

AN4001: Setting Up and Using WinFlash

Topics

- Installation
- Using WinFlash
- Troubleshooting

1 Introduction

The WinFlash application is used to flash the CAN driver DLL file and the Hex-file to a controller. This application note will discuss the installation and how to successfully use WinFlash.

2 Installation

The steps to successful installation are as follows:

- Run the “winflash.exe” application (The setup application)
- Select a CAN Interface and installation of CAN drivers
- Reboot and run

2.1 Run the “winflash.exe” Application

Locate and open the WinFlash folder on your PC. In this folder there should be a setup application named “winflash.exe” or “setup.exe.” Click on the setup application to launch the application wizard.

After the installation wizard has started, read each page carefully, and follow the instructions. Click “Next >” when you have finished reading each page. You will then be prompted to select a CAN Interface.

2.2 Select a CAN Interface and Install of CAN drivers

When prompted with “which interface do you want to use for communication?”, you will be given the following options:

- Configure Manually
- Sontheim GmbH CAN Interface
- Vector Infomatik CAN Interface
- PEAK-System Technik GmbH CAN interface
- Wünshe CAN Interface.

Select “PEAK-System Technik GmbH CAN interface” and click “Next >.”

NOTE: See Figures 1 and 2 on the next page for additional help.

Click “Yes” then “OK” and another install wizard will start up to install the CAN drivers.

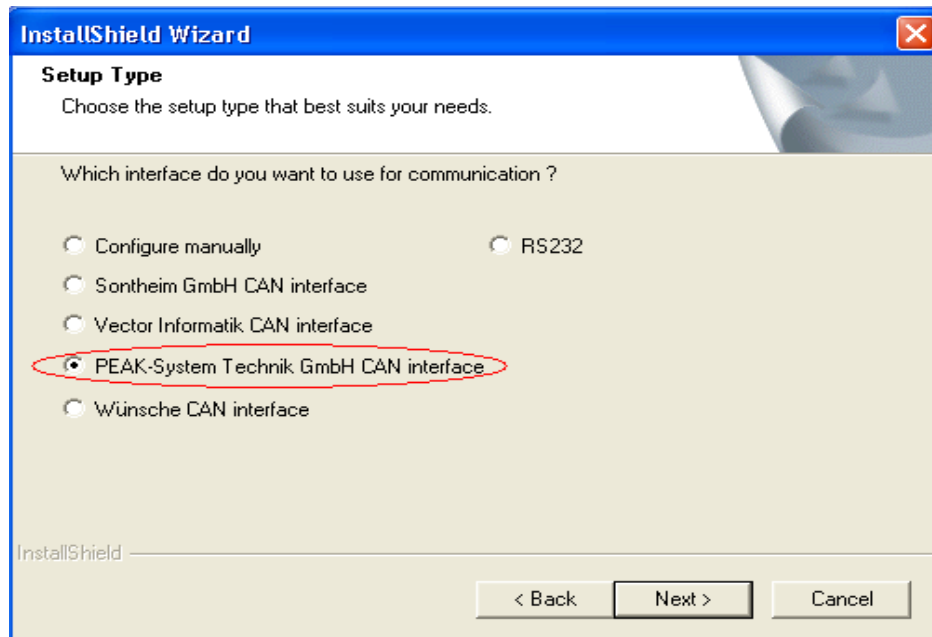


Figure 1

Read each page carefully and continue to follow the instructions. You will then be prompted with "Which type of PEAK CAN will be used?" Select "PCAN USB" and then click "Next >."

