146

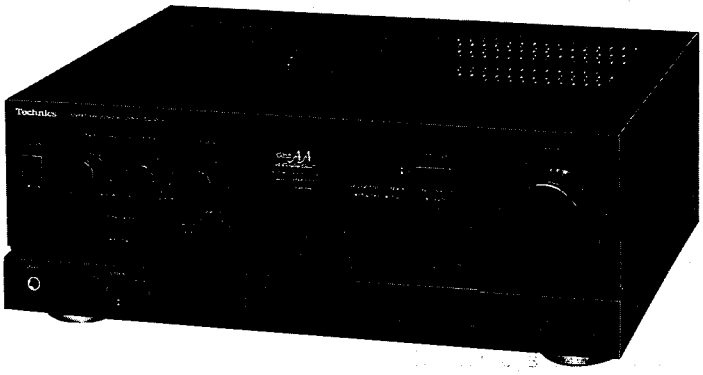
ORDER NO. AD8806153C1
A2

Service Manual

Amplifier

Stereo Integrated Amplifier

SU-V650



Color

(K).....Black Type

Area

Color	Area
(K)	(M).....U.S.A.
(K)	(MC).....Canada.

SPECIFICATIONS (IHF '78)

■ MAIN AMP.SECTION

Rated minimum sine wave RMS power output
20 Hz ~ 20 kHz both channels driven
0.007% total harmonic distortion
90W per channel (8 ohms)

1 kHz continuous power output
both channels driven
0.0009% total harmonic distortion
90W per channel (8 ohms)

0.005% total harmonic distortion
110W per channel (4 ohms)

Dynamic headroom 0.7dB (8 ohms)
0.8dB (4 ohms)

Total harmonic distortion
rated power at 20Hz ~ 20kHz 0.007% (8 ohms)
rated power at 1 kHz 0.0009% (8 ohms)
0.005% (4 ohms)

half power
20Hz ~ 20kHz 0.005% (8 ohms)
1kH 0.0009% (8 ohms)

Intermodulation distortion
rated power at 50Hz : 7kHz = 4 : 1 , SMPTE , 8Ω 0.007%

Power band width
both channels driven, -3 dB THD 0.03%
5Hz ~ 50kHz (8Ω)

Damping factor 40(4Ω), 80(8Ω)

Headphones output level and impedance 600mV/330Ω

Load impedance
MAIN or REMOTE 4 ~ 16 ohms
MAIN and REMOTE 8 ~ 16 ohms

Residual hum and noise 0.8mV

Frequency response
PHONO RIAA standard curve ± 0.8dB
30Hz ~ 15kHz

TUNER, CD, AUX
TAPE 1/DAT, TAPE 2/EXT 5Hz ~ 100kHz, -3dB
+0dB, -0.2dB(20Hz ~ 20kHz)

Input sensitivity/Impedance
PHONO MM 0.25mV(2.5mV, IHF'66)/47 kilohms
MC 17μV(170μV, IHF'66)/220 ohms
TUNER, CD, AUX
TAPE 1/DAT, TAPE 2/EXT
15mV(150mV, IHF'66)/22 kilohms

S/N
PHONO MM 76dB (86dB, IHF'66)
MC 72dB (68dB,IHF'66,250μV)
TUNER, CD, AUX
TAPE 1/DAT, TAPE 2/EXT 80dB(100dB, IHF'66)

Phono maximum input voltage
MM 150mV(160mV, 1kHz, RMS, IHF'66)
MC 10mV(12mV, 1kHz, RMS, IHF'66)

Tone controls
BASS 50Hz, +10dB ~ -10dB
TREBLE 20kHz, +10dB ~ -10dB

Subsonic filter 20Hz,-6dB/oct.

Loudness control (volume at - 30 dB) 50Hz, +9dB

output voltage/Impedance
TAPE 1/DAT, TAPE 2/EXT REC OUT 150mV

Channel balance.AUX 250Hz ~ 6,300Hz ±1dB

Channel separation,AUX 1kHz 50dB

■ GENERAL

Power consumption 460W,530VA
Power supply AC 120V,60Hz
Dimensions (WxHxD) 430x159x363mm
(16-15/16"x6-1/4"x14-1/4")

Weight 10.1kg(22.2 lb.)

Notes:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P.3045 system).

Matsushita Services Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Hawaii, Inc.
99-859, Iwaiwa Street
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave.65 De Infanteria,Km.9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Technics

■ CONTENTS

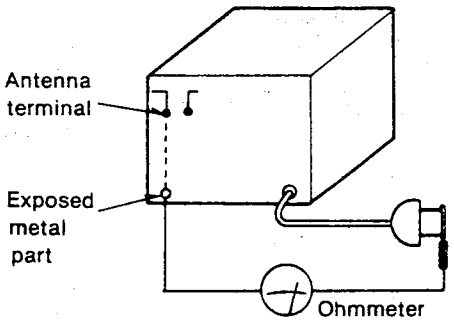
■ SAFETY PRECAUTION (This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

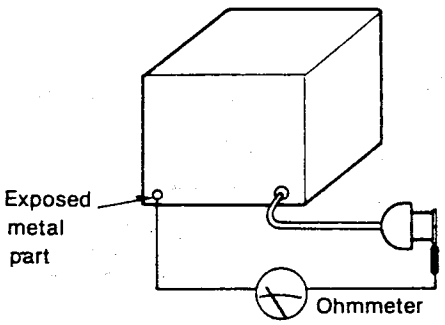
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ BEFORE REPAIR

(1) Turn off the power supply. Using a 10Ω, 10W resistor, connect both ends of power supply capcitors(C705,C706) in order to discharg e the voltage.

(2) Before turning the power supply on, after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 120V, 60Hz in NO SIGNAL mode is **250mA ~ 500mA.**

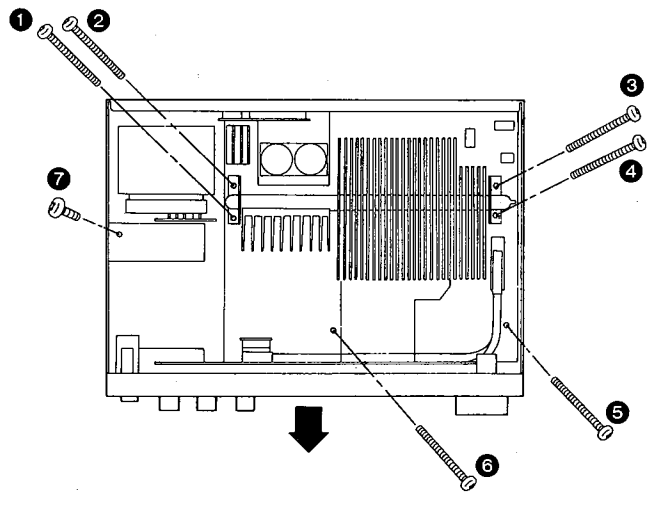
Ref. No.	Part No.	Value.
R601	ERDS2TJ471	470 1/4
R602	ERDS2TJ471	470 1/4
R603	ERDS2TJ221	220 1/4
R604	ERDS2TJ471	470 1/4
R605	ERDS2TJ221	220 1/4
R613 ⚠	ERDS1FJ180	18 1/2
R701 ⚠	ERDS1FJ221	220 1/2
R702 ⚠	ERDS1FJ221	220 1/2
R703 ⚠	ERDS1FJ682	6.8K 1/2
R704 ⚠	ERDS1FJ682	6.8K 1/2
R751	ERDS2TJ223	22K 1/4
R752	ERDS2TJ223	22K 1/4
R753	ERDS2TJ102	1K 1/4
R754	ERDS2TJ153	15K 1/4
R755	ERDS2TJ823	82K 1/4
R756	ERDS2TJ153	15K 1/4
R757	ERDS2TJ102	1K 1/4
R758	ERDS2TJ102	1K 1/4
CAPACITORS(VALUE,VOLTAGE)		
C1 ⚠	ECKWNS103ZV	0.01 125
C103	ECQM1H103JZ	0.01 50
C104	ECQM1H103JZ	0.01 50
C105	ECCD1H820K	82P 50
C106	ECCD1H820K	82P 50
C107	ECEA0JU222	2200 6.3
C108	ECEA0JU222	2200 6.3
C109	ECQM1H222JZ	0.0022 50
C110	ECQM1H222JZ	0.0022 50
C111	ECQM1H122JZ	0.0012 50
C112	ECQM1H122JZ	0.0012 50
C113	ECQM1H103JZ	0.01 50
C114	ECQM1H103JZ	0.01 50
C115	ECQM1H393JZ	0.039 50
C116	ECQM1H393JZ	0.039 50
C117	ECEA1HKN010B	1 50
C118	ECEA1HKN010B	1 50
C119	ECQM1H472JZ	0.0047 50
C120	ECQM1H472JZ	0.0047 50
C121	ECKD1H103PF	0.01 50

