GD2483

WaveDump QuickStart Guide

Rev. 3 - 07 June 2012

Purpose of this Guide

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

Change Document Record

Date	Revision	Changes
18 October 2010	00	Initial release.
06 April 2011	01	Revised all chapters, new document format
01 March 2012	02	Revised § 1
07 June 2012	03	Updated §System requirements & installation setup

Symbols, abbreviated terms and notation

DPP   Digital Pulse Processing
FFT   Fast Fourier Transform
SBC   Single Board Computer

Reference Document

[RD1]   User Manual UM1935 - CAENComm User & Reference Manual

[RD2]   Application Note AN2472 - CONET1 to CONET2 migration

[RD3]   User Manual UM2091 - WaveDump User Manual

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1 Introduction

This *WaveDump Quick Start Guide* contains the basic information and commands that will let you use *WaveDump* in few steps.

WaveDump is a C based console application that can control any model of CAEN digitizer and it must be considered as a starting point in order to create an own acquisition software: it is an example of the use of the *CAENDigitizer* library to control the data acquisition by CAEN digitizers.

To avoid any misunderstanding, we remind you that *WaveDump* is a demo tool developed only for CAEN digitizers running <u>standard firmware</u>; if your digitizer runs some DPP firmware (e.g *DPP PHA*, *DPP CI* or *DPP-PSD*) you have to use the related *DPP Control Software* that you may download from CAEN website.

System requirements & installation setup

OS	OS version	CAEN Library required	Third-party software required
Windows	2000/XP/Vista/7 (32 and 64-bit)	CAENDigitizer CAENComm (rel. 1.0 or later) CAENVMELib	n/a
Linux	kernel Rel. 2.4/2.6 (32 and 64-bit)	CAENDigitizer CAENComm (rel. 1.0 or later) CAENVMELib	gnuplot Gnuplot

Tab. 1.1: host PC requirements

First of all be sure to have all the third-party software listed in the Tab. 1.1 installed, then:

- go to WaveDump web page: Home / Products / Firmware/Software / Software Tools / Digitizer Tools / CAEN WaveDump.

- Download the WaveDump software package related to your OS in the "Download" tab.

- Uncompress the downloaded package.

- **For Windows users:** launch the WaveDump Setup executable file and follow the installer instructions.

✏️ **Note:** WaveDump for Windows OS is a standalone version which installs locally all the required libraries (see **Tab. 1.1**) 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.

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

Install the required libraries starting with CAENVMELib, then CAENComm, finally CAENDigitizer. Now, install WaveDump following the instructions in the INSTALL file.

2 Board Connection

CAEN digitizers can be connected to the host PC through the three following ways.

Direct Link to the Module via USB

Desktop and NIM versions can be directly handled via USB, just connecting the digitizer to the host PC via the USB cable (the USB driver is available on Digitizer web page)

Direct Link to the Module via Optical Link

Every CAEN digitizer can be controlled directly via Optical Link; for this purpose a CAEN PCI or PCIe controller (Mod. A2818 and A3818) is required. See the web pages of A2818/A3818 for more info.

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

Link through a VME Bridge

VME Digitizer Boards can be controlled via VMEbus through a VME Bridge.

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. 2.1: CAEN 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].

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3 Getting Started

This section will help you to understand the main features of *WaveDump* step by step: from the start-up to the first acquisition.

As an example, we feed a **DT5720 digitizer** with NIM pulses (unipolar square pulses with Amplitude -800 mV); the pulses have frequency 100 kHz and width 1 us. We use a direct USB link between digitizer and PC.

If you can use the same signal follow this guide, otherwise try to fit these tips to your set-up.

Fig. 3.1: CAEN DT5720 digitizer.

WaveDump Configuration File Overview

Turn on the digitizer and connect your pulse generator to the channel 0 of the digitizer.

All the relevant parameters for the data acquisition are in the configuration file named **WaveDumpConfig.txt** in the **WaveDump\bin** folder.

This file is divided in two Sections: *Common* and *Individual Settings*.

Common Settings are the ones common to all the channels of the digitizer.

Individual Settings[1] are the ones related to a single channel of the digitizer.

Please note that some settings in the common section can be overwritten by the corresponding settings in the Individual section.

In our example the main configurations are:

In the Common Section:

```
[COMMON]
# OPEN: open the digitizer
OPEN USB 0 0
...
# RECORD_LENGTH = number of samples in the acquisition window
RECORD_LENGTH 10000
...
# EXTERNAL_TRIGGER: external trigger input settings.
EXTERNAL_TRIGGER DISABLED


# MAX_NUM_EVENTS_BLT: maximum number of events to read out in one Block
Transfer. High values corresponds to
```

