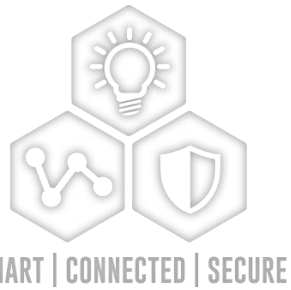
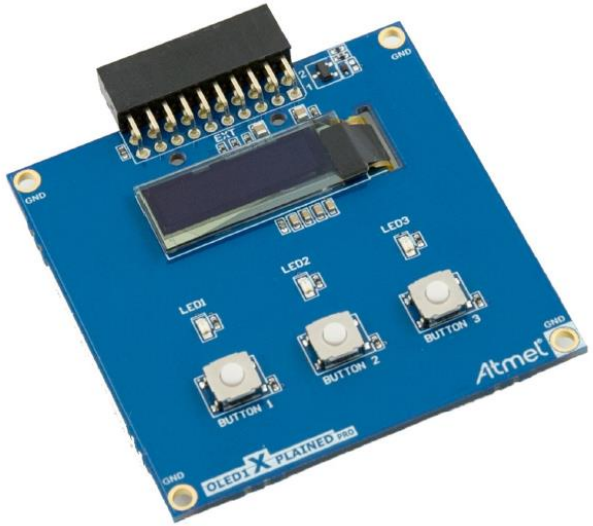
OLED1 Integration

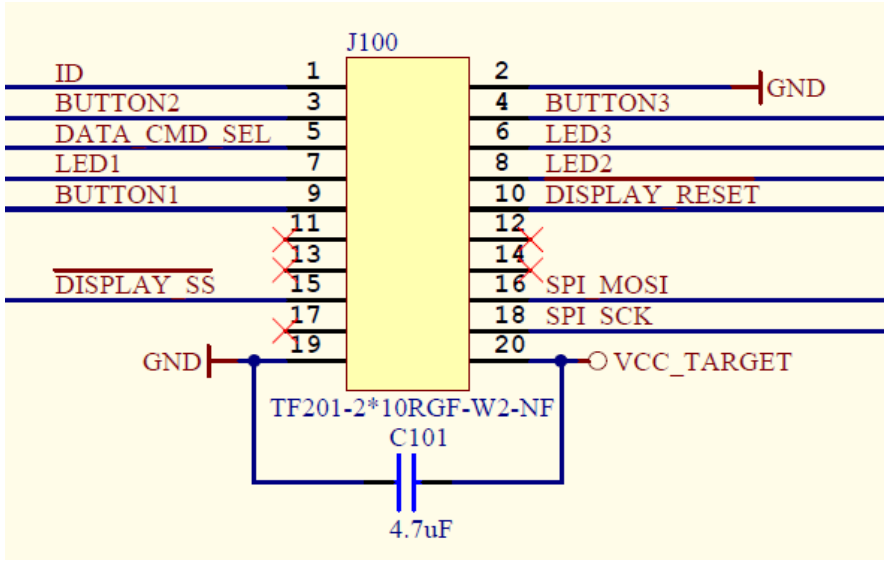
A Leading Provider of Smart, Connected and Secure Embedded Control Solutions

