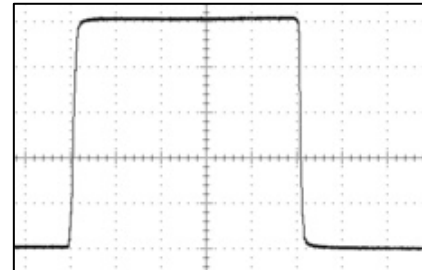


## Features

- 4 Optical Pulse Outputs: 1550 nm wavelength, 0.5 to 1.5 mW amplitude, 1 ns rise time
- 2 Electrical Outputs: 2.5 to 10 V amplitude under 50  $\Omega$ , 1 ns rise time
- Each triggered output pulse can be delayed up to 10 seconds with 1 ps resolution and low jitter
- Trigger can be internal from two programmable frequency generators, or external
- Compact packaging (19", 1U)
- All parameters may be controlled via front panel, Ethernet or Internet



Example of optical pulse (20 ns/div)



## Applications

- Components Test
- ATE Application
- Precision Pulse Application
- Up to 1 km pulse transmission by optical fiber
- Instrument Triggering

## Description

The GFT7016 generator provides four independent optical channels (SO1 to SO4) and two independent electrical channels (SE1 and SE2). Up to 10 seconds delay can be programmed on each channel with 1 ps resolution, and channel-to-channel jitter is less than 15 ps rms.

- SC/PC outputs deliver 1 ns rise time optical pulses, independently adjustable in amplitude (from 0.5 to 1.5 mW), and width (100 ns to 10  $\mu$ s)
- BNC outputs deliver 1ns rise time electrical pulses (under 50  $\Omega$ ), independently adjustable in amplitude (2.5 to 10 V), and width (100 ns to 10  $\mu$ s)

Output channels can be externally triggered from input (TRIG IN), or internally triggered from frequency generators (1 Hz to 10 kHz), or software triggered from local or remote command.

The GFT7016 is a low profile 19", 1U rack instrument.

GFT7016 can be locally controlled over front panel keys and LCD display, or remotely controlled via Ethernet, or via "web page" control panel from an embedded Web server. This control panel provides a simple method to configure settings for each channel (delay, amplitude, width, trigger source) and to control operation and display status of the instrument. The "web page" can be opened via Internet Explorer, Mozilla Firefox or Google Chrome.



# GFT7016

## Optical Pulse Generator

### Specifications

#### Delays Channels

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Number	6 independent delays
Range	0 to 10 seconds
Resolution	1 ps
RMS Jitter ( output to output) (external trigger to outputs)	< 15 ps < 50 ps + $10^{-7}$ x delay
Trigger delay (external trigger to outputs)	< 100 ns
Skew between optical and electrical outputs	150 ps peak to peak
Accuracy	< 250 ps + $10^{-6}$ x delay
Time base	0.5 ppm stability

#### External trigger

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Threshold	+ 1 V
Slope	Rising edge
Impedance	1 k $\Omega$
Rate	< 10 kHz

#### Internal trigger

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From Programmable frequency generator	1 Hz to 10 kHz in step of 1 Hz
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#### Optical outputs

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Number	4 channel Outputs
Wavelength	1550 nm
Level	0.5 to 1.5 mW (with 0.1 mW resolution)
Rise time / Fall time	< 1 ns / < 10 ns
Width (at 50%)	100 ns to 10 $\mu$ s (with 1 ns resolution)
Connector	SC/APC

#### Electrical outputs

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Number	2 channel Outputs
Level	2.5 to 10 V (with 100 mV resolution)
Load	50 $\Omega$
Rise time / Fall time	< 1 ns / < 5 ns
Width (at 50%)	100 ns to 10 $\mu$ s (with 1 ns resolution)
Connector	BNC

#### External time reference

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Frequency	10 MHz
Level	Typical 0 dBm , internal 50 $\Omega$

