

# Service Manual

**PIONEER**  
The Art of Entertainment

● GM-H100/UC



ORDER NO.  
**CRT1343**

BRIDGEABLE POWER AMPLIFIER

# GM-H100

## GM-H50 UC

UC

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## SAFETY INFORMATION

### CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

### WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

## SPECIFICATIONS

|                             |                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------|
| Power source .....          | 14.4 V DC (10.8 - 15.6 V allowable)                                                                  |
| Grounding system .....      | Negative type                                                                                        |
| Current consumption         |                                                                                                      |
| (GM-H100) .....             | 13 A (at continuous power, 4Ω)                                                                       |
| (GM-H50) .....              | 6.5 A (at continuous power, 4Ω)                                                                      |
| Fuse                        |                                                                                                      |
| (GM-H100) .....             | 30 A                                                                                                 |
| (GM-H50) .....              | 15 A                                                                                                 |
| Dimensions                  |                                                                                                      |
| (GM-H100) .....             | 264 (W) × 58 (H) × 260 (D) mm<br>[10 - 3/8 (W) × 2 - 1/4 (H) × 10 - 1/4 (D) in.]                     |
| (GM-H50) .....              | 264 (W) × 52 (H) × 181 (D) mm<br>[10 - 3/8 (W) × 2 (H) × 7 - 1/8 (D) in.]                            |
| Weight                      |                                                                                                      |
| (GM-H100) .....             | 4.3 kg (9.5 lbs.)(Leads for wiring not included)                                                     |
| (GM-H50) .....              | 2.9 kg (6.4 lbs.)(Leads for wiring not included)                                                     |
| Maximum power output        |                                                                                                      |
| (GM-H100) .....             | 100 W × 2/320 W × 1 (EIAJ)                                                                           |
| (GM-H50) .....              | 50 W × 2/160 W × 1 (EIAJ)                                                                            |
| Continuous power output     |                                                                                                      |
| (GM-H100) .....             | 50 W × 2/160 W × 1 (at 4Ω, 20 - 20,000 Hz, 0.05% THD)<br>80 W × 2 (at 2Ω, 20 - 20,000 Hz, 0.05% THD) |
| (GM-H50) .....              | 25 W × 2/80 W × 1 (at 4Ω, 20 - 20,000 Hz, 0.05% THD)<br>40 W × 2 (at 2Ω, 20 - 20,000 Hz, 0.05% THD)  |
| Load impedance .....        | 4Ω (2 - 8Ω allowable)                                                                                |
| Frequency response .....    | 10 - 50,000 Hz (+0 dB, -1 dB)                                                                        |
| Signal-to-noise ratio ..... | 100 dB (IHF - A network)                                                                             |
| Distortion                  |                                                                                                      |
| (GM-H100) .....             | 0.003% (at 20 W, 1 kHz)                                                                              |
| (GM-H50) .....              | 0.003% (at 10 W, 1 kHz)                                                                              |
| Separation .....            | 65 dB (1 kHz)                                                                                        |
| Input level .....           | 0.2 - 2 V / 8 kΩ                                                                                     |

*These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.*

#### Note:

Specifications and the design are subject to possible modification without notice due to improvements.

## 1. DISASSEMBLY

### ● Remove the Case

1. Remove the four screws A and remove the case.

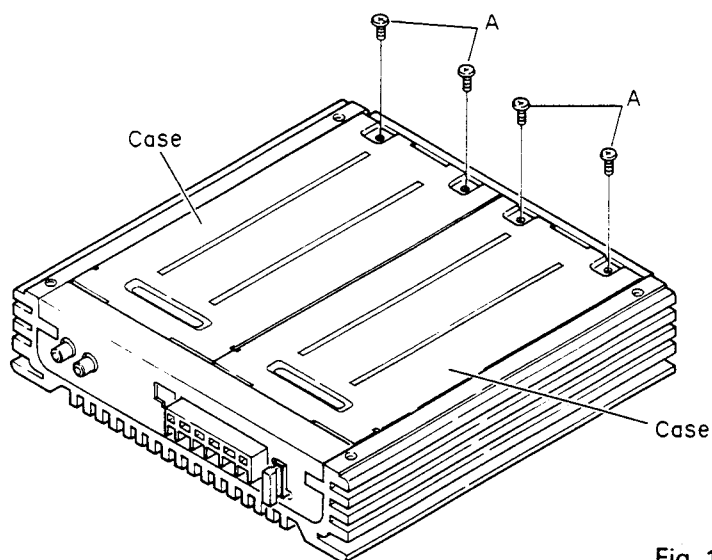


Fig. 1

### ● Remove the Heat Sink

1. Remove the two screws B and remove the front panel.
2. Remove the two screws C and remove the rear panel.
3. Remove the ten screws D and remove the heat sink.

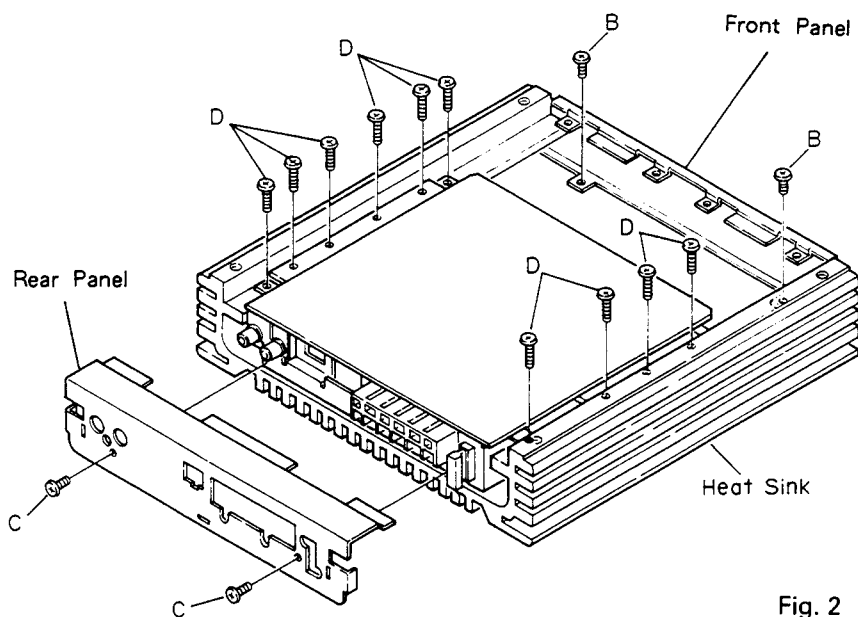


Fig. 2

## 2. CIRCUIT DESCRIPTION

### ● PWM (Pulse Width Modulation) POWER SUPPLY

The PWM power supply is a circuit that maintains stable secondary voltage in a DC-DC converter, regardless of the voltage fluctuation and load fluctuation of the primary voltage.

Former PWM power supply detected and controlled only positive voltage of DC-DC converter. New PWM power supply increases output in the lower range through detecting and controlling both positive and negative voltages and it creates a higher fidelity sound.

Former circuit

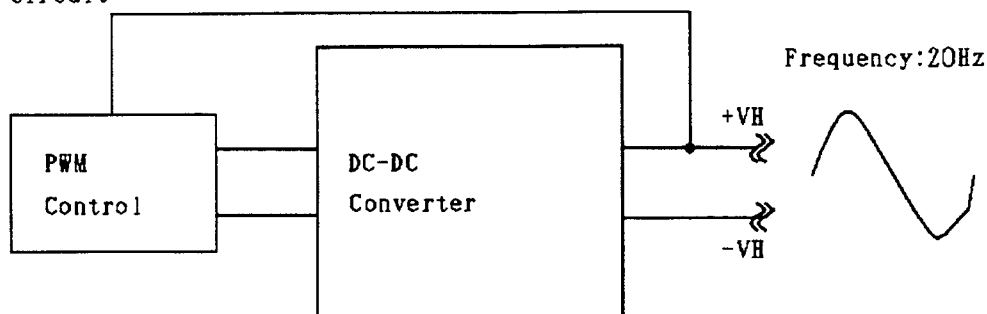


Fig. 3

Former circuit did not detect negative voltage and it created distortions at the lower part as output increases.

New circuit

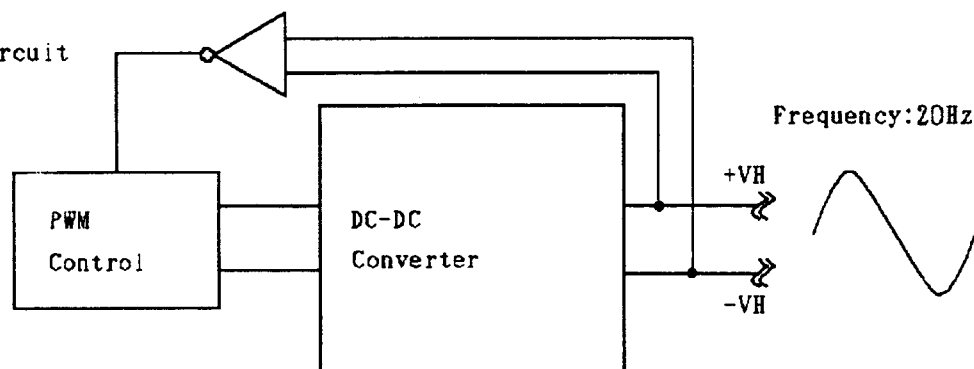


Fig. 4

New circuit detects both positive and negative voltage and it does not create any distortions at the lower part even when output increases.

3. ADJUSTMENT

• Connection Diagram

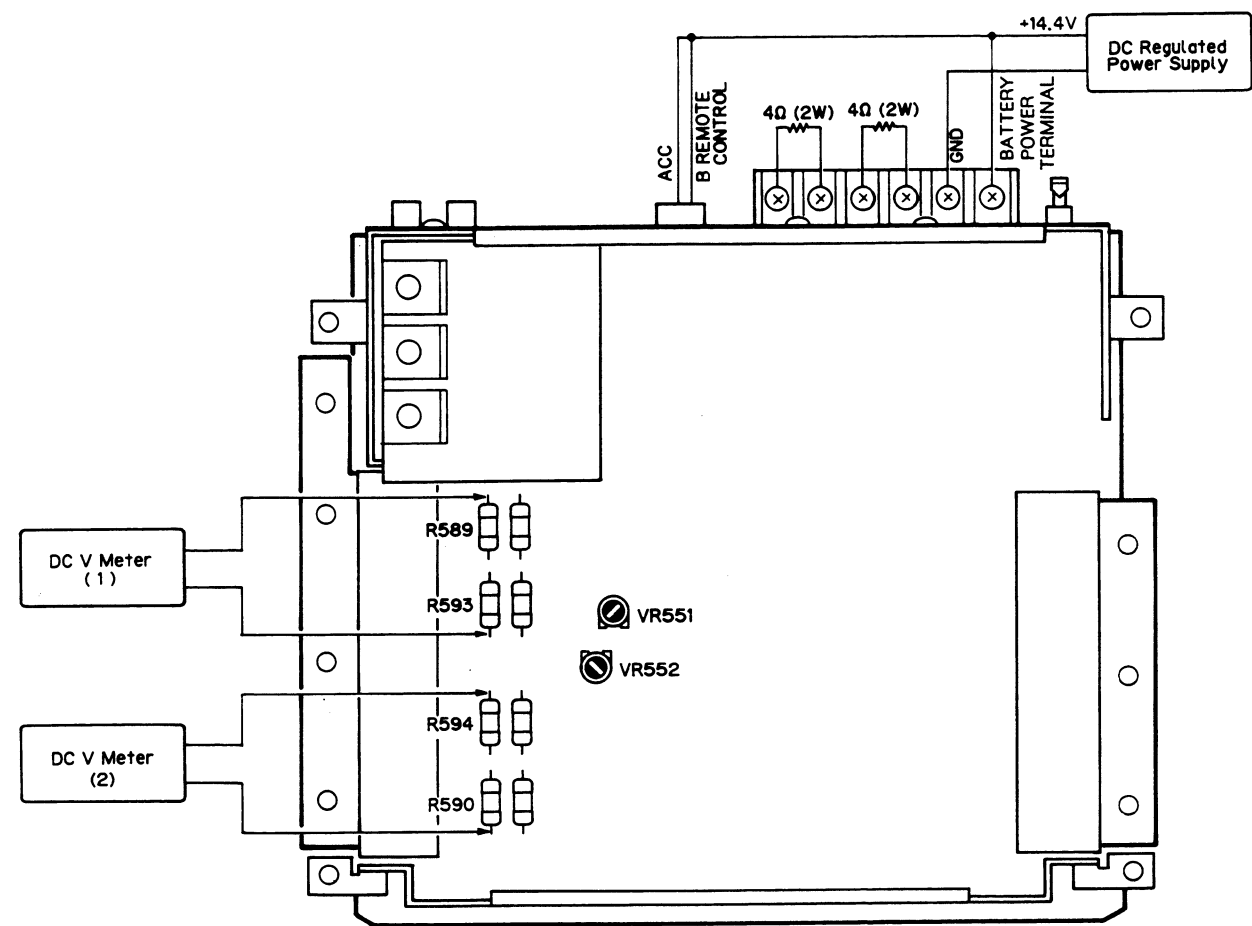


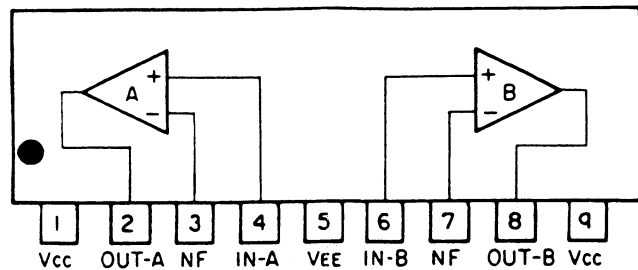
Fig. 5

3.1 IDLE CURRENT ADJUSTMENT

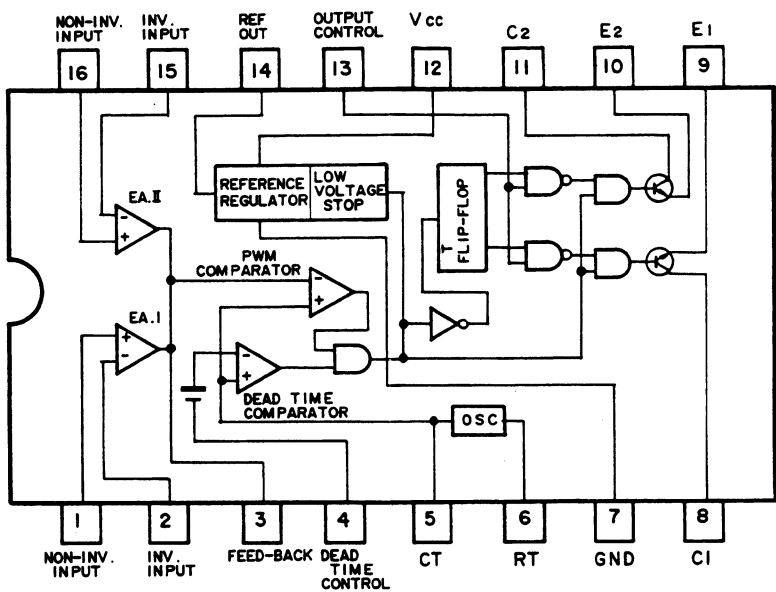
| No. | Adjusting Point | Adjustment Method                                                                      |
|-----|-----------------|----------------------------------------------------------------------------------------|
| 1   |                 | Rotate VR551 and VR552 counterclockwise. Turn the power on, and wait about 10 minutes. |
| 2   | VR551, 552      | DC V Meter: 1.0mV+ 2.3mV<br>- 0.34mV                                                   |

• ICs

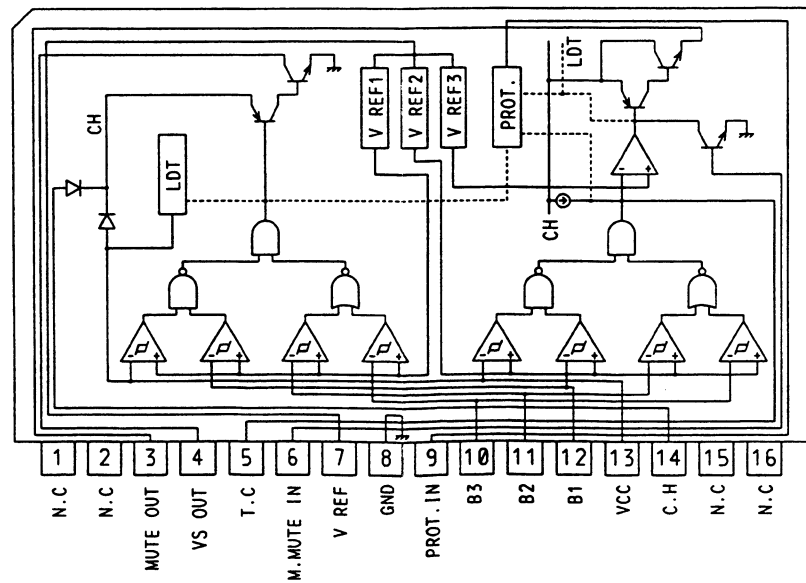
UPC4570HA



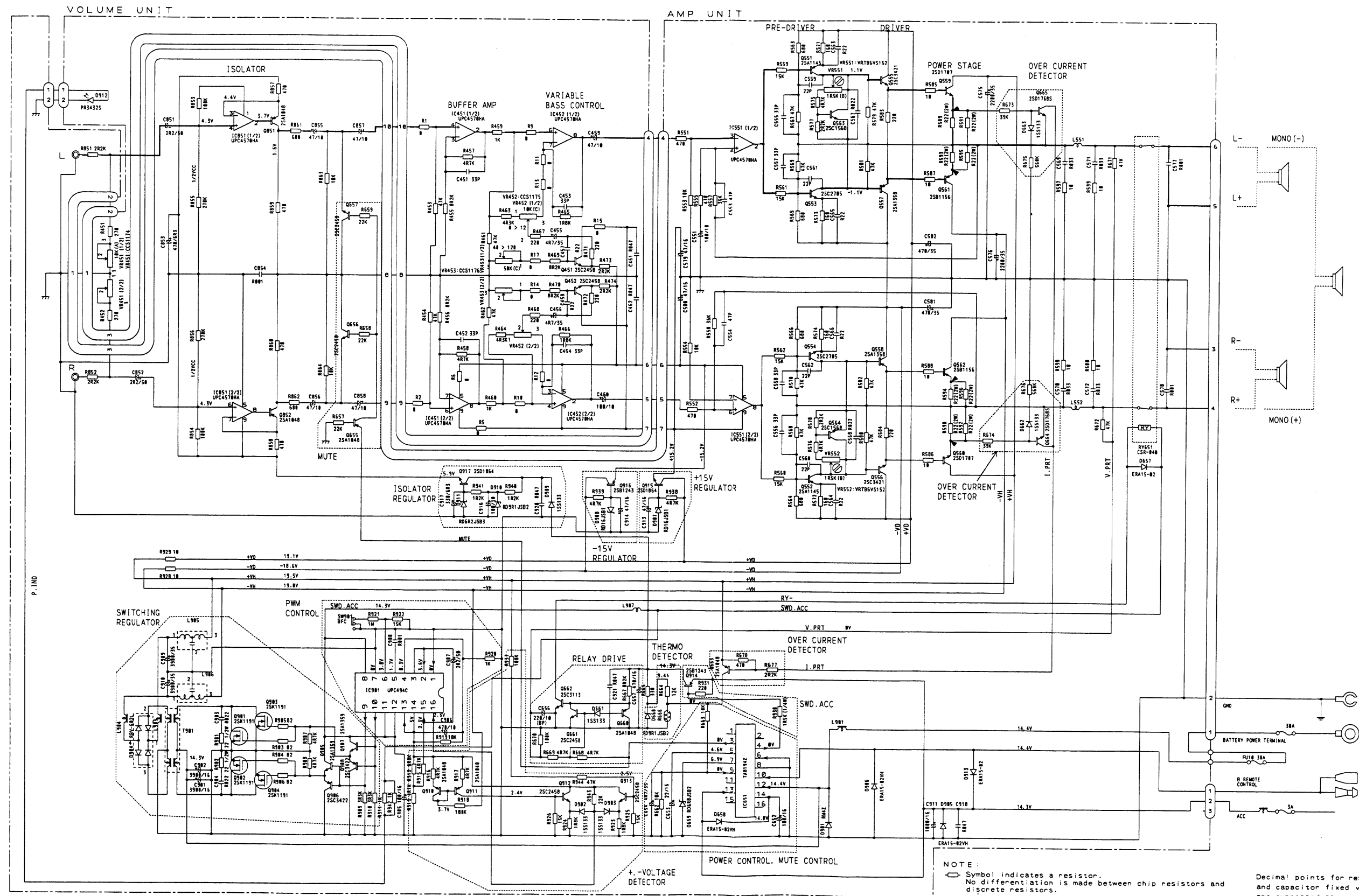
UPC494C



TA8194Z

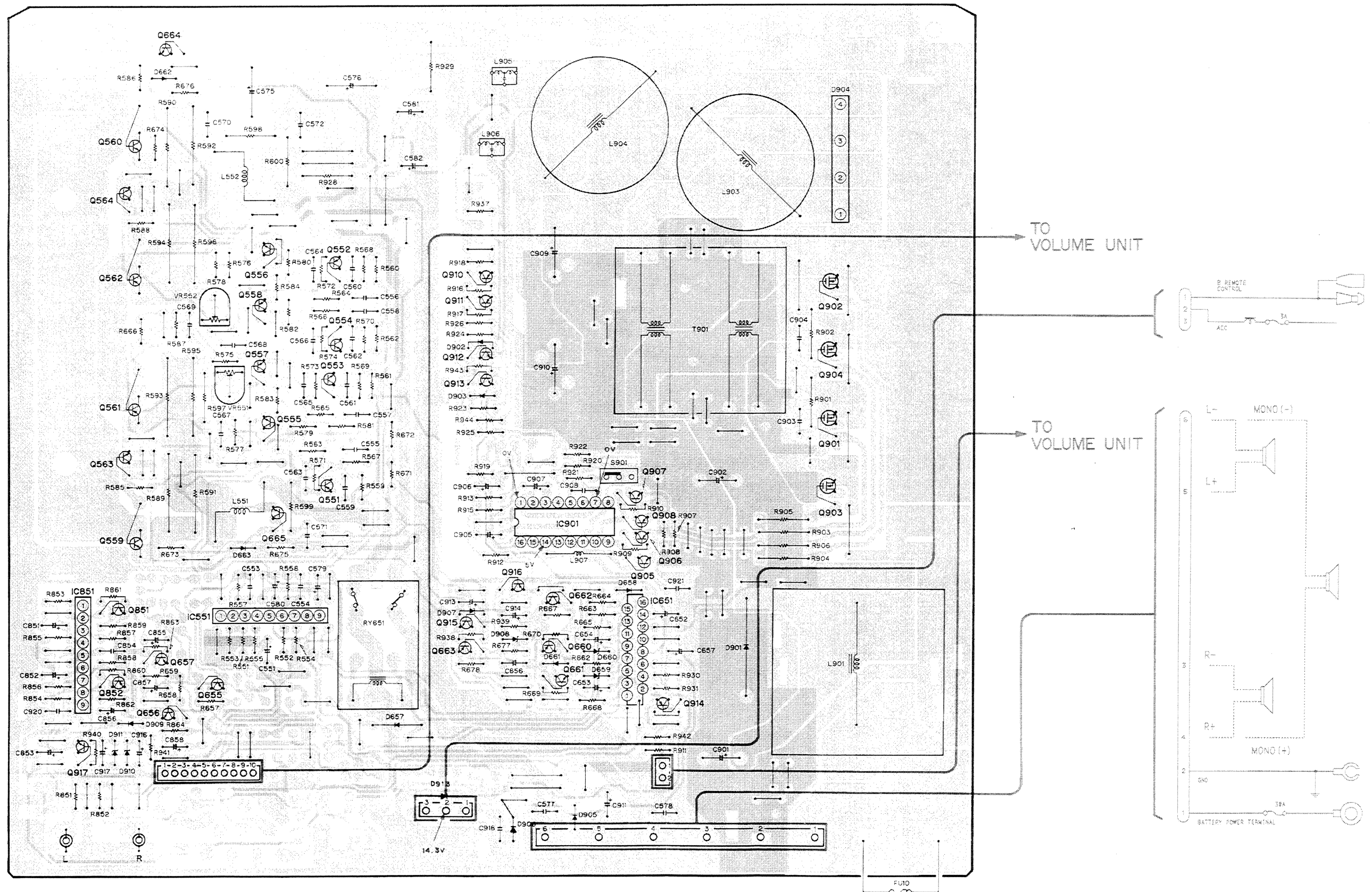


## 4. SCHEMATIC CIRCUIT DIAGRAM (GM-H100/UC)

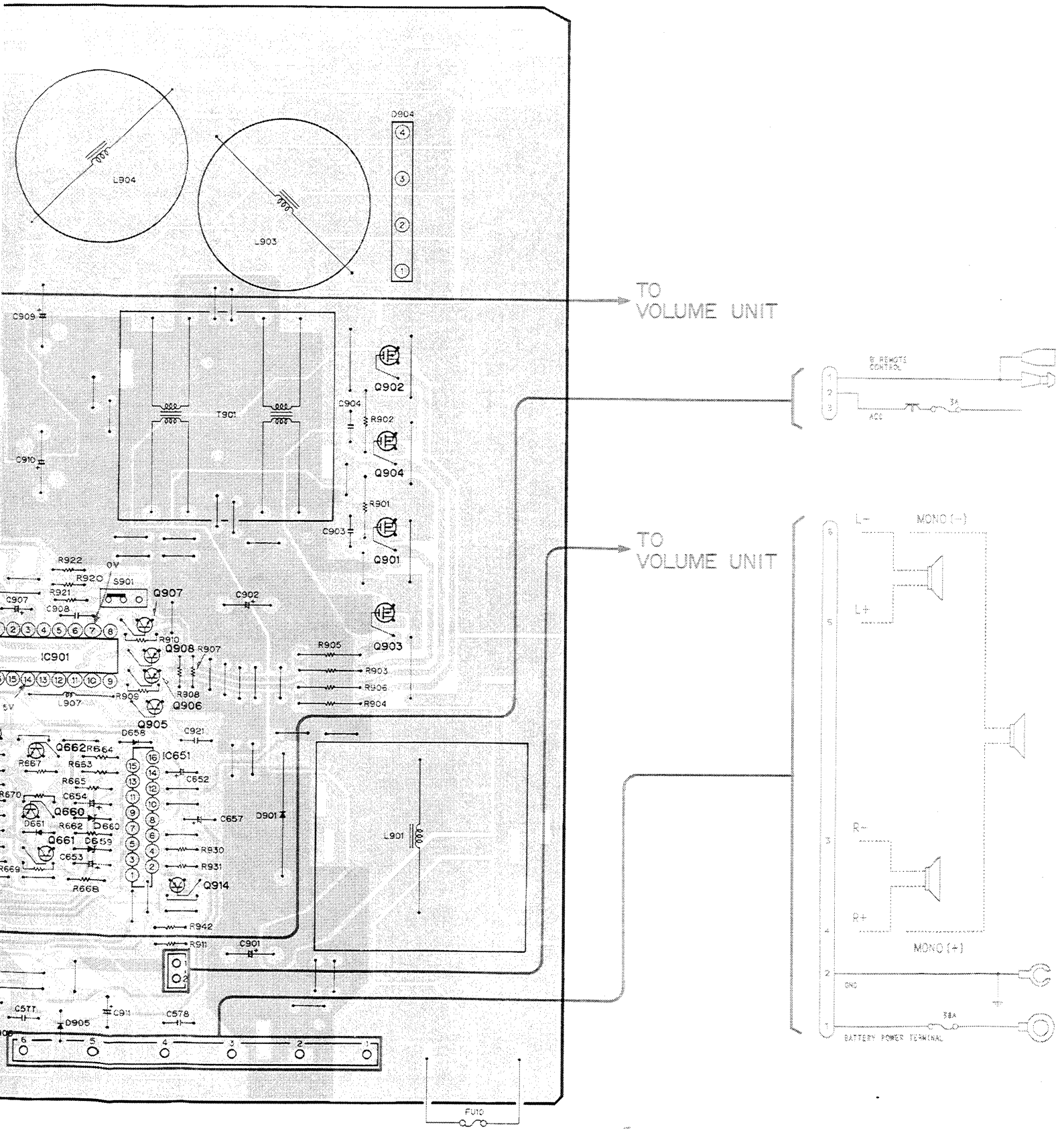


## AMP UNIT

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Q661 Q907 Q914  
301 Q660 Q905 Q908  
316 Q662 IC651 Q906 Q902 Q904  
Q903 Q901



VOLUME UNIT

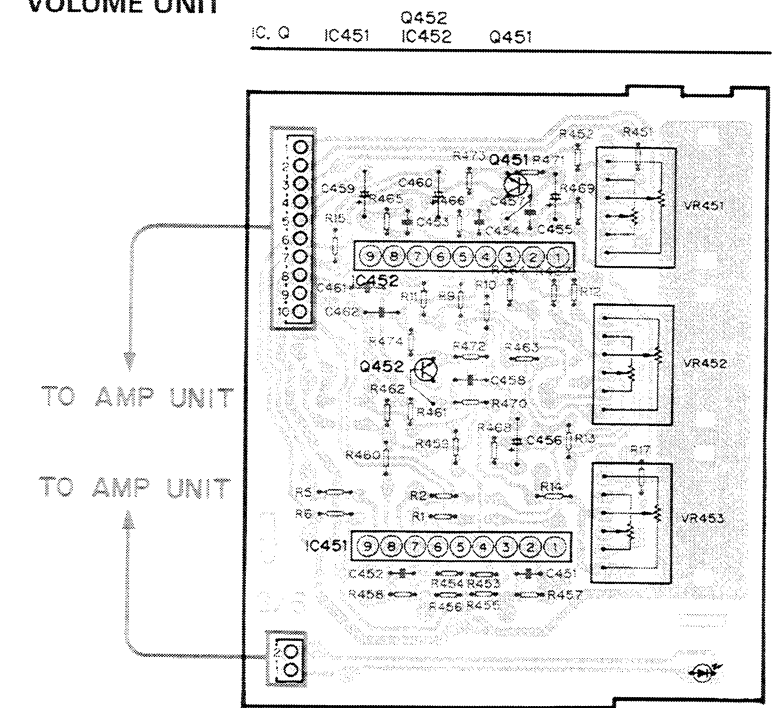


Fig. 7



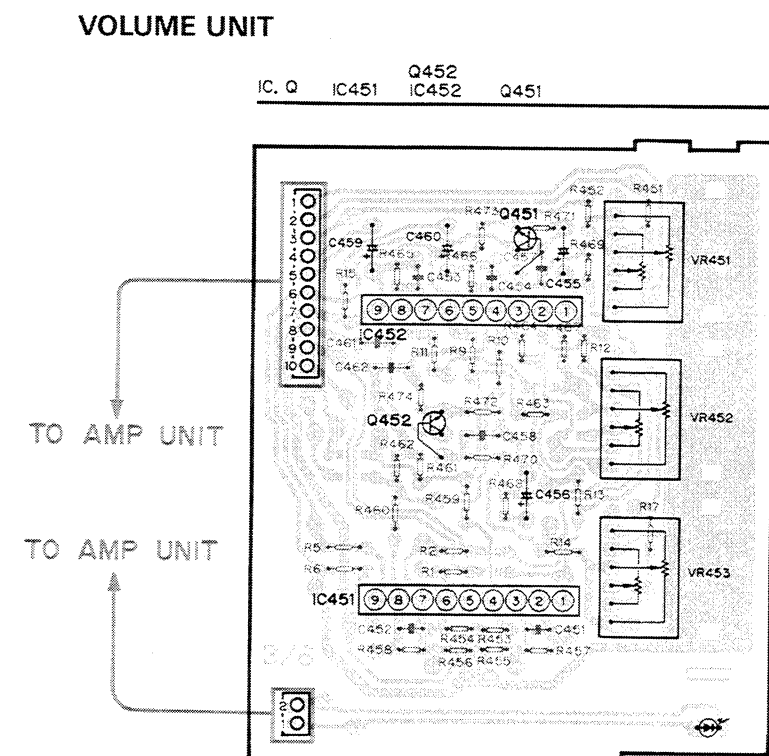
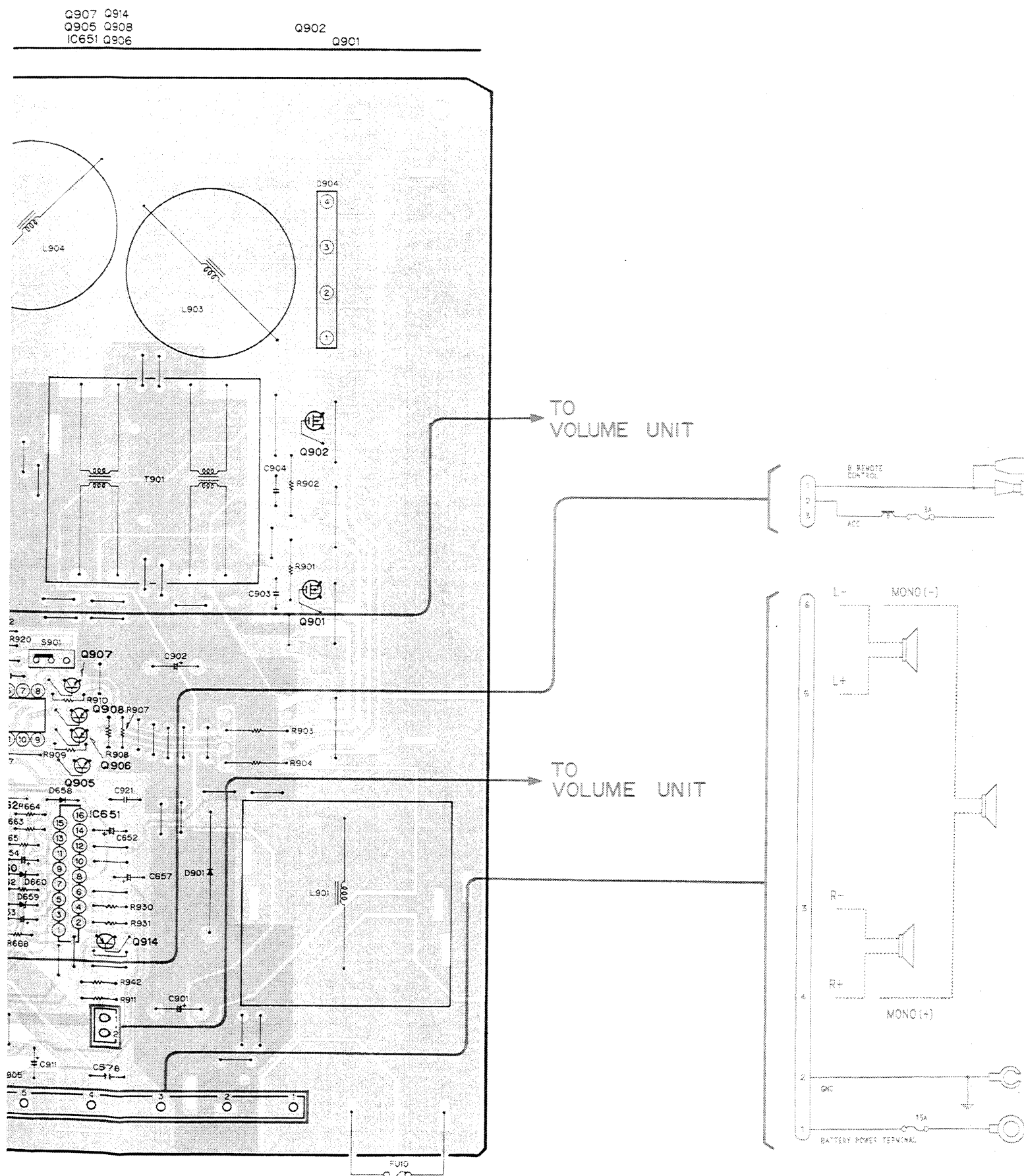


Fig. 8

## 7. SCHEMATIC CIRCUIT DIAGRAM (GM-H50/UC)

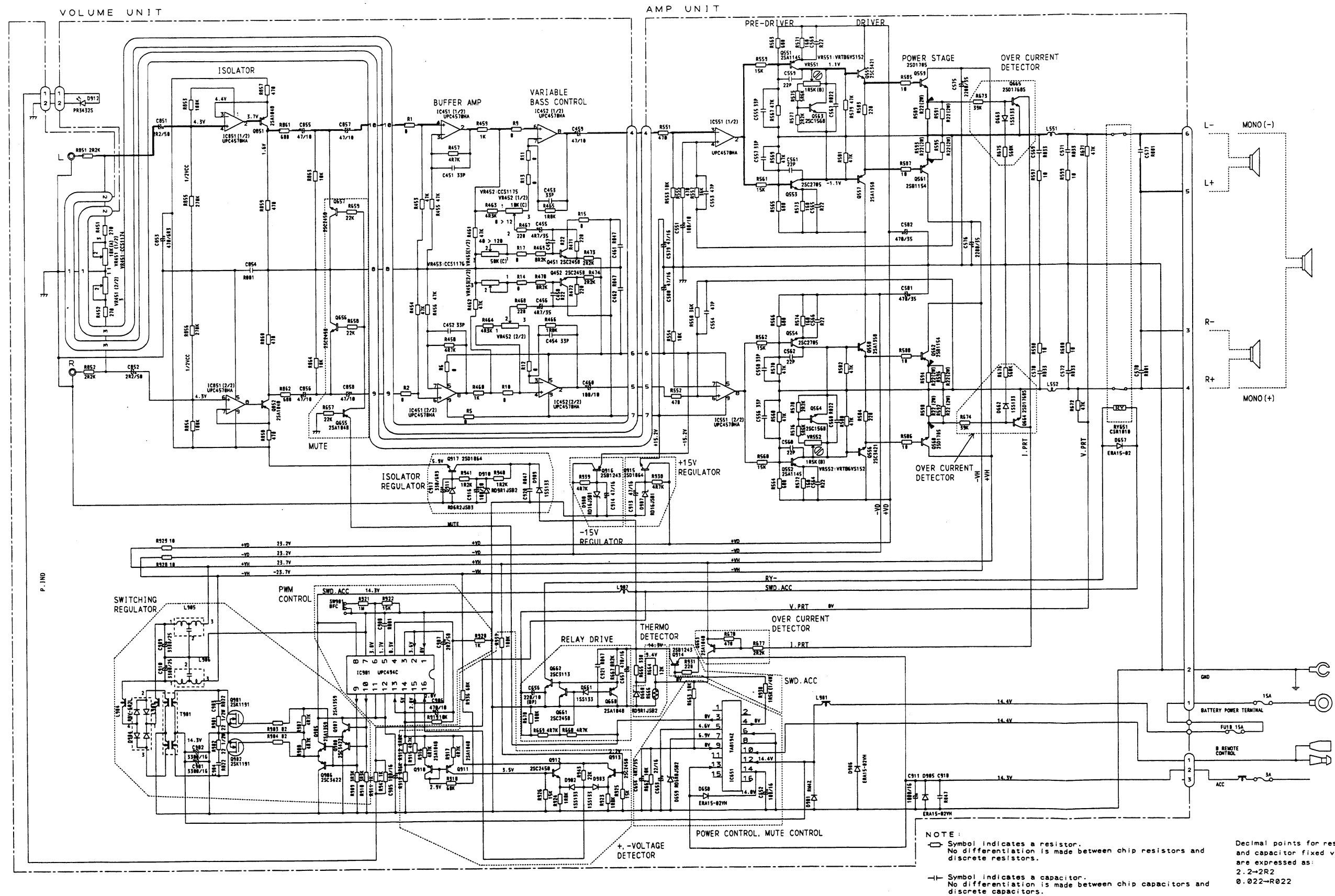


Fig. 9

# 8. EXPLODED VIEW

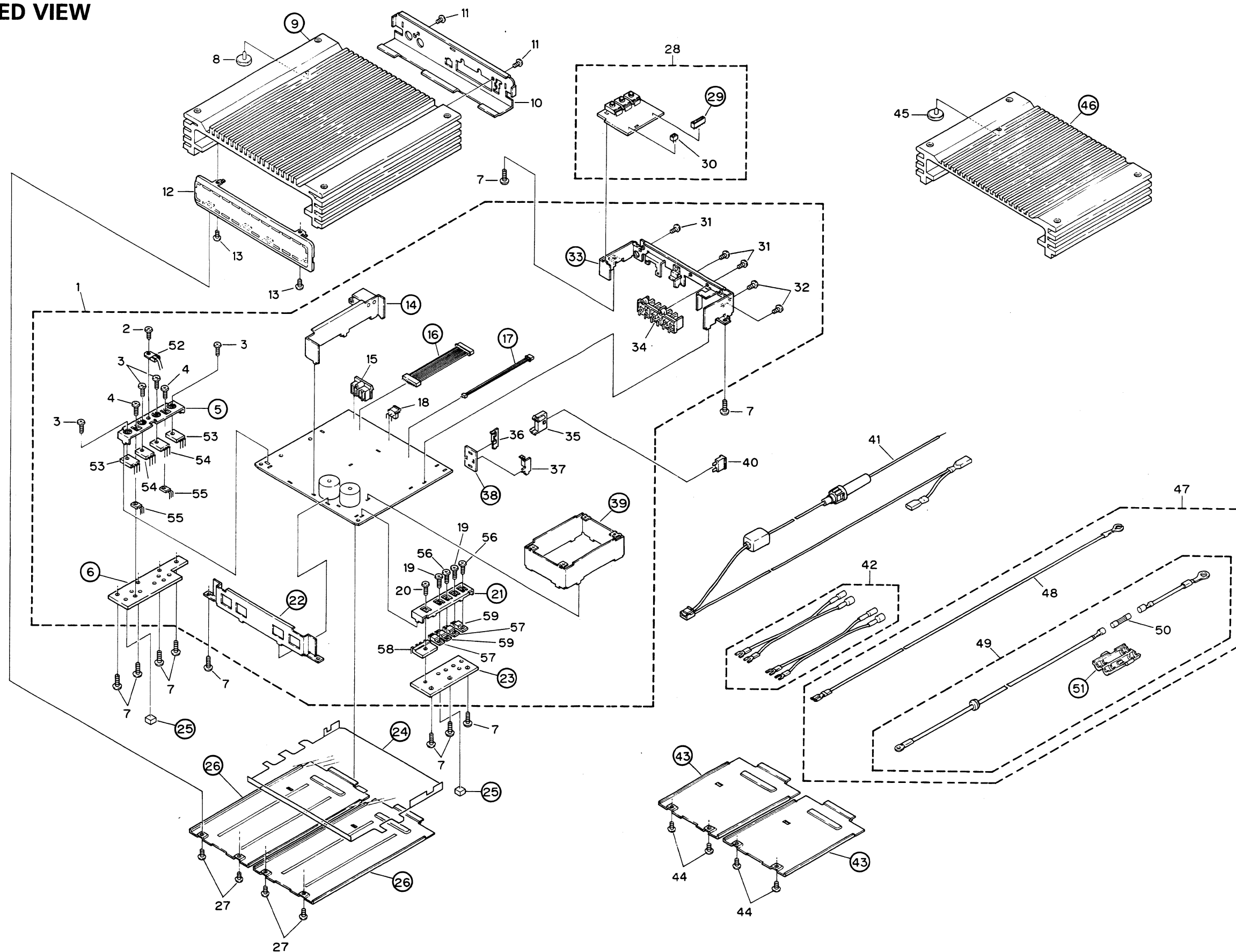


Fig. 10

## ● Parts List

## NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

| Mark No. | Description                 | Part No.           | Mark No. | Description                | Part No.           |
|----------|-----------------------------|--------------------|----------|----------------------------|--------------------|
| ● 1      | Amp Unit (H100)<br>(H50)    | CWH1101<br>CWH1103 | 35       | Fuse Holder                | CKR1001            |
| 2        | Screw                       | BMZ30P050FMC       | 36       | Terminal                   | CNC3549            |
| 3        | Screw                       | BMZ30P100FMC       | 37       | Terminal                   | CNC3548            |
| 4        | Screw                       | BMZ30P100FZK       | 38       | P. C. Board                |                    |
| 5        | Bracket                     |                    | 39       | Holder                     |                    |
| 6        | Heat Sink (H100)<br>(H50)   |                    | 40       | Fuse (H100)<br>(H50)       | CEK1140<br>CEK1137 |
| 7        | Screw                       | BMZ30P100FMC       | 41       | Cord Assy (H100)<br>(H50)  | CDE3309<br>CDE3016 |
| 8        | Lens (H100)                 | CNS2050            | 42       | Cord Assy (H100)<br>(H50)  | CDE3307<br>CDE3018 |
| 9        | Heat Sink (H100)            |                    | 43       | Case (H50)                 |                    |
| 10       | Panel (H100)<br>(H50)       | CNB1391<br>CNB1397 | 44       | Screw (H50)                | BMZ30P040FMC       |
| 11       | Screw                       | PMS30P040FZK       | 45       | Lens (H50)                 | CNS2053            |
| 12       | Panel (H100)<br>(H50)       | CNB1390<br>CNB1394 | 46       | Heat Sink (H50)            |                    |
| 13       | Screw                       | BMZ30P040FMC       | 47       | Cord Assy (H100)<br>(H50)  | CDE3164<br>CDE3030 |
| 14       | Holder                      |                    | 48       | Cord (H100)<br>(H50)       | CDE3025<br>CDE3020 |
| 15       | Jack                        | CKB1006            | 49       | Cord (H100)<br>(H50)       | CDE3163<br>CDE3024 |
| 16       | Connector                   |                    | 50       | Fuse (H100)<br>(H50)       | CEK1117<br>CEK1115 |
| 17       | Connector                   |                    | 51       | Fuse Holder                |                    |
| 18       | Plug                        | CKS1821            | 52       | Thermister (H100)<br>(H50) | CCX1009<br>CCX1010 |
| 19       | Screw                       | BMZ30P080FMC       | 53       | Transistor (H100)<br>(H50) | 2SD1707<br>2SD1705 |
| 20       | Screw                       | BMZ30P080FMC       | 54       | Transistor (H100)<br>(H50) | 2SB1156<br>2SB1154 |
| 21       | Bracket                     |                    | 55       | Transistor                 | 2SC1568            |
| 22       | Holder                      |                    | 56       | Screw (H100)               | BMZ30P080FMC       |
| 23       | Heat Sink                   |                    |          |                            |                    |
| 24       | Insulator                   |                    |          |                            |                    |
| 25       | Spacer (H100)               |                    |          |                            |                    |
| 26       | Case (H100)                 |                    |          |                            |                    |
| 27       | Screw (H100)                | BMZ30P040FMC       |          |                            |                    |
| ● 28     | Volume Unit (H100)<br>(H50) | CWG1024<br>CWG1026 | 57       | FET                        | 2SK1191            |
| 29       | Plug                        |                    | 58       | Diode                      | RBV-602L           |
| 30       | Plug                        | CKS1035            | 59       | FET (H100)                 | 2SK1191            |
| 31       | Screw                       | PPZ30P080FZK       |          |                            |                    |
| 32       | Screw                       | PPZ20P080FZK       |          |                            |                    |
| 33       | Bracket                     |                    |          |                            |                    |
| 34       | Terminal (H100)<br>(H50)    | CKE1016<br>CKE1017 |          |                            |                    |

