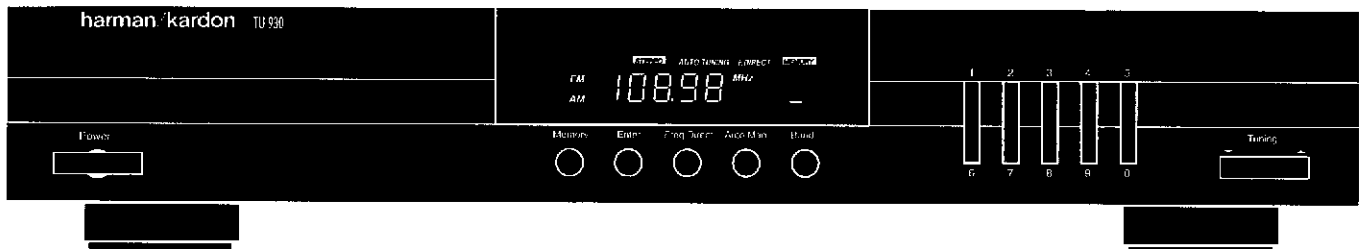


# The Harman Kardon Model TU930 AM/FM STEREO TUNER

Manual A

# Technical Manual

TU930



**harman/kardon**

Parts and Service Office

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PRINTED IN TAIWAN 1112-TU930 P-9409 1200

## CONTENTS

SPECIFICATIONS .....	2	PACKAGE .....	7
INTERNAL VIEW .....	2	MECHANICAL PARTS LIST .....	8
COMPONENTS AND THEIR FUNCTIONS .....	3	MECHANICAL EXPLODED VIEW .....	9
DISASSEMBLY PROCEDURES .....	3	ELECTRICAL PARTS LIST .....	10
ALIGNMENT PROCEDURES .....	4	FM FRONT END SECTION .....	12
BLOCK DIAGRAM .....	5	WIRING DIAGRAM .....	13
CIRCUIT DESCRIPTION .....	6	P.C. BOARDS .....	14
TIMING CHART .....	6	SCHEMATIC DIAGRAMS .....	15

## SPECIFICATIONS

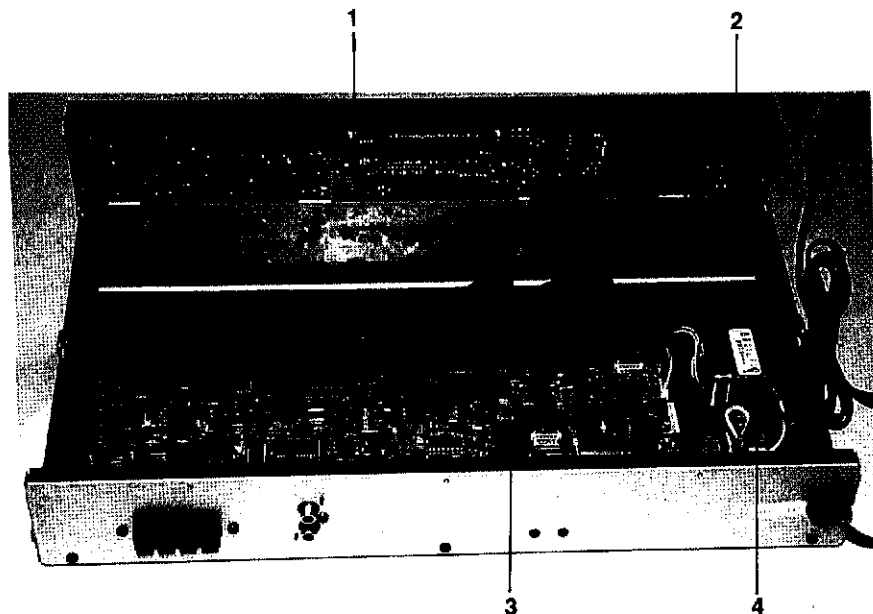
<ul style="list-style-type: none"> <li>• <b>FM SECTION</b></li> <li>Tuning Range 87.5-108 MHz</li> <li>30dB Quieting Sensitivity                     <ul style="list-style-type: none"> <li>Mono 14dBf <math>\leq</math> 20dBf</li> <li>Stereo 15.2dBf <math>\leq</math> 19dBf</li> </ul> </li> <li>Image Ratio 38dBf <math>\leq</math> 41dBf                     <ul style="list-style-type: none"> <li>(120 Volts version) 50dB <math>\geq</math> 40dB</li> <li>(230 Volts version) 85dB <math>\leq</math> 70dB</li> </ul> </li> <li>IF Rejection 85dB <math>\geq</math> 75dB</li> <li>Spurious Response Rejection 90dB</li> <li>Capture Ratio 2dB <math>\leq</math> 4dB</li> <li>Alternate Channel Selectivity 65dB <math>\geq</math> 55dB</li> <li>AM Rejection 50dB <math>\geq</math> 45dB</li> <li>Signal to Noise Ratio                     <ul style="list-style-type: none"> <li>Mono 70dB <math>\geq</math> 65dB</li> <li>(120 Volts version) 65dB <math>\geq</math> 60dB</li> <li>(230 Volts version) 65dB <math>\geq</math> 55dB</li> <li>(120 Volts version) 60dB <math>\geq</math> 55dB</li> <li>(230 Volts version)</li> </ul> </li> <li>Total Harmonic Distortion                     <ul style="list-style-type: none"> <li>Mono 0.1% <math>\leq</math> 0.25%</li> <li>Stereo 0.25% <math>\leq</math> 0.3%</li> </ul> </li> <li>Stereo Separation at 1kHz 40dB <math>\geq</math> 30dB</li> <li>Output Level 1.0V <math>\pm</math> 2dB</li> </ul>	<ul style="list-style-type: none"> <li>• <b>AM SECTION</b></li> <li>Tuning Range                     <ul style="list-style-type: none"> <li>North America area model 530-1,720kHz</li> <li>Europe models 522-1,611kHz</li> </ul> </li> <li>20dB Quieting Sensitivity 800uV/m <math>\leq</math> 1,600uV/m</li> <li>Selectivity 30dB <math>\geq</math> 25dB</li> <li>Signal to Noise Ratio 50dB <math>\geq</math> 40dB</li> <li>Image Rejection 35dB <math>\geq</math> 30dB</li> <li>IF Rejection 45dB <math>\geq</math> 30dB</li> <li>• <b>DIMENSION</b> 17-5/16" <math>\times</math> 2-9/16" <math>\times</math> 12-5/8" (W <math>\times</math> H <math>\times</math> D) (440 <math>\times</math> 65 <math>\times</math> 320 mm)</li> <li>• <b>WEIGHT</b> 7.48 lbs. (3.4kg)</li> <li>• <b>POWER SUPPLIES</b> <ul style="list-style-type: none"> <li>North America area model AC 120V, 60Hz</li> <li>Europe Area AC 230V, 50Hz</li> </ul> </li> <li>• <b>POWER CONSUMPTION</b> 8W</li> </ul>
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These specifications are service target specs.

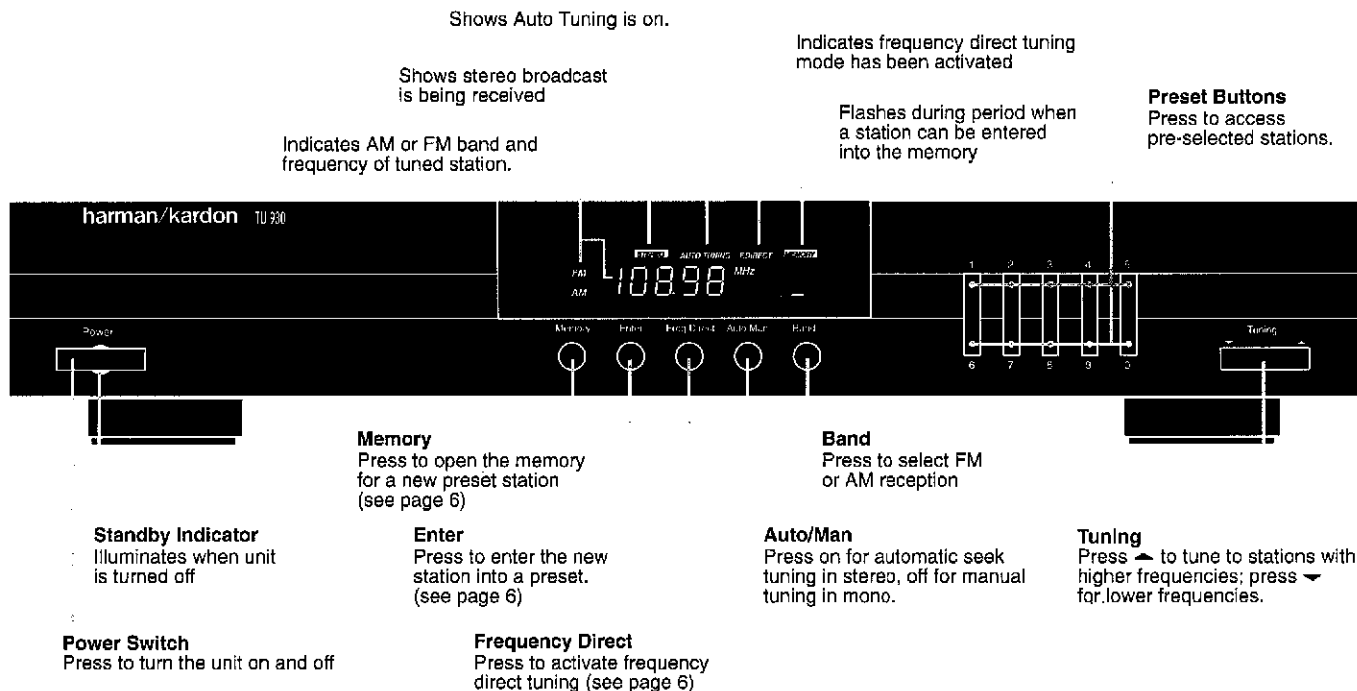
Specifications and components subject to change without notice. Overall performance will be maintained or improved.

## INTERNAL VIEW

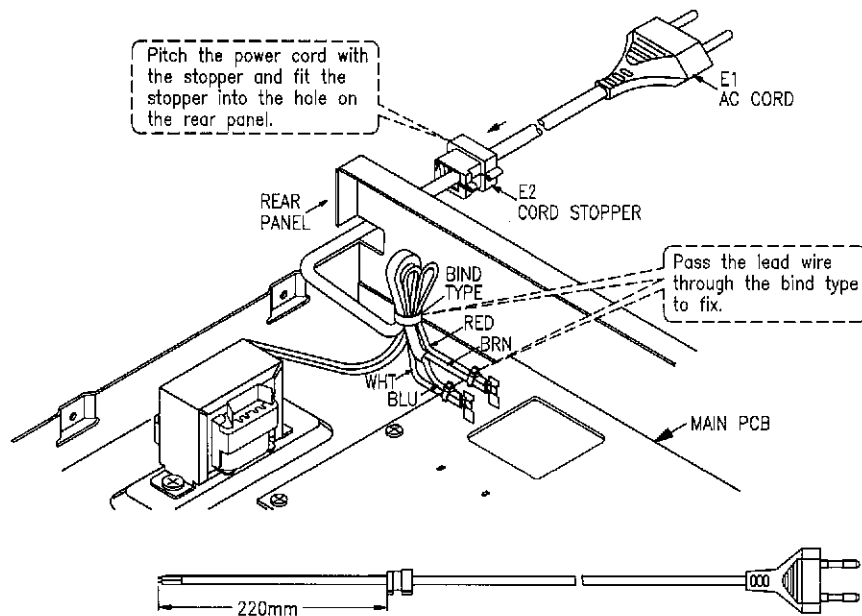
1. PCB-2 FRONT P.C. BOARD
2. PCB-3 POWER SWITCH P.C. BOARD
3. PCB-1 MAIN P.C. BOARD
4. POWER TRANSFORMER



## COMPONENTS AND THEIR FUNCTIONS



## AC CORD REPLACEMENT



## DISASSEMBLY PROCEDURES (REAR TO PAGE 8,9 and 13)

### ❶ COVER TOP REMOVAL

Remove 7 screws (A) and then remove the Cover Top (M19).

### ❷ FRONT PANEL ASS'Y REMOVAL

1. Remove the Cover Top (M19), referring to the previous step ❶.
2. Remove 1 screw (B) and then remove the Power Switch P.C. Board (M13).
3. Remove 9 screws (C) and then remove the Front P.C. Board (M17).
4. Remove 6 screws (D) and then remove the Front Panel Ass'y (M1-M12).

### ❸ REAR PANEL REMOVAL

1. Remove the Cover Top (M19), referring to the previous step ❶.
2. Remove 8 screws (E) and then remove the Rear Panel (M29).

### ❹ MAIN P.C. BOARD REMOVAL

1. Remove the Cover Top (M19), referring to the previous step ❶.
2. Remove the Rear Panel (M29), referring to the previous step ❷.
3. Remove 6 screws (F) and then remove the Main P.C. Board (M25).

## ALIGNMENT PROCEDURES (REFER TO PAGE 13 AND 15)

- Conditions:
- Make the adjustment at a room temperature of 77°F (25°C).
  - After the Power switch is pushed on, wait for 2 minutes before measuring to be sure of the most stable operation.

### ■ AM ADJUSTMENT

- Conditions:
- Set the AM mode by pressing the "AM" button.
  - Standard modulation of the AM Signal Generator is 1kHz at 30%.

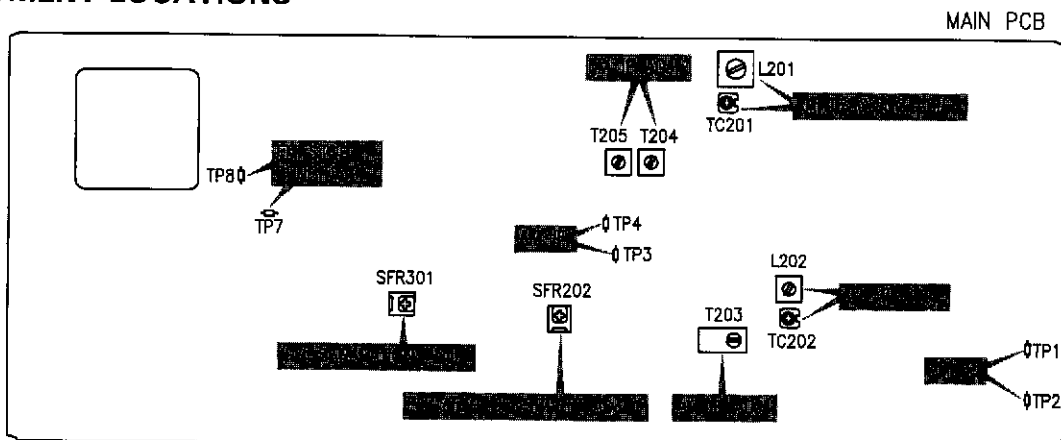
IF	• Connect the AM Test Loop Antenna cable into the output jack of AM Signal Generator (600kHz, 30% Mod.)	* 600kHz 603kHz	* 600kHz 603kHz	T203	Maximum output level and symmetrical curve on scope.
VT	• Connect DC Meter to TP1 and TP2 (GND)	* 530kHz 522kHz	* 530kHz 522kHz	L202	VT = 1-1.1V
		* 1720kHz 1611kHz	* 1720kHz 1611kHz	TC202	VT = 7.7-8V
Tracking	• Place AM Test Loop Antenna close enough to couple signal into the AM Loop Antenna.  • Connect the VTVM and oscilloscope to the OUTPUT jacks.	* 1400kHz 1404kHz	* 1400kHz 1404kHz	L201	Maximum output
		* 600kHz 603kHz	* 600kHz 603kHz	TC201	Maximum output
Repeat step 3 for optimum sensitivity.					

