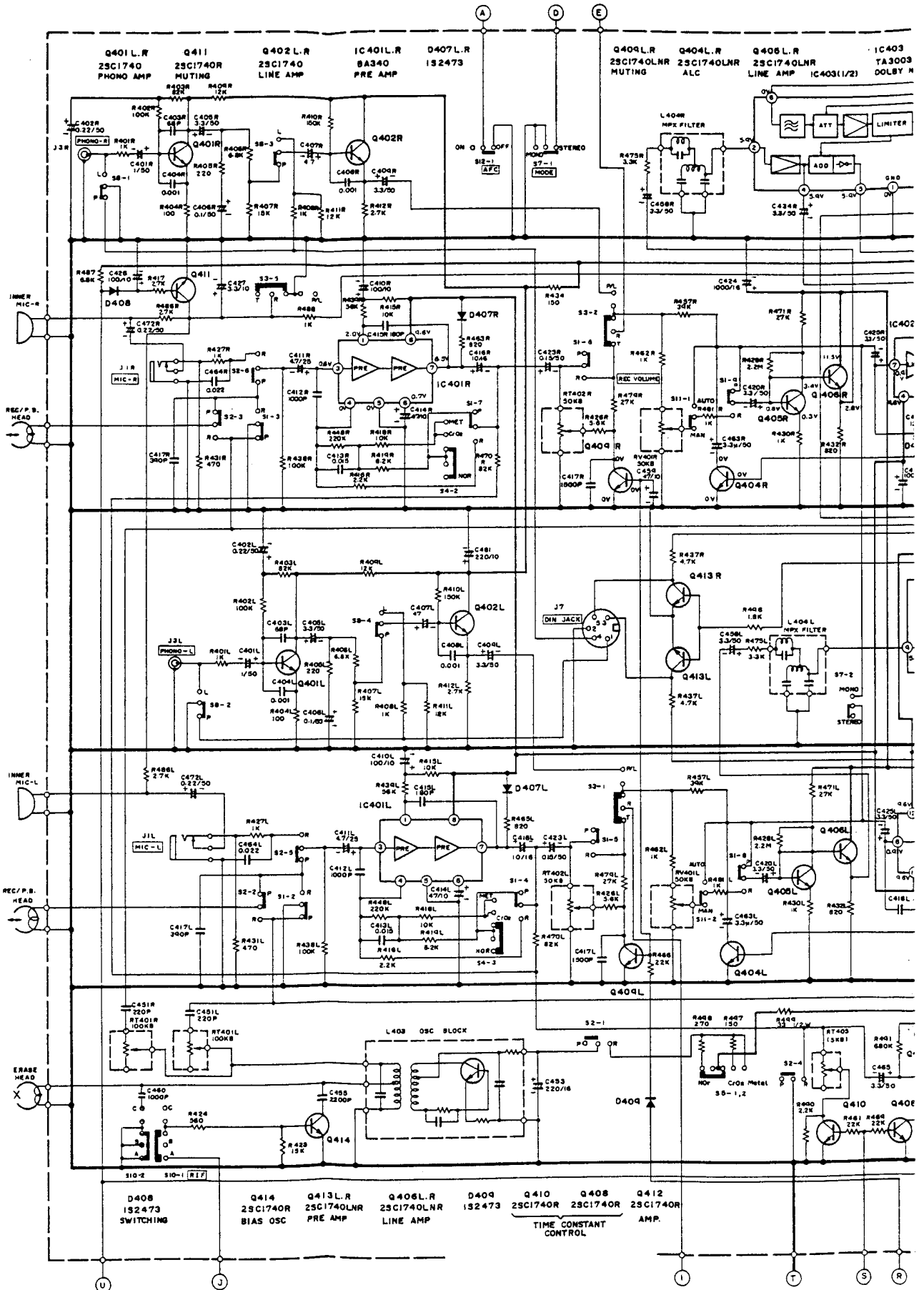


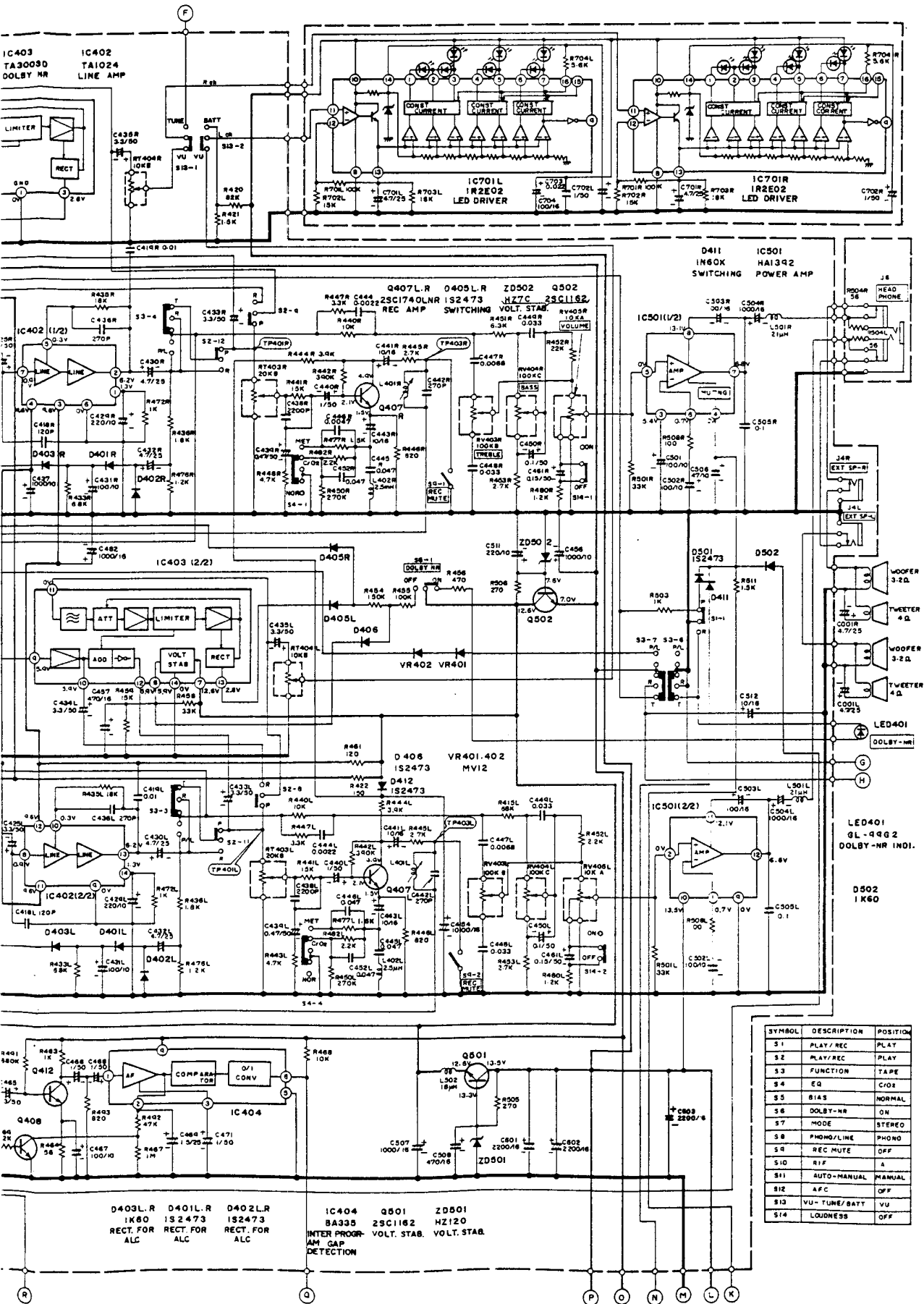


AM IF S-Curve FM IF TP201 FM Tuning Level

TUNER

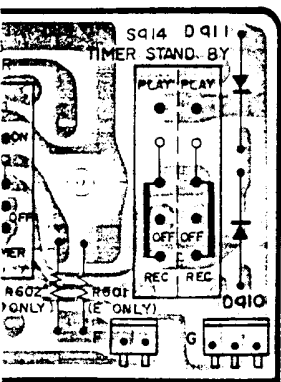
SCHMATIC DIAGRAM (Tape recorder/Audio Section)



