

PicoDigitizer125/16i-1000/8o

Quick Start Guide

Version 1.3 – October 2015

Congratulations on the purchase of your new PicoDigitizer125/16i-1000/8o!

Box Contents

In the PicoDigitizer125/16i-1000/8o box, you will find:

- **The PicoDigitizer125/16i-1000/8o enclosure**
- **A universal power supply with a power cord.**
 - Maximum output power: 150 Watts
 - Output voltage: 12 VDC
 - Input voltage: 100 to 240 VAC
 - Frequency: 50 to 60 Hz
 - Operation temperature: 0 to 40°C
- **The BAS software tools USB dongle**
 - Windows 7 Installer (Host and FPGA development).
 - Ubuntu 12.04 LTS Installer (Host development).
- **The PicoDigitizer125/16i-1000/8o Quick Start Guide**
- **An Ethernet cable**
- **A mini-USB cable**
- **Other documents** (Terms of use and product policies)

Enclosure Contents

PicoDigitizer125/16i-1000/8o

- A **Perseus601x** carrier board equipped with a Virtex6 FPGA.
- A **MO1000/MI125** hybrid FMC stack.
- A **back plane** board ensuring the Perseus, MO1000 and MI125 operation.

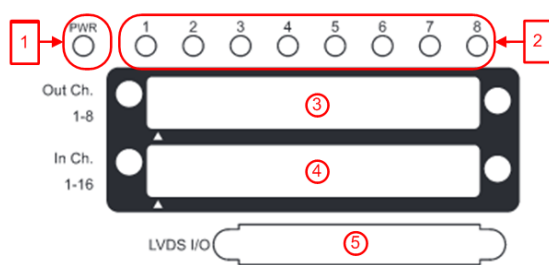
PicoDigitizer125/16i-1000/8o-E

- A **Perseus601x** carrier board equipped with a Virtex6 FPGA.
- A **MO1000/MI125** hybrid FMC stack.
- A **back plane** board ensuring the Perseus, MO1000 and MI125 operation.
- A **SAMC-514** embedded CPU in the PicoDigitizer125/16i-1000/8o-E.

SAMC-514 Linux passwords			
User	nutaq	admin (sudo)	superuser (su)
Password	nutaq	nutaq	nutaqrd

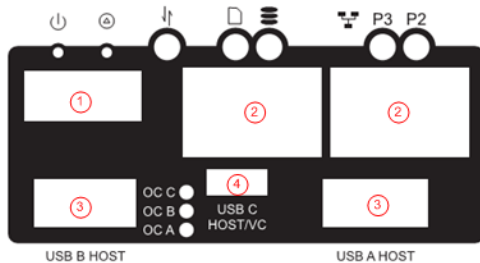
PicoDigitizer125/16i-1000/8o Front Panel

Depending on the PicoDigitizer125/16i-1000/8o model, the front panel gives access to a MI125-MO1000 FMC stack. The following diagram lists the important connectors and indicators.



1. Perseus Power-On LED
2. Perseus User LED
3. MO1000 Connector
4. MI125 Connector
5. Mestor LVDS Connector

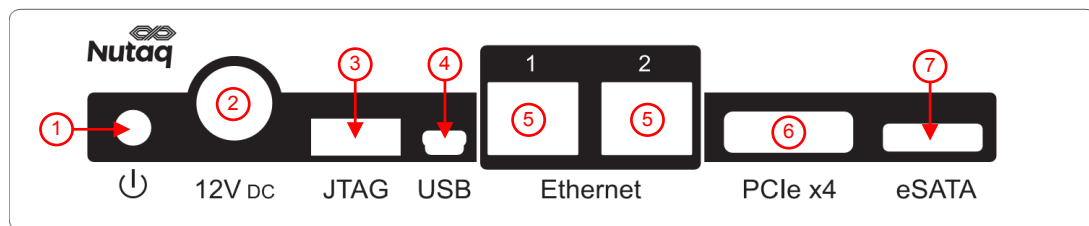
On the PicoDigitizer125/16i-1000/8o-E models, the front panel gives access to the embedded CPU. The following diagram lists the important connectors and indicators.



1. HDMI connector for video monitor
2. Ethernet connectors
3. USB connectors (mouse and keyboard)
4. Mini-USB connector

PicoDigitizer125/16i-1000/8o Back Panel

On all PicoDigitizer models, the back pane gives access to the Perseus debug, control and data streaming ports.



1. Power button.
Power up: When the power cable has been connected or the PicoDigitizer is in shutdown, press once to power up the unit.
Power cycle: When the PicoDigitizer is running, press once to power cycle slot B, and press twice to power cycle slots A and B.
Shutdown: When the PicoDigitizer is running, press and hold the button for three seconds to shutdown the unit.
 For full power button operation details, please consult the PicoDigitizer User's Guide.
2. 12V DC power supply connector.
3. FPGA JTAG connector for the Perseus Virtex-6 FPGA.
4. Mini-USB connector. Access the Perseus embedded Linux console.
5. Gigabit Ethernet connectors.
6. PCI Express x4 connector (optional).
7. External HDD eSATA connector (Present on PicoDigitizer125/16i-1000/8o-E).

