PicoDigitizer250x

Quick Start Guide

Version 1.1 – June 2014 – Release 6.5

Congratulations on the purchase of your new PicoDigitizer250x!

Box Contents

In the PicoDigitizer250 box, you will find:

- **The PicoDigitizer enclosure**

- **A universal power supply** (EA12101A-120) **with a power cord**.
  - Maximum output power: 180 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 17 Installer (Host development).

- **The PicoDigitizer250x Quick Start Guide**

- **License sticker for the software tools** (in the ADP software tools DVD case**).**
  - ADP software activation code

- **MMCX – SMA cables**
  - 4 cables for the PicoDigitizer250 and PicoDigitizer250E
  - 8 cables for the PicoDigitizer2x250

- **An Ethernet cable**

- **Other documents** (Terms of use and product policies)

Enclosure Contents

PicoDigitizer250(E)

- A **Perseus601x** carrier boards equipped with a Virtex6 FPGA.
- An **ADAC250** FMC.
- A **back plane** board ensuring both Perseus and ADAC250 operation.

PicoDigitizer2x250

- Ttwo **Perseus601x** carrier boards equipped with a Virtex6 FPGA.
- Two **ADAC250** FMCs.
- A **back plane** board ensuring both Perseus and both ADAC250 operation.

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

PicoDigitizer250x Front Panel

Depending on your PicoDigitizer250x models, the front panel gives access to either 1 or 2 ADAC250. The following diagram lists the important connectors and indicators.
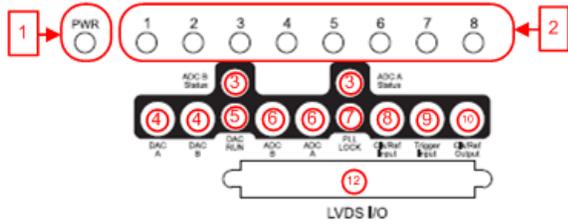
1. Perseus Power-On LED
2. Perseus User LED
3. ADC A/B Status LEDs
4. DAC A/B Output Connectors
5. DAC Run LED
6. ADC A/B Input Connectors
7. PLL Lock LED
8. Clock/Reference Input Connector
9. Trigger Input Connector
10. Clock/Reference Output
11. Mestor LVDS Connector

On the PicoDigitizer250E model, the front panel gives access to the embedded CPU. The following diagram lists the important connectors and indicators.
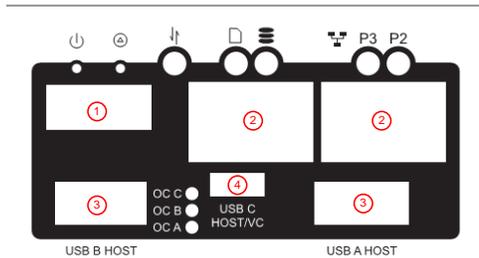
1. HDMI connector for video monitor
2. Ethernet connectors
3. USB connectors (mouse and keyboard)
4. Mini-USB connector

PicoDigitizer Back Panel

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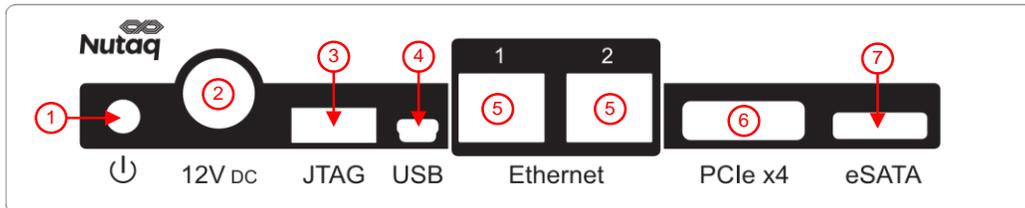
1. Power button.

    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 PicoDigitizer250E).

Setting Up the PicoDigitizer250

The following procedure will guide you through the PicoDigitizer250 setup to run the Record/Playback example.

Requirements

- ➢ PicoDigitizer box content
- ➢ A PC with Windows 7 64-bits and 10 GB of RAM.
- ➢ Visual Studio 2008 SP1
- ➢ An Ethernet cable
- ➢ A 1-MHz signal generator
- ➢ A 1-GHz oscilloscope

Procedure

1. Install the ADP software tools on the Windows PC. Follow the instructions available in the *ADP uTCA edition - Software installation guide for windows7.pdf* document in the *Install documentation* folder of the installation DVD.

