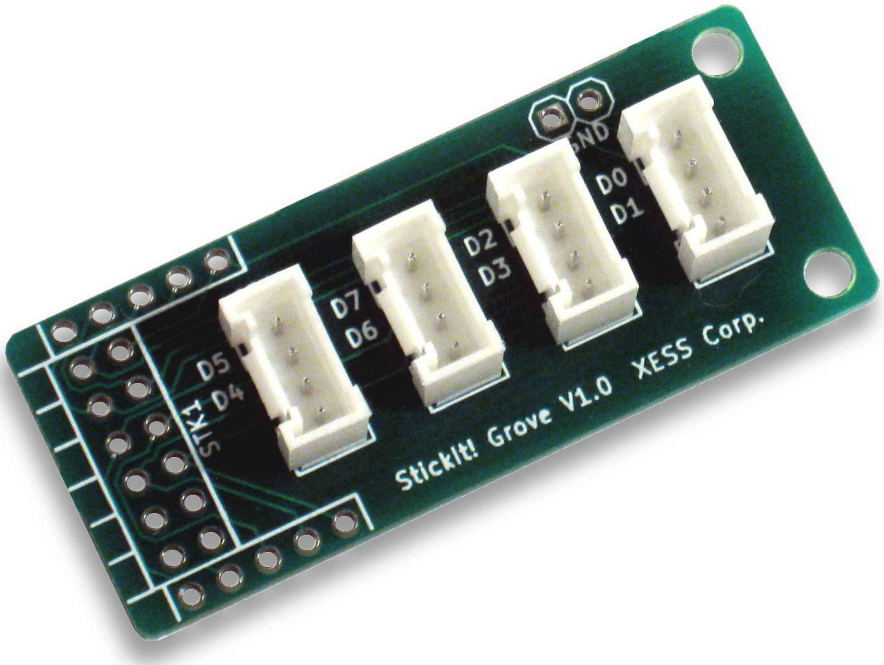
StickIt! Grove Manual

How to install and use
your new StickIt! Grove



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Document Revision History

Date	Version	Revision
07/15/2015	1.0	Initial release for StickIt! Grove V1.0.

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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! Grove 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 also has
  - example designs,
  - application notes, and
  - tutorials.

Packing List

Here is what you should have received in your package:

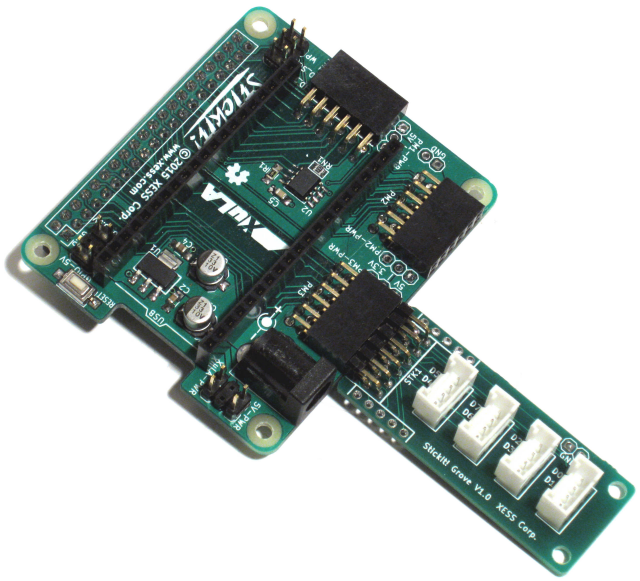
- a StickIt! Grove.
- a 6×2 right-angle male header.
- two 5×1 male headers.

2 Setup

The StickIt! Grove provides sockets for connecting up to four Grove modules to a single PMOD socket on a StickIt! Board, or it can be plugged into a solderless breadboard.

