Gateway User's Guide

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Radio Frequency Compliance Statement

RFind Systems, Inc. is the responsible party for the compliance of the following device:
MODEL: G100A
FCC ID: UL3G100A
CANADA: 6721A-G100A

The user(s) of this product is cautioned to only use accessories and peripherals approved, in advance, by RFind Systems, Inc. The use of accessories and peripherals, other than those approved by RFind Systems, Inc., or unauthorized changes to approved products, may void the compliance of these products and may result in the loss of the user(s) authority to operate the equipment.

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Compliance

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Installation Note

To comply with FCC radio frequency exposure compliance requirements, this device must be installed by a RFind Systems certified technician. Please refer to RFind Systems installation instructions for a list of approved peripheral devices.

Introduction

This document describes how to install and configure the RFind Gateway. The RFind Gateway is used to transmit and receive data from tags to a central database.

Overview

There are two models of RFind Gateway: wired and wireless. The wired model connects to a network via an RJ-45 cable while the wireless model features an 802.11b ethernet card allowing it to connect to an access point. The RFind Gateway also comes equipped with a 9-pin RS232 serial port, an antenna connector, a power receptacle, and four status LEDs.

The following is a brief description of what each item is used for:

Item	*Description*
9-Pin RS232 Port	Used for configuration and for troubleshooting. For example, if the Gateway is not receiving data, error messages explaining the cause can be seen from this port.
RJ-45 Port (Wired model only)	Provides the ability to transmit and receive data to and from the Gateway. The Gateway is equipped with a web server as well as an FTP server for firmware upgrades. The most common use for this port will be sending data received from tags to a central database server.
802.11b Wireless Card (Wireless model only)	Provides ability to transmit and receive data to and from the Gateway.
Power Receptacle	Supplies power to the Gateway.
Antenna	Communications interface for RFID tag communication.
Status LEDs	See Appendix A for LED definitions.

Gateway Types

There are two different logical types of gateways:

- Locating
- Chokepoint

A locating gateway is used to process location data received from asset tags as well as to configure tags (for example during the commissioning process). Locating gateways are also used to request a tags status. In general your gateways should always be configured as locating gateways.

A chokepoint gateway is used to implement a chokepoint in your system. In this case the sole function of the gateway is to send out a special message to determine if any tags are in the immediate area surrounding the gateway. You can control the scan rate of a chokepoint gateway by setting the scan rate parameter. This determines how often the gateway sends out a scan message. The smallest value for this parameter is 200ms.

Gateway Configuration

The initial configuration of the gateway must be done using a 9-Pin RS232 straight through cable with one female end and one male end. Do not supply power to the gateway until the appropriate step below.

To configure the gateway, complete the following steps:

1. Connect RS232 cable from Gateway to PC COM port.

2. Open up Hyperterminal by going to Start -> Programs -> Accessories -> Communications -> Hyperterminal

3. When prompted to enter a name for the connection, enter "RFind Gateway" and click OK.

4. In the "Connect To" dialog, select the appropriate COM port from the "Connect using:" drop down box and click "OK".

5. Use the following COM port settings on the COM port properties dialog:

   Bits per second: 9600
   Data bits: 8
   Parity: None
   Stop Bits: 1
   Flow Control: None

6. Click "OK" when finished.

7. Use the power adapter to supply power to the Gateway. After a short delay, you should see text displayed in your Hyperterminal session indicating that the Gateway is starting up. When prompted, press any key on your keyboard to indicate that you would like to modify the settings.
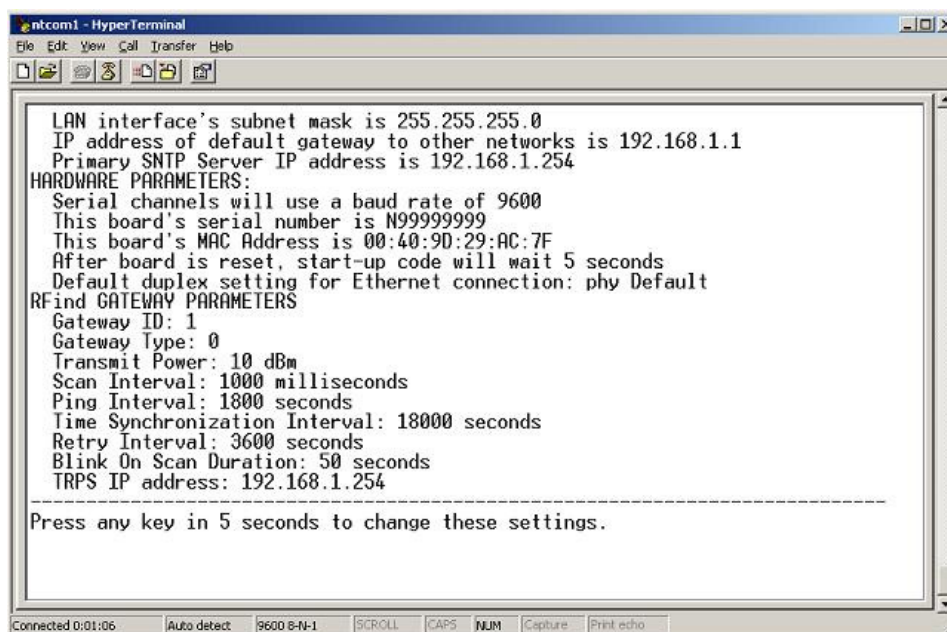
Illustration 1: Gateway boot prompt in hyperterminal session.

