How to use CodeWarrior ASM with Adapt9S12 and Serial Monitor.doc

This document assumes that CW is already been installed. It further assumes that the user has all the necessary hardware and just need assistance in starting how to use CW.

Getting Started:



Click on the Metrowerks IDE icon ^{CodeWarrior IDE.lnk} to get started. Note that the IDE is greyed out to indicate a blank working space.



New Project:

Let create a new project by clicking on File menu. File-New as shown below.

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File Edit View Search	Christen Debug	Process	sor Expert	Window	Help		Im.		
Open	Ctrl+O					80		 	
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On the project tab select HC(S)12 New Project Wizard.

New	×
Project File Object Empty Project HC(S)12 New Project Wizard	Project name:
	Location: C:\Documents and Settings\Ex Set Add to Project: Project:

Project Name:

Type a project name called *Test*. Press on the Set... button to create a Test subfolder to save the test.mcp file.

Create New Pi	roject		<u>?</u> ×
Save in: 🗀	Test 🔽 🗲 🔁 📸 🛛	•	
File name:	test	Save	
Save as type:	Project Files (*.mcp)	Cance	el
🔽 Create Fold	der		1.

As can be seen below the setup for the folders are set. Press OK to continue.

New	×
Project File Object	
Empty Project HC(S)12 New Project Wizard HCS12 Stationery	Project name: test Location: C:\Test\test Set Add to Project: Project: T
	OK Cancel

Selecting the MCU:

Scroll up or down to locate the MCU of interest. In this example the Adapt9S12E128 is used. Select the MCU type as MC9S12E128 then press Next button to continue.

12 110 100		1.000
A CHARGE CONTRACT	Derivatives	_
	MC9512D64	
Ja1801910-	MC9512DB128A	
	MC9512DB128B	
	MC9512DG128B	
	MC9512DG256B	
	MC9512DJ128B	
	MC9S12DJ256B	and a
	MC9512DJ64	
	MC9512DP256B	
	MC9512DP512	
	MC9512DT128B	
	MC9512D1256B	
etrowerks	MC9512E128	
	MC9512E64	
	MC9512H128	
	MC9512H256	-

In this example the Assembly box is selected as shown. One may select C or C++ according the user's programming preference. Press Next button to continue.

New Project Wizard - Page 2		×
L'aron	Please choose the set of languages to be supported initially. You can make multiple selections.	
Contraction of the second	Assembly C++	
	This will set up your application with a ANSI-C compliant startup code (doing initialisation of global variables).	
metrowerks	-	
	<pre></pre>	;el

Absolute or Relocatable:

In this example the Relocatable assembly is selected as shown. Press next to continue.

New Project Wizard - Page 3	<u>x</u>
delenero.	Which kind of assembly would you like?
Contractor of the	Absolute Assembly Relocatable Assembly
	Relocatable Assembly supports to split up the application into multiple assembly source files. The source files are linked together using the linker.
metrowerks	
	<pre> < Back Next > Cancel</pre>

Serial Monitor:

The Adapt9S12E128 or EQ128 is pre-programmed with Freescale Serial monitor. Check boxed the Motorola Serial Monitor Hardware Debugging box as shown. Press *Finish* button to continue.



Setup Complete:

Below is the IDE after the setups are completed.



Files Tab:

Note that a new window pane is added. These contain the Files, Link Order and Targets Tab.

Files tab contain 6 subfolders called Sources, Prm, Linker Map, Libraries, Debugger Project File and Debugger Cmd Files.

By pressing on the + icon, one can see what are insider these subfolders. Sources folder contains the working files. By default CW creates a file called main.asm. Prm folder contains programming parameters. This document will only go thru the important aspects of the IDE. One should read up on the others.



Double click on the main.asm to see what it contains.

Debug:

Connect serial cable to PC COM 1 and the Adapt9S12 board. Make sure the Run/Load switch is in Load mode. Power up Adapt9S12 board making sure to see the PWR (Green) LED is ON.

Select the Project Menu. Project-Debug as shown below.



CW will immediately initiate the Debugger screen. Leave the Monitor setup as is and press OK button.

Monitor Setup	×					
Monitor Communication Load Options						
HOST Serial Communication Port:						
Please select in this dialog the serial communication port used to connect to the hardware.						
HOST Serial Communication Port:						
Communication protocol Show Monitor TX/BX						
OK Cancel						

True Time Simulator and Real_Time Debugger:

By default the program will erase and program the Adapt9S12E128 or EQ128. This program allows the user to manipulate the MCU. This document will not thoroughly explain how to use the True Time Simulator and Real Time Debugger. It is merely to show how to start the program and its basic usage.

