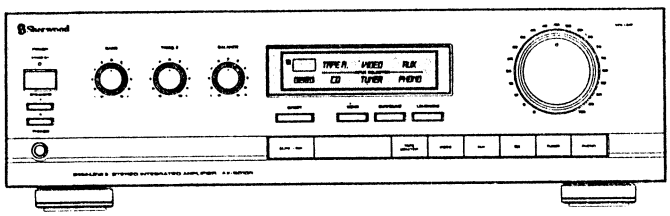
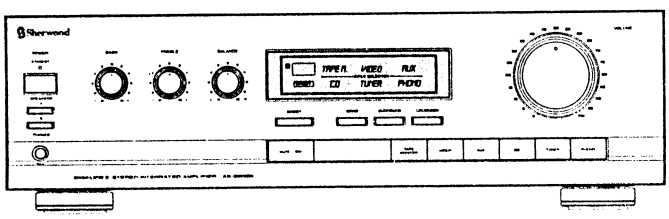
SERVICE MANUAL



AX-5010R
STEREO
INTEGRATED AMPLIFIER



AX-5015R
STEREO
INTEGRATED AMPLIFIER

■ CONTENTS

Safety Precaution 2
Specifications 3
Block Dragram 5
Circuit Description 6
P.C.Boards(Top & Bottom Views) 9
Exploded View 21
Mechanical Parts List 25
Wiring Diagram 27
Electrical Parts List 29
Schematic Diagram 31

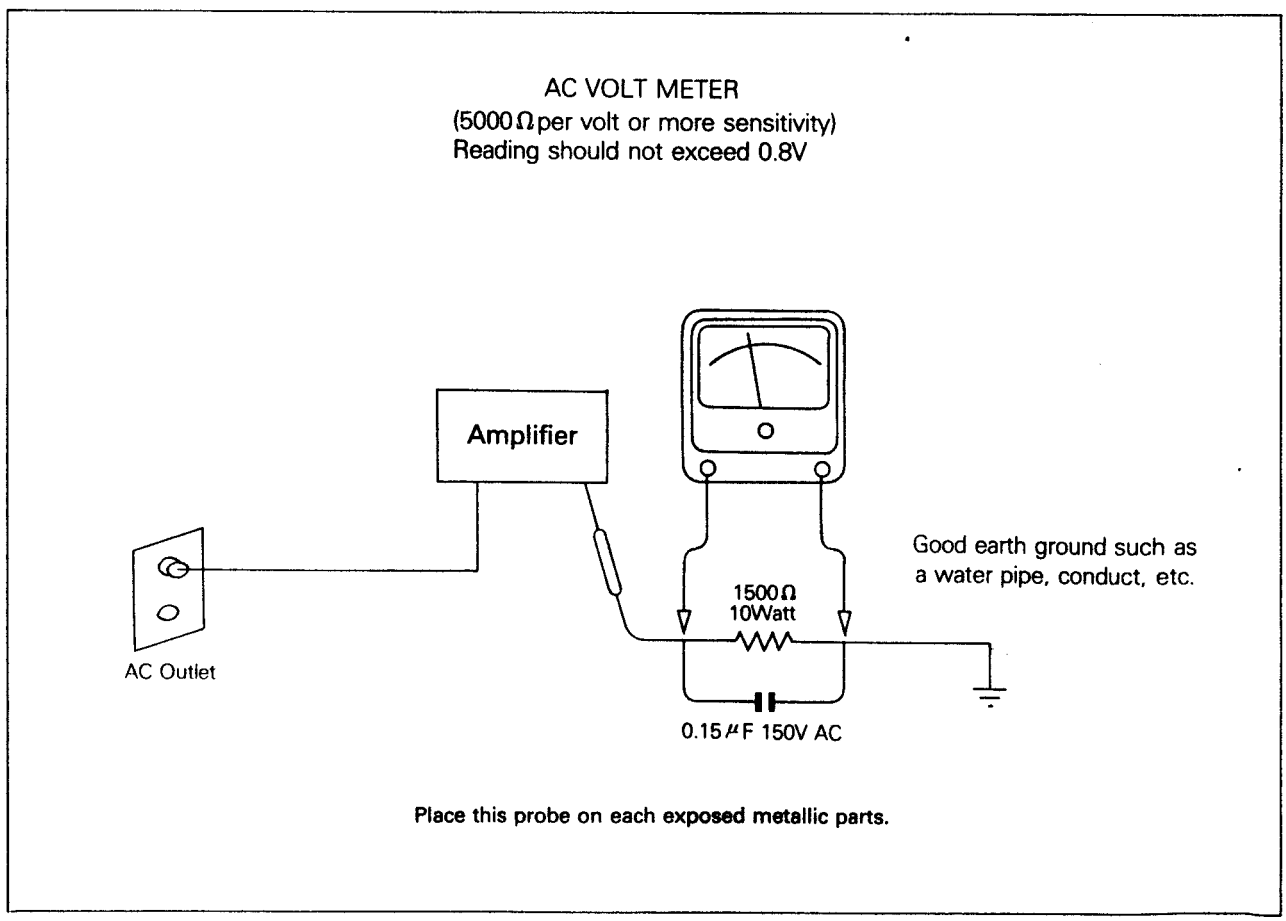
Sherwood

Safety Precaution

WARNING

Service should not be attempted by anyone unfamiliar with the necessary precautions on this player. The following precautions are necessary during servicing.

1. Many electrical and mechanical parts in this player have special characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristic are identified in this manual and its supplements : electrical components having such features are identified by a ⚠ in the schematic diagram and the parts list.
   Before replacing any of these components, read the parts list in this manual carefully.
   The use of substitute replacement parts that do not have the same safety characterstics as specified in the parts list may create shock, fire or other hazards.
2. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as terminals, screwheads, metal overlays, etc. to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a 120V AC outlet(**120V Version only**).(Do not use a line isolation transformer during this check.) Use an AC voltmeter having 5000Ω per volt or more sensitivity in the following manner : Connect a 1500Ω 10watte resistor paralleled by a 0.15μF 150V AC capacitor, between a known good earth ground(water pipe, conduct, etc.)and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500Ω resistor and 0.15μF capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.3 volts RMS. This corresponds to 0.2mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.



Specifications

USA/Canadian version

Power output / ch.
Minimum continuous average both channels driven with no more than 0.3% THD.
at 8 ohms 1kHz 85W
at 8 ohms 20Hz to 20kHz 80W
Intermodulation Distortion, 60Hz:7kHz=4:1 SMPTE
50W for AI2110R(100W for AI2115R), output into 8 ohms 0.05%
Damping Factor at 1 kHz into 8 ohms 35
Input Sensitivity for 100W output, 8 ohms at 1 kHz
Phono 2.5mV
Aux / Tuner 150mV
Phono Preamp input overload;
at 1 kHz, 0.1% THD. 150mV
Signal to Noise ratio, IHF "A" wtd. / unwtd.;
Phono ..... 70 / 67dB
CD / Tuner ..... 96 / 86dB
Frequency Response
Phono, RIAA 40 - 20,000 Hz ..... ±0.5dB
CD at 1W, - 3dB ..... 10Hz - 50kHz
Loudness Contour
at 100 Hz ..... + 6dB
at 10kHz ..... + 3dB
Tone Control;
Bass at 100Hz ..... ± 10dB
Treble at 10kHz ..... ± 10dB
Channel Separation at Aux
at 100 Hz 55dB
at 1kHz 55dB
at 10kHz 40dB
Power Consumption ..... Typical 80W(min. 18W, max. 130W)
Power requirements;
A:120V 50Hz for USA / Canadian version
B:120 / 220V 60 / 50Hz for multi - voltage version(switchable)
C:230V 50Hz for general Europian version
D:230V 50Hz for Germanian & Italian version
E:240V 50Hz for British & Australian version
F:230V 50Hz for Swiss & Scandinabian version
Dimensions ..... 400(W) X 118(H) X 245(D)mm
15.7(W) X 4.6(H) X 9.6(D)inches
Weight (net) ..... 8.6kg (17 lbs, 9.6oz)

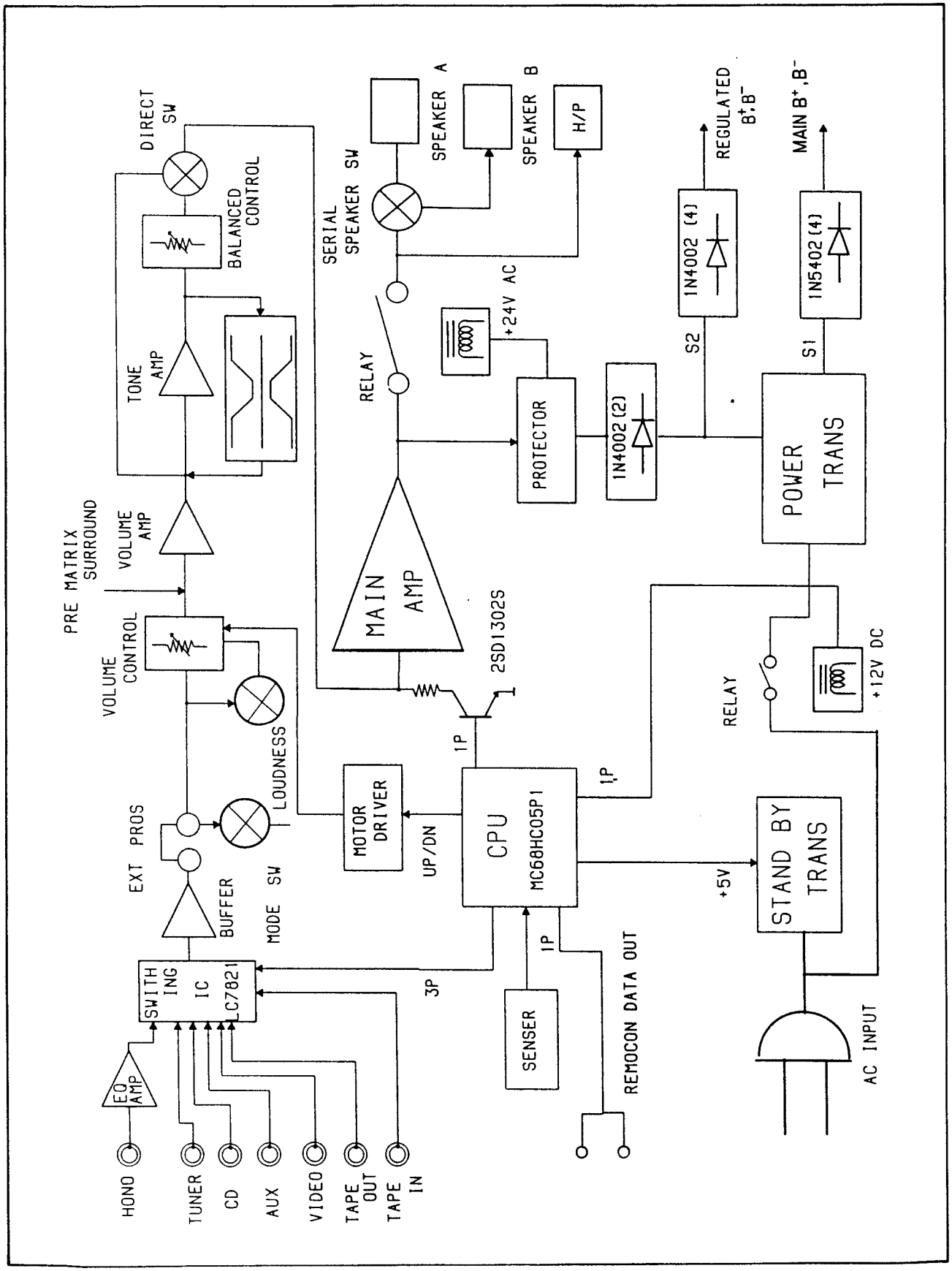
Europian version

Power output / ch.
IEC standard 63Hz to 12.5kHz 8 ohms,THD 0.7% 83W
DIN standard 1kHz 8 ohms, THD 1.0% 85W
Total Harmonic Distortion at - 6dB rated output 1kHz 8 ohms 0.03%
Intermodulation Distortion at - 6dB rated output 8 ohms 0.04%
Damping Factor at 1 kHz into 8 ohms 35
Input Sensitivity for 80W output at 1 kHz 8 ohms
Phono 2.5mV
Aux / Tuner 150mV

Phono Preamp input overload;
at 1 kHz, 0.1% THD. ····· 150mV
Signal to Noise ratio, IEC "A" wtd. / unwtd.;
Phono:5mV input 2.2kohm shorted and vol. adj. to 80W ····· 76 / 70dB
AUX :500mV input 2.2kohm shorted and vol. adj. to 80W ····· 96 / 86dB
Frequency Response
Phono, RIAA 40 - 20,000 Hz ····· ± 0.5dB
Aux at 1W, - 3dB ····· 10Hz - 50kHz
Loudness Contour
at 100 Hz ····· + 6dB
at 10kHz ····· + 3dB
Tone Control;
Bass at 100Hz ····· ± 10dB
Treble at 10kHz ····· ± 10dB
Power Consumption ····· Max. 350W, min 18W
Power requirements;
A:120V 50Hz for USA / Canadian version
B:120 / 220V 60 / 50Hz for multi-voltage version(switchable)
C:230V 50Hz for general Europian version
D:230V 50Hz for Germanian & Italian version
E:240V 50Hz for British & Australian version
F:230V 50Hz for Swiss & Scandinabian version
Dimensions ····· 400(W) × 118(H) × 245(D)mm
15.7(W) × 4.6(H) × 9.6(D)inches
Weight(net) ····· 8.6kg(17 lbs, 9.6oz)

Note :Specifications and design subject to change without notice for improvements. Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the European standard, and provides information on regional circuit modification through use of alternate schematic or wiring diagram,and information on regional component variations through use of parts list.

Block Diagram

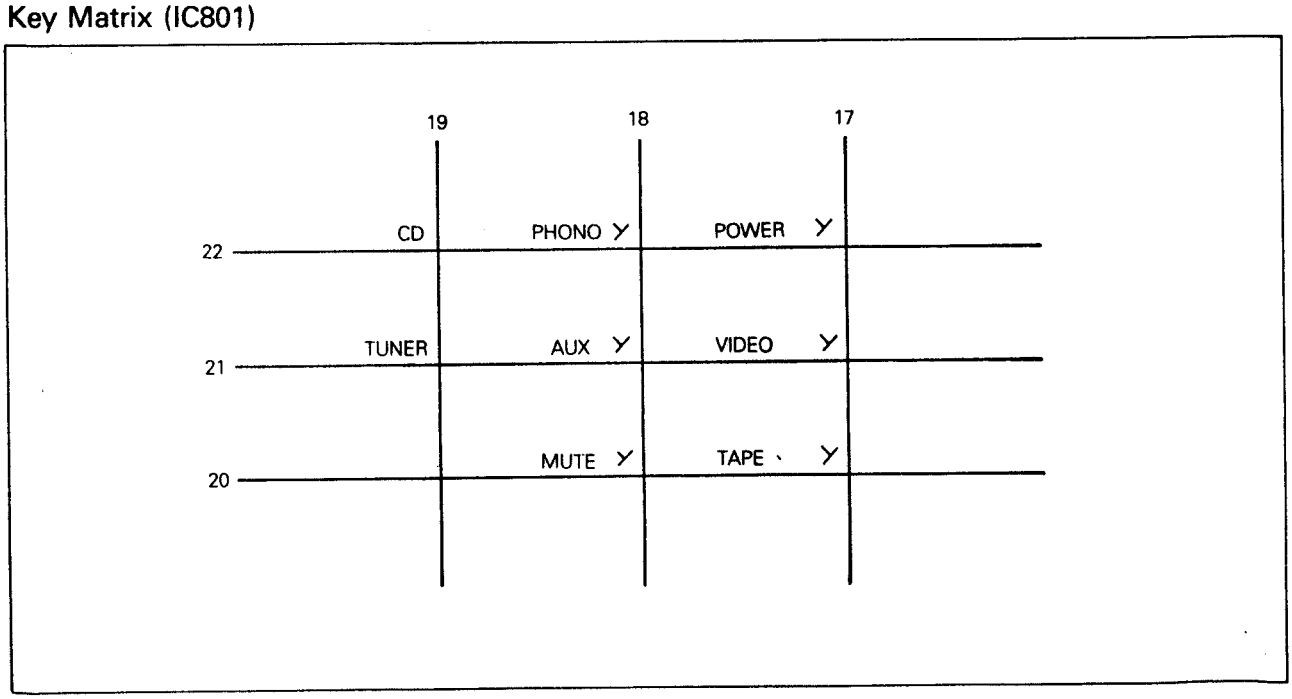


Circuit Description

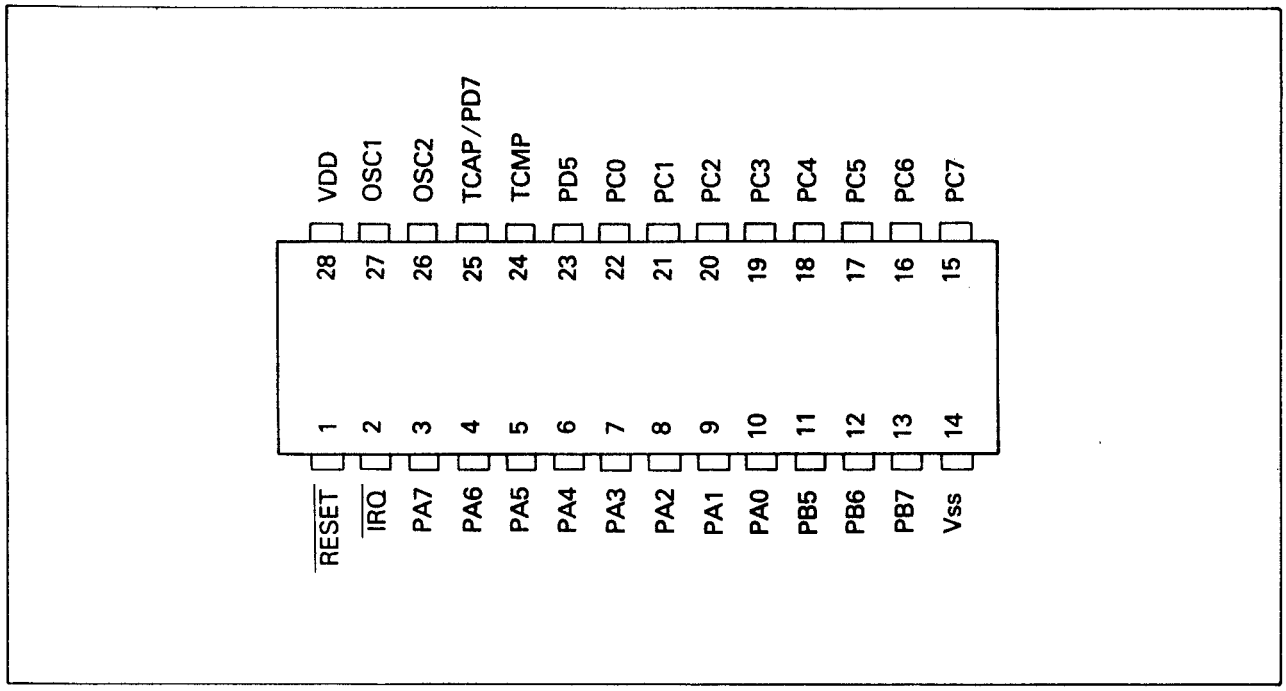
Function Assigned(MC68HC059P : IC801)

No.	Terminal	Operating	Remark
1	$\overline{\text{RESET}}$		Q351
2	$\overline{\text{IRQ}}$	5V	
3	PA7(Stand–by relay)	0V	Q352
4	PA6(Deck Pause)		Q354
5	PA5(Strobe)		IC803
6	PA4(Data)		IC302/303
7	PA3(Clock)		IC302/303
8	PA2(Strobe)		IC302
9	PA1(Volume LED)		Q211
10	PA0(Mute)		IC201
11	PB5(Vol. Down)		IC201
12	PB6(Vol. Down)		IC201
13	PB7(Philips Generator)		Q355 for CD, Tuner only
14	Vss		
15	PC7(AC Cord off)	0V	
16	PC6		
17	PC5(Key scan 3)		Key Matrix
18	PC4(Key scan 2)		
19	PC3(Key scan 1)		
20	PC2(Key in 3)	5V	
21	PC1(Key in 2)	0V	
22	PC0(Key in 1)		
23	PD5(Timer in)		
24	NC		Ground
25	PD7(Remocon in)		Q353
26	X		OSC
27	EX		4MHz
28	Vdd		

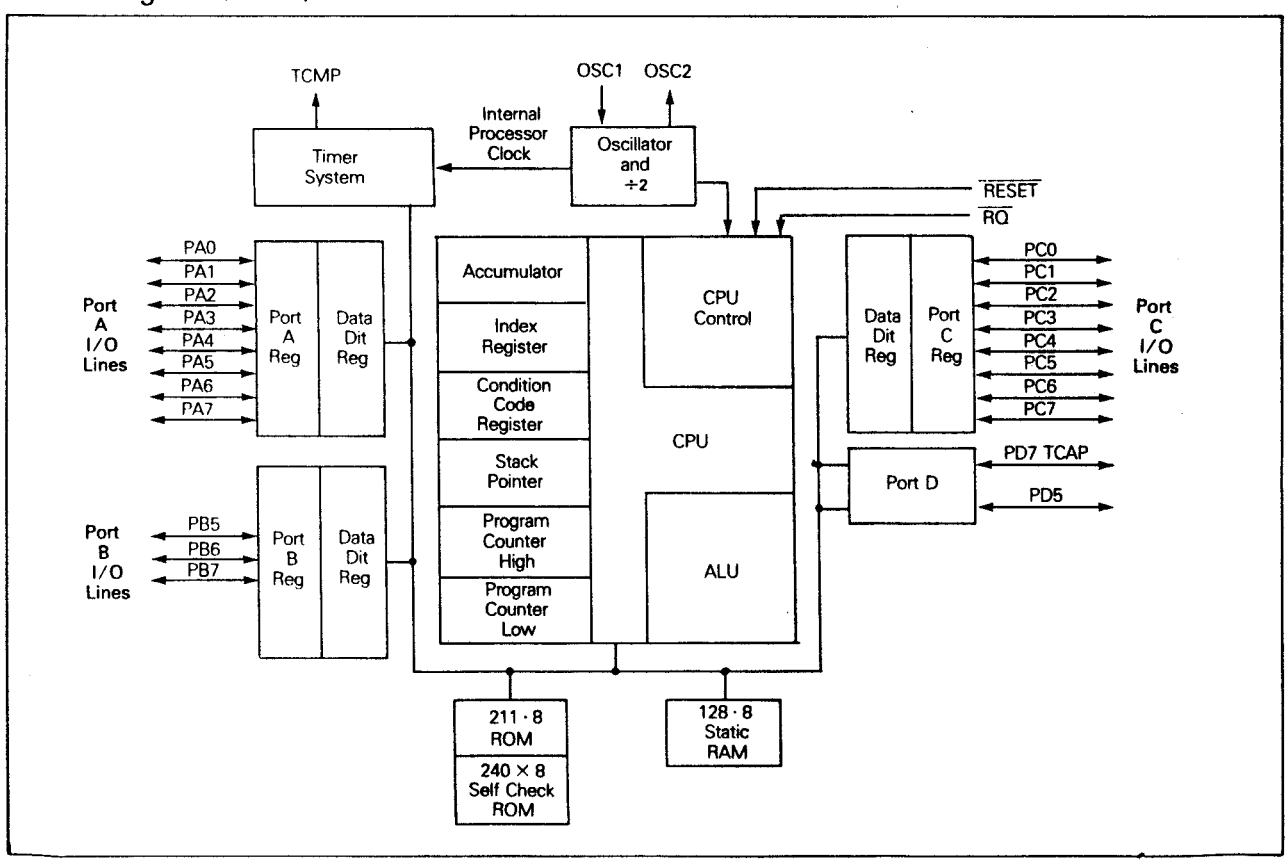
Key Matrix (IC801)



