PRODUCT SPECIFICATION

MODEL 4020 SINGLE-ENDED TDR/TDT SOURCE ENHANCEMENT MODULE

- **Provides 9ps TDR and 7 ps TDT incident single-ended pulses**
- **Produces very high-quality, flat pulses**
- **Enables increased resolution for TDR analysis of high-speed electronic interconnects and circuits**
- **Connects to the output of either an Agilent or Tektronix TDR/TDT plug-in**
- **Compact, easy to use design that is quick to connect and set-up**

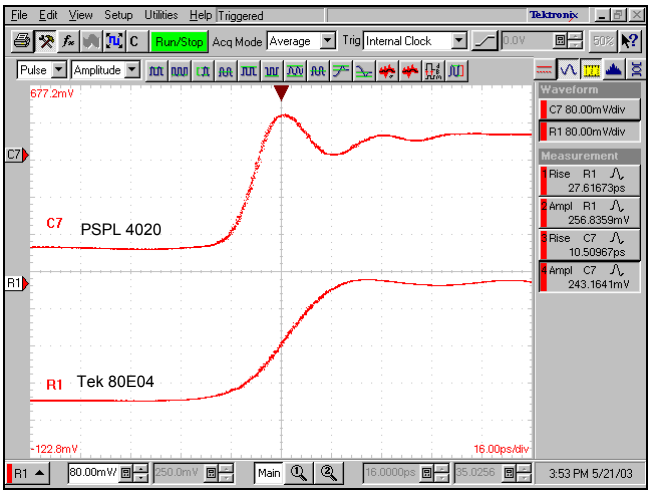
Main Driver Module

TDR Remote Head

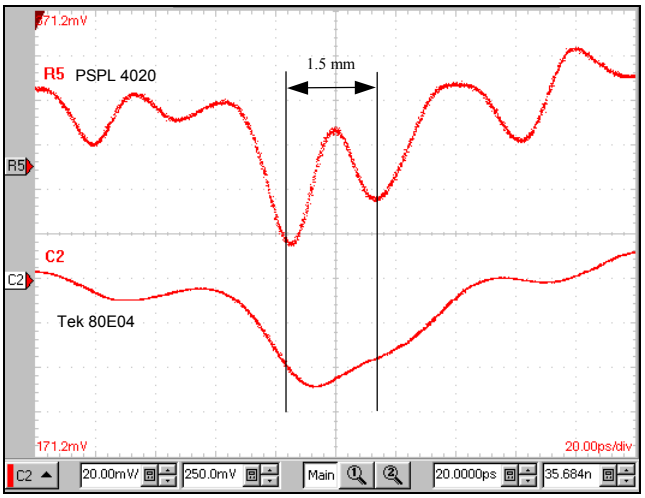
TDT Remote Head

The Picosecond Pulse Labs (PSPL) Model 4020 is a single-ended TDR / TDT source enhancement module that connects to the output of a TDR/TDT plug-in and produces ultra-fast risetime pulses, enabling the world's highest resolution TDR analysis and the world's fastest TDT analysis. The 4020 consists of a single-channel main driver module, a small remote pulse head, a connecting cable, and an external power supply. Configurations are also available for both TDR and TDT measurements (different remote heads are used for TDR and TDT).

4020 Source Enhancement Module TDR Measurements

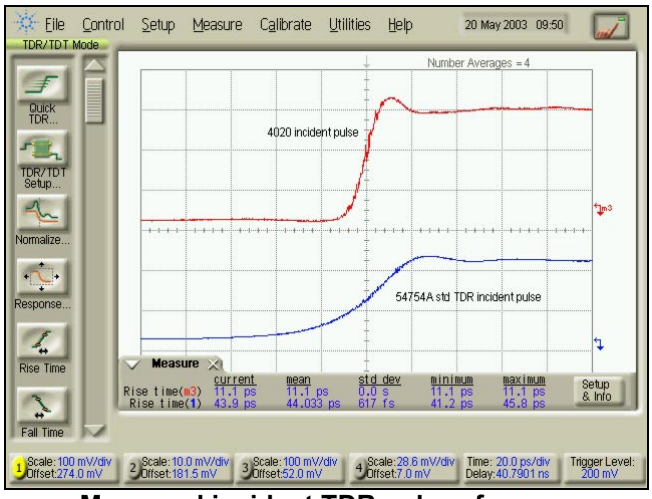


Measured incident TDR pulses from a Tektronix 80E04 (27.6 ps) and a PSPL Model 4020 (10.5 ps) [1]

