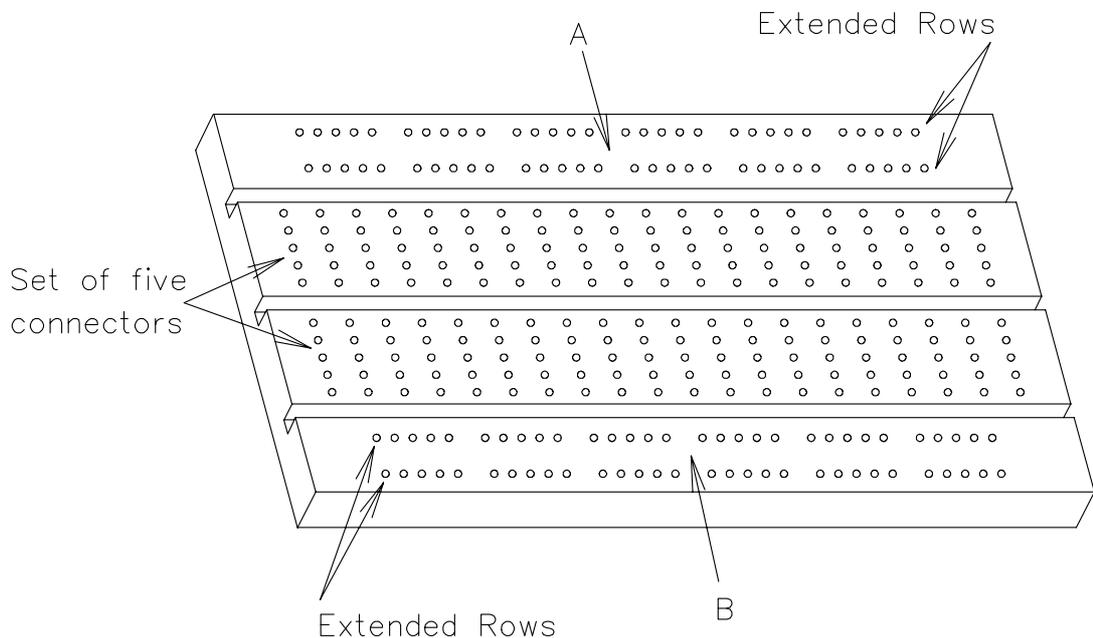


Appendix A

Breadboards

Breadboards permit quick solderless connections between the components of an electronic circuit. As indicated in the diagram, the holes of the breadboard are split into parallel sets of five (5). Within each hole is a metal clip to hold a wire and the clips in each set are connected together.



Two wires can be connected electrically by placing their ends into two holes belonging to the same set of 5 holes. The connector sets in the outside rows have been joined together to form four (4) extended rows. (Some breadboards do not have connections at points A and B resulting in eight “half” rows.) These outside rows are often used to supply power to the board. After an external power supply has been connected to one of these rows, power can be withdrawn to supply electronic circuits at any location along the board.

Each of the breadboards you will use is assembled on a plug-in unit that fits into one of the connectors on the common backplane. On this backplane you have access to five pairs of banana jacks (red and black), and five coaxial BNC connectors. All black banana jacks and the outside contacts on the BNC connectors are grounded and are thus electrically equivalent. The red banana plugs and the center conductors of the BNC connectors are all routed to each of the plug-in breadboard modules. In addition, $\pm 15V$, $+5V$, and $0V$ DC power connections are also available on each breadboard. Fig. A.1 shows the location of the common connections on the breadboards.

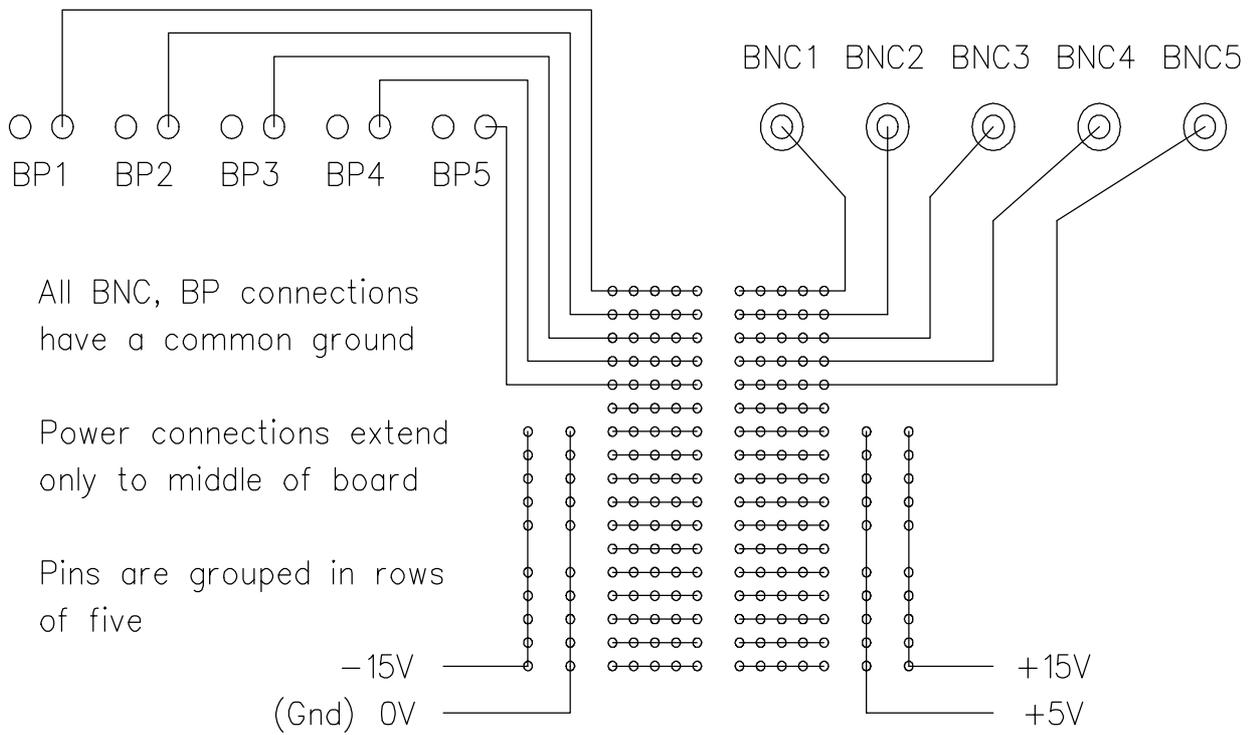


Figure A.1: Layout of common connections on the breadboards

The banana plugs and the BNC connectors are used to connect the components on the breadboard to the external devices such as meters, scopes, and function generators. You should not connect wires directly between the breadboard and an external device; it is unsafe. The proper breadboarding technique is illustrated in Fig. A.2.

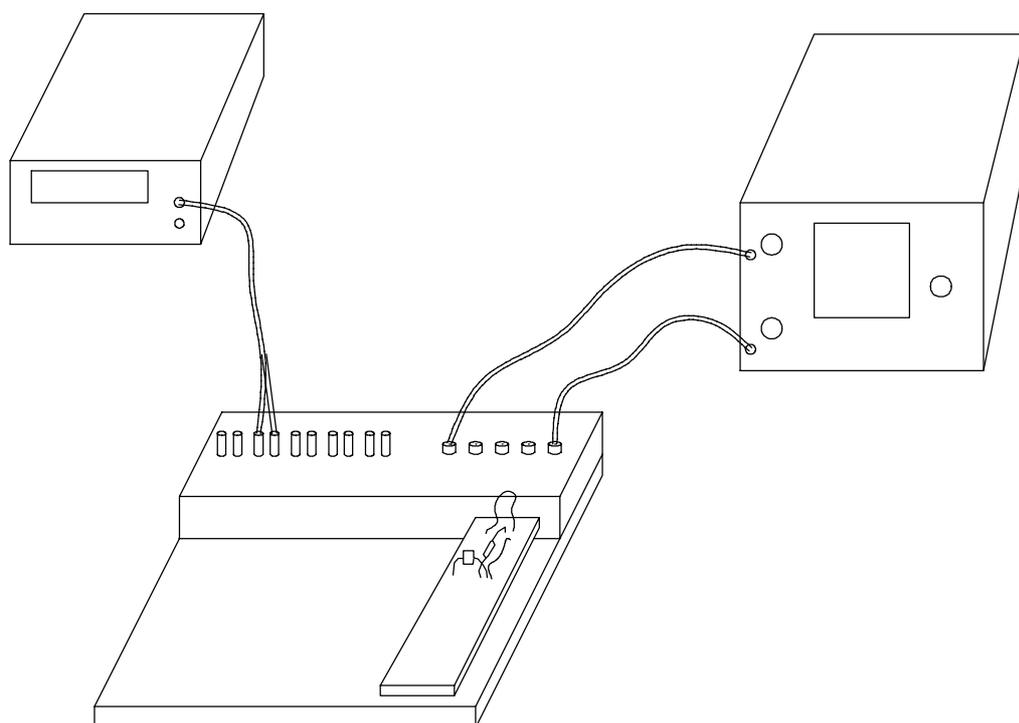


Figure A.2: The proper breadboarding technique