Brooklyn Board by Silica Architech Documentation

Release .0

Silica

Mar 16, 2017

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Silica Brooklyn Board is useful system to evaluate MAXIM Pmod device and is designed for use with Freescale TWR-K70F120M tower system **This software release is working with MQX4.0 Rtos**

You can find and download TWR-K70 documentation by clicking:

http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=TWR-K70F120M&tid=m32TWR

Firmware application was developed with CodeWarrior MCU v10.3 Special Edition. It's strongly recomended to use Codewarrior 10.3 to build this project.

No MQX installation is required. Project contain all MQX resources needed for full functionalitty.

Codewarrior v10.3 Special Edition is free downlodable from Freescale site. Go to: http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=CW-MCU10&fpsp=1&tab=Design_Tools_Tab

Codewarrior v10.3 Special Edition is also downlodable here

Please for download select "offline" package. (note that download can take much time ...)

We suggest you to read the Quick Start Guide to setup your evaluation system

Quick start guide

This guide explains how to use this application and provides an overview of on the structure of the project firmware

CHAPTER 1

Installing Codewarrior on WIN7 or WIN8

 $Double \ click \ on \ `CW_MCU_v10.3_b121211_SE_Offline.exe' \ that \ you \ have \ downloded \ first, \ and \ follow \ installation \ istruction.$

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Quick start guide for Codewarrior install can be found at http://cache.freescale.com/files/soft_dev_tools/doc/ quick_ref_guide/MCU_QS.pdf?fpsp=1

When setup ask for MCU type, select almost Kinetis as show below, then press NEXT button

CodeWarrior Development Student	dio for Microcontrollers 🗕 🗆 🗙						
Choose Components Choose which features of CodeWarrior Development Studio for Microcontrollers v10.3 you want to install.							
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.							
Select components to install:							
Descripti	ion						
Space required: 2.1GB Position descripti	your mouse over a component to see its on,						
Freescale Semiconductor, Inc							
	< Back Next > Cancel						

If you have Windows7 or Windows8 (32 or 64 bit) Codewarrior will install into "Freescale\CW MCU v10.3" folder on the root of your system HDD.



and create a default work folder named workspace in the path C:\Users\ your_user_name \workspace

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make shure that setup have been installed Jungo Driver. See your system configuration (righ-click on Computer -> Properties -> Device Manager)

if you have any troubles about, read Codewarrior install Guide

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Codewarrior on WINXP

For WinXP, after installation, you have:

• installation folder

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• default work folder in c:\Documents and Settings\ your_user_name \workspace



• Jungo driver:

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CHAPTER 2

Quick start guide

Hardware requirements

- Tower system for Kinetis K70F120M (with TWR-SER expansion)
- Mini USB type-B cable
- Silica BrooklynBoard
- PC with at least one RS232 serial port and terminal software (two serial port for MAX3232 emulation)
- RS232 DB9 serial cable (modem type)
- Maxim Analog Essential Collection



Software requirements

- CodeWarrior MCU v10.3 Special Edition (download here).
- Brooklyn Board application firmware for TWR-K70F120M system (download here)

Hardware setup

• Assemble tower system TWR-K70F120M and Brooklin Board as in figure below.



Don't care slot position, but be careful to connect Primary and Secondary connector properly. Take care at reference signed near PCI board connectors.



• Plug a Pmod Device (i.e. DS3231M Real Time Clock) inside properly connector.



-> Be careful to see device reference next to connector. Each connector is designed for one or more devices and

will only accept dedicated modules.

• Plug Mini USB type-B cable into Cpu Board plug and connect to PC with Codewarrior. TWR power led will on.



• If you see device tab, you will find OSBDM/OSJTAG debug port. If it doesn't occour, **unplug USB cable, start Codewarrior and then plug USB cable**. Tower system will be found and OSBDM/OSJTAG driver will be loaded. Close Codewarrior suite.

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• plug the standard serial DB9 cable into serial connector on Tower System

• connect serial cable to terminal PC (equipped with terminal SW)



• On your terminal PC setup COMx parameter:

speed = 115200 baud data with = 8 parity = none stop bit = 1 flow control = none

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Now you are ready for install FW project.

