5 MANAGING SOFTWARE

This chapter describes how to perform operations regarding RS 3000 operating software and bootPROM images software. The following topics are covered:

- Upgrading the system image software
- Upgrading the Boot PROM image software
- Loading RS 3000 software from a TFTP server
- Loading RS 3000 software from a BootP/TFTP server

5.1 UPGRADING SYSTEM IMAGE SOFTWARE

To upgrade the system software and boot using the upgraded image, perform the following procedure.

1. Display the current boot settings by using the **`system show version`** command. Note the current **`Image Boot Location`**.

   Here is an example:

```
rs# system show version
Software Information
  Software Version   : 8.0
  Copyright          : Copyright (c) 2000-2001 Riverstone Networks, Inc.
  Image Information  : ros8000, built on Mon Jan 25 14:10:21 2000
  Image Boot Location: file:/pc-flash/boot/img/ros80000
  Boot Prom Version  : prom-2.0.0.5
```

   In the example above, the location "**`pc-flash`**" indicates that the RS 3000 is set to use the factory-installed software on its internal flash memory.

2. Copy the upgrade system software onto a TFTP server that the RS 3000 can access. (Use the **`ping`** command to verify that the RS 3000 can reach the TFTP server.)

Note If the TFTP server is one or more hops away from the RS 3000, add a route to the TFTP server's network using the **`ip add route`** command.

3. Enter the following command to copy the software upgrade onto the RS 3000's internal flash memory:

```
system image add <IPaddr-of-TFTP-host> <image-file-name>
```

Note The <*image-file-name*> is the full directory path and filename to the image software file on the TFTP server.

Here is an example:

```
rs# system image add 134.152.178.5 tftpboot/ros8100
Downloading image 'tftpboot/ros8100' from host '134.152.178.5'
 to local image ros8100 (takes a while) . . .
 download: done
 save:
kernel: 100%
done
Image checksum validated.
%SYS-I-BOOTADDED, Image 'ros8100' added.
```

4. Enter the **system image list** command to list the images on the internal flash memory and verify that the new image is present.

   Here is an example:

```
rs# system image list
Images currently available on Master CM
slot0:
ros8100 (version 8.1.0.0)
ros8000 (version 8.0.0.0)  [selected for next boot]
```

5. Use the **system image choose** command to select the image file that the RS 3000 will use when rebooted.

   Here is an example:

```
rs# system image choose ros8100
Found image in slot0
Making image ros8100 (version 8.1.0.0) the active image
for next reboot on Master CM . . .
%SYS-I-CHS_PRIMARY_OK, image successfully chosen on Primary CM
rs#
```

6. Use the **system image list** command to verify the change.

Note You do not need to activate this change.

7. Reboot the RS 3000 to load and run the new system software image.

5.2 UPGRADING BOOT PROM SOFTWARE

The RS 3000 boots using the boot PROM image software installed on the motherboard's internal memory. To upgrade the boot PROM image, use the following procedure.

1. Display the current boot settings by entering the **`system show version`** command. Note the current **`Boot Prom Image`** version.

   Here is an example:

```
rs# system show version
Software Information
  Software Version   : 8.0
  Copyright          : Copyright (c) 1996-2000 Riverstone Networks, Inc.
  Image Information  : ros8000, built on Mon Jan 25 14:10:21 2000
  Image Boot Location: file:/pc-flash/boot/img/ros8000
  Boot Prom Version  : prom-2.0.0.5
```

2. Copy the upgrade boot PROM image software onto a TFTP server that the RS 3000 can access. (Use the **`ping`** command to verify that the RS 3000 can reach the TFTP server.)

Note If the TFTP server is one or more hops away from the RS 3000, add a route to the TFTP server's network using the **`ip add route`** command.

3. Enter the following command to copy the bootPROM upgrade onto the RS 3000's internal memory:

```
system promimage upgrade <IPaddr-of-TFTP-host> <image-file-name>
```

Note The <*image-file-name*> is the full directory path and filename to the bootPROM image file on the TFTP server.

