Telemetry Card with Memory

DataCan User Manual – V1.4

PN: 109137

www.datacan.ca

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History of Changes

Rev. No.	Date	Pages	Description of Changes
0.1	Nov - 2018		Initial Draft
1.0	Feb - 2019		Initial Release
1.1	Feb - 2019	42	Included Tool Line Voltage
1.2	Oct – 2020	42	Fixed Supervisor mode shortcut
1.3	Aug -2021	42	Added single gauge Modbus Map
1.4	June - 2022	50	Updated Format, Reformatted Instructions, Updated Images, Added Specifications

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1 About This Guide

This document is intended as a supplement to formal training. DataCan is constantly working to improve its products. We must therefore reserve the right to change designs, materials, specifications, and prices without notice. DataCan declines any liability that may arise out of the potential inaccuracies in this guide.

This guide assumes that you have some computing and tool knowledge. For more information, contact your local service representative.

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We thank you for any feedback or comments that will help us to continue to improve our products and service.

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2 Introduction

DataCan Services Corp. provides technology-driven downhole measurement solutions that deliver productivity, quality and safety. We design, manufacture and service 200°C plus hybrid platform instruments, patented multi-cycle instant close shut-in tools, reservoir management systems and a suite of quartz and piezo-resistive pressure measurement instruments. We offer specialized solutions that will help you improve productivity in your applications.

We are the leader in ultra-high temperature circuit design, manufacturing and packaging.

- Our part selection process ensures the best long-term reliability is provided.
- Our fully automated surface mount assembly procedures ensure the highest quality circuit is constructed every time with minimal heat impact.
- Our Hybrid design and construction techniques will enable DataCan and its customers to reliably enter the 177ºC to 225ºC market.
    - Our metal-to-metal seal and fully welded designs prevent potential leaks.

This manual is supplemented by several other manuals depending on the elements of your system. To answer questions not covered in the manual about a specific component of your system, please refer to the manual for that specific component.

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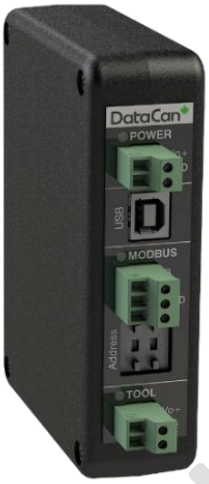
3 Product Overview



3.1 Product Description

The DataCan Telemetry Card is a reliable instrument that works in conjunction with DataCan Telemetry Units, DataCan Downhole gauges, and a Modbus data collection system. The Card can be programmed to communicate with any of DataCan's non-addressable (original style) or addressable (multi-gauge or newer-style) permanent / SRO gauges. In addition to providing power to the attached equipment, the Telemetry Card logs the downhole data and makes it available to a Modbus network. A PC can be plugged into the Telemetry Card to set up the networks, program data collection rates, as well as to download records from the memory using the included DataCan Download Software.

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3.2 Product Specifications

WARNING: If your product does not have a part number that matches the part number(s) below, please contact a DataCan representative to ensure this manual applies to your needs.

Telemetry Card with Memory - Multi-Gauge (up to 8 gauges) Telemetry Card with Memory

Part No.	109137
Telemetry Card Kit Part No.	112026
Input Voltage	10 – 24 VDC, 1 W typical 4 W peak
Communication Method	Modbus and USB
Max # of Gauges on a Single Line	8
Tool Power Isolation	Yes
Data Storage	More than 44 million sample capacity
Physical Dimensions	121 mm (Depth) x 115 mm (Height) x 32 mm (Width)
Operating Temperature	-40 °C to 60 °C

Accessories

Accessory Type	Part No.
USB-B Cable (6ft) [Included in 112026]	PE171UU0012
Card to Gauge Hookup Cable [Included in 112026]	109530
2.5mm Flat Head Screwdriver [Included in 112026]	112790
2 Pin terminal (For Power In or Tool Out)	109417
3 Pin Terminal (For Modbus)	109418
36V to 12V Converter (For wider input voltage range)	109112
DataCan Download and Program Software	100872

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3.3 Network Connections

The Telemetry Card connects to 2 different networks, as well as a USB link to a PC.

The 2 networks are the:

- Modbus network
- Downhole tool network

The Modbus-Out network is used to connect to a user's SCADA system or DataCan data aggregation and display networks, such as a DataCan surface box or DataCan Data2Desk system. Multiple Telemetry Cards can be connected to the same Modbus network, but each Multi-Gauge Telemetry Card has its own downhole tool network.

For addressable gauges, each downhole gauge on each Telemetry Card must be set up with its unique gauge address. These gauge addresses have nothing to do with the Modbus addresses between Telemetry Cards.

Note: Make sure each multi-gauge Downhole gauge has a unique address programmed into it. More than one gauge with the same programmed address on a line will cause communication to stop.

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4 Connecting and Configuring Telemetry Card with Gauges

Proper installation of DataCan products ensures high-quality performance and long-lasting results. The following section highlights the steps required to properly configure devices to the Telemetry Card.

FOR MULTI GAUGE SYSTEMS: The addresses of gauges in a multi-gauge system must be configured so that each address is unique. The first time a set of gauges is connected, the gauges must be connected to the system one at a time while the software is used to configure the Telemetry Card and the gauge. After all gauges have been configured, they may be connected all at once.

4.1 Tools Required

Description	Part No.
USB Download Cable	100682
Gauge to Telemetry Card Test Hookup Cable (for temporary connection)	109530
*Passthru Gauge Test Hookup Cable (for temporary passthrough connection)	109377
2.5mm flat head screwdriver	112790
Wire stripper (if connecting through surface cable)	N/A
Windows laptop with DataCan Download Software Installed	N/A

*If configuring multiple gauges.

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4.2 Connecting Gauges to the Telemetry Card

Warning: DO NOT have the Telemetry Card connected to a computer when powering it up, it may damage the computer. Only connect the USB cable after the telemetry card has been powered up.

1. Ensure the Telemetry Card is powered down.
2. Connect downhole gauges to the **DH TOOL** connection of the Telemetry Card. If it will only be a temporary connection, the test hookup cable provided with the card may be useful.
    - The **TOOL Vo+** terminal must be connected to the Center Pin of the gauge, and the **TOOL Vo-** must be connected to the Housing of the gauge.
    - To connect multiple Gauges, start with a pass-through Gauge, and use a pass-through cable to connect the next Gauge. The "bottom" gauge can only be the last in the chain.

    Note: If configuring multiple gauges, only connect and configure one gauge at a time.

3. Connect power to the **POWER** connection on the Telemetry Card, with the positive connecting to the **POWER Vin+** terminal and the negative to the **POWER GND** terminal.

    Note: The Telemetry Card accepts 10 VDC to 24 VDC with a max power draw of 4W.

4. After power is applied, ensure the **POWER** indicator LED is on. If your Telemetry Card has already been configured for your gauge, it will start logging.

    Note: The **POWER** indicator should be solid orange. See Section 7 – *LED Indicator Descriptions and Troubleshooting* for a full description of LED status indicators.

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4.3 Instructions for Connecting and Configuring Addressable Gauges

Warning: DO NOT have the telemetry card connected to a computer when powering it up, it may damage the computer. Only connect the USB cable after the telemetry card has been powered up.

Note: These instructions are for addressable downhole gauges. For non-addressable downhole gauges, see Section 4.4 – *Instructions for Connecting and Configuring Non-Addressable Gauges.*

1. Ten seconds after power-up, ensure the **POWER** LED indicator is a SOLID orange. See Section 7 – *LED Indicator Descriptions and Troubleshooting* for a full description of LED status indicators.

Note: The **POWER** indicator will slowly flash if the input power is between 5 V and 9.5 V, if there is no input power and the USB is connected; this mode allows the memory to download but not tool operation. If the power indicator does not come on at all then your power is either below 5 V or not connected at all. Confirm that your power supply is on, that you have connected the power lines to the correct terminals, and that any fuse in line with the system is intact.

2. Connect the Telemetry Card to DataCan Download Software via a USB cable.

Note: A Windows PC with the DataCan Download Software installed and a USB-A to USB-B cable (printer cable) is required.

Note: The card draws minimal power from the USB if the main power supply is turned off. If you want to power down the card, you must disconnect the USB cable.

Warning: DO NOT have the telemetry card connected to a computer when powering it up, it may damage the computer. Only connect the USB cable after the telemetry card has been powered up.

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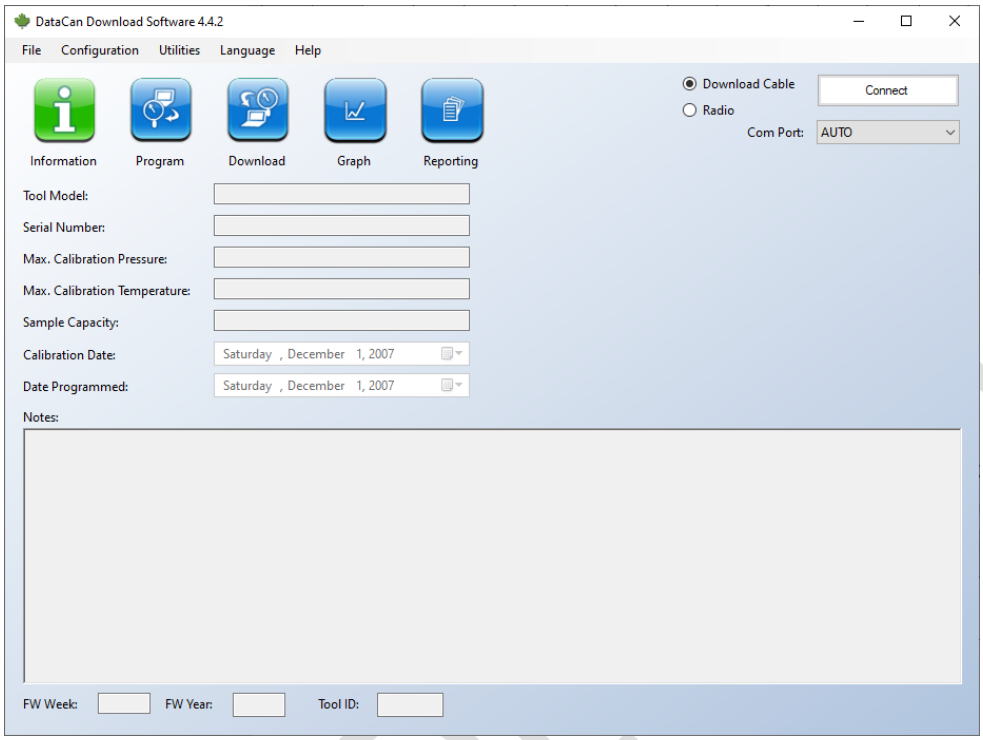
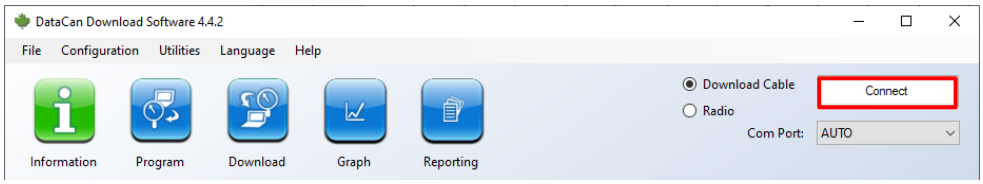
3. Open DataCan Download Software on your Windows PC. The startup page should appear as shown below.



4. Press the **Connect** Button. See Section 5.1 – *Connecting to the Card* for more information about the **Information** screen, and what happens when the Card connects.

Note: If configuring a multigauge system, the sample rate should be set before configuring gauges. The minimum sample rate for multi-gauge systems is 1 second per gauge. E.g. the minimum for a 5 gauge system is 5 seconds. If you set the sample rate faster than that, the system will not sample at the best effort speed and the "tool current" diagnostic reading will be affected. Setting the sample rate to 1 second even with a single gauge attached will affect the "tool current" reading.



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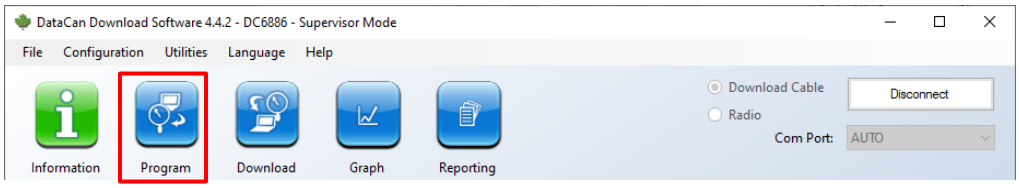
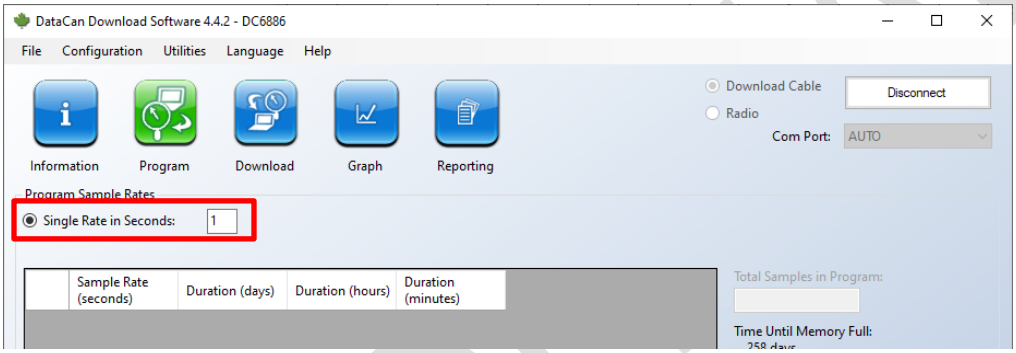
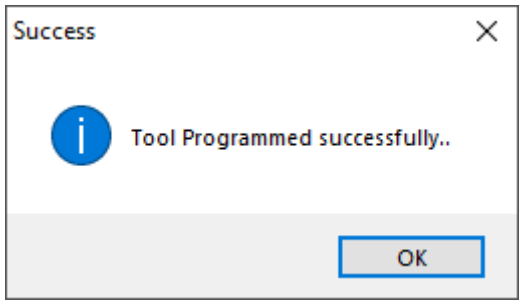
5. If setting the sample rate, click **Program,** otherwise skip to step 9.



6. Beside the **Single Rate in Seconds,** enter an appropriate sample rate. If the rate is already appropriate there is no need to change anything.



7. Click on the **Program Tool** button found at the bottom left of the screen. A pop-up window should appear with a message confirming success.



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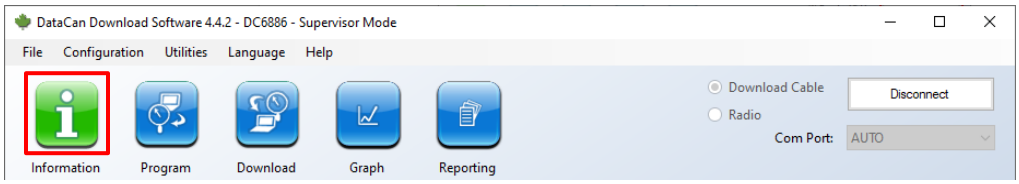
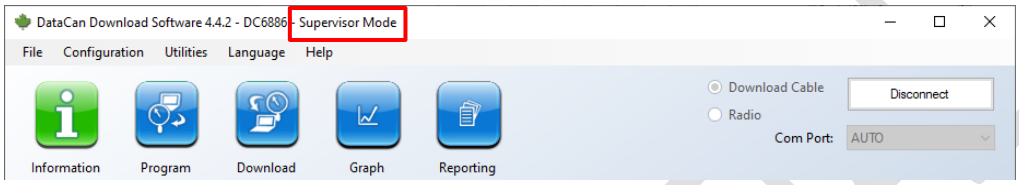
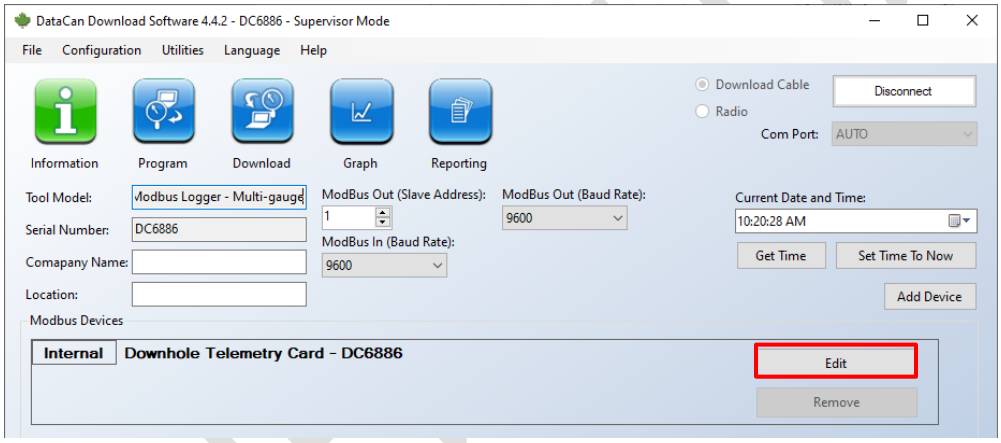
8. Click **Information**.



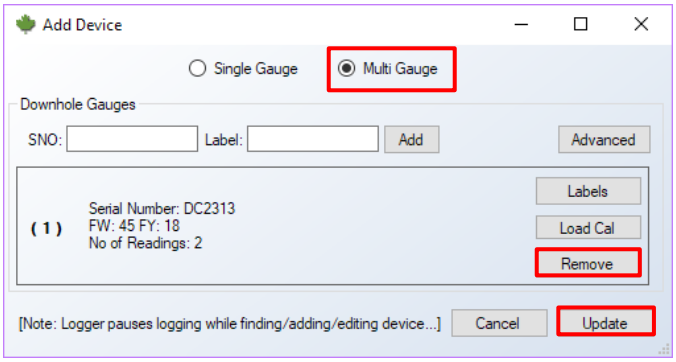
9. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time. "-Supervisor Mode" should appear in the top bar.



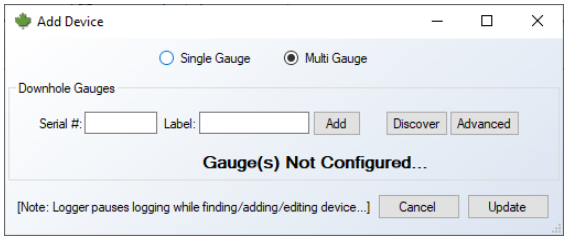
10. Once in Supervisor Mode, press the **Edit** button.



11. In the window that pops up, select **"Multi Gauge"** for addressable gauges, **"Single Gauge"** is for non-addressable gauges. If buttons are not available, supervisor mode is not enabled and you must return to step 5. If there are any gauges listed that will not be connected to this Telemetry Card, press the **Remove** button next to the corresponding gauge. With all the gauges removed, press the **Update** button



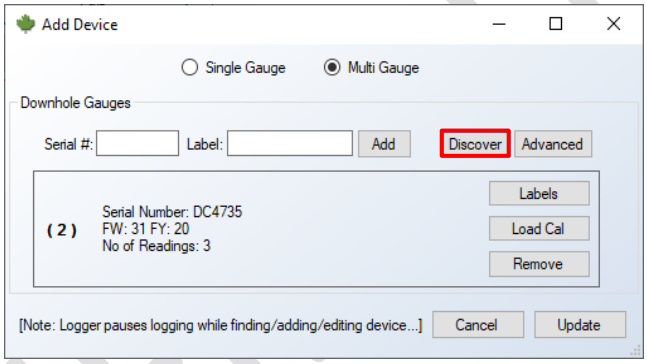
1. If needed, repress the **Edit** button once you have cleared the list of gauges. If needed, reselect **"Multi Gauge"** in the reopened window. It will display the message "Gauge(s) Not Configured…".



12. To add gauges to the list:

A) If only one gauge is connected to this Card, press the **Discover** button.

B) If multiple previously configured gauges are connected, press the **Discover** button (This will be the case if the gauges were installed with a run-in-hole Telemetry Card different than the card being installed).



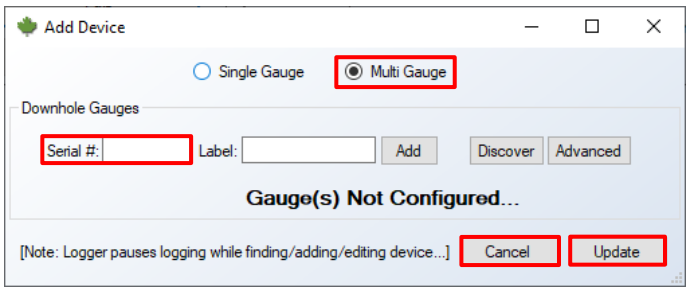
C) If connecting a set of multiple gauges together that have never been configured:

a. Ensure only the gauge that is to be first in the list is attached.

b. Enter the **Serial #** of the gauge and press **Add.**

c. Once the first gauge has been added, connect the next gauge, enter its **Serial #** and press **Add.**

d. Repeat for every gauge to be connected. The software will set each gauge's address in the order they are added.



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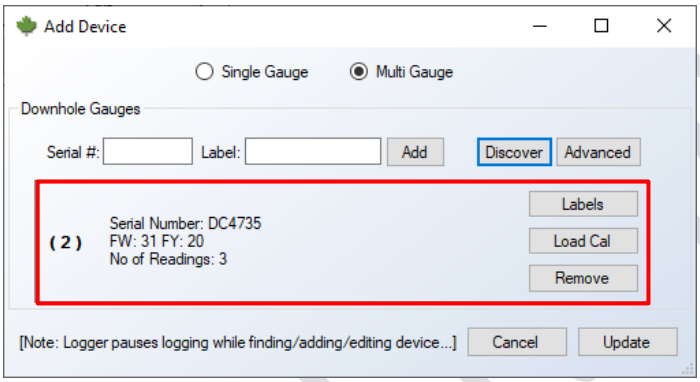
Note: If multiple gauges with the same address are connected, communication errors when adding the gauges may occur.

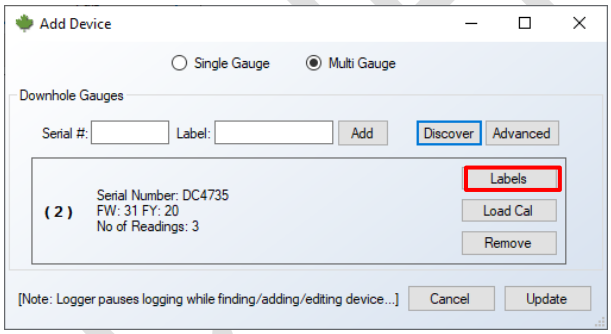
Note: Once a gauge has been added, it does not have to remain connected during the rest of the configuration procedure.

13. Once the gauge or gauges have been detected and added, a window will appear displaying the gauge(s) connected.

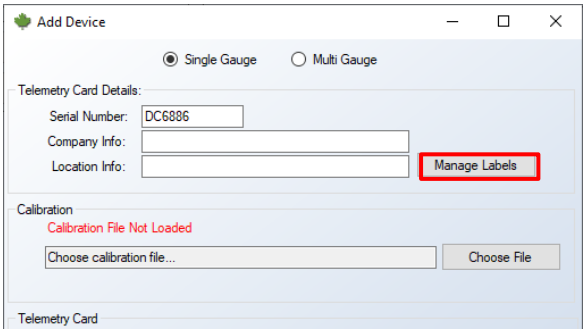


14. If desired, labels can be applied to data from a gauge. It will be shown on the downloaded data and appear on the screen. This can be done for each gauge in a Multi-Gauge or Single Gauge System.

Note: Labels can be edited at any time by pressing the **Edit** button.



Multi Gauge Window



Single Gauge Window

15. When the configuration is complete, press the **Update** button.

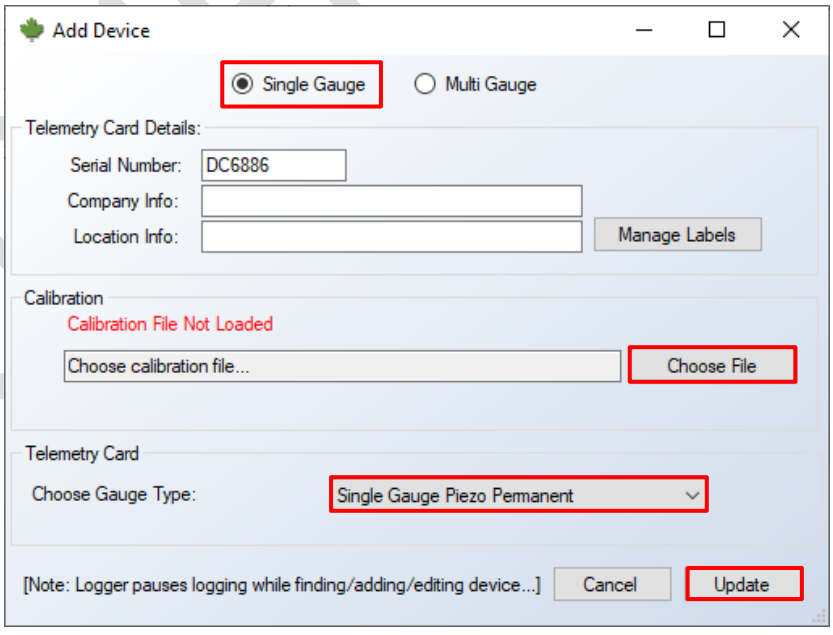
16. Connect all configured gauges and perform a diagnostic according to Section 5.2 - *Diagnostics*.

4.4 Instructions for Connecting and Configuring Non-Addressable Gauges

Note: If you are using **Single Gauge** to add a device, you must have the calibration file for the serial number of your gauge. The calibration file can be downloaded from the DataCan website datacan.ca/downloads at any time.

The process for adding the non-addressable gauge is very similar to adding addressable gauges as explained in the previous Section 4.3 – *Instructions for Connecting and Configuring Addressable Gauges.* The only difference is in steps 10 and 11. Please refer to the following steps instead.

1. Select the **Single Gauge** option.
2. Press **Choose File**.
3. Select the file for the gauge connected and click **Open.**
4. Select the gauge type from the drop-down menu.
5. Press **Update** once all information has been entered.



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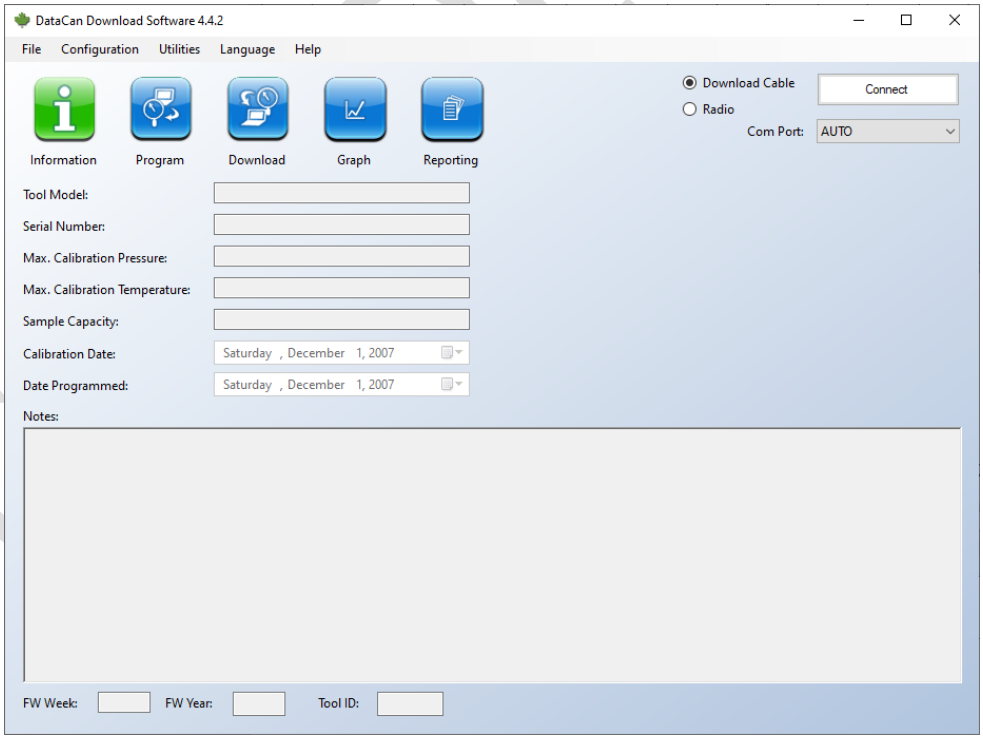
5 Basic Software Operation

The software used to configure and download the Telemetry Card is the DataCan Download Software that is available on the DataCan website at datacan.ca/downloads. The software should install on any windows PC and includes all drivers required to communicate with the Card.

5.1 Connecting to the Card

To connect the software to the Telemetry Card after it has been installed on a windows PC, follow these steps.

