

# Applications

## Applications Note

*Insight on Color*

Vol. 15, No. 2

## Using DIAGNOSE.EXE with a LabScan

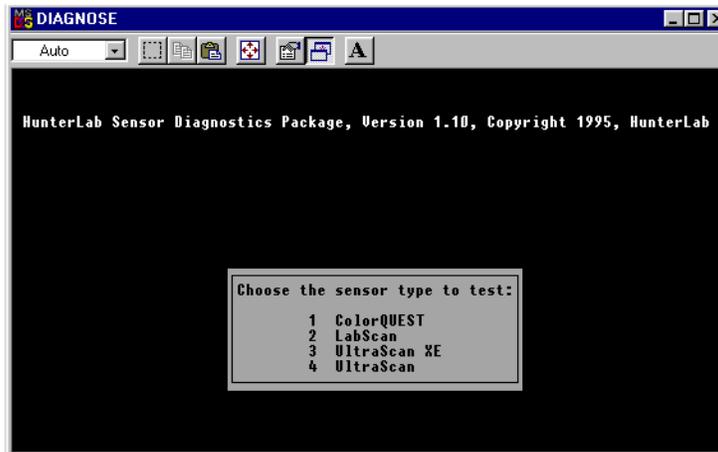
The DIAGNOSE.EXE program, which may be used to assess instrument performance and diagnose potential problems, is installed automatically with HunterLab's Universal and EasyMatch Coatings software packages. For users of other software packages, the program may be forwarded to you from HunterLab Technical Support if a problem with your instrument is suspected. Three files must be installed in the same folder on your computer in order to run the diagnostics: DIAGNOSE.EXE, ENGLISH.DGM, and LS#####.CAL, the instrument calibration file.

*Note: Only one LabScan calibration file, the one matching the instrument to be tested, may be located in the folder containing DIAGNOSE.EXE while the program is in use.*

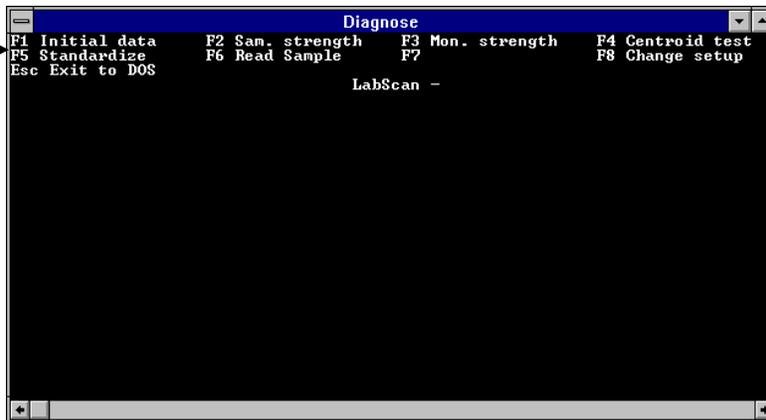
Perform the following steps periodically to assess instrument performance or if there is any reason to suspect that the instrument is not operating properly.

Perform the following steps to complete all available diagnostics. If any diagnostic results are outside the stated range, follow the instructions for contacting HunterLab that are given at the end of the procedure.

1. Exit Universal, EasyMatch, or your instrument control software.
2. Clean the white tile and black glass as described in your User's Manual. Allow the instrument and lamp to warm up for two hours before running the diagnostics. The standard tiles should be dry and at room temperature.
3. Locate the DIAGNOSE.EXE program file (in your UNIVERSE or EZMATCH folder if you are using one of those packages) using the Windows File Manager or Windows Explorer. Double-click the DIAGNOSE name to open the program.
4. On the opening Diagnose screens, choose 2, LabScan, and the serial port to which the instrument is connected. The main menu screen then appears.



Available functions →



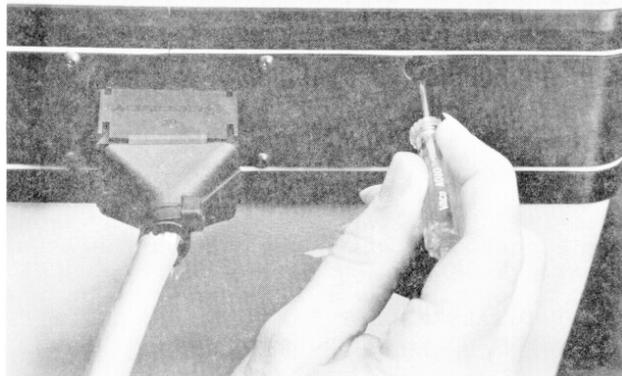
5. Install the standard (2.0-inch) port plate and confirm that the UV filter is out.
6. Place the white calibrated tile at the sample port. Press **F2** to perform the **Sample strength test**. The raw A/D counts for the white tile are then displayed for each measurement wavelength at the top of the screen. The peak sample signal strength should not exceed 25,000 counts. The electronic offset at the bottom of the screen should be between 500 and 2,000 counts. Press Home to return to the diagnostics menu.

| Diagnose                      |                  |       |                  |      |                  |       |       |       |       |
|-------------------------------|------------------|-------|------------------|------|------------------|-------|-------|-------|-------|
| F1 Initial data               | F2 Sam. strength |       | F3 Mon. strength |      | F4 Centroid test |       |       |       |       |
| SAMPLE SIGNAL STRENGTH        |                  |       |                  |      |                  |       |       |       |       |
| 400                           | 4315             | 480   | 17130            | 560  | 13991            | 640   | 12295 |       |       |
| 410                           | 7497             | 490   | 16533            | 570  | 13478            | 650   | 12734 |       |       |
| 420                           | 11061            | 500   | 15856            | 580  | 12969            | 660   | 13286 |       |       |
| 430                           | 14170            | 510   | 15128            | 590  | 12701            | 670   | 13639 |       |       |
| 440                           | 16466            | 520   | 14454            | 600  | 12618            | 680   | 13566 |       |       |
| 450                           | 17742            | 530   | 14095            | 610  | 12526            | 690   | 13097 |       |       |
| 460                           | 18009            | 540   | 14126            | 620  | 12333            | 700   | 12520 |       |       |
| 470                           | 17679            | 550   | 14198            | 630  | 12180            |       |       |       |       |
| COUNTERWEIGHT SIGNAL STRENGTH |                  |       |                  |      |                  |       |       |       |       |
| 1412                          | 1482             | 1841  | 3026             | 5421 | 8662             | 11445 | 13004 | 13386 | 13352 |
| 13295                         | 13141            | 12223 | 10088            | 7072 | 4138             | 2225  | 1534  | 1438  | 1426  |
| 1389                          | 1389             | 1389  | 1389             | 1388 | 1389             | 1389  | 1389  | 1389  | 1389  |
| 1389                          | 1390             | 1389  | 1389             | 1390 | 1392             |       |       |       |       |
| ELECTRONIC OFFSET 1389        |                  |       |                  |      |                  |       |       |       |       |
| <Home> Exit diagnostic        |                  |       |                  |      |                  |       |       |       |       |

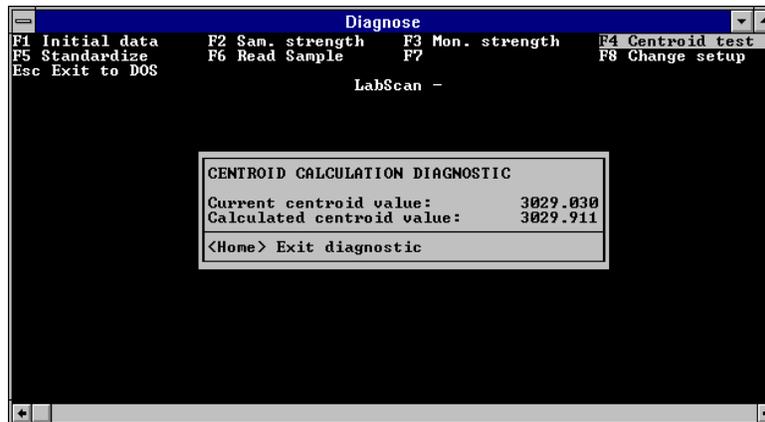
- Press **F3** to perform the **Monitor strength test**. The raw monitor counts are then displayed for each measurement wavelength at the top of the screen. The peak monitor signal strength should not exceed 30,000 counts. The electronic offset at the bottom of the screen should be between 500 and 2,000 counts. Press Home to return to the diagnostics menu.

