

BlueSentry-XPert Direct Connect Install Guide

Physical Ports

BlueSentry has 2 AD channels, VCC, and GND on the 4 terminal screwposts. The other 6 channels can be accessed via the RJ45 connector, or the internal 12 pin header.

RJ45 - pin 1 on the right side (LEDs on TOP)	Screw posts – pin 1 on the left side looking into connector
1-V+	1-V+
2-CH5	2- CH1
3-CH3	3- CH2
4-CH4	4 -GROUND
5-GROUND	
6-CH6	
7-CH7	
8-CH8	

***WARNING**

BlueSentry channel inputs do NOT have input protection, care must be taken not to exceed the maximum input voltage of +5VDC on any input, and the inputs should never be driven to negative voltages below GROUND. This will cause permanent damage to the AD circuits.

Expansion Header

BlueSentry contains an internal 12 pin .1inch spacing header along the long edge of the circuit board. Refer to page 5 for the description of the pins.

Power Pins

BlueSentry has a built in Low Drop Out regulator which supplies clean 5V to the AD circuits. For best operation, apply 6V or more to V+ to get solid +5V range readings. Power draw is approx 70ma when connected, as low as 7ma average when idle, depending on settings.

LEDs

When power is applied, both the YELLOW and GREEN leds will alternate about 10 times as the unit is self-testing, then the GREEN LED will blink about once per second. Once a connection is made, the GREEN LED will blink 4 times/second, and the YELLOW LED blinks when DATA is sent or commands are received from Bluetooth. As the data rate increases, this LED will flash more quickly. If the YELLOW LED comes on solid, and the GREEN LED blinks a continuous pattern, the unit either cannot communicate to the Bluetooth radio, or has failed an internal self-test. Power cycling may solve the problem.

Making a Connection

BlueSentry displays under Service discovery as "RN_BS-wxyz, where the wxyz matches the last 2 bytes of the Bluetooth address of the unit.

To connect to BlueSentry, browse for services, you should see: "Sensor on RN_BS-wxyz" as the Profile. BlueSentry uses SPP,(Serial Port Profile) and should be connected to as a Virtual COM port on PCs, Palms, PocketPCs, or other clients. Once connected, data will flow in both directions as if the serial port were locally attached.

BlueSentry is a class 1 Bluetooth device with high power transmitter (100meters) however, actual range may be limited to 100 feet or due to internal antennae or type of client device used to connect to BlueSentry. NOTE: Only one client can connect to a BlueSentry at a time, 7 Bluesentry's (per Bluetooth limits) connected to a single PC adapter at a time.

Operation

Once connected to BlueSentry over Bluetooth SPP, you are ready to acquire data. The following commands listed below can be used to operate the unit. Each command is a single character. Results are immediate, however, any commands given do not survive a power cycle and must be re-issued if the unit is powered down or rebooted remotely.

The ? sign will show on your terminal emulator about once every two seconds, telling you that BlueSentry is ready for your command. To start getting output, just send the \$.

List of commands

\$ toggle AD continuous output

! stop AD continuous output

***** perform a single acquisition

+ speed up the rate (max rate is 18000/ 0x12 = 1KHz on1 ch, Fast Ascii mode)

- slow down the acquire rate(default is 18000/ 0x4650 = 1.00Hz)

, set comma delimited output in ASCII/ mode (default is space delimited)

1,2,3,4,5,6,7,8 set the number of channels desired (default is 4)

< XY (hex) set the channel mask (default is 00) a bitmap of channels to sample

a set output mode to ASCII (default, fast mode is off)

b set output mode to BINARY

OTHER PRODUCTS AVAILABLE FROM ROVING NETWORKS

RN-700	Bluetooth Terminal Server & Ethernet Gateway
RN-USB	Bluetooth Class I (long range) USB Adapter
RN-400U	Bluetooth USB Printer Adapter
RN-220P	BluePort –XP Bluetooth Serial Adapter with integrated Lithium Ion battery pack
RN-210P	BluePort Bluetooth Serial Port Adapter
RN-30S	Bluetooth embedded serial module, class I
RN-02S	Bluetooth embedded serial module, class 2
RN-24	Bluetooth “super module”, class II (4-20Vdc input, 8 GPIO, high power switches, 2ch AD)



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c toggle output FAST mode (no start header ,sequence number, or space/comma)

d wxyz set an exact delay value (enter 4 hex digits, A-F or a-f is ok ex: F3A4)

e echo character back (to test the link)

f send data at the maximum frequency

g display settings, channel, speed, mode, ioports and power info

i read GPIO port, format returned is XY, only lower 2 bits of the byte are valid.

k XY set the counter mode mask (default is 00)

m toggle AD mode from single ended to differential (default is single ended)

n display unit serial number (this is also the Bluetooth address)

o XY set GPIO. format = oXY, X=in/out mask (1=out, 0=in), Y=value.

