

# J2151A PerfectPulse

Data Sheet

## PerfectPulse

### Fast Edge Signal Generator

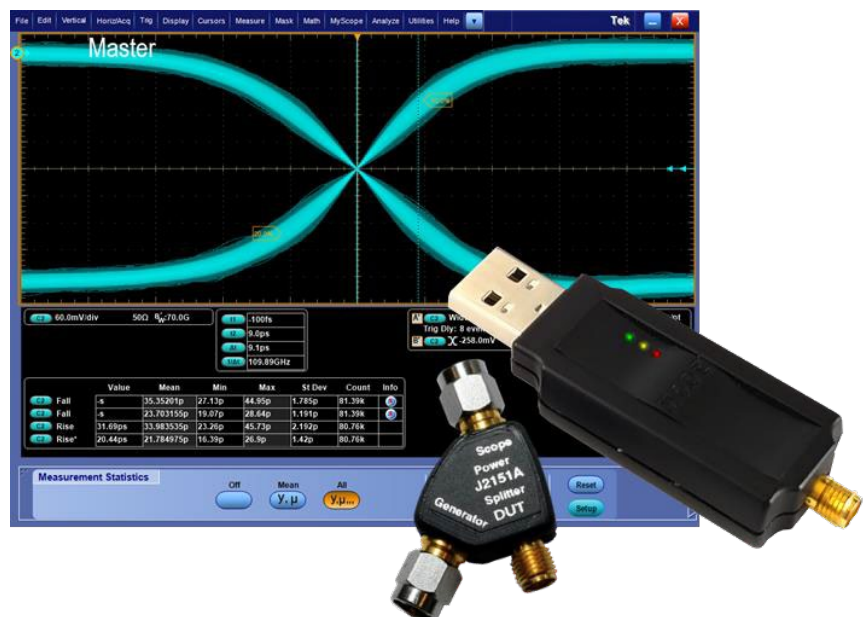
Cable/Coupon/Trace/PCB Tester

TDR – Time Domain Reflectometry

Fast edge generation for DSP correction

Instrument calibration

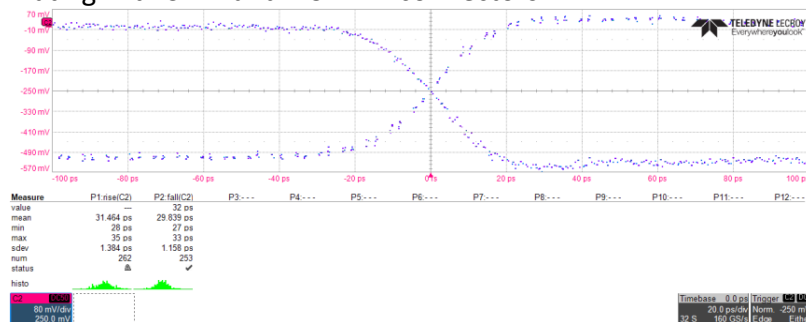
Troubleshooting



# PerfectPulse Fast Edge Pulse Generator

The PerfectPulse signal generator provides a square ~32ps edge pulse in a pocket sized, self-contained package, requiring only a USB power source. Single button operation allows selection of different operating modes, while LEDs indicate the current operating mode. The negative 500mV, 50Ω output signal is very square, without overshoot or undershoot, making it perfect for verifying instrument and probe rise/fall times, as well as verifying signal path rise/fall time and undershoot/overshoot. The (included) 10GHz+ power splitter allows the signal generator to be used as a reflectometer (TDR/TDT) for measuring PCB coupons, cable and PCB trace impedance, verifying cable crimps, measuring trace and cable lengths, dielectric constant and many other applications.

The 3.5mm output connector provides many more mating cycles than 2.92mm or SMA connectors for longer life while still mating with SMA and 2.92mm connectors.



