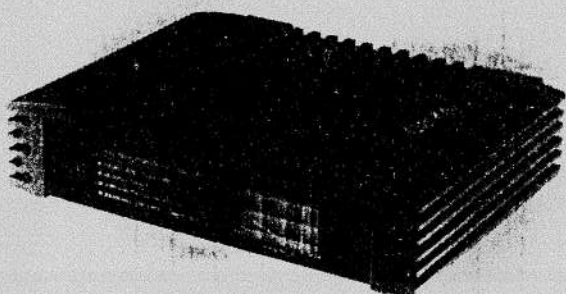


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Service Manual

Published by Service Administration Section



**80W+80W (PEAK) DC SERVO
 STEREO POWER AMPLIFIER**

Model 502HA (EE-714A)

■ SPECIFICATIONS:

Circuit system : W-servo regulator
 PWM±2 power units
 Parallel push-pull complementary circuit
 Current mirror load circuit
 DC servo circuit

Rated power : 50W+50W (1 kHz, 0.1%, 4Ω)
 Max. power : 80W+80W (Peak)
 Load impedance : 4Ω×2
 Power supply voltage :
 DC 14.4V (10.8 to 15.6V)
 Negative ground

Current consumption :
 15A (at rated power)

Dimensions : Width 245 mm
 Height 62 mm
 Depth 215 mm

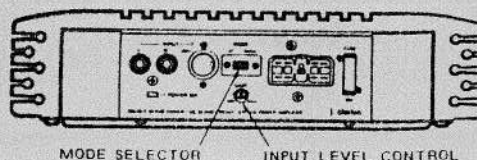
Weight : 3.1 kg

■ FEATURES:

- Total Maximum Power Output 80W+80W (PEAK)
- EIAJ Max. Output Power 60W+60W (@ 1kHz, 10% THD)
- Continuous Output Power 100W (50W/ch. into 4 Ohm, 20Hz to 20kHz, @ 0.1% THD)
- Bridge (MONO) Capability (Max. 120W @ 10% THD)
- DC Servo Circuit
- Double Servo Regulator Power Supply Circuit
- Isolated Input Ground Circuit
- Adjustable Input Level Control
- 10Hz to 60kHz (-1dB) Frequency Response
- Overvoltage Protection System
- Overheating Protection Circuit
- Speaker Lead Short Protection Circuit
- Turn ON Muting Circuit (Soft Start)
- Automatic Remote Switching Circuit

■ COMPONENTS:

● EE-714A-01		
Main unit		1
Parts bag	653-0086-39	1
{ Lead holder Tap-screw Plate nut	335-0833-01	5
	653-0086-48	6
	653-0086-49	4
DIN cable	653-0088-04	1
Extension lead (Power supply)	852-7219-01	1
9 P connector	653-0088-03	1

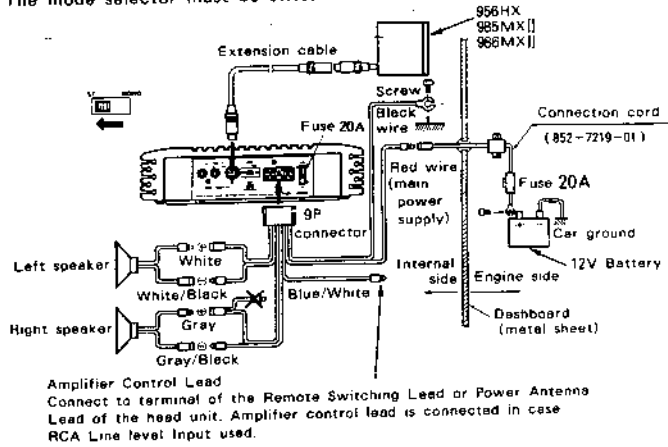


- **MODE SELECTOR** : Set the mode selector to the desired mode.
- **MODE SELECTOR (MONO)** : To use the amp for monaural reproduction only, remove the two screws, turn the plate 180° and fasten the plate using the two screws.
- **INPUT LEVEL CONTROL** : Adjust the input level control to obtain desired gain.

WIRE CONNECTION:

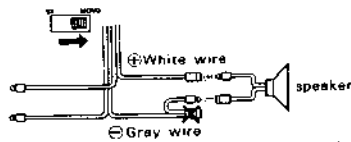
STEREO MODE

The mode selector must be switched to the stereo mode.



