

Guide GD2783

First Installation Guide to Desktop Digitizers & MCA

Rev. 3 – 21 July 2016

Purpose of this Guide

This guide is a first and immediate approach for the customer to the use of CAEN Desktop digitizers and Digital MCAs.

Change Document Record

Date	Revision	Changes
18 September 2012	00	Initial release.
26 November 2012	01	Modified "Power Requirements" paragraph in Chapter 7.
29 January 2013	02	Deleted Appendix A on DT5780 and related references
21 July 2016	03	Updated to Windows 10 driver and DT5781x MCA support. Updated § 4 and § 5. Added § 7.

Symbols, abbreviated terms and notation

DPP	Digital Pulse Processing
MCA	Multi-Channel Analyzer
OS	Operating System

Reference Documents

[RD1]	GD2512 - CAENUpgrader QuickStart Guide
[RD2]	UM2088 - Digital Pulse Height Analyzer User Manual

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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).



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1 Introduction

The purpose of this guide is to facilitate customer's approach to CAEN Desktop Digitizers and Digital MCAs providing the main guidelines to a first usage. The guide allows to:

- **FAMILIARIZE WITH THE HARDWARE:**

By recognizing the hardware and the documentation items in the delivered kit.

- **SET UP THE HARDWARE:**

By connecting communication and supply cables.

- **SET UP THE DRIVERS:**

By downloading and installing the proper drivers in the specific Windows Operating System.

- **SET UP A FIRST CONNECTION AND COMMUNICATE BETWEEN THE HOST STATION AND THE BOARD:**

By using CAENUpgrader software tool for reading the release of the firmware running on the board's FPGA.

What described in the guide applies to every CAEN Desktop Digitizer and to the Digital MCAs like DT5780x and DT5781x.

2 You received...

According to the order, here is described the delivered kit in terms of hardware and documentation items.



Note: Possible missing of one or more of the items composing the kit must be signalled to CAEN Support.
Mail to: support.nuclear@caen.it

Hardware items

DESCRIPTION	ITEM
Desktop Digitizer or MCA(*)	
USB cable	
Desktop Power Supply	
Power Supply cable	

(*):

- When ordering the Digitizer only, it comes running the standard firmware on it (i.e. digital oscilloscope solution).
- When ordering a Digital MCA or the Digitizer together with the license for a DPP firmware, it comes running the DPP firmware on it (i.e. solution for Digital Pulse Processing in Nuclear Physics applications).

Documentation items

In case of ordering a Digitizer board or a Digital MCA:

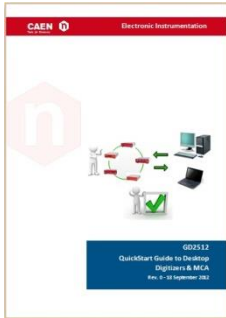
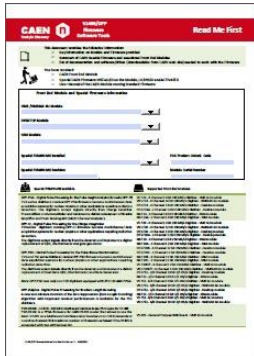
DESCRIPTION	ITEM
Digitizer or MCA User Manual	
First Installation Guide to Desktop Digitizers & MCA	

The User Manual is also available for download in digital format on CAEN web site (www.caen.it) in the 'Documentation' tab at the digitizer and MCA page.

The manual concerning the DPP-PHA algorithm running on the DT5780x and DT5781x can be downloaded on CAEN web site (www.caen.it) in the 'Documentation' tab at:

Home / Products / Firmware/Software / Software Tools / DPP Control Software / DPP-PHA Control Software

In case of ordering a Desktop Digitizer together with a DPP license:

DESCRIPTION	ITEM
Digitizer User Manual	
First Installation Guide to Desktop Digitizers & MCA	
Read Me First	

The User Manual is also available for download in digital format on CAEN web site (www.caen.it) in the 'Documentation' tab at the digitizer page.

The DPP Control Software to manage the DPP algorithm related to the purchased license are available for download on CAEN web site (www.caen.it) in the 'Documentation' tab at:

Home / Products / Firmware/Software / Software Tools / DPP Control Software / DPP-[DPP type] Control Software

At the same web page it is downloadable the manual concerning the DPP algorithm and Control software:

- UM2088 - Digital Pulse Height Analyzer User Manual
- UM2580 - Digital Pulse Shape Discriminator User Manual

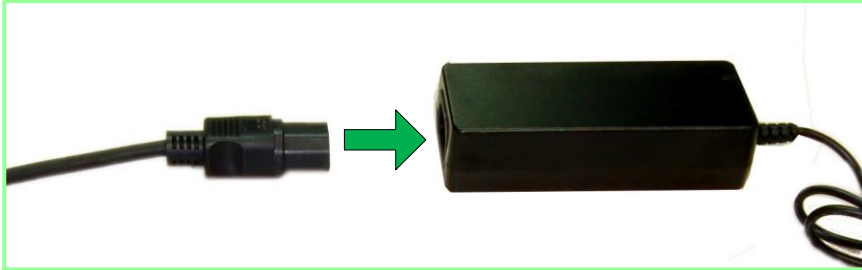
The User Manual related to the DPP-CI (i.e. DPP-CI Runner User Manual) is available at:

Home / Products / Firmware/Software / DPP Firmware/Software Tools (Digitizer) / DPP Firmware / DPP-CI

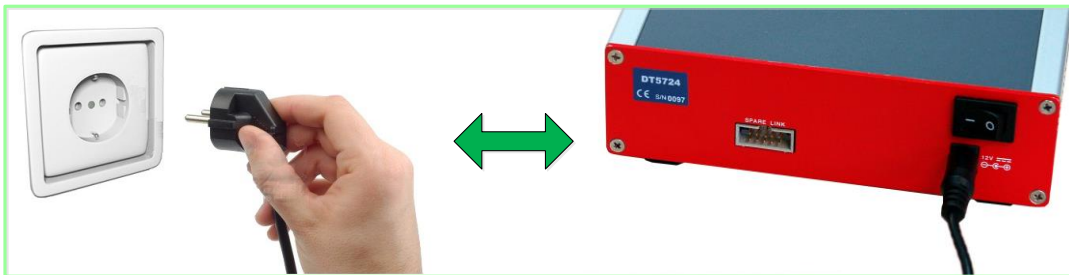
3 Hardware setup

Power Supply Connection

- Connect the 3-pole connector of the power supply cable to the 12V-45W Desktop Power Supply.



- Connect the power supply to the net and to the Digitizer on the rear panel DC input connector.



USB Link Connection

- Connect the USB cable to the Digitizer.

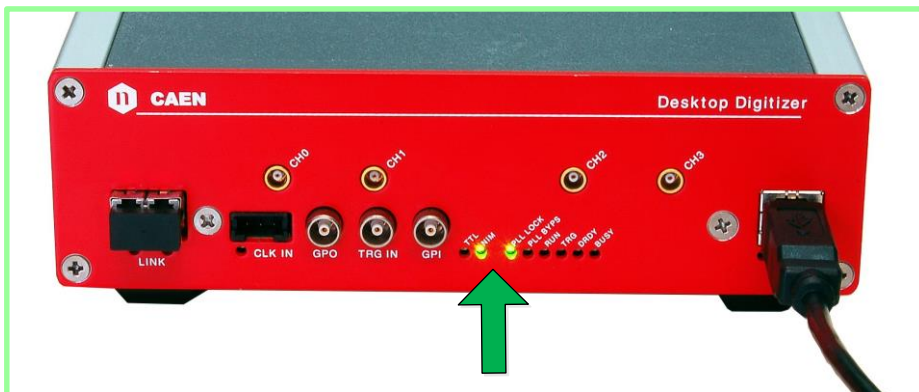


Desktop Board Power On

- Switch on the Digitizer



At power on, the Digitizer loads the firmware on the FPGA clearing the output buffer and setting the registers to their default configuration. At the end of the procedure, if succeeded, only the NIM and PLL LOCK LEDs have to stay on.





4 Drivers Setup

Once the hardware is set up, the next step is to install in the Operating System the drivers handling the USB communication between the Digitizer (or the DT5780) and the host station.

Where to download the USB drivers

CAEN provides the USB drivers for its Desktop Digitizers and DT5780 Digital MCA compliant to the following Operating Systems:

OS	OS version
 Windows	Vista/7/8/8.1/10 32 and 64-bit
 Linux	kernel Rel. 2.6/3.x 32 and 64-bit










Drivers updates are available for download on CAEN website (www.caen.it) in every Digitizer's page at the 'Software/Firmware' area (**login is required before to download**).







Note: In order to ensure the best system performance, it is recommended to have always the latest USB drivers release installed.

