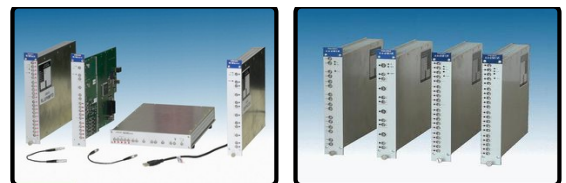


NEMbox / NIMbox Programmable NIM Module

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NEMbox (Nuclear Electronics Miniature Box) is a programmable Logic / DAQ module, powered either in a NIM crate (NIMbox version) or with a commercial 6V output AC/DC transformer ("Desk" version). It is well suited for scientific and educational purposes.

NEMbox and NIMbox consist of a FPGA main carrier board with USB-2 interface and up to 4 I/O Sub-modules. A firmware programmed into the FPGA as well as interface software featuring "LogicPool", provides a new and unique way for the user to build up his specific setup by using prebuilt functional modules and to wire them internally for his application.

A user defined internal wiring configuration can be saved on an EPROM chip so that the module does not need to be reprogrammed in case of power failure or system reset. All communication with the module as well as programming is done via a USB-2 interface.

Being able to work as multiple coincidence, fan in / fan out, splitter, logic, discriminator, ADC, TDC, etc., NEMbox/NIMbox finds many applications in trigger logic and data acquisition, and allows to cut costs because one single unit can replace the functionality of several non programmable NIM modules.

Main Features

- Computer programmable NIM module (NIMbox) or desktop module (NEMbox)
 - Main FPGA board with USB-2 port, 100 MHz clock,
 - 4 slots for I/O sub-modules as NIM/TTL I/O, discriminator, 100MHz FADC, DAC
 - Pre-configured firmware with standard functions for logic and included hardware
 - “Logic box” tool set for virtual wiring / configuring within National Instruments LabView
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- Single wide NIM module (NIMbox) or desktop module (NEMbox)
 - Main FPGA board with USB-2 port, 100 MHz clock,
 - 4 slots for I/O submodules,
 - NIM connector (NIMbox) or 6 V DC power supply (NEMbox)
 - Available sub-modules (to be configured at factory)
 - **NIM I/O**: 5 channels, max. input frequency 100 MHz, input/output delay less than 4 ns, 50 Ohm input/output impedance
 - **TTL I/O**: 5 or 16 channels I/O, max. input frequency 100 MHz, input/output delay less than 4 ns, high input impedance or 50 Ohm, 50 Ohm output impedance
 - Leading edge discriminator: 4 channels, 1 programmable TTL I/O, programmable LEDs, programmable thresholds and hystereses, 50 Ohm input impedance, input range -2,5 V to +2,5 V
 - **ADC**: 100 MHz Flash ADC, 2 programmable TTL I/O, FIFO 1024 values
 - **DAC**: 100 MHz DAC, FIFO 1024 values, 2 channels
 - **RAM**: 8 Mb
 - NEMbox / NIMbox can be programmed with LabView VI's
 - LabView “tool box” VI set for:
 - TTL I/O with 1 to 255 ms debouncer and I/O selector
 - NIM I/O with I/O selector
 - Discriminator with threshold and hysteresis loader
 - LED with 10 ms stretcher
 - Boolean logic
 - Flip flop logic with RS, rising edge trigger, D-FF
 - Synchronizer
 - Scaler (counter) with user defined pulse train output, max. rate 100 MHz, 32 bit, leading edge trigger input A&B
 - Pulser with 10 ns resolution, 32 bit, user defined pulse train output and leading edge single pulse trigger
 - Clock with 32 bit clock divider, duty cycle 50%, frequency 0.02 Hz to 100 MHz, quartz precision
 - ADC with external or internal gate control and 1024 FIFO values
 - DAC with 1024 FIFO values
 - TDC, multichannel and multihit, with time resolution of 10 ns, 22 bit time stamps and 1024 FIFO values. Time range ca. 40 ns to 40 s
 - Direct FPGA programming possible for advanced users

Standard versions

Items	Description
NIMbox-NDL8	8 channel LE discriminator with programmable NIM or TTL logic
NIMbox-NPN20	20 channel programmable NIM or TTL logic
NIMbox-NAD4	4 channel 100MHz 14 bit F-ADC with 8 x TTL I/O
NIMbox-NDA8	8 channel 100MHz DAC
NIMbox-N3AN	3 channel 100MHz 14 bit F-ADC with 6 x TTL I/O and 5 NIM or TTL I/O
NIMbox-ADNN	1 channel 100MHz 14 bit F-ADC with 3x TTL I/O, 4x discriminator, 10x NIM or TTL I/O
NIMbox-DNAE	1 ch. ADC, 3 ch. TTL I/O, 2 ch. DAC 100 MHz, 4 ch. discriminator and 5 ch. NIM I/O

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

Product Data Sheet

NEMbox / NIMbox Programmable
NIM Module:

[Print Product Data Sheet](#)

Documentation

Manual and Tech-Notes :

[NIMbox-NEMbox](#)

Introduction:

[WIENER NIM CAMAC introduction](#)

Downloads

CD-ROM:

[NEMbox NIMbox](#)

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