Minolta Spectrophotometer User Guide

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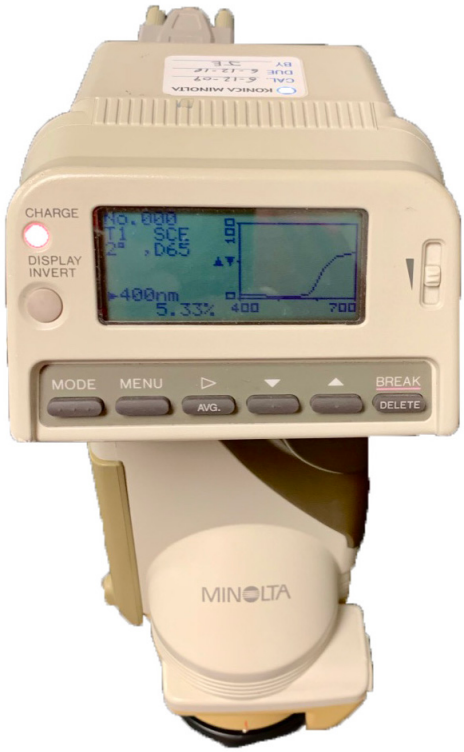

Introduction

The Minolta Spectrophotometer (Model CM-2002), also referred to as the Minolta Color Scanner, is a handheld instrument that measures color reflectance over a spectral range of 400 to 700 nm wavelengths. The instrument was commonly used on ODP Legs and some IODP expeditions, either in handheld mode or as part of an automated track system in which the instrument was moved along the track and lowered onto a split-core section for making measurements (Figure 1).

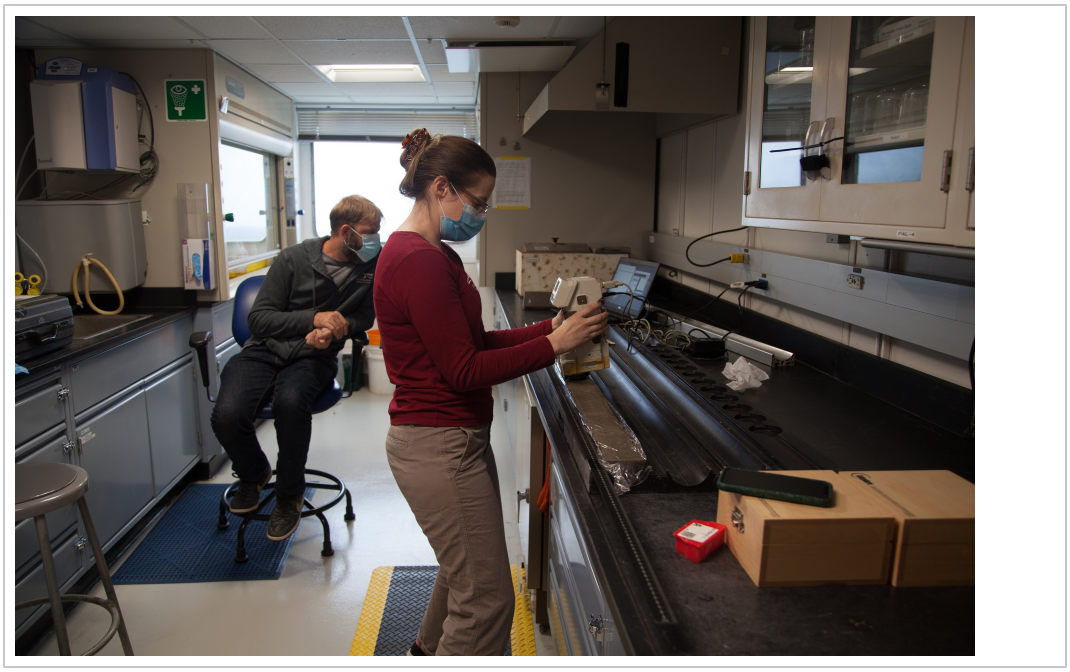

Figure 1. Taking measurements.

