USER QUICK GUIDE

Multi-Channel Logger V1.2

www.datacan.ca

Table of Contents

History of Changes

Rev. No.	Date	Pages	Description of Changes
0	February 3, 2016		Initial Draft logger
1.0	February 25, 2016	47	Update logger manual to Multi-Channel logger
1.1	March 15, 2016	45	Added technical description of each physical connection.
1.2	July 26, 2016	47	Updated entity parameters and minor edits.

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.

www.datacan.ca
info@datacan.ca

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

Warnings and Conditions

WARNING – Care shall be taken to avoid ignition hazard due to impact or friction, during transportation and installation.

WARNING – The casing of this device is not isolated from the internal circuit. Care must be taken to avoid grounding issues.

WARNING – The ModBus Sensors connection and the SCADA ModBus connections are not isolated from one another. When calculating total inductance and capacitance of installed systems both connections must be taken into account.

WARNING – Battery pack replacement is the only user maintenance activity. Any substitution or modification to any components may impair intrinsic safety.

1 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, patent pending 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.

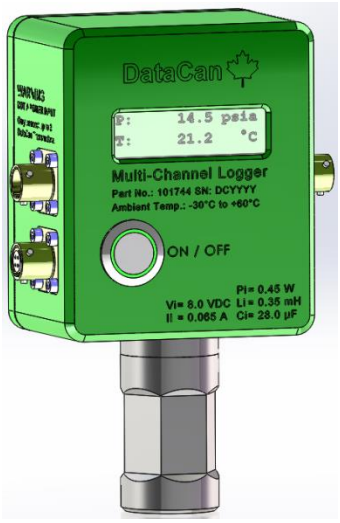
2 Product Description

The Multi-Channel Wellhead logger is used to measure and record the pressure of up to 4 different pressure test points. It is intended to work outside in a wide variety of environments with a weatherproof housing and connections. The logger has 1 internal pressure sensor and is intended to connect to up to 3 external DataCan pressure transmitters.

The main unit and each external pressure transmitter can be screwed onto the wellhead to measure readings such as: tubing, casing and vent pressures.

The logger contains an internal battery pack to power the unit. The user can also supply external power through the SCADA / Modbus connector. When external power is applied the battery is electrically disconnected.

Once logging has been started by 5 button presses it cannot be stopped except by connecting the DataCan Logger Download cable and programming a new sample program into the logger.



DataCan's program and download software operates and controls all of DataCan's downhole and surface products. The software can be used to program tools, download the information stored on the tool memory, graph tool data, and create reports containing relevant job information. The software runs on Windows XP/Vista/7/8/10.

There is also a SCADA ModBus port that allows the data collected by the logger to be passed on to an external system on an ongoing basis.

The logger is intrinsically safe. Certified to CAN/CSA C22.2 No 60079-0, CAN/CSA C22.2 No 60079-11, ANSI/UL 60079-0, ANSI/UL 60079-11, CAN/CSA C22.2 No 142 and UL508.
With a rating of:
Class I, Zone 0, AEx ia IIB T4 Ga

2.1 Data Overview

DataCan download software is designed to be as user friendly as possible while offering features not found on the competition's communication software.

DataCan's products are designed to store data to memory. Whether the memory is located downhole inside of a memory recorder, or at the surface in a surface read out box or multi-channel logger, the architecture of the data storage and retrieval remains the same.

DataCan stores data in "Jobs". One job has a start time and end time. For a logger the start time is when the operator starts the logger by 5 button presses. The end time for a logger is when power runs out or it is reprogrammed.

The act of powering the tool starts the tool and the program sequence. If you remove power from a tool then re-establish power, the program will restart as well.

Jobs can be downloaded individually or as a set. Jobs can be merged together. Jobs are not deleted by the act of re-programming the tool. The only way to delete a job is to instruct the software to perform the delete jobs command. You must delete all of the jobs at once.

You can sample any pressure gauge, surface box, or logger in real time and save files in real time to a remote location.

2.2 Physical Specifications

The Logger can be ordered to measure max pressures of 750 to 30 000 psi.

The logger is housed in a weather proof casing and operates in temperatures from -30 °C to +75 °C; however the intrinsic safety rating is only valid as described below.

Description	Minimum	Maximum	Units
Ambient Temperature	-25	60	°C

Table 1: General ratings.

2.3 Physical Connections

There are 3 external electrical connections on the logger, and 1 pressure port connection. The three electrical connections are: on the lower left hand side the **Download** connection; on the upper left hand side the **ModBus Sensors** connection; and on the right hand side the **SCADA ModBus** connection.

The **Download** connection is used for setup and download only. It is not normaly used during logging. It is isolated from the rest of the circuit internally, and will not function if the logger is not powered and awake. The download connection is for use with DataCan Logger Download Cable ONLY. The connection is a power receiver and the entity parameters are described below.

Description	Value	Units
Vi	8	VDC
Ii	.065	ADC
Pi	1.2	W
Ci	0.12	uF
Li	0	uH

*Table 2: **Download** connection Entity parameters.*

The **SCADA ModBus** connection is used to collect samples on an ongoing basis from the logger. See the *Surface Telemetry Card Modbus Map* for ModBus registers and settings. Additionally the logger can be powered via **SCADA ModBus** connection. When powered from the connector the battery is disconnected no current is drawn from the battery. Operational specifications are in Table 3.

Description	Minimum	Maximum	Units
Input Voltage	4.5	8.0	V (DC)
Input Current	0.040	0.065	A (DC)

*Table 4: **SCADA** connection operational ratings.*

Table 5 contains the entity parameters for the **SCADA ModBus** connection.

Description	Value	Units
Vi	8	VDC
Ii	.065	ADC
Pi	.45	W
Ci	14	uF
Li	0	uH

*Table 5: **SCADA** connection entity parameters.*

The **ModBus Sensors** connection is for connecting external DataCan pressure sensors. It is a power source connection. The entity parameters are described in table 6.

Description	Value	Units
Max Output voltage (Uo)	8.0	VDC
Max Output Current (Io)	1.1	ADC
Max Power (Po)	1.2	W
Max connected Capacitance (Co)	4.0	uF
Max connected Inductance (Lo)	75	uH

*Table 6: **ModBus Sensors** entity parameters*

2.4 Battery

Only the DataCan mulit-channel logger battery pack, part number 107264, can be used in the DataCan multi-channel logger. The battery pack is a moderate discharge primary lithium cell. Do not short the terminals of the battery pack; it is protected by a fuse and if the fuse blows the pack is unusable. Do not try to open the battery pack or bypass any of its safety features. The parameters of the pack are listed in table 7.

Description	Value	Units
Maximum open Circuit voltage	7.8	VDC
Nominal Voltage	7.2	VDC
Max Current	1.04	ADC
R_{int} min	7.07	Ω
Fuse current	0.062	A
Max Power	0.695	W

Table 7: Battery pack parameters

3 DataCan Download Software Installation

Each tool shipment comes with a DataCan USB Flash Drive that contains all of the files you need to install the software program and USB drivers.

Before installing DataCan Download Software, you should have your computer ready with one of the following operating systems: Windows XP/Vista/7/8/10.

To install DataCan Software from the Flash Drive:

- Insert the Flash Drive into a USB Port
- Open the **DataCan Download Software** folder.
- Double click the **setup.exe** file to launch the DataCan Software installation.
- Follow the instructions leading to the completion of the software installation.

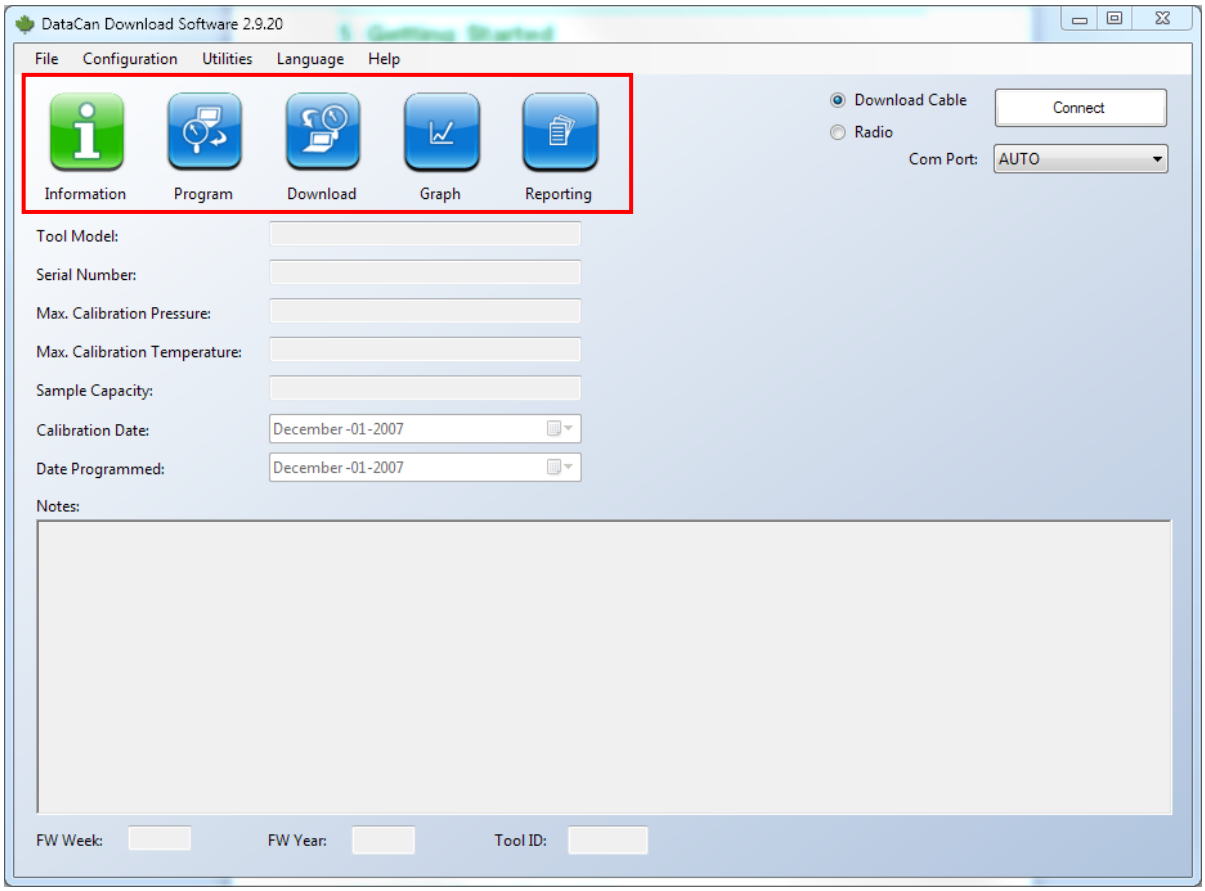
New releases are available for download on our website http://datacan.ca/support.php or http://datacanchina.ca/support.php.

3.1 Download Cable Drivers

If you are using Windows vista or later and are connected to the internet, the driver for the cable should automatically install the first time the cable is plugged in.

4 Getting Started With the Software

DataCan download software contains five main sections. Navigate between the five different sections by clicking the buttons shown below. The active section's button is highlighted green.



The five sections are as follows:

Info – See information about the connected tool.

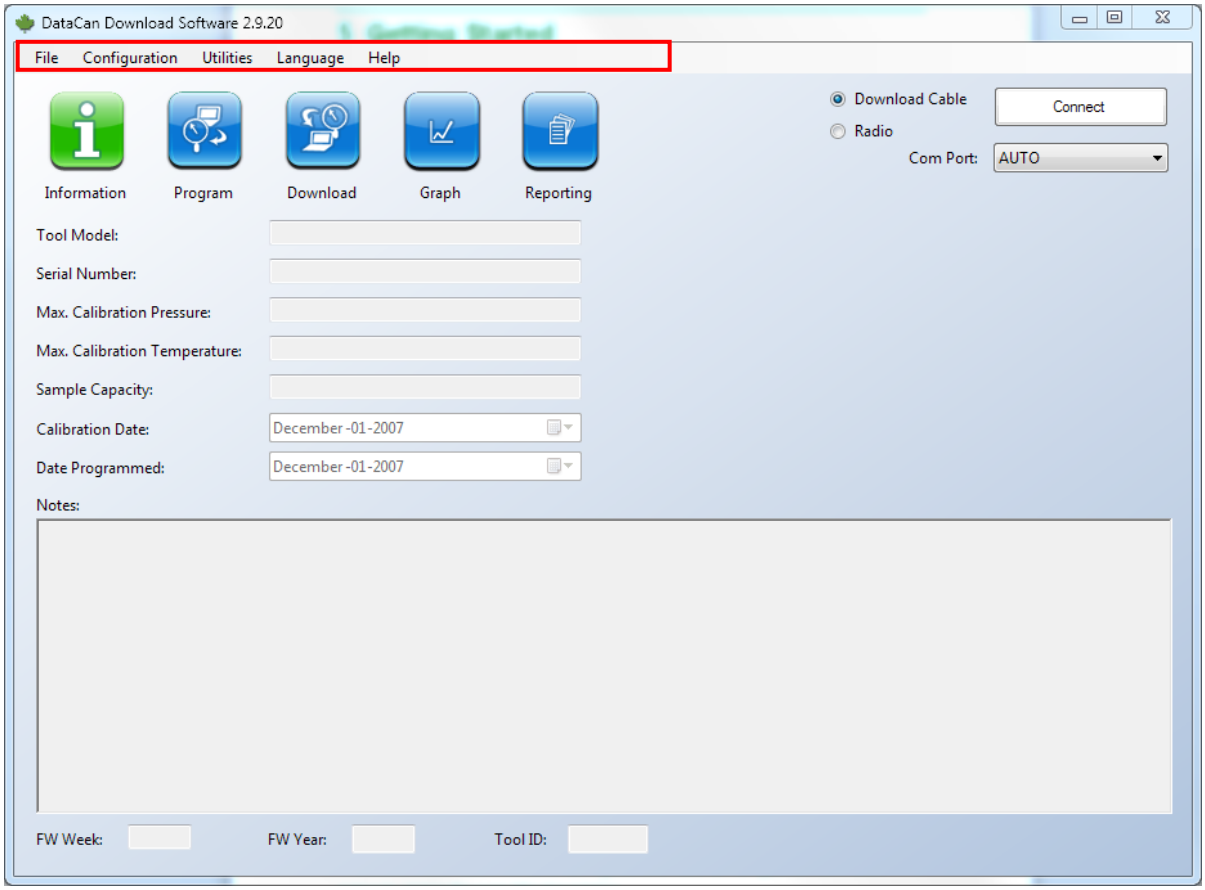
Program –Program the tool.

Download –Download data from the tool memory.

Graph – Create graphs and tables of the downloaded data.

Reporting – Create detailed reports of job information.

The software also has five menus containing additional features. Navigate between the five menus by clicking the menu title shown below.



The five menus are as follows:

Graph – Open, close and save jobs in graph and tabular form in the Graph Section.

Configuration – Change the settings of the connected tool.

Utilities – Calculate battery usage and perform real time sampling with the connected tool.

Language – Switch between English, Mandarin Chinese, and German languages.

Help – View graph help and software version details.

5 The Logger

5.1 Overview

There are 6 components to the logger: button, screen, pressure fitting, Download connector, ModBus Sensors connector, and SCADA ModBus connector.

- The button always turns on the screen.
- After programing, or powering on, the logger is asleep.
- To start logging the button must be pressed 5 times quickly. **NOTE:** All external transmitters must be connected before logging is started
- The screen displays pressure and temperature readings. The readings from each transmitter are cycled through in order of address. During sleep, after the first press, the screen displays how many more button presses are required to start logging.
- The pressure fitting is to be connected to the pressure port to be measured.
- The ModBus Sensors connection is to connect external DataCan transmitters.
- The SCADA ModBus connection is to connect the logger to an external data collection system. Also, the logger can be powered by this connection. Powering by this connection disconnects the battery.
- The Download connection is for connecting the Logger to the DataCan download software and requires a DataCan Logger Download cable.

