

# NIMbox NAD4

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**NAD4 - 4 channel 100 MHz flash ADC with 8 programmable TTL I/O ports**

**This single slot wide NIM module is a pre-configured NIMbox version with 4 x SU701 sub-modules. NAD4 is a 4 channel 14-bit 100MHz flash ADC with FIFO and with additional 8 programmable TTL I/O ports. NAD4 can be used as digitizer / oscilloscope.**

Programming the internal FPGA allows to set-up the ADC channels and their data read out but also to define logic functions for the 8TTL I/O ports. This includes AND/OR coincidences and majorities, fan in / fan out etc. but also includes more complex features as timer, counter, and even multi-hit dead-time less Time-to digital converter. All logic functions are programmed into the FPGA via the high speed USB-2 interface.

Using the provided LabView VI library "Toolbox" easy and fast

programming of all configurations settings and functions is possible.

## Main Features

- programmable NIM module with 4 channels 100MHz/14bit FADC and 8 programmable TTL inputs / outputs,
  - USB-2 interface for programming, control and read-out
  - Pre-configured firmware with standard functions for logic and built-in hardware (I/O and ADC's)
  - "Logic box" tool set for virtual wiring, configuring and read-out within National Instruments LabView
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- Single width NIM module
  - 4 channel flash ADC, 14-bit, maximum 100MHz (programmable sampling frequency divider),
  - Input range 0.5V to +0.5V (other ranges on request)
  - Internal (threshold) and external trigger, pre- and post-trigger sampling
  - automatic calculation of pulse characteristics as integral charge, maximum with position,
  - 8 programmable TTL inputs / outputs, Lemo connectors 50 Ohm impedance
  - Programmable logic functions as AND / OR / XOR / NOT, Fan In / Fan Out, complex multi-level logic conditions possible, configurable FPGA embedded functions as 32-bit scaler / counter, clock, pulse / delay and gate generator, synchronizer
  - EEPROM to save programmed configuration
  - High-speed USB-2 interface for programming, read-out and firmware upgrades
  - Power consumption: 6V x 800mA (2A fuse)

## Standard configurations

Items	Description
<b>NAD4-AC</b>	4 channel AC coupled F-ADC with 8 TTL I/O ports
<b>NAD4-DC</b>	4 channel DC coupled F-ADC with 8 TTL I/O ports
<b>NAD4-Mix</b>	2 channel AC coupled and 2 channel DC coupled F-ADC with 8 TTL I/O ports

## NEMbox/NIMbox Submodules

NIMBox/NEMbox submodules are to be used in the slots on the main FPGA carrier board. Submodule programming is done through the FPGA using the USB 2 link. Different submodules can be combined. I/O connectors: LEMO<sup>T</sup> (except SU701 and SU705).

- **SU703: 4 channel leading edge discriminator with 1 channel TTL Input / Output**
  - Programmable threshold (-2.5 ... +2.5V, 12 bit)
  - Programmable hysteresis ( 0 to 60 mV, 12 bit)
  - 5 programmable LED/s
- **SU704: 5 channel NIM or TTL Input / Output**
  - 50 Ohm, Lemo connectors
  - NIM or TTL for each channel jumper selectable
  - Output -16 mA (NIM) or 0 – 3.3V (TTL)
  - Delay 4-5 ns
- **SU706: 1 channel sampling ADC with 2 channel TTL Input / Output**

- 14 bit resolution, 100 MHz maximum sampling rate
- pre and post trigger sampling
- FIFO 1024 values
- AC coupled and DC coupled versions
- **SU707: 8 channel LVDS I/O**
  - RJ45 connectors
- **SU709: 8 temperature sensors**
  - Digital, duty cycle output
  - Calibrated on chip
  - Range: -45 to 130 °C
  - Absolute accuracy +/- 0.7 °C, chip resolution 0.005 °C
- **SU710: 2 channel DAC**
  - 100 MHz / 14 bit, +/-1V range (at 50Ohm)
  - Memory for 1024 values
- **SU711: 5 channel delay**
  - 0.5 to 128 ns (other ranges on request)
  - ground delay < 20ns

### Standard VHDL modules included in all firmwares:

- Discriminator (only if SU703 is present)
- Digital I/O (for all NIM / TTL I/Os)
- ADCH (ADC and histogrammer, only if SU706 is present)
- DAC (only if SU710 is present)

### Standard VHDL modules included in specific firmwares:

- L – Logic (AND, OR, XOR, Flip Flops...)
- C – Counter, Clock, Timer, Gate Generator (32 bit)
- G – Counter, Clock, Timer, Gate Generator
- B – Time to Digital Converter

Item	Description
<b>SU 703</b>	4 channel discriminator with 1 x TTL I/O and LED's, Lemo <sup>T</sup>
<b>SU 704</b>	5 channel NIM or TTL I/O, jumper selectable, Lemo <sup>T</sup>
<b>SU 706</b>	100MHz 14 bit F-ADC with 2 x TTL I/O, Lemo <sup>T</sup>
<b>SU 707</b>	8 channel LVDS I/O with RJ45 connectors
<b>SU 709</b>	8 channel temperature sensors
<b>SU 710</b>	2 channel 100MHz 14 bit DAC, Lemo <sup>T</sup>
<b>SU 711</b>	5 channel delay 0.5 to 128 ns

### Product Data Sheet

NIMbox NAD4:

[Print Product Data Sheet](#)

**Documentation**

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Manual and Tech-Notes : [NIMbox-NEMbox](#)

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Introduction: [WIENER NIM CAMAC introduction](#)

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**Downloads**

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CD-ROM: [NEMbox NIMbox](#)

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