VECTOR

Vector Logger Suite Manual

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Imprint

Vector Informatik GmbH
Ingersheimer Straße 24
D-70499 Stuttgart

Contents

1 Introduction

In this chapter you find the following information:

1.1 About this User Manual

Conventions

In the two following charts you will find the conventions used in the user manual regarding utilized spellings and symbols.

Style	Utilization
bold	Blocks, surface elements, window and dialog names of the software. Accentuation of warnings and advices. **[OK]** Push buttons in brackets **File|Save** Notation for menus and menu entries
`Source Code`	File name and source code.
Hyperlink	Hyperlinks and references.
<CTRL>+<S>	Notation for shortcuts.

Symbol	Utilization
	This symbol calls your attention to warnings.
	Here you can obtain supplemental information.
	Here you can find additional information.
	Here is an example that has been prepared for you.
	Step-by-step instructions provide assistance at these points.
	Instructions on editing files are found at these points.
	This symbol warns you not to edit the specified file.

1.1.1 Warranty

Restriction of warranty

We reserve the right to change the contents of the documentation and the software without notice. Vector Informatik GmbH assumes no liability for correct contents or damages which are resulted from the usage of the documentation. We are grateful for references to mistakes or for suggestions for improvement to be able to offer you even more efficient products in the future.

1.1.2 Registered Trademarks

Registered trademarks

All trademarks mentioned in this documentation and if necessary third party registered are absolutely subject to the conditions of each valid label right and the rights of particular registered proprietor. All trademarks, trade names or company names are or can be trademarks or registered trademarks of their particular proprietors. All rights which are not expressly allowed are reserved. If an explicit label of trademarks, which are used in this documentation, fails, should not mean that a name is free of third party rights.

- Windows, Windows 7, Windows 8.1, Windows 10, Windows 11 are trademarks of the Microsoft Corporation.

1.2 Important Notes

1.2.1 Safety Instructions and Hazard Warnings

1.2.1.1 Proper Use and Intended Purpose

WARNING!

The loggers are measuring devices which are used in the automotive and commercial vehicles industries. The loggers are designed for gathering and recording data of the bus communication, for analyzing and possibly controlling electronic control units. This includes, inter alia, bus systems like CAN, LIN, MOST and FlexRay.

The loggers may only be operated in a closed state. In particular, printed circuits must not be visible. The loggers may only be operated according to the instructions and descriptions of this manual. Only suitable accessories should be used, such as the original Vector accessories or accessories approved by Vector.

The loggers are exclusively designed for use by skilled personnel as its operation may result in serious personal injuries and damage to property. Therefore, only those persons may operate the loggers who (i) have understood the possible effects of the actions which may be caused by the loggers; (ii) are specifically trained in the handling with the loggers, bus systems and the system intended to be influenced; and (iii) have sufficient experience in using the loggers safely.

The logger specific information can be acquired via the specific manuals as well as from the Vector KnowledgeBase at www.vector.com. Please consult the Vector KnowledgeBase for updated information prior to the operation of the loggers. The knowledge necessary for the bus systems used, can be acquired in workshops and internal or external seminars offered by Vector.

1.2.1.2 Hazards

WARNING!
The loggers may control and/or otherwise influence the behavior of electronic control units. Serious hazards for life, body and property may arise, in particular, without limitation, by interventions in safety relevant systems (e.g. by deactivating or otherwise manipulating the engine management, steering, airbag and/or braking system) and/or if the loggers are operated in public areas (e.g. public traffic). Therefore, you must always ensure that the loggers are used in a safe manner. This includes, inter alia, the ability to put the system in which the loggers are used into a safe state at any time (e.g. by „emergency shutdown“), in particular, without limitation, in the event of errors or hazards.

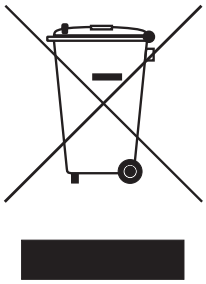
Comply with all safety standards and public regulations which are relevant for the operation of the system. Before you operate the system in public areas, it should be tested on a site which is not accessible to the public and specifically prepared for performing test drives in order to reduce hazards.

1.2.2 Disclaimer

WARNING!
Claims based on defects and liability claims against Vector are excluded to the extent damages or errors are caused by improper use of the loggers or use not according to its intended purpose. The same applies to damages or errors arising from insufficient training or lack of experience of personnel using the loggers.

1.2.3 Disposal of Vector Hardware

Please handle old devices responsibly and observe the environmental laws applicable in your country. Please dispose of the Vector hardware only at the designated places and not with the household waste.



Within the European Community, the Directive on Waste Electrical and Electronic Equipment (WEEE Directive) and the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive) apply.

For Germany and other EU countries, we offer free take-back of old Vector hardware.

Please carefully check the Vector hardware to be disposed of before shipping. Please remove all items that are not part of the original scope of delivery, e.g. storage media. The Vector hardware must also be free of licenses and must no longer contain any personal data. Vector does not perform any checks in this regard.
Once the hardware has been shipped, it cannot be returned to you. By shipping the hardware to us, you have relinquished your rights to the hardware.
Before shipping, please register your old device via:

https://www.vector.com/int/en/support-downloads/return-registration-for-the-disposal-of-vector-hardware/

2 Overview

In this chapter you find the following information:

2.1 General Information

Vector Logger Suite

The Vector Logger Suite is a tool to create easy configurations for the compact loggers of the GL1000/GL2000 series, the multibus logger of the GL3000/GL4000/GL5000 series and for the VN1630 log interface when operating in standalone mode.

With the Vector Logger Suite, hardware settings for CAN, CAN FD, LIN, FlexRay and MOST150 channels can be set. Filter and trigger conditions, logging of analog and digital inputs, diagnostic data and CCP/XCP measurements can be configured as well. Additionally, LEDs can be set to visualize certain events (settings depend on the device type).

Readout of the logging data is supported as well as conversion to several logging formats.

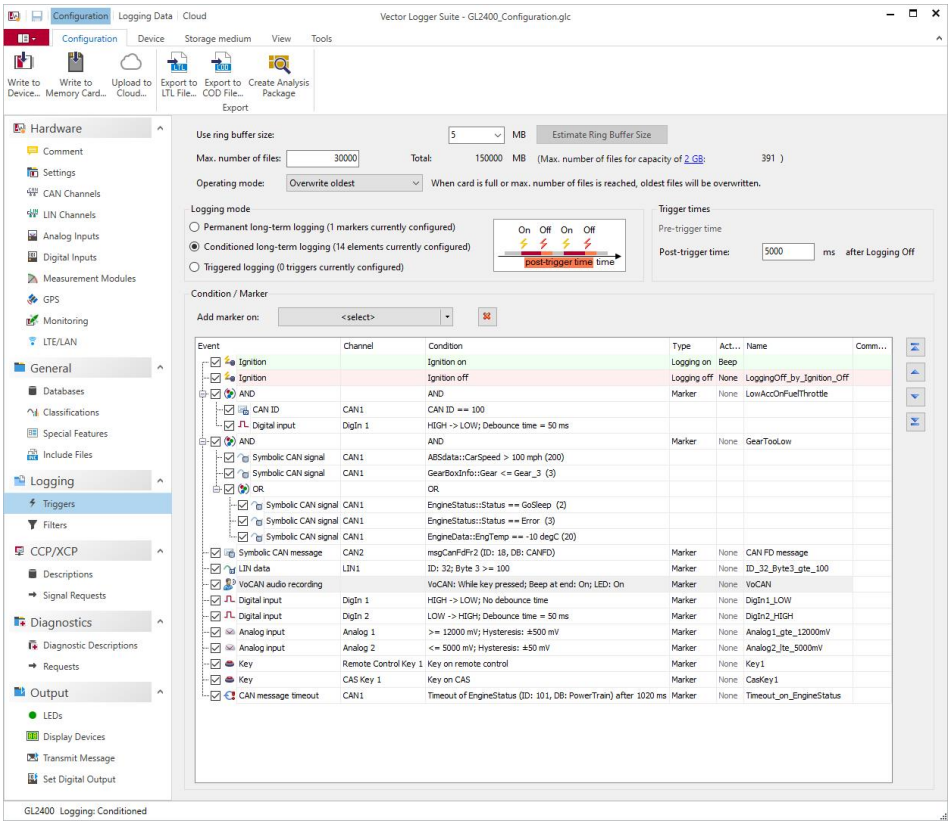


Figure 1: Vector Logger Suite

2.2 LED Display

2.2.1 GL1000

LEDs

The logger has five LEDs. LED 1 to LED 4 are freely programmable. The LEDs can be assigned to different events like trigger active or CAN/LIN errors. LED **USB** indicates the connection to the computer and is not programmable. Please refer to the GL1000 manual for more details on the meaning of this LED.

2.2.2 GL2000

LEDs

The logger has six LEDs. LED 1 to LED 4 are freely programmable. The LEDs can be assigned to different events like trigger active or CAN/LIN errors. LED **USB** indicates the connection to the computer, and LED **Power** the status of the power supply. These two LEDs are not programmable. Please refer to the GL2000 manual for more details on the meaning of this LED.

2.2.3 GL3000/GL4000/GL5000

LEDs

The logger has five red LEDs that are freely programmable. The LEDs can be assigned to different events like trigger active or CAN/LIN/FlexRay errors.

2.2.4 VN1630 log

LEDs

The VN1630 log has five LEDs indicating bus activities and status as well as one LED for the logging mode. The LEDs are not configurable. Please refer to the VN1600 interface family manual for more details on the meaning of the LEDs.

2.3 Event Keys

2.3.1 GL3000/GL4000/GL5000

Keys

The GL3100/GL3200/GL3400 and the GL4000/GL5000 series loggers feature four programmable event buttons on the front panel. These buttons can be used as triggers, for example.

2.4 Ring Buffer

Concept

A ring buffer is a certain memory area where logging data is stored. If the end of this memory area is reached, the oldest data from the beginning of the area is overwritten. Thus, the ring buffer contains always the latest logged data.

Figure 2: General ring buffer concept

2.4.1 GL1000/GL2000 Series

The ring buffer sizes can be configured between 2 MB and 2 GB. The ring buffer is directly written on the SD card, not in the RAM of the logger.

2.4.2 GL3000/GL4000/GL5000 Series

The GL3000/GL4000/GL5000 series contains two ring buffers (memory 1 and memory 2) in the RAM, GL5000 series even a third ring buffer (memory 3). They can be configured independently. The size of each ring buffer can be set as follows:

Logger	Buffer Size (MB)
GL3000 series	1...117
GL3400	1...200
GL4000 series	1...234
GL5000 series	1...390

The sum of the all ring buffers (Memory1_Block1 + Memory2_Block1; GL5000 plus Memory3_Block1) must not exceed the buffer size shown above (logger dependent). The ring buffer is created in the RAM of the logger and written to the memory medium when a trigger occurs.

Every ring buffer is installed twice, i. e. in block 1 and block 2. During the saving process of the data of one ring buffer block to the memory medium, the new data is written to the other ring buffer block. With this procedure, no data loss occurs while saving the data of a ring buffer block.

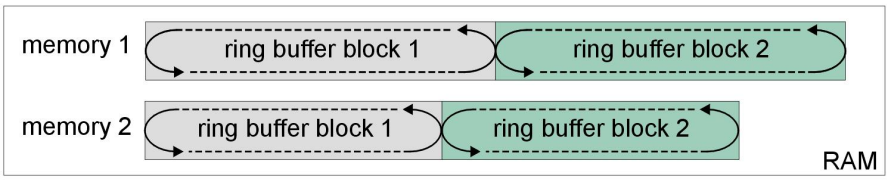


Figure 3: Ring buffer concept of the GL3000/GL4000/GL5000 series

2.4.3 VN1630 log

The ring buffer is installed on the RAM of the device with the size of 32 MB. The maximum size of the logging file is configurable.

Data is written to the memory when a trigger occurs. At a permanent long-term logging, data is buffered shortly and then written to the memory card.

2.5 Triggered Logging

2.5.1 GL Logger

Concept

If a certain event occurs, writing to the ring buffer is stopped. Such an event is called a trigger. When a trigger event occurs the ring buffer is closed, i. e. data storage to the ring buffer is stopped and the data in the ring buffer is stored as a triggered file. New logging data is stored to a new empty ring buffer.

The ring buffer can be configured to continue logging for a defined post-trigger time after the trigger event. In this case, the ring buffer is not closed when the trigger event occurs, but after the post-trigger time.

This trigger behavior applies to the **Triggered Logging** mode. With the **Conditioned long-term logging** mode, trigger types are used which directly start and stop the data logging.

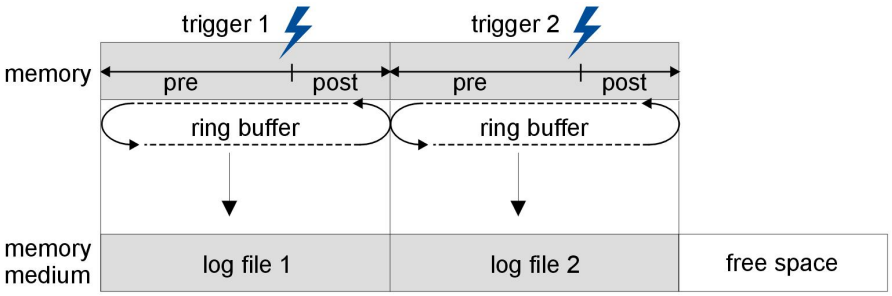


Figure 4: Triggering and logging

If a trigger event occurs just after a brief time and the end of the ring buffer has not yet been reached, the logging file will be smaller than the specified ring buffer size. If a trigger event occurs after a longer time, i. e. the data in the ring buffer have been overwritten one or more times, the size of the logging file corresponds to that of the ring buffer.

Various trigger events can be defined and parameterized in the Vector Logger Suite, e. g. on receiving a certain message or if a certain value in a signal is reached.

The trigger concept saves a lot of memory space since data doesn't need to be recorded over all of the time, but only on events of interest.

Triggered logging

In order to use triggers for logging, the logging mode must be set to **Triggered logging**. Closed (also called "triggered") ring buffers are stored as a log file. At the end of the logging session, an open ring buffer may remain. This open ring buffer is stored to a log file, too.

Pre-trigger time

The pre-trigger time describes the time to be recorded before a trigger event.

Post-trigger time

The post-trigger time describes the time to be recorded after a trigger event. After the post-trigger time elapses the current ring buffer is closed and a new ring buffer is started.

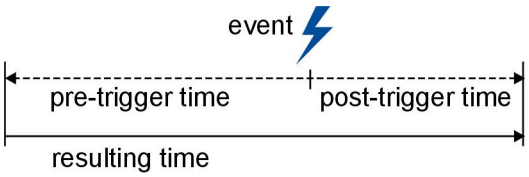


Figure 5: Pre -and post-trigger times

The Vector Logger Suite supports the configuration of the post-trigger time only. The pre-trigger time results from the rest of the ring buffer which is recorded before the trigger occurred. A calculator is available for the estimation of the needed ring buffer size.

2.5.2 VN1630 log

Concept

If a certain trigger event occurs, data from the ring buffer is written to the memory card according to the set pre-trigger-time. Afterwards, data is written for the duration of the post-trigger time to the same file. Data is stored as a triggered file. New logging data is stored to ring buffer until the next trigger.

Various trigger events can be defined and parameterized in the Vector Logger Suite, e. g. on receiving a certain message or if a certain value in a signal is reached.

The trigger concept saves a lot of memory space, since data doesn't need to be recorded over all of the time, but only on events of interest.

Triggered logging

In order to use triggers for recording, the logging mode must be set to **Triggered logging**. Triggered ring buffers are stored as a log file. At the end of the logging session, an open ring buffer may remain. This open ring buffer is not stored to a log file.

Pre-trigger time

The pre-trigger time describes the time to be recorded before a trigger event. If a trigger event occurs after just a brief time and the pre-trigger time has not been reached, the logging file therefore contains less data accordingly.

Post-trigger time

The post-trigger time describes the time to be recorded after a trigger event. After the post-trigger time elapses the current logging file ring buffer is closed. New data is written to the ring buffer again.

The Vector Logger Suite supports the configuration of the post-trigger time only. The pre-trigger time is limited by the size of the RAM. A calculator is available for the estimation whether the RAM size is big enough for the wanted pre-trigger time. If during the recording the RAM is faster filled up than expected, e.g. the bus load is higher than expected, the oldest data is deleted and thus the pre-trigger time shortened.

2.6 Long-Term Logging

Permanent long-term logging

Alternately to recordings with triggers, you can continuously record the complete data traffic from measurement start in a permanent long-term logging without gaps. Therefore the logging mode is set to **Permanent long-term logging**. In this mode all configured triggers are switched off.

GL Logger

In order to record the data traffic without gaps, ring buffers are still used internally. As soon as the ring buffer is completely filled, it is triggered and the recording is immediately continued to the next ring buffer without gaps. For **permanent long-term logging** the Vector Logger Suite uses the configured ring buffer size. The post-trigger time is not used. Permanent long-term logging is a chain of ring buffers without gap. Due to this, the **File Manager** of the Vector Logger Suite displays the logging data not as one big file per test drive but as many single files each of the same ring buffer size.

If the logger changes to sleep mode, the current ring buffer will be triggered in advance even if the buffer was not completely full. The file is marked as end of test drive and will be stored. At the next logger start, a new ring buffer is started.

At read out and conversion in the **File Manager** the Vector Logger Suite identifies that a **permanent long-term logging** was done and assembles all single files of a test drive that were logged between switching on and off of the logger (or sleep-/wake up) to one big file for that test drive.

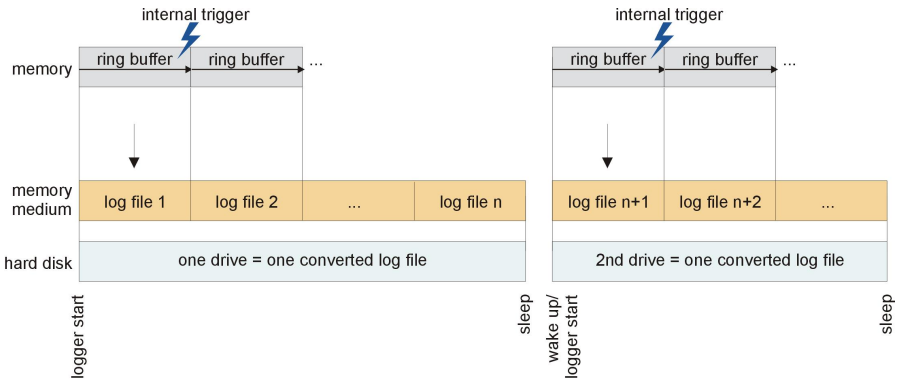


Figure 6: Logging

With the **Separate files for each ring buffer** option it is possible to read out the logged data in single files per ring buffer. This option makes it easier to analyze the logging data if needed.

VN1630 log

Data traffic is recorded continuously. As soon as the defined maximum size of the file is reached the recording is immediately continued to the next logging file without gaps. The Vector Logger Suite displays in the **File Manager** the individual logging files.

Conditioned long-term logging

Alternatively, the permanent long-term logging of the data traffic can be started with a start condition (**logging on**) and stopped with a stop condition (**logging off**). For this, the logging mode is switched to **Conditioned long-term logging**.

For each memory, only one start trigger and one stop trigger can be configured. After one of these triggers occurred it is inactive until its counterpart is activated.

GL Logger

As for the **permanent long-term logging**, the logging ring buffers are still used internally. As soon as the ring buffer is completely filled, it is triggered and the recording is immediately continued to the next ring buffer without gaps. For this, the Vector Logger Suite uses the configured ring buffer size. The post-trigger time is not used. The **File Manager** of the Vector Logger Suite displays the logging data not as one big file per logging block but as many single files each of the same ring buffer size.

If the logger changes to sleep mode while logging (after **logging on**), the current ring buffer is triggered even if the buffer was not completely full and the **logging off** condition was not fulfilled. The file is marked as end of the logging (same as for **logging off**) and will be stored. At the next logger start, the **logging on** condition must be fulfilled before a new logging will be started.

At read out and conversion in the **File Manager**, the Vector Logger Suite identifies that a permanent long-term logging (**conditioned long-term logging**) was done and assembles all single files of each logging block between **logging on** and **logging off** to one big file per logging block.

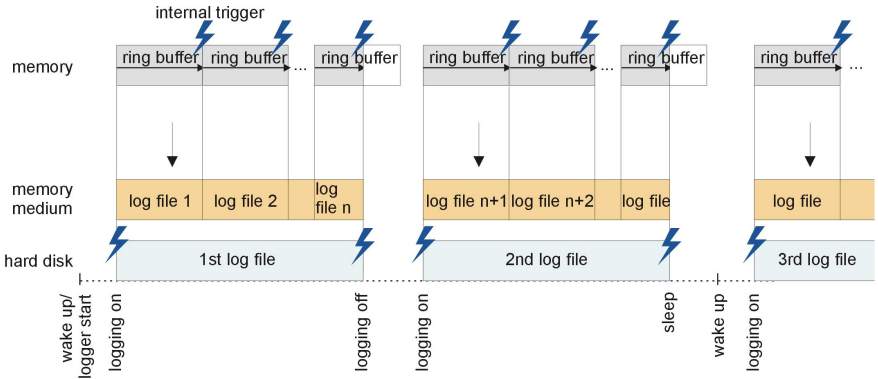


Figure 7: Conditioned long-term logging

With the option **Separate files for each ring buffer** it is possible to read out the data in single files per ring buffer. This option makes it easier to analyze the logging data if needed.

VN1630 log

As for the **permanent long-term logging**, data is recorded continuously in single files. Recording is started with the condition **logging on** and stopped with the condition **logging off**.

Note for GL1000
The logger writes the data directly to the memory card. If the power supply of the logger is interrupted unexpectedly during recording, the last ring buffer is not lost, but the marker for the end of logging (**permanent long-term logging** or **conditioned long-term logging**) gets lost. The logger will identify the power interruption at the next start and will add the marker. Thus in spite of the power interruption, the assembly of the single ring buffers per test drive/logging block is possible because the Vector Logger Suite requires the end markers to identify and separate the test drives/logging blocks on conversion.

Please make sure that the logger went to sleep mode before disconnecting power.

Note for GL2000/GL2400
The logger writes the data directly to the memory card. If the power supply of the logger is interrupted unexpectedly during recording, the UPS provides power for a few seconds so that the data of the last ring buffer is logged completely. The marker for the end of logging (**permanent long-term logging** or **conditioned long-term logging**) is also stored. So the assembly of the single ring buffers per test drive/logging block is possible in the Vector Logger Suite.

Please make sure that the logger went to sleep mode before disconnecting power.

Note for GL3000/GL4000/GL5000
If the power supply of the logger is interrupted unexpectedly during recording, the last ring buffer is not saved from the RAM to the memory card. Thus the data from the last ring buffer is lost.

At a permanent long-term logging (**permanent long-term logging** or **conditioned long-term logging**) the marker for the end of logging gets lost, too. The assembly of the single ring buffers per test drive/logging block is no longer possible because the Vector Logger Suite requires the end markers to identify and separate the test drives/logging blocks on conversion.

Please make sure that the GL3000/GL4000/GL5000 went to sleep mode before disconnecting power. Alternatively, you can open the front panel while the logger is still supplied by power to force a regular shutdown and writing of the last ring buffer to the memory card.

Marker

Markers are available for GL Loggers (GL1000 series excluded). Like triggers, markers are defined for certain events when the logger is configured. However, they do not trigger a new recording (trigger file) but merely mark a point in time within a long-term logging. As a result, you have more flexibility in the selection of pre- and post-trigger time for the readout. However, the long-term logging causes more memory space to be occupied on the memory card.

Markers are only available in the Navigator and help you to quickly locate for the conversion the time areas of interest.

2.7 Operating Mode

2.7.1 GL Logger

General information

The loggers have two operating modes for handling the situation of a full memory medium:

- **Stop logging**
  With the setting **Stop logging**, the logger records data until the memory medium is full. On full memory medium, no further trigger and no logging condition will be considered. This avoids overwriting recorded triggered files on the memory medium.
- **Overwrite oldest**
  With the setting **Overwrite oldest**, the logger records data in ring buffers until the memory medium is full. On full memory card, the oldest triggered file is deleted and the new data is stored. This mode allows keeping always the newest log files on the memory medium while oldest log files are overwritten. Overwrite mode is the default setting for a new configuration in the Vector Logger Suite.

The operating modes apply to all logging modes (**Triggered logging**, **Conditioned long-term logging** and **Permanent long-term logging**).

Differences

The following figure visualizes the differences between the logging modes:

- **Stop logging**
  After „log file n“ the logging is canceled.
- **Overwrite oldest**
  Further logging files (log file n+1 etc.) are written on the memory medium.

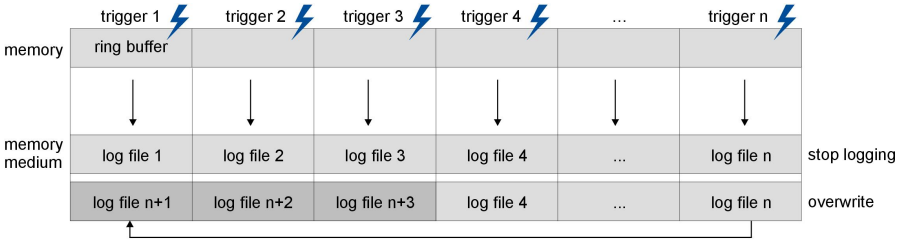


Figure 8: Difference between the modes

2.7.2 VN1630 log

General information

The VN1630 log records data until the memory card is full. This avoids overwriting recorded files. This operating mode applies to all logging modes (**Triggered logging**, **Conditioned long-term logging** and **Permanent long-term logging**).

2.8 Classification

Concept

Loggers of the GL2000/GL3000/GL4000/GL5000 series support the recording of classifications.

With classifications, you can define statistic evaluations of signals and signal conditions which are executed during the complete measurement time. The results are stored in a compact form and therefore require little memory space. The memory requirement is constant, i. e. it is independent of the measurement duration. When reading out the data, a separate text file is generated for each configured classification task. The text file displays the results in tabular form and can be directly read into Microsoft Excel and immediately displayed.

2.9 Data Compression

2.9.1 GL3000/GL4000/GL5000 Series

The GL3000/GL4000/GL5000 series support the optional compression of the logging files to save space on the memory card. In the same way, the transmission time at the read out via Wi-Fi/LTE can be reduced. After the read out of the memory card with the **File Manager**, the files will be automatically decompressed.

2.10 Filter

Concept

With the Vector Logger Suite, you can use filter on CAN messages, LIN messages and FlexRay frames/PDUs to reduce the amount of data to be recorded. Due to this the possible logging time is extended. The different filters influence the recording of messages only. Messages with **Stop** filter are not recorded. Messages with **Limit** filter (GL Logger only) are logged with reduced rate. All other messages are completely stored.

The filters do not influence the trigger, because the logger receives all messages. After reception of a message, the trigger conditions are checked. A message can cause a trigger even if it is not recorded due to a **Stop** filter.

2.11 Memory Media

2.11.1 GL1000/GL1010

The GL1000/GL1010 uses an SD/SDHC card for storing logging data. For more information on supported SD/SDHC cards please refer to the GL1000/GL1010 manual.

Note
Please do not remove or exchange the SD/SDHC card during operation in the logging mode. This may cause loss of data!

2.11.2 GL2000/GL2010

The GL2000/GL2010 uses an SD/SDHC card for storing logging data. For more information on supported SD/SDHC cards please refer to the GL2000 manual.

