

Freescale Semiconductor Application Note

Document Number: AN4460 Rev. 1, 04/2013

Using the Xtrinsic FXOS8700CQ **Command Line Interface** Software

by: Talat Ozyagcilar Systems and Applications Engineer

Introduction 1

The FXOS8700CQ command line interface driver provides an easy way to communicate with the FXOS8700CQ using the RD4247FXOS8700 sensor toolbox platform. Once the sensor toolbox board is programmed with this firmware, the user can

- modify and read registers,
- view details of the operating mode of the device, ٠
- and stream/view data as signed counts or in signed units

using a generic terminal program via a virtual serial port 5 over USB.

Contents

1	Intro	duction					
2	Programming the Sensor Toolbox Hardware						
3	Setup of Terminal Program						
4	List o	of Commands					
	4.1	Register Read (RR)7					
	4.2	Register Write (RW)					
	4.3	Report Configuration (RF) 10					
	4.4	Display XYZ Data as Signed Counts (CN) 11					
	4.5	Display XYZ Data as Signed Counts,					
		with HPF Enabled (CH) 12					
	4.6	Display XYZ Data in Signed Units (GN) 13					
	4.7	Display XYZ Data in Signed Units,					
		with HPF Enabled (GH) 14					
	4.8	Stream XYZ Data by Polling (S) 15					
	4.9	Stream XYZ Data via Interrupts (I) 16					
	4.10	Stream XYZ Data via the FIFO Buffer (F) 17					
5	Reco	overing the Bootloader for Sensor Toolbox 19					



© 2012-2013 Freescale Semiconductor, Inc. All rights reserved.



2 **Programming the Sensor Toolbox Hardware**

The following items are required to program the sensor toolbox hardware:

• A PE Micro USB multilink device capable of programming HCS08 targets.

www.pemicro.com

• Freescale CodeWarrior for Microcontrollers v6.2 or higher.

www.freescale.com/codewarrior

This project was developed with CodeWarrior for Microcontrollers v6.2 which has the classic IDE environment. The project can be imported into the newer CodeWarrior for Microcontrollers v10.x releases which have the Eclipse environment utilizing the CodeWarrior Classic Project Importer feature (File > Import...). Please see corresponding documentation and help for details.

The following steps are necessary for programming the sensor toolbox board using CodeWarrior for Microcontrollers v6.2.

- 1. Connect the sensor toolbox board to the host PC using the USB cable included in the kit. For most cases, the FTDI drivers will be installed automatically. If a driver cannot be found by Windows go to www.ftdichip.com to download them.
- 2. Connect the PE Micro multilink device to the host PC. If this is the first time the device is connected to the PC, the drivers will be installed automatically.
- 3. Connect the PE Micro multilink device to the sensor toolbox board using the 6-pin ribbon cable attached to the multilink.



Figure 1. PE Micro multilink and sensor toolbox board

4. Turn the board on using the ON/OFF switch. The red LED light will turn on indicating that the board is powered up.



5. Start CodeWarrior and open the project file with *.mcp extension.

Freescale CodeWarrior		
File Edit View Search Project Processor Expert [Device Initialization Window Help	
1 ● ■ □ □ □ × ▶ ■ 1 1	A 🖿 🥙 🐂 💺 🔳 🖻 🛍	
FXOS8700CQ_Command_Line_Interface.mcp		
🕪 P&E Multilink/Cyclone Pro 🔄 🚔 🔝 😽	Debug	
Files Link Order Targets	Icon	
💉 🛛 File	Code Data 🕊 🚊	
 main.c iic.c sci.c FXOS8700CQ.c Includes derivative.h system.h iic.h sci.h spi.h terminal.h data_flash.h MC9S08QE8.h FXOS8700CQ.h Libs ansiis.lib MC9S08QE8.C Project Settings Start08.c Linker Files burner.bbl Project.map 	655 215 × 524 3 × 1534 217 × 5044 22 × 141 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 0 0 × 12607 2139 × 12607 2018 × 0 121 × 7 0 × 0 0 × 12607 2018 × 7 0 × 7 0 × 0 0 × 1/2 0 × 1/2 × × 1/2 × × 0 × × 0	
19 files	20512 2596	



