



ASNT_PRBS45

0.1-45Gbps PRBS Generator with USB Control Interface

- Data rates from 0.1Gbps to 45Gbps
- Generates industry standard PRBS7, PRBS9, PRBS11, PRBS15, PRBS17, PRBS20, PRBS23, PRBS29, or PRBS31 signals
- Generates a custom pattern up to 1Mbit data pattern
- Adjustable differential data output with amplitudes from 0V to 1.4V
- 14ps rise/fall time for PRBS data output
- 17ps rise/fall time for sync output
- User selectable sync output for scope triggering with input clock divide ratio from 4 to 1024
- Selectable Error ratio from 10^{-12} up to 10^{-1}
- GUI software interfaces with onboard USB
- DLL is provided for control with example python code

DESCRIPTION

The ASNT_PRBS45 can be used for test applications, design verification, and R&D environments. The pseudo random bit sequence (PRBS) generator shown in Fig. 1 operates within a wide data range. A single-ended half-rate clock is needed for the instrument's operation. An input frequency of n GHz corresponds to a $2n$ Gbps PRBS data output. The output data has adjustable amplitude. The trigger output has a user defined divide ratio in relation to the input high-speed clock. I/O's are SMA female connectors with internal AC coupling and CML interface. All operation and adjustment controls are accessible by a GUI connected through a USB port. Alternatively the unit can be controlled through a DLL. An example python code is provided as one way to use the DLL to control the unit. Matlab, Java and many other programs can use the DLL. See the user guide for more details. Power is supplied with an internal AC-DC power converter.



Fig. 1. PRBS Generator's Front Panel



Terminal Functions

TERMINAL		DESCRIPTION
Name	Type	
High-Speed I/O's		
Clock In	CML input	Female SMA connector; single-ended clock input; AC coupled with internal 50Ohm termination; requires a 50Ohm source impedance
Clock Out	CML output	Female SMA connector; single-ended clock output; AC coupled with internal 50Ohm termination; requires external 50Ohm termination
Sync	CML output	Female SMA connector; single-ended trigger output; AC coupled with internal 50Ohm termination; requires external 50Ohm termination.
Data Out +	CML output	Female SMA 2.92mm connector; single-ended direct data output; AC coupled with internal 50Ohm termination. Requires external 50Ohm termination.
Data Out -	CML output	Female SMA 2.92mm connector; single-ended inverted data output; AC coupled with internal 50Ohm termination; requires external 50Ohm termination.
Clock Out 1 +	CML output	Female SMA connector; single-ended direct clock output AC coupled with internal 50Ohm termination. Requires external 50Ohm termination.
Clock Out 1 -	CML output	Female SMA connector; single-ended direct clock output; AC coupled with internal 50Ohm termination; requires external 50Ohm termination.



ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT	COMMENTS
Clock Input					
Single-ended Swing	100		1000	<i>mV_{PP}</i>	Applying more than 1V may permanently damage the input
Frequency	0.05		22.5	<i>GHz</i>	
Clock Output					
Single-ended Swing		400		<i>mV_{PP}</i>	
Frequency	0.05		22.5	<i>GHz</i>	
Insertion Jitter		< 140		<i>fs</i>	
Clock Output 1					
Single-ended Swing		500		<i>mV_{PP}</i>	
Frequency	0.05		22.5	<i>GHz</i>	
Data Output					
Single-Ended Swing	0		700	<i>mV_{PP}</i>	Adjustable
Data Rate	0.1		45	<i>Gbps</i>	
Rise/Fall times		14/14		<i>ps</i>	20% - 80%
Duty Cycle	45	50	55	<i>%</i>	Adjustable
Trigger Output					
Frequency	0.0000475		5.625	<i>GHz</i>	
Single-ended Swing		600		<i>mV_{PP}</i>	
Duty Cycle	47	50	53	<i>%</i>	
Rise/Fall time	15	17	19	<i>ps</i>	20%-80%
ALL I/O's are AC coupled					

MECHANICAL DIMENSIONS

PARAMETER	TYP	UNIT	COMMENTS
Length	164	<i>mm</i>	
Width	129	<i>mm</i>	
Height	58	<i>mm</i>	Without rubber feet



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REVISION HISTORY

Revision	Date	Changes
1.3.1	11-2016	Minimum data rate reduced from 4Gbps to 0.1Gbps
1.2.1	07-2016	Added DLL capability
1.1.1	06-2016	Updated features Corrected Description section Corrected Electrical Characteristics section
1.0.1	10-2015	Initial Release