


CAEN Application Note


**How to upgrade CAEN VME boards firmware using the
CVupgrade application**

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	AN	CVUpgrade Application note	06/02/08	0.0	

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1. Introduction

CAEN VME boards store two firmware versions, called **standard** and **backup** respectively.

At Power On, a microcontroller reads the Flash Memory and programs the module with one of the firmware version (standard or backup) selected by on board Jumper.

It is possible to upgrade the two firmware versions via VME, by writing the Flash; for this purpose, download the software package available at product page on CAEN web site (www.caen.it/nuclear).

N.B.: it is strongly suggested to upgrade ONLY one of the stored firmware revisions (generally the standard one); if both revision are simultaneously updated, and a failure occurs, it will not be possible to upload the firmware via VME again!

2. CVupgrade tool

A new software tool allows to upgrade in-field the firmware of two CAEN VME board family.

CAEN provides users with simple software application (named CVupgrade) that allows to upgrade VME board firmware when a new release is available.

CVUpgrade currently supports the following modules:

- VME Digitizers family (V1724, V1721, V1731, V1720)
- VME TDC family (V1190, V1290)

CVUpgrade is suitable for Linux (kernel 2.4/2.6) and Windows 2000/XP/Vista and should be used with the CAEN VME Bridges ([V1718](#), [VX1718](#), [V2718](#), [VX2718](#)). It requires the installation of the Bridges CAENVMELib library.

CAEN provides the complete CVupgrade source code for users of different VME CPU/Bridge or different operating systems.

3. Firmware upgrade procedure

CVUpgrade is a command line application using the following syntax:

CVupgrade ConfFile BaseAddress [*options*]

where:

ConfFile is the name of Altera Raw Binary Format file to be loaded into the module flash memory.

BaseAddress is the board VME Base Address (Hex 32 bit)

[*Options*]:

-backup: write backup image. If this option is not used, standard image is overwritten.


-no_verify: disable verify (don't read and compare the flash content)

-verify_only: read the flash content and compare with the ConfFile file

-param filename: a different name for the parameter file can be used (default is CVupgrade_params.txt)

CVupgrade default behaviour (no options specified): write standard image and verify, upgrade parameters read from cvupgrade_params.txt file.

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N.B.: Cvupgrade allows to write both the firmware versions (standard/backup) regardless of the location of jumper on the board.

4. Upgrade examples

Module: V1724

Base address: 32100000

ConfFile: v1724_rev1.6_0.6.rbf:

Upgrade standard image:

```
CVupgrade v1724_rev1.6_0.6.rbf 32100000
```

Upgrade backup image:

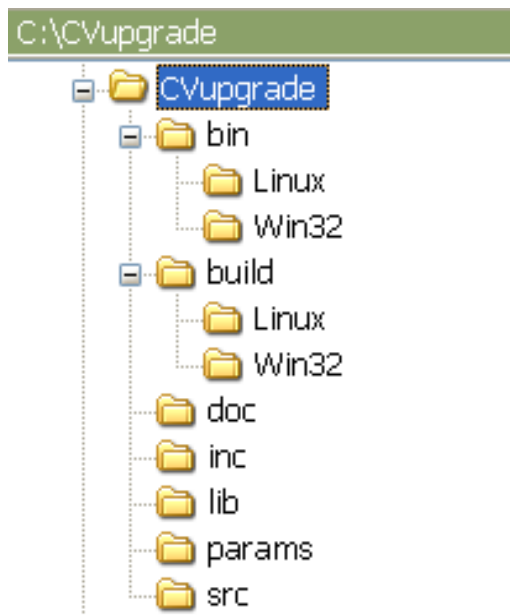
```
CVupgrade v1724_rev1.6_0.6.rbf 32100000 -backup
```

Verify standard image:

```
CVupgrade v1724_rev1.6_0.6.rbf 32100000 -verify_only
```

5. Software description


When the ZIP file containing the source code and auxiliary file has been uncompressed the following directory structure is created:



\CVUpgrade The home directory; contains CvupgradeREADME.txt

bin\Linux Directory for CVUpgrade executable (Linux version). It contains the specific default CVupgrade_params.txt file of the module for which the tool is provided.

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\bin\Win32	It contains the CVUpgrade executable (for Windows 2000/XP/Vista) and the specific default CVupgrade_params.txt file of the module for which the tool is provided. This directory contains also a Visual Basic script file (Cvupgrade.vbs) which provides a simple graphic interface to enter the ConfFile name and the VME base address.
\build\Linux	Directory for makefile. It contains the specific default CVupgrade_params.txt file of the module for which the tool is provided.
\build\Win32	Directory for MS VC++ 2005 solution/project.
\doc\	contains documentation files.
\inc\	contains files needed for compilation (included files)
\lib\	contains Library file (CAENVMElib.lib). For compilation under Windows 2000/XP/Vista.
\params\	contains configuration parameters files for all supported modules.
\src\	contains source C code files needed for compilation.

6. Application porting

The application source code (ANSI C code) is provided. In this way the Cvupgrade tool can be recompiled for different Bridge/CPU and operating systems.

6.1. Windows

A Microsoft Visual C++ 2005 solution file is provided (in the directory \build\Win32).

6.2. Linux

A Makefile is available for recompilation under Linux operating system (in the directory \build\Linux).

6.3. Retarget the application to different Bridge/CPU


If a CAEN VME Bridge is used as VME master, the CVupgrade tool only needs a correct installation of the CAENVMElib in the host PC.

The application can be directly used, without any code modification.

If different Bridge/CPU are used:

- functions declared in the **vme.h** file must be implemented for the target Bridge/CPU.
- functions defined in the **vme.c** must be written using specific function calls of specific API library.

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7. Appendix A: Exit codes

EXIT CODE	DESCRIPTION
0	Successful upgrade
-1	Insufficient number of arguments
-2	Cannot open parameter file
-3	Cannot open configuration file (.rbf)
-4	Cannot connect with VME bridge (V1718/V2718)
-5	Generic error during programming/verify

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