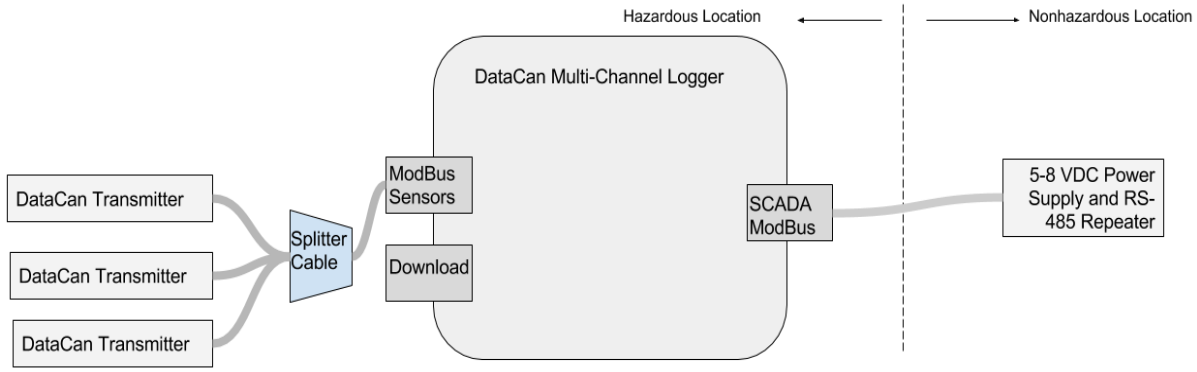
5.2 Connecting Transmitters to the logger

TRANSMITTERS MUST BE CONNECTED BEFORE LOGGING IS STARTED
If you wish to connect another transmitter after logging has started you must stop the logging.

Transmitters are connected to the logger via the **ModBus Sensors** connector. One transmitter may be connected with just a connection cable. To connect more than one transmitter, a splitter cable must be used.

Each transmitter connected to the logger must have a different address. If you have purchased a complete system from DataCan, the transmitters will already have been

programed. However, if you are adding a new component or replacing a component in a system you may have to set the addresses of the transmitters. The permissible addresses are 2, 3, or 4. No other addresses will be detected, and again, each transmitter in the system must have a different address. See the *DataCan Transmitter User Guide* for changing transmitter addresses. Having two transmitters of the same address connected to a logger will cause errors.



5.3 Starting Logging

Once the sample rate is programmed, all external transmitters' addresses have been set, and all external transmitters have been connected the logger must be started. To start logging press the button 5 times quickly. After the first button press the screen will come on and display the number of presses left to start logging. The logger will start a new job in memory every time logging is started.

5.4 Stopping Logging

If you want to connect another transmitter after you start logging you must stop the logger. There are two ways to stop the logger. The first is to reprogram the logger. Connecting to the download software and reprograming the sampling rate, even with the same rate, will cause the logger to go to sleep.

The second method is to disconnect all power sources. When powered up the logger powers up in sleep mode.

5.5 Connecting to SCADA

The logger can be connected to external ModBus SCADA devices. Pins D and C on the 4-pin military connecter are lines A and B respectively, with pin A being reference. Please see the *Multi-Channel Logger User Guide ModBus Map* for the full ModBus map.

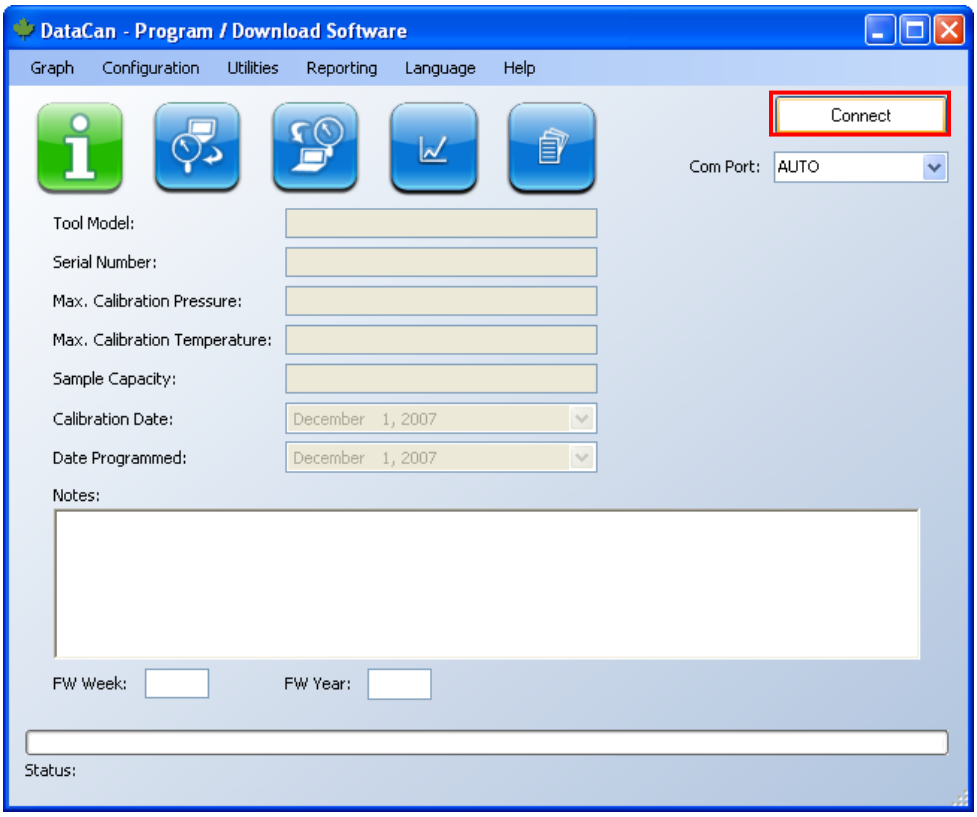
To power the logger by the SCADA connection 5-8 VDC must be applied between pins B (positive) and A (negative) of the 4-pin military connector.

6 Connecting the Logger

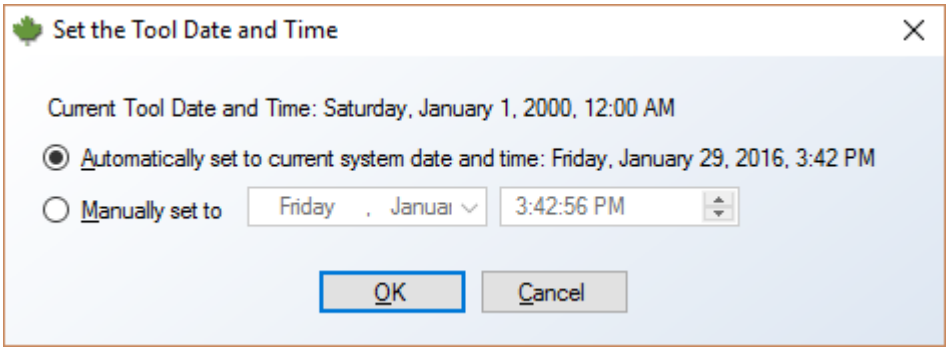
Once the DataCan Download Software and the USB drivers have been installed you are ready to initiate communication with the tool.

Connect the green tool connection end of the DataCan *Multi-Channel Logger* Communication Cable to connection marked **Download**. Connect the USB end to a receptacle on your computer.
[Put in pitctures]

Open DataCan Download Software. You will be directed to the info page shown below. Click on the **Connect** button.

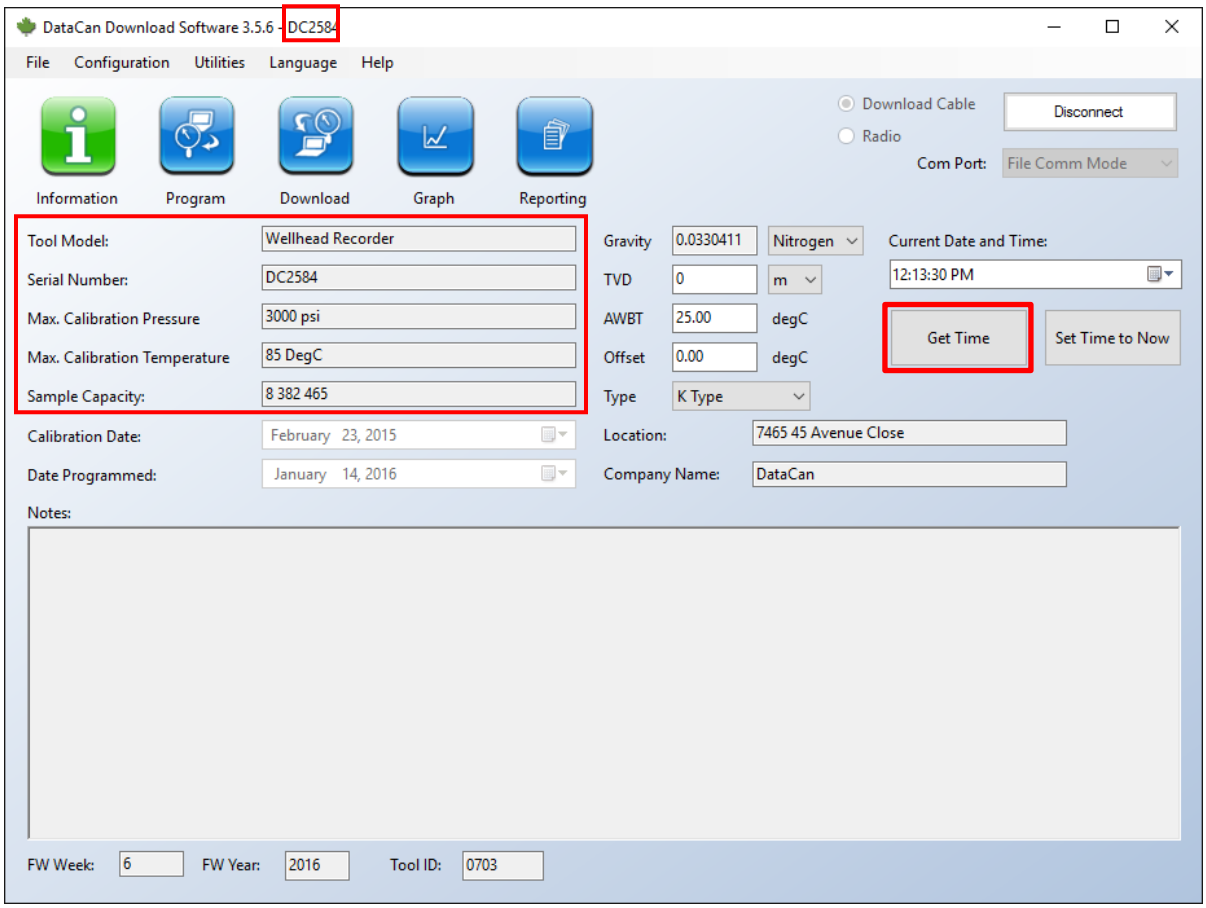


On connect, you may be prompted to set the time and date. If so, automatically set by clicking "OK".



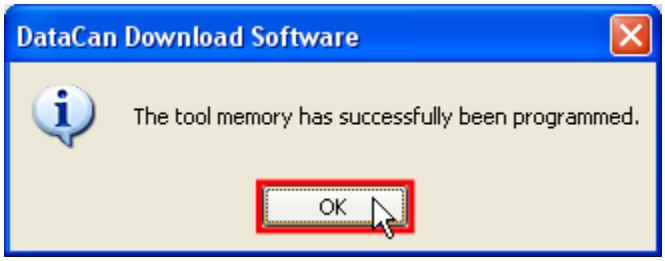
Once the software has established communication the Tool Model, Serial Number, Max Calibration Pressure, Max Calibration Temperature and Sample Capacity fields will fill with information from the tool.

You may test the real time clock chip by pressing “Get Time.” The time / date should update to the correct time.



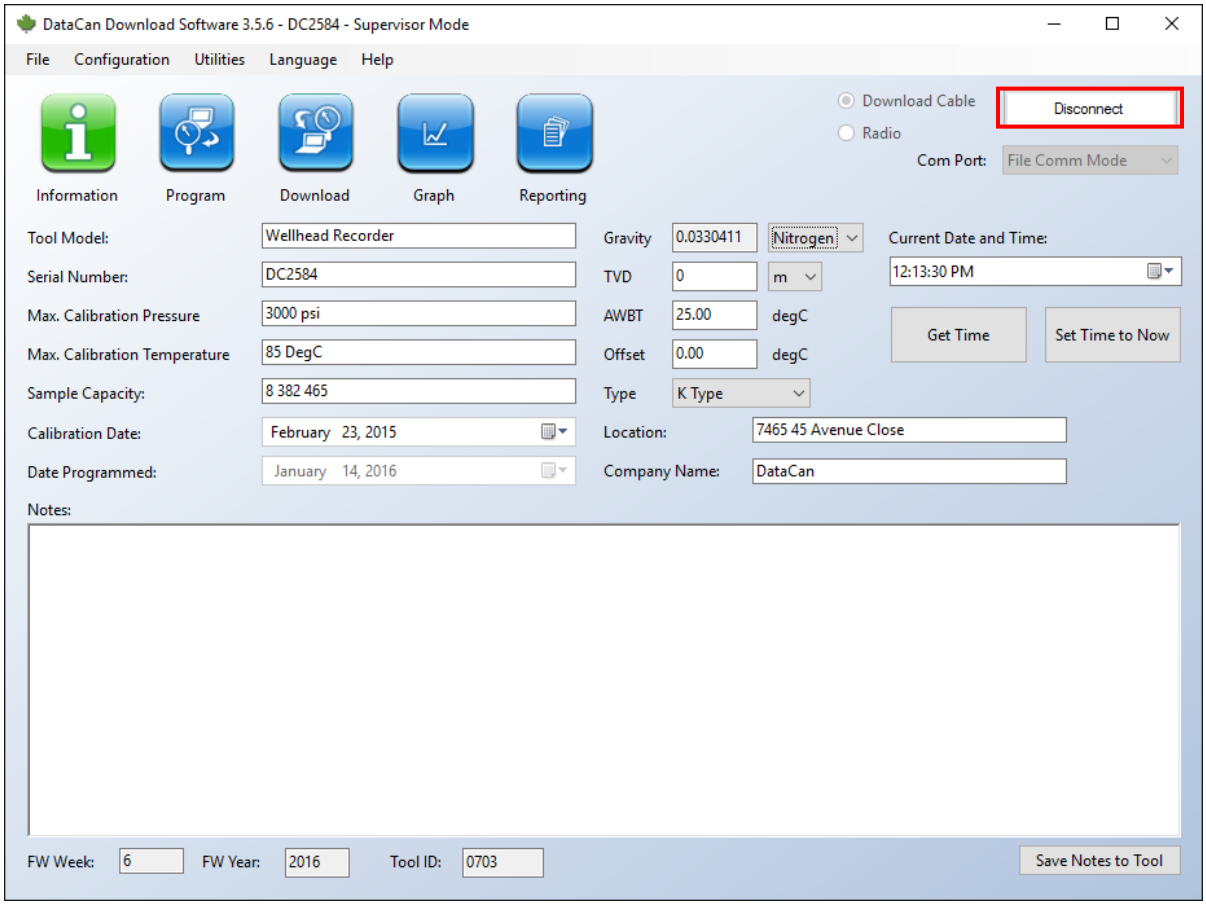
To edit the tool information fields enter **supervisor mode** by pressing **Ctrl + Shift + D** simultaneously on the keyboard. The background of the fields will change from grey to white and you will be able to enter the required information. Press the “Save Notes to Tool” button to store this information to the gauge memory. It is necessary to save the new information to the gauge memory by pressing the **Save Notes to Tool** button that appears only when in supervisor mode.

