WIENER, Plein & Baus, Ltd.

Products for Nuclear Physics




Andreas Ruben, WIENER Plein & Baus, Ltd.

WIENER US - Product Lines

WIENER
Plein & Baus Elektronik
Werk für Industrie-elektronik
Nuklear-elektronik
Regelungs-technik

iseg

mesytec
www. .com

HYTEC

NIM & CAMAC Crates

- CERN spec. modular NIM and CAMAC crates
- **NIM**: 5U / 7U (with fan tray)
  CAMAC: 7U
- Plug-in low Noise Power supplies:
  300W – 650W (linear reg.)
  1650W (low noise switcher)
- NIM portable
  UEP15: 150W
  +/-6V, +/-12V, +/24V

WIENER VME Crates for Physics

- Low-cost VME NIX-I line

✓ Standard VME mechanics, light construction

✓ Low noise open frame power supply
5V/100A, +-12V/6A

✓ Plug-in fan tray

- High Performance VME/VME64x/VXS 6000 line

✓ Modular design for “on-the-run” exchange of power supplies and fan trays

✓ Flexible configurable (backplane, PS, card cages,…)

✓ Ultra-low noise “switching” power supplies
up to 3kW DC power output (6kW optional)

✓ High reliability (10 … 20 years experiment run time

✓ High level of integrated diagnostics, test and monitoring capabilities, remote control

✓ Efficient self-controlled cooling

NEW VME 195 mini crate

- 9 slot in 19” x 5U high enclosure,
- 6U x160mm VME card format, 6U x 160mm transition
- monolithic backplanes VME 64, 64x, V430 (cPCI/PXI*)
- Ethernet (www / SNMP), CAN-bus, RS 232 interface for remote control,

- modular built 600W low noise power supply (up to 6 voltages)
- lowest noise and ripple < 10mVpp typ. (0-20MHz)
- variable fan speed, temperature controlled
- intelligent monitoring, alphanumeric display with self diagnostics

MPOD Universal Power Supply System

- Bin for 10 LV and / or HV modules:
  - **Up to 80 - channels floating LV**
  - **Up to 320 HV channels with ISEG EHQ modules (8, 16 or 32 channels)**
- Controller with Ethernet, CANbus, USB interface, and interlock input
- 4 slot Mpod Mini

NEW

MPOD Low Voltage Modules

- 8 channel floating low voltage module:
  - 0V to 8V / 10A (50W)
  - 0V to 16V / 5A (50W)
  - 0V to 30V /2.5A (50W)
  - 0V to 60V / 1A (50W)
- Extremely low noise and ripple: <10mV$_{pp}$,
- Individual voltage current setting / monitoring, Ramp up/down, inhibit, …
- Connectors: 2 x 8 pin high current sub-D, 37 pin sub-D for sense / control

220 mm depth / 6U height
8 TE (40,3 mm) wide

Mpod - ISEG High Voltage Modules

- **EHS 80**:
  8-channels high current, Common Ground (or floating)
  500V/15mA … 6kV/1mA, SHV
- **EHS F0**:
  16-channels high current, Common Ground (or floating)
  500V/10mA … 4kV/1.5mA, REDEL

High ⇕ **power**

High ⇕ **density**

- **EDS F0**:
  16-channels high resolution, Common Ground
  500V/500µA … 3kV/500µA, up to 1.5nA res., REDEL
- **EDS 20**:
  32-channels high resolution, Common Ground
  500V/500µA … 3kV/500µA, up to 1.5nA resolution, REDEL

220 mm depth / 6U height
8 TE (40,3 mm) wide

16/32 channel EDS HV modules,

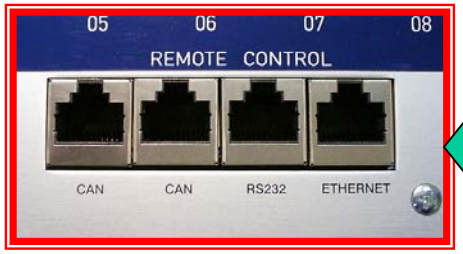
COMMON-GND

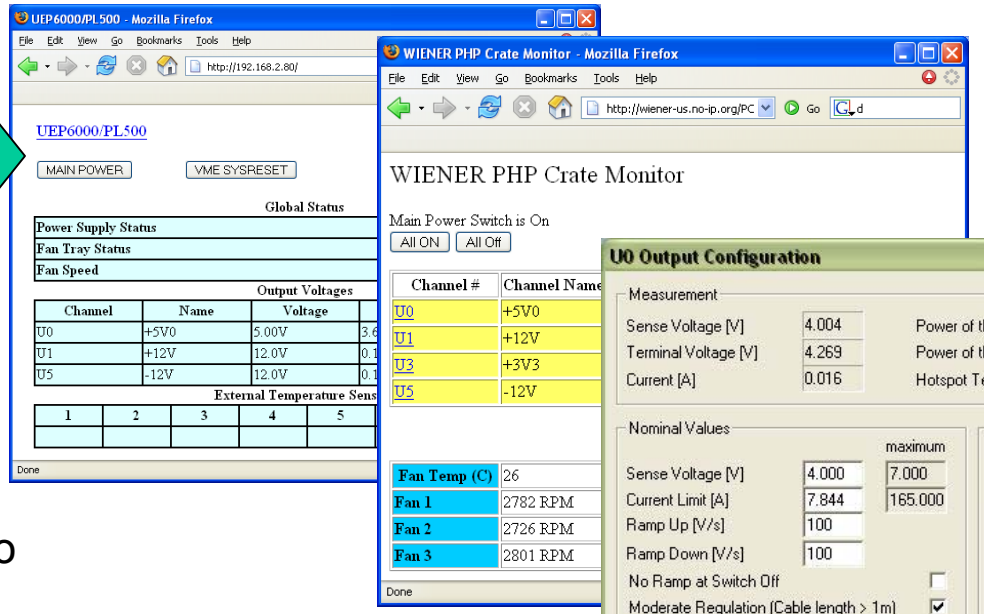
Type	Channels	Vmax	I max	V res	I res	Ripple
EDS F030x_504	16	3000	0.5mA	10^{-5} ...10^{-6} * Vmax	10^{-5} ...10^{-6} * Imax	<60mV
EDS F005x_105	16	500V	1mA	10^{-5} ...10^{-6} * Vmax	10^{-5} ...10^{-6} * Imax	<10mV
EDS 20 030x_504	32	3000	0.5mA	10^{-5} ...10^{-6} * Vmax	10^{-5} ...10^{-6} * Imax	<60mV
EDS 20 005x_105	32	500V	1mA	10^{-5} ...10^{-6} * Vmax	10^{-5} ...10^{-6} * Imax	<10mV

