



User's manual

GFT1004

4 to 10 CHANNELS DIGITAL DELAY GENERATOR



- 4 to 10 independent delay channels,
- 1 ps delay resolution,
- < 15 ps RMS jitter (optical mode),
- 10 seconds delay range,
- Adjustable output level and width.

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EDITION

Write by : MONNIER-BOURDIN Technical manager		Date & Visa : Massy, le
Ed.	Date	Description
1 to 5	26/08/2004	Creation
7-13	12/10/2018	Performance, functions & interfaces upgrade

REFERENCE DOCUMENTS

	Documents	Reference
DR 1		
DR 2		
DR 3		
DR 4		

1. GENERAL INFORMATION

1.1. Description

The GFT1004 Digital Delay Generator provides four to ten independent delayed outputs pulses.

Delays up to 10 seconds may be programmed with 1ps resolution and channel to channel jitter less than 15 ps RMS in optical mode.

BNC outputs deliver adjustable level (2.5 to 10 V) into 50 Ω .

One input channel is used to trigger off all output channels.

A trigger out signal (T0) is provided as a reference for the delayed outputs in different operation mode.

GFT1004 parameters may be local controlled over the front panel keys and LCD display and remote controlled via an Ethernet interface (10/100Mb/s) or Internet (Web page).

Instrument Options

Option 1	Extension to 8 channels
Option 2	Optical input for timing system In timing system mode, 256 instruments could be triggered by a GFT3001 Master Clock transmitter via optical network
Option 3	Clock output
Option 4	32 V channel (Width = 1 μ s, rise/fall time = 2/10 ns under 50 Ω)
Option 5	Extension to 10 channels
Option 6	5 V to 20 V channel (Width = 0.1 to 10 μ s, rise/fall time < 5 ns under 50 Ω)
Option 7	TTL channel (2.5 to 6V, positive or negative going pulse, Width = 100 ns to 10 s under 50 Ω)
Option 8	Optical output channel (850 nm – ST connector – 0.5 to 1 mW – Width = 0.1 to 10 μ s)
Option 9	100 ps resolution
Additional options	Trigger source saved after shut down, Immediate modification of output pulse without validation, other specific options available upon request.

Package contents:

The box you receive should contain the following:

- GFT1004
- Power cable
- CD containing user's manual and Labview drivers/DLL

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www.greenfieldtechnology.com

1.2. Installation

1.2.1. Power source

The GFT1004 can be operated from 90 VAC to 240 VAC, 50 Hz to 60 Hz nominal supply source.

The maximum power consumption of the GFT1004 is 65 W.

1.2.2. Power cord

The GFT1004 comes with a removable power cord for European or US usage. It has a three contact plug for connection to both the power source and protective ground.

1.3. Operating temperature

The GFT1004 can be operated where the ambient air temperature is 0°C to 35°C and can be stored in ambient temperature from - 10°C to + 60°C. The GFT1004 is cooled by air circulation. To prevent instrument damage, a clearance of 2 inches on the side and 1 inch on the rear must be maintained for proper cooling.

1.4. Rack mounting information

The GFT1004 is supplied in a 19 inch rack mounting format, 1Unit.

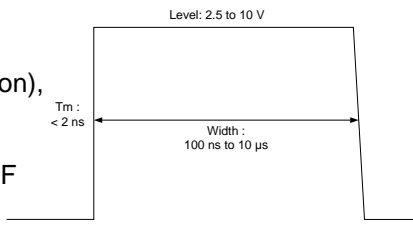
1.5. Self-test

The model, firmware version, serial numbers of the equipment and self-test will be displayed during a certain period after the mains power is applied, depending on the ambient temperature. The self-test should not exceed 1 minute.

1.6. Optimal performance

To ensure optimal performance, it is recommended to wait 1 hour after the equipment's switching on.

