



RN-BTHID-RD-UM

# Bluetooth HID Reference Design

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**USER MANUAL**

## OVERVIEW

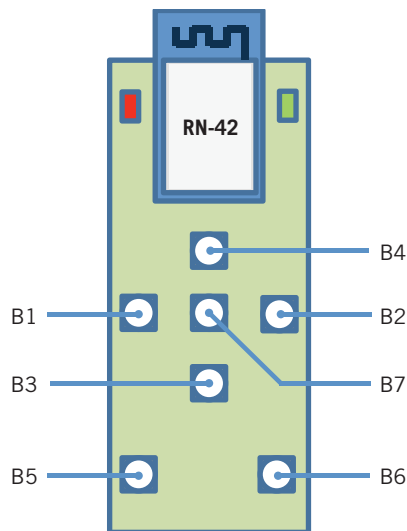
The Bluetooth HID profile is typically used in applications such as keyboards, mice, and game controllers. To demonstrate the basic capability of the Bluetooth HID profile, Roving Networks has developed a Bluetooth reference design implemented in the RN-42 module. This document describes the reference design and how to use it.

The reference design operates in three modes:

- *Presenter mode*—Used for presentation software such as Microsoft® Powerpoint
- *Music mode*—Music controller for products such as the iPod, iPhone, and iPad
- *Custom mode*—You can program each button to send a sequence of up to 4 keys

Figure 1 shows the iRemote controller and Table 1 describes the button operation for a short button press.

**Figure 1. iRemote Controller**



**Table 1. iRemote Controller Buttons**

Button	Presenter Mode	Music Mode	Custom Mode
B1	Left Arrow	Previous Track	1
B2	Right Arrow	Next Track	2
B3	Down Arrow	Volume Down	3
B4	Up Arrow	Volume Up	4
B5	S: Start/Pause Motion Presentation	Rewind	5
B6	B: Blank/Unblank Screen	Fast Forward	6
B7	iPad Voiceover Select	Play/Pause	7

You can also perform the following operations by pressing the buttons for a longer time:

- To put the controller to sleep, press B7 for 4 seconds.
- To toggle the iOS virtual keyboard, press B5 for 3 seconds.
- To toggle between modes 1 and 3, press B6 for 3 seconds.

## OPERATION

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The following sections describe how to operate the iRemote controller, including how to power it on and off, pairing/connecting, and operational modes.

### Power On/Off

To turn the iRemote on, press and hold B7 until the LEDs blink, then release it.

To turn the iRemote off, press and hold B7 for 4 seconds until both LEDs flash quickly, then release it. The iRemote automatically turns off if no buttons are pressed for 120 seconds.

### Status LEDs

Table 2 describes the status LEDs.

**Table 2. Status LEDs**

LED	Action	Meaning
Green	Short blink	The device is turned on but not connected and not paired.
	Even blink	The device is on and attempting to connect to a previously paired host.
	Solid	The device is turned on and connected.
Red	Blinking	The LED blinks the appropriate number of times to denote the mode: <ul style="list-style-type: none"> <li>• Presenter</li> <li>• Custom</li> <li>• Music</li> </ul>

### Pairing & Connecting

By design, the iRemote is always be discoverable and shows up as a keyboard with the device name shown as iRemote-ABCD, where ABCD represents the last 2 bytes and the Bluetooth MAC address.

#### iOS Pairing

To pair the iRemote to an iOS device such as an iPad, iPod, or iPhone, perform the following steps:

Tap the **Settings** icon.

Select **General > Bluetooth > iRemote-ABCD**.

Because the iRemote uses Secure, Simple Pairing (SSP), you do not need to enter a 4-digit pairing code.

### *PC/Mac Pairing*

When you pair the iRemote with a PC or MAC that supports Bluetooth version 2.1 or greater, the iRemote uses SSP and you do not need to enter a 4-digit pairing code. If the PC or MAC uses an older Bluetooth stack (such as version 2.0), you must manually enter the pairing code **1234**.

### **Clearing a Previously Stored Pairing**

You can clear a previously stored pairing by performing the following steps:

1. Turn off the iRemote.
2. Press and hold B5 and B6.
3. Press B7 to turn the device on.

When the iRemote turns back on, the pairing is cleared.

### **Operational Modes**

The iRemote operates in a variety of modes. To change the mode, turn off the devices, press and hold the appropriate button as described in Table 3, and turn the device back on.

The green and red LEDs flash quickly 5 times to indicate that the mode has changed. Unless you change the mode again, the iRemote remembers the configured state for future power up and re-connect cycles.

**Table 3. Operational Modes**

<b>Button</b>	<b>Mode</b>
B1	Presentation Mode.
B2	Custom Mode.
B3	Music Mode (default).
B4	Factory Reset (press and release B4 three times slowly).
B6	SPP Mode.
B5 and B6	Clear previous stored pairings.

### *Quick Mode Change*

You can quickly change between Presenter (mode 1) and Music (mode 3) by holding down button B6 for 3 seconds. Once detected the button press is detected, the green LED blinks twice to indicate the change and the blue LED blinks either 1 or 3 times to indicate the new mode.

### *toggling the iOS Virtual Keyboard*

Apple iOS devices only support a single keyboard. When the iRemote is connected over Bluetooth, it removes/hides the virtual keyboard. For many applications it is desired to use this keyboard. To toggle the keyboard, press and hold B5 for 3 seconds.

### *Remote Shutter Option (iOS Devices)*

A new feature added to iOS 5 is ability to use the volume up control to trigger the camera shutter/take a picture function on the camera app. With this feature, you can use B1 as a remote camera snapshot button. Additionally, you can use this button to start/stop movie mode when the iRemote is set to movie function.

## **ADVANCED FEATURES**

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This section describes advanced features such as how to configure the module remotely and how to customize the board.

### **Remote Configuration**

For advanced users, the iRemote provides an additional serial port profile (SPP), allowing connection to the device for remote configuration or other purposes. For more information on SPP mode, refer to the Roving Networks Bluetooth advanced user guide, which is available on the Support page on the Roving Networks web site at [http://www.rovingnetworks.com/Support\\_Overview](http://www.rovingnetworks.com/Support_Overview).

To configure the iRemote remotely, perform the following steps:

1. Enter SPP mode as described in “Operational Modes” on page 4.
2. Connect to the iRemote using a terminal emulator such as Teraterm.
3. Once connected over Bluetooth, enter command mode by typing the **\$\$\$** command. The iRemote returns **CMD**, indicating that it is in command mode.

**NOTE:** While SPP mode allows you to send commands over Bluetooth to the iRemote, you can also send the commands over the UART interface anytime HID is not connected.

### **Example: Change Operational Mode**

To change the operational mode, send the command:

```
SB,0,<mode> // Sets the operating mode without using the power on sequence.
```

where <mode> is the string **mode** followed by a decimal number. For example, mode2 indicates custom mode.

### **Example: Change Button Operation**

To change the button operation, send the following command while in command mode:

```
SB,<button>,<value 1>,<value 2>, ...
```

where <value> is 4-digit hex number representing the HID modifier bit and scan code for a given key. You can store up to 6 key strokes for any button (B1 through B7).

For example, to configure B1 to send the ! character, use the command:

```
SB,1,021E // 02 is the keyboard modifier for the left Shift key, and 1E is the 1 key. This  
           // combination sends an exclamation mark over Bluetooth.
```

To display the current button configuration, use the command:

```
B // Displays button configurations. The mode and the button assignment is  
  // displayed. The mode is displayed as the string mode followed by a  
  // decimal number. For example, mode2 indicates custom mode.
```

