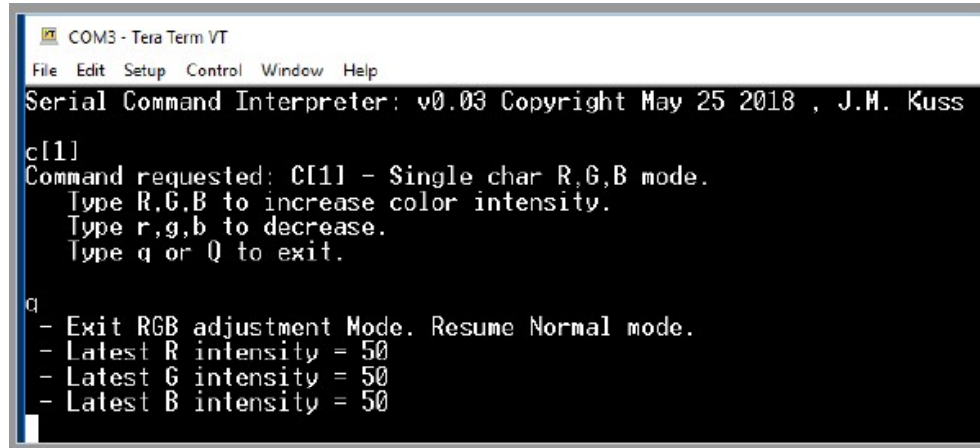


STM-32 ,
HAL,
STMCubeMx

PWM RGB LED & UART Command Demo

System power up



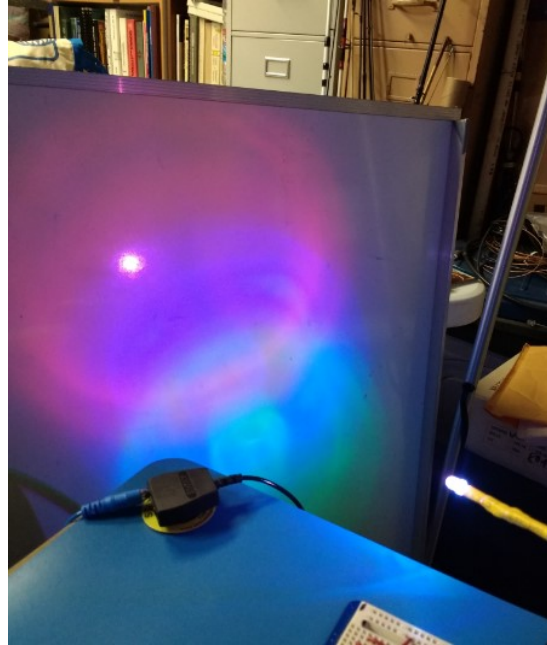
```
COM3 - Tera Term VT
File Edit Setup Control Window Help
Serial Command Interpreter: v0.03 Copyright May 25 2018 , J.M. Kuss
c[1]
Command requested: C[1] - Single char R,G,B mode.
Type R,G,B to increase color intensity.
Type r,g,b to decrease.
Type q or Q to exit.
q
- Exit RGB adjustment Mode. Resume Normal mode.
- Latest R intensity = 50
- Latest G intensity = 50
- Latest B intensity = 50
```

Command interpreter put into RGB PWM Duty Cycle Adjustment Mode:



R,G,B, each at PWM 200 Hz, 50% on/off duty cycle

Driving LED R,G,B @ 50,50,50



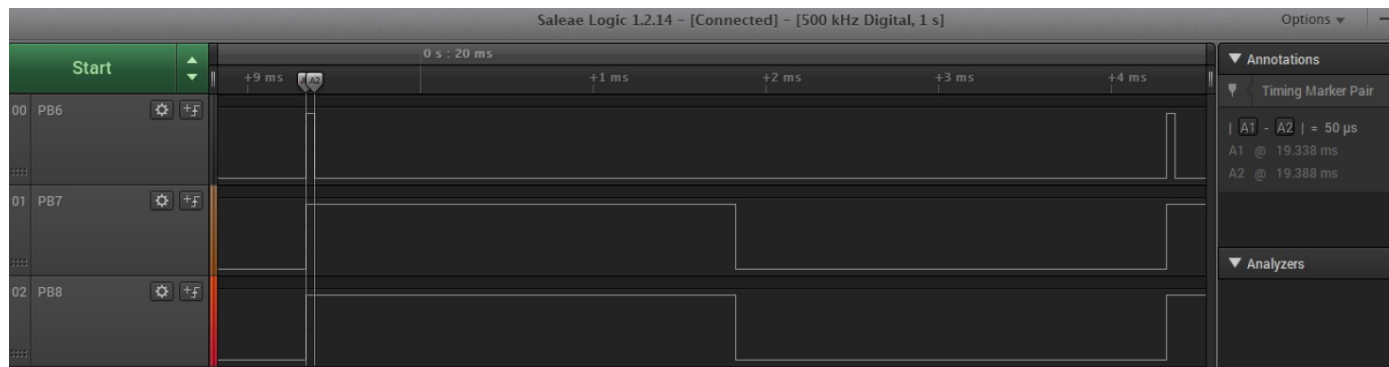
LED itself appears white but it projects 3 colors