Procedures

Instrument Configuration

The Minolta Spectrophotometer comes in a case, which should contain all components necessary to run, except a lap top (Figure 2).. The necessary components for use with Spectrolog software are

- The scanner
- Scanner power supply
- White calibration standard
- RS232 null modem cable
- National Instruments RS232 to USB cable
- Lab top PC
- CD with Spectrolog

To use the scanner with the Spectrolog software, connect a RS232 null modem cable to the Minolta, connect the RS232 end of a National Instruments RS232-to-USB cable to the null modem cable and connect the USB end to a computer, preferably a lap top for mobility, and plug in the power supply. The internal battery will charge but may not retain a charge for the duration of measuring core sections.

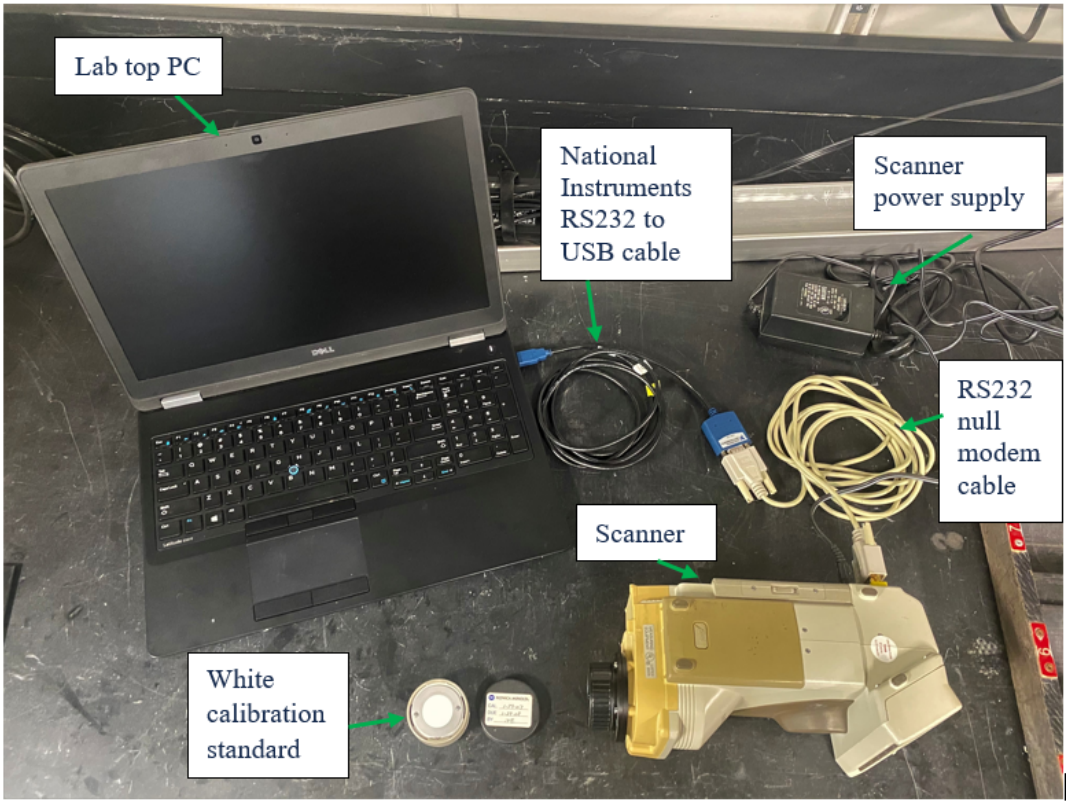

Figure 2. Picture of the instrument, cables, and white calibration standard.

