

Purpose of this Guide

This QuickStart Guide contains the basic information and examples that will let you use CAENUpgrader in few steps.

Change Document Record

Date	Revision	Changes
18 May 2011	00	Initial release.
19 July 2011	01	Modified § UPGRADE PLL : added note on PLL configuration file for DT/NIM boards
16 February 2012	02	Extended § Reference Documents . Modified § System requirements & installation setup . "Link number" parameter definition changed in § 4 .
06 June 2012	03	Updated § System requirements & installation setup
06 September 2012	04	Updated § 3
03 December 2012	05	Updated § FIRMWARE UPGRADE (for boards and bridges)
18 February 2013	06	Updated § 1
18 May 2014	07	Updated § 1 , § 2 , § GET FIRMWARE RELEASE (for digitizers and bridges) , § FIRMWARE UPGRADE (for boards and bridges) , § VERIFY FIRMWARE UPGRADE (only for boards) , § UPGRADE PLL . Added § DeskBoot Utility
7 November 2016	08	Updated § 2 , § 3 , § UPGRADE PLL : default configuration file for DT/NIM/WME boards § V2495 Support

Symbols, abbreviated terms and notation

DPP	Digital Pulse Processing
SBC	Single Board Computer

Reference Documents

[RD1]	UM1934 - CAENComm User & Reference Manual
[RD2]	AN2472 - CONET1 to CONET2 migration
[RD3]	UM1935 - CAENDigitizer User & Reference Manual
[RD4]	GD2812 - DeskBoot QuickStart Guide
[RD5]	UM5175 – V2495/VX2495 User Manual

All documents can be downloaded at: <http://www.caen.it/csite/LibrarySearch.jsp>

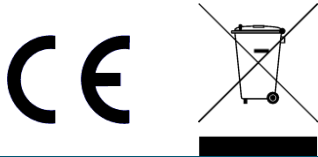
CAEN SpA.
Via Vetraia, 11 55049 Viareggio (LU) - ITALY
Tel. +39.0584.388.398 Fax +39.0584.388.959
info@caen.it
www.caen.it
© CAEN SpA – 2016

Disclaimer

No part of this manual may be reproduced in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of CAEN SpA.

The information contained herein has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. CAEN SpA reserves the right to modify its products specifications without giving any notice; for up to date information please visit www.caen.it.

MADE IN ITALY: We stress the fact that all the boards are made in Italy because in this globalized world, where getting the lowest possible price for products sometimes translates into poor pay and working conditions for the people who make them, at least you know that who made your board was reasonably paid and worked in a safe environment. (this obviously applies only to the boards marked "MADE IN ITALY", we cannot attest to the manufacturing process of "third party" boards).



Index

Purpose of this Guide	2
Change Document Record	2
Symbols, abbreviated terms and notation	2
Reference Documents	2
Index	4
List of Figures	4
List of Tables	5
1 Introduction	6
System requirements & installation setup	7
2 Board Connection	8
Direct Link to the Module via USB	9
Direct Link to the Module via Optical Link	9
Link through a VME Bridges	9
3 Getting Started	10
CAENUpgrader GUI Functions Overview	11
GET INFORMATION (only for boards)	11
GET FIRMWARE RELEASE (for digitizers and bridges)	12
FIRMWARE UPGRADE (for boards and bridges)	13
VERIFY FIRMWARE UPGRADE (only for boards)	16
STORE PRODUCT UNLOCK CODE (only for boards)	17
GET PRODUCT UNLOCK CODE (only for boards)	20
DELETE PRODUCT UNLOCK CODE (only for boards)	20
UPGRADE PLL	21
DeskBoot Utility	23
Troubleshooting	23
4 Appendix A	24
Connection Settings Description	24

List of Figures

Fig. 1.1: Additional CAEN libraries required by CAENUpgrader to be installed apart in Linux environment ..	7
Fig. 2.1: PC-to-CAEN Board connection options	8
Fig. 3.1: CAEN DT5724,V1731,V1751 and VX1724 digitizers.	10
Fig. 3.2: CAENUpgrader's GUI main window	10
Fig. 3.3: CAENUpgrader's "Get Information" box	Errore. Il segnalibro non è definito.
Fig. 3.4: CAENUpgrader's "Get Firmware Revision" box	12
Fig. 3.5: Firmware file type selection in the 'Browse' window	13
Fig. 3.6: Warning message uploading a .rbf file.	14
Fig. 3.7: CAENUpgrader's "Upgrade Firmware" box for CAEN boards	14
Fig. 3.8: Firmware options upgrading x780, x790 or DT55xx boards	15
Fig. 3.9: 'Web License' page on CAEN website	17
Fig. 3.10: Module detailed selection	17
Fig. 3.11: Registration form	18
Fig. 3.12: Registration request's confirmation page	18
Fig. 3.13: 'License Status' Web Page	19
Fig. 3.14: Product Unlock Code availability at 'License Status' Web Page	19
Fig. 3.15: CAENUpgrader's "Store Product Unlock Code" box	19
Fig. 3.16: CAENUpgrader's "Get Product Unlock Code" box	20
Fig. 3.17: CAENUpgrader's "Delete Product Unlock Code" box	20
Fig. 3.18: CAENUpgrader's PLL settings window	21
Fig. 3.19: CAENUpgrader's Upgrade PLL box	22
Fig. 3.20: DeskBoot utility integrated into CAENUpgrader tool	23
Fig. 3.21: CAENUpgrader's About window	23
Fig. 4.1: Hardware System: PC with USB port, hosting a A2818; V2718 bridges in Daisy Chain, V1718 bridge and V1724 VME digitizers	24

List of Tables

Tab. 1.1:List of the supported CAEN boards and Bridges6

Tab. 1.2:Host PC requirements7

Tab. 2.1:CAEN Optical Bridges9

Tab. 2.2:CAEN VME Bridges9

1 Introduction

This CAENUpgrader Quick Start Guide contains the basic information and guidelines for letting you use CAENUpgrader in few steps.

CAENUpgrader is a software composed of command line tools together with a Java Graphical User Interface (for Windows and Linux OS). It reunites all the functions included in cvUpgrade, CAENBridgeUpgrade and PLLConfig programs. In few easy steps you will be able to perform the following main functions on your board:

- upload different firmware versions
- verify the firmware upload success
- manage the PLL configuration upgrade
- upload different PLL configuration files
- get board information
- get the current firmware version
- manage the firmware license
- force the board reboot

and on your bridge:

- upload different firmware versions
- get the current firmware version

Here below the table of the supported boards and bridges:




Boards	Bridges
CAEN Digitizers (VME, VME64X, NIM, Desktop), x780/81 (Digital MCA), x790 and Programmable Logic Unit (V2495)	VME/VME64X-USB2.0 Bridges (V1718, VX1718)
VME /VME64X TDC family	VME/VME64X-PCI CONET Bridges (V2718, VX2718)
General Purpose VME Board (V1495)	PCI CONET Controller (A2818)
VME (V65xx) and desktop (DT55xx) Power Supply Units	PCI Express CONET2 Controller (A3818)
TPC Readout System (SY2791)	A2719 Internal Controller for V2718

Tab. 1.1:List of the supported CAEN boards and Bridges



Note: If you have a VME64X board or bridge, any action supported in CAENUpgrader has to be performed referring to the correspondent VME model.

System requirements & installation setup

OS	OS version	CAEN Libraries required	Third-party software required
	7/8/8.1/10 32 and 64-bit	CAENComm CAENVMELib ⁽¹⁾	
	32 and 64-bit	CAENComm (1.02 or later) CAENVMELib (2.22 or later)	Java ⁽²⁾ Runtime Environment 8u40 or later. You can download from http://www.java.com

⁽¹⁾ CAEN libraries are locally installed by the CAENUpgrader Installer.

⁽²⁾ Java is a registered trademark of Oracle, Inc.

Tab. 1.2: Host PC requirements

CAENUpgrader stands on the third-party software listed in the **Tab. 1.2**. For the program installation, do as follows:

- Go to CAENUpgrader web page:
Home / Products / Firmware/Software / Software Tools / Configuration Tools / CAENUpgrader.
- Download the CAENUpgrader software package related to your OS in the “Download” tab.
- Uncompress the downloaded package.
- For Windows users:** launch the CAENUpgrader Setup executable file, then follow the installer instructions. Note that this is a standalone version which installs locally all the required libraries (see **Tab. 1.2**) and doesn’t need them to be installed apart by the user.
- For Linux users:** before to install the CAENUpgrader, the installation of the CAEN required libraries is needed. Click on the red link above the CAENUpgrader package in order to download them.











