

Kentech Instruments Ltd.

Notes
for
SIMCART power supply

Kentech Instruments Ltd.,

Unit 9, Hall Farm Workshops, South Moreton, Didcot, Oxon, OX11 9AG, U.K.

International tel: (44) 1235 510 748 International fax: (44) 1235 510 722
email info@kentech.co.uk

This power supply has
the following specification:-

Input voltage of 12 volts DC $\pm 15\%$

Input current 1.8 amps average

Outputs

- 1 +4kV at 20 μ A adjustable in 500volt steps
- 2 +1kV at 100 μ A adjustable in 50volt steps
- 3 -1kV to +500volts at 100 μ A adjustable in 50volt steps.
- 4 +1kV 20 μ A adjustable in 100volt steps
- 5 -4kV at 2mA fixed (for pulse generator use only)
- 6 -3kV at 1mA fixed (for pulse generator use only)

It consists of four PCBs. On early models these were not through hole plated and care should be taken when replacing components as soldering on both top and bottom may be required.

Board 1

This is the main logic board. It contains the crystal controlled oscillator and the feedback controls for the four adjustable supplies. These four supplies use a preset voltage coupled with the feedback signal to determine the mark to space ratio of the drive signal to the main inverters. Supplies 5 and 6 are high current fixed supplies that use dedicated chips for each rail power supply. All six rails run off the same 34.8kHz clock. This helps prevent the rails "talking" to each other.

The power supplies use both AC and DC feedback so that power rails rise and fall smoothly with no overshoot.

Board 2 contains outputs 4 and 5.

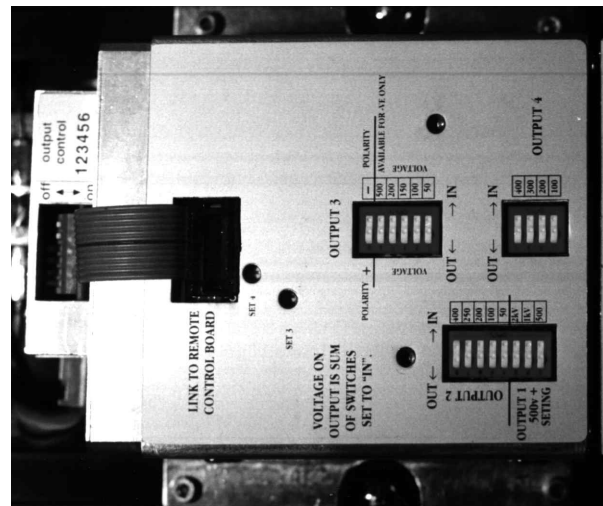
Board 3 contains outputs 3 and 6

Board 4 contains outputs 1 and 2

We have recently been able to upgrade output 1 to deliver 6kV as a special for French X-ray imagers.

USING THE POWER SUPPLY

Each output may be turned off or on individually via a set of DIP switches. These are accessed through a recess in the cover to the remote control board. They are suitably labelled. In addition the maximum voltage from each output may be set with a potentiometer. Outputs 3 and 4 are on the top panel whilst 1, 2 and 5 are on one side and 6 on the opposite side. It will be necessary to lift the power supply out of the SIMCART to change 1 and 2. In normal use (as set at the factory) the output in question should be switched to its maximum output and then the potentiometer used to set the maximum voltage. The indicated step voltage settings will only be accurate when the overall voltage is set to that specified above for each power supply.



2.7 ADJUSTING THE VOLTAGES ON SUPPLIES 1 THROUGH 4.

These four supplies are adjustable by means of dip switch settings on the top of the unit. A panel is screwed down over these switches to prevent inadvertent changing of the settings. The output voltage will be the sum of all the switches set to the “in” position, with the exception of supply 1 which is 500 volts plus the sum of such switches. Output 3 also has a polarity switch and can cover the range -1kV to +500 V. At shipping this is connected to the bias control unit.

2.8 CONNECTIONS TO THE POWER SUPPLY.

The connections are made via seven Lemo connectors accessible from the bottom of the unit as shown. Outputs 1, 5 and 6 which are higher voltages are on size '0' high voltage Lemo connectors. All the others and the 12 volt DC input are on size '00' Lemo connectors.

APPLICATION

The four adjustable supplies were intended for the following applications although it is for the user to use them as he wishes.

- Supply 1 phosphor bias
- Supply 2 MCP bias
- Supply 3 Second MCP bias Normally the one to be gated.
- Supply 4 Photodetector bias.

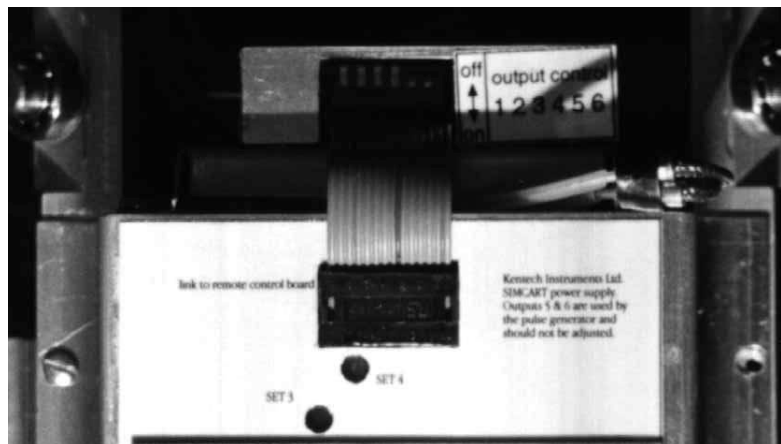
The two fixed supplies drive the pulse generator. Output 5 drives the four output cards and trigger amplifier card. Output 6 drives the trigger card. The preset potentiometers for these supplies should not be adjusted.

2.10 REMOTE CONTROL OF THE POWER SUPPLIES

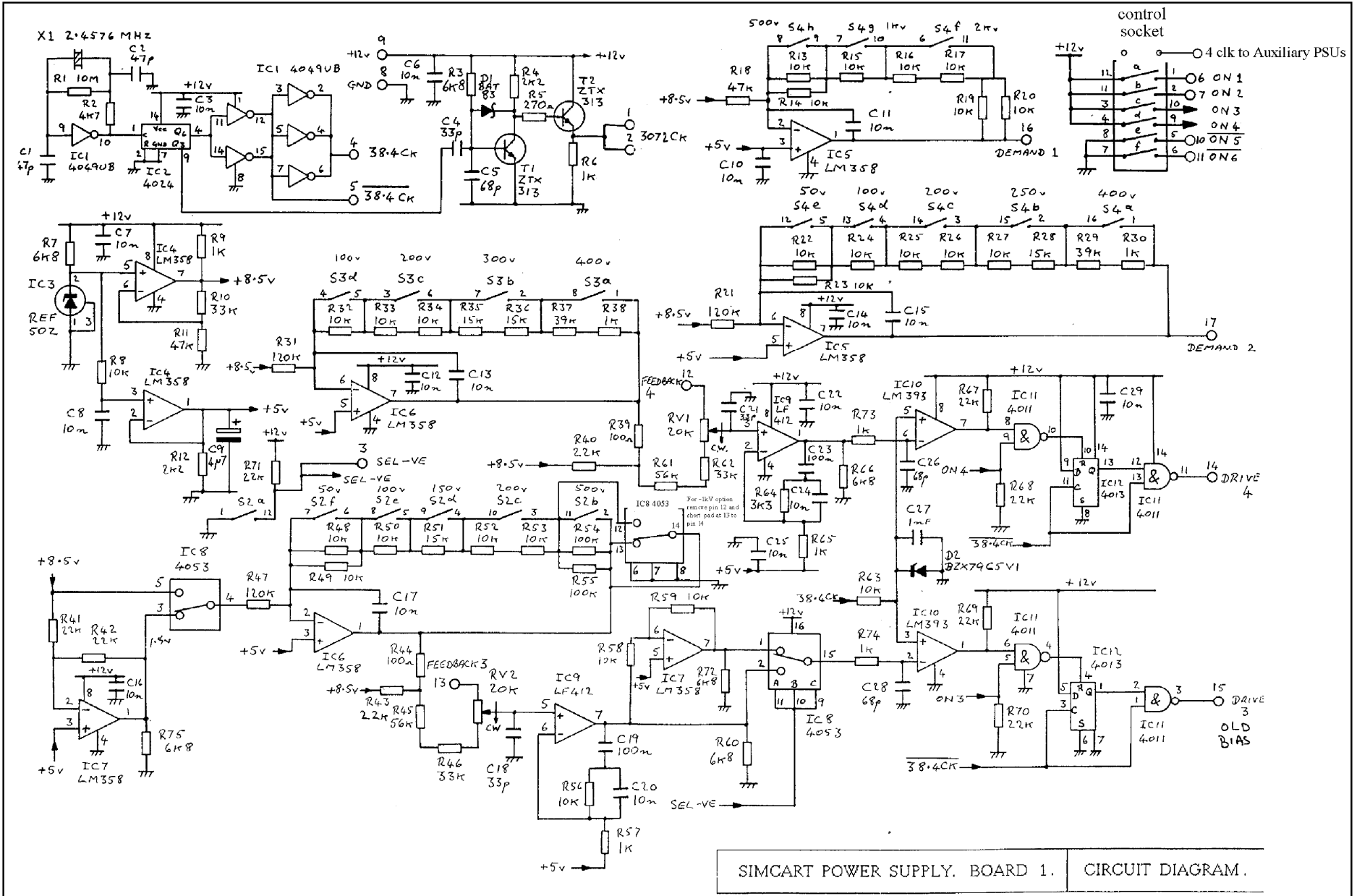
The turning on and off of the power supply rails can be performed remotely via an eight way lead. The eight leads are as follows, six to control the six rails, one to switch from local to remote mode and the ground. All controls are active high and require about 12 volts. All these controls are via fully isolated relays, including the ground which is kept separate from the pulser and chassis ground. In this way it is hoped that the pulser and other em radiation sources will not affect the control of the power supply. It should not be necessary to screen these leads.

The colour code for the connections to the remote control board is marked on the cover and is as follows.

- grey remote mode on
- lilac isolated ground
- blue output 6 on
- green output 5 on
- yellow output 1 on
- orange output 2 on
- red output 3 on
- brown output 4 on

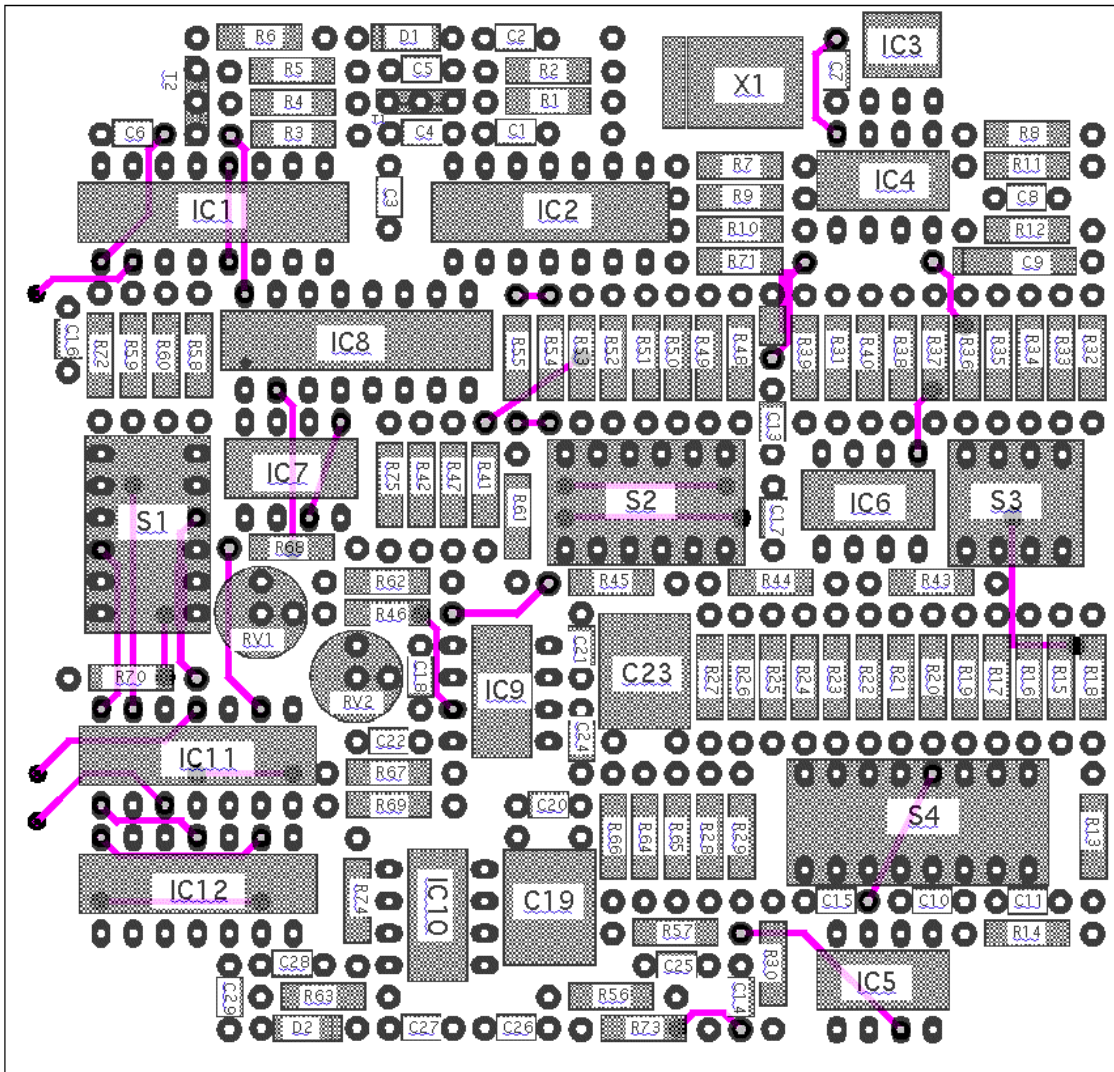


The remote control board is connected to the power supply by way of a short ribbon cable with a dual in line IDC connector. If required, this can be disconnected and the power supply controlled as normal. In this case a 6 or 7 way switch is required. If a seven way switch is installed then only 6 switches are used, the one on the left (when reading the text the right way up) is not used. Similarly if a 6 way switch is installed then it should be installed to the right of the 14 pin socket, leaving the left two pins free. This is because 12 way connectors are not available.

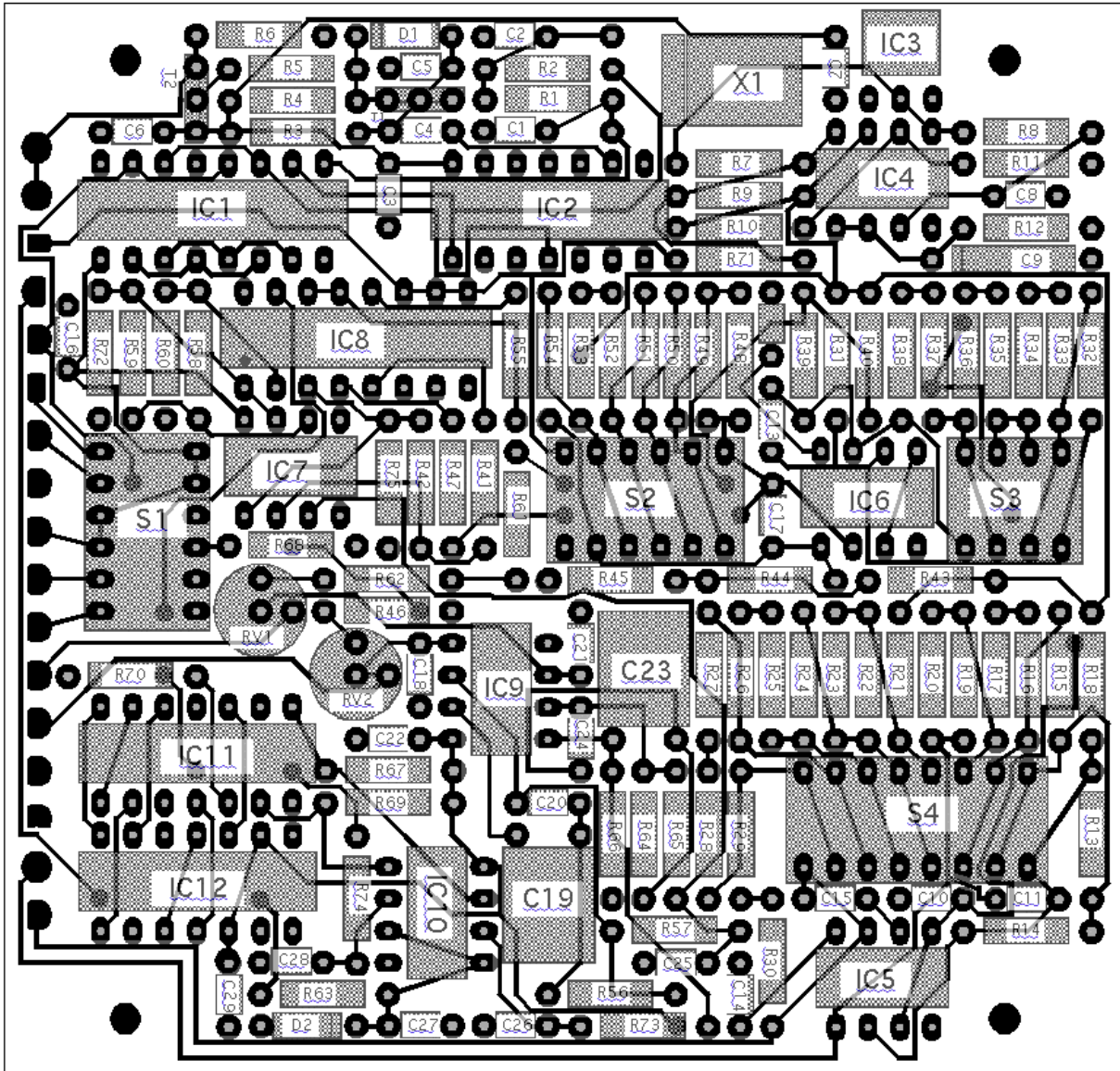


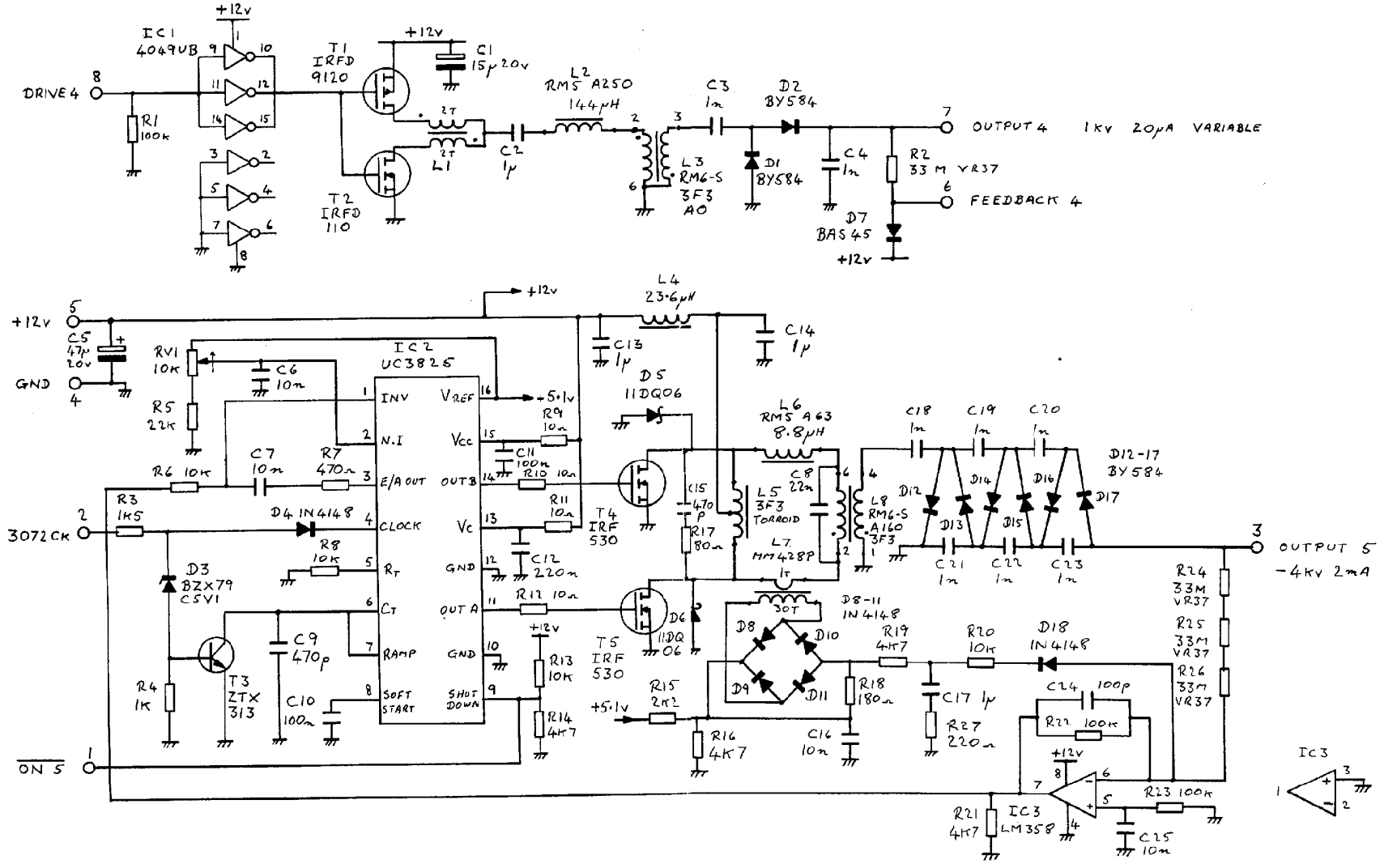
SIMCART POWER SUPPLY. BOARD 1. CIRCUIT DIAGRAM.

Board 1 components and top tracks and pads



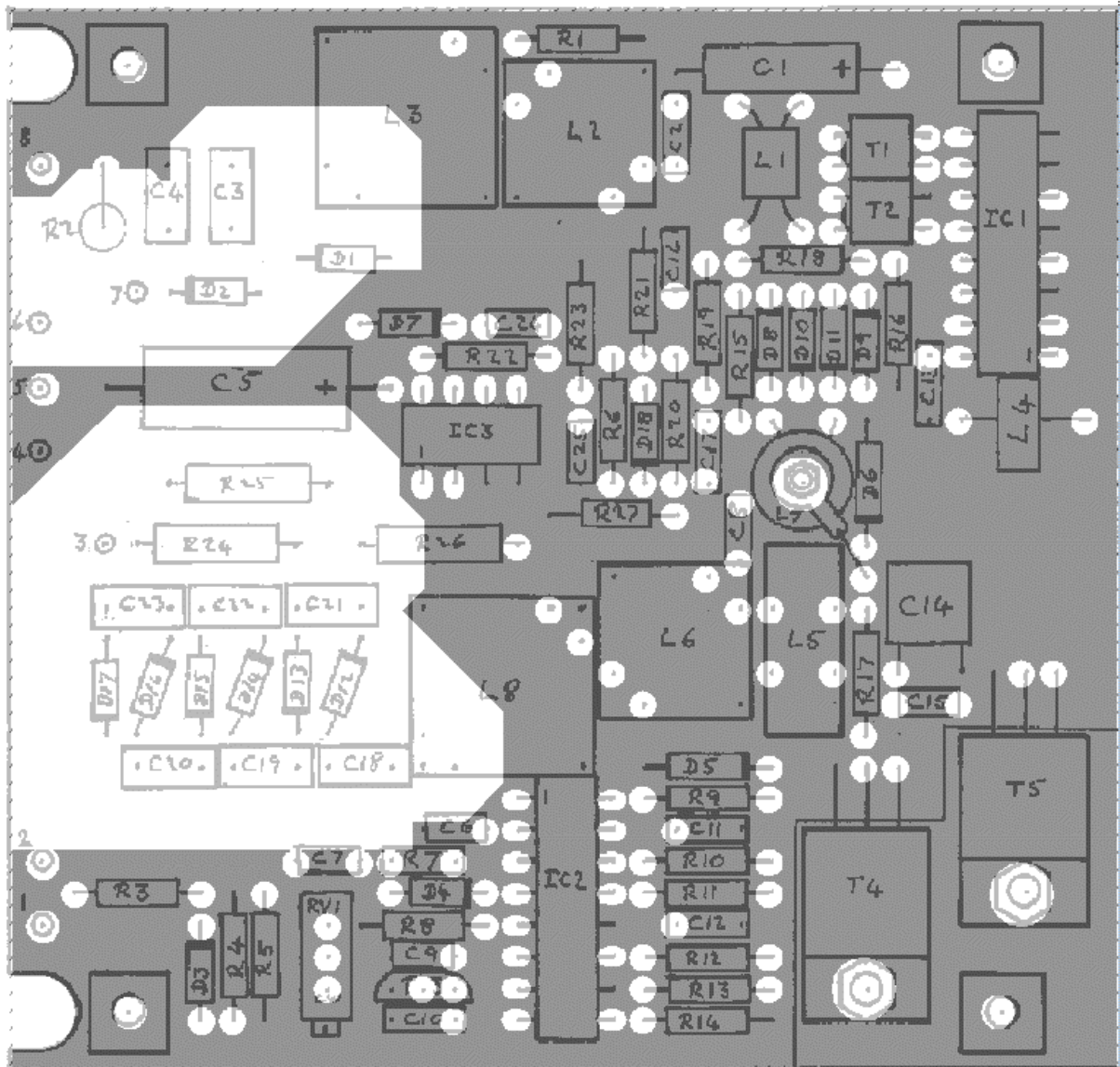
Board 1 components and bottom tracks and pads viewed from top



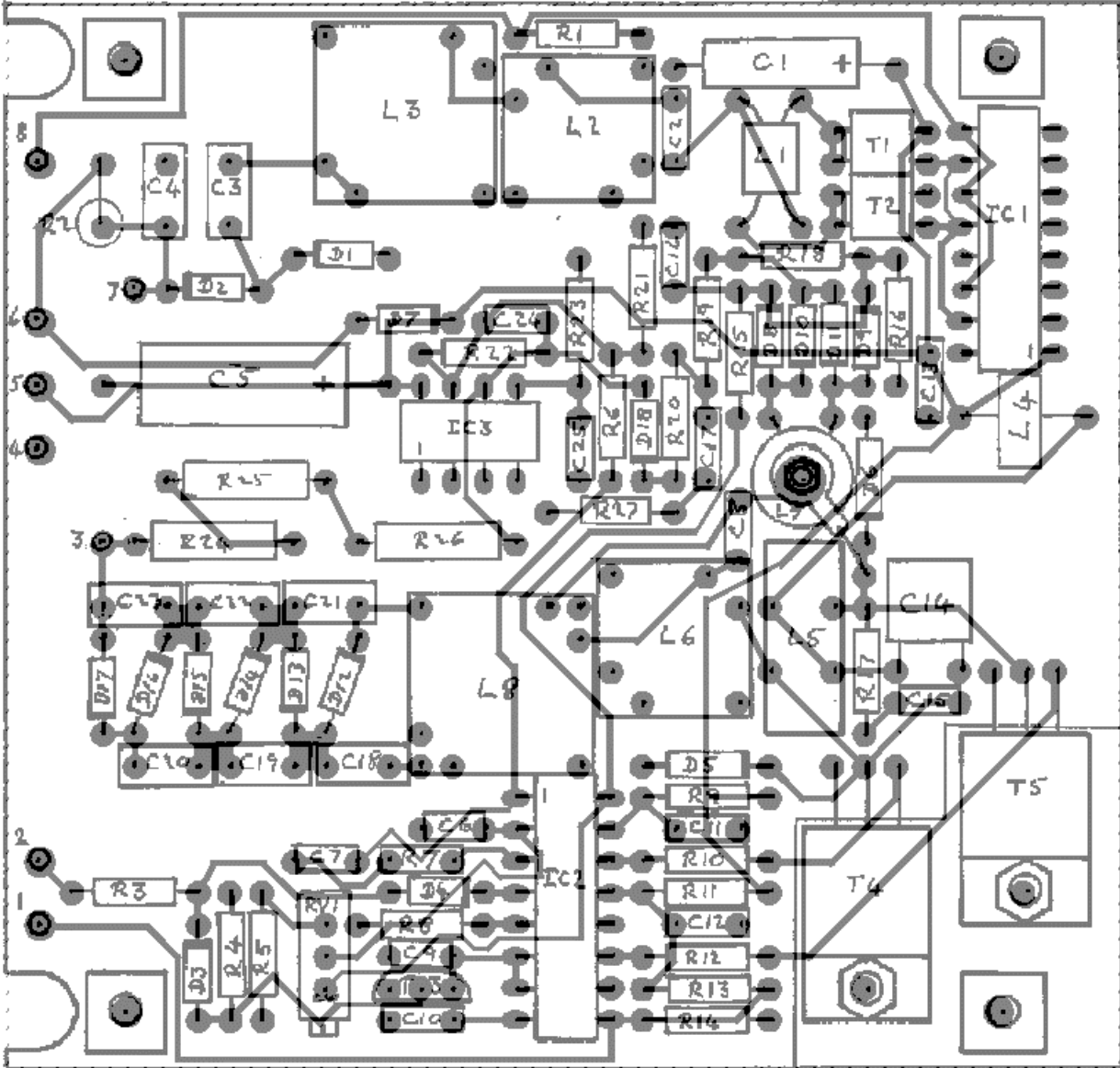


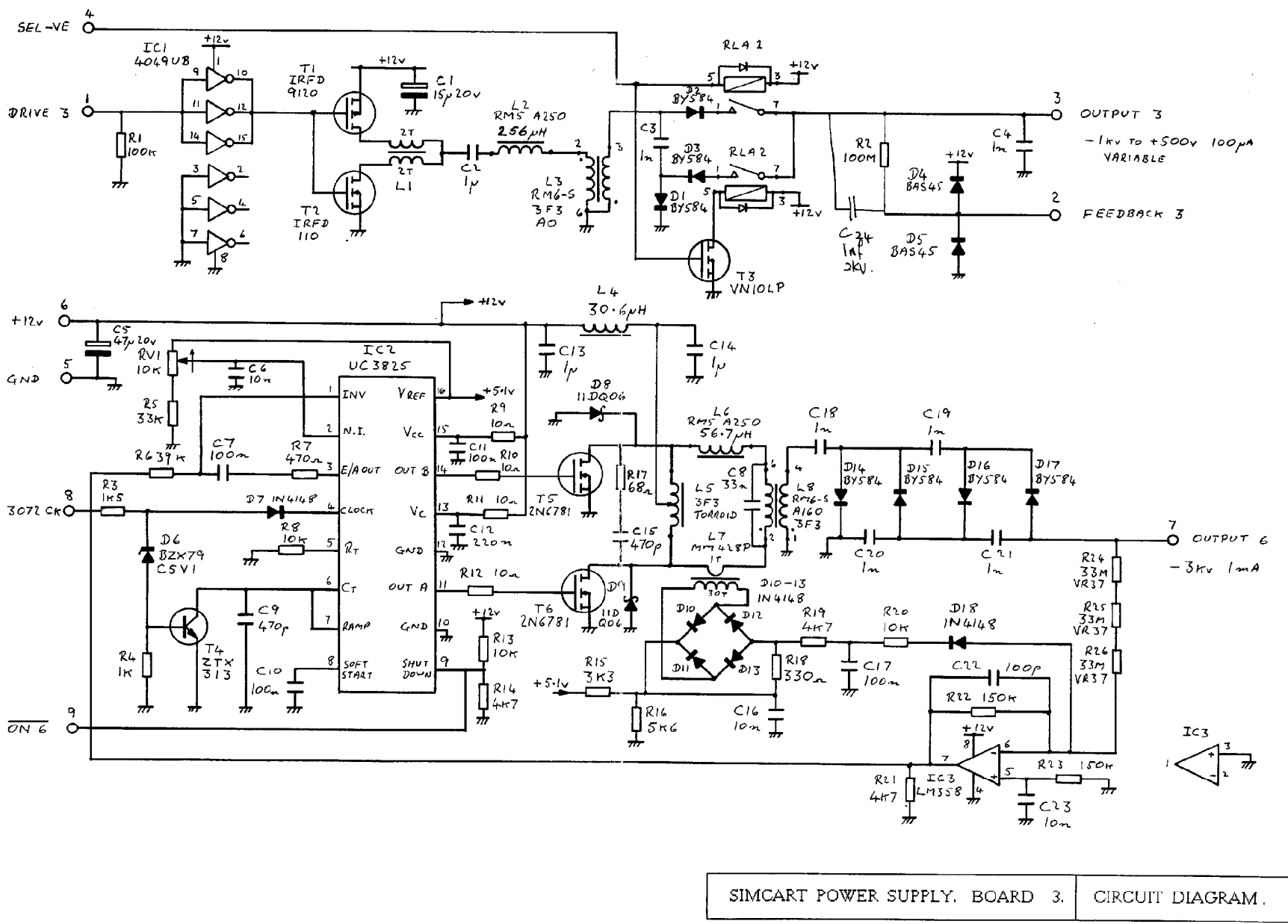
SIMCART POWER SUPPLY BOARD 2. CIRCUIT DIAGRAM.

Board 2 components and top pads viewed from top



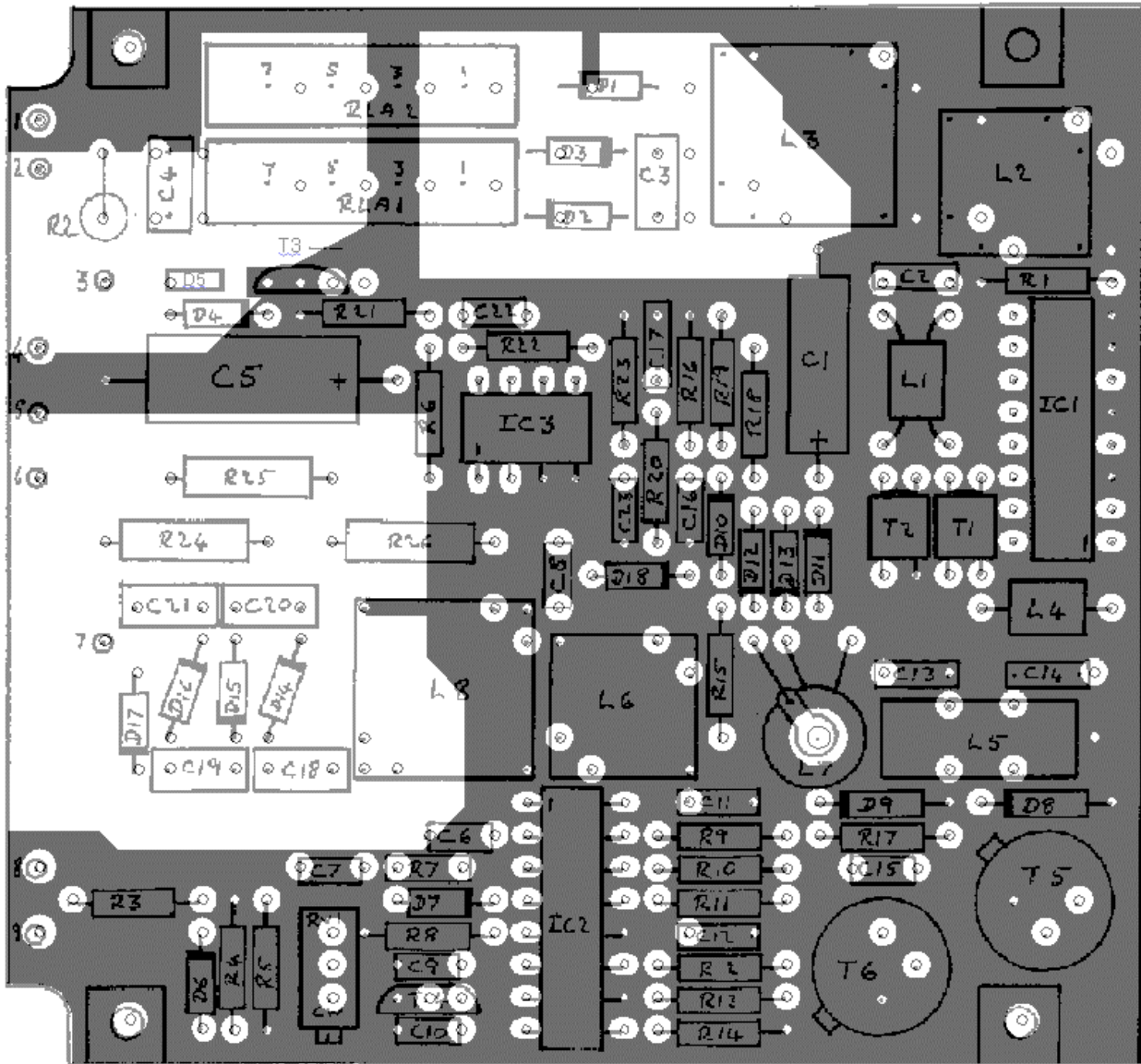
Board 2 components and bottom pads and tracks viewed from top