1. Open the DataCan Download Software on your Windows PC. The startup page should appear as shown below.



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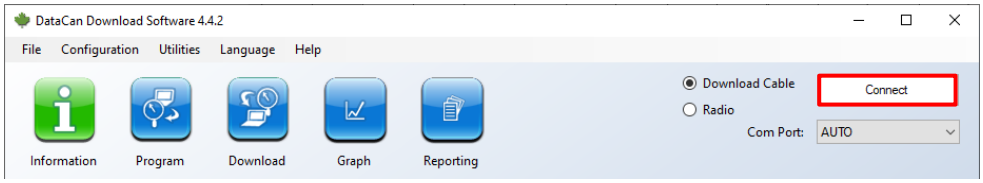
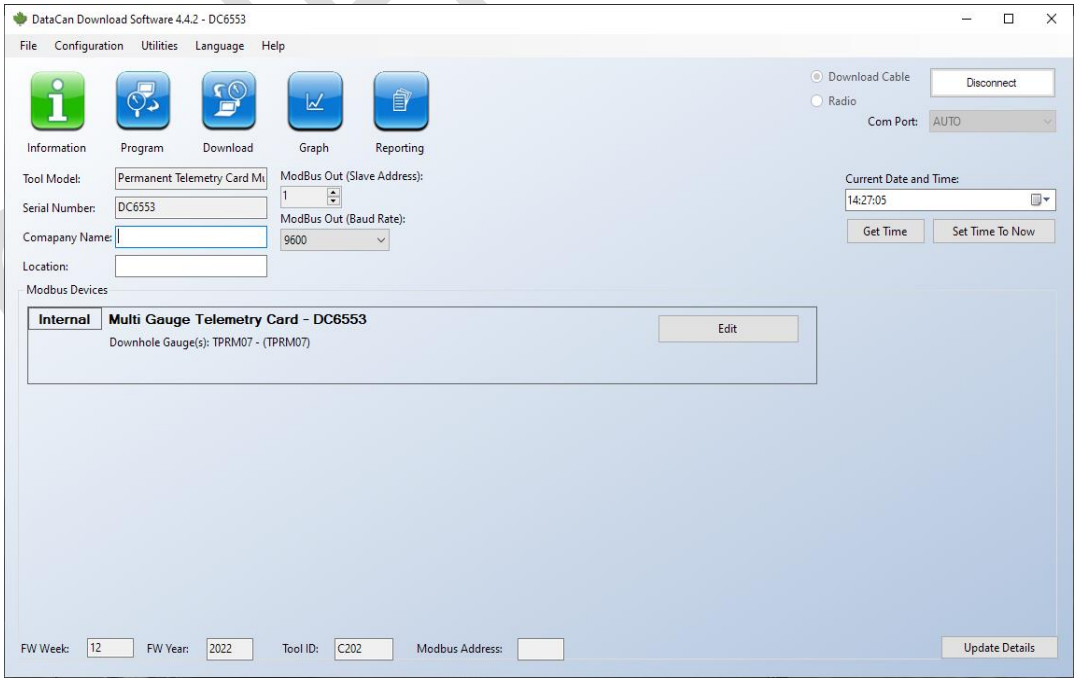
2. Press the **Connect** Button.



Note: After successful connection, the page should appear as shown below with the following details:

- Tool Model of the Telemetry Card
- Serial Number of the Telemetry Card
- Company Name (User writeable)
- Location Info (User writeable)
- Modbus Address
- ModBus Baud Rate
- Date and Time of the card's clock
- Details of downhole tools connected to the logger
- Firmware Week & Year
- Tool ID



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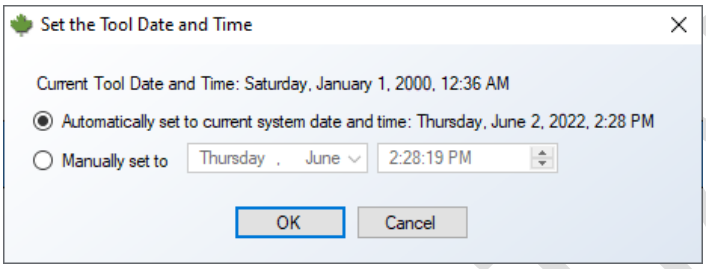
Note: The Internal Telemetry Card always shows up on the **Information** page in the DataCan Download Software as address 0.

3. If the Telemetry Card has not been powered up for a few months, you will be prompted to set the time; this is normal. Press **OK** when you have finished setting the time.



Note: The Telemetry Card uses a rechargeable backup clock battery. It should function for the lifetime of your device and never need to be replaced. If your device is not powered on for months, the battery may drain and the clock may lose time. If the Telemetry Card does not retain its time on power-up, simply leave the device powered on for 24hrs and the battery will recharge.

If even after charging, the Telemetry Card does not retain its time through power losses, please return the card to DataCan for servicing.

5.2 Diagnostics

The Diagnostics screen is used to view real-time data from connected gauges and diagnostic information from the surface box.

To use Diagnostics ensure all gauges in the system are connected to the surface box, the power is on, and the card is connected to the PC.

Warning: DO NOT have the telemetry card connected to a computer when powering it up, it may damage the computer. Only connect the USB cable after the telemetry card has been powered up.

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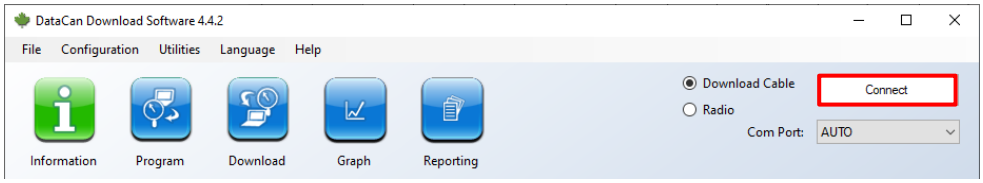
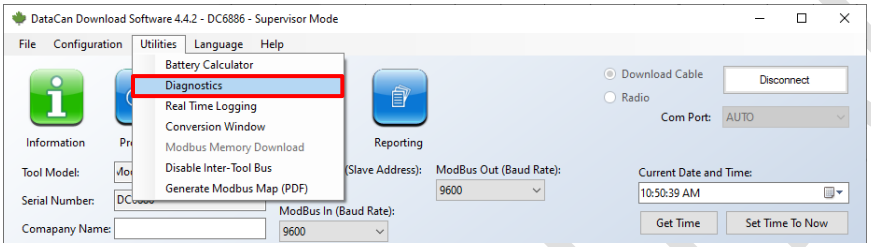
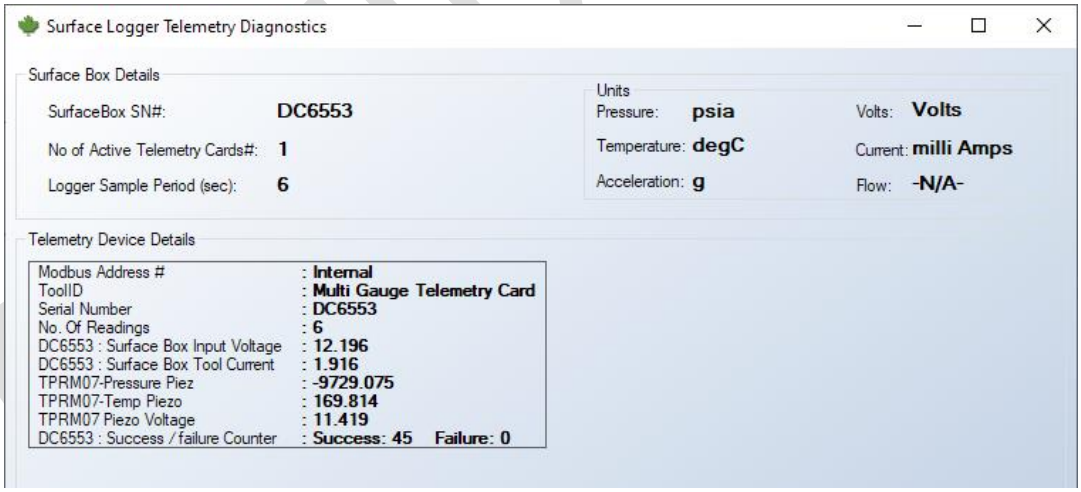
1. Open the DataCan Download Software and press the **Connect** Button.



2. View **Diagnostics** by pressing **Utilities -> Diagnostics.**



3. The Diagnostics screen will open where it is possible to ensure that each connected gauge is providing data. The **Surface Box Input Voltage** should be between 10V and 24V and the **Surface Box Tool Current** should appear as expected. Each 0.75" Piezo gauges draw 1.8 mA, and Quartz gauges generally draw 4.5 mA.



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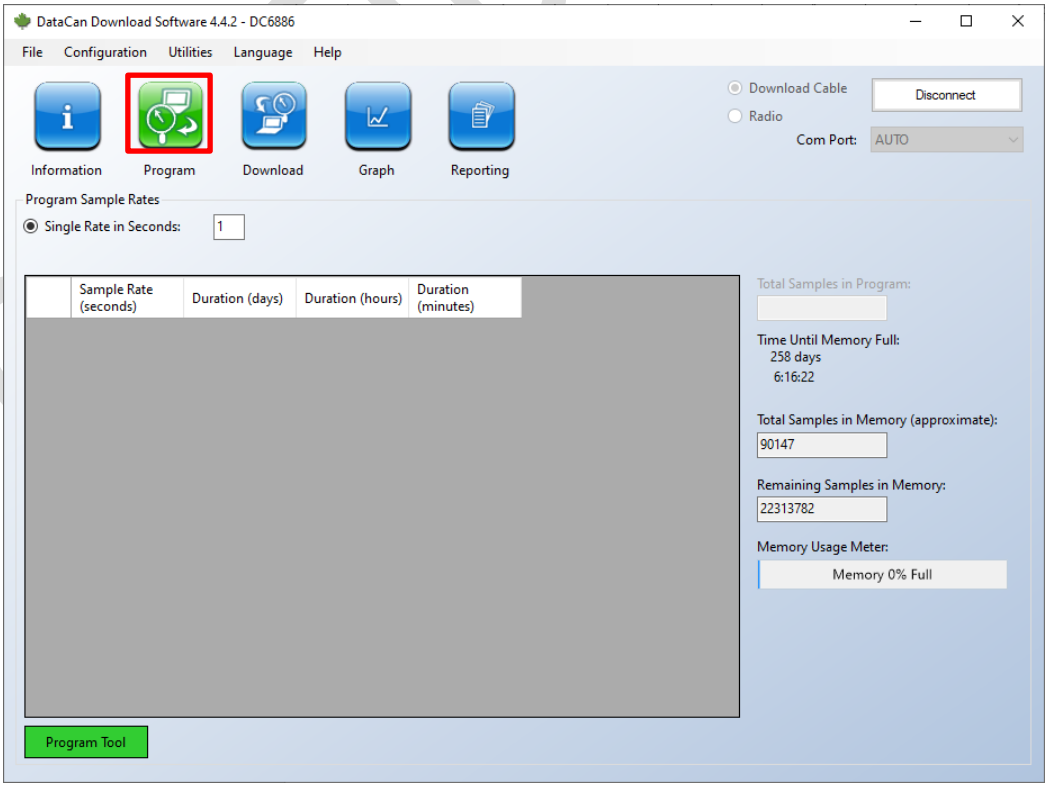
5.3 Programming Sample Rate

Programming Sample Rate sets how often the data is collected and stored in memory. For example, if the sample rate is set to 60 seconds, data will be sampled and recorded every 60 seconds. The minimum sample rate for multi-gauge systems is 1 second per gauge. E.g. the minimum for a 5 gauge system is 5 seconds. If you set the sample rate faster than 1 second per gauge the system will at best effort and the "tool current" diagnostic reading will be affected. Setting the sample rate to 1 second will always affect the "tool current" reading.

NOTE: If any of the gauges on the gauge list is not responding, the Telemetry Card will retry the gauge three times every sample period. If this makes the data collection take longer than the sample time, the logger will collect data at a best effort rate.

The following instructions outline how to program the sample rate after connecting the Telemetry Card to the DataCan Download software:

1. Click on the **Program** icon.



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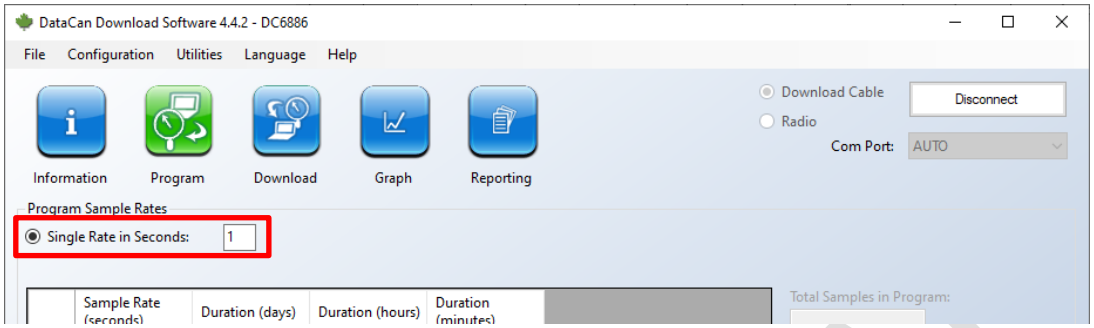
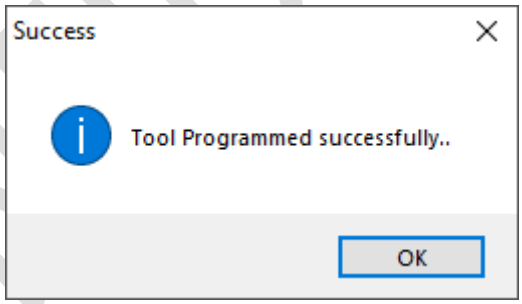
2. Beside the **Single Rate in Seconds,** enter the desired sample rate.



3. Click on the **Program Tool** button found at the bottom left of the screen. A pop-up window should appear with a message confirming success.



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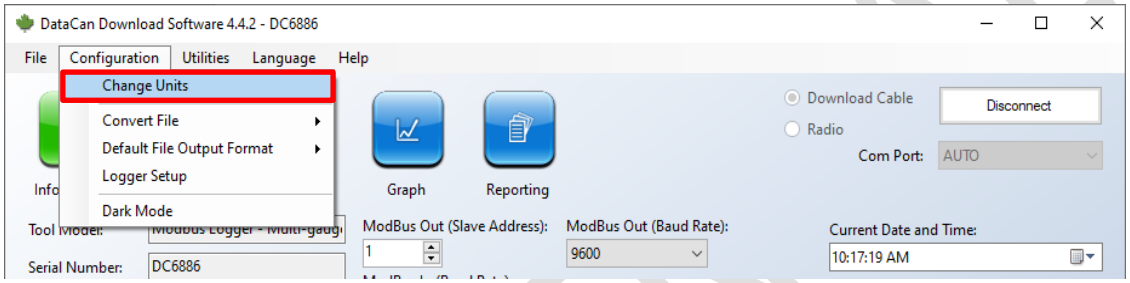
5.4 Changing Units

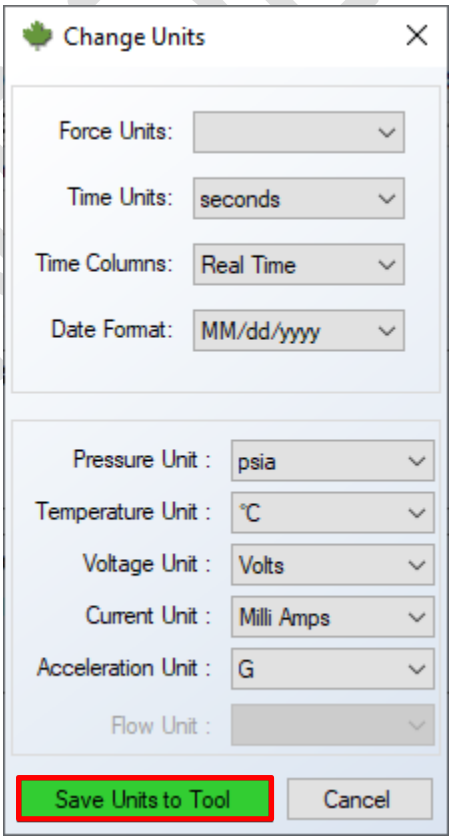
The DataCan readout can display units in a wide variety of formats. The units of the readout may be changed at any time.