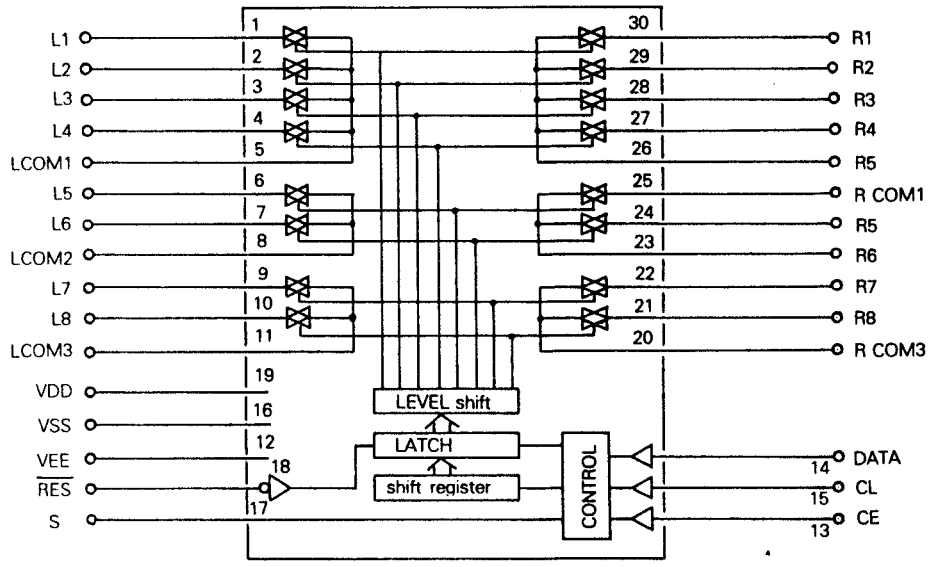
Pin Assignment(IC302)



Block Diagram (IC302)



- LC 7821 : IC103(Switching IC)

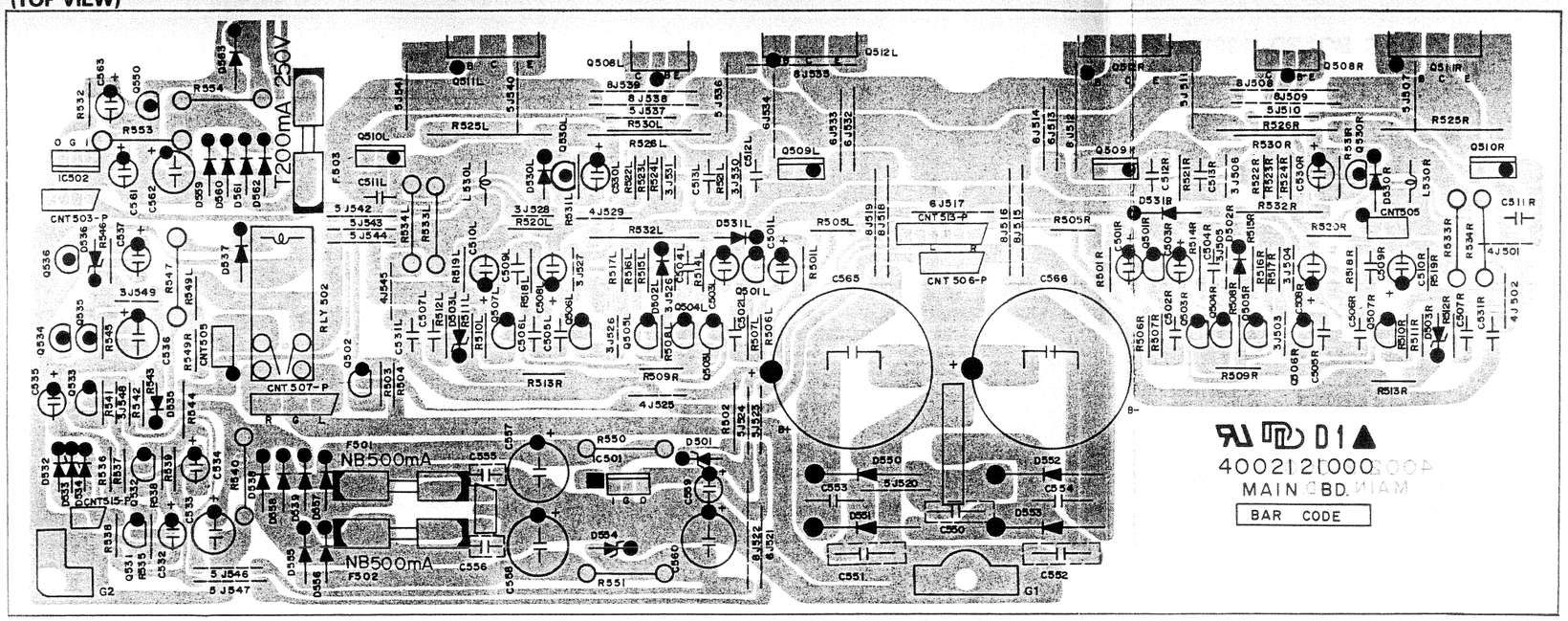


PIN NO.	TERMINAL	DESCRIPTION
1	PHONO	
2	TUNER	input output terminals of
3	CD	audio signal of left channel
4	AUX	
5		Control to the inside
6	VIDEO	analog switch at the serial
7		data
8	TAPE OUTPUT	
9		
10	TAPE INPUT	
11	DAT OUTPUT	
12	VEE	Negative power Supply terminal-15V
13	STROBE	Setial Control terminal
14	DATA	Connect terminal of
15	CLOCK	MB88P 515B
16	VSS	
17	S	Ground terminal

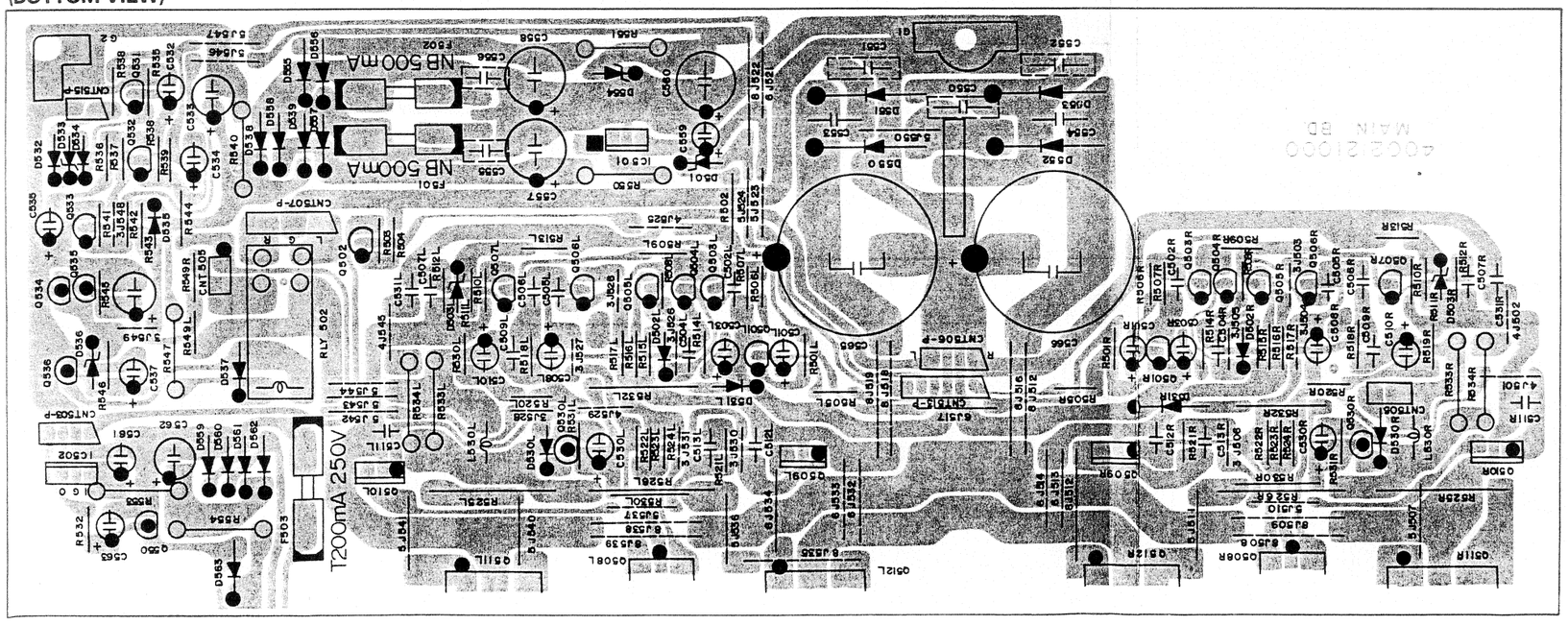
PIN NO.	TERMINAL	DESCRIPTION
18	RES	Reset terminal When power is turned ON.the Condition of the analog switch is not determined.but when this teminal is L all analog switches are OFF.
19	VDD	Power Supply terminal(-15V)
20	DAT OUTPUT	
21	TAPE INPUT	Input Output terminals of
22		audio signal of right
23	TAPE OUTPUT	channel
24		Control to the inside analog
25	VIDEO	switch at the serial data
26		
27	AUX	
28	CD	Power Supply terminal(-15V)
29	TUNER	
30	PHONO	

P.C.Boards(Top & Bottom Views)

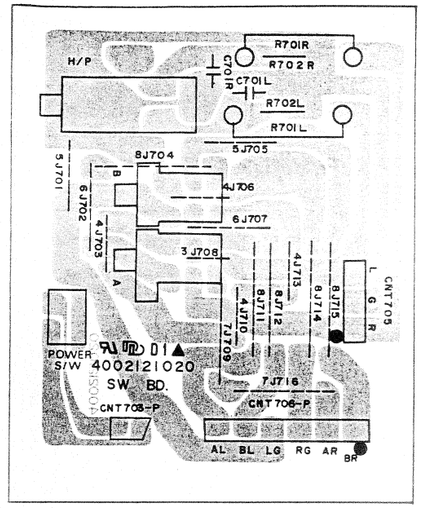
MAIN P.C. BOARD 4002121000
(TOP VIEW)



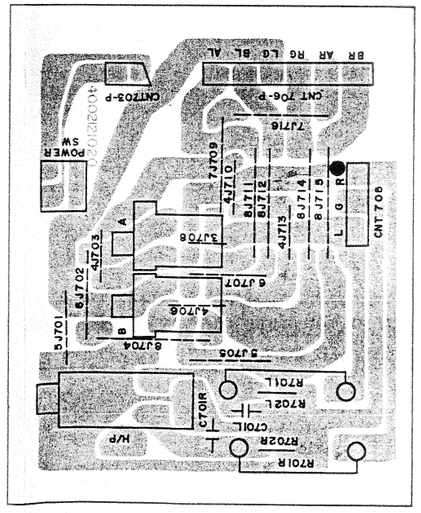
(BOTTOM VIEW)



SW P.C. BOARD 4002121020
(TOP VIEW)

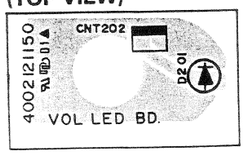


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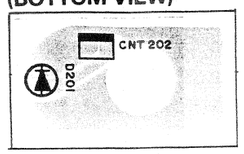


VOL.LED P.C. BOARD 4002121150 (AX5010R only)

(TOP VIEW)

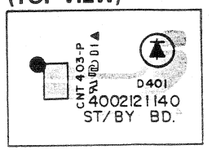


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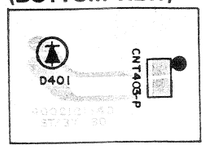


ST/BT P.C. BOARD 4002121140

(TOP VIEW)

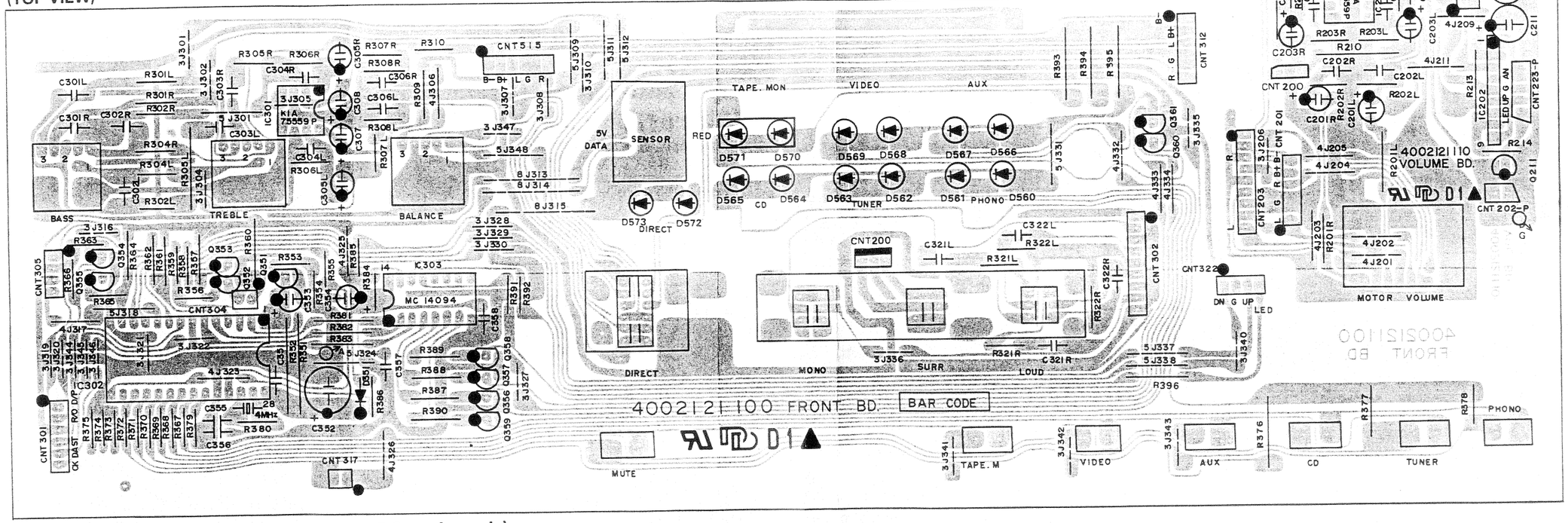


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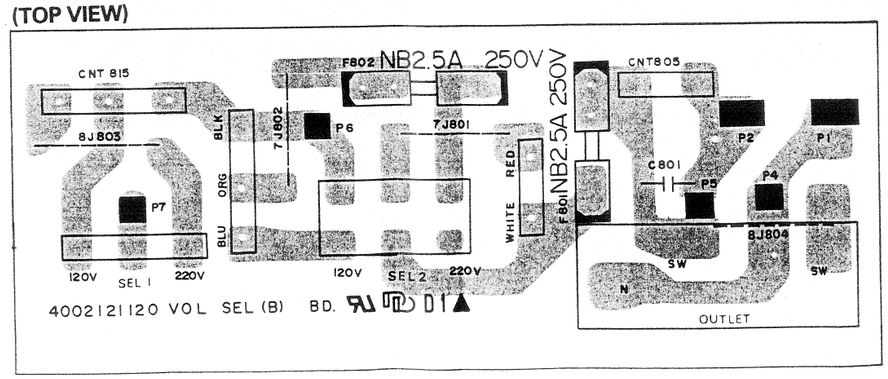
FRONT P.C. BOARD 4002121100 (AX5010R only)

(TOP VIEW)

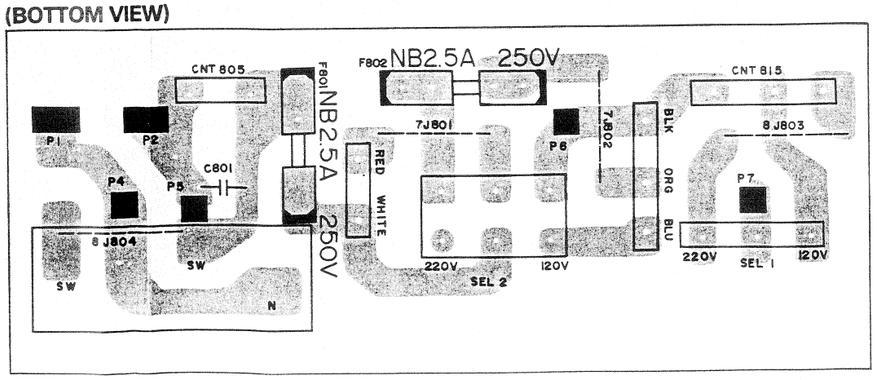


VOL.SEL P.C. BOARD 4002121120 (AX5010R B version only)

(TOP VIEW)

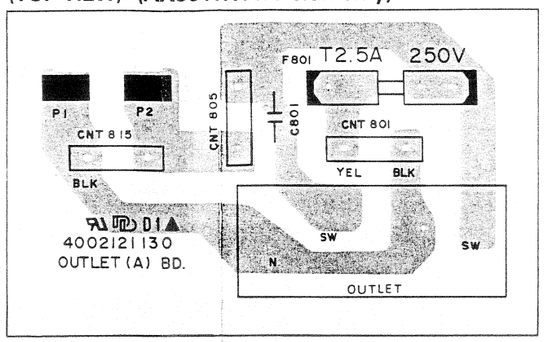


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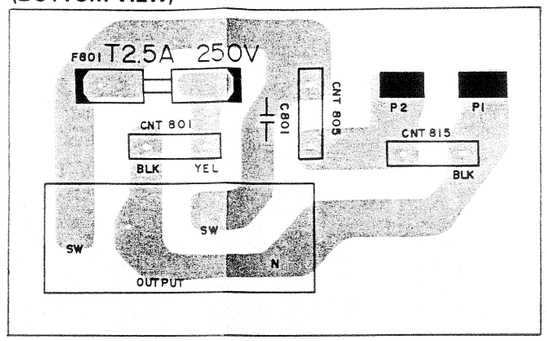


OUTLET P.C. BOARD 44002121130

(TOP VIEW) (AX5010R Aversion only)

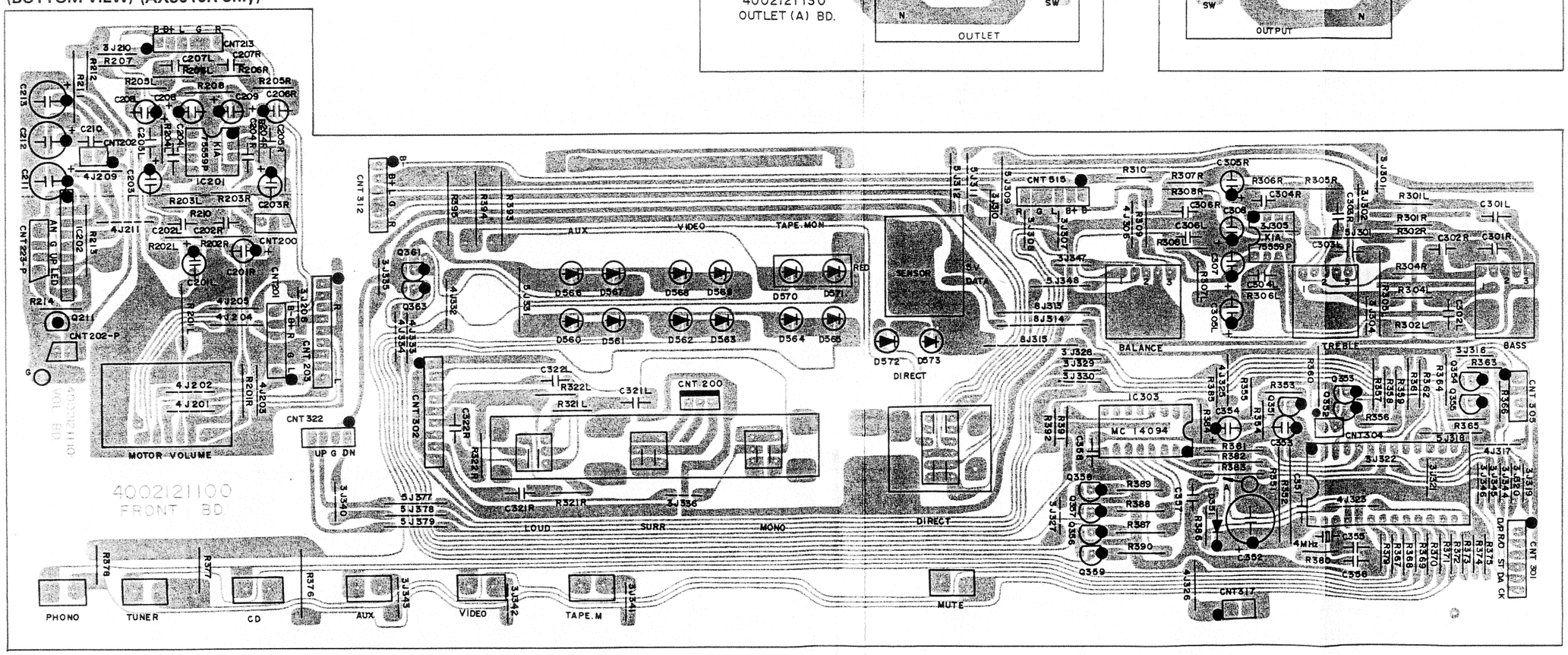


(BOTTOM VIEW)



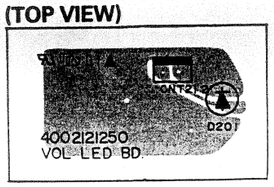
FRONT P.C. BOARD 4002121100

(BOTTOM VIEW) (AX5010R only)

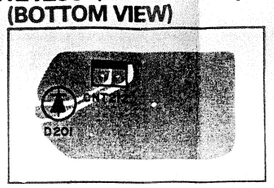


VOL.LED P.C. BOARD 4002121250 (AX5015R only)

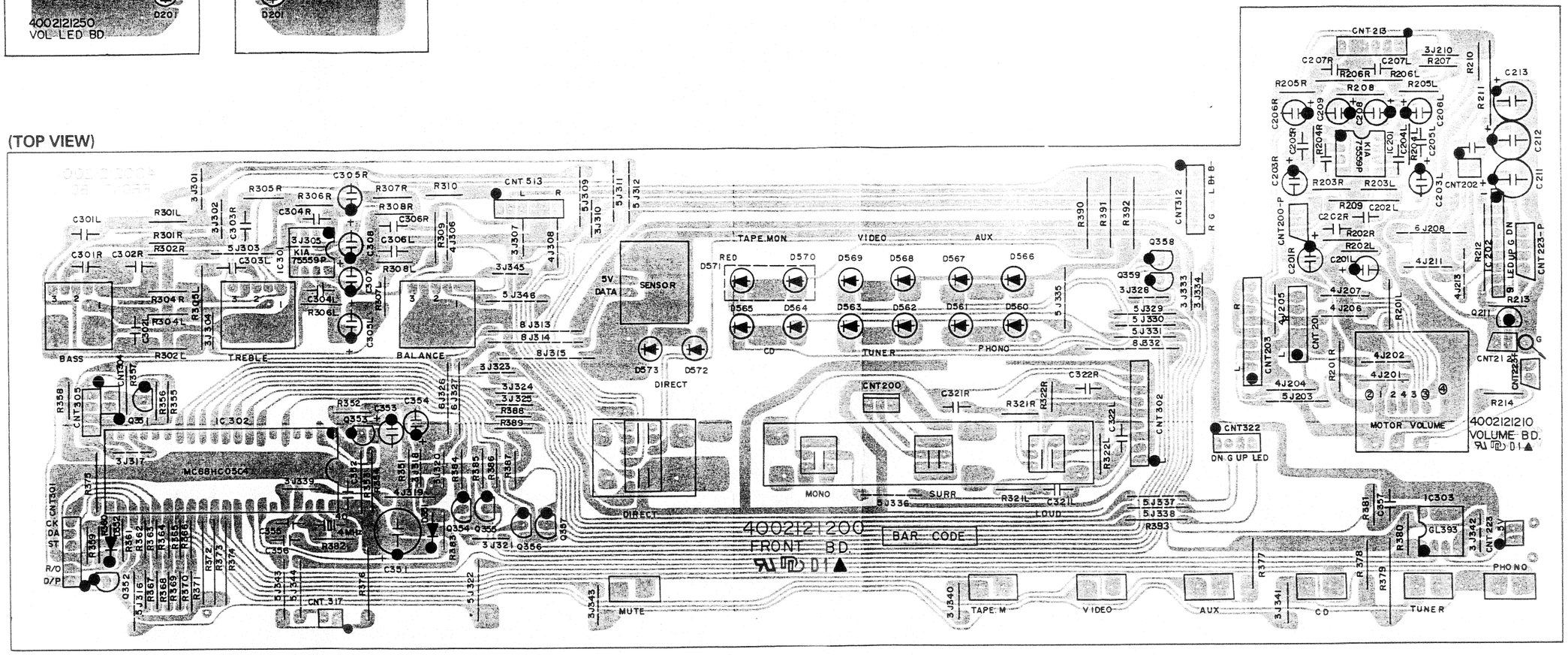
(TOP VIEW)



