



SLUG4 DATA-LOGGER MANUAL

YieldPoint Inc.

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Service Policy

Units within the warranty period returned for repair, test, and recalibration are serviced at no charge in accordance with the terms of the warranty policy. The Customer pays all transportation and other charges to the factory.

Units out of warranty returned for repair, test, and/or recalibration are handled on a time and material basis. If requested, or if costs exceed 50% of current list price, YieldPoint Inc., advises the customer prior to making the repairs. Such repairs are performed at the customer's expense. Typical test, recalibration, and repairs are 25% of the instrument's current list price. Transportation charges both ways are at the customer's expense.

Please be sure all returns are shipped with the following information included:

1. Your company Name with Billing and Shipping Addresses.
2. A complete description of your problem, or re-calibration data.
3. The contact person at your company, with their telephone and facsimile numbers.
4. Non-Warranty returns additionally need your Purchase Order Number.

Please pack your returned instruments in their original shipping cartons, or in equivalent strong protective shipping cartons.

1. Basics

The SLUG4 (Sensor Logger for Underground) is a small, low cost Plug 'n Play data-logger that parses data from up to four (4) YieldPoint digital instruments (that's up to 40 channels) into 32Mb of non-volatile FLASH memory which can then be downloaded later to a PC for further analysis and interpretation.



The SLUG4. The black dot indicates SLOT 1. Plugging into SLOT1 with a sensor or SLOT 5 with the USB download cable will activate the datalogger.

The SLUG4 has no on/off switch. It turned on by one of two events:

- (i) A sensor is plugged into either of PORTs 1 to 4, in which case the data-logger will wait for approximately 60s, with the LED flashing once/second, before reading any instruments that are plugged in. The delay is designed to allow the user to plug in multiple instruments before the first set of readings is taken.
- (ii) The USB download cable is plugged into the USB PORT. In this case the LED will flash just once for 0.5s.

Should the LED not flash then the batteries should be replaced.

In order to turn off the data-logger all plugs should be disconnected. This will not cause data or settings to be lost.

1.1. Power Requirements

SLUG4 is powered from two 9V batteries. Using two alkaline batteries the device will operate for more than 60 days while taking 1 sample/hour. Two 9V lithium power cells (middle + RHS below) will approximately double the period of operation. The two 9V batteries fit into the lid of the SLUG4 unit.



IMPORTANT!!!

The SLUG requires battery power both to log data and to download data to the PC. Data will not be lost if battery drain causes a loss of power, however a fresh battery must be installed before downloading.

In between readings, when it draws 10-30mA, the SLUG4 operates in SLEEP mode and only draws a current of 80 μ A. Based on the capacity of 9V batteries – alkaline 650mAh and lithium 1200mAh - the life-expectancy can be calculated. The SLUG4 will operate with battery voltage down to 6.5Vdc, and will not loose data even if the voltage should decline further.

The 3V CR1025 lithium battery provides backup power to the clock and is operational only when the 9V batteries are removed. If the SLUG4 does not retain its date/time after battery changes then this lithium battery should be changed.

1.2. Memory Size

Each SLUG4 has 32Mb of Flash memory arranged in 8192 Pages of 528 bytes. A sample (one reading from each of the 4 ports) is stored on each page of memory a total of 8,000 samples comprising 32,000 readings. If the maximum number of readings is exceeded the SLUG4 will stop logging and remain in sleep mode.

2. Operation

2.1 SLUG Software

The SLUG data-logger software (same for SLUG and SLUG 4) can be downloaded free-of-charge- from the URL <http://www.yieldpoint.com/slugsetup.exe>

The software at this link is continually being upgraded and can be regularly downloaded at no charge. The program is compatible with both Windows XP and Windows Vista operating systems.

2.2. USB Download Cable

Communications between the SLUG4 data-logger and a PC requires a USB download cable (purchased separately).

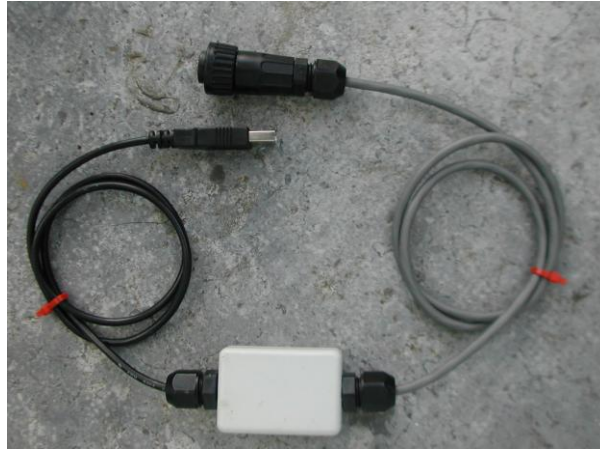


Figure 3. The USB download cable.

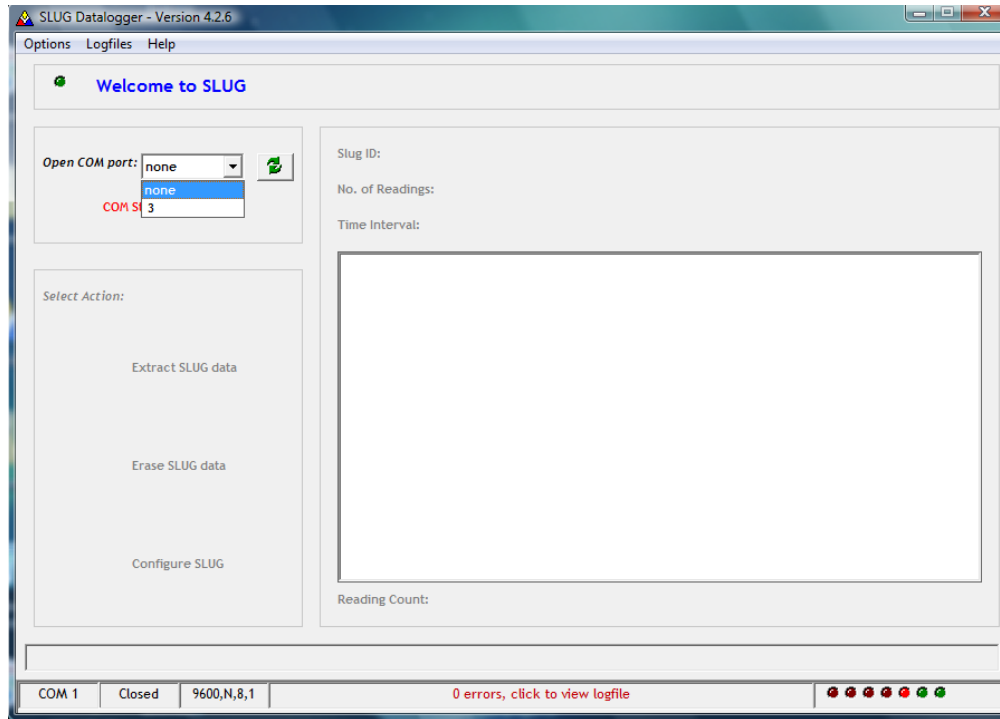
Instructions for installing the USB download cable drivers for Windows XP and Windows Vista are available at: <http://www.yieldpoint.com/usb/>

Once properly installed, the driver configures the USB download cable as a virtual serial port. Depending on your computers settings the specific designation may vary between COM4 and COM16.

It is possible to determine which COM port the USB download cable has been assigned by a two step process:

- (i) Unplug the USB download cable and click on the green refresh arrows (Figure 4 STEP1). Use the Open COM Port pull-down list to determine pre-existing COM Ports.
- (ii) Plug in the USB download cable (without SLUG4) and the click the green refresh buttons. The COM Port assigned will appear.

STEP 1: USB Download Cable disconnected. Click green arrows.