Reduce R down to 1% PWM

```
[
Unknown command !
c[1]
Command requested: C[1] - Single char R,G,B mode.
  Type R,G,B to increase color intensity.
  Type r,g,b to decrease.
  Type q or Q to exit.

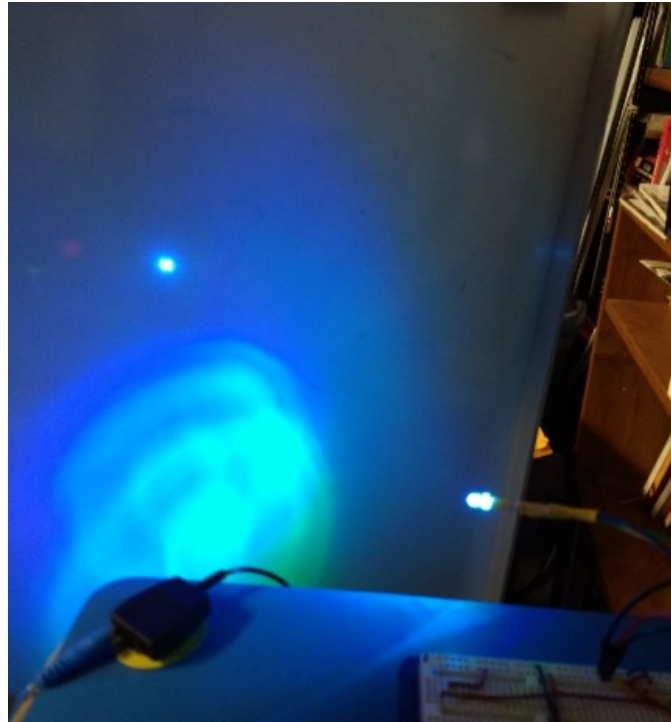
r49 r48 r47 r46 r45 r44 r43 r42 r41 r40 r39 r38 r37 r36 r35 r34 r33 r32 r31 r30 r29 r28 r27 r26 r25 r24 r23
r22 r21 r20 r19 r18 r17 r16 r15 r14 r13 r12 r11 r10 r9 r8 r7 r6 r5 r4 r3 r2 r1 █
```

Press lower case “r” in order to decrease Red PWM by 1%, repeat.



Verified accuracy of 1% PWM with Logic Analyzer

LED output R,G,B = 1,50,50



The Red is not noticeable, only Blue and Green are seen here.

Reduce G and B down to 0 %

```
r49 r48 r47 r46 r45 r44 r43 r42 r41 r40 r39 r38 r37 r36 r35 r
r22 r21 r20 r19 r18 r17 r16 r15 r14 r13 r12 r11 r10 r9 r8 r7
g42 g41 g40 g39 g38 g37 g36 g35 g34 g33 g32 g31 g30 g29 g28
6 g15 g14 g13 g12 g11 g10 g9 g8 g7 g6 g5 g4 g3 g2 g1 b49 b48
6 b35 b34 b33 b32 b31 b30 b29 b28 b27 b26 b25 b24 b23 b22 b21
9 b8 b7 b6 b5 b4 b3 b2 b1 b0 g0 q
- Exit RGB adjustment Mode. Resume Normal mode.
- Latest R intensity = 1
- Latest G intensity = 0
- Latest B intensity = 0
```

At 1% Red only, you can see some faint Red output from the LED.



Crank Red up to almost full Power:

```
R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20  
R31 R32 R33 R34 R35 R36 R37 R38 R39 R40 R41 R42 R43 R44 R45 R46 R47  
7 R58 R59 R60 R61 R62 R63 R64 R65 R66 R67 R68 R69 R70 R71 R72 R73  
84 R85 R86 R87 R88 R89 R90 R91 R92 R93 R94 R95 R96 R97 R98 R99 q  
- Exit RGB adjustment Mode. Resume Normal mode.  
- Latest R intensity = 99  
- Latest G intensity = 0  
- Latest B intensity = 0
```



Tools Utilized:

JBtech (or equivalent) TTL UART to PC Comm port via USB converter:

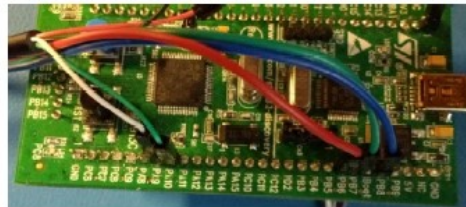


Hookup Instructions:

JBtech Wire	STM32....	LED Driver
Red (USB +5)	n/a	+5v
Black (USB Gnd)	n/a	Gnd
White (RXD of PC)	PA9 (STM32 USART1_TX)	
Green (TXD of PC)	PA10 (STM32 USART1_RX)	

White and Green to PC Comm port, also shown are R,G,B pins PB6, PB7, PB8, also to Logic Analyzer.

STM32VLDISCOVERY board, based on STM32F100RBT6B:



Salae Logic Analyzer:

