

# **HENSE TECHNOLOGY**

## **Application Note**

### **Converting PIC to Freescale (Motorola) HC08 Assembler**

**AN1234e**

**10/2004**

## HC908 Instructions & PIC Equivalents

Operations	Microchip		Freescale HC908	
	Instruction(s)	Bytes	Instruction	Byte
<b>Byte-Orientede file register operations</b>				
Add W and f	ADDWF	2	ADD	2
AND W with f	ANDWF	2	AND	2
Clear f	CLRF	2	CLC	2
			CLI	2
Clear W	CLRWF	2	CLR	2
Complement f	COMF	3	COM	2
			COMA	2
			COMX	2
Decrement f	DECF	2	DEC	2
Decrement f, Skip if 0	DECFSZ	2	No equivalent instruction	
Increment f	INCF	2	INC	2
Increment f, Skip if 0	INCFSZ	1	No equivalent instruction	
Inclusive OR W with f	IORWF	2	ORA	2
Move f	MOVF	4	MOV	2
Move W to f	MOVWF	2	MOV	2
No Operation	NOP	2	NOP	1
Rotate Left f through Carry	RLF	2	ROL	2
			ROLA	2
			ROLX	2
Rotate Right through Carry	RRF	2	ROR	2
			RORA	2
			RORX	2
Subtract W from f	SUBWF	2	SUB	2
Swap nibbles in f	SWAPF	2	NSA	1
Exclusive OR W with f	XORWF	2	EOR	2

<b>Bit Oriented file register operations</b>				
Bit Clear f	BCF	2	BCLR	2
Bit Set f	BSF	2	BSET	2
Bit test f, Skip if Clear	BTFSC	4	BRCLR	3
Bit test f, Skip if Set	BTFSS	4	BRSET	3

## HC908 Instructions & PIC Equivalents

Operations	Microchip		Freescale HC908	
	Instruction(s)	Bytes	Instruction	Byte
<b>Literal And Control Operations</b>				
Add literal and W	ADDLW	2	ADD	2
AND literal with W	ANDLW	2	AND	2
Call subroutine	CALL	2	BSR	2
Clear Watchdog Timer	CLRWDT	2	No equivalent instruction	
Go to address	GOTO	2	BRA	2
Inclusive OR literal with W	IORLW	2	ORA	2
Move literal to W	MOVLW	2	MOV	2
Return from interrupt	RETFIE	2	RTI	1
Return with literal in W	RETLW	2	No equivalent instruction	
Return from Subroutine	RETURN	2	RTS	1
Go into standby mode	SLEEP	2	WAIT	1
Subtract W from literal	SUBLW	2	SUB	2
Exclusive OR literal with W	XORLW	2	EOR	2

## HC908 Instructions & PIC Equivalents

Operations	PIC Instruction(s)	Bytes	HC908 Instruction(s)	Bytes
Add with Carry	BTFSS STATUS, C INCF M,F ADDWF M,F	6	ADC	3
Arithmetic Shift Left	BCF STATUS, C RLF M,F	2	ASL	3
Arithmetic Shift Right	BCF STATUS,C BTFSC M,7 BSF STATUS,C RRF M,F	8	ASR	3
Branch if Carry Bit Clear	BTFSS STATUS,C GOTO addr	4	BCC	3
Branch if Carry Bit Set	BTFSC STATUS,C GOTO addr	4	BCS	2
Branch if Equal	BTFSC STATUS,Z GOTO addr	4	BEQ	2
Branch if Greater than	BTFSS STATUS,N BNOV rel BTFSS STATUS,OV BNN rel	16	BGT	2
Branch if Half Carry Bit Clear	BTFSC STATUS,DC GOTO addr	4	BHCC	2
Branch if Half Carry Bit Set	BTFSC STATUS,DC GOTO addr	4	BHCS	2
Branch if Higher	BTFSC STATUS,C GOTO addr BTFSC STATUS,Z GOTO addr	8	BHI	2
Branch if Higher or Same	BTFSS STATUS,C GOTO addr	4	BHS	2
Branch if IRQ High	BTFSC PORTx, <pin> GOTO addr	4	BHI	2
Branch if IRQ Low	BTFSS PORTx,<pin> GOTO addr	4	BIL	2