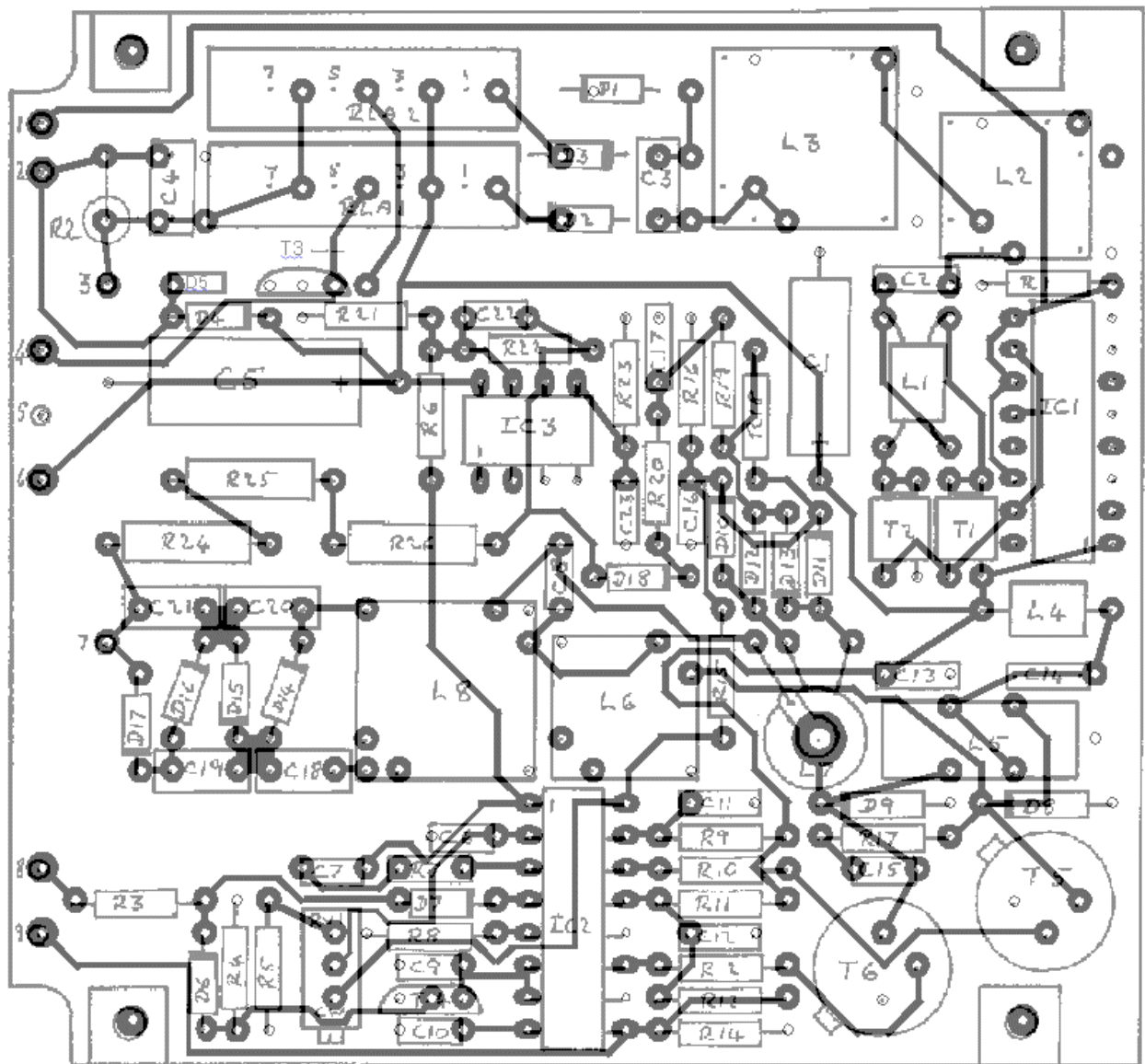


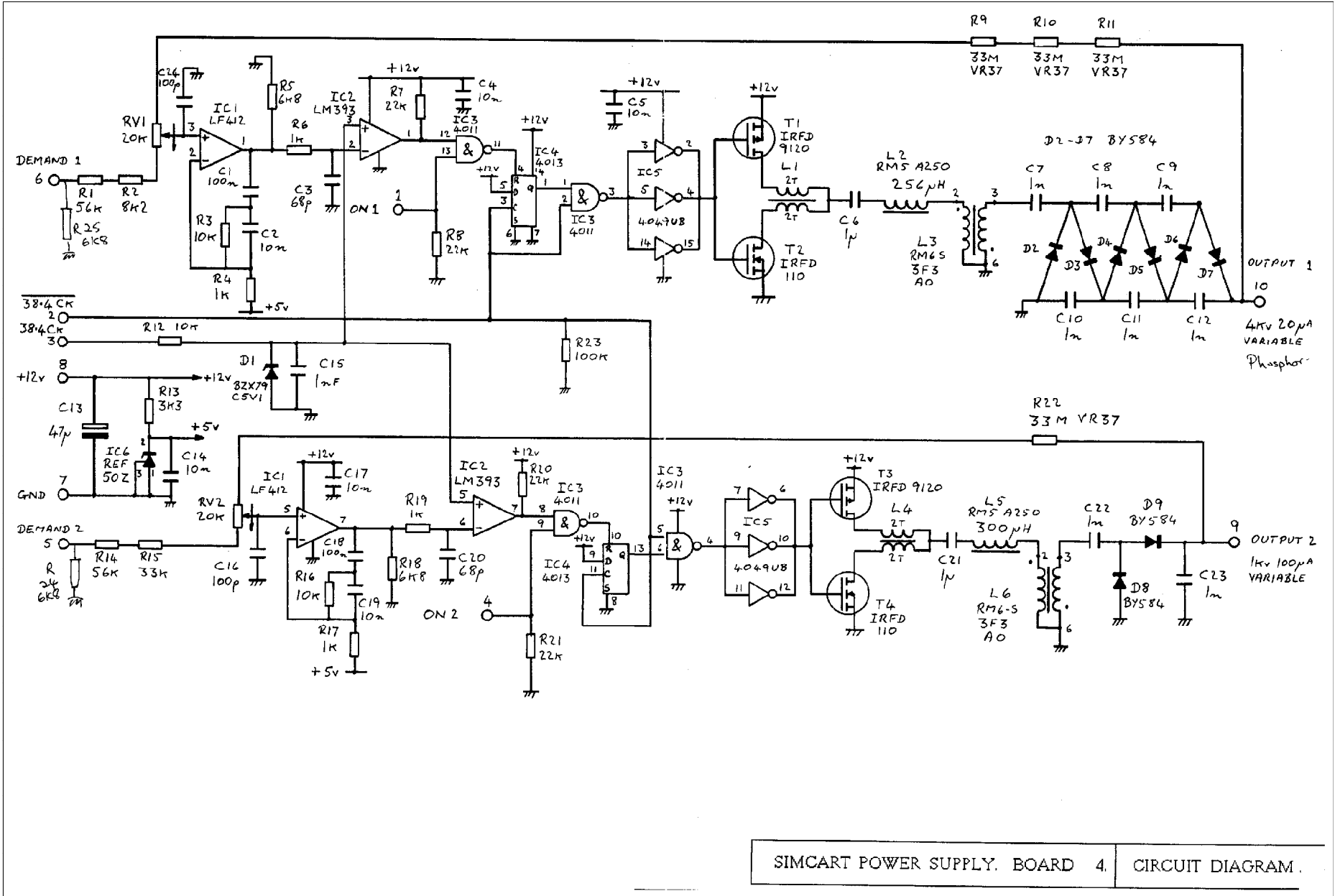
SIMCART POWER SUPPLY, BOARD 3. CIRCUIT DIAGRAM.

Board 3 components and top pads viewed from top



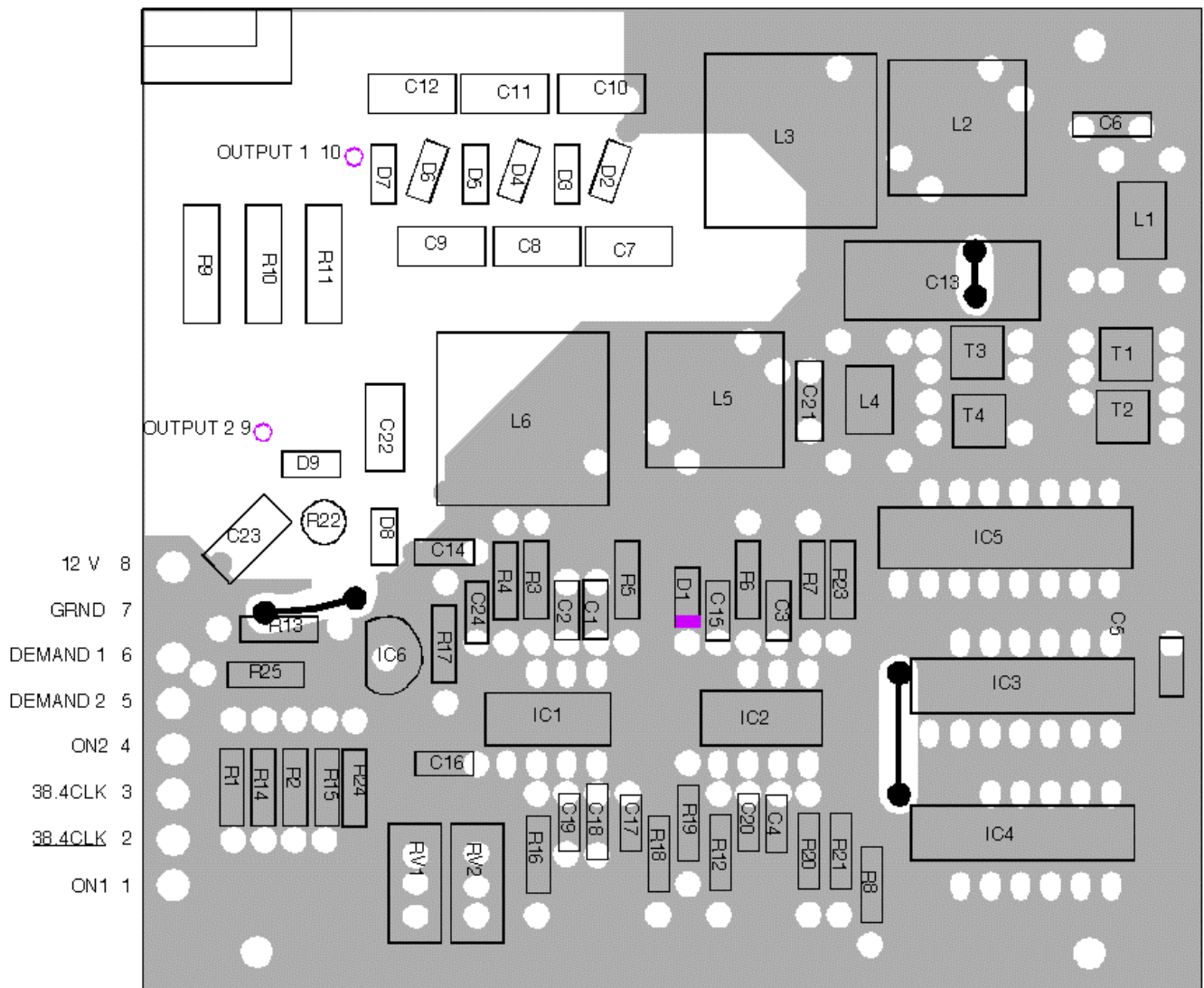
Board 3 components and bottom pads and tracks viewed from top





SIMCART POWER SUPPLY. BOARD 4. CIRCUIT DIAGRAM.

Board 4 components and top pads viewed from top



Board 4 components and bottom pads and tracks viewed from top

