
Using the 93LC56 and 93LC66

INTRODUCTION

The Microchip Technology Inc. 93LC56/66 are low-power 3-wire non-volatile memories and are suitable for many embedded system code and data storage applications. These devices are easily interfaced to most microcontrollers in today's market place, but Microchip's 8-bit RISC series PIC16CXX offers the best code density of any microcontroller on the market today. Using the PIC16C54, the assembly programs contained in this application note have been fully tested and provide the correct timing and 3-wire sequences to fully operate the 93LC56/66 in a PIC16CXX-based embedded application. The PIC16C54 was clocked at a 10MHz frequency. This application note is intended to provide the engineer with readily available stand-alone code modules to accomplish all of the necessary functions to utilize these devices in a low power application using the efficient PIC16C54 microcontroller.

The 93 series of devices have essentially four I/O pins:

CS Chip Select
CLK Clock
DI Data In
DO Data Out

This series of devices use a series of commands to accomplish the normal memory functions. These are READ, WRITE, EWEN, ERASE, ERAL, WRAL, EWDS. For a more detailed discussion of the function of these devices reference the appropriate data sheet and AN536, also published by Microchip Technology.

The following programs are included in this application note and are fully functional stand-alone modules. They are intended for use by those who are not already familiar with interfacing a PIC16CXX microcontroller to a 93 series device. For those with more experience, please refer to application note AN530.

3-Wire Byte Read Program

- Start Bit Routine
- Receive Data Routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine
- Read Routine

3-Wire Byte Write Program

- Delay Routine
- Start Bit Routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine
- Erase/Write Enable Routine (EWEN)
- Byte Write Routine
- Erase/Write Disable Routine (EWDS)

3-Wire Byte Write with Data Polling Program

- Data Polling Delay Routine
- Start Bit Routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine
- Erase/Write Enable Routine
- Write Routine
- Erase/Write Disable Routine (EWDS)

3-Wire Sequential Read Program

- Delay Routine
- Start Bit Routine
- Bit In Routine
- Receive Data Routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine
- Read Routine

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Line PC Opcode

```
0001          LIST P=16C54,c=132
0002          ;*****
0003          ;      3-Wire Byte Read Program (80 bytes)
0004          ;
0005          ;      This program demonstrates how to interface a
0006          ;      Microchip PIC16C54 to a 93LC56 or 93LC66 Serial EE
0007          ;      device. This program will read 8 consecutive addresses
0008          ;      in the 'random read' mode. This means that the opcode
0009          ;      and address for each byte will be sent to the device.
0010          ;      This program will repeat forever.
0011          ;
0012          ;      Another, more efficient method of reading consecutive
0013          ;      addresses is called the 'sequential read' mode. This
0014          ;      involves sending the opcode and address for the first
0015          ;      byte to read, then continuing to provide clocks for the
0016          ;      next addresses. The device will automatically increment
0017          ;      the address. An example of the sequential read mode is
0018          ;      provided in the '3wseqr.asm' file.
0019          ;
0020          ;      This program communicates to the serial EE in the
0021          ;      x16 mode, and ASSUMES THE USER HAS SET THE ORG PIN
0022          ;      ON THE DEVICE TO Vcc.
0023          ;
0024          ;      Timing is based on using the PIC16C54 in 'XT' mode
0025          ;      using a 4Mhz crystal. Clock speeds to the serial EE
0026          ;      will be approximately 50 kHz for this setup.
0027          ;
0028          ;      PIC16C54 to Serial EE Connections:
0029          ;
0030          ;      PIC16C54      Serial EE
0031          ;      _____
0032          ;      Pin 10 (RB4) -> Chip Select
0033          ;      Pin 11 (RB5) -> Clock
0034          ;      Pin 12 (RB6) -> Data In
0035          ;      Pin 13 (RB7) -> Data Out
0036          ;
0037          ;      ORG = Vcc
0038          ;*****
0039          ;      Register Assignments
0040          ;*****
0041          0003 status equ 3h      ; status register
0042          0005 port_a equ 5h      ; port 5 (port_a)
0043          0006 port_b equ 6h      ; port 6 (port b) comm lines to serial EE
0044          000A eeprom equ 0ah     ; bit buffer
0045          000C addr equ 0ch       ; address register
0046          000D datai equ 0dh      ; stored data input reg.
0047          000E datao equ 0eh      ; stored data output reg.
0048          0010 txbuf equ 10h     ; transmit buffer
0049          0011 count equ 11h     ; bits transmitted so far
0050          0012 bits equ 12h      ; bits to transmit
0051          0013 bytcnt equ 13h    ; byte counter for read routine
```

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Line PC Opcode

```
0052          0015 loops equ 15h   ; delay loop counter
0053          0016 loops2 equ 16h   ; delay loop counter
0054          0017 hbyte equ 17h    ; high byte for input data
0055          0018 lbyte equ 18h    ; low byte for input data
0056          ;*****
0057          ;      Bit Assignments
0058          ;*****
0059          0007 di equ 7          ; eeprom input
0060          0006 do equ 6          ; eeprom output
```