8/16 channel EHQ HV modules,
COMMON-GND or FLOATING

Type	Channels	V max	I max	V res	I res	Ripple
EHQ 8660x_205 (-F)	8	6000V	1mA	120mV	20nA	<50mV
EHQ 8040x_205 (-F)	8	4000V	2mA	80mV	40nA	<10mV
EHQ 8030x_305 (-F)	8	3000V	3mA	60mV	60nA	<10mV
EHQ 8020x_405 (-F)	8	2000V	4mA	40mV	80nA	<10mV
EHQ 8010x_805 (-F)	8	1000V	8mA	20mV	120nA	<10mV
EHQ 8005x_156 (-F)	8	500V	15mA	10mV	300nA	<10mV
EHQ F040x_155 (-F)	16	4000V	1.5mA	80mV	30nA	<10mV
EHQ F030x_205 (-F)	16	3000V	2mA	60mV	40nA	<10mV
EHQ F020x_305 (-F)	16	2000V	3mA	40mV	60nA	<10mV
EHQ F010x_605 (-F)	16	1000V	6mA	20mV	120nA	<10mV
EHQ F005x_106 (-F)	16	500V	10mA	10mV	200nA	<10mV

Remote Control Interfaces





- **Ethernet:**
  - **HTTP – Port 80:** WWW interface
  - **TCP/IP – Port 69:** Special wiener protocol to access all data **SNMP v2c compatible**
  - **TELNET - Port 23:** Connection to other RS232 ports only
- **CAN-bus**
- **USB-2**
- **RS232**

ISEG High Voltage Modules: NIM / CAMAC

Universal 1 or 2 channel lowest noise laboratory high voltage supplies, +/-2kV … 8kV, lowest noise (<2mV$_{pp}$)

- NIM NHQ Line:
  - **Low-cost series**: with <50mV$_{pp}$ ripple, no interface
  - **Standard series**: 1V, 1µA resolution, RS232 or CAN-bus interface
  - **High precision series**: up to 10mV / 100pA resolution, RS232 or CAN-bus interface
- CAMAC CHQ Line:
  - 1 or 2 channels **2kV … 8kV** versions,
  - **Standard series**: 1V, 1µA resolution
  - **High precision series**: up to 10mV / 100pA resolution,

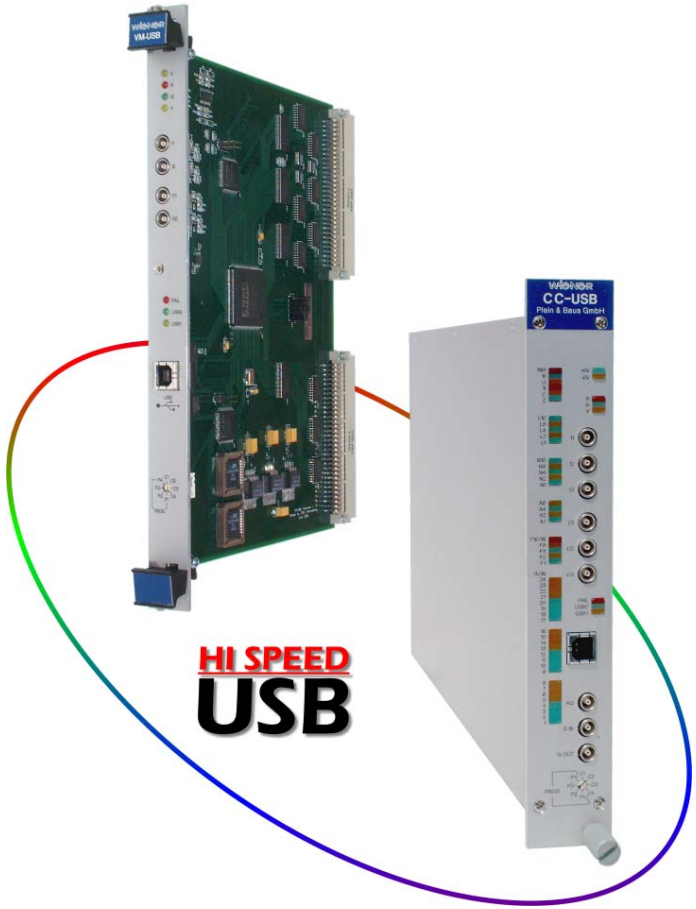
ISEG High Voltage Modules: VME

- **VME VHQ 2 Line**: **Flexibility**
  - Double wide VME with **2 channels +/-2kV … +/-5kV** versions,
  - Complete front panel or VME bus operation
  - 1V, 1µA resolution, optional 100nA (100µA full scale)
  - Low ripple <5mV$_{pp}$ (<2mV$_{pp}$ for <=4kV)

NEW

- **VME VHS 4 / VHS F Line**: **High Density**
  - Single wide with **4 channels**, SHV connectors
  - Double wide with **12 channels**, REDEL multi-pin or SHV
    - 500V … 1000V -> Si detectors, APD's, …
    - 2kV … 4kV -> PMT's, wire/ionization chambe
    - 6kV … 8kV/2mA -> HPGe, RPC, …
  - low ripple <10mV$_{pp}$ ripple, 16 bit resolution U/I

New USB Controller for VME & CAMAC



VM-USB

- VME controller with high speed USB-II interface,
- 2 + 2 NIM I/O for trigger, counter, DGG, logic
- D8/16/32/BLT/CBLT
- Up to 32MB/s data rates
- Programmable VME sequencer

CC-USB

- CAMAC controller with high speed USB-II interface,
- 3 + 3 NIM I/O for trigger, counter, DGG, logic,
- Full CAMAC data way display
- Fast-CAMAC Level 1 support
- Up to 12MB/s data rates
- Programmable CAMAC sequencer

CC-USB & VM-USB software

- Open source libusb library for Linux, OS X and MS Windows
- Windows driver plug&play, library (DLL)
- Linux library and sample code
- Ready-to-run application
- NI LabView VI's and programs
- EASY-CAMAC / EASY-VME library:

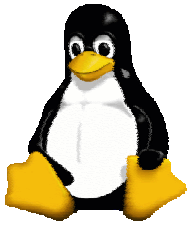
  CAMAC_write(BYTE, BYTE, BYTE, long, int, int);

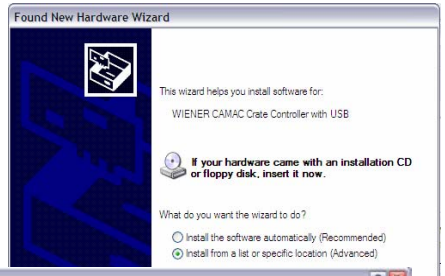
  int CAMAC_read(BYTE, BYTE, BYTE, long, int, int);

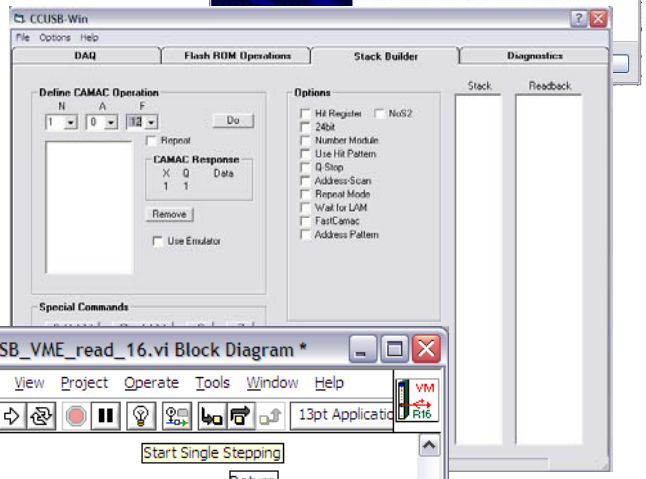
  int CAMAC_Z(void)

