



ASNT_PRBS34B Selectable PRBS7/PRBS15 Generator with USB Control Operation Manual



Fig. 1 ASNT_PRBS34B board

- Broadband frequency range from 2Gbps – 32Gbps
- On board data rate multiplexer to reduce the input clock frequency
- Adjustable phase-shift for multiplexer' clock
- $1-2^{16}$ (any combination) divide ratio for sync output
- Differential CML inputs and outputs
- Minimal insertion jitter
- Fast rise and fall times
- 50% duty cycle sync output on any divide ratio
- Software controlled via USB 2.0 interface
- Single +5.0V supply

DESCRIPTION

The ASNT_PRBS34B is a broadband 2^7-1 or $2^{15}-1$ PRBS generator intended for test, prototyping, microwave, and communication applications. A single-ended or differential clock from 1GHz to 16GHz can be used to drive the generator. A dual 1/256 divider block with differential Sync Output divides the input clock allowing a PRBS7 and PRBS15 pattern view on an oscilloscope by using a divide ratio 127 or 32767. The PRBS7/PRBS15 data output is multiplexed to double the data rate, giving a maximum data rate of 32Gbps. An on-board DAC module, software controlled via USB interface allows to phase adjust the multiplexer clock input for all input clock frequencies in a specified range to ensure the best output is achieved. The built-in PRBS generator reset switch presets PRBS generator to avoid the all zero-state lock-up.

FUNCTIONAL BLOCK DIAGRAM

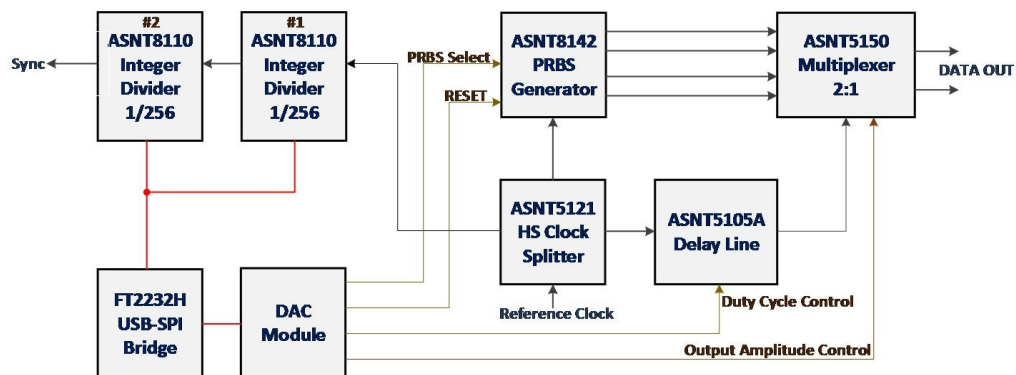


Fig. 2 Functional Block Diagram



TERMINAL FUNCTIONS

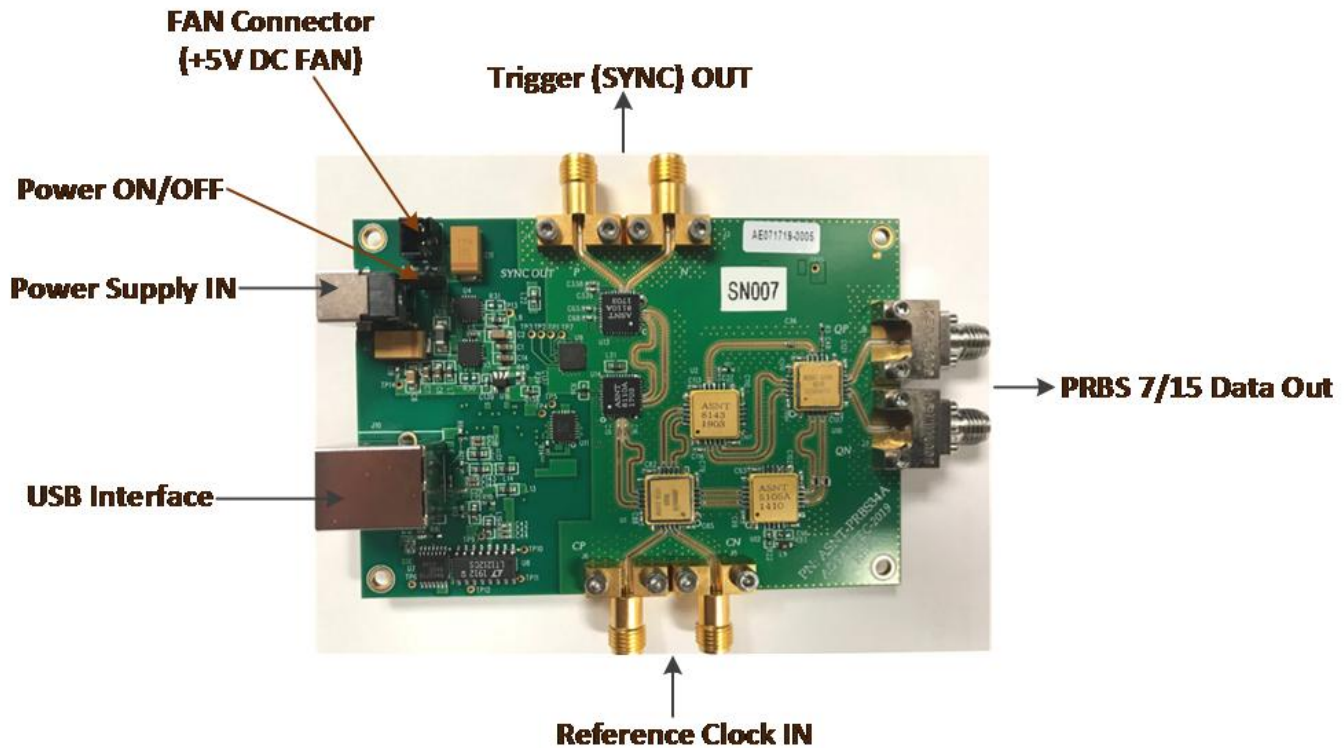


Fig. 3. Terminal Functions Diagram

OPERATION

1. Measure 50Ω on all SMA connectors referenced to **vcc**.
2. Connect the power supply (provided) to the board.
3. Use a fan (not provided) to air cool the board during operation (**Required**).

The 5V/up to 0.2A FAN can be directly connected to the board (Terminal Functions section).

Digi-Key part number of the mating connector: H2083-ND; Mating jumper cables: Red – H2BXG-10112-R4-ND; Black - H2BXG-10112-B4-ND

3. Apply an **AC coupled** single-ended/differential clock signal to the Reference Clock Input.
4. Connect the PRBS Output to a 50Ω terminated **AC-coupled** oscilloscope single-ended/differentially.
5. Connect the Sync (Trigger) Output **AC-coupled** to oscilloscope trigger

Note: If using a single-ended input/output only, apply an AC coupled 50Ω termination to the unused input/output. This will reduce any noise presence.

6. Start the provided software and choose either a PRBS7 or a PRBS15 Pattern.
7. Follow the software operating instructions provided in the GUI interface section.

GUI Interface

The provided GUI interface allows full PC control of the ASNT_PRBS34B output signal parameters, including the output sync signal division ratio. After starting the software by engaging the provided .exe file the GUI window will appear as it's depicted in the picture below.

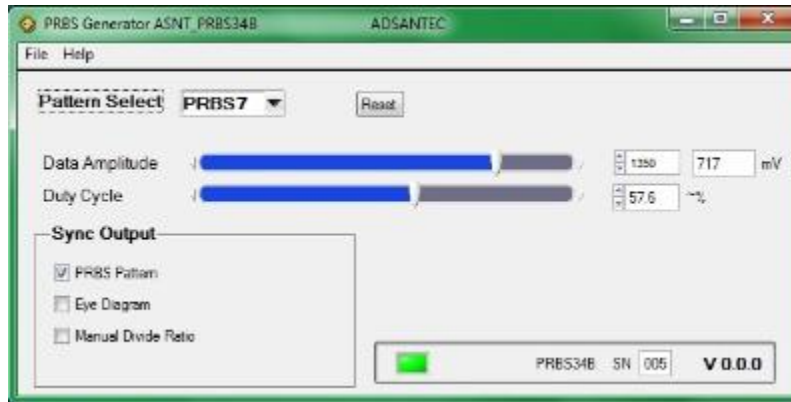


Fig. 4. ASNTPRBS34B GUI Interface

The software automatically connects to a powered and USB-connected ASNT_PRBS34B board. When connected, the USB connection indicator changes the color from red to green and indicates the serial number of the board under test (in the provided example it's **SN 005**). The device is connected and ready for configuration. If necessary, reset the generator to avoid the all zero-state lock-up at the start up by clicking the **Reset button** (upper center). The user can choose the type of Sync output signal depending on the particular testing need by checking the appropriate box in the **Sync Output** section. The PRBS pattern type selection is realized by choosing the appropriate pattern in the **Pattern Select** dropdown menu. The interface also supports precision output data amplitude adjustment (**Data Amplitude**) and multiplexer clock input phase adjustment to ensure the best possible data output signal under full range of input clock frequencies (**Duty Cycle**).