| Diagnose                      |                  |       |                  |      |                  |       |       |       |       |
|-------------------------------|------------------|-------|------------------|------|------------------|-------|-------|-------|-------|
| F1 Initial data               | F2 Sam. strength |       | F3 Mon. strength |      | F4 Centroid test |       |       |       |       |
| MONITOR SIGNAL STRENGTH       |                  |       |                  |      |                  |       |       |       |       |
| 400                           | 5065             | 480   | 18892            | 560  | 14838            | 640   | 13126 |       |       |
| 410                           | 9026             | 490   | 18054            | 570  | 14190            | 650   | 13762 |       |       |
| 420                           | 13179            | 500   | 17143            | 580  | 13650            | 660   | 14425 |       |       |
| 430                           | 16777            | 510   | 16210            | 590  | 13444            | 670   | 14704 |       |       |
| 440                           | 19297            | 520   | 15403            | 600  | 13409            | 680   | 14380 |       |       |
| 450                           | 20471            | 530   | 15042            | 610  | 13280            | 690   | 13637 |       |       |
| 460                           | 20423            | 540   | 15130            | 620  | 13011            | 700   | 12934 |       |       |
| 470                           | 19732            | 550   | 15175            | 630  | 12868            |       |       |       |       |
| COUNTERWEIGHT SIGNAL STRENGTH |                  |       |                  |      |                  |       |       |       |       |
| 15                            | 54               | 242   | 1165             | 4097 | 8814             | 12730 | 14079 | 14084 | 13776 |
| 13803                         | 14074            | 14353 | 12130            | 7093 | 2310             | 506   | 106   | 54    | 44    |
| -1                            | -1               | -1    | 0                | 0    | -1               | 0     | -1    | 0     | -2    |
| -1                            | -1               | 0     | -1               | -1   | 2                |       |       |       |       |
| ELECTRONIC OFFSET 1390        |                  |       |                  |      |                  |       |       |       |       |
| <Home> Exit diagnostic        |                  |       |                  |      |                  |       |       |       |       |

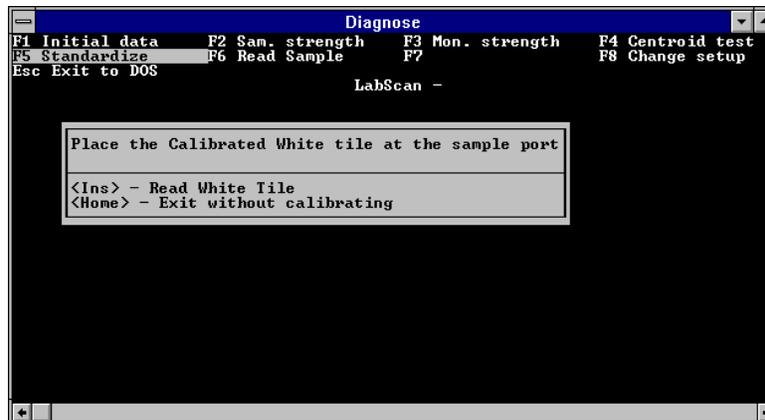
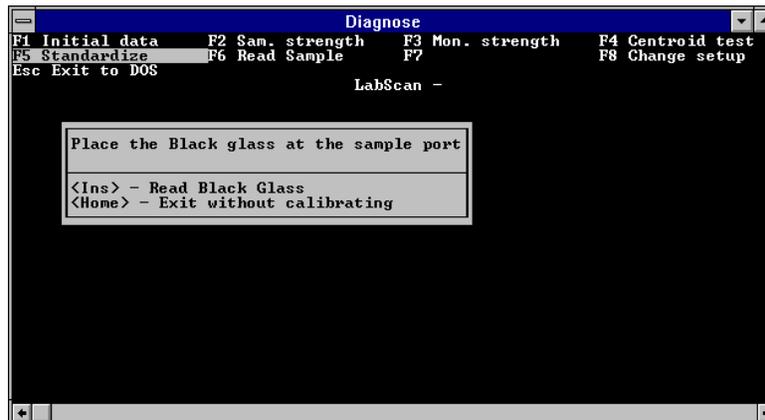
*Note: Based on the results of this test, HunterLab Technical Support may instruct you to adjust the instrument gain. This is done by removing the plastic plug from the 1/4-inch hole on the back of the sensor and using a small screwdriver to turn the adjustment screw that is located about 1-inch behind the hole. Perform this adjustment only under the guidance of HunterLab Technical Support.*



