VmodMIB™
Reference Manual

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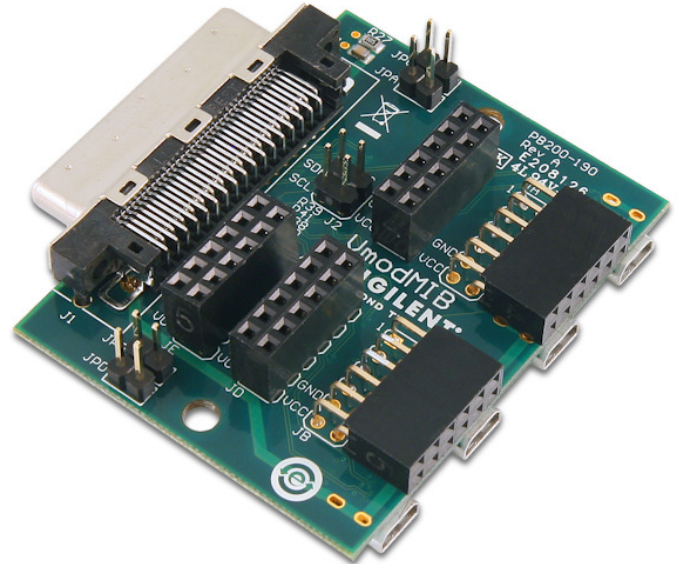Pullman, WA 99163
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Overview

The Digilent Vmod Module Interface Board (VmodMIB) is a simple solution for interfacing additional peripheral modules and HDMI devices to VHDCI-equipped Digilent system boards.

Features include:

- VHDCI peripheral board connector
- Four HDMI and five 12-pin Pmod™ connectors

Functional Description

The VmodMIB is an expansion board that connects to the VHDCI connector on Digilent system boards and provides additional Pmod and HDMI connections.

Power Connections

The VmodMIB provides two power busses and a ground bus. The two power busses are labeled VCC and VU. 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.

The usual Digilent convention is to power the VCC bus at 3.3V and the VCCFX2 bus at 5.0V. However, depending on the system board connected and the power supply used, other voltages may be present. Use caution when 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.

68 Pin, VHDCI Connector

VHDCI connector J1 is provided on one side of the board for connection to Digilent system boards, like the Genesys™ and Atlys™, which contain a VHDCI-style connector. The Digilent VHDCI connector signal convention provides for 40 general-purpose I/O signals.

The 40 general-purpose I/O signals from the VHDCI connector are brought out to the Pmod and HDMI connectors. See Table 1 for a description of the relationship between the VHDCI connector pins and the signal names, Table 2 for the relationship between signal names and Pmod pins and Table 3 for the relationship between signal names and HDMI pins.

Pmod Connectors

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

All Digilent Pmods use either a 6-wire interface or a 12-wire interface. The 6-wire interface provides four I/O signals, power, and ground. The twelve-wire interface provides 8 I/O signals, two powers, and two grounds. The signal definitions for the I/O signals as well as the voltage requirements for the power supply depend on the specific module.

The VmodMIB provides five 12-pin Pmod connectors.

HDMI Connectors

The VmodMIB also provides four HDMI type-D connectors to allow audio/video connections to the system board. They use 19 pins and the relationship between these pins and the signal names from the VHDCI connector are described in table 3. Each HDMI connector has a jumper which can be used to select a 5V source when shorted.

Also, data can be sent to the HDMI connectors via an I^{2}C bus from signals JE1/SDA and JE2/SCL when the jumpers at J2 are shorted.

Keep in mind that all HDMI ports share signals with Pmod ports. JA is shares signals with JAA, JB with JBB, JC with JCC, JD with JDD. All HDMI ports share pins with Pmod port JE, which contains the I^{2}C bus signals.

