112學年專題 - Feature #39

Feature # 56 (Closed): NSP32連接ESP32

NSP32連接ESP32_Print一維資料

2023-09-25 05:01 - Chifu Chung

狀態:	Closed	**開始日期:**	2023-09-25
優先權:	Normal	**完成日期:**	2023-10-31
被分派者:	宏益 廖	**完成百分比:**	100%
分類:		**預估工時:**	0:00 小時
版本:		**耗用工時:**	0:00 小時
概述			
相關的議題清單:			
關聯至 硬體組 - Task #231: AWPPG P type 連續裝置製作		New	2024-09-02

歷史

#1 - 2023-09-25 05:06 - Chifu Chung

- 追蹤標籤 從 Bug 變更為 Feature

- 狀態 從 New 變更為 In Progress

#2 - 2023-09-25 05:12 - Chifu Chung

- 完成日期 設定為 2023-10-31

#3 - 2023-09-25 05:18 - Chifu Chung

- 父議題 設定為 #56

#4 - 2023-09-28 08:05 - 宏益 廖

- 檔案 clipboard-202309281419-gcvfy.png 已新增

- 檔案 clipboard-202309281421-i5lzk.png 已新增

- 檔案 clipboard-202309281422-dgpwc.png 已新增

- 檔案 clipboard-202309281515-cqwdw.png 已新增

- 檔案 clipboard-202309281517-s1ijy.png 已新增

- 檔案 clipboard-202309281524-lag57.png 已新增

- 檔案 clipboard-202309281525-wltlr.png 已新增

- 檔案 clipboard-202309281526-fyy6u.png 已新增

- 檔案 clipboard-202309281528-2vseo.png 已新增

- 檔案 clipboard-202309281553-l0von.png 已新增

#5 - 2023-09-28 09:36 - Chifu Chung

- 完成百分比 從 0 變更為 100

#6 - 2023-09-28 11:29 - 宏益 廖

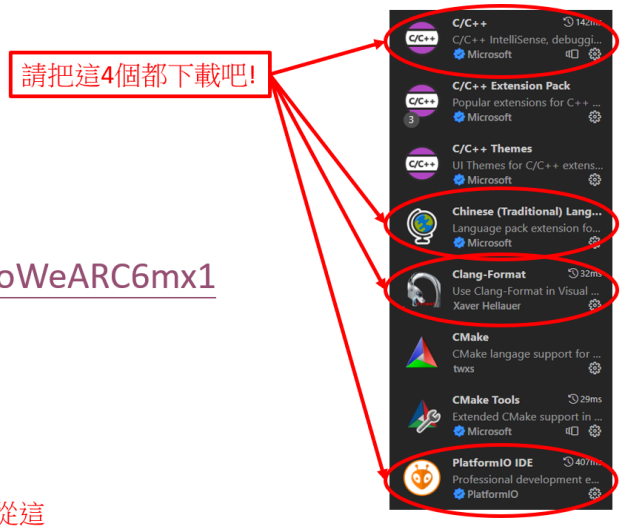
- 檔案 已刪除 (clipboard-202309281421-i5lzk.png)

#7 - 2023-09-28 11:32 - 宏益 廖

- 檔案 clipboard-202309281932-tq8y2.png 已新增

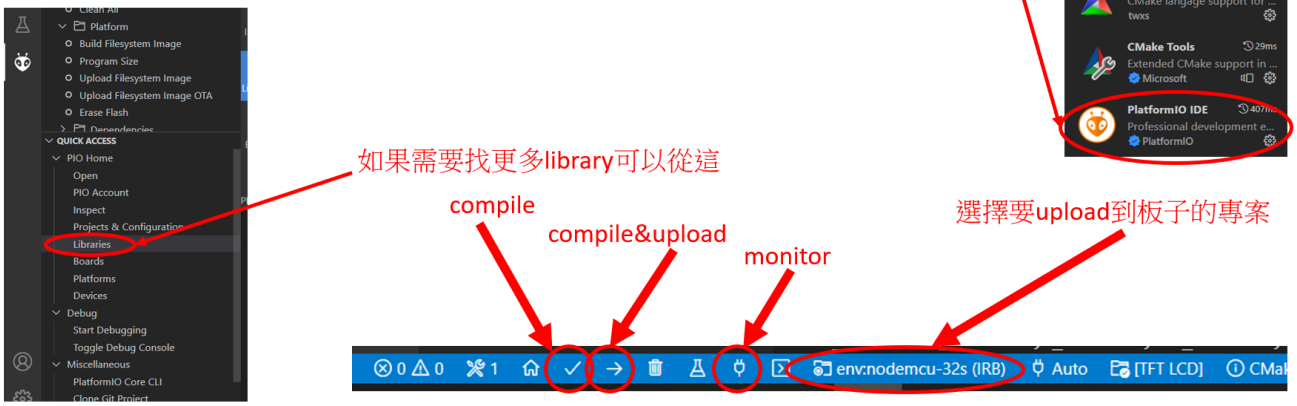
*PlatformIO環境建置

PlatformIO



- Visual Code + PlatformIO 教學影片 ：

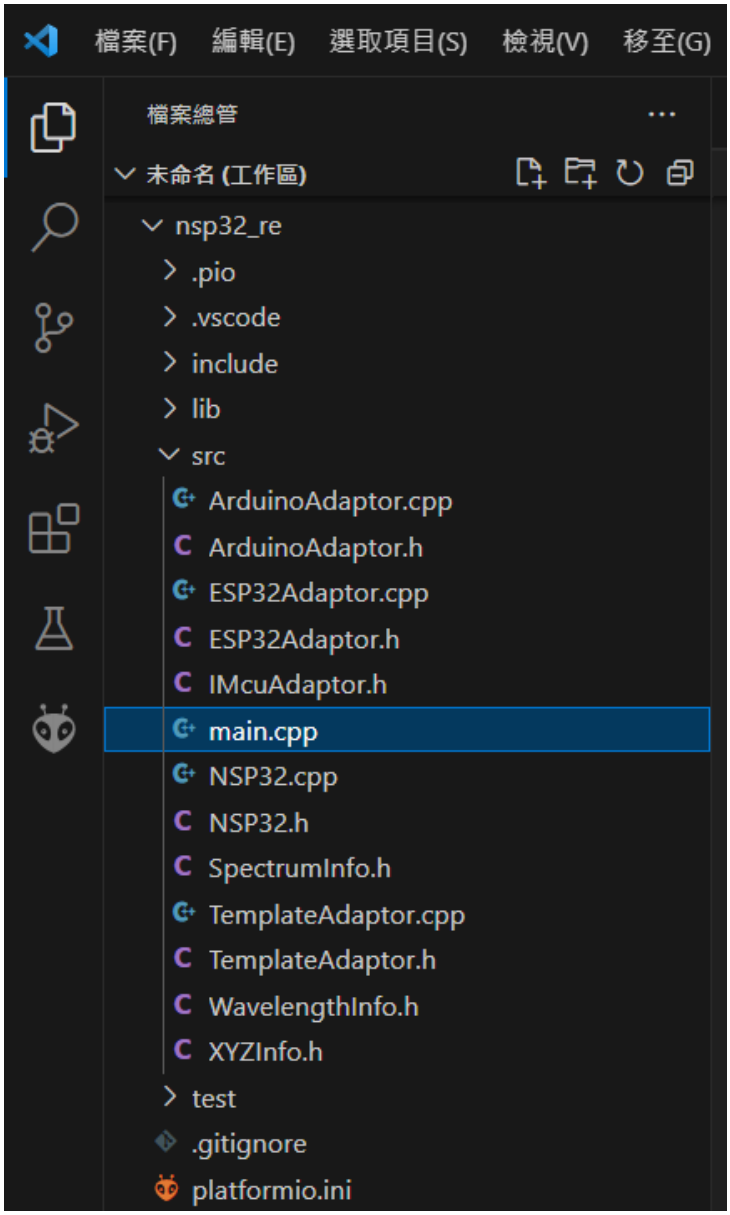
https://youtu.be/tc3Qnf79Ny8?si=YHI-0SoWeARC6mx1



https://youtu.be/tc3Qnf79Ny8?si=YHI-0SoWeARC6mx1

>>>""Ctrl+左鍵""這個功能很重要一定要會用

匯入函數庫(直接丟src資料夾)