2. SPECIFICATIONS

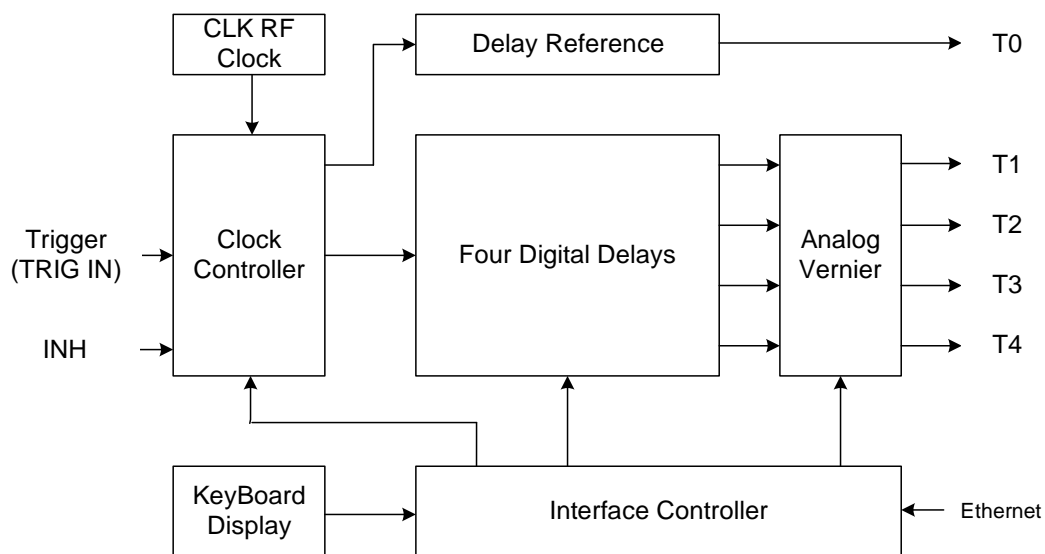
Delays	
Channels	4 to 10 independent delay channels
Range	0 to 10 seconds
Resolution	1 ps
RMS Jitter	$< 15 \text{ ps RMS}$ (Optical trigger, T0 to any channel) $< 25 \text{ ps RMS}$ (Internal trigger, T0 to any channel) $< 50 \text{ ps} + \text{delay} \times 10^{-7} \text{ RMS}$ (External trigger to any channel) $< 1 \text{ ns RMS}$ (Mix internal / external trigger)
Accuracy	$< 250 \text{ ps} + \text{delay} \times 10^{-7}$
Trigger delay	$< 100 \text{ ns}$ (insertion delay)
Internal time base	
Frequency	CLK RF
Stability	10^{-8}
Trigger	
Internal trigger	Repetition rate of 1 Hz to 100 kHz with a 1 Hz resolution
External trigger	Repetition rate up to 50 kHz Trigger level $\sim 1.5 \text{ V} / 50 \Omega$ Positive pulse BNC connector
Option	Timing system
Outputs	
Trigger Out (T0)	Positive-going pulse into 50Ω (both positive and negative-going pulse for TTL version), Amplitude 2.5 to 10 V (2.5 to 6 V in TTL version), resolution: 10 mV, Rise time : $< 2 \text{ ns}$ ($< 3 \text{ ns}$ for TTL version), Width: 100 ns to 10 ms (1s for TTL version), resolution: CLK RF BNC connector,
Delayed output (T1 to T10)	Positive-going pulse into 50Ω (both positive and negative-going pulse for TTL version), Amplitude 2.5 to 10 V (2.5 to 6 V in TTL version), resolution: 10 mV, Rise time : $< 2 \text{ ns}$ ($< 3 \text{ ns}$ for TTL version), Fall time: $< 5 \text{ ns}$, Width: 100 ns to 10 ms (1s for TTL version), resolution: CLK RF BNC connector, 
CLK RF / 2 clock output (option)	Frequency: CLK RF / 2, $> 1 \text{ V} / 50 \Omega$, BNC connector,

INH input	
Active	High
Threshold	> +1.5V
Repetition rate	> 1 kHz
Interface	
Front panel, Ethernet 10/100 Mb/s (direct command or web page interface)	
General	
Power Required	90 – 240 V / 50 – 60 Hz / 0.75 A
Weight	Net: < 10 kg
Dimensions	19", 1 U, 300 mm without handles

3. OPERATING INFORMATION

3.1. Principle – Block diagram

The principle of the programmable delay generator is described in the figure below:



When the external trigger source is selected a rising edge on a “TRIG IN” starts a delay sequence.

Trigger source may be chosen from input TRIG IN, manual trigger, internal trigger, soft trigger or optical trigger (in option).

Both internal trigger are synchronized with optical trigger.