2.11.3 GL3000/GL3100/GL4000

The GL3000/GL3100/GL4000 saves the logging data to a Compact Flash card (CF card). The slot for the Compact Flash card is located behind the front access panel. Alternatively, a USB memory medium can be connected.

2.11.4 GL3200/GL3400/GL4200/GL5000

The GL3200/GL3400/GL4200/GL5000 saves the logging data on a removable disk (SSD). The slot therefore is located behind the front access panel.

2.11.5 VN1630 log

The VN1630 log uses an SD/SDHC card for storing logging data. For more information on supported SD/SDHC cards please refer to the VN1600 interface family manual.

2.11.6 Memory Size

Please note that the listed capacity of the CF/SD cards (e. g. 2 GB) may not match the actual available memory size. Some parts of the memory card are used for administration and other functions.

The listed capacity printed on the memory medium is calculated with 1 GB = 1 billion bytes, 1 MB = 1 million bytes. This calculation differs from the common calculation in Windows with 1 GB = 1024 MB, 1 MB = 1024 KB, 1 KB = 1024 Byte. This formula known from Windows is also used in the Vector Logger Suite for the calculation of the available card memory.

2.12 Download and Upload

2.12.1 GL1000/GL2000 Series

Download

The configuration can be loaded into the logger of the GL1000/GL2000 series by USB interface. Therefore the logger must be connected to the USB port of the computer. Alternatively, the configuration can be stored to an SD card in a card reader. In both cases the configuration is stored to the SD card first and will be updated in the logger on the next start in logging mode. If the configuration is updated on start of the logger, the effective start-up time (the time from power-up until recording of the first data frame) is extended.

Upload

The Vector Logger Suite supports the readout of the recorded data from the SD card. The logger must be connected to the USB port of the computer. The data is read out in raw format and then converted automatically to the desired logging format.

For more information see section Readout and Convert the Logged Data on page 62.

2.12.2 GL3000/GL3100/GL4000

Download

The configuration is saved for the GL3000/GL3100/GL4000 to a Compact Flash card in the card reader. This card is then inserted into the logger.

The logger also supports a download via USB (USB port located behind the front access panel). Therefore the logger has to be switched on.

The front access panel must then be closed. The next time the logger is started in logging mode, the configuration is checked and updated if it is okay.

Please refer to section GL3000/GL4000 Series via Card Reader (recommended) on page 64 and the online help for more information on the configuration download.

Upload

The Vector Logger Suite supports the readout of the recorded data from the Compact Flash card in the card reader. The data is read out in raw format and then converted automatically to the desired logging format.

The logger also supports the data read out via USB (USB port located behind the front access panel). Therefore the logger has to be switched on.

2.12.3 GL3200/GL3400/GL4200/GL5000

Download

The configuration for the GL3200/GL3400/GL4200/GL5000 is saved to a removable disk (SSD) that is connected to the **eSATA** interface (with external power supply) on the computer. It is then inserted into the logger. The front access panel must then be closed. Next time the logger is started in logging mode, the configuration will be checked and, if okay, updated.

Upload

The Vector Logger Suite supports readout of recorded data from the SSD connected to the computer. The data are read out in raw format and then converted automatically to the desired logging format.

2.12.4 VN1630 log

Download

The configuration can be loaded to the SD card in the VN1630 log by USB interface. Therefore the device must be connected to the USB port of the computer. Alternatively, the configuration can be stored to an SD card in a card reader. In both cases the configuration is stored to the SD card. On each start of the device in logging mode, the configuration is read from the SD card. Please note that recording can only be started with a configuration on the inserted SD card.

Upload

The Vector Logger Suite allows the configuration of the device and the upload of recorded data from the device or memory card to the computer.

For uploading the logging data from the VN1630 log, it must be connected to the USB port of the computer. The data is uploaded in a raw format first, and automatically converted to the desired logging format afterwards.

For more information see section Readout and Convert the Logged Data on page 62.

2.12.5 Logging Formats

Overview

The logged data can be converted to the following formats.

Formats	GL1000	GL2000	GL3000/GL4000/GL5000	VN1630 log
ASC	Yes	Yes	Yes	Yes
BLF	Yes	Yes	Yes	Yes
MDF	MDF[1]	MDF[1]	MDF[1]	MDF 4.1[2]
TXT	Yes	Yes	Yes	No
CLF	Yes	Yes	Yes	No
MAT [3]	Yes	Yes	Yes	No
HDF5	Yes	Yes	Yes	No
PCAPNG	No	No	Yes[4]	No

1) MDF versions 3.0 to 4.2, signal-oriented, with version 4 also message-oriented
2) message-oriented
3) MALTLAB® v7.3
4) GL5000 only

2.12.6 Automated Sequences

GL Logger

The option exists for all GL Loggers to use the console program **CLexport**, for example, to convert the recorded raw data for automated sequences. This program is included in the `ExecExt64` directory of the Vector Logger Suite installation. **CLexport** and other console programs are described in detail in the user manual of the G.i.N. Configuration Program.

2.13 Navigator versus Classic View

Overview

The **File Manager** enables logging files on memory cards and the SSD to be displayed, transferred to the computer, and converted to various formats with the selected settings. The settings can be stored in conversion profiles.

The classic view is available for all GL Loggers and VN1630 log. For the GL2000/GL3000/GL4000/GL5000 series, the Navigator is additionally available.

Classic View

When conversion is carried out in this view, all logging files are always transferred from the memory medium to the computer and then converted to the selected format. The logging files can be additionally saved as a raw file on the computer. This gives you the option of converting data from this format to other formats at a later time.

Navigator

With the Navigator, you can have more information on the recorded logging data displayed before the conversion is carried out. Thus you get a quick overview of the number of messages that were recorded over a particular time period.

In addition, you can use the Navigator to make a targeted selection of the data to be read out. You do not have to read out the entire memory card but can limit the readout to the areas of interest. Markers will help you to quickly locate the time ranges of interest. By including less data, the readout and conversion are completed much faster.

In order to convert the logging files to other formats at a later time, you must copy all original files from the memory medium to the hard disk.

2.14 Pack&Go

Overview

With Pack&Go, you can export your logger project, consisting of the configuration (GLC) and all its referenced project files (e. g. databases), as a Pack&Go file and then load it (together with the compiled configuration) into the logger during configuration.

Thus, on a test drive you will have all the files that are needed to view the configuration, change the configuration, or analyze the log data with the appropriate databases.

You also can save the Pack&Go file on your hard disk in order to forward your logger project along with its associated files in a compact form to a colleague.

To protect the data on the logger from unauthorized access, you can assign a password to the Pack&Go file. Likewise, you can exclude certain file types from the export if their export is not desired for safety reasons. For example, it is possible to save only the configuration (GLC) and not the databases on the logger. Please note for changing the configuration all files must be available.

Note
When the Pack&Go file is written to the logger, it is stored on the memory card. When a memory card is replaced, the Pack&Go file is not automatically copied to the new memory card! Please note this in particular, when you are using multiple memory cards in your loggers.

2.15 CCP/XCP

Overview

The GL Loggers support reading out of ECU internal data via CCP/XCP. The CAN Calibration Protocol (CCP) supports reading of internal ECU process or measurement variables and writing of control parameters to the ECU memory via CAN. XCP (Universal Measurement and Calibration Protocol) is an extension and advanced development of CCP for further bus systems. The Vector loggers also support reading data from the ECU using DAQ and polling mode.

Configuration

With the Vector Logger Suite, you can configure the loggers for the measurement of ECU related data using the CCP or XCP protocol.

The following options are available:

- **Direct use of an ECU description (ASAP2 file)**
  The ECU that is addressed via CCP/XCP is defined by inserting the ASAP2 file (A2L) into the Vector Logger Suite. For every ECU, the important protocol and ECU settings can be made here. Afterwards, the signals to be measured will be selected and displayed in a measurement list. With this configuration procedure, you can change the measurement list at any time.
- **CCP/XCP measurement configuration with CANape**
  The setting of the CCP/XCP protocol parameters and the assembling of the measurement list is carried out in CANape. The A2L file of an ECU is loaded in CANape and the signals to be measured are selected. Afterwards, CANape generates a DBC file with special attributes for CCP/XCP on CAN to initialize the ECU with the logger. This DBC file is added in the Vector Logger Suite. With this configuration procedure, you can only change the measurement list in CANape.

  The DBC file reflects the current configuration of the measurement data to exactly one control unit, which the user has configured in CANape. I. e. that the DBC file will change if the CANape configuration changes. Please note that the DBC file doesn't contain the complete description of this control unit. You have to create one DBC file for each control unit to read data from several control units. The names of the DBC files have to be renamed if necessary.

On both configuration procedures for XCP on FlexRay, additional information will be added to the FIBEX file.

Seed & Key

To prevent access to controller data by unauthorized persons, some controllers (ECUs) have access protection, which can be activated via a Seed & Key procedure.

This procedure provides for the measurement and calibration system first to query a value from the controller (Get Seed For Key) in order to calculate a key from it, which is then sent back to the controller (Unlock Protection). The controller then only allows access to its data when the key calculated by the measurement and calibration system matches the self-calculated key, i. e. when the measurement and calibration system knows the procedure for calculating the key.

In CANape, the algorithm for calculating the key is encapsulated in a DLL. The logger cannot use this DLL intended for the computer. Instead, an SKB file (Seed & Key Binary) is used, which must be programmed in CANape beforehand. Therefore the Seed & Key algorithm must be known.

Reference
You can find further information on CCP/XCP and Seed & Key in section CCP/XCP and Seed & Key (GL Logger) on page 75.

VX measurement hardware

With the GL3000/GL4000/GL5000 series and the VX measurement hardware from Vector, you can record internal ECU signals (variables, parameters) in parallel with bus communication. The ECU signals are measured using a POD (plug-on device), which for its part uses microcontroller specific data trace or debug interfaces of the ECU. The connection of the logger to the VX module is by means of Ethernet and uses the XCP on UDP protocol.

When you paste the A2L file in the Vector Logger Suite you can select if the VX measurement hardware should be used.

Execution

On its start the logger automatically establishes a CCP/XCP connection – for protected ECUs the Seed & Key algorithm is used.

With DAQ mode, the control unit sends the requested data as DTO messages (Data Transmit Object) with the given cycle time. The DTO messages are logged or processed as defined in the logger configuration.

The logger requests from the ECU the measurement data in polling mode with the specified cycle time. After the request, the ECU will send the requested data. Minimum one measurement value has to be configured in DAQ mode.

FAQ

Measurement mode	DAQ (data aquisition) mode: for all transport types Polling mode: for CCP and XCP on CAN
Supported CCP version	CCP 2.0 and CCP 2.1
Supported XCP version	XCP 1.0 and higher
File format	A2L: This file in ASAP2 format describes signals and CCP/XCP interfaces of the ECU. FIBEX: Description of the bus communication for XCP on FlexRay and XCP on Ethernet in XML format.
Number of ECUs	Multiple ECUs possible

Supported logger

The Vector loggers support CCP/XCP and Seed & Key as follows:

Logger	CCP	XCP on CAN	XCP on FR	XCP on Ethernet	Seed & Key	VX Measurement Hardware
GL1000 series	Yes	Yes	No	No	Yes	No
GL2000 series	Yes	Yes	No	No	Yes	No
GL3000 series	Yes	Yes	No	Yes	Yes	Yes
GL4000 series	Yes	Yes	Yes	Yes	Yes	Yes
GL5000 series	Yes	Yes	Yes	Yes	Yes	Yes

Note
Please note, for support of CCP/XCP a license must be obtained separately for the logger itself.

Requirements without Seed & Key

For the configuration of CCP/XCP without Seed & Key the following items are required for the direct use of an ECU description:

- Logger that supports CCP/XCP
- CCP/XCP license for this logger
- Vector Logger Suite
- A2L file describing the not protected ECU

Requirements with Seed & Key

For the configuration of CCP/XCP with Seed & Key, the following items are required for the direct use of an ECU description:

- Logger that supports CCP/XCP and Seed & Key
- CCP/XCP license for this logger
- Vector Logger Suite
- Vector CANape 8.0 or higher for the creation of an SKB file
- A2L file describing the Seed & Key protected ECU
- ECU (hardware) with Seed & Key protection, for access by CANape
- Seed & Key algorithm must be known

2.16 Diagnostics

Concept

The GL Loggers support reading out of control unit internal data by means of diagnostic services via the CAN bus. To prevent inadvertent write accesses to control units and resulting changes in the control unit software, the Vector Logger Suite provides only **reading diagnostic services**.

The following diagnostic data can be read out:

- Identification data
- Measurement values
- Fault memory (without environment data)

The **diagnostic descriptions** contain information regarding the diagnostic services, i. e. the diagnostic requests to be supported, possible responses, and their interpretation. They usually also contain the communication parameters, such as CAN identifiers and Timings. The diagnostic descriptions are loaded in the Vector Logger Suite in either CANdela (CDD) format, ODX/PDX or MDX format. While only one control unit is usually described in **CDD** and **ODX** files, several control units can be described in a **PDX** or **MDX** file, e. g. all control units within a vehicle. In this case, the control units to which the logger is to send diagnostic services can be selected.

If present, the Vector Logger Suite adopts the **communication parameters** automatically from the diagnostic description. If these parameters are incomplete, the preset values of the missing parameters must be checked and changed, if required. Alternatively, the parameters can also be entered completely manually. In either case, it is recommended that the values of the communication parameters should be checked for completeness and correctness after a new diagnostic description is added.

The GL Loggers also support On-Board Diagnostics (OBD). This has the advantage that no diagnostic description is required for the configuration of the available diagnostic requests.

Diagnostic request lists are then configured. A list contains those diagnostic requests that are to be sent when a particular event occurs. You can define which data the logger requests either through the response parameter (signal request) directly or through specification of the diagnostic service (service request). The list may contain diagnostic requests for various control units on different CAN buses. Examples of events include the start of the logger (if necessary, with a time delay), a cyclic timer, the receipt of a certain message, or the fulfillment of a signal condition. As soon as an event occurs, the requests in the list are sent one after the other. The logger always waits for the response of a service before it sends the next request in the list. If a response is missing, the logger waits for a timeout. Likewise, a new list is only begun after the current list has been completely processed.

