RN-131G-EVAL

rn-131g-eval-um.pdf Version 2.1

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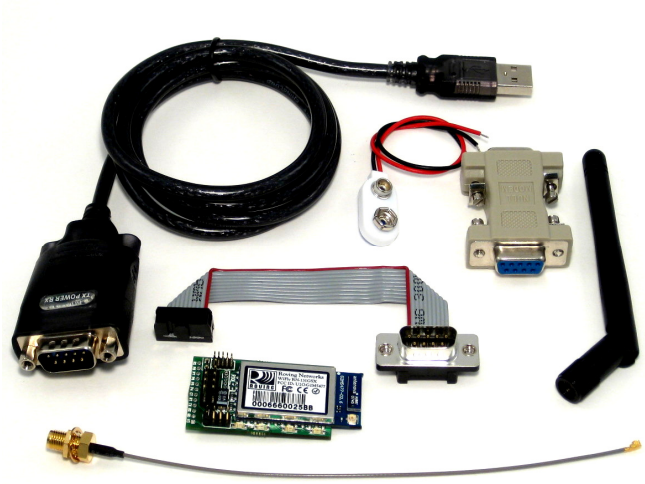
WiFly GSX evaluation Kit



Overview

This document describes the hardware and software setup for the Roving Networks WiFly GSX 802.11 b/g module. In addition to the RN-131G-EVAL kit you will need a Windows based computer with a USB port. You may also need a null modem serial cable or USB to serial cable, if you want to connect the WiFly GSX UART to your computer.

The WiFly GSX module is mounted to a development carrier board called the SURF board. This board has status LEDS and connections for the programmer and UART interfaces.

The evaluation kit allows you to configure and program the WiFly GSX 802.11 b/g module using the command interface, create connections and transfer data. The command interface is made up of simple ASCII commands. A complete listing is available in the WiFly GSX User Manual (rn-131-um.pdf).

Evaluation Kit Description

The evaluation kit includes the following hardware required to connect to the WiFly GSX module though the USB of your computer.

- SURF board with WiFly GSX module
- USB serial cable – links your computer to the SURF board
- Null modem
- 10 pin Serial cable – connects the RS232 header of the SURF board to a DB9 connector.
- 9V battery clip
- Antenna cable – U.FL and reverse SMA connectors
- 4” rubber antenna – reverse SMA connector

In addition to the hardware in the WiFly GSX evaluation Kit you will need a x86 compatible computer with a USB port running Windows XP or Vista. The WiFly GSX evaluation kit may work with other Windows versions and operating systems. However this document only covers the Windows XP and Vista operation.

Before starting install the evaluation board drivers for the USB interface. These can be found on the Roving Networks website at: http://www.rovingnetworks.com/bin/RN-USB-X-WINDOWS.exe

Surf Board Description

UART Interface
TTL signals

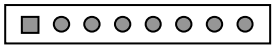
RX - input to SuRF board
TX - output from the SuRF board

(Note: the lables on the board for RX and TX are incorrect)

PIN	Description
1	3.3 VDC
2	GND
3	RXDB
4	TXDB
5	RSTB
6	CTSB
7	PIO4
8	PIO5
9	PIO6
10	PIO7
11	PIO8
12	Reset

Power

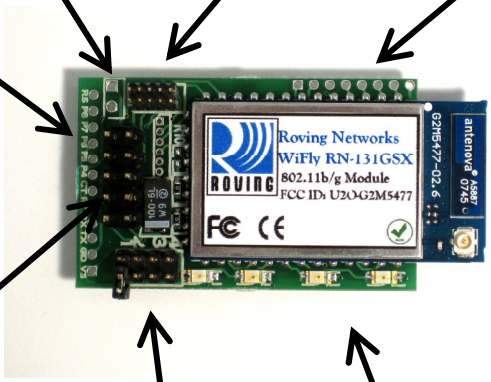
Evaluation Board Connector



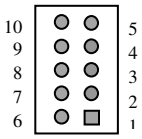
Sensors

WARNING: Sensors must not have more than 1.2 VDC or permanent damage will occur to the module