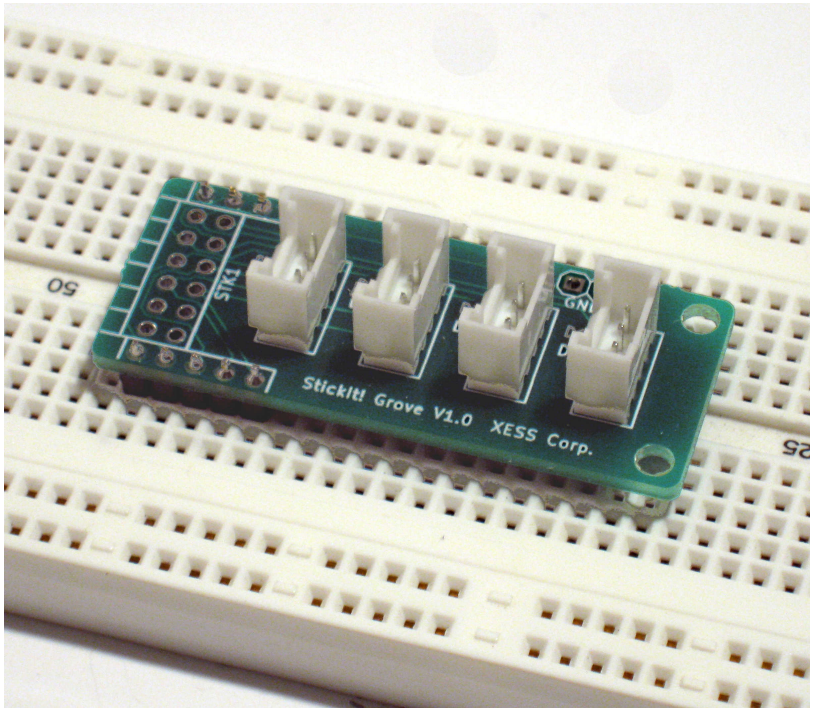
Inserting Your StickIt! Grove Into Your StickIt! Board

To use the StickIt! Grove with a PMOD socket, first solder the 6×2 right-angle male header to the module. Then the StickIt! Grove can be inserted into any of the PMOD sockets of the StickIt! Board as shown below.



Inserting Your StickIt! Grove Into a Breadboard

To use the StickIt! Grove with a solderless breadboard, first solder the two 5×1 male headers as shown. Then the StickIt! Grove can be inserted into the breadboard as shown below.



3 Using the StickIt! Grove

Each of the four Grove sockets receives two of the eight data lines that connect to the PMOD and breadboard connectors. Each Grove socket also shares a common ground and power connection with the PMOD and breadboard connectors. Attaching a Grove module to one of the sockets provides the module with power, ground, and two I/O lines.

Using the StickIt! Grove with a StickIt! Board

In order to interface a Grove module with a StickIt! Board and XuLA Board through a PMOD socket, you have to figure out the path the signals take from the pins of the FPGA through the StickIt! Board and PMOD sockets and finally on to the Grove module. You can manually trace the path using the following procedure:

- Connect the StickIt! Grove to one of the PMOD sockets (PM1–PM3) on the StickIt! Board.
- Connect a Grove module to one of the sockets (GR1–GR4) on the StickIt! Grove and note which PMOD signals (D0–D7) it connects to.
- Using the PMOD socket and signal found in the previous steps, lookup the channel it connects to in the table on page 12 of the StickIt! Board manual.
- Now use the channel to lookup the FPGA pin of the XuLA Board it connects to in the table on page 9 of the StickIt! Board manual.
- Make a UCF file associating each FPGA pin with each I/O of the module.
- Include the UCF file in your Xilinx ISE FPGA project.

As an example, consider using a simple Grove module with a single LED. Plugging the module into socket GR3 on the StickIt! Grove connects the LED's anode to pin D7 of the PMOD connector and its cathode to ground. Inserting the StickIt! Grove into socket PM3 of the StickIt! Board connects D7 to channel 30. Assuming a XuLA2 board is inserted into

the StickIt! Board, channel 30 will terminate on pin B2 of the FPGA. So the UCF file would contain a constraint like this:

```
net LED loc = B2;
```

