SPECTROPOL

BNC
Berkeley Nucleonics Corp.

MODEL 577
0.001 HZ TO 20 MHZ DIGITAL DELAY / PULSE GENERATOR

Overview

Quick Specs

- Channels: 4 or 8 Independent Channel Outputs
- Resolution: 250 ps
- Accuracy: 1 ns +.0001 x setpoint
- RMS Jitter: < 50 ps (channel to channel)
- Voltage: 5V Peak for TTL, 45V Peak for Adjustable.
- Pulse Width: 10 ns - 1000 s
- Memory: 12 Storage Slots

Service Features

- Warranty: Full 3 Year Warranty
- Integration Assistance, Full customer Support (Phone or Web-Based)
- Lifetime No-Cost Firmware upgrades

Features

Channel Multiplexing

One of the most unique features of the Berkeley Nucleonics pulse generators is the ability to combine the timing of any or all channels together and output them out of any of the output BNCs. The multiplexing function (MUX) can be set through remote communications via a computer or from the front panel of most units.

Selectable Clock Reference

The Model 577 offers additional inputs and outputs for external clock synchronizing. Specify your input/output reference frequency (10 MHz to 100 MHz). Synchronize with the Mode Lock Oscillator of a laser or **phase lock multiple units** with one clock.

Flexible Gating Options

The Model 577 is packed with gating options for almost any setup. You may gate with a channel or on any input. You may gate individual channels or gate all. Gate immediately (output inhibit) or gate after a pulse (pulse inhibit).

External Trigger Options

Select channels for internal/external triggering, or free-run. Triggered channels have flexible output choices: single pulse, burst at its clock rate, continuous pulse train or a series of on/off pulses (duty cycle). Contact us for custom wave trains or modes.

Individual Rates

Each channel can have individual channel rates (either T0 or any of the other channels...).

Auto-Save

Forgot to save your settings? The Model 577 stores your setup configurations while powering down. Recall is automatic on power-up.

Dual Input Panel Connectors

The Model 577 offers two inputs for triggering or gating. You may specify electrical or optical input signals, and configure any trigger/gate combination. Use Trigger #2 to disable a triggered pulse train.

Front Panel High Voltage

Our modular architecture offers expanded functionality on user-selected front panel outputs. We offer a front panel High Voltage option (adjustable from 35V, 200 mV steps) on 2, 4, 6, or all 8 channels.

Front Panel Optical

Many applications benefit from optical signals. For noisy environments or communications applications, we offer an LED output stage at the front panel. This modular option can be configured for 2, 4, 6, or 8 outputs at 820nm or 1300nm.

Combined Output Types

The outputs are configured in modules and output types are combined in pairs. Thus one may select optical, standard electrical, or high voltage electrical in pairs for their instrument. For example, an 8-channel unit may have optical, standard electrical, and high voltage outputs all on one instrument. Custom or additional output modules may be added as the need arises. See our helpful Order Chart for all option configurations.

Field Programmability

The instrument can now have functions upgraded in the field, such as a special or custom feature upgrade via a fully programmable FPGA.

Custom Output Modes

Custom Modules such as the TZ-50 give users an expanded list of capabilities with the Model 577. One example is our TZ50 option, which provides customers a TTL signal into 50 Ω expanded.

Negative Delay

Use the convenient negative delay feature to reference one channel with respect to another channel in positive or negative time increments. By allowing a channel to reference another channel as its trigger, you can synchronize the channels with respect to each other.

Note: The Negative Delay cannot trigger a channel before your initial trigger. It is intended to complement the channel referencing option.

Specifications

Base Model	Number of Channel
577-4C	4 Independent Output Channels
577-8C	8 Independent Output Channels

INTERNAL RATE GENERATOR

Rate (T0 period)	0.001 Hz to 20.000 MHz (1000 s – 50 ns)
Resolution	5 ns
Accuracy	5 ns + (0.0001 x period)
T0 Period Jitter	< 50 ps RMS
Time Base	200 MHz, low jitter PLL
Oscillator	50 MHz, 50 ppm crystal oscillator
System Output Modes	Single, Normal, Burst, Duty Cycle, External Gate/Trigger
Burst Mode	1 to 10,000,000 pulses
Duty Cycle Mode	1 to 10,000,000 pulses ON and/or OFF
Pulse Control Modes	Internally triggered, externally triggered or external gate.

TIMING GENERATOR

Pulse Width Range	10 ns -1000 s
Width Accuracy	1 ns + 0.0001 x width setting
Width Resolution	250 ps
Pulse Delay Range	0 - 1000s
Delay Accuracy	1 ns + 0.0001 x delay setting
Delay Resolution	250 ps
Jitter (channel to channel)	< 50ps RMS
Output Multiplexer	Any/all channels may be OR'd to any/all outputs.
Time Base	Same as the internal rate generator
Channel Output Modes	Single, Normal, Burst, Duty Cycle
Burst Mode	1 to 10,000,000 pulses
Duty Cycle Mode	1 to 10,000,000 pulses ON and/or OFF
Wait Counts	1 to 10,000,000 pulses
Channel Control Modes	Internally triggered or external gated. Each channel may be independently set to either mode.

