



GFT6042

14-bit High Speed Digitizer

FEATURES

- Up to 4 analog channels in only 1U space
- Up to 2GS/s sampling rate per channel
- 14 bits vertical resolution
- DC coupled with up to 1GHz bandwidth
- Programmable DC offset
- Internal and external clock reference
- Internal and external trigger
- Trigger output
- Time stamp for real time operations
- 2 GByte DRAM data memory
- Controlled via Ethernet
- Compact packaging: 19" W x 300 mm D x 1U H
- Option:
GPIO for communication to external equipment
AC coupled Analog Input (ask to factory)

APPLICATIONS

- RADAR , LIDAR
- LIDAR
- Wireless communication
- High speed data acquisition
- Test and measurement
- Ultrasonic ranging
- Short pulse capture
- Spectroscopy
- Test on high speed circuits
- Automatic Test Equipment
- Time of Flight



DESCRIPTION

The GFT6042 is a versatile 14-bit data acquisition system designed to meet the most challenging measurement situations. This compact digitizer can record 1 to 4 analog inputs at speeds of 0.5GS/s up to 2 GS/s per channel with 14 bits resolution.

This digitizer with selected number of channels 1, 2 or 4, a full flexible DC coupled analog front end meet the requirement of a large variety of detectors in the most advanced measurement situation.

The flexible DC coupled analog front end contains a variable gain (in option), variable bias control, over voltage protection and anti-aliasing noise suppression filter.

The GFT6042 is available in several sample rates from 0.5GS/s to 2GS/s per channel.

The digitizer is supplied with windows software application which includes a front panel graphical interface. This software application can be used to control and explore the capabilities of the high speed digitizer. The GFT6042 as a built in Web server that provide a remote control via a standard Web Browser.

The GFT6042 is a low profile 19", 1U rack instrument with Ethernet interface.

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Specifications

Parameter	Value							
General parameters								
Vertical resolution	14							
Data memory	2 Gbyte							
Sample rate/channel options								
	Options	2GS		1GS		0.5GS		
	Number of channels	2	1	4	2	4	2	
	Sampling rate per channel (GS/s)	2	2	1	1	0.5	0.5	
Analog inputs fixed gain								
	Input impedance (Ω)	50	50	50	50	50	50	
	Input Range Vp-p	1	1	0.5	0.5	0.5	0.5	
	Analog bandwidth -3dB (MHz)	1200	1200	700	700	250	250	
Analog inputs Variable Gain (option)								
Analog Bandwidth -3dB (MHz)	0.2, 0.5 Vpp	900	900	500	500	500	250	
	1, 2, 5 Vpp	700	700	400	400	250	250	
Variable DC-offset								
	Fixed gain	+/- 0.25V						
	Variable gain option	Full range of each range setting						
Clock reference								
Internal clock reference								
	Frequency	10 MHz						
	Accuracy	+/- 3 ppm, +/- 1/year ppm						
External clock reference input								
	Frequency (min-max)	10 MHz +/- 5 ppm						
	Signal level (min –max)	0.5 – 3.3 Vpp						
	Impedance AC	50 Ω						
	Impedance AC (high)	200 Ω (soft controlled)						
	Duty cycle	TBD						
Clock reference output								
	Frequency	Set by selected clock reference						
	Signal level	1.2 Vpp (into 50 Ω load)						
	Impedance AC/DC	50 Ω / 10 K Ω						
Trigger								
External trigger input								
	Trigger frequency	>1 MHz						
	Impedance DC	50 Ω						
	High impedance DC	>500 Ω (soft controlled)						
	Input range (min – max)	-0.5 to 3.3 V						
	Threshold	Programmable						
	Sensitivity	200 mV						
	Time resolution	125 ps						
	Excess jitter	25 ps (added inside the unit)						
Trigger output								
	PRF (max)	100 MHz						
	Signal level output low max	0.1 V						
	Signal level output high min	1.2 V (into 50 Ω load)						
	Impedance DC	50 Ω						
	GPIO data rate	TBD when used as GPIO						
	Connector	Shared with trigger input						