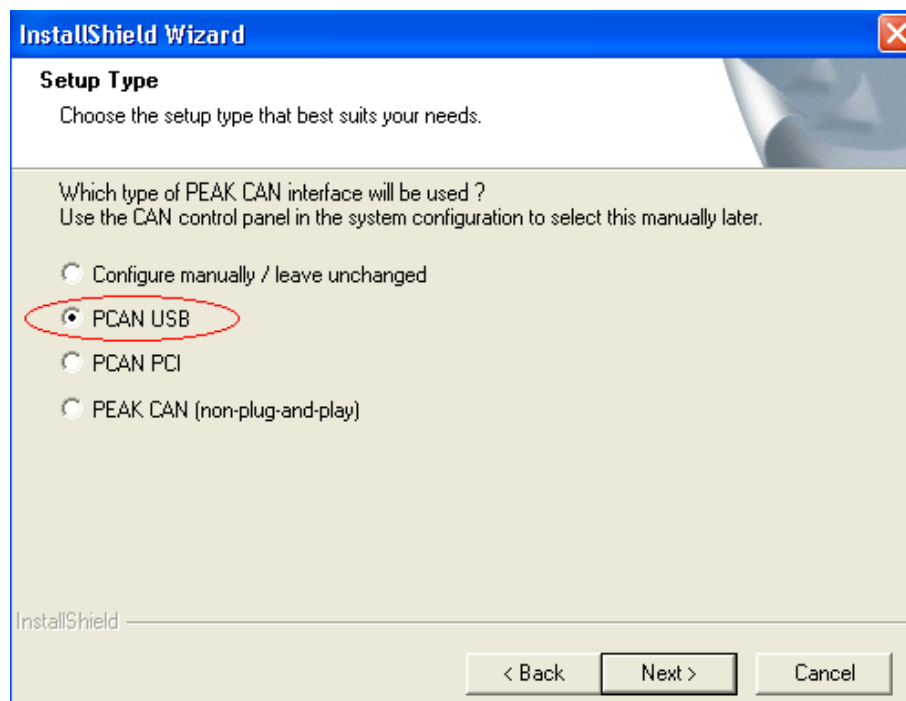


Figure 2

After clicking "Next >" a dialog box will open up asking you to name the default network. Type in the desired name and click "Next >." Follow the instructions and click "Finish" to finish the installation.

2.3 Reboot and Run

WinFlash and the CAN drivers have now been setup. Restart your computer and WinFlash is all ready run.

3 Using WinFlash

Now that WinFlash has been successfully installed, you can use it to flash the application Hex-File to your controller. This section includes:

- Description
- The WinFlash GUI
- Step-by-Step Instructions
- Working with Configurations

3.1 Description

The C and IEC1131 development environments produce a file in Intel Hex format using correct compiling and linking procedures. This hex file can be transferred to the controller's Flash memory with help of WinFlash via the CAN interface.

The following prerequisites are necessary for the correct transmission of the user program from the PC into the Flash memory of the controller:

- A correct file in Intel or Motorola Hex format must exist
- The PC must have an CAN interface with installed drivers
- The controller must have a Flash memory, which already contains a boot loader. This loader is a minimum program, which makes writing of the Flash memory possible. All programmable STW ECUs are delivered with this piece of software. It resides in flash sector 0 and can not be erased. Newer versions of this loader program support communication via RS232, too (if an RS232 interface is available on the system).

3.2 The WinFlash GUI

WinFlash can handle different configuration sets (i.e. different Hexfiles with different parameters). Those parameter sets can be stored into WinFlash's INI file and loaded back for use at any time.

3.2.1 GUI Elements

General configuration setting

Element	Description
CAN-DLL	The CAN driver DLL that will be used for CAN hardware access (change by clicking "Select"; click "Configure" to set communication interface specific parameters)
Delay	Defines a gap between the individual CAN messages sent to the ECU (in micro seconds). This might be required if the ECU can not handle fast traffic at high bit rates well enough or if the PCs CAN interface only has a small TX buffer (i.e. Wuensche CPC-PP). For most ECUs this can be set

Element	Description
	to "0".