Here is an example:

```
rs# system promimage upgrade 134.152.178.5 tftpboot/prom-211
Downloading image 'tftpboot/prom-211' from host '134.152.178.5'
image is a prom upgrade to version 'prom-2.0.1.1'
tftp complete
checksum valid. Ready to program.
Active-CM: flash found
Active-CM: erasing...
Active-CM: programming...
Active-CM: verifying...
Active-CM: programming successful.
Active-CM: Programming complete.
rs#
```

4. Reboot the RS 3000.
5. Enter the **`system show version`** command to verify that the new boot PROM software is in the internal memory of the RS 3000's motherboard.

5.3 LOADING SOFTWARE FROM THE NETWORK

Typically, the RS 3000 loads its operating software from the flash memory contained on the motherboard. Alternately, the RS 3000 can be configured to ignore its internal flash image and obtain its software from a network server. The RS 3000 can obtain its image software from either a TFTP or BootP/TFTP server.

5.3.1 Loading Image Software from a TFTP Server

Perform the following procedure to configure the RS 3000 to load its image software from a TFTP server:

1. Copy the image software onto a TFTP server that the RS 3000 can access.
2. Reboot the RS 3000 and enter Boot mode by pressing the "Esc" key to interrupt the normal boot process.
3. At the Boot prompt, enter the **`set`** command to view the current bootPROM variable values.

   Here is an example:

```
 re-boot> set

...tty1 = 9600
bootdiagmode = off         [off on quick mfg-test]
  diag_log =
mfg_loop_by = time        [time count]
mfg_loop_max = 86400
 bootdelay = 2
promsetaddrs = 1
flow_control = on          [off on]
bootptimeout = 5
   netaddr = 0.0.0.0
  autoboot = boot
   netmask = 0,0,0,0
   gateway = 0.0.0.0
bootsource = /pc-flash/boot/ros80
  bootaddr = 0.0.0.0
   ethaddr = 00:00:1d:12:34:56
sysid = -1
rs-boot>
```

4. Notice in the example above that `netaddr`, `netmask`, and `gateway` have the value **`0.0.0.0`**, and that **`bootsource = /pc-flash/boot/ros80`**.
5. From the Boot prompt, use the **`set`** command to set the following:

- IP address of the RS 3000 – (**`netaddr`**)
- Subnet mask for the RS 3000 – (**`netmask`**)
- The IP address of the RS 3000's default gateway – (**`gateway`**)
- Full path and filename to the software image on the TFTP server – (**`bootsource`**)
- IP address of the TFTP server – (**`bootaddr`**)

```
rs-boot> set netaddr <IPaddr>
rs-boot> set netmask <subnet-mask>
rs-boot> set gateway <IPaddr>
rs-boot> set bootsource <dir-filename>
rs-root> set bootaddr <IPaddr>
```

Here is an example:

```
rs-boot> set netaddr 134.152.179.132
rs-boot> set netmask 255.255.255.224
rs-boot> set gateway 134.152.179.129
rs-boot> set bootsource /tftpboot/ros80
rs-boot> set bootaddr 134.152.176.5
```

6. Enter the **set** command to view the changes:

   Here is an example:

```
 rs-boot> set
...
   netaddr = 134.152.179.132
  autoboot = boot
   netmask = 255.255.255.224
   gateway = 134.152.179.129
bootsource = /tftpboot/ros80
  bootaddr = 134.152.176.5
   ethaddr = 00:00:1d:12:34:56
sysid = -1
rs-boot>
```

7. From the Boot prompt, use the **ping** command to verify that the RS 3000 can reach the TFTP server.
8. Reboot the RS 3000. As the RS 3000 initializes, it ignores the software image on the internal flash and retrieves its operating software from the TFTP server at **134.152.176.5**:

   Here is an example:

```
rs-boot> boot

Rebooting. . .

. . .source: tftp://134.152.176.5/tftpboot/ros80

  Build location: host 'matrix' by 'adm'...

  Version: 8.0.0.0 . . .
```

5.3.2 Loading Image Software from a BootP/TFTP Server

The RS 3000 contains a BootP client and can be configured to obtain its image software from a BootP/TFTP server. Using the BootP client allows the RS 3000 to obtain its software network address from the server using only its MAC address. This eliminates the need to initially configure the RS's IP address, subnet mask, and boot source.

