RADIOFRAME ®
N E T W O R K S

User Reference

S-Series GSM/GPRS Radio Base Station

Service Information

This equipment complies with part 15 of the FCC Rules. Operation is subject to the two following conditions: This device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits pursuant to 47 CFR Part 22 subpart H and Part 24 Subpart E of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

Notices

RadioFrame Networks reserves the right to revise this document for any reason, including, but not limited to, conformity with standards promulgated by various governmental or regulatory agencies, utilization of advances in the state of the technical arts, or to reflect changes in the design of equipment, techniques, or procedures described or referred to herein.

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⚠ CAUTION: Safety Instructions

Read and follow these instructions when connecting and using your base station.

- Maintain a distance of at least 20 cm between persons and a functioning radio base station.
- Do not store or use the radio base station in locations that are exposed to heat, direct sunlight, excessive dust, or extreme cold. Keep it away from heaters, stoves, fireplaces, and other sources of heat.
- Only a qualified technician should open the radio base station case. Do not insert anything into the case openings or touch the inside of the case to avoid damage.
- Do not expose the radio base station to liquids. You may dust the base station with a damp cloth occasionally, being sure not to allow moisture to get inside.
- Always be sure that your base station power transformer is rated for the AC power available in your location.
- Locate the radio base station near an accessible electrical outlet. Ensure that power and data cables are not located where they can be stepped on or tripped over. If the power cable has been damaged, do not use it. When connecting and disconnecting cables, be sure to grasp the plug and not the cable. Be careful to pinch the locking clip when disconnecting any Ethernet cable.
- Openings in the radio base station case are provided for ventilation. To prevent overheating, these openings must not be blocked or covered. Do not locate the base station on a soft surface such as a blanket because doing so may block the openings on the bottom of the case. If you place the base station in a bookcase or other enclosed space, be sure to provide adequate ventilation and air flow.

Regulatory Notices

Electromagnetic Interference (EMI) is any signal or emission, radiated in free space or conducted along power or signal leads, that endanger the function of a radio navigation or other safety service or seriously degrades, obstructs, or repeatedly interrupts a licensed radio communications service. Radio Communications services include but are not limited to AM/FM commercial broadcast,

CE Notice

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1   Getting to Know Your Radio Base Station

Welcome

The S1 GSM/GPRS Radio Base Station is the link between your cell phone (or your data card) and your service provider, providing your own personal island of coverage. It has a network connection for Internet access through your cable or DSL modem. There's also a router inside and four LAN (local area network) ports for sharing connectivity with multiple computers.

To create your cell radio link, install and set up the base station. You won't find a complicated configuration script because the base station finds your cell service provider across the Internet by itself! (This assumes, of course that your cable or DSL modem is "talking" to its ISP, or Internet service provider. Please make sure this step is taken before you attempt to get the S1 base station working; you will need to arrange service and make sure it is working by contacting the ISP or your cellular service provider.)

Once you have confirmed Internet access through your cable or DSL modem, the Quick Install Guide gives you all the information you need to get on the air. This reference contains much more information in case, for example, you want to do special configuration of the base station's router. By the way, we don't recommend manually setting up the router (or the radio base station for that matter) unless you have unusual needs AND you have the experience to work with Internet Protocol (IP) communications devices. Chances are the S1 works just the way you need, right out of the box!

Speaking of the box . . .

Inside the S1 GSM/GPRS Radio Base Station box, you will find:

- S1 Radio Base Station, GSM/GPRS
- Power adapter
- Ethernet cable (CAT5)
- Quick Install Guide
- Warranty Card

You will also need . . .

- Broadband connection and cable or DSL modem
- For web-based configuration, a computer running Microsoft Windows with:
    - Ethernet network adapter and cable
    - Internet Explorer 5.0 or Mozilla Firefox 1.5

2   The S1 Indicators, Connectors and Reset Button

S1 LEDs are located on the front panel, shown in Figure 1, and connectors and the reset button are located on the back panel, shown in Figure 2.

Figure 1 Front Indicators
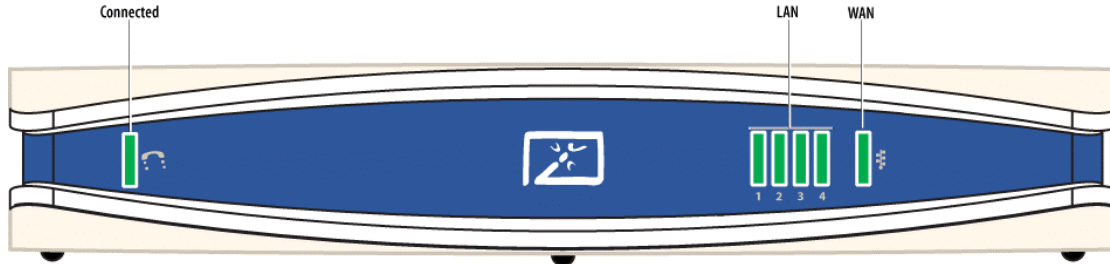
Indicators

Connected Indicator   Green. Lights when the S1 detects a valid cell communication channel.