(BOTTOM VIEW)

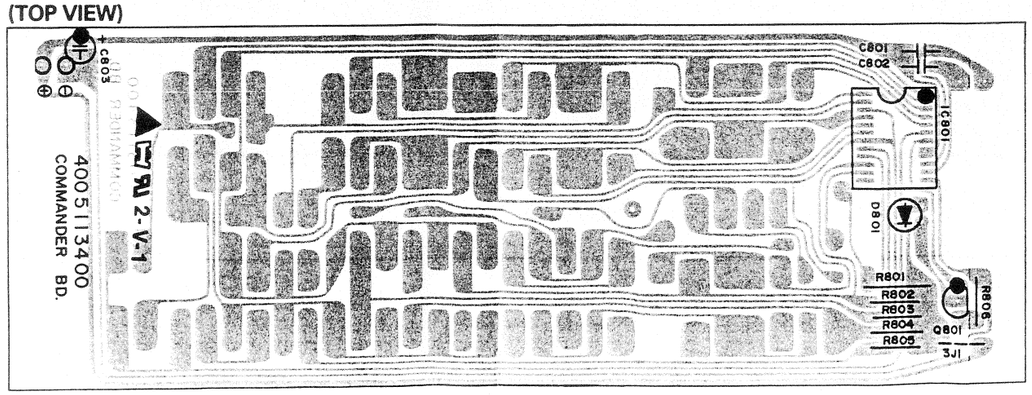


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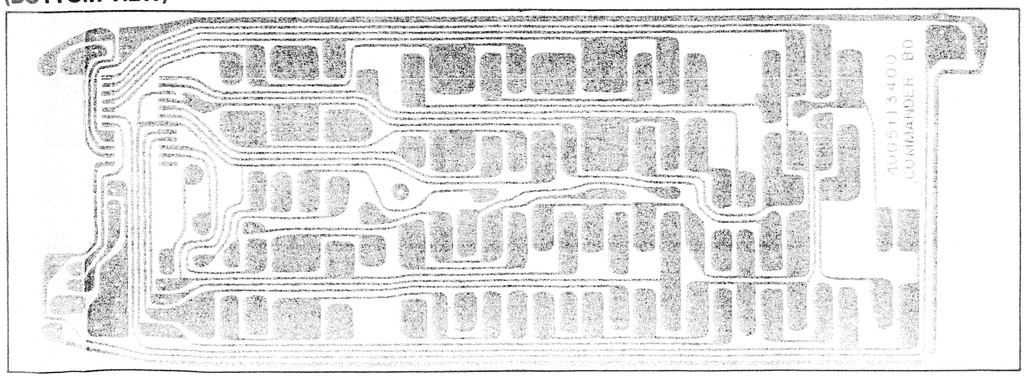


REMOCON P.C. BOARD 4005113400

(TOP VIEW)

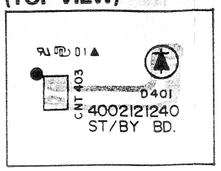


(BOTTOM VIEW)

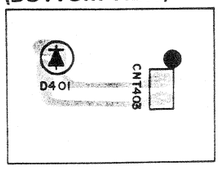


ST/BY P.C. BOARD 4002121240 (AX5015R only)

(TOP VIEW)



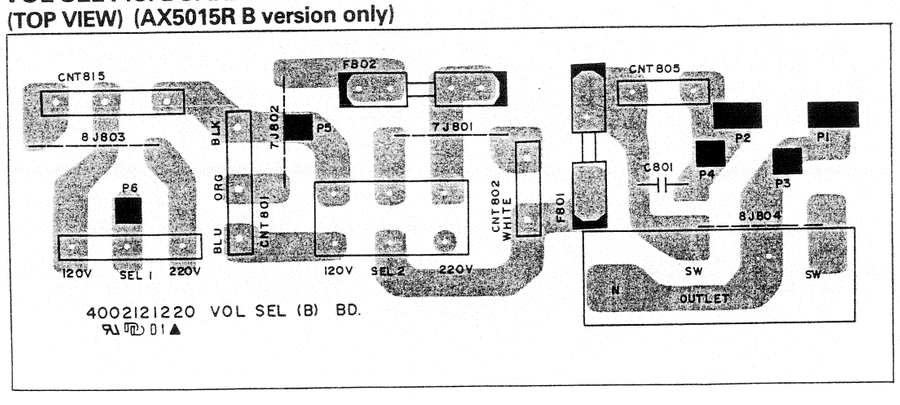
(BOTTOM VIEW)



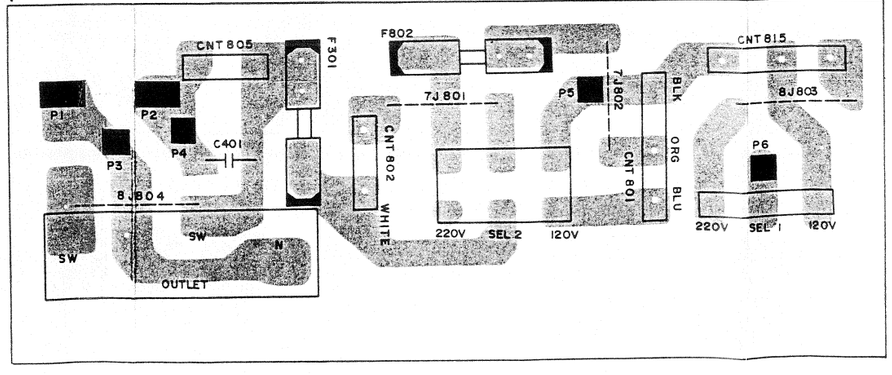
(BOTTOM VIEW) (AX5015R only)

VOL SEL P.C. BOARD 4002121220

(TOP VIEW) (AX5015R B version only)

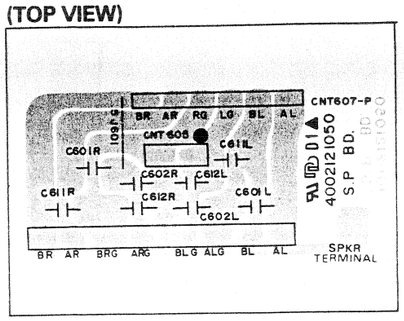


(BOTTOM VIEW)

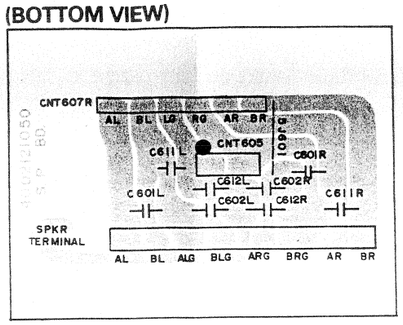


S.P P.C. BOARD 4002121050

(TOP VIEW)

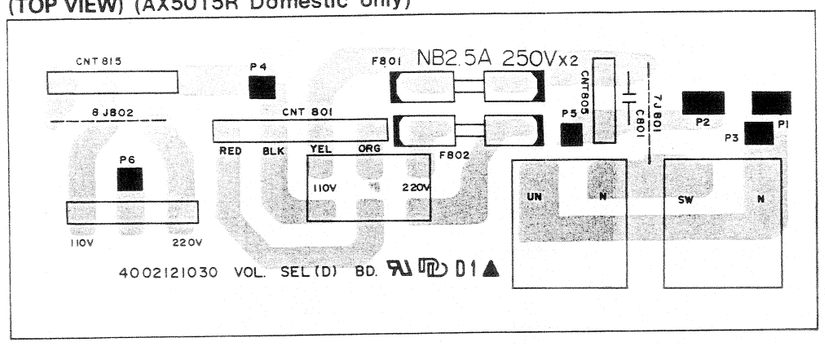


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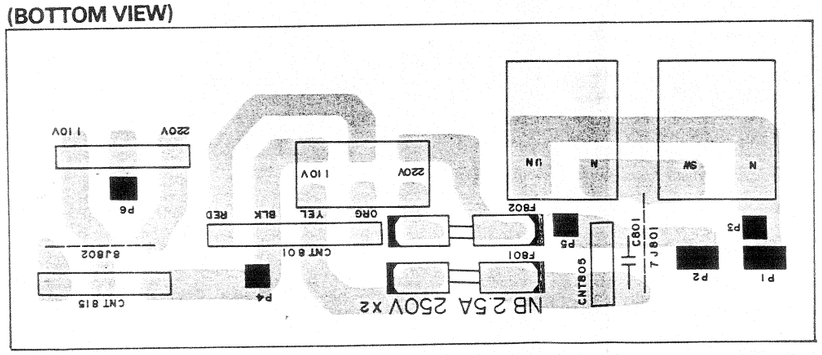


VOL.SEL P.C. BOARD 4002121030

(TOP VIEW) (AX5015R Domestic only)

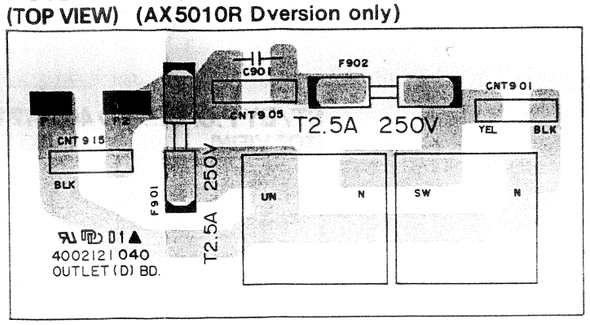


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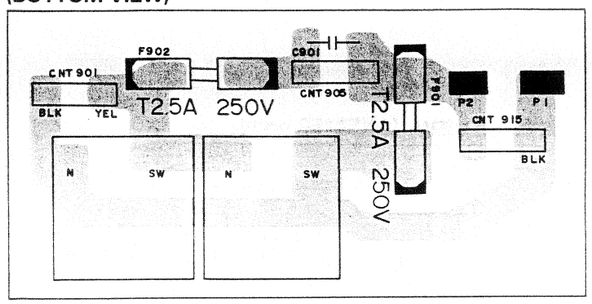


OUTLET P.C. BOARD 4002121040

(TOP VIEW) (AX5010R Dversion only)

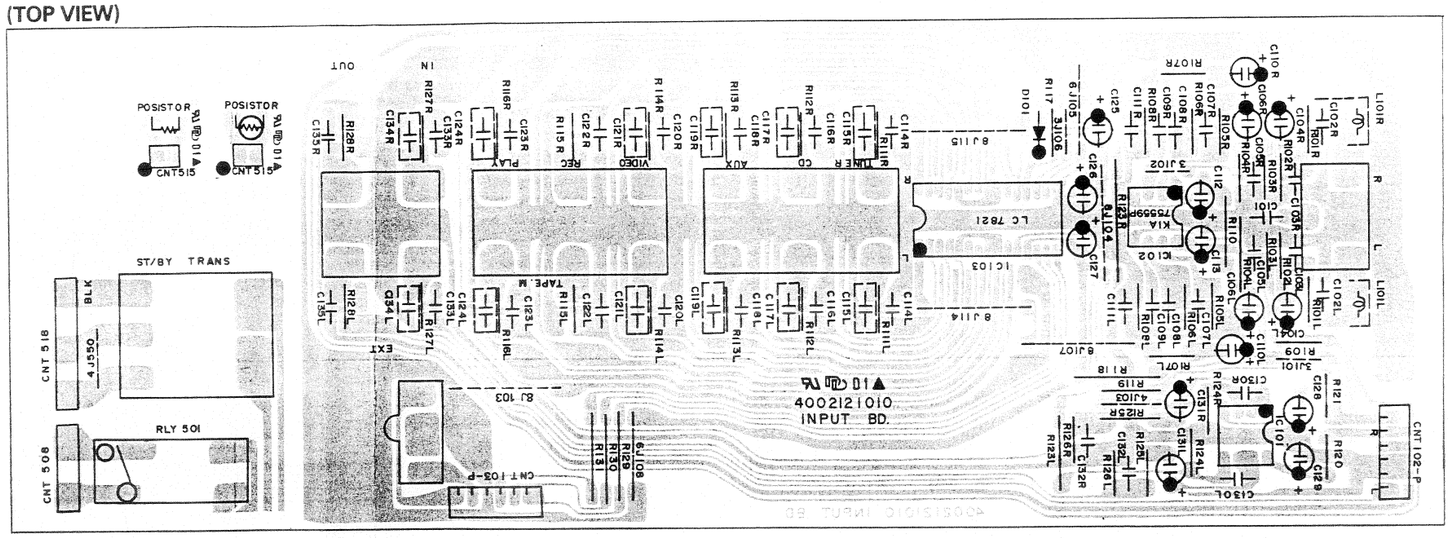


(BOTTOM VIEW)

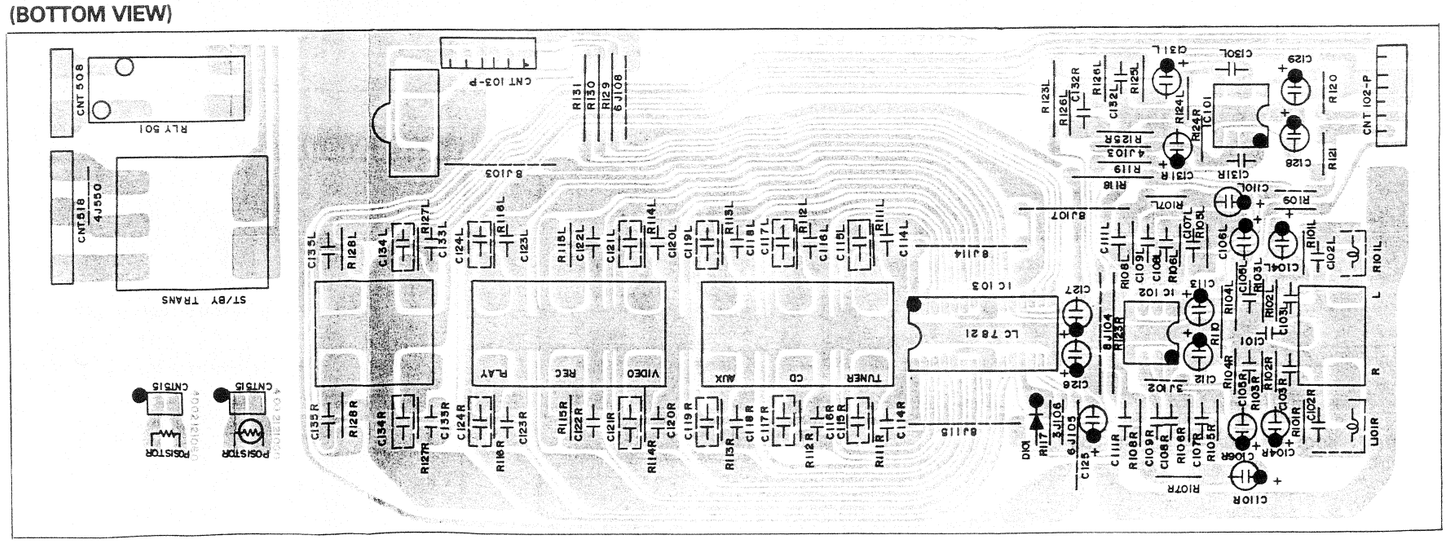


INPUT P.C. BOARD 4002121010

(TOP VIEW)



(BOTTOM VIEW)



Electrical Parts List

PRODUCT SAFETY NOTICE : Products marked with a ⚠ have special characteristics important to safety. If you replace any of these components, carefully read the product safety notice of this manual. Don't degraded the safety of the product through improper servicing.
Resistors & Capacitors tolerance, D (± 0.5%), J (± 5%), K (± 10%), M (± 20%), Z (+ 80%, − 20%).

Ref. No	Part No.	Description				Remark
Main Board 4002121000						
Capacitors						
C501L/R	3479247971	Electric SA	4.7㎌	50V	M	
C502L/R	3579681130	Ceramic	680pF	50V	J	
C503L/R	3479233031	Electric SA	33㎌	16V	M	
C504L/R	3579471130	Ceramic	470pF	50V	J	
C505L/R	3579200130	Ceramic	20pF	50V	J	
C506L/R	3579080030	Ceramic	8pF	50V	J	
C507L/R	3579473530	Ceramic	0.047㎌	100V	J	
C508L/R	3479210971	Electric SA	1㎌	50V	M	
C509L/R	3579050030	Ceramic	5pF	50V	J	
C510L/R	3479222071	Electric SA	22㎌	50V	M	
C511L/R	3579101130	Ceramic	100pF	50V	J	
C512L/R	3579101130	Ceramic	100pF	50V	J	
C513L/R	3679473120	Mylar	0.047㎌	100V	J	
C514 - C529L/R	·	Not used !				
C530L/R	3479247971	Electric SA	4.7㎌	50V	M	
C531L/R	3679473120	Mylar	0.047㎌	100V	J	
C532	3479210061	Electric SA	10㎌	35V	M	
C533	3409247169	Electric SA	47㎌	35V	M	
C534	3479247971	Electric SA	4.7㎌	50V	M	
C535	3479222041	Electric SA	22㎌	25V	M	
C536	3409247111	Electric SA	470㎌	6.3V	M	
C537	3479247041	Electric SA	47㎌	25V	M	
	·					
C550 - C554	3509103450	Ceramic	0.01㎌	500V	J	
C555/C556	3579103530	Ceramic	0.01㎌	50V	J	D
C557/C558	3409247169	Electric SA	470㎌	35V	M	
C559	3479210061	Electric SA	10㎌	35V	M	
C560	3409222141	Electric SA	220㎌	25V	M	
C561	3479247031	Electric SA	47㎌	16V	M	
C562	3409247139	Electric SA	470㎌	16V	M	
C563	3479210971	Electric SA	1㎌	50V	M	
C464	·	Not used !				
C565/C566	3479568280	Electric SA	6800㎌	63V	M	
Connectors						
CNT503 - P	4119104223	Ass'y 4P 220mm to Front B'D				
CNT505	4119103302	Ass'y 3P 330mm to Main B'D				
CNT506 - P	4119104303	Ass'y 4P 300mm to SP B'D				
CNT513 - P	4119106303	Ass'y 6P 300mm to Front B'D				
CNT515 - P	4119102163	Ass'y 2P 160mm to Posistor B'D				
CNT507 - P	4119106263	Ass'y 6P 260mm to S/W B'D				
Diodes						
D501	2258599116	Zener, DZ 12BM				
D502L/R	2058306101	1N4148				
D503L/R	2258599116	Zener, DZ 12BM				Domestic
D504 - D529	·	Not used !				
D530L/R	2058306101	1N4148				
D531L/R	2058306101	1N4148				
D532	2058306101	1N4148				
D533	2258599116	Zener, DZ 12BM				
D536	2258599109	Zener, DZ 15BM				
D534/D535	2058306101	1N4148				
D537 - D539	2258106100	1N4002				

Ref. No	Part No.	Description	Remark
D540 - D549	·	Not used !	
D550 - D553	2058100105	1N5402	
D554	2258599109	15BM	
D555 - D563	2258106100	1N4002	
Fuses			
F501 - F502	5508301635	T 500mA/250V	C,D,E,F
F501 - F502	5508201630	NB 500mA/250V	Domestic, B
	5508201621	NB 500mA/125V	A
F503	5508301135	T 200mA/250V	C,D,E,F
	5508101130	SB 200mA/250V	Domestic, B
	5508101121	SB 200mA/125V	A
IC's			
IC501	2168601105	GD7815	
IC502	2168601101	GD7805	
Resistors:All Resistors are 1/5W carbon film ±5% tolerance, unless otherwise specified. M is metal film, M.O is metal oxide and C is cement type.			
R501L/R	3069332970	3.3kΩ	
R502	3069105970	1MΩ	
R503	3069103970	10kΩ	
R504	3069332970	3.3kΩ	
R505L/R	3069102970	1kΩ	
R506L/R	3069471970	470Ω	
R507L/R	3069563970	56kΩ	
R508L/R	3069681970	680Ω	
R509L/R	3069103970	10kΩ	
R510L/R	3069221970	220Ω	
R511L/R	3069472970	4.7kΩ	
R512L/R	3069621970	620Ω	
R513L/R	3069103970	10kΩ	
R514L/R	3069203970	2kΩ	
R515L/R	3069221970	220Ω	
R516L/R	3069221970	220Ω	
R517L/R	3069680970	68Ω	
R518L/R	3069563970	56kΩ	
R519L/R	3069472970	4.7kΩ	
R520L/R	3069103970	10kΩ	
R521L/R	3069471970	470Ω	
R522L/R	3069392970	3.9kΩ	
R523L/R	3069182970	1.8kΩ	
R524L/R	3069103970	10kΩ	
R525L/R	3059478782	C, 0.47Ω 5W	
R526L/R	3059478782	C, 0.47Ω 5W	
R527 - R529	·	Not used !	
R530L/R	3069472970	4.7kΩ	
R531L/R	3069222970	2.2kΩ	
R532L/R	3069153970	15kΩ	
R533L/R	3039100476	M.O 10Ω 1W	
R534L/R	3039100476	M.O 10Ω 1W	
R535L/R	3069473970	47kΩ	
R536L/R	3069101970	100Ω	
R537L/R	3069103970	10kΩ	
R538L/R	3069473970	47kΩ	
R539L/R	3069223970	22kΩ	

Ref. No	Part No.	Description	Remark
R540	3039222476	2.2kΩ M.O 1W	
R541	3069473970	47kΩ	
R542	3069105970	1MΩ	
R543	3069243970	24kΩ	
R544	3069223970	22kΩ	
R545	3069152970	1.5kΩ	
R546	3069101970	100Ω	
R547	3039479476	4.7Ω M.O 1W	
R548	3069562970	5.6kΩ	
R549L/R	3069123970	12kΩ	
R550	3039100476	M.O, 10Ω 1W	
R551	3039271476	270Ω 1W	
R552	3069331970	330Ω	
R553	3039220476	M.O, 22Ω 1W	
R554	3039339476	3.3Ω1W	
Relay			
Relay1	5528001510	DE 24V/3A	
Relay2	5528001510	VS 12MB - NR 12V	
Transistors			
Q501L/R	2208606112	KTC 1302S	
Q502	2208206105	KTA 1015Y	
Q503L/R	2208606108	KTC 2240B	
Q504L/R	2208606108	KTC 2240BL	
Q505L/R	2208206105	KTA 1015Y	
Q506L/R	2028206102	KTA 949Y	
Q507	2208606104	KTC 1815Y	
Q508	2208606114	MPS A06	
Q509	2008607113	2SC 3421Y	
Q510	2008207106	2SA 1358Y	
Q511	2028116104	2SA 1490	
Q512	2028416107	2SC 3854	
Q513 - Q529	·	Not used !	
Q530	2208606114	MPS A06	
Q531	2208606104	KTC 1815Y	
Q532	2208206105	KTA 1015Y	
Q533	2208606104	KTC 1815Y	
Q534 - Q536	2208606104	MPS A06	
Q537 - Q549	·	Not used !	
Q550	2208606104	MPS A06	

