

JVC

SERVICE MANUAL

STEREO INTEGRATED AMPLIFIER

MODEL No. **AX-70BK**



Contents

Safety Precautions	Page 1-2	■ Use of New-Type Connector	Page 1-8
Instruction Book		Adjustment Procedures	1-8
Block Diagram	1-3	Inter Block Diagram of Major ICs	1-9
Technical Explanations	1-4	Parts List	Separate Volume Insertion
Handling Precautions of L.C.D. Panel	1-6	Schematic Diagram	Insertion
Removal Procedures	1-7	Connection Diagram	Insertion

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes.

For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of the service manual. Electrical components having such features are identified by shading on the schematics and by (Δ) on the parts list in the service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in the service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.

When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.

5. Leakage current check
(Electrical shock hazard testing)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

Do not use a line isolation transformer during this check.

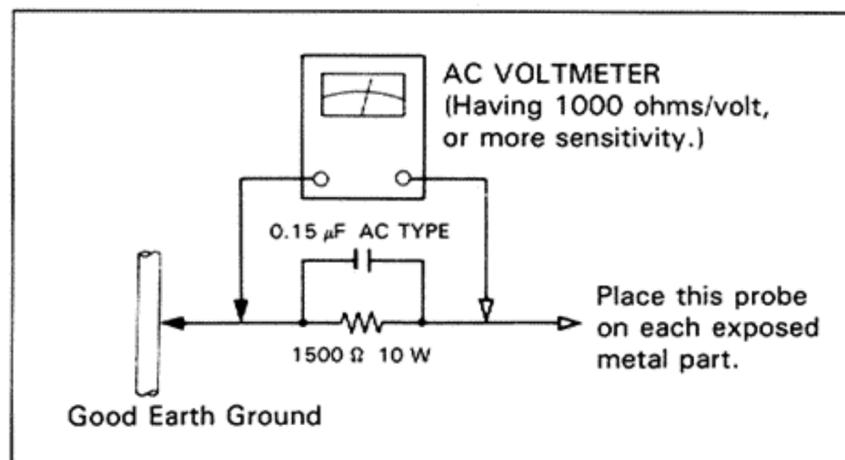
- Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 AC(r.m.s.).

- Alternate check method

Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500 Ω 10 W resistor paralleled by a 0.15 μ F AC-type capacitor between an exposed metal part and a known good earth ground.

Measure the AC voltage across the resistor with the AC voltmeter.

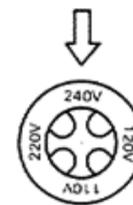
Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC(r.m.s.). This corresponds to 0.5 mA AC(r.m.s.).



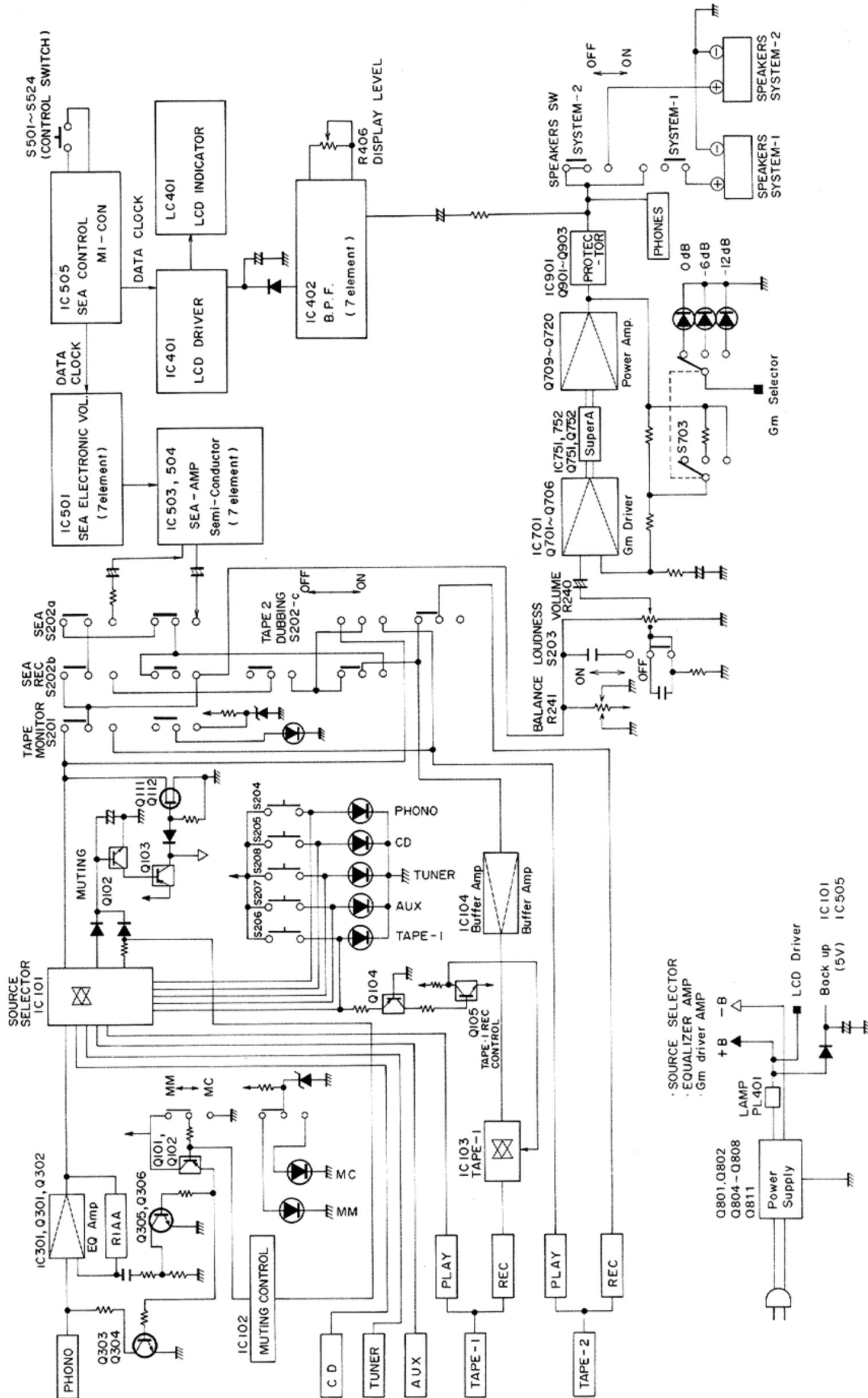
CHECKING YOUR LINE VOLTAGE (Except for U.S.A., Canada, U.K., Continental Europe and Australia)

Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located on the rear panel.

CAUTION: Before setting the "Voltage selector switch" to the proper voltage, disconnect the power plug.



