

SUBWOOFER SYSTEM YST-SW320

SERVICE MANUAL

IMPORTANT NOTICE

This manual has been provided for the use of authorized YAMAHA Retailers and their service personnel.

It has been assumed that basic service procedures inherent to the industry, and more specifically YAMAHA Products, are already known and understood by the users, and have therefore not been restated.

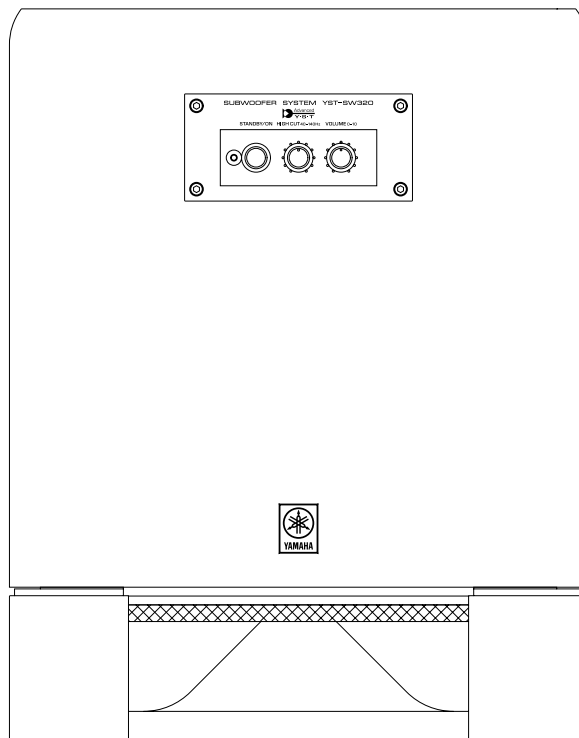
WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components, and failure of the product to perform as specified. For these reasons, we advise all YAMAHA product owners that any service required should be performed by an authorized YAMAHA Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of YAMAHA are continually striving to improve YAMAHA products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and part replacement. Recheck all work before you apply power to the unit.



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このサービスマニュアルは、エコマーク認定の再生紙を使用しています。
This Service Manual uses recycled paper.

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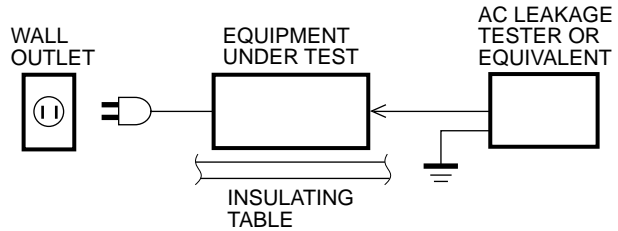


YAMAHA
YAMAHA CORPORATION
P.O.Box 1, Hamamatsu, Japan

YST-SW320

■ TO SERVICE PERSONNEL

1. Critical Components Information
Components having special characteristics are marked \triangle and must be replaced with parts having specifications equal to those originally installed.
 2. Leakage Current Measurement (For 120V Models Only)
When service has been completed, it is imperative to verify that all exposed conductive surfaces are properly insulated from supply circuits.
- Meter impedance should be equivalent to 1500 ohm shunted by 0.15 μ F.



- Leakage current must not exceed 0.5mA.
- Be sure to test for leakage with the AC plug in both polarities.

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

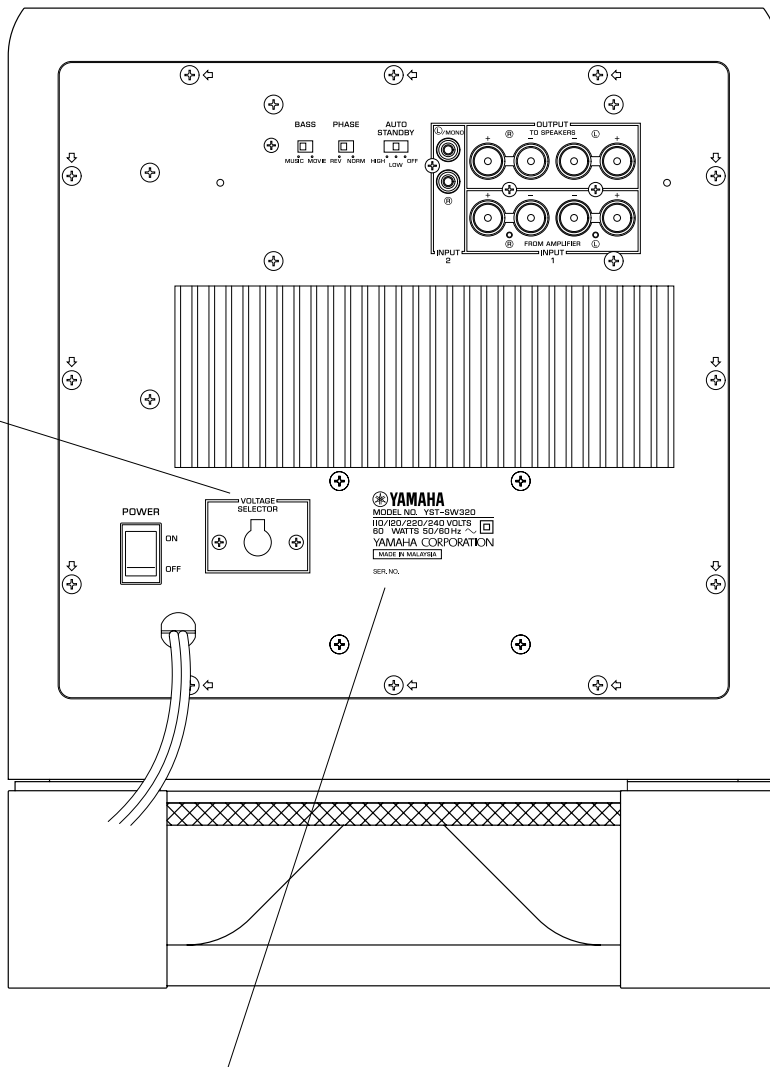
Type	Advanced Yamaha Active Servo Technology
Driver	25 cm (9-13/16") cone woofer (JA25600) Magnetically shielded type
Amplifier Output	250W/5 Ω
Frequency Response	20 Hz to 160 Hz (-24 dB/oct.)
Power Supply	
U, C models	AC120V, 60 Hz
A model	AC240V, 50 Hz
B, G models	AC230V, 50 Hz
R, T models	AC110/120/220/240V, 50/60 Hz
Power Consumption	60W
Dimensions (W x H x D)	340 x 432 x 370 mm (13-3/8" x 17" x 14-9/16")
Weight	17 kg (37 lbs. 7 oz)
Finish	
All model	Black color
R, T, G models	Cherry color
Accessories	Nonskid pad x 4

* Specifications subject to change without notice.

U	USA model
C	Canadian model
A	Australian model
B	British model
G	European model
R	General model
T	China model

REAR PANEL

R, T models only



U, C models

YAMAHA
 MODEL NO. YST-SW320
 120 VOLTS 60 WATTS
 60Hz ~
 YAMAHA CORPORATION
 MADE IN MALAYSIA
 SER. NO.



THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
 (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
 (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRABLE OPERATION.

ATTENTION: RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR.
 WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003.
 CET APPAREIL NUMERIQUE DE LA CLASSE B EST CONFORME A LA NORME NMB-003 DU CANADA.

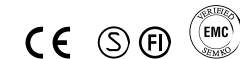
A model

YAMAHA
 MODEL NO. YST-SW320
 240 VOLTS 60 WATTS
 50 Hz ~
 YAMAHA CORPORATION
 MADE IN MALAYSIA
 SER. NO.



B, G models

YAMAHA
 MODEL NO. YST-SW320
 230 VOLTS 60 WATTS
 50 Hz ~
 YAMAHA CORPORATION
 MADE IN MALAYSIA
 SER. NO.



R model

YAMAHA
 MODEL NO. YST-SW320
 110/120/220/240 VOLTS
 60 WATTS 50/60 Hz ~
 YAMAHA CORPORATION
 MADE IN MALAYSIA
 SER. NO.

T model

YAMAHA 马来西亚制造
 型号 YST-SW320
 额定电压 110/120/220/240 V
 中国只适用于 220 V
 额定频率 50/60 Hz ~
 SER. NO.

DISASSEMBLY PROCEDURES

(Remove parts in the order as numbered.)

1. Removal of Front Panel Ass'y

Remove 4 screws (①) and then remove the Front Panel Ass'y in Fig. 1.

- * Use an Allen wrench (3mm) to unscrew the Front Panel Ass'y.

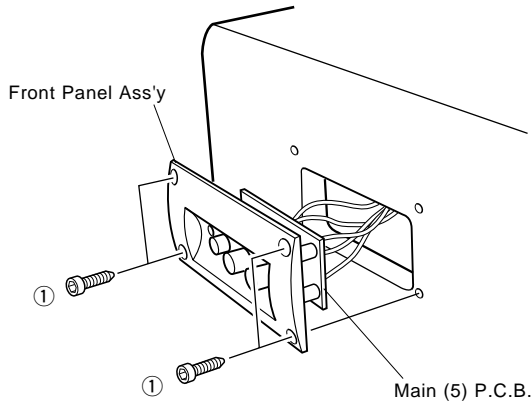


Fig. 1

2. Removal of Loud Speaker

- a. Remove 8 screws (②) and then remove the Base Ass'y in Fig. 2.
- b. Remove 4 screws (③) and then remove the Loud Speaker in Fig. 2.

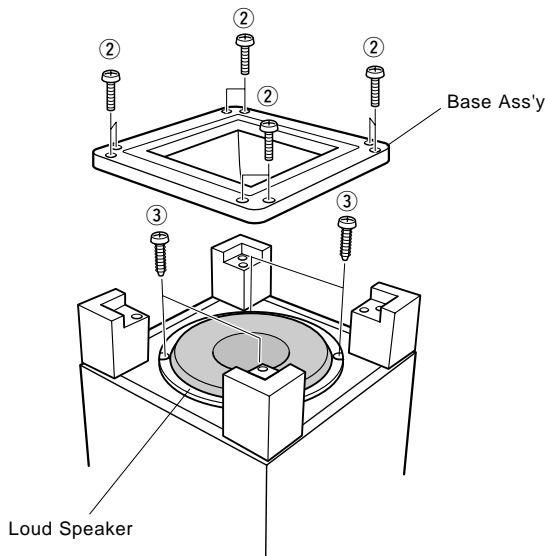


Fig. 2

3. Removal of Rear Panel Ass'y

Remove 12 screws (④) in Fig. 3.

- * Arrow marks (⇐) are printed to identify the screws to be removed.

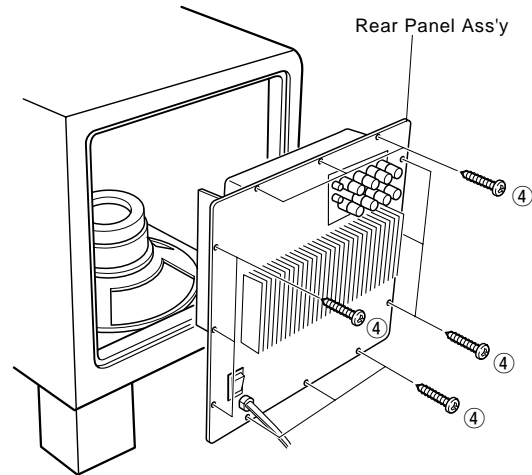


Fig. 3

- * When assembling the Rear Panel, check to ensure that the gasket is not damaged so as to prevent air leakage from occurring.