The **diagnostic data** are saved in the logging files as raw messages synchronously with the other messages.

Diagnostic protocol

The control units can be read out using the supported diagnostic protocols

- KWP2000 (Keyword Protocol 2000) and
- UDS (Unified Diagnostic Services)
- OBD-II (SAE J1979)
- WWH-OBD: World-Wide Harmonized OBD (ISO 27145)

- OBDonUDS: OBD using Unified Diagnostic Services (SAE J1979-2)
- ZEVonUDS: OBD for electric vehicles / Zero Emission Vehicles (ZEVs) and Plug-in Hybrid Electric Vehicles (PHEVs) (SAE J1979-3)

The diagnostic protocol is usually contained in the diagnostic description. It can be manually set, if required. For OBD no diagnostic description is required.

Transport protocol

The loggers support diagnostics using the ISO-TP transport protocol.
The following addressing modes are supported for this:

- Normal
- Normal fixed
- Extended

Session type

Diagnostic services are supported in the following sessions:

- Default
- Extended

A session is generally already assigned to each diagnostic service in the diagnostic description. The Vector Logger Suite automatically adopts the session from there. It can also be manually set, if required.

The logger assumes the complete session management. Prior to communication with a control unit, it automatically starts the required session and changes it if necessary.

External diagnostic tester

For the case that another node on the CAN bus sends diagnostic services to the control units in parallel with the logger, the logger immediately stops sending all of its diagnostic requests. If after a specified timeout the logger no longer receives diagnostic communication between the other node and the control units, it starts processing the appropriate diagnostic service lists again after the configured events occur.

Offline analysis

The Vector Logger Suite converts the log files to the message-oriented formats ASC, BLF and TXT and via virtual CAN messages signal-oriented to MDF and TXT.

The symbolic interpretation of the diagnostic data from the log files takes place, e. g. in CANoe/CANalyzer. CANoe/CANalyzer also requires the diagnostic descriptions for this.

For signal based recordings of diagnostic data no diagnostic description is required, but only the analysis package created by the Vector Logger Suite.

2.17 Monitoring Interface

Logger as bus interface

Loggers of the GL2000/GL3000/GL4000 series support a monitoring mode that makes it possible to use the loggers in CANoe/CANalyzer as bus interface for monitoring mode. The GL3000/GL4000/GL5000 series support the signal sampling mode.

The logger is connected via Ethernet to the CANoe/CANalyzer computer and sends the bus data to CANoe/CANalyzer after measurement start, where the data can be analyzed in the measurement setup. Sending messages with CANoe/CANalyzer is not possible.

Supported bus systems and licenses

Depending on the mode, the bus systems CAN, LIN, FlexRay and MOST150 are supported. The relevant CANoe/CANalyzer licenses must be provided by a connected hardware interface on the computer or by a license dongle. A combined operation of loggers and other hardware interfaces in CANoe/CANalyzer is not possible.

2.17.1 Monitoring Mode

Monitoring mode

In monitoring mode, the logger transfers all incoming data such as messages and Error Frames. The bus systems CAN, LIN, FlexRay and MOST150 are supported.

During measurement, the logger does not record any data in the ring buffer. Classifications are also continued during the measurement. The following sections describe which logger functions are limited, or will not run or will run with different behavior to normal logger operation.

Logger functions

The following functions do not work or work with restrictions:

- Logging in **Memory 1** and **Memory 2**
- Logging of virtual CAN messages (e. g. analog inputs or date/time)
- Logging of error frames
- Tachograph
- Sleep mode
- VoCAN, CASM2T3L

The following functions have unrestricted functionality:

- Classification
- CCP/XCP
- Diagnostics
- Sending of CAN messages (by the Logger, not by CANoe/CANalyzer)
- Gateway configurations
- Camera (all HostCAM models/CAMlog2)
- LOGview

Logging

In monitoring mode, logging in **Memory 1** and **Memory 2** is stopped. In this time the logger doesn't control the trigger condition.

However classifications are continued. In the logging file begin and end of a monitoring mode is marked by the logger with a specific, virtual CAN message. The message ID and channel on which they are recorded can be set with the Vector

Logger Suite.

Filter

Filters defined for CAN, LIN and FlexRay in the logger configuration have no effect on the data that are sent to CANoe/CANalyzer. So CANoe/CANalyzer displays unfiltered all available messages on the connected CAN, LIN and FlexRay buses.

Virtual messages

Data from internal CAN messages (e. g. signals of the analog and digital inputs) are visible in CANoe/CANalyzer if the corresponding Tx event is activated in the Vector Logger Suite.

Send messages

Messages that are sent by the logger in logging mode are also sent in monitoring mode. In the **Trace** window of CANoe/CANalyzer, these messages are displayed as Tx messages (if configured).

Virtual messages that are not sent on the real bus by the logger but logged only in the ring buffer in logging mode, are also displayed (if configured) in CANoe/CANalyzer as Tx messages (e. g. logging of date/time or analog inputs). Since the logger also can send virtual messages on the virtual channels CAN10...CAN16, these channels are completely displayed in CANoe/CANalyzer as well.

Since the logger also can sent messages in monitoring mode, gateway configurations will remain running.

Options

CCP/XCP measurements also continue in monitoring mode on the logger. Pictures of the camera (all HostCAM models, CAMlog2) are also logged and the LOGview is actuated.

Wi-Fi/LTE

If the logger configuration triggers a Wi-Fi/LTE connection while the logger is in monitoring interface mode, the monitoring interface mode will be stopped after a successful connection. As consequence, the CANoe/CANalyzer measurement is also stopped.

Sleep mode

The timeout for the sleep mode is not available in monitoring mode. The logger remains awake as long as the CANoe/CANalyzer measurement is running even when the bus is sleeping and the timeout time for sleep mode is passed.

Configuration

The configuration of the logger and of CANoe/CANalyzer is described in tutorial Usage as Interface on page 79 and in the online help.

Requirements

The monitoring mode is supported since the following software versions:

GL2000 series

Component	Version number	Remarks
CANoe/CANalyzer	8.2 (GL2000/GL2010) 11.0 SP3 (GL2400)	CAN, LIN
GL2000 Firmware	V1.14 (GL2000_114.COD)	CAN, LIN

GL3000/GL4000 series

Component	Version number	Remarks
CANoe/CANalyzer	7.6 SP3 8.0 SP4	CAN, LIN, FlexRay add. MOST150
GL3x00/GL4x00 Firmware	V1.47 (GL3000_147.COD) V1.97 (GL3000_197.COD)	CAN, LIN, FlexRay add. MOST150

2.17.2 Signal Sampling Mode

Signal sampling mode

In signal sampling mode, the logger transfers sampled signal values of predefined signals. The smallest sampling rate is 50 ms. CAN-, LIN-, CCP/XCP- and diagnostic signals are supported as well as system information. Each signal is mapped in CANoe/CANalyzer onto a system variable.

During the measurement, the logger continues to record data in the ring buffer. All logger functions have unrestricted functionality.

Requirements

The signal sampling mode is supported since the following software versions:

GL3000/GL4000 series

Component	Version number	Remarks
CANoe/CANalyzer	8.5 SP3	CAN, LIN
GL3x00/GL4x00 Firmware	V2.74 (GLx000_274.COD)	CAN, LIN

GL5000 series

Component	Version number	Remarks
CANoe/CANalyzer	11.0 SP3	CAN, LIN
GL5000 Firmware	V0.55 (GL5000_055.COD)	CAN, LIN

2.18 Real-time Clock

Logger as bus interface

The date and time of the real-time clock can be set. It is recommended to set the real-time clock before the first logging.

The loggers of the GL1000/GL2000 series must be connected via USB to the computer. The real-time clock of the logger is set to the current system time of the computer.

The loggers of the GL3000/GL4000 series can be connected either via USB or via the CONSOLE cable to a COM port of the computer. With the CONSOLE cable, the real-time clock can be set either to the current system time of the computer or to a manually set time.

The loggers of the GL5000 series can be connected via a COM port of the computer. The real-time clock can be set either to the current system time of the computer or to a manually set time.

The VN1630 log must be connected via USB to the computer. The real-time clock of the device is set to the current system time of the computer.

3 Vector Logger Suite

In this chapter you find the following information:

3.1 Installation Instructions

Using this installation instruction

This instruction describes the installation of the software package for the Vector Logger Suite containing:

- Vector Logger Suite
- Online help for the configuration tool
- This user manual
- User manual for GL1000 series
- User manual for GL2000 series
- User manual for GL3000/GL4000 series
- User manual for GL3400
- User manual for GL5000 series

Operating system

The following software requirements must be fulfilled to run the Vector Logger Suite:

- Windows 10 (64 bit)
- Windows 11 (64 bit)

Program variants

The Vector Logger Suite can be installed as a 64 bit program. Due to the larger address space, the 64 bit variant can process very extensive databases. The 64 bit version can only be installed on 64 bit operating systems.

Setup

Follow the instructions below to install the Vector Logger Suite.

Step by Step Procedure

1. Execute the setup, which is found on the
   - Vector Logger Suite DVD:
     `.\VLSuite\Setup_VLSuite_64Bit.exe`.
   - Vector Driver Setup:
     `.\Tools\VN1630_log\Setup.exe`.
2. Please, follow the instructions found there to complete the installation.
3. After successful installation, Vector Logger Suite can be found (if chosen during installation) in the start menu.

3.2 Overview

About Vector Logger Suite

The Vector Logger Suite enables the configuration of the loggers of the GL1000/GL2000/GL3000/GL4000/GL5000 series and the recording function of the VN1630 log interface with a wide range of settings. You may set baud rates, logging triggers and filters and manage log files on the memory card. It also supports trigger and filter access by symbolic names defined in the databases.

Depending on the logger type, the main features are:

- Customizable filters for CAN messages, LIN messages and FlexRay frames/PDUs
- Customizable triggers and markers
- Support of databases
- CCP/XCP configuration
- Diagnostics
- Customizable analog and digital inputs
- File management
- Cloud

3.3 TreeView

3.3.1 Hardware

In the **Hardware** node, you can configure and check the channel settings, analog and digital inputs, and LEDs.

Item	Description
Comment	Here a comment and a version number can be added to the configuration.
Settings	When this tree node is selected, hardware settings like the ring buffer and the timeout for the sleep mode status are displayed in the property panel (for GL Loggers only).
CAN Channels	When this tree node is selected, settings for the CAN channels can be made in the property panel.
LIN Channels	When this tree node is selected, settings for the LIN channels can be made in the property panel.
FlexRay Channels	When this tree node is selected, settings for the FlexRay channels can be made in the property panel (only for the GL4000 / GL5000 series).
Ethernet Logging	This tree node is used to configure the GL5450 Ethernet Extension settings in the property panel (GL5000 series only).
MOST150 Channels	When this tree node is selected, settings for the MOST150 channels can be made in the property panel (only for the GL3000 / GL4000 / GL5000 series).
Channels	For VN1630 log: With this tree node, settings for the CAN/CAN FD/LIN channels can be made in the property panel.
Analog Inputs	When this tree node is selected, the analog input logging settings can be set in the property panel.
Digital Inputs	When this tree node is selected, the digital input loggings can be set in the property panel.
Measurement Modules	For the CAN measurement modules of CSM the database and channel assignment is configured here.
GPS	The GL2000 series supports the logging of GPS data from a serial GPS mouse. The settings for this GPS logging (CAN messages and/or system channel) are configured here.
CANgps	The loggers support the logging of GPS data via CANgps. For the loggers of the GL2000 / GL3000 / GL4000 / GL5000 series the settings for logging GPS data via system channel are configured here.
HostCAM	The cameras for the loggers of the GL3000 / GL4000 / GL5000 series are activated here, the first settings are also configured. The events for the start of the recording are configured on the **Trigger** page.
Monitoring	Loggers of the GL2000 / GL3000 / GL4000 / GL5000 series support a monitoring interface mode that allows the use of loggers as bus interface for monitoring in

Item	Description
	CANoe/CANalyzer (see section Monitoring Interface on page 38).
LTE/Wi-Fi/LAN	When this tree node is selected, you can set which events should trigger the LTE/Wi-Fi/LAN connection and which logged data should be transferred from the logger to the destination system (GL2000 / GL3000 / GL4000 / GL5000 series only, depending on the transfer type).

3.3.2 General

The **General** node allows the following settings for the logger:

Item	Description
Databases	When this tree node is selected, the property panel displays a list of all databases (DBC, LDF, XML, ARXML) which are assigned to the current project. Databases can be added, edited or removed. They are required in order to configure filters or triggers by symbolic message or signal.
Analysis Package	This page contains the settings for the analysis package. The analysis package of a project is required for the interpretation and conversion of the measurement data, i. e. the interpretation of the logged raw messages.
Meta Data	This page allows you to configure the input of metadata. The metadata configuration is made available for export through the analysis package.
Classification	When this tree node is selected, the classification can be configured. With the classifications, you can define statistic evaluations of signals and signal conditions which are executed during the complete measurement time (for GL Loggers except for GL1000 family).
Special Features	When this tree node is selected, special features for the logger can be selected in the property panel.
Include Files	When this node is selected, include files with LTL code can be added in the main window in order to extend the current configuration (GL Logger only).

3.3.3 Logging Memory

Logging Memory is the main node of the Vector Logger Suite and specifies miscellaneous logging conditions.

Item	Description
Triggers	When this tree node is selected, markers and triggers can be specified in the property panel. Markers are used in long-term loggings to mark special events. Triggers are used to log data when a defined event occurs. For additional information on the logging concept based on ring buffers and trigger, see sections Ring Buffer on page 16 and Triggered Logging on page 18.
Filters	When this tree node is selected, record filters on CAN

Item	Description
	messages, LIN messages and FlexRay frames/PDUs can be configured in the property panel.

3.3.4 CCP/XCP

The GL Loggers support CCP/XCP.

Item	Description
Descriptions	When this tree node is selected, a list of all A2L files that are assigned to the project will be displayed in the main window. These files can be added or removed. Additionally, protocol and ECU settings can be made. The A2L files are required to define lists with CCP/XCP signals.
Signal Requests	When this tree node is selected, lists with CCP/XCP signals can be configured.

3.3.5 Diagnostics

The GL Loggers support diagnostics on CAN.

Item	Description
Diagnostic Descriptions	When this tree node is selected, a list of all diagnostic descriptions (CDD, ODX, PDX, MDX) that are assigned to the project will be displayed in the main window. These files can be added or removed. Additionally, single ECUs can be selected and their communication parameters can be set. The diagnostic description files are required to define lists with **diagnostic requests**. For OBD no diagnostic description is required.
Requests	When this tree node is selected, you can configure the logger for the request of diagnostic data of the ECUs. You can define which data the logger requests either through the response parameter (signal request) directly or through specification of the diagnostic service (service request).

3.3.6 Output

For the GL Loggers, this tree node specifies the settings for the output functionality of the logger.

Item	Description
LEDs	When this tree node is selected, the programmable LEDs can be configured.
Display Devices	When this tree node is selected, you can configure the display of events and signals on the LOGview and the display of events for the Front Panel display of the GL3000 / GL4000 / GL5000 series.
Transmit Message	When this tree node is selected, CAN messages can be configured that will be sent onto the CAN bus by the logger at a configured event. Alternatively this CAN message can be logged as virtual message in the logging file.

Item	Description
Set Digital Output	When this tree node is selected, the SET and RESET conditions of the digital outputs can be configured.
Gateway	When this tree node is selected, a simple gateway between CAN channels can be configured. The complete CAN messages are transferred 1:1.

3.4 Export

The module **Export** displays log files on memory cards and on the SSD, and allows transferring them to the computer. Furthermore, the conversion to different formats is possible. The converted files can be displayed in CANoe, CANalyzer, CANape, vSignalyzer or 3rd party tools.

Button	Description
Select Source	With this button a connected logger, a memory card in a card reader, a connected SSD or a local directory is selected to display the logging data from this source.
Device Information	When this button is selected, miscellaneous details about the selected logger are displayed.
Quick View	This button gives you a preview in CANoe, CANalyzer, CANape or vSignalyzer of the logging data directly from the logger or the memory card.
Measurements	Use this button to select how the logging data is displayed, e. g. the complete measurement or trigger or marker.
Destination Format	When this button is selected, the destination format and further settings are selected.
Databases	Use this button to manage the databases for the export.
Meta Data	This page queries the configured metadata. You can also add additional entries. When exporting, the metadata is embedded in the target files if the target format supports it.
Channel Mapping	When this button is selected, you can map the channels of the read-in logging files onto configured channels (CAN, LIN, FlexRay).
File Storage	When this button is selected, the destination folder and destination file names can be selected as well as further file settings.
Profiles	With this button export profiles can be saved. An existing export profile can be loaded before data export. Export profiles contain all settings for the export of logging files.
Export	This button starts the conversion of the logging data according to the previously selected settings.
Open Target Folder	This button opens the target folder with the previously converted data.

3.5 General Settings

Vector Logger Suite

The **Options** dialog provides the following general settings:

- Language
- Logger type at program start
- Pack&Go export
- Conversion profiles
- Analysis package
- Generated files
- Quick view
- Diagnostics
- Cloud

3.6 Support Assistant

Vector Support Assistant

In order to optimally assist you in resolving your problem, additional information is needed. The **Vector Support Assistant** compresses the necessary files and send them password-protected to the Vector Support. You can deactivate files that should not be sent. You can also save the report without sending it to check the file assembly.

4 Tutorials

In this chapter you find the following information:

4.1 Overview

Overview

This tutorial gives example on how to operate the Vector Logger Suite for the first time and also briefly describe the most important features. To illustrate the basic principle, first a simple configuration will be created, generated and then loaded into the logger. Afterwards, additional features will be integrated into this basic configuration. Configurations of any type can be created based on this basic principle.

The examples for the GL3000/GL4000 series are prepared for Compact Flash cards. Logger configuration and data readout for the SSD are performed analogously.

4.2 Sample Projects

General information

In addition to the following tutorials, sample projects demonstrate the main functions of the loggers. With a CAN interface and an included ECU simulation, a measurement task can be performed.

This includes:

- logger configuration
- data logging
- readout
- analysis

File location

The examples are optionally installed with the Vector Logger Suite. The projects and descriptions can be opened in the backstage via **Sample Projects**. Right-click on a project to open the project folder containing the files and a short hands-on video.

The sample projects are available for the GL2400. For a different logger type, you can create the project file in the backstage via **Save for Logger Type...**.

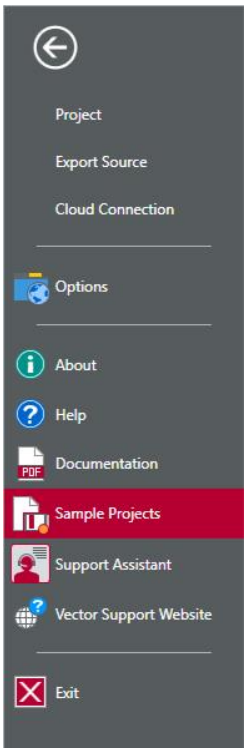


Figure 9: Backstage

4.3 Create a Configuration

4.3.1 GL Logger

Example

The following example describes the creation of a configuration for GL Loggers that records all data of the defined CAN buses as long-term logging. The baudrate for the two CAN buses CAN1 and CAN2 (for GL1000 / GL2000 / GL3400 / GL5000 series) or CAN5 and CAN6 (for GL3000 / GL4000 series) is set and a LED is configured.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Open a new project and select the logger type. The logger type is displayed in the status bar.
3. In the tree view, open node **Hardware**.
4. Click on **CAN Channels**.
5. Select baudrate **500,000 bd** in the combo box for CAN1 or CAN5.
6. Select baudrate **125,000 bd** in the combo box for CAN2 or CAN6.
7. Click on LEDs.
8. Select **Always blinking** in the LED 1 combo box.
9. In the tree view, open node **Logging Memory**.
10. Click on **Triggers**.
11. Select the **Permanent long-term logging** mode.
12. Save the configuration on your computer.

4.3.2 VN1630 log

Example

The following example describes the creation of a configuration for VN1630 log that records all data of the defined CAN buses as long-term logging. The baudrate for the two CAN buses on channel 1 and 2 is set.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Open a new project and select the logger type VN1630 log. The logger type is displayed in the status bar.
3. In the tree view, open node **Hardware**.
4. Click on **Channels**.
5. Select the mode **CAN** or **CAN FD**.
6. Select the baudrate **500,000 bd** in the combo box for channel 1.
7. Select the baudrate **125,000 bd** in the combo box for channel 2.
8. For CAN FD, also select the data rate.
9. In the tree view, open node **Logging**.
10. Click on **Triggers**.
11. Select mode **Permanent long-term logging**.
12. Save the configuration on your computer.

4.4 Write a Configuration

4.4.1 GL1000/GL2000 Series

Example
This example describes how to write the configuration created in tutorial Create a Configuration on page 56 to a logger of the GL1000/GL2000 series.

Step by Step Procedure

1. Open the project from tutorial Create a Configuration.
   The logger type is displayed in the status bar.
2. Connect the logger via USB to your computer. The logger's **USB** LED is on.
3. Write the current configuration into the logger by selecting **Configuration | Write to Device**.
4. Wait for the confirmation dialog.
5. GL2000 series: When the confirmation dialog is displayed, make sure the option **Eject logger** is selected. Confirm the dialog with **[OK]**.
   The logger's **USB** LED is blinking.
6. Disconnect the logger from USB and connect the logger to your test system. Make sure the test system supplies the logger with voltage.
7. The logger now starts in logging mode. LED1 is blinking – as configured in tutorial Create a Configuration.
8. GL2000 series: The logger's **Power** LED is on.

4.4.2 GL3000/GL4000 Series

Example
This example describes how to download a configuration (e. g. from tutorial Create a Configuration on page 56) created with the Vector Logger Suite to a logger of the GL3000/GL4000 series.

WARNING!
The logger must always be in sleep mode or off before the Compact Flash card (CF card) can be inserted or removed. To shut down the logger properly, do not simply disconnect power during logging mode! Instead, open the front access panel, and wait until the LED in the CF card slot or on the SSD cartridge, respectively, turns green or turns off. Now you can safely remove the CF card / SSD cartridge.

Step by Step Procedure

1. Insert the CF card into the card reader on the computer.
2. Open a project for the GL3000/GL4000 series, e. g. the project from tutorial Create a Configuration on page 56. The logger type is displayed in the status bar.
3. Select **Configuration | Write to Memory Card…** to load the configuration on the CF card. In addition, select the drive of the card reader in the displayed dialog.
4. Wait for the confirmation dialog. When it is displayed, make sure the option **Eject logger / memory card** is selected. Confirm the dialog with **[OK]**.
5. Open the front access panel of the logger and insert the CF card to the logger. After that close the front access panel.
6. Start the logger and make sure that the logger is kept awake by bus activity or the KL15/Wake-pin.

   Now the configuration is loaded into the logger. This process takes about one minute. In case of a firmware update, it can take up to five minutes.
   During the configuration update, the logger first boots up and displays **Record** for about 30 s and then **FLASHING** for about 30 s. As soon as the logger displays **Record** again, the new configuration is active.
7. The logger then initiates the configuration and recording of data.

4.4.3 GL5000 Series

Example

This example describes how to download a configuration (e. g. from tutorial Create a Configuration on page 56) created with the Vector Logger Suite to a logger of the GL5000 series.

Step by Step Procedure

1. Open the project from tutorial Create a Configuration on page 56 for the GL5000 series. The logger type is displayed in the status bar.
2. Connect the logger via USB to your computer, power it up and wait until the display shows **USB Mode**.
3. Write the current configuration to the connected logger by selecting **Configuration | Write to Device**.
4. Wait for the confirmation dialog. When it is displayed, make sure the option **Eject logger / memory card** is selected. Confirm the dialog with **[OK]**.
5. Connect the logger to your test system.

   Now the configuration is loaded into the logger. This task takes about one minute.
   During the configuration update the logger first boots up and displays **Record** for about 30 s and then **Update in progress** for about 30 s. As soon as the logger displays **Record** again, the new configuration is active.
6. The logger then initiates the configuration and recording of data.

4.4.4 VN1630 log

Example

This example describes how to download a configuration from tutorial Create a Configuration on page 56, created with the Vector Logger Suite, to a VN1630 log.

Step by Step Procedure

1. Open the project of tutorial Create a Configuration on page 56 for the VN1630 log. The logger type is displayed in the status bar.
2. Connect the VN1630 log via USB to your computer.
3. Write the configuration to the connected VN1630 log by selecting **Configuration | Write to Device**.
4. Disconnect the VN1630 log from USB and connect it to your test system. The VN1630 log now starts in logging mode. The LED **Log** lights green, if data is written to the memory card.

4.5 Readout and Convert the Logged Data

4.5.1 GL1000/GL2000 Series

Example
This example explains how to readout and convert logged data from the GL1000/GL2000 series.

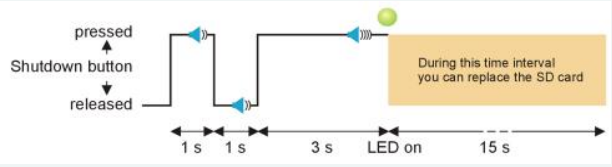
Step by Step Procedure

1. Disconnect the logger from the test system.
2. Open a project for the GL1000 series or the GL2000 series and open the module **Export**.
3. Connect the logger via USB to your computer. All data from the logger is automatically displayed if the **Measurement Selection** list was empty before.
   Otherwise click on **Backstage**  and select the logger from the **Attached Hardware** list.
4. Click on **Destination Format** and select the file format (e. g. BLF logging file) and optionally further settings.
5. Click on **File Storage** and select the target directory and optionally further settings.
6. Click on **Export** to initiate the readout of the logging data and the automatic conversion to the selected file format. The files are stored in a new subfolder (Destination Subdirectory) of the target directory.
7. Click on **Open Target Folder** and open the new subfolder.
8. Analyze the converted files (e. g. BLF file with CANoe/CANalyzer).

Note for GL2000 series

You can also read out the logging data from the memory card in a card reader. To securely remove the SD card from the GL2000, follow this procedure:

1. Press the shutdown button for one second until the signal tone beeps.
2. Release the shutdown button for one second until the signal tone beeps again.
3. Press the shutdown button for at least 3 seconds until the signal tone beeps a third time and the SD LED lights up.
4. Now you have 15 seconds to safely remove and/or replace the memory card.



This procedure shall assure that the SD card is not falsely removed from the logger, if the remove button is touched only accidentally. After the 15 seconds interval, the logger goes to sleep mode. In case of bus activity or high ignition level, the logger may wake up again immediately.

4.5.2 GL3000/GL4000 Series via Card Reader (recommended)

Example

This example explains how to readout and convert logged data from the GL3000/GL4000 series via the card reader on the computer.

Step by Step Procedure

1. Open the front access panel of the logger. Wait until the LEDs in the CF card slot disappear. Then, you can remove the CF card.
2. Open a project for the GL3000/GL4000 series and open the module **Export**.
3. Insert the CF card into the card reader on the computer.
4. All data from the CF card is automatically displayed if the **Measurement Selection** list was empty before. Otherwise click on **Backstage**  and select the CF card from the **Attached Hardware** list.
5. Click on **Destination Format** and select the file format (e. g. BLF logging file) and optionally further settings.
6. Click on **File Storage** and select the target directory and optionally further settings.
7. Click on **Export** to initiate the readout of the logging data and the automatic conversion to the selected file format. The files are stored in a new subfolder (Destination Subdirectory) of the target directory.
8. Click on **Open Target Folder** and open the new subfolder.
9. Analyze the converted files (e. g. BLF file with CANoe/CANalyzer).

