**ELECTRONICS & DEFENSE** 







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## 1 EVK features

- PCle kit
  - PCI connectivity to PC
- USB kit
  - USB connectivity to PC
  - Up to 2000Hz sampling rate supported
- Temperature measurements supported
- Service mode and BTO mode access
  - Full IMU information
    - Full IMU configuration capability
  - Detailed IMU diagnostics
  - Help section
- Measure panel
  - Data presentations and save data to file capability
  - o 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 IMUs simultaneously supported (requires additional cable(s))



STIM318 EVK PCI



```
STIM318 EVK USB
```

### 1.1 General description

The evaluation kit provides measurement and configuration access to STIM318 IMU. Configuration, graphical result presentation and saving data to file functions are supported. The single voltage supply required for the IMU operation is provided from an USB port.

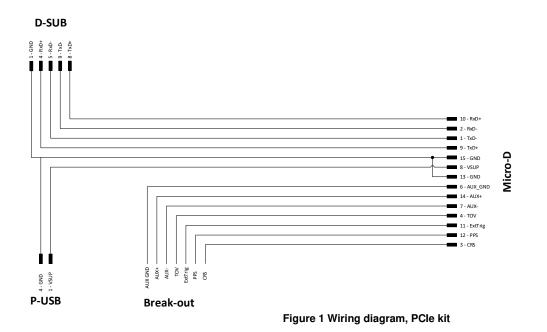
#### USB-kit – important notice!

The USB kit supports certain distinct bit rates only. The following bit rates have been tested and verified:

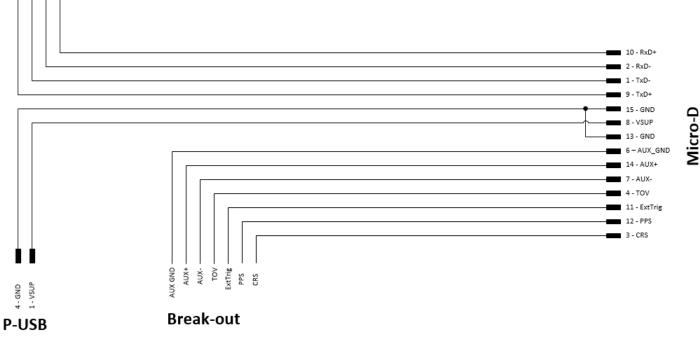
Approved bit rates w/USB kit
3 000 000 bps
2 000 000 bps
1 500 000bps
1 411 765 bps
Most settings below
1 300 000 bps
Table 2 Valid bit rates

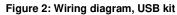
Figure 1 and Figure 2 shows the wiring diagrams of the PCIe and USB version respectively.











## 1.2 Configurable and readable parameters

Configurable parameters in Service Mode:

- Output format (angular rate, incremental angle etc.)
- Bias trim offset parameters
- Datagram format
- Sampling rate
- Bandwidth/ Low pass filter frequency
- RS422 transmission bit rate



- Number of stop bits in datagram
- Parity
- Line/ Datagram termination

Configurable parameters in Bias Trim Offset Mode:

- Gyro bias offset
- Accelerometer bias offset
- Inclinometer bias offset

Readable parameters:

- Part number
- Serial number
- Firmware revision
- Hardware revision
- IMU diagnostics

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

**Note**: Time of Validity (TOV) and external trigger functionalities of STIM318 are not supported by the EVK PC-software.

## Kit contents

- PCIe option:
  - o PCIe to RS422 interface card
  - IMU communication and power cable
- USB kit:
  - USB to RS422 interface cable with USB power supply connector
- Memory stick with:
  - PC software, STIM318
  - $\circ$  User manual for evaluation kit
- Allen Wrench for fixing connector of communication and power cable to the IMU

Note that the evaluation kit does not include a STIM318 IMU. This must be ordered separately.

### 2 System requirements

- Windows XP SP2 (or later), Windows Vista, Windows 7 (32/ 64bit), Windows 10
- PCle kit:
  - 1 free USB port and 1 free PCIe slot
- USB kit:
  - 2 free USB ports
- Quad core processor recommended (when simultaneously logging data from two IMUs)



## 3 Getting started

Depending on the version of evaluation kit, preparing your system involves the following steps:

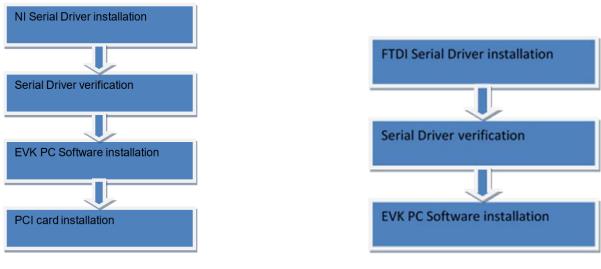




Figure 4: USB kit installation

#### 3.1 PCle installation

### 3.1.1 Installation of PCIe to RS422 serial driver

Install the serial driver from the memory stick included in the kit. This procedure is self-explanatory. Follow the onscreen messages without doing any configuration changes.

