

PicoDigitizer125/16i-1000/8o

Quick Start Guide

Version 1.2 – Novembre 2014

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 ADP software tools DVD**
 - Windows 7 Installer (Host and FPGA development).
 - Linux Fedora 20 and Ubuntu 12.04 LTS Installer (Host development).
- **The PicoDigitizer125/16i-1000/8o Quick Start Guide**
- **License sticker for the software tools** (in the ADP software tools DVD case).
 - ADP software activation code
- **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.

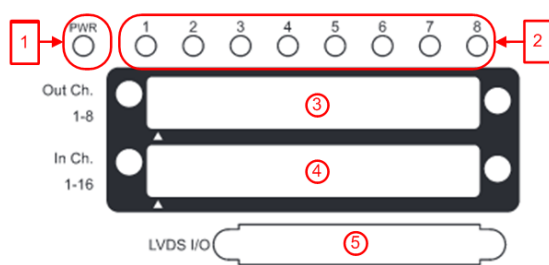
PicoDigitizer125/16i-1000/8o-E

- 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

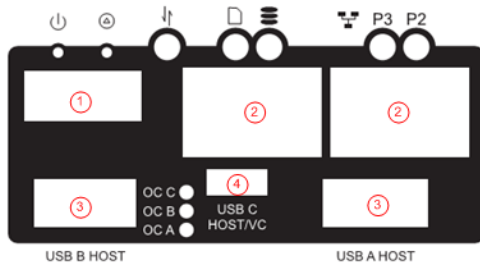
PicoDigitizer125/16i-1000/8o Front Panel

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

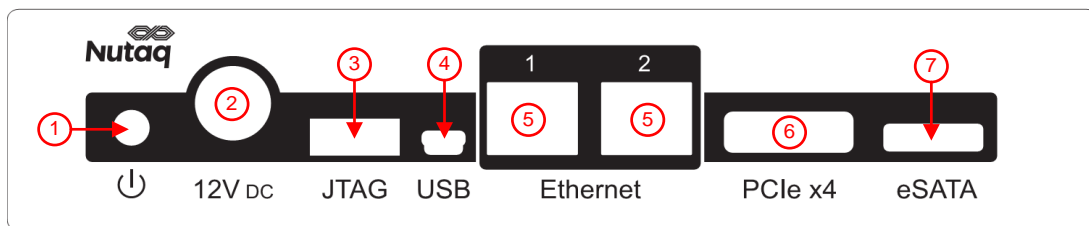
On the PicoDigitizer125/16i-1000/8o-E models, the front panel gives access to the embedded CPU. The following diagram lists the important connectors and indicators.



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 2008 SP1
- 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

1. Install the ADP software tools on the Windows PC. Follow the instructions available in the *ADP uTCA edition – Software Installation Guide.pdf* document in the *Install documentation* folder of the installation DVD.
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 an input signal to an input of your choosing.
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. Start Microsoft Visual Studio.
8. On the **File** menu, point to **Open** and click **Project/Solution**.
9. Browse to the `[ADPROOT]/examples_perseus6010/perseus6010_mo1000_mi125_bsd/host/prj_win/` folder and select the file named `perseus6010_mo1000_mi125.sln`.
The host software project opens and you see the hierarchy of the project on the **Solution Explorer** tab. If you do not see the **Solution Explorer** tab, on the **View** menu, click **Solution Explorer**.
10. Select the build configuration Release x64.
11. On the **Build** menu, click **Build Solution**.
12. There is one batch file in the folder
 - `Launch_perseus6010_mo1000_mi125_demo.bat`
13. Open the batch file with a text editor.

There are three necessary application parameters for the host software and the IP address parameters.

Parameters	Values: description
IP_ADDR_PERSEUS	192.168.0.101(default)
TEST_MODE (Optional parameter)	0: DDS 1: Pass-Through (default)
CONFIGURATION_MODE (Optional parameter)	0: All (default) 1: MO1000 Only 2: MI125 Only 3: DDS Only 4: Pass-Through Only
BOTTOM_CLOCK_SOURCE	System clock source default: 1 (onboard oscillator)
BOTTOM_CLOCK_FREQUENCY	System clock source frequency default: 125000000 (onboard osc. freq.)

BOTTOM_DAC_CLOCK_FREQUENCY	MO1000 DAC clock frequency default: 250000000
BOTTOM_MASTER_CLOCK_FREQUENCY	MO1000 PLL generated system clock frequency default : 125000000
BOTTOM_INTERPOLATION	MO1000 PLL interpolation mode default: 13 (8x interpolation)
BOTTOM_ACTIVE_CHANNELS	MO1000 active channels default: 3 (all channels are active)
TOP_CHANNEL_USED	MI125 channel selection default: 0 (MI125 channel to use as an input for the loopback)

The **IP_ADDR_PERSEUS** parameter must contain the IP address of the Perseus port 0 (for example, 192.168.0.101). The bytes of this address must be separated by periods.

It is important that you use the addresses specific to your hardware; the values presented here are for example purposes only.

14. Save and close the file.

15. Double-click the edited batch file to start the application.

The test starts automatically.

16. The following figure illustrates the menu that appears when using the default parameters for the Launch_perseus6010_mo1000_mi125_demo.bat file. When prompted enter "n" to use the default parameters.

```

C:\Windows\system32\cmd.exe

-----Example Default Parameters-----
- Test Mode = 1, to execute a pass-through
- Configuration Mode = 0, Configure everything <default>

-----MO1000 Bottom Default Parameters-----
- Reference Clock Source = 1, Internal 125 MHz
- Reference Clock Frequency = 125000000 Hz
- DAC Clock Frequency = 1000000000 Hz
- Master Reference Clock Frequency = 125000000 Hz
- Interpolation Mode = 13, 8x
- Active Channels = 3, 08 channels active <all channels>

-----MI125 Top Default Parameters-----
- Channel Used = 0

Would you like to change the default parameters? <y/n>

```

17. The following illustrates a successful MI125-MO1000-Loopback test on a PicoDigitizer125/16i-1000/8o(-E).

```

MO1000-MI125 functional example.
Connecting to Perseus 192.168.0.101
Connected!

Initializing MO1000 Bottom...
- MO1000 board #1
- Core Version: 0x0201, Driver Version: 0x001A
- DAC Calibrating...Done!
- Channel Lane = 0
- Channel Frame = 0
- Channel Sync = 0
- Status = 1
- Dac 1 Test pattern compare error : 0
- Dac 2 Test pattern compare error : 0
- PCB Board temp: 55.5C
- Dac1 temp: 53.0C
- Dac2 temp: 65.0C
- Clock PLL lock status : 1
- Dac 1 Fifo warning #1 error : 0
- Dac 1 Fifo warning #2 error : 0
- Dac 1 Synchronisation lost error : 0
- Dac 2 Fifo warning #1 error : 0
- Dac 2 Fifo warning #2 error : 0
- Dac 2 Synchronisation lost error : 0
Done!

Initializing MI125 Top...
- MI125 board #2
- Board #2 is a clk master: yes.
- Core Version: 0x0201, Driver Version: 0x0023
- All channels calibration successfull!
- PCB Board #2 temp: 53.5C
Done!

Pass-through mode
- Writing 1 to DAC mux to enable ADC <Pass-through>
- Setting MI125 Channel 0 to use
- Resetting asynchrone FIFO
- Enabling asynchrone FIFO
Done!

```

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