

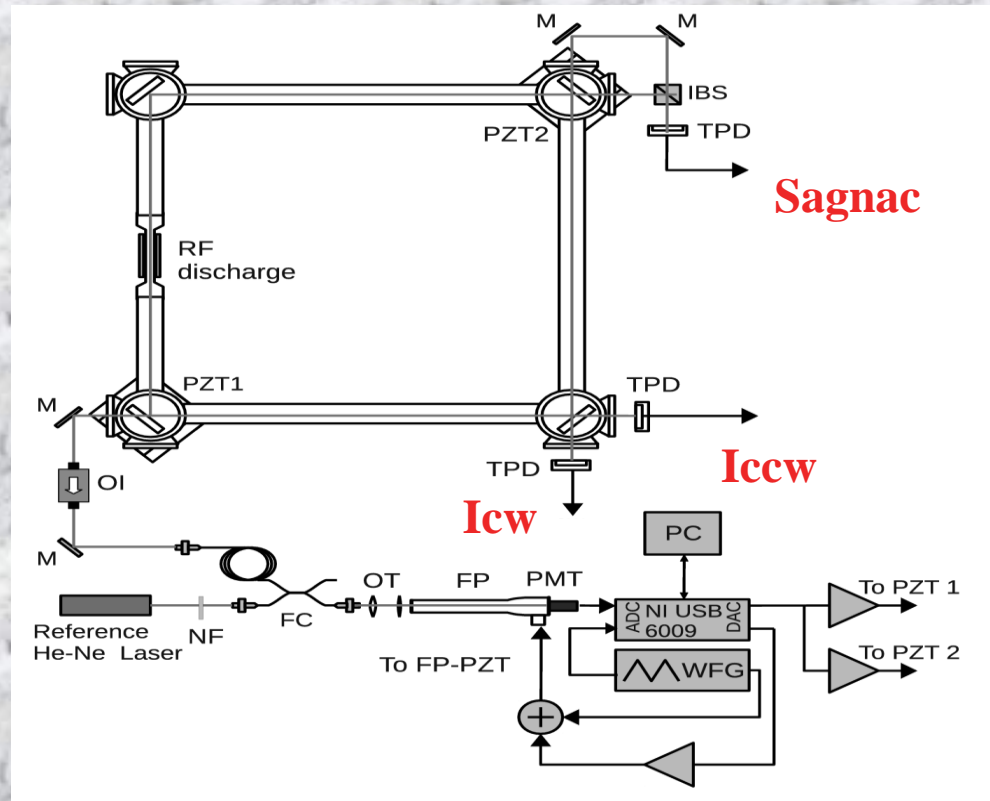
DAQ SYSTEM FOR GYROLASER

Bachir Bouhadef

DAQ SYSTEM FOR GYROLASER

Analog input channels :

Icw, Iccw and Sagnac @ 5 kHz.
Control parameters (>10) @ 1 Hz.



DAQ SYSTEM FOR GYROLASER



**NI PXI-8106 RT : 2.16 GHz Intel Core 2 Duo
T7400 With LabVIEW Real-Time**

DAQ SYSTEM FOR GYROLASER

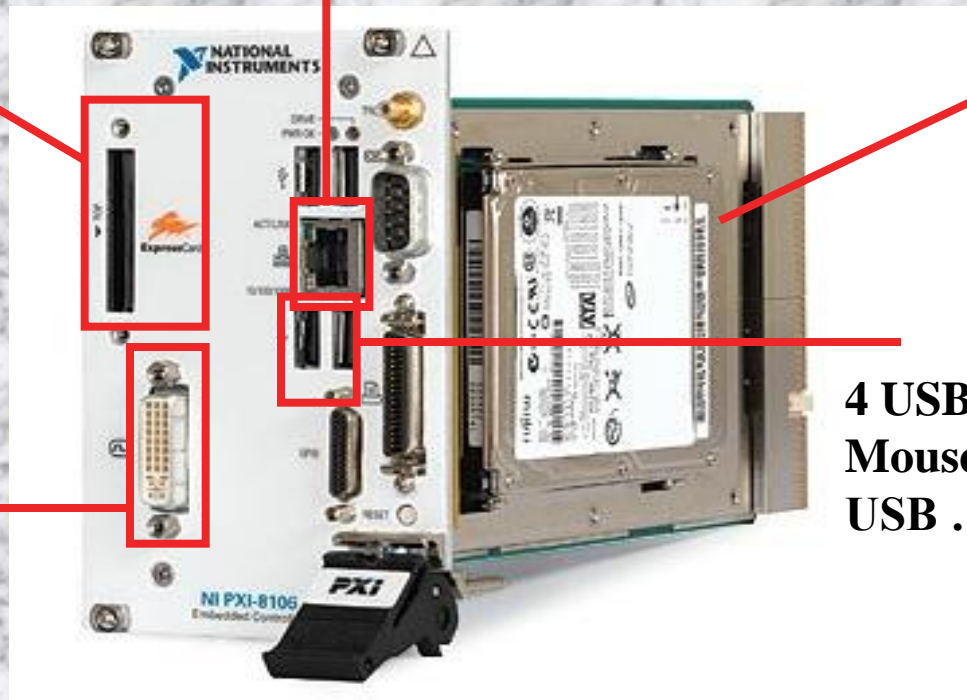
What PXI-8106 can offer ?