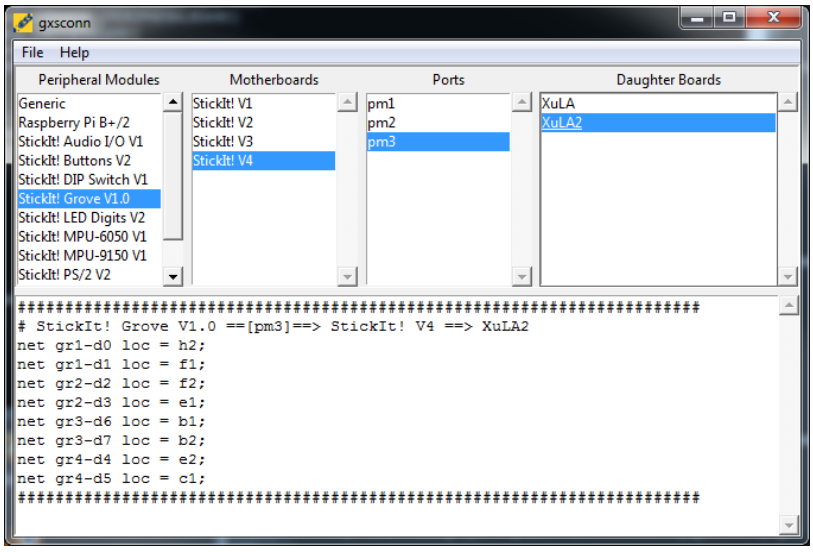
Admittedly, that's a lot of work just to make a connection! Instead of going through all that, the `xsconnect` Python package (https://pypi.python.org/pypi/xsconnect) provides two scripts to make the process easier. The command-line script generates the UCF directly like so:

```
xsconn -p grove -m stickit4 -n pm3 -d xula2
```

which gives:

```
##############################################################################
# StickIt! Grove V1.0 ==[pm3]==> StickIt! V4 ==> XuLA2
net gr1-d0 loc = h2;
net gr1-d1 loc = f1;
net gr2-d2 loc = f2;
net gr2-d3 loc = e1;
net gr3-d6 loc = b1;
net gr3-d7 loc = b2;
net gr4-d4 loc = e2;
net gr4-d5 loc = c1;
##############################################################################
```

The `gxsconn` script does the same thing, but with a GUI:



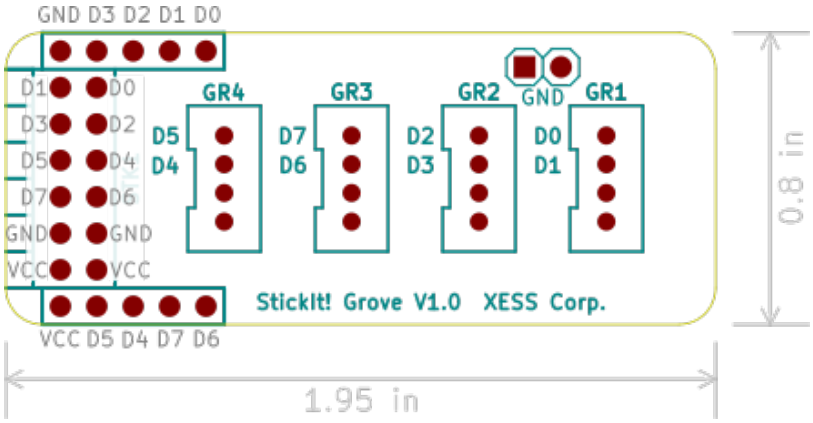
Just change the `gr3-d7` in the output to `LED` (or whatever name you want to use) and include the constraint in the UCF file of your ISE project.