Individual Settings for each configuration

Element	Description
Hex-File	The Hexfile to flash (change by clicking "Select"; "View" will display the Hexfile and its time stamp and size)
Start Time	Time in seconds determining how long WinFlash will try to address the controller (helpful if the power switch is remote from the PC running WinFlash)
Local ID	The local ID allows selection of exactly one controller on the CAN bus, which is to be flashed (it is possible to have several controllers available, distinguishable by their Local-IDs). The default ID for newly delivered STW devices is "0".
Serial Number	Alternately to using the Local ID for identifying which ECU to address the Serial Number can be used. Only required if two controllers have the same local ID
Company ID	Enter your company identification (2 characters). "Wakeup" and "Flashing" will not work without the correct company ID. Contact STW Technic, LP if you do not have this information.
Send ID	CAN-ID on which to address the controller. The default is 81d (0x51) and there's usually no need to change this.
Bitrate	Flash CAN-Bit rate of the controller (this does not necessarily match the bit rate of the application). Default is 125kBit/s
Type of Hexfile	Select the type of the application. This will determine the numbers of Flash sectors to erase. WinFlash will automatically detect how many sectors of Flash the controller has and erase them according to the selection. The available number of sectors depends on the ECU. C-Application -> this setting will erase all flash sectors CANopen Configuration -> will erase sectors required for a CANopen configuration file IEC1131 Application -> will erase sectors required for an IEC1131 application IEC1131 Run-Time-System -> will erase sectors required for an IEC1131 run-time-system User Defined -> will allow you to define the sectors manually, separated by commas (i.e. 1,4,6 will erase sectors 1,4 and 6)
Reset Request	Usually it is required to turn the ECU off and on again to bring it into flash mode. With this setting it is possible to send out a reset message from WinFlash before starting to flash. This message is freely configurable. The application running on the controller must support the message and perform a system reset (i.e. close_esx()). However, if the application fails to run, the controller has to be reset manually. The ID and message bytes are decimal values.

If WinFlash is exited with the "Exit" button all setting are saved and restored with the next start if the INI directive "CONFIGAUTOSAVE" is set to 1.

On the ESX, ESX-Lt., C2C and related controllers the parameters "Local ID" "Send ID" and "Bit rate" may be checked / changed with the flash loader BIOS-functions or with help of WinFlash's wakeup function.

3.1.2 Buttons and Menu Items

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Search Local ID

Searches the network for controllers. Click on the Button and turn on the controller(s). You will get a window with all controllers that were found in the network (listed by their Local ID). If you have more than one controller and only one is found, make sure that they have individual Local IDs.

If you select one entry from the combo box that ID will be placed in the "Local ID" parameter field on the main window.

This option can be used to verify communication with erasing or flashing the controller.

Flash with Local ID

This will start the flashing procedure according to the configuration as it appears on the screen. The progress will be reported in the status window.

Sort Hexfile

For loading a Hexfile to the internal flash of a C167CS the file must be sorted (i.e. the addressed must be in linear ordering). WinFlash++ will automatically sort all Hexfiles before loading them onto a controller. If you need to use a Hexfile with another tool that does not support sorting the trim function will do this for you and save the ordered results to another file.

This function is helpful if you get an error while downloading which specifies the line number. The reported number will refer to the sorted Hexfile.

Read from Node to File

This allows to read the Flash contents back from the controller and store it in a Hexfile on the PC. Before reading out the Flash contents start and end address must be specified. The addresses can be selected from various profiles or entered manually. The file read back from the controller will be larger than the original Hexfile as it will also contain empty flash areas. To compare the contents of a Hexfile with the controller's flash contents use "Verify Program on Controller" from the "Actions" menu.

Caution: If you read a Hexfile from the controller that you intend to flash back later, make sure you only read out the part(s) that contain(s) code. On some controllers RAM data is mapped mixed with the Flash data.

Example:

A C167CR-ESX typically has ROM from 0x8000 to 0xDFFF, then a gap containing RAM, then ROM again from 0x10000. So if you would read out a block starting from 0x8000 right down to 0x7FFFF and try to flash the resulting file back to the ESX this will fail at address 0xE000.

Bottom line: it's important to know about the controllers RAM/ROM mapping when using "Read from Node to File" to retrieve a Hexfile for flashing back later.

Verify Program on Controller

This allows to check whether the selected Hexfile matches the contents of the controllers flash. The results will be displayed in the status window. This function is optimized so it will only check the areas in flash that actually should contain data (according to the contents of the Hexfile).

Target Selection

When using an ESX with active Babyboard (i.e. type B) it is possible to load a program onto this Babyboard by switching the flash target to "BBB". As this is usually not necessary except for special adaptations of the BBB software, downloading to the Babyboard is protected by password. Please contact STW if you really do need to do this.

After selecting "BBB" all actions will refer to the Babyboard (Wakeup will retrieve some extra Babyboard information, Flashing will download the file to the Babyboard).

