Table of contents:

1 EVK features

- USB connectivity to PCs/ laptops
- Up to 2000Hz sampling rate supported
- Temperature measurements supported
- 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 hard drive, available memory and processor capacity of PC
  - Various stop criteria for measurements available ('Manually', 'No. of samples' or 'Time elapsed')
- Measurements of up to 4 gyro modules simultaneously supported (requires additional cables depending on the type of evaluation kit)

1.1 General description

The evaluation kit provides measurement and configuration access to STIM210 gyro. Configuration, graphical result presentation and saving data to file functions are supported. The single voltage supply required for the gyro module operation is provided from an USB port.

Feature	Available
Portability across PC's	No
Hardware installation required?	Yes
Gyro output available?	Yes
Temperature data available?	Yes
TOV, PPS, CRS, External trigger available?	Yes (break-out cable)
Transmission rate supported	Up to 5.34Mbit/s

Table 1: Features of PCI/PCIe kit

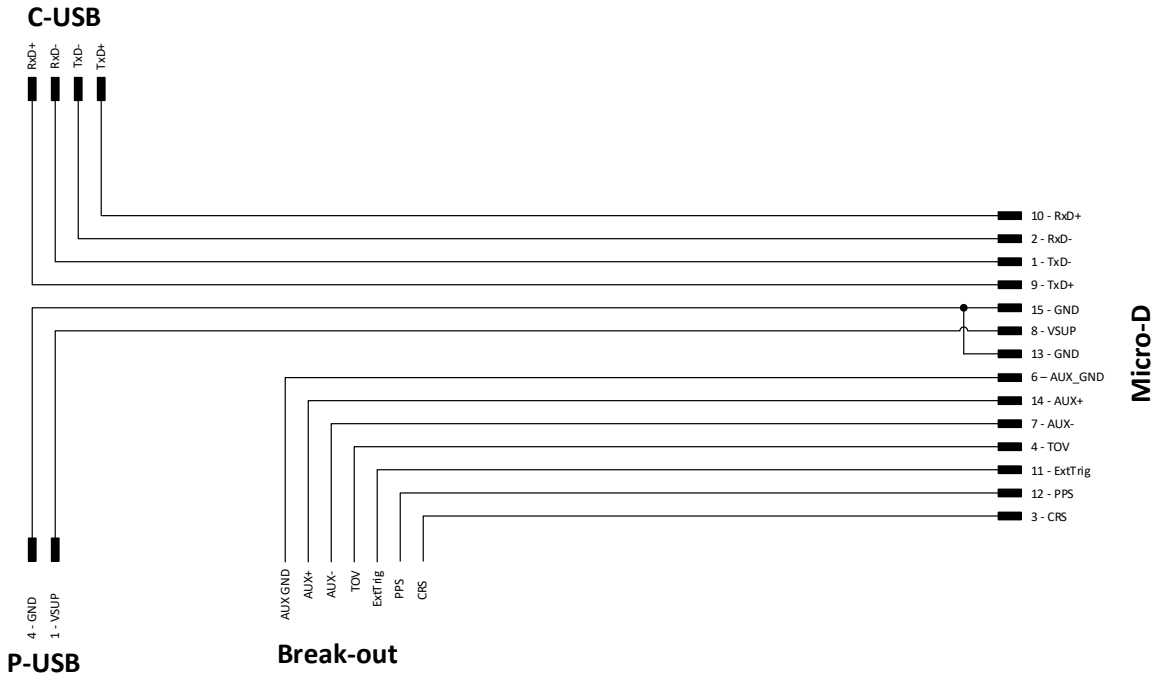


Figure 1 Wiring diagram

1.2 Configurable and readable parameters

Configurable parameters in Service Mode:

- Output format (angular rate, increment angle etc.)
- Datagram format
- Sampling rate
- Bandwidth / Low pass filter frequency
- RS-422 transmission bit rate
- Number of stop bits in datagram
- Parity
- Line/ Datagram termination

Readable parameters:

- Part number
- Serial number
- Firmware revision
- Hardware revision
- Gyro module diagnostics

Detailed diagnostic information including RAM and flash checks, stack handling checks, status of internal voltage supply references, and various parameter reports for each measurement axis is available in SERVICE mode.

Note: Time of Validity (TOV) and external trigger functionalities of STIM210 are not supported by the EVK PC-software.

2 Kit contents

- USB to RS422 interface cable with USB power supply connector
- Memory stick with
  - PC software
  - FTDI CDM20824 serial driver for Windows
  - User manual for evaluation kit
- Tool for fixing connector of communication and power cable to the gyro module

- Hard copy of User manual

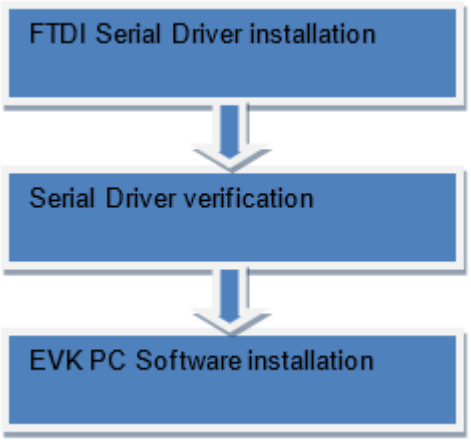
Note that the evaluation kit does not include a STIM210 gyro module. This must be ordered separately.

3 System requirements

- Windows XP SP2 (or later), Windows Vista, Windows 7 (32/ 64bit) , Windows 10 (32/ 64bit)
- 2 free USB ports
- Quad core processor recommended (when simultaneously logging data from two gyro modules)

4 Getting started

Preparing your system involves the following steps:



4.1 USB kit Installation of FTDI serial driver

To install the drivers for the FTDI serial driver under Windows, follow the instructions below:

- Connect the USB-RS422 plug to a spare USB port on your PC.
- If there is an available Internet connection, some Windows versions will silently connect to the Windows Update website and install a suitable driver
- In the event that no automatic installation takes place, please refer to the set-up guide from FTDI: http://www.ftdichip.com/Support/Documents/InstallGuides.htm

4.2 Verification and configuration of serial driver

Launch *Device Manager*. See *Control Panel -> Hardware and Sound -> Devices and Printers*.

Verify that the driver installation has completed successfully:

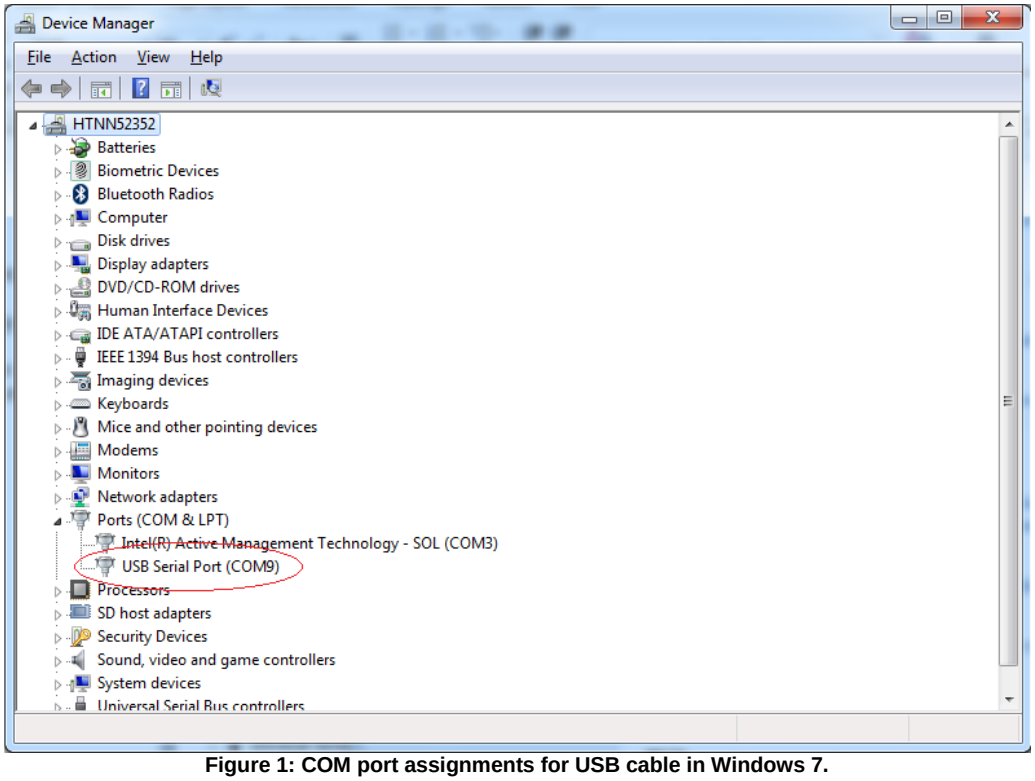
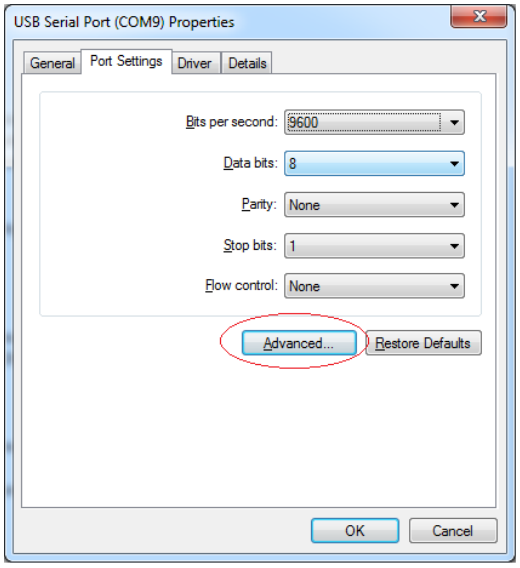


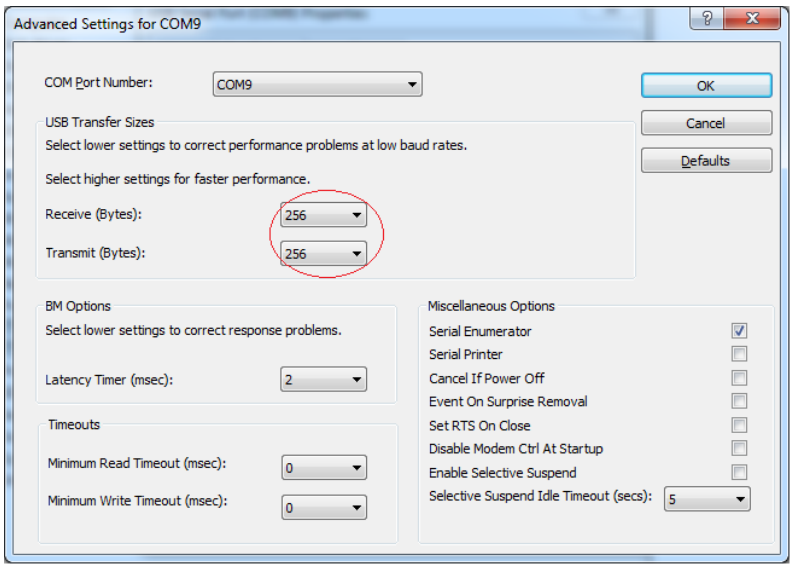
Figure 1: COM port assignments for USB cable in Windows 7.

Make a note of the assigned COM port value(s) information. This will be needed later for connecting to the STIM210 from the PC software.

Right-click "USB Serial Port (COM<n>)" and select "Properties"



Select "Advanced" from the "Port Setting" tab.



Set the "Receive (Bytes)" and Transmit (Bytes) settings to 256.
Press OK twice.

The computer may have to be restarted for the changes to take effect.

4.3 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. The PC software also can be downloaded from the Sensonor support site. Check this site regularly for updates.

5 Connecting the STIM to your PC

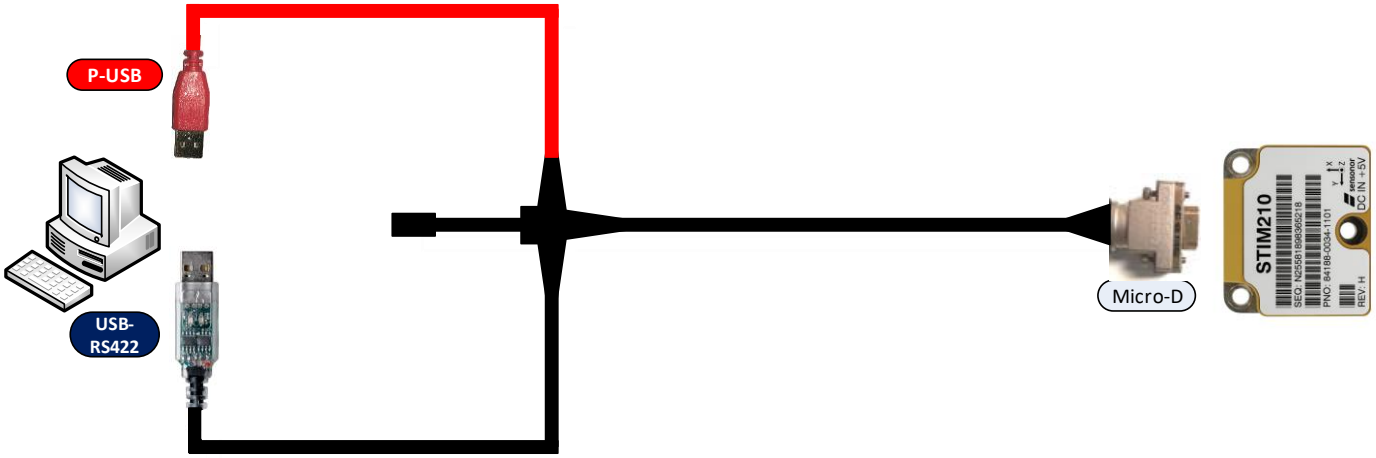


Figure 2 Connecting the STIM210 to the computer

6 Using PC software

1. Navigate to the 'Sensonor evaluation tools' folder from Windows start menu. Click on the shortcut named "STIM210 EVK" to start the PC software. For full functionality, the computer user should have Local Administrator rights.

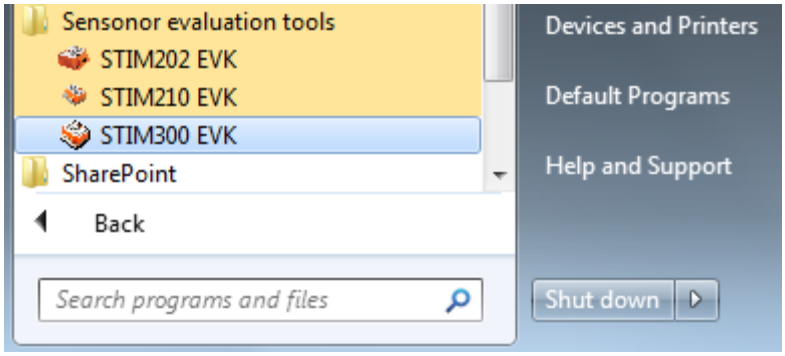


Figure 3: Starting PC software from Windows start menu

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

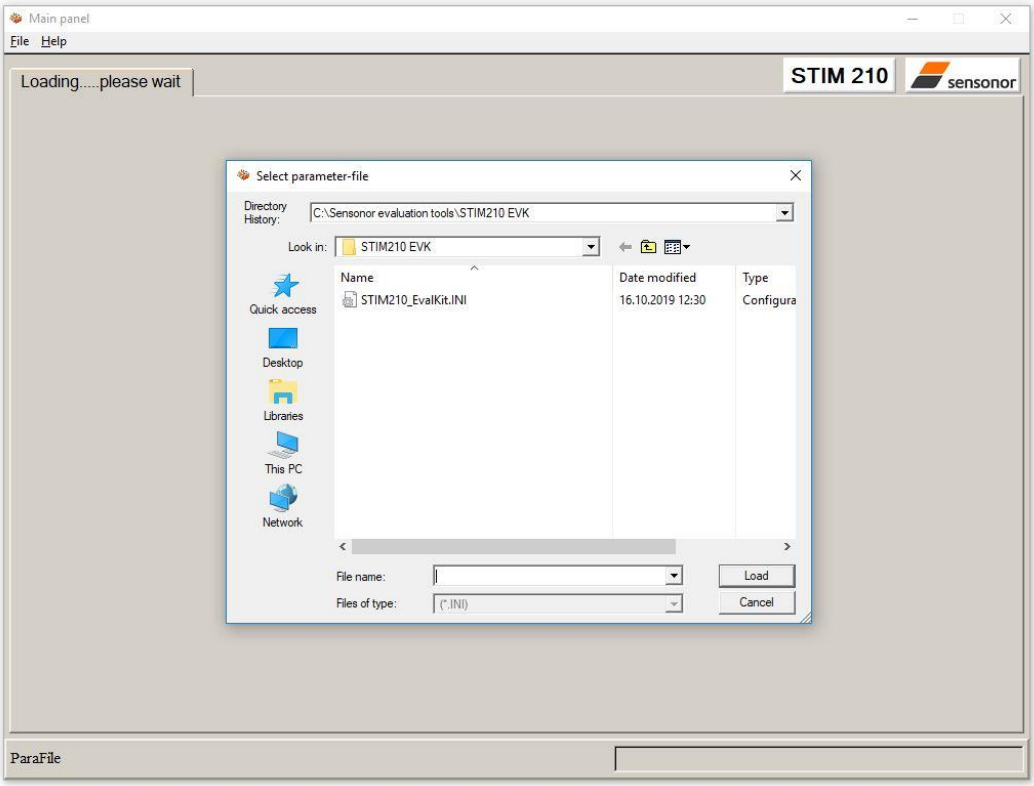


Figure 4: INI-file selection

3. A pop-up box for software registration appears. Fill in the open fields and press "Submit". The default email client opens. Press "Send" in order to complete this step (user information is sent to Sensonor for support issues). This step will only have to be completed once.

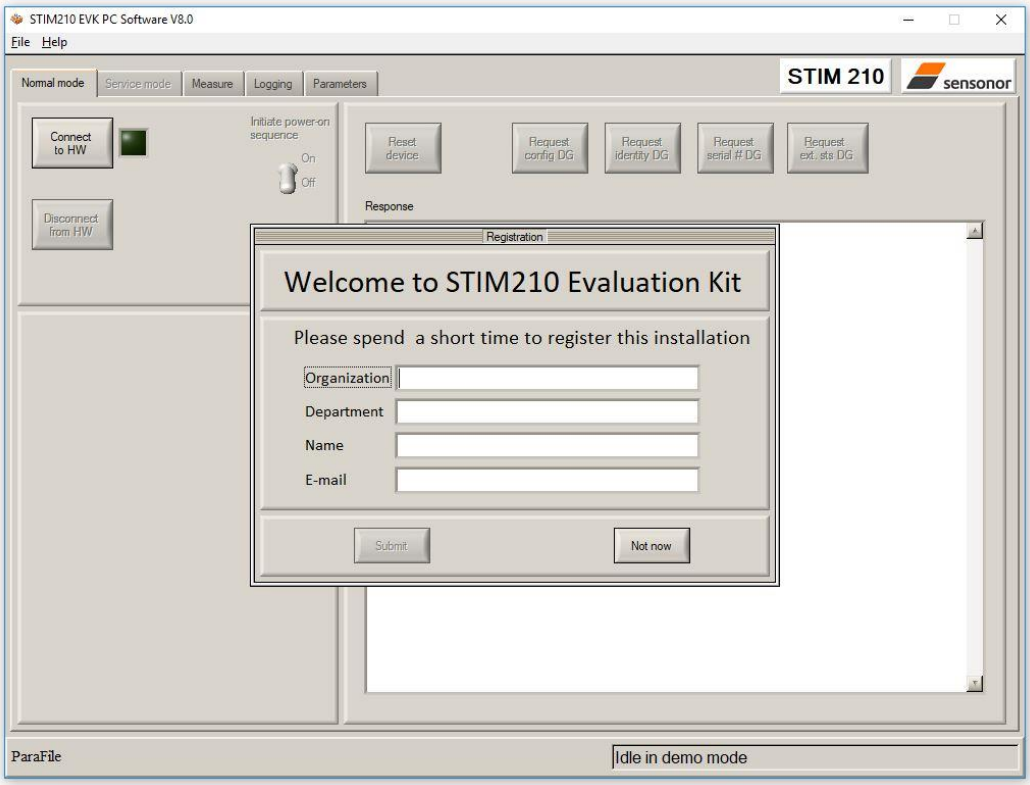


Figure 5: Welcome message and software registration

4. The Normal mode panel is shown

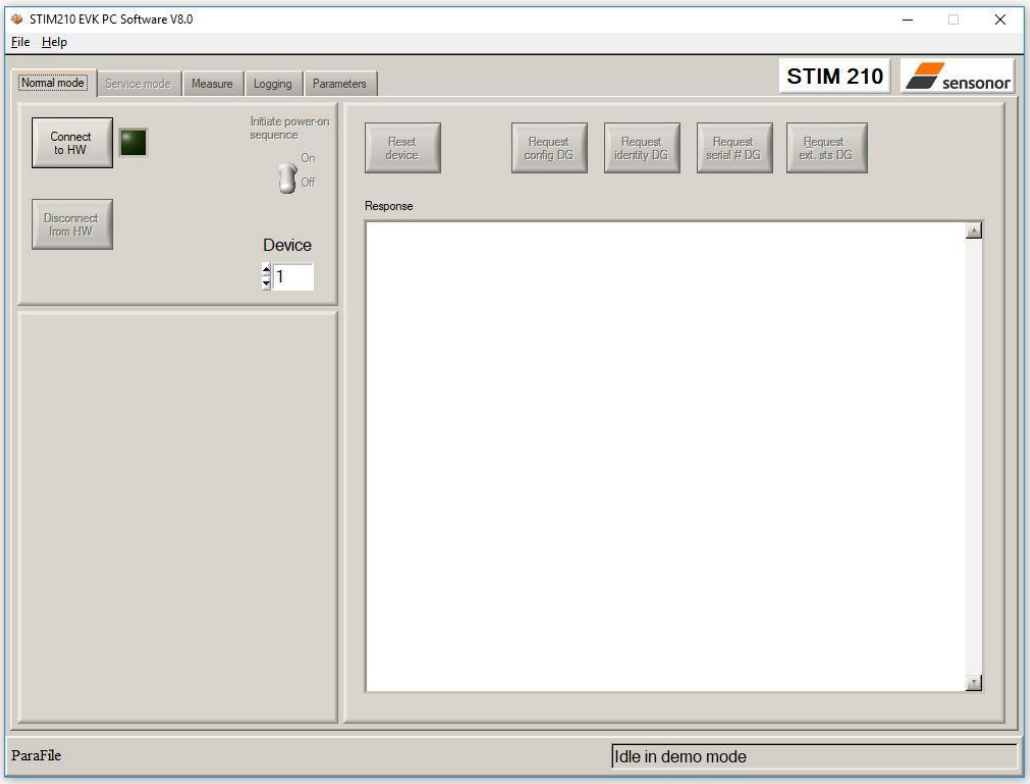


Figure 6: Normal mode panel after selecting INI-file

5. Verify the correct COM port settings in the Parameters view. If needed port # setting needs to be changed, do this by double clicking on the value and enter correct value. The default password to edit is 'stim'.

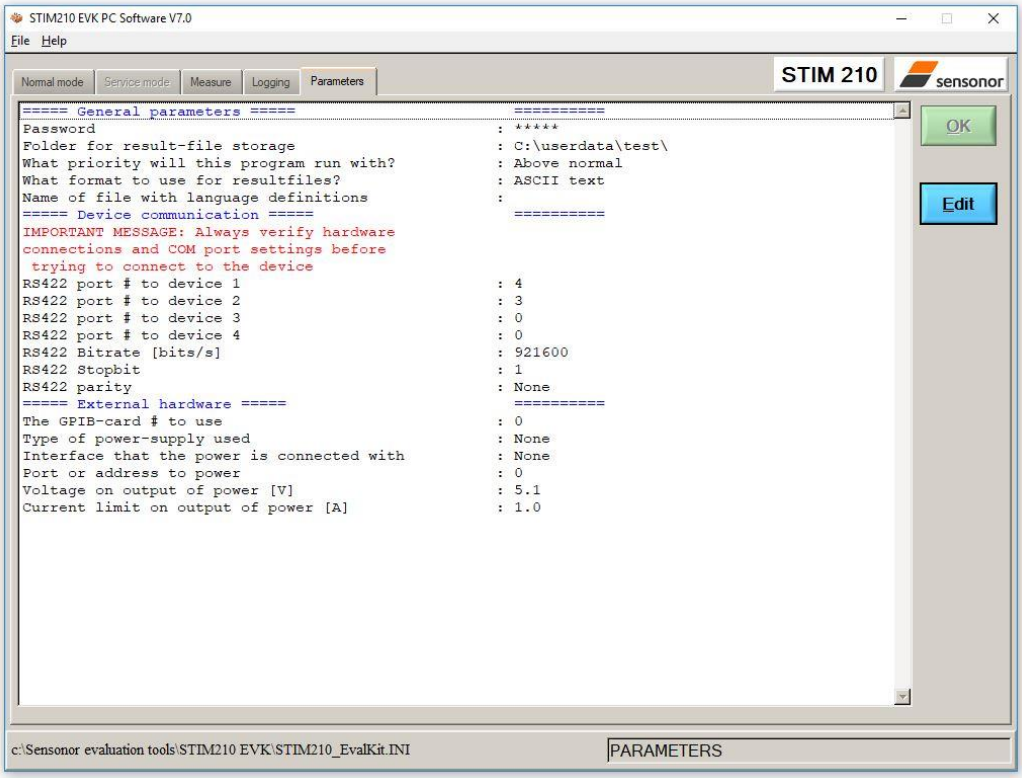


Figure 7: Edit the INI-file in order to verify correct COM port settings

6. 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

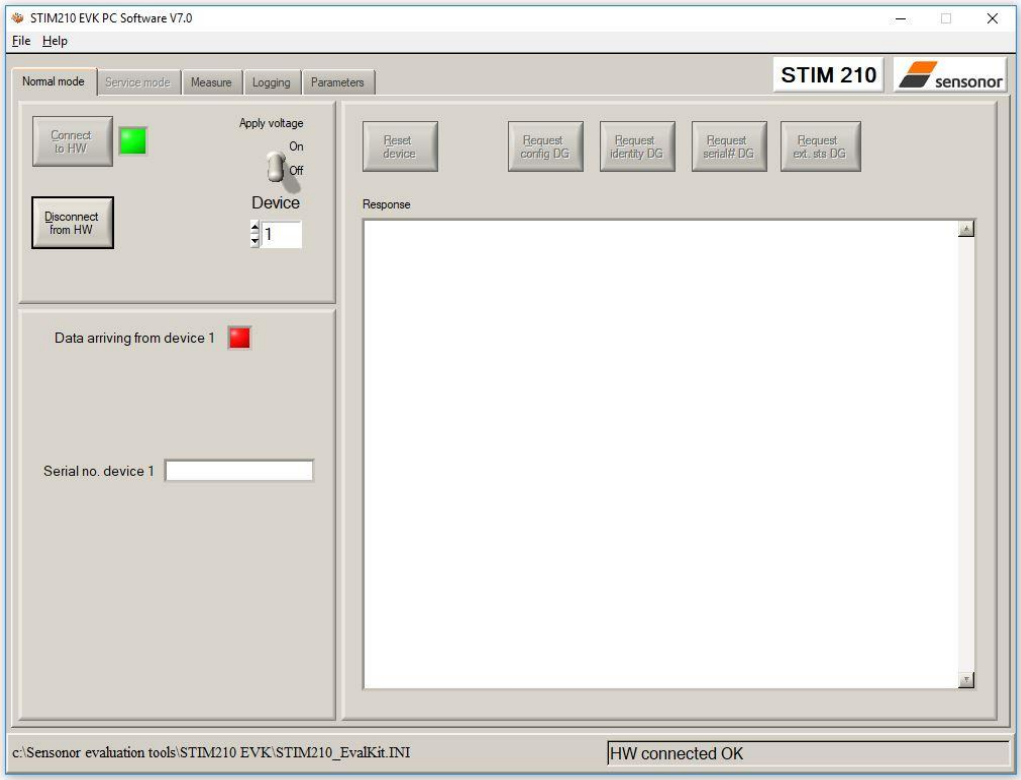


Figure 8: Normal mode panel after first hardware connection

7. 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.

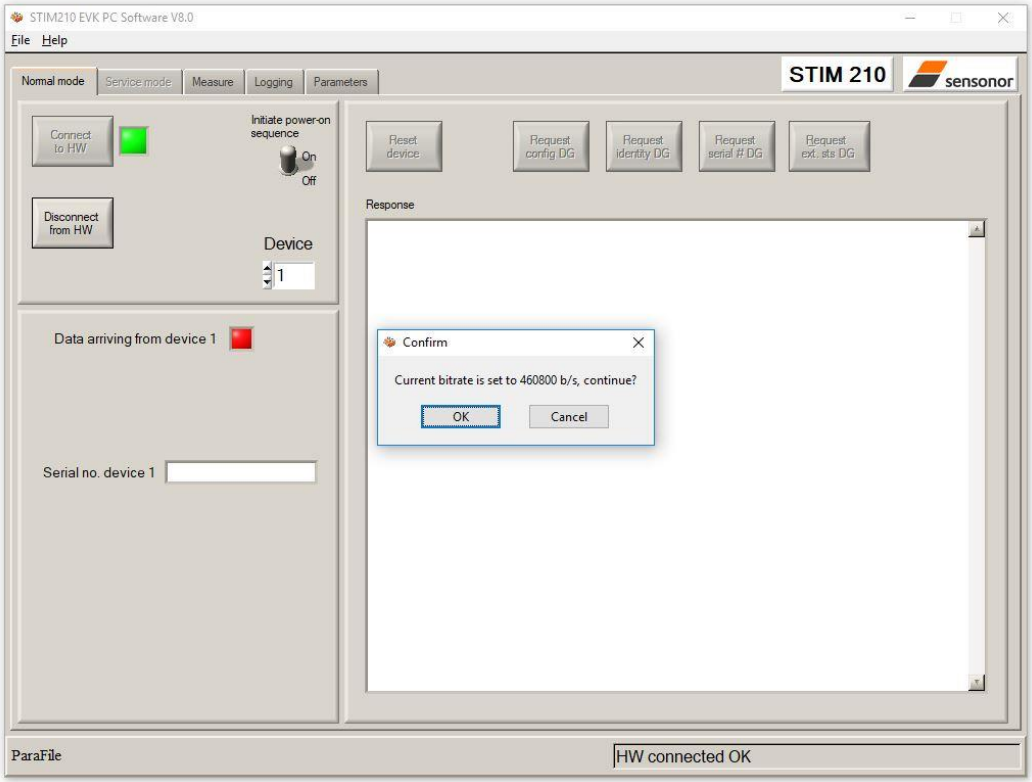


Figure 9: Confirm bitrate

8. 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’

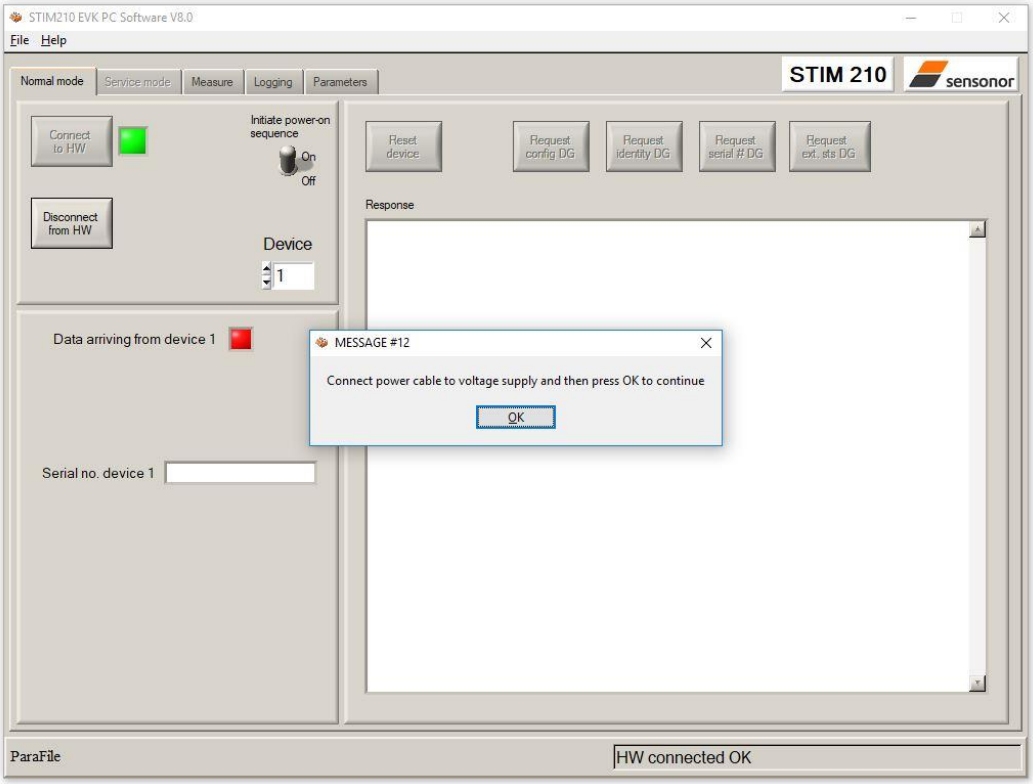


Figure 10: Confirm power supply is switched on

9. 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 11. The system is now ready for use

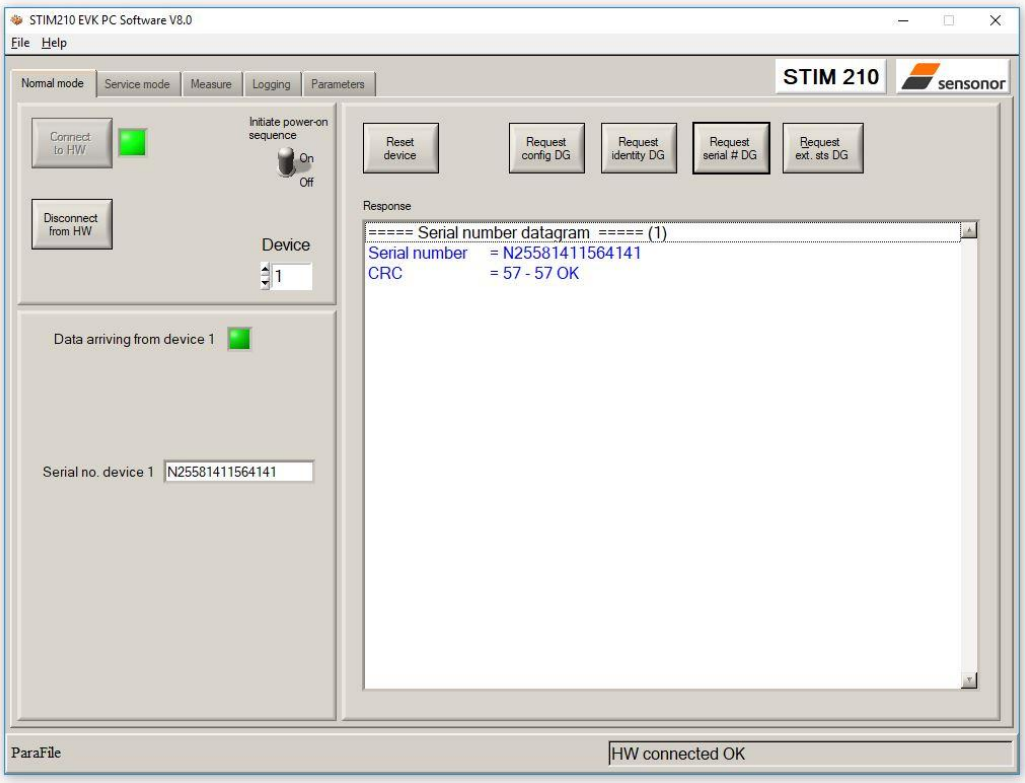


Figure 11: Result of sending 'Request serial# DG' to the STIM210

7 Introduction to PC software

7.1 Panels overview

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

7.1.1 Service mode panel

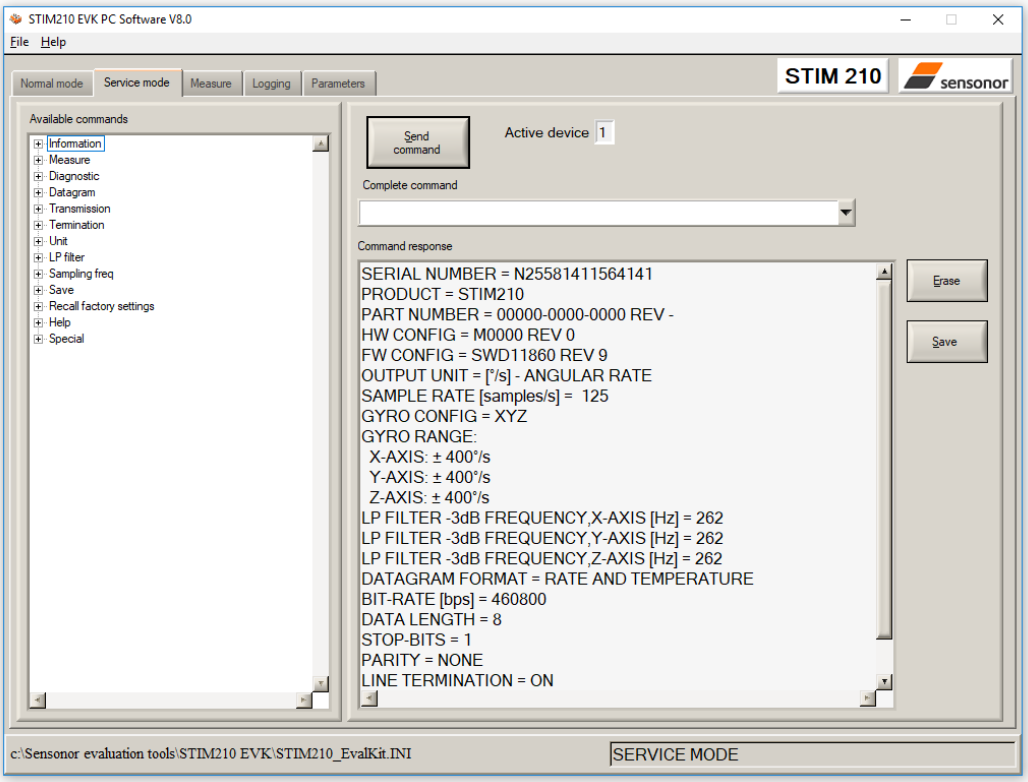


Figure 12: Service mode panel

7.1.2 Measure panel

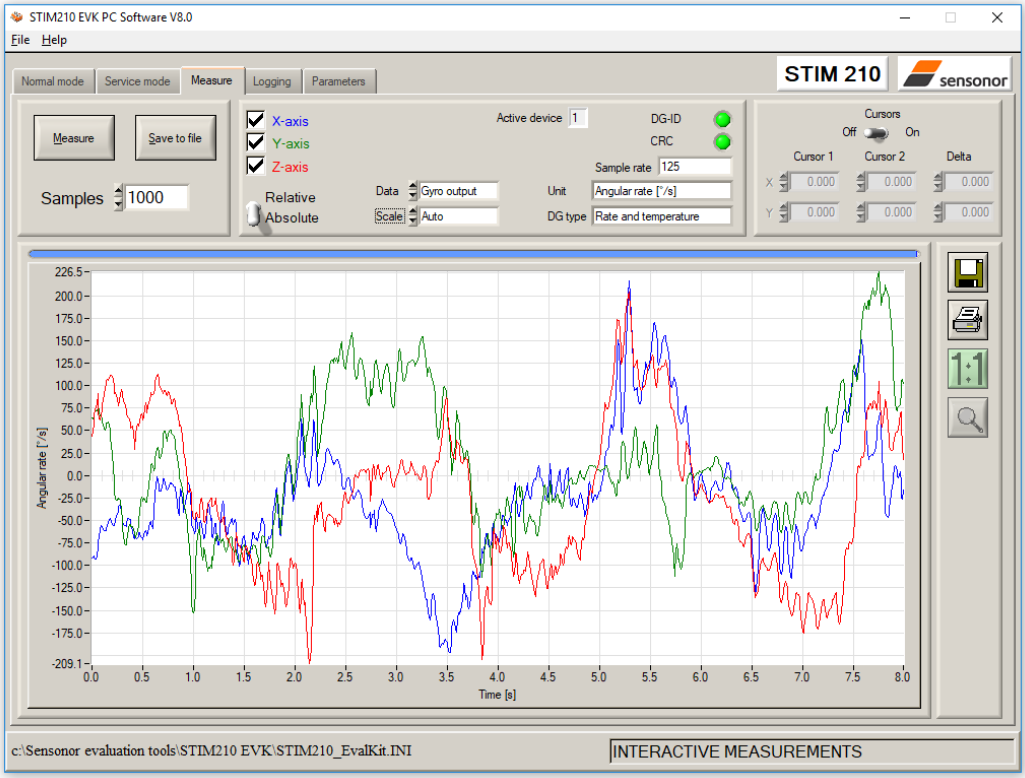


Figure 13: Measure panel

7.1.3 Logging panel

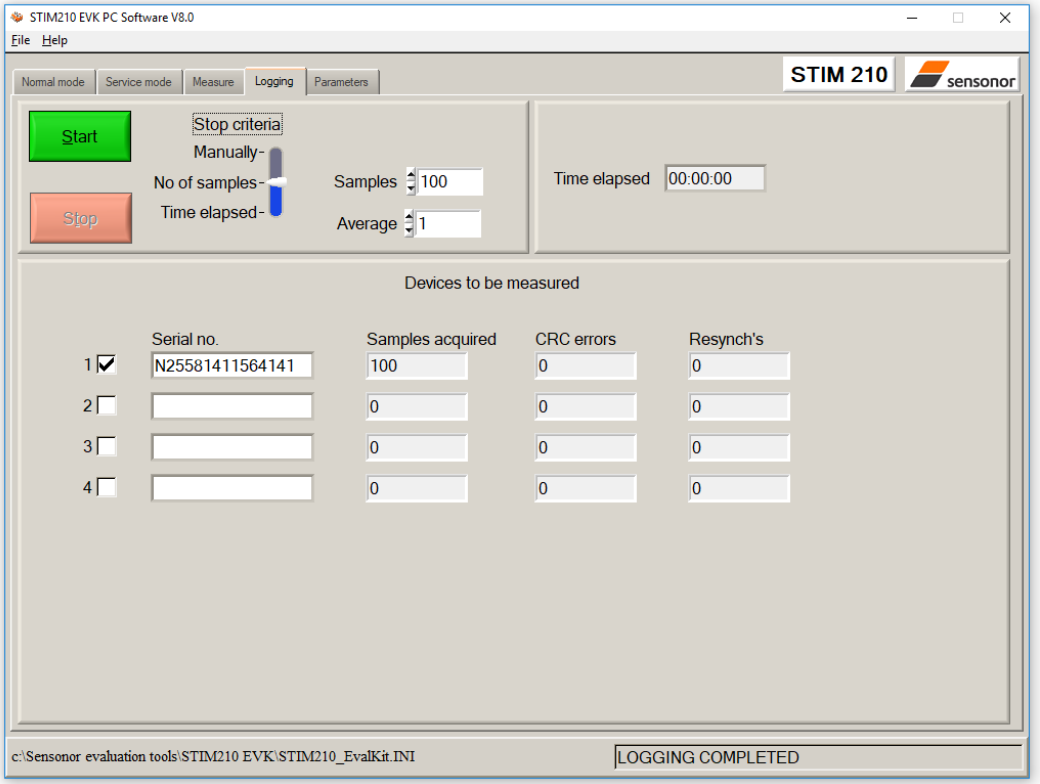


Figure 14: Logging panel (for saving data to file)

7.2 Main panel menu

Table 2: The options available from the main panel menu.

Menu	Description
'File' → 'New parameter file'	Creates a new INI-file with default settings. Note that the new INI-file must be edited to match the hardware and gyro module configuration settings.
'File' → 'Open parameter file'	For loading an existing INI-file
'File' → 'Save parameter file as'	To save current parameter settings with a new file name
'File' → 'Print parameters'	For printing the current 'Parameters' content on the default printer
'File' → 'Edit parameters'	Edit the 'Parameters' content
'File' → 'Exit'	Exit program
'Help' → 'Check for updates'	Opens the Sensonor support site in a web browser. New and updated Drivers, PC software and user manuals can be downloaded
'Help' → 'About'	Information about the program (Program name, publisher and software revision number)

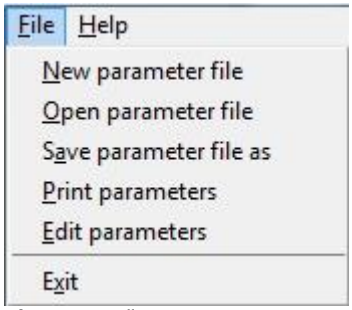


Figure 15: File Menu

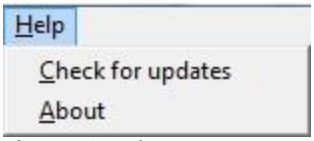


Figure 16: Help menu

7.3 Normal mode panel descriptions

Table 3: Normal mode panel descriptions.