STEP2: USB download cable connected (without SLUG4). Click green Arrows

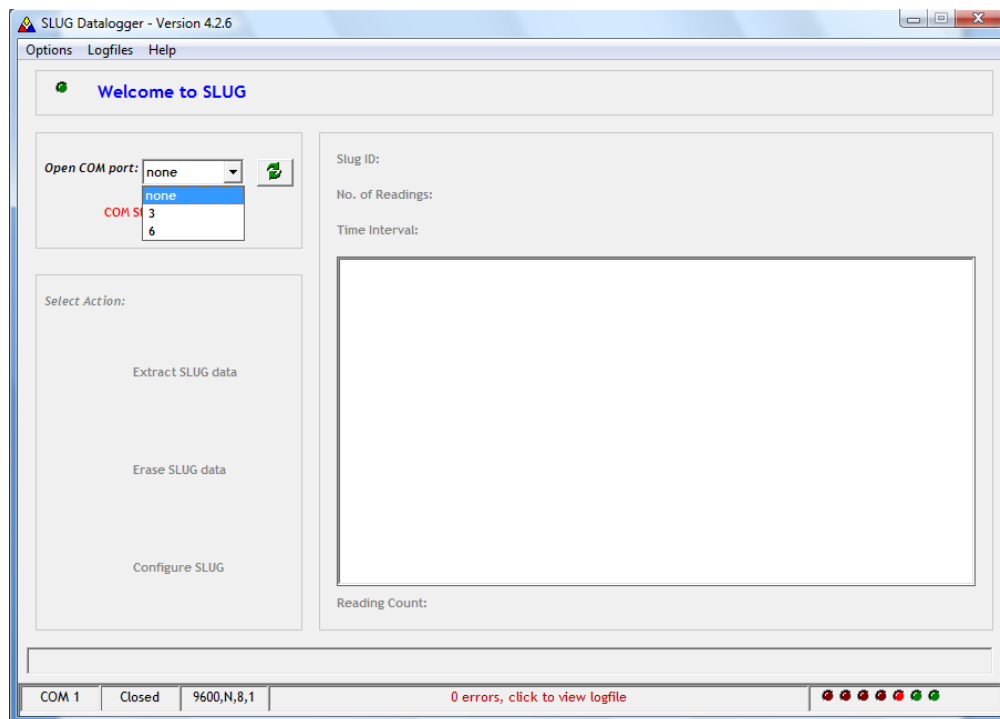


Figure 4: 2 Step COM Port determination for the USB Download cable. In this case the cable is assigned to COM6

To Open the virtual COM Port select COM6 from the pull down menu.

