

Application Note

CAPACITOR TESTING:
0.1 μ F to 470 μ F

Capacitor Testing: 0.1 uF to 470 uF

This document explains how to use PASS 6.0 software to program the Analyzer to detect the presence of a capacitor in a harness. Although the Analyzer is capable of detecting the presence of a capacitor, it is not capable of precise capacitance measurements.

This document applies to capacitors whose values are between 0.1 uF and 470 uF.

- The Analyzer is not capable of reliably detecting capacitors whose values are less than 0.1 uF.
- The Analyzer is not capable of reliably detecting capacitors whose values are greater than 470 uF.

This document contains the following main sections:

- 1 a list of assumptions – knowledge required to perform the tasks outlined in this document
- 2 instructions for adding a capacitor in PASS - Wires Method
- 3 instructions for adding a capacitor in PASS using the Group Method
- 4 a chart of common capacitor values and the PASS Test Parameters values

Assumptions

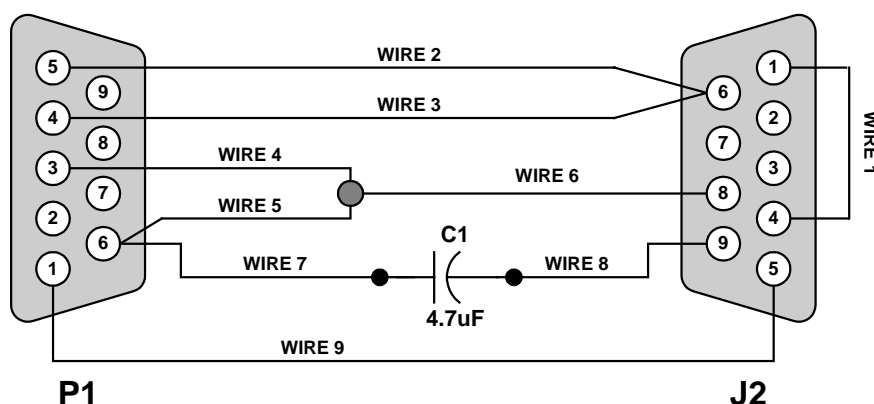
To successfully use this document, the following knowledge is required:

- knowledge of how to build Netlists using PASS 6.0
- knowledge of how to use the Sequence table to create a Sequence

For assistance on how to use features of PASS 6.0, see the PASS 6.0 Help file.

Adding a Capacitor: Wires Method

The best way to explain the procedure for adding a capacitor to a PASS program for a harness is with an example. This example illustrates how to program a capacitor in PASS 6.0 using the Wires Method. This example uses the simple wire harness shown below. Note that there is one capacitor connected between Wire 7 and Wire 8. The value of the capacitor is 4.7 uF.



When building a PASS 6.0 Netlist using the Wires Method, it is necessary to describe the connectors, wires, pins, and splices. It is assumed that the reader is familiar with building a Netlist in PASS 6.0 using the Wires Method, so these details will not be covered in this document.

In addition to describing the connectors, wires, pins, and splices in the PASS 6.0 Netlist, the following steps apply to adding the capacitor:

- 1 Use the Dynalab Component Calculator to compute the test parameters for the capacitor.
- 2 Input the test parameters from Step 1 into the PASS 6.0 Test Parameters table.
- 3 Add the capacitor to the PASS 6.0 Components Table

A detailed explanation of each of these steps is provided on the following pages.

Step 1: Compute the test parameters for the capacitor

The Dynalab Component Calculator is used to compute the test parameters for the capacitor. It is a Microsoft Excel Spreadsheet and is supplied on the same CDROM as the PASS 6.0 software. It allows the user to derive the proper test parameter values for capacitors and capacitors.

For a given value of capacitance and tolerance, the calculator supplies values for:

- Test Voltage
- Test Current
- Threshold 1 voltage
- Threshold 2 voltage

To use the Component Calculator to calculate the test parameters for a capacitor, select the sheet for “Capacitors”, enter the capacitor value in the field labeled “Capacitance”, and enter 40 in the field labeled “Tolerance”. It is recommended that 40% be used as the tolerance. The Analyzer is not capable of performing precision capacitance measurements, and can only verify the presence of a capacitor. A 40% tolerance is sufficient to allow the Analyzer to detect the capacitor’s presence.

After entering the capacitance value and tolerance, the Component Calculator will calculate the corresponding test parameters.

Microsoft Excel - Dynalab Component Calculator.xls

Dynalab Capacitance Calculation

Enter desired capacitor value and tolerance:

Capacitance	4.70 uF
Tolerance	40 %

Enter these values in the Test Parameters Table:

Test Voltage	Test Current	Threshold 1	Threshold 2
5.00	0.08	1.40	3.27

XL Series Resistance / Model 1024 Resistance / **Capacitors** /

Ready

2 - Enter capacitance

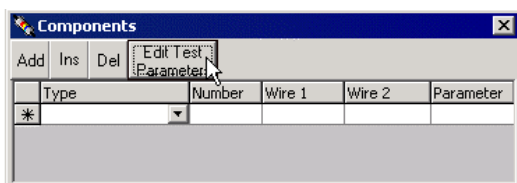
3 - Enter 40% for tolerance

1 - Select sheet labeled Capacitors

4 - Test Parameters are calculated

Step 2: Input the test parameters into the PASS 6.0 Test Parameters table

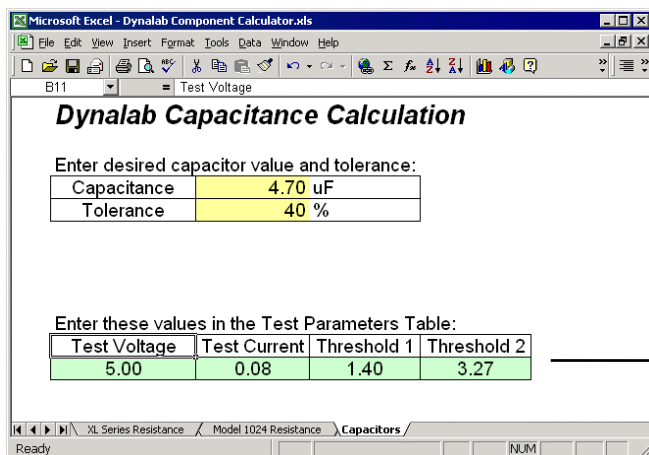
The test parameters provided by the Component Calculator must be entered into the PASS 6.0 Test Parameters table. To access this table, open the Components table, and select Edit Test Parameters.



	Test Voltage	Test Current	Threshold 1	Threshold 2
1	12.00	0.28	3.91	7.61
2	5.00	2.00	2.00	2.00
3	5.00	2.00	2.00	2.00
4	5.00	2.00	2.00	2.00
5	5.00	2.00	2.00	2.00
6	5.00	2.00	2.00	2.00
7	5.00	2.00	2.00	2.00
8	5.00	2.00	2.00	2.00
9	5.00	2.00	2.00	2.00
10	5.00	2.00	2.00	2.00
11	5.00	2.00	2.00	2.00
12	5.00	2.00	2.00	2.00
13	5.00	2.00	2.00	2.00
14	5.00	2.00	2.00	2.00
15	5.00	2.00	2.00	2.00

The Test Parameters table will appear. It has fifteen sets of Test Parameters. Each set is available for testing a particular component.

In this example, there is only one component. Therefore, it is recommended that Test Parameter set 1 be used. Simply enter the values from the Component Calculator in the PASS 6.0 Test Parameters table for set 1 as shown below:

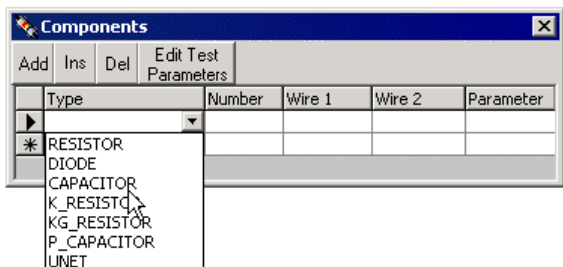


Enter the calculated values in the PASS 6.0 Test Parameters table

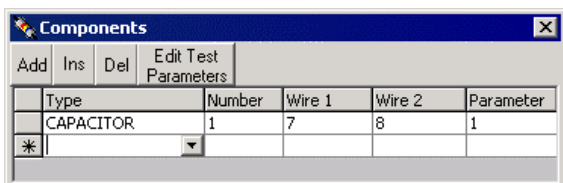
	Test Voltage	Test Current	Threshold 1	Threshold 2
1	5.00	0.08	1.40	3.27
2	5.00	2.00	2.00	2.00

Step 3: Add the capacitor to the PASS 6.0 Components Table

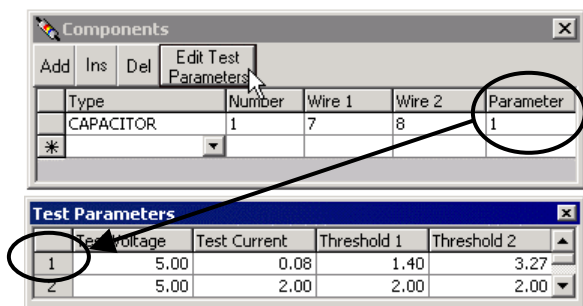
After the test parameters for the capacitor have been calculated and entered into the Test Parameters table, it is necessary to add the capacitor to the Components Table. In this example, capacitor C1 is added to the Components table as follows:



In the Components table, populate the Type field with the type of component. A pull down menu of possible selections is provided. In this case, select CAPACITOR if the capacitor is NOT polarized. If the capacitor is polarized, select P_CAPACITOR.

