## VME Products

**CAEN Short Form Catalog 2010**

### More modules are available in VME64X standard
(see Ordering Information)

The VERSAmodule Eurocard bus is one of the trademarks of CAEN instrumentation catalog. Widely used both in the industry and in the research communities it offer the combination of several qualities such as reliability, robustness and flexibility. CAEN VME products are widely used both in test and measurements applications and in small and big data acquisition installations. In the following pages you will find the huge selection of functions that the CAEN modules offer.

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### V1785 - 8 Ch Dual Range Multievent Peak Sensing ADC

The Mod. V1785 is a 1-unit wide VME 6U module housing 8 Peak Sensing Analog-to-Digital Conversion channels. Each channel is able to detect and convert the peak value of the positive analog signals (with >50 ns risetime) fed to the relevant connectors. Input voltage range is 0 ÷ 4 V. Each channel is processed by two gain stage (x1 and x8) in parallel followed by the ADC stage: a dual input range is then featured: 0 ÷ 4 V (1 mV LSB) and 0 ÷ 500 mV (125 µV LSB); this allows to avoid saturation with big input signals while increasing resolution with small ones.

The ADCs use a sliding scale technique in order to reduce the differential non-linearity.

Programmable zero suppression, multievent buffer memory, trigger counter and test features complete the flexibility of the unit. The module works in A24/A32 mode. The data transfer occurs in D16, D32, BLT32 or MBLT64 mode. The unit supports also the Chained Block Transfer (CBLT32/CBLT64) and the Multicast commands.

The VME interface is VME64 and VME64X standard compliant and features the A24/A32 and MultiCast addressing modes. The data readout occurs either in D32, BLT32, MBLT64 mode, or in daisy chain with 32/64 bit Chained Block Transfers. The module features a fully programmable RORA interrupter.

The board is provided with the P1 and P2 VME connectors and fits into both V430 and standard 6U crates. It also supports the "live insertion", allowing the User to insert (or remove) the board into (or from) the crate without switching it off.

**Ordering Information**

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<td>WV1785XNCAAAA</td>
<td>V1785NC - 8 Ch. Dual Range Multievent Peak Sensing ADC</td>
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### V785 - V785N - 32 / 16 Channel Multievent Peak Sensing ADC

The Mod. V785 is a 1-unit wide VME 6U module housing 32 Peak Sensing Analog-to-Digital Conversion channels. Each channel is able to detect and convert the peak value of the positive analog signals (with >50 ns risetime) fed to the relevant connectors. Input voltage range is 0 ÷ 4 V. The Model V785N houses 16 channels on LEMO 00 connectors and shares most of the other features with the Mod. V785.

The outputs of the PEAK sections are multiplexed and subsequently converted by two fast 12-bit ADCs (V785: 5.7 µs for all channels, V785N: 2.8 µs for all channels). The integral non linearity is ±0.1% of full scale range (FSR), measured from 2% to 97% of FSR; the differential non linearity is ±1.5% of FSR, measured from 3% to 100% of FSR. The ADCs use a sliding scale technique to reduce the differential non-linearity.

Programmable zero suppression, multievent buffer memory, trigger counter and test features complete the flexibility of the unit. The module works in A24/A32 mode. The data transfer occurs in D16, D32, BLT32 or MBLT64 mode. The unit supports also the Chained Block Transfer (CBLT32/CBLT64) and the Multicast commands.

A 16 ch. flat cable to LEMO input adapter (Mod. A385, see Accessories section) is available for the Mod. V785 (one 32 ch. V785 requires two A385 adapters). The boards support the live insertion that allows inserting or removing them into the crate without switching it off.

**Ordering Information**

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<tr>
<td>WV785XAGAAAA</td>
<td>V785AG - 32 Channel Peak Sensing ADC (8V, No 12V DCDC, live ins)</td>
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<tr>
<td>WV785XNCAAAA</td>
<td>V785NC - 16 Channel Peak Sensing ADC (4V, No 12V DCDC, live ins)</td>
</tr>
<tr>
<td>WA385XAAAAAAA</td>
<td>A385 - 16 Channel Cable Adapter (Flat to LEMO) for V785, 50cm ±10% cables</td>
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</table>
V1729A  4 Channel 14 bit 2 GS/s (300 MHz bandwidth) Switched-Capacitor Digitizer

The V1729A is a 1-unit wide VME 6U board based on the MATACQ (analogue matrix) chip developed by a collaboration between the CEA/DAPNIA and the IN2P3/LAL. This board is well suited for acquisition of fast analog signals.

VME interface supports A32/D64, A32/D32, A24/D16 modes; GPIB and USB 2.0 are also featured.

The module houses four 14 bit ADC channels with 2GHz sampling frequency and 300MHz bandwidth. The measurement is realized in three phases:

- Acquisition: the analog signal is continuously sampled at the sampling frequency in a circular analog memory. The arrival of a trigger signal starts the stopping phase of the sampling. At the end of this phase, the state of the memory is set: it then contains the last 2560 points sampled (out of which 2520 are valid).

- Digitization and Storage: after a stopping command of the acquisition, the samples stored under analog form in the MATACQ chips are rapidly (650µs) re-read and converted into digital data over 14 bits, then stored in a digital memory buffer. The acquisition is informed of the end of the conversion phase either by polling an internal register, or by an interrupt.

- Reading: readout rate is close to 1 kHz with a performing A32/D64 system for a full readout of a 4-channel board.

(CEA/DAPNIA & IN2P3/LAL Design)

Ordering Information

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<td>WV1729AXAAAA</td>
<td>V1729A - 4 Ch. 14 bit 2 GS/s (300 MHz bandwidth) Switched-Capacitor Digitizer</td>
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V551B  Sequencer for V550 - V550A C-RAMS

The Mod. V551B is a 1-unit wide VME module which can handle data acquired by some of the well known front-end chips (VA, Amplex, Gasplex, etc.). The V551 has been developed to control the signals from/to the Mod. V550 and V550A C-RAMS (CAEN Readout for Analog Multiplexed Signals). A single V551B can control up to 19 C-RAMS modules, enabling the readout of 76608 multiplexed detector channels.