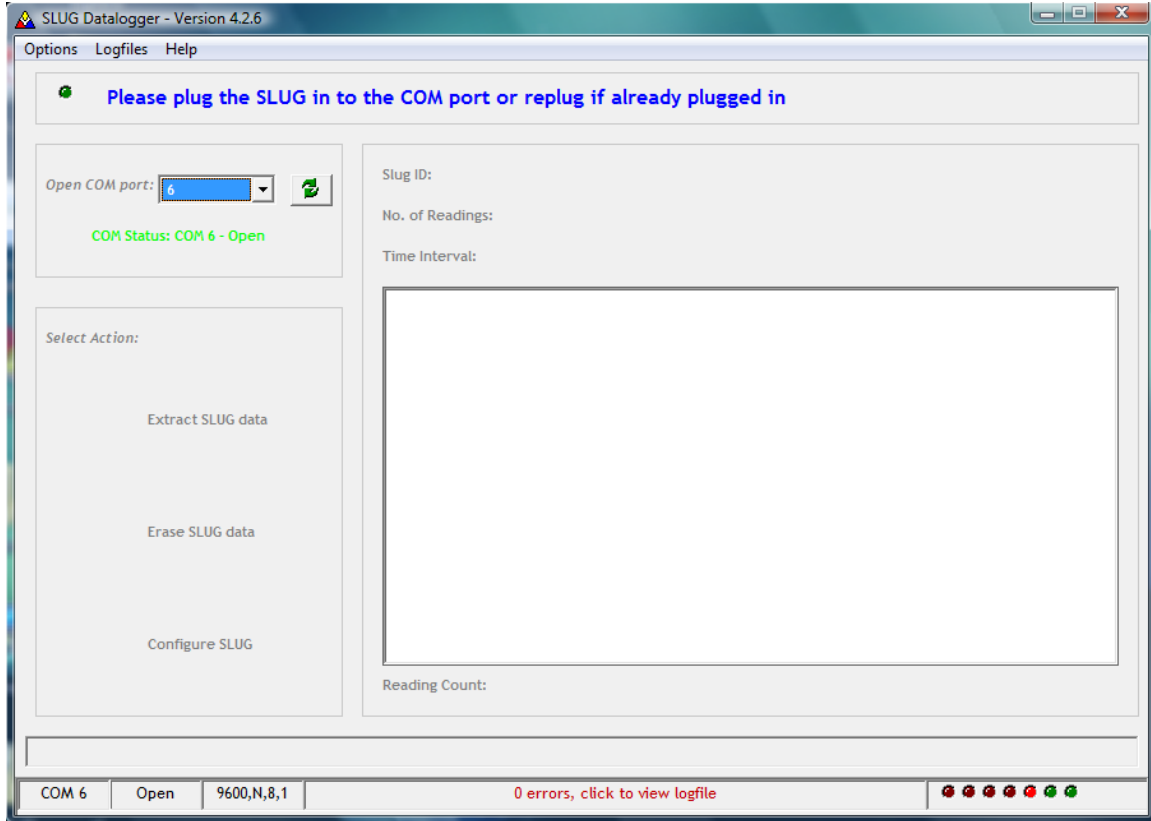


Figure 5: The USB download cable is configured on COM6 and is open. The Software automatically configures the parameters for the virtual COM Port: **9600,8,N,1**.

IMPORTANT: All instrument Ports must be empty (i.e. the logger powered down) before the USB download cable is plugged in .

2.3 Configure the SLUG4

Next connect the SLUG4 to the 5-pin connector. The Green LED on The SLUG4 will flash once, and the SLUG software will automatically detect the SLUG4 and determine its SLUG ID (YYMM-##), the No. of Readings it contains and the Time Interval between samples. The **Select Action** icons will activate. A message will alert the user if the SLUG4 time is more than 1min out of sync with the PC time, in which case the clock should be resynchronised.