To configure the RS 3000 to use its BootP client to obtain its image software, perform the following procedure:

1. Load the RS 3000's image software on a BootP/TFTP server that can be reached by the RS 3000.
2. Boot the RS 3000 and enter Boot mode by interrupting the normal startup sequence by pressing the "Esc" key.
3. Use the **set** command to obtain the RS 3000's MAC address.

   Here is an example:

```
 re-boot> set

...tty1 = 9600
bootdiagmode = off         [off on quick mfg-test]
  diag_log =
mfg_loop_by = time        [time count]
mfg_loop_max = 86400
 bootdelay = 2
promsetaddrs = 1
flow_control = on          [off on]
bootptimeout = 5
   netaddr = 0.0.0.0
  autoboot = boot
   netmask = 0,0,0,0
   gateway = 0.0.0.0
bootsource = /pc-flash/boot/ros80
  bootaddr = 0.0.0.0
   ethaddr = 00:00:1d:12:34:56   < MAC address >
sysid = -1
rs-boot>
```

4. Use the **set** command to change the value of **autoboot** to **bootp**.

   Here is an example:

```
rs-boot> set autoboot bootp
```

5. Configure the BootP/TFTP server with the RS 3000's MAC address, an appropriate IP address, and the location of the RS 3000 software image file. Additionally, make sure that the ARP cache of the BootP/TFTP server is set correctly for the RS 3000.

6. Reboot the RS 3000 by entering the **reboot** command at the Boot prompt.

   Here is an example:

```
rs-boot> reboot

Ethernet Base address = 00:00:1d:12:34:56
Ethernet CPU address  = 00:00:1d:12:34:57

Performing Bootp with timeout in 5 seconds.
** plen = 300  plen - sizeof(struct bootp) = 0
BOOTPD='134.141.179.134'
netaddr='134.141.179.132'
* bootp source is C:\TFTPBOOT\ROS80
Booting boot file C:\TFTPBOOT\ROS80.
source: tftp://134.141.179.134/C:\TFTPBOOT\ROS80
 File: version (703 bytes)
  Build location: host 'matrix' by 'adm'
  Version: 8.0.0.0
  Build date: Mon Dec 25 23:56:47 2000
 File: kernel (3568593 bytes)
  Loading kernel (base 0x80001000, size 50528)
(base 0x8000d560, size 3507312)
  100% - kernel loaded...
...
...
Press RETURN to activate console . . .
```

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FIRMWARE/BOOTPROM COMPATIBILITY NOTE

This document describes the initial system firmware and the minimum recommended firmware versions required for each RS module. Please visit the Riverstone Networks website (http://www.riverstonenet.com/) for information on obtaining RS firmware and boot-prom code.