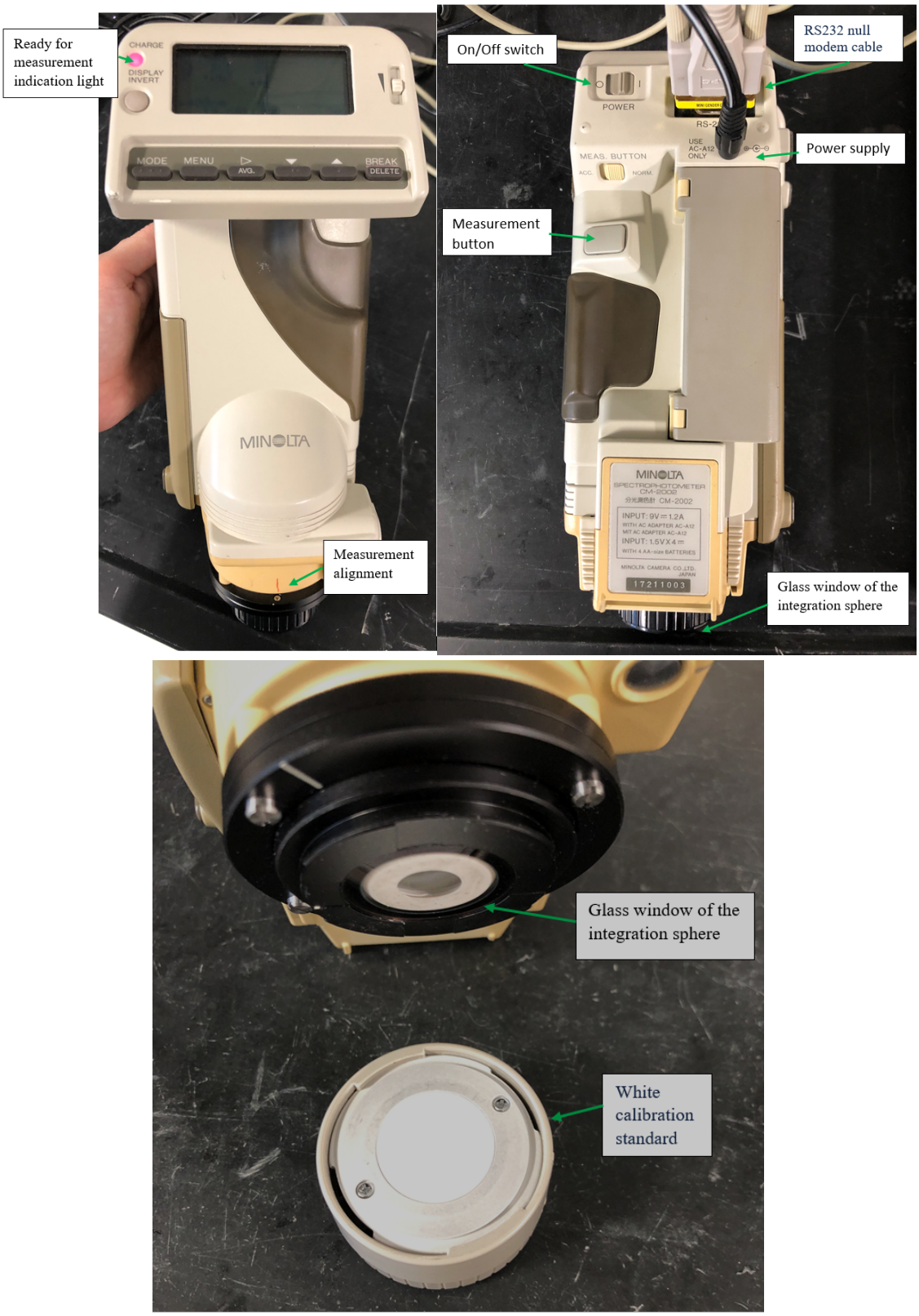

Figure 3. Picture of scanner components (front and back).

Software

The Spectrolog software runs the scanner (Figure 3). It is located on a CD that is in the Minolta Spectrophotometer case.

