

BLDC Sensored:

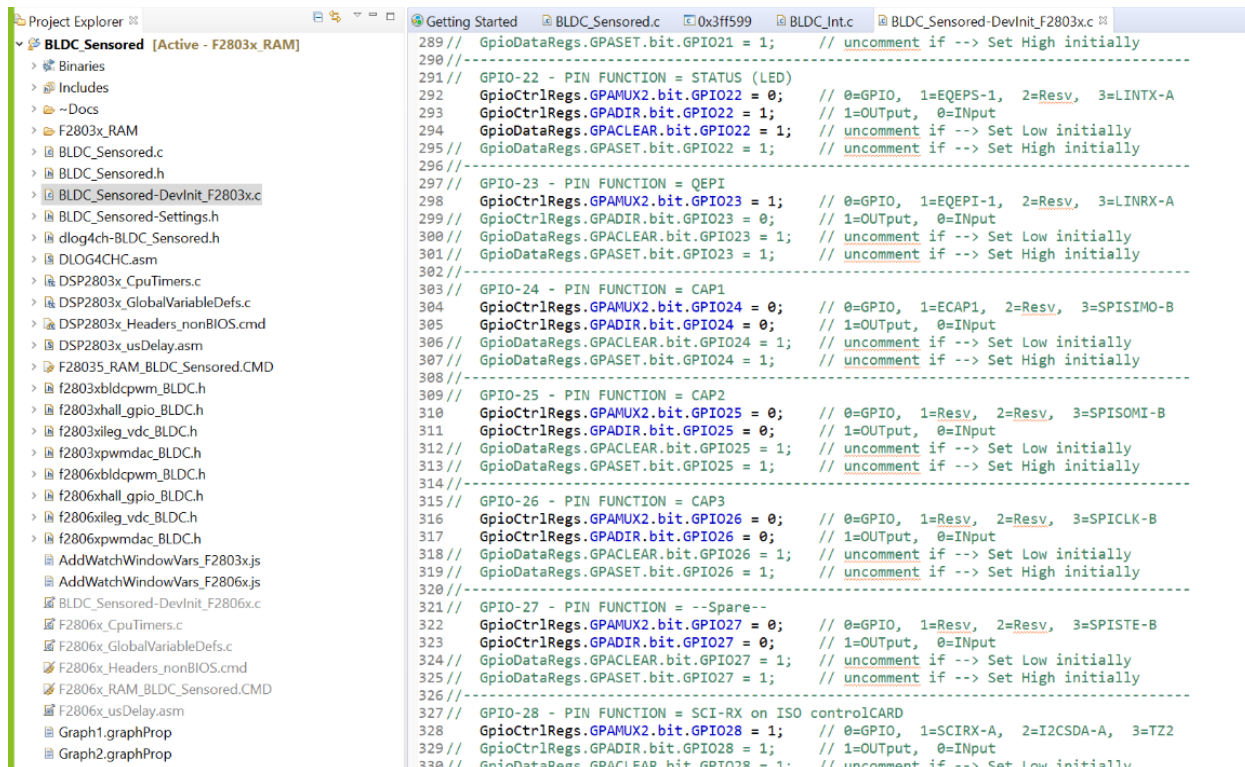
Question related to BLDC sensored:

- 1) Looking at figure 1, the setup of hall input is done for the same GPIO as setup of SPI-B. This does not correspond with the information given in Figure 3, that states that the hall input is set up for GPIO40-42. **Which is correct and can SPI-B be set up at the same time?**
- 2) Also we have tried to input hall signals on the board on J10 and then debug the code (for GPIO24-26), however we are unsure how to see if this is setup correctly when debugging, see Figure 4. **Should we be able to see the signal hall-gpio-bitA, -B & -C?**

Question related to BLDC sensorless:

- 3) Furthermore, setting up BLDC sensorless and trying to debug, we receive the error code 0x3ff8a1, see Figure 6. **What can we do about this?**