The following sequence happens - Loading, erasing and lastly, the debugger



🐱 True-Time Simulator & Real-Time Debugger 🛛 C:\Test\tes	t\Monitor.ini			- D ×
File View Run MONITOR-HCS12 Component Procedure Wind	dow Help			
	●			
S Source		Assembly		
C:\Test\test\bin\main.dbg	Line: 7637	Entry		
MyCode: SECTION main: Entry:	_	COOO ANDCO COO2 MOVB COO7 NOP	: #239 #1,0x2400	
CLI ; enable interrupts loop:		COO8 BRA COOA LDS	*-6 ;abs = COO2 OxFFFF	-
MOVB #1,temp_byte ; just some demonstre NOP ; Insert here your ow	m code	📰 Register		
		HC12 D 0	A 0 B 0	Auto
🔀 Data		IX 0		
temp_byte 24 unsigned char	j Symb j Giobai	SP 4000	CCR SXHINZVC	
		P Procedure		
in Command	<u>_D×</u>	Entry ()		Ē
done .\cmd\monitor_postload.cmd	_	E Memory		- U ×
Postload command file correctly executed.	_		Auto	
in>	-		00 00	
			00 00	-
For Help, press F1 Automatic	c (triggers, breakpoints,	watchpoints, and t	race possible)	MC9512E

A simple program:

Lets start with a simple program of Blinking an LED connected to PP0.

Edit the main.asm with the codes below.

DelayCounter ds.b 2 LED equ %00000001 ;Port P bit 0 ; code section SECTION MyCode: Entry: ;This example no interrupt are needed sei ; disable interrupts movw #\$FFFF, DelayCounter ;Initialize counter bset DDRP,LED ;Make PP0 as output main: bset PTP,LED ;Turn LED on DelayCounter ;Do some delay ldx bsr DelayRoutine DelayRoutine bsr DelayRoutine bsr DelayRoutine bsr bclr PTP,LED ;Turn LED off ldx DelayCounter ;Do some delay DelayRoutine bsr DelayRoutine bsr DelayRoutine bsr DelayRoutine bsr ;main loop is execute endlessly bra main DelayRoutine dbne x,DelayRoutine ;Delay routine

rts

Metrowerks CodeWarrior								
File Edit View Search Project	t Debug Process	or Expert Window	Help					
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test.mcp		Monitor	main.asm					
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Monitor		NAMES			-			Ď
Files Link Order Targets		END	LED	equ	%00000001	;Port F	bit O	
🛩 File	Code Da	R/	; code	section				
madme.txt	n/a	/* ur PC	MyCode:	SEC.	TION			
sources	48	RC	Entry:			_		
	0	/* ba Pi		sei		disah	wample no interrupt are needed de interrupts	
Monitor linker prm	n/a n/a	P/		COMPRESS OF	AAPPER D. L. C.			
🖃 😋 Linker Map	Ō	Pi Pi		bset	DDRP, LED	nter	Make PPO as output	
Monitor.map	n/a	P/	3					
mc9s12e128.inc	ŏ	/* Pl	main:	bset	PTP, LED	Turn I	ED on	
E Cabugger Project File	0	/* Pl		Idv	DelauCounter	Do som	e delan	
E C Debugger Cmd Files	0	END		bsr	DelayRoutine	,	e deray	
🗄 🧰 Monitor	0	PLACE		bsr	DelayRoutine			
		ธา		bsr	DelayRoutine			
		RC		helr	PTP LED	Turn T	ED off	
		Vi						
		NC CC		bsr	DelayCounter	;Do som	e delay	
				bsr	DelayRoutine			
				bsr	DelayRoutine			
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11 files	48	Line 35	- M2120					
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								1

Programming Flash:

In this example, the True Time Simulator and Real-Time Debugger are used. Switch SW2 to Load mode and Power up Adapt9S12 or press the RESET button if already powered up. Under Project menu select Debug or F5 function key.

