

**COMPLETE OPERATIONAL EXAMPLE**

This manual is continuously updated by our staff to help our customers to use the GEMINI interferometer at the top of its potential. You can always find the latest version of this manual at **www.nireos.com/downloads**

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We made our best to assure that the manual is clearly written and does not contain errors, but we are aware that perfection can not be reached. Please contact us at [**info@nireos.com**](mailto:info@nireos.com)in case you spot an error or in case you find hard to understand some parts of the manual.

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# Introduction

The aim of this manual is to show a step by step example on how to properly acquire spectra with NIREOS GEMINI Interferometer using the executable program, ***GEMINI.exe***, provided. This manual is based and tested on Windows operative system. This software controls the positioner inside the interferometer, the drivers of the positioner must be installed. The installer, **MCS\_Installer\_3.8.9.exe**, can be found in the **MCS** folder.

**N.B.**: At the moment the software works with a National Instrument Data Acquisition (DAQ) Card (USB-6002). So, in order to take a measurement this DAQ system must be used. Other Acquisition systems are not supported.

This example contains all the steps needed to acquire successfully an input light interferogram and then compute its correspondent spectrum. This manual is intended for user with a previous knowledge of the principle of Fourier transform spectroscopy and on the GEMINI interferometer operating principle. See the *Theoretical Manual* for a detailed explanation. A basic knowledge of the LabVIEW programming language is required. All the processing codes to retrieve the light spectral information are the results of year of research in the Fourier Transform spectroscopy field and have been tested and applied to a great variety of scientific applications. Please have a look on [www.nireos.com](http://www.nireos.com) to see the wide applicability of this device.

# Interface

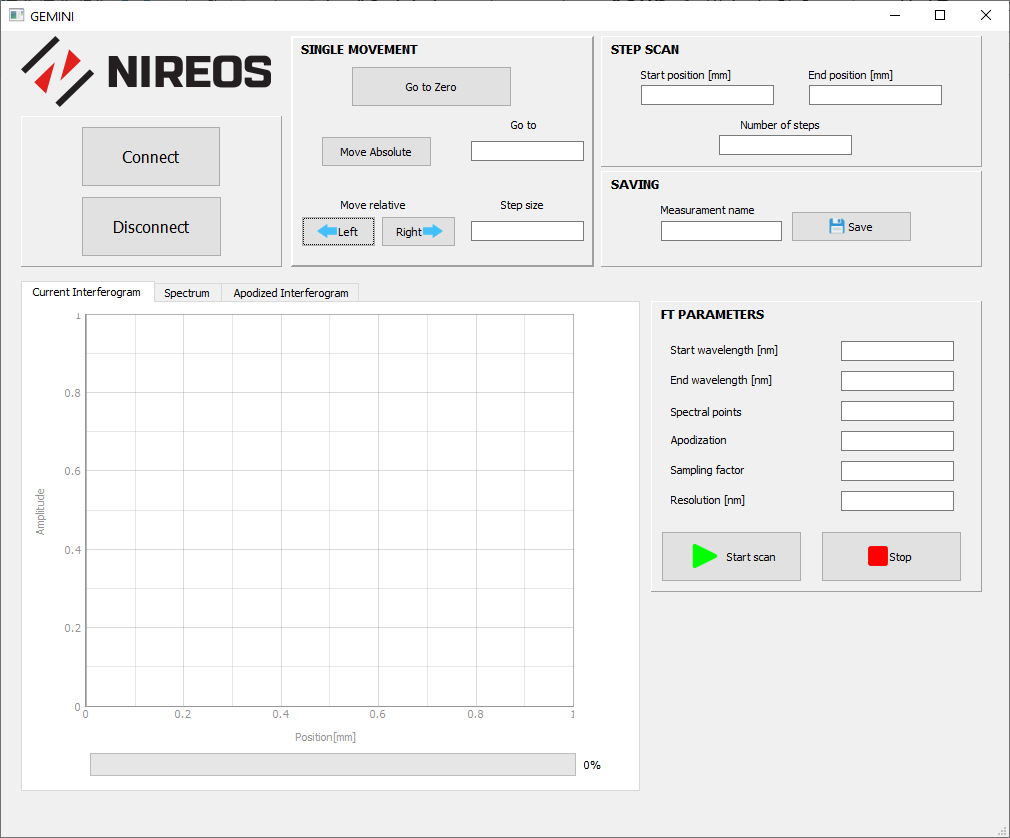


Figure 1 Screenshot interface of GEMINI software.

* 1. **Buttons**

**Connect**:connect to the GEMINI controller plugged-in in the USB port.

**Disconnect**: release the connection to the GEMINI controller.

**Go to Zero**: move the positioner in the zero position, so where the delay between the two replicas is zero.

**Move Absolute**: take the value in the textbox “Go to” and move the positioner in that position.

**Left**: take the value in the textbox “Step size” and move the positioner on the left with respect to the current position.

**Right**: take the value in the textbox “Step size” and move the positioner on the right with respect to the current position.

**Save**:

**Start scan**:

**Stop**:

* 1. **Textboxes:**

**Go to**:

**Step size**:

**Start position [mm]**:

**End position [mm]**:

**Number of samples**:

**Measurement name**:

**Start wavelength [nm]**:

**Start wavelength [nm]**:

**Spectral points**:

**Apodization**:

**Sampling factor**:

**Resolution [nm]**:

* 1. **Graphs:**

**Current Interferogram**:

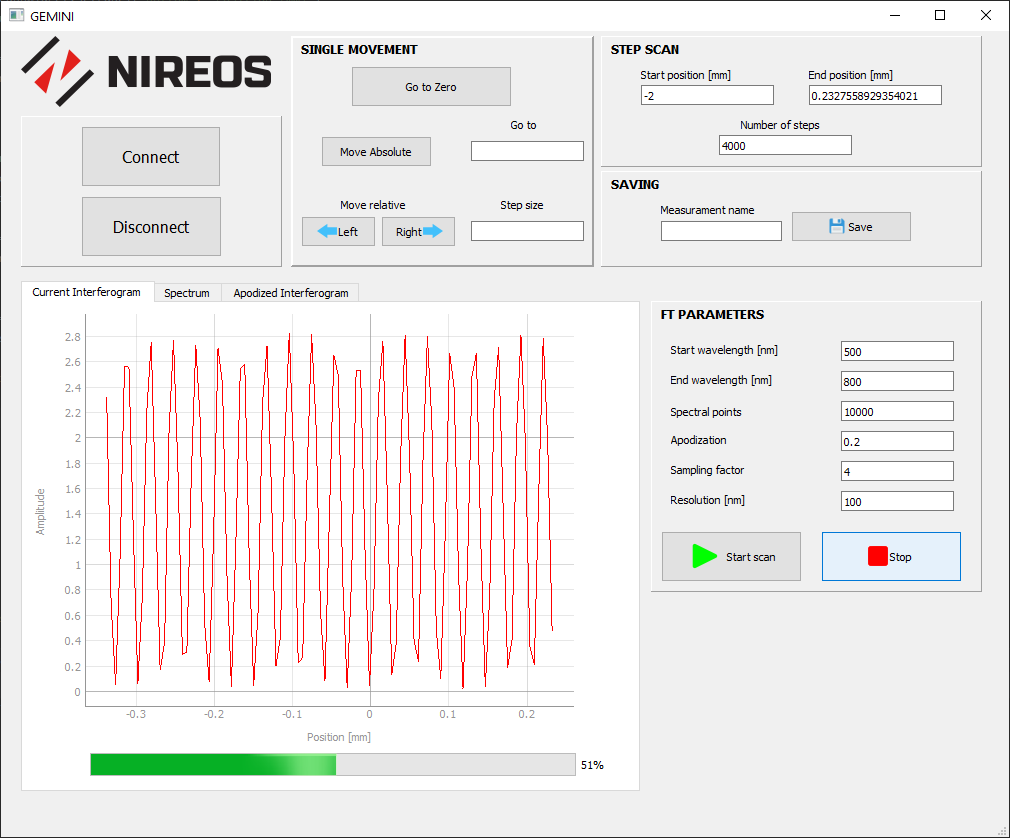


Figure 2 Current interferogram acquired by GEMINI system

**Spectrum**:

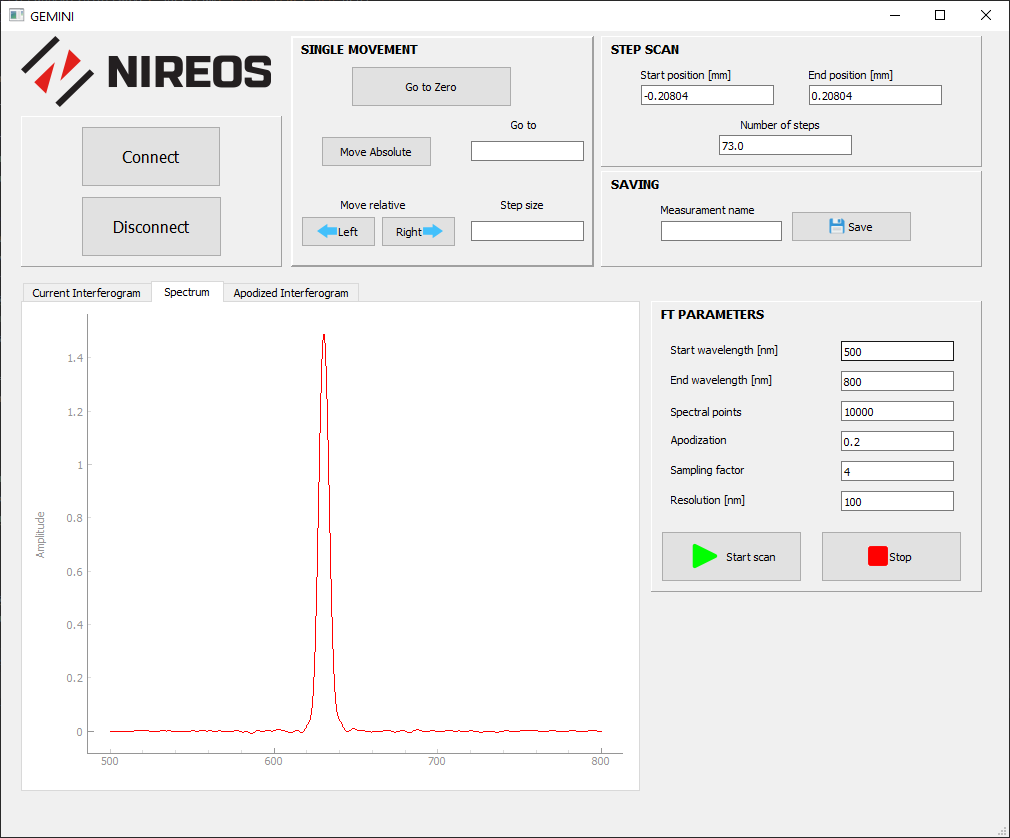


Figure 3 Spectrum retrieved from the measurement

**Apodized Interferogram**:

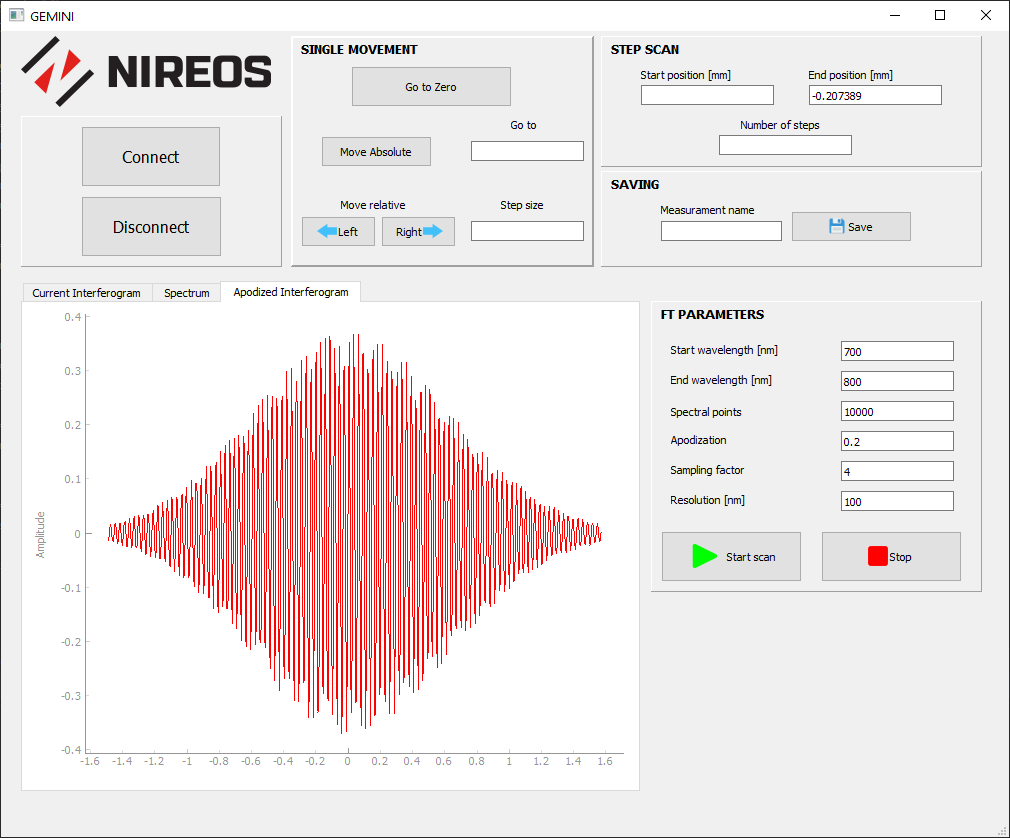


Figure 4 Apodized interferogram of the Current interferogram

# Configuration Files

The GEMINI interferometer is shipped already calibrated and configurated. In order to work properly, this example software needs three configuration files that must be present in the operational example working folder together with python script.

## \*\_parameters\_int.txt

This file contains the interferogram of a highly temporal coherent source such as HeNe laser sampled over the whole scan range of the GEMINI interferometer. The file is composed of two rows the first one contains the position axis and the second one the interferogram values at the correspondent positions. This file is used to calibrate the position axis of the interferometer with an extremely high precision. The file is used inside the *Get\_Calibrated\_position\_axis.vi* to calculate the position axis with interferometric accuracy, therefore it is always recommended to use this file. The position axis calibration procedure is simply an interferogram acquisition of a highly temporally coherent source such as HeNe laser over the whole scan range of the motor. The Acquired interferogram should be saved together with its correspondent position axis inside the “\*\_parameters\_int.txt” file. The first row of the file must contain the position axis in millimeters and the second row must contain the correspondent interferogram values. If you need further information on how to perform the position axis calibration procedure, please contact us at **info@nireos.com**.

## \*\_parameters\_scale.txt

This file contains the scale parameter of the positioning system and it is used to find the physical zero of the interferometer. Warning: Do not modify this file! Changing the value contained in this file require invalidate the position axis calibration procedure performed in factory.

## \*\_parameters\_cal.txt

This file contains the conversion table from mm-1 to wavelength and it is used to calibrate the spectral axis. The user can add or modify any of the entry and the software will automatically take into account the change to compute the spectral axis.

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