Using the StickIt! Grove with a Breadboard

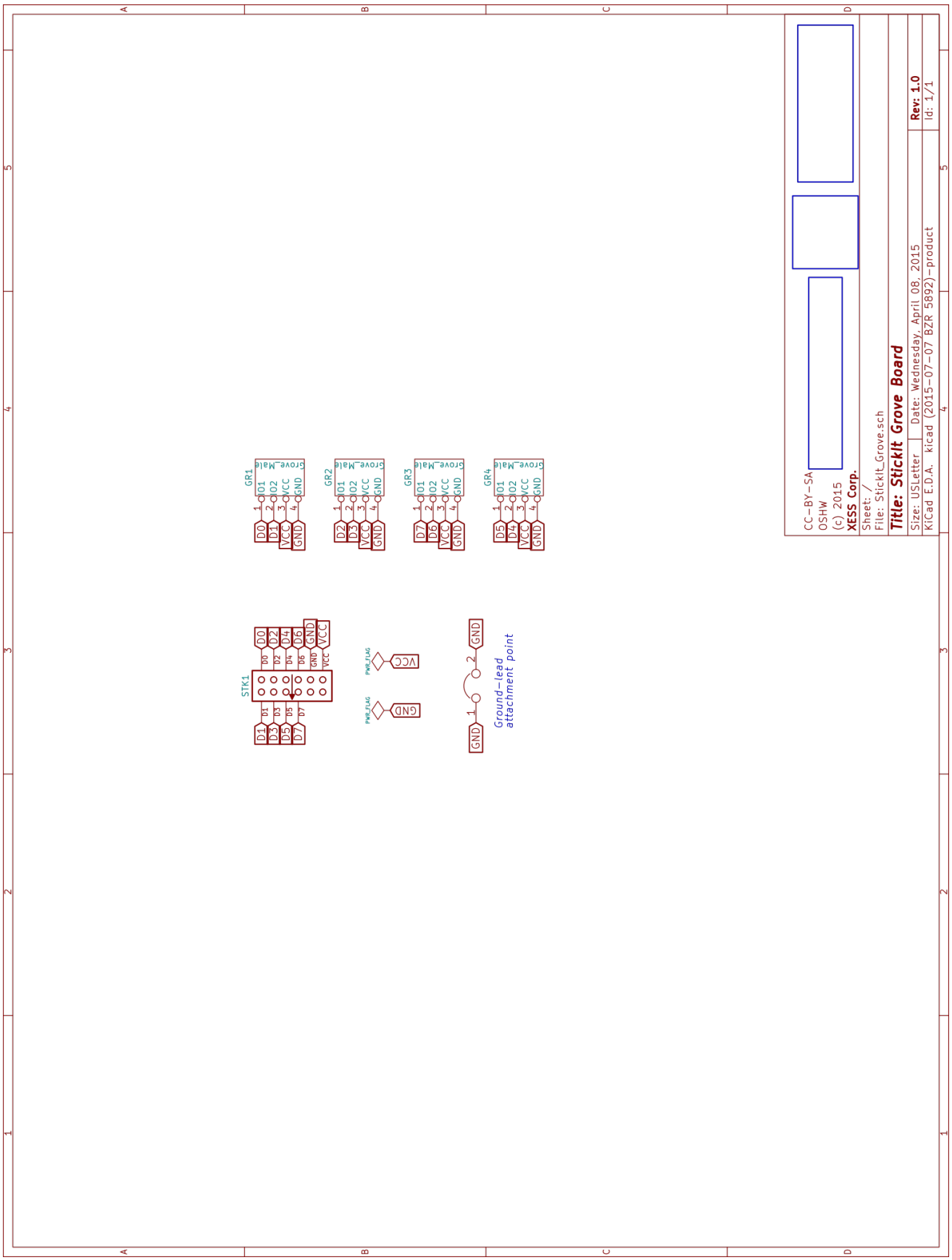
After inserting the StickIt! Grove into a breadboard, attaching a Grove module to one of the sockets connects its two I/O signals to two of the pins D0–D7 connecting to the breadboard as well as the power and ground pins. The pins associated with each Grove socket are printed next to each socket, and the corresponding pin locations on the breadboard header are shown in the figure on page 7. Then just use jumpers or hookup wire to make connections from the header to the rest of your circuitry on the breadboard.

4 I/O Locations

The connections of the PMOD and breadboard I/O signals to the Grove sockets are shown below.



5 Schematic


GR1
GR2
GR3
GR4
Grove_Male
IO1
IO2
VCC
GND
D0
D1
D2
D3
D7
D6
D5
D4
STK1
PWR_FLAG
Ground-lead
attachment point
CC-BY-SA
OSHW
(c) 2015
XESS Corp.
Sheet: /
File: StickIt_Grove.sch
Title: StickIt Grove Board
Size: USLetter
Date: Wednesday, April 08, 2015
Rev: 1.0
KiCad E.D.A. kicad (2015-07-07 BZR 5892)-product
Id: 1/1