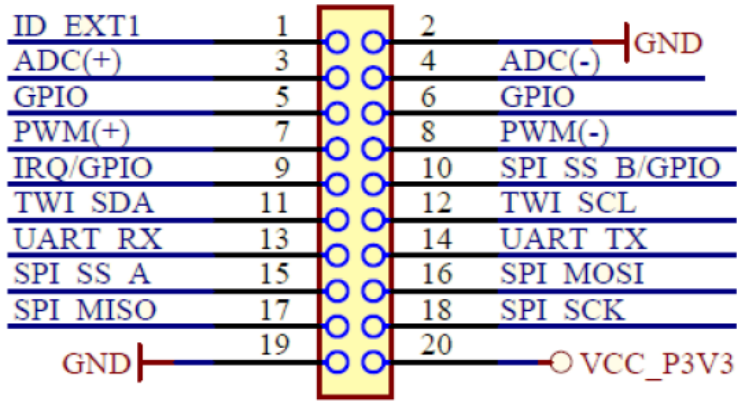


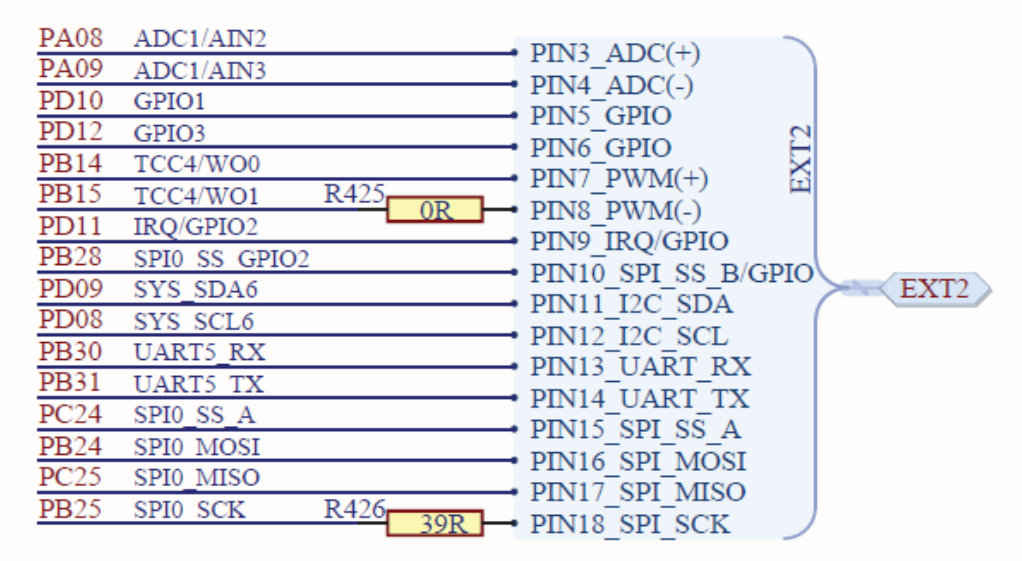
Martin Ruppert

OLED1 Xplained Pro - SSD1306



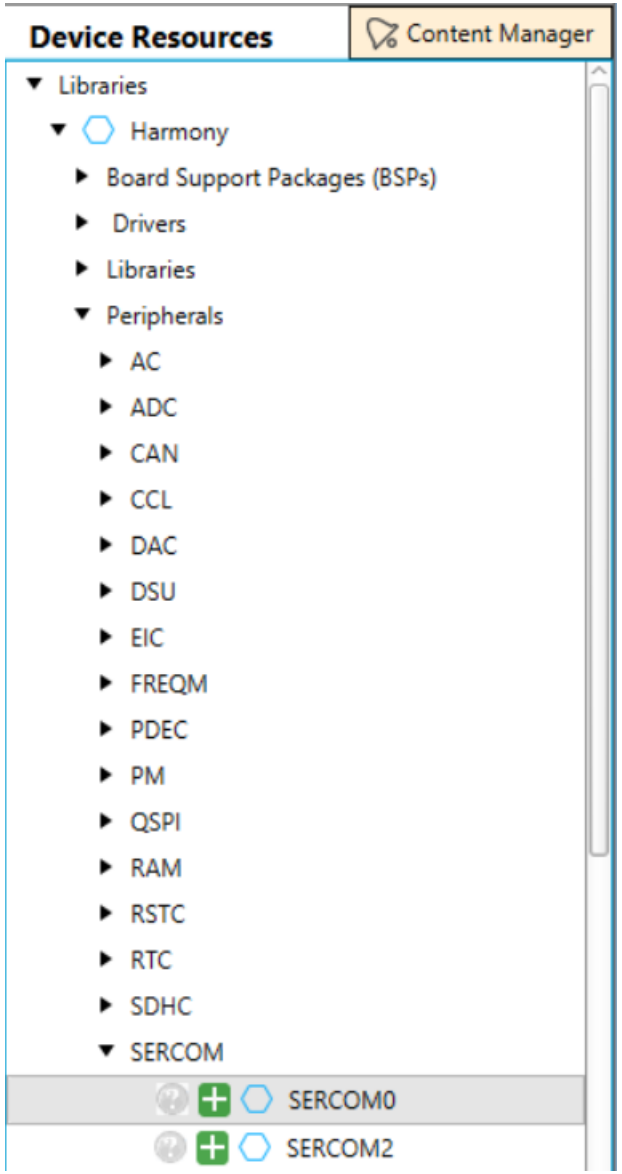






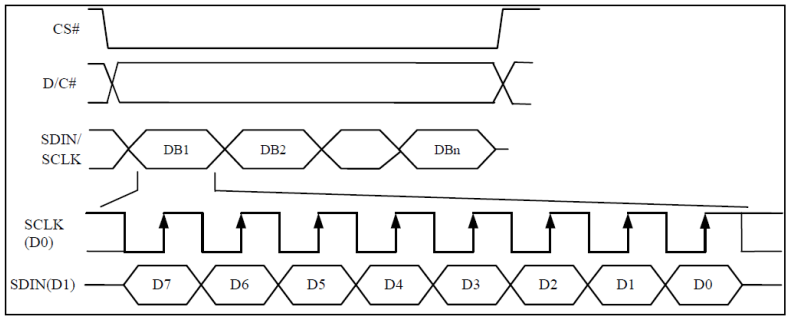
BUTTON2	3	PA08	
BUTTON3	4	PA09	
DATA_CMD_SEL	5	PD10	
LED3	6	PD12	
LED1	7	PB14	
LED2	8	PB15	
BUTTON1	9	PD11	
DISPLAY_RESET	10	PB28	
DISPLAY_SS_N	15	PC24	SPI0_SS_A
SPI_MOSI	16	PB24	SPI0_MOSI
SPI_SCK	18	PB25	SPI0_SCK