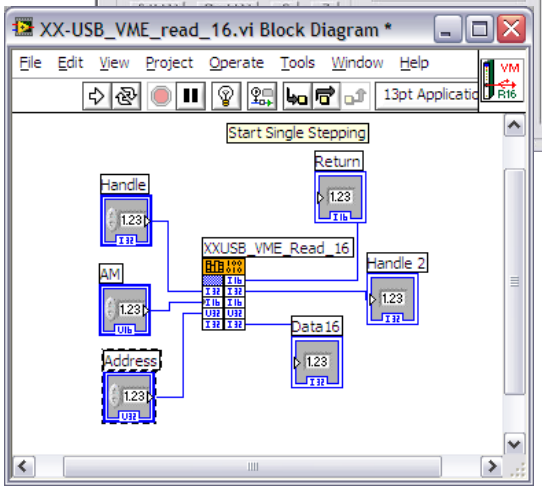
  int VME_read_32(BYTE ,long, long);
  int VME_write_32(BYTE, long, long);

- DAQ software support: MSU NSCL, MIDAS, DAQ++,







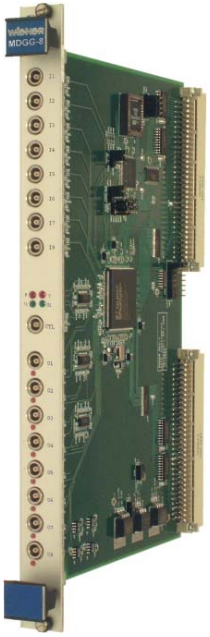


New Logic / Controller Modules

CFB - CAMAC to FERA Bridge

- CAMAC sequencer with data transfer to FERA front ports, up to 10MHz FERA transmission
- 16-bit and 24-bit CAMAC readout at rates of 2.5MHz
- 28k FIFO for data buffering

NEW



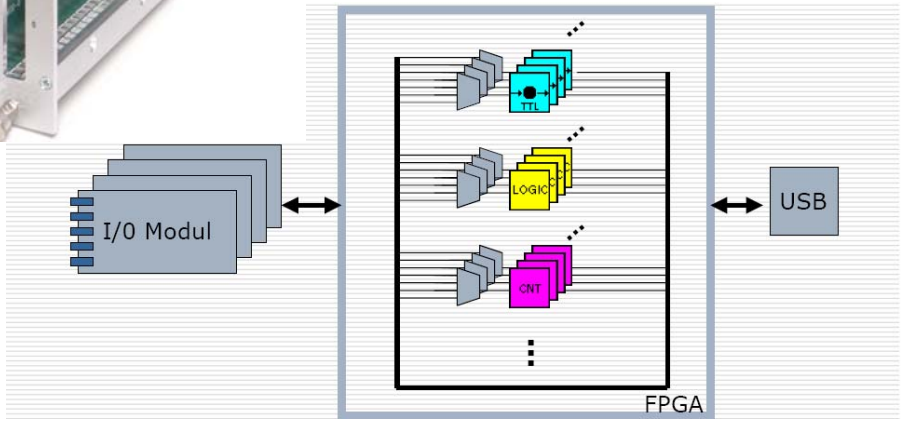
VME MDGG-8

- FPGA based VME multifunctional delay and gate generator
- 8 channels with Lemo inputs / outputs
- Programmable functions:
  - gate and delay (6ns resolution / 32bit range)
  - Latching scaler (SCLR) / pre-scaler
  - coincidence register (CR).
- Veto / control input, status & users LED's

More coming up!!!

NemboX

- **N**uclear **e**lectronics **m**iniature **box** - compact tool for small-scale data acquisition, test or student lab
- NIM module or box ("DESK“) with a commercial 6V AC/DC block supply
- Central logic device: Altera FPGA
- Interface: USB 2
- 4 I/O slots

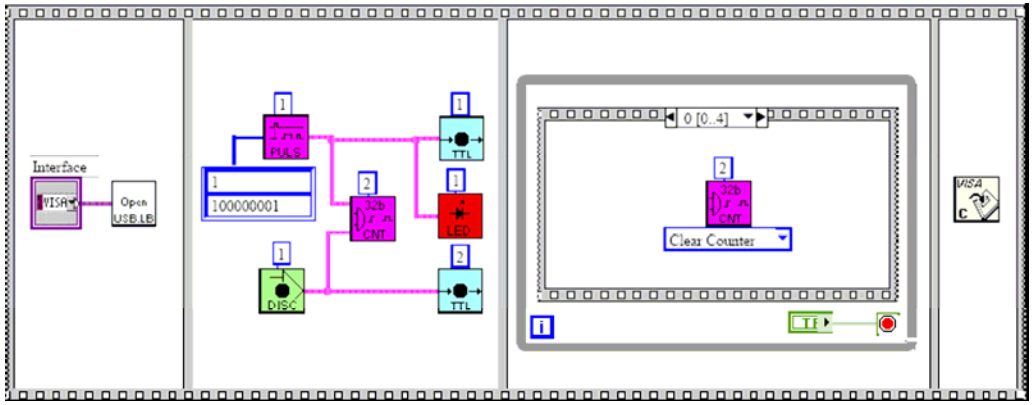


NemboX I/O modules

- **SU700 – TTL_coax I/O,** 5 channels
- **SU701 – TTL I/O,** 16 channel I/O in groups of 8
- **SU703 – Discriminator:** 4 Channels with 2 I/O
- **SU704 – NIM I/O,** 5 channels
- **SU705 - RAM (static),** 8MB x 18 bit, 100 MHz
- **SU706 – F-ADC** 14 bit, 100 MHz, pre-/post trigger sampling
- **SU707 – DAC** 14 bit, 100 MHz, ideal as arbitrary function generator

NemboX Programming

- PC-Interface: USB 2.0 (480 Mbps)
- User programs in C or other languages
- FPGA-Programming (VHDL)
  - Optimized special application
  - Random Pulser
  - Coincidence counter
  - TOF Histogrammer
  - …
- "LogicBox" for LabView



“LOGIC BOX”

