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2. VR604, Overload Protection Level Adj. (R-ch)
3. Volume Control
4. Treble Control
5. Bass Control
6. Q901, Regulator
7. VR603, Overload Protection level Adj (L-ch)
8. F901, AC Fuse
9. F904, Pilot Lamp Protector Fuse
10. S1, Function Selector Switch
11. C001, Smoothing Capacitor
12. C002, Smoothing capacitor
13. F903, Circuit Protector
14. F902, Circuit Protector
15. T001, Power Transformer
16. VR601, Bias Adj. (L-ch)
17. Q615, Power Transistor (L-ch)
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36. M001, Power Meter (L-ch)
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38. S7, Monitor-1, Switch
39. S6, Monitor-2, Switch
40. S5, Low-Fid Switch
41. S4, Loudness Switch
42. Balance Control
43. Main Amp. PCB
44. Volume Control Amp. PCB
45. PRE Amp. PCB
46. Short Pin
47. Tone Control PCB
48. Voltage Selector
PRECAUTIONS

1. Always disconnect the chassis from power line when soldering. Turning the power switch OFF is not enough. Power line leakage passing through the heating element may destroy the transistors.

2. Never attempt to do any work on the transistor amplifiers without first disconnecting the AC line cord and waiting until the power supply filter capacitors have discharged.

3. Replacements for output and driver transistors, if necessary, must be made from the same hfe group as the original type.

4. If one output transistor burns out (open or short), always remove all output transistors in that channel and check the bias adjustment, the control and other parts in the network with an ohm-meter before inserting a new transistor. All transistors in one channel will be destroyed if the base biasing circuit is open on the emitter end.

5. When mounting a replacement power transistor, be sure the bottom of the flange, the mica insulators and the surface of the heat sink are free of foreign matter, for they may cause transistors failure.

6. Silicon grease must be applied between the transistor and the mica insulator, and between the mica insulator and the heat sink for better heat conduction.

POWER AMPLIFIER BIAS ADJUSTMENT

Instrument: DC milli-volt meter
Set volume control to minimum (Counter-clockwise) position.
Set potentiometers VR601 to min. (Counter-clockwise) and VR602 to min. (Clockwise) too before starting this procedure.

1. Connect the plus lead of a DC milli-volt meter to test point T3 (on main amp. pcb) and minus lead to test point T1.

2. Adjust the potentiometer VR601 to obtain a 6.6mV reading on the DC milli-volt meter (see Fig 1)

3. Repeat the above steps 1 and 2 for Right Channel. (use test points Pin NO. T4, T2 and potentiometer VR602).

   VR601: BIAS (IDLING CURRENT) ADJ. L—CH.
   VR602: BIAS (IDLING CURRENT) ADJ. R—CH.

CHASSIS TOP VIEW (MAIN AMP PORTION)

Fig. 1 POWER AMPLIFIER BIAS ADJUSTMENT HOOK-UP
OVERLOAD PROTECTION LEVEL ADJUSTMENT

Instruments: Audio Generator and AC VTVM
Set Function Selector to AUX position.
Be sure to make this adjustment with one channel driven.
1. Connect 4 ohm 100W resistor to output terminal (speaker-1) (L) or (R), then connect AC VTVM in parallel.
2. Turn potentiometer for level adjustment VR 603 (L-ch.) and VR604 (R-ch.) fully counter-clockwise.
3. Connect audio generator to AUX input terminal (L) or (R) and apply 1KHz (sine wave) signal. Adjust input level so that reading on AC VTVM is 20V.
4. Turn potentiometer VR603 or VR604 so that the Protection Relay is disengaged (when indication on AC VTVM is zero).
5. Adjust input level to confirm that the Relay remains activated when the output level is 18V.
6. Proceed the above steps from 2 through 5 for the other channel.

METER CALIBRATION ADJUSTMENT

Instrument: Audio generator and AC VTVM.
Set Function Selector to AUX position.
Set Bass and Treble to Flat (Center) position and Loudness, Low Filter, Switchs to “OUT” position.
1. Connect 8ohm 50W resistor to Right and Left Speaker-1 terminal.
2. Connect AC VTVM in parallel with this 8 ohm load of (L) or (R) channel.
3. Connect Audio generator to input terminal of AUX (L) or (R) channel and apply 1KHz (sine wave) signal. Adjust input level so that reading on AC VTVM is 2.83V (1W/8ohm).
4. Turn and adjust VR605 (L-ch.) or VR606 (R-ch.) so that VU meter indication 1W.
5. Then increase input level by 10dB (output 10W = 8.94V/8ohm) and make sure that reading on VU meter is 10W.

VR605 Left channel meter calibration adjust VR
VR606 Right channel meter calibration adjust VR

CHASSIS TOP VIEW (MAIN AMP PORTION)

Fig. 2 RELAY ADJUSTMENT DIAGRAM
METER CALIBRATION DIAGRAM
TROUBLESHOOTING

I Both Channel inoperative
A. If meter lamp does not light, check AC fuse F901 and
   1. If AC fuse F901 is blown
      a. Rectifier D903, 905, 906, 907 or 908 may be
         short-circuited, or
      b. Primary or Secondary winding of power trans-
         former may be short-circuited, or
      c. Capacitor C001, 002, 905, 908, 909, 910 or
         911 may be short-circuited.
   2. If AC fuse is not blown
      a. Power Switch may be faulty, or
      b. Primary winding of power transformer may be
         broken.
B. If meter lamp does light, check B1 and B2 voltages.
   1. If no voltage at B1 and B2, check AC fuses F902
      and 903.
      a. If there fuse are blown.
         (1) Repeat the above steps a and c of part 1 of
             item A, or
         (2) Check all transistor in Main Amp. circuit.
      b. If there fuse are not blown.
         (1) Secondary winding of power transformer
             may be broken, or
         (2) Rectifier D 905, 906, 907 or 908 may be
             open circuited.
   2. If B1 and B2 voltage are present, check following
      item C
C. Check if relay of Overload Protector is activated.
   1. If relay is activated when power switch is on.
      a. Contact of relay may be faulty.
   2. If relay stays disabled
      a. Output circuit may be short-circuited, or
      b. Relay may be faulty (disconnection of coil), or
      c. Transistor Q621 may be faulty (open).

II One channel inoperative
A. Check if input signal is supplied to Main Amp. input
   terminal.
   1. If input signal is not supplied to Main IN terminal.
      a. Check all transistors in Tone Control Amp.
      b. Check all coupling capacitors in Tone Control
         Amp.
   2. If input signal is supplied properly.
      a. C601 (C602 for R-ch.) may be faulty, or
      b. Contact of Overload Protector Relay may be
         faulty.

III Overload protector inoperative
A. If Relay is disengaged or comes ON and OFF at the
   peak of signal.
   1. There may be excessive input, or
   2. Overload Detector Level may be miss-aligned.
B. If relay is disengaged or comes ON and OFF at the
   small signal.
   1. Overload Detector Level may be miss-aligned.
C. If Relay does not deactivate at the excessive input or
   short-circuit of output circuit.
   1. Transistor Q621 for driving Relay may be short-
      circuited.

IV Hum and Noise
A. If there is hum at minimum volume
   1. Check each transistor in Main Amp.
   2. Check each coupling capacitor in Tone Amp.
B. If there is noise at minimum volume
   1. Check each transistor in Tone Amp.
   2. Check each coupling capacitor in Tone Amp.
   3. Check each resistor at collector, base and emitter
      ends of each transistor.
C. If there is hum or noise only in Phone Amp.
   1. Q401 or 403 (Q402 or 404 for R-ch.) may be
      faulty, or
   2. Capacitor C401, 409, 411, or 417 (C402, 410,
      412, or 418 for R-ch.) may be faulty.

GAIN DIAGRAM

*Signal = 1000Hz sine wave
## TRANSISTORS, AND DIODES

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<thead>
<tr>
<th>Symbol</th>
<th>Part No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>Q401–404</td>
<td>301201134</td>
<td>2SC1327, Phono Amp.</td>
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<tr>
<td>Q501–504</td>
<td>301201134</td>
<td>2SC1327, Tone Amp.</td>
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<td>Q601–604</td>
<td>301001134</td>
<td>2SA750(1), Differential Amp.</td>
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<td>Q605, 606</td>
<td>301201164</td>
<td>2SC1886, Pre-driver</td>
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<td>Q607, 608</td>
<td>301201150</td>
<td>2SC1567, Driver</td>
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<tr>
<td>Q609, 610</td>
<td>301001135</td>
<td>2SA794, Driver</td>
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<td>Q611, 612</td>
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<td>2SA750(1), Overload Protection</td>
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<td>2SC1619, Power Amp.</td>
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<td>Q617</td>
<td>301001134</td>
<td>2SA 750(1), Output DC Cut off (–)</td>
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<td>Q618</td>
<td>301201134</td>
<td>2SC1327, Output DC Cut off (+)</td>
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<td>Q619, 620</td>
<td>301201115</td>
<td>2SC828, Overload Protection Threshold</td>
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<td>Q621</td>
<td>301201151</td>
<td>2SC1316, Protection Relay Driver</td>
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<td>Q801, 802</td>
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<td>2SC1327, Tone Amp.</td>
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<td>Q901</td>
<td>301301131</td>
<td>2SD526, Stabilizer</td>
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<td>D601, 602</td>
<td>300919026</td>
<td>1N4003, DC Balance Requator</td>
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<td>D603, 604</td>
<td>300212009</td>
<td>STV-4H, Temperature Compensator</td>
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<td>300111010</td>
<td>1S2473, VU Meter Rectifier</td>
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<td>D607–612</td>
<td>300111008</td>
<td>1K88, VU Meter Rectifier</td>
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<td>D613</td>
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<td>TD81515, Relay Overload protection</td>
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<td>D614</td>
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<td>BZX-83C, Zener Requator 12V, ½W</td>
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<td>D615</td>
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<td>300919028</td>
<td>1N5404, Rectifier</td>
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## COIL AND SEMI-FIXED VARIABLE RESISTORS

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<tr>
<td>Ry 601</td>
<td>240111225</td>
<td>Relay, Overload Protection</td>
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<tr>
<td>VR802</td>
<td>525101142</td>
<td>50KBX2, Bass Control</td>
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<td>VR601, 602</td>
<td>510502161</td>
<td>5KB, Idling Current Adj.</td>
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<td>VR603, 604</td>
<td>510502162</td>
<td>10KB, Overload Protection Level Adj.</td>
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<td>510502162</td>
<td>10KB, VU Meter Level Adj.</td>
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<td>VR501</td>
<td>515121121</td>
<td>250KW, Balance Control</td>
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<td>VR701</td>
<td>525121136</td>
<td>100KBX2, Volume Control</td>
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<td>VR801</td>
<td>525101142</td>
<td>50KBX2, Treble Control</td>
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## OTHERS

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<th>Symbol</th>
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<tr>
<td>S1</td>
<td>601011298</td>
<td>Switch, Function Selector</td>
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<td>S2</td>
<td>601011291</td>
<td>Switch, Speaker Selector</td>
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<td>S3–S6</td>
<td>614040821</td>
<td>Switch, Push 4-Key Low-Fil, Londness</td>
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<td>(1 set) Tape Monitor-2 and 1</td>
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<td>S7</td>
<td>614010118</td>
<td>Switch, Power Supply</td>
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<td>PL001, 002</td>
<td>352063025</td>
<td>Lamp, 63V 250mA Pilot</td>
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<td>M001, 002</td>
<td>231310071</td>
<td>Watt Meter</td>
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<td>F901</td>
<td>341220040</td>
<td>Fuse, 4A, 3AG, AC Circuit Protection</td>
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<td>(Line Voltage at 100V or 120V only)</td>
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<td>F902, 903</td>
<td>341220060</td>
<td>Fuse, 6A AC Circuit Protection</td>
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<td>F904</td>
<td>341220010</td>
<td>Fuse, 1A, Lamp Protection</td>
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<td>C001, 002</td>
<td>402100339</td>
<td>Capacitor, Electrolytic 10000mfd, 35V</td>
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<td>T001</td>
<td>205001393</td>
<td>Transformer Power Supply (Multi-Voltage)</td>
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<td>204001393 Transformer, Power Supply (100V/120V)</td>
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<td>206001393 Transformer, Power Supply (220V/240V)</td>
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<td>141610280</td>
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<td>Phono, Main Amp, and Rectifier Circuit Board Assembly (without Power Amp. Transistors)</td>
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<td>Phono, Main Amp and Rectifier Circuit Board Assembly (without Power Amp. Transistors) For BS. Spec. Application</td>
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<td>Phono, Main Amp and Rectifier Circuit Board Assembly (without Power Amp. Transistors) For CEE Spec. Application</td>
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<td>Tone Control Amp Circuit Board Assembly</td>
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<td>Volume Control Amp Circuit Board Assembly</td>
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<td>Tape Monitor Lo-Fil &amp; Loudness Switch Circuit Board Assembly</td>
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<tr>
<td>141810686</td>
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<td>Tape Monitor (DIN Jack) Circuit Board Assembly</td>
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Printed in Taiwan '76 Dec.