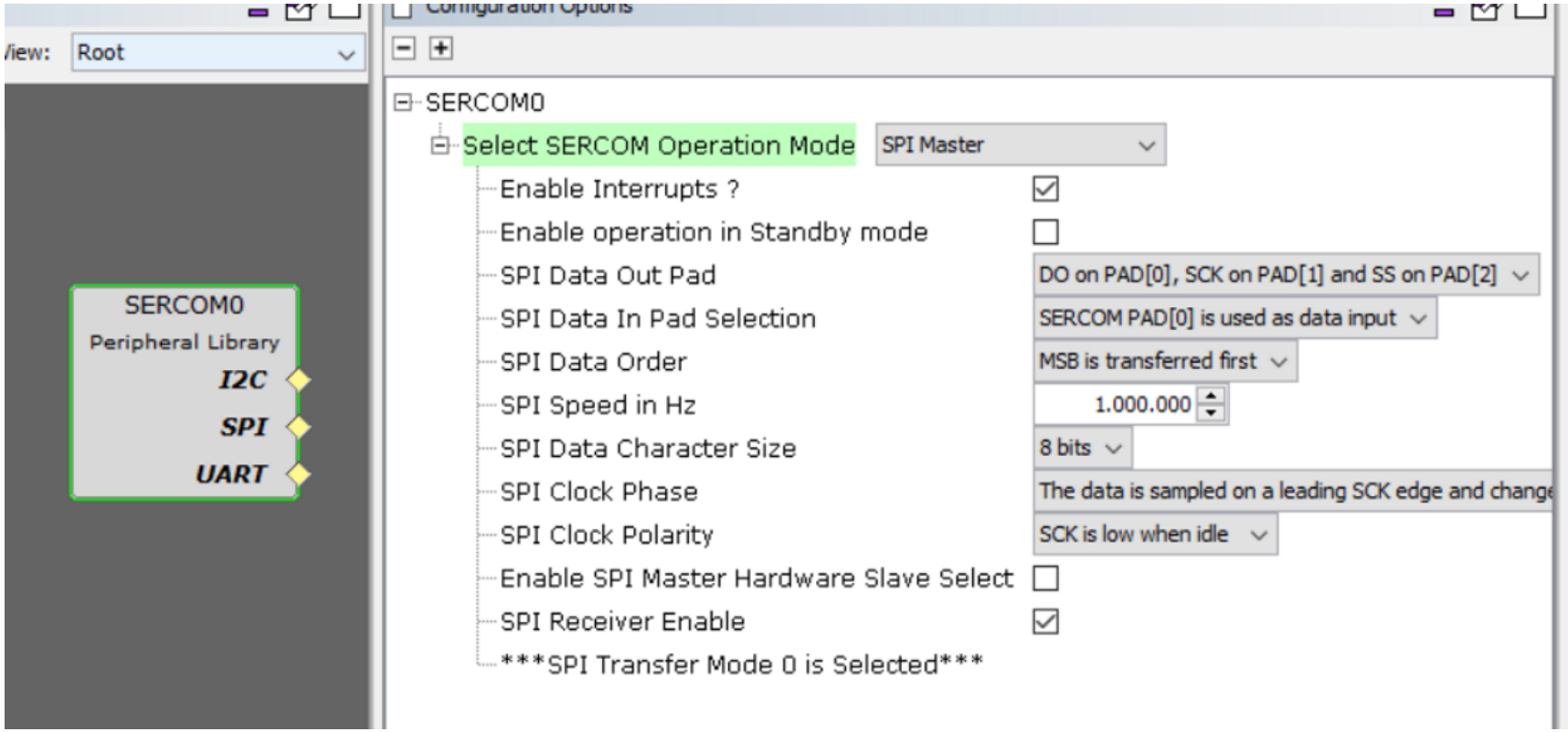
MICROCHIP


Device Resources
Content Manager
Libraries
Harmony
Board Support Packages (BSPs)
Drivers
Libraries
Peripherals
AC
ADC
CAN
CCL
DAC
DSU
EIC
FREQM
PDEC
PM
QSPI
RAM
RSTC
RTC
SDHC
SERCOM
SERCOM0
SERCOM2

