**BinaryColors\_Transmitter HDL Module Documentation**

BinaryColors\_Transmitter module transmits the sequence of bytes, corresponding to each LED’s red, green and blue state. Bytes follow the order: global brightness, blue, green, and red. First transmitted three bits of brightness are always ones and the remaining value cannot exceed the max\_brightness constant value. Color bytes can only hold values 0 and 255.

**Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Default value** | **Type** | **Description** |
| LED\_number | 8 | Integer | Defines the number of LEDs in the chain |
| max\_brightness | 8 | Integer | Default value and the maximum value of the global brightness |
| const\_brightness | 0 | bool | If true, overrides any user global brightness value with the constant one |

**Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Signal** | **Direction** | **Width (bits)** | **Description** |
| CLK | IN | 1 | Clock signal |
| NRST | IN | 1 | Synchronous reset. Active low |
| TX\_COUNTER\_MAX | IN | 16 | How many bytes to transmit. Assigned to LED\_number / 16 + 1 |
| TX\_COUNTER | OUT | 16 | Not used |
| NEXT\_BYTE | IN | 8 | The next byte to transmit.  Assigned to 0 |
| GBCR\_GB | IN | 5 | Global brightness value, cannot exceed max\_brightness |
| R | IN | (LED\_number-1) / 8) + 1) \* 8 | Each i-th bit corresponds to the i-th LED’s red channel on/off state |
| G | IN | (LED\_number-1) / 8) + 1) \* 8 | Each i-th bit corresponds to the i-th LED’s green channel on/off state |
| B | IN | (LED\_number-1) / 8) + 1) \* 8 | Each i-th bit corresponds to the i-th LED’s blue channel on/off state |