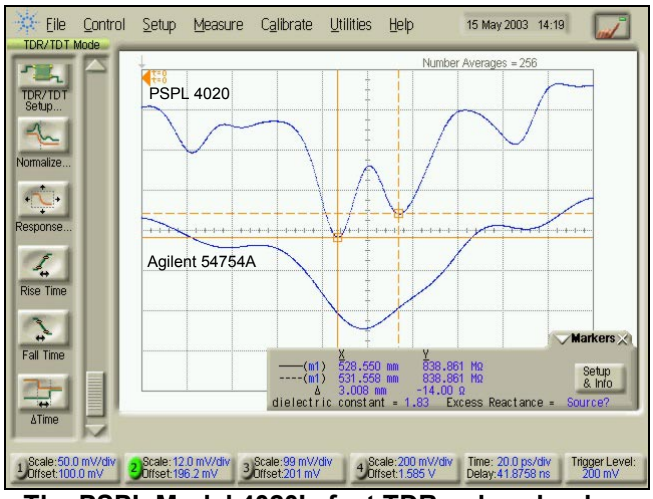


The PSPL Model 4020's fast TDR pulse clearly resolves two separate features otherwise unseen [1]

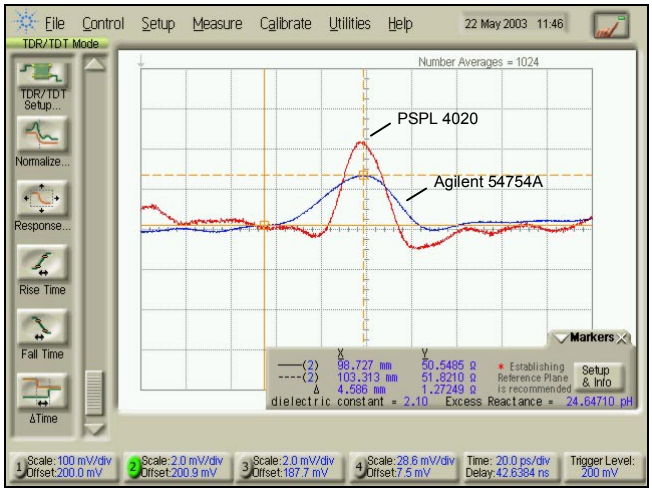
4020 Source Enhancement Module TDR Measurements (cont.)



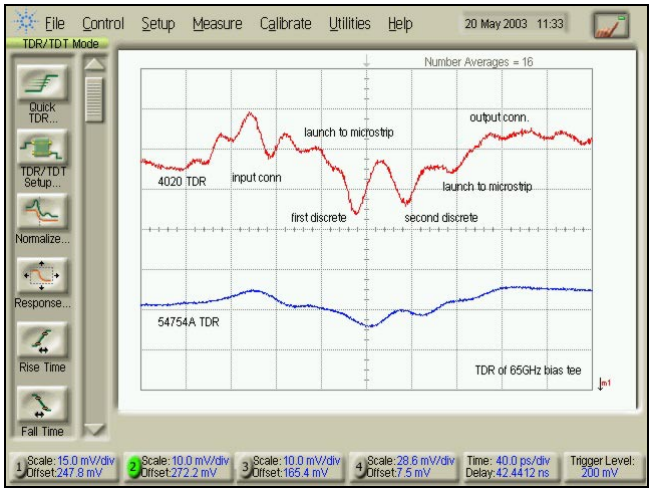
Measured incident TDR pulses from an Agilent 54754A (43.9 ps) and a PSPL Model 4020 (11.1 ps) [2]