Brooklyn Board MQX FW setup

• In the root of your HDD C:\ create new folder named "**Pmqx**".

Important: Pay attention that the pathname is case-sensitive

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• Unzip all files from Pmod_MQX.zip into the folder C:\Pmqx just created

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• If you have already opened Codewarrior, exit and restart it. The "Workspace launcher" tab will open. Clik on "brouse" button.

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Use this a	s the default and do not ask again OK Cancel	

• navigate and select C:\Pmqx as workspace, then click OK

192	Workspace Launcher	
Select a workspace	Select Workspace Directory	×
CodeWarrior Development S Choose a workspace folder t	Select the workspace directory to use.	
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Now we could see the welcome window of Codewarrior Developement Suite

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New Project Wizard	What's New Product Release Notes	
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maybe will open firewall popup as below



if yes, left-clik on enable access and proceed

• close the welcome window by clicking 'X' in the Welcome tab



Now we can see the Codewarrior main window

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		>

Codewarrior is ready to setup MQX project

IMPORTING AND BUILDING MQX LIBRARY

 Navigate to C\Pmqx\config\twrk70f120m\cw10 and drag the file twrk70f120m.wsd into Codewarrior Project window



BSP and PSP library (needed for this project) will be loaded automatically



Now you can see library in Project Window.

BUILDING MQX LIBRARY

• Click on hammer icon (with green star) red-circled as in figure below



• BSP and PSP library are now ready for the project

<u>p</u>		C/C++ -	CodeWarrior Development Studi	io
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IMPORTING Pmod1_6 FIRMWARE

• Select File -> Import and click

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• in the next tab select "Existing Project into Workspace" and click "NEXT"

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Select Create new projects	from an archive file or directory.	Ľ
Select an import sou type filter text	rce: File Projects into Workspace em ices ir t Development Environment kpert halysis	
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- in the next window make the following step
- 1 click on **Brouse** button.
- 2 select folder "C:\Pmqx\Pmod1_6" as below.
- 3 click on OK button.

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	> 🔒 shell	~
	Cartella: Pmod1_6 Crea nuova cartella OK	Annulla .::

- select checkbox "Pmod1_6(C:\Pmqx\Pmod1_6)
- click "Finish"

)e	Import	- 🗆 🗙
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Select root directory:	C:\Pmqx\Pmod1_6	Browse
○ Select archive file:		Browse
Projects:		
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		Deselect All
		Refresh
Copy projects into w	orkspace	
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Add project to work	cing sets	
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The firmware Pmod1_6 will be imported

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		Select root directory:	C:\Pmqx\Pmod1_6	Browse
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		Pmod1_6 (C:\Pr	nqx\Pmod1_6)	Select All
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				Refresh
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A Commander 🛙	1			
▼ Project Creation ▼ Settings ≥ Import project	js	?	< Back Next > Finish	Cancel

BUILDING Pmod1_6 FIRMWARE

 see Codewarrior Project tab and select the project "Pmod1_6", move mouse cursor on the right side an arrow will appear. Click on arrow and a popup menu will open. Check "Pmod_MQX_FlashRam_debug" and click over



File Edit Search Project Run MQX Tools PEM	icro Processor Expert Window Help
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File Name	Build
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E Pmod1_6 : Pmod_MQX_FlashRam_debug Spsp_twrk70f120m : Debug	New
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	Open in New Window
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	Index >
	Build Configurations
	Make Targets
	Build Project
	Clean Project
	Conv Ctrl+C

• select "Pmod1_6" project and right click over, select "Clean Project" and click

when process finish, click on single-hammer icon or righ-click over the project and select "build" to build entire project

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	Open in New Window
	Preprocess
	Disassemble
	Index +
	Build Configurations
	Make Targets
	Build Project
	Clean Project
	Copy Ctrl+C
	Paste Ctrl+V
	💢 Delete
	Move

See the "problems" tab. There are 20 warnings because of file C_Events.c has same function as Events.c in BSP library. This is normally in MQX and doesn't make trouble