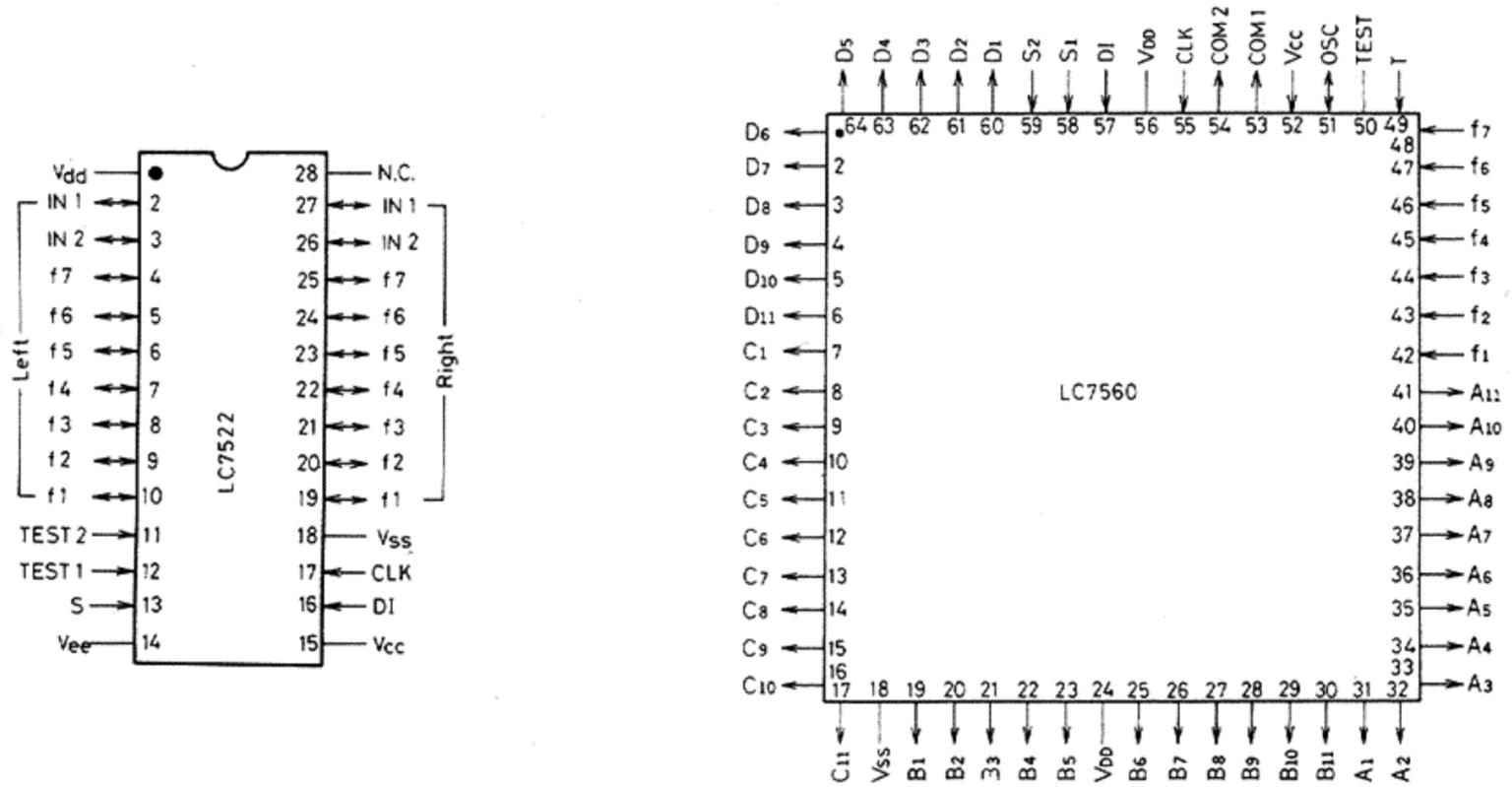
Block Diagram



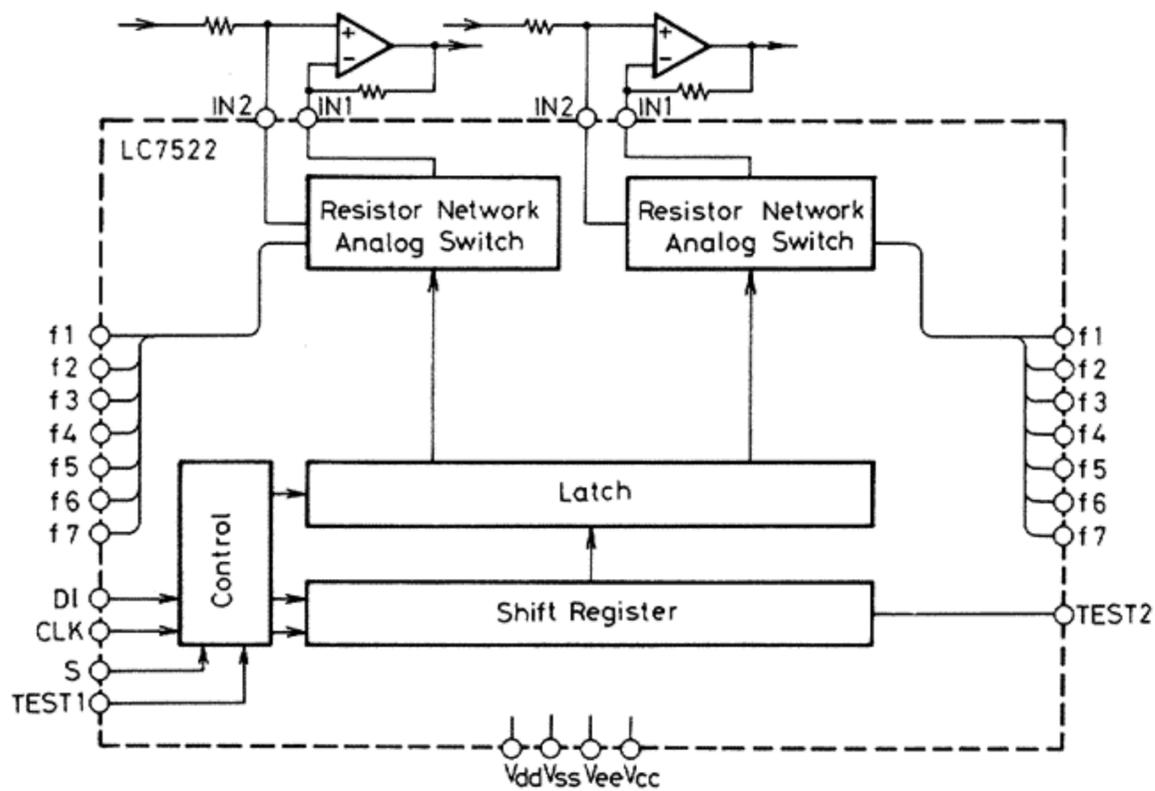
Technical Explanations

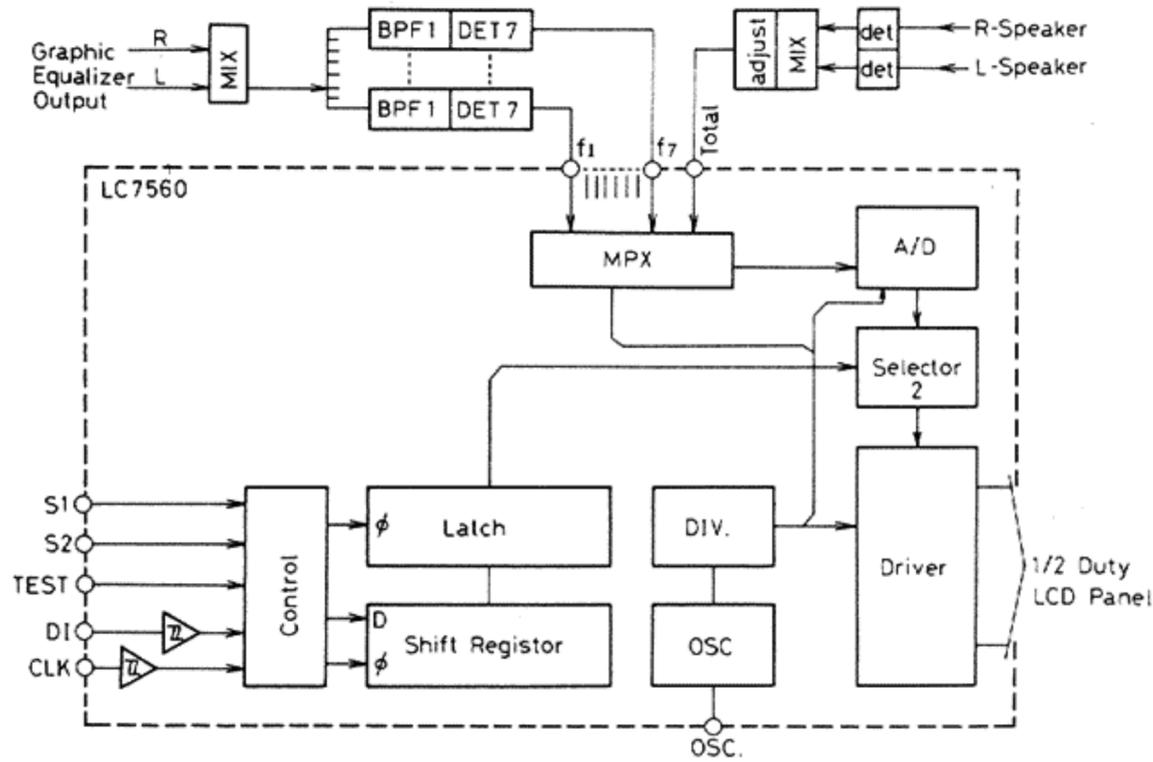
Among the various LSI's adopted on this model, explanations are made in this Section especially on the two types of LSI's assigned to SEA control by the computer. These two LSI's are LC7522 (Symbol No. IC501) and LC7560 (Symbol No. IC401).