The module works in A24/A32, D32 mode. Block Transfer mode is also available. A programmable individual pedestal is subtracted and the result is stored in a 2k x 32 bit FIFO.

The arrival of a trigger signal starts the stopping phase of the sampling. At the end of this phase, the state of the memory is set: it then contains the last 2560 points sampled (out of which 2520 are valid).

- Control of up to 19 V550 – V550A modules
- 5 MHz maximum multiplexing frequency
- Programmable duty cycle

Ordering Information

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<tbody>
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<td>WV551BXAAAA</td>
<td>V551B - C-RAMS Sequencer</td>
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</table>

V550 - V550A  CAEN Readout for Analog Multiplexed Signals

The Mod. V550 and V550A CAEN Readout for Analog Multiplexed Signals (C-RAMS) are 1-unit wide VME modules housing 2 independent Analog to Digital Conversion channels, to be used for the readout of analog multiplexed signals coming from some of the well known front-end chips (Amplex, Gasplex, VA, etc.). Each channel of the module accepts positive, negative or differential input signals, amplifies and feeds them to a 10 bit ADC (12 bit for the V550A). The sensitivity (mV/bit) can be selected among 4 different values with relative ratios of 1, 2, 5 and 10. The input signals are sampled by the ADC up to a 5 MHz frequency and their digital value is compared to a threshold for each channel. If the signal is over the channel's threshold, a programmable individual pedestal is subtracted and the result is stored in a 2k x 32 bit FIFO.

The modules work in A24/A32, D32 mode. Block Transfer mode is also available. A positive open-collector signal (“DRDY”) allows to obtain a wired-OR Global Data Ready signal. A fast CLEAR signal is also available for a cycle abort. It is also possible to operate the modules in TEST mode (VME selectable) by simulating some input patterns.

The Mod. V550 and V550A can be controlled by the CAEN Mod. V551B C-RAMS Sequencer.

Ordering Information

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<td>WV550XBAAAA</td>
<td>V550B - CAEN Readout for Analog Multiplexed Signals (10 bit)</td>
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<tr>
<td>WV550ABAAAA</td>
<td>V550A - CAEN Readout for Analog Multiplexed Signals (12 bit)</td>
</tr>
</tbody>
</table>

More Technical Specifications available on www.caen.it
V974 4 Channel Variable Gain Fast Amplifier

The Mod. V974 is a 4 channel fast rise time amplifier housed in a 1-unit VME module; each channel features a voltage gain adjustable from 1 to 10 in x1 steps. Channels are non-inverting and bipolar; they amplify both positive and negative signals. Input bandwidth is 250 MHz for signals up to 50 mVpp and decreases for larger ones (up to 100 MHz @ 400 mVpp). Gain setting is performed independently for each channel via four rotary handles. Channels can be cascaded in order to obtain larger gain values. Each channel is provided with three LEMO 00 connectors, one for the input and two bridged for the output. The board features a ±2 V output dynamics. Screw-trimmers (one per channel) allow the offset calibration which operates over a ±25 mV range. The features include an output short circuit protection.

Ordering Information

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<td>WV974X6AAAAA</td>
<td>V974B - 4 Channel Variable Gain Fast Amplifier</td>
</tr>
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</table>

V975 8 Channel Fast Amplifier

The Mod. V975 is an 8 channel fast rise time amplifier housed in a 1-unit VME module; each channel features a fixed voltage gain of 10. Channels are bipolar, non-inverting and can be cascaded in order to obtain larger gain values. Input bandwidth is 250 MHz for signals up to 50 mVpp and decreases for larger ones (up to 100 MHz @ 400 mVpp). Each channel is provided with three LEMO 00 connectors, one for the input and two bridged for the output. The board features a ±2 V output dynamics. Screw-trimmers (one per channel) allow the offset calibration which operates over a ±25 mV range. The features include an output short circuit protection.

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<tr>
<td>WV975X6AAAAA</td>
<td>V975B - 8 Channel Fixed Gain Fast Amplifier</td>
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</tbody>
</table>

V859 Dual Attenuator

The Model V859 is a passive dual section attenuator housed in a 1-unit VME module; the module does not require any power supply since it is made up of resistive cells. Attenuation ranges from 0 to 44.5 dB for each section (0.5 dB steps). The two sections can be cascaded in order to obtain a single section featuring a 0÷89 dB (0.5 dB step) attenuation. Each section is provided with two LEMO 00 connectors, one for the input (50 Ohm impedance) and one for the output, and seven toggle switches for attenuation setting; an additional switch, allows to cascade the two sections.

Ordering Information

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<td>WV859X6AAAAA</td>
<td>V859 - Dual Attenuator (0 to 44.5 dB)</td>
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</table>

Amplifier (Fast) • Attenuator
The Mod. V1495 is a VME 6U board, 1U wide, suitable for various digital Gate/Trigger/Translator/Buffer/Test applications, which can be directly customised by the User, and whose management is handled by two FPGA. The first one is the FPGA “Bridge”, used for the VME interface and for the connection between the VME and the 2nd FPGA (FPGA “User”) through a proprietary local bus. The FPGA “Bridge” manages also the programming via VME of the FPGA “User”.

The FPGA “User” (Cyclone EP1C20) manages the front panel I/O channels and is substantially an empty FPGA. It is available to be programmed by the User according to the desired logic function. The I/O channel digital interface is composed by four sections placed on the motherboard. The channel interface can be freely expanded or modified by the user by adding or exchanging up to three independent mezzanine boards, choosing between the five available types:

- A395A 32 LVDS/ECL/PECL input channels
- A395B 32 LVDS output channels
- A395C 32 ECL output channels
- A395D 8 NIM/TTL input/output channels
- A395E 8 Analog output channels 16 bit resolution

Therefore, the Mod. V1495 can achieve a maximum number of 194 I/O channels. A Mounting Option is necessary in order to install three A395C on the V1495 (see Ordering Options).

