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# BSR 64000 Quick Start Guide



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# Preface

## Scope

This document describes the basic tasks used to get the Motorola™ Broadband Services Router™ 64000 (BSR 64000™) out of the box, running, connected to the network and operational.

## Audience

This document is for use by those persons who will install and configure the BSR 64000™ product. Only trained service personnel should install, maintain, or replace the BSR 64000.

## Documentation Set

The following documents comprise the BSR 64000 documentation set:

- *BSR 64000 Command Reference Guide*  
This document contains the Command Line Interface (CLI) commands for managing, configuring, and maintaining the BSR 64000.
- *BSR 64000 Configuration and Management Guide*  
This document provides the instructions and procedures for configuring and managing the BSR 64000.
- *BSR 64000 Installation Guide*  
This document describes how to install the BSR 64000 product.

- *BSR 64000 Release Notes*

These documents provide information about features not described or incorrectly documented in the main documentation set; known problems and anomalies; product limitations; and problem resolutions.

- *BSR 64000 SNMP MIB Reference Guide*

This document describes the Simple Network Management Protocol (SNMP) MIBs; provides information that describes standard and proprietary MIB support; describes how to walk the MIBs and how to compile and load the SNMP MIBs. It also provides task examples.

- *BSR Troubleshooting Guide*

This document provides instructions and procedures for troubleshooting the BSR product.

- *BSR 64000 Quick Start Guide*

This document provides basic tasks used to get the BSR 64000™ out of the box, running, connected to the network, and operational.

## Conventions

This document uses the conventions in the following table:

Convention	Example	Explanation
angle brackets < >	<b>ping</b> <i>&lt;ip-address&gt;</i> <b>ping 54.89.145.71</b>	Arguments in italic and enclosed by angle brackets must be replaced by the text the argument represents. In the example, <b>54.89.345.71</b> replaces <i>&lt;ip-address&gt;</i> . When entering the argument, do not type the angle brackets.
bar brackets [ ]	<b>disable</b> [ <i>level</i> ]	Bar brackets enclose optional arguments. The example indicates you can use the <b>disable</b> command with or without specifying a <i>level</i> . Some commands accept more than one optional argument. When entering the argument, do not type the bar brackets.

Convention	Example	Explanation
<b>bold text</b>	<b>cable relay-agent-option</b>	Boldface text must be typed exactly as it appears.
brace brackets {}	<b>page {on   off}</b>	Brace brackets enclose required text. The example indicates you must enter either <b>on</b> or <b>off</b> after <b>page</b> . The system accepts the command with only one of the parameters. When entering the text, do not type the brace brackets.
<i>italic text</i>	<b>boot system</b> <filename>	Italic type indicates variables for which you supply values in command syntax descriptions. It also indicates file names, directory names, document titles, or emphasized text.
screen display	Wed May 6 17:01:03 2000	This font indicates system output.
vertical bar	<b>page {on   off}</b>	A vertical bar separates the choices when a parameter is required. The example indicates you can enter either command: <b>page on</b> or <b>page off</b> When entering the parameter, do not type the vertical bar or the brace brackets.

## Notes, Cautions, Warnings

The following icons and associated text may appear in this document.



**Note:** A note contains tips, suggestions, and other helpful information, such as references to material not contained in the document, that can help you complete a task or understand the subject matter.



**Caution:** The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important installation, servicing, and operating instructions in the documents accompanying the equipment.



**Warning:** This symbol indicates that dangerous voltages levels are present within the equipment. These voltages are not insulated and may be of sufficient strength to cause serious bodily injury when touched. The symbol may also appear on schematics.

## Contacting Support

Use the following information to contact Support:

U.S.	1-888-944-HELP 1-888-944-4357
International	+215-323-0044
WWW	<a href="http://www.gi.com/BUSAREA/CUSACC/websupport.html">http://www.gi.com/BUSAREA/CUSACC/websupport.html</a>
Email	<a href="mailto:cmtssupport@motorola.com">cmtssupport@motorola.com</a>



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# Quick Start

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# Introduction

Use the BSR 64000™ Quick Start Guide to unpack the product, connect it to the network, and establish minimal operation.

