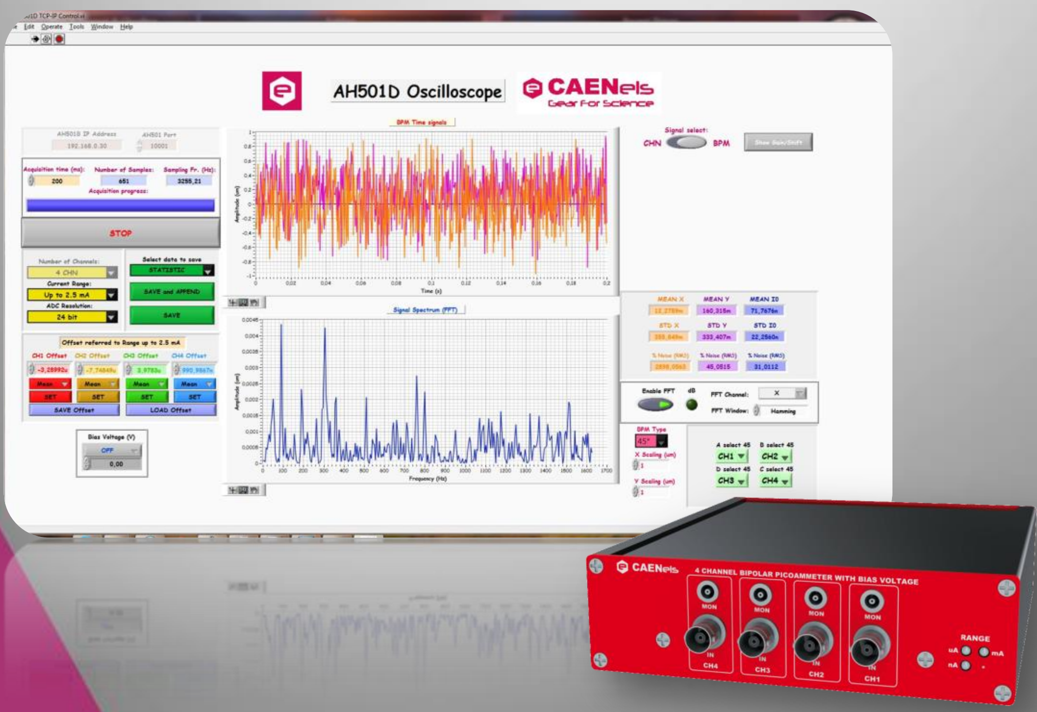
AH501D

Oscilloscope

Quick Start Guide



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BEAMLINE ELECTRONIC INSTRUMENTATION

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Document Revision	**Date**	**Comment**
1.0	November 18th 2013	First release of document
1.1	October 29th 2014	Guide graphics changed