The following instructions outline how to change the readout units:

1. Click on **Change Units** under the **Configuration** drop-down list.



3. Once all changes have been made, press **Save Units to Tool**.



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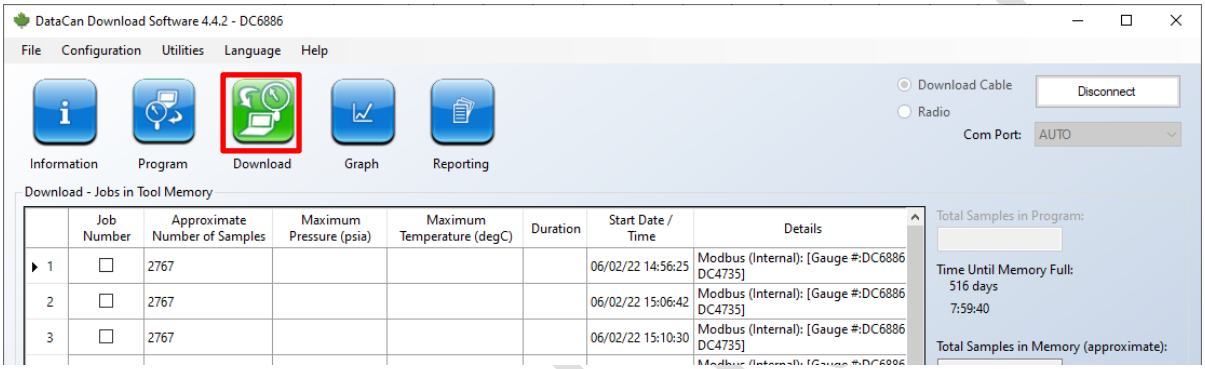
5.5 Downloading and Erasing Jobs

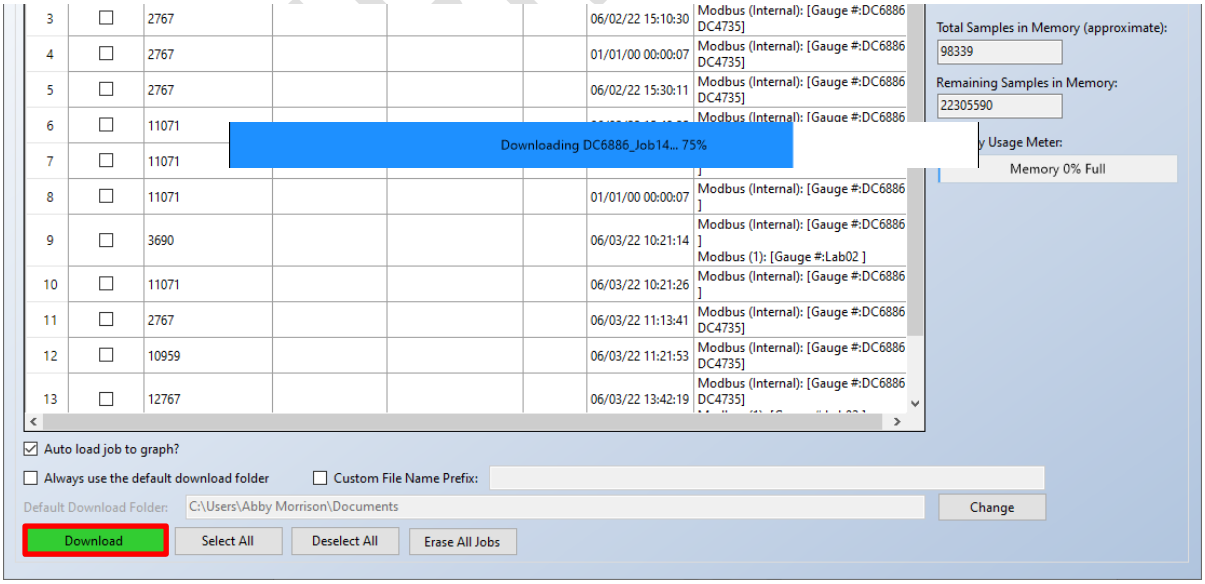
Data records are recorded in the logger as jobs. The Telemetry Card creates a new job every time it is powered up and talks to a gauge. It also creates a new job anytime the settings are changed.

To download jobs after connecting to the software, proceed with the following steps:

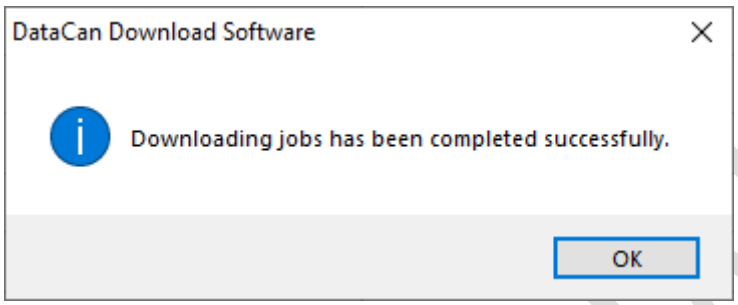
1. Click on the **Download** icon to redirect to the download page.

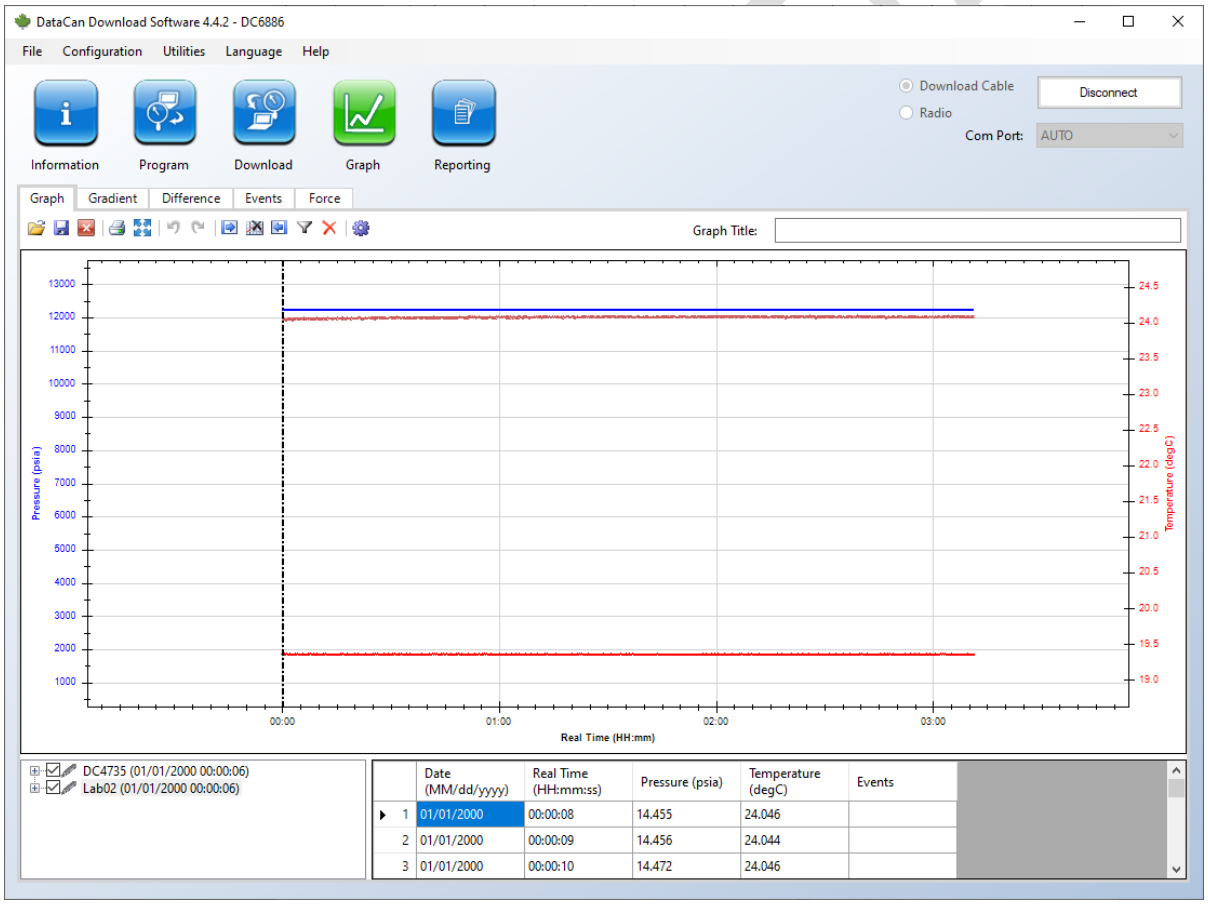


2. Select jobs that need to be downloaded and click on the **Download** button. You will be prompted to save a binary file for each job selected. Choose a location to save to and click **Save.** Once it succeeds, you will see a progress bar with the download progress.



3. Once the data has been downloaded, a pop-up window will confirm success and, if “Auto load job to graph?” is selected, you will be automatically directed to the Graph page with the downloaded data displayed.

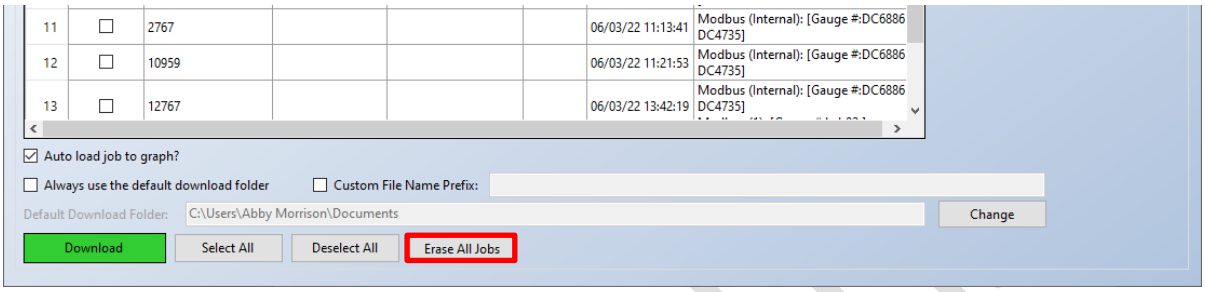


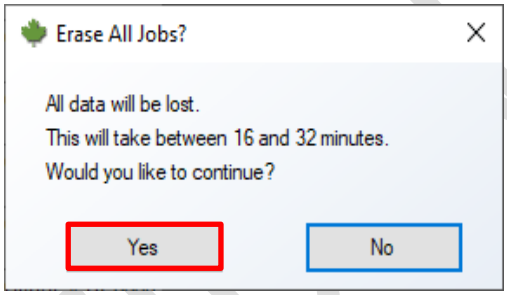


To erase jobs, proceed with the following steps:

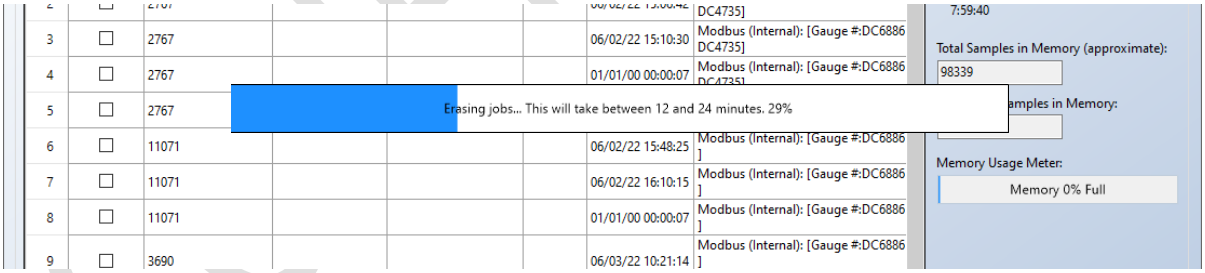
1. On the download page, click on **Erase All Jobs.** A confirmation prompt will appear to confirm whether you would like to continue with this action and states the approximate time to erase all jobs to memory depending on the memory filled. Click **Yes** to continue.

   NOTE: Exit **Supervisor Mode** before erasing all jobs. In supervisor mode the entire memory is formatted and takes significantly longer then just erasing all jobs.