PIN	Description
1	Sensor PWR
2	Resistor network to S ensor-4
3	Resistor network to Sensor-4
4	Sensor-7
5	Sensor-4
6	Sensor-5
7	Sensor-6
8	GND



RS232 Interface



RX - input to SuRF board
TX - output from the SuRF

PIN	Description
1	No connect
2	RX
3	TX
4	No connect
5	GND
6	No connect
7	RTS
8	CTS
9	3 – 12 VDC
10	No connect

Jumper Block 1 - 4

1) Adhoc mode & Factory Reset
2) Config 1
3) Config 2
4) Config 3

LED Indicators

Condition	Blue LED	Red LED	Yellow LED	Green LED
ON solid	Power On			Connected over TCP
Fast blink		Not Associated	Rx/Tx data transfer	No IP address
Slow blink		Associated, No Internet		IP address OK
OFF	No Power	Associated, Internet OK		

There are three ways to setup and configure the WiFly GSX module

1. Over the serial interface, (RS232 or TTL) using a terminal emulator
2. Over WiFi using Adhoc networking mode using Telnet

NOTE: We suggest using TeraTerm as your terminal emulator program. This is available for download from the Roving Networks website. http://www.rovingnetworks.com/support/teraterm.zip

Configuration using the serial interface (RS232)

The USB serial cable connects your computer to the WiFly GSX module. Your computer should recognize the Prolific serial interface and load the correct drivers. If not the drivers are available on the Roving Networks support site.

Vista : http://www.rovingnetworks.com/bin/pl/PL-2303-Vista-Driver.exe

Window XP : http://www.rovingnetworks.com/bin/pl/PL-2303-XP-Driver.exe

Configuration is a two step process:

1. Setting up the hardware connections on the WiFly GSX module
2. Configuring the WiFly GSX module to access the WiFi network

Once complete the WiFly GSX module will be associated with the network, have an IP address and opened a socket over which data can be sent.

Step 1: Setting up the hardware

USB Connection:

1. Power the SURF board by connecting the 9V battery clip or other 5-12V DC power supply to the power connector. When powered the blue LED should be ON.
2. Connect the 10pin serial ribbon cable to the evaluation board. When looking from above, the ribbon cable should extend away from the SURF board.

3. Connect the USB serial cable to your computer. Note which COM port the device is installed on.
4. Use the Null Modem to connect the USB serial and 10pin serial cable.

Note: By default the WiFly module uses the on-board chip antenna. You do not need to install the antenna.

Step 2: Configuring the WiFly GSX Module

Configuration commands are made over the data channel when the module is in command mode. The escape sequence $$$ enters command mode. Once in command mode, the WiFly GSX device is configured using simple ASCI commands. To leave command and return to data mode type *exit*.

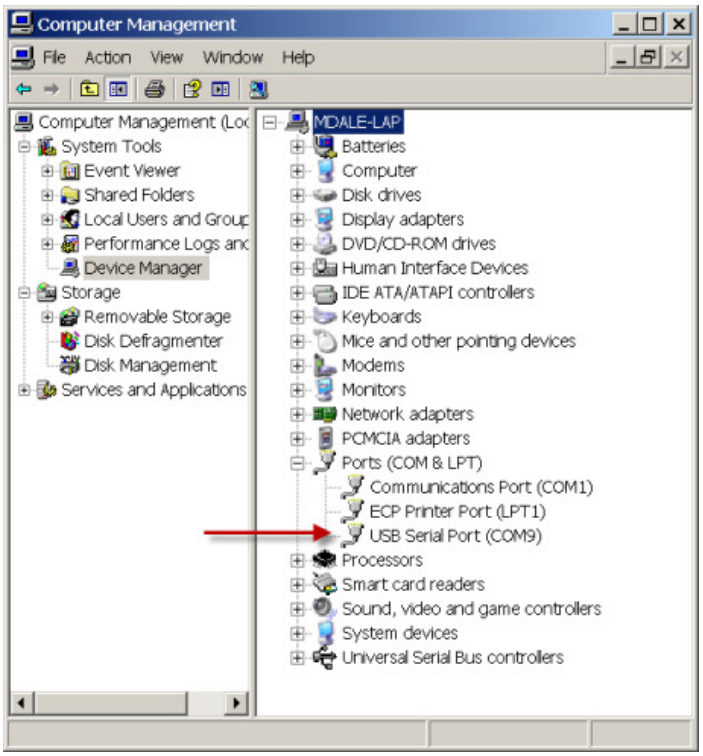
The most basic configuration requires only the name (SSID) and authentication pass word of the wireless network access point. The WiFly GSX module can only associate with one network at a time. It is recommended that you first configure the WiFly GSX module using an open access point to simplify the setup.

