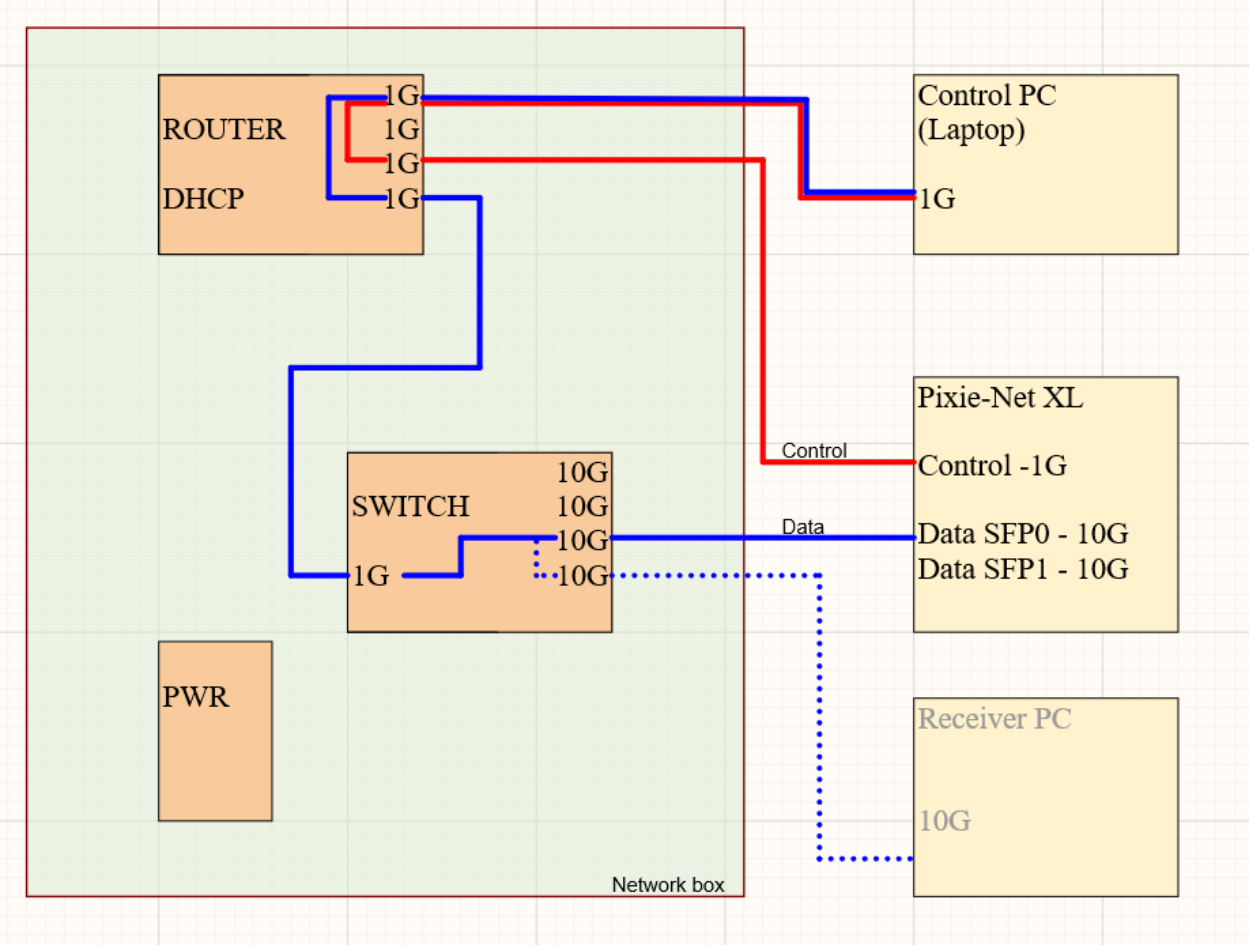
Illustrated Setup of Pixie-Net XL

Physical Network setup:

The Pixie-Net XL uses a “control network” (red) to operate the data acquisition, and a “data network” (blue) to receive list mode data.

