MODFLEX SHIELD FOR ARDUINO
USER GUIDE AND DEMO APPLICATION



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1 Introduction

1.1 Purpose & Scope

The purpose of this document is to provide details regarding the use of the ModFLEX Shield For Arduino with the Arduino Duemilanove. There are ModFLEX Shields available for both the ProFLEX01 and SiFLEX02 ModFLEX modules.

1.2 Audience

This document is intended to be read by electronics hobbyists. It is assumed that the person reading this has a mild technical understanding.

1.3 Applicable Documents

- *ProFLEX01 / SiFLEX02 Datasheet*
- *ProFLEX01 / SiFLEX02 Host Protocol User's Guide*

1.4 Revision History

Date	Change Description	Revision
12-10-2010	Initial release.	1.0

Table 1 Revision History

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2 Jumper Configurations

2.1.1 Jumper 1 (J1)

Jumper J1 is used to enable the software reset for the ModFLEX module. When this is enabled (moved to the position connecting pins 2 and 3) digital pin 6 (D6) on the Arduino Duemilanove controls the reset signal of the ModFLEX module. When using the software reset capability, D6 on the Duemilanove needs to be configured as a digital output and be set high for normal operation. Resetting the ModFLEX module is accomplished by setting D6 low for a couple of milliseconds, and then setting it back high.

The software reset is being used for the demo application provided, and as such J1 pins 2 and 3 should be jumpered.

2.1.2 Jumper 2 and 3 (J2 and J3)

J2 and J3 are responsible for determining which mode of UART the Duemilanove uses to communicate with the ModFLEX module on the ModFLEX Shield. When the ModFLEX Shield is configured to use hardware UART mode (J2 and J3 moved to the positions connecting pins 1 and 2) the Duemilanove will use its designated UART RX and TX pins (D0 and D1 respectively) to communicate with the ModFLEX module. When it is desired to use software UART mode, digital pins 7 (D7) and 8 (D8) will be the RX and TX UART signals respectively.

When using hardware UART mode, the J2 and J3 jumpers must be removed when uploading software to the Duemilanove. The reason for this is that the hardware UART is used by the Arduino bootloader.

For the demo application software UART mode is used, and as such jumpers J2 and J3 should be connected between pins 1 and 2.

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3 Firmware and Necessary Software

3.1 Arduino Software

First you will need the Arduino Software. At the time of this writing the most current build is 0021. It can be downloaded by using this link: http://arduino.googlecode.com/files/arduino-0021.zip. If this link fails look under the download section at arduino.cc/en.

Extract the downloaded .zip's contents anywhere you would like. No installation is required; you will simply locate and execute the arduino.exe file located within the extracted folder to use this software:

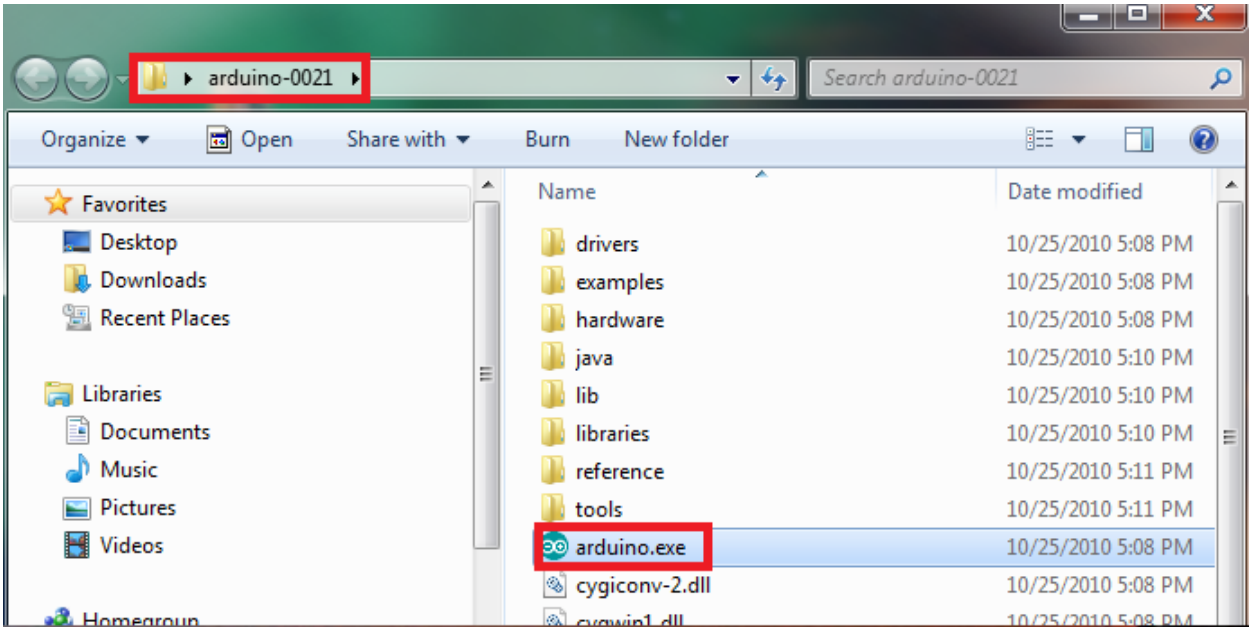


Figure 1

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3.1.1 ModFLEX Wireless Shield Library

Download the ModFLEX Wireless Shield Library using one of the following links.

ProFLEX01 ModFLEX Shield
http://www.lsr.com/products/radio_modules/802.15.4/proflex-01.aspx

SiFLEX02 ModFLEX Shield
http://www.lsr.com/products/radio_modules/900_mhz/siflex-02.aspx

Extract the .zip's contents in the *"library"* folder located within the extracted *"aruindo-0021"* folder:

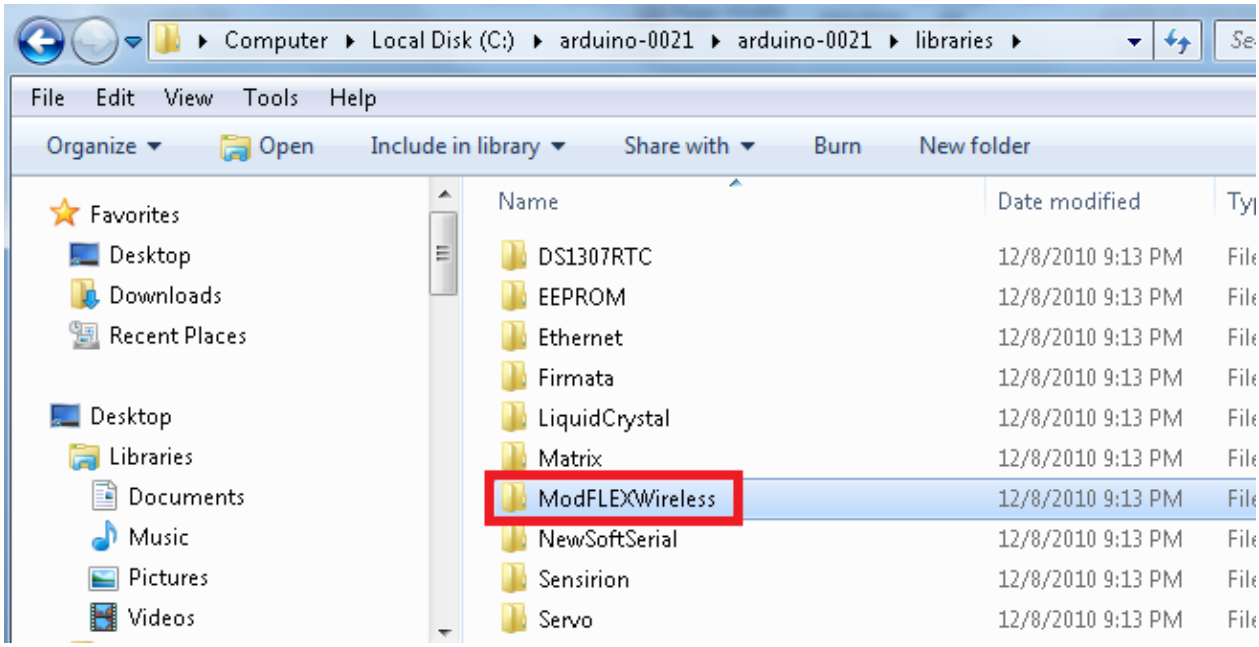


Figure 2

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If you are using the ProFLEX01 Module Shield dismiss the following steps.