Express card

10/100/1000BASE-TX (Gigabit) Ethernet

Hard disk

4 USBs
Mouse, keyboard,
USB



DAQ SYSTEM FOR GYROLASER



NI-PXI-8106



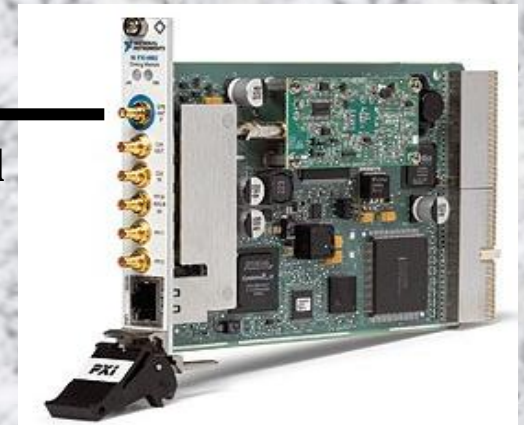
DAQ System

GPS Antenna



**NI-PXI-6682
&
NI-PXI 6653**

GPS signal

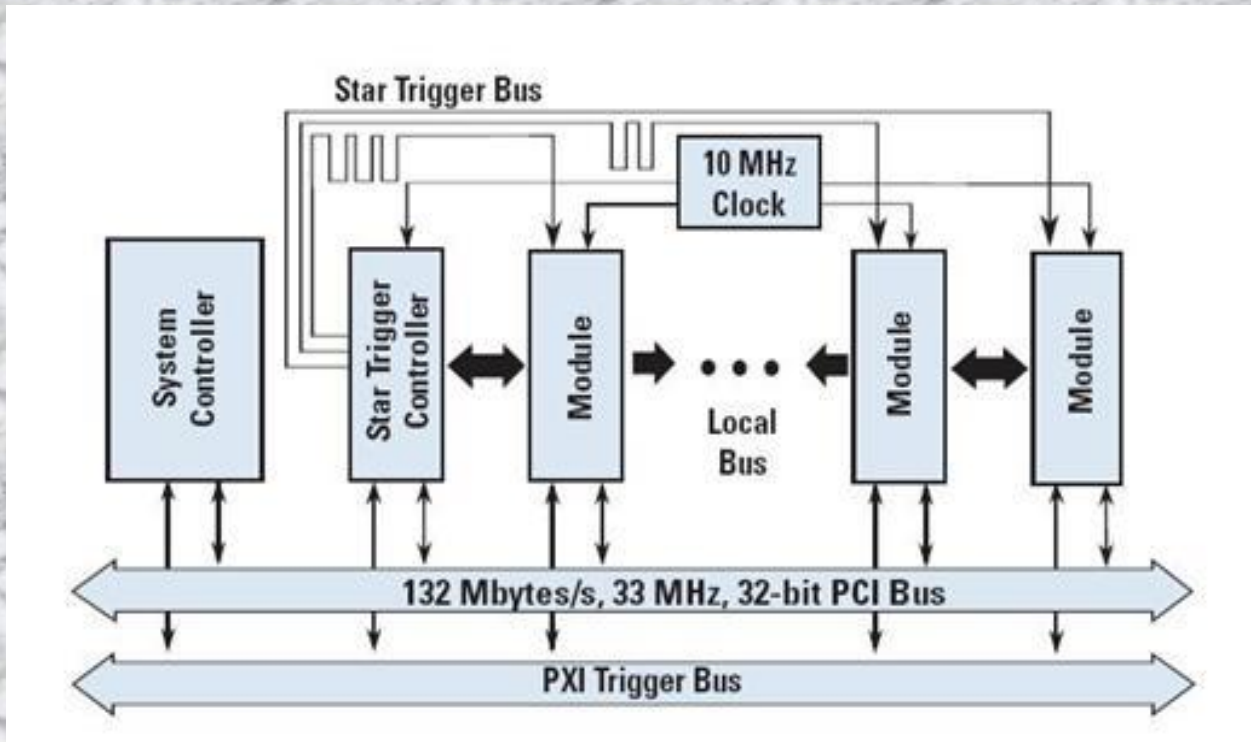