#### General specifications

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Dimensions	19" Rack, 1U, Depth = 300 mm
Local interface on front panel	LCD display and small keyboard
Computer interface	Ethernet 10/100 Mb/s and Web page
Power	90 to 240 VAC, 50/60 Hz, < 50 W
Weight	< 10 kg

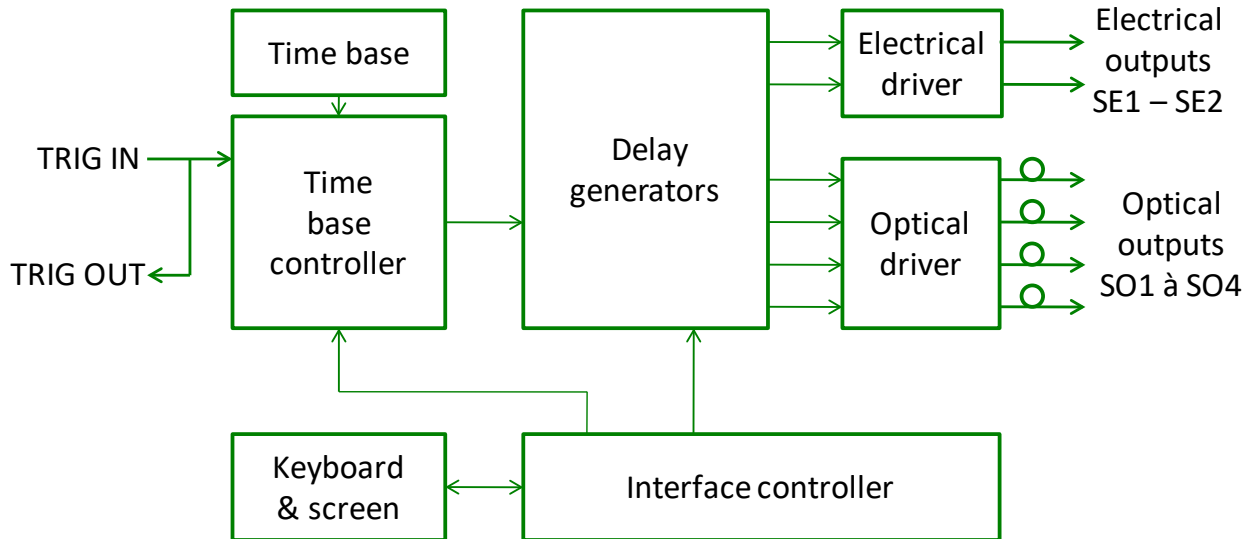
#### Options

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Option 1: Optical Output at 1310 nm Wavelength
Option 2: Other external time reference up to 80 MHz
Option 3: Extension to 4 electrical Outputs
Option 4: Optical input for timing system mode

## Functional Overview

**Block diagram:** The GFT6016 includes the following functions: Time base, Time base controller, delay channel, Electrical and optical drivers and Interface controller



*Functional Organization of GFT7016*

**Time base:** This function provides a precise time base from internal reference or external 10 MHz reference. In option external reference can be up to 90 MHz

**Time base controller:** This function provides 3 trigger sources and time base to each channel.

- External Trigger source: A rising edge on a "TRIG IN" start delay channels. A copy of external trigger signal is available on "TRIG OUT" connector.
- Internal Trigger source from an internal generator. The frequency of generator is programmable from 1Hz to 10 KHz
- Soft Trigger source from local or remote command