● Installation of emblem

1. Put the emblem into the cabinet at the specified position.
2. Place a piece of cloth/wood on top of the emblem.
3. Using a mallet, hammer the emblem in place through the cloth/wood.

- * Use special care not to cause damage to the emblem or cabinet while hammering the emblem.

● **Installation of power switch**

Rapid cures bond (such as 5 minute epoxy) is required to fix the power switch.

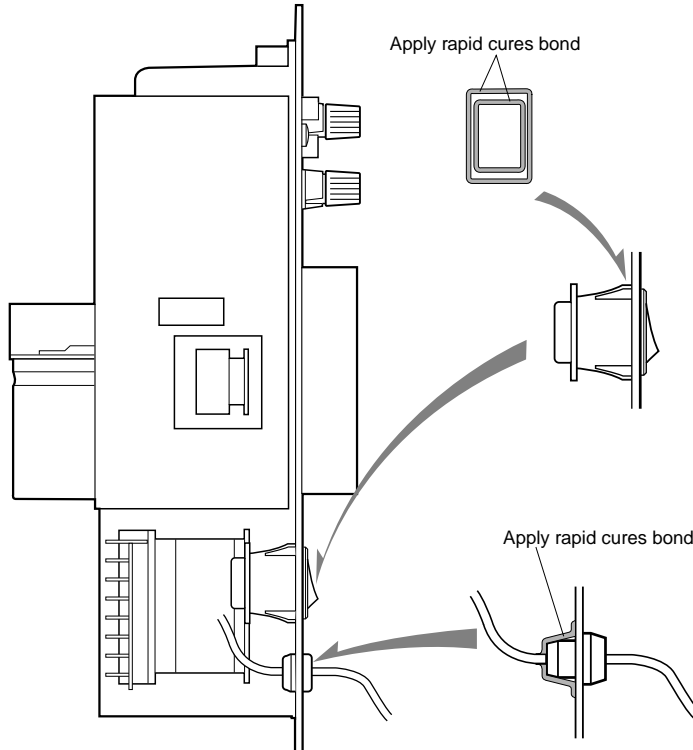
As shown in Fig. A, apply rapid cures bond (such as 5 minute epoxy) to the power switch (the area which contacts the rear panel), insert it in the rear panel and make sure it is fixed.

(Inserting the power switch in the rear panel only would not be sufficient for its secure installation.)

● **Precaution for installation of power cord**

After connecting the power cord, be sure to apply the rapid cures bond (such as 5 minute epoxy) to the cord stopper as shown in Fig. A,

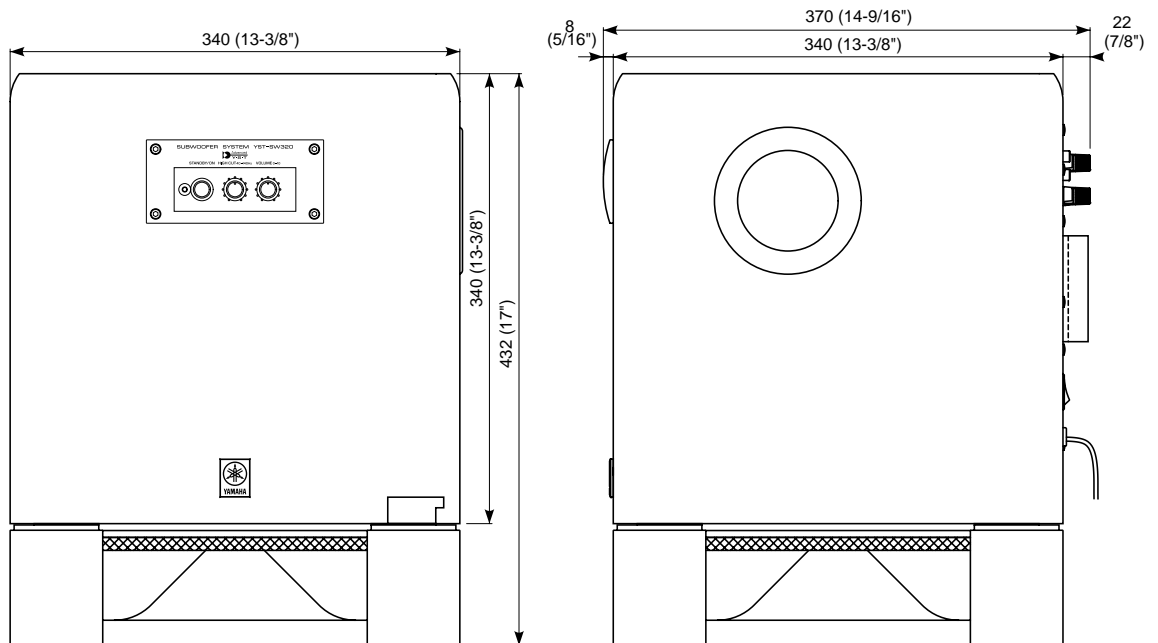
Bond application diagram (Fig. A)



Glue List

Place	Name
Cord stopper	5 minute epoxy or 2051(Revertex Finewaters SDN.BHD.) or VYLOK 917DH (National Starch & Chemical (M) SDM.BHD.)
Power switch	5 minute epoxy or Diabond 1620B

● **Dimensions**



Units : mm (inch)

■ ADJUSTMENTS

● Confirmation of Power Amp operation

For the power amplifier which has been repaired, it is absolutely necessary to confirm that a correct waveform is obtained at points indicated by A and B in the schematic diagram according to the following procedure.

Devices required

- Signal generator
- 8Ω or 6Ω load resistor
- Oscilloscope (dual trace type)

Connection

- 1) Connect the output signal from the signal generator to the input terminal of YST-SW320.
- 2) Disconnect the connector terminal connected to the speaker unit and reconnect it to the load resistor.
- 3) Connect the HOT side of the oscilloscope CH1 probe to the point A or B indicated in the figure and the GND side to the GND of the main unit.
- 4) Connect the oscilloscope CH2 input to the red side of the connector cable, which is connected with the load resistor.
At this time, the GND terminal of CH2 must be left unconnected.

Setting

- 1) Set the signal generator to the sine wave, 100Hz and minimum output level settings.
- 2) Set the volume of YST-SW320 to the minimum position.
- 3) Turn on the power to YST-SW320.
- 4) Adjust the output level of the signal generator and the volume of YST-SW320 so that the output level observed at oscilloscope CH2 is 28Vp-p.

Waveform observation

With the settings made as described above, observe the waveform obtained at CH1 for judgment.

● Idling Adjustment

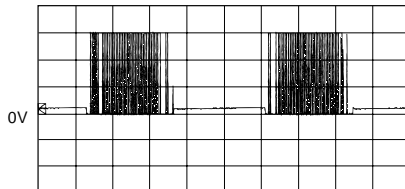
To stabilize operation of the amplifier, turn ON the power with no input signal and wait for 1 or 2 minutes in non loaded condition before the adjustment. Adjust VR1 so that the voltage between terminals TP11 and TP12 is DC 50mV to 250mV.

● Confirmation of AUTO STANDBY

Measuring Condition	Rating	Remarks
R60 = 1MΩ →1MΩ//10kΩ F = 100Hz Input Level = 4mV Load = Open	After 2 to 8 sec. STANDBY (LED become red) Don't STANDBY	VOLUME: MAX HIGH CUT: MAX AUTO STANDBY: LOW VOLUME: MAX HIGH CUT: MAX AUTO STANDBY: HIGH

Normal

Point A (Cathode of D29)
V : 20V/div H : 2 msec/div
DC range 1 : 1 probe

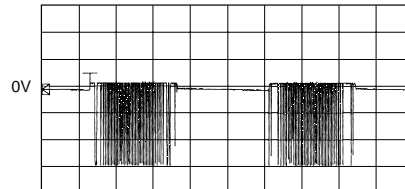


Abnormal

+B or GND level
Becomes constant

Normal

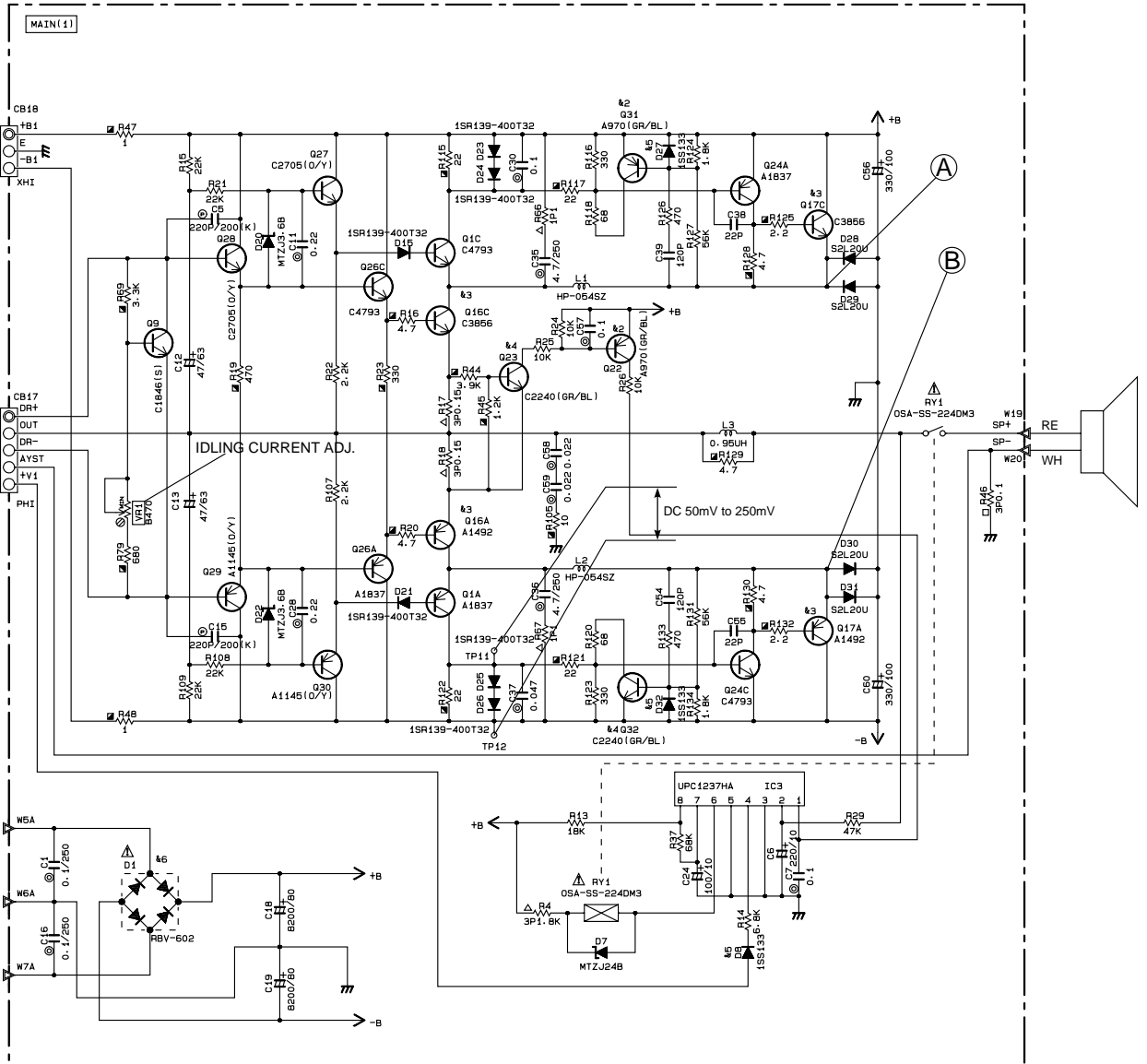
Point B (Anode of D30)
V : 20V/div H : 2 msec/div
DC range 1 : 1 probe