6. Click on the green Debug icon for debugging to flash program on to the board.



7. Click the Connect (Reset) button in the initial dialog window.

Johnection port and mo	erface Type			Luurere al
Interface: USB HCS08	HCS12/CEV1 Mu	ultilink - USB Port	•	Add LPT Port
				Retresh List
Port: USB-ML-12	(FS) Rev A on USE	81 (Name=PE565	6093) (Autodetected)	
iterface Detected :	Firmware Versi	ion :	Socket Programming Ad	dapter Settings
arget CPU Information				
CPU: HCS08 Pr	ocessor - Autod	etect		
CLL reset line:	MCII Valtage			
	MCO Voltage.			
Teset Uptions	d hafara communik	acting to target fo	. O millisect	onde (decimal)
Delay after neset ar	10 Derore communic	cating to target to		ueciniai).
		0.1.1.1		
Provide power to tar	trol (Voltage> Ho roet Be	ower-Out Jackj oulator Output Vr	ltane Power Down Dela	au 250 mS
I had a black had been a second a second second second	got	5V V	Power Up Dela	250 ms
Power off target upo	in software exit			9 200 1110
 Power off target upo 	m software exit			
Power off target upo Frim Control	m software exit).00 Hz. (Valid Br	ange: 31250.00 to 39062.5	50 Hz)
Power off target upc Irim Control Default trim reference fre Use custom trim refe	equency is : 31250). 00 Hz. (Valid Ra	ange: 31250.00 to 39062.5 Hz Click for trim details.	50 Hz)

Figure 3. PEMICRO Connection Manager window

NOTE

Keep in mind that this dialog may not appear depending on the state of the microcontroller prior to launching the debugger.

8. Click Yes to erase and flash the program in the next dialog window. Once programming is completed, close the debugger and CodeWarrior, and power down the sensor toolbox board using the ON/OFF switch. The command line interface program is now ready to be executed once the sensor toolbox board is powered up again.

🗖 Erase a	nd Program Flash?	
1	Load image contains flash memory data.	Erase and Program flash?
	✓ Yes	<u> </u>

Figure 4. Erase and Program Flash window



3 Setup of Terminal Program

Once programmed, turn on the sensor toolbox board and start a terminal program with the following settings:

- Baud: 115200 bps
- Bits: 8
- Parity: None
- Stop Bits: 1
- Hardware Flow Control: None

The specific COM port is determined using the Device Manager feature of Windows.



Figure 5. Device Manager



Once the terminal program is set up as specified, press the Enter key; this will result in the displaying of the program header which indicates

- the compile date and time of the firmware image
- firmware revision number
- · detected iic address and whoami of the sensor on board
- the details of the operating mode of the device
- followed by the command prompt.

Pressing the Enter key after the startup of the program will generate an output similar Example 1.

Example 1.

```
* *
                              * *
    Freescale Semiconductor
* *
    FXOS8700CO Demo
                              * *
        using the MC9S08QE8 **
* *
* *
                              * *
    Aug 16 2012
* *
                   16:42:43 **
Command Line Interface Software Revision: 1.00
This version of command line interface does
not support external flash
FXOS8700CQ : IIC Address = 0x1E, WhoAmI = 0xC7
Operating Mode = Hybrid (Accel+Mag), ACTIVE,
ODR = 50Hz,
Hybrid auto inc = ON,
Mag OSR = 16,
Accel OSR = Normal,
HP = 2Hz,
Accel FSR = 2g
FXOS8700CQ>
```



4 List of Commands

A list of commands can be viewed by pressing ? key followed by the Enter key. Example 2 outlines the details of each command (parameters accepted, output format, special cases, and so on). The commands are not case-sensitive.