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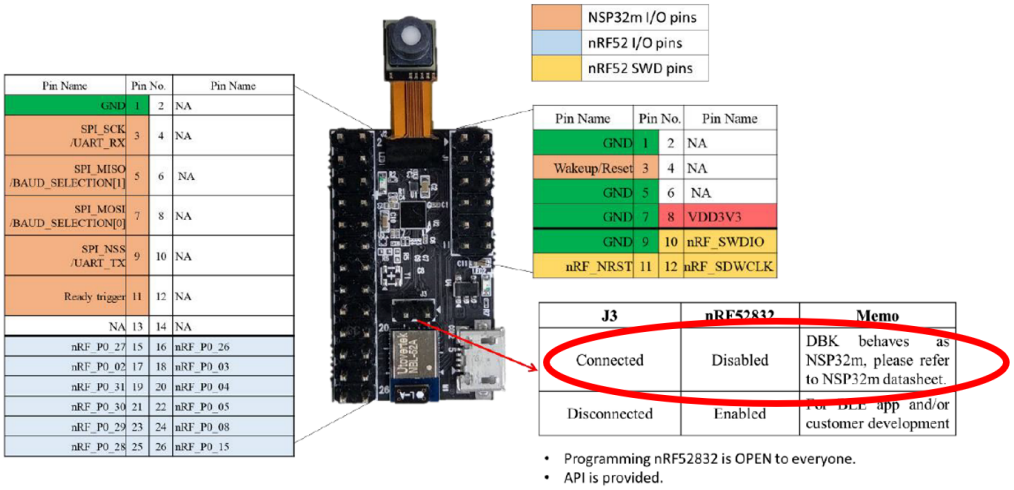
*接線

如圖(若使用DBK請將上方針腳用短路夾short)

NSP32 DBK

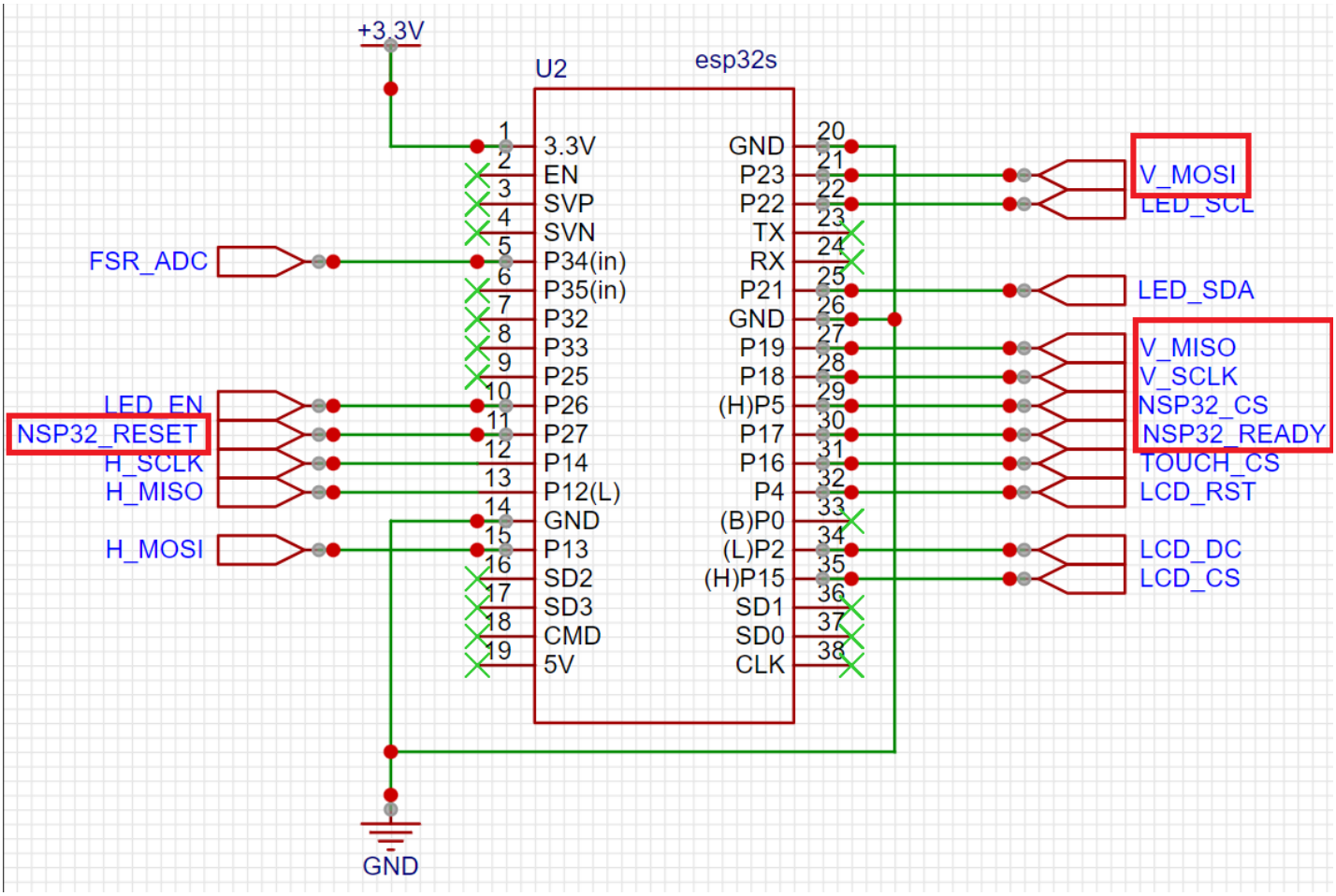


Pin Name	Pin No.		Pin Name
GND	1	2	NA
SPI_SCK /UART_RX	3	4	NA
SPI_MISO /BAUD_SELECTION[1]	5	6	NA
SPI_MOSI /BAUD_SELECTION[0]	7	8	NA
SPI_NSS /UART_TX	9	10	NA
Ready trigger	11	12	NA
NA	13	14	NA
nRF_P0_27	15	16	nRF_P0_26
nRF_P0_02	17	18	nRF_P0_03
nRF_P0_31	19	20	nRF_P0_04
nRF_P0_30	21	22	nRF_P0_05
nRF_P0_29	23	24	nRF_P0_08
nRF_P0_28	25	26	nRF_P0_15

Pin Name	Pin No.		Pin Name
GND	1	2	NA
Wakeup/Reset	3	4	NA
GND	5	6	NA
GND	7	8	VDD3V3
GND	9	10	nRF_SWDIO
nRF_NRST	11	12	nRF_SDWCLK

J3	nRF52832	Memo
Connected	Disabled	DBK behaves as NSP32m, please refer to NSP32m datasheet.
Disconnected	Enabled	For BLE app and/or customer development

- Programming nRF52832 is OPEN to everyone.
- API is provided.



```
* -----------------------------------------------------------
*              NSP32      Arduino      Arduino    Arduino      ESP32
*  SPI                    Uno/101      Mega       Nano v3
* Signal       Pin          Pin          Pin        Pin
* ---------------------------------------------------------------
* Wakeup/Reset  RST        8            49         D8            27
* SPI SSEL      SS         10           53         D10           5
* SPI MOSI      MOSI       11 / ICSP-4  51         D11           23
* SPI MISO      MISO       12 / ICSP-1  50         D12           19
* SPI SCK       SCK        13 / ICSP-3  52         D13           18
* Ready         Ready      2            21         D2            17
*
```