- TTL: I/O Selector, 1 to 255ms Debouncer
- NIM: I/O Selector

- DISCRIMINATOR: threshold, Hystereses

- LED:10ms stretcher

- Boolean: NOT, AND, OR, XOR

- Flip Flops: RS, Rising Edge triggered, D-FF

- Synchronizer: Start, Pulse

- Scaler: 100 MHz, 32 bit

- Pulser: 10ns resolution, 32 bit

- Clock: 0.02 Hz ÷ 100 MHz, 32 bit clock divider

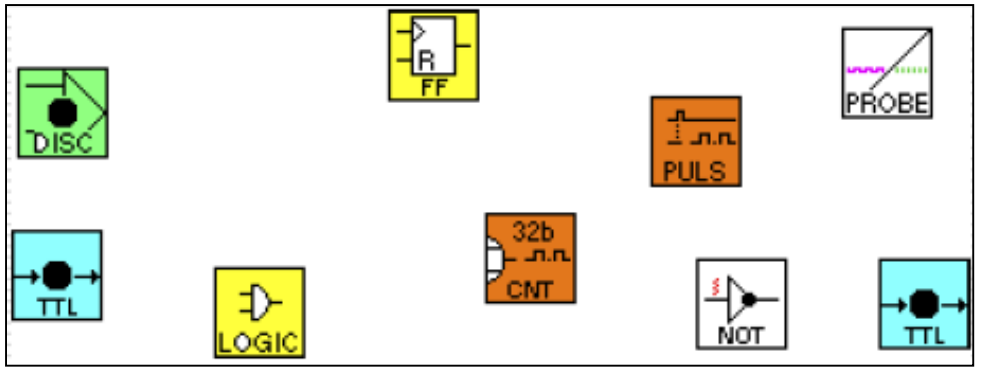
- ADC: Gate control, FIFO 1024 values

- DAC: FIFO 1024 values

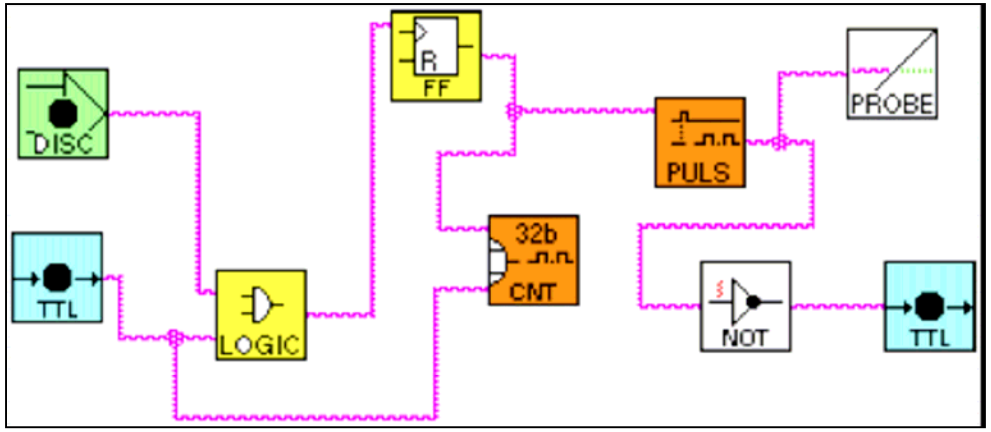
- TDC: multi-channel, multi-hit
  10 ns resolution ,
  22 bit time stamps
  Time range ca. 40 ms ÷ 40 s

Logic Box Application

1. Select components:



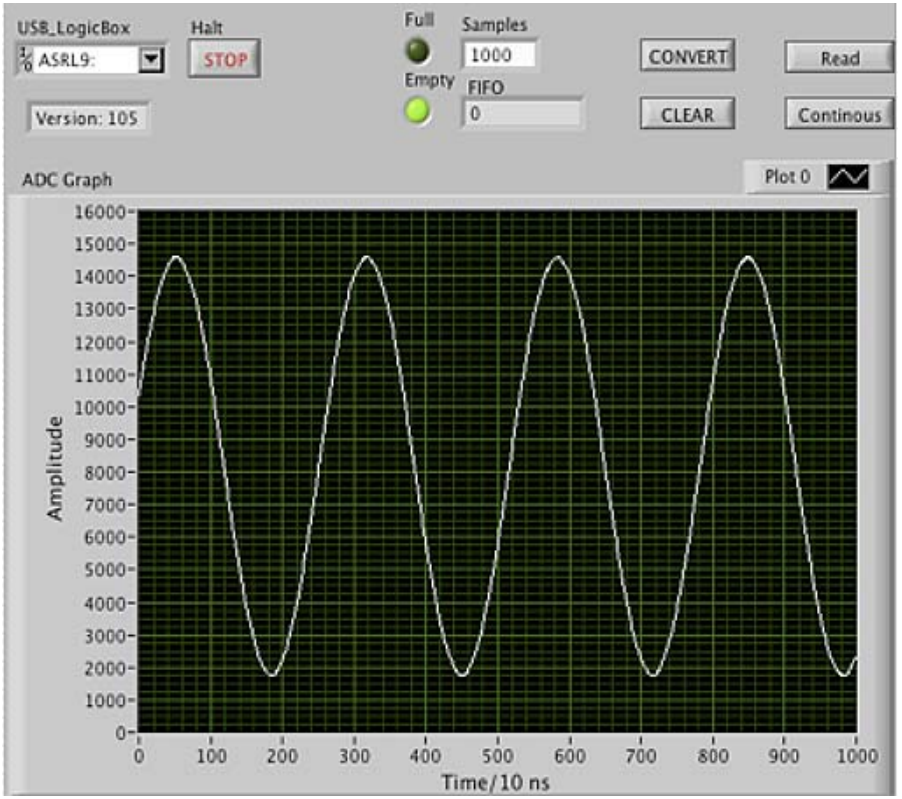
2. “Wire” in LabView:

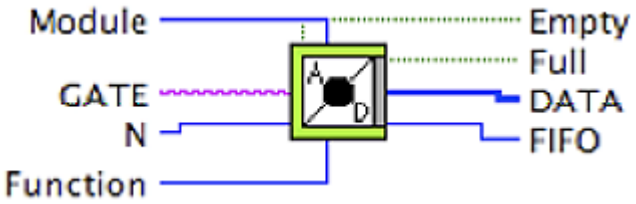


3. Upload to Nembox and use

Nembox ADC

- Maximum frequency 100MHz, with 16bit programmable divider
- 14 bit resolution, -0.5 V … 0.5V input range (other on request)
- Internal or external trigger, programmable pre and post trigger sampling
- FIFO for 1024 values
- Pulse characteristics calculated by FPGA, charge (integral), position and height of maximum





NIMbox NADC4 / NDAC4

NADC4

- 4 channel **flash ADC**, 14-bit, max. 100MHz
- 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, scaler / counter, clock, pulse / delay and gate generator

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NDAC4

- 4 channel **DAC**, 14-bit, maximum 100MHz with programmable frequency divider, On board memory for 1024 values, continuous mode for periodic signals

NIMbox NPL20 / NDL8

NPL20

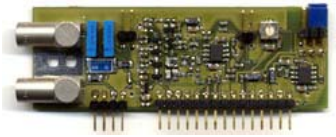
- 20 programmable NIM, TTL or mixed I/O, Lemo
- Maximum rate 100MHz, Less than 4-5 input / output delay
- Programmable logic functions as AND / OR / XOR / NOT, Fan In / Fan Out, complex multi-level logic conditions possible, configurable FPGA embedded functions as 32-bit scaler / counter, clock, pulse / delay and gate generator, synchronizer
- FPGA based multi-hit TDC, 10ns resolution, 40ms - 40s time range
- NIM-to-TTL / TTL-to-NIM converter for NPL20M version

NDL8

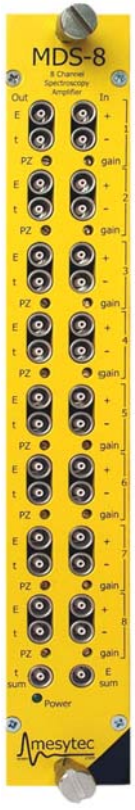
- 8 channel leading edge discriminator, >100MHz, Lemo inputs
- Individual thresholds, programmable from -2.5V to +2.5V (12bit)
- 12 programmable NIM and TTL (10 NIM + 2 TTL)

MESYTEC Products

- Electronics for Si- and n-detectors, PMT's, proportional counters, ….