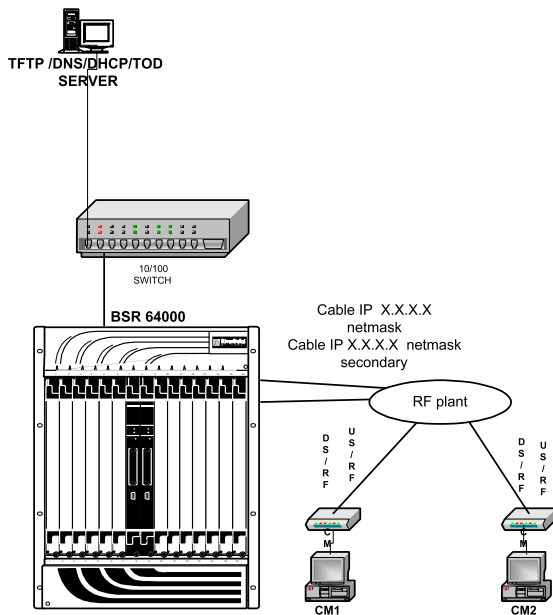


**Note:** Detailed installation procedures and configuration and management procedures are covered in the BSR 64000 product documentation set.

Follow these basic configuration tasks to make the BSR 64000 operational:

- [Configuring the Servers](#)
- [Physically Install the BSR](#)
- [Accessing the CLI to Set System Passwords](#)
- [Specifying System Time Information](#)
- [Configure SNMP](#)
- [Configure the Ethernet IP Address](#)
- [Configure Cable IP Address](#)
- [Configure the POS Module](#)
- [Configure Routing](#)
- [Configure the CMTS](#)
- [Save the Configuration](#)

The following illustration shows the basic configuration of the BSR 64000:



## Configuring the Servers

The following servers are required for the basic operation of the BSR on your network, and must be configured to allow cable modems to range and register properly on the HFC network:

- DHCP
- TFTP



**Note:** The CM configuration file must be stored on the TFTP server.

The following DHCP options are necessary:

- IP address
- Router address
- TFTP server address
- Bootfile for the CM configuration file

The following servers can be configured to operate the BSR on your network for management, provisioning, troubleshooting and billing purposes:

- LDAP
- Event (Syslog) Server
- Provisioning Server
- DNS

For more information on installing the servers, refer to the vendor server software documentation.

## Physically Install the BSR

Follow these steps to physically install the BSR:

1. Understand and follow all safety warnings.
2. Prepare the site area for the BSR installation.
3. Mount the BSR chassis in the equipment rack.
4. Connect the power, network cables, terminal cable, and alarm leads to the BSR.
5. Turn on the BSR and observe the system LEDs.

Refer to the following document for additional instructions:

- *BSR 64000 Installation Guide*

## Accessing the CLI to Set System Passwords

Follow these steps to access the CLI from a console session in order to configure password privileges for enabled modes and telnet:



**Note:** Make sure that the serial cable is connected properly and the terminal application is configured correctly. Refer to the BSR 64000 Installation Guide for more information.

1. Configure the terminal application on your PC to use COM port 1 or 2.
2. Configure the terminal port to the following settings:
  - Bits per second: 9600 bits per second
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow control: None
3. Start your terminal or terminal application to connect to the BSR.
4. Power on the BSR 64000.



**Warning:** Do not interrupt the boot process.

5. The terminal session begins and the password prompt displays. The password is a null value by default. Press the **Enter** key. The RDN> prompt displays.
6. To enter Privileged EXEC mode, use the **enable** command in User EXEC mode, as shown in the following example:

```
RDN>enable
```

The `Password` prompt displays.

7. To enter Privileged EXEC mode, press the Enter key at the password prompt. The password is a null value by default.
8. To enter Global Configuration mode in order to set system passwords, use the **configure** command, as shown in the following example:

```
RDN#configure
```

The `RDN(config)#` prompt displays.

## Setting System Passwords

System passwords should be set immediately. System passwords can contain up to 31 uppercase or lowercase alphanumeric characters and a numeric character cannot be the first character. Spaces are valid password characters. The user must enter the correct password to gain access to the BSR and privileged-level commands.



**Note:** Access to a telnet session is denied if the password for both the console and telnet is not set.

Follow these steps to configure the BSR system passwords:

1. To set the password for a console (terminal) session that allows access to the BSR in User EXEC mode, use the **password console** command in Global Configuration mode, as shown below:

```
RDN(config)#password console {0 | 7} <password>
```

where:

**0** indicates that the following password is unencrypted (clear text).

**7** indicates that the following password is encrypted.

*password* is the user-defined password that is no more than 31 characters.

