THE PULSE OF THE FUTURE

PVX-4110
±10,000V PULSE GENERATOR

BNC
DEI High Voltage

- **0 to ±10,000V Pulse Output**
- **<60ns Rise And Fall Times**
- **<200ns to DC Pulse Width**
- **Optimized to drive deflection plates, grids and other capacitive loads**
- **Protected against arcs, short circuits and load transients**
- **Voltage And Current Monitor Outputs**

The PVX-4110 pulse generator produces fast, high voltage wave forms to 10,000V. Optimized for high impedance capacitive loads, the PVX-4110 is well suited for driving extraction grids and deflection plates for electrostatic modulation of particle beams in time-of-flight mass spectrometers and accelerators. Its robust and versatile design also makes it well suited for pulsing or gating power tube grids, Pockels cells and Q Switches, acoustic transducers, microchannel plates, photomultiplier tubes and image intensifiers. The exceptional pulse fidelity of the PVX-4110 will optimize the performance of any system in which it is used.

The PVX-4110 generates an output voltage pulse of 10,000 volts with rise and fall times less than 60ns, with very flat voltage pulses to DC into a capacitive load. It can generate singled-ended output pulses from ground to +10,000V or from ground to –10,000V, and can also generate pulses originating from a DC voltage offset from ground by using both VLow and VHigh power supply inputs. This offset can be from –10,000V to +10,000V, with a maximum power supply voltage differential of ≤10,000V.

The PVX-4110 requires a TTL gate signal, a high voltage DC power supply and optional DC offset supply inputs. The output pulse width and frequency are controlled by the gate signal. The pulse output voltage is controlled by the amplitude of the input DC power supplies.

When the input gate is high, the V_{HIGH} supply is connected to the output. When the input gate is low, the V_{LOW} supply is connected to the output. Therefore the PVX-4110 can be used to generate a negative-going pulse by logically inverting the input gate, so that the input gate is high until the unit is pulsed. When the input gate goes low, the V_{LOW} input supply is connected to the output, thereby generating a negative-going pulse.

The PVX-4110 features front panel indicator LEDs to monitor the status of the pulse generator. Front panel voltage and current monitors provide a straightforward means to view the output voltage and current waveforms in real-time, eliminating the need for an external high voltage oscilloscope probe.

The pulse generator is a direct-coupled, air-cooled solid-state half-bridge (totem pole) design, offering equally fast pulse rise and fall times, low power dissipation, and virtually no over-shoot, under-shoot or ringing. It has over-current detection and shut-down circuitry to protect the pulse generator from potential damage due to arcs and shorts in the load or interconnect cable. All control and protection logic circuitry, support power, energy storage and output network are incorporated into the PVX-4110. It can be connected directly to the load, and does not require series or shunt resistors, impedance-matching networks between the pulser and the load, or additional energy storage (capacitor banks). All of this is taken care of within the PVX-4110.