Figure 1: GPIO24, -25 & 26 setup (line 303-319):



```
289 // GpioDataRegs.GPASET.bit.GPIO21 = 1; // uncomment if --> Set High initially
290 // -----
291 // GPIO-22 - PIN FUNCTION = STATUS (LED)
292 GpioCtrlRegs.GPAMUX2.bit.GPIO22 = 0; // 0=GPIO, 1=EQEPS-1, 2=Resv, 3=LINTX-A
293 GpioCtrlRegs.GPADIR.bit.GPIO22 = 1; // 1=OUTPUT, 0=INPUT
294 GpioDataRegs.GPACLEAR.bit.GPIO22 = 1; // uncomment if --> Set Low initially
295 // GpioDataRegs.GPASET.bit.GPIO22 = 1; // uncomment if --> Set High initially
296 // -----
297 // GPIO-23 - PIN FUNCTION = QEPT
298 GpioCtrlRegs.GPAMUX2.bit.GPIO23 = 1; // 0=GPIO, 1=EQEPT-1, 2=Resv, 3=LINRX-A
299 // GpioCtrlRegs.GPADIR.bit.GPIO23 = 0; // 1=OUTPUT, 0=INPUT
300 // GpioDataRegs.GPACLEAR.bit.GPIO23 = 1; // uncomment if --> Set Low initially
301 // GpioDataRegs.GPASET.bit.GPIO23 = 1; // uncomment if --> Set High initially
302 // -----
303 // GPIO-24 - PIN FUNCTION = CAP1
304 GpioCtrlRegs.GPAMUX2.bit.GPIO24 = 0; // 0=GPIO, 1=ECAP1, 2=Resv, 3=SPISIMO-B
305 GpioCtrlRegs.GPADIR.bit.GPIO24 = 0; // 1=OUTPUT, 0=INPUT
306 // GpioDataRegs.GPACLEAR.bit.GPIO24 = 1; // uncomment if --> Set Low initially
307 // GpioDataRegs.GPASET.bit.GPIO24 = 1; // uncomment if --> Set High initially
308 // -----
309 // GPIO-25 - PIN FUNCTION = CAP2
310 GpioCtrlRegs.GPAMUX2.bit.GPIO25 = 0; // 0=GPIO, 1=Resv, 2=Resv, 3=SPISOMI-B
311 GpioCtrlRegs.GPADIR.bit.GPIO25 = 0; // 1=OUTPUT, 0=INPUT
312 // GpioDataRegs.GPACLEAR.bit.GPIO25 = 1; // uncomment if --> Set Low initially
313 // GpioDataRegs.GPASET.bit.GPIO25 = 1; // uncomment if --> Set High initially
314 // -----
315 // GPIO-26 - PIN FUNCTION = CAP3
316 GpioCtrlRegs.GPAMUX2.bit.GPIO26 = 0; // 0=GPIO, 1=Resv, 2=Resv, 3=SPICLK-B
317 GpioCtrlRegs.GPADIR.bit.GPIO26 = 0; // 1=OUTPUT, 0=INPUT
318 // GpioDataRegs.GPACLEAR.bit.GPIO26 = 1; // uncomment if --> Set Low initially
319 // GpioDataRegs.GPASET.bit.GPIO26 = 1; // uncomment if --> Set High initially
320 // -----
321 // GPIO-27 - PIN FUNCTION = --Spare--
322 GpioCtrlRegs.GPAMUX2.bit.GPIO27 = 0; // 0=GPIO, 1=Resv, 2=Resv, 3=SPISTE-B
323 GpioCtrlRegs.GPADIR.bit.GPIO27 = 0; // 1=OUTPUT, 0=INPUT
324 // GpioDataRegs.GPACLEAR.bit.GPIO27 = 1; // uncomment if --> Set Low initially
325 // GpioDataRegs.GPASET.bit.GPIO27 = 1; // uncomment if --> Set High initially
326 // -----
327 // GPIO-28 - PIN FUNCTION = SCI-RX on ISO controlCARD
328 GpioCtrlRegs.GPAMUX2.bit.GPIO28 = 1; // 0=GPIO, 1=SCIRX-A, 2=I2CSDA-A, 3=T2Z
329 // GpioCtrlRegs.GPADIR.bit.GPIO28 = 1; // 1=OUTPUT, 0=INPUT
330 // GpioDataRegs.GPACLEAR.bit.GPIO28 = 1; // uncomment if --> Set Low initially
```

