Guide of building flexio_camera_hal_test

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Overview

The flexio_camera_hal driver is developed based on TWR- K80F150M board. So if you want to make sure the flexio_camera_hal driver is working well, you had better to run the “flexio_camera_hal_test” example code actully. This example would demo a case that display the image, captured by camera, in LCD.

However, the origin TWR- K80F150M board can not support the flexio_camera_hal_test profectly. Some rework would be done to the board so that enough flexio pins are laid out to the TWR-ELEV socket. Additionally, a TWR-LCD board would be used as the display device, a TWR-PROTO board with OV7670 camera would be used to generate the camera data.

Hardware Preparation

The totoal hardware system are assembled with: a TWR-K80F150M board, a TWR-LCD board, a TWR-PROTO board with OV7670 camera module and a set of TWR-ELEV (both Primary and Secondary) board, as shown in Figure 1.

Figure 1 Total hardware system overview

The TWR-K80 board

The origin TWR- K80F150M board can not support the flexio_camera_hal_test profectly. Some rework would be done to the board so that enough flexio pins are laid out to the TWR-ELEV socket. For detailed rework, please see to table 1.

Note: The default debug UART (LPUART1) and SDRAM could not be used, since there are confictions of pin usage.

Table 1 Rework on TWR-K80 for flexio_camera_hal example

		MCU pin	MCU function	TWR-ELEV	Camera OV7670	Comment
FlexIO HW config	**FlexIO data pins**	PTD8	FXIO0_D24	A7	D0	R189 removed
		PTD9	FXIO0_D25	A8	D1	R190 removed
		PTD10	FXIO0_D26	C38	D2	R295 populated, R114 removed
		PTD11	FXIO0_D27	C37	D3	R299 populated, R49 removed
		PTD12	FXIO0_D28	D40	D4	R113 populated, R52 removed
		PTD13	FXIO0_D29	D39	D5	R112 populated, R56 removed
		PTD14	FXIO0_D30	D38	D6	R111 populated, R81 removed
		PTD15	FXIO0_D31	D37	D7	R110 populated, R101 removed
	FlexIO timer 0 trigger	PTA12	FXIO0_D18	B62	HREF	
	FlexIO timer 0 input pin	PTB1	FXIO0_D1	A37	PCLK	
I2C2 HW config		PTA10	I2C2_SDA	C8	SCCB_SIOD	
		PTA11	I2C2_SCL	C9	SCCB_SIOC	
GPIO HW config		PTA13	FXIO_D19	B61	VSYNC	
CLKOUT HW config		PTC3	CLKOUT	A64	XCLK	R143 populated, R187 removed
FlexBUS HW config	**FlexBUS data/address pins**	PTB18	FB_AD16	B67		
		PTB17	FB_AD15	B66		
		PTC0	FB_AD14	A66		
		PTC1	FB_AD13	A67		
		PTC2	FB_AD12	A68		
		PTC4	FB_AD11	A69		
		PTC5	FB_AD10	A70		
		PTC6	FB_AD9	A71		
		PTC7	FB_AD8	A72		R30 removed
		PTC8	FB_AD7	A73		
		PTC9	FB_AD6	A74		
		PTC10	FB_AD5	A75		R203 removed
		PTD2	FB_AD4	A76		
		PTD3	FB_AD3	A77		
		PTD4	FB_AD2	A78		
		PTD5	FB_AD1	A79		
		PTD6	FB_AD0	A80		
	FlexBUS R/W pin	PTC11	FB_RW	B71		R195 removed
	FlexBUS ALE pin	PTD0	FB_ALE	B63		
	FlexBUS chip select pin	PTD1	FB_CS0	B64		

The TWR-LCD board

The TWR-LCD is used to display the image that captured by camera. In fact, the data from the camera comes so many and fast, it is hard to check them one by one just by our eyes. However, when we use the LCD display device, only a glance at the screen is necessary for every data.

Note:

1. The TWR-LCD should be attached to the TWR-ELEV Primary baord, as shown in Figure 2. If attaching to TWR-ELEV Secondary board, no connection would be available.

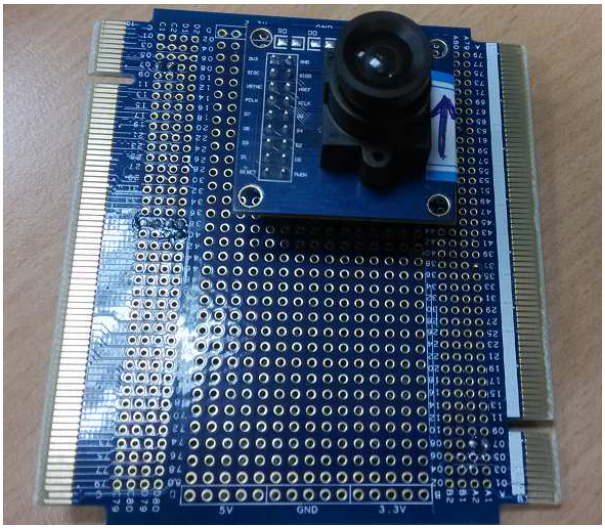
2. The switchers SW1 on TWR-LCD would be “ON-OFF-ON-OFF-ON-OFF-ON-OFF”, as shown in Figure 3.

Figure 2 TWR-LCD in flexio_camera_hal_test application

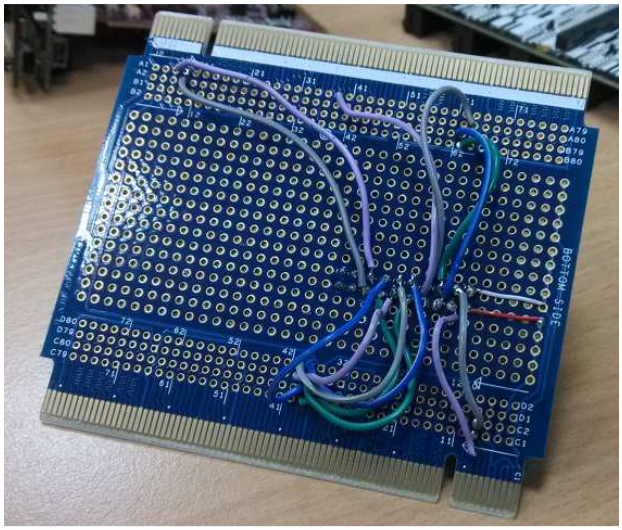
Figure 3 TWR-LCD SW1 configuration

The TWR-PROTO board with OV7670

There is no TWR-CAMERA board, so we need to DIY it with TWR-PROTO board and OV7670 camera module. The OV7670 can be boughted from electric pruduct market. Then some connection should be done on TWR-PROTO board between OV7670 socket and TWR-ELEV socket, as shown in Table 1. The finshed prduct is shown as Figure 4.



Front side of TWR-PROTO with OV7670



Back side of TWR-PROTO with OV7670

Figure 4 TWR-PROTO board with OV7670 module

Software Preparation

The application of flexio_camera_hal_test example's source code is assembled mainly with ksdk_platform_lib, lcd (SSD1289) driver, camera (OV7670) driver and application code. Except the ksdk_platform_lib which is provided generally by KSDK, most application related code files are located in "flexio_camera_hal_test" directory.

When you want to compiled the application, there are some steps should followed:

1. Run the generator to generate the project files for each IDE, like IAR and KEIL project. We will use IAR to demo how to organize *these* source files.

2. Open the project "flexio_hal_test" located in "<ksdk_root_dir>\platform\hal\src\flexio\test\iar\twrk80f150m".

3. Add all the source files located in "<ksdk_root_dir>\platform\hal\src\flexio\test\src\flexio_camera_hal_test" into "flexio_hal_test" project. Do add the fsl_flexio_hal.h/c and fsl_flexio_camera_hal.h/c if they are not included into the ksdk_platform_lib. Then the project's workspace would be shown as the Figure 5.