🔝 Problems 🛛 📮 Console					
0 errors, 20 warnings, 0 others					
Description	Resource	Path	Location	Туре	
a 🚯 Warnings (20 items)					
🔈 identifier 'char_t' redeclared	Pmod1_6		line 54, extern	C/C++ Probl	
🔈 Symbol AD1_OnMeasurementComplete mult	Pmod1_6			C/C++ Probl	
🔈 Symbol calloc multiply defined in libc_Thum	Pmod1_6			C/C++ Probl	
😘 Symbol Cpu_OnLLSWakeUpINT multiply defi	Pmod1_6			C/C++ Probl	
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🔈 Symbol FIFO_timer_OnInterrupt multiply defi	Pmod1_6			C/C++ Probl	
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🔈 Symbol XI2C_OnError multiply defined in C_E	Pmod1_6			C/C++ Probl	
🔈 Symbol XI2C_OnMasterBlockReceived multip	Pmod1_6			C/C++ Probl	
🔈 Symbol XI2C_OnMasterBlockSent multiply de	Pmod1_6			C/C++ Probl	
🔈 Symbol XSPCI_OnBlockReceived multiply def	Pmod1_6			C/C++ Probl	
🔈 Symbol XSPCI_OnBlockSent multiply defined	Pmod1_6			C/C++ Probl	
🔈 Symbol XSPCI_OnError multiply defined in C	Pmod1_6			C/C++ Probl	

Click on **bug** icon red-circled. Popup menu will open. Select "Pmod1_6_MQX_FLASH_RAM_debug" and click

1	C/C++ - CodeWarrior
File Edit Search Project Run MQX Tools Proces	ssor Expert Window Help

• Click again "bug" icon and debug will start with firmware download

during firmware download this tab will open

Brooklyn Board by Silica Architech Documentation, Release .0

19		Debug - Co	deWarrior Developmen	t Studio		_ 🗆 X
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and when download finish you see the main debug windows of Codewarrior

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Thread [ID: 0x10001] (Suspended: Signal 'Process Suspended' received. Description: Process	kernel_data	0x1fff34a0	0x1fff4590
2_mqx_idle_task() idletask.c:b2 0x0000d492	Ø active_connector	0x0	0x1fff3334
 I_task_exit_function_internal() task.ci29/0 0x0000bcoc Throad [ID: 0x10002] (Supponded) Signal 'Process Supponded' received. Description: Process 	(x)= valtick	0x0	0x1fff32cc v
Thread [10: 0x10003] (Juspended, Signal Process Suspended Teceived, Description, Process 5 DummyEn10 dispatch S-177 0x00000/156	<		>
\equiv 4 time delay internal() time.c:542 0x0000b332			~
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idletask.c ⊠	- 0)	😅 Disassembly 🛿	- 0
56 volatile KERNEL_DATA_STRUCT_FTR kernel_data;	^	Enter location here	 <!--</th-->
		62 if (++kern	el data->IDLE LOOP.IDLE L ^
50GEI_KERNEL_DAIA(Kernel_data);		0000d484: ldr r0,[sp,#0]	
60 while (1) {		0000d486: ldr r0,[r0,#0x33	34]
61#if !defined(MQX ENABLE IDLE LOOP) MQX ENABLE IDLE LOOP		0000d48a: adds r1,r0,#1	
<pre>62 if (++kernel_data->IDLE_LOOP.IDLE_LOOP1 == 0) {</pre>		0000d48c: 1dr r0,[sp,#0]	241
63 if (++kernel_data->IDLE_LOOP.IDLE_LOOP2 == 0) {		♦ 00000492: 1dr r0 [sp #0]	
64 if (++kernel_data->IDLE_LOOP.IDLE_LOOP3 == 0) {		0000d494: 1dr r0,[r0,#0x33	341
65 ++kernel_data->IDLE_LOOP.IDLE_LOOP4;		0000d498: cmp r0,#0	-
67) /* Endif */		0000d49a: bne _mqx_idle_ta	ask+0xc (0xd484); 0x0000d4
68 } /* Endif */		63 if (++	kernel_data->IDLE_LOOP.ID
69 #endif		0000d49c: ldr r0,[sp,#0]	
70 #if MQX_ENABLE_LOW_POWER		0000d49e: 1dr r0, [r0, #0x33	18]
71 if (parameter)		000004422: adds r1,r0,#1	
72 {		000004446: str r1.[r0.#0x33	181
73 _ASM_SLEEP();		0000d4aa: ldr r0,[sp,#0]	
74 } 75 Hondif		0000d4ac: ldr r0,[r0,#0x33	88]
76	~	0000d4b0: cmp r0,#0	~
	>	<	>
💫 Commander 🛛 👘 🐨 🖓 🐨 🖓 🔛 😨 Console 🖄		■ X ¾	🚂 🖉 🚝 🛃 🖛 🗂 🗝 🗖
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			×
		1	

