

Coming Soon

DT1082

Desktop Four-Fold Programmable Logic Unit



Features



- Handy Desktop form factor
- 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.DT1082 Desktop Four Fold Programmable Logic Unit** is a laboratory tool that incorporates in a single handy Desktop 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

Desktop 257 x 102 x 331 mm³ (WxHxD), excluding the handle bar

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

No. of sections

4 sections, independently programmable.

Possibility to daisy chain more sections to make them operate as a single function with multiple inputs.

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: 15 ns \div 10 μ s
 - Delay: 0 \div 10 μ s
 - Step: 5 ns
 - 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: ≤ 5 ns
- Output TTL Amplitude: 3.1 V
- Monostable stage
 - Width: 15 ns \div 1 μ s
 - Step: 5 ns
 - 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 @ 100 MHz
- Time over threshold mode, TTL out : 12.5 ns @ 80 MHz
- Non-updating mode, 25 ns @ 40 MHz

Reflections: $\leq 2\%$ on input signals (measured with -200 mV_{pp} 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 @ 100 MHz
- Asynchronous functions, TTL out @ 80 MHz
- Synchronous functions, @40 MHz
- Scaler max. division rate @ 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

Environmental

- Environmental: Indoor use
- Operating Temperature: Operating Temperature $-20\text{ °C} \div 50\text{ °C}$
- Operating Humidity: $25\% \div 95\%$ RH non condensing
- Storage Temperature: $-30\text{ °C} \div +80\text{ °C}$
- Storage Humidity: $5\% \div 90\%$ RH non condensing
- Altitude: $\leq 2000\text{ m}$
- 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	
WDT1082XAAA	DT1082 - Quad 6-input Desktop Programmable Logic Unit	RoHS

Related Products

V2495



Programmable Logic Unit PLUS

N1081B

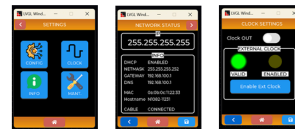
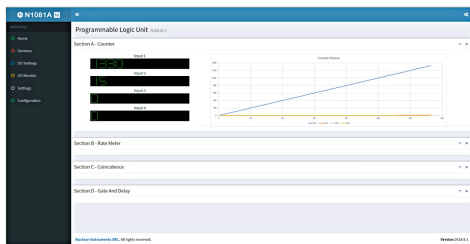


NIM Four-Fold Programmable Logic Unit

DT5495



Programmable Logic Unit



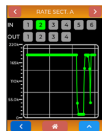
Provides access to device settings, including configuration parameters, clock management, system information, and maintenance tools

Displays the communication parameters of the unit, including IP address, DHCP status, 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.



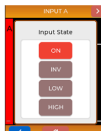
Implements event counting on up to four input channels. Counters operate independently and can be reset individually or all at once. Counts are updated in real time.



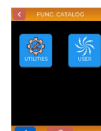
Provides a graphical representation of input and output event rates. Enables analysis of rates over time for a given logic section.



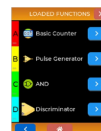
Monitors in real time the logic state of all inputs and outputs. This view allows verification of signal activity and correct module connections.



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



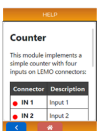
Enables the unit to run custom firmwares generated with the Sca-Compiler software. This feature allows the design, compilation, and upload of user-defined logic functions directly into the x1082 FPGA.



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 control.



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

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CAEN S.p.A.

Via Vetraia 11
55049 - Viareggio
Italy

Phone +39.0584.388.398

Fax +39.0584.388.959

info@caen.it

www.caen.it

CAEN GmbH

Brunnenweg 9
64331 Weiterstadt, Germany

Phone +49 (0)212.254.4077

Mobile +49 (0)151.16.548.484

info@caen-de.com

www.caen-de.com

CAEN Technologies, Inc.

1 Edgewater Street - Suite 101
Staten Island, NY 10305
USA

Phone +1.718.981.0401

Fax +1.718.556.9185

info@caentechnologies.com

www.caentechnologies.com

CAENspa India Private Limited

B205, BLDG42, B Wing,
Azad Nagar Sangam CHS,
Mhada Layout, Azad Nagar, Andheri West
Mumbai, Maharashtra 400053, India

info@caen-india.in

www.caen-india.in