## Board Customization

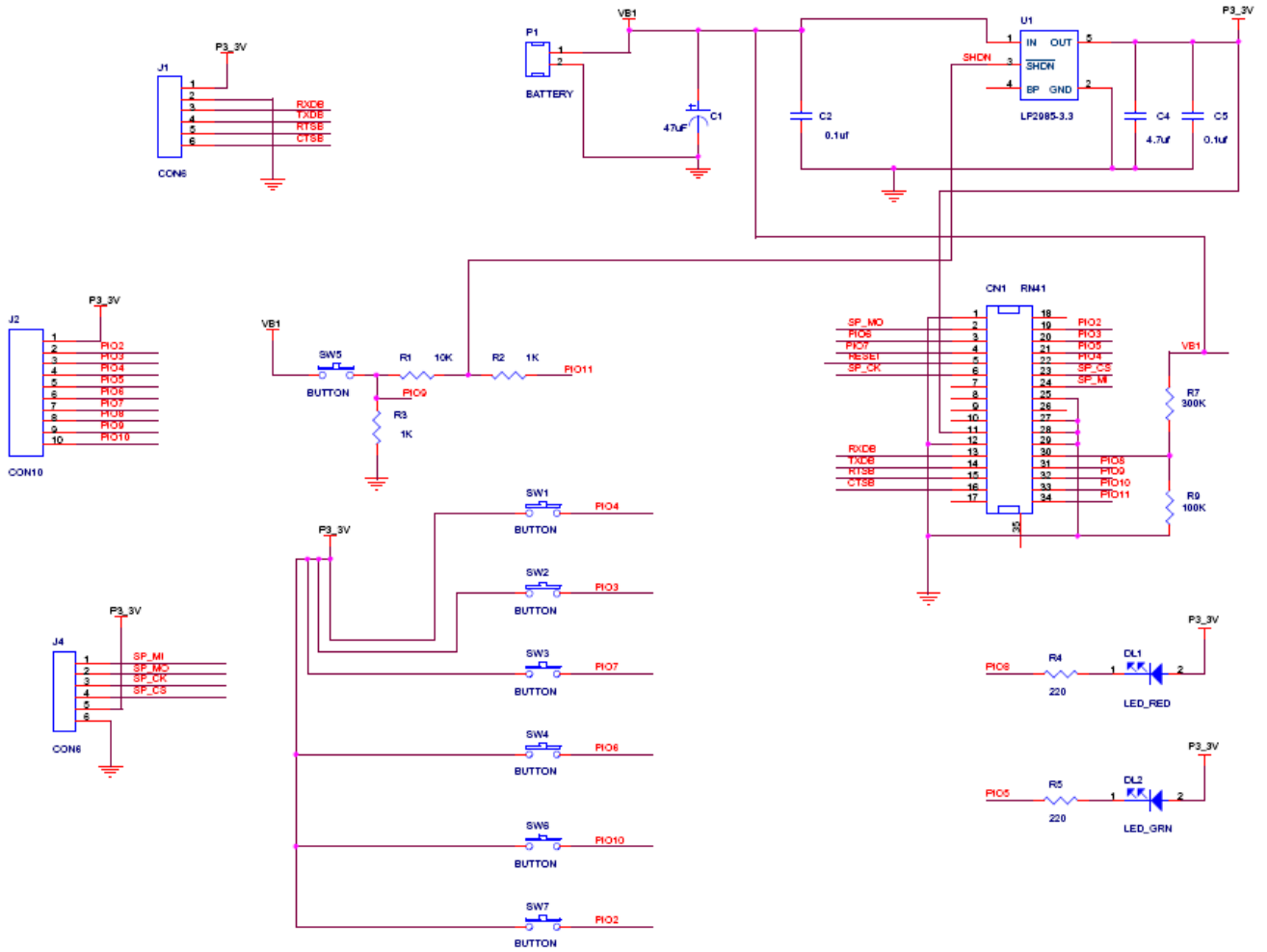
The iRemote PCB contains two headers, primary and secondary, which are available for customization.

- *Primary header (J2)*—The primary header makes the power, ground, and all buttons available so that you can attach custom actuators.
- *Secondary header (J1)*—The secondary header offers TTL-level UART connectivity. The HID firmware is fully programmable and can be used to send full keyboard, mouse, and joystick HID reports.

**NOTE:** Header J4 is the programming header. If you are building your own board, Roving Networks recommends that you include a programming header so that you can load new firmware onto the Bluetooth device.

Figure 2 shows the iRemote board schematic.

Figure 2. Board Schematic



## VERSION HISTORY

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### Version 6.11 (Current Version)

- Added support for voiceover select on B7 to mode 1
- Added ability to change modes while B6 is pressed for 3 seconds
- Added ability to toggle iDevice virtual keyboard while B5 is pressed for 3 seconds

### Version 6.10

- Initial Release

## RESOURCES & RELATED DOCUMENTS

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For more information, refer to the following sources, which are available on the Support page on the Roving Networks website at [http://www.rovingnetworks.com/Support\\_Overview](http://www.rovingnetworks.com/Support_Overview).

- *Bluetooth Advanced User Manual*
- *RN-42 Data Sheet*

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