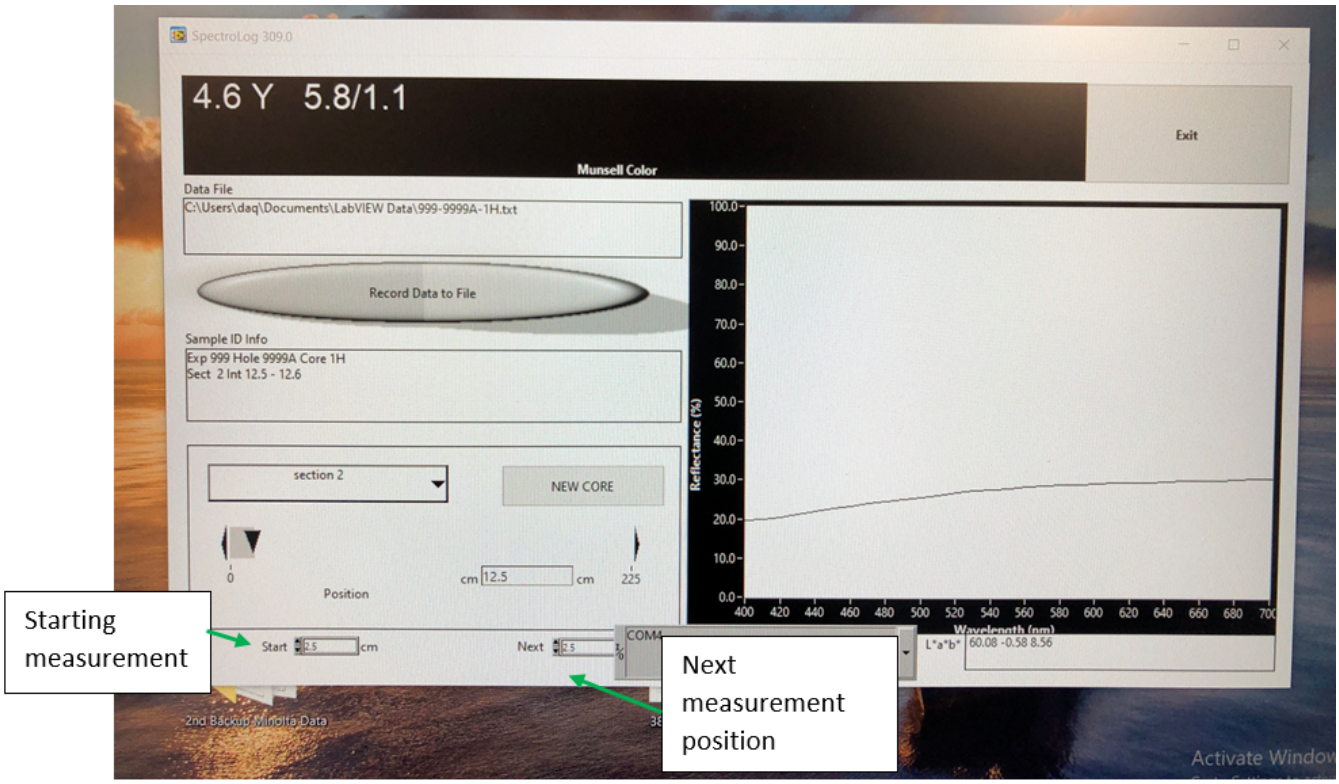

Figure 4. Screen capture of Spectrolog software.

Installation

These installation steps will require administrative privilege on the target workstation. Actual operation of the software does NOT require administrative privilege.

1. Install the LabVIEW 2011 Runtime environment for your Windows workstation.
2. Install NI VISA. Reboot when installation is complete.
3. Copy Spectrolog-2.0.0.0.exe to a location on your computer
4. Run the application to verify its operation (Figure 3).

Notes:

- This program does not capture calibration data from the white standard or from the zero (black) calibration.
- Camera must be configured to report XYZ, L*a*b*, and Munsell (hue value chroma--HVC). Program data parser expects to find this info in the output stream.
- The Minolta by default communicates at 9600 baud, 8 bits, 1 stop bit, no parity. You shouldn't have to change any settings. PuTTY is a good testing tool, if needed.
- The Minolta must NOT be in "REMOTE" mode. Under normal operation, the Minolta echoes text to the serial port: Spectrolog works this way. [The REMOTE mode is applied when the device is driven from the computer, e.g. from a track system where the sensor is moved over a long sample.]
- You may see timeout issues on the Minolta screen if you are using it offline with a serial cable connected, but not running Spectrolog.
- The data file location will be displayed in Spectrolog when you click the New Core button. This location is hard-coded and cannot be changed. Example: C:\Users\{your account}\Documents\LabVIEW Data\317-1318A-1H.txt
- Spectral wavelengths in the data files go from 400 nm to 700 nm in 10 nm steps.

