ELECTRONICS & DEFENSE

STIM202

Evaluation kit
User Manual

Table of contents:

1 General descriptions

The STIM202 evaluation kits provide measurement and configuration access to STIM202 multi-axis gyro modules. Gyro module configuration, graphical result presentation and save data to file functions are supported. The single voltage supply required for operation is provided from any PC or laptop USB port.

Two alternative evaluation kits are available, for either PCI or USB connectivity.

1. **STIM202 EVK PCI**
   The evaluation kit with PCI connectivity is the recommended solution for thorough characterization. The kit is in the following referred to as "*the PCI kit*"

Figure 1: STIM202 EVK PCI

2. **STIM202 EVK USB**
   The evaluation kit with USB connectivity provides the alternative solution, e.g. for smaller, portable laptop setups, and is an excellent choice for gyro module configuration and shorter measurement series. The kit is in the following referred to as "*the USB kit*"

Figure 2: STIM202 EVK USB

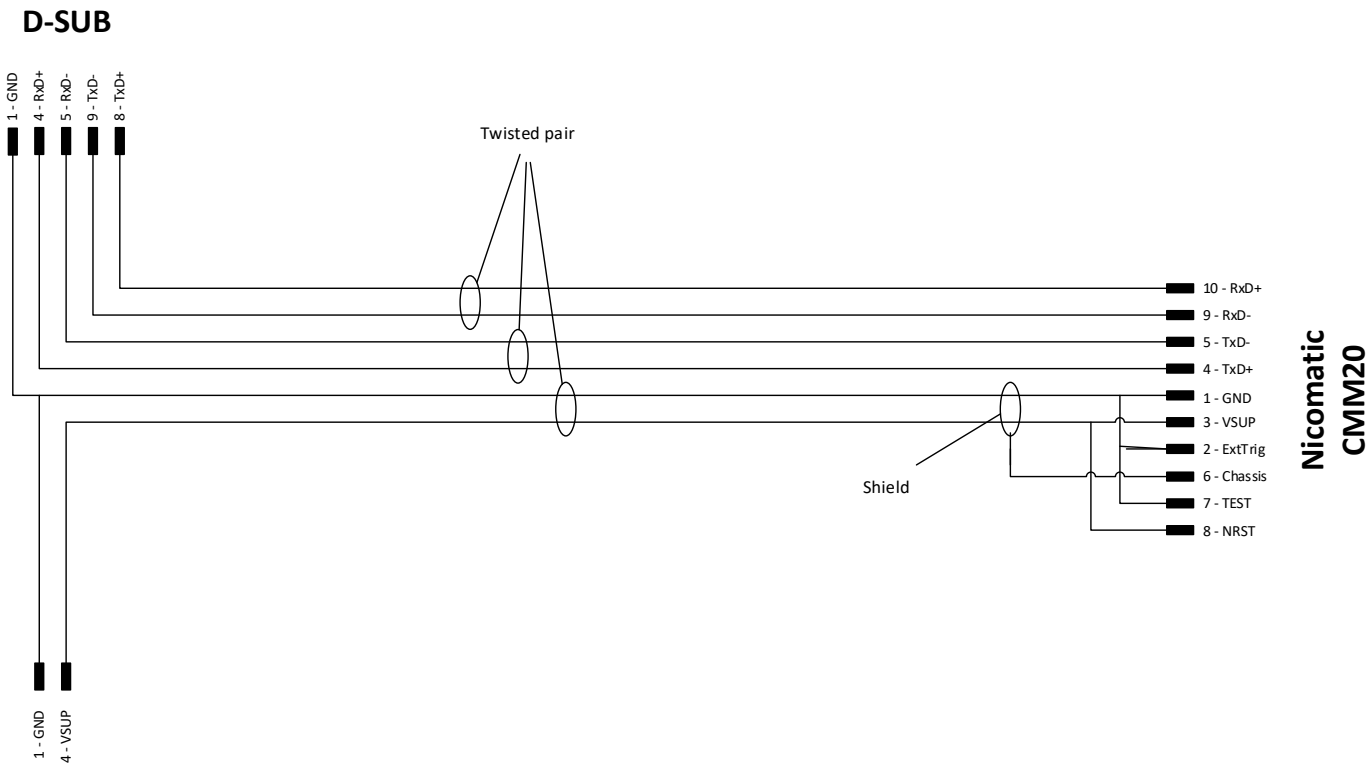

Figure 3: STIM202 EVK Wiring diagram

Note that the evaluation kits does not include the gyro module.

2 Kit contents

- *STIM202 communication and power cable*
- Either of the two options for interface hardware;
  - *PCI to RS422 interface card, "the PCI card",* for the PCI kit, supporting all gyro module transmission

bit rates (377400, 460800 and 921600 bits/s)
    - *USB to RS422 interface cable, "the USB cable",* for the USB kit, supporting only the default gyro module transmission bit rate (460800 bits/s)
- Memory stick with PC software and User manual
- Torx screw driver for fixing connector of communication and power cable to gyro module
- Hard copy of User manual

3 Kit Features

- PCI or USB connectivity to PCs/ laptops
- Up to 1000Hz sampling rate
- Temperature measurements
- Service mode access
    - Full gyro module information
    - Full gyro module configuration capability
    - Detailed gyro module diagnostics
    - Help section
- Measure panel
    - Data presentations and save data to file capability
    - Custom scale and zoom functions
    - CRC check
- Logging panel
    - Support for any measurement duration (only limited by HD memory and processor capacity of PC)
    - Various stop criteria for measurement series (Manually, No of samples or Time elapsed)
- Measurements on 2 gyro modules simultaneously supported (requires either one or two additional cables depending on the kit in use)

4 Configurable and readable parameters

In addition to measurements, the evaluation kits provide access to the following gyro module user configurable parameters:

- Output format (angular rate, increment angle, etc.)
- Datagram format (standard, extended, etc.)
- Sampling rate (125 samples/s, 250 samples/s, etc.)
- Bandwidth/ Low pass filter frequency (16Hz, 33Hz, etc.)
- RS422 transmission bit rate (374400 bits/s, 460800 bits/s, etc.)
- Number of stop bits in datagram (1 or 2 stop bits)
- Parity bit (no parity, odd parity, even parity)
- Line/ Datagram termination (on/off, None/ <CR><LF>)

The evaluation kits provide access to the following user readable gyro module parameters:

- Unit part number
- Serial number
- Firmware revision
- Hardware revision
- Guro module diagonistics

Gyro module diagnostic information includes RAM and flash checks, stack handling checks, status of internal voltage supply references, and various parameter reports for each measurement axis.

Note: External trigger functionality of STIM202 are not supported by the evaluation kits.

5 System requirements

- Windows XP SP2 (or later), Windows Vista, Windows 7 (32/ 64bit)
- 1 free USB port and 1 free PCI slot for the PCI kit
- 2 free USB ports for the USB kit
- Quad core processor recommended (when simultaneously logging data from two gyro modules)

6 Getting started

Two separate software installations are required:

- NI serial driver installation
- PC software installation

6.1 Installation of NI serial driver

Install the National Instruments (NI) serial driver from the CD-ROM included in the kit. This process is self-instructive. Follow the on-screen messages without doing any configuration changes.

Figure 4 and Figure 5 show two of the messages that appear during serial driver installation.

The NI serial driver can also be found from the STIM202 product support site. Use this site to regularly check for updates.

