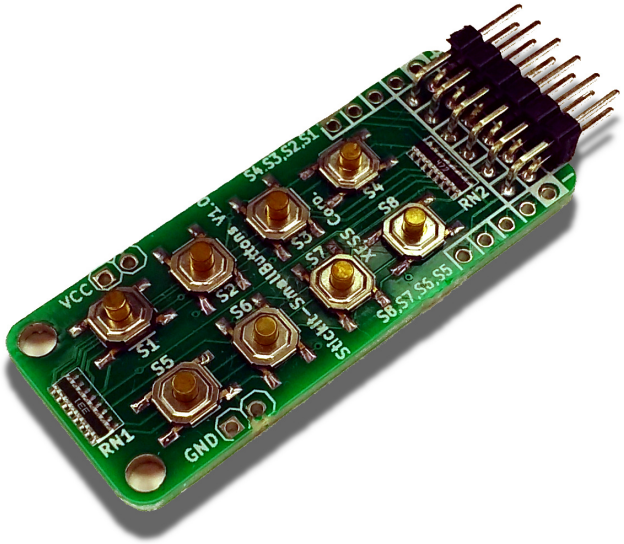
StickIt-SmallButtons Manual

How to install and use
your new StickIt-SmallButtons



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Document Revision History

Date	Version	Revision
2016-08-31	1.0	Initial release for StickIt-SmallButtons V1.0.

0 Contents

1 Preliminaries

Here's some helpful information before getting started.

Getting Help!

Here are some places to get help if you encounter problems:

- If you can't get the StickIt-SmallButtons module to work, send an e-mail message describing your problem to help@xess.com.
- Or submit a problem report at www.xess.com/interact/contact/.
- Our web site (http://www.xess.com) also has
  - example designs,
  - application notes, and
  - tutorials.
- Our Github site (https://github.com/xesscorp/StickIt-SmallButtons) contains the source for the StickIt-SmallButtons software and hardware if you really want to get into the nitty-gritty details.

Take Notice!

It's pretty hard to get in trouble with this module.

Packing List

Here is what you should have received in your package:

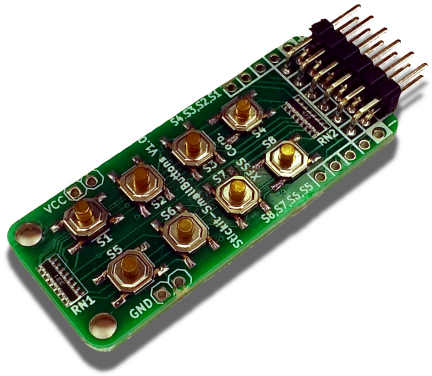
- a StickIt-SmallButtons module.
- a PMOD® male header.
- two 5×1 headers.

2 Setup

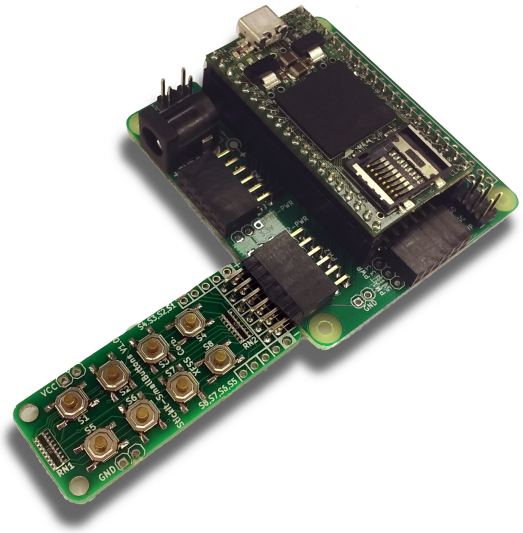
The StickIt-SmallButtons module provides an array of eight pushbuttons that you can insert into an eight-bit PMOD socket such as the ones on a StickIt! Board.

Inserting Your Module Into a PMOD Socket

To use the StickIt-SmallButtons module with a PMOD socket, first solder the included male PMOD header to the module as shown.

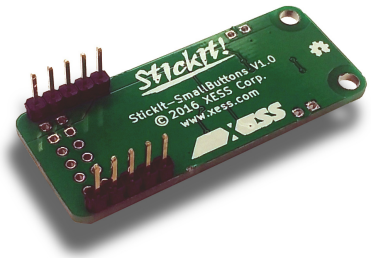


Then insert the module into one of the PMOD sockets on the StickIt! Board.