Front Board 4002121100

Capacitors

C301L/R	3679223120	Mylar	0.022μF	100V	J	
C302L/R	3679223120	Mylar	0.022μF	100V	J	
C303L/R	3579561130	Ceramic	560pF	50V	J	
C304L/R	3579470130	Ceramic	47pF	50V	J	
C305L/R	3479247971	Electric SA	4.7μF	50V	M	
C306L/R	3579561130	Ceramic	560pF	50V	J	
C307/C308	3479247031	Electric SA	47μF	16V	M	
C309 - C320	·	Not used !				
C321L/R	3579151130	Ceramic	150pF	50V	J	AX5010R only
C321L/R	3579471130	Ceramic	470pF	50V	J	AX5015R only
C322L/R	3679473120	Mylar	0.0047μF	100V	J	AX5010R only
C322L/R	3679683120	Mylar	0.068μF	100V	J	AX5015R only
C323 - C350	·	Not used !				
C351	3579102130	Ceramic	0.001μF	50V	J	AX5010R only
C351	3439147312	Ceramic	0.047μF	5.3V	J	AX5015R only
C352	3439147312	Electric SA	0.047μF	5.3V	M	AX5010R only
C352	3579102130	Ceramic	0.001μF	50V	J	AX5015R only
C353	3479210971	Electric SA	1μF	50V	M	
C354	3479210061	Electric SA	10μF	35V	M	
C355/C356	3529220210	Ceramic	22pF	50V	J	
C357	3579101130	Ceramic	100pF	50V	J	AX5010R only
C357	3579210871	Electric	0.1μF	50V	J	AX5015R only
C358	3579471130	Ceramic	470pF	50V	J	

Connectors

CNT301	4119106403	Ass'y 6P 400mm to Input B'D
CNT302	4119109102	Ass'y 9P 100mm to Volume B'D
CNT304	4119102162	Ass'y 2P 160mm to ST/BY B'D
CNT305	4119104223	Ass'y 4P 220mm to Main B'D
CNT312	4119106202	Ass'y 6P 200mm to Volume B'D
CNT315	4119106303	Ass'y 6P 300mm to Main B'D
CNT317	4119102302	Ass'y 2P 220mm to Switch B'D
CNT322	4119104183	Ass'y 4P 180mm to Volume B'D
CNT200	4358103266	Ass'y 3P 260mm to Volume B'D

Diodes

D351	2058306101	1N4148	
D352	2058306101	1N4148	AX5015R only
D560 - D569	2381215501	LED SLR 54YC3	
D570 - D571	2381215701	LED SLR 54URC3	
D572 - D573	2381215501	LED SLR 54YC3	

IC's

IC301	2168206104	KIA 75559P	
IC302	2138309139	MC 68HC05P1	
IC303	2138009115	MC 14094	AX5010R only
IC303	2168801100	GL 393	AX5015R only

Resistors

R301L/R	3069223970	22kΩ	
R302L/R	3069333970	33kΩ	
R303	·	Not used !	
R304L/R	3069223970	22kΩ	
R305L/R	3069203970	20kΩ	
R306L/R	3069225970	2.2MΩ	
R307L/R	3069471970	470Ω	
R308L/R	3069104970	100kΩ	
R309 - R310	3069470970	47Ω	
R311 - R320	·	Not used !	
R321L/R	3069473970	47kΩ	
R322L/R	3069562970	5.6kΩ	
R322L/R	3069103970	10kΩ	
R323 - R350	·	Not used !	
R351	3069104970	100kΩ	AX5010R only
R351	3069103970	10kΩ	AX5015R only
R352	3069104970	100kΩ	AX5010R only
R352	3069102970	1kΩ	AX5015R only
R353	3069102970	1kΩ	AX5010R only
R353	3069104970	100kΩ	AX5015R only
R354	3069103970	10kΩ	AX5010R only
R354	3069104970	100kΩ	AX5015R only
R355	3069334970	330kΩ	AX5010R only
R355	3069202970	2kΩ	AX5015R only
R356	3069223970	22kΩ	
R357	3069103970	10kΩ	AX5010R only
R357	3069562970	5.6kΩ	AX5015R only
R358/R359	3069472970	4.7kΩ	AX5010R only
R358	3069102970	1kΩ	AX5015R only
R359	3069224970	220kΩ	AX5015R only

Ref. No	Part No.	Description	Remark
R360	3069562970	5.6kΩ	AX5010R only
R360	3069223970	22kΩ	AX5015R only
R361	3069223970	22kΩ	AX5010R only
R361	3069103970	10kΩ	AX5015R only
R362	3069103970	10kΩ	AX5010R only
R363	3069472970	4.7kΩ	AX5010R only
R364	3069223970	22kΩ	AX5010R only
R365	3069103970	10kΩ	AX5010R only
R366	3069102970	1kΩ	AX5010R only
R367 - R369	3069154970	150kΩ	AX5010R only
R370 - R372	3069104970	100kΩ	AX5010R only
R373 – R375	3069474970	470kΩ	AX5010R only
R376 - R378	3069105970	1MΩ	AX5010R only
R379	3069104970	100kΩ	AX5010R only
R380	3069106970	10MΩ	AX5010R only
R381 - R383	3069103970	10kΩ	AX5010R only
R384 - R386	3069104970	100kΩ	AX5010R only
R385	3069103970	10kΩ	AX5010R only
R387 - R392	3069103970	10kΩ	AX5010R only
R393 - 395	3069681970	680kΩ	
R362 - R366	3069154970	150kΩ	AX5015R only
R367 - R371	3069753970	75kΩ	AX5015R only
R372 - R374	3069334970	330kΩ	AX5015R only
R375	3069223970	22kΩ	AX5015R only
R376 - R380	3069103970	10kΩ	AX5015R only
R381	3069102970	1kΩ	AX5015R only
R382	3069335970	3.3MΩ	AX5015R only
R383	3069103970	100kΩ	AX5015R only
R384 - R389	3069103970	10kΩ	AX5015R only
R390 - R392	3069471970	680Ω	AX5015R only
	3938101830	Resonator, CSA 4.00MG	
Transistors			
Q351 - Q361	2208060610 4	KTC 1815Y	AX5010R only
Q351 - Q359	2208060610 4	KTC 1815Y	AX5015R only

Ref.No	Part No.	Description	Remark

Switch Board 4002121020

Capacitors			
C701L/R	3579561130	Ceramic 560pF 50V J	
Connectors			
CNT706 - P	4358112354	Ass'y 12p 350 To Speaker Board	
CNT705	4119106263	Ass'y 6p 260 To Main Board	
Resistors			
R701L/R	3039471576	M.O. 470Ω 2W	

Ref.No	Part No.	Description	Remark

Input Board 4002121010

Capacitors			
C101	3579473530	Ceramic 0.047 μF 50V Z	
C102L/R	3579220130	Ceramic 22pF 50V J	
C103L/R	3579680130	Ceramic 68pF 50V J	
C104L/R	3479210061	Electric SA 10 μF 35V M	
C105L/R	3579100030	Ceramic 10pFF 50V J	
C106L/R	3409210121	Electric SA 100 μF 10V M	
C107L/R	3679182120	Mylar 0.0056 μF 100V J	

Ref. No	Part No.	Description	Remark
C108L/R	3679182120	Mylar 0.0018 μF 100V J	
C109L/R	3579222530	Ceramic 2200pF 50V Z	
C110L/R	3479268871	Electric SA 0.68 μF 50V M	
C111L/R	3679562120	Mylar 0.0056 μF 100V J	
C112/C113	3479247031	Electric SA 47 μF 16V M	
C114 - C119L/R	3579101130	Ceramic 100pF 50V J	D
C120 - C124L/R	3579101130	Ceramic 100pF 50V J	D
C125	3479210971	Electric SA 1 μF 50V M	
C126 - C129	3479247031	Electric SA 47 μF 16V M	
C130L/R	3579471130	Cermic 470pF 50V J	
C131L/R	3479247971	Electric SA 4.7 μF 50V M	
C132L/R	3579471130	Ceramic 470pF 50V J	
C133 - C135L/R	3579101130	Ceramic 100pF 50V J	
Connectors			
CNT102	4119106302	Ass'y 6p 300 to Volume Boards	
CNT103	4119106403	Ass'y 6p 400 to Front Boards	
Coil			
L101L/R	2648601470	Inductor 50μH	D
Diode			
D101	2058306101	1N4148	
IC's			
IC101/IC102	2168206104	KIA 7555OP	
IC103	2168017132	LC 7821	
Resistors			
R101L/R	3069102970	1kΩ	
R102L/R	3069913970	91kΩ	
R103L/R	3069913970	91kΩ	
R104L/R	3069911970	910Ω	
R105L/R	3069564970	560kΩ	
R106L/R	3069433970	43kΩ	
R107L/R	3069471970	470kΩ	
R108L/R	3069104970	100kΩ	
R109 - R110	3069471970	470kΩ	
R111 - R116L/R	3069104970	1kΩ	
R117L/R	3069104970	100kΩ	
R118/R119	306911970	100kΩ	
R120/R121	3069471970	470kΩ	
R123L/R	3069471970	470kΩ	
R124L/R	3069472970	47kΩ	
R125L/R	3069471970	470kΩ	
R126L/R	3069472970	4.7kΩ	
R127L/R	3069102970	1kΩ	
R128L/R	3069102970	1kΩ	
R129/R131	3069103970	10kΩ	

Ref. No	Part No.	Description	Remark

Speaker Board 4002121050

Capacitors			
C601L/R	3579472530	Ceramic 4700pF 50V J	D
C602L/R	3579472530	Ceramic 4700pF 50V J	D
C603 - C610		Not used !	
C611L/R	3579472530	Ceramic 4700pF 50V J	D
C612L/R	3579472530	Ceramic 4700pF 50V J	D
Connectors			
CNT605	4119104303	A'ssy 4p 300 To Main B'D	

Ref. No	Part No.	Description	Remark
CNT607 - P	4358112354	A'ssy 12p 350 To Switch B'D	

Ref.No	Part No.	Description	Remark
Volume Board 4002121110			
Capacitors			
C201L/R	3479247971	Electric SA 4.7㎌ 50V M	
C202L/R	3579470130	Ceramic 47pF 50V J	
C203L/R	3409210121	Electric SA 100㎌ 10V M	
C204L/R	3579331130	Ceramic 330pF 50V J	
C205L/R	3579220130	Ceramic 22pF 50V J	
C206L/R	3479210061	Electric SA 10㎌ 35V M	
C207L/R	3579102530	Ceramic 1000pF 50V J	
C208 - C210	·	Not used !	
C211L - C213	3479210131	Electric SA 100㎌ 16V M	
Connectors			
CNT201	4119106302	Ass'y 6P 300 To input Board	
CNT202	4119102101	Ass'y 2P 100 To Volume LED Board	
CNT203	4119109102	Ass'y 2P 100 To Front Board	
CNT213	4119106202	Ass'y 6P 200 To Front Board	
CNT200	4358103266	Ass'y 3P 260 To Front Board	
IC's			
IC201	2168206104	KIA 75559P	
IC202	2168007204	TA 729 - 1S	
Resistors			
R201L/R	3069102970	1kΩ	
R202L/R	3069473970	47kΩ	
R203L/R	3069472970	4.7kΩ	
R204L/R	3069333970	33kΩ	
R205L/R	3069471970	470Ω	
R206L/R	3069104970	100kΩ	
R207 - R208	3069470970	47kΩ	
R209	·	Not used !	
R209	3069362970	3.6kΩ	AX5015R only
R210	3069362970	3.6kΩ	AX5010R only
R210	3069223970	22kΩ	AX5015R only
R211	3069330970	33Ω	AX5010R only
R211	3069330970	33kΩ	AX5015R only
R212	3069223970	22kΩ	AX5010R only
R212	3069103970	10kΩ	AX5015R only
R213	3069103970	10kΩ	AX5010R only
R213	3069432970	4.3kΩ	AX5015R only
R214	3069432970	4.3kΩ	AX5010R only
R214	3069224970	220kΩ	AX5015R only
Transistor			
Q211	2208206113	MPS A56	

Ref. No	Part No.	Description	Remark
Volume LED Board 4002121150			
Connector			
CNT202	4119102101	Ass'y 2p 100 To Volume Board	
Diode			
D201	2308220140	LED SLC - 22 VR5	

Ref.No	Part No.	Description	Remark
Outlet Board (D) 4002121040/(A) 4002121130			
Fuses			
F901	5508302534	T 2.5V/250V	D
F801	5508202521	NB 2.5A/125V	A

Ref.No	Part No.	Description	Remark
Volume Selector Board(DOM)4002121030/(B) 4002121120			
Fuses			
F801	5508203030	NB 5A/250V	DOM,AX5015R only
F802	5508202530	NB 2.5A/250V	DOM,AX5015R only
F801	5508202030	NB 5A/250V	B
F802	5508202530	NB 2.5A/250V	B

Ref.No	Part No.	Description	Remark
ST/BY Board 40021211140			
Connector			
CNT403	4119102162	Ass'y 2P To Fornt Board	
D401	2308220140	Diode, LED SLD SLC - 22 UR5	

Ref.No	Part No.	Description	Remark
Remocon Board 4003113000/(DOM)4003113000			
Capacitors			
C801	3409247021	Electric 47㎌ 10V	AX5010R only
C802	3579103530	Ceramic 0.01㎌ 50V	AX5010R only
C803 - C804	3579101130	Ceramic 100pF 50V	AX5010R only
C801 - C802	3579101130	Ceramic 100pF 50V	DOM,AX5015R only
C803	3409247021	Electric 47㎌ 10V	DOM,AX5015R only
Diodes			
D802	2408001100	LED IREL2	AX5010R only
D801	2408001100	LED IREL2	DOM,AX5015R only
IC			
IC801	2138313140	MN158141KA - A	AX5010R only
Transistors			
Q801	2208606112	KTD1302S	DOM, AX5015R only
Q802	2208606112	KTD1302S	AX5010R only
Resistors			
R801	3069229970	2.2Ω	AX5010R only
R801 - R805	3069224970	220kΩ	DOM, AX5015R only
	3938001001	Resonator, CSB455E	

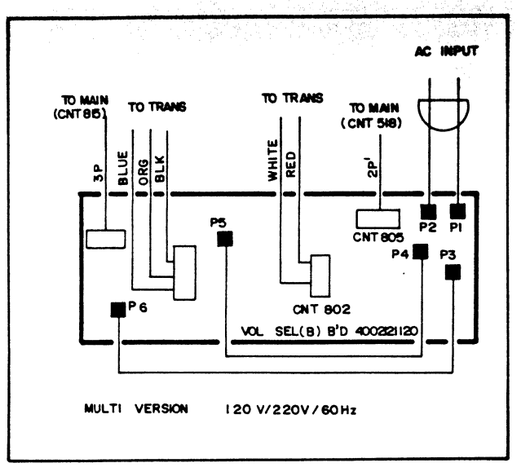
Mechanical Parts List

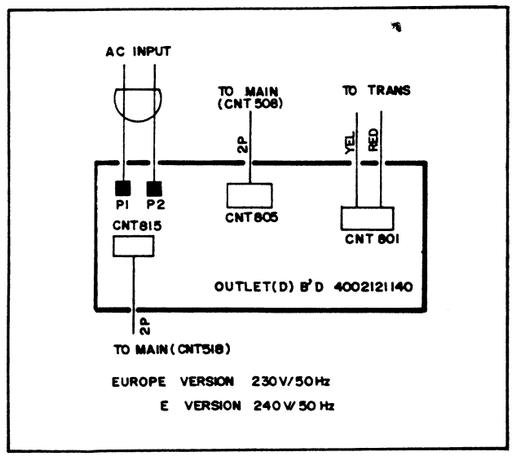
No.	Description	Part No.	Q'ty	Remark
1	Panel Front Black	048501019312	1	Domestic
(1)	Panel Front Black	048501019311	1	AX5010R only
2	Badge	048535032511	1	Domestic
(2)	Badge(Sherwood)	048535031911	1	
3	Knob Tone Black	048545081911	3	
4	Window Display	048555033611	1	
5	Inlay	048535032611	1	
6	Diffuser	8535032810	1	
7	Knob VR	8543032910	1	
8	LED SLC22 VR5	2308220140	2	
9	Shield Motor VR	6165136610	1	
10	VR RK16Y	3208054310	1	AX5010R only
(10)	VR Motor	3208060310	1	Domestic
11	Button Tact (8Key)	8543032810	1	
12	Holder LED	6063004010	1	
13	Button Mono	8545081710	3	
14	Shield Push Switch	6165136810	1	
15	Switch Tact	4658003710	7	
16	Button Direct	8545081810	1	
17	Switch Push Direct	4628056910	1	
18	Sensor	2408000131	1	
19	Washer Plan	8305003810	1	
20	Chassis Front	6122212610	1	
21	Switch Vertical	4658004010	1	
22	Button Tact Power	8545081510	1	
23	Button Speaker	8545081610	2	
24	Switch Push	4628043810	2	
25	Jack Phones	4438006010	1	
26	Bracket Phones	6505107310	1	
27	Shield Tone VR	6165136710	1	
28	Switch Push (3Key)	4628058110	1	
29	LED SLR54YCD	2381215501	12	
30	Power Transformer	2828081907	1	Domestic
(30)	Power Transformer	2828080107	1	D
31	Foot (Gold/R)	046033101711	4	Domestic
(31)	Foot (Gold)	046033101611	4	
32	Switch Push SDJL 4	4618006510	1	Domestic
33	Switch Push SDJL 2	4618006610	1	Domestic
34	Terminal Speaker	4408105510	1	
35	Jack RCA (4P)	4438103410	1	
36	Jack RCA (2PGreen)	4438107610	1	
37	Jack RCA (2PGround)	4438107810	1	
38	Jack RCA (6P)	4438103510	2	
39	Cover Bottom	6122416310	1	
40	Cover Top Black	046122020011	1	
41	Frame Left	6122631210	1	
42	Bracket Heatsink	6503018310	1	
43	Heatsink	7502003010	1	
44	Bracket Heatsink(R)	6505081610	2	
45	Holder Power TR	6515002312	2	
46	Frame Right	6122620310	1	
47	Outlet Black	4448103910	2	Domestic
(47)	Outlet Black	4448102810	2	AB
(47)	Outlet Black	4448103610	2	C,D,F
48	Chassis Back Black	046102029611	1	Domestic
(48)	Chassis Back Black	046102029621	1	A
(48)	Chassis Back Black	046102029631	1	B
(48)	Chassis Back Black	046102029641	1	C
(48)	Chassis Back Black	046102029651	1	D
(48)	Chassis Back Black	046102029661	1	E
(48)	Chassis Back Black	046102029671	1	F
49	Cord Stopper Black	6513000310	1	Domestic
(49)	Cord Stopper Black	6518000710	1	A,B
(49)	Cord Stopper Black	6518000111	1	C,D,E,F
50	Cord AC Power Black	4308001610	1	Domestic
(50)	Cord AC Power Black	4308001410	1	A,B
(50)	Cord AC Power Black	4308000430	1	C,D,F
(50)	Cord AC Power Black	4308003610	1	E
51	Adadter	4428300310	1	Domestic B
52	Plug Jumper	4328204210	2	
53	System Ground	4408104910	1	
54	VR KK12K1240	3208054110	2	
55	VR 100KMN	3208054210	1	
56	LED SLR 54URC	2381215701	2	

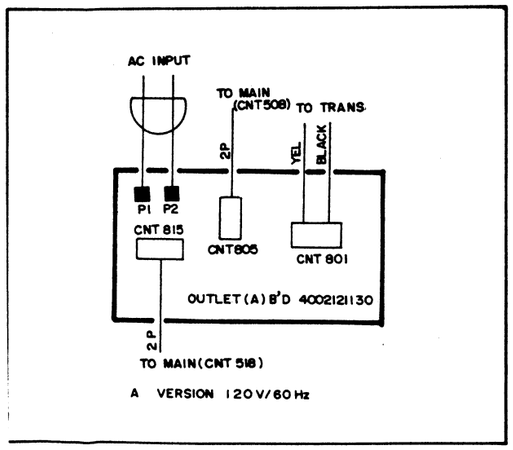
Screws

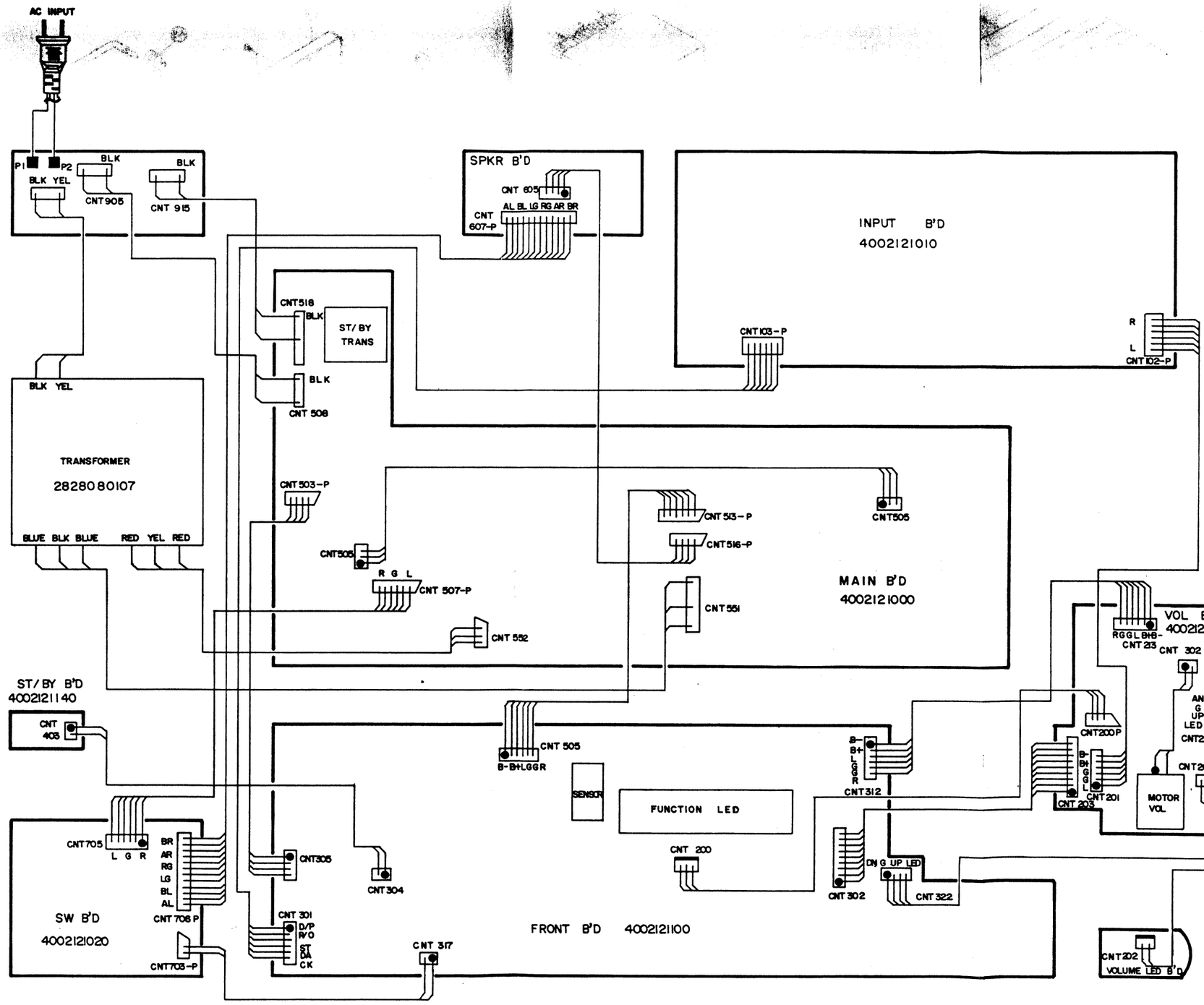
S1	WSAM 4×8 ZNB	8159440083	8	
S2	2 BTC 3×8 ZNB	8109230083	51	
S3	2 BTC 3×6 ZNB	8109230063	20	
S4	2 WPTC 3×8 ZNB	8159230083	4	
S5	2 PTC 4×6 ZNY	8119240061	1	
S6	HEX MSPW 3×12 ZNY	8099130121	4	