Table 1: *VHDCI Signals and Connector Pinout*

J1

1	JC-CLK_P	35	JC-CLK_N
2	GND	36	GND
3	JC-D0_P	37	JC-D0_N
4	JC-D1_P	38	JC-D1_N
5	GND	39	GND
6	JC-D2_P	40	JC-D2_N
7	JA-D0_P	41	JA-D0_N
8	GND	42	GND
9	JA-D1_P	43	JA-D1_N
10	JA-D2_P	44	JA-D2_N
11	GND	45	GND
12	JB-D0_P	46	JB-D0_N
13	JB-D1_P	47	JB-D1_N
14	GND	48	GND
15	JA-CLK_P	49	JA-CLK_N
16	VCCB	50	VCCB
17	VCC5V0	51	VCC5V0
18	VCC5V0	52	VCC5V0
19	VCCB	53	VCCB
20	JB-CLK_P	54	JB-CLK_N
21	GND	55	GND
22	JB-D2_P	56	JB-D2_N
23	JE8	57	JE7
24	GND	58	GND
25	JE2/SCL	59	JE1/SDA
26	JE10	60	JE9
27	GND	61	GND
28	JE4	62	JE3
29	JD-CLK_P	63	JD-CLK_N
30	GND	64	GND
31	JD-D0_P	65	JD-D0_N
32	JD-D1_P	66	JD-D1_N
33	GND	67	GND
34	JD-D2_P	68	JD-D2_N
S1	SHIELD	S2	SHIELD

Table 2: *Pmod Connector Pin Layouts*

<table>
<tr><th colspan="2">JA Top Set of Pins</th><th colspan="2">JA Bottom Set of Pins</th></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>JA-D0_N</td><td>7</td><td>JA-CLK_N</td></tr>
<tr><td>2</td><td>JA-D0_P</td><td>8</td><td>JA-CLK_P</td></tr>
<tr><td>3</td><td>JA-D2_N</td><td>9</td><td>JA-D1_N</td></tr>
<tr><td>4</td><td>JA-D2_P</td><td>10</td><td>JA-D1_P</td></tr>
<tr><td>5</td><td>GND</td><td>11</td><td>GND</td></tr>
<tr><td>6</td><td>VCCB</td><td>12</td><td>VCCB</td></tr>
</table>

<table>
<tr><th colspan="2">JB Top Set of Pins</th><th colspan="2">JB Bottom Set of Pins</th></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>JB-D0_N</td><td>7</td><td>JB-CLK_N</td></tr>
<tr><td>2</td><td>JB-D0_P</td><td>8</td><td>JB-CLK_P</td></tr>
<tr><td>3</td><td>JB-D2_N</td><td>9</td><td>JB-D1_N</td></tr>
<tr><td>4</td><td>JB-D2_P</td><td>10</td><td>JB-D1_P</td></tr>
<tr><td>5</td><td>GND</td><td>11</td><td>GND</td></tr>
<tr><td>6</td><td>VCCB</td><td>12</td><td>VCCB</td></tr>
</table>

<table>
<tr><th colspan="2">JC Top Set of Pins</th><th colspan="2">JC Bottom Set of Pins</th></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>JC-D0_N</td><td>7</td><td>JC-CLK_N</td></tr>
<tr><td>2</td><td>JC-D0_P</td><td>8</td><td>JC-CLK_P</td></tr>
<tr><td>3</td><td>JC-D2_N</td><td>9</td><td>JC-D1_N</td></tr>
<tr><td>4</td><td>JC-D2_P</td><td>10</td><td>JC-D1_P</td></tr>
<tr><td>5</td><td>GND</td><td>11</td><td>GND</td></tr>
<tr><td>6</td><td>VCCB</td><td>12</td><td>VCCB</td></tr>
</table>

<table>
<tr><th colspan="2">JD Top Set of Pins</th><th colspan="2">JD Bottom Set of Pins</th></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>JD-D0_N</td><td>7</td><td>JD-CLK_N</td></tr>
<tr><td>2</td><td>JD-D0_P</td><td>8</td><td>JD-CLK_P</td></tr>
<tr><td>3</td><td>JD-D2_N</td><td>9</td><td>JD-D1_N</td></tr>
<tr><td>4</td><td>JD-D2_P</td><td>10</td><td>JD-D1_P</td></tr>
<tr><td>5</td><td>GND</td><td>11</td><td>GND</td></tr>
<tr><td>6</td><td>VCCB</td><td>12</td><td>VCCB</td></tr>
</table>

<table>
<tr><th colspan="2">JE Top Set of Pins</th><th colspan="2">JE Bottom Set of Pins</th></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>JE1/SDA</td><td>1</td><td>JE7</td></tr>
<tr><td>2</td><td>JE2/SCL</td><td>2</td><td>JE8</td></tr>
<tr><td>3</td><td>JE3</td><td>3</td><td>JE9</td></tr>
<tr><td>4</td><td>JE4</td><td>4</td><td>JE10</td></tr>
<tr><td>5</td><td>GND</td><td>5</td><td>GND</td></tr>
<tr><td>6</td><td>VCCB</td><td>6</td><td>VCCB</td></tr>
</table>

NOTE: All signals are connected via a 50 ohm resistor with the exception of the VCCB and GND signals.