(ex: o11 sets IO1= output=5V, o20 sets IO2=output=0V, o00 sets back to an input)

p X Set Power outputs, Power1=bit 0, Power2=bit1, example p 1 turns ON power 1, p2 turns on power 2, p3 turns on both, p0 turns off both.

q toggle sending the “?” prompt every second.

r Reset to default values (delay, channels, mode, does not reset sleep or UP timers)

s sleep. (unit will disconnect, and will wakeup when re-connected)

t **xx** sleep after XX(hex) seconds of no activity (enter 00 to disable sleep)

u display elapsed UP timer since powerup reset in days, hours, minutes, seconds.

v display version info

y XY Set the threshold value for counter mode (default is 80 hex, = 2.5Volts)

z reset elapsed UP timer to zero.

x **<string>** Send Bluetooth Radio configuration commands (CAUTION: see page 6).

~ REBOOT the unit (same as a power cycle, disconnects Bluetooth)

COMMON PROBLEMS and QUESTIONS:

Authentication: My Bluetooth client can see the BlueSentry and its serial service, but I can't connect: This is most likely caused by a security setting on your client. BlueSentry **does** support authentication with a fixed pincode of "1234", or you can turn off security on your client. Some clients have these setting off by default, others have them on. To check and disable security:

From your PC desktop, click My Bluetooth Places, goto the Bluetooth Device configuration (or Advanced Configuration) drop down menu, click on the client applications tab, Select the Bluetooth serial port application name, and click on the properties button, if "secure connection", or "authentication", or "encryption" is checked, un check it.

Changing the clients COM port: Widcomm stack, the most common stack out there allows you to connect to BlueSentry using a "Virtual COM" port mapper. The software installs with a default COM port, usually COM3, COM4, or COM5. To change this setting:

From your PC desktop, click My Bluetooth Places, goto the Bluetooth Device configuration (or Advanced Configuration) drop down menu, click on the client applications tab, Select the Bluetooth serial port application name, and click on the properties button, then you can change the com port.

Connecting to more than one BlueSentry from the same client at the same time: Bluetooth allows 7 devices at a time in a piconet. Widcomm stack allows you to create multiple instances of serial port profile and connect to multiple bluesentrys at the same time. To do this:

From your PC desktop, click My Bluetooth Places, goto the Bluetooth Device configuration (or Advanced Configuration) drop down menu, click on the client applications tab, Select the Bluetooth serial port application name, and click on the ADD COM port button, then you can add another Bluetooth serial port and assign it to another virtual com port (such as COM9).

POWER UP LED PATTERNS If the YELLOW LED comes on solid, and the GREEN LED blinks a continuous pattern, the unit either cannot communicate to the Bluetooth radio, or has failed an internal self-test. The unit may have a hardware failure and requires repair. Power cycling may solve the problem.

Bluetooth Radio Configuration Commands

By using the “x” command, you can access a number of configuration parameters of the Bluetooth radio on the BlueSentry. For example, you can change the Bluetooth Name, service profile name, pincode, and many other features. You can also setup The Bluesentry to automatically connect out as a master to a pre-defined Bluetooth slave (such as roving networks BluePort serial adapter).

The “x” command tunnels a string to the on board Bluetooth module. Commands are entered in the same format as the commands on Roving Networks embedded radios and BluePort serial adapters.

Each time you enter a command, the BlueSentry will disconnect from your remote Bluetooth side, reset the radio, set the command, and then reset again. You must then re-connect to the BlueSentry. The best way to utilize this feature is to send the command: “xST,60”, which will change the remote configuration timer (which allows the Bluetooth radio to accept configuration over Bluetooth upon powerup) to 60 seconds.

You can then re-connect to the BlueSentry, type “\$\$\$<cr>”, and you will get the full remote configuration menu of the radio. Once you have completed making configuration changes, you should send the command “ST,0” to remove the remote configuration timer (so in the future you can immediately connect to BlueSentry and communicate to the main program upon power ups) .

For a complete list of commands, refer to the document :

<http://www.rovingnetworks.com/documents/BlueportII-ref-guide.pdf>

or go to the support page of the website, and click on the link for

[RN-30/02/24 Modules/Blueport II Software Interface Manual \(pdf\)](#)

CAUTION: changing the Radio settings can cause your device to act in strange ways or possibly become disabled. For example, once you set master mode, you cannot connect back into the BlueSentry to reconfigure it, you must have the BlueSentry connect out to an SPP capable slave device which can run a terminal emulator so you can remote configure it again.

In NO instance should the Baudrate or Parity settings be modified, these are fixed at the proper settings and changing these settings will cause the BlueSentry to fail powerup diagnostics and make the device inoperable. Use caution when executing the commands.

Data Output Formats

BlueSentry acquires signals with 16 bit accuracy, in the range of 0 to +5VDC. A value of 0x0000 represents 0 volts, a value of 0xFFFF represents 5Volts.

