

NetMCA-3 Technical Data

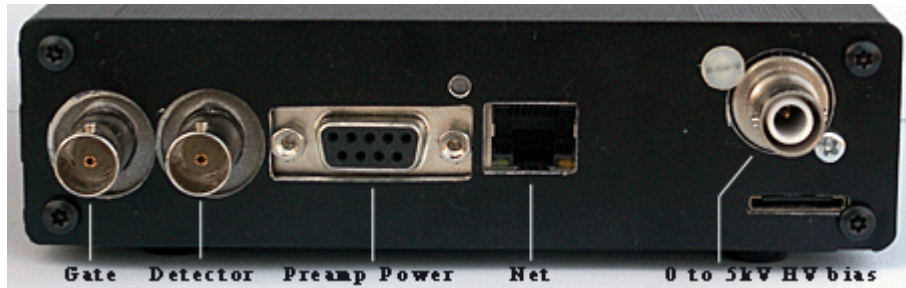
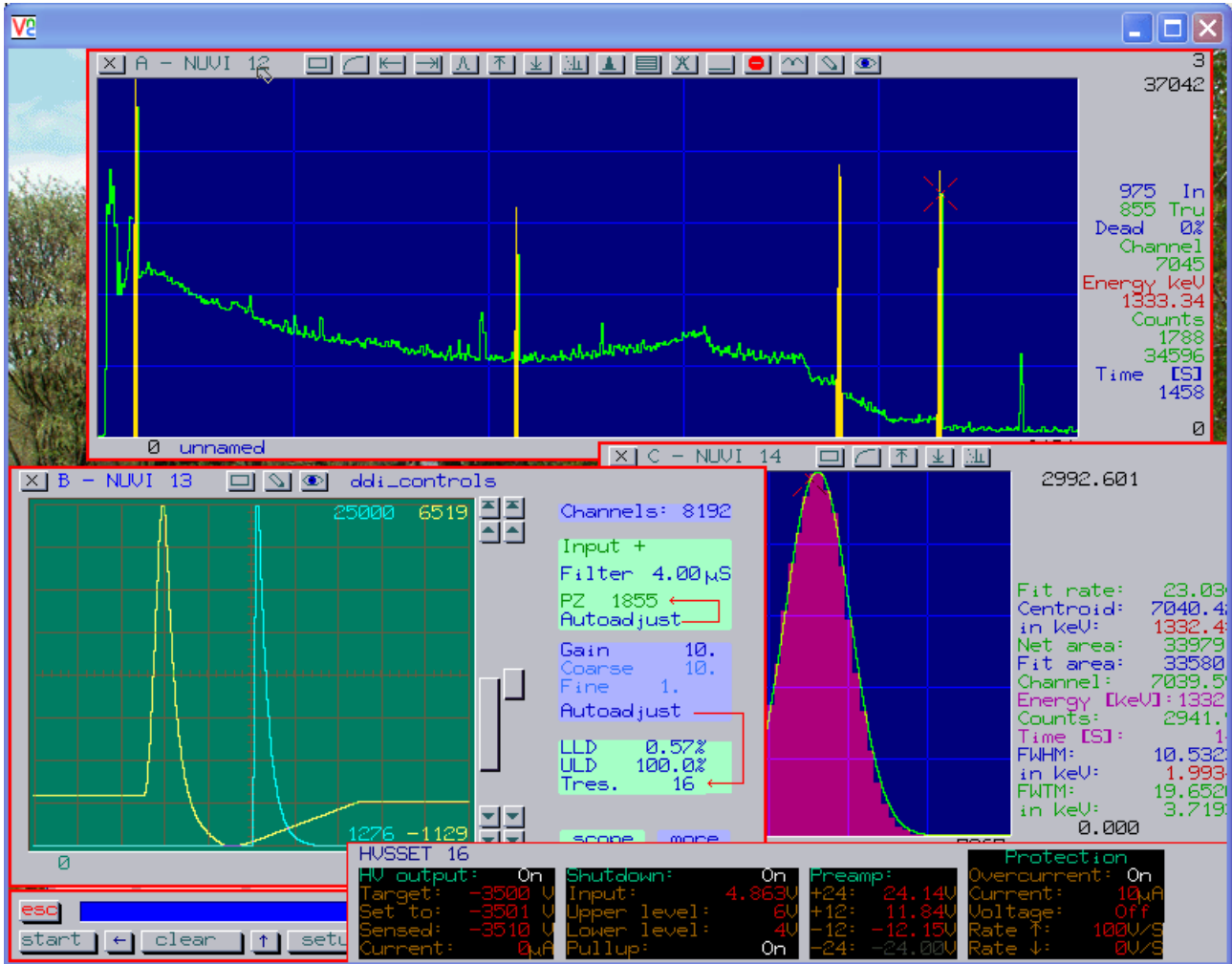


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1. Overview

The netMCA-3 is a triple port nuclear/xray spectrometer.

