



QST



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QST Issue: Oct 1998

Title: Creating a PIC-Based IDer (sidebar to Using PIC Microcontrollers in Amateur Radio Projects)

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Table 2

An Assembly Language Program for a PIC Morse Code Generator

	list	p=16f84			MOVF	0E,W	
	radix	hex			INCF	0E,F	
	__config	0x3FF1			GOTO	agn3dit	;loop up and do it again.
dahlen	equ	d'99' ;	<==controls code speed..	enddit	MOVLW	3C	;add a small delay
			;increase		MOVWF	10	
ditlen	equ	d'33' ;	<==(though not over 255) for		CALL	time	
	org	0x000	;slower code, decrease for		RETLW	00	
	MOVLW	00	;faster code. Make sure the				
	MOVWF	0A	;top number is three times	lspace		0xB4	;subroutine to make a
			;the bottom.				;letter space
	GOTO	start			MOVLW		
	NOP				MOVWF	10	
	NOP				CALL	time	
	NOP				RETLW	00	
time	MOVF	10,W					
	BTFSC	03,2		start	CLRF	04	;MAIN PROGRAM
	GOTO	endtime					;STARTS HERE
uptop	MOVLW	01			MOVLW	0xFD	
	MOVWF	0D			TRIS	6	
upagn	CLRF	0C					
doagn	DECFSZ	0C,F		top	CALL	dit	;modify this code to
	GOTO	doagn					;xmit the
	DECFSZ	0D,F			CALL	dah	;CW you want to send
	GOTO	upagn			CALL	dah	
	MOVLW	4A			CALL	lspace	;lspace is a pause for
	MOVWF	0C					;the space between
upone	DECFSZ	0C,F			CALL	dit	;letters. Include it after
	GOTO	upone					;each letter.
	DECFSZ	10,F			CALL	dit	;As it appears here, the
	GOTO	uptop					;IDer will
endtime	RETLW	00					;transmit W2FS
					CALL	dah	
dah	MOVLW	01	;subroutine to do a dah		CALL	dah	
	MOVWF	0E			CALL	dah	
agn3dah	MOVLW	dahlen			CALL	lspace	
	SUBWF	0E,W			CALL	dit	
	BTFSC	03,0			CALL	dit	
	GOTO	enddah			CALL	dah	
	BSF	06,1	;turn on pin B1		CALL	dit	
	MOVLW	01			CALL	lspace	
	MOVWF	10			CALL	dit	
	CALL	time	;wait 1 millisecond		CALL	dit	
	BCF	06,1	;turn off pin B1		CALL	dit	
	MOVLW	01					
	MOVWF	10			MOVLW	01	
	CALL	time	;wait 1 millisecond		MOVWF	0E	
	MOVF	0E,W					;this code programs the
	INCF	0E,F		loop			;delay between IDs.
	GOTO	agn3dah	;loop up to do it again.		MOVLW	d'150'	<= 4 x this number =
enddah	MOVLW	3C	;add a small delay				;number of seconds
	MOVWF	10			SUBWF	0E,W	; between IDs when
	CALL	time					;using a 4 MHz resona-
	RETLW	00					;tor.
					BTFSC	03,0	
dit	MOVLW	01	;subroutine to do a dit		GOTO	bottom	
	MOVWF	0E			MOVLW	10	
agn3dit	MOVLW	ditlen		again	MOVWF	0F	
	SUBWF	0E,W			MOVLW	0xFA	
	BTFSC	03,0			MOVWF	10	
	GOTO	enddit			CALL	time	
	BSF	06,1	;turn on pin B1		DECFSZ	0F,F	
	MOVLW	01			GOTO	again	
	MOVWF	10			MOVF	0E,W	
	CALL	time	; wait 1 millisecond		INCF	0E,F	
	BCF	06,1	;turn off pin B1	bottom	GOTO	loop	
	MOVLW	01			GOTO	top	
	MOVWF	10			END		
	CALL	time	;wait 1 millisecond				

Creating a PIC-Based IDer

Table 2 contains the assembly-language code that makes a 16F84 PIC generate Morse code. The code is designed to work with the circuit of Figure 1, using a ceramic resonator or a 3.5795-MHz colorburst crystal. Audio output is obtained at pin RB1. The program is designed to be easy to modify to insert your choice of call sign, Morse code speed and transmit interval. To change the Morse code speed, alter the lines labeled "dahlen" and "ditlen." To change the ID interval, change the number between the apostrophes in the line labeled "loop." Change the lines that start with the label "top" to change the call sign (or other text) that is to be transmitted by the chip. Follow the pattern shown in the program and make sure you put an "lspace" after the end of each letter. If you plan to transmit text other than just a call sign, you can do this by adding extra "lspace" instructions to create longer delays between the words. When altering this code, be sure to keep the label "top" on the same line as the first code element to be sent.

If you type in the program yourself, you may leave out the comments on each line by dropping the semicolon and the text that follows it. Blank lines can either be left in or deleted as you prefer. Alternatively, you can download this file from the ARRL's FTP site and edit it. The program may look long, but it only uses about 10% of the program capacity of a 16F84.