Clock and time synchronization.



Chassis PXI-1042

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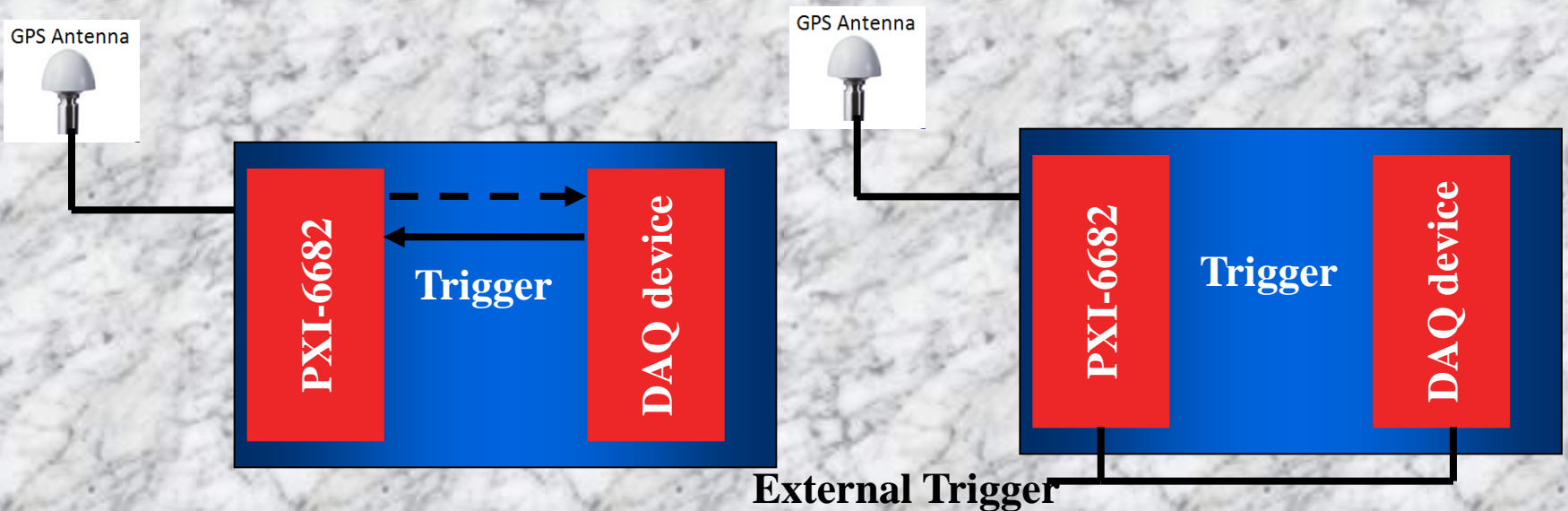


PXI Timing and Triggering Buses – PXI combines industry-standard PC components, such as the PCI bus, with advanced triggering and synchronization extensions on the backplane.