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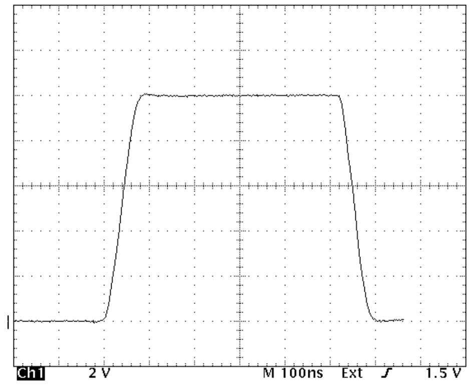
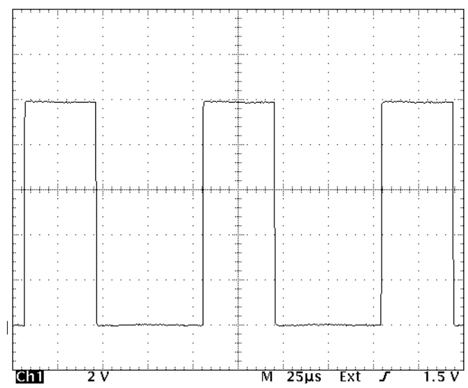
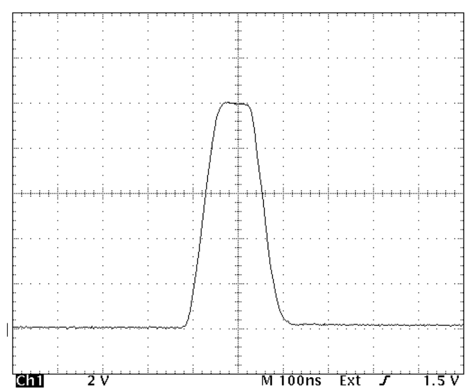
SPECIFICATIONS	
OUTPUT (Measured into a 50pF load connected with 4ft RG-11 cable)	
Maximum Value	±10,000 Volts (V_{High} - V_{Low})
Minimum Value	0 Volts
Means Of Adjustment	Controlled By Power Supply Input Voltages
Pulse Rise And Fall Time	<60ns (10% to 90%)
Pulse Width	<200ns to DC, Controlled by Input Gate
Pulse Recurrence Frequency (PRF)	Single shot to 10kHz, Controlled by Input Gate [(1)]
Max. Average Power	100W (V_{High} + V_{Low}) [(1)]
Max. Duty Cycle	Continuous
Droop	<1%
Over/undershoot	<5%
Jitter	<1ns shot-to-shot
Output Connector	LEMO ERA.3S.415.CTL, Rear Panel
Output Cable	4 Ft RG-11
INPUT DC VOLTAGE +V_{IN} (V_{High}) (User-Supplied)	
Absolute Max. Value	+10,000 Volts
Absolute Min. Value	-10,000 Volts
Relative Max. Value	+10,000 Volts over V_{Low} Voltage
Relative Min. Value	V_{Low} Voltage
Input Connector	LEMO ERA.3S.415.CTL, Rear Panel
INPUT DC VOLTAGE -V_{IN} (V_{Low}) (User-Supplied, only needed if biasing output)	
Absolute Max. Value	+10,000 Volts
Absolute Min. Value	-10,000 Volts
Input Connector	LEMO ERA.3S.415.CTL, Rear Panel
INPUT GATE (User-Supplied)	
Gate Source & Connector	+5V ±1V into 50Ω, into front panel BNC connector
VOLTAGE AND CURRENT MONITORS	
Voltage Monitor	2000:1 into 1 MegΩ, BNC Connector
Current Monitor	10A/V into 50Ω, BNC Connector
GENERAL	
Input AC Power	90-240VAC 50/60Hz
Dimensions	19"W x 7.0"H x 21.5"D (48.25cm W x 17.8cm H x 54.6cm D)
Weight	Approximately 24 lbs (11 Kilograms)
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE	



~54ns Typical Rise Time, 10,000V, 120pF Load



Typical Output Waveform, 10kHz, 10,000V, 120pF Load



~136ns Typical Minimum Pulse Width, 10,000V, 150pF Load

These specifications are measured driving a 50pF load connected with 4 feet of RG-11 cable, at 10,000V output. However the PVX-4110 can drive loads of a few picofarads to several hundred picofarads of capacitance, limited by its maximum power dissipation capability[(1)]. For frequencies greater than 10kHz please contact Berkeley Nucelonics. The PVX-4110 can also drive resistive or inductive loads, within limitations. Contact Berkeley Nucleonics for additional information and applications assistance.

[(1)] The power dissipated in the PVX-4110 when driving a capacitive load is defined by the formula CV^2F, where C is the total load capacitance, including the capacitance of the load, interconnect cable, and the internal capacitance of the PVX-4110, V is the pulse voltage, and F is the pulse repetition frequency (or the total pulses per second). (For these calculations, the inter-nal capacitance of the PVX-4110 is 50pF, and RG-11 cable is 21.5pf/foot.) Given the maximum dissipation of 100W, the maximum load capacitance, frequency and/or voltage at which the PVX-4110 can operate can be approximated using this formula. This formula also approximates the high voltage power supply requirements needed to drive a given load at a specific voltage and frequency. This formula is not applicable when driving resistive or inductive loads.

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BNC
Berkeley Nucleonics Corp.
2955 Kerner Blvd
San Rafael CA, 94901 USA
Call: (415) 453-9955
info@berkeleynucleonics.com
www.berkeleynucleonics.com