OUTPUT MODULE (AT20)

TTL/CMOS Mode	
Output/Source Impedance	High Impedance
Output Level	4.0 V (typical) into 1 kΩ
Rise Time (10% - 90%)	< 3ns (1.5ns typical)
Jitter	< 50 ps RMS channel to channel
Adjustable Mode	
Output Level	2 V to 20 VDC into 1 kΩ or 1 V to 10 VDC into 50 Ω
Amplitude Resolution	10 mV
Current	200 mA typical, 400 mA (short pulses)
Rise Time (10% - 90%)	15 ns (typical) @ 20V into Hi-Z (25 ns typ @ 10V into 50 Ω)
Slew Rate	> 0.1V/ns
Overshoot	< 1 V + 10% of pulse amplitude

INPUT MODULE (IA15)

Trigger Input	
Function	Generate individual pulses, start a burst or continuous stream
Rate	DC to 1/ (200 ns + longest active pulse). Maximum of 5 MHz
Slope	Rising or Falling
Threshold	200 mV to 15 VDC
Maximum Input	60 V Peak
Resolution	10 mV
Trigger Accuracy	±3% of Threshold Voltage
Impedance	5.3 kΩ + 40pF
Trigger Jitter	< 800 ps RMS
Insertion Delay	< 110 ns

Minimum Pulse Width	20 ns
Pulse Inhibit Delay	< 150 ns RMS
Output Inhibit Delay	< 100 ns RMS
Gate Input	
Mode	Pulse Inhibit or Output Inhibit
Polarity	Active High or Active Low

MEMORY and CONNECTIVITY

Memory Storage	16 Memory Location
USB	USB 1.0 Standard
RS-232	DE-9F Connector using RS-232 Communications Standard
External Clock In	10 MHz – 100 MHz user selectable in discrete values
External Clock Out	To or Ref out (10 to 100 MHz) user selectable in discrete values

PHYSICAL and ENVIRONMENTAL

Dimensions	10.5” x 8.25” x 5.5” [267 x 210 x 140mm]
Weight	8 lbs [3.6 kg]
Power	100 - 240 VAC 50/60 Hz <3 A
Fuse	3.15 A, 250 V Time-lag (Qty 2)
Operating Temp	32 - 104°F [0 - 40°C]
Transportation & Storage Temp	-40 - 158°F [-40 - 70°C]
Shipping Dimensions	18x12x9"
Shipping Weight	10 lbs

Options

Option L82 or Option L130 - Optical Outputs

Wavelength	820 nm or 1300 nm
Maximum Signal Rate	5 MBd
Maximum Link Dist.	1.5 km
Connector Type	ST

Option TZ50 - TTL 50 Ω Output Impedance

TTL/CMOS Mode

Output Level	4.0 V typ into 50 Ω
Rise Time	< 3 ns (2ns typical)
Slew Rate	0.5 V/ns
Jitter - Channel to Channel	50 ps RMS

Adjustable Mode

Output Level	2 V to 20 VDC into 1 kΩ or 1 V to 10 VDC into 50 Ω
Amplitude Resolution	10 mV
Current	200 mA typical, 400 mA (short pulses)
Rise Time (10% - 90%)	15 ns (typical) @ 20V into Hi-Z (25 ns typ @ 10V into 50 Ω)
Slew Rate	> 0.1V/ns
Overshoot	< 1 V + 10% of pulse amplitude

Option AT35 - 35V Adjustable Output

TTL/CMOS Mode

Output Level	4.0 V typ into Hi-Z
Rise Time	< 3 ns (2ns typical)
Slew Rate	0.5 V/ns
Jitter - Channel to Channel	50 ps RMS

Adjustable Mode

Output Amplitude	5 V – 35 V into 50Ω load at 200 Hz
Resolution	10 mV
Rise Time (10% - 90%)	< 30 ns
Accuracy	500 mV
Max. Frequency	4 kHz (Internal & External)

Option TZ35 - TTL 50 Ω Output Impedance + 35V Adjustable Output

TTL/CMOS Mode

Output Level	4.0V into 50 Ω (typ)
Rise Time	< 3 ns (2ns typical)
Slew Rate	0.5 V/ns
Jitter - Channel to Channel	50 ps RMS

Adjustable Mode

Output Amplitude	5V – 35V into 50Ω load at 200 Hz
Resolution	10 mV
Rise Time (10% - 90%)	< 30 ns

Accuracy	500 mV
Max. Frequency	4 kHz (Internal & External)

Option AT45 - 45V High and Low Impedance

Amplitude	4V - 45V
Resolution	20 mV
Accuracy	+/-1.5%
Rise Time (10%-90%)	< 2ns into 50 Ω (typ), < 9ns into Hi-Z (typ)
Fall Time (90%-10%)	< 9ns into 50 Ω (typ), < 9ns into Hi-Z (typ)
Frequency	DC – 100 kHz (Internal & External)
Overshoot	< 35% Typical for Fast Rise Time
Polarity	**High Impedace Mode**: Active High or Active Low **Low Impedance (50 Ω) Mode**: Active High Only
Pulse Width Range	**High Impedance Mode**: 10 ns to DC **Low Impedance (50Ω) Mode**: 10 ns to 10 seconds
Max Current	35 mA (Hi-Z @10 ms width), 900 mA (50 Ω @ 10 ms width)

AT45 NOTE:

* Due to the power consumption and heat restrictions, a maximum of four AT45 channels can be installed on a single unit

** Deletes TTL and ADJUSTABLE mode selection and replaced by LOW and HIGH Impedance selection

Option IL82 or Option IL130 - Optical Inputs

Wavelength	820nm or 1300nm
Maximum Signal Rate	5 MBd
Maximum Link Dist.	1.5 km
Connector Type	ST
Insertion Delay	< 300 ns
Jitter	< 1.4 ns RMS

System Options

Option	**Description**
DT15	Dual Trigger. Enable Gate Input to act as second trigger
COM	Extended Communications – Adds Ethernet & GPIB
EU	Replace North American Cord with European Cord