The FPGA “User” can be programmed “on the fly” via VME, without any external hardware tools, without disconnecting the board from the set up, and without resetting it or turning the crate off. A flash memory on the board stores the programming file, which can be loaded to the FPGA “User” at any moment. Four (independent, digital, programmable, asynchronous, chainable) timers, are available for Gate/Trigger applications.

The unit is supported by a free "FPGA demo firmware", but custom applications can be developed as well. The Mod. V1495 has been developed in the framework of the european project EURITRACK, which belongs to the Sixth Framework Programme (FP6).
FW1495SC is a FPGA firmware for CAEN V1495 model that allows to use the Mod. V1495 as a multievent latching scaler housing up to 128 independent counting channels. Each channel has 32 bit counting depth and accepts LVDS/ECL/PECL and NIM/TTL (max 16 channels) inputs; the maximum input frequency is 270 MHz. The board has a FIFO memory that stores the values of the counter, latched “On the fly” at the trigger arrival, while the counting goes on.

The Trigger signal can be provided by an external NIM/TTL signal or by a VME request. It is also possible to generate a periodical Trigger signal by means of an internal programmable timer.

The counters can be also read out “On the fly” real time via VME. A programmable General Input signal (NIM /TTL) can be programmed as CLEAR, TEST or VETO (in common for all channels).

- Up to 128 Channel Latching Scaler
- 270 MHz counting frequency
- 32 bit channel depth
- Multichannel scaler operation with programmable dwell time from 1 μsec to ~ 1 hour
- 4 k x 32 bit multievent buffer memory
- Trigger time tag
- VME Block Transfer support

**Ordering Information**

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<th>Code</th>
<th>Description</th>
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<tr>
<td>WFW1495SCXAA</td>
<td>FW1495SC - 128 Channels Latching Scaler for V1495</td>
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</tbody>
</table>
**V976**

Quad 4 Fold AND/OR/MAJ, NIM-TTL TTL-NIM Translator, Fan-In Fan-Out

The Mod. V976 is a 1-unit VME module housing four 4-input Coincidence Fan in/Fan out and NIM – TTL / TTL – NIM adapter sections. Each section features 4 inputs and 4 outputs on LEMO 00 connectors and can operate as a 4 channel level translator or as AND/OR gate. It is possible to use two or four sections together to obtain an 8 or 16 input majority.

The logic functions can be selected via front-panel and internal switches. Some extra functions, such as a 1 to 12 Fan Out, can be performed by cascading properly the module’s sections.

The module accepts NIM and TTL inputs; the output can be programmed to provide NIM or TTL levels, either direct or inverted.

- Four independent sections with four channels each
- TTL and NIM inputs automatically detected
- NIM/TTL selectable output level
- AND, OR, Majority function with selectable number of inputs
- Logic Fan In / Fan Out
- Direct or inverted output

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**V1718**

VME-USB 2.0 Bridge

The Mod. V1718 is a 1-unit wide 6U VME master module which can be operated from the USB port of a standard PC; the board can perform all the cycles foreseen by the VME64 (except those intended for 3U boards). The board can operate as VME System Controller (normally when plugged in the slot 1) acting as Bus Arbiter in Multimaster systems.

The VME bus activity can be monitored in detail, both locally (through a LED display) and remotely. The front panel includes also 5 TTL/NIM programmable outputs on LEMO 00 connectors (default assignment is: D0/D’, AS, DTACK, BERR and LOCATION MONITOR) and two programmable TTL/NIM inputs (on LEMO 00 connectors). The I/Os can be programmed via USB in order to implement functions like Timer, Counter, Pulse generator, I/O register, etc.

The V1718 – PC interface is USB 2.0 compliant, USB data transfer takes place through the High Speed Bulk Transaction protocol; the sustained data rate on the USB is up to 30 MByte/s in BLT Read cycles. Thanks to the 128KB memory buffer, the activity on the VME bus is not slowed down by the transfer rate on the USB port.

The Module is provided with drivers which support the use with the most common PC platforms (Windows 2000/XP, Vista, Linux); libraries and useful example programs in C/C++, Visual Basic and LabView are provided as well. Firmware upgrade is possible via USB.

- No boot required, ready at power ON
- Up to 30 MByte/s sustained data transfer rate
- VME Master (arbiter or requester)
- VME Slave (register and test RAM access)
- Cycles: R/W, RMW, BLT, MBLT, IACK, ADO, ADOH
- Addressing: A16, A24, A32, CR/CSR, LCK
- Data width: D8, D16, D32, D64
- System Controller capabilities
- Interrupt handler
- Front panel Dataway Display (available also from PC and VME)
- 5 outputs and 2 inputs, NIM or TTL, fully programmable
- Libraries, Demos (C and LabView) and Software tools for Windows and Linux

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<td>WV976XAAAA</td>
<td>V976 - Quad 4 Fold AND/OR/MAJ, NIM-TTL TTL-NIM Level Translator and Fan-In Fan-Out</td>
</tr>
</tbody>
</table>

**V1718**

VME-USB 2.0 Bridge

The Mod. V1718 is a 1-unit wide 6U VME master module which can be operated from the USB port of a standard PC; the board can perform all the cycles foreseen by the VME64 (except those intended for 3U boards). The board can operate as VME System Controller (normally when plugged in the slot 1) acting as Bus Arbiter in Multimaster systems.