1. Open the newly extracted ModFLEXWireless folder and open the LsrModuleApi.h file using any text editor:

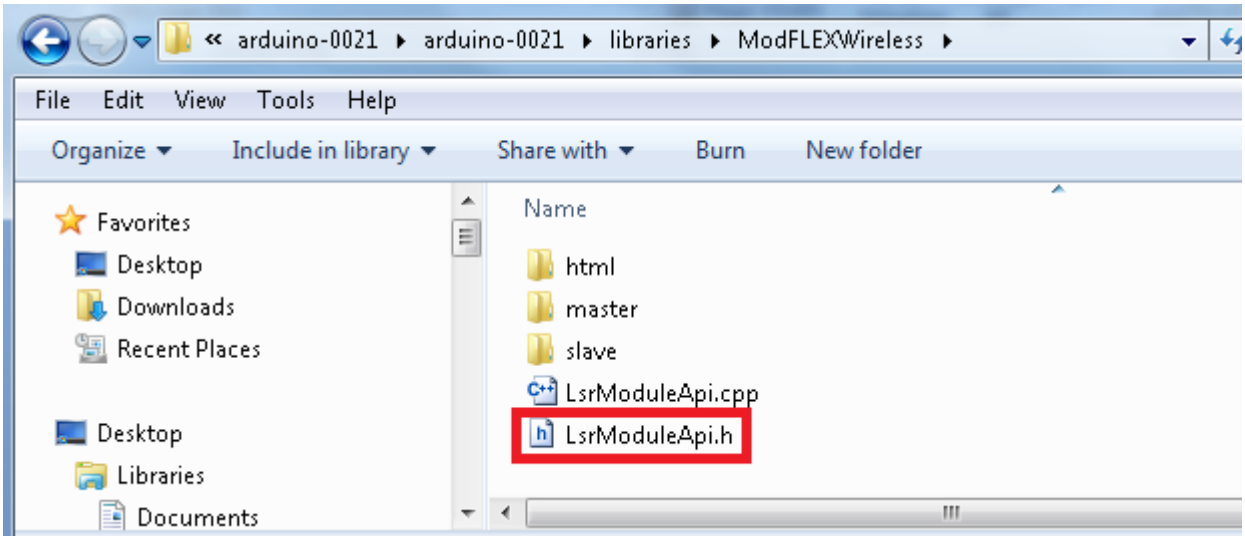


Figure 3

2. Modify the following define to SIFLEX02 instead of PROFLEX01:

```
#ifndef LsrModuleApi_h
#define LsrModuleApi_h

#include <inttypes.h>

#ifndef NULL
    #define NULL    0
#endif

//#define SIFLEX02  ///< Use with a SiFLEX02 ModFLEX Shield (900MHz)
#define PROFLEX01  ///< Use with a ProFLEX01 ModFLEX Shield (2.4GHz)
```

Figure 4

330-0057-R1.0 Copyright © 2010 LS Research, LLC

3.1.2 NewSoftSerial Software

In order to utilize the software UART mode on the ModFLEX Wireless shield you will need the NewSoftSerial library from Arduiniana. At the time of this writing the latest version can be downloaded using this link: http://arduiniana.org/NewSoftSerial/NewSoftSerial10c.zip. If this link fails it can be located at http://arduiniana.org/libraries/newsoftserial/.

Open the downloaded .zip and transfer the *"NewSoftSerial"* folder to the *"libraries"* folder in *"arduino-0021"*:

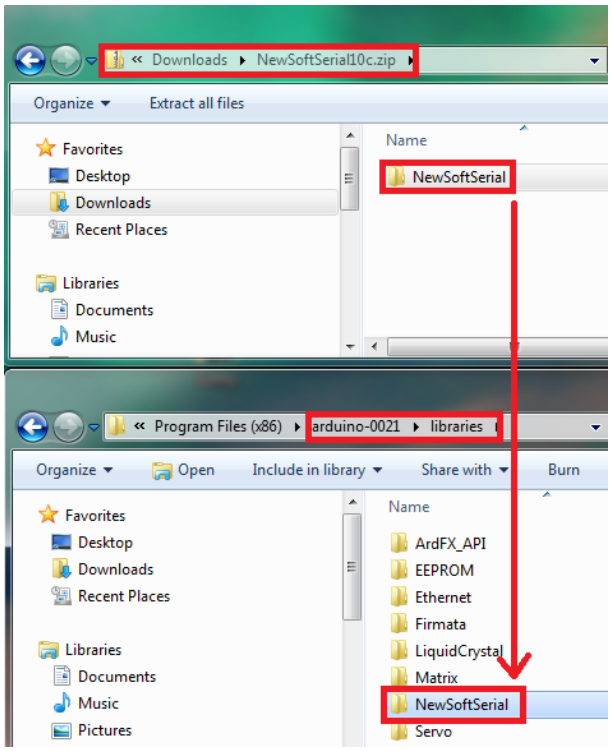


Figure 5

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4 Demo Application

4.1.1 Purpose

The demo application is provided to show users how the ModFLEX Wireless shield can utilize both hardware and software UART, as well as how to make use of the ModFLEX Wireless Library. The Arduino communicates with the wireless ModFLEX module using software UART, and the PC using hardware UART. Two Arduino Duemilanoves equipped with the same type of ModFLEX Wireless shields (ProFLEX01 or SiFLEX02) are required for this demo application.

4.1.2 Loading the Demo Application

1. Determine which Duemilanove you want to be the “slave” and which one you want to be the “master”.

2. Open the *“arduino-0021”* folder and execute the *“arduino.exe”* file:

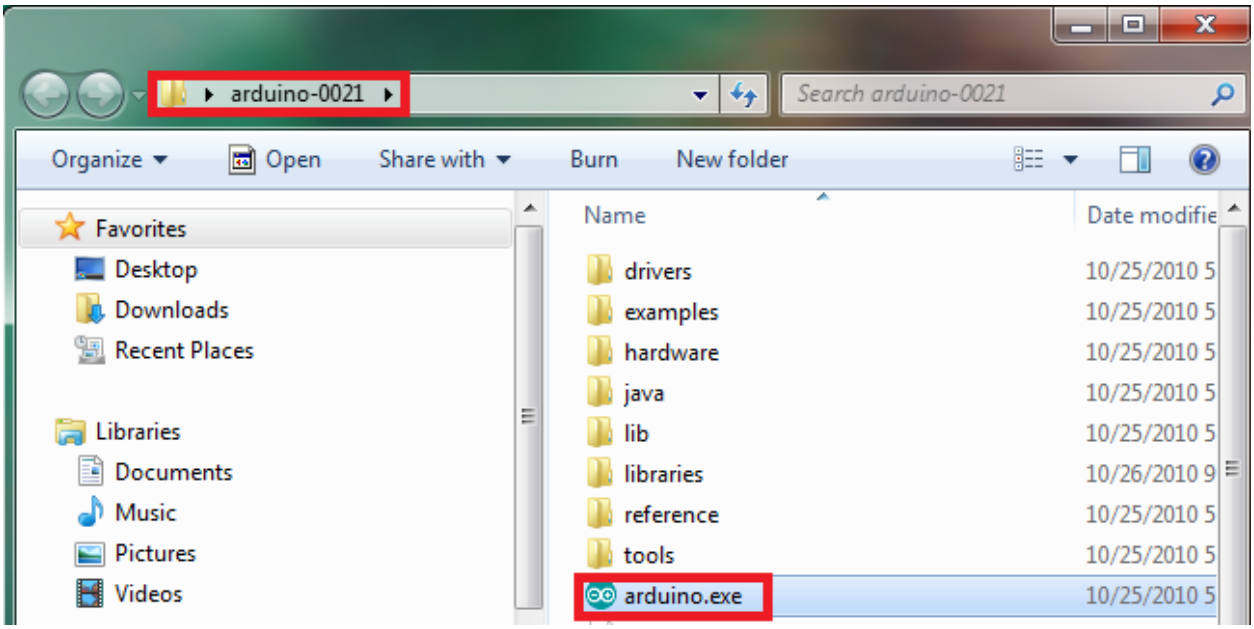


Figure 6

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3. First we will load the slave. Locate the "sketch" to be loaded onto the slave. The file is located in the *"ModFLEXWireless"* folder (arduino-021\libraries\ModFLEXWireless\slave):

