the opamp stable (it is internally compensated for a gain of 2). Despite this precaution, the input stage will oscillate when the input is open and no input capacitance is present. You should therefore always terminate the input with a resistor (maximum 1 kΩ) when testing the circuit.
The opamp output signals are summed by resistors R16–R19. Together with C15/C16, they also provide the passive 75 µs correction portion of the RIAA curve, which means that any high-frequency noise present at this point is filtered out. The components are dimensioned with fairly low resistance values to keep the thermal noise of this passive network as low as possible. After all, we don't want to spoil the low-noise output of the parallel opamp input stage with noisy downstream components.

A brief remark about the capacitors used in this circuit: Ceramic capacitors are about the worst possible choice for audio circuits. Here our aim is to have the best possible sound, so we use 1% polystyrene capacitors in all key locations. They are expensive, but unquestionably the best choice for this design. For many of the capacitors there are several footprints on the PCB, so you can also use other capacitor types (MKT or MKP, for example).
The next stage, built around IC5A, provides a gain of 40 and the two remaining time constants of the RIAA correction curve at 3,180 and 318 µs, which are determined by the feedback network R20–R25/C17–C18. These two values are exactly a factor of 10 apart, so the gain drops from 40 to 4. If you want to know how the exact values for the correction networks were calculated, please see the project description on the Elektor.Labs website [1].

Next there is a buffer stage built around IC5B. This opamp has a passive low-pass filter (C19/R26) at the input with a corner frequency of 10 Hz, which suppresses any very low frequency signals from the record player drive mechanism. There is lots of room on the board for this 2.2 µF capacitor, so you can use a polypropylene type (which has better audio charac-

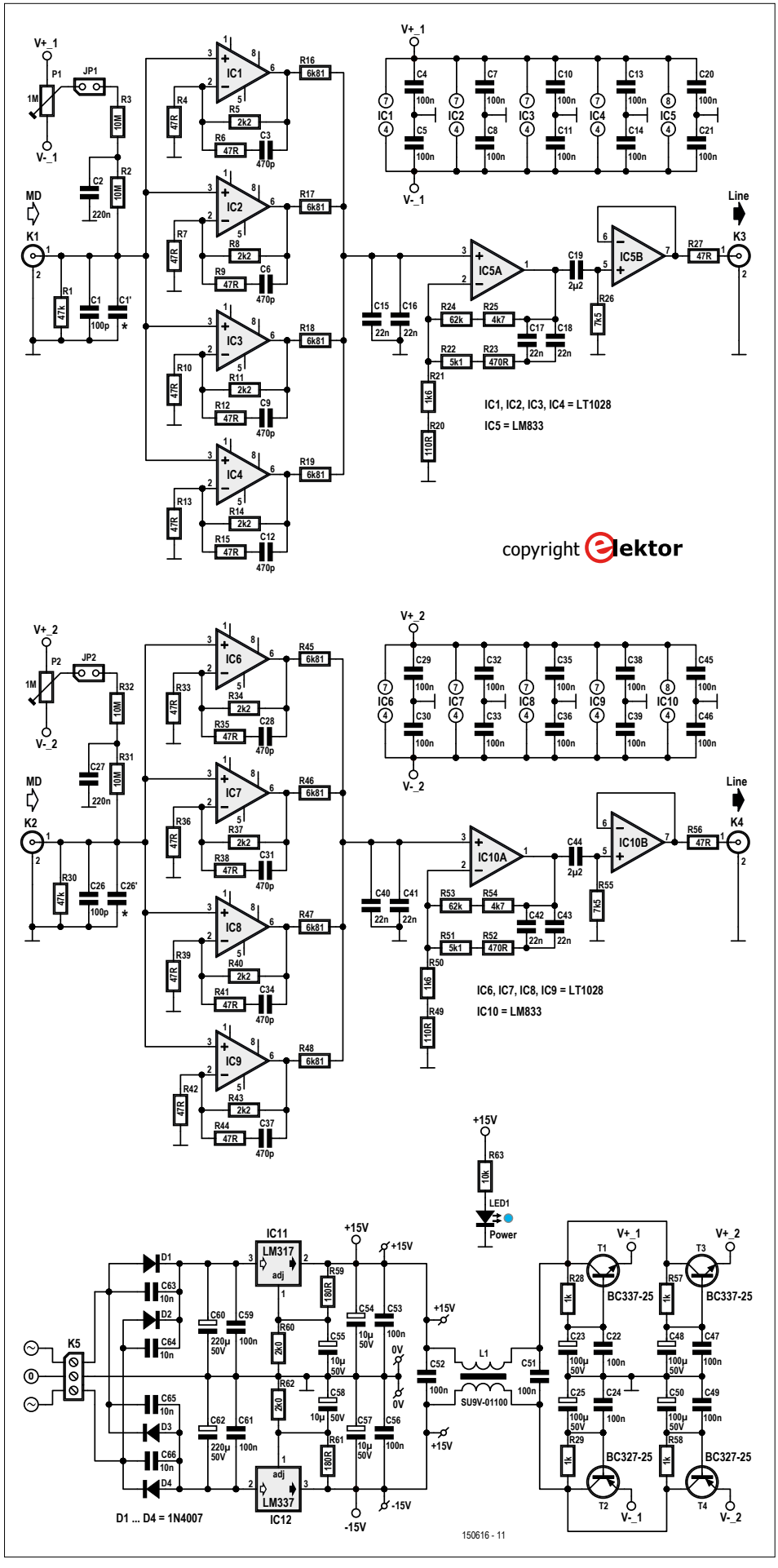

Figure 2. The schematic diagram of the low-noise preamplifier, with four paralleled opamps in the input stage of each channel.