IQS323 Arduino Example Code

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Introduction

This Arduino example code demonstrates how to set up and use the IQS323 Integrated Circuit (IC). The IQS323 is a 3 Channel Self-Capacitive / 3 Channel Mutual-Capacitive / 2 Channel Inductive sensing controller with Touch and Proximity user interfaces. This example code accommodates all 3 IQS323 Evaluation Kits.

This example code is intended for an Arduino Compatible board that uses 3.3 V logic, such as Sparkfun's Pro Micro (3.3V, 8 MHz). If a 5V logic Arduino board is used, a logic-level translator will be required between the Arduino-based board and the IQS323.

Arduino Code Configuration

The behaviour and pin assignments of the Arduino code can be configured with the `#define` settings at the start of `iqs323-example-code.ino`.

In the example code folder, go to file: `src/IQS323.h`. Change the value of the define to the number of the specific IQS323 EV-KIT the Arduino project needs to be compiled for.

```
/* Select the EV-Kit below by changing the value of the define (default = 0):
 * 0: Inductive Options EV-Kit (AZP1212A3).
 * 1: Slider EV-Kit (AZP1209A4).
 * 2: 3-Projected Buttons EV-Kit (AZP1210A4).
 */
#define IQS323_EV_KIT   0
```

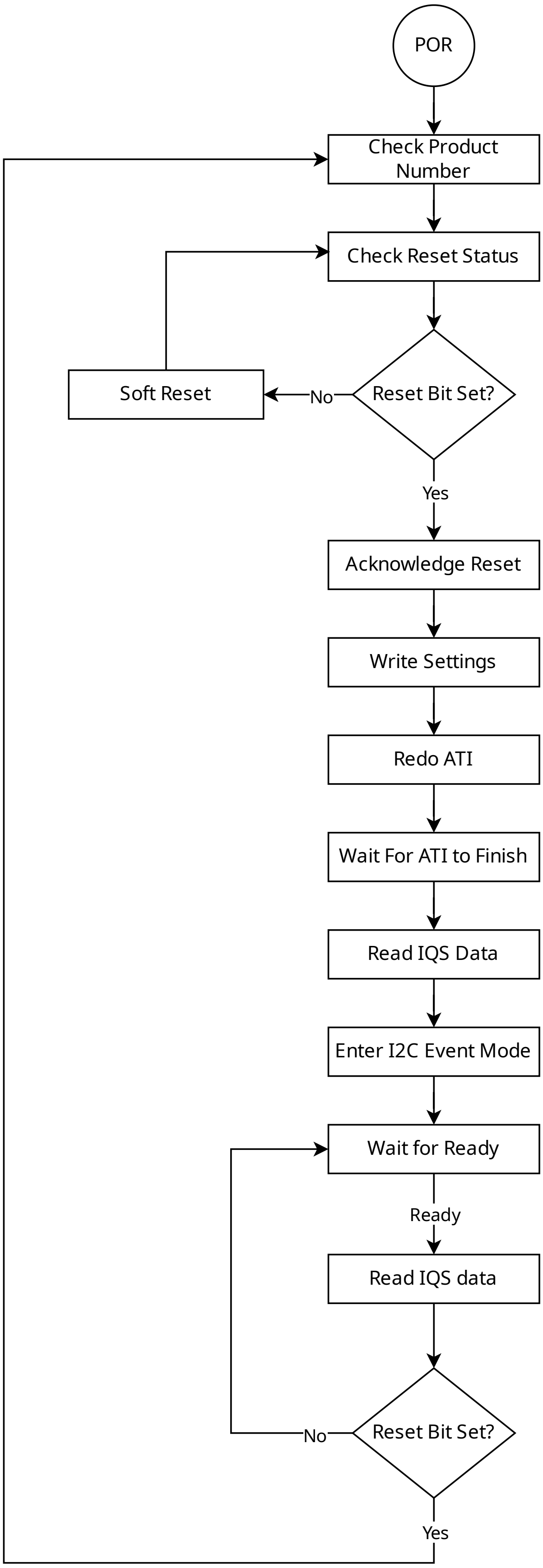
Change the following pin assignments and parameters to suit your hardware:

```
/*** Defines ***/
#define DEMO_IQS323_ADDR                     0x44
#define DEMO_IQS323_POWER_PIN                4
#define DEMO_IQS323_RDY_PIN                  7
```