- Offers a full analog front-end line:
  - charge integrating preamplifier module with positive/negative outputs
  - 4, 8,16, …64 channel MPR pre-amp boxes
  - Pre-amp, filter, shaper combinations
  - **8 channel shaping + timing filter amplifier MDS-8, sum outputs, NIM**
  - Multi channel preamplifier system with amplitude, timing and position outputs, up to 96 channels
  - **4 channel Si BIAS MHV-4 module, 0..100V / 0...400V, 1nA res., 1mV noise, RS232 interface, NIM**



mesytec
www. .com

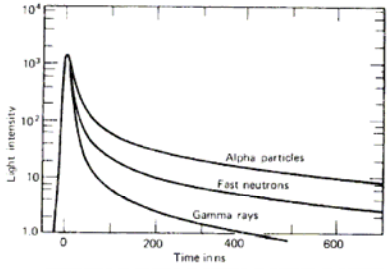
MESYTEC Detector Read-Out Modules

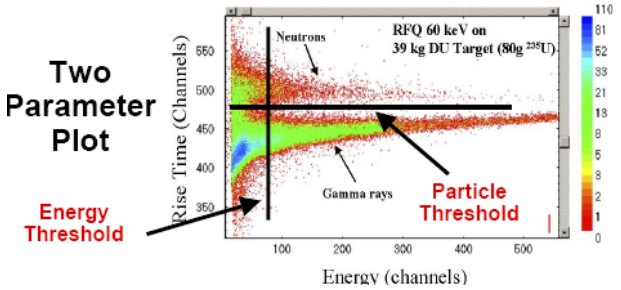
NEW

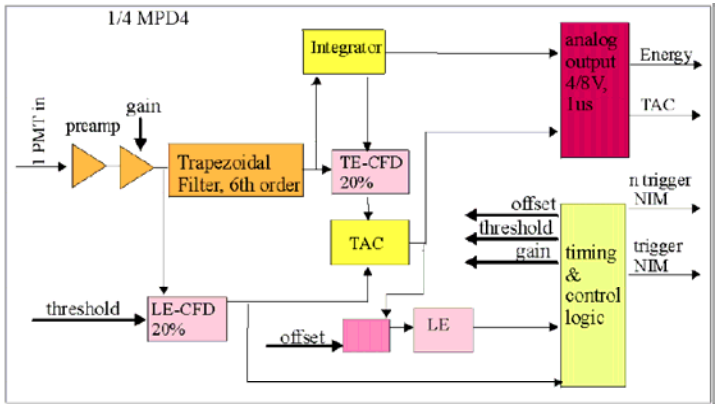
MSCF-16: 16 channel shaper + TFA + CFD

- Low noise shaping amplifier with base line restorer
- 4 shaping times, active split and timing filter amplifier
- programmable gain and pole/zero adjustment
- Constant fraction discriminator with 4 delay, 2 fractions
- Digital delay of 450ns for timing stop
- Outputs: shaped, ECL timing, trigger out, multiplicity
- 3 "standard" types:
  - **PMT** (ST: 0.1 ... 1µs, CFD-DT 3 ... 12ns)
  - **Si** (ST: 0.25 ... 2µs, CFD-DT 10 ... 60ns)
  - **Ge** (ST: 0.5 ... 4µs, CFD-DT 20 ... 120ns)
- Full manual and remote control (USB-2)