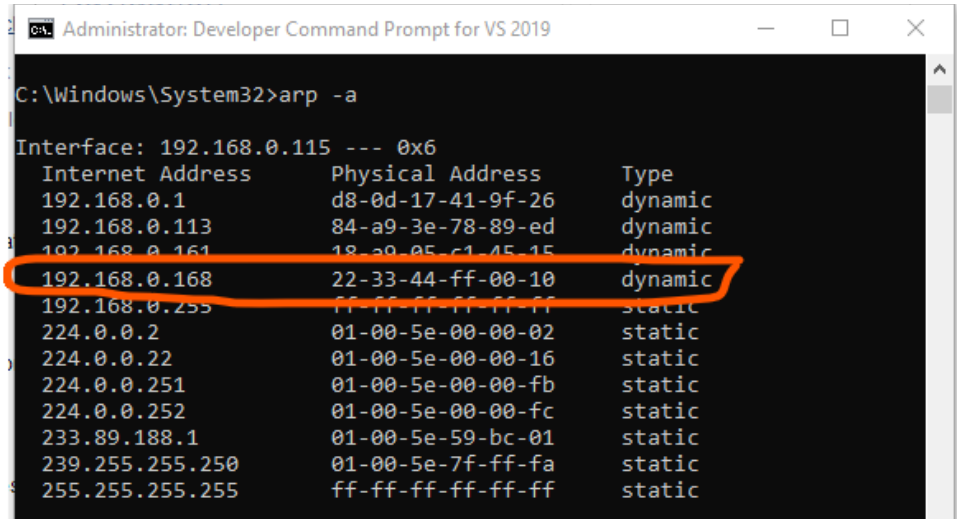
The sketch below shows a common test setup where the control and data networks are merged using a 1/10G switch for a single control PC (laptop). A generic 1G router assigns IP addresses through DHCP. Optionally, a dedicated receiver PC can receive the full rate 10G data stream (dotted blue connection).



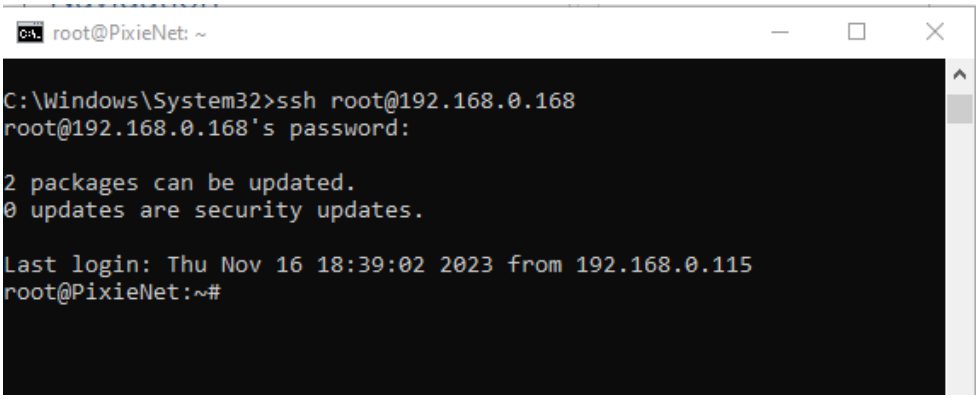
For this example, we assume that the Pixie-Net XL’s built in pulser is connected to one of its analog inputs and the default settings file is used. For other input signals, the DAQ parameters have to be adjusted to match the signal characteristic (gain, offset, polarity; and energy filter for best resolution).

Control PC setup:

1. Find the Pixie-Net XL IP address: execute arp –a in a Windows command prompt and match the physical MAC address from the Pixie-Net XL's label with the IP address reported.