Full ASCII mode data will flow in the following character displayable HEX format:

-SSSS 1111 2222 3333 4444 \n\r

SSSS is a sequence number, starts at 1, rolls at 0xFFFF

FAST ASCII mode data will flow in the following character displayable HEX format:
1111222233334444 \n\r

Binary mode data will flow in the following RAW BINARY format:

2DSSSS1111222233334444\r (\r = decimal 13, 2D = ‘-’).

FASTBinary mode data will flow in the following RAW BINARY format:

1111222233334444\r (\r = decimal 13, 2D = ‘-’).

Channel mask Mode for selecting channels

By using the “<XY” command, BlueSentry can be set to sample any number of channels. The XY value is an 8 bit map of the channels. For example, if you want channels 4 and 6, you would enter “<28”. Channels are returned in order from 1-8. Default is 00, which disabled this mode.

Differential Mode

By using the “m” command, BlueSentry can be set to operate the AD in differential mode. Default is single ended, with channels referenced to ground. In differential mode, the channels are paired, 1-2, 3-4, 5-6, 7-8 and the resulting measurement is the delta between channels. The first channel is +, the second is -. The output data produced will be a 16 bit value for each pair, for example, if maxchan =4, you will get 2 readings.

Data Rates

BlueSentry acquires signals at about 5Kz per sample.

The maximum transfer rate is limited due to the Bluetooth serial speed of 230Kbps.

The output rate is set by $18000 / (D)$, where **D** is the delay value Standard delay values set by the + and - , and f commands are:

CHAN	Delay	MAX ASCII	Delay	MAX FAST ASCII	Delay	MAX BINARY
1	0x0018	750Hz	0x0012	1000Hz	0x0009	2000Hz
2	0x0030	375Hz	0x0024	500Hz	0x0012	1000Hz
3	0x0048	250Hz	0x0036	333Hz	0x001B	750Hz
4	0x0060	187.5Hz	0x0048	250Hz	0x0024	500Hz

For example, to set a rate of exactly 200Hz, D = 90 decimal, or 005A hex.

So you would type “d005A” to set that delay value.

The hex value 0x4650 = exactly 1 second rate.

The fastest rate possible is 3KHz, in FAST BINARY mode, with a delay value of 0x0006

Power Draw and Sleep Mode

State	Current at 5VDC :	BT not connected	BT connected
Idle		20ma	40ma
Fast AD			60ma

Sleep mode

7ma

is GND). 5VDC is also available on Pin 1 of the 8 pin box header, J4, pin 1 has the small white arrow pointing to it.

BlueSentry can be put to sleep with the 's' character command. The processor stops, And all circuits go low power. The Bluetooth radio will disconnect, then stay awake to listen for incoming connections. The unit can be awakened from sleep automatically by re-connecting via Bluetooth.

Counter Mode

For each channel, a counter mode can be enabled. In this mode, the high byte of the reading is compared to the previously stored reading. If the difference is greater than the threshold (default is 0x80, or 2.5Volts) a counter is incremented. The result will be sent as ABXX, where AB is the count from 0 to 255, and XX should be ignored. Counter mode can be enabled for any of the channels, by using the K command, and setting a bit to 1 for each channel. For example, if counter mode on channels 0 and 2 is desired, set the mask to 0x05 by sending "k05".

The counter is reset after each delay period. To utilize this counter, the frequency of the signal being counted divided by the delay value should be < 255 or the counter will overflow. For example, if the signal is 1KHz, the delay value should be no greater than ¼ second, or a hex value of 0x1194 or faster. Because the sample rate is 5Khz, the maximum frequency that can be counted is limited to around 2.5Khz/ number of channels being sampled.

Expansion Header

PIN #	12 Pin HEADER J7 (pin 1 has white ARROW, nearest RJ45)
1	CHANNEL 3
2	CHANNEL 4
3	CHANNEL 5
4	CHANNEL 6
5	CHANNEL 7
6	CHANNEL 8
7	IO 1 general purpose digital IO
8	IO 2
9	POWER 1 switches 5VDC to load circuit
10	POWER 2 switches VIN to load circuit
11	VIN power input
12	System GND

POWER1 supplies the clean 5VDC output of the LDO regulator to load circuits via a power MOSFET. The LDO has an 800ma load current limit and depending on the environment temperature may have a lower thermal drop out as the regulator on board does not have a heat sink. The impedance of the FET switch is about 0.1 ohms.

POWER2 switches the input voltage to load circuits. The impedance of this MOSFET switch is about 0.1 ohms.

IO1 and IO2 are general purpose digital IO (25ma current limit).

Access to regulated 5VDC output power

In some cases it may be useful to tap the 5VDC regulated power used internally by the BlueSentry. This power is available on Jumper JP1 pin 1, which is the square pin (pin 2