to start program you can press "F8" or click on Icon red-circled in image above

NOTE: for full Codewarrior functionallity please refer to Freescale Official Guide

download here Codewarrior Guide

Running Brooklyn Board MQX FW

When you start program, in terminal window you can see for few seconds this screen



this screen will inform about task init and task start

then, you see the Pmod start screen

rs232_115200 - HyperTerminal	 ×
File Edit View Call Transfer Help	
//////////////////////////////////////	
Connected 00.01.19 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

and after you can see the main menu



Now select device menu (typing selection key in the terminal window) and follow menu option to test device.

It' strongly recomended to change or insert Pmod Modules when Tower System is off (without power).

Then, turn off the power by disconnecting the Mini USB B-type cable, remove device (if present) and insert new module in properly connector.

Turn on the power by plug the Mini USB B-type cable. The program will restart. No reload from debug console is needed. Follow same steps used before to test new device

CHAPTER $\mathbf{3}$

Firmware details

Brookling Board firmware comes from original Maxim Maxim Zenboard Platform project revision 1.6, by using the file listed below.

Main project files from Maxim

- MaximPmod.c
- menu.c.
- maximDeviceSpecificUtilities.c
- platform.c
- utilities.c

and related include files

- MaximPmod.h
- menu.h
- maximDeviceSpecificUtilities.h
- platform.h
- utilities.h
- platform_config.h

You can find all this file in the "Source" folder of the project

General include files

• xbasic_types.h

- xgpio.h
- xgpio_l.h
- xiic_l.h
- xil_assert.h
- xil_cache.h
- xil_io.h
- xil_types.h
- xparameters.h
- xparameters_ps.h
- xpseudo_asm.h
- xpseudo_asm_gcc.h
- xpseudo_asm_rctv.h
- xreg_cortex9.h
- xspi.h
- xspi_i.h
- xspi_l.h
- xstatus.h
- xuartlite.h
- xuartlite_i.h
- xuartlite_l.h
- xuartps_hw.h

You can find all this file in the "Source\x_files" folder of the project

l 🔁 🚺 = 1	x_file	25		- • ×
File Home Condividi \	/isualizza			~ (
🔄 ∋ 👻 ↑ 퉺 > Abe > Wo	rkMQX → Pmod_MQX → Pmod1_6 → S	Sources → x_files v C	Cerca x_files	م
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〕 Download	🛒 xgpio.h	09/05/2013 18.14	File H	9 KB
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👌 Musica	📓 xil_types.h	09/05/2013 18.14	File H	5 KB
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	📓 xparameters_ps.h	09/05/2013 18.14	File H	13 KB
🍓 Gruppo home	🔛 xpseudo_asm.h	14/05/2013 18.45	File H	3 KB
	📓 xpseudo_asm_gcc.h	09/05/2013 18.14	File H	6 KB
🖳 Computer	📓 xpseudo_asm_rvct.h	14/05/2013 18.44	File H	6 KB
🏭 Disco locale (C:)	📓 xreg_cortexa9.h	09/05/2013 18.14	File H	22 KB
👝 Disco locale (D:)	📓 xspi.h	09/05/2013 18.14	File H	35 KB
P Vodafone ADSL Router	📓 xspi_l.h	09/05/2013 18.14	File H	13 KB
	📓 xstatus.h	09/05/2013 18.14	File H	20 KB
辑 Rete	🔛 xuartlite.h	09/05/2013 18.14	File H	12 KB
	📓 xuartlite_i.h	09/05/2013 18.14	File H	6 KB
	📓 xuartlite_l.h	09/05/2013 18.14	File H	12 KB
	📔 xuartps_hw.h	09/05/2013 18.14	File H	16 KB
21 elementi				