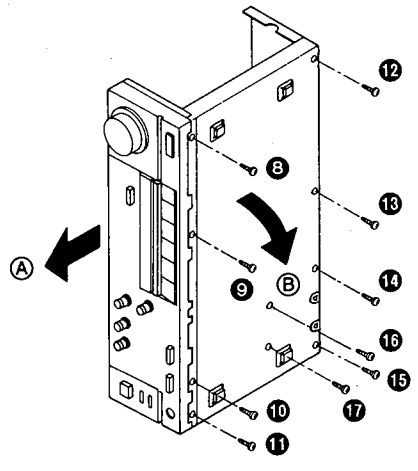
Ref. No.	Part No.	Value.
C122	ECKD1H103PF	0.01 50
C213	ECQM1H563JV	0.056 50
C214	ECQM1H563JV	0.056 50
C215	ECQM1H563JV	0.056 50
C216	ECQM1H563JV	0.056 50
C301	ECEA1HPS3R3	3.3 50
C302	ECEA1HPS3R3	3.3 50
C303	ECCD1H101K	100P 50
C304	ECCD1H101K	100P 50
C305	ECCD1H820K	82P 50
C306	ECCD1H820K	82P 50
C307	ECEA1VPS4R7	4.7 35
C308	ECEA1VPS4R7	4.7 35
C309	ECCD1H390K	39P 50
C310	ECCD1H390K	39P 50
C311	ECEA1CPS100	10 16
C312	ECEA1CPS100	10 16
C313	ECQM1H823JZ	0.082 50
C314	ECQM1H823JZ	0.082 50
C315	ECQM1H153JZ	0.015 50
C316	ECQM1H153JZ	0.015 50
C317	ECQM1H183JZ	0.018 50
C318	ECQM1H183JZ	0.018 50
C319	ECQM1H182JZ	0.0018 50
C320	ECQM1H182JZ	0.0018 50
C401	ECEA1HPS3R3	3.3 50
C402	ECEA1HPS3R3	3.3 50
C403	ECKD1H271KB	270P 50
C404	ECKD1H271KB	270P 50
C405	ECEA1CPS220	22 16
C406	ECEA1CPS220	22 16
C407	ECCD1H820K	82P 50
C408	ECCD1H820K	82P 50
C409	ECCD1H100KC	10P 50
C410	ECCD1H100KC	10P 50
C411	ECKD1H681K	680P 50
C412	ECKD1H681K	680P 50
C413	ECCD2H070D	7P 500
C414	ECCD2H070D	7P 500

Ref. No.	Part No.	Value.
C415	ECQM1H102JZ	0.001 50
C416	ECQM1H102JZ	0.001 50
C417	ECEA1HK010	1 50
C418	ECEA1HK010	1 50
C419	ECCD2H680K	68P 500
C420	ECCD2H680K	68P 500
C421	ECCD2H680K	68P 500
C422	ECCD2H680K	68P 500
C423	ECKD1H333PF	0.033 50
C424	ECKD1H333PF	0.033 50
C425	ECEA2AU100	10 100
C427	ECKD1H223PF	0.022 50
C429	ECEA1HK010	1 50
C430	ECEA1HK010	1 50
C501	ECEA0JPS101B	100 6.3
C502	ECEA0JPS101B	100 6.3
C503	ECEA0JPS101B	100 6.3
C504	ECEA0JPS101B	100 6.3
C505	ECKD1H223PF	0.022 50
C506	ECKD1H223PF	0.022 50
C507	ECEA0JPS101B	100 6.3
C508	ECEA1HU470	47 50
C509	ECEA1HN100S	10 50
C513	ECKD1H223PF	0.022 50
C514	ECKD1H223PF	0.022 50
C605	ECEA1CU471	470 16
C701	ECEA1HN3R3S	3.3 50
C702	ECEA1HN3R3S	3.3 50
C703 ⚠	ECEA1JU330	33 63
C704	ECEA1JU330	33 63
C705	ECET1JV103LM	10000 63
C706	ECET1JV103LM	10000 63
C708	ECKD2H103PE	0.01 500
C751	ECEA1EK100	10 25
C752	ECEA1EK100	10 25
C753	ECEA1EK100	10 25
C754	ECEA1EK3R3B	3.3 25
C755	ECEA1EK3R3B	3.3 25
C756	ECKD1H821KB	820P 50
C757	ECKD1H103PF	0.01 50
C758	ECKD1H103PF	0.01 50

●Preparation for the P.C.B. trouble shooting.

Ref. No. 7	How to check the main P.C.B.
Procedure 1→7	1. Remove the 17 screws (❶~⓱). 2. Remove the front panel in the direction of arrow Ⓐ. 3. Remove the bottom chassis in the direction of arrow Ⓑ. 4. Reinstall the front panel to the main P.C.B.





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F880603580 TW

●ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	UPC4570C	I.C. PHONO EQ
IC301	UPC4570C	I.C. TONE CONTROL
IC401	AN7062N	I.C. V.AMP
IC501	SVI3205	I.C. P.AMP/C.AMP
IC751	M5218P	I.C. ACTIVE SERVO
TRANSISTORS		
Q101	2SK170-GR	TRANSISTOR
Q102	2SK170-GR	TRANSISTOR
Q103	2SK170-GR	TRANSISTOR
Q104	2SK170-GR	TRANSISTOR
Q401	2SA1123R	TRANSISTOR
Q402	2SA1123R	TRANSISTOR
Q403	2SC1685NCQRS	TRANSISTOR
Q404	2SC1685NCQRS	TRANSISTOR
Q405	2SC2631-Q	TRANSISTOR
Q406	2SC2631-Q	TRANSISTOR
Q407	2SC3311A-Q	TRANSISTOR
Q408	2SC3311A-Q	TRANSISTOR
Q409	2SA1309Q	TRANSISTOR
Q410	2SA1309Q	TRANSISTOR
Q411	2SC2631-Q	TRANSISTOR
Q412	2SC2631-Q	TRANSISTOR
Q413	2SA1123R	TRANSISTOR
Q414	2SA1123R	TRANSISTOR
Q415	2SC3944AQRS	TRANSISTOR
Q416	2SC3944AQRS	TRANSISTOR
Q417	2SA1535AQRS	TRANSISTOR
Q418	2SA1535AQRS	TRANSISTOR
Q501	2SA992EFP	TRANSISTOR
Q502	UN4112	TRANSISTOR
Q751	2SC3944AQRS	TRANSISTOR
Q752	2SA1535AQRS	TRANSISTOR
DIODES		
D101	MA165	DIODE
D102	MA165	DIODE
D401	MA167	DIODE
D402	MA167	DIODE
D403	MA4036M	DIODE
D404	MA4036M	DIODE
D405	MA165	DIODE
D406	MA165	DIODE
D407	MA165	DIODE
D408	MA165	DIODE
D409	MA29WA	DIODE
D501	MA165	DIODE
D503	MA4160M	DIODE
D601	LN018454PH	DIODE
D602	MA4033M	DIODE
D603	LN121456PH	DIODE
D604	LN121456PH	DIODE
D605	LN121456PH	DIODE
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D616	LN121456PH	DIODE
D617	LN121456PH	DIODE
D618	LN121456PH	DIODE
D619	LN121456PH	DIODE
D624 ⚠	SVD1SR35200A	DIODE
D702 ⚠	SVDS10VB20F	DIODE
D703	MA4160M	DIODE
D704	MA4160M	DIODE
D751	MA4180-M	DIODE
D752	MA4180-M	DIODE
D753	MA165	DIODE
VARIABLE RESISTORS		
VR201	EWJKXA090B15	V.R, MAIN VOL
VR202	EVH0YA015G15	V.R, BALANCE
VR301	EWCRYA023C15	V.R, TONE
VR302	EWCRYA023C15	V.R, TONE
VR401	QVNB3A00B471	V.R, I.C.Q ADJUST
VR402	QVNB3A00B471	V.R, I.C.Q ADJUST
THERMISTORS AND VARISTORS		
TH201	ERTD2WHL104S	THERMISTOR
TH202	ERTD2WHL104S	THERMISTOR
TH401	ERTD2WHL104S	THERMISTOR
TH402	ERTD2WHL104S	THERMISTOR
COILS AND TRANSFORMERS		
L501	SLQY07G-50	COIL
L502	SLQY07G-50	COIL
L503	SLQY18G-20	COIL
L504	SLQY18G-20	COIL
T1 ⚠	SLT5Q157	POWER TRANSFORMER
FUSES		
F1 ⚠	XBA1F60NU14	FUSE
SWITCHES		
S1-1	SSH6002	SW, PHONO
S1-2	SSH6002	SW, TUNER
S1-3	SSH6002	SW, CD
S1-4	SSH6002	SW, AUX
S1-5	SSH6002	SW, TAPE2/EXT
S1-6	SSH6002	SW, TAPE1/DAT
S3-1	ESA2682	SW, REC SELECTOR
S3-2	ESA335029B	SW, REC SELECTOR
S4	SSH3704	SW, PHONO SELECTOR
S5	SSH1215	SW, CD DIRECT
S6	SSH3704	SW, LOUDNESS
S7	SSH3704	SW, SUBSONIC
S8	SSH1218	SW, TONE CONTROL
S9-1	SSH2115	SW, SP MAIN
S9-2	SSH2115	SW, SP REMOTE
S11 ⚠	SSH1201	SW, POWER
RELAYS		
RLY501	SSY126	RELAY

■ RESISTORS AND CAPACITORS

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System of Capacitor

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001μF)	Tolerance	Peculiarity
ECEA	50	M	330	
Type	Voltage (50V)	Pecliarity	Value (33μF)	

● Capacity values are in microfarads (μF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F).
● Resistance values are in ohms (Ω), unless specified otherwise, 1K=1,000Ω, 1M=1,000kΩ