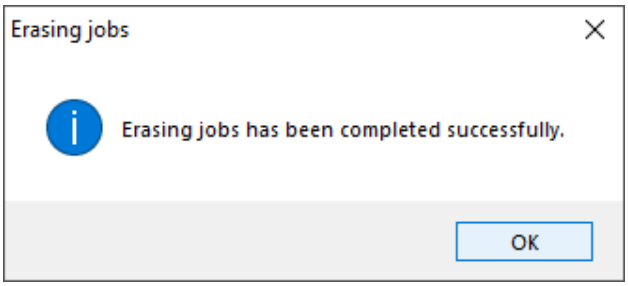




2. A progress bar will appear with the approximate time remaining.



3. After the erase is completed, a dialogue box will appear confirming success.

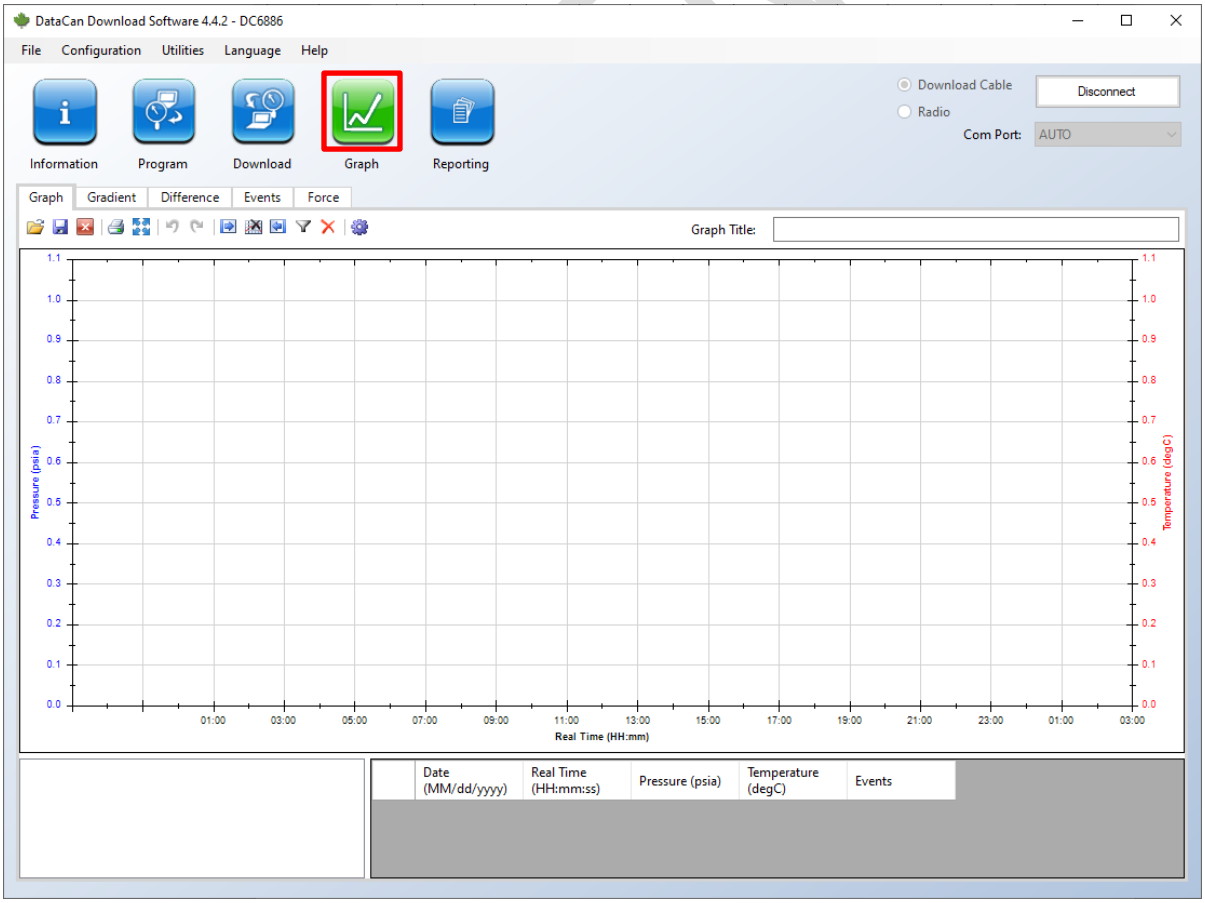


5.6 Graphing Data

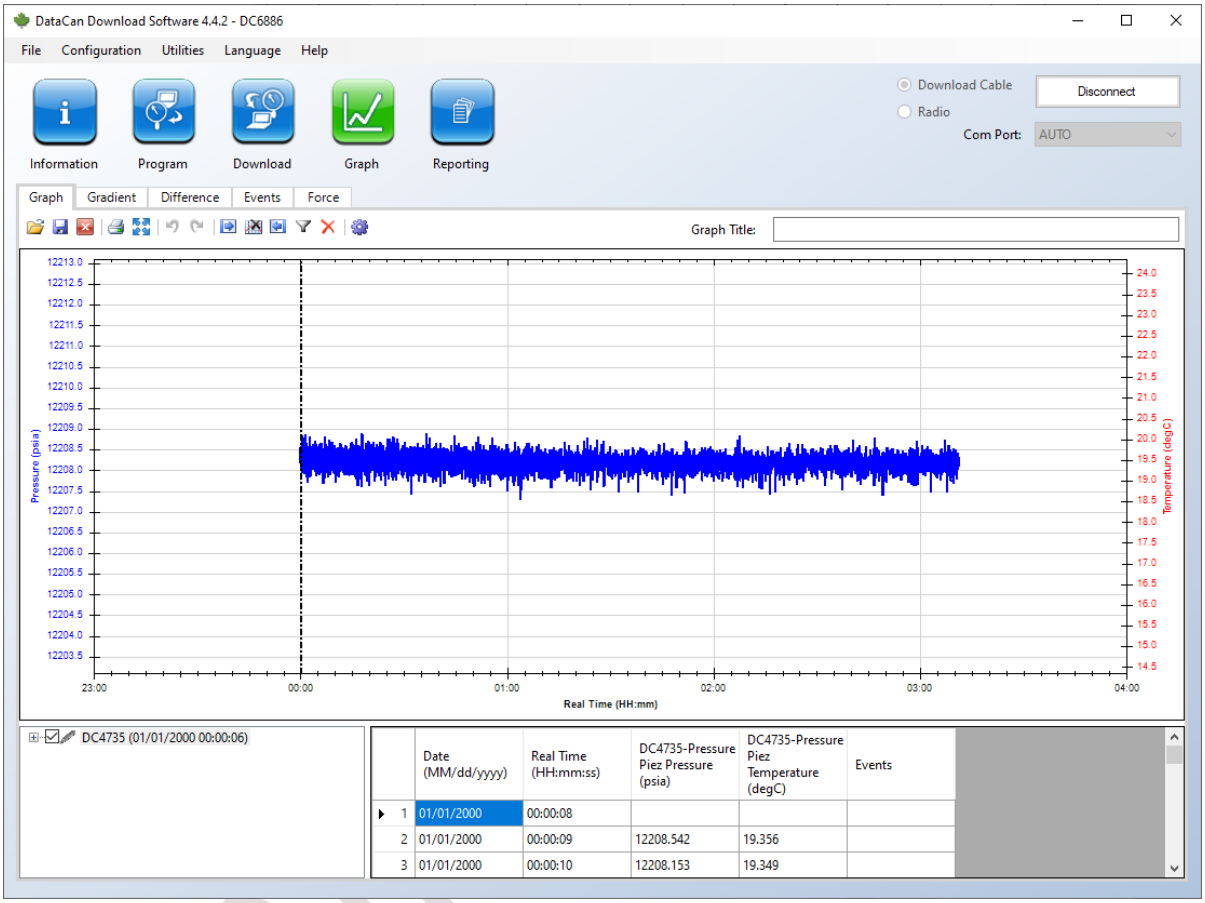
If you wish to display downloaded jobs, you can use the graphing feature. If more than one gauge was connected during a job, the data downloaded is divided into one file per device and one summary file. The summary file has "_Summary(FilesList).txt" at the end of the file name. If the user would like to view all gauges from one job at the same time, this summary file can be opened in the graphing software. Alternatively, each file can be opened and viewed individually.

Note: Please refer to the *DataCan Download Software Guide* for a description of all the graphing functionality.

1. Click on the **Graph** button to get to the Graph Page. The page should appear as follows.



2. Press the open file icon . Once you select your downloaded job, the graph will automatically appear along with the job details in the table below.



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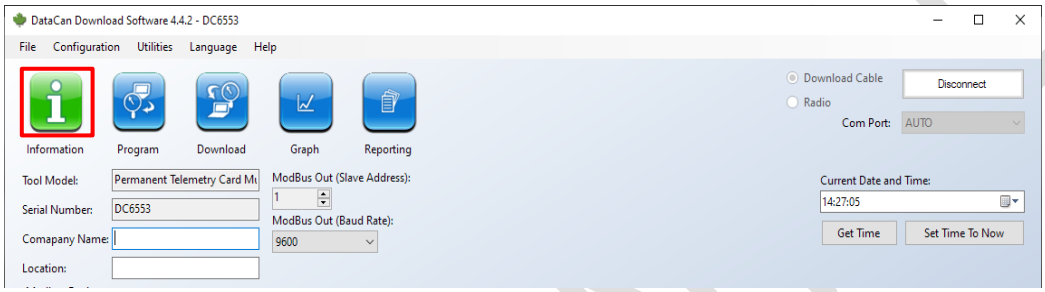
5.7 Company Name and Location

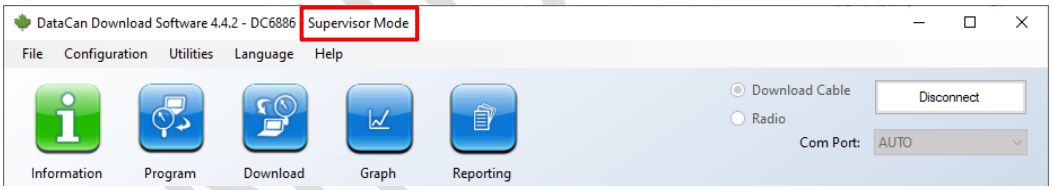
Using the DataCan Download Software, you may input the company name and location.

The following instructions describe how you can input this information:

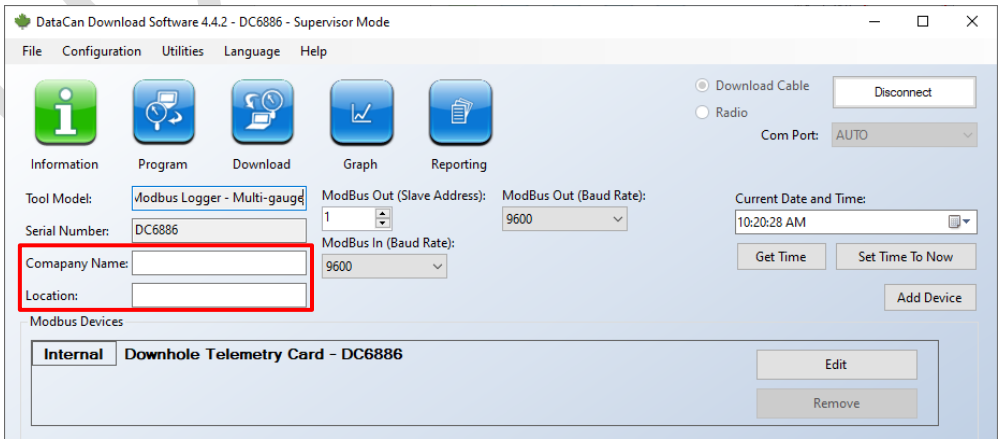
1. Once the software is open, click the **Information** icon.



2. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time. "-Supervisor Mode" should appear in the top bar.



3. Once in Supervisor Mode, you can edit the fields for "Company Name" and "Location".



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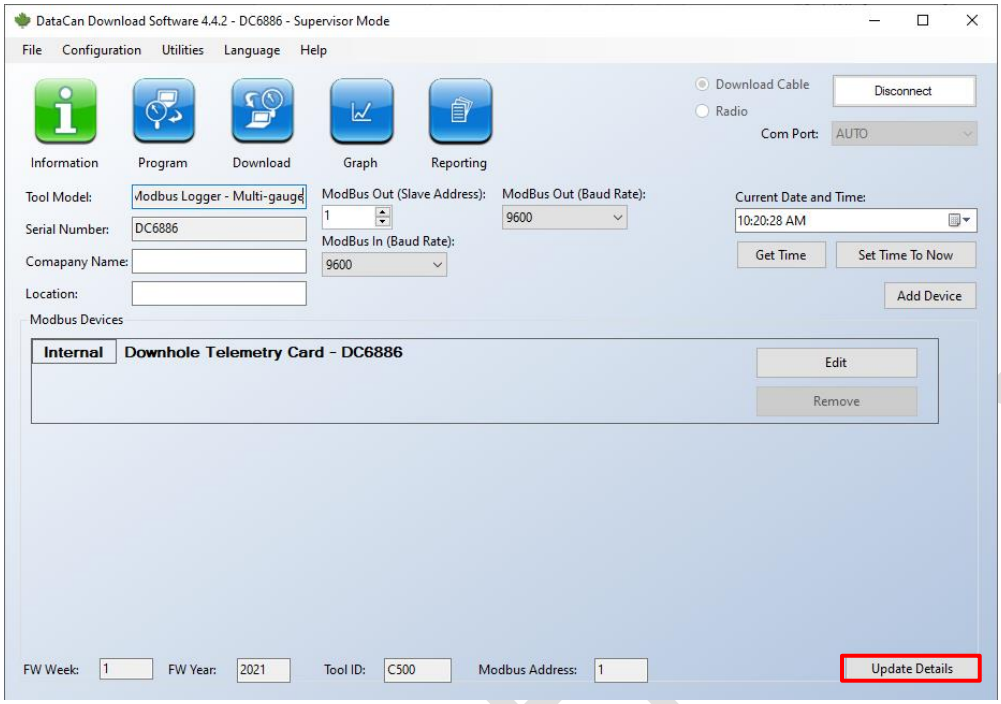
4. Once you are finished, press **Update Details.**



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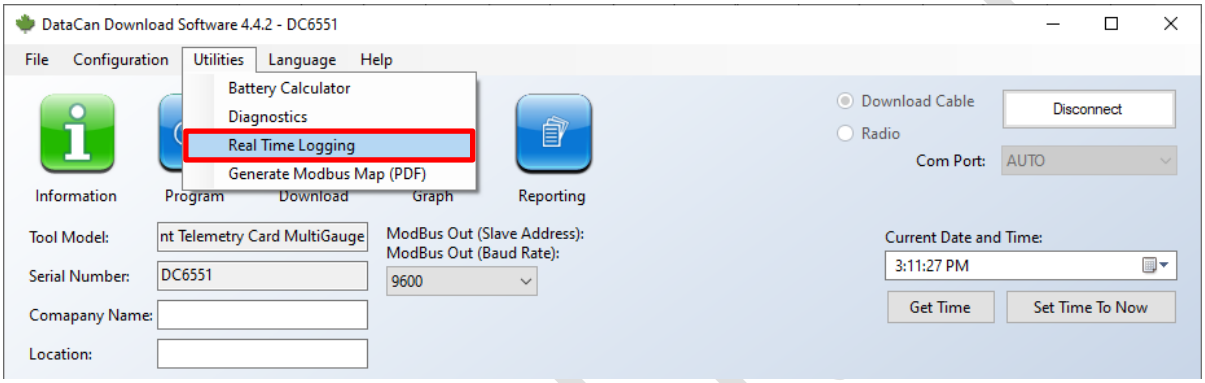
5.8 Real-Time Data Display

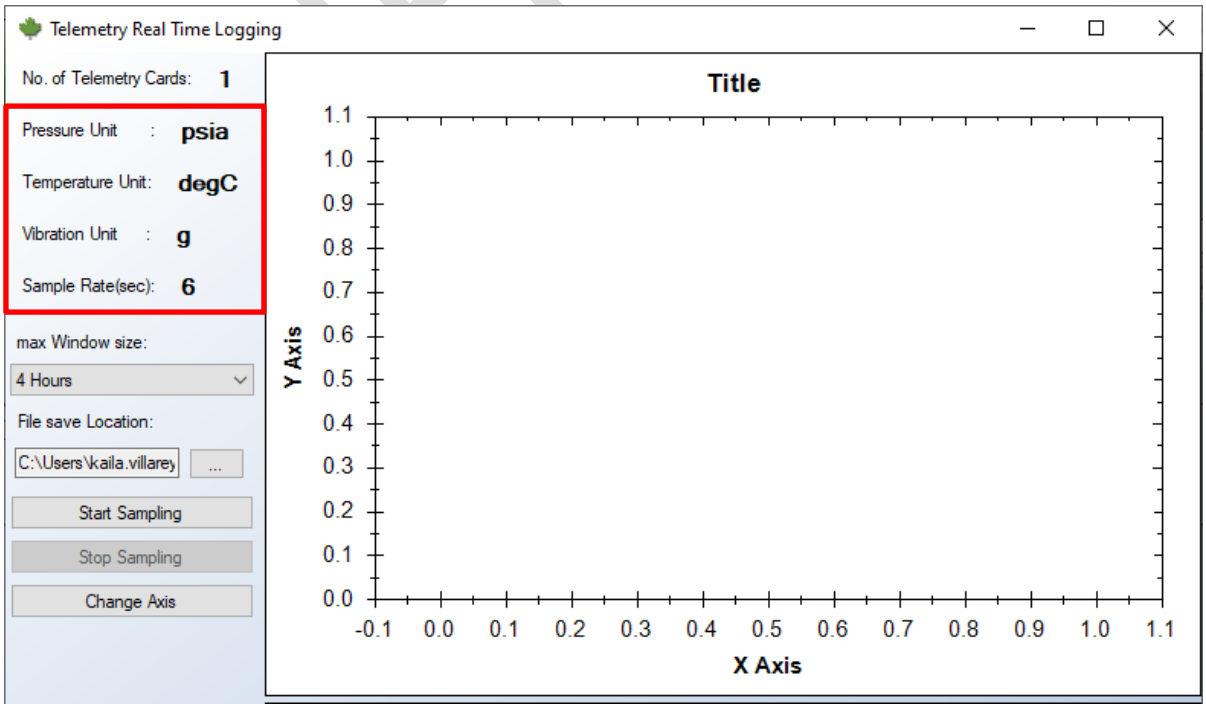
The DataCan Multi-Gauge Telemetry Card can graph data in real-time on a PC and save that graph to the computer.