The VME bus activity can be monitored in detail, both locally (through a LED display) and remotely. The front panel includes also 5 TTL/NIM programmable outputs on LEMO 00 connectors (default assignment is: D0/D’, AS, DTACK, BERR and LOCATION MONITOR) and two programmable TTL/NIM inputs (on LEMO 00 connectors). The I/Os can be programmed via USB in order to implement functions like Timer, Counter, Pulse generator, I/O register, etc.

The V1718 – PC interface is USB 2.0 compliant, USB data transfer takes place through the High Speed Bulk Transaction protocol; the sustained data rate on the USB is up to 30 MByte/s in BLT Read cycles. Thanks to the 128KB memory buffer, the activity on the VME bus is not slowed down by the transfer rate on the USB port.

The Module is provided with drivers which support the use with the most common PC platforms (Windows 2000/XP, Vista, Linux); libraries and useful example programs in C/C++, Visual Basic and LabView are provided as well. Firmware upgrade is possible via USB.

- No boot required, ready at power ON
- Up to 30 MByte/s sustained data transfer rate
- VME Master (arbiter or requester)
- VME Slave (register and test RAM access)
- Cycles: R/W, RMW, BLT, MBLT, IACK, ADO, ADOH
- Addressing: A16, A24, A32, CR/CSR, LCK
- Data width: D8, D16, D32, D64
- System Controller capabilities
- Interrupt handler
- Front panel Dataway Display (available also from PC and VME)
- 5 outputs and 2 inputs, NIM or TTL, fully programmable
- Libraries, Demos (C and LabView) and Software tools for Windows and Linux

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<td>V1718 - VME-USB 2.0 Bridge</td>
</tr>
<tr>
<td>WXX1718XAAAA</td>
<td>VX1718 - VME-USB 2.0 Bridge</td>
</tr>
</tbody>
</table>
The Mod. V2718 is a 1-unit wide VME master module, which can be controlled by a standard PC equipped with PCI or PCIe CAEN Controller cards (Models. A2818 and A3818).

The connection between the V2718 and the A2818 takes place through an optical fiber cable (AY2705, AY2720, AI2705, A12720). Multi crate sessions can be easily performed, since up to eight Daisy chained (via optical fiber cables) V2718 can be controlled by one A2818/A3818, thus building a CONet (Chainable Optical Network).

The V2718 can perform all the cycles foreseen by the VME64 (except those intended for 3U boards). The board can operate as VME System Controller (normally when plugged in the slot 1) acting as Bus Arbiter in Multimaster systems. The VME bus activity can be monitored in detail, both locally (through a LED display) and remotely. The front panel includes also 5 TTL/NIM programmable outputs on LEMO 00 connectors (default assignment is: DS0/1, AS, DTACK, BERR and LOCATION MONITOR) and two programmable TTL/NIM inputs (on LEMO 00 connectors). The I/Os can be programmed in order to implement functions like Timer, Counter, Pulse generator, I/O processor, etc.

The sustained data transfer rate is up to 70 MByte/s. Thanks to the 128KB memory buffer, the activity on the VME bus is not slowed down by the transfer rate on the CONet when several V2718s share the same network.

The Module is provided with drivers which support the use with the most common PC platforms (Windows 2000/XP, Vista, Linux); libraries and useful example programs in C/C++, Visual Basic and LabView are provided as well. Future firmware upgrade is possible via PCI/PCIe.

Daisy-chain your systems by CAEN controllers!!
PCI and PCI-Express options combined with the speed of the optical link.

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<td>A2818 - PCI Optical Link Controller</td>
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<td>#W2718XAAAA</td>
<td>V2718KIT - VME-PCI Bridge (V2718) + PCI Optical Link (A2818) + Optical Fibre 5m duplex (AY2705)</td>
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<td>#WV2718XAAAA</td>
<td>V2718 - VME-PCI Bridge</td>
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</table>

The Mod. V812 is a 1-unit wide VME module housing a 16 channel constant fraction discriminator. The module accepts 16 negative inputs and generates precise ECL pulses when the input signals exceed a given threshold: constant fraction discriminator. The pulse forming stage of the discriminator determines the timing of the discrimination. The pulse forming stage of the discriminator produces an output pulse whose width is adjustable in a range from 15 ns to 250 ns via VME. Moreover, in order to protect against multiple pulsing, it is possible to program via VME a dead time, from 150 ns to 2 µs, during which the discriminator is inhibited from retiggering. The discriminator thresholds are individually settable via VME in a range from -1 mV to -255 mV (1 mV step) through an 8-bit DAC. Each channel can be turned on or off via VME by using a mask register. A Current Sum output generates a current proportional to the input multiplicity, i.e. to the number of channels over threshold, at a rate of -1.0 mA per hit (-50 mV per hit into a 50Ohm load). A MAJORITY output provides a NIM signal if the number of input channels over threshold exceeds the MAJORITY programmed value. Several V812 boards can be connected in a daisy chain via the Current Sum output: in this case, by switching the majority logic to External, it is possible to obtain a Majority signal when the number of active channels in the chained modules exceeds a global Majority level. The logic OR of discriminator outputs is available on a front panel NIM signal.