===

*程式(從Beginner.ino改)

```
#include <ArduinoAdaptor.h>
#include <NSP32.h>

using namespace NanoLambdaNSP32;

/***********************************************************************************
 * modify this section to fit your need                                                          *
 ***********************************************************************************/

const unsigned int PinRst = 27;         // pin Reset
const unsigned int PinReady = 17;     // pin Ready

/***********************************************************************************/

ArduinoAdaptor adaptor(PinRst);                              // master MCU adaptor
NSP32 nsp32(&adaptor, NSP32::ChannelSpi);     // NSP32 (using SPI channel)

void PinReadyTriggerISR() {
    // make sure to call this function when receiving a ready trigger from NSP32
    nsp32.OnPinReadyTriggered();
}

void setup() {

    // initialize "ready trigger" pin for accepting external interrupt (falling edge trigger)
    pinMode(PinReady, INPUT_PULLUP);
                                                                                                         // use pull-up
    attachInterrupt(digitalPinToInterrupt(PinReady), PinReadyTriggerISR, FALLING);    // enable interrupt for falling edge

    // initialize serial port for "Serial Monitor"
    Serial.begin(115200);
    // initialize NSP32
    nsp32.Init();
    Serial.println("Init");
    // =============== standby ===============
    nsp32.Standby(0);
    Serial.println("Standby");
    // =============== wakeup ===============
    nsp32.Wakeup();
    Serial.println("Wakeup");
    // =============== hello ===============
    nsp32.Hello(0);
    Serial.println("Hello");
    // =============== get sensor id ===============
    nsp32.GetSensorId(0);
    Serial.println("GetSensorId");

    char szSensorId[15];                                              // sensor id string buffer
    nsp32.ExtractSensorIdStr(szSensorId);     // now we have sensor id string in szSensorId[]
```

```
    Serial.print(F("sensor id = "));
    Serial.println(szSensorId);

    // ============== get wavelength ==============
    nsp32.GetWavelength(0);

    WavelengthInfo infoW;
    nsp32.ExtractWavelengthInfo(&infoW);
//  now we have all wavelength info in infoW, we can use e.g. "infoW.Wavelength" to access the wavelength data array

    Serial.print(F("Elements of wavelength = "));

    //Serial.println(infoW.Wavelength[0]);

    for(int i = 0; i < 75; i++){
        Serial.printf("%d ",infoW.Wavelength[i]);
    }

    // ============== spectrum acquisition ==============
    nsp32.AcqSpectrum(0, 32, 3, false);     // integration time = 32; frame avg num = 3; disable AE

    // "AcqSpectrum" command takes longer time to execute, the return packet is not immediately available
    // when the acquisition is done, a "ready trigger" will fire, and nsp32.GetReturnPacketSize() will be > 0
    while (nsp32.GetReturnPacketSize() <= 0) {
        // TODO: can go to sleep, and wakeup when "ready trigger" interrupt occurs

        nsp32.UpdateStatus();      // call UpdateStatus() to check async result
    }

    SpectrumInfo infoS;
    nsp32.ExtractSpectrumInfo(&infoS);
//  now we have all spectrum info in infoW, we can use e.g. "infoS.Spectrum" to access the spectrum data array

    Serial.print(F("Elements of spectrum = "));

    //Serial.println(infoS.Spectrum[0], 6);
    for(int i = 0; i < 75; i++){
        Serial.printf("%.6f ",infoS.Spectrum[0], 6);
    }
}

void loop() {
}
```

==========

*注意事項

心得

- 熟悉SPI各個腳位 & SPI的四種mode
- 更加熟悉NSP32這塊sensor
- 用硬體定義的CS(5)不行，但自己定義的CS(22)卻可行?