The PSPL Model 4020's fast TDR pulse clearly resolves two features otherwise unseen [2]
(Note: The distance recorded by the Agilent system is twice the actual physical distance)



The PSPL Model 4020's TDR measurement of a cable defect shows the impedance measurement to be 52.3 ohms , 70% larger than the previously measured deviation from 50 ohms [2]



The PSPL Model 4020's TDR measurement of a 50 GHz PSPL bias tee reveals the impedance effects of multiple features [2]

[1] Measurements made using a Tektronix sampling oscilloscope (TDS8000). The 80E04 measurements were made using the 80E04's built-in sampler. The Model 4020 measurements were made using a Tek 70GHz sampling plug-in (80E06).
[2] Measurements made using an Agilent digital oscilloscope (86100A). The 54754A measurements were made using the 54754A's built-in sampler. The Model 4020 measurements were made using an Agilent 70GHz sampling plug-in (86118A).

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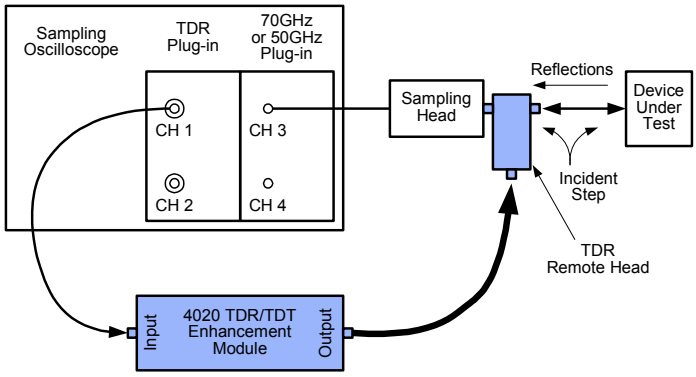

Single-ended TDR set-up with 4020, digital sampling oscilloscope, TDR plug-in, and sampling plug-in

The model 4020 sharpens the output pulses of a TDR plug-in. A standard TDR plug-in has a measured pulse risetime of 25-40 ps (depending on the model and maker) while the 4020 provides pulses of less than 9 ps risetime.

The 4020's remote TDR pulse head has built-in coaxial connections for both the device under test and a high-bandwidth sampling plug-in (50 GHz or 70 GHz bandwidth). This further increases the measurement system's overall TDR resolution (standard TDR plug-in's use built in samplers with bandwidths of 18-20 GHz).

Therefore, the model 4020 improves TDR resolution in two ways, by providing the world's fastest TDR source and by enabling easy connections to high-speed sampling plug-in's.

Specifications:

Output Parameters	**Min**	**Typ**	**Max**
TDR output step amplitude		200 mV	
TDR output incident raw rise time (deconvolved)		9 ps	
TDR output incident measured rise time (with 70 GHz sampling plug-in)		11 ps	
TDT output step amplitude		2 V - 2.5 V	
TDT output raw rise time (deconvolved)		7 ps	
TDT output measured rise time (with 70 GHz sampling plug-in)		10 ps	
Output step overshoot/undershoot (with 70 GHz sampling plug-in)		±15%	
Input Parameters	**Min**	**Typ**	**Max**
Input step amplitude (positive pulse from the TDR module or a similar pulse source)		200-250 mV_{pp}	1 V_{pp}
Input rise time (from the TDR module or a similar pulse source)		20-40 ps	
Input repetition rate (from the TDR module or a similar pulse source)		200 kHz	1 MHz
General Specifications			
Connectors: 2.4 mm on remote head outputs (one male, one female)			
Warranty: One year. See Terms and Conditions of Sale for details.			
Items included: Power supply and cords, driver module, 18" coaxial cable with SMA male connectors, remote head(s)			

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Ordering Information
4020-TDR: 4020 driver box with positive TDR remote head
4020-TDT: 4020 driver box with positive TDT remote head
4020-TDRT: 4020 driver box with both positive TDR and positive TDT remote heads

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