Main Project files added

In source folder you find application specific files:

- main.c (MQX main function including task declaration and function)
- C_Events.c (ISR events function)
- driver.c (low-level function replacement)

and include files

- main.h (MQX main include)
- MaxFuncRedefinition.h (start menu function redifinition)
- def.h (general purpose definition)

This project is developed under Codewarrior 10.3 using **Processor Expert tools**. In the BSP project you can find folder "Generated_Code" witch contains files generated by Processor Expert. Opening BSP project you can see Processor Expert settings. It's strongly recommended to make no changes in the configurations of the Processor Expert components, because of some adjustement needed in file after code generation. A detail of this changes is available on request.

		_
CodeWarrior Projects 🛛		
🔡 🞝 🖃 🤹 🖉 File Name		~
File Name		^
⊿ 😤 bsp twrk70f120m : Debug		
Archives		
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Documentation		
Generated Code		
Generic IO Drivers		
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Peripheral IO Drivers		
N ProcessorExpert.pe		
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Sources		
b 🔁 twrk70f120m BSP Files		
b 🔁 twrk70f120m User Config		
Pmod1_6 : twrk70f120m_Int_Flash_SramData_Debug		
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MQX1:MQX		
Processors		
GPU:MK70FN1M0VMJ12		
Components		
Referenced_Components		
▷ I GPIO_LED:GPIO_LDD		
D M AD1:ADC_LDD		
FIFO_timer:TimerInt_LDD		
▷ XI2C:I2C_LDD		
Wart:Serial_LDD		
XSPCI:SPIMaster_LDD		
CS0:BitlO_LDD		
CS1:BitlO_LDD		
GPIO1:BitIO_LDD		
GPIO2:BitIO_LDD		
GPIO4:BitIO_LDD		
		*

MQX tasks brief

In file main.c there are 4 tasks: **Pmod_task**: invokes init timer and main_pmod() **Led_task**: yellow led blink (on tower cpu board) **PmodLed_task**: orange led blink during Pmod_task active **adc_task**: a task that read from ADC converter the value of potentiometer R52 and start/stop blue led blink.

```
2 *
      This file contains MQX only stationery code.
 3 *
 4 *
 5
 6 #include "main.h"
 8 #include "UART PDD.H"
 9 #include "GPIO LED.h"
10 #include "def.h"
11
12
13 #if !BSPCFG ENABLE IO SUBSYSTEM
14 #error This application requires BSPCFG_ENABLE_IO_SUBSYSTEM defined non-zero in user_config.h. Ple
15 #endif
16
17
18 #ifndef BSP_DEFAULT_IO_CHANNEL_DEFINED
19 #error This application requires BSP DEFAULT IO CHANNEL to be not NULL. Please set corresponding F
20 #endif
21
22
23 TASK TEMPLATE STRUCT MQX template list[] =
   /* Task number, Entry point, Stack, Pri, String, Auto? */
{PMOD_TASK, Pmod_task, 4096, 10, "main", MQX_AUTO_START_TASK},
{LED_TASK, Led_task, 1500, 9, "led", MQX_AUTO_START_TASK},
{PMODLED_TASK, PmodLed_task, 1500, 8, "pmodled", MQX_AUTO_START_TASK},
{ADC_TASK, adc_task, 1500, 8, "adc", MQX_AUTO_START_TASK},
[ADC_TASK, 0, 0, 0, 0, 0, 0, ]
24 {
25 /* Task number, Entry point, Stack, Pri,
26
27
28
29
30 {0,
31 };
32
33 LDD_TDeviceData *LED_DeviceData;
34 LDD TError
                         LED Error;
35 LDD TDeviceData
                        *T1Ptr;
36
37 bool mPmod = FALSE;
```

