Introduction to the
Agilent E3631A Triple Power Supply

Introduction

The Agilent E3631A is a triple power supply, meaning that it contains three independent voltage sources. One source can be programmed to output from 0 V to 6 V with a maximum current of 5 A. The other two sources are connected in series so that one provides a positive voltage with respect to their common connection while the other provides a negative voltage. The magnitude of these two sources can be set from 0 V to 25 V with a maximum current of 1 A. All of the sources are isolated from earth ground.

This document describes the most common use of the E3631A, as a set of three voltage sources. In this case we can visualize the power supply as comprising three ideal adjustable voltage sources, each represented by the cartoon of a dry cell battery in Figure 1. Note that there are no built-in connections between the 6 V supply and either of the two 25 V supplies. Also, none of the supplies have any connection to the green ground terminal, which is connected to earth ground through the a.c. power cord.

Using the E3631A

1. When the E3631A is first turned on, all of the outputs are turned off (disabled). Press the Output On/Off button to enable the outputs and display voltage and current.

2. Each of the three independent power supplies in the E3631A must be programmed separately. Begin by pressing one of the three power supply selection buttons on the front panel, as shown in Figure 2. A small indicator will be lit in the display to show which of the three supplies is currently selected, as shown in Figure 3. For the example illustrated in Figure 3, the +25V indicator is lit so the +25 V supply is currently selected.
3. The desired output voltage is programmed by rotating the adjust knob. Note that one of the digits in the displayed voltage is blinking. Rotating the knob clockwise increments the blinking digit while rotating the knob counterclockwise decrements that digit. Pressing the digit select buttons (under the adjust knob) will cause different digits in the display to blink, which allows you to make fine or coarse adjustments as you desire. Note that if none of the digits is blinking then the adjust knob has no effect. On the other hand, turning the knob while the outputs are off does change the voltage setting.

4. Repeat the process of selecting one of the three supplies and setting the desired output voltage as necessary. Note that it is possible to place the two 25V supplies in tracking mode, where the magnitude of both supplies is forced to be the same, by pressing the Track button.

5. The power supplies are connected to your circuit through the banana jacks on the front panel. Note that if you are using the 6V supply then both the red and black banana jacks must be connected to your circuit. If you are using either the +25V or the –25V supply then the black COM banana jack must be connected to your circuit. In many cases the two black banana jacks will be connected together.

6. Make sure that the output current for each of the supplies, as shown on the right side of the display, is less than the maximum rated value. If one of the supplies is overloaded its voltage will automatically be reduced until the output current is less than the maximum value, and the small indicator to the right of the current display will change from CV (constant voltage) to CC (constant current). Press the Output On/Off button immediately to disable the outputs and check your connections for errors.

7. It is not generally necessary to connect the green banana jack to your circuit, unless the circuit must be referenced to earth ground. In some cases, connecting the ground banana jack to your circuit will introduce noise.

8. If you wish to modify your circuit after programming the power supply you can press the Output On/Off button to disable the supplies without changing their programmed settings. Once your modifications are finished, press the Output On/Off button again to apply power to the circuit.

Troubleshooting

1. I keep turning the knob but the voltage doesn’t change.
   
   (a) Make sure that one of the digits in the voltage display is blinking. If not, press the digit select buttons until a digit is blinking.
   
   (b) Check the CV/CC indicators. If the CC indicator is lit then you probably have a short circuit somewhere...you are trying to draw too much current from the supply.

2. The display on the power supply looks right, but when I measure the voltage in my circuit it is not the same.
   
   (a) Verify that the supply you are adjusting is the same one that you have connected to your circuit. If you have connected to the 6V supply jacks then adjusting the 25V supply won’t do you any good.
(b) Make sure you have connected the black banana jack for the power supply (labeled ‘-’ for the 6V supply and ‘COM’ for the ±25V supplies) to your circuit as well as the red banana jacks.

(c) Errors of less than 20mV for the 6V output and less than 50mV for the 25V outputs are within the normal accuracy of the supply.