Setting Up the PicoDigitizer125/16i-1000/8o(-E)

The following procedure will guide you through the PicoDigitizer125/16i-1000/8o(-E) setup to run the Loopback example.

Requirements

- PicoDigitizer box content
- A PC with Windows 7 64-bits and 10 GB of RAM.
 - Gigabit Ethernet network card with jumbo frame capability
- Visual Studio 2012
- An Ethernet cable
- A 10-MHz signal generator
- A 100-MHz oscilloscope
- 2 Edge Rate Contact™ breakout SMA cables purchased from Nutaq or a custom cable to generate a signal on an input and receive a signal from an output of the PicoDigitizer125/16i-1000/8o(-E)

Procedure

This procedure briefly describes how to run one of the PicoDigitizer125/16i-1000/8o example design. For more details, please refer to document *MO1000 - MI125 Examples Guide.pdf* in folder `%BASROOT%/doc/fmc/MO1000-MI125`.

1. Install the BAS Software tools on the Windows PC. Follow the instructions available in the *Board & Systems Software Tools - Installation Guide.pdf* document in the `doc/release` folder of the USB dongle.
2. Connect the PC to the PicoDigitizer125/16i-1000/8o with the Ethernet cable. Use the Ethernet port 1 on the PicoDigitizer backplane.
3. Connect both the Edge Rate Contact breakout SMA cables to the PicoDigitizer front panel connectors.
The signal input must be less than 2 Vpp in amplitude to avoid the risk of damaging the hardware. Connect the input signal to input channel 1.
Connect the output channel of your choice to your oscilloscope.
4. Power up the PicoDigitizer125/16i-1000/8o by plugging in the power supply and by clicking once on the backplane reset button.
5. The Perseus will boot and configure itself with the MI125-MO1000 Loopback example bitstream previously written in Flash memory.
6. The PicoDigitizer125/16i-1000/8o Perseus is configured to use a static IP upon startup. The Perseus default IP address is 192.168.0.101
7. On the host PC, browse to `%BASROOT%/examples/mo1000_mi125/host/scripts`.
8. In this folder are two batch files (or shell scripts, if you use Linux) demonstrating MI125 and MO1000 configuration with data generation using the MO1000, or data pass-through from the MI125 to the MO1000. The MI125 and the MO1000 are the two FPGA Mezzanine Cards installed in the PicoDigitizer125/16i-1000/8o responsible for data acquisition and digital to analog conversion, respectively.
 - `MO1000_MI125_DDS.bat(.sh)`
 - `MO1000_MI125_Passthrough.bat(.sh)`
9. On windows, double-click the file `MO1000_MI125_Passthrough` launch the demo. The demo then starts automatically.
10. The following demonstrates a successful MO1000 and MI125 configuration with data pass-through.

```
----- MO1000_Init -----
Parsing MOMI_Init.ini file for needed parameters...Done!
Configuring the Perseus at IP = 192.168.0.101, please wait.
MO1000 Init...
- Board number : 1
  - Sampling clock source : 1
  - Reference clock frequency : 125000000 Hz
  - DAC clock frequency : 1000000000 Hz
  - Interpolation mode : 13
  - Master clock mode : 1
  - Master clock frequency : 125000000 Hz
  - DAC output control :
    - Channel 1 : Enable
    - Channel 2 : Enable
    - Channel 3 : Enable
    - Channel 4 : Enable
    - Channel 5 : Enable
    - Channel 6 : Enable
    - Channel 7 : Enable
    - Channel 8 : Enable
  - Core Version: 0x0201
  - Driver Version: 0x001B
```

```

- DAC Calibrating...Done!
- PCB Board temp: 50.0C
- Dac1 temp: 45.0C
- Dac2 temp: 41.0C
Done!

----- MI125_Init -----

Parsing MOMI_Init.ini file for needed parameters...Done!

Configuring the Perseus at IP = 192.168.0.101, please wait.
MI125 Init...
- Board number : 2
- Sampling clock source : 2
- Trigger output IO : OFF
- Is a clock master : Yes.
- Core Version: 0x0201
- Driver Version: 0x0023
- PCB temp: 42.0C
Done!

----- DACMux_Setup.exe -----

Configuring the Perseus at IP = 192.168.0.101, please wait.
Configuring DAC multiplexer...
Done!

----- CustomRegister_Write -----

Configuring the Perseus at IP = 192.168.0.101, please wait.
CustomRegister Write...
- Custom Register ID : 5
- Value to write : 0
Done!

----- CustomRegister Write -----

Configuring the Perseus at IP = 192.168.0.101, please wait.
CustomRegister Write...
- Custom Register ID : 16
- Value to write : 1
Done!

----- CustomRegister_Write -----

Configuring the Perseus at IP = 192.168.0.101, please wait.
CustomRegister Write...
- Custom Register ID : 16
- Value to write : 0
Done!

```

11. After the user has selected the pass-through test, the oscilloscope should display the tone inputted on the Mi125 ADC by the signal generator.