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如何在PLATFORMIO中使用ESP32-S3的JTAG内置调试器

乐鑫32 VSCode platformio-ini

爱德华多格布

10月 '23

如何在PLATFORMIO中使用ESP32-S3的JTAG内置调试器

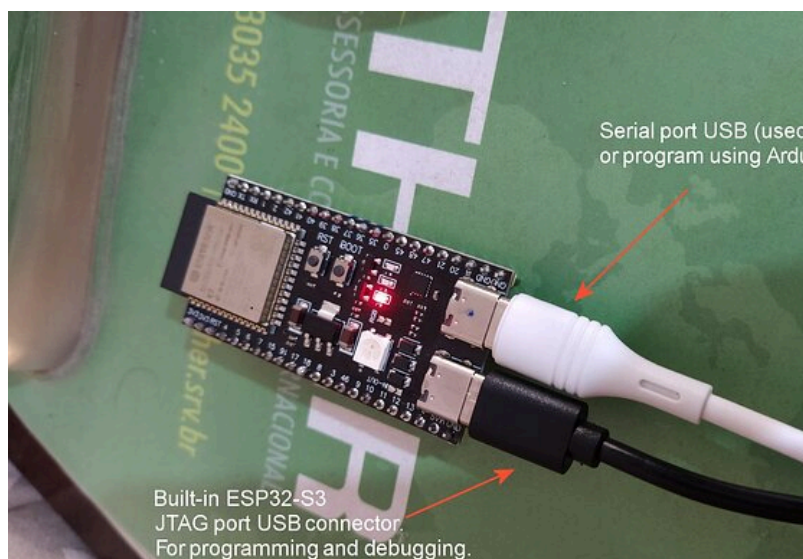
大多数互联网示例都在 ESP-IDF 中使用 ESP32-S3 内置调试器，但我将展示如何在 VSC PLATFORMIO 中执行此操作。

使用 ESP32-S3 自带的 USB 端口在 PLATFORMIO 上传固件并调试软件。允许您同时使用 ESP 卡/录像机上的标准串行端口进行正常的串行通信。

下面的视频非常完整，解释了如何在 PLATFORMIO 上配置 ESP32-S3 的嵌入式调试器。互联网上有很多东西，但这是它在 PLATFORMIO 中对我有用的唯一方式。

<https://www.youtube.com/watch?v=HGB9PI3IDL0>

可以直接通过 ESP32-S3 的 NATIVE USB 进行编程和调试，而无需通过主 USB 连接器连接 ESP32。但是，有趣的是，为了在 Platformio 终端上接收来自 ESP32 的串行通信，拥有主要的 USB 连接是很有趣的。因此，我们将直接从 ESP32-S3 JTAG 获得信息，并通过串行直接在终端中获得信息。



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步骤:

00-在此处下载 Zadig 2.8 程序: <https://zadig.akeo.ie>

0-将线缆连接到 ESP32-S3 的原生 USB, 通过此端口进行 ESP 录制和调试。

1-下载并打开ZADIG, 选项, 列出所有设备, 选择“USB Jtag/串行调试单元 (接口0)”, 将当前驱动程序更改为“USB 串行 (CDC)”, 然后单击Zadig上的“更新驱动程序”按钮进行安装。

2-仍在 ZADIG 中, 选择“USB Jtag/串行调试单元 (接口 2)”, 将当前驱动程序更改为“WinUSB”, 然后单击 Zadig 中的“更新驱动程序”按钮进行安装。

3-打开 Windows 设备管理器以找出要配置的端口, 在我的情况下, COM14 是 JTAG (“USB-JTAG/串行调试单元 (接口 0)”), COM10 是 ESP32 板的标准串行 - S3 (“USB-Enhanced-SERIAL CH323”)

4-在 Platformio 中, 配置 Platformio.ini 文件。在随附的文件中, 有端口COM14 (或在Windows设备管理器中显示为 JTAG调试器的“USB-JTAG/串行调试单元 (接口0)”的相同端口) 和用于串行监视器的COM10 (或Windows设备管理器中显示为“USB-Enhanced-SERIAL CH323”的相同端口)。代码也是通过调试器上传的。这样, Platformio.ini文件将按如下方式配置:

[env:esp32-s3-devkitc-1]

```
platform = https://github.com/platformio/platformio-esp32-s3
;platform = espressif32
board = esp32-s3-devkitc-1 ;ESP32-S3
framework = arduino
upload_speed = 2000000 ;ESP32S3 USB-Serial
upload_port = COM14
monitor_speed = 115200
monitor_port = COM10
debug_tool = esp-builtin
debug_init_break = break setup
build_type = debug ;build in debug mode if
```



重要提示:

-如何在调试期间更改变量。在Watch_Window中, 只能查看变量。但是, 如果键入变量 name = value, 则在调试期间运行代码后, 该变量就会立即更改。

-将字符串变量更改为“Eduardo ok”的示例:

tchar={'E', 'd', 'u', 'a', 'r', 'd', 'o', ' ', 'o', 'k'}: 将字符串值更改为 “Eduardo ok”

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- 在将ESP与JTAG调试器一起使用之前, 必须通过普通USB连接并执行ERASE FLASH。在PlatformIO本身中,

有“擦除Flash”选项。否则，ESP无法与JTAG一起工作，因为JTAG引脚可能被配置为其他内容。

- 通过单击行号的左侧，将添加断点。在监视中，我们可以查看变量，但是要更改它们的值，我们需要在“变量”窗口中找到它们。这是最糟糕的部分，因为它们以令人困惑的方式排序并且无法搜索，也就是说，在 PLATFORMIO 调试器中更改变量的值是垃圾，但其余部分非常好，甚至可以在旅途中添加断点。

- 在监视窗口中，通过键入 (void) variable_name 可以以十六进制查看其值。

\$pc : 默认十进制整数格式

0x10012000 : 地址，默认十进制整数格式

(void) \$pc : \$pc寄存器，十六进制格式

(void) 0x10012000 : 地址，十六进制格式

& 变量 : 显示变量指向地址

- 可以通过 DEBUG_CONSOLE 调整变量格式：

设置 output-radix 16 : 以十六进制调整

set output-radix 10 : 设置为十进制

set output-radix 8 : 调整八进制

- 可以在监视窗口中进行计算。例如：

var1*var2+4 : (结果出现)

Below the source file (main.c) of blink example program for debugging testing:

```
#include <Arduino.h>
```

```
#define LED_BUILTIN 2
```

```
long tdelay=1000;
```

```
char tchar[40];
```

```
// the setup function runs once when you press
```

```
void setup() {
```

```
    Serial.begin(115200);
```

```
    // initialize digital pin LED_BUILTIN as an output
```

```
    pinMode(LED_BUILTIN, OUTPUT);
```

```
    sprintf(tchar, "Teste"); //tchar[0]="Teste"
```

```
}
```

```
int i=0;
```

```
// the loop function runs over and over again ;
```

```
void loop() {
```

```
    i++;
```

```
    digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
```

```
    Serial.println("Led ON");
```

```
    delay(tdelay); // wait ;
```

```
    digitalWrite(LED_BUILTIN, LOW); // turn the LED off (LOW is the voltage level)
```

```
    Serial.println("Led OFF");
```

[Skip to main content](#)

```

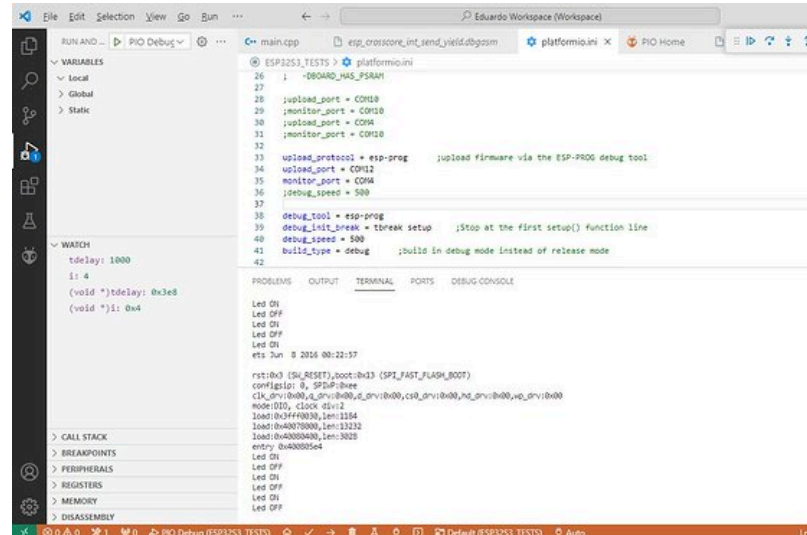
    delay(tdelay);
}

```

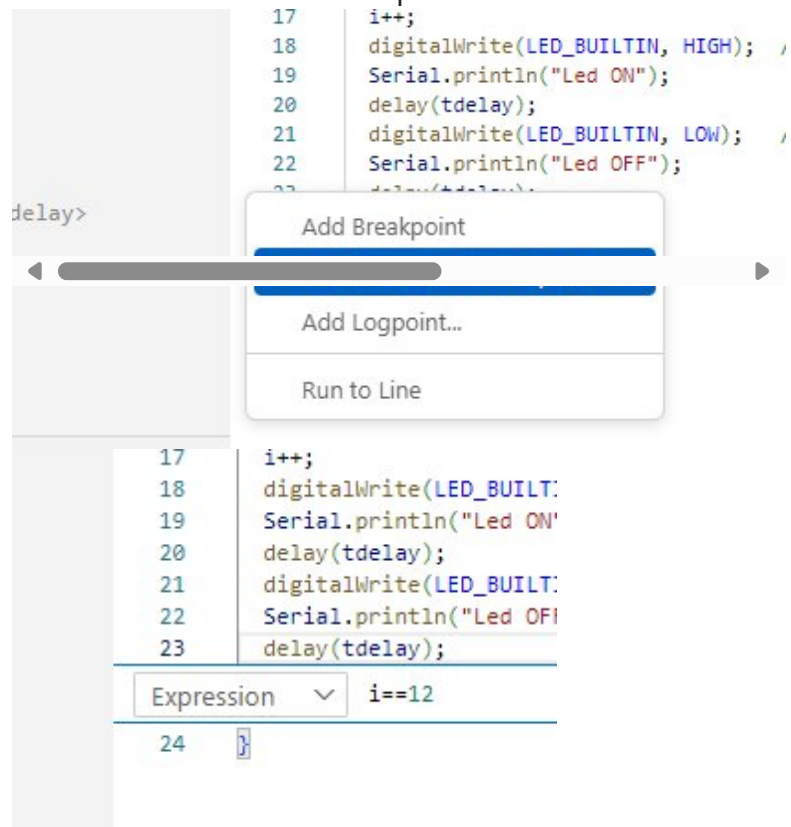
// wait ;

Below some examples on using VSC PLATFORMIO debugger:

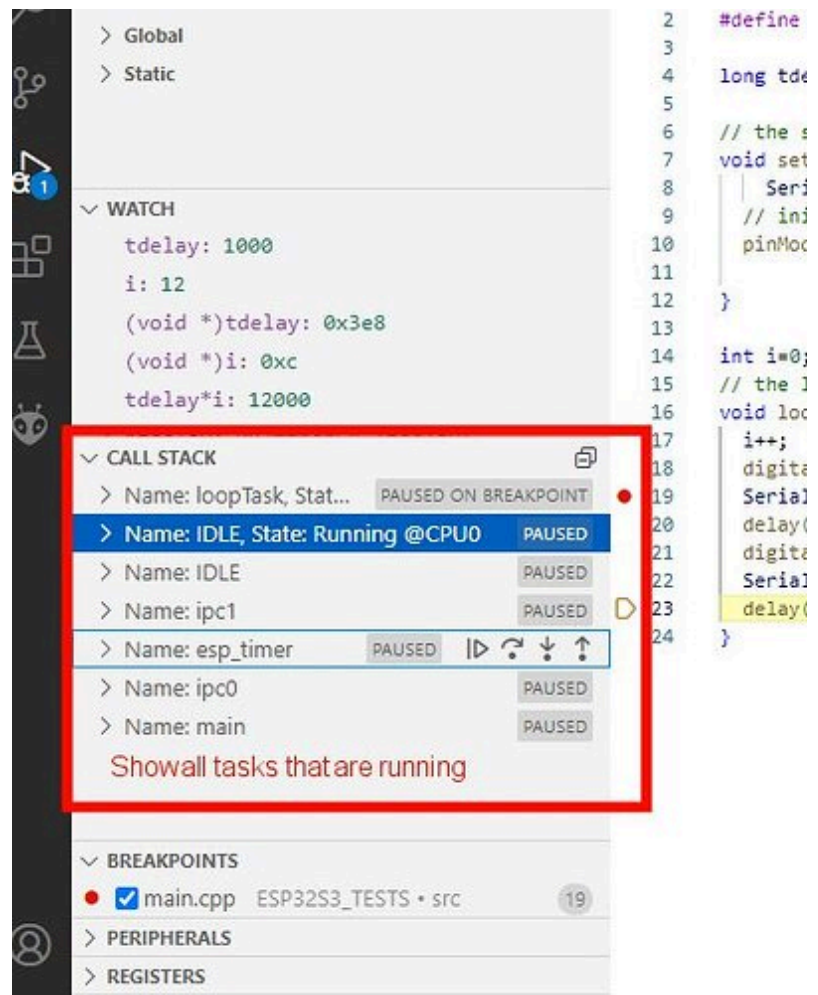
Watch Window and Serial Terminal:



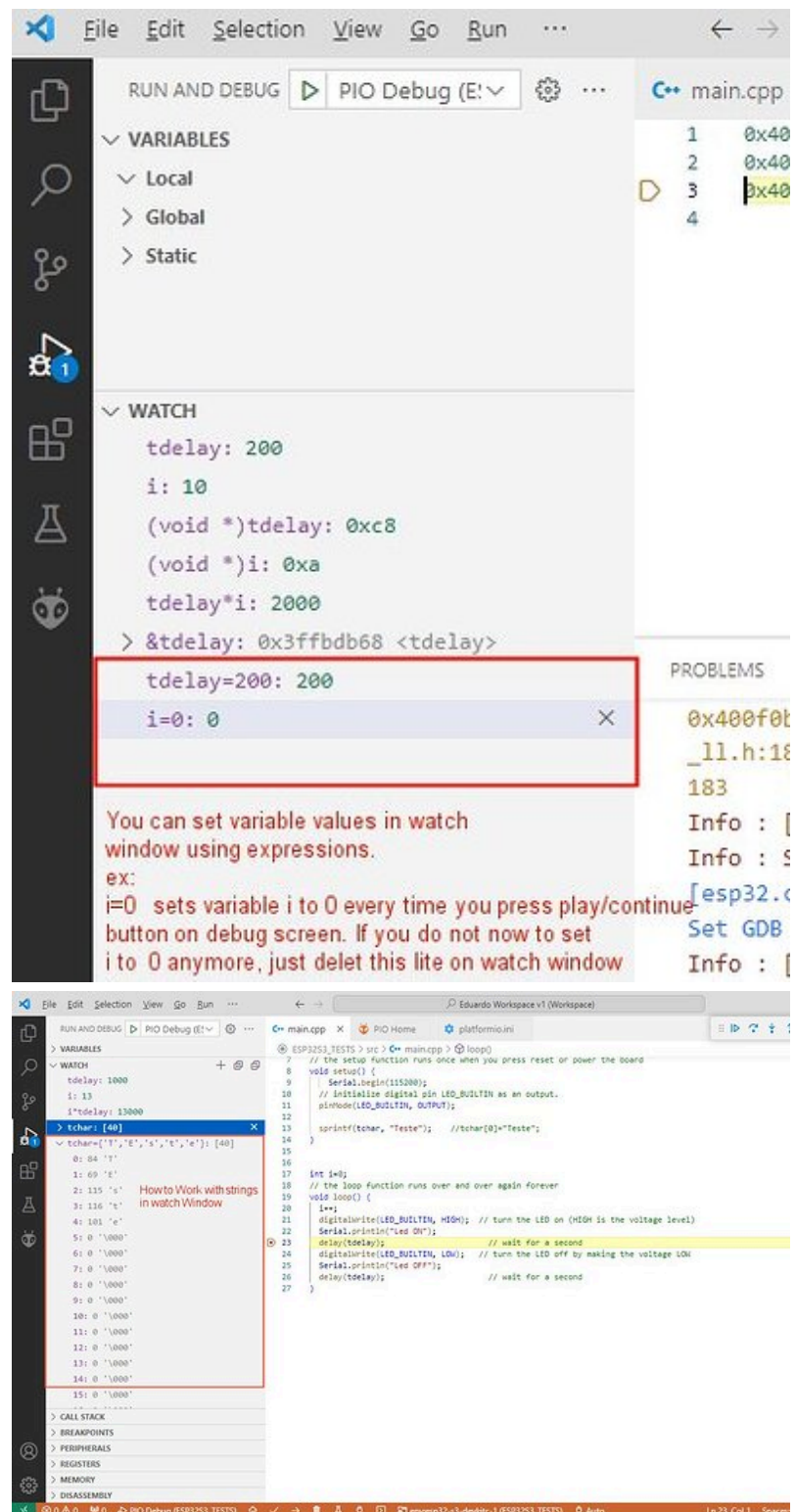
How to add conditional breakpoints:



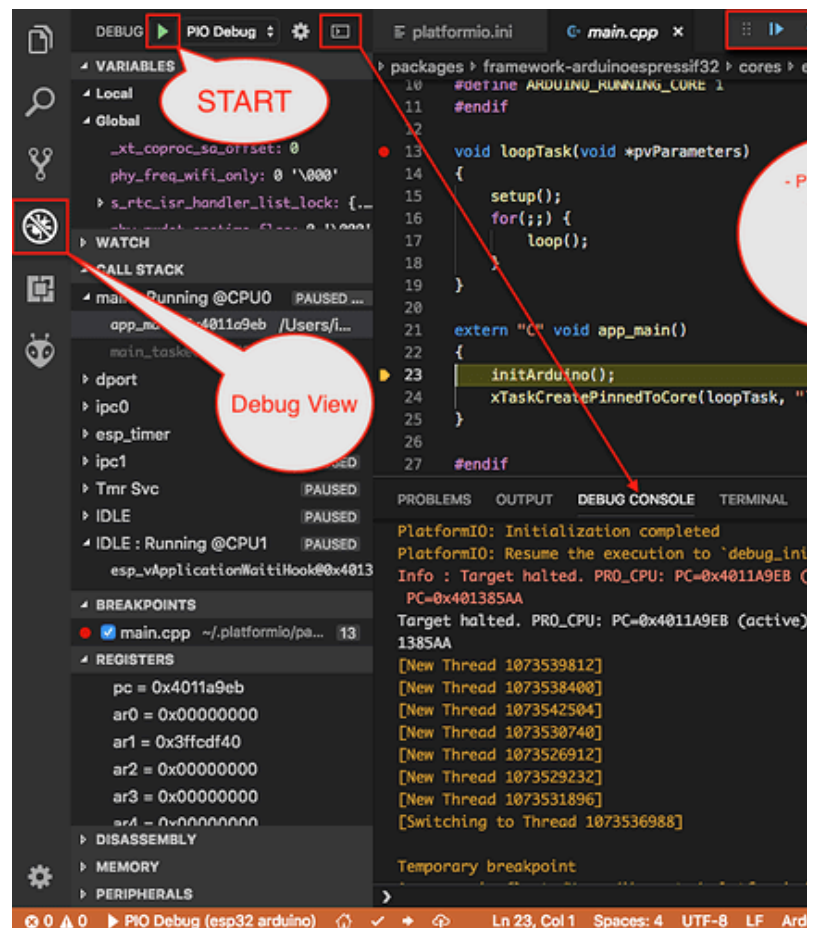
Show RTOS running tasks:



Changing variable values using watch window:



Debugger compiles, upload and runs F5 key (same as clicking Menu, Start debugging). I dig this image from another youtube video.