Wakeup with local ID / Wakeup with SNR

These buttons are used to set one controller into the "active state". This means you can read and set flash parameters of this controller. Click on the button then switch on the device. If the specified node is found in the network the following window will pop up:

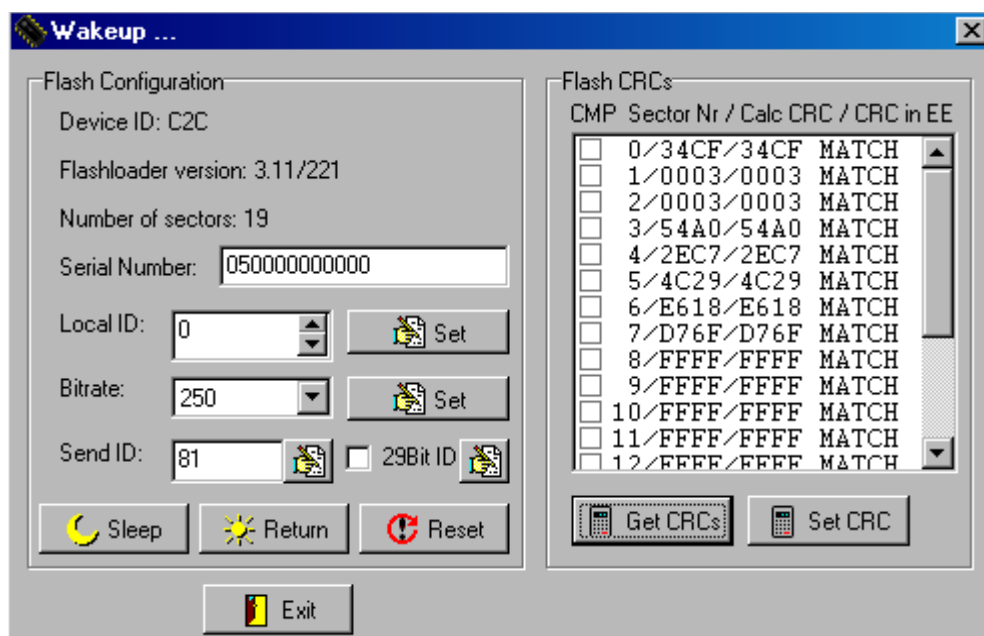


Figure 3

The upper three fields show information about the device and may not be altered.

The Local ID, Flash Bit rate and Send ID may be changed by altering the value and clicking on the corresponding "Set" button.

Buttons:

Node Reset Completely reset the controller

Node Sleep Leave active mode and set controller to sleep mode

Node Return Leave active mode and start application

Depending on the device's capabilities some other options may be available:

Get CRCs

Read back the CRCs over the flash sectors from the controller. The results will be displayed in the following format:

Sector Number / Calculated CRC over the Sector / Sector CRC in the controllers EEPROM / Match or Nomatch.
The Check boxes in each line show if the controller is configured to check the CRC for this sector.

Set CRCs

Correct the CRC for one sector of the flash. This means if the calculated checksum differs from the one in EEPROM this can be corrected using this button. Select the sector to correct the CRC by clicking on the corresponding line. When writing the CRC the Wakeup window must be left using "Sleep", "Return" or "Reset". In any other case the CRC will not be saved and the controller will not start up until this is corrected.

Set Compare Modes (from V1.06)

By clicking on the check boxes next to each CRC you can (de-)activate the CRC check for each individual sector. When changing one of the values the Wakeup window must be left using "Sleep", "Return" or "Reset". In any other case the CRC will not be saved and the controller will not start up until this is corrected.

Timeout Factors for SMM

This only refers to the ESX with a SMM (Shadow Memory Module) installed for AK4 applications. The timeout factor may be configured independently for writing and erasing. The values are given in percent.

Example:

Setting the Erase timeout factor to 10% means that the ESX will wait for the SMM Flash to be erased for another 10% of the time it took to erase the main board flash. If it is still not erased after that period the ESX will detect this and automatically retry with 20%. Thus the factor is automatically adapted by the ESX. It is usually not necessary to set this manually.