Part	Description	Initial Firmware Version	Recommended Firmware Version
AIC-21	RS 1 Port OC-3 ATM MMF Interface Card for G3M-A03BM-02, G8M-A03BM-02 and R38-A03DM-04; SC connectors	3.1.0.0	9.1.2.7
AIC-29IR	RS 1 Port OC-3 ATM SMF-IR Interface Card for G3M-A03BM-02, G8M-A03BM-02 and R38-A03DM-04; SC connectors	3.1.0.0	9.1.2.7
AIC-67	RS 1 Port DS3 ATM Interface Card for G3M-A03BM-02, G8M-A03BM-02 and R38-A03DM-04; BNC Connectors	3.1.0.0	9.1.2.7
AIC-77	RS 1 Port E3 ATM Interface Card for G3M-A03BM-02, G8M-A03BM-02 and R38-A03DM-04; BNC Connectors	3.1.0.0	9.1.2.7
E10-170B	ES 10170 Base Chassis, Includes RapidOS and 32 MB PCMCIA card	9.3.0.0	9.3.0.4
E10-AC	ES 10170 AC POWER SUPPLY	9.3.0.0	9.3.0.4
E10-DC	ES 10170 DC POWER SUPPLY	9.3.0.0	9.3.0.4
E10-CM4	ES 10170 Control Module 4 (w/ 256 MB of memory) with 4 Ports 5th Generation GbE (Requires SFPGE-##)	9.3.0.0	9.3.0.4
E10-FED-64	ES 10170 64 Port 4th Generation 10/100 Ethernet Linecard with mini-RJ21 connectors (Requires E10-FC## cable)	9.3.0.0	9.3.0.4
E10-GEF-08	ES 10170 8 Port 5th Generation GbE Linecard (Requires SFPGE-##)	9.3.0.0	9.3.0.4
E10-WDEB-02	ES 10170 2 Ports 4th Generation GbE WDM Linecard (4 GbE on each Port)	9.3.0.0	9.3.0.4
G10-B128	RS1000 Base Unit with 128 MB memory and single AC power supply, Includes RapidOS	6.3.0.0	9.1.2.7
G10-B128-DC	RS1000 Base unit with 128MB memory and single DC Power supply, Includes RapidOS	6.3.0.0	9.1.2.7
G11-B256	RS1100 Base Unit with 256 MB memory and redundant AC power supplies, Includes RapidOS	9.4.0.0	9.4.0.2
G11-B256-DC	RS1100 Base unit with 256MB memory and redundant DC Power supplies, Includes RapidOS	9.4.0.0	9.4.0.2
G20-B128	RS 2000 Base with 16 10/100 Base-TX ports (w 128 M mem)	3.1.0.0	8.0.3.13[1]
G21-B	RS 2100 Switch Router with 8 1000Base-SX ports	2.2.0.1	8.0.3.13[1]
G2M-DE1BM-04	RS 1x00/3x00 (4 Ports T1/E1or 2 Ports DS3/E3) Base Module Requires WIC-## Module (max 2 per card)	6.2.0.0	9.1.2.7
G2M-GLHA8-01	One port 70 Km 1000Base-LH module MB for RS 2000	2.0.0.0	8.0.3.13[1]
G2M-GLXA9-02	RS 2000 2-port 1000Base-LX Expansion Module	1.2.0.0	8.0.3.13[1]
G2M-GSXA1-02	RS 2000 2-port 1000 Base-SX Expansion Module	1.2.0.0	8.0.3.13[1]
G2M-HFXA4-08	8-port 100 Base-FX module with MT-RJ fiber connectors for RS 2000	2.1.0.1	8.0.3.13[1]
G2M-HSIAC-02	RS 2000 2 port HSSI Module	2.1.0.0	8.0.3.13[1]
G2M-HTXA2-08	RS 2000 8-port 10/100 Base-TX Expansion Module	1.2.0.0	8.0.3.13[1]
G2M-SCEAC-04	Quad port Serial module with compression and encryption for RS 2000	2.1.0.0	9.1.2.7
G2M-SECAC-04	RS 1x00/3x00 4 Port Serial Module with compression (Requires SYS-S530-DTE)	2.1.0.0	9.1.2.7
G2M-SERAC-02	Dual port Serial module for RS 2000 (No compression or encryption)	2.1.0.0	9.1.2.7
G30-B128	RS3000 Base unit with 128 MB, 32 Ports 3rd Generation 10/100 BaseTX, 2 expansion slots with redundant AC power supplies, Includes RapidOS	6.0.0.0	9.1.2.7

