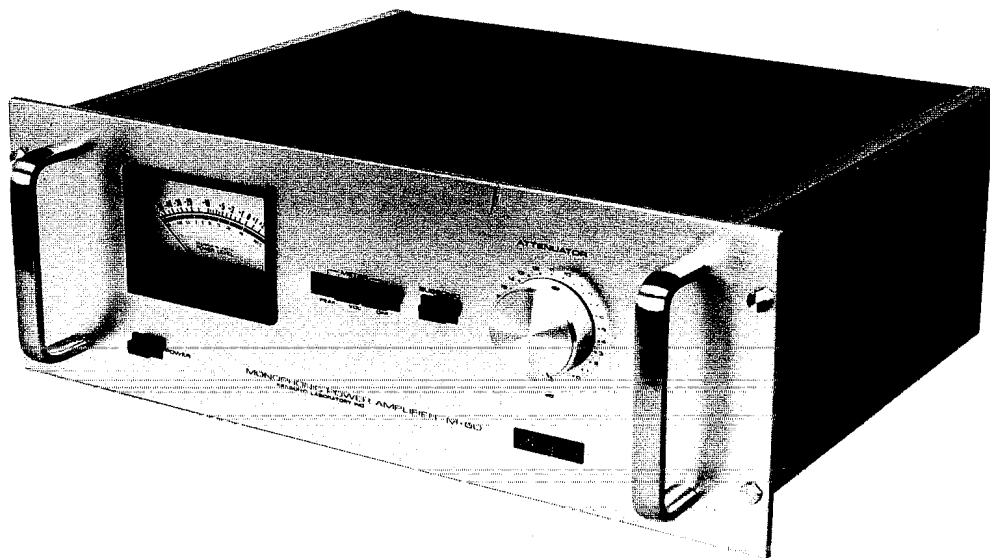


Accuphase

MONOPHONIC POWER AMPLIFIER M-60



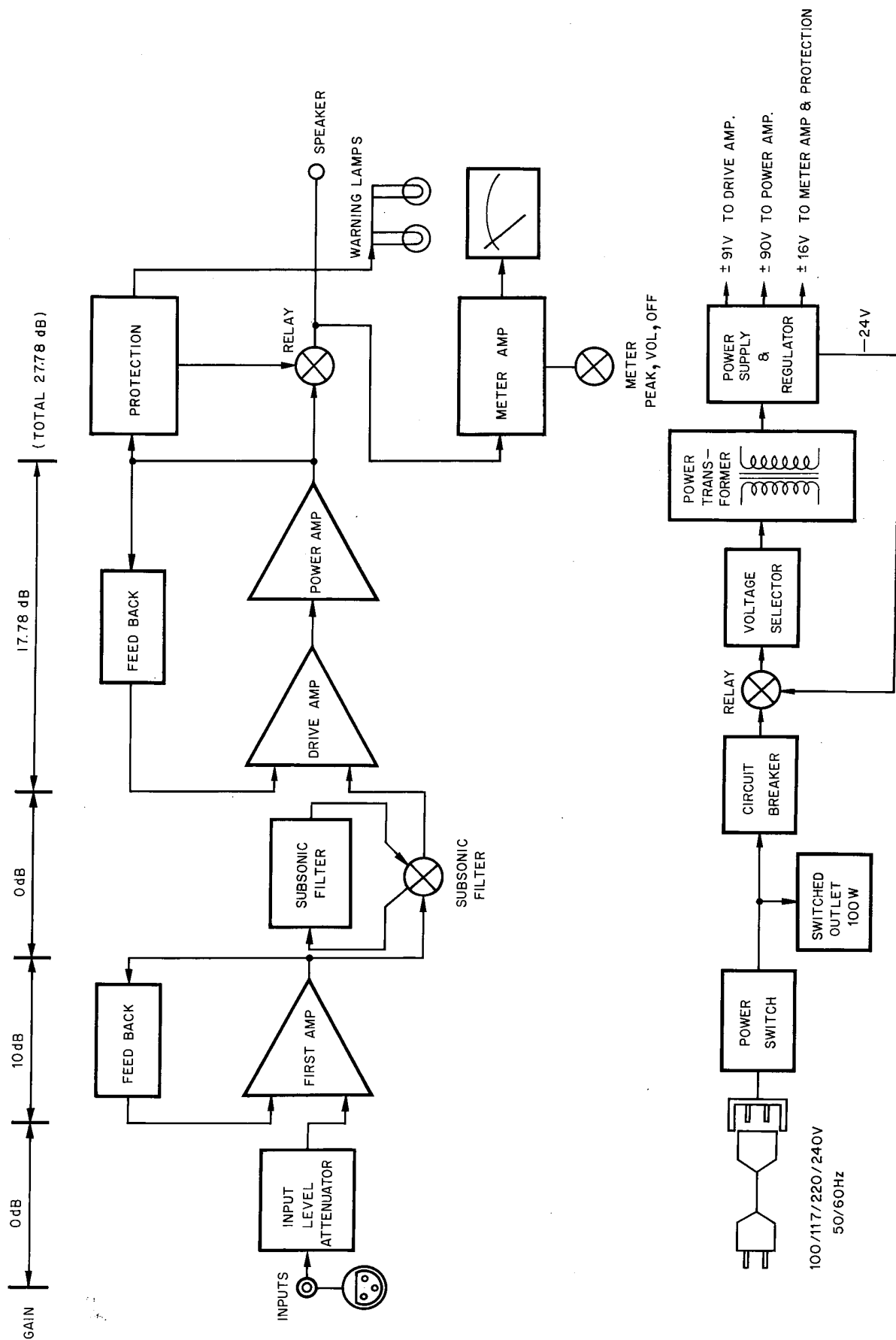
Service Information

STARTING WITH SERIAL NO. G5Y001

TABLE OF CONTENTS

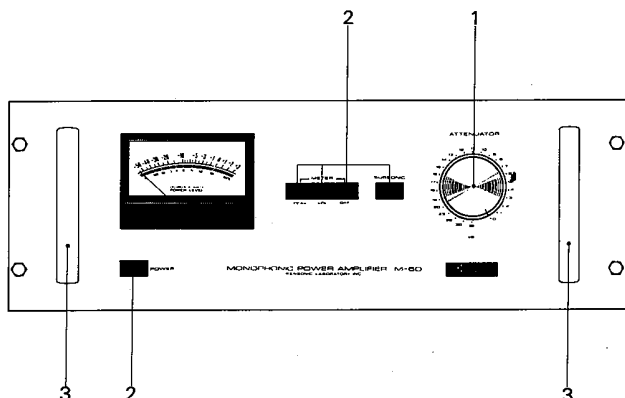
| | |
|---|--------|
| BLOCK DIAGRAM..... | 1 |
| EXTERNAL VIEW..... | 2 |
| HOW TO REPLACE THE FOLLOWING PARTS..... | 2 |
| INTERNAL VIEW..... | 3 |
| EXPLODED VIEW..... | 4 |
| MISCELLANEOUS..... | 5 |
| MAIN DRIVE AMP. ASSEMBLY..... | 6 |
| PROTECTION CIRCUIT ASSEMBLY..... | 7 |
| METER CIRCUIT ASSEMBLY..... | 8 |
| FUSE CIRCUIT ASSEMBLY..... | 8 |
| PHASE CORRECT CIRCUIT ASSEMBLY..... | 8 |
| PROTECTION CIRCUIT DESCRIPTION..... | 9 |
| CHECKING THE POWER SUPPLY..... | 9 |
| CIRCUIT DESCRIPTION..... | 10 |
| CIRCUIT ADJUSTMENT..... | 11 |
| TRANSISTOR LEADS..... | 12 |
| SCHEMATIC DIAGRAM..... | 13, 14 |
| SPECIFICATIONS..... | 15 |

BLOCK DIAGRAM

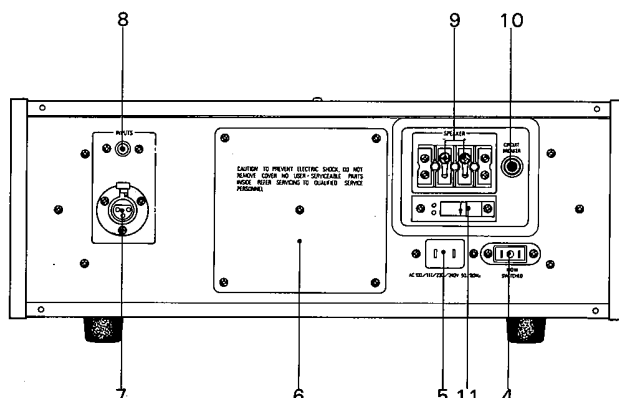


EXTERNAL VIEW

●FRONT



●REAR



●PARTS LIST

| No. | Description | Part No. | Remarks |
|-----|---|-------------|--------------------------|
| 1 | Knob for ATTENUATOR | 381-5001-04 | Ref. EXPLODED VIEW No.16 |
| 2 | Push-button for POWER, METER, SUBSONIC | 389-5001-14 | Ref. EXPLODED VIEW No.14 |
| 3 | Handle | 132-0007-04 | Ref. EXPLODED VIEW No. 1 |
| 4 | AC Outlet | 305-1201-00 | |
| 5 | AC Connector Plug | 301-3201-00 | |
| | AC Connector Plug | 301-3301-00 | for 3-Conductor |
| 6 | Square Plate | 159-0003-04 | |

| No. | Description | Part No. | Remarks |
|-----|--------------------------------|-------------|-------------------------|
| 7 | Cannon Receptacle | 304-5301-00 | XLR-3-13 for INPUT 2 |
| 8 | Pin Jack 1-Pin | 302-0101-00 | for INPUT 1 |
| 9 | Speaker Terminal | 313-5021-00 | |
| 10 | Circuit Breaker | 311-0101-00 | 10A at 100, 117V(Black) |
| | Circuit Breaker | 311-0051-00 | 5A at 220, 240V(Red) |
| 11 | Voltage Selector Jack | 302-4001-00 | |
| | Voltage Selector Plug | 301-4001-00 | |
| | Voltage Selector Fixed Bracket | 248-0001-14 | |

HOW TO REPLACE THE FOLLOWING PARTS

POWER TRANSISTOR Ref: INTERNAL VIEW NO.2

1. Remove the Side Plate held by 6 screws.
2. Transistors located above the heat sink can be replaced after removing the transistor locking screws.

LOAD CIRCUIT RELAY Ref: INTERNAL VIEW NO.11

1. Remove the Bottom Plate (6 screws) and the Side Plate (Left side: 8 screws).
2. The Relay can be removed from the Bottom Plate side after taking off the 4 screws.

