ADSANTEC
Ultra High-Speed Mixed Signal ASICs

Advanced Science And Novel Technology Company, Inc.
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ASNT_PRBS45
0.1-45*Gbps* PRBS Generator with USB Control Interface

- Data rates from 0.1*Gbps* to 45*Gbps*
- 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 0*V* to 1.4*V*
- 14*ps* rise/fall time for PRBS data output
- 17*ps* 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

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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 50*Ohm* termination; requires a 50*Ohm* source impedance
Clock Out	CML output	Female SMA connector; single-ended clock output; AC coupled with internal 50*Ohm* termination; requires external 50*Ohm* termination
Sync	CML output	Female SMA connector; single-ended trigger output; AC coupled with internal 50*Ohm* termination; requires external 50*Ohm* termination.
Data Out +	CML output	Female SMA 2.92*mm* connector; single-ended direct data output; AC coupled with internal 50*Ohm* termination. Requires external 50*Ohm* termination.
Data Out -	CML output	Female SMA 2.92*mm* connector; single-ended inverted data output; AC coupled with internal 50*Ohm* termination; requires external 50*Ohm* termination.
Clock Out 1 +	CML output	Female SMA connector; single-ended direct clock output AC coupled with internal 50*Ohm* termination. Requires external 50*Ohm* termination.
Clock Out 1 -	CML output	Female SMA connector; single-ended direct clock output; AC coupled with internal 50*Ohm* termination; requires external 50*Ohm* termination.

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ELECTRICAL CHARACTERISTICS

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

MECHANICAL DIMENSIONS

PARAMETER	TYP	UNIT	COMMENTS
Length	164	*mm*	
Width	129	*mm*	
Height	58	*mm*	Without rubber feet

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REVISION HISTORY

Revision	Date	Changes
1.3.2	07-2019	Updated Letterhead
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