The default Gateway settings should be appropriate for most users. If would like to customize the settings then complete steps 8 to 11. By default, the wired Gateway is configured as follows:

IP Address:	192.168.1.50
Subnet Mask:	255.255.255.0
IP Gateway:	192.168.1.1
Primary Time Server:	192.168.1.254
Secondary Time Server:	None (0.0.0.0)
TRPS IP Address (Expeditor Server):	192.168.1.254

The default network settings for the wireless Gateway are as follows:

IP Address:	192.168.1.50
Subnet Mask:	255.255.255.0
IP Gateway:	192.168.1.1
Wireless Protocol Mode	Infrastructure
Wireless SSID	rfind
Wireless Channel	Search
WEP	Disabled
WPA	Disabled
Primary Time Server:	192.168.1.254
Secondary Time Server:	None (0.0.0.0)
TRPS IP Address (Expeditor Server):	192.168.1.254

NOTE: In order to protect your wireless network, RFind Systems Inc. recommends that you use some form of encryption. As a minimum, 128 Bit WEP encryption should be used. To modify the wireless encryption and other settings complete steps 8 to 11 below.

If any of the above settings must be modified for your site, then you must follow the configuration instructions below. Note that the Gateway uses SNTP to get its time from an external time source. Under Windows XP and Windows Server 2003, the SNTP service is enabled by default. Configuring the SNTP server on these operating systems is as easy as allowing inbound connections on UDP port 123. If you have disabled SNTP for security reasons or do not want to use an SNTP server internal to your network, you can configure the Gateway to use an external time server.

8. When prompted press "M" to modify the current settings.

9. When prompted for a password, enter the default password of "rfind" and press enter.

10. The following table describes each of the settings in the order you will be prompted for them. Press enter after entering a new value for each setting. If you press enter without entering a new value, the current setting will be used.

Setting	Description
Obtain IP settings from network.	Set to N for No. Setting this Y or Yes will allow the Gateway to get its IP configuration automatically.
IP Address	Ipv4 IP address for Gateway.
Subnet Mask	Ipv4 Subnet mask.
IP Gateway	Ipv4 IP address of IP gateway.
Primary SNTP Server	Ipv4 IP address of primary SNTP server.
Secondary SNTP Server	Ipv4 IP address of secondary SNTP server.
Root password	Press Y and enter to choose to update root password and then enter a new root password.
Admin password	Not currently used.
Baud Rate	Accept Default – Do not change.
Serial Number	Accept Default – Do not change.
MAC Address	Protected.
CPU Delay	Number in seconds indicating how to long to wait for user to press a key to change settings. Recommended setting is 5 seconds.
Ethernet Duplex Setting	Accept Default – Do not change.
Gateway ID	Protected.
Gateway Type	Available settings are 0 or 2. 0 – Locating gateway 2 – Chokepoint gateway Most often this will be set to 0.

Setting	Description
Transmit Power	Transmit power in dBm. Supported range is -30 dBm to +10 dBm. Setting to a value outside this range will cause Gateway to use default value of +10 dBm.
Scan Interval	Rate at which a gateway will scan for tags. Recommended setting is 500 milliseconds. Setting is ignored if gateway is a locating gateway.
Ping Interval	Rate at which gateway will send an XML ping message to server. Used to tell server that gateway is still on-line. Recommended setting is 1800 seconds.
Time Synchronization Interval	Interval in seconds at which Gateway will synchronize its time with external time source.
Retry Interval	Interval in seconds at which the gateway will attempt to resend messages to the server in case of network failure. If gateway detects network failure it will start buffering messages in a queue. Up to 5000 messages can be queued. Recommended setting is 20 seconds.
Blink On Scan Duration	Set to 100. (Setting is ignored.)
TRPS IP Address	Ipv4 IP address of machine on which Expeditor web service is installed.
TRPS Port Number	Set to 80. If you are running the TRPS Web Service on a port other than the default of port 80 then set the port number to the port number for the web service.

Additional settings for the wireless Gateway:

Setting	Description
Wireless Network Type	Type of wireless network to connect to. Recommended setting is Infrastructure (option 0) which is the default setting.
Wireless SSID	Sevice Set Identifier for access point. Default is "rfind".
Wireless Channel	Access point channel number. Valid channels are 1 to 11.
Enable WEP	Set to Y to enable WEP. If you want to use WPA then set this to N. If you want to use WEP, the wireless authentication type set for the network must be "Shared Key".
Enable WPA	Set to Y to enable WPA. If you want to use WEP set this to N.

11. After modifying the above settings as desired, a short delay will be observed followed by a message indicating that the settings were saved. The device will then reboot and go through the boot sequence as before. Simply watch the output in your Hypterminal session and you should see a message indicating that the Gateway has booted up correctly.
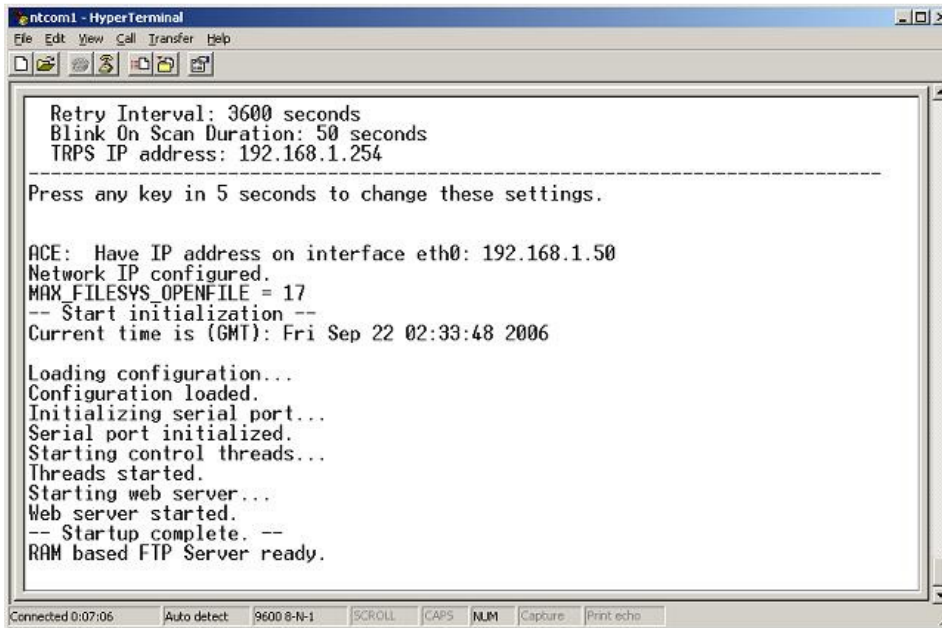
Illustration 2: Gateway hyperterminal session showing output after gateway has completed boot sequence.

Accessing the Gateway Demo Application

As mentioned previously, the gateway features a web server. Provided on the gateway is a demo application which can be used to test the transmission range of the gateway and check that a given tag is functioning correctly.

To access the demo application open a web browser such as internet explorer and browse to http://<Gateway IP Address>/Demo/index.html. For example:
http://192.168.1.50/Demo/index.html

After the page loads, you will be presented with a page that has two text boxes and three buttons, "Idle", "Start" and "Blink". Below is a description for each of the fields and buttons:

Field or Button Name	Description
Blink Messages Sent	Read only field used to indicate how many blink messages have been sent to the given tag. This field is only updated after you press the stop button.
Transmit Power	Transmit Power in dBm currently in use by the Gateway.
Tag ID	Tag ID of tag currently being manipulated.
Idle	Sends an idle message to the tag. If you are planning on a shipping a tag, you should first put it in idle.

Field or Button Name	Description
Start	Sends a start message to the tag. When a tag arrives at your site it will be in idle. It must be "started" in order for it to be capable of blinking its LED or doing any other activities such as locating itself.
Blink	Sends repeated blink messages to the tag. After clicking this button, the button text will change to stop. Pressing this button again will stop the Gateway from sending blink messages.

To make a tag blink, simply enter its tag ID and press "Start". This takes the tag out of idle. Now enter the desired transmit power and select "Blink". The tag will now start to periodically blink its LED. Click "Stop" to stop blinking the tag.

Support

For support on any RFind Systems hardware, please contact us at:

RFind Systems, Inc.
www.rfind.com

email: support@rfind.com
Telephone: (250) 862-3412

Appendix A – Status LEDs

LED	Meaning
Bottom Left (Red)	On solid when the Gateway is powered.
Top Left (Green)	On when an error is present.
Top Right (Green)	On solid when the Gateway has an ethernet link.
Bottom Right (Amber)	On when the Gateway is transferring data to/from the server.