Overview	Documentation	Download	Related Products	Required Products	
Description	Release	Date	OS-Version	Environment	Download
Control Software					
 CAENUpgrader	1.5.2	September, 2015		C, JAVA	
SW Package 2.07 MB - Type: .tgz					 
Release Notes 2.47 KB - Type: .txt					 
 [-] CAENUpgrader requires additional Libraries					
CAENComm library (*)		SW Package 21.6 KB - Type: .tgz			 
CAENVMELib & demo(**)		Library (Linux glibc 2.12 or greater) 64.09 KB - Type: .tgz			 

Fig. 1.1: Additional CAEN libraries required by CAENUpgrader to be installed apart in Linux environment

Because of CAENComm is based on CAENVMELib, it is necessary to install CAENVMELib on your PC before installing the CAENComm. Now, install CAENUpgrader by following the installation instructions within the README file inside the package.

2 Board Connection

CAENComm library (see [RD1]) allows CAENUpgrader to access the target board via USB or via CAEN proprietary CONET optical link, using the following channels of communication:

- PC => USB => CAEN Front-end Modules with USB 2.0 interface:
 - CAEN Waveform digitizers, Digital MCAs and x790 boards with USB interface (NIM/Desktop form factors),
- PC => USB => CAEN Front-end Modules with Mini-USB 2.0 interface:
 - Programmable Logic Unit V2495
- PC => PCI (A2818) or PCIe (A3818) => CONET => CAEN Modules with Optical link:
 - Waveform digitizers (VME, NIM/Desktop form factors), Digital MCAs and x790 boards (Desktop/NIM)
 - SY2791 TPC Readout System
- PC => USB => V1718 => VME => CAEN Slave VME Modules:
 - CAEN VME waveform digitizer, CAEN VME TDCs V1190, V1290, General Purpose V1495, Power Supply Units V65xx, Programmable Logic Unit V2495
- PC => PCI (A2818) or PCIe (A3818) => CONET => V2718 => VME => CAEN Slave VME Modules:
 - CAEN VME waveform digitizer, CAEN VME TDCs V1190, V1290, General Purpose V1495, Power Supply Units V65xx

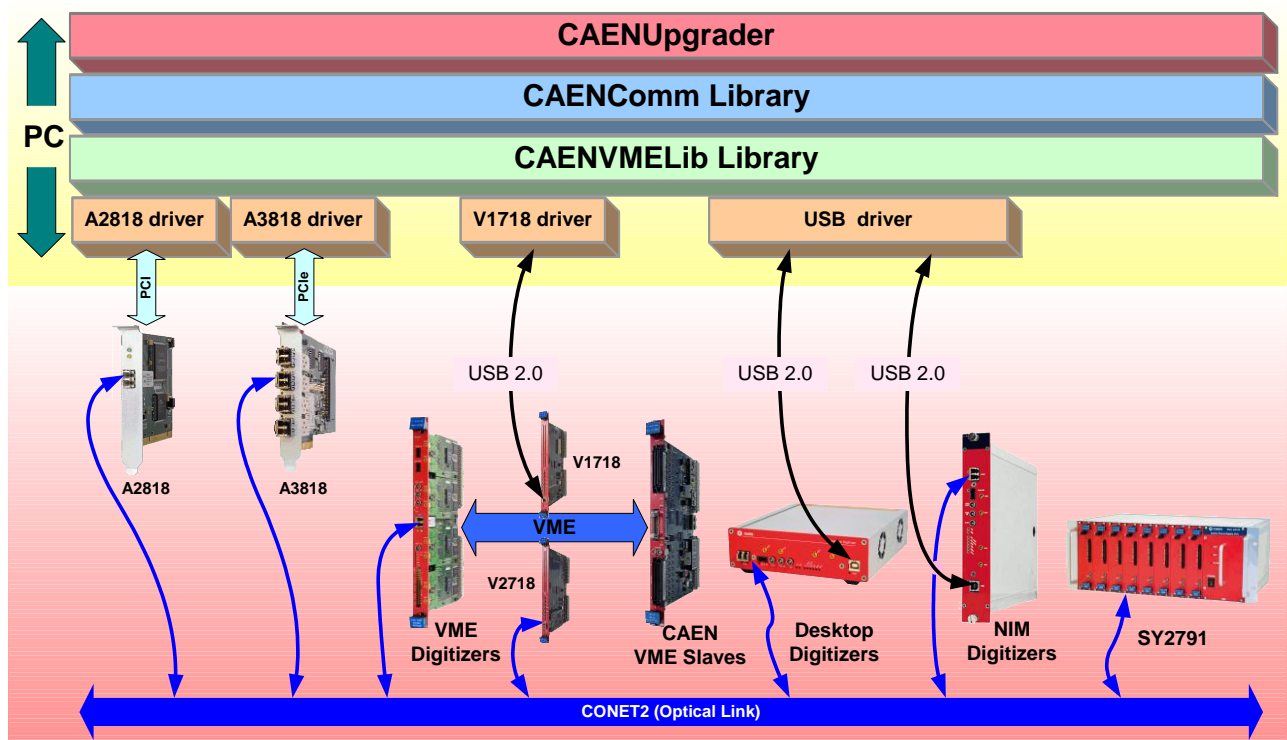


Fig. 2.1:PC-to-CAEN Board connection options

Note: In case of optical master and slave connection, be sure that they both are provided with the same CONET protocol version, in order to avoid system failures. CAEN makes two versions available, CONET1 and the new CONET2, which is not compatible with CONET1. Please refer to [RD2] reference and to the User Manual of your optical board or bridge for more detailed information.

Note: Please refer to [RD5] reference for more detailed information on Programmable Logic Unit V2495 connection.

Direct Link to the Module via USB

Desktop and NIM versions can be directly handled via USB as well, just connecting the board to the host PC via the USB cable. The USB driver compliant to the architecture of your PC processor can be downloaded at the board's web page.

Direct Link to the Module via Optical Link

Every CAEN Digitizer (and so the Digital MCAs and the x790 boards) can be controlled directly via Optical Link; for this purpose, a CAEN PCI or PCIe Controller (Mod. A2818 and A3818) is required, as shown in **Fig. 2.1**. See the web pages of A2818/A3818 for more info.

In this case, the slave unit must be connected to the featured master controller via the optical fibre cable (see the Ordering Options of the controller).



A2818 PCI Controller with Optical link (requiring just a host PC with a free PCI slot)	A3818 PCIe Controller with Optical Link (requiring just a host PC with a free PCI slot)
	

Tab. 2.1:CAEN Optical Bridges

Link through a VME Bridges

VME Digitizer Boards can be controlled via VMEbus through a VME bridge (see **Fig. 2.1**).

Two CAEN bridges are available:

V1718 / VX1718 with USB interface (requiring just a host PC with a free USB port)	V2718 / VX2718 with Optical Link (requiring Mod. A3818 or A2818 controller)
	

Tab. 2.2:CAEN VME Bridges



Note: If you want to use a VME bridge from another manufacturer or a SBC you have to provide a CAENComm-like library. Please refer to the Application Notes AN2472 [RD2].

3 Getting Started

This Section is intended to let you dial with the main features of CAENUpgrader step by step. For this purpose, **CAENUpgrader** software in **Windows** environment, the **DT5724 desktop digitizer board** with **USB** connection, the **V1731, V1751 and VX1724 VME digitizer boards** have been selected as examples.



Fig. 3.1: CAEN DT5724, V1731, V1751 and VX1724 digitizers.

Next paragraphs highlight the main functions provided by CAENUpgrader after you have performed two basic actions:

- turn on the digitizer and connect it to the PC;
- launch the **CAENUpgraderGUI.jar** file.

You will see a two-tab GUI interface with the only “**Available actions**” control box active, both for “**Board Upgrade**” and for “**Bridge Upgrade**” tab. This is the philosophy CAENUpgrader has been built on: different options will appear according to the action chosen in order not to confuse the user.

