HIGHLAND TECHNOLOGY

# P500 digital delay and pulse generator

## Features


- 4 delay and width pulse outputs A B C D and T0 start reference
- Up to 1000 seconds delay with 1 picosecond resolution
- 30 nanosecond insertion delay
- Less than 20 picoseconds RMS typical jitter
- 14 MHz rep rate
- Custom GaN output stages make clean, fast 50-ohm pulses from 0.5 to 25 volts p-p
- User-friendly operation: color LCD, spinner knob, onboard help
- No timing errors, aborted pulses, or missed triggers during timing changes
- Optional isolated rear-panel high-voltage outputs
- Trains/frames option includes timing lists and multiple pulses per trigger
- Interfaces are USB, RS-232, and Ethernet with SCPI and web page controls
- Web page controls from any browser

The P500 is a benchtop digital delay and pulse generator that generates four separately programmable delay-and-width outputs. The P500 can generate delays up to 1000 seconds in 1 picosecond increments, and is capable of a high repetition rate of 14 MHz. Applications for the P500 include laser timing, pulse picking, ICCD camera systems, ATE systems, and radar testing.

P500 trigger sources include internal, external, remote, manual, or line. The low-jitter internal synthesized rate generator may be programmed from 0.001 Hz to 14 MHz in 1 mHz steps. The external trigger features selectable trigger level, slope, and termination impedance. Trigger gating and burst facilities are standard.

The front panel includes a color LCD, numeric keypad, and spinner knob. Each function of the P500 has an intuitive single-level control menu invoked by an associated pushbutton. A HELP system explains each pushbutton, input, output, and setting.

Remote interfaces include RS-232, USB, and Ethernet with both ASCII serial commands and web page controls.

The standard P500 timebase is a precision temperature-compensated crystal oscillator. An optional OCXO is available for applications requiring extreme accuracy and lowest jitter. Multiple P500s may be synchronized to each other, or locked to an external 10 MHz reference.

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# Specifications: P500 digital delay and pulse generator

| | |
|---|---|
| FUNCTION | Four channel digital delay/pulse generator |
| CHANNELS | T0 A B C D |
| OUTPUT VOLTAGES | Vlow ± 5 volts<br>Vhi -5 to +20 volts<br>Rise/fall < 1.5 ns typ<br>Clean pulses from 0.5 to 25 volts p-p<br>Zout 50 ohms (divide voltages by 2 into 50 ohm loads) |
| TIMING RANGE | Delay+Width 0-999 seconds relative to T0 |
| INSERTION DELAY | Normal Mode: Trigger to T0 output, 55 ns ± 500 ps<br>Fast Mode: Trigger to T0 output, 30 ns ± 500 ps |
| REP RATE | 0 to 14 MHz  limited to 1 / (max d+w + 70 ns) |
| ACCURACY | Trigger to rising or falling edges ± 500 ps ± timebase |
| RESOLUTION | Edge times, 1 ps<br>Output levels, 0.1 V<br>Trigger level, 10 mV |
| JITTER | Typical 20 ps RMS + timebase jitter<br>Max 30 ps RMS + timebase jitter |
| TRIGGER | External, internal, software, manual, AC line<br>Burst, divide-by-N, N-of-M pulse picking<br>External trigger range ± 5 volts<br>rising/falling edge<br>impedance selectable 2K+15 pF or 50 ohms<br>minimum recommended amplitude 0.25 volts p-p<br>Internal, 1 µHz to 14 MHz, 1 µHz resolution<br>period jitter < 10 ps RMS + timebase jitter<br>Line trigger requires external P492 adapter |
| STANDARD VCXO TIMEBASE | Initial accuracy: ±1 PPM<br>Aging: < ±5 ppm/1000 hours<br>Jitter: 10 ns/s RMS max<br>Lockable to external 10 MHz ± 10 PPM |
| OVENIZED OCXO TIMEBASE* | Initial accuracy: ±0.01 PPM<br>Aging: < 1 ppb/day, < 100 ppb/year<br>Jitter: 0.2 ns/sec RMS max<br>Lockable to external 10 MHz ± 0.1 PPM<br>*OCXO timebase is an optional feature installable at factory. All OCXO specifications apply only after initial 10-minute warm-up. |
| CLOCK INPUT | 10 MHz, sine or square, 0.5 to 5 volts p-p<br>1kΩ nominal input impedance |
| CLOCK OUTPUT | 10 MHz square wave, 3 volts p-p AC coupled<br>50Ω nominal output impedance |
| COUNTDOWN | Provides trigger divide-by-N or N-of-M burst/pulse picker mode, up to 200 MHz external trigger |
| POWER | External 24 volts DC from universal adapter supplied<br>Includes standard IEC60320 C13 line cord<br>60 watts max |
| OPTIONAL HV OUT | Five isolated rear-panel outputs, T0 A B C D<br>Voltage programmable 5-50 volts into 50 ohms<br>Rise/fall < 2 ns<br>Max pulse width 25 v-µs |
| COMMUNICATIONS | USB, 10/100 Ethernet, RS-232 |
| DISPLAY | 3.5" diagonal 320 x 240 color LCD |
| PACKAGING | 13.5” x 8” x 4.63” aluminum enclosure (including connectors and feet) |
| TEMPERATURE | Specifications apply over 10-40°C ambient<br>Operating range -20 to 60°C |
| CONFORMANCE | RoHS |
| WARRANTY | 2 years limited |
| OPTIONS | Rear-panel isolated high-voltage outputs<br>Frame and train engine<br>OCXO timebase<br>Rackmount adapter |



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