1. After confirming that all gauges are connected and communicating, and programing the desired sample rate, select **Utilities -> Real-Time Logging**.



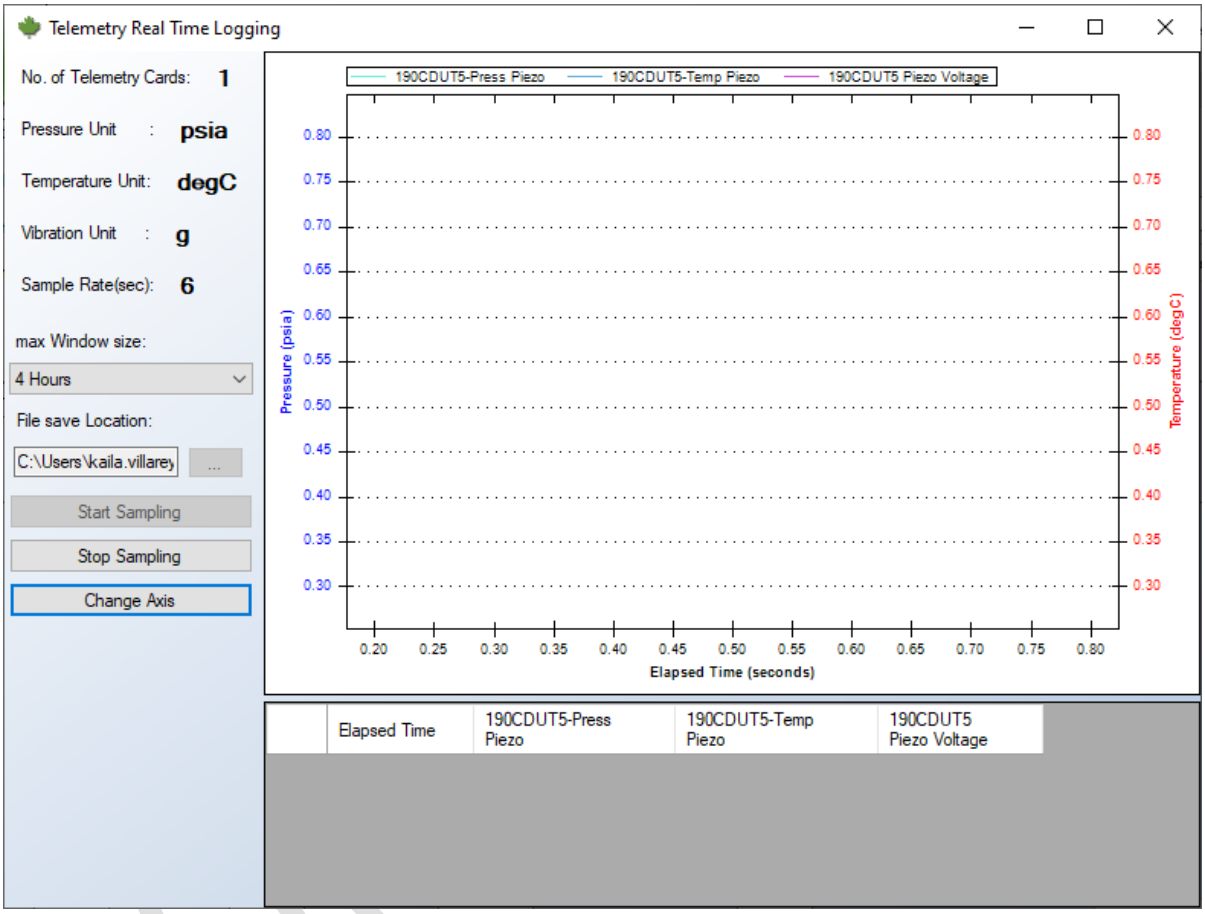
2. A Telemetry Real-Time Logging pop-up window will appear. Ensure the correct units are listed and the Sample Rate is set.

   Note: If you wish to change the units or sample rate, please refer to *Changing Units* and *Programming Sample Rate* respectively.



3. To begin graphing, press **Start Sampling**. The graph will start once the first complete sample set has been collected, and then update every sample interval, displaying a graph of the collected data in real-time.

   Note: The axis of the graph may be changed by clicking **Change Axis** or using your mouse to zoom in by hovering the pointer over the graph and scrolling.



4. To end graphing, click **Stop Sampling.**

   Note: The log is saved to an auto-generated file at the location specified. If you click start sampling when the file location is the same as a previous recorded job, you will OVERWRITE the old file. The data is still recorded in the Telemetry Card memory, but the timing of the Start Sampling and Stop Sampling button presses are lost.

6 Modbus Communication

6.1 Modbus communication settings

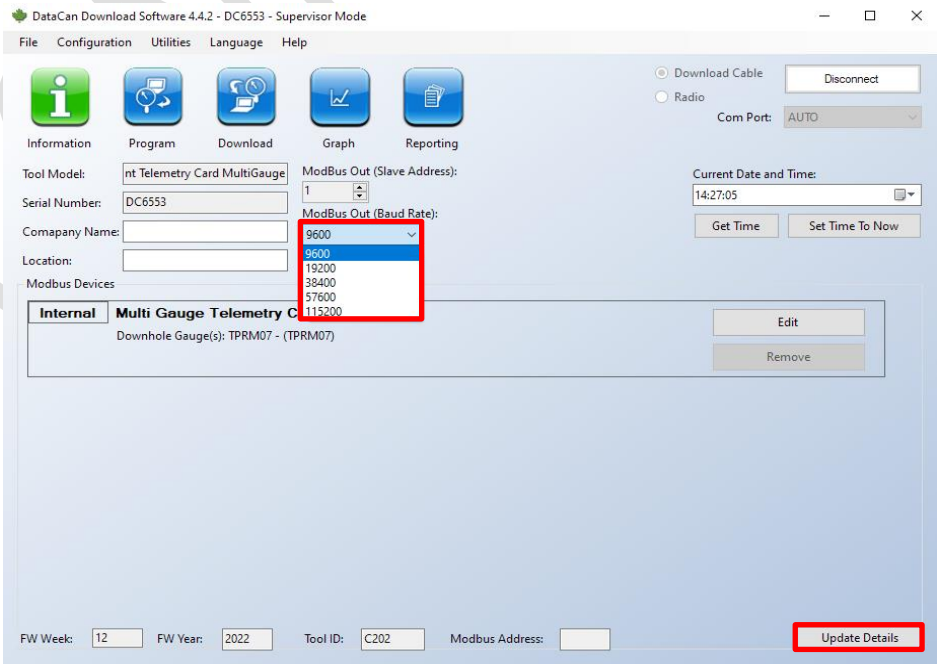
The default Modbus communication settings are:

Baud Rate	9600
Data Bits	8
Parity Bits	None
Stop Bits	1

The baud rate may be set to 9600, 19200, 38400, 57600, 115200. None of the other settings may be changed.

To change the baud rate:

1. connect the card to the download software, see section 5.1.
2. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time. "-Supervisor Mode" should appear in the top bar.
3. Click on the **Modbus Out (Baud Rate):** drop down menu and select the desired Baud Rate. Then click the **Update Details**.



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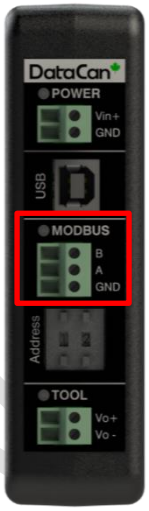
6.2 Connecting to the Modbus Terminal



The ModBus wires are connected to the Modbus terminal indicated. The pinout is:

Pin	Connection
B	Inverted or **D-** RS-485 line
A	Non-inverter or **D+** RS-485 line
GND	Card reference voltage. This is internally connected to the Power GND pin. Do not connect if the Scada system is on the same power supply as the Telemetry Card.

6.3 Setting the Modbus Address Using the Physical Selector

If using addresses 1-99, the physical address selector on the front of the card can be used to set the Modbus address of the Telemetry Card. Press the **+** or **–** buttons for each digit until the correct address is displayed. The card will convert to that address when the next sample is taken.

6.4 Setting the Modbus Address Using the DataCan Download Software

If an address above 99 is desired, setting the physical address selector to **00** will enable the DataCan Download Software address selector.

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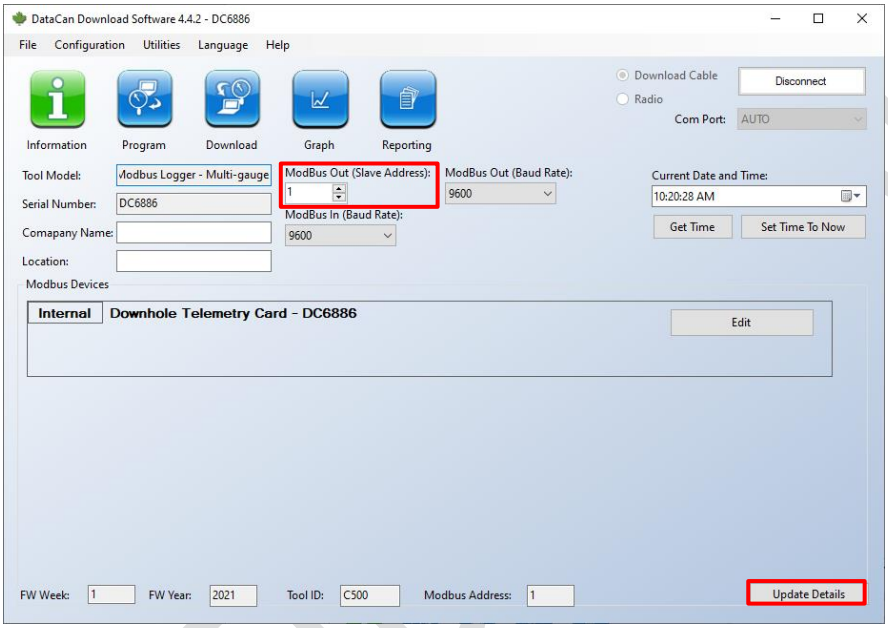
1. Use the **DataCan Download Software** to connect to the Telemetry Card after the physical selector is set to **00.**

2. On the information page, **Modbus out (Slave Address):** will be changeable.
3. Set the address to the desired number and click **Update Details**.



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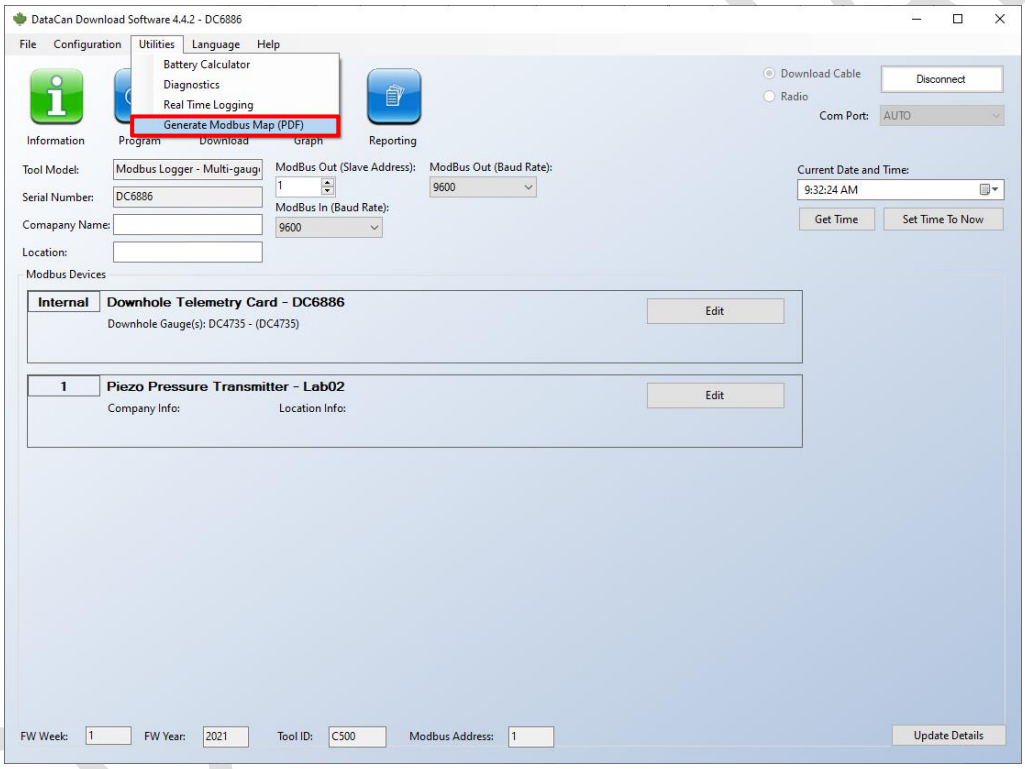
6.5 Modbus Map

The location of sensor data in the Modbus map depends on the number and type of gauges the Telemetry Card is configured to log. Once all the sensors are connected and configured to the Telemetry Card, a map of the Modbus registers can be generated.

Note: A copy of the Modbus Map should be saved after setup.

1. Open the DataCan Download Software and click **Connect.**
2. Click **Utilities -> Generate Modbus Map (PDF)**. A file window pop-up will appear.



3. Choose a location and file name then save the PDF.

Note: The PDF will include all the Box setup information, sensor reading registers, and reading types. If the gauge # is the same as the Telemetry Card Serial number, then the reading is generated by the Telemetry Card.

