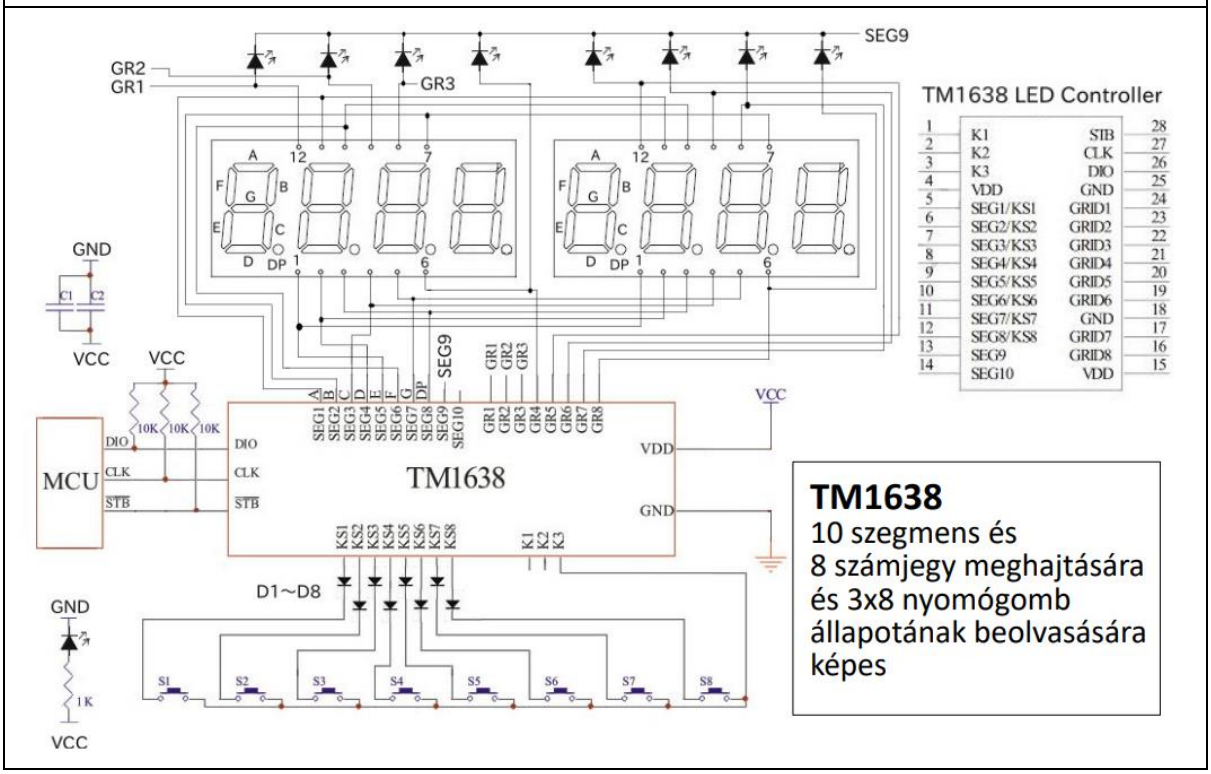
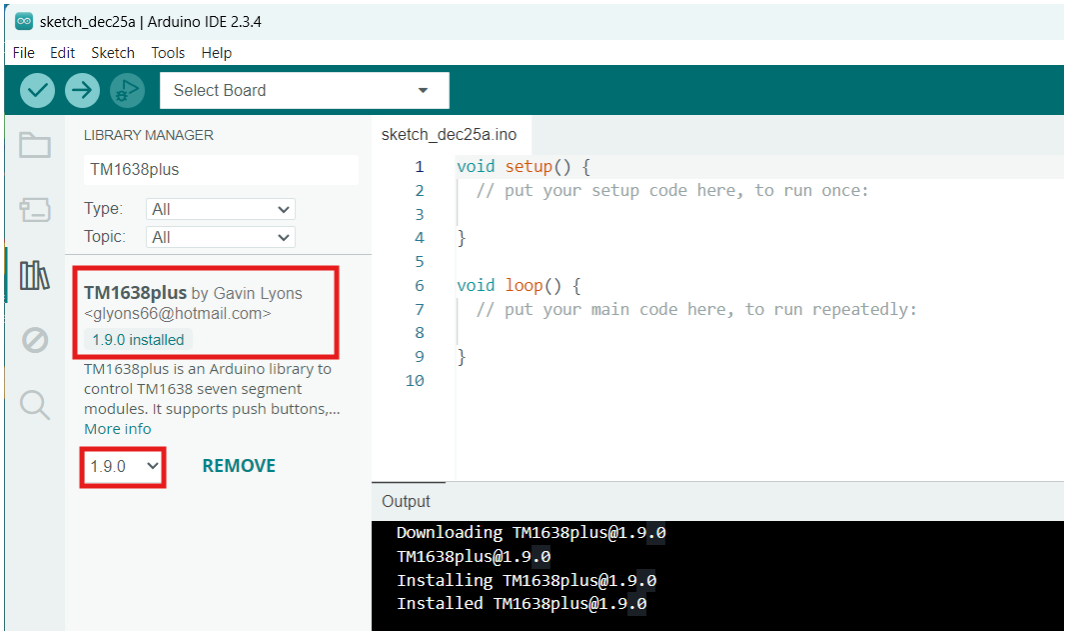
Getting Start ESP32: ESP32 GPIO + ESP32 Interface

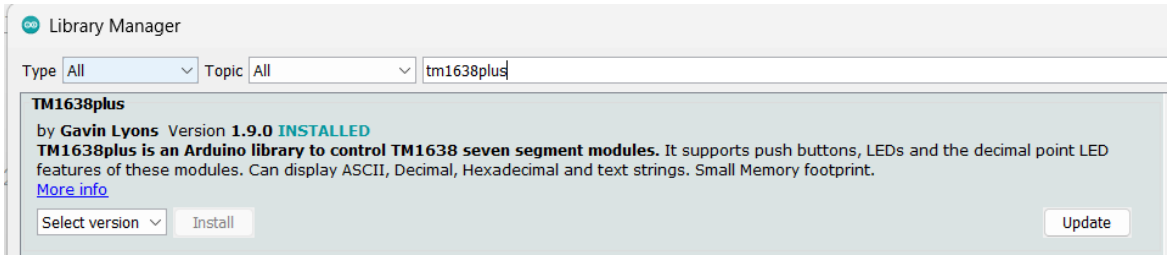
Mission 5/12 – ESP32 + TM1638 7Segment Display Keypad & LED

1. 8-Digit 7 Segment Display with 8 LED and 8 Push Switches TM1638 BOARD
2. Read https://www.cybertice.com/p/1350
3. Read https://www.allnewstep.com/p/1157
4. Read https://megtestesules.info/hobbielektronika/2023/h2023_10.pdf



5. Add Library: Sketch → Include Library → Manage
6. Filter with “tm1638plus”, Select TM1638plus by Gavin Lyons Version 1.9.0

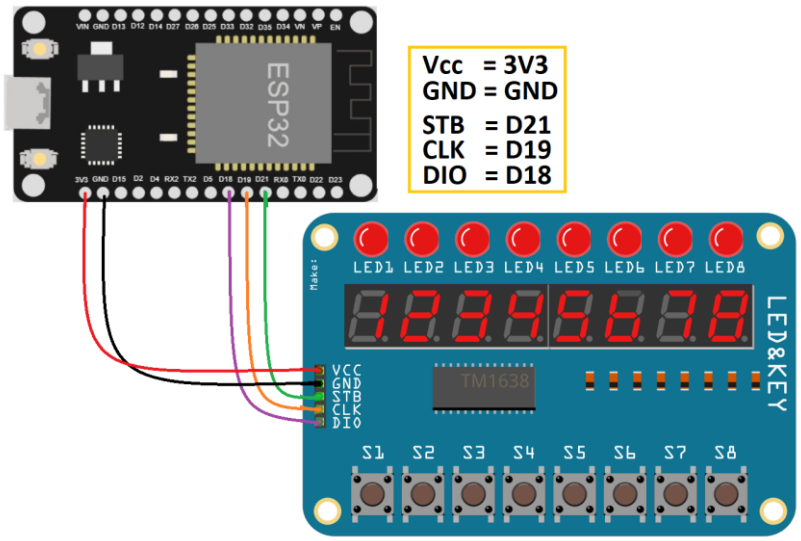




TM1638plus by Gavin Lyons Version 1.9.0

7. Test Code 1 “Test01-Hello TM1638”

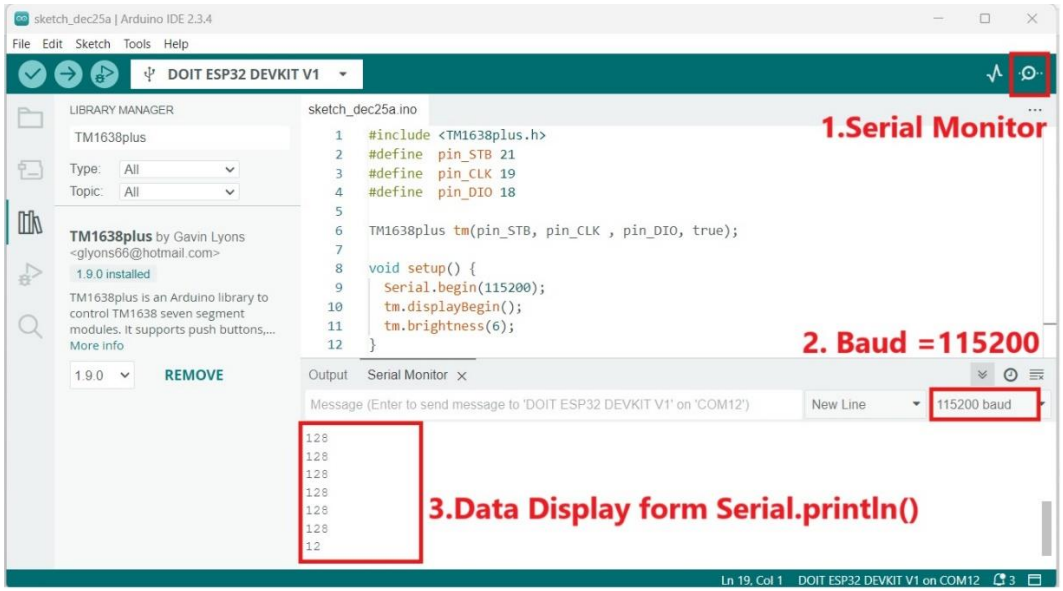
```
#include <TM1638plus.h>
#define  pin_STB 21
#define  pin_CLK 19
#define  pin_DIO 18

TM1638plus tm(pin_STB, pin_CLK , pin_DIO);

void setup() {
  Serial.begin(115200);
  tm.displayBegin();
  tm.brightness(6);
}

void loop() {
  tm.reset();
  tm.displayText("-Arduino");
  delay(2000);

  tm.reset();
  tm.displayASCIIwDot(0, '2');
  tm.displayASCII(1, '3');
  tm.displayASCII(2, '4');
  tm.displayASCII(3, '2');
  delay(2000);

  tm.reset();
  tm.displayHex(0, 0);
  tm.displayHex(1, 1);
  tm.displayHex(2, 2);
  tm.displayHex(3, 3);
  tm.displayHex(4, 4);
  tm.displayHex(5, 5);
  tm.displayHex(6, 6);
  tm.displayHex(7, 7);
  delay(2000);

  tm.reset();
  tm.displayHex(0, 8);
  tm.displayHex(1, 9);
  tm.displayHex(2, 0x0A);
  tm.displayHex(3, 0x0B);
  tm.displayHex(4, 0x0C);
  tm.displayHex(5, 0x0D);
  tm.displayHex(6, 0x0E);
  tm.displayHex(7, 0x0F);
  delay(2000);
}
```



8. Test Code 2 “Test02-Switch on Board”

```
#include <TM1638plus.h>
#define  pin_STB 21
#define  pin_CLK 19
#define  pin_DIO 18

TM1638plus tm(pin_STB, pin_CLK , pin_DIO, true);

void setup() {
 Serial.begin(115200);
 tm.displayBegin();
 tm.brightness(6);
}

void loop() {
 uint8_t buttons = tm.readButtons();
 Serial.println(buttons);
 delay(250);
}
```