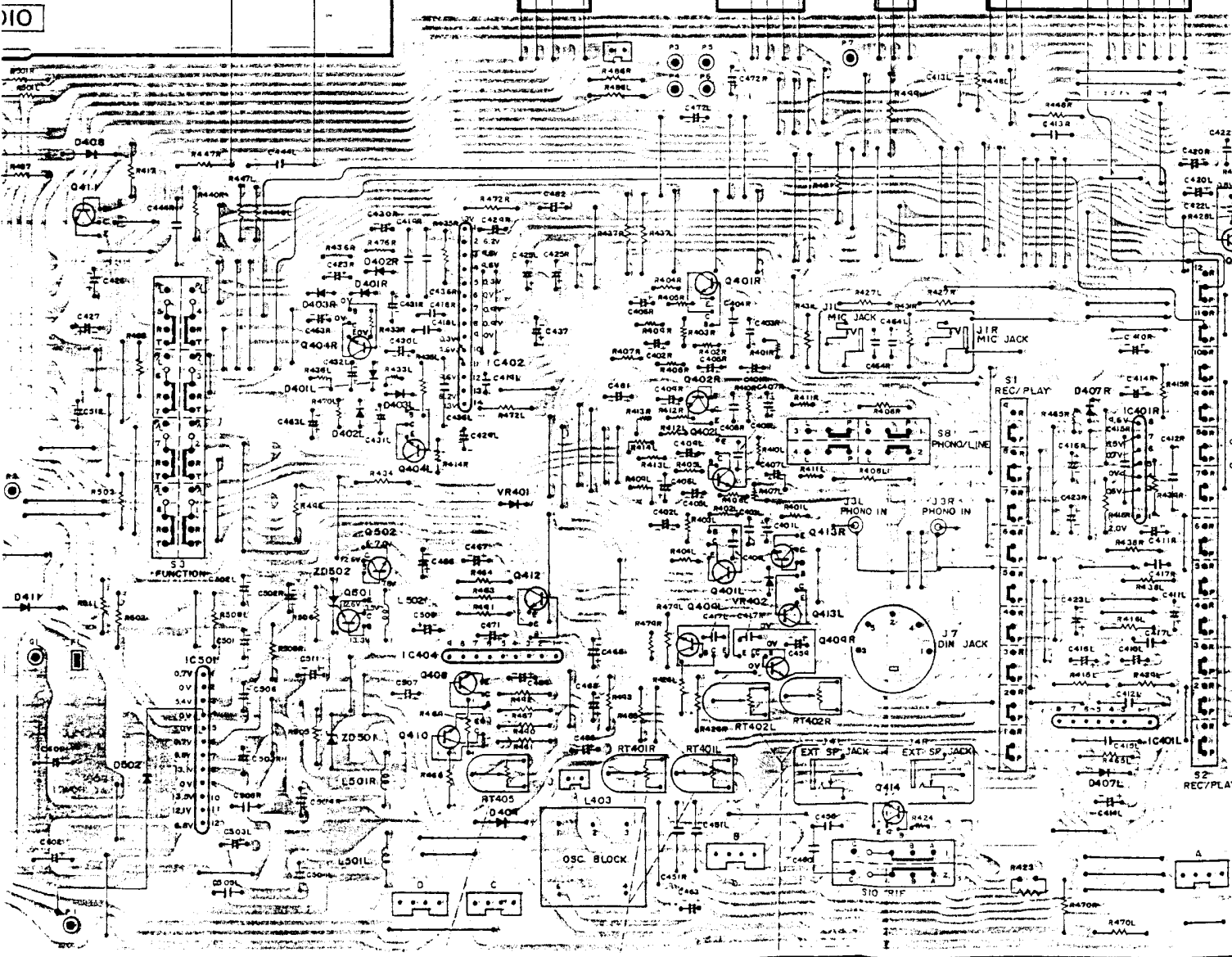
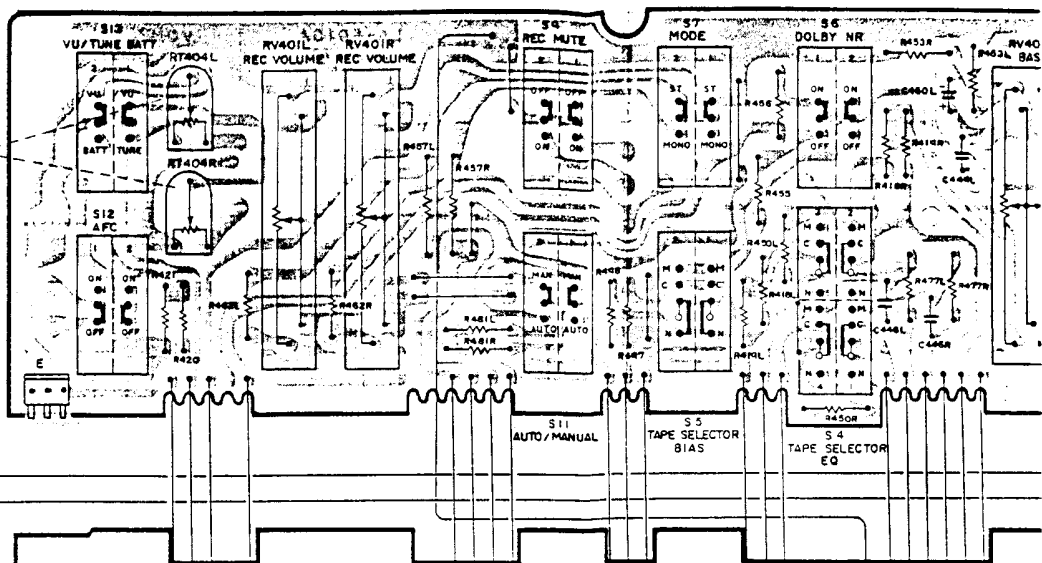


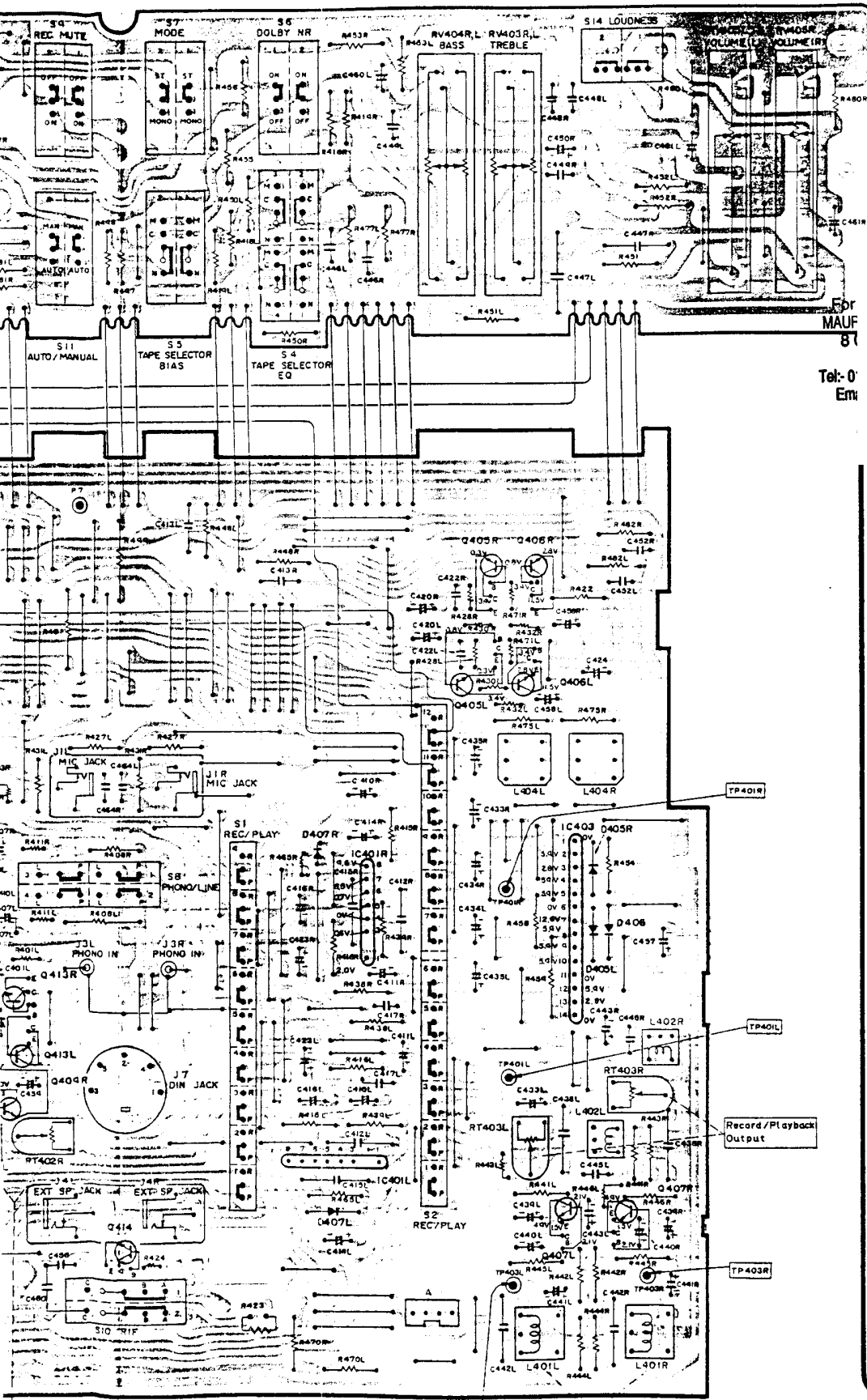
SYMBOL	DESCRIPTION	POSITION
S1	PLAY/REC	PLAY
S2	PLAY/REC	PLAY
S3	FUNCTION	TAPE
S4	EQ	CIF
S5	BIAS	NORMAL
S6	DOLBY-BR	ON
S7	MODE	STEREO
S8	PHONO/LINE	PHONO
S9	REC MUTE	OFF
S10	RIF	A
S11	AUTO-MANUAL	MANUAL
S12	AFC	OFF
S13	VU-TUNE/BATT	VU
S14	LOUDNESS	OFF

ARD DIAGRAM



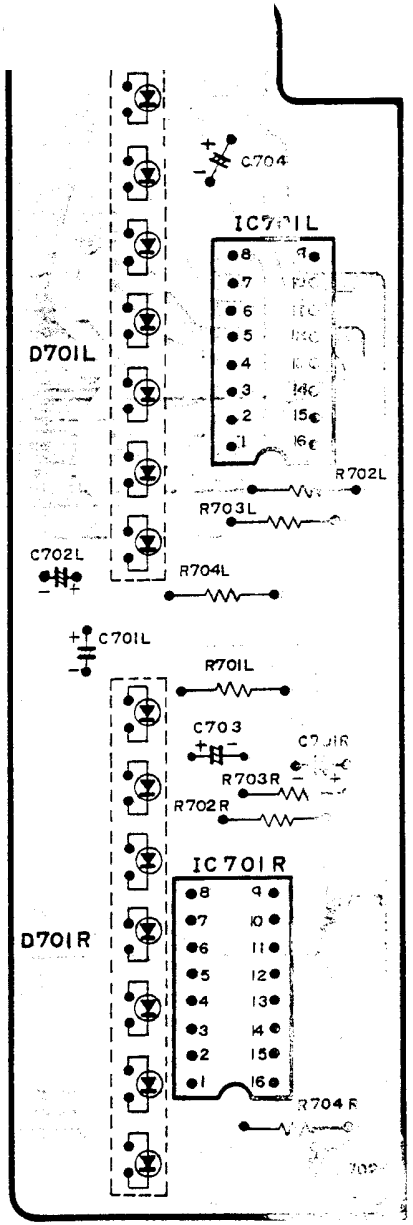
TIMER





VOLUME

Tel: 0
Em



LEVEL INDICATOR

SCHMATIC DIAGRAM (Microprocessor/Drive/Power Section)

IC902
DN 6838
TAPE END
DETECTION

D901, 902
1K60
RECT.

Q913
2SC1740S
SWITCHING

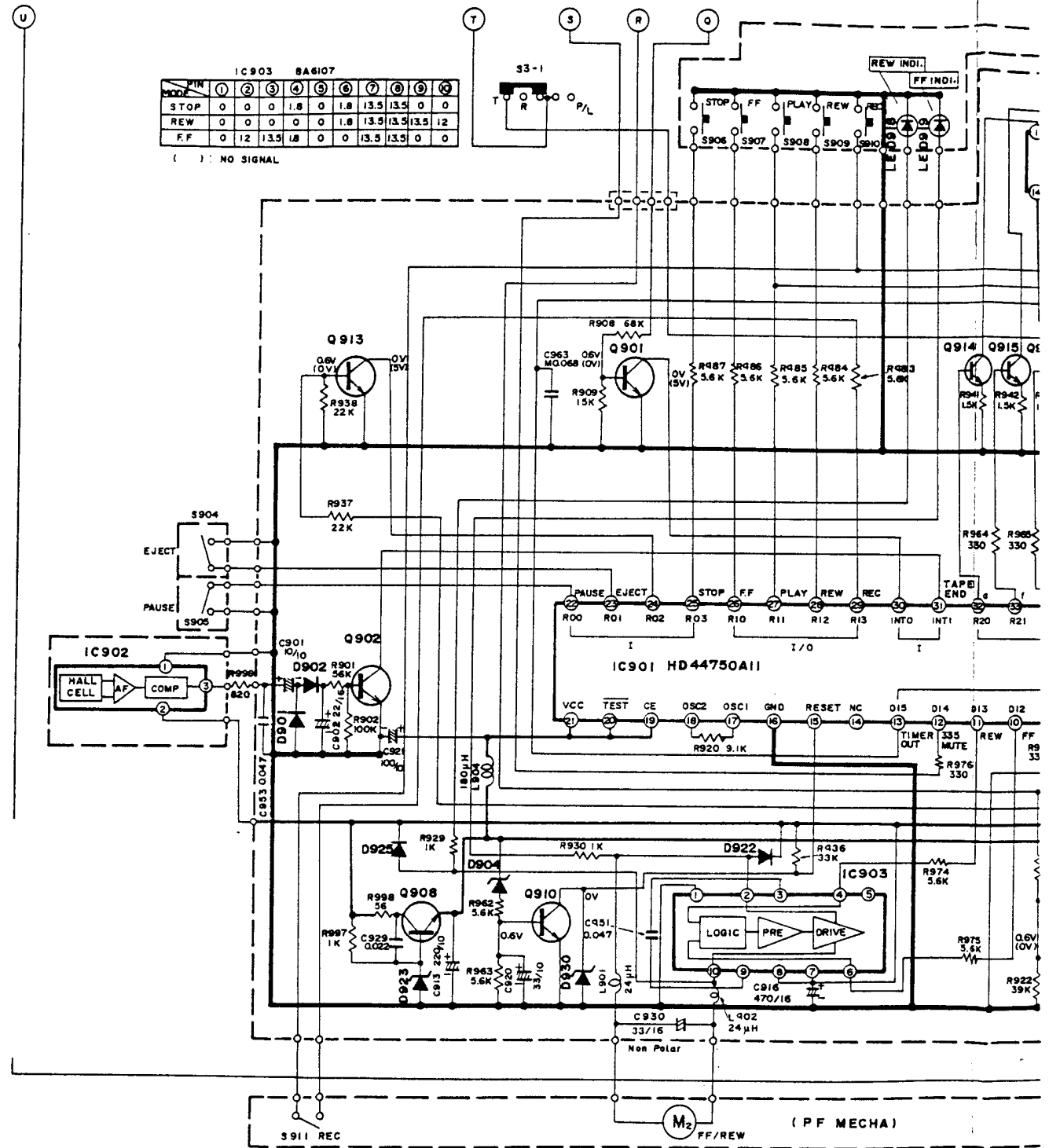
Q902
2SC1740S
SWITCHING

Q901
2SC1740S
SWITCHING

Q914
2SC1
LED

IC903 BA6107		①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
STOP	0	0	0	1.8	0	1.8	13.5	13.5	0	0	
REW	0	0	0	0	1.8	13.5	13.5	13.5	12		
FF	0	12	13.5	18	0	0	13.5	13.5	0	0	

() : NO SIGNAL



D925
1S2473
PROTECTOR

Q908
2SD468
VOLT. STAB.

D923
HZ6A3
VOLT. STAB.

D904
RD2.7
VOLT. STAB.

Q910
2SC1740S
SWITCHING

D922
1S2473

Q904, 905
2SD985
SWITCHING

Q907, 911
2SC116
SWITCHING

IC901
HD44750A11
FUNCTION CONTROL

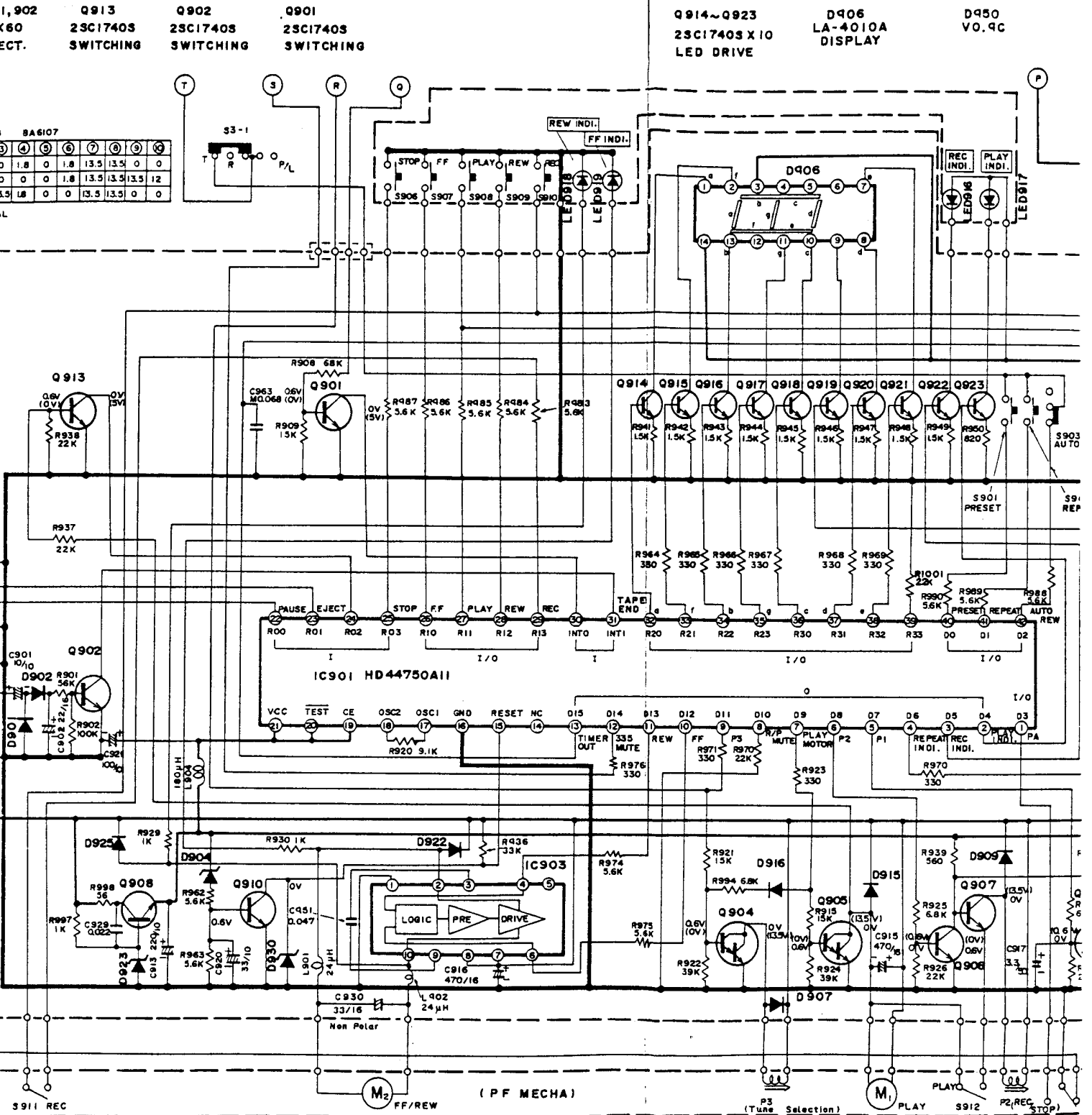
D930
HZ6B
VOLT. STAB.

IC903
BA6107
FF/REW MOTOR
DRIVE

D916
1K60
PROTECTOR

D909
1SR34
REVERSE
PROTECT

(Microprocessor/Drive/Power Section)



Q908 23D468 VOLT. STAB.
 D923 HZ6A3 VOLT. STAB.
 D904 RD2.7 VOLT. STAB.
 Q910 23C1740S SWITCHING

D922 IS2473

Q904, 905 23D985 SWITCHING

Q907, 912 23C1162 SWITCHING

Q906, 911 23C1740S SWITCHING

D907 IS2473VE REVERSE VOLTAGE PROTECTOR

IC901 HD44750AII FUNCTION CONTROL

D930 HZ68 VOLT. STAB.