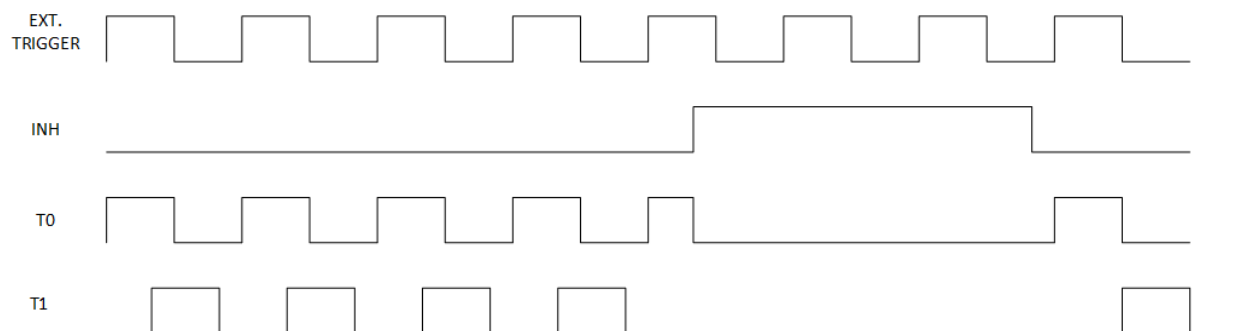
The sequence follows 3 phases:

- After on insertion delay a reference pulse appear at the “T0” output,
- Following the reference a pulse will appear on each channel after a specified delay,
- At the end of sequence, after last delayed pulse outputs, the delay generators are initiate.

When a sequence is in progress the instrument will not respond to a trigger event.

Each delayed values output pulse (T1 to T10) can be independently adjustable in level and width. All values (delay, level, width) are saving when shut down the equipment, except the trigger source (option). After power on, all trigger sources are off (INH).

INH input inhibits all outputs T0 and T1 to T4 when INH input level is higher than +1.5V. When INH input comes back to low level (0V), all outputs come back to their initial state (triggered if set on an active trigger).



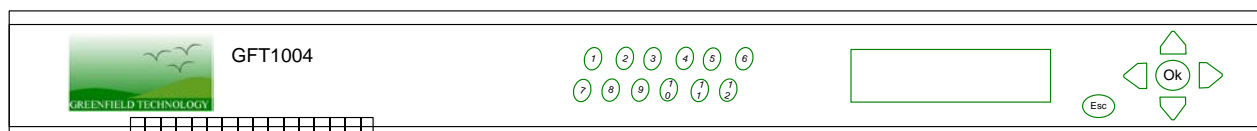
3.2. Local command and parameter

The following table described the trigger sources, amplitude and width for both reference output T0 and delayed output T1 to T10:

		GFT1004
		T0 à T10
TRIGGER SOURCE	Option 2 (Timing System)	Inhibited (INH)
		Internal 1 (IN1)
		Internal 2 (IN2)
		External (EXT)
		Local Single Shot (LSS)
		Repetitive F1 (F1)
		Repetitive F2 (F2)
		Repetitive F3 (F3)
		Single Shot 1 (SS1)
		Single Shot 2 (SS2)
AMPLITUDE		2.5 V to 10 V in 10 mV steps
WIDTH		100 ns to 10 ms in CLK RF steps

3.3. Front panel operation summary

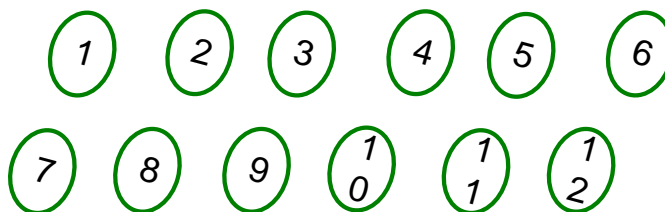
The GFT1004 front panel consists of a keyboard and a LCD display for the command/control in the local mode. The user, with the front panel, can program the various setting.



3.3.1. Leds

The 8 led displays information's:

1. GFTy synchronized by optical network (when OFF) (option 1),
2. TRIG1 : flick at the trigger frequency of channel 1,
3. TRIG2 : flick at the trigger frequency of channel 2,
4. TRIG3 : flick at the trigger frequency of channel 3,
5. TRIG4 : flick at the trigger frequency of channel 4,
6. TRIG9 : flick at the trigger frequency of channel 9,
7. ON /OFF,
8. TRIG5 : flick at the trigger frequency of channel 5,
9. TRIG6 : flick at the trigger frequency of channel 6,
10. TRIG7 : flick at the trigger frequency of channel 7,
11. TRIG8 : flick at the trigger frequency of channel 8,
12. TRIG10 : flick at the trigger frequency of channel 10.