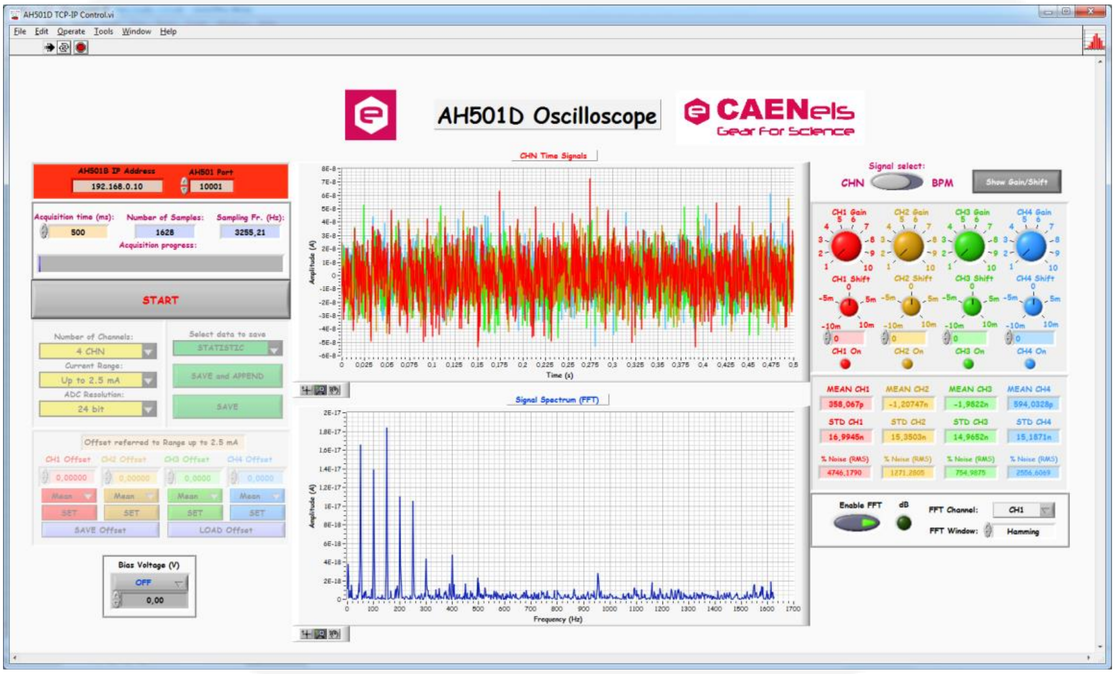
1. Introduction

The free software *AH501D Oscilloscope* makes it easy to set the picoammeter and visualize or save the acquired data. AH501D Oscilloscope software is available only for Windows platform. The system requirements are as follows:

- Windows minimum system requirements:
  - Windows® XP/Windows Vista®/Windows® 7/Windows® 8
  - Intel® or equivalent AMD Athlon® processor
  - 110 MB available HD space
  - Ethernet network card

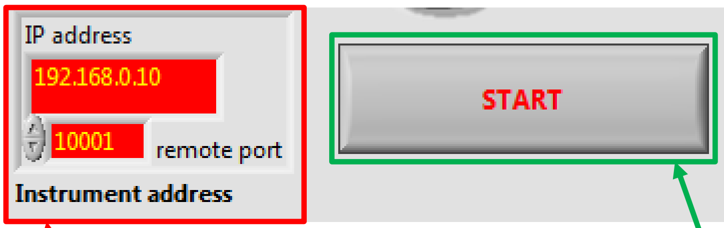
2. Quick start

The following chapters describe the main functionality of the AH501D Oscilloscope software. The main window of the program is divided in the following sections:



2.1 Connection setting

Remote communication is guaranteed by means of an Ethernet 10/100 auto-sensing socket present on each AH401D module rear panel. To establish a connection it is necessary to set the IP address of the instrument and its TCP/IP communication port using the *Connection settings* section present in the main window.



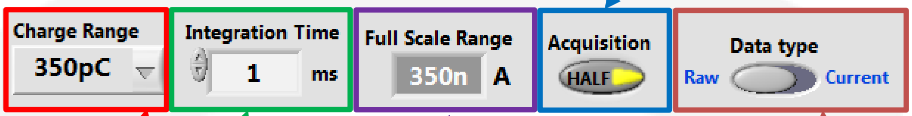
First it is necessary to set the module IP address and port to communicate with the AH401D. This operation can be made by using the module IP address/port section (the default communication port is 10001).

The communication with the instrument can be established by clicking on the *START* button.

2.2 Acquisition settings

In the upper part of the main window it is possible to configure the *Acquisition settings:*

The purpose of the Acquisition type section is to select whether to process data from both integrator circuits (FULL) - i.e. maximum speed - or only from one integrator circuit (HALF) – i.e. best noise performance. For more information see the *HLF Command* section in the AH401D user manual