A pop up window will indicate when the changes have been made. Click **OK**.



The **Notes** section was added for the operator to manually capture other information such as job details, job location or reminders. To save your notes to the tool memory you must click the **Program Tool** button (see next section) or use the same procedure as changing the tool information.

To disconnect the tool from the PC simply press the **Disconnect** button and unplug the tool.


DataCan Download Software 3.5.6 - DC2584 - Supervisor Mode
File
Configuration
Utilities
Language
Help
Information
Program
Download
Graph
Reporting
Download Cable
Radio
Disconnect
Com Port:
File Comm Mode
Tool Model:
Wellhead Recorder
Serial Number:
DC2584
Max. Calibration Pressure
3000 psi
Max. Calibration Temperature
85 DegC
Sample Capacity:
8 382 465
Calibration Date:
February 23, 2015
Date Programmed:
January 14, 2016
Gravity
0.0330411
Nitrogen
TVD
0
m
AWBT
25.00
degC
Offset
0.00
degC
Type
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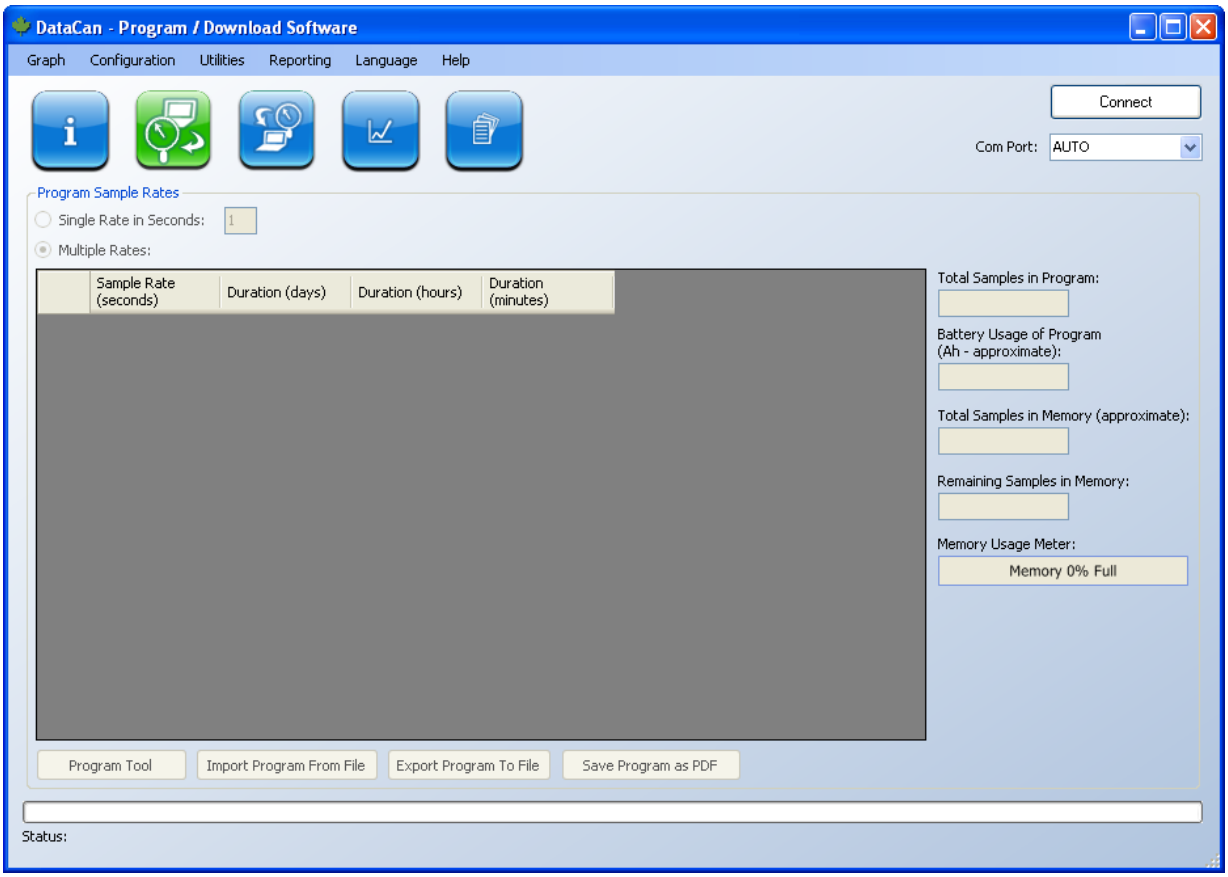
Location:
7465 45 Avenue Close
Company Name:
DataCan
Current Date and Time:
12:13:30 PM
Get Time
Set Time to Now
Notes:
FW Week:
6
FW Year:
2016
Tool ID:
0703
Save Notes to Tool

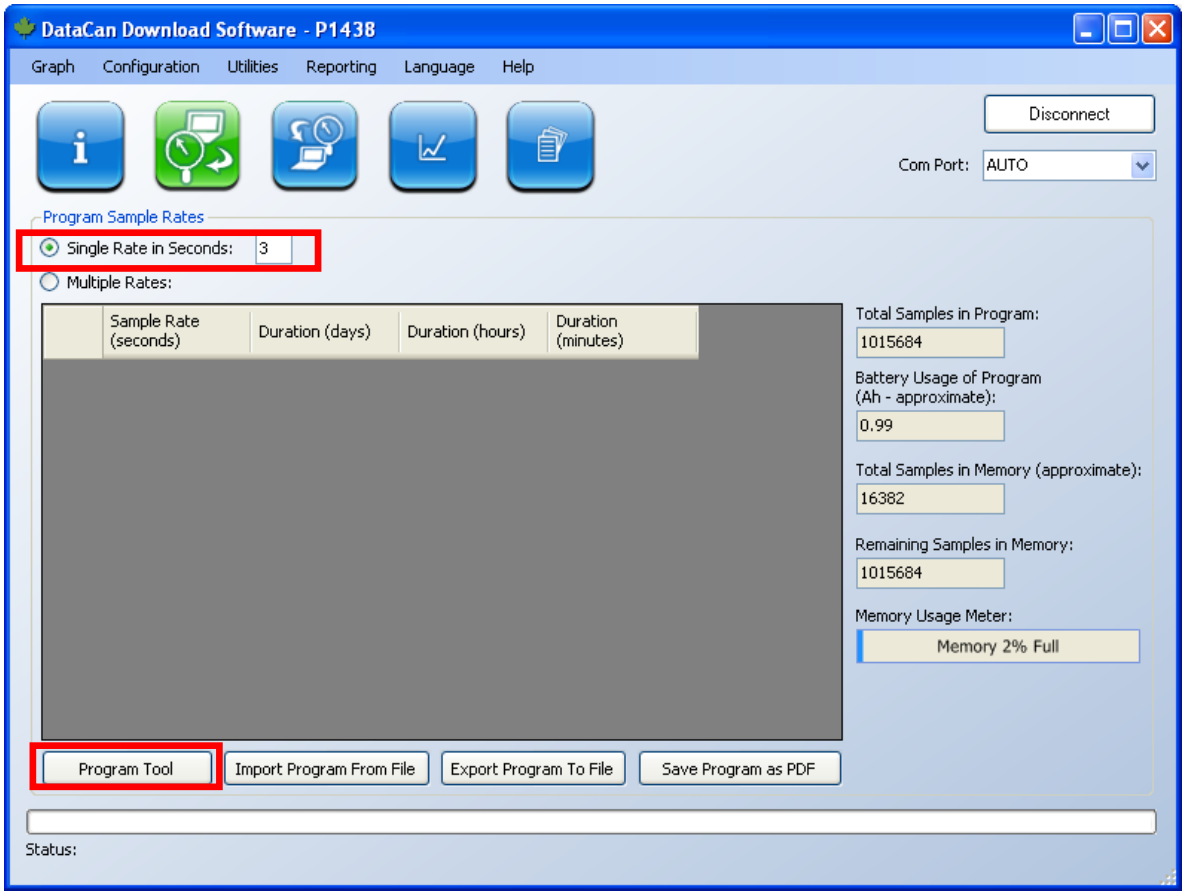
7 Programming the Logger

Enter the Program section by clicking on the following icon. Here you can create programs and store programs to the tool memory.

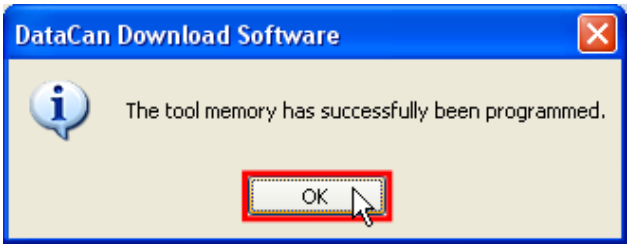


7.1 Single Rate Program

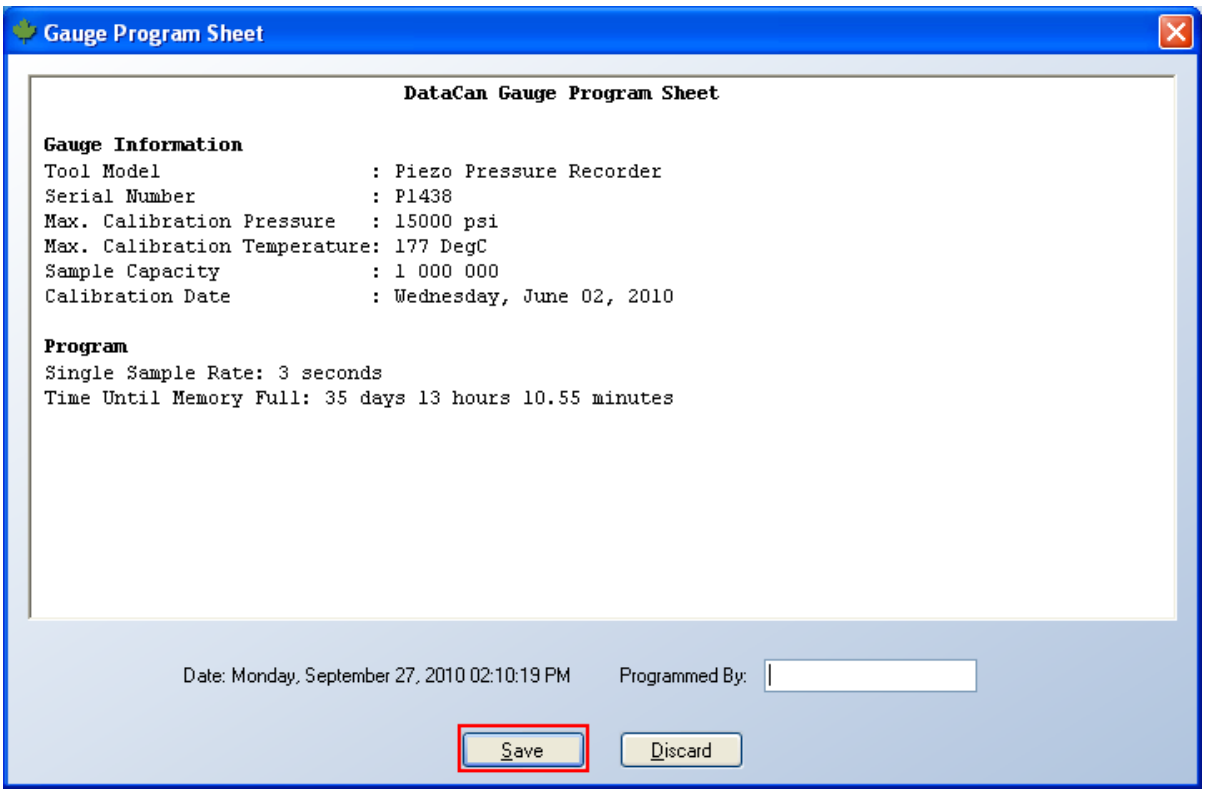
To create a program using a single sample rate select the **Single Rate in Seconds** radio button under the **Program Sample Rates** heading. Enter the desired sample rate in the field provided. For example, if 3 is entered the tool will sample once every three seconds. The **Total Samples in Program**, **Battery Usage of Program, Total Samples in Memory, and Remaining Samples in Memory** will be calculated automatically. The **Memory Usage Meter** visually displays the percentage the samples of memory have used from the total. Click the **Program Tool** button to save the program to the tool memory. **Note** that all sensors connected to the logger will be sampled at the sample rate.



A pop up window will appear when the program has been loaded on the tool. Click **OK**.



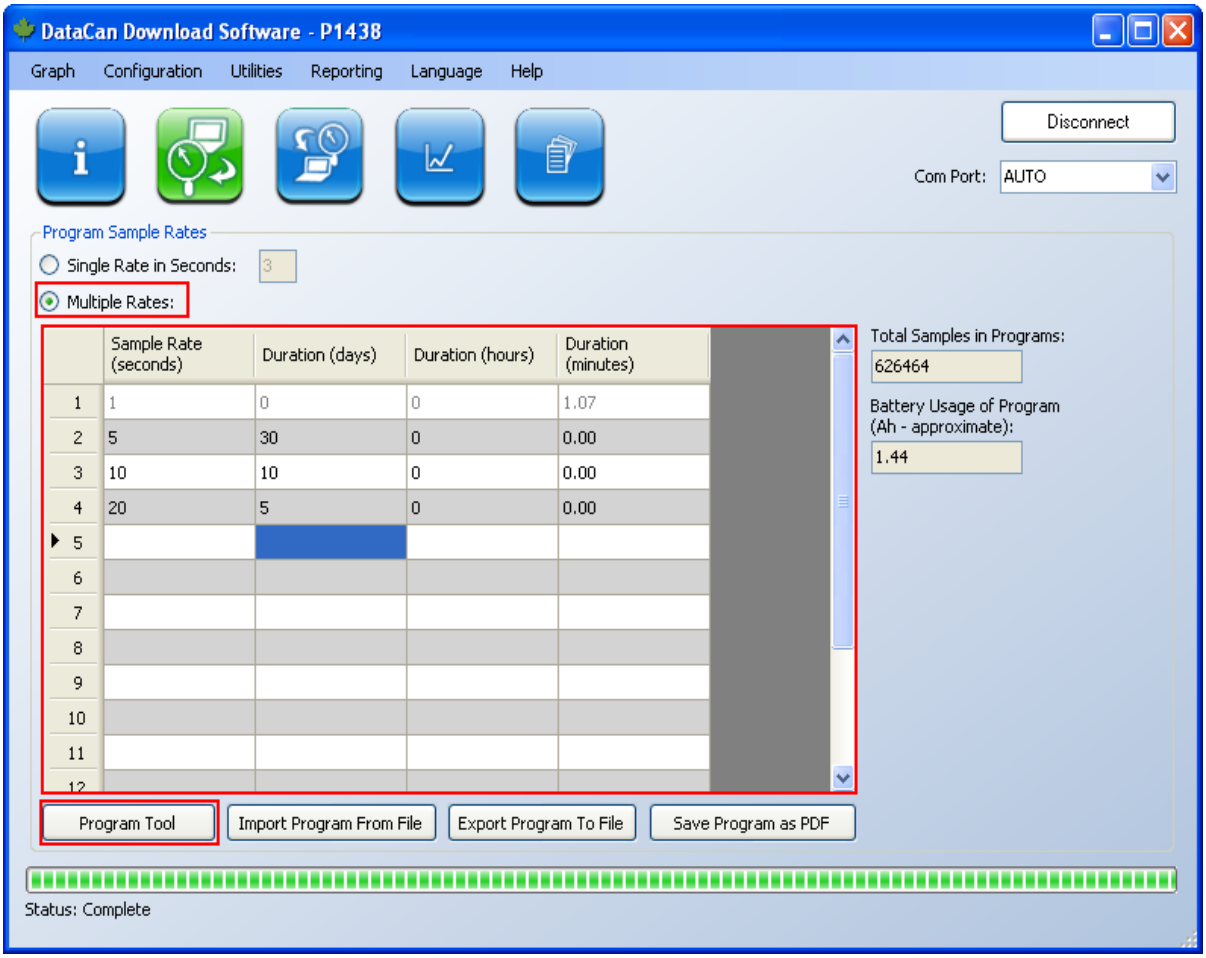
A DataCan Gauge Program Sheet will pop up which shows the details of the program entered into the tool memory. You can either choose to discard the sheet or save it to the PC as a pdf file. If you choose to save the sheet enter your name in the blank field provided and press the **Save** button. This creates a record of the tool program that can be referred to when the tool is in operation.