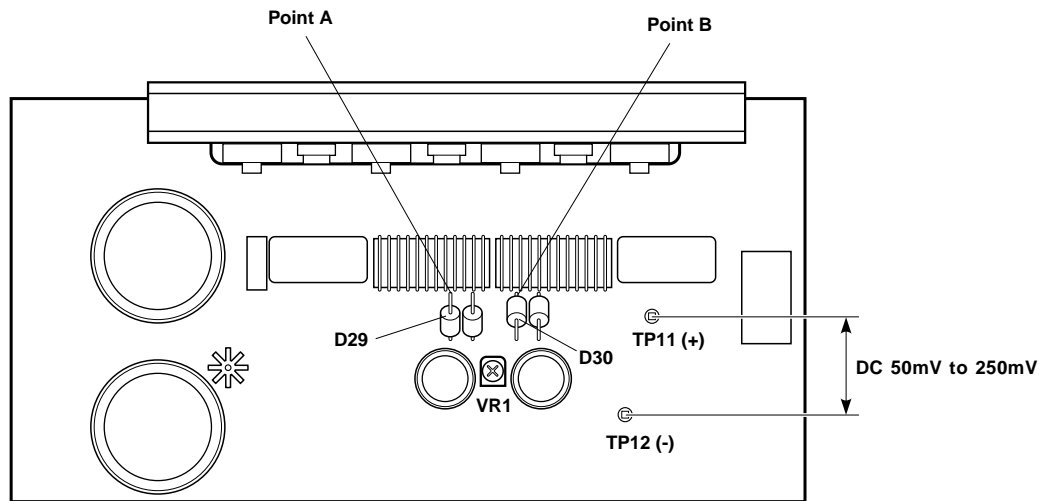
Abnormal

-B or GND level
Becomes constant

● Schematic Diagram



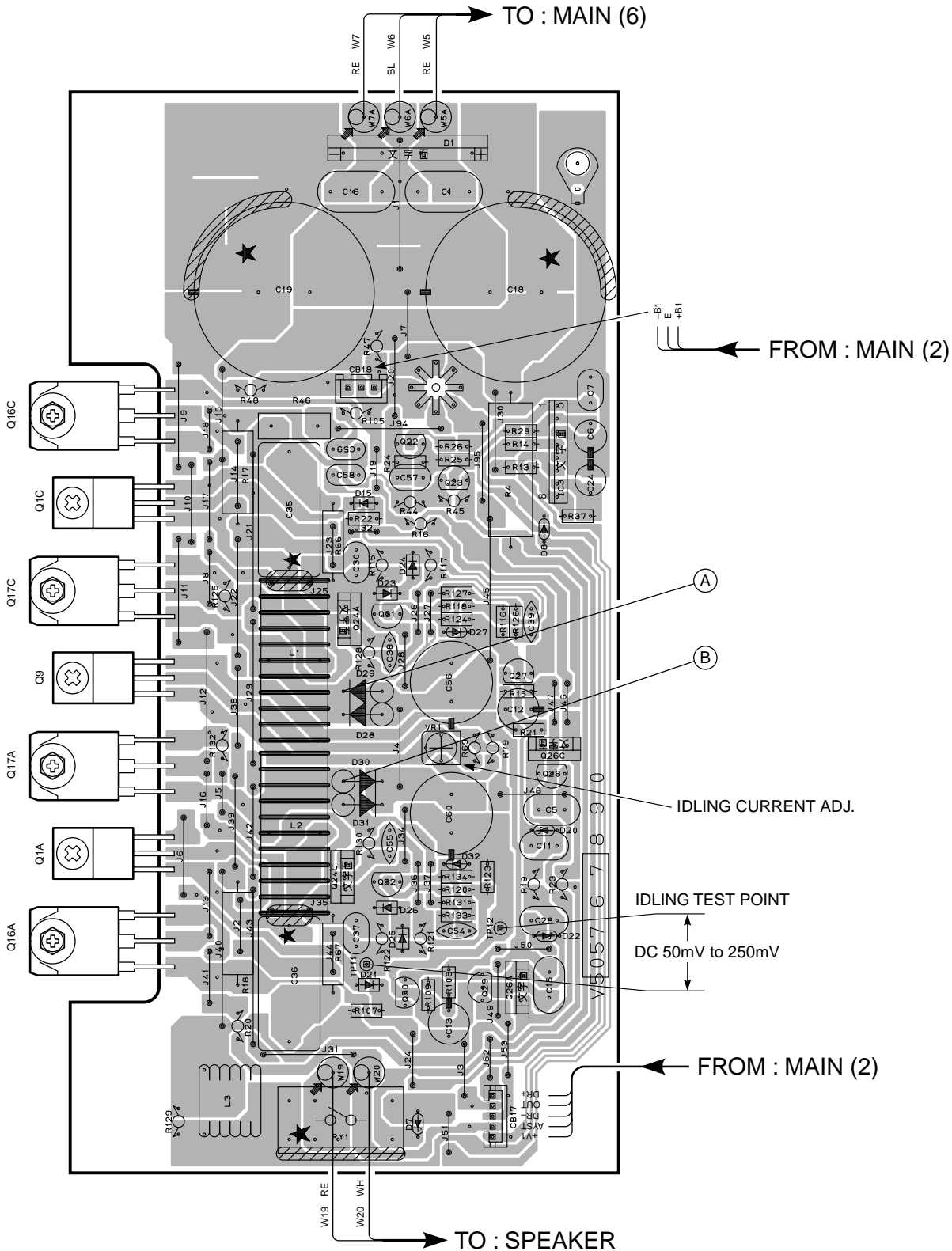
● Test Points



Main (1) P.C.B

1 ■ PRINTED CIRCUIT BOARD (Foil side)

MAIN (1) P.C.B.



1

■ PRINTED CIRCUIT BOARD (Foil side)

MAIN (2) P. C. B.

2

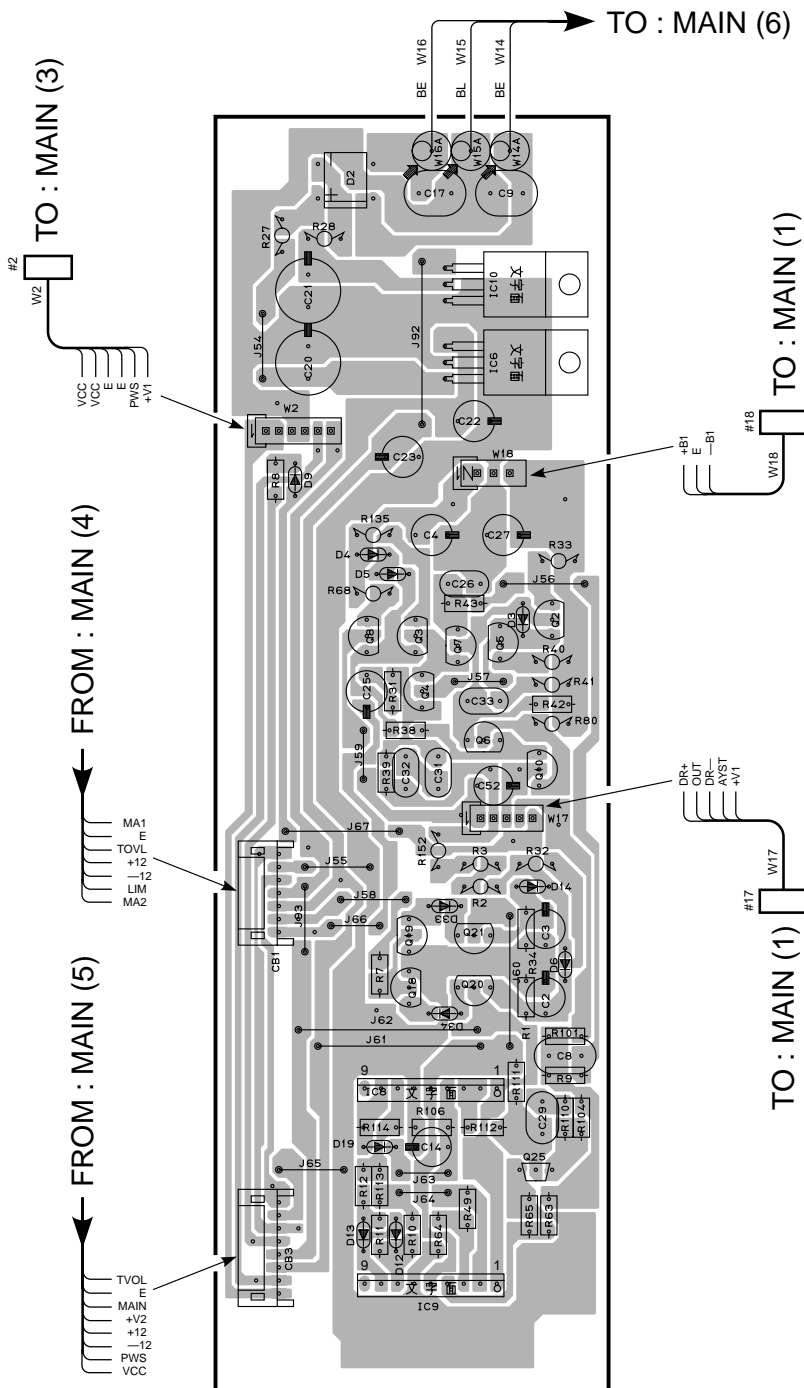
3

4

5

6

7



1

■ PRINTED CIRCUIT BOARD (Foil side)

2

MAIN (7) P. C. B.

3

MAIN (3) P. C. B.