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```

0061      0007  datout  equ   7      ; data out line (port_b)
0062      0006  datin   equ   6      ; data in line (port_b)
0063      0005  sclk    equ   5      ; clock line (port_b)
0064      0004  chpsel  equ   4      ; chip select line (port_b)
0065      ;
0066      ;*****
0067      0000          org   01ffh
0068  01FF  0A33  begin   goto   PWRUP  ; set the reset vector
0069      0000          org   000h
0070  0000  0A33          goto   PWRUP
0071      ;
0072      ;*****
0073      ;      Start Bit Subroutine
0074      ;      this routine generates a start bit
0075      ;      (Chip select and DI high when clock goes high)
0076      ;*****
0077      BSTART
0078      0001  04C6      bcf     port_b,datin  ; set datain and chipselect lines
0079      0002  0486      bcf     port_b,chpsel ; low just to check operation
0080      0003  04A6      bcf     port_b,sclk   ; make sure clock starts low too.
0081      0004  0000      nop
0082      ;
0083      0005  0586      bsf     port_b,chpsel ; set chip select line high
0084      0006  05C6      bsf     port_b,datin  ; set data in line high
0085      0007  0000      nop
0086      0008  05A6      bsf     port_b,sclk   ; set the clock line high to
0087      ; generate the start bit
0088      0009  0000      nop
0089      000A  0000      nop
0090      000B  04A6      bcf     port_b,sclk   ; set clock low again
0091      000C  0800      retlw   0
0092      ;
0093      ;*****
0094      ;      BITIN routine reads one bit of data from the
0095      ;      serial EE device and stores it in 'di'
0096      ;*****
0097      BITIN
0098      000D  05EA      bsf     eeprom,di     ; assume input bit is high
0099      000E  05A6      bsf     port_b,sclk   ; set clock line high
0100      000F  0000      nop
0101      0010  07E6      btfsz   port_b,datout ; read the data bit
0102      0011  04EA      bcf     eeprom,di     ; input bit was low

```

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Line	PC	Opcode			
0103	0012	04A6	bcf	port_b,sclk	; set clock line low
0104					
0105	0013	0800	retlw	0	
0106					
0107			;*****		
0108			; Receive data routine		
0109			; This routine reads one byte of data from the part		
0110			; into the 'datai' register.		
0111			;*****		
0112			RX		
0113	0014	006D	clrf	datai	; clear input buffer
0114	0015	0C08	movlw	.8	; set # bits to 8
0115	0016	0031	movwf	count	
0116	0017	0403	bcf	status,0	; make sure carry bit is low
0117	0018	036D	rlf	datai	; rotate the buffer left 1 bit
0118	0019	090D	call	BITIN	; read 1 bit
0119	001A	040D	bcf	datai,0	; assume the input bit was low
0120	001B	06EA	btfsz	eeprom,di	; check the bit
0121	001C	050D	bsf	datai,0	; set high if neccessary
0122	001D	02F1	decfsz	count	; 8 bits done?
0123	001E	0A18	goto	RXLP	; no, do another
0124	001F	0800	retlw	0	

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```
0125      ;
0126      ;*****
0127      ;      BITOUT routine
0128      ;      This routine takes one bit of data in 'do' and
0129      ;      transmits it to the serial EE device
0130      ;*****
0131      BITOUT
0132      0020 07CA      btfss    eeprom,do      ; check state of data bit
0133      0021 0A24      goto     bitlow         ; low, goto bitlow
0134      0022 05C6      bsf      port_b,datin   ; high, set datain high
0135      0023 0A25      goto     clkout         ; and clock it
0136      ;
0137      0024 04C6      bitlow   bcf      port_b,datin   ; output a logic low
0138      0025 05A6      clkout   bsf      port_b,sclk    ; set clock line high
0139      0026 0000      nop
0140      0027 04A6      bcf      port_b,sclk    ; return clock line low
0141      0028 0800      retlw    0
0142      ;
0143      ;*****
0144      ;      Transmit Data Subroutine
0145      ;      This routine takes the byte of data stored in the
0146      ;      'datao' register and transmits it to the serial EE device.
0147      ;*****
0148      TX
0149      0029 0212      movf     bits,w          ; set the number of bits to xmit
0150      002A 0031      movwf    count
0151      ;
0152      TXLP
0153      002B 04CA      bcf      eeprom,do      ; assume bit 7 is low
```

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Line	PC	Opcode
0154	002C	06F0
0155	002D	05CA
0156	002E	0920
0157	002F	0370
0158	0030	02F1
0159	0031	0A2B
0160	0032	0800
0161		
0162		
0163		
0164		
0165		
0166		
0167		
0168		
0169		
0170	0033	0C00
0171	0034	0005
0172	0035	0065
0173		
0174	0036	0C80
0175	0037	0006
0176		
0177		
0178		
0179		
0180		
0181		
0182		
0183		
0184		
0185		
0186		
0187	0038	0C00
0188	0039	002C

```
0154      btfsc    txbuf,7      ; is bit 7 clear?
0155      bsf      eeprom,do     ; no, set data bit =1
0156      call     BITOUT        ; transmit 1 bit to serial EE
0157      rlf      txbuf         ; rotate txbuf left
0158      decfsz   count         ; all bits done?
0159      goto     TXLP          ; no, do another bit
0160      retlw    0             ; yes, jump out
0161      ;
0162      ;*****
0163      ;      POWER-UP ROUTINE
0164      ;      This is the program entry point, which in this case simply
0165      ;      sets the port_a I/O lines and directs control to the
0166      ;      read routine.
0167      ;*****
0168      PWRUP
0169      ;
0170      movlw    b'00000000'
0171      tris     port_a         ; set port_a as all output
0172      clrfs   port_a         ; all lines low
0173      ;
0174      movlw    b'10000000'
0175      tris     port_b         ; set RB7 as input, rest output;
0176      ;
0177      ;      Fall through and do the read
0178      ;
0179      ;*****
0180      ;      READ ROUTINE
0181      ;      This routine reads 8 consecutive addresses in
0182      ;      random mode starting at address 0. This is done in
0183      ;      x16 mode and will repeat forever.
0184      ;*****
0185      READ
0186      ;
0187      movlw    .0             ; set starting address to 00
0188      movwf    addr           ;
```

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```

0189 003A 0C08      movlw  .8          ; set number of addresses to
0190 003B 0033      movwf  bytcnt      ; read as 8
0191                                     ;
0192 003C 0901 rbyte call  BSTART      ; generate the start bit
0193 003D 0C02      movlw  .2          ; set # bits to 2
0194 003E 0032      movwf  bits        ;
0195 003F 0C80      movlw  b'10000000' ; get opcode (10b)
0196 0040 0030      movwf  txbuf       ; into output buffer
0197 0041 0929      call   TX          ; and transmit it
0198 0042 0C08      movlw  .8          ;
0199 0043 0032      movwf  bits        ; set number of bits to 8
0200 0044 020C      movf   addr,w      ; get the address
0201 0045 0030      movwf  txbuf       ; into the output buffer
0202 0046 0929      call   TX          ; and transmit it
0203
0204 0047 0914      call   RX          ; read the high byte

```

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Line	PC	Opcode			
0205	0048	020D	movf	datai,w	; move input data to w
0206	0049	0037	movwf	hbyte	; xfer it to high byte
0207					
0208	004A	0914	call	RX	; read the low byte
0209	004B	020D	movf	datai,w	; move input data to w
0210	004C	0037	movwf	hbyte	; xfer it to low byte
0211					
0212	004D	0486	bcf	port_b,chpsel	; clear the chip select line
0213					
0214	004E	02AC	incf	addr	; add 1 to the address
0215	004F	02F3	decfsz	bytcnt	; have all bytes been read?
0216	0050	0A3C	goto	rbyte	; no, read another byte
0217	0051	0A38	goto	READ	; yes, start over
0218		0000	END		

Using the 93LC56 and 93LC66

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Line PC Opcode