**Turn-on and turn-off response reveals little to no undershoot or overshoot**

## Characteristics

A TDR/TDT is generally a large, expensive instrument that includes a high-speed edge pulse and a sampling oscilloscope. The TDR/TDT is used to measure dielectric constants, PCB coupons, PCB signal traces, interconnects and cables using reflected waves. TDT offers similar capabilities, using transmission measurements rather than reflected measurements. PerfectPulse is a low-cost, pocket sized pulse generator and together with the included resistive port splitter and a real time oscilloscope can be used to make these measurements.

### FEATURES:

#### J2151A Signal Generator

- Precise, Fast Edge Generation and TDR in one convenient package
- Ultra-fast Rise time and Fall time of 32ps (typical) with little device to device variance
- No overshoot or undershoot
- Selectable output pulse train with 50% duty ratio - 1kHz, 10kHz, 100kHz, 1MHz, 10MHz square waves
- Output signal pulse amplitude 0 to negative 500mV (50Ω) – trimmed to within 1%
- 3.5mm connector for long life
- Includes 10GHz+ power splitter for TDR operation
- Compatible with 50Ω probes

### APPLICATIONS:

- Applications requiring fast, precise edge
- TDR – Time Domain Reflectometry
- DSP correction and calibration
- Probe and Scope calibration
- Low cost PCB coupon tester - Characteristic PCB impedance
- Measure cable and PCB trace length, characteristic impedance, and dielectric constant
- Verify the integrity cable crimps and connector launches
- Measure PCB trace path rise/fall time and overshoot/undershoot
- Supports cable and trace loss modeling
- Test frequency bandwidth, rise/fall time and flatness of lab instruments and probes

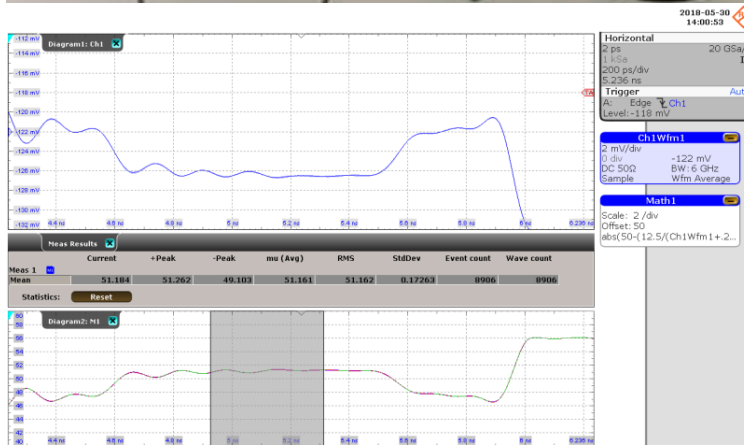


## Operation

The J2151A has seven (7) modes of operation. The mode can be selected by pressing the MODE push button on the top of the key. Three LEDs indicate the active operating mode.

| Mode | Description        | Red | Yellow | Green | Notes          |
|------|--------------------|-----|--------|-------|----------------|
| 1    | OFF                | x   | x      | x     |                |
| 2    | DC                 | x   |        |       |                |
| 3    | 1kHz Square Wave   |     | x      |       | 50% Duty Cycle |
| 4    | 10kHz Square Wave  |     |        | x     | 50% Duty Cycle |
| 5    | 100kHz Square Wave | x   | x      |       | 50% Duty Cycle |
| 6    | 1MHz Square Wave   |     | x      | X     | 50% Duty Cycle |
| 7    | 10MHz Square Wave  | x   |        | x     | 50% Duty Cycle |

## Sample Application – Measuring Trace Impedance Changes



Using the TDR function, along with the Picotest P2100A 50 ohm PDN probe for injection, you can test PCB coupon impedance. This image shows the change from 47 to 51 Ohms.

| Technical Specifications |                         |          |
|--------------------------|-------------------------|----------|
| Characteristic           | Typical                 | Units    |
| Typical rise/fall time   | 32                      | ps       |
| Flatness                 | 0.1dB (typ.)<br>at 2GHz | dB       |
| Output Voltage           | 0 - -500m               | V        |
| Output Impedance         | 50                      | $\Omega$ |