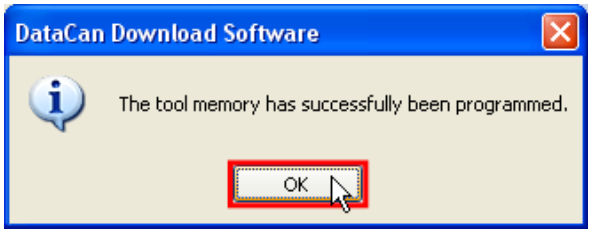
7.2 Multiple Sample Rate Program

To create a program using multiple sample rates select the **Multiple Rates** radio button under the **Program Sample Rates** heading. Enter the desired sample rates and durations in the fields provided. Up to 16 steps can be entered in the program. When all the programs are completed the tool will default to 30-second sample rate and continue until the memory is full.

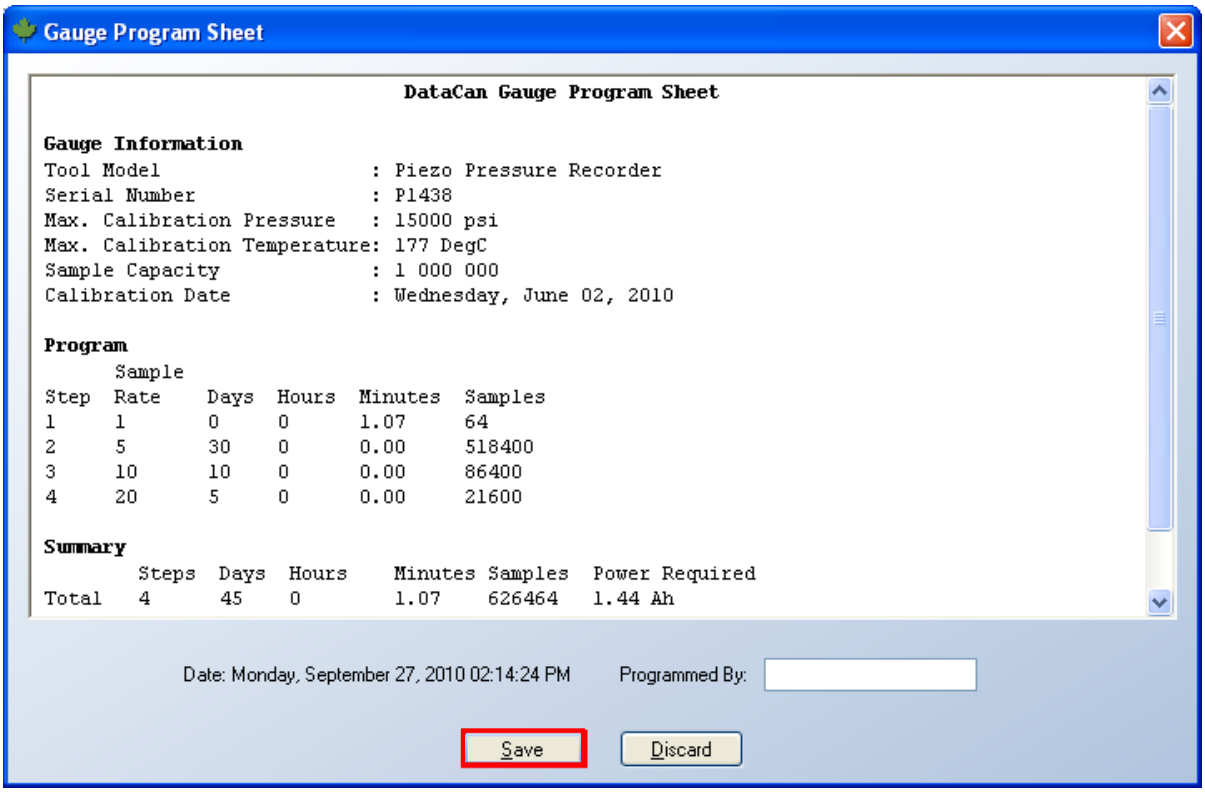
The **Total Samples in Program** and **Battery Usage of Program** will be calculated automatically. Click the **Program Tool** button to save the program to the tool memory.



When the programming is complete a pop up window will tell you the tool memory has been programmed successfully. Press **OK**.



A DataCan Gauge Program Sheet will pop up which shows the details of the program entered into the tool memory. You can either choose to discard the sheet or save it to the PC as a pdf file. If you choose to save the sheet enter your name in the blank field provided and press the **Save** button. This creates a record of the tool program that can be referred to when the tool is in operation. The sheet also shows the overrun time which is the time it takes to fill the tool memory after all the program steps have completed and the default sample rate of 30 seconds kicks in.

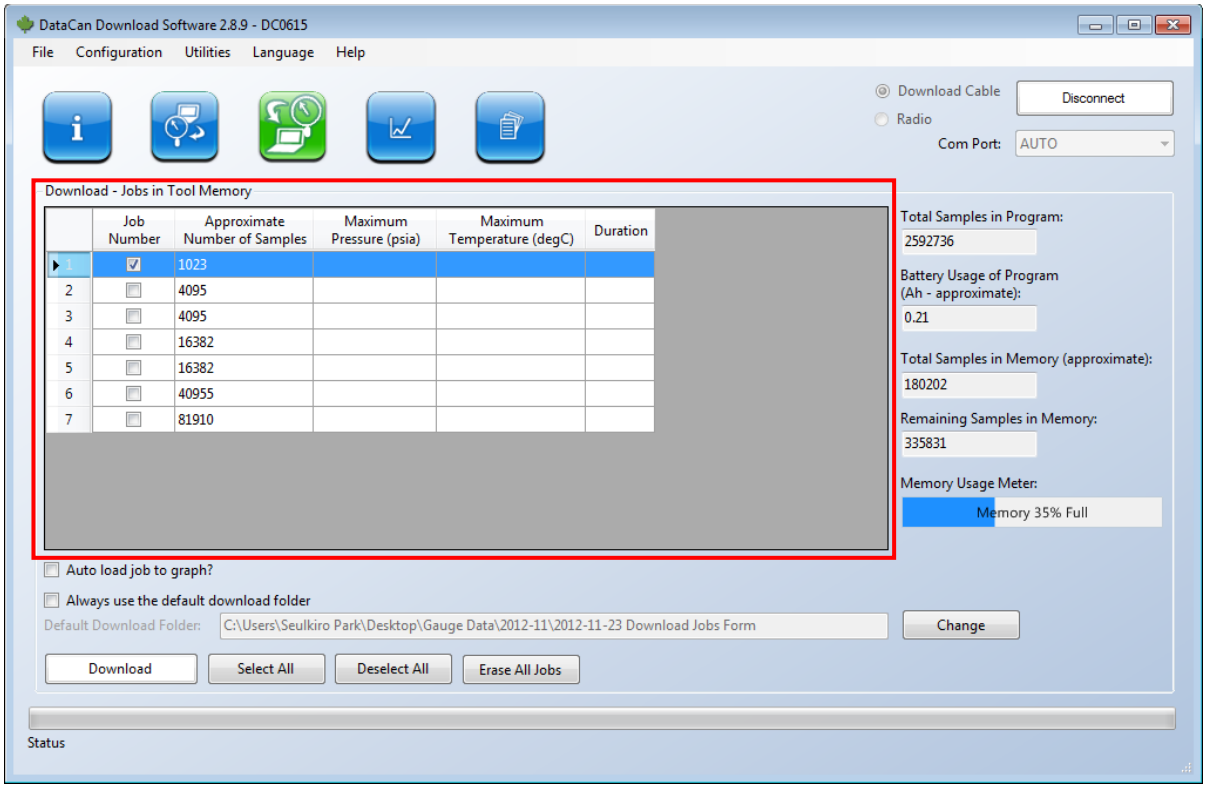


8 Downloading Data

8.1 Jobs in Tool Memory

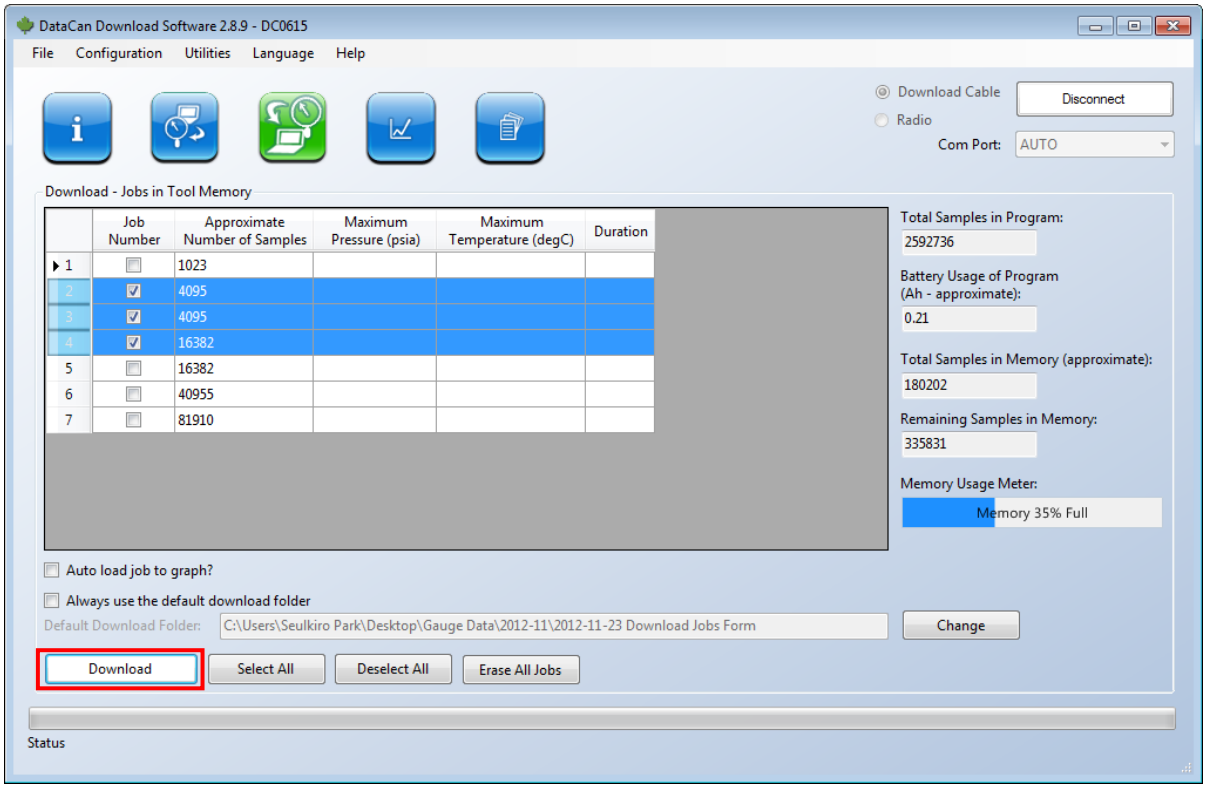
Enter the Download section by clicking on the following icon. Here you can view recorded jobs and download data.

The **Jobs in Tool Memory** section lists the jobs recorded in the tool memory when the tool is connected to the PC. Number of samples, maximum pressure, maximum temperature, and duration columns are updated once the data is downloaded from the tool.

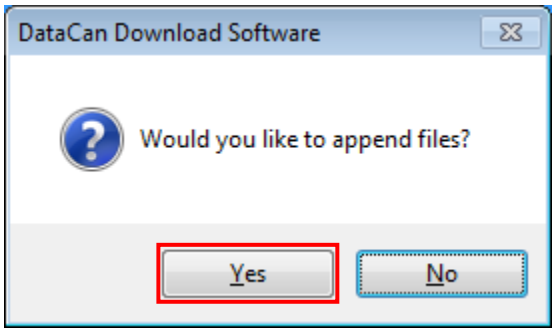


8.2 Download Data

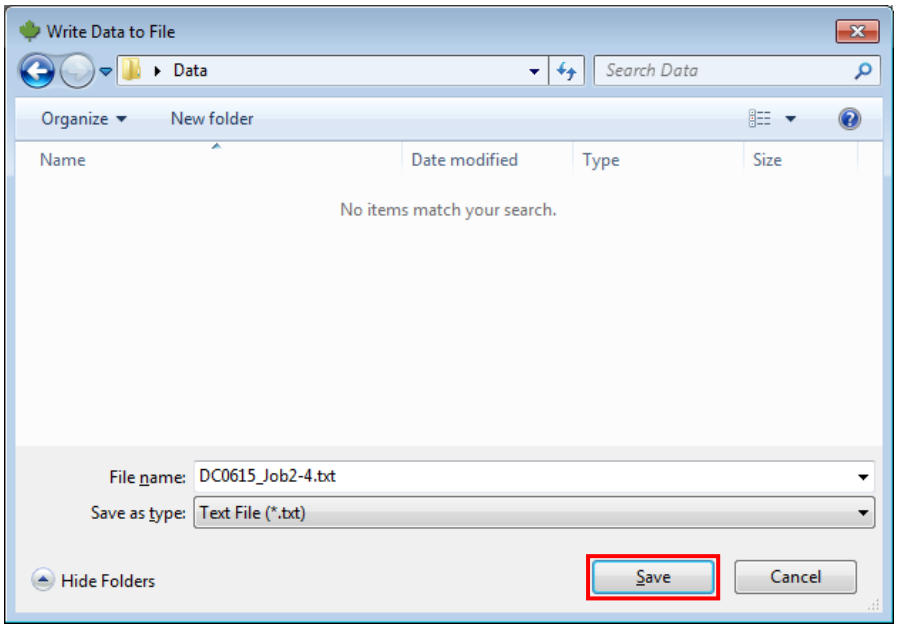
Select the check box next to the jobs that you want to download to your PC and click the **Download** button.



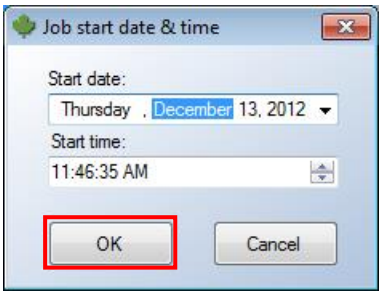
A pop up window will ask you if you want to append the files. If you click on the **Yes** button it will save the multiple jobs to the PC as a single file. If you click the **No** button it will save the jobs as individual files. Click **Yes**.