Figure 5 and Figure 6 show two of the messages that appear during serial driver installation.

II-Serial 3.6	
Start Installation Review the following summary before continuing.	NATIONAL INSTRUMENTS
Adding of Changing         • NI-Serial 3.6         Documentation         Serial Configuration         • NI-Serial 3.6 for LabVIEW Real-Time         • NI-Serial 2.6 for LabVIEW Real-Time         • NI Spy 2.7.1         • NI Measurement & Automation Explorer 4.6.2	e installation settings
Save File)	<u>Next &gt;&gt;</u>

Figure 5: NI serial driver installation summary





Figure 6: NI serial driver

## 3.1.2 Installation of PCIe card



Disconnect power from your computer prior to installation.

Following your computer manufacturer's directions, insert the card into a free PCIe slot.

### 3.1.3 Verification of serial driver set-up

Launch Device Manager: Start -> Control Panel -> Hardware and Sound -> Devices and Printers -> Device Manager.

Verify that the serial driver installation has completed successfully. An example is shown in Figure 7.

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



<u>File</u> <u>Acti</u>	on <u>V</u> iew <u>H</u> elp	
🗇 🔿   🛙		
17	Ports (COM & LPT)	
	Communications Port (COM1)	
	NI PCI-8431/2 (RS-485) SN:15E50DE, Communications Port 1 (COM4)	
0	NI PCI-8431/2 (RS-485) SN:15E50DE, Communications Port 2 (COM3)	
	NI USB-485/1 SN:00CB33, Communications Port (COM6)	_
	Processors	
D - 00	Security Devices	1
Þ	Sound, video and game controllers	
Þ - 1	System devices	-
Þ 🖶	Universal Serial Bus controllers	

Figure 7: COM port assignments for PCIe card cable in Windows 7

## 3.2 USB installation

## 3.2.1 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: <u>http://www.ftdichip.com/Support/Documents/InstallGuides.htm</u>

### 3.2.2 Connecting the USB EVK to your PC

Figure 8 shows how to connect the EVK to a PC

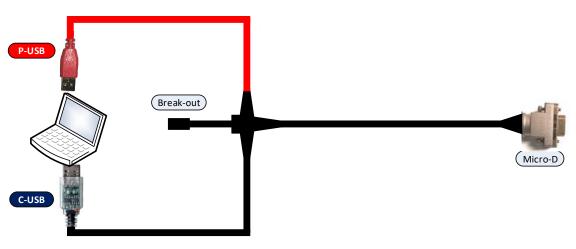


Figure 8: Connecting the EVK to a computer.



### 3.2.3 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:

Device Manager	
Eile <u>A</u> ction <u>V</u> iew <u>H</u> elp	
= 🔿   🖬   🔽 🖬   👧	
Batteries	
Biometric Devices	
Bluetooth Radios	
Computer	
Disk drives	
Display adapters	
DVD/CD-ROM drives	
Human Interface Devices	
De ATA/ATAPI controllers	
> 📲 IEEE 1394 Bus host controllers	
🔊 \overline{a} Imaging devices	
🕟 🥌 Keyboards	
Mice and other pointing devices	
Modems	
👂 🖳 Monitors	
Network adapters	
a 🕎 Ports (COM & LPT)	
Intel(R) Active Management Technology - SOL (COM3)	
USB Serial Port (COM9)	
Processors	
D SD host adapters	
P Security Devices	
Sound, video and game controllers	
🖂 📲 System devices	
🔈 📲 Universal Serial Bus controllers	

Figure 9: COM port assignments for USB cable in Windows

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

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

ieneral Por	t Settings	Driver	Details			
		<u>B</u> its pe	er second:	9600		•
			Data bits:	8		•
			<u>P</u> arity:	None		•
			Stop bits:	1		•
		Elo	ow control:	None		•
				vanced	<u>R</u> estore	Defaults

Figure 10: Port setting properties for COM port

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



COM <u>P</u> ort Number:	СОМ9	<b>•</b>	OK
JSB Transfer Sizes			Cancel
Select lower settings to c	orrect performance problems a	at low baud rates.	
Select higher settings for	faster performance.		Defaults
Receive (Bytes):	256 -	Ŋ	
Transmit <mark>(</mark> Bytes):	256 🗸	$\mathcal{V}$	
3M Options		Miscellaneous Options	
Select lower settings to c	orrect response problems.	Serial Enumerator	
		Serial Printer	
atency Timer (msec):	2 🔻	Cancel If Power Off	
- 100		Event On Surprise Removal	
Timeouts		Set RTS On Close	
Minimum Read Timeout (i	msec):	Disable Modem Ctrl At Startup Enable Selective Suspend	
		) Lindble Belecuve Suspend	E.

