Appendix A. Registers Documentation

**SK9822 AXI4-lite IP Registers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Short Name** | **Long Name** | **Size in bytes** | **Notes** |
| CSR | Control and Status Register | 1 |  |
| TSR | Transmission Start Register | 1 |  |
| GBCR | Global Brightness Control Register | 1 |  |
| ICSR | Interrupt Control and Status Register | 1 |  |
| LEDs | LED full-range colors | 4 \* LED\_number | Each LEDs[i] corresponds to i-th LED of N. Start and end address are not constant |
| R | Red binary colors | ((LED\_number-1) / 8) + 1 | Each i-th bit corresponds to i-th LED. Start and end address are not constant. Register size multiple of 8 bits. |
| G | Green binary colors | ((LED\_number-1) / 8) + 1 | Each i-th bit corresponds to i-th LED. Start and end address are not constant. Register size multiple of 8 bits. |
| B | Blue binary colors | ((LED\_number-1) / 8) + 1 | Each i-th bit corresponds to i-th LED. Start and end address are not constant. Register size multiple of 8 bits. |

Explanation:

r – allowed to read

w – allowed to write

h – updated by hardware

“LED\_number” is the number of elements in LEDs array.

“i” is variable from 0 to (LED\_number – 1)

**Control and Status Register RESET\_Value: 0b00000000**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| TI | 0 | rh | **Transmission indication.**  0b – no data transmission is happening  1b – transmission is going on |
| INSEL | 1 | rw | **Color source selection.**  0b – binary color data is selected as input source  1b – full-color data is selected as input source |
| LOOP | 2 | rw | **Continuous transmission option.**  The start of the transmission takes place an infinite number of times for each ST command as long as LOOP is activated  0b – deactivates loop. Transmission starts happening only once for each ST command  1b – activates the loop. |
| RES | 7:3 | r | **Reserved** |

**Transmission Start Register RESET\_Value: 0b00000000**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| ST | 0 | wh | **Start transmission command.**  This bit is set by software and automatically cleared by hardware  0b – takes no effect  1b – starts the transmission and resets to 0 value |
| RES | 6:1 | r | **Reserved** |
| SYNC\_ST | 7 | wh | **Start synchronous transmission command.**  This bit is set by software and automatically cleared by hardware  0b – takes no effect  1b – sets the EXT\_ST transmission signal to 1 |

**Global Brightness Control Register RESET\_Value: 0b10000000**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| INSEL | 0 | rw | **Global brightness input selection in full colored mode.**  0b – global brightness is used  1b – individual brightness of each LED is used |
| RES | 2:1 | r | **Reserved** |
| GB | 7:3 | rw | **Global brightness value.**  Can be limited by hardware |

**Interrupt Control and Status Register RESET\_Value: 0b00000000**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| TIEN | 0 | rw | **Transmission interrupt enable.**  0b – interrupt disabled  1b – interrupt enabled |
| TI | 1 | rh | **Transmission interrupt status.**  This bit is set by software and automatically cleared by hardware  0b – no interrupt occurred  1b – interrupt occurred |
| CTI | 2 | wh | **Clear transmission interrupt.**  This bit is set by software and automatically cleared by hardware  0b – no effect  1b – TI will set to 0 |
| STI | 3 | wh | **Set transmission interrupt.**  This bit is set by software and automatically cleared by hardware  0b – no effect  1b – TI will set to 1 |
| RES | 7:4 | r | **Reserved** |

**LEDs[i] Register RESET\_Value: 0x8**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| BS | 4:0 | rw | **Individual brightness**  Optional brightness for all channels of LEDs[i] |
| RES | 7:5 | r | **Reserved** |
| R | 15:8 | rw | **Red**  LEDs[i] red channel value |
| G | 23:16 | rw | **Green**  LEDs[i] green channel value |
| B | 31:24 | rw | **Blue**  LEDs[i] blue channel value |

**R Register RESET\_Value: 0x0**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| ON[i] | 1 per i | rw | **Turns on/off the red channel of LEDs[i].**  0b – off  1b – on |

**G Register RESET\_Value: 0x0**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| ON[i] | 1 per i | rw | **Turns on/off the green channel of LEDs[i].**  0b – off  1b – on |

**B Register RESET\_Value: 0x0**

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Bits** | **Type** | **Description** |
| ON[i] | 1 per i | rw | **Turns on/off the blue channel of LEDs[i].**  0b – off  1b – on |