Figure 2: configure GPIO24, -25 & -26 as inputs (line 104-106)

```
workspace_v7 - CCS Edit - BLDC_Sensored/f2803xhall_gpio_BLDCh - Code Composer Studio
File Edit View Navigate Project Run Scripts Window Help
Project Explorer
BLDC_Sensored [Active - F2803x_RAM]
  Binaries
  Includes
  ~Docs
  F2803x_RAM
  BLDC_Sensored.c
  BLDC_Sensored.h
  BLDC_Sensored-Devinit_F2803x.c
  BLDC_Sensored-Settings.h
  dlog4ch-BLDC_Sensored.h
  DLOG4CHC.asm
  DSP2803x_CpuTimers.c
  DSP2803x_GlobalVariableDefs.c
  DSP2803x_Headers_nonBIOS.cmd
  DSP2803x_usDelay.asm
  F28035_RAM_BLDC_Sensored.CMD
  f2803xblldcpwm_BLDCh
  f2803xhall_gpio_BLDCh
  f2803xileg_vdc_BLDCh
  f2803xpwmdac_BLDCh
  f2806xblldcpwm_BLDCh
  f2806xhall_gpio_BLDCh
  f2806xileg_vdc_BLDCh
  f2806xpwmdac_BLDCh
  AddWatchWindowVars_F2803x.js
  AddWatchWindowVars_F2806x.js
  BLDC_Sensored-Devinit_F2806x.c
  F2806x_CpuTimers.c
  F2806x_GlobalVariableDefs.c
  F2806x_Headers_nonBIOS.cmd
  F2806x_RAM_BLDC_Sensored.CMD
  F2806x_usDelay.asm
  Graph1.graphProp
  Graph2.graphProp
  IQmath_fpu32.lib
Getting Started BLDC_Sensored.c 0x3ff599 BLDC_Int.c BLDC_Sensored-Devinit_F2803x.c f2803xhall_gpio_BLDCh
82         0xFFFF, \
83         0, \
84         -10, \
85     }
86
87 /*-----
88 Target Independent Default Initializer HALL3 Object
89 -----*/
90 #define HALL3_DEFAULTS F2803XHALL3
91
92 /*-----
93 HALL3_INIT Macro Definition
94 -----*/
95 #define HALL3_INIT_MACRO(v) \
96 \
97     EALLOW; /* Enable EALLOW*/ \
98     /* Configure ECAP1/2/3 as GPIO-inputs (GPIO24/25/26) for Piccolo B*/ \
99     GpioCtrlRegs.GPAMUX2.bit.GPIO24 = 0; /* GPIO24 is ECAP1 - A */ \
100    GpioCtrlRegs.GPAMUX2.bit.GPIO25 = 0; /* GPIO25 is ECAP2 - B */ \
101    GpioCtrlRegs.GPAMUX2.bit.GPIO26 = 0; /* GPIO26 is ECAP3 - C */ \
102 \
103    /* Config GPIO24/25/26 as inputs*/ \
104    GpioCtrlRegs.GPADIR.bit.GPIO24 = 0; /* GPIO24 is ECAP1 - A */ \
105    GpioCtrlRegs.GPADIR.bit.GPIO25 = 0; /* GPIO25 is ECAP2 - B */ \
106    GpioCtrlRegs.GPADIR.bit.GPIO26 = 0; /* GPIO26 is ECAP3 - C */ \
107    EDIS; /* Disable EALLOW*/ \
108 \
109    HALL3_DETERMINE_STATE_MACRO(v) \
110    v.HallGpioBuffer = v.HallGpio; /* Init with current ECAP/GPIO logic levels*/ \
111    v.HallGpioAccepted = v.HallGpio; /* Init with current ECAP/GPIO logic levels*/ \
112 \
113 /*-----
114 HALL3_DETERMINE_STATE Macro Definition
115 -----*/
116 Uint32 temp;
117 Uint16 HallGpioBitA,HallGpioBitB,HallGpioBitC;
118
119 #define HALL3_DETERMINE_STATE_MACRO(v) \
120 \
121 /* temp.2-0 = GPIO26.GPIO25.GPIO24 */ \
122 temp = (GpioDataRegs.GPADAT.all>>24)&0x00000007; /* read all three GPIOs at once*/ \
123 \
```

Figure 3: GPIO information From “DRV830x-HC-C2-KIT Hardware Reference Guide”.

