

PRBS mode setting

Enable PRBS mode as per the instruction given in the datasheet. Device supports two PRBS generator mode referred as 23-bit and 9-bit PRBS generator mode and can be selected using following register bit:

Figure 109. Register 4

15	14	13	12	11	10	9	8
OFFSET_REM OVAL_SELF	0	0	0	0	0	0	PAT_SELECT_IND
R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h
7	6	5	4	3	2	1	0
PRBS_SYNC	PRBS_MODE	PRBS_EN	MSB_FIRST	0	0	ADC_RES	
R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	R/W-0h	

LEGEND: R/W = Read/Write; W = Write only; -n = value after reset

6	PRBS_MODE	R/W	0h	0 = 23-bit PRBS generator 1 = 9-bit PRBS generator
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PRBS pattern can be synchronized using sync pulse applied at TX_TRIG pin as described in the datasheet:

9.3.5 LVDS Synchronization Operation

Different test patterns can be synchronized on the LVDS serialized output lines to help set and program the FPGA timing that receives the LVDS serial output. Of these test patterns, the ramp, toggle, and pseudo-random sequence (PRBS) test patterns can be reset or synchronized by providing a synchronization pulse on the TX_TRIG pin or by setting and resetting a specific register bit. The synchronization pulse on the TX_TRIG pin must meet the setup and hold time constraints with respect to the system clock, as shown in Figure 84.

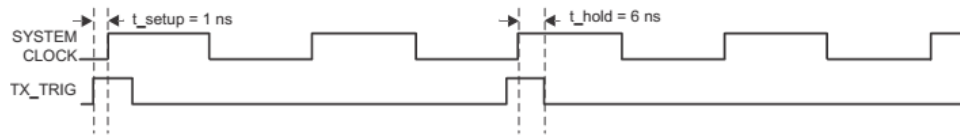


Figure 84. Setup and Hold Time Constraint for the TX_TRIG Signal

So after enabling PRBS mode and selecting the PRBS generator mode, follow below steps to detect valid PRBS pattern on the LVDS data. **It is assumed that device is configured in 12 bit LVDS serialization factor.**

- 1) Apply a trigger pulse on the TX_TRIG pin (This will start the PRBS pattern with seed value).
- 2) Depending on the PRBS_MODE bit logic, the device gives out the respective seed value as listed below. So RTL logic that looks for valid PRBS data on the device output in the FPGA should wait for valid seed value.
 - a. Seed value for PRBS_MODE = 0 -> "101110000000"
 - b. Seed value for PRBS_MODE = 1 -> "000011011111"
- 3) The next value can be calculated from this seed value using the logic given below.
 - a. **Logic to get next data for PRBS_MODE = 0.**
Initial PRBSdata = "01010011011100000001010"
Following steps calculates next PRBS data sent out by device:
PRBSdata(22 to 12) <= PRBSdata(10 to 0)

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PRBSdata(15) <= PRBSdata(17) xor PRBSdata(22)
PRBSdata(14) <= PRBSdata(16) xor PRBSdata(21)
PRBSdata(13) <= PRBSdata(15) xor PRBSdata(20)
PRBSdata(12) <= PRBSdata(14) xor PRBSdata(19)
PRBSdata(11) <= PRBSdata(13) xor PRBSdata(18)
PRBSdata(10) <= PRBSdata(12) xor PRBSdata(17)
PRBSdata(9) <= PRBSdata(11) xor PRBSdata(16)
PRBSdata(8) <= PRBSdata(10) xor PRBSdata(15)
PRBSdata(7) <= PRBSdata(9) xor PRBSdata(14)
PRBSdata(6) <= PRBSdata(8) xor PRBSdata(13)
PRBSdata(5) <= PRBSdata(7) xor PRBSdata(12)
PRBSdata(4) <= PRBSdata(6) xor PRBSdata(11)
PRBSdata(3) <= PRBSdata(5) xor PRBSdata(10)
PRBSdata(2) <= PRBSdata(4) xor PRBSdata(9)
PRBSdata(1) <= PRBSdata(3) xor PRBSdata(8)
PRBSdata(0) <= PRBSdata(2) xor PRBSdata(7)
PRBS_OUT <= PRBSdata(15 to 4)

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b. Logic to get next data for PRBS MODE = 1

Initial PRBSdata = "0000000000110111111001"

Following steps calculates next PRBS data sent out by device:

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PRBSdata(15) <= PRBSdata(4) xor PRBSdata(8)
PRBSdata(14) <= PRBSdata(3) xor PRBSdata(7)
PRBSdata(13) <= PRBSdata(2) xor PRBSdata(6)
PRBSdata(12) <= PRBSdata(1) xor PRBSdata(5)
PRBSdata(11) <= PRBSdata(0) xor PRBSdata(4)
PRBSdata(10) <= PRBSdata(4) xor PRBSdata(8) xor PRBSdata(3)
PRBSdata(9) <= PRBSdata(3) xor PRBSdata(7) xor PRBSdata(2)
PRBSdata(8) <= PRBSdata(2) xor PRBSdata(6) xor PRBSdata(1)
PRBSdata(7) <= PRBSdata(1) xor PRBSdata(5) xor PRBSdata(0)
PRBSdata(6) <= PRBSdata(0) xor PRBSdata(4) xor PRBSdata(4) xor PRBSdata(8)
PRBSdata(5) <= PRBSdata(4) xor PRBSdata(8) xor PRBSdata(3) xor PRBSdata(3)
xor PRBSdata(7)
PRBSdata(4) <= PRBSdata(3) xor PRBSdata(7) xor PRBSdata(2) xor PRBSdata(2)
xor PRBSdata(6)
PRBSdata(3) <= PRBSdata(2) xor PRBSdata(6) xor PRBSdata(1) xor PRBSdata(1)
xor PRBSdata(5)
PRBSdata(2) <= PRBSdata(1) xor PRBSdata(5) xor PRBSdata(0) xor PRBSdata(0)
xor PRBSdata(4)
PRBSdata(1) <= PRBSdata(0) xor PRBSdata(4) xor PRBSdata(4) xor PRBSdata(8)
xor PRBSdata(4) xor PRBSdata(8) xor PRBSdata(3)
PRBSdata(0) <= PRBSdata(4) xor PRBSdata(8) xor PRBSdata(3) xor PRBSdata(3)
xor PRBSdata(7) xor PRBSdata(3) xor PRBSdata(7) xor PRBSdata(2)
PRBS_OUT <= PRBSdata(15 to 4)

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