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Time synchronization in PXI

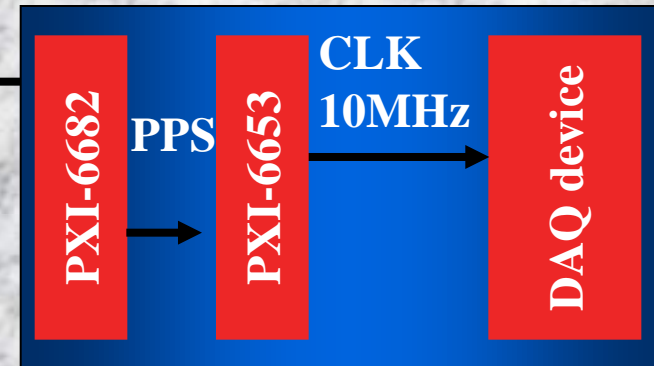
1. 1PXI-6682 can generate start trigger and send to DQA device.
2. Or DAQ system can send trigger when start acquisition.
3. We use an external trigger.



DAQ SYSTEM FOR GYROLASER

Time synchronization in PXI

- PXI-6682 can power the GPS antenna and process the RF signal (1.575 GHz)
- PXI-6682 routes clocks and triggers with low skew within chassis
- Most PXI chassis provide a 10MHz reference clock with 25ppm accuracy($10\text{MHz}\pm 250\text{Hz}$)
- With PXI 6682, clock accuracy can be improved to 1ppm.

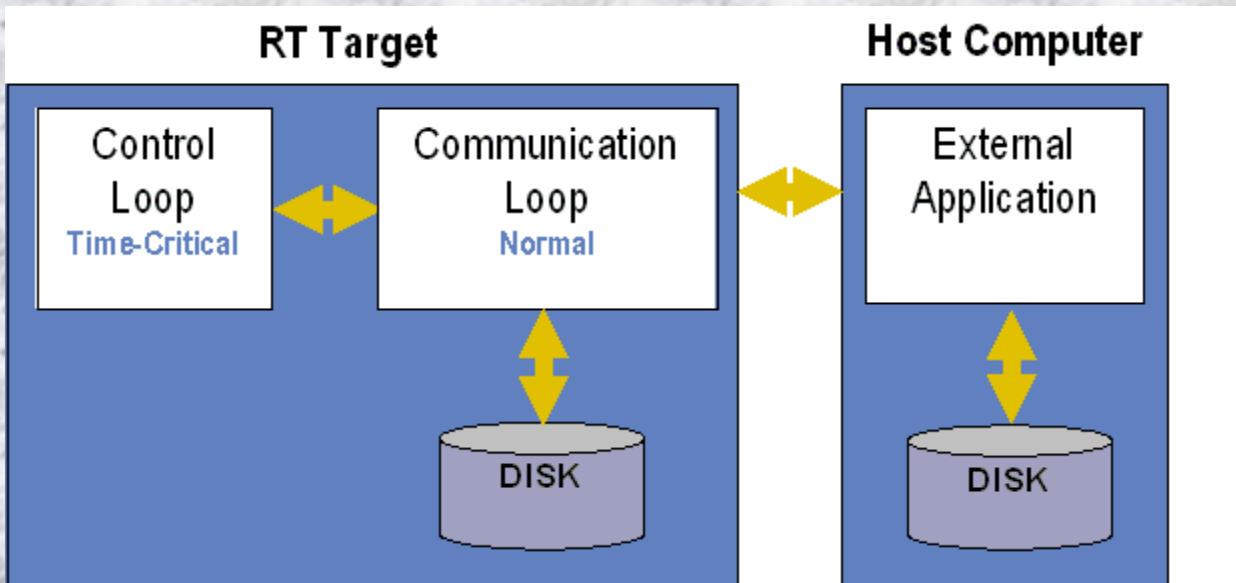


The PXI-6682 can generate a start trigger and send it to the data acquisition device on the PXI backplane. This introduces a 2-3 nanosecond propagation delay per slot.

PXI- 6653 uses PPS signal to generate a stable clock of 10 MHz, even though 6682 Could be enough (using PPS to generate clock with labview) .

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Real time embedded module



In our RT embedded module have two kind of processes or loops

- Time-Critical process : timestamp of our data**
- Normal process for saving data and sending it to host computer**

DAQ SYSTEM FOR GYROLASER

Real time embedded module work

Create circular buffer of 24 files, each file name will be the same each 24 hours this can be extended to many if needed.

After the end of an hour the file will be closed and a message containing the file name will be send to the host for transfer.

If the system stop fo some minutes, the data will be append to the older in the same file and the hour is over a new file will be created.