IC903 BA6107 FF/REW MOTOR DRIVE

D916 IK60 PROTECTOR

D909 ISR34 REVERSE CURRENT PROTECTOR

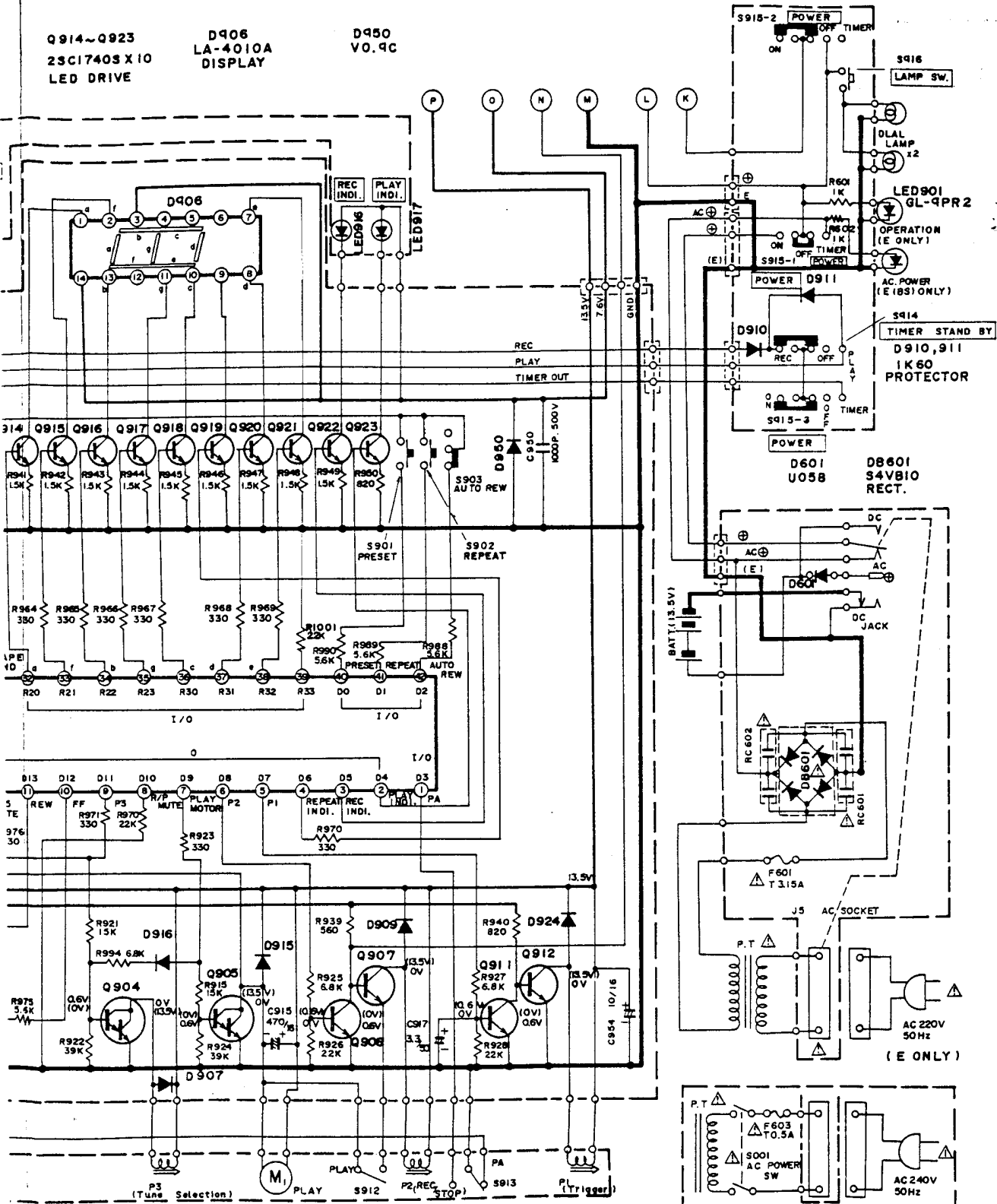
D924 ISR34 REVERSE CURRENT PROTECTOR

D915 IS2473 PROTECTOR

Q914~Q923
23C17403 X10
LED DRIVE

D906
LA-4010A
DISPLAY

D950
VO.9C



Q907, 912
23C1162
SWITCHING

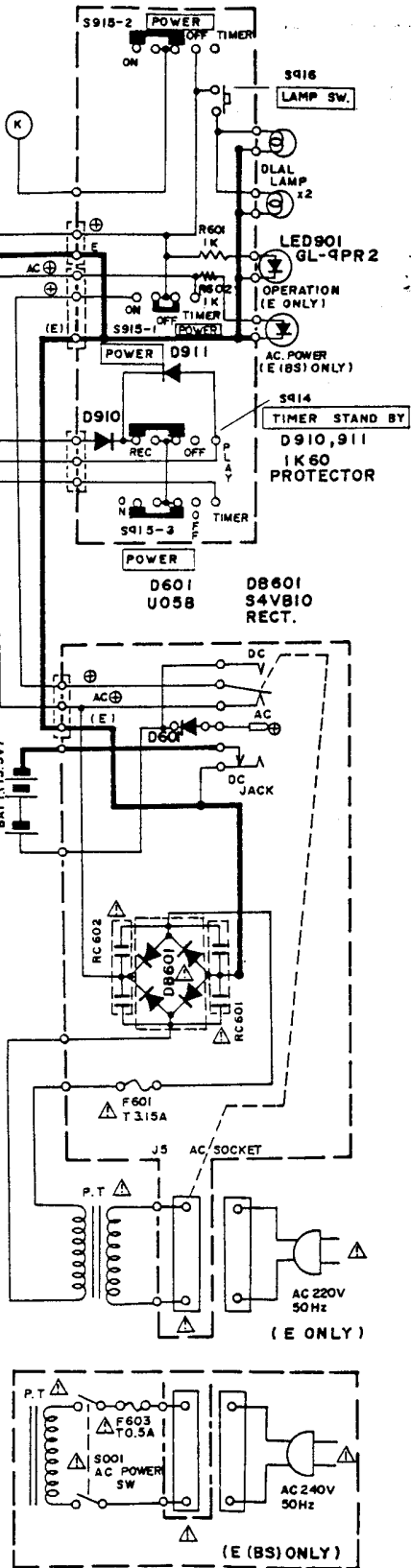
Q906, 911
23C17403
SWITCHING

D907
1S2473VE
REVERSE VOLTAGE
PROTECTOR

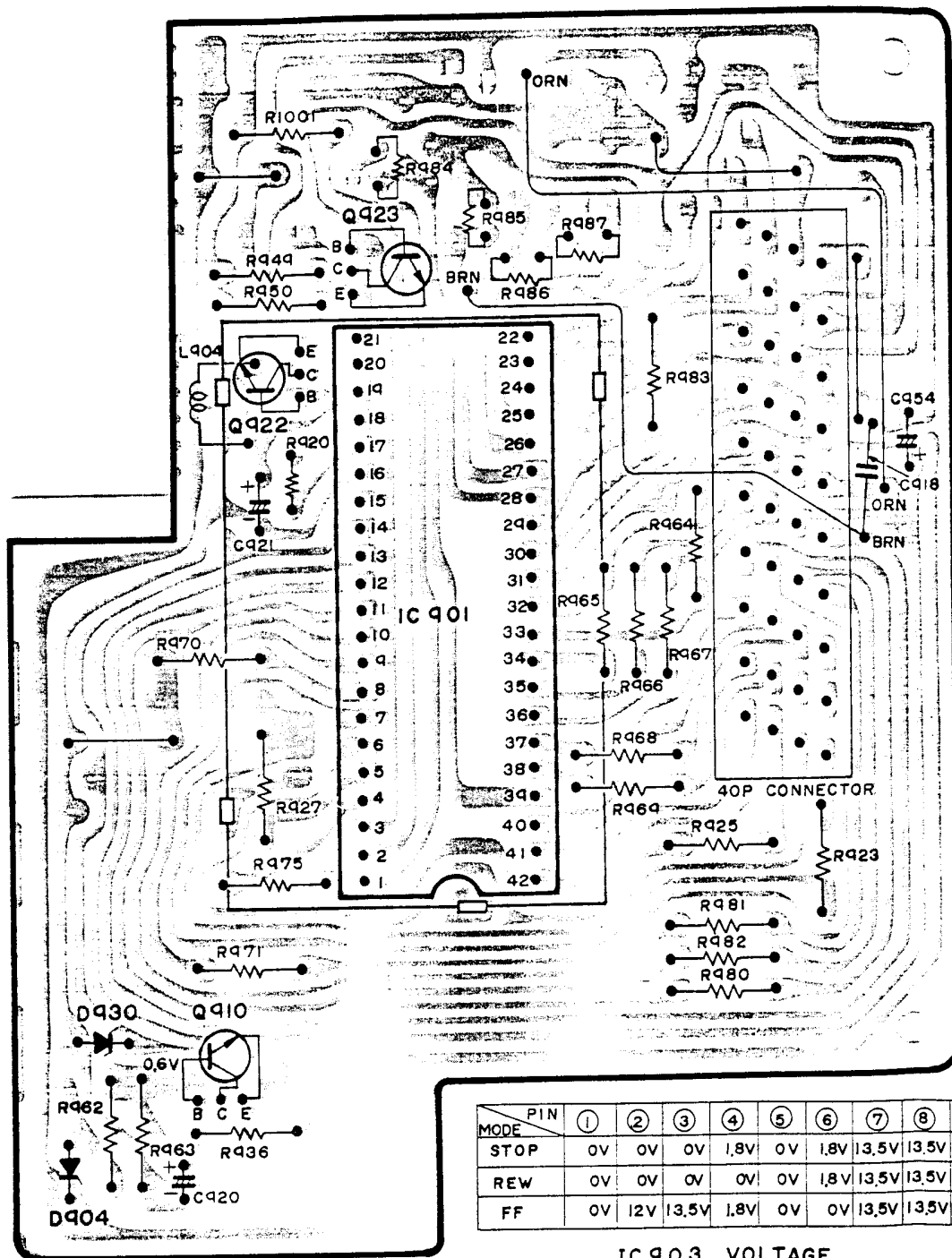
D909
1SR34
REVERSE CURRENT
PROTECTOR

D924
1SR34
REVERSE CURRENT
PROTECTOR

D915
1S2473
PROTECTOR



CIRCUIT BOARD DIAGRAM

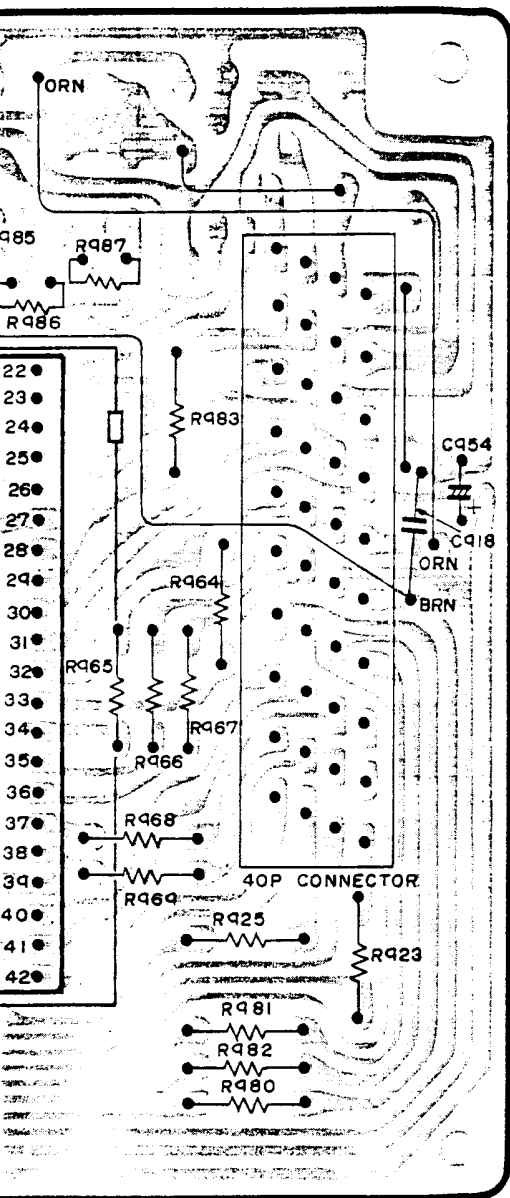


MODE \ PIN	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
STOP	0V	0V	0V	1.8V	0V	1.8V	13.5V	13.5V	0V	0V
REW	0V	0V	0V	0V	0V	1.8V	13.5V	13.5V	13.5V	12V
FF	0V	12V	13.5V	1.8V	0V	0V	13.5V	13.5V	0V	0V

