SOLITAIRE
SERVICING INFORMATION

Testing the Module.

(Please note that when connecting the SOLITAIRE into a 'test system', that there is insufficient voltage to switch on the output relay, so the output leads must be connected to the black speaker terminal AND the transistor emitter resistor (0.47 OHMS 5W W/W).

1. Connect the + and - supply lines to an external current limiting Power Supply with max. +/- 30VDC output voltage (or use 2 x 3 30VDC supplies).

2. Rotate the biasing trimpot fully 18 turns anti clockwise.

3. Connect the amplifier to a signal source (sound tech 1700B or oscillator) which generates sine wave at 1.0kHz frequency and monitor the input and output on a dual trace oscilloscope.

4. Power the module on and check that there is no current limiting. You should be able to monitor the amp on the oscilloscope. You should see a ave with severe crossover distortion.

5. Measure the voltage drop after the 'capacity multipliers' which should be 2 volts less than the main voltage of 30VDC. If either the positive or negative devices drop more than this voltage, check their VBE and ensure that it is not more than 0.65V. If a higher value is measured, replace the device.

6. If the voltages are O.K. check the waveform on the osc. It should show crossover distortion.

7. Clip a multi meter across 0.47 OHMS 5W wire wound output stage emitter resistor and turn the trimpot clockwise until you measure approx. 0.0125V across this resistor.

SERVICING INFORMATION

If a fuse blows:

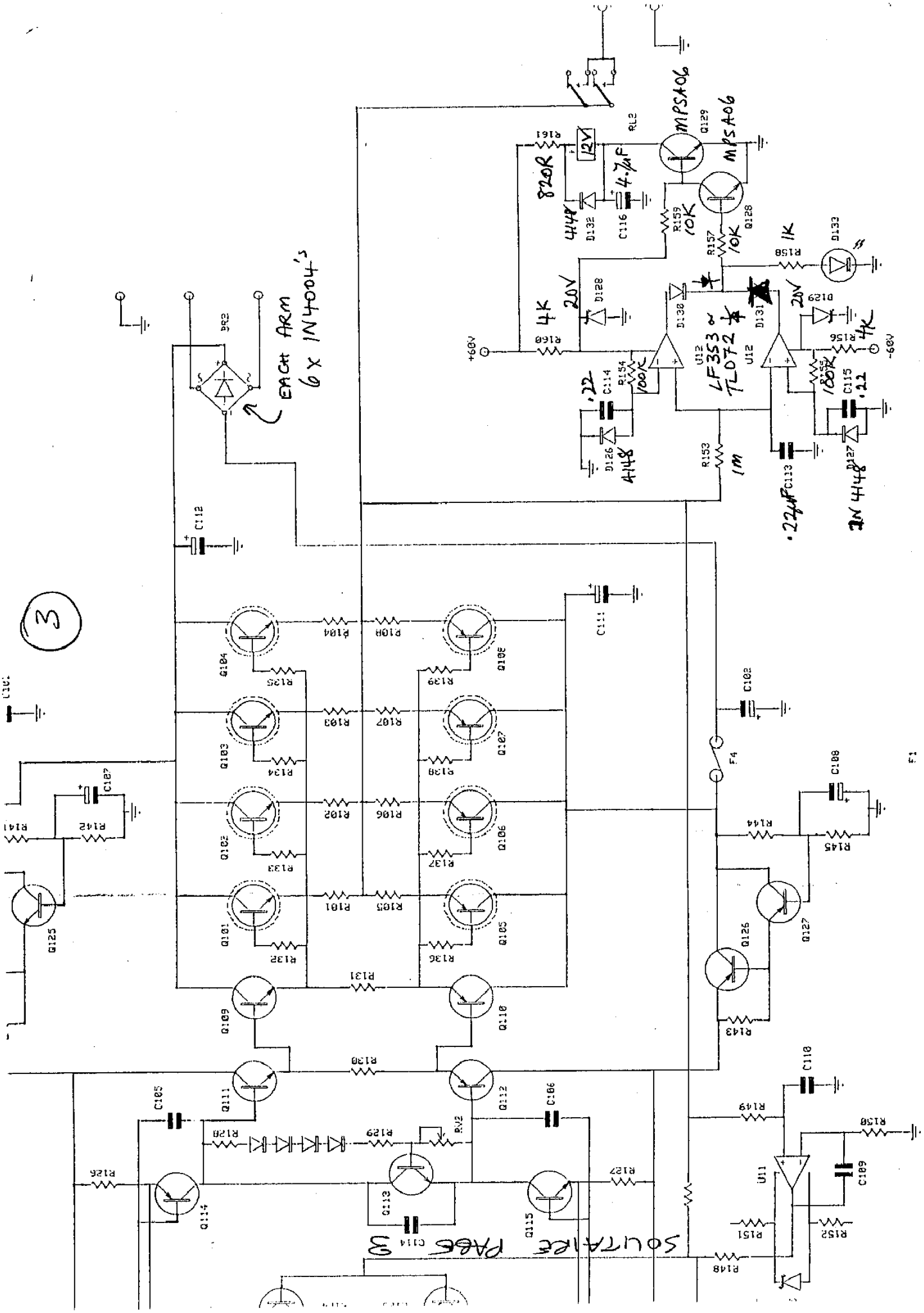
1. Measure the resistance (100R setting on FLUKE 8050A) of the power and driver transistors between all 3 terminals. If any reading is less than 100R the listed devices must be replaced. **Q1-10 and Q101-110.**