### ■ FM ADJUSTMENT

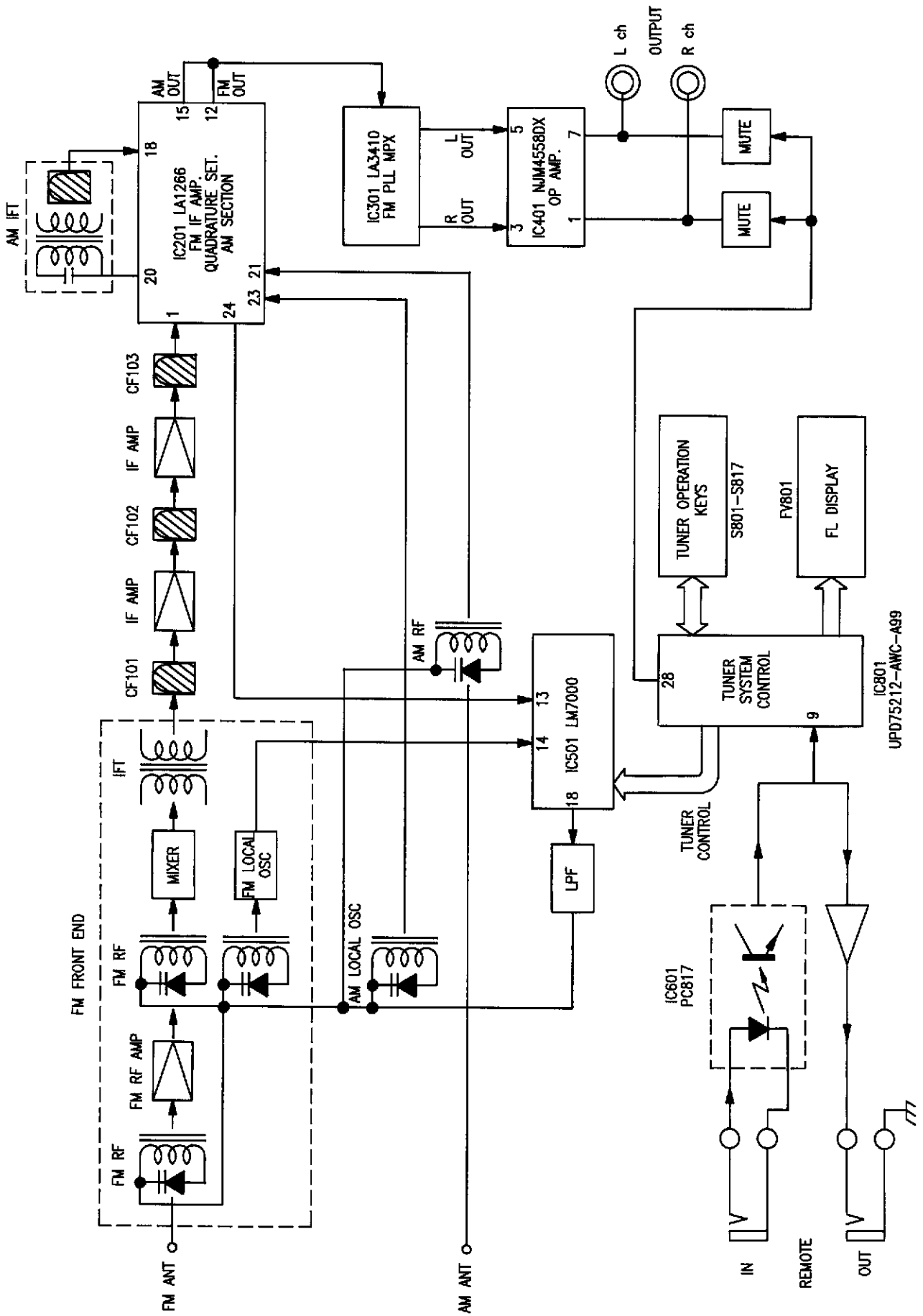
- Conditions:
- Set the FM mode by pressing the "FM" button.
  - During separation adjustment, pressing "Auto" button.

IF	• FM Signal Generator set to 98MHz, 40kHz DEV. 60dB input from Antenna Terminal. • DC Meter connect to TP3 and TP4. • VTVM and Distortion Meter connect to Output Jacks.	98MHz	98MHz	T204	0V ± 50mV
				T205	Distortion to minimum (<0.25%)
Separation	• FM Signal Generator set to 67.5kHz, 7.5kHz DEV. (100% MOD.) input from Antenna Terminal. • VTVM connect to output jacks.	98MHz	98MHz	SFR301	Separation to optimum (>30dB)
Stop Sensitivity	• FM Signal Generator set to 22.5kHz, DEV. 26dB Input from Antenna Terminal. • DC Meter connect to TP7 and TP8 (GND).	98MHz	98MHz	SFR202	6V

## ADJUSTMENT LOCATIONS



BLOCK DIAGRAM



## CIRCUIT DESCRIPTION

### ■ FM TUNER SECTION

The FM signal which has entered through the ant is high-frequency amplified in the front end unit FE101, mixed with the output of the local oscillator and converted into the 10.7MHz intermediate-frequency. The 10.7MHz signal is amplified in the intermediate-frequency amplifying section which consists of CF101, Q203, CF102, Q204 and CF103 and fed to pin 1 of IC201. In IC201, the signal is transmitted through the IF amp in two steps, and after being detected in the quadrature, it is transmitted through the post amplifier to pin 12 and then input to pin 2 of IC301. In IC301, the pilot signal is detected out of the signal which has been fed and 38kHz signal is produced.

The stereo signal is demodulated, out-put from pin 4 for the left channel and pin 7 for the right channel and then fed to the amplifier section.

### ■ AM TUNER SECTION

The AM signal which has entered through the antenna is transmitted through the tuning circuit consisting of L201 and TC201 to IC201. In IC201 it undergoes high-frequency amplification, intermediate-frequency amp-lification local oscillation, intermediate-frequency amp-lification and detection, and then output from pin 15. This signal is turned ON and OFF at Q505 and Q506 according to the signal from the input selector and fed to pin 2 of IC301.

### ■ MUTING CIRCUIT

If FM is received out of tuning or in a very weak field intensity, pin 38 of IC801 becomes high level. This is fed to the base of Q404, whose collector then becomes low level and the collector of Q403 high level. As a result, Q401 (L ch) and Q402 (R ch) are conducted to mute the output.

### ■ SYNTHESIZER SECTION

#### • FM

The local oscillation output at the front end is fed to pin 14 of IC501. Control output signal if fed from IC801, compared with the divided local oscillation output and output to pin 18. This voltage is level converted at Q501 and Q502, and fed to the front end.

#### • AM

The local oscillation output is fed from pin 24 of IC201 to pin 13 of IC501. In IC501 Control output signal is fed from IC801, compared with the local oscillation output and output to pin 18. This voltage is level converted at Q501 and Q502 and fed to the AM local oscillation section.

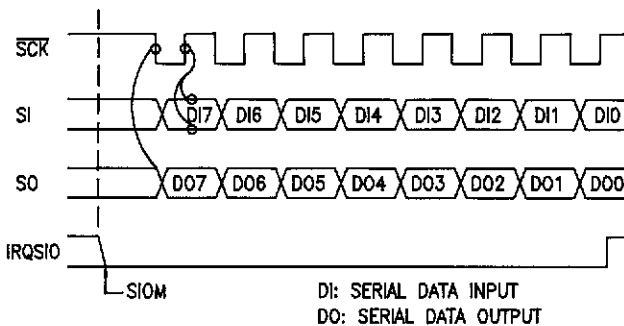
### ■ INDICATOR SECTION

#### • Frequency Display

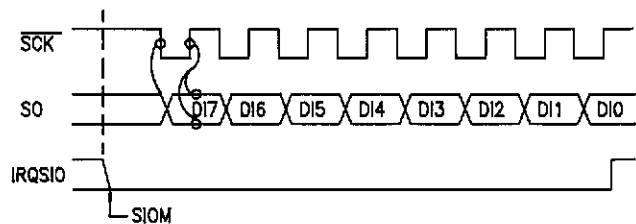
Output pins 40 to 47 and 51 to 63 of Display driver IC801 control Matrix display FV801.

## TIMING CHART

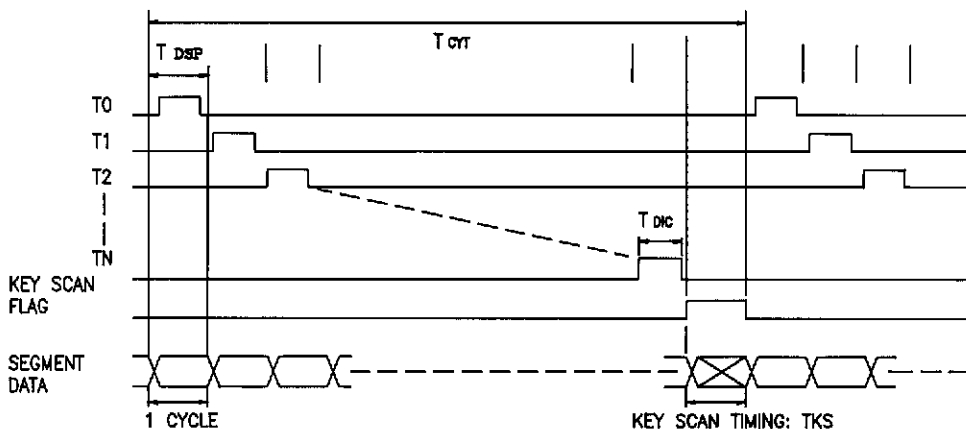
### SERIAL INPUT/OUTPUT TIMING CHART



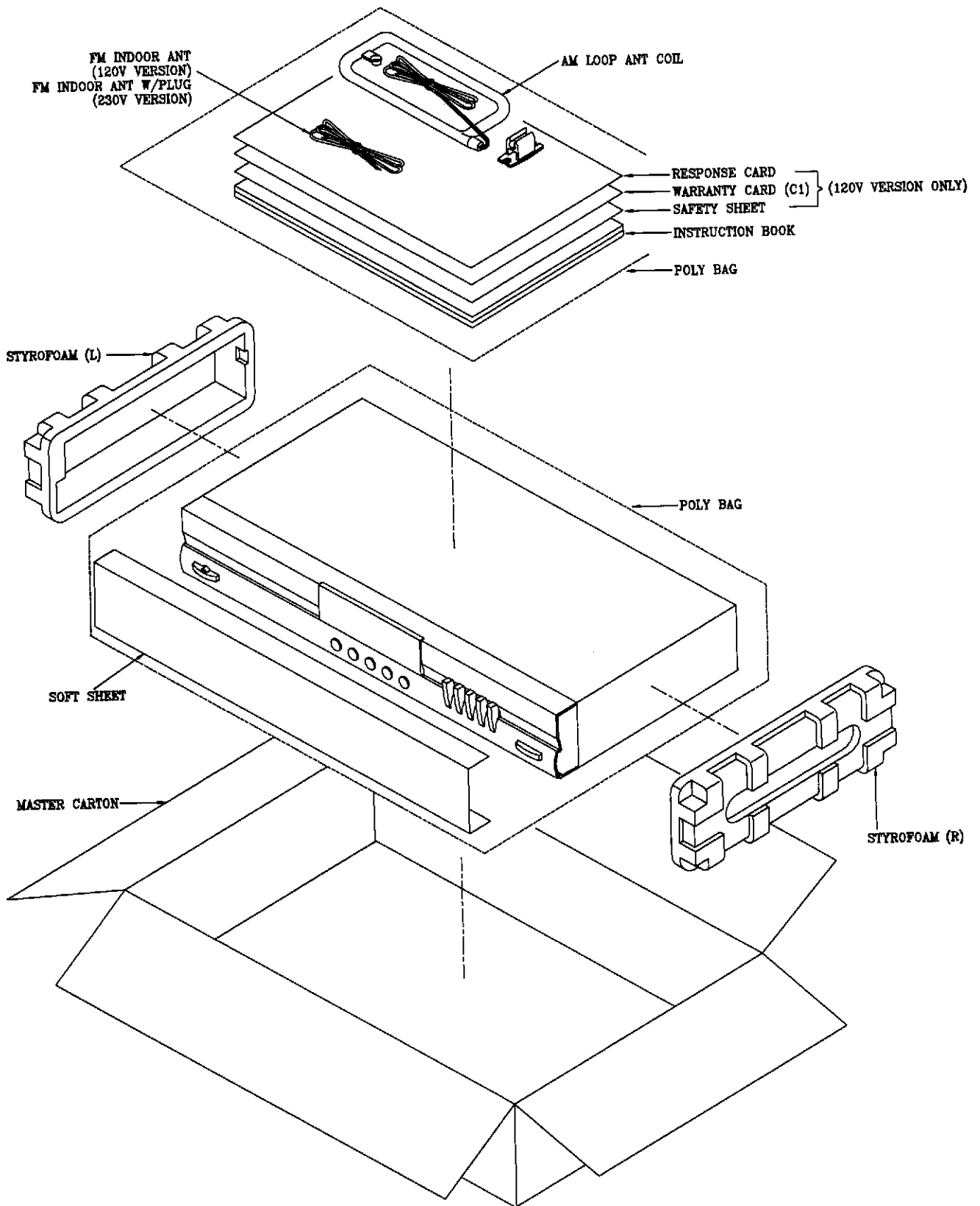
### SERIAL/BUS MODE TIMING CHART



### SERIAL INPUT/OUTPUT TIMING CHART



PACKAGE



## MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
M1	8942300800	SCREW, 9-BID3008 ZN3K (× 9)	M22	200307910T	CHASSIS, BOTTOM
M2	200107910T	CHASSIS, FRONT	M23	8641400600	SCREW, 6-BID4006 ZN3A (× 2)
M3	100407910T	WINDOW, FRONT	M24	2090079993	SUPPORTER, SPACER (× 6)
M4	100707910T	KNOB, PREST (× 5)	M25	C143239711	PCB ASSEMBLY, MAIN (120 Volts version)
M5	200207910T	HOLDER, KNOB	M25	C143239710	PCB ASSEMBLY, MAIN (230 Volts version)
M6	100807910T	KNOB, TUNING	M26	2005079551	WASHER, EARTH (× 3) (120 Volts version)
M7	8942300600	SCREW, 9-BID3006 ZN3K (× 15)	M26	2005079551	WASHER, EARTH (× 2) (230 Volts version)
M8	100307910T	PLATE, SIDE (R)	M27	8941301400	SCREW, 9-BID3014 ZN3A (× 6)
M9	100107910T	PANEL, FRONT	M28	200507910T	COVER, SHIELD (120 Volts version)
M10	100207910T	PLATE, SIDE (L)	M28	201206145A	COVER, SHIELD (230 Volts version)
M11	100507910T	KNOB, POWER	M29	101107910T	PANEL, REAR (120 Volts version)
M12	100907910T	LENS, POWER LED	M29	101307910T	PANEL, REAR (230 Volts version)
M13	C143239730	PCB ASSEMBLY, POWER	M30	8742300800	SCREW, 7-BID3008 ZN3A (× 2)
M14	8741301000	SCREW, 7-BID3010 ZN3A	M31	201006145A	SINK, HEAT
M15	100607910T	KNOB, MEMORY	M32	8741300600	SCREW, 9-BID3006 ZN3A
M16	200606145A	HOLDER, FL			
M17	C143239721	PCB ASSEMBLY, FRONT (120 Volts version)			
M17	C143239720	PCB ASSEMBLY, FRONT (230 Volts version)			
M18	8741300800	SCREW, 7-BID3008 ZN3A (× 9)			
M19	101007910T	COVER, TOP			
M20	JS27593800	SHEET, FOOT (× 4)			
M21	JS85047300	FOOT, 55 (B) (× 4)			