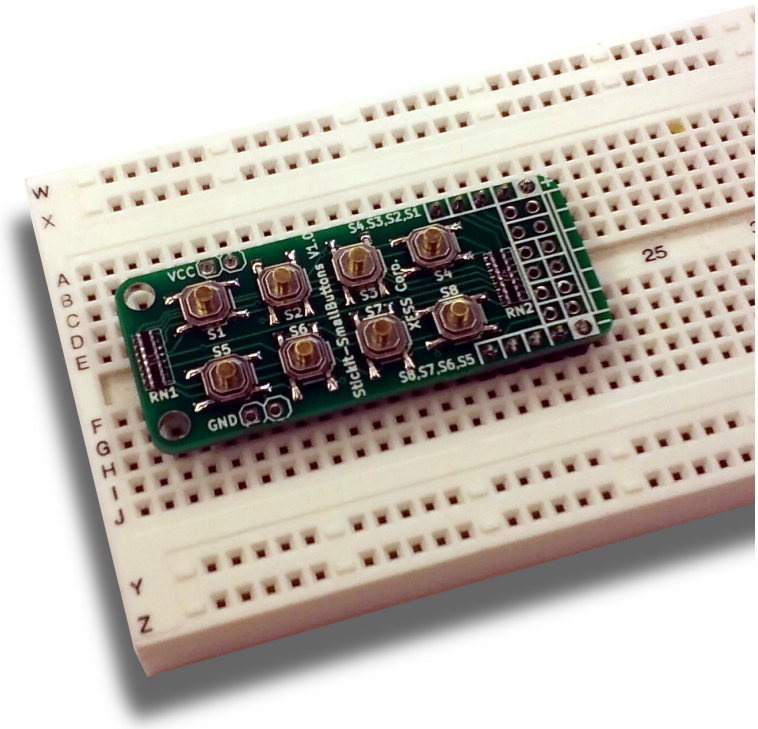


Inserting Your Module Into a Solderless Breadboard

To use the StickIt-SmallButtons module with a solderless breadboard, first solder the two included 5×1 headers to the module as shown.

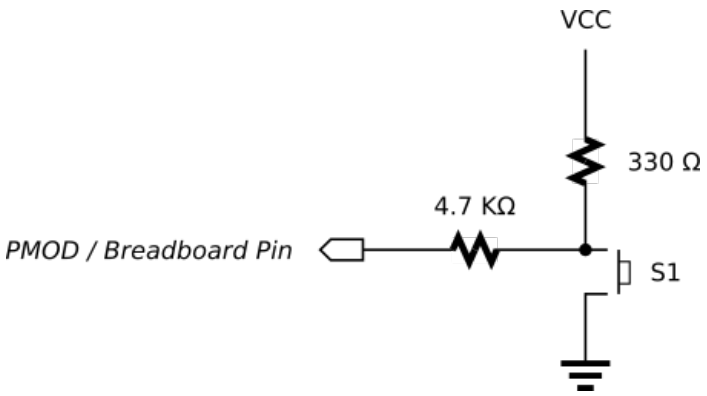


Then insert the module into the breadboard and make connections to it.


W
X
A
B
C
D
E
F
G
H
I
J
Y
Z
25
VCC
GND
S1
S2
S3
S4
S5
S6
S7
S8
RN1
RN2
S4,S3,S2,S1
S8,S7,S6,S5
StickIt-SmallButtons
XESS Corp.

3 Operation

All eight buttons of the StickIt-SmallButtons module are built from the following circuit:



When a pushbutton is pressed, the corresponding pin on the PMOD and breadboard headers is pulled to ground through the 4.7 KΩ resistor. When the pushbutton is released, the pin is pulled to the voltage applied to the VCC pin of the module through a combined resistance of 5 KΩ.

There is no hardware debouncing of the switches on the module.

4 Using the Module

Using the StickIt-SmallButtons module on a breadboard is easy: just connect the pins of the module to the inputs of your circuitry wherever you need a pushbutton input.

If you're using the StickIt-SmallButtons module to connect with one of the XESS FPGA boards through a PMOD port, then the process is a bit more complicated:

1. Create a Xilinx ISE/Vivado FPGA project and write some VHDL code for scanning the buttons.
2. Attach the module to a PMOD socket on an XESS board.
3. Determine the pins of the FPGA that connect to each I/O pin of the module.
4. Make a UCF file associating each FPGA pin with an I/O pin of the module.
5. Include the UCF file in your ISE/Vivado project and compile it into a bitstream.

That's a pretty big effort, so to get you started we've provided a pre-built project (https://github.com/xess
SmallButtons/FPGA/ButtonTest) that does all that. You can take that and modify it for your own applications.

The pre-built project uses a specific PMOD port and XESS FPGA board. To make it easier to move the module to another port or use a different board, we've built the `xsconnect` program that determines all the FPGA pin assignments for you. For example, the FPGA pin assignments to use when connecting the StickIt-SmallButtons module to the PM2 port of the StickIt! Board with a XuLA Board2 FPGA board are shown below. Just cut-and-paste the pin assignment constraints into the UCF file for your project and you're good to go.

A I/O Locations

The connections of the I/O signals to the PMOD and breadboard headers of the StickIt-SmallButtons module are shown below: