M5Stack drives the PWM controller TLC5940

with 16 Segment LED Displays

M5Stack User Meeting Vol.5
2019/8/2

“Make your debut on the MFT2019 with your work!”

「M5Stackで作品を作りMaker Faire Tokyoに出よう！」の投票です。
皆さん、面白い！好き、気になる、と思った作品に投票をお願いします。

- RICOH THETAプラグイン開発者コミュニティ【ばらしーたー】
- ☑ ししかわ【ボンゴキャット in M5Stack】
- tomorrow56【Line tracing Spider Robot】
- aNo研【グラス・ポーター】
- aNo研【スマートグラスe幹事】
- aNo研【ゆめのプリンロボ】
- BotanicFields, Inc.【16Segment LED サイネージ】
- aNo研【ことばのとびら】
- ＋ オプションを追加

1　コメント1件

いいね！　コメント

M5Stack

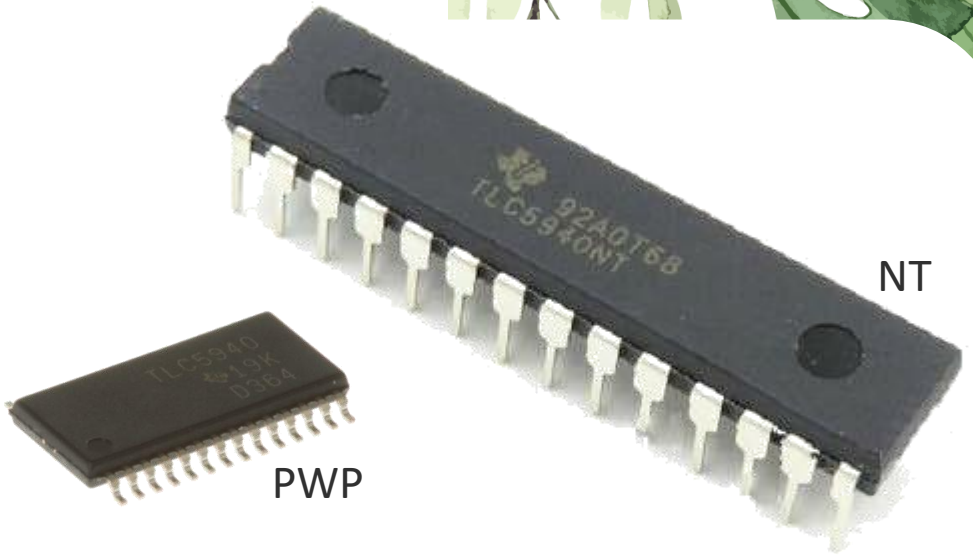
My work: 16 Segment LED Display

But nobody voted me..

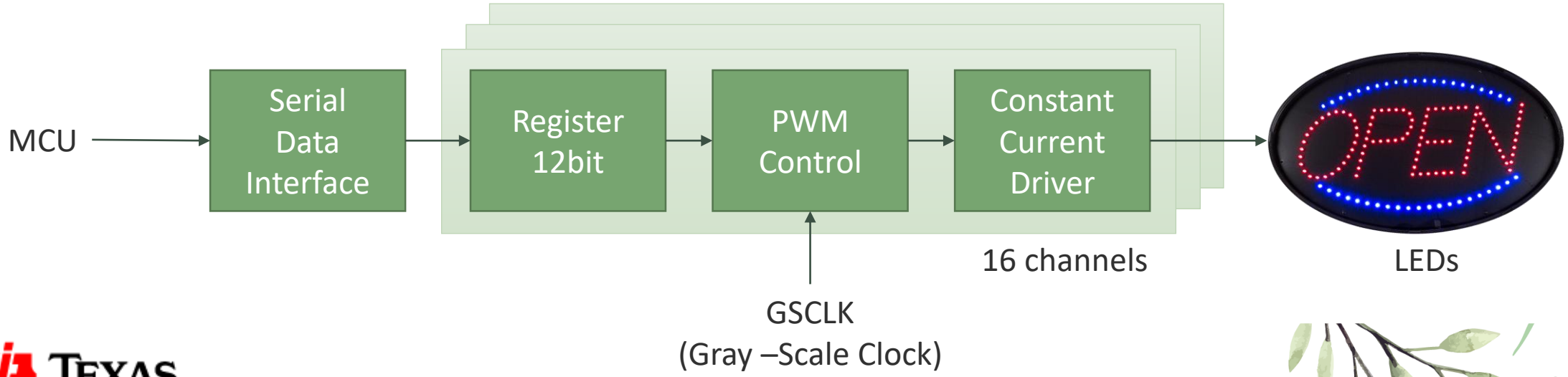
I.