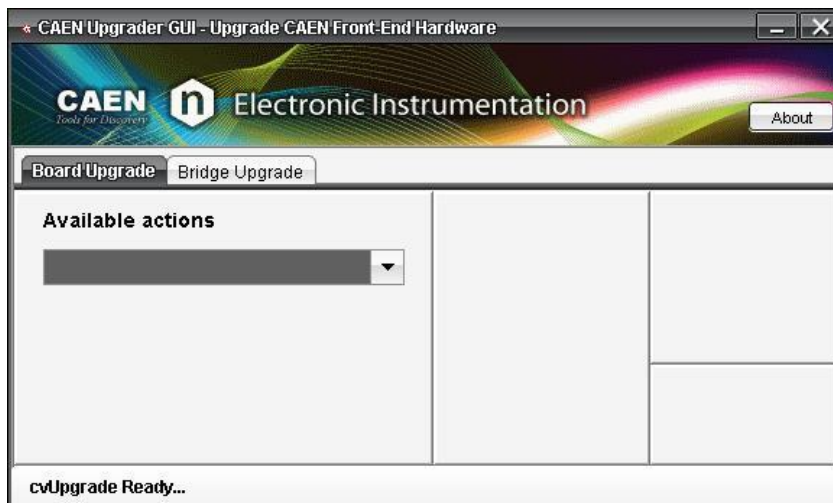


Fig. 3.2:CAENUpgrader's GUI main window

CAENUpgrader GUI Functions Overview

GET INFORMATION (only for boards)

This function allows a file to be generated on your computer containing all the main information related to your board that can be needed when a request for firmware license is performed by the user (see the proper section on this guide).

From the **“Board Upgrade”** tab, perform the following steps:

- Select the **“Get Information”** option in the **“Available actions”** scroll menu: the **“Board’s Model”** box will appear right below.
- Select your board model in the **“Board’s Model”** scroll menu; in our example, we selected a **DT5724**.

This last action makes new commands appear. Let’s focus on them from left to right:

- Browse your hard disk by the **“Browse”** button and set the **“Board Info output folder”**, which means where to save the board info file on your computer. For the sake of simplicity, in this example we save it in the desktop folder.
- **“Connection Type”** control box will let you select the type of connection you are using (in our example, USB).
- **“LINK number”** allows for choosing between different boards/bridges linked to your computer, if you are using more than one connection link. In our example, we leave this field set to **0**, which is the default value when there is only one link available.

It can be noticed that other two commands, **“Board number”** and **“VME BASE Address”** appear as shaded and not selectable, as they are not needed when using the DT5724 board through the USB connection. A detailed description of the connection parameters is given in the Appendix at the end of this guide.

- By clicking on the **“GetInfo”** button, a message will appear telling you that the board information file has been created. Follow the path you chose before and you will find a .dat file, in our example called **“BoardInfo-DT5725-xx.dat”**, where xx is the serial number of the board.

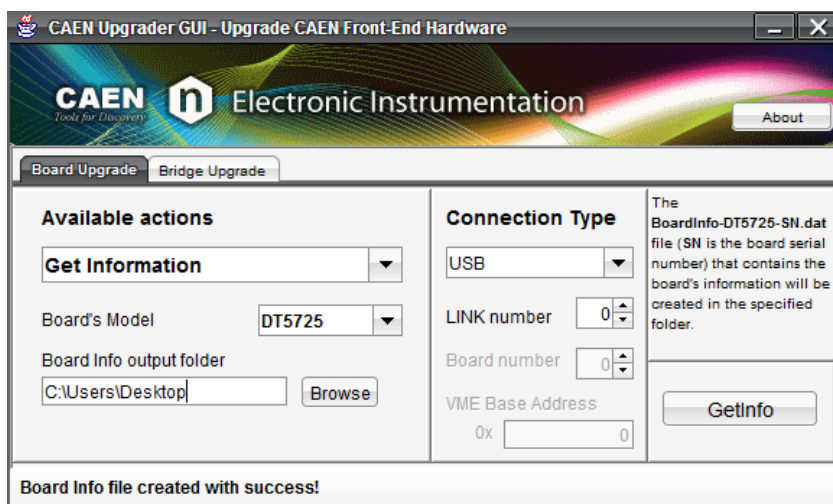


Fig. 3.3: CAENUpgrader’s “Get Information” box

This example was intended to show you how CAENUpgrader works concerning the **“Get Board Information”** function. Next sections will describe the complete set of CAENUpgrader’s functionalities.

GET FIRMWARE RELEASE (for digitizers and bridges)

By this function, it is possible to retrieve from the digitizer or the bridge the information about the current firmware release running on it.

- According to the target board, select “**Get Firmware Release**” in the “**Available actions**” scroll menu of CAENUpgrader’s “**Board Upgrade**” or “**Bridge Upgrade**”.
- Insert the target model in the appearing “**Board’s Model**” or “**Bridge Model**” box. This action will make other commands be visible.
- Type the proper connection parameter settings. In the example, the V1751 is addressed by the A3818 PCIe Controller using the Optical Link, so Connection Type = OPTLINK.
- Press “**Get FW Rel**” button to retrieve the information.

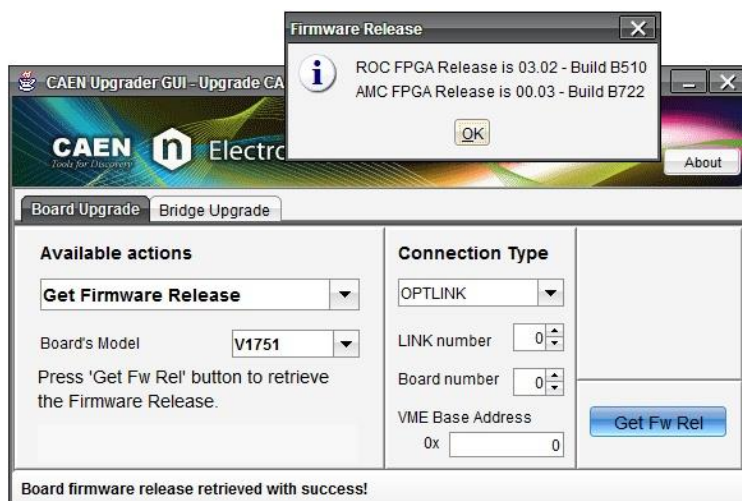


Fig. 3.4: CAENUpgrader’s “Get Firmware Revision” box

When using the GET FW RELEASE action with a x780 (Dual Digital MCA) or a x790 module, two pop-up windows will appear giving information about the HV (power supply) firmware and the FPGA firmware release respectively. In case of the desktop power supply units DT55xx, a single window will report the revisions of the HV firmware and the motherboard FGPA (ROC).

FIRMWARE UPGRADE (for boards and bridges)

CAENUpgrader can manage the firmware upload on every CAEN board and bridge that may need it. In case of digitizers, the firmware must be intended as the default firmware (for the waveforms recording) or CAEN's Digital Pulse Processing (DPP) firmware, specifically dedicated to different applications and running only on Digitizer boards. The programming file for a module can be downloaded at the module's web page. In particular, the DPP firmware is downloadable in a "trial" version, functionally fully opened, but the Digitizer can run the DPP algorithms for a limited time of 30 minutes, then a power cycle of the board is required for another 30-minute use.



Note: the 30-minute time limitation doesn't apply to x780/81 and x790 boards, which are factory provided with full time operating DPP firmware.

CAEN makes two main programming file types available with **.rbf** and **.cfa** extensions.



Note: exceptions are the PCIe Controller A3818, whose programming file has **.bin** extension, the HV firmware file for x780, x790 and DT55xx boards (see the example at the end of this paragraph) which is a **.hex** file, and the V2495 Main FPGA Application firmware, which is a **.rpd** file. The upgrade firmware procedure of a A3818 through the CAENUpgrader tool is described in the A3818 User Manual

The **.rbf** file is a programming file used for the digitizer default firmware and for DPP firmware.

The new **.cfa** file, now available only for digitizers, is a sort of archive format file aggregating all the standard firmware files compatible with the same family of digitizers. This means, taking the x724 family as an example, that a single **.cfa** file is needed in order to upgrade the standard firmware either on a V1724 (VME), or on a DT5724 (Desktop), or on a N6724 (NIM) digitizer. The **.cfa** file features also heuristics, so that CAENUpgrader will inform the user when he is trying to upload a firmware not compatible with the target digitizer.



Note: concerning the **.rbf** files, if the firmware size exceeds the correct upgradable one, CAENUpgrader doesn't perform the upgrade and provides out a message to advise the user.

UPGRADING THE STANDARD FPGA

Let's see how to upgrade the default firmware on the example board DT5724 using a **.rbf** file (the differences in using a **.cfa** file are shown in parenthesis):

- Select **"Upgrade Firmware"** in the **"Available actions"** scroll menu of CAENUpgrader's **"Board Upgrade"** tab and insert your board model in the appearing **"Board's Model"** box. This action will make other commands be visible.
- Click on the **"Browse"** button, select the **"*.rbf"** option in the 'File type' scroll menu of the 'Browse' window (**"*.cfa"** is set by default) and seek on your hard disk the programming file previously downloaded. In the example, we used a **.rbf** file for a DT5724 board, which is the standard firmware version CONET2 compliant (in case of **.cfa** option, the file for the x724 digitizer family has to be used).