## 9. PACKING METHOD

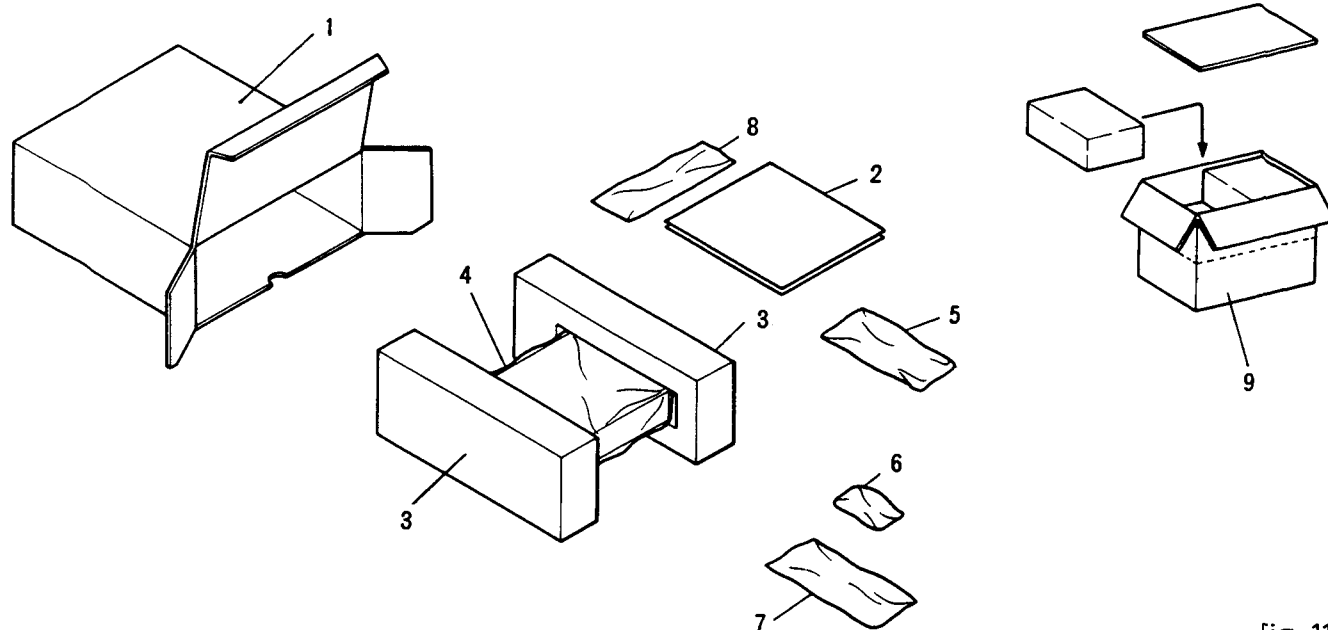


Fig. 11

### ● Parts List

| Mark No. | Description                         | Part No. | Mark No. | Description        | Part No.     |
|----------|-------------------------------------|----------|----------|--------------------|--------------|
| 1        | Carton (H100)                       | CHG1908  | 7-1      | Cord (H100)        | CDE3025      |
|          | Carton (H50)                        | CHG1907  |          | Cord (H50)         | CDE3020      |
| 2-1      | Owner's Manual<br>(English, French) | CRD1430  | 7-2      | Cord (H100)        | CDE3163      |
| 2-2      | Card                                |          |          | Cord (H50)         | CDE3024      |
| 3        | Styrofoam (H100)                    | CHP1380  | 8-1      | Screw Assy         |              |
|          | Styrofoam (H50)                     | CHP1379  | 8-1-1    | Screw (× 4)        | HYC50P650FZK |
| 4        | Polyethylene Bag<br>(H100)          | CEG1026  | 8-2      | .....              |              |
|          | Polyethylene Bag<br>(H50)           | CEG1042  | 8-3      | Cover              | CNS2052      |
| 5        | Cord Assy (H100)                    | CDE3309  | 8-4      | Driver             | CNV2697      |
|          | (H50)                               | CDE3016  | 9        | Contain Box (H100) | CHL1908      |
| 6        | Cord Assy (H100)                    | CDE3307  |          | Contain Box (H50)  | CHL1907      |
|          | Cord Assy (H50)                     | CDE3018  |          |                    |              |
| 7        | Cord Assy (H100)                    | CDE3164  |          |                    |              |
|          | Cord Assy (H50)                     | CDE3030  |          |                    |              |

## 10. ELECTRICAL PARTS LIST

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

### ● GM-H100/UC

Unit Number :

Unit Name : Volume Unit

#### MISCELLANEOUS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name       | Part No.  |
|------|------|----------------------|------|-----------------|-----------|
| IC   | 451  | 452                  |      |                 | UPC4570HA |
| Q    | 451  | 452                  |      |                 | 2SC2458   |
| D    | 912  |                      |      |                 | PR3432S   |
| VR   | 451  |                      |      | Volume 10kΩ (A) | CCS1174   |
| VR   | 452  |                      |      | Volume 10kΩ (C) | CCS1175   |
| VR   | 453  |                      |      | Volume 50kΩ (C) | CCS1176   |

#### RESISTORS

| Mark | ==== | Circuit Symbol & No. | ====                | Part Name | Part No.    |
|------|------|----------------------|---------------------|-----------|-------------|
| R    | 1    | 2                    | 12                  |           | RS1/10S0R0J |
| R    | 5    | 6                    | 9 10 11 13 14 15 17 |           | RS1/8S0R0J  |
| R    | 451  | 452                  |                     |           | RS1/10S271J |
| R    | 453  | 454                  | 461 462             |           | RS1/10S473J |
| R    | 455  | 456                  |                     |           | RS1/10S822J |
| R    | 457  | 458                  |                     |           | RS1/10S472J |
| R    | 459  | 460                  |                     |           | RS1/8S102J  |
| R    | 463  | 464                  |                     |           | RS1/10S432J |
| R    | 465  | 466                  |                     |           | RS1/10S182J |
| R    | 467  | 468                  | 471                 |           | RS1/10S221J |
| R    | 469  |                      |                     |           | RS1/10S822J |
| R    | 470  |                      |                     |           | RS1/8S822J  |
| R    | 472  |                      |                     |           | RS1/8S221J  |
| R    | 473  | 474                  |                     |           | RS1/10S222J |

#### CAPACITORS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No.     |
|------|------|----------------------|------|-----------|--------------|
| C    | 451  | 452 453 454          |      |           | CCSQSL330J50 |
| C    | 455  | 456                  |      |           | CESAS4R7M35  |
| C    | 457  | 458                  |      |           | CKSYF224Z25  |
| C    | 459  |                      |      |           | CESAS470M10  |
| C    | 460  |                      |      |           | CESAS101M10  |
| C    | 461  | 462                  |      |           | CKSYB473K25  |

Unit Number :

Unit Name : Amp Unit

#### MISCELLANEOUS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No.  |
|------|------|----------------------|------|-----------|-----------|
| IC   | 551  | 851                  |      |           | UPC4570HA |
| IC   | 651  |                      |      |           | TA8194Z   |
| IC   | 901  |                      |      |           | UPC494C   |
| Q    | 551  | 552                  |      |           | 2SA1145   |
| Q    | 553  | 554                  |      |           | 2SC2705   |

| Mark | ==== | Circuit Symbol & No.    | ==== | Part Name            | Part No.   |
|------|------|-------------------------|------|----------------------|------------|
| Q    | 555  | 556                     |      |                      | 2SC3421    |
| Q    | 557  | 558                     |      |                      | 2SA1358    |
| Q    | 559  | 560                     |      |                      | 2SD1707    |
| Q    | 561  | 562                     |      |                      | 2SB1156    |
| Q    | 563  | 564                     |      |                      | 2SC1568    |
| Q    | 655  | 660 663 851 852 910 911 |      |                      | 2SA1048    |
| Q    | 656  | 657 661 912 913         |      |                      | 2SC2458    |
| Q    | 662  |                         |      |                      | 2SC3113    |
| Q    | 664  | 665                     |      |                      | 2SD1768S   |
| Q    | 901  | 902 903 904             |      |                      | 2SK1191    |
| Q    | 905  | 907                     |      |                      | 2SA1359    |
| Q    | 906  | 908                     |      |                      | 2SC3422    |
| Q    | 914  | 916                     |      |                      | 2SB1243    |
| Q    | 915  | 917                     |      |                      | 2SD1864    |
| D    | 657  | 913                     |      |                      | ERA15-02   |
| D    | 658  | 905 906                 |      |                      | ERA15-02VH |
| D    | 659  |                         |      |                      | RD6R8JSB2  |
| D    | 660  | 910                     |      |                      | RD9R1JSB2  |
| D    | 661  | 662 663 902 903         |      |                      | 1SS133     |
| D    | 901  |                         |      |                      | RM4Z       |
| D    | 904  |                         |      |                      | RBV-602L   |
| D    | 907  | 908                     |      |                      | RD16JSB1   |
| D    | 909  |                         |      |                      | 1SS133     |
| D    | 911  |                         |      |                      | RD6R2JSB3  |
| L    | 551  | 552                     |      | Coil                 | CTH1028    |
| L    | 901  |                         |      | Choke Coil           | CTH1049    |
| L    | 903  | 904                     |      | Choke Coil           | CTH1027    |
| L    | 905  | 906                     |      |                      | CCG-081    |
| L    | 907  |                         |      | Coil 100μH           | CTF-113    |
| T    | 901  |                         |      | Transformer          | CTT1011    |
| RY   | 651  |                         |      | Relay                | CSR-040    |
| SW   | 901  |                         |      | Switch               | MSH-156    |
| VR   | 551  | 552                     |      | Semi-fixed 1.5kΩ (B) | VRTBVS152  |

#### RESISTORS

| Mark | ==== | Circuit Symbol & No.                | ==== | Part Name | Part No.     |
|------|------|-------------------------------------|------|-----------|--------------|
| R    | 551  | 552 555 678 859 860                 |      |           | RD1/4PS471JL |
| R    | 553  | 554 662 663 863 864                 |      |           | RD1/4PS103JL |
| R    | 557  | 558                                 |      |           | RD1/4PS363JL |
| R    | 559  | 560 561 562 925 926                 |      |           | RD1/4PS153JL |
| R    | 563  | 564 565 566 861 862                 |      |           | RD1/4PS681JL |
| R    | 567  | 568 569 570 579 580 581 582 671 672 |      |           | RD1/4PS473JL |
| R    | 571  | 572 573 574                         |      |           | RD1/4PS161JL |
| R    | 575  | 576                                 |      |           | RD1/4PS472JL |
| R    | 577  | 578 677 851 852                     |      |           | RD1/4PS222JL |
| R    | 583  | 931                                 |      |           | RD1/4PS221JL |

| Mark | ===== | Circuit Symbol & No. | ===== | Part Name | Part No.     |            |     |     |          |              |
|------|-------|----------------------|-------|-----------|--------------|------------|-----|-----|----------|--------------|
| R    | 584   |                      |       |           | RD1/4PS221JL |            |     |     |          |              |
| R    | 585   | 586                  | 588   |           | RD1/4PS100JL |            |     |     |          |              |
| R    | 587   |                      |       |           | RD1/4PS100JL |            |     |     |          |              |
| R    | 589   | 590                  | 591   | 592       | 593          | 594        | 595 | 596 | 0.22Ω/2W | CCM1013      |
| R    | 597   | 598                  | 599   | 600       |              |            |     |     |          | RS1/2P100JL  |
| R    | 657   | 658                  | 659   | 943       |              |            |     |     |          | RD1/4PS223JL |
| R    | 664   |                      |       |           |              |            |     |     |          | RD1/4PS123JL |
| R    | 665   |                      |       |           |              |            |     |     |          | RD1/4PS331JL |
| R    | 666   |                      |       |           |              | Thermister |     |     |          | CCX1009      |
| R    | 667   |                      |       |           |              |            |     |     |          | RD1/4PS822JL |
| R    | 668   | 669                  | 907   | 908       | 915          | 916        | 917 | 938 | 939      | RD1/4PS472JL |
| R    | 670   | 853                  | 854   |           |              |            |     |     |          | RD1/4PS104JL |
| R    | 673   | 674                  |       |           |              |            |     |     |          | RD1/4PS393JL |
| R    | 675   | 676                  |       |           |              |            |     |     |          | RD1/4PS564JL |
| R    | 855   | 856                  |       |           |              |            |     |     |          | RD1/4PS274JL |
| R    | 857   | 858                  |       |           |              |            |     |     |          | RD1/4PS471JL |
| R    | 901   | 902                  |       |           |              |            |     |     |          | RD1/2PS220JL |
| R    | 903   | 904                  | 905   | 906       |              |            |     |     |          | RD1/4PM820J  |
| R    | 909   | 910                  |       |           |              |            |     |     |          | RD1/4PS332JL |
| R    | 911   | 942                  |       |           |              |            |     |     |          | RD1/4PS102JL |
| R    | 912   |                      |       |           |              |            |     |     |          | RD1/4PS682JL |
| R    | 913   |                      |       |           |              |            |     |     |          | RD1/4PS472JL |
| R    | 918   |                      |       |           |              |            |     |     |          | RD1/4PS184JL |
| R    | 919   |                      |       |           |              |            |     |     |          | RD1/4PS183JL |
| R    | 920   |                      |       |           |              |            |     |     |          | RD1/4PS102JL |
| R    | 921   |                      |       |           |              |            |     |     |          | RD1/4PS105JL |
| R    | 922   |                      |       |           |              |            |     |     |          | RN1/4PC1502D |
| R    | 923   | 924                  |       |           |              |            |     |     |          | RD1/4PS182JL |
| R    | 928   | 929                  |       |           |              |            |     |     |          | RD1/4PM100J  |
| R    | 930   |                      |       |           |              |            |     |     |          | RD1/4PS152JL |
| R    | 937   |                      |       |           |              |            |     |     |          | RD1/4PS104JL |
| R    | 940   | 941                  |       |           |              |            |     |     |          | RD1/4PS122JL |
| R    | 944   |                      |       |           |              |            |     |     |          | RD1/4PS473JL |

## CAPACITORS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No.     |
|------|------|----------------------|------|-----------|--------------|
| C    | 551  |                      |      |           | CEZA101M10   |
| C    | 553  | 554                  |      |           | CCPSL470J50L |
| C    | 555  | 556                  | 557  | 558       | CCPSL330J50L |
| C    | 559  | 560                  | 561  | 562       | CCPSL220J50L |
| C    | 563  | 564                  | 565  | 566       | CQFAH224J50L |
| C    | 567  | 568                  |      |           | CQFAH223J50L |
| C    | 569  | 570                  | 571  | 572       | CQFA333J50L  |
| C    | 575  | 576                  |      |           | CCH1024      |
| C    | 577  | 578                  |      |           | CKCYB102K50  |
| C    | 579  | 580                  | 913  | 914       | CEA470M16L2  |
| C    | 581  | 582                  |      |           | CEA471M35L2  |
| C    | 652  | 905                  |      |           | CEA101M16L2  |
| C    | 653  |                      |      |           | CEA220M16L2  |
| C    | 654  |                      |      |           | CEA4R7M35L2  |
| C    | 656  |                      |      |           | CCH1036      |
| C    | 657  |                      |      |           | 470 μF/16V   |
| C    | 851  | 852                  |      |           | CCH-114      |
| C    | 853  |                      |      |           | CEZA2R2M50   |
| C    | 854  |                      |      |           | CEA471M6R3L2 |
| C    | 855  | 856                  | 857  | 858       | CKPYB102K50L |
| C    |      |                      |      |           | CEZA470M10   |
| C    | 901  | 902                  |      |           | 3900 μF/16V  |
| C    | 903  | 904                  |      |           | CCH1025      |
| C    | 906  |                      |      |           | CQMA223J50   |
| C    | 907  |                      |      |           | CEA471M10L2  |
| C    | 908  |                      |      |           | CEA2R2M50L2  |
| C    |      |                      |      |           | CQPA102J2A   |

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name   | Part No.     |
|------|------|----------------------|------|-------------|--------------|
| C    | 909  | 910                  |      | 3900 μF/35V | CCH1088      |
| C    | 911  |                      |      |             | CEA102M16L2  |
| C    | 916  |                      |      |             | CEA101M10L2  |
| C    | 917  |                      |      |             | CEA331M6R3L2 |
| C    | 918  | 920                  | 921  |             | CKCYF473Z50  |

## Miscellaneous Parts List

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No. |
|------|------|----------------------|------|-----------|----------|
| FU   | 10   |                      |      | Fuse 30A  | CEK1140  |

## ● GM-H50/UC

Unit Number :  
Unit Name : Volume Unit

## MISCELLANEOUS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name       | Part No.  |
|------|------|----------------------|------|-----------------|-----------|
| IC   | 451  | 452                  |      |                 | UPC4570HA |
| Q    | 451  | 452                  |      |                 | 2SC2458   |
| D    | 912  |                      |      |                 | PR3432S   |
| VR   | 451  |                      |      | Volume 10kΩ (A) | CCS1174   |
| VR   | 452  |                      |      | Volume 10kΩ (C) | CCS1175   |
| VR   | 453  |                      |      | Volume 50kΩ (C) | CCS1176   |

## RESISTORS

| Mark | ===== | Circuit Symbol & No. |     |     |    |    |    |    |    |  |  | ==== | Part Name   | Part No. |             |
|------|-------|----------------------|-----|-----|----|----|----|----|----|--|--|------|-------------|----------|-------------|
| R    | 1     | 2                    | 12  |     |    |    |    |    |    |  |  |      |             |          | RS1/11S0R0J |
| R    | 5     | 6                    | 9   | 10  | 11 | 13 | 14 | 15 | 17 |  |  |      | RS1/8S0R0J  |          |             |
| R    | 451   | 452                  |     |     |    |    |    |    |    |  |  |      | RS1/11S271J |          |             |
| R    | 453   | 454                  | 461 | 462 |    |    |    |    |    |  |  |      | RS1/11S473J |          |             |
| R    | 455   | 456                  |     |     |    |    |    |    |    |  |  |      | RS1/11S473J |          |             |
| R    | 457   | 458                  |     |     |    |    |    |    |    |  |  |      | RS1/11S472J |          |             |
| R    | 459   | 460                  |     |     |    |    |    |    |    |  |  |      | RS1/8S102J  |          |             |
| R    | 463   | 464                  |     |     |    |    |    |    |    |  |  |      | RS1/11S432J |          |             |
| R    | 465   | 466                  |     |     |    |    |    |    |    |  |  |      | RS1/11S182J |          |             |
| R    | 467   | 468                  | 471 |     |    |    |    |    |    |  |  |      | RS1/11S221J |          |             |
| R    | 469   |                      |     |     |    |    |    |    |    |  |  |      | RS1/11S822J |          |             |
| R    | 470   |                      |     |     |    |    |    |    |    |  |  |      | RS1/8S22J   |          |             |
| R    | 472   |                      |     |     |    |    |    |    |    |  |  |      | RS1/8S221J  |          |             |
| R    | 473   | 474                  |     |     |    |    |    |    |    |  |  |      | RS1/11S222J |          |             |

## CAPACITORS

| Mark | =====           | Circuit | Symbol & No. | ===== | Part Name | Part No.     |
|------|-----------------|---------|--------------|-------|-----------|--------------|
| C    | 451 452 453 454 |         |              |       |           | CCSQS3 30J50 |
| C    | 455 456         |         |              |       |           | CESASIR 7M35 |
| C    | 457 458         |         |              |       |           | CKSYF12 4Z25 |
| C    | 459             |         |              |       |           | CESASIR 0M10 |
| C    | 460             |         |              |       |           | CESASO 1M10  |
| C    | 461 462         |         |              |       |           | CKSYB17 3K25 |

Unit Number :  
Unit Name : Amp Unit

## MISCELLANEOUS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No.   |
|------|------|----------------------|------|-----------|------------|
| IC   | 551  | 551                  |      |           | UPC450 #1A |
| IC   | 651  |                      |      |           | TA819Z     |
| IC   | 901  |                      |      |           | UPC49C     |
| Q    | 551  | 552                  |      |           | 2SA1115    |
| Q    | 553  | 554                  |      |           | 2SC2715    |

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name                    | Part No.   |
|------|------|----------------------|------|------------------------------|------------|
| Q    | 555  | 556                  |      |                              | 2SC3421    |
| Q    | 557  | 558                  |      |                              | 2SA1358    |
| Q    | 559  | 560                  |      |                              | 2SD1705    |
| Q    | 561  | 562                  |      |                              | 2SB1154    |
| Q    | 563  | 564                  |      |                              | 2SC1568    |
| Q    | 655  | 660                  | 663  | 851 852 910 911              | 2SA1048    |
| Q    | 656  | 657                  | 661  | 912 913                      | 2SC2458    |
| Q    | 662  |                      |      |                              | 2SC3113    |
| Q    | 664  | 665                  |      |                              | 2SD1768S   |
| Q    | 901  | 902                  |      |                              | 2SK1191    |
| Q    | 905  | 907                  |      |                              | 2SA1359    |
| Q    | 906  | 908                  |      |                              | 2SC3422    |
| Q    | 914  | 916                  |      |                              | 2SB1243    |
| Q    | 915  | 917                  |      |                              | 2SD1864    |
| D    | 657  |                      |      |                              | ERA15-02   |
| D    | 658  | 905                  | 906  |                              | ERA15-02VH |
| D    | 659  |                      |      |                              | RD6R8JSB2  |
| D    | 660  | 910                  |      |                              | RD9R1JSB2  |
| D    | 661  | 662                  | 663  | 902 903                      | 1SS133     |
| D    | 901  |                      |      |                              | RM4Z       |
| D    | 904  |                      |      |                              | RBV-602L   |
| D    | 907  | 908                  |      |                              | RD16JSB1   |
| D    | 909  |                      |      |                              | 1SS133     |
| D    | 911  |                      |      |                              | RD6R2JSB3  |
| L    | 551  | 552                  |      | Coil                         | CTH1028    |
| L    | 901  |                      |      | Choke Coil                   | CTH1031    |
| L    | 903  | 904                  |      | Choke Coil                   | CTH1036    |
| L    | 905  | 906                  |      |                              | CCG-081    |
| L    | 907  |                      |      | Coil 100 $\mu$ H             | CTF-113    |
| T    | 901  |                      |      | Transformer                  | CTT1012    |
| RY   | 651  |                      |      | Relay                        | CSR1010    |
| SW   | 901  |                      |      | Switch                       | HSH-156    |
| VR   | 551  | 552                  |      | Semi-fixed 1.5k $\Omega$ (B) | VRTB6VS152 |

## RESISTORS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name                             | Part No.     |
|------|------|----------------------|------|---------------------------------------|--------------|
| R    | 551  | 552                  | 555  | 678 859 860                           | RD1/4PS471JL |
| R    | 553  | 554                  | 662  | 663 863 864                           | RD1/4PS103JL |
| R    | 557  | 558                  |      |                                       | RD1/4PS363JL |
| R    | 559  | 560                  | 561  | 562 925 926                           | RD1/4PS153JL |
| R    | 563  | 564                  | 565  | 566 861 862                           | RD1/4PS681JL |
| R    | 567  | 568                  | 569  | 570 579 580 581 582 671 672           | RD1/4PS473JL |
| R    | 571  | 572                  | 573  | 574                                   | RD1/4PS161JL |
| R    | 575  | 576                  |      |                                       | RD1/4PS562JL |
| R    | 577  | 578                  | 677  | 851 852                               | RD1/4PS222JL |
| R    | 583  | 931                  |      |                                       | RD1/4PS221JL |
| R    | 584  |                      |      |                                       | RD1/4PS221JL |
| R    | 585  | 586                  | 588  |                                       | RD1/4PS100JL |
| R    | 587  |                      |      |                                       | RD1/4PS100JL |
| R    | 589  | 590                  | 591  | 592 593 594 595 596 0.22 $\Omega$ /2W | CCN1013      |
| R    | 597  | 598                  | 599  | 600                                   | RS1/2P100JL  |
| R    | 657  | 658                  | 659  | 943                                   | RD1/4PS223JL |
| R    | 664  |                      |      |                                       | RD1/4PS123JL |
| R    | 665  |                      |      |                                       | RD1/4PS331JL |
| R    | 666  |                      |      | Thermister                            | CCX1010      |
| R    | 667  |                      |      |                                       | RD1/4PS822JL |
| R    | 668  | 669                  | 907  | 908 915 916 917 938 939               | RD1/4PS472JL |
| R    | 670  | 853                  | 854  |                                       | RD1/4PS104JL |
| R    | 673  | 674                  |      |                                       | RD1/4PS393JL |
| R    | 675  | 676                  |      |                                       | RD1/4PS564JL |
| R    | 855  | 856                  |      |                                       | RD1/4PS274JL |

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No.     |
|------|------|----------------------|------|-----------|--------------|
| R    | 857  | 858                  |      |           | RD1/4PS471JL |
| R    | 901  | 902                  |      |           | RD1/2PS220JL |
| R    | 903  | 904                  |      |           | RD1/4PM820J  |
| R    | 909  | 910                  |      |           | RD1/4PS332JL |
| R    | 911  | 942                  |      |           | RD1/4PS102JL |
| R    | 912  |                      |      |           | RD1/4PS682JL |
| R    | 913  |                      |      |           | RD1/4PS562JL |
| R    | 918  |                      |      |           | RD1/4PS683JL |
| R    | 919  |                      |      |           | RD1/4PS183JL |
| R    | 920  |                      |      |           | RD1/4PS102JL |
| R    | 921  |                      |      |           | RD1/4PS105JL |
| R    | 922  |                      |      |           | RM1/4PC1502D |
| R    | 923  | 924                  |      |           | RD1/4PS182JL |
| R    | 928  | 929                  |      |           | RD1/4PM100J  |
| R    | 930  |                      |      |           | RD1/4PS152JL |
| R    | 936  |                      |      |           | RD1/4PS683JL |
| R    | 937  |                      |      |           | RD1/4PS104JL |
| R    | 940  | 941                  |      |           | RD1/4PS122JL |

## CAPACITORS

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name        | Part No.     |
|------|------|----------------------|------|------------------|--------------|
| C    | 551  |                      |      |                  | CEZA101M10   |
| C    | 553  | 554                  |      |                  | CCPSL470J50L |
| C    | 555  | 556                  | 557  | 558              | CCPSL330J50L |
| C    | 559  | 560                  | 561  | 562              | CCPSL220J50L |
| C    | 563  | 564                  | 565  | 566              | CQFAH224J50L |
| C    | 567  | 568                  |      |                  | CQFAH223J50L |
| C    | 569  | 570                  | 571  | 572              | CQFA333J50L  |
| C    | 575  | 576                  |      | 2200 $\mu$ F/35V | CCN1024      |
| C    | 577  | 578                  |      |                  | CKCYB102K50  |
| C    | 579  | 580                  | 913  | 914              | CEA470M16L2  |
| C    | 581  | 582                  |      |                  | CEA471M35L2  |
| C    | 652  | 905                  |      |                  | CEA101M16L2  |
| C    | 653  |                      |      |                  | CEA220M16L2  |
| C    | 654  |                      |      |                  | CEA47M35L2   |
| C    | 656  |                      |      | 220 $\mu$ F/10V  | CCN1036      |
| C    | 657  |                      |      | 470 $\mu$ F/16V  | CCN-114      |
| C    | 851  | 852                  |      |                  | CEA2R2M50    |
| C    | 853  |                      |      |                  | CEA471M6R3L2 |
| C    | 854  |                      |      |                  | CKPYB102K50L |
| C    | 855  | 856                  | 857  | 858              | CEA470M10    |
| C    | 901  | 902                  |      |                  | CCN1023      |
| C    | 903  | 904                  |      |                  | CQMA223J50   |
| C    | 906  |                      |      |                  | CEA471M10L2  |
| C    | 907  |                      |      |                  | CEA2R2M50L2  |
| C    | 908  |                      |      |                  | CQPA102J2A   |
| C    | 909  | 910                  |      |                  | CCN1087      |
| C    | 911  |                      |      |                  | CEA102M16L2  |
| C    | 916  |                      |      |                  | CEA101M10L2  |
| C    | 917  |                      |      |                  | CEA331M6R3L2 |
| C    | 918  | 920                  | 921  |                  | CKCYF473Z50  |

## Miscellaneous Parts List

| Mark | ==== | Circuit Symbol & No. | ==== | Part Name | Part No. |
|------|------|----------------------|------|-----------|----------|
| FU   | 10   |                      |      | Fuse 15A  | CEK1137  |

## 11. CONNECTING THE UNITS

Connect the components as shown in the diagram.

- Before finalizing installation, turn everything on, and make sure everything works correctly and that no noise is getting into the system.
- When routing leads and cords, secure them with cable retainers and electrician's adhesive tape. Also, to prevent any damage to the insulation on the leads and cords, protect them with electrician's adhesive tape wherever they may touch sharp edges.
- Keep all wiring away from hot surfaces or heater outlets to prevent short circuits.
- It is recommended that the speakers connected to the amplifier have the ratings shown below, or higher. If a speaker has a rating below that recommended, it may be damaged when the volume is turned up. The speaker impedance must be 2 to 8 ohms.

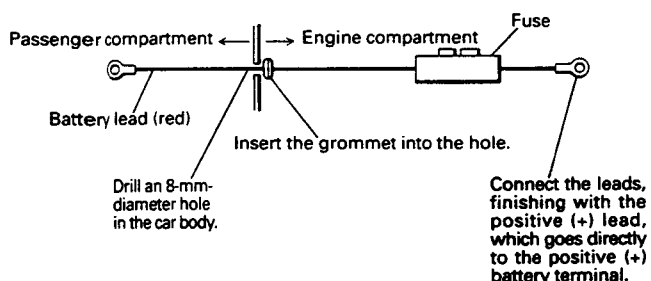
| Mode        |         | Speaker ratings |        |
|-------------|---------|-----------------|--------|
|             |         | GM-H100         | GM-H50 |
| Two-channel | Maximum | 100 W           | 50 W   |
|             | Nominal | 50 W            | 25 W   |
| One-channel | Maximum | 320 W           | 160 W  |
|             | Nominal | 160 W           | 80 W   |

In the case of a full-range speaker, use one whose maximum rating is higher than the maximum rating shown. In the case of a sub-woofer, use one whose nominal rating is higher than the nominal rating shown.

- Never connect a speaker lead to ground or to other speaker grounds. The protection circuitry will operate instantaneously, turning off the amplifier.
- To prevent noise problems, keep the power leads to the amplifier away from the signal cords (RCA cords) and speaker leads. Also, keep the power leads away from any antenna cords.
- Amplifier ground leads (black) should be connected to a solid metal part of the vehicle body. If using multiple amplifiers, connect all amplifier ground leads to the same point to prevent noise problems. To get good contact when grounding, you may have to sand away the paint to expose the metal underneath.
- To operate the amplifier and car stereo properly, connect the battery lead and the accessory power lead (red) correctly. If the leads are not connected correctly or are not connected at all, the amplifier and car stereo will not work.

### Connecting the battery lead (red)

Route the battery lead (red) from the engine compartment to the passenger compartment to connect it to the amplifier. To prevent a short circuit, do not connect the positive (+) lead of the battery until the other leads have been connected.



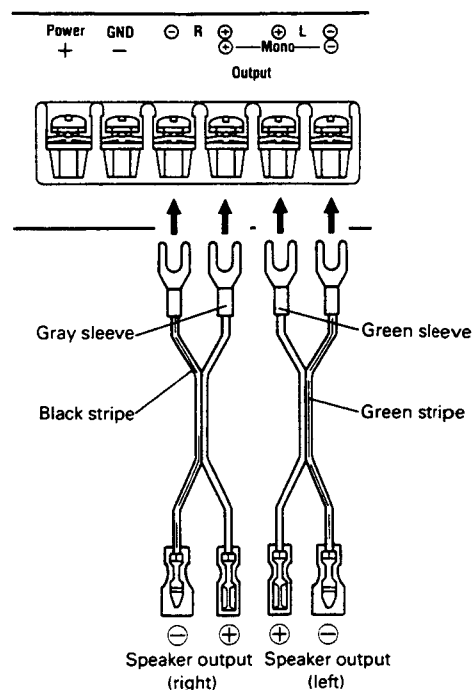
## Connecting the leads (supplied)

### Connecting the speaker leads

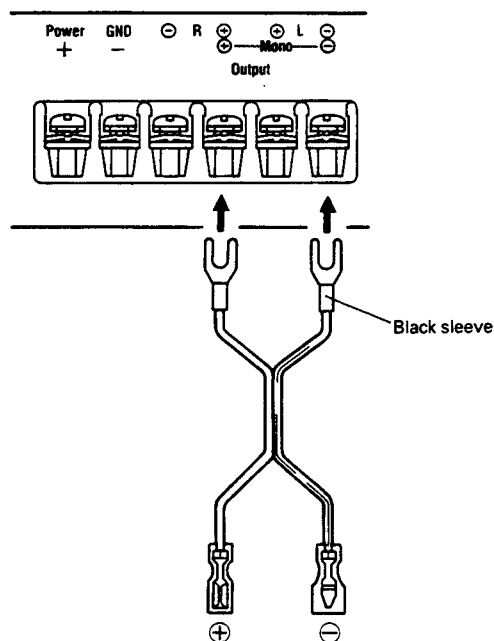
The speaker output mode can be two-channel (stereo), one-channel (mono), or three-channel (stereo + mono). Connect the speaker leads to suit the mode. To connect the speaker leads to the speaker terminals of the amplifier, see the connection diagram for each channel. Be careful with the polarity (+ and -), and with which channel is which (left [L] and right [R]).

- If the amplifier is used in three-channel mode, inductors and capacitors are needed. For more information, see "Three-channel mode (stereo + mono)".

### Two-channel mode (stereo)



### One-channel mode (mono)

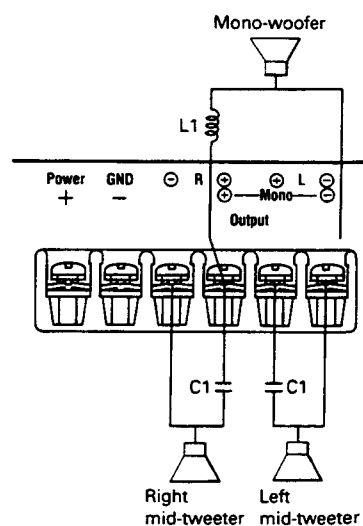


### Three-channel mode (stereo + mono)

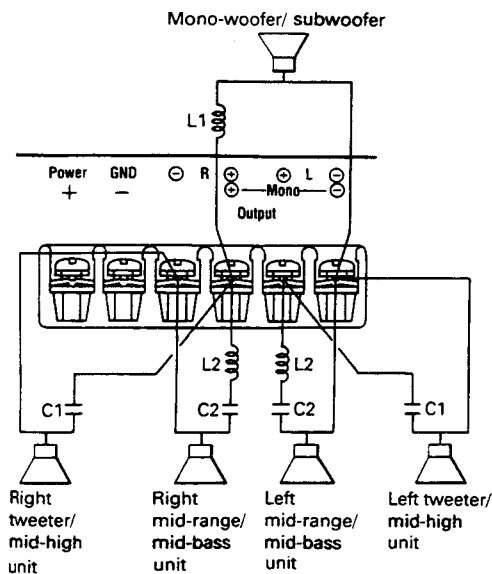
The power amplifier is basically a two-channel/one-channel bridgeable amplifier, but three channels can be catered for by combining the stereo and mono modes using inductors and capacitors. Some typical examples are given below.

- As making this connection does require a knowledge of electronics, get it done by your dealer or by someone specializing in such work.

#### Example 1 Three-channel, two-way system



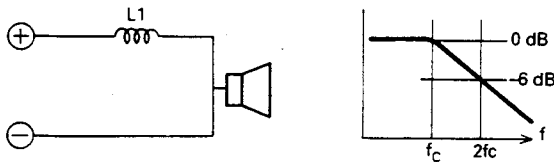
## Example 2 Three-channel, three-way system



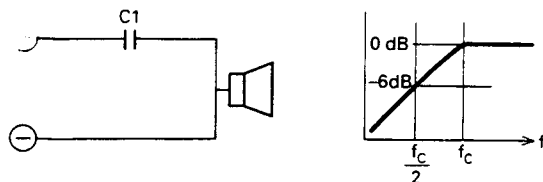
- The inductor (L1 or L2 in the diagram) acts as a low-pass filter. The capacitor (C1 or C2 in the diagram) acts as a high-pass filter. In three-channel mode, connect the inductor (L) to the woofer / subwoofer, and the capacitor (C) to the mid-tweeter / tweeter / mid-high unit.
- The filters (low-pass and high-pass) must be used in three-channel mode, otherwise the total load will be  $2\Omega$  or less, and the amplifier may fail, even if the speaker impedance is  $4\Omega$ .
- If the inductors and capacitors are connected to the speaker leads, secure or solder them so they cannot be pulled loose. Tape the joints to prevent short circuits.

## Setting the filter constant

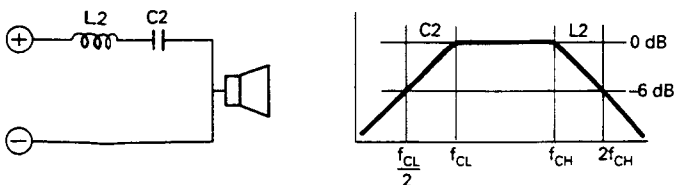
### ① Low-pass filter (for subwoofer/woofer): 6 dB/octave



### ② High-pass filter (for mid-tweeter/mid-high-tweeter): 6 dB/octave



### ③ Band-pass filter (combination of low-pass filter and high-pass filter for mid-bass/mid): 6 dB/octave



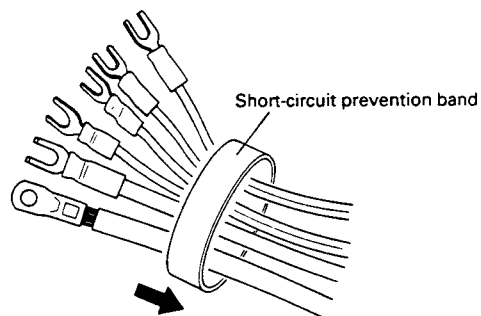
## Component Guide

| Speaker load impedance | 2Ω     |        | 4Ω     |        | 8Ω     |        |
|------------------------|--------|--------|--------|--------|--------|--------|
| fc (Hz)                | L (mH) | C (μF) | L (mH) | C (μF) | L (mH) | C (μF) |
| 50                     | 6.4    | 1600   | 12.7   | 800    | 25.5   | 400    |
| 80                     | 4.0    | 1000   | 8.0    | 500    | 16     | 250    |
| 125                    | 2.5    | 560    | 5.1    | 300    | 10     | 160    |
| 200                    | 1.6    | 400    | 3.2    | 200    | 6.4    | 100    |
| 320                    | 1.0    | 250    | 2.0    | 125    | 4      | 62     |
| 500                    | 0.64   | 160    | 1.3    | 80     | 2.6    | 40     |
| 800                    | 0.4    | 100    | 0.8    | 50     | 1.6    | 25     |
| 1250                   | 0.25   | 64     | 0.5    | 30     | 1.0    | 16     |
| 2000                   | 0.16   | 40     | 0.3    | 20     | 0.64   | 10     |
| 3200                   | 0.1    | 25     | 0.2    | 12.5   | 0.4    | 6.2    |
| 5000                   | 0.06   | 16     | 0.13   | 8      | 0.26   | 4      |
| 8000                   | 0.04   | 10     | 0.08   | 5      | 0.16   | 2.5    |
| 10000                  | 0.03   | 8      | 0.06   | 4      | 0.13   | 2      |

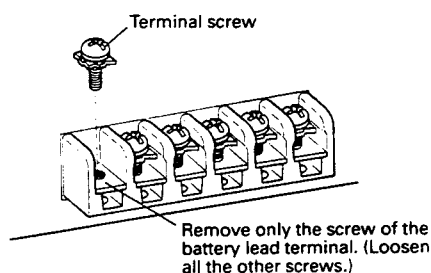
- A multi-channel system can be set up using a combination of filters ①, ②, and ③. The inductance (L) and capacitance (C) that determine the frequency (fc) applicable to the system should be chosen according to the above table.
- Use the capacitors specified. Non-polarized capacitors rated at over  $\pm 25V$  should be used for C1 and C2 in the diagram.

## Connection procedure for speaker, battery, and ground leads

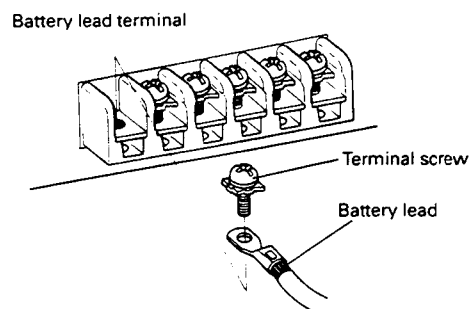
1. Pass the leads through the band for preventing short circuits.
  - This band *must* be used.



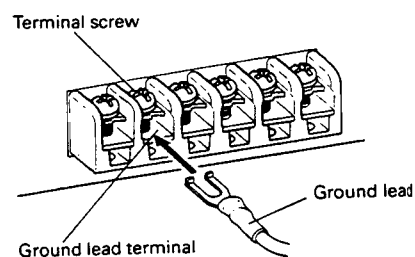
2. Loosen the screws of the terminals on the rear panel, and remove the screw of the battery lead terminal. (Loosen all the other screws.)



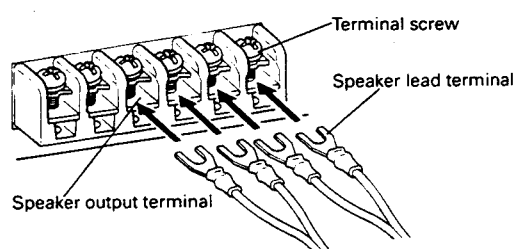
3. Connect the battery lead to the battery lead terminal, reinserting and tightening the screw.



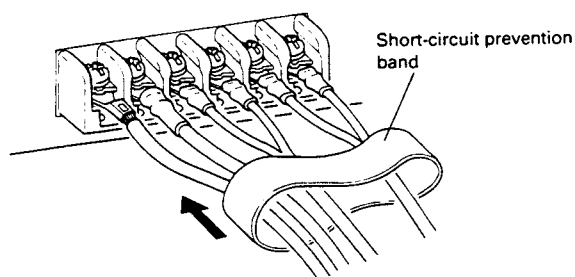
4. Connect the ground lead to the ground lead terminal, tightening the screw.

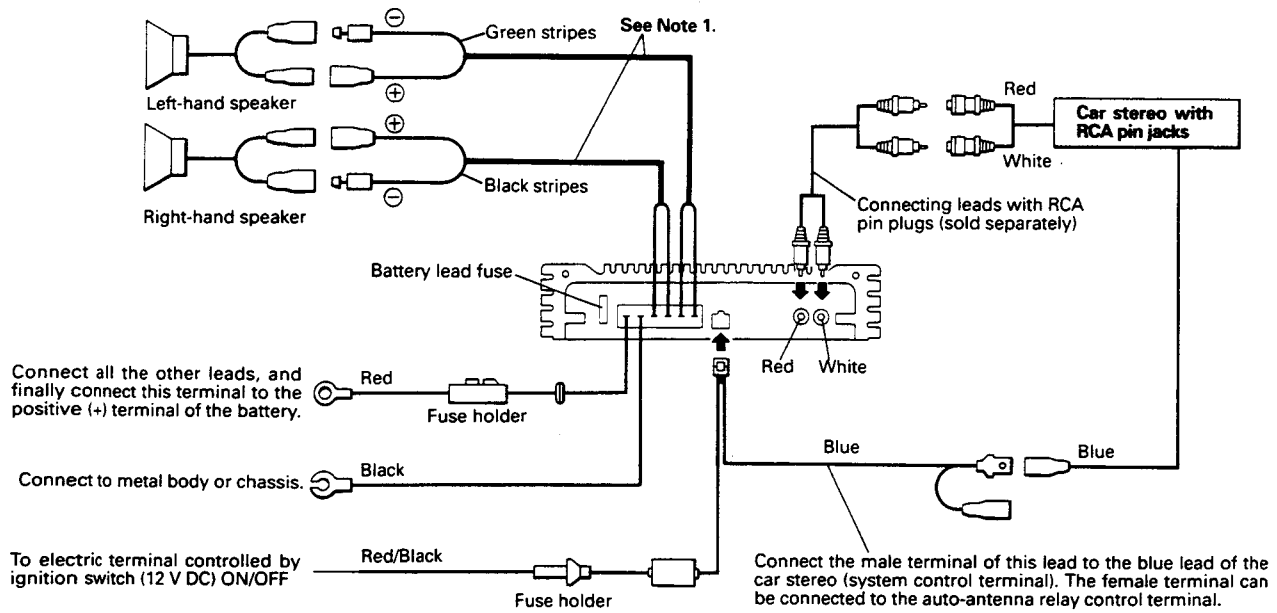


5. Arrange the speaker leads to suit the output mode to be used, connecting them to the speaker output terminals, and tightening the screws.



6. Slide the short-circuit prevention band over the terminals.

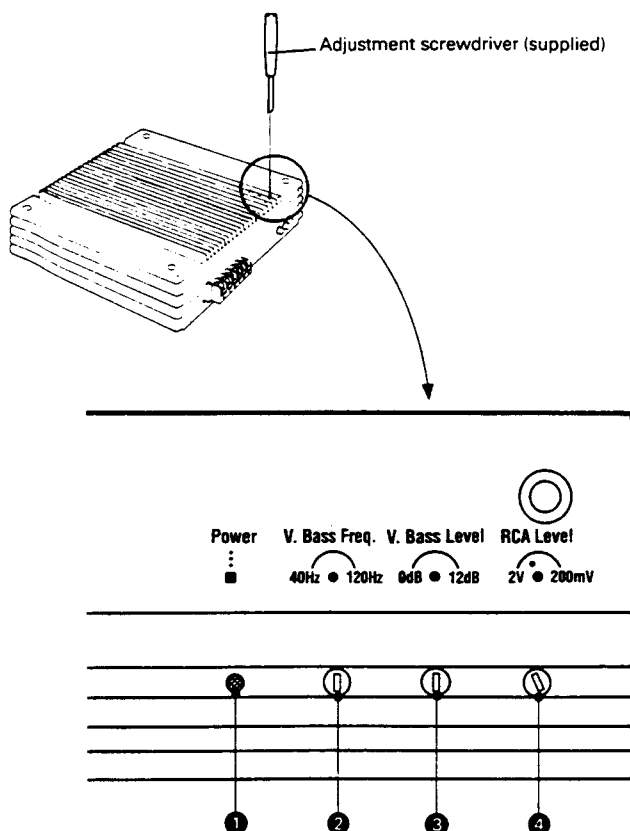




**Note 1:**

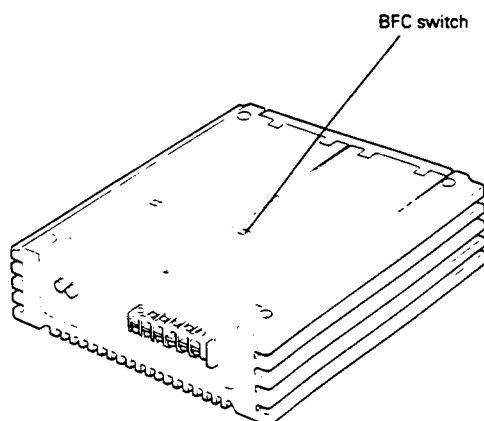
The speaker leads are connected differently depending on whether the output mode is three-channel, two-channel, or one-channel. This connection diagram shows how to wire up the amplifier for two-channel mode.

## 12. CONTROLS AND THEIR USE



### BFC (Beat Frequency Control) switch

If beating is heard when listening to AM stations on your car radio, change the position of the BFC switch on the bottom of the amplifier with a small flat-bladed screwdriver.



### ① Power Indicator

The power indicator lights when the power is switched on.

### ② Variable Bass Frequency Control

Adjusting the variable bass frequency control changes the boostable bass frequency of the amplifier. You can select a frequency in the range 40 to 120 Hz. Adjust the boostable bass frequency to suit the speakers or the music.

### ③ Variable Bass Level Control

Adjusting the variable bass level control changes the level of the boostable bass frequency set by control ②.

- If you do not want to boost the bass, turn the control fully counterclockwise to 0 dB.

### ④ RCA Input Level Control

If the output is low even when the volume of the car stereo is turned up, turn this control clockwise. If there is distortion when the volume of the car stereo is turned up, turn this control counterclockwise.

- Adjust controls ②, ③, and ④ with the supplied adjustment screwdriver. Keep the screwdriver in case you need to readjust the controls later.
- No change in low-frequency sounds may be noticeable when the 40-to-120-Hz frequency level is adjusted if the program source does not contain components in the 40-to-120-Hz range or if small-diameter speakers are used.