3.3.2. LCD

The 2 x 20 character LCD is the user interface for all the front panel programming operations.

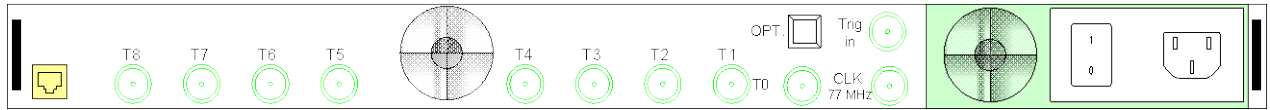
3.3.3. Keys

Six keys select the function:

- Up▲ and down▼ will allow to select display line. After “OK”, you can increment or decrement digit at the current location,
- Right► and left◄ will allow to move the cursor position,
- “OK” set “cursor mode”, or if you are already in cursor mode store the current value and clear cursor mode,
- “ESC” clear “cursor mode” without storing the current value.

3.4. Rear panel operation summary

All input or output connections of the GFT1004 are located on the rear panel.



3.4.1. Power switch

The unit is turned on by switching the mains POWER button. The GFT1004 can be operated from 90 to 240 V at a line frequency of 50 – 60 Hz.

3.4.2. Ethernet port

The RJ45 Ethernet rear panel connector allows computer's control of the GFT1004. The command syntax for Ethernet is the same as the GPIB.

3.4.3. Trigger input (TRIG IN)

BNC connector for application of the trigger input signal that generates the delay.

3.4.4. Trigger output (T0)

BNC connector for signal output. This is the output reference. This should be terminated in 50Ω.

3.4.5. Clock output (CLK OUT) (option 3) / 10 MHz clock input (CLK IN)

- The clock output (BNC connector) is the CLK RF reference divided by 2 (ex: 77.76 MHz for a 155.52MHz CLK RF reference). This should be terminated in 50 Ω.
- The clock input (BNC connector) is for a 10 MHz reference.

3.4.6. Optical input (OPT)

Type SC/PC connector for signal input. This is the specific optical pattern input for timing system.

3.4.7. Trigger output T1 to T4 / T5 to T8 (option 1) / T9, T10 (option 5)

BNC connectors for delayed signal outputs. This should be terminated in 50 Ω.

3.5. Display LCD menu without option 1 / 2 / 5

Menu 1 :

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2
S	E	L	F		T	E	S	T											

After Self-test :

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2

Menu 2 : Press ▲ (UP)

2	8	.	0		°	C													
I	N	T	E	R	N	A	L		C	L	O	C	K						

Menu 2 when inhibition input activated

2	8	.	0		°	C													
I	N	H	I	B	I	T	E	D											

Menu 3: Press ▲ (UP)

T	0		I	N	H		1	0	.	0	V				5	0	0	n	s

Press OK

T	0																		
T	r	i	g	g	e	r	:										I	N	H

Press OK

T	0																		
T	r	i	g	g	e	r	:										I	N	<u>H</u>

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	<u>1</u>

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	<u>2</u>

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										E	X	<u>I</u>

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:			L	o	c		S	i	n	g	I	<u>e</u>

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	H

Press OK if you want one TRIGGER.

Press ESC, if you want exit without changing the parameters.

Press OK,

Press ▲ (UP)

T	0																		
A	m	p	l	i	t	u	d	e	:				1	0	.	0	0		V

Press ▲ (UP)

T	0																		
W	i	d	t	h	:								5	0	0		n	s	

Press ▲ (UP)

R	E	T	U	R	N		T	O		M	A	I	N						
M	E	N	U																

Press OK

Menu 4 : Press ▲ (UP)

T	1		I	N	H		1	0	.	0	V				5	0	0	n	s
									2	9	6		3	5	0		p	s	

Press OK if you want to change a parameter (similar to T0).

Press ESC, if you want exit without changing the parameters.