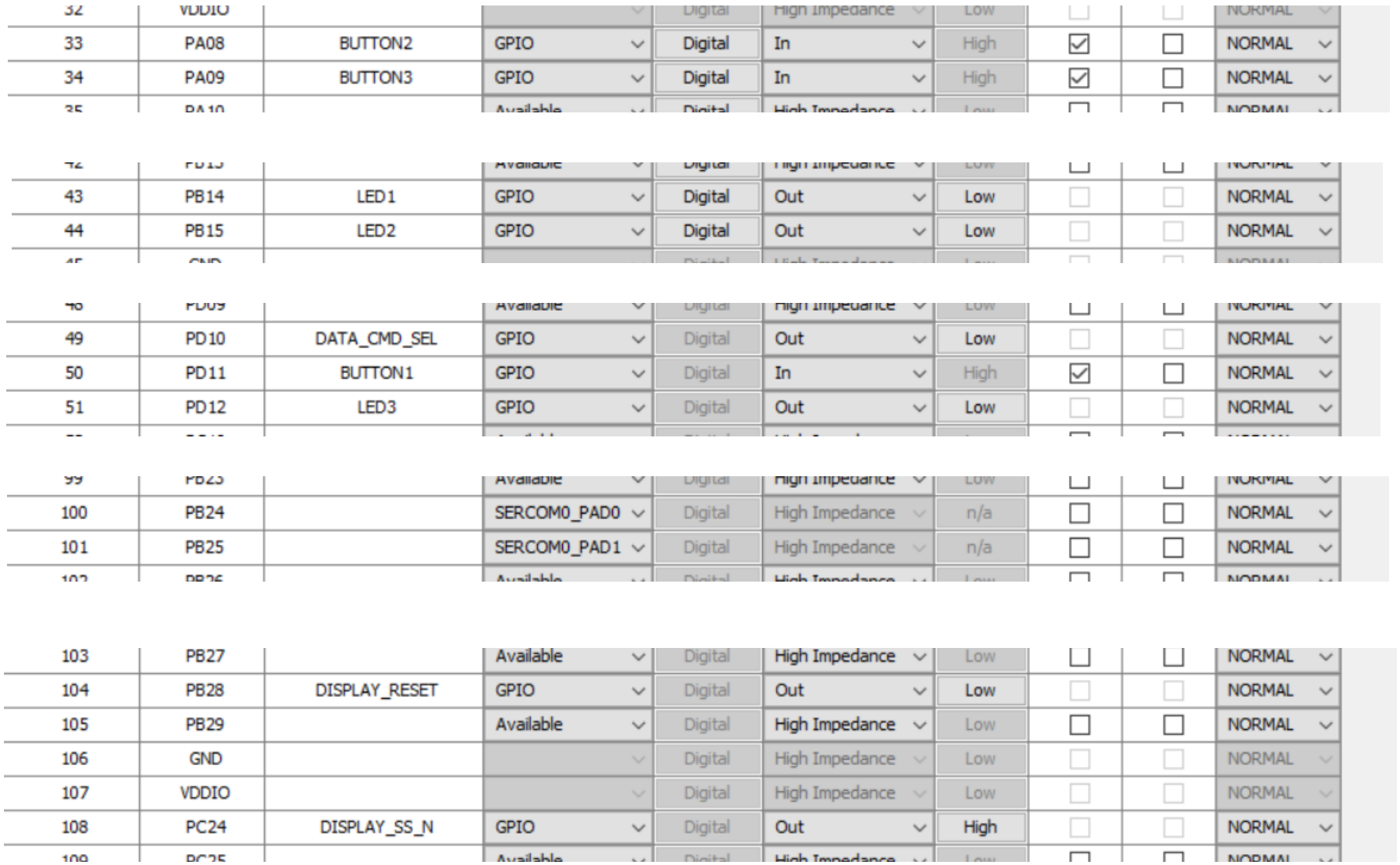
Configure the SERCOM0 with MCC

Figure 8-5 : Write procedure in 4-wire Serial interface mode



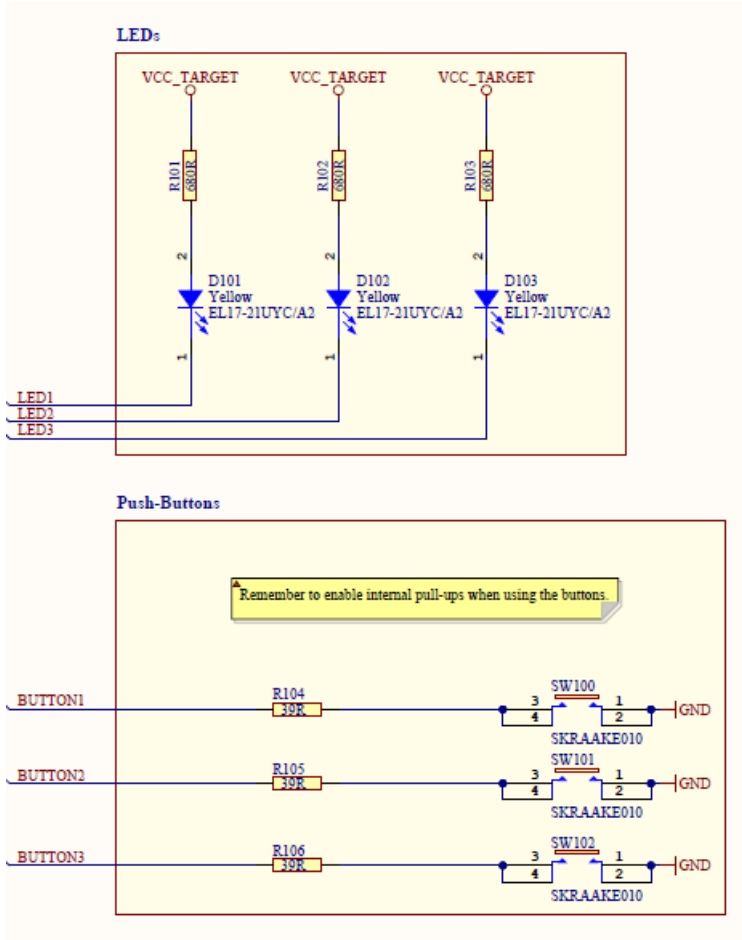


Configure Pins

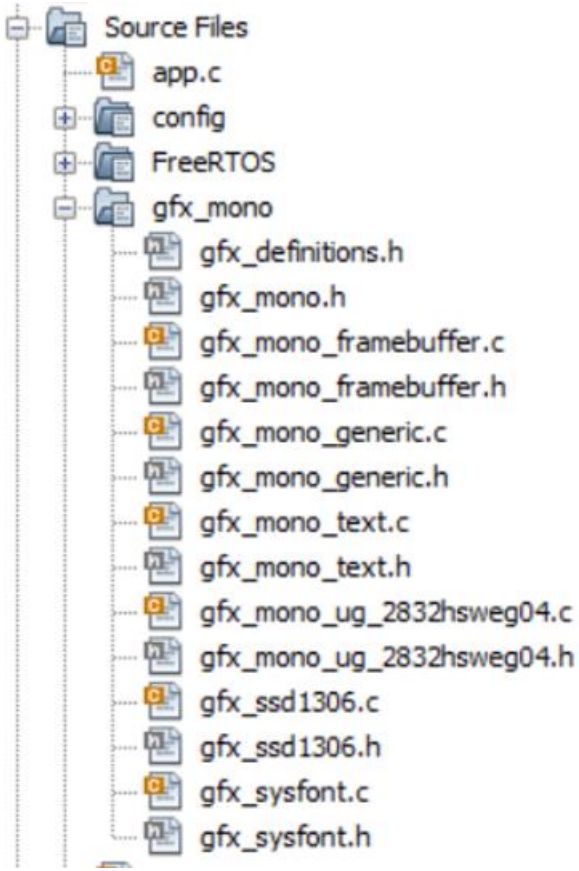


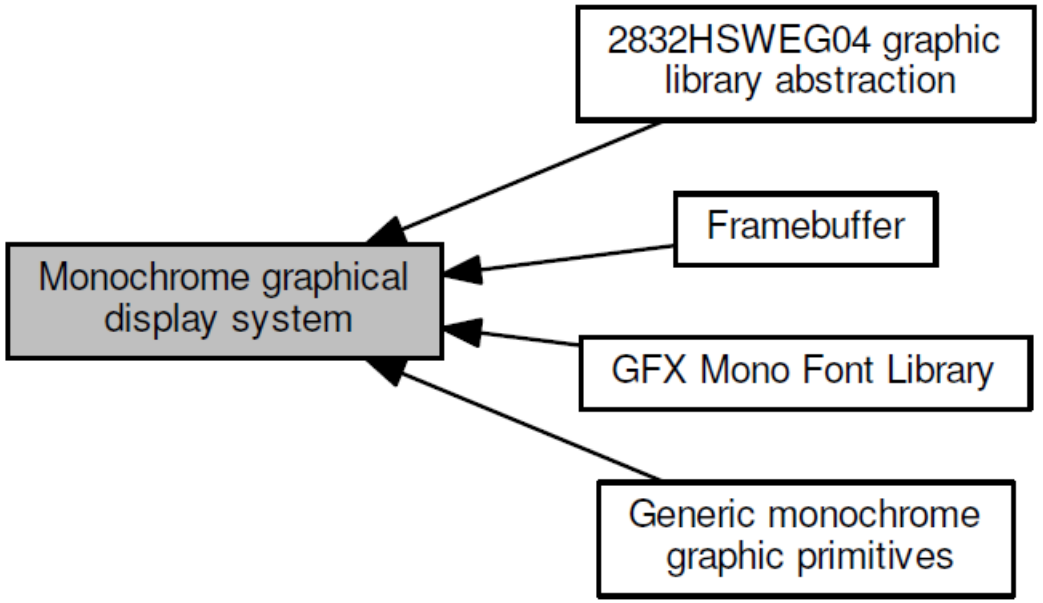
33	PA08	BUTTON2	GPIO	Digital	In	High	☑	☐	NORMAL
34	PA09	BUTTON3	GPIO	Digital	In	High	☑	☐	NORMAL
43	PB14	LED1	GPIO	Digital	Out	Low	☐	☐	NORMAL
44	PB15	LED2	GPIO	Digital	Out	Low	☐	☐	NORMAL
49	PD10	DATA_CMD_SEL	GPIO	Digital	Out	Low	☐	☐	NORMAL
50	PD11	BUTTON1	GPIO	Digital	In	High	☑	☐	NORMAL
51	PD12	LED3	GPIO	Digital	Out	Low	☐	☐	NORMAL
100	PB24		SERCOM0_PAD0	Digital	High Impedance	n/a	☐	☐	NORMAL
101	PB25		SERCOM0_PAD1	Digital	High Impedance	n/a	☐	☐	NORMAL
103	PB27		Available	Digital	High Impedance	Low	☐	☐	NORMAL
104	PB28	DISPLAY_RESET	GPIO	Digital	Out	Low	☐	☐	NORMAL
105	PB29		Available	Digital	High Impedance	Low	☐	☐	NORMAL
106	GND			Digital	High Impedance	Low	☐	☐	NORMAL
107	VDDIO			Digital	High Impedance	Low	☐	☐	NORMAL
108	PC24	DISPLAY_SS_N	GPIO	Digital	Out	High	☐	☐	NORMAL