I hope it helps anyone that was struggling to debug ESP32-S3 in PLATFORMIO 😊 😊 😊 😊 😊 😊 😊 😊 😊

- 🔗 [Cannot run builtin debugger on esp32-s3 board](#)
- 🔗 [Cannot run debugger on ESP32-C6](#)
- 🔗 [Debugging a teensy with Platformio vscode plugin](#)
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steven52880

Oct '23

Thanks a lot! I have been troubled all the day before saw the post!

wangdekun

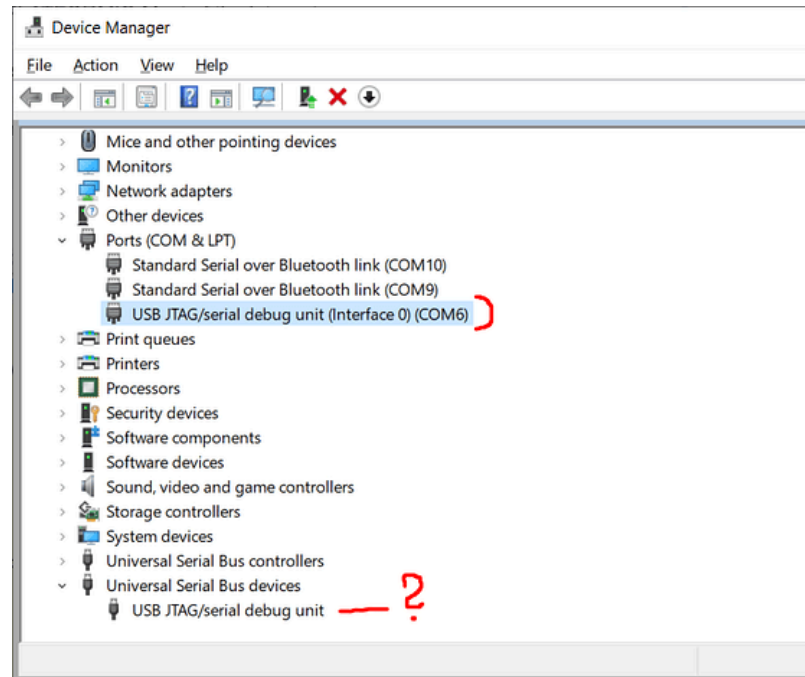
Oct '23

Thanks a lot! I have been troubled all the day before saw the post!

Thank you for the detailed guideline!

I'm a bit stuck at the step 4: It seems you have there 2 COM ports - one for JTAG, second "USB-Enhanced-SERIAL CH323" and those you then use in the configuration for upload_port and monitor_port.

But on my end I see just the first one. (There are 2 others, but they are irrelevant to the microcontroller, they exist even with the microcontroller disconnected) It looks like this:



Do you happen to know what I could be doing wrong?

pjglasso

Nov '23

Hi there, @vladimir.nejedly ,

What Probe are you using?

Did you run the "ZADIG" usb driver utility?

That's the push that makes the whole thing GO! so , check that.

Great Post though, shows allot of cool tricks.

HTH

GL 😊 PJ

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vladimir.nejedly

Nov '23

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Hey, thanks for the message! I'm using a built-in probe. And actually in the meantime I figured the problem out

(just forgotten to report it here). I written whole tutorial about it on my page here: [Debugging Dice Device – Dice Device](#)

In short, I really had to run Zadig as you say, but only on the second device above (with 'JTAG' in name) and mainly had to be careful to select libusbK and especially not libusb0 (that realization cost quite some hours of my life... ;-)).

eduardogb

Nov '23

Yes, I use the Zadig. Take a look at the Tutorial.

eduardogb

Nov '23

I realized that when debugging I can use the JTAG Interface for programming and this same debugger port for sending things over the serial. But sometimes it is not good, as when you reset the ESP32, it resets also the JTAG serial port, while the FTDI Serial works seamsly even when you reset the ESP32 as it is a separate chip.

eduardogb

Nov '23

Very interesting. For me it worked as I described on Windows10

mgcsmls

Mar 5

Can I ask if debugging will work on either an [ESP32-S2 Mini](#) or an [ESP32-S3-Zero](#) , considering they only have a single USB port?

maxgerhardt 

Mar 6

Yes, because that USB port is directly connected to the ESP32, there is no USB-to-UART converter on these boards which would create a second USB port.

mgcsmls

Mar 8

Can the single serial port act as a serial and HID output at the same time as debugging over USB?

I have a sketch that uses both serial and HID keyboard.

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