In the next steps, the DT5720 web page has been taken as an example:

- Left-click on the **Download icon** related to the driver package (.zip file) compliant to the Windows Operating System you're working with:
 - DT57xx-N67xx-DT55xx Win32 USB Win32 USB Driver
 - DT57xx-N67xx-DT55xx Win64 USB Win64 USB Driver

Overview	Tech. Spec.	Documentation	Software/Firmware	Compare	Related Products	Accessories	Ordering Option
Description		Release	Date	OS-Version	Environment	Download	
Driver							
	DT57xx-N67xx-DT55xx Win32 USB Driver ^(a)	3.4.9	July, 2016	7/8/8.1/10 (32-bit)			
Drivers 32.5 KB - Type: .zip							
	DT57xx-N67xx-DT55xx Win64 USB driver	3.4.9	July, 2016	7/8/8.1/10 (64-bit)			
Drivers 34.61 KB - Type: .zip							
	DT57xx-N67xx-DT55xx-V1718-N957 Linux USB Driver	1.5.1	August, 2015				
Release Notes 4.14 KB - Type: .txt							
Drivers (Linux kernel 2.6 - 3.x) 8.24 KB - Type: .tgz							

- In order to access the download, read and accept the **License Agreement** in the appearing window.

Overview	Tech. Spec.	Documentation	Software/Firmware	Compare	Related Products	Accessories	Ordering Option
Description			Release	Date	OS-Version	Environment	Download
Driver							
 DT57xx-N67xx-DT55xx Win32 USB Driver ^(a) Drivers 32.5 KB - Type: .zip			3.4.9	July, 2016	7/8/8.1/10 (32-bit)		
 DT57xx-N67xx-DT55xx Win64 USB driver Drivers 34.61 KB - Type: .zip							
 DT57xx-N67xx-DT55xx-V1718-N957 Linux USB D Release Notes 4.14 KB - Type: .txt Drivers (Linux kernel 2.6 - 3.x) 8.24 KB - Type:							
Firmware CONET2 Compliant							
 x720 Standard FW CONET 2 Compliant Release Notes 5.64 KB - Type: .txt FW Package 1.42 MB - Type: .cfa							

Software License

Copyright © 1998-2015 C.A.E.N. S.p.A

Licence Agreement for "CAEN Software or Firmware" (collectively, the "CAEN SwFw")

By using or distributing this CAEN SwFw (or any work based on the CAEN SwFw) you shall be deemed to have accepted the terms and conditions set

Accept Decline

- Finalize the download.

If no different path has been specified by the user, CAEN USB Drivers Package is saved in a default destination folder that may be different depending on the Windows version and settings.

How to install the USB Drivers

It is recommended not to connect the hardware to the host station (i.e. to plug in the USB cable) until it is explicitly requested in the following installation procedure.

- Unpack the CAENUSB Drivers Package.

Both package versions, 32-bit and 64-bit Windows OSs, are provided with a single folder containing the driver files, i.e.:

CAENUSBDrvB-x.y.z-W7_8_10_x64 (where xyz is the driver release).

The drivers need to be installed manually by the user. The procedure is described for different Windows OSs in the following paragraphs.

In Windows 10 (32/64bit)

The description is based on a Windows 10 32-bit version.

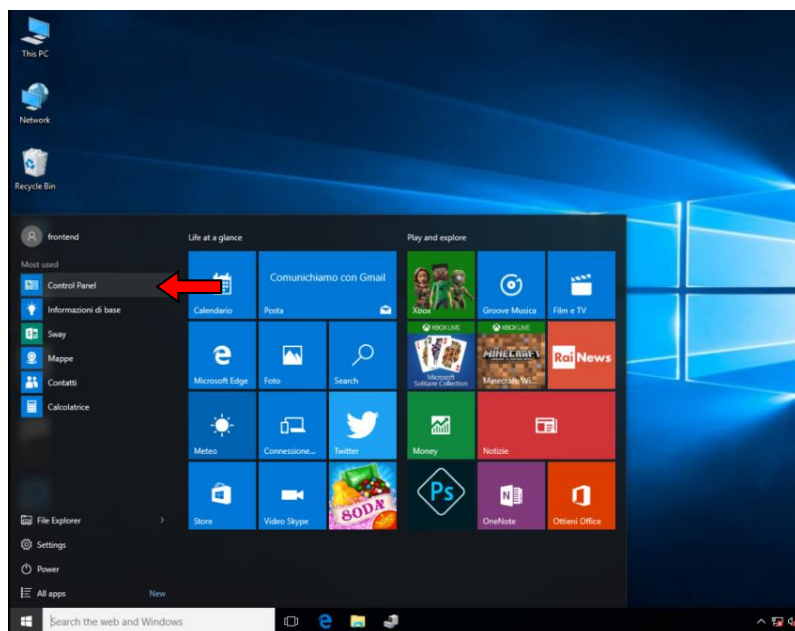
For the 64-bit version, the displayed dialogue boxes, indications or operations may slightly differ from the following instructions.

- Plug the USB cable into a USB port on the host station and power on the Digitizer.

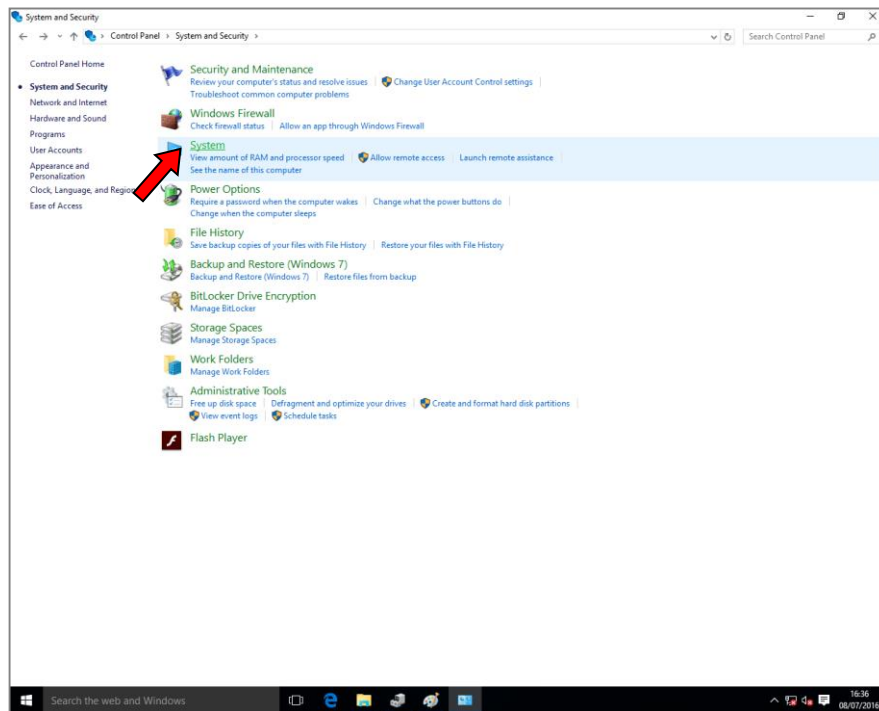


After the device is attached, Windows detects the new hardware. In order to install the drivers:

- Select the menu **Start**.
- Click on **Control Panel**

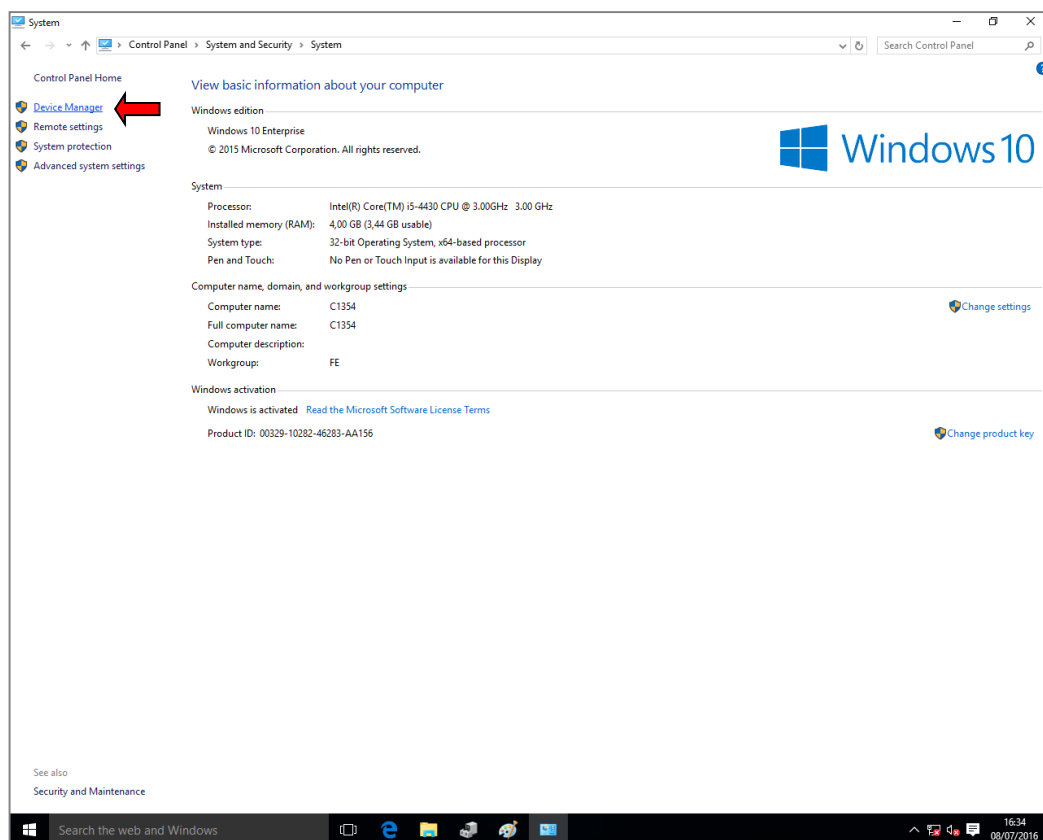


- Left-click on **System and Security** and left-click on **System**.

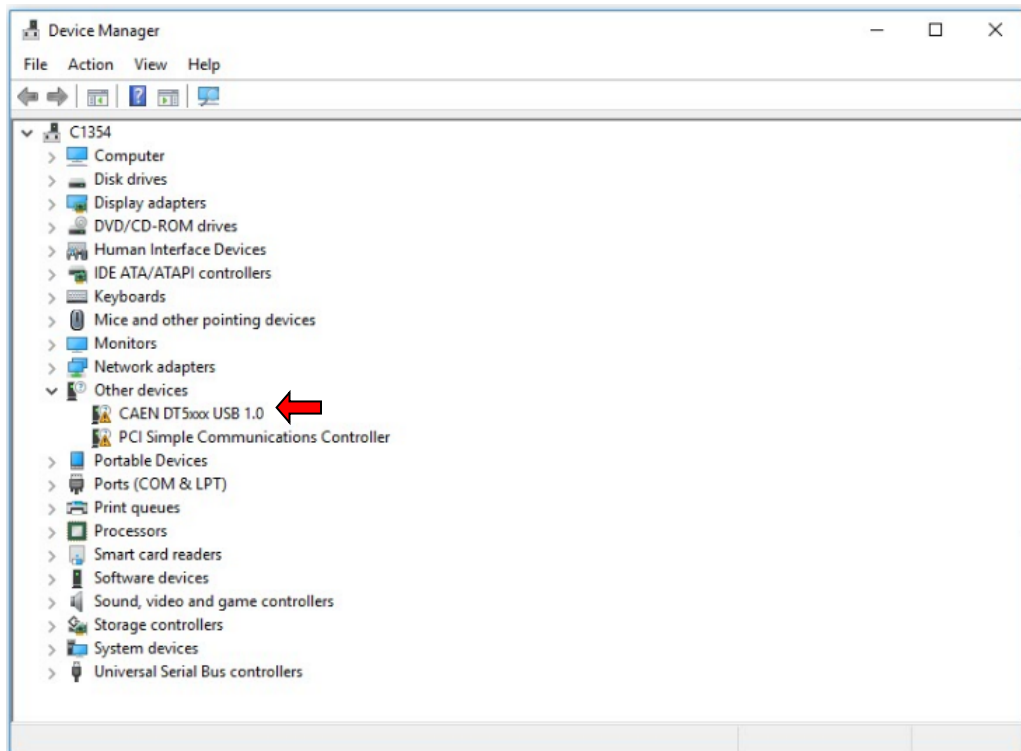


In the **System** of the appearing window:

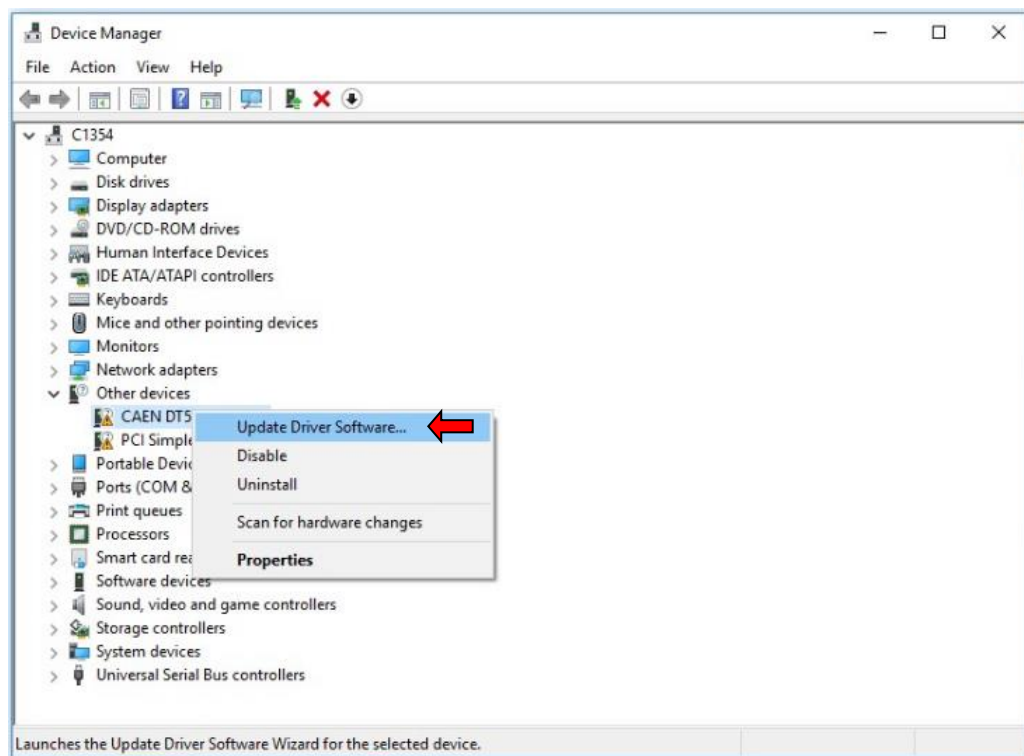
- Select **Device Manager**.



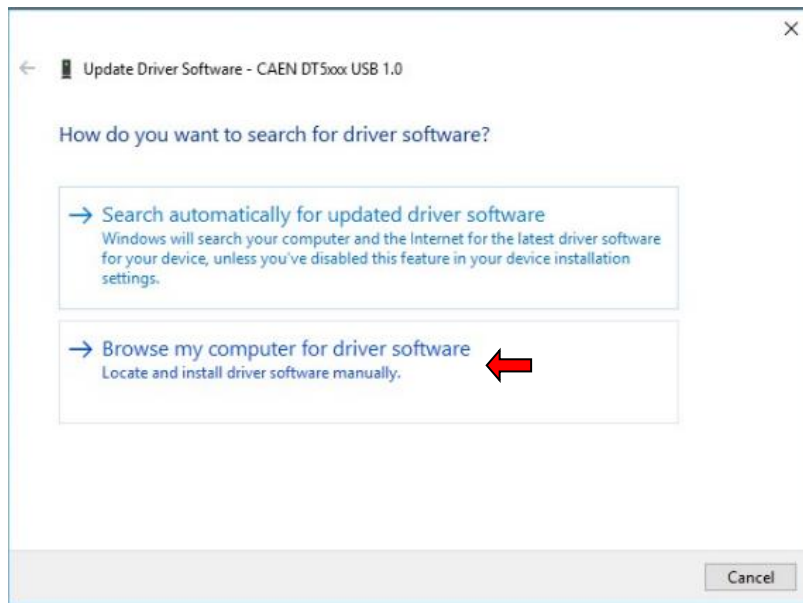
In the appearing Device Manager window, find the unknown **CAEN DT5xxx USB 1.0** in the list **Other Devices**:



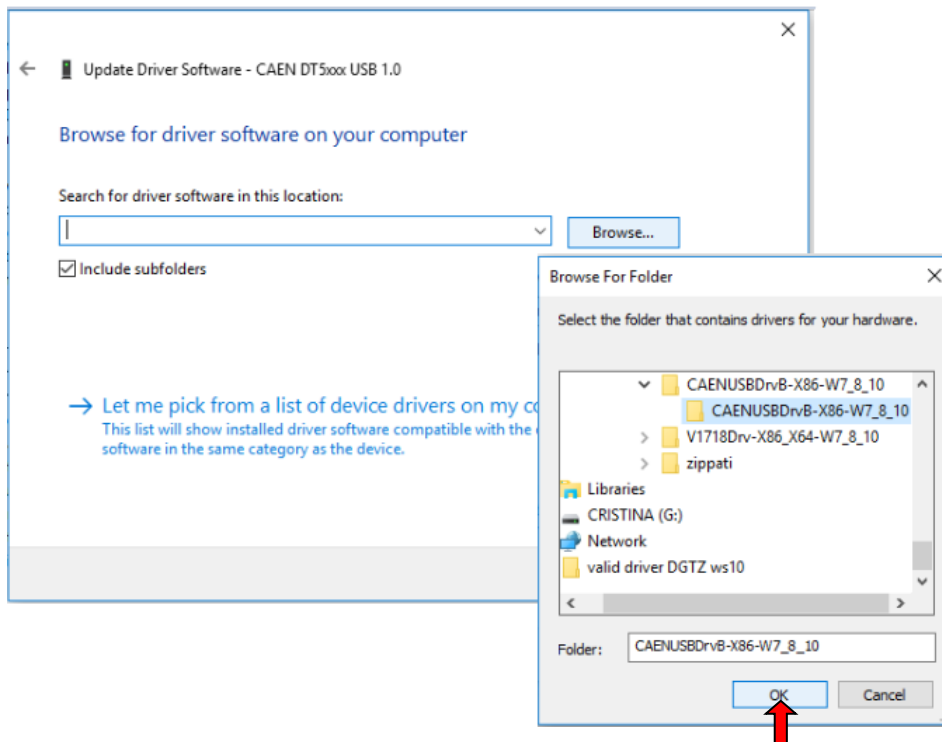
- Right click on **CAEN DT5xxx USB 1.0** and select **Update Driver Software** option in the scroll menu.



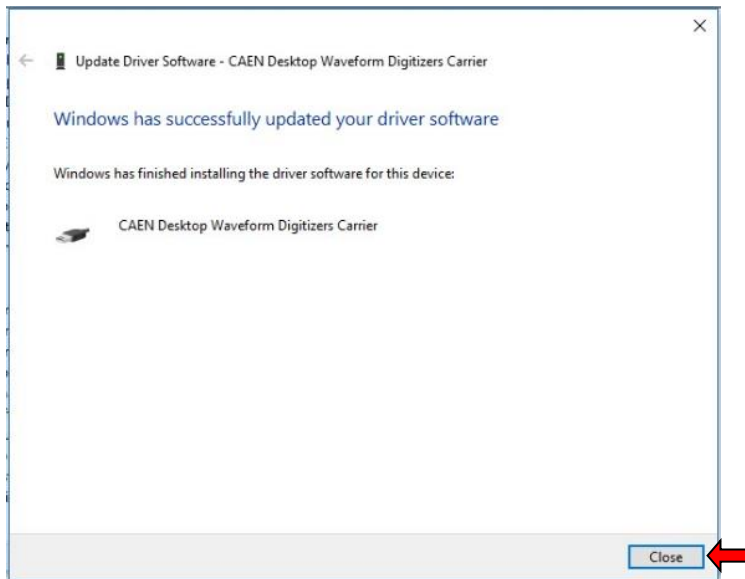
- Select **Browse My Computer for driver software**.



- Click **[Browse]** to point to the Windows 10 drivers' folder you have previously unpacked.
- Click **[OK]** to include the path in the search.
- Click **[Next]** to continue.

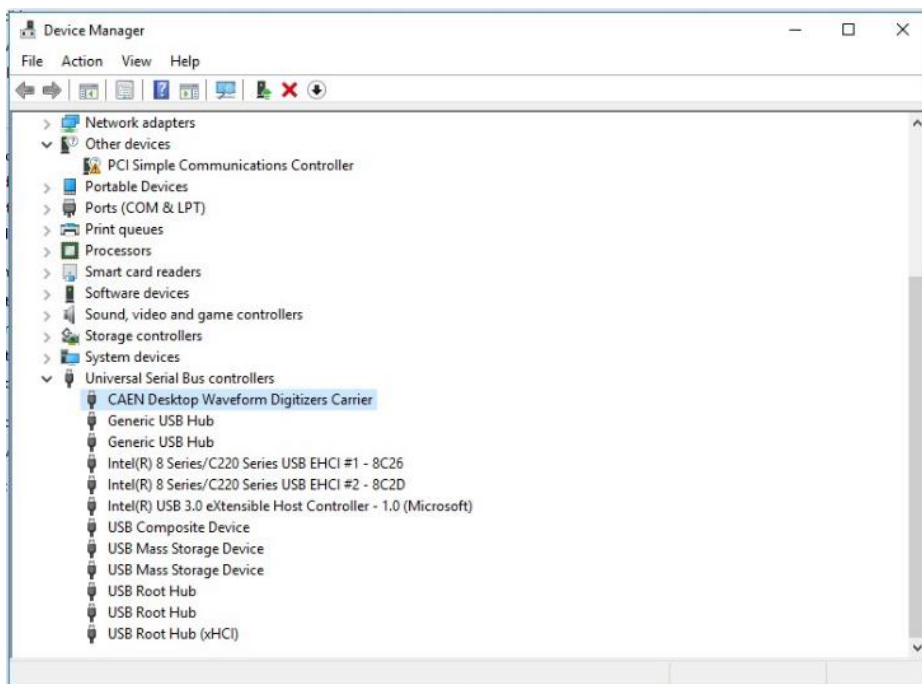


When the drivers installation will be completed, click **Close** to close the window.



In order to verify the drivers have been properly installed:

- Find the presence of **CAEN Desktop Waveforms Digitizer Carrier** in the **Universal Serial Bus controllers** list of the **Device Manager**.



Note: Once installed, the USB drivers are reloaded by the OS at every board's power cycle. This means that **CAEN Desktop Waveform Digitizers Carrier** disappears if the board is powered off or the USB cable is not connected to the host.

In Windows 7 (32 / 64 bit)

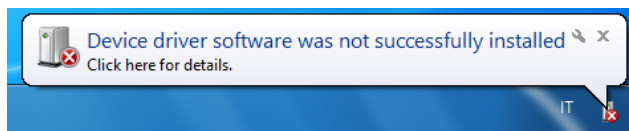
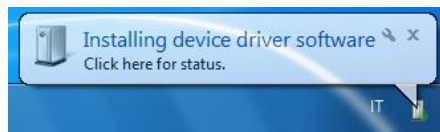
The description is based on a Windows 7 32-bit version.

For the 64-bit version, the displayed dialogue boxes, indications or operations may differ slightly from the following instructions.

- Plug the USB cable into a USB port on the host station and power on the Digitizer.

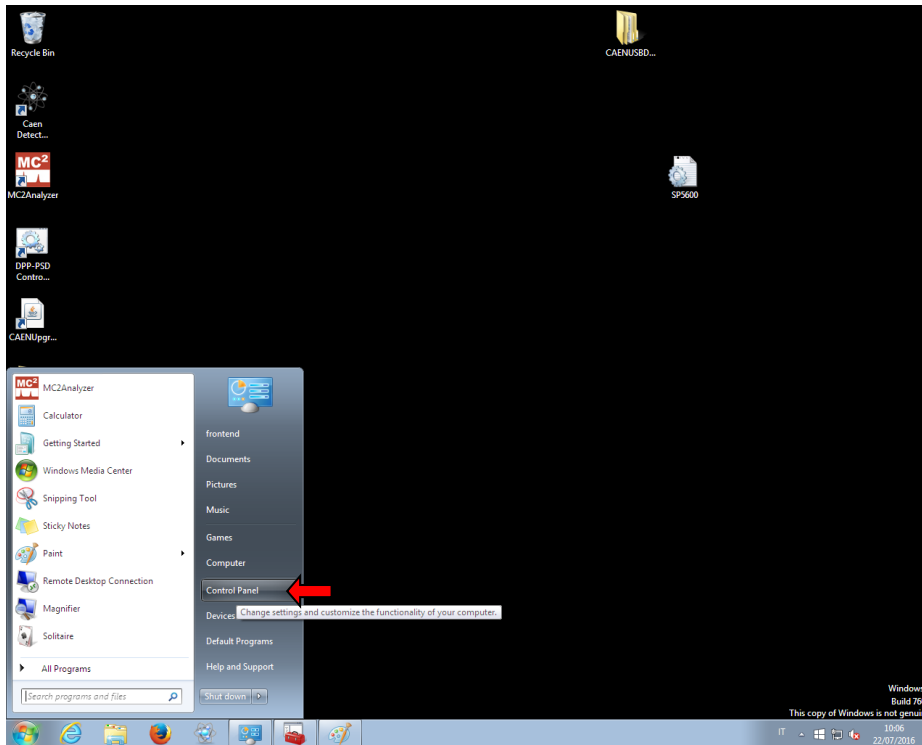


After the device is attached, Windows detects the new hardware and tries to find a matching drivers to install automatically. If the attempt fails, the following messages are displayed in sequence:



The USB drivers need to be installed manually, so:

- Select the menu **Start**.
- Right-click on **Control Panel Home** (top left side menu) and select **System and Security**



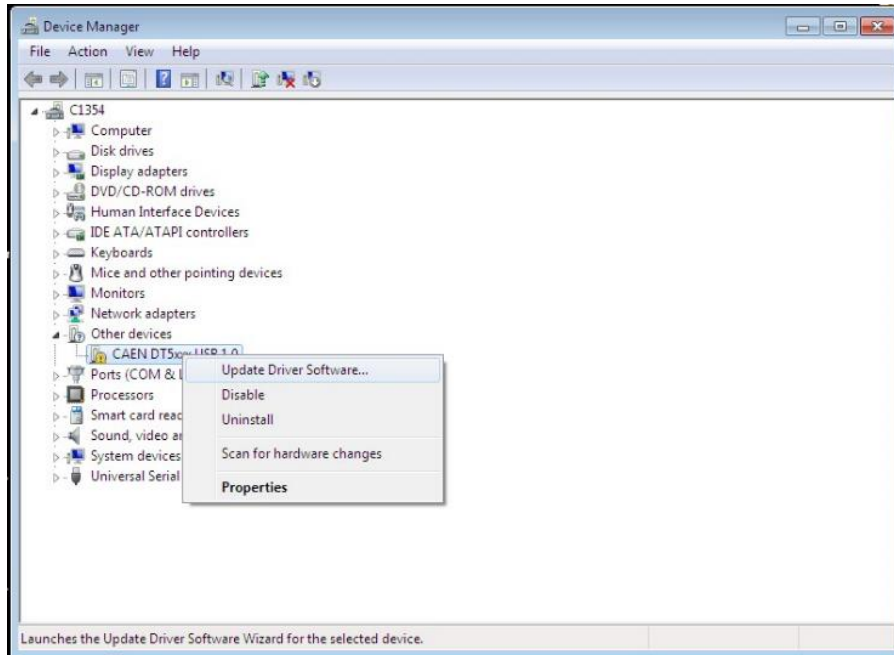
In the **System and Security** of the appearing window, select **System** and perform the following actions:

- Select **Device Manager**.

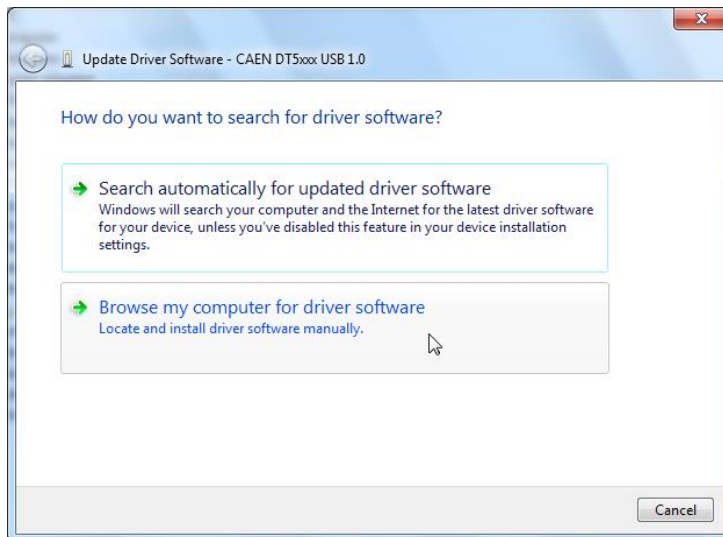


In the appearing Device Manager window, find the unknown **CAEN DT5xxx USB 1.0** in the list **Other Devices**:

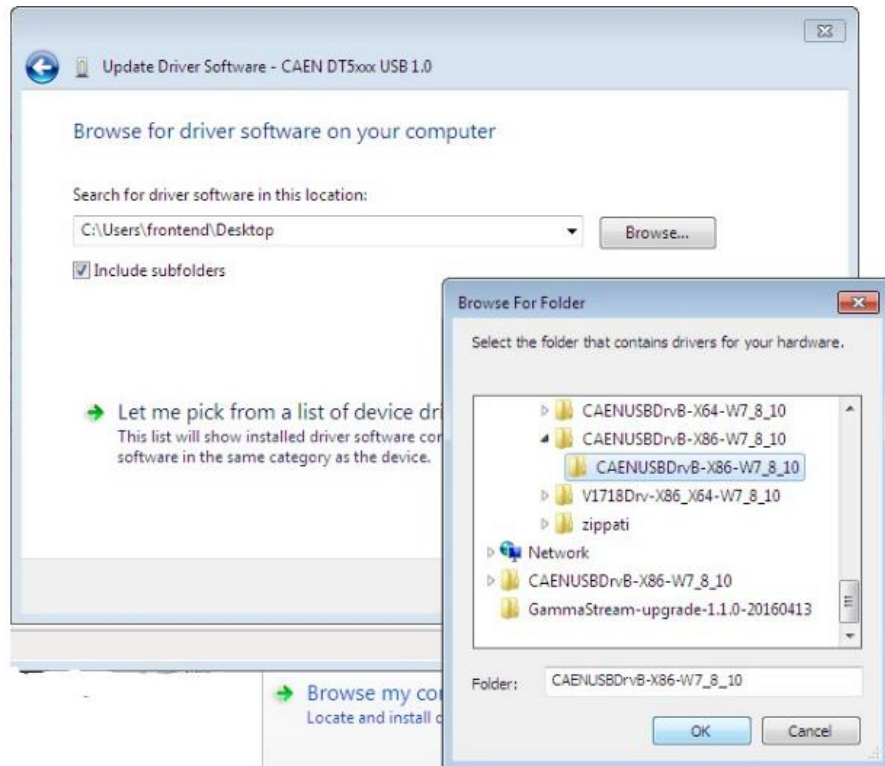
- Right click on **CAEN DT5xxx USB 1.0** and select **Update Driver Software** option in the scroll menu.



- Select **Browse My Computer for driver software**.

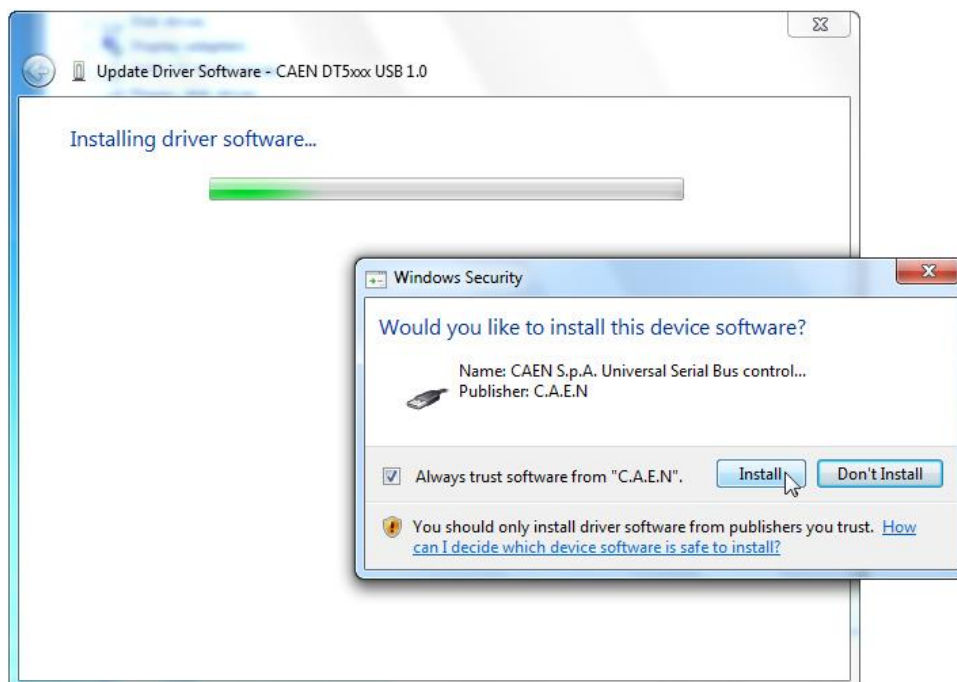


- Click **[Browse]** to point to the Windows 7 drivers folder you have previously unpacked.
- Click **[OK]** to include the path in the search.
- Click **[Next]** to continue.