```
0001                LIST P=16C54,c=132
0002                ;*****
0003                ;      3-Wire Byte Write Program (106 bytes)
0004                ;
0005                ;      This program demonstrates how to interface a
0006                ;      Microchip PIC16C54 to a 93LC56 or 93LC66 Serial EE
0007                ;      device. This program will execute the erase/write enable
0008                ;      command, write to 8 consecutive addresses, and then
0009                ;      execute the erase/write disable command. This
0010                ;      sequence will repeat forever.
0011                ;
0012                ;      After each byte is written, time must be given to the
0013                ;      device for it to complete the write cycle before
0014                ;      the next command can be sent. The easiest solution
0015                ;      is to consult the data book for the maximum write
0016                ;      cycle time and just wait that long before the next
0017                ;      command is sent. This program demonstrates that
0018                ;      solution.
0019                ;
0020                ;      Another, more efficient method of determining when the
0021                ;      write cycle is complete is called 'data polling.' This
0022                ;      method is demonstrated in the program "3wdpoll."
0023                ;
0024                ;      This program communicates to the serial EE in the
0025                ;      x16 mode, and ASSUMES THE USER HAS SET THE ORG PIN
0026                ;      ON THE DEVICE TO Vcc.
0027                ;
0028                ;      Timing is based on using the PIC16C54 in 'XT' mode
0029                ;      using a 4Mhz crystal. Clock speeds to the serial EE
0030                ;      will be approximately 40 kHz for this setup.
0031                ;
0032                ;      PIC16C54 to Serial EE Connections:
0033                ;
0034                ;      PIC16C54      Serial EE
0035                ;      _____
0036                ;      Pin 10 (RB4) -> Chip Select
0037                ;      Pin 11 (RB5) -> Clock
0038                ;      Pin 12 (RB6) -> Data In
0039                ;      Pin 13 (RB7) -> Data Out
0040                ;      ORG=Vcc
0041                ;
0042                ;*****
0043                ;      Register Assignments
0044                ;*****
0045                0005 port_a equ 5h      ; port 5 (port_a)
0046                0006 port_b equ 6h      ; port 6 (port b) comm lines to serial EE
0047                000A eeprom equ 0ah     ; bit buffer
0048                000C addr equ 0ch       ; address register
0049                000D datai equ 0dh       ; stored data input reg.
0050                000E datao equ 0eh       ; stored data output reg.
0051                0010 txbuf equ 10h      ; transmit buffer
```

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Line PC Opcode

```
0052                0011 count equ 11h    ; bits transmitted so far
0053                0012 bits equ 12h       ; bits to transmit
0054                0013 bytcnt equ 13h      ; byte counter for write routine
0055                0015 loops equ 15h       ; delay loop counter
0056                0016 loops2 equ 16h      ; delay loop counter ;
0057                ;*****
0058                ;      Bit Assignments
0059                ;*****
0060                0007 di equ 7            ; eeprom input
```

Using the 93LC56 and 93LC66

```

0061      0006 do      equ    6      ; eeprom output
0062      0007 datout  equ    7      ; data out line (port_b)
0063      0006 datin   equ    6      ; data in line (port_b)
0064      0005 sclk    equ    5      ; clock line (port_b)
0065      0004 chpsel  equ    4      ; chip select line (port_b)
0066      ;
0067      ;*****
0068      0000      org    01ffh
0069      01FF 0A2F begin  goto    PWRUP ; set the reset vector
0070      0000      org    000h
0071      0000 0A2F      goto    PWRUP
0072      ;
0073      ;*****
0074      ;      DELAY ROUTINE
0075      ;      This routine takes the value in 'loops'
0076      ;      and multiplies it times 1 millisecond to
0077      ;      determine delay time.
0078      ;*****
0079      WAIT
0080      ;
0081      0001 0C6E top    movlw   .110      ; timing adjustment variable
0082      0002 0036      movwf   loops2
0083      0003 0000 top2  nop              ; sit and wait
0084      0004 0000      nop
0085      0005 0000      nop
0086      0006 0000      nop
0087      0007 0000      nop
0088      0008 0000      nop
0089      0009 02F6      decfsz  loops2      ; inner loops complete?
0090      000A 0A03      goto    top2        ; no, go again
0091      ;
0092      000B 02F5      decfsz  loops        ; outer loops complete?
0093      000C 0A01      goto    top        ; no, go again
0094      000D 0800      retlw   0          ; yes, return from sub
0095      ;
0096      ;*****
0097      ;      Start Bit Subroutine
0098      ;      this routine generates a start bit
0099      ;      (Chip select and DI high when clock goes high)
0100      ;*****
0101      BSTART
0102      000E 0C8F      movlw   b'10001111'

```

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Line	PC	Opcode			
0103	000F	0006	tris	port_b	; set port b for output
0104					; except for the data out line
0105	0010	04C6	bcf	port_b,datin	; set datain and chipselect lines
0106	0011	0486	bcf	port_b,chpsel	; low just to check operation
0107	0012	04A6	bcf	port_b,sclk	; make sure clock starts low too.
0108	0013	0000	nop		
0109					
0110	0014	0586	bsf	port_b,chpsel	; set chip select line high
0111	0015	05C6	bsf	port_b,datin	; set data in line high
0112	0016	0000	nop		
0113	0017	05A6	bsf	port_b,sclk	; set the clock line high to
0114					; generate the start bit
0115	0018	0000	nop		
0116	0019	0000	nop		
0117	001A	04A6	bcf	port_b,sclk	; set clock low again
0118	001B	0800	retlw	0	
0119					
0120					;*****
0121					; BITOUT routine
0122					; This routine takes one bit of data in 'do' and
0123					; transmits it to the serial EE device
0124					;*****

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```
0125          BITOUT
0126 001C 07CA      btfss  eeprom,do      ; check state of data bit
0127 001D 0A20      goto   bitlow         ; low, goto bitlow
0128 001E 05C6      bsf     port_b,datin   ; high, set datain high
0129 001F 0A21      goto   clkout         ; and clock it
0130
0131 0020 04C6 bitlow bcf     port_b,datin   ; output a logic low
0132 0021 05A6 clkout bsf     port_b,sclk   ; set clock line high
0133 0022 0000      nop
0134 0023 04A6      bcf     port_b,sclk     ; return clock line low
0135 0024 0800      retlw   0
0136
0137          ;*****
0138          ; Transmit Data Subroutine
0139          ; This routine takes the byte of data stored in the
0140          ; 'datao' register and transmits it to the serial EE device.
0141          ;*****
0142          TX
0143 0025 0212      movf    bits,w          ; set the number of bits to xmit
0144 0026 0031      movwf   count
0145
0146          TXLP
0147 0027 04CA      bcf     eeprom,do      ; assume bit 7 is low
0148 0028 06F0      btfsc   txbuf,7        ; is bit 7 clear?
0149 0029 05CA      bsf     eeprom,do      ; no, set data bit =1
0150 002A 091C      call    BITOUT         ; transmit 1 bit to serial EE
0151 002B 0370      rlf     txbuf          ; rotate txbuf left
0152 002C 02F1      decfsz  count          ; all bits done?
0153 002D 0A27      goto    TXLP          ; no, do another bit
```