It has one DDI (Digital Detector Interface) port and two ADC-style MCA ports.

The DDI port is for direct connection of a detector - HPGe, Si, NaI etc. It has an analog input through which it takes the signal from the detector output for digitalization, a gate which allows external gating on a per event basis, a HV bias output and a detector preamp power output. The DDI uses advanced, TGI proprietary DSP conversion algorithms and delivers the best resolution and throughput one can expect from a given detector. The input signal is digitized after only differentiation and PZ correction; filtering and event recognition, base line restoration and pile-up detection/rejection are all done by DSP (Digital Signal Processing).

The two MCA ports, each on a D-25 connector with a "standard" pinout, make a dual input multichannel analyzer (MCA). The netMCA-3 relies on an Ethernet connection to communicate to the outside world; it does so via RFB (VNC) and http, thus being accessible from practically any PC, windows, linux etc. without the need for any MCA specific software to be running on that PC. In other words, the PC

is used simply as a terminal - screen, keyboard and mouse - to the netMCA-3 which contains all the software it takes to do spectrum acquisition through all its 3 ports simultaneously, storage and evaluation, as well as to import/export spectra, transfer data over ftp etc.

2. Features

- completely accessible and controllable over the Internet
- DDI port for direct connection of a detector
- DSP conversion of the digitized input signal
- up to 16k spectrum length
- external gating for the detector input
- flexible HV shutdown input
- two D-25 MCA ports with "standard" pinouts
- independent and simultaneous operation of all 3 ports
- coincidence driven operation of the two ports
- comes spectrum acquisition and evaluation ready
- works over the Internet using a regular PC with no special MCA software
- 10/100 Ethernet
- internal HDD
- powered by 12V, 0.8A typ - wall adapter included in shipment
- on site reprogrammable port logic for customer specific interfaces

3. Signal Description

3.1. DDI port

Detector input BNC - this is the analog input where the detector signal comes in (typically from the detector's preamp output). Both positive and negative polarities are supported, menu switchable.

Gate BNC - gates the event conversion. If the input is open, conversion will proceed normally. If the input is shorted during the event rising edge, the event will not be converted into the spectrum.

HV output SHV - detector bias HV output. 0 to 5 kV, 100 uA max. Polarity is reconfigurable by changing the HV coil and a jumper in their sockets (should be done by an experienced technician only, takes opening the case and is not easy to do). Ships with the polarity specified with your order. The HV menu allows monitoring of set & readback voltages, output current (at apr. 0.4 uA resolution), and the shutdown input voltage.

Preamp power D-9 - power for the detector preamp. +24V, -24V, +12V and -12V; also has the external shutdown sense input and RxD and TxD (used for maintenance purposes, intended to talk to smart detectors for automated setup). The power outputs allow a 100 mA current to be drawn each.

Figure 3.1.1 shows the pinout of the D-9 preamp power connector:

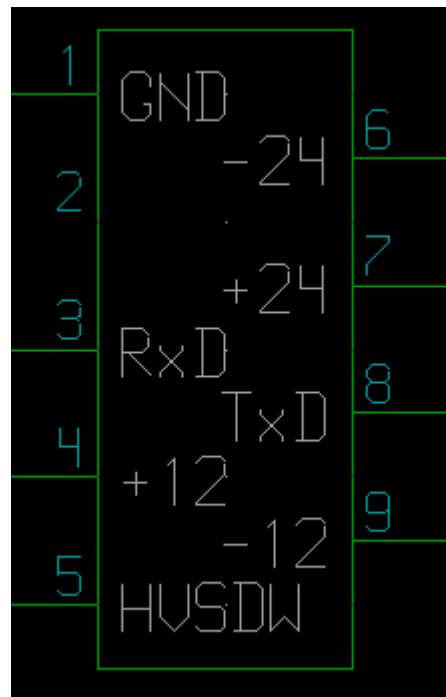


Figure 3.1.1 – preamp power connector signals

Table 3.1.1. – signals description on the D-9 connector

Signal	Pin	Direction	Function
'-24	6	Output	-24V, 100mA max. power for the preamp
'+24	7	Output	+24V, 100mA max. power for the preamp
'-12	9	Output	-12V, 100mA max. power for the preamp
'+12	4	Output	+12V, 100mA max. power for the preamp
GND	1	N.A.	Ground
RxD	3	Input	RS-232 RxD
TxD	8	Output	RS-232 TxD

3.2 MCA ports

Figure 3.2.1. shows the pinout of the two D-25 MCA port connectors.