## PARTS DESCRIPTION

405 **A** **B** **C** **D** **E** **F** **G**

405 : CARBON RESISTOR

**A** : POWER RATING (**01** = 1/6W)**C** **D** **E** : RATED RESISTANCE (UNIT : ohm)(**683** = 68K ohm)**F** : TOLERANCE (**5** = 5%)**G** : FORMING TYPE (**2** = HORIZONTAL)515 **A** **B** **C** **D** **E** **F** **G**

515 : ELECTROLYTIC CAPACITOR

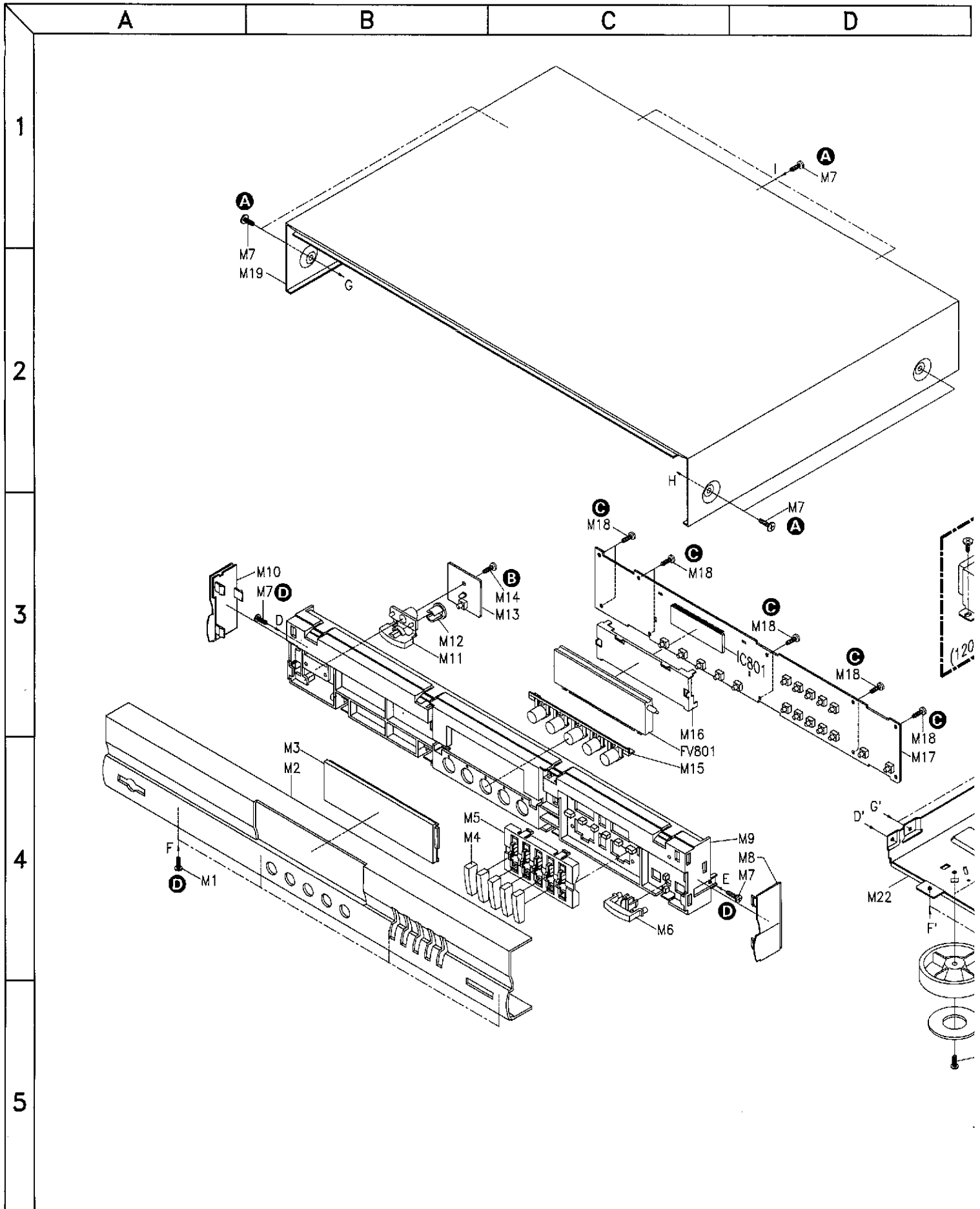
**A** : FORMING TYPE (**4** = SHORT CUT FORMING (S))**B** **C** **D** : CAPACITANCE (UNIT : uF)(**1010** = 10uF)**E** : RATED TOLERANCE (**2** = ±20%)**F** **G** : RATED VOLTAGE (**10** = 10V)510 **A** **B** **C** **D** **E** **F** **G**

510 : CERAMIC CAPACITORS

**A** : TEMPERATURE CHARACTERISTICS(**1** = 560pF-0.0022uF)**B** **C** **D** : RATED CAPACITANCE(**681** = 680pF)**E** : TOLERANCE (**1** = ±10%)**F** : RATED VOLTAGE (**5** = 50V DC)**G** : FORMING TYPE (**2** = TAPING)



# MECHANICAL EXPLODED VIEW

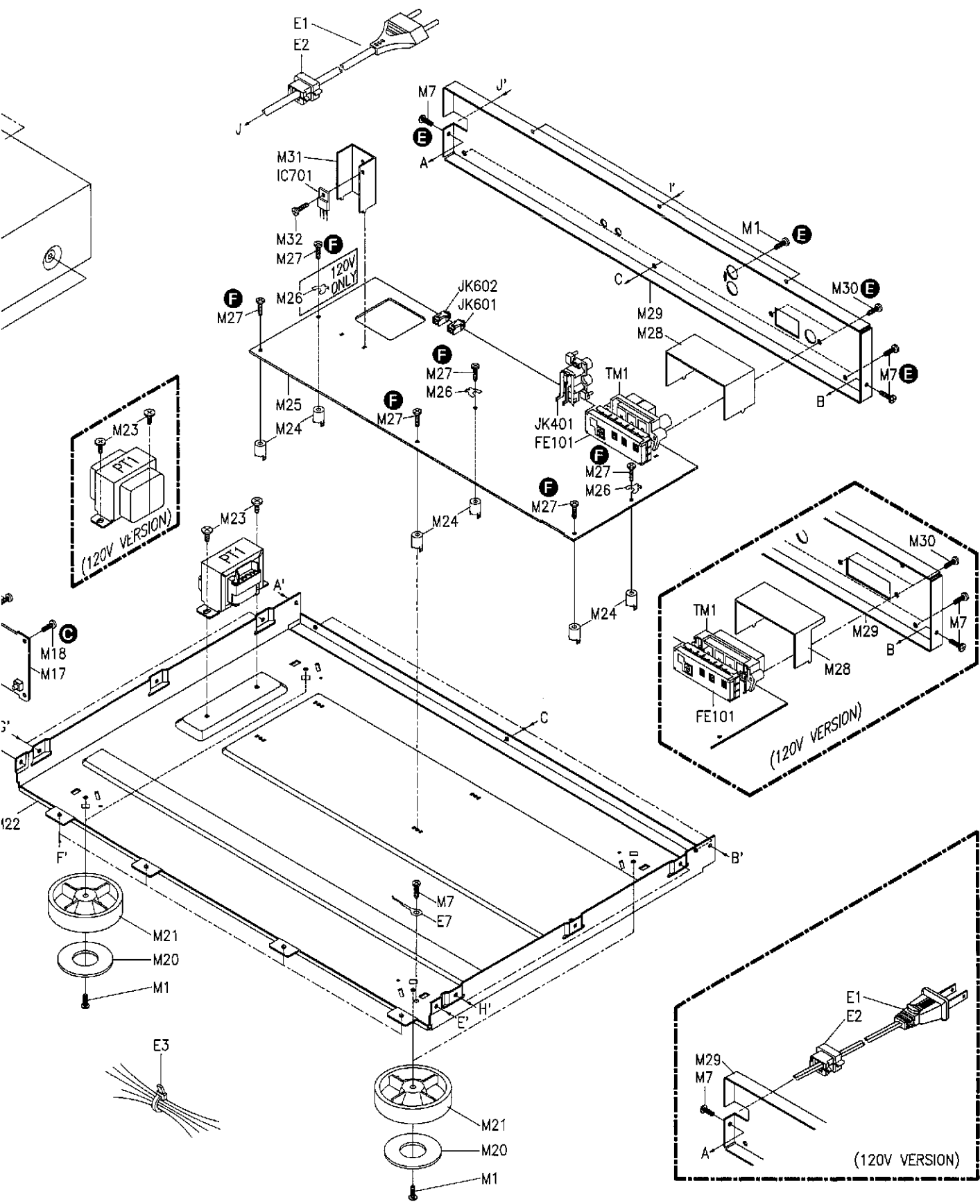


E

F

G

H



## ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS</b>					
C101	5153470216	ELE 47u/16V	C414	7306533115	MUL 33p/50V
C103	7308622345	MUL .022u/25V	C415	7306947055	MUL 47p/50V
C104	5104103452	CER .01u	C416	7306947055	MUL 47p/50V
C201	7308622345	MUL .022u/25V	C417	5104103452	CER .01u
C203	7308622345	MUL .022u/25V	C501	7308622345	MUL .022u/25V
C204	7308622345	MUL .022u/25V	C502	5153101216	ELE 100u/16V
C205	7308622345	MUL .022u/25V	C503	7308622345	MUL .022u/25V
C206	5091471513	PPP 470p	C504	7307110315	MUL .01u/16V
C207	5121270552	CER CH 27p	C505	5153109250	ELE 1u/50V
C208	7308622345	MUL .022u/25V	C507	5121300552	CER CH 30p
C209	5153100225	ELE 10u/25V	C508	5121300552	CER CH 30p
C210	7308622345	MUL .022u/25V	C509	5153470216	ELE 47u/16v
C211	7308622345	MUL .022u/25V	C510	7308622345	MUL .022u/25V
C212	7308622345	MUL .022u/25V	C512	7306510215	MUL .001u/50V
C213	7308622345	MUL .022u/25V	C520	7308622345	MUL .022u/25V
C214	7308622345	MUL .022u/25V	C702	5153229250	ELE 2.2u/50V
C215	7308622345	MUL .022u/25V	C703	7308622345	MUL .022u/25V
C216	7308622345	MUL .022u/25V	C704	5153221216	ELE 220u/16V
C217	7308622345	MUL .022u/25V	C705	5153470216	ELE 47u/16V
C218	7308622345	MUL .022u/25V	C706	7308622345	MUL .022u/25V
C219	5153100225	ELE 10u/25V	C708	7308622345	MUL .022u/25V
C220	5153109250	ELE 1u/50V	C709	5153470216	ELE 47u/16V
C221	5105473132	SEM .047u	C710	5153470216	ELE 47u/16V
C222	7306647345	MUL .047u/50V	C711	5154221235	ELE 220u/35V
C223	5153109250	ELE 1u/50V	C712	5154221235	ELE 220u/35V
C224	7308622345	MUL .022u/25V	C713	5154222225	ELE 2200u/25V
C226	7308622345	MUL .022u/25V	C714	7306610445	MUL .1u/50V
C230	5153109250	ELE 1u/50V	C715	7306610445	MUL .1u/50V
C231	7306510215	MUL .001u/50V	C717	7306647345	MUL .047u/50V
C232	7306510215	MUL .001u/50V	C718	7306647345	MUL .047u/50V
C233	7306510115	MUL 100p/50V	C719	7306647345	MUL .047u/50V
C234	5153100225	ELE 10u/25V (120V version)	C720	7306647345	MUL .047u/50V
C235	5153100225	ELE 10u/25V (230V version)	C721	7308622345	MUL .022u/25V
C236	5153100225	ELE 10u/25V (230V version)	C722	7308622345	MUL .022u/25V
C237	7308622345	MUL .022u/25V	C723	7306647345	MUL .047u/50V
C238	5153479250	ELE 4.7u/50V	C724	7306610445	MUL .1u/50V
C239	5153479250	ELE 4.7u/50V	C725	5154221250	ELE 220u/50V
C240	5153109250	ELE 1u/50V	C726	7306610445	MUL .1u/50V
C241	5153478250	ELE .47u/50V	C727	5154101250	ELE 100u/50V
C242	5105472132	SEM .0047u	C728	7308622345	MUL .022u/25V
C243	5153228250	ELE .22u/50V	<b>RESISTORS</b>		
C301	5153470216	ELE 47u/16V	TP1	4050400006	CBN 1/4W 0
C302	7308622345	MUL .022u/25V	TP2	4050400006	CBN 1/4W 0
C303	7308622345	MUL .022u/25V	TP3	4050400006	CBN 1/4W 0
C304	5153100225	ELE 10u/25V	TP4	4050400006	CBN 1/4W 0
C305	7306522115	MUL 220p/50V	TP5	4050400006	CBN 1/4W 0
C306	5116122550	MYL .0012u (120V version)	TP6	4050400006	CBN 1/4W 0
C306	7306582115	MUL 820p/50V (230V version)	TP7	4050400006	CBN 1/4W 0
C307	5116122550	MYL .0012u (120V version)	TP8	4050400006	CBN 1/4W 0
C307	7306582115	MUL 820p/50V (230V version)	R001	4050215554	CBN 1/2W 1.5M (120V version)
C308	5153100225	ELE 10u/25V	R002	4050215554	CBN 1/2W 1.5M (120V version)
C309	5153100225	ELE 10u/25V	R201	4050410255	CBN 1/4W 1K
C312	5153229250	ELE 2.2u/50V	R202	4050110455	CBN 1/6W 100K
C313	7306510115	MUL 100p/50V	R203	4050110455	CBN 1/6W 100K
C314	5153100225	ELE 10u/25V	R204	4050110255	CBN 1/6W 1K
C315	5153478250	ELE .47u/50V	R205	4050122155	CBN 1/6W 220
C316	5153228250	ELE .22u/50V	R206	4050433155	CBN 1/4W 330
C317	5116473550	MYL .047u	R207	4050122255	CBN 1/6W 2.2K
C401	5153470216	ELE 47u/16V	R208	4050168355	CBN 1/6W 68K
C402	5153229250	ELE 2.2u/50V	R209	4050410255	CBN 1/4W 1K
C403	5153229250	ELE 2.2u/50V	R210	4050110255	CBN 1/6W 1K
C404	5153470216	ELE 47u/16V	R211	4050468255	CBN 1/4W 6.8K
C405	5153470216	ELE 47u/16V	R214	4050139155	CBN 1/6W 390
C406	5153100225	ELE 10u/25V	R215	4050127455	CBN 1/6W 270K
C407	7306533115	MUL 330p/50V	R217	4050133155	CBN 1/6W 330
C408	7306533115	MUL 330p/50V	R218	4050110255	CBN 1/6W 1K
C409	7306510115	MUL 100p/50V	R230	4050156055	CBN 1/6W 56
C410	7306510115	MUL 100p/50V	R231	4050127455	CBN 1/6W 270K
C411	5153229250	ELE 2.2u/50V	R232	4050133155	CBN 1/6W 330
C412	5153229250	ELE 2.2u/50V	R233	4050110255	CBN 1/6W 1K
C413	7306533115	MUL 330p/50V	R234	4050133055	CBN 1/6W 33
			R235	4050110355	CBN 1/6W 10K
			R236	4050110355	CBN 1/6W 10K
			R238	4050410255	CBN 1/4W 1K



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
D713 $\Delta$	4138104002	1N4002L	C810	5150100225	MINI ELE 10u/25V
D714 $\Delta$	4138104002	1N4002L	C811	7308622345	MUL .022u/25V
	COILS		C813	511C684550	MSC .68u
L102	4325022093	COIL, PEAKING 22uH	C814	2000001154	BACK UP ELE .1F/5.5V or
L103	4325022093	COIL, PEAKING 22uH		2000001014	GOLD .1F/5.5V
L104	4300400720	COIL, FM ANT (120V version)	C815	7307110315	MUL .01u/16V
L201	4300102770	COIL, AM ANT TWS-358-638		RESISTORS	
L202	4330101570	COIL, AM OSC TWS-358-644	R801	4050139155	CBN 1/6W 390
L203	4325027993	COIL, PEAKING 2.7uH	R802	4050410055	CBN 1/4W 10
L301	4325027993	COIL, PEAKING 2.7uH	R803	4050427155	CBN 1/4W 270
L701	4325022192	COIL, PEAKING 220uH	R804	4050110455	CBN 1/6W 100K
	TRANSFORMERS		R805	4050110455	CBN 1/6W 100K
T204	4340201300	FM DET (A) TWS-358-636	R808	4050122355	CBN 1/6W 22K
T205	4340201310	FM DET (B) TWS-358-637	R809	4050110255	CBN 1/6W 1K
	CONTROLS		R810	4050147355	CBN 1/6W 47K
SFR202	5226104T56	RES, SEMI FIX 100KX VZ068TLT or	R811	4050147355	CBN 1/6W 47K
	5226104177	RES, SEMI FIX 100KX	R812	4050133055	CBN 1/6W 33
SFR301	5226204T56	RES, SEMI FIX 200KX VZ068TLT (120V version)	R813	4050110155	CBN 1/6W 100
	5226104T56	RES, SEMI FIX 100KX VZ068TLT or (230V version)	R814	4050447355	CBN 1/4W 47K
TC201	5010300045	RES, SEMI FIX 100KX (230V version)	R819	4050110455	CBN 1/6W 100K
	5010300055	TERMINAL 30P VCT51C537A or	R820	4050147355	CBN 1/6W 47K
TC202	5010300045	TERMINAL 30P		INTEGRATED CIRCUITS	
	5010300055	TERMINAL 30P VCT51C537A or	IC801	UPD75212ACW-199 IC, FLDRIVER & PL CONTROL	
		TERMINAL 30P	IC802	PST600D IC, RESET	
	MISCELLANEOUS			TRANSISTORS	
CF101	4160200194	FILTER, CERAMIC (RED) SFE10.7MS3GH-A	Q801	DTC144ES	SWITCHING
CF102	4160200194	FILTER, CERAMIC (RED) SFE10.7MSGH-A	Q802	DTC144ES	SWITCHING
CF103	4160200003	FILTER, CERAMIC (RED) SFE10.7MA5	X801	4100941940	X'TAL 4.194304M AT-49
CF301	4160500161	RESONATOR CSB456F11		DIODES	
T203	4160500199	FILTER, CERAMIC TWS-358-679	D801	4121901760	1SS176
T206	4160700077	FTZ L.P.F. 10FE01 (230V version)	D802	4121901760	1SS176
T301	416910T0C6	FILTER, MPX	D803	4121901760	1SS176
T302	416910T0C6	FILTER, MPX	D804	4121141480	1N4148
BPF101	4160700100	FILTER, BAND PASS SW-7G (230V version)	D805	4121901760	1SS176
		JACK, 2P RCA HSP-222V-1	D806	4121141480	1N4148
JK401	4500800284	JACK, REMOTE JY3530-01-010	D807	4121141480	1N4148
JK601	4500100393	JACK, REMOTE JY3530-01-010	D808	4121901760	1SS176
JK602	4500100393	JACK, REMOTE JY3530-01-010	D809	4121141480	1N4148 (230V version)
TM1	4560004086	TERMINAL, 4P ANTENNA (120V version)	D810	4121901760	1SS176
TM1	456002093	JACK, 2P ANTENNA HSP-312V1-02 (230V version)	D811	4121141480	1N4148
FE101	7161234086	FM FRONT END FE417-G02	D812	4121141480	1N4148
FS701 $\Delta$	5266125020	FUSE UL/CSA T1.25A/125V (120V version)	D813	4121901760	1SS176
		FUSE SEMKO T1.25AL/250V (230V version)	D815	4121901760	1SS176
FS701 $\Delta$	5267125160	TERMINAL PIN "L"	D816	4121901760	1SS176
TP9	2000000843	TERMINAL PIN "L"		MISCELLANEOUS	
TP10	2000000843	TERMINAL PIN "L"	S801	4400000160	SWITCHING, TACT SKHVBL3720-CP
E4	4490600261	HOLDER, WIRE 6P20 (x 3)	S802	4400000160	SWITCHING, TACT SKHVBL3720-CP
E5	4490401002	BASE, EH TOP 4P	S803	4400000160	SWITCHING, TACT SKHVBL3720-CP
E8	4692000034	HOLDER, FUSE PFC5000-0202T (x 2)	S804	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S805	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S806	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S807	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S808	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S809	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S810	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S811	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S812	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S813	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S814	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S815	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S816	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S817	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S818	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S819	4400000160	SWITCHING, TACT SKHVBL3720-CP
			S820	4400000160	SWITCHING, TACT SKHVBL3720-CP
			FV801	4110540184	DISPLAY, FLD FV569G
			E4	4490600261	HOLDER, WIRE 6P20 (x 3)
			E6	4490400261	HOLDER, WIRE 4P20
			E7	4590100105	TERMINAL ASSEMBLY, EARTH BLK-100
	CAPACITORS				
C801	7306610445	MUL .1u/50V			
C802	5150109250	MINI ELE 1u/50V			
C803	7306610445	MUL .1u/50V			
C804	5150470216	MINI ELE 4.7u/16V			
C805	7306610445	MUL .1u/50V			
C806	5121300552	CER CH 30p			
C807	5121300552	CER CH 30p			
C808	7306610445	MUL .1u/50V			
C809	7306610445	MUL .1u/50V			

Ref. No.	Part No.	Description
LED809	4120639104	LED 3Q SEL3910A (AMBER) or 41206264AT (AMBER)
S818	4400000160	SWITCH, TACT SKHVBL3720-CP
E6	4490400261	HOLDER, WIRE 4P20

CHASSIS MISCELLANEOUS

PT1	△	420C412204	TRANSFORMER, POWER UL/CSA EI-41 (120V version)
PT1	△	420C414205	TRANSFORMER, POWER IEC-65 EI-41 (230V version)
E1	△	463117L070	CORD, AC UL/CSA 7FT BLK (120V version)
E1	△	463221P070	CORD, AC VDE 7F BLK2 (230V version)
E2		4580000021	STOPPER, CORD 2271
E3		2000000144	BIND TYPE "A" (x4)

L101		4300103440	COIL, AM LOOP ANT
A1		900107910T	STYROFOAM (L)
A2		900207910T	STYROFOAM (R)
A3		900507910T	CARTON, MASTER (120V version)
A3		900307910T	CARTON, MASTER (230V version)
A4		900407910T	SHEET, SOFT
A5		9906005041	BAG, POLY (SET)
A6		9010007440	LABEL, SERIAL NO. (20x6)
A7		5401300025	ANTENNA, FM INDOOR (120V version)
A7		5402150036	ANTENNA, FM INDOOR W/PLUG (230V version)
A8		9080021300	BOOK, INSTRUCTION (E)

Ref. No.	Part No.	Description
A9	9030006630	CARD, WARRANTY (120V version)
A10	9902304041	BAG, POLY 23 x 40 (I/B)
A11	9030006650	CARD, RESPONSE (120V version)
A12	9100019240	UPC SERIAL NO. LABEL (120V version)
A12	9100019250	UPC SERIAL NO. LABEL (230V version)
A13	9012000070	DATA CODE LABEL 27 x 12 (120V version)
A14	9120003472	SHEET, SAFETY (120V version)
A15	9020001130	LABEL, CSA (CSA SUPPLY) (120V version)

CAPACITORS

ELE	: Electrolytic
MUL	: Multi-Layer Ceramic
CER	: Ceramic
PPP	: Polypropylene
SEM	: Semi-Conductor
MYL	: Mylar
CER CH	: Ceramic CH
MSC	: Multi-Layer Metallized Polyester Film
470u	: 470uF
470p	: 470pF
.047u	: 0.047uF

RESISTORS

CBN	: Carbon
2.2K	: 2.2K ohm
220	: 220 ohm

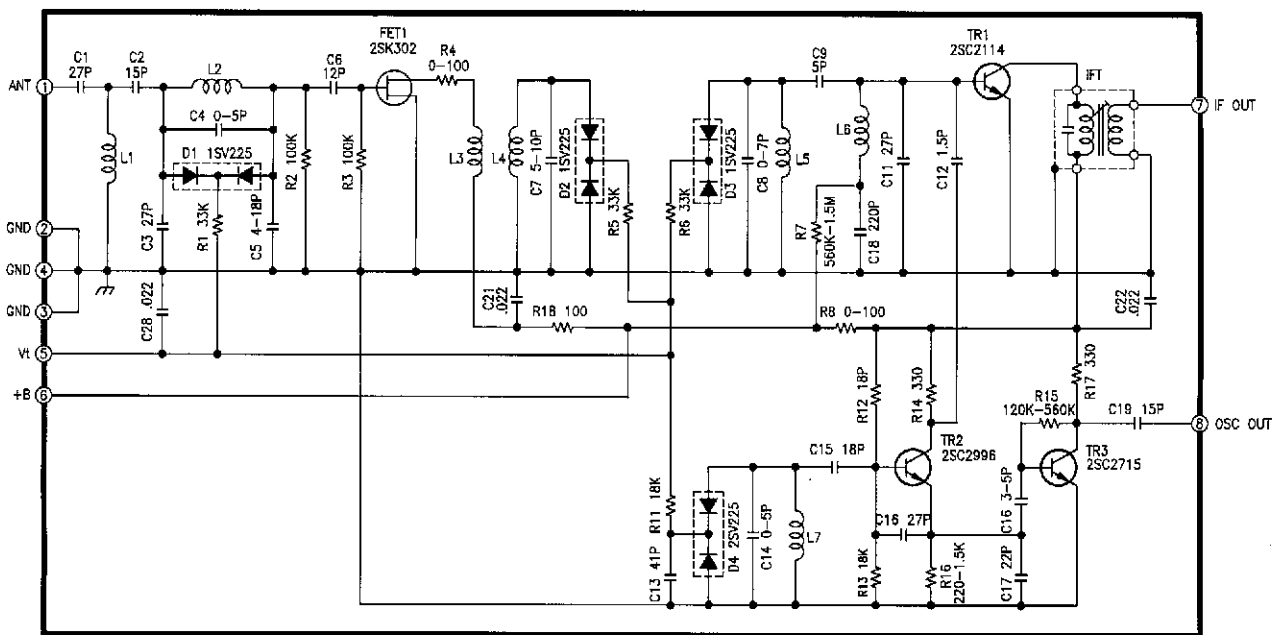
CONTROLS

RES, SEMI FIX : Semi-fixed Resistor

NOTE

△ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACEMENT PART AS SPECIFIED.

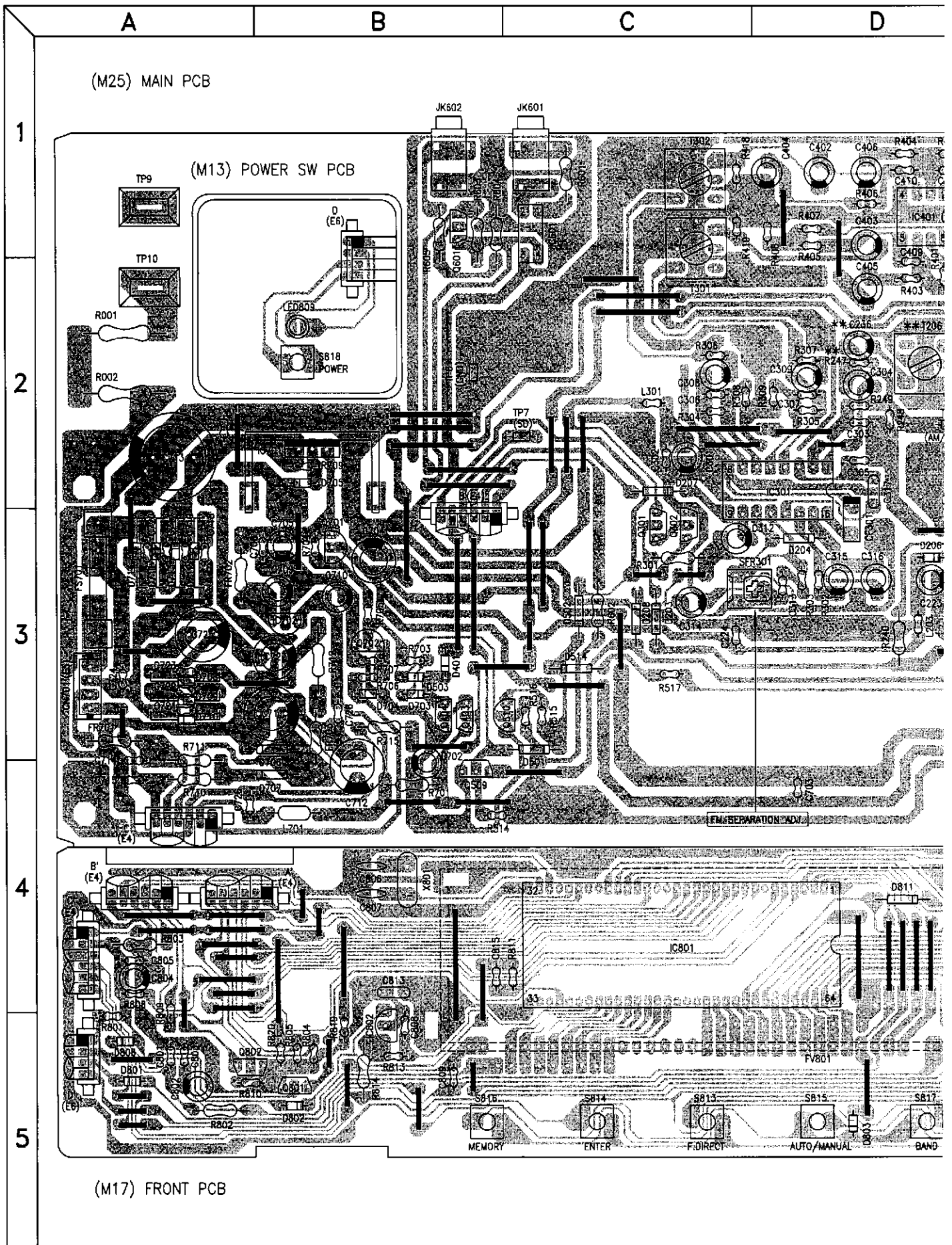
FM FRONT END SECTION



NOTES:

1. TERMINAL NUMBER REFER TO OVERALL APPEARANCE.
2. RECEIVING FREQUENCY. 87.5 - 108MHz
3. INPUT IMPEDANCE. 75 OHM
4. OUTPUT IMPEDANCE. 300 OHM
5. SUPPLY VOLTAGE. +B 12V
6. TUNING VOLTAGE. Vt 1.2MIN - 9.2MAX V.

P.C. BOARDS



E

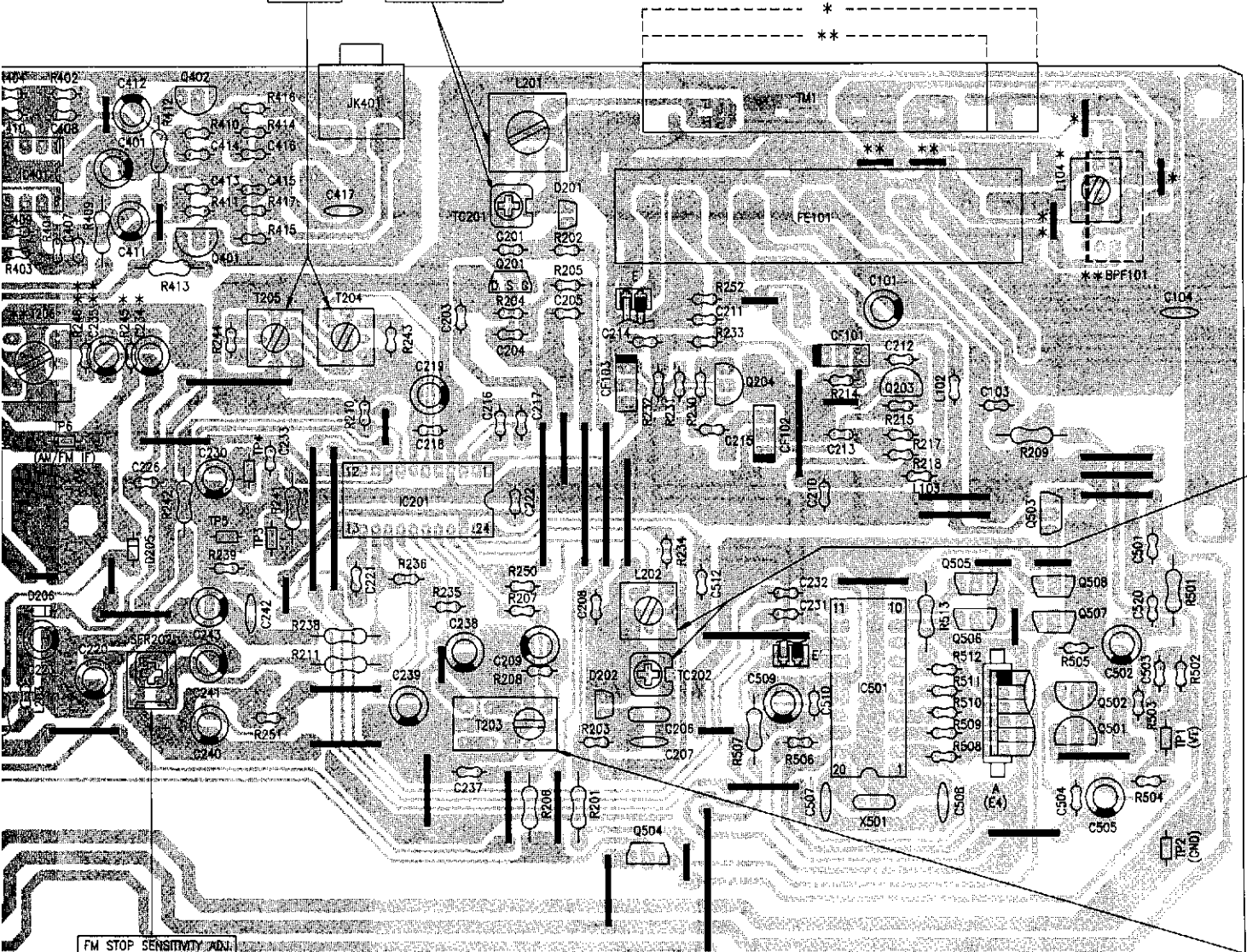
F

G

H

FM IF ADJ.

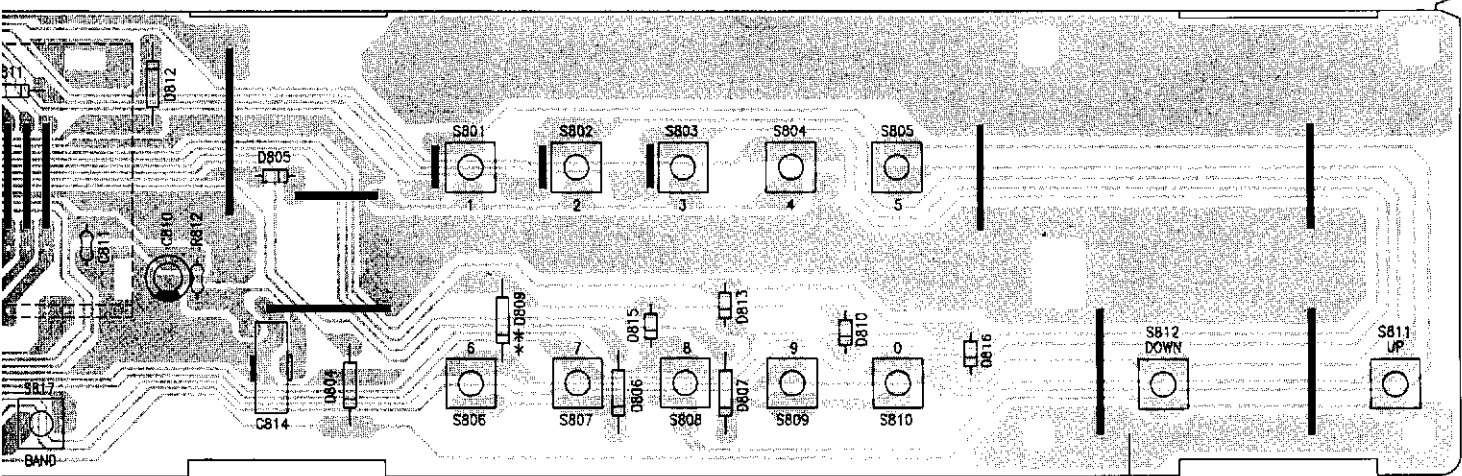
AM TRACKING ADJ.



AM VT ADJ.

FM STOP SENSITIVITY ADJ.

AM IF ADJ.



