Introduction

This manual provides instructions on the hardware and software setup of the RS-232 Data Logger Module.

Hardware Configuration

1. Connect the male RS-232 from the SQM-160 into the RS-232 to Serial converter.
2. Obtain a USB type A to USB type B (male-to-male) cable and plug the USB type B end into the Arduino microcontroller and plug the USB type A end into a 5V power brick. The Arduino can alternatively be powered via the DC barrel plug, connected to a 9-12 V power supply brick.
3. Connect a jumper wire from the 5V pin and ground of the microcontroller into the positive and negative rails of a breadboard to form a 5 V bus.
4. Connect the Vcc and ground pins of the RS-232 to serial converter, to the positive and negative rails of the 5V bus on the breadboard.
5. Connect the RX and TX pins of the RS-232 to serial converter into the Serial1 interface of the Arduino. Ensure RX of the RS-232 to serial converter is connected to the TX pin of Serial1, and TX of the RS-232 to serial converter connected to the RX pin of Serial1.
6. Insert a 2GB SD card into the SD card reader module. Ensure the SD card is formatted to either FAT16 or FAT32. If the SD card has higher storage, partition it to 2GB using a PC.
7. Connect the 5V and ground pins of the SD card reader module to the positive and negative rails of the 5V bus on the breadboard. Connect the MISO, MOSI, SCK and CS pins of the module to the corresponding pins of the SPI interface on the microcontroller. See full Arduino Mega pinout diagram: https://store-usa.arduino.cc/products/arduino-mega-2560-rev3?selectedStore=us
8. Obtain a Digi XBee3 module and configure it using the XCTU Software. Instructions related to this can be found in the User Guide Setting UP XBEE Module manual.
9. Connect the 3.3 V and ground pins of the module to the corresponding pins of the microcontroller. Connect the RX and TX pins of the module to the Serial0 (or just Serial) interface of the microcontroller. See the full Digi XBee 3 manual for pinout diagrams: https://www.digi.com/resources/documentation/digidocs/pdfs/90001543.pdf

Software Configuration

1. Ensure the microcontroller is already flashed with the program specified in the GitHub repository. If not, re-flash it using the Arduino IDE.
2. The program can be tested by plugging in the RS-232 to serial converter into a USB adapter and into a laptop, and running the Python script in the GitHub repository. The on-screen messages should indicate if data is correctly logging. If any errors are identified with the SD card, plug it into a laptop and reformat it.