Menu n : Press ▲ (UP)

T	4		I	N	H		7	.	0	V				5	0	0	n	s	
									5	4	5		5	4	5		p	s	

Menu n+1 : Press ▲ (UP)

F	R	E	Q	U	E	N	C	Y		1									
													1	1	0		H	z	

Menu n+2 : Press ▲ (UP)

F	R	E	Q	U	E	N	C	Y		2									
													1	0			H	z	

Menu n+3 : Press ▲ (UP)

T	r	i	g	g	e	r													
P	R	E	S	S		O	K												

Single shot with external trigger (EXT)

Menu n+4 : Press ▲ (UP)

-	-	-						1	2	3	4								
S	T	A	T	U	S			*	*	_	_								

T1, T2 : TRIGGER ON

Clear the status: press OK

Menu 1: Press ▲ (UP)

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2

3.6. Display LCD menu with option 1 / 2 / 5

Menu 1 :

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2
S	E	L	F		T	E	S	T											

After Self-Test :

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2

Menu 2 : Press ▲ (UP)

2	8	.	0		°	C					-	2	2	.	6		d	B	m
S	Y	N	C		O	K													

Menu 2 when inhibition input activated

2	8	.	0		°	C					-	2	2	.	6		d	B	m
I	N	H	I	B	I	T	E	D											

Menu 3: Press ▲ (UP)

T	0		I	N	H			6	.	0	V				4	0	0	n	s

Press OK

T	0																		
T	r	i	g	g	e	r	:										I	N	H

Press OK

T	0																		
T	r	i	g	g	e	r	:										I	N	H

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	1

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	2

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										E	X	T

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:			L	o	c		S	i	n	g	l	e

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:							R	e	p		F	1

Press ▲ (UP)

T	0																		
T	r	i	a	a	e	r	:							R	e	p		F	2

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:							R	e	p		F	3

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:					S	i	n	g	l	e		1

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:					S	i	n	g	l	e		2

Press ▲ (UP)

T	0																		
T	r	i	g	g	e	r	:										I	N	H

Press OK if you want to select one trigger.

Press ESC, if you want exit without changing the parameters.

Press OK and press ▲ (UP)

T	0																		
A	m	p	l	i	t	u	d	e	:				1	0	.	0	0		V

Press ▲ (UP)

T	0																	
W	i	d	t	h	:								1	0	0		n	s

Press ▲ (UP)

R	E	T	U	R	N		T	O		M	A	I	N					
M	E	N	U															

Press OK

Menu 4 : Press ▲ (UP)

T	1		I	N	H			6	.	0	V				4	0	0	n	s
														3	5	0		p	s

Press OK if you want to change a parameter (similar to T0).

Press ESC, if you want exit without changing the parameters.

Menu n : Press ▲ (UP)

T	A		I	N	H			6	.	0	V				4	0	0	n	s
										5	4	5		5	4	5		p	s

Menu n+1 : Press ▲ (UP)

F	R	E	Q	U	E	N	C	Y		1									
														1	1	0		H	z

Menu n+2 : Press ▲ (UP)

F	R	E	Q	U	E	N	C	Y		2									
															1	0		H	z

Menu n+3 : Press ▲ (UP)

G	R	O	U	P															
																0	0	0	1

Menu n+4 : Press ▲ (UP)

T	r	i	g	g	e	r													
P	R	E	S	S		O	K												

Single shot with external trigger (EXT)

Menu n+5 : Press ▲ (UP)

-	-	-					1	2	3	4	5	6	7	8	9	A			
S	T	A	T	U	S		*	_	_	_	_	_	*	*	_	_			

T1, T7, T8 : TRIGGER ON

Clear the status : press OK

Menu 1 : Press ▲ (UP)

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2

3.7. Display LCD – IP address

G	F	T	1	0	0	4		s	n	1	0	1		v	1	.	5	.	2

Press OK then OK again

I	P		A	D	R	E	S	S											
					0	9	9	.	0	0	0	.	0	0	0	.	0	1	8

Press ▲ (UP)

N	E	T		M	A	S	K												
					2	5	5	.	0	0	0	.	0	0	0	.	0	0	0

Press ▲ (UP)

G	A	T	E	W	A	Y		A	D	R	E	S	S						
					0	9	9	.	0	0	0	.	0	0	0	.	0	0	1

Press ▲ (UP)

U	S	E		D	H	C	P												
																		N	O

Press ▲ (UP)

S	y	n	c		W	o	r	d									0	0	3	5

Press ▲ (UP)

M	i	n	i	m	u	m		D	e	l	a	y							
											7	2		2	6	6		p	s

Press ▲ (UP)

L	A	N	G	U	A	G	E												
													E	N	G	L	I	S	H

Press ▲ (UP)

R	E	T	U	R	N		T	O		M	A	I	N						
M	E	N	U																

Press ▲ (UP) to go IP menu

Press OK to go GFT1004 menu

3.8. Default value

The default values are the following:

- IP ADDRESS : 99.0.0.18,
- GATEWAY ADDRESS : 99.0.0.01,
- NET MASK : 255.0.0.0,
- Frequency 1 & 2 : 1000 Hz,
- Synchro Word : 0035,
- Level: 5.00 V,
- Width: 500 ns.