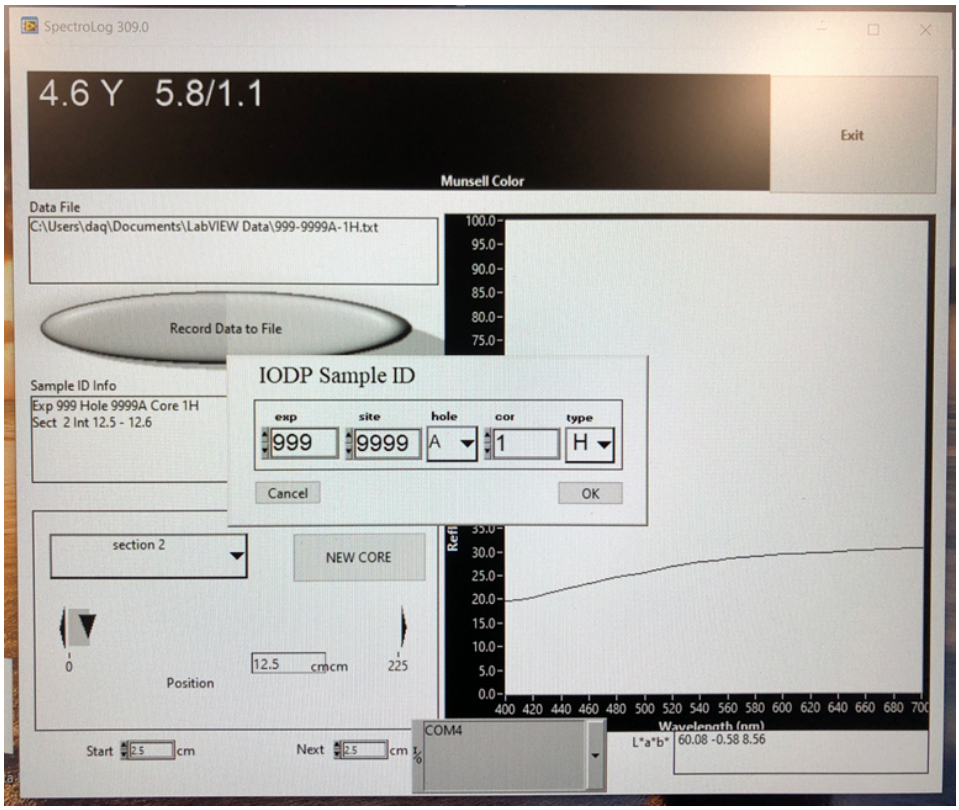

Figure 5. New Core button screen

Preparing Samples

Standards should be measured without plastic wrap. Sections are prepare similar to those measured on the SHMSL. For a sediment core, preparation is:

1. Use a spatula or smear slide to clean the cut surface of the core by lightly scraping away any material that was smeared across the surface during core splitting.
    a. If the Minolta is being used in place of the QE Pro Spectrophotometer, then take the SHIL image first so Minolta sensor marks will not be in the image.
2. Apply GLAD® Plastic Wrap to the surface of sediment cores.
    a. **IMPORTANT!!!** It is necessary to cover the core section with GLAD® PlasticWrap in order to avoid damage to the integration sphere. Any mud that gets on the glass window of the integration sphere or scratches to the glass will prevent accurate measurement of subsequent samples. Care should be taken to reduce wrinkles in the wrap.

Warning! Do not cover the standards with GLAD® Plastic Wrap; they will give erroneous results if you do.

Measuring Samples

1. Turn on the Minolta color reflectance camera.
2. Perform the white calibration, then press the 'Measure' button.
    a. A Zero calibration may also be completed. If not, the factory default values are likely to be used if the scanner has not been used for a long time.
3. Connect the cables from the computer to the Minolta. The cables include a null modem RS232 cable connect to the Minolta and a National Instruments RS232 to USB cable, with the USB going into the computer.
4. Double-click the SpectroLog executable to run the program.
5. Specify the identifiers for the core to be measured; press OK. Select the appropriate section from the drop-down list. The data will be placed in a file named accordingly.
6. Enter starting measurement position, enter position of next measurement. The software will auto generate the next sample position using the offset between the first two measurement positions entered.
7. Position the camera over the sample, and press the Minolta 'Measure' button. When complete data is retrieved from the instrument, the on-screen display will update to show the measurement values, and the measurement progress bar will update for the next measurement position.
8. Select the section drop-down list to start measuring the next section and to reset the measurement progress scale.
9. Press the 'Next Core' button to start measuring another core. This has the effect of starting a new data file.