Table 3: HDMI *Connector Pin Layouts*

<table>
<tr><td colspan="2" align="center">JAA</td><td colspan="2" align="center">JCC</td></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>VCC5V0</td><td>1</td><td>VCC5V0</td></tr>
<tr><td>2</td><td>VCCB</td><td>2</td><td>VCCB</td></tr>
<tr><td>3</td><td>JA-D2_P</td><td>3</td><td>JC-D2_P</td></tr>
<tr><td>4</td><td>GND</td><td>4</td><td>GND</td></tr>
<tr><td>5</td><td>JA-D2_N</td><td>5</td><td>JC-D2_N</td></tr>
<tr><td>6</td><td>JA-D1_P</td><td>6</td><td>JC-D1_P</td></tr>
<tr><td>7</td><td>GND</td><td>7</td><td>GND</td></tr>
<tr><td>8</td><td>JA-D1_N</td><td>8</td><td>JC-D1_N</td></tr>
<tr><td>9</td><td>JA-D0_P</td><td>9</td><td>JC-D0_P</td></tr>
<tr><td>10</td><td>GND</td><td>10</td><td>GND</td></tr>
<tr><td>11</td><td>JA-D0_N</td><td>11</td><td>JC-D0_N</td></tr>
<tr><td>12</td><td>JA-CLK_P</td><td>12</td><td>JC-CLK_P</td></tr>
<tr><td>13</td><td>GND</td><td>13</td><td>GND</td></tr>
<tr><td>14</td><td>JA-CLK_N</td><td>14</td><td>JC-CLK_N</td></tr>
<tr><td>15</td><td>VCCB</td><td>15</td><td>VCCB</td></tr>
<tr><td>16</td><td>GND</td><td>16</td><td>GND</td></tr>
<tr><td>17</td><td>JE2/SCL</td><td>17</td><td>JE2/SCL</td></tr>
<tr><td>18</td><td>JE1/SDA</td><td>18</td><td>JE1/SDA</td></tr>
<tr><td>19</td><td>VCC5V0</td><td>19</td><td>VCC5V0</td></tr>
</table>

<table>
<tr><td colspan="2" align="center">JBB</td><td colspan="2" align="center">JDD</td></tr>
<tr><th>Pin</th><th>Pinout</th><th>Pin</th><th>Pinout</th></tr>
<tr><td>1</td><td>VCC5V0</td><td>1</td><td>VCC5V0</td></tr>
<tr><td>2</td><td>VCCB</td><td>2</td><td>VCCB</td></tr>
<tr><td>3</td><td>JB-D2_P</td><td>3</td><td>JD-D2_P</td></tr>
<tr><td>4</td><td>GND</td><td>4</td><td>GND</td></tr>
<tr><td>5</td><td>JB-D2_N</td><td>5</td><td>JD-D2_N</td></tr>
<tr><td>6</td><td>JB-D1_P</td><td>6</td><td>JD-D1_P</td></tr>
<tr><td>7</td><td>GND</td><td>7</td><td>GND</td></tr>
<tr><td>8</td><td>JB-D1_N</td><td>8</td><td>JD-D1_N</td></tr>
<tr><td>9</td><td>JB-D0_P</td><td>9</td><td>JD-D0_P</td></tr>
<tr><td>10</td><td>GND</td><td>10</td><td>GND</td></tr>
<tr><td>11</td><td>JB-D0_N</td><td>11</td><td>JD-D0_N</td></tr>
<tr><td>12</td><td>JB-CLK_P</td><td>12</td><td>JD-CLK_P</td></tr>
<tr><td>13</td><td>GND</td><td>13</td><td>GND</td></tr>
<tr><td>14</td><td>JB-CLK_N</td><td>14</td><td>JD-CLK_N</td></tr>
<tr><td>15</td><td>VCCB</td><td>15</td><td>VCCB</td></tr>
<tr><td>16</td><td>GND</td><td>16</td><td>GND</td></tr>
<tr><td>17</td><td>JE2/SCL</td><td>17</td><td>JE2/SCL</td></tr>
<tr><td>18</td><td>JE1/SDA</td><td>18</td><td>JE1/SDA</td></tr>
<tr><td>19</td><td>VCC5V0</td><td>19</td><td>VCC5V0</td></tr>
</table>

NOTE: All signals are connected via a 50 ohm resistor