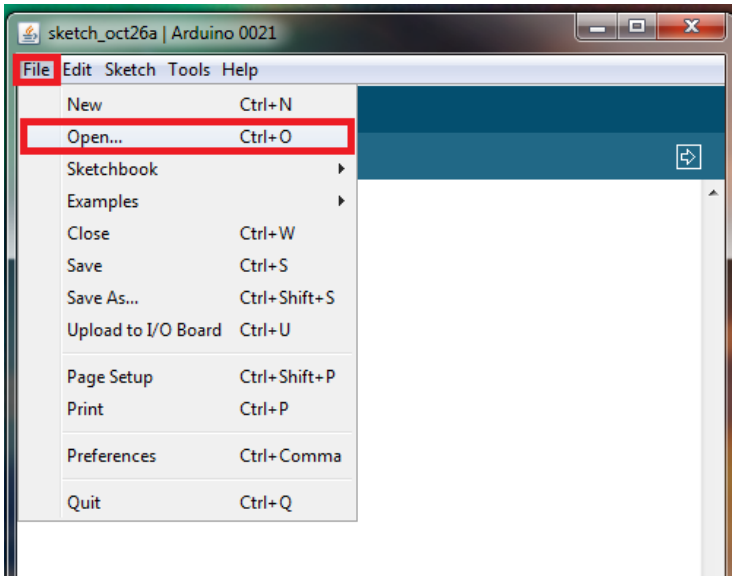


Figure 7

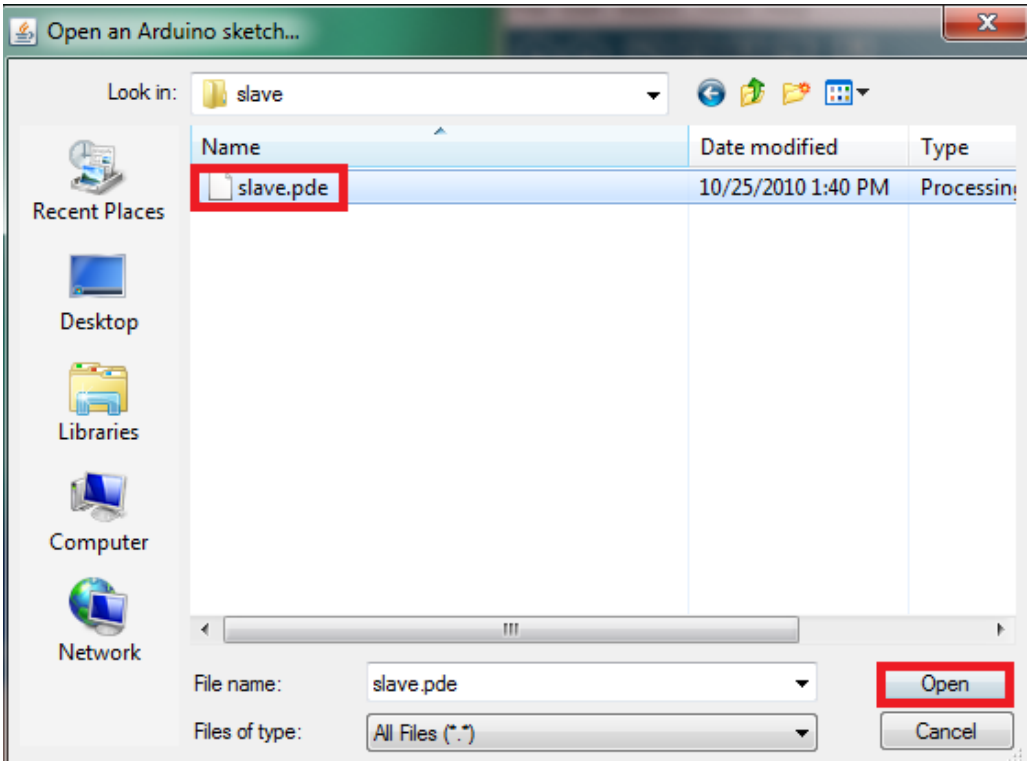


Figure 8

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4. If you are using SiFLEX02 ModFLEX Shields, edit the following section of code to look like this:

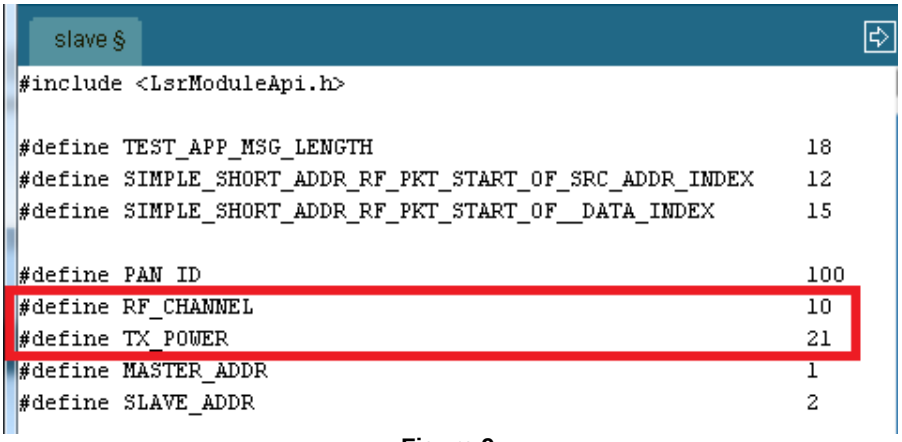


Figure 9

5. Connect the Duemilanove (ModFLEX shield attached) to your PC, make sure the appropriate COM port is selected, and upload to the board:

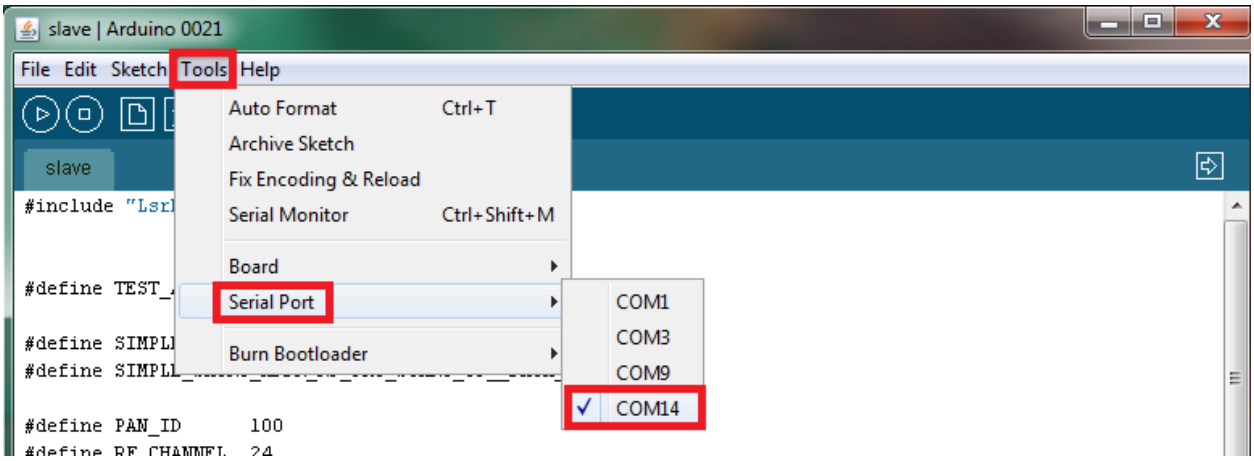


Figure 10

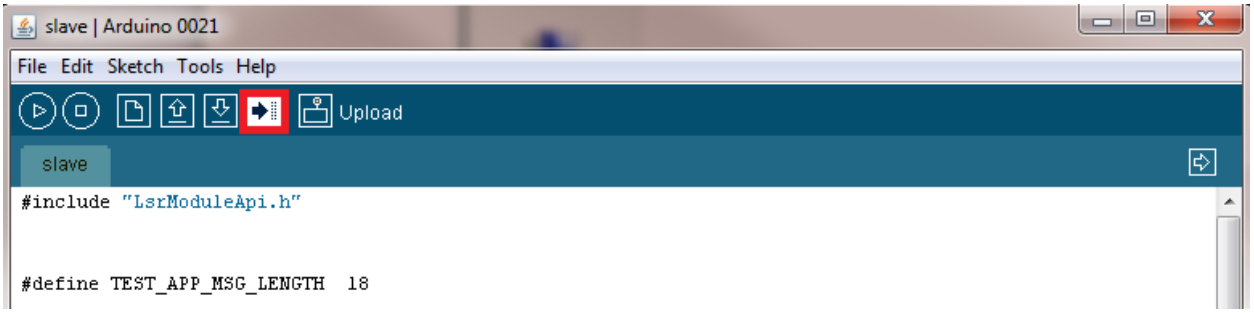


Figure 11

6. Repeat the same steps for the master.

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7. At this point both Duemilanoves should be powered up and communicating. Open the Arduino Serial Monitor to see the data the master is sending to the PC using the hardware UART. Make sure the COM port is the same as the one the master is connected to. Also the baud rate should be set to 19,200.