Circular buffer

File xxx0.dat

File xxx1.dat



File xxx22.dat

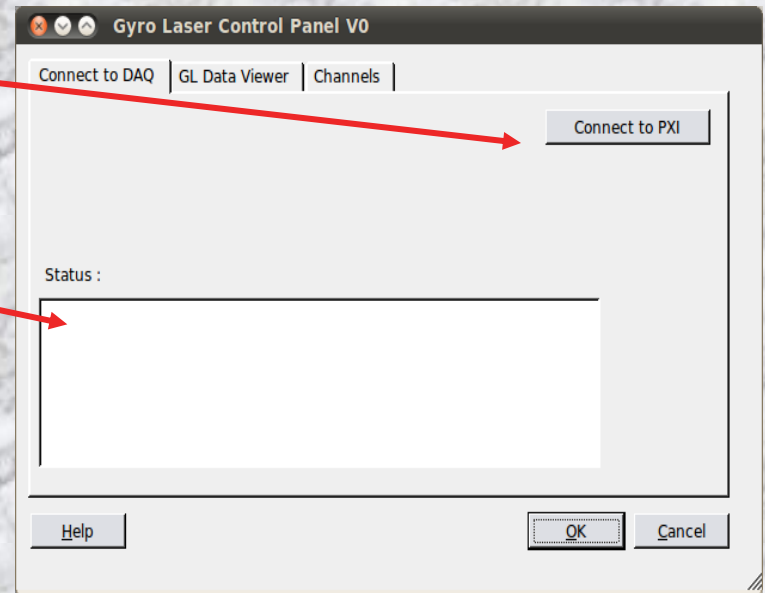
File xxx23.dat

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Gyro laser user Interface in host computer

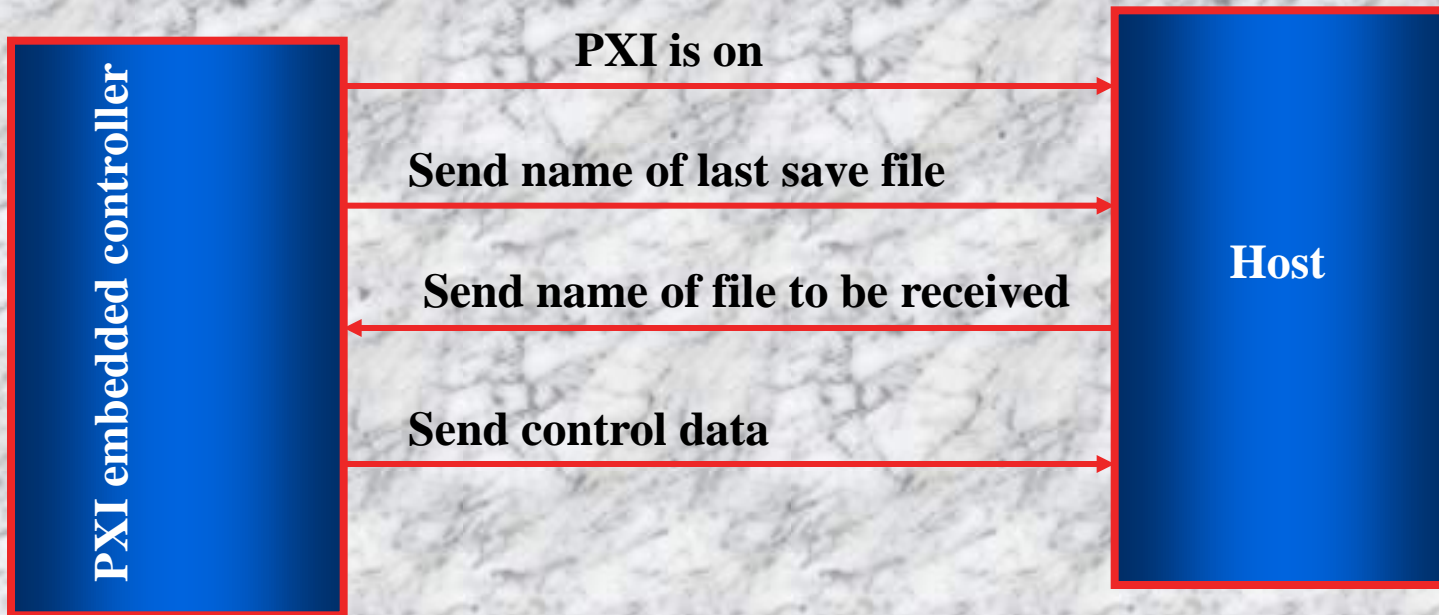
Connect to PXI to receive data files of 1 hour

