AN1262

Using C30 External Spaces to Communicate with Off-Chip Serial SRAM

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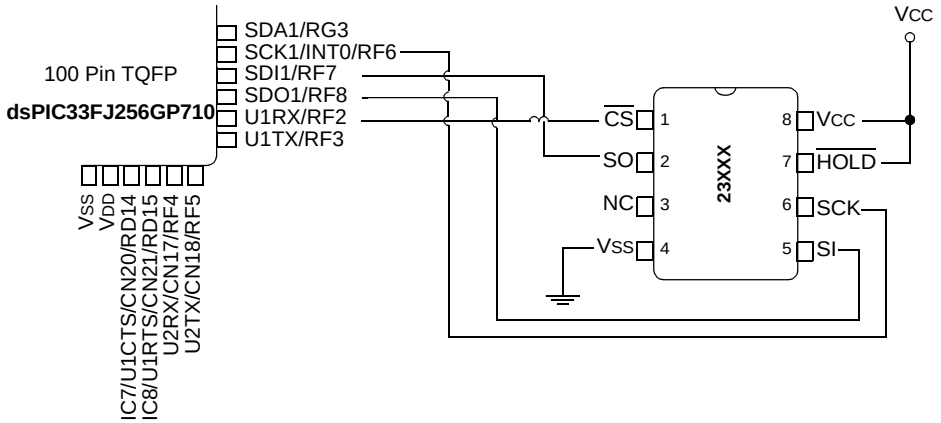
INTRODUCTION

The C30 compiler for the Microchip dsPIC® DSC and PIC24 families offer a solution to address external memory. The compiler supports functions that allow the user to access external storage in the same way as the internal memory on the MCU.

This application note is intended to serve as an introduction to using the Microchip external serial SRAM devices to add additional memory to an application. The concept presented is not limited to serial SRAM, but can also be applied to other external EEPROM devices as well.

Figure 1 shows an overview of the hardware connections that were used in developing this application note. The Explorer 16 development board was used along with one of the SPI memory PIM modules. The PIM module was modified by removing the SPI EEPROM and replacing it with one of the serial SRAM devices.

FIGURE 1: CIRCUIT FOR dsPIC33F/PIC24 AND 23XXX SERIES EXTERNAL SPI SRAM



Note: $\overline{CS}$ and $\overline{HOLD}$ pins should all have pull-up resistors (~10k-ohms).

FIRMWARE DESCRIPTION

The purpose of the firmware is to show how to configure the C30 compiler to operate with an external memory Space. Much of the configuration is detailed in the C30 compiler user guide, *"MPLAB® C Compiler for PIC24 MCUs and dsPIC® DSCs"* (DS51284) in Chapter 6.

The code presented here has been written to specifically communicate with the external serial SRAM using the SPI1 peripheral.

The code example provided contains the necessary low level drivers to communicate with the external Serial SRAM. In addition, an example is included in the `main.c` file that shows how to define an array in the external SRAM and write to and read from this array.

