1 Introduction

The VI800A-TTLU is a plug in accessory for the VM800P Plus module, which expands the IO capabilities of the VM800P to include a TTL level UART. This module behaves as an SPI to UART bridge to the VM800P Plus module.

1.1 Features

- Connects to the VM800P Plus module using an SPI slave interface
- SPI slave interface is converted to UART TTL interface
- 4 GPIO inputs and 4 GPIO outputs
- 8 LEDs to indicate the input and output status
- 5 V tolerant buffers
- Screw connector to connect the UART signals, GPIO inputs and GPIO outputs
- IO connector to connect the UART signals, GPIO inputs and GPIO outputs
- Powered from the VM800P module
2 Ordering Information

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI800A-TTLU</td>
<td>VI800A UART TTL module, plug in accessory for the VM800P Plus module</td>
</tr>
</tbody>
</table>

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3 Hardware Description

Please refer to section 3.2.2 for connector settings. Some VI800A-TTLU jumpers must be set to work properly with your system.

3.1 VI800A-TTLU module

![VI800A-TTLU module](image)

**Figure 3-1 – VI800A-TTLU module**

The VI800A-TTLU module is designed to connect directly with the VM800P Plus module. The main functions of the VI800A TTLU are as follows:

- Plug in accessory board for the VM800P Plus board.
- Interface to the VM800P Plus board as a SPI slave device.
- Connects to an external UART TTL interface.
- Supports 4 GPIO inputs.
- Supports 4 GPIO outputs.
- Contains 8 LEDs.
- Powered by the VM800P Plus board.
3.2 Physical Descriptions

3.2.1 PCB Dimensions

The VI800A-TTLU module PCB dimension is illustrated in Figure 3-2, Figure 3-3 and Figure 3-4.
3.2.2 VI800A-TTLU Connectors

Connectors and jumpers are described in the following sections.

- **CN1- SPI Interface**
  This is the interface where the SPI control and data signals are routed. There are also power and ground pins on this interface. This interface is used to connect the VI800A-TTLU board to the VM800P Plus board.

  **Note:**
  This should be connected to J6 of the VM800P plus board.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SCLK</td>
<td>I</td>
<td>SPI Clock input, 3.3V (5V tolerant)</td>
</tr>
<tr>
<td>2</td>
<td>MOSI</td>
<td>I</td>
<td>Master Out Slave in, 3.3V (5V tolerant)</td>
</tr>
<tr>
<td>3</td>
<td>MISO</td>
<td>O</td>
<td>Master In Slave out, 5V</td>
</tr>
<tr>
<td>4</td>
<td>SS#</td>
<td>I</td>
<td>SPI chip select, active low, 3.3V (5V tolerant)</td>
</tr>
<tr>
<td>5</td>
<td>INT0</td>
<td>O</td>
<td>Interrupt output active low, 3.3V</td>
</tr>
<tr>
<td>6</td>
<td>IO6</td>
<td>I</td>
<td>Daughter reset input, active low, 3.3V (5V tolerant)</td>
</tr>
<tr>
<td>7</td>
<td>AD4</td>
<td>IO</td>
<td>Address/Data Line 4</td>
</tr>
<tr>
<td>8</td>
<td>AD5</td>
<td>IO</td>
<td>Address/Data Line 5</td>
</tr>
<tr>
<td>9</td>
<td>3V3</td>
<td>P</td>
<td>3.3V power supply</td>
</tr>
<tr>
<td>10</td>
<td>5V</td>
<td>P</td>
<td>5V power supply</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>P</td>
<td>Ground</td>
</tr>
<tr>
<td>12</td>
<td>RST#</td>
<td>I</td>
<td>Reset, active low</td>
</tr>
<tr>
<td>13</td>
<td>AD1</td>
<td>IO</td>
<td>Address/Data Line 1</td>
</tr>
<tr>
<td>14</td>
<td>NC</td>
<td>NA</td>
<td>Not Connected</td>
</tr>
<tr>
<td>15</td>
<td>AD3</td>
<td>IO</td>
<td>Address/Data Line 3</td>
</tr>
<tr>
<td>16</td>
<td>AD2</td>
<td>IO</td>
<td>Address/Data Line 2</td>
</tr>
</tbody>
</table>

**Table 3-1 – CN1 Pinout**

- **CN2- IO Interface (alternative to CN3)**
  This is the interface where the UART TTL connections, GPIO input and outputs are connected. There are also power and ground pins on this interface.
<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3V3</td>
<td>P</td>
<td>3.3V power supply</td>
</tr>
<tr>
<td>2</td>
<td>5V</td>
<td>P</td>
<td>5V power supply</td>
</tr>
<tr>
<td>3</td>
<td>I/P1</td>
<td>I</td>
<td>Input 1</td>
</tr>
<tr>
<td>4</td>
<td>I/P2</td>
<td>I</td>
<td>Input 2</td>
</tr>
<tr>
<td>5</td>
<td>I/P3</td>
<td>I</td>
<td>Input 3</td>
</tr>
<tr>
<td>6</td>
<td>I/P4</td>
<td>I</td>
<td>Input 4</td>
</tr>
<tr>
<td>7</td>
<td>O/P1</td>
<td>O</td>
<td>Output 1</td>
</tr>
<tr>
<td>8</td>
<td>O/P2</td>
<td>O</td>
<td>Output 2</td>
</tr>
<tr>
<td>9</td>
<td>O/P3</td>
<td>O</td>
<td>Output 3</td>
</tr>
<tr>
<td>10</td>
<td>O/P4</td>
<td>O</td>
<td>Output 4</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>P</td>
<td>Ground</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>P</td>
<td>Ground</td>
</tr>
<tr>
<td>13</td>
<td>TXD OUT</td>
<td>O</td>
<td>Transmit Data</td>
</tr>
<tr>
<td>14</td>
<td>RXD IN</td>
<td>I</td>
<td>Receive Data</td>
</tr>
<tr>
<td>15</td>
<td>RTS# OUT</td>
<td>O</td>
<td>Request to send</td>
</tr>
<tr>
<td>16</td>
<td>CTS# IN</td>
<td>I</td>
<td>Clear to send</td>
</tr>
</tbody>
</table>