LED‘s and Buttons



GFX Mono Library





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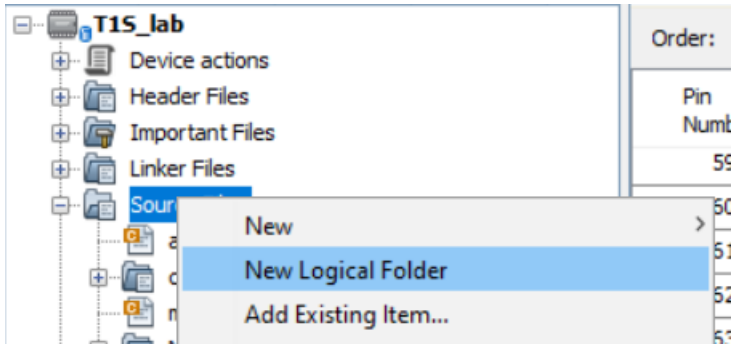
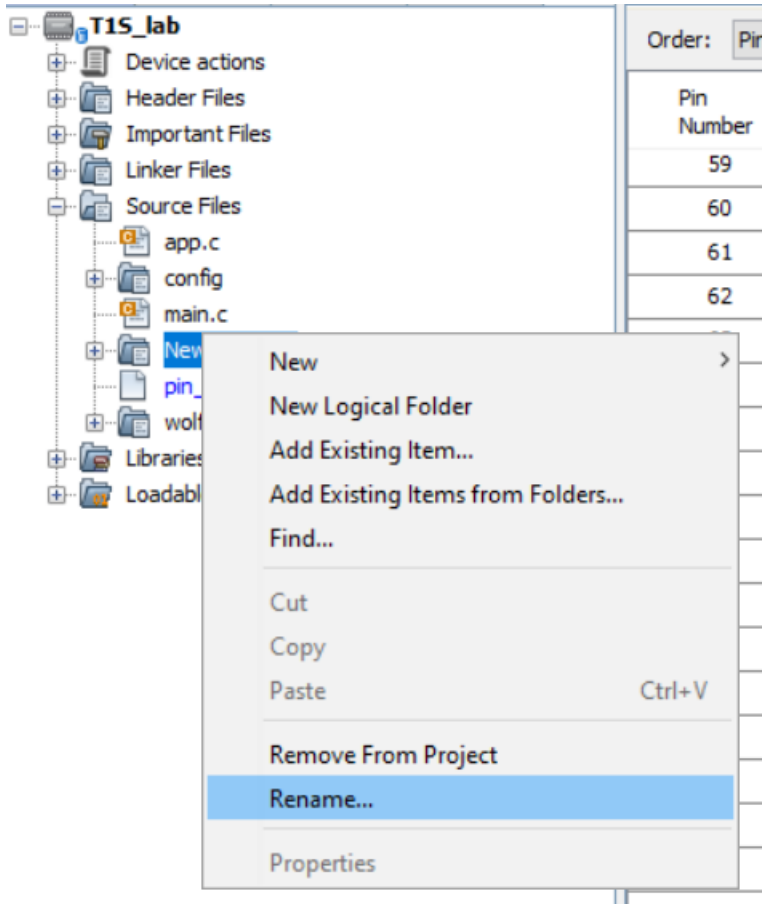
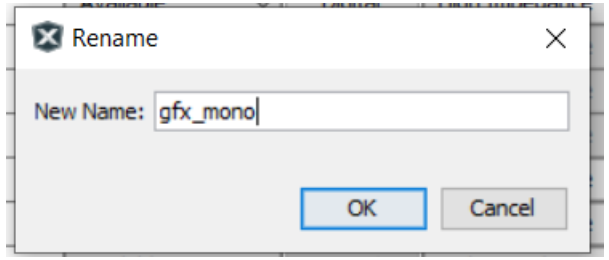
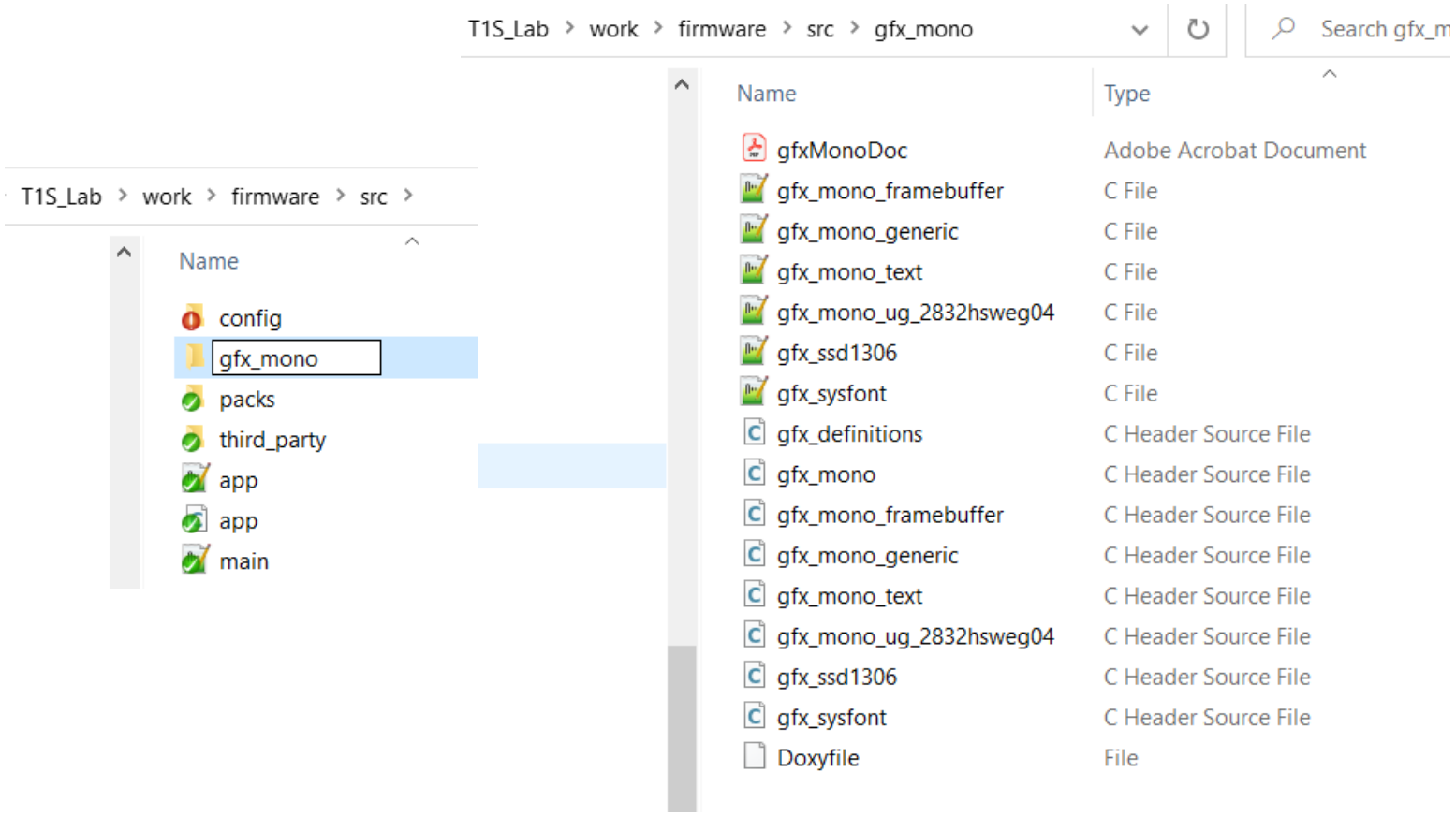
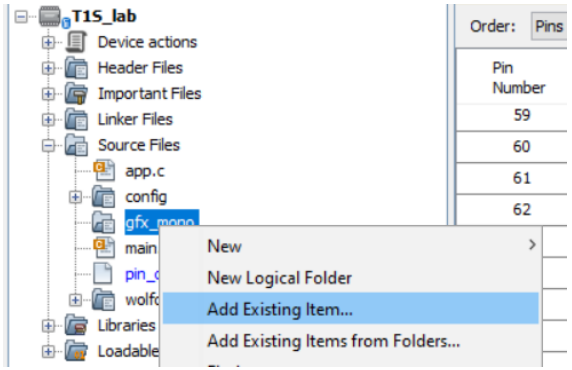

T1S_lab
Device actions
Header Files
Important Files
Linker Files
New
New Logical Folder
Add Existing Item...
Order:
Pin
Numb

