

## ListTOF Data Acquisition Unit

### Field of application

The unit is designed to be used in any neutron scattering measurement in case of line detectors, series of single detectors or special neutron scattering signal sources together with signals coming from choppers or other signal sources. Neutron events from large number of detectors can be collected by having several ListTOF Data Acquisition Units working parallel.

Its basic mode of operation is event recording. The unit collects all the input events and generates both histogram and event record list data with high resolution timestamps. The unit is optimized to Time-Of-Flight experiments.

### Software

The ListTOF Data Acquisition Unit has preinstalled internal firmware which communicates with a dedicated data processing computer through a dedicated Gigabit Ethernet line.

A product DVD is a part of the delivery. It contains the following components:

- **Data Acquisition software**

This software performs the necessary data processing according to the attached configuration files. It runs under MS Windows 10. The software works as a TCP/IP server program which accepts and responds to requests from an instrument computer.

- **Data Acquisition Suite**

An easy-to-use graphical application written in NI LabView, containing simple programs for demonstrating / testing data acquisition. Source code is also available.

- **Detailed documentation**

of the communication protocol, description of commands

## Specification

Type: ListTOF

Housing: durable 160 x 120 x 100 mm aluminum casing

The casing can be secured as needed with four screws to any flat surface.

Power supply: the unit has external power adapter and connector (5V DC)

Signal inputs:

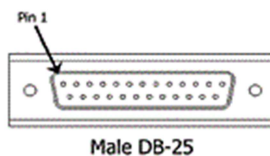
- 48 logical inputs
- 4 input ports (Port 0 to Port 3) with 12 digital input signals each
- Port connectors are DB25M D-sub 25 pin
- 12 inputs of Port 0 are available parallel on front panel BNC connectors also
- Input impedance of each input can set to either to 4 k $\Omega$  or to 50  $\Omega$
- Each channel accepts any signal level between 2.5V and 10V as "ON" and levels below 0.5V as "OFF".

In case of ListTOF experiments with choppers, stroboscopic measurements or with using Monitor Control Unit the following BNC inputs are preferable:

Signal name	Port0 signal name	Front panel pin code
Chopper-1	EventStatus01	Ch01
Chopper-2	EventStatus02	Ch02
Chopper-3	EventStatus03	Ch03
Chopper-4	EventStatus04	Ch04
Chopper-5	EventStatus05	Ch05
Chopper-6	EventStatus06	Ch06
Chopper-7	EventStatus07	Ch07
Free	EventStatus08	Ch08
Free	EventStatus09	Ch09
Monitor Count	EventStatus10	Ch10
Stroboscopic event-1	EventStatus11	Ch11
Stroboscopic event-2	EventStatus12	Ch12

The pin distribution (valid for each port) is shown below:

Pin#	Name
1	EventStatus01
2	GND
3	EventStatus02
4	GND
5	EventStatus03
6	GND
7	EventStatus04
8	GND
9	EventStatus05
10	GND
11	EventStatus06
12	GND
13	EventStatus07
14	GND
15	EventStatus08
16	GND
17	EventStatus09
18	GND
19	EventStatus10
20	GND
21	EventStatus11
22	GND
23	EventStatus12
24	GND
25	-



## Signal input definitions:

- Each input line can set to be Status Input or Event Input. At Event Inputs it is necessary to set also whether the raising or the falling edge causes the event. (It is pre-programmable.) If active event occurs then also the logical value of other lines (Status Inputs) are also recorded as parameter of the event.
- Both EventStatus11 (Pin#21) signals of Port1 and Port2 with falling edge input impulses can be used also for handshaking.
- Maximal count rate:  $10^5$  event/sec
- Output connections: 2 TTL output lines, Out1 and Out2 with BNC connectors
- Exclusively for data handshaking (by giving out 800 ns wide impulses)
- The corresponding handshake lines:

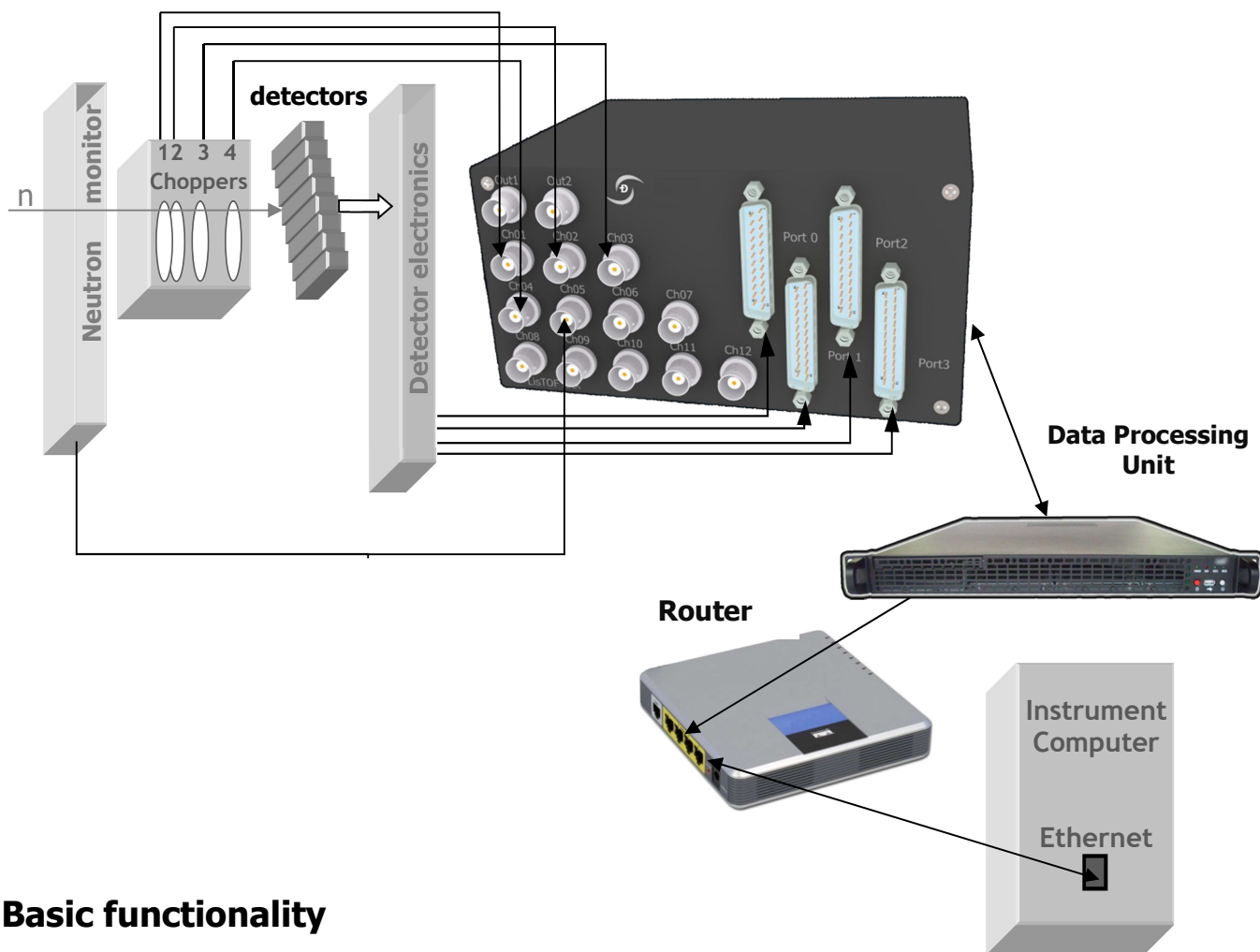
Falling edge input to	800 ns wide active low impulse output
EventStatus11 (Pin#21) of Port1	Out1 BNC connector
EventStatus11 (Pin#21) of Port2	Out2 BNC connector

- Service input: RS232 connector
- Data and control communication:
- Gigabit Ethernet connector for the output data stream and control
- The connection has a preset fixed IP address.
- Data outputs:
  - Event record list data with timestamp of 100 ns resolution

## ListTOF Data Acquisition System

We deliver TDC Data Acquisition System as a package containing optimized components:

- ListTOF Data Acquisition Unit
- Data Processing Unit with completely installed operation system and software
- Router
- Instrument Computer



## Basic functionality

The ListTOF Data Acquisition System gathers the incoming neutron events from the detectors and from the choppers. The data processing software running on a Data Processing Unit with Windows 10 or 7

- analyses the gathered real time data
- calculates the wavelength of each neutron scattering data
- produces both the event record list and the spectrum

during the measurement. The spectrum can be readout by any application software by using a simple communication protocol with the Data Processing Unit and by setting a proper wavelength interval. Having a dedicated Instrument Computer is suggested.