2. To set the password for a telnet session that allows access to the BSR in User EXEC mode, use the **password telnet** command in Global Configuration mode, as shown below:

```
RDN(config)#password telnet {0|7} <password>
```

where:

**0** indicates that the following password is unencrypted (clear text).

**7** indicates that the following password is encrypted.

*password* is the user-defined unencrypted password for the BSR that is no more than 31 characters.

3. To set the Privileged EXEC password, use the **enable password** command, as shown below:

```
RDN(config)#enable password {0|7} <password>
```

where:

**0** indicates that the following password is unencrypted (clear text).

**7** indicates that the following password is encrypted.

*password* is the user-defined unencrypted password for the BSR that is no more than 31 characters.

4. Automatic encryption is disabled by default. If you want to encrypt all currently unencrypted passwords and all future passwords entered on the BSR, use the **service password-encryption** command in Global Configuration mode, as shown below:

```
RDN(config)#service password-encryption
```

If you want to turn off the service password encryption feature so that passwords entered in the future are no longer encrypted, use the **no service password-encryption** command in Global Configuration mode, as shown below:



```
RDN(config)#no service password-encryption
```



**Note:** The **no service password-encryption** command does not unencrypt passwords that are already encrypted. If you want to unencrypt encrypted passwords, you must change them manually.

5. The **show running-config** command is used to determine if the password name and encryption has been set. Use the **show running-config** command in Privileged EXEC mode to verify your configuration, as shown below:

```
RDN(config)#show running-config
```



**Note:** The **show running-config** command output identifies the system password with the number 0 if it is unencrypted. If the system password is encrypted, it is identified with the number 7.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Specifying System Time Information

Follow these steps to specify the system time information:

1. To set the system clock time zone for the BSR, use the **clock timezone** command in Global configuration mode, as shown in the following example:

```
RDN(config)#clock timezone <word> <hours> <minutes>
```

where:

*word* is the name of the time zone.

*hours* represents the number of hours offset from the Universal Time Coordinated (UTC), which is a range between -23 and +23 hours from the UTC.

*minutes* represents the number of minutes offset from the UTC from 0 to 59.

2. To set the BSR system clock, enter Ctrl Z to return to Privileged EXEC mode and enter either of the **clock set** commands, as shown in the examples below:

```
RDN#clock set <hh:mm:ss> <day> <month> <year>
```

where:

*hh:mm:ss* is the hour, minute, and second in hh:mm:ss format.

*day* is the day of the month from 1 to 31.

*month* is the first three letters of the month.

*year* is any year between 1993 and 2035.

For example:

```
RDN#clock set 11:22:30 5 Apr 2001
```

3. To check the BSR clock settings that you set, use the **show clock** command in Privileged EXEC mode.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure SNMP

Follow these steps to configure SNMP on the BSR:

1. To enable all versions of SNMP running on the SNMP server, use the **snmp-server enable** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#snmp-server enable
```

2. Configure SNMP server identification, access levels, packet size and traps.
3. Compile or import new SNMP MIBs.
4. Use an SNMP browser to configure or view MIBs.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 SNMP MIB Reference Guide*
- *BSR 64000 Command Reference Guide*

## Configure the Ethernet IP Address

Follow these steps to assign the primary Ethernet IP address and subnet mask and configure some basic system parameters:

1. To enter the Ethernet interface, use the **interface ethernet** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#interface ethernet <slot>/<port>
```

where:

*slot* is the SRM module slot on the BSR.

*port* is the port interface on the SRM module.

2. To enter the primary Ethernet IP address and subnet mask, use the **ip-address** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#ip-address {<ip-address> <subnet-mask>}
```

where:

*ip-address* is the IP address designated for the Ethernet interface.

*subnet-mask* is the subnet mask designated for the Ethernet interface.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure Cable IP Address

Follow these steps to configure the cable IP address and subnet mask:

1. To enter the cable interface, use the **interface cable** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#interface cable <slot>/<port>
```

where:

*slot* is the DOCSIS module slot on the BSR

*port* is the port interface on the DOCSIS module.