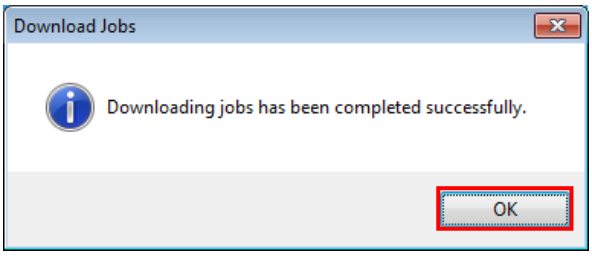
Select a location to save the data file from the tool. Press the **Save** button.



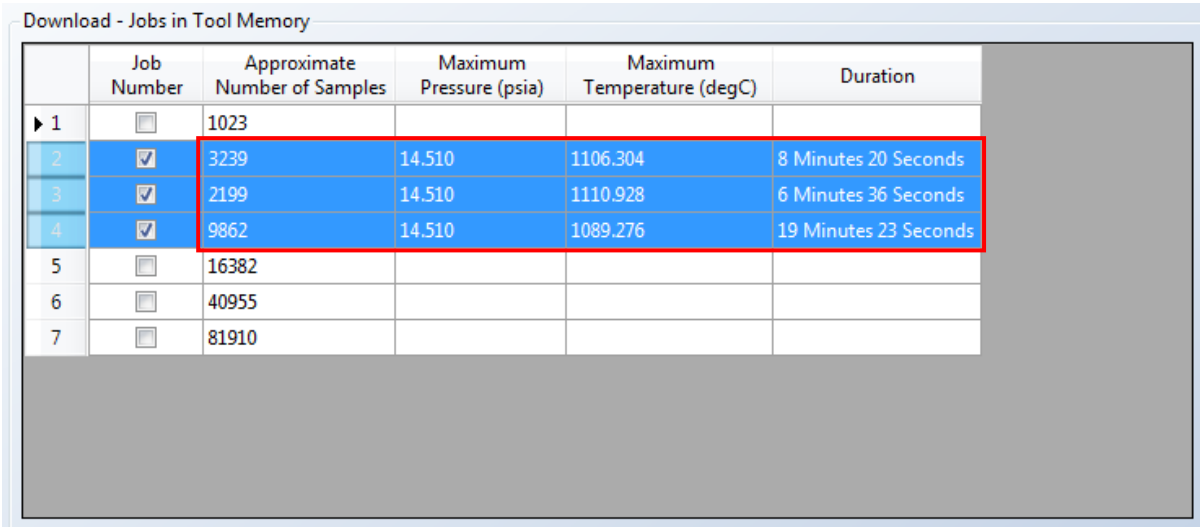
Select the start date and time that the tool battery was connected based on your records. Click **OK** to save the file.



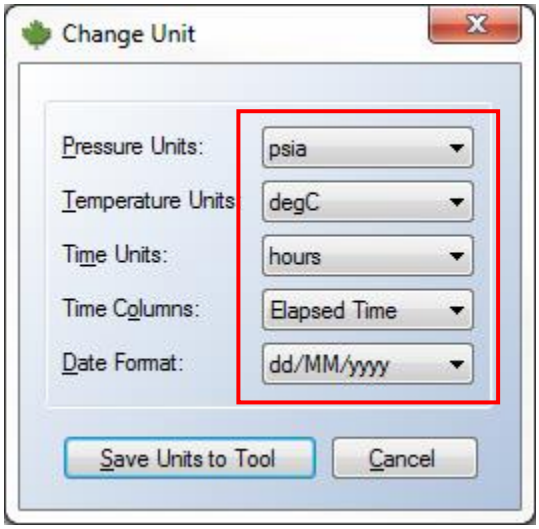
When the jobs are finished downloading a pop up window will tell you that the download was successful. Click **OK**.



Notice that number of samples, maximum pressure, maximum temperature, and duration columns are now updated after the data is downloaded from the tool.



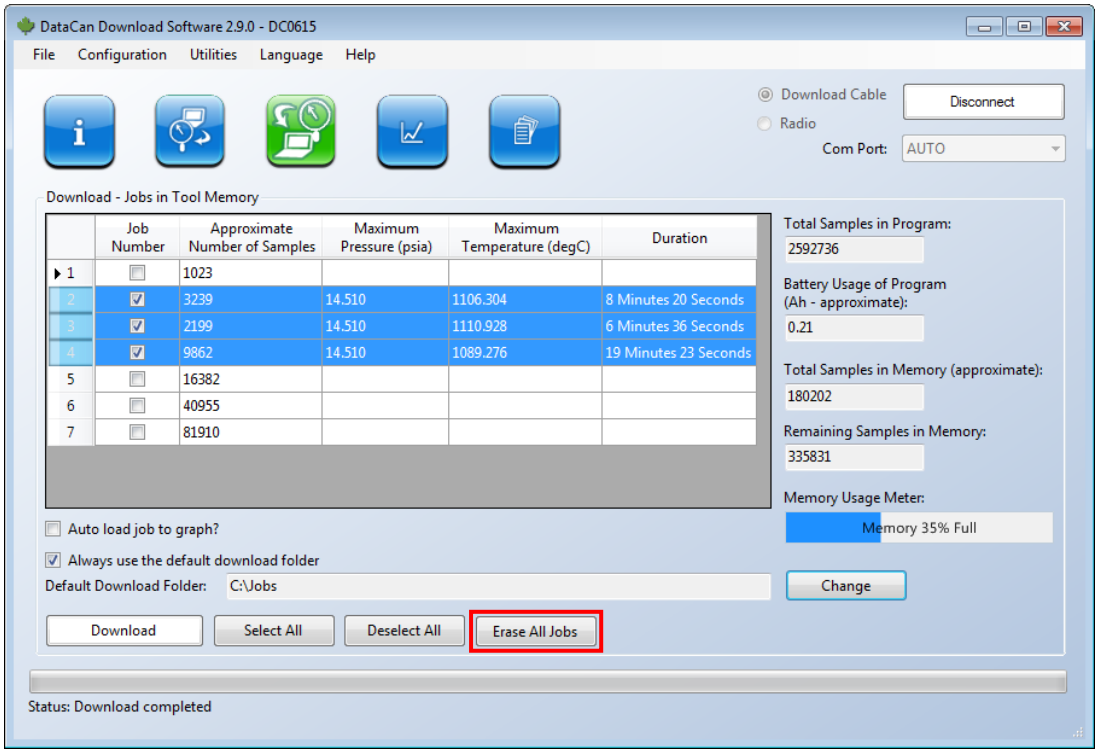
The software automatically converted the data file to a text (ASCII) file based on the settings (see Configuration section shown below) saved in the tool memory. To change Units, please refer to the Configuration Menu in Section 8.2.



8.3 Erase Jobs from Memory

When the data from the tool has been downloaded onto a PC you can erase the jobs contained within the tool memory. This frees up space in the tool memory for future jobs.

To erase the jobs from the memory, select the **Erase All Jobs** button.



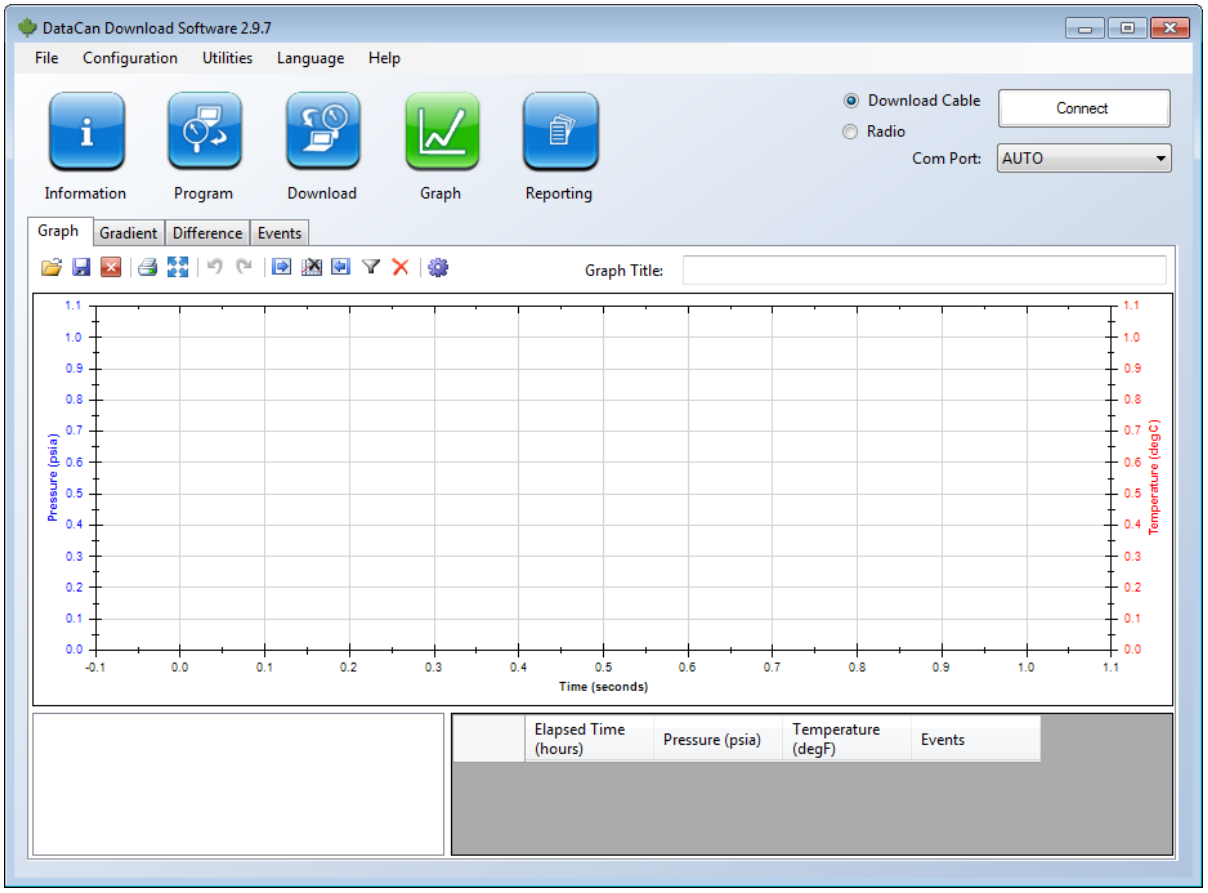
A window will appear that confirms you want to delete all of the jobs from the tool. Click **Yes** to proceed.

> You cannot erase individual jobs as this would result in fragmented memory. You must erase all jobs at once.

Do not disconnect until complete.

9 Graph

Enter the Graph section by clicking on the following button.



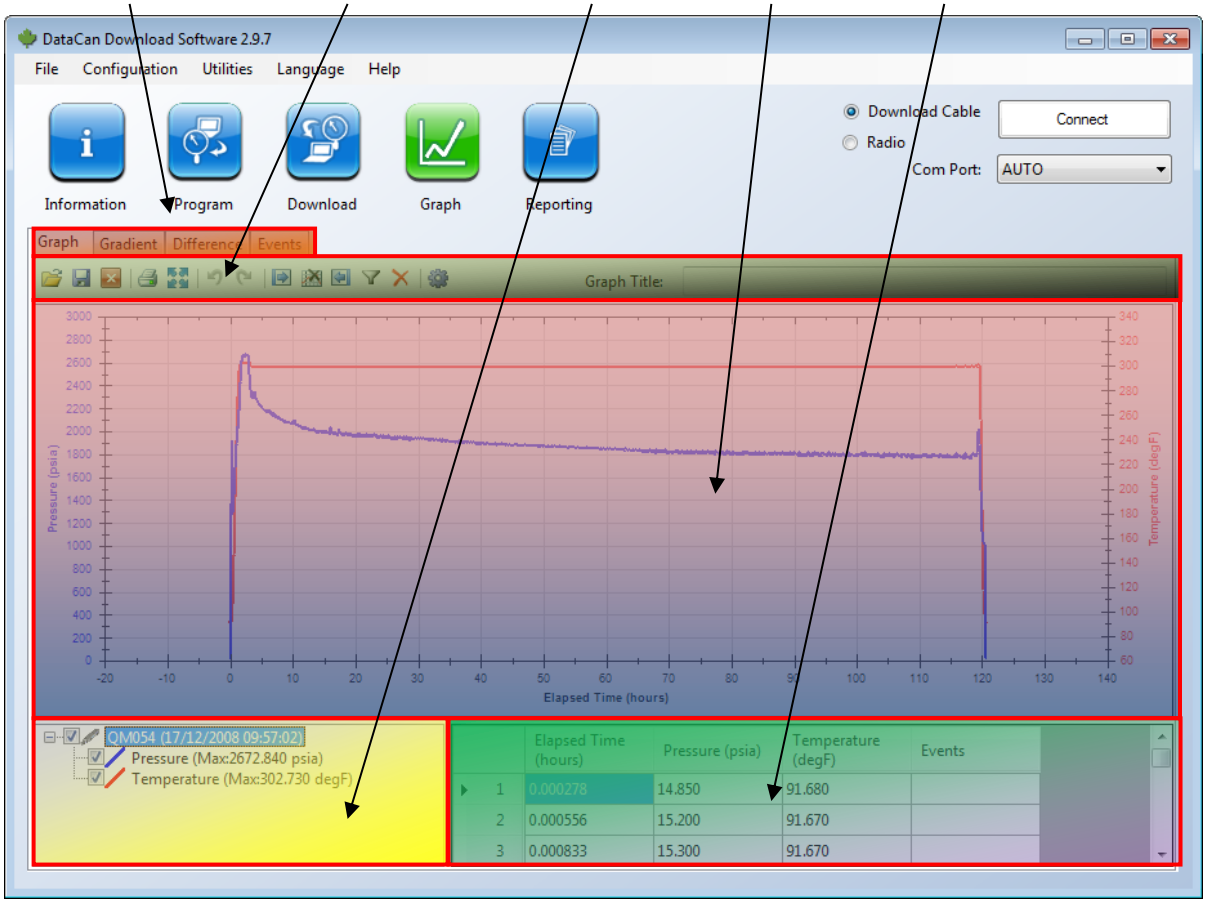
9.1 About the Graph

The graphing section is used to manipulate and present data in a graphical format. Here you can:

- Delete portions of the data to remove the beginning and end portions of a job that are not useful.
- Filter the data to reduce the file size.
- View multiple data sets at one time.
- View a difference plot to see if two gauges are tracking each other.
- Zoom in and out of the graph to look at pressure, temperature, acceleration, or other data variances.
- Modify the data to adjust for gauge annomolies.
- Change the start time to align multiple data sets.
- Create a gradient plot and make annotations for a report.

There are 5 main areas of the graphing screen:

1) The view tabs 2) The action buttons 3) The legend 4) The graph 5) The data table.



At any time, you can move your mouse to one of the section boards and adjust the size of each section.

The view tabs allow you to move from the main data graph to the gradient table and gradient graph and to the difference graph.

The action buttons on the top side perform a variety of useful functions. You can select large portions of data to delete or filter. You can move to full screen mode, undo changes you make, and save the data file. Each action button is described as follows:


Open


Save As


Close All Graphs


Quick Print


Full Screen Mode


Undo


Redo


Left Boundary


Reset Lines


Right Boundary


Filter


Delete


Units / Settings

The legend is important when graphing multiple plots of data. You can select which data sets to view, you can change the color and size of the respective data curves, and you can adjust the start dates for each data set.

The graphing section displays a graph of the data. The blue curve is defaulted to the pressure data, the red curve is defaulted to temperature data. The pressure scale is automatically generated on the left and the temperature scale is automatically generated on the right. The bottom of the graph shows the time as it was recorded in the data file. A right click of the mouse button over the graph pops up another menu of actions for the user to perform.

The data table at the bottom right side of the graph screen shows a table from the active data file.