Using a terminal emulator to communication with the WiFly GSX module.

1. Open the COM port the USB Serial cable is connected on. This can be found by opening the "Device Manager" which is part of the system tools in Windows. In the Device Manager browse and expand the selection for Ports (COM & LPT) In the example to the right the USB serial port is COM9

2. Next open up a terminal emulation program specifying the COM port found in the previous step. If using TeraTerm, select ***Serial*** and choose the COM ***Port*** from the pull down list.

Note: the default serial port setting is 9600, 8 bit, no parity.



Entering Command Mode

1. From within the terminal window, put the WiFly GSX module into command mode by typing ***$$$*** in the terminal window. You should get ***CMD*** back confirming you are in command mode.
2. Next type ***show net*** to display the current network settings.

```
CMD
show net
SSid=TheLoft
Chan=6
Assoc=OK
DHCP=OK
Time=FAIL
Links=1
<2.03>
```

NOTE: After each command completes you will see a prompt that looks like <X.XX> where X.XX indicates the version of firmware running on the module In the example to the right the version is 2.03

Finding Available Networks

Use the scan feature in the WiFly GSX module to find the name (SSID) and channel of available networks. To start the scan you must have your terminal emulator connected and the WilFy module must be in command mode.

- Type ***scan*** at the WiFly GSX command prompt for a list of WiFi networks within range

```
CMD
scan
<2.03>
SCAN:Found 6
Num            SSID    Ch  RSSI    Sec     MAC Address      Suites
 1             roving1 01 -64     Open 00:1c:df:4f:45:9e     104     4
 2             NETGEAR 01 -58     Open 00:22:3f:6b:95:42     104     0
 3        07FX12018434 06 -73      WEP 00:18:3a:7e:71:d7    1104     0
 4             TheLoft 06 -51 WPA2PSK 00:0c:41:82:54:19 AESM-AES  1100     0
 5          airlink-11 11 -53   WPAv1 00:18:02:70:7e:e8 TKIPM-TKIP  3100    ac
 6              sensor 11 -52     Open 00:1c:df:cc:aa:d8     100     1
```

Associating with an access point

The red LED will be blinking if the WiFly GSX is not connected to and access point.

If the access point you're connecting to is open you can simply use the join command to associate with it. From the scan list above you can see that roving1 is an open network access point.

Type **join roving1** to associate with an access point.

```
COM7 - Tera Term VT
File Edit Setup Control Window Help
<2.03> scan
<2.03>
SCAN:Found 6
Num            SSID    Ch  RSSI    Sec     MAC Address      Suites
 1             roving1 01 -59     Open 00:1c:df:4f:45:9e     104     4
 2             NETGEAR 01 -59     Open 00:22:3f:6b:95:42     104     0
 3        07FX12018434 06 -72      WEP 00:18:3a:7e:71:d7    1104     6
 4             TheLoft 06 -53 WPA2PSK 00:0c:41:82:54:19 AESM-AES  1100     6
 5          airlink-11 11 -58   WPAv1 00:18:02:70:7e:e8 TKIPM-TKIP  3100     1
 6              sensor 11 -53     Open 00:1c:df:cc:aa:d8     100     1

ERR: ?-Cmd
<2.03> join roving1
Auto-Assoc roving1 chan=1 mode=OPEN SCAN OK

<2.03> Associated!
DHCP in 1ms: Renew: 86400 s
IF is UP
DHCP=ON
IP=10.20.20.62:2000
NM=255.255.255.0
GW=10.20.20.20
HOST=0.0.0.0:2000
PROTO=2
MTU=1460
bind=-10
listen FAIL
```

Upon rebooting the WiFly GSX module will attempt to associate with the WiFi network and acquire an IP address. The WiFly GSX module is successfully configured if the red LED is off (associated) and the green light is flashing slowly (IP address acquired).

You could also have specified the roving1 access point to connect to from the list by using the command **join # 1**

If you know the name of the access point you want to connect to you can set it with out previously using the **scan** command by setting the ssid with the **set wlan ssid access_point_name** and then using the **join** command with no arguments.

Connecting to security enable networks

If the access point you are connecting is running security you will need to provide the security key. The WiFly GSX module will determine the type of security automatically. You enter the security key with the **set wlan phrase key**

You will also want to enter the name of the access point using the **set wlan ssid access_point_name**

Once you have set the security key you can confirm the setting by typing **get wlan ssid**

```
COM7 - Tera Term VT
File Edit Setup Control Window Help
ERR: ?-Cmd
<2.03> set wlan phrase rubygirl
AOK
<2.03> set wlan ssid TheLoft
AOK
<2.03> get wlan ssid
SSID=TheLoft
Chan=0
Ant=0
Join=1
Auth=OPEN
Mask=0x1fff
Rate=0x1
Passphrase=rubygirl
<2.03> join TheLoft
Auto-Assoc TheLoft chan=6 mode=WPA2 SCAN OK

<2.03> Associated!
DHCP: Starting... 6428556 (1)
DHCP in 1182ms: Renew: 86400 s
IF is UP
DHCP=ON
IP=10.20.20.62:2000
NM=255.255.255.0
GW=10.20.20.20
HOST=0.0.0.0:2000
PROTO=2
MTU=1460
Listen on 2000
```

Saving your configuration

Your settings must be saved to the config file or they will not take effect on the next boot cycle. Save the configuration to flash using the ***save*** command Now reboot the WiFly GSX module by typing **reboot** to see that your changes take effect.

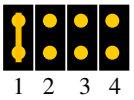
```
COM7 - Tera Term VT
File Edit Setup Control Window Help
ERR: ?-Cmd
<2.03> save
Storing in config
<2.03> reboot
*Reboot*
WiFly Ver 2.03,04-23-2009
MAC Addr=00:12:b8:00:0b:db
Auto-Assoc TheLoft chan=6 mode=WPA2 SCAN OK

*READY*
Associated!
DHCP: Starting... 6478311 (1)
DHCP in 1177ms: Renew: 86400 s
IF is UP
DHCP=ON
IP=10.20.20.62:2000
NM=255.255.255.0
GW=10.20.20.20
HOST=0.0.0.0:2000
PROTO=2
MTU=1460
Listen on 2000
```

Using Adhoc mode

The WiFly GSX module can be configured to setup an adhoc network. This mode is useful for point to point communications. The WiFly device is in Adhoc mode the device looks like access point for other WiFi devices to join. **Note: currently the WiFly only supports OPEN mode for creating adhoc networks.** Adhoc mode can be set via hardware or software commands.

To enable adhoc mode via hardware:

Set *PIO9* high (3.3V) at power up. On the RN-134 PIO9 is on jumper block 1.



Place jumper as shown above on jumper block position 1 to put the module in adhoc mode

When the module powers up in adhoc mode the WiFly module creates an adhoc network with the following

SSID: WiFly-GSX-XX where XX is the final two bytes of the devices MAC address
IP address: 169.254.1.1

To enable adhoc mode from software:

From command mode, the module is configured for adhoc mode using the join command. You will also need to set the ssid and channel.

```
set wlan    join   4
set wlan    ssid   my_adhoc_network
set wlan    chan   1
```

Turn off DHCP and set the IP address and netmask so other devices know where to connect to the adhoc WiFly GSX. Since auto IP fixes the first two bytes of the IP address you want to use the netmask of 255.255.0.0 so that other device connecting to the module can be reached. Alternatively you can set the netmask to a smaller subnet if the other device's IP addresses are begin statically to the same subnet as the adhoc device

```
set ip      address    169.254.1.1
set ip      netmask    255.255.0.0
set ip      dhcp       0
```

Be sure to save your configuration, then upon reboot the module will be in adhoc mode.