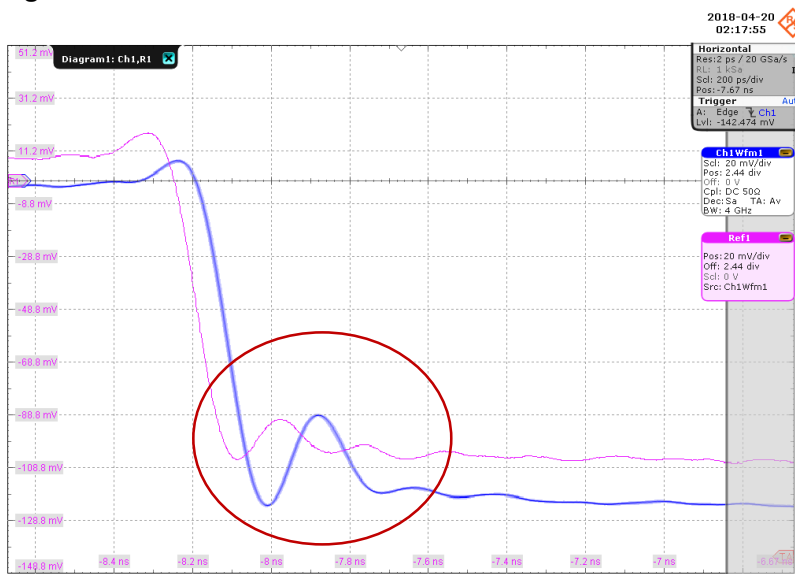
The Picotest TDR Demo Trace test board provides four sample traces; 50 ohm, Beatty trace, 50 Ohm with 3" markers notches, and 50 to 52.5 ohm to 50 Ohm. The resistive splitter is included and supports TDR/TDT operation.



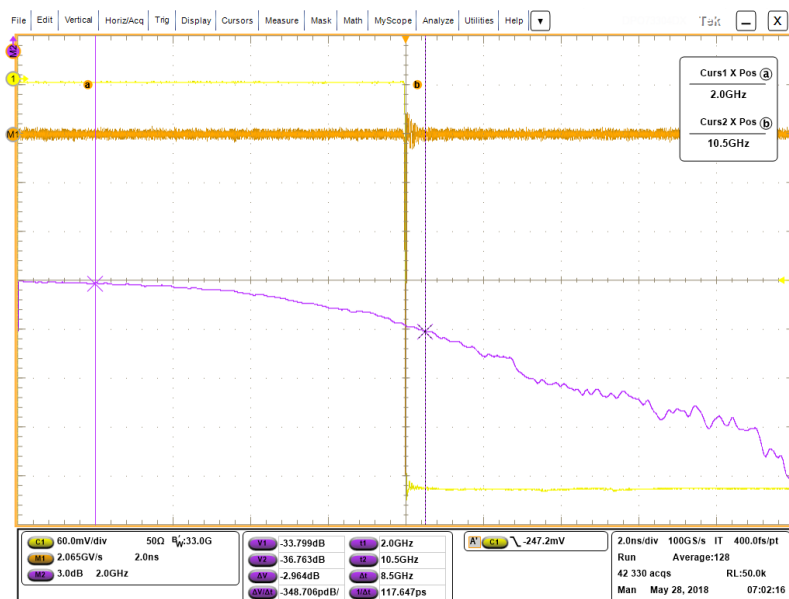
Picotest P2100A – 1-Port PDN Probe supports connections up to 1.5GHz.

## Sample Application – Measuring Cable & Connector Discontinuity

The output signal of the J2151A is connected to the Picotest 1-Port probe. The probe is used to INJECT and READ the TDR signal.



Using the TDR function of PerfectPulse, you can easily see the bad cable crimp as evidenced by the impedance ring



The -3dB bandwidth of the PerfectPulse edge is 10.5 GHz while it is -0.6dB at 5GHz and -0.1dB at 2GHz