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G30-B128-DC	RS3000 Base unit with 128 MB, 32 Ports 3rd Generation 10/100 BaseTX, 2 expansion slots with redundant DC power supplies, Includes RapidOS	6.0.0.0	9.1.2.7
G30-B256	RS3000 Base unit with 256 MB, 32 Ports 3rd Generation 10/100 BaseTX, 2 expansion slots with redundant AC power supplies, Includes RapidOS	6.3.0.0	9.1.2.7
G31-B256	RS3100 Base unit with 256 MB, 32 Ports 5th Generation 10/100BaseTX, 2 expansion slots with redundant AC power supplies, Includes RapidOS	9.4.0.0	9.4.0.2
G31-B256-DC	RS3100 Base unit with 256 MB, 32 Ports 5th Generation 10/100BaseTX, 2 expansion slots with redundant DC power supplies, Includes RapidOS	9.4.0.0	9.4.0.2
G32-B256	RS3200 Base unit with 256 MB, 32 Ports 5th Generation 100 Base-FX, 2 expansion slots with redundant AC power supplies (Requires SFPFX-## or SFPBX-##), Includes RapidOS	9.4.0.0	9.4.0.2
G32-B256-DC	RS3200 Base unit with 256 MB, 32 Ports 5th Generation 100 Base-FX, 2 expansion slots with redundant DC power supplies (Requires SFPFX-## or SFPBX-##), Includes RapidOS	9.4.0.0	9.4.0.2
G3M-A03BM-02	RS 1x00/3x00 2 Port ATM DS3/E3/OC3/STM1 Base Module; Requires AIC-## (max 2 per card)	6.0.0.0	9.1.2.7
G3M-GBCDM-02	RS 1x00/3x00 2 Port 4th Generation GbE Module (Requires GIC-##)	9.0.0.0	9.1.2.7
G3M-GBCFM-02	RS 1x00/3x00 2 Port 5th Generation GbE Module (Requires GIC-##)	9.1.0.0	9.1.2.7
G3M-GBCMM-02	RS 1x00/3x00 2 Port 4th Generation MPLS GbE Module (Requires GIC-##)	8.0.0.0	9.1.2.7
G3M-GTSOM-02	RS 1x00/3x00 2 Port 5th Generation GbE MPLS Advanced Services Module (ASM) Linecard (Requires GIC-##)	9.4.0.0	9.4.0.2
G3M-GLHB9-02	RS 3000 2-port 1000 Base-LH Expansion Module (70KM)	6.0.0.0	9.1.2.7[1]
G3M-GLXB9-02	RS 3000 2-port 1000 Base-LX Expansion Module	6.0.0.0	9.1.2.7[1]
G3M-GSXB1-02	RS 3000 2-port 1000Base-SX Expansion Module	6.0.0.0	9.1.2.7[1]
G3M-HFXFM-16	RS 1x00/3x00 16-Port 100 Base-FX 5th Generation Fast Ethernet Module (Requires SFPFX-## or SFPBX-##)	9.3.0.2	9.3.0.4
G3M-HTXB2-16	RS 1x00/3x00 16-Port 10/100 Base-TX 3rd Generation Fast Ethernet Module	6.0.0.0	9.1.2.7
G3M-HTXF2-16	RS 1x00/3x00 16-Port 10/100 Base-TX 5th Generation Fast Ethernet Module	9.3.0.2	9.3.0.4
G3M-P03MM-02	RS 1x00/3x00 2 Port POS MPLS OC3/STM1 (Requires SFP03-##)	9.3.0.2	9.3.0.4
G80-CHS	RS 8000 8 slot Base system, including chassis, backplane and modular fan	1.0.0.0	9.1.2.7
G86-CHS	RS 8600 16 slot Base unit, chassis, switch fabric, backplane and modular fan	1.2.0.0	9.1.2.7
G86-SWF	RS 8600 Switch fabric Module. Order only if second is required for redundancy.	1.2.0.0	9.1.2.7
G8M-A03BM-02	RS 8x00 2 Port ATM DS3/E3/OC3/STM1 Base Module; Requires AIC-## (max 2 per card)	3.1.0.0	9.1.2.7
G8M-A12B1-02	RS 8x00 1+1 Port ATM OC-12c MMF Module	6.1.1.0	9.1.2.7
G8M-A12B9-02	RS 8x00 1 + 1 OC-12c/STM-4 ATM SMF-IR Module	6.1.1.0	9.1.2.7
G8M-CM2-128	RS 8x00 Control Module 2 with 128 MB memory	1.1.0.0	9.1.2.7[3]
G8M-CM3-256	RS 8x00 Control Module 3 with 256 MB memory	6.0.0.0	9.1.2.7
G8M-CM5-512	RS 8X00 Control Module 5 with 512MB memory	9.3.0.0	9.3.0.4
G8M-CT3BB-02	RS 8x00 2 Ports Channelized DS3 Line Card	6.3.0.0	9.1.2.7
G8M-DE1BM-04	RS 8x00 (4 Ports T1/E1, 2 Ports DS3/E3) Base Module Requires WIC-## Module (max 2 per card)	6.2.0.0	9.1.2.7
G8M-GBCDM-	RS 8X00 2 Port 4th Generation GbE Module (Requires GIC-##)	9.0.0.0	9.1.2.7

