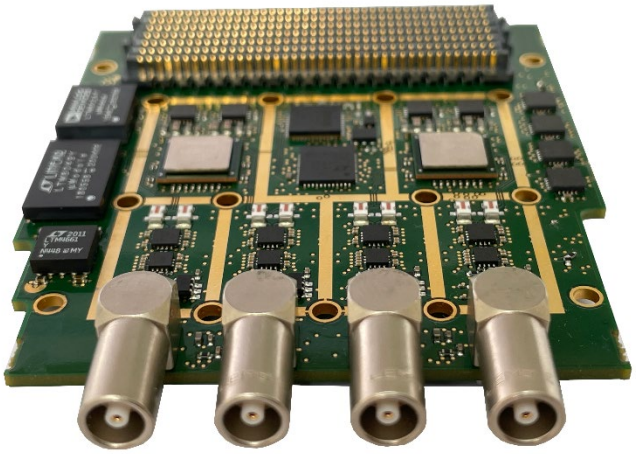
GFT6304 (preliminary)

FMC, Four Channel High Speed Digitizer

Features



- 4 analog channels
- 50 Ω input impedance
- Up to 3.2 GS/s sampling rate per channel
- 12 bits vertical resolution
- DC to 750 MHz analog bandwidth
- ± 100 mV to ± 2500 mV variable full scale range
- ± 50 % variable full scale offset range
- > 1 M samples per channel with GFT6204 carrier board
- FMC+ form factor
- Based on the latest generation of Texas Instrument ADC ref: ADC12DJ3200

Applications

- RADAR, LIDAR
- Diagnostics on Laser system and High-Energy physics
- High speed data acquisition
- Test and measurement equipment
- Ultrasonic ranging
- Short pulse capture
- Spectroscopy
- Test on high-speed circuits
- Automatic Test Equipment

Description

The GFT6304 FMC module is the ideal digitizer for characterizing high speed signal. This compact digitizer can record four analog inputs at speed of 3.2 GS/s with 12 bits resolution.

The four flexible DC coupled analog front end contains a variable gain, variable bias control, over voltage protection and anti-aliasing filter. The settings are controlled with SPI interface via FMC+ connector.

The on-board clock is implemented with low phase noise clock and can be external via the FMC+ connector.

The GFT6304 is a standard FMC+ module according to VITA 57-4 2018 standard.

In option for lower cost channel number can be reduced to 2 channels and sample rate can be reduced to 2.7 GS/s.

Typical application: For stand-alone High Speed Digitizer application Greenfield Technology supply a carrier board (Ref: GFT6204) that provides:

- External, channel and command trigger modes
- 1 Mega samples par channel data memory
- Lab software for quick and easy control of the digitizer.

Specifications

Parameter	Value
General parameters	
Vertical resolution	12 bits
Data output	16 JESD204 links at 8 Mbit
Data memory	> 1 MSamples per channel with GFT6204
Analog channels	
Number of channels	4
Sampling rate	3.2 GS/s
Signal range setting	± 100 mV to ± 2500 mV
Impedance DC	50 Ω
Analog bandwidth	DC to 750 MHz
Flatness (DC to 200 MHz)	2 dB
ENOB @ 500 MHz	≥ 8 bits
SNR @ 500 MHz	> 50 dB
Channel isolation	> 40 dB
Connector	LEMO
Offset	
Bias setting	± 50 % full scale
DC Vertical Offset Accuracy	< 1 % x offset
Clock reference	
Internal clock reference	
Frequency	160 MHz
Accuracy	± 5 ppm
External clock reference	
Frequency	10 to 200 MHz via FMC connector
Trigger input	
Trigger source	External, Channel, Software from carrier board
General specifications	
Power and Voltage	+1.8 VDC / 0.5 A +3.3 VDC / 4 A +12 VDC / 0.5 A
Physical size	FMC+ (69 x 84 mm)
FMC interface	VITA 57-4 2018
Operating temperature	20°C to 30°C
Options	
Option 1	Only 2 Channels at 3.2 GS/s (lower cost)
Option 2	Sampling rate at 2.7 GS/s (lower cost)
Absolute maximum rating	
Analog inputs	- 5 V / + 5 V, 160 mA @ DC
Operating temperature (ambient)	10°C to 40°C

Functional overview

Block diagram

The digitizer includes an analog front-end with signal conditioning and A/D conversions and an FMC+ connector, see figure 1.