MPD-4 Pulse shape discrimination module





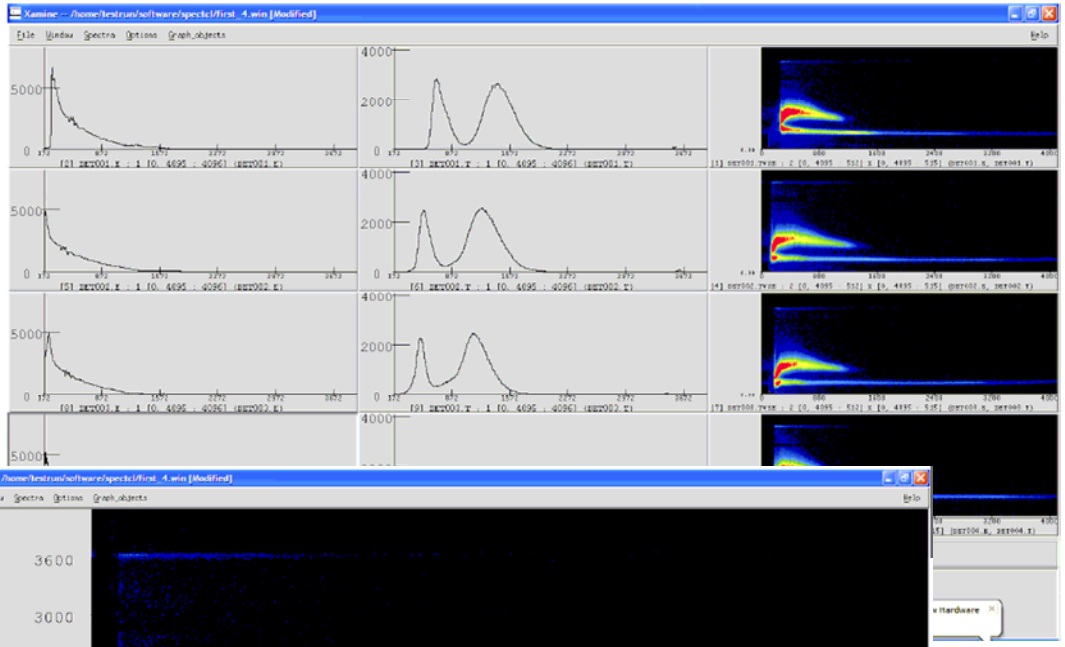


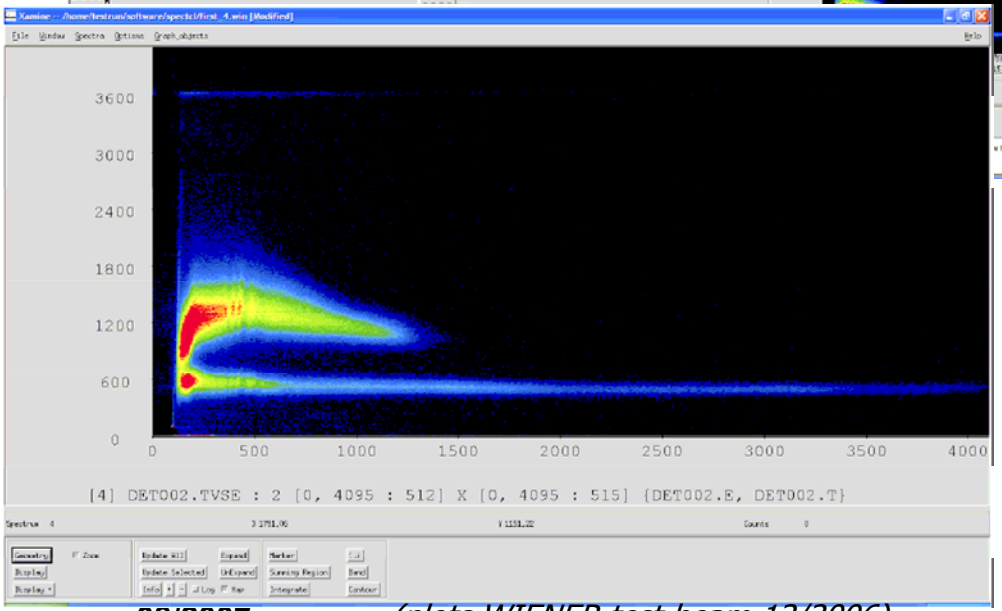
(plots P. Kerr LLNL, CAARI 2006

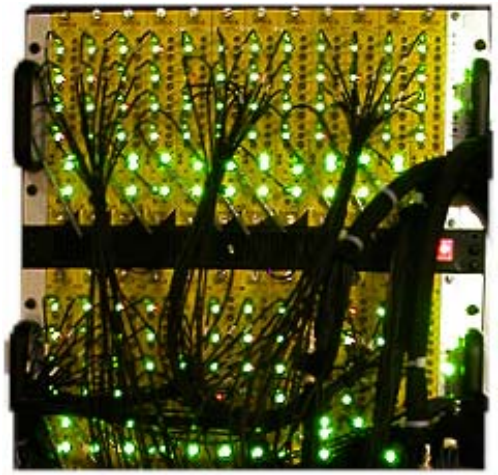
- ✓ Pulse shape discrmiation for liquid scintillator (NE213 type) by measuring decay time
- ✓ MPD-4: 4 channels in single wide NIM:
  - 4-fast variable PMT input amplifier
  - 2 CFD's with 20% fraction on leading and trailing edge, TAC
  - Trapezoidal shaping
  - thresholds for energy- and TAC signals
  - fast mode with n or gamma trigger (within 150ns)

MPD-4 Pulse shape discrimination module

- All signals with fan out, logic in NIM and ECL
- Full manual or remote programming,
- USB-2 interface
- Applications: neutron experiments, fissile material detection for homeland security, …





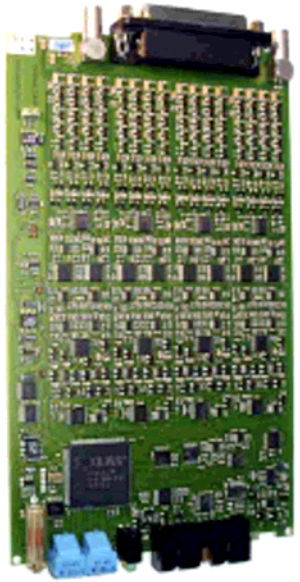


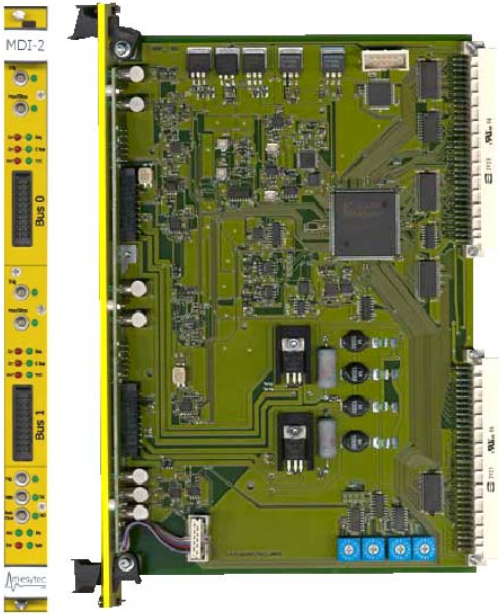
(plots WIENER test beam 12/2006)

MESYTEC Read-out Systems (1)

Multi-channel Si-detector Read-out System (VME)

- Time multiplexed with zero suppression
- **MTM front-end:**
  16 …128 channel pre-amp, shaper, timing filter, discriminator + multiplexer
- **MDI-2 VME Read-Out Module**:
  2 channel VME ADC (5MHz)
  for up to 512 channels,
  12bit ADC with sequencer,
  high integral + differential linearity (DNL<1%),
  fast read-out/conversion

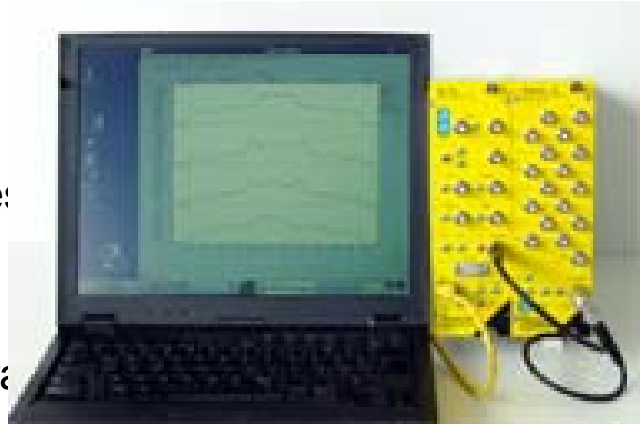


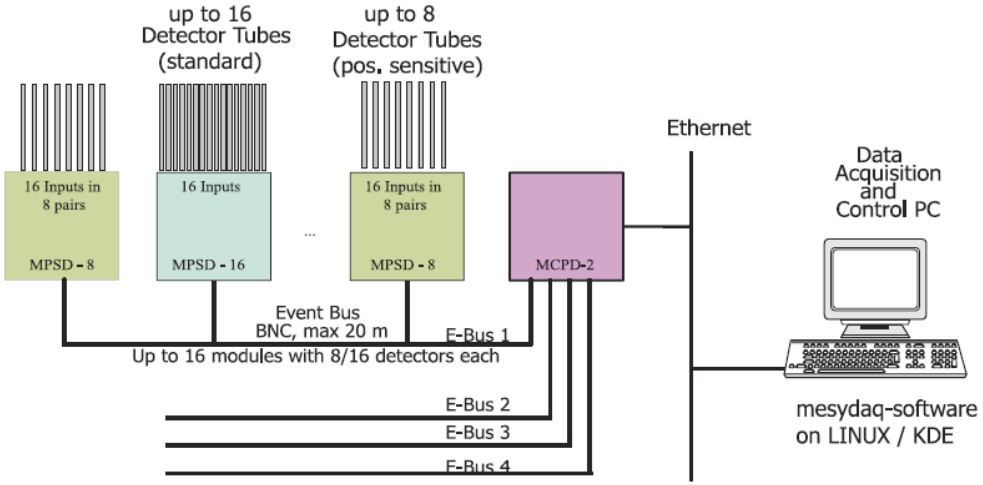


NEW

MESYTEC Read-out Systems (2)