Example 2. List of Commands

FXOS8700CQ>?		List of FXOS8700CQ commands:
RR xx	:	Register xx Read
RW xx=nn	:	Register xx Write value nn
RF	:	Report Configuration Specifics
CN	:	XYZ data as Signed Counts
СН	:	XYZ data as Signed Counts, with Accel HP Filter enabled
GN	:	XYZ data in Signed Units
GH	:	XYZ data in Signed Units, with Accel HP Filter enabled
S aa	:	Stream XYZ:
I aa n	:	Stream XYZ via Interrups
	:	n: 1=INT1; 2=INT2
F aa ww	:	Stream XYZ via FIFO
	:	aa: CN, CH, GN or GH as explained above
	:	ww: Watermark= 1 to 31

FXOS8700CQ>

4.1 Register Read (RR)

This command simply reads the register contents.

Format

```
RR xx<ENTER> or RR<ENTER>
```

Input Parameter(s)

xx: two ASCII characters representing a 1-byte register address as hexadecimal.

Output

Content of the register specified. If no register is specified, all register contents will be displayed.

Example 3. Register Read sample output (WHOAMI register)

FXOS8700CQ>RR 0D = C7 FXOS8700CQ>



FXC	SE	3700)CQ>	>RR	Read	All	Registers	
00	=	\mathbf{FF}	FΕ	80	00			
04	=	C4	40	A0	00			
80	=	00	03	00	01			
0C	=	01	C7	00	00			
10	=	00	80	00	84			
14	=	44	00	00	00			
18	=	00	00	00	00			
1C	=	00	00	00	00			
20	=	00	00	00	00			
24	=	00	00	00	00			
28	=	00	00	19	00			
2C	=	00	01	00	00			
30	=	00	00	FF	FE			
34	=	\mathbf{EF}	\mathbf{FF}	36	FE			
38	=	88	00	00	00			
3C	=	00	00	00	00			
40	=	00	00	00	00			
44	=	00	\mathbf{FF}	1F	00			
48	=	87	FΕ	В3	FE			
4C	=	5B	FF	01	FD			
50	=	F7	16	00	00			
54	=	00	00	00	00			
58	=	00	00	00	1F			
5C	=	20	00	01	00			
60	=	00	00	00	00			
64	=	00	00	00	00			
68	=	00	00	00	00			
6C	=	00	00	00	00			
70	=	00	00	00	00			
74	=	00	00	00	00			
78	=	00						

Example 4. Read All Registers sample output

FXOS8700CQ>



4.2 Register Write (RW)

This command writes a single byte to the specified address.

Format

RW xx=nn<ENTER>

Input Parameter(s)

xx: two ASCII characters representing a 1-byte register address in hexadecimal.

nn: two ASCII characters representing a byte in hexadecimal, to be written to xx.

Output

Success or Failure

NOTE

A warning message will be displayed when modifying the CTRL_REG1 (0x2A) indicating that the part must be in Standby mode prior to changing output data rate (ODR).

Example 5. Register Write sample output (OFF_X register)

FXOS8700CQ>RW 2F=AA Success FXOS8700CQ>



4.3 Report Configuration (RF)

This command display the specifics of the operating configuration of the sensor device.

Format

rf<ENTER>

Input Parameter(s)

None

Output

Operating Mode:

Hybrid (Accel+Mag), Accel Only, Mag Only, Rsrvd + ACTIVE, STANDBY

Output Data Rate (ODR):

800Hz, 400Hz, 200Hz, 100Hz, 50Hz, 25Hz, 12.5Hz, 6.25Hz, 3.15Hz, 1.56Hz, 0.8Hz

Hybrid Mode Auto Increment (Hybrid auto inc): Displayed only if device is configured for hybrid mode

ON, OFF

Magnetometer Oversampling Ratio (Mag OSR):

2, 4, 8, 16, 32, 64, 128, 256, 512, 1024

Accelerometer Oversampling Ratio (Accel OSR):