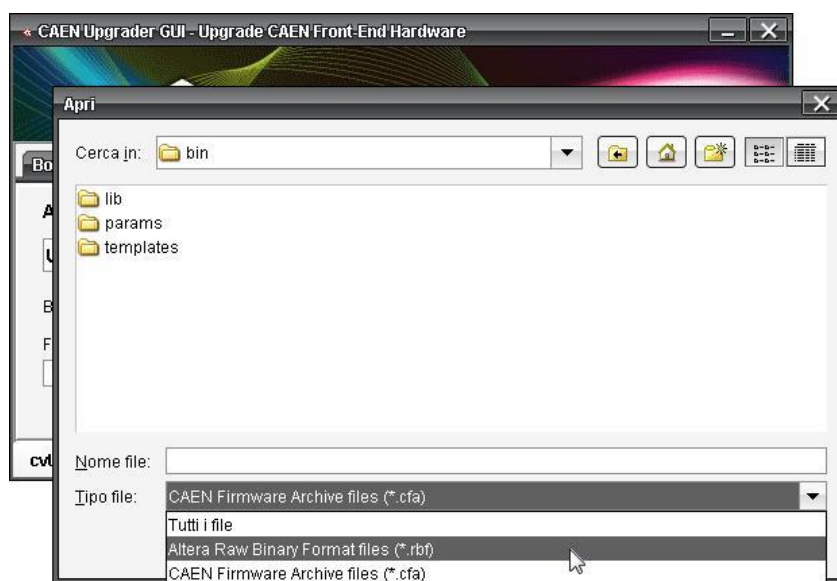


Fig. 3.5: Firmware file type selection in the 'Browse' window

- Select the **.rbf** file you have downloaded. In our example it is called: “**dt5724_n6724_rev_3.1_0.11.rbf**” (“**x724_standard_3.1_0.11.cfa**” in case of **.cfa** file).
- A pop-up window will warn you that CAENUpgrader can’t check if the **.rbf** file you are using matches your target module. Press “**OK**” to continue.

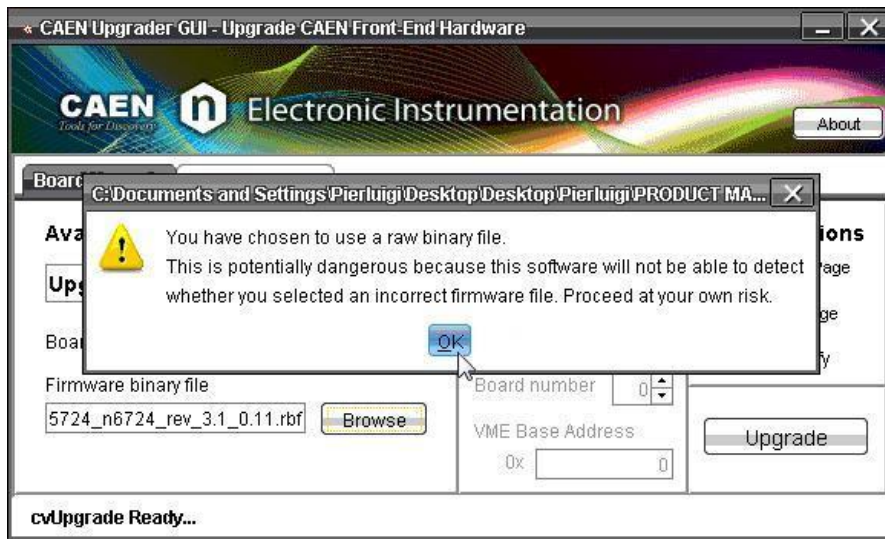


Fig. 3.6: Warning message uploading a **.rbf** file.

- Set Connection Type to USB.
- The “**Config Option**” menu at the top right of the GUI let you choose in which page of the board's memory the firmware will be saved. By selecting “**Standard Page**”, the firmware will be saved in the section of the board memory that is loaded by default at the digitizer start-up. In our example this option has been chosen.



Note: It is strongly recommended to upgrade the firmware selecting always the “**Standard Page**” option. If any failure occurs during the upgrade, please contact support.nuclear@caen.it

- Click on the “**Upgrade**” button to upgrade the firmware. After few seconds a pop-up window with a successful upgrade message will appear (if you’re uploading a **.cfa** file, in case of mismatch between the firmware and the target board, the software will show an error message).
- Power cycle the board to load and use the new firmware.

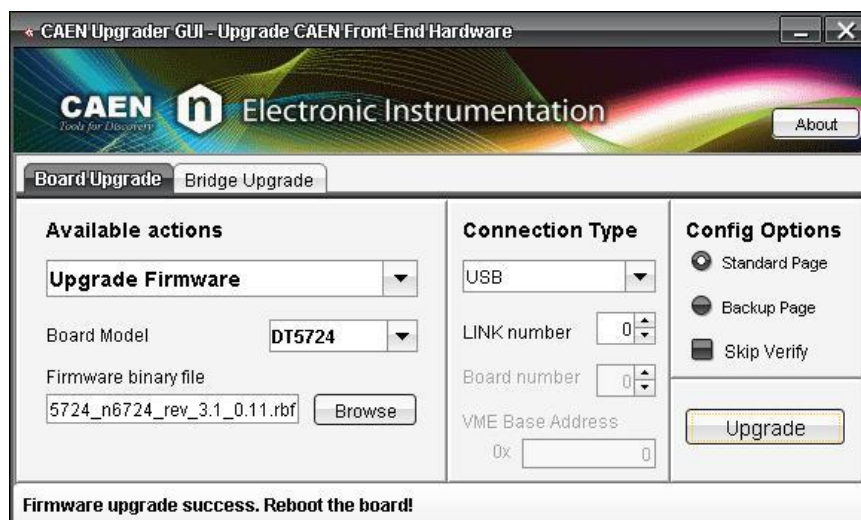


Fig. 3.7: CAENUpgrader’s “Upgrade Firmware” box for CAEN boards

In particular, the procedure above described can be referred to also for the V1718 bridge (by selecting in this case the “**Upgrade Firmware**” action in the “**Available actions**” scroll menu of the “**Bridge Upgrade**” tab). Regarding other bridges like the A2818 and the V2718 (and so for its piggy back A2719), an example of firmware upgrade using CAENUpgrader is reported in [RD2].

UPGRADING BACKUP FPGA

CAENUpgrader allows for upgrading also the backup FPGA. The procedure is the same as for the standard page except for selecting the **"Backup Page"** option.

Please, refer to the "Firmware Upgrade" paragraph, within the User Manual of your board, for details about the use of the Backup FPGA.

UPGRADING HV firmware (x780, x790, DT55xx)

By selecting a x780 or x790 model in the relevant menu, the user can then choose to upgrade the HV firmware or the Readout firmware by checking the relevant option in the tab, as shown in **Fig. 3.8**

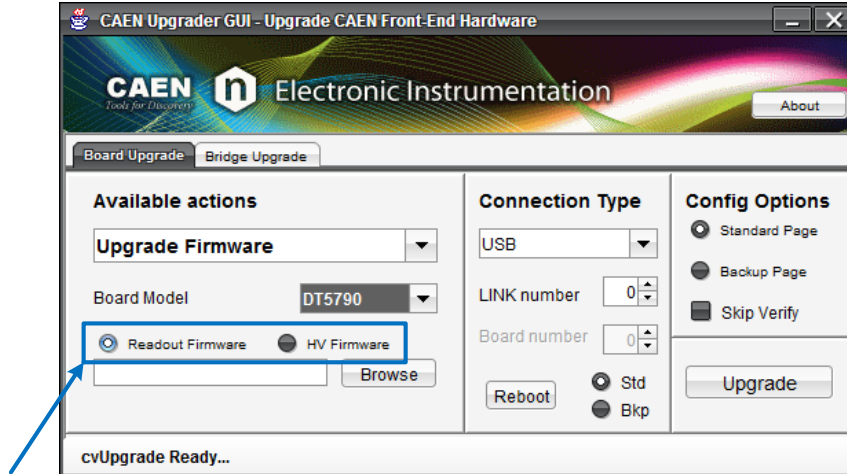


Fig. 3.8: Firmware options upgrading x780, x790 or DT55xx boards

VERIFY FIRMWARE UPGRADE (only for boards)

This function verifies that the firmware has been correctly loaded on your board:

- Select the **“Verify Board firmware”** option from the **“Available actions”** scroll box in the **“Board Upgrade”** tab
- Insert DT5724 (as an example) as Board’s Model.
- Browse through the **“Browse”** button for the binary file you have just loaded and click on the **“Verify”** button. The **“verification passed!”** message will appear.