First-time users may find it useful press Control+H to obtain on-line help. Hover over each of the interface elements to see what it does. Control+H again to put away help.

The application is architected to save data to a file named according to the expedition, site, hole, and core specified. As a section is completed, toggle the drop-down list to the next section--data continues to go into the same file. When measurements for a core are completed, press the 'New Core' button to start a new data file.

Acquisition of data to a file may be turned-off by toggling the 'Record data to file' button. This is useful for intermediate control readings.

The measurement progress bar may be reset at any time by clicking on the arrows at the end of the bar. The next measurement taken will have that centimeter interval applied to the reading.

Calibration

As noted above, calibration is to be completed when you turn the instrument on. Attach the white calibration standard by gently turning it on the integration sphere. Press the measurement button on the scanner. The scanner automatically goes into measurement mode afterwards. To see if the calibration worked, take another measurement while the calibration standard is still on the scanner or measure other standards and compare the observed values to those expected.

Calibration can be complete any time without restarting the scanner by using the menu options of the scanner.

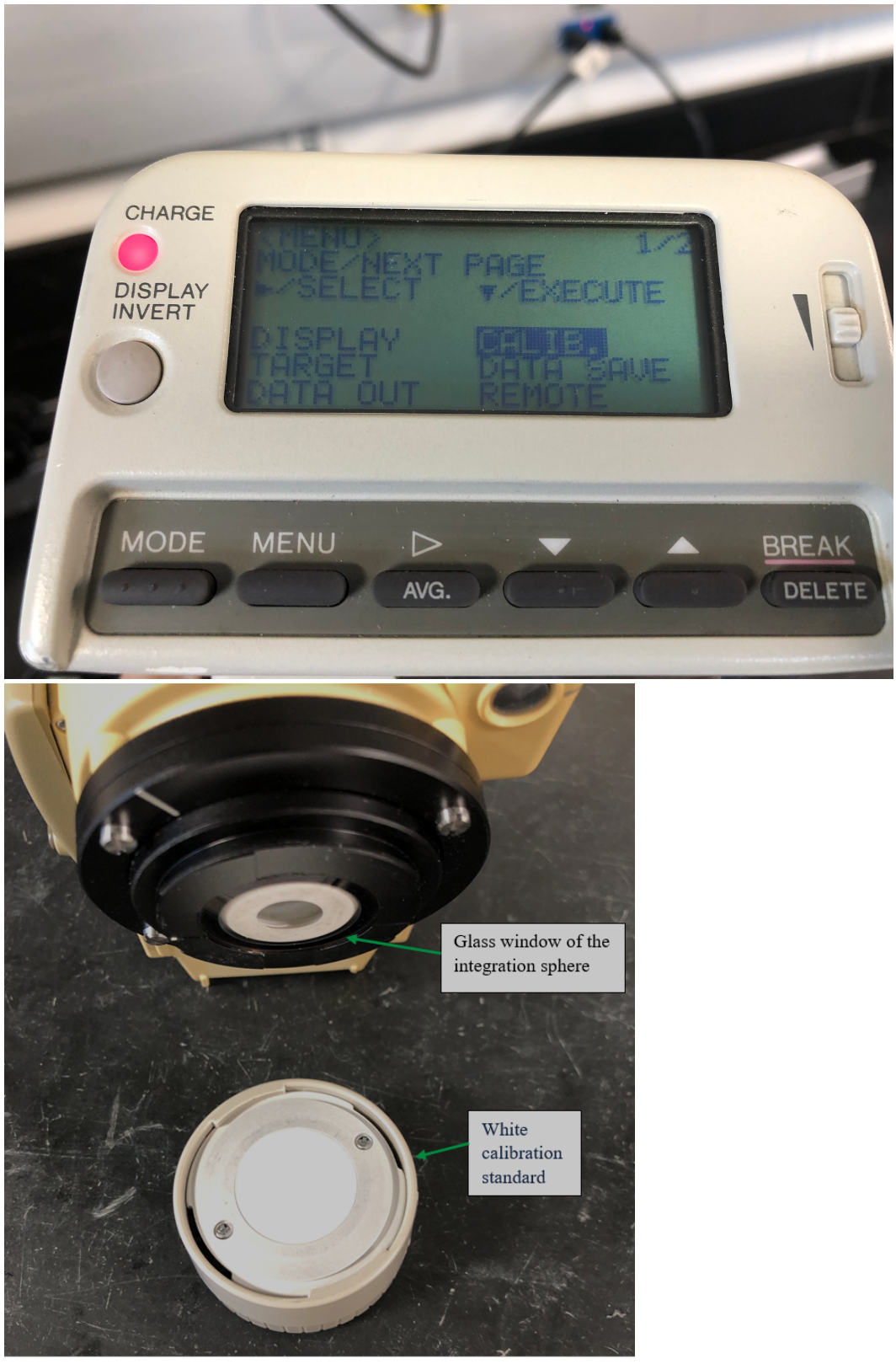

Figure 6. Calibration screen and white calibration standard.

Data

While output for the Minolta Spectrophotometer can be modified as described in the vendor manual, for using the SPECTROLOG software, the output must be set to report XYZ, L*a*b*, and Munsell (hue value chroma--HVC). Program data parser expects to find this info in the output stream. Thus, it is best to leave the settings of the instrument as is. If they are altered, please return them to the Spectrolog settings when done.