Figure 11: Advanced settings for COM port

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.



## 3.3 Installation of PC software

Install the PC software by running "setup.exe" found on the included memory stick or downloaded from product support web page. Follow the on-screen instructions to complete the installation. See the following screen shots for guidance.

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

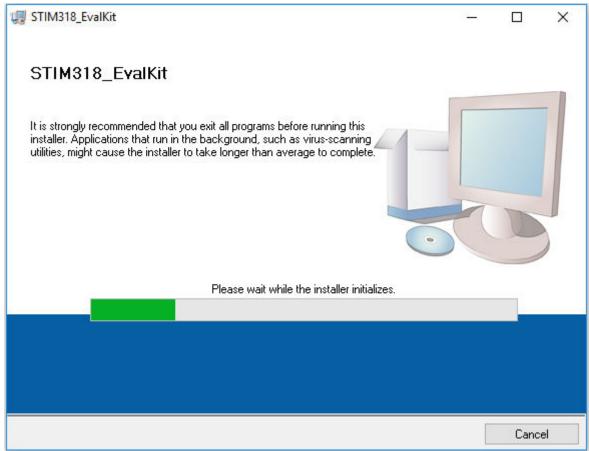


Figure 12: PC software installation (1 of 4). Installer initializes



🐙 STIM318_EvalKit	-		Х
Destination Directory Select the installation directories.			
All software will be installed in the following locations. To install software into a different location, click the Browse button and select another directory.			
Target directory for application C:\Program Files (x86)\STIM318_EvalKit\	-		
	Brow	Ise	
Target directory for National Instruments software C:\Program Files (x86)\National Instruments\	Brow	ise	]
<< <u>B</u> ack <u>Next</u> >		<u>C</u> ance	el

Figure 13: PC software installation (2 of 4)

🐙 STIM318_EvalKit	-		Х
Start Installation Review the following summary before continuing.			
Adding or Changing • STIM318_EvalKit Files Click the Next button to begin installation. Click the Back button to change the installation s	settings		
Save File << Back	·> ]	<u>C</u> ano	el

Figure 14: PC software installation (3 of 4)

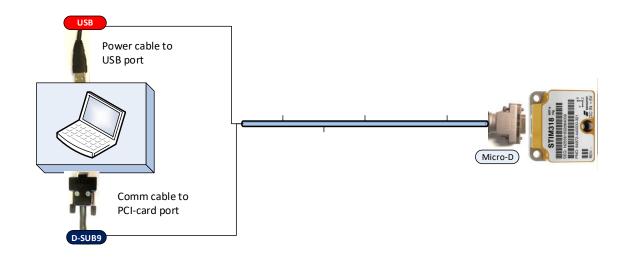


🐙 STIM318_EvalKit		_		×
Installation Complete				
The installer has finished updating your system.				
	<< Back	Next>>	Finis	h

Figure 15: PC software installation (4 of 4). Installation complete



# 4 Connecting the STIM to your PC





#### 5 First PC software start-up

1. Navigate to the 'STIM evaluation tools' folder from Windows start menu. Click on the shortcut named "STIM318 EVK" to start the PC software. For full functionality, the computer user should have Local Administrator rights.

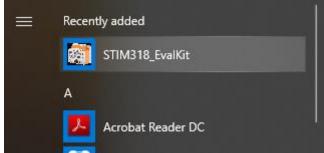


Figure 16: Starting PC software from Windows 10 start menu

2. A pop-up window will ask for a parameter (.INI) file. Select the INI-file (available in the installation folder by default) and press "Load"

Eile <u>H</u> elp							- 🗆 X
Loading please wait					STIM	318	SAFRAN
Select parameter-fil	e					×	
2018 - 122	Windows (C:) > STIM evaluation tool	s > STIM318 GenTest	5~	, P Search STIM	1318 GenTe	st	
Organize 🔻 New	folder			8	: • 🔲	0	
Recovery ^	Name	Date modified	Туре	Size			
STIM evalu	STIM318.INI	11.02.2021 08:55	Configuratio	n sett	7 KB		
STIM210							
STIM300							
STIM300							
STIM318							
STIM320							
STIM320							
System Vo							
temp							
- temp							
urerdata							
userdata							
Users							
Users Vindows 🗸							
Users	File name: 921600.INI		~	(*.INI)		~	
Users	File name: 921600.INI		~	(*.INI) Load	Can		
Users	File name: 921600.INI		~ [	-	Can		
Users	File name: 921600.INI		~ [	-	Can	cel	
Users	File name: 921600.INI		[	-	Can	cel	
Users	File name: 921600.INI		~ [	-	Can	cel	

Figure 17: 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. This step will only have to be completed once.

