PmodBT™ Reference Manual

Revision: January 17, 2011
Note: This document applies to REV C of the board.

Overview

The PmodBT is a wireless communication peripheral module with a fully-integrated Bluetooth interface. The PmodBT's simple UART interface and profile support let you use the module's robust functionality with a minimum of extra code. This makes it the perfect solution for embedded wireless communication between a PC, PDA, or smart phone and any number of remote applications.
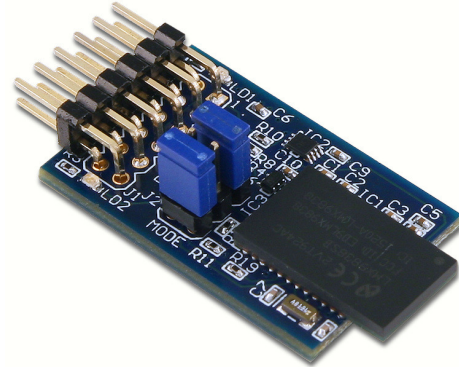
Features include:

- a National Semiconductor LMX9838 Bluetooth serial port module
- a UART interface
- a 12-pin header Pmod interface connector
- a wide range of profiles including the Generic Access Profile, Service Discovery Application Profile, and the Serial Port Profile
- 2.5V – 3.6V operating voltage
- a small form factor: 0.8" x 1.5"

Functional Description

The PmodBT provides Bluetooth support in either a transparent cable-replacement mode or a more powerful command mode. The main communication interface with the PmodBT is the UART on J1 with hardware handshaking and a hardware reset pin.

UART Interface

The UART interface's factory default setting uses eight data bits, no parity bit, and one stop bit. The baud rate is selectable via the mode jumpers of J2. Table 1 gives some sample baud rate settings for J2. A '1' signifies a shorted jumper and '0' signifies open.

PmodBT Block Diagram
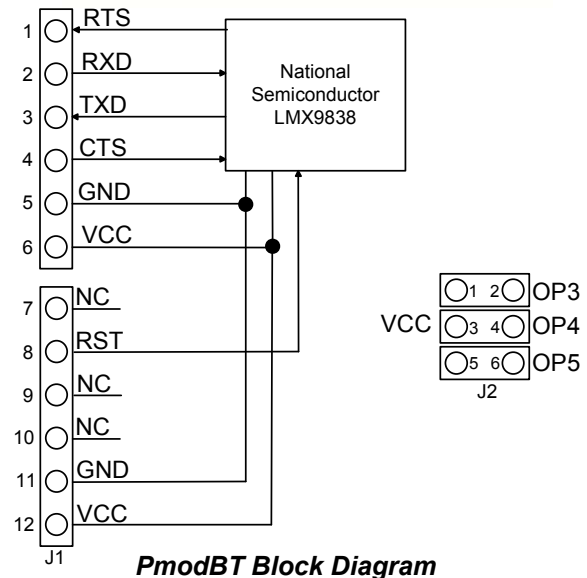
J2 Pin 1 (OP3)	J2 Pin 3 (OP4)	J2 Pin 5 (OP5)	Baud
1	0	0	Select from NVS Table
1	0	1	9600 bps
1	1	0	115.2 kbps
1	1	1	921.6 kbps

Table 1 *UART Speed Select Jumper Settings*

The factory default for the "Select from NVS Table" setting (1,0,0) is 9600 bps. Changes to the factory default communications settings are in effect until you issue the "Restore Factory Settings" command.

The UART interface relies on the two hardware handshaking signals RTS and CTS to determine when data can be sent or received. These signals are used by both the host and the PmodBT to indicate a low buffer situation. The PmodBT takes input from the host controller on CTS and supplies output of buffer conditions on RTS. If hardware handshaking is not being used by the host application, CTS must be pulled low or the PmodBT will not send data.

Table 2 describes the signals assigned on each pin of the PmodBT 12-pin header.

Command Mode

The LMX9838 Bluetooth serial port module on the PmodBT uses a command protocol for all commands sent or received through the UART. These commands are the basis for communicating with the module by the host device.

Transparent Mode

The Bluetooth module has a transparent mode in which the module acts as a pass-through for serial communication between the host and a single Bluetooth device.

The only way to exit transparent mode is to use a UART_BREAK signal, defined by holding the receive line low for longer than 164µS, or the hardware reset.

For more information on the command and transparent modes, see the *LMX9838 Software User's Guide* at the National Semiconductor web site.

Connector J1 – UART Communications		
Pin	Signal	Description
1	RTS	Ready to Send
2	RXD	Receive
3	TX	Transmit
4	CTS	Clear To Send
5	GND	Power Supply Ground
6	VCC	Power Supply (3.3V)
7	NC	Not Connected
8	RST	Reset
9	NC	Not Connected
10	NC	Not Connected
11	GND	Power Supply Ground
12	VCC	Power Supply (3.3V)

Table 2 *Interface Connector Signals*

Power Supply

The PmodBT is designed to work with Digilent programmable logic and embedded control system boards that have 12-pin header connectors.

The PmodBT requires a 2.5V-3V supply voltage. A 3.3V power supply voltage is available on all Digilent system boards and is provided as part of the 12-wire Pmod interface standard.

Digilent system boards with Pmod interface connectors allow jumper selection of the power supply voltage being provided to the Pmod. Ensure that the system board is jumpered to provide 3.3V to the module before applying power to the board.

For more information on board specifications regarding hardware tolerances and chip architecture, see the *LMX9838 Data Sheet* at the National Semiconductor web site.