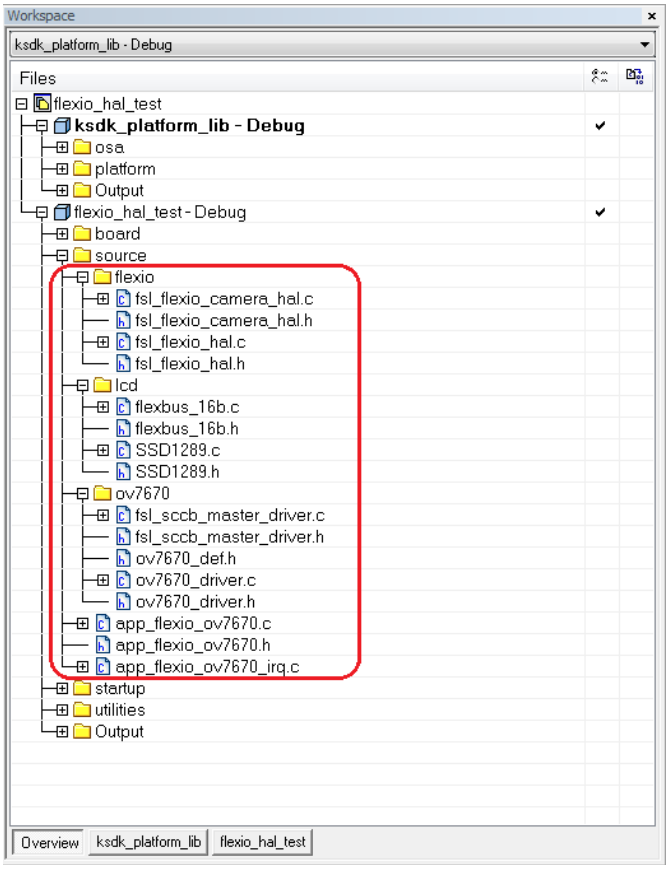


Figure 5 Workspace of flexio_camera_hal_test project

4. Add include path for additional source files, as shown in Figure Figure 6.

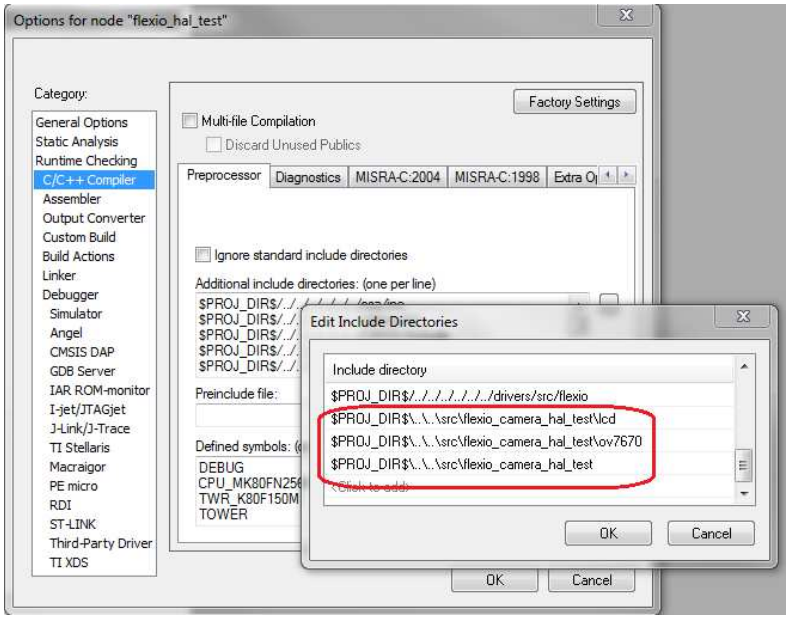


Figure 6 Add include path in flexio_camera_hal_test project

Note: Only KEIL and IAR are supported to build the project in current version.