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```
Line  PC  Opcode
0154 002E 0800      retlw   0            ; yes, jump out
0155
0156          ;*****
0157          ; POWER-UP ROUTINE
0158          ; This is the program entry point, which in this case simply
0159          ; sets the port_a I/O lines and directs control to the
0160          ; erase/write enable routine.
0161          ;*****
0162          PWRUP
0163          ;
0164 002F 0C00      movlw   b'00000000'
0165 0030 0005      tris    port_a          ; set port_a as all output
0166 0031 0065      clrf    port_a          ; all lines low
0167
0168 0032 0C80      movlw   b'10000000'
0169 0033 0006      tris    port_b          ; set RB7 as input, rest output;
0170
0171          ; Fall through and do erase/write enable
0172          ;
0173          ;*****
0174          ; EWEN (Erase/Write ENable Routine)
0175          ; this routine enables the dut for erasing and
0176          ; writing. This must be done prior to any erase,write
0177          ; eral,wral instructions.
0178          ;*****
0179          EWEN
0180          ;
0181 0034 090E      call    BSTART          ; generate a start bit
0182
0183 0035 0C02      movlw   .2            ; set # bits to 2
0184 0036 0032      movwf   bits          ;
0185 0037 0C00      movlw   b'00000000'   ; get the opcode (00b)
0186 0038 0030      movwf   txbuf         ; into the output buffer
0187 0039 0925      call    TX            ; and transmit it
0188 003A 0C08      movlw   .8            ; set # bits to 8
```


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```

0189 003B 0032      movwf  bits          ;
0190 003C 0CC0      movlw  b'11000000'    ; get opcode and address
0191                      ;      (11XXXXXX)
0192 003D 0030      movwf  txbuf          ; into output buffer
0193 003E 0925      call   TX              ; and transmit it
0194 003F 0486      bcf    port_b,chpsel  ; set chip select line low
0195 0040 0000      nop
0196                      ;
0197                      ;      Now continue on to the write command
0198                      ;
0199                      ;*****
0200                      ;      Byte Write Routine
0201                      ;      This routine writes an AA55h pattern into
0202                      ;      8 consecutive addresses starting at address 00.
0203                      ;      A delay of about 10ms is given after each byte
0204                      ;      for the write cycle to complete.

```

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Line	PC	Opcode			
0205			;	The write is done in the x16 mode: the user must	
0206			;	have the ORG pin tied to Vcc on the device	
0207			;	*****	
0208			WRITE		
0209			;		
0210	0041	0C00	movlw	.0	; set starting address to 00
0211	0042	002C	movwf	addr	;
0212	0043	0C08	movlw	.8	; set number of bytes to write as 8
0213	0044	0033	movwf	bytcnt	;
0214					;
0215	0045	090E	topwr	call	BSTART ; generate the start bit
0216					;
0217	0046	0C02	movlw	.2	; set # bits to 2 for the opcode
0218	0047	0032	movwf	bits	;
0219	0048	0C40	movlw	b'01000000'	; get opcode (01b)
0220	0049	0030	movwf	txbuf	; into the transmit buffer
0221	004A	0925	call	TX	; and send it
0222					;
0223	004B	0C08	movlw	.8	; set # of bits to 8 for the
0224	004C	0032	movwf	bits	; address
0225	004D	020C	movf	addr,w	; get address counter
0226	004E	0030	movwf	txbuf	; into output buffer
0227	004F	0925	call	TX	; and send it
0228	0050	0CAA	movlw	b'10101010'	; get upper byte of data (AAh)
0229	0051	0030	movwf	txbuf	; into the transmit buffer
0230	0052	0925	call	TX	; and send it
0231	0053	0C55	movlw	b'01010101'	; get lower byte of data (55h)
0232	0054	0030	movwf	txbuf	; into transmit buffer
0233	0055	0925	call	TX	; and send it
0234					;
0235	0056	0486	bcf	port_b,chpsel	; clear the chip select line
0236					; to initiate write cycle
0237					;
0238	0057	0C0A	movlw	.10	;
0239	0058	0035	movwf	loops	; set delay time to 10mS
0240	0059	0901	call	WAIT	; and wait
0241					;
0242	005A	02AC	incf	addr	; increment address counter
0243	005B	02F3	decfsz	bytcnt	; all bytes written?
0244	005C	0A45	goto	topwr	; no, do another
0245					; yes, go on
0246			;		
0247			;	Now continue on to the erase/write disable command	
0248			;		
0249			;	*****	
0250			;	EWDS (Erase/Write Disable Routine)	
0251			;	This routine executes the erase/write disable command	
0252			;	which prevents the contents of the array from being	

Using the 93LC56 and 93LC66

```
0253          ;          written to.
0254          ;
0255          ;*****
```

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Line PC Opcode

```
0256          EWDS
0257          ;
0258 005D 090E          call    BSTART          ; generate a start bit
0259          ;
0260 005E 0C02          movlw   .2              ; set # bits to 2
0261 005F 0032          movwf   bits            ;
0262 0060 0C00          movlw   b'00000000'      ; get the opcode (00b)
0263 0061 0030          movwf   txbuf          ; into the output buffer
0264 0062 0925          call    TX              ; and transmit it
0265 0063 0C08          movlw   .8              ; set # bits to 8
0266 0064 0032          movwf   bits            ;
0267 0065 0C00          movlw   b'00000000'      ; get opcode and address
0268          ;                                ; (00XXXXXX)
0269 0066 0030          movwf   txbuf          ; into output buffer
0270 0067 0925          call    TX              ; and transmit it
0271 0068 0486          bcf     port_b,chpsel    ; set chip select line low
0272 0069 0000          nop
0273 006A 0A34          goto    EWEN            ; start all over
0274          ;
0275          0000  END
```

Using the 93LC56 and 93LC66

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```
Line   PC   Opcode

0001                                LIST P=16C54,c=132
0002                ;*****
0003                ;       3-Wire Byte Write with Data Poll Program (107 bytes)
0004                ;
0005                ;       This program demonstrates how to interface a
0006                ;       Microchip PIC16C54 to a 93LC56 or 93LC66 Serial EE
0007                ;       device. This program will execute the erase/write enable
0008                ;       command, write to 8 consecutive addresses, and then
0009                ;       use the 'data polling' method to determine when the
0010                ;       write cycle is complete. The program then executes
0011                ;       the erase/write disable command. This sequence will
0012                ;       repeat forever.
0013                ;
0014                ;       When writing to a 3-wire serial EE device, the
0015                ;       internally timed write cycle will begin after
0016                ;       the opcode, address and data are sent to the
0017                ;       device. There are two ways to make sure that the
0018                ;       cycle is complete before you send it another command.
0019                ;       The simplest method is to simply wait for the maximum
0020                ;       write cycle time, which can be obtained from the data book.
0021                ;       A more efficient method is "Data polling." This is
0022                ;       done by toggling the chip select line low and then
0023                ;       back high after the opcode, address and data are sent.
0024                ;       The chip select line must be low for at least 250ns
0025                ;       before bringing it high again. The device will pull
0026                ;       the data out line low at that point, and set it high
0027                ;       when the write cycle is complete. The user can then check
0028                ;       or "poll" the dataout line until it goes high before
0029                ;       sending the next command.
0030                ;
0031                ;       As an option, the user can connect a LED to pin 18
0032                ;       on the PIC16C54 (use about a 1K resistor in series) as a
0033                ;       timeout indicator. This LED will come on if the
0034                ;       data polling is unsuccessful and the device being
0035                ;       programmed does not respond. This can be tested by
0036                ;       simply running the program with no part in the socket.
0037                ;
0038                ;       This program communicates to the serial EE in the
0039                ;       x16 mode, and ASSUMES THE USER HAS SET THE ORG PIN
0040                ;       ON THE DEVICE TO Vcc.
0041                ;
0042                ;       Timing is based on using the PIC16C54 in 'XT' mode
0043                ;       using a 4Mhz crystal. Clock speeds to the serial EE
0044                ;       will be approximately 50 kHz for this setup.
0045                ;
0046                ;       PIC16C54 to Serial EE Connections:
0047                ;
0048                ;       PIC16C54      Serial EE
0049                ;       _____
0050                ;       Pin 10 (RB4) -> Chip Select
0051                ;       Pin 11 (RB5) -> Clock
```

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```
Line   PC   Opcode

0052                ;       Pin 12 (RB6) -> Data In
0053                ;       Pin 13 (RB7) -> Data Out
0054                ;       ORG=Vcc
0055                ;
0056                ;*****
0057                ;       Register Assignments
0058                ;*****
0059    0005 port_a equ    5h      ; port 5 (port_a)
0060    0006 port_b equ    6h      ; port 6 (port b) used comm lines to serial EE
```

Using the 93LC56 and 93LC66

```
0061      000A  eeprom equ  0ah      ; bit buffer
0062      000C  addr  equ  0ch      ; address register
0063      000D  datai  equ  0dh      ; stored data input reg.
0064      000E  datao  equ  0eh      ; stored data output reg.
0065      0010  txbuf  equ  10h     ; transmit buffer
0066      0011  count  equ  11h     ; bits transmitted so far
0067      0012  bits   equ  12h     ; bits to transmit
0068      0013  bytcnt  equ  13h     ; byte counter for write routine
0069      0015  loops   equ  15h     ; delay loop counter
0070      0016  loops2  equ  16h     ; delay loop counter
0071      ;*****
0072      ;          Bit Assignments
0073      ;*****
0074      0007  di      equ  7        ; eeprom input
0075      0006  do      equ  6        ; eeprom output
0076      0007  datout  equ  7        ; data out line (port_b)
0077      0006  datin   equ  6        ; data in line (port_b)
0078      0005  sclk    equ  5        ; clock line (port_b)
0079      0004  chpsel  equ  4        ; chip select line (port_b)
0080      0001  timeout equ  1        ; write cycle timeout warning (port_a)
0081      ;
0082      ;*****
0083      0000      org  01ffh
0084  01FF 0A26  begin  goto  PWRUP    ; set the reset vector
0085      0000      org  000h
0086  0000 0A26      goto  PWRUP
0087      ;
0088      ;*****
0089      ;          DATA POLL DELAY ROUTINE
0090      ;          This routine delays 100 us is
0091      ;          used for delay between polls
0092      ;*****
0093      dpdelay
0094      ;
0095      0001  0C19      movlw  .25      ; timing adjustment variable
0096      0002  0036      movwf  loops2
0097      0003  0000      top      nop
0098      0004  02F6      decfsz loops2    ; loops complete?
0099      0005  0A03      goto   top      ; no, go again
0100      ;
0101      0006  0800      retlw  0        ; yes, return from sub
0102      ;
```

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```
Line  PC  Opcode

0103      ;*****
0104      ;          Start Bit Subroutine
0105      ;          this routine generates a start bit
0106      ;          (Chip select and DI high when clock goes high)
0107      ;*****
0108      BSTART
0109      0007  04C6      bcf      port_b,datin ; set datain and chipselect lines
0110      0008  0486      bcf      port_b,chpsel ; low just to check operation
0111      0009  04A6      bcf      port_b,sclk  ; make sure clock starts low too.
0112      000A  0000      nop
0113      ;
0114      000B  0586      bsf      port_b,chpsel ; set chip select line high
0115      000C  05C6      bsf      port_b,datin ; set data in line high
0116      000D  0000      nop
0117      000E  05A6      bsf      port_b,sclk  ; set the clock line high to
0118      ; generate the start bit
0119      000F  0000      nop
0120      0010  0000      nop
0121      0011  04A6      bcf      port_b,sclk  ; set clock low again
0122      0012  0800      retlw  0
0123      ;
0124      ;*****
```

Using the 93LC56 and 93LC66

```

0125      ;      BITOUT routine
0126      ;      This routine takes one bit of data in 'do' and
0127      ;      transmits it to the serial EE device
0128      ;*****
0129      BITOUT
0130      0013      07CA      btfss      eeprom,do      ; check state of data bit
0131      0014      0A17      goto      bitlow      ; low, goto bitlow
0132      0015      05C6      bsf      port_b,datin      ; high, set datain high
0133      0016      0A18      goto      clkout      ; and clock it
0134      ;
0135      0017      04C6      bitlow      bcf      port_b,datin      ; output a logic low
0136      0018      05A6      clkout      bsf      port_b,sclk      ; set clock line high
0137      0019      0000      nop
0138      001A      04A6      bcf      port_b,sclk      ; return clock line low
0139      001B      0800      retlw      0
0140      ;
0141      ;*****
0142      ;      Transmit Data Subroutine
0143      ;      This routine takes the byte of data stored in the
0144      ;      'datao' register and transmits it to the serial EE device.
0145      ;*****
0146      TX
0147      001C      0212      movf      bits,w      ; set the number of bits to xmit
0148      001D      0031      movwf      count
0149      ;
0150      TXLP
0151      001E      04CA      bcf      eeprom,do      ; assume bit 7 is low
0152      001F      06F0      btfsc      txbuf,7      ; is bit 7 clear?
0153      0020      05CA      bsf      eeprom,do      ; no, set data bit =1

```

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Line	PC	Opcode			
0154	0021	0913	call	BITOUT	; transmit 1 bit to serial EE
0155	0022	0370	rlf	txbuf	; rotate txbuf left
0156	0023	02F1	decfsz	count	; all bits done?
0157	0024	0A1E	goto	TXLP	; no, do another bit
0158	0025	0800	retlw	0	; yes, jump out
0159					
0160					;*****
0161					
0162					POWER-UP ROUTINE
0163					This is the program entry point, which in this case simply
0164					sets the port_a I/O lines and directs control to the
0165					erase/write enable routine.
0166					;*****
0167					PWRUP
0168	0026	0C00	movlw	b'00000000'	
0169	0027	0005	tris	port_a	; set port_a as all output
0170	0028	0065	clrf	port_a	; all lines low
0171					
0172	0029	0C80	movlw	b'10000000'	
0173	002A	0006	tris	port_b	; set RB7 as input, rest output;
0174					
0175					Fall through and do erase/write enable
0176					
0177					;*****
0178					EWEN (Erase/Write ENable Routine)
0179					this routine enables the dut for erasing and
0180					writing. This must be done prior to any erase,write
0181					eral,wral instructions.
0182					;*****
0183					EWEN
0184					
0185	002B	0907	call	BSTART	; generate a start bit
0186					
0187	002C	0C02	movlw	.2	; set # bits to 2
0188	002D	0032	movwf	bits	

Using the 93LC56 and 93LC66

```
0189 002E 0C00      movlw    b'00000000'    ; get the opcode (00b)
0190 002F 0030      movwf    txbuf      ; into the output buffer
0191 0030 091C      call     TX          ; and transmit it
0192 0031 0C08      movlw    .8          ; set # bits to 8
0193 0032 0032      movwf    bits      ;
0194 0033 0CC0      movlw    b'11000000'    ; get opcode and address
0195                      ;      (11XXXXXX)
0196 0034 0030      movwf    txbuf      ; into output buffer
0197 0035 091C      call     TX          ; and transmit it
0198 0036 0486      bcf      port_b,chpsel ; set chip select line low
0199 0037 0000      nop
0200                      ;
0201                      ;      Now continue on to the write command
0202                      ;
0203                      ;*****
0204                      ;      WRITE
```

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```
Line  PC  Opcode

0205          ;      This routine writes a AA55h pattern into
0206          ;      8 consecutive addresses starting at address 00.
0207          ;      It will then 'poll' the data out line to determine
0208          ;      when the write cycle is complete.  If the cycle has
0209          ;      not completed within 20 ms, then it will continue
0210          ;      anyway and turn the timeout fail LED on.
0211          ;      The write is done in the x16 mode: the user must
0212          ;      have the ORG pin tied to Vcc on the device. This
0213          ;      program will repeat forever.
0214          ;*****
0215      WRITE
0216          ;
0217      0038 0C00      movlw    .0          ; set starting address to 00
0218      0039 002C      movwf    addr      ;
0219      003A 0C08      movlw    .8          ; set number of bytes to write as 8
0220      003B 0033      movwf    bytcnt    ;
0221                      ;
0222      003C 0907      topwr  call    BSTART    ; generate the start bit
0223                      ;
0224      003D 0C02      movlw    .2          ; set # bits to 2 for the opcode
0225      003E 0032      movwf    bits      ;
0226      003F 0C40      movlw    b'01000000' ; get opcode (01b)
0227      0040 0030      movwf    txbuf      ; into the transmit buffer
0228      0041 091C      call     TX          ; and send it
0229                      ;
0230      0042 0C08      movlw    .8          ; set # of bits to 8 for the
0231      0043 0032      movwf    bits      ; address
0232      0044 020C      movf     addr,w      ; get address counter
0233      0045 0030      movwf    txbuf      ; into output buffer
0234      0046 091C      call     TX          ; and send it
0235      0047 0CAA      movlw    b'10101010' ; get first half of data (AAh)
0236      0048 0030      movwf    txbuf      ; into the transmit buffer
0237      0049 091C      call     TX          ; and send it
0238      004A 0C55      movlw    b'01010101' ; get second half of data (55h)
0239      004B 0030      movwf    txbuf      ; into transmit buffer
0240      004C 091C      call     TX          ; and send it
0241                      ;
0242      004D 0486      bcf      port_b,chpsel ; clear the chip select line
0243                      ; to initiate write cycle
0244      004E 0000      nop
0245      004F 0586      bsf      port_b,chpsel ; set the chip sel line high
0246                      ; to begin data polling
0247      0050 0CC8      movlw    .200      ;
0248      0051 0035      movwf    loops      ; poll 100 times before timeout(about 20ms)
0249      0052 0901      polltop call    dpdelay    ; wait 100us
0250      0053 06A6      btfsc    port_b,datout ; is the data out line high?
0251      0054 0A59      goto     okpoll    ; yes-cycle complete: do another
0252      0055 02F5      decfsz   loops      ; has it timed out?
```

Using the 93LC56 and 93LC66

```
0253 0056 0A52      goto    polltop      ; no, check again
0254 0057 0525      bsf     port_a,timeout; yes, set timeout LED and go on
0255 0058 0A5A      goto    badpoll      ;
```