IC 903 VOLTAGE

MICROPROCESSOR

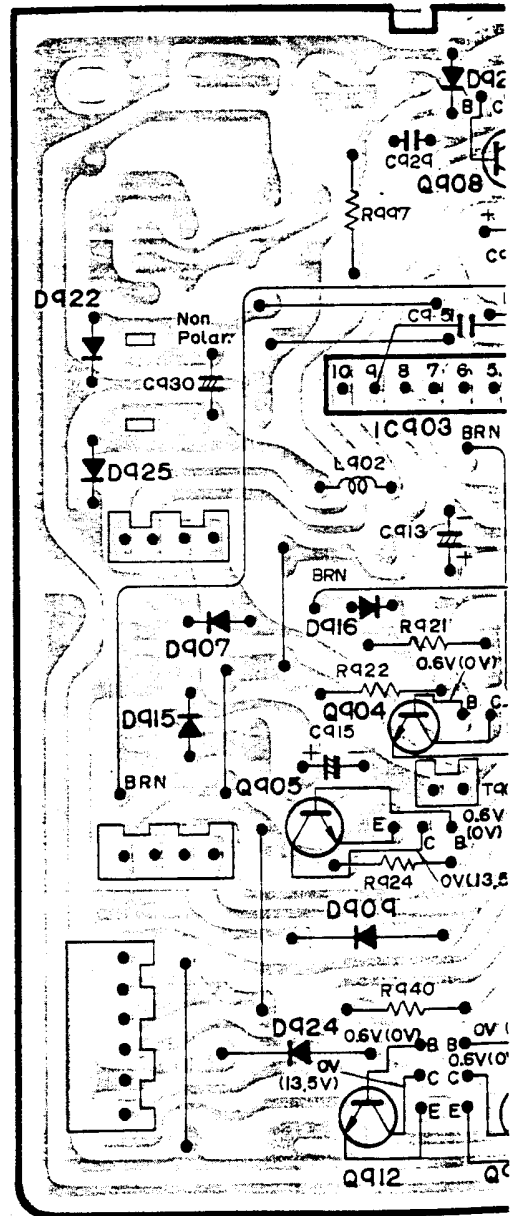
BOARD DIAGRAM

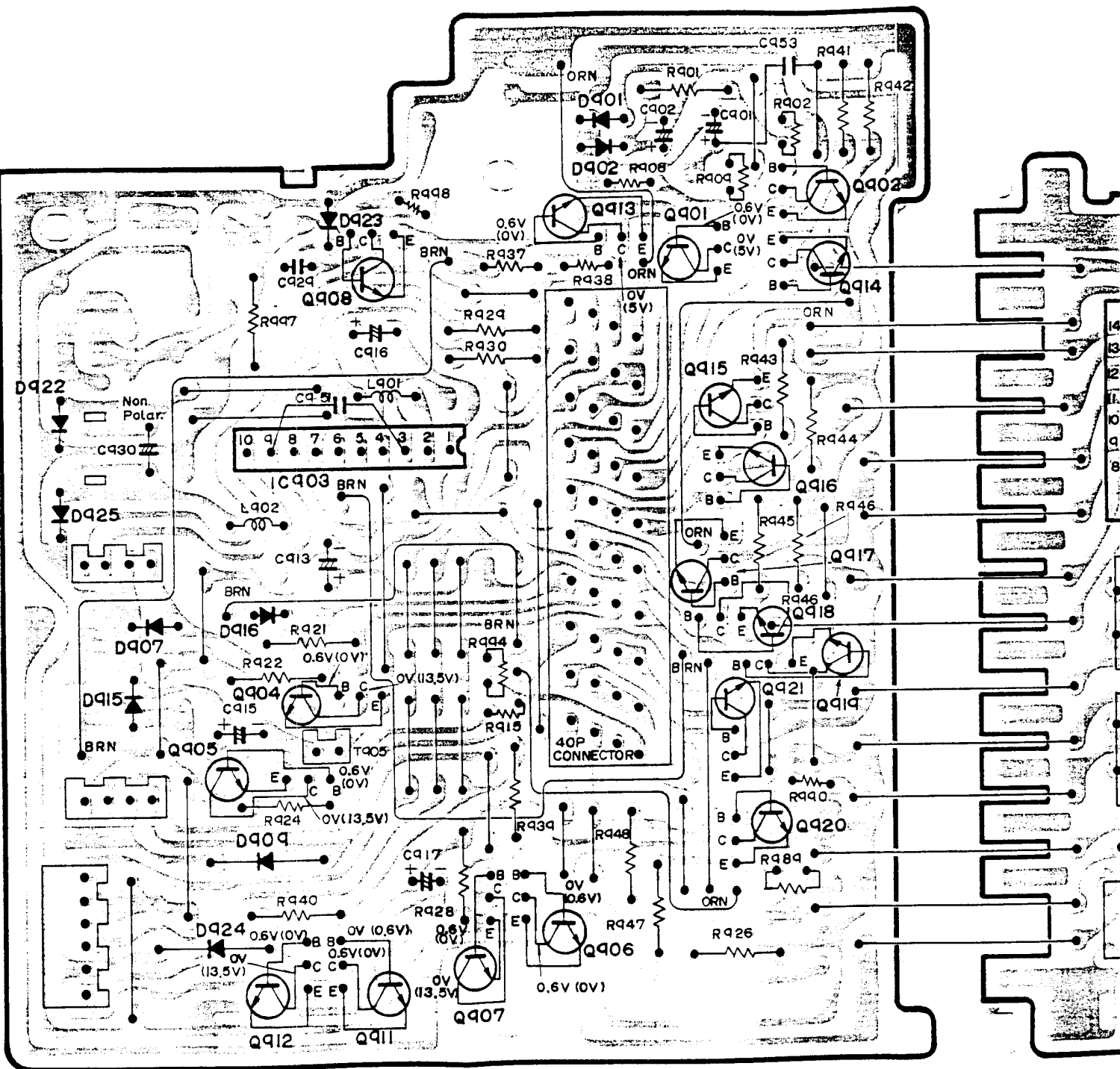


PIN	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
TOP	0V	0V	0V	1.8V	0V	1.8V	13.5V	13.5V	0V	0V
EW	0V	0V	0V	0V	0V	1.8V	13.5V	13.5V	13.5V	12V
FF	0V	12V	13.5V	1.8V	0V	0V	13.5V	13.5V	0V	0V

