

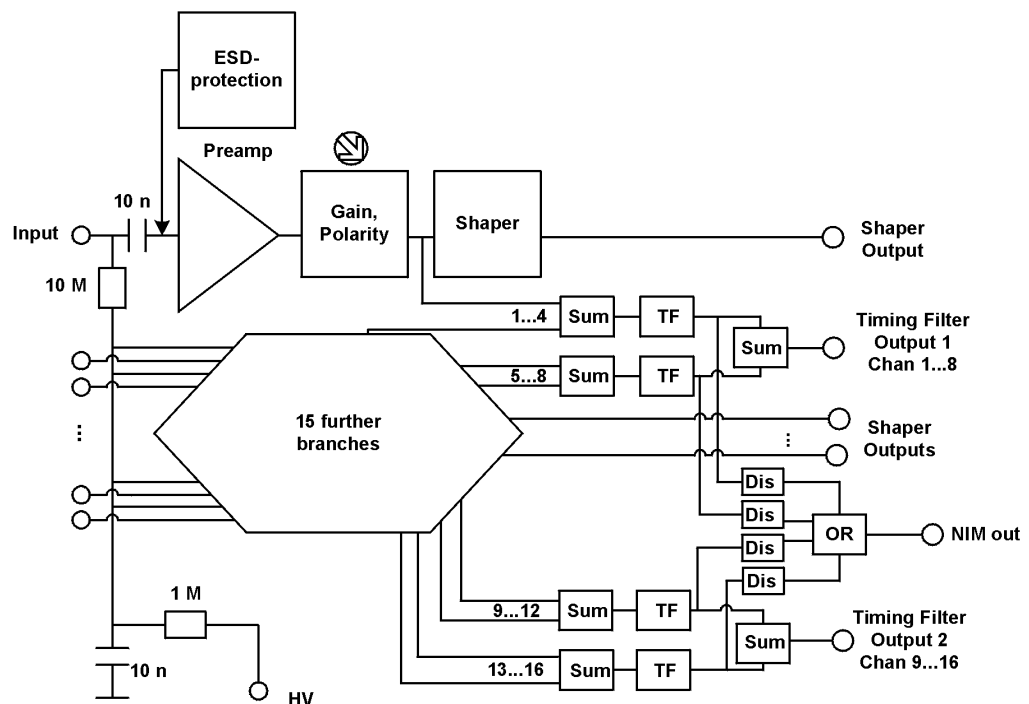
mesytec MPRS-16 includes 16 channels of charge sensitive preamplifiers, shapers, timing filter amplifiers and leading edge discriminators. It provides two timing filter outputs, where each is the sum of 8 channels. It also provides a NIM trigger output which is the or'ed signal of the discriminators. It is well suited for high resolution timing and ADC gate generation. The input polarity and sensitivity can be selected in 8 steps by a rotary switch. The shaper outputs are designed to connect directly to standard peaksensing ADCs. The modules are especially well suited for single or double sided multistrip silicon detectors.

### Features:

- 16 channel compact module
- Includes: preamplifier, shaper, timing filter
- High quality discriminator output (NIM) for good timing resolution or data acquisition start, adjustable threshold.
- Sensitivity and polarity selectable with rotary switch in steps: 3.3, 5, 6.7, 10, 17, 25, 33, 50 MeV full range
- Shaper output 10V @ 1k $\Omega$ , 1 $\mu$ s FWHM
- Pulser input
- Bias voltage up to  $\pm$  400V
- Preamplifier input protection
- PCB module available for vacuum use



### Schematics:



## Technical Data:

### Input stage

- Input connector(s): subD 25 female connector
- Pin assignment:

Function	connector	Function	connector
Sig-gnd	1,2,7,12,13,14,15,25	Cha 9	19
Cha 1	11	Cha 10	6
Cha 2	23	Cha 11	18
Cha 3	10	Cha 12	5
Cha 4	22	Cha 13	17
Cha 5	9	Cha 14	4
Cha 6	21	Cha 15	16
Cha 7	8	Cha 16	3
Cha 8	20	guardring	24

- Positive and negative charge can be amplified equally.
- The guardring output (24) is connected via R-C- R filter (100kΩ, 10nF, 100kΩ) to the common detector bias input.

### Noise

- 5.5keV Si + 0.064keV/pF (1200e- FWHM + 18e-/pF)
- maximum input capacity: 1000pF (detector + cable)

### Pulser input

- Tail pulse, or square pulse, internally not terminated.
- Amplitude:  
Typ. 11 MeV/V ± 10% (0.5pF couple capacity)

### Sensitivity

- Sensitivity can be changed by a rotaryswitch. The following max ranges (8V output at the shaper module) can be set:  
3.3, 5, 6.7, 10, 17, 25, 33, 50 MeV.

### Shaper Outputs:

- Unipolar positive gaussean pulse ( $CR(RC)^5$ ). Output amplitude: 0 to 10V, max 50mA
- Peaking time 790ns.
- Crosstalk  $<3 \cdot 10^{-3}$  (-50dB) to neighbour channel, less than -70dB to others.
- Pin assignment of 34 pole output connector:  
pin 1 channel 1, pin 3 channel 2.....  
pin 2,4,...32,33,34 output ground

- Option: low power output stage (max 4V output signal). Is useful for in vacuum use.

### Timing Filter Outputs

The MPRS provides two timing filter outputs. The signals are generated from the sum of channel 1..8 and 9..16. The signals are negative and are scaled and polarized with the rotary switch setting. Output amplitudes : -1.5V for maximum range in a single channel. The amplitude will vary to some extent with detector capacity and signal risetime.

### Discriminators

The MPRS provides a NIM trigger output, which is the ored sum of its 4 leading edge discriminators, working each on the analog timing sum of 4 channels. Multiple discriminators are used to provide a high quality low jitter NIM signal. The discriminatoers have a common threshold, which can be adjusted via 10- turn potentiometer. The threshold value is available at the sense output. 10V of output voltage corresponds to 100% of the chosen sensitivity range. ( 1V threshold voltage in the 25MeV range means 10% which corresponds to 2.5MeV threshold value)

### Detector bias input

- Lemo connector
- Maximum voltage ±400V
- When detector side must be on ground level: terminate bias input with 50Ω

### Ground connections

- Ground screws on rear side

**Power Supply**

Connector

- SubD9 connector: 1, 2 = gnd, 3 = +6V, 4 = +12V, 5 = -6V

Power consumption

With 10V output driver = 2.3W

- +12V 100mA
- +6V 130mA
- -6V -100mA

With 4V output driver: 1W

- +6V 140mA
- -6V -20mA

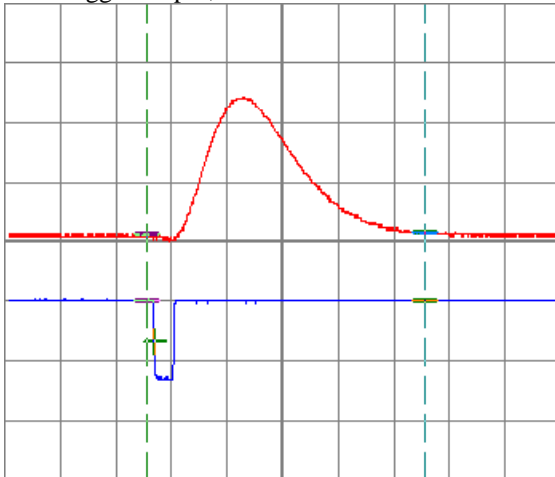
Due to the low power consumption cooling is not necessary.

**Dimensions:**

- Length: 173 mm (without connectors)
- Width: 105 mm
- Height: 46 mm

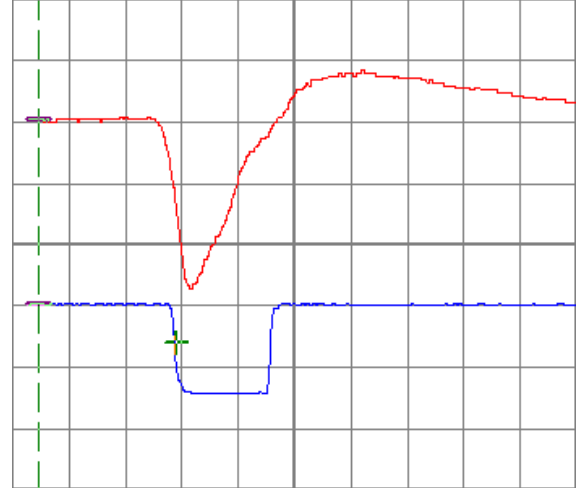
**Output signals:**

Upper trace (CH1):shaper output, lower trace (CH2) NIM trigger output, terminated with 50Ohm



T=500ns, Ch1= 2V, CH2 = 0.5V

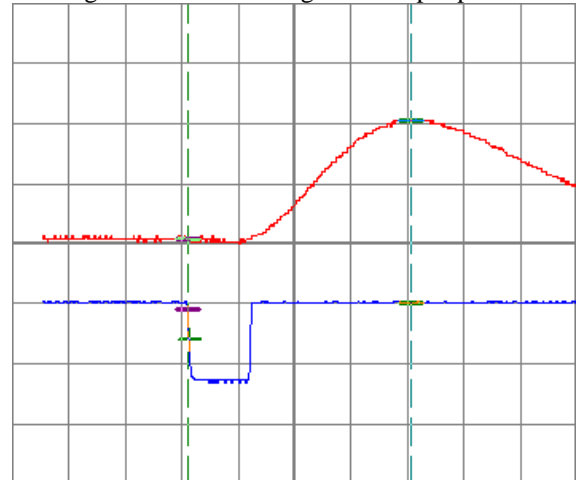
Upper trace: timing output, lower trace: NIM trigger output



T= 100ns, CH1=0.5V, CH2=0.5V

Upper trace: shaper signal output, lower trace NIM trigger output.

Peaking time: from NIM signal to shaper peak: **790ns**



T=200ns, CH1=5V, CH2=0.5V

Updated 1.3.2005, power consumption, output signals, scem.