SPI.begin(SCLK, MISO, MOSI, CS)

```
SPI.begin(18, 19, 23, 22);
```

ANS：在SPI.begin下加這行

```
SPI.setHwCs(true);
```

ESP32 Default SPI Pins

Many ESP32 boards come with default SPI pins pre-assigned. The pin mapping for most boards is as follows:

SPI	MOSI	MISO	SCLK	CS
VSPI	GPIO 23	GPIO 19	GPIO 18	GPIO 5
HSPI	GPIO 13	GPIO 12	GPIO 14	GPIO 15

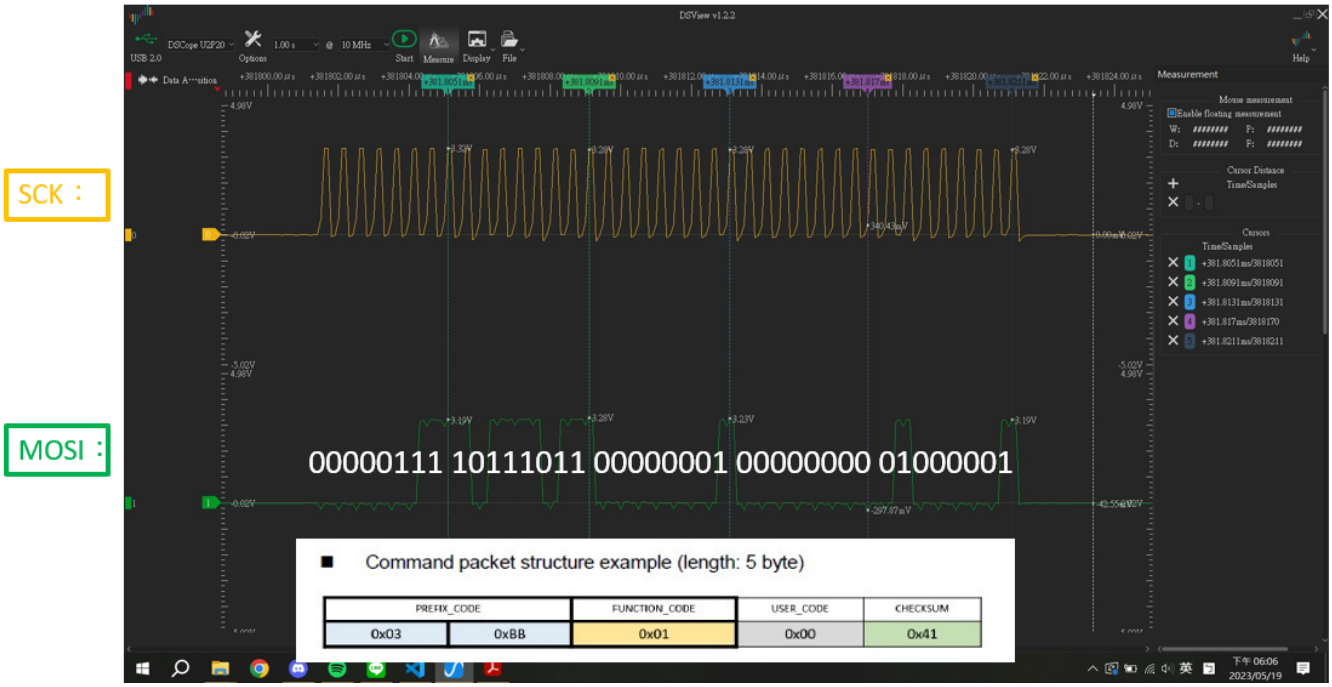
==========

***結果**

結果

```
sensor id = CB-74-0B-2C-33
Number of points = 75
Elements of wavelength =
390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 57
5 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760
Elements of spectrum =
0.000112 0.000169 0.000163 0.000150 0.000198 0.000260 0.000271 0.000214 0.000152 0.000110 0.000119 0.000163 0.000219 0.000241 0.000209 0.000127 0.0000
54 0.000058 0.000138 0.000258 0.000361 0.000429 0.000436 0.000383 0.000296 0.000249 0.000265 0.000287 0.000266 0.000222 0.000200 0.000230 0.000274 0.0
00354 0.000460 0.000558 0.000582 0.000513 0.000420 0.000369 0.000381 0.000436 0.000505 0.000560 0.000599 0.000623 0.000652 0.000663 0.000656 0.000609
0.000490 0.000315 0.000147 0.000047 0.000060 0.000159 0.000281 0.000361 0.000344 0.000239 0.000100 0.000000 0.000000 0.000003 0.000124 0.000260 0.0002
94 0.000137 0.000000 0.000000 0.000000 0.000000 0.000068 0.000506 0.000774
Elements of spectrum =
0.000000 0.000000 0.000028 0.000154 0.000288 0.000362 0.000334 0.000215 0.000102 0.000051 0.000121 0.000246 0.000367 0.000418 0.000389 0.000293 0.0001
76 0.000098 0.000094 0.000169 0.000291 0.000389 0.000395 0.000319 0.000231 0.000220 0.000285 0.000361 0.000383 0.000344 0.000281 0.000255 0.000280 0.0
00388 0.000516 0.000589 0.000577 0.000524 0.000509 0.000532 0.000566 0.000584 0.000584 0.000582 0.000590 0.000618 0.000652 0.000662 0.000634 0.000564
0.000448 0.000306 0.000183 0.000105 0.000101 0.000169 0.000270 0.000344 0.000318 0.000194 0.000036 0.000000 0.000000 0.000071 0.000241 0.000372 0.0003