IC 903 VOLTAGE

MICROPROCESSOR





RTV servis Horvat

DRIVE

Kešinci, 31402 Semeljci

LED

031-856-139

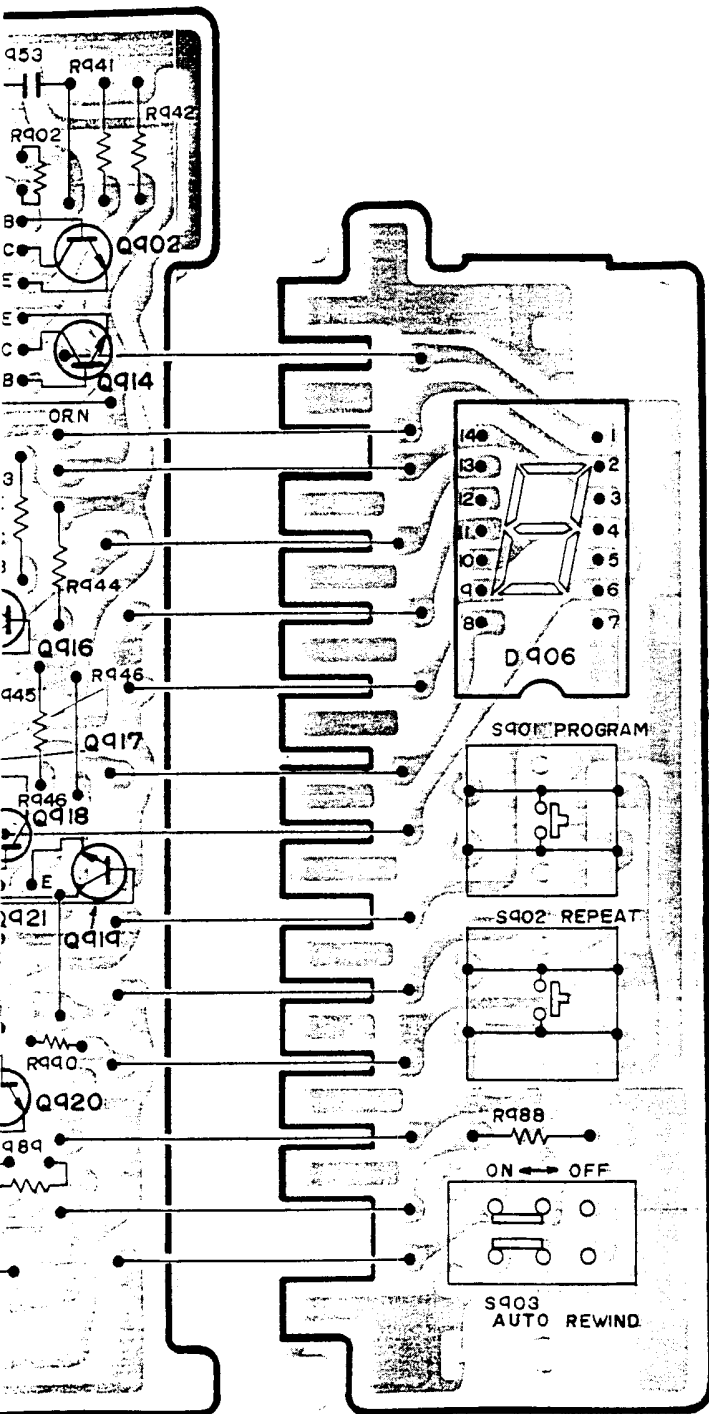
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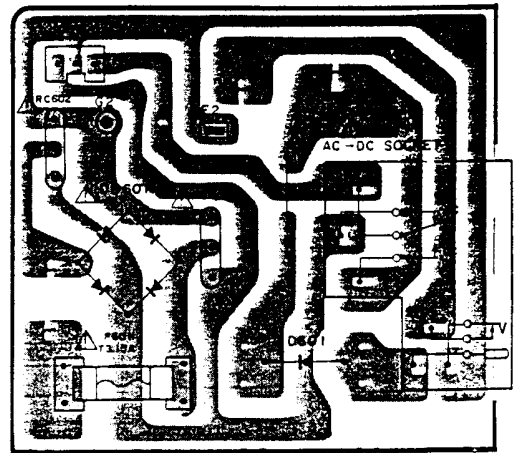
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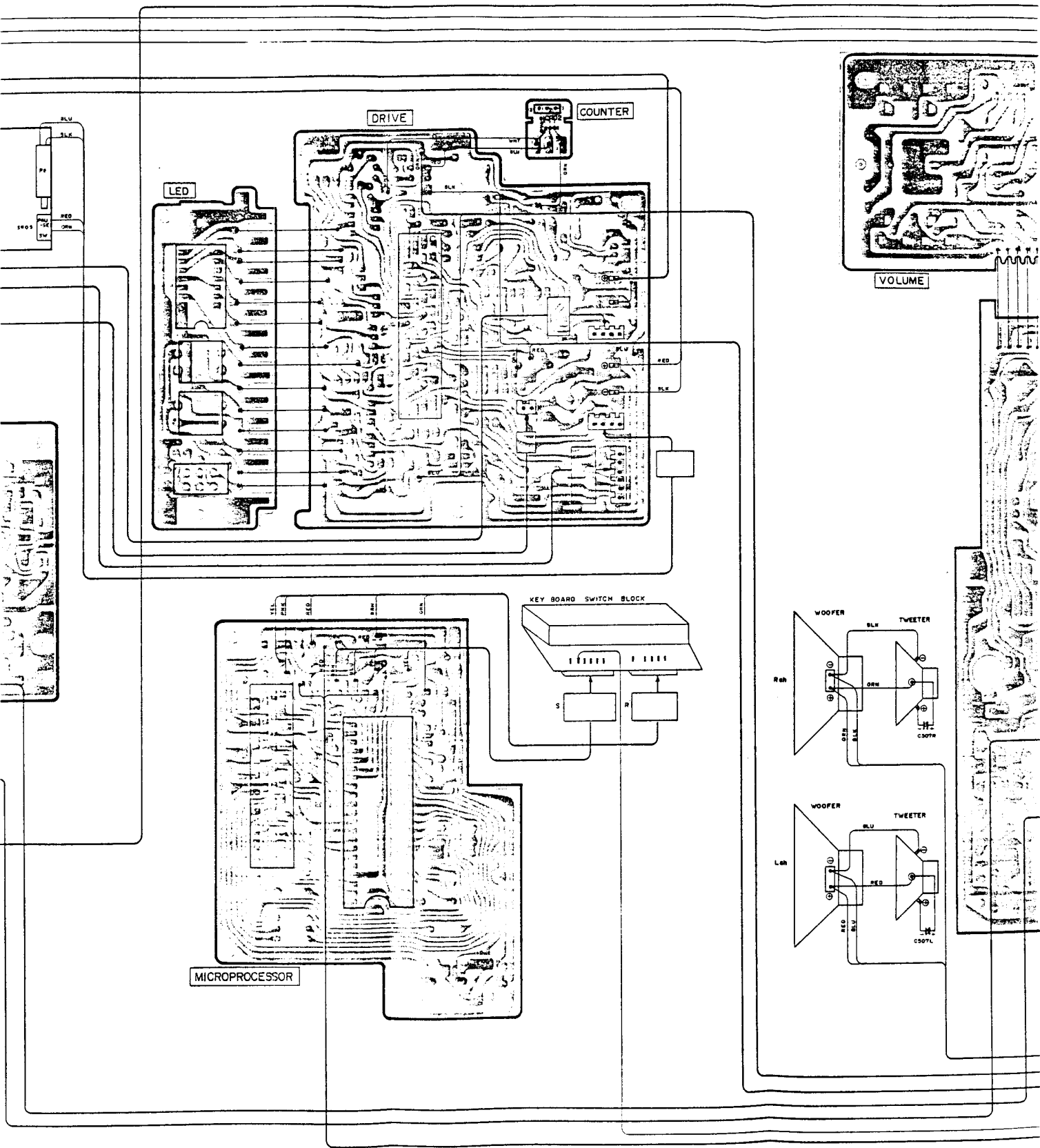
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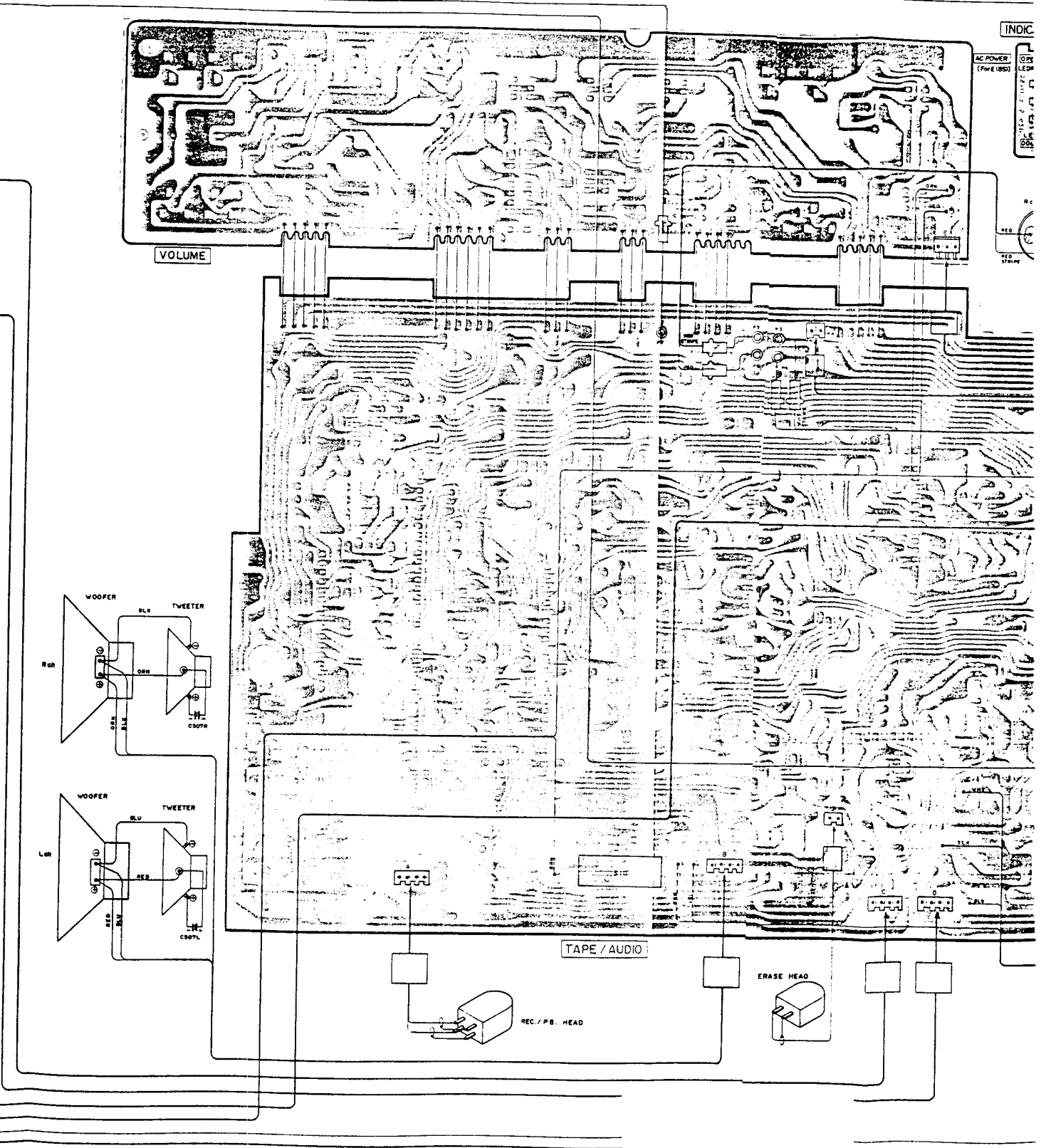