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#WV812XAAAA</td>
<td>V812B - 16 Channel Constant Fraction Discriminator</td>
</tr>
</tbody>
</table>
V895 16 Channel Leading Edge Discriminator

The Mod. V895 is a 1-unit wide VME module housing a 16 channel leading edge discriminator. The module accepts 16 negative (positive on request) inputs and produces 16 differential ECL outputs with a fan-out of two on four front panel flat cable connectors. Maximum input frequency is 140 MHz. The pulse forming stage of the discriminator produces an output pulse whose width is adjustable in a range from 5 to 40 ns via VME. The discriminator thresholds are individually settable in a range from -1 mV to -255 mV (1 mV step), via VME through an 8-bit DAC. A positive input version (Model V895 P), with the thresholds settable in the 1 mV to 255 mV range, is also available. Each channel can be turned on or off via VME by using a mask register. A Current Sum output generates a current proportional to the input multiplicity, i.e. to the number of channels over threshold, at a rate of -1.0 mA per hit (-50 mV per hit into a 50 Ohm load). A MAJORITY output connector provides a NIM signal if the number of input channels over threshold exceeds the MAJORITY programmed value. Several V895 boards can be connected in a daisy chain via the Current Sum output: in this case, by switching the majority logic to External, it is possible to obtain a Majority signal when the number of active channels in the chained modules exceeds a global Majority level. The logic OR of discriminator outputs is available on a front panel NIM signal.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV895X8AAAAA</td>
<td>V895B - 16 Channel Leading Edge Discriminator</td>
</tr>
</tbody>
</table>

V814 16 Channel Low Threshold Discriminator

The Mod. V814 is a 1-unit wide VME module housing a 16 channel low threshold discriminator. The module accepts 16 negative (positive on request) inputs and produces 16 differential ECL outputs with a fan-out of two on four front panel flat cable connectors. Maximum input frequency is 60 MHz. The pulse forming stage of the discriminator produces an output pulse whose width is adjustable in a range from 6 to 95 ns via VME. The discriminator thresholds are individually settable in a range from -1 mV to -255 mV (1 mV step), via VME through an 8-bit DAC, a positive input version (Model V814 P), with the thresholds settable in the 1 mV to 255 mV range, is also available. Each channel can be turned on or off via VME by using a mask register. A Current Sum output generates a current proportional to the input multiplicity, i.e. to the number of channels over threshold, at a rate of -1.0 mA per hit (-50 mV per hit into a 50 Ohm load). A MAJORITY output connector provides a NIM signal if the number of input channels over threshold exceeds the MAJORITY programmed value. Several V814 boards can be connected in a daisy chain via the Current Sum output: in this case, by switching the majority logic to External, it is possible to obtain a Majority signal when the number of active channels in the chained modules exceeds a global Majority level. The logic OR of discriminator outputs is available on a front panel NIM signal.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV814X8AAAAA</td>
<td>V814B - 16 Channel Low Threshold Discriminator Positive Inputs</td>
</tr>
</tbody>
</table>

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WV814XP8AAAAA</td>
<td>V814PB - 16 Channel Low Threshold Discriminator Positive Inputs</td>
</tr>
</tbody>
</table>

- Thresholds individually programmable via VME
- ECL outputs with fan-out of two
- Selectable Updating/Non-Updating mode
- Programmable output width
- Mask register for individual channel enable/disable
- Global VETO and TEST inputs
- OR, CURRENT SUM and MAJORITY outputs

More Technical Specifications available on www.caen.it
**V925 Quad Linear Fan In-Fan Out**

The Mod. V925 is a 1-unit VME module which houses three 4 In / 4 Out and one 3 In / 3 Out sections; one Discriminator channel is also featured. Each Fan In-Fan Out section produces on all its output connectors, the sum of the signals fed to the inputs, eventually inverted. Fan in/Fan out inputs are bipolar, while the output can be either inverting or non inverting (jumper selectable independently for each section). Both input and output signals are DC coupled. Maximum input amplitude is ±1.6 V. Moreover each Fan In-Fan Out section features a screwdriver trimmer which allows the DC offset adjustment. The discriminator channel has one DC coupled input (trigger slope leading/trailing is jumper selectable), the threshold is screwdriver adjustable and monitorable via test point; the output is NIM standard, its width is screwdriver adjustable as well. Front panel LEDs allow to monitor all the mode, gain and polarity adjustments performed via internal jumpers.

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV925XAAAAA</td>
<td>V925 - Quad Linear Fan In-Fan Out</td>
</tr>
</tbody>
</table>

**V259 16 Bit Strobed Multi-hit Pattern Unit**

The Mod. V259 is a 1-unit wide VME 6U module able to store internally a 16 bit input pattern which can be read via the VME bus; the board has 16 inputs; an input coincidence circuit, controlled by a GATE signal, selects the hits which are stored in a Pattern register. If a channel has been already hit during the GATE window, the unit sets the relevant bit in a Multiplicity register. The unit provides a fast OR signal of the inputs. Input signals can be std. NIM or ECL depending on the purchased version (V259N or V259E). The control signals (GATE, CLEAR, FAST OR) are NIM for both versions. The unit has an A24, D16 VME interface. (CEA-IRF SACLAY design)

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WV259ECLAAAAA</td>
<td>V259E - 16 Bit Strobed Multi-Hit Pattern Unit (ECL Level)</td>
</tr>
<tr>
<td>WV259NIMAAAAA</td>
<td>V259N - 16 Bit Strobed Multi-Hit Pattern Unit (NIM Level)</td>
</tr>
</tbody>
</table>
### V977 - 16 Channel Input/Output Register (Status A)

The Mod. V977 is a 1-unit wide VME module that can work either as 16 channel general purpose I/O Register or as Multihit Pattern Unit; the operating mode is selected via VME and is signalled via front panel LEDs. The module has 16 Inputs/Outputs; an on-board switch allows to select between NIM and TTL output signals, NIM and TTL input signals are both accepted; 2 Leds signal the I/O status of each channel. The module features an additional channel (TEST CHANNEL), which allows to send a test pulse via a front panel pushbutton. Input channels can be individually/globally masked via VME or globally via a front panel GATE input. The channel status can be cleared either via VME or via the front panel common CLEAR input. The channels global OR and /OR outputs are available as front panel signals and can be eventually masked. GATE and CLEAR signals can be either NIM or TTL; OR and /OR can be set at NIM or TTL level in the same way of the output channels. The module houses also a fully programmable VME RORA INTERRUPTER that generates a VME interrupt request when the OR of a selected set of output channels has a TRUE status. Live insertion is supported.

