Digilent FX2 Breadboard Reference Manual

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Overview

The Digilent FX2 Breadboard (FX2BB) offers a ready-made solution for prototyping breadboarded or wire-wrapped circuits as accessories to Digilent system boards. The FX2BB provides connectors suitable for direct connection of various Digilent system boards and Digilent Pmod™ peripheral modules.

The FX2BB is available in a wire-wrap version or a solderless breadboard version.

Features include:

- two 630 tie point breadboards separated by 100 tie point bus strip (solderless breadboard version)
- 32x65 hole wire-wrap area (wire-wrap version)
- four 6-pin male header
- four 6-pin female header
- FX2 connector
- prototype/wire-wrap connections on every signal
- two power buses and one ground plane.

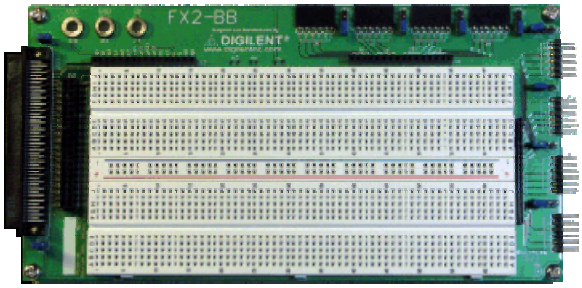

Figure 1
Digilent FX2 Breadboard

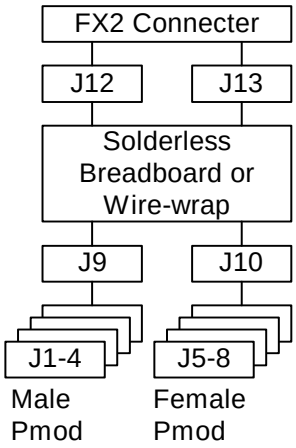

Figure 2
Block Diagram

Functional Description

Power Connections

The FX2BB provides two power busses and a ground bus. The two power busses are labeled VU and VCC. These two busses are made available at each connector position on the board. There is also a ground plane that connects the ground pins from all connectors together.

The usual Digilent convention is to power the VCC bus at 3.3V and the VU bus at 5.0V. However depending on the system board connected and the power supply used, other voltages may be present. But observe caution before using any voltage other than 3.3V on the VCC bus. Most Digilent system boards will be damaged if the voltage on the VCC bus is greater than 3.3V.

Banana jacks J14-J16 provide connection points for connecting external, bench power supplies to the board to power the busses.

Alternatively, the power busses can be powered from the FX2 connector or any of the Pmod connectors. When configuring power jumpers and powering the board, it is important that each power supply bus be powered from a single power source. Damage can occur if the same bus is powered by more than one source.

Hirose, 100 Pin, FX2 Connector

FX2 connector J11 is provided on one side of the board for connection to Digilent system boards like the Nexys that contain an FX2 style connector. The Digilent FX2 connector signal convention provides for forty general-purpose I/O signals, three clock signals, JTAG signals, and power busses.

The forty general-purpose I/O signals from the FX2 connector are brought out to connector J12. These signals are labeled IO1-IO40. See Table 1 for a description of the relationship between FX2 connector pins and signal names on J12. The remaining signals from the FX2 connector are brought out to connector J13. See Table 1 for a description of the relationship between FX2 connector pins and connector J13 signal names.

In addition to the FX2 connector signals, connector J13 also provides access to the power and ground busses.

Jumper blocks JP9 and JP10 are used to connect or disconnect the VU and VCC busses of the system board and the VU and VCC busses on the FX2BB. Shorting blocks are placed on JP9 and/or JP10 to connect the busses, or removed to disconnect the busses.

Pmod Connectors

Digilent Pmod peripheral modules provide various peripheral functions. These can be as simple as buttons or switches for inputs and LEDs for outputs, to as complex as graphical LCD display panels, accelerometers and keypads.

All Digilent Pmod modules use a six-wire interface for connection to a system board. The interface provides four I/O signals, power and ground. The signal definitions for the four signals as well as the voltage requirements for the power supply depend on the specific module.

The system board connection is through a 6-pin male connector. In addition to the system board connection, many Pmods, such as A/D and D/A converters, provide interfaces to outside signals. These connections are made through a 6-pin female connector.

The FX2BB provides two sets of four 6-pin connectors for connection of Pmods. Connectors J1-J4 are male connectors for connection to the external signal side of Pmods like A/D or D/A converters. Connectors J5-J8 are female connectors for connection to the system board side of Pmods.

The signals for Pmod connectors J1-J4 are brought out to connector J9. These signals are labeled; J1, 1-4; J2, 1-4, etc. Similarly, the signals for Pmod connectors J5-J8 are brought out to connector J10 and labeled; J5, 1-4, etc.

Each Pmod connector has an associated power select jumper. The power select jumper for J1 is JP1 and so on. These jumpers are used to select one of the two power busses on the FX2BB to provide power to the power supply pin on a Pmod plugged into that connector position. Placing a shorting block in the VCC position provides VCC power to the Pmod. Placing a shorting block in the VU position provides VU power to the Pmod. Place a shorting block so that it hangs off of the center pin only, disconnects power to the Pmod.

Table 1: FX2 Signals and Connector Pinout

A		B	
1	VCC	1	SHLD
2	VCC	2	GND
3	TMS	3	TDI (from host to peripheral)
4	JTSEL	4	TCK
5	TDO (From peripheral to host)	5	GND
6	IO1	6	GND
7	IO2	7	GND
8	IO3	8	GND
9	IO4	9	GND
10	IO5	10	GND
11	IO6	11	GND
12	IO7	12	GND
13	IO8	13	GND
14	IO9	14	GND
15	IO10	15	GND
16	IO11	16	GND
17	IO12	17	GND
18	IO13	18	GND
19	IO14	19	GND
20	IO15	20	GND
21	IO16	21	GND
22	IO17	22	GND
23	IO18	23	GND
24	IO19	24	GND
25	IO20	25	GND
26	IO21	26	GND
27	IO22	27	GND
28	IO23	28	GND
29	IO24	29	GND
30	IO25	30	GND
31	IO26	31	GND
32	IO27	32	GND
33	IO28	33	GND
34	IO29	34	GND
35	IO30	35	GND
36	IO31	36	GND
37	IO32	37	GND
38	IO33	38	GND
39	IO34	39	GND
40	IO35	40	GND
41	IO36	41	GND
42	IO37	42	GND
43	IO38	43	GND
44	IO39	44	GND

45	IO40	45	GND
46	GND	46	CLKIN (from peripheral to host)
47	CLKOUT (from host to peripheral)	47	GND
48	GND	48	CLKIO (from host to peripheral)
49	VU	49	VU
50	VU	50	SHLD

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