

# Lab 7. Serial communications and analogue to digital conversion

## Introduction

The original Launchpad boards shipped with a microcontroller that did not have a (hardware) UART. In order to perform serial communications therefore, applications running on these chips had to implement a UART in software. The code in `softuart.c` does just this. This UART can transmit only and its RS232 parameters are:

**Bit rate: 2400**

**Parity: None**

**Stop bits: 1**

**Handshaking (flow control) none.**

The file `main.c` that accompanies the files for this lab makes use of the analogue to digital converter and built-in temperature sensor within the MSP430G2231 processor. The temperature at the core of this chip is transmitted repeatedly over the serial link to the PC.

## Tasks:

1) Download and compile `main.c`, `softuart.c` and `softuart.h` on your system (you will have to create a project with the appropriate settings for this device. These are:

Microcontroller: MSP430G2231

Debugger: FET Debugger

Remember to add `main.c` and `softuart.c` to your project

2) Set up hyperterminal or some other “dumb” terminal device with the correct communications parameters such that it displays the output from the Launchpad

3) Using the calibration curve provided on page 564 of the MSP430G2231 User's Guide (see link below) modify the code in `ReadTemperature` such that the temperature is displayed in Celsius.

4) You should notice that the data received from the MSP430G2231 has the occasional error. Investigate mechanisms used in industry to detect and correct data transmission errors.

Link for MSP430G2231 user guide.

<http://www.ti.com/general/docs/lit/getliterature.tsp?literatureNumber=slau144i&fileType=pdf>

Information regarding error checking

[http://en.wikipedia.org/wiki/Longitudinal\\_redundancy\\_check](http://en.wikipedia.org/wiki/Longitudinal_redundancy_check)

[http://en.wikipedia.org/wiki/Cyclic\\_redundancy\\_check](http://en.wikipedia.org/wiki/Cyclic_redundancy_check)

<http://en.wikipedia.org/wiki/Checksum>