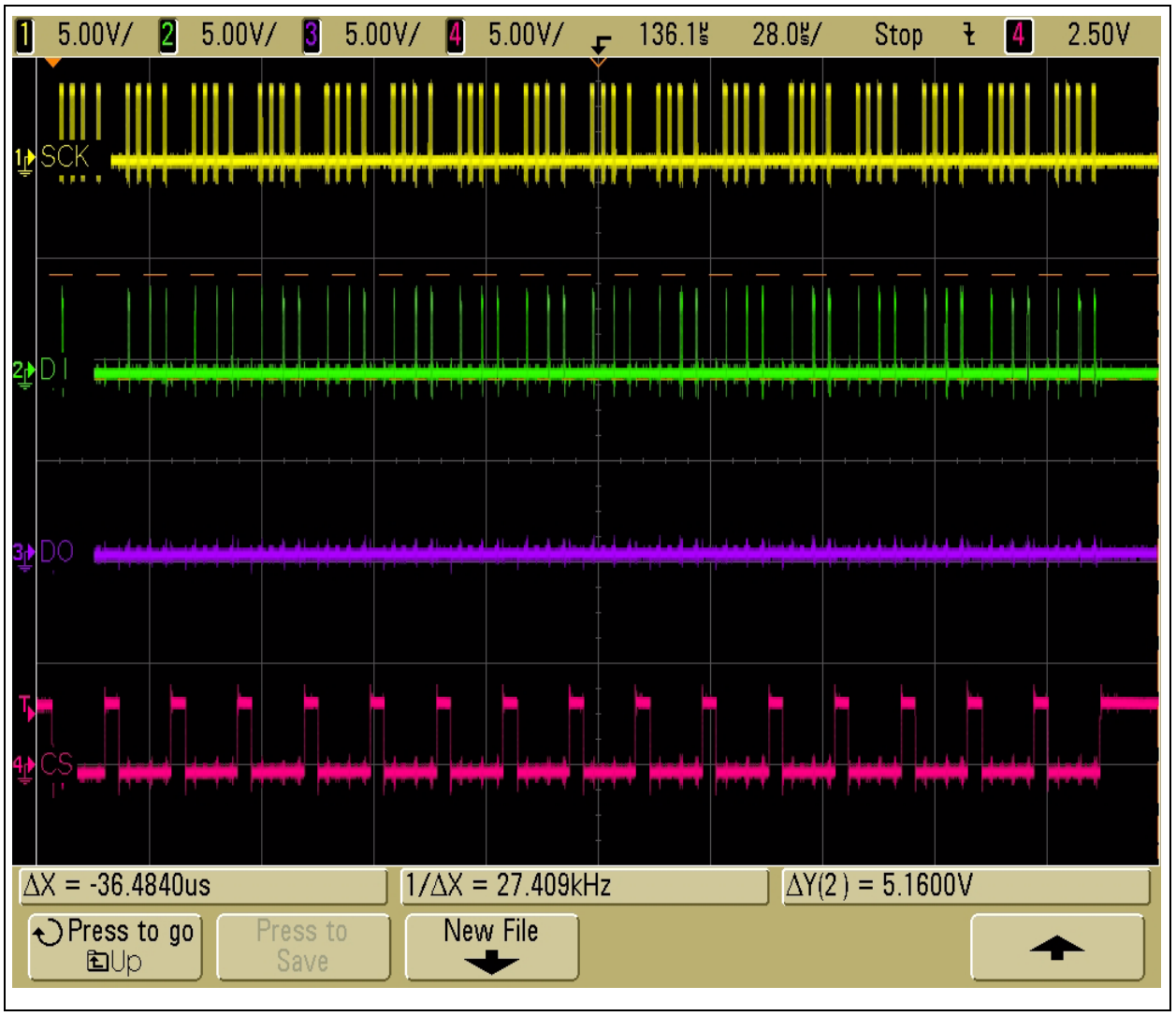
WRITE TO THE EXTERNAL SRAM

The screen shot shown in Figure 2 below is the result of the following line of code.

```
for (i = 0; i < 16; i++) array[i] = i;
```

The screen shot shows the data being loaded into the external SRAM.

