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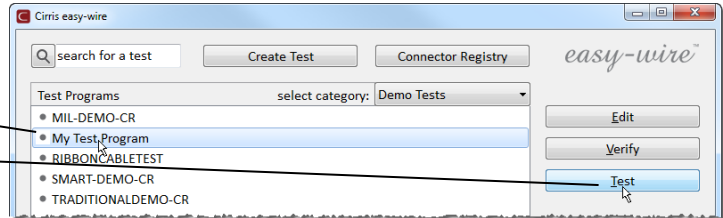
## Demo 5: Test Components

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In this demo, you will learn how to test components by editing the test program you created in demo 3. If you did not create a test program, use the SMART-DEMO test program.

### Step 1

In the test program list, select "My Test Program", and click **Test**.



### Step 2

Click **Start**.

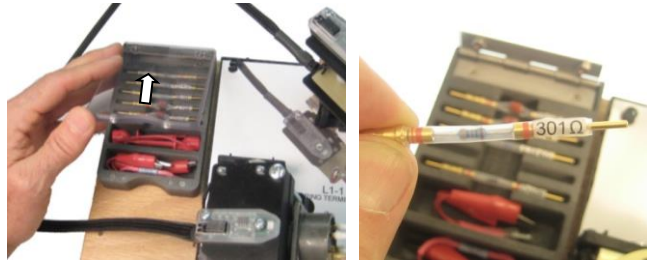
If you have a CH2 tester, also click **Hipot**.

Make sure the harness tests good.



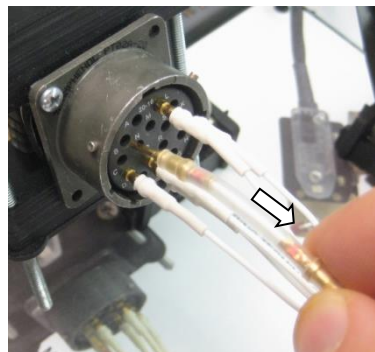
### Step 3

Open the component case and take out the 301Ω resistor.



### Step 4

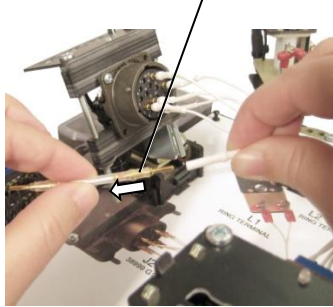
Unplug the Removable Wire Segment from the J1-B socket.



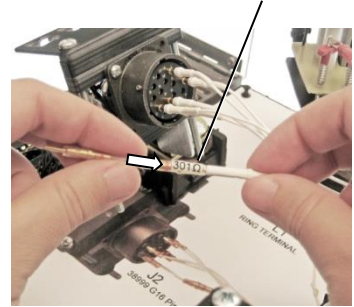
### Step 5

Replace the removable wire segment with the 301Ω resistor. The orientation of the resistor does not matter.

Removable Wire Segment

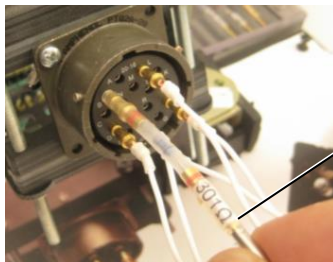


301Ω Resistor



### Step 6

Insert the 301Ω resistor into the J1-B socket as shown.



301Ω Resistor

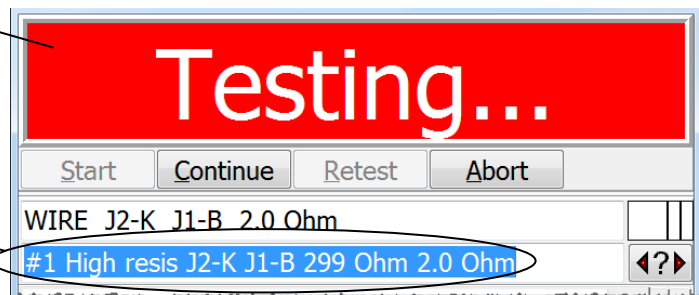
### Step 7

In the test window, click **Retest**.