4.5.3 GL3000/GL4000 Series via USB

Example
This example explains how to read out and convert logged data from the GL3000/GL4000 series and how to download a configuration via USB.

Step by Step Procedure

1. In the **Vector Logger Suite**, open the module **Export**.
2. Make sure the logger is supplied with voltage and running in logging mode. The display shows **Record** and the LEDs light as configured.
3. First, connect the USB cable to the computer (USB connector Type-A).
4. Open the front access panel.
5. Quickly connect the USB cable with the USB device connector (USB connector Type-B).

   After opening the front access panel, the logger stops logging and waits at least 6 seconds for the USB connection. If logging data is still written to the memory medium the waiting time is extended respectively. During this time, the display shows **Stop Rec** or **Save XX%** and the LEDs show a running light from right to left. If the USB cable is not connected during this waiting time, the logger will switch off.

   If the USB cable is connected during this waiting time, the logger switches to USB mode and the display shows **USB Mode**. The LEDs still show the running light from right to left, and on the memory medium green and red LEDs light up (at the compact flash card behind the card, at the SSD on the front of the cartridge).

   Do not remove the memory medium while the logger is in USB mode!
6. All data from the logger is automatically displayed if the **Measurement Selection** list was empty before. Otherwise click on **Backstage**  and select the logger from the **Attached Hardware** list.
7. Click on **Destination Format** and select the file format (e. g. BLF logging file) and optionally further settings.
8. Click on **File Storage** and select the target directory and optionally further settings.
9. Click on **Export** to initiate the readout of the logging data and the automatic conversion to the selected file format. The files are stored in a new subfolder (Destination Subdirectory) of the target directory.
10. Click on **Open Target Folder** and open the new subfolder.
11. Analyze the converted files (e. g. BLF file with CANoe/CANalyzer).
12. Open a project for the GL3000/GL4000 series, e. g. the project from tutorial Create a Configuration on page 56. The logger type is displayed in the status bar.
13. Write the configuration to the memory medium of the connected logger by selecting **Configuration | Write to Device**.
14. A message confirms the successful writing of the configuration. Make sure that option **Eject logger/memory card** is activated. Close the message with

[OK].

15. Disconnect the USB cable from the logger and close the front access panel. The logger will switch off.
16. Start the logger and make sure that the logger is kept awake by bus activity or the KL15/Wake-pin.

    Now the configuration is loaded into the logger. This process takes about one minute. This can take up to five minutes for a firmware update. During the configuration update, the logger first boots up and displays **Record** for about 30 s and then **FLASHING** for about 30 s. As soon as the logger displays **Record** again, the new configuration is active.

The logger starts the configuration and the logging of the data.

4.5.4 GL5000 Series

Example
This example explains how to upload and convert logged data from the GL5000 series via USB.

Step by Step Procedure

1. Open the module **Export**.
2. Connect the logger via USB to your computer, power it up and wait until the display shows **USB Mode**.
3. All data from the logger is automatically displayed if the **Measurement Selection** list was empty before. Otherwise click on **Backstage**  and select the logger from the **Attached Hardware** list.
4. Click on **Destination Format** and select the file format (e. g. BLF logging file) and further settings.
5. Click on **File Storage** and select the target directory and further settings.
6. Click on **Export** to initiate the readout of the logging data and the automatic conversion to the selected file format. The files will be stored in a new subfolder (Destination Subdirectory) of the target directory.
7. Click on **Open Target Folder** and open the new subfolder.
8. Analyze the converted files (e. g. BLF file with CANoe/CANalyzer).

4.5.5 VN1630 log

Example

This example explains how to readout and convert logged data from the VN1630 log.

Step by Step Procedure

1. Open the module **Export**.
2. Disconnect the VN1630 log from the test system and connect it via USB to your computer. The device must be connected to the external power supply until LED **Log** is off and the LED push button lights green.
3. All data from the logger is automatically displayed if the **Measurement Selection** list was empty before. Otherwise click on **Backstage** and select the logger from the **Attached Hardware** list.
4. Click on **Destination Format** and select the file format (e. g. BLF logging file) and further settings.
5. Click on **File Storage** and select the target directory and further settings.
6. Click on **Export** to initiate the readout of the logging data and the automatic conversion to the selected file format. The files will be stored in a new subfolder (Destination Subdirectory) of the target directory.
7. Click on **Open Target Folder** and open the new subfolder.
8. Analyze the converted files (e. g. BLF file with CANoe/CANalyzer).

Note

You can also read out the logging data from the memory card in a card reader. To securely remove the SD card from the VN1630 log, press the LED push button at least for three seconds. Remaining data in the ring buffer is written to the SD card which can take approx. 15 seconds. During this time, the LED flashes yellow. Remove the SD card only if the LED lights green. During this procedure do not disconnect the VN1630 log from the power supply.

4.5.6 Archive Raw Logging Data

Copying data

Logging data must always be selected completely when copying to ensure a complete data set. If only individual logging data are copied, these cannot be converted later.

There are two ways to archive raw logging data for later conversion:

- **Manually**
  Copy the raw logging data from the memory media to the computer for later conversion. It is important to copy the **entire** contents of the memory media.
- **Archive function**
  In the Vector Logger Suite, select **Export | Export | File Storage** and enable option **Archive raw logging data files** to store all data in a ZIP file.

4.6 Configuration with Simple Filter

Example

The following example describes how to insert a simple filter which is used in the logger. The filter settings block all received messages of one channel except for the messages with ID between 100 and 200 which are logged.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Open the project of tutorial Create a Configuration on page 56 for the corresponding logger type.
3. In the tree view, open node **Logging Memory**.
4. Click on **Filters**.
5. In column **Action**, change the status of the **Default** filters from **Pass** to **Stop** in order to block all incoming CAN and LIN messages.
6. Select **CAN ID** in the filter combo box.
   The filter setting dialog pops up.
7. Set **Relational operator** to **ID Range**, below enter the **ID** value 100 (0x64) and **Last ID** value 200 (0xC8).
8. Click on **[OK]**. The filter is listed in the list view now.
9. Now change the just added filter action to **Pass**. This makes sure that only CAN messages with ID between 100 and 200 are logged. Select the corresponding CAN channel under **Channel**.
10. Save the configuration.
11. Download the configuration as already described on the logger.

4.7 Configuration with Simple Trigger

Example

The following example describes how to insert a simple trigger which is used in the logger.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Open the project of tutorial Create a Configuration on page 56 for corresponding logger type.
3. In the tree view, open node **Logging Memory**.
4. Click on **Triggers**.
5. Select the mode **Triggered logging**.
6. As trigger event, select **On CAN ID**.
7. Click on **[Add…]**. The trigger setting dialog is opened.
8. Set **Relational operator** to **==**.
9. Enter **ID** value 100. This setting will trigger to every received CAN message with ID 100. **Extended ID** must be deactivated.
10. Click on **[OK]**. The trigger is listed in the list view now.
11. Save the configuration.
12. Download the configuration as already described on the logger.

4.8 License Installation

4.8.1 Installation on the Logger

Example
The following example describes how to subsequently install the CCP/XCP license for the GL1000/GL2000 series. An activated LIC file for the logger is required.

Step by Step Procedure

1. Connect the logger via USB with the computer. Only the logger on which the license should be installed must be connected.
2. Open the Vector Logger Suite.
3. Select **Device | Install License…** in the ribbon to open the selection dialog. Select the license file (LIC) for your logger there. If **Install License…** is not available, check the connection between logger and computer. Update your view with **<F5>**.
4. Click **[Open]**. The license file will be copied on the memory card of the logger. After that, the logger will be automatically ejected from the system.
5. Start the logger in logging mode. The license will be checked by the firmware and after that, it will be copied from the memory card to the internal memory of the logger. The license installation is finished afterwards. After a reconnection of the logger to the computer, the installed license will be displayed in the Vector Logger Suite in **Device Information** of the module **Export**.

Example

The following example describes how to subsequently install the CCP/XCP license for the GL3000/GL4000 series. An activated LIC file for the logger is required. The example is for a Compact Flash card (CF card). The installation occurs analogously for the SSD.

The Online Data Transfer license and the logger-based camera license are installed in the same way.

Step by Step Procedure

1. Insert a CF card into the card reader.
2. Open the Vector Logger Suite.
3. Select **Storage Medium | Write License to Storage Medium** in the menu to open the selection dialog. Select the license file (LIC) for your logger there.
4. Click **[Open]**.
5. In the next dialog, select the drive of the CF card.
6. Click **[OK]**. The license file is written to the CF card.
   Optionally, you can use **Configuration | Write to Memory Card…** to write a new configuration to the CF card.
7. Eject the CF card.
8. Open the front access panel of the logger, insert the CF card into the logger, and then close the front access panel again.
9. Switch on the logger. The logger checks and installs the license file if it matches with the logger's serial number and type.

4.8.2 Installation on the Camera

Step by Step Procedure

1. Connect the HostCAM to your computer via the Ethernet interface and supply it with power. Only P1214_E and F44 support camera-based licenses.
2. Start the Vector Logger Suite.
3. In the menu, open dialog **HostCAM Setup** via menu **Tools | HostCAM Setup…**.
4. Under **Network**, select the network adapter to which the camera is connected.
5. Click on the button  in order to search for connected cameras and to read their current settings.
6. In section **Main Unit**, select the corresponding license file from your computer. The serial number in the license file name must match the serial number of the connected camera.
7. Load the license file into the camera with  .
8. Remove the camera from the computer.

4.9 CCP/XCP and Seed & Key (GL Logger)

Example

The following example describes the procedure of the creation of a logger configuration with CCP/XCP and Seed & Key with direct use of an ECU description file (A2L) in Vector Logger Suite.

- Section Creation of Configuration on page 76 explains the basic configuration for CCP/XCP.
- If the ECU has a Seed & Key protection, section Generation of an SKB File on page 77 explains how to generate a SKB file required by the logger to unlock the ECU. If the ECU has no Seed & Key protection, this section can be skipped.
- Installation on the Logger on page 72 finally describes how to install a CCP/XCP license to a logger hardware.

4.9.1 Creation of Configuration

Step by Step Procedure

1. Open the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...**which shall be extended by the CCP/XCP measurement.
3. Include the A2L file to the project via **[Add…]** on the **CCP/XCP | Descriptions** page and assign the channel. For A2L files with Seed & Key, a second dialog is opened for including the SKB file. If no SKB file is selected and the dialog is closed with **[OK]**, a warning symbol is automatically disabled. Column **Settings** displays whether the A2L file includes Seed & Key. The SKB file can be added later.
4. Open the dialog for ECU and protocol settings via **[Settings…]**.
5. Check the setting and edit them if necessary.
6. Close the dialog with **[OK]**.
7. In the tree view, open node **CCP/XCP | Signal Requests**.
8. Open the selection dialog for the CCP/XCP signals via **[Add…]**.
9. In this dialog, select the signals to be measured. You can apply several signals consecutively via **[Apply]**.
10. Close the dialog with **[OK]**.
11. If necessary edit the measurement mode (DAQ or Polling) and the cycle time in the measurement list.
12. For XCP on FlexRay, add the ECU adequate FIBEX file on the page **General | Databases**.
13. Load the configuration into the logger via **Configuration | Write to Device…** or create a COD file via **Configuration | Export to COD File…**. In this process, the Vector Logger Suite creates DBC/FIBEX files in the subdirectory **Analysis**. For a later export, these files must be added to the configuration. Alternatively, the DBC/FIBEX files can be generated via **Configuration | Create Analysis Package…**.
14. Start the logger in logging mode. The CCP/XCP connection is automatically established if an SKB file is also available with Seed & Key. In this case, the logger automatically calculates and transmits the correct key for the seed received from the ECU. After the connection is established, the ECU transmits CCP/XCP data to the logger according to the configured DAQ or polling mode. This data is logged as normal CAN or FlexRay data. In case of a connection break (i. e. the logger does no longer receive CCP/XCP data from the ECU), the connection is automatically initiated again.

4.9.2 Generation of an SKB File

Example
The following steps are explained for CANape 19.0. Other versions may have slightly different menu names, etc. If data from a Seed & Key protected ECU is to be logged, an SKB file containing the Seed & Key algorithm information is necessary in addition.

Step by Step Procedure

1. Start CANape:
   - If a CANape project exists for the connected ECU, open this project.
   - If no CANape project exists yet, create a new project based on the ECUs A2L file.
2. Open the **Function Editor** via **Tools | Function Editor**.
3. Create a new function in section **Seed & Key algorithm**
4. Select **New…** from the shortcut menu. The function is stored to an SKS file.

   When the function is created, the following four parameters are automatically included:
   - **var seed[]**
     Key from ECU
   - **var seedLength**
     Length of the key from ECU
   - **var key[]**
     Response key to ECU
   - **var keyLength**
     Length of response key to ECU
5. Insert the ECU specific Seed & Key algorithm.
6. Select **Export…** from the shortcut menu of the SKS file.
7. Click on **[SeedKey Binary (.skb)]**.
8. Select an export directory, where the SKB file is created.

Note
The SKS files contain the encryption algorithms in plain text and will always be saved in the subfolder **SeedAndKey** in the CANape working directory. After the SKB file was created, the respective SKS file can be deleted or moved for safety reasons. Otherwise it will be exported, too, when the project is exported by the project manager.

Test of SKB file

The generated SKB file can be integrated into the CCP/XCP device in CANape instead of a Seed & Key DLL. This allows testing the SKB file with CANape first before including it to the logger configuration. The testing procedure is as follows:

Step by Step Procedure

1. Connect the ECU to the CAN interface for CANape.
2. Start CANape.
3. Include the SKB file to the project: open the dialog **Devices configuration** via **Devices | Device Configuration**. In the tree, select the connected CCP respectively XCP device in node **Devices** and then node **Protocol**. In the **General** tab, section **Seed&Key**, use **[Browse...]** to find the generated SKB file and enter it. The setting Enable must be selected.
4. Start the measurement for at least some seconds, and check for correct connection setup, i. e. no error messages are displayed and data from the ECU is displayed.

