Overview

The AvidCore ZigBee Development Board is a fully functional carrier board for Digi brand and compatible XBee modems. The development board provides access to all LED indicators and buttons associated with the modem. All the IO ports can also be easily accessed through the male connector at the top of the board. Headers are used to enable/disable modem pins with multiple functions.

The ZigBee development board includes a 3.3 volt regulator that is rated for 500 milliamps max. This allows for a substantial amount of power to be supplied to external circuitry from the expansion connector at the top of the board.

Pin 14 (VREF) is tied to the 3.3 volt supply. This allows for compatibility with Series 1 XBee modems. The VREF pin is not used with Series 2 modems.

The following figure highlights the major components on the ZigBee development board:

1. USB Mini Connector. This connector interfaces the XBee modem with a computer USB port. A USB to serial converter under the modem converts the USB interface to serial. This port can also be hooked to a 5.0 volt power supply to provide power to the modem when a computer interface is not needed.

2. POWER Indicator LED. The LED will be illuminated when the board has 3.3 volts applied to it.

3. Status LEDs. These five LED indicate various statuses of the modem and the serial interface of an attached computer. See the section on **LED Status Indicators** for more information.
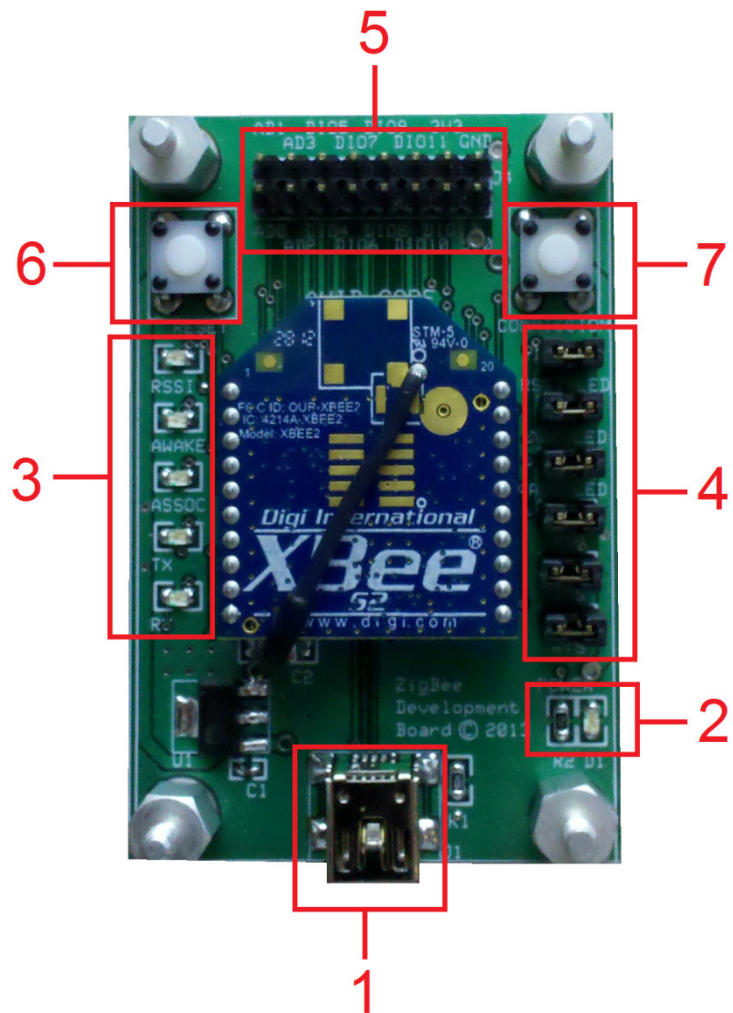

Figure 1: Major Components of the ZigBee Development Board

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4. Signal and Status Headers. These headers are used to disable and enable various pins on the XBee modem. See the section on **Enabling Other Modem Signals** for more information.

5. I/O Connector. All the digital and analog inputs and outputs for the ZigBee development board are accessible through this connector. Pins for ground, 5.0 volts and 3.3 volts are also provided at this connector. See the section on **Enabling the I/Os** for more information.

6. Reset Button. The reset button is used for resetting the modem. Often it is required to press the reset button while configuring or flashing a ZigBee End Point device.

7. Commissioning button. The Commissioning button has three distinct functions. Pressing the commissioning button once will cause a device to broadcast its ID across the network it is associated with. Pressing the button twice will open a network for joining for one minute. Pressing the button four times will cause the device to drop off the network and attempt to rejoin. Pressing the button four times on a ZigBee Coordinator will cause the modem to drop off the network and create a new network. See the official ZigBee User's Manual for more information on the commissioning button.

Enabling the I/Os

Several of the I/O ports are multiplexed on pins with multiple functionalities. Once the I/Os have been enabled in the ZigBee modem firmware, one or more headers on the ZigBee development board may have to be removed for proper I/O operation. Below is a table indicating what headers, if any, need to be removed to have access to the corresponding I/O port.

I/O Channel	Action Needed For Access
Analog/Digital I/O 0	None, however, the commissioning button shares the same pin as this I/O and should not be pressed while this I/O channel is in use.
Analog/Digital I/O 1	None
Analog/Digital I/O 2	None
Analog/Digital I/O 3	None
Digital I/O 4	None
Digital I/O 5	Remove Assoc LED header.
Digital I/O 6	Remove RTS header.
Digital I/O 7	Remove CTS header.
Digital I/O 8 (Not currently supported by ZigBee firmware)	Remove DTR header.
Digital I/O 9 (Not currently supported by ZigBee firmware)	Remove Awake LED header.
Digital I/O 10	Remove RSSI LED header.
Digital I/O 11	None
Digital I/O 12	None

Table 1: I/O Channels and Corresponding Actions Needed For Access

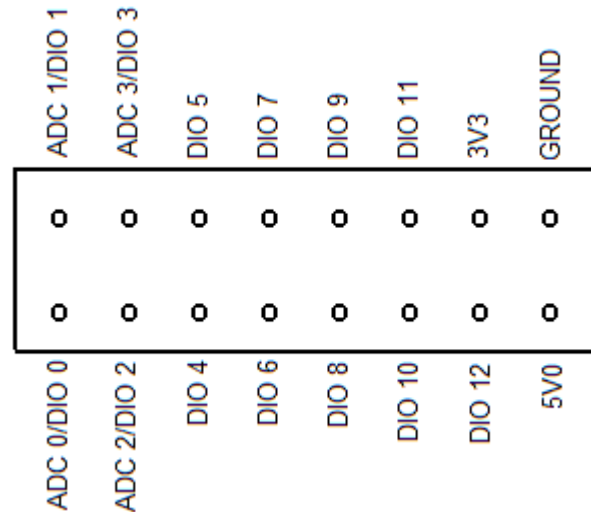The following figure shows the pin-out for the I/O connector:

Figure 2: I/O Connector Pin-out

Enabling Other Modem Signals

When the functionality of an XBee modem pin is desired other than that of the I/O channel, the associated pin in the I/O connector at the top of the ZigBee development board should have no load on it and the corresponding header should be installed.

The following figure shows the arrangements of the headers and which header is associated with what signal:
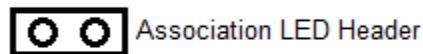
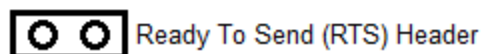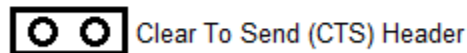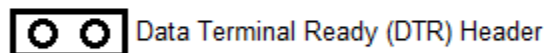The RSSI LED header provides a signal path to the RSSI LED.

Received Signal Stregnth Indicator (RSSI) LED Header
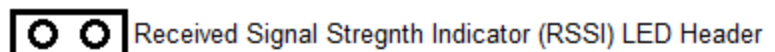
The Awake LED header provides a signal path to the Awake LED.

Awake LED Header
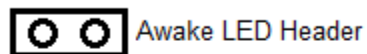
The Association LED header provides a signal path to the Assoc LED.

Association LED Header

The DTR header provides a signal path between the DTR pin on the XBee modem and the serial to USB converter.

Data Terminal Ready (DTR) Header

Clear To Send (CTS) Header

Ready To Send (RTS) Header

Figure 3: ZigBee Development Board Headers

The CTS header provides a signal path between the CTS pin on the XBee modem and the serial to USB converter.

The RTS header provides a signal path between the RTS pin on the XBee modem and the serial to USB converter.

LED Status Indicators

There are five LED status indicators to the left of the XBee modem connector. From top to bottom, the LEDs are as follows: RSSI, Awake, Association, TX, and RX.

The RSSI (received signal strength indicator) LED indicates the strength of the last received signal. The XBee modem produces a PWM pattern on the RSSI pin based on the last received packet.

The Awake LED ties to pin 13 on the XBee modem. The Awake LED will be illuminated if the modem is active. The LED will be extinguished if the modem is in reset or if it is sleeping.

The Association LED indicates the network association status of the modem. See the ZigBee Reference Manual for more information.

The TX LED indicates the ZigBee Development Board is sending a transmission on the serial line.

The RX LED indicates the ZigBee Development Board is receiving data on the serial line.

Interfacing With X-CTU Software

The ZigBee Development Board is designed to offer full functionality with Digi's X-CTU software. In order to allow firmware updates, pin 16 on the ZigBee modem must be configured as RTS and the RTS jumper must be installed. Also, pin 9 on the ZigBee modem must be configured as DTR and the DTR jumper must be installed. Full modem configuration reads and writes can also be accomplished with the X-CTU software and ZigBee Development Board.