HIGH SPEED AMPLIFIER
FOR PHOTOMULTIPLIER TUBES
PV16

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The PV16 variable gain amplifier is intended to allow the detection of light pulses by PIN diodes and single photon pulses from photomultipliers. It produces standard logic bipolar pulses from microvolt signals at Gigahertz frequencies rather than just linearly amplifying signals. The very high and adjustable gain designed for photons at Gigahertz rates are unique as well as the lack of any noise at the output without an input signal at any gain.

The PV16 amplifier was optimized for the Hamamatsu Hybrid R10467U Photomultiplier and conventional electron amplifier PMTs. The PV16 is a Constant Pulse Amplifier (CPA) with exceptionally low noise, very wide input dynamic range, and 30 db of gain adjustment to allow optimum use of all PMTs without changing their applied voltage.

The input polarity for pulses is selectable, the input is protected against over-voltage, and a high frequency boost selection is available. The high sensitivity allows impedance matching so that ringing may be eliminated by pulse shaping.[1]

Size	32 x 32 x 48 mm	1.26" cube with SMA inputs and outputs
Weight	47g	1.64 oz
Power/Consumption	6 VDC 217ma	1.3W
Input/Output impedance	50 ohms	SMA female
Gain	Maximum 64db	Minimum 32db
Input Voltage Negative input Version Positive input Version	Minimum -300uv 300 uv	Maximum[2] -0.5V 0.5V
Output Rise/Fall Time	Less than 250 picoseconds	PECL 100
Output Amplitudes, 50 ohm load	+ 600 mv Positive output, 800 mv max	-600 mv Negative output, 800 mv max
Bandwidth	1.5 GHz	
Input Amplifier Chip	Noise Factor (NF) 0.5 db to 500 MHz; 0.6 db to 1GHz	Gain: 22db @ 400 MHz 16 db @ 1 GHz
Input Amplifier IP3	45 dBm	5V operation
Output Noise	Less than 4 mv pp	No false logic pulses at any gain
Input Limit Protection	V_{RWM} 5.0v	V_{BR} 5.4v
Input coupling Maximum Input pulse width	1 nf into 50 Ohms	RC = 50 ns
Output Coupling	1 nf into 50 Ohms	External termination
Minimum Pulse width	Tested with 600 ps Hybrid Pulse Width	300 ps tested from 1.5 GHz toggle
Power Supply	5V internal regulated	Ultra-low dropout
Black Anodized Aluminum Box	6V external power supply	2.1 x 5.5 mm power plug

1 External pulse shaping attenuates the signal but allows impedance mismatches without ringing
2 The input is limited at +/-5V to prevent damage to the input amplifier, but +/-0.5V is maximum for which the input is not over driven.