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Parameter	Value
Multi-unit Synchronization	
External sync input	
PRF (max)	>1 MHz
Signal level input high min	0.8 V
Signal level input low max	2 V
Impedance DC	50 Ω
High impedance DC	>500 Ω
GPIO data rate	100 MHz
Connector	BNC (Shared with Sync output)
Sync output	
PRF (max)	>1 MHz
Signal level output low max	0.1 V
Signal level output high min	1.2 V (into 50 Ω)
Impedance DC	50 Ω
GPIO data rate	100 MHz
Connector	BNC (Shared with Sync input)
GPIO	
Standard GPIO	
Trigger input/output	See trigger specification
Sync input/output	See trigger specification
GPIO option (included with the variable gain option)	
Number of GPIO signals	4
Signal level input high min	0.8 V
Signal level input low max	2 V
Input impedance	10 K Ω
Signal level output low max	0.1 V (no load)
Signal level output high min	3.1 V (no load)
Output impedance	90 Ω
Max data rate	100 Mbit/s per pin
GPIO power out	3.3 V / 100 mA
Connector	subD 9 ways
General specifications	
Power supply and Voltage requirements	50 W / 90 – 240 V/ 50 – 60 Hz
Physical size	19" W x 300 mm D x 1U H
Operating temperature range	0 to 40°C

Absolute maximum rating

Analog inputs:		
DC		-4 V / +4 V
VG option range 5Vp-p		+/- 5 V
VG option other range		+/- 4 V
AC		TBD
External trigger input (to GND)		-2.3 V , +5 V
External Clock reference (AC / DC)		5 Vpp / +/-5 V
Ambient temperature (operation)		0°C to 40°C

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Dynamic performance

@ 71 MHz -1dBFS input signal

Channels / Sample rate options						
Number of channels	2	1	4	2	4	2
Sampling rate per channel (GS/s)	2	2	1	1	0.5	0.5
Analog performance fixed gain						
ENOB (bits)	9.3	9.3	9.7	9.7	10	10
SNR (dB)	58	58	60	60	62	62
SFDR (dB)	75	75	75	75	75	75
Analog performance variable gain (option) 0.5, 1, 2, 5 Vp-p						
ENOB (bits)	9.3	9.3	9.7	9.7	10	10
SFRD (dB)	75	75	75	75	75	75
Analog performance variable gain (option) 0.2 Vp-p						
ENOB (bits)	-	-	9.1	9.1	9.4	9.4
SFRD (dB)	-	-	75	75	75	75

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Functional overview

Block diagram

The digitizer include an analog front-end with signal conditioning and A/D conversions and a digital back-end for data flow control, triggering and host communication, see figure 1.