Resistor Type		Wattage		Tolerance
ERD	: Carbon	10 : 1/8W	12 : 1/2W	J : ±5%
ERG	: Metal Oxide	14 : 1/4W	25 : 1/4W	F : ±1%
ERQ	: Fuse Type Metal	1A : 1W	18 : 1/8W	G : ±2%
ERX	: Metal Film	S2 : 1/4W	S1 : 1/2W	J : ±5%
ERD L	: Carbon (chip)	2F : 1/4W	50 : 1/2W	K : ±10%
ERO K	: Metal Film (chip)	2A : 2W	3A : 3W	M : ±20%
ERC	: Solid	6G : 1/10W	8G : 1/8W	
ERF	: Incombustible Box-Shaped			
ERM	: Wire-Wound			
RRJ	: Cip Resistor			
ERJ	: Cip Resistor			

Capacitor Type		Voltage		Tolerance
ECE	: Electrolytic	0J : 6.3V	1A : 10V	K : ±10%
ECCD	: Ceramic	1C : 16V	1E : 25V	M : ±20%
ECKD	: Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 % −20
ECQM	: Poyester	50 : 50V	05 : 50V	J : ±5%
ECQP	: Polypropylene	2H : 500V	2A : 100V	G : ±2%
ECG	: Ceramic	1 : 100V	1J : 63V	F : ±1%
ECEA N	: Non Polar Electrolytic	KC : 400V AC		C : ±0.25pF
QCU	: Ceramic (Chip Type)	KC : 125V AC		D : ±0.5pF
ECUX	: Ceramic (Chip Type)	(UL)		
ECF	: Semiconductor			
EECW	: Liquid electrolyte double layer capacitor			

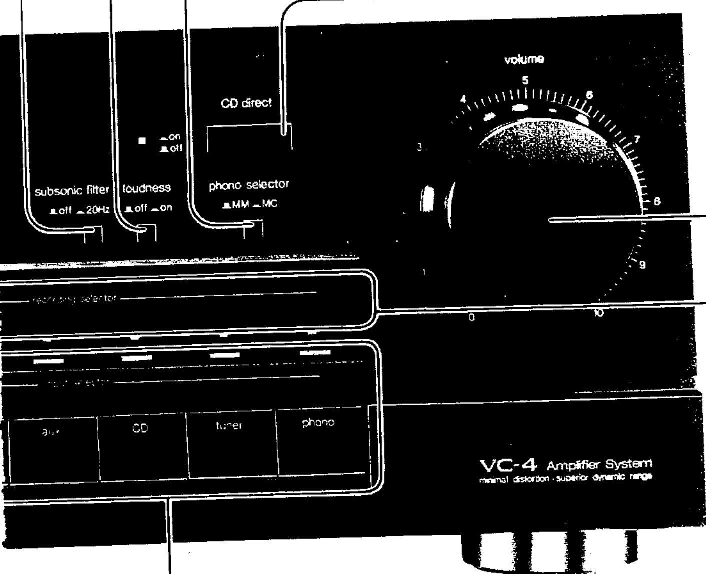
Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.	Ref. No.	Part No.	Value.
RESISTORS(VALUE,WATTAGE)			R305	ERDS2TJ224	220K 1/4	R429 ⚠	ERD25FJ2R2	2.2 1/4
R105	ERDS2TJ473	47K 1/4	R306	ERDS2TJ224	220K 1/4	R430 ⚠	ERD25FJ2R2	2.2 1/4
R106	ERDS2TJ473	47K 1/4	R307	ERDS2TJ392	3.9K 1/4	R431 ⚠	ERD25FJ2R2	2.2 1/4
R107	ERDS2TJ221	220 1/4	R308	ERDS2TJ392	3.9K 1/4	R432 ⚠	ERD25FJ2R2	2.2 1/4
R108	ERDS2TJ221	220 1/4	R309	ERDS2TJ223	22K 1/4	R433 ⚠	ERD25FJ101	100 1/4
R109	ERDS2TJ220	22 1/4	R310	ERDS2TJ223	22K 1/4	R434 ⚠	ERD25FJ101	100 1/4
R110	ERDS2TJ220	22 1/4	R311	ERDS2TJ102	1K 1/4	R435	ERDS2TJ103	10K 1/4
R111	ERD25FJ332	3.3K 1/4	R312	ERDS2TJ102	1K 1/4	R436 ⚠	ERD25FJ470	47 1/4
R112	ERD25FJ332	3.3K 1/4	R313	ERDS2TJ562	5.6K 1/4	R437	ERDS2TJ473	47K 1/4
R113	ERDS2TJ332	3.3K 1/4	R314	ERDS2TJ562	5.6K 1/4	R438 ⚠	ERD25FJ6R8	6.8 1/4
R114	ERDS2TJ332	3.3K 1/4	R315	ERD25FJ392	3.9K 1/4	R439 ⚠	ERD25FJ6R8	6.8 1/4
R115	ERD25FJ332	3.3K 1/4	R316	ERD25FJ392	3.9K 1/4	R501	ERDS2TJ392	3.9K 1/4
R116	ERD25FJ332	3.3K 1/4	R317	ERD25FJ223	22K 1/4	R502	ERDS2TJ392	3.9K 1/4
R117	ERDS2TJ151	150 1/4	R318	ERD25FJ223	22K 1/4	R503	ERDS2TJ121	120 1/4
R118	ERDS2TJ151	150 1/4	R319	ERDS2TJ183	18K 1/4	R504	ERDS2TJ121	120 1/4
R119	ERDS2TJ100	10 1/4	R320	ERDS2TJ183	18K 1/4	R505	ERDS2TJ392	3.9K 1/4
R120	ERDS2TJ100	10 1/4	R401	ERDS2TJ122	1.2K 1/4	R506	ERDS2TJ392	3.9K 1/4
R121	ERDS2TJ101	100 1/4	R402	ERDS2TJ122	1.2K 1/4	R507	ERDS2TJ121	120 1/4
R122	ERDS2TJ101	100 1/4	R403	ERDS2TJ823	82K 1/4	R508	ERDS2TJ121	120 1/4
R123	ERDS2TJ151	150 1/4	R404	ERDS2TJ823	82K 1/4	R509	ERF2AKR10P	0.1 2
R124	ERDS2TJ151	150 1/4	R405	ERD25FJ272	2.7K 1/4	R510	ERF2AKR10P	0.1 2
R125	ERDS2TJ682	6.8K 1/4	R406	ERD25FJ272	2.7K 1/4	R511	ERF2AKR10P	0.1 2
R126	ERDS2TJ682	6.8K 1/4	R407	ERD25TJ104	100K 1/4	R512	ERF2AKR10P	0.1 2
R127	ERDS2TJ823	82K 1/4	R408	ERD25TJ104	100K 1/4	R513 ⚠	ERD25FJ100	10 1/4
R128	ERDS2TJ823	82K 1/4	R409	ERDS2TJ561	560 1/4	R514 ⚠	ERD25FJ100	10 1/4
R129	ERDS2TJ334	330K 1/4	R410	ERDS2TJ561	560 1/4	R515 ⚠	ERD25FJ100	10 1/4
R130	ERDS2TJ334	330K 1/4	R411 ⚠	ERD25FJ470	47 1/4	R516 ⚠	ERD25FJ100	10 1/4
R131	ERDS2TJ561	560 1/4	R412 ⚠	ERD25FJ470	47 1/4	R517 ⚠	ERD25FJ1R0	1 1/4
R132	ERDS2TJ561	560 1/4	R415	ERDS2TJ182	1.8K 1/4	R518 ⚠	ERD25FJ1R0	1 1/4
R211	ERDS2TJ473	47K 1/4	R416	ERDS2TJ182	1.8K 1/4	R519 ⚠	ERD25FJ100	10 1/4
R212	ERDS2TJ473	47K 1/4	R417	ERDS2TJ391	390 1/4	R520 ⚠	ERD25FJ100	10 1/4
R213	ERDS2TJ183	18K 1/4	R418	ERDS2TJ391	390 1/4	R521 ⚠	ERDS1FJ100	10 1/2
R214	ERDS2TJ183	18K 1/4	R419 ⚠	ERD25FJ101	100 1/4	R522 ⚠	ERDS1FJ100	10 1/2
R215	ERDS2TJ824	820K 1/4	R420 ⚠	ERD25FJ101	100 1/4	R523	ERG2SJ331H	330 2
R216	ERDS2TJ824	820K 1/4	R421	ERDS2TJ223	22K 1/4	R524	ERG2SJ331H	330 2
R219	ERD25FJ272	2.7K 1/4	R422	ERDS2TJ223	22K 1/4	R525	ERG2ANJP102S	1K 2
R220	ERD25FJ272	2.7K 1/4	R423 ⚠	ERD25FJ821	820 1/4	R526	ERDS2TJ223	22K 1/4
R301	ERD25FJ561	560 1/4	R424 ⚠	ERD25FJ821	820 1/4	R527	ERDS2TJ223	22K 1/4
R302	ERD25FJ561	560 1/4	R425	ERDS2TJ223	22K 1/4	R528	ERDS2TJ824	820K 1/4
R303	ERDS2TJ823	82K 1/4	R426	ERDS2TJ223	22K 1/4	R529	ERDS2TJ124	120K 1/4
R304	ERDS2TJ823	82K 1/4	R427 ⚠	ERD25FJ101	100 1/4	R531 ⚠	ERDS1FJ100	10 1/2
			R428 ⚠	ERD25FJ101	100 1/4	R532 ⚠	ERDS1FJ100	10 1/2

Loudness switch (loudness)
Set to the "on" position when listening to music at a low volume. Auditory perception of sound in the low frequency range falls off at low volume, but when the switch is in this position, this deficiency is compensated for, so that the full impact of the musical performance can be enjoyed.

Phono cartridge selector (phono selector)
This selector should be set to the position which corresponds to the type of cartridge used on the turntable.

MM (▪ ▬ ▮):
Set to this position when using a moving-magnet type cartridge or high-output moving-coil cartridge (1 mV or more).

MC (▮ ▬ ▪):
Set to this position when using a moving-coil type cartridge (less than 1 mV).



Compact disc direct-through switch (CD direct)
This switch can be used to select compact disc as a listening source. When this switch is ON, the signals from the compact disc are sent directly to the volume and tone control circuits, without passing through the input selectors. No other sound source can be selected when this switch is ON.

Volume control (volume)
This control is used to adjust the volume level. Be absolutely sure to set this control to a low position before switching the power ON. After the power is switched ON, please wait several seconds before increasing the volume level.

Input selectors/indicators (input selector)
Press to select the sound source to be listened.
The corresponding indicator illuminates during operation to indicate the selected sound source.

tape 1/DAT:
Press this button to playback or monitor the sound of a tape deck or other equipment connected to the "TAPE 1/DAT" terminals on the rear panel.

tape 2/ext:
Press this button to play back or monitor the sound from a tape deck connected to the "TAPE 2/EXT" terminals on the rear panel.

aux:
Press this button to listen to sound from a video disc player or other equipment connected to the "AUX" terminals on the rear panel.

CD:
Press this button to listen to a compact disc.

tuner:
Press this button to listen to radio broadcasts.

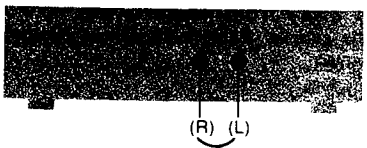
phono:
Press this button to listen to phono discs.

Recording output indicators (recording selector)
The corresponding indicator illuminates to show the position of the Recording output selector and the program source which can be recorded.

■ CONNECTIONS

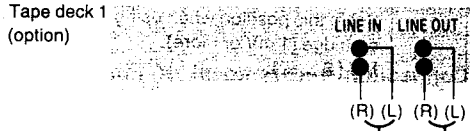
"CD" terminals

Connect a compact disc player.



"TAPE 1/DAT" terminals

In addition to a tape deck, the analog terminals of a digital audio tape deck (DAT) can be connected here.
If the digital audio tape deck is connected, connect the tape deck to the "TAPE 2/EXT" terminals.

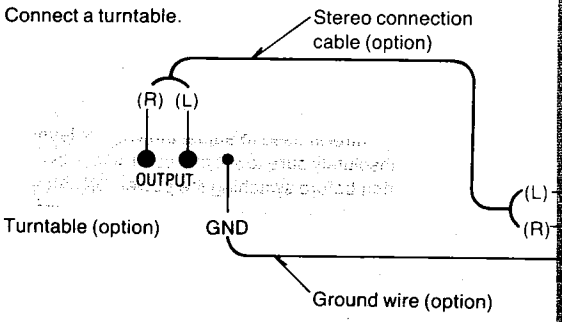


Stereo connection cables (option)

(R) (L) (L) (R) (L) (R)

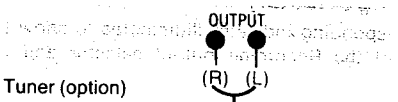
"PHONO" terminals

Connect a turntable.



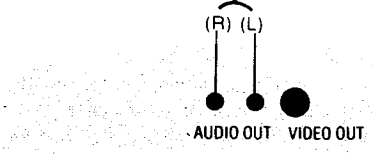
"TUNER" terminals

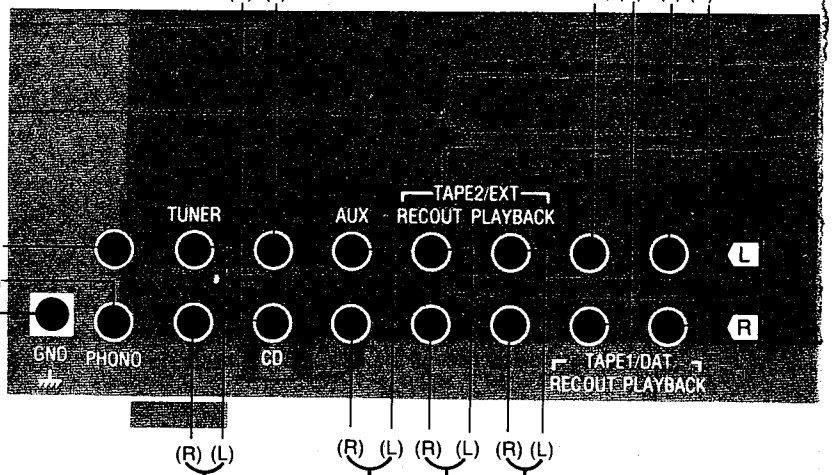
Connect a tuner.



"AUX" terminals

Connect a video disc player etc. These terminals are audio playback only.

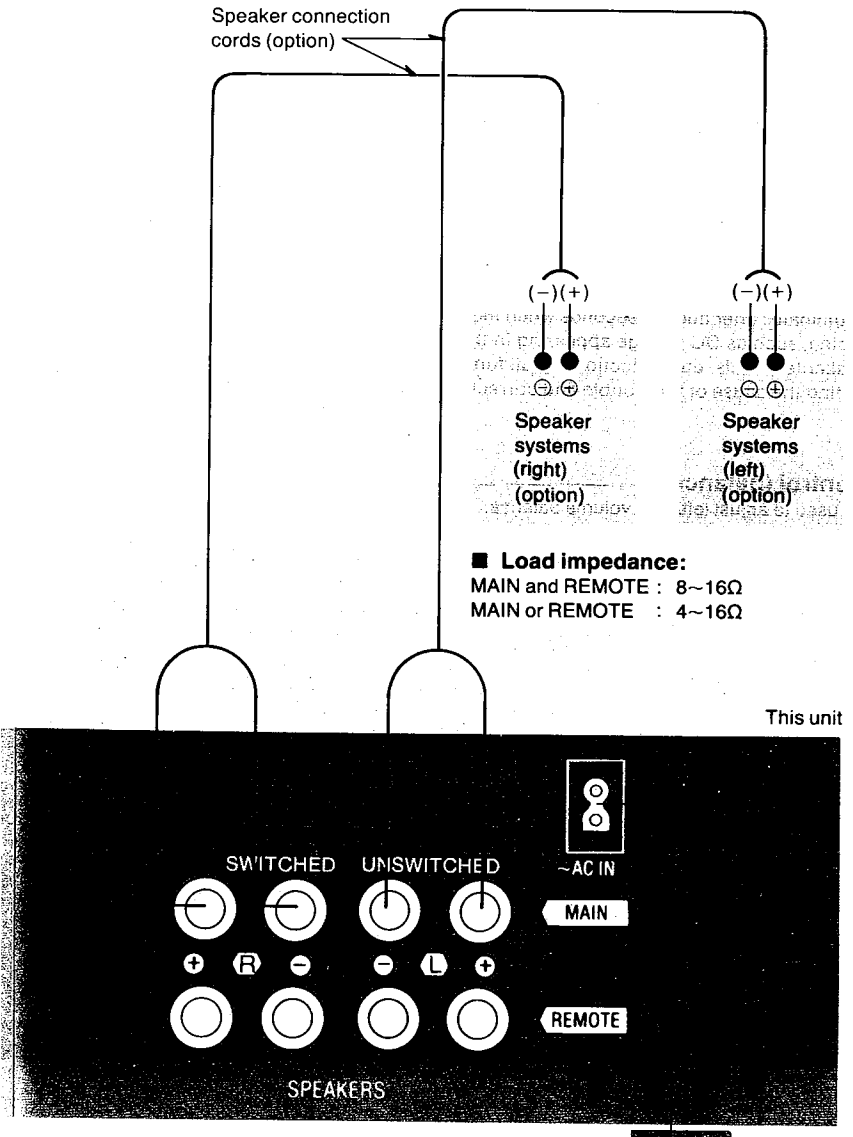




(R) (L) (R) (L) (R) (L) (R) (L)

Stereo connection cables (option)

*Phono input capacitance is about 100 pF.

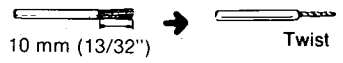


■ **Load impedance:**
MAIN and REMOTE : 8~16Ω
MAIN or REMOTE : 4~16Ω

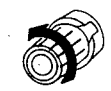
"SPEAKERS" terminals

■ **Connection of speaker wires**

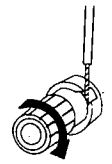
1. Strip off the outer covering, and twist the center conductor.



2. Loosen screw as shown.

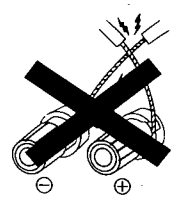


3. Insert wire and tighten screw completely. Pull the wire to assure a proper connection.



Notes:

1. To prevent damage to circuitry, never short plus (+) and minus (−) speaker terminals.

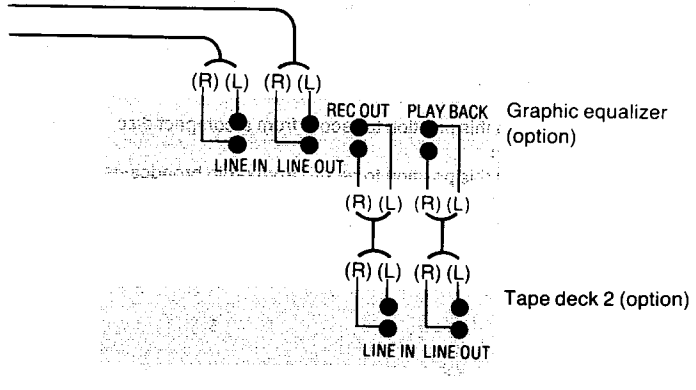


2. Be sure to only connect positive (+) cords to positive (+) terminals, and negative (−) cords to negative (−) terminals.

■ **"REMOTE" terminals**
Connection to second pair of speakers.

"TAPE 2/EXT" terminals

Connect a graphic equalizer or a second tape deck, etc.



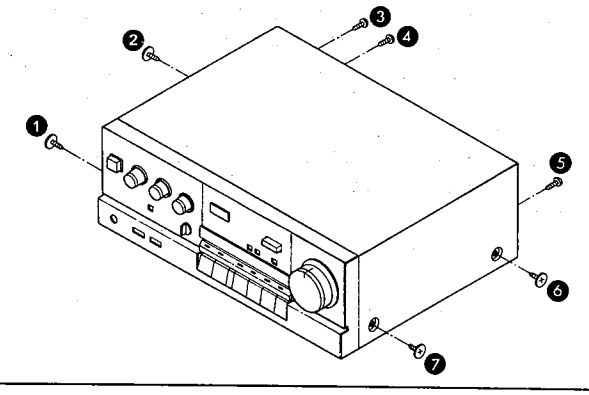
AC outlets

■ **"SWITCHED" outlet:**
Power is controlled by power switch of this unit.
Audio equipment rated up to 50W can be connected.

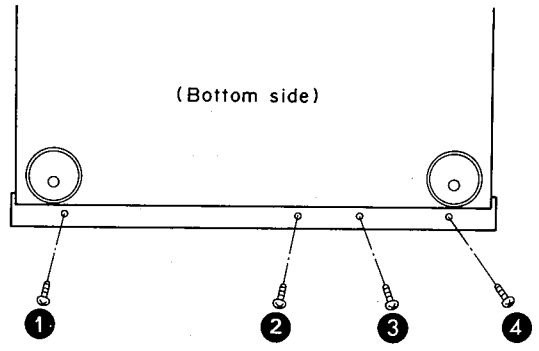
■ **"UNSWITCHED" outlets:**
Power is always available, regardless of the power switch setting.
Audio equipment rated up to 200W (total for all outlets) can be connected.

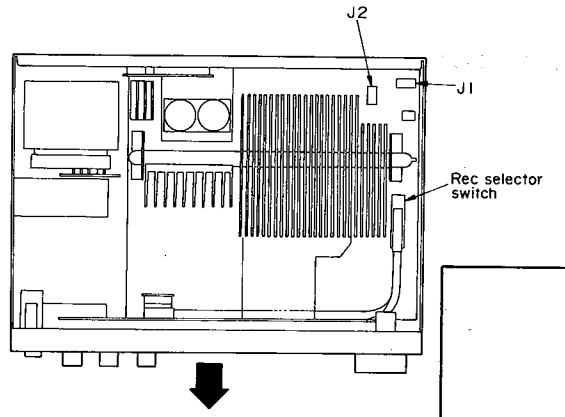
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	How to remove the cabinet
Procedure 1	●Remove the 7 screws (❶~❼).



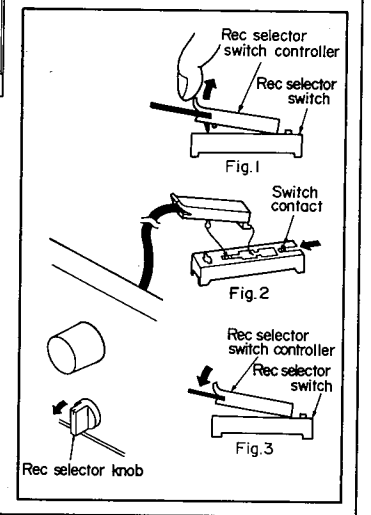
Ref. No. 2	How to remove the front panel
Procedure 1→2	1. Remove the 2 connectors (J1, J2). 2. Remove the rec selector switch controller. 3. Remove the 4 screws (❶~❹).



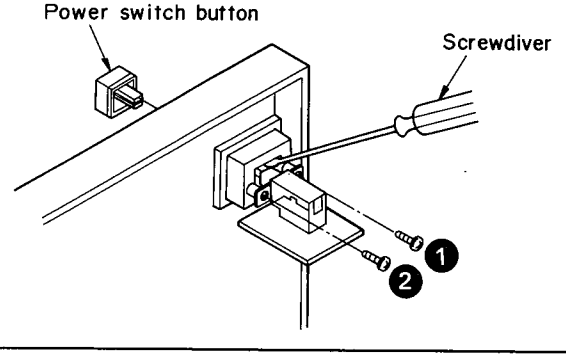


How to remove the rec selector switch controller
●Pull up the rec selector switch controller in the direction of the arrow as shown in figure 1 and then remove it. (See Fig. 1)

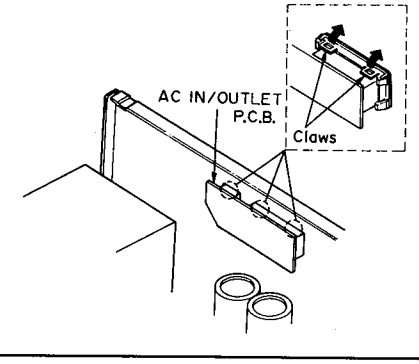
How to replace the rec selector switch controller
1. Push the switch contact in the direction of the arrow. (See Fig. 2)
2. Rotate the rec selector knob counterclockwise. (See Fig. 2)
3. Install the rec selector switch controller in the rec selector switch. (See Fig. 3)



Ref. No. 3	How to remove the power switch button
Procedure 1→3	1. Remove the power switch button by pushing it from behind the front panel. 2. Remove the 2 screws (❶, ❷).



Ref. No. 4	How to remove the AC IN/ OUTLET P.C.B.
Procedure 1→4	●Release the 3 claws.



■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:
* No sound is heard when the power is switched ON.
* Sound stops during a performance.

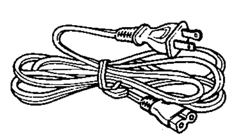
The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted" , or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.
If this occurs, follow the procedure outlined below:

1. Switch OFF the power.
2. Determine the cause of the problem and correct it.
3. Switch ON the power once again.

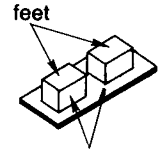
Note:
When the protection circuitry functions, the unit will not operate unless the power is first switched OFF and then ON again.

■ ACCESSORIES

- **AC power supply cord** 1
  (SJA 172-1) .... For (M) area only
  (SJA 172) .... For (MC) area only



- **Feet** 2
  (SKL 312)



■ LOCATION OF CONTROLS

•Subsonic filter switch (subsonic filter)
off (▬ _ ▮): Set to this position for ordinary use.
20 Hz (▮ _ ▬): Set to this position to eliminate ultra-low-frequency noise such as motor "rumble" and unusual vibration of the woofer cone caused by a warped disc, etc.

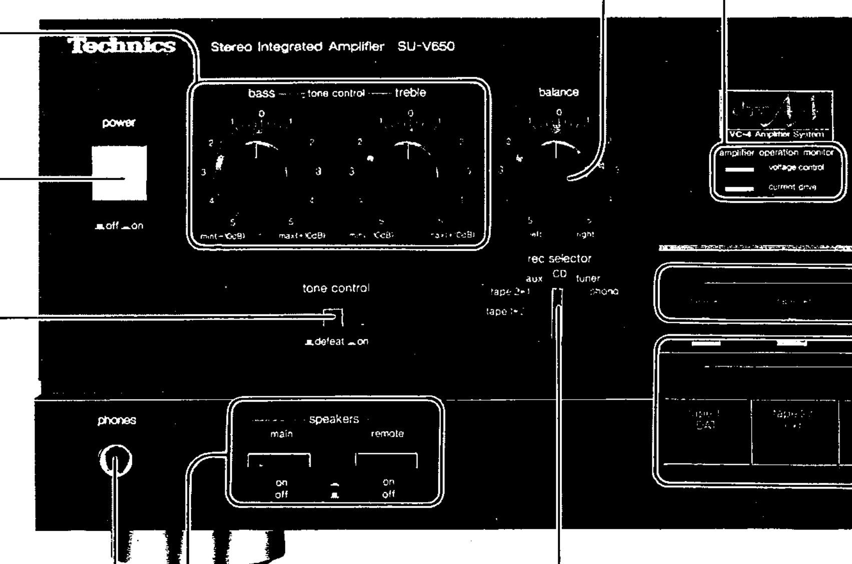
•Operation indicators (amplifier operation monitor)
This indicator illuminates to indicate the operating condition of this unit.
voltage control:
When the power is switched ON, this indicator illuminates when the unit is in the operation condition.
current drive:
When the power is switched ON, this indicator illuminates after about 4 seconds when the unit is in the operation condition. If an abnormal condition in the circuitry is detected, such as DC voltage appearing in the output, or a short-circuit of the positive (+) and negative (–) wires from the speaker terminals, the protection circuit functions and this indicator does not illuminate. If this occurs, switch the power OFF, find the cause of the trouble and correct it, and then switch the power ON once again.

•Balance control (balance)
This control is used to adjust left/right volume balance.

•Tone controls (bass/treble)
The bass control is for the low-frequency sound range, and the treble control is for the high-frequency sound range.

•Power switch (power)

•Tone control switch (tone control)
This switch is used to switch the tone control circuit (bass, treble) ON or OFF.
defeat (▬ _ ▮):
Set to this position to turn the bass/treble tone control circuit off. Regardless of the positions of the bass/treble tone controls, the characteristics will remain flat.
on (▮ _ ▬):
Set to this position to adjust the tone quality by using the tone controls.



•Headphones jack (phones)

•Speaker selectors (speakers)
These selectors are used to switch the speaker systems ON and OFF.
main on (▮ _ ▬):
Sound can be heard from the speakers connected to the "MAIN" terminals.
remote on (▮ _ ▬):
Sound can be heard from the speakers connected to the "REMOTE" terminals.

•Recording output selector (rec selector)
This selector is used to select the signal to be recorded by the connected tape deck.
tape 1▶2:
Set to this position to record from tape deck 1 to tape deck 2.
tape 2▶1:
Set to this position to record from tape deck 2 to tape deck 1.
aux:
Set to this position to record the signals from equipment connected to the "AUX" terminals.
CD:
Set to this position to record from a compact disc.
tuner:
Set to this position to record from radio broadcasts.
phono:
Set to this position to record from phono discs.

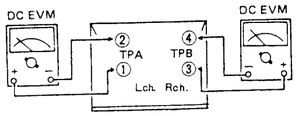
■ MEASUREMENTS AND ADJUSTMENTS

Control positions and equipment used.

- Volume knob.....∞ (Minimum)
- Main speaker selector.....off
- Remote speaker selector.....off
- DC electronic voltmeter(EVM)

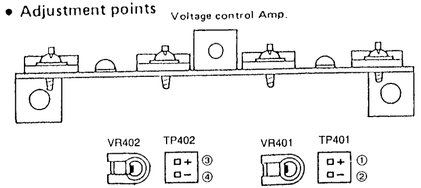
VOLTAGE CONTROL(V)AMP.IDLING(ICQ) ADJUSTMENT

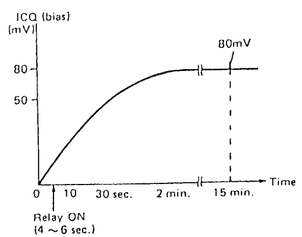
1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Completely turn the (V) amp. adjusting volumes (**VR401**, **VR402**) counter-clockwise.
3. Turn ON the set when it is cold, and 15 sec.later, adjust **VR401** and **VR402** so that the voltage is **50mV**. Also, check that the voltage is **60 ~ 85mV** (standard : **80mV**) after lapse of **10 - 15 minutes.** (Below **85mV** after lapse of **60 min.**)



TPA = ①TP401(+), TPB = ③TP402(+)
②TP401(−) ④TP402(−)

