Mine Design technologies

SMART Log3

SMART Log

SMART Log

&

SMART Log3

User Guide

V3.4 Nov 24, 2016

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1 About this Document

This document describes the setup procedure and use of the SAMRT Log and SMART Log3 series of dataloggers.

1.1 Revision Status

Table 1 – Revision Status

Date	Revision	Information
Jan 1, 2014	1.0	Document inception
Jan 10, 2014	2.0	Added Content
June 30, 2014	3.0	Format aligned with MDT branding
Aug 25, 2014	3.1	TOC added
Sep 30, 2014	3.2	Warranty/Picture Update
Dec 12, 2014	3.3	Added Content
Nov 24, 2016	3.4	Update to LED

1.2 Document Approvals

Table 2 – Approvals Status

Date:	Revision:	Approval:
Dec 12, 2014	3.3	AD, MT
Nov 24, 2016	3.4	MT

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2 Introduction

This document describes the use of Mine Design Technologies Inc. (MDT) SMART Log series of dataloggers. This document is intended to provide an overview of the use only. There may be conditions at your operation that require an alternate form of installation, or modifications to this procedure. It is recommended that you read the entire manual prior to starting.

3 SMART Log Description

The SMART Log series of dataloggers have been designed with the end user in mind and as such have been manufactured to survive the rigors of the mining world. The product is housed in an all steel powder coated enclosure. The internal working are encapsulated and suspended in such a manner as to improve survivability in the event of a blast or other accidental damage.

In the event the logger is mechanically damaged, crushed by a scoop, found submerged in a pool of contaminated water or a combination of all three, contact MDT. All is not lost, even if the SMART Log appears broken beyond all salvation, there is a good probability your data is still intact. If so, MDT will make every attempt to recover it.

There are 2 product offerings; the SMART Log and SMART Log3. In both instances, the products function and operate in the exact same manner. This manual is applicable to both products.

The SMART Log is a single port device capable of recording 114 285 readings.

The SMART Log3 is a 3 port device capable of recording 55 944 readings per port.

The loggers have been designed for recording data from any of the SMART series of instruments. This includes, but is not limited to:

1. SMART MPBX (Multi-Point Borehole Extensometer)
2. SMART Cables (Instrumented Cable Bolt)
3. SMART Contractometer
4. GMM100, GMM250 and GMM500 (Ground Movement Monitor)

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4 Unpacking

SMART Logs are individually packaged and ship with a Philips screwdriver as well as pre-installed batteries. The Philips screwdriver is used to open the enclosure of the SMART Log.

5 Initial Setup

5.1 Software Installation

1. Insert the Mine Design Technologies Software CD or USB key into the computer, or click the download link provided by the MDT support team to download the software.
2. Install the MineMonitor software by following the on-screen prompts.
3. The instruction manual for MineMonitor is located on the media in PDF format, or can be downloaded from http://www.mdt.ca

5.2 Hardware Setup

1. Check your SMART Log to see if there is a paper tab sticking out of the enclosure that reads "Pull to Activate". If no tab is present, skip to step 5. The paper tab keeps the unit powered off if it's anticipated that the SMART Log may sit for several months before being deployed. If the paper tab is present then open the back cover of the SMART Log by removing the 4 screws as shown:

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2. The batteries have been installed, but a paper tab must be removed before they will make contact. Remove the tab as shown:

3. Turn the unit over and ensure that the GREEN LED light on the front panel is lit (for legacy firmware the ORANGE LED will also illuminate). The GREEN LED will stay lit for 60 seconds before turning off again (see picture below). While illuminated the unit is powered and in "Ready" Mode. Please refer to Table 3 – Status LED Indicators for a complete list of all possible LED combinations.

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4. Reinstall the back cover, ensuring that the power wires do not get pinched.
5. Plug the included communication cable into the "USB" socket on the SMART Log as shown below:

6. Plug the other end of the cable into a free USB port on the computer where MineMonitor is installed. Ensure only 1 SMART Log is connected to the PC at a time.
7. If prompted for a driver for the device, browse to the folder on the CD or USB key where they are stored (i.e. D:\SMARTLog drivers) and follow the on-screen prompts. Alternatively, the latest drivers can also be downloaded here: http://www.ftdichip.com/Drivers/D2XX.htm
8. Open MineMonitor from the Start Menu (All Programs – MineDesignTechnologies – MineMonitor)

