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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).

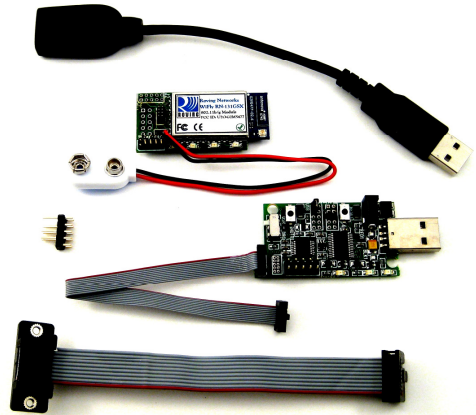
Evaluation Kit Description

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

- SURF board with WiFly GSX module
- Evaluation board – links your computer to the SURF board
- 10pin (2x5) 050" board to board cable – connects the SURF board to the evaluation board
- USB cable – connects the SURF board to the host computer
- Serial cable – connects the SURF board to a RS232 device
- Header – for RS232 connections using the serial cable

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>



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Surf Board Description

UART Interface TTL signals

 RX into the SuRF board
 TX is from the SuRF board

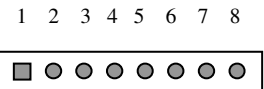
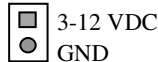
(Note: the labels on the board for RX and TX are incorrect)

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



Evaluation Board Connector

Power

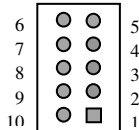


Other Signals

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

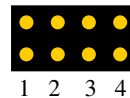
PIN	Description
1	Sensor PWR
2	Sensor-4
3	Sensor-5
4	Sensor-7
5	No connect
6	No connect
7	Sensor-6
8	GND

RS232 Interface


 RX into the SuRF board
 TX is from the SuRF board

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



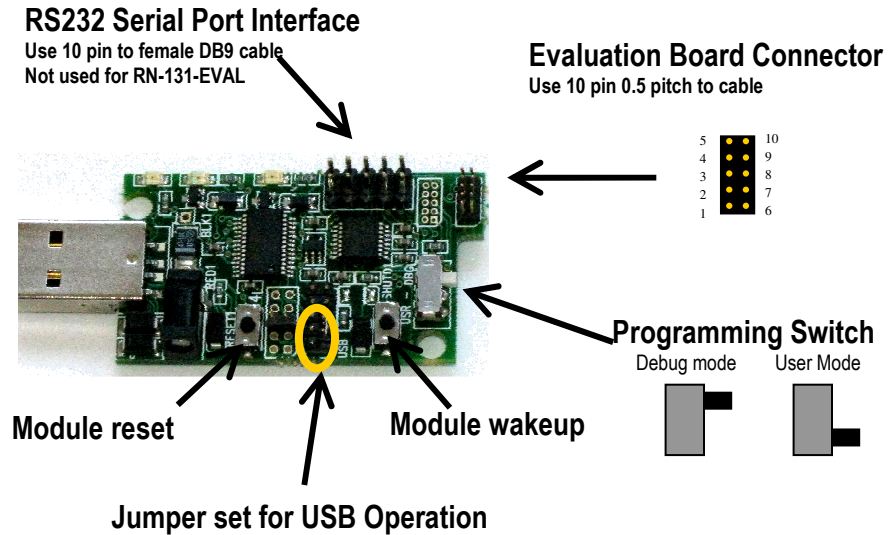
- 1) Adhoc mode & Factory Reset
- 2) Config 1
- 3) Confir ?
- 4) Co

LED Indicators

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

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Evaluation Board Description



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

1. Using the Evaluation board with a terminal emulation program
2. Over the air using Adhoc networking mode with Telnet
3. Through the UART interface (Embedded applications)

NOTE: We suggest using TeraTerm as you terminal emulator program. This is available for download from the Roving Networks website. <http://www.rovingnetworks.com/support/teraterm.zip>
Do not use HyperTerm with the Evaluation Board it has several bugs that make it unusable for this application.

Configuration using the Evaluation Board

The evaluation board physically connects your computer to the WiFly GSX module. With the drivers installed the programmer will appear as a "USB Serial Port" on a COM port. The Evaluation board will have the green LED on when plugged into the USB.

This is a two step process:

1. Making a connection to the WiFly GSX module
2. Configuring the WiFly GSX module to access the WiFi network

Once complete the WiFly GSX module is associated with the network and has acquired an IP address.

Step 1: Setting up the hardware

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USB Connection:

1. Connect the USB extension cable to the Evaluation board.
2. Connect the 10pin ribbon cable to the evaluation board. When looking from above, red side of the ribbon cable should be towards the outside of the evaluation board.
3. Connect the other end of the 10pin ribbon cable to the SuRF board, when looking from the top the red side of the ribbon cable should be towards the center of the SuRF board.
4. Verify that the jumper on the Evaluation board is set for USB mode, and the programming switch is in the USER mode.
5. Plug the USB cable into the computer.

Note: When the SuRF board is connected to the Evaluation board the 9 volt battery is not needed.

Step 2: Configuring the WiFly GSX Module

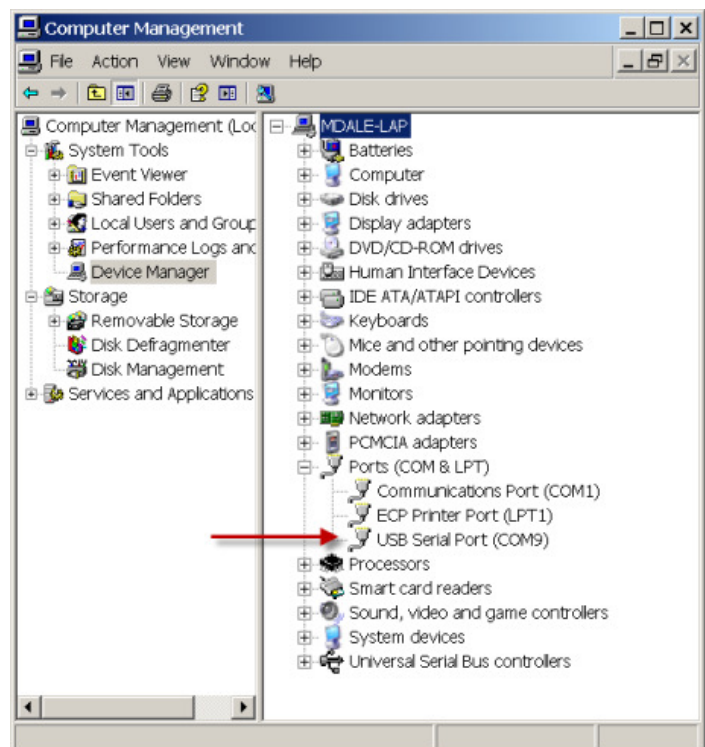
Configuration commands are made over the data channel when the module is in command mode. The escape sequence \$\$\$ enters command mode. Once in command mode, the WiFly GSX device is configured using simple ASCII commands. To leave command and return to data mode type *exit*.

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. Determine the COM port the USB Serial port 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.



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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 WiFly 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 an 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.

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```

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.

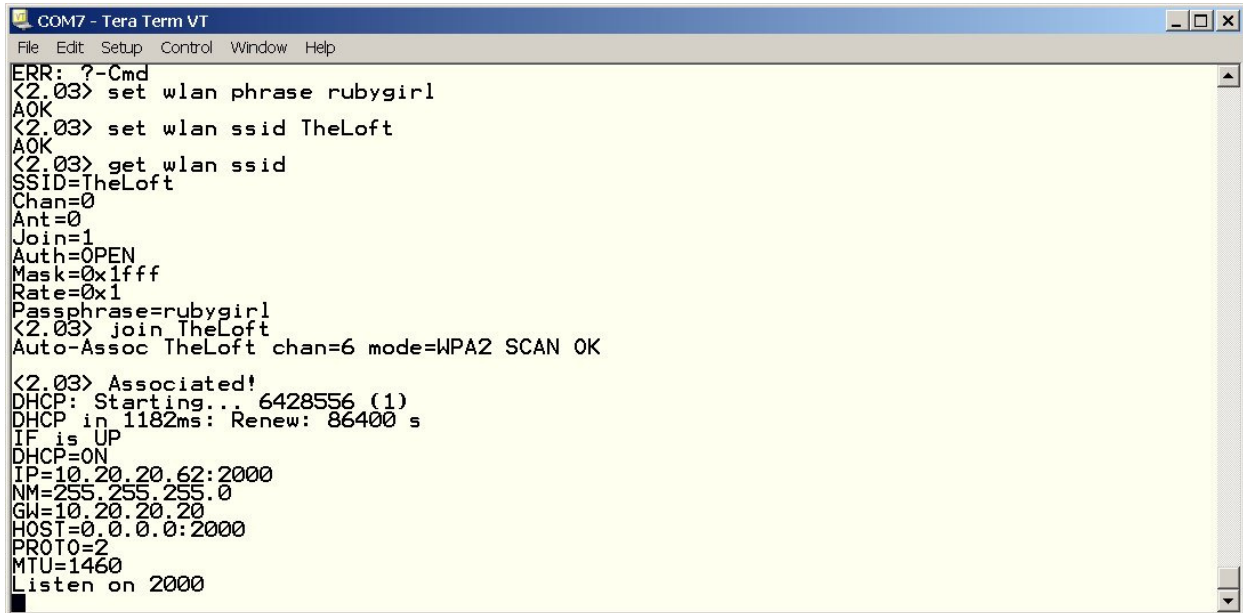
Connecting to security enable networks

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**

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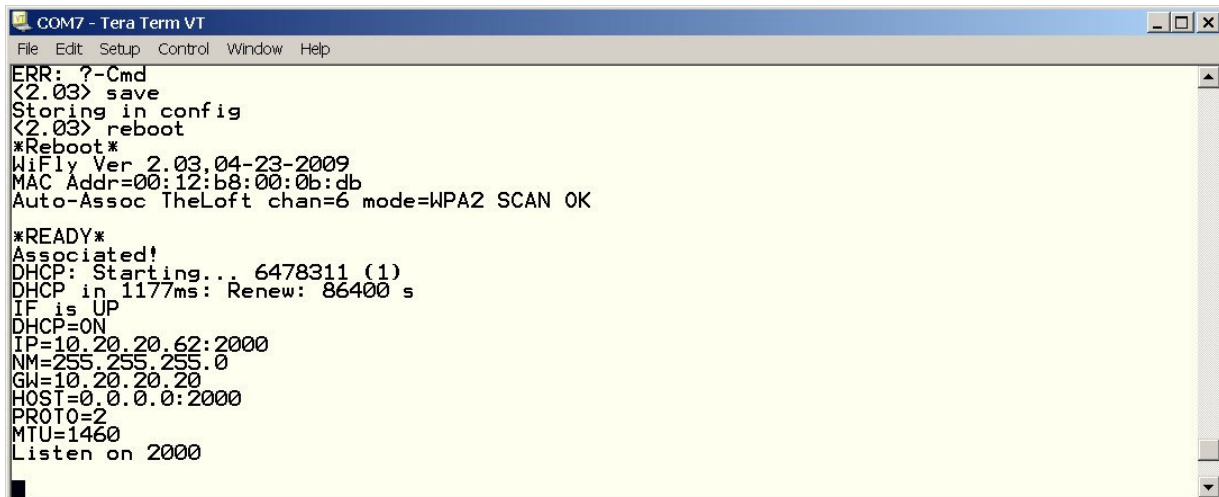


```
COM7 - Tera Term VT
File Edit Setup Control Window Help
ERR: ?-Cmd
<2.03> set wlan phrase rubygirl
AOK
<2.03> set wlan ssid TheLoft
AOK
<2.03> get wlan ssid
SSID=TheLoft
Chan=0
Ant=0
Join=1
Auth=OPEN
Mask=0x1fff
Rate=0x1
Passphrase=rubygirl
<2.03> join TheLoft
Auto-Assoc TheLoft chan=6 mode=WPA2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



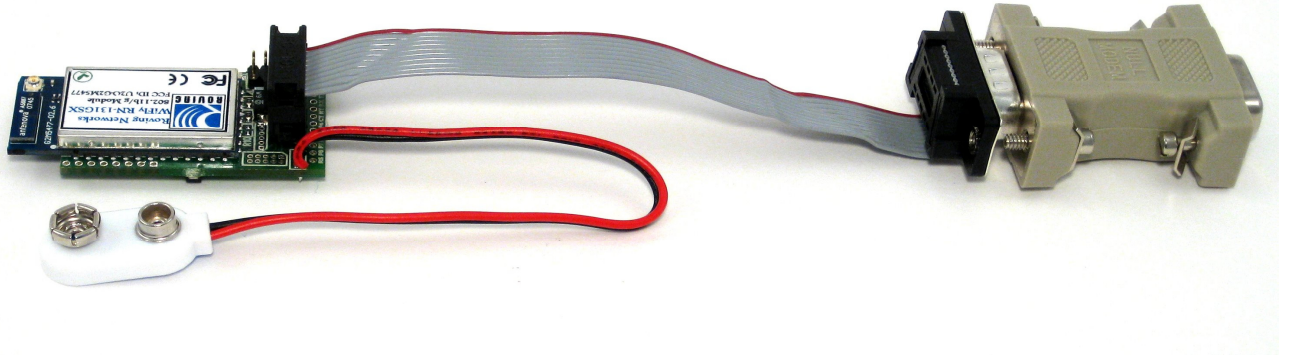
```
COM7 - Tera Term VT
File Edit Setup Control Window Help
ERR: ?-Cmd
<2.03> save
Storing in config
<2.03> reboot
*Reboot*
WiFly Ver 2.03,04-23-2009
MAC Addr=00:12:b8:00:0b:db
Auto-Assoc TheLoft chan=6 mode=WPA2 SCAN OK

*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
```

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Using the RS232 Interface

Attach the pin 10 to male DB9 ribbon cable such that red edge points towards the jumper block and the cable runs away from the SuRF board.

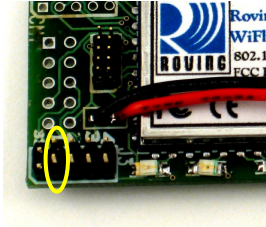


In this configuration power can be applied through pin 9 of the DB9 connector or by using the 9 volt battery clip provided as shown above.

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Using Adhoc mode

The Surf Board is put into Adhoc mode by putting on jumper 2. Jumper 2 is actually the first available jumper since jumper 1 pins have been clipped to avoid accidental shorting to VDC.



With the Surf Board in adhoc mode connect the 9 volt battery. The SuRF board will flash the red, yellow and green LEDs in sequence when the module is in adhoc mode.

The WiFly module creates an adhoc network with the following

SSID:	WiFly-GSX
IP address:	169.254.1.1

Connect to the WiFly-GSX network by go into 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 WiFly-GSX network. Once successfully associated the red LED will blink fast and the yellow LED will go off. The green LED remains blinking to indicate there is an IP address but no active connection.

Note: Vista may take one or two minutes allocating IP address for your computer (Auto IP). To work around this you can assign a static IP address.

Once you have associated with the WiFly-GSX network you will be able to ping the WiFly module at the IP address 169.254.1.1 or open a telnet window using port 2000. From telnet you can send data to the WiFly UART or enter command mode to configure the module. For example, it is useful to use adhoc mode to set and save the SSID and security key for enterprise networking without using the development board or UART connection.

Note: The module can not be in Adhoc and Enterprise network mode simultaneously.

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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 WiFly 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

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