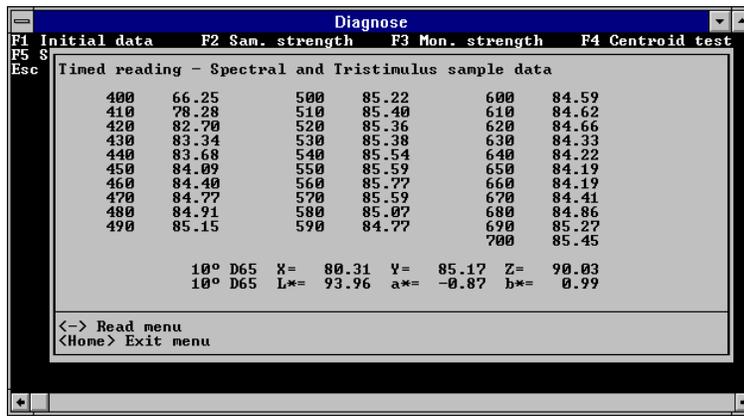
8. Press **F4** to perform the **Centroid test**. The measured and calculated centroid values are displayed. The two values should match to within 3 units. Press Home to return to the diagnostics menu.



9. Press **F5** to **standardize the instrument**. Standardization prompts very similar to those seen in your operational software will be obtained. Press Insert after completing the instructions described by each prompt. No confirmation is given when standardization is complete.



10. Place a sample or tile at the reflectance port and press **F6, Read Sample**. Press 1 to perform timed readings for the sample. Type an interval between reads and Press Enter. This interval should be short enough that you can examine several measurements quickly, but long enough that you have time to note the values. Five seconds is suggested. The spectral and tristimulus readings of the sample will be shown and continuously updated at the interval selected. Press - on the number pad to return to the Read Sample menu.



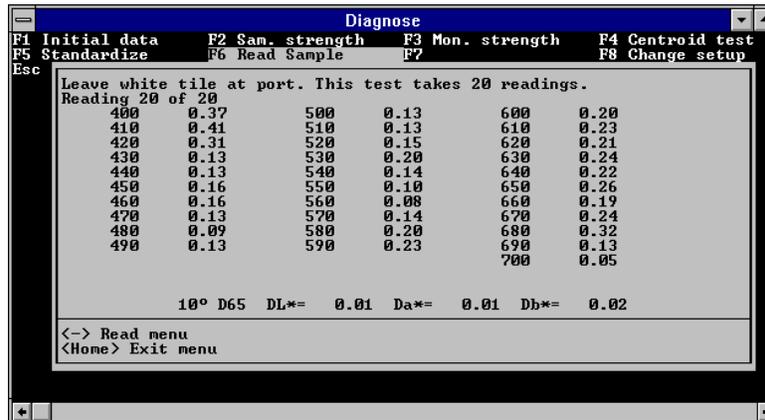
11. Press 2 to perform the repeatability test. Place the white calibrated tile at the reflectance port. Press Insert. Twenty reads of the tile will commence and Delta L\*, a\*, and b\* values (between the first and last readings) will be displayed on the screen along with delta values for reflectance at each wavelength read. If any of the spectral value deltas is outside the following specifications, record the result and contact HunterLab Technical Support.