4.1 Resource Allocation

The Fig 5 shows the various stages of the board in a block diagram format and illustrates the major connections and feedback values that are being mapped to the C2000 MCU. Table 2, below lists these resources.

J1 Pin no.	GPIO	Signal Name	Function (DRV8301/DRV8302)
23	GPIO-00	PWM_AH	DRV830x Phase AH PWM input
73	GPIO-01	PWM_AL	DRV830x Phase AL PWM input
24	GPIO-02	PWM_BL	DRV830x Phase BH PWM input
74	GPIO-03	PWM_BL	DRV830x Phase BL PWM input
25	GPIO-04	PWM_CH	DRV830x Phase CH PWM input
75	GPIO-05	PWM_CL	DRV830x Phase CL PWM input
26	GPIO-06	DAC_PWM4	PWM DAC
76	GPIO-07	STOP	Push button input
28	GPIO-08	DAC_PWM3	PWM DAC
78	GPIO-09	START	Push button input
29	GPIO-10	DAC_PWM1	PWM DAC
79	GPIO-11	DAC_PWM2	PWM DAC
33	GPIO-12	LED-1	User LED
83	GPIO-13	OCTWn	Over-temperature warning
84	GPIO-14	FAULTn	Over-current fault
34	GPIO-15	LED-2	User LED
38	GPIO-16	SPI-SIMO	Isolated SPI Interface
88	GPIO-17	SPI-SOMI	Isolated SPI Interface
39	GPIO-18	SPI-CLK	Isolated SPI Interface
89	GPIO-19	SPI-STE	Isolated SPI Interface
40	GPIO-20	QEPA	Encoder A
90	GPIO-21	QEPB	Encoder B
41	GPIO-22	STATUS	User LED
91	GPIO-23	QEPI	Encoder Index
35	GPIO-24	SDI	SPI Data In/M_DC
85	GPIO-25	SDO	SPI Data Out/GAIN
36	GPIO-26	SCLK	SPI ClockDC_ADJ
86	GPIO-27	/SCS	/SCS/M_PWM
44	GPIO-30	CAN-RX	Isolated CAN Interface
94	GPIO-31	CAN-TX	Isolated CAN Interface
30	GPIO-40	CAP1	Hall Input 1
80	GPIO-41	CAP2	Hall Input 2
31	GPIO-42	CAP3	Hall Input 3
81	GPIO-43	DC-CAL	Short DC current sense amplifier inputs to ground, calibrate offset
59	ADC-A1	IA-FB	Current sense phase A

Figure 4: Running debugger

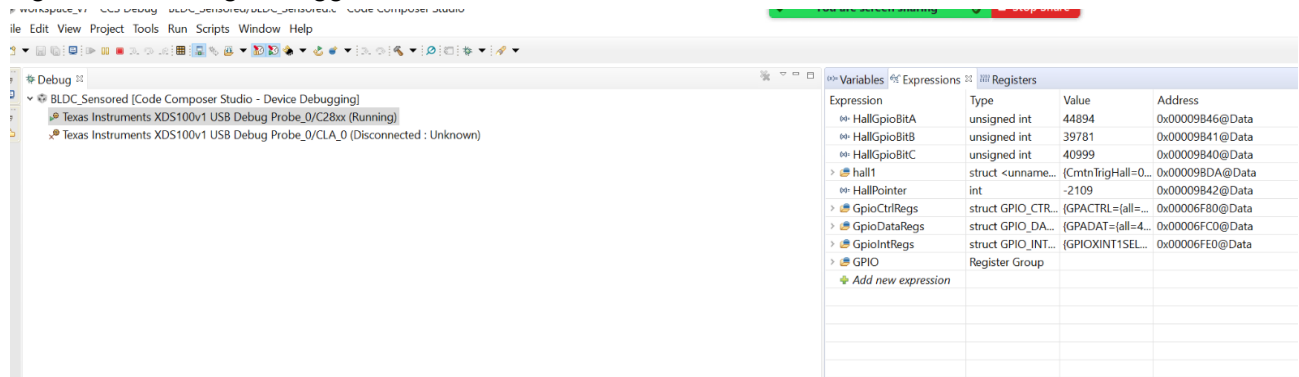
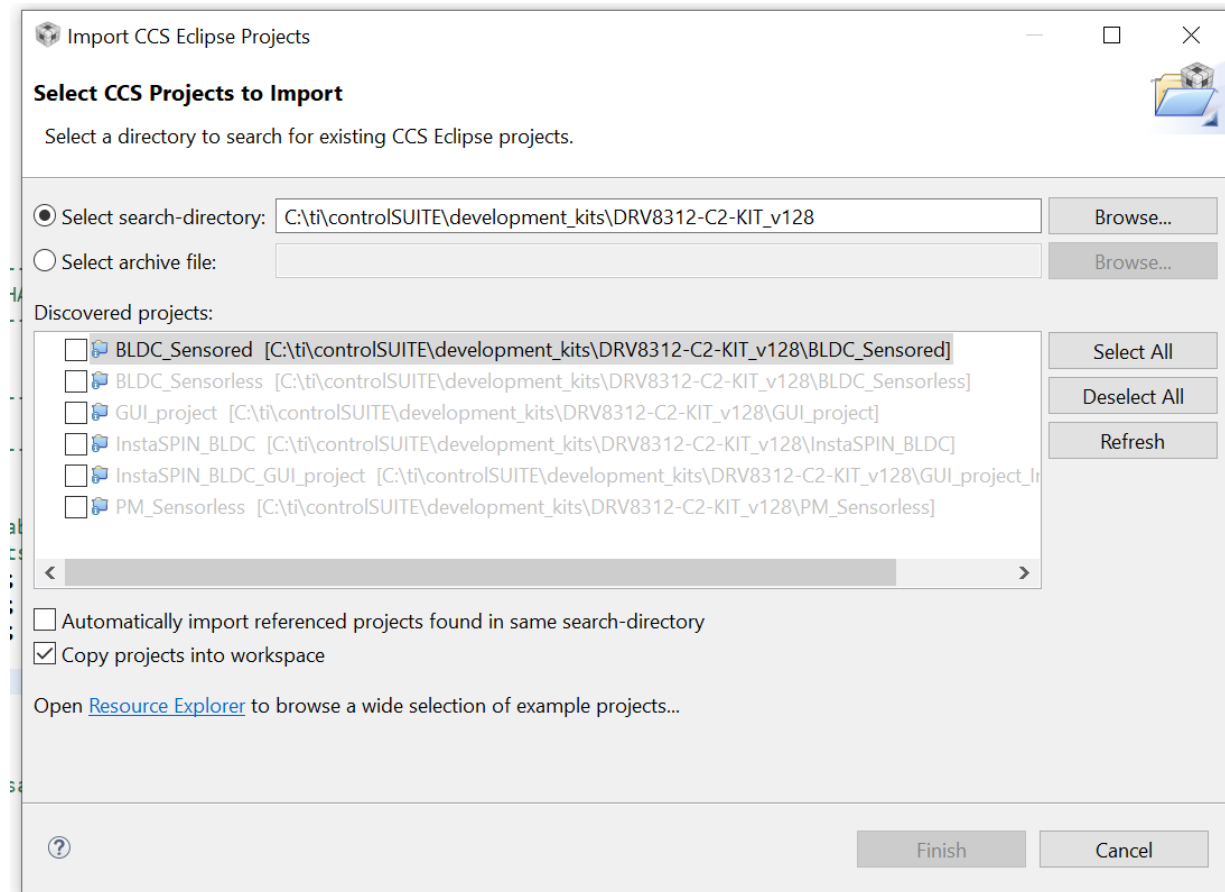


Figure 5: The project chosen



BLDC Sensorless:

Figure 6: Error code (0x3ff8a1) when debugging BLDC_sensorless