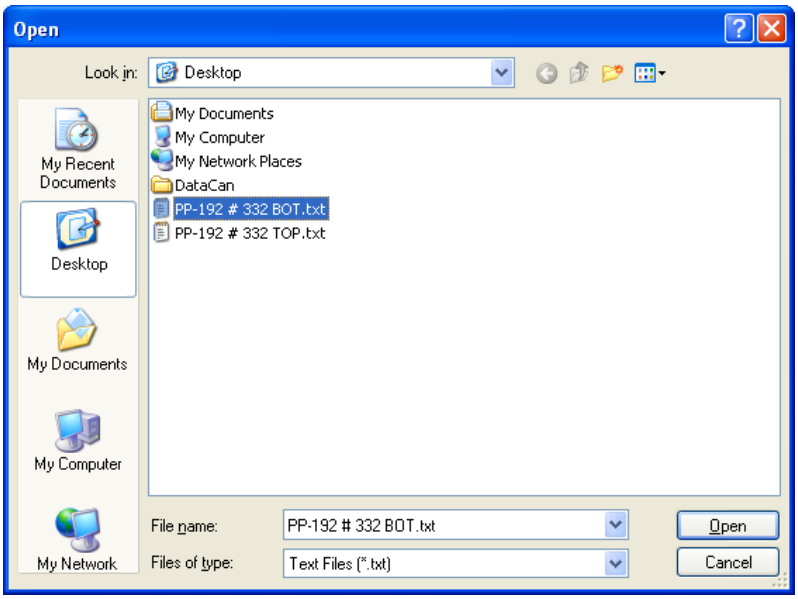
9.2 Open Graph from Data File

There are two ways that you can load a data set into the graph. First, you can load a graph from a data file located on your computer. Second, you can automatically load the data that you downloaded from your gauge.

You may create a graph from any file that you have downloaded and saved to your computer as previously outlined in downloading section of this manual.

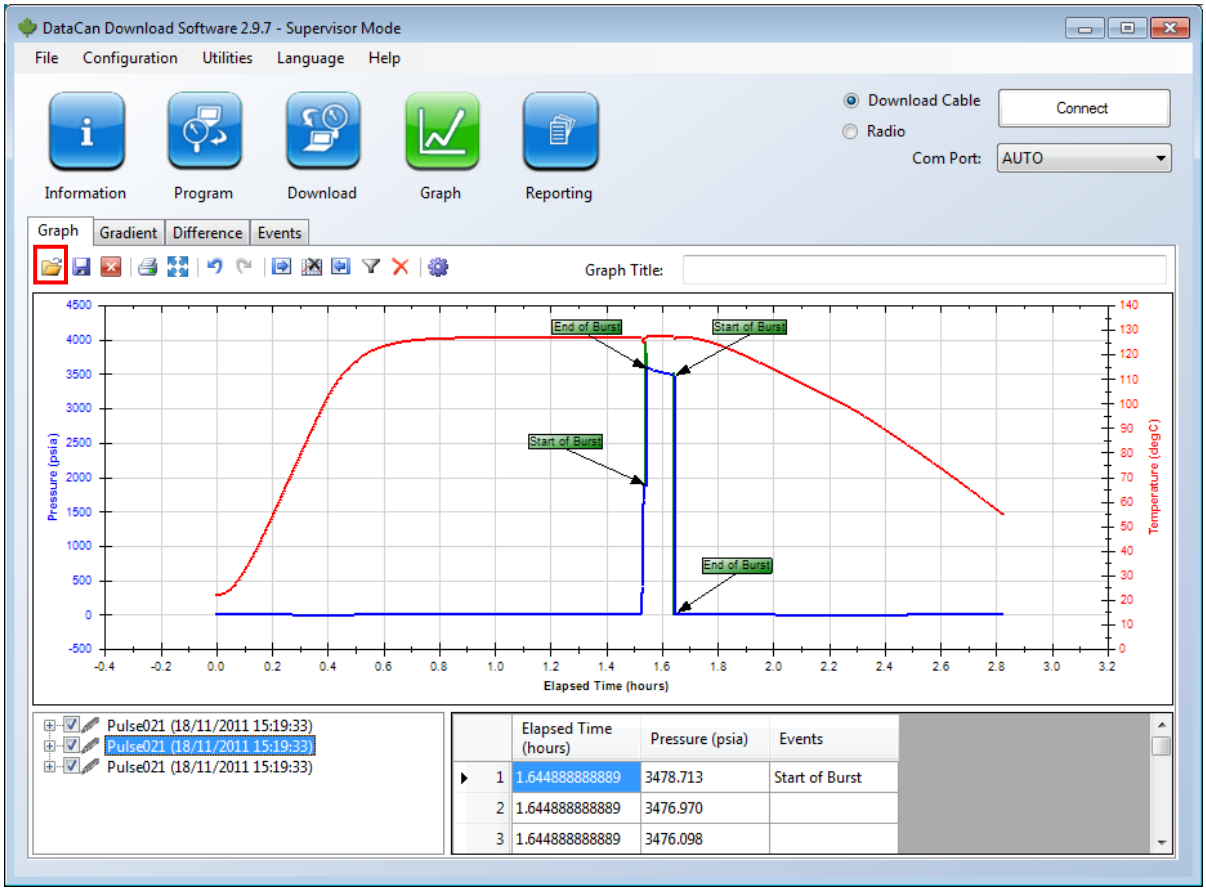
Click on the **Graph** button and go to **File >Open**

This brings up the browse window. Select the file you want to graph and click **Open**



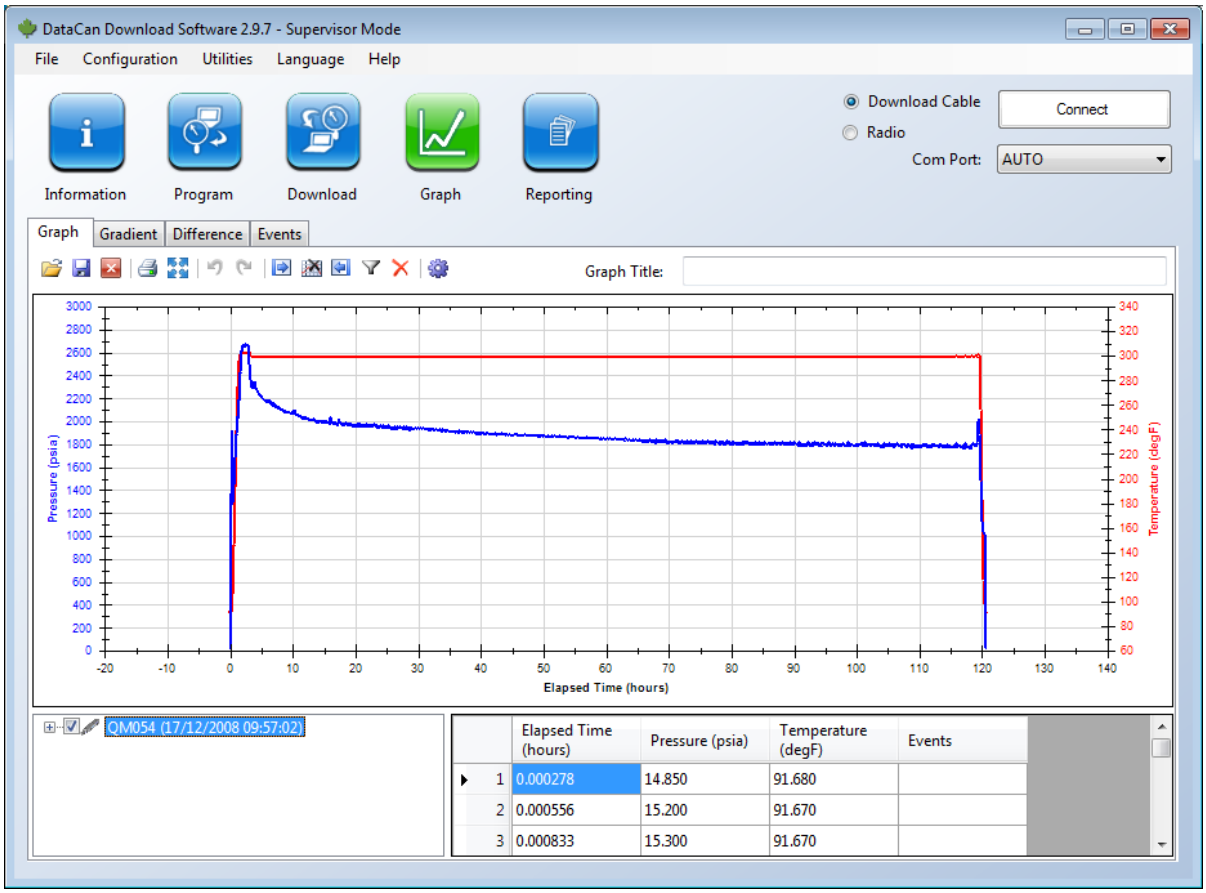
9.2.1 Open Graph From Data File – Quick Button

The second way to open a graph is by using the Quick Button  on the top of the graph as highlighted in the image below.



9.2.2 Open Graph From Data File – Drag and Drop

The third way to open a graph is to open the folder containing your text file in Windows Explorer. Drag the file from Windows Explorer into the graph screen in the DataCan Download Software.



To add another data file to the graph, repeat the above process. You can add up to 4 different data sets.

9.3 Append Data

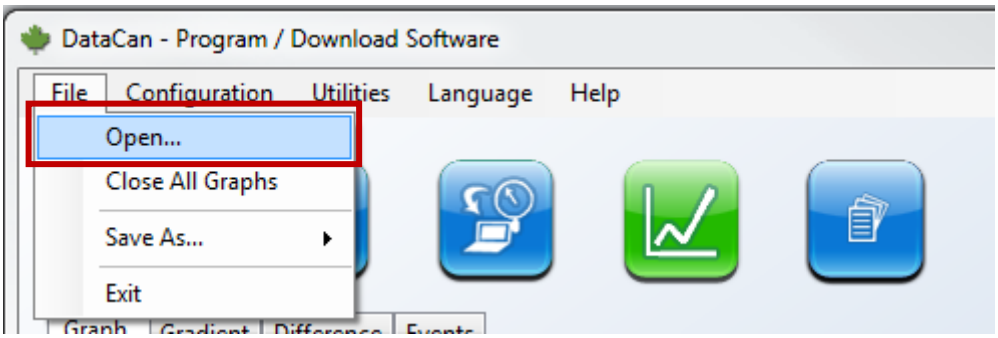
Two or more data files can be placed one after the other by using the append feature. This occurs when more than one data file are opened with the same gauge serial number(s).

There are two options when appending data:

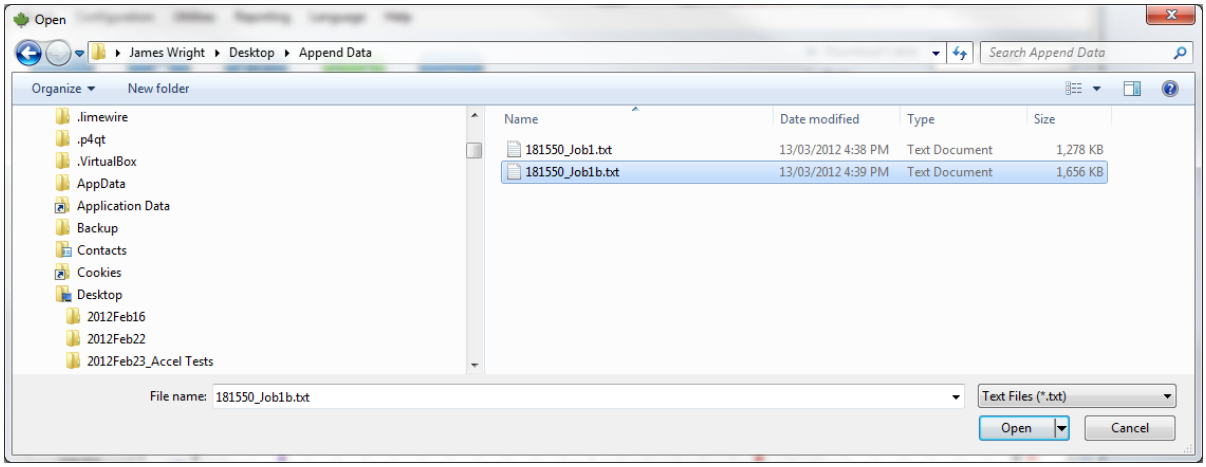
1) **Concurrent Time** – This feature ignores the start time of the appended data. Instead the first data set of appended files is started immediately following the last data set in the first file.
2) **Keep Start Times** – All data from each data set retains its original time stamp. If there is a large time gap between the two (or more) data sets, the gap will still remain in the data.

9.3.1 Concurrent Time

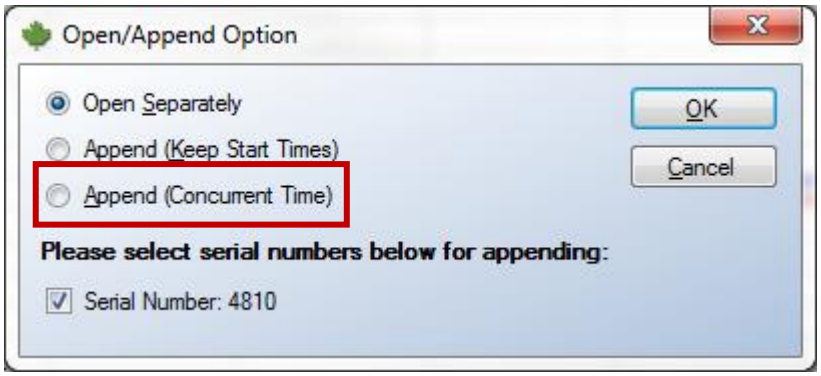
In the menu, select “File -> Open”. You can either select multiple files with the same serial number or you can repeat the “File -> Open” process to open a second file with the same serial number.



Select the file you would like to append and click the “Open” button.

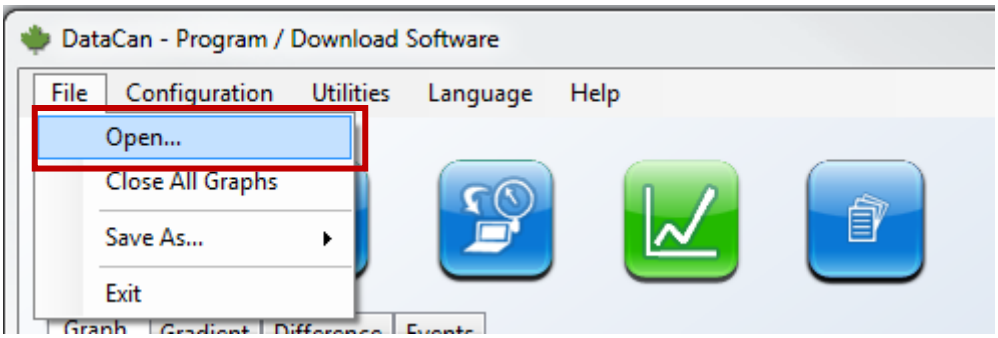


A new dialog pops up. Click “Append (Concurrent Time)” and click the “OK” button.

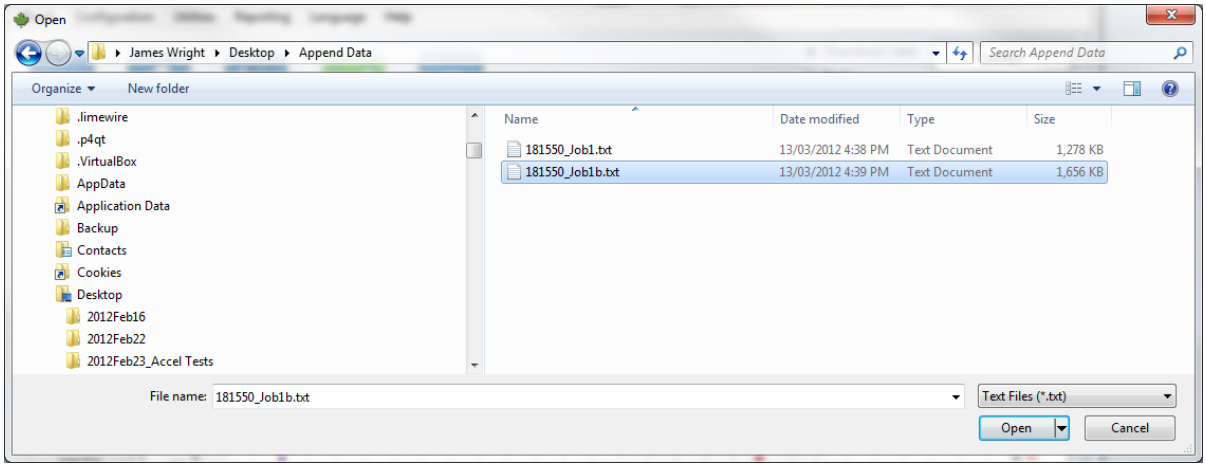


9.3.2 Keep Start Times

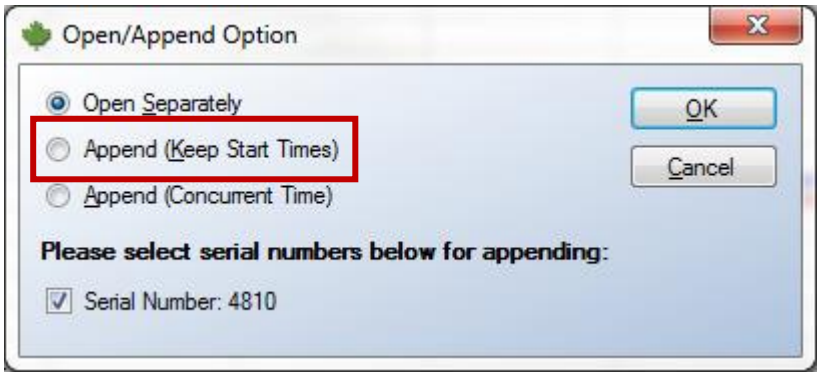
In the menu, select “File -> Open”. You can either select multiple files with the same serial number or you can repeat the “File -> Open” process to open a second file with the same serial number.



Select the file you would like to append and click the “Open” button.

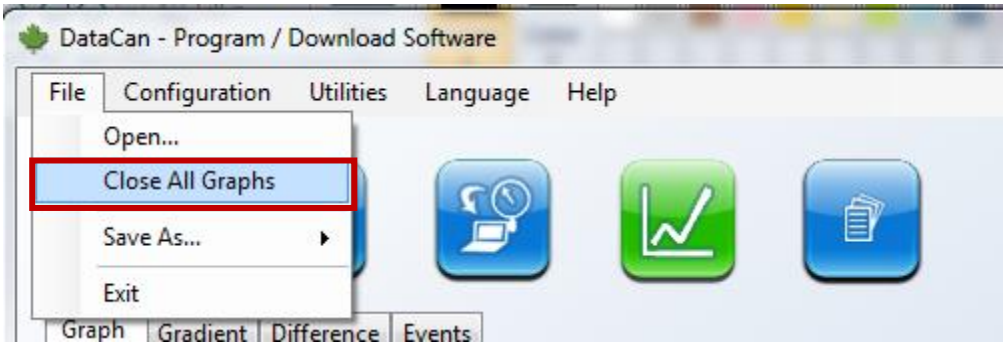


A new dialog pops up. Click “Append (Keep Start Time)” and click the “OK” button.



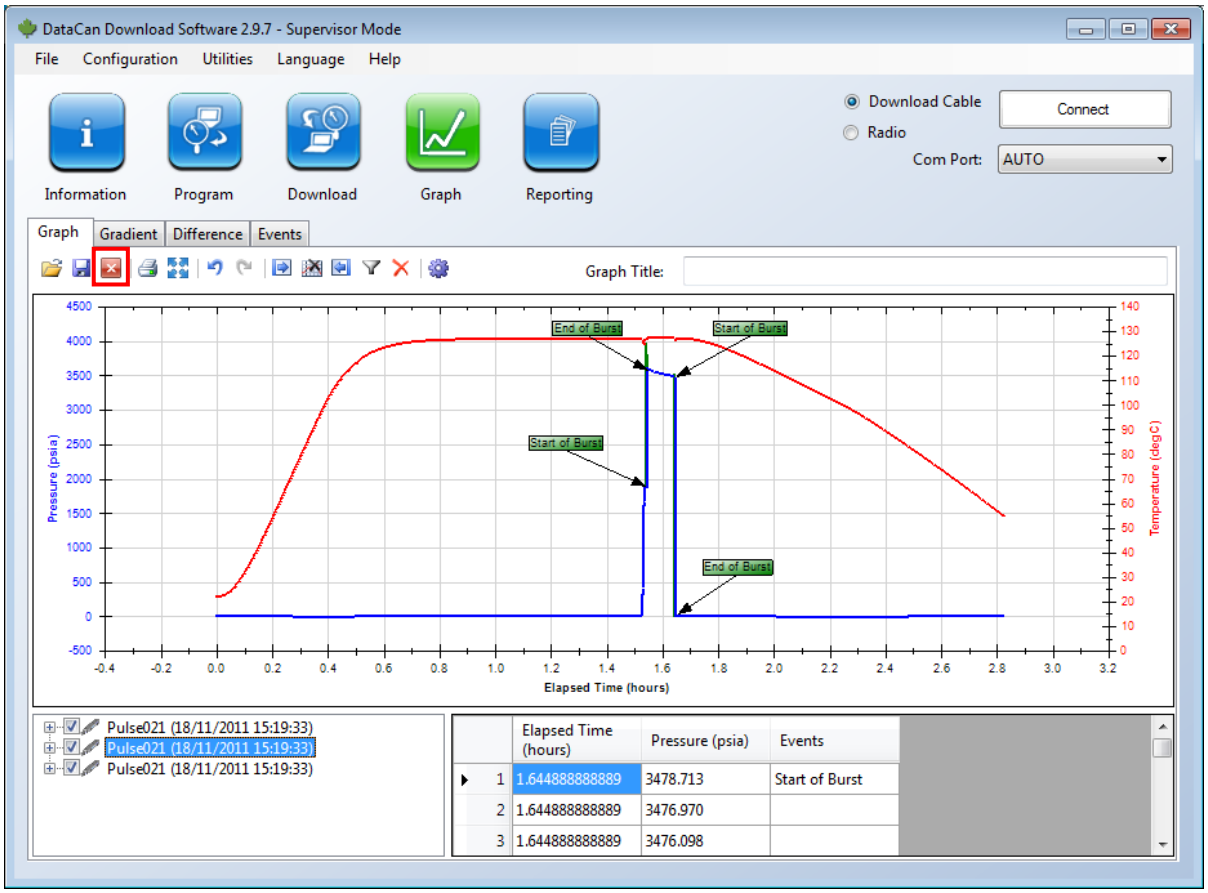
9.4 Close All Graphs

To close the graphs that you have opened press **File** and go to **Close All Graphs.**



9.4.1 Close All Graphs – Quick Button

Alternatively, you can close all graphs by using the Quick Button  located on the top side of the graph screen.



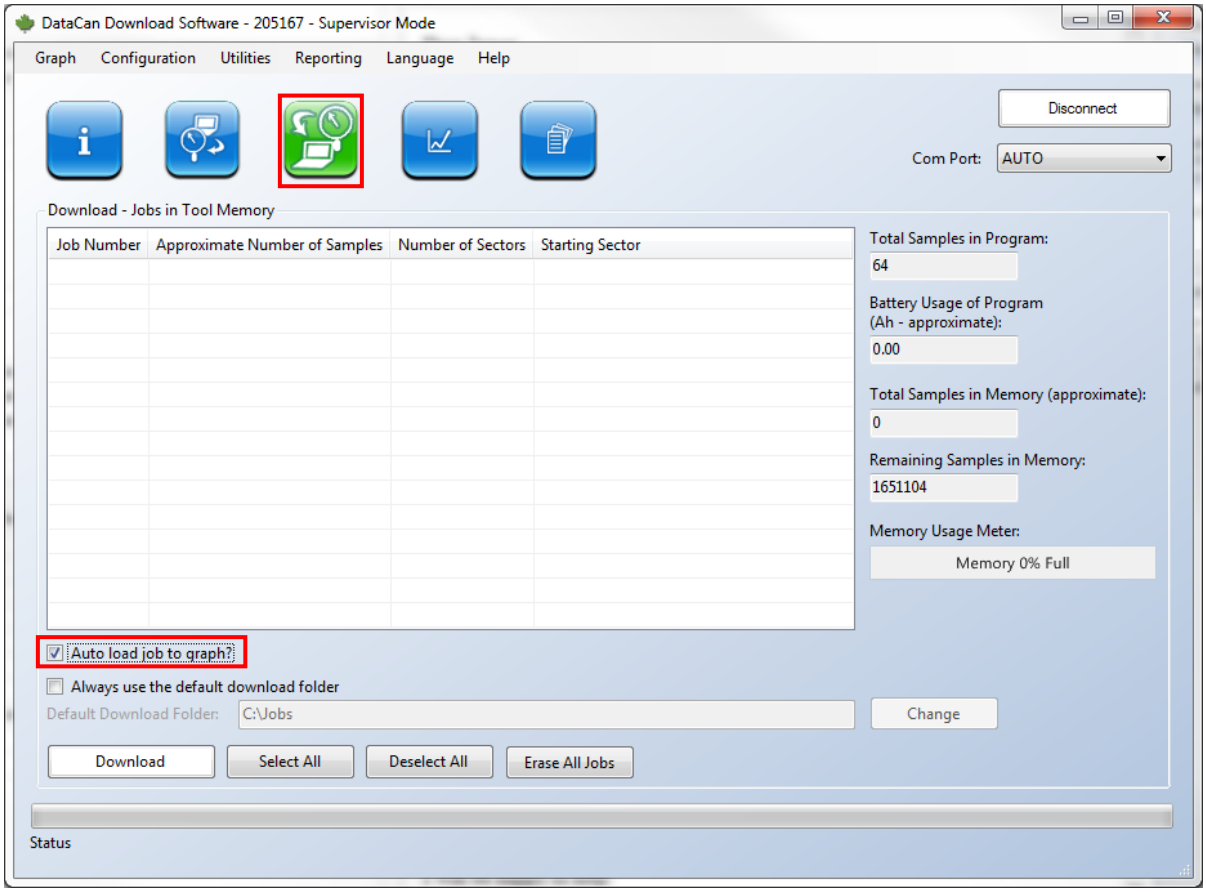
9.5 Open Graph Automatically

A graph can automatically be created when the data is downloaded from the tool onto your computer by using the Autograph feature.

By default, the autograph feature is turned off. The reason is that it takes more of your computer processing power to download the data and plot the data at the same time. In most cases, customers download data and then create the graph or report at a different time.

If multiple jobs are downloaded simultaneously only the last job selected In Tool Memory list will be graphed.

This feature is enabled in the “Download” section of the software.

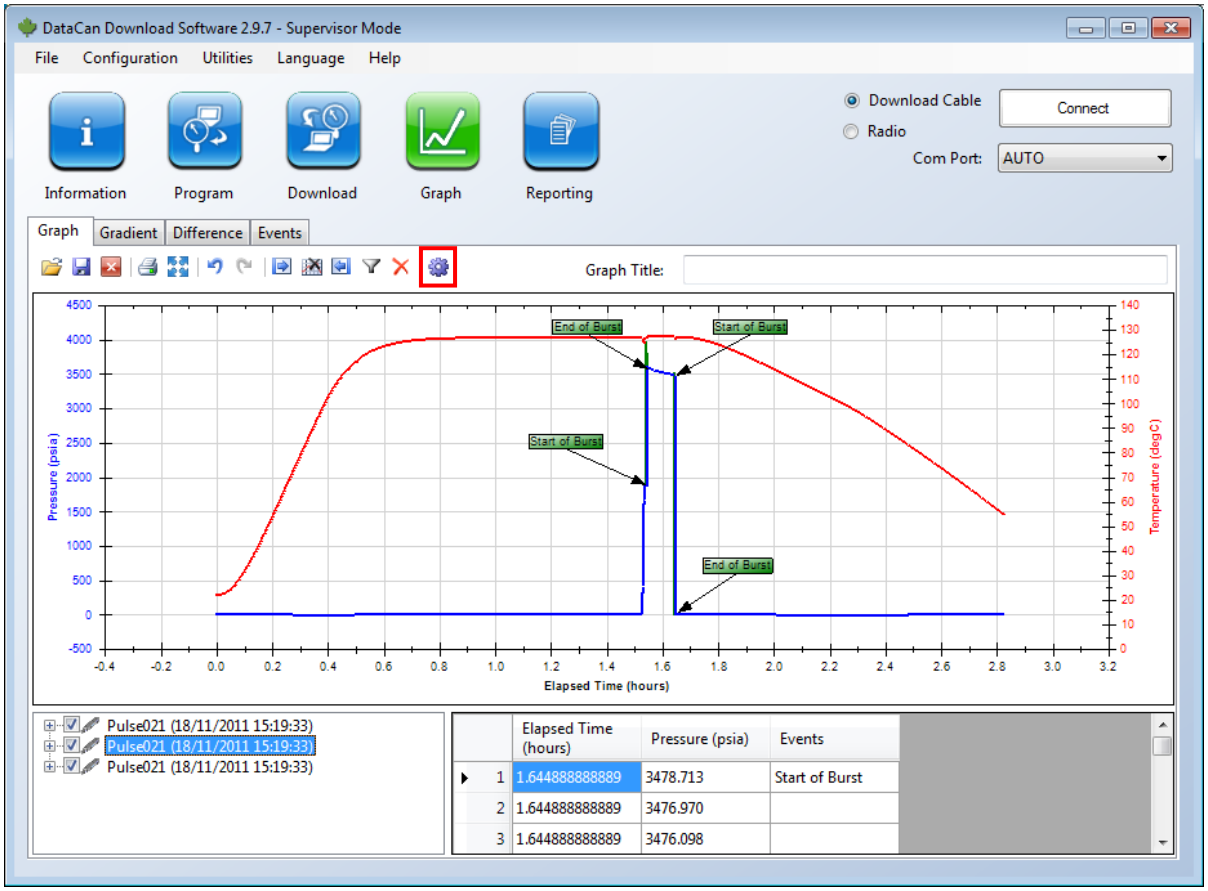


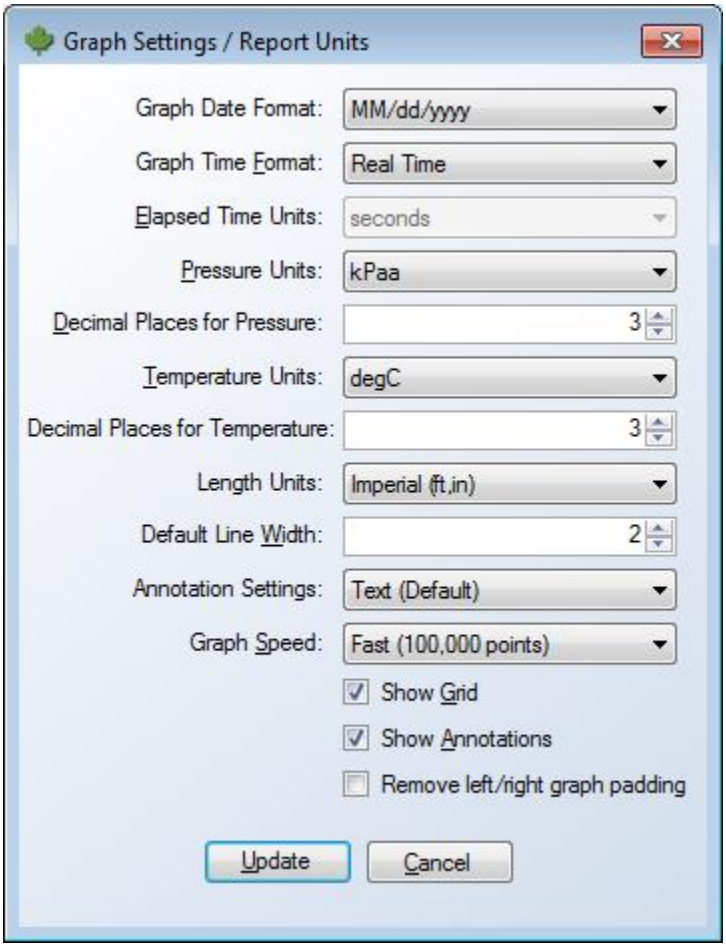
Activate the Autograph feature by selecting the check box beside **Auto load job to graph?**

Once the “Auto load job to graph” option is activated, then the downloaded jobs will automatically appear in the graph screen after the data is downloaded from the tool.