- `DEMO_IQS323_ADDR` is the IQS323 I2C Slave address. For more information, refer to the datasheet and application notes found on the IQS323 Product Page.
- `DEMO_IQS323_POWER_PIN` can be used to power the IQS323 directly from an Arduino GPIO. This parameter sets which pin to use. This is an optional setting and can be removed if the IQS323 is powered from the VCC pin or an external power supply.
- `DEMO_IQS323_RDY_PIN` sets the pin assignment for the IQS323 ready pin. This must support external interrupts. On the SparkFun Pro Micro, pins 0, 1, 2, 3, and 7 support interrupts.

> Please note that powering an IQS device directly from a GPIO is *generally* not recommended. However, the `DEMO_IQS323_POWER_PIN` in this example could be used as an enable input to a voltage regulator.

Example Code Flow Diagram

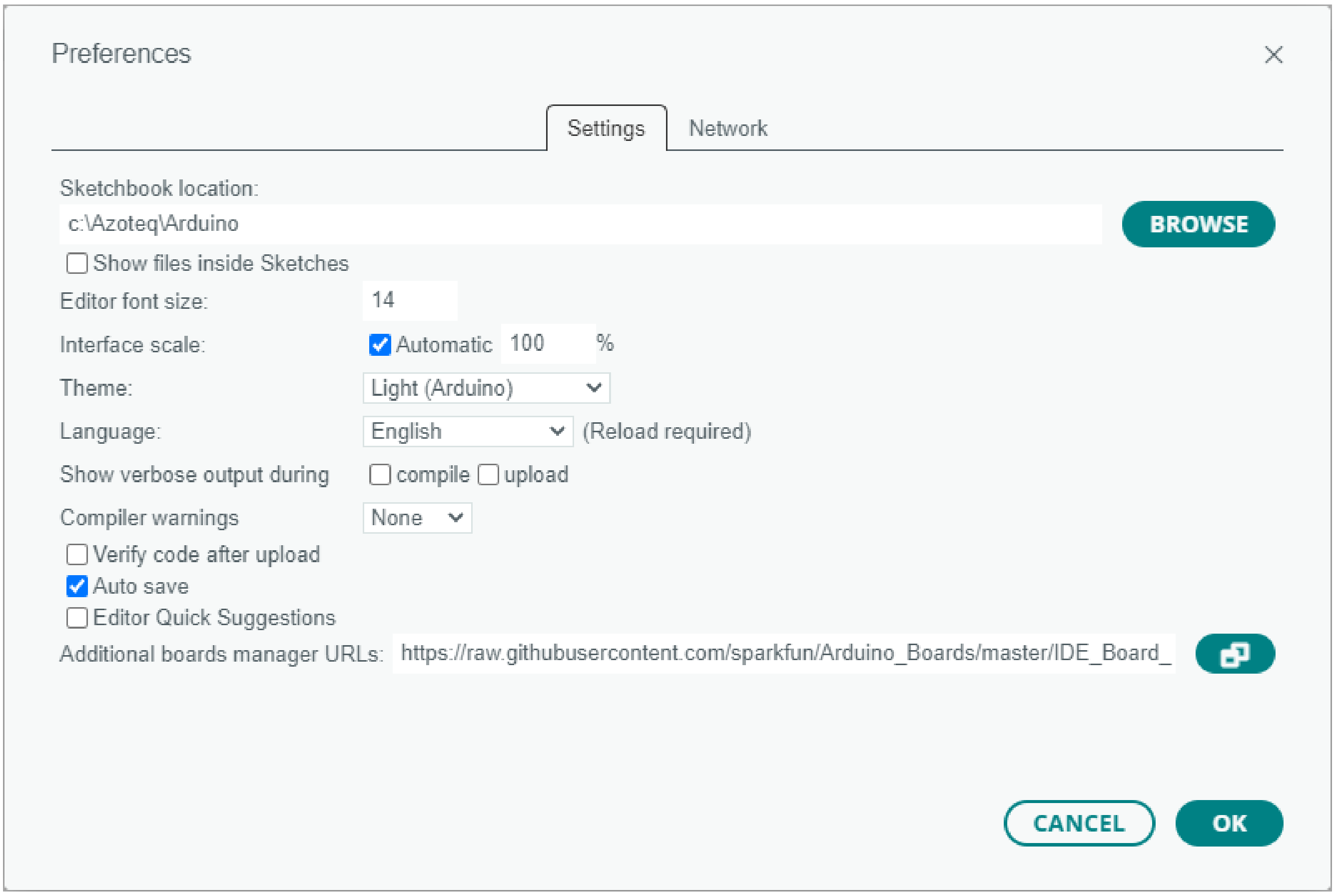


SparkFun Board Library Installation

To use the SparkFun Pro Micro, the SparkFun Board Library must be installed in the Arduino IDE.

Add the SparkFun Board Library by opening Preferences (**File** > **Preferences**), and paste the following URL into the "Additional Board Manager URLs" text box.

```
https://raw.githubusercontent.com/sparkfun/Arduino_Boards/master/IDE_Board_Manager/package_sparkfun_index.json
```



Sketchbook location: c:\Azoteq\Arduino

□ Show files inside Sketches

Editor font size: 14

Interface scale: ☑ Automatic 100 %

Theme: Light (Arduino)

Language: English (Reload required)

Show verbose output during □ compile □ upload

Compiler warnings None

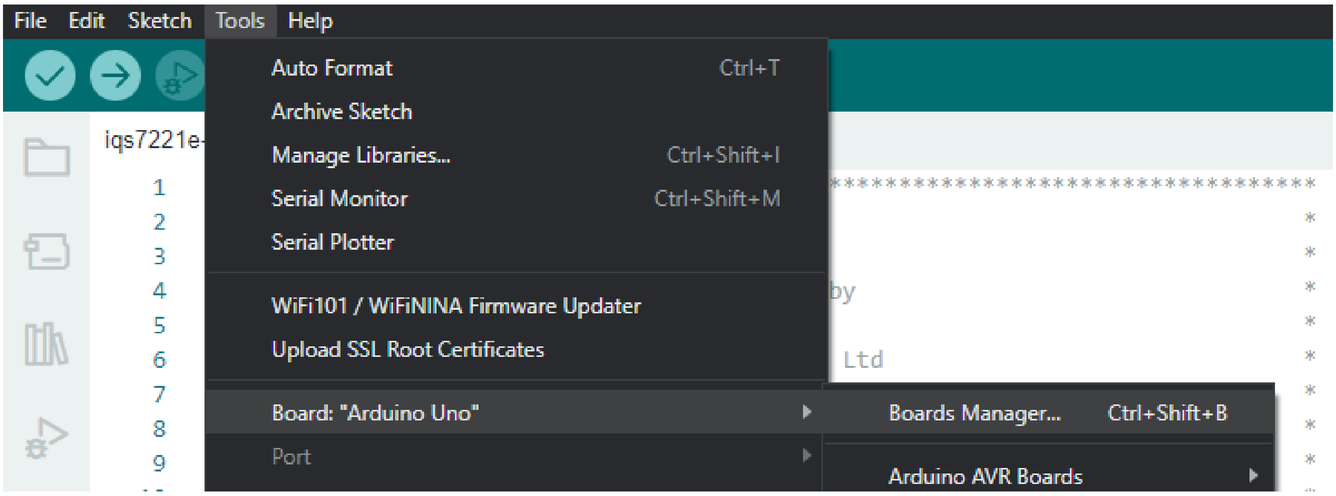
□ Verify code after upload

☑ Auto save

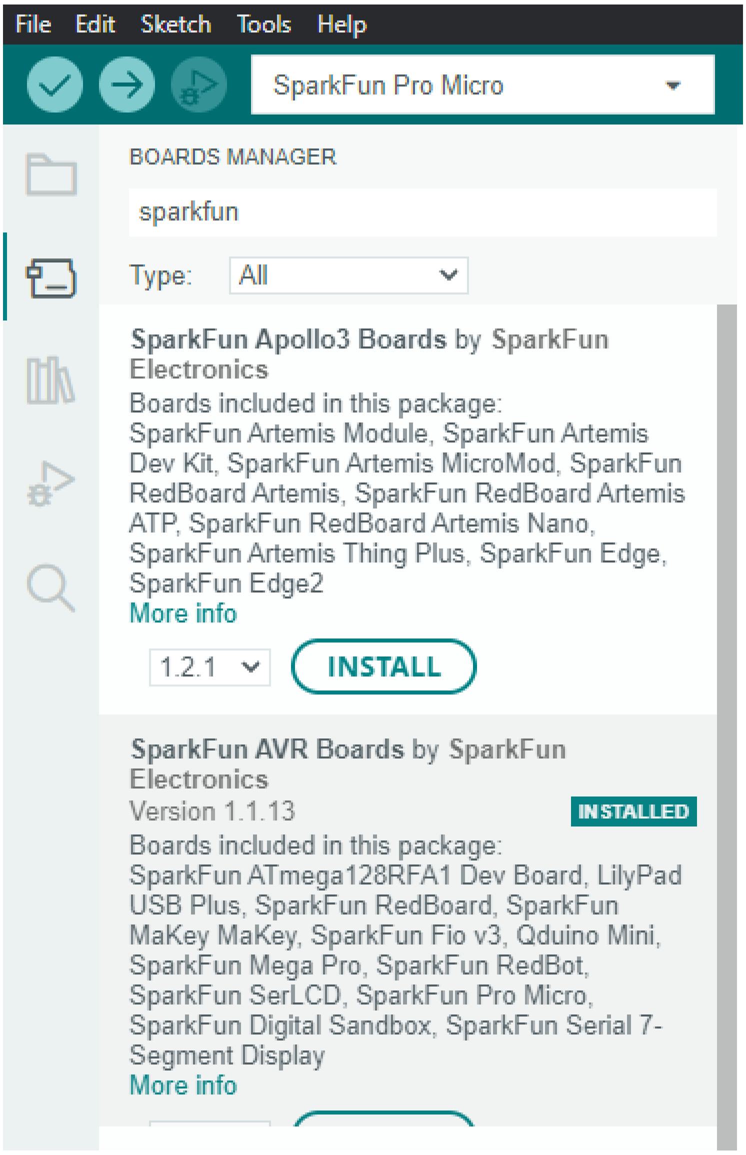
□ Editor Quick Suggestions

Additional boards manager URLs: https://raw.githubusercontent.com/sparkfun/Arduino_Boards/master/IDE_Board_

Click "OK". Then open the Board Manager under **Tools** > **Board** > **Boards Manager...**.


File
Edit
Sketch
Tools
Help
Auto Format Ctrl+T
Archive Sketch
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter
WiFi101 / WiFiNINA Firmware Updater
Upload SSL Root Certificates
Board: "Arduino Uno"
Port
Boards Manager... Ctrl+Shift+B
Arduino AVR Boards
iqs7221e

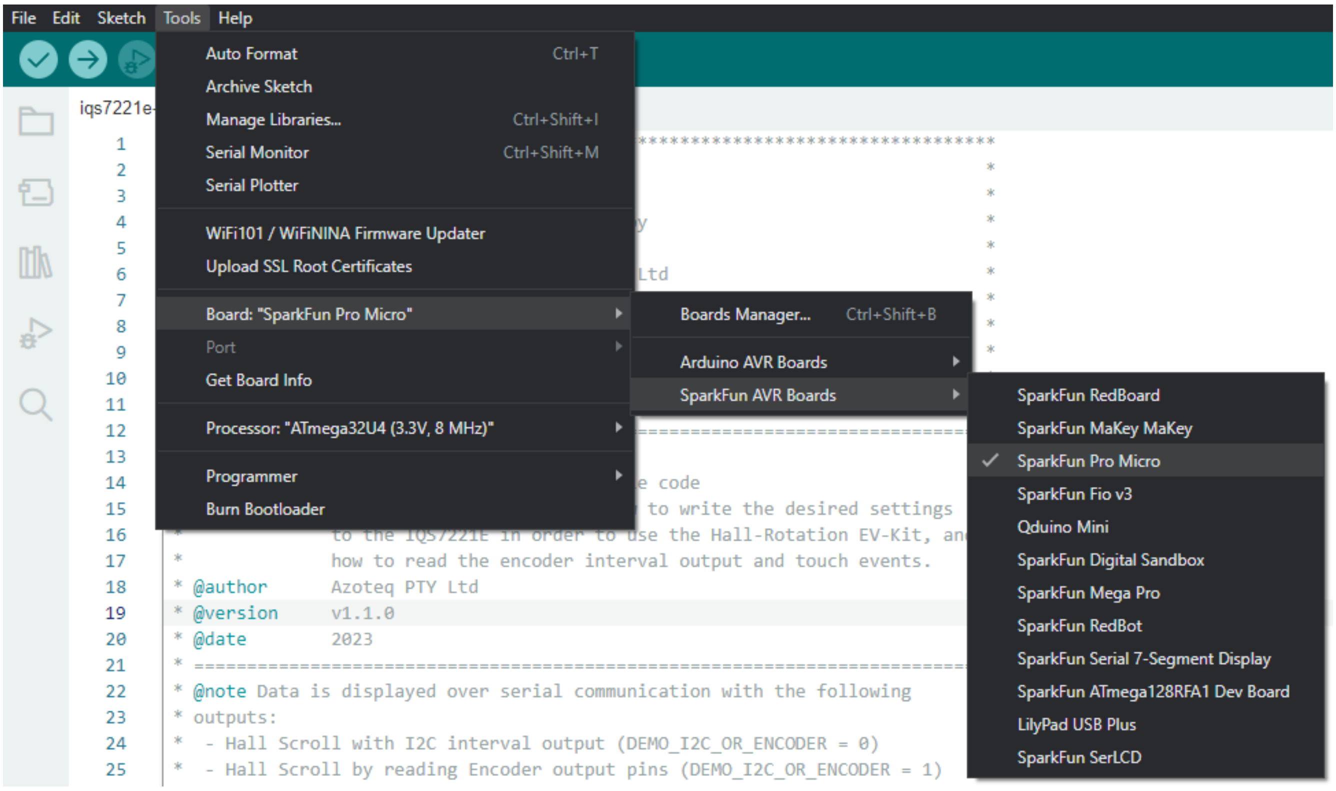
Search for "SparkFun", and install "SparkFun AVR Boards by SparkFun".



SparkFun Apollo3 Boards by **SparkFun Electronics**
Boards included in this package:
SparkFun Artemis Module, SparkFun Artemis Dev Kit, SparkFun Artemis MicroMod, SparkFun RedBoard Artemis, SparkFun RedBoard Artemis ATP, SparkFun RedBoard Artemis Nano, SparkFun Artemis Thing Plus, SparkFun Edge, SparkFun Edge2
More info
1.2.1 INSTALL

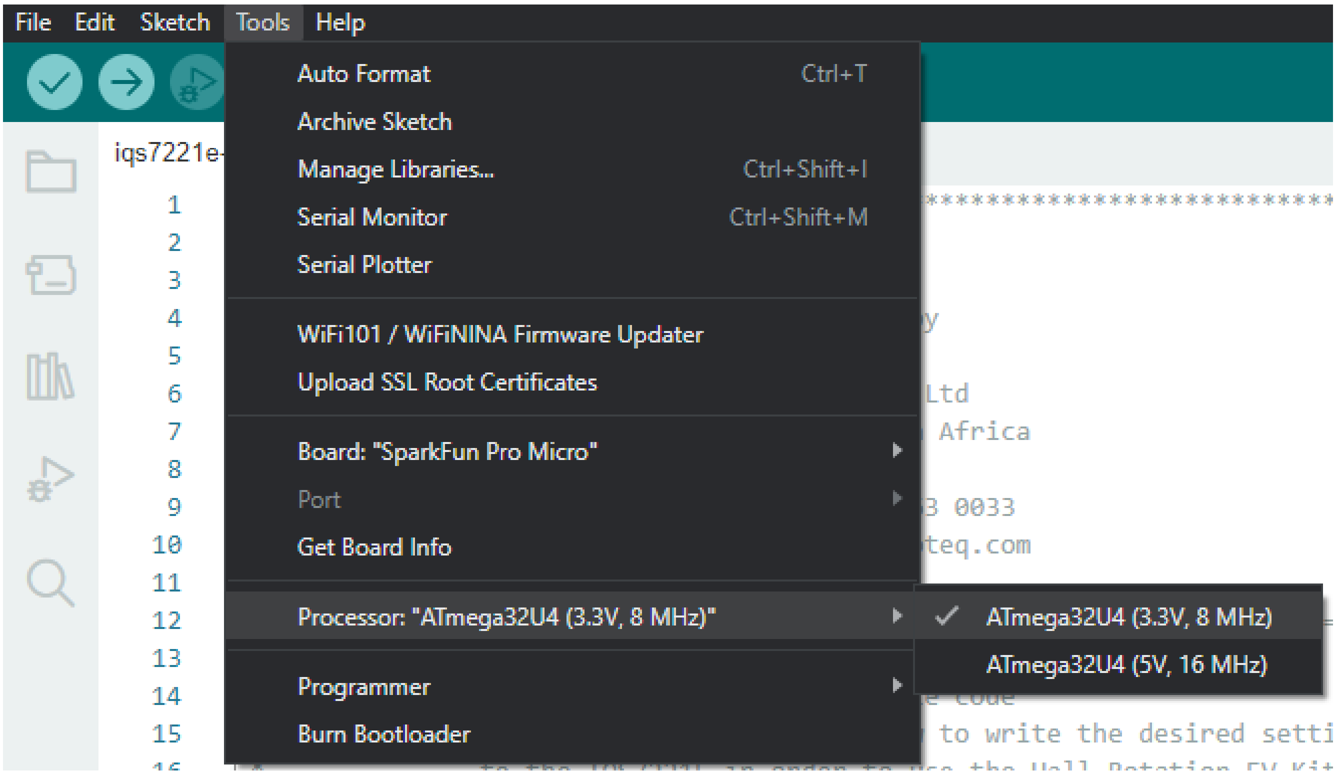
SparkFun AVR Boards by **SparkFun Electronics**
Version 1.1.13 INSTALLED
Boards included in this package:
SparkFun ATmega128RFA1 Dev Board, LilyPad USB Plus, SparkFun RedBoard, SparkFun MaKey MaKey, SparkFun Fio v3, Qduino Mini, SparkFun Mega Pro, SparkFun RedBot, SparkFun SerLCD, SparkFun Pro Micro, SparkFun Digital Sandbox, SparkFun Serial 7-Segment Display
More info

You can now select the "SparkFun Pro Micro" in the Board selection menu.


