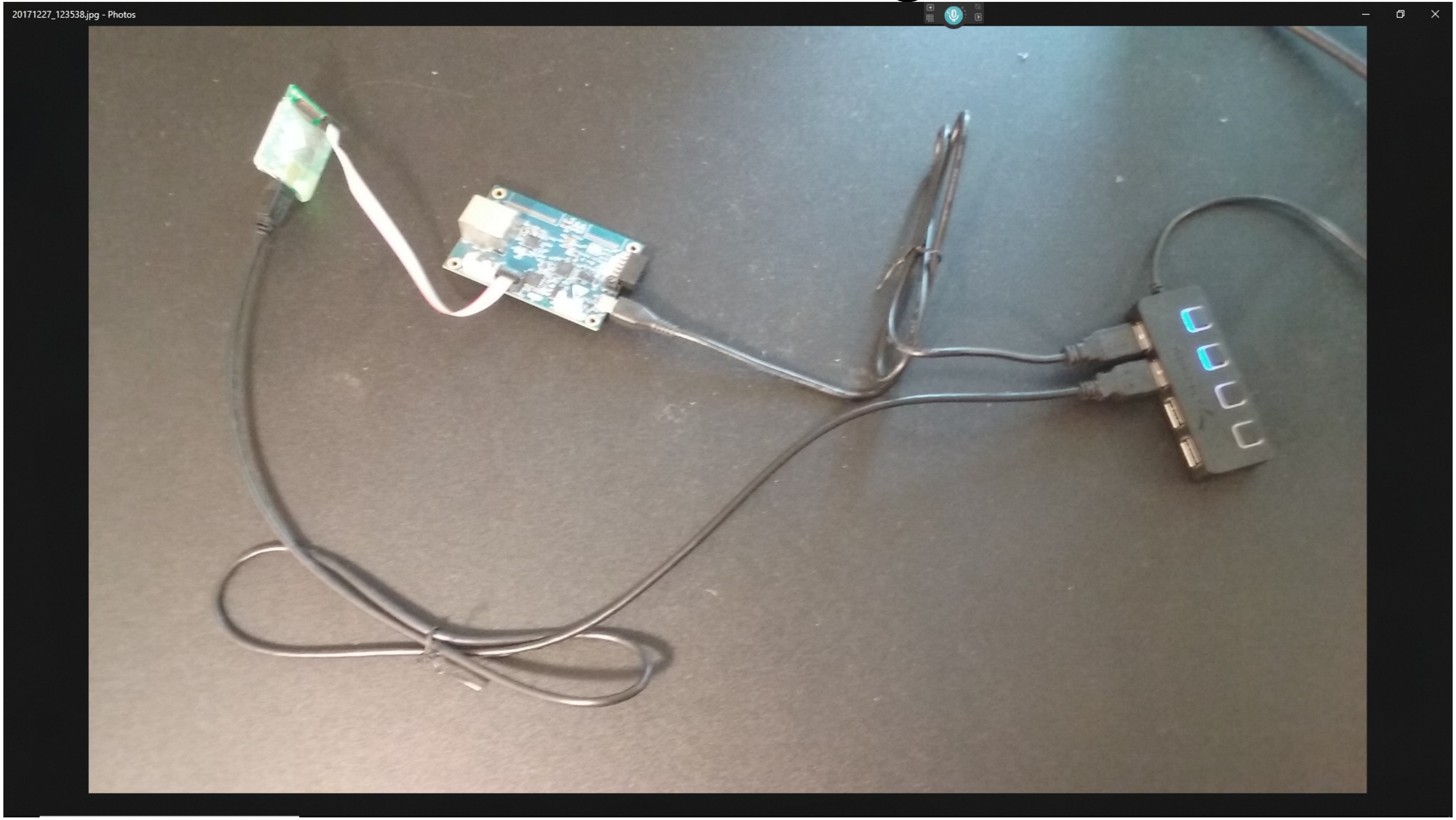
# S5D9 Bus USBX Example
# by
# Michael Li (1/1/2018)
# https://www.miketechuniverse.com

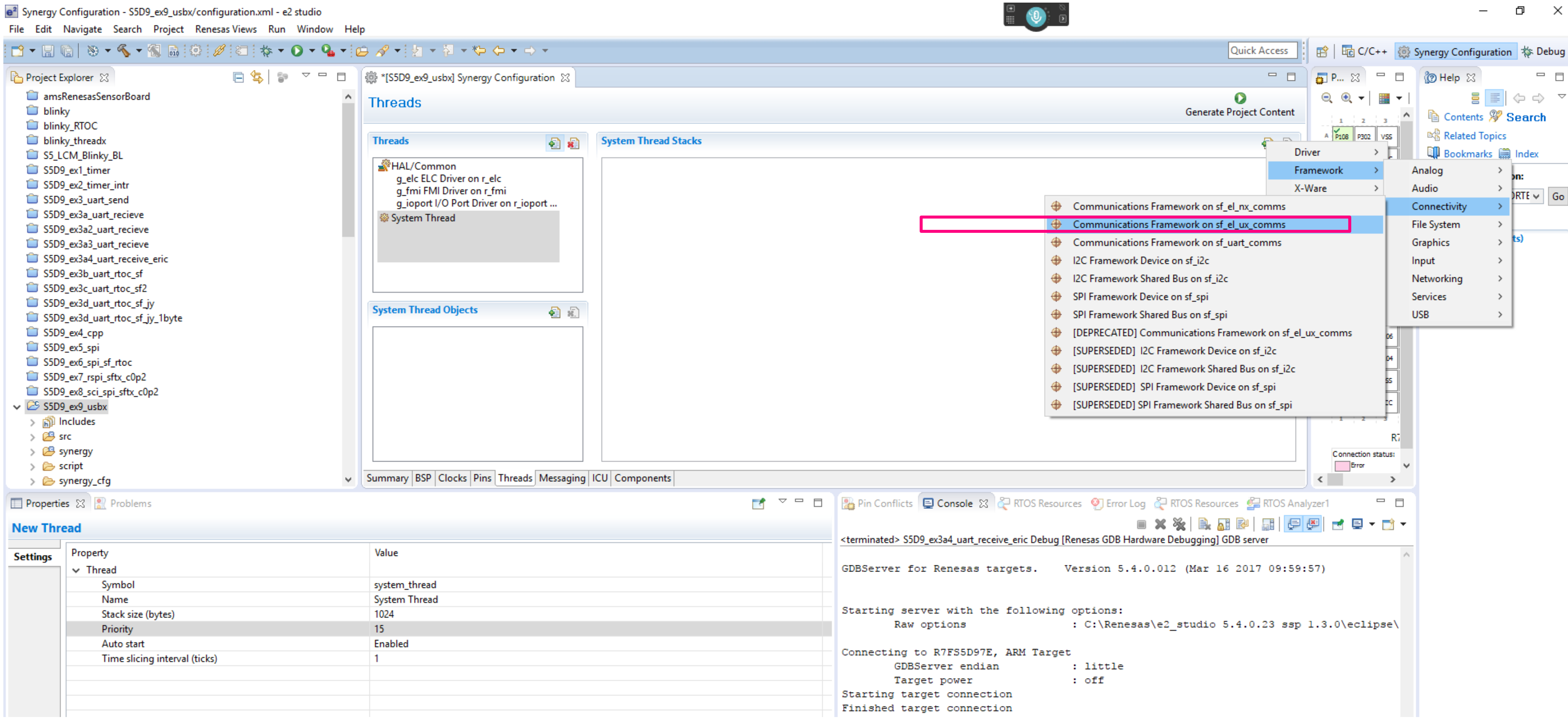
- This example shows how to send an outgoing message and receive an incoming message through the PC’s USB bus.