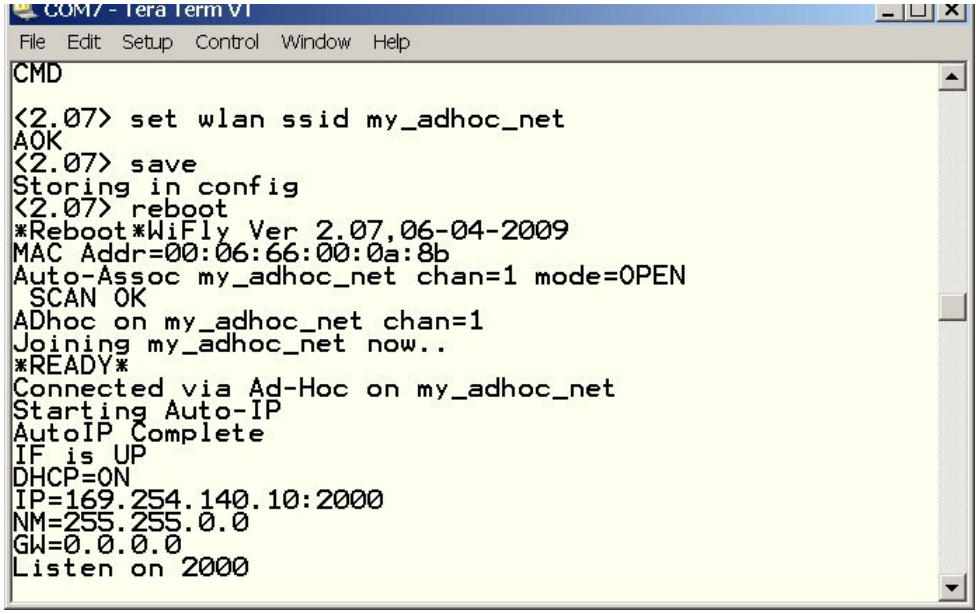
To associate with an adhoc network from another WiFly device:

```
set wlan ssid  my_adhoc_network
reboot
```

or alternatively you can use the join command to associate with the adhoc network. Remember to disassociated using the leave command if you are previously associated to another network.

```
join my_adhoc_network
```

If you leave DHCP service enabled the WiFly device will get an IP address using auto IP when associating with the adhoc network. By definition auto IP fixes the first two bytes of subnet to 169.254.xxx.xxx. The WiFly device takes about two to three seconds to resolve the auto IP address.



To set the IP address statically, disable the DHCP service and explicitly assigning the IP address.

```
set ip      dhcp      0
set ip      address   169.254.1.2
```

You can confirm the device has properly connected to the adhoc network using the ping command.

```
ping 169.254.1.1 10
```

To use associate with the WiFly adhoc network from another computer

Open the "Control Panel / Networking and Sharing / Networking and Sharing Center" dialog in Vista or "Control Panel / Network Connections" dialog in Windows XP. From here, view available networks and select the name of the adhoc network.

Note: Once associated with the adhoc network, Vista auto IP may take a couple minutes to allocate an IP address for your computer. To work around this you can assign a static IP address in the network settings / TCP/IP / Properties menu.

Once associated with the adhoc network you can open a connection or telnet window using the IP address of the Wifly module as you would with an enterprise connection.

Note: The module does not support adhoc and infrastructure network modes simultaneously.

Trouble Shooting

WiFly GSX module red LED remains on after setting SSID and channel

The WiFly GSX module can not connect to the networks. Possible problems include, not saving the configuration before rebooting, enter command mode and verify settings. Incorrect or missing WEP/WPA keys, confirm access point is either open (no security) or you have the right authentication level set and the correct pass phrase or key.

WiFly GSX Module red LED is off, but green LED is flash quickly

The WiFy module is associated with the network but was unable to get an IP address. Check the DHCP is ON in WiFly GSX configuration. If using a static IP address make sure the sub-net mask and the gateway IP addresses are set correctly using the ***get ip*** command