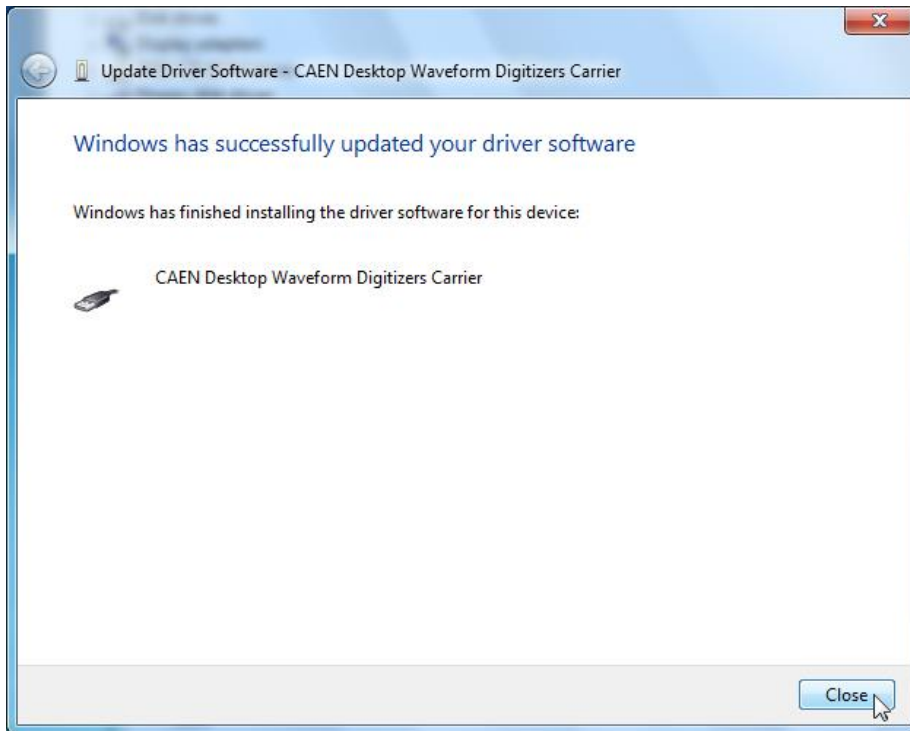
When an application install calls for a device installation in Windows 7, a prompt may appear requiring the user to accept or deny the installation:

- Click **[Install]** to accept the installation.



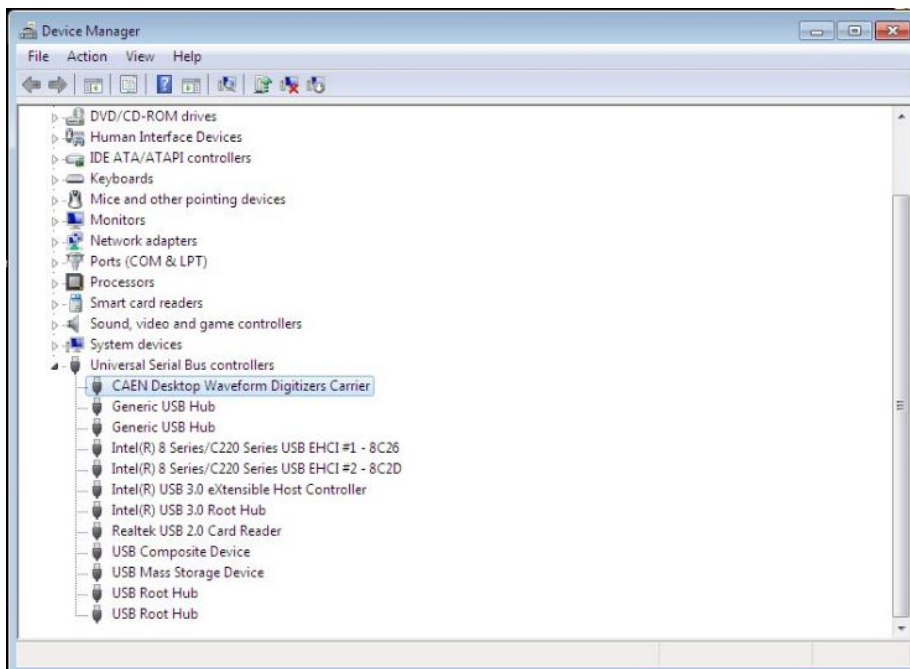
The Wizard will complete the drivers' installation and finally:

- Click **[Close]** to close the Wizard.



In order to verify the drivers have been properly installed:

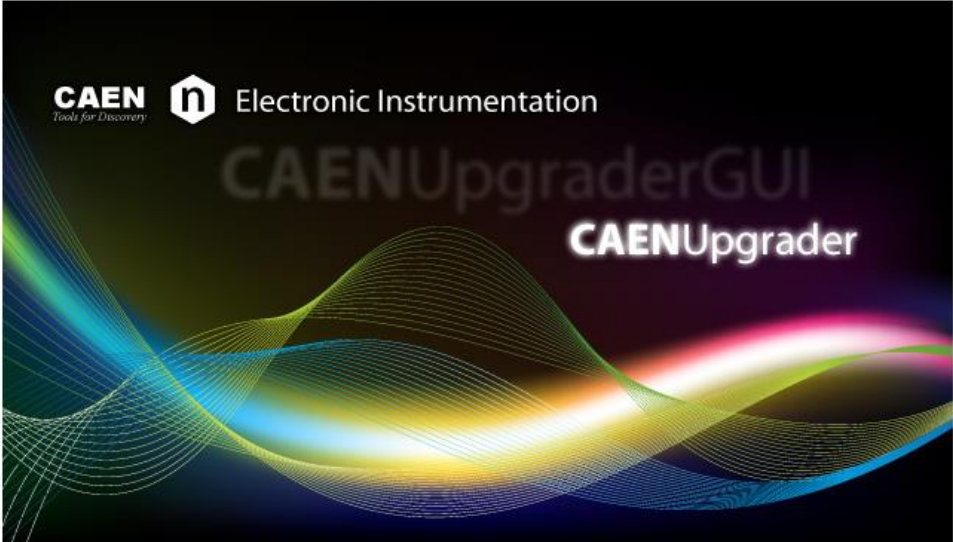
- Find the presence of **CAEN Desktop Waveforms Digitizer Carrier** in the **Universal Serial Bus controllers** list of the **Device Manager**.



Note: Once installed, the USB drivers are reloaded by the OS at every board's power cycle. This means that **CAEN Desktop Waveform Digitizers Carrier** disappears if the board is powered off or the USB cable is not connected to the host.




5 Software Setup

Once the USB drivers are properly installed, a simple procedure to check the connection and communication with the desktop board is to use CAEN’s CAENUpgrader software tool to read the release of the firmware currently running.



CAENUpgrader is a configuration tool whose main function is to upgrade the firmware on CAEN’s front-end boards and bridges as well as VME power supplies.

Before to install and use the program, make sure your Operating System is provided with the third-party software listed in the following **Tab. 5.1**.

OS	OS version	CAEN Libraries required	Third-party software required
	Vista/7/8/8.1/10 32 and 64-bit	CAENComm CAENVMELib(*)	 Java ⁽¹⁾ Runtime Environment 6 or later. You can download from http://www.java.com
	Kernel Rel. 2.6/3.x 32 and 64-bit	CAENComm (1.02 or later) CAENVMELib (2.22 or later)	

⁽¹⁾ Java is a registered trademark of Oracle, Inc.

Tab. 5.1: Host PC requirements for CAENUpgrader

(*) Unlike Linux, CAENUpgrader Windows version is standalone, which means that the CAEN libraries are locally installed by the CAENUpgrader Installer and don’t need to be installed apart by the user


Please, refer to **[RD1]** for complete information about CAENUpgrader usage.

Where to download CAENUpgrader













CAENUpgrader is available for download on CAEN web site (www.caen.it) at:

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

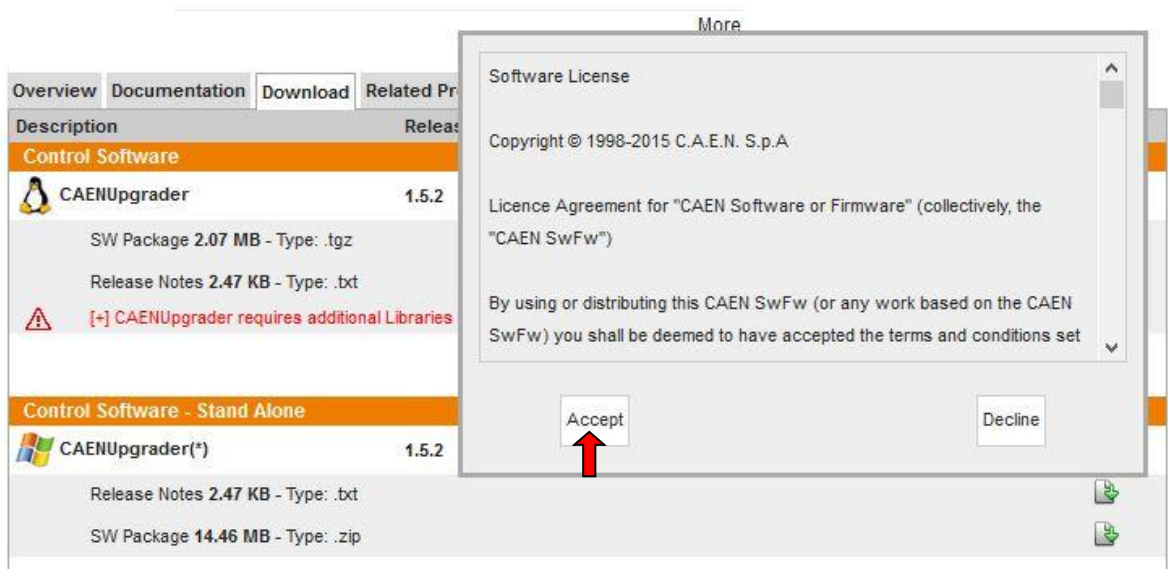
Login is required before to download.