2. If necessary, remove the module from the chassis and return to M.A.S. or accredited servicing agent.

TESTS:

1. **DC PROTECTION CIRCUIT:** To check the correct operation, connect a 'DC Source' - a battery, etc, across the BLACK speaker terminal and at the junction of the 1.0 MEGA OHM R53 or R153 /0.22 mF C13/C113 input network which is closest to the TL072/LF353 I.C.

   Please note that if you connect it to the wrong side - the output of the amplifier, it acts as a short circuit and can destroy the amplifier!


EACH ARM
6 x 1N4004's
MPSA06
MPSA06
LF353 or TL072
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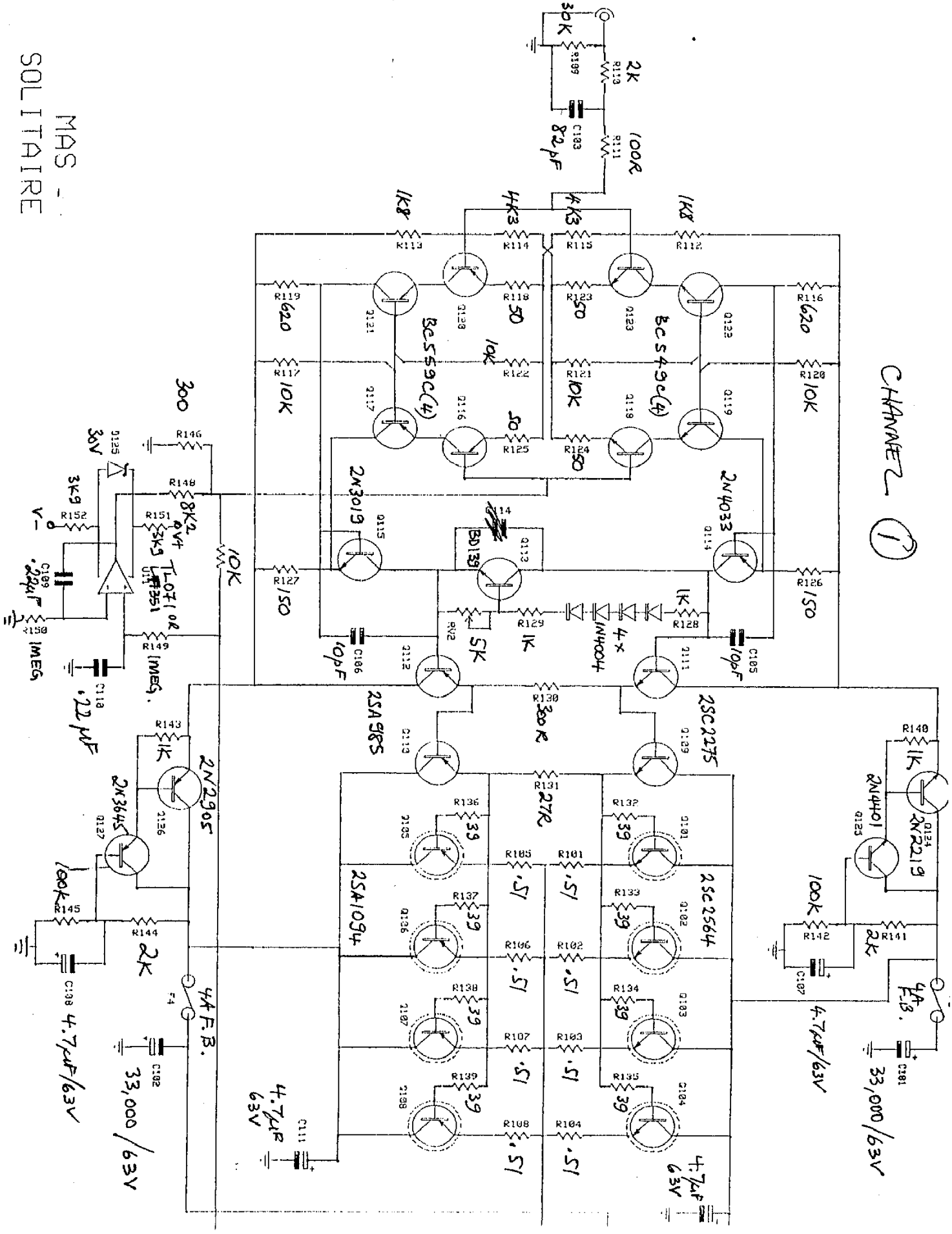
3