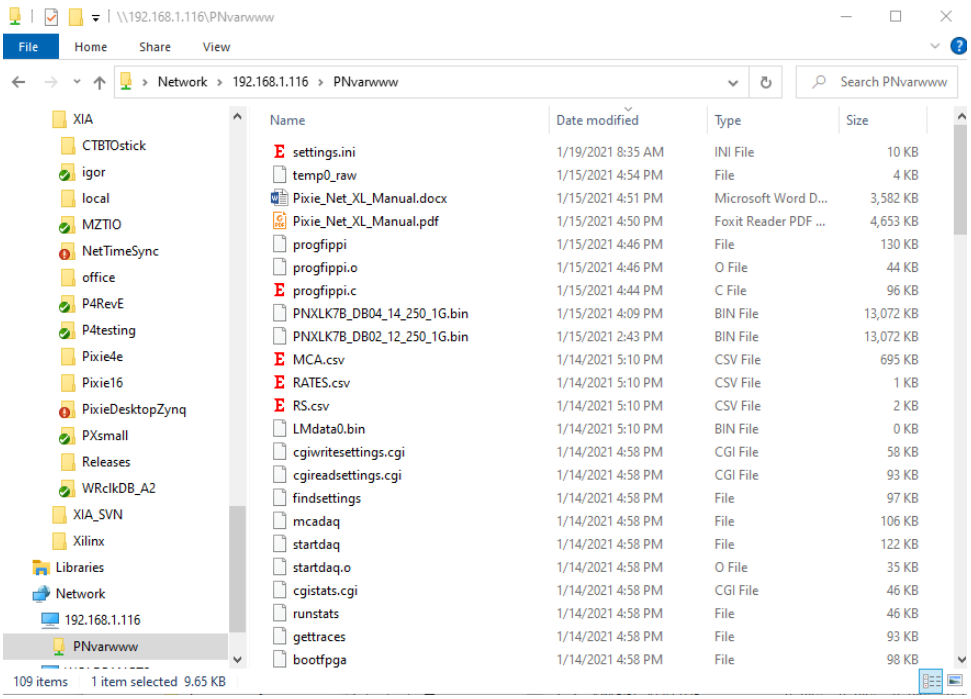
2. SSH log in to Pixie-Net XL: type ssh root@<IP>
Many terminal tools can be used for the SSH connection. The screenshot below shows Windows command prompt with the built in ssh function. Other options include Tera Term (also for serial port connection)



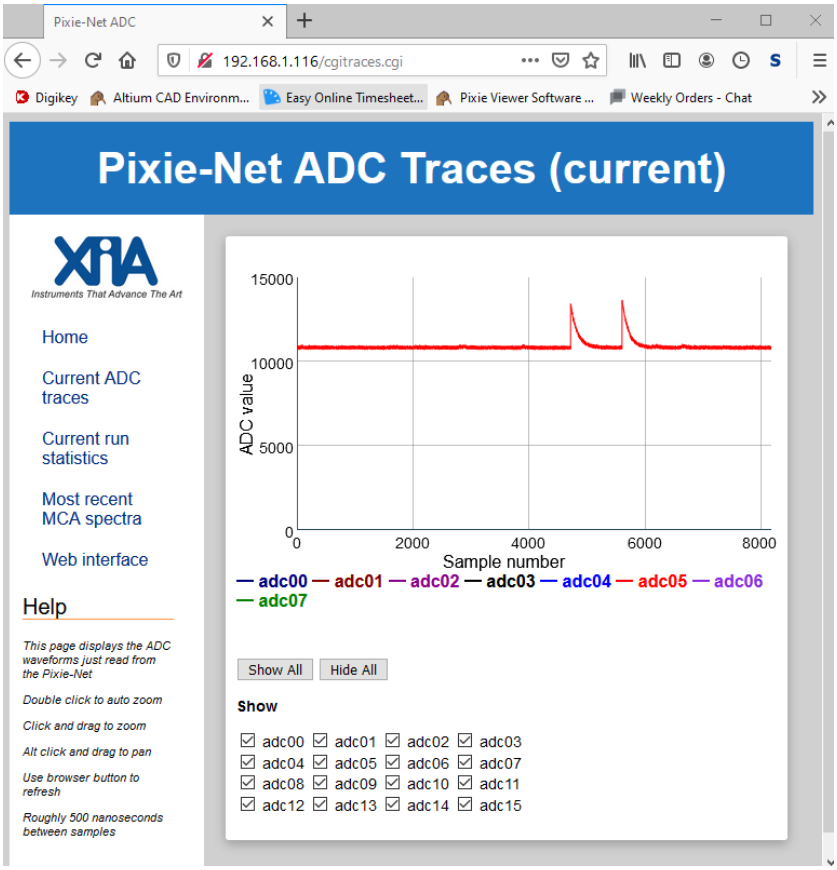
3. Open Windows Explorer and go to the shared working directory on the Pixie-Net XL:
- Type the Pixie-Net XL IP address in the address bar.
- open folder PNvarwww. This is folder /var/www in the on the Pixie-Net XL's SD card

Note the following:

- setting.ini contains the DAQ parameters. It can be edited with any text editor (even from the Pixie Net Linux terminal)
- LMdata0.bin is the list mode data for data acquisitions that save data to the SD card.
- MCA.csv and RS.csv are MCA spectra and run statistics from the most recent data acquisition



4. Open a web browser, navigate to the Pixie-Net XL's IP and go to "current ADC traces" to check detector signal. Signals should show a fast rising edge and a slow decay, no clipping.

