

### Features

- Generate optical arbitrary waveforms with non-linearity compensation
- Vertical resolution: 11 bits
- Rise/fall time: 300ps
- Jitter: <30 ps RMS (from external trigger)
- Optical Wavelength: 1,06  $\mu\text{m}$  (other wavelengths upon request)
- Plug and play control via web page (without DLL and without specific software)

### Applications

- High power lasers with gain saturation
- Inertial confinement fusion
- Laser plasma interaction
- Big Physics Applications
- Optical marking
- Automatic Test Equipment



*GFT7031 and laptop with embedded web page*

### Description

The GFT7031 is a PC controlled Optical Waveform Generator. It allows to provide temporally shape optical laser pulses with up to 2.5GS/s resolution.

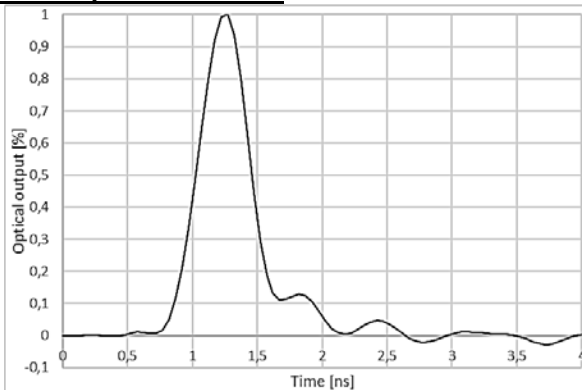
This generator is well suited for laser facilities requiring shape flexibility and non-linearity compensation (gain saturation, etc.)

There are three trigger modes for generating optical waveform.

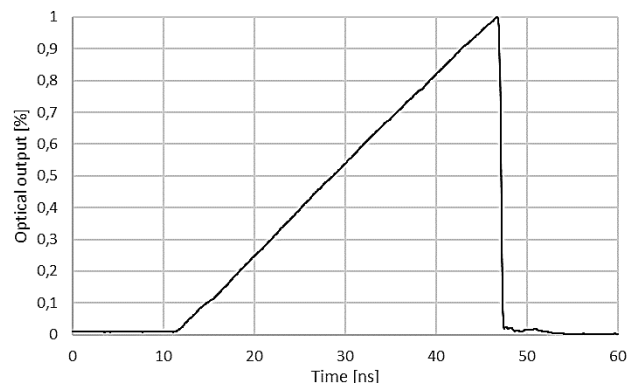
- External: One input is used to trigger Waveform Generator with low jitter. Rate can be repetitive or single.
- Internal: Trigger to Waveform Generator is from frequency programmable generator. Rate is repetitive.
- Soft trigger from command

All the settings are controlled via Ethernet network. A powerful control panel Web page, from embedded server, provides a simple method to configure settings, download the waveform data and control the state of the instrument.