*Spectral Data Specifications, Delta, Spectral reflectance:*

Should be ≤0.4 at 400 nm and 700 nm

Should be ≤0.2 at 420 nm and 680 nm

Should be ≤0.1 from 440 nm to 660 nm.



Press - on the number pad to return to the Read Sample menu.

12. Press 3 to perform the drift test. Place the white tile at the reflectance port, press Insert, and wait 30 minutes for the test to be automatically performed. Delta L\*, a\*, and b\* values (between the first and last readings) will be displayed on the screen along with delta values for reflectance at each wavelength read. No specification has been established for the parameters of drift shown, but if you are reporting results of other diagnostics to HunterLab Technical Support due to a suspected problem, also report the drift results for their evaluation. Press Home to return to the diagnostics menu.

| Diagnose   |                  |                  |                  |     |       |  |
|--|------------------|------------------|------------------|-----|-------|--|
| F1 Initial data  | F2 Sam. strength | F3 Mon. strength | F4 Centroid test |     |       |  |
| F5 Standardize   | F6 Read Sample   | F7               | F8 Change setup  |     |       |  |
| Esc  |                  |                  |                  |     |       |  |
| Leave white tile at port. The drift test takes 30 minutes to complete. |                  |                  |                  |     |       |  |
| 400  | 0.02             | 500              | 0.03             | 600 | 0.11  |  |
| 410  | 0.16             | 510              | 0.01             | 610 | -0.06 |  |
| 420  | 0.05             | 520              | 0.03             | 620 | -0.00 |  |
| 430  | 0.04             | 530              | 0.04             | 630 | 0.06  |  |
| 440  | 0.00             | 540              | 0.04             | 640 | 0.00  |  |
| 450  | 0.06             | 550              | 0.03             | 650 | -0.04 |  |
| 460  | -0.00            | 560              | -0.01            | 660 | 0.09  |  |
| 470  | 0.06             | 570              | 0.07             | 670 | 0.01  |  |
| 480  | 0.01             | 580              | 0.01             | 680 | 0.02  |  |
| 490  | 0.03             | 590              | -0.00            | 690 | -0.03 |  |
|  |                  |                  |                  | 700 | 0.02  |  |
| 10° D65 DL* = 0.01 Da* = -0.00 Db* = -0.01                             |                  |                  |                  |     |       |  |
| <-> Read menu  |                  |                  |                  |     |       |  |
| <Home> Exit menu   |                  |                  |                  |     |       |  |

13. Press **F8** to **change the setup** for diagnostic testing. You will obtain the same selection screen listing the instruments that was shown when the software was first entered.

14. When all diagnostics are complete, press Esc to exit the diagnostics program.

If any of these diagnostics indicates a problem, contact HunterLab Technical Support at (703) 471-6870 and describe the tests performed and the exact results obtained.

If the sensor passes all diagnostics, enter your software package, standardize the LabScan, and commence normal operation.

## Other Diagnostics for the LabScan

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 normal software package.

- White Tile Check:** Standardize the instrument using the standard (1.75") area of view with the UV filter out. Set your data display to show absolute XYZ values using the D65 illuminant and 10° observer. Read the white calibrated tile and compare the values read to those shown on the standards card. All values read should be within  $\pm 0.10$  units of the values shown on the standards card immediately after standardization. If any of the values are out of this specification, clean the white tile and black glass and standardize and read again.
- Green Tile Check:** Standardize the instrument using the standard (1.75") area of view with the UV filter out. Set your data display to show absolute XYZ values using the D65 illuminant and 10° observer. Read the green calibrated tile and compare the values read to those shown on the back of the tile. All values read should be between  $\pm 0.30$  units 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. More complete instructions on checking the green tile are given in your User's Manual.

*For Additional Information Contact:*

Technical Services Department  
 Hunter Associates Laboratory, Inc.  
 11491 Sunset Hills Road  
 Reston, Virginia 20190  
 Telephone: 703-471-6870  
 FAX: 703-471-4237  
 www.hunterlab.com