Normal, Low Noise, High Res, Low Power

High-Pass Filter (HP):

0.031Hz, 0.063Hz, 0.12Hz, 0.25Hz, 0.5Hz, 1Hz, 2Hz, 4Hz, 8Hz, 16Hz

Acceleration Full-Scale Range (Accel FSR):

 $\pm 2g, \pm 4g, \pm 8g$, Rsvd

Example 6. Report Configuration sample output

```
FXOS8700CQ>RF
Operating Mode = Hybrid (Accel+Mag), ACTIVE,
ODR = 50Hz,
Hybrid auto inc = ON,
Mag OSR = 16,
Accel OSR = Normal,
HP = 2Hz,
Accel FSR = 2g
FXOS8700CQ>
```



4.4 Display XYZ Data as Signed Counts (CN)

This command displays the sensor data from a single acquisition cycle from enabled sensors. If device is in Hybrid (Accel+Mag) mode XYZ data from both sensors will be displayed. If device is in Accel Only or Mag Only mode, then XYZ data from a single sensor will be displayed accordingly.

Format

CN<ENTER>

Input Parameter(s)

None

Output

XYZ data will be displayed based on current configuration. Acceleration data will be in the range [-8192,+8191]. Magnetometer data will be in the range [-32768,32767].

Example 7. Display Sensor Data as Signed Counts sample output

FXOS8700CQ>CN Xacc=-00770;Yacc=-00040;Zacc=+04136;Xmag=-00502;Ymag=-00677;Zmag=-00242 FXOS8700CQ>



4.5 Display XYZ Data as Signed Counts, with HPF Enabled (CH)

Identical to Section 4.4 except accelerometer data is fed through a high-pass filter before being displayed. Please note that the high-pass filter may only be applied to the accelerometer data.

This command displays sensor data from a single acquisition cycle from enabled sensors. If device is in Hybrid (Accel+Mag) mode XYZ data from both sensors will be displayed. If device is in Accel Only or Mag Only mode, then XYZ data from a single sensor will be displayed accordingly.

Format

CH<ENTER>

Input Parameter(s)

None

Output

XYZ data will be displayed based on current configuration. Acceleration data will be in the range [-8192,+8191]. Magnetometer data will be in the range [-32768,32767].

Example 8. Display sensor data as counts, with HPF enabled

FXOS8700CQ>CH	
* WARNING - HPF requires samples to settle after an activation *	
Xacc=-00008;Yacc=-00004;Zacc=-00012;Xmag=-00494;Ymag=-00660;Zmag=-00)260



4.6 Display XYZ Data in Signed Units (GN)

This command displays sensor data from a single acquisition cycle from enabled sensors. If device is in Hybrid (Accel+Mag) mode XYZ data from both sensors will be displayed. If device is in Accel Only or Mag Only mode, then XYZ data from a single sensor will be displayed accordingly.

Format

gn<ENTER>

Input Parameter(s)

None

Output

XYZ data will be displayed based on current configuration. Data read from the sensors will be converted to *g* and μT units for acceleration and magnetic field respectively. Acceleration data will be in the range as specified in Accel FSR (for Accel FSR = 2g, in the range [-2.0000 g, +1.9999 g]). Magnetometer data will be in the range [-3276.8 μ T, 3276.7 μ T].

Example 9. Display Sensor Data in Signed Units output sample

FXOS8700CQ>GN Xacc=-0.7305g;Yacc=-0.0137g;Zacc=+1.0225g;Xmag=-00047uT;Ymag=-00063uT;Zmag=-00023uT FXOS8700CQ>



4.7 Display XYZ Data in Signed Units, with HPF Enabled (GH)

Identical to Section 4.6 except accelerometer data is fed through a high-pass filter before being displayed. Please note that the high-pass filter may only be applied to the accelerometer data.

This command displays sensor data from a single acquisition cycle from enabled sensors. If device is in Hybrid (Accel+Mag) mode XYZ data from both sensors will be displayed. If device is in Accel Only or Mag Only mode, then XYZ data from a single sensor will be displayed accordingly.