---

[1] If you are using a digitizer of the x740 family, the *Individual Settings* are referred to a group of channels, not to the single channels. This means that, for example, if you enable the group [0], channels from 0 to 7 will be enabled. In this case, you should use for each group the GROUP_TRG_ENABLE_MASK command that is the hex mask used to select the channels inside the group which will take part to the board autotrigger. For more details refer to the WaveDump User Manual [RD3].

```
# options: 1 to 1023

MAX_NUM_EVENTS_BLT    100


# POST_TRIGGER: post trigger size in percent of the whole acquisition window

# options: 0 to 100

POST_TRIGGER  80


# TRIGGER_EDGE: decides whether the trigger occurs on the rising or falling
edge of the signal

TRIGGER_EDGE FALLING

...
```

In the Individual Section:

```
[0]

ENABLE_INPUT YES

DC_OFFSET -20

TRIGGER_THRESHOLD 2500

CHANNEL_TRIGGER ACQUISITION_ONLY

...
```

Signal Acquisition

Launch the executable file ***WaveDump.exe***. After the start up, WaveDump reads the configuration file and sets the parameters on the board.

A command shell will appear showing the firmware release loaded on the digitizer and the main control commands.

Press "`Space`" in order to visualize all the available commands.

If you want to start the acquisition press "`s`". On the digitizer's front panel the "RUN" LED should be on.

At this point you may observe two different messages on the screen:

1. A message "`No Data`". This means that the board is not triggering. On the digitizer's front panel the "TRG" LED should be off.

2. A successful acquisition message "`Reading at xx MB/s (Trg Rate: yy Hz)`". This means that the digitizer is triggering correctly. Both RUN and TRG LEDs should be on.

In the first case Channel 0 is not triggering. This can be due to an uncorrect trigger threshold setting or to the dynamic range of the signal that does not match the input dynamic range of the digitizer.

To visualize an acquisition window press "`T`" and "`p`": the first command enables the continuous Software Trigger, while the second one plots one acquired event.

Considering the baseline (or the saturation) of your signal, set suitable values of `DC_Offset` and `Trigger_Threshold` in the Individual Section of the configuration file.

Press "R" in the *WaveDump* shell to reload the parameters and see if Channel 0 is now triggering.

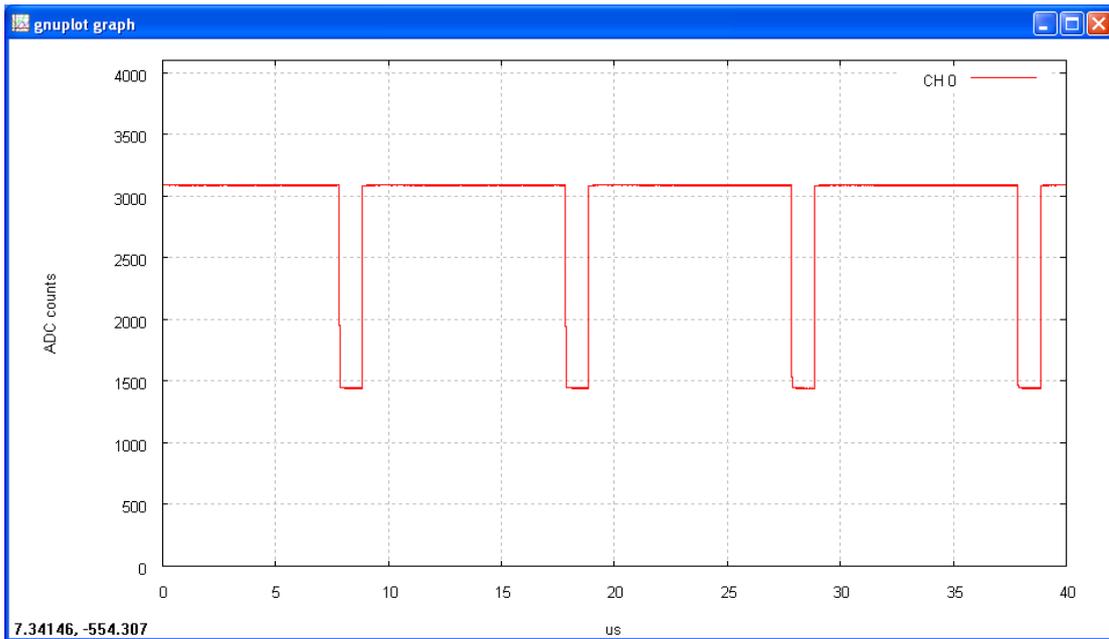With our set-up we obtain a plot like Fig. 3.2

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Fig. 3.2: Gnuplot window showing acquired data

Try to change some other parameter until you are satisfied of your configuration.

WaveDump features two more acquisition modalities: **Samples Amplitude Histogram** and **FFT**.

Press "h" and *Gnuplot* will show you the histogram of the samples amplitude.

Press "f" and the *Gnuplot* will show the Fast Fourier Transform of your signal.

Saving Data to File

To enable the record of the data to file press "w" or "W": The first choice will save only an acquisition window, the latter will save data continuously. The data will be saved in the format set in the configuration file; ASCII in our case.

To interrupt the acquisition press "s" and then "q" to quit. In the same folder you will find a file called ***wave0.txt*** with all the data ready for a further analysis.

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