Terminal Layout Diagram



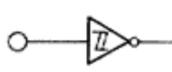
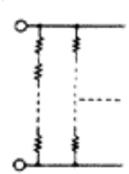
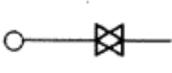
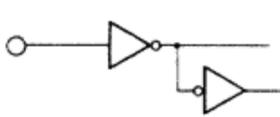
Interior Block Diagram





■ Explanation of Each Terminal

LC7522 (Graphic Equalizer) C-MOS LSI, 7 bands, right-side/left-side independent, ± 2 dB step, ± 10 dB variable

Name	Terminal No.	Terminal type	Explanation
VDD	10	—	Power supply terminal, +18V Power supply for voice signals
Vref	12		Power supply terminal, +13V Power supply for logic drive
Vss	18		Power supply terminal, 0V
VEE	19		Power supply terminal, -18V Power supply for voice signals
DI	17		Terminal for data input from CPU Schmitt inverter type
CLK	16		Terminal for clock input from CPU Schmitt inverter type
GND	—	—	Voice-signal system GND
IN1	1, 28		Input terminal for voice signals IN1 to be connected to OP amplifier inversion input
IN2	2, 27		IN2 to be connected to OP amplifier noninversion input Provided both on right side and on left side
f1 ~ f7	9 ~ 3 26 ~ 20		Connection terminal for band filter f1 ~ f7 x right side/left side Total 14 terminals
S	11		Select terminal when 2 chips are used Key code: FD under "1" input Key code: FC under "0" input

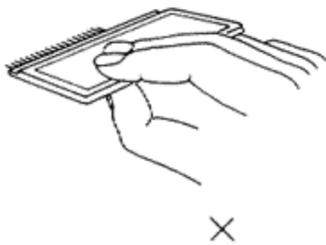
Name	Terminal No.	Terminal type	Explanation														
VDD	24 56		Power supply terminal, +13V Power supply for A/D conversion														
Vcc	52		Power supply terminal, +5V Power supply for logic drive														
Vss	18		Power supply terminal, 0V														
DI	57		Terminal for data input from CPU Schmitt inverter type														
CLK	55		Terminal for clock input from CPU Schmitt inverter type														
COM1 COM2	53 54		Output terminal to LCD common														
A ₁ ~ A ₁₁	31 ~ 41		Output terminal to LCD segment For bands f ₁ and f ₂														
B ₁ ~ B ₁₁	19 ~ 30		Output terminal to LCD segment For bands f ₃ and f ₄														
C ₁ ~ C ₁₁	7 ~ 17		Output terminal to LCD segment For bands f ₅ and f ₆														
D ₁ ~ D ₁₁	60 ~ 64 1 ~ 6		Output terminal to LCD segment For band f ₇ and total display														
f ₁ ~ f ₇	42 ~ 48		Input terminal for voice signal detection output														
T	49		Input terminal for total display Inputs signal detection output														
OSC	51		Open-drain-type output buffer Connection terminal of exterior-mounted CR for oscillator														
S1	58		Select terminal when a plural number of chips is used (max. 4 chips)														
S2	59		<table border="1"> <thead> <tr> <th>S1</th> <th>S2</th> <th>Key Code</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>FB</td> </tr> <tr> <td>0</td> <td>1</td> <td>FA</td> </tr> <tr> <td>1</td> <td>0</td> <td>F9</td> </tr> <tr> <td>0</td> <td>0</td> <td>F8</td> </tr> </tbody> </table>	S1	S2	Key Code	1	1	FB	0	1	FA	1	0	F9	0	0
S1	S2	Key Code															
1	1	FB															
0	1	FA															
1	0	F9															
0	0	F8															

Handling Precautions of L.C.D. Panel

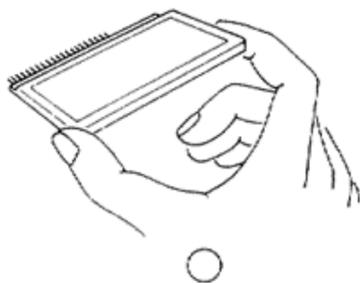
The LCD (Liquid Crystal Display) panel employed in this device requires the following handling precautions.

1. Since the LCD is made of plate glass, never apply strong mechanical force to it.

Do not forcibly press the light-polarizing plate.

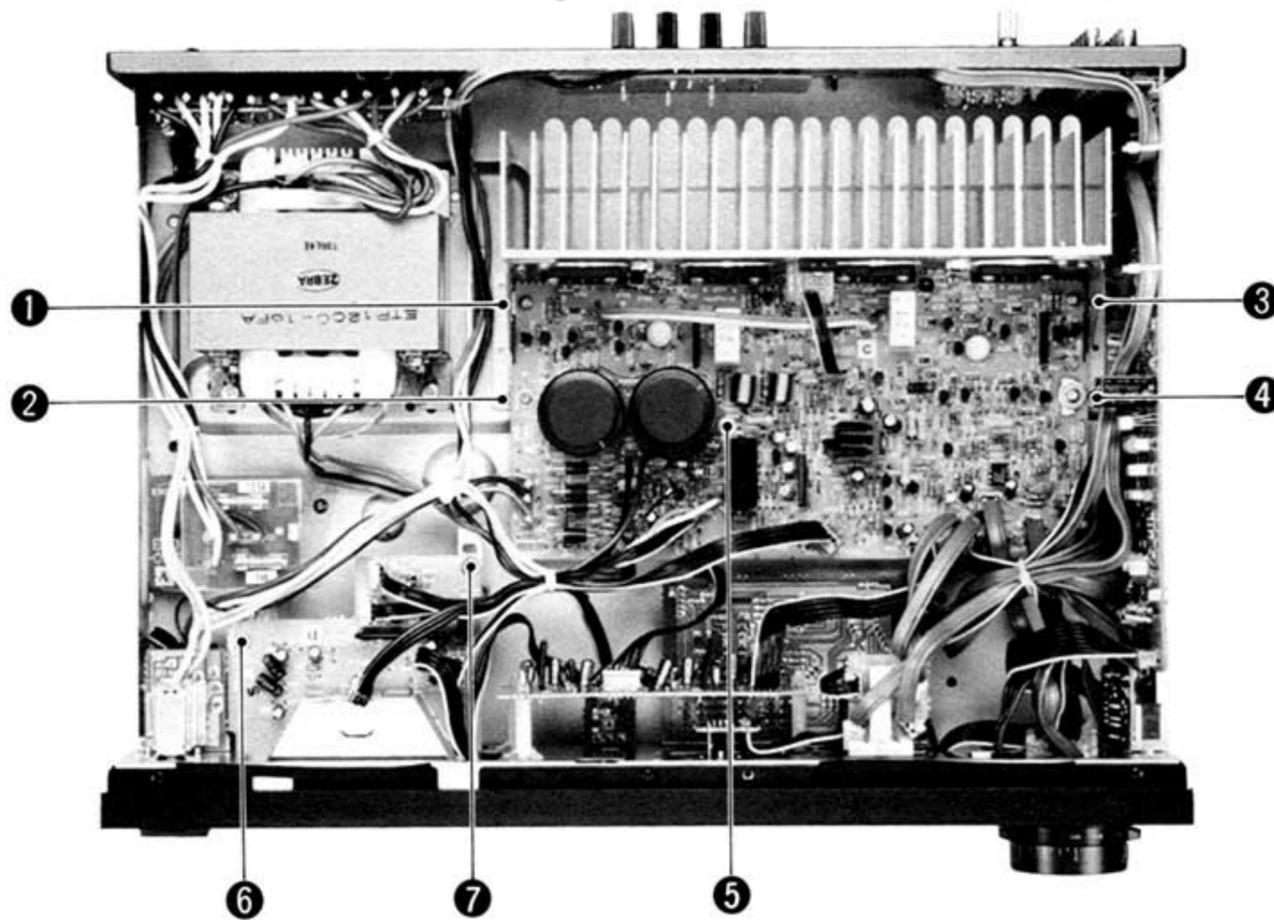


When handling, grip it as shown in the figure below.



2. When handling the LCD, wear gloves whenever possible.
3. When the light-polarizing plate (surface other than silk-printed areas) becomes contaminated, use an applicator moistened with isopropyl alcohol to gently wipe it clean. As for the silk-printed areas, use a soft cloth to gently wipe it clean.
Note: The light-polarizing plate attached to the LCD surface and the silk-printed areas are made of soft material.
4. As much as possible, avoid exposing the LCD to harmful light irradiation (direct sunlight or ultraviolet rays), especially when the device is not in use.
5. Do not imprint DC voltage on pins of the LCD (its characteristics will be degraded).
6. When the LCD is damaged, resulting in leakage of liquid crystal, be very cautious to keep the liquid away from one's mouth or swallowing it. Should liquid crystal contact the hands or clothing, immediately wash with water, using soap or other appropriate cleanser.

Removal Procedures



■ Removing the Front Panel

1. Remove the metal cover.
2. Remove three plastic rivets on the upper part of the front panel and three screws from the lower part.
3. Pull out the balance knob.
4. Pull out the volume knob and remove the nut.

■ Precautions when Installing the Front Panel

1. Turn the selector knob on the front panel to the -12 dB position.
2. Rotate the arm clockwise.
3. After completing the above procedures, install the front panel.

■ Precautions when Installing the Arm (Fig. 1)

When the arm is removed for operations such as rotary switch (Gm selector: S703) replacement, reinstall the arm while following the precautions below.

1. Turn the rotary switch shaft counter clockwise all the way.
2. Have the line marking on the top, then insert the arm.

■ Gm Selector Knob Replacement (Fig. 2)

1. Remove the front panel.
2. Take off the bonds securing the two speed nuts on the inner side of the front panel.
3. Press the Gm selector knob to prevent the ball bearings from scattering. Remove the two speed nuts and remove the Gm selector knob.

■ Removing the Power Transistors

1. Remove screws ① ~ ④ on the bracket of Main Amplifier PC Board.
2. Remove screw ⑤ on the Main Amplifier PC Board.
3. Lift up the heat sink and slant it toward the front panel.
4. Resolder the pins of the power transistors.

■ Removing the SEA Display PC Board

1. Remove two plastic rivets ⑥ ~ ⑦ on the SEA Display PC Board.
2. Lift up the SEA Display PC Board and pull it toward the back.

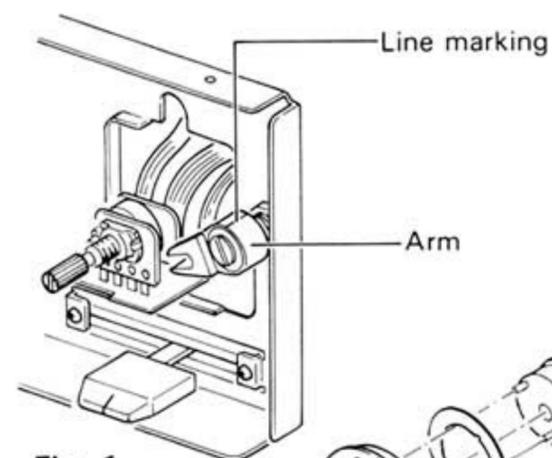


Fig. 1

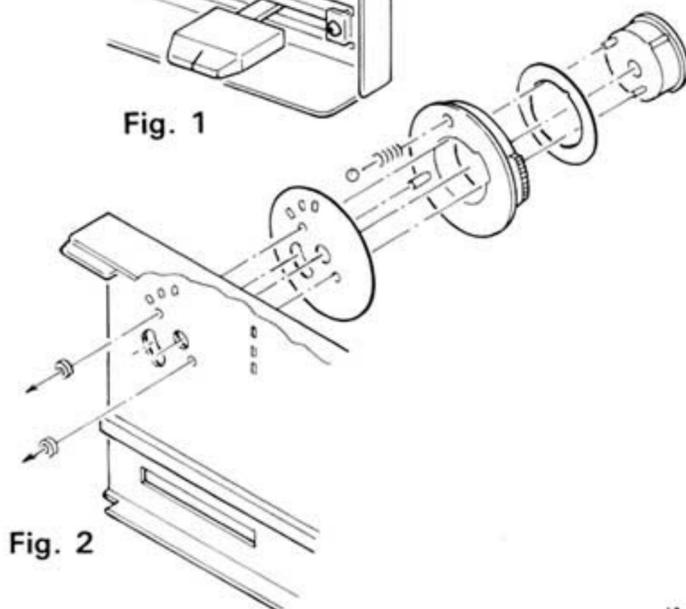


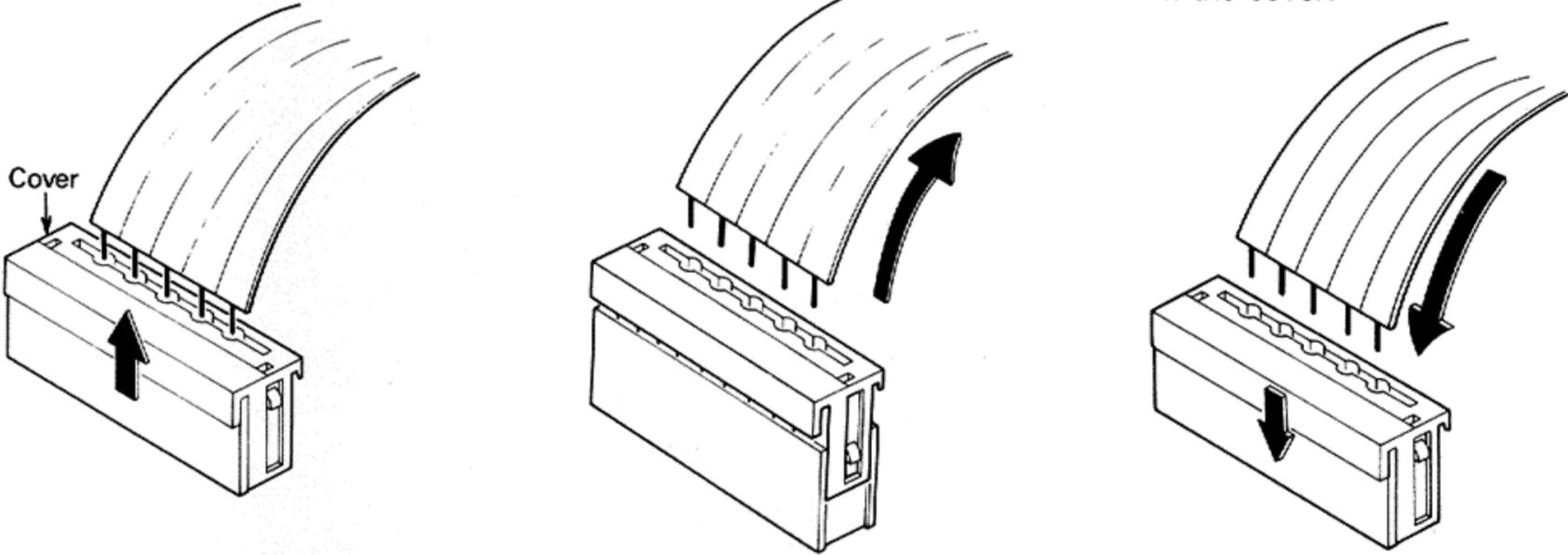
Fig. 2

■ Use of New-type Connector

(1) Slide the cover upward.

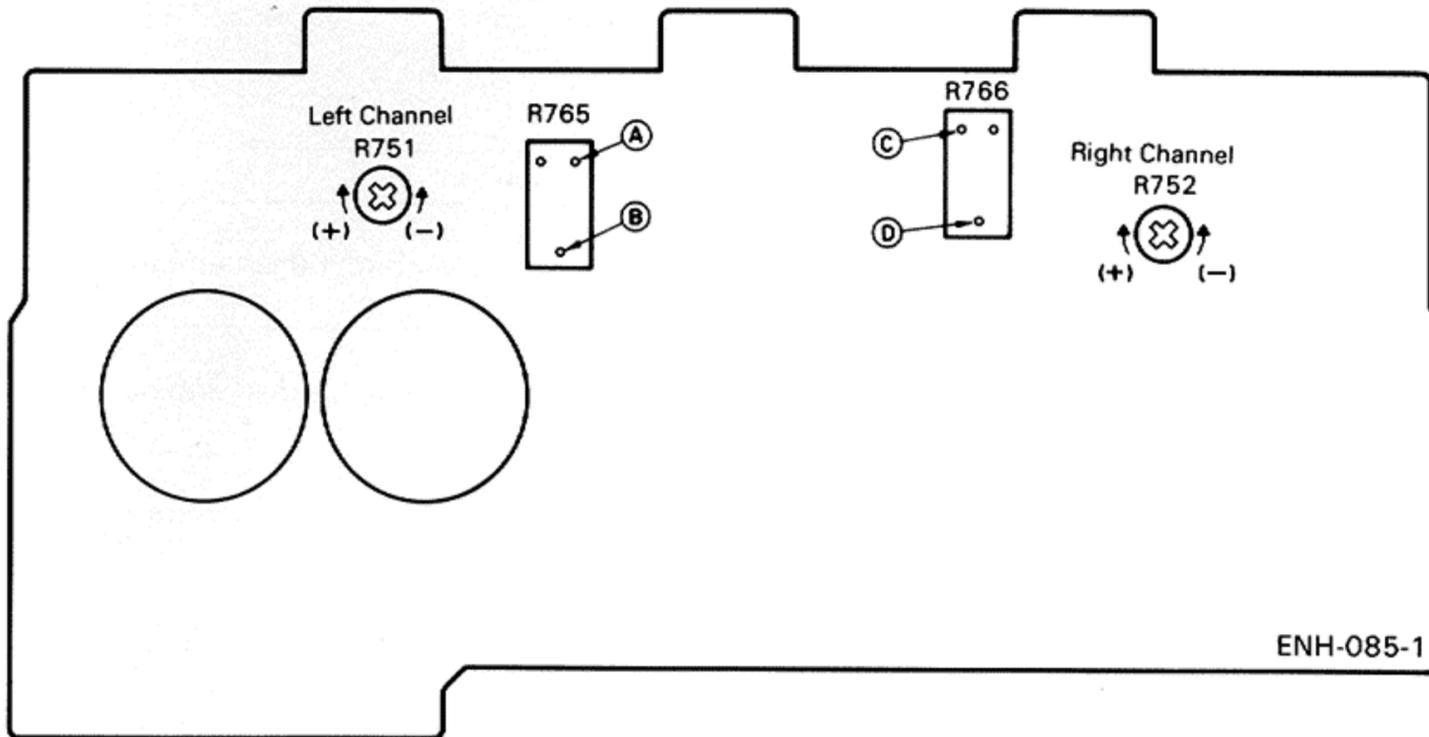
(2) Extract the wires.

(3) Insert the wires after pushing in the cover.



Adjustment Procedures

■ Power Amplifier Idling Current Adjustment



1. Before tuning on the power, turn the semi-fixed resistors (R751 for L channel and R752 for R channel) of the power amplifier circuit board fully counterclockwise.

2. Adjust the semi-fixed resistors (R751 and R752) so that the voltage at the following test points of the power amplifier circuit board is within a range of 4 ~ 10 mV after the power is turned on.

L channel: Measure the voltage between test point (A) (emitter of Q717) and output at the test point (B).

R channel: Measure the voltage between test point (C) (emitter of Q718) and output at the test point (D).

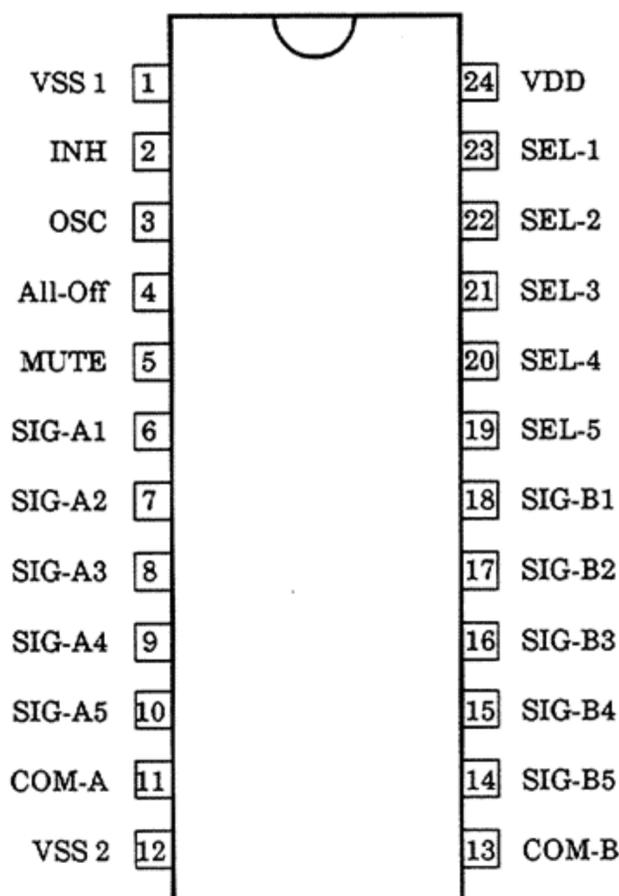
3. Readjust resistors R751 and R752 about 10 minutes after the power is turned on (the heatsink temperature must be sufficiently high) so that the voltage at the test points becomes 11 mV.

Confirm that the voltage does not vary when the heatsink temperature increases further.

Note: Be sure to perform the measurement with the probes and cabinet of the measuring equipment separated from the grounding terminals of AX-70BK or other measuring equipment.

Internal Block Diagram of Major ICs

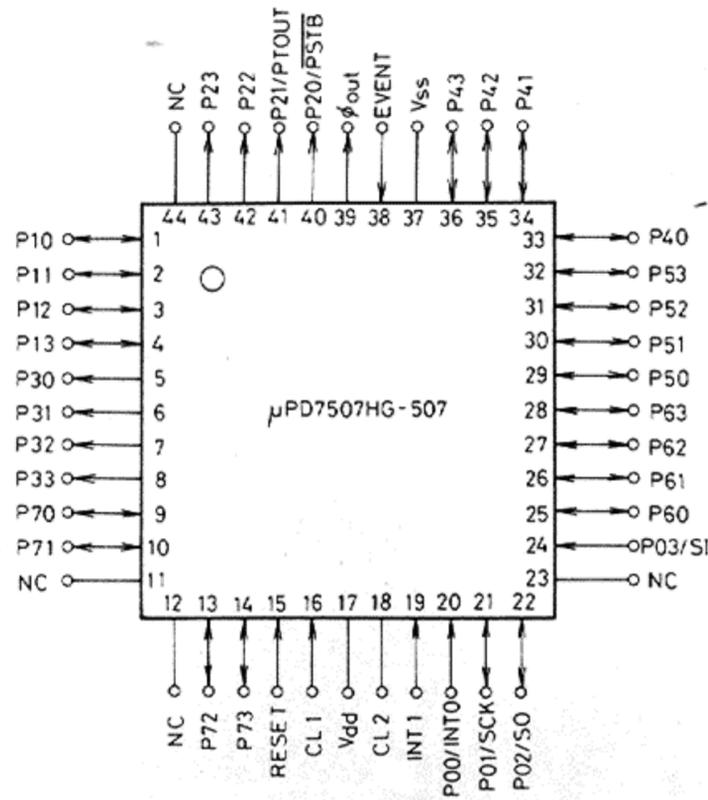
IC101: TC9152P



IC101: TC9152P

Pin No.	Name	Terminal Function
6 18	SIG-A1 SIG-B1	Signal input terminal 1. Analog switch 1 is turned on when SEL-1 is selected to connect this terminal and the COM terminal.
7 17	SIG-A2 SIG-B2	Signal input terminal 2. Analog switch 2 is turned on when SEL-2 is selected to connect this terminal and the COM terminal.
8 16	SIG-A3 SIG-B3	Signal input terminal 3. Analog switch 3 is turned on when SEL-3 is selected to connect this terminal and the COM terminal.
9 15	SIG-A4 SIG-B4	Signal input terminal 4. Analog switch 4 is turned on when SEL-4 is selected to connect this terminal and the COM terminal.
10 14	SIG-A5 SIG-B5	Signal input terminal 5. Analog switch 5 is turned on when SEL-5 is selected to connect this terminal and the COM terminal.
11 13	COM-A COM-B	The analog switch common terminal.
23 22 21 20 19	SEL-1 SEL-2 SEL-3 SEL-4 SEL-5	The input terminal for selecting analog switches. Each selected analog switch is turned on when the SEL-1 to SEL-5 terminals are at "H" level. SEL-1 through SEL-5 are alternately reset. This terminal is also used as the I/O terminal for the display driver output.
24 1 12	VDD VSS1 VSS2	The power supply voltage terminal. The Control system is VDD - VSS1 The analog switch system is VDD - VSS2
2	INH	The inhibit input terminal Normal operation at "H" level and inhibit operation at "L" level.
3	OSC	The CR connection terminal for the oscillator. The muting time and analog switch switching timing are set using the frequency of this oscillator.
4	ALL-OFF	The input terminal for turning off all analog switches. All analog switches are turned off when this terminal is at "H" level.
5	MUTE	The muting signal output terminal. This terminal becomes "H" level for a certain time when "H" level input is received at the select input (SEL-1 ~ SEL-5) terminals. The analog switches are turned off during this time.