- NIM and TTL inputs/outputs
- Individual channel enabling/disabling
- Software Input/Output generation
- Fully programmable RORA Interrupter
- Pushbutton TEST signal
- Status A capabilities
- Live insertion

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV977XBAAAA</td>
<td>V977B - 16 Channel I/O Register (Status A)</td>
</tr>
</tbody>
</table>

### V792 - V792N - 32 / 16 Channel Multievent QDC

The Mod. V792 is a 1-unit wide VME 6U module housing 32 Charge-to-Digital Conversion channels with current integrating negative inputs (50Ω impedance). For each channel, the input charge is converted to a voltage level by a QAC (Charge to Amplitude Conversion) section. Input range is 0 – 400 pC. The outputs of the QAC sections are multiplexed and subsequently converted by two fast 12-bit ADCs. The integral non linearity is ±0.1% of Full Scale Range (FSR) measured from 5% to 95% of FSR. The ADCs use a sliding scale technique to improve the differential non-linearity.

The Mod. V792N houses 16 input channels on LEMO connectors and shares most of the other features with the Mod. V792. The Mod. V792/V792N offers a 32 event buffer memory, A24/A32 addressing mode, D16, D32, BLT32/MBLT64 and CBLT32/CBLT64 data transfer mode. Multicast commands are also supported. A 16 ch. decoupling board Mod. A992 (see Accessories section) is available for the Mod. V792 to avoid ground loops and signal reflections when long flat cable (110Ω) connections to the 50Ω inputs are used (one V792 requires two A992 boards). A 16 channel flat cable to LEMO input adapter, Mod. A392 (see Accessories section) is also available for the Mod. V792 (one V792 requires two A392 boards).

The board has a special circuitry that allows it to be removed from and inserted in a powered crate without switching the crate off.

- 0 – 400 pC input range
- Full 12bit resolution
- 100 fs LSB
- 5.7 μs / 32 ch and 2.8 μs / 16 ch conversion times
- 600 ns fast clear time
- Zero and overflow suppression for each channel
- ±0.1% integral non linearity
- ±1.5% differential non linearity
- 32 event buffer memory
- BLT32/MLT64/CBLT32/CBLT64 data transfer
- Multicast commands
- Live insertion
- Libraries (C and LabView) and Software tools for Windows and Linux

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV792XACAAAA</td>
<td>V792AC - 32 Channel Multievent QDC (No 12V DCDC, live ins)</td>
</tr>
<tr>
<td>WV792XNCAAAA</td>
<td>V792NC - 16 Channel Multievent QDC (No 12V DCDC, live ins)</td>
</tr>
</tbody>
</table>
V862 32 Channel Multievent Individual Gate QDC

The Mod. V862 is a 1-unit wide VME 6U module housing 32 Charge-to-Digital Conversion channels with current integrating negative inputs. Each channel has an independent gate input (GATE I) logically ANDed with a COMMON GATE input; the input charge on the I-th channel is converted to a voltage level by a QAC (Charge to Amplitude Conversion) section when both the GATE I and COMMON GATE signals are active. Input range is 0 ÷ 400 pC. The integral non linearity is ±0.1% of full scale range (FSR), measured from 2% to 97% of FSR; the differential non linearity is ±1.5% of FSR, measured from 3% to 100% of FSR. The ADCs use a sliding scale technique to reduce the differential non-linearity.

The outputs of the QAC sections are multiplexed and subsequently converted by two fast 12-bit ADCs (5.7 µs for 32 channels). The Mod. V862 offers a 32 event buffer memory; programmable zero suppression and trigger counter complete the features of the unit. The module works in A24/A32 mode. The data transfer occurs in D16, D32, BLT32, MBLT64 or CBLT32/CBLT64 mode. The unit also supports the Multicast commands. The board supports live insertion.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV862XAAAAA</td>
<td>V862AC - 32 Channel Multievent QDC With Individual Gate (live insertion)</td>
</tr>
<tr>
<td>WA967XAAAAA</td>
<td>A967 - 32 Channel Cable Adapter (1x32 to 2x16) for V767, V862, V1190, VX1190, V1495</td>
</tr>
</tbody>
</table>

V965 - V965A 16/8 Channel Dual Range Multievent QDC

The board is a 1-unit wide VME 6U module that houses 16 (V965) or 8 (V965A) Charge-to-Digital Conversion channels with current integrating negative inputs (50 Ohm impedance).

For each channel, the input charge is converted to a voltage level by a QAC (Charge to Amplitude Conversion) section. Each QAC output is then converted by two ADCs in parallel; one ADC is preceded by a x1 gain stage, the other by a gain of about 9x stage. A dual input range is then featured: 0 ÷ 900 pC (200 fC LSB) and 0 ÷ 100 pC (25 fC LSB); this allows to avoid saturation with big charge pulses while increasing resolution with small ones.

The outputs of the QAC sections are multiplexed and subsequently converted by two fast 12-bit ADCs. The ADCs use a sliding scale technique to improve the differential non-linearity. Programmable zero suppression, multi-event buffer memory, trigger counter and test features complete the flexibility of the unit.