3.9. Operating example

3.9.1. Initial setup

Turn on the GFT1004 (switch on rear panel).

After 5 seconds the following set are displayed :

G	F	T	1	0	0	4		s	n	1	0	1		v	3	.	0	.	3
S	E	L	F		T	E	S	T											

The green led lights on and if not connected to the optical network the red led is turned on.

3.9.2. Generate a delayed pulse on channel 1

Repetitive frequency of the pulse is 1000Hz, amplitude 6V and width 1μs.

Use keys to set up menu as following:

Press OK at the top menu of the channel	T1 INH Trigger: INH
Press OK	T1 Trigger: INH
▲ 1 time	T1 Trigger: IN1
Press OK	T1 Trigger: IN1
▲ 2 times	T1 Amplitude: 5.00 V
Press OK	T1 Amplitude: 5.00 V
► 2 times	T1 Amplitude: 5.00 V
▲ 1 time	T1 Amplitude: 6.00 V
Press OK	T1 Amplitude: 6.00 V
▲ 1 time	T1 Width: 500 ns
Press OK	T1 Width: 500 ns
► 3 times	T1 Width: 500 ns
▲ 1 time	T1 Width: 1200 ns
► 1 time	T1 Width: 1200 ns
▼ 2 times	T1 Width: 1000 ns
Press OK	T1 Width: 1000 ns

After the 2nd OK only the yellow led on the right of first line lights (T1).

With an oscilloscope you can check the channel T1.

Measurement should be:

Rectangular shape with repetitive frequency =1000 Hz, Amplitude= 6.0V, Width = 1.0 μs.

4. CONNECTING TO THE INSTRUMENT VIA ETHERNET

4.1. Generality

For connecting over the LAN, you would do have the following:

- Connect the instrument to the LAN physically,
- On the user interface, either specify the LAN address,
- On the control PC, enter the instrument's IP address,
- After the connection has been established, the following commands can be used to modify the settings:
 - Set the instrument's IP address with: IP XXX.XXX.XXX.XXX
 - Query the instrument's IP address with: IP? ⇒ :IP XXX.XXX.XXX.XXX
 - Set the instrument's IP mask with: NM XXX.XXX.XXX.XXX
 - Query the instrument's IP mask with: NM? ⇒ :NM XXX.XXX.XXX.XXX
 - Set the instrument's IP passerelle: GW XXX.XXX.XXX.XXX
 - Query the instrument's IP passerelle with: GW? ⇒ :GW XXX.XXX.XXX.XXX

When using TCP/IP command remote control all commands and responses are terminated with a CRLF. There are 3 ports active used for TCP/IP communication:

- 4000: general communication port (to send commands or queries).
- 4001: try to connect this port will reinitialize connection. Can be used when connection is lost.
- 4002: reset the microcontroller. Can be used if connection is lost and impossible to restart.
Caution, in that case, laser and T0 will be stopped.

4.2. Command structure

Each command description has at least some of the following items:

- Full command syntax,
- Form Set / Query,
- Brief description,
- Parameters,
- RST value,
- Specified limits.
- Example.

4.2.1. *IDN?

Syntax:	*IDN?
Form:	Query
Description:	Queries instrument identification. Response gives instrument model, serial number and firmware version.
Parameter:	-
RST value	-
Example:	GFTy/MIPSI,GFT1004,SN101/000000,V1.0 Instrument model: GFT1004 Serial number: 101, Firmware version: 1.1

4.2.2. DELAY

Syntax:	DELAY Tn,<D> DELAY? Tn
Form:	Set & Query
Description:	Delay time of channel Tn is set to <D> picosecond relative to T0 channel
Parameter:	Tn: channel number 1 to 10 <D> : picosecond delay
RST value	-
Specified limit	0 to 9 999 999 999 999 picoseconds
Example:	Set : program 1 ns to channel 2 : DELAY T2,1000 Query: DELAY? T2 => :DELAY T2,1000

4.2.3. TRIG

Syntax:	TRIG Tn,<T> TRIG? Tn
Form:	Set & Query
Description:	Set channel Tn trigger mode to internal 1 or 2, external, manual single shot, Repetitive F1, Repetitive F2, Repetitive F3, Single shot 1, Single shot 2 or off.
Parameter:	Tn : channel number 0 to 10 <T>: trigger mode : IN1, IN2, EXT, LSS, F1, F2, F3, SS1, SS2, INH
RST value	INH
Example:	Internal mode 1 to channel 2 : TRIG T2,IN1 Query mode to channel 2 : TRIG? T2 => :TRIG T2,IN1

