RN4020 PICtail™/PICtail Plus Board User's Guide

OVERVIEW

The RN4020 PICtail Plus Daughter Board is a Bluetooth® Low Energy demonstration board that showcases the Microchip RN4020 Certified Bluetooth Low Energy (BTLE) module. The RN4020 module is a single-mode Bluetooth Smart module that complies with Bluetooth Core Specification 4.0. The high-speed UART interface and the General Purpose Input Output (GPIO) Ports are available on the RN4020 module to configure, control and transfer data.

The RN4020 PICtail Plus Daughter Board has PICtail Plus and PICtail connectors to interface with a PIC® microcontroller (MCU) on the development boards that support PICtail Plus or PICtail interface with the required pin mapping. The PICtail board also has a PIC18 USB-to-UART serial bridge on the board to enable easy serial connection to a PC over USB. The PIC18 also exposes a command shell to control its GPIO ports.

FEATURES

- Microchip RN4020 Certified Bluetooth Low Energy (BTLE) module
- PICtail Plus Daughter Board or PICtail Daughter Board connection interfaces
- PIC18 USB-to-UART serial bridge/converter with a command shell for IO control
- Status LEDs and utility button

BOARD CONFIGURATION

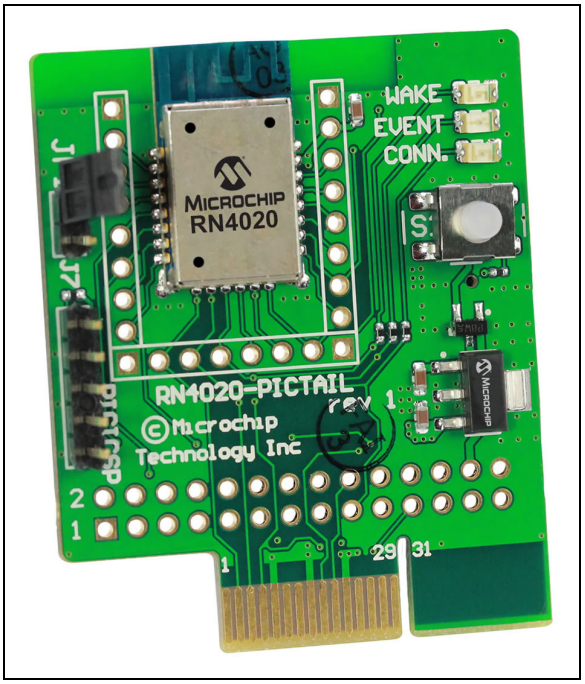
The jumper JP1 on the board can be used to select between PICtail mode or USB-to-UART bridge mode.

When JP1 is shorted, the board operates in PICtail mode. In this mode, the UART, control signals, and digital inputs/outputs can be accessed over the standard PICtail Plus or PICtail connection interfaces to be driven by a PIC MCU. The USB-to-UART serial bridge over J5 is turned off.

When JP1 is open, the board operates in USB-to-UART bridge mode. In this mode, the PIC18 USB-to-UART serial bridge over J5 is turned on, and the PICtail interface should not be used.

Note:	Ensure that the USB mini-B cable is detached when operating in PICtail mode.

FIGURE 1: Microchip RN4020 Certified Bluetooth Low Energy (BTLE) Module



GETTING STARTED

The RN4020 module on the RN4020 PICtail Plus Daughter Board exposes a high speed UART interface which can be used to issue ASCII commands to configure and control the RN4020 module. For more information on the RN4020 commands, configuration and examples, refer to the user's guide for the RN4020 module.

While in PICtail mode, the board can be plugged into any standard Microchip development board that supports the PICtail Plus, or PICtail, connection interface.

Note:	Ensure that the PICtail connector pin-out on the host MCU development platform supports the pin-out on the PICtail interface on the RN4020 PICtail Plus Daughter Board.

The firmware running on the Microchip 8/16/32-bit PIC MCU can be used to interface over UART and IO ports with the RN4020 on the PICtail board. Refer to the **Other Information** section for information about downloading PIC workspaces for PICtail mode.

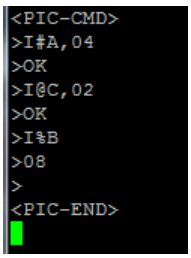
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While in USB-to-UART Bridge mode, the board can be plugged into a PC that supports serial COM ports. When plugged in over USB mini-B receptacle J5 to a PC, the board enumerates as a serial COM port. A terminal emulator application on the PC can be used to open the COM port and issue commands when the RN4020 is in Command mode, or to transfer data when it is in Microchip Low Power Data Profile (MLDP) mode.

The USB-to-UART Bridge mode enables a simple command shell running on the USB-to-UART Bridge that is used to control the GPIOs on RN4020 through the PIC18. Typing $$$ with a carriage return on the terminal emulator will enter the PIC18 command shell, as seen in Figure 2.

Typing $$$ with a carriage return a second time on the terminal emulator will exit the PIC18 command shell. There is a 1 second guard band duration for both entry into and exit out of the command shell. Command shell is entered or exited only if there is no data transfer during the duration of the guard band.