## HC908 Instructions & PIC Equivalents

Operations	PIC Instruction(s)	Bytes	HC908 Instruction(s)	Bytes
Bit Test	MOVLW <mask> ANDWF M,W	4	BIT	3
Branch if Lower	BTFSC STATUS,C GOTO addr	4	BLO	2
Branch if Lower or Same	BTFSC STATUS,C GOTO addr BTFSC STATUS,Z GOTO addr	8	BLS	2
Branch if IRQ Mask Clear	BTFSS INTCON, GIE GOTO addr	4	BMC	2
Branch if Minus	BTFSC M,7 GOTO addr	4	BMI	2
Branch if IRQ Mask Set	BTFSC INTCON,GIE GOTO addr	4	BMS	2
Branch if Not Equal	BTFSS STATUS,Z GOTO addr	4	BNE	2
Branch if Plus	BTFSS M,7 GOTO addr	4	BPL	2
Branch if BIT n in Memory Clear	BTFSS M,n GOTO addr	4	BRCLR n	3
Branch if Bit n in Memory Set	BTFSC M,n GOTO addr	4	BRSET n	3
Compare and Branch if Equal	SUBWF M,W BTFSC STATUS,Z GOTO addr	6	CBEQ	3
Compare Index Register with Memory	MOVF M,W SUBWF FSR,W	2	CPX	2

## HC908 Instructions & PIC Equivalents

Operations	PIC Instruction(s)	Bytes	HC908 Instruction(s)	Bytes
Decimal Adjust Accumulator	ADDLW 0x06 BTFSS STATUS,DC GOTO \$+3 ADDLW 0x10 GOTO \$+2 ADDLW 0xFA GOTO \$+2 ADDLW 0xFA ADDLW 0x60 BTFSS STATUS,DC ADDLW 0xA0	18	DAA	1
Decrement and Branch if Not Zero	DECF M,F BTFFSS STATUS,Z GOTO addr	6	DBNZ	4
Divide	(Divide Routine)(AN617	<b>82</b>	DIV	<b>1</b>
Load index Register From Memory	MOVF M,W MOVWF FSR	4	LDX	3
Logical Shift Left	BCF STATUS,C RLF M,F	4	LSL	3
Logical Shift Right	BCF STATUS,C RRF M,F	4	LSR	3
Move	MOVF M,W MOVWF N	4	MOV	3
Multiply	Multply Routine	<b>42</b>	MUL	<b>1</b>
Negate (2'S Complement)	COMF M,F INCF M,F	4	NEG	2
Subtract with Carry	BTFSS STATUS,C INCF M,F SUBWF M,F	6	SBC	3
Store Index Register	MOV FSR, W MOVWF M	2	STHX	2
Store Index Register Low in Memory	MOVF FSR,W MOVWF M	2	STX	2
Test for Negative or Zero	MOVLW O SUBWF M,W	2	TST	1

HC908 Exact Instructions				
Operations	PIC Instruction(s)	Bytes	HC908 Instruction(s)	Bytes
Add Immediate Value to Stack Point Register	No Equivalent Instruction		AIS	2
Branch if Greater Than or Equal			AIX	2
Branch if Greater Than			BGE	2
Branch if Less than or Equal to			BGT	2
Branch if Less than			BLE	2
Compare index Register with memory			BLT	2
Load Index Register From Memory			CPHX	2-3
Push Accumulator onto Stack			LDHX	2-4
Push Index Register High onto Stack			PSHA	1
Push Index Register Low onto Stack			PSHH	1
Pull Accumulator from Stack			PSHX	1
Pull Index Register High from Stack			PULA	1
Pull Index Register Low from Stack			PULH	1
Reset Stack Pointer			PULX	1
Transfer Stack Pointer to Index Register			RSP	1
Transfer Index Register to Stack Pointer			TSX	1
			TXS	1



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