 **WARNING:** Check the compliance between the software and the USB drivers release, as CAENUpgrader 1.3.0 or above does not work with DT57xx-N67xx-DT55xx Win32 USB Win32 USB Driver < 3.4.7 (Desktop & NIM Digitizers).

- Go to the '**Download**' area in the CAENUpgrader web page and left-click on the **Download icon** related to the **SW Package** (.zip file) compliant to Windows OS (the software supports both 32 and 64-bit machines).

Overview	Documentation	Download	Related Products	Required Products	
Description	Release	Date	OS-Version	Environment	Download
Control Software					
 CAENUpgrader	1.5.2	September, 2015			
SW Package 2.07 MB - Type: .tgz					 
Release Notes 2.47 KB - Type: .txt					 
 [+] CAENUpgrader requires additional Libraries					
Control Software - Stand Alone					
 CAENUpgrader(*)	1.5.2	September, 2015			
Release Notes 2.47 KB - Type: .txt					 
SW Package 14.46 MB - Type: .zip					  

- In order to access the download, read and accept the **License Agreement** in the appearing window.



- Finalize the download.

If no different path has been specified by the user, CAENUpgrader Installation Package is saved in a default destination folder that may be different depending on the Windows version and settings.

How to install CAENUpgrader

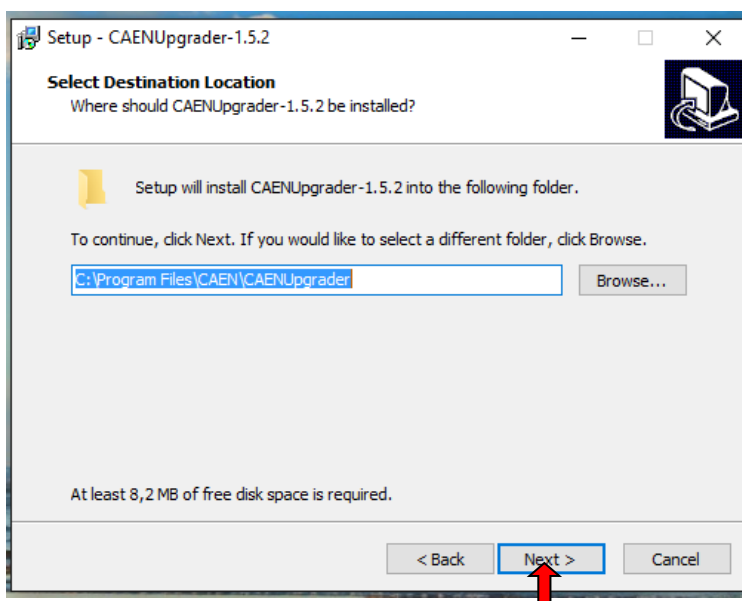
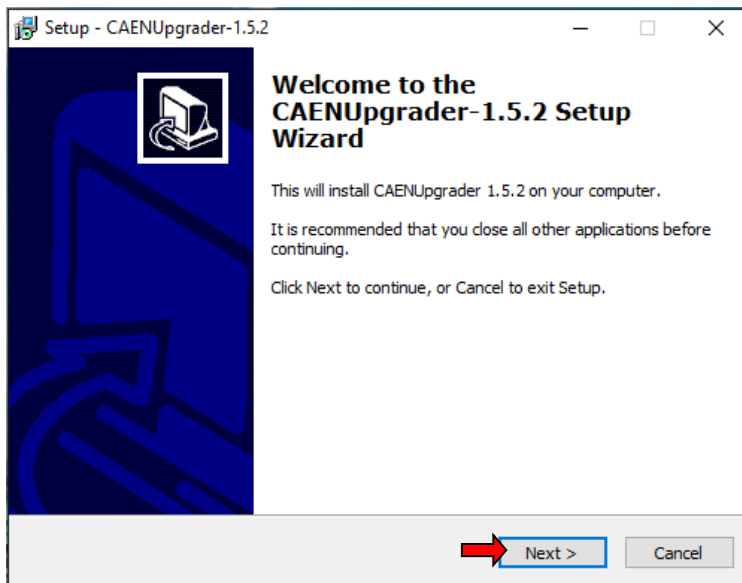
The installation here described is based on Windows 7.

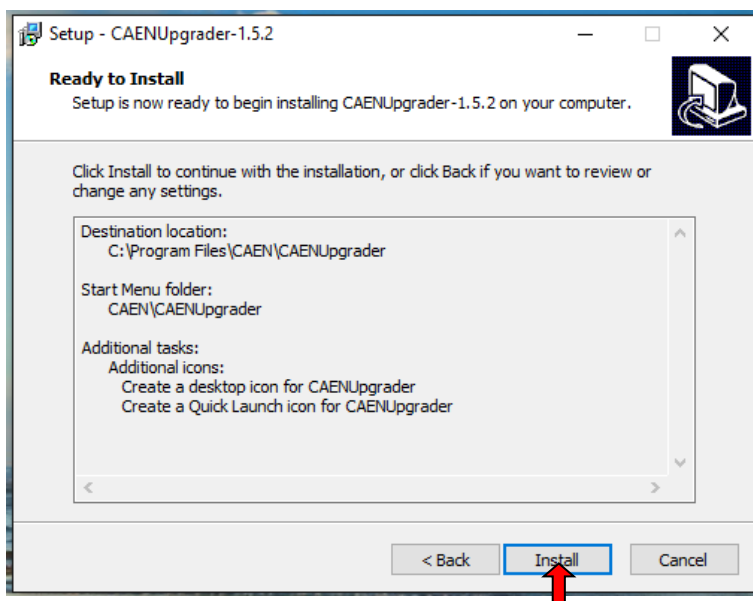
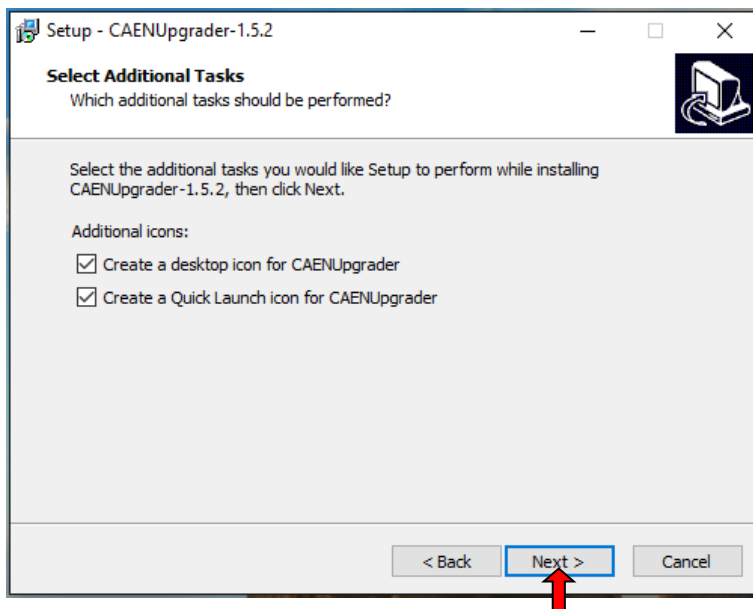
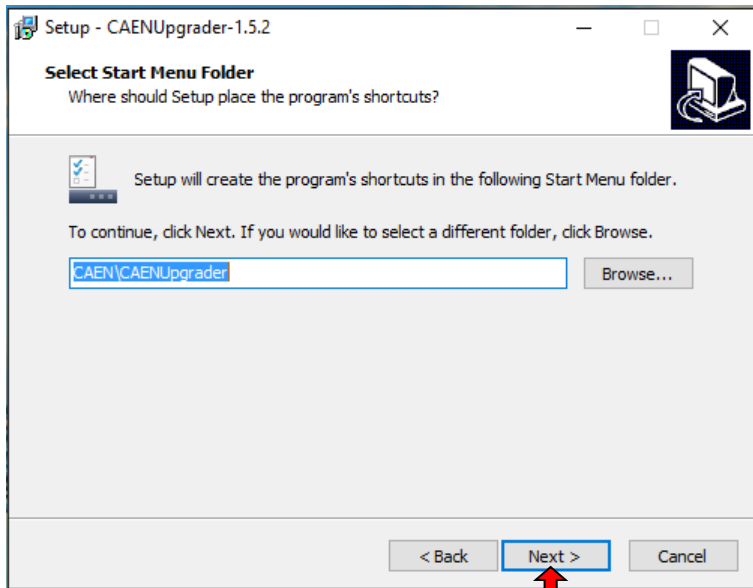
The displayed dialogue boxes, indications or operations may be slightly different from the following instructions depending on the Operating System version and settings.