3.3 Step-by-Step Instructions

Single step instructions for loading the Hexfile and the CAN DLL file onto the controller.

- Start WinFlash
- Select the CAN DLL corresponding to your hardware
- Set the type of the Hexfile to flash
- Set correct baud rate
- Set correct company ID
- Set correct local ID (if not sure search for itfirst)
- Choose hex file to be flashed
- Click "Flash with Local ID"
- Switch the controller OFF and then ON again

The progress of flashing will be displayed in the status box.

3.4 Working with Configurations

WinFlash will show a selection box with all defined configurations. By selecting one configuration from this box it will be loaded and the values placed on the front end.

By default un-configured slots will be named "EMPTYX". If you wish to change those names you can either edit the INI-File directly or select the menu item "File -> Save Current Configuration". The selections will then be written to the INI file.

If WinFlash is exited and the "CONFIGAUTOSAVE" setting in the INI file is active (default) the current configuration is saved to the INI file.

The title bar of WinFlash will show the active configuration.

4 Troubleshooting

4.1 Problems with the CAN Bus

You may be having problems with your CAN bus. To avoid problems with the CAN bus be sure that your USB dongle is connected properly to your system. Make sure that your CAN+ and your CAN- are connected properly as well. If everything is connected and installed correctly, then you may be having other types of problems.

You may also be having problems if you have multiple nodes connected to the CAN Bus and they are set at different bit rates. If you have multiple CAN items connected and you are experiencing problems, try to disconnect all CAN items except for the controller and then try to flash the controller. You can reconnect your other CAN items at a later time.

4.2 Incorrect Company ID

WinFlash will not work if the company ID text box located on the WinFlash GUI is filled out incorrectly. Make sure that you have entered the correct company ID when using WinFlash. If you lost or do not know your company ID, then you can contact STW Technic, LP for your ID.

4.3 Does Your Controller Have Power?

Be sure that your controller's power is set up correctly and that each power and ground pin are being routed to their appropriate places. You can check AN2002 for correct pin locations for minimal specifications including power.

NOTE: STW controllers with a safety relay will engage the relay on power up as shipped from the factory. The end-of-line test program loaded in the controller does this. This can be used to ensure that a controller is powered properly. If you hear a click, a program is running.

5 Summary

Once WinFlash is installed correctly and you have set up your system correctly, WinFlash will allow you to flash

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your controller's memory with the necessary files for its operation. If you have any additional questions, please contact STW Technic, LP.

6 History

Revision	Date	Author	Comments
1	05/27/2008	J. Yore	Created Application Note
2	8/21/2008	A. Jansen	Internal changes.



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About Us

STW Technic is the premier manufacturer of mobile electronics for on- and off-highway vehicles. A wholly owned subsidiary of STW GmbH, Germany, STW Technic is located in Atlanta, GA.

STW was founded in 1985, and has since provided electronic controls for world wide market leaders of agriculture, construction, municipal and military vehicles as well as many other kinds of mobile equipment. In 2007, STW will sell about 60,000 freely programmable controllers (more than any other manufacturer) in more than 200 different variations into these markets.

Due to highly demanding safety requirements for many applications in mobile equipment (i.e. cranes, fire equipment, etc.), many of STW's controllers are certified based on IEC 61508 (SIL2) and EN 954-1 (Cat. 3) standards. STW is also ISO 9001 certified, and further certification includes ISO/TS 16949:2002, the quality standard of the automotive industry.

In addition to the controller product range, STW offers displays, joysticks, sensors, and other electronic components to provide a complete electronic system for vehicles.

STW is also a supplier of robust pressure and force measurement sensors with thin-film, ceramic or silicon technology. STW specializes in applications in extreme conditions, which includes pressures up to 3,000 bar (44,000 psi) and media temperatures up to 300 °C (540 °F).

STW is a reliable partner, who not only supplies controllers, but can also train you to develop your own applications, write the applications for you, maintain inventory for you, and do everything a control engineering department would do.

Construction Equipment



Controllers



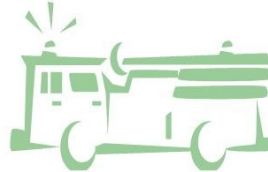
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Displays



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