The module works in A24/A32 addressing mode; the data transfer occurs in D16/D32/BLT32/MBLT64. The module also supports the Multicast commands. The board supports live insertion.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV965XAAAAA</td>
<td>V965 - 16 Channel Dual Range Multievent QDC (No 12V DCDC, live ins)</td>
</tr>
<tr>
<td>WV965AXAAAAA</td>
<td>V965A - 8 Channel Dual Range Multievent QDC (No 12V DCDC, live ins)</td>
</tr>
</tbody>
</table>
V560 16 Channel Scaler

The Mod. V560 is a single width VME module which houses 16 independent 32 bit counting channels at the maximum input frequency of 100 MHz. Each channel can be software enabled to generate an interrupt signal when the counter is full. The interrupt level and the correlated vector can be set and read via std. VME write and read cycles. Each channel can be cascaded with the following one through internal jumpers to produce a 64 bit counting depth. The status of the internal jumpers can be read via std. VME read cycles. All the channels can be cleared via the relevant VME command and via the front panel pushbutton. The unit has a standard A24/A32, D32 VME interface.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV560NBAAAAA</td>
<td>V560AN - 16 Channel 32 Bit Scaler NIM</td>
</tr>
</tbody>
</table>

V830 32 Channel Latching Scaler

The model V830 is a 1-unit wide VME 6U Multievent Latching Scaler, housing 32 independent counting channels. Each channel has 32 bit counting depth and accepts either ECL or LVDS inputs, depending on the purchased version; the maximum input frequency is 250 MHz. The counters’ values can be read on the fly from VME without interfering on data acquisition process. The model V830 is equipped with a 32 k x 32 bit multievent buffer memory which may be used to store and readout accumulated data during subsequent counting. The Trigger signal can be provided by an external NIM/ECL signal or by a VME request. It is also possible to generate a periodical Trigger signal by means of an internal programmable timer. The module features VETO and CLEAR ECL inputs and a TEST NIM input (in common for all channels). The model V830 works in A24/A32 mode and data transfer occurs in D32, BLT32 or MBLT64 mode. The unit also supports the Chained Block Transfer (CBLT32/CBLT64) and the Multicast commands. The board supports live insertion.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV830XACAAAA</td>
<td>V830AC - 32 Channel 32 Bit Scaler 250 MHz (With FIFO) ECL inputs</td>
</tr>
<tr>
<td>WV830LXCAAAA</td>
<td>V830LC - 32 Channel 32 Bit Scaler 250 MHz (With FIFO) LVDS inputs</td>
</tr>
</tbody>
</table>
**V1190A - V1190B** 128/64 Channel MultiHit TDC

The board is a 1-unit wide VME 6U module that houses 128 (V1190A) or 64 (V1190B) independent Multi Hit/ Multi Event Time to Digital Conversion channels. The unit features High Performance TDC chips, developed by CERN. LSB can be set at 100 ps (19 bit resolution, 52 µs FSR), 200 ps (17 bit, 104 µs FSR), or 800 ps (17 bit, 104 µs FSR). The channels can be enabled for the detection of hits rising/falling edges or for their width measurement (both the edges' timing, and the hit width can be measured with the selected resolution). For each channel there is a digital adjustment for the zero-ing of any offsets. The data acquisition can be programmed in "EVENTS" ("TRIGGER MATCHING MODE", with a programmable time window) or in "CONTINUOUS STORAGE MODE". Both ECL and LVDS input signals are supported. The VME interface allows the module to work in A24 and A32 addressing modes. The board houses a 32 k x 32 bit deep Output Buffer, that can be readout via VME in a completely independent way from the acquisition itself. The internal registers are available in D16 mode only, while the Output Buffer is accessible in D32, BLT32 or MBLT64. The module supports also the Chained Block Transfer mechanism and the Multicast commands. The board supports live insertion.

**Performant and cost effective.**

128 acquisition channels with 3 different sub nanoseconds timing resolution squeezed in a 1U VME module

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV1190AEXAAA</td>
<td>V1190A - 128 Ch Multi event Multi hit TDC 100-200-800 psec ECL/LVDS</td>
</tr>
<tr>
<td>WV1190BEXAAA</td>
<td>V1190B - 64 Ch Multi event Multi hit TDC 100-200-800 psec ECL/LVDS</td>
</tr>
<tr>
<td>WA967XAAAAAA</td>
<td>A967 - 32 Channel Cable Adapter (1x32 to 2x16) for V767, V862, V1190, VX1190, V1495</td>
</tr>
<tr>
<td>VXV1190AEXAAA</td>
<td>VX1190A - 128 Ch. Multi event Multi hit TDC 100-200-800 psec ECL/LVDS (no JAUX)</td>
</tr>
<tr>
<td>VXV1190BEXAAA</td>
<td>VX1190B - 64 Ch. Multi event Multi hit TDC 100-200-800 psec ECL/LVDS (no JAUX)</td>
</tr>
</tbody>
</table>

**V1290A - V1290N** 32/16 Channel MultiHit TDC

The Mod. V1290A is a 1-unit wide VME 6U module that houses 32 independent Multi Hit/Multi Event Time to Digital Conversion channels. The unit houses 4 High Performance TDC chips, developed by CERN. LSB is 25 ps (21 bit resolution, 52 µs FSR). The module accepts both ECL and LVDS inputs. The Mod. V1290N houses 16 independent Multi Hit/Multi Event Time to Digital Conversion channels. It houses 2 High Performance TDC chips and shares most of its features with the V1290A. The V1290N module accepts NIM inputs. The channels can be enabled for the detection of hits rising/falling edges. For each channel there is a digital adjustment for the zero-ing of any offsets. The data acquisition can be programmed in "EVENTS" ("TRIGGER MATCHING MODE", with a programmable time window) or in "CONTINUOUS STORAGE MODE". The VME interface allows the module to work in A24 and A32 addressing modes. The board houses a 32 k x 32 bit deep Output Buffer, that can be readout via VME in a completely independent way from the acquisition itself. The internal registers are available in D16 mode only, while the Output Buffer is accessible in D32, BLT32 or MBLT64. The module supports also the Chained Block Transfer mechanism and the Multicast commands. The board has a special circuitry that allows it to be removed from and inserted in a powered crate without switching the crate off.