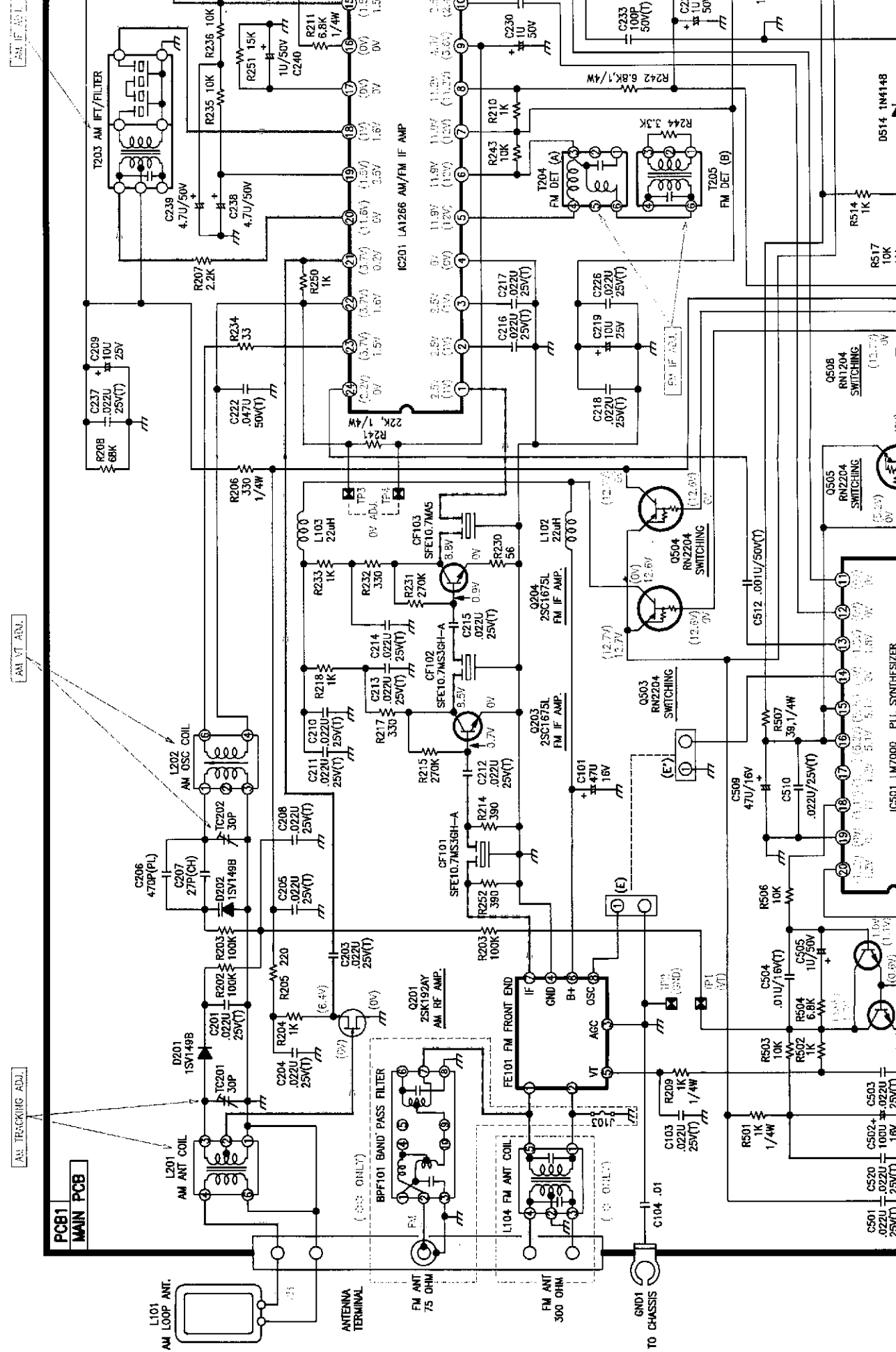
(E7) BLACK TO BOTTOM CHASSIS

\*\* : 230 Volts version  
\* : 120 Volts version



SCHEMATIC DIAGRAMS I

A B C D E F



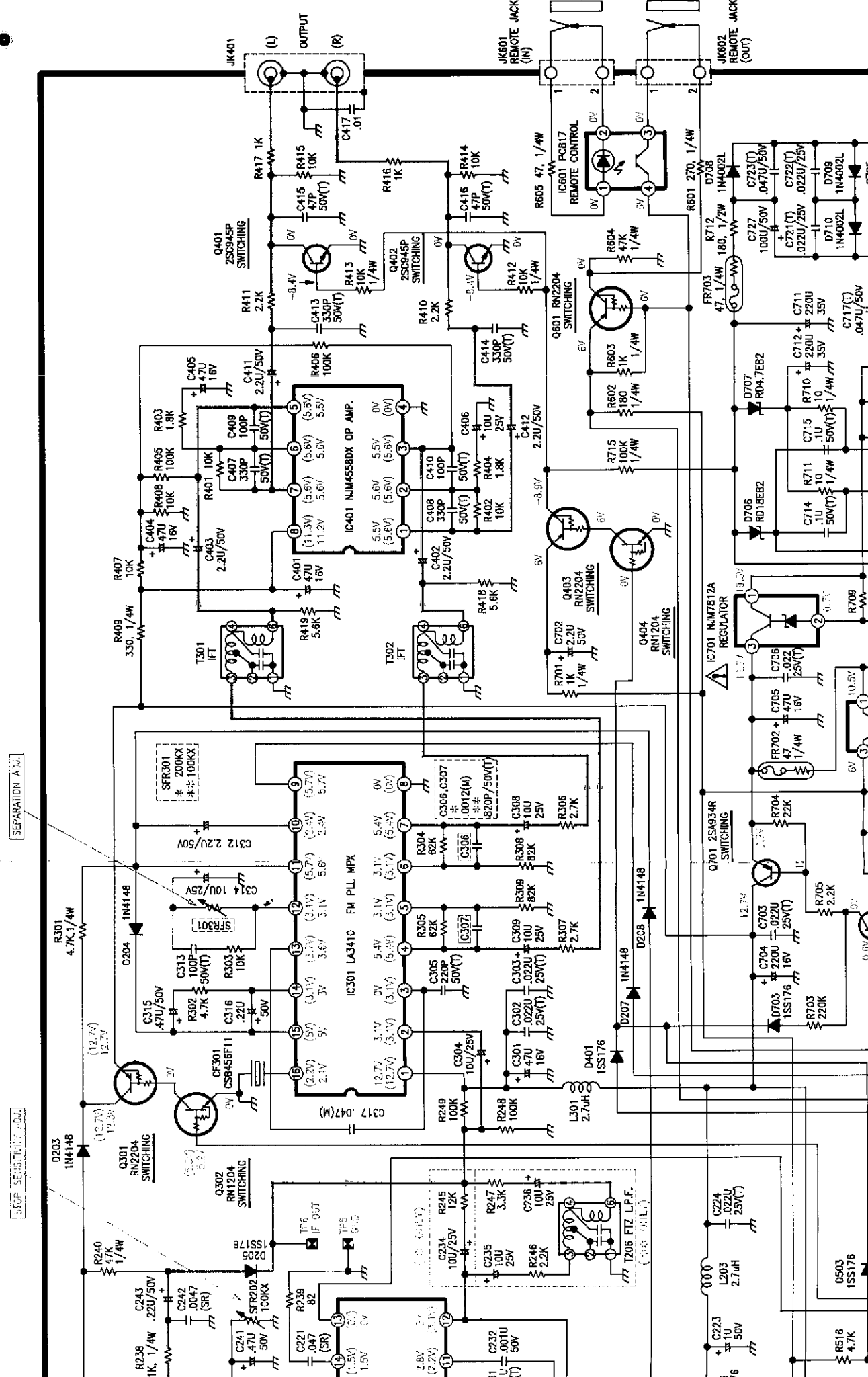
1

2

3

4

G H I J K



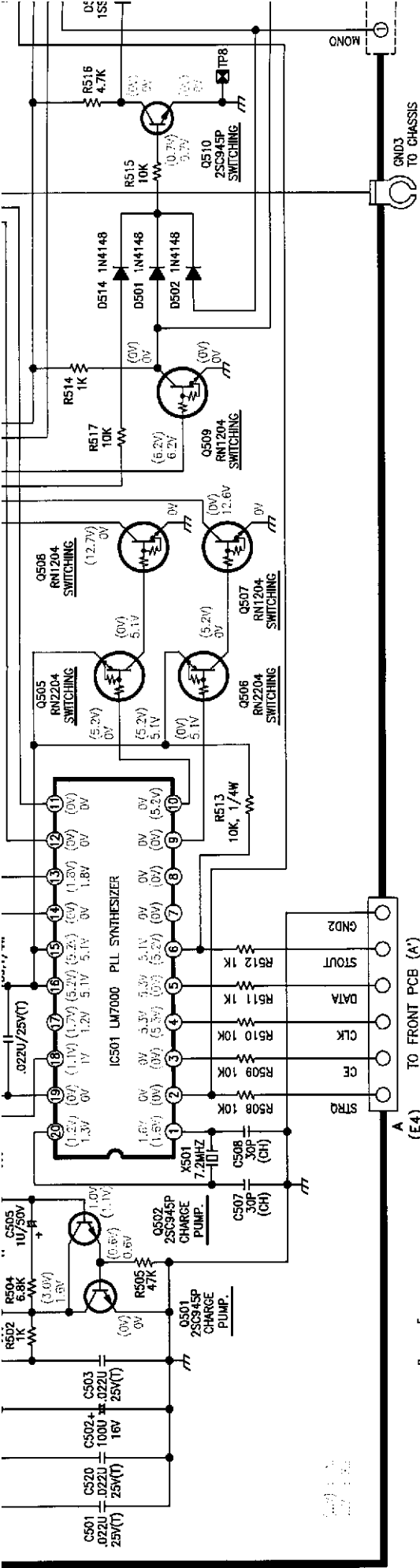
SEPARATION ADJ.

STOP SEPARATION ADJ.

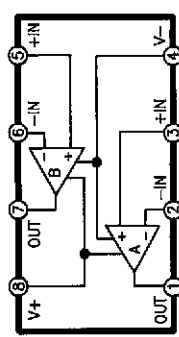
0.6V

10.5V

6V

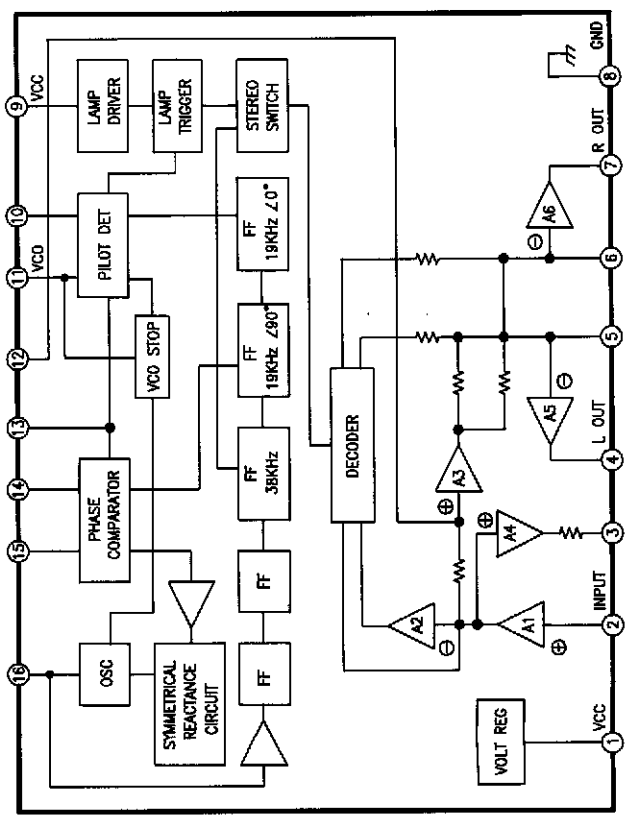


**IC401 NJM4558DX OP AMP.**

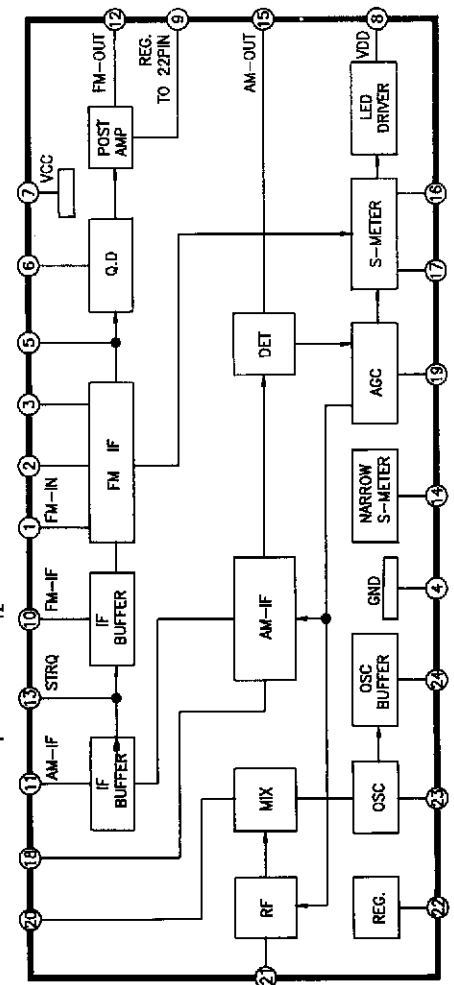


(E4) TO FRONT PCB (A')

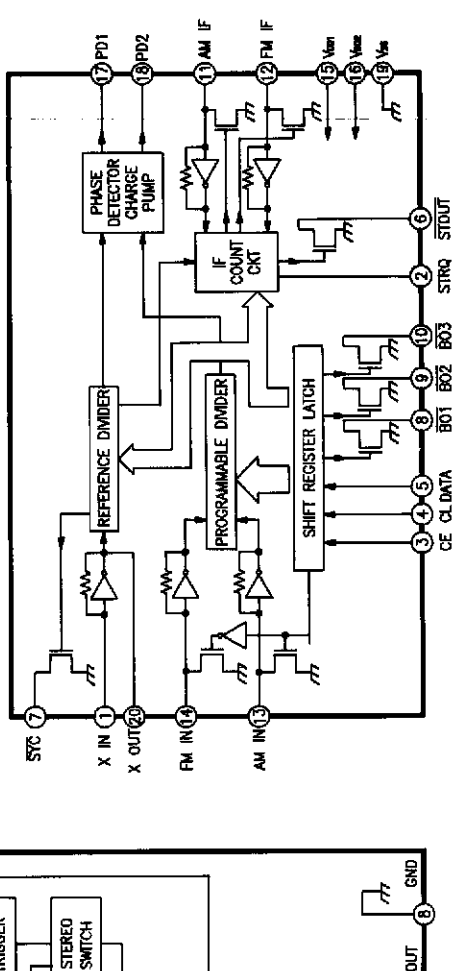
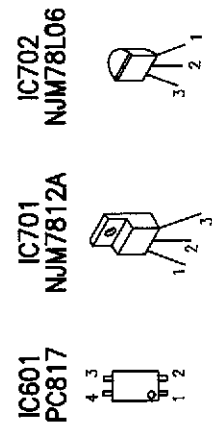
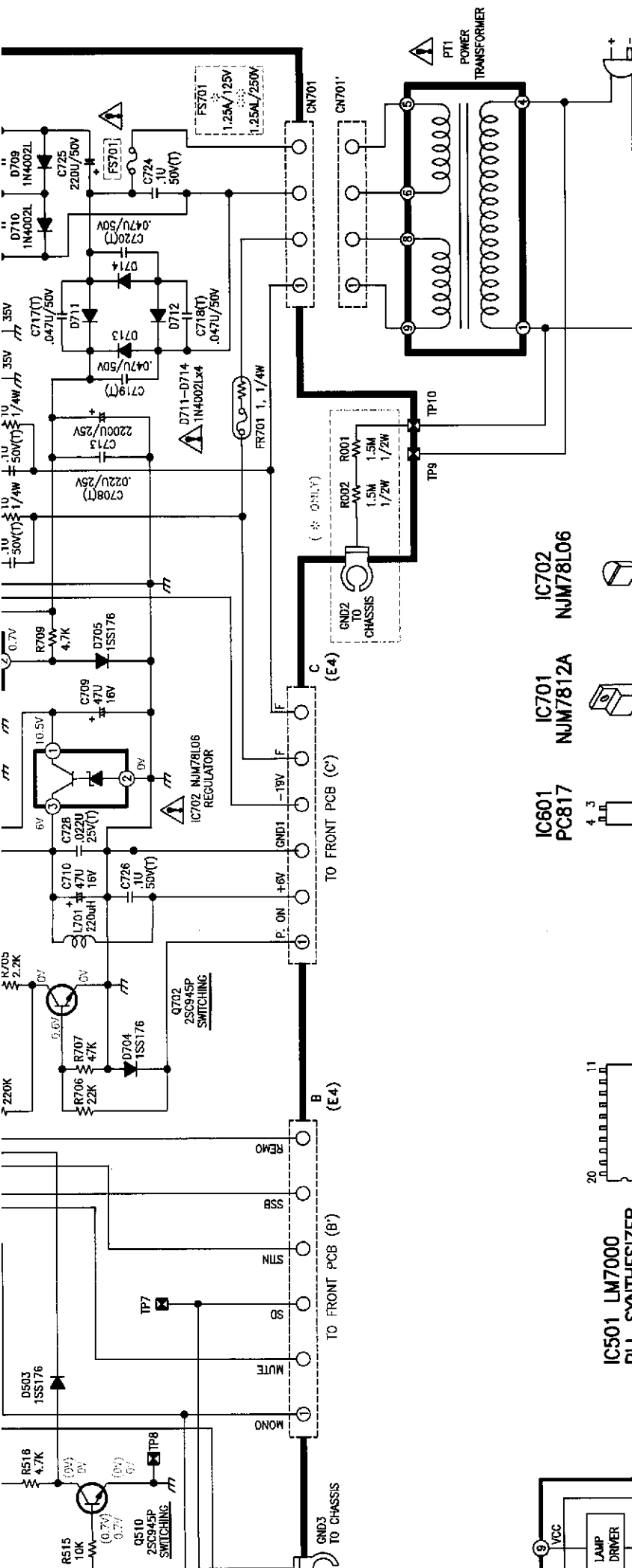
**IC301 LA3410 FM PLL MPX**