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02			
G8M-GBCFM-02	RS 8X00 2 Port 5th Generation GbE Module (Requires GIC-##)	9.1.0.0	9.1.2.7
G8M-GBCMM-02	RS 8X00 2 Port 4th Generation GbE MPLS Module (Requires GIC-##)	8.0.0.0	9.1.2.7
G8M-GTSOM-02	RS 8x00 2 Port 5th Generation GbE MPLS Advanced Services Module (ASM) (Requires GIC-##)	9.4.0.0	9.4.0.2
G8M-GLHA8-01	One port 70 Km 1000 Base-LH module with 16 MB for RS 8x00	2.0.0.0	9.1.2.7[1]
G8M-GLHB8-02	2-port 1000 Base-LH Module (SCLX for MMF / SMF) [T-Series]	3.1.0.0	9.1.2.7[1]
G8M-GLXB9-02	2-port 1000 Base-LX Module (SCLX for MMF or SMF) [T-Series]	3.1.0.0	9.1.2.7[1]
G8M-GSXB1-02	2-port 1000 Base-SX Module (SCSX for MMF Only) [T-Series]	3.1.0.0	9.1.2.7[1]
G8M-GTXB2-02	RS 8x00 2 Port 1000 Base-T Module (w HRT/HRL supPort)	3.1.0.0	9.1.2.7
G8M-HFXA1-08	8-port 100 Base-FX MMF module with 16 MB	1.0.0.0	8.0.3.13[1]
G8M-HFXFM-16	RS 8x00 16-Port 100 Base-FX 5th Generation Fast Ethernet Module (Requires SFPFX-## or SFPBX-##)	9.3.0.2	9.3.0.4
G8M-HSIAC-02	Dual port HSSI module for RS 8x00	2.1.0.0	8.0.3.13[1]
G8M-HTXA2-08	8-Port 10/100 Base-TX Module (Cat 5 RJ-45) with 16 MB	1.0.1.0	9.1.2.7[1]
G8M-HTXB2-16	RS 8x00 16-Port 100 Base-TX 3rd Generation Fast Ethernet Module	3.1.0.0	9.1.2.7
G8M-HTXF2-16	RS 8x00 16-Port 100 Base-TX 5th Generation Fast Ethernet Module	9.3.0.2	9.3.0.4
G8M-P03B1-04	4-port OC-3c/STM-1 Packet over SONET/SDH MMF module [T-Series]	3.1.0.0	9.1.2.7
G8M-P03B9-04	4-port OC-3c/STM-1 Packet over SONET/SDH SMF module [T-Series]	3.1.0.0	9.1.2.7
G8M-P03MM-02	RS 8x00 2 Port MPLS POS OC3/STM-1 (Requires SFP03-##)	9.1.2.1	9.1.2.7
G8M-P12B1-02	2-port OC-12c/STM-4 Packet over SONET/SDH MMF module [T-Series]	3.1.0.0	9.1.2.7[1]
G8M-P12B9-02	2-port OC-12c/STM-4 Packet over SONET/SDH SMF module [T-Series]	3.1.0.0	9.1.2.7[1]
G8M-P12MM-02	RS 8X00 2 Port MPLS POS OC12/STM-4 (Requires SFP12-##)	9.1.2.1	9.1.2.7
G8M-S48DM-01	RS 8x00 1 Port OC-48/STM-16 SRP (Requires SFP48-##)	9.1.0.0	9.1.0.02
G8M-SRP-MATE	RS 8x00 SRP bridge Module (one required for every two G8M-S48DM-01)	N/A	N/A
G8M-SCEAC-04	Quad port Serial module with compression and encryption for RS 8x00	2.1.0.0	9.1.2.7[1]
G8M-SECAC-04	RS 8x00 4 Port Serial Module with compression (Requires SYS-S530-DTE)	2.1.0.0	9.1.2.7
IA 1100	Internet Appliance with 24 10/100 ports and 2 1000 SX ports	3.1.0.0	7.0.2.7[4]
IA 1200	Internet Appliance with 8 1000 SX ports	3.1.0.0	7.0.2.7[4]
R16-CHS	RS 16000 8 slot chassis with modular fans, 1 switching fabric and backplane	9.0.0.0	9.1.2.7
R16-CM4EF-12	Control module with 512 MB memory, 1 RJ-45 10/100, 12 10/100 ports through a telco adapter	9.0.0.0	9.1.2.7
R16-CM4EG-04	Control module with 512 MB memory, 1 RJ-45 10/100 port, and 4 non-MPLS GbE ports	9.0.0.0	9.1.2.7
R16-GSFEM-08	8-slot non-MPLS GbE Base Card (requires SFP)	9.0.0.0	9.1.2.7
R16-GSFFM-08	8-slot non-MPLS GbE Base Card (requires SFP)	9.3.0.0	9.3.0.4
R16-HTXD7-64	64 port 10/100 BaseTX card with mini RJ-21 connectors	9.3.0.0	9.3.0.4
R16-WDME8B-02	R16-WDME8B-02 Bi-directional CWDM module	9.0.0.0	9.3.0.4