When running Spectrolog, the following output is recorded in tab-delimited columns of an ASCII text file:

Expedition, Site, Hole, Core, Core Type, Section, Interval Top (cm), Interval Bottom (cm), "L*a*b*", L*, a*, b*, "XYZ", X, Y, Z, "hvc", Hue, Value, Chroma, "spectra", 400 nm, 410 nm, 420 nm, ..., 690 nm, and 700 nm.

The three columns for "hvc" are the Munsell Hue, Value, and Chroma. The "spectra" is given every 10 nm from 400 to 700 nm.

An example output is shown for 4 measurements along section 384-1554A-5H-5:

384 1554 A 5 H 5 135.0 135.1 L*a*b* 38.45 -1.28 3.25 XYZ 9.67 10.34 10.13 hvc 1.3 GY 3.7/.5 spectra 8.36 8.37 8.58 8.82 9.05 9.23 9.41 9.59 9.76 9.87 9.98 10.12 10.26 10.31 10.36 10.42 10.49 10.58 10.59 10.56 10.51 10.40 10.31 10.21 10.09 9.96 9.81 9.69 9.58 9.45 9.35
384 1554 A 5 H 5 137.5 137.6 L*a*b* 36.19 -1.08 4.83 XYZ 8.53 9.11 8.41 hvc 8.7 Y 3.5/.7 spectra 6.88 6.75 6.86 7.14 7.39 7.63 7.85 8.06 8.25 8.42 8.57 8.74 8.87 8.99 9.06 9.15 9.28 9.40 9.44 9.46 9.42 9.35 9.30 9.23 9.17 9.09 8.99 8.89 8.80 8.75 8.71
384 1554 A 5 H 5 140.0 140.1 L*a*b* 37.08 -0.77 3.63 XYZ 9.01 9.58 9.24 hvc 8.4 Y 3.6/.5 spectra 7.62 7.58 7.75 8.02 8.25 8.42 8.61 8.78 8.90 9.01 9.13 9.27 9.38 9.46 9.54 9.62 9.70 9.83 9.89 9.88 9.85 9.82 9.76 9.67 9.57 9.50 9.40 9.31 9.24 9.15 9.09
384 1554 A 5 H 5 142.5 142.6 L*a*b* 36.95 -0.82 4.08 XYZ 8.94 9.51 9.03 hvc 8.3 Y 3.6/.6 spectra 7.30 7.35 7.48 7.78 8.03 8.24 8.42 8.60 8.74 8.85 9.00 9.17 9.27 9.38 9.46 9.54 9.64 9.78 9.85 9.85 9.82 9.77 9.72 9.62 9.52 9.44 9.34 9.25 9.17 9.06 9.00
384 1554 A 5 H 5 145.0 145.1 L*a*b* 37.69 -0.74 3.99 XYZ 9.33 9.91 9.46 hvc 7.9 Y 3.7/.6 spectra 7.60 7.73 7.91 8.15 8.43 8.63 8.82 8.99 9.14 9.27 9.39 9.55 9.68 9.74 9.83 9.96 10.08 10.18 10.24 10.27 10.25 10.18 10.14 10.05 9.94 9.89 9.81 9.71 9.61 9.52 9.48
384 1554 A 5 H 5 147.5 147.6 L*a*b* 36.98 -0.92 4.19 XYZ 8.95 9.53 9.01 hvc 8.6 Y 3.6/.6 spectra 7.18 7.32 7.46 7.72 8.00 8.22 8.42 8.60 8.74 8.89 9.03 9.16 9.29 9.39 9.48 9.58 9.68 9.82 9.87 9.86 9.84 9.76 9.70 9.62 9.52 9.45 9.34 9.25 9.15 9.05 9.00