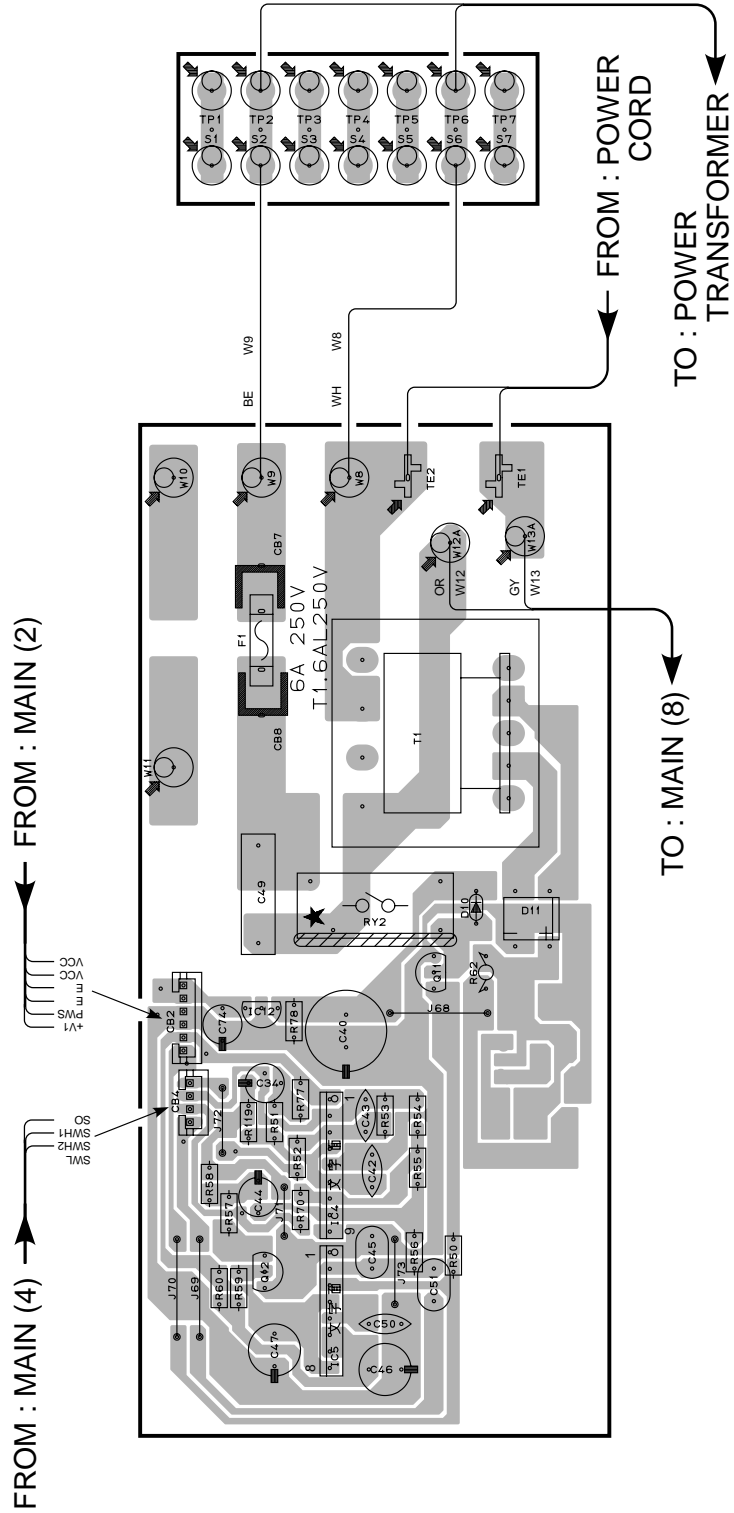
4

5

6

7

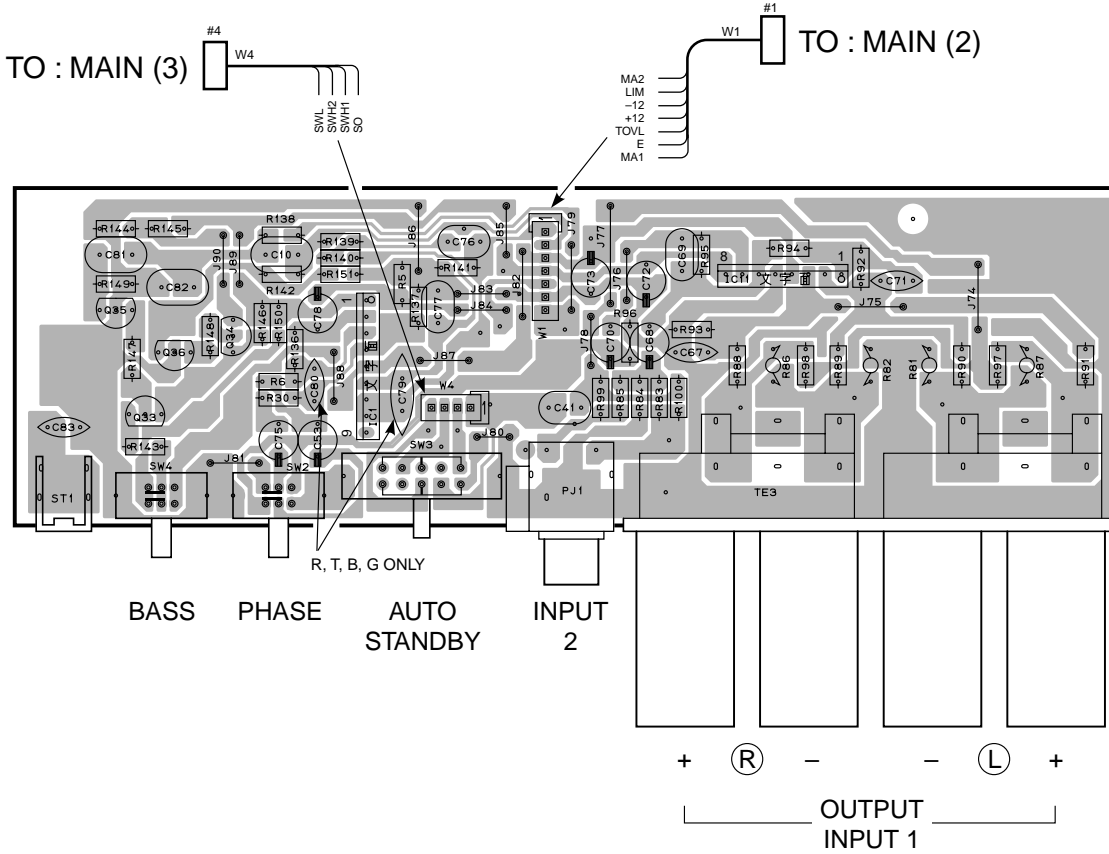
● U, C, A, B, G models



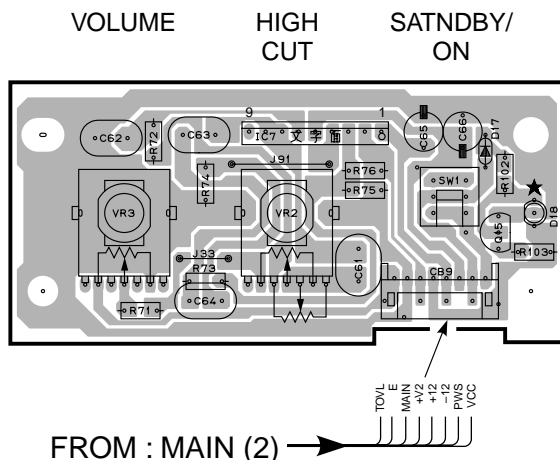
YST-SW320

PRINTED CIRCUIT BOARD (Foil side)

MAIN (4) P. C. B.



MAIN (5) P. C. B.

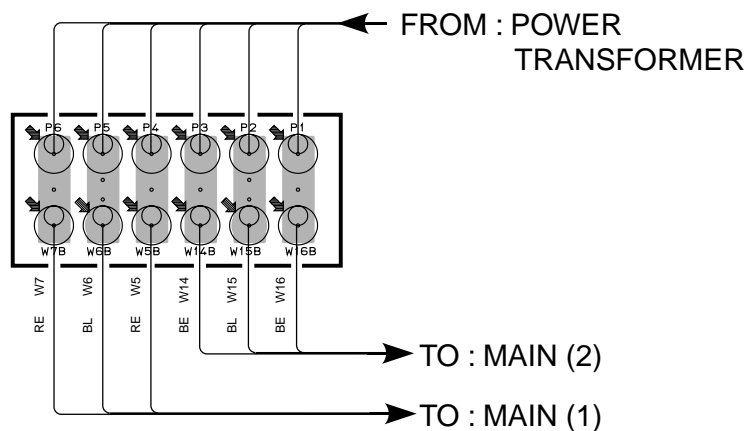


1

■ PRINTED CIRCUIT BOARD (Foil side)

MAIN (6) P. C. B.

2

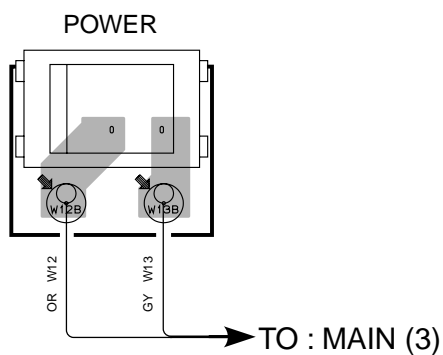


3

4

MAIN (8) P. C. B.