- แสดงผลการทำงานที่ Serial Monitor



9. Test Code 3 “Test03-LED on Board”

```
#include <TM1638plus.h>
#define  pin_STB 21
#define  pin_CLK 19
#define  pin_DIO 18

TM1638plus tm(pin_STB, pin_CLK , pin_DIO, true);

void setup() {
 Serial.begin(115200);
 tm.displayBegin();
 tm.brightness(6);
}

void loop() {
 uint8_t buttons = tm.readButtons();
 Serial.println(buttons);
 tm.reset();
 tm.displayText("--------");
 tm.setLED(0, ((buttons >> 0) & 1));
 tm.setLED(1, ((buttons >> 1) & 1));
 tm.setLED(2, ((buttons >> 2) & 1));
 tm.setLED(3, ((buttons >> 3) & 1));
 tm.setLED(4, ((buttons >> 4) & 1));
 tm.setLED(5, ((buttons >> 5) & 1));
 tm.setLED(6, ((buttons >> 6) & 1));
 tm.setLED(7, ((buttons >> 7) & 1));
 delay(250);
}
```

- >> คือ Shift Right
- & คือ bit and
- สมมุติ button = asdf ghij = 11011111
  - # (buttons >> 7) & 1) จะได้ a = 1
  - # (buttons >> 6) & 1) จะได้ s = 1
  - # (buttons >> 5) & 1) จะได้ d = 0
  - # (buttons >> 4) & 1) จะได้ f = 1
  - # (buttons >> 3) & 1) จะได้ g = 1
  - # (buttons >> 2) & 1) จะได้ h = 1
  - # (buttons >> 1) & 1) จะได้ i = 1
  - # (buttons >> 0) & 1) จะได้ j = 1

10. Test Code 4 “Test04-Switch, LED and Display”

```
#include <TM1638plus.h>
#define  pin_STB 21
#define  pin_CLK 19
#define  pin_DIO 18

TM1638plus tm(pin_STB, pin_CLK , pin_DIO, true);

void setup() {
 Serial.begin(115200);
 tm.displayBegin();
 tm.brightness(6);
}

void loop() {
 uint8_t buttons = tm.readButtons();
 Serial.println(buttons);
 tm.reset();
 tm.displayText("--------");
 for (int i = 0; i < 8; i++) {
   bool DataBit = (buttons >> i) & 1;
    tm.setLED(i, DataBit);
   if (DataBit) tm.displayHex(i, i);
 }
 delay(250);
}
```

11. Test Code 5 “Test05-Switch Counter”

```
#include <TM1638plus.h>
#define DebounceDelay   100
#define Counter_Switch  0  // D0 or BOOT
#define  pin_STB 21
#define  pin_CLK 19
#define  pin_DIO 18

int nCounter = 1234;
TM1638plus tm(pin_STB, pin_CLK , pin_DIO);

void TM1638_Display(int Tempp) {
 int singleDigit;
 tm.reset();
 singleDigit = Tempp % 10; Tempp /= 10;  tm.displayHex(7, singleDigit);
 singleDigit = Tempp % 10; Tempp /= 10;  tm.displayHex(6, singleDigit);
 singleDigit = Tempp % 10; Tempp /= 10;  tm.displayHex(5, singleDigit);
 singleDigit = Tempp % 10; Tempp /= 10;  tm.displayHex(4, singleDigit);

 tm.displayASCII(0, 'C');
 tm.displayASCII(1, 'n');
 tm.displayASCIIwDot(2, 't');
 tm.display7Seg(3, 0b01001000); //tgfe dcba
}


void setup() {
 pinMode(Counter_Switch, INPUT_PULLUP);
 Serial.begin(115200);
 tm.displayBegin();
 tm.brightness(6);
 Serial.begin(115200);
 TM1638_Display(nCounter);
}

void loop()
{ if (digitalRead(Counter_Switch) == LOW) {    // If Switch Press
   delay(DebounceDelay);    // Debounce Delay H->L
   while (digitalRead(Counter_Switch) == LOW); // wail until release
   delay(DebounceDelay);    // Debounce Delay L->H
   nCounter++;
   Serial.println(nCounter);
   TM1638_Display(nCounter);
 }
}
```

- กดปุ่ม BOOT จะนับจำนวนขึ้น +1
- How are the following commands different?

- tm.displayASCII(0, 'C');

- tm.displayASCIIwDot(2, 't');

- tm.displayHex(4, singleDigit);

- tm.display7Seg(3, 0b01001000); //tgfe dcba