Note: The “Verify” function doesn’t apply to HV firmware (e.g. x780, x790, DT55xx).

STORE PRODUCT UNLOCK CODE (only for boards)

CAEN Company makes different Digital Pulse Processing firmware be available for those CAEN digitizers which support them. These DPPs are freely downloadable in a “trial” version, complete in terms of functionalities but operating only for 30 minutes per board power cycle.

If you want to unlock the firmware, you need to buy a license by sending to CAEN a formal purchase request specifying the product code of the DPP you want to buy (findable at the DPP web page).



Note: The “Store Product Unlock code” function doesn’t apply to x780, x781, x790 boards, which are delivered with factory licensed DPP firmware.

Here follow a step-by-step example of the procedure you need to perform in order to have your DPP firmware unlocked for example on a **V1724** digitizer (supporting DPP TF):

- Once you bought a License, a License_ID code will be specifically generated by CAEN and sent you through an e-mail. This code is directly associated to the DPP product code you indicated in your request.
- If you haven’t the DPP firmware already uploaded on your board, in the e-mail you will found how to download the trial version. Then, refer to the **Upgrade Firmware** section of this guide for loading it on your board. On the contrary, jump to the step below.
- The e-mail will address you by an active link to the ‘Web License’ page on CAEN website.

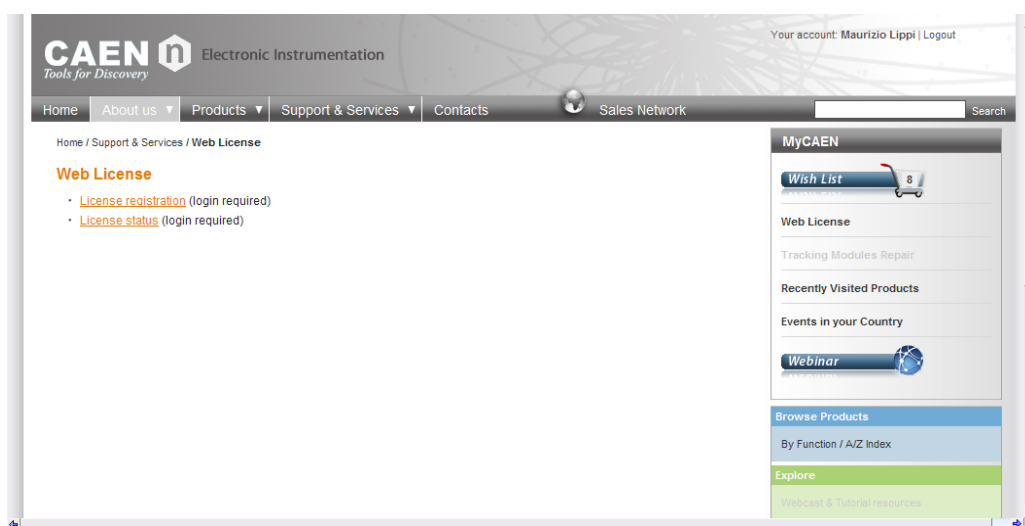


Fig. 3.9: ‘Web License’ page on CAEN website

- Click on the ‘License registration’ link (**login required**) and select the module in your posses in three simple steps.

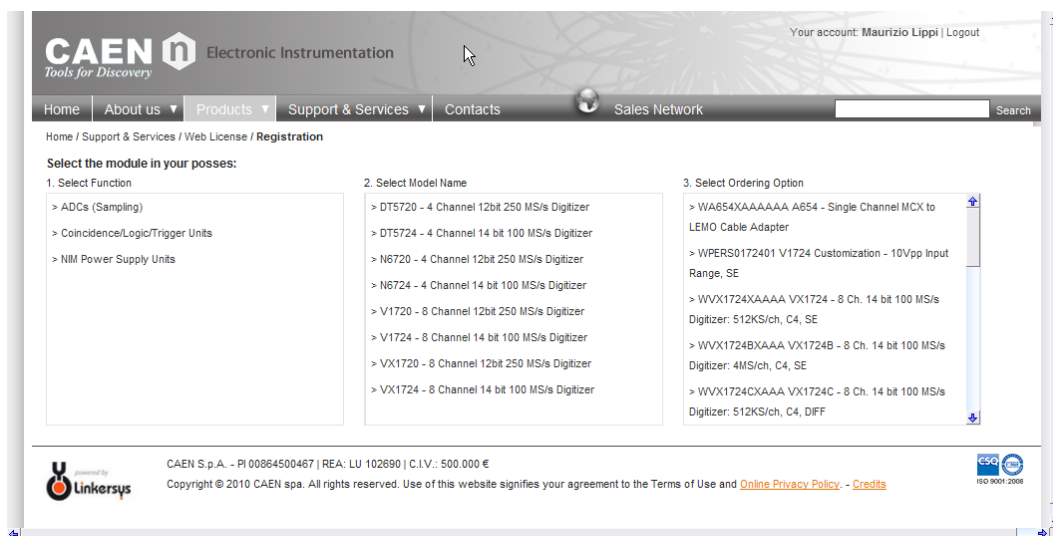
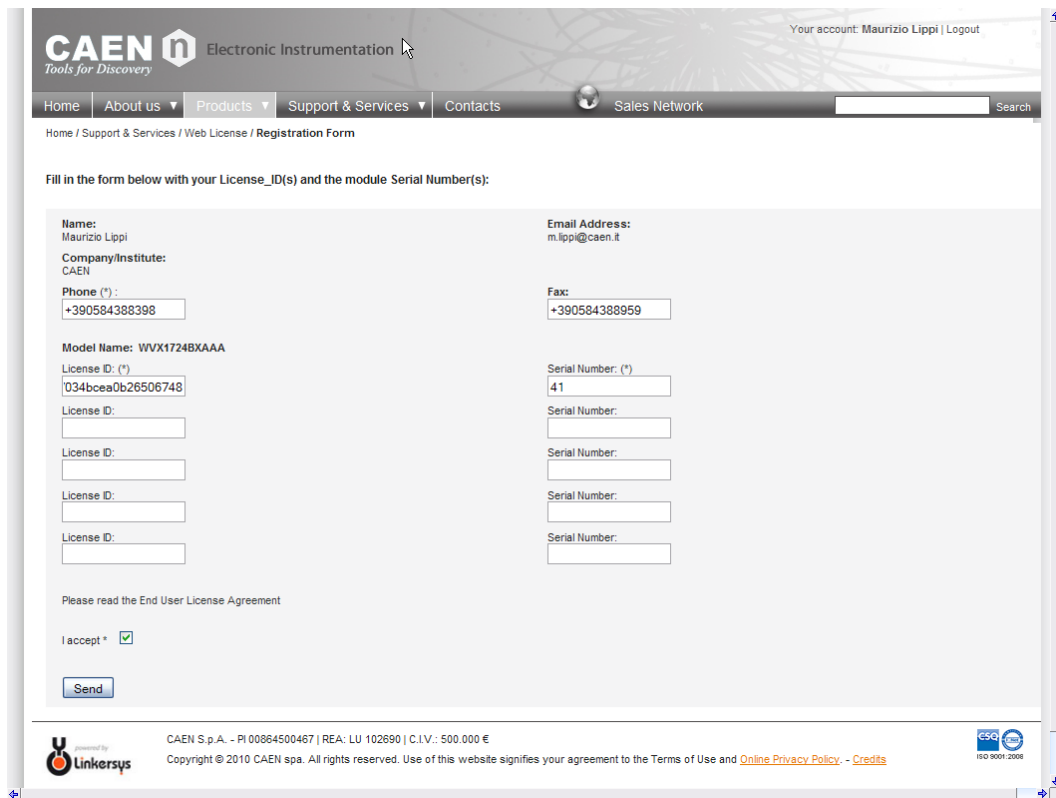


Fig. 3.10: Module detailed selection

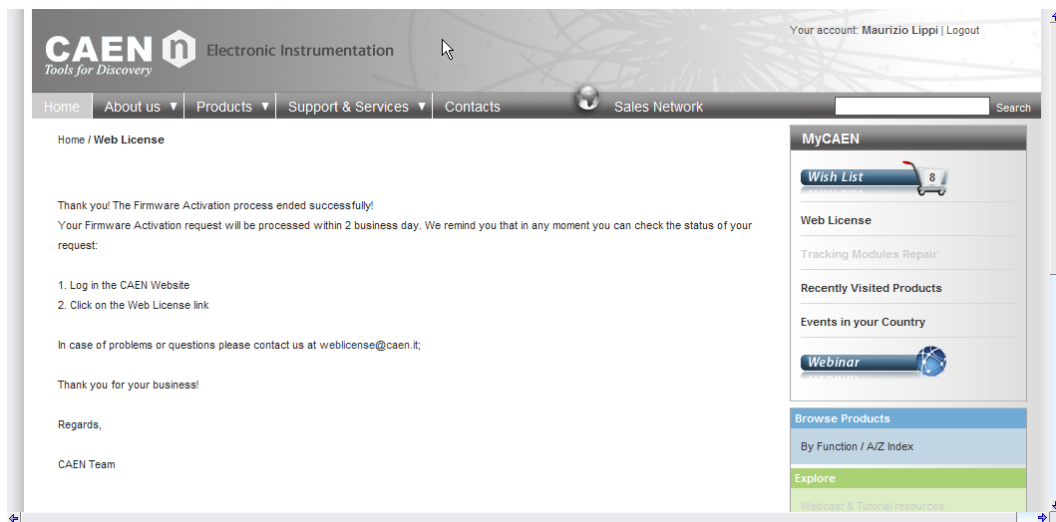
- Submit the Activation Request after you've filled in the appearing Registration form with the given License_ID and the module Serial Number.