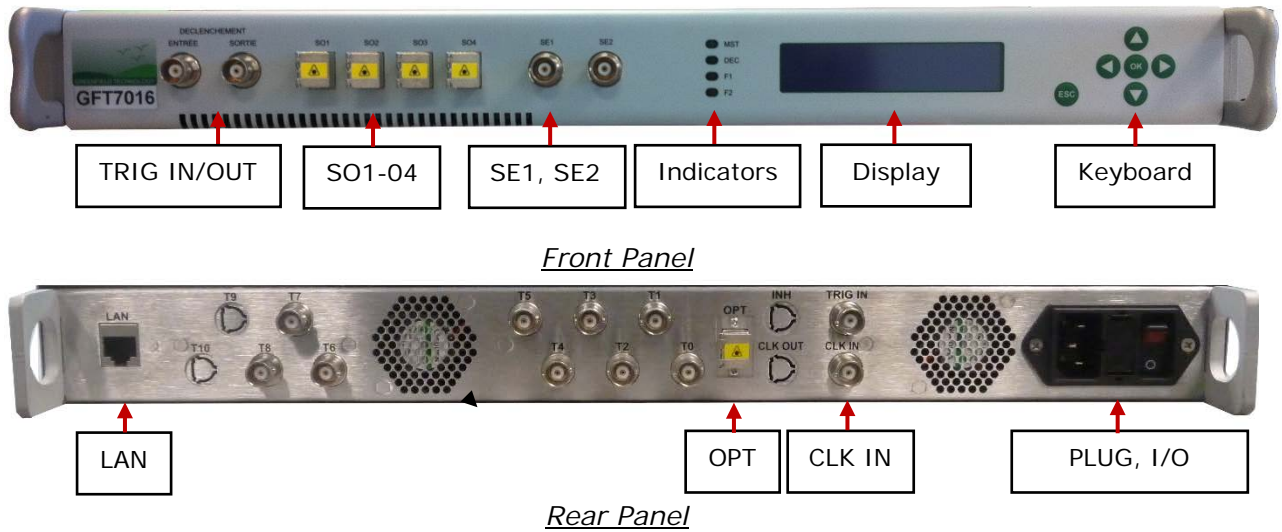
**Delay Channel:** They are 6 independent delay channels. The delay from the selected trigger source is programmable up to 10 seconds in step of 1 ps.

**Drivers:** Each delayed output pulse (Electrical or Optical) can be independently adjustable in amplitude and width.

**Interface Controller:** It manages internal function and user interfaces. All the parameters can be locally controlled over the front panel keys and LCD display and remote controlled via Ethernet or Internet (Web page)

# GFT7016 Optical Pulse Generator

## Input / Outputs interfaces



**Connector, switch and indicator are showing below.**

Front Panel	
TRIG IN	External trigger input: BNC connector
TRIG OUT	External trigger output: BNC connector
SO1	Optical output channel 1: SC/PC
SO2	Optical output channel 2: SC/PC
SO3	Optical output channel 3: SC/PC
SO4	Optical output channel 4: SC/PC
SE1	Electrical output channel 1: BNC connector
SE2	Electrical output channel 2: BNC connector
<ul style="list-style-type: none"> <li>Indicators</li> </ul>	
PWR	Light when Power supply is ON
TRIG	Flick at same rate of the trigger
F1	No connected
F2	No connected
<ul style="list-style-type: none"> <li>Keyboard to local control</li> <li>Display to local control</li> </ul>	
Rear Panel	
LAN	Ethernet connection: RJ45 connector
CLK IN	External time reference input: BNC connector
PLUG	AC power plug (90 – 240V)
I/O	Power ON/OFF switch
OPT	Optical input option : SC/PC connector

## Ordering information

Model	Description
GFT7016	Base version: 4 optical outputs with 1550 nm wavelength and 2 electrical outputs
GFT7016-01	With Option 1: Optical Outputs at 1310 nm Wavelength
GFT7016-02	With Option 2: Other external time reference up to 80 MHz
GFT7016-03	With Option 3: Extension to 4 electrical Outputs
GFT7016-03	With Option 4: Optical input for timing system mode

**Ordering example:** GFT7016-01-03 (GFT6016 with option 1: Optical Outputs at 1310 nm Wavelength and with option 3: Extension to 4 electrical Outputs)