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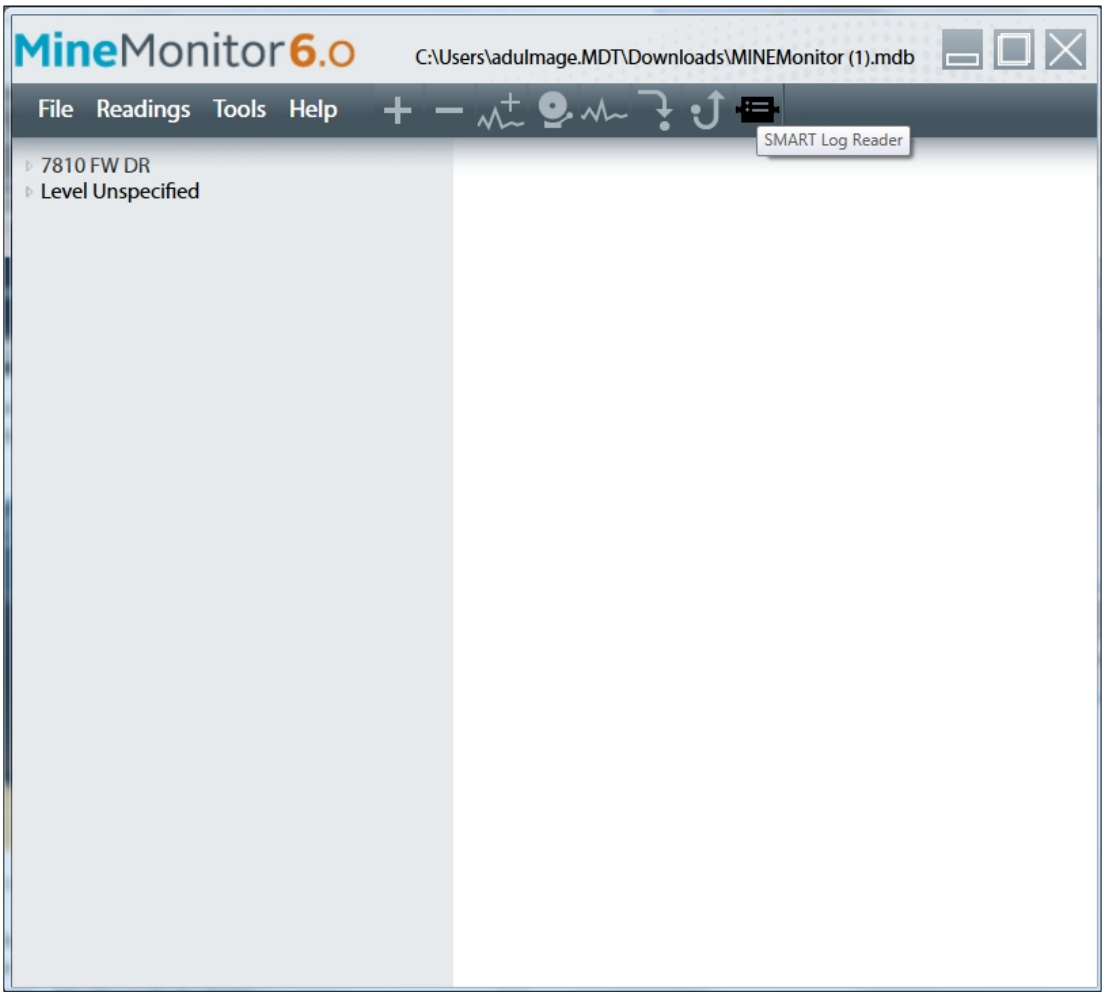
9. Click the “Data Loggers” option in the top right corner, as shown:



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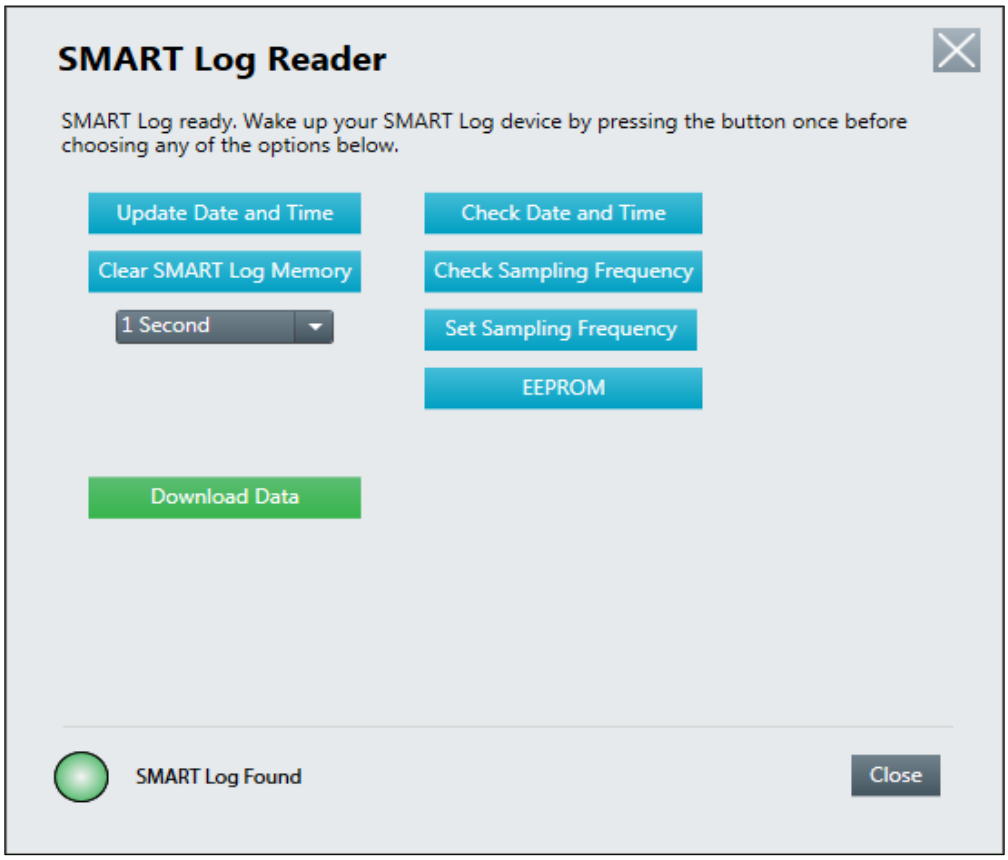
10. You will see the following screen upon startup:



NOTE: The SMART Log will go to sleep after 60 seconds of inactivity to save battery power. In order for proper software recognition and configuration to occur, the GREEN LED must be lit. Simply pushing the START/STOP button briefly will wake the unit, as shown:

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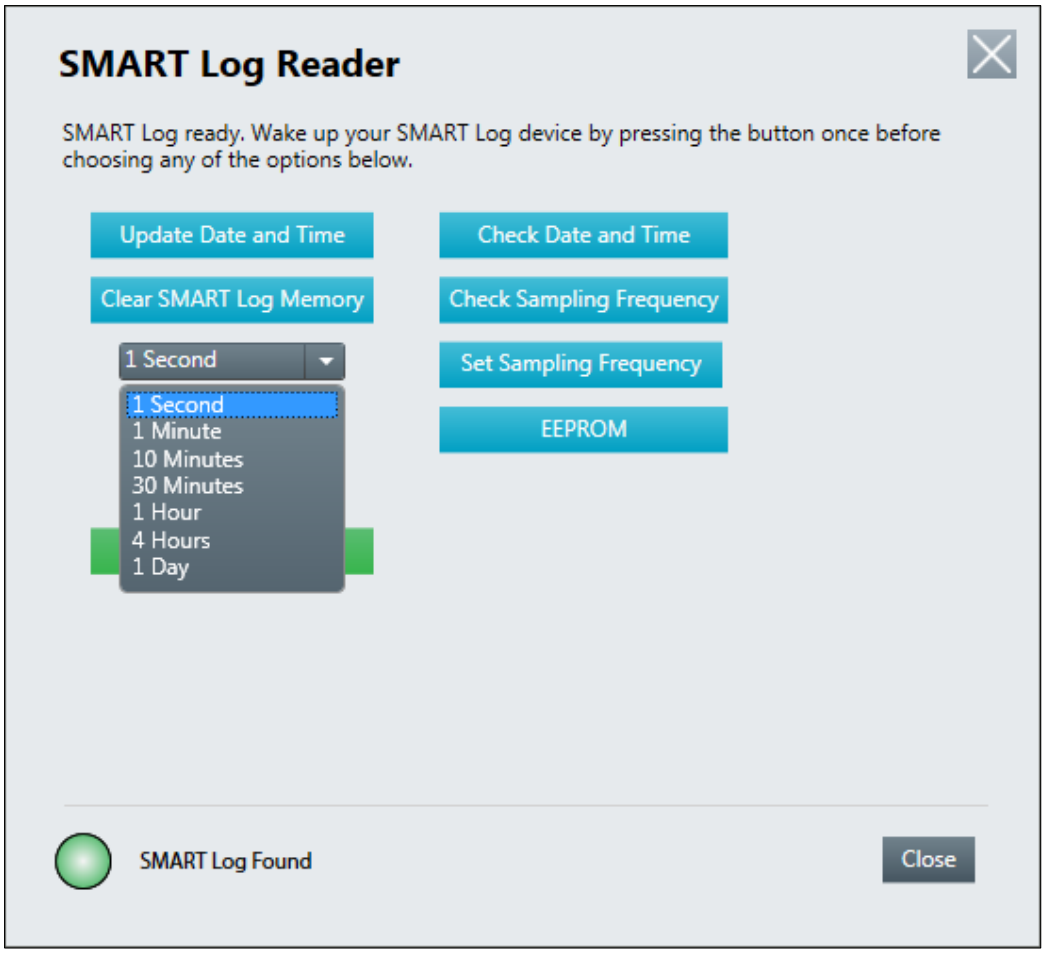
11. The default sampling frequency is one hour. This can be changed to any of the options shown below. More frequent sampling will affect battery life (avoid using 1 second unless absolutely necessary).