2. Connect the PC to the PicoDigitizer250 with the Ethernet cable. Use the Ethernet port 1 on the PicoDigitizer250 backplane.

3. Connect an MMCX to SMA cable between the ADAC250 ADC A connector and the signal generator. Configure the signal generator to output a 0 dBm signal at 1MHz.

4. Connect an MMCX to SMA cable between the ADAC250 DAC A connector and the oscilloscope.

5. Power up the PicoDigitizer250 by plugging in the power supply and by clicking once on the backplane reset button.

6. The Perseus will boot and configure itself with the Record example bitstream previously written in Flash memory.

7. The PicoDigitizer Perseus is configured to use a static IP upon startup. The Perseus default IP address is 192.168.0.101

8. Start Microsoft Visual Studio.

9. On the **File** menu, point to **Open** and click **Project/Solution**.

10. Browse to the *perseus6010_adac250_record_playback\host\prj_win* folder and select the *perseus6010_adac250_playback_record.sln* file.

    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**.

11. Select the build configuration Release x64.

12. On the **Build** menu, click **Build Solution**.

13. Double-click *Launch_adac250_record_playback_demo.bat.*

    The test starts automatically.

14. When prompted, choose the test you wish to execute. The results for the Record (15) and the Playback(16) tests are shown below.

15. **Record Test Result**

    - The following window shows a successful PicoDigitizer250 record test:

- *The received data is stored in the following folder:*
  ADPROOT/examples_perseus6010/perseus6010_adac250_record_playback/bin/record_data.bin.

  To visualize the received data using Matlab, proceed to step 17.

16. **Playback Test Result**

   - The following window shows a successful PicoDigitizer250 playback test. Select the continuous playback option for the playback module to continuously output the generated sine signal loaded in memory. When the playback has started, the oscilloscope should display a sine wave at 977 kHz.

17. **Plotting Recorded Data using Matlab**

   - In Matlab, change the current folder to
     ADPROOT\examples_perseus6010\ perseus6010_adac250_record_playback\bin.

   - Run this command: bintofft('filename', num_of_channels_to_plot, 'int16', number_of_samples, acquisition_frequency);
     For example: *bintofft('record.bin', 2, 'int16', 1024, 250000000);*

   - Matlab will plot the received data and the FFT for each channel.
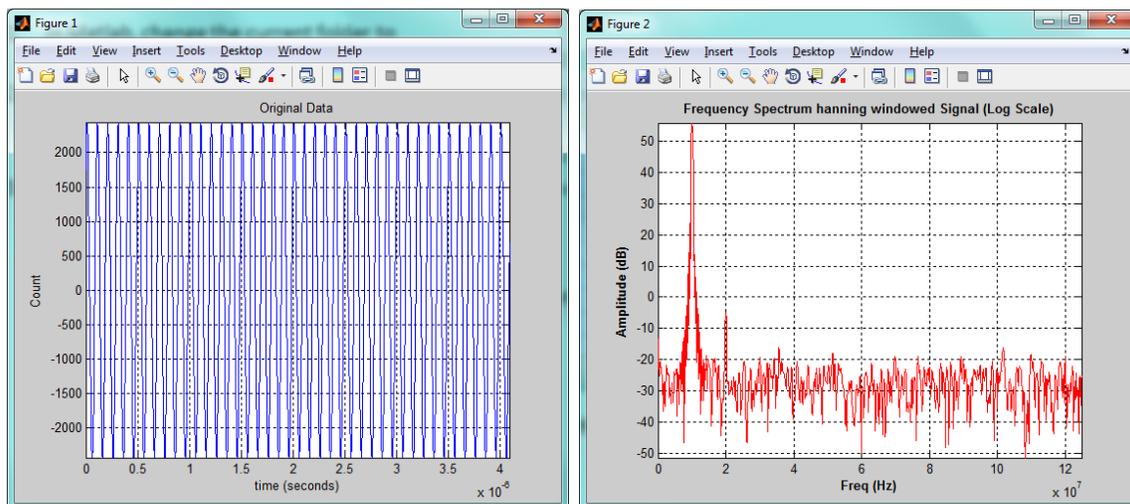
In the figures above, we clearly see the 10MHz tone in the time spectrum plot and the frequency spectrum FFT plot.