- **PSD+: Neutron detector Read-out Systems (NIM)**
  - **MPSD-8**: for n-PSD, preamplifier, shaper, window discriminator system with position calculation
  - **MCU34**: x-y n-MWPC detector read out
  - **MCPD:**High speed serial data bus plus a central proces and histogramming module with ethernet
  - 10 bit position / amplitude data
  - 100 kHz per tube / 12.8 MHz peak rate / 4 MHz cont. ra
  - 8 up to 1300 (pos. sens.) / 2500 (std.) channels

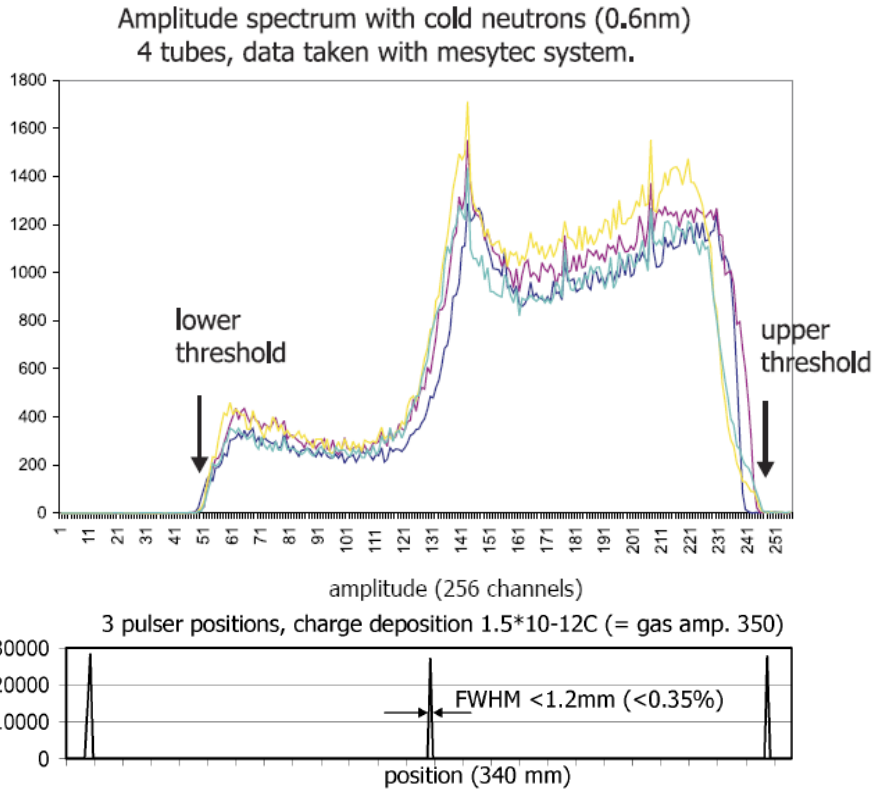


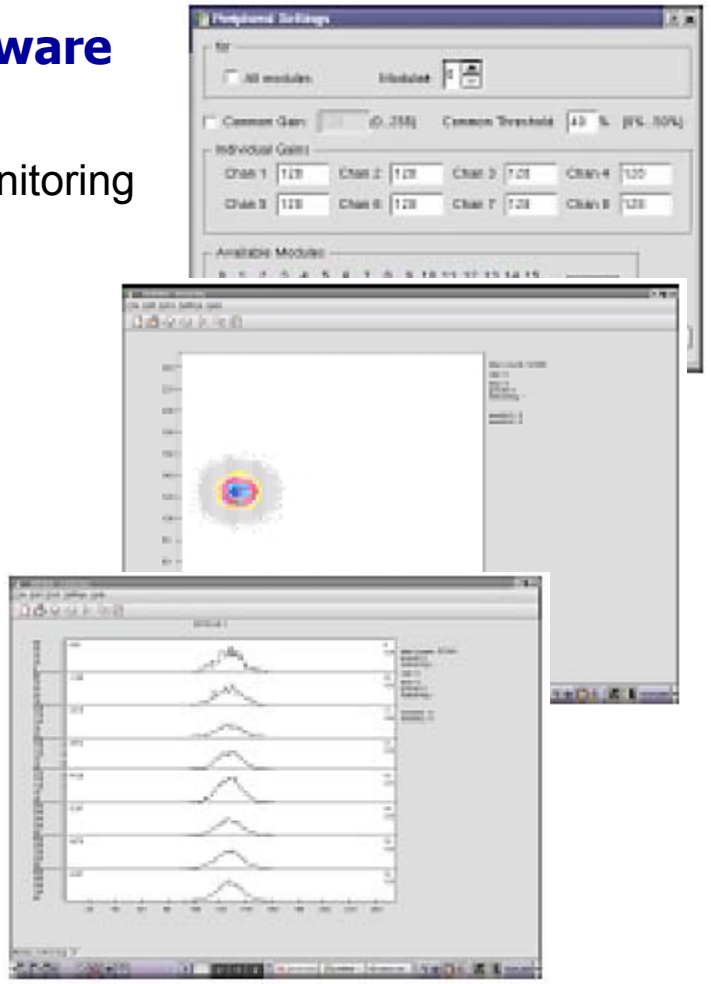


**HMI (SANS V4),
FRM-II (SPODI),
ANSTO,
IAEA …**

MESYTEC Read-out Systems (2)

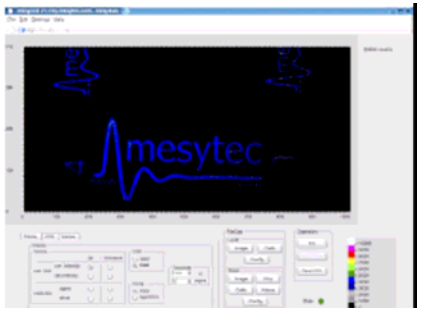
- **Neutron detector Read-out System - Software**
  - Linux based DAQ software (MESYDAQ) with full experiment control, data handling and online monitoring





MESYTEC Read-out Systems (3)

- **MPET: Medical Imaging DAQ System (NIM)**
  - modular system for readout of position sensitive PMT's for PET
  - MPET-8: up to 8 scintillator coupled PMT's in two coincidence groups, amplification, digitization of position and amplitude data and coincidence filtering
  - can easily be interfaced to different PMT types