- Adjustment points

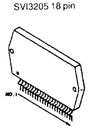




■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

UPC4570C	8 pin
AN7062N	18 pin
M5218P	8 pin

SVI3205 18 pin



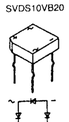
UN4112

2SC3311, 2SA1309

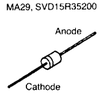
2SC3944, 2SA1535

2SK170 2SA1123
2SC1685, 2SC2631
2SA992

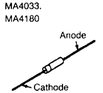
SVDS10VB20



MA165, MA167
MA29, SVD15R35200

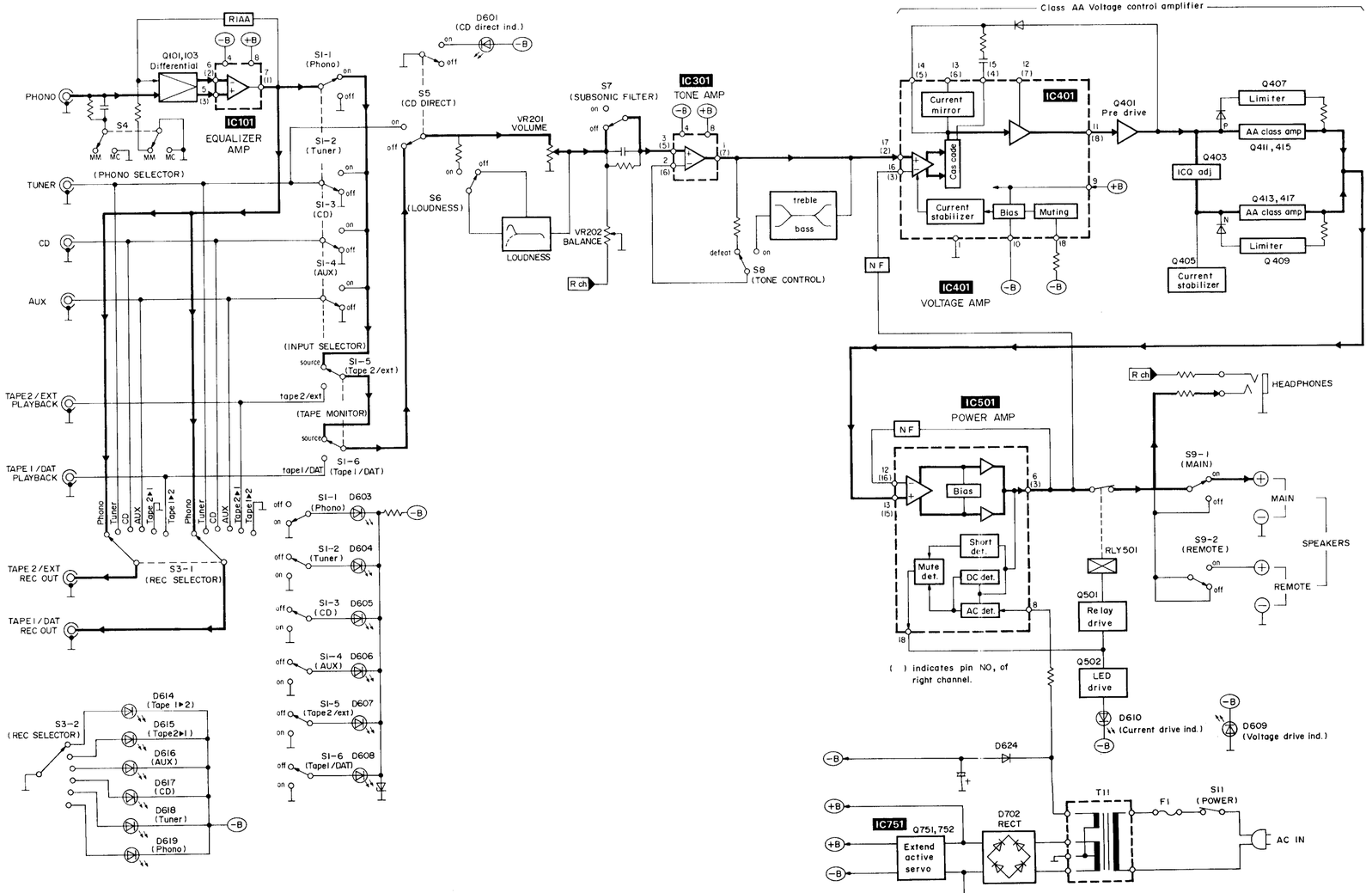


MA4036, MA4160
MA4033,
MA4180

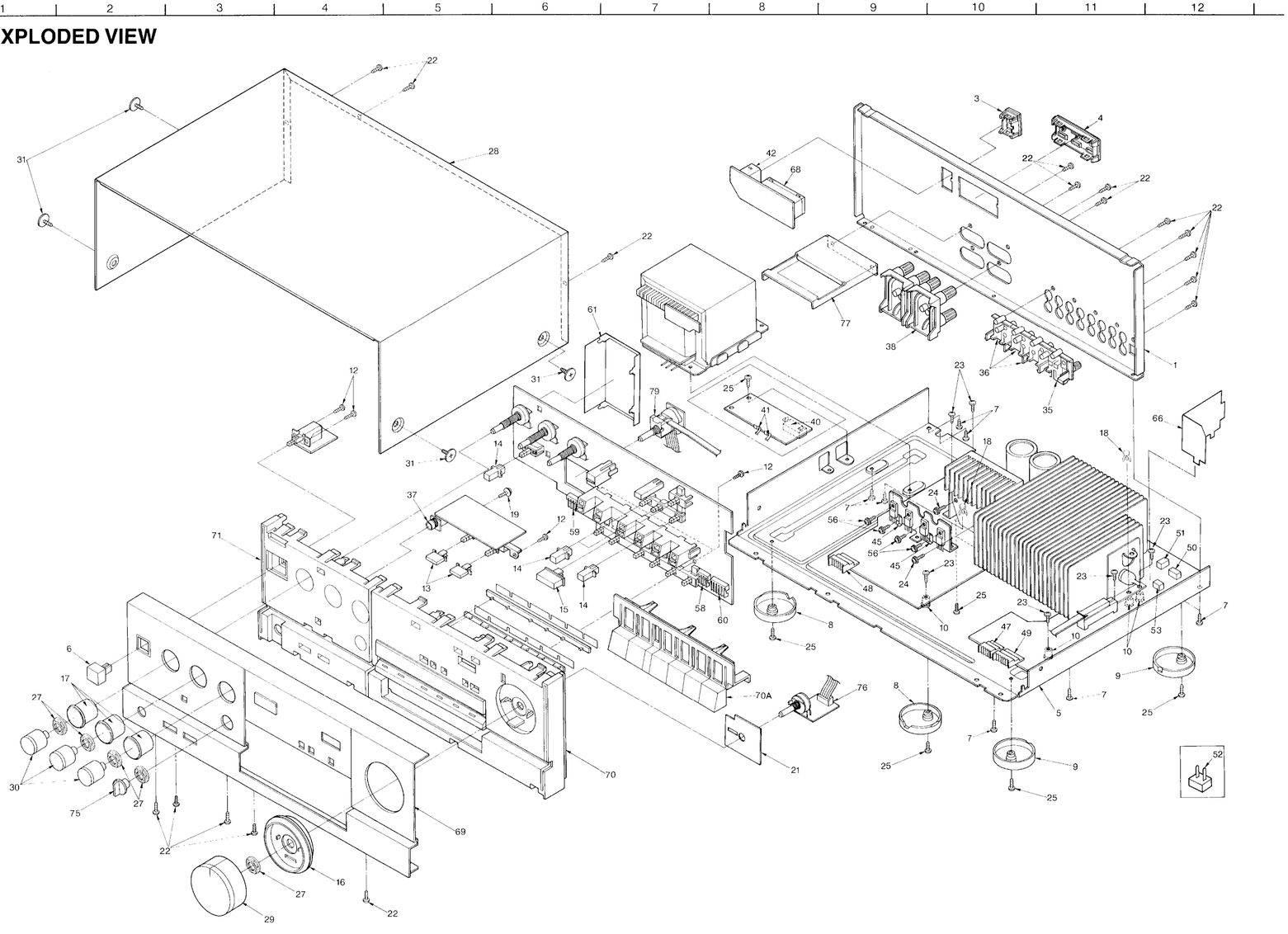


LN018454
LN121456
LN121455

■ BLOCK DIAGRAM



■ EXPLODED VIEW



■ REPLACEMENT PARTS LIST

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

●CABINET PARTS LIST

Ref. No.	Part No.	Description
CABINET AND CHASSIS		
1	SGP7440-1B	PANEL
3	SJS9234A	AC INLET COVER
4	SJS9229A	AC OUTLET COVER
5	SKU11420-5	BOTTOM BOARD
6	SBC966-5	BUTTON, POWER
7	XTB3+8FFZ	SCREW
8	SKL308	SET FOOT(L)
9	SKL309	SET FOOT(R)
10	SHE187-2	HOLDER
12	XTB3+10G	SCREW
13	SBC439-2	BUTTON, SP
14	SBC719-1	BUTTON, TONE/SUB'LOUD
15	SBC820	BUTTON, CD DIRECT
16	SGX806	ORNAMENT
17	SGX9007	ORNAMENT
18	SHR415	LOCK PIN
19	XTW3+10Q	SCREW
21	SMC5407-1	SHIELD COVER
22	XTB3+10JFZ1	TAPPING SCREW
23	XTB3+20J	SCREW
24	XYN3+F14	TAPPING SCREW
25	XTW3+10T	SCREW
27	SNE4021	NUT
28	SKC2210K991	CABINET BODY
29	SBN1249	KNOB, MAIN VOL
30	SBN1247	KNOB, TONE
31	SNE2129-3	SCREW
35	SJF3070NJ	TERMINAL, PHONO IN
36	SJF3071NJ	TERMINAL, INPUT
37	SJJD17B	JACK, HEADPHONES
38	SJF4819	TERMINAL, SP
40	SJS305-1	JACK, POWER TRANSFORMER
41 ⚠	SJT389	FUSE HOLDER
42 ⚠	SJS9234B	AC INLET
45	SUS227	SPRING
47	SJS50780WL	CONNECTOR(7P)
48	SJS50880WL	CONNECTOR(8P)
49	SJS51080WL	SOCKET(10P)
50	SJT3319	CONNECTOR(3P)
51	SJT3415	CONNECTOR(4P)
52	SJT3209	TERMINAL, TEST POINT
53	SJT30243-V	CONNECTOR(2P)
56	XTW3+8T	SCREW
58	SJT30747WL	CONNECTOR(7P)
59	SJT30848WL	CONNECTOR(8P)
60	SJT31047WL	CONNECTOR(10P)
61	SMC1300	SHIELD PLATE
66	SMC1299	SHIELD PLATE
68 ⚠	SJS9229B	AC OUTLET
69	SGWUV650-KE	FRONT PANEL
70	SGXUV650-KE1	FRONT GRILLE (R)
70A	SBC1040	BUTTON, INPUT
71	SGXUV650-KE2	FRONT GRILLE (L)
75	SBN1089-3	KNOB, REC
76	SJT30543-V	CONNECTOR(5P)
77	SLN3126	ANGLE
79	ESA335029B	SW, REC SELECTOR

●PACKING PARTS LIST

Ref. No.	Part No.	Description
PACKING MATERIAL		
P1 (M)	SPG6410	PACKING CASE
P1 (MC)	SPG6411	PACKING CASE
P2	SPS5257	PAD
P3	SPS5258	PAD
P4	SPS5185	PAD
P5	SPP730	PROTECTION COVER
P6	RPF17	PROTECTION COVER
P7	SKL312	INSULATOR
ACCESSORIES		
A1 (M)	SQF13381	INSTRUCTION BOOK
A1 (MC)	SQF13382	INSTRUCTION BOOK
A2 ⚠ (MC)	SJA172	POWER CORD
A2 ⚠ (M)	SJA172-1	POWER CORD

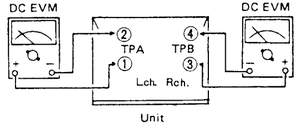
■ MEASUREMENTS AND ADJUSTMENTS

Control positions and equipment used.

- Volume knob.....∞ (Minimum)
- Main speaker selector.....off
- Remote speaker selector.....off
- DC electronic voltmeter(EVM)

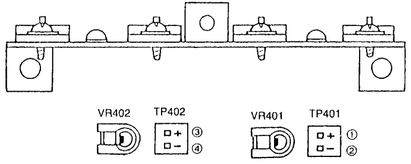
VOLTAGE CONTROL(V)AMP.IDLING(ICQ) ADJUSTMENT

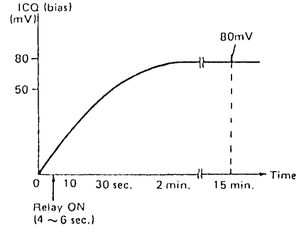
1. Test equipment connection is shown in figure. (Connect the DC EVM on both channels.)
2. Completely turn the (V) amp. adjusting volumes (**VR401**, **VR402**) counter-clockwise.
3. Turn ON the set when it is cold, and 15 sec.later, adjust **VR401** and **VR402** so that the voltage is **50mV**. Also, check that the voltage is **60 ~ 85mV** (standard : **80mV**) after lapse of **10 - 15 minutes.** (Below **85mV** after lapse of **60 min.**)



TPA = ①TP401(+), TPB = ③TP402(+)
②TP401(-) ④TP402(-)