What is TLC5940 ?

TLC5940



- 16 Channel PWM controller for LED
- 4096 Levels of Brightness
- Constant Current Sink Drivers up to 120mA



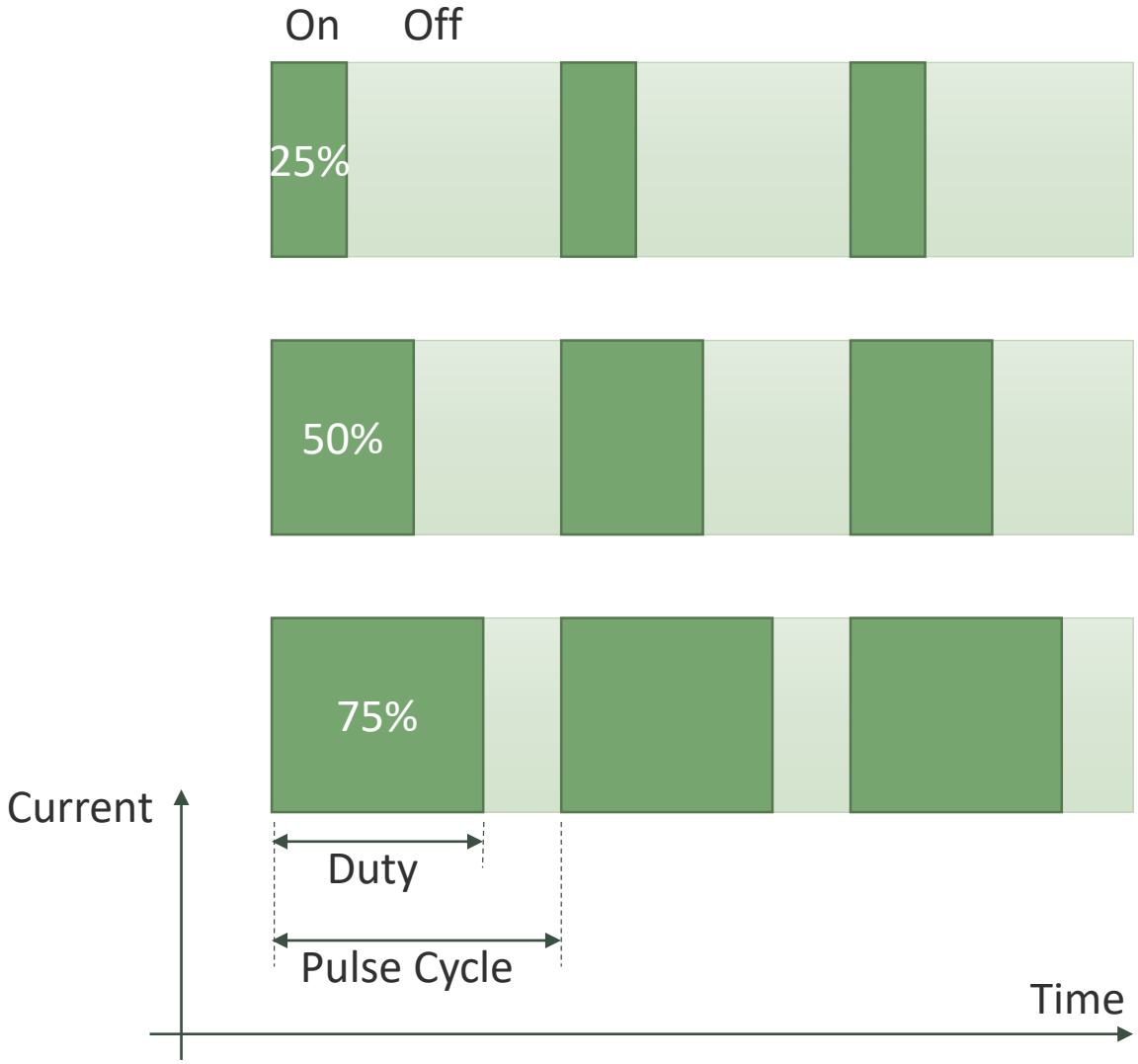
Texas Instruments

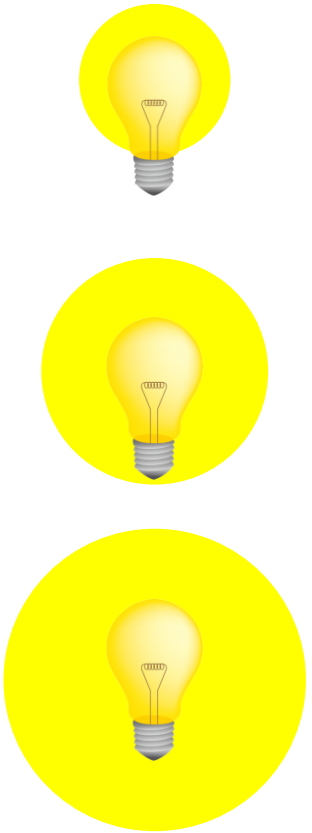
It has been available since 2005.

2.

What is PWM ?

Pulse Width Modulation

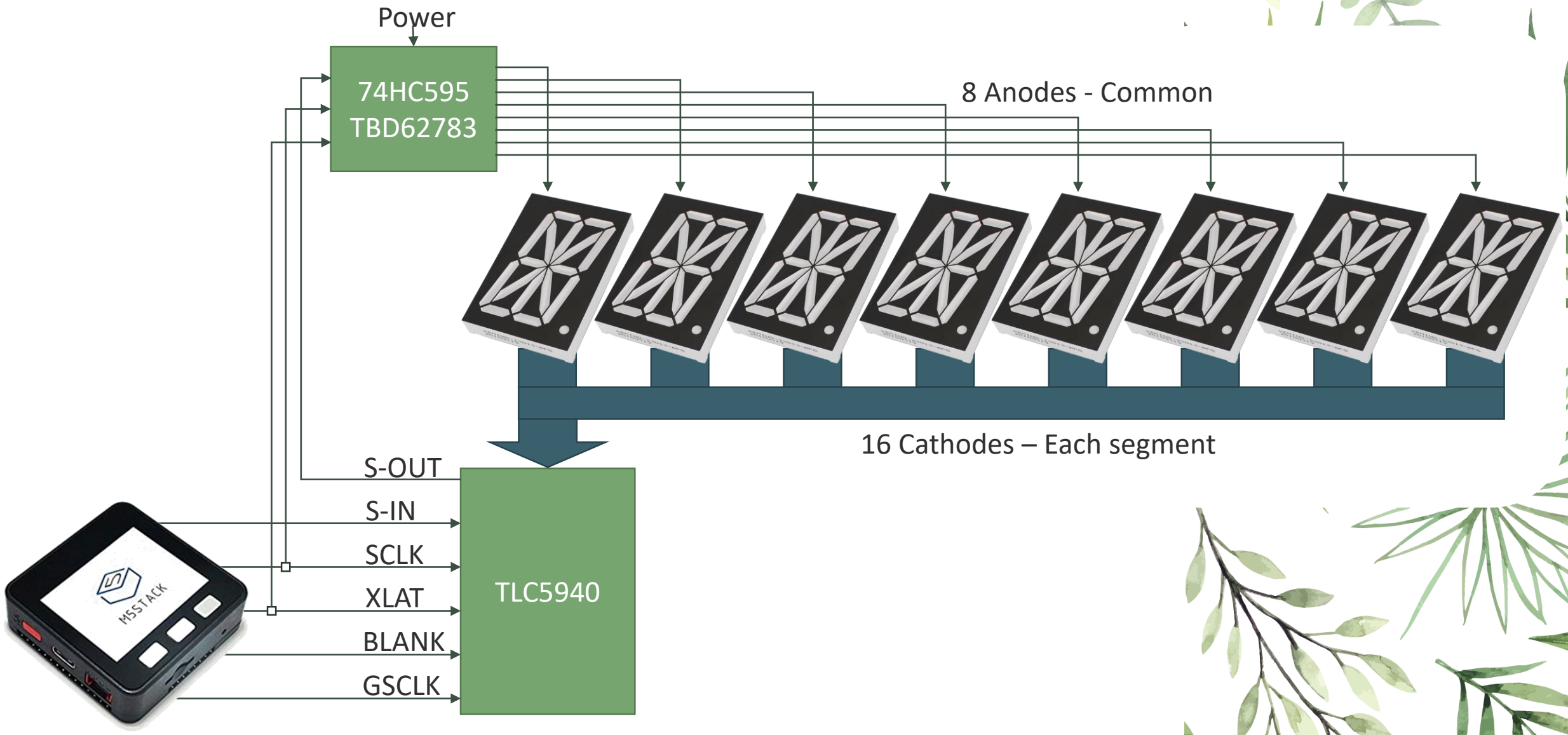




3.

Structure and Interface

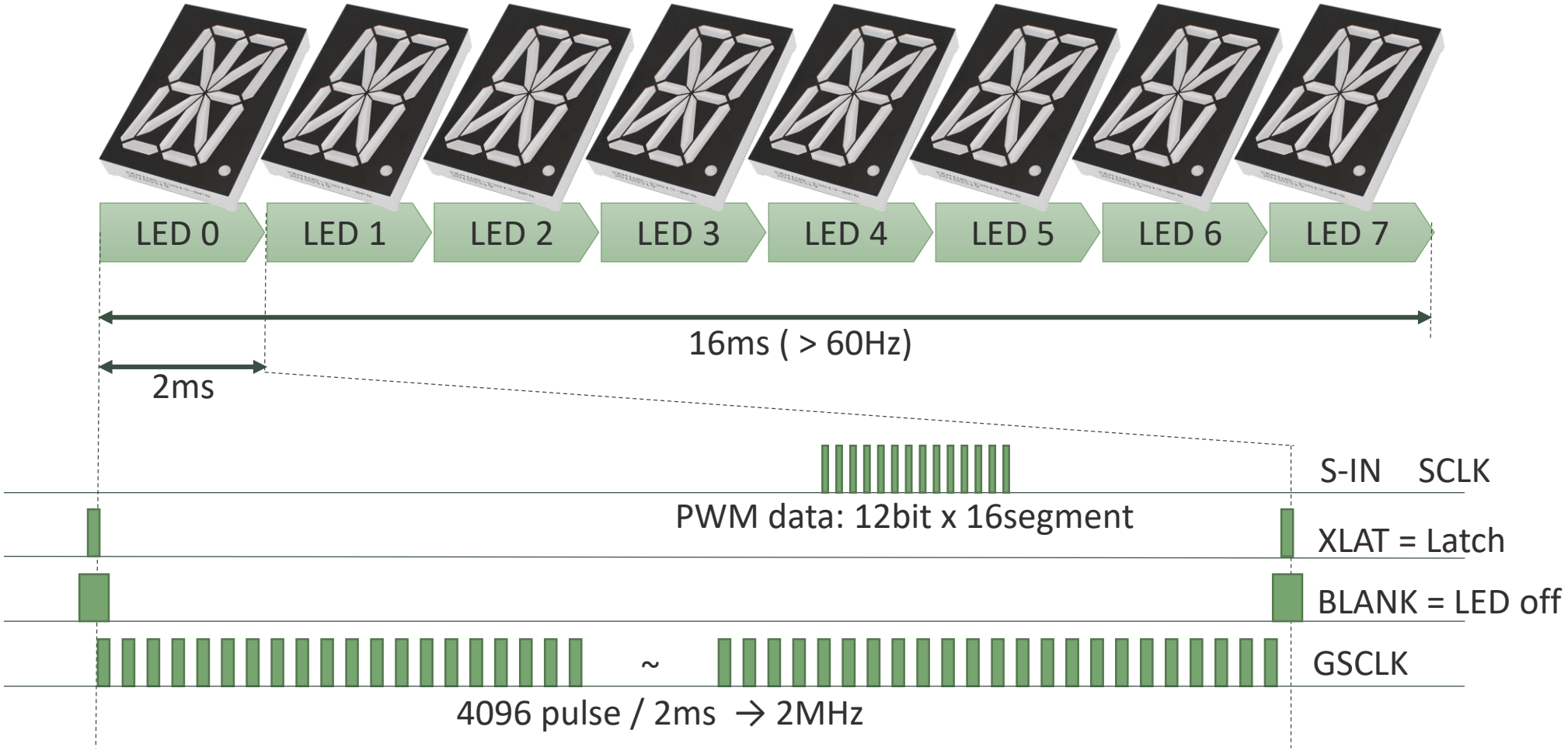
Structure and Interface



4.

Timing

Timing


LED 0
LED 1
LED 2
LED 3
LED 4
LED 5
LED 6
LED 7
16ms (> 60Hz)
2ms
S-IN
SCLK
PWM data: 12bit x 16segment
XLAT = Latch
BLANK = LED off
GSCLK
~
4096 pulse / 2ms → 2MHz

5.