SOLITAIRE PAGE 1

MAS - SOLITAIRE



2. **DC SERVO:** Using a high quality multi meter, measure the DC offset between the BLACK and RED speaker terminals. It should be around 0.002 VOLTS or less. If it is more than 0.05 VOLTS, the TL071 I.C. should be replaced.

3. **OUTPUT TRANSISTOR BIASING:** The SOLITAIRE has 4 pairs of output transistors and when 'biasing' the amplifier it is wise to check the biasing of **ALL** the output transistors to ensure that one or more of the devices are not conducting more current than the others. This is especially important when replacing a power transistor. Also check the different biasing currents between the NPN and PNP devices. If there is a large discrepancy, replace the 'driver transistor' (also mounted to the heat sink).

VOLTAGE CHECK

VOLTAGE FROM MAINS SUPPLY. Can be measured at the FUSE HOLDERS or the COLLECTOR (middle pin) of either the Power Transistors or Driver Transistor.

Depending on the country and mains voltage fluctuations, this voltage should range a minimum of 55VDC - 60VDC.

VOLTAGE AND INPUT STAGE. This tests that the "CAPACITOR MULTIPLIERS" are correctly functioning.

Measure across the metal can collectors of the transistors Q24/Q11, Q26/Q12 and Q124/Q111, Q126/Q112.

The voltage drop should be approximately 2VDC.

VOLTAGE ON OUTPUT TERMINALS

Place you probes across the speaker terminals and measure less than 0.05VDC. If the DC Protection circuitry is operating, you must measure this voltage between the BLACK speaker terminal (EARTH) and the junction of resistors R101/102/103/104/105/106/107/108 on the PC Board (ie., before the relay).

BIASING VOLTAGE refer to SOLITAIRE MANUAL.

POTENTIAL PROBLEMS OR FAULTS

1. Blown outputter Driver transistors. This can happen because:-

a. Incorrect connection of interconnect cable (common problem is a "floating ground connection").

b. Short circuiting the output terminals.

PLEASE NOTE: In many cases, when a fault arises, it is only ONE transistor which may be damaged. Using a multi meter, measure the impendance between any two pins (CE, CB, BE) until you find the device with the lowest resistance. Remove this device OUT OF THE CIRCUIT, then measure the other transistors again. If their impendance is greater than 100 Ohms, they are okay.

2. Blown Input Stage Transistors.

This fault can arise and will manifest itself as an amplifier which will not function on the test bench. Simply measure the VBE of the input stage devices and confirm that this sis the problem. Then replace these devices with matched sets of devices supplied by the factory.

3. Faulty DC Protection Circuit.

a. Measure voltages to U2/U12 to ensure that power supply is not at fault.