5

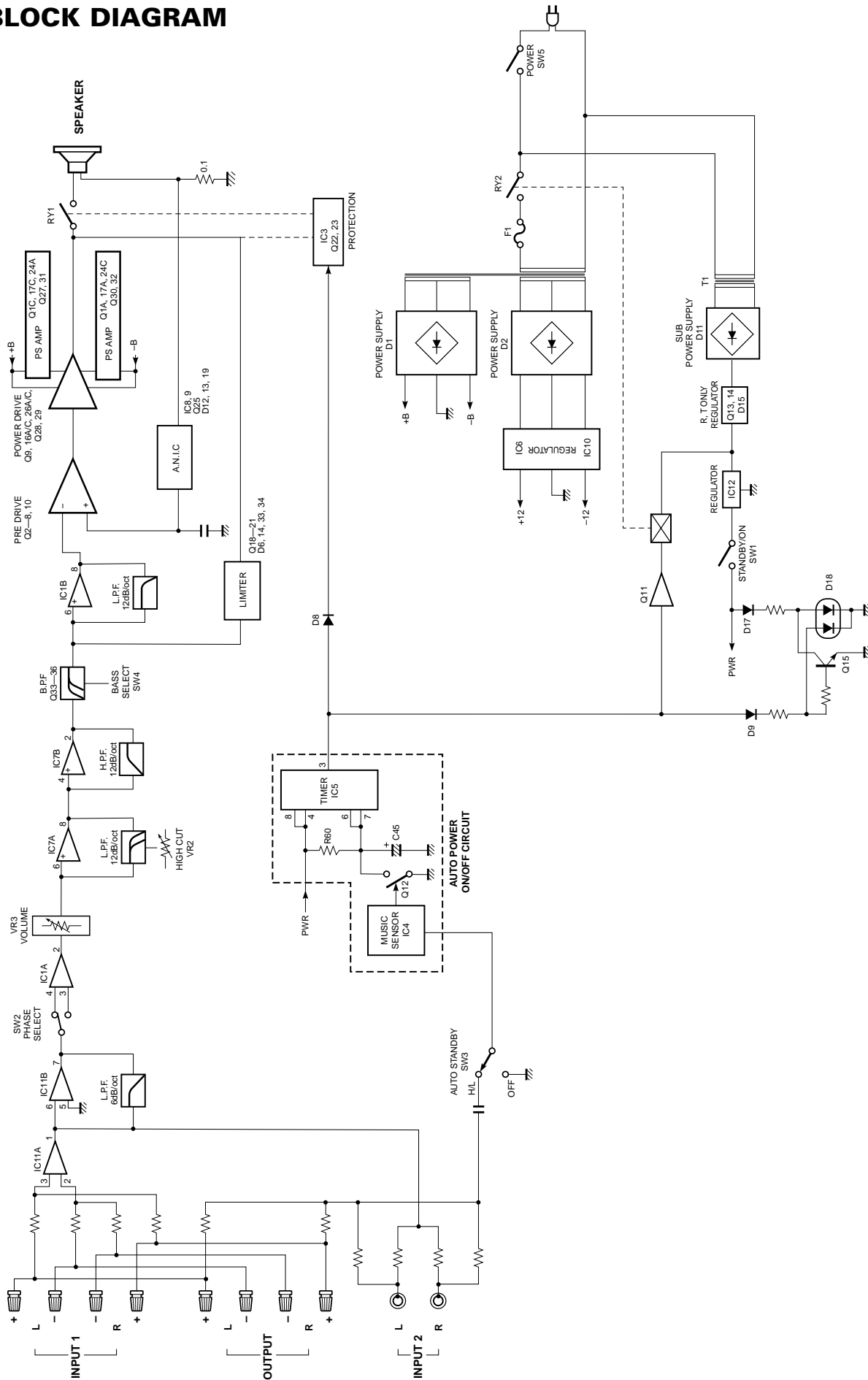


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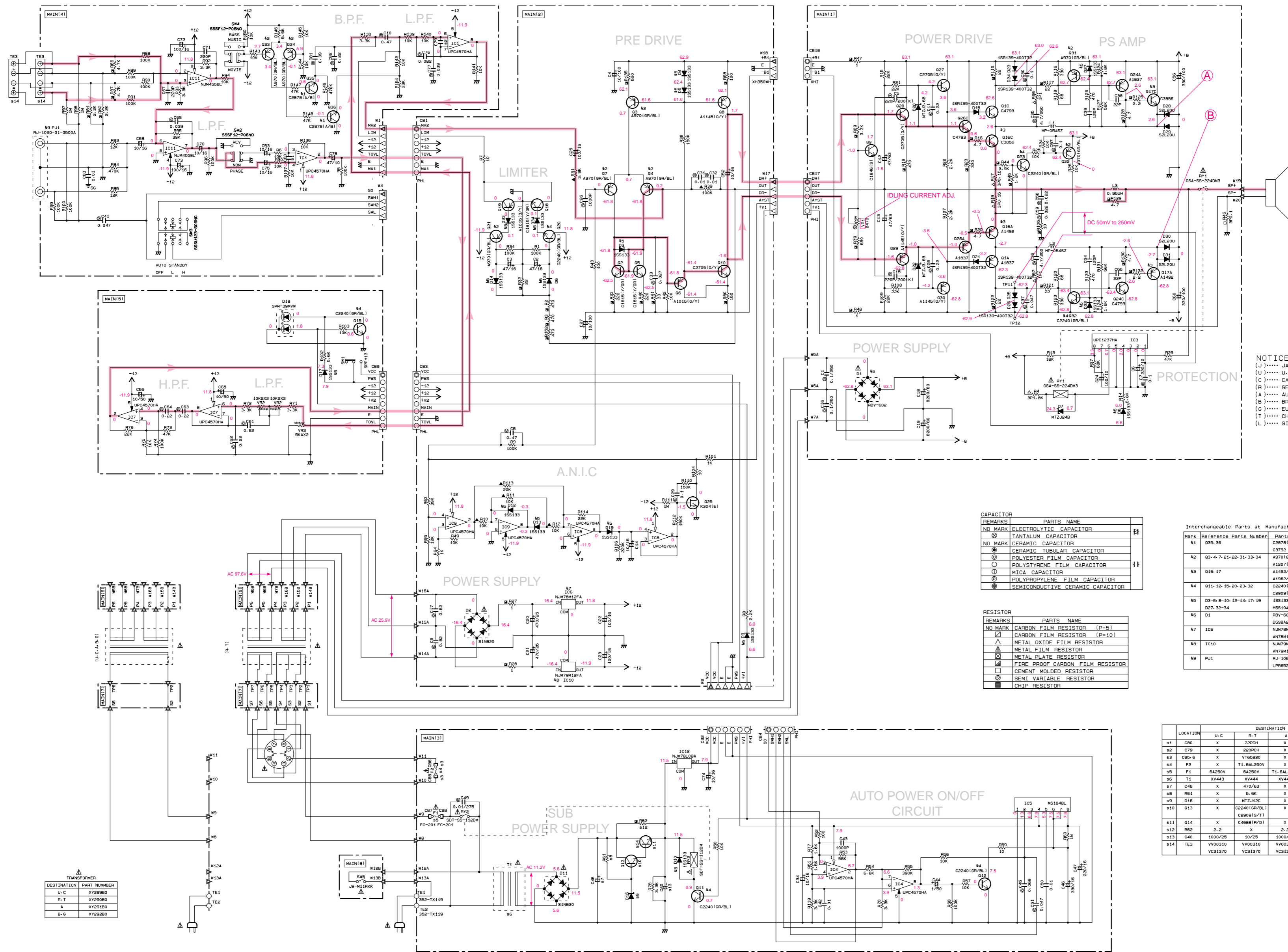
7

YST-SW320

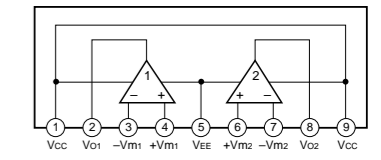
BLOCK DIAGRAM



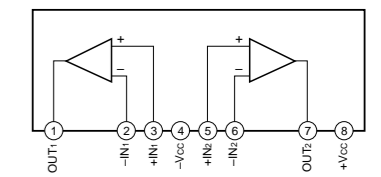
SCHEMATIC DIAGRAM



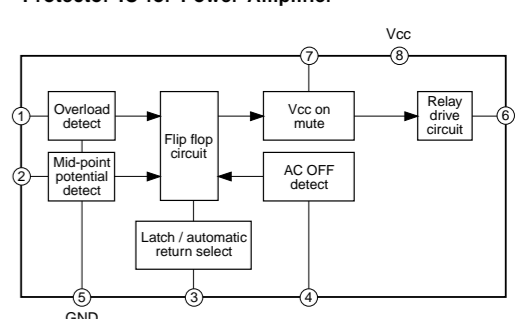
IC1, 4, 7-9 : μ PC4570HA Dual OP-Amp



IC11 : NJM4558L Dual OP-Amp



IC3 : μ PC1237HA Protector IC for Power Amplifier



NOTICE (model)
 (J)..... JAPANESE
 (U)..... U. S. A
 (C)..... CANADIAN
 (R)..... GENERAL
 (A)..... AUSTRALIAN
 (B)..... BRITISH
 (G)..... EUROPEAN
 (T)..... CHINA
 (L)..... SINGAPORE

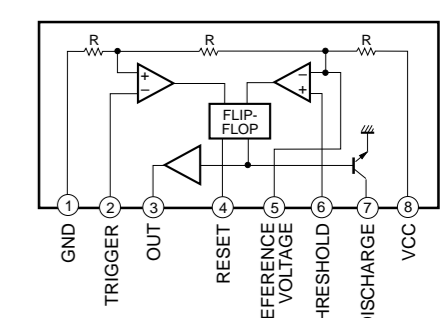
REMARKS	PARTS NAME
NO MARK	ELECTROLYTIC CAPACITOR
NO MARK	TANTALUM CAPACITOR
NO MARK	CERAMIC CAPACITOR
NO MARK	CERAMIC TUBULAR CAPACITOR
NO MARK	POLYESTER FILM CAPACITOR
NO MARK	POLYSTYRENE FILM CAPACITOR
NO MARK	MICA CAPACITOR
NO MARK	POLYPROPYLENE FILM CAPACITOR
NO MARK	SEMICONDUCTIVE CERAMIC CAPACITOR

REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR (P=5)
NO MARK	CARBON FILM RESISTOR (P=10)
NO MARK	METAL OXIDE FILM RESISTOR
NO MARK	METAL FILM RESISTOR
NO MARK	METAL PLATE RESISTOR
NO MARK	FIRE PROOF CARBON FILM RESISTOR
NO MARK	CEMENT MOLDED RESISTOR
NO MARK	SEMI VARIABLE RESISTOR
NO MARK	CHIP RESISTOR

Interchangeable Parts at Manufacture-Stage		
Mark	Reference Parts Number	Parts Name
R1	Q35-36	C28781A/B1
R2	Q3-4-7-21-22-31-33-34	C3792
R3	Q16-17	A1492/C385610/P/V1
R4	Q11-12-15-20-23-32	A1962/C284218/O1
R5	D3-6-8-10-12-14-17-19	1S5133
R6	D27-32-34	H55104T0
R7	D1	F8Y-502
R8	D2	Q35A20
R9	PJ1	RJ-1060-01-0900A

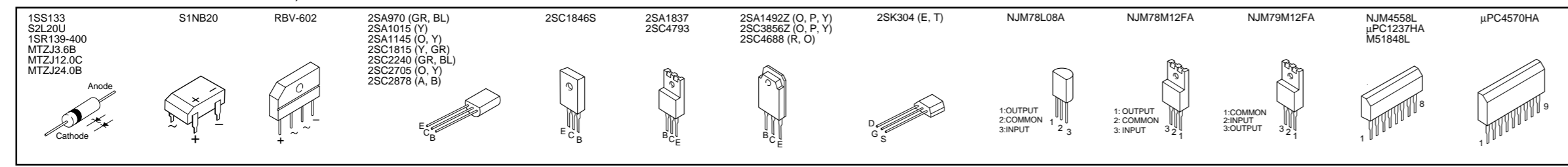
LOCATION	U.C	R-T	A	B-G
R1	C80	X	20PCH	X
R2	C78	X	20PCH	X
R3	C85-6	X	V10650	X
R4	F2	X	T1-6AL250V	X
R5	F1	6A250V	T1-6AL250V	T1-6AL250V
R6	T1	XY443	XY444	XY445
R7	C48	X	470/53	X
R8	R61	X	R.6K	X
R9	D16	X	MTZ12C	X
R10	G13	X	C22401GR/BL1	X
R11	G14	X	C4681R/O1	X
R12	R62	2.2	X	2.2
R13	C40	1000/25	10/25	1000/25
R14	TE3	VY00310	VY00310	V481140

IC5 : M51848L CR Timer



DESTINATION	PART NUMBER
U-C	XY29890
R-T	XY29890
A	XY29180
B-G	XY29280

PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICs.



* All voltage are measured with a 10MΩ/V DC electric volt meter.
 * Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.
 * Schematic diagram is subject to change without notice.