- Adjustment points

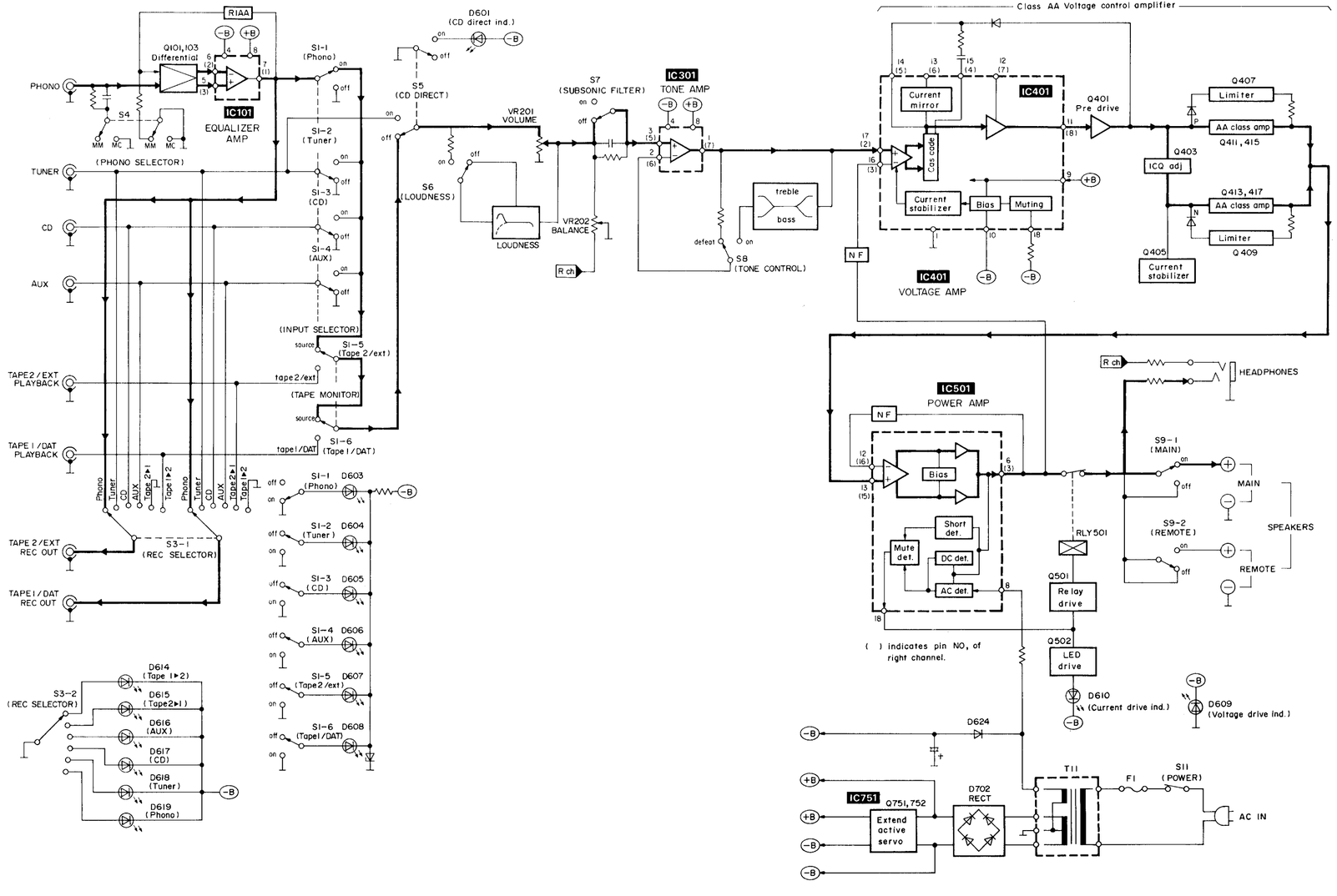


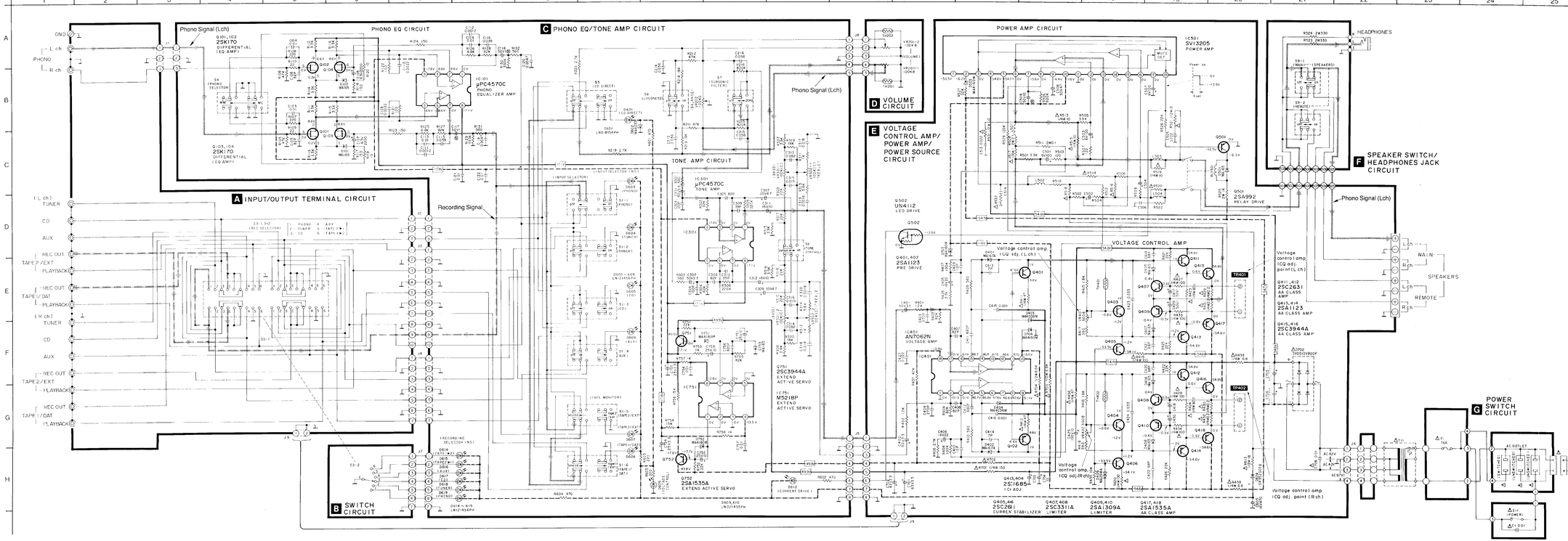


■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

NO. 1 UPC4570C 8 pin AN7062N 18 pin M5218P 8 pin		SVI3205 18 pin	UN4112
2SC3311, 2SA1309	2SC3944, 2SA1535	2SK170 2SA1123 2SC1685, 2SC2631 2SA992	SVDS10VB20
MA165, MA167 MA29, SVD15R35200 Anode Cathode	MA4036, MA4160 MA4033, MA4180 Anode Cathode	LN018454 LN121456 LN121455 Anode Cathode	

■ BLOCK DIAGRAM





■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

- •S1-1 – S1-6 : Input selector switches.
  (S1-1: phono S1-2: tuner S1-3: CD
  S1-4: aux S1-5: tape 2/ext S1-6: tape 1/DAT)
- •S3-1, S3-2 : Recording output selector switch in "**CD**" position.
- •S4 : Phono cartridge selector switch in "**MM**" position.
- •S5 : Compact disc direct-through switch in "**off**" position.
- •S6 : Loudness switch in "**off**" position.
- •S7 : Subsonic filter switch in "**off**" position.
- •S8 : Tone control switch in "**off**" position.
- •S9-1, S9-2 : Speaker selector switches.
  [S9-1: main S9-2: remote]
- •S11 : Power switch in "**on**" position.
- : Phono Signal (Lch)
- : Recording Signal
- : Positive voltage lines.
- : Negative voltage Lines.

• Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high- impedance) with the chassis taken as standard. Therefore, there may exist some differences in the voltage values, depending on the internal impedance of the DC circuit tester.

Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
*Caution!
IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
*Cover the parts boxes made of plastics with aluminum foil.
*Ground the soldering iron.
*Put a conductive mat on the work table.
*Do not touch the legs of IC or LSI with the fingers directly.

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE 6 A 125 V FUSE.

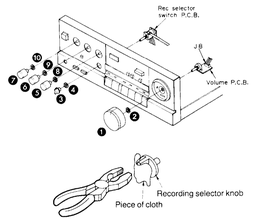
RISK OF FIRE-REPLACE FUSE AS MARKED.

FUSE CAUTION

This symbol located near the fuse indicates that the fuse used is fast operating type. For continued protection against fire hazard, replace with same type fuse. For fuse rating, refer to the rating adjacent to the symbol.

Ce symbol indique que le fusible utilisé est à rapide. Pour une protection permanente, n' utiliser que des fusibles de même type. Ce dernier est indiqué là qu le présent symbol est apposé.

Ref. No. 5	How to remove the rec selector switch P.C.B., volume P.C.B., tone P.C.B. and speaker switch P.C.B.
Procedure 1→2→5	

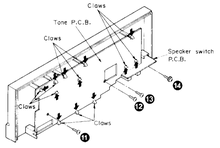


How to remove the volume P.C.B.
1. Remove the 1 knob (❶) and 1 nut (❷).
2. Remove the flat cable (J8).

How to remove the rec selector switch P.C.B.
1. Remove the 1 knob (❸) and 1 nut (❹).
   To prevent damage to the recording selector knob when removing it with a pair of pliers, wrap it up with a piece of cloth as shown.

How to remove the tone P.C.B.
1. Remove the 3 knobs (❺~❼) and 3 nuts (❽~❿).
2. Remove the 2 screws (⓫, ⓬).
3. Release the 12 claws.

How to remove the speaker switch P.C.B.
1. Remove the 2 screws (⓭, ⓮).

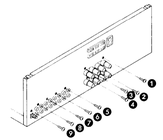


How to remove the flat cable

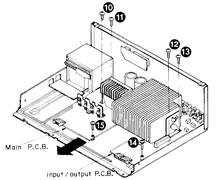
Pull out the flat cable while pressing the connector.

Ref. No. 6	How to remove the main P.C.B. and input/output P.C.B.
Procedure 1→2→6	1. Remove the 15 screws (❶~❺). 2. Remove the main P.C.B. and input/output P.C.B. in the direction of arrow.

※Preparation for the P.C.B. trouble shooting, refer to the procedure explained on page 25.

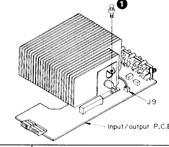


Note:
To check the unit for continuity when it is turned on, place it on its right side panel where the power IC is installed. This will prevent abnormal temperature from rising inside the unit.

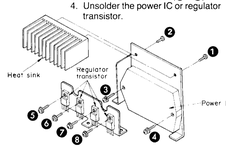


"ATTENTION SERVICER"
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 7	How to remove the input/output P.C.B.
Procedure 1→2→6→7	1. Remove the flat cable (J9). 2. Remove the latch (❶).

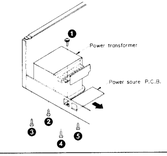


Ref. No. 8	How to remove the power IC and regulator transistor
Procedure 1→2→6→8	1. Remove the 2 screws (❶, ❷). 2. Remove the heat sink 3. Remove the 6 screws (❸~❽). 4. Unsolder the power IC or regulator transistor.



●When mounting the power IC or regulator transistor, apply silicone compound (SZZ0L15) to the rear side of powre IC or regulator transistor.

Ref. No. 9	How to remove the power source P.C.B. and power transformer
Procedure 1→9	1. Remove the 1 screw (❶). 2. Remove the power source P.C.B. in the direction of arrow. 3. Remove the 4 screws (❷→❺). 4. Remove the power transformer.



■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM