C400 Four Channel Pulse Counting Detector Controller

Features

- Four independent channels with fast discriminators, scalers, preamp power and high voltage.
- Able to control photomultipliers and APDs.
- 10 nsec pulse pair resolution
- 150 MHz discriminator bandwidth
- Trigger distribution facility for large detector arrays
- Quadrature encoder input
- Multiple host interface options

Applications

- Fast scintillator readout, NaI, LaCl3 , LaBr3 and YAP crystals.
- Avalanche photodiode readout
- Detector array readout for area and position sensing detectors
- Diffraction experiments

Options

- HV range and polarity selections
- Matching pre-amplifiers to suit supported detector types

Specifications

Input signals	Pulse amplitude –4 V to +4V (up to 80mA into 50 ohms) Suitable for typical photomultiplier pre-amplifier output pulses for NaI, LaCl and YAP scintillators, and avalanche photodiodes
Disriminators	Window comparator. Lower and upper thresholds independently adjustable from –5 V to + 5V, 16 bit resolution. Automated pulse height scan facility to assist setup
Input impedance	50 ohm
Resolution	Minimum detectable pulse width 10 nsec Pulse pair resolution 10 nsec
Scalers	32 bit scalers with transparent background readout Pulse integration period 100 µsec to 1000 sec.
Triggers	TTL gate/trigger input to synchronize scalers. Gate input is mirrored to gate output to allow multiple C400s to be operated together with daisychain configuration.
Control outputs	+/- 12 VDC / 100 mA fused outputs for pre-amp power. -5 to +5 VDC 16 bit analog output for control of remote HV supply or other function. LED drive 5V pulsed for scintillator test pulser LEDs. Adjustable frequency and pulse duration.
HV output options	20 to 200 V. Line <0.01%, Load <0.05%, Ripple <0.01% 50 to 500 V. Line <0.01%, Load <0.01%, Ripple <0.01% 100 to 1250 V. Line <0.001%, Load <0.005%, Ripple <0.001% 200 to 2000 V Line <0.01%, Load <0.01%, Ripple <0.001% All supply options 1 W maximum output power. Supplies can be in any combination on the four channels. 200 and 500 V suitable for APDs, 1250 and 2000 suitable for PMTs. Supplies can be either polarity (specify at time of order) Line regulation < 0.001%
Monitor out	Discriminated pulse output. TTL levels into 50 ohm impedance. Minimum pulse width 10 nsec typical.

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Encoder in	Complementary quadrature encoder input, TTL levels. Maximum encoder count rate 1 MHz. Integration period 100 µsec to 1000 sec Counter depth 32 bits.
Trigger in	TTL levels. 10k ohm input impedance
Trigger out	TTL levels into 50 ohm impedance
Power input	+24V (+/- 2V) DC, 750 mA typ, 1500 mA max.
Controls	Two rotary switches for loop address and comms mode/baud rate (for fiber-optic communications
Displays	Four front panel LEDs for HV on per channel Eight rear panel LEDs for power, device status, communications.
Case material	1U 19” steel chassis with Al alloy front panel
Weight	3.5 kg (7.7 lb)
Operating environment	10 to 35 C (15 to 25 C recommended to reduce drift and offset) , < 70% humidity, non-condensing, vibration < 0.1g all axes (1 to 1000 Hz)
Shipping and storage environment	-10 to 50C, < 80% humidity, non-condensing, vibration < 1g all axes, 1 to 1000 Hz

Interfacing

Interfaces	RS-232 or RS-485, 8-bit ASCII. Selectable baud rate up to 115 kbps. The electrical interface can be set to RS-232 or full duplex differential RS-485. Ethernet 10/100 Mbps. UDP and TCP/IP. Fiber-optic loop, 10 Mbit/sec serial, 9-bit asynchronous binary. Loop is able to support connection of slave devices to the C400 such as M10 general purpose I/O unit.
Host computer	Diagnostic host program supplied. C++ libraries available for Microsoft® Windows and Linux. ASCII communications based on SCPI via RS-232/RS-485 for legacy system integration.

