
Interfacing the 93XX76 and 93XX86 to a PIC16C5X

INTRODUCTION

Microchip's newest offerings in the 3-wire Serial EEPROM family are the 93XX76 and 93XX86 devices. These are 8k-bit and 16k-bit versions of our 93 series Serial EEPROMs with a couple of differences from the standard 93XX46, 93XX56 and 93XX66 devices:

1. These devices have a Program Enable (PE) pin, which is used as a hardware write protect. Tying the PE pin to VCC enables the array to be written to, while tying it to Vss prohibits the array from being written to. There is an internal pull-up resistor on the PE pin that allows the array to be written to when there is no connection to the PE pin.
2. The internal write cycle begins on the rising edge of the last data bit (D0) for the 93XX76 and 93XX86 devices, where the existing 93XX46, 93XX56 and 93XX66 devices begin their internal write cycle on the falling edge of Chip Select (CS) after the last data bit has been sent. Software written for the 93XX46, 93XX56 and 93XX66 devices will still be compatible, however the internal write cycle will begin slightly earlier on the new 93XX76 and 93XX86 devices. The only changes to the code required are the number of address bits necessary to access the larger memory arrays.

The code that is written for this application note was taken from AN560 and the only modifications were the number of address bits output. Please refer to AN560 for more details about the original code. If the reader is new to Serial EEPROMs, please refer to application note AN536 for a more basic tutorial. This application note is intended to provide the engineer with stand-alone code modules for accomplishing all of the necessary functions required to utilize these devices in an application. See Figure 1 for a schematic of how the PIC16C54 was connected to the 93XX76 and 93XX86.

Although these devices are called 3-wire devices, they have essentially 4 I/O pins:

CS	Chip Select
CLK	Clock
DI	Data In
DO	Data Out

These devices use a series of commands to accomplish standard memory functions. These are READ, WRITE, EWEN, ERASE, ERAL, WRAL, EWDS. These functions are discussed in more detail in the datasheets for any of the 93 series devices.

The following programs are included in this application note and are fully functional stand-alone modules. The source code for these modules can be downloaded from the Microchip BBS. They are located in the MEM_APPS file library as one zipped up file, AN619.zip. Please consult page 8-1 of the *1995/1996 Non-Volatile Memory Products Data Book* or page 6-3 of the *1995/1996 Embedded Control Handbook Update* for more information on how to use the Microchip BBS.

The following are the programs included in this application note, along with the subroutines they call:

Byte Read Program (7686byrd.asm)

- Start Bit Routine
- Bin In Routine
- Receive Data routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine

Byte Write Program (7686bywr.asm)

- 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)

Byte Write with Data Polling Program (7686dpol.asm)

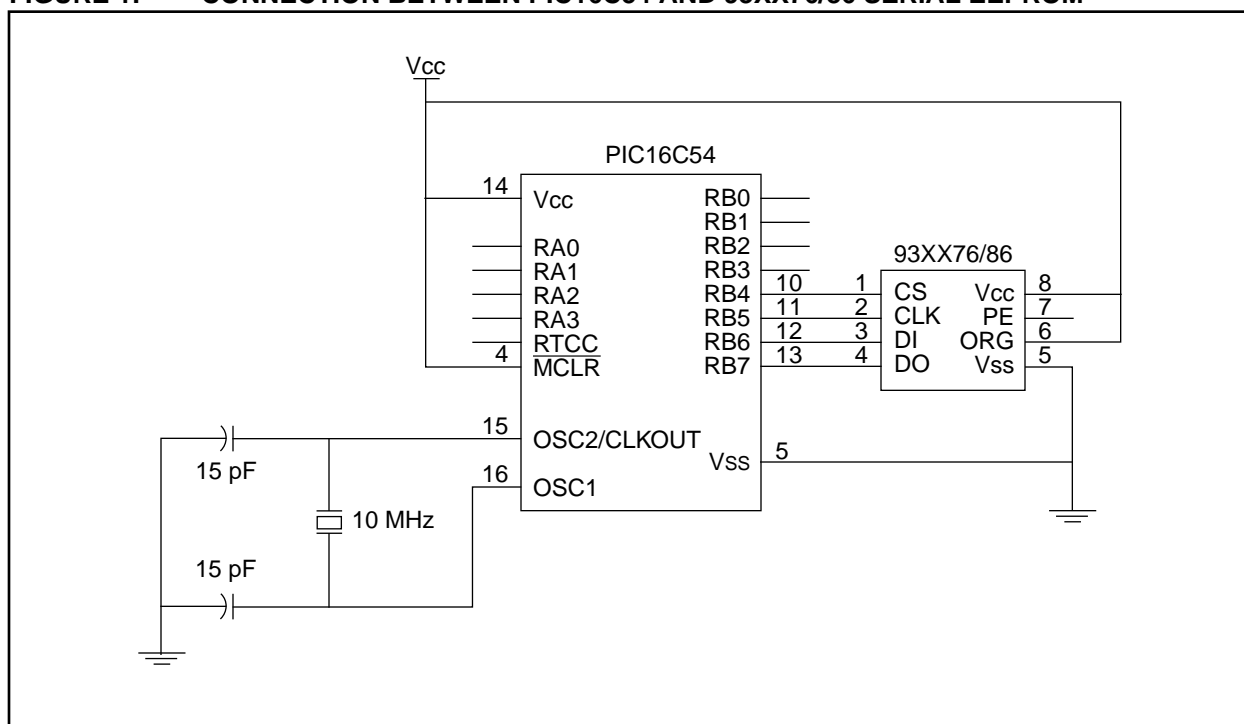
- Data Polling Delay Routine
- Start Bit Routine
- Bit Out Routine
- Transmit Data Routine
- Power-up Routine
- Erase/Write Enable Routine (EWEN)
- Write Routine
- Erase/WRite Disable Routine (EWDS)

AN619

Sequential Read Program (7686seqr.asm)

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

FIGURE 1: CONNECTION BETWEEN PIC16C54 AND 93XX76/86 SERIAL EEPROM



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