		23.21	
STIM318 EVK PC Software V3.0		- 0	×
<u>F</u> ile <u>H</u> elp	121		
Nomal mode Service mode BTO mode Measure Logging Parameters	STIM318	SAFF	RAN
Connect to HW     Initiate power-on sequence     Reset device     Reguest config DG     Reguest identify DG     Reguest serial# DG       Disconnect     On     Off     Response	Request BTO DG	Request Ext status	T
from HW Registration		<u></u>	
Welcome to STIM318 EVK PC Software         Please spend a short time to register this installation         Organization         Department         Name         E-mail			
Submit			
		<u></u>	
t:\HEM\STIM Evalkit\STIM318\STIM318.INI			

Figure 18: Welcome message and software registration

4. A pop-up window containing the End User License Agreement appears. Click the "Accept" button to accept the agreement and enable the EVK software to have full functionality.

Elle Help         Normal mode       BTO mode       BTO mode       Measure       Logging       Parameters         Connect       Initiate nowce.on       End User License Agreement       Request         Document revision : DOK477.20       Last updated: December 03, 2001       Please read this End-User License Agreement carefully before clicking the "Agree" button, downloading or using STIM GYRO MODULE AND INU EVALUATION SOFTWARE.         Interpretation ==       Interpretation and Definitions ===         The words of which the initial letter is capitalized have meaning defined under the following conditions. The following definitions shall have the same meaning regardless of whether they appear in singular or in plural.         == 1.2 Definitions ===	- 🗆 X	STIM318 EVK PC Software V3.0
Connect       Initiate nower-on         Disconnect       End User License Agreement         Disconnect       Find User License Agreement ("Agreement")         Disconnect       The second of the		Help
Connect to HW         End User License Agreement         Bequest           Disconnect from HW         End-User License Agreement ("Agreement") ====== Document revision : DOK477.r0 Last updated: December 03, 2021 Please read this End-User License Agreement carefully before clicking the "Agree" button, downloading or using STIM GYRO MODULE AND HMU EVALUATION SOFTWARE.         Image: Connect the transmission of transmission of the transmission of transmissin of transmission of transmission of transmission of transmissi	1318 SAFRAN	Imail mode Service mode BTO mode Measure Logging Parameters STIM318
Connect to HW         End User License Agreement         Bequest           Disconnect from HW         End-User License Agreement ("Agreement") ====== Document revision : DOK477.r0 Last updated: December 03, 2021 Please read this End-User License Agreement carefully before clicking the "Agree" button, downloading or using STIM GYRO MODULE AND HMU EVALUATION SOFTWARE.         Image: Connect the transmission of transmission of the transmission of transmissin of transmission of transmission of transmission of transmissi	1	
Disconnect From HW Disconnect From HW Disconnect I. Interpretation and Definitions small letter is capitalized have meaning sefund under the following conditions. The following definitions shall have the same meaning regardless of whether they appear in singular or in plural. The Definitions small		Connect End User License Agreement
<ul> <li>For the purposes of this End-User License Agreement:</li> <li>- Agreement means this End-User License Agreement that forms the entire agreement between the User and the Company regarding the use of the Application.</li> <li>- Application means the Software program provided by the Company downloaded by the User to a Device, named STIM GYBO MODULE AND IMU EVALUATION SOFTWARE and any its subsequent derivatives and update versions.</li> <li>- Company (referred to as either "the Company", "We", "Us" or "Our" in this Agreement) refers to Sensonor AS, Knudsradvier 7, 3194 Horten, Norway, enterprise \$ NO 390 682 362</li> <li>- Content refers to content such as text, images, data or other information that can be posted, uploaded, linked to or otherwise made available by the User, regardless of the form of that content.</li> <li>- Device means any device that can access the Application such as a computer, a cellphone or a digital tablet.</li> <li>- Sensonor Products means any product developed and/or manufactured and/or sold by Sensonor such as ING, Gyros and Inertial Systems but not limited too.</li> <li>- Third-Party Services means any services or content (including data, information, applications and other products services) provided by a third-party that may be displayed, included or made available by the Application.</li> </ul>		<pre>Co HW  Disconnect For Hey Status Disconnect For Hey Status Disconnect For Hey Status Disconnect For the purposes of this End-User License Agreement ("Agreement") """""""""""""""""""""""""""""""""""</pre>
t:\HEM\STIM Evalkit\STIM318\STIM318.INI NORMAL MODE		IEM\STIM EvalKit\STIM318\STIM318.INI

Figure 19: EULA confirmation window

5. The Normal mode panel is shown



Image: STIM318 EVK PC Software V3.0 <u>File</u>			- 0	×
Normal mode Service mode BTO mode Measure Log	ng Parameters	STIM318	SAFRA	N
Connect to HW Disconnect from HW Device	Reset       Request config DG       Request identity DG       Request serial# DG         Response	Bequest BTO DG	Request Ext status	
t:\HEM\STIM EvalKit\STIM318\STIM318.INI	NORMALMODE			_

Figure 20: Normal mode panel after selecting INI-file



6. 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'.