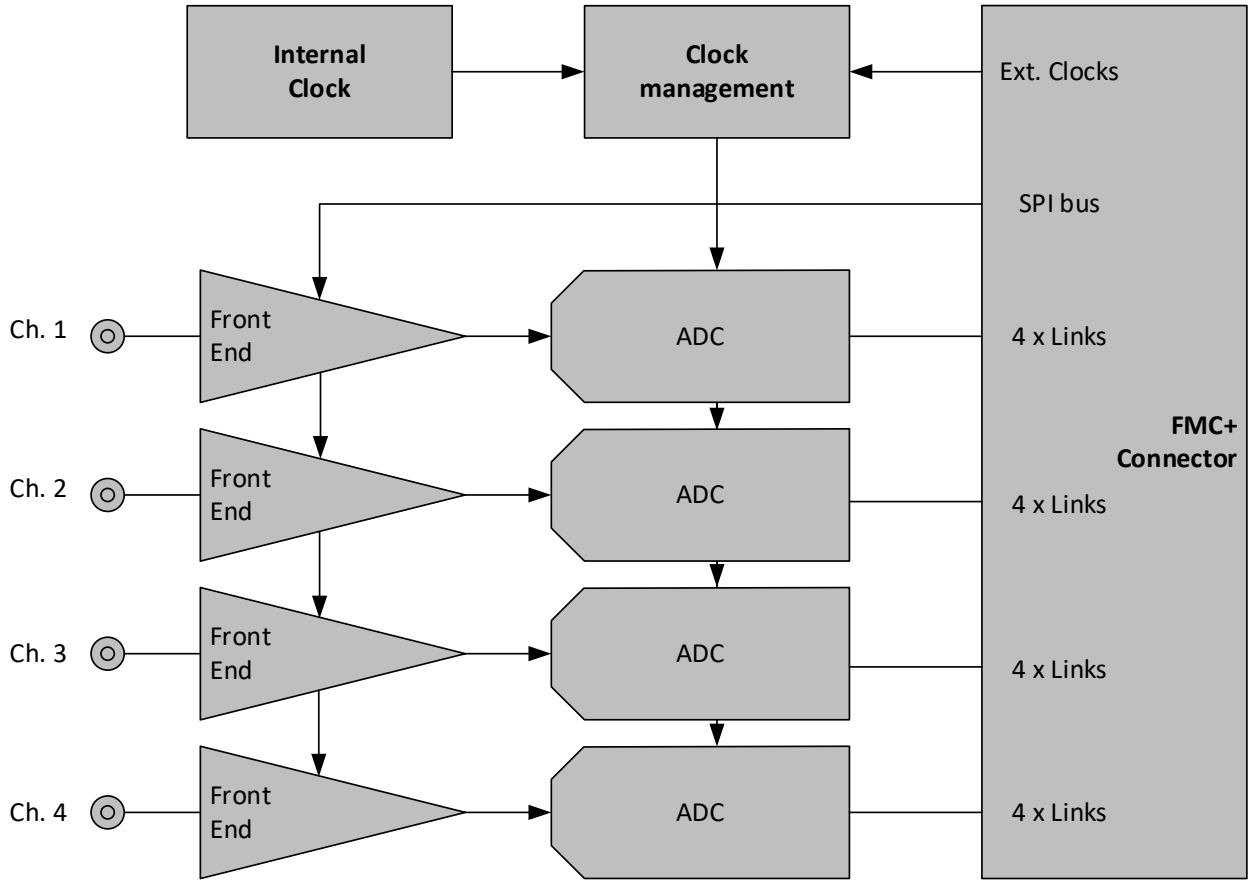


Figure 1: Block diagram 4-channel mode

Analog front end

The analog front end contains over-voltage protection, variable gain setting, variable DC bias and anti-aliasing filter. The settings are user controlled via SPI interface.