Format

GH<ENTER>

Input Parameter(s)

None

Output

XYZ data will be displayed based on current configuration. Data read from the sensors will be converted to *g* and μT units for acceleration and magnetic flux density respectively. Acceleration data will be in the range as specified in Accel FSR (for Accel FSR = 2 g, in the range [-2.0000 g, +1.9999 g]). Magnetometer data will be in the range [-3276.8 μ T, 3276.7 μ T].

Example 10. Display Data in Signed Units, with HPF Enabled sample output

Xacc=+0.0000g;Yacc=+0.0039g;Zacc=-0.0020g;Xmag=-00046uT;Ymag=-00059uT;Zmag=-00020uT FXOS8700CQ>



4.8 Stream XYZ Data by Polling (S)

Stream sensor XYZ data (by polling).

The characteristic of the streamed data will be the same as the output generated by one of the four display commands explained above in Section 4.4 through 4.7; this will be specified via the *aa* parameter of this command.

NOTE

Streaming data is not recommended for ODR settings faster than 100 Hz in Hybrid (Accel+Mag) mode and faster than 200 Hz in Accel Only and Mag Only modes due to the limitations of the serial port. Streaming faster than recommended may lead to missed samples.

Press <ENTER> to stop streaming at any time.

This command will disable all interrupt sources routed to pins INT1 and INT2. It will put the device in ACTIVE mode if it is not in ACTIVE mode already.

Format

S aa<ENTER>

Input Parameter(s)

aa: CN or CH or GN or GH

Output

Data will be streamed based on command parameter and current configuration.

Example 11. Stream Data by Polling sample output

```
FXOS8700CQ>S CN
*Recommended Streaming ODR<=100Hz for HYBRID mode,*
*ODR<=200Hz for Mag Only or Accel Only modes*
 - Streaming XYZ data as signed counts
Xacc=-00096; Yacc=+00020; Zacc=+04104; Xmaq=-00353; Ymaq=+00088; Zmaq=-00378
Xacc=-00102; Yacc=+00036; Zacc=+04108; Xmag=-00360; Ymag=+00092; Zmag=-00408
Xacc=-00098;Yacc=+00026;Zacc=+04076;Xmag=-00360;Ymag=+00098;Zmag=-00388
Xacc=-00110;Yacc=+00030;Zacc=+04110;Xmag=-00372;Ymag=+00109;Zmag=-00407
Xacc=-00096;Yacc=+00026;Zacc=+04122;Xmag=-00354;Ymag=+00082;Zmag=-00397
Xacc=-00102;Yacc=+00026;Zacc=+04078;Xmag=-00341;Ymag=+00081;Zmag=-00377
Xacc=-00108;Yacc=+00026;Zacc=+04062;Xmag=-00362;Ymag=+00108;Zmag=-00386
Xacc=-00100;Yacc=+00018;Zacc=+04088;Xmag=-00360;Ymag=+00099;Zmag=-00419
Xacc=-00106;Yacc=+00030;Zacc=+04096;Xmag=-00357;Ymag=+00089;Zmag=-00370
Xacc=-00108; Yacc=+00030; Zacc=+04090; Xmag=-00357; Ymag=+00106; Zmag=-00391
Xacc=-00102;Yacc=+00028;Zacc=+04084;Xmag=-00372;Ymag=+00106;Zmag=-00404
Xacc=-00103;Yacc=+00034;Zacc=+04110;Xmag=-00361;Ymag=+00104;Zmag=-00400
Xacc=-00106; Yacc=+00023; Zacc=+04108; Xmag=-00349; Ymag=+00100; Zmag=-00387
Xacc=-00098;Yacc=+00020;Zacc=+04128;Xmag=-00359;Ymag=+00105;Zmag=-00390
Xacc=-00096;Yacc=+00045;Zacc=+04088;Xmag=-00362;Ymag=+00112;Zmag=-00392
```

FXOS8700CQ>



4.9 Stream XYZ Data via Interrupts (I)

This command streams sensor XYZ data (via interrupts).

The characteristic of the streamed data will be the same as the output generated by one of the four display commands explained above in Section 4.4 through 4.7; this will be specified via the *aa* parameter of this command.

NOTE

Streaming data is not recommended for ODR settings faster than 100 Hz in Hybrid (Accel+Mag) mode and faster than 200 Hz in Accel Only and Mag Only modes due to the limitations of the serial port. Streaming faster than recommended may lead to missed samples.

Press <ENTER> to stop streaming at any time

Format

I aa n<ENTER>

Input Parameter(s)

FXOS8700CO>I GN 2

aa: CN or CH or GN or GH

n: 1 for INT1 or 2 for INT2, specifying which interrupt pin to use for streaming.

Output

Data will be streamed based on command parameter and current configuration.

```
Example 12. Stream Data via Interrupts sample output
```

```
*Recommended Streaming ODR<=100Hz for HYBRID mode,*
*ODR<=200Hz for Mag Only or Accel Only modes*
 - Streaming XYZ data via INT2 in signed units
Xacc=-0.0273g;Yacc=+0.0069g;Zacc=+1.0039g;Xmag=-00035uT;Ymag=+00010uT;Zmag=-00039uT
Xacc=-0.0239g;Yacc=+0.0059g;Zacc=+0.9786g;Xmag=-00035uT;Ymag=+00009uT;Zmag=-00040uT
Xacc=-0.0259g;Yacc=+0.0074g;Zacc=+1.0083g;Xmag=-00035uT;Ymag=+00010uT;Zmag=-00041uT
Xacc=-0.0239g;Yacc=+0.0098g;Zacc=+1.0156g;Xmag=-00036uT;Ymag=+00008uT;Zmag=-00040uT
Xacc=-0.0264q;Yacc=+0.0090q;Zacc=+0.9922q;Xmaq=-00035uT;Ymaq=+00009uT;Zmaq=-00039uT
Xacc=-0.0254g;Yacc=+0.0049g;Zacc=+0.9942g;Xmag=-00036uT;Ymag=+00007uT;Zmag=-00039uT
Xacc=-0.0273g;Yacc=+0.0100g;Zacc=+1.0117g;Xmag=-00035uT;Ymag=+00008uT;Zmag=-00039uT
Xacc=-0.0278g;Yacc=+0.0103g;Zacc=+1.0000g;Xmag=-00034uT;Ymag=+00008uT;Zmag=-00039uT
Xacc=-0.0259g;Yacc=+0.0059g;Zacc=+0.9952g;Xmag=-00034uT;Ymag=+00009uT;Zmag=-00039uT
Xacc=-0.0259g;Yacc=+0.0064g;Zacc=+1.0015g;Xmag=-00036uT;Ymag=+00008uT;Zmag=-00039uT
Xacc=-0.0283g;Yacc=+0.0064g;Zacc=+1.0054g;Xmag=-00036uT;Ymag=+00010uT;Zmag=-00039uT
Xacc=-0.0249g;Yacc=+0.0083g;Zacc=+0.9976g;Xmag=-00036uT;Ymag=+00011uT;Zmag=-00038uT
Xacc=-0.0266g;Yacc=+0.0064g;Zacc=+0.9976g;Xmag=-00037uT;Ymag=+00007uT;Zmag=-00040uT
Xacc=-0.0269g;Yacc=+0.0083g;Zacc=+1.0025g;Xmag=-00036uT;Ymag=+00009uT;Zmag=-00041uT
Xacc=-0.0249g;Yacc=+0.0054g;Zacc=+1.0039g;Xmag=-00036uT;Ymag=+00008uT;Zmag=-00039uT
```

FXOS8700CQ>



4.10 Stream XYZ Data via the FIFO Buffer (F)

This command streams sensor XYZ data (via the FIFO buffer).