E2 Studio 5.4.0.023
SSP 1.3.0

# Hardware Setup with S5D9 board and Jlink debug board.



# Must create a new thread to use the USBX communication framework.



Synergy Configuration - S5D9_ex9_usbx/configuration.xml - e2 studio

File Edit Navigate Search Project Renesas Views Run Window Help

Project Explorer

- amsRenesasSensorBoard
- blinky
- blinky_RTOC
- blinky_threadx
- S5_LCM_Blinky_BL
- S5D9_ex1_timer
- S5D9_ex2_timer_intr
- S5D9_ex3_uart_send
- S5D9_ex3a_uart_recieve
- S5D9_ex3a2_uart_recieve
- S5D9_ex3a3_uart_recieve
- S5D9_ex3a4_uart_receive_eric
- S5D9_ex3b_uart_rtoc_sf
- S5D9_ex3c_uart_rtoc_sf2
- S5D9_ex3d_uart_rtoc_sf_jy
- S5D9_ex3d_uart_rtoc_sf_jy_1byte
- S5D9_ex4_cpp
- S5D9_ex5_spi
- S5D9_ex6_spi_sf_rtoc
- S5D9_ex7_rspi_sftx_c0p2
- S5D9_ex8_sci_spi_sftx_c0p2
- S5D9_ex9_usbx
  - Includes
  - src
  - synergy
  - script
  - synergy_cfg

*[S5D9_ex9_usbx] Synergy Configuration

Threads

Generate Project Content

Threads

- HAL/Common
  - g_elc ELC Driver on r_elc
  - g_fmi FMI Driver on r_fmi
  - g_ioport I/O Port Driver on r_ioport ...
- System Thread

System Thread Stacks

System Thread Objects

Driver > | Framework > | X-Ware >

Analog > | Audio > | Connectivity > | File System > | Graphics > | Input > | Networking > | Services > | USB >

- Communications Framework on sf_el_nx_comms
- Communications Framework on sf_el_ux_comms
- Communications Framework on sf_uart_comms
- I2C Framework Device on sf_i2c
- I2C Framework Shared Bus on sf_i2c
- SPI Framework Device on sf_spi
- SPI Framework Shared Bus on sf_spi
- [DEPRECATED] Communications Framework on sf_el_ux_comms
- [SUPERSEDED] I2C Framework Device on sf_i2c
- [SUPERSEDED] I2C Framework Shared Bus on sf_i2c
- [SUPERSEDED] SPI Framework Device on sf_spi
- [SUPERSEDED] SPI Framework Shared Bus on sf_spi