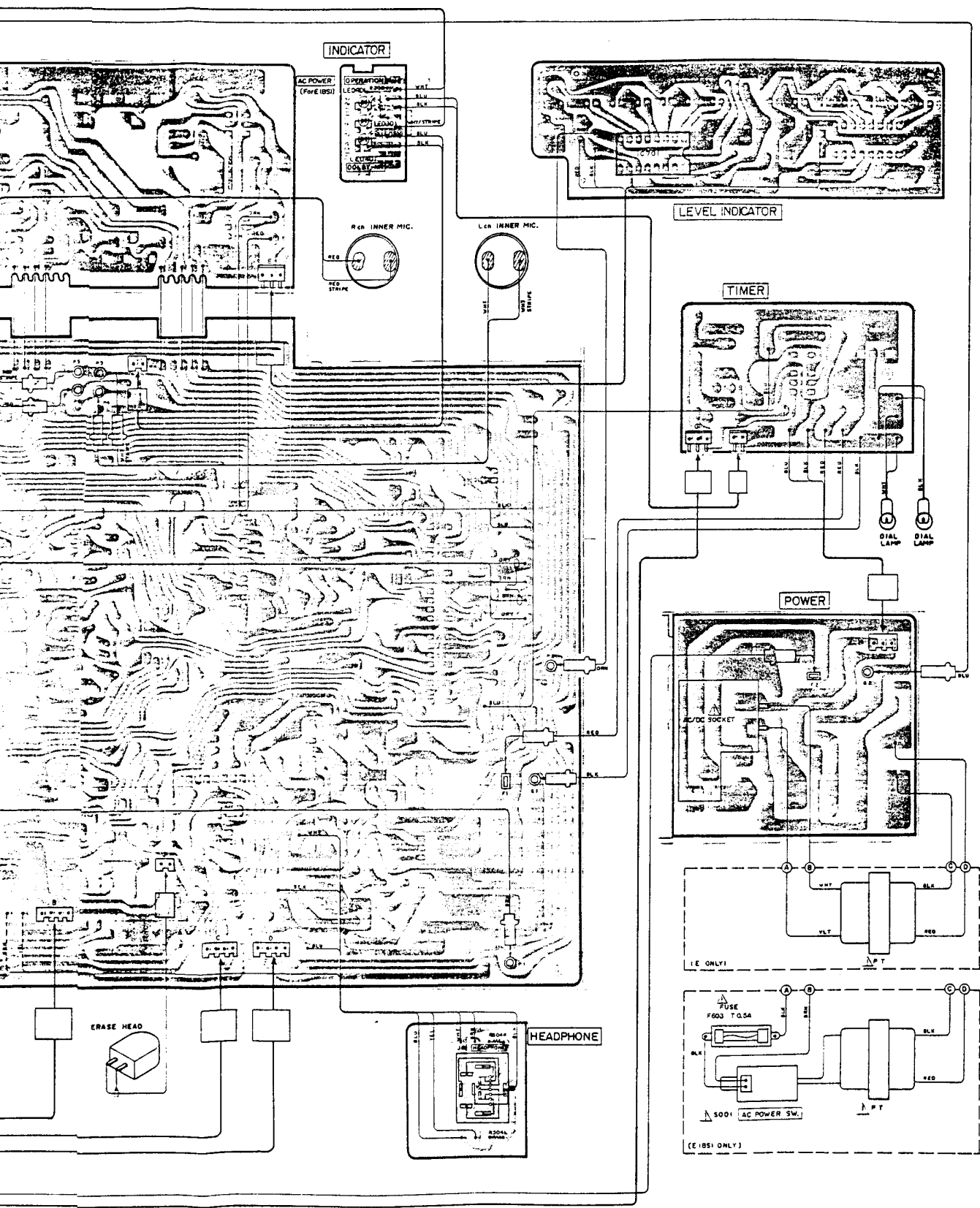
LED



POWER







REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
RESISTORS					
RC601	0186451	CR PACK	U915	5330571	DIODE 1S2473VE
RC602	0186451	CR PACK	0916	5331051	DIODE 1K60
RT301	0151806	SEMI VARIABLE 1K0HM B	0922	5330571	DIODE 1S2473VE
RT302	5007105	SEMI VARIABLE 4.7K0HM	0923	5330391	ZENER DIODE SILICON HZ8A3
RT401LR	0151818	SEMI VARIABLE 100K0HM	0924	5331241	DIODE 1SR34
RT402LR	0151821	SEMI VARIABLE 5K OHM	0925	5330571	DIODE 1S2473VE
RT403LR	0151817	SEMI VARIABLE 20K0HM B	0930	5330392	ZENER DIODE SILICON HZ6B 1HMZ 400MW
RT404LR	0151808	SEMI VARIABLE 10K OHM R58B	0950	5330421	DIODE SILICON V09C 15K
RT405	0151360	SEMI VARIABLE 5K B	ZD301	5330533	ZENER DIODE SILICON HZ-12C
RV401LR	5020092	VARIABLE 50K0HM(B)	ZD502	5330513	ZENER DIODE SILICON HZ7C
RV403LR	5020082	VARIABLE 100K0HM(B)	LED301	5380271	LED GL-9PR2
RV404LR	5020081	VARIABLE 100K0HM(C)	LED401	5380281	LED GL-9PR2
RV405LR	5020093	VARIABLE 10K0HM(A)	LED901	5380271	LED GL-9PR2
SEMI-CONDUCTORS					
DB601	5331521	DIODE 54VB10	IC201	5351064	IC AN2538B
D102	5330573	DIODE SILICON 1S2473 300MHZ 300MW	IC301	5350884	IC HA1330
D103	5330661	DIODE SILICON LS2790 200MHZ 80MW	IC401LR	5350961	IC BA340
D104	5330573	DIODE SILICON 1S2473 300MHZ 300MW	IC402	5357001	IC TA1024
D105	5330573	DIODE SILICON 1S2473 300MHZ 300MW	IC403	5356832	MODULE TA3003
D151	5331052	DIODE 1K60RLF-2	IC404	5352033	IC BA335
D201	5331052	DIODE 1K60RLF-2	IC501	5352141	IC HA1392
D202	5331052	DIODE 1K60RLF-2	IC701LR	5365501	IC IR-2E02
D203	5331052	DIODE 1K60RLF-2	IC901	5365401	IC HD44750A11
D204	5331052	DIODE 1K60RLF-2	IC902	5391031	HALL ELEMENT DN685B
D205	5331052	DIODE 1K60RLF-2	IC903	5352221	IC BA6107
D206	5331052	DIODE 1K60RLF-2	Q101	5321271	TRANSISTOR SILICON 2SC1674L 600MHZ
D401LR	5330571	DIODE 1S2473VE	Q102	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
D402LR	5330571	DIODE 1S2473VE	Q103	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
D403LR	5331051	DIODE 1K60	Q151	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
D405LR	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q152	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
D406	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q201	5321281	TRANSISTOR SILICON 2SC1675-L 230MHZ 200M
D407LR	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q401LR	5321293	TRANSISTOR 2SC1740LN-R
D407R	5330571	DIODE 1S2473VE	Q402LR	5321293	TRANSISTOR 2SC1740LN-R
D408	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q404LR	5321293	TRANSISTOR 2SC1740LN-R
D409	5330573	DIODE SILICON 1S2473 300MHZ 300MW	Q405LR	5321293	TRANSISTOR 2SC1740LN-R
D411	5331052	DIODE 1K60RLF-2	Q406LR	5321293	TRANSISTOR 2SC1740LN-R
D601	5330501	DIODE SILICON UD-5B 60HZ 3HM	Q407LR	5321293	TRANSISTOR 2SC1740LN-R
0701LR	5380465	LED LN07202P	Q408	5321293	TRANSISTOR 2SC1740LN-R
0901	5331051	DIODE 1K60	Q409LR	5321293	TRANSISTOR 2SC1740LN-R
0902	5331051	DIODE 1K60	Q410	5321293	TRANSISTOR 2SC1740LN-R
0904	5330847	DIODE RD2.7E-82	Q411	5321293	TRANSISTOR 2SC1740LN-R
0906	5380521	LED LA4010A	Q412	5321293	TRANSISTOR 2SC1740LN-R
0907	5330571	DIODE 1S2473VE	Q413LR	5321293	TRANSISTOR 2SC1740LN-R
0909	5331241	DIODE 1SR34	Q414	5321293	TRANSISTOR 2SC1740LN-R
0910	5331052	DIODE 1K60RLF-2	Q501	5320643	TRANSISTOR SILICON 2SC1162 150M
0911	5331052	DIODE 1K60RLF-2	Q502	5320643	TRANSISTOR SILICON 2SC1162 150M
			U901	5321294	TRANSISTOR 2SC 1740S

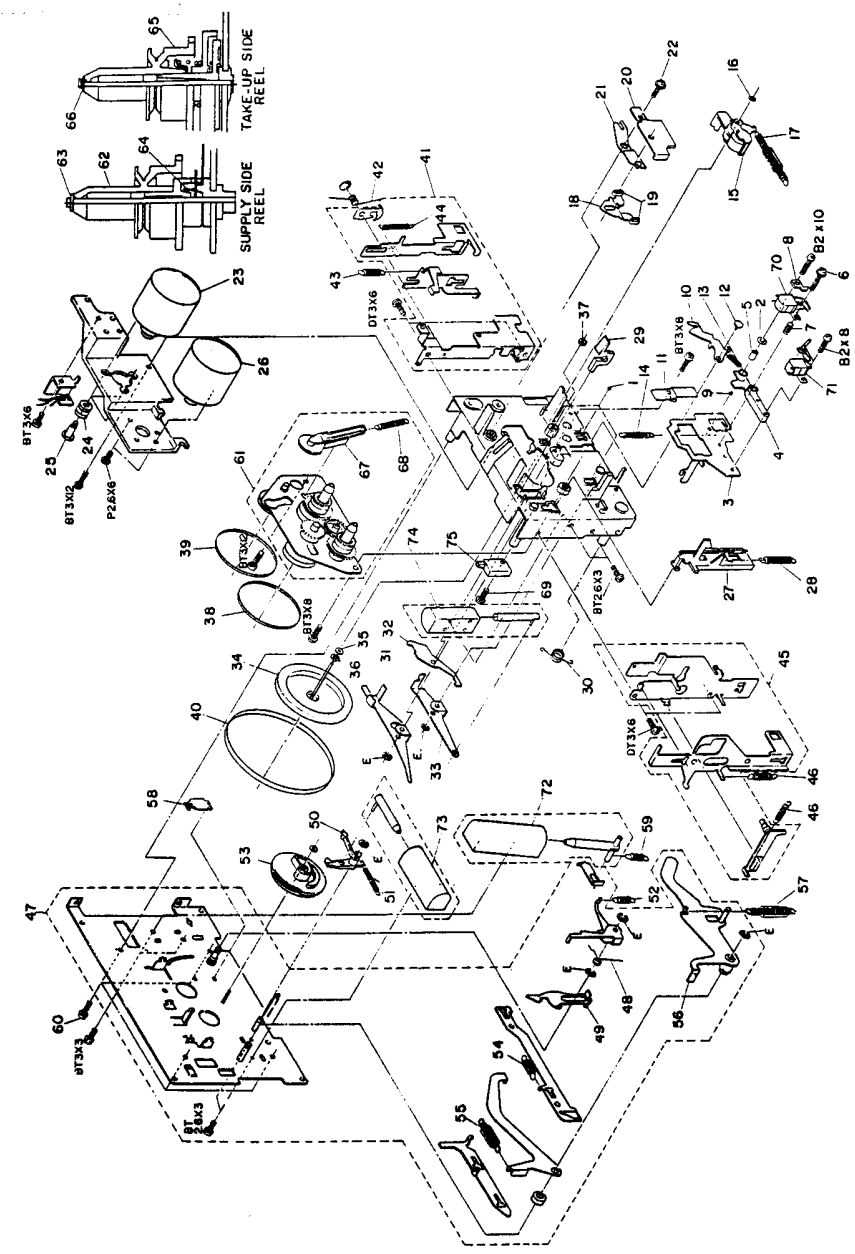
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SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
SEMI-CONDUCTORS					
0902	5321294	TRANSISTOR 2SC 1740S	L902	5150461	CHOKE 240 MH
U904	5322671	TRANSISTOR 2SD905	L904	5152031	CHOKE COIL 160MH
U905	5322671	TRANSISTOR 2SD905	MISCELLANEOUS		
U906	5321294	TRANSISTOR 2SC 1740S	Δ	5653242	POWER SOCKET
0907	5320643	TRANSISTOR SILICON 2SC1162 150M		5653321	IC SOCKET
0908	5321213	TRANSISTOR 2SD468C 190MHZ 0.9MW	PL901	5762243	LAMP(12V)
U910	5321294	TRANSISTOR 2SC 1740S	PL902	5762286	LAMP(12V)
U911	5321294	TRANSISTOR 2SC 1740S		5898371	CONNECTOR
U912	5320643	TRANSISTOR SILICON 2SC1162 150M	6P101	5161551	FILTER
U913-923	5321294	TRANSISTOR 2SC 1740S	CF201	5160211	CERAMIC FILTER CF107A
VR201	5340022	VARIATOR SILICON HV-46 10K	CF202	5160211	CERAMIC FILTER CF107A
VR401	5340022	VARIATOR SILICON HV-46 10K	F301LR	5161731	LCR FILTER
VR402	5340022	VARIATOR SILICON HV-46 10K	ΔF601	5721065	FUSE 3,15A
TRANSFORMERS					
T101	5140071	FM IF	ΔF603	5720173	FUSE 500MA [For E(BS)]
T151	5160101	CERAMIC FILTER 488 KHZ	J1	5679442	JACK PLATE (MIC)
T201	5148111	FM DISCRI.	J3	5676241	JACK (PHONE)
T202	5148112	FM DISCRI.	J4	5679442	JACK PLATE (EXT.SP.)
T203	5140072	FM IF	J6	5674132	HEADPHONE JACK
T204	5130122	AM IF	J7	5653211	DIN JACK
Δ PT	5212683	POWER TRANSFORMER [For E(BS)]	S 1	5623431	SLIDE SWITCH (REC./P.B.)
Δ PT	5212682	POWER TRANSFORMER [For E]	S 2	5623611	SLIDE SWITCH (REC/P.B.)
COILS					
L101	5126482	FM RF	S 3	5624091	SLIDE SWITCH (FUNCTION)
L102	5150791	CHOKE COIL	S 4	5604281	LEVER SWITCH (EQ.)
L103	5126276	FM OSCILLATOR COIL	S 5	5604092	LEVER SWITCH (BIAS)
L104	5123271	FM TRAP COILLO.5MH (For E)	S 6	5604082	LEVER SWITCH (DOLBY NR)
L105	5123271	FM TRAP COILLO.5MH (For E)	S 7	5604082	LEVER SWITCH (MONO/STEREO)
L106	5123271	FM TRAP COILLO.5MH (For E)	S 8	5623871	SLIDE SWITCH (PHONE/LINE)
L151	5123493	SW ANTENNA COIL	S 9	5604083	LEAF SWITCH (REC.MUTE)
L152	5113501	FERRITE CORE ANTENNA	S 10	5624252	SLIDE SWITCH (RIF)
L153	5113501	FERRITE CORE ANTENNA	S 11	5604082	LEVER SWITCH (REC MODE-AUTO/MANUAL)
L154	5123494	SW OSC	S 12	5604082	LEVER SWITCH (AFC)
L155	5120319	MW OSC	S 13	5604082	LEVER SWITCH (LEVEL/TUNE, BATT.)
L156	5120465	LW OSC	S 14	5633621	PUSH SWITCH (LOUDNESS)
L157	5123271	FM TRAP COILLO.5MH	S 15	5625011	SLIDE SWITCH (BAND)
L401LR	5260215	TRAP COIL 33MH	ΔS001	5602021	SEESAW SWITCH-AC POWER [For E(BS)]
L401M	5260215	TRAP COIL 33MH	S901	5633352	PUSH SWITCH (PROGRAM)
L402LR	5120274	CHOKE COIL	S902	5633352	PUSH SWITCH (REPEAT)
L403	5260821	OSCILLATOR BLOCK	S903	5623575	SLIDE SWITCH (AUTO REW.)
L404LR	5161601	DOLBY FILTER	S904, S905	5633361	PUSH SWITCH (EJECT, PAUSE, POWER ASSIST)
L501LR	5150761	CHOKE COIL	S912	5603113	LEAF SWITCH (MOTOR)
L502	5152123	CHOKE 18 MH	S914	5624251	SLIDE SWITCH (TIMER-P.B./OFF/REC)
L901	5150461	CHOKE 240 MH	S915	5604431	LEVER SWITCH (POWER-ON/OFF/TIMER)
			S916	6533521	LEAF SPRING (DIAL LIGHT)
FOR ACCESSORIES					
Δ	5747321	POWER CORD [For E]			
Δ	5746341	POWER CORD [For E(BS)]			
	5896391	FM ANTENNA [For E(BS)]			