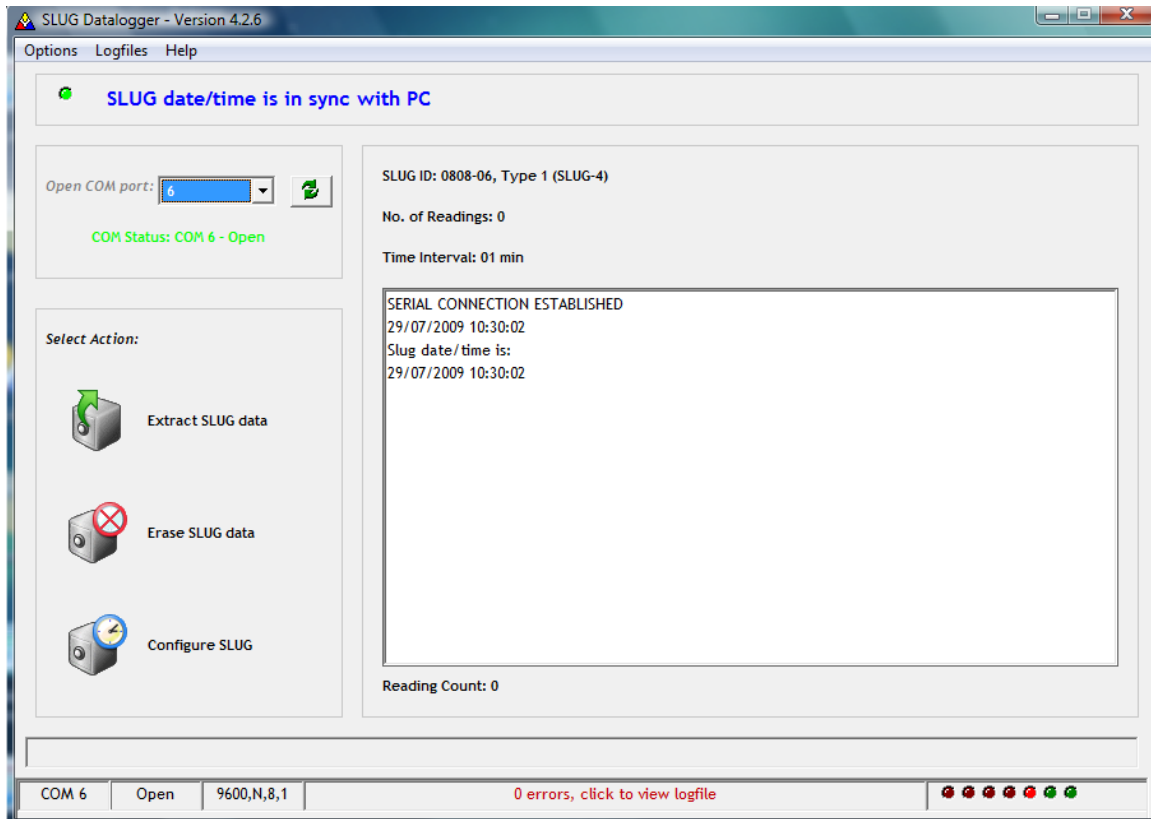


Figure 6: SLUG4 number 0808-06 has been plugged into the download cable.

Click the **Configure Slug** icon. The Configure SLUG window provides 2 functions:
(1) setting the reading interval from 1s (or as quickly as possible with no sleep) to 24hr, and
(2) synchronizing the SLUG4's Internal Clock with PC time.

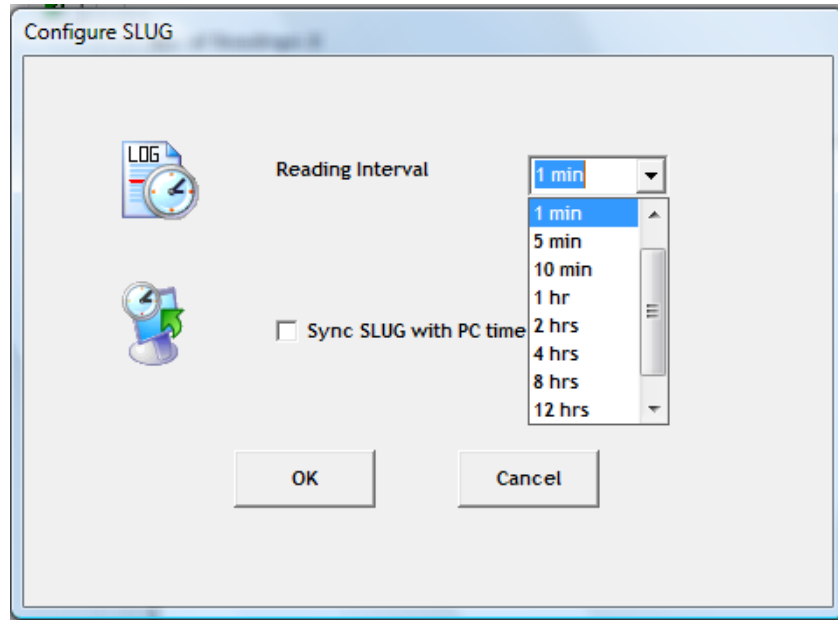


Figure 7: The Configure SLUG window. The SLUG4 clock will be synchronized with the PC if the checkbox is checked.

2.4 Collect data with the SLUG4

It is advisable to change the 9V batteries prior to a new data-logging session, and as described above, resynchronise the internal with the new battery attached. If the SLUG4 does not retain the time after unplugging the 9V batteries then the 3V CR1025 lithium battery should be replaced.

To start data-logging sessions simply plug any YieldPoint digital instrument into one of the instrument PORTs(1-4). The data-logger will wait for approximately 60s, with the LED flashing once/second, before the first sample is taken. Then the LED will generate 4 longer flashes as each of the ports are read. A 1-10 second delay may occur between these readings. It is important to verify this sequence at the beginning of a data-logging session. To save battery power the LED only flashes during the first sample. Should it be necessary to re-check the LED sequence then the data-logger must be turned off by unplugging all the instruments and reconnecting.