Controlled By M5Stack

Controlled by M5Stack / ESP32

GSCLK

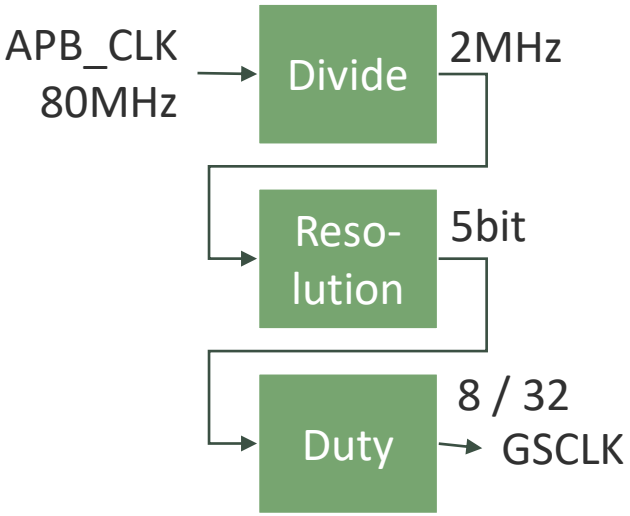
Generated by
the LEDC function

BLANK, XLAT

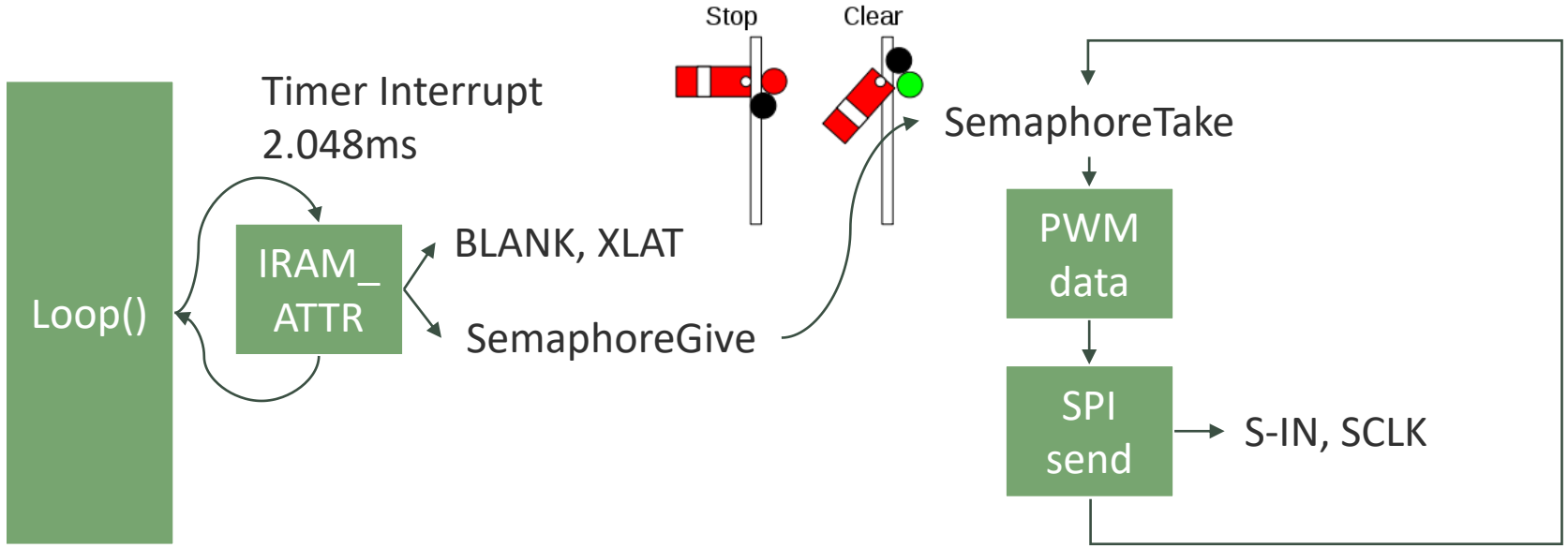
Generated by a handler
Invoked every 2ms by a
Timer Interruption

S-IN, SCLK

Take a Semaphore,
Make new PWM data,
Send it through SPI




```
ledcSetup(CH0, 2e6, 5);
ledcAttachPin(PIN, CH0);
ledcWrite(CH0, 8);
```



6.

Conclusion with Pitfalls

Conclusion

M5Stack is Powerful

By using LEDC or FreeRTOS functions, we can generate various signals.

The SPI of multi-device support is working with the internal LCD and an external device.

Examples are very useful.

Pitfalls

Assign signals:
GPIO25
... makes big sound !
GPIO 0, 2, 5, 12, 15
... they are strapping pins, so
do not pull-up/down

M5Stack has already used some M-BUS pins internally, so be careful to assign pins.

Thanks!

2019/08/02

M5Stack User Meeting #5

At OMRON Corporation

Shinagawa, Japan