Applications Note

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Using the Built-in LabScan XE Diagnostics

The LabScan XE contains several built-in tests. The complete test set may be performed on any instrument that has either the retroviewer or the foot switch option installed. A limited test set may be performed on instruments without the retroviewer or foot switch options.

Complete Test Set Using the Retroviewer or Foot Switch

Perform the following steps periodically to assess instrument performance or if there is any reason to suspect that the instrument is not operating properly. These diagnostics test the operation of the various lights, motors, and switches in the LabScan XE.

1. Place the instrument in the port-up orientation with the sample port uncovered. Also install the largest (2.00-inch) port plate. You will need to observe changes occurring inside the instrument port while performing the tests.
2. Turn the LabScan XE on. It need not be connected to a computer or DP-9000 processor.
3. Press and hold the Macro/Read button on the front of the LabScan XE and then press the Retroviewer button or foot switch. Release both buttons. The diagnostic mode will be entered. While in this mode, the In Progress indicator light will flash while a particular test is in progress and the Power light will be continuously lit. You will need to examine the status of the UV and SAV indicator lights at various times.
4. The first test is the lamp test. The instrument lamp and the In progress light should both flash continuously. You can observe the flashing of the lamp through both the open instrument port and the retroviewer.
5. Press the Retroviewer button or foot switch to move on to the port plate sensor test (if the VSI option is installed). The instrument beeps when the new test begins.
6. Install each of your port plates in turn and observe which indicator lights turn on while each plate is installed. They should correspond to the table below, indicating that the port plate sensors are working properly.

Size of Port Plate Hole	Indicator Lights Turned On
2.00-inch	SAV
1.20-inch	UV
0.70-inch	In Progress
0.40-inch	UV, In Progress
0.20-inch	SAV, UV
Option or CMR	SAV, UV, In Progress

7. Press the Retroviewer button or foot switch to move on to the internal reference tile test.
8. The internal reference tile should continuously move into position and then back to its home position. You can observe this by looking into the open instrument port. The UV light should come on when the tile is in position over the port and the SAV indicator light should come on when the tile is in its home position.
9. Press the Retroviewer button or foot switch to move on to the test for the first UV filter of the UV filter set (if the UV control option is installed).
10. The first UV filter should continuously move into and out of the light path in a manner similar to how the internal reference tile moved. You can see this by looking deep into the instrument port. As the filter moves, the SAV and UV indicator lights should light alternately.
11. Press the Retroviewer button or foot switch to move on to the test for the second UV filter of the UV filter set (if the UV control option is installed).
12. The second UV filter should continuously move into and out of the light path. This filter rotates into place on a horizontal axis. You can observe this by looking deep into the instrument port. As the filter moves, the UV indicator light should turn on and off.
13. Press the Retroviewer button or foot switch to move on to the test for the UV filter set (if the UV control option is installed).
14. The two UV filters should continuously move into and out of the light path. You can see the motion (although more vaguely than in the individual UV filter tests) by looking deep into the instrument port. As the filters move, the SAV and UV indicator lights should light alternately.
15. Press the Retroviewer button or foot switch to move on to the zoom lens test (if the VSI option is installed).
16. The zoom lens should move back and forth from the LAV (1.75-inch) position to the SAV (0.125-inch) position. You can observe the lens moving toward and away from the port by looking carefully into the port. The UV indicator light should light when the lens is all the way down (away from the port) and the SAV light should light when the lens is all the way up (toward the port).
17. Press the Retroviewer button or foot switch to move on to the retroviewer light test. The zoom lens will need to move back to the LAV position (down) before this test can begin. The instrument will beep when the retroviewer light test begins.
18. The retroviewer light should flash on and off. You can see the lights at the very top of the instrument port turn on. The UV indicator light will remain on throughout this test.
19. Press the Macro/Read button to exit the diagnostic mode.

If any of these diagnostics indicates a problem in that you don't see the motion or the lights described for a particular test, contact HunterLab Technical Support at (703) 834-2206 and describe the tests performed and the exact results obtained.

If the sensor passes all diagnostics, standardize the LabScan XE and commence normal operation.

Limited Test Set Without the Retroviewer or Foot Switch

Perform the following steps periodically to assess instrument performance or if there is any reason to suspect that the instrument is not operating properly. These diagnostics test the operation of various lights, motors, and switches in the LabScan XE. If a retroviewer is installed in your LabScan XE or you have access to a foot switch, it is recommended that you run the complete test set as described in the first part of this note.

1. Place the instrument in the port-up orientation with the sample port uncovered. Also install the largest (2.00-inch) port plate. You will need to observe changes occurring inside the instrument port while performing the tests. Turn the instrument off.
2. Press and hold the Macro/Read button while you turn the instrument on. Hold the button until the In Progress light comes on and then release it. (The instrument need not be connected to a computer or DP-9000 processor.)
3. The diagnostic tests will begin for the installed options. Unlike the complete test set, these tests will proceed automatically without input from the user until all tests have been completed. It can sometimes be difficult to observe the functioning of each option, as the tests are completed rapidly. The tests are performed in the following order: lamp test, internal reference tile test, first UV filter test, second UV filter test, UV filter set test, zoom lens test, retroviewer test. If an option is not installed, its test will be skipped. See the instructions for the complete test set for guidelines on what to observe for each test.
4. When all available tests are complete, the In Progress light will flash three times if there are no faults, and thirteen times (very rapidly) if any errors were detected. The sensor will then beep to indicate that the test set is complete.

If any of these diagnostics indicates a problem in that you don’t see the motion or the lights described for a particular test, contact HunterLab Technical Support at (703) 834-2206 and describe the tests performed and the exact results obtained.

If the sensor passes all diagnostics, standardize the LabScan XE and commence normal operation.

Other Diagnostics for the LabScan XE

Several diagnostic procedures are described in your instrument User's Manual and may also be used to assess instrument operation and performance. These tests are performed within your software or using the DP-9000.

- **White Tile Check:** Standardize the instrument using large area view with all UV filters out. Set your data display to show XYZ values using the D65 illuminant and 10° observer. Read the white calibrated tile and compare the values read to those shown on the back of the standard. All values read should be within ±0.05 unit of the values shown on the standard immediately after standardization of the instrument. If any of the values are out of this specification, clean the white tile, restandardize, and read the white tile again.

- **Green Tile Check:** Standardize the instrument using large area view with all UV filters out. Set your data display to show XYZ values using the D65 illuminant and 10° observer. Read the green tile and compare the values read to those shown on the back of the tile (the "values read at factory"). All values read should be within ±0.15 unit of the values on the back of the tile immediately after standardization of the instrument. If any of the values are out of this specification, clean all the tiles and perform the test again.

If either of these diagnostics indicates a problem, contact HunterLab Technical Support at (703) 834-2206 and describe the tests performed and the exact results obtained.

If the sensor passes these diagnostics, standardize the LabScan XE and commence normal operation.

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