Color	0x0000FF	Address/range																					FINAL (after all BULE (0x0000ff) bits were sent)	Notes
SM clock signal																								Delay cycle clock
SM cycle count			1		2		3		4		5		6		7		8		9		10			Cycle Counter
Time			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		Zoom in
Current Instruction			L1 (OUT)						L2(JMP)				L3/L4(NOP)											Instruction flow
PIO	CTRL	50200000	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	0x00000001	Activate state machine 0
	FSTAT	50200004	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01	0x0f000f01		as data have already plug into output shift register
	FDEBUG	50200008	0x01000e00	0x01000e00	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x01000e00	0x01000e00	0x01000e00	IUT with auto PULL eanble, stalled.
	FLEVEL	5020000c	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	FIFO level
	SM0_CLKDIV	50200cc8	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x0009e000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x000fa000	0x0009a000	Clock dividor not change
	SM0_EXECCTRL	50200ccc	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00017a00	0x00013800	Stalled during the instruction
	SM0_SHIFTCTRL	502000d0	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	0x40060000	Set auto PULL
	SM0_ADDR	502000d4	0x00000014	0x00000014	0x00000014	0x00000014	0x00000014	0x00000014	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	0x00000010	ow the address of current instruction
	SM0_INSTR	502000d8	0x00006221	0x00006221	0x00006221	0x00006221	0x00006221	0x00006221	0x00001123	0x00001123	0x00001123	0x00001123	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x0000a442	0x00006221	Changed with instruction change
	SM0_PINCTRL	502000dc	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x20003000	0x20003000	0x20003000	0x20003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x20003000	Changed wth side-set
GPIO status register		0x40014060	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x20003000	0x20003000	0x20003000	0x20003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x00003000	0x20003000	l seams connect to SM0_PINCTRL
RGBC Data Register		0x0000FF00	0x0000FF00	0x0000FF00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x0001FE00	0x00000000	o the register will contain the RGB data we set, when we sent data bit by bit, it will continue shit left MSE
GPIO output pin voltage		1.8/3.3	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	3.3	3.3	3.3	3.3	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	1.8(LOW)	3.3	
WS2812 serial input pin voltage		0.7VDD/0.3VDD(VDD=3v)	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.7VDD	0.7VDD	0.7VDD	0.7VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.3VDD	0.7VDD	ime time, the low/high output corr
WS2812 supply voltage	RED	1.8-2.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GREEN	3.0-3.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	BLUE	3.2-3.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2-3.4 V	
WS2812 Luminance	RED	550-700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GREEN	1100-1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	BLUE	200-400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200-400	
APDS-9960 Photodiode output voltage	RED	-0.3 - 3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	GREEN	-0.3 - 3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	BLUE	-0.3 - 3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8V	
	CLEAR	-0.3 - 3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8 V	he results after we send all RGB 2
ATIME=0xfe																								

RELATED CODE

```
static const uint16_t ws2812_program_instructions[] = {
    //  .wrap_target
    0x6021, //  0: out x, 1 side 0 [2]
    0x1123, //  1: jmp !x, 3 side 1 [1]
    0x1400, //  2: jmp 0 side 1 [4]
    0xa442, //  3: nop side 0 [4]
    //  .wrap
};
```