CHAPTER 4

Firmware changes

1 - added include file **MaxFuncRedefinition.h** at the top of **MaximPmod.c** file. This file must be the first include in list.

```
#include "MaxFuncRedifinition.h" <----
#include <stdio.h>
#include "platform.h"
#include "menu.h"
#include "utilities.h"
#include "maximDeviceSpecificUtilities.h"
#include "maximPMOD.h"
#define MAJOR_REVISION 1
#define MINOR_REVISION 6
```

2 - renamed main() function inside MaximPmod.c file with new name main_pmod().

```
int main_pmod()
                     <----
/ * *
* \brief
               Main() function for Analog Essentials example program.
* \par
               Details
               This function sets up and initializes the FPGA and hardware, displays
\hookrightarrowthe root menu via
               Hyperterminal, then dispatches inidividual demo programs for specific_
*
→module based on
*
               user's keypress selection.
* \param
               None
*
* \retval
               Always TRUE
*/
{
       // Variables for the main() function
      u8 uchInput=0;
      int nMenuState=0;
```

int i=0;
char tempString[256];

3 - Added redefinition of "printf" function inside include file **maximPMOD.h**. This is needed for build this project without any other changes to send functionality messages through Tower Expansion Board serial interface



4 - commented function led_knight_rider inside MaximPmod.c file to obtain application fast start.

5 - changed costant definition ABOUT_ONE_SECOND inside MaximPmod.h file as follow:

6 - improved definition inside "utilities.h", row 103, as follow

```
void set_seven_segment_character(u8 uchDigitNumber, u8 uchValue, u8 uchDecimalActive);
void print_seven_segment_number(float fNumber);
extern struct maximDateTime *t; //NEEDED FOR MQX CORRECT BUILD <----
//struct maximDateTime *t;
void print_seven_segment_time(struct maximDateTime *t);
```

7 - changed triangle wave ramp value for MAX5216 (file menu.c, row 765 anf 769)

case 12:

```
printf("Triangle Wave started\r\n");
```

```
fflush(stdout);
                                for(i=0;i<300;i++)</pre>
                                {
//
                                        for(j=0; j<65535; j=j+23)
                                        for(j=0; j<65535; j=j+230)
                                                                      <-- new ramp
→definition
                                        {
                                                 max_MAX5216_set_output_voltage(g_
→pActiveGPIOPort,j);
                                        }
//
                                        for(j=65535; j>=0; j=j-23)
                                        for(j=65535; j>=0; j=j-230) <-- new ramp
→ definition
                                         {
                                                 max_MAX5216_set_output_voltage(g_
→pActiveGPIOPort,j);
                                        }
                                }
                                nMenuState = 0;
                                break;
```

NOTE: All these changes are tested on revision 1.6 of Maxim project files and need to be checked on further new revisions

CHAPTER 5

Tips and Tricks

At the date of issue of this firmware version there are some care in the use of Cadewarrior 10.3. If you would make changes in BSP or PSP library or in Processor Expert components, please take care the following remarks. We know that it's just released a new Codewarrior version (10.4) but we have no tested the functionality of this project inside this revision.

Printf Floating Point settings

In order to see temperature value of MAXIM Pmod DS3231M, MAX31723 and MAX31855 printf function need to be improved with floating poing features. Settings of this functionallity are included in PSP library.

For the normally use of this project, there is no reason to clean and rebuild PSP library. If you need to make this operation, there is a possibility to have some truobles with **printf** function whit floating point variables. If it occours, there is a trip for rebuild this library without floating point failure.

• be very careful to the next steps

- 1 Select PSP properties (right-click on project)
- 2 Select C/C++ Build -> Settings
- 3 Select and set Floating Point "Software (default)"
- 4 Click OK button to confirm selections



5 - Right click on PSP project, select build. When finished, in the Problems Windows there is one error. Don't care it and proceed with following steps 6-10.