Panel unit	Functionality and description
Connect to HW	Connects to interface hardware. Opens COM port according to settings specified in active parameter file
LED	Indicator for hardware connection. A GREEN light indicates the COM port is opened
Disconnect from HW	Disconnects from interface hardware. Closes the 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	Device number (and corresponding COM port) according to active parameter file. Selects which gyro module is activated for datagram requests in Normal mode, Service mode operations and measurements in Measure panel. Does not apply for Logging panel
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 status button	Sends command (‘E’) to receive extended error information datagram
Response window	Displays response to special datagram requests ('C', 'N' and ‘I’ datagrams)

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 after the gyro module has been powered up. Service mode usage, functionalities and descriptions are listed in Table 4. Exit from Service mode to Normal mode by selecting 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 flash memory when the save command (‘s’) subsequently is sent to the gyro module.

Table 4: 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 be sent. The command is auto-completed by the software during usage of the listings in the Available commands window. Left click inside the Complete command window brings up a list of previously sent commands. Right click enables manual command entry
Send command button	Sends command to the gyro module
Active device indicator	Indicates active gyro module. Corresponding COM port is specified in the active parameter file
Command response window	Shows the responses to commands from the gyro module. See product datasheet for details
Erase button	Clears the content of the command response window
Save button	Saves the content of the command response window to a text file with a date and time tag

7.5 Measure panel descriptions

Table 5: 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 MS)

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 simultaneously)
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	Indicates active gyro module. Corresponding COM port is specified in the active parameter file
CRC and DG-ID LEDS	Status on all CRC checks and DG-IDs. GREEN = OK, RED = FAIL
Data box	Selects which datagram content to be shown. Several options are available, depending on the active datagram type. Left click inside box to display available selections. The plot updates immediately if a measurement series has 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	Displays the sample rate used in measurement
Unit box	Displays the output unit for all measurements (Angular Rate, Incremental Angle, etc.)
DG type box	Displays the type of datagram received
Save to disk icon	Saves the plot to a .JPG file
Print icon	Prints a picture of the plot 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 the 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 above plot area shows the measurement series progress
Lower bar on panel	Shows the INI-file in use and the active mode (INTERACTIVE MEASUREMENTS)

Saved data:
An example of a result file is shown in Figure 17, for a standard datagram measurement series of gyro module # 1. A description of each of the columns of the data log file is found in the table that follows.

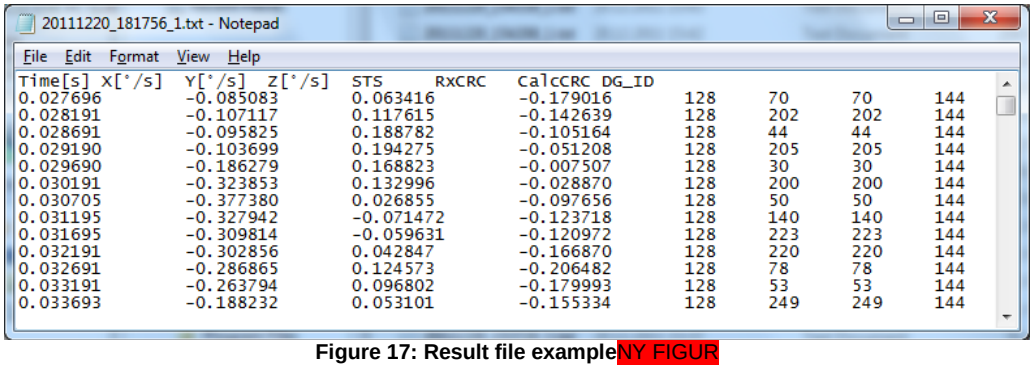


Figure 17: Result file exampleNY FIGUR

Table 6: Result file example. (Standard datagram content written to file).

DG-type	Col. #	Heading	Comments
Standard	1	Time[s]	Time in seconds (derived from sample rate). First sample is always zero.
	2	GYRO_X	Gyro signal X-axis
	3	GYRO_Y	Gyro signal Y-axis
	4	GYRO_Z	Gyro signal Z-axis
	5	GYRO_STS	Status-byte for gyro
	6	GYRO_TMP_X	Temperature, X-axis gyro
	7	GYRO_TMP_Y	Temperature, Y-axis gyro

	8	GYRO_TMP_Z	Temperature, Z-axis gyro
	9	GYRO_TMP_STS	Gyro temperature status
	10	Counter	Sample counter. See product datasheet for details
	11	Latency	Sample latency. See product datasheet for details
	12	RxCRC	Received CRC
	13	CalCRC	Calculated CRC
	14	DG_ID	Datagram identifier

7.6 Logging panel

Table 7: Logging panel descriptions.

Panel unit	Functionality and description
Start button	Starts data logging
Stop button	Stops data logging
Stop criteria slide	User can select between “Manually”, “No of samples” and “Time elapsed” for stopping a measurement series
Samples box	Used for defining number of samples when logging a finite number of samples
Average box	Used for specifying how many samples should be averaged before saving the averaged value to file. If values is ‘1’ no averaging is done
Time elapsed	Shows the time elapsed since start of test
Samples acquired	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 available space on the storage media in use
- The path for result file storage is defined in the active parameter file
- The program should be run with administrator rights to ensure the creation and storage of the result file

7.7 Parameters panel

Table 8: 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	Path to storage (e.g. “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 assigned to gyro module # 1
RS422 port # to device 2	Defining which COM port # to assigned to gyro module # 2
RS422 Bitrate [bit/s]	RS422 bit rate selection
RS422 Stopbit	1 or 2. Default is “1”
RS422 parity	None, odd or even. Default is “None”
===== External Hardware =====	
The GPIB-card # to use	Interface for external power supply (optional). If card(s) are in use; the first card will be assigned to #0, second to #1, etc. Default value is “0”
Type of power supply used	External power supply (optional). Default "None" (not in use). Agilent E3631A, E3633A and E3644A are supported
Interface that the power is connected with	Interface type for external power supply (optional). Default "None" (not in use). RS232 (for Agilent E3631A only) and GPIB supported
Port or address to power	GPIB port for external power supply (optional). Default "0" (not in use). Selectable up to 31
Voltage on output of power supply [V]	Voltage output on external power supply (optional). Default value is 5.1 V. Value should be within the supply voltage range of the gyro module. See product datasheet for details
Current limit on output of power [A]	Current limitation on external power supply (optional). Default value is 1.0 A

7.8 Messages from the program

Messages that the program can display are listed inTable 9:

Table 9: 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 the 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	Power on sequence failed. Note that for the software to be able to read the special datagrams on power-on, the power supply must be applied exactly when instructed as described in previous chapters
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 cannot 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 received	When trying to read datagrams into memory a datagram type not supported by the EVK is detected