**System status of PXI and data
To the critical steps of acquisition system**



DAQ SYSTEM FOR GYROLASER

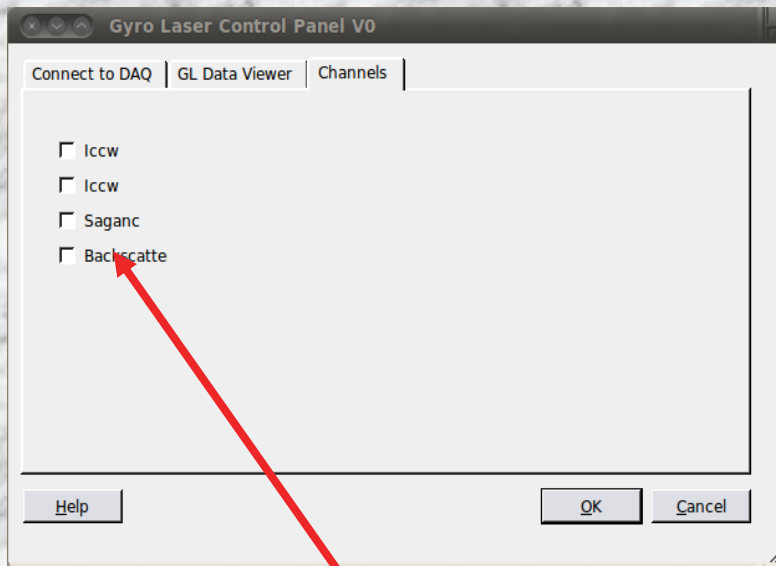
PXI embedded controller -host interface



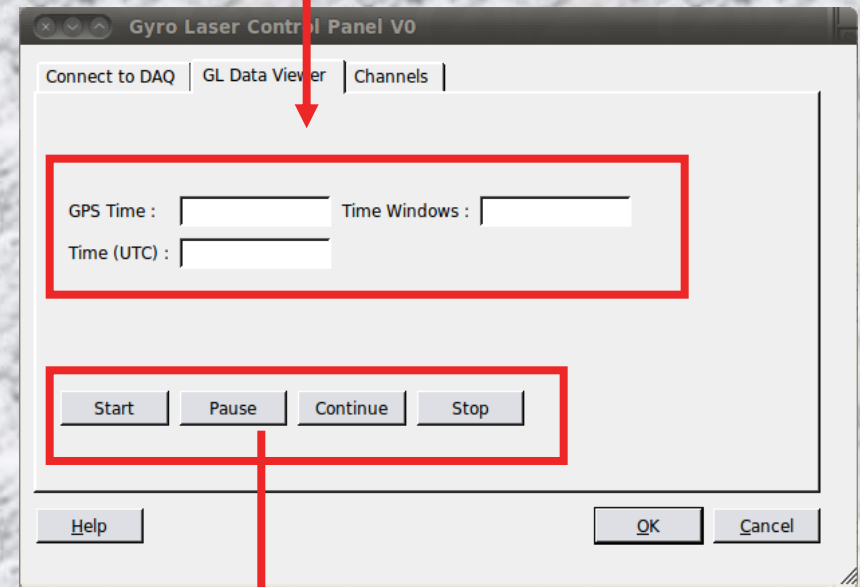
DAQ SYSTEM FOR GYROLASER

Gyro laser user Interface

Start time and period



Check the channel to be analysed



Buttons to start stop the analysis.

DAQ SYSTEM FOR GYROLASER



NI PXI-4462

4 input channels @ 204.8 kS/s.

**Used for acoustic and vibration data
For that reason**

24-bit resolution ADCs with 118 dB dynamic range

Variable antialiasing filters

Software-configurable AC/DC coupling and IEPE conditioning

Integrated Electronic Piezoelectric (IEPE) must be **disable in our application**

DAQ SYSTEM FOR GYROLASER



NI PXI-6229

16-Bit, 250 kS/s, 32 Analog Inputs

**Four 16-bit analog outputs (833 kS/s)
48 digital I/O; 32-bit counters; digital triggering**