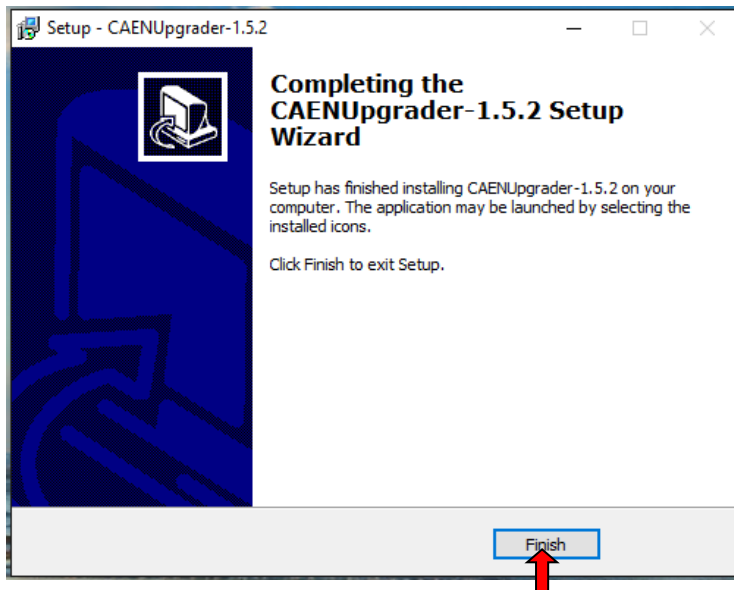
- Unpack the Software Installation Package.
- Launch the installer file by double left-click on **CAENUpgrader-x.y.z_standalone.exe** (where xyz is the software release).
- Complete the **installation Wizard** reading carefully the indications in each step, as shown in the screen shots sequence below (based on Windows 10 OS).



Note: Unlike the typical installation here documented, the user can personalize it by selecting a different destination path and what icon to create.





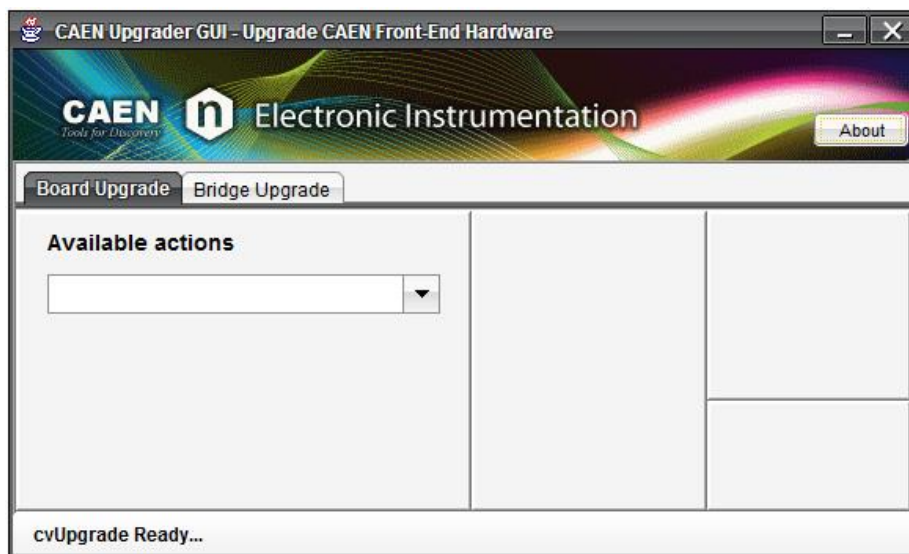


6 Connection and Communication

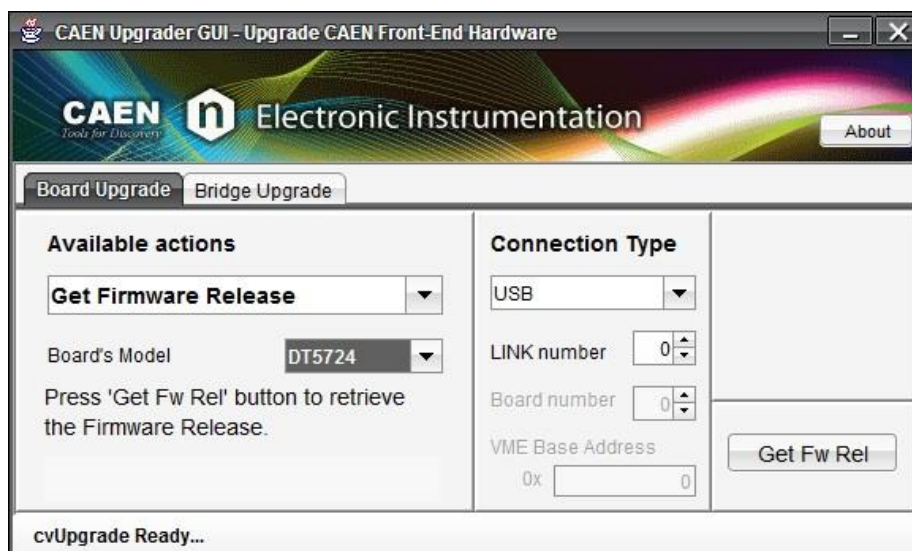
Once the Installation Wizard is completed, it is possible to use CAENUpgrader for reading the firmware release running on the target Digitizer (or MCA) through the following steps.

- Launch the CAENUpgrader GUI by one of the following options:
 - The desktop icon of the program
 - The Quick Launch icon of the program
 - The *.jar* file in the *bin* folder from the installation path on your host

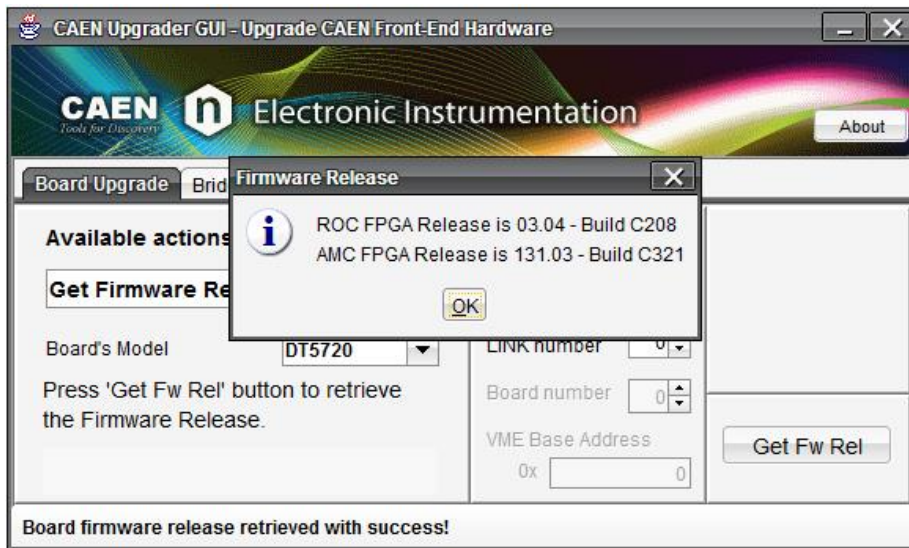
The GUI below will appear.



- Select 'Get Firmware Release' in the 'Available actions' scroll box menu of the 'Board Upgrade' tab.
- Select the model of the target board in the new appearing 'Board Model' scroll box menu.
- Set the connection parameters as follows:
 - Connection Type = USB;
 - LINK number = 0 (assuming that no other USB link is used to communicate with other digitizers).



- Press the 'Get FW Rel' button and check the release number in the pop up window.



7 Technical Support

CAEN makes available the technical support of its specialists at the e-mail addresses below:

support.nuclear@caen.it
(for questions about the hardware)

support.computing@caen.it
(for questions about software and libraries)



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.



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