Summary | BSP | Clocks | Pins | Threads | Messaging | ICU | Components

Properties | Problems

New Thread

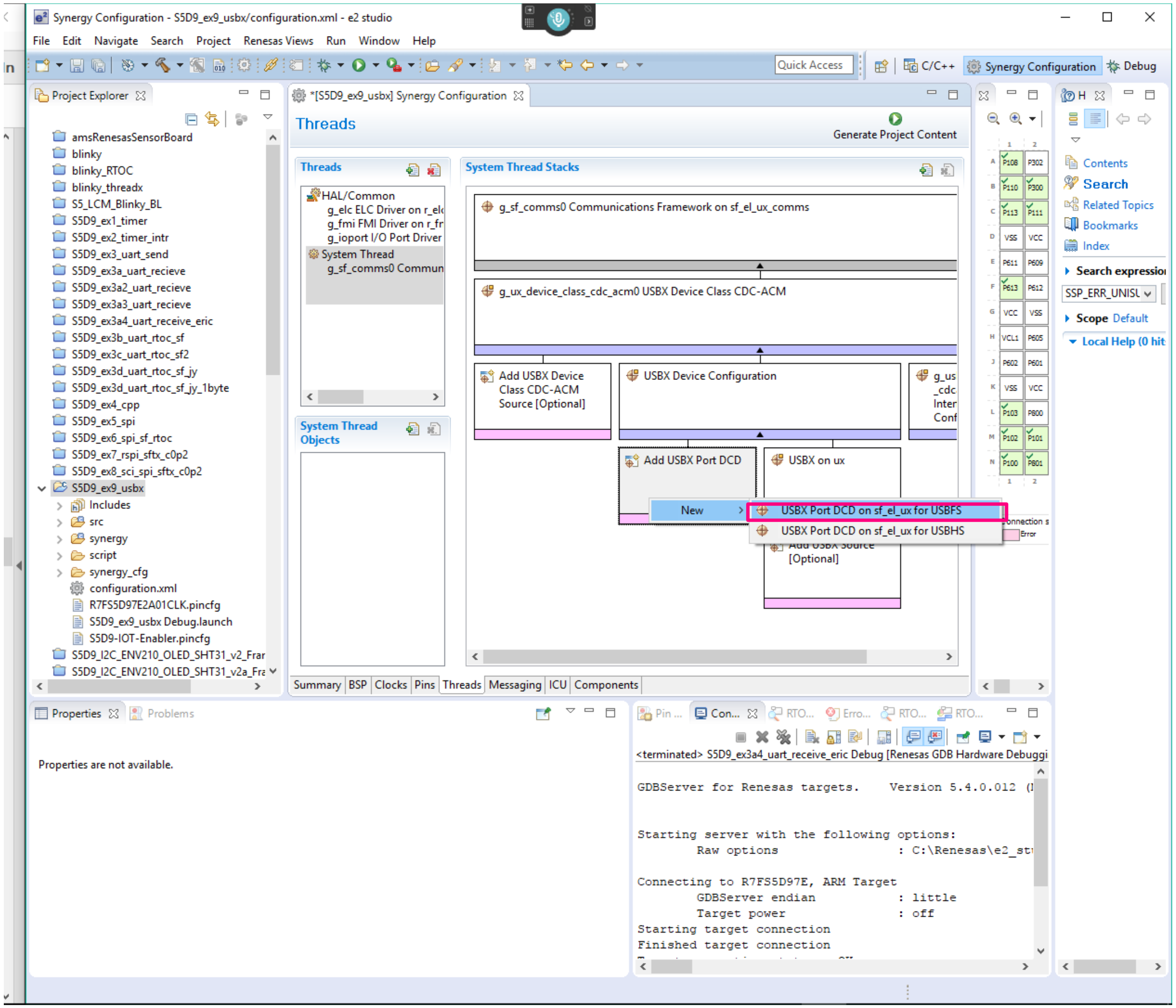
Settings

| Property | Value |
|---|---|
| Thread | |
| Symbol | system_thread |
| Name | System Thread |
| Stack size (bytes) | 1024 |
| Priority | 15 |
| Auto start | Enabled |
| Time slicing interval (ticks) | 1 |

Pin Conflicts | Console | RTOS Resources | Error Log | RTOS Resources | RTOS Analyzer1

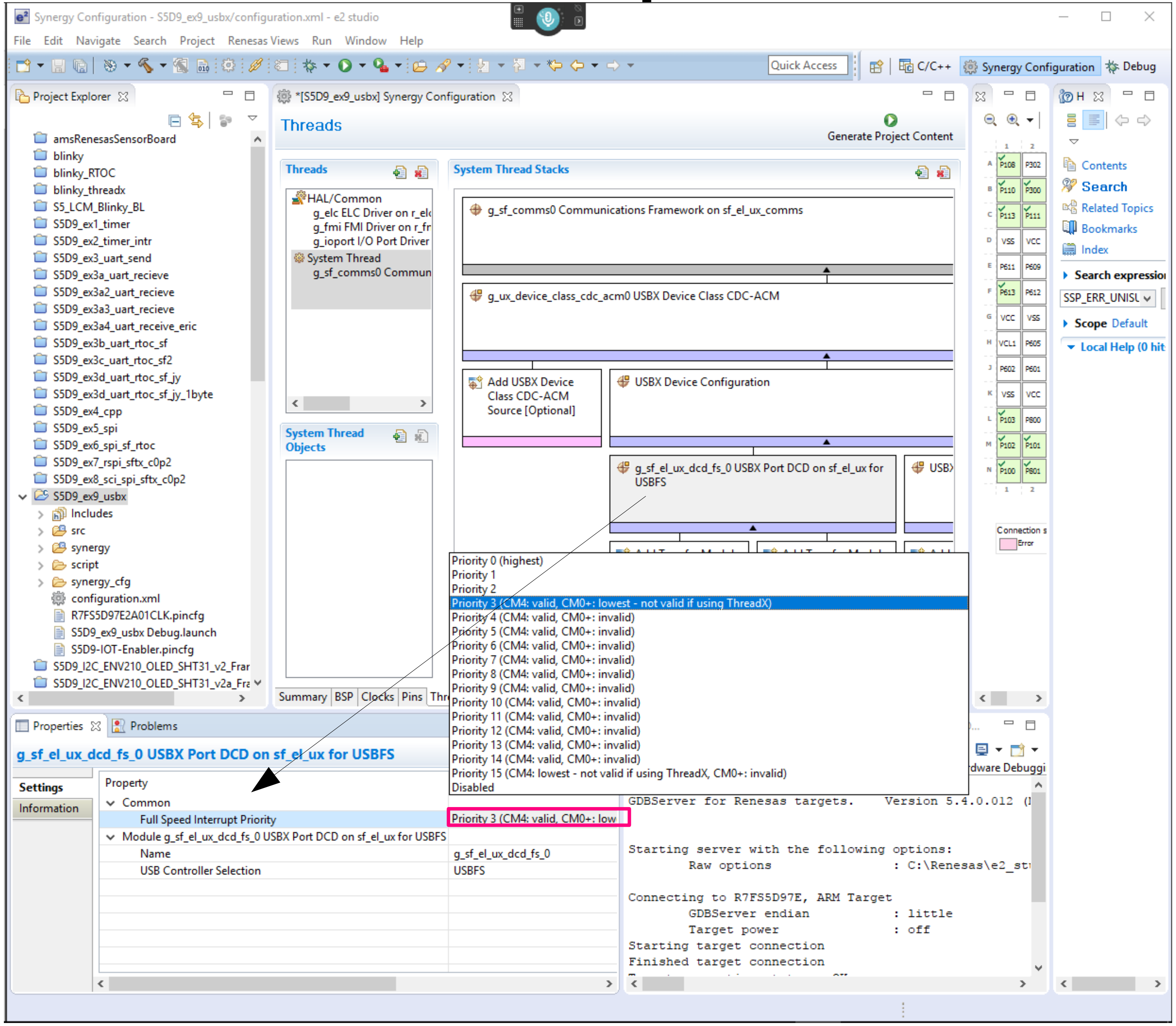
```
<terminated> S5D9_ex3a4_uart_receive_eric Debug [Renesas GDB Hardware Debugging] GDB server

GDBServer for Renesas targets.    Version 5.4.0.012 (Mar 16 2017 09:59:57)


Starting server with the following options:
        Raw options                : C:\Renesas\e2_studio 5.4.0.23 ssp 1.3.0\eclipse\

Connecting to R7FS5D97E, ARM Target
        GDBServer endian           : little
        Target power               : off
Starting target connection
Finished target connection
```

# Choose the port


Synergy Configuration - S5D9_ex9_usbx/configuration.xml - e2 studio
Threads
Generate Project Content
System Thread Stacks
g_sf_comms0 Communications Framework on sf_el_ux_comms
g_ux_device_class_cdc_acm0 USBX Device Class CDC-ACM
Add USBX Device Class CDC-ACM Source [Optional]
USBX Device Configuration
Add USBX Port DCD
USBX on ux
New
USBX Port DCD on sf_el_ux for USBFS
USBX Port DCD on sf_el_ux for USBHS
Summary
BSP
Clocks
Pins
Threads
Messaging
ICU
Components
Properties are not available.

```
<terminated> S5D9_ex3a4_uart_receive_eric Debug [Renesas GDB Hardware Debuggi

GDBServer for Renesas targets.    Version 5.4.0.012  (I


Starting server with the following options:
        Raw options                       : C:\Renesas\e2_st

Connecting to R7FS5D97E, ARM Target
        GDBServer endian                  : little
        Target power                      : off
Starting target connection
Finished target connection
```

# Property: Disable → Priority 3 Interrupt



Threads:
- HAL/Common
  - g_elc ELC Driver on r_elc
  - g_fmi FMI Driver on r_fmi
  - g_ioport I/O Port Driver
- System Thread
  - g_sf_comms0 Communications Framework

System Thread Stacks:
- g_sf_comms0 Communications Framework on sf_el_ux_comms
- g_ux_device_class_cdc_acm0 USBX Device Class CDC-ACM
- Add USBX Device Class CDC-ACM Source [Optional]
- USBX Device Configuration
- g_sf_el_ux_dcd_fs_0 USBX Port DCD on sf_el_ux for USBFS

Priority 0 (highest)
Priority 1
Priority 2
Priority 3 (CM4: valid, CM0+: lowest - not valid if using ThreadX)
Priority 4 (CM4: valid, CM0+: invalid)
Priority 5 (CM4: valid, CM0+: invalid)
Priority 6 (CM4: valid, CM0+: invalid)
Priority 7 (CM4: valid, CM0+: invalid)
Priority 8 (CM4: valid, CM0+: invalid)
Priority 9 (CM4: valid, CM0+: invalid)
Priority 10 (CM4: valid, CM0+: invalid)
Priority 11 (CM4: valid, CM0+: invalid)
Priority 12 (CM4: valid, CM0+: invalid)
Priority 13 (CM4: valid, CM0+: invalid)
Priority 14 (CM4: valid, CM0+: invalid)
Priority 15 (CM4: lowest - not valid if using ThreadX, CM0+: invalid)
Disabled

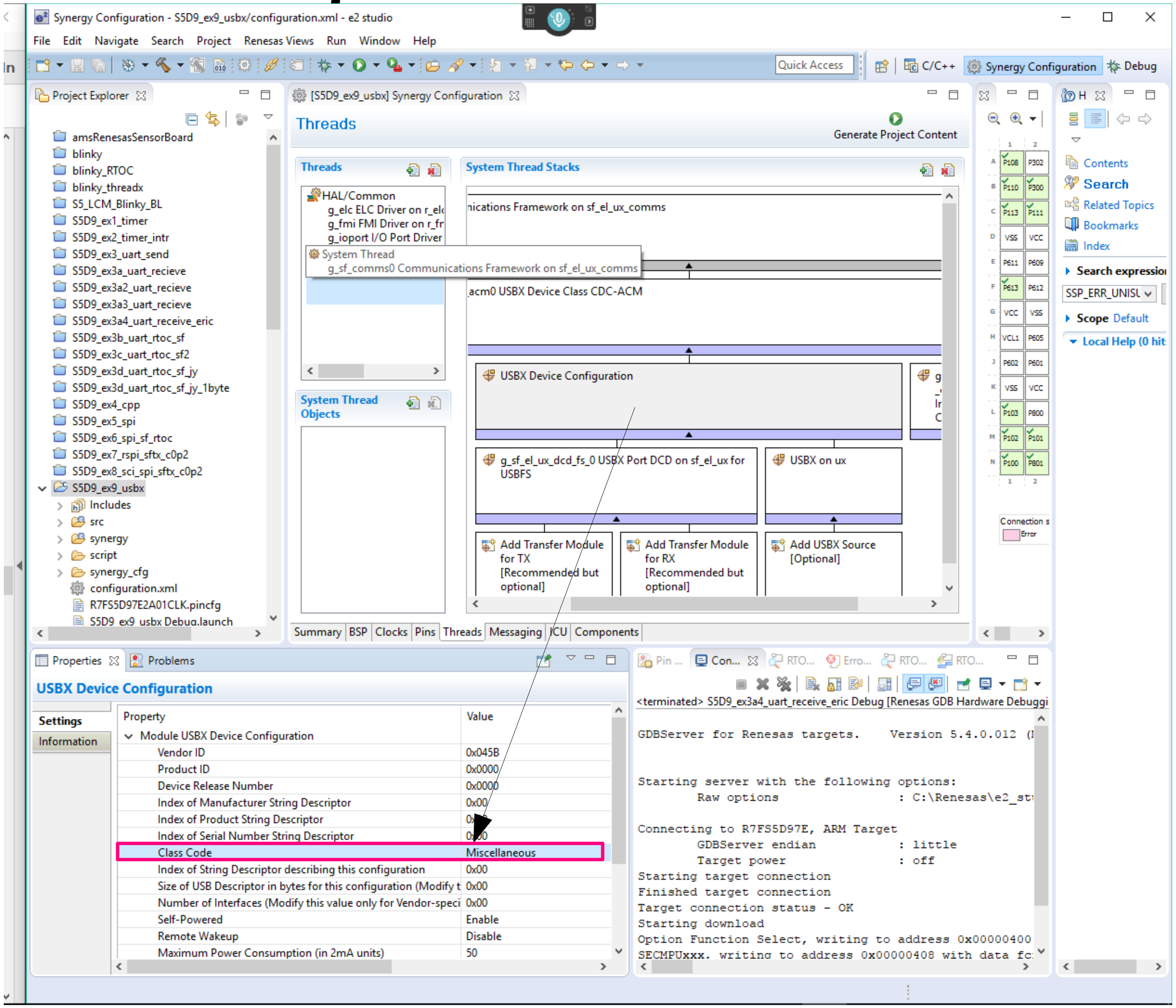
**g_sf_el_ux_dcd_fs_0 USBX Port DCD on sf_el_ux for USBFS**