FIGURE 2: PIC18 Command Shell



The supported commands are listed in Table 1. The supported commands can be issued with carriage return after entering the PIC18 command shell, as in the example that is shown below.

EXAMPLE 1:

```
I#A,04     // Sets the PIC18 IO port RA2 to logic HIGH
I@C,02     // Sets the direction of PIC18 IO port RC1 to input
I%B        // Reads the logic levels on PIC18 IO port RB
```

TABLE 1: BASIC COMMANDS SUPPORTED IN THE PIC18 COMMAND SHELL

Basic Commands Supported	Description
I#X,YY	Sets or Clears the IO port A/B/C on PIC18
I@X,YY	Sets the direction of the IO port A/B/C on PIC18
I%X	Reads the IO port A/B/C on PIC18
H	Provides help on supported commands and may show additional commands, if available
V	Version of the command shell

Legend: X – A or B or C; YY – Hex byte value

OTHER INFORMATION

To obtain the most recent and complete RN4020 data sheet, user's guide, and code examples, visit the Microchip web site: **www.microchip.com/rn4020**

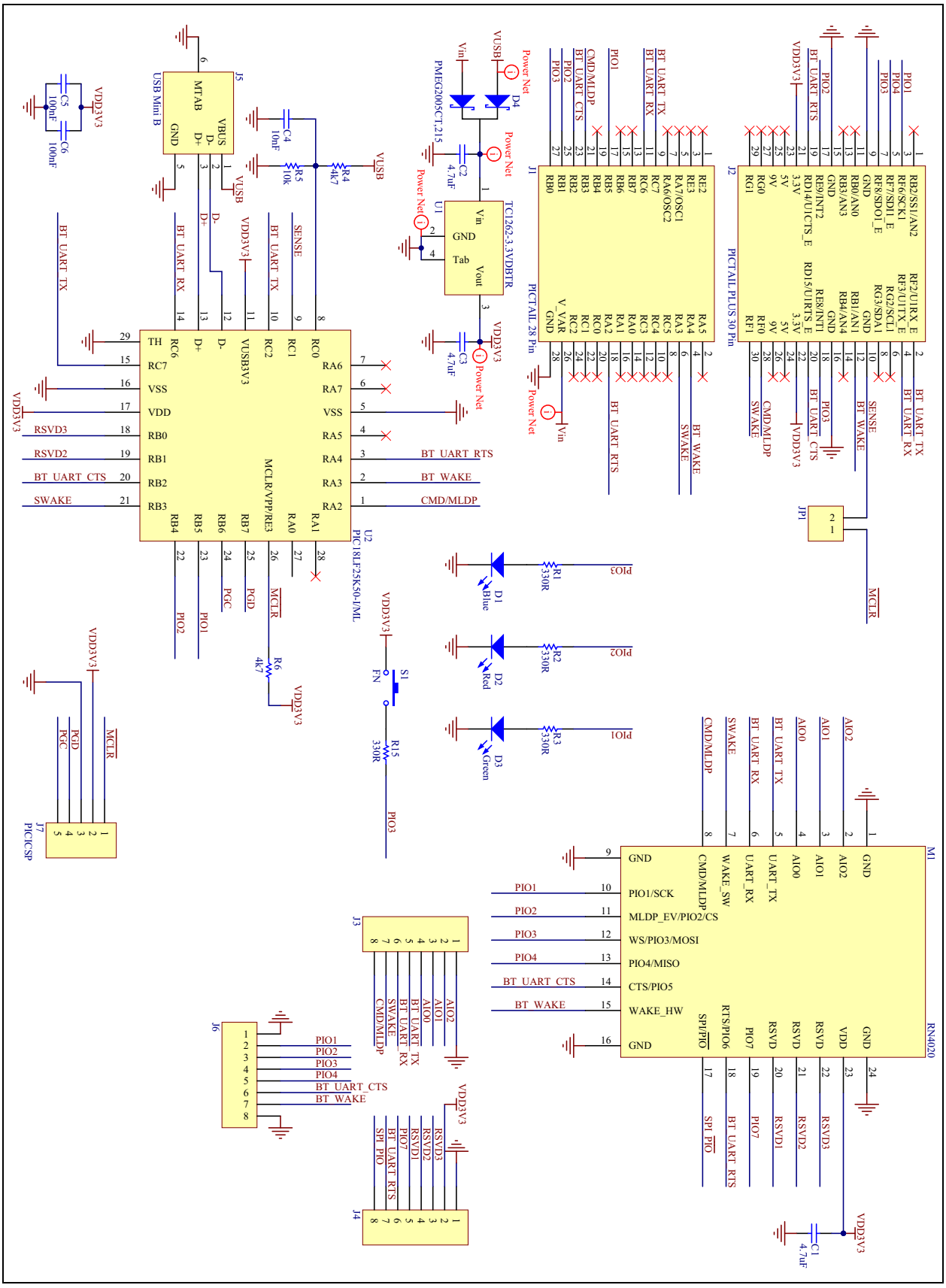
REVISION HISTORY

Revision A (June 2014)

This is the initial release of this document.

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BOARD SCHEMATIC



NOTES:

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