

LabVIEW – Data Acquisition



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MAX

Measurement and Automation Explorer

- A tool to set up and test NI hardware
- Can set up *tasks* consisting of one or more channels of DAQ, *scales* for scaling data etc
- Interacts with all NI hardware, as well as most other vendors
- Can also set up and test serial and parallel ports, GPIB ports, PXI systems etc



DAQmx

- The driver for the basic National Instruments DAQ cards (USB6008, PCI6251 etc)
- Most cards are PnP, and driver automatically finds new hardware
- Provides seamless integration into LabVIEW – a set of DAQmx VIs controls the DAQ cards
- Works on various platforms (PCI, PXI, USB etc)



Interacting with DAQ HW

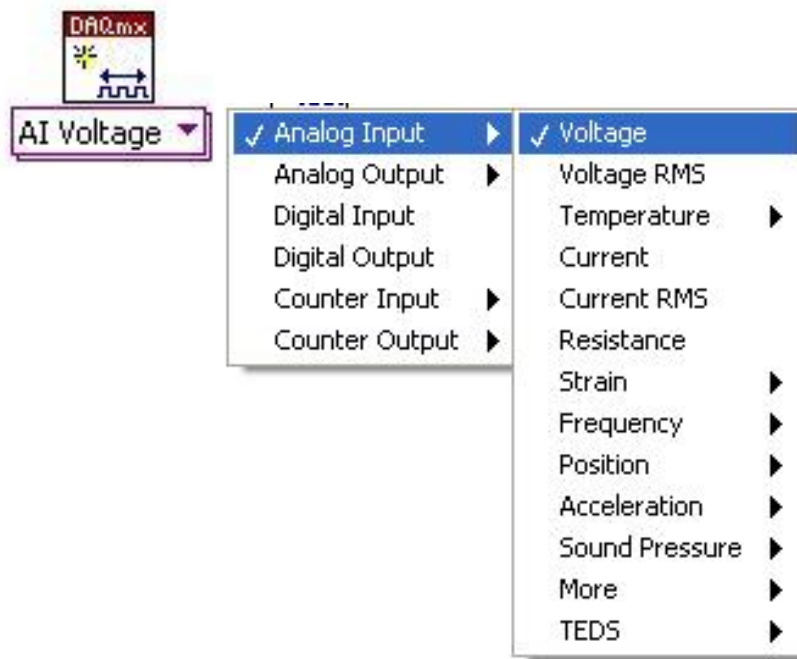
Typical sequence of obtaining data is:

- Create Virtual Channel (Ain, Dout, etc)
- Set timing and triggering parameters
- Write data to Channel (for outputs)
- Start Task
- Wait until Task has completed
- Read data (for inputs)
- Stop Task
- Clear Channel

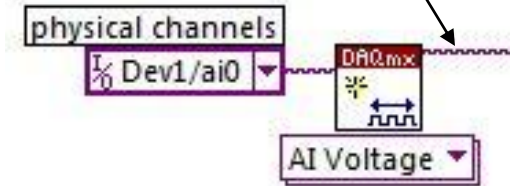


DAQ HW – Creating Channels

- When a Virtual Channel is created, all further sub-VIs use a Reference to that channel

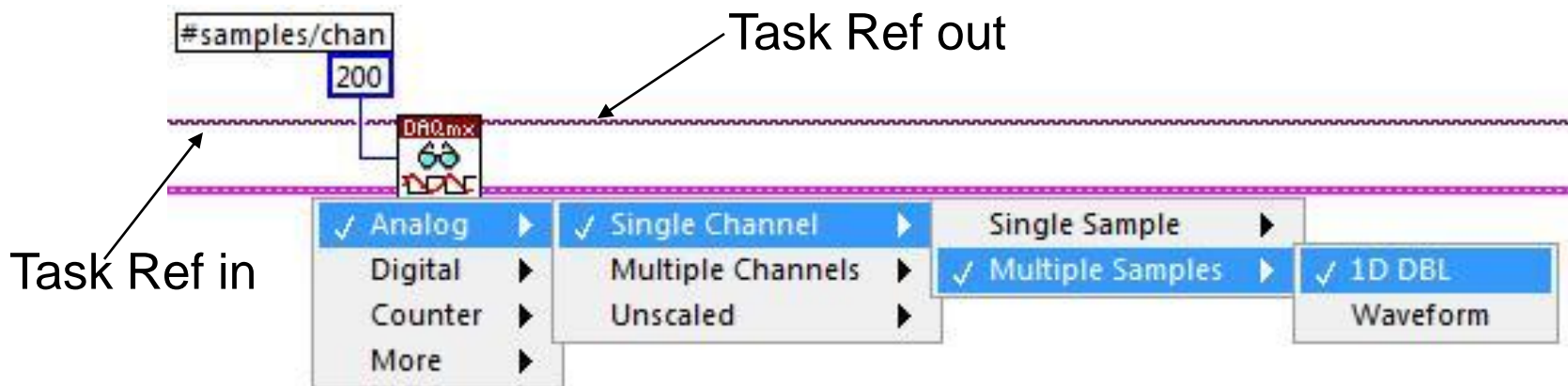


Task Reference
(task out)