Table 3-2 – CN2 Pinout

- **CN3- External Screw Connector (alternative to CN2)**
  
  This is the interface where the UART TTL connections, GPIO input and outputs are connected. There are also power and ground pins on this interface.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TXD_OUT</td>
<td>O</td>
<td>Transmit data</td>
</tr>
<tr>
<td>2</td>
<td>RXD_IN</td>
<td>I</td>
<td>Receive data</td>
</tr>
<tr>
<td>3</td>
<td>RTS#_OUT</td>
<td>O</td>
<td>Request to send</td>
</tr>
<tr>
<td>4</td>
<td>CTS#_IN</td>
<td>I</td>
<td>Clear to send</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>P</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>I/P1</td>
<td>I</td>
<td>Input 1</td>
</tr>
<tr>
<td>7</td>
<td>I/P2</td>
<td>I</td>
<td>Input 2</td>
</tr>
<tr>
<td>8</td>
<td>I/P3</td>
<td>I</td>
<td>Input 3</td>
</tr>
<tr>
<td>9</td>
<td>I/P4</td>
<td>I</td>
<td>Input 4</td>
</tr>
<tr>
<td>10</td>
<td>O/P1</td>
<td>O</td>
<td>Output 1</td>
</tr>
<tr>
<td>11</td>
<td>O/P2</td>
<td>O</td>
<td>Output 2</td>
</tr>
<tr>
<td>12</td>
<td>O/P3</td>
<td>O</td>
<td>Output 3</td>
</tr>
<tr>
<td>13</td>
<td>O/P4</td>
<td>O</td>
<td>Output 4</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>P</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Table 3-3 – CN3 Pinout
• **JP1 - Output Drive Select**

This jumper provides the option to select the power supply voltage for the inputs and outputs.

<table>
<thead>
<tr>
<th>Jumper position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short pin 1-2</td>
<td>3.3V selected</td>
</tr>
<tr>
<td>Short pin 2-3</td>
<td>5V selected (default)</td>
</tr>
</tbody>
</table>

*Table 3-4 – JP1 Pin options*

### 3.2.3 VI800A-TTLU Components

- **U1 – SC16IS760**

  This converts the SPI signals from the VM800P Plus board to UART signals.

- **LED1 – LED4**

  Indicates the status of GPIO inputs. Illuminate when the GPIO line is logic 0.

- **LED5 – LED8**

  Indicates the status of the GPIO outputs. Illuminate when the GPIO line is logic 0.
4 Board Schematics

Figure 4-1 - VI800A-TTLU Schematics
5 Hardware Setup Guide

5.1 Power Configuration

The board is powered from the VM800P Plus board. The CN1 connector on the VI800A-TTLU board should be connected to the J6 connector of the VM800P Plus board as shown in the Figure 5-1.

![VI800A-TTLU module connected to VM800P Plus module](image)

5.2 UART Interface connection

The TX signal on CN3 is connected to the RX signal on the external UART device.
The RX signal on CN3 is connected to the TX signal on the external UART device.
The RTS signal on CN3 is connected to the CTS signal on the external UART device.
The CTS signal on CN3 is connected to the RTS signal on the external UART device.
The GND signal on CN3 is connected to the GND signal on the external UART device.
The output from the external device is connected to the inputs I/P1, I/P2, I/P3 and I/P4 on the CN3.
The outputs O/P1, O/P2, O/P3 and O/P4 on the CN3 are connected to the input on the external device.
The LEDs LED1 to LED8 are used to display the status of the inputs and outputs.
This interface is used to interface the VM800P Plus module to the devices have UART and GPIO interfaces.
6 Contact Information

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Please visit the Sales Network page of the Bridgetek Web site for the contact details of our distributor(s) and sales representative(s) in your country.
Appendix A – References

Document References

VM800P Datasheet: VM800P Plus board
FT800 datasheet: FT800_Embedded_Video_Engine
FT800 software programming guide: FT800_Programmer_Guide

FT800 sample application notes:
AN_246_VM800CB_SampleAPP_Arduino_Introduction
AN_275_FT800_Example_with_Arduino.pdf
AN_318_Arduino_Library_for_FT800_Series
AN_330_VI800A_TTL_232U_N485U_ArduinoLibrary_Sample
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<table>
<thead>
<tr>
<th>Revision</th>
<th>Changes</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 1.0</td>
<td>Initial Release</td>
<td>2014-10-14</td>
</tr>
<tr>
<td>Version 1.1</td>
<td>Added height dimensions</td>
<td>2014-10-20</td>
</tr>
<tr>
<td>Version 1.2</td>
<td>Dual branding to reflect the migration of the product to the Bridgetek name – logo changed, copyright changed, contact information changed</td>
<td>2016-09-13</td>
</tr>
</tbody>
</table>