Acquisition range

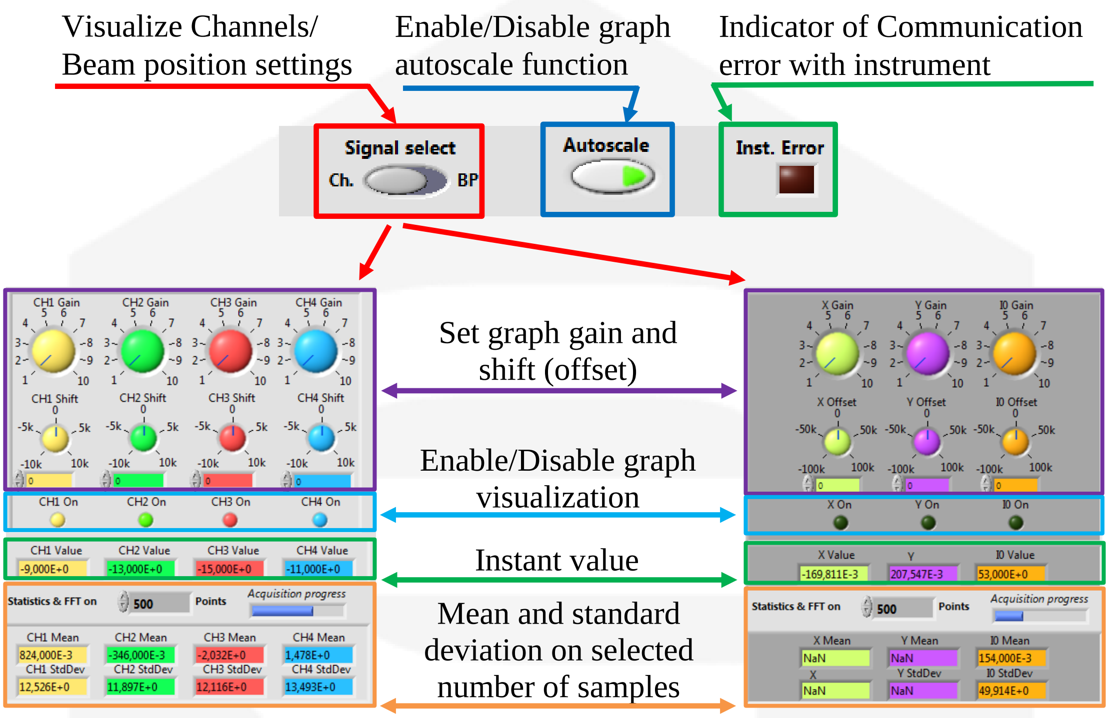
Integration time

Used full range

Representation used in communication (row data or Current – ASCII format); it is recommended to use the raw representation for a faster data transfer

2.3 Graph settings

In the upper-right part of the main window it is possible to configure the *Graph settings*. There are two possible graph options sections: one relative to the Channels visualization and one relative to the Beam position. The Channels graph visualization options are relative to the acquired data from the four input connectors; the Beam Position graph visualization options are relative to the X-Y Beam position and its Intensity (Io):



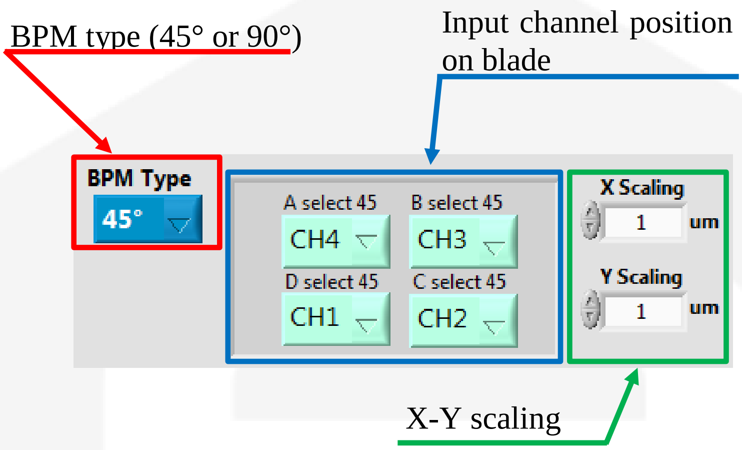
In a standard 90° blade BPM system, the X-Y and Intensity (Io) of the Beam are calculated with the following formulas (I_A, I_B, I_C and I_D represent the acquired input channels values):

$$\begin{cases} X = \dfrac{I_B - I_D}{I_B + I_D} \\ Y = \dfrac{I_A - I_C}{I_A + I_C} \\ I_o = I_A + I_B + I_C + I_D \end{cases}$$

In some cases, where a second BPM is installed on the same beamline, the blade system is rotated CW by 45° in order not to get shadowed by the first blade set and the computation needs to be modified. The equation used in a 45° rotated blade BPM system are the following:

$$\begin{cases} X = \dfrac{I_B + I_C - (I_A + I_D)}{I_A + I_B + I_C + I_D} \\ Y = \dfrac{I_A + I_B - (I_C + I_D)}{I_A + I_B + I_C + I_D} \\ I_o = I_A + I_B + I_C + I_D \end{cases}$$

The *Beam Position options* section allows to select the type of BMP blade (45° or 90°), the connection with the four input channels and the X-Y scaling:



2.4 FFT, Offset Calibration and Save data settings

In the bottom-right part of the main window it is possible to configure some other settings like:

- *FFT visualization section*: those options allow to enable or disable the FFT visualization; select the channel on which the FFT is calculated and to enable/disable the autoscale in FFT graph (to improve the calculation of FFT it is necessary to increase the number of acquired samples);
- *Offset calibration section:* this section allows to compensate the offset of the acquired data; the offset could be compensated manually or it is possible to use the *SET* button, which takes the mean value of the last acquisition as channel offset. For more information about the offset calibration please see the *Offset Calibration* chapter in the AH401D User Manual;
- *Save data section:* this section allows to save the acquired data. It is possible to select the type of saved data: *POINTS* – to save the acquired data and *STATISTIC* – to save only the mean and standard deviation of acquired data. If append option is disabled every

acquisition will open a save data window; otherwise the data will be "appended" to previous saved data. Two files are created when *SAVE* option is selected: one with saved data and the second with the acquisition settings.