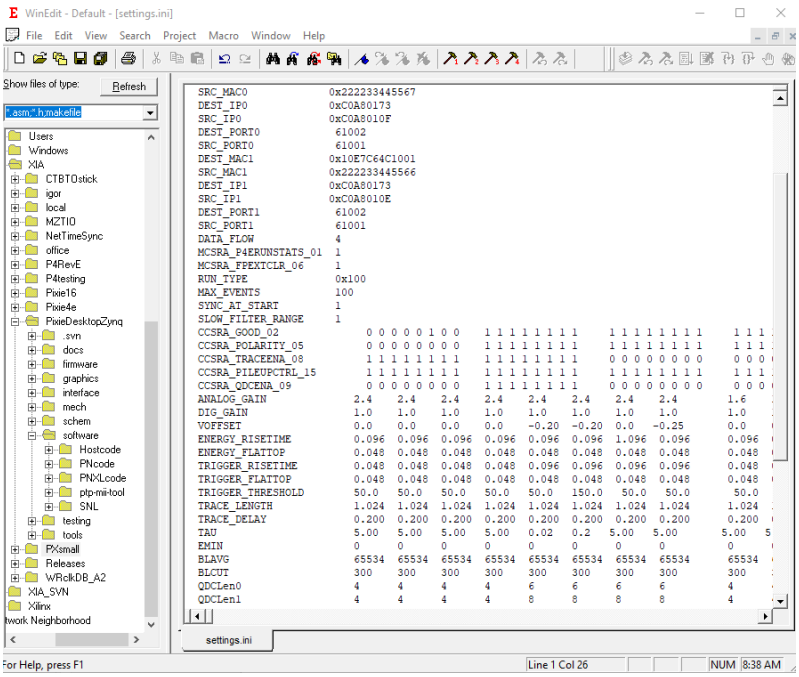


Pixie-Net XL setup

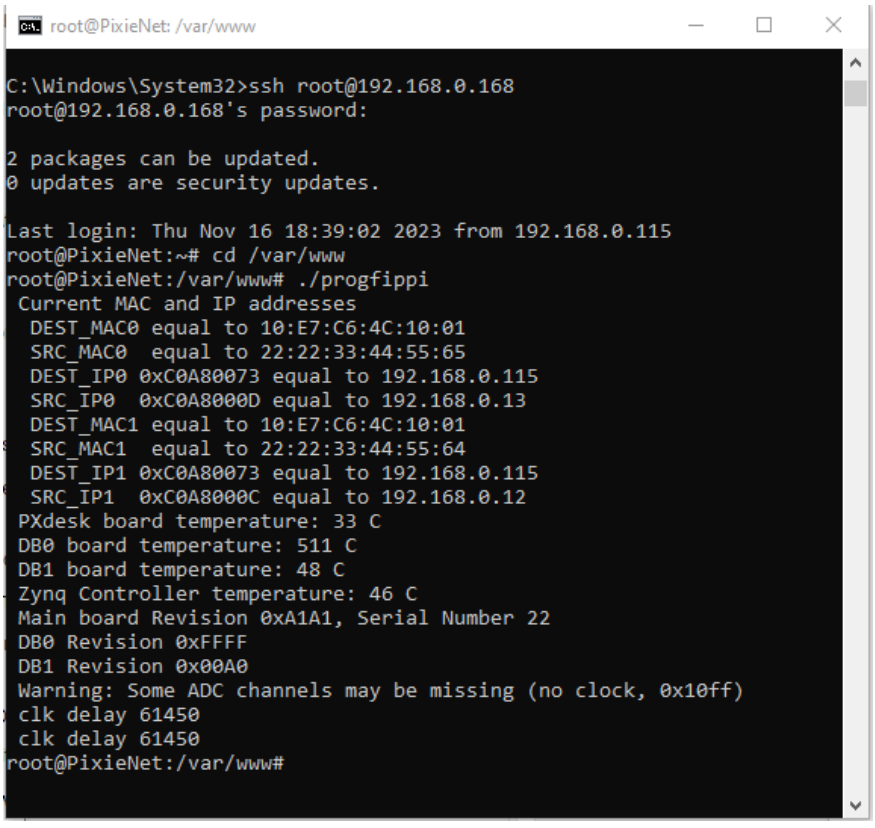
5. Optional: Edit settings.ini, for example to adjust analog gain, offset, run type …

Parameters [mostly] match the Pixie-16 in meaning and value range. See manual for details!

For 10G data streaming, the file MUST specify correct destination IP and MAC of the receiver PC



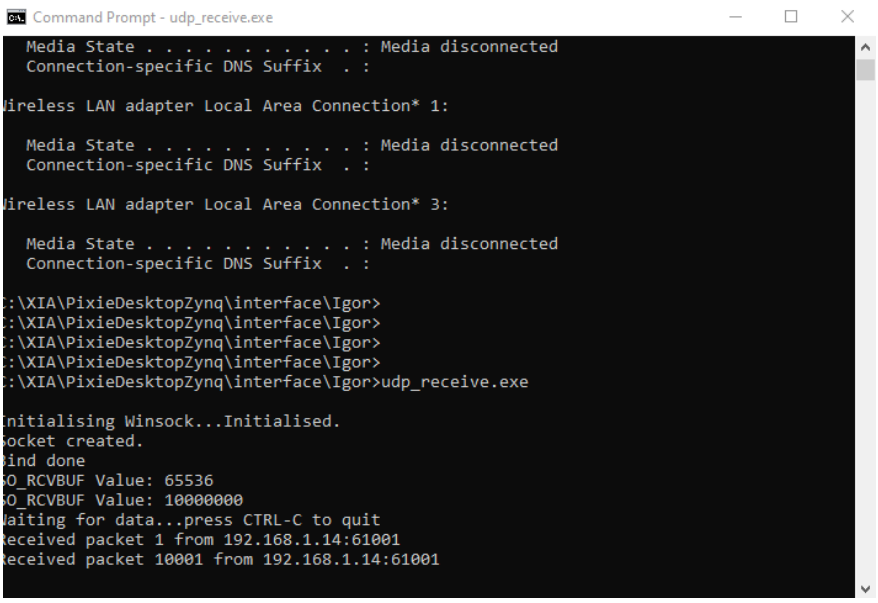
6. After any change in settings.ini, apply settings from file by running “progfippi” in the command prompt



Receiver PC Setup and Data Acquisition

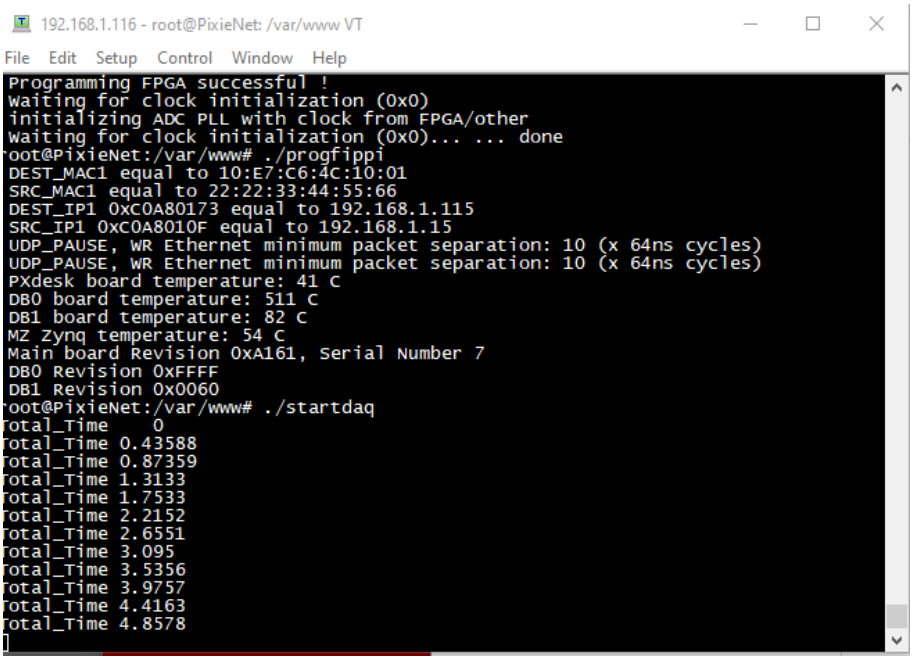
7. Open a new command prompt on the [receiver] PC and start the udp receiver program “udp-receive.exe”. It can be downloaded from XIA’s website (see “hostcode”)
Window may ask for Firewall permission: allow
The receiver program will then be “waiting for data …”

The UDP receiver program exists for Windows and Linux. It’s basically copied from a socket programming tutorial, 1-2 pages of code. It is expected that users modify or integrate this in their overall data acquisition system.



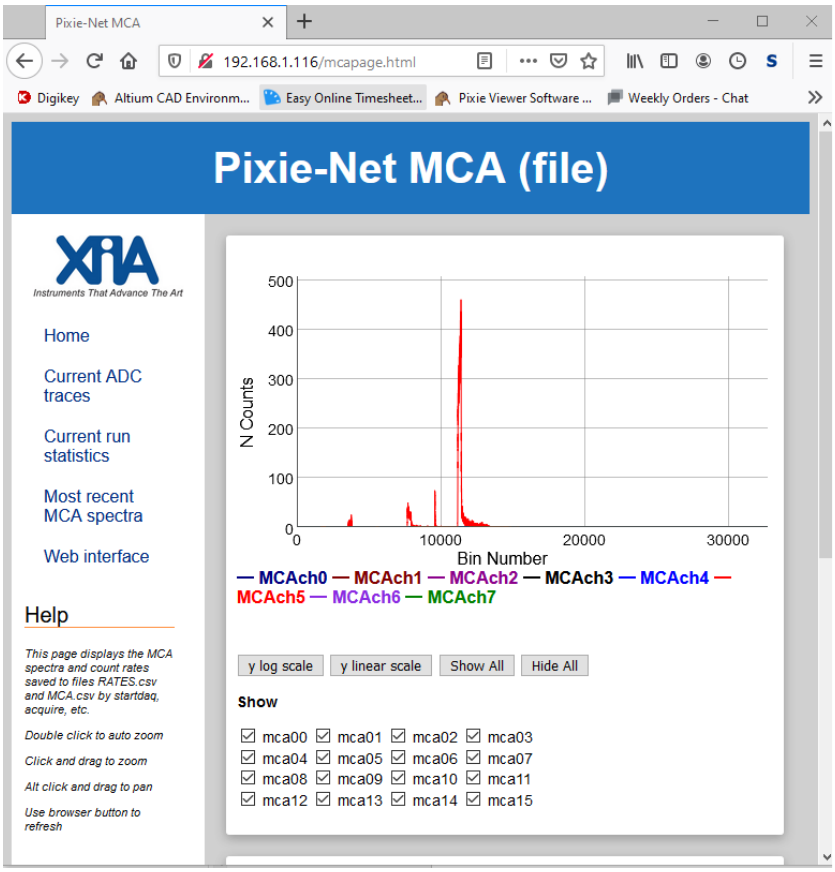
8. Start DAQ by typing “./startdaq” in the first (Pixie-Net XL) command prompt …

The [receiver] PC will now receive packets and Pixie-Net XL will count the run time

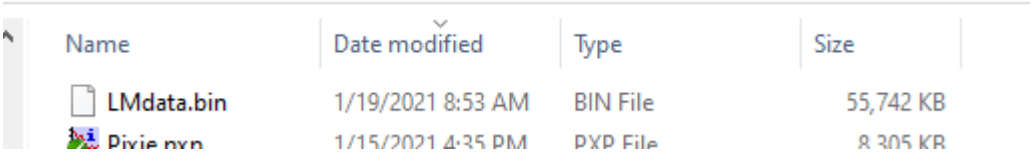


9. Results:

MCA spectra can be seen on the webpage …



.. and the LM file increases in size in Windows Explorer in the same location as the UDP receiver program



The default DAQ period is set to 10s with the parameter REQ_RUNTIME in the settings file.

See the user manual for a description of the list mode data format. XIA provides an experimental Igor Pro GUI to read and display the data.

Next step: try the web interface to set parameters and start runs. (see user manual)