9.6 Graph Setup

The graph setup allows you to change the graph units, change data grid and annotations visibility settings. Enter graph setup by clicking the Quick Button located on the top side of the graph screen as highlighted in the image below.





Change the available options to what suits your jobs needs and click the Update button at the bottom of the tab.

9.6.1 Graph Time Format

This option will change both how the graph is displayed as well as the time and date columns stored in the data file.

Real Time – The graph axis and data file show a calendar date and clock time.

Elapsed Time – The graph axis and data file show the elapsed time, or the time starting when the battery was plugged in (time zero).

Both – Date, Real Time and Elapsed Time columns are stored in the data file. The graph time axis is in Real Time.

9.6.2 Elapsed Time Units

This can be in either: seconds, minutes, hours or days.

9.6.3 Pressure Units and Temperature Units

Change to the desired unit of measurement for pressure or temperature.

9.6.4 Decimal Places for Pressure

The number of digitals after the decimal place can be changed for pressure.

9.6.5 Length Units

This changes the units used for the depth when using gradient points.

9.6.6 Default Line Width

The user can change how thick each plotted line appears.

9.6.7 Annotation Settings

This option will change how graph annotations are displayed.
Text (Default) – Event text will be shown in the annotation.
Numeric Annotations – A number representing the order in which the point appears in the graph. Displaying a number instead of text can minimize the chance of the text overlapping on the graph. The number displayed for each annotation / gradient is the same as the index used in the Events Table.
Time/Press/Temp/Text – The event annotation will include the Time, Pressure, and Temperature of the data for the corresponding event, followed by the event text.

Gradients annotations will always contain Depth, Pressure, and Temperature, except when shown as numeric annotations.

9.6.8 Graph Speed

When trying to graph large data sets on slower computers it is best to change the “Graph Speed” setting to “Fast”. This draws a maximum of 100000 points for every data set in the graph. If any important data does not show up on the graph because of the filtering, change this graph setting to “Show All Points”.

9.6.9 Show Grid

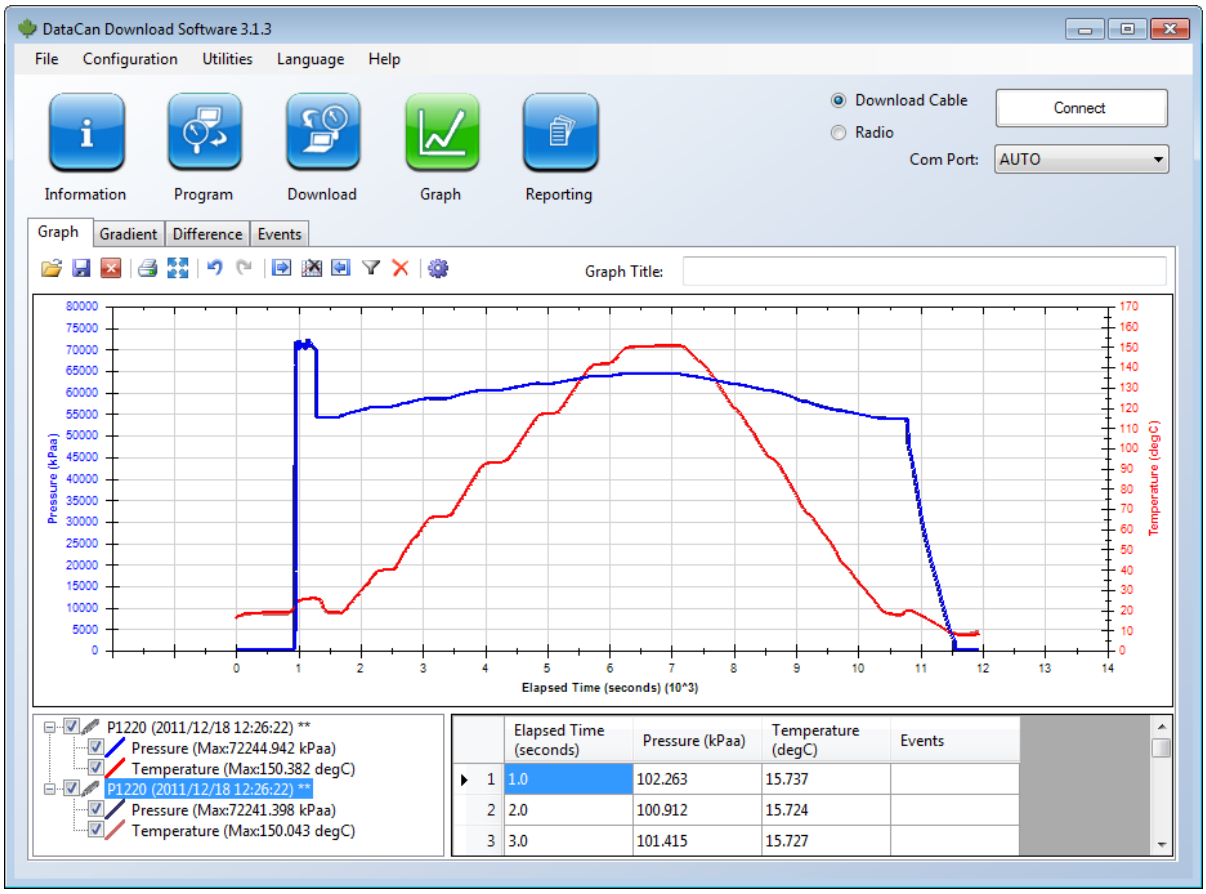
The legend and data table at the bottom of the graph screen can be hidden by unchecking the **Show Grid** checkbox.

9.6.10 Show Annotations

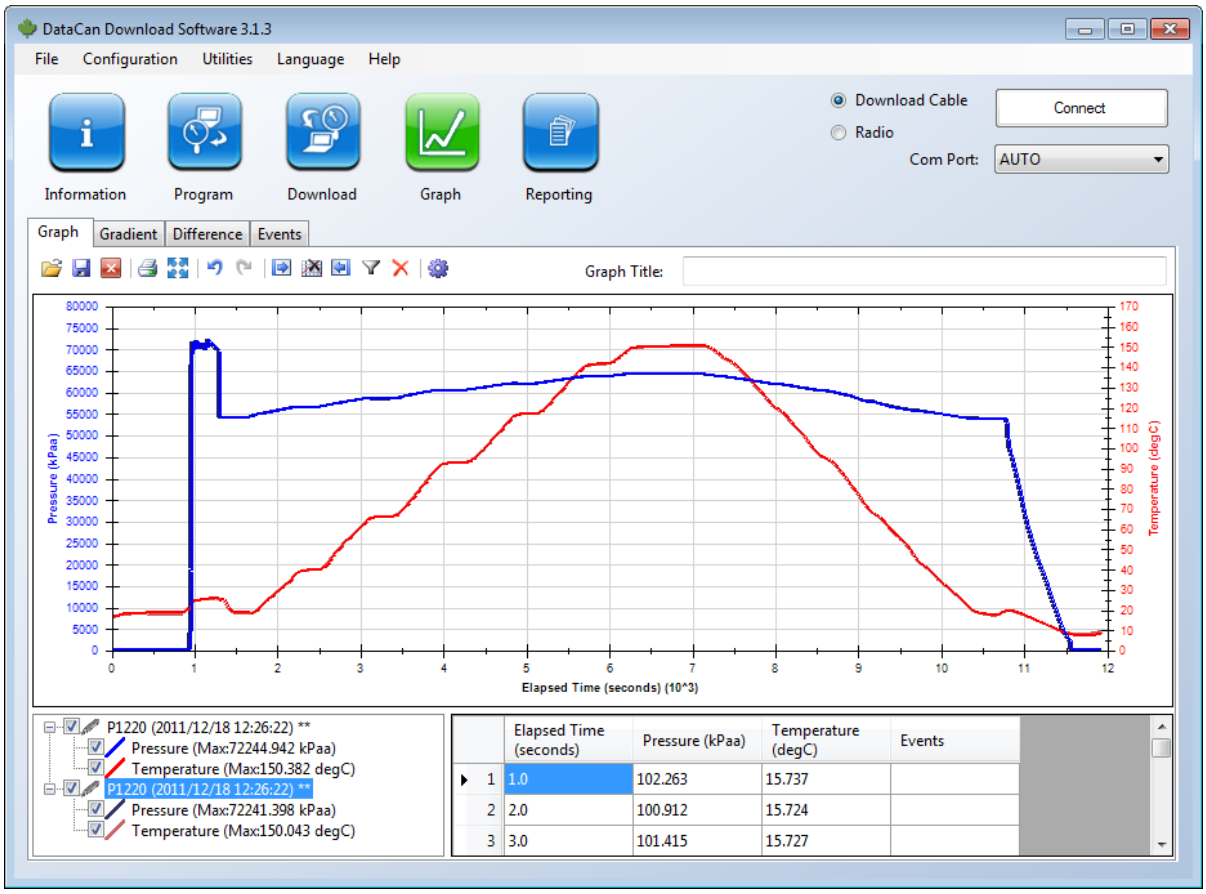
All the annotations and gradient point markers on the graph can be hidden by unchecking the **Show Annotations** checkbox.

9.6.11 Remove Left/Right Graph Padding

If the **Remove Left/Right Graph Padding** box is unchecked, the left and right padding will be added to the graph to center the graph. If checked, the padding will be removed.



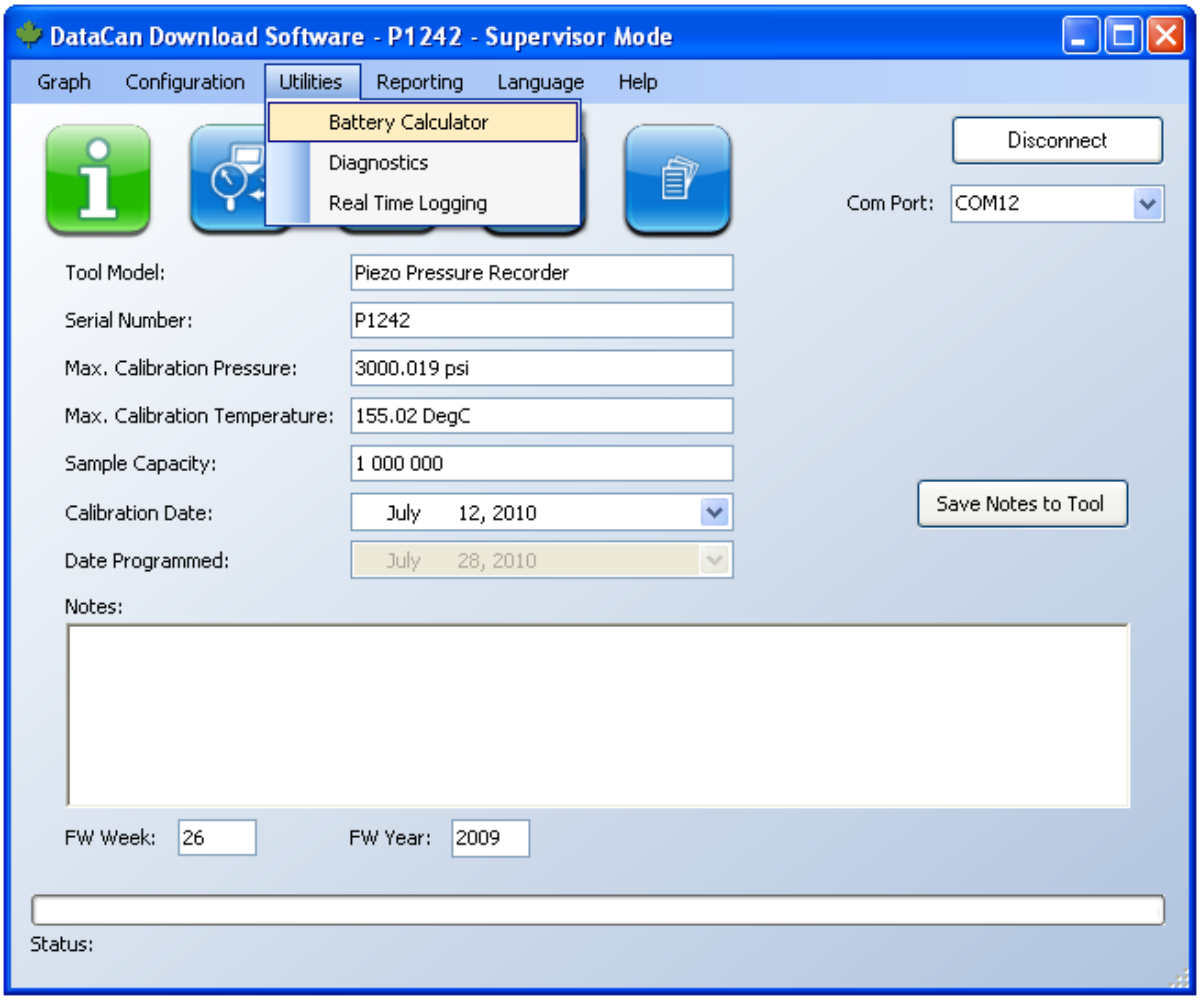
Graph with left/right padding.

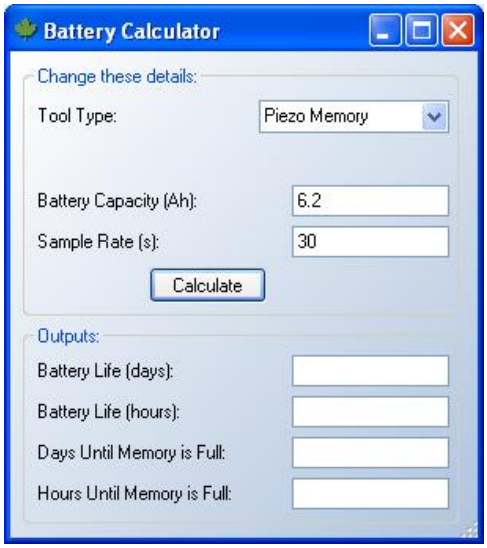


Graph without left/right padding.

10 Battery Calculator

The battery calculator can be used to determine the battery life in hours or days and the hours or days until the tool memory is full. It is found under the **Utilities** tab.





The inputs required for the battery calculator are the tool type, the battery capacity, and the sample rate being used. The battery capacity for the logger is 18Ah.

Once the information is input press the **Calculate** button and the results will be shown in the bottom half.