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>WV1290AEXAAA</td>
<td>V1290A - 32 Ch Multi event Multi hit TDC 25 psec ECL/LVDS</td>
</tr>
<tr>
<td>WV1290BNXAAA</td>
<td>V1290N - 16 Ch Multi event Multi hit TDC 25 psec NIM</td>
</tr>
<tr>
<td>VXV1290AEXAAA</td>
<td>VX1290A - 32 Ch. Multi event Multi hit TDC 25 psec ECL/LVDS (no JAUX)</td>
</tr>
<tr>
<td>VXV1290BNXAAA</td>
<td>VX1290N - 16 Ch. Multi event Multi hit TDC 25 psec NIM (no JAUX)</td>
</tr>
</tbody>
</table>

**T26**

- 3 programmable ranges: 100 ps LSB (19 bit resolution), 200 ps LSB (19 bit) and 800 ps LSB (17 bit)
- ECL/LVDS inputs automatically detected
- 5 ns Double Hit Resolution
- Leading and Trailing Edge detection
- Trigger Matching and Continuous Storage acquisition modes
- 32 k x 32 bit output buffer
- BLT32/MBLT64/CBLT32/CBLT64 cycles supported
- Multicast commands
- Live insertion
- Libraries, Demos (C and LabView) and Software tools for Windows and Linux

**T26**

- 25 ps LSB
- 21 bit resolution
- 52 µs full scale range
- 5 ns Double Hit Resolution
- Leading and Trailing Edge detection
- Trigger Matching and Continuous Storage acquisition modes
- 32 k x 32 bit output buffer
- BLT32/MBLT64/CBLT32/CBLT64 cycles supported
- Multicast commands
- Live Insertion
- Libraries, Demos (C and LabView) and Software tools for Windows and Linux
V775 - V775N  
32 / 16 Channel Multievent TDC

The Mod. V775 is a 1-unit wide VME 6U module housing 32 Time-to-Digital Conversion channels. The Full Scale Range can be selected via VME from 140 ns to 1.2 µs with 8 bit resolution. The board can operate both in COMMON START and in COMMON STOP mode. Each time interval between the COM signal and the input signal is converted into a voltage level by the TAC sections. The outputs of the TAC sections are multiplexed and subsequently converted by two fast ADC modules (5.7 µs conversion time). The Mod. V775N houses 16 channels on LEMO 00 connectors and shares most of its features with the Mod. V775.

- Full scale range programmable from 140 ns to 1.2 µs
- 12 bit resolution with 15 bit dynamic range
- 35 ps LSB
- 5.7 µs / 32 ch and 2.8 µs / 16 ch conversion times
- 600 ns fast clear time
- Zero and overflow suppression for each channel
- ±0.1% integral non linearity
- ±1.5% differential non linearity
- 32 event buffer memory
- BLT32/MBLT64/CBLT32/CBLT64 data transfer
- Multicast commands
- Live insertion
- Libraries, Demos (C and LabView) and Software tools for Windows and Linux

V972  
Delay Unit

The Mod. V972 is a 1-unit wide VME 6U module that houses a delay unit with a range from 0 to 31.5 ns with a 2.6 ns offset. The delay can be set in 0.5 ns steps via front panel toggle switches. The unit is made up of calibrated coaxial cable stubs for high accuracy delay and does not require any power supply. The module features LEMO 00 I/O connectors.

- Completely passive delay via a set of calibrated coaxial cable stubs (50 Ohm)
- 0 to 31.5 ns delay with 2.6 ns offset
- 0.5 ns resolution
- ±100 ps accuracy on 0.5 to 8 ns delay steps; ±200 ps accuracy on 16 ns steps
- VSWR < 1.15

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV775XACAAAA</td>
<td>V775AC - 32 Channel Multievent TDC (No 12V DCDC, No live ins)</td>
</tr>
<tr>
<td>WV775XNCAAAA</td>
<td>V775NC - 16 Channel Multievent TDC (No 12V DCDC, No live ins)</td>
</tr>
<tr>
<td>WV972XAAAAAA</td>
<td>V972 - Delay Unit (2.6 to 34.1 ns)</td>
</tr>
</tbody>
</table>

More Technical Specifications available on www.caen.it
The Model V993B Dual Timer is a 1-unit VME module housing two identical triggered pulse generators. The module produces NIM/TTL (NIM/TTL selection is performed via an on-board switch) and ECL pulses whose width ranges from 50 ns to 10 s when triggered. Output pulses are provided normal and negated. Timers can be re-triggered with the pulse end marker signal, a short pulse occurring at the end of each output pulse. The coarse adjustment of the output width is provided via a 9-position rotary switch, the fine adjustment can be performed via either a rotary handle or by providing an external voltage. The trigger START can be provided via either an external signal (NIM, TTL or ECL) or manually via a front panel switch. The module features also VETO and RESET input signals. RESET is also available on a front panel switch. The V993B is equipped with LEMO 00 connectors for NIM/TTL signals and male pin couples for ECL signals.

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV993XBAAAAA</td>
<td>V993B - Dual Timer</td>
</tr>
</tbody>
</table>

The Mod. V538A is a 1-unit wide VME module housing 8 independent logic level translators. Each of the 8 channels accepts a NIM or ECL signal and provides two NIM and two ECL outputs (OUT 0÷7 A, B). The NIM and ECL inputs of each channel are ORed prior to fan-out. The maximum operating frequency is 300 MHz. Two front panel input bridged connectors accept a COMMON IN NIM signal, which allows the use of the module as a fan-out of 16 NIM and 16 ECL signals.

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>WV538XBAAAAA</td>
<td>V538AB - 8 Channel NIM-ECL/ECL-NIM Translator</td>
</tr>
</tbody>
</table>

- Manual or pulse triggered START (NIM, TTL or ECL)
- Monostable or bistable operation
- NIM, TTL and ECL output pulses from 50 ns to 10 s
- Manual or pulse triggered RESET
- (NIM, TTL and ECL) END-MARKER pulse
- VETO input
- 8 independent NIM to ECL/NIM and ECL to NIM/ECL channels
- NIM and ECL fan-out of 2
- 300 MHz maximum operating frequency
- COMMON IN input with a fan-out of 16 (both NIM and ECL)
- I/O delay <5 ns