LAN Indicators   Green. The LAN indicators serve two purposes. When the light is steadily ON, it indicates that the S1 router is connected to an Ethernet device through the corresponding LAN port. When the light is flashing, the router is sending or receiving data over that port.

WAN Indicators   Green. The WAN indicator serves two purposes. When the light is steadily ON, it indicates that the S1 router is connected to a cable or DSL modem. When the light is flashing, the router is sending or receiving data over the WAN port.

Figure 2 Back Connectors and the Reset Button
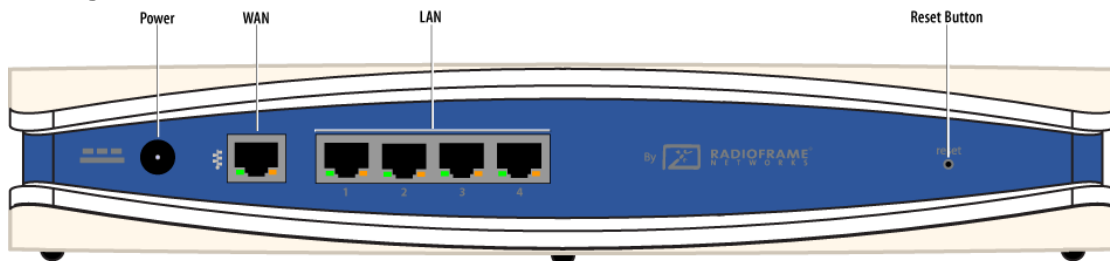
Connectors

Power Connector   The power connector is where you connect the power adapter.

LAN Ports The LAN ports connect to devices, such as computers or print servers, using a CAT5 (or better) Ethernet cable.

WAN Port   The WAN port connects to your cable or DSL modem using a CAT5 (or better) Ethernet cable.

Reset Button

The Reset button reboots the S1 when you press it for just a second. If you press the Reset button for 30 seconds, the S1 is reset to factory defaults. Router settings, such as password, static IP addresses, and port forwarding table entries are all cleared.

Note: Resetting the S1 (as opposed to rebooting it) clears any settings, such as router configuration and replaces them with the factory defaults. If you have made modifications, it is a good idea to write down these settings before doing a Reset. You can find most of them on the Status screen. (See Chapter 4.)

3 Connecting the S1

Your S1 connects to your broadband modem (cable or DSL). Then you can connect networked devices, for example a computer and a printer server, to the network ports on the S1. See Figure 3.

Note: The Internet packets for your cellular service are time-critical for smooth conversation. Therefore the S1 gives priority to voice packets. It is important to connect the S1 *directly* to your broadband modem and connect other devices to the network ports on the S1.

Figure 3 Typical Setup
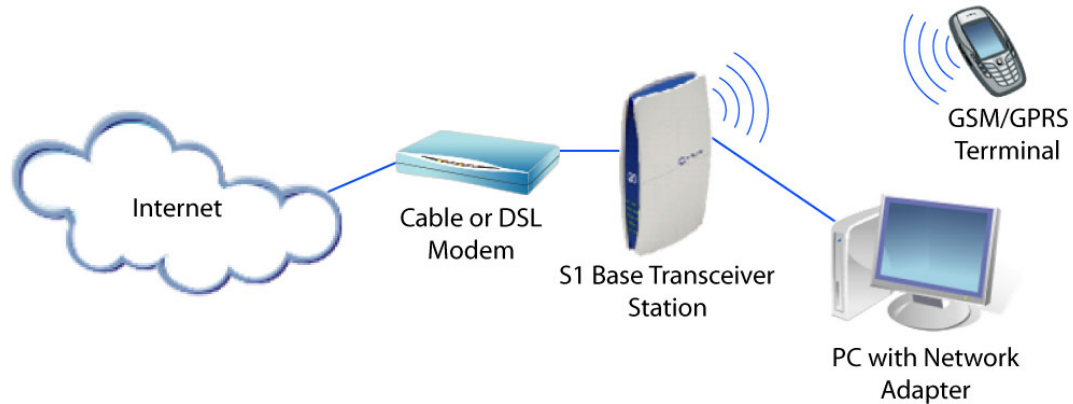
Placement Tips

The S1 provides a "coverage area" within which you will be able to use your cellular devices. Typical indoor operating range for cellular devices is between xx and yy meters away from the S1 base station. Signal strength degrades somewhat as the distance between your S1 and cellular devices increases. This may or may not be noticeable to you. Some obstructions can weaken signals simply by getting in the way of your cellular radio waves, for example, metal appliances, large mirrors, and thick walls.