STIM318 EVK PC Software V3.0		10			×
Eile Help					
Normal mode Service mode BTO mode Measure Logging Parameters	ST	IM318	Ss	6AFR	AN
===== General parameters =====	========	l		4.15	
Password	: ****			<u>OK</u>	
Folder for result-file storage	: c:\temp\		-		-
What priority will this program run with?	: Below normal				
What format to use for resultfiles?	: ASCII text		-		_
Name of file with language definitions	: c:\temp\			Edit	
===== Device communication =====	========			Luit	
IMPORTANT MESSAGE: Always verify hardware					
connections and COM port settings before					
trying to connect to the device					
RS422 port # to device 1	: 5				
RS422 port # to device 2	: 0				
RS422 port # to device 3	: 0				
RS422 port # to device 4	: 0				
RS422 Bitrate [bits/s]	: 921600				
RS422 Stopbit	: 1				
RS422 parity	: None				
===== External hardware =====					
The GPIB-card # to use	: 0				
Type of power-supply used	: None				
Interface that the power is connected with	: GPIB				
Port or address to power	: 5				
Voltage on output of power [V]	: 5.0				
Current limit on output of power [A]	: 2.0				
currents rimits on subbus of bener [11]					
			-		
		-	_		
	I				
t:\HEM\STIM EvalKit\STIM318\STIM318.INI	PARAMETERS				
			_	_	_

Figure 21: Edit the INI-file in order to verify correct COM port settings

7. Connect the IMU by pressing the 'Connect to HW' button in the Normal mode panel. A green LED light indicates that the COM port is active

STIM318 EVK PC Software V3.0			- 🗆 ×
Normal mode Service mode BTO mode Measure Loggi	ng Parameters	STIM318	SAFRAN
Connect to HW Disconnect from HW Device	Reset       Request config DG       Request identity DG       Request serial# DG         Response	Request BTO DG	Request Ext statos
t:\HEM\STIM EvalKit\STIM318\STIM318.INI	HW connected OK		

Figure 22: Normal mode panel after first hardware connection

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



ISTIM318 EVK PC Software V3.0 File Help		- 🗆 X
	TIM318	SAFRAN
Connect Initiate power-on Reset Request Request Request Request	lequest 3TO DG	Request Ext status
t:\HEM\STIM EvalKit\STIM318\STIM318.INI HW connected OK		

Figure 23: Normal mode panel after switching on voltage

 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'

Connect       Initiate power-on sequence         Image: Sequence       Image: Sequence <t< th=""><th>mal mode Service mode BTO mode Measur</th><th>e Logging Parameters</th><th>STIM318</th><th>SAFRA</th></t<>	mal mode Service mode BTO mode Measur	e Logging Parameters	STIM318	SAFRA
Connect power cable to voltage supply and then press OK to continue	Connect to HW Disconnect from HW Devic	n Response Request advice config DG identity DG serial#DG		Ext status
		Connect power cable to voltage supply and then press OK to continue		

- Figure 24: Confirmation of supply voltage
- 10.A green LED (Data arriving from device n) indicates that data is received from the IMU(s). Verify the communication to module by clicking on the 'Request serial# DG' button. An example of such a result is shown in Figure 25. The system is now ready for use.



STIM318 EVK PC Software V3.0			- 0	×
<u>File H</u> elp				
Normal mode Service mode BTO mode Measure Lo	ging Parameters	STIM318	SA	FRAN
Connect to HW Disconnect from HW Device 1 Data arriving from device 1 Serial no. device 1 N25582005068407	Reset       Request       Request       Request         device       Config DG       Reduction       Request         response       Serial number       = N25582005068407         CRC       = 984075464 - 984075464 OK	Bequest BTO DG	Bequest Ext status	
t:\HEM\STIM EvalKit\STIM318\STIM318.INI	HW connected OK			