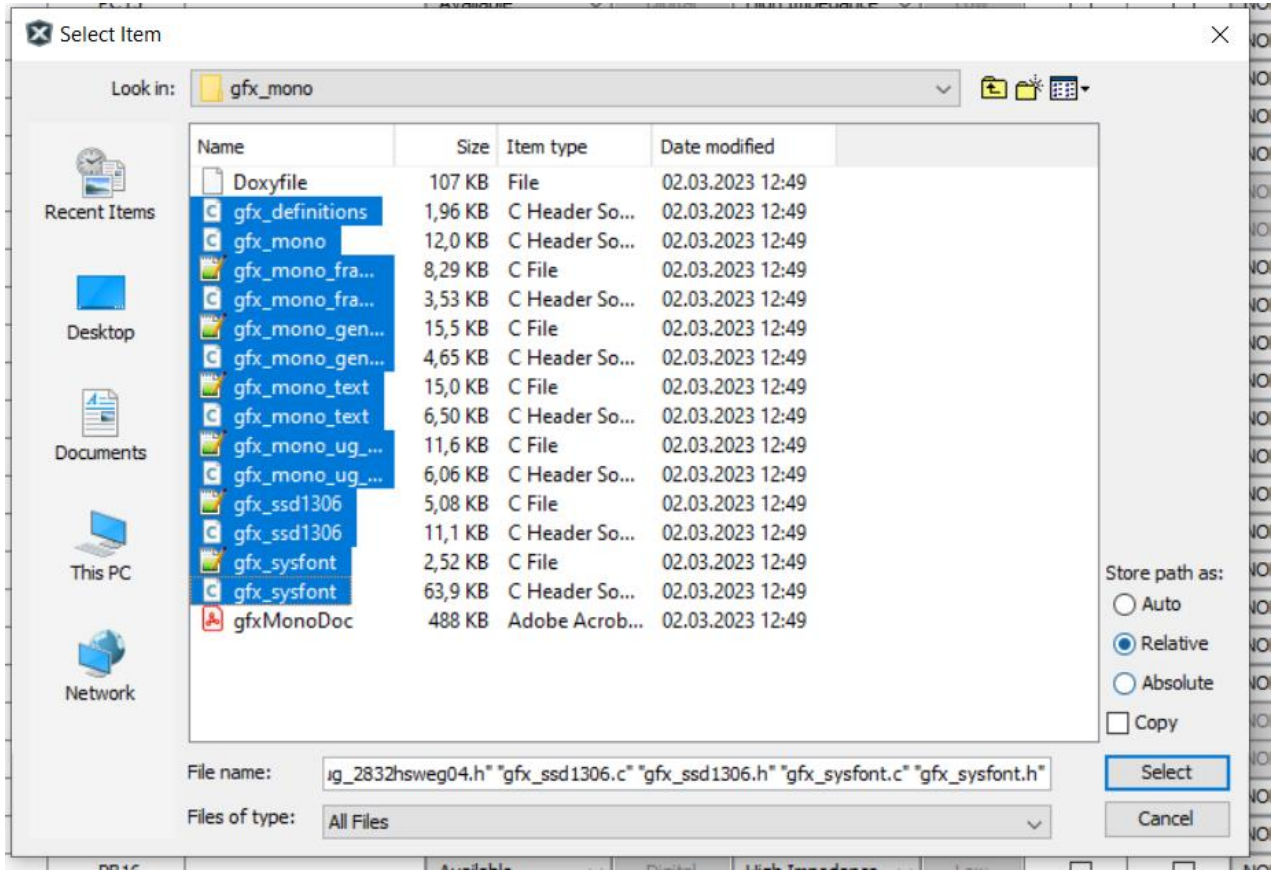

T1S_lab
Device actions
Header Files
Important Files
Linker Files
Source Files
app.c
config
main.c
Libraries
New
New Logical Folder
Add Existing Item...
Add Existing Items from Folders...
Find...
Cut
Copy
Paste
Ctrl+V
Remove From Project
Rename...
Properties
Order:
Pin Number
59
60
61
62

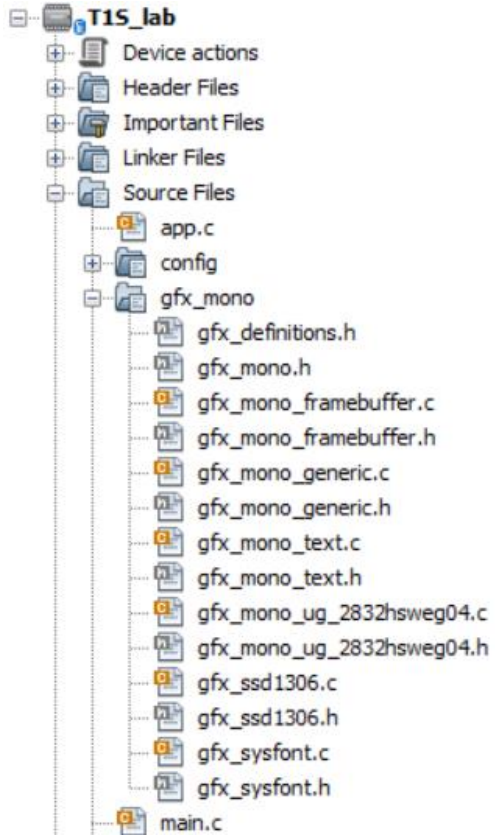

Rename
New Name:
gfx_mono
OK
Cancel

MICROCHIP


T1S_Lab > work > firmware > src > gfx_mono
Search gfx_m
Name
Type
gfxMonoDoc
Adobe Acrobat Document
gfx_mono_framebuffer
C File
gfx_mono_generic
C File
gfx_mono_text
C File
gfx_mono_ug_2832hsweg04
C File
gfx_ssd1306
C File
gfx_sysfont
C File
gfx_definitions
C Header Source File
gfx_mono
C Header Source File
gfx_mono_framebuffer
C Header Source File
gfx_mono_generic
C Header Source File
gfx_mono_text
C Header Source File
gfx_mono_ug_2832hsweg04
C Header Source File
gfx_ssd1306
C Header Source File
gfx_sysfont
C Header Source File
Doxyfile
File
T1S_Lab > work > firmware > src >
Name
config
gfx_mono
packs
third_party
app
app
main


T1S_lab
Device actions
Header Files
Important Files
Linker Files
Source Files
app.c
config
gfx_mono
main
pin_
wolf
Libraries
Loadable
New
New Logical Folder
Add Existing Item...
Add Existing Items from Folders...
Order:
Pins
Pin Number
59
60
61
62


Select Item
Look in:
gfx_mono
Recent Items
Desktop
Documents
This PC
Network
Name
Size
Item type
Date modified
Doxyfile 107 KB File 02.03.2023 12:49
gfx_definitions 1,96 KB C Header So... 02.03.2023 12:49
gfx_mono 12,0 KB C Header So... 02.03.2023 12:49
gfx_mono_fra... 8,29 KB C File 02.03.2023 12:49
gfx_mono_fra... 3,53 KB C Header So... 02.03.2023 12:49
gfx_mono_gen... 15,5 KB C File 02.03.2023 12:49
gfx_mono_gen... 4,65 KB C Header So... 02.03.2023 12:49
gfx_mono_text 15,0 KB C File 02.03.2023 12:49
gfx_mono_text 6,50 KB C Header So... 02.03.2023 12:49
gfx_mono_ug_... 11,6 KB C File 02.03.2023 12:49
gfx_mono_ug_... 6,06 KB C Header So... 02.03.2023 12:49
gfx_ssd1306 5,08 KB C File 02.03.2023 12:49
gfx_ssd1306 11,1 KB C Header So... 02.03.2023 12:49
gfx_sysfont 2,52 KB C File 02.03.2023 12:49
gfx_sysfont 63,9 KB C Header So... 02.03.2023 12:49
gfxMonoDoc 488 KB Adobe Acrob... 02.03.2023 12:49
Store path as:
Auto
Relative
Absolute
Copy
File name:
ıg_2832hsweg04.h" "gfx_ssd1306.c" "gfx_ssd1306.h" "gfx_sysfont.c" "gfx_sysfont.h"
Select
Files of type:
All Files
Cancel