The characteristic of the streamed data will be the same as the output generated by one of the four display commands explained above in Section 4.4 through 4.7; this will be specified via the *aa* parameter of this command.

NOTE

Streaming data is not recommended for ODR settings faster than 100 Hz in Hybrid (Accel+Mag) mode and faster than 200 Hz in Accel Only and Mag Only modes due to the limitations of the serial port. Streaming faster than recommended may lead to missed samples.

Press <ENTER> to stop streaming at any time.

This command will enable the FIFO interrupt on INT2 pin as push-pull, active low and disable all other interrupt sources. It will put the device in ACTIVE mode if it is not in ACTIVE mode already.

Format

Faa ww<ENTER>

Input Parameter(s)

aa: CN or CH or GN or GH, specifying the data format for streaming.

ww: 1 - 31 samples per FIFO acquisition, utilizing the watermark detection feature.

0 for filling the whole buffer, utilizing the overflow detection feature.

Output

Data will be streamed based on command parameter and current configuration.



Example 13. Stream Data via the FIFO Buffer sample output

FXOS8700CQ>F GN 03 * !!! - FIFO Streaming is not possible in Mag Only mode * *Recommended Streaming ODR<=100Hz for HYBRID mode, * *ODR<=200Hz for Mag Only or Accel Only modes* - Streaming XYZ data via FIFO in signed units FIFO Watermark Samples= 3 group= 00 Xacc=-0.0288g;Yacc=+0.0005g;Zacc=+1.0078g Xacc=-0.0234g;Yacc=+0.0051g;Zacc=+0.9737g Xacc=-0.0234g;Yacc=+0.0098g;Zacc=+0.9961g FIFO Watermark Samples= 3 group= 01 Xacc=-0.0273g;Yacc=+0.0098g;Zacc=+1.0220g Xacc=-0.0239g;Yacc=+0.0049g;Zacc=+0.9918g Xacc=-0.0269g;Yacc=+0.0078g;Zacc=+0.9879g FIFO Watermark Samples= 3 group= 02 Xacc=-0.0269g;Yacc=+0.0093g;Zacc=+1.0137g Xacc=-0.0259g;Yacc=+0.0103g;Zacc=+1.0083g Xacc=-0.0230g;Yacc=+0.0078g;Zacc=+0.9893g FIFO Watermark Samples= 3 group= 03 Xacc=-0.0249g;Yacc=+0.0059g;Zacc=+0.9981g Xacc=-0.0269g;Yacc=+0.0078g;Zacc=+1.0083g Xacc=-0.0249g;Yacc=+0.0059g;Zacc=+0.9966g FIFO Watermark Samples= 3 group= 04 Xacc=-0.0264g;Yacc=+0.0039g;Zacc=+0.9981g Xacc=-0.0269g;Yacc=+0.0074g;Zacc=+1.0049g Xacc=-0.0234g;Yacc=+0.0049g;Zacc=+1.0039g FIFO Watermark Samples= 3 group= 05 Xacc=-0.0259g;Yacc=+0.0069g;Zacc=+0.9947g Xacc=-0.0244g;Yacc=+0.0069g;Zacc=+1.0054g Xacc=-0.0239g;Yacc=+0.0095g;Zacc=+1.0074g FIFO Watermark Samples= 3 group= 06 Xacc=-0.0244g;Yacc=+0.0054g;Zacc=+0.9922g Xacc=-0.0269g;Yacc=+0.0069g;Zacc=+0.9947g Xacc=-0.0264g;Yacc=+0.0093g;Zacc=+1.0078g FIFO Watermark Samples= 3 group= 07 Xacc=-0.0273g;Yacc=+0.0093g;Zacc=+1.0015g Xacc=-0.0264g;Yacc=+0.0051g;Zacc=+0.9918g Xacc=-0.0264g;Yacc=+0.0103g;Zacc=+1.0069g

FXOS8700CQ>



5 Recovering the Bootloader for Sensor Toolbox

In the zipped file, AN4460SW.zip, in the directory named Bootloader, there is an s19 image file named Bootloader.s19. This image must be programmed into the flash memory of the microprocessor on the sensor toolbox board in order to use with the PC software. The following steps recover the bootloader using CodeWarrior v6.x.

NOTE

For instructions using CodeWarrior v10.x, go to Start > Programs > Freescale CodeWarrior > CW for MCU v10.x > Documentation. On the webpage that opens up click on the FAQ Guide link and search for "How can I flash or download a binary file to the target" in the FAQ document.

1. Go to the following path C:\Program Files\Freescale\CodeWarrior for Microcontrollers V6.2\prog

NOTE

Note that actual path may be different depending on where the application is installed on host PC.

2. Double-click on the file hiwave.exe., this will initiate the True-Time Simulator & Real-Time Debugger as shown in Figure 6. If the Connection Manager window (Figure 3 on page 4) appears, click Abort.



Figure 6. True-Time Simulator and Real-Time Debugger



- 3. From the menu, go to File > Open Configuration... and select the BDM_P&E_Multilink_CyclonePro.ini file included in the AN4460SW.zip archive.
- 4. Ensure the PE Micro device is connected to the host PC. When the interface and port settings are configured correctly, click Connect (Reset). (see Figure 3 on page 4)
- 5. In the True-Time Simulator & Real-Time Debugger window (Figure 7) click on Multilink Cyclone Pro > Load... and select the file Bootloader.s19 included in the AN4460.zip. (Figure 8)

🐻 True-Time Simulator & Real-Time Debugger 🛛 C:\Program Files\F	reescale\CodeWarrior for Micr 🔳 🗖 🔀
File View Run MultilinkCyclonePro Component Command Window Help	
□☞■ ४๒€ ११ →२국44 - €	
S Source	Assembly
	LDHX #0x0100
	Register
P Procedure	A 0 HX 0 SP FF
<fca1></fca1>	Memory
Data:1	0000 06 00 C3 00 0004 C6 00 00 00 0008 00 00 00 00 0000 1F 00 00 00 0014 00 00 00 00 0014 00 00 00 00
Data:2	Postload command file does not ex:
For Help, press F1 Automatic (triggers, breakpoints, watchpo	ints, and trace possible) 9508QE8

Figure 7. True-Time Simulator and Real-Time Debugger



Figure 8. Load Executable File

6. Click on Open. In the next prompt window, click Yes (Figure 4 on page 4). A window will display information about the programming process. Once complete, the window shown in Figure 6 will remain. The bootloader is now programmed into the flash memory of the microprocessor on the sensor toolbox board. Disconnect the PE Micro device from sensor toolbox board and switch off and on the power prior to using the board with sensor toolbox PC software.



How to Reach Us:

Home Page: freescale.com

Web Support: freescale.com/support Information in this document is provided solely to enable system and software implementers to use Freescale products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document.

Freescale reserves the right to make changes without further notice to any products herein. Freescale makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in Freescale data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including "typicals," must be validated for each customer application by customer's technical experts. Freescale does not convey any license under its patent rights nor the rights of others. Freescale sells products pursuant to standard terms and conditions of sale, which can be found at the following address: freescale.com/salestermsandconditions.

Freescale, the Freescale logo, AltiVec, C-5, CodeTest, CodeWarrior, ColdFire, C-Ware, Energy Efficient Solutions logo, Kinetis, mobileGT, PowerQUICC, Processor Expert, QorlQ, Qorivva, StarCore, Symphony, and VortiQa are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Airfast, BeeKit, BeeStack, ColdFire+, CoreNet, Flexis, MagniV, MXC, Platform in a Package, QorlQ Qonverge, QUICC Engine, Ready Play, SafeAssure, SMARTMOS, TurboLink, Vybrid, and Xtrinsic are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. © 2013 Freescale Semiconductor, Inc.

Document Number: AN4460 Rev. 1 04/2013