If you have concerns about your cellular coverage that might be related to range or obstruction factors, place your S1 as close as possible to the centre of the area where you want coverage. In a multi-storey setting, place the S1 on a floor that is as close to the centre of the building as possible. This may mean placing the S1 in an upper storey.

Making the Connections

Here are the steps to connecting the S1:

- Connect the S1 WAN port to the Ethernet port on the DSL or cable modem
- Connect any network devices to the LAN ports on the S1
- Connect the AC power cable to the S1

Figure 4 S1 Connections

Power   Modem   LAN
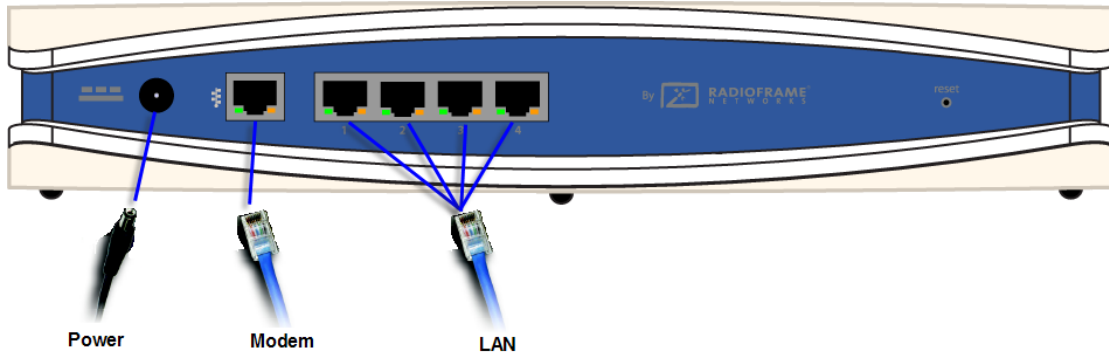
1 Make sure that all network devices you are going to connect to the S1 are OFF. Make sure the DSL or cable modem is OFF. Make sure the modem is properly connected to the coax cable or telephone cable that provides your broadband Internet service.

   Note: Your ISP can assist you with this connection. It requires that the ISP has configured your Internet access and you have received any necessary setup information from your ISP. Once you are connected, the ISP can also test the connection from their office.

2 Connect an Ethernet network cable (CAT5 or better) to the S1 WAN (modem) port.

3 Connect the other end to your DSL or cable modem's Ethernet port.

4 Connect Ethernet network cables to your networked devices' ports and the LAN ports.

5 Power on the cable or DSL modem.

   Note: You might wish to check the signal-strength bars on your cell phone before powering up the S1 so that you can observe the difference once the S1 is in service.

6 Connect the AC power adapter cable to the S1 power port and then plug the power adapter into an electrical outlet.

7 Power on the networked devices.

Wall Mounting (Optional)

<<To Be Supplied>>

First Call

The S1 takes a few moments to register on the cellular network, but there's no intervention required on your part to get it working. After the initialization is complete, you can simply make a call as you normally do.

4 Configuring the S1 Router

For the majority of situations, the router configuration does not need your attention. The S1 uses Dynamic Host Configuration Protocol (DHCP) to find the information it needs from your Internet Service Provider (ISP) over the Wide Area Network (WAN) connection.

If you do wish to make router configuration changes, you can use this chapter of the manual to see what the settings mean. (To secure the router, you will need to change the default password.)

Logging Into the S1 Router

The router has its own web client for your use. For access, launch Internet Explorer or Mozilla Firefox browser and enter the router's IP address—**192.168.1.1**—in the browser's Address Field. Press **Enter**. The Login screen (Figure 5) appears. Type **admin** in the User Name field and **admin123** in the Password field. Click **Login**.

Figure 5 S1 Router Login

In Figure 6 you can see that DHCP is selected, and example settings, such as your ISP provides, are shown in the "Internet Setup" section of the Setup screen. These settings will be different in your case, but you don't need to change anything because DHCP takes care of the settings automatically.

Figure 6 Sample Automatic Setup Performed

Along the top of the interface are 6 main tabs: Setup, Routing, Security, Status, Reset Configuration, and Logout.

The Setup Tab—Basic Setup

Internet Setup By default, your ISP will provide an IP address automatically. In this case, the DHCP radio button is selected and the fields in this section are automatically populated.

If you select the Manual radio button, you need to obtain a static IP address and other configuration information from your ISP and enter it in these fields.