Notice that the test window turns red.

A High Resistance Error (error code #1) displays. The resistance is measured at about 299 Ohms, when the wire should have measured less than 2 Ohms.



### Step 8

Click **Abort**.

Then click **Done** to return to the main menu.

Leave the resistor in place on the harness board.

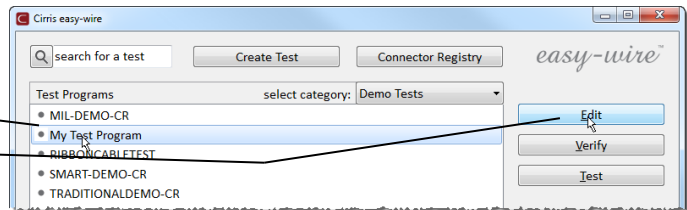


## Adding a Resistor

We will now modify the test program we created so we can test the 301Ohm resistor in the harness.

### Step 1

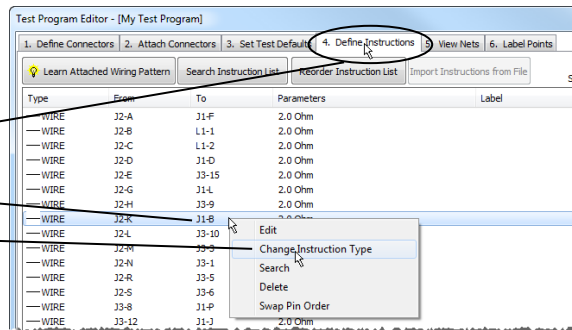
In the Easy-Wire main menu, select “My Test Program”, and click **Edit/View**.



### Step 2

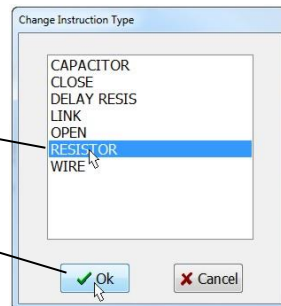
Open the “Define Instructions” tab.

Right-click on the line J2-K to J1-B, and click **Change Instruction Type**.



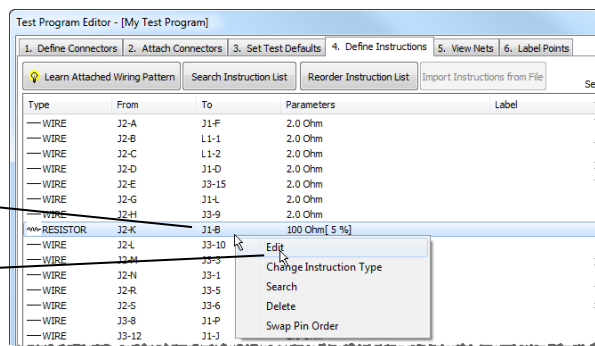
### Step 3

In the “Change Instruction Type” window, select **RESISTOR**, and click **OK**.



### Step 4

Again right-click on the Resistor J2-K to J1-B instruction line, and select **Edit**.

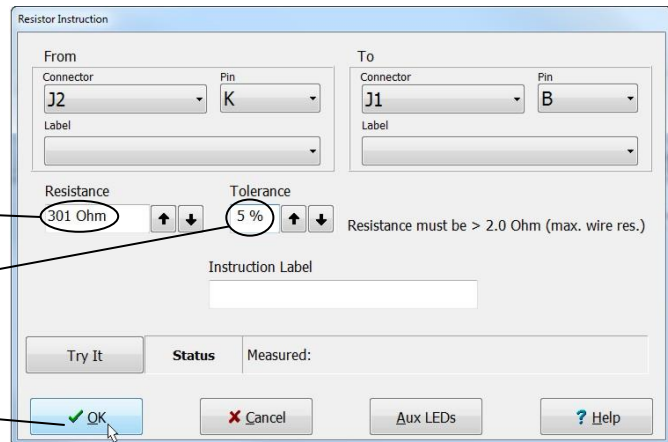


### Step 5

In the “Resistor Instruction” window, highlight the Resistance value, and type **301**.

Highlight the Tolerance percentage and type **5**.

Click **OK**.



The "Resistor Instruction" dialog box is shown. It has two sections: "From" and "To". The "From" section has a "Connector" dropdown set to "J2", a "Pin" dropdown set to "K", and a "Label" field. The "To" section has a "Connector" dropdown set to "J1" and a "Pin" dropdown set to "B". Below these, there are "Resistance" and "Tolerance" fields. The "Resistance" field is set to "301 Ohm" and the "Tolerance" field is set to "5 %". There are up and down arrows for both fields. A note says "Resistance must be > 2.0 Ohm (max. wire res.)". Below the fields is an "Instruction Label" field. At the bottom, there are buttons: "Try It", "Status", "Measured:", "OK" (with a green checkmark), "Cancel" (with a red X), "Aux LEDs", and "? Help".

**Note:** In the above example we set Tolerance at 5%. Whenever you set Tolerance you must take into account the tolerance of the part you are measuring plus the tolerance of the tester, then take into account any significant resistance of the wiring and connections back to the tester.

#### CR

Resistor accuracy:	$\pm 1\%$
CR Tester accuracy:	$\pm 3\%$
	$\pm 4\%$

#### CH2

Resistor accuracy:	$\pm 1\%$
CH2 Tester accuracy:	$\pm 2\%$
	$\pm 3\%$

Back wiring to the tester adds only .5 Ohms to the resistance measurement. Therefore setting the tolerance at 5% will ensure the test doesn't reject a good resistor.

### Step 6

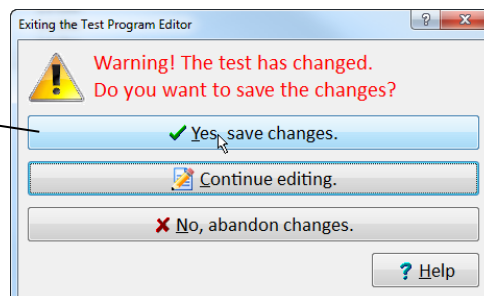
In the “Test Program Editor”, click **Done**.



The "Test Program Editor" toolbar is shown. It includes a "WIRE" dropdown menu, "Edit Instruction", "Change Instruction Type", "Add Instruction", "Add Multiple", "Delete Instruction", "Swap Instruction Pin Order", "Done", "Save", "Save As", "Text View", and "Reports" buttons.

### Step 7

Select **Yes, save changes**.

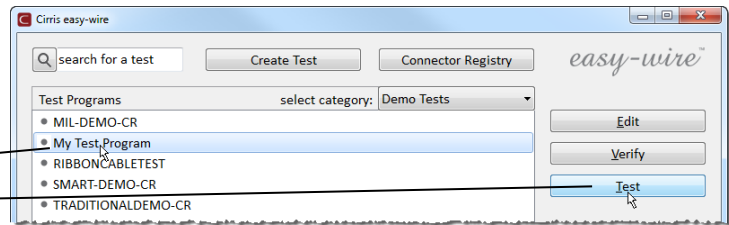


The "Exiting the Test Program Editor" dialog box is shown. It has a warning icon and the text "Warning! The test has changed. Do you want to save the changes?". There are three buttons: "Yes, save changes." (with a green checkmark), "Continue editing." (with a pencil icon), and "No, abandon changes." (with a red X). There is also a "? Help" button.

## Testing the Resistor

### Step 1

In the Easy-Wire main menu, select “My Test Program”, and click **Test**.



### Step 2

Click **Start**.



If you have a CR, the test window will display Good.



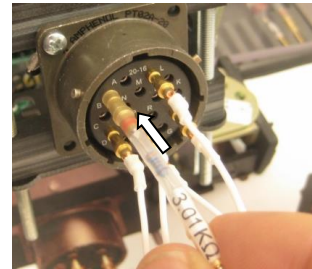
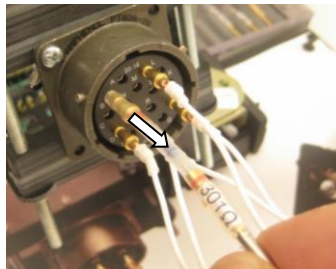
If you have a CH2, click **Hipot** to complete the test and the test window will display Good.



**Note:** A Cirris hipot tester does not apply high voltage across a component that is identified in the test program.

### Step 3

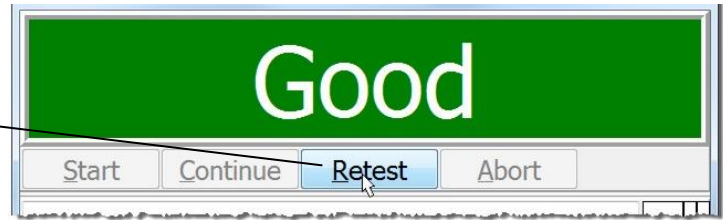
Remove the 301Ω resistor component, and replace it with the 3.01K Ω resistor.



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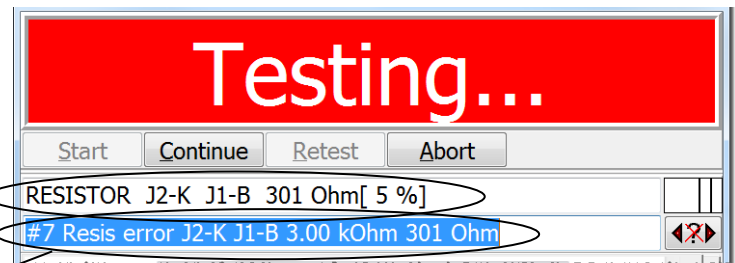
#### Step 4

Click **Retest**.



The Resistor Instruction shows that the resistor should be measured at 301 Ohms.

The Resistance Error (error code #7) shows the resistor being measured at about 3.00 KOhms.



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#### Step 5

Click **Abort**.

Then click **Done** to return to the main menu.

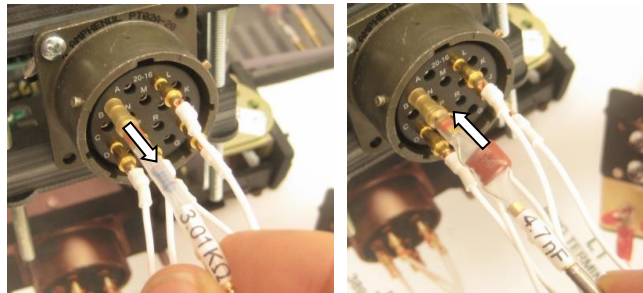




## Adding a Capacitor

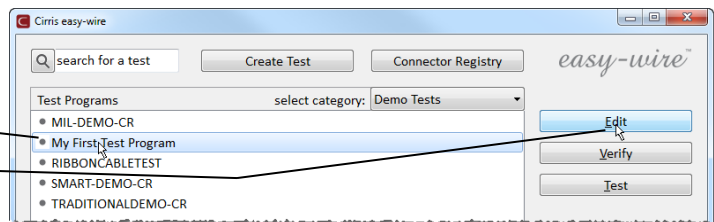
### Step 1

Replace the 3.01K $\Omega$  resistor with the 4.7nF capacitor. Make sure the capacitor is inserted in the J1-B position as shown.



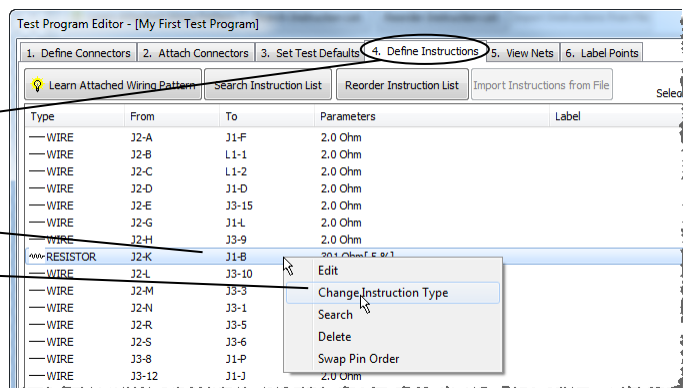
### Step 2

In the Easy-Wire main menu, select “My Test Program”, and click **Edit/View**.



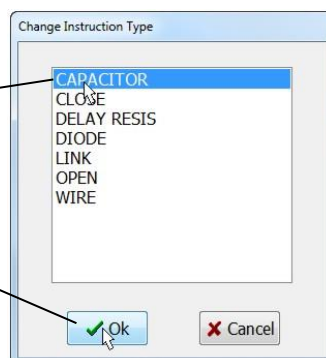
### Step 3

In the “Define Instructions” tab, right-click on the Resistor J2-K to J1-B instruction line, and click **Change Instruction Type**.



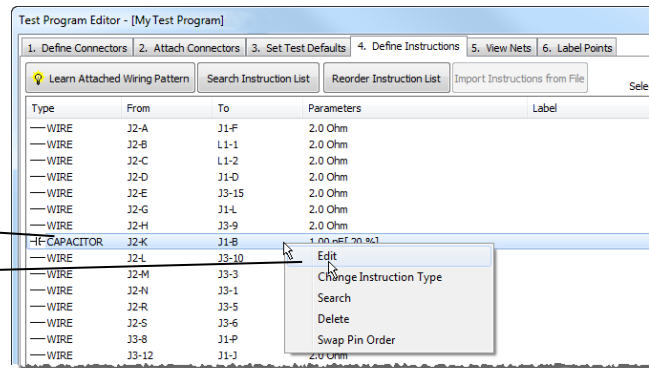
### Step 4

In the “Change Instruction Type” window, select **Capacitor**, and click **OK**.



### Step 5

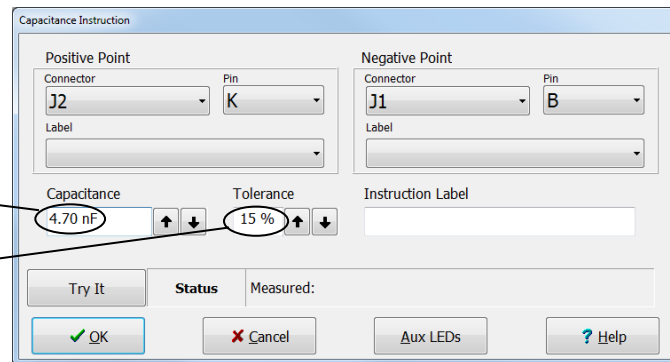
Right-click on the Capacitor J2-K to J1-B instruction line, and click **Edit**.



### Step 6

In the "Capacitance Instruction" window, highlight the Capacitance value and type **4.70 nF**.

Highlight the Tolerance percentage and type **15**.



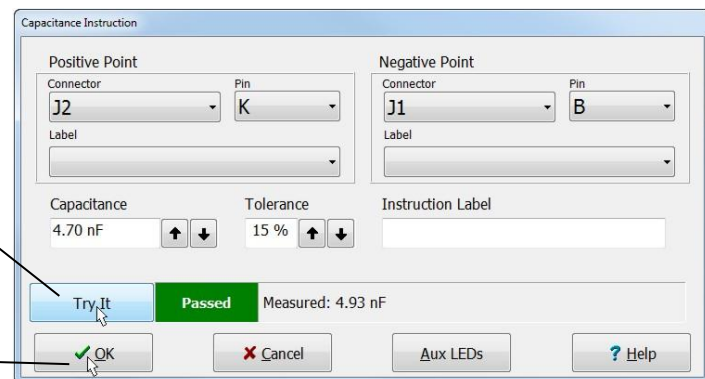
**Note:** In this case setting the tolerance to 15 % allows for a 5% component tolerance and a 10 % tester (CH2 and CR) tolerance for capacitance measurement.

### Step 7

If you want, click **Try It**.

The tester will display a value that is approximate to the capacitor's value. This is a helpful feature when you want to check a component value.

Click **OK**.



### Step 8

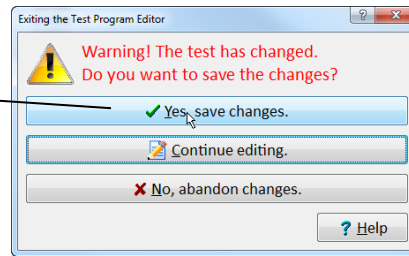
In the Test Editor click **Done**.





### Step 9

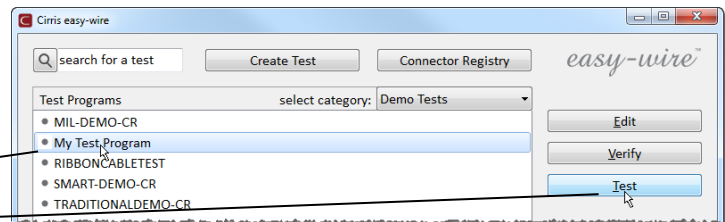
Select **Yes, save changes.**



## Testing the Capacitor

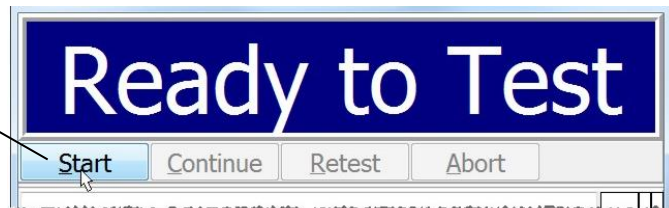
### Step 1

In the Easy-Wire main menu, select "My Test Program". and click **Test**.



### Step 2

In the test window, click **Start**.  
If you have a CH2 tester, also click **Hipot**.



The test window should display Good.

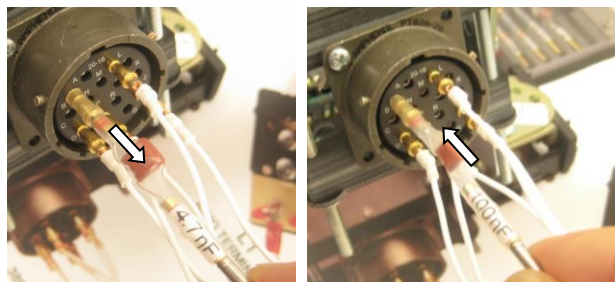


**Troubleshooting:** If the test does not display good, do the following:

- Verify that the test program you selected from the main menu is "My Test Program".
- Verify that the diode is in the J1-B socket on the harness board.

### Step 3

Replace the 4.7nF capacitor with the 100nF capacitor. Make sure to insert the capacitor in the J1-B socket as shown.

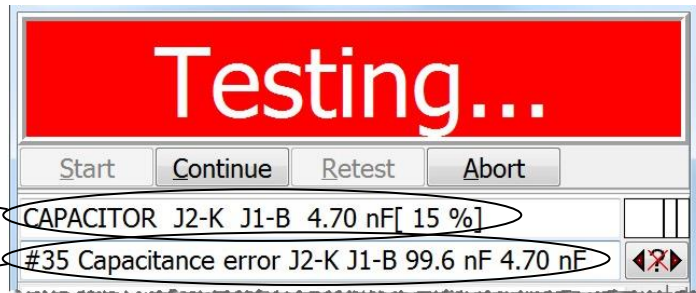


#### Step 4

In the test window, click **Retest**.



The Capacitor Instruction shows the capacitor should be 4.7nF.



The Capacitance Error (error code #35) shows that the resistor is being measured at about 100nF.

#### Step 5

Click **Abort**.

Then click **Done** to return to the main menu.



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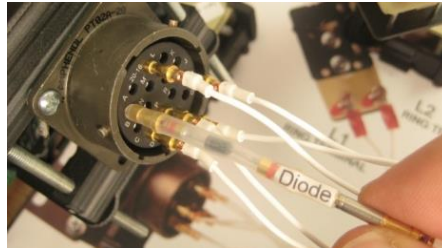
## Auto-learning a Diode

Diodes allow electrical current to flow in only one direction. Most diodes and resistors can be auto-learned. Instead of manually inputting the diode instruction, in the steps below we will auto-learn a diode.

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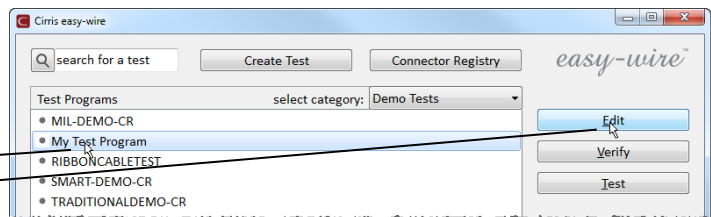
### Step 1

Replace the 100nF capacitor with the Diode. Make sure the diode is inserted into the J1-B socket. The orientation stripe on the diode can be in either direction.



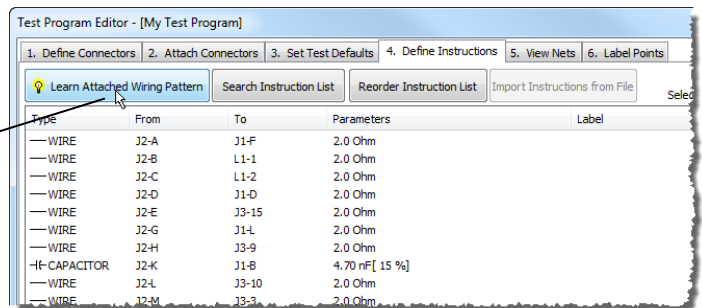
### Step 2

In the Easy-Wire main menu, select “My Test Program”, and click **Edit**.



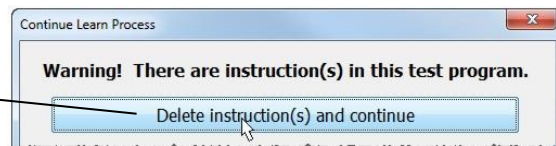
### Step 3

In the “Define Instructions” tab, click **Learn Attached Wiring Pattern**.



### Step 4

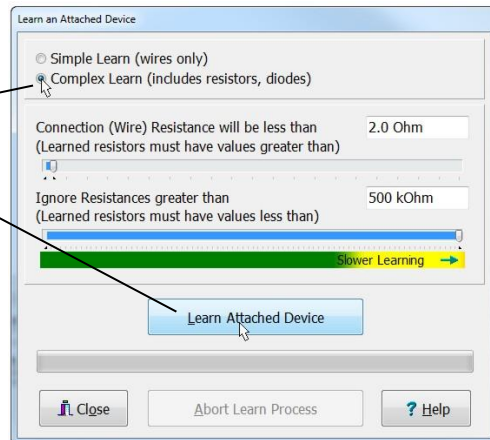
Click **Delete Instruction(s)** and continue.



### Step 5

In the “Learn an Attached Device” window, select **Complex Learn...**

Then click **Learn Attached Device**.

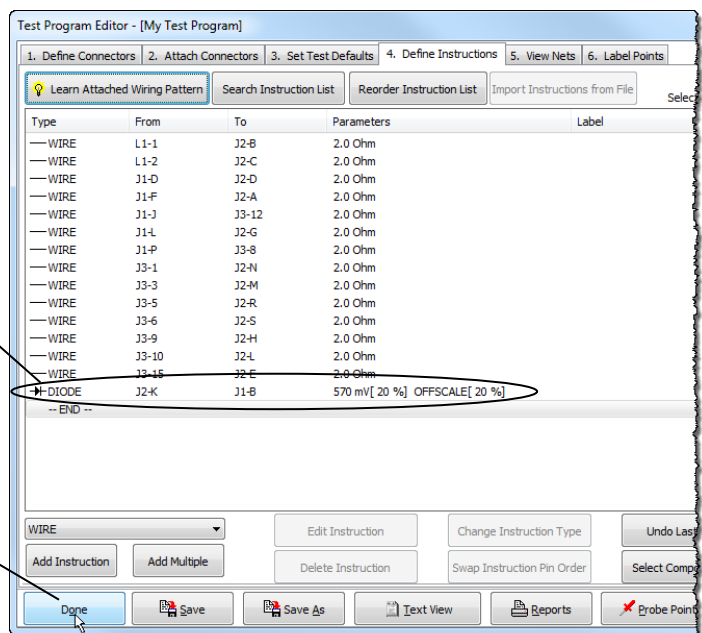


### Step 6

Notice that the test program has been relearned with the diode.

In the test program editor, click **Done**.

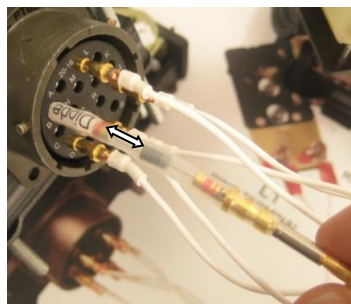
Then select **Yes, save changes** to return to the main menu.



**Note:** We could also have used the Add Instruction button (above the Done Button) to add the diode instruction. We could also have edited the previous capacitor instruction to make the diode instruction.

### Step 7

Now reverse the direction of the diode.

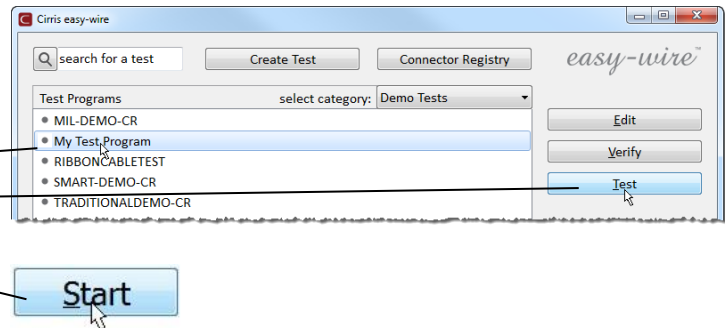


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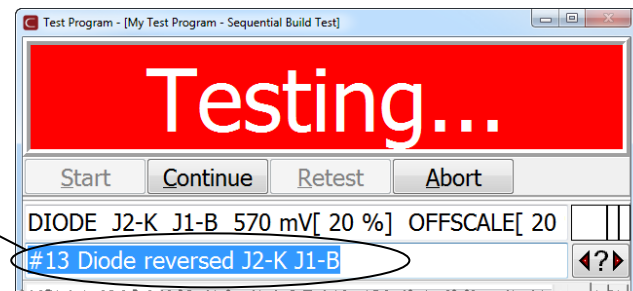
### Step 8

In the Easy-Wire main menu, select “My Test Program”, and click **Test**.

Then click **Start** in the test window.



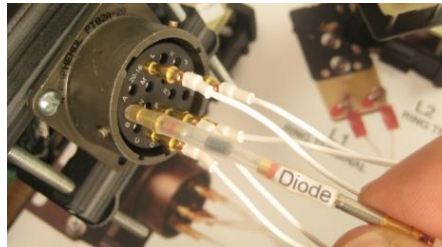
Notice that the test window immediately shows a Diode reversed error (error code #13).



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### Step 9

If you are moving on to “Demo 6: Hipot Testing”, reverse the diode again so that it’s in the correct position.



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## Congratulations!

You successfully tested a resistor, capacitor, and diode.

Please make sure that all unused components are back in their storage case before returning the demo to Cirris.

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