Figure 25: Example of 'Request serial# DG' response



## 6 Introduction to PC software

#### 6.1 Panels overview

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

## 6.1.1 Service mode panel

∰ STIM318 EVK PC Software V3.0 — □ >			
lormal mode Service mode BTO m	ode Measure Logging Parameters	STIM318	SAFRAI
Available commands  Implement in the implement is a second	Send command Complete command	Active device 1	
Transmission     Termination	Command response	<u> </u>	
<ul> <li>Unit</li> <li>UP filter</li> <li>Gyro acc. comp. settings</li> <li>Bas tim offset</li> <li>Save mortiguration</li> <li>Save</li> <li>Save</li> <li>Real factory settings</li> <li>Help</li> <li>Special</li> </ul>	SERIAL NUMBER = N25582005068407 PRODUCT = STIM318 PART NUMBER = 00000-0000-0000 REV - FW CONFIG = SWD12270 REV 0.1493 GYRO OUTPUT UNIT = [1'/s] - ACCELERATION INCLINOMETER OUTPUT UNIT = [10'/s] - INTEGRATED VELOCITY SAMPLE RATE [samples/s] = 1000 GYRO CONFIG = XY2 ACCELEROMETER CONFIG = XY2 INCLINOMETER CONFIG = NA GYRO RANGE: X-AXIS: ± 400°/s Z-AXIS: ± 400°/s Z-AXIS: ± 10g Y-AXIS: ± 10g Y-AXIS: ± 10g INCLINOMETER RANGE: X-AXIS: ± 10g INCLINOMETER RANGE: X-AXIS: ± 10g INCLINOMETER RANGE: X-AXIS: ± 10g INCLINOMETER RANGE: X-AXIS: ± 1.7g Z-AXIS: ± 1.7g GYRO LP FILTER -3dB FREQUENCY, X-AXIS [Hz] = 33		Erase

Figure 26: Service mode panel

## 6.1.2 BTO panel

STIM318 EVK PC Software V3.0 e <u>H</u> elp		– D X
Iomal mode Service mode BTO mode Measure	e Logging Parameters	STIM318 SAFRAM
Available commands	Send	Active device 1
Information     Programming	command	Active device 1
± Utilities	Complete command	
		•
	Response	
		Erase
		Save
ৰ		<u>ل</u> تے .
HEM\STIM EvalKit\STIM318\STIM318.INI	в	TO MODE

Figure 27: BTO mode panel



#### 6.1.3 Measure panel



Figure 28: Measure panel

## 6.1.4 Logging panel

mal mode Servi	ice mode BTO mode Measure	Logging Parameters	-		STIM318	SAFF
Start Stop	Stop criteria Manually - No of samples - Time elapsed -	Samples $21000$ Average $21$	Time elapsed	00:00:01		
		Devices to be m	easured			
	Serial no.	Samples acquired	CRC errors	Resynch's		
1 🔽	N25582005068407	1000	0	0		
2 🕅		0	0	0	I	
3		0	0	0	1	
4		0	0	0	ſ	

Figure 29: Logging panel (for saving data to file)

#### 6.2 Main panel menu

Menu	Description
'File' $\rightarrow$ '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 IMU configuration settings.
'File' $\rightarrow$ 'Open parameter file'	For loading an existing INI-file



'File' $\rightarrow$ '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
$File' \rightarrow File'$	Exit program
'Help' $\rightarrow$ 'Check for updates'	Opens the Product support site in a web browser. New and updated Drivers, PC software and user manuals can be downloaded
'Help' → 'License agreement'	Displays the End User License Agreement with buttons for Agree or Decline
'Help' → 'About'	Information about the program (Program name, publisher and software revision number)

Table 3: Menu contents

## <u>File</u> <u>H</u>elp

New parameter file

Open parameter file

S<u>a</u>ve parameter file as

Print parameters

Edit parameters

Exit

Figure 30: File Menu

## Help Check for updates License agreement About

Figure 31: Help menu



## 6.3 Normal mode panel

Panel content	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			
Apply voltage switch (On/Off)	Toggles supply voltage if connected to 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 IMU 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 IMU. 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			
Request BTO DG button	Sends command ('T') to receive Bias Trim Offset datagram			
Response window	Displays response to special datagram requests ('C', 'N' and 'I' datagrams)			

Table 4: Normal mode panel descriptions

### 6.4 Service mode panel

Service mode is used for IMU configuration.

Service mode is entered by clicking on the Service mode tab next to the Normal mode tab after the IMU has been powered up. Service mode usage, functionalities and descriptions are listed in Table 5. 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 IMU in Service mode are only stored permanently in flash memory when the save command ('s') subsequently is sent to the IMU.

Panel content	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 IMU			
Active device indicator	Indicates active IMU. Corresponding COM port is specified in the active parameter file			
Command response window	Shows the responses to commands from the IMU. 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			

Table 5: Service mode panel descriptions



## 6.5 BTO mode panel

BTO mode is used for configuration of bias trim offset parameters.

BTO mode is entered by clicking on the BTO mode tab after the IMU has been powered up. BTO mode usage, functionalities and descriptions are listed in Table 6. Exit from BTO mode to Normal mode by selecting any available panel tab.

Note: Changes made for the IMU in BTO mode are only stored permanently in flash memory when the settings are saved to flash memory.

Panel content	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 IMU			
Command response window	Shows the responses to commands from the IMU. 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			

Table 6: BTO mode panel descriptions



# 6.6 Measure panel

Panel content	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	When set to 'Absolute', all results are plotted as received. When set to 'Relative'
switch	the curves are translated so that the first measurement is shown in the plot as zero.
Active device indicator	Indicates active IMU. 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)

Table 7: Measure panel description



# Saved data:

An example of a result file is shown in Figure 32, for a standard datagram measurement series of IMU # 1. A description of each of the columns of the data log file is found in the table that follows.