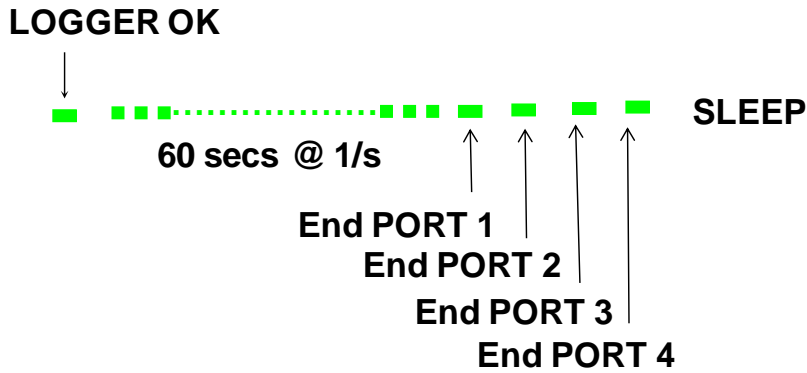


Figure 8: The SLUG4 LED sequence when an instrument is plugged into one of the 4 PORTs. The 60 s interval allows the user to plug in multiple instruments.

The SLUG4 simply writes the RS485 ASCII output string from the digital sensor into memory.

2.5. Download the Data.

After opening the appropriate Virtual COM port connect the SLUG4 data-logger to the USB download cable. Serial Communication will be established and the SLUG4 will inform the software of the number of readings available for download. In this case 20 samples which is equivalent to 80 readings were taken over a 20min interval.

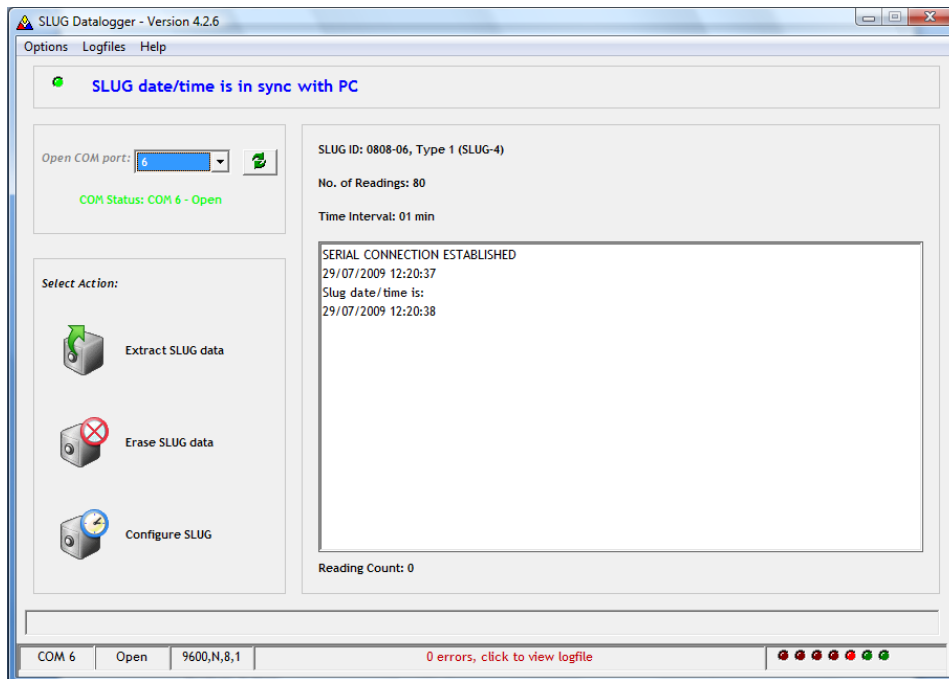


Figure 9: The software response when a SLUG4 is plugged into the USB connection.