DAQ HW - Input

- For reading DAQ HW, select the data-type for the output

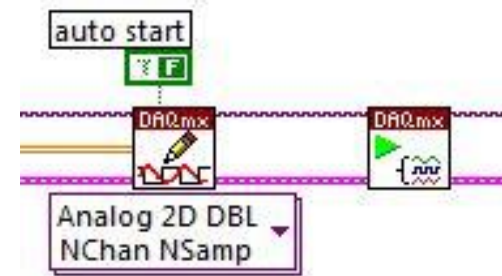
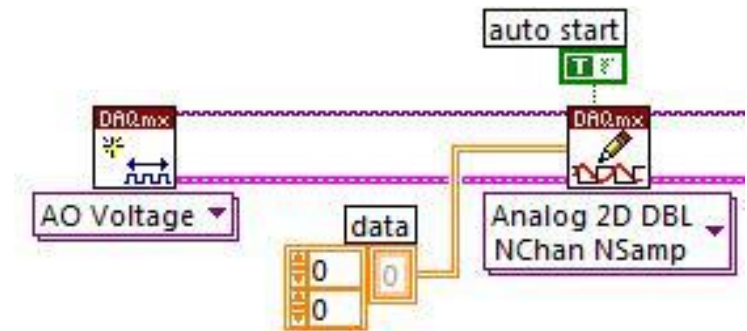


- For single channel, multiple sample output is a 1D array; multiple channel output is 2D array



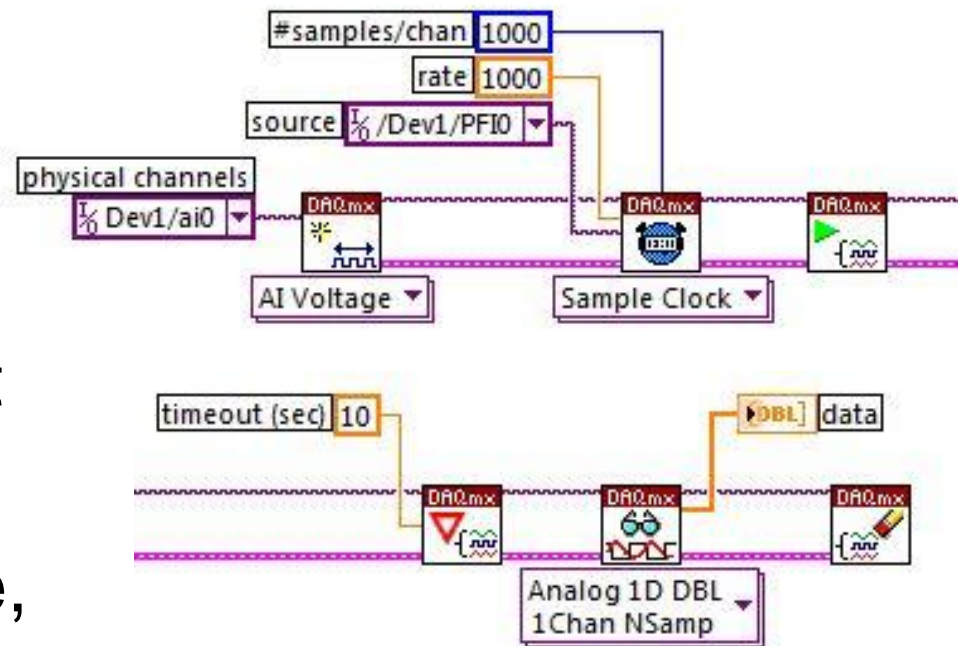
DAQ HW - Output

- For writing to DAQ HW, select the data-type for the output
- Once data is written to buffer, it will be output immediately
- If 'auto start' is False, start the task manually



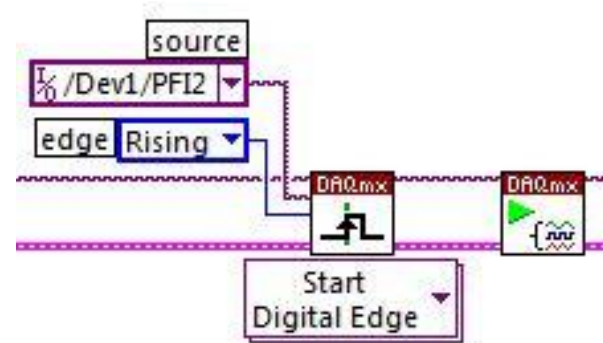
DAQ HW - Synchronising

- DAQ can synchronise to an external clock
- Manually start task
- Task waits until complete, or times out (generating an error)
- After task is complete, clear it to free DAQ resources



DAQ HW - Triggering

- DAQ can be triggered by an external source
- Manually start task
- Task won't read/write data until triggered



DAQ HW – Multiple Devices

- Multiple cards can share resources (triggers, clocks etc)
- Can use both external clock and trigger in one task
- Use 'connect' before starting tasks, and 'disconnect' after stopping tasks
- Connections are very architecture-dependent