Wiring Diagram

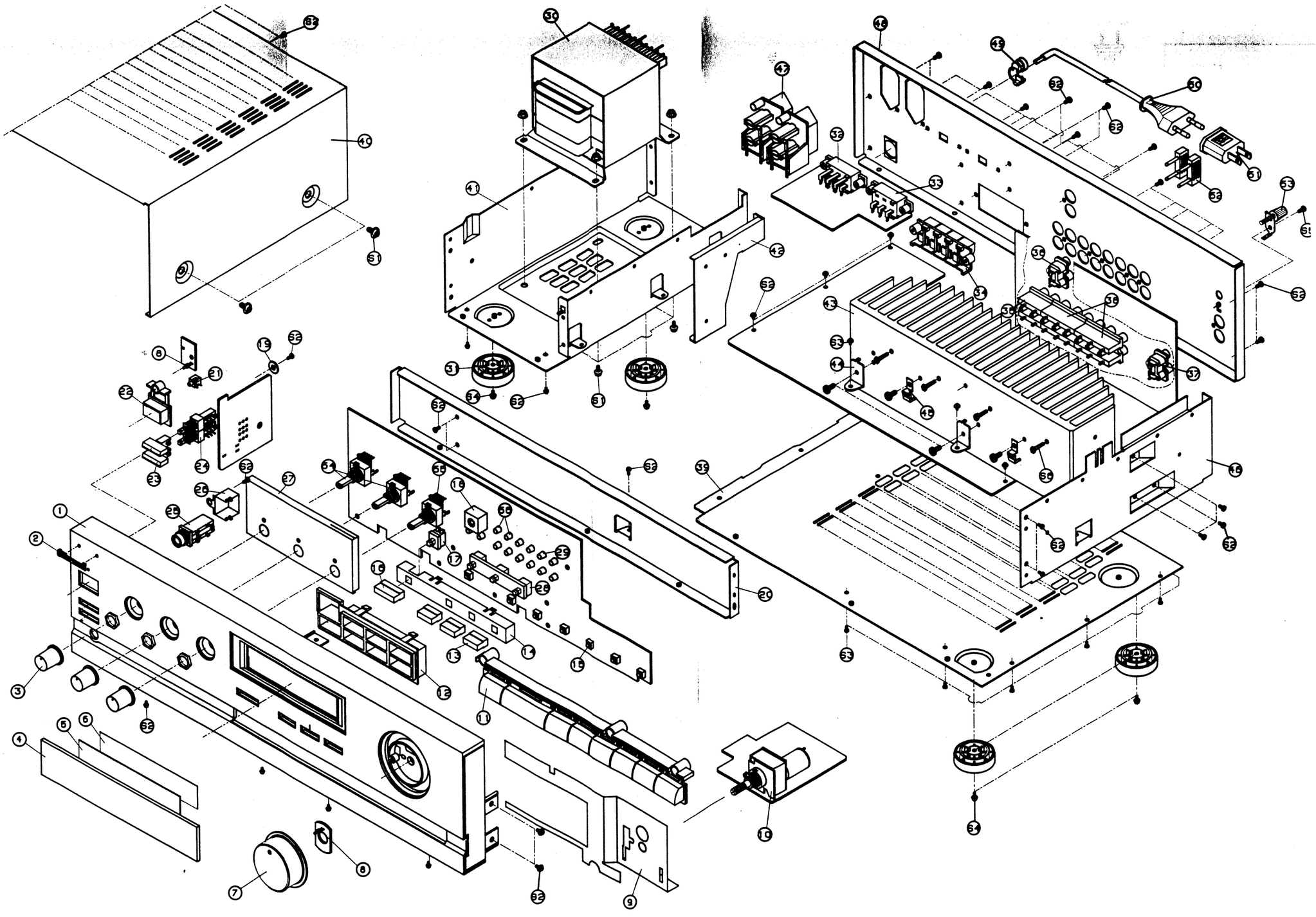






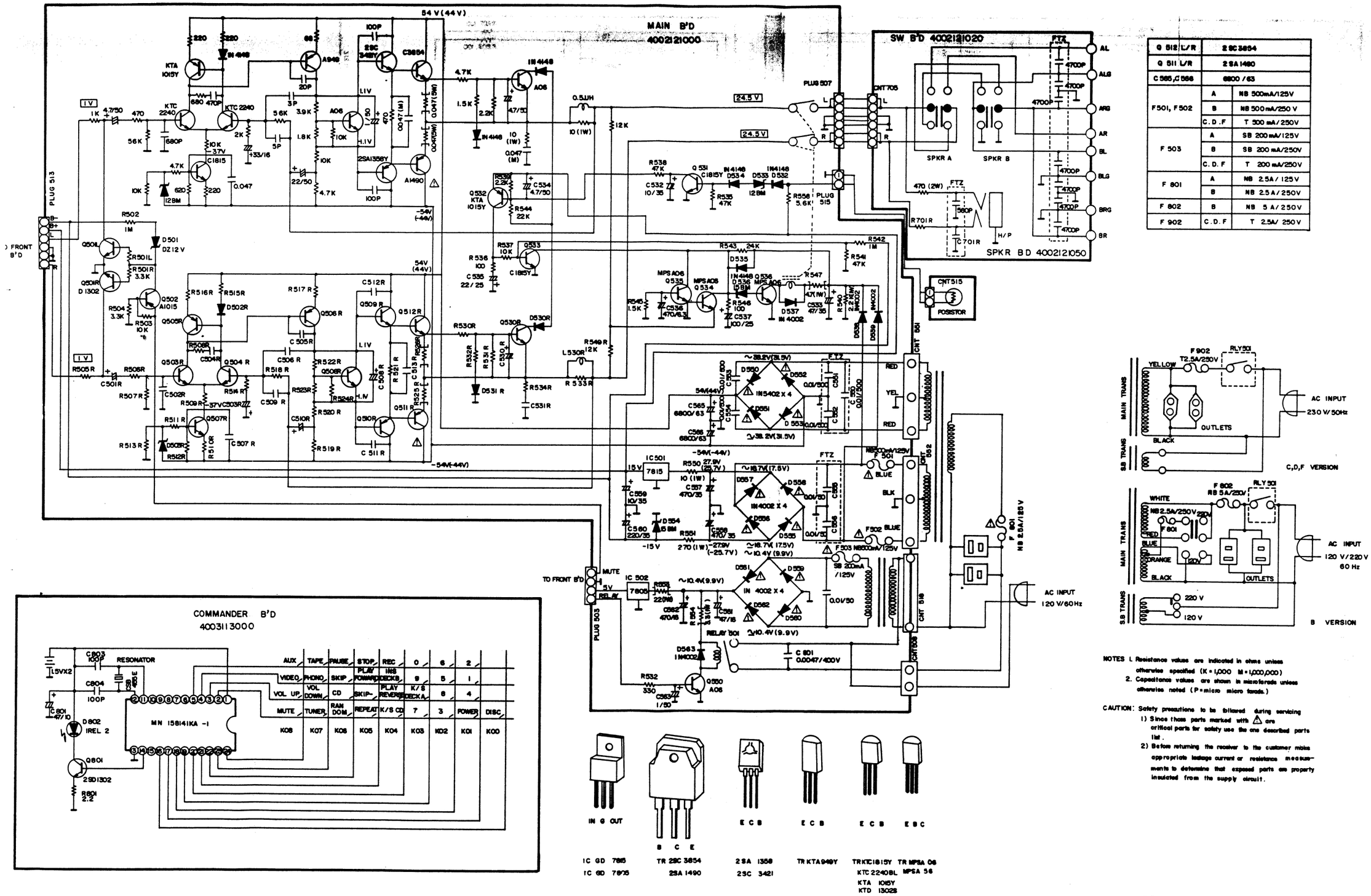


Exploded View



Schematic Diagram

AX-5010R(I)



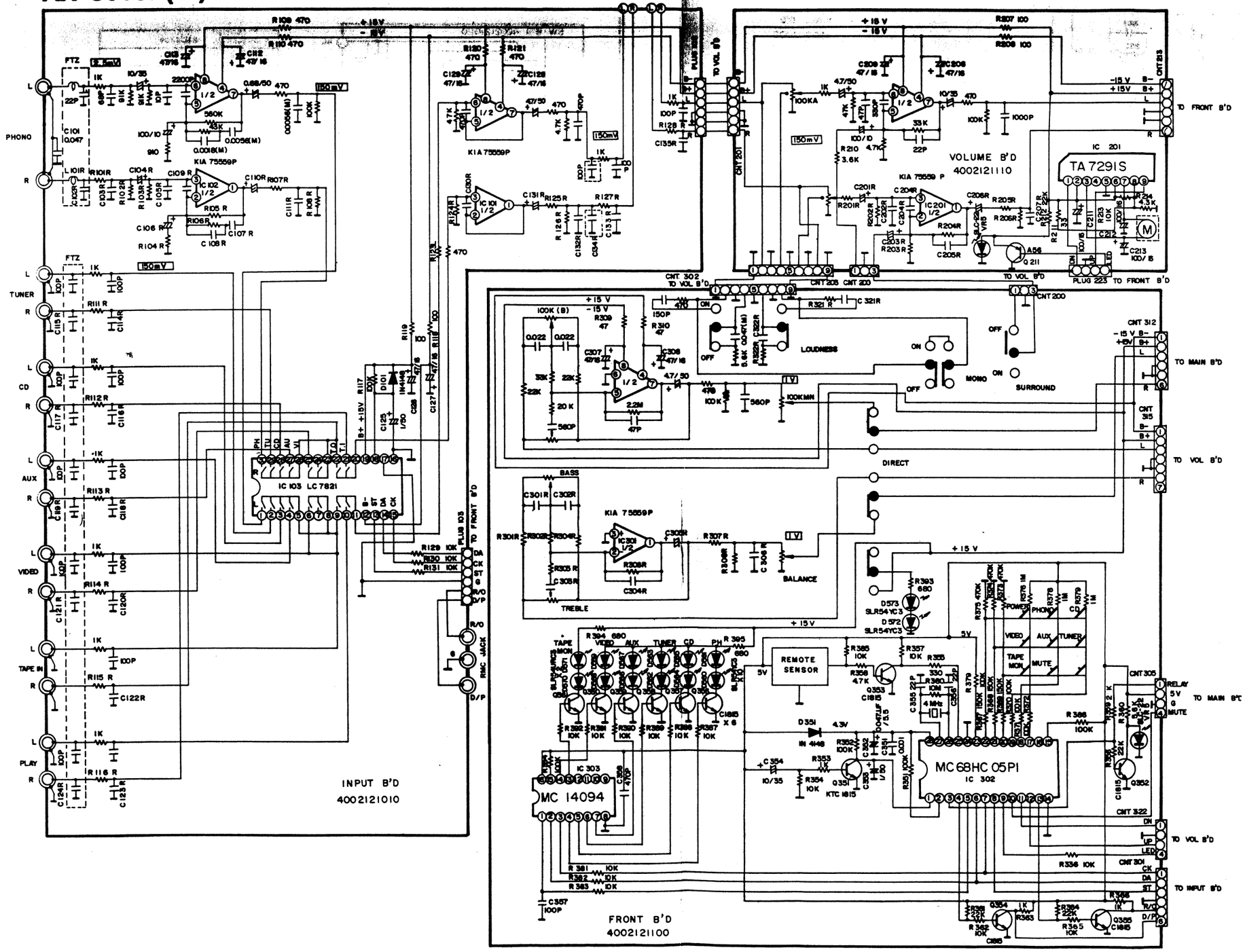
Q 512 L/R	2 SC 3854	
Q 511 L/R	2 SA 1490	
C 565, C 566	6800 / 63	
F501, F502	A	NB 500mA/125V
	B	NB 500mA/250 V
	C.D.F	T 500 mA/250V
F 503	A	SB 200 mA/125V
	B	SB 200 mA/250V
	C. D. F	T 200 mA/250V
F 801	A	NB 2.5A / 125 V
	B	NB 2.5 A / 250 V
F 802	B	NB 5 A / 250 V
F 902	C.D.F	T 2.5A/ 250 V

NOTES 1. Resistance values are indicated in ohms unless otherwise specified (K = 1,000 M = 1,000,000)
2. Capacitance values are shown in microfarads unless otherwise noted (P = micro micro farads.)

CAUTION: Safety precautions to be followed during servicing
1) Since those parts marked with ⚠ are critical parts for safety use the one described parts list.
2) Before returning the receiver to the customer make appropriate leakage current or resistance measurements to determine that exposed parts are properly insulated from the supply circuit.

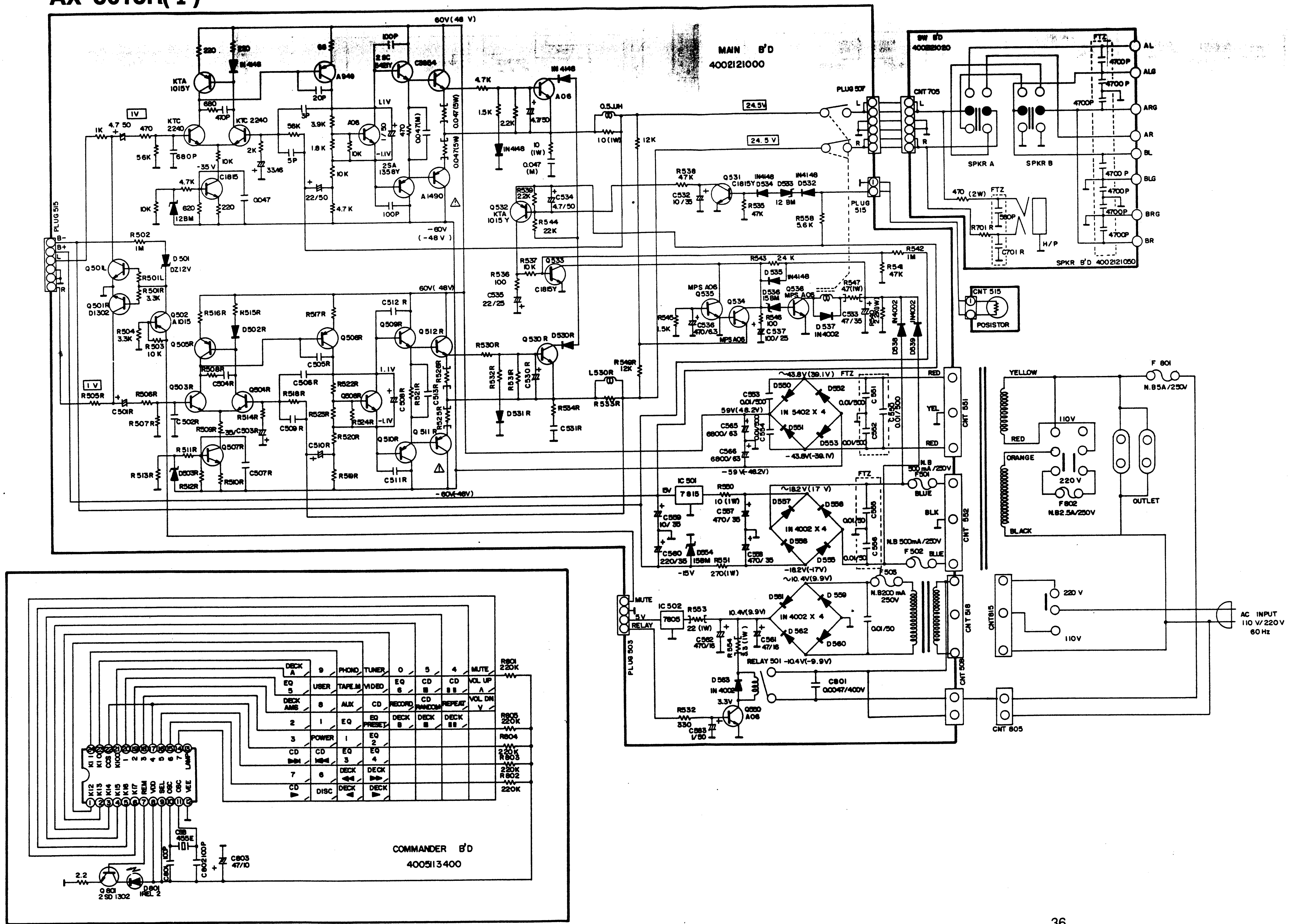
Schematic Diagram

AX-5010R(II)

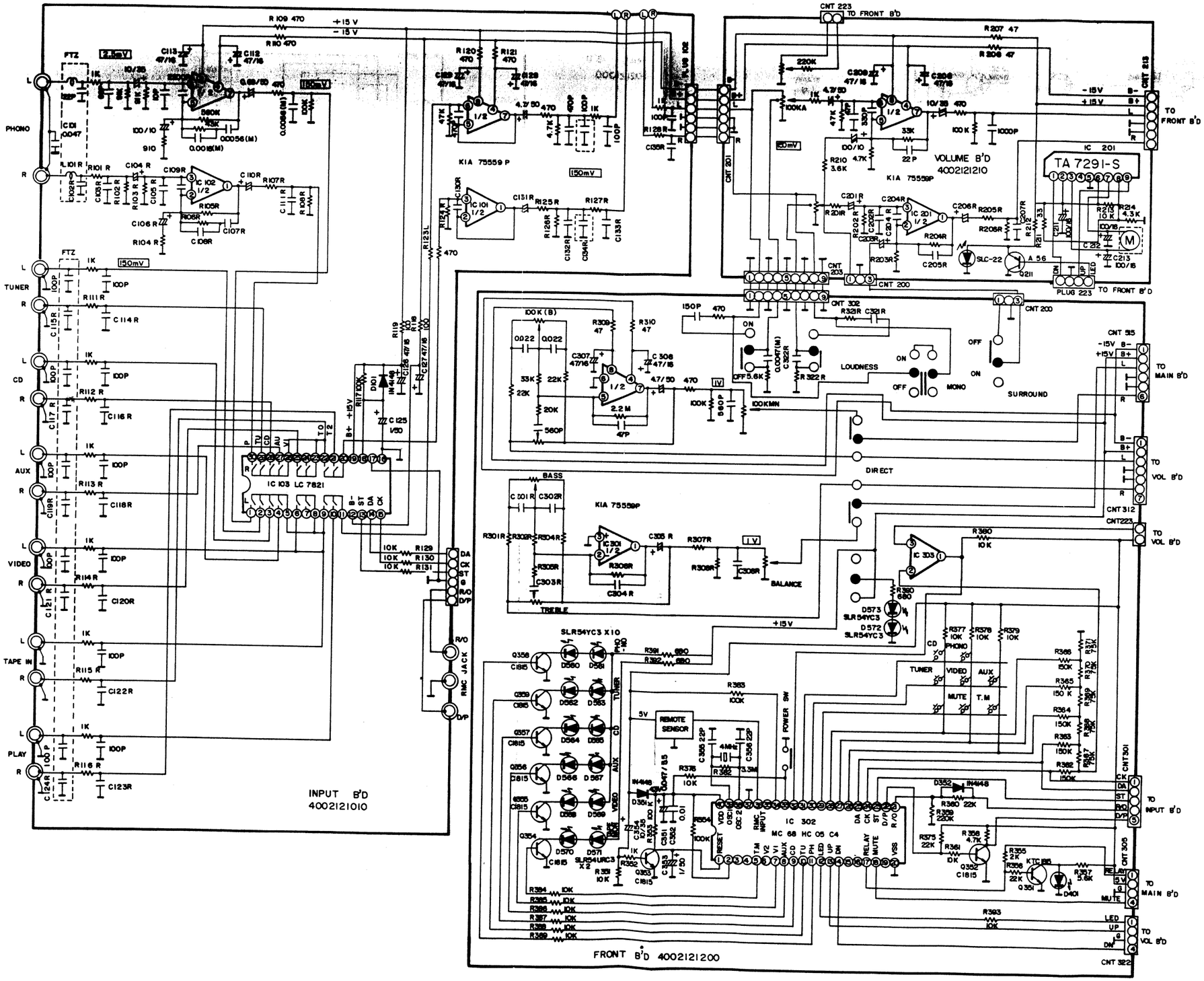


Schematic Diagram

AX-5015R(I)



Schematic Diagram
AX-5015R(Ⅱ)



WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHATSOEVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

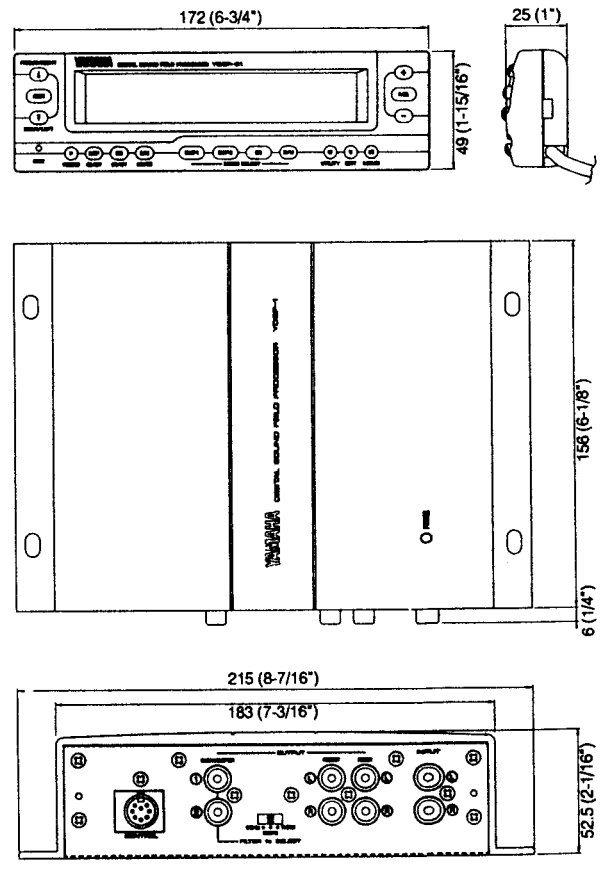
If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

■ SPECIFICATIONS

Output Level/Impedance	1.5V/560Ω
Input Sensitivity/Impedance	1.5V/20kΩ
Frequency Response	20Hz—20kHz
Total Harmonic Distortion (20Hz—20kHz)	
Output Level 1.5V,	
20kHz LOW PASS FILTER	Less than 0.03%
Signal-to-Noise Ratio (IHF-A Network)	More than 90dB
Equalizer Band	9-band
Center Frequency	63, 125, 250, 500, 1k, 2k, 4k, 8k, 16kHz
Boost/Attenuation	±12dB (2dB per a step)
Subwoofer Frequency	
(THROUGH, 130Hz, 80Hz)	–6dB/oct.
Audio Muting	–20dB
DSP Preset Programs	8 (HALL, CHAMBER CHURCH, STADIUM, JAZZ CLUB, ROCK CON, DISCO, THEATER)
DSP User Programmable Areas	8
EQ Preset Programs	4 (POPS, VOCAL, CLASSIC, FLAT)
EQ User Programmable Areas	4
Power Supply	14.4V
Power Consumption	800mA (Less than 1mA for memory back up)
Dimensions (W x H x D)	
Main Unit	215 x 52.5 x 162mm (8-7/16" x 2-1/16" x 6-5/16")
Commander Unit	172 x 25 x 49mm (6-3/4" x 1-1/16" x 1-15/16")
Weight	
Main Unit	1.5kg (3lbs. 5oz.)
Commander Unit	0.2kg (7oz.)
Accessories	Commander unit
	4.5m extention cable
	Power cords
	Frame
	Mounting hardware
	Magic fastener x2
	5 x 6 tapping hex screw with washer x4
	M2 x 5 screw x4
	M5 x 8 flat head screw x4
	M5 x 8 hex screw with washer x4