The screenshot shows the 'Registration Form' on the CAEN website. The header includes the CAEN logo and navigation links. The form is titled 'Fill in the form below with your License_ID(s) and the module Serial Number(s):'. It contains fields for Name, Email Address, Company/Institute, Phone, Fax, Model Name, License ID, and Serial Number. There are checkboxes for 'I accept' and a 'Send' button. The footer includes copyright information and logos for Linkersys, CAEN S.p.A., and ISO 9001:2008.

Fig. 3.11:Registration form

- From this moment you can monitor the status of your license in the 'License Status' webpage (login required).



The screenshot shows the 'Registration request's confirmation page' on the CAEN website. The header is the same as the previous page. The main content area says 'Thank you! The Firmware Activation process ended successfully!' and provides instructions for checking the status of the request. It includes a list of steps: 1. Log in the CAEN Website, 2. Click on the Web License link. It also provides contact information for weblicense@caen.it. The right sidebar contains a 'MyCAEN' section with links to 'Wish List', 'Web License', 'Tracking Modules Repair', 'Recently Visited Products', 'Events in your Country', 'Webinar', 'Browse Products', 'By Function / A/Z Index', 'Explore', and 'Webcast & Tutorial resources'.

Fig. 3.12:Registration request's confirmation page

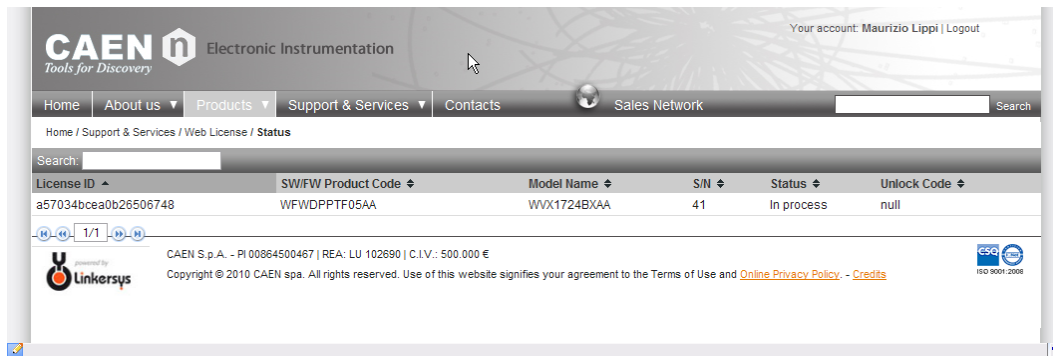


Fig. 3.13: 'License Status' Web Page

- As soon as your request is processed, CAEN releases the Product_Unlock_Code. Its availability will be notified by email and on the website in the 'License Status' page.

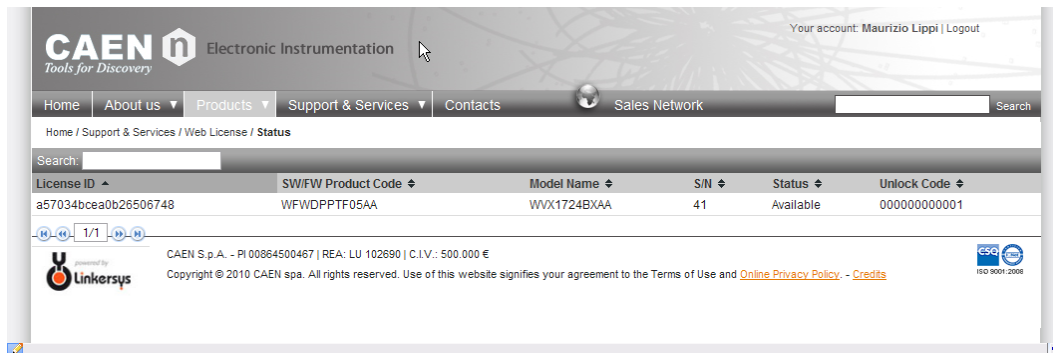


Fig. 3.14: Product Unlock Code availability at 'License Status' Web Page

Once the PUC is available, you can use it with CAENUpgrader to unlock the firmware on your module:

- Select the **"Store Product Unlock Code"** action in the **"Available actions"** scroll menu of CAENUpgrader's **"Board Upgrade"** tab.
- Insert your board model.
- Type the PUC, copied from the 'License status' webpage, in the **"Product Unlock Code value"** box.
- Select the proper connection type and click on the **"Store PUC"** button to unlock the firmware. A message will notify you about the outcome of the action.

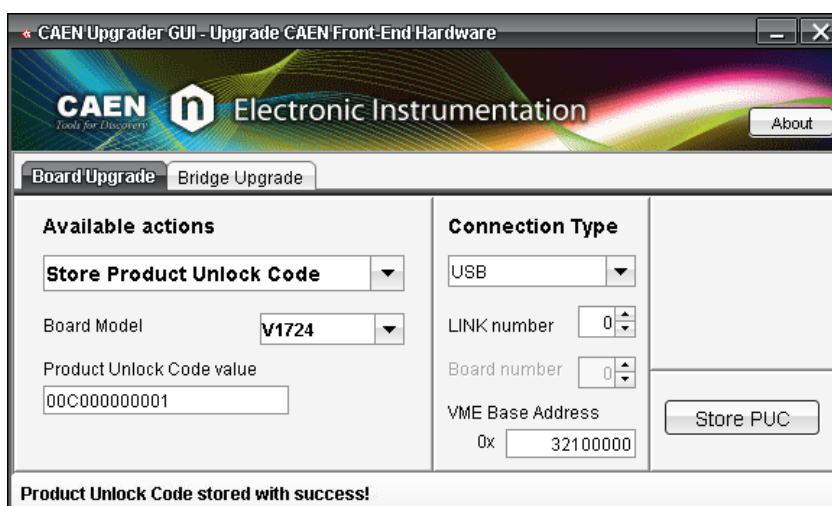


Fig. 3.15: CAENUpgrader's "Store Product Unlock Code" box

After a power cycle your firmware will be ready to use with no time restriction.

GET PRODUCT UNLOCK CODE (only for boards)

If you need to retrieve the Product Unlock Code of the DPP firmware on your board, you can do that by the “**Get Product Unlock Code**” action in the “**Board Upgrade**” tab. Set your board model and the proper connection type and click on the “**Get PUC**” button. The PUC will be displayed under the “**Board’s Model**” box.

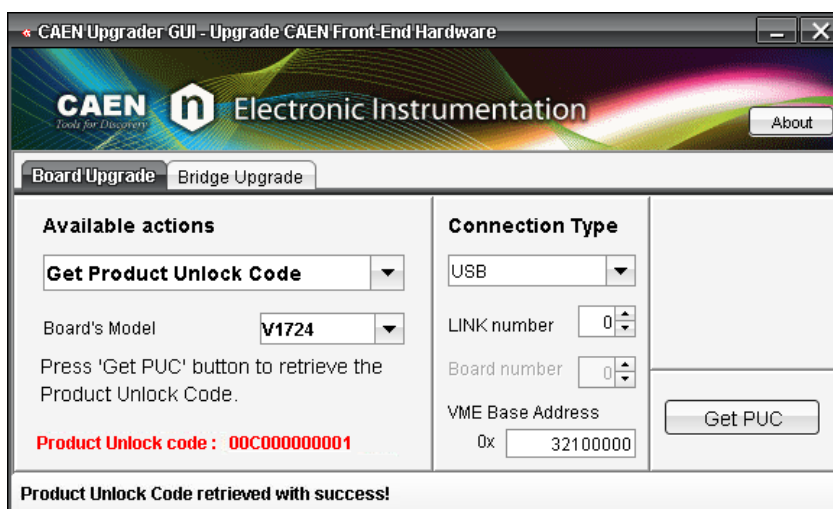


Fig. 3.16:CAENUpgrader’s “Get Product Unlock Code” box



Note: The “Get Product Unlock code” function doesn’t apply to x780, x781, x790 boards, which are delivered with factory licensed DPP firmware.