Metrowerks CodeWarı	rior						- 🗆 ×
File Edit View Search	Project Debug Process	sor Expert Window He	elp				
test.mcp	Add main, asm to Project Add Files, Greate Group, Create Target, Create Segment/Overl	аў	. ■ E I	🗈 🖬 🗣 Path: 🖸 C:\test\test\Sc	ources\main.asr		
- Moritor	Create Design		_				
Files Link Order Tar	Check Syntax Preprocess Precompile Compile Disassemble	Ctrl+; Ctrl+F7 Ctrl+Shift+F7	equ e section e: SE(200000001	Port P 1	bit O	
Prm burner.bbl	Bring Up To Date Make	Ctrl+U F7	sei		;This ex ; disable	ample no interrupt are needed e interrupts	
E Linker Map	Stop Build Remove Object Code	Ctrl+Break	bset	#SFFFF, DelayCou DDRP, LED	nter	;Initialize counter ;Make PPO as output	
El Cibraries mc9s12e128.i E Cibraries mc9s12e128.i	Re-search for Files Reset Project Entry Pa	ths	bset	PTP, LED	Turn LE	D on	
Monitor.ini Debugger Cmd Fi	Synchronize Modification Debug Can't Run	n Dates F5 Ctrl+F5	bsr bsr bsr bsr bsr	DelayRoutine DelayRoutine DelayRoutine DelayRoutine	, DO SOME	ueray	
	Set Default Project Set Default Target		belr	PTP, LED	Turn LE	D off	
-		i i	ldx bsr bsr bsr bsr	DelayCounter DelayRoutine DelayRoutine DelayRoutine DelayRoutine	;Do some	delay	
			bra avPoutino	main	;main lo	op is execute endlessly	
		STACI VE(VECTC INIT	dbne rts	x,DelayRoutine	;Delay ro	outine	
11 files	48	Line 35	Col 62 •		1		× //

Codewarrior will immediately launch True Time Simulator and Real-Time Debugger as shown. Note that it will erase then program Flash in succession.

🐻 True-Time Simulator & Real-Time Debugger 🛛 c:\test\test\Monitor.ini	
File View Run MONITOR-HCS12 Component Procedure Window Help	
S Source	Assembly
c:\test\test\bin\main.dbg Line: 7640) Entry
MyCode: SECTION	C000 ORCC #16
Entry:	C008 BSET 0x025A,#1
sei ;This example no interrupt are needed	COOC BSET 0x0258,#1
; disable interrupts	CO10 LDX 0x2400
movw #\$FFFF,DelayCounter ;Initialize counter	Register
bset DDRP,LED ;Make PPU as output	HC12 Auto
	D O A O B O
Data	
main.dbg Auto Symb Glob	lobal IP COOO PC COOO PPAGE 3F
➡ DelayCounter " array[2] of unsigned char	SP 4000 CCR SXHINZVC
	P Procedure
Command	Entry ()
done .\cmd\monitor_postload.cmd	Memory
Postload command file correctly executed.	Auto
1 ins	000080 00 00 00 20
For Help, press F1 Automatic (triggers, breakp	kpoints, watchpoints, and trace possible) MC9512E //

To run the program, select Run menu then Start/Continue or F5 function key as shown.

📙 True	-Time Simulator & Real-	Time Debugg	er c:\test\	\test\Mo	nitor.ini					
File Vie	W Run MONITOR-HCS12	Component	Procedure	Window	Help					
	Start/Continue	F5	2 - C	-2-	€					
E Sou	Restart Halt	Ctrl+Shift+F5					0 0 ccombly			
	Ver Carla Char				Line: 7640	-	Entru			
NewC	ada Step Over	F11 F10			LINE. 7040		COOD ODCC	#1 C		_
II NYC	Step Out	Shift+F11					COO2 MOVW	#65535,0x	2400	
Ent	ry: Assembly Step	Ctrl+E11					COOS BSET	0x025A,#1		
	Assembly Step Over	Ctrl+F10	menn	upt are	needed		COLC BSET	0x0258,#1 0x2400		
	Assembly Step Out	Ctrl+Shift+F1	L							
	nc bs Control Points		nitia as o	lize co utput	unter	늯	Register			
					•		HC12		_	Auto
👗 Dat	a				- 0	X			в	0
	main.dl	bg	A	uto S	ymb Glob	a	IP COOO	PC COOO	PPAGE	3F
DelayCounter " array[2] of unsigned char							SP 4000	CCR SXHI	NZVC	
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					Þ		000088 80 00	00 00	•	-
, Start/Cor	ntinue program		Auto	omatic (trig	igers, breakpi	oints,	watchpoints, and t	race possible)		MC9512E //

The LED connected at PP0 will immediately begins to Blink.

This concludes the example of using CW in assembly to using True-Time Simulator and Real-Time Debugger.