4.2.4. VOLTAGE LEVEL

Syntax:	AMPL Tn,<V> AMPL? Tn
Form:	Set & Query
Description:	Set channel Tn to voltage level <V>
Parameter:	Tn : channel number 0 to 10 <V> : voltage level in mV
RST value	-
Specified limit	2500 to 10 000 mV
Example:	2.5 V to channel 4 : AMPL T4,2500 Query mode to channel 4: AMPL? T4 => :TRIG T4,2500

4.2.5. WIDTH

Syntax:	WIDTH Tn,<W> WIDTH? Tn
Form:	Set & Query
Description:	Set channel Tn at specified <W> width
Parameter:	Tn: channel number 0 to 10 <W> : width in ns
RST value	-
Specified limit	100 to 10 000 000 ns
Example:	250 ns to channel 4 : WIDTH T4,250 Query mode to channel 4 : WIDTH? T4 => :WIDTH T4,2500

4.2.6. POLARITY (TTL version)

Syntax:	TTL Tn,<P> TTL? Tn
Form:	Set & Query
Description:	Set channel Tn at specified <P> polarity (positive or negative)
Parameter:	Tn : channel number 0 to 10 <P> : polarity : POS, NEG
RST value	POS
Example:	Negative-going pulses on channel 3 : TTL T3,NEG TTL? T3 => :TTL T3,NEG

4.2.7. GROUP

Syntax:	GROUP <N> GROUP?
Form:	Set & Query
Description:	Set the group for DEC1 / DEC3
Parameter:	<N> : group in hexadecimal
RST value	-
Specified limit	1 to FFFF
Example:	GROUP 1 GROUP? => :GROUP 1

4.2.8. FREQUENCY

Syntax:	FREQ Fn,<F> FREQ?
Form:	Set & Query
Description:	Set the frequency in internal mode
Parameter:	Fn : F1 for IN1, F2 for IN2 <F> : frequency in Hz
RST value	-
Specified limit	10 to 100 000 Hz
Example:	Internal trigger 2 (IN2) at 10KHz: FREQ F2,10000 FREQ? F2 => :FREQ F2,10000

4.2.9. SYNCHRO WORD

Syntax:	SYNC <W> SYNC?
Form:	Set & Query
Description:	Set the synchro word
Parameter:	Set : <W>: Synchro word in decimal Query : <W>: Synchro word in hexadecimal
RST value	-
Specified limit	01 to FF in hexadecimal
Example:	SYNC 53 (decimal) SYNC? => :SYNC 35 (hexadecimal)

4.2.10. RUN

Syntax:	RUN
Form:	Set
Description:	Software trigger
Parameter:	-
RST value	OFF
Example:	RUN

4.2.11. STAT

Syntax: STAT CLEAR

STAT? <XXXX>

Form: Set & Query

Description: Equipment information

Parameter: <XXXX> :

TEMP: Temperature

POPT: Optical power

CLK: INTERNAL / EXTERNAL

POW : Level + 6 V, -6 V, +3.3 V, + 1.8 V and + 11 V

TRIG: trigger channel 1 to 10

RST value OFF

Example: STAT CLEAR : clear the information

STAT? TEMP => :STAT TRET,10.00

STAT? POPT=> :STAT POPT,-19,69

STAT? CLK => :STAT CLK,INTERNAL

STAT? POW => :STAT POW,6.00,-5.99,3.35,1.75,11.45

STAT? TRIG => :STAT TRIG,1,0,0,1 Channel 1 and 4 trig on mode internal, external or manual

4.2.12. IP address

Syntax: IP x.x.x.x
IP?

Form: Set & Query

Description: IP Address

Parameter: x.x.x.x : IP address

RST value Off

Example: IP 172.17.23.6
IP? => :IP 172.17.23.6

4.2.13. Net mask address

Syntax: NM x.x.x.x
NM?