### Typical Output Waveforms



*Single pulse 430ps-FWHM optical response*



*Full-scale 36ns optical ramp with software non-linearity compensation*

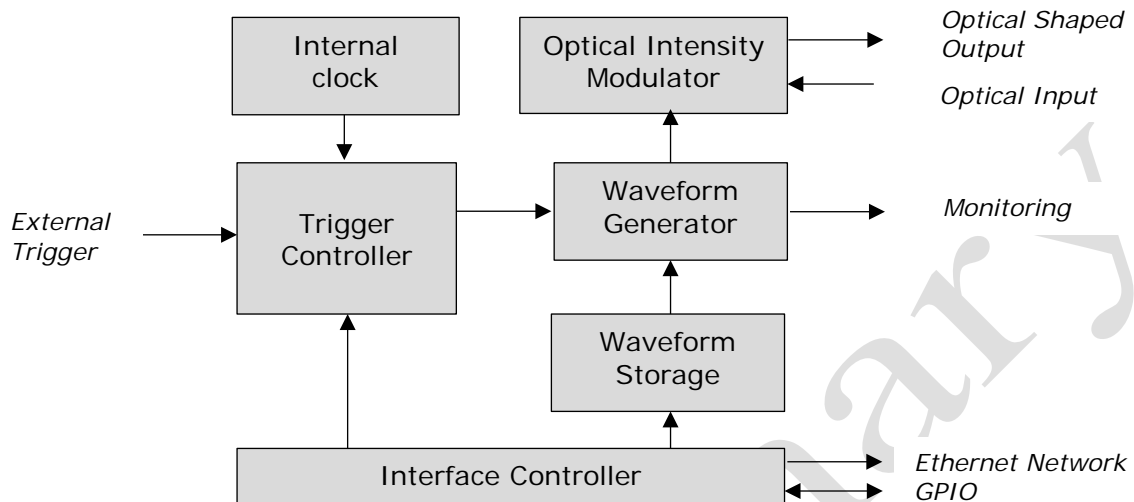
### Specifications

<b>Optical Input/output</b>	
Wavelength	1,06 $\mu\text{m}$ (+/- 0.08), (other wavelengths upon request)
Optical power input	< 100 mW CW
Min. insertion loss	5 dB (typ.)
Input/output fiber	PM
Connectors	FC/APC (other connectors upon request)
<b>External trigger</b>	
Trigger threshold	< 1 V
Input level typ.	5 V
Input max. level	ADU
Internal termination	50 $\Omega$
Width	< 100 ns
Repetition rate	< 50 kHz
Connector	BNC
<b>Internal trigger</b>	
Repetition rate	Internal generator adjustable from 1Hz to 10 000 Hz in step of 1 Hz
<b>Soft trigger</b>	
Single Shot rate	From software command
<b>Arbitrary optical Output</b>	
Waveform	Arbitrary upon software request
Sample rate	2.5 GS/s (400 ps resolution)
Record length	1600 ns (4000 points)
Vertical resolution	11 bits
Extinction ratio	> 27 dB (30 dB typ.)
Rise/fall time (20/80%)	~ 300 ps
Jitter RMS	< 30ps (External trigger to Output)
<b>Electrical monitoring</b>	
Pulse shape	Like the arbitrary output (without optical non-linearity compensation)
Amplitude	About 400 mV
External load	50 $\Omega$
Rise/fall time	~ 300 ps
Pulse Width (FWHM)	Image of electrical output +/- 20 ps
Jitter RMS	< 30 ps
Connector	BNC
<b>GPIO</b>	
Number of GPIO signals	4 (digital bi-directional signal)
Signal level input	High min= 2.0 V, Low max = 0.8 V
Input impedance	10 k $\Omega$
Signal level output	High min = 2.4 V, Low max = 0.6 V at 24 mA
<b>General specification</b>	
Control interface	10/100/1000 Mb/s Ethernet
Size	19" – 1U – 400 mm
Weight	5 kg
Power	V/A 90/240 V, < 35 VA

### Functional overview

#### Block diagram

The GFT7031 includes the 5 following functions: Internal clock, Trigger controller, Waveform Generator and storage, Optical intensity modulator and Interface controller.



#### Internal clock

This function provides a low jitter time base.

#### Trigger controller

There are three trigger modes for generating optical waveform

- ✓ External for synchronization
- ✓ Internal for automatic sequencing: An internal frequency programmable generator (1 Hz to 10 000 Hz) provide a repetitive Trigger source
- ✓ Software for user's control

#### Waveform generator and storage

This function is an Electrical Arbitrary Waveform Generator running at 2.5 Giga sample/s with 11-bit vertical resolution. Data of each sample are from the Waveform storage memory.

Data can be downloaded to the memory from PC file.

A 400 mV electrical signal on "Output Monitoring" allows to control the Waveform.

#### Optical intensity modulator

This function allows to modulate the external optical signal with the waveform generator. The modulate signal is available on front panel.

#### Interface Controller

The interface controller manages internal functions and user interfaces. All the settings and data waveform value can be remote controlled via Ethernet (10/100/1000 Mb/s) or Internet (Web pages from embedded Web server)

GPIO: The GPIO (General Purpose digital input output) is intended for communication to external equipment and offers 4 digital bi-directional signals. The direction of each pin is set individually. The GPIOs are controlled from software.

