Application Note

CONTINUITY-RND

How to program the Analyzer to check continuity in random order.

Dynalab
TEST SYSTEMS

CONTINUITY-RND

This document explains how to use the PASS 6.0 software to program the Dynalab Analyzer to check continuity in a random order.

This document contains the following main sections:

1. a list of assumptions – knowledge required to perform the tasks outlined in this document
2. an explanation of the problem
3. an explanation of the solution approach
4. an overview of the Dynalab solution to the problem
5. an example Sequence

Assumptions

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

- basic knowledge of how to enter harness data 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.

Requirements

The CONTINUITY-RND Sequence item requires that the Analyzer be equipped with EPROM Version 7.032 or later.

Warning: Attempts to execute a Sequence item on an Analyzer equipped with an older EPROM version that does not support the Sequence item will result in non-execution of the item – it is ignored in Sequence execution. This may have undesirable consequences, including the passing of defective harnesses.

Problem

If the operator starts the test before connecting the harness to the fixture, the Analyzer checks continuity as the harness is being connected. By default, the Analyzer checks continuity in a specific order. This requires the operator to attach the wires in the same order expected by the Analyzer. If the operator does not follow this order, two problems arise:

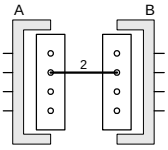
1. The operator does not get positive indication from the Analyzer that continuity has been established for the wire being connected.
2. As the operator connects a wire, continuity may be momentarily established, and then lost when the operator releases the wire. This can happen because of intermittent fixture connections. If the operator is attaching the wires in a different order than expected by the Analyzer, the momentary continuity will not be seen by the Analyzer. Once the harness is fully connected to the fixture, the operator must then manually wiggle the connections in the order dictated by the Analyzer in order to establish continuity and pass the tests. This process is inefficient and decreases productivity.

Solution

The solution to this problem is to have the Analyzer continuously scan for continuity in a random order. The Analyzer should sense and acknowledge connections as the operator chooses to make them. This is illustrated below, using a simple 4-wire harness as the example.

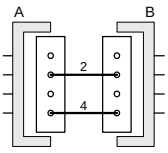
Operator presses START button to start the test. The Analyzer displays a rotating cursor in the upper left hand corner of the display, indicating that it is continuously scanning. The Analyzer displays the first connection to be made.

```
∗OPEN
A-1
B-1
```



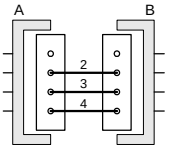
Instead of installing wire 1 as expected by the Analyzer, the operator installs wire 2. The Analyzer responds with an audible beep, and with advancing the progress bar. The Analyzer continues to display the first connection to be made.

```
∗OPEN
A-1
B-1
■■■
```



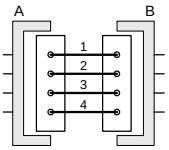
Operator installs wire 4. The Analyzer responds with an audible beep, and with advancing the progress bar. The Analyzer continues to display the first connection to be made.

```
∗OPEN
A-1
B-1
■■■■■■
```



Operator installs wire 3. The Analyzer responds with an audible beep, and with advancing the progress bar. The Analyzer continues to display the first connection to be made.

```
*OPEN
A-1
B-1
■■■■■■■■■■
```



Operator installs wire 1. The Analyzer responds with an audible beep and displays a message indicating that the assembly is complete.

```
ASSEMBLY OK
```

Solution Overview

The random order continuity test is implemented with the CONTINUITY-RND sequence item. It is designed to test all of the circuits in a Netlist to ensure that each circuit has established continuity at some point during the test. This test mode does NOT test the circuits in a specific order. This test mode allows the harness wires to be connected to the test fixture in any order. This can speed testing time.

During this test mode, the Analyzer keeps a record of each of the circuits. During the test, the Analyzer continuously scans all of the circuits. When continuity for a circuit is established for the first time, the Analyzer removes its name from the list of circuits to test and continues testing only the remaining circuits. This process continues until all of the circuits have been removed from the list. While the Analyzer is performing continuity scans, a progress bar is updated on the Analyzer display showing overall test progress. The progress bar increases in length with each circuit recorded.

This test mode can be useful in situations where the fixture connections cause intermittent continuity, and the operator must wiggle the connections after the harness is connected in order to get the harness to pass all tests. With this test mode, once continuity is established for a circuit, the Analyzer removes that circuit from the list. This results in the harness passing the continuity tests without the need for the operator to manually wiggle the connections.

Example Sequence

This example shows a very simple sequence that uses CONTINUITY-RND. This sequence starts with a random order continuity scan followed by a scan for shorts. If a soft short is found, the test starts over. If the harness passed all the tests, the Analyzer will display the message "Assembly OK". If errors were logged during the tests, the Analyzer will display the errors. The Analyzer then waits for the operator to push the start button. When the operator pushes the start button, the sequence repeats.

Example Sequence using CONTINUITY-RND

Line	Command	Parameter	Application Effect
1	CONTINUITY-RND	MAIN	Performs random order continuity scan for all circuits in the MAIN Netlist
2	SHORT	MAIN	Performs a complete short scan of all circuits in the MAIN Netlist
3	BSS	1	Branches to line 1 if a soft short error was detected during step 2
4	REPORT		Displays "Assembly OK" if harness passes all tests, or displays error information
5	KWAIT		Waits for the operator to push the Start button
6	REPEAT		Goes to line 1 to repeat Sequence execution.

Line 1 The CONTINUITY-RND item at the beginning of the Sequence instructs the Analyzer to perform a continuous random order continuity test for all circuits in the MAIN Netlist.

Line 2 The SHORT sequence item instructs the Analyzer to perform a short test for all circuits in the MAIN Netlist. During this test, the analyzer is looking for any short circuits (unwanted continuity) in the MAIN Netlist.

Line 3 BSS instructs the Analyzer to branch back to line 1 if any soft shorts were found as a result of the short test. A soft short is a momentary short circuit condition.

Line 4 REPORT displays a summary report.

Line 5 KWAIT waits for the operator to press the START key.

Line 6 REPEAT instructs the Analyzer to go to Line 1 and repeat execution of Sequence.