PARTS LIST

■ ELECTRICAL PARTS

■ WARNING

Components having special characteristics are marked \triangle and must be replaced with parts having specifications equal to those originally installed.

- Carbon resistors (1/6W or 1/4W) are not included in the ELECTRICAL PARTS List. For the part Nos. of the carbon resistors refer to the last page.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS :

C.A.EL.CHP	: CHIP ALUMI. ELECTROLYTIC CAP	L.EMIT	: LIGHT EMITTING MODULE
C.CE	: CERAMIC CAP	LED.DSPLY	: LED DISPLAY
C.CE.ARRAY	: CERAMIC CAP ARRAY	LED.INFRD	: LED, INFRARED
C.CE.CHP	: CHIP CERAMIC CAP	MODUL.RF	: MODULATOR, RF
C.CE.ML	: MULTILAYER CERAMIC CAP	PHOT.CPL	: PHOTO COUPLER
C.CE.M.CHP	: CHIP MULTILAYER CERAMIC CAP	PHOT.INTR	: PHOTO INTERRUPTER
C.CE.SAFTY	: RECOGNIZED CERAMIC CAP	PHOT.RFLCT	: PHOTO REFLECTOR
C.CE.TUBLR	: CERAMIC TUBULAR CAP	PIN.TEST	: PIN, TEST POINT
C.CE.SMI	: SEMI CONDUCTIVE CERAMIC CAP	PLST.RIVET	: PLASTIC RIVET
C.EL	: ELECTROLYTIC CAP	R.ARRAY	: RESISTOR ARRAY
C.MICA	: MICA CAP	R.CAR	: CARBON RESISTOR
C.ML.FLM	: MULTILAYER FILM CAP	R.CAR.CHP	: CHIP RESISTOR
C.MP	: METALLIZED PAPER CAP	R.CAR.FP	: FLAME PROOF CARBON RESISTOR
C.MYLAR	: MYLAR FILM CAP	R.FUS	: FUSABLE RESISTOR
C.MYLAR.ML	: MULTILAYER MYLAR FILM CAP	R.MTL.CHP	: CHIP METAL FILM RESISTOR
C.PAPER	: PAPER CAPACITOR	R.MTL.FLM	: METAL FILM RESISTOR
C.PLS	: POLYSTYRENE FILM CAP	R.MTL.OXD	: METAL OXIDE FILM RESISTOR
C.POL	: POLYESTER FILM CAP	R.MTL.PLAT	: METAL PLATE RESISTOR
C.POLY	: POLYETHYLENE FILM CAP	RSNR.CE	: CERAMIC RESONATOR
C.PP	: POLYPROPYLENE FILM CAP	RSNR.CRYS	: CRYSTAL RESONATOR
C.TNTL	: TANTALUM CAP	R.TW.CEM	: TWIN CEMENT FIXED RESISTOR
C.TNTL.CHP	: CHIP TANTALUM CAP	R.WW	: WIRE WOUND RESISTOR
C.TRIM	: TRIMMER CAP	SCR.BND.HD	: BIND HEAD B-TITE SCREW
CN	: CONNECTOR	SCR.BW.HD	: BW HEAD TAPPING SCREW
CN.BS.PIN	: CONNECTOR, BASE PIN	SCR.CUP	: CUP TITE SCREW
CN.CANNON	: CONNECTOR, CANNON	SCR.TERM	: SCREW TERMINAL
CN.DIN	: CONNECTOR, DIN	SCR.TR	: SCREW, TRANSISTOR
CN.FLAT	: CONNECTOR, FLAT CABLE	SUPRT.PCB	: SUPPORT, P.C.B.
CN.POST	: CONNECTOR, BASE POST	SURG.PRTCT	: SURGE PROTECTOR
COIL.MX.AM	: COIL, AM MIX	SW.TACT	: TACT SWITCH
COIL.AT.FM	: COIL, FM ANTENNA	SW.LEAF	: LEAF SWITCH
COIL.DT.FM	: COIL, FM DETECT	SW.LEVER	: LEVER SWITCH
COIL.MX.FM	: COIL, FM MIX	SW.MICRO	: MICRO SWITCH
COIL.OUTPT	: OUTPUT COIL	SW.PUSH	: PUSH SWITCH
DIOD.ARRAY	: DIODE ARRAY	SW.RT.ENC	: ROTARY ENCODER
DIODE.BRG	: DIODE BRIDGE	SW.RT.MTR	: ROTARY SWITCH WITH MOTOR
DIODE.CHP	: CHIP DIODE	SW.RT	: ROTARY SWITCH
DIODE.VAR	: VARACTOR DIODE	SW.SLIDE	: SLIDE SWITCH
DIOD.Z.CHP	: CHIP ZENER DIODE	TERM.SP	: SPEAKER TERMINAL
DIODE.ZENR	: ZENER DIODE	TERM.WRAP	: WRAPPING TERMINAL
DSCR.CE	: CERAMIC DISCRIMINATOR	THRMST.CHP	: CHIP THERMISTOR
FER.BEAD	: FERRITE BEADS	TR.CHP	: CHIP TRANSISTOR
FER.CORE	: FERRITE CORE	TR.DGT	: DIGITAL TRANSISTOR
FET.CHP	: CHIP FET	TR.DGT.CHP	: CHIP DIGITAL TRANSISTOR
FL.DSPLY	: FLUORESCENT DISPLAY	TRANS	: TRANSFORMER
FLTR.CE	: CERAMIC FILTER	TRANS.PULS	: PULSE TRANSFORMER
FLTR.COMB	: COMB FILTER MODULE	TRANS.PWR	: POWER TRANSFORMER ASS'y
FLTR.LC.RF	: LC FILTER, EMI	TUNER.AM	: TUNER PACK, AM
GND.MTL	: GROUND PLATE	TUNER.FM	: TUNER PACK, FM
GND.TERM	: GROUND TERMINAL	TUNER.PK	: FRONT-END TUNER PACK
HOLDER.FUS	: FUSE HOLDER	VR	: ROTARY POTENTIOMETER
IC.PRTCT	: IC PROTECTOR	VR.MTR	: POTENTIOMETER WITH MOTOR
JUMPER.CN	: JUMPER CONNECTOR	VR.SW	: POTENTIOMETER WITH ROTARY SW
JUMPER.TST	: JUMPER, TEST POINT	VR.SLIDE	: SLIDE POTENTIOMETER
L.DTCT	: LIGHT DETECTING MODULE	VR.TRIM	: TRIMMER POTENTIOMETER

Note) Those parts marked with “#” are not included in the P.C.B. ass'y.

P.C.B. MAIN

Schm Ref.	PART NO.	Description		
*	V5057600	P.C.B.	MAIN(UC)	
*	V5057700	P.C.B.	MAIN(RT)	
*	V5057800	P.C.B.	MAIN(A)	
*	V5057900	P.C.B.	MAIN(BG)	
CB1	VB858600	CN.BS.PIN	7P	
CB2	VD004900	CN.BS.PIN	6P	
CB3	VB858700	CN.BS.PIN	8P	
CB4	VD004700	CN.BS.PIN	4P	
CB5	VT658200	HOLDER.FUS	PC-FH1(RT)	
CB6	VT658200	HOLDER.FUS	PC-FH1(RT)	
CB7	VT658200	HOLDER.FUS	PC-FH1	
CB8	VT658200	HOLDER.FUS	PC-FH1	
CB9	VB858700	CN.BS.PIN	8P	
CB17	VD004800	CN.BS.PIN	5P	
CB18	VL844700	CN.BS.PIN	3P	
C1	VT857900	C.POL	0.1uF	250V
C2	VJ837200	C.EL	47uF	16V
C3	VJ837200	C.EL	47uF	16V
*	C4	VT727600	C.EL	10uF 100V
C5	VK534000	C.PP	220pF	200V
C6	VE117600	C.EL	220uF	10V
C7	UA655100	C.MYLAR	0.1uF	50V
C8	UA655470	C.MYLAR	0.47uF	50V
C9	UA655820	C.MYLAR	0.82uF	50V
C10	UA655470	C.MYLAR	0.47uF	50V
C11	UA655220	C.MYLAR	0.22uF	50V
C12	Ui377470	C.EL	47uF	63V
C13	Ui377470	C.EL	47uF	63V
C14	VJ836900	C.EL	10uF	16V
C15	VK534000	C.PP	220pF	200V
C16	VT857900	C.POL	0.1uF	250V
C17	UA655820	C.MYLAR	0.82uF	50V
*	C18	V6092500	C.EL	8200uF 80V
*	C19	V6092500	C.EL	8200uF 80V
C20	UJ648470	C.EL	470uF	25V
C21	UJ648470	C.EL	470uF	25V
C22	VF964800	C.EL	100uF	16V
C23	VF964800	C.EL	100uF	16V
C24	VF760000	C.EL	100uF	10V
C25	VF964800	C.EL	100uF	16V
C26	UA653100	C.MYLAR	1000pF	50V
C27	VT727600	C.EL	10uF	100V
C28	UA655220	C.MYLAR	0.22uF	50V
C29	UA655100	C.MYLAR	0.1uF	50V
C30	UA655100	C.MYLAR	0.1uF	50V
C31	UA654100	C.MYLAR	0.01uF	50V
C32	UA654100	C.MYLAR	0.01uF	50V
C33	UA654270	C.MYLAR	0.027uF	50V
C34	VJ836900	C.EL	10uF	16V
C35	V5058000	C.MYLAR	4.7uF	250V
C36	V5058000	C.MYLAR	4.7uF	250V
C37	UA654470	C.MYLAR	0.047uF	50V
C38	FG251220	C.CE	22pF	50V