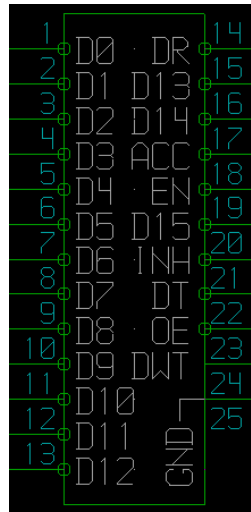


Figure 3.2.1. – D-25 connector pinout

Table 3.2.1. – signals description on the D-25 connectors

Signal	Pin	Direction	Function
D0 - D15	1-13,15,16,19	Inputs	D15 Input data signals. Active low "by standard", however polarity is programmable via an EOR mask in the MCA setup
DR	14	Input	Data Ready - programmable polarity
ACC	17	Output	Data accepted - programmable polarity
EN	18	Output	Enable signal to ADC
OE	22	Output	Output enable signal to ADC
DT	21	Input	Dead time input from ADC, programmable polarity
INH	20	Input	Inhibit signal, programmable polarity
DWT	23	N.A.	Dwell time, not used in ADC mode
GND	24	N.A.	System ground

4. Specifications

4.1. DDI port characteristics

Gain range: 10 to 3000

Conversion range: up to 16384 channels

Gain temperature stability: < 30ppm/C

Offset zero: 0 (by design)

Differential nonlinearity: < 1% LSB

Integral nonlinearity: < 0.025% fullscale

HV range: 0 to +5 or -5 kV (jumper & socket selectable)

Differentiator: 1, 2, 4 and 8 uS (menu selectable)

Shaping time equivalent: 1 to 12 uS

4.2 Electrical characteristics

Table 4.2.1. Absolute maximum ratings

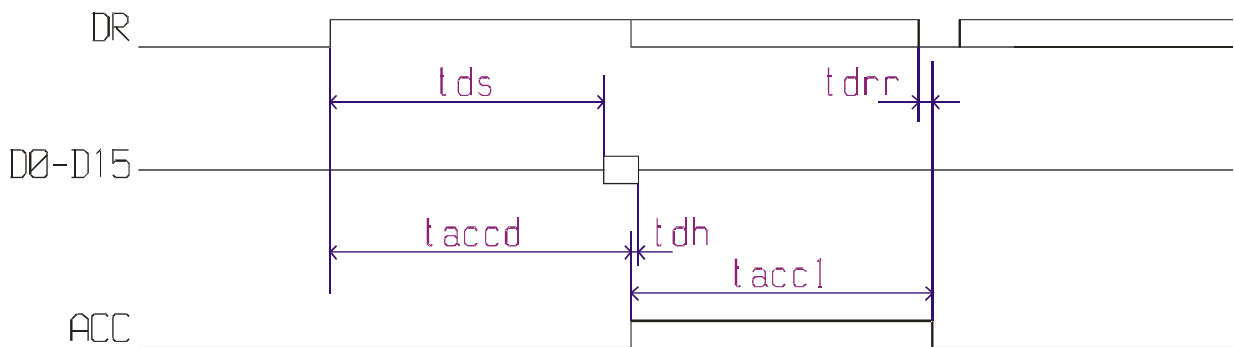
Characteristic	Symbol	Minimum	Maximum	Unit
Power Supply Voltage	Vp	-0.5	16	V
Input Voltage at analog Detector input	Vdi	-15	15	V
Input Voltage at MCA ports	Vi	-0.5	+5.5	V
Output current per pin	Io	-100	100	mA

Table 4.2.2. Recommended operating conditions

Characteristic	Symbol	Minimum	Typical	Maximum	Unit
Power Supply Voltage	Vp	11.5	12	13	V
Input Voltage Low	Vil	0	-	0.8	V
Input Voltage High	ViH	2	-	5.5	V
Output Voltage 1	Voh	-	3.3	-	V

Table 4.2.3. MCA Ports Timing Characteristics

Symbol	Description	Min	Max	Unit
tds	Data setup to DR assertion	-440	-	nS
tdh	Data hold after ACC asserion	0	-	nS
taccd	DR asserted to ACC asserted	450	500	nS
taccl	ACC asserted	450	500	nS
tdrr	DR release to ACC release	33	-	nS



When operating in coincidence mode, only events with overlapping taccd for a minimum of 33 nS will be acquired.