12. After selecting your preferred sampling rate, click the "Set Sampling Frequency" button.
13. The date and time must also be programmed during the initial configuration. This will also have to be done if the batteries are replaced. Click the "Update Date and Time" button and the software should report back the current time. You can also click the "Check Date and Time" button to see the currently set time.

Your SMART Log device is now configured for use. Sampling once per hour, the SMART Log should provide more than 1 year of battery life. The unit automatically goes to sleep after each sample, or after 60 seconds of inactivity, to conserve battery life.

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6 Special Precautions - Batteries

Please note the SMART Log and SMART Log3 uses high capacity **3.6 volt DC lithium batteries** and although they look and feel the same as traditional AA alkaline batteries, they are not. **The SMART Log will not operate with standard 1.5 volt AA batteries.** Both batteries must be replaced at the same time.

Please contact MDT for replacement batteries, or options to purchase them locally. They are **AA size non-rechargeable Lithium batteries providing 3.6 volt DC each**. Each SMART Log requires 2 batteries. Batteries can be purchased online from Digi-key (www.digikey.com), Allied Electronics (www.alliedelec.com), or from Excell Battery (www.excellbattery.com). MDT recommends the use of Tadiran branded batteries part number **TL-5903/S**. If substitute batteries are used please contact MDT to ensure they meet the correct specifications.

To replace the batteries, remove the 4 screws securing the lid. Take note of the battery orientation swapping the old batteries for fresh ones. Secure the new batteries with the Velcro strap.

Re-attach the lid ensuring the battery wires do not get pinched in the process.

Lastly, the sampling frequency and date/time will need to be programmed. Follow the steps outlined in Section 5.2, number 11.

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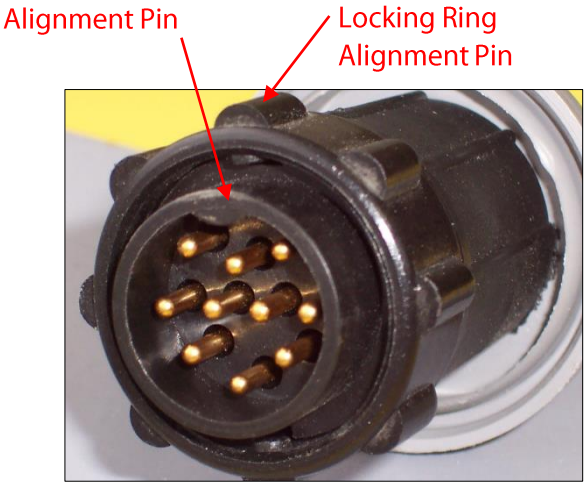
7 How to connect the SMART Log

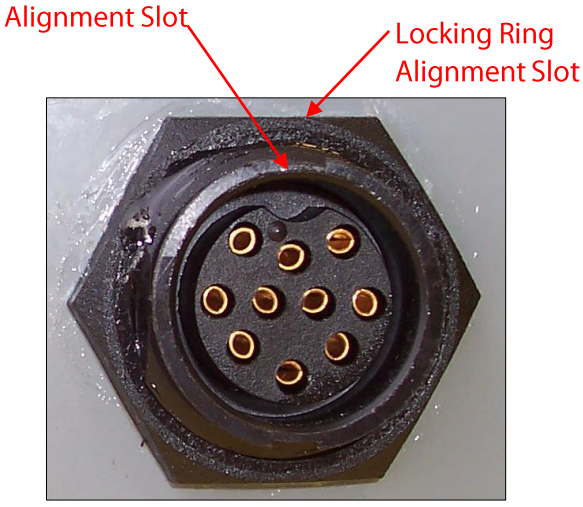
All MDT SMART device (instruments, loggers and readout boxes) connectors mate by first aligning the alignment pins and are then locked in place with a locking ring.