Settings | Information

| Property | |
|---|---|
| Common | |
| Full Speed Interrupt Priority | Priority 3 (CM4: valid, CM0+: low |
| Module g_sf_el_ux_dcd_fs_0 USBX Port DCD on sf_el_ux for USBFS | |
| Name | g_sf_el_ux_dcd_fs_0 |
| USB Controller Selection | USBFS |

```
GDBServer for Renesas targets.    Version 5.4.0.012 (I

Starting server with the following options:
        Raw options                   : C:\Renesas\e2_stu

Connecting to R7FS5D97E, ARM Target
        GDBServer endian              : little
        Target power                  : off
Starting target connection
Finished target connection
```

# Update the Class Code for uploading Window OS driver.



Synergy Configuration - S5D9_ex9_usbx/configuration.xml - e2 studio

File Edit Navigate Search Project Renesas Views Run Window Help

Project Explorer

- amsRenesasSensorBoard
- blinky
- blinky_RTOC
- blinky_threadx
- S5_LCM_Blinky_BL
- S5D9_ex1_timer
- S5D9_ex2_timer_intr
- S5D9_ex3_uart_send
- S5D9_ex3a_uart_recieve
- S5D9_ex3a2_uart_recieve
- S5D9_ex3a3_uart_recieve
- S5D9_ex3a4_uart_receive_eric
- S5D9_ex3b_uart_rtoc_sf
- S5D9_ex3c_uart_rtoc_sf2
- S5D9_ex3d_uart_rtoc_sf_jy
- S5D9_ex3d_uart_rtoc_sf_jy_1byte
- S5D9_ex4_cpp
- S5D9_ex5_spi
- S5D9_ex6_spi_sf_rtoc
- S5D9_ex7_rspi_sftx_c0p2
- S5D9_ex8_sci_spi_sftx_c0p2
- S5D9_ex9_usbx
  - Includes
  - src
  - synergy
  - script
  - synergy_cfg
  - configuration.xml
  - R7FS5D97E2A01CLK.pincfg
  - S5D9_ex9_usbx Debug.launch

[S5D9_ex9_usbx] Synergy Configuration

Threads — Generate Project Content

Threads: HAL/Common — g_elc ELC Driver on r_elc; g_fmi FMI Driver on r_fmi; g_ioport I/O Port Driver; System Thread — g_sf_comms0 Communications Framework on sf_el_ux_comms

System Thread Stacks: …nications Framework on sf_el_ux_comms; …acm0 USBX Device Class CDC-ACM; USBX Device Configuration; g_sf_el_ux_dcd_fs_0 USBX Port DCD on sf_el_ux for USBFS; USBX on ux; Add Transfer Module for TX [Recommended but optional]; Add Transfer Module for RX [Recommended but optional]; Add USBX Source [Optional]

System Thread Objects

Summary | BSP | Clocks | Pins | Threads | Messaging | ICU | Components

Properties — USBX Device Configuration

| Property | Value |
|---|---|
| Module USBX Device Configuration | |
| Vendor ID | 0x045B |
| Product ID | 0x0000 |
| Device Release Number | 0x0000 |
| Index of Manufacturer String Descriptor | 0x00 |
| Index of Product String Descriptor | 0x00 |
| Index of Serial Number String Descriptor | 0x00 |
| Class Code | Miscellaneous |
| Index of String Descriptor describing this configuration | 0x00 |
| Size of USB Descriptor in bytes for this configuration (Modify t | 0x00 |
| Number of Interfaces (Modify this value only for Vendor-speci | 0x00 |
| Self-Powered | Enable |
| Remote Wakeup | Disable |
| Maximum Power Consumption (in 2mA units) | 50 |

```
<terminated> S5D9_ex3a4_uart_receive_eric Debug [Renesas GDB Hardware Debuggi

GDBServer for Renesas targets.    Version 5.4.0.012 (I

Starting server with the following options:
          Raw options             : C:\Renesas\e2_st

Connecting to R7FS5D97E, ARM Target
          GDBServer endian        : little
          Target power            : off
Starting target connection
Finished target connection
Target connection status - OK
Starting download
Option Function Select, writing to address 0x00000400
SECMPUxxx, writing to address 0x00000408 with data fc
```

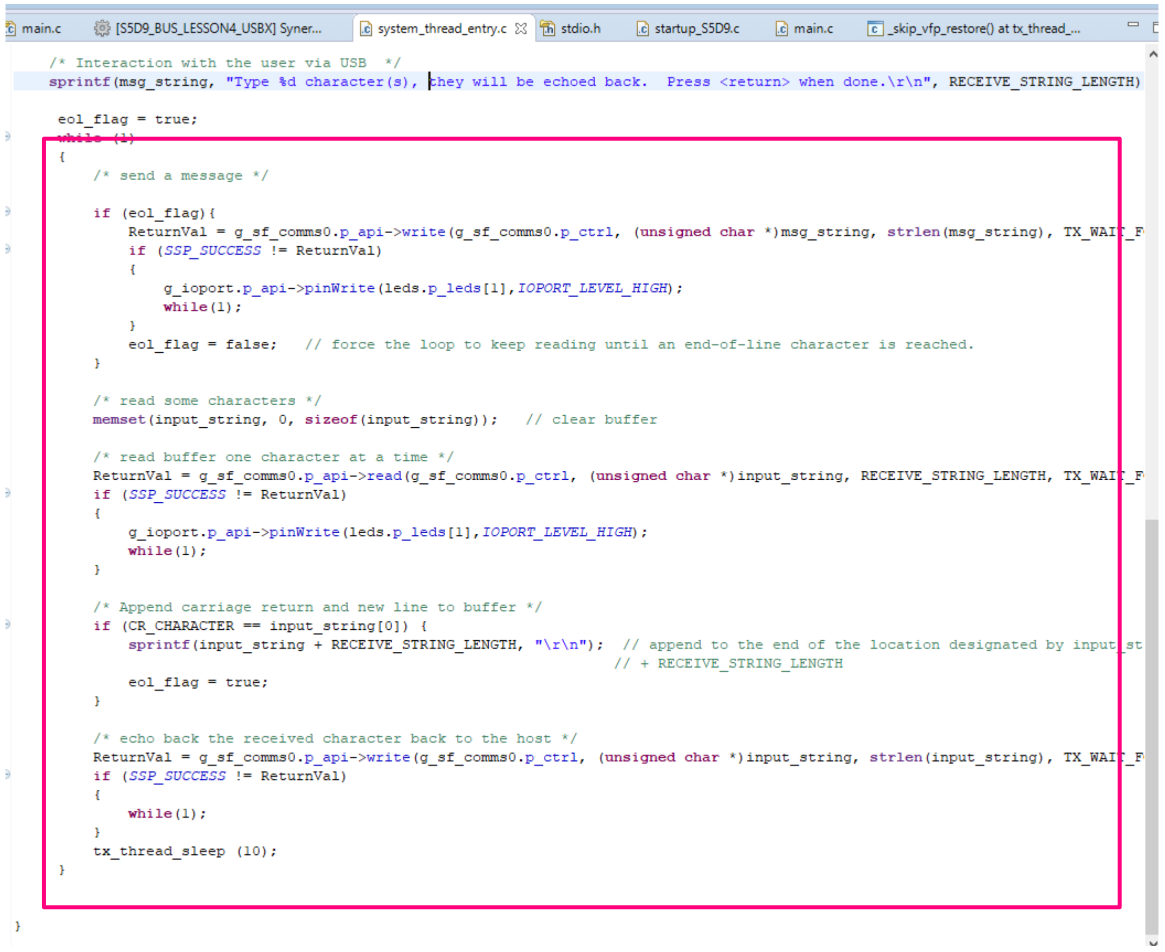
Contents | Search | Related Topics | Bookmarks | Index