2. To enter the cable IP address and subnet mask, use the **ip-address** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#ip-address {<ip-address> <subnet-mask>}
```

where:

*ip-address* is the IP address designated for the cable interface.

*subnet-mask* is the subnet mask designated for the cable interface.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure the POS Module

Follow these steps to configure the POS module:

1. To configure the physical Packet Over SONET (POS) interface, use the **interface pos** command in Global Configuration mode, as shown in the example below:

```
BSR (config) #interface pos <slot>/<port>
```

where:

*slot* is the POS module slot on the BSR.

*port* is the POS interface on the POS module.

2. To enter the IP address and subnet mask for the POS interface, use the **ip-address** command in Interface Configuration mode, as shown in the following example:

```
RDN (config-if) #ip-address {<ip-address> <subnet-mask>}
```

where:

*ip-address* is the IP address designated for the POS interface.

*subnet-mask* is the subnet mask designated for the POS interface.

3. To enable the internal clock on the POS module, use the **pos internal clock source** command in Interface Configuration mode, as shown in the following example:

```
BSR (config-if) #pos internal clock source
```



**Note:** If the clocking source is different for your implementation, refer to the *BSR 64000 Configuration and Management Guide* for more information.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure Routing

Use the following sections to configure routing policy, static or dynamic RIP, OSPF, BGP routing as required.

### Routing Policy

Follow these steps to define routing policy on the BSR:

1. Create a route map and define its conditions.
2. Configure an IP access list and an AS-path access list.
3. Create community lists by filtering certain routes.
4. Configure prefix lists.
5. Apply a damping criteria to routes.

Refer to the following document for additional instructions:

- *BSR 64000 Configuration and Management Guide*

### Configure RIP v1 or RIP v2 on an Interface

Follow these steps to set an IP address for the RIP network on the specified router interface and identify the version of RIP used on the interface.

1. To enable RIP on the specified router interface, use the **router rip** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#router rip
```

2. To associate RIP routing with a network, use the **network** command in Router RIP Configuration mode, as shown in the following example:

```
RDN(config-rip)#network <ip-address> <wildcard-mask>
```

where:

*ip-address* is the RIP network address

*wildcard-mask* is the inverse of the subnet mask of the specified router interface

3. To set the version of RIP to 1 or 2, use the version command in Router RIP Configuration mode, as shown in the following example:

```
RDN(config-rip)#version [1 | 2]
```

where:

**1** is for RIP version 1

**2** is for RIP version 2

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure OSPF on an Interface

Follow these steps to set an IP address for the OSPF network on the specified router interface.

1. To enable OSPF on the specified router interface, use the **router ospf** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#router ospf
```

2. To enable OSPF announcements on the specified router interface, use the **network** command, as shown in the following example:

```
RDN(config-ospf)#network <ip-address> <wildcard-mask> <area-id>
```

where:

*ip-address* is the IP address of the OSPF network.

*wildcard-mask* is the inverse of the subnet mask of the specified router interface.

*area-id* is the identification number for the OSPF area on which the interface resides.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure BGP on an Interface

Follow these steps to set an IP address for the BGP network on the specified router interface.

1. To enable BGP on the specified router interface, use the **router bgp** command in Global Configuration mode, as shown in the following example:

```
RDN(config)#router bgp <n>
```

where:

*n* is the Autonomous System (AS) number from 1 to 65535.

2. The BGP neighbor table identifies a router as a BGP peer and maps its IP address to a specific AS. To add an entry to the BGP neighbor table, use the **neighbor remote-as** command.

```
RDN(config-bgp)#neighbor {<ip-address> | <peer-group-name>}  
remote-as <n>
```

where:

*ip-address* is the IP address of the neighbor.

*peer-group-name* is the name of the BGP peer group.

*n* is the AS to which the neighbor belongs from 1 to 65535.

3. To advertise networks to BGP peers in the AS and specify networks where the AS originates, use the **network** command in Router BGP Configuration mode, as shown in the following example:

```
RDN(config-bgp)#network <network-number> [<mask network mask> |  
<network-mask>]
```

where:



*network-number* is the network that BGP advertises.

*mask* is the BGP network or subnetwork mask.

*network-mask* is the BGP network mask address.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure the CMTS

Follow these steps to pre-qualify the DOCSIS network and configure the commands necessary to provide CM communication with the CMTS and DHCP server:

1. The cable helper-address function is used to disassemble a cable modem's DHCP broadcast packet, and reassemble the DHCP broadcast packet into a unicast packet so that the packet can traverse through the router and communicate with the DHCP server.

To configure the helper IP address for the cable modems (CMs) to forward only UDP broadcasts, use the **cable helper-address cable-modem** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#cable helper-address <ip-address> cable-modem
```

where:

*ip-address* is the IP address of the destination DHCP server.

To configure the helper IP address for the Customer Premises Equipment (CPE) to forward only UDP broadcasts, use the **cable helper-address host** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#cable helper-address <ip-address> host
```

where:

*ip-address* is the IP address of the destination DHCP server.

2. To allow the broadcast DHCP MAC discovery packets to be gathered from a CM or CPE and redirect the packets to their corresponding DHCP server so that a CM or CPE can obtain an IP address, use the **ip dhcp relay information option** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#ip dhcp relay information option
```

3. The default authentication parameters are enabled, but have a *null* value by default. Authentication parameters need to be set on the CMTS and the CMs to ensure security on the HFC network. To activate authentication on the CMTS so all CMs return a known text string to register with the CMTS for network access, use the **cable shared-secret** command in Interface Configuration mode, as shown in the following example:



**Caution:** Ensure that the authentication string or hexadecimal key in the CM configuration file matches the authentication string or hexadecimal key configured on the CMTS. CMs cannot register with the CMTS if authentication parameters do not match.

```
RDN(config-if)#cable shared-secret [n] [<“authentication string”> | <0xkey>]
```

where:

*n* is the number of the shared secret.

“*authentication string*” is an alpha-numeric text string specified in double quotes.

*0xkey* is a key specified in hexadecimal notation.

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Configure the Downstream Port

Follow these steps to configure the required downstream port settings:

1. To set the fixed downstream center frequency, use the **cable downstream frequency** command in Interface Configuration mode, as shown below:

```
RDN(config-if)#cable downstream 0 frequency {88000000-857000000}
```



**Note:** The digital carrier frequency cannot be the same as the video carrier frequency.

2. To set the downstream modulation rate, use the **cable downstream modulation** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#cable downstream 0 modulation [64 | 256]
```

where:

64 is 64 QAM.

256 is 256 QAM.

3. The MPEG framing format must be compatible with the downstream symbol rate. Review local standards and specifications to determine the correct value. To set the downstream MPEG framing format, use the **cable downstream annex** command in Interface Configuration mode:

```
RDN#cable downstream 0 annex [A / B]
```

where:

A is the European DOCSIS MPEG framing format.

B is the North America DOCSIS MPEG framing format.



**Note:** The CMs connected to the downstream port must be set to the same MPEG framing format as the BSR CMTS interface.

- The downstream port is in a shut-down state by default. To enable the downstream port, use the **no cable downstream shutdown** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#no cable downstream shutdown
```

If you need additional instructions, refer to the following documents:

- BSR Configuration and Management Guide*
- BSR 64000 Command Reference Guide*

## Configure the Upstream Ports

Follow these steps to configure the required upstream port settings:

- The RF output upstream frequency must comply with the expected CM input frequency. Set the RF output upstream frequency by entering a fixed frequency for the upstream port.



**Note:** Make sure that the upstream frequency selected does not interfere with the frequencies used for any other upstream applications running in the cable plant.

To set the upstream frequency for the upstream port, use the **cable upstream frequency** command in Interface Configuration mode, as shown below:

```
RDN(config-if)#cable upstream {0-3} frequency {5000000-42000000}
```

- To set the upstream channel width in Hertz, use the **upstream channel width** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#cable upstream {0-3} channel-width [200000 | 400000 | 800000 | 1600000 | 3200000]
```

- To apply an existing upstream modulation profile to an upstream port, use the **cable upstream modulation-profile** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#cable upstream {0 - 3} modulation-profile {1 - 16}
```

4. The upstream ports are in a shut-down state by default. To enable the upstream ports, use the **no cable upstream shutdown** command in Interface Configuration mode, as shown in the following example:

```
RDN(config-if)#no cable upstream shutdown
```

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

## Save the Configuration

Follow these steps to save the current running configuration:

1. To copy the current system configuration to the system startup configuration, use the **copy running-config startup-config** command in Privileged EXEC mode, as shown in the following example:

```
RDN#copy running-config startup-config
```

2. Reboot the BSR.
3. To verify that changes were implemented, use the **show running-config** command in Privileged EXEC mode as shown in the following example:

```
RDN#show running-config
```

Refer to the following documents for additional instructions:

- *BSR 64000 Configuration and Management Guide*
- *BSR 64000 Command Reference Guide*