Note: The register numbers given are in the format 3XXXX. For polling data, this is the same as a register number given in 4XXXX format.

Below is an example of a generated Modbus Map PDF for a single addressable Piezo Permanent Gauge.

Modbus Map

Configuration Date & Time		**08 Jun 2022 15:30:33**	
Modbus Address			
Tool Details			
Serial #		**DC6551**	
FY:	**21**	FW:	**1**
No of Cards	**1**	Sampling Period	**6 Sec(s)**
Location Info		Company Info	
Units			
Pressure		**psia**	
Temperature		**degC**	
Flow		**-N/A-**	
Acceleration		**g**	
Voltage		**Volts**	
Current		**Amps**	
Modbus Write Locations			
30061		Set Sample Period in seconds format: Low byte followed by high byte Example: 0x0300 for 3 seconds 0x302A for 3 hours(10800 seconds)	
Card Details			
Internal Card			
Serial #		**DC6551**	
FY:	**21**	FW:	**1**
No of Readings	**6**	No of Guages	**1**
Location Info		Company Info	
Guage(s)	**190CDUT5**		
Modbus Reading Locations			
Register	**Gauge(Label)**	**Reading Type**	**Data Type**
30129	DC6551	Surface Box Input Voltage	Swapped Float
30131	DC6551	Surface Box Tool Current	Swapped Float
30133	190CDUT5 (190CDUT5-Press Piezo)	Multi-Gauge Piezo Permanent - Pressure	Swapped Float
30135	190CDUT5 (190CDUT5-Temp Piezo)	Multi-Gauge Piezo Permanent - Temperature	Swapped Float
30137	190CDUT5	Multi-Gauge Piezo Permanent - Voltage	Swapped Float
30139	DC6551	Success Counter	Decimal
30140	DC6551	Failure Counter	Decimal

6.6 Modbus Data Format

DataCan provides sensor readings in IEEE floating-point format. The number is stored in the Modbus registers in a swapped float. The register given is the location of the Most Significant Word and the Least Significant Word is stored in the register with the next highest address. From the example Modbus map above, the pressure reading will be in registers 30133 and 30134.

Below is a complete breakdown of a request packet and response from the Telemetry Card configured for the above Modbus Map.

Request from SCADA: 03 03 00 80 00 0B 04 07

Talking to the device at address 3, read holding registers starting at register location 0x0080 which is register 30129 and going for (0x0B) 11 registers.

Response from card:

03 03 16 41 3F B2 86 3F D5 BD 00 C6 17 E7 8C 43 26 8B 0E 41 35 F5 6F 00 09 A0 F7

Reply with (0x16) 22 bytes:

30129-30130 (0x413FB286): 11.981 (Telemetry Card input voltage)

30131-30132 (0x3FD5BD00): 1.670 (Tool Current)

30133-30134 (0xC617E78C): -9721.887 (Pressure)

30135-30136 (0x43268B0E): 166.543 (Temperature)

30137-30138 (0x4135F56F): 11.372 (Tool Voltage)

30139 (0x09): 9 successful tool communications

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6.7 Modbus Test Mode and Modbus Debugging

DataCan has two features to aid in setting up and debugging Modbus polling.

The first register, 30049, is set to a swapped float value of 234.5678. This allows a user to confirm Modbus communication and data formatting with a known value.

Register	Address (HEX)	Contents (HEX)	Contents (Dec)	Content Description
30049	0 x 30	0 x 436A	17258	High word of 234.5678
30050	0 x 31	0 x 915B	37211	Low word of 234.5678

The second feature is a test mode that, when started, sets the values of registers 30133, 30134, 30135, and 30136 to known values for 120 seconds. The known values are a swapped float reading 123.4567 in register 30133, and a swapped float reading 456.7890 in register 30135. This allows a user to confirm the formatting of the first pressure and temperature readings of the most common sensor setups.

Register	Address (HEX)	Contents (HEX)	Contents (Dec)	Content Description
30133	0 x 84	0 x 42F6	17142	High word of 123.4567/ Usually high word of Press 1
30134	0 x 85	0 x E9D5	59861	Low word of 123.4567/ Usually low word of Press 1
30135	0 x 86	0 x 43E4	17380	High word of 456.7890/ Usually high word of temp 1
30136	0 x 87	0 x 64FE	25854	Low word of 456.7890/ Usually low word of temp 1

To enter the Modbus test more either:

1. Connect the Telemetry Card to the downloaded software.
2. Select **Configuration -> Modbus Test Mode.**

OR

Write 0 x 0000 to register 40051.

After 120 seconds, the contents of the registers will return to their regular content. The value of pressure and temperature readings that are recorded to memory is unchanged.

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7 LED Indicator Descriptions and Troubleshooting

The LEDs on the front of the card can provide information on the status of the operation.

Indicator	Behaviour	Meaning
POWER (Orange)	Solid	Power is on and is adequate to power the telemetry card.
	Flashing slowly (1 blink/second)	Voltage is too low to run gauges, but memory logs can be accessed.
	Fast or erratic blinking	If the device cannot start up properly, check that the power supply to the card has adequate power output (4W).
MODBUS (Green)	Flash	The Telemetry card has responded to a data request on the Modbus network.
	Solid	The card has had an error, please power the card off and on.
Tool (Blue)	Flashing	A sample has been collected by a downhole gauge.
(Red)	Flashing	The card has failed to collect a sample from a downhole gauge. Please confirm the list of configured gauges on the information screen and the gauges connected.
(Blue)	Solid	No tool connection fault. There is no current draw on the tool network. (Note: this is only updated when the card attempts to talk with a gauge. If the sampling rate is set for a long interval, it can be a long time before this indicator responds.)
(Red)	Solid	Tool Power fault. This is most likely caused by a short circuit in the tool line. Check tool connections if there is no short circuit in your connections. With the tools connected, disconnect, and reconnect telemetry card power. If you have disconnected the tool line from the card and the indicator stays on longer than your sample rate, please return the card to DataCan for service.

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8 Advanced Telemetry Card Setup

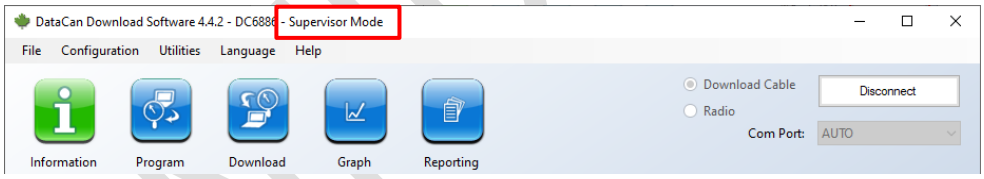
8.1 Output Voltage

The Telemetry Card can output either 12 V or 24 V to the tool line. Lower voltage requires less power and puts less stress on the tools, extending their life. A single tool on an intact line will likely always work on 12 V. A pair of tools run on a line less than 4 000 m (13 000 ft) should be run on 12 V. If you have more than two tools or depths deeper than described above, you will likely need to run the system at 24 V output.

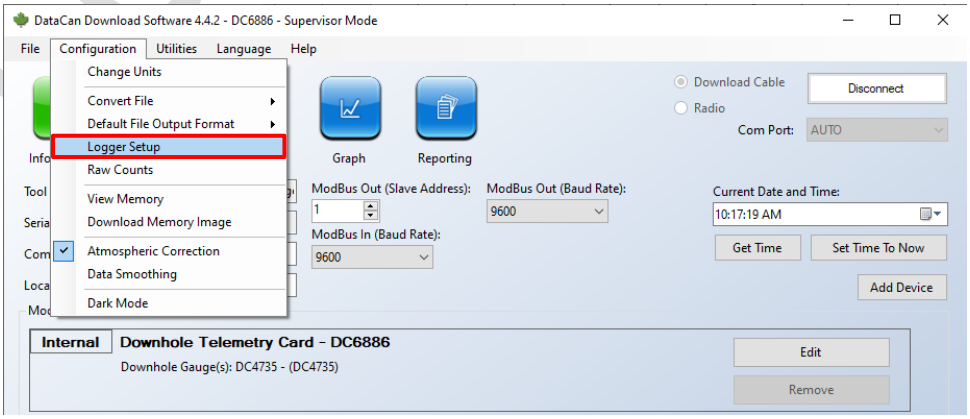
The following instructions outline how to change the tool line voltage:

1. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time.

   Note: "-Supervisor Mode" should appear in the top bar.



2. Select **Configuration -> Logger Setup.**



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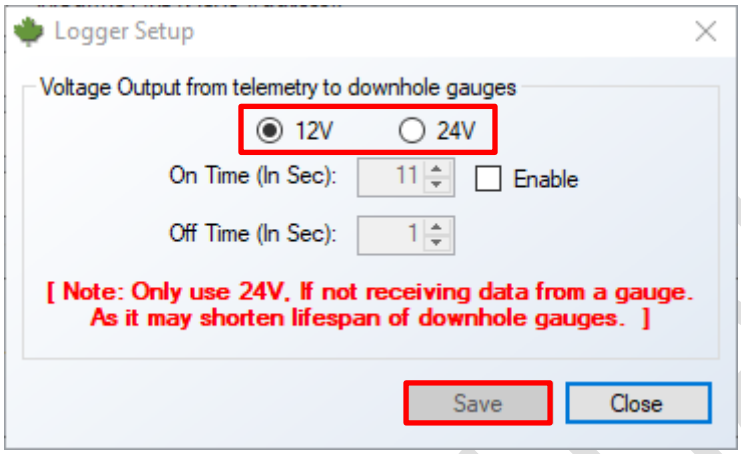
3. In the **Logger Setup** window, under the **Voltage Output from telemetry to downhole gauges** heading, you have the option to choose between 12 V and 24 V.



4. Once you have selected the desired output voltage, click **Save.**

8.2 Power Cycle Timer

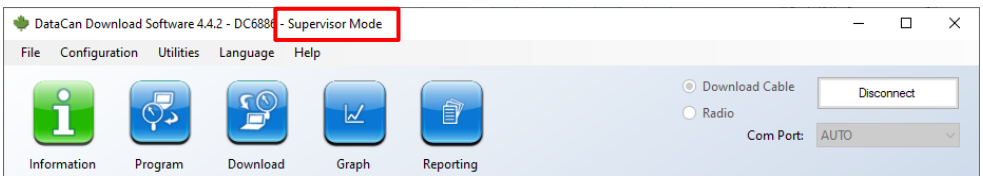
Warning: Do not set this timer until after you have finished setting up the sensor and sampling. Trying to change settings when the power is in the off phase, will not work.

The Telemetry Unit can turn off the power to the connected gauges. The user can set a timer to turn the gauge power on and off. Turning the power off to the gauges will lower the power to 0.5W of power consumption, extending battery life if needed.

The following instructions outline how to change the power cycle time:

1. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time.

   Note: "-Supervisor Mode" should appear in the top bar.



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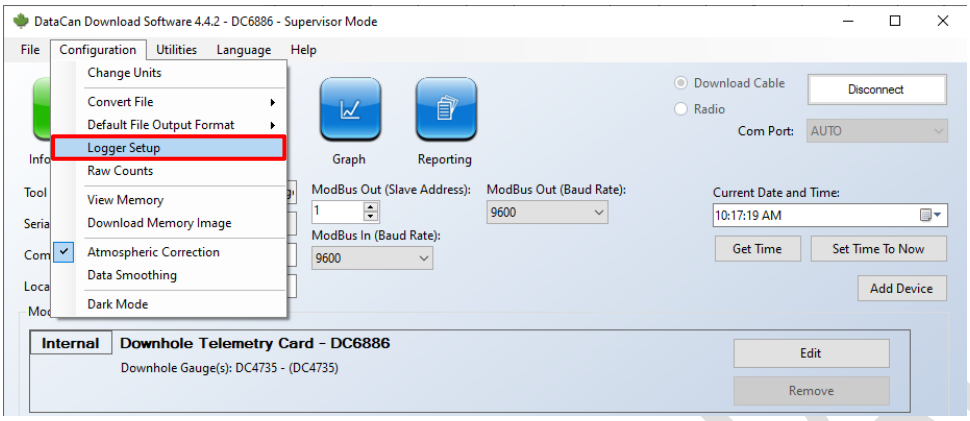
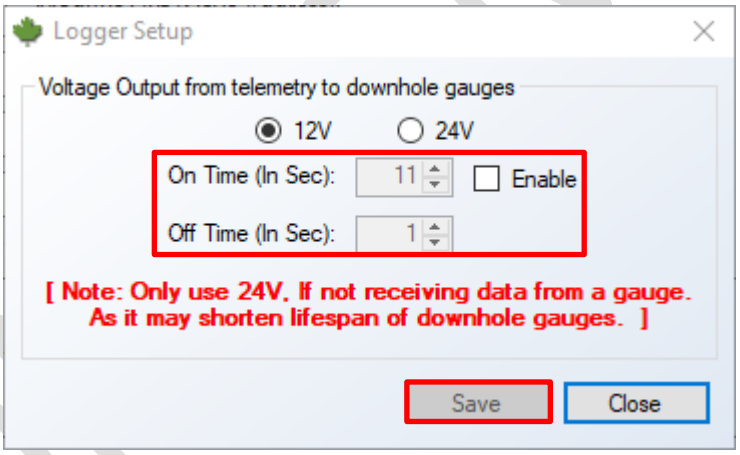
2. Select **Configuration -> Logger Setup.**



3. In the **Logger Setup** window, click the **Enable** box. Set the on and off time in seconds.

   Note: The minimum **On Time** is 11 seconds.



4. Once the On and Off times are set, press the **Save** button to store them in the logger.

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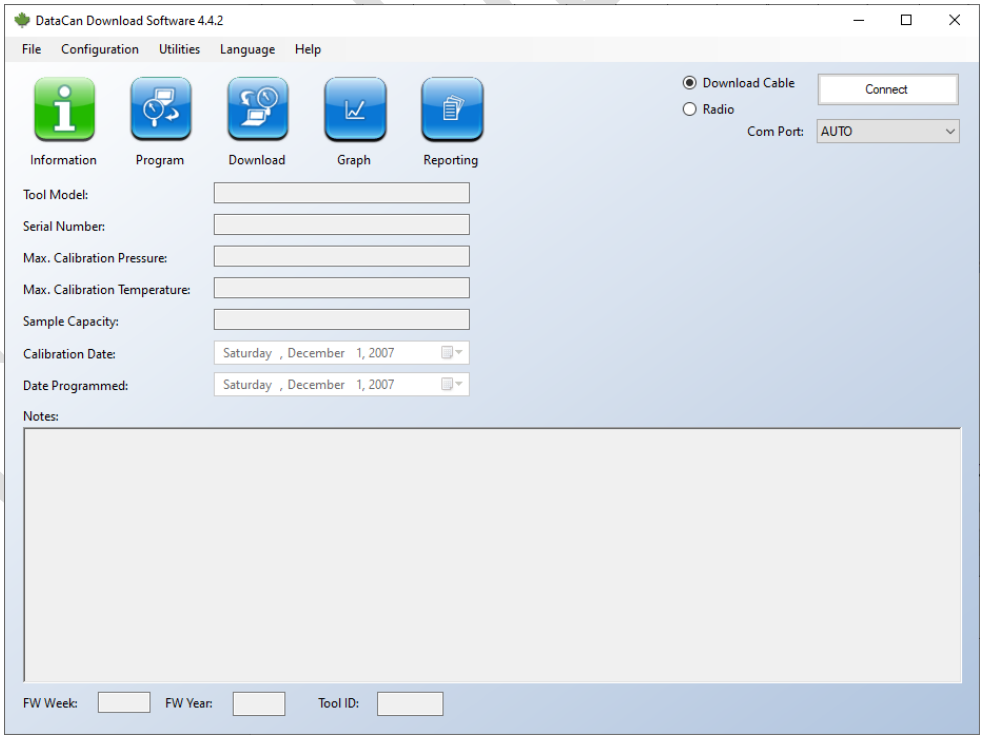
8.3 Changing Address by Serial Number

If you wish to have the gauges displayed in a different order than the current setup or if you have permanently connected more than one gauge with the same address together, the address of the gauges can be changed using the serial number of the gauge.