34	
35 /*FUNCTION*	
36*	
on a manager where a sub-	
Problems 🛛 📮 Console 🔗 Search	
1 error, 20 manings, 0 others	
description	Resource P
▲ 😣 Errors (1 item)	
😡 mingw32-make: *** [PSP Cortex/dispatch_S.obj] Error 1	psp_twrk70f1
Warnings (20 items)	

- 6 Select PSP properties (right-click on project)
- 7 Select C/C++ Build -> Settings
- 8 Select amd set Floating Point "Hardware vfpv4"
- 9 Click OK button to confirm selections

P	Properties for psp_twrk70f120m	- D X
type filter text	Settings - psp_twrk70f120m	\$ • \$ • •
type filter text Resource Builders C/C++ Build Build Variables Discovery Options Environment Logging Settings Tool Chain Editor C/C++ General Run/Debug Settings	Settings - psp_twrk70f120m Configuration: Debug [Active] Tool Settings Pauld Steps Duild A stract Debugging ARM CPU Debugging Messages Librarian ARM Linker Mode Thumb Compiler Dutput ARM Compiler Dutput ARM Compiler Dutput ARM Compiler Processor Cortex-m4 Floating Point Hardware vfpv4 Endianness Little Endian Mode Thumb Thumb Therworking (required for processor) ARM Assembler Processor Language ARM Assembler Compiler Com	
?	With the second sec	OK Cancel

10 - Right click on PSP project, select build. When finished, in the Problems Windows there is NO error

BSP library are now builded and ready for the project without any error

🗖 CodeWarrior Projects 🕱	- 8
🔡 📮 🖻 🔄 🔑 File Name	
File Name	B
bsp_twrk70f120m : Debug E Pmod1_6 : twrk70f120m_Int_Flash_SramData_Debug	
b E psp_twrk70f120m : Debug	

Cautions for Processor Expert suite

Pmod project is developed using HAL driver generated using Processor Expert suite. The suite is located inside BSP library.

Brief summary of Processor Expert components settings

See the figure below.



1- Components red framed are standard Processor Expert component. It's possible to make changes at any time. Code generation takes changes and make new files each time.

2- Components black framed are ignored by Code generation and linker. This mode can be used when you like to use same pins alternately for UART and GPIO function. With Processor Expert using more than one components for same pin make errors in code generation. To make this, you can enable first components using pins, generate code, disable components and enable the second one for new code generation. The result is tha you have more source code using same pins.

3- Component blue framed. Component "freezed". Code generation is disabled. This is because Processor Expert in Codewarrior 10.3, in BitIo or BitsIO components, don't add mqx include files during code generation. The result of this is a general linker error during build of BSP library. If yuo make changes or add a new one, yuc must add "manually" the needed include file "mqx.h" in component code (.h file) and disable code generation.

ADDING DEFINITION IN PE_LDD FILES

When you make any changes os adds in Processor Expert components, you must proceed with new code generation. After this, because of disabled components in project, some manual adding are needed in PE_LDD.h and PE_LDD.c files (see folder Generated_Code in BSP project) Look at **PE_LDD add.txt** in project folder (C:\Pmqx). You must copy definition inside this file into PE_LDD.h as image below:

+ + _____ ** LDD component ID specifying the component instance in the project. This ID ** **is** used internally **as** an index to the array of LDD device structures. */ #define PE_LDD_COMPONENT_GPIO_LED_ID 0x00U #define PE_LDD_COMPONENT_AD1_ID 0x01U #define PE_LDD_COMPONENT_TU1_ID 0x02U #define PE_LDD_COMPONENT_FIFO_timer_ID 0x03U #define PE_LDD_COMPONENT_XI2C_ID 0x04U #define PE_LDD_COMPONENT_UART_ID 0x05U #define PE_LDD_COMPONENT_XSPCI_ID 0x06U #define PE_LDD_COMPONENT_GPI01_ID 0x07U #define PE_LDD_COMPONENT_GPIO2_ID 0x08U #define PE_LDD_COMPONENT_GPIO3_ID 0x09U #define PE_LDD_COMPONENT_GPI04_ID 0x0AU #define PE_LDD_COMPONENT_GPI05_ID 0x0BU #define PE LDD COMPONENT GPIO6 ID 0x0CU #define PE_LDD_COMPONENT_GPI07_ID 0x0DU #define PE_LDD_COMPONENT_GPI08_ID 0x0EU #define PE_LDD_COMPONENT_GPI09_ID $0 \times 0 FU$ #define PE_LDD_COMPONENT_GPI010_ID 0x10U #define PE_LDD_COMPONENT_GPI03_1_ID 0x11U #define PE_LDD_COMPONENT_GPI04_1_ID 0x12U #define PE_LDD_COMPONENT_GPI05_1_ID 0x13U #define PE_LDD_COMPONENT_GPI06_1_ID 0x14U #define PE_LDD_COMPONENT_GPI07_1_ID 0x15U #define PE_LDD_COMPONENT_GP_de_ID 0x16U #define PE_LDD_COMPONENT_GP_re_ID 0x17U #define PE LDD COMPONENT CS0 ID *0x18U* <-- added definition #define PE_LDD_COMPONENT_CS1_ID 0x19U <-- added definition #define PE_LDD_COMPONENT_GP_di_ID *0x1AU* <-- added definition #define PE_LDD_COMPONENT_GP_ro_ID 0x1BU<-- added definition #define PE_LDD_COMPONENT_GPIO_SPI_ID 0x1CU<-- added definition #define PE_LDD_COMPONENT_GP_MISO_ID *0x1DU* <-- added definition #define PE_LDD_COMPONENT_GP_MOSI_ID 0x1EU<-- added definition #define PE LDD COMPONENT GP SCK ID 0x1FU<-- added definition

/*

You must change also PE_LDD.c: definition of LDD_TDeviceData *PE_LDD_DeviceDataList[24]* changed to **LDD_TDeviceData *PE_LDD_DeviceDataList[32]** added 8 row of "NULL," in structure definition.

The result of changes is show in figure below

```
/*
** ------
** Array of initialized device structures of LDD components.
**
*/
LDD_TDeviceData *PE_LDD_DeviceDataList[32] = {
  NULL,
  NULL
};
```

IMPORTANT SETTING To obtain functionallity as described above, you must go to BSP Properties -> Processor Expert Option and set "Delete unused previously generated file = NO". See figure below

₩.	Properties for bsp_twrk70)f120m	- • ×
type filter text	Processor Expert Project Options - bs	sp_twrk70f120m	⇔ ≠ ⇔ ≠ ≠
type filter text Resource Builders C/C++ Build C/C++ General Processor Expert Run/Debug Settings 	Processor Expert Project Options - bs Name Main & Events directory Generated code directory Documentation directory Project settings directory Set periph. init component name as periphe Main module update Event module(s) update Update of other user modules Generate ISRs Delete unused events Delete unused previously generated files Freeze code generation Generate code before build automatically Save project before code generation Create code generation log	sp_twrk70f120m Value Sources Generated_Code Documentation Project_Settings No Smart update (recommended) Smart update (recommended) Smart update (recommended) Smart update (recommended) No Voc No Voc	
(?)	Code generation reference number	67 Restore Def	aults Apply

NOTE: on further revisions of Codewarrior these tips have to be checked and verified

CHAPTER 6

More about Pmod

Maxim Analog Essential Collection is a collection of plug-in peripheral modules (Pmod) You can find more informations visiting Maxim Analog Essential Collection site



Important notice

At the date of issue of this review, Maxim Zenboard Platform Project files are available on version 1.6, and don't support MAX14850 Pmod module. As a result this version, that use original files from Maxim project, is not able to emulate this device.



Emulation of MAX3232

This device is a RS232 converter, and require 2 serial channel (each one connected to terminal software) for full test. The first one is used for commands and the second one must be connected, for complete testing purpose, to MAX3232 Pmod serial connector (by standard modem cable).



We also suggest you to see documentation Maxim Pmod-Compatible Plug-In Peripheral Modules for any specific

further detail.

• search

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