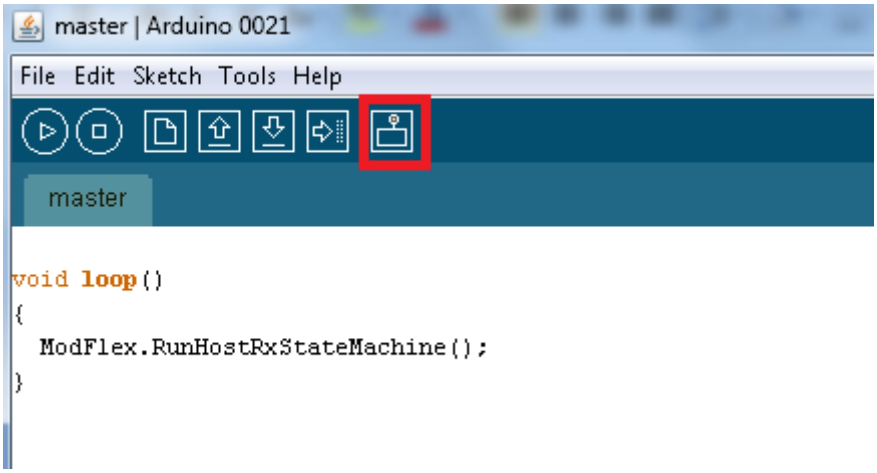


Figure 12

The Serial Monitor window will appear displaying simple statistics from the master:

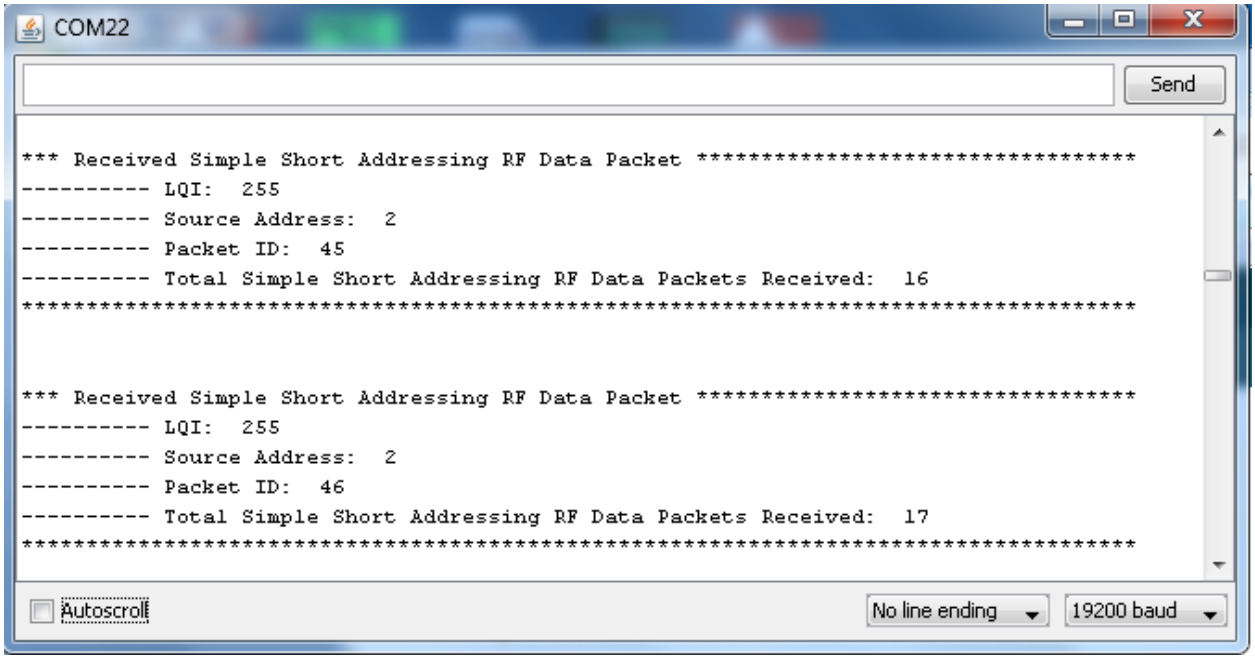


Figure 13

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5 Ping Pong Range Test on ModFLEX Shield

See the Development Kit User's Guide for detailed information regarding the Ping Pong Range Test usage.

