GFT2002
Time Interval Meter

GREENFIELD TECHNOLOGY

FEATURES

- Two Channels (Start, Stop)
- 1ps one-shot time resolution
- < 5ps rms time interval jitter
- ± 1 second time interval range
- 19'', 1U rack
- Ethernet interface

APPLICATIONS

- Components Test
- Jitter Analyzer for Telecom
- Lab / R&D characterizations
- Measure jitter and skew
- Real Time, Time stamping
- Variation in Pulse Timing

DESCRIPTION

The GFT2002 is very precise time interval analyzer with low jitter. It has two inputs: one Start and one Stop. Reading data represent the time interval between one start and one stop.

Trigger level and slope are adjustable on each input. The module uses a linear interpolation technique and an internal calibration to obtain very high accuracy.

The module uses an internal 10MHz very stable oscillator or an external 10 MHz source.

All parameters may be local controlled over front panel keys and LCD display and remote controlled over Ethernet and Internet (Internal web server) interface (10 / 100Mb/s).

The user can open a web page to control the device via Internet explorer, Mozilla Firefox or Chrome.

GFT2002 control panel web page

CONTROL PANEL WEB PAGE

This web page, from embedded Web server, provides a simple method to:
- Configure settings for each channel (START, STOP)
- Read results
- Control operation and status of the instrument.

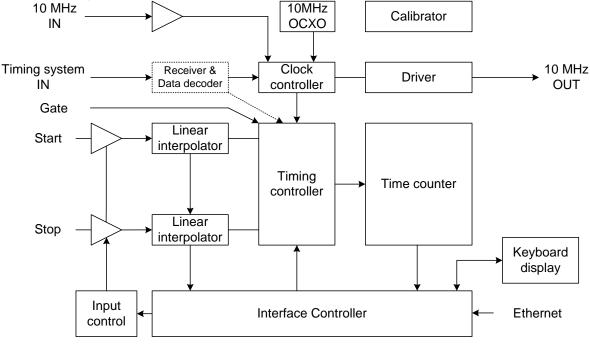The configuration information of the instrument is stored in the GFT2002.

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SPECIFICATIONS

Inputs start or stop		
	Threshold	-5 to + 5V
	Slope	Rising or falling edge
Input gate		
	Threshold	+1.5V (fixed)
	Coupling	DC – 50Ω
Time interval		
	Range	- 1 to +1 second
	Trigger rate	0 to 20kHz
	Resolution	< 1ps, single shot
	Error	< 250ps + time interval x 10^{-9}
	RMS jitter	5ps typically
	Arming mode	On start, on stop, on gate
Event counting		
	Range	0 to 10 000 000
	Count rate	0 to 10MHz
	Gate	Internal with 1 s duration or duration of input gate
System		
	Calibration	Internal
	Functions	Time interval, event counting
Output 10 MHz		
	Signal	Square wave, 2.5Vpp, AC coupling
Input 10 MHz		
	Signal	1V nominal (automatic detection)
	Coupling	AC - 50Ω
Clock		
	Time base	10MHz ovenized
	Stability	+/- 0.005ppm
	Accuracy	10^{-9}
General		
	General interface	Local front panel, remote via Ethernet
	Size	19'', 1U, 30cm
	Connector	BNC
	Power Supply	< 40 W / 90 – 240 V /50 – 60Hz
Software		
	interface	Free driver for windows 7 / 8
	Web page	Internet explorer, Chrome, Firefox
Option		
	Option 1	Optical input compliant to GFT3001 for timing system

GFT2002 Time Interval Meter

FUNCTIONAL OVERVIEW

Block diagram

The time interval meter includes receiver with signal conditioning, a clock reference, a high resolution time system and an interface controller.

Block diagram

Receiver (Start / Stop)

Each channel receiver consists of a threshold programmable fast comparator and a switch used to select the active slope.

Time system

Interval mode: The time interval result is obtained by processing the two following information

- Coarse information provides by a wide range (32-bit) and high count rate (155 MHz) time counter
- Fine information coming from a linear interpolator that analyses a ramp signal started by the event on Start (or Stop) input.

The GFT6002 uses an internal calibration function to obtain very high accuracy.

A gate input can be used to enable all Start or Stop events as desired.

Event mode: In this mode the GFT2002 counts events at Start and a Stop inputs. Event counting can be internally gated or externally gated through the duration of input gate.

Clocks

The GFT2002 provides an internal low jitter clock locked on a 10 MHz internal reference.
It provides also 3 connections

- 10 MHz input: for 10MHz external reference
- 10 MHz output: Clock reference output for clocking external equipment
- OPT: 155 MHz external clock reference from Timing System (option)

Interface

- The Ethernet interface is intended for stand-alone operation.
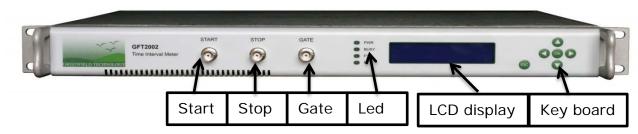- The front panel Key board and LCD display allow local control.

Option

The GFT2002 can be connected to the Greenfield Technology Timing system.
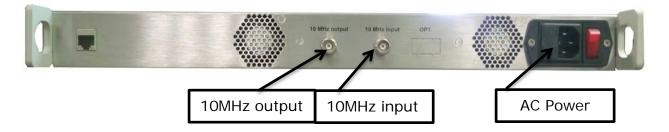In this mode the clock and the Start is from the GFT3001 (Master Oscillator Transmitter) via optical network.

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ENCLOSURE

Front panel

| Start | Stop | Gate | Led | | LCD display | Key board |

Rear panel

| 10MHz output | 10MHz input | | AC Power |

CONNECTOR, SWITCH, INDICATORS

Front panel	
START	Start pulse input: BNC connector
STOP	Stop pulse input: BNC connector
GATE	External Gate input: BNC connector
PWR	Indicator: Power On
BUSY	Indicator: Measurement running
F1	Indicator: Mode timing system On
F2	Indicator: N.A

Rear panel	
	LAN connection: RJ45 connector
10 MHz Output	External 10MHz reference input: BNC connector
10 MHz Input	10 MHz reference output: BNC connector
OPT	Timing System input: SC/PC connector
Plug	AC power plug (90-240V)
Red switch	Power On/Off switch

ORDERING INFORMATION

Model	Description
GFT2002	Time Interval Meter base version
GFT2002-OPT	Option: Adds Optical input for timing system mode