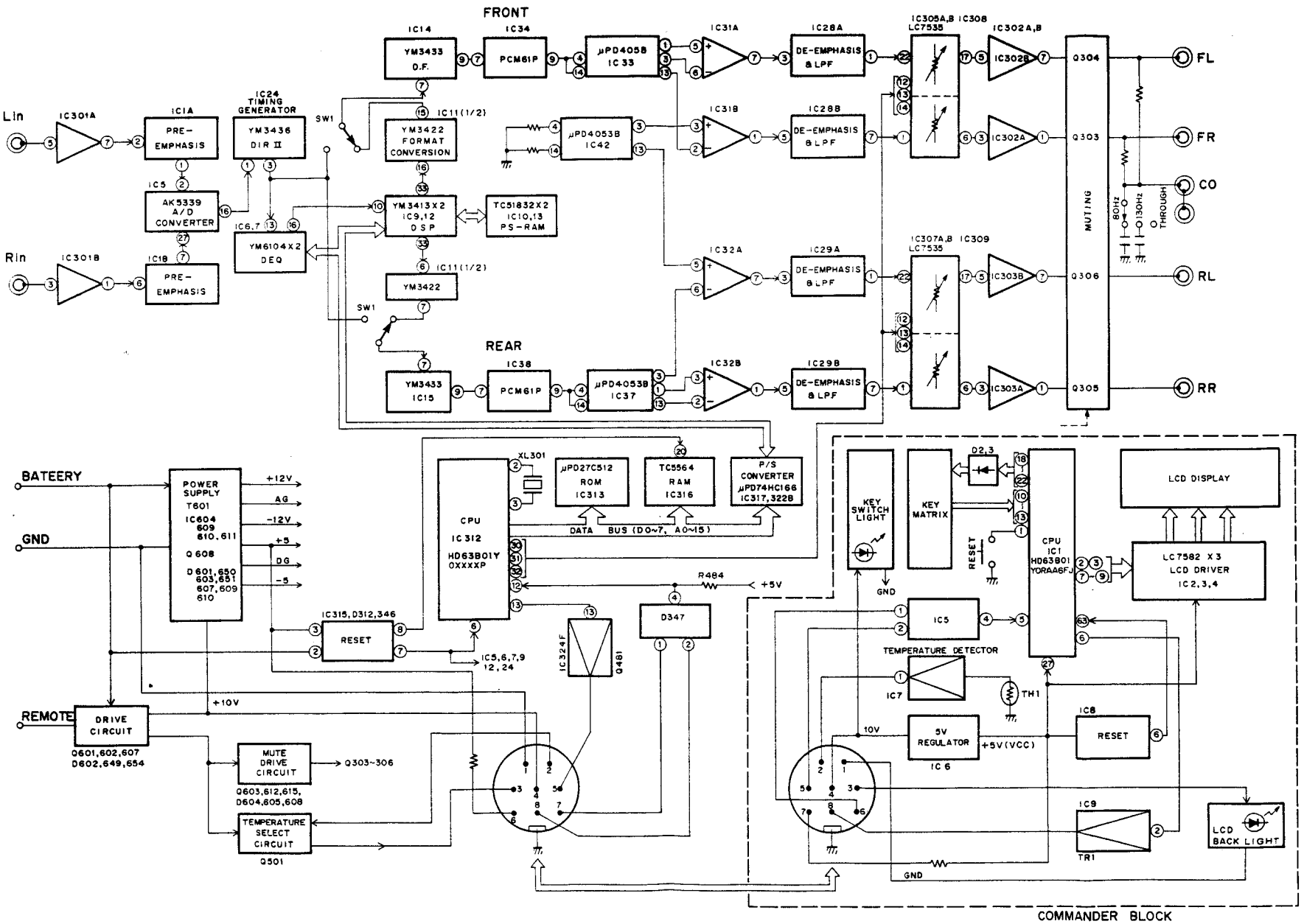
* *Specifications subject to change without notice.*

● **DIMENSIONS**

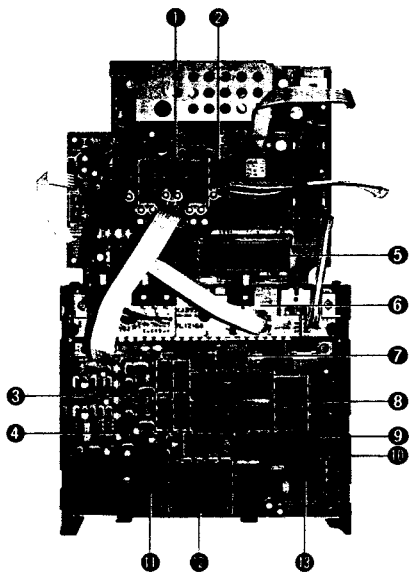


Unit : mm (inch)

■ BLOCK DIAGRAM



■ INTERNAL VIEW



❶ IC308, 309 : LC7535 (Electric Controlled Volume)
❷ MAIN CIRCUIT BOARD
❸ IC34, 38 : PCM61P (DAC)
❹ DSP CIRCUIT BOARD
❺ IC312 : HD63B01Y0XXXXP (8 bit μ-COM)
❻ I/O CIRCUIT BOARD
❼ IC11 : YM3422 (Digital Signal Format Converter)
❽ IC10, 13 : TC51832FL-10 (RAM)
❾ IC9, 12 : YM3413 (LDSP)
❿ IC14, 15 : YM3433 (Digital Filter)
⓫ IC5 : AK5339-VP (A/D Converter)
⓬ IC6, 7 : YM6104 (Digital Equalizer)
⓭ IC24 : YM3436 (Digital Format Interface Receiver)

■ DISASSEMBLY PROCEDURES

(Remove parts in the order as numbered.)

1. Removal of Top Cover Ass'y

a. Remove 4 screws (①) in Fig. 1.

2. Removal of Shield Plate (B)

a. Removal 5 screws (②, ③) in Fig. 1.

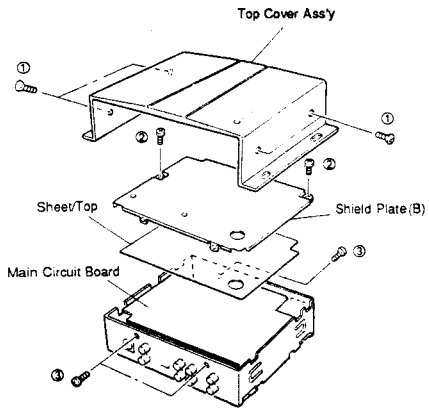


Fig. 1

3. Removal of Main Circuit Board

a. Remove 7 screws (④) in Fig. 2 and then remove the Sub Panel (R).

b. Remove 4 screws (⑤) in Fig. 2 and then remove the Main Circuit Board.

* Remove 3 connectors (#1, #4, #5) from DSP Circuit Board.

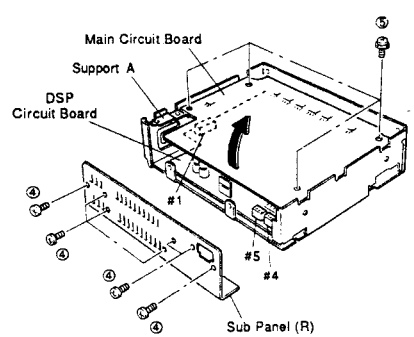


Fig. 2

■ CHIP DEVICE DESCRIPTIONS

CAUTION : AFTER REMOVING CHIP DEVICES, DONOT REUSE THEM.

1. KINDS OF CHIP DEVICES

There are five kinds of chip devices :

a. Thick film chip resistors
b. Multi-layer ceramic chip capacitors
c. Mini-mould (Chip) transistors
d. Mini-mould (Chip) diodes
e. Mini-mould (Chip) ICs

2. IDENTIFICATION OF CHIP DEVICES

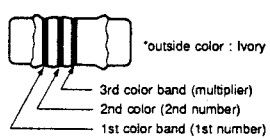
The first four kinds of chip devices have similar shape and size, and it is quite difficult to identify them at a glance, but basically, the following identification is available:

a. Resistors and Jumper Resistors

The resistance of each chip resistor is indicated by a color code consisting of three color bands.

Color codes

Color	1st color band	2nd color band	3rd color band
	Nominal resistance (Unit : Ω)		
	1st number in code	2nd number in code	Multiplier
Black	0	0	10^0
Brown	1	1	10^1
Red	2	2	10^2
Orange	3	3	10^3
Yellow	4	4	10^4
Green	5	5	10^5
Blue	6	6	
Purple	7	7	
Gray	8	8	
White	9	9	
Gold			10^{-1}

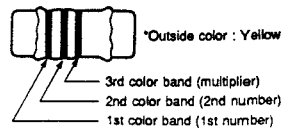


b. Ceramic Capacitors

A color code is used to indicate the capacitance of capacitors less than 1000pF.

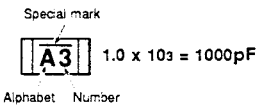
Color codes

Color	1st color band	2nd color band	3rd color band
	Nominal capacitance (Unit : pF)		
	1st number in code	2nd number in code	Multiplier
Black	0	0	10^0
Brown	1	1	10^1
Red	2	2	10^2



Capacitors exceeding 1000pF in capacitance have a 2 character indication of the capacitance value. For example, "A3" stands for 1000pF.

Example :



● Indication Code Definitions

Alphabet ..... The numerical value of the electrostatic capacity.
Number ..... The value of the multiplier.
Special mark ..... Temperature characteristic.

● Electrostatic capacity

<Alphabet>

Alphabet	A	B	C	D	E	F	G	H	J	K	L	M
Numerical value	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0

Alphabet	N	P	Q	R	S	T	U	V	W	X	Y	Z
Numerical value	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1

Alphabet	a	b	d	e	f	m	n	t	y
Numerical value	2.5	3.5	4.0	4.5	5.0	6.6	7.6	8.0	9.0

<Number>

Number	0	1	2	3	4	5	6	7	8	9
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^8	10^{-1}

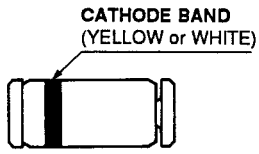
c. Transistors

Transistor can be identified by a character code consisting of any combination of letters and numbers. Given below is a cross-reference table of identification codes : use it to identify each device.

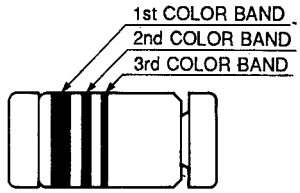
Indication	Part No.	Description	HFE rank
BQ	iC241200	Transistor 2SC2412	Q-rank
BR	iC241200	Transistor 2SC2412	R-rank
BS	iC241200	Transistor 2SC2412	S-rank
CCB	VG730700	Transistor 2SC3326	B-rank
14	VB503600	Digital Transistor DTA114EK	
24	VB504700	Digital Transistor DTC114EK	
A3	VK625100	Diode Array	

d. Diodes and Zener Diodes

Each diode has a yellow or white band (cathode band) on its cathode side as shown below:



The zener diode has three color bands as shown below:



The 1st and 2nd color bands indicate the model as a number assigned to each color as listed in Table 1. Referring to Table 1, read the code number by converting the colors of the bands into the corresponding numbers and then find the model code in Table 2.
The number in the model code indicates the zener voltage. The 3rd color band on the zener diode indicates the subdivision of the zener voltage.

COLOR	1st color band 1st number in code	2nd color band 2nd number in code	3rd color band Zener voltage Subdivision
Black	0	0	—
Brown	1	1	—
Red	2	2	—
Orange	3	3	—
Yellow	4	4	A
Green	5	5	B
Blue	6	6	C
Purple	7	7	—
Gray	8	8	—
White	9	9	D

Table 1

RLZ Series Zener Code No. and Model Code Cross-reference Table.

Zener Code No.	Model Code	Zener Code No.	Model Code	Zener Code No.	Model Code
07	RLZ3.6	16	RLZ8.2	25	RLZ20
08	RLZ3.9	17	RLZ9.1	26	RLZ22
09	RLZ4.3	18	RLZ10	27	RLZ24
10	RLZ4.7	19	RLZ11	28	RLZ27
11	RLZ5.1	20	RLZ12	29	RLZ30
12	RLZ5.6	21	RLZ13	30	RLZ33
13	RLZ6.2	22	RLZ15	31	RLZ36
14	RLZ6.8	23	RLZ16	32	RLZ39
15	RLZ7.5	24	RLZ18		

Table 2

As explained above, you can identify chip devices tentatively, but actual identification should be made by referring to the parts layout drawing in the service manual.

3. SPECIAL NOTICE FOR HANDLING CHIP DEVICES

Chip devices are not heatproof or shockproof. Use caution when handling them.

a. For shock provention

Chip devices are made of ceramic moulding, please do not subject them to direct shock.

- Set the chip device flat onto the printed circuit board.
- Do not apply unnecessary stress to the chip device. When soldering two terminals of the chip device, soldering is done one terminal at s time. Sometimes, when one terminal is soldered, the other unsoldered terminal will lift slightly. In these cases, do not try to push down the lifted terminal using the tip of the soldering iron; you may crack the chip device or break the terminals.

b. For heat prevention

Do not apply high temperature to chip devices for long periods. Soldering should be done quickly.

c. Soldering

- Chip devices can not withstand rapid heating or cooling. Do not heat the chip itself; heat the terminals of chip devices only.
- Solder quickly, excessive soldering time will cause damage to chip devices.
- Try to reduce amount of solder when soldering. The mount of solder will effect the extent of chip bending against the printed circuit board. Refer to the proper amount of solder as shown below.

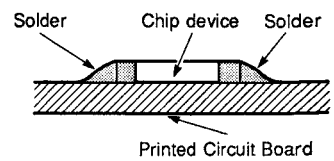


Fig. 5

d. Soldering iron

When soldering chip devices, use the correct soldering iron.

- Soldering iron
  The power of the soldering iron should be less than 30 watts. The diameter of the iron should be about 2 mm.
- Temperature of iron tip.
  The temperature of the soldering iron tip should be less than 536°F. (280°C)

e. Mounting chip device onto printed circuit board

- Set chip devices as close as possible to the surface of the printed circuit board.
  Do not apply unnecessary pressure to chip devices to try to make it close to the surface of printed circuit board.
  Try to keep the distance between the chip device and the surface of the printed circuit board less than 0.5mm.
- Do not connect (solder) wire or terminals of otherparts to a terminal of a chip device.
- Do not mount chip devices incorrectly, such as in (b), (c) and (d), below.

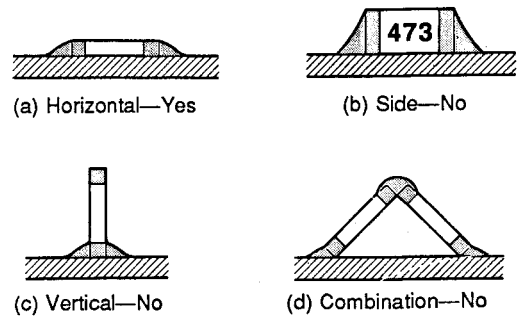


Fig. 6

f. Removal of defective device for repair

When removing chip devices with a fork tipped iron, heat the chip device with the fork tip and slide the chip device off.
When you are going to remove the chip devices using a regular tipped iron, alternately heat the two terminals of the chip device about 2 or 3 times and slide the chip device off. Slide chip device only in the direction shown below.

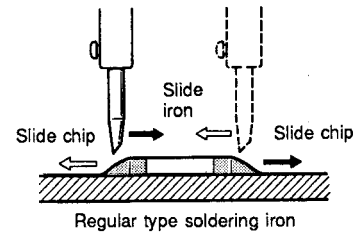


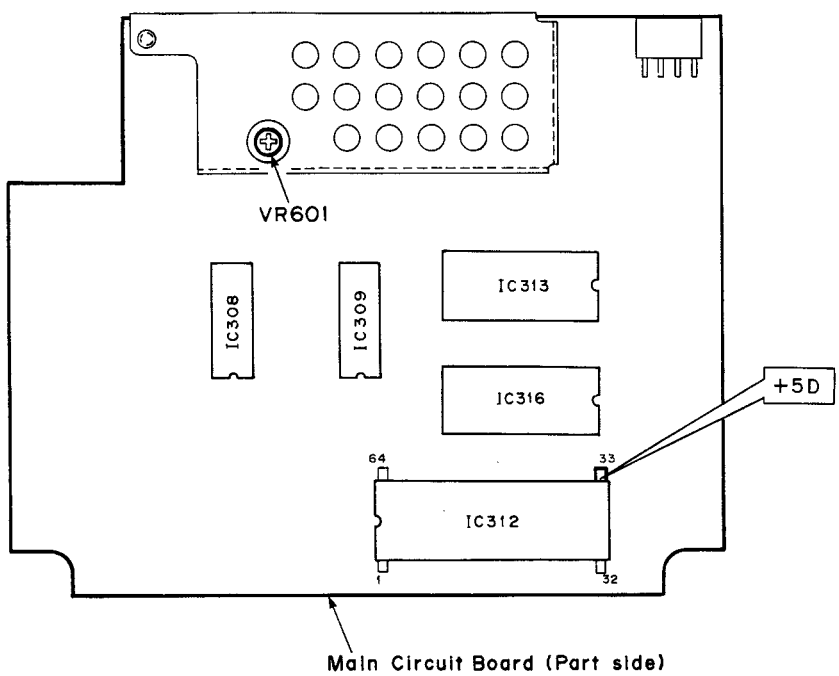
Fig. 7

■ ADJUSTMENTS

Voltage adjustment

- Use to make connection between the Main Circuit Board and the DSP Circuit Board.
  5P Extention cord (P/No. VB711700)
  8P Extention cord (P/No. VB717100)
- Set DC power supply voltage to 14.4V, with no load or signal applied.
- Measure the voltage at the test point +5D and adjust the VR601 so that the following rating will be satisfied.

$$V_{5D} = 5 \pm \frac{0.2}{0.1} \text{ V (DC)}$$



e. Mounting chip device onto printed circuit board

- Set chip devices as close as possible to the surface of the printed circuit board.
  Do not apply unnecessary pressure to chip devices to try to make it close to the surface of printed circuit board.
  Try to keep the distance between the chip device and the surface of the printed circuit board less than 0.5mm.
- Do not connect (solder) wire or terminals of otherparts to a terminal of a chip device.
- Do not mount chip devices incorrectly, such as in (b), (c) and (d), below.

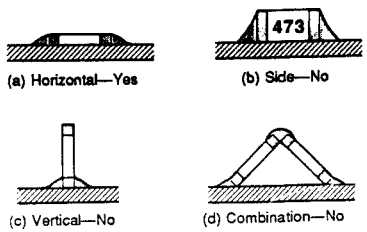


Fig. 6

f. Removal of defective device for repair

When removing chip devices with a fork tipped iron, heat the chip device with the fork tip and slide the chip device off.
When you are going to remove the chip devices using a regular tipped iron, alternately heat the two terminals of the chip device about 2 or 3 times and slide the chip device off. Slide chip device only in the direction shown below.

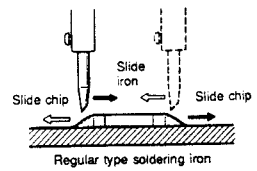


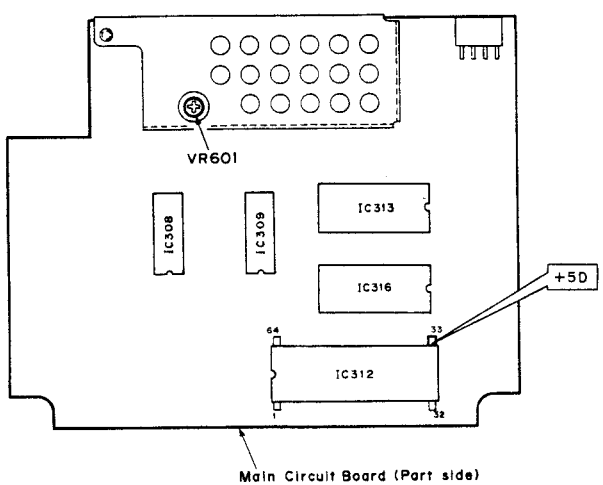
Fig. 7

■ ADJUSTMENTS

Voltage adjustment

- Use to make connection between the Main Circuit Board and the DSP Circuit Board.
  5P Extention cord (P/No. VB711700)
  8P Extention cord (P/No. VB717100)
- Set DC power supply voltage to 14.4V, with no load or signal applied.
- Measure the voltage at the test point +5D and adjust the VR601 so that the following rating will be satisfied.

$$V_{SD} = 5 \pm \frac{0.2}{0.1}\ V\ (DC)$$



Main Circuit Board (Part side)

1. S-RAM Check

When turning ON the power of this unit for the first time, S-RAM check should be done at the same time according to the procedure described below.

① Turn ON the power.
Confirm that "HELP!" appears on display.
② Turn OFF the power.
③ Turn ON the power.
Confirm that the mode is set to HALL.

If "HELP!" appears in above Step ③, an abnormality exists in either the S-RAM itself or its peripheral.

When the S-RAM check results (Steps ① to ③) are satisfactory, proceed to the test program described.

④ Proceeding to the test program while "HELP!" is on display will result in the "ERROR" display. When the key operation is not accepted, the communication condition between the main unit and the commander is poor.

2. Test Program

1. Starting

Turn ON the power, press the "memo" key and within 5 seconds, press the "AUDIO" key. Then pressing the "reset" key within 10 seconds will start the program.

2. Error check

The test program executes the error check and displays the error, if any, by using the following error messages.

Error message	Check Content
ERROR 1	ROM error
ERROR 2	CPU internal RAM error
ERROR 3	External RAM error
ERROR 4	Back-up error
ERROR 5	DEQ, DSP transfer error

3. Test Mode Menu

The test mode has following menu items.
(1) LCD check
(2-1) RAM through
(2-2) DSP through
(3) EQ check
(4) VOL UP/DOWN
(5) MUTE ON/OFF

The initial conditions are as follows.

- **LCD display : RAM**
- **LED : Green**
- **Signal : RAM through**
- **EQ : Flat**
- **VOL : Max.**
- **MUTE : OFF**
- **BAL/FAD : Center position**

(1) LCD check

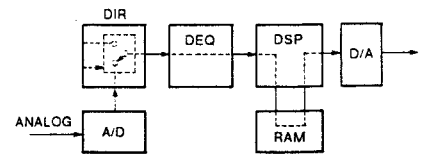
With the test program started, pressing the "POSITION" key will cause all LCDs to light.

(2) Signal check

0dB should be obtained at every channel under the following conditions.
EQ : Flat
BAL/FAD : Center position
VOL : 0

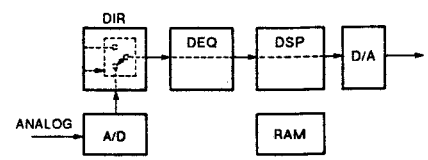
1) RAM through

When the test program is started, "RAM" appears on display and the signal is obtained in the RAM through state. After that, the signal state is switched between DSP through and RAM through at every pressing of the "DSP ON" key. In the RAM through state, about 186ms delay occurs.



2) DSP through

When the "DSP ON" key is pressed in the RAM through state, "DSP" appears on display and the signal state becomes the DSP through state.
After that, the signal state is switched between DSP through and RAM through at every pressing of the "DSP ON" key.



(3) EQ check

Pressing the "EQ (ON/OFF)" key sets to DSP through state and 1kHz EQ measurement mode. When the parameter "+" key is pressed, the frequency gain which is flashing then increases by 12dB and when the "–" key is pressed it decreases by 12dB, resulting in 0dB. Pressing the "–" key again will result in -12dB. When the "P.SEL" key is pressed, the frequency shifts to the right by one and at the same time all bands become flat.

(4) VOL UP/DOWN

The volume is at maximum(0) when the test program is started. It varies as the " △ " " ▽ " key is used.