To ensure proper fit and connection please follow these directions:

Rotate the male connector until the alignment pin of the male connector is aligned with the alignment slot on the female connector. A slight wiggle will engage the gold colored contacts. After coupling the two halves together, with light pressure, rotate the locking ring on the male connector until the locking ring engages the female connector. When properly engaged the locking ring will move towards the female connector approximately 1/16". Still applying light pressure continue to rotate the locking ring a half-turn clockwise to lock the connector in position. Note the locking ring on the male connector is not threaded and is not intended to engage the threads on the female connector.



Male connector on MDT SMART instruments.



Female connector on back of MDT SMART instruments.

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8 How to use the SMART Log

8.1 To START Logging

Once the batteries have been installed, the sampling frequency and date/time set, the unit is ready to log data from an instrument.

Connect a SMART instrument to the "Instrument" port on the SMART Log. For a SMART Log3 there are 3 ports labeled Port 1, Port 2 and Port 3. Make note of which port your instrument (i.e. MPBX) is connected to. The unit can be tie wrapped to the screen or otherwise secured. Hold the button until the GREEN LED light is illuminated and the ORANGE LED blinks, then release the button.

When the GREEN LED is illuminated and the ORANGE LED is blinking on and off this indicates that the unit has started logging.

If after this sequence the GREEN and ORANGE LED blink alternately, the SMART Logs batteries are low and should be changed.

In this scenario the logger will continue to log data but the sample frequency will be automatically set to 24 hours to conserve battery life. In addition, should the batteries run low while logging (after a month's deployment for instance), the logger will again automatically switch to a 24 hour sample interval to conserve battery life.

If both the GREEN and ORANGE LEDs blink together at the same time, the SMART Logs memory is full and should be downloaded or erased before the SMART Log will store new readings.

Each time the unit takes a sample, the GREEN LED will light and the ORANGE LED will blink rapidly. This may not be noticed if the sampling is set to only once per hour.

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8.2 To STOP Logging

When you need to retrieve the logger and collect the data, push and hold the button until the GREEN LED blinks, then release the button. **The GREEN LED blinking indicates that the unit has stopped logging.** The GREEN LED will remain on for 60 seconds after logging has stopped, then it will return to a sleep state.

Each time you start logging, the data will be appended to the internal memory where it left off.

Table 3 – Status LED Indicators

Function	GREEN LED	ORANGE LED
Ready/Standby	On	Off
Start Logging	On	Slow Blink
Recording Sample	On	Fast Blink
Stop Logging	Slow Blink	Off
Low Battery	Alternate Slow Blink (checked after button press to start/stop logging and after every sample is recorded)	
Memory Full	Slow Blink Together 3 times every 10 seconds	

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8.3 To Download Data

1. Plug the included communication cable into the "USB" socket on the MDT SMART Log as shown below:

2. Plug the other end of the cable into a free USB port on the computer where MineMonitor is installed.
3. Open MineMonitor from the Start Menu (All Programs – MineDesignTechnologies – MineMonitor)

