DEF: A circuit block is a part of a circuit one can draw a box around with only two wires coming out of the box.

NOTE: Every two-terminal circuit element is, by itself, a circuit block.

**TOOL:** (Kirchhoff's Current Law) The currents flowing out of any circuit block sum to zero.

TOOL: (Kirchhoff's Voltage Law) The voltage drops around circuit blocks forming a loop sum to zero.

TOOL: Circuits blocks that are in parallel have the same voltage drop across them.

TOOL: Circuits blocks that are in series have the same current flowing through them.

NOTE: Any circuit block (except one consisting of only current sources) may be replaced by a Thévenin equivalent consisting of only a voltage source and a resistor.

EX: The schematics below show blocks identified at successively higher levels. Each component in the first schematic is a circuit block.
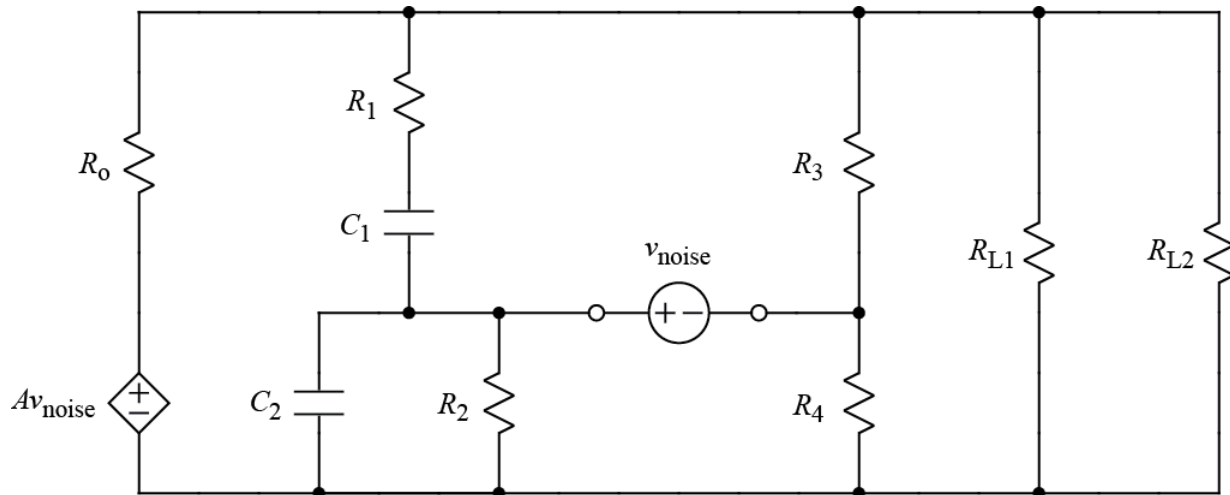

The next version of the schematic, shown below, is redrawn to allow for the drawing of circuit blocks. Note that the circuit is the same since elements are still connected to each other by wires in the same configuration as the original circuit.
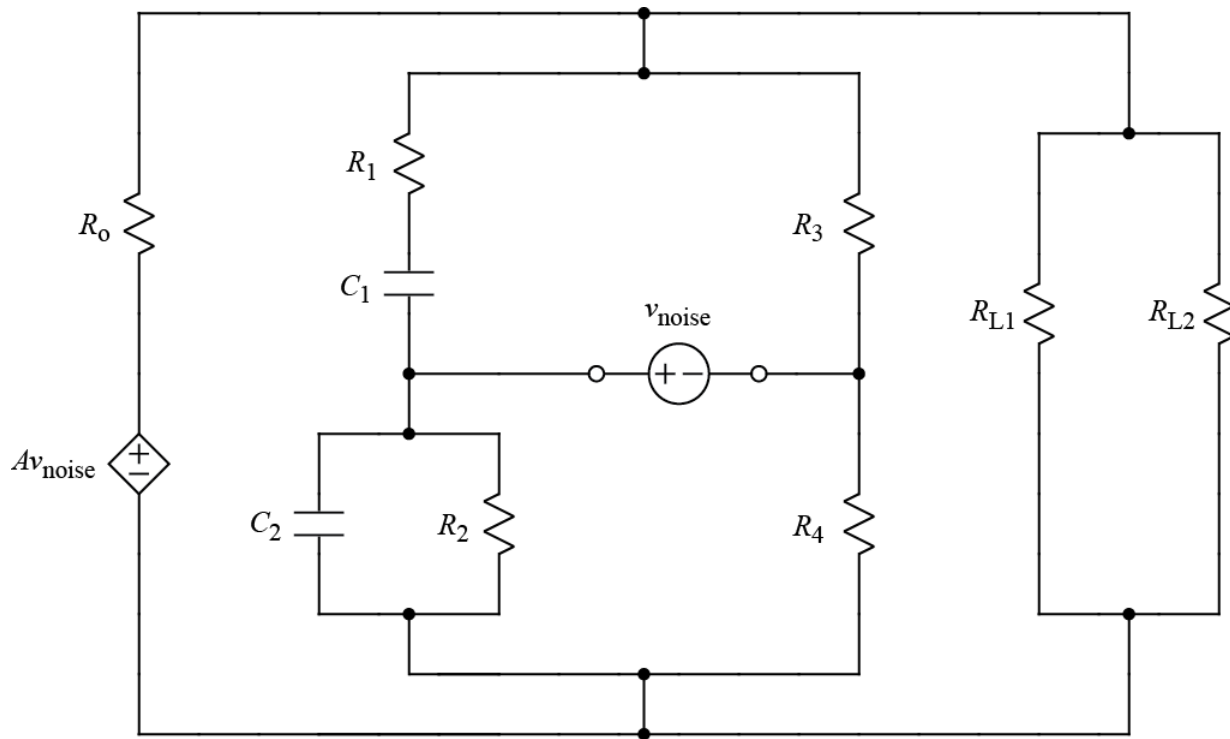
The next schematic shows circuit blocks at the next higher level.
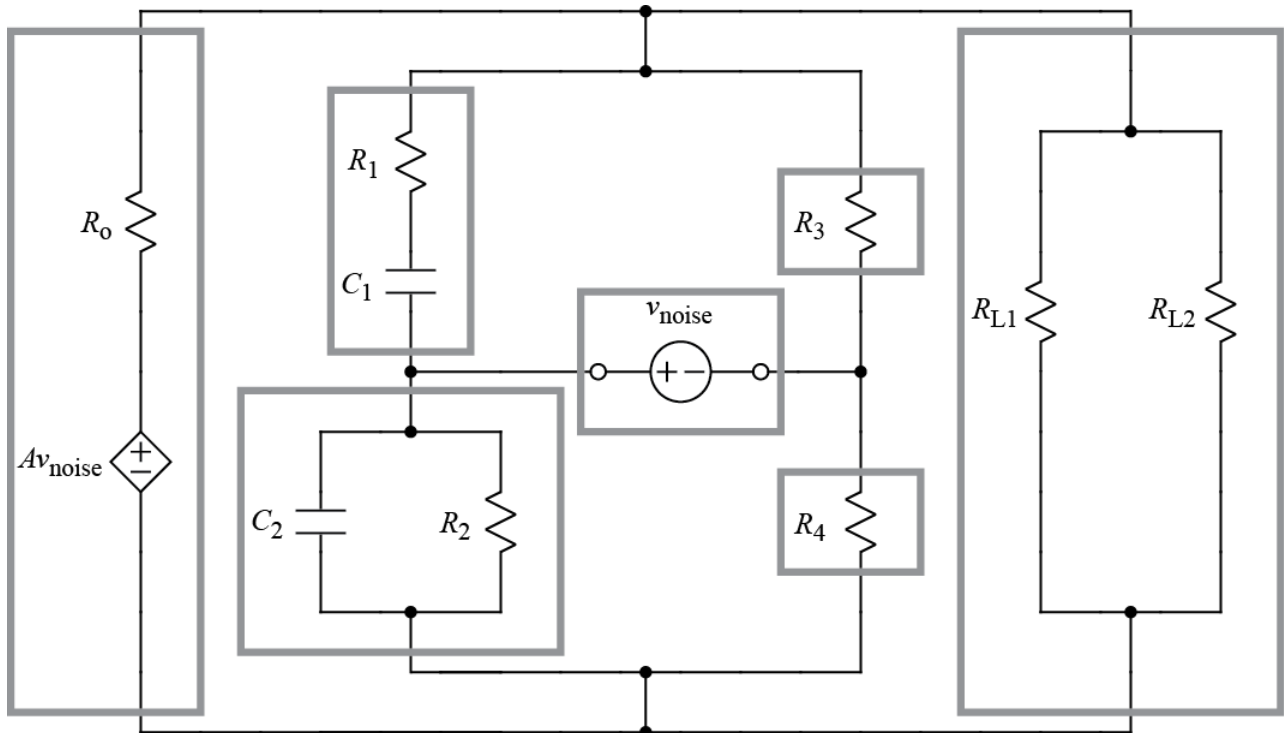
As shown by coloring nodes, the blocks on the left and right are in parallel (since they have the same color of node on top and they have the same color of node on bottom).
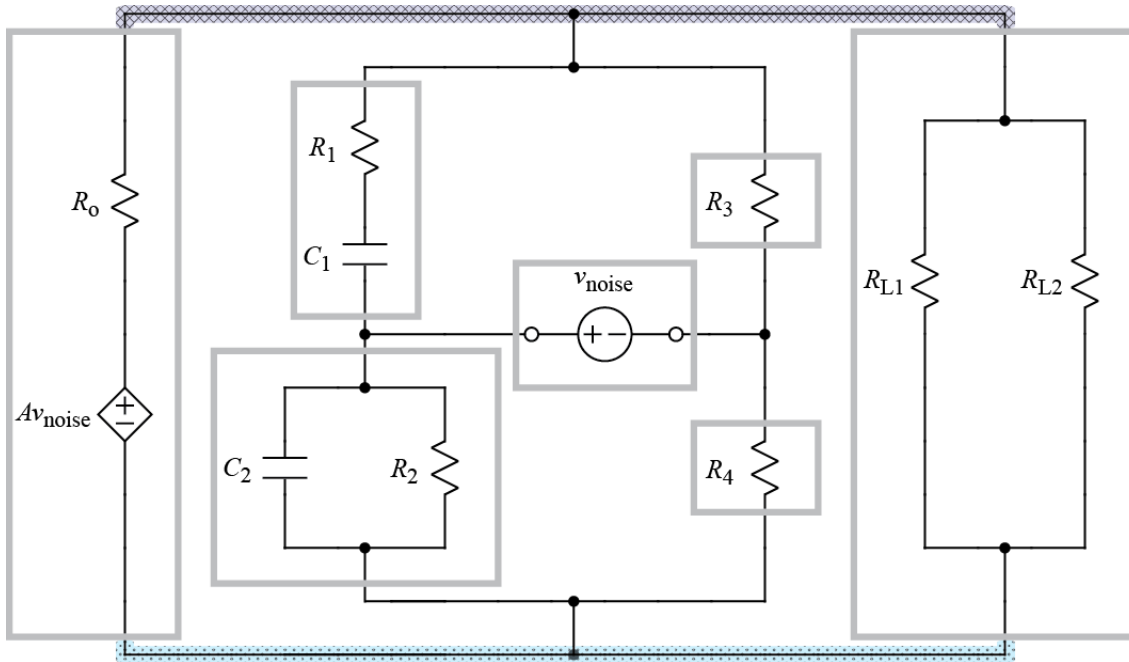
Moving up to the next level of circuit blocks reveals that the middle section of the circuit is a block in parallel with the blocks on the left and right.
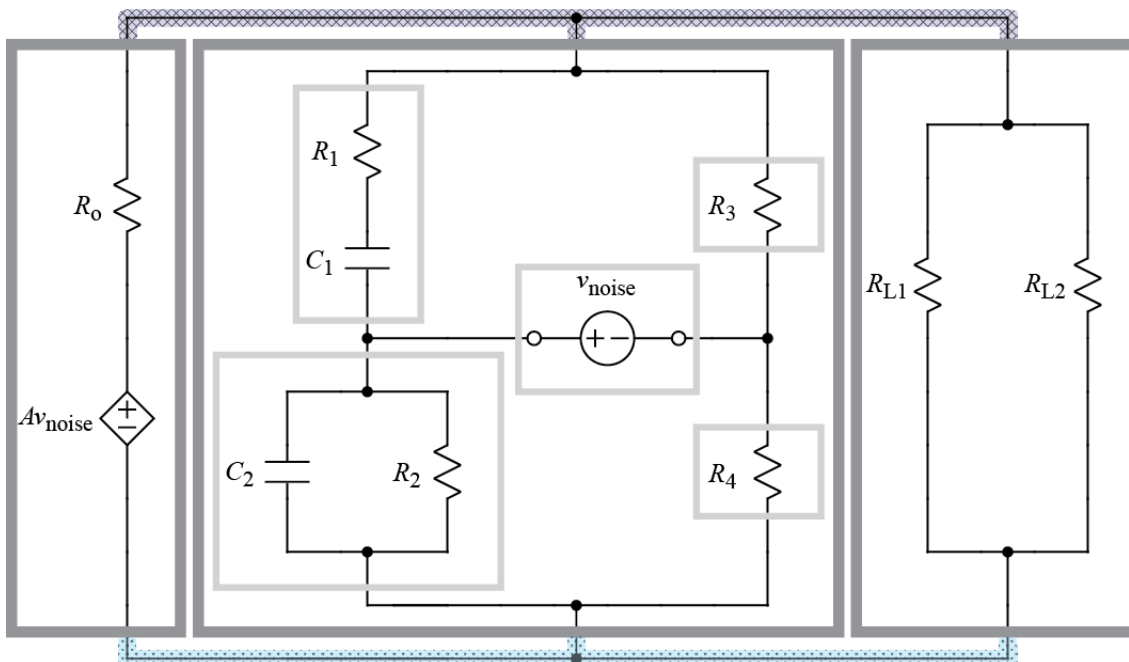
At the next higher level, a pair of blocks may be combined to create a new block, and the new block will be in parallel with the remaining block. One such scenario is shown below.