DELETE PRODUCT UNLOCK CODE (only for boards)

This command will delete the unlock code from your board, getting the uploaded DPP firmware back tot he ‘trial’ version. Select “**Delete Product Unlock Code**” action in the “**Board Upgrade**” tab. Set the proper connection type and click on the “**DeletePUC**” button.

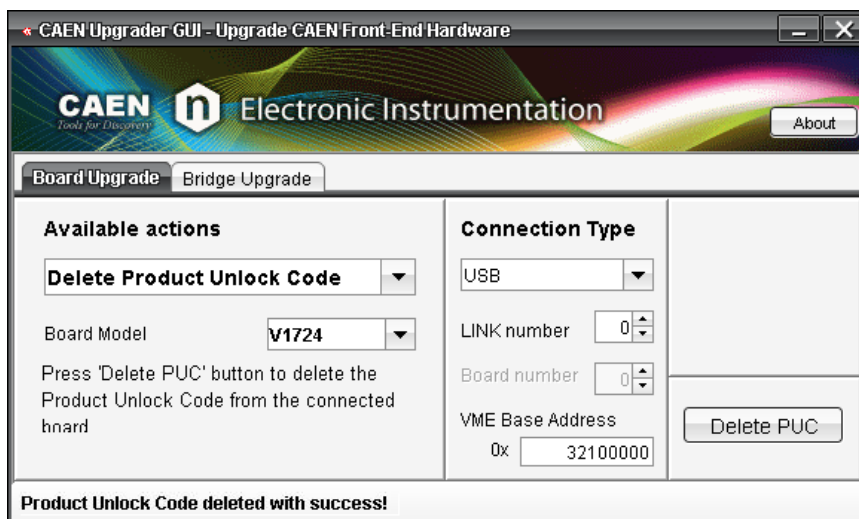


Fig. 3.17:CAENUpgrader’s “Delete Product Unlock Code” box



Note: The “Delete Product Unlock code” function doesn’t apply to x780, x781, x790 boards, which are delivered with factory licensed DPP firmware.

UPGRADE PLL

CAENUpgrader's **"Upgrade PLL"** action allows you to upgrade the PLL configuration on CAEN Digitizers with customized settings.

- Select the **"Upgrade PLL"** action in the **"Available actions"** scroll menu of CAENUpgrader's **"Board Upgrade"** tab.
- Insert your board model in the **"Board's Model"** box. In the example, we chose the V1731 board. New commands will appear.
- You can now use the **"Browse"** button to load a PLL configuration file (.rbf) already present on your computer, or you can generate the file by the PLL settings window opening up once you click on the **"New"** button (active only for supported board models).



Note: CAENUpgrader allows the User to create a new PLL Configuration file only for some VME digitizers, whereas DT/NIM boards can only load files generated by CAEN. Open the PLL directory to find the default configuration file or Daisy Chain configuration for your board. If you need the creation of a new PLL configuration file, please contact CAEN Support: support.nuclear@caen.it

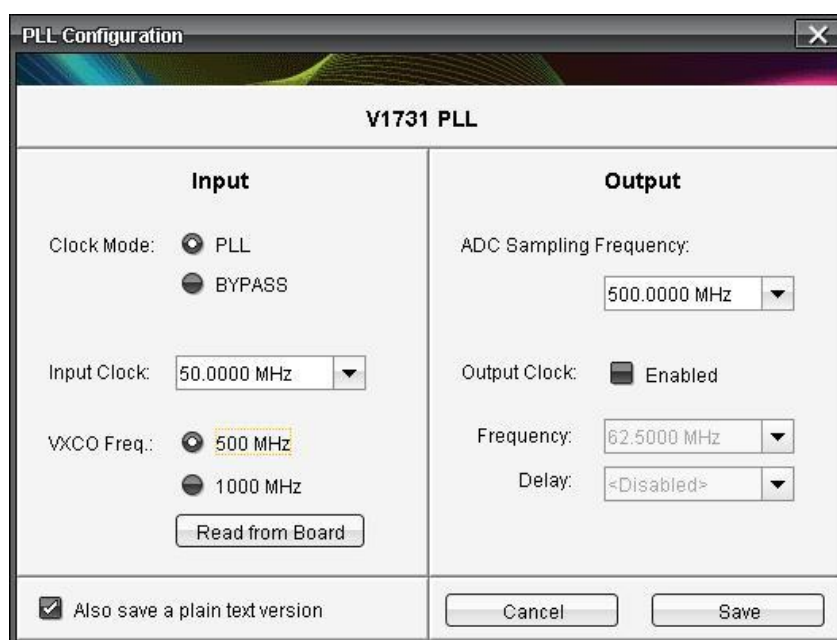


Fig. 3.18:CAENUpgrader's PLL settings window

- Once the PLL configuration has been set according to your purposes, you can save the configuration file on your computer by clicking on the **"Save"** button. Automatically the PLL settings window disappears and the file is loaded in the **"PLL upgrade file"** box.
- Select the connection type: as in the example the V1731 board is connected to the computer through the CAEN USB V1718 bridge, the USB connection has to be set; type in the appropriate box the VME Base Address of the target VME digitizer.



Note: Please refer to the User Manual of your digitizer for detailed information about the VME Base Address.

- Click on the **"Upgrade"** button to upload the new configuration on your board.
- Power cycle the board to make the changes be effective.



Note: When upgrading the PLL with .rbf files, if the firmware size exceeds the correct upgradable one, CAENUpgrader doesn't perform the upgrade and provides out a message to advise the user.



Note: The PLL directory includes configuration files both for VME modules both for Desktop/NIM boards. In particular, Desktop and NIM boards have got the same pll configuration file.

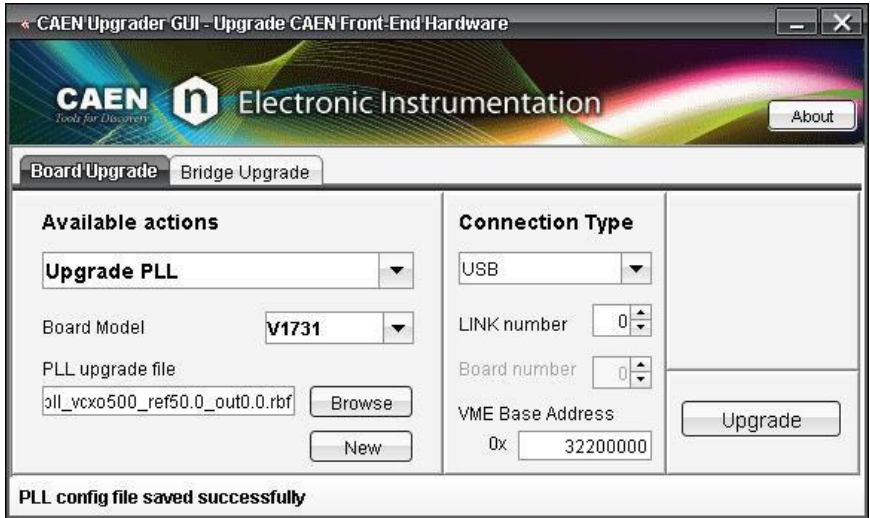


Fig. 3.19:CAENUpgrader’s Upgrade PLL box

DeskBoot Utility

Starting from the release 1.5 of CAENUpgrader software, the DeskBoot utility has been integrated. DeskBoot applies only to desktop and NIM board and works only through USB link. It allows to force by software the board to reboot loading the FLASH Standard page copy of the firmware or the Backup page one.