(5) MUTE ON/OFF

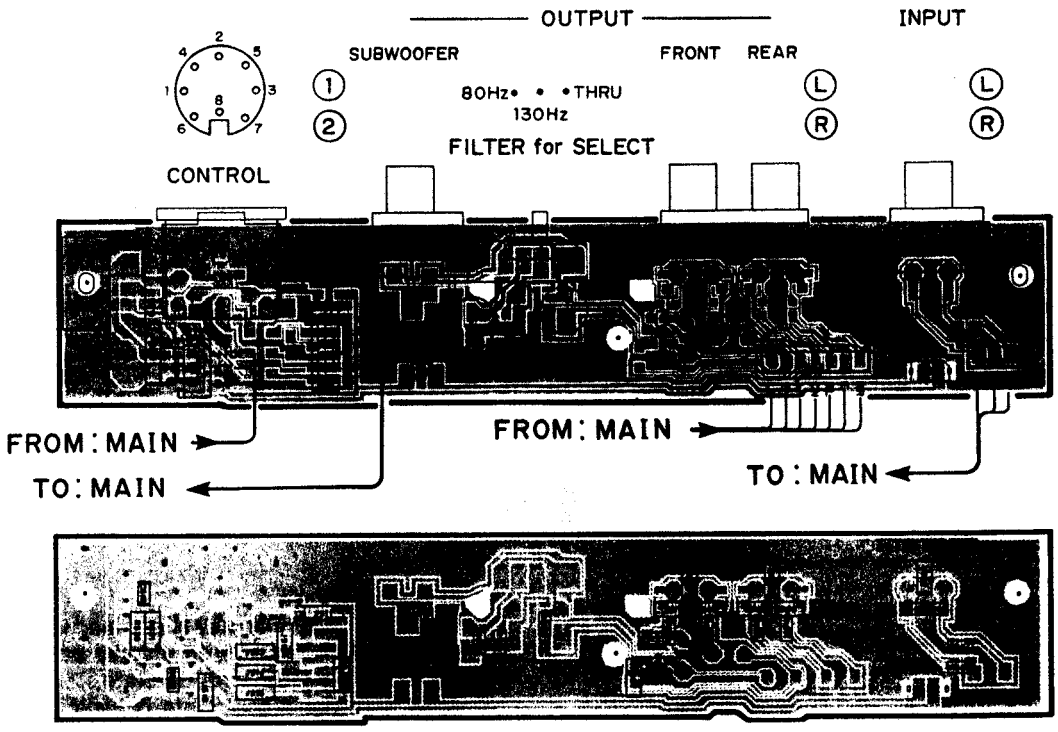
Pressing the "MUTE" key will result in 20dB decrease . The MUTE display flashes during MUTE ON.

4. Terminating Test Program

Be sure to press the "RESET" key at the end of the test program.

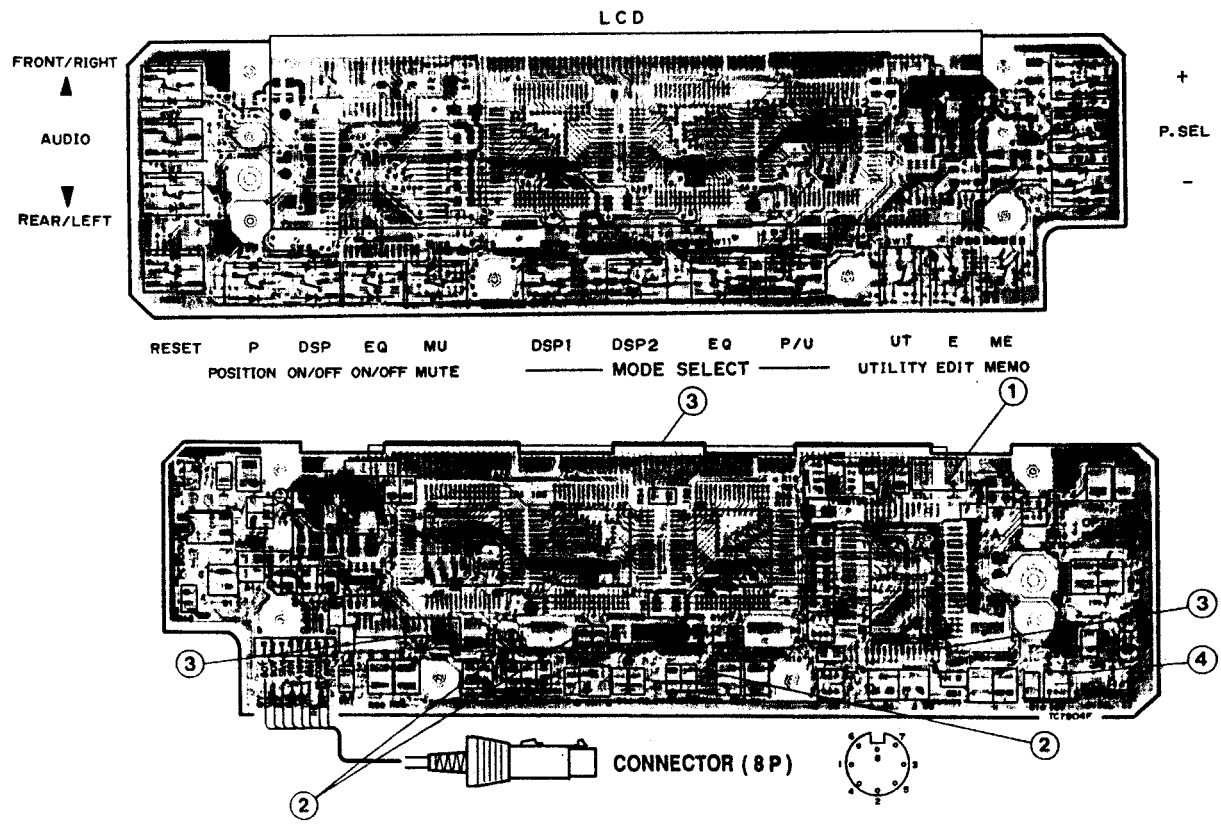
■ PRINTED CIRCUIT BOARD (Foil side)

I/O C. B



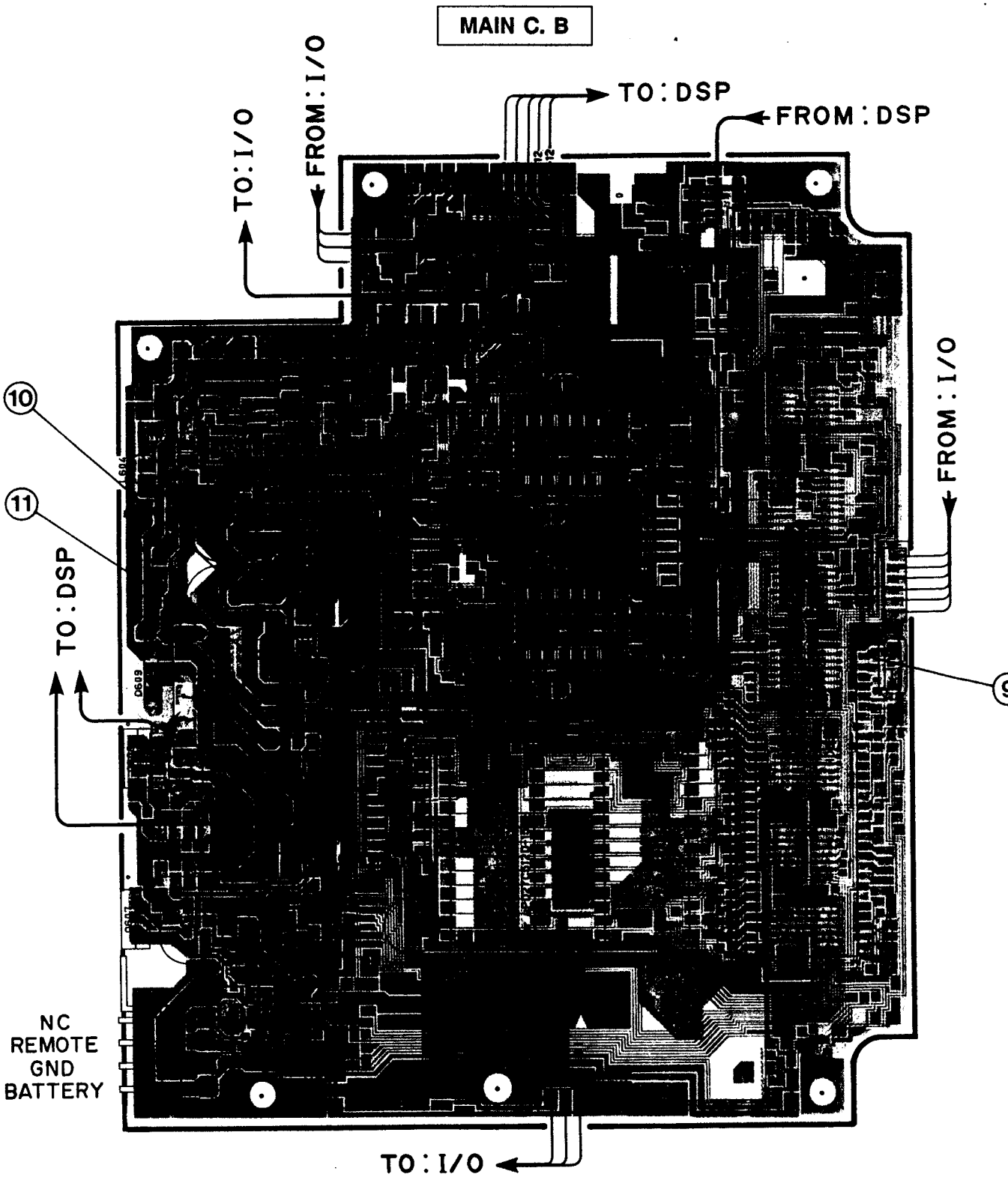
Commander C. B

① to ④ : WAVEFORM OF TEST POINT (See page 24)



■ PRINTED CIRCUIT BOARD (Foil side)

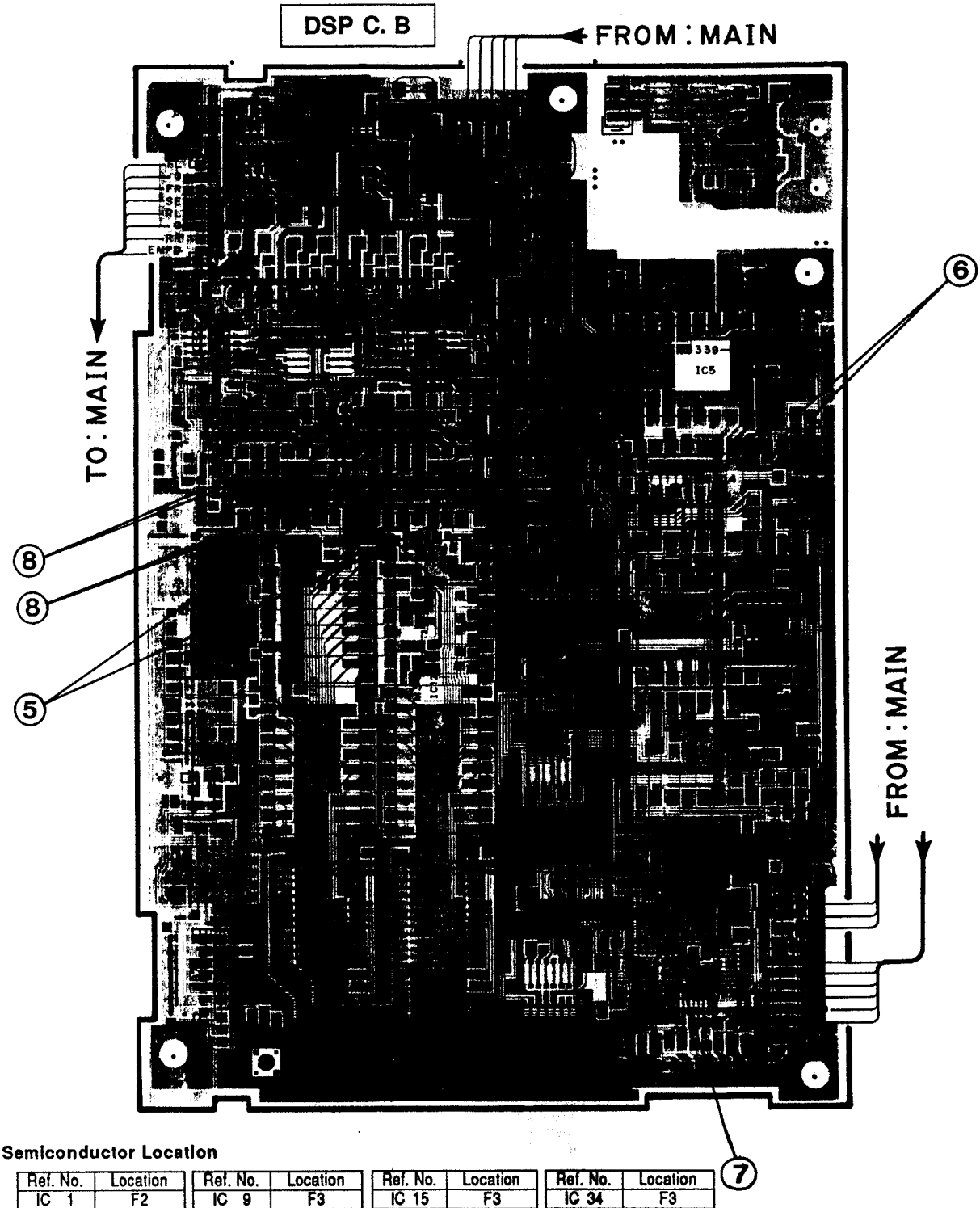
⑤ to ⑪ : WAVEFORM OF TEST POINT (S



● **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D 347	D2	D 610	B3	IC 312	D4	IC 609	A2
D 601	B3	D 650	B4	IC 313	B4	IC 610	B2
D 603	A4	D 651	B4	IC 315	B4	IC 611	B3
D 604	B4	D 653	B5	IC 316	C4	Q 601	B4
D 607	A3	IC 308	C3	IC 326	B2	Q 607	A4
D 609	A3	IC 309	C3	IC 604	A4	Q 608	A4

e page 22 and 23)



● **Semiconductor Location**

Ref. No.	Location
IC 1	F2
IC 3	F2
IC 4	G2
IC 5	G2
IC 6	G3
IC 7	G3

Ref. No.	Location
IC 9	F3
IC 10	F4
IC 11	E3
IC 12	F3
IC 13	F4
IC 14	F3

Ref. No.	Location
IC 15	F3
IC 24	G4
IC 28	F2
IC 29	E2
IC 31	F2
IC 32	E2

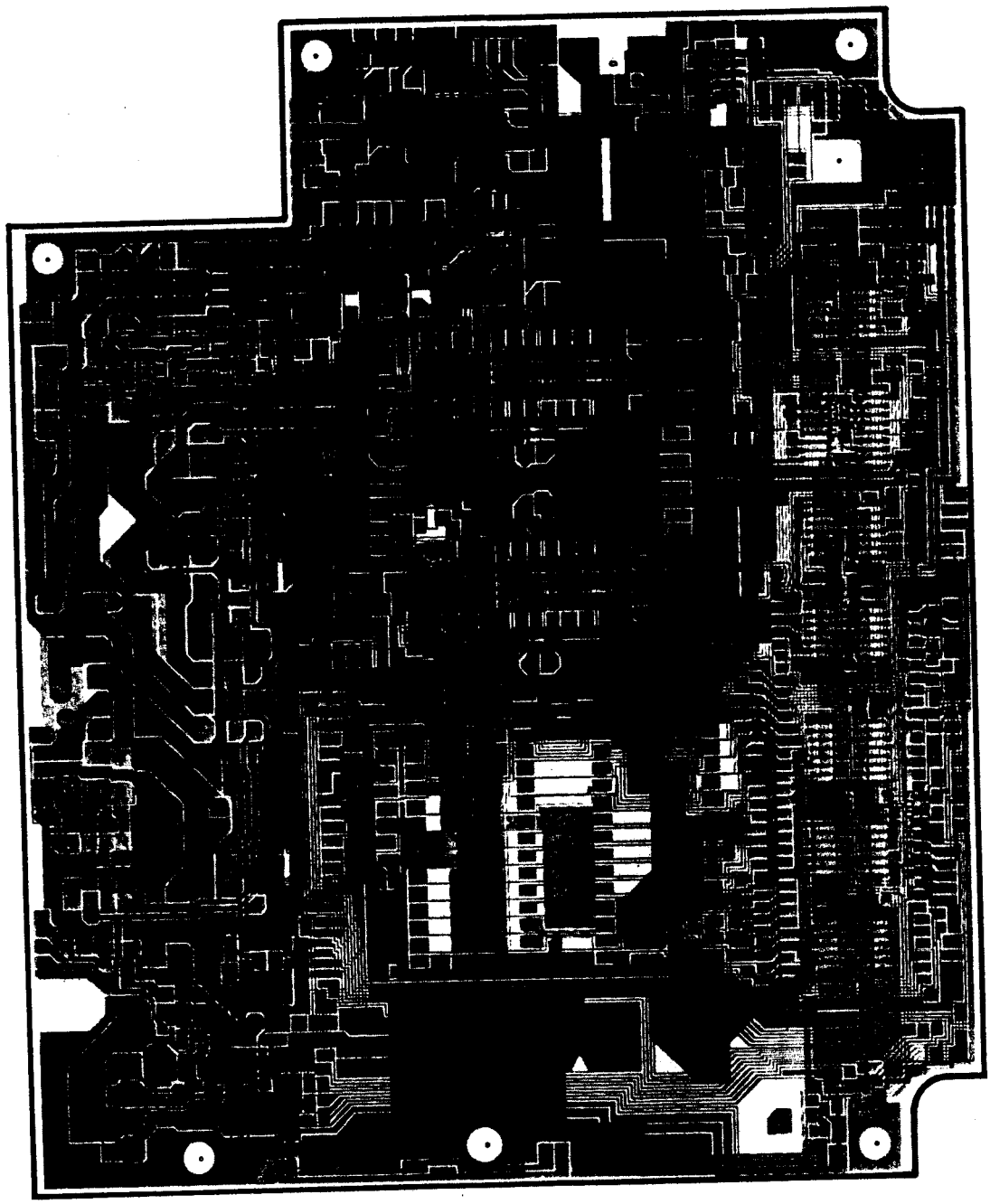
Ref. No.	Location
IC 34	F3
IC 38	F3
IC 41	F3

- **SW1**

  This unit has a SW1 for the servicing purpose.
  Sliding it to the opposite side of the IC11 allows the output to come through the DSP and DEQ circuits. This facilitates determination whether a failure exists in the DSP and DEQ circuits (including ICs) or elsewhere. Be sure to slide it back to the IC11 side after completion of the repair work.

■ PRINTED CIRCUIT BOARD (Foil side)

MAIN C. B



● Semiconductor Location

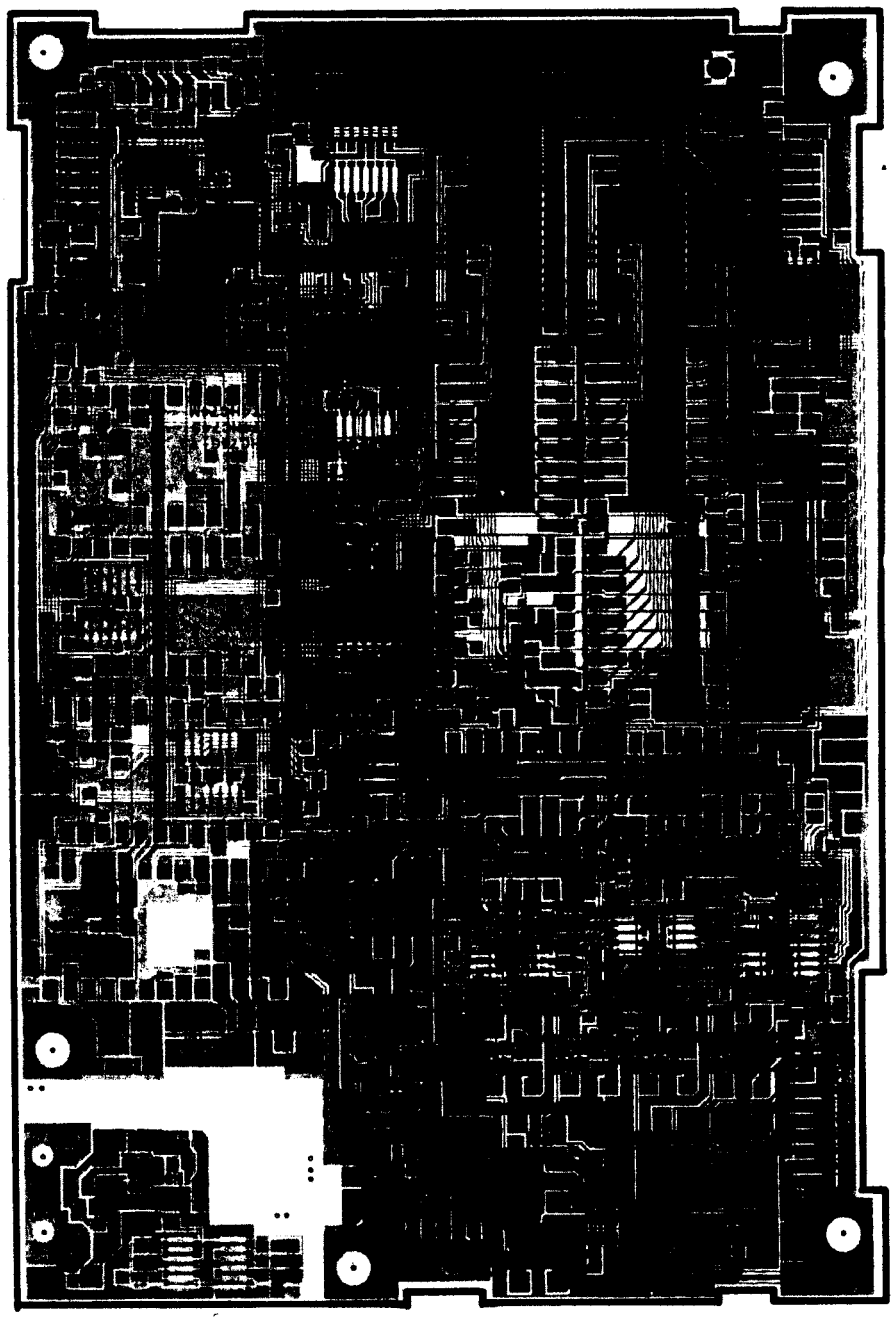
Ref. No.	Location
D 312	B4
D 346	B4
D 481	D2
D 508	B4
D 602	A4
D 605	B2
D 649	B4

Ref. No.	Location
IC 301	B2
IC 302	C2
IC 303	C3
IC 305	C2
IC 307	C3
IC 317	D4
IC 322	D4

Ref. No.	Location
IC 324	D2
IC 327	D4
Q 303	B3
Q 304	C2
Q 305	B3
Q 306	B3
Q 481	D2

