**SK9822 HDL Module Documentation**

SK9822 module transmits a single frame or a sequence of frames with respect to the settings. The module instantiates bytes transmitter, start bytes transmitter, end bytes transmitter, binary colors transmitter and full colors transmitter. The internal state machine iterates over them to share the SPI output. While no transmission goes on, the internal state machine is in idle mode and it is the right moment to change settings of the module. The transmission state can be recognized by the high value of the transmission indication flag. Only when the state machine switches back to idle mode, the transmission indication flag becomes zero again.

**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 |
| CLK\_divider | 50 | Integer | Specifies the source CLK frequency division factor for SCLK signal. Can be in range of 1…65535 |

**Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Signal** | **Direction** | **Width (bits)** | **Description** |
| CLK | IN | 1 | Clock signal |
| NRST | IN | 1 | Synchronous reset. Active low |
| SCLK | OUT | 1 | SPI clock output |
| MOSI | OUT | 1 | SPI data output |
| CSR\_TI | OUT | 1 | Transmission indication |
| CSR\_INSEL | IN | 1 | Color source selection |
| CSR\_LOOP | IN | 1 | Continuous transmission option |
| TSR\_ST | IN | 1 | Start transmission command |
| GBCR\_INSEL | IN | 1 | Global brightness input selection |
| GBCR\_GB | IN | 5 | Global brightness value, cannot exceed max\_brightness |
| ICSR\_TIEN | IN | 1 | Transmission interrupt enable |
| ICSR\_TI | IN | 1 | Transmission interrupt status |
| ICSR\_CTI | IN | 1 | Clear transmission interrupt |
| ICSR\_STI | IN | 1 | Set transmission interrupt |
| 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 |
| LEDs | IN | 32 \* LED\_number | The least significant byte is individual brightness.  The most significant byte is the red channel value. |