Search expression: SSP_ERR_UNISL

Scope Default

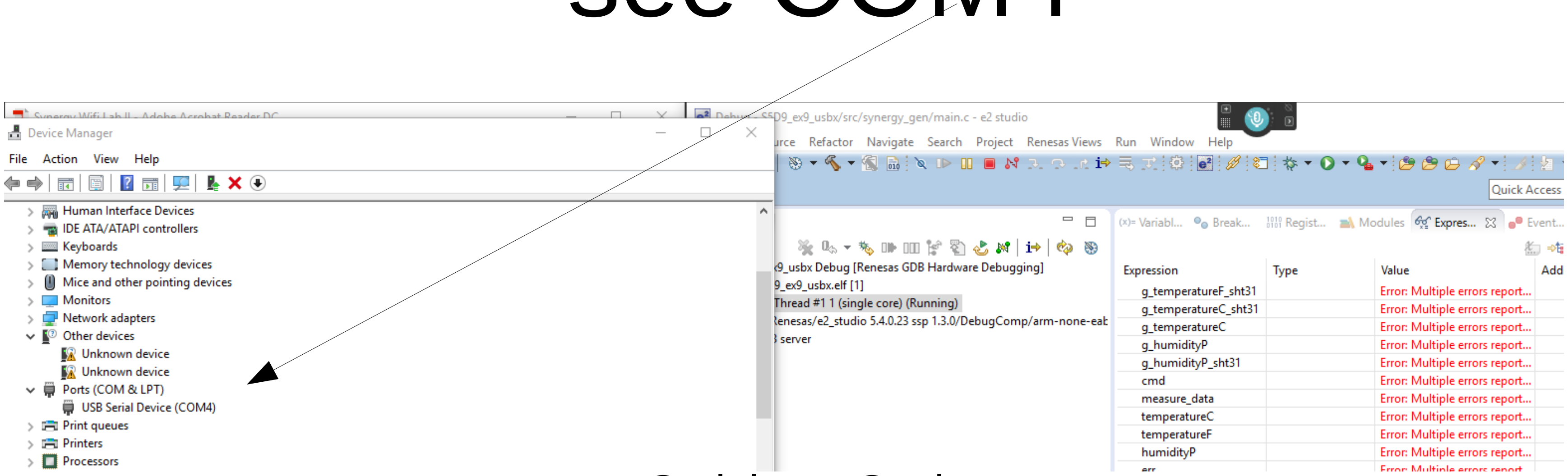
Local Help (0 hit

# System Thread’s forever loop.


main.c
[S5D9_BUS_LESSON4_USBX] Syner...
system_thread_entry.c
stdio.h
startup_S5D9.c
main.c
_skip_vfp_restore() at tx_thread_...

```c
    /* Interaction with the user via USB  */
    sprintf(msg_string, "Type %d character(s), they will be echoed back.  Press <return> when done.\r\n", RECEIVE_STRING_LENGTH)

     eol_flag = true;
     while (1)
     {
         /* send a message */

         if (eol_flag){
             ReturnVal = g_sf_comms0.p_api->write(g_sf_comms0.p_ctrl, (unsigned char *)msg_string, strlen(msg_string), TX_WAIT_F
             if (SSP_SUCCESS != ReturnVal)
             {
                 g_ioport.p_api->pinWrite(leds.p_leds[1],IOPORT_LEVEL_HIGH);
                 while(1);
             }
             eol_flag = false;   // force the loop to keep reading until an end-of-line character is reached.
         }

         /* read some characters */
         memset(input_string, 0, sizeof(input_string));   // clear buffer

         /* read buffer one character at a time */
         ReturnVal = g_sf_comms0.p_api->read(g_sf_comms0.p_ctrl, (unsigned char *)input_string, RECEIVE_STRING_LENGTH, TX_WAIT_F
         if (SSP_SUCCESS != ReturnVal)
         {
             g_ioport.p_api->pinWrite(leds.p_leds[1],IOPORT_LEVEL_HIGH);
             while(1);
         }

         /* Append carriage return and new line to buffer */
         if (CR_CHARACTER == input_string[0]) {
             sprintf(input_string + RECEIVE_STRING_LENGTH, "\r\n");  // append to the end of the location designated by input_st
                                                                     // + RECEIVE_STRING_LENGTH

             eol_flag = true;
         }

         /* echo back the received character back to the host */
         ReturnVal = g_sf_comms0.p_api->write(g_sf_comms0.p_ctrl, (unsigned char *)input_string, strlen(input_string), TX_WAIT_F
         if (SSP_SUCCESS != ReturnVal)
         {
             while(1);
         }
         tx_thread_sleep (10);
     }

}
```

# Run the firmware before you can see COM4



Device Manager

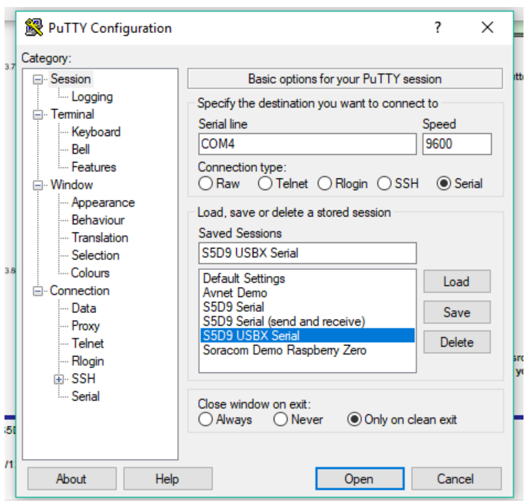
- Human Interface Devices
- IDE ATA/ATAPI controllers
- Keyboards
- Memory technology devices
- Mice and other pointing devices
- Monitors
- Network adapters
- Other devices
  - Unknown device
  - Unknown device
- Ports (COM & LPT)
  - USB Serial Device (COM4)
- Print queues
- Printers
- Processors

Debug - S5D9_ex9_usbx/src/synergy_gen/main.c - e2 studio

```
9_usbx Debug [Renesas GDB Hardware Debugging]
9_ex9_usbx.elf [1]
Thread #1 1 (single core) (Running)
Renesas/e2_studio 5.4.0.23 ssp 1.3.0/DebugComp/arm-none-eab
server
```

| Expression | Type | Value |
|---|---|---|
| g_temperatureF_sht31 | | Error: Multiple errors report... |
| g_temperatureC_sht31 | | Error: Multiple errors report... |
| g_temperatureC | | Error: Multiple errors report... |
| g_humidityP | | Error: Multiple errors report... |
| g_humidityP_sht31 | | Error: Multiple errors report... |
| cmd | | Error: Multiple errors report... |
| measure_data | | Error: Multiple errors report... |
| temperatureC | | Error: Multiple errors report... |
| temperatureF | | Error: Multiple errors report... |
| humidityP | | Error: Multiple errors report... |

## Serial port Setting



PuTTY Configuration

Basic options for your PuTTY session

Specify the destination you want to connect to

Serial line: COM4 Speed: 9600

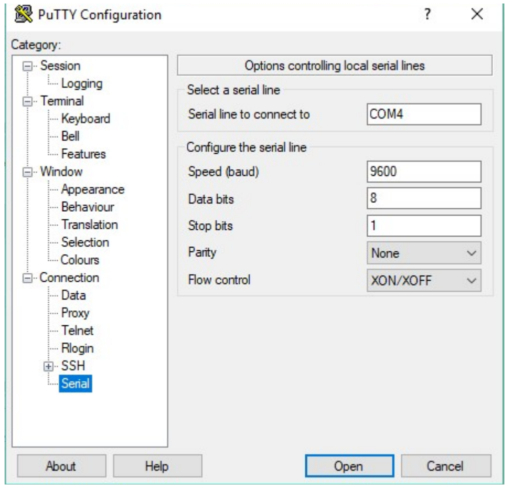
Connection type: Raw Telnet Rlogin SSH [✓ Serial]

Load, save or delete a stored session

Saved Sessions: S5D9 USBX Serial

- Default Settings
- Avnet Demo
- S5D9 Serial
- S5D9 Serial (send and receive)
- S5D9 USBX Serial
- Soracom Demo Raspberry Zero

Close window on exit: Always Never [✓ Only on clean exit]



PuTTY Configuration

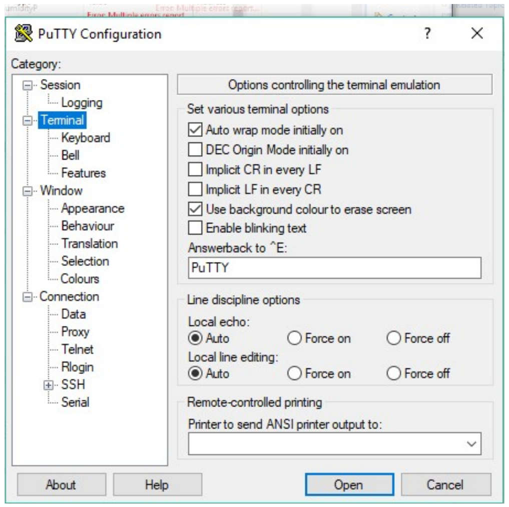
Options controlling local serial lines

Select a serial line

| | |
|---|---|
| Serial line to connect to | COM4 |

Configure the serial line

| | |
|---|---|
| Speed (baud) | 9600 |
| Data bits | 8 |
| Stop bits | 1 |
| Parity | None |
| Flow control | XON/XOFF |