1. With the Telemetry Card connected to the gauges and powered on, connect the Card to the DataCan Download Software.

2. Open DataCan Download Software on your Windows PC. The startup page should appear as shown below.



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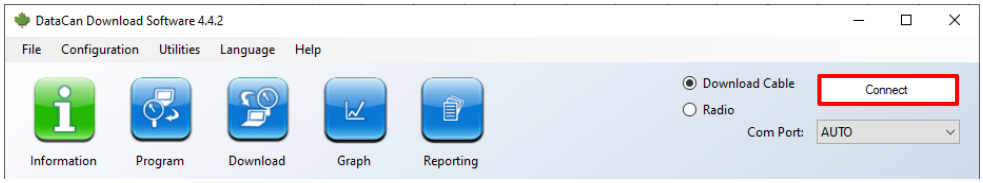
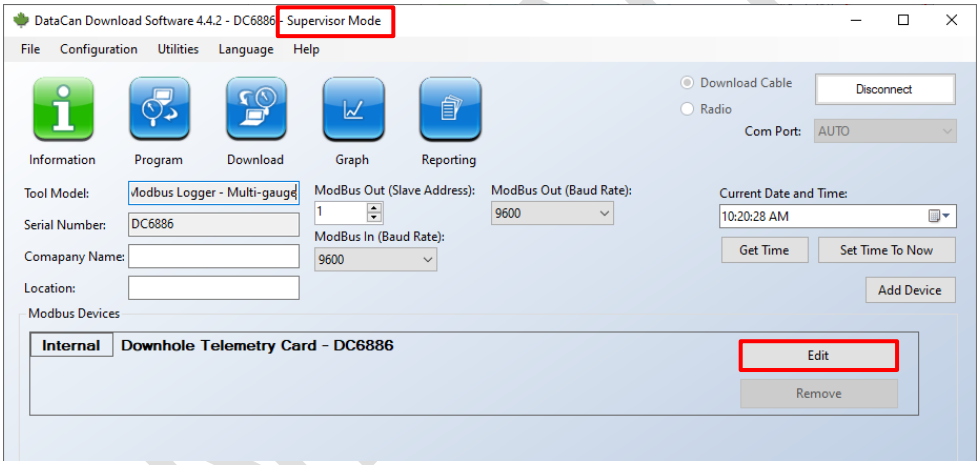
3. Press the **Connect** Button.

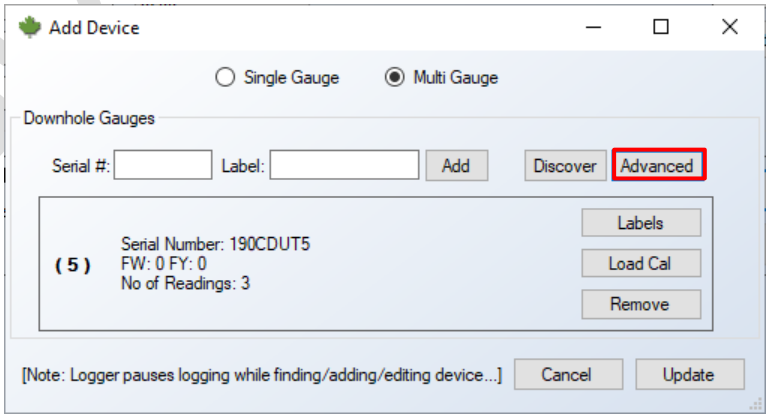


4. Enter **Supervisor mode** by pressing **Ctrl+SHIFT+D** at the same time then press the **Edit** button.

   Note: The Internal Telemetry Card always shows up on the **Information** page in the DataCan Download Software as address 0. To change your setup, you must enter Supervisor mode. "-Supervisor Mode" should appear in the top bar.



5. Press **Advanced.**



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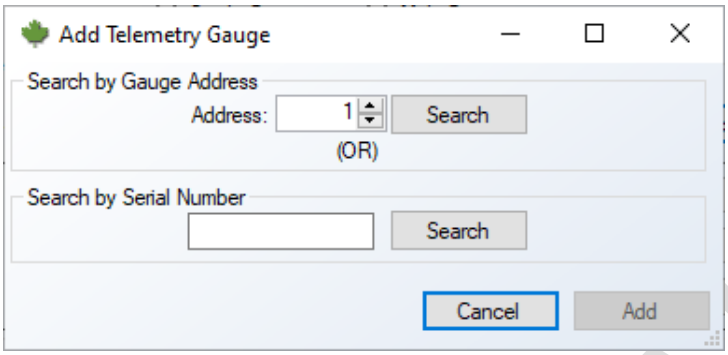
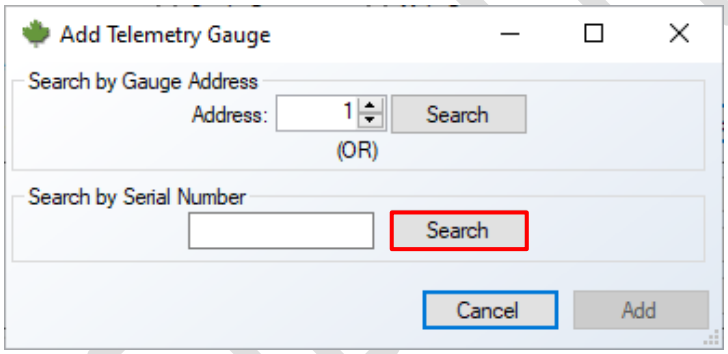
Note: The following pop-up window should appear.

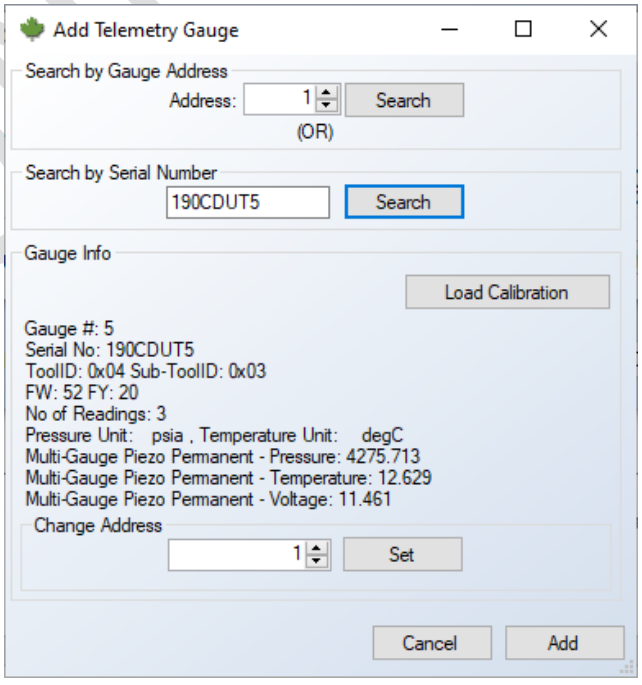


6. Enter the Serial number and press **Search.**

   Note: If another gauge is on the same address as the one searched, the tool information will be empty.



Note: The "Gauge Info" section should appear.



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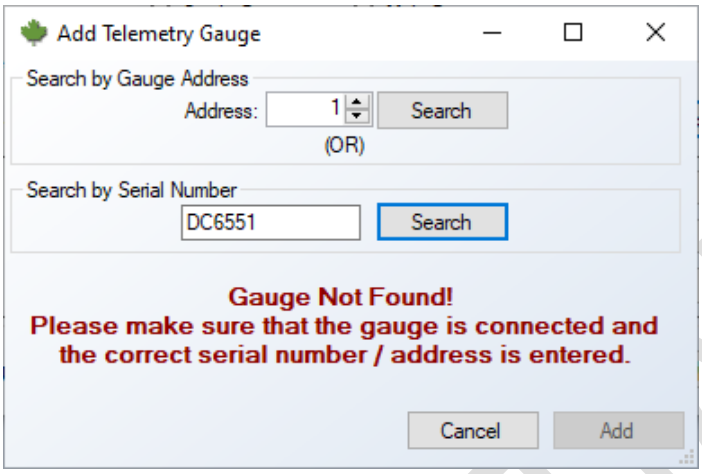
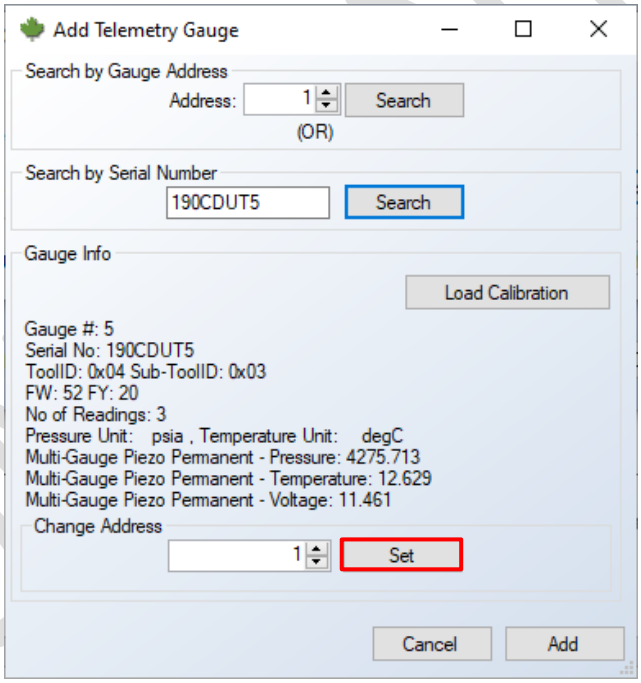
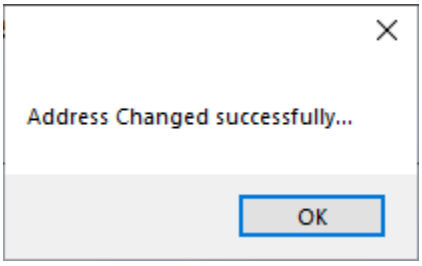
If the "Gauge Info" section does not appear, the message "Gauge Not Found!" may be displayed. Ensure you have input the correct serial number and try again.



7. Enter the desired new address into the "Change Address" selection box and press **Set.**



8. A pop-up window displaying the message "Address Changed Successfully…" will appear. Press **OK.**



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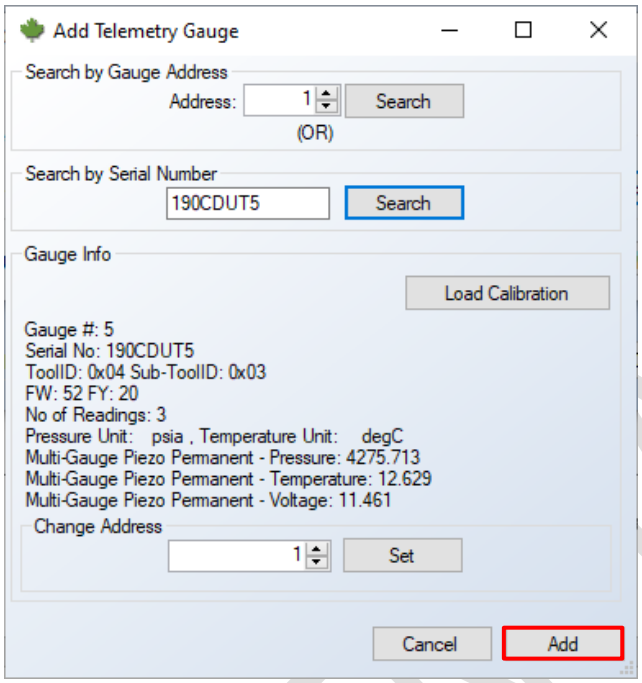
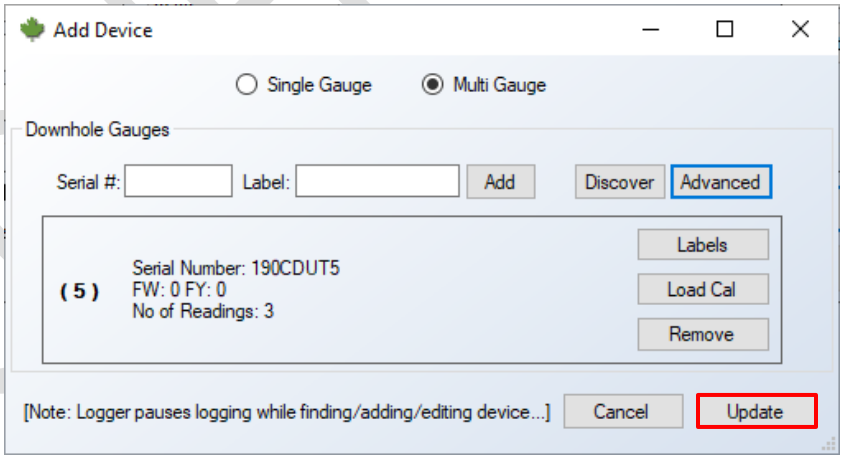
9. Press **Add** to add the device at the new address.



10. If the gauge had already been on the list under a different address, remove the old address.

11. Press **Update.**



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9 Telemetry Card Commissioning Checklist

Surface box serial #: _____

☐ Surface line/test cables are properly connected to Card.

☐ Power is connected and the "TOOL" indicator LED is flashing Blue.

☐ Telemetry Card is connected via USB cable to DataCan Download Software installed.

Diagnostics screen information:

Sample Period _____ (Sec) Pressure Units _____ Temperature Units _____

Input Voltage _____(V) Tool Current: _____mA

Gauge Information:

1: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

2: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

3: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

4: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

5: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

6: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

7: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

8: Serial # _____ Label _____ Press_____ Temp _____ Volt_____

Surface device readings:_____

Information Page: Modbus Out Address _____ Modbus Out Baud Rate: _____

☐ Modbus Map Generated

Completed By: _____ Date: _____

Location: _____

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