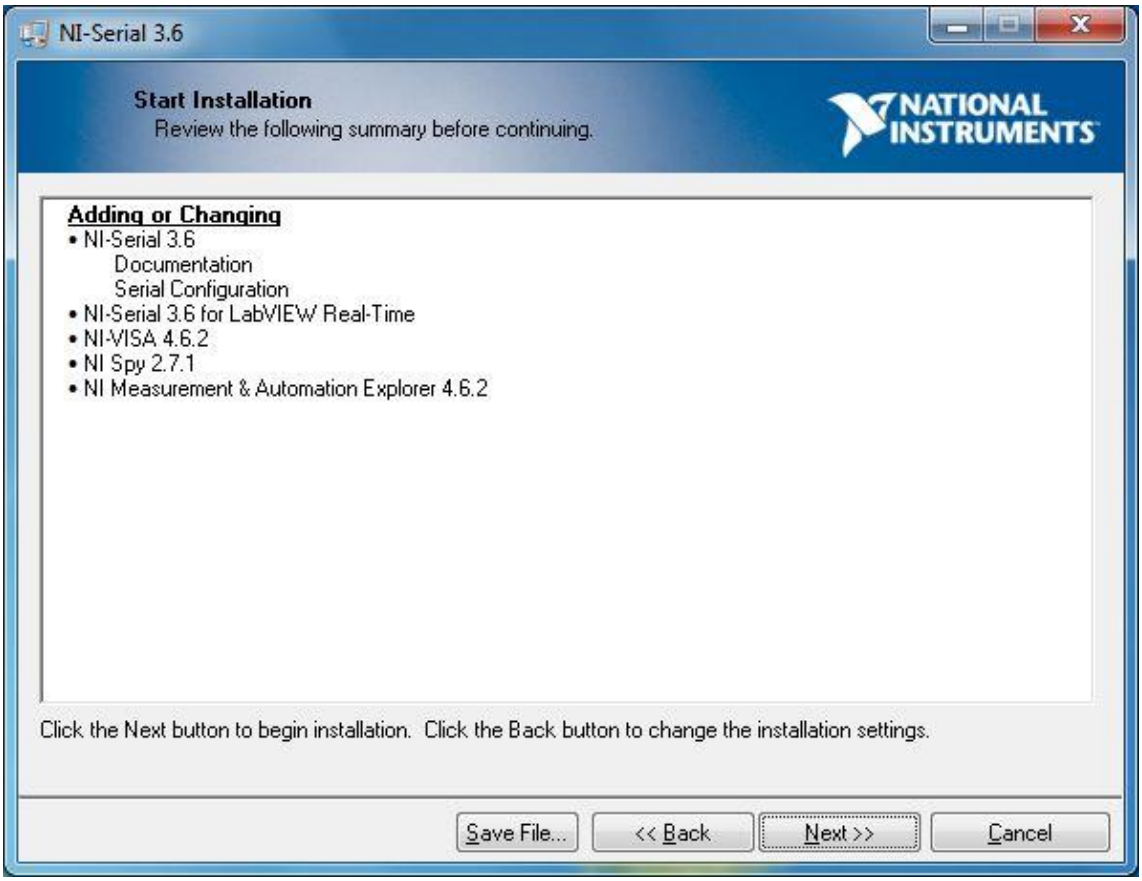

Figure 4: NI serial driver installation. Start Installation

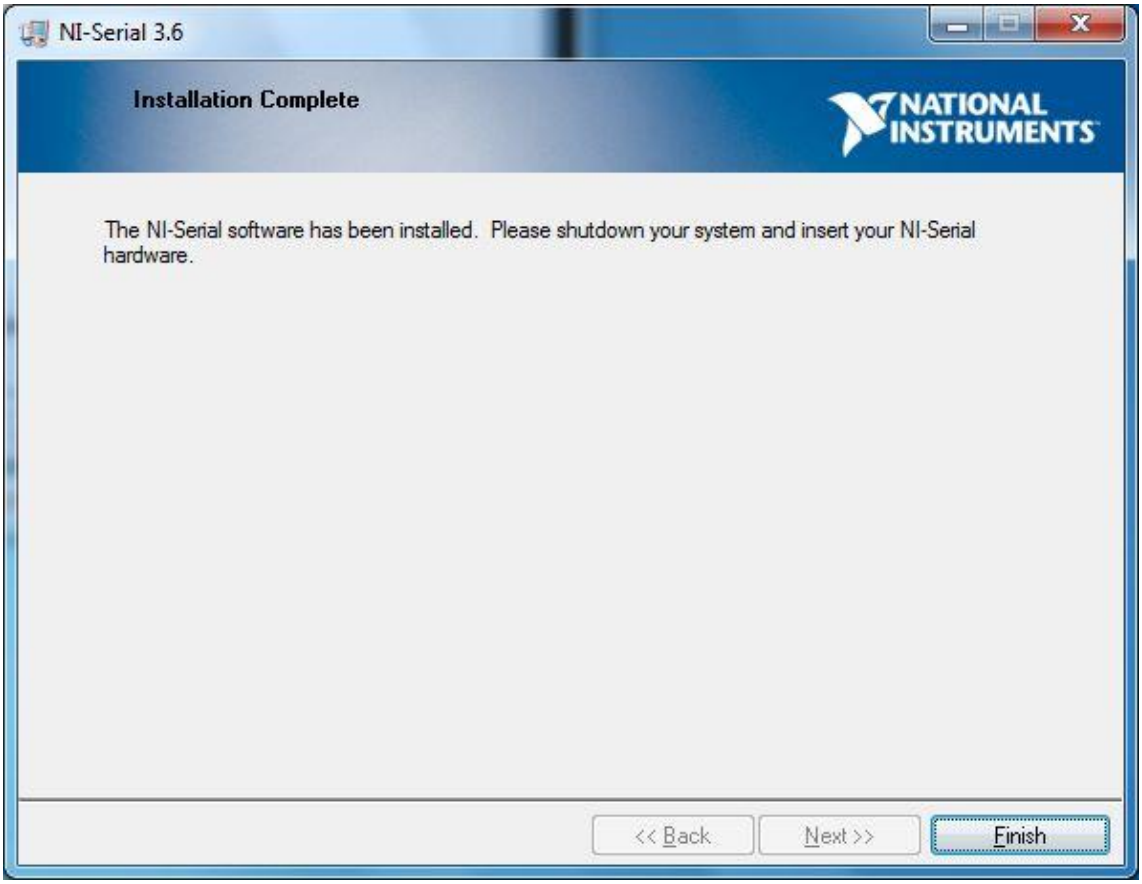

Figure 5: NI serial driver installation. Installation complete

6.2 Installation of PC software

Install the PC software by running "setup.exe" found on the included memory-stick. Follow the on-screen instructions to complete the installation. See Figure 6 through Figure 11 for guidance.

The PC software can also be downloaded from the Sensonor support site. Use this site regularly to check for updates.

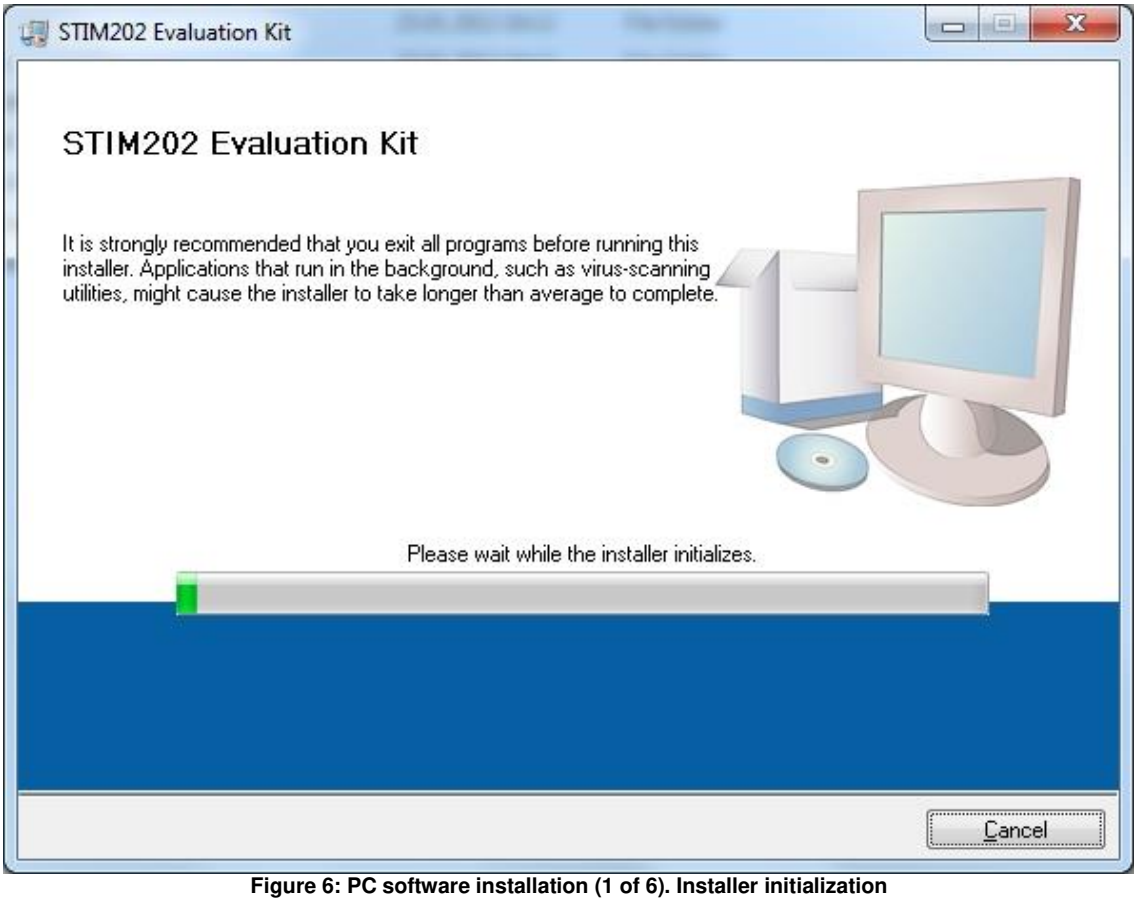

Figure 6: PC software installation (1 of 6). Installer initialization

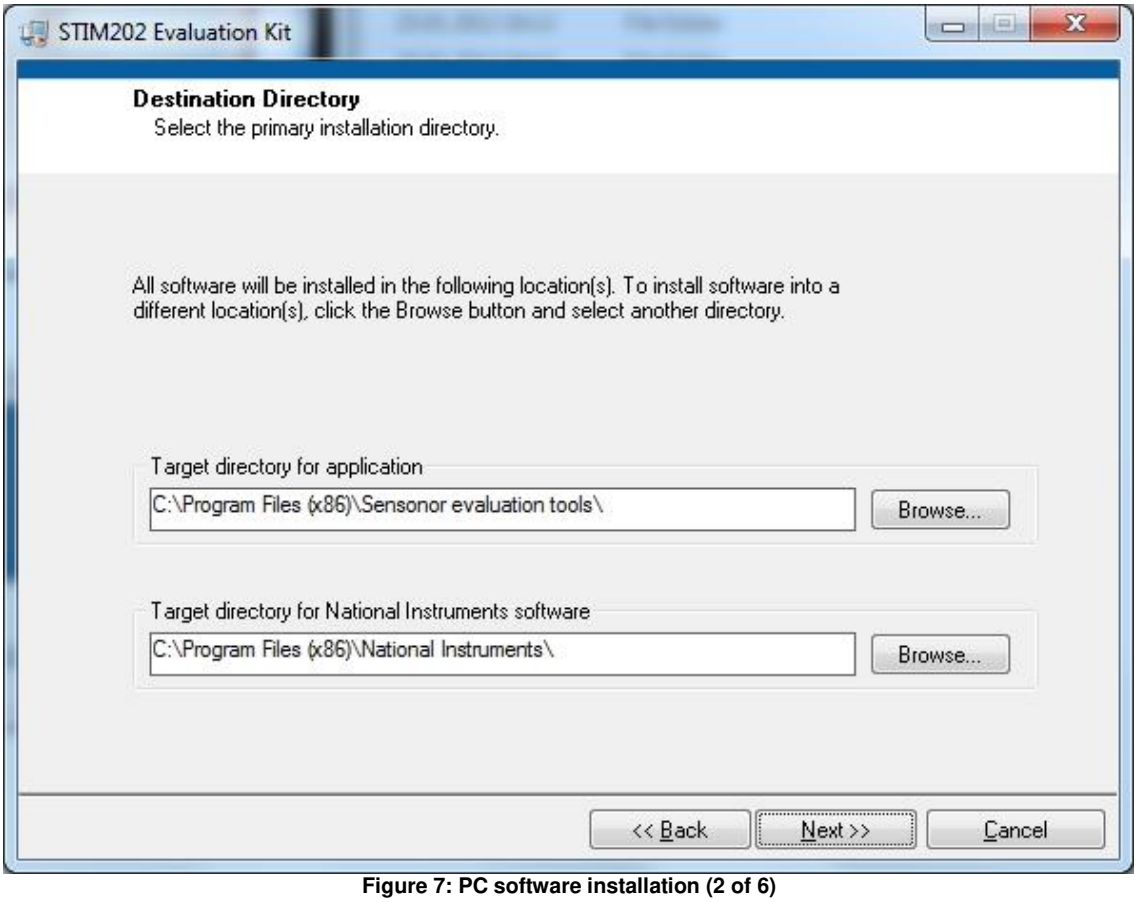

Figure 7: PC software installation (2 of 6)

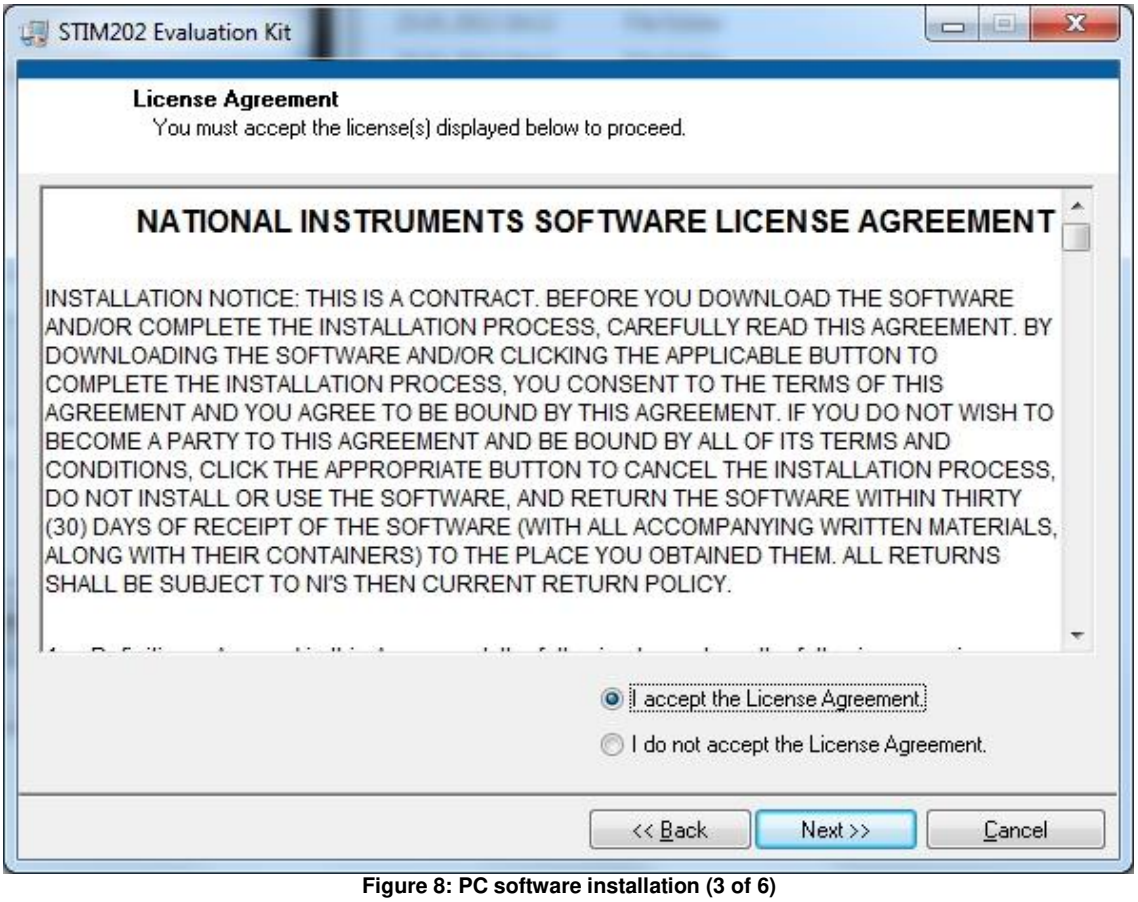

Figure 8: PC software installation (3 of 6)

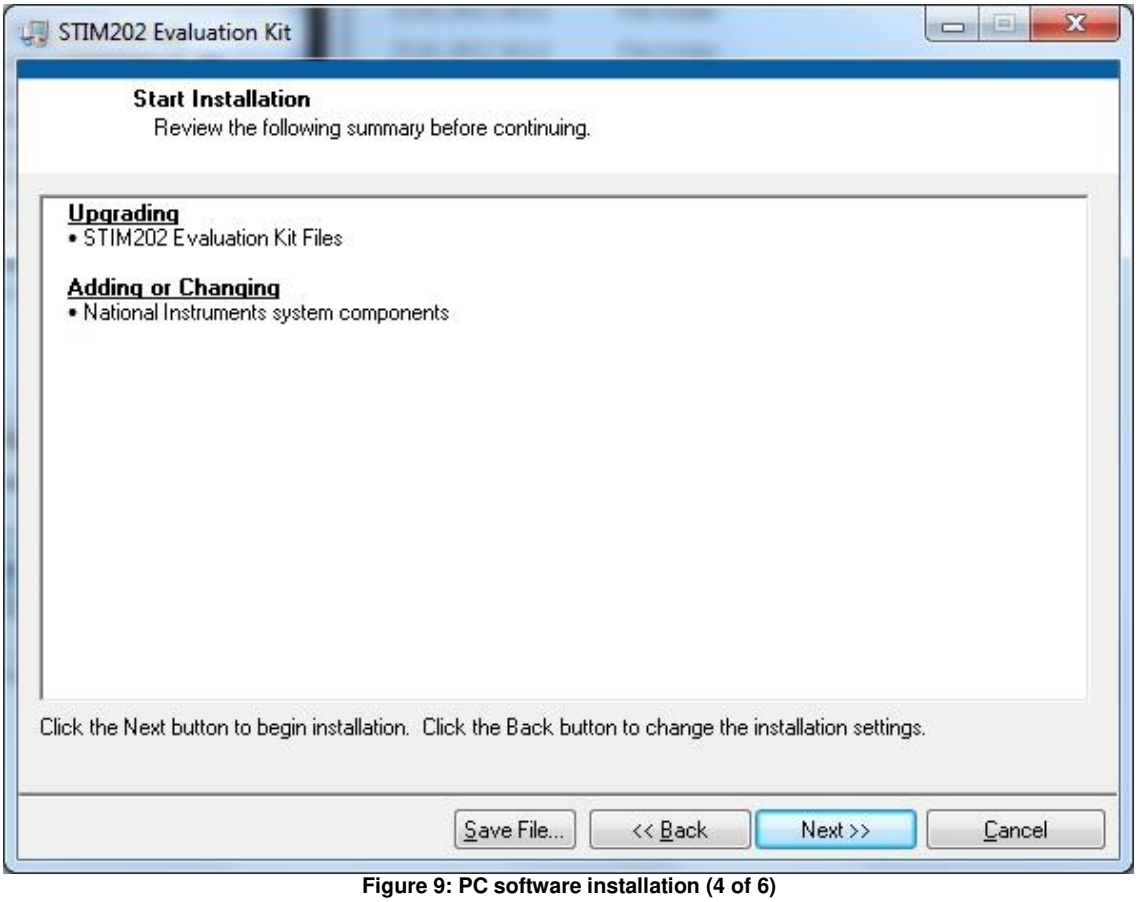

Figure 9: PC software installation (4 of 6)

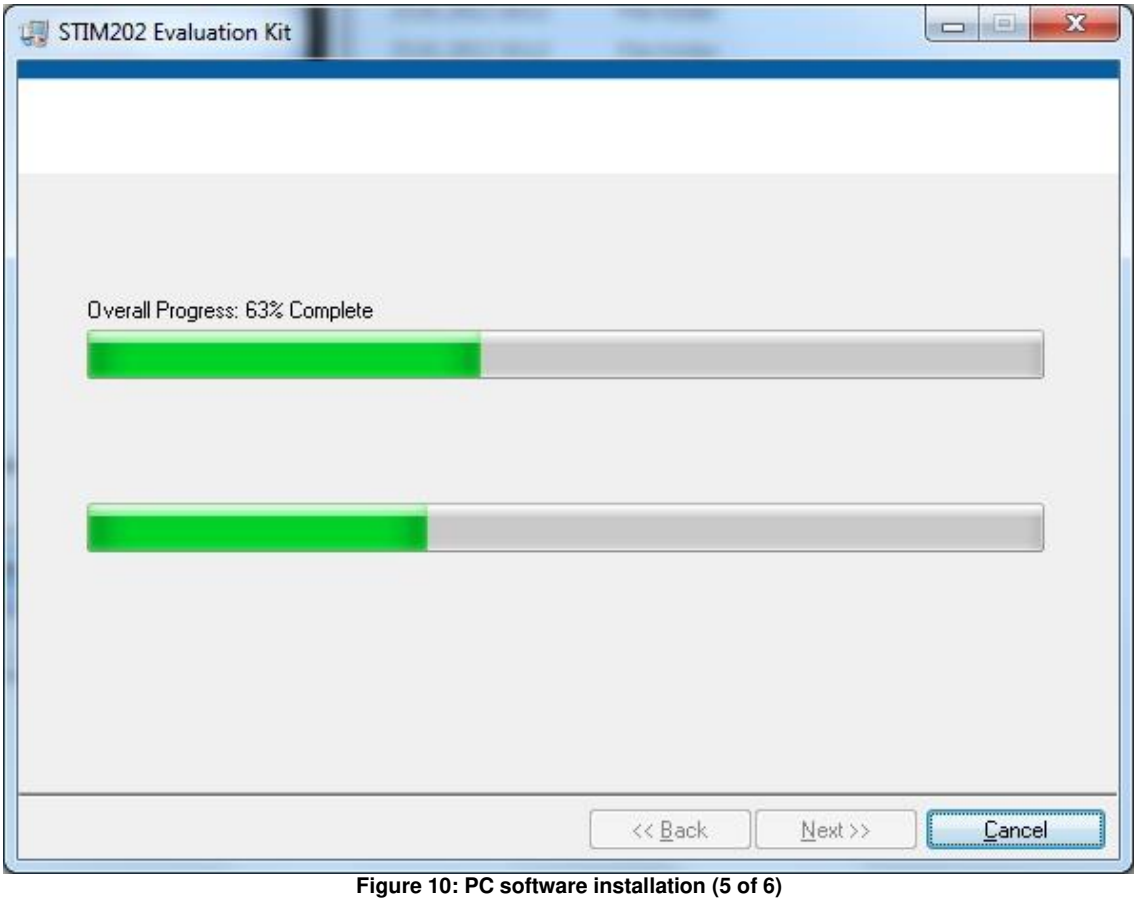

Figure 10: PC software installation (5 of 6)

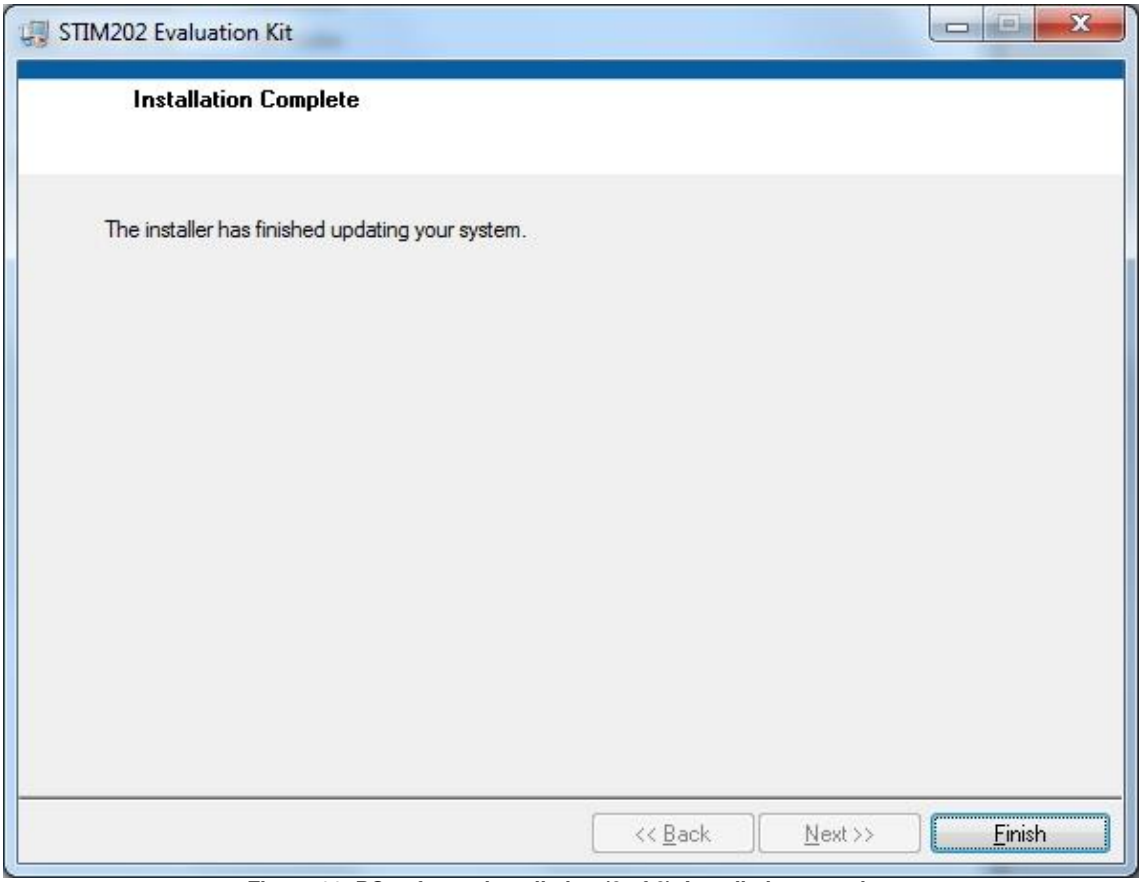

Figure 11: PC software installation (6 of 6). Installation complete

6.3 First hardware connections

6.3.1 Common preparations

1. Connect a gyro module to the Micro-D connector of the *STIM202 communication and power cable*. Use the T6 Screw driver (included) for tightening the fixing screws of the connector to gyro module

6.3.2 For preparing the PCI kit (skip this step if the USB kit is used)

2. Install the *PCI card* into a free PCI slot of the PC cabinett

3. Connect the 9 pin D-SUB connector of the *STIM202 communication and power cable* to either PORT 1 or PORT 2 of the *PCI card*. Tighten the screws of the D-SUB connector to ensure a good electrical connection

6.3.3 For preparing the USB kit (skip this step if the PCI kit is used)

2. Connect the 9 pin D-SUB connector of the *STIM202 communication and power cable* to the *USB cable*. Tighten the screws of the *STIM202 communication and power cable* to ensure a good electrical connection. See Figure 2 to identify two cables if necessary. (The *USB cable* is the black one with blue connectors.)

3. Connect the (blue) USB connector of the *USB cable* into a free USB port of the laptop/ PC

6.3.4 Common verifications

4. Verify that the NI serial driver installation has completed successfully in the Device Manager. See *Control Panel -> Hardware and Sound,* or similar path, to locate this. An example for Device Manager in Windows 7 is shown in Figure 12

5. Notice the assigned COM port(s) as this information is needed later for connecting to gyro module(s) from PC software

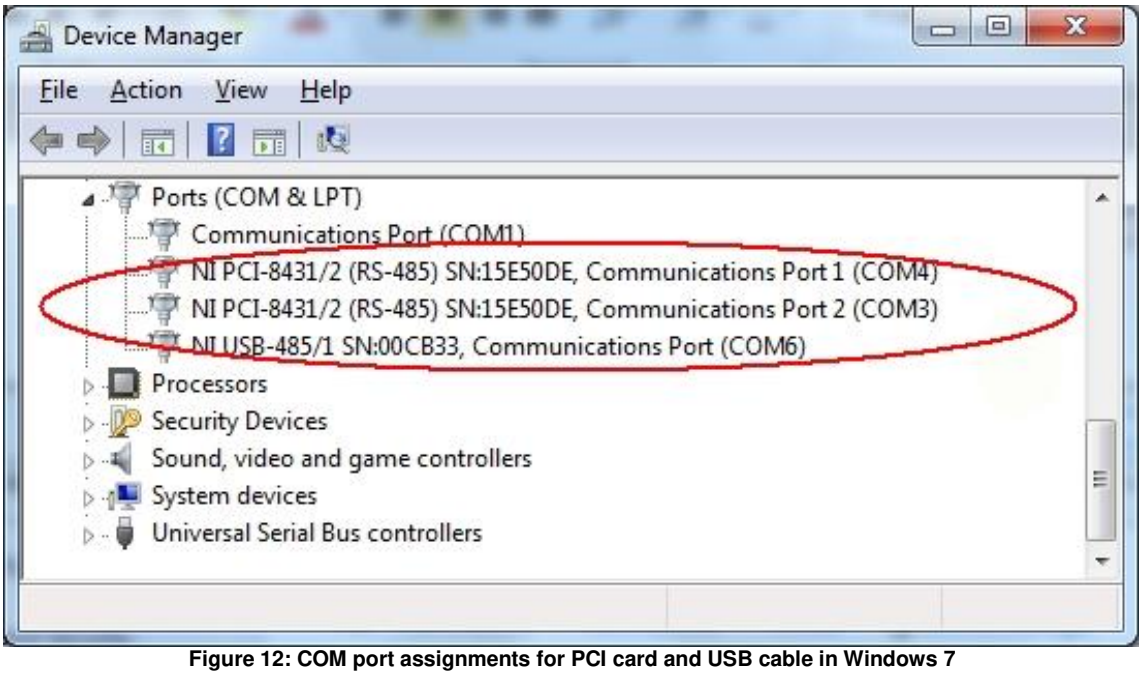

Figure 12: COM port assignments for PCI card and USB cable in Windows 7

6.4 First PC software start-up

1. Navigate to the ‘STIM evaluation tools’ folder from Windows start menu. Click on the shortcut named "STIM202 EVK" to start the PC software. For full functionality; run program as administrator

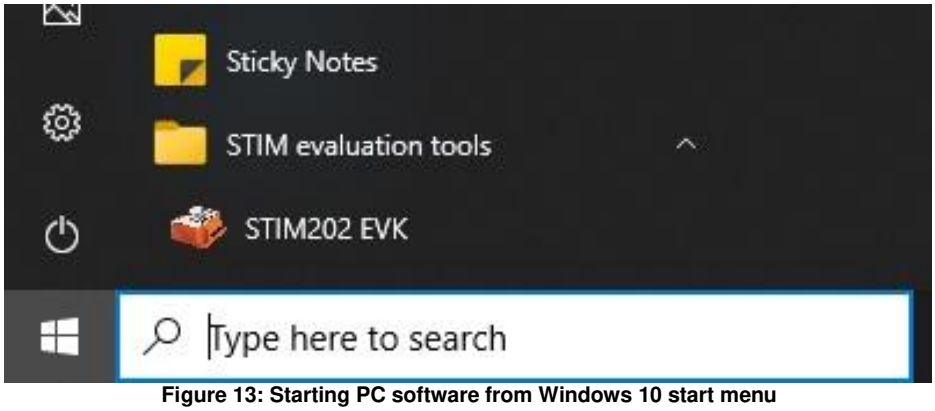

Figure 13: Starting PC software from Windows 10 start menu

2. A pop-up box appears, asking for a parameter (.INI) file. Select the INI-file available in the installation folder and click "Load"

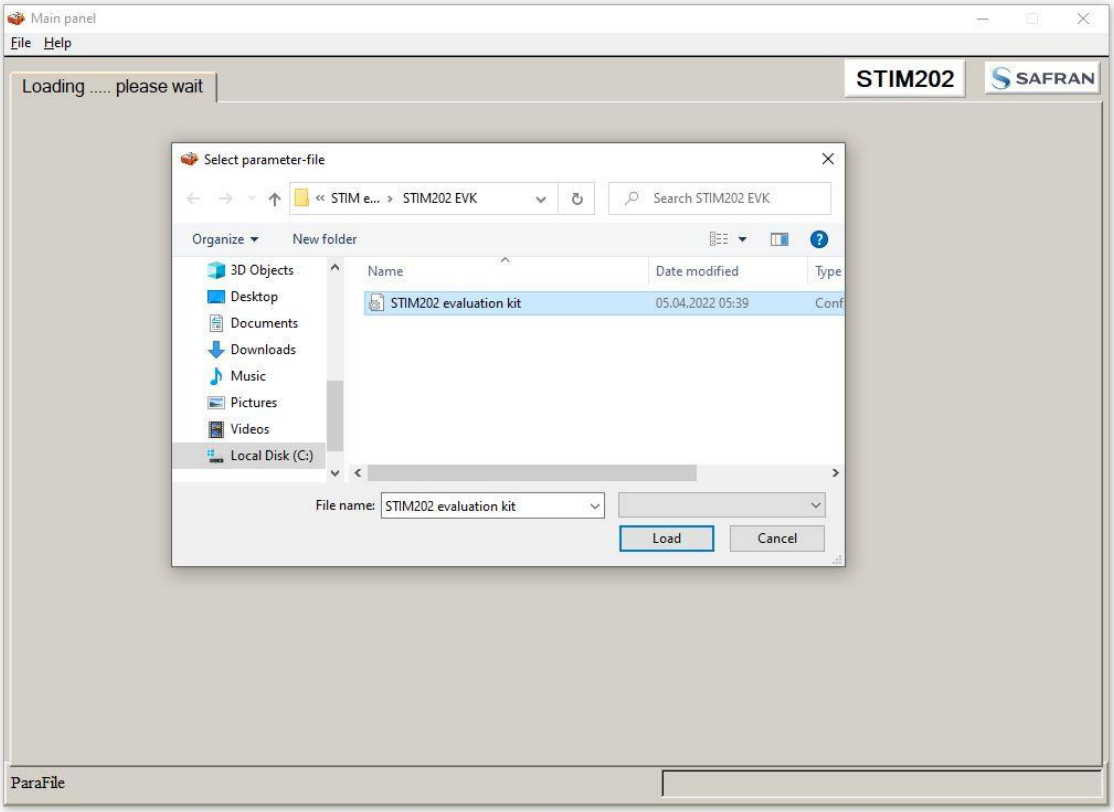

Figure 14: INI-file selection

3. A pop-up window containing the End User License Agreement appears. Click the “Agree” button to accept the agreement and enable the EVK software to have full functionality.

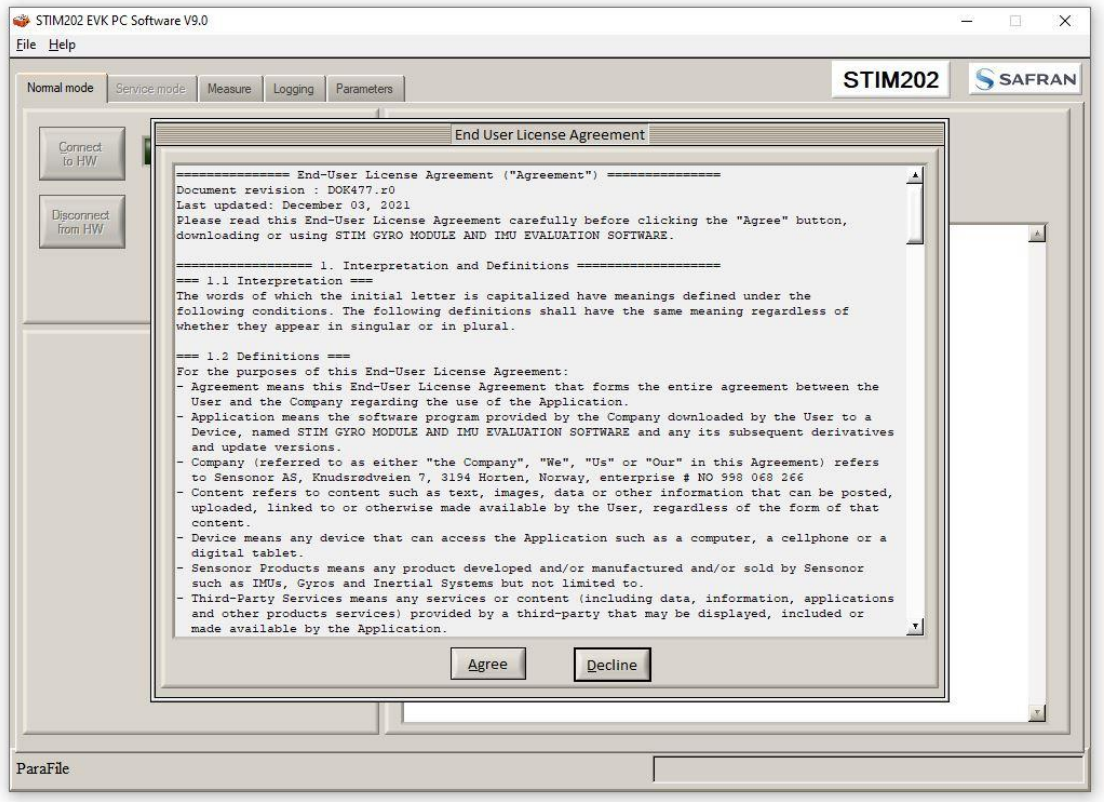

Figure 15: Welcome message and software registration

4. A pop-up box for software registration appears. Fill in the open fields and click "Submit". The default email client opens. Press "Send" in order to complete this step (the user information is sent to the product and application support team)

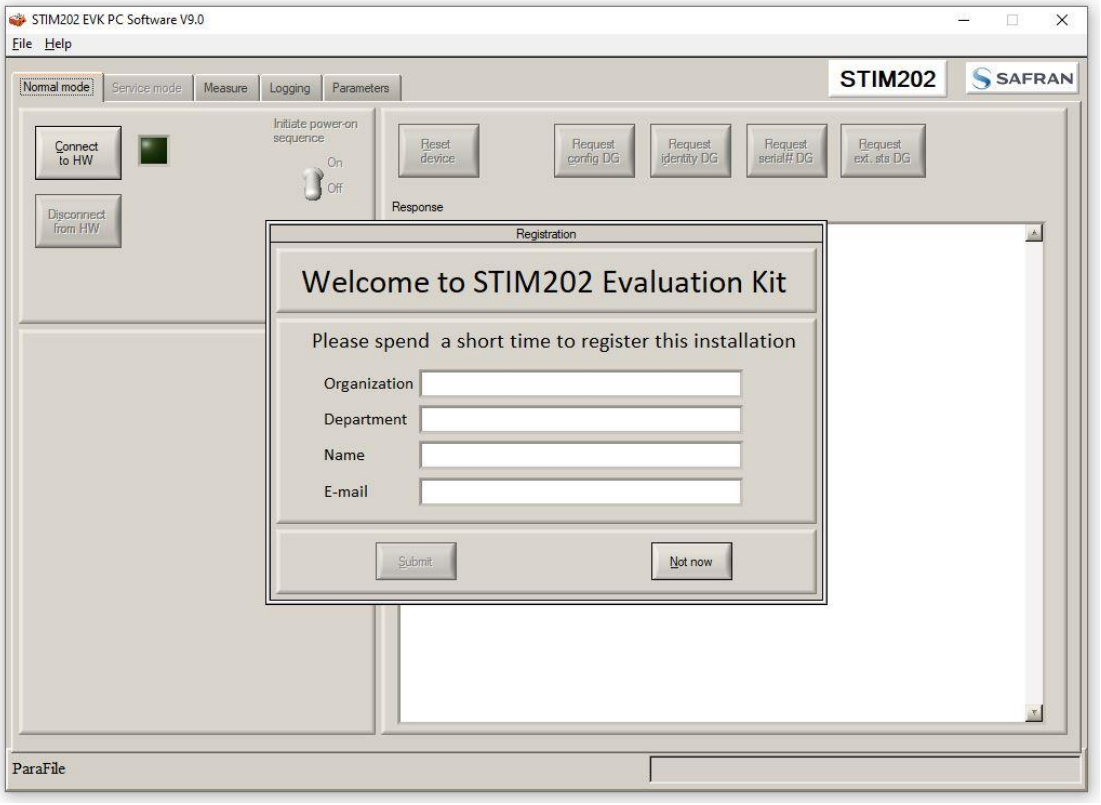

Figure 16: Welcome message and software registration

5. The Normal mode panel is shown

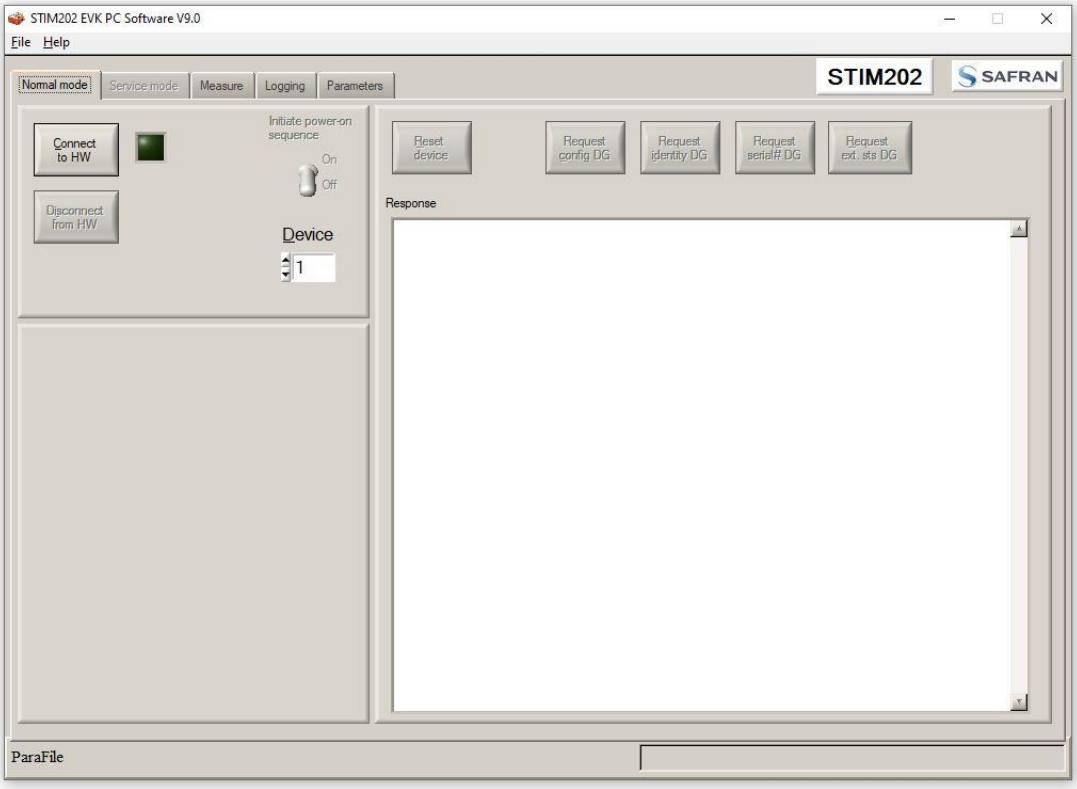

Figure 17: Normal mode panel after selecting INI-file and registration

6. Verify the correct COM port settings in the Parameters view. Password to edit is ‘stim’. Click "OK" to confirm when the correct COM ports are selected. Devices not connected should have a ‘0’ for port number

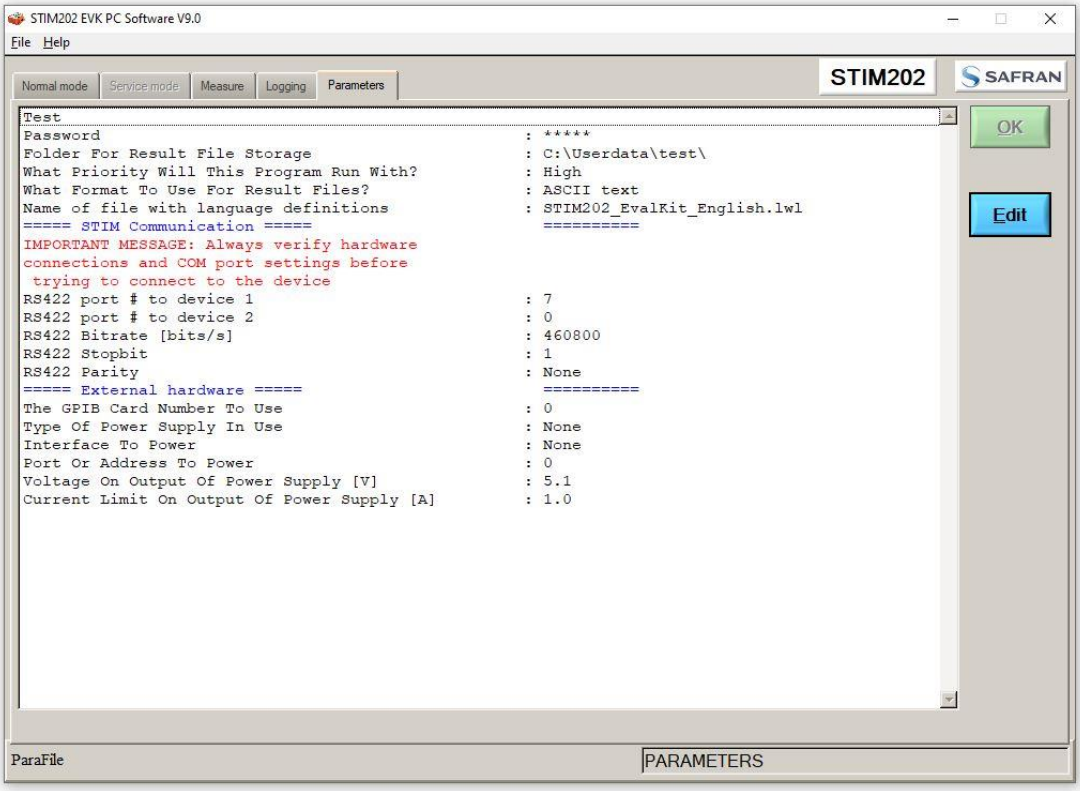

Figure 18: Editing the INI-file in order to verify the correct COM port settings

7. Go back to Normal mode panel. Connect to and open COM port by pressing the ‘Connect to HW’ button. A green LED light indicates that the COM port is active

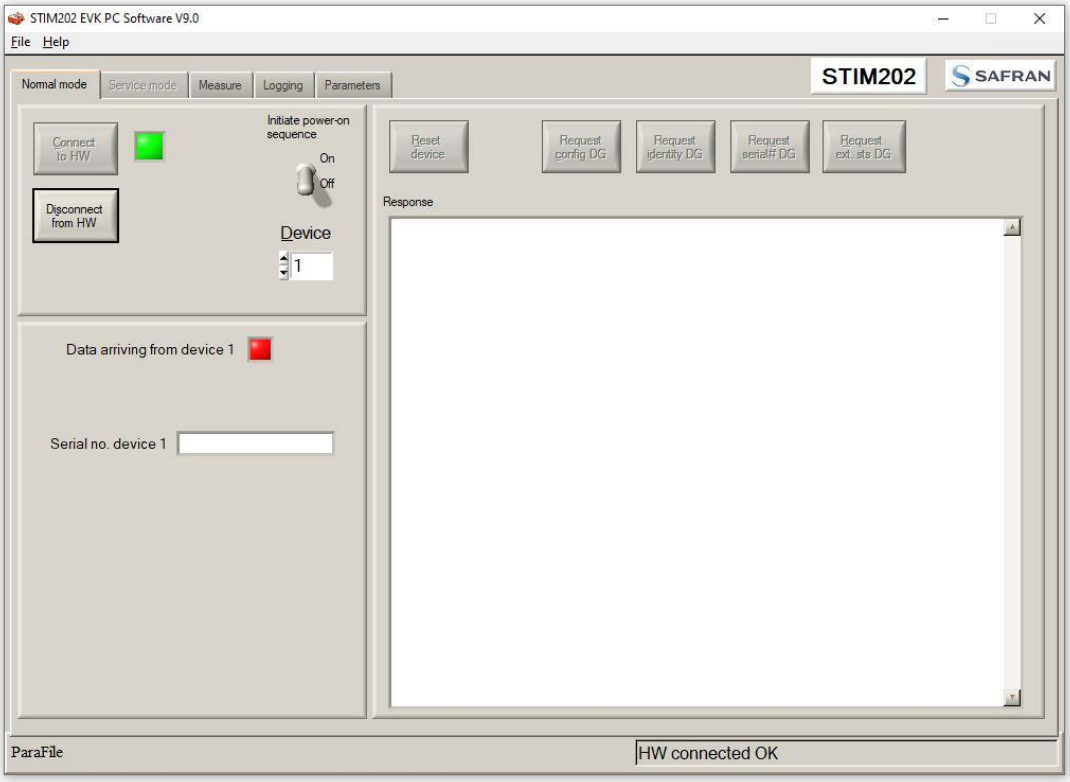

Figure 19: Normal mode panel after first hardware connection

8. Switch the 'Initiate power-on sequence' control switch position to 'On' position. Do not insert the power supply cable at this point. The pop-up message asking for confirmation of bitrate appears. Press OK

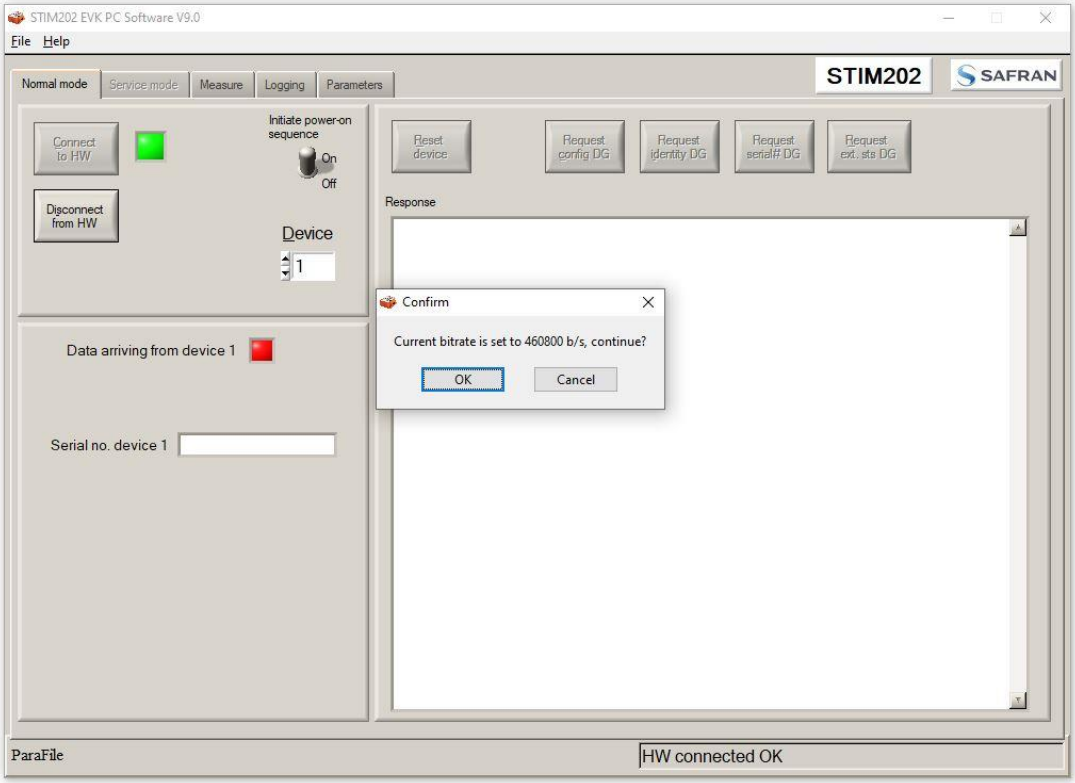

Figure 20: Normal mode panel when USB connector of *STIM202 communication and power cable* is to be inserted

9. A pop-up message telling "Connect power cable to voltage supply and then press OK to continue" appears. First insert the red USB connector into a free USB port of the PC/ laptop and then confirm the supply voltage is applied by pressing 'OK'

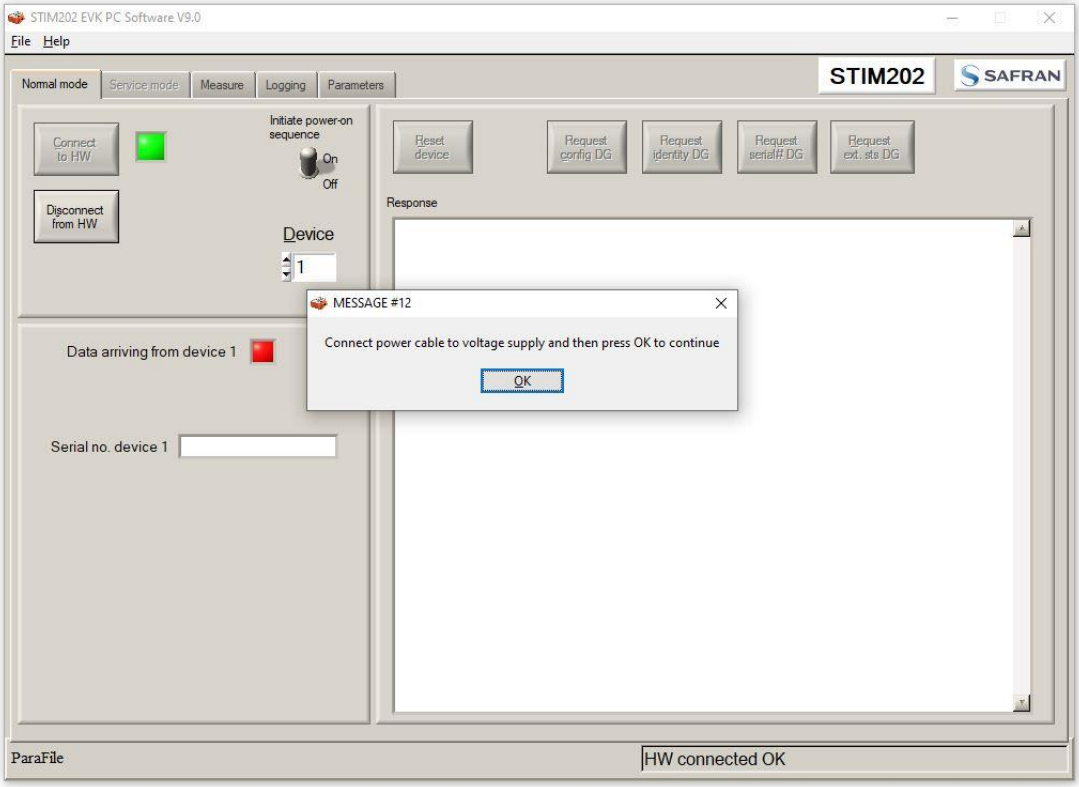

Figure 21: Confirm power supply is switched on

10. A green LED (Data arriving from device n) indicates that data is received from the gyro module(s). Verify the communication to module by clicking on the 'Request serial# DG' button. An example of such a result is shown in Figure 22. The system is now ready for use

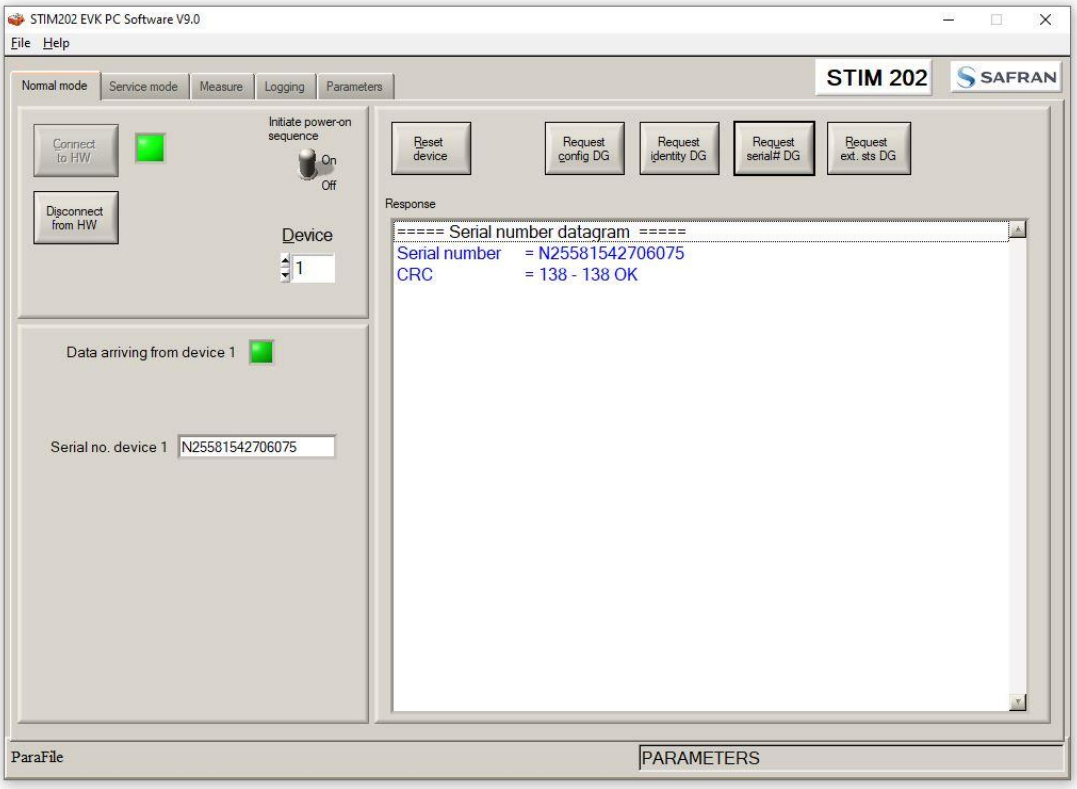

Figure 22: Result of sending 'Request serial DG' to the gyro module

7 Introduction to PC software

7.1 Panels overview

In addition to the panels already shown (Normal mode and Parameters panel), other panels are also available:

7.1.1 Service mode panel

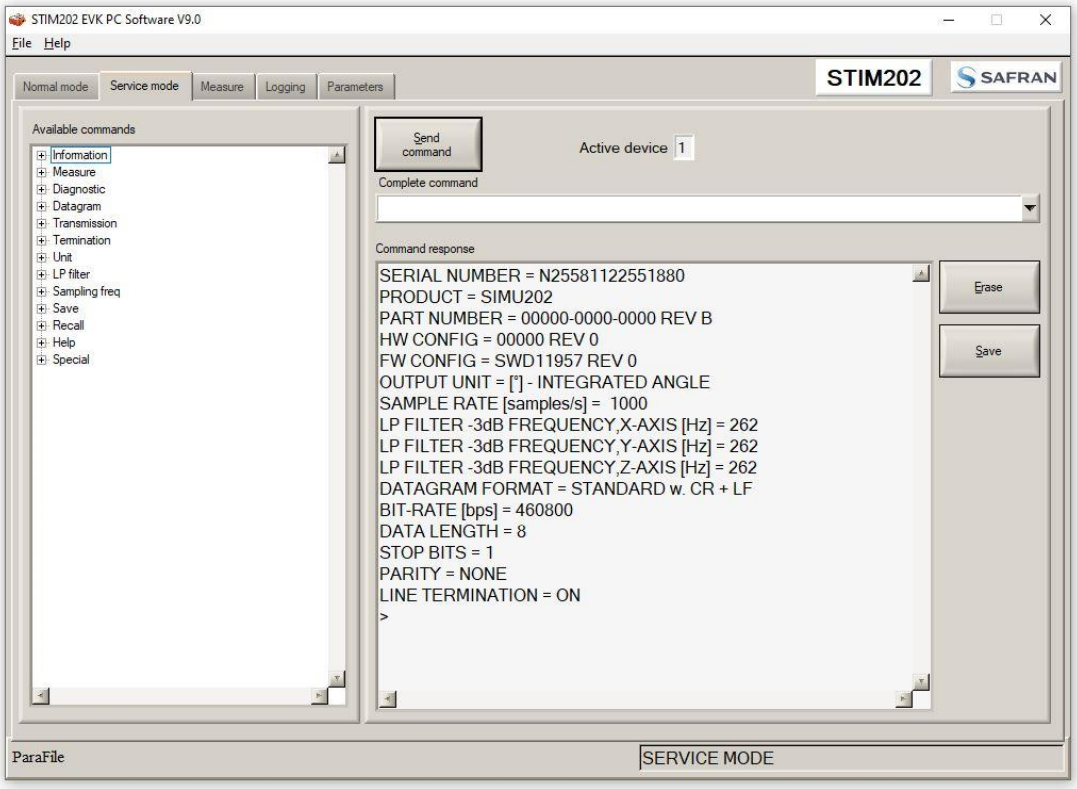

Figure 23: Service mode panel

7.1.2 Measure panel

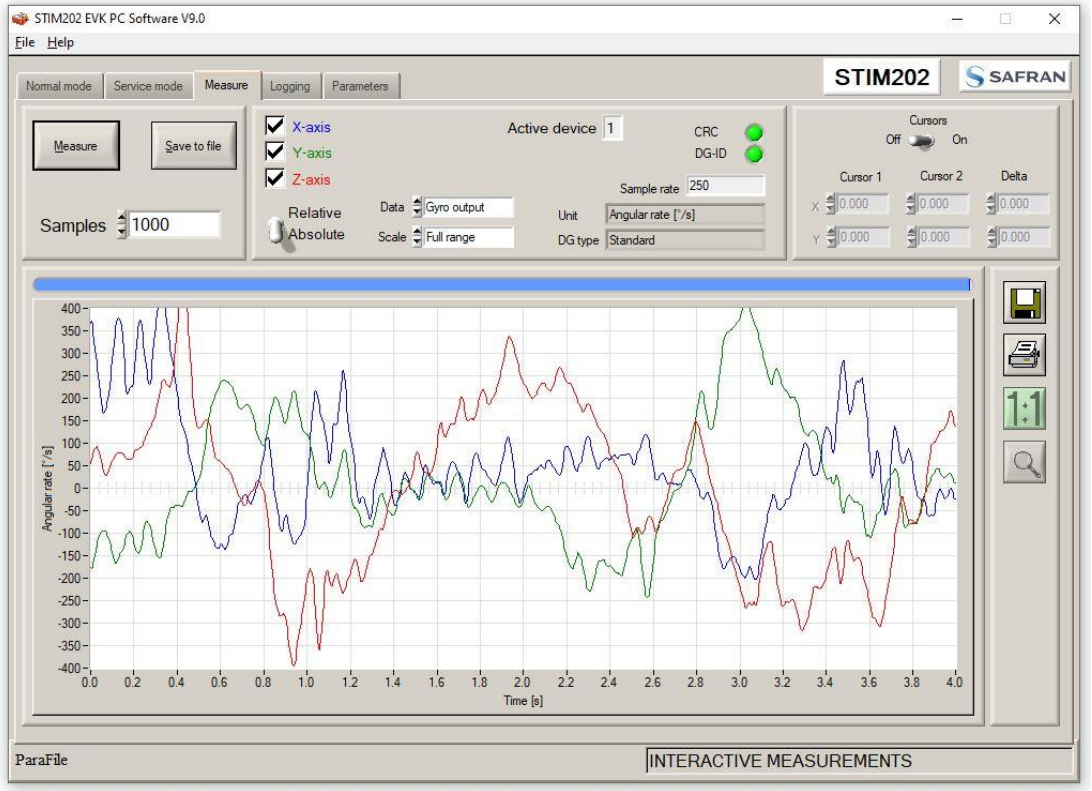

Figure 24: Measure panel

7.1.3 Logging panel

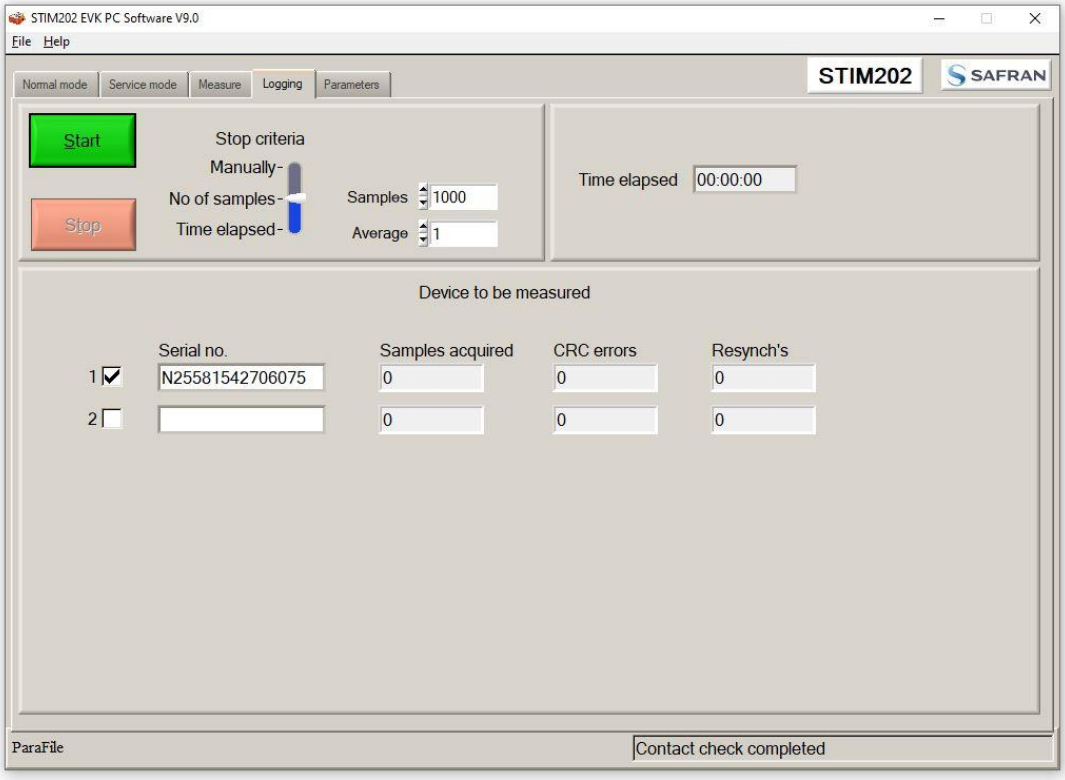

Figure 25: Logging panel (for saving data to file)

7.2 Main panel menus

Menu	Description
'File' → 'New parameter file'	For creating a new INI-file. Notice that this new INI-file also needs be edited by the user before taken into use. The content is not equal to any existing INI-files. Notice also that the Parameters view in the software is not updated with the new INI-file content until the user clicks the "Edit" button (this triggers an update of this view)
'File' → 'Open parameter file'	For opening and taking a specific INI-file into use
'File' → 'Save parameter file as'	To save parameters into an INI-file
'File' → 'Print parameters'	For printing the current 'Parameters' content at the default printer
'File' → 'Edit parameters'	To edit the 'Parameters' content
'File' → 'Exit'	To exit program
'Help' → 'Check for updates'	Opens the Sensonor support site in a web browser. NI serial drivers, any PC software updates and new releases of User manuals can be obtained from here
'Help' → 'About'	About the program (Program name, publisher and software revision number)
'Help' → 'License agreement'	Displays the EULA

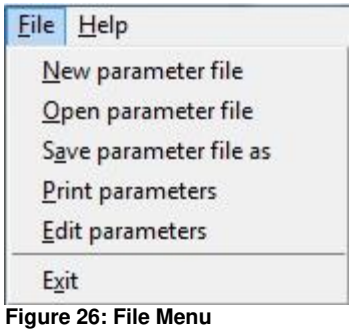

Figure 26: File Menu

Figure 27: Help menu

7.3 Normal mode panel descriptions

Table 1: Normal mode panel descriptions

Panel unit	Functionality and description
Connect to HW	To connect to interface hardware. Opens PC COM port according to selections in active parameter file
LED(s)	Indicator for hardware connection. A GREEN light indicates the corresponding COM port is opened. If two units are connected a second LED will appear
Disconnect from HW	To Disconnect from interface hardware. Closes the corresponding COM port
Initiate power-on sequence switch	Toggles supply voltage if configured with an external power supply. Controls certain functions of the PC software
Device box	Should hold the correct gyro module (device) number according to active parameter file. Choice depends on which gyro module and COM port the user wants to operate
Reset device button	Resets the gyro module. Sends reset command (‘R’)
Request config DG button	Sends command (‘C’) to receive configuration datagram
Request identity DG button	Sends command (‘N’) to receive part number datagram
Request serial# DG button	Sends command (‘I’) to receive serial number datagram
Request ext. sts DG button	Sends command (‘E’) to receive extended error information datagram
Response window	Lists responses from the gyro module

7.4 Service mode panel descriptions

Service mode is used for gyro module configuration.

Service mode is entered by clicking on the Service mode tab next to the Normal mode tab. Panel units, functionalities and descriptions are listed in Table 2. Exit from gyro module Service mode to Normal mode is done by pressing one of the other panel tabs (Normal, Logging, Service or Parameter panel tab).

Note: Changes made for the gyro module in Service mode are only stored permanently in gyro module flash memory when the save command (‘s’) is issued.

Table 2: Service mode panel descriptions

Panel unit	Functionality and description
Available commands window	Shows a list of available commands. See product datasheet for details
Complete command window	Contains the complete command to send. It is auto-completed by usage of the listings in the available commands window. Left click in the complete command window shows a list of earlier sent commands. Right click enables manual command entry
Send command button	Sends command to the gyro module
Active device indicator	Informs about the active gyro module (device). Corresponding COM port is according to the active parameter file
Command response window	Shows the responses from the gyro module. See product datasheet for details
Erase button	Erases the content of the command response window
Save button	Saves the content of the command response window to a text file with a detailed date and time tag

7.5 Measure panel descriptions

Table 3: Measure panel descriptions

Panel unit	Functionality and description
Measure button	Starts a measurement series
Samples box	Defines the number of samples to be collected (max 50 millions)
Save to file button	Saves data from a completed measurement series to a result file. The file path defined in the active parameter file is proposed
X-, Y- and Z-axis check boxes	Selects which axis data to present in the graph area (up to 3 axes can be plotted)
Relative and absolute toggle switch	When set to 'Absolute', all results are plotted as received. When set to 'Relative' the curves are translated so that the first measurement is shown in the plot as zero.
Active device indicator	Informs about the active gyro module (device). Corresponding COM port is according to the active parameter file
CRC and DG-ID LEDS	Confirms all CRC checks and DG-IDs as expected. Normally GREEN. LEDs turn RED if checks fail
Data box	Selects which datagram content to be shown. Several options are available, depending on the active datagram type. Use the arrows in the left side of box to scroll between available selections. The plot updates immediately if a measurement series has already been done.
Scale box	Enables user to change Y-axis scaling (Full range, User defined, or Auto). Left click inside box to display available selections
Sample rate box	Informs what sample rate has been used for the measurements
Unit box	Displays the output unit for all measurements (Angular Rate, Incremental Angle, etc.)
DG type box	Shows the type of datagram received
Save to disk icon	Saves a picture of the plotted data to file
Print icon	Prints a picture of the plotted data to the default printer
1:1 icon	Resets zoom level to 1:1 (if ZOOM is active. See below)
Zoom icon	Enables a custom zoom of the presented results in the strip chart (graph area) according to placement of available cursors
Cursors (On/Off) switch	Enables usage of cursors (default is Off)
Cursor 1	Shows the location of cursor no 1
Cursor 2	Shows the location of cursor no 2
Delta	Shows the delta between the two cursor locations (X and Y values)
Progress bar	A blue continuous line shows the measurement series progress
Lower bar on panel	Shows the INI-file in use and the active mode (NORMAL MODE)

Save data to file from measure panel:
An example of a result file is shown in Figure 28, for a standard datagram measurement series of device # 1. A description of each of its column of data is found in Table 4.

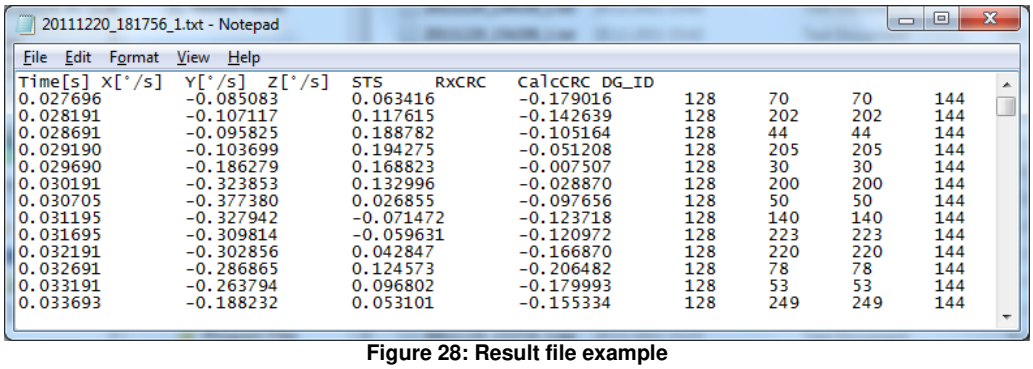

Figure 28: Result file example

Table 4: Result file example. (Standard datagram content written to file.)

DG-type	Col. #	Heading	Comments
Standard	1	Time[s]	Time in seconds
	2	X[°/s] or X[°]	Gyro signal X-axis
	3	Y[°/s] or Y[°]	Gyro signal Y-axis
	4	Z[°/s] or Z[°]	Gyro signal Z-axis
	5	STS	Status-byte
	6	RxCRC	Received CRC
	7	CalCRC	Calculated CRC
	8	DG_ID	Datagram identifier

7.6 Logging panel descriptions

Table 5: Logging panel descriptions

Panel unit	Functionality and description
Start button	Starts data logging
Stop button	Stops data logging
Stop criteria slide	User selections between “manually”, “no of samples” and “Time elapsed” for stopping a measurement series
Samples box	In use when defining a series length with “no of samples”
Time elapsed	Shows the real time for the test running
Samples acq.	Shows number of samples acquired
CRC_errors	Shows number of CRC errors (normally 0, otherwise the user should consider to reject results data in any analysis)
Resynch’s	Increments from 0 to a number if any re-synchronisations are needed in order to re-establish data collections from module

Log to file capability:

- Quad core processor is recommended when measuring on two gyro modules simultaneously
- The size of the log file is only limited by the free memory of the hard disk(s) in use
- The path for result file storage is defined in the active parameter file
- The program should be run as administrator to ensure the necessary rights to establish result files

7.7 Parameters panel descriptions

Table 6: Parameters panel descriptions

Panel unit	Functionality and description
===== General parameters =====	
Password	Current valid password to be able to edit the parameters list. The password is “stim”
Folder for result-file storage	“c:\userdata\test\
What priority will this program run with	Instructs the program priority for the PC operation system
What format to use for result files	ASCII text by default. Can be changed to 8 byte binary
Name of file with language definitions	Application can be configured with language other than English
===== Device communication ===== IMPORTANT MESSAGE: Always verify hardware connections and COM port settings before trying to connect to the device	
RS422 port # to device 1	Defining which COM port # to be assigned to gyro module (device) # 1
RS422 port # to device 2	Defining which COM port # to be assigned to gyro module (device) # 2
RS422 Bitrate [bit/s]	Manual RS422 bit rate selection. NOTE that USB cable that comes with the USB kit, supports only the default 460800 bits/s option, while the PCI card of the PCI kit supports all available bit rates
RS422 Stopbit	1 or 2. Default is “1”
RS422 parity	None, odd or even. Default is “None”
===== External Hardware =====	
The GPIB Card Number To Use	Normally "0" (when no GPIB card in user). If card(s) are in use; the first card will be assigned to #1, second to #2, etc. Default value is “0”
Type Of Power Supply In Use	Normally "None" (when not in use). Agilent E3631A, E3633A and E3644A supported. Default value is “None”
Interface To Power	Normally "None" (when not in use). RS232 (for Agilent E3631A only) and GPIB supported. Default is “None”
Port Or Address To Power	Normally "0", when not in use. Selectable up to 31. Default is “0”
Voltage On Output Of Power Supply [V]	Default value is “5.1”. Can be neglected if not in use. Value should be within the supply voltage range of the gyro module. Clicking on the arrow of the control unit when editing this parameter allows for voltages as high as 6.0V maximum. Manual entry allows even higher values, however with a warning. Note: The entered value/ voltage applied to the gyro module should never exceed the absolute maximum ratings value for the supply voltage of the gyro module (maximum 7.0V)
Current Limit On Output Of Power Supply [A]	Default value is “1.0”. To limit the current consumption from the power source

7.7.1 Binary file description

The binary file’s first 2101 bytes is the header. The header is defined as:

- The first byte is stating the number of ‘columns’ in the file (n columns)
- The next 100 bytes is defining the data-type for each ‘column’ (only the first n values are set). Currently these numbers are all 0x05, meaning 8-byte floating point (double)
- The remaining header bytes are 100 20-byte strings with the header name for each ‘column’ (only the first n values are set)

After the header follows the data measurement result values, stored as 8-byte floating point values (double) in groups of n results.

7.8 Messages from the program

Messages that the program can display are listed in Table 7:

Table 7: Possible messages given by the program

#	Message	Description
1	This application is already running! Stop loading of 2. instance...	The program is already started, a second instance will not be allowed
2	Wrong password entered!	The password entered does not match the required one for this INI-file
3	No response to message was received	Did not receive the expected response to sent service-mode command
4	There is no measurement data available for storage	To be able to save measurement data, there must be data available
5	Unable to open the selected file	Saving of measurement data failed, unable to open or create the selected file
6	Unable to allocate the required memory	Failed to acquire the requested number of datagrams from the gyro module due to error when trying to allocate memory for temporary storage
7	No product identification datagram received	Even after retries the, expected datagram is not received as response to command sent
8	No configuration datagram received	Even after retries the, expected datagram is not received as response to command sent
9	No serial number datagram received	Even after reties the, expected datagram is not received as response to command sent
10	No datagrams received	Failed to acquire the requested number of datagrams from the gyro module, no recognizable datagrams received
11	Turn off device supply voltage	Instruction to user when running without controlled power-supply
12	Turn on device supply voltage	Instruction to user when running without controlled power-supply
13	Error encountered when trying to control voltage	Failed to control the specified power-supply
14	Unexpected DG-ID received !	When waiting for datagrams, unexpected datagrams are received
15	Unable to read config DG to determine output unit !	Unable to read configuration datagram to determine the output unit
16	Unable to synch with DG-stream !	Failed to acquire the requested number of datagrams from the gyro module, unable to get in synch with datagram stream
17	Error encountered when trying to print, check configuration !	Failed to print the graph, check that a printer is configured
18	Unable to create result-folder specified by parameter !	The specified pathname can not be created, either due to access-rights or errors in the path specification

19	Unable to enter service-mode !	Unable to enter service-mode, does not receive expected response to command.
20	Unable to save parameters to active INI-file !	Error encountered when trying to save parameters onto INI-file
21	Edit-mode of parameters is active, unable to exit !	The edit-mode of parameters are active, unable to exit the program until edit mode is ended
22	You are about to change the RS422 bit rate. If are you using the USB kit hardware provided by Sensonor, please notice that you will not be able to communicate with the device if you change to something else than supported 460800 b/s! For the PCI card there are no worries - it supports all available bit rates	A warning to the user about limitations for certain RS422 hardware
23	Unable to create/save to selected file, check access rights to folder	Unable to open or create the specified file in the selected folder, try another filename and/or location. The reason may be lacking access rights to the folder, or illegal filename format
24	Unsupported datagram-type received	When trying to read datagrams from the device an unsupported datagram-id was encountered.

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