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Part	Description	Initial Firmware Version	Recommended Firmware Version
R32-CHS	RS 32000 Chassis	6.0.0.0	8.0.3.13[1]
R32-CM3-256	RS 32000 Control Module	6.0.0.0	8.0.3.13[1]
R32-CT3BB-04	RS 32000 4 Port Channelized T3 card	6.0.0.0	8.0.3.13[1]
R32-GBCCM-04	RS 32000, 4 Port Gigabit Ethernet with four GBIC bays	6.0.0.0	8.0.3.13[1]
R32-GBCCM-08	RS 32000, 8 Port Gigabit Ethernet with eight GBIC bays	6.0.0.0	8.0.3.13[1]
R32-HTXC2-24	RS 32000, 24 Port Fast Ethernet	6.0.0.0	8.0.3.13[1]
R32-HTXC3-32	RS 32000, 32 Port Fast Ethernet	6.0.0.0	8.0.3.13[1]
R32-HTXD2-24	RS 32000, 24 Port Fast Ethernet	6.0.0.0	8.0.3.13[1]
R32-HTXD3-32	RS 32000, 32 Port Fast Ethernet	6.0.0.0	8.0.3.13[1]
R32-SWF	RS 32000 Switch Fabric	6.0.0.0	8.0.3.13[1]
R38-A03DM-04	RS38000 4 Port ATM DS3/E3/OC3/STM1 Base Module; Requires AIC-## (Max 4 per card)	9.0.0.0	9.1.2.7
R38-A12DM-04	RS 38000 4 Port ATM OC-12/STM4 Module (Requires SFP12-##)	9.2.0.0	9.3.0.4
R38-CHS	RS 38000 Chassis	7.0.0.0	9.1.2.7
R38-CHS-RSF	RS 38000 Base Chassis with Redundant Switch Fabric Modules	7.0.0.0	9.1.2.7
R38-CM4-256	RS 38000 Control Module 4 with 256 MB of memory	7.0.0.0	9.1.2.7
R38-CT3DB-04	RS 38000 4 Ports channelized T3 line card	8.0.0.0	9.1.2.7
R38-GBCDM-