T1S_lab
Device actions
Header Files
Important Files
Linker Files
Source Files
app.c
config
gfx_mono
gfx_definitions.h
gfx_mono.h
gfx_mono_framebuffer.c
gfx_mono_framebuffer.h
gfx_mono_generic.c
gfx_mono_generic.h
gfx_mono_text.c
gfx_mono_text.h
gfx_mono_ug_2832hsweg04.c
gfx_mono_ug_2832hsweg04.h
gfx_ssd1306.c
gfx_ssd1306.h
gfx_sysfont.c
gfx_sysfont.h
main.c

MICROCHIP

Add gxf_mono Glue

\src\gfx_mono\gfx_definitions.h

```
#include "../peripheral/port/plib_port.h"
#include "../peripheral/sercom/spi_master/plib_sercom0_spi_master.h"
#include "../system/time/sys_time.h"

#define GFX_DELAY_FUNCTION(x)   \
   { \
      SYS_TIME_HANDLE tm_hdl; \
      SYS_TIME_DelayMS ( x, &tm_hdl ); \
      while(SYS_TIME_DelayIsComplete(tm_hdl) == false); \
   }

#define GFX_SPI_WRITE_FUNCTION(x,y)      SERCOM0_SPI_Write(x,y)
#define GFX_SPI_IS_BUSY()                SERCOM0_SPI_IsBusy()
#define GFX_DISPLAY_RESET_CLEAR()        DISPLAY_RESET_Clear()
#define GFX_DISPLAY_RESET_SET()          DISPLAY_RESET_Set()
#define GFX_DISPLAY_SS_N_CLEAR()         DISPLAY_SS_N_Clear()
#define GFX_DISPLAY_SS_N_SET()           DISPLAY_SS_N_Set()
#define GFX_DATA_CMD_SEL_CLEAR()         DATA_CMD_SEL_Clear()
#define GFX_DATA_CMD_SEL_SET()           DATA_CMD_SEL_Set()
```

gfx_mono Initialization

Add GFX Init at the end of SYS_Initialize

```
#include "peripheral/port/plib_port.h"
#include "../../gfx_mono/gfx_definitions.h"

void SYS_Initialize ( void* data )
{
    ...
    init system function
    ...


    APP_Initialize();
    NVIC_Initialize();

    gfx_mono_ssd1306_init();
    gfx_mono_print_scroll("LAN867x PLCA Node: %d",DRV_ETHPHY_PLCA_LOCAL_NODE_ID);
    gfx_mono_print_scroll("%s",TCPIP_NETWORK_DEFAULT_MAC_ADDR_IDX0);
    gfx_mono_print_scroll("%s",TCPIP_NETWORK_DEFAULT_IP_ADDRESS_IDX0);

}
```

Wait 1000 milli seconds

```
SYS_TIME_HANDLE tm_hdl;

while(1){
   SYS_TIME_DelayMS ( 1000, &tm_hdl );
   while(SYS_TIME_DelayIsComplete(tm_hdl)==false);
   LED3_Toggle();
}
```

```
SYS_TIME_DelayMS ( 1000, &tm_hdl );
while(1){
   if(SYS_TIME_DelayIsComplete(tm_hdl)==true){
      LED3_Toggle();
      SYS_TIME_DelayMS ( 1000, &tm_hdl );
   }
}
```

Add Virtuel UART Receive Funtion

„send to terminal commands from firmware“

\peripheral\sercom\usart\plib_sercom1_usart.c

```
void SERCOM1_USART_Virtual_Receive(char *str) {
    while (*str!=0) {
        if (SERCOM1_USART_RxPushByte(*str) == true) {
            SERCOM1_USART_ReadNotificationSend();
        }
        str++;
    }
}
```

\peripheral\sercom\usart\plib_sercom1_usart.h

```
void SERCOM1_USART_Virtual_Receive(char *str);
```

Add Button Poll and Action

```
#include "config/default/peripheral/port/plib_port.h"
#include "config/default/peripheral/sercom/usart/plib_sercom1_usart.h"
#include "gfx_mono/gfx_definitions.h"

{
    static int old_but1 = 0;
    int temp_but1 = BUTTON1_Get();
    if (temp_but1 && !old_but1) {
        LED1_Set();
    }
    if (!temp_but1 && old_but1) {
        LED1_Clear();
        SERCOM1_USART_Virtual_Receive("iperf -s\n");
        gfx_mono_print_scroll("iperf TCP server");
    }
    old_but1 = temp_but1;

    static int old_but2 = 0;
    int temp_but2 = BUTTON2_Get();
    if (temp_but2 && !old_but2) {
        LED2_Set();
    }
    if (!temp_but2 && old_but2) {
        LED2_Clear();
        SERCOM1_USART_Virtual_Receive("iperf -s -u\n");
        gfx_mono_print_scroll("iperf UDP server");
    }
    old_but2 = temp_but2;

    static int old_but3 = 0;
    int temp_but3 = BUTTON3_Get();
    if (temp_but3 && !old_but3) {
        LED3_Set();
    }
    if (!temp_but3 && old_but3) {
        LED3_Clear();
        SERCOM1_USART_Virtual_Receive("iperfk\n");
        gfx_mono_print_scroll("iperf kill server");
    }
    old_but3 = temp_but3;
}
```

set programming speed up