Form: Set & Query

Description: Net mask Address

Parameter: x.x.x.x : NW address

RST value Off

Example: NW 255.255.0.0
NW? => :NW 255.255.0.0

4.2.14. GW address

Syntax:	GW x.x.x.x
	GW?
Form:	Set & Query
Description:	GW Address
Parameter:	x.x.x.x : GW address
RST value	Off
Example:	GW 172.17.23.6
	GW? => :GW 172.17.23.6

4.3. Remote control via internet

With Internet explorer or Firefox, you can open a web page to drive the GFT1004:

GFT1004

GREENFIELD TECHNOLOGY

Current configuration

Setup

Trigger

Status

Security

Trigger mode	Delay
T0 : -	
T1 : Inhibited	
T2 : Inhibited	
T3 : Inhibited	
T4 : Inhibited	
T5 : Inhibited	
T6 : Inhibited	
T7 : Inhibited	
T8 : Inhibited	
T9 : Inhibited	
T10 : Inhibited	

Trigger group : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 = 0x 0001

Trigger status : 1 2 3 4 5 6 7 8 9 10 Clear

power supply : ●

reception : ●

Faults synchronization : ●

inhibited : ●

pll oscillator : ●

gated oscillator lock : ●

GFT1004

GREENFIELD TECHNOLOGY

Current configuration

Setup

Trigger

Status

Security

Trigger mode	Delay	Amplitude	Polarity	Width
T0 : Inhibited		0 mV	Negative	0 ns
T1 : Inhibited	T1 : 0 ps	5000 mV	Negative	100 ns
T2 : Inhibited	T2 : 0 ps	5000 mV	Negative	100 ns
T3 : Inhibited	T3 : 0 ps	5000 mV	Negative	100 ns
T4 : Inhibited	T4 : 0 ps	5000 mV	Negative	100 ns
T5 : Inhibited	T5 : 0 ps	5000 mV	Negative	100 ns
T6 : Inhibited	T6 : 0 ps	5000 mV	Negative	100 ns
T7 : Inhibited	T7 : 0 ps	5000 mV	Negative	100 ns
T8 : Inhibited	T8 : 0 ps	5000 mV	Negative	100 ns
T9 : Inhibited	T9 : 0 ps	5000 mV	Negative	100 ns
T10 : Inhibited	T10 : 0 ps	5000 mV	Negative	100 ns

Trigger group : 0x 0001

Frequency 1 : 1000 Hz

Frequency 2 : 500 Hz

Send Reset

5. SOFTWARE

The GFT1004 comes with DLL drivers for Windows 2000 / XP. Our primary objective in designing software drivers is to get the user up and running as quickly as possible.

Software drivers are provide as a Dynamic Link Library (DLL) which is compatible with most 32-bit windows based development software.

The main program is written on Labview v6.1 or later.

The listing of files is the following:

- GFT1004: main program,
- DLL or vi:
 - *.dll or *.vi : set the value,
 - *_val.dll or *_val.vi : query the value.

Delay

```
void Delay(LVRefNum *IDConnexionIN, uint8 Channel, floatExt DelayPs, TD1 *entrEDErreurPasDErreur,
LVRefNum *IDDeConnexionOUT, TD1 *errorOut)
```

Delay_val

```
void Delay_val(LVRefNum *IDConnexionIN, uint8 Channel, TD1 *entrEDErreurPasDErreur, LVRefNum
*IDDeConnexionOUT, uint8 *ChannelOut, floatExt *DelayPs, TD1 *errorOut)
```

Identifiant_val

```
void Identifiant_val(LVRefNum *IDConnexionIN, TD1 *entrEDErreurPasDErreur, LVRefNum
*IDDeConnexionOUT, LStrHandle *dataOut, TD1 *errorOut)
```

Softtrigger

```
void Softtrigger(LVRefNum *IDConnexionIN, TD1 *entrEDErreurPasDErreur, LVRefNum
*IDDeConnexionOUT, TD1 *errorOut)
```

Trigger

```
void Trigger(LVRefNum *IDConnexionIN, uint8 Channel, uint16 Trigger2, TD1 *entrEDErreurPasDErreur,
LVRefNum *IDDeConnexionOUT, TD1 *errorOut)
```

trigger_val

```
void Trigger_val(LVRefNum *IDConnexionIN, uint8 Channel, TD1 *entrEDErreurPasDErreur, LVRefNum
*IDDeConnexionOUT, uint8 *ChannelOut, uint16 *TriggerOut, TD1 *errorOut)
```

sta_val

```
void Sta_val(LVRefNum *IDConnexionIN, TD1 *entrEDErreurPasDErreur, LVRefNum
*IDDeConnexionOUT, TD2Hdl *Surveillance, TD1 *errorOut)
```