Pre-amplifiers

CP10-A	Matching pre-amplifier suitable for LaCl3, LaBr3 and YAP scintillator / photomultipliers. DC input coupling.
CP10-B	Matching pre-amplifier suitable for plastic scintillator photomultipliers, continuous dynode electron multipliers, channel plates and silicon photomultipliers (APD arrays). DC input coupling. nalog voltage +/- 10 V into 10 kohm. Frequency 0 to 1 MHz TTL into 50 ohm.

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Connectors

Signal inputs: Four Lemo coaxial size 00.

Preamp: Four D9 socket.

1	DGnd	6	DGnd
2	Pulser out	7	DGnd
3	AGnd	8	+12 V out
4	-12 V out	9	AGnd
5	DAC out		

HV out: Four SHV

Ethernet: RJ-45

Fiber optics: Two Avago ST bayonet (compatible with 1 mm POF and 200 µm HCS fiber))

RS-232 / RS485: Six pin mini-DIN (“PS/2”)

1	Tx / RS-485 Tx-	4	n/c
2	Rx / RS-485 Rx+	5	RS-485 Tx+
3	Gnd	6	RS-485 Rx-

Gate in: BNC (isolated from case) TTL levels.

Gate out: BNC (isolated from case) TTL levels

Encoder in: D9 socket

1	Enc A+	6	+5V out
2	Enc A-	7	DGnd
3	Enc B+	8	DGnd
4	Enc B-	9	Enc Z+
5	Enc Z-		

Monitor outputs: Four Lemo coaxial size 00

Power in: 2.1mm threaded jack. Mates with Switchcraft S761K or equivalent.

Ground: M4 threaded stud

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Ordering Information

C400	C400 four channel scintillation detector controller with user manuals, software drivers, calibration data.
-nXP20/12/05/02	Add n HV supplies positive 2000/1250/500/200 volts.
-nXN20/12/05/02	Add n HV supply negative 2000/1250/500/200 volts.

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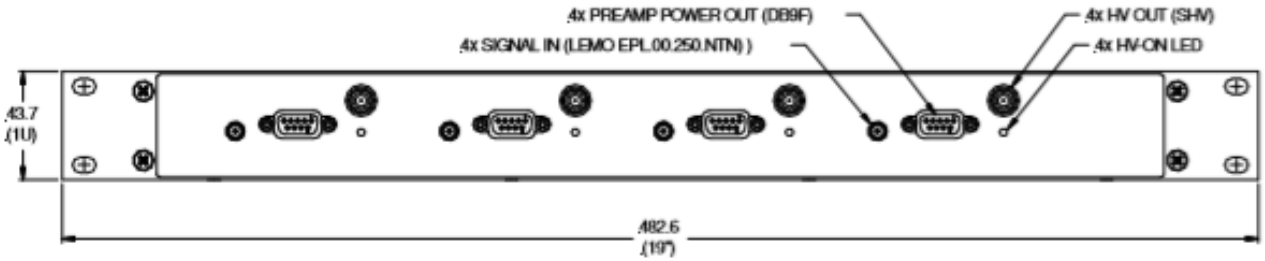
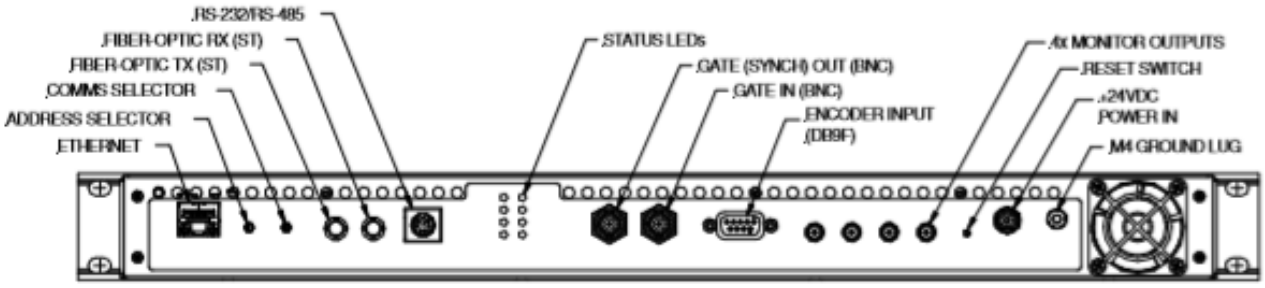