Ref. No.	Location
Q 602	B4
Q 603	B2
Q 612	B2
Q 614	B2
Q 615	B2

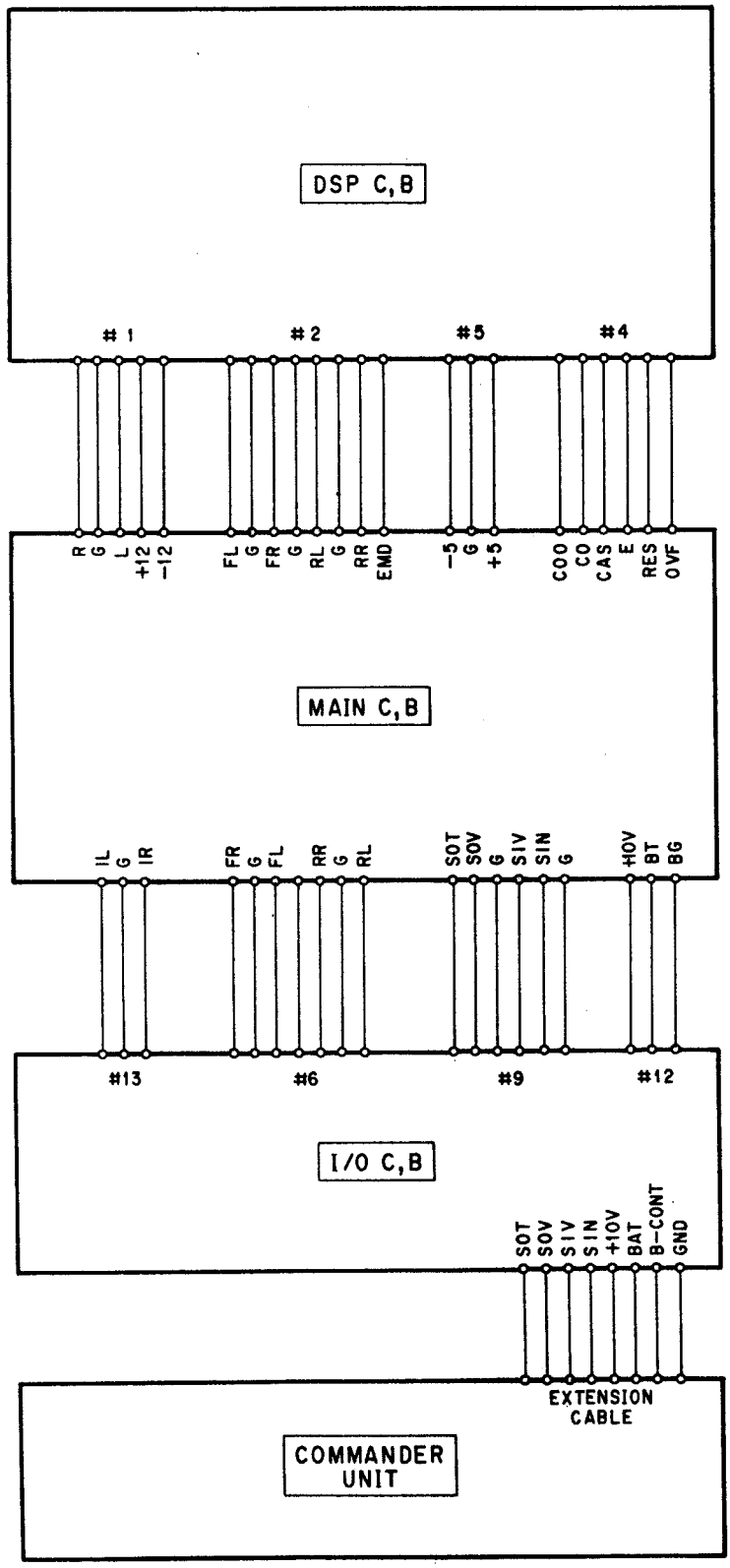
DSP C. B



● **Semiconductor Location**

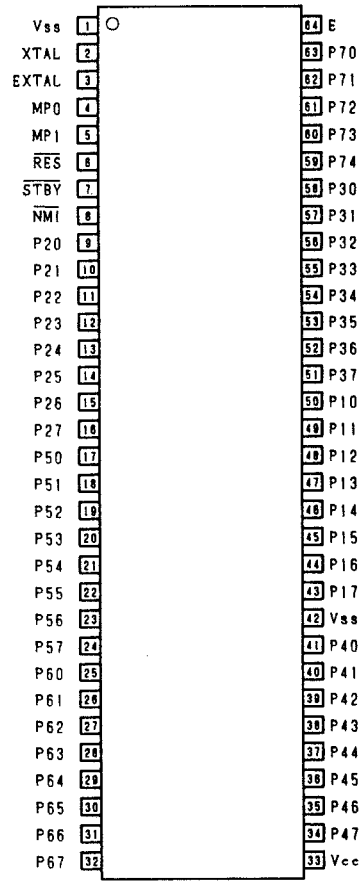
Ref. No.	Location
IC 17	G4
IC 19	F4
IC 23	G3
IC 33	F2
IC 37	F2
IC 42	F2

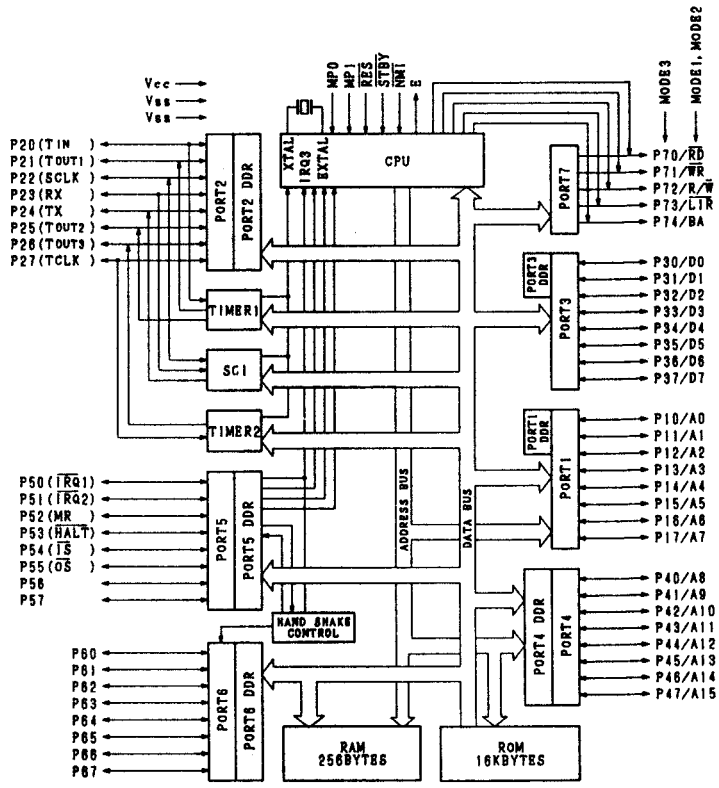
■ INTERCONNECT WIRING DIAGRAM



■ IC DATA

IC312 (MAIN) : Useable for all HD63B01Y0XXXXP series.
8 bit μ-COM

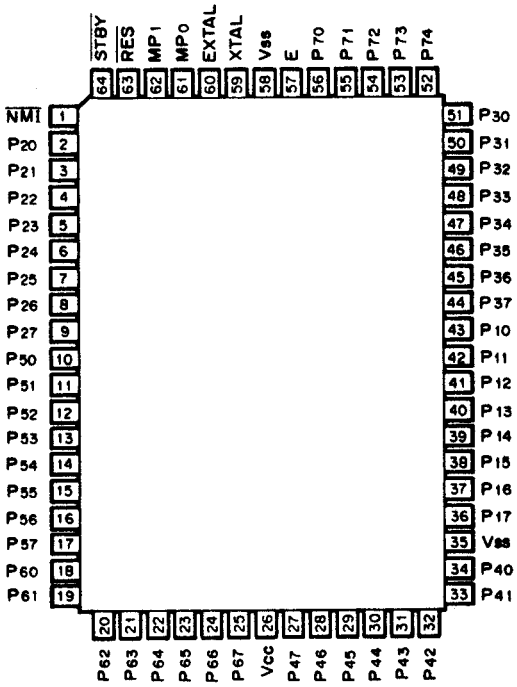


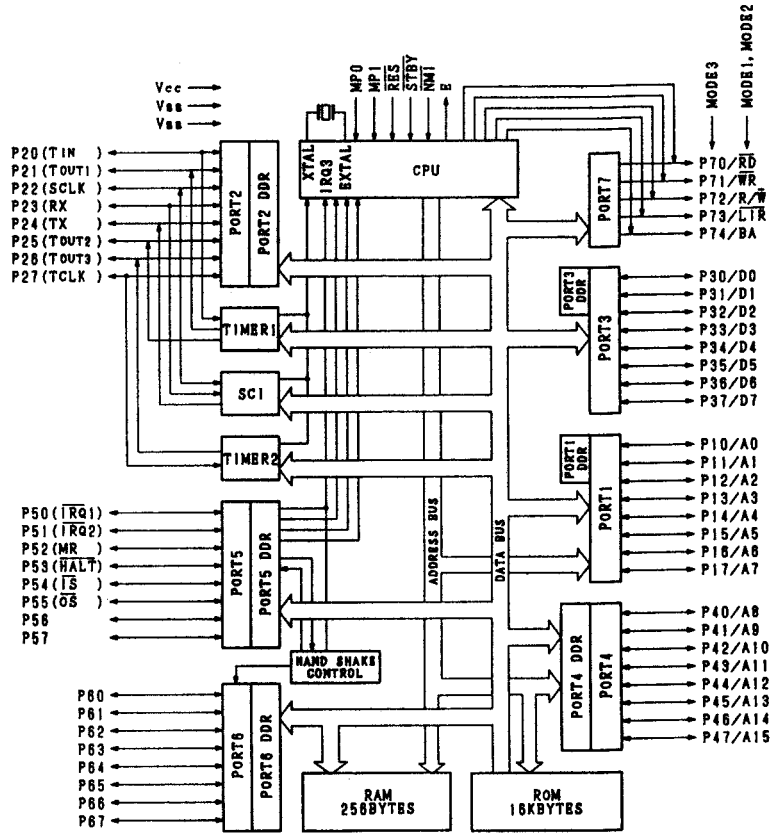


Pin No.	Pin Name	Description	I/O	Function
1	VSS	VSS	—	Ground
2	XTAL	XTAL	—	Oscillation circuit
3	EXTAL	EXTAL	—	Oscillation circuit
4	MP0	MP0	—	Mode program input. Fixed to "H"
5	MP1	MP1	—	Mode program input. Fixed to "L"
6	$\overline{RES}$	IC#	—	Reset input (Negative logic)
7	$\overline{STBY}$	STBY#	—	Stand-by input (Negative logic)
8	$\overline{NMI}$	RESET	—	$\overline{NMI}$ input (Negative logic) Used for resetting equipment.
9	P20	CEC	O	LCD driver (C) chip enable

Pin No.	Pin Name	Description	I/O	Function
10	P21	COO	I	Bit O input of DEQ coefficient RAM
11	P22	LCLK	O	Clock for LCD driver
12	P23		I	Communication input
13	P24	DATA	O	Communication output
14	P25	CEA	O	DA control output
15	P26	CEB	O	DA control output
16	P27	DI0	—	Unused
17	P50	DI1	—	
18	P51	DI2	—	
19	P52	DI3	I	Overflow input pull-down
20	P53	DI4	I	Halt input
21	P54	K0	—	Unused
22	P55	K1	—	
23	P56	K2	—	
24	P57	K3	—	
25	P60	CONTROL	I	DA control input
26	P61	EMP	—	Unused
27	P62	ERR	—	
28	P63	FS0	—	
29	P64	FS1	—	
30	P65	DI	O	Data for volume IC
31	P66	VCLK	O	Clock for volume IC
32	P67	CE	O	Chip enable for volume IC
33	VCC	VCC	—	Power source
34	A15	A15	—	Address bus
35	A14	A14	—	
36	A13	A13	—	
37	A12	A12	—	
38	A11	A11	—	
39	A10	A10	—	
40	A9	A9	—	
41	A8	A8	—	
42	VSS	VSS	—	Ground
43	A7	A7	—	Address bus
44	A6	A6	—	
45	A5	A5	—	
46	A4	A4	—	
47	A3	A3	—	
48	A2	A2	—	
49	A1	A1	—	
50	A0	A0	—	
51	D7	D7	—	Data bus
52	D6	D6	—	
53	D5	D5	—	
54	D4	D4	—	
55	D3	D3	—	
56	D2	D2	—	
57	D1	D1	—	
58	D0	D0	—	
59	BA		—	Unused
60	$\overline{LIR}$		—	
61	R/$\overline{W}$		—	
62	$\overline{WR}$	$\overline{WR}$	—	
63	$\overline{RD}$	$\overline{RD}$	—	
64	E	E	—	

IC1 (COMMANDER) : HD63B01YORAA6FJ
8bit μ-COM

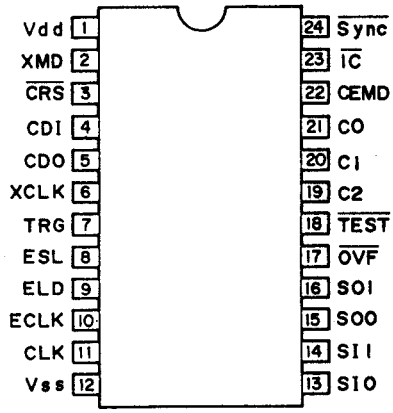


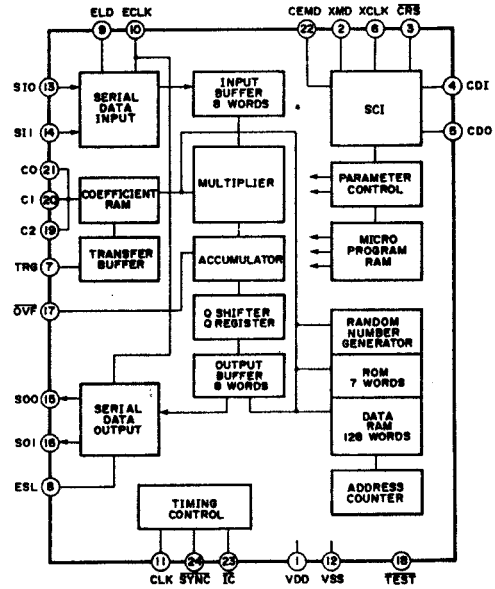


Pin No.	Pin Name	Description	I/O	Function
1	Vss	Vss	—	Ground
2	XTAL	XTAL	—	Oscillation circuit
3	EXTAL	EXTAL	—	Oscillation circuit
4	MP0	MP0	—	Mode program input. Fixed to "H"
5	MP1	MP1	—	Mode program input. Fixed to "L"
6	$\overline{RES}$	IC#	—	Reset input (Negative logic)
7	$\overline{STBY}$	STBY#	—	Stand-by input (Negative logic)
8	$\overline{NMI}$	RESET	—	$\overline{NMI}$ input (Negative logic) Used for resetting equipment.
9	P20	CEC	O	LCD driver (C) chip enable

Pin No.	Pin Name		I/O	ACT	Function
10	P50	K0	I	H	Key scan input
11	P51	K1			
12	P52	K2			
13	P53	K3			
14	P54				Pull-up to high level
15	P55				
16	P56				
17	P57				
18	P60	DI0	O	H	Key scan output
19	P61	DI1			
20	P62	DI2			
21	P63	DI3			
22	P64	DI4			
23	P65				NC
24	P66				
25	P67				
26	VCC	VCC			Power terminal (+5V)
27	P47				NC
28	P46				
29	P45				
30	P44				
31	P43				
32	P42	$\overline{INH}$	O	L	LCD driver $\overline{INH}$ output
33	P41				NC
34	P40				
35	VSS	VSS			GND terminal
36	P17				NC
37	P16				
38	P15				
39	P14				
40	P13				
41	P12				
42	P11				
43	P10				
44	P37				
45	P36				
46	P35				
47	P34				
48	P33				
49	P32				
50	P31				
51	P30				
52	P74				
53	P73				
54	P72				
55	P71				
56	P70				
57	E				
58	VSS	VSS			GND terminal
59	XTAL	XTAL			Crystal connection terminal
60	EXTAL	EXTAL			
61	MP0	MP0			Mode setting terminal
62	MP1	MP1			Single chip mode at (1,1)
63	$\overline{RES}$	$\overline{RES}$	I	L	Reset input terminal
64	$\overline{STBY}$	$\overline{STBY}$	I	L	Stand-by input terminal (fixed to high level)

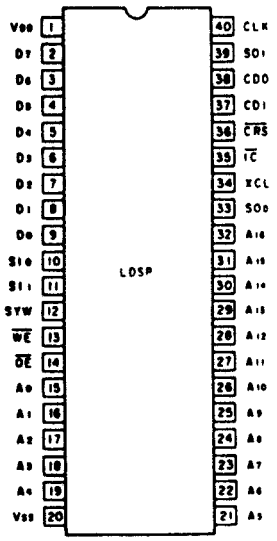
IC6, 7 : YM6104
Digital Equalizer





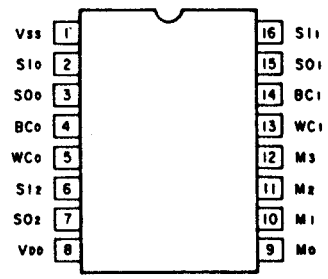
Pin No.	Pin Name	I/O	Function
1	VDD	I	+5V power supply
2	XMD	I	Switches CDI input to either synchronous mode (1 : 1) "L" or asynchronous mode (Start-stop synchronous system 16 : 1) "H"
3	$\overline{CRS}$	I	Initializes SCI interface
4	CDI	I	SCI input for setting micro program, factor and control register
5	CDO	O	SCI output for setting micro program, factor and control register
6	XCLK	I	Input-output clock for CDI and CDO
7	TRG	I	Determines parameter transfer timing from transfer buffer to factor RAM when external trigger is selected
8	ESL	I	Enters output timing into SO0 and SO1 when EXT clock is selected
9	ELD	I	Enters input timing into SI0 and SI1 when EXT clock is selected
10	ECLK	I	Enters input-output clock for SI0, SO0 and SO1 when EXT clock is selected
11	CLK	I	Master clock input
12	VSS	I	Ground
13, 14	SI0, SI1	I	16 bits serial input
15, 16	SO0, SO1	O	16 bits serial output
17	$\overline{OVF}$	O	Over flow detect
18	$\overline{TEST}$	I	Used for testing Usually connected to +5V
19	C2/Sign	O	Outputs bit 2 of factor RAM while delaying it by 1 bit. Used as a timing signal Monitors sign bit of accumulator by setting test Reg (When factor RAM is used as a timing signal, effective bit number of factor decreases)
20	C1/TESTM	O	Outputs bit 1 of factor RAM while delaying it by 1 bit. Used as a timing signal Switches to test output of multiplier by setting test Reg
21	CO	O	Outputs bit 2 of factor RAM while delaying it by 1 bit. Can be used as a timing signal
22	CEMD	I	Turns OFF CE of SCI input CE ON : "H" CE OFF : "L"
23	$\overline{IC}$	I	Initializes DEQ operation
24	$\overline{Sync}$	I	Synchronous signal of system

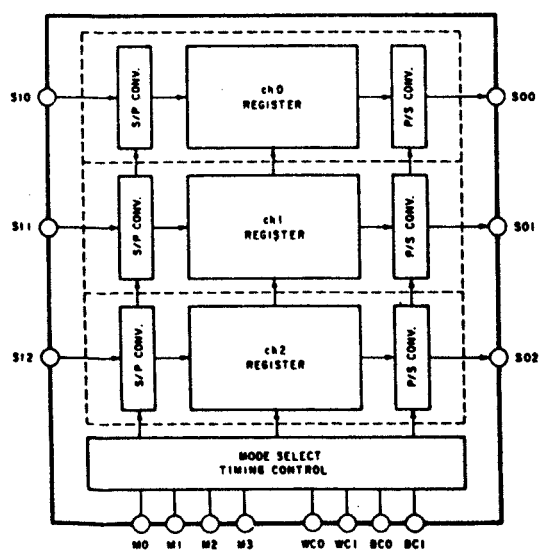
IC9, 12 : YM3413
LDSP



Pin No.	Pin Name	I/O	Function	Pin No.	Pin Name	I/O	Function
1	VDD	—	+5V voltage supply	40	CLK	I	Master clock input
2	D7	I/O	I/O pins connected to memory data bus (8bit)	39	SO1	O	Serial data output
3	D6	I/O		38	CDO	O	CD data output
4	D5	I/O		37	CDI	I	CD data input
5	D4	I/O		36	CRS	I	CD data sync signal input
6	D3	I/O		35	IC	I	LDSP initial clear signal input
7	D2	I/O		34	XCLK	I	ACIA clock input
8	D1	I/O		33	SDO	O	Serial data output
9	D0	I/O		32	A16	O	Outputs connected to memory address bus
10	SI0	I	Serial data input	31	A15	O	
11	SI1	I		30	A14	O	
12	SYW	I	System sync signal input	29	A13	O	
13	WE	O	Read/write signal to memory input	28	A12	O	
14	OE	O	Pin connected to memory OE term	27	A11	O	
15	A0	O	Outputs connected to memorys address bus	26	A10	O	
16	A1	O		25	A9	O	
17	A2	O		24	A8	O	
18	A3	O		23	A7	O	
19	A4	O		22	A6	O	
20	VSS	O	GND 0V	21	A5	O	

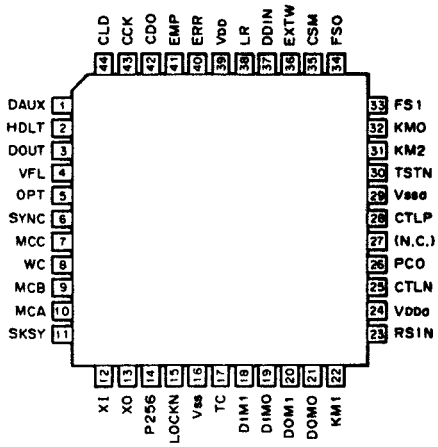
IC11 : YM3422
Digital Signal Format Converter

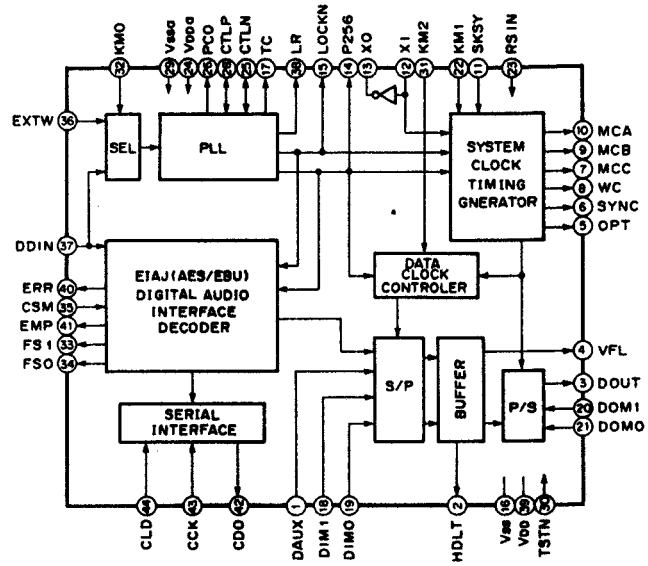




Pin No.	Pin Name	I/O	Function
1	VSS	—	GND terminal
2	SI0	IN	Serial data input (ch 0)
3	SO0	OUT	Serial data output (ch 0)
4	BC0	IN	Bit clock input
5	WC0	IN	System synchronized signal input
6	SI2	IN	Serial data input (ch 0)
7	SO2	OUT	Serial data output (ch 0)
8	VDD	—	Voltage supply (+5V)
9	MO	IN	Mode select signal
10	M1	IN	
11	M2	IN	
12	M3	IN	
13	WC1	IN	System synchronized signal input (Word clock)
14	BC1	IN	Bit clock input
15	SC1	IN	Serial data output (ch 1)
16	SI1	OUT	Serial data input (ch 1)

IC24 : YM3436
Digital Format Interface Receiver





Pin No.	Pin Name	I/O	Function	Pin No.	Pin Name	I/O	Function
1	NC			33	NC		
2	NC			34	NC		
3	NC			35	NC		
4	DB11	O	Meter data output	36	DI00	I	Digital in data
5	DB10	O		37	DI01	I	
6	DB9	O		38	DI02	I	
7	DB8	O		39	DI03	I	
8	DB7	O		40	DI04	I	
9	DB6	O		41	DI05	I	
10	NC			42	NC		
11	DB5	O		43	DI06	I	
12	DB4	O		44	DI07	I	
13	DB3	O		45	DI08	I	
14	DB2	O		46	DI09	I	
15	DB1	O		47	DI10	I	
16	DB0	O		48	DI11	I	
17	NC			49	NC		
18	NC			50	NC		
19	NC			51	NC		
20	NC			52	NC		
21	$\overline{OVD}$	I	Overflow data	53	HT1	I	Falling and holding times are determined by these inputs.
22	OMODE	I	Output mode control	54	HT0	I	
23	IMODE	I	Input mode control	55	FT1	I	
24	NC			56	FT0	I	
25	$\overline{TST}$	I	Test pin	57	VSS		Ground
26	VDD		Power supply	58	VDD		Power supply
27	VSS		Ground	59	NC		
28	ICLK	I	System clock input	60	C3	O	Channel select
29	$\overline{SYNC}$	I	Synch. pulse	61	C2	O	
30	$\overline{RST}$	I	Initial reset	62	C1	O	
31	$\overline{DIEN}$	I	Digital input enable	63	C0	O	
32	NC			64	NC		