ADC

The ADCs are 12-bits resolution and 3.2 GS/s sampling rate.

Clock

There are 2 modes to clock the digitizer:

- Internal clock for standalone operation
- External clock for synchronization

FMC connector

This connector allows to connect the module to a carrier board according to VITA 57-4 2018 standard. This carrier board must provide power supply, external clock, SPI serial bus and accept 16 x JESD 204 links.

Software tools

The GFT6304 is plugged to GFT6204 board. The GFT6204 is supplied with the Lab software that provides quick and easy control of the digitizer. The tool offers both time-domain and frequency domain analysis. Data can be saved in different file formats for off-line analysis.

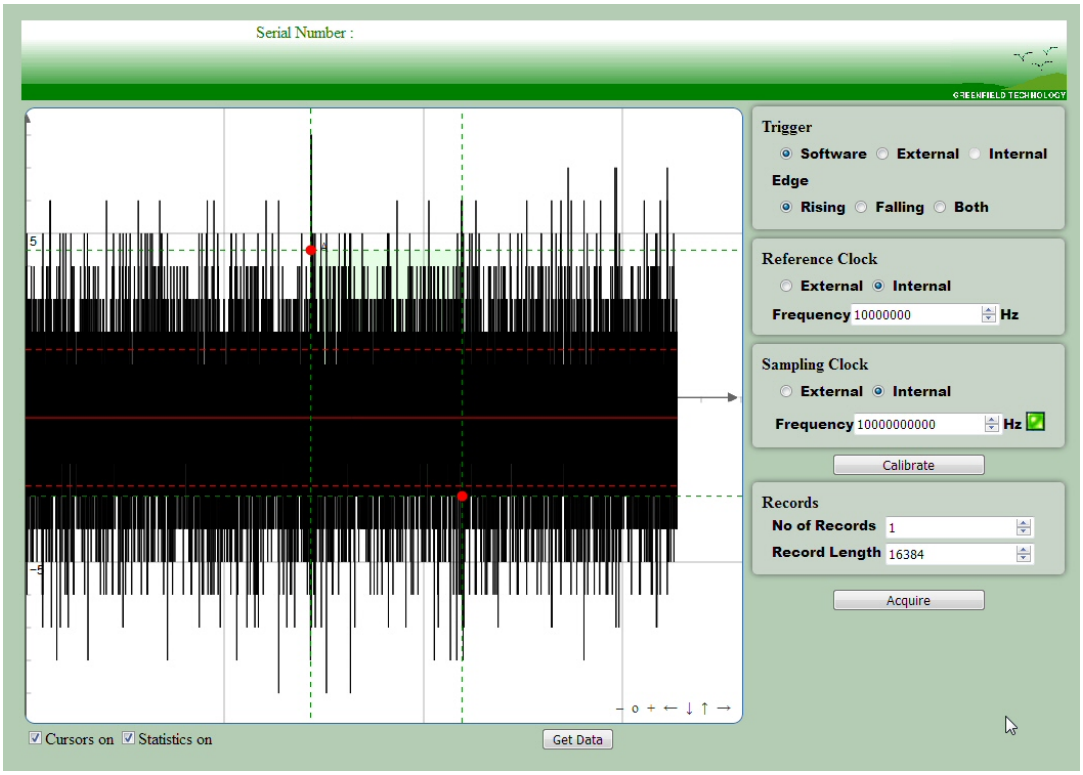
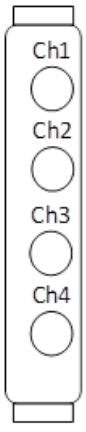


Figure 2: Example of software tools

Front panel connectors

Ch1	Channel 1 analog input: LEMO connector
Ch2	Channel 2 analog input: LEMO connector
Ch3	Channel 3 analog input: LEMO connector
Ch4	Channel 4 analog input: LEMO connector



Ordering information

Digitizer part number
GFT6304-X-X (Where "X" is option number)
Ordering example:
GFT6304-2-3.2 (GFT6304 with 2 Channels and sampling rate = 3.2 GS/s)