

Nutaq MI125

Up to 32 Channels, 125 MSPS A/D FMC
PRODUCT SHEET



QUEBEC

MONTREAL

NEW YORK

nutaq
.com

Nutaq MI125

- 16 channels FMC LPC or 32 channels FMC HPC
- 125 MSPS A/D, 14-bit width per channel
- Phase aligned channels and phase coherent sampling
- Supports external or on-board low jitter clock
- DC or AC coupled input option
- Lowest cost per channel in the industry
- Plug and play with Nutaq RD's μ TCA Perseus AMCs

The MI125 FPGA mezzanine card (FMC) is a 16/32 channels phased aligned A/D card design around the high-performance LTM9012 QUAD ADC from Linear Technology. The MI125 takes full advantage of the LTM9012 integrated low-noise amplifiers which are suitable for single-ended drive and pulse train signals such as required for imaging applications. Combined with multiple clocks and trigger modes, the MI125 is at its best in DSP applications such as medical/industrial imaging (PET/ultrasound systems), multichannel DAQ, nondestructive testing, radar beamformers, phased array antennas and multichannel pulse detectors (linear accelerators, synchrotron).

The MI125 complies with VITA 57.1, a widely used standard in the FPGA-based digital signal processing industry, making it easier for developers to integrate FPGAs into embedded system designs.

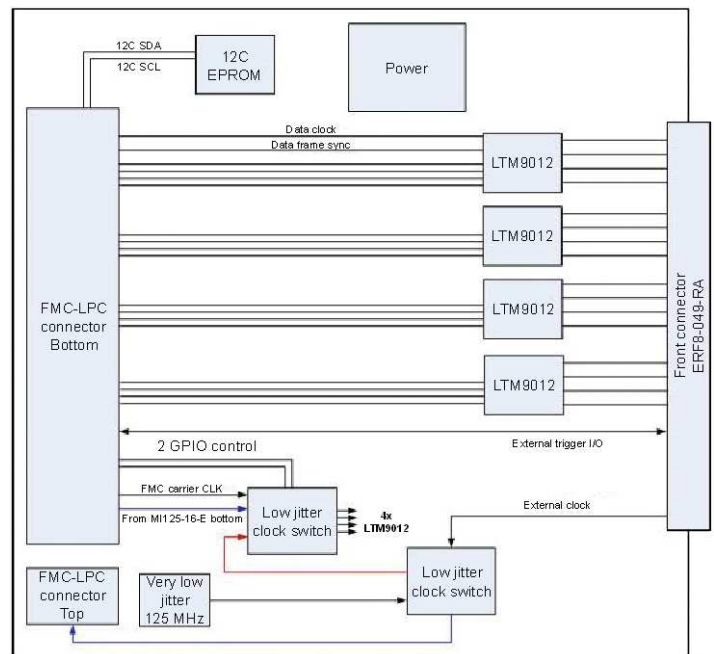
The MI125 is also completely integrated to the Nutaq μ TCA Perseus AMCs, but it can as easily be used on any other FMC carrier on the market. It is compatible with low-pin-count (16 channels) or high-pin-count (32 channels) FMC interfaces.

HARDWARE ARCHITECTURE

The VITA 57.1 standard comes to the rescue of complex designs with its unprecedented mechanical and electrical flexibility. It offers standard specifications for small, mezzanine modules designed to adapt an FPGA-based carrier card to different I/O requirements.

FEATURES

- Lowest cost per channel in the industry
- FMC LPC – 16 channels A/D, 125MSPS, 14 bits
- FMC HPC – 32 channels A/D, 125MSPS, 14 bits (Nutaq RD's double-stacked FMCs)
- DC or AC coupled inputs ordering options
- Equipped with an onboard, low-jitter onboard clock
- Supports external sampling clocks for phase-coherent multiboard/multichannel applications
- External trigger input for event-based acquisition
- Phased aligned analog input paths
- Phase-coherent sampling clock to all channels (16 LPC, 32 HPC)
- Complies with VITA 57.1



- Front panel, 16 channels, clock and trigger signals integrated within a unique robust connector Edge Rate Contact™ (ERF8-RA)
- Compatible with Nutaq RD's MO1000 FMC card, enabling multichannel inputs and outputs on the same FMC card; contact info@nutaq.com for more information.

APPLICATIONS

- Medical/Industrial imaging (PET and ultrasound systems)
- Multichannel DAQ systems
- Nondestructive testing
- RADAR/LIDAR beamformers
- Phased array antennas
- Scientist multichannel detectors (linear accelerators, synchrotron)

16 OR 32 CHANNELS CONFIGURATIONS

The MI125-16 (16 channels) is an LPC FMC that complies with all the electrical and mechanical specifications of VITA 57.1, making it possible to use on any FMC-LPC compliant carrier on the market. On Nutaq's Perseus AMC, it fits in a mid-size μ TCA slot. For the 32 channel option,

a MI125-16 and MI125-16-E—a MI125 HPC with an LPC on top—are stacked to become the MI125-32 (32 channels). The MI125-32 complies with all the electrical specifications of VITA 57.1, but the height of the module exceeds the mechanical specifications. An additional 10 mm in height must therefore be allotted when using the MI125-32 on an FMC HPC carrier other than Nutaq's Perseus AMC. On the Perseus, it fits in a full-size μ TCA slot.

Note: All 32 channels of the MI125-32 can be clocked with the same phased synchronous selected user clock (external/onboard from the bottom stacked board). A special PCB design allows phased synchronous sampling over the all 32 channels.

PERFORMANCES

DC-coupled option

- Analog input bandwidth (–3 dB): 80 MHz
- Conditions: $F_s = 125$ MSPS, F_{in} (MHz) = 1 30 50
 - Full-scale input (dBm): 10 (50 ohms)
 - SNR (dB): 66.2
 - SFDR (dBc): 74.9
 - Noise floor (dBFS): -110
 - THD (dBc): 82.8

AC coupled option

- Analog input bandwidth (–3 dB): 80 MHz
- Conditions: $F_s = 125$ MSPS, F_{in} (MHz) = 1 30 50
 - Full-scale input (dBm): 10 (50 ohms)
 - SNR (dB): 66.7 65 64.8
 - SFDR (dBc): 70.8 72 75.3
 - Noise floor (dBFS): -112 -112 -111
 - THD (dBc): 69.1 83.1 79.3

Differential coupled option

- Contact info@nutaq.com

SPECIFICATIONS

General

- A/Ds: 125 MSPS, 14 bits
- Number of channels: LPC: 16, HPC: 32

Sampling clock

- Onboard crystal 125 MHz, 2 fsec RMS jitter
- External sampling CLK input

FMC connectivity

MI125

Low-pin-count connector

- LA (00–33), CLK0 (required), CLK1 (optional): M2C clocks

MI125-E

Low-pin-count connector

- LA (00–33)

High-pin-count connector

- LA (00–34), HA (00–23), HB (00–11)

MI125-32

High-pin-count connector

- LA (00–34), HA (00–23), HB (00–11)

Front panel

MI125-16 / MI125-16-E

- 1x ERF8-RA Samtec Edge Rate Contact™
- 16x A/D channels
- 1x trigger input/output
- 1x sampling CLK input

MI125-32

- 2x ERF8-RA Samtec Edge Rate Contact™
- 32x A/D channels
- 2x trigger input/output
- 2x sampling CLK input

Mechanical

Rugged FMC form factor — designed for conduction cooling, but not tested or implemented. Contact info@nutaq.com for details.

MI125-16

- Dimensions (W×H×D): 69 mm × 10 mm × 86 mm, 60 g

MI125-16-E

- Dimensions (W×H×D): 69 mm × 15.4 mm × 86 mm, 62.7 g

MI125-32

- Dimensions (W×H×D): 69 mm × 20 mm × 86 mm, 122.7 g

Standards compliance

MI125-16

- VITA 57.1

MI125-16-E

- VITA 57.1 electrical specifications
- Out of mechanical specifications by H = 5.4 mm

MI125-32

- VITA 57.1 electrical specifications
- Out of mechanical specifications by H = 10 mm

Electrical

- 12 V, 3V3 or 3V3MP

Power consumption

- Total: typically 8.8 W (MI125-16, all channels 125 MHz)



2150 Cyrille-Duquet, Quebec City (Quebec) G1N 2G3 CANADA
T. 418-914-7484 | 1-855-914-7484 | F. 418-914-9477
info@nutaq.com

Nutaq products are constantly being improved; therefore, Nutaq reserves itself the right to modify the information herein at any time and without notice. The FMC logo is a trademark of VITA.