MONO (BRIDGE) MODE

The mode selector must be switched to the mono (bridge) mode.



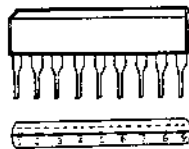
- Note:
- 1) The head wires marked "X" are not used. Make sure that they are not in contact with metal.
 - 2) When not using the DIN cord, input to the RCA terminal. In this case, connect the amplifier control lead (blue/white) in the 9 pin connector to the external power lead from the unit. When using the RCA terminal in mono, only connect the left channel.
 - 3) Use 4 ohms impedance speakers with maximum wattage rating of more than 80 watts (mono mode: 160 watts)

EXPLANATION OF IC's:

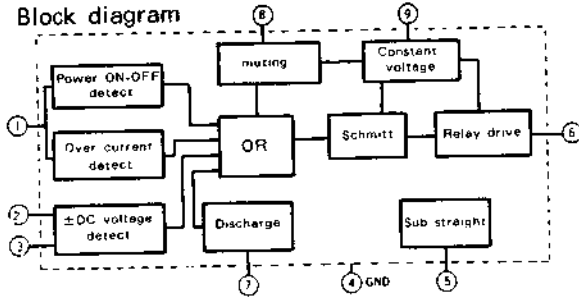
TA 7317P 051-0247-00 OCL

Power Amp. & Speaker protection circuit

Outward Form



Block diagram

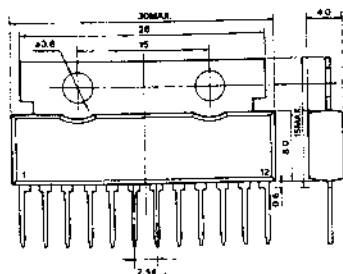


μPC 1225H 653-0086-50 30~50W

Power amp. driver

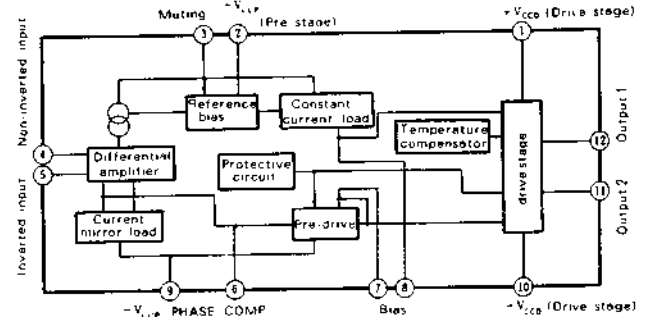
This IC is a stereo Hi-Fi power amplifier driver. It consists of a voltage amplifier circuit, pre-drive circuit, drive circuit, and protective circuit.

Outward Form



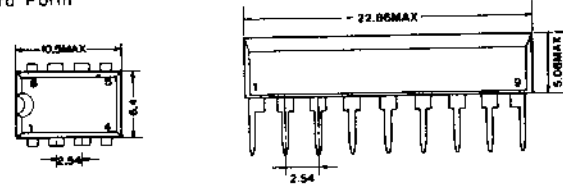
Terminal Description

端 (No)	機 種
1	+V _{CC} (Drive stage power)
2	+V _{CCP} (Pre-drive stage power)
3	MUTING
4	INPUT
5	NFB
6	PHASE COMP
7	BIAS
8	BIAS
9	-V _{CCP} (Pre-drive stage power)
10	-V _{CC} (Drive stage power)
11	LOWER OUTPUT
12	UPPER OUTPUT



- μPC 4570C 659-0247-15 Super low noise.
- μPC 4570HA 653-0086-58 High speed, wide-band Dual OP. Amp.

Outward Form



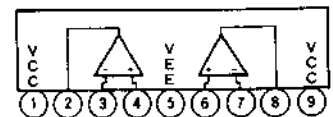
μPC4570C

μPC4570HA

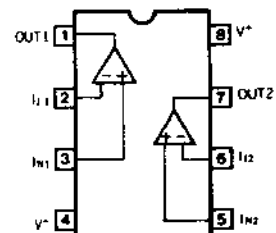
Feature

- Phase compensation
- Noise voltage referred to input (f=1kHz) 4.5nV/√Hz
- T.H.D. (f=20Hz~20kHz) 0.002%
- Slew rate 7V/μs

Block Diagram



μPC4570HA

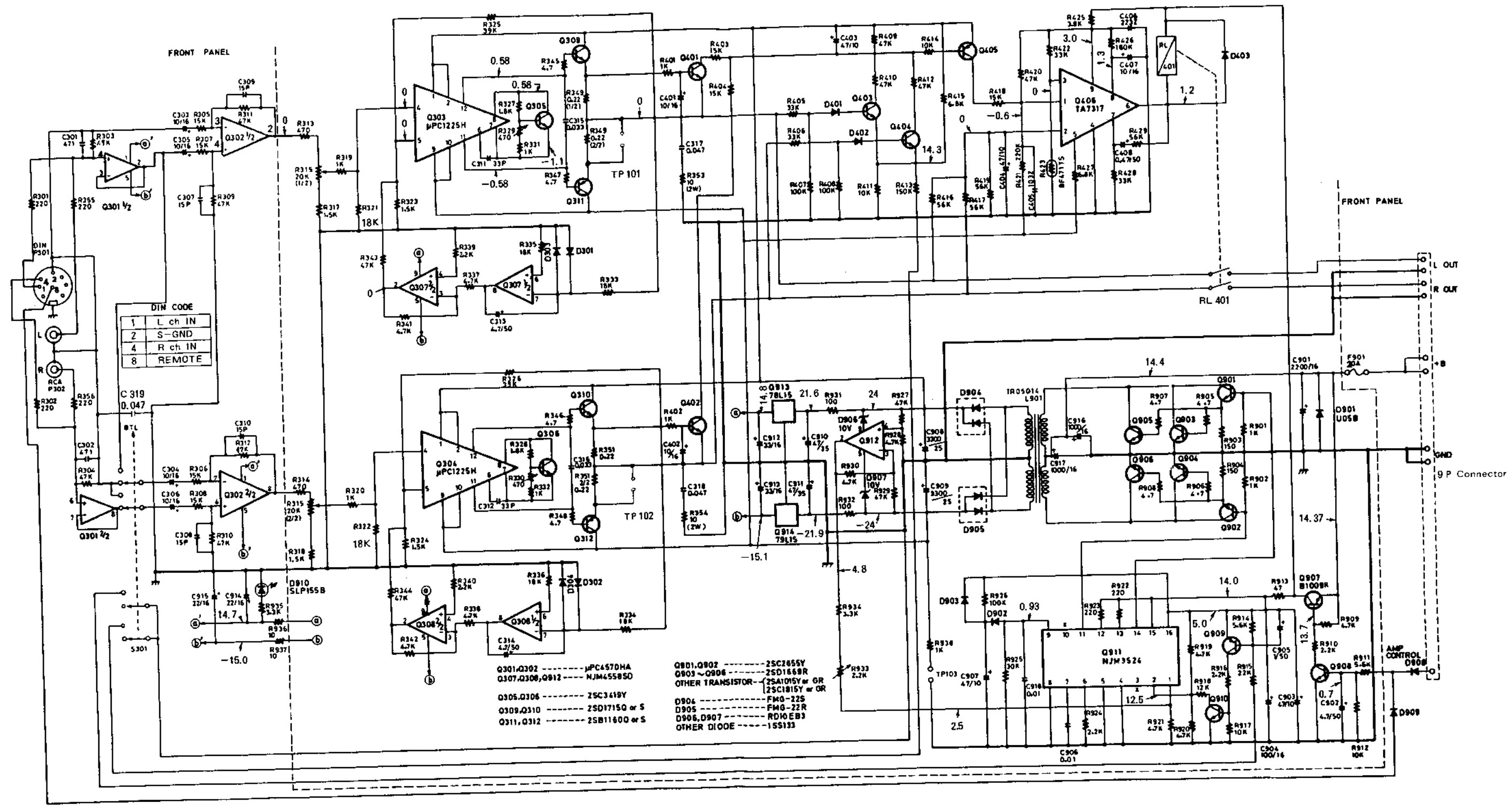


(Top View)
μPC4570C

- NJM 3524 051-0749-00 PWM Switching Regulator Controller

Refer to the description in Explanation of ICS Vol. 2. (Page 50)

CIRCUIT DIAGRAM:



DIN CODE

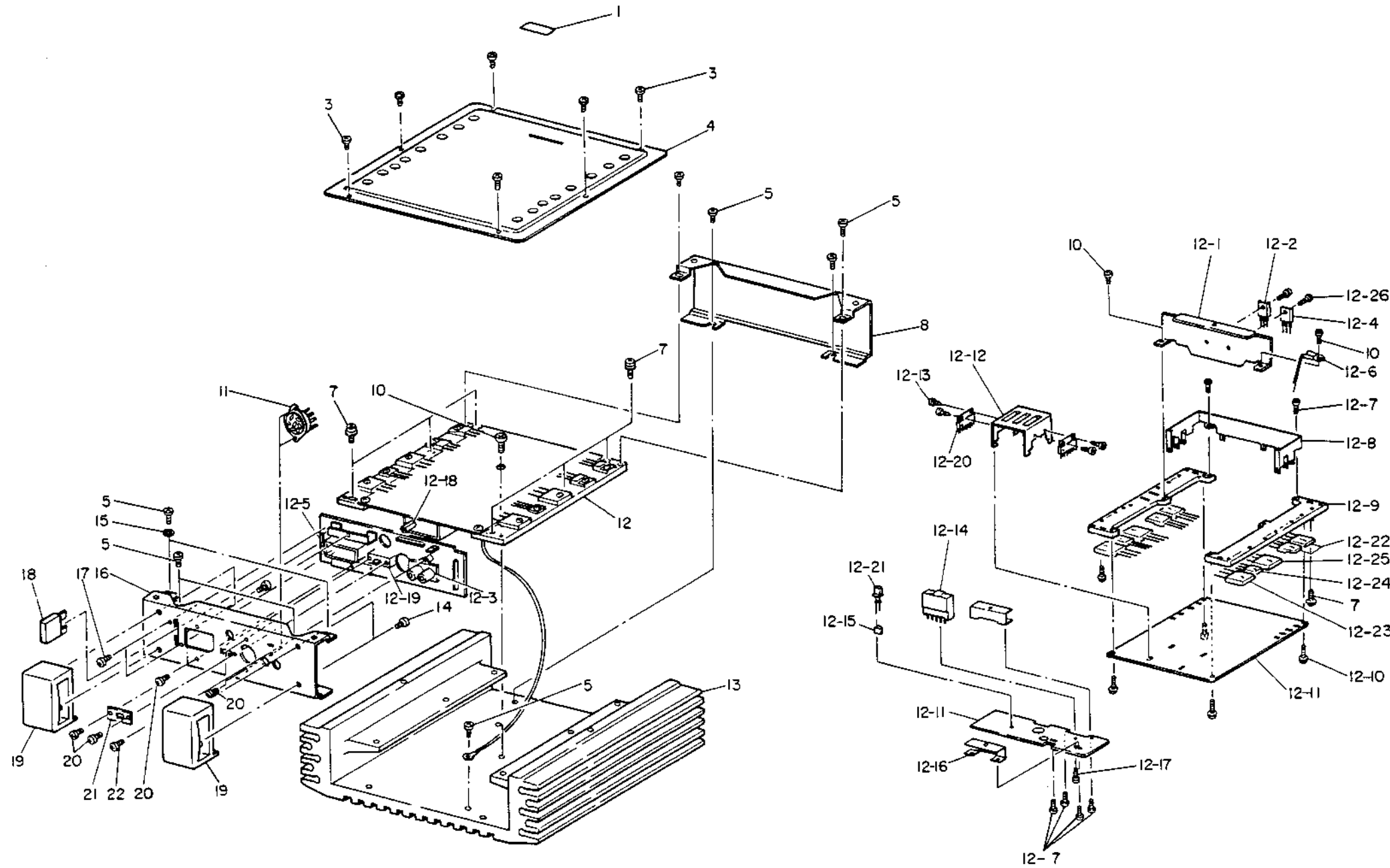
1	L ch IN
2	S-GND
4	R ch IN
8	REMOTE

- Q301, Q302 ----- μPC4570HA
- Q307, Q308, Q912 ----- NJM45585D
- Q305, Q306 ----- 2SC3419Y
- Q309, Q310 ----- 2SD17150 or S
- Q311, Q312 ----- 2SB11600 or S
- Q801, Q902 ----- 2SC2655Y
- Q903 ~ Q906 ----- 2SD1568R
- OTHER TRANSISTOR ----- 2SA105Y or OR
- 2SC1815Y or OR
- D904 ----- FM0-225
- D905 ----- FM0-22R
- D906, D907 ----- RD10EB3
- OTHER DIODE ----- 155133

* The voltages are as measured with a digital voltmeter without stereo signals. (DCV)
 Note: Remember that the heat sink for μPC1225H is expressed in -Vcc.

EXPLODED VIEW/PARTS LIST:

PARTS LIST: Electrical Section



REF. NO.	PART NO.	DESCRIPTION	QTY
1	286-6999-00	Setplate	1
3	653-0086-03	B-tight $\phi 3 \times 6$ (BLK)	6
4	653-0087-07	Lower case	1
5	653-0086-05	B-tight $\phi 3 \times 6$	9
7	653-0086-07	Double sems M3 \times 12	16
8	653-0087-06	Face panel	1
10	653-0086-10	B-tight $\phi 3 \times 8$	3
11	653-0088-01	DIN SOCKET	1
12	-	AMP ASSY	1
12-1	653-0086-22	Heat sink	1
12-2	653-0086-12	Diode (FMG 22S)	1
12-3	653-0086-24	Pin jack	1

REF. NO.	PART NO.	DESCRIPTION	QTY
12-4	653-0087-13	Diode (FMG 22R)	1
12-5	653-0086-26	AUTO FUSE holder	1
12-6	653-0086-27	Posistor	1
12-7	653-0086-28	B-tight $\phi 3 \times 6$	6
12-8	653-0087-16	Earth bar	1
12-9	653-0087-15	Heat sink	2
12-10	653-0086-31	B-tight $\phi 3 \times 8$	4
12-11	653-0087-19	PCB	1
12-12	653-0086-33	Heat sink	1
12-13	653-0086-34	Screw M3 \times 6	4
12-14	653-0086-35	Connector	1
12-15	653-0086-36	LED holder	1

REF. NO.	PART NO.	DESCRIPTION	QTY
12-16	653-0086-37	Connector bracket	2
12-17	653-0086-38	P-tight $\phi 3 \times 8$	1
12-18	653-0086-62	Variable resistor	1
12-19	653-0086-67	Slide switch	1
12-20	653-0086-50	IC (μ PC 1225H)	2
12-21	653-0086-59	LED	1
12-22	653-0087-11	Transistor (2SD 1669)	4
12-23	653-0086-52	Transistor (2SD 1715)	2
12-24	102-3419-25	Transistor (2SC 3419Y)	2
12-25	653-0086-53	Transistor (2SB 1160)	2
12-26	653-0087-17	Sems screw M3 \times 8	2
13	653-0087-04	Heat sink	1

REF. NO.	PART NO.	DESCRIPTION	QTY
14	653-0086-14	Screw M4 \times 6 (BLK)	4
15	653-0086-15	WASHER $\phi 3$	2
16	653-0089-01	Escutcheon	1
17	653-0086-17	P-tight $\phi 2 \times 6$	2
18	060-0057-08	Auto fuse (20A)	1
19	653-0086-18	Handle	2
20	653-0086-19	Screw M2.6 \times 5 (BLK)	6
21	653-0086-20	Lock plate	1
22	653-0086-21	P-tight $\phi 3 \times 8$ (BLK)	1

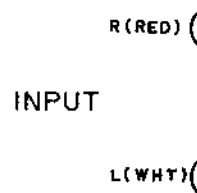
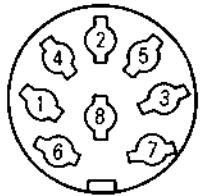
REF. NO.	PART NO.	DESCRIPTION	QTY
Q 301, 302	653-0086-58	IC (μ PC 4570HA)	2
Q 303, 304	653-0086-50	IC (μ PC 1225H)	2
Q 305, 306	102-3419-25	Transistor (2SC 3419Y)	2
Q 307, 308, 912	653-0086-51	IC (NJM 4558SD)	3
Q 309, 310	653-0086-52	Transistor (2SD 1715Q, S)	2
Q 311, 312	653-0086-53	Transistor (2SB 1160Q)	2
Q 401, 402, 403, 404, 908, 910	102-1815-51	Transistor (2SC 1815GR)	6
Q 405, 911	100-1015-25	Transistor (2SA 1015Y)	2
Q 406	051-0247-00	IC (TA 7317P)	1
Q 901, 902	102-2655-25	Transistor (2SC 2655Y)	2
Q 903, 904, 905, 906	653-0087-11	Transistor (2SD 1669R)	4
Q 907	653-0086-55	Transistor (2SB 1009R)	1
Q 911	051-0749-00	IC (NJM 3524D)	1
Q 913	653-0086-68	IC (78L 15)	1
Q 914	653-0085-69	IC (79L 15)	1
Q 301 ~ 304, 401 ~ 403, 902, 903, 908, 909	001-0294-00	Diode (1SS 133)	11
D 901	001-0100-00	Diode (U 05B)	1
D 904	653-0087-12	Diode (FMG-22S)	1
D 905	653-0087-13	Diode (FMG-22R)	1
D 906, 907	001-0323-45	Diode (RD 10EB 3)	1
D 910	653-0086-59	LED (SLP-155B)	1
L 301, 302	653-0086-60	Coil	2
L 901	653-0087-14	DC-DC coil	1
C 311, 312	174-3300-46	Ceramic capacitor (33pF SL)	2
C 313, 314, 902	179-4753-62	Electrolytic capacitor (50V 4.7 μ F)	3
C 315, 316	173-3331-10	Polyester capacitor (50V 0.033 μ F)	2
C 317, 318, 319	173-4731-10	Polyester capacitor (50V 0.047 μ F)	3
C 906, 918	173-1031-10	Polyester capacitor (50V 0.01 μ F)	2
C 401, 402, 407	179-1063-32	Electrolytic capacitor (16V 10 μ F)	3
C 403, 404, 903, 907	179-4763-22	Electrolytic capacitor (10V 47 μ F)	4
C 408	179-4743-62	Electrolytic capacitor (50V 0.47 μ F)	1
C 904	179-1073-32	Electrolytic capacitor (16V 100 μ F)	1
C 905	179-1053-62	Electrolytic capacitor (50V 1 μ F)	1
C 910, 911	179-4763-52	Electrolytic capacitor (35V 47 μ F)	2
C 912, 913	179-3363-32	Electrolytic capacitor (16V 33 μ F)	2
C 916, 917	179-1083-33	Electrolytic capacitor (16V 1000 μ F)	2
C 307 ~ 310	174-1500-46	Ceramic capacitor (15pF SL)	4
C 405	160-1035-06	Ceramic capacitor (0.01 μ F)	1
C 406	160-2235-06	Ceramic capacitor (0.022 μ F)	1
C 301, 302	160-4712-05	Ceramic capacitor (470pF)	2
C 901	179-2283-32	Electrolytic capacitor (16V 2200 μ F)	1
C 303 ~ 306	182-1063-32	Electrolytic capacitor (16V 10 μ F)	4
C 914, 915	182-2263-32	Electrolytic capacitor (16V 22 μ F)	2
C 908, 909	653-0087-18	Electrolytic capacitor (25V 3300 μ F)	2
R 423	653-0086-27	Posistor	1
RL 401	653-0086-66	Relay	1
R 315	653-0086-62	Variable resistor	1
R 329, 330	653-0086-63	Variable resistor	2
R 933	653-0086-65	Variable resistor	1
R 349, 351	653-0086-64	Cement resistor (5W 0.22)	2
R 353, 354	114-1001-21	Metalize resistor (2W 10 Ω)	2

PRINTED WIRING BOARD:

A	LEFT SPEAKER ⊕
B	RIGHT SPEAKER ⊕
C	GND
D	ACC
E	LEFT SPEAKER ⊖
F	RIGHT SPEAKER ⊖
G	AMP CONTROL +B
H	GND
I	ACC



1	L ch INPUT
2	SIGNAL GND
3	
4	R ch INPUT
5	
6	
7	
8	REMOTE POWER ON-OFF VOLTAGES



ADJUSTMENTS:

- POWER SUPPLY VOLTAGE:
Adjust R 933 so that the voltage of TP103 is $-24V \pm 0.2V$.
- IDLING CURRENT
Before making adjustments, preheat under the following conditions:
Time : 15 minutes
Voltage : 14.4V
Input signal: No signal (Input shorted)
Output load: None

Adjust R 329 (L) so that the voltage of TP101 is $4.4mV \pm 0.2mV$.
Adjust R 330 (R) so that the voltage of TP102 is $4.4mV \pm 0.2mV$.

