

## G. Digital I/O

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Measuring and generating digital values is used in a variety of applications, including controlling relays and monitoring alarm states. Generally, measuring and generating digital values is used in laboratory testing, production testing, and industrial process monitoring and control.

Digital I/O can read from or write to a line or an entire digital port, which is a collection of lines.

You can use the digital lines in a DAQ device to acquire a digital value. This acquisition is based on software timing. On some devices, you can configure the lines individually to either measure or generate digital samples. Each line corresponds to a channel in the task.

You can use the digital port(s) in a DAQ device to acquire a digital value from a collection of digital lines. This acquisition is based on software timing. You can configure the ports individually to either measure or generate digital samples. Each port corresponds to a channel in the task.

## Exercise 9-7 Digital Example VI

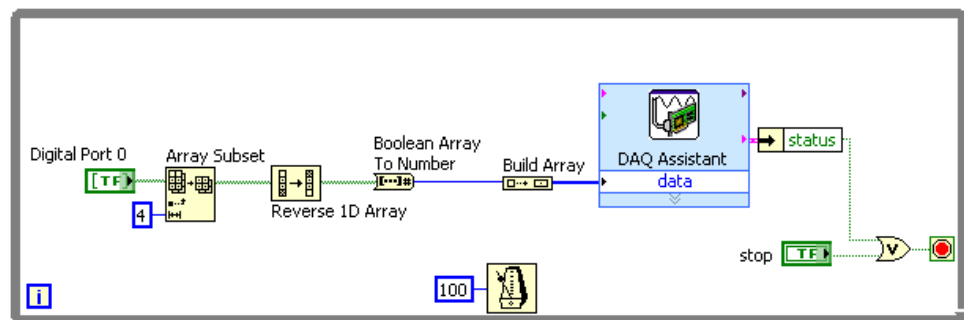
**Objective:** To control the digital I/O lines on the DAQ device.

Complete the following steps to complete a VI that turns on the LEDs of Port 0 on the DAQ Signal Accessory based on the digital value set on the front panel. Each LED is wired to a digital line on the DAQ device. The lines are numbered 0, 1, 2, and 3, starting with the LED on the right.



**Note** The LEDs use negative logic. That is, writing a 1 to the LED digital line turns off the LED. Writing a 0 to the LED digital line turns on the LED.

1. Open the Digital Example VI, located in the C:\Exercises\LabVIEW Basics I directory, and modify the block diagram as shown in the following figure.



Place the DAQ Assistant Express VI, located on the **Functions»Input** palette, in the While Loop. Complete the following steps to configure the counter to perform event counting.

- a. Select **Digital I/O»Port Output** for the measurement to make.
- b. Select **Dev1»port0** for the physical channel and click the **Finish** button.
- c. In the **Digital Output Port Task Configuration** dialog box that appears, select **Invert All Lines In Port** because the LEDs use negative logic.
- d. Click the **OK** button to close the configuration dialog box. All of the settings specified for the task are saved internally in the DAQ Assistant VI.



Place the Build Array function, located on the **Functions»All Functions»Array** palette, on the block diagram. Wire the Build Array function to the DAQ Assistant. Complete the wiring of the block diagram.

The Boolean buttons on the front panel are stored in an array to simplify the code. The Array Subset function extracts only the first four elements in the array. The output of the array subset needs to be reversed because element 0 of the array is the most significant bit. The array is then converted to a number with the Boolean Array to Number function, and converted into an array of one element. This value is passed to the DAQ Assistant Express VI to write that value to the port.

2. Save the VI.
3. Display the front panel and run the VI. Turn the Boolean LEDs on and off and observe the changes on the DAQ Signal Accessory.
4. Stop and close the VI.

### **End of Exercise 9-7**