* New Parts

Schm Ref.	PART NO.	Description		
C39	FG212120	C.CE	120pF	50V
C40	VF606700	C.EL	1000uF	25V(BG)
C40	VF606700	C.EL	1000uF	25V(UCABG)
C40	VH620500	C.EL	10uF	25V(RT)
C41	UA654470	C.MYLAR	0.047uF	50V
C42	FG214100	C.CE	0.01uF	50V
C43	FG213100	C.CE	1000pF	50V
C44	VJ839100	C.EL	1uF	50V
C45	UA654680	C.MYLAR	0.068uF	50V
C46	UJ638330	C.EL	330uF	16V
C47	UJ648220	C.EL	220uF	25V
* C48	VT726600	C.EL	470uF	63V(RT)
C49	VS741700	C.CE.SAFTY	0.01uF	275V
C50	FG214100	C.CE	0.01uF	50V
C51	UA654470	C.MYLAR	0.047uF	50V
C52	VJ836900	C.EL	10uF	16V
C53	VJ836900	C.EL	10uF	16V
C54	FG212120	C.CE	120pF	50V
C55	FG251220	C.CE	22pF	50V
C56	VT728200	C.EL	330uF	100V
C57	UA655100	C.MYLAR	0.1uF	50V
C58	UA654220	C.MYLAR	0.022uF	50V
C59	UA654220	C.MYLAR	0.022uF	50V
* C60	VT728200	C.EL	330uF	100V
C61	UA655820	C.MYLAR	0.82uF	50V
C62	UA655220	C.MYLAR	0.22uF	50V
C63	UA655220	C.MYLAR	0.22uF	50V
C64	UA655220	C.MYLAR	0.22uF	50V
C65	UM417100	C.EL	10uF	50V
C66	UM417100	C.EL	10uF	50V
C67	FG212220	C.CE	220pF	50V
C68	VJ836900	C.EL	10uF	16V
C69	UA654390	C.MYLAR	0.039uF	50V
C70	VJ836900	C.EL	10uF	16V
C71	FG212220	C.CE	220pF	50V
C72	VF964800	C.EL	100uF	16V
C73	VF964800	C.EL	100uF	16V
C74	VJ836900	C.EL	10uF	16V
C75	VJ836900	C.EL	10uF	16V
C76	UA654820	C.MYLAR	0.082uF	50V
C77	UA654390	C.MYLAR	0.039uF	50V
C78	Vi531900	C.EL	47uF	10V
C79	VA777700	C.CE	220pF	50V
C79	VA777700	C.CE	220pF	50V(RTBG)
C80	VA761000	C.CE	22pF	50V
C80	VA761000	C.CE	22pF	50V(RTBG)
C81	UA655390	C.MYLAR	0.39uF	50V
C82	UA655220	C.MYLAR	0.22uF	50V
C83	FG214100	C.CE	0.01uF	50V
△ D1	Vi234100	DIODE.BRG	RBV-602	
△ D2	VR253700	DIODE.BRG	S1NB20	1.0A 200V
D3	iF004600	DIODE	1SS133	
D4	iF004600	DIODE	1SS133	

* New Parts

P.C.B. MAIN

Schm Ref.	PART NO.	Description
D5	iF004600	DIODE 1SS133
D6	iF004600	DIODE 1SS133
D7	VG442500	DIODE.ZENR MTZJ24B 24V
D8	iF004600	DIODE 1SS133
D9	iF004600	DIODE 1SS133
D10	iF004600	DIODE 1SS133
△ D11	VR253700	DIODE.BRG S1NB20 1.0A 200V
D12	iF004600	DIODE 1SS133
D13	iF004600	DIODE 1SS133
D14	iF004600	DIODE 1SS133
D15	VU264100	DIODE 1SR139-400
D16	VG440300	DIODE.ZENR MTZJ12C 12V(RT)
D17	iF004600	DIODE 1SS133
D18	VS079300	LED SPR-39MVW
D19	iF004600	DIODE 1SS133
D20	VG436400	DIODE.ZENR MTZJ3.6B 3.6V
D21	VU264100	DIODE 1SR139-400
D22	VG436400	DIODE.ZENR MTZJ3.6B 3.6V
D23	VU264100	DIODE 1SR139-400
D24	VU264100	DIODE 1SR139-400
D25	VU264100	DIODE 1SR139-400
D26	VU264100	DIODE 1SR139-400
D27	iF004600	DIODE 1SS133
D28	VP779200	DIODE S2L20U
D29	VP779200	DIODE S2L20U
D30	VP779200	DIODE S2L20U
D31	VP779200	DIODE S2L20U
D32	iF004600	DIODE 1SS133
D33	iF004600	DIODE 1SS133
D34	iF004600	DIODE 1SS133
△ F1	KB001660	FUSE T1.6A 250V(ABG)
△ F1	KB001660	FUSE T1.6A 250V(BG)
△ F1	V5279400	FUSE 6A 250V(RT)
△ F1	V5279400	FUSE 6A 250V(UCRT)
△ F2	KB001660	FUSE T1.6A 250V(RT)
IC1	XB247301	IC uPC4570HA
IC3	XF663A00	IC uPC1237HA
IC4	XB247301	IC uPC4570HA
IC5	XP741A00	IC M51848L
IC6	XJ602A00	IC NJM78M12FA
IC7	XB247301	IC uPC4570HA
IC8	XB247301	IC uPC4570HA
IC9	XB247301	IC uPC4570HA
IC10	XD343A00	IC NJM79M12FA
IC11	XM922A00	IC NJM4558L
IC12	iG160100	IC NJM78L08A 8V
L1	V5058100	COIL 120uH
L2	V5058100	COIL 120uH
L3	VR906600	COIL 0.95uH
* PJ1	V6415800	JACK,PIN 2P RJ-1060-01-0500
# Q1	iX632610	TR A1837/C4793 O,Y
Q2	iC1815M0	TR 2SC1815 Y,GR
Q3	iA097000	TR 2SA970 GR,BL

* New Parts

Schm Ref.	PART NO.	Description
Q4	iA097000	TR 2SA970 GR,BL
Q5	iC1815M0	TR 2SC1815 Y,GR
Q6	iA101590	TR 2SA1015 O,Y
Q7	iA097000	TR 2SA970 GR,BL
Q8	VE198700	TR 2SA1145 O,Y
# Q9	VC398100	TR 2SC1846 S
Q10	VE198800	TR 2SC2705 O,Y
Q11	iC224030	TR 2SC2240 GR,BL
Q12	iC224030	TR 2SC2240 GR,BL
Q13	iC224030	TR 2SC2240 GR,BL(RT)
Q14	VK801200	TR 2SC4688 R,O(RT)
Q15	iC224030	TR 2SC2240 GR,BL
# Q16	iX606460	TR A1492Z/C3856Z O,P,Y
Q18	iC1815M0	TR 2SC1815 Y,GR
Q19	iA101590	TR 2SA1015 O,Y
Q20	iC224030	TR 2SC2240 GR,BL
Q21	iA097000	TR 2SA970 GR,BL
Q22	iA097000	TR 2SA970 GR,BL
Q23	iC224030	TR 2SC2240 GR,BL
Q24	iX632610	TR A1837/C4793 O,Y
Q25	V3028000	FET 2SK304 E
Q26	iX632610	TR A1837/C4793 O,Y
Q27	VE198800	TR 2SC2705 O,Y
Q28	VE198800	TR 2SC2705 O,Y
Q29	VE198700	TR 2SA1145 O,Y
Q30	VE198700	TR 2SA1145 O,Y
Q31	iA097000	TR 2SA970 GR,BL
Q32	iC224030	TR 2SC2240 GR,BL
Q33	iA097000	TR 2SA970 GR,BL
Q34	iA097000	TR 2SA970 GR,BL
Q35	iC287820	TR 2SC2878 A,B
Q36	iC287820	TR 2SC2878 A,B
R2	HV455470	R.CAR.FP 470Ω 1/4W
R3	HV455470	R.CAR.FP 470Ω 1/4W
R4	HL236180	R.MTL.OXD 1.8KΩ 3W
R10	HU597100	R.MTL.FLM 10KΩ 1/4W
R11	HU597100	R.MTL.FLM 10KΩ 1/4W
R12	HU597100	R.MTL.FLM 10KΩ 1/4W
R16	HV453470	R.CAR.FP 4.7Ω 1/4W
R17	VG730500	R.MTL.OXD 0.15Ω 3W
R18	VG730500	R.MTL.OXD 0.15Ω 3W
R19	HV455470	R.CAR.FP 470Ω 1/4W
R20	HV453470	R.CAR.FP 4.7Ω 1/4W
R23	HV455330	R.CAR.FP 330Ω 1/4W
R27	HV453100	R.CAR.FP 1Ω 1/4W
R28	HV453100	R.CAR.FP 1Ω 1/4W
R31	HU576390	R.MTL.FLM 3.9KΩ 1/4W
R32	HV454220	R.CAR.FP 22Ω 1/4W
R33	HV455220	R.CAR.FP 220Ω 1/4W
R39	HU578100	R.MTL.FLM 100KΩ 1/4W
R40	HV455220	R.CAR.FP 220Ω 1/4W
R41	HV454330	R.CAR.FP 33Ω 1/4W
R44	HV756390	R.CAR.FP 3.9KΩ 1/4W

* New Parts

P.C.B. MAIN

Schm Ref.	PART NO.	Description		
* R45	HV456120	R.CAR.FP	1.2KΩ	1/4W
R46	V6022600	R.WW	0.1Ω	3W
R47	HV453100	R.CAR.FP	1Ω	1/4W
R48	HV453100	R.CAR.FP	1Ω	1/4W
R62	HV453220	R.CAR.FP	2.2Ω	1/4W(BG)
R62	HV453220	R.CAR.FP	2.2Ω	1/4W(UCABG)
R66	HL213100	R.MTL.OXD	1Ω	1W
R67	HL213100	R.MTL.OXD	1Ω	1W
R68	HV455120	R.CAR.FP	120Ω	1/4W
R69	HV456330	R.CAR.FP	3.3KΩ	1/4W
R79	HV455680	R.CAR.FP	680Ω	1/4W
R80	HV455150	R.CAR.FP	150Ω	1/4W
R81	HV456220	R.CAR.FP	2.2KΩ	1/4W
R82	HV456220	R.CAR.FP	2.2KΩ	1/4W
R86	HV456470	R.CAR.FP	4.7KΩ	1/4W
R87	HV456470	R.CAR.FP	4.7KΩ	1/4W
R105	HV454100	R.CAR.FP	10Ω	1/4W
R113	VH007900	R.MTL.FLM	20KΩ	1/4W
R115	HV454220	R.CAR.FP	22Ω	1/4W
R117	HV454220	R.CAR.FP	22Ω	1/4W
R121	HV454220	R.CAR.FP	22Ω	1/4W
R122	HV454220	R.CAR.FP	22Ω	1/4W
R125	HV453220	R.CAR.FP	2.2Ω	1/4W
R128	HV453470	R.CAR.FP	4.7Ω	1/4W
R129	HV453470	R.CAR.FP	4.7Ω	1/4W
R130	HV453470	R.CAR.FP	4.7Ω	1/4W
R132	HV453220	R.CAR.FP	2.2Ω	1/4W
R135	HV455560	R.CAR.FP	560Ω	1/4W
R152	HV455470	R.CAR.FP	470Ω	1/4W
△ RY1	VU161600	RELAY	DC OSA-SS-224DM3	
△ RY2	VU349800	RELAY	DC SDT-SS-112DM	
ST1	BB071360	SCR.TERM	8.3x13	
SW1	VS066500	SW.PUSH	SPPH13-W	
SW2	V5178000	SW.SLIDE	SSSF12-P06NO	
SW3	V5178100	SW.SLIDE	SSSU123-S09NO	
SW4	V5178000	SW.SLIDE	SSSF12-P06NO	
△ T1	XV443A00	TRANS.PWR	(UC)	
△ T1	XV444A00	TRANS.PWR	(RT)	
△ T1	XV445A00	TRANS.PWR	(ABG)	
△ T1	XV445A00	TRANS.PWR	(BG)	
TE1	VT658100	TERM.WRAP	352-TX119	
TE2	VT658100	TERM.WRAP	352-TX119	
TE3	V4811400	TERM.SP	8P(BG)	
TE3	VV003100	TERM.SP	8P(RT)	
TE3	VV003100	TERM.SP	8P(UCRTA)	
TP11	VT969000	PIN.TEST	IRS-2049	
TP12	VT969000	PIN.TEST	IRS-2049	
VR1	VJ692800	VR.TRIM	B470Ω	
VR2	VV954800	VR	10KΩ	
VR3	VV954700	VR	A5KΩ	
*	BB070700	GND.MTL		
*	VN774800	GND.WSHR	MEP1866 #11102	
*	V6383100	ASSY,CABLE	2P 420MM RE/WH	