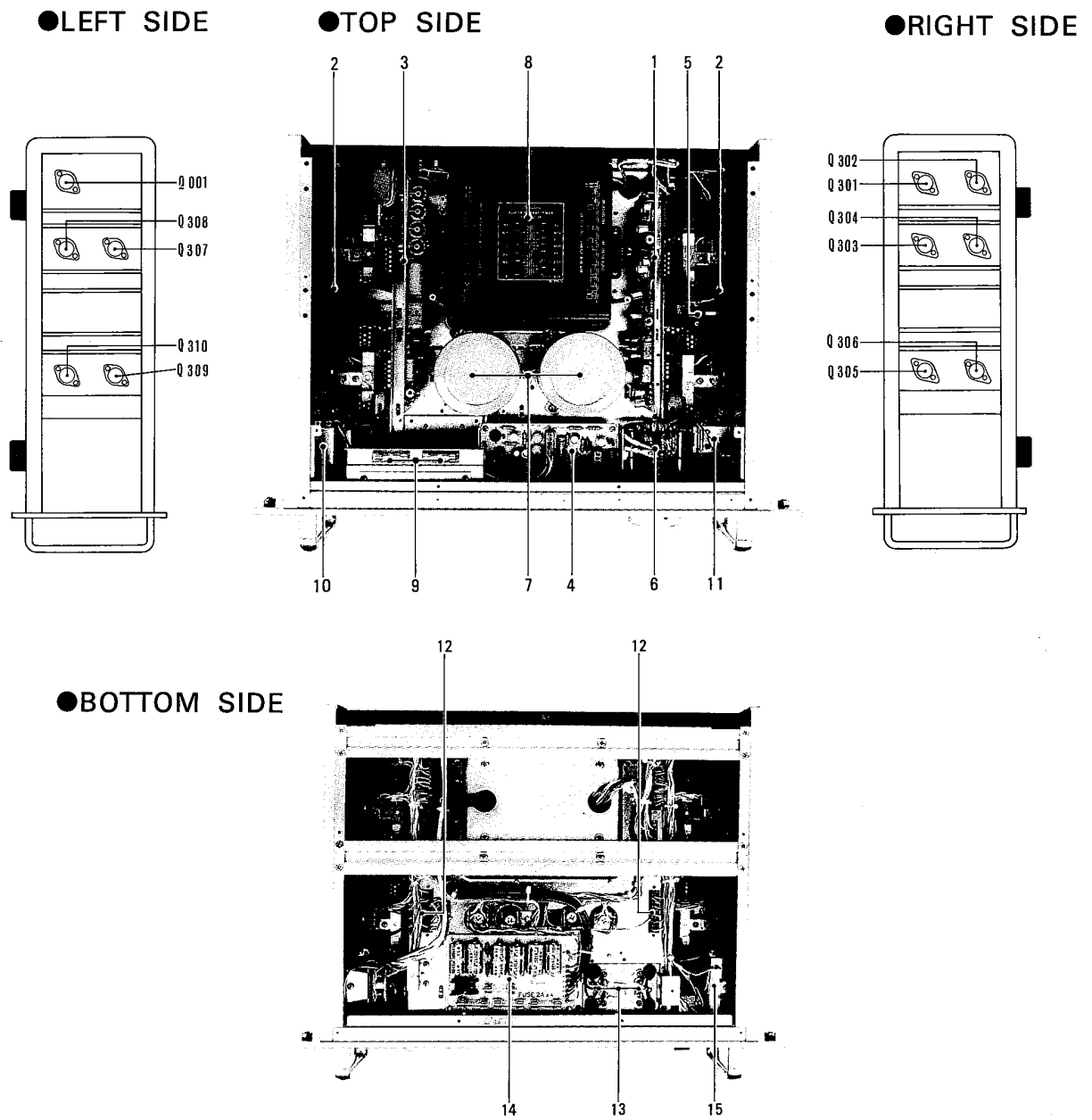
METER CIRCUIT ASSEMBLY Ref: INTERNAL VIEW NO.4 & EXPLODED VIEW

1. Remove in the following order: Top Plate, Sub-chassis Shield Cover.
2. Remove the Meter Selector and the Subsonic Filter Push-buttons.
3. Remove the Printed Board Connector Jacks (2 pcs).
4. The Meter Circuit Assembly can be removed when two screws holding the printed board are removed.

METER Ref: EXPLODED VIEW NO.16

1. Remove the Top Plate.
2. First remove a knob on the Front Panel. Then take off the Front Panel after removing the Hex. Head Bolt, Hex. nut and the six locking screws.
3. The entire Meter Assembly can be pulled forward after unscrewing the three screws attached to the Meter Fix Bracket.
4. The Meter can then be removed after taking off the 4 nuts attached to the Meter Fixed Bracket at the rearside of the Meter.

INTERNAL VIEW

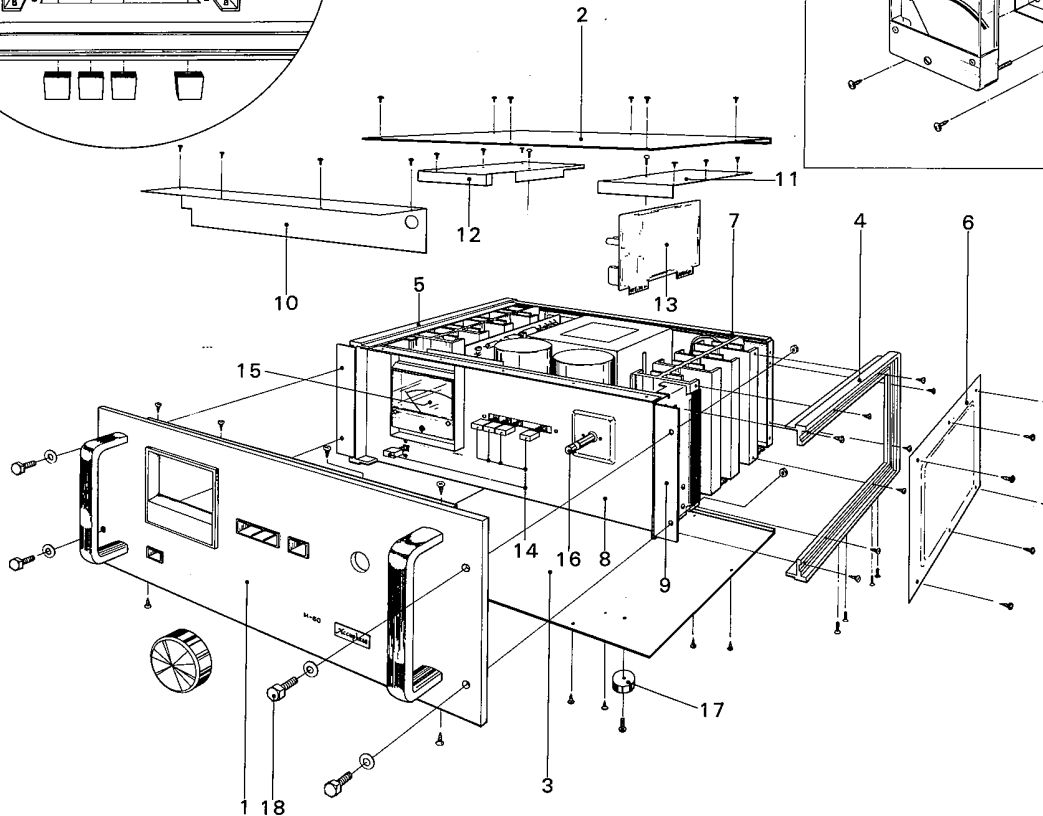
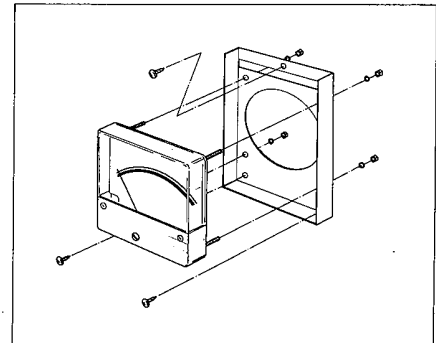
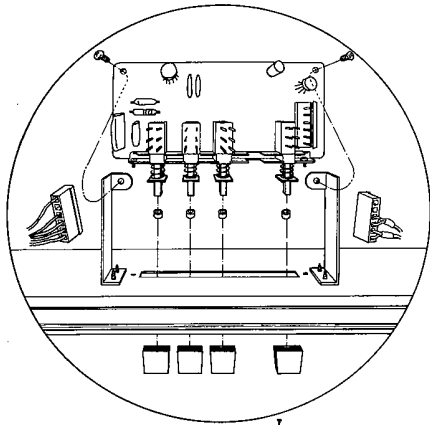


●PARTS LIST

| No. | Description | Part No. | Remarks |
|-----|----------------------------------|---------------|----------------------------------|
| 1 | Main Drive Amp. Assembly | 710-0003-00 | |
| 2 | Heat Sink | 240-0003-02 | for Power Transister |
| | Transistor PNP | 28B554-0-K | Q ₃₀₄ , 308, 308, 310 |
| | Transistor PNP | 2SB555-K | Q ₃₀₂ |
| | Transistor NPN | 2SD424-0-K | Q ₃₀₃ , 305, 307, 309 |
| | Transistor NPN | 2SC1195-K | Q ₃₀₁ |
| | Transistor NPN | 2SD371-R or Y | Q ₃₀₁ |
| | Silicon Varistor | STV-3H-0 | D ₂₀₁ , 202 |
| | Transistor Insulator | 318-0001-00 | |
| | Cement Coated Wirewound Resistor | RW864AG1ROK | 1Ω ±10% 10W |
| 3 | Protection Circuit Assembly | 720-0002-00 | |
| 4 | Meter Circuit Assembly | 716-0018-00 | |
| 5 | Phase Correct Circuit Assembly | 716-0017-00 | |
| 6 | ATTENUATOR | 578-1251-00 | |

| No. | Description | Part No. | Remarks |
|-----|----------------------------------|-------------|-----------------------------------|
| 7 | Electrolytic Capacitor | CE33W2A223 | 22,000μF 100WV |
| 8 | Power Transformer | 510-2002-00 | |
| 9 | Pilot Lamp. | 176-5201-00 | 8V-300mA |
| | Lamp Socket | 306-1001-00 | |
| 10 | Relay | 362-2204-00 | LY2-US (For Power Supply Circuit) |
| 11 | Relay | 362-2203-10 | MM2XL-K55 (Load Relay Circuit) |
| 12 | Printed Circuit Bord Connector | 303-1001-00 | 10-pin |
| 13 | Rectifier | SG-5T(+) | D ₀₀₁ |
| | | SG-5T(-) | D ₀₀₂ |
| | Transistor Insulator | 318-0001-00 | |
| | Insulating Bushing | 318-1102-00 | |
| 14 | Fuse Circuit Assembly | 716-0016-00 | |
| | Fuse | 310-0201-00 | 2A F1, 2, 3, 4 |
| 15 | Cement Coated Wirewound Resistor | RW864DG2R2K | 2.2Ω ±10% 20W |