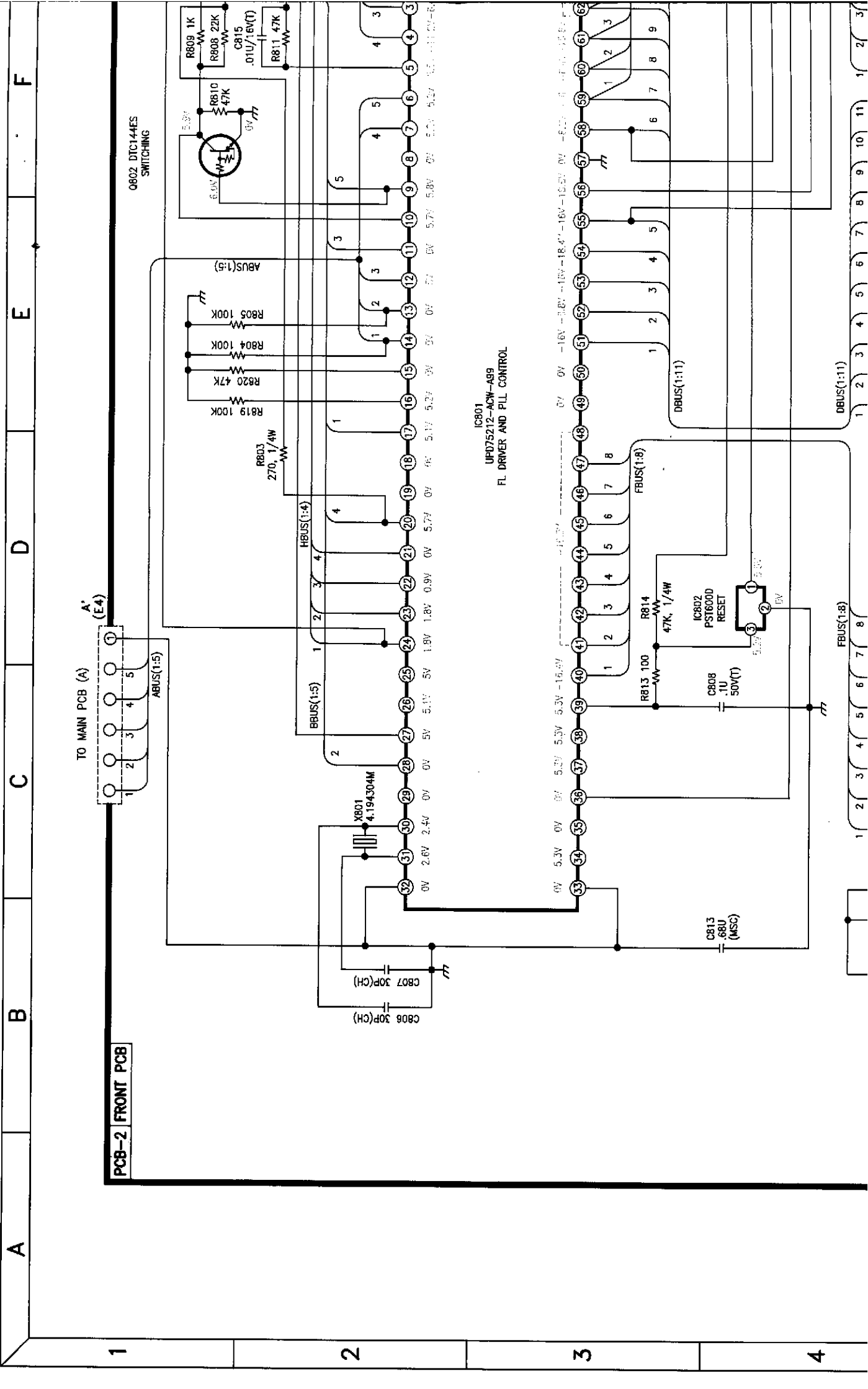
**IC201 LA1266 AM/FM IF AMP.**



57C  
X IN  
X OUT  
FM IN  
AM IN



SCHEMATIC DIAGRAMS II

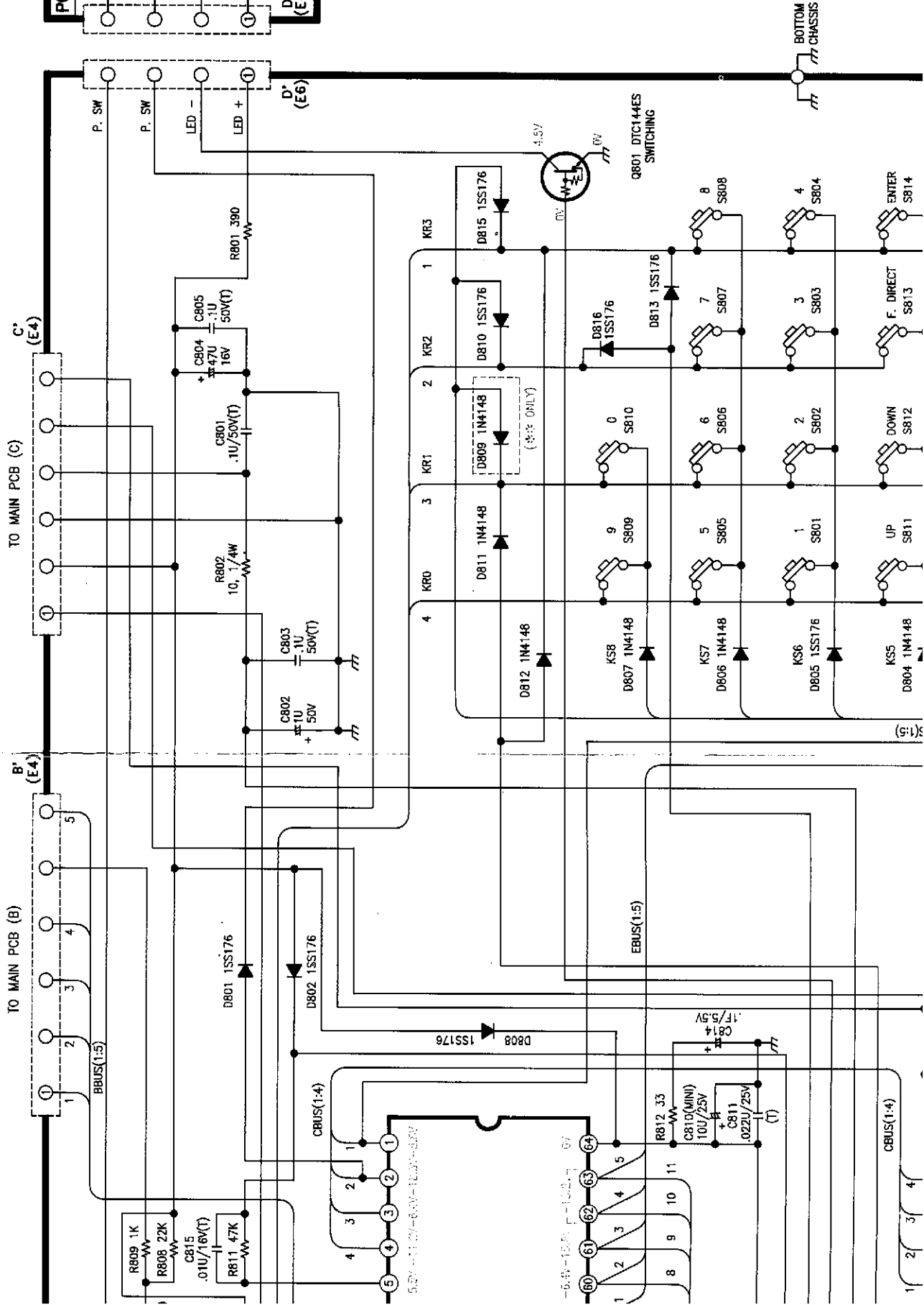
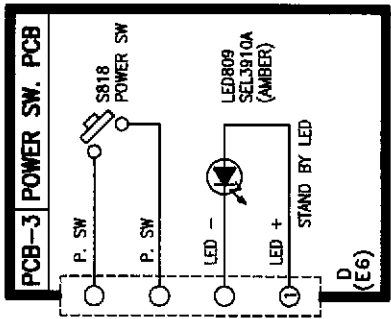


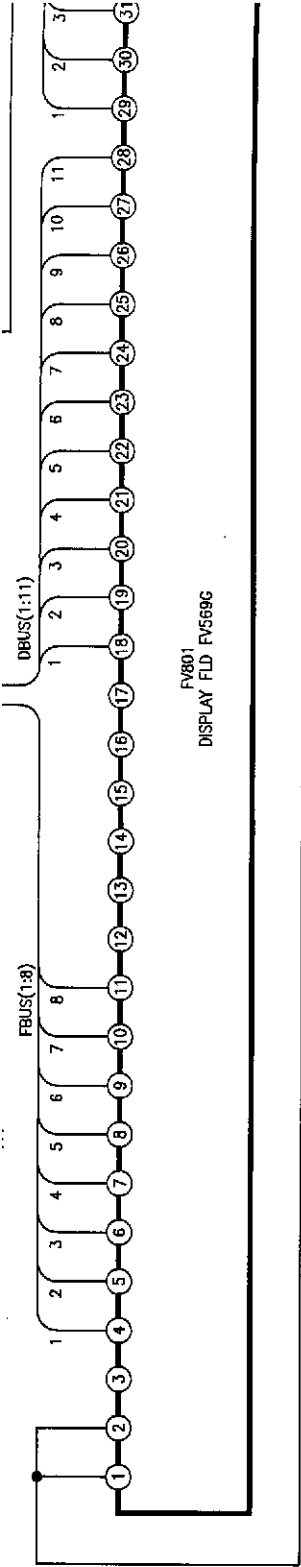
K

J

H

G

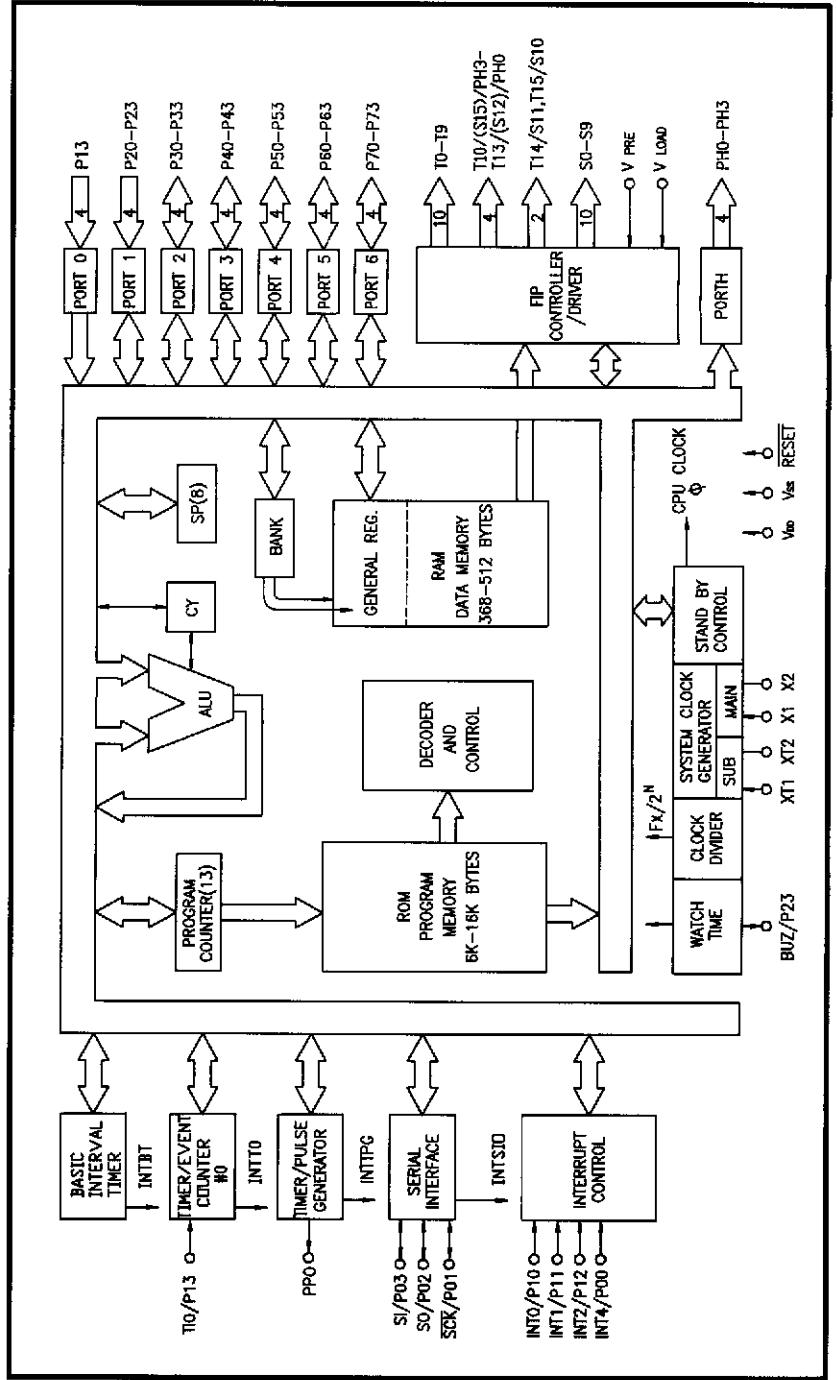




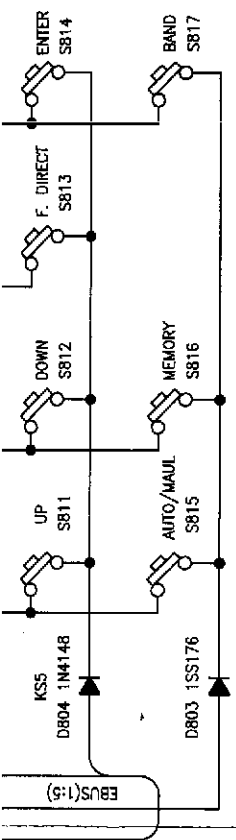
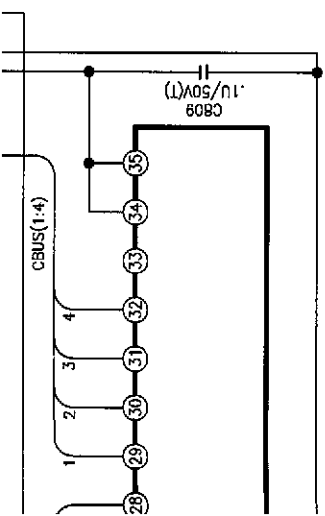
FV801  
DISPLAY FLD. FV569C

Functional Explanation of Synth  
IC801 UPD75212ACW-A99 Term

IC801 UPD75212ACW-A99  
FL DRIVER AND PLL CONTROL



PIN NO.	PIN NAME	DESCRIPTION
1	S3	SEGMENT OUTPUT
2	S2	SEGMENT OUTPUT
3	S1	SEGMENT OUTPUT
4	S0	SEGMENT OUTPUT
5	INT4/P00	SERIAL INTERFACE/
6	SCK/P01	SERIAL INTERFACE/
7	SO/P02	SERIAL INTERFACE/
8	SI/P03	SERIAL INTERFACE/
9	INT0/P10	SERIAL INTERFACE/
10	INT1/P11	SERIAL INTERFACE/
11	INT2/P12	SERIAL INTERFACE/
12	T10/P13	TIMER/EVENT COUN
13	P20	4 BIT I/O PORT (2)
14	P21	4 BIT I/O PORT (2)
15	P22	4 BIT I/O PORT (2)
16	BUZ/P23	REFERENCE FREQUE
17	P30	4 BIT I/O PORT (3)
18	P31	4 BIT I/O PORT (3)
19	P32	4 BIT I/O PORT (3)
20	P33	4 BIT I/O PORT (3)
21	P60	4 BIT I/O PORT (6)
22	P61	4 BIT I/O PORT (6)
23	P62	4 BIT I/O PORT (6)
24	P64	4 BIT I/O PORT (6)
25	P40	4 BIT I/O PORT (4)
26	P41	4 BIT I/O PORT (4)
27	P42	4 BIT I/O PORT (4)
28	P43	4 BIT I/O PORT (4)
29	PPO	TIMER/PAUSE GENE
30	X1	QUARTS OSCILLATOR
31	X2	QUARTS OSCILLATOR
32	VSS	GND