FRONT VIEW



REAR VIEW

Dims mm

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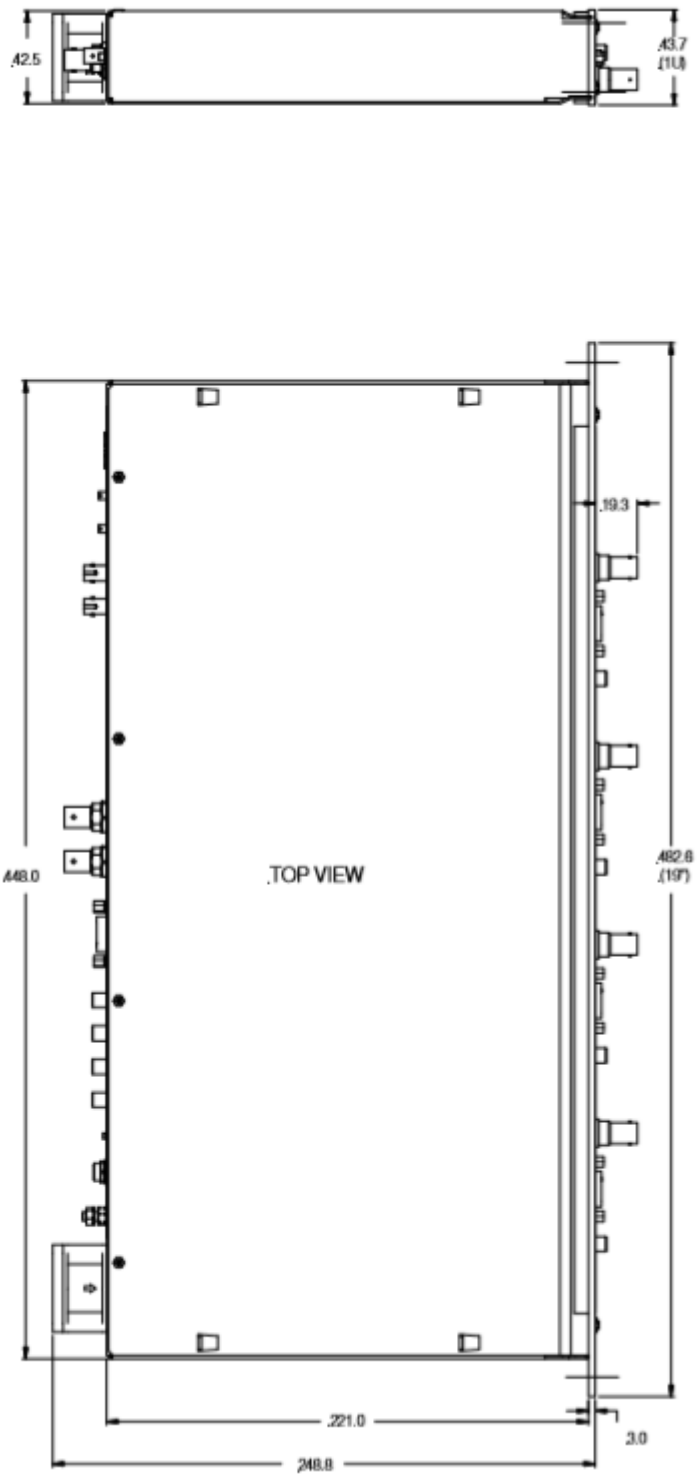

Dims mm