Note

When CANape starts a Seed & Key procedure, in the working directory a log file **SeednKey_<devicename>.log** is created that contains information about the process. Here **<devicename>** stands for the current device. When the next Seed & Key procedure is started the file is overwritten by its latest version.

Reference

You can find examples for the Seed & Key functions in the online help.

4.10 Usage as Interface

Example
The following example describes how to use a logger of the GL2000/GL3000/GL4000/GL5000 family in monitoring mode as a monitoring interface for CANoe or CANalyzer version 14.0. Other versions may have slightly different menu names, etc.

Reference
You can find further information on the monitoring mode in section Monitoring Interface on page 38.

4.10.1 Configuration of the Logger

Step by Step Procedure

1. Open the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...** which shall be extended by the interface functionality.
3. Enable the monitoring mode on page **Hardware | Monitoring | Monitoring Mode**.
4. Set the IP address of the logger and adjust the subnet mask and the port if necessary. Make sure that the settings match to your computer or network.
5. Optionally, you can change the channel and the CAN ID for the marker message that marks begin and end of the monitoring mode in the logging file.
6. If required, you can set which messages (sent by the logger) should be displayed in CANoe/CANalyzer. In the same way, you can specify whether Error frames are displayed.
7. Load the configuration as described in tutorial Write a Configuration on page 58 into the logger.

4.10.2 Configuration in CANoe/CANalyzer

Step by Step Procedure

1. Open CANoe/CANalyzer.
2. Create a new configuration with a template via **File | New…**. Choose template **Default** under section **General** from the **Available Templates** list and select **Create Configuration**.
3. Enable the GL Logger mode via **Hardware | Channel Usage | Extensions | GL-Logger**.
4. Set the number of CAN, LIN, and FlexRay channels via **Hardware | Channel Usage | Measurement | General**.
5. If you want to use databases, you have to add networks in the **Simulation Setup** and assign the corresponding databases.
6. Set the IP address and the port of the logger via **Hardware | Network Hardware**. Adjust these settings with the settings of the Vector Logger Suite and if necessary with your network.
7. Connect the computer with the logger via Ethernet. Therefore use the connection ETH at the GL2000, the connection ETH2 at the GL3000/GL4000 and one of the connections EP1 to EP5 at the GL3400 or GL5000.
8. Click on **[Check Connection]**.
   If the logger is identified, its configuration data is listed. If the logger is not identified, the list remains empty. In this case check your net-work connection, the IP address, and the port.
9. Start the measurement.

Note

While measurement, the logger is in monitoring interface mode. In this mode no data is written to **Memory 1** and **Memory 2**. Classifications are continued in monitoring interface mode.

4.11 Logging of Diagnostic Data

4.11.1 GL Logger

Example
The following example describes the creation of a configuration, to query and log data from the ECU cyclically, which can only be read out by diagnostic services. For this procedure signal request lists (parameter lists) are created.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...** which shall be extended by the diagnostic functionality.
3. In the tree view, open node **Diagnostics | Diagnostic Descriptions**.
4. Select a diagnostic description with **[Add…]**.
5. If several ECUs are available in the diagnostic description, you can select those ECUs from which diagnostic data should be read out in the subsequent dialog.
6. Open dialog **ECU Settings** via **[ECU settings…]**.
7. Check all ECUs parameter settings for the diagnostic communication and adjust them if required.
8. In section **Session configuration**, select the service request for the **Default** session and **Extended session**.
9. Close the dialog with **[OK]**.
10. In the tree view, open node **Requests**.
11. Select the **On cyclic timer** event from the selection list and add it via **[Add…]**.
12. In the subsequent dialog, set the **Cycle time** and the **Delay** time after start.
13. Close the dialog with **[OK]**.
    A new group with brief information about the event now appears in the list under **Requests**.
14. Select **Signal Request** using the **Request** selection menu.
15. In the **Diagnostic Signal Selection** dialog, the signals (parameter) are grouped by ECU. Note that only signals that are contained in responses of reading diagnostic services are listed.
16. Type in the name of the diagnostic signal. This triggers corresponding filtering of the list of diagnostic symbols underneath.
17. When you have found the desired signal, select it.
18. In the **DID**, **Service**, and **Session Type** fields, you can define the signal request more precisely.
19. Close the selection dialog for diagnostic signals with **[OK]**.
20. The new signal is added to the list of events.
21. Add additional signal requests for the event using the **Request** selection menu.

22. If required, you can change the delay and cycle time by marking the **Event** row and pressing **[Condition…]**.
23. Create further service request lists by adding additional events with service requests.
24. Save the configuration on your computer.
25. Load the configuration as described in tutorial Write a Configuration on page 58.

4.12 Configuration of the LTE Data Transmission

Example

The following example describes the creation of a configuration to transmit logging data of the GL2000 series via an LTE connection.

- The first section describes the configuration of the GL2000 series. The loggers of the GL3000/GL4000/GL5000 series are configured in a similar way.
- The second section describes the hardware wiring.
- Finally, the one-time setup of the Sierra Wireless LTE router is explained.

4.12.1 Configuration of the Logger (GL2000/GL2400)

Note

For the transmission of logging data to a ML Server, a corresponding MLserver license (Online Data Transfer license) must be installed on the logger. Also, the ML Server infrastructure must be provided, including server hardware and accessibility on the internet.

For the upload of logging data to the Vector Cloud, a fee-based access authorization is also required. This functionality is not available in all regions.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...** which shall be extended by the LTE data transmission.
3. In the tree view, open the node **LTE/LAN**.
4. Enable option **Data transfer to MLserver**.
5. From the **Event** dropdown, add an event that shall trigger the upload of logging data, e. g. on **Key**.
6. Via **[…]** in the **Data Selection** column, you can set which data should be transmitted at the occurrence of the event.
7. Set the IP address of the logger in **Logger IP**.
   Typically, you can leave the default value **192.168.13.30** which works with the factory setting of the Sierra Wireless LTE router.
8. Set the IP address of the LTE router in **Gateway IP**.
   Typically, you can leave the default value **192.168.13.31** which works with the factory setting of the Sierra Wireless LTE router.
9. Set the **Subnet Mask** for the subnet between logger and LTE router. Again, typically you can leave the default **255.255.255.0**.
10. Set the IP address of the ML Server (**MLserver IP**).
    The logger will try to contact the ML Server on this IP address.
11. Save the configuration on your computer.
12. Load the configuration into the logger as described in see section Write a Configuration on page 58.

4.12.2 Connections and Displays of the Sierra Wireless LTE Router

Connections

The following connections of the Sierra Wireless LTE router are required for the data transmission:

Front

- Main antenna
- Power supply
- Ethernet interface
- Secondary antenna (Diversity)
- SIM card (behind cap)

LEDs

The four multi-colored LEDs on the front of the LTE router display its status concerning power, cellular connection and activity. You can find a detailed description of these states in the device manual of the manufacturer.

Insert SIM card

Before switching on the device, insert the SIM card. Proceed as follows:

Step by Step Procedure

1. Remove the cap for the SIM card.
2. Push the card into the slot all the way to the stop.
3. Close the cap for the SIM card.

Note

When inserting the SIM card, please note the direction of the flattened edge of the SIM card.

Setup

In the following setup, you can see how to connect the LTE router and the switch-on adapter GLA600 to the logger.

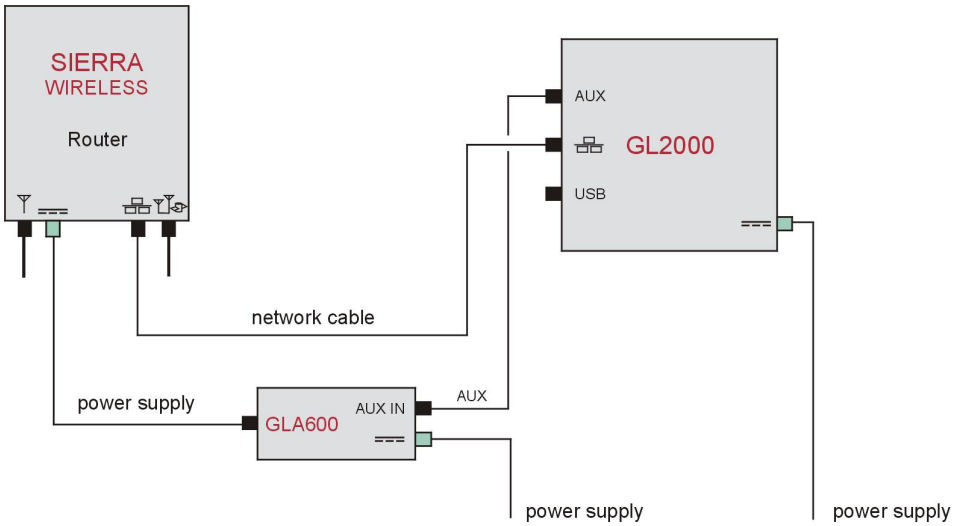


Figure 10: Setup

4.12.3 Configuration of the Sierra Wireless LTE Router

Note

- The LTE router requires an activated SIM card and an external power supply (range of the power supply: 8 V … 28 V).
- For security reasons it is strongly recommended to change the factory password.
- After switching on, the LTE router is accessible after about 1 to 3 minutes, depending on the model.
- The status of the connection is displayed via LEDs (see also the manufacturers device manual):
  - LED **Network**: green
  - LED **Signal**: green or yellow (depending on signal strength)
  - LED **Activity**: off
  - LED **Power**: green
  - No LED flashes

Before using the logger, the LTE router must be configured to establish an internet connection on its own. Proceed as follows to configure the LTE router:

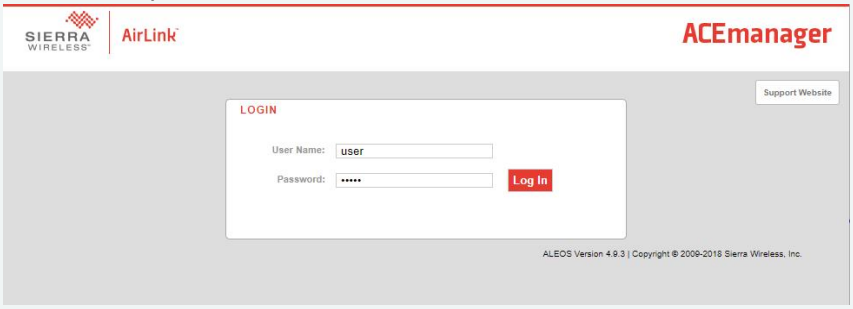
Step by Step Procedure

1. Connect the LTE router with the computer via the Ethernet interface.
2. Switch on the LTE router by connecting it to the power supply.
3. Open an internet browser on the computer.
4. Insert the IP address (with port): **https://192.168.13.31:9443**.
   For older devices, the IP address is: **http://192.168.13.31:9191**

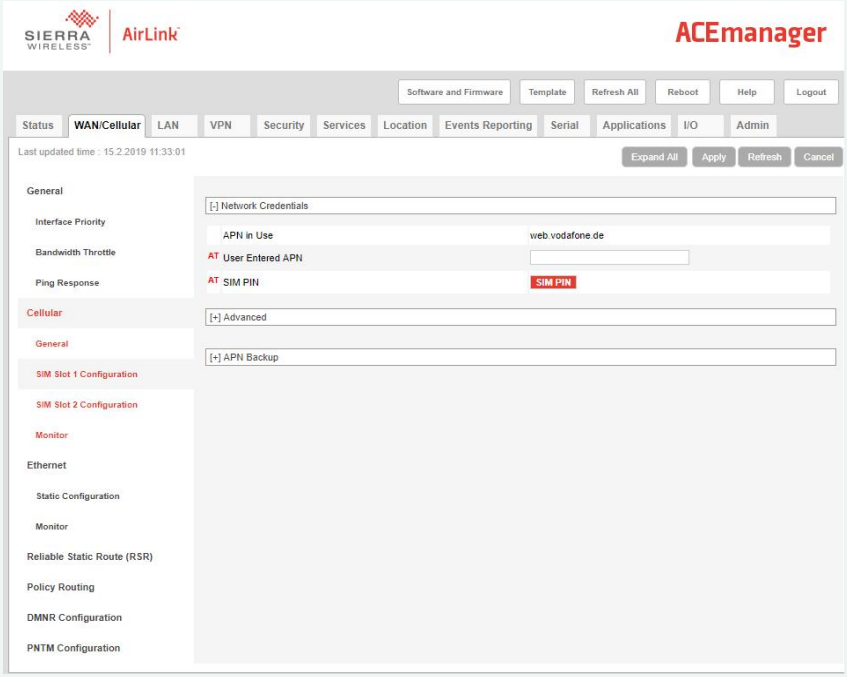
Note

Make sure that the computer is located in the same subnet as the LTE router (192.168.13.xx), or that the computer receives the IP address automatically from the DHCP server of the LTE router. After switching on, it may take up to 1...3 minutes until the device reacts.

5. The login dialog of the ACEmanager is opened.
   Enter your user name and the password. At delivery, the administrator user name is **user**, the password is located on the bottom of the device. For older devices, the password is **12345**.

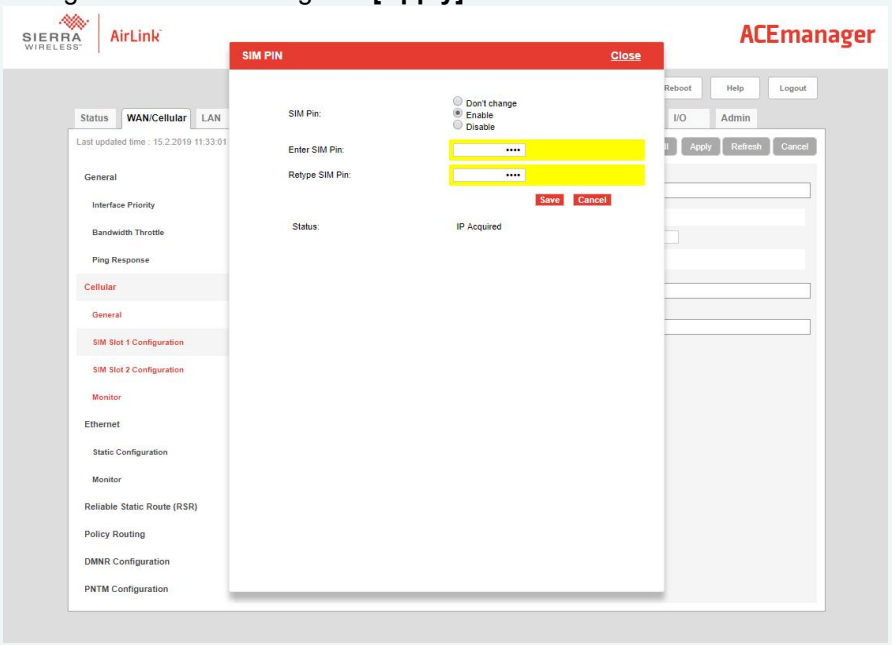


6. The ACEmanager main window is opened. Configure the LTE router.

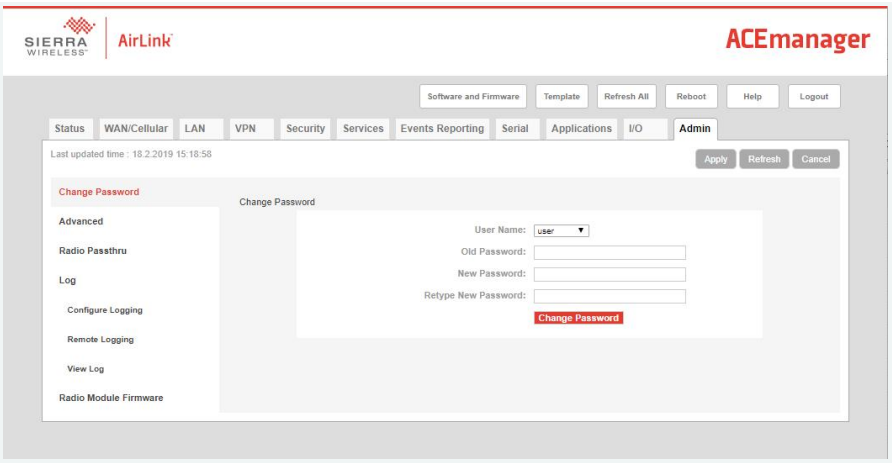


7. On the **WAN/Cellular** page, verify that the correct APN has been auto-detected. If the correct APN is not preselected, please input the value as **User Entered APN**.

8. On **WAN/Cellular** page, enter the PIN of the used SIM card in the SIM PIN Dialog. Confirm the settings via **[Apply]**.



9. Change the password of the LTE router on the **Admin** page in section **Change Password**. Confirm the change with the **[Apply]** button. Remember the password for the next login.



10. To apply the settings, the LTE router must be rebooted. Therefore, press **[Reboot]** and confirm with **[OK]**.
11. After the reboot, on the **Status** page you can check if the configuration was successful.
12. You can also check the status via the LEDs (see device manual of the manufacturer):
    - LED **Network**: green
    - LED **Signal**: green or yellow (depending on the signal strength)
    - LED **Activity**: off
    - LED **Power**: green
    - No LED flashes

4.13 Record images with a HostCAM

Example
The following example describes the initial setting of the HostCAMs P1214_E and F44. It explains how to create logger configurations that allow you to record the images of the HostCAM with the loggers of the GL3000/GL4000/GL5000 series.

Reference
Further information on configuring and connecting the camera can be found in

- the HostCAM user manual (for model P1214_E) and
- the HostCAM F44 user manual (for model F44).

The initial setup of F9114 is described in `GettingStartedWithHostCAM_F9114.pdf`, which is supplied with the Vector Logger Suite.

Note

- For recording, the camera is connected to the GL3000/GL4000 Ethernet connection **ETH 2**. For the GL3400 and GL5000, the camera is connected to one of the Ethernet ports **EP1** to **EP5**.
- Camera F44 can only be connected to GL3400 and GL5000.
- For operation, a license must be installed either on the logger or on the camera. Please note that licenses cannot be transferred from the logger to the camera and vice versa.
- If multiple cameras are triggered simultaneously, it may result that during the image transmission, the storage of recorded bus data to the memory medium is delayed. That may lead to a temporary impossibility to record any bus data.

4.13.1 Setting up a HostCAM

Note

This section provides a step-by-step procedure for the P1214_E and F44 camera models. The HostCAM is connected to the computer via Ethernet. It is recommended to use a USB-to-Ethernet adapter in order to access the camera outside of the company network.

The HostCAM setup uses Microsoft's APIPA method to establish a connection to a connected camera. This method selects a random address from the IP address range **169.254.x.x** in order to communicate with a device whose IP address is unknown. It is therefore necessary that this address range is not blocked by a firewall in order to establish a connection. If necessary, contact your IT department to ensure this.

Reference

Further information on configuring and connecting the camera can be found in

- the HostCAM user manual (for model P1214_E) and
- the HostCAM F44 user manual (for model F44).

The initial setup of F9114 is described in `GettingStartedWithHostCAM_F9114.pdf`, which is supplied with the Vector Logger Suite.

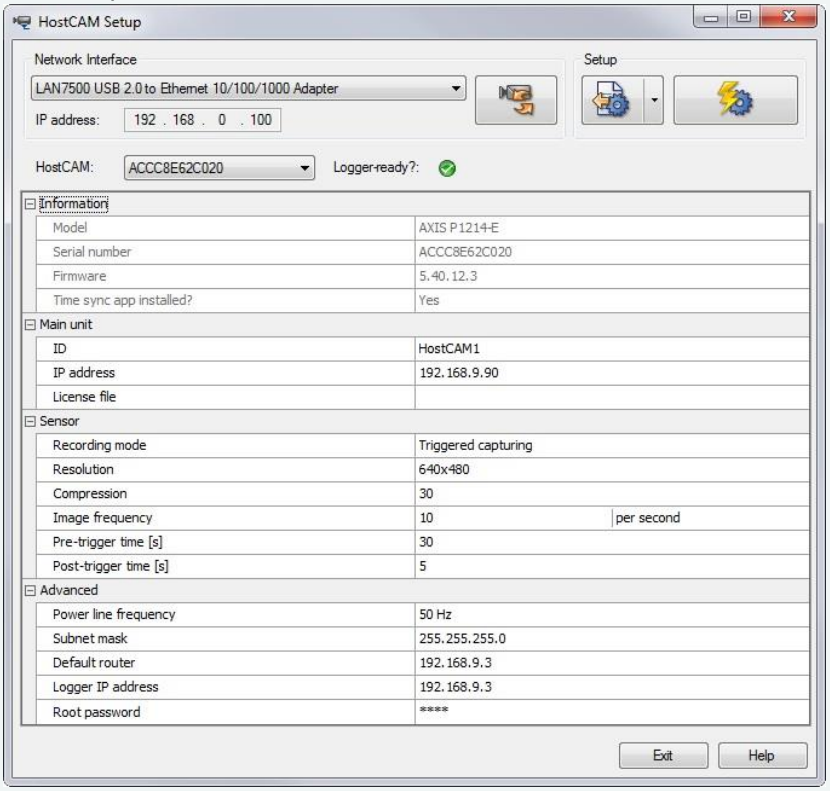
The camera must be set up once as described hereafter before using it together with the GL3000/GL4000/GL5000.

Step by Step Procedure

1. Connect the HostCAM to the computer using the Ethernet interface and supply it with power.
2. Start the Vector Logger Suite.
3. In the module **Configuration**, open dialog **HostCAM Setup** via **Tools | HostCAM Setup…**.
4. Under **Network**, select the network adapter to which the camera is connected.
5. Click on the button  in order to search for connected cameras and to read their current settings.
6. Load the default settings of the camera via the button  | **Set default settings**. If you have already set up the camera before, you may skip this step.
7. Adjust your settings in the table for **Main unit** and **Sensors**:
   - Set up the ID of the camera (HostCAM1 ... HostCAM4), particularly if you connect multiple cameras to the logger. In this example, the default value **HostCAM1** is used.

- The IP address of the camera must be in the same subnet as the GL3000/GL4000 (192.168.9.3) or GL3400/GL5000 (192.168.9.4). It must not be identical to the IP address of the logger. In most cases the default value 192.168.9.90 can be set especially if only one camera is connected. In this example the default value **192.168.9.90** is used.
- **Wide Dynamic Range Mode** (only for F44 and F9114 models). This mode improves the illumination in situations with strong contrast between bright and dark areas.
- Resolution
- Image frequency (frame rate)
- Select for your use case the mode **Triggered capturing** or **Long-term capturing**.
- If you chose the mode **Triggered capturing**, enter the pre and post-trigger times.

8. **For use in the USA**: In **Advanced**, change the power line frequency to 60 Hz.
9. Load the settings into the camera via the button  .
10. Save the settings in a file via the button  | **Save settings** in order to be able to check them later without needing to connect the camera or to be able to use the same settings on other cameras.
11. Remove the camera from the computer and connect it to the GL3000/GL4000 connection **ETH 2** or to the GL3400/GL5000 to one of the Ethernet ports **EP1** to **EP5**.



4.13.2 Configuration of a Triggered Capturing

Example

The following example describes the configuration of a triggered capturing of images by a HostCAM with one sensor in the Vector Logger Suite. Only one sensor will be configured for the multi-sensor camera models F44 and F9114. The capturing shall always be started when Panel Key 1 is pressed. The status of the camera is displayed on LED2 and the triggering of the camera on LED3.

Note

- **Requirement**
  During the setup of the camera sensor, the **Triggered capturing** mode has been set.
- The triggers should be chosen so that there is enough time between two triggers to allow the images of the last trigger to be transmitted.
- During the image transmission, no other trigger signals can be received or evaluated by the logger.
- For each measurement of a trigger, the images are stored in one ZIP file.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...** to which the image recording shall be added.

Activation of the camera

3. In the tree view, open node **Hardware**.
4. Click on **HostCAM**.
5. Activate the camera **HostCAM1**.
6. For the GL3400 and GL5000, additionally select the model P1214_E, F44, or F9114. Also select sensor 1 with a connected F44 or F9114.
7. Set up the IP address of the camera. The presetting **192.168.9.90** corresponds to the default setting of the first camera. It can be changed as described above.
8. Choose the mode **Triggered capturing**.
9. Choose **Marker message…** (optional).

Configuration of a trigger event

10. In the tree view, open node **Logging Memory 1 | Trigger**.
11. Choose the mode **Triggered logging**.
12. Choose the trigger event **Key** and in the following dialog **Panel Key 1**.
13. In column **Action/HostCAM**, click on **[…]** in order to activate the HostCAM1 on this trigger.
14. In the dialog **Action Settings**, activate the **HostCAM1** and **Trigger capturing**.
15. Close the dialog with [**OK**].

Configuration of a LED

16. In the tree view, open node **Output | LEDs**.
17. At **LED 2**, select the **HostCAM status** for **HostCAM1**.
18. At **LED 3**, select the **HostCAM trigger** for **HostCAM1**.
19. Save the configuration on your computer.
20. Load the configuration into the logger as described in tutorial Write a Configuration on page 58.

Note

- The triggers should be triggered by activating the key in the way that there is enough time between two triggers to allow the images of the last trigger to be transmitted.
- When triggered, the image data are transmitted from the camera to the logger. It is impossible to trigger further camera recordings during the transmission.
- For each camera recording, the images are stored in one ZIP file.

4.13.3 Configuration of a Long-Term Capturing

Example

The following example describes the configuration of a long-term capturing of images by a HostCAM in the Vector Logger Suite. Only one sensor will be configured for the multi-sensor camera models F44 and F9114. The capturing shall be started by Panel Key 3 and stopped by Panel Key 4. The status of the camera is displayed on LED2. The running image capturing is displayed on LED 3.

Note

► **Requirements:**

- During the setup of the camera sensor, the **Long-term capturing** mode has been set.
- The picture resolution and image frame must be set low enough (e. g. 1 image per second).

► For each measurement (without an interruption), the images are stored in one ZIP file. When the file reaches the size of 250 MB the capturing will be continued in a new ZIP file.

Step by Step Procedure

1. Start the Vector Logger Suite.
2. Create a new project in the backstage via **New Project...** or load an existing project via **Open Project...** to which the image recording shall be added.

Activation of the camera

3. In the tree view, open the **Hardware** node.
4. Click on **HostCAM**.
5. Activate the camera **HostCAM1**.
6. For the GL3400 and GL5000, additionally select the model P1214_E, F44, or F9114. Also select sensor 1 with a connected F44 or F9114.
7. Set up the IP address of the camera. The presetting **192.168.9.90** corresponds to the default setting of the first camera. It can be changed as described above.
8. Choose mode **Long-term capturing**.

Configuration of start/stop events

9. In the tree view, open node **Logging Memory 1 | Trigger**.
10. Choose mode **Conditioned long-term logging**.
11. Choose the trigger event **Key** and in the following dialog **Panel Key 3**.
12. In the column **Action/HostCAM**, click on **[...]** in order to activate the HostCAM1 on this trigger.
13. In the dialog **Action Settings**, activate **HostCAM1** and **Start capturing**.
14. Close the dialog with **[OK]**.
15. Again, choose the trigger event **Key** and in the following dialog **Panel Key 4**.
16. In the column **Action/HostCAM**, click on **[...]**.
17. In the dialog **Action Settings**, activate the **HostCAM1** and **Stop capturing**.

18. Close the dialog with **[OK]**.

Configuration of a LED

19. In the tree view, open node **Output | LEDs**.
20. At **LED 2**, select the **HostCAM status** for the **HostCAM1**.
21. At **LED 3**, select the **HostCAM trigger** for the **HostCAM1**.
22. Save the configuration on your computer.
23. Load the configuration into the logger as described in tutorial Write a Configuration on page 58.

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