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SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR CASSETTE DECK ASSEMBLY (A)					
1	0948492	BALL - 2MM	47	7041325	POWER ASSIST CHASSIS ASSEMBLY
2	7770921	WASHER	48	6546131	RECORD SPRING
3	7323103	HEAD PLATE	49	7327291	RECORD LEVER
4	0758352	HEAD BASE	50	0758363	LOCK LEVER (A)
5	7575902	COLLAR	51	0300595	SPRING
6	7781004	SCREW	52	0301102	SPRING FOR LOCK LEVER (B)
7	0321733	HEAD SPRING C	53	0430733	POWER ASSIST GEAR ASSEMBLY
8	7317371	EARTH PLATE	54	0323664	SPRING
9	0948492	BALL - 2MM	55	0301742	SPRING FOR RECORD SLIDER (B)
10	7325282	ADJUST PLATE	56	7323032	POWER ASSIST LEVER ASSEMBLY
11	0533671	HEAD PLATE HOLDER	57	0301237	SPRING FOR POWER ASSIST LEVER
12	0758322	ARM PIN	58	0743846	THINUST SUPPORT
13	0320576	SPRING	59	6540022	SPRING FOR SOLENOID (PLAY)
14	0322547	SPRING FOR HEAD PLATE	60	7761132	BT SCREW
15	0383615	PRESSURE ROLLER ARM ASSEMBLY	61	7041214	HEEL BASE ASSEMBLY
16	7786624	POLYSLIDER WASHER	62	6413832	SUPPLY REEL BASE ASSEMBLY
17	0300075	SPRING	63	7786115	POLYESTER WASHER
18	7323432	BRAKE PLATE	64	0303013	SPRING
19	0586004	RUBBER FOR BRAKE	65	0413843	TAKE UP REEL BASE ASSEMBLY
20	7327311	BRAKE HOLDER	66	7786115	POLYESTER WASHER
21	7323071	BRAKE LEVER	67	0302002	IDLER SLIDER ASSEMBLY
22	7781133	BT SCREW-3MM	68	0301025	SPRING
23	5576572	MOTOR ASSEMBLY (PLAY)	69	7780262	PAN HEAD SCREW
24	0576082	RUBBER PLATE	70	5444991	RECORD PLAYBACK HEAD
25	7539004	MOTOR FIXING SCREW	71	5445262	ERASE HEAD
26	5576581	MOTOR ASSEMBLY (FF+REWIND)	72	5642702	SOLENOID (STOP)
27	7323472	LOCK SLIDER	73	5642712	SOLENOID (PLAY)
28	0300981	SPRING	74	5642722	SOLENOID
29	0758344	RECORD PREVENTION ARM	75 (SH)	5633361	PUSH SWITCH
30	6546171	SPRING FOR SOLENOID LEVER	FOR CASSETTE DECK ASSEMBLY		
31	7322991	DRIVING LEVER	76	0758562	CHASSIS ASSEMBLY
32	7325161	RELAY LEVER	77	0316231	SPRING M
33	7323012	SOLENOID LEVER	78	0345672	PULLEY-160HMD
34	0373571	FLYWHEEL	79	0394442	POINTER
35	7778848	POLYSLIDER WASHER	80	5421571	BUILT IN MICROPHONE
36	7772623	SPRING	81	0570291	MIC COVER
37	7786623	POLYSLIDER WASHER	82	0758551	INDICATOR HOLDER
38	0354684	BELT FOR FF+REWIND	83	0467763	SCALE PLATE (For E)
39	0355161	BELT FOR TAKE UP	84	0467764	SCALE PLATE (For E(BS))
40	0357431	FLYWHEEL BELT	85	0758541	EXCHANGE LEVER
41	7323524	PAUSE HOLDER ASSEMBLY	86	0699410	BT BIND HEAD SCREW-3MMX10MM (BLACK)
42	0319707	SPRING FOR PAUSE SLIDER	87	7548252	COLLAR
43	0546061	SPRING	88	7330171	RECORD LEVER
44	0300981	SPRING	89	0301101	SPRING
45	7323534	EJECT HOLDER ASSEMBLY	90	5550381	COUNTER
46	0301723	SPRING FOR EJECT SLIDER	91	0355021	COUNTER BELT
			92	0671310	DT SCREW-2.6MMX10MM

EXPLODED VIEW (Cassette Chassis)



Note: Components marked without numbers in this drawing are not specified as replacement parts.

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
		FOR CASSETTE DECK ASSEMBLY (A)	114	7781133	BT SCREW-3HMD
93	6257813	EJECT BUTTON ASSEMBLY	115	5407421	SPEAKER-16CM
94	6296865	SLIDE KNOB (AUTO REWIND)	116	5639284	FUNCTION SWITCH ASSEMBLY
95	6257803	PAUSE BUTTON ASSEMBLY	117	6758532	EJECT ASSEMBLY
96	6251101	LIGHT BUTTON	118	6301951	SPRING
97	6053492	PUSH BUTTON ASSEMBLY (LOUDNESS)	119	6333647	HANDLE ASSEMBLY
98	6283384	TUNING KNOB ASSEMBLY	120	6531142	SPRING
99	6283394	KNOB ASSEMBLY (BAND+FUNCTION)	121	6034233	REAR CASE ASSEMBLY (For E)
100	6295554	SLIDE KNOB	122	6034234	REAR CASE ASSEMBLY [For E(BS)]
101	6296853	LEVER KNOB	123	6173454	BATTERY LID ASSEMBLY
102	6296843	SLIDE KNOB(TIMER STANDBY)	124	6305691	BATTERY TERMINAL (+,-)
103	7766431	SPACER	125	6305702	BATTERY SPRING (-)
104	7711801	SPACER	126	7451491	BATTERY TERMINAL
105	7781303	TAPPING SCREW-3HMDX40MM	127	6758591	TERMINAL HOLDER
106	7766371	SPACER	128	5752511	ROD ANTENNA
107	7755411	SPACER	129	5687142	CAP TERMINAL
108	6034213	FRONT CASE ASSEMBLY (For E)	130	8744414	BIND SCREW-3HMDX14MM
109	6034214	FRONT CASE ASSEMBLY [For E(BS)]	131	5659121	BACK COVER
110	6053013	PUSH BUTTON	132	6746881	FUSE COVER [For E(BS)]
111	6092632	CASSETTE LID ASSEMBLY	133	6746902	SWITCH COVER [For E(BS)]
112	6223511	HEAD COVER	134	5671661	FM ANTENNA TERMINAL
113	5401122	SPEAKER-5CM			



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