* New Parts

Schm Ref.	PART NO.	Description		
*	V6406300	HOLDER.LED	LE56217-0A	

* New Parts

MECHANICAL PARTS

Ref. No.	PART NO.	Description	Remarks	Markets
* 1	V6182200	CABINET ASS'Y		
* 1	V5866400	CABINET ASS'Y		
* 1-7	V5859600	FRONT COVER		
* 1-8	V5859700	GASKET		
1-11	CB070450	BINDING TIE	L=100	
1-12	V5195800	FLANGE NUT	B M6X15.5 MFZN2	
* 2	XY889A00	LOUD SPEAKER	25cm 6Ω	
* 4-1	V5860400	FRONT PANEL		
* 4-6	V5860800	SHIELD SHEET		
* 4-11	V5860900	SWITCH KNOB		
* 4-12	V5861200	VOLUME KNOB		
4-15	EP600280	BIND HEAD P-TITE SCREW	3x8 ZMC2-Y	
* 5-1-1	V5057900	P.C.B. ASS'Y	MAIN	(BG)
* 5-1-1	V5057700	P.C.B. ASS'Y	MAIN	(RT)
* 5-1-1	V5057800	P.C.B. ASS'Y	MAIN	(A)
* 5-1-1	V5057600	P.C.B. ASS'Y	MAIN	(UC)
5-1-4	V5195000	HEAT SINK		
# 5-1-5	iX606460	PAIR TRANSISTOR	A1492Z/C3856Z O,P,Y	Q16A,Q16C
# 5-1-6	VC398100	TRANSISTOR	2SC1846 S	Q9
5-1-7	VK195900	SHEET	19x24	
# 5-1-8	iX632610	PAIR TRANSISTOR	A1837/C4793 O,Y	Q1A,Q1C
5-1-11	VT669300	PW HEAD B-TITE SCREW	3x8-8 MFC2	
5-1-12	Ei330086	BIND HEAD B-TITE SCREW	3x8 FCRM3-BL	
5-1-13	VK173200	SCREW, TRANSISTOR	3x15 SP FCM3	
△* 5-5	XY291B00	POWER TRANSFORMER		(A)
△* 5-5	XY292B00	POWER TRANSFORMER		(BG)
△* 5-5	XY290B00	POWER TRANSFORMER		(RT)
△* 5-5	XY289B00	POWER TRANSFORMER		(UC)
△ 5-6	V3756200	POWER CORD	10A SPT-2 2.1m	(UC)
△ 5-6	VQ790000	POWER CORD	5A 2.0m	(B)
△ 5-6	VT666200	POWER CORD ASS'Y		(A)
△ 5-6	VZ555600	POWER CORD	10A 250V 2.0m	(RT)
△ 5-6	VE371200	POWER CORD	2.5A 250V 2.0m	(G)
5-8	VT665900	CORD STOPPER	SR-4K-4	
5-9	CB069250	BINDING TIE	BK-1	
* 5-11	V5194200	REAR PANEL		(UC)
* 5-11	V5194300	REAR PANEL		(RT)
* 5-11	V5194400	REAR PANEL		(A)
* 5-11	V5194500	REAR PANEL		(G)
5-12	VY840200	PLATE	D	
△* 5-14	V5520700	ROCKER SWITCH	JW-M11RKK UCS TV-5	
* 5-15	V5195200	COVER		
* 5-16	V5860000	GASKET		
* 5-17	V5860100	GASKET		
* 5-18	V5860200	GASKET		
* 5-19	V5195100	HEAT SINK	20BS220-L85-K	
5-20	VS755300	BUSH, B		
* 5-21	V5194600	SUPPORT,PCB	L	
* 5-22	V6436000	SUPPORT,PCB		
5-23	VS498200	GASKET	F	(RT)
* 5-24	V6486500	MOUNTING PLATE		
5-31	Ei330086	BIND HEAD B-TITE SCREW	3x8 FCRM3-BL	
5-32	Ei340086	BIND HEAD TAPPING SCREW	4x8 FCRM3-BL	

* New Parts

Ref. No.	PART NO.	Description	Remarks	Markets
5-33	EX601360	BIND HEAD P-TITE SCREW	3x10 FCRM3-BL	
5-34	VT669300	PW HEAD B-TITE SCREW	3x8-8 MFC2	
5-35	EX601890	BIND HEAD BONDING SCREW	3x6 FCRM3-BL	
5-36	EK396010	BIND HEAD S-TITE SCREW	4x8 FCRM3-BL	
5-37	EP640170	SEMS BIND HEAD P-TITE SCREW	4x12 MFC2-BL	
5-38	ED330086	BIND HEAD SCREW	3x8 FCRM3-BL	(RT)
* 11-1	V5858600	BASE		
* 11-2	V5836700	REFLECTOR		
11-10	V5858900	FLAT HEAD TAPPING SCREW	#1 4.0x14	
* 12-1	V5859900	LEG		
12-10	03763040	FLANGE NUT	D 6.0X13 MFZN2Y	
21	VS755300	BUSH, B		
26	V2729700	EMBLEM	A	
* 27	V5881400	SPACER		
32	Ei340256	BIND HEAD TAPPING SCREW	4x25 ZMC2-BL	
* 33	V6018100	HEXAGON SOCKET TAPPING SCREW	4x16 MFCR33	
34	VB131900	BIND HEAD SCREW	6x25 MFZN2-BL	
35	V5861300	BIND HEAD SCREW	6x50	
		ACCESSORIES		
	VV257100	LEG	x4	

* New Parts

Parts List for Carbon Resistors

Value	1/4W Type Part No.	1/6W Type Part No.	Value	1/4W Type Part No.	1/6W Type Part No.
1.0 Ω	HJ35 3100	HF85 3100	10 kΩ	HF45 7100	HF45 7100
1.8 Ω	HJ35 3180	*	11 kΩ	HF45 7110	HF45 7110
2.2 Ω	HJ35 3220	HF85 3220	12 kΩ	HJ35 7120	HF85 7120
3.3 Ω	HJ35 3330	HF85 3330	13 kΩ	HF45 7130	HF45 7130
4.7 Ω	HJ35 3470	HF85 3470	15 kΩ	HF45 7150	HF45 7150
5.6 Ω	HJ35 3560	HF85 3560	18 kΩ	HF45 7180	HF45 7180
10 Ω	HF45 4100	HF45 4100	22 kΩ	HF45 7220	HF45 7220
15 Ω	HJ35 4150	HF85 4150	24 kΩ	HF45 7240	HF45 7240
22 Ω	HF45 4220	HF45 4220	27 kΩ	HJ35 7270	HF85 7270
27 Ω	HJ35 4270	HF85 4270	30 kΩ	HF45 7300	HF45 7300
33 Ω	HF45 4330	HF45 4330	33 kΩ	HF45 7330	HF45 7330
39 Ω	HJ35 4470	HF85 4390	36 kΩ	HF45 7360	HF45 7360
47 Ω	HF45 4470	HF45 4470	39 kΩ	HF45 7390	HF45 7390
56 Ω	HF45 4560	HF45 4560	47 kΩ	HF45 7470	HF45 7470
68 Ω	HF45 4680	HF45 4680	51 kΩ	HF45 7510	HF45 7510
75 Ω	HF45 4750	HF45 4750	56 kΩ	HF45 7560	HF45 7560
82 Ω	HF45 4820	HF45 4820	62 kΩ	HF45 7620	HF45 7620
91 Ω	HF45 4910	HF45 4910	68 kΩ	HF45 7680	HF45 7680
100 Ω	HF45 5100	HF45 5100	82 kΩ	HF45 7820	HF45 7820
110 Ω	HJ35 5110	HF85 5110	91 kΩ	HF45 7910	HF45 7910
120 Ω	HF45 5120	HF45 5120	100 kΩ	HF45 8100	HF45 8100
150 Ω	HF45 5150	HF45 5150	110 kΩ	HF45 8110	HF45 8110
160 Ω	HJ35 5160	*	120 kΩ	HF45 8120	HF45 8120
180 Ω	HF45 5180	HF45 5180	150 kΩ	HF45 8150	HF45 8150
200 Ω	HF45 5200	HF45 5200	180 kΩ	HF45 8180	HF45 8180
220 Ω	HF45 5220	HF45 5220	220 kΩ	HJ35 8220	HF85 8220
270 Ω	HF45 5270	HF45 5270	270 kΩ	HF45 8270	HF45 8270
330 Ω	HF45 5330	HF45 5330	300 kΩ	HF45 8300	HF45 8300
390 Ω	HF45 5390	HF45 5390	330 kΩ	HF45 8330	HF45 8330
430 Ω	HF45 5430	HF45 5430	390 kΩ	HJ35 8390	HF85 8390
470 Ω	HF45 5470	HF45 5470	470 kΩ	HF45 8470	HF45 8470
510 Ω	HF45 5510	HF45 5510	560 kΩ	HJ35 8560	HF85 8560
560 Ω	HF45 5560	HF45 5560	680 kΩ	HJ35 8680	HF85 8680
680 Ω	HF45 5680	HF45 5680	820 kΩ	HJ35 8820	HF85 8820
820 Ω	HF45 5820	HF45 5820	1.0 MΩ	HF45 9100	HF45 9100
910 Ω	HF45 5910	HF45 5910	1.2 MΩ	HJ35 9120	*
1.0 kΩ	HF45 6100	HF45 6100	1.5 MΩ	HJ35 9150	HF85 9150
1.2 kΩ	HF45 6120	HF45 6120	1.8 MΩ	HJ35 9180	HF85 9180
1.5 kΩ	HF45 6150	HF45 6150	2.2 MΩ	HJ35 9220	HF85 9220
1.8 kΩ	HF45 6180	HF45 6180	3.3 MΩ	HJ35 9330	HF85 9330
2.0 kΩ	HJ35 6200	HF85 6200	3.9 MΩ	HJ35 9390	*
2.2 kΩ	HF45 6220	HF45 6220	4.7 MΩ	HJ35 9470	HF85 9470
2.4 kΩ	HJ35 6240	HF85 6240			
2.7 kΩ	HF45 6270	HF45 6270			
3.0 kΩ	HF45 6300	HF45 6300			
3.3 kΩ	HF45 6330	HF45 6330			
3.6 kΩ	HJ35 6360	HF85 6360			
3.9 kΩ	HF45 6390	HF45 6390			
4.7 kΩ	HF45 6470	HF45 6470			
5.1 kΩ	HF45 6510	HF45 6510			
5.6 kΩ	HF45 6560	HF45 6560			
6.8 kΩ	HF45 6680	HF45 6680			
8.2 kΩ	HF45 6820	HF45 6820			
9.1 kΩ	HF45 6910	HF45 6910			

1/4W Type

HJ35 ○○○○

10mm

1/4W Type

HF45 ○○○○

5mm

1/6W Type

HF85 ○○○○

5mm