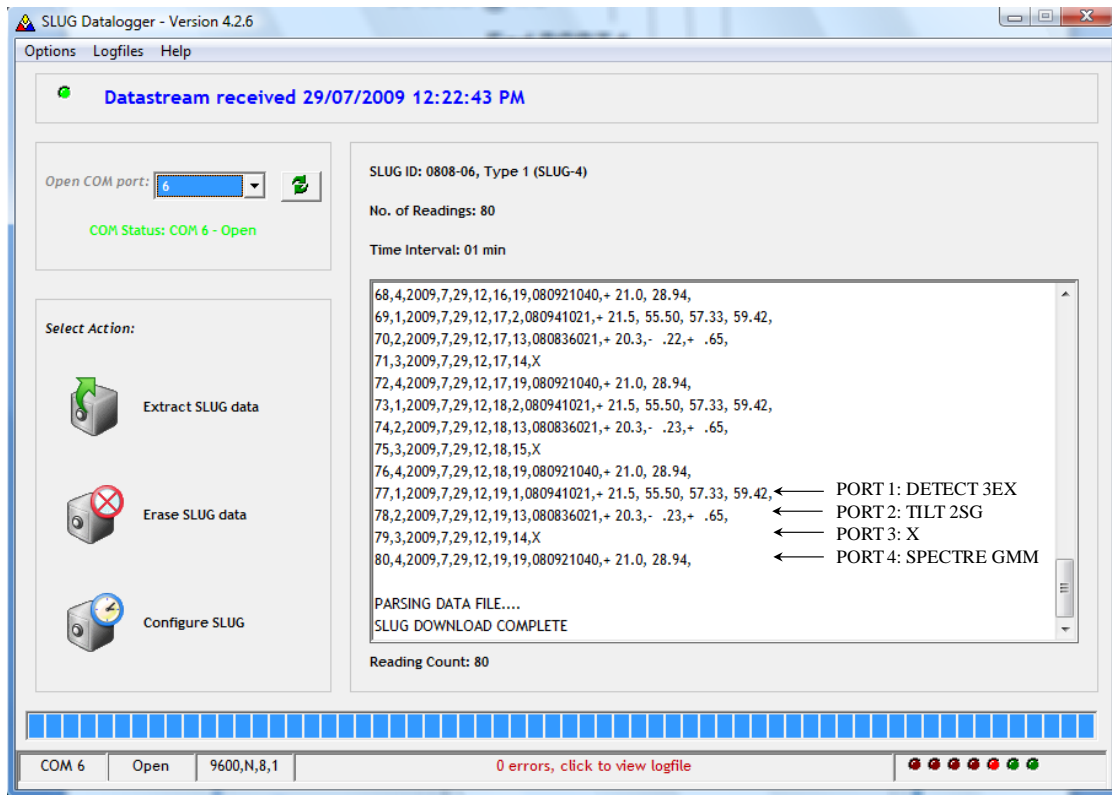


Figure 10: Data Extraction: 20 samples comprising 80 readings taken at 1min intervals have been downloaded.

Clicking on the Extract SLUG data icon will download the data from the SLUG. Individual samples will scroll down the text box. Using the last reading as an example the output string comprises:

Reading Number(80), PORT ID(4),YY(2009),MM(7),DD(29),hh(12),mm(19),ss(19), SensorID(080921040),Temp (21.0C), Disp(28.94mm),

In this data-logging session 20 measurements were taken from a DETECT 3EX borehole extensometer (PORT 1), a 2 channel tiltmeter (Port 2), PORT 3 is vacant, and a SPECTRE GMM (PORT 4). It should be pointed out that no configuration was required for the different instruments The readings are:

- PORT 1: 080941021 (DETECT 3EX), 21.5C, 55.50mm, 57.33mm, 59.42mm
- PORT 2: 080936021 (TILT 2SG), 20.3C, -0.23 arcdeg (X-axis), +0.65 arcdeg (Y-Axis).
- PORT 3: No sensor Attached
- PORT 4: 080921040 (SPECTRE GMM), 21.0C, 28.94mm

The data is written into a text file with a file name corresponding to the unique Sensor ID and called SensorID.txt.