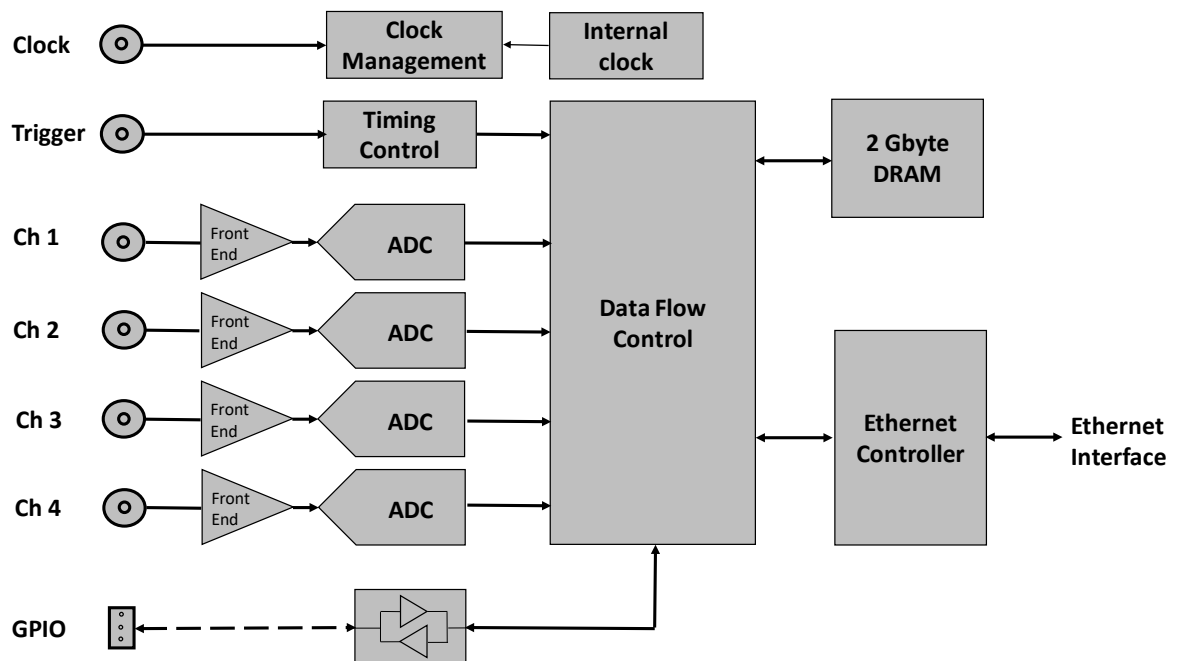


Figure 1: Block diagram 4-channel mode

Analog front end

The analog front end contains over-voltage protection, variable gain setting (option), variable DC bias and noise suppression filter. The gain is set in steps of 1-2-5 to get full scale signal range from 200 mV to 5 000 mV. The bias is set in 31 steps and the range is covering the selected gain setting.

The settings are user controlled via software.

When the GFT6042 is configured in a 0.5GS and 1GS sample rate, each ADC is connected to one analog input channel (see figure 1). In a 2GS sample rate configuration, two ADCs operate on the same analog input in an interleaved mode.

Data recording

Three methods for data recording to serve different use cases:

- Continuous Multi-record recording in on board DRAM for very long records.
- Triggered streaming for fast data transfer and long measurement time.
- Individual level trigger for multi-channel pulse capture

Signal processing

There is support for real time signal processing on the digitizer:

- Real time waveform averaging
- Level trigger for event detection
- Gain and offset calibration
- Custom real time signal processing can be implemented (For more information ask the factory)

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Trigger

There are several trigger modes for data recording:

- External for synchronization
- Level trigger for data driven acquisition
- Software for user's control
- Internal for automatic sequencing

There is also a trigger output for triggering external equipment. The trigger timing is controlled by pre-trigger buffer and trigger delay parameter settings.

Clock

There are several modes to clocking the digitizer:

- Internal clock for stand-alone operation
- External clock for synchronization

There is also a clock reference output for clocking external equipment.

GPIO (Option)

The GPIO (general purpose digital input output) is intended for connecting 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 tools

The GFT6042 is supplied with the Lab software that provides quick and easy control of the digitizer. Data can be saved in different file formats for off-line analysis. With lab software the GFT6042 operate as a desktop oscilloscope.

Data interface

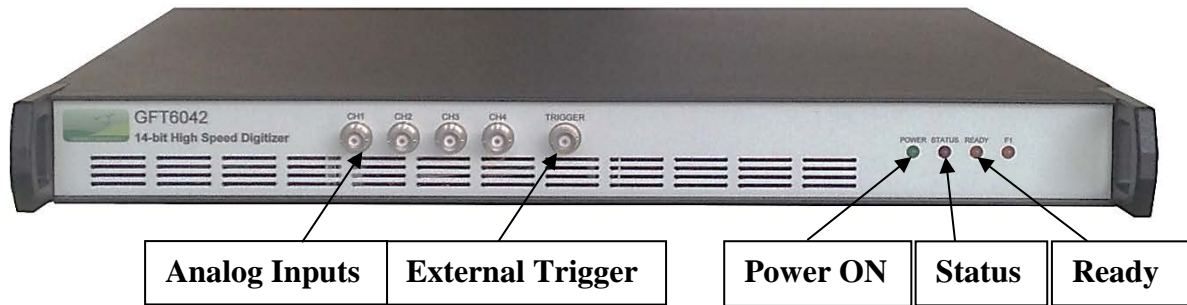
The Ethernet interface is intended for stand-alone operation and allows the GFT6042 to be integrated with sensor system. With Ethernet interface the digitizer is easily connected to any computer.

The GFT6042 has an embedded Web server. This allows all parameters to be controlled by any PC with browser. You will need only to enter the unit's IP address into the browser. The browser automatically will open a virtual control panel on PC.

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Front panel



Rear panel



Ordering information

Ordering information		Reference
14-bit High Speed Digitizer		GFT6042
Sampling rate option		
Sample rate per channel	Channel number	
2 GS/s	2	2GS-2C
2 GS/s	1	2GS-1C
1 GS/s	4	1GS-4C
1 GS/s	2	1GS-2C
0.5 GS/s	4	0.5GS-4C
0.5 GS/s	2	0.5GS-2C
Analog input variable gain option Full scale range 0.2, 0.5, 0.1, 0.2, 0.5 V _{pp}		VG
Option GPIO		
4 x GPIO		-GPIO
AC coupled Analog Input option (ask to factory)		AC

Ordering example: GFT6042-2GS-1C-GPIO