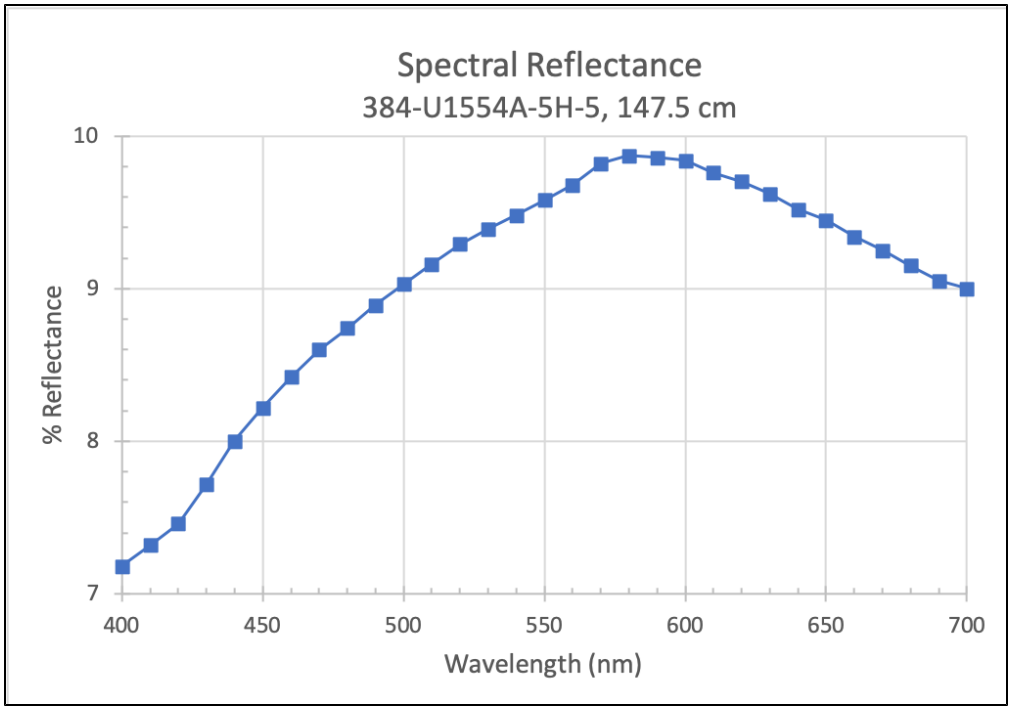

Figure 5. Example data plot.

Useful Links

- Minolta Spectrophotometer CM-2002 manual from the vendor. This is available **only on the ship** at **Minolta CM-2002 manual.pdf**.

Credits

This document was originated on Expedition 384 by Gary Acton (OTHERS ADD NAMES) and includes text from notes written by Bill Mills, who is the author of the Spectrolog software. Credits for subsequent changes to this document are given in the page history.

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