File Edit Sketch Tools Help
iqs7221e
Auto Format Ctrl+T
Archive Sketch
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter
WiFi101 / WiFiNINA Firmware Updater
Upload SSL Root Certificates
Board: "SparkFun Pro Micro"
Port
Get Board Info
Processor: "ATmega32U4 (3.3V, 8 MHz)"
Programmer
Burn Bootloader
Boards Manager... Ctrl+Shift+B
Arduino AVR Boards
SparkFun AVR Boards
SparkFun RedBoard
SparkFun MaKey MaKey
✓ SparkFun Pro Micro
SparkFun Fio v3
Qduino Mini
SparkFun Digital Sandbox
SparkFun Mega Pro
SparkFun RedBot
SparkFun Serial 7-Segment Display
SparkFun ATmega128RFA1 Dev Board
LilyPad USB Plus
SparkFun SerLCD

```
 *              how to read the encoder interval output and touch events.
 * @author      Azoteq PTY Ltd
 * @version     v1.1.0
 * @date        2023
 * ==========================================================================
 * @note Data is displayed over serial communication with the following
 * outputs:
 *  - Hall Scroll with I2C interval output (DEMO_I2C_OR_ENCODER = 0)
 *  - Hall Scroll by reading Encoder output pins (DEMO_I2C_OR_ENCODER = 1)
```

Also be sure to select the "3.3 V, 8 MHz" version under **Tools** > **Processor**.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Serial Monitor Ctrl+Shift+M
Serial Plotter
WiFi101 / WiFiNINA Firmware Updater
Upload SSL Root Certificates
Board: "SparkFun Pro Micro"
Port
Get Board Info
Processor: "ATmega32U4 (3.3V, 8 MHz)"
✓ ATmega32U4 (3.3V, 8 MHz)
ATmega32U4 (5V, 16 MHz)
Programmer
Burn Bootloader

Source: Pro Micro Hookup Guide

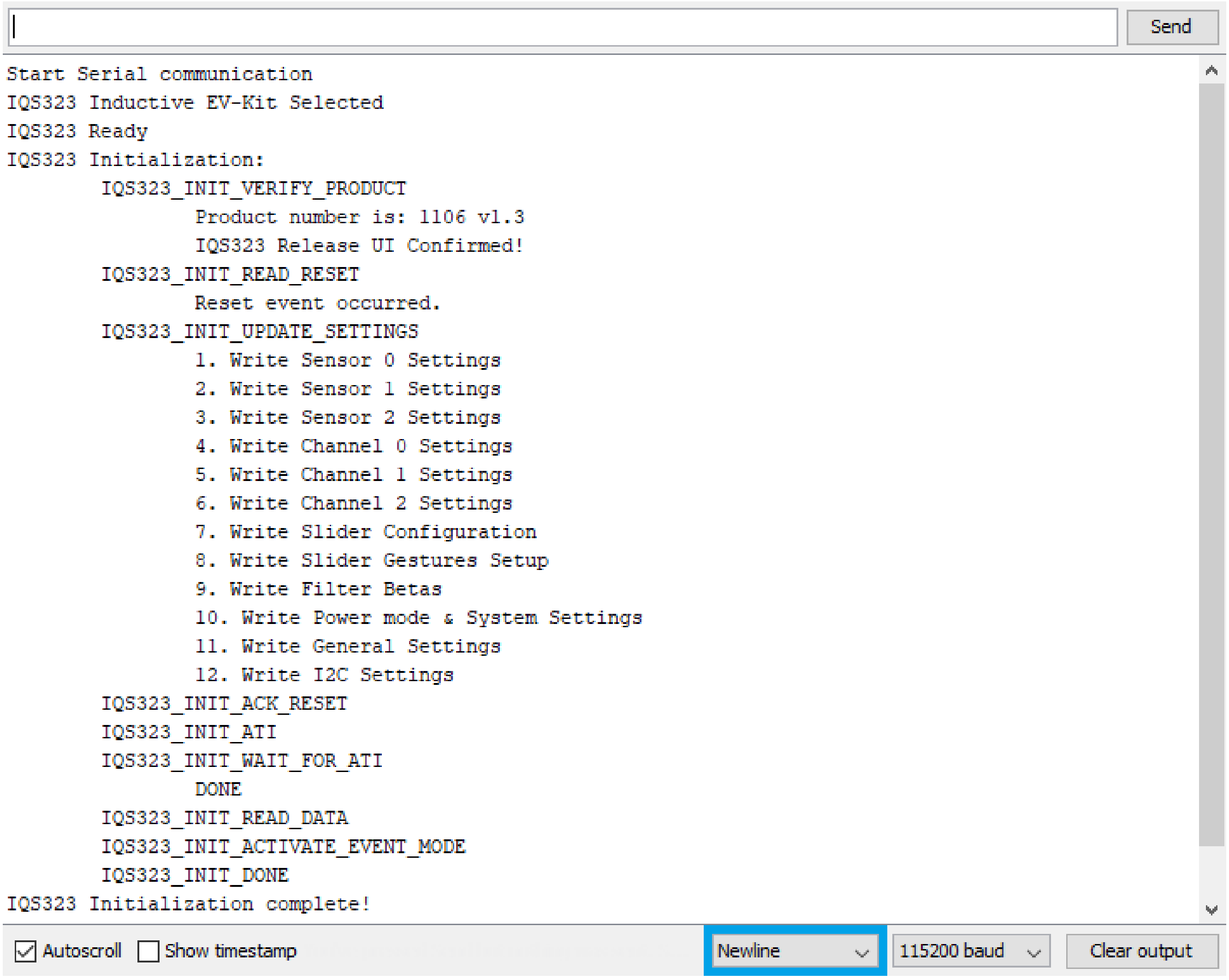
Serial Communication and Interface

The example code provides verbose serial feedback to aid users in the demonstration of start-up and operational functions. It also has two built-in commands to demonstrate IQS323's functionality. To use the built-in commands, the user simply sends an 'f' or 'r' over the serial interface.

```
1 - "f\n" - Force open a communication(RDY) window
```

```
2 - "r\n" - Request a Software Reset during runtime
```

It is important to take note of the newline ('\n') character that is needed to complete any serial request. It can be activated in the built-in Arduino IDE Serial monitor, shown inside the blue rectangle in the figure below.



```
Start Serial communication
IQS323 Inductive EV-Kit Selected
IQS323 Ready
IQS323 Initialization:
        IQS323_INIT_VERIFY_PRODUCT
                Product number is: 1106 v1.3
                IQS323 Release UI Confirmed!
        IQS323_INIT_READ_RESET
                Reset event occurred.
        IQS323_INIT_UPDATE_SETTINGS
                1. Write Sensor 0 Settings
                2. Write Sensor 1 Settings
                3. Write Sensor 2 Settings
                4. Write Channel 0 Settings
                5. Write Channel 1 Settings
                6. Write Channel 2 Settings
                7. Write Slider Configuration
                8. Write Slider Gestures Setup
                9. Write Filter Betas
                10. Write Power mode & System Settings
                11. Write General Settings
                12. Write I2C Settings
        IQS323_INIT_ACK_RESET
        IQS323_INIT_ATI
        IQS323_INIT_WAIT_FOR_ATI
                DONE
        IQS323_INIT_READ_DATA
        IQS323_INIT_ACTIVATE_EVENT_MODE
        IQS323_INIT_DONE
IQS323 Initialization complete!
```