FIGURE 2: WRITE TO THE EXTERNAL SERIAL SRAM



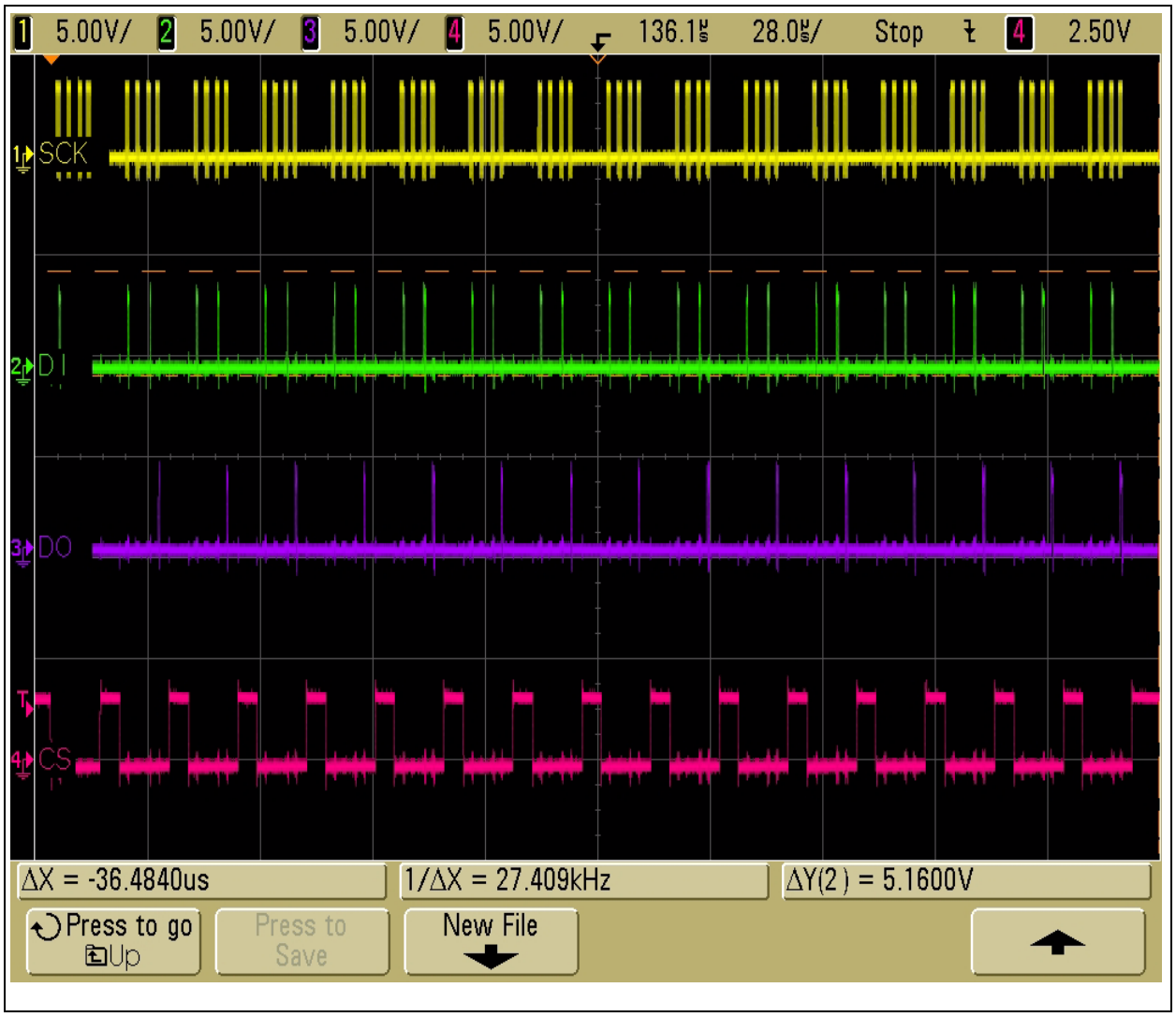
READ FROM EXTERNAL SRAM

The screen shot in Figure 3 is the bus activity that is generated from the following line of code.

```
for (i = 0; i < 16; i++) cache[i] = array[i];
```

In this line the data is being read from the external SRAM and copied into the array `cache[]`.

FIGURE 3: READING FROM THE EXTERNAL SERIAL SRAM



CONCLUSION

The C30 compiler offers customers an easy to implement solution to adding additional program or data storage. The code example provided can also be used for external Serial EEPROMS. Additional code changes can be made to support I²C™ or UNI/O® devices.

The code was tested on Microchip's Explorer 16 Demonstration Board along with a modified SPI Memory PIM module. The connections are shown in Figure 1.

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