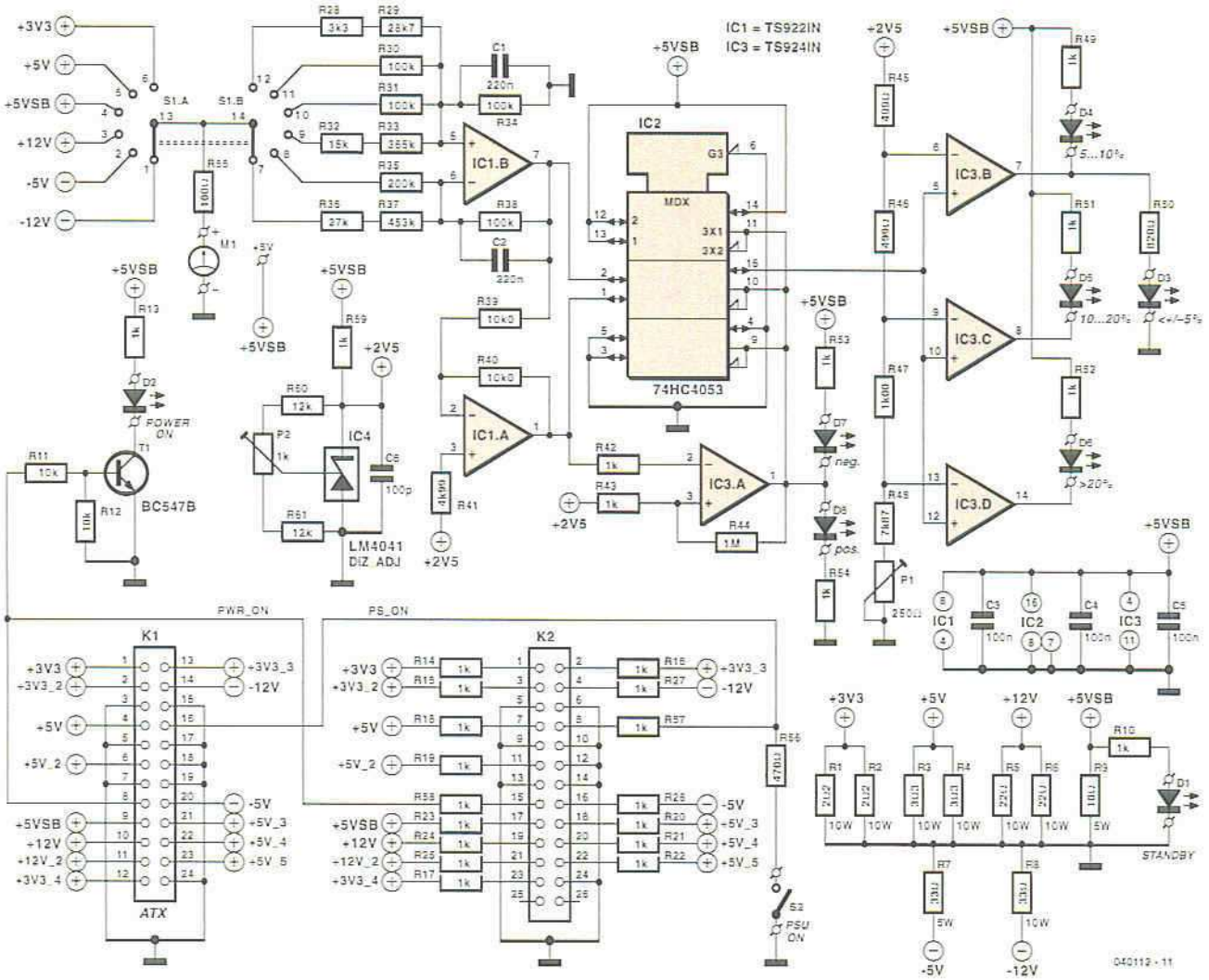

Figure 2. The measurement circuit itself is fairly small. A lot of room is taken up by the power resistors (R1-R9), which load the power supply.

standby, +12 V, –5 V and –12 V. The standby voltage (+5VSB) is always present as long as the mains is connected. This voltage is therefore used as the supply for the tester (**Figure 1**). LED D1 is driven directly from the +5VSB supply and hence indicates that the mains is turned on and that the power supply has at least a working standby voltage.

The power supply is turned on by closing switch S2. This pulls pin PS_ON sufficiently low via R56. According to the specification this pin should be <0.8 V at 1.6 mA. A value of 470 Ω for R56 achieves this. The PWR_ON output, also called PWR_GOOD or PWR_OK, is used by the power supply to show that the most important outputs (+12 V, +5 V and +3.3 V) are within their limits and can supply a nominal current. When this signal is active, D2 lights up. Since this output can only source 200 µA at a minimum voltage of 2.4 V, a buffer stage consisting of R11, R12 and T1 has been added.

Once the mains is turned on (and D1 and D2 are lit), S1 is used to select the voltage that is connected to the input of amplifier IC1b.

S1 is a 2-pole 6-way rotary switch (it has to be a break-before-make type, otherwise you'll introduce shorts in the outputs). The first switch selects the supply voltage to be tested. The common output of this switch is also connected to a PCB pin (via a 100 Ω resistor for protection). It is possible to connect a small voltmeter module to this pin, so that the absolute value of the selected voltage can be seen. Next to the connection for the meter (M1) is an extra PCB pin with +5 V for the voltmeter module.

The selected voltage makes its way via the common of S1b to one of the potential dividers connected to the inputs of IC1b.

Each resistor combination gives the right amount of attenuation to the chosen voltage such that the output of IC1b will be a nominal 2.5 V at every position of S1. There is no need for a symmetrical power supply to measure negative voltages because IC1b is a rail-to-rail type opamp. With positive voltages IC1b functions as a non-inverting buffer. The two negative supply voltages are inverted and attenuated.

We now take a small jump to the tolerance LEDs in the circuit (D3-D8). According to the ATX specification all voltages should be within ±5%, with the exception of -12 V, which may be ±10%. We have therefore chosen four tolerance ranges that are covered by the LEDs: <5% (green LED D3), 5-10% (yellow LED D4), 10-20% (red LED D5) and >20% (second red LED D6). The range division at 10% was used to give you the choice whether to accept that deviation or