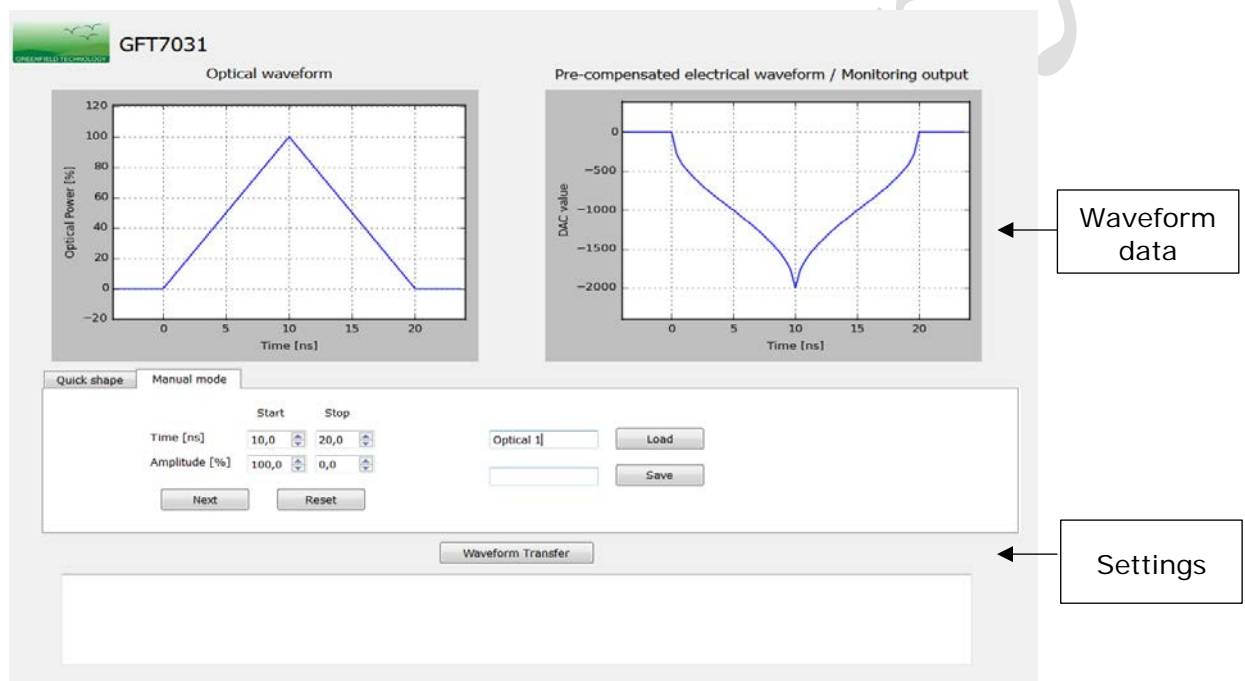
### Software and control tools

Two ways to remote control the generator

- **Quick way** via web page. Web page from embedded server, provides a simple method (no DLL no specific software) to configure setting, to control operation, to display status of the instrument and to display waveform. Waveform Data can be loaded from PC file.

The web page can be opened via internet explorer, Mozilla Firefox or Chrome (without any DLL).

After connecting a cable from the GFT7031's Ethernet port to your computer network, enter the GFT7031's IP address into your PC's browser (the IP address can be identified or assigned via the web page). The browser will automatically open the control panel web page on your PC.



*Waveform control interface illustration*

- **General remote way** via Ethernet and LabView software application or other PC software application. GFT7031 offers a set of low-level command to adjust settings and control the equipment. Example of use is provided in a user' manual.

### Front and Rear panels



Front panel



Rear panel

### Connector, Switch, Indicator

Front panel	
TRIG IN	Trigger Input: BNC connector
MONITOR OUT	Monitoring Output: BNC connector
OPTIC IN	Optical Input: FC/APC connector
OPTIC OUT	Optical Shaped output: FC/APC connector
• <b>Indicators</b>	
PWR	Light when the power is ON
DEF	Light when failure detected
ETH	Light when connected on the ethernet network
TRIG	Light when equipment has been triggered
Rear panel	
LAN	Lan connection: RJ45 connector
GPIO	Programmable Input / output: D-sub connector (9 ways)
SYNC	N.C
CLK	N.C
PLUG	AC power IEC plug (90-240 V)
• <b>Switch</b>	
Red Switch	Power ON/OFF

### Ordering information

Model	Description
GFT7031	Base version: 2.5 GS/s Optical Waveform Generator
-MF	Adds mounting flange

Ordering example: GFT7031-MF (Model GFT7031 with mounting flange)