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```
Line  PC   Opcode

0256
0257 0059 0425  okpoll  bcf     port_a,timeout; clear the timeout LED
0258 005A 0486  badpoll  bcf     port_b,chpsel ; chip sel line back low
0259 005B 02AC      incf     addr      ; increment address counter
0260 005C 02F3      decfsz  bytcnt   ; all bytes written?
0261 005D 0A3C      goto    topwr     ; no, do another
0262                          ; yes, go on
0263                          ;
0264                          ;   Now continue on to the erase/write disable command
0265                          ;
0266                          ;*****
0267                          ;   EWDS (Erase/Write Disable Routine)
0268                          ;   This routine executes the erase/write disable command
0269                          ;   which prevents the contents of the array from being
0270                          ;   written to.
0271                          ;
0272                          ;*****
0273  EWDS
0274  ;
0275 005E 0907      call     BSTART      ; generate a start bit
0276  ;
0277 005F 0C02      movlw    .2          ; set # bits to 2
0278 0060 0032      movwf    bits        ;
0279 0061 0C00      movlw    b'00000000' ; get the opcode (00b)
0280 0062 0030      movwf    txbuf      ; into the output buffer
0281 0063 091C      call     TX          ; and transmit it
0282 0064 0C08      movlw    .8          ; set # bits to 8
0283 0065 0032      movwf    bits        ;
0284 0066 0C00      movlw    b'00000000' ; get opcode and address
0285                          ;   (00XXXXXX)
0286 0067 0030      movwf    txbuf      ; into output buffer
0287 0068 091C      call     TX          ; and transmit it
0288 0069 0486      bcf     port_b,chpsel ; set chip select line low
0289 006A 0000      nop
0290 006B 0A2B      goto    EWEN        ; start all over
0291  ;
0292  ;
0293
0294      0000  END
```

Using the 93LC56 and 93LC66

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Line PC Opcode

```
0001                LIST P=16C54,c=132
0002                ;*****
0003                ;      3-Wire Sequential Read Program (93 bytes)
0004                ;
0005                ;      This program demonstrates how to interface a
0006                ;      Microchip PIC16C54 to a 93LC56 or 93LC66 Serial EE
0007                ;      device. This program will read 8 consecutive addresses
0008                ;      in the 'sequential read' mode. This means that the opcode
0009                ;      and address are sent for the first address only. After
0010                ;      the first address is read, the Chip Select line is left
0011                ;      high and clocks for the remaining 7 bytes are sent to the
0012                ;      device. The device will automatically increment the address
0013                ;      pointer in this mode, allowing the user to read as many
0014                ;      consecutive addresses as needed. This program will repeat
0015                ;      forever.
0016                ;
0017                ;      This program communicates to the serial EE in the
0018                ;      x16 mode, and ASSUMES THE USER HAS SET THE ORG PIN
0019                ;      ON THE DEVICE TO Vcc.
0020                ;
0021                ;      Timing is based on using the PIC16C54 in 'XT' mode
0022                ;      using a 4MHz crystal. Clock speeds to the serial EE
0023                ;      will be approximately 50 kHz for this setup.
0024                ;
0025                ;      PIC16C54 to Serial EE Connections:
0026                ;
0027                ;      PIC16C54      Serial EE
0028                ;      _____
0029                ;      Pin 10 (RB4) -> Chip Select
0030                ;      Pin 11 (RB5) -> Clock
0031                ;      Pin 12 (RB6) -> Data In
0032                ;      Pin 13 (RB7) -> Data Out
0033                ;      ORG = Vcc
0034                ;
0035                ;*****
0036                ;      Register Assignments
0037                ;*****
0038    0003    status    equ    3h      ; status register
0039    0005    port_a    equ    5h      ; port 5 (port_a)
0040    0006    port_b    equ    6h      ; port 6 (port b) used comm lines to serial EE
0041    000A    eeprom    equ    0ah     ; bit buffer
0042    000C    addr      equ    0ch     ; address register
0043    000D    datai     equ    0dh     ; stored data input reg.
0044    000E    datao     equ    0eh     ; stored data output reg.
0045    0010    txbuf     equ    10h     ; transmit buffer
0046    0011    count     equ    11h     ; bits transmitted so far
0047    0012    bits      equ    12h     ; bits to transmit
0048    0013    bytcnt    equ    13h     ; byte counter for read routine
0049    0015    loops      equ    15h     ; delay loop counter
0050    0016    loops2     equ    16h     ; delay loop counter
0051    0017    hbyte      equ    17h     ; high byte for input data
```

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Line PC Opcode

```
0052    0018    lbyte    equ    18h     ; low byte for input data
0053                ;*****
0054                ;      Bit Assignments
0055                ;*****
0056    0007    di        equ    7        ; eeprom input
0057    0006    do        equ    6        ; eeprom output
0058    0007    datout     equ    7        ; data out line (port_b)
0059    0006    datin      equ    6        ; data in line (port_b)
0060    0005    sclk       equ    5        ; clock line (port_b)
```


Using the 93LC56 and 93LC66

```

0061      0004  chpsel equ    4      ; chip select line (port_b)
0062      ;
0063      ;*****
0064      0000      org    01ffh
0065      01FF  0A40  begin    goto    PWRUP    ; set the reset vector
0066      0000      org    000h
0067      0000  0A40      goto    PWRUP
0068      ;
0069      ;*****
0070      ;      DELAY ROUTINE
0071      ;      This routine takes the value in 'loops'
0072      ;      and multiplies it times 1 millisecond to
0073      ;      determine delay time.
0074      ;*****
0075      WAIT
0076      ;
0077      0001  0C6E  top      movlw    .110      ; timing adjustment variable
0078      0002      movwf    loops2
0079      0003  0000  top2    nop              ; sit and wait
0080      0004      nop
0081      0005      nop
0082      0006      nop
0083      0007      nop
0084      0008      nop
0085      0009  02F6      decfsz    loops2      ; inner loops complete?
0086      000A  0A03      goto     top2        ; no, go again
0087      ;
0088      000B  02F5      decfsz    loops      ; outer loops complete?
0089      000C  0A01      goto     top        ; no, go again
0090      000D  0800      retlw     0          ; yes, return from sub
0091      ;
0092      ;*****
0093      ;      Start Bit Subroutine
0094      ;      this routine generates a start bit
0095      ;      (Chip select and DI high when clock goes high)
0096      ;*****
0097      BSTART
0098      000E  04C6      bcf       port_b,datin ; set datain and chipselect lines
0099      000F  0486      bcf       port_b,chpsel ; low just to check operation
0100      0010  04A6      bcf       port_b,sclk  ; make sure clock starts low too.
0101      0011  0000      nop
0102      ;

```

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Line	PC	Opcode			
0103	0012	0586	bsf	port_b,chpsel	; set chip select line high
0104	0013	05C6	bsf	port_b,datin	; set data in line high
0105	0014	0000	nop		
0106	0015	05A6	bsf	port_b,sclk	; set the clock line high to
0107					; generate the start bit
0108	0016	0000	nop		
0109	0017	0000	nop		
0110	0018	04A6	bcf	port_b,sclk	; set clock low again
0111	0019	0800	retlw	0	
0112					
0113			;*****		
0114			; BITIN routine reads one bit of data from the		
0115			; serial EE device and stores it in 'di'		
0116			;*****		
0117			BITIN		
0118	001A	05EA	bsf	eeeprom,di	; assume input bit is high
0119	001B	05A6	bsf	port_b,sclk	; set clock line high
0120	001C	0000	nop		
0121	001D	07E6	btfs	port_b,datout	; read the data bit
0122	001E	04EA	bcf	eeeprom,di	; input bit was low
0123	001F	04A6	bcf	port_b,sclk	; set clock line low
0124					

Using the 93LC56 and 93LC66