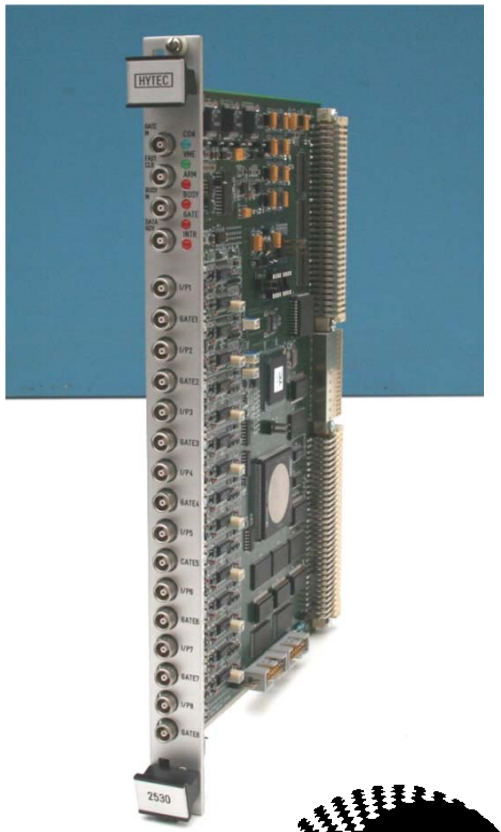


- **MCCD: CCD with Read-out System**
  - large area CCD detector with high speed and high resolution readout electronics
  - designed for in vacuum operation to allow charged particle detection.
  - CCD: 1M pixels, 50mm x 50mm size
  - 14bit ADC, multiplexed
  - 100 Mbit Ethernet for computer control / DAQ

NEW

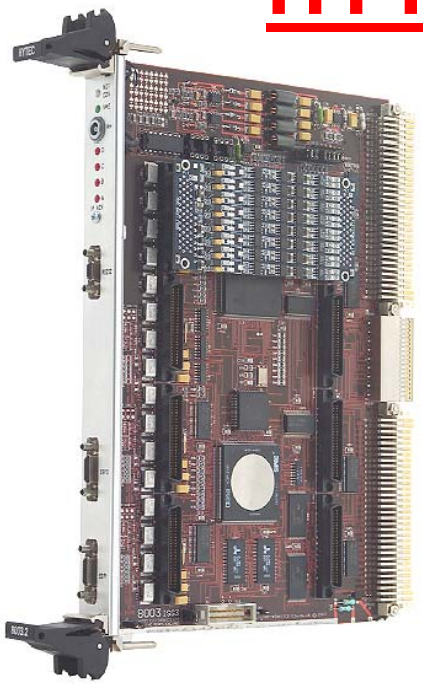
HYTEC ADC2530 - 13 bit peak ADC

- 8 inputs in 6U single wide VME module
- **13-bit resolution** (8k channels) for **HPGe detectors**
- 8V input range (pos./neg. and 50ohms/1k selectable)
- Common and individual gates
- Sliding scale correction for improved diff. non-linearity
  - **+/-1% diff. non-linearity**
  - **+/-0.025% int. non-linearity**
- Upper (ULD) / lower threshold (LLD)
- 3µs conversion time / input, dead time 1µs...20µs
- 64k dual-ported SRAM for data buffering / histogram
- Gated, histogram or self triggered mode
- Data structure compatible to other VME modules



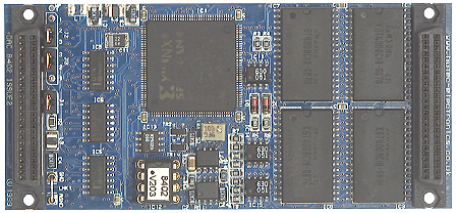
HYTEC

HYTEC Slow Control Modules



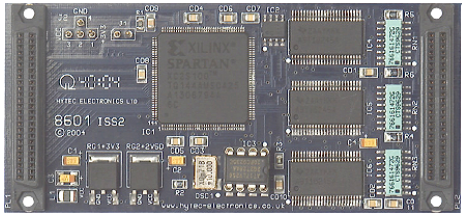
VME64x IP Carrier:

- **VICB 8001**
  - IP carrier (2 IP sites) with 32 channel I/O (TTL)
  - 1MB SRAM (circulating history memory, diagnostic)
- **VICB 8002**:
  - IP carrier (4 IP sites) with full logic and interrupt handling
- **VICB 8003**:
  - IP carrier (4 IP sites) with 32MHz SHARC DSP
  - 1 or 2MB memory, optional RS232 or fast LVDS links



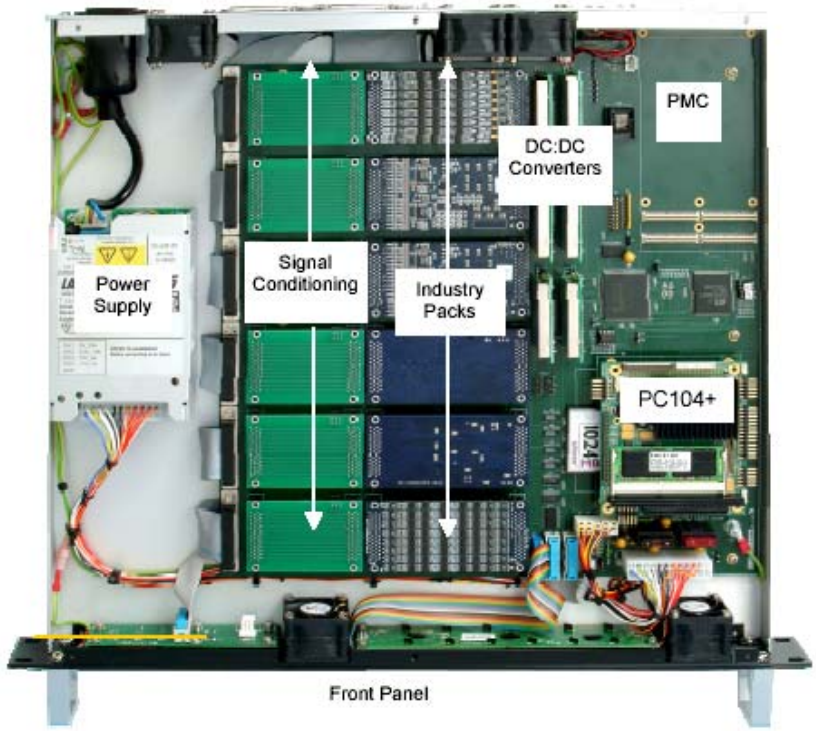
IP modules:

- **8401**: 8 channel 16-bit ADC
- **8402**: 16 channel 16-bit DAC
- **8403**: 16 channel 20/24bit multiplexed ADC
- **8512**: 16 channel 32 bit counter / timer
- **8601**: 4 channel step-motor driver



HYTEC 9010 IOC Blade

- Holds up to 6 IP boards + 6 signal conditioner boards
- Built in PC104+ CPU, PMC slot
- Ethernet 10/100 control and monitoring
- EPICS; LINUX; Windows / OPC Support
- Flexible and Compact



Thank you for listening.

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