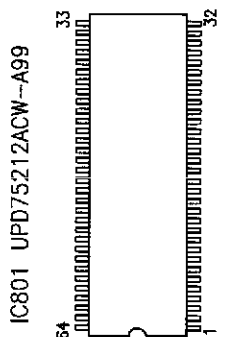


**tion of Synthesizer  
:W-A99 Terminals**

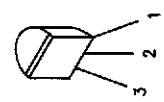
DESCRIPTION	PIN NO.	PIN NAME	DESCRIPTION
SEGMENT OUTPUT	33	XT1	QUARTS OSCILLATOR
SEGMENT OUTPUT	34	XT2	QUARTS OSCILLATOR
SEGMENT OUTPUT	35	P50	4 BIT I/O PORT (5)
SEGMENT OUTPUT	36	P51	4 BIT I/O PORT (5)
SERIAL INTERFACE/4 BIT INPUT PORT (0)	37	P52	4 BIT I/O PORT (5)
SERIAL INTERFACE/4 BIT INPUT PORT (0)	38	P53	4 BIT I/O PORT (5)
SERIAL INTERFACE/4 BIT INPUT PORT (0)	39	RESET	RESET INPUT
SERIAL INTERFACE/4 BIT INPUT PORT (0)	40	T0	DIGITAL OUTPUT
SERIAL INTERFACE/4 BIT INPUT PORT (1)	41	T1	DIGITAL OUTPUT
SERIAL INTERFACE/4 BIT INPUT PORT (1)	42	T2	DIGITAL OUTPUT
SERIAL INTERFACE/4 BIT INPUT PORT (1)	43	T3	DIGITAL OUTPUT
SERIAL INTERFACE/4 BIT INPUT PORT (1)	44	T4	DIGITAL OUTPUT
TIMER/EVENT COUNTER/4 BIT INPUT PORT (1)	45	T5	DIGITAL OUTPUT
4 BIT I/O PORT (2)	46	T6	DIGITAL OUTPUT
4 BIT I/O PORT (2)	47	T7	DIGITAL OUTPUT
4 BIT I/O PORT (2)	48	T8	DIGITAL OUTPUT
REFERENCE FREQUENCY O/P, 4 BIT I/O PORT (2)	49	T9	DIGITAL OUTPUT
4 BIT I/O PORT (3)	50	T10/S15/PH3	DIGITAL OUTPUT/4 BIT OUTPUT PORT
4 BIT I/O PORT (3)	51	T11/S14/PH2	DIGITAL OUTPUT/4 BIT OUTPUT PORT
4 BIT I/O PORT (3)	52	T12/S13/PH1	DIGITAL OUTPUT/4 BIT OUTPUT PORT
4 BIT I/O PORT (6)	53	T13/S12/PH0	DIGITAL OUTPUT/4 BIT OUTPUT PORT
4 BIT I/O PORT (6)	54	T14/S11	SEGMENT OUTPUT
4 BIT I/O PORT (6)	55	T15/S10	SEGMENT OUTPUT
4 BIT I/O PORT (6)	56	VLOAD	POWER SUPPLY TERMINAL
4 BIT I/O PORT (4)	57	VPRE	POWER SUPPLY TERMINAL
4 BIT I/O PORT (4)	58	S9	SEGMENT OUTPUT
4 BIT I/O PORT (4)	59	S8	SEGMENT OUTPUT
4 BIT I/O PORT (4)	60	S7	SEGMENT OUTPUT
4 BIT I/O PORT (4)	61	S6	SEGMENT OUTPUT
TIMER/PAUSE GENERATOR	62	S5	SEGMENT OUTPUT
QUARTS OSCILLATOR	63	S4	SEGMENT OUTPUT
QUARTS OSCILLATOR	64	V00	POWER SUPPLY TERMINAL

PIN NO.	PIN NAME	DESCRIPTION
33	XT1	QUARTS OSCILLATOR
34	XT2	QUARTS OSCILLATOR
35	P50	4 BIT I/O PORT (5)
36	P51	4 BIT I/O PORT (5)
37	P52	4 BIT I/O PORT (5)
38	P53	4 BIT I/O PORT (5)
39	RESET	RESET INPUT
40	T0	DIGITAL OUTPUT
41	T1	DIGITAL OUTPUT
42	T2	DIGITAL OUTPUT
43	T3	DIGITAL OUTPUT
44	T4	DIGITAL OUTPUT
45	T5	DIGITAL OUTPUT
46	T6	DIGITAL OUTPUT
47	T7	DIGITAL OUTPUT
48	T8	DIGITAL OUTPUT
49	T9	DIGITAL OUTPUT
50	T10/S15/PH3	DIGITAL OUTPUT/4 BIT OUTPUT PORT
51	T11/S14/PH2	DIGITAL OUTPUT/4 BIT OUTPUT PORT
52	T12/S13/PH1	DIGITAL OUTPUT/4 BIT OUTPUT PORT
53	T13/S12/PH0	DIGITAL OUTPUT/4 BIT OUTPUT PORT
54	T14/S11	SEGMENT OUTPUT
55	T15/S10	SEGMENT OUTPUT
56	VLOAD	POWER SUPPLY TERMINAL
57	VPRE	POWER SUPPLY TERMINAL
58	S9	SEGMENT OUTPUT
59	S8	SEGMENT OUTPUT
60	S7	SEGMENT OUTPUT
61	S6	SEGMENT OUTPUT
62	S5	SEGMENT OUTPUT
63	S4	SEGMENT OUTPUT
64	V00	POWER SUPPLY TERMINAL

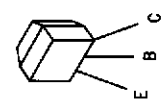
(... 120 Volt ...)  
(... 0.30 Volt ...)



IC802  
PST6000



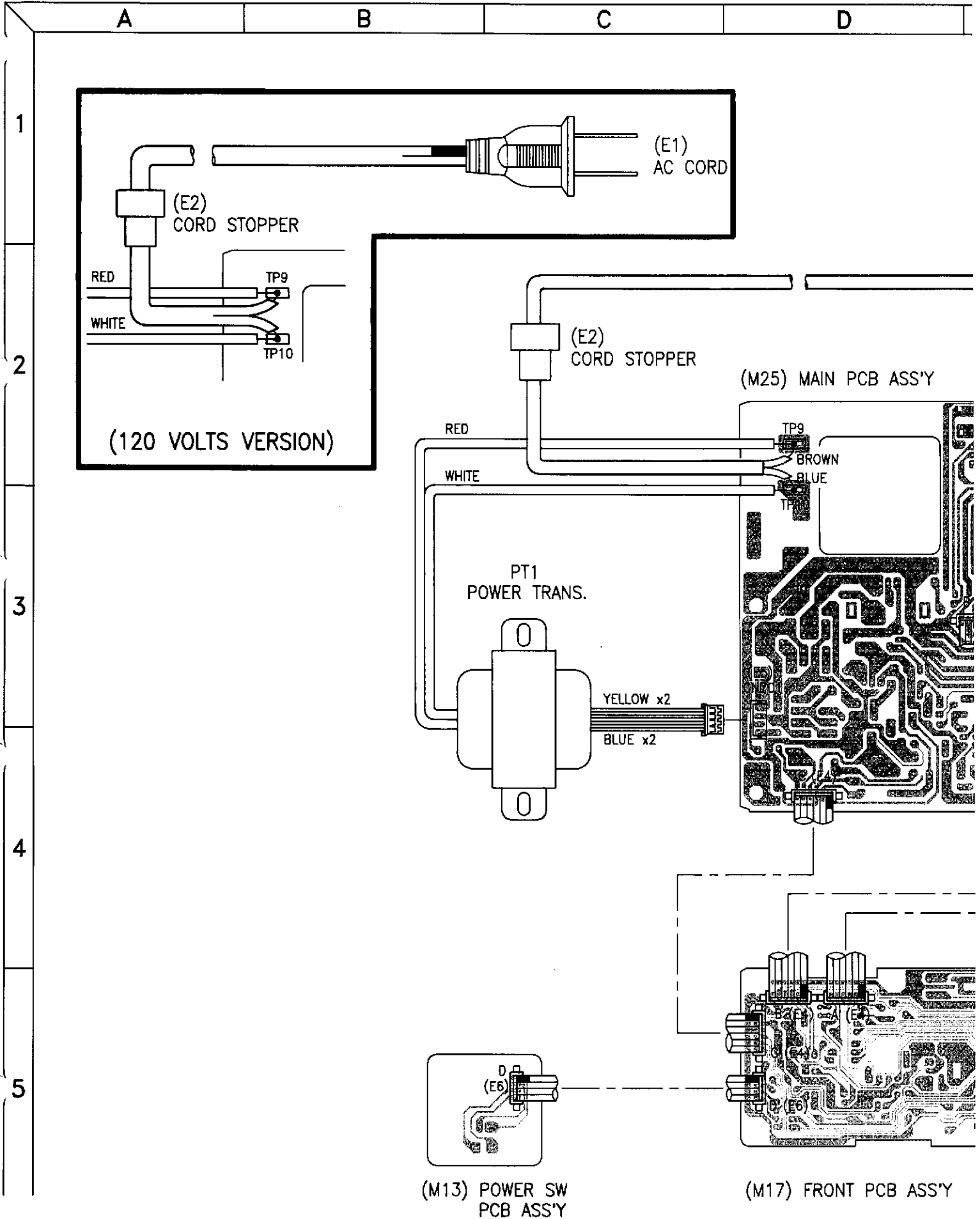
DTC144ES



- NOTE:**
1. ALL RESISTANCES VALUES ARE IN  $\Omega$ .  
K $\Omega$ =1000 $\Omega$ , M $\Omega$ =1000K $\Omega$ .
  2. THE WATTAGE OF RESISTORS IS 1/6W UNLESS OTHERWISE NOTED.
  3. ALL CAPACITANCES VALUES ARE IN  $\mu$ F UNLESS OTHERWISE NOTED. P= $\mu$ uF.
  4. ...V:DC VOLTAGE AT NO SIGNAL UNLESS OTHERWISE NOTED.



# WIRING DIAGRAM

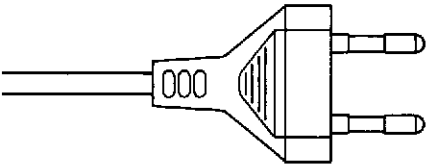


E

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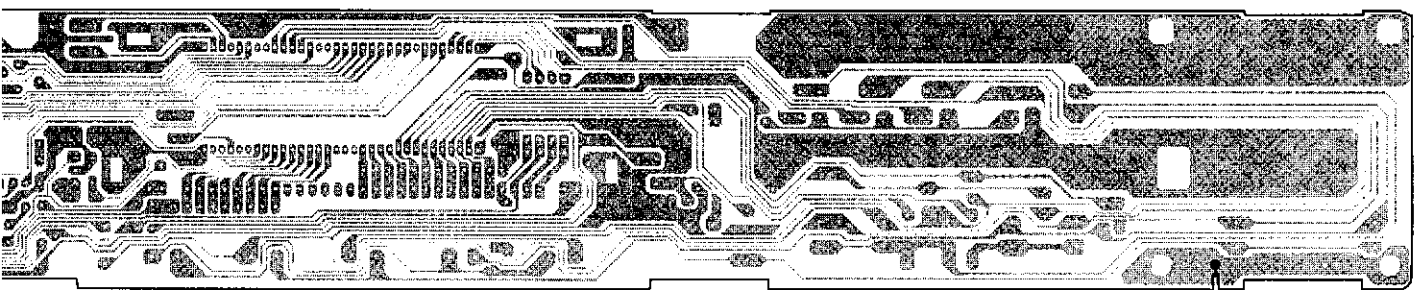
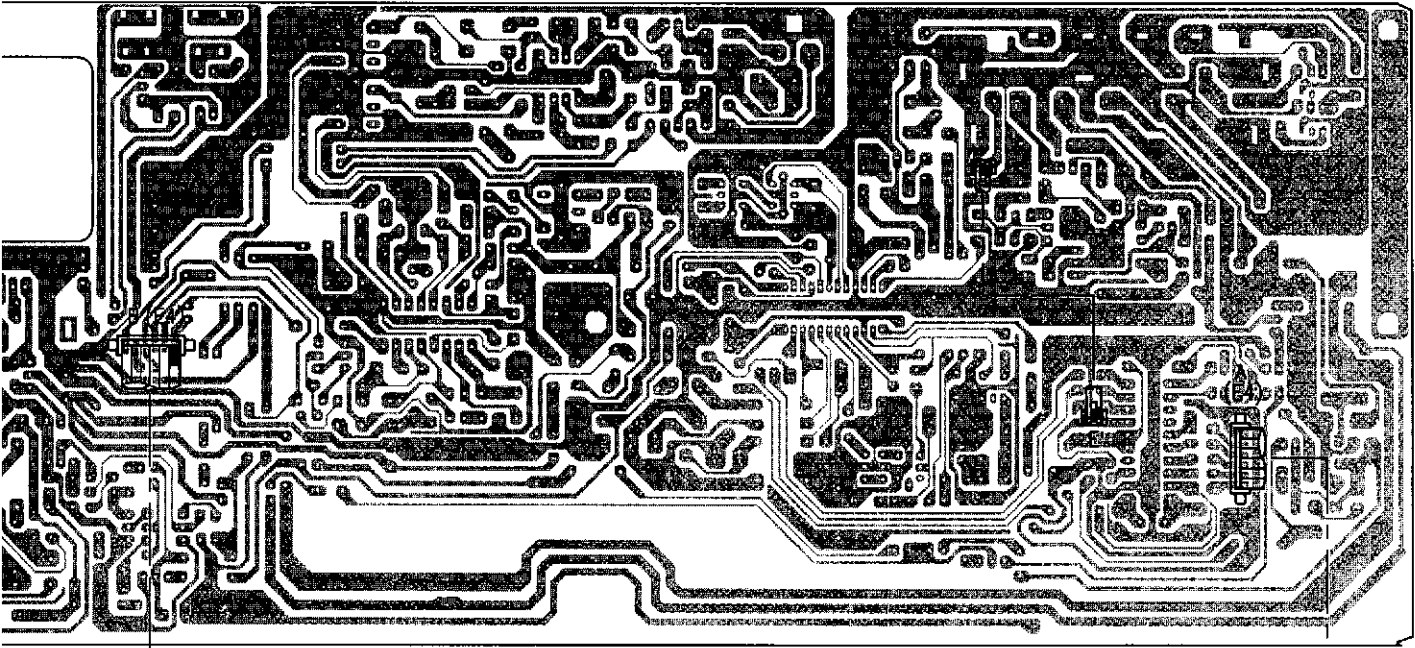
H



(E1)  
AC CORD

ASS'Y

(M25) MAIN PCB ASS'Y



CB ASS'Y

TO  
BOTTOM  
CHASSIS  
BLACK