The Ping Pong Range Test firmware is built into the module firmware. This allows for the test to be used on the ModFLEX shield. Jumper J1 must be set so the software reset is disabled.

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6 ModFLEX Wireless Shield Library User Guide

The ModFLEX Wireless Library comes with a user guide. To view it, locate the *"index.html"* file residing in the *"html"* folder of the *"ModFLEXWireless"* folder:

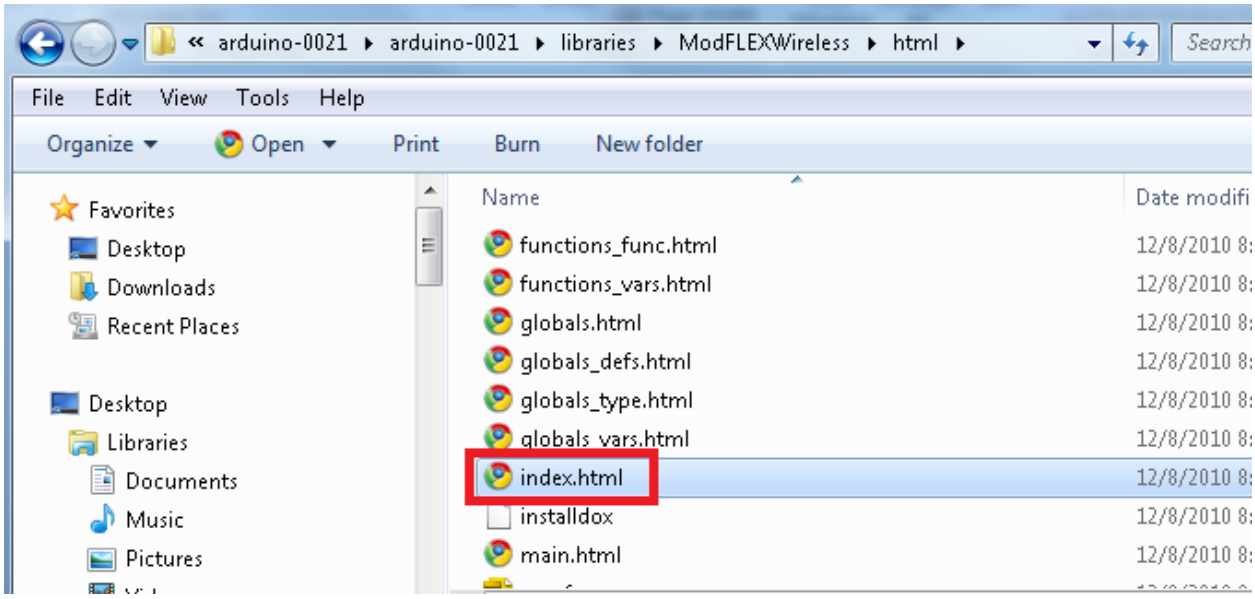


Figure 14

You can now navigate around this webpage and find helpful information about using the ModFLEX Wireless Library:

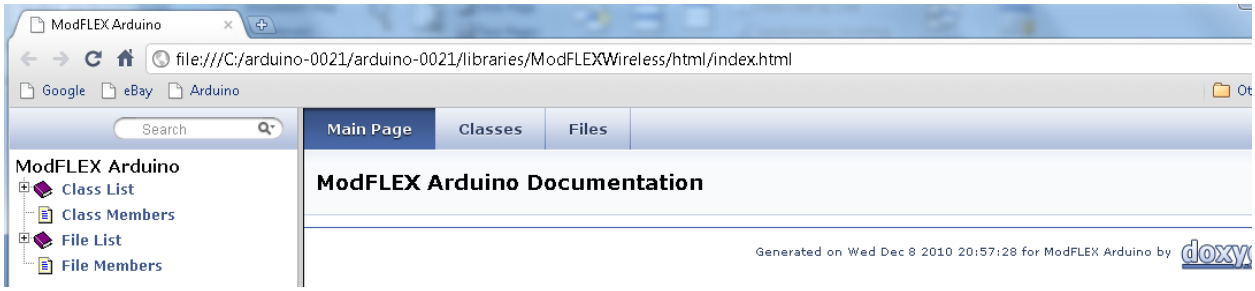


Figure 15

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7 Contacting LS Research

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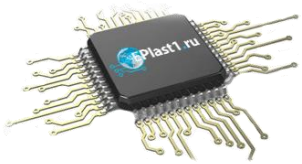
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