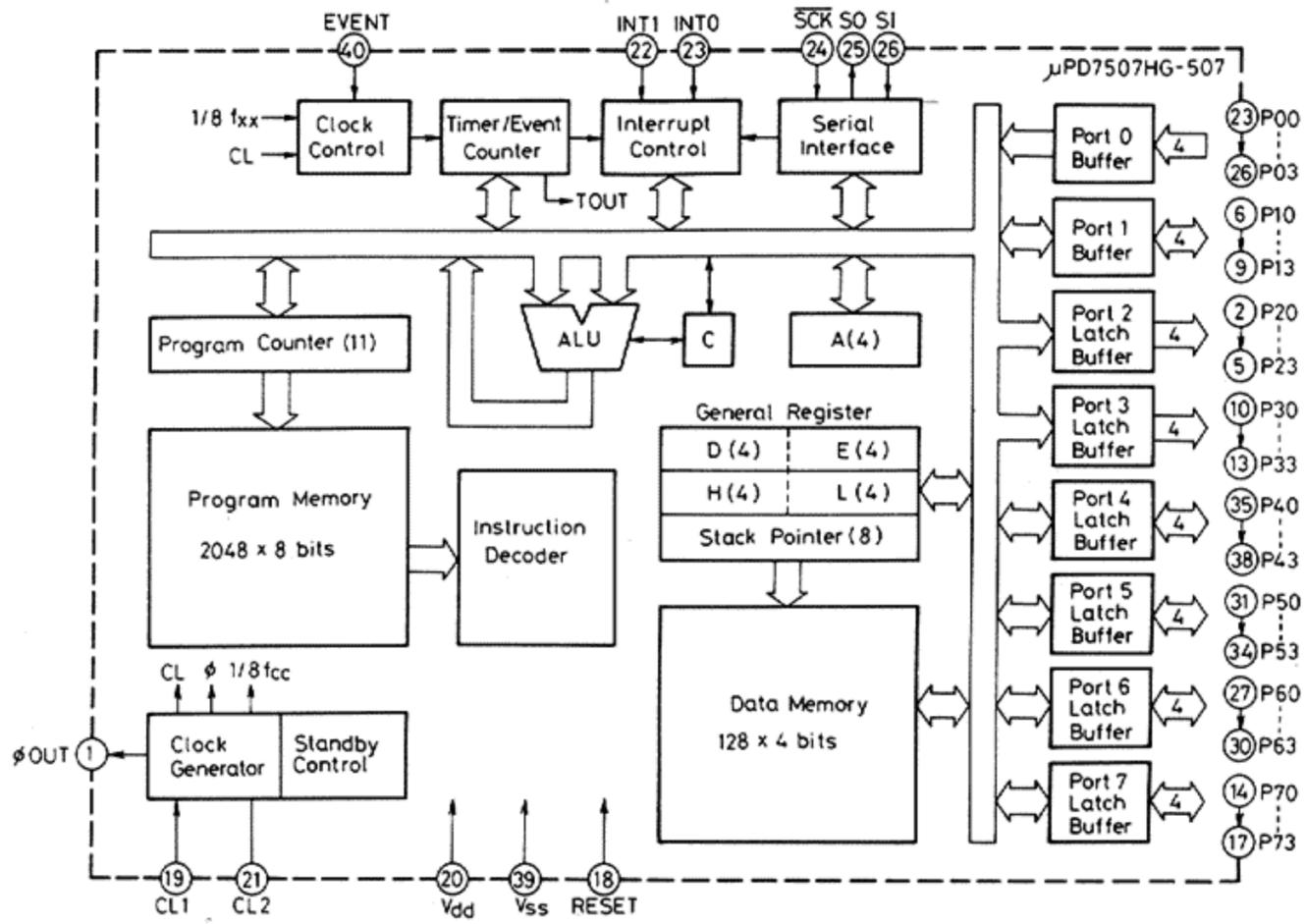
IC505: μ PD7507HG-507



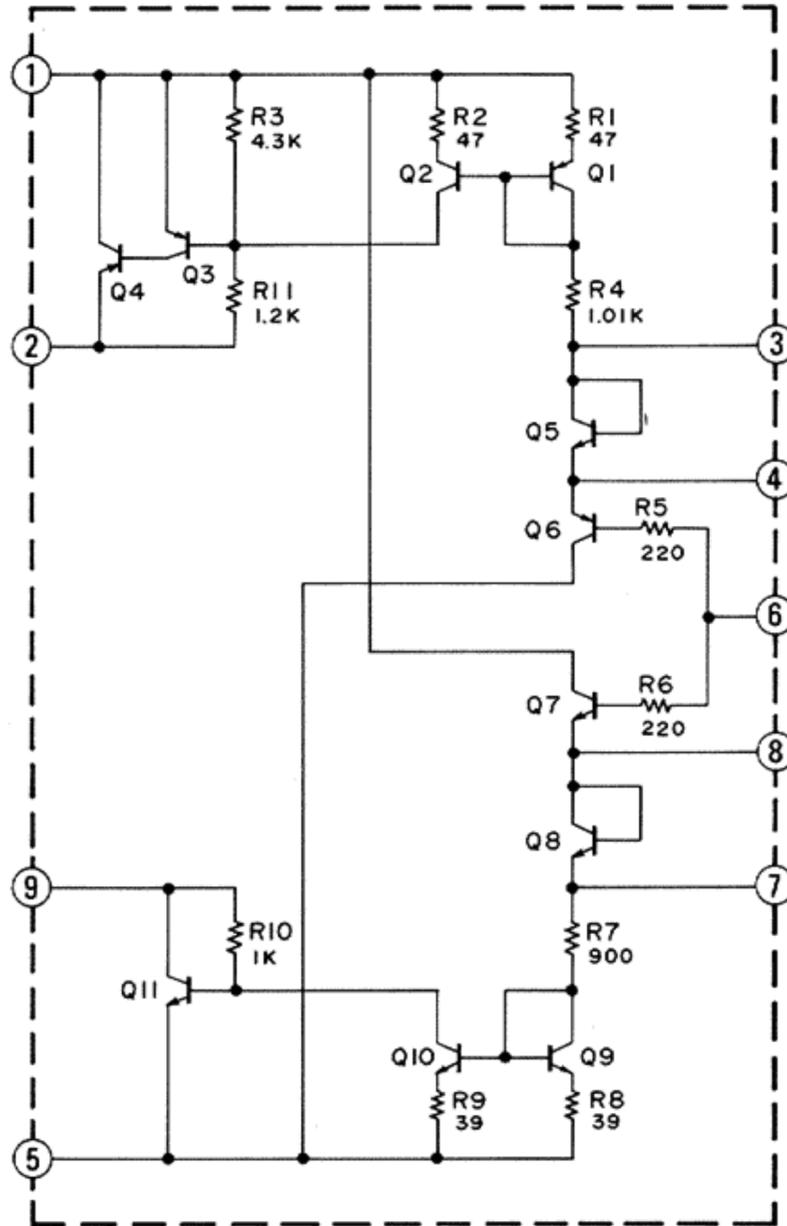
IC505: μ PD7507HG-507

Pin No.	Symbol	Name	I/O	Terminal Function
1	P10	P10	I	Key input; Composed the key matrix with P30 → P33.
2	P11	P11	I	Key input; Composed the key matrix with P30 → P33.
3	P12	P12	I	Key input; Composed the key matrix with P30 → P33.
4	P13	P13	I	Key input; Composed the key matrix with P30 → P33.
5	P30	P30	O	Key output
6	P31	P31	O	Key output
7	P32	P32	O	Key output
8	P33	P33	O	Key output
9	P70	P70	I	Key input; Composed the key matrix with P30 → P33.
10	P71	P71	I	Key input; Composed the key matrix with P30 → P33.
11	NC	NC	---	Non connection
12	NC	NC	---	Non connection
13	P72	P72	I	Key input; Composed the key matrix with P30 → P33.
14	P73	P73	I	Key input; Composed the key matrix with P30 → P33.
15	RESET	RESET	I	Connect the RESET of MN1758JSL.
16	CL1	X'tal in	I	Connect the ceramic oscillator.
17	Vdd	Vdd	---	+5V
18	CL2	X'tal out	O	Connect the ceramic oscillator.
19	INT1	INT1	---	Not use. (GND)
20	P00/INT1	RM IN	I	Remote control signal input
21	P01/SCK	P01/SCK	---	Not use. (Vdd)
22	P02/SO	INH	I	Connect the INH2 of MN1758JSL.
23	NC	NC	---	Non connection.
24	P03/SI	TEST	I	SEA volume UP/DOWN test mode
25	P60	CLK	O	Serial CLOCK OUT
26	P61	DATA	O	Serial DATA OUT
27	P62	RM IND	O	"H" output when remote control signal received.
28	P63	P63	---	Not use. (open)
29	P50	P50	---	Not use. (GND)
30	P51	P51	---	Not use. (GND)
31	P52	P52	---	Not use. (GND)
32	P53	P53	---	Not use. (GND)
33	P40	P40	---	Not use. (GND)
34	P41	P41	---	Not use. (GND)
35	P42	P42	---	Not use. (GND)
36	P43	P43	---	Not use. (GND)
37	Vss	Vss	---	GND
38	EVENT	EVENT	---	Not use. (GND)
39	ϕ OUT	ϕ OUT	---	Not use. (open)
40	P20	P20	---	Not use. (open)
41	P21	P21	---	Not use. (open)
42	P22	P22	---	Not use. (open)
43	P23	P23	---	Not use. (open)
44	NC	NC	---	Non connect.

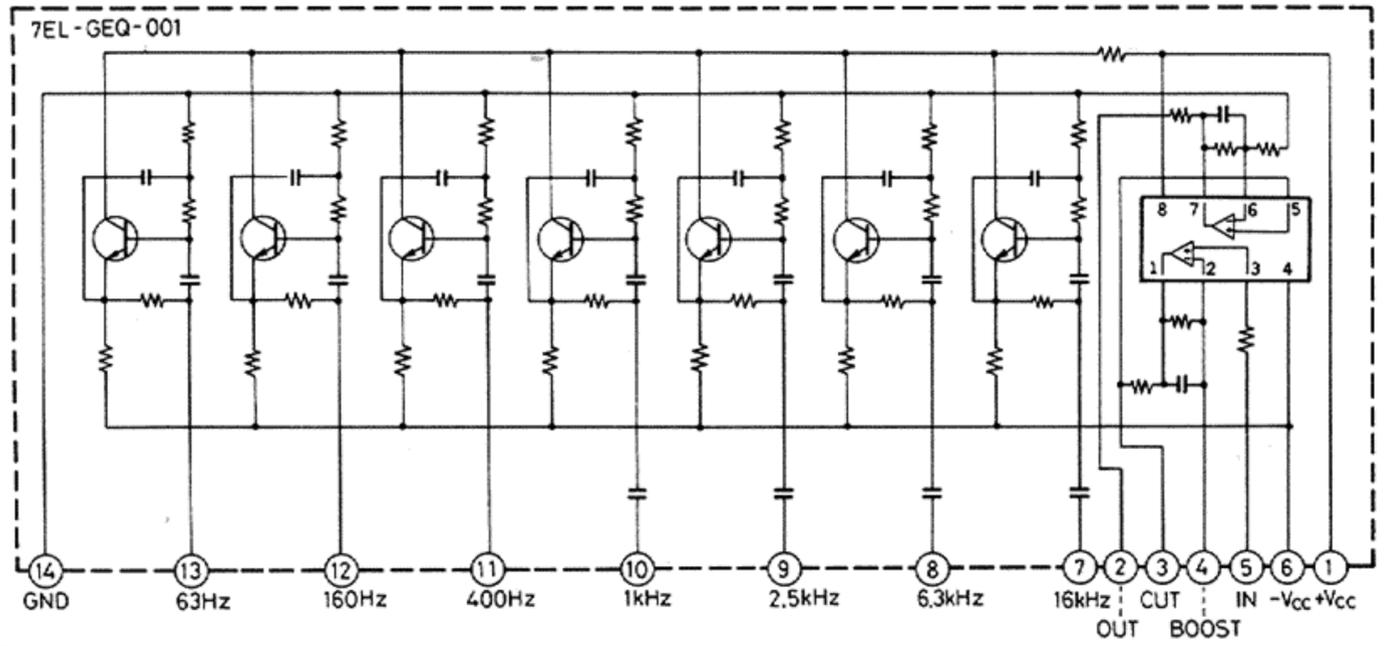
IC505: μ PD7507HG-507



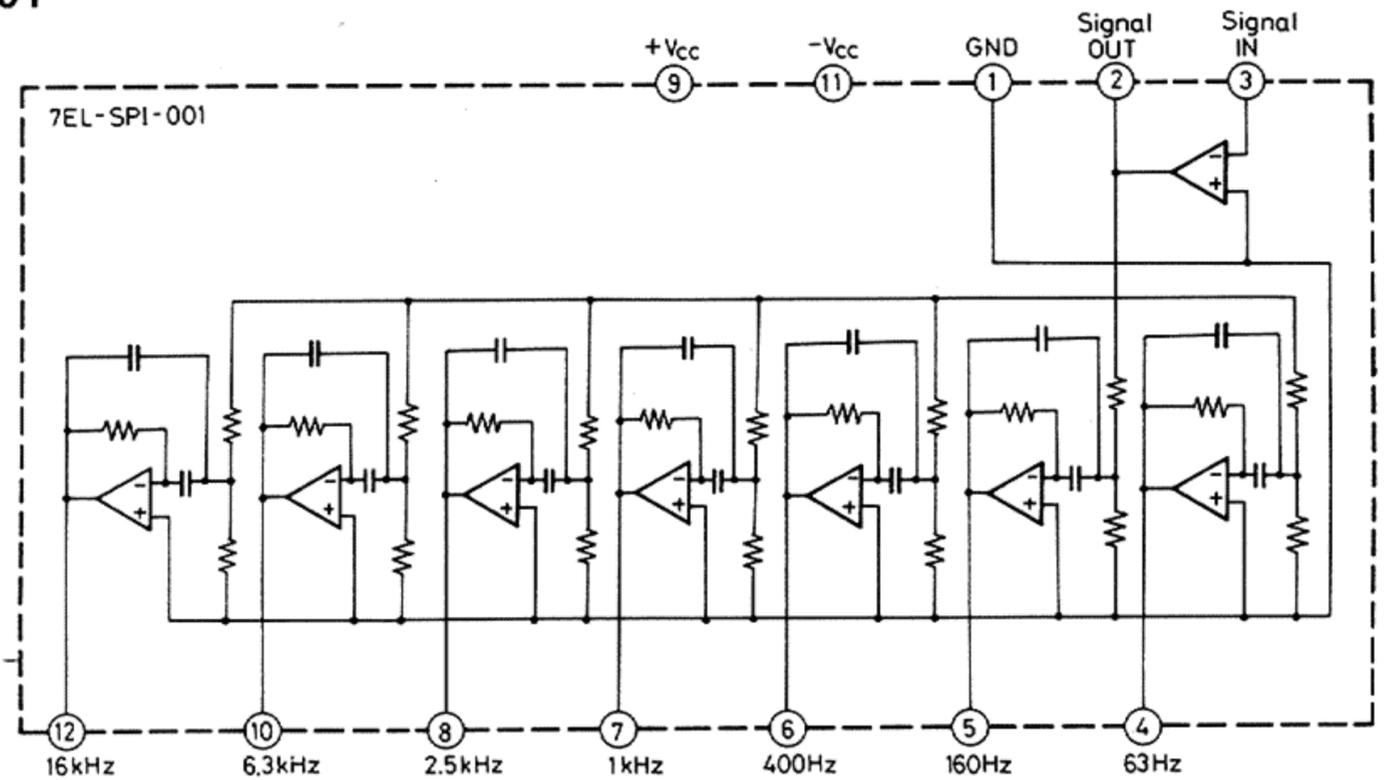
IC751, 752: VC5022



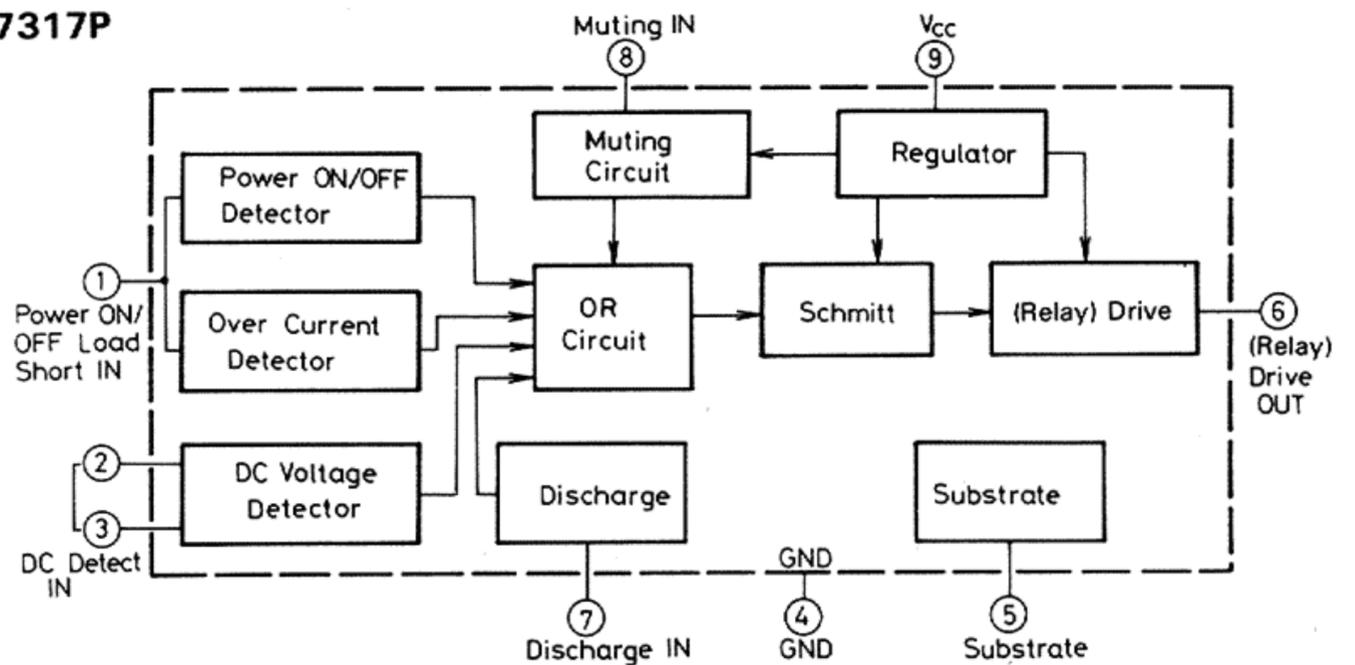
IC503, 504: 7EL-GEQ-001



IC402: 7EL-SPI-001

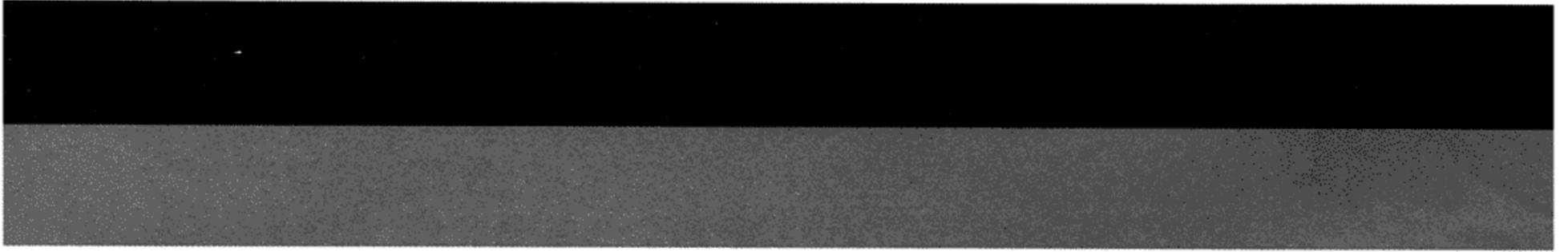


IC102, IC901: TA7317P



— MEMO —

AX-70BK



JVC

VICTOR COMPANY OF JAPAN, LIMITED
AUDIO PRODUCTS DIVISION, YAMATO PLANT, 1644, SHIMOTSURUMA, YAMATO-SHI, KANAGAWA-KEN, 242, JAPAN