Architectural Energy Corporation (AEC) MicroDataLoggers (MDL)

Overview

Architectural Energy Corporation (AEC) MicroDataLoggers (MDL), shown in Figure 1, can receive signals from up to four interchangeable modules plugged into the logger’s four channels. The logger can log for up to two weeks using the internal batteries or indefinitely with its 120-volt transformer. Thermistors, current transducers or other sensors can be connected to each module. The loggers have the ability to preset a launch time, provide an LCD display and can store 64,000 data points with 12-bit resolution. AEC provides custom software for setting up, launching, and downloading the dataloggers. This application note explains the launching, data retrieval, data graphing, and spreadsheet export procedures specific to the AEC MicroDataLogger.

Launching the Logger

1. **Connect the serial cable to PC and attach all modules to the logger.** (Current transducers require a 333 milivolt AC module.)
2. **Open the MDL software application.** Ensure the communication port of the PC is correctly selected for the logger by clicking on Preferences tab then Options. The Options menu also enables the user to change the units from English to SI, or visa versa, and to select the data export format.
3. **From the LOGGER pull-down menu, select CONFIGURE MDL.** Check that the serial number on the screen matches the logger’s. (Note: the serial number on the MDL is on the back of the logger).
4. In the CONFIGURE MICRODATALOGGER screen (Figure 3) click on the READ CHANNELS button. (All modules must be installed at this point). The channel name and module name will be read from the data logger and entered automatically. A title for the configuration can be entered in the MDL name field (top of window) and for the individual channels in the Channel Name fields.

5. Configure the individual channels to report the correct units and values. This is done by clicking on the SCALE button for any channel. Insert the slope, offset, and units for that channel. These values are part of the linear equation: \( y = mx + b \) such that \( m \) is the slope and \( b \) is the offset. The current transducers used with the MicroDatalogger outputs millivolts. This signal needs to be converted to amps. The data logger reads on a scale of 0 to 333. The Slope (or multiplier) for each current transducer (CT) is proportional to its amperage rating: slope = amp rating / 333. For example, for a 5 amp current transducer, the slope will be 5/333 or 0.01502. This value appears on MDL CT's. In this example, the Offset is 0. Select amps in the Units pull-down menu. A warm-up time of 2 to 10 seconds is recommended for most sensors. The warm-up time is shown in tenths of a second. (A warm-up time is not necessary with temperature and relative humidity sensors.)
6. Click on **OK** after configuring the scale parameters.
7. **Set the run time parameters at the main configuration screen.** Check the computer’s clock at the bottom left for accuracy. Enter the time to begin data collection, the sample interval, and the number of samples stored per reading. The storage interval defines how frequently the logger will average the sample readings and send them to memory. (Note: the sample interval is not the storage interval unless you enter “1” in the **Samples to Average** box). The stop time and date are listed for the logging session at the bottom, left.
8. Checking the Memory Overwrite Enable box allows the logger to collect data continuously, replacing the oldest data with the latest readings.
9. Checking the Button Start/Stop box allows the user to pre-configure the logger and start the data collection in the field by pressing the button located on the side of the logger.
10. **To send changed configuration to the logger, click the SEND CONFIG button.** In a moment, the data logger will beep and a window will appear on the computer screen confirming that the information was sent successfully to the logger.
11. If several loggers are launched with the same sensors and configuration, save the first configuration, then reload that configuration into subsequent loggers.
12. **Remove the serial port connection from the logger, connect transducers and/or sensors to the modules, and place the equipment in the field.** A 120-volt transformer should be used if the logger will be collecting data for more than 2 weeks.
13. To view real time readings, exit to the configure screen by clicking on the CLOSE button. Select Real Time Readings from the Logger pull-down menu.

The real-time readings and parameters for all active channels are shown at Figure 5. They are updated every three seconds. The real-time readings, the logger’s clock, and the number of readings stored can be viewed at the logger’s LCD display by pressing the button located on the left side of the logger. Instructions for the push-button control are printed on the back of the logger.

Retrieving Data from Logger

1. Connect the logger to the serial port of the PC, and select Retrieve Data from the Logger menu. This screen shows the configuration information.

2. Verify the serial number in the right corner of the logger and click on the Retrieve Data button. A Save As window will open. The data must be saved with the .log suffix. Click on the SAVE button. The logger will beep as it downloads data.

Once downloaded, the Retrieve Data screen will reappear. When all the data has been retrieved, click on the CLOSE button.
Using MDL Software to Graph Collected Data

1. Select **New Graph Definition** from the Graph pull-down menu.

![Graphing parameters screen](image)

**Figure 6: Graphing parameters screen.**

2. Use the browser at the top of the window to find the appropriate data file. The channel titles will appear in the Channels windows. Highlight the channels to be graphed. Once highlighted, click on the **ADD** button. They will appear in the Plots portion of the window. Individual channels can be added from several data sets into a single graph. The channels can be removed by clicking on **REMOVE** or **REMOVE ALL**.

3. **Click on the OK button and a graph of the data will appear.** Zoom in on a section of the graph by clicking across the area with your mouse. All the data points can be viewed on one graph by choosing **One Plot** on the **Graph Type** menu.
4. The Analysis Mode in the Zoom Mode menu provides statistics for the defined section of the graphed data. Figure 7 shows an example of results from the Analysis Mode.

![Image of Analysis Mode statistics]

**Figure 7: Analysis mode selected area.**

**Exporting Data for Use in Spreadsheet Applications**

To open the data file in EXCEL or other spreadsheet software, the file must be converted into ASCII (text) format.

1. Under the **File** pull down menu, select **Export**.
2. Choose the file to be exported and click on **Open**.
3. Choose a file name for the new text file and a folder location, then click on **Save As**. The new text file can be imported as a tab delimited file in Excel.