PuTTY Configuration

Options controlling the terminal emulation

Set various terminal options

- [✓] Auto wrap mode initially on
- [ ] DEC Origin Mode initially on
- [ ] Implicit CR in every LF
- [ ] Implicit LF in every CR
- [✓] Use background colour to erase screen
- [ ] Enable blinking text

Answerback to ^E: PuTTY

Line discipline options

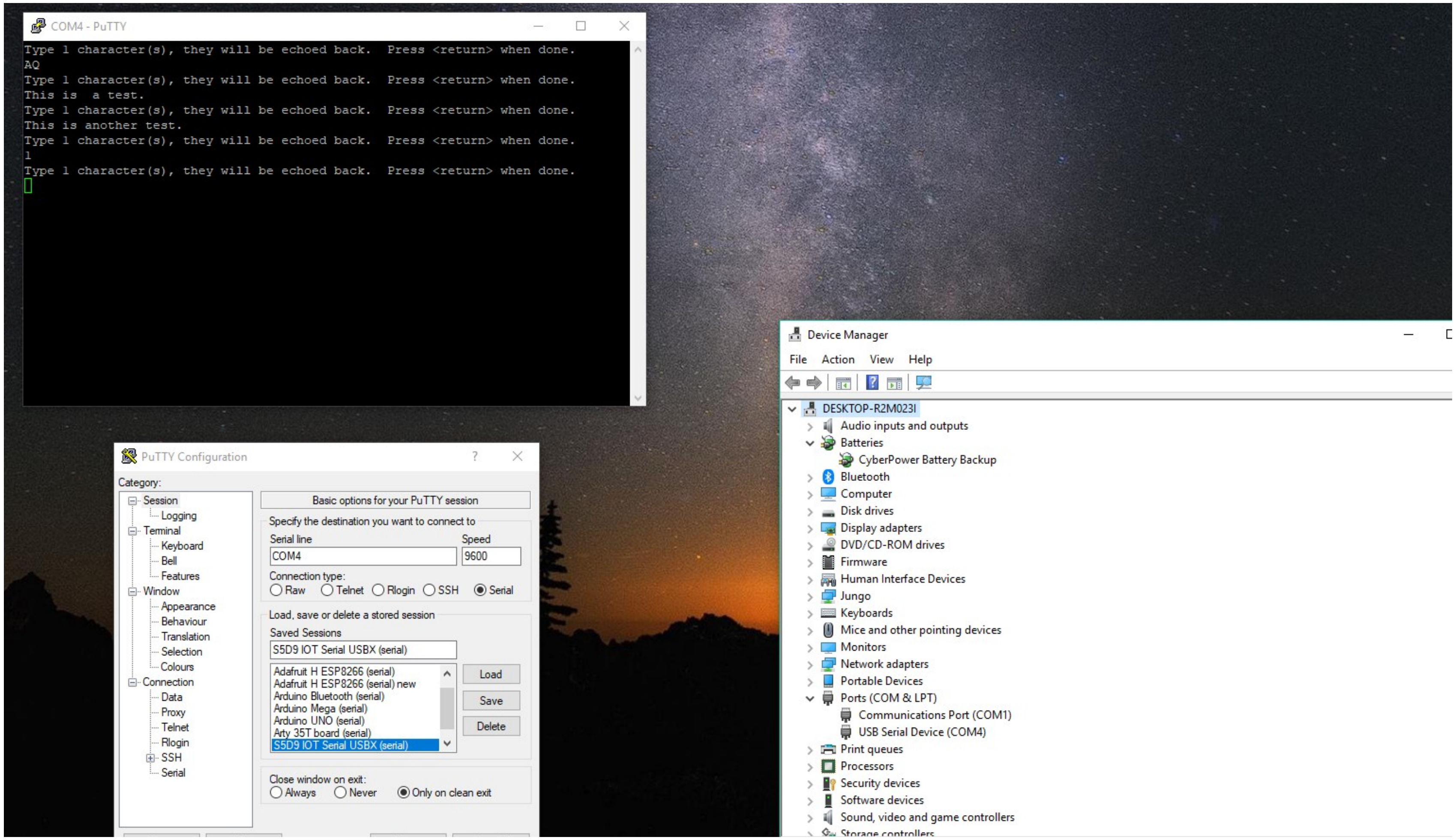
Local echo: [✓ Auto] Force on Force off

Local line editing: [✓ Auto] Force on Force off

Remote-controlled printing

Printer to send ANSI printer output to:

# Run Serial Term Putty



```
Type 1 character(s), they will be echoed back.  Press <return> when done.
AQ
Type 1 character(s), they will be echoed back.  Press <return> when done.
This is  a test.
Type 1 character(s), they will be echoed back.  Press <return> when done.
This is another test.
Type 1 character(s), they will be echoed back.  Press <return> when done.
1
Type 1 character(s), they will be echoed back.  Press <return> when done.
```

PuTTY Configuration — Basic options for your PuTTY session

Serial line: COM4  Speed: 9600

Connection type: Raw / Telnet / Rlogin / SSH / [✓ Serial]

Saved Sessions: S5D9 IOT Serial USBX (serial)

- Adafruit H ESP8266 (serial)
- Adafruit H ESP8266 (serial) new
- Arduino Bluetooth (serial)
- Arduino Mega (serial)
- Arduino UNO (serial)
- Arty 35T board (serial)
- S5D9 IOT Serial USBX (serial)

Close window on exit: Always / Never / [✓ Only on clean exit]

Device Manager — DESKTOP-R2M023I

- Ports (COM & LPT)
  - Communications Port (COM1)
  - USB Serial Device (COM4)