```
0125 0020 0800          retlw  0          ;
0126
0127          ;*****
0128          ;      Receive data routine
0129          ;      This routine reads one byte of data from the part
0130          ;      into the 'datai' register.
0131          ;*****
0132          RX
0133 0021 006D          clrf    datai        ; clear input buffer
0134 0022 0C08          movlw   .8           ; set # bits to 8
0135 0023 0031          movwf   count
0136 0024 0403          bcf     status,0     ; make sure carry bit is low
0137 0025 036D  RXLP    rlf     datai        ; rotate the buffer left 1 bit
0138 0026 091A          call    BITIN        ; read 1 bit
0139 0027 040D          bcf     datai,0      ; assume the input bit was low
0140 0028 06EA          btfsz   eeprom,di    ; check the bit
0141 0029 050D          bsf     datai,0      ; set high if necessary
0142 002A 02F1          decfsz  count        ; 8 bits done?
0143 002B 0A25          goto    RXLP        ; no, do another
0144 002C 0800          retlw   0
0145
0146          ;*****
0147          ;      BITOUT routine
0148          ;      This routine takes one bit of data in 'do' and
0149          ;      transmits it to the serial EE device
0150          ;*****
0151          BITOUT
0152 002D 07CA          btfsz   eeprom,do     ; check state of data bit
0153 002E 0A31          goto    bitlow       ; low, goto bitlow
```

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Line	PC	Opcode
0154	002F 05C6	bsf port_b,datin ; high, set datain high
0155	0030 0A32	goto clkout ; and clock it
0156		;
0157	0031 04C6	bitlow bcf port_b,datin ; output a logic low
0158	0032 05A6	clkout bsf port_b,sclk ; set clock line high
0159	0033 0000	nop
0160	0034 04A6	bcf port_b,sclk ; return clock line low
0161	0035 0800	retlw 0
0162		;
0163		;*****
0164		; Transmit Data Subroutine
0165		;
0166		; This routine takes the byte of data stored in the
0167		;'datao' register and transmits it to the serial EE device.
0168		;*****
0169	0036 0212	TX movf bits,w ; set the number of bits to xmit
0170	0037 0031	movwf count
0171		;
0172		TXLP
0173	0038 04CA	bcf eeprom,do ; assume bit 7 is low
0174	0039 06F0	btfsz txbuf,7 ; is bit 7 clear?
0175	003A 05CA	bsf eeprom,do ; no, set data bit =1
0176	003B 092D	call BITOUT ; transmit 1 bit to serial EE
0177	003C 0370	rlf txbuf ; rotate txbuf left
0178	003D 02F1	decfsz count ; all bits done?
0179	003E 0A38	goto TXLP ; no, do another bit
0180	003F 0800	retlw 0 ; yes, jump out
0181		;
0182		;*****
0183		; POWER-UP ROUTINE
0184		;
0185		; This is the program entry point, which in this case simply
0186		; sets the port_a I/O lines and directs control to the
0187		; erase/write enable routine.
0188		;*****
0188		PWRUP

Using the 93LC56 and 93LC66

```

0189          ;
0190 0040 0C11      movlw  b'00010001'
0191 0041 0005      tris   port_a          ; set RA0 as input, rest output
0192 0042 0065      clrf   port_a          ; all lines low
0193 0043 0C80      movlw  b'10000000'
0194 0044 0006      tris   port_b          ; set RB7 as input, rest output;
0195          ;
0196          ;          Fall through and do the read
0197          ;
0198          ;*****
0199          ;          READ ROUTINE (Sequential read mode)
0200          ;          This routine reads 8 consecutive addresses in
0201          ;          sequential mode starting at address 0. This
0202          ;          program will repeat forever
0203          ;*****
0204          READ

```

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Line	PC	Opcode			
0205			;		
0206	0045	0C00	movlw	.0	; set starting address to 00
0207	0046	002C	movwf	addr	;
0208	0047	0C08	movlw	.8	; set number of addresses to
0209	0048	0033	movwf	bytcnt	; read as 8
0210					;
0211	0049	090E	call	BSTART	; generate the start bit
0212	004A	0C02	movlw	.2	; set # bits to 2
0213	004B	0032	movwf	bits	;
0214	004C	0C80	movlw	b'10000000'	; get opcode (10b)
0215	004D	0030	movwf	txbuf	; into output buffer
0216	004E	0936	call	TX	; and transmit it
0217	004F	0C08	movlw	.8	;
0218	0050	0032	movwf	bits	; set number of bits to 8
0219	0051	020C	movf	addr,w	; get the address
0220	0052	0030	movwf	txbuf	; into the output buffer
0221	0053	0936	call	TX	; and transmit it
0222					
0223	0054	0921	rbyte	call	RX
0224	0055	020D		movf	datai,w
0225	0056	0037		movwf	hbyte
0226					
0227	0057	0921		call	RX
0228	0058	020D		movf	datai,w
0229	0059	0037		movwf	hbyte
0230					
0231	005A	02AC		incf	addr
0232	005B	02F3		decfsz	bytcnt
0233	005C	0A54		goto	rbyte
0234					
0235	005D	0486		bcf	port_b,chpsel
0236	005E	0A45		goto	READ
0237		0000			END

Using the 93LC56 and 93LC66

NOTES:

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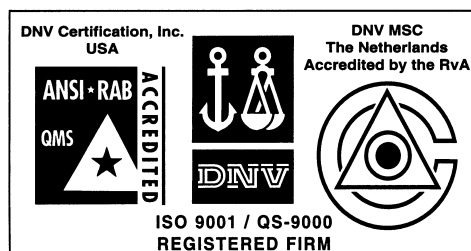
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