

## **Application Note**

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### **ALARM FEATURE**

# ALARM FEATURE

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This document explains how to use the PASS 6.0 software to program the Dynalab Analyzer to enter an alarm mode when the operator removes the harness before the Analyzer has completed the test scan.

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
- 4 an overview of the Dynalab solution to the problem, including 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
- specific knowledge of how to define a detection switch
- 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.

## Problem

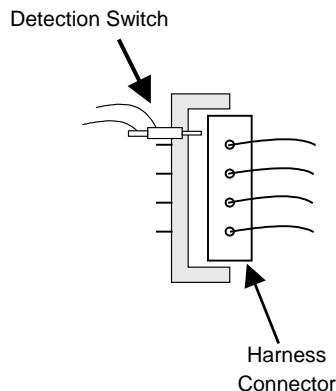
If the operator removes the harness before the Analyzer has completed the test scan, the harness being removed will be partially tested and may be considered a good harness.

## Solution

When a harness is removed before the Analyzer has completed the test scan, the Analyzer senses this condition and enters an alarm mode. The alarm mode does the following:

- Stops testing
- Sounds an audible alarm
- Displays a unique message
- Requires operation of the alarm keyswitch to reset the alarm

## Solution Overview

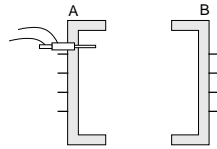


The Alarm Feature is designed to monitor the state of a fixture-mounted detection switch to determine if the harness is present in the fixture. If the state of the switch indicates the harness is not present, and if the test sequence is not complete, the Analyzer will enter the alarm mode. The alarm mode will abort the test, sound a continuous alarm, and display the message “BLOCK DETECTION SWITCH OPENED”. This behavior will continue until an authorized person with a key operates the Analyzer’s alarm keyswitch. The alarm condition can only be reset through activation of the keyswitch. Cycling the Analyzer’s power will not reset the alarm condition.

The Alarm Feature is particularly useful when the test philosophy requires that defects be fixed before the harness can be removed from the test fixture. In other words, each harness is expected to pass all tests before being removed from the test fixture. This test philosophy is implemented by using the ADV OFF Sequence item at the beginning of the Sequence. This prevents the operator from logging errors by pressing the START button. When errors are displayed, the operator must fix the error before the scan will continue. In this scenario, the only time a harness may be removed from the fixture is when all tests have been completed – and all tests can be completed only if the harness is good. When implementing the Alarm Feature using this test philosophy, a defective harness that cannot be repaired will trigger the alarm mode when removed from the fixture. This ensures that authorized personnel will be notified whenever a defective non-repairable harness has been removed from the test fixture.

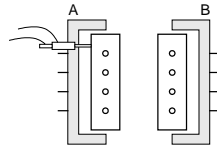
This solution is illustrated below, using a simple 2-connector, 4-wire harness as the example. Two scenarios are illustrated.

**Scenario A: Operator removes harness before tests are completed – Analyzer goes into alarm mode:**



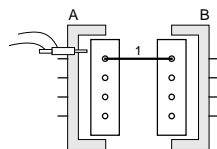
Analyzer prompts the operator to install the harness because the alarm detection switch is open, indicating that the harness is not present.

\*  
INSTALL HARNESS



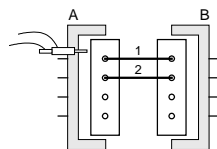
Operator installs the harness connectors – the alarm detection switch closes, the Analyzer starts the test scan indicating the first connection to be made.

OPEN  
A-1  
B-1



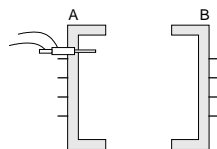
Operator installs wire 1. The Analyzer responds with an audible beep, and displays the next connection to be made.

OPEN  
A-2  
B-2



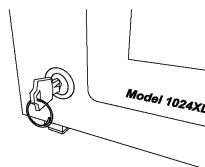
Operator installs wire 2. The Analyzer responds with an audible beep, and displays the next connection to be made

OPEN  
A-3  
B-3



Operator removes the harness from the fixture, even though testing is not complete. The detection switch opens, and the Analyzer enters the alarm mode. The Analyzer sounds a continuous alarm and displays a message indicating that the detection switch is open.

BLOCK DETECTION  
SWITCH OPENED

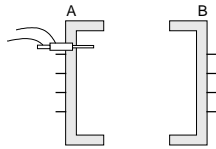


In order to de-activate the alarm mode, a supervisor or other authorized person must insert a key into the alarm keyswitch and turn the switch.

When the alarm mode has been de-activated, the Analyzer returns to the Main Menu, allowing the test program to be restarted.

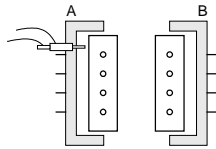
TEST PROGRAM  
>RUN DOWNLOAD  
SELECT TRANSFER  
PROBE

**Scenario B: All tests are successfully completed – harness is good:**



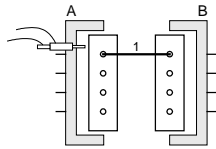
Analyzer prompts the operator to install the harness, because the alarm detection switch is open, indicating that the harness is not present.

\*  
I NSTALL HARNESS



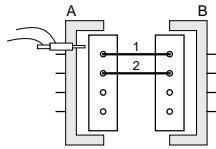
Operator installs the harness connectors – the alarm detection switch closes, the Analyzer starts the test scan indicating the first connection to be made.

OPEN  
A-1  
B-1



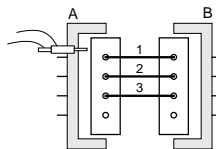
Operator installs wire 1. The Analyzer responds with an audible beep, and displays the next connection to be made.

OPEN  
A-2  
B-2



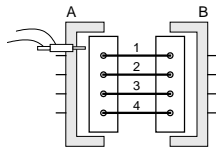
Operator installs wire 2. The Analyzer responds with an audible beep, and displays the next connection to be made

OPEN  
A-3  
B-3



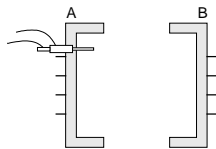
Operator installs wire 3. The Analyzer responds with an audible beep, and displays the next connection to be made

OPEN  
A-4  
B-4



Operator installs wire 4. The Analyzer responds by indicating that the harness is complete, and instructs the operator to remove the harness. The Analyzer monitors the alarm detection switch, waiting for the harness to be removed.

\*  
ASSEMBLY PASSED  
REMOVE HARNESS



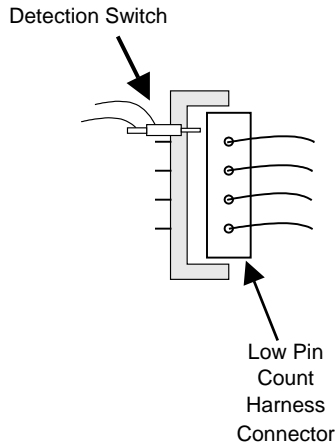
Operator removes harness. The alarm detection switch opens, and the Analyzer prompts the operator to install the next harness to be tested.  
The test sequence then repeats.

\*  
I NSTALL HARNESS

This solution has three aspects:

- 1 Characteristics of the alarm detection switch
- 2 Definition of the alarm detection switch in PASS
- 3 Modification of the Sequence in PASS

## Characteristics of the alarm detection switch



In order to implement the Alarm Feature, at least one reliable detection switch must be present on the fixture. For simplicity, it is recommended that a single detection switch be used for this purpose.

The detection switch must be highly reliable. Reliability is important, since the detection switch is used to determine the presence of the harness in the fixture, and an unreliable detection switch may cause the Analyzer to erroneously enter the alarm mode.

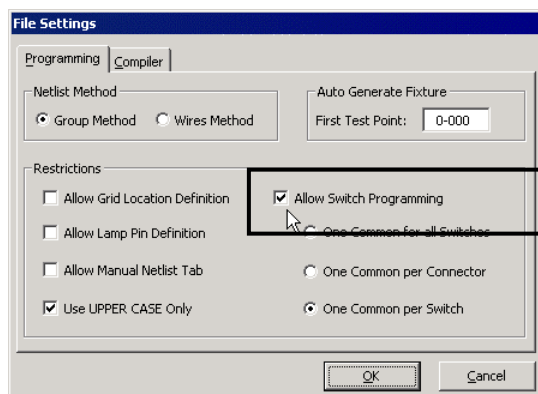
It is recommended that the harness connector to be detected by the switch be a low pin count connector. This is important, since a low pin count connector will be less prone to assembly errors than a high pin count connector will. If errors occur when assembling wires to the connector which is associated with the alarm detection switch, it is likely that the connector may need to be removed from the fixture to effect repair. If this connector is removed, it will trigger the alarm.

## Definition of the alarm detection switch in PASS

The alarm detection switch must be defined in the PASS program. The steps for defining the switch in PASS are described in this section. The Alarm Feature is designed to monitor the state of any detection switch that is defined in a special Netlist named "ALARM". However, the detection switch must first be defined in the MAIN Netlist. The steps below will show how to define the detection switch in the MAIN Netlist, how to create the ALARM Netlist, and how to define the detection switch in the ALARM Netlist.

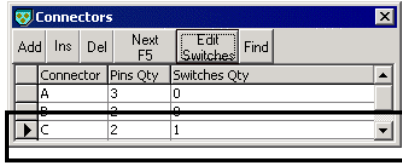
### File Settings

First, ensure that the File Settings are configured to allow switch programming. Select: **File->File Settings**. The following will appear:

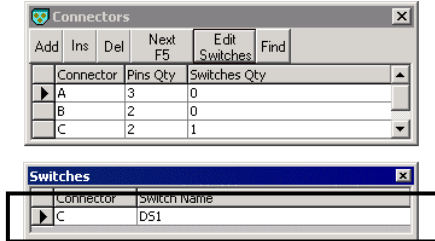


Make sure the box labeled "Allow Switch Programming" is checked and press OK

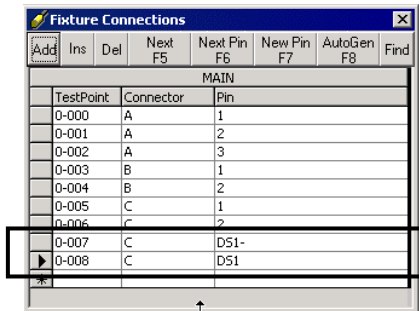
## Define the detection switch and connector in the MAIN Netlist



Next, define the connector and switch corresponding to the detection switch. This is done by making an entry in the Connectors table. It is important to understand that in PASS, a detection switch is always associated with a connector. In the example shown at left, the connector that has an associated detection switch is connector C. It has 2 pins and 1 switch.



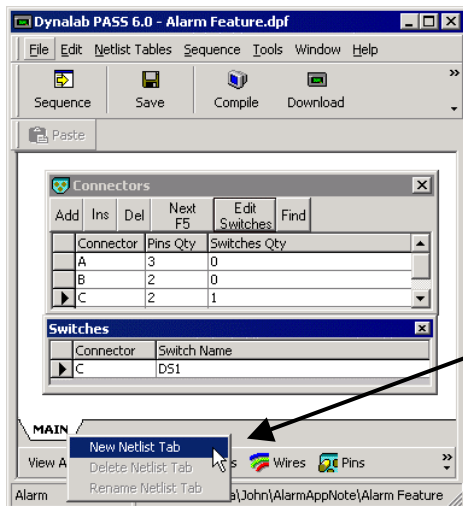
Once the connector is defined as shown above, pressing the “Edit Switches” button will cause the Switches table to appear. In the Switches table, the Switch Name will automatically be populated with “DS1” (Detection Switch 1). The detection switch is now defined in the MAIN Netlist.



In addition to defining the alarm detection switch and connector, it will be necessary to define all the other harness elements in the MAIN Netlist. Once this is done, the Fixture Connections table in the MAIN Netlist must have an entry for the detection switch similar to the one shown here.

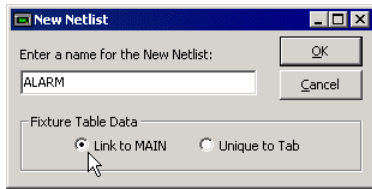
Entry for detection switch

## Defining the detection switch and connector in the ALARM Netlist

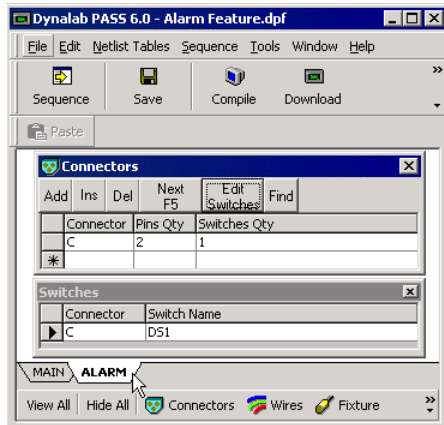


The ALARM Netlist must now be defined by pointing to the MAIN Netlist tab located at the lower left of the PASS window, right clicking and selecting New Netlist Tab:

Place cursor over “MAIN” tab, right click, and select “New Netlist Tab”.



In the “New Netlist” box, enter “ALARM” for the Netlist name, and make sure that the “Link to MAIN” button is selected.



In the ALARM Netlist, define only the connector and switch that correspond to the detection switch. Nothing else should be defined in the ALARM Netlist. The purpose of the ALARM Netlist is to tell the Analyzer what switch is the alarm detection switch. The Analyzer will monitor this detection switch to determine if the harness is present in the fixture.

## Modification of the Sequence in PASS

Once the alarm detection switch is defined as previously explained, it is necessary to modify the PASS Sequence. The following is a basic example Sequence that employs the Alarm Feature.

This Sequence monitors the alarm detection switch to make sure the harness is present, performs a complete scan of the MAIN Netlist, monitors the alarm detection switch to make sure the harness is removed, and automatically repeats the Sequence.

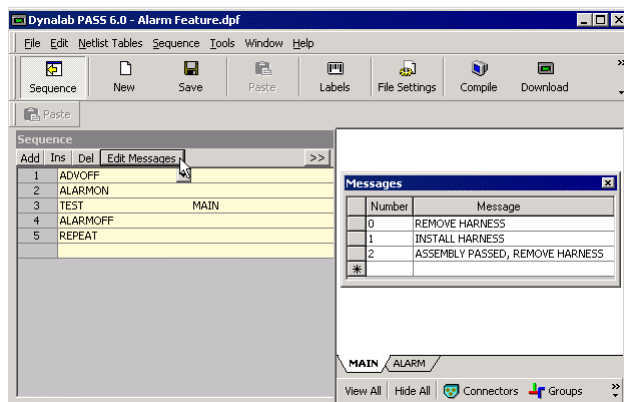
If an error is encountered, the Sequence causes the Analyzer to stop and display an error message. The Analyzer continues to monitor the test points associated with the error, and waits until the operator has fixed the error condition. Once the error condition is fixed, the Analyzer will then continue testing the remainder of the harness. The operator cannot override this behavior by pressing the START button. The operator must fix the error in order for the test to continue.

### Example Sequence using the Alarm Feature

Line	Command	Parameter	Application Effect
1	ADVOFF		Prevent Advance By Start Key on Error
2	ALARMON		Beginning of ALARM Switch Scan
3	TEST	MAIN	Complete Netlist Scan
4	ALARMOFF		Ending of ALARM Switch Scan
5	REPEAT		Repeat Sequence From First Line



- Line 1** ADVOFF: Prevents the operator from logging errors by pressing the START button. When errors are displayed, the operator must fix the error before the scan will continue. (When an error is encountered, the Analyzer stops on the error, displays the error message, and continuously scans the points where the error occurred, waiting for the operator to fix the error. The default behavior of the Analyzer is to allow the operator to press the START button to log the error – the Analyzer then would then advance by continuing to scan the remainder of the Netlist. With ADVOFF, the START button has no effect – the Analyzer will not advance, but will wait for the operator to fix the error).
- Line 2** ALARMON: Enables the scanning of the alarm detection switch. This is disabled by the ALARMOFF Sequence item. Between ALARMON and ALARMOFF, the Analyzer will monitor the alarm detection switch and enter the alarm mode if the harness is removed before the test scan is completed. ALARMON also displays the message “REMOVE HARNESS” if the alarm detection switch indicates that the harness is present. It displays the message “INSTALL HARNESS” if the alarm detection switch indicates that the harness is not present.
- Line 3** TEST: Performs a complete continuity and shorts scan of the MAIN Netlist.
- Line 4** ALARMOFF: Disables the scanning of the ALARM detection switch. ALARMOFF also displays the message “ASSEMBLY PASSED, REMOVE HARNESS”. This indicates that ALARMOFF is designed with a specific test philosophy in mind that requires defects to be fixed before the harness can be removed from the test fixture. In other words, each harness is expected to pass all tests before being removed from the test fixture. This test philosophy is implemented by using the ADVOFF Sequence as seen in Line 1. ADVOFF prevents the operator from logging errors by pressing the START button. When errors are displayed, the operator must fix the error before the scan will continue. In this scenario, the only time a harness may be removed from the fixture is when all tests have been completed – and all tests can be completed only if the harness is good
- Line 5** REPEAT: Causes the Sequence to start over at Line 1



The ALARMON and ALARMOFF Sequence items are designed to display messages – ALARMON uses message numbers 0 and 1, and ALARMOFF uses message number 2. Therefore, in addition to modifying the Sequence as shown above, it is also necessary to modify the Messages table as shown here.

In the Sequence table, pressing the “Edit Messages” button causes the Messages table to appear. Messages 0, 1, and 2 must be defined in the Messages table as shown here.

## ALARMON and ALARMOFF – Description

ALARMON and ALARMOFF are actually macros – each is made up of several Sequence items. The fundamental Sequence item that provides the Alarm Feature capability is actually ALARM. The ALARM Sequence item causes the Analyzer to start monitoring the status of the Alarm detection switch. The problem with using ALARM by itself is that the Analyzer will enter the alarm mode right at the beginning of the test, since the detection switch is open at that point. Extra Sequence items are needed to first make sure that the connector associated with the detection switch has been assembled in place, and that the detection switch is closed before monitoring its state to check for premature removal of the harness. ALARMON and ALARMOFF are macros that contain extra Sequence items to ensure that the detection switch is monitored only after the previously tested harness has been removed and the current harness assembly has begun.

### ALARMON:

ALARMON is a macro that does the following:

- If the alarm detection switch is closed, indicating that the previously tested harness is still in place, ALARMON will cause the Analyzer to display the prompt “REMOVE HARNESS” and wait until the alarm detection switch opens.
- If the alarm detection switch is open, indicating that no harness is present in the fixture, ALARMON will cause the Analyzer to display the prompt “INSTALL HARNESS” and wait until the alarm detection switch closes.
- After the operator installs the connector associated with the alarm detection switch, causing the switch to close, ALARMON invokes the ALARM Sequence item.

The following is the actual Sequence that makes up the ALARMON macro:

Line	Command	Parameter	Application Effect
1	STOPOFF		Disables the STOP function. Analyzer will not stop on errors.
2	MESSAGE	0	Displays “REMOVE HARNESS”
3	SW_OPEN	ALARM	Scans all detection switches defined in the ALARM Netlist, verifying that they are all open.
4	OERP		On error repeat previous Sequence item
5	MESSAGE	1	Displays “INSTALL HARNESS”
6	SW_CLOSED	ALARM	Scans all detection switches defined in the ALARM Netlist, verifying that they are closed.
7	OERP		On error repeat previous step: loops back to line 6 (SW_CLOSED) if not all switches in ALARM Netlist are closed. Along with line 6, this forms a continuous loop waiting for the switches in the ALARM Netlist to close
8	STOP		Enables the STOP function. Analyzer will stop on errors, and display error condition.
9	ALARM	ALARM	Enables the Alarm Function

- Line 1** STOPOFF: Instructs the Analyzer not to stop during scan to display errors.
- Line 2** MESSAGE 0: Displays the message defined in the Messages table as number 0. This message should be defined as “REMOVE HARNESS”.
- Line 3** SW\_OPEN: Scans all the detection switches defined in the ALARM Netlist, verifying that they are all open. (Only one detection switch needs to be defined in the ALARM Netlist to implement the Alarm Feature.) If the alarm detection switch is closed, an error is returned.
- Line 4** OERP: On Error Repeat Previous: If the previous Sequence item returned an error execute the previous Sequence item again. Otherwise, execute the next Sequence item. This causes the Analyzer to loop back to line 3 (SW\_OPEN) if the alarm detection switch is closed. Along with line 3, this forms a continuous loop waiting for the alarm detection switch to open.
- Line 5** MESSAGE 1: Displays the message defined in the Messages table as number 1. This message should be defined as “INSTALL HARNESS”.
- Line 6** SW\_CLOSED: Scans all the detection switches defined in the ALARM Netlist, verifying that they are all closed. (Only one detection switch needs to be defined in the ALARM Netlist to implement the Alarm Feature.) If the alarm detection switch is open, an error is returned.
- Line 7** OERP: On Error Repeat Previous: If the previous Sequence item returned an error execute the previous Sequence item again. Otherwise, execute the next Sequence item. This causes the Analyzer to loop back to line 6 (SW\_CLOSED) if the alarm detection switch is open. Along with line 7, this forms a continuous loop waiting for the alarm detection switch to close.
- Line 8** STOP: Instructs the Analyzer to stop on an error condition and display the error.
- Line 9** ALARM: Causes the Analyzer to monitor the alarm detection switch, and enter the alarm mode if the detection switch opens

### **ALARMOFF:**

ALARMOFF is a macro that does the following:

- Causes the Analyzer to display the prompt “REMOVE HARNESS” and to wait until the alarm detection switch opens.
- ALARMOFF invokes –ALARM. This disables the ALARM sequence item, so that the Analyzer stops monitoring the alarm detection switch.