IP Address This is the IP address of the S1 as seen from the Internet. Your ISP will provide you with the static IP Address you need to specify here.

Subnet mask Your ISP will provide you with the Subnet Mask.

Gateway Your ISP will provide you with the default Gateway Address.

Static DNS 1-3 Your ISP will provide you with at least one Domain Name System (DNS) Server IP Address.

Optional Settings In most cases, just leave these blank.

Host Name If your ISP asks for a host name, make one up and enter it here.

MTU The MTU (Maximum Transmission Unit) setting specifies the largest packet size permitted for network transmission.

Size This is not editable if you leave MTU at its default.

The Setup Tab—DHCP Setup

From the setup tab, if you click the DHCP Server link in the left margin, you will see the screen shown in Figure 7. These settings allow you to configure the S1 router's LAN-side Dynamic Host Configuration Protocol (DHCP) server function for devices connected to the S1 LAN ports.

Figure 7 DHCP Server Setup

DHCP Server By default, the router is enabled as a local DHCP server. If you already have one on your network, set the option to **Disable**. (If you disable DHCP, assign a LAN-side static IP address to the S1.)

Starting IP Address This address must be larger than the S1 LAN IP address and on the same subnet. By default the Starting IP address is 192.168.0.50.

Number of Clients This is the maximum number of devices you wish the router to be able to assign addresses.

Client Lease Time This is the amount of time before the devices will automatically be reassigned a dynamic IP address.

Show Config button Shows a table of Starting IP Address, Number of Clients, Client Lease Time and a delete checkbox to clear.

Show Lease button Shows a table of Host Name, MAC Address, IP Address.

When you are done setting up DHCP, click the **Submit Changes** button.

The Routing Tab—Advanced Routing

Figure 8 Advanced Routing

Dynamic Routing By default, dynamic routing is disabled. It enables the router to determine network packets' route based on the fewest hops between source and destination.

Static Routes Static routes are designated routes that network packets must take between source and destination.

> **Destination IP Address** This is the address of the host (or network) to which packets on the static route are directed.

> **Subnet Mask** This is the subnet mask of the route destination.

> **Default Gateway** This is the address of the route destination gateway.

> **Interface** This is the port (LAN or WAN) facing the route destination.

When you are done configuring routing, click the **Submit Changes** button.

The Routing Tab—View/Delete Routes

Selecting the View/Delete Routes link pops up a window that shows a table of the routes that are set up.

The Security Tab—Firewall

Figure 9 Firewall: Add Rule

Add Rule Use this screen to set up rules to filter Internet packets to enhance your network's security.

Source IP Enter the IP Address where the filtered packets originate.

Destination IP Enter the IP Address where the filtered packets are destined.

Protocol Optionally, choose a protocol for the packets you wish to filter.

Application Choose the application for the packets you wish to filter.

Source Port No This field is read-only.

Destination Port No This field is read-only.

Action Choose to block packets or not.

When you are done setting up filtering rules, click the **Submit Changes** button.

View/Delete Firewall Rules View/Delete Rules link pops up a window that shows a table of the firewall rules that are set up.

The Security Tab—Port Forwarding

Figure 10 Port Range Forwarding

Port Range Forward Use this table to allow for public services or for specialized applications to work on your network.

> **Application** Enter the name of the application.
>
> **Start** Enter the port the server or Internet application uses.
>
> **End** Enter the same port number or the upper end of the range.
>
> **Protocol** Select TCP, UDP, or Both.
>
> **IP Address** Enter the IP address of the server that you want the Internet users to be able to access.
>
> **Enable checkbox** Check the Enabled checkboxes to enable the services you have defined.

When you are done setting up port forwarding, click the **Submit Changes** button.

The Security Tab—HTTPS Enable/Disable

This page allows you to turn on or off management of HTTPS.

The Status Tab

The Status Tab shows the current router settings in a read-only display. Figure 11 gives an example. These settings are a combination of factory defaults and changes that have been applied. Table 1 lists the default setting for each parameter.

Figure 11 Status Screen

Table 1 Status Screen and S1 Factory Defaults

Setting	Default
Router Information	
Current Time	—
Mac Address	—
Domain Name	—
Host Name	—
Internet Information	
Connection Type	DHCP
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.254
DNS1, -2, -3	—
MTU	—
Local Network Information	
Local IP	192.168.0.1
Subnet Mask	255.255.255.0
Dynamic Routing	Disabled
DHCP Details	
DHCP Server	Enabled
Security Information	
HTTPS	Disabled

Appendix A Troubleshooting

The S-Series GSM/GPRS Base Station is designed for plug and play installation and operation. Should the base station fail to function as expected, please review these steps in order, depending on the symptoms.

<<To Be Supplied>>