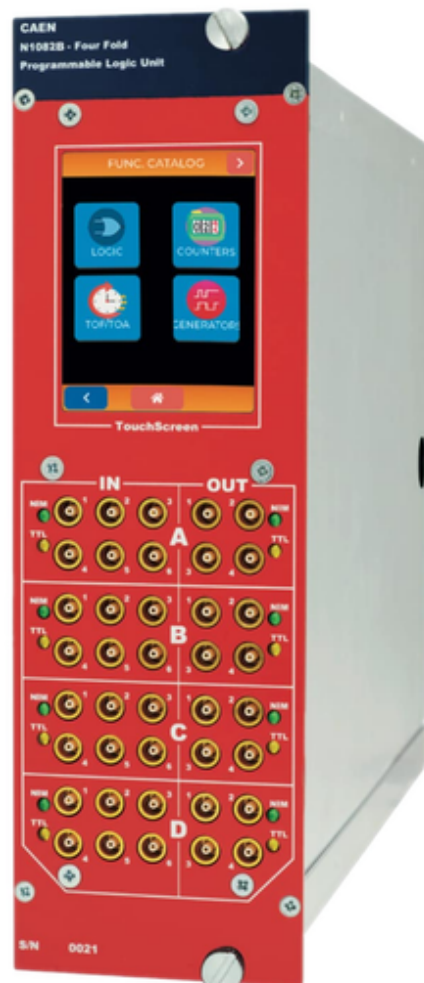


Coming Soon

N1082

NIM Four-Fold Programmable Logic Unit



Features



- Double-width NIM unit
- Wide range of **user-selectable functionalities**: logic functions, counting, timing, digital pulse generator.
- 4 independent sections, each with:
 - 6 NIM/TTL/ANALOG input
 - 4 NIM/TTL output
- Input stage with **Gate&Delay** and **Leading Edge Discriminator** for analog input signals
- Output stage with **Monostable** capability
- **2.8" touch screen display** with user-friendly widgets to configure each section and monitor real-time data
- Ethernet (1 Gbps) and USB2.0 connectivity
- **Web-based Graphical User Interface** to remotely control the module and access advanced features

Description

The CAEN **Mod.N1082 Four Fold Programmable Logic Unit** is a laboratory tool that incorporates in a single **NIM** module the most common functionalities that you need to implement the **logic capabilities** of your experiment.

The module is organized in four sections, with 6 inputs and 4 outputs each accepting TTL/NIM signals, with the possibility to feed in analog signals and process them through a leading-edge discriminator. The input stage features an asynchronous **Gate&Delay** with 5 ns resolution while the output stage feature an asynchronous **Monostable** stage. This allows the user to trim at best the needed parameters and to perform accurate measurements using the available logic functions.

Each section is configurable independently according to one of the available pre-programmed functions. The board configuration can be performed using the 2.8" touch screen display or via the web-interface, accessible via USB or Ethernet.

On the **touch screen** interface, each function is associated to a widget, meant to be used for configuration and monitor purposes.

The **web-interface** allows the user to remotely configure the instrument via USB or Ethernet, monitor the functions output, dump data on file or history chart and access to the most advanced functions. No software installation is required!

Developed in collaboration with Nuclear Instruments.

Technical Specifications

General

Form Factor 2U NIM module

No. of sections

- 6 sections, independently programmable.
- Possibility to daisy chain more sections to make them operate as a single function with multiple inputs.

Functions

Logic

FANOUT, WIRE, AND, OR, OR+VETO, MAJORITY, MAJORITY+VETO, LUT, COINCIDENCE

Counter

SCALER, COUNTER, COUNTER TIMER, CHRONOMETER, RATE METER

Timing

TIME, TAGGING, ToF, ToT

Generator

PULSE GENERATOR, DIGITAL GENERATOR, PATTERN GENERATOR

Input

Nr. of inputs: 6 per section CH 3 and CH 6 may be reserved for special function

Connector: LEMO

Input impedance: 50 Ω / 1 k Ω

Signal type NIM/TTL/DISCR, DISCR is an arbitrary signal fed to the leading-edge discriminator

Min input width: 2 ns

Min input voltage: ± 10 mV in DISCR mode

Gate and Delay stage:

- **Gate:** 15ns \div 10 μ s
- **Delay:** 0 \div 10 μ s
- **Step:** 5ns
- **Resolution:** $\pm 1\%$ ± 3 ns

Output

- Nr. of outputs: 4 per section
 - Connector: LEMO
 - Signal type: NIM/TTL
 - Min output width: 5.5 ns Measured with -500 mV signal, -200 mV threshold, WIRE function
 - Output NIM rise/fall time: ≤ 2.5 ns
 - Output TTL rise/fall time: ≤ 6 ns Measured up to 1 MHz , WIRE function
 - Output TTL Amplitude: 3.1 V
- Monostable stage:
- Width: 15 ns \div 1 μ s
 - Step: 5ns
 - Resolution: $\pm 1\%$ ± 3 ns

Minimum I/O delay

- 30 ns – G&D and Monostable disabled
- 40 ns- G&D enabled, Monostable disabled
- 40 ns- G&D disabled, Monostable enabled
- 55 ns – G&D and Monostable enabled

Measured in WIRE mode

Leading Edge Discriminator

Operation mode:

- Time over Threshold (G&D and Monostable disabled)
- Non-updating (when Monostable output is enabled)

Min. input voltage: ± 10 mV

Max Input Voltage: ± 5.2 V

Threshold range: [-800 mV ÷ 2.5 V]

Threshold step: 1 mV

Non linearity: $4\% \pm 6.5$ mV

Efficiency:

- - 3 mV threshold variation to pass from 0% to 100% of the trig rate
- Measured with -500 mV signal, WIRE function

Double pulse resolution

- Time over threshold mode, NIM out : 10 ns à 100 MHz
- Time over threshold mode, TTL out : 12.5 ns à 80 MHz
- Non-updating mode, 25 ns à 40 MHz

Reflections: $\leq 2\%$ on input signals (measured with -200 mVpp signal)
Methodology note: all the technical specifications of the Leading Edge discriminator are based on the x1082 working in WIRE function, to replicate a standard discriminator unit

Max. sustainable frequency

- Asynchronous functions, NIM out à 100 MHz
- Asynchronous functions, TTL out à 80 MHz
- Synchronous functions, à 40 MHz
- Scaler max. division rate à 130 MHz

Methodology note: these technical specifications are based on measurements done with 3.3 V pulses, 2 ns width, 400 mV threshold

AND

Minimum overlap: 1.5 ns

VETO

Veto must precede the event by at least 3 ns

Timing functions

- Minimum detectable time: 13 ns
- Resolution: 10 ns
- Bin size: [10 ns ÷ 1s], up to 1024 bins
- Time reconstruction: $t = 13 \text{ ns} + \text{bin size} \cdot \text{bin number}$

Pulse Generator

Signal type: NIM/TTL

Max. frequency: 20 MHz

Min. pulse width: 10 ns

Connectivity

Ethernet (1Gbps) , USB 2.0

Touchscreen

2.8" LCD, Transmissive type

Software

- Touch screen widgets
- Web-based Graphical User Interface

Power consumption

1.5 A @ 12V (Typ.)

Environmental

Environmental: Indoor use

Operating Temperature: Operating Temperature -20 °C ÷ 50 °C

Operating Humidity: 25% ÷ 95% RH non condensing

Storage Temperature: -30 °C ÷ +80 °C

Storage Humidity: 5% ÷ 90% RH non condensing

Altitude: ≤2000 m

Pollution Degree: 2

Overvoltage Category: II

EMC Environment: Commercial and light industrial

IP Degree: IPX0 enclosure, not for wet location

Regulatory

- EMC: CE 2014/30/EU Electromagnetic compatibility Directive
- Safety: CE 2014/35/EU Low Voltage Directive

Ordering Options

Code	Description
WN1082XAAAAA	N1082 - Quad 6-input NIM Programmable Logic Unit RoHS

Related Products

DT1081B



Desktop Four-Fold Programmable Logic Unit

V2495

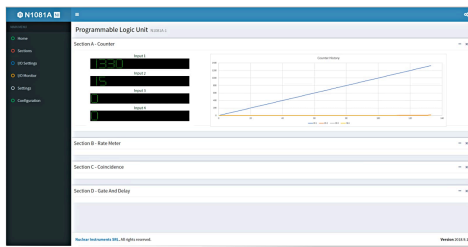
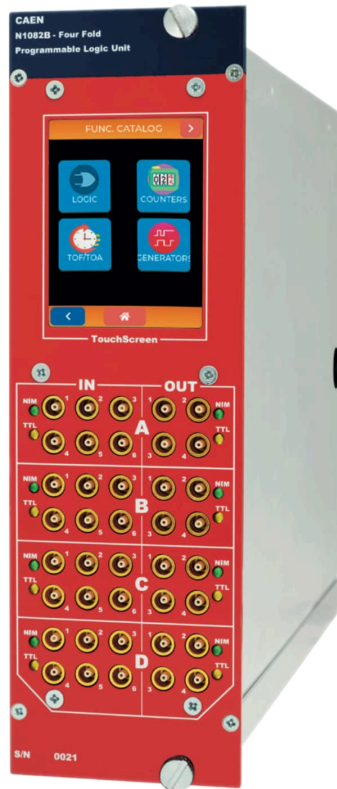


Programmable Logic Unit PLUS

DT5495



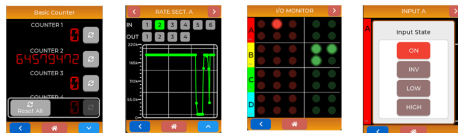
Programmable Logic Unit



Provides access to device settings, including configuration parameters, clock management, system information, and maintenance tools

Displays the communication parameters of the unit, including IP address, DHCP status, subnet, gateway, DNS, MAC address, hostname, and cable connection state

Configures internal and external clock sources. External synchronous can be enabled, and indicators display the validity and status of the clock signals.

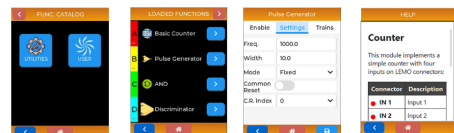


Implements event counting on up to four input channels. Counters operate independently and can be reset individually or all at once. Counts are updated in real time.

Provides a graphical representation of input and output event rates. Enables analysis of rates over time for a given logic section.

Monitors in real time the logic state of all inputs and outputs. This view allows verification of signal activity and correct module connections.

Allows configuration of each input channel. Inputs can be set to ON, inverted, or forced to logical LOW or HIGH states.



Enables the unit to run custom firmwares generated with the Sca-Compiler software. This feature allows the design, compilation, and upload of user-defined logic functions directly into the x1082 FPGA.

Displays the list of logic and utility modules currently loaded in the x1082. Each module can be opened for detailed configuration.

Generates digital pulses with programmable frequency, width, and mode (e.g., burst or train). It supports common reset synchronization and allows selection of the reset index for advanced timing count.

Provides documentation for the Counter module. Describes the available LEMO inputs and their correspondence with logical channels.

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