N25582005068407_2	20210302_120310_1.txt -	Notepad											-		×
Eile Edit Format y															
erial no anple rate yro BV X yro BV Y yro BV Y yro range X yro range X yro range Z co unit co BV X co BV X co BV Z co co range X	N25582005068407 1000 33 33 33 0 0 0 0 33 33 33 0 0 0 0														
	$\begin{array}{c} {\rm GYRO}, {\rm Y}, {\rm GYRO}, {\rm Z}, {\rm GYRO}, {\rm Z}, {\rm 0}, {\rm 043}, {\rm 279}, {\rm 0}, {\rm 042}, {\rm 279}, {\rm 0}, {\rm 042}, {\rm 279}, {\rm 0}, {\rm 043}, {\rm 274}, {\rm 0}, {\rm 035}, {\rm 2770}, {\rm 0}, {\rm 035}, {\rm 2770}, {\rm 0}, {\rm 035}, {\rm 2770}, {\rm 0}, {\rm 0320}, {\rm 243}, {\rm 1}, {\rm 0}, {\rm 035}, {\rm 0}, {\rm 0320}, {\rm 243}, {\rm 1}, {\rm 0}, {\rm 005}, {\rm 0}, {\rm 0}, {\rm 005}, {\rm 0}, {\rm 0},$	$\begin{array}{c} v_{\rm TCST6t} & {\rm ACC\_M}\\ -0.0166487\\ -0.0164874\\ -0.0175242\\ -0.00175242\\ -0.0075242\\ -0.0075242\\ 0.00911553\\ 0.00911553\\ 0.0011557\\ 0.0211182\\ 0.033451\\ 0.033454\\ 0.033455\\ 0.0345731\\ 0.0345757\\ 0.03457531\\ 0.0345755\\ 0.035555\\ 0.03555\\ 0.03555\\ 0.03555\\ 0.03555\\ 0.03555\\ 0.0355\\ 0.03555\\ 0.03555\\ 0.035\\ 0.0355\\ 0.00$	$\begin{array}{c} ACC_Y & ACC_Z \\ 0 & 005 espects \\ 0 & 005 asymptotic \\ 0 & 005 as$	AccSts 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} 0.00271034\\ 0.00220571\\ 0.00229536\\ 0.00239536\\ 0.00239536\\ 0.00239526\\ 0.00239526\\ 0.002439526\\ 0.00243252\\ 0.00243256\\ 0.002276375\\ 0.00224386\\ 0.00276375\\ 0.002631576\\ 0.00251576\\ 0.00251576\\ 0.00253296\\ 0.00253296\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.00253294\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552394\\ 0.002552342\\ 0.00255252\\ 0.00255232\\ 0.0025523\\ 0.0025523\\ 0.002552\\ 0.0025523\\ 0.0025$	$\begin{array}{c} Rec Bc & CalCRC \\ 0.0007457 \\ 0.00074519 \\ 0.00074519 \\ 0.00075110 \\ 0.0007510 \\ 0.0007510 \\ 0.00057110 \\ 0.0005710 \\ 0.00055102 \\ 0.00055102 \\ 0.00055102 \\ 0.00055102 \\ 0.00055102 \\ 0.0005450 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.000540 \\ 0.00059$	$\begin{array}{c} DG_{-}TD \\ 1 & 0000 44114 \\ 1 & 0000 8531 \\ 1 & 0000 87166 \\ 1 & 0000 8706 \\ 1 & 0000 89076 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 0000 89075 \\ 1 & 00076675 \\ 1 & 00076675 \\ 1 & 00076675 \\ 1 & 000776576 \\ 1 & 000776576 \\ 1 & 000775140 \\ 1 & 000775540 \\ 1 & 00076675540 \\ 1 & 000775540 \\ 1 & 000765540 \\ 1 & 000765540 \\ 1 & 000765540 \\ 1 & 000765540 \\ 1 & 000765540 \\ 1 & 000765540 \\ 1 & 000666455 \\ 1 & 0007664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000666455 \\ 1 & 000664655 \\ 1 & 000664655 \\ 1 & 000664555 \\ 1 & 000664555 \\ 1 & 000664555 \\ 1 & 000664555 \\ 1 & 000664555 \\ 1 & 000664555 \\ 1 & 000666555 \\ 1 & 000666555 \\ 1 & 00065555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 00066555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 0006655555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 000665555 \\ 1 & 00$		97 99 101 103 105 107 109 113 113 123 125 129 131 123 135 127 133 135 137 139 134 143 143	506 506 506 506 506 506 506 506 506 506	$\begin{array}{c} 1830925590\\ 2207972000\\ 2204518235\\ 171634606\\ 3833059400\\ 2333059400\\ 233501604\\ 133501604\\ 333029501604\\ 133501604\\ 3302905191\\ 1718657760\\ 3302905191\\ 3302905191\\ 3302905191\\ 33663914599\\ 26779393576\\ 244502796\\ 2445022796\\ 2445022796\\ 2445022796\\ 2445022796\\ 2445022796\\ 2445022796\\ 2445022796\\ 2445022796$	$\begin{array}{c} 1830925590\\ 2209782000\\ 2204518235\\ 1716346164\\ 10333365400\\ 133335501604\\ 1039576011\\ 3339501604\\ 1039576011\\ 33923061591\\ 2146574203\\ 246254129\\ 3165572297\\ 2462575012\\ 24625750711\\ 25513041459\\ 255130424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 2590424230\\ 259042330$		1455 114555 11455 114555 114555 114555 114555 114555 1145555 1145555 1145555 11455555 11455555555	
069331 070347	0.0216064 0.0248413	0.0499268 0.0473022	-0.0249023 -0.0284424	0	0.00245094 0.00242043	0.00086021 0.00090599	1.00063133 1.00060272	Ö	151	506 506	3482036581 2628372395	3482036581 2628372395		145 145	
071637	0.0285034 0.0325317	0.0436401 0.0393066	-0.0307007 -0.0321655	0	0.00237465	0.00095749 0.00100327	1.00057793	0	155 157	506 507	4041051843 521851980	4041051843 521851980		145 145	
073648	0.0368042 0.0409546	0.0347290 0.0308838	-0.0332642 -0.0338135	0	0.00237846	0.00104904 0.00108337	1.00054359	0	159 161	506 507	3230278474 3906799444	3230278474 3906799444	1	145 145	
076321	0.0454102 0.0490723 0.0512916	0.0280762 0.0269165 0.0269555	-0.0336304 -0.0330811 -0.0323486	0	0.00242424	0.00111198 0.00112915 0.00114250	1.00053024 1.00053596 1.00054741	0	163 165 167	505 507 506	3822860592 2929874706 1030291844	3822860592 2929874706 1030291844	8	145 145	

Figure 32: Result file example

DG-	Col. #	Heading	Comments
type			
	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	ACC_X	Accelerometer signal X-axis
	11	ACC_Y	Accelerometer signal Y-axis
	12	ACC_Z	Accelerometer signal Z-axis
	13	ACC_STS	Status-byte for accelerometer
Ð	14	ACC_TMP_X	Temperature, X-axis accelerometer
Standard	15	ACC_TMP_Y	Temperature, Y-axis accelerometer
an	16	ACC_TMP_Z	Temperature, Z-axis accelerometer
St	17	ACC_TMP_STS	Accelerometer temperature status
	18	INC_X	Inclinometer signal X-axis
	19	INC_Y	Inclinometer signal Y-axis
	20	INC_Z	Inclinometer signal Z-axis
	21	INC_STS	Status-byte for inclinometer
	22	INC_TMP_X	Temperature, X-axis inclinometer
	23	INC_TMP_Y	Temperature, Y-axis inclinometer
	24	INC_TMP_Z	Temperature, Z-axis inclinometer
	25	INC_TMP_STS	Inclinometer temperature status
	26	Counter	Sample counter. See product datasheet for details
	27	Latency	Sample latency. See product datasheet for details
	28	RxCRC	Received CRC
	29	CalCRC	Calculated CRC
	30	DG_ID	Datagram identifier

Table 8: Result file content, datagram including Gyro, Accelerometer, Inclinometer, Temperature



## 6.7 Logging panel

Panel content	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	Used for downsampling of data. Average value of selected number of
	values is logged to file
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 us	
	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
	Table 9: Logging panel descriptions

Log to file capability:

- Quad core processor is recommended when measuring on two or more IMUs 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



## 6.8 Parameters panel

Panel content	Functionality and description
===== General parameters =====	
Password	Current valid password to be able to edit the parameters list. The default 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 (see description in 6.8.1)
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 IMU # 1
RS422 port # to device 2	Defining which COM port # to assigned to IMU # 2
RS422 port # to device 3	Defining which COM port # to assigned to IMU # 3
RS422 port # to device 4	Defining which COM port # to assigned to IMU # 4
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 IMU. 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

Table 10: Parameters panel descriptions

## 6.8.1 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.

## 6.9 Messages from the program

Messages that the program can display are listed in Table 11.



#	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 IMU 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 IMU, 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 detect the three special datagrams that theSTIM318 sends immediately after power on. This could result from incorrect power up sequence (as specified via dialog boxes during power-on procedure) or from incorrect communication settings (COM port number, parity settings, number of stop bits, bit rate etc.)
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 IMU, 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, 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

Table 11: Possible messages given by the program



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