54 0.000127 0.000000 0.000000 0.000000 0.000000 0.000154 0.000507 0.000699
Elements of spectrum =
0.000000 0.000032 0.000099 0.000132 0.000189 0.000263 0.000282 0.000209 0.000117 0.000084 0.000154 0.000255 0.000342 0.000374 0.000349 0.000292 0.0002
07 0.000153 0.000153 0.000202 0.000277 0.000335 0.000330 0.000268 0.000185 0.000172 0.000242 0.000346 0.000416 0.000439 0.000441 0.000460 0.000504 0.0
00589 0.000669 0.000685 0.000602 0.000450 0.000326 0.000293 0.000334 0.000405 0.000467 0.000504 0.000535 0.000569 0.000614 0.000663 0.000672 0.000587
0.000416 0.000226 0.000120 0.000130 0.000198 0.000244 0.000238 0.000213 0.000180 0.000145 0.000077 0.000000 0.000000 0.000000 0.000059 0.000315 0.0004
27 0.000275 0.000000 0.000000 0.000000 0.000000 0.000000 0.000263 0.000602
Elements of spectrum =
0.000000 0.000112 0.000153 0.000180 0.000220 0.000242 0.000195 0.000104 0.000056 0.000089 0.000190 0.000275 0.000304 0.000280 0.000221 0.000144 0.0000
53 0.000016 0.000047 0.000156 0.000310 0.000440 0.000474 0.000411 0.000303 0.000254 0.000285 0.000310 0.000280 0.000217 0.000178 0.000192 0.000235 0.0
```

Hello package (using SPI mode0)



#8 - 2023-10-02 05:07 - 宏益 廖

- 狀態 從 In Progress 變更為 Resolved

#9 - 2023-12-14 18:45 - Chifu Chung

- 狀態 從 Resolved 變更為 Closed

#10 - 2024-09-03 14:45 - Chifu Chung

- 關聯至 Task #231: AWPPG P type 連續裝置製作 已新增

檔案

clipboard-202309281419-gcvfy.png	441 KB	2023-09-28	宏益 廖
clipboard-202309281422-dgpwc.png	754 KB	2023-09-28	宏益 廖
clipboard-202309281515-cqwdw.png	216 KB	2023-09-28	宏益 廖
clipboard-202309281517-s1ijy.png	15.2 KB	2023-09-28	宏益 廖
clipboard-202309281524-lag57.png	598 KB	2023-09-28	宏益 廖
clipboard-202309281525-wltlr.png	120 KB	2023-09-28	宏益 廖
clipboard-202309281526-fyy6u.png	328 KB	2023-09-28	宏益 廖
clipboard-202309281528-2vseo.png	11.1 KB	2023-09-28	宏益 廖
clipboard-202309281553-l0von.png	18.4 KB	2023-09-28	宏益 廖
clipboard-202309281932-tq8y2.png	41.9 KB	2023-09-28	宏益 廖