For Windows Vista users these are in the folder:

c:\Users\Public\Documents\YieldPoint\Slug\datafiles. This may vary depend on your PC configuration and operating system. Conduct a simple File Search on SensorID.txt to determine the location of the files.

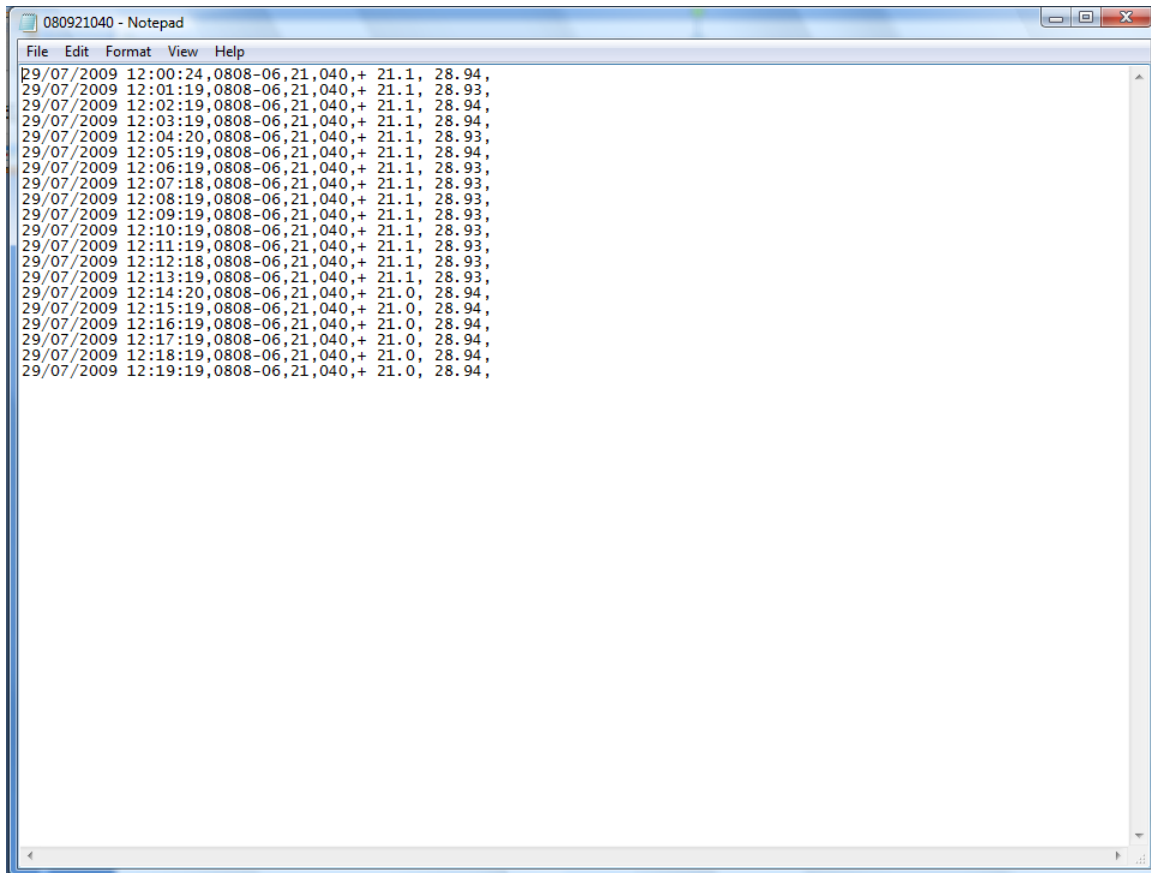


Figure 11: The csv download file opened in Notepad.

3.Troubleshooting

If any problems should arise with your SLUG4 device the following sequence of events should be followed,

- (i) Replace the batteries.
- (ii) Try a different SLUG4 (or SLUG) with the download cable.
- (iii)Try a different download cable if available.
- (iv)Call YieldPoint for telephone assistance (613 531 4722).