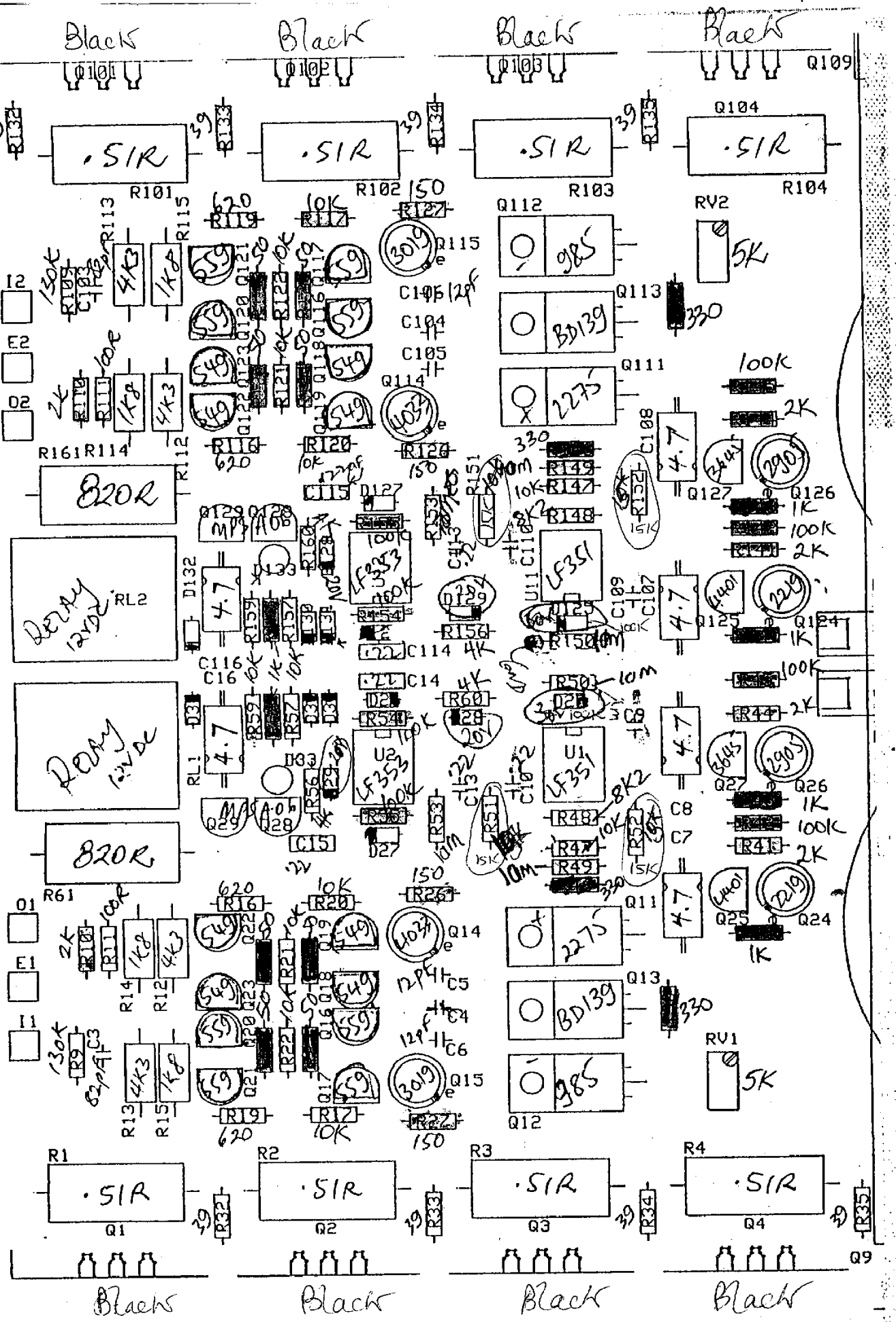
b. Replace MPSA06's if U2/U12 seem to be operating correctly.

4. Biasing Trimpot Has No Effect.

Replace Q13/Q113.

IF FAULT PERSISTS:

Remove complete module, including heat sink bracket and back panel (RCA inputs etc) and return to factory for repair.


Black
Black
Black
Black
Q101
Q102
Q103
Q109
Q104
R101
R102
R103
R104
.51R
.51R
.51R
.51R
Q112
Q113
Q111
Q115
Q114
RV2
5K
I2
E2
O2
R161
R114
R112
820R
RL2
RL1
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Q127
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Q27
Q26
Q25
Q24
Q11
Q13
Q12
RV1
5K
R1
R2
R3
R4
Q1
Q2
Q3
Q4
Q9
Black
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Black