DeskBoot detailed description can be found by consulting [RD4]. The software utility is also separately available for download on CAEN website (www.caen.it) at:

Home / Products / Firmware/Software / Digitizer Software / Configuration Tools / CAEN DeskBoot

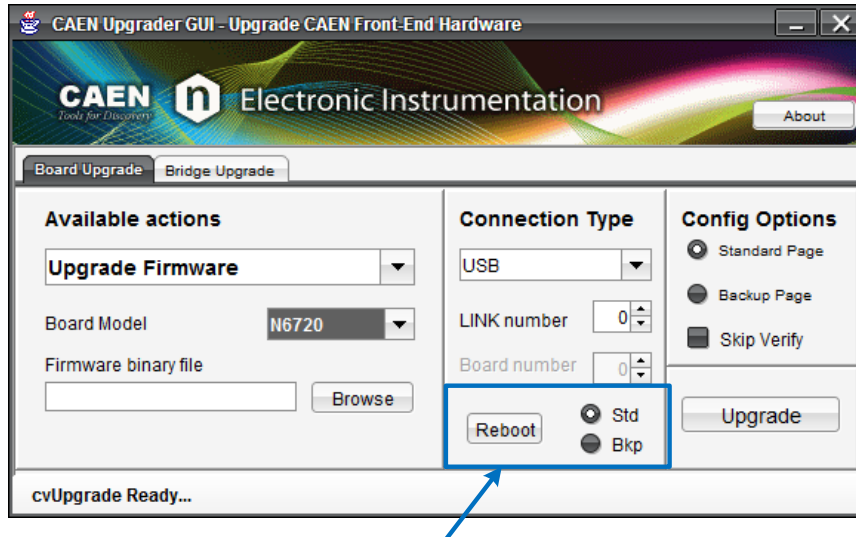


Fig. 3.20: DeskBoot utility integrated into CAENUpgrader tool

- Select “Std” if you want the board to reboot from the Standard FLASH page firmware copy, or “Bkp” for the Backup one
- Push the “Reboot” button to perform the reboot.

The flash of the board’s front panel LEDs, with NIM and PLL Lock ones finally ON, means the reboot was performed. A pop-up message is shown by the software to advise the user.

Troubleshooting

CAENUpgrader records any operation and its outcomes, chronologically starting from the program opening, in a log file (.txt). The file is readable at any moment when the program is open or after the program has been closed. File location depends on the OS version installed on your computer. The file is reset any time the program is reopened.

By clicking on the “About” button, at the top right of CAENUpgrader GUI, a small window appears with the basic information about the program (SW version, developers, info & support contact) and the log file path.



Note: If the Operative System supports it, the Log path will be clickable.

If you’re experiencing any problem you’re not able to manage, due to errors occurring during the use of CAENUpgrader functions, you can contact CAEN support (support.computing@caen.it) attaching the session log file.



Fig. 3.21: CAENUpgrader’s About window

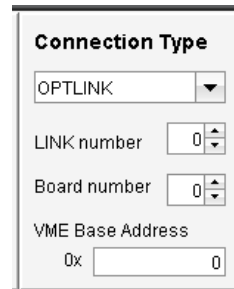
4 Appendix A

Connection Settings Description

CAENUpgrader's GUI provides the "Connection Type" box for setting the connection parameters needed to perform any software action on your target board or bridge.

These parameters are:

- Connection Type
- LINK number
- Board number
- VME Base Address



Connection Type: specifies the connection used for the target module. For target bridges, this parameter is fixed automatically once the module's model has been selected.

LINK number: in case of USB, the link numbers are assigned by the PC when you connect the cable to the device; it is 0 for the first device, 1 for the second and so on. There is not a fixed correspondence between the USB port and the link number. For the CONET, the link number indicates which link of A2818 or A3818 is used; Link index start from 0 (1st Optical link port in the 1st slot used). It is not known a priori which is the first slot used (it depends on the motherboard of the PC used.). **IMPORTANT NOTE:** if A2818 and A3818 are installed together, the A2818 have lower index assigned.

Board number: refers to the position of the target board or bridge in a CONET network. A CONET network consists in up to eight (8) nodes connected in a Daisy Chain, through the optical link, to a single Optical Controller (like the A2818).

VME Base Address: is an identification code to target a VME module. This code is fixed by the four rotary switches on the module itself (refer to the module's User Manual).

The following example is intended to show the setting of the connection parameters in three practical cases.

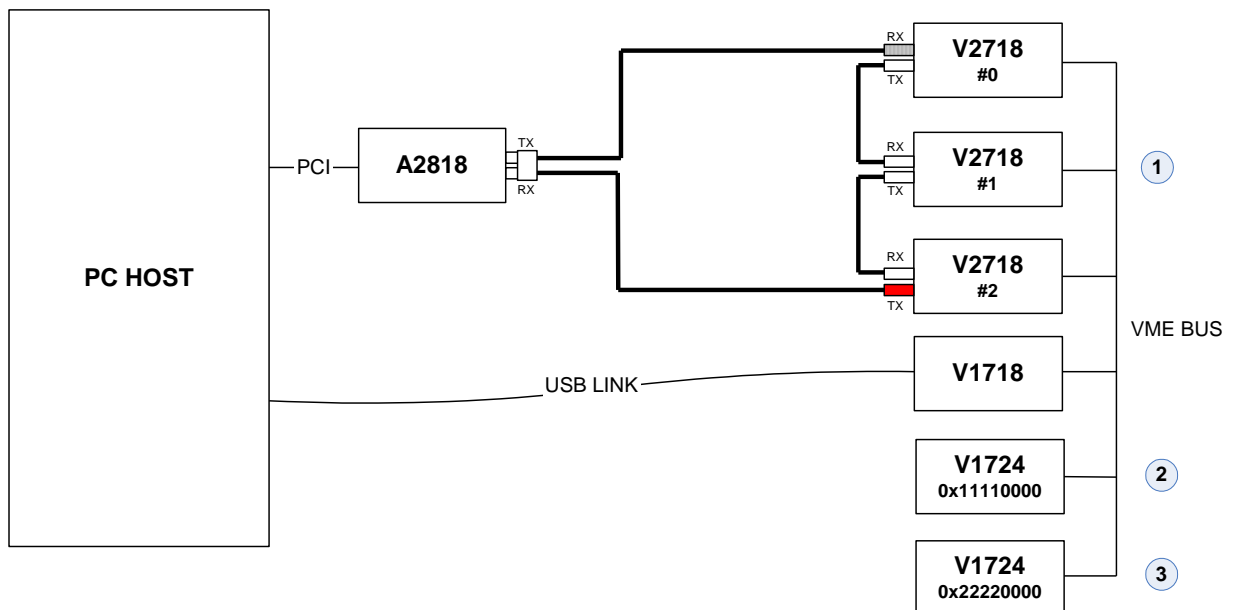


Fig. 4.1: Hardware System: PC with USB port, hosting a A2818; V2718 bridges in Daisy Chain, V1718 bridge and V1724 VME digitizers

1. Target the second V2718 bridge in the CONET network through the Optical Link:

CONNECTION TYPE	LINK number	Board number	VME Base Address	Connection Type PCI SLAVE LINK number <input type="text" value="0"/> Board number <input type="text" value="1"/>
PCI SLAVE	0	1	NOT REQUIRED	

2. Target a VME Digitizer (V1724) through the USB link by means of a V1718 bridge:

CONNECTION TYPE	LINK number	Board number	VME Base Address	Connection Type USB LINK number <input type="text" value="0"/> Board number <input type="text" value="0"/> VME Base Address 0x <input type="text" value="11110000"/>
USB	0	NOT REQUIRED	0x11110000	

3. Target the a VME Digitizer (V1724) through the Optical Link using the second V2718 bridge:

CONNECTION TYPE	LINK number	Board number	VME Base Address	Connection Type OPTLINK LINK number <input type="text" value="0"/> Board number <input type="text" value="1"/> VME Base Address 0x <input type="text" value="22220000"/>
OPTLINK	0	1	0x22220000	



Note: Other useful examples about connection parameters can be found in [RD3].



CAEN SpA is acknowledged as the only company in the world providing a complete range of High/Low Voltage Power Supply systems and Front-End/Data Acquisition modules which meet IEEE Standards for Nuclear and Particle Physics. Extensive Research and Development capabilities have allowed CAEN SpA to play an important, long term role in this field. Our activities have always been at the forefront of technology, thanks to years of intensive collaborations with the most important Research Centres of the world. Our products appeal to a wide range of customers including engineers, scientists and technical professionals who all trust them to help achieve their goals faster and more effectively.

**CAEN S.p.A.**

Via Vetraria, 11
55049 Viareggio
Italy
Tel. +39.0584.388.398
Fax +39.0584.388.959
info@caen.it
www.caen.it

CAEN GmbH

Klingenstraße 108
D-42651 Solingen
Germany
Phone +49 (0)212 254 4077
Fax +49 (0)212 25 44079
Mobile +49 (0)151 16 548 484
info@caen-de.com
www.caen-de.com

CAEN Technologies, Inc.

1140 Bay Street - Suite 2 C
Staten Island, NY 10305
USA
Tel. +1.718.981.0401
Fax +1.718.556.9185
info@caentechnologies.com
www.caentechnologies.com