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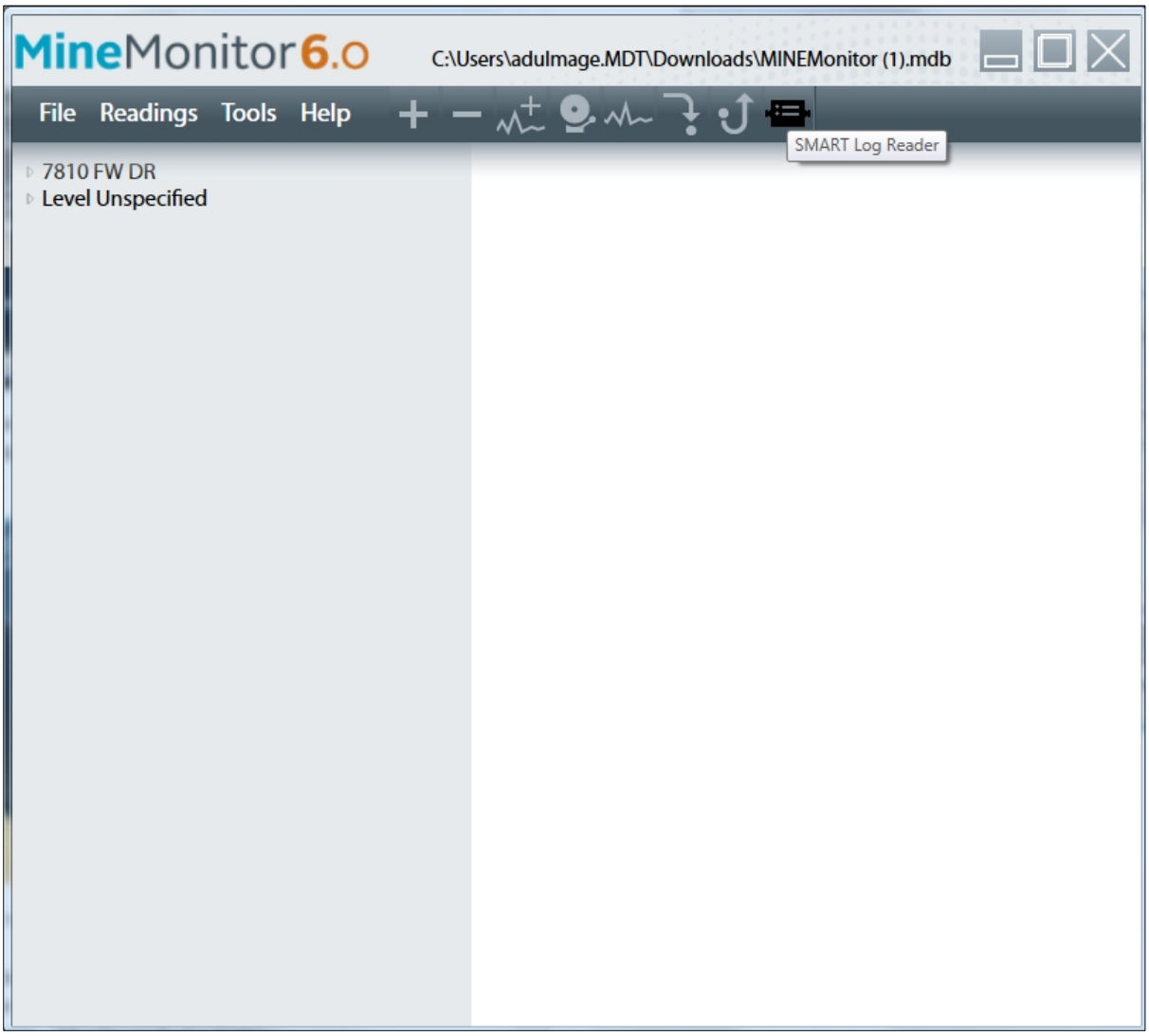
4. Click the “Data Loggers” option in the top right corner, as shown:



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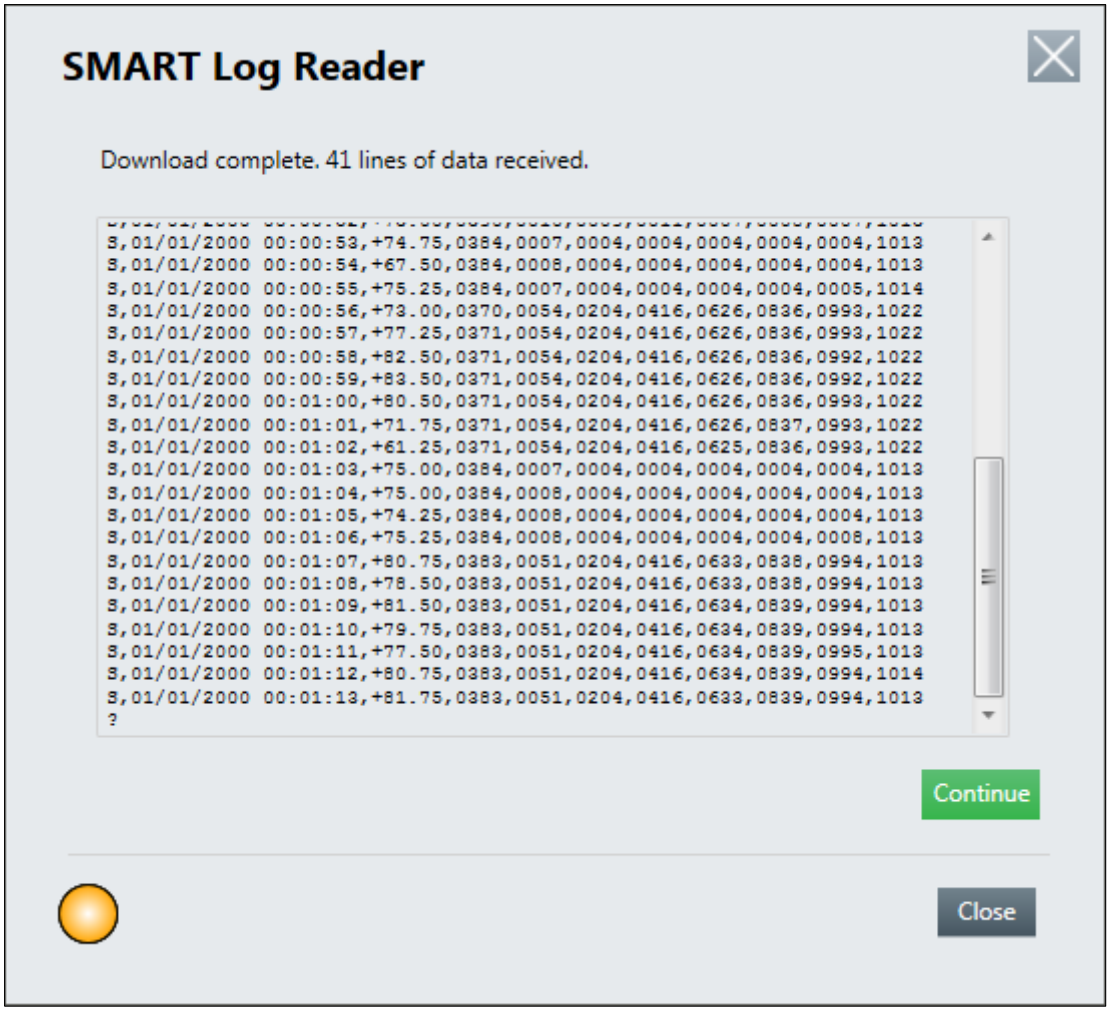
5. Check to see if the GREEN LED is ON, indicating a ready state. If the unit is not active, tap the button to put it in a ready state. Click the "Download Data" button in the SMART Log Reader application to receive a set of readings as shown below:



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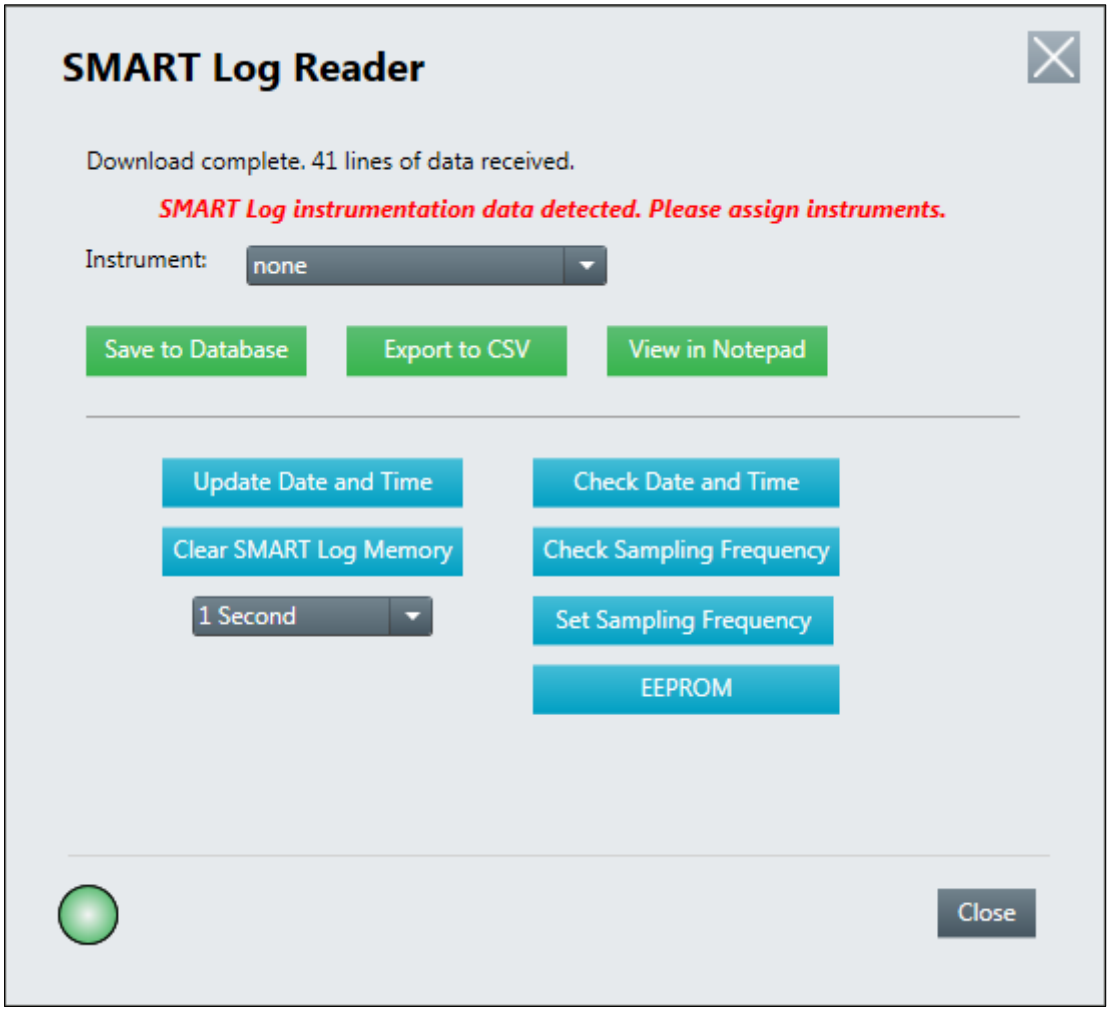
6. Click the Continue button and you'll see the following screen:



7. Simply select the instrument that the SMART Log was connected to from the list and click the "Save to Database" button. If you wish to export to Excel or view the raw data in Notepad, just click the associated buttons.

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8.4 To Erase Logged Data

1. While in the SMART Log Reader software, ensure the GREEN LED is lit on the SMART Log and click the "Clear SMART Log Memory" button.
2. Note it may take up to 2 minutes for all the data to be securely erased. After the 2 minute period has elapsed you are free to continue configuring the SMART Log. Do not attempt to configure the SMART Log before 2 minutes has elapsed.
3. You are now ready to log more data. Note that this securely erases all data on the SMART Log. Data cannot be recovered once the erase is started.

9 Specifications

Table 4 – SMART Log Specifications

Parameter	SMART Log	SMART Log3
SMART Instrument Ports	1	3
Memory Size	64Mbit (32Mbit legacy)	64Mbit (32Mbit legacy)
Maximum Number of Readings per Port	114 285 (57 142 legacy)	55 944 (27 972 legacy)
Analog to Digital Resolution	10-bit	16-bit
Preset Sample Interval	1min, 10min, 30min, 1hr, 4hr, 24hr	
User programmable Sample Interval	1 sec to 99 999 999 sec	
User Programmable Sample Times	10	

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10 Parting Thoughts

While this set of instructions will handle most cases, situations it does not cover will inevitably arise. In these cases, contact MDT. Our staff has been involved with many installations, and can help you to find a solution to your particular case. Questions can be directed to support@mdt.ca or 1-613-549-5223.

11 Warranty

Mine Design Technologies Inc. (MDT) warrants its SMART Log and SMART Log3 product line (herein referred to as the Product(s)) against defects in materials and workmanship for a period of ONE YEAR from the date of purchase. While MDT strives to produce a superior quality products in every respect; the Products are intended for use in extreme environments under conditions of continued stress where in the instrument can be damaged and/or destroyed as a result of actions beyond MDT's control. As such unless it can be shown unequivocally that the Product was defective at the time of installation, the warranty on the Product(s) is null and void should the instrument fail after installation. Except for obligations specifically assumed by MDT under warranty, MDT will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind whether or not based upon expressed or implied warranty, contract, negligence or strict liability arising in connection with the design manufacture, sale, use or repair of the Product(s). This expressed limited warranty is extended by MDT to the original end purchaser only and is not assignable or transferable to any other party. This is the complete warranty for the Product(s). MDT assumes no obligations or liabilities for any additions to this warranty unless made in writing and signed by an officer of MDT. Unless made in a separate agreement between MDT and the original end user purchaser, MDT does not warrant the installation, maintenance or service of this Product.

THE WARRANTY DOES NOT COVER:

a) Defects or damage resulting from use of the Product in other than its normal and customary manner.
b) Defects or damage from misuse, accident, or neglect.
c) Defects from improper testing, operation, maintenance, installation, alteration, modification or adjustment.
d) Product disassembled or repaired in such a manner as to adversely affect performance or prevent adequate inspection and testing to verify any warranty claim.
e) Any instrument that cannot be accessed to verify any warranty claim.
f) All freight costs to the MDT repair depot.

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