ELECTRICAL CHARACTERISTICS

Parameter	Min	Typ	Max	Unit	Comments
Power Supply		5.0		V	Provided
Ivcc		2.1		A	
Power		10.5		W	
Operating Temperature	-25	30	60	°C	
Clock Input					
Frequency		1	16	GHz	
Single-Ended Swing	50	400	1000	mV	Peak-to-Peak
Common mode level	vcc -0.8	vcc -0.2	vcc	V	
Duty Cycle	40%	50%	60%		Range of input tolerance
Sync Output					
Frequency		0.0003	16	GHz	
Single-Ended Swing	570	600	630	mV	Peak-to-Peak
Common-Mode Level	vcc - (Single-Ended Swing)/2				
Rise/Fall Times	15	17	19	ps	20% to 80%
Duty Cycle	45%	50%	55%		
PRBS Output					
Data rate		2	32	Gbps	
Single-Ended Voltage Level		400		mV	Peak-to-Peak
Common Mode Level	vcc - (Single-Ended Swing)/2			V	
Duty Cycle	40%	50%	60%		
Rise/Fall Time		20		ps	20% to 80%



BOARD DIMENSIONS

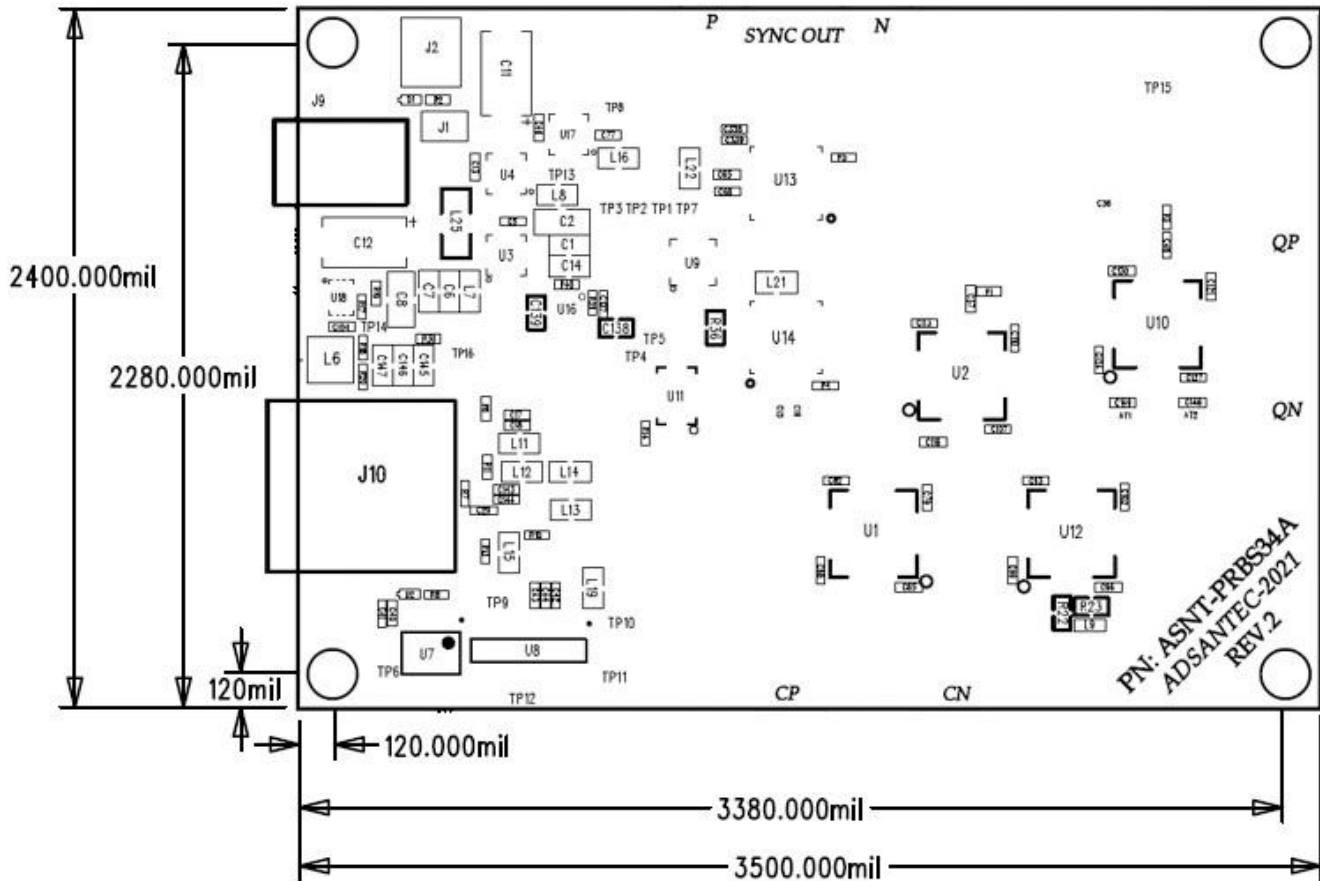


Fig. 5 Board Dimensions Diagram

REVISION HISTORY

Revision	Date	Changes
1.1.2	05-2023	Added Board Dimensions Section Added Fig. 5 Board Dimensions Diagram
1.0.2	03-2023	Initial release