EXPLODED VIEW



● PARTS LIST

| No. | Description | Part No. | Remarks |
|-----|-------------------------------------|-------------|--------------------------------------|
| 1 | Front Panel Assembly | 130-0007-03 | |
| | Front Panel | 131-0007-02 | |
| | Handle | 132-0007-04 | |
| | Handle Fixed Bracket | 247-0049-04 | |
| | Meter Frame | 113-0004-03 | |
| | Push-button Frame | 113-0008-14 | for Meter Switch |
| | Push-button Frame | 113-0010-04 | for Power Switch and Subsonic Switch |
| | Badge | 182-1001-04 | Accuphase |
| | Rubber Cushion | 250-2008-04 | |
| 2 | Top Plate | 150-0004-02 | |
| 3 | Bottom Plate | 155-0005-02 | |
| 4 | Frame Assembly (R) | 112-0004-02 | |
| | Frame D | 112-1004-23 | Upper |
| | Frame E | 112-1005-23 | Lower |
| | Frame F | 112-1006-04 | Back |
| | Frame Fixed Bracket | 244-0011-04 | |
| | Flat Head B Type Self Tapping Screw | 613-0308-04 | 3×8mmdia. |
| | Frame Assembly (L) | 112-0003-02 | |
| 5 | Frame A | 112-1001-23 | Upper |
| | Frame B | 112-1002-23 | Lower |
| | Frame F | 112-1006-04 | Back |

| No. | Description | Part No. | Remarks |
|-----|-------------------------------------|-------------|-----------------------------|
| | Frame Fixed Bracket | 244-0011-04 | |
| | Flat Head B Type Self Tapping Screw | 613-0308-04 | 3×8mmdia. |
| 6 | Side Plate | 151-0003-02 | |
| 7 | Rear Panel | 135-0008-02 | |
| 8 | Sub Chassis | 111-2003-02 | |
| 9 | Front Panel Fixed Bracket | 247-0048-04 | |
| 10 | Sub Chassis Shield Cover | 231-0027-03 | |
| 11 | Shield Cover (R) | 231-0015-03 | |
| 12 | Shield Cover (L) | 231-0014-03 | |
| 13 | Main Drive AMP. Assembly | 710-0003-00 | Right Side Only |
| 14 | Push-button Switch | | |
| | | 354-4003-00 | for METER & SUBSONIC Switch |
| | | 354-1003-00 | for Power Switch |
| 15 | Power Meter | 178-2004-00 | |
| | Meter Fixed Bracket | 246-0004-04 | |
| 16 | ATTENUATOR | 578-1251-06 | |
| | Shaft | 203-5004-04 | |
| 17 | Plastic Foot | 238-0001-14 | |
| 18 | Hex. Head Bolt | 630-0601-04 | 6×12mm |
| | Hex. Nut | 633-2061-03 | 6mmdia. |
| | Nylon Washer | 637-0061-59 | 6mmdia. |

● MISCELLANEOUS

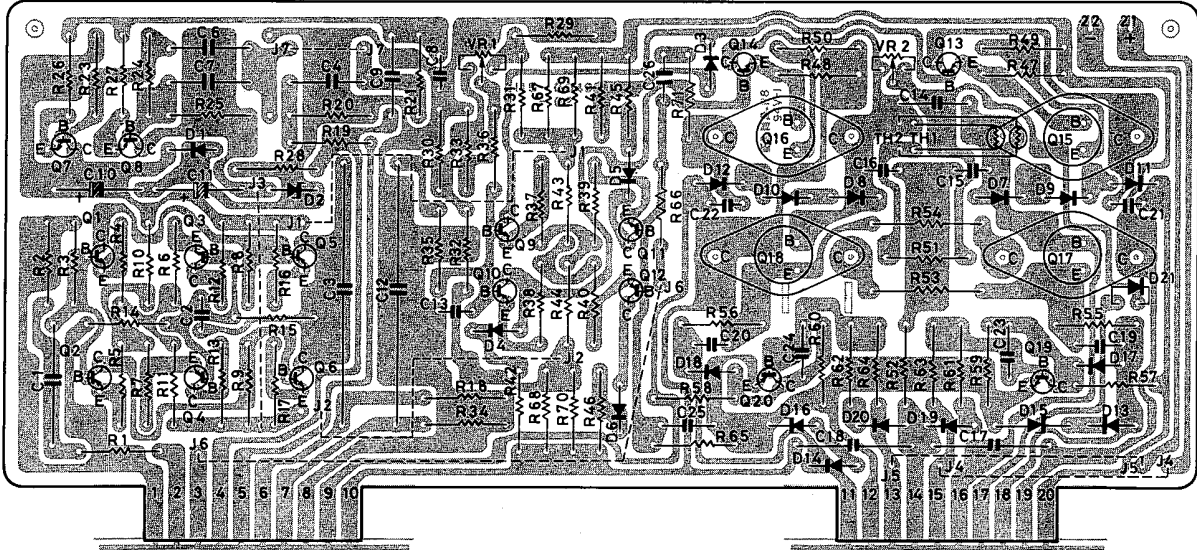
| No. | Description | Part No. | Remarks |
|------------------------|----------------------------------|---------------|--|
| | Screws for | | |
| | Top Plate | 614-0308-02 | 3×8mm (3) 6pcs |
| | Nylon Washer | 637-1031-50 | 3mm dia. 6pcs |
| | Front Panel | 613-0308-04 | 3×8mm (2) 6pcs |
| | Hex. Head Bolt | 630-0601-04 | 6×12mm 4pcs |
| | Hex. Nut | 633-2061-03 | 6mm dia. 4pcs |
| | Nylon Washer | 637-0061-59 | 6mm dia. 4pcs |
| | Frame Assembly | 613-0308-04 | 3×8mm (2) 16pcs |
| | Handle | 600-0510-04 | 5×10mm (1) 4pcs |
| | Side Plate | 614-0306-02 | 3×6mm (3) 12pcs |
| | Bottom Plate | 614-0306-02 | 3×6mm (3) 8pcs |
| | Rear Panel | 614-0308-02 | 3×8mm (3) 10pcs |
| | Square Plate | 600-0306-04 | 3×6mm (1) 4pcs |
| | Power Transistor | 600-0312-04 | 3×12mm (1) 22pcs |
| | Rectifier (SG-5T) | 600-0308-04 | 3×8mm (1) 4pcs |
| | Plastic Foot | 600-0414-04 | 4×14mm (1) 4pcs |
| | | | Notes. |
| | | | (1) Pan Head ISO Metric Screw |
| | | | (2) Flat Head B Type Self Tapping Screw |
| | | | (3) Binding Head B Type Self Tapping Screw |
| Q001 | Transistor NPN | 2SD371-R or Y | for Voltage Regulator |
| Q301 | Transistor NPN | 2SC1195-K | for driver Stage |
| Q302 | Transistor PNP | 2SB555-K | for driver Stage |
| Q303, 305, 307, 309 | Transistor NPN | 2SD424-O-K | for Final Stage |
| Q304, 306 308, 310 | Transistor PNP | 2SB554-O-K | for Final Stage |
| D001 | Rectifier | SG-5T (+) | |
| D002 | Rectifier | SG-5T (-) | |
| D201, 202 | Silicon Varistor | STV-3H-O | |
| R001, 002 | Carbon Film Resistor | RD142HA183J | 18kΩ ± 5% ½W |
| R003 | Cement Coated Wirewound Resistor | RW864DG2R2K | 2.2Ω ± 10% 20W |
| R101, 102 107, 108 | Carbon Film Resistor | RD142HA123J | 12kΩ ± 5% ½W |
| R103, 104 105, 106 | Carbon Film Resistor | RD142HA133J | 13kΩ ± 5% ½W |
| R109 | Carbon Film Resistor | RD142HA113J | 11kΩ ± 5% ½W |
| R110 | Carbon Film Resistor | RD142HA103J | 10kΩ ± 5% ½W |

| No. | Description | Part No. | Remarks |
|-----------------|----------------------------------|---------------|-----------------------------|
| R111 | Carbon Film Resistor | RD142HA912J | 9.1kΩ ± 5% ½W |
| R112 | Carbon Film Resistor | RD142HA822J | 8.2kΩ ± 5% ½W |
| R113 | Carbon Film Resistor | RD142HA752J | 7.5kΩ ± 5% ½W |
| R114 | Carbon Film Resistor | RD142HA622J | 6.2kΩ ± 5% ½W |
| R115 | Carbon Film Resistor | RD142HA562J | 5.6kΩ ± 5% ½W |
| R116, 122 | Carbon Film Resistor | RD142HA472J | 4.7kΩ ± 5% ½W |
| R117 | Carbon Film Resistor | RD142HA432J | 4.3kΩ ± 5% ½W |
| R118 | Carbon Film Resistor | RD142HA392J | 3.9kΩ ± 5% ½W |
| R119 | Carbon Film Resistor | RD142HA332J | 3.3kΩ ± 5% ½W |
| R120 | Carbon Film Resistor | RD142HA302J | 3kΩ ± 5% ½W |
| R121, 124 | Carbon Film Resistor | RD142HA682J | 6.8kΩ ± 5% ½W |
| R301~308 | Cement Coated Wirewound Resistor | RW864AG1R0K | 1Ω ± 10% 10W |
| R309, 310 | Metal Film Resistor | RS143AA180J | 18Ω ± 5% 1W |
| R311~318 | Carbon Film Resistor | RD142HA132J | 1.3kΩ ± 5% ½W |
| C001 | Mylar Film Capacitor | CQ93M2E103MUL | 0.01μF ± 20% 250 WV |
| C002~005 301 | Ceramic Capacitor | CK45F2H103P | 0.01μF +100% - 0% 500 WV |
| C006, 007 | Electrolytic Capacitor | CE33W2A223 | 22,000μF 100 WV |
| C201 | Bipolar Electrolytic Capacitor | 559-0001-00 | 100μF 10 WV |
| C302, 303 | Metallized Film Capacitor | CQ91M2E474K | 0.47μF 250 WV |
| | Accessories | | |
| | Power Supply Cord | 680-2201-00 | |
| | Power Supply Cord | 680-3401-00 | 3-Conductor |
| | Case | 801-0011-03 | |
| | Owner's Manual | 820-2009-00 | |
| | Poly Bag | 812-2536-04 | |
| | Packing Materials | | |
| | Shipping Carton | | |
| | Outer Carton | 800-0007-04 | |
| | Inner Carton | 801-0011-04 | |
| | Plastic Cover | 810-5153-04 | Clear (Outside) |
| | Plastic Cover | 810-5052-04 | White (Inside) |
| | Front Protector | 803-0018-03 | |
| | Rear Protector A | 803-0019-03 | |
| | Rear Protector B | 803-0020-03 | |

MAIN DRIVE AMP. ASSEMBLY (710-0003-00)

●PRINTED CIRCUIT BOARD

* Printed circuit board as seen from the reverse side.



●PARTS LIST

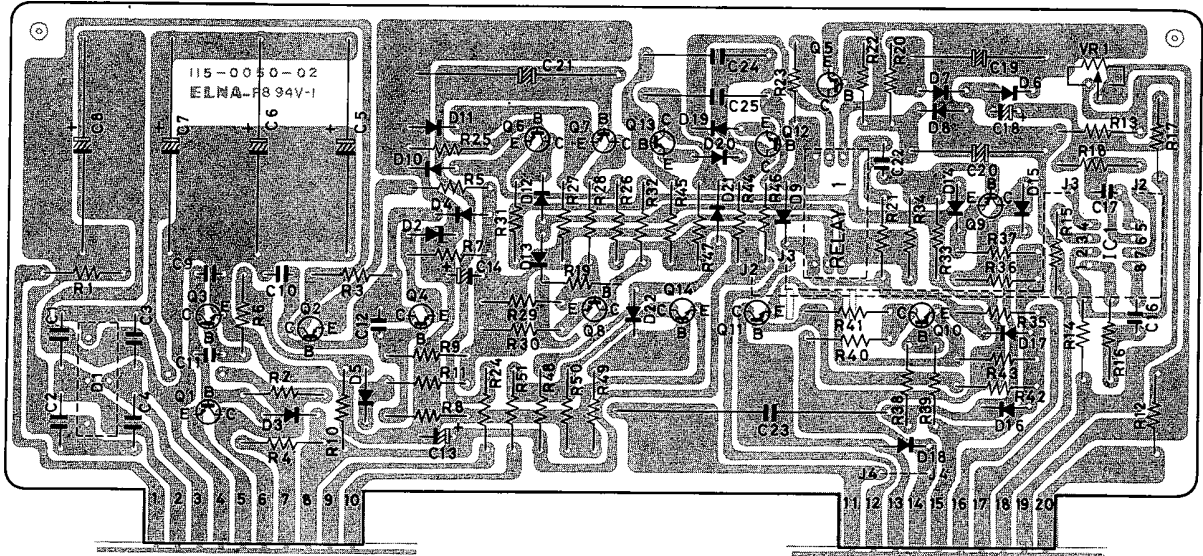
| No. | Description | Part No. | Remarks |
|-------------------------------------|----------------------|--------------------|-------------------------|
| Q1, 3 | Transistor NPN | 2SC1746A-GRorBL-K | |
| Q2, 4 | Transistor PNP | 2SA856A-GR or BL-K | |
| Q5, 8, 10, 12 | Transistor PNP | 2SA809-V/002 | |
| Q6, 7, 9, 11 | Transistor NPN | 2 SC1451-V/004 | |
| Q13 | Transistor PNP | 2SA810-B/101 | |
| Q14 | Transistor NPN | 2 SC1452-B/101 | |
| Q15, 18 | Transistor PNP | 2SA483-OrY-K1 | |
| Q16 | Transistor NPN | 2SC515A | |
| Q17 | Transistor NPN | 2SC783-OrY-K1 | |
| Q19 | Transistor NPN | 2SC497-O or Y | |
| D1, 2 | Zener Diode | YZ-350 | |
| D3-6 | Silicon Diode | 1S1555 | |
| D7-14, 17, 18 | Silicon Diode | 1S1553 | |
| D15, 16 | Zener Diode | CZ-060 | |
| D19, 20 | Silicon Diode | 1S2091-BL | |
| D21 | Silicon Varistor | STV-3H-0 | |
| TH1, 2 | Thermistor | 5TP-31L | |
| VR1 | Potentiometer 5kΩ B | 581-0532-00 | for Center Voltage Adj. |
| VR2 | Potentiometer 200Ω B | 581-0221-00 | for Bias Current Adj. |
| R1, 35 | Carbon Film Resistor | RD142HA222J | 2.2kΩ ± 5% ½ W |
| R2 | Metal Film Resistor | RN142HA125JL | 1.2MΩ ± 5% ½ W |
| R3 | Metal Film Resistor | RN142HA244J | 240kΩ ± 5% ½ W |
| R4-7, 16, 17, 29, 30, 33, 47, 48 | Carbon Film Resistor | RD142HA102J | 1kΩ ± 5% ½ W |
| R8, 9, 12, 13 | Metal Film Resistor | RN142HA163J | 16kΩ ± 5% ½ W |
| R10, 11 | Metal Film Resistor | RN142HA164J | 160kΩ ± 5% ½ W |
| R14 | Carbon Film Resistor | RD142HA1502G | 15kΩ ± 2% ½ W |
| R15 | Carbon Film Resistor | RD142HA3302G | 33kΩ ± 2% ½ W |
| R18, 20, 34 | Carbon Film Resistor | RD142HA105J | 1MΩ ± 5% ½ W |
| R19 | Carbon Film Resistor | RD142HA391J | 390Ω ± 5% ½ W |
| R21 | Carbon Film Resistor | RD142HA203J | 20kΩ ± 5% ½ W |
| R23, 25 | Carbon Film Resistor | RD142HA204J | 200kΩ ± 5% ½ W |
| R24 | Carbon Film Resistor | RD142HA103J | 10kΩ ± 5% ½ W |
| R26, 27 | Carbon Film Resistor | RD142HA221J | 220Ω ± 5% ½ W |
| R28 | Carbon Film Resistor | RD142HA184J | 180kΩ ± 5% ½ W |
| R31, 32 | Carbon Film Resistor | RD142HA333J | 33kΩ ± 5% ½ W |

| No. | Description | Part No. | Remarks |
|--------------------|---------------------------|--------------|--------------------------|
| R36 | Carbon Film Resistor | RD142HA513J | 51kΩ ± 5% ½ W |
| R37-40 | Carbon Film Resistor | RD142HA121J | 120Ω ± 5% ½ W |
| R41, 42, 45, 46 | Carbon Film Resistor | RD142HA152J | 1.5kΩ ± 5% ½ W |
| R43, 44 | Carbon Film Resistor | RD142HA183J | 18kΩ ± 5% ½ W |
| R49, 50 | Oxide Metal Film Resistor | RS143AA101J | 100Ω ± 5% 1 W |
| R51 | Carbon Film Resistor | RD142HA100J | 10Ω ± 5% ½ W |
| R52 | Carbon Film Resistor | RD142HA750J | 75Ω ± 5% ½ W |
| R53, 54 | Oxide Metal Film Resistor | RS143DA103J | 10kΩ ± 5% 2 W |
| R55, 56 | Oxide Metal Film Resistor | RS143AA331J | 330Ω ± 5% 1 W |
| R57, 58 | Carbon Film Resistor | RD142HA104J | 100kΩ ± 5% ½ W |
| R59, 60 | Carbon Film Resistor | RD142HA623J | 62kΩ ± 5% ½ W |
| R61, 62 | Oxide Metal Film Resistor | RS143AA822J | 8.2kΩ ± 5% 1 W |
| R63, 64 | Carbon Film Resistor | RD142HA331J | 330Ω ± 5% ½ W |
| R65 | Carbon Film Resistor | RD142HA1692G | 16.9kΩ ± 2% ½ W |
| R66 | Carbon Film Resistor | RD142HA2401G | 2.4kΩ ± 2% ½ W |
| R67-70 | Oxide Metal Film Resistor | RS143AA103J | 10kΩ ± 5% 1 W |
| R71 | Carbon Film Resistor | RD142HA823J | 82kΩ ± 5% ½ W |
| C1 | Metallized Film Capacitor | CQ93M2E105K | 1μF ± 10% 250 WV |
| C2, C25 | Mica Capacitor | CM93D2A200J | 20pF ± 5% 100 WV |
| C3, 12 | Metallized Film Capacitor | CQ91M2E335K | 3.3μF ± 10% 250 WV |
| C4, 9 | Metallized Film Capacitor | CQ93M2E224K | 0.22μF ± 10% 250 WV |
| C6, 7, 14 | Metallized Film Capacitor | CQ93M2E104K | 0.1μF ± 10% 250 WV |
| C8 | Mica Capacitor | CM93D2A470J | 47pF ± 5% 100 WV |
| C10, 11 | Electrolytic Capacitor | CE02W1H4R7 | 4.7μF 50 WV |
| C13, 15, 16 | Mica Capacitor | CM93D2A101J | 100pF ± 5% 100 WV |
| C17, 18 | Metallized Film Capacitor | CQ93M2E474K | 0.47μF ± 10% 250 WV |
| C19, 20 | Mica Capacitor | CM93D2A561J | 560pF ± 5% 100 WV |
| C21, 22 | Mica Capacitor | CM93D2F331J | 330pF ± 5% 315 WV |
| C23, 24 | Ceramic Capacitor | CK45F2H103P | 0.01μF +100% - 0% 500 WV |
| C26 | Mica Capacitor | CM93D2A100D | 10pF ± 0.5% 100 WV |
| | Pan Head ISO Metric Screw | 600-0312-01 | 3×12mm for Q15-18 |
| | Nex. Nut | 633-2031-01 | 3mm dia. for Q15-18 |
| | Lock Washer | 639-2031-01 | for Q15-18 |
| | Transistor Spacer | 250-0003-00 | for Q19, 20 |

PROTECTION CIRCUIT ASSEMBLY (720-0002-00)

●PRINTED CIRCUIT BOARD

* Printed circuit board as seen from the reverse side



●PARTS LIST

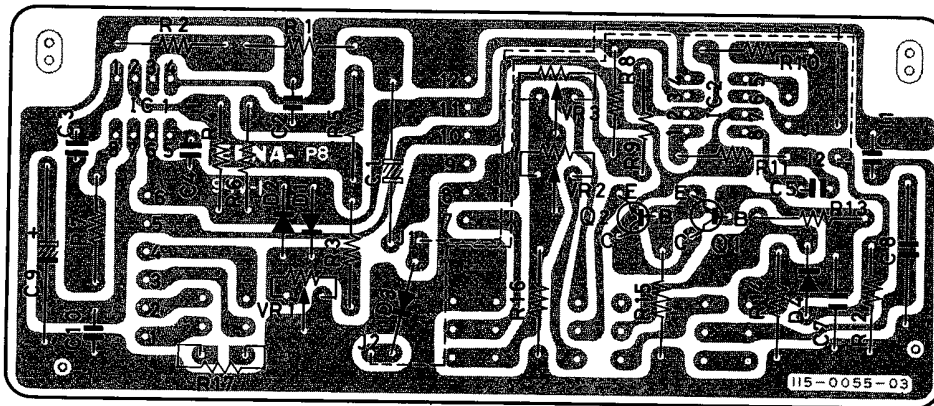
| No. | Description | Part No. | Remarks |
|---------------------------|----------------------|------------------|---------------------------|
| RELAY 1 | Reed Relay | 363-2201-00 | LAB2-24V |
| Q1, 11 | Transistor NPN | 2SC497-O or Y | |
| Q2, 9 | Transistor PNP | 2SA485-Y | |
| Q3, 5, 6, 8 | Transistor NPN | 2SC1746-GR or BL | |
| Q10 | Transistor NPN | 2SC1746-BL-Ⓢ | Ⓢ : Selected |
| IC1 | IC | LM709CH | |
| D1 | Full Wave Bridge | S1RB-10 | |
| D2 | Zener Diode | XZ-060 | |
| D3, 5 | Silicon Varistor | SV-03 | |
| D4 | Silicon Varistor | SV-02 | |
| D6-11, 14-16 19-22 | Silicon Diode | 1S1555 | |
| D12, 13 | Silicon Diode | 1S1553 | |
| D17 | Zener Diode | XZ-245 | |
| VR1 | Potentiometer 10kΩB | 581-0142-00 | for Protection Level Adj. |
| R1 | Carbon Film Resistor | RD142HA101J | 100Ω ± 5% ½W |
| R2, 3 | Carbon Film Resistor | RD142HA392J | 3.9kΩ ± 5% ½W |
| R4 | Metal Film Resistor | RN143AAR47J | 0.47Ω ± 5% 1W |
| R5 | Carbon Film Resistor | RD142HA6R8J | 6.8Ω ± 5% ½W |
| R6, 30 | Carbon Film Resistor | RD142HA100J | 10Ω ± 5% ½W |
| R7 | Carbon Film Resistor | RD142HA122J | 1.2kΩ ± 5% ½W |
| R8 | Carbon Film Resistor | RD142HA1002G | 10kΩ ± 2% ½W |
| R9 | Carbon Film Resistor | RD142HA1472G | 14.7kΩ ± 2% ½W |
| R10, 11 | Carbon Film Resistor | RD142HA2002G | 20kΩ ± 2% ½W |
| R12, 40 | Carbon Film Resistor | RD142HA472J | 4.7kΩ ± 5% ½W |
| R13 | Metal Film Resistor | RN143AA1R0J | 1Ω ± 5% 1W |
| R14, 15 | Carbon Film Resistor | RD142HA271J | 270Ω ± 5% ½W |
| R16 | Carbon Film Resistor | RD142HA152J | 1.5kΩ ± 5% ½W |
| R17 | Carbon Film Resistor | RD142HA564J | 560kΩ ± 5% ½W |
| R18 | Carbon Film Resistor | RD142HA330J | 33Ω ± 5% ½W |
| R19, 36, 37 | Carbon Film Resistor | RD142HA153J | 15kΩ ± 5% ½W |
| R20, 24, 28 35, 41, 42 | Carbon Film Resistor | RD142HA103J | 10kΩ ± 5% ½W |
| R21 | Carbon Film Resistor | RD142HA513J | 51kΩ ± 5% ½W |
| R22 | Carbon Film Resistor | RD142HA102J | 1kΩ ± 5% ½W |
| R23 | Carbon Film Resistor | RD142HA240J | 24Ω ± 5% ½W |
| R25, 34 | Carbon Film Resistor | RD142HA333J | 33kΩ ± 5% ½W |

| No. | Description | Part No. | Remarks |
|-------------------|--------------------------------|------------------|--------------------------|
| R26, 27, 33 | Carbon Film Resistor | RD142HA332J | 3.3kΩ ± 5% ½W |
| R29 | Carbon Film Resistor | RD142HA222J | 2.2kΩ ± 5% ½W |
| R31, 32 | Carbon Film Resistor | RD142HA104J | 100kΩ ± 5% ½W |
| R38, 39 45, 46 | Carbon Film Resistor | RD142HA334J | 330kΩ ± 5% ½W |
| R43 | Carbon Film Resistor | RD142HA470J | 47Ω ± 5% ½W |
| R44, 47, 49 | Carbon Film Resistor | RD142HA223J | 22kΩ ± 5% ½W |
| R48 | Carbon Film Resistor | RD142HA242J | 2.4kΩ ± 5% ½W |
| R50 | Oxide Metal Film Resistor | RS143AA221J | 220Ω ± 5% 1W |
| R51 | Metal Film Resistor | RN143AA5R6J | 5.6Ω ± 5% 1W |
| C1-4 | Ceramic Capacitor | CK45F2H103P | 0.1μF +100% -0% 500WV |
| C5-8 | Electrolytic Capacitor | CE02W1V471 | 470μF 35WV |
| C9-12 | Ceramic Capacitor | CC45SL1H470K | 47pF ±10% 50WV |
| C13, 14, 18 | Tantalum Solid Capacitor | CS15E1V100M | 10μF ±20% 35WV |
| C16 | Mylor Film Capacitor | CQ93M1H472K | 4700pF ±10% 50WV |
| C17 | Ceramic Capacitor | CC45SL1H221K | 220pF ±10% 50WV |
| C19 | Bipolar Electrolytic Capacitor | CE02DIH3R3(B.P.) | 3.3μF 50WV |
| C20 | Bipolar Electrolytic Capacitor | CE02DIH100(B.P.) | 10μF -35WV |
| C21 | Bipolar Electrolytic Capacitor | CE02DIA221(B.P.) | 220μF 10WV |
| C22 | Mylar Film Capacitor | CQ93M1H102K | 1000pF ±10% 50WV |
| C23 | Metallized Film Capacitor | CQ91M2E475K | 4.7μF ±10% 250WV |
| C24, 25 | Metallized Film Capacitor | CQ93M2E105K | 1μF ±10% 250WV |
| ※ | Transistor Spacer | 250-0003-00 | for Q1, 2, 9, 11, 14 |
| | Heat Sink | 240-2001-00 | for Q2 |

METER CIRCUIT ASSEMBLY (716-0018-00)

●PRINTED CIRCUIT BOARD

* Printed circuit board as seen from the reverse side.



●PARTS LIST

| No. | Description | Part No. | Remarks |
|-----------|----------------------|------------------|---|
| | Connector Plug | 304-0603-00 | |
| | Push-button Switch | 354-4003-00 | |
| Q1 | Transistor NPN | 2SC1746-GR or BL | |
| Q2 | Transistor NPN | 2SC1451-B or G | |
| IC1, 2 | IC | LM709CH | |
| D1, 2, 4 | Silicon Diode | 1S1555 | |
| D3 | Silicon Varistor | SV-07 | |
| VR1 | Potentiometer 100Ω B | 580-0121-00 | for -40dB Calibration Adj. |
| VR2, 3 | Potentiometer 470Ω B | 580-0521-00 | VR2 for PEAK 0dB Adj. VR3 for VOL 0dB Adj. |
| R1 | Carbon Film Resistor | RD142HA823J | 82kΩ ± 5% ½W |
| R2 | Carbon Film Resistor | RD142HA301J | 300Ω ± 5% ½W |
| R3 | Carbon Film Resistor | RD142HA471J | 470Ω ± 5% ½W |
| R4 | Metal Film Resistor | RN142HA225JL | 2.2MΩ ± 5% ½W |
| R5, 6, 13 | Carbon Film Resistor | RD142HA473J | 47kΩ ± 5% ½W |
| R7, 11 | Carbon Film Resistor | RD142HA152J | 1.5kΩ ± 5% ½W |
| R8 | Carbon Film Resistor | RD142HA393J | 39kΩ ± 5% ½W |
| R9 | Carbon Film Resistor | RD142HA433J | 43kΩ ± 5% ½W |

| No. | Description | Part No. | Remarks |
|---------|--------------------------------|------------------|---------------------------|
| R10 | Carbon Film Resistor | RD142HA474J | 470kΩ ± 5% ½W |
| R12 | Carbon Film Resistor | RD142HA562J | 5.6kΩ ± 5% ½W |
| R14 | Metal Film Resistor | RN142HA475JL | 4.7MΩ ± 5% ½W |
| R15 | Carbon Film Resistor | RD142HA104J | 100kΩ ± 5% ½W |
| R16 | Carbon Film Resistor | RD142HA331J | 330Ω ± 5% ½W |
| R17 | Carbon Film Capacitor | RD142HA331J | 330Ω ± 5% ½W |
| C1 | Bipolar Electrolytic Capacitor | CE02DH2R2(B.P.) | 2.2μF 50 WV |
| C2 | Bipolar Electrolytic Capacitor | CE02D1C330(B.P.) | 33μF 16 WV |
| C3 | Ceramic Capacitor | CK45B1H471K | 470pF ±10% 50 WV |
| C4 | Ceramic Capacitor | CC45SL1H100D | 10pF ±0.5% 50 WV |
| C5 | Ceramic Capacitor | CC45SL1H331K | 330pF ±10% 50 WV |
| C6 | Ceramic Capacitor | CC45SL1H040C | 4pF ±0.25% 50 WV |
| C7 | Metallized Film Capacitor | CQ93M2E154K | 0.15μF ±10% 250 WV |
| C8 | Metallized Film Capacitor | CQ93M2E334K | 0.33μF ±10% 250 WV |
| C9 | Electrolytic Capacitor | CE02W1C101 | 100μF 16 WV |
| C10, 11 | Ceramic Capacitor | CK45F1H103Z | 0.01μF +80% -20% 50 WV |

FUSE CIRCUIT ASSEMBLY (716-0016-00)

●PARTS LIST

| No. | Description | Part No. | Remarks |
|-------|---------------------------|-------------|-----------------------------|
| | Fuse Holder | 306-1101-00 | |
| F1~4 | Fuse | 310-0201-00 | 2A |
| D1 | Full Wave Bridge | S1RB-40 | |
| R1, 2 | Oxide Metal Film Resistor | RS143AA221J | 220Ω ± 5% 1 W |
| C1~4 | Ceramic Capacitor | CK45F2H103P | 0.01μF +100% - 0% 500 WV |
| C5-10 | Electrolytic Capacitor | CE02W2C470 | 47μF 160 WV |

PHASE CORRECT CIRCUIT ASSEMBLY (716-0017-00)

●PARTS LIST

| No. | Description | Part No. | Remarks |
|----------|----------------------------------|-------------|--------------------|
| L1 | Choke Coil | 506-0001-00 | 2μH |
| R1 | Cement Coated Wirewound Resistor | RW983HG100J | 10Ω ± 5% 5 W |
| R2, 3, 4 | Metal Film Resistor | RN143JA150J | 15Ω ± 5% 6.3 W |
| C1 | Metallized Film Capacitor | CQ93M2E224K | 0.22μF ±10% 250 WV |

IMPROVED METER CIRCUIT FOR M-60

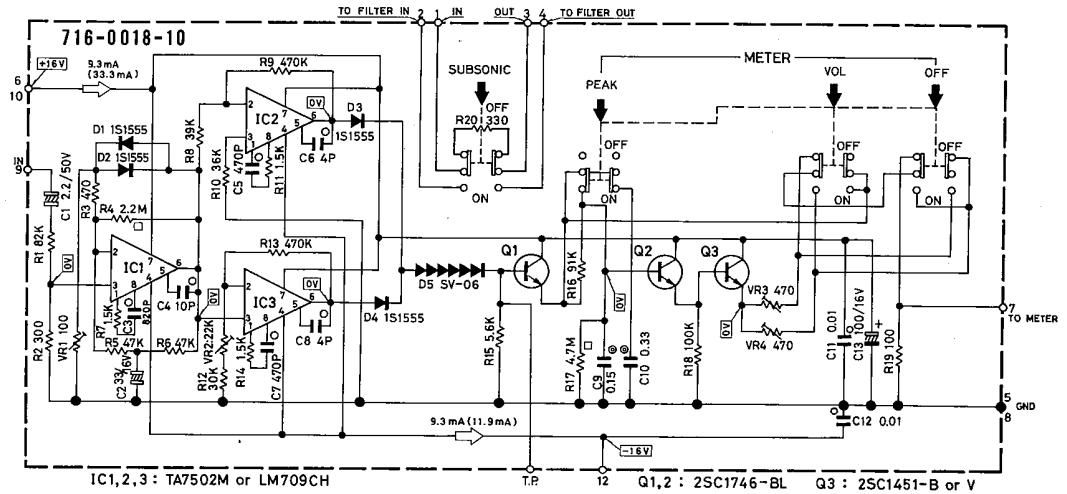
METER CIRCUIT ASSEMBLY (716-0018-10)

The Meter Circuit has been improved and revision details are explained in this service sheet. Please, attach it between pages 8 and 9 of

the M-60 Service Manual for future reference.

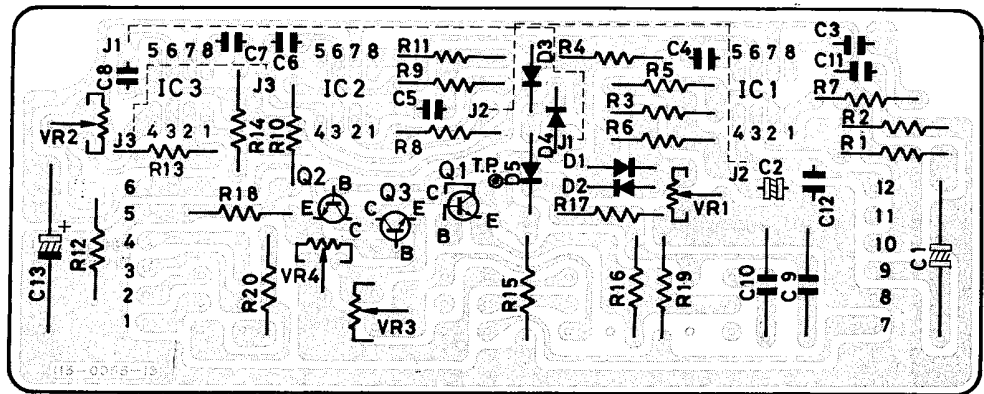
* It applies only to M-60 units from Serial No. B6Y301 and up. (It does not apply to units from Serial No. G5Y001 ~ J5Y300.)

SCHEMATIC DIAGRAM



PRINTED CIRCUIT BOARD

*Printed Circuit Board as seen from the reverse side.



PARTS LIST

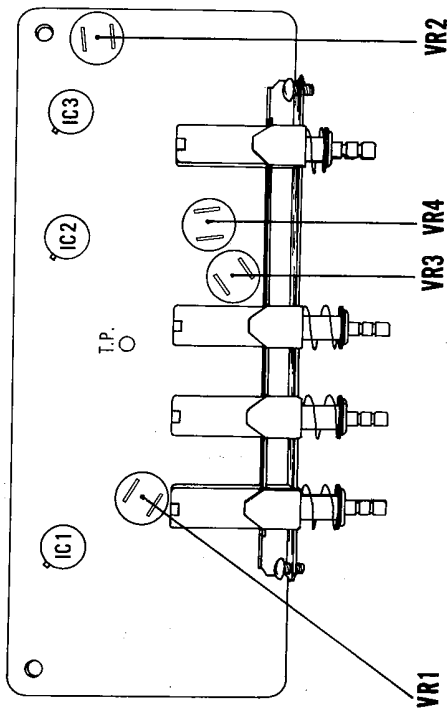
| No. | Description | Part No. | Remark |
|------------|----------------------|--------------------|----------------------------|
| | Connector Plug | 304-0603-00 | |
| | Push-button Switch | 354-4003-00 | |
| Q1, 2 | Transistor NPN | 2SC1746-BL | |
| Q3 | Transistor NPN | 2SC1451-V or S | |
| IC1-3 | IC | TA7502M or LM709CH | |
| D1-4 | Silicon Diode | 1S1555 | |
| D5 | Silicon Varistor | SV-06 | |
| VR1 | Potentiometer 100ΩB | 580-0121-00 | for -40dB Calibration Adj. |
| VR2 | Potentiometer 22kΩB | 580-0241-00 | for Level Adj. |
| VR3 | Potentiometer 470ΩB | 580-0521-00 | for PEAK 0dB Adj. |
| VR4 | Potentiometer 470ΩB | 580-0521-00 | for VOL 0dB Adj. |
| R1 | Carbon Film Resistor | RD142HA823J | 82kΩ ±5% ½W |
| R2 | Carbon Film Resistor | RD142HA301J | 300kΩ ±5% ½W |
| R3 | Carbon Film Resistor | RD142HA471J | 470Ω ±5% ½W |
| R4 | Metal Film Resistor | RN142HA225JL | 2.2MΩ ±5% ½W |
| R5, 6 | Carbon Film Resistor | RD142HA473J | 47kΩ ±5% ½W |
| R7, 11, 14 | Carbon Film Resistor | RD142HA152J | 1.5kΩ ±5% ½W |
| R8 | Carbon Film Resistor | RD142HA393J | 39kΩ ±5% ½W |
| R9, 13 | Carbon Film Resistor | RD142HA474J | 470kΩ ±5% ½W |

| No. | Description | Part No. | Remark |
|---------|--------------------------------|-------------------|-----------------------|
| R10 | Carbon Film Resistor | RD142HA363J | 36kΩ ±5% ½W |
| R12 | Carbon Film Resistor | RD142HA303J | 30kΩ ±5% ½W |
| R15 | Carbon Film Resistor | RD142HA562J | 5.6kΩ ±5% ½W |
| R16 | Carbon Film Resistor | RD142HA913J | 91kΩ ±5% ½W |
| R17 | Metal Film Resistor | RN142HA475JL | 4.7MΩ ±5% ½W |
| R18 | Carbon Film Resistor | RD142HA104J | 100kΩ ±5% ½W |
| R19 | Carbon Film Resistor | RD142HA101J | 100Ω ±5% ½W |
| R20 | Carbon Film Resistor | RD142HA331J | 330Ω ±5% ½W |
| C1 | Bipolar Electrolytic Capacitor | CE02D1H2R2 (B.P.) | 2.2μF 50WV |
| C2 | Bipolar Electrolytic Capacitor | CE04D1C330 (B.P.) | 33μF 16WV |
| C3 | Ceramic Capacitor | CK45B1H821K | 820pF ±10% 50WV |
| C4 | Ceramic Capacitor | CC45SL1H100D | 10pF ±0.5% 50WV |
| C5, 7 | Ceramic Capacitor | CK45B1H471K | 470pF ±10% 50WV |
| C6, 8 | Ceramic Capacitor | CC45SL1H040C | 4pF ±0.25% 50WV |
| C9 | Mylar Film Capacitor | CQ93M1H154J | 0.15μF ±5% 50WV |
| C10 | Mylar Film Capacitor | CQ93M1H334J | 0.33μF ±5% 50WV |
| C11, 12 | Ceramic Capacitor | CK45K1H103Z | 0.01μF +80% -20% 50WV |
| C13 | Electrolytic Capacitor | CE02W1C101 | 100μF 16WV |

RE: CIRCUIT CHANGE

The Meter Circuit has been revised to indicate full waveform peaks instead of former halfwaves in order to detect full waveform peaks perfectly. Comparison of Meter indications will show a slight difference when measuring waveforms that are not symmetrical such as voice signals, etc.

CIRCUIT ADJUSTMENT



(When Meter or Printed Circuit Board is replaced, please adjust as follows.)

*VTVM registers 48.98V when an output of 300 watts is being fed into an 8 ohm load.
Repeat steps 1 and 2 until precise calibration is completed.

| STEP | ADJUST ITEM | INPUT SIGNAL | LOAD | TEST EQPT | PROCEDURE CONNECTING POINT | ADJUST | REMARKS |
|------|---------------------------|----------------|----------------|-----------|----------------------------|------------------------------|---|
| | | | | | | | |
| 2 | PEAK LINEARITY ADJUSTMENT | 1kHz Sine Wave | No Load (Open) | VTVM | "SPEAKER" Terminal | Meter Circuit Assembly "VR1" | Adjust input signal so that VTVM reads 0.49V. Then adjust VR1 so that PEAK meter reads -40 dB. |
| 3 | OFFSET VOLTAGE ADJUSTMENT | 1kHz Sine Wave | No Load (Open) | SCOPE | Meter "T.P." Terminal | Circuit Assembly "VR2" | Adjust VR2 to obtain exact peak heights of rectified full waveform on scope screen. Repeat steps 1 and 2. |
| 4 | VOL 0dB CALIBRATION | 1kHz Sine Wave | No Load (Open) | VTVM | "SPEAKER" Terminal | Meter Circuit Assembly "VR4" | Adjust input signal so that PEAK meter reads 0 dB. Then adjust VR4 so that VOL meter reads 0 dB. |

PROTECTION CIRCUIT DESCRIPTION

This unit has, in addition, five other protection circuits, namely: an ASO (Area of Safety Operation) limiter circuit, an abnormal load impedance detector circuit, an abnormal DC output voltage detector circuit, a relay control circuit which triggers a relay in the output load circuit and a warning protection circuit. These various protection circuits are described below.

1. ASO LIMITER CIRCUIT

This circuit employs Q19, Q20, D17, D18, D19 and D20 which are located in the Main Drive Assembly (710-0003-00). In case of a short circuit in the speaker connecting network, or when the load impedance drops to an abnormally low value, this circuit limits the input signal level to the drive stage transistors Q301 and Q302. This serves to clip their output and protect the power transistors by keeping them working within the area of safe operation (ASO).

A special feature of this circuit is that it protects the power transistors against exceptionally strong pulse surges of short duration without having to activate the circuit breaking protection relay.

2. ABNORMAL LOAD IMPEDANCE PROTECTION CIRCUIT

If AC power is turned ON when the output impedance happens to be extremely low or non-existent as in the case of a shorted or near-short speaker circuit, this situation is quickly detected by this circuit which then prevents the load circuit relay from closing. This protection circuit employs IC1, D6, D7 and Q5 which are located within the Protection Circuit Assembly (720-0002-00).

When power is turned on under normal conditions, an AC line frequency signal is applied to IC1 via terminal 20 of the Protection Circuit Assembly. This is amplified by IC1, and is supplied as a minus voltage to the base of Q5 after being rectified by the voltage doubler rectifier D6 and D7. This causes Q5 to turn OFF and permits normal operation of the Relay Control Circuit to close the relay shortly after power is turned on.

In case of an abnormally low load impedance, or a short circuited output, however, the AC line frequency signal is not applied to IC1, Q5 is then biased to plus by R21 (51 Kohms) which turns it ON. This causes the relay control circuit to keep the load circuit relay open and prevent connection to the output load.

3. DC OUTPUT VOLTAGE DETECTOR CIRCUIT

When a large, very low frequency voltage is applied to the speakers, or when a high DC voltage is created in the output circuit due to a fault in the power transistor circuit, damage may be caused to the speakers. This protection circuit prevents this possibility by causing the relay to open the speaker circuit and consists of Q6, Q7, Q8, D10 ~ 13, R24, R25 and C21 in the Protection Circuit Assembly (720-0002-00). When the output voltage potential is more than DC 2V and it is "+", Q6 is turned ON. When it is "-", Q7 is turned ON. This reduces the collector voltage and triggers the relay to break the speakers circuit. For signal frequencies above 5 Hz, however, the relay will remain closed up to the full rated power output due to the time constant of R24, R25 and C21. For signal frequencies below 5 Hz, the relay will break the speaker circuit before full power is reached.

4. LOAD CONNECTING RELAY CONTROL CIRCUIT

This circuit consists of Q9, Q10, Q11, D14, D15 and D16 located in the Protection Circuit Assembly (720-0002-00). It controls relay action in accordance with signals from the protection circuits explained in "b" and "c" above. In addition, it has two other functions, namely to prevent the relay from closing for an interval of about 3 seconds after power is turned ON and enable circuits to stabilize. It also breaks the speaker circuit when power is turned OFF and prevents reproduction of residual output energy.

-Checking circuit action

- (1) When power turned ON under normal conditions.
Stages preceding Q9 have no relation to this circuit action. For a 3 second interval immediately after power is turned on capacitor C23 is charging. This causes Q10 to remain at ON and Q11 at OFF, and the relay remains open. After about 3 seconds the fully charged condition of C23 creates a "0" base bias which causes Q10 to turn OFF and Q11 to turn ON to close the relay.
- (2) When power is OFF.
As explained in "b" above, the disappearance of the AC line frequency signal supplied to IC1 causes the load circuit relay to open and at off the speaker immediately. The circuit is designed to prevent reproduction of residual output energy.
- (3) Circuit action in case of trouble.
When an abnormal situation occurs, as explained under "b" and "c" above, action of these respective circuits causes Q9 to turn

ON. This further causes Q10 to turn ON, and Q11 to turn OFF. The relay which was open in the case of "b" remains open. The relay which was closed in the case of "c" then opens. Power transistors and speakers are thus protected in this manner.

5. WARNING PROTECTION CIRCUIT

A Warning Circuit using a multivibrator and centered around Q12 and Q13 within the 720-0002-00 assembly is provided for protection against incorrect speaker connection. The circuit remains inactive when the speaker system is connected correctly and operating normally.

The Meter Lamp will glow continuously to indicate this whenever the amplifier is on since Q14 will be ON to pass a steady current to the lamp.

In case of a shorted output circuit, however, RELAY-1 activates this Warning Circuit causing the multivibrator to turn Q14 ON and OFF repeatedly, which in turn causes the Meter Lamp to flash an on-off, on-off warning signal.

CHECKING THE POWER SUPPLY

A circuit breaker is provided in the power supply on the primary side of the power transformer. It functions if a fault should occur in the supply circuit to the power transistors or in the power transformer. Moreover, a fuse protects the power transformer from overheating in case of a short circuit in the secondary circuit that may not trigger the primary side circuit breaker. It is located on the printed circuit board that is mounted beneath the main chassis. It should be checked in the following cases.

- If the Meter Lamp fails to light or when the RELAY does not go ON although the circuit breaker works normally. → F1, F2 (2A)
- If no sound can be heard although the Meter Lamp lights up and the Relay goes ON. → F3, F4 (2A)
- If the Meter Lamp flashes the "ON-OFF" warning signal and the Relay does not go ON despite the fact that the speaker is disconnected. → F2 (2A)
- If hum increases substantially when the Subsonic Filter is turned ON. → F3, F4 (2A)

CIRCUIT DESCRIPTION

The bias current of a Main Drive amplifier must be stable under all operating conditions.

This is particularly so in the case of Main Drive amplifiers whose every stage is direct-coupled since instability in any one stage will adversely affect current flow in the final output stage. Good stability is ensured in this Monophonic Amplifier with the following methods. (Refer to the schematic diagram)

- (a) Careful matching of transistors Q9, Q10, Q11 and Q12 used in the first differential amplifier stage.
- (b) Constant, regulated voltage to the differential amplifier due to the use of Zener Diodes D1 and D2.
- (c) Non-drift of the differential amplifier due to the use of D3, D4, D5 and D6.
- (d) No V_{BE} drift in Q17 and Q18, as well as the driver stages Q301, Q302 and the final stages Q310 due to function of Silicon Varistor (D201:STV-3H) and Thermistor (TH1, TH2: 5TP-31L) connected between the base elements of Q17 and Q18.

The bias current for the final stage is the sum total requirement of the 4 pair power transistors and is set at 100mA.

Power consumption during no signal condition is limited to this small current drain and so creates hardly and heat.

If the amplifier operated continuously at an average power output of 50 watts, both sides of upper top plate should heat up to about 30 ~ 40 degrees centigrade (about 95 ~ 105 degrees fahr.)

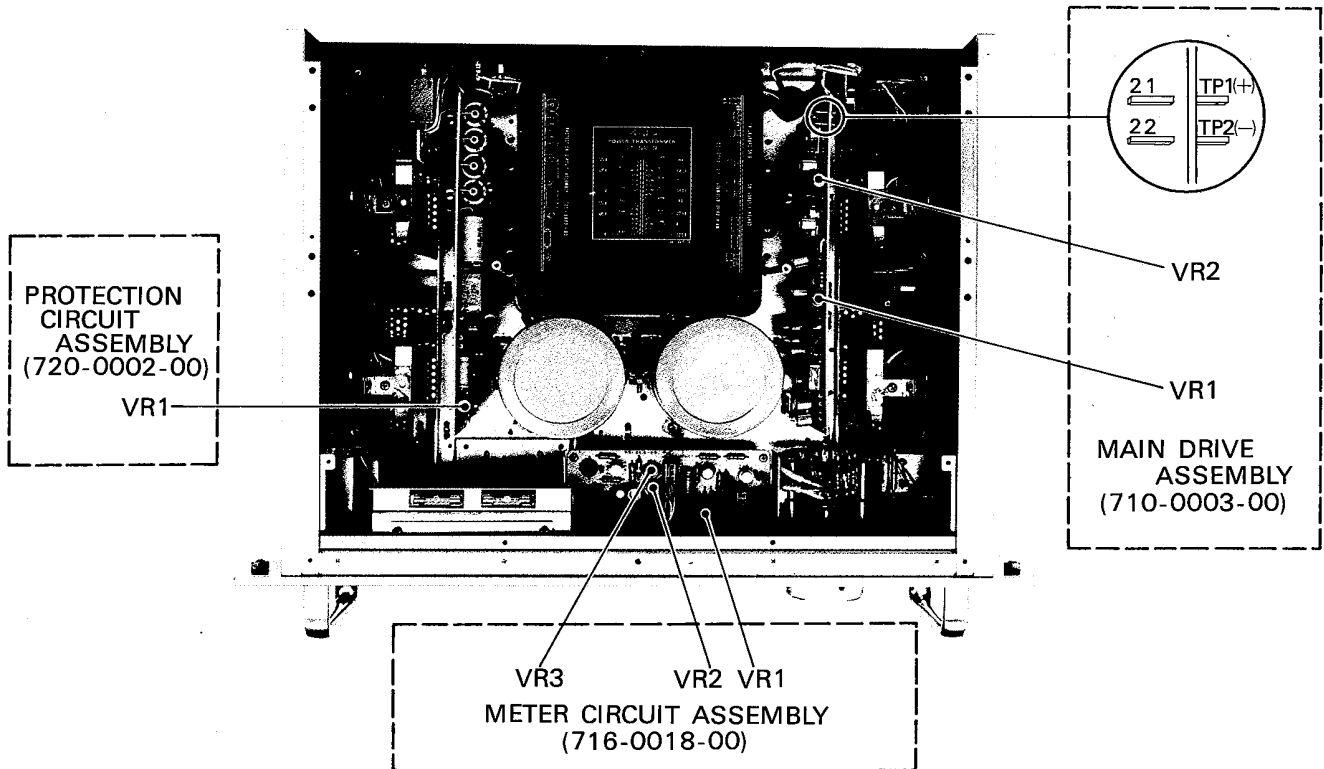
If the amplifier heats up, bias current adjustment should be made, as explained on the following page.

Bias current adjustment is also necessary when the Main Drive Assembly printed circuit board or the power transistors are replaced.

Bias current calculation and adjustment are made by means of measuring voltage as explained below.

$$I = V/R$$

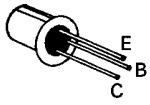
where V is the voltage measured across E to E in the final push-pull stage with a VOM tester; and R is 0.5 ohms, the resultant value of the emitter resistor in the final stage.



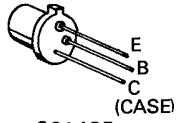
CIRCUIT ADJUSTMENT

| STEP | ADJUST ITEM | INPUT SIGNAL | LOAD | PROCEDURE | | ADJUST | REMARKS |
|--|---------------------------|-----------------------------|------------------------|---------------------------|---------------------|------------------------------------|--|
| | | | | TEST EQPT. | CONNECTING POINTS | | |
| MAIN DRIVE AMP. Assembly (When overheating is suspected, or when Printed Circuit Board or Power Transistors are replaced) | | | | | | | |
| 1 | CENTER VOLTAGE ADJ. | No Input | No Load (Open) | V. O. Meter (D. C. Range) | "SPEAKER" Terminals | Main Drive Assembly "VR 1" | For Meter Indication within $0 \pm 50\text{mV}$ |
| 2 | BIAS CURRENT ADJ. | No Input | No Load (Open) | V. O. Meter (D. C. Range) | TP1(+), TP2(-) | Main Drive Assembly "VR 2" | For Meter Indication of 50mV |
| 3 | Same as above | Sine Wave or Program Source | Speaker or Dummy Load | | | | Feed 1-10W output for about 15 minutes. |
| 4 | Same as above | No Input | No Load (Open) | V. O. Meter (D. C. Range) | TP1(+), TP2(-) | Main Drive Assembly "VR 2" | For Meter Indication of 50mV. Repeat step 1. |
| PROTECTION CIRCUIT Assembly (When Printed Circuit Board is replaced) | | | | | | | |
| 1 | MINIMUM LOAD IMPEDANCE | No Input | 1 Ω Resistor | Power Meter Lamp | None | Protection Circuit Assembly "VR 1" | 1 : Power : OFF - Set VRI fully clockwise. 2 : Power : ON - Turn VRI counterclockwise to the point where lamp stops flashing. |
| 2 | ABNORMAL LOAD IMPEDANCE | No Input | 0.75 Ω Resistor | Power Meter Lamp | None | | Turn power off. Then turn power on Lamp should flash "on-off" warning. |
| METER CIRCUIT Assembly (When Printed Circuit Board is replaced) | | | | | | | |
| 1 | PEAK-0dB CALIBRATION | 1kHz Sine Wave | No Load (Open) | VTVM | "SPEAKER" Terminals | Meter Circuit Assembly "VR 2" | Adjust input signal so that VTVM reads 48.98V. Then adjust VR2 so that PEAK meter reads 0 dB. |
| 2 | PEAK-LINEARITY ADJUSTMENT | 1kHz Sine Wave | No Load (Open) | VTVM | "SPEAKER" Terminals | Meter Circuit Assembly "VR 1" | Adjust input signal so that VTVM reads 0.49V. Then adjust VR1 so that PEAK meter reads -40 dB. |
| 3 | VOL-0dB CALIBRATION | 1kHz Sine Wave | No Load (Open) | VTVM | "SPEAKER" Terminals | Meter Circuit Assembly "VR 3" | Adjust input signal so that PEAK meter reads 0 dB. Then adjust VR3 so that VOL meter reads 0 dB. |

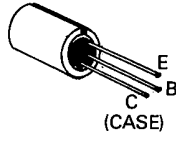
TRANSISTOR



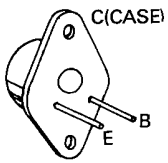
2SA856
2SA856A
2SC1746
2SC1746A



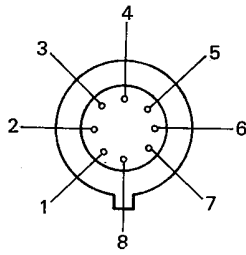
2SA485
2SC497



2SA809
2SA810
2SC1451
2SC1452

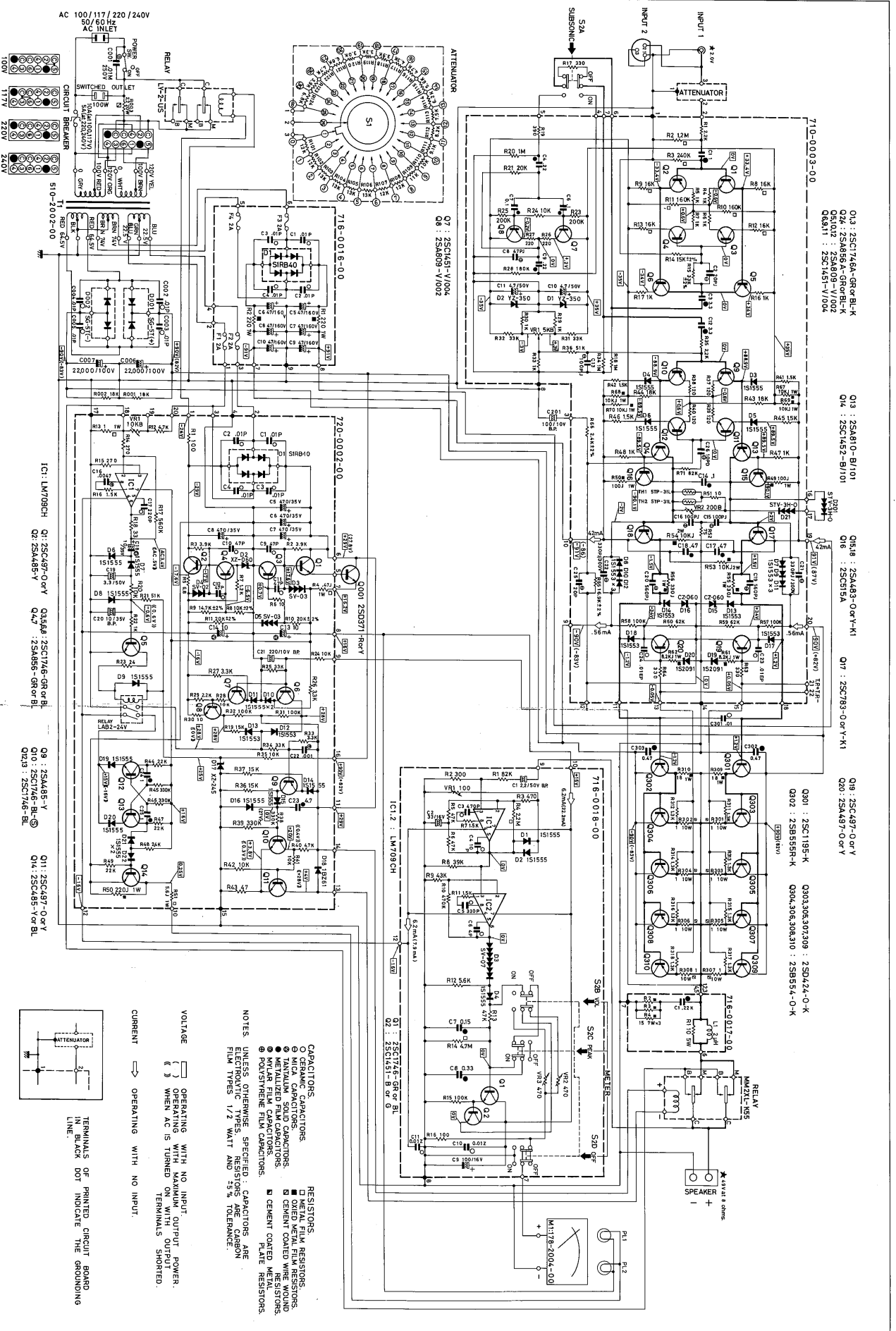


2SA483
2SB554
2SB555
2SC515A
2SC783
2SC1195
2SD371
2SD324
2SD424



IC LM709CH

SCHEMATIC DIAGRAM



- Q13 : 25C1746A-GR-or-BL-K
- Q24 : 25A856A-GR-or-BL-K
- Q5102 : 25A809-V/002
- Q6311 : 25C1451-V/004
- Q13 : 25A810-B/101
- Q14 : 25C1452-B/101
- Q1518 : 25A483-0-or-V-K1
- Q15 : 25C515A
- Q17 : 25C789-0-or-V-K1
- Q18 : 25C497-0-or-V
- Q20 : 25A497-0-or-V
- Q19 : 25C195-K
- Q202 : 25B555R-K
- Q301,306,307,309 : 25D422-0-K
- Q304,305,308,310 : 25B554-0-K

- IC1 : LM709CH
- Q7 : 25C487-0-or-V
- Q358 : 25C1746-GR-or-BL
- Q47 : 25A856-Y
- Q48 : 25C195-K
- Q49 : 25C487-0-or-V
- Q43 : 25C1746-BL-Ⓞ
- Q43 : 25C1746-BL

NOTES

- UNLESS OTHERWISE SPECIFIED: CAPACITORS ARE ELECTROLYTIC TYPES. RESISTORS ARE CARBON FILM TYPES 1/2 WATT AND 5% TOLERANCE.

CAPACITORS

- CERAMIC CAPACITORS
- MICA CAPACITORS
- ANALOG SOLID CAPACITORS
- WAXED FILM CAPACITORS
- POLYSTYRENE FILM CAPACITORS

RESISTORS

- METAL FILM RESISTORS
- OXID METAL FILM RESISTORS
- CEMENT COATED WIRE WOUND
- CEMENT COATED METAL PLATE RESISTORS

VOLTAGE

- () OPERATING WITH NO INPUT
- () WHEN AC IS TURNED ON

CURRENT

- ⇨ OPERATING WITH NO INPUT

TERMINALS OF PRINTED CIRCUIT BOARD IN BLACK DOT INDICATE THE GROUNDING LINE.

Indicated values of parts in the schematic diagram may be changed in case of performance improvement.

SPECIFICATIONS

POWER OUTPUT (from 20Hz to 20,000Hz with no more than 0.1% total harmonic distortion):

450 watts, min., RMS, at 4 ohms
300 watts, min., RMS, at 8 ohms
150 watts, min., RMS, at 16 ohms

TOTAL HARMONIC DISTORTION (from 20Hz to 20,000Hz at any power output from 1/4 watt to rated power):

4 ohms: 0.1% max.
8 ohms: 0.1% max.
16 ohms: 0.1% max.

INTERMODULATION DISTORTION:

will not exceed 0.1% at rated power output for any combination of frequencies between 20Hz and 20,000Hz

FREQUENCY RESPONSE:

20Hz to 20,000Hz: +0, -0.2dB at rated power output
2Hz to 90,000Hz: +0, -3dB at rated power output

DAMPING FACTOR:

45 (at 8 ohms load, 20Hz to 20,000Hz)

RISE TIME:

3 μ Sec.

SLEWING RATE:

25 V/ μ Sec.

INPUT SENSITIVITY AND IMPEDANCE:

2.0 Volts, 100Kohms, for rated output at the maximum level

HUM AND NOISE

100 dB below rated output

OUTPUT LOAD IMPEDANCE:

4, 8 and 16 ohms

SUBSONIC FILTER:

cutoff frequency: 17Hz 18dB/oct.

POWER LEVEL METER:

switchable for Volume Level and Peak Level.

calibrated to read OdB = 300 watts into 8 ohms load and

capable of directly reading down to -50dB (3 mW)

ATTENUATOR:

precision, 1dB stepping type

POWER REQUIREMENT:

voltage selector for 100V, 117V, 220V, 240V 50/60Hz operation

CONSUMPTION:

540 watts at zero signal output
800 watts at rated output (8 ohms load)

SEMICONDUCTOR COMPLIMENT:

47 transistors, 51 diodes, 3 IC's

DIMENSIONS:

462mm (19 inches) wide, 170mm (6-5/16 inches) high,

346mm (13-3/4 inches) deep

*mountable on 19" standard rack

rack mount pitch: 100mm (4")

rack inside horizontal measurement: 430mm (16-15/16")

WEIGHT:

27kgs (59.4 lbs) net, 32kgs (70.4 lbs) in shipping carton

The logo for Accuphase, featuring the word "Accuphase" in a stylized, italicized font. The "A" is large and prominent, with the "cc" following it. The "p" is also large and has a distinctive shape. The "hase" is in a smaller, more standard font.

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