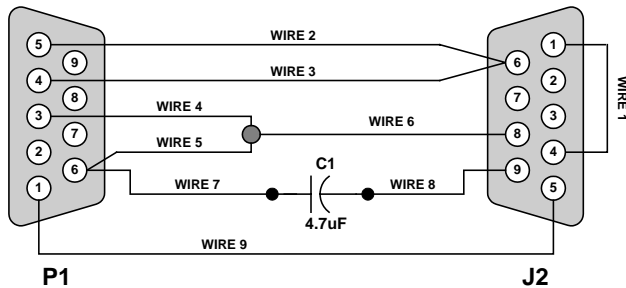


The Number field should contain the Capacitor number. In this case, the number is 1. Wire 1 and Wire 2 fields should be populated with the two wires to which the capacitor is connected. In this case, these are 7 and 8. If the capacitor is polarized, Wire 1 is connected to the positive terminal, and Wire 2 is connected to the negative terminal.



The Parameter field is populated with the number that corresponds to the entry in the Test Parameters table for this capacitor. Previously, entry number 1 of the Test Parameters table was populated with the values calculated for this capacitor. Therefore, the Parameter field is populated with the value 1. This links the capacitor with its associated test parameters.

Example Netlist tables for harness with capacitor using Wires Method



In summary, the PASS 6.0 Netlist tables for the example harness including the capacitor, are shown below:

Dynalab PASS 6.0 - Capacitor_Wires_Method.dpf

File Edit Netlist Tables Sequence Tools Window Help

Sequence New Save Print Paste Labels File Settings Compile Download

Paste

Connectors

Add Ins Del Next F5 Find

Connector	Pins Qty
P1	9
J2	9
*	

Wires

Add Ins Del Next F5 Edit Colors Find

Wire	Base Color	Stripe Color
1	BLK	(none)
2	BLU	(none)
3	BRN	(none)
4	GRN	(none)
5	GRY	(none)
6	ORG	(none)
7	RED	(none)
8	VIO	(none)
9	WHT	(none)
*		

Splices

Add Ins Del Next F5 Same F6 Find

Number	Wire
1	4
1	5
1	6
*	

Pins

Add Ins Del Next Pin F5 Same Pin F6 New Pin F7 Find

Connector	Pin	Wire
P1	1	9
P1	3	4
P1	4	3
P1	5	2
P1	6	5
P1	6	7
J2	1	1
J2	4	1
J2	5	9
J2	6	2
J2	6	3
J2	8	6
J2	9	8
*		

Components

Add Ins Del Edit Test Parameters

Type	Number	Wire 1	Wire 2	Parameter
CAPACITOR	1	7	8	1
*				

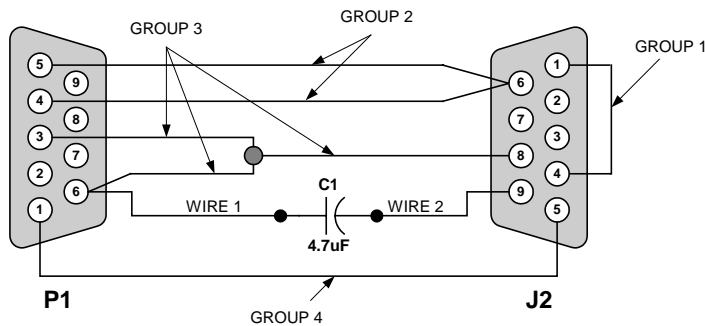
Test Parameters

	Test Voltage	Test Current	Threshold 1	Threshold 2
1	5.00	0.08	1.40	3.27
2	5.00	2.00	2.00	2.00

MAIN

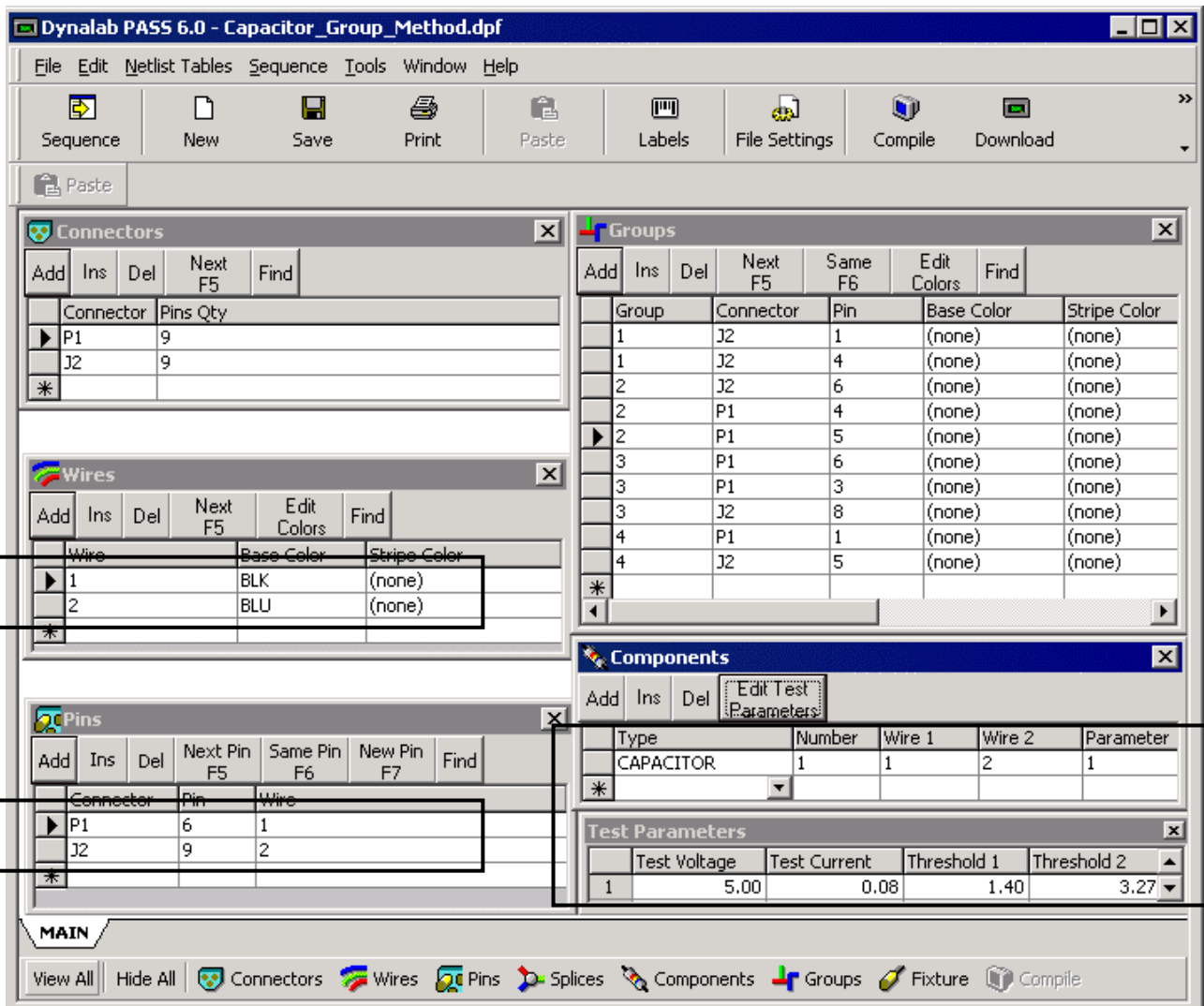
View All Hide All Connectors Wires Pins Splices Components Groups Fixture Compile

Adding a Capacitor: Group Method



The following example explains how to define a capacitor in a Netlist where the Group Method has been used. This example uses the simple wire harness shown at left. Note that four groups are defined in the harness. **The capacitor is not part of any group, but is added to the Netlist using the Wires Method.** So, in addition to defining the four groups in the Netlist, it is also necessary to define Wire 1 and Wire 2 as well as the Pins to which these wires connect.

The capacitor is defined in the same way as was described in the previous section. The resulting PASS 6.0 Netlist is shown below:



Add Wires to which capacitor is connected, and Pins to which wires are connected

Capacitor and Test Parameters are defined in the same way as in the Wires Method as described in the previous section

Common Values Chart

As an alternative to using the Dynalab Component Calculator, the following chart provides the test parameters for several common capacitance values at 40% tolerance.

Capacitor Value (uF)	Test Voltage (VOLTS)	Test Current (mA)	Threshold 1 (VOLTS)	Threshold 2 (VOLTS)
0.1	12.00	0.08	0.08	0.19
0.47	8.00	0.08	0.25	0.57
1	5.00	0.08	0.30	0.70
2.2	5.00	0.08	0.66	1.53
4	5.00	0.08	1.19	2.79
4.7	5.00	0.08	1.40	3.27
6.8	5.00	0.12	1.35	3.15
10	5.00	0.12	1.99	4.63
22	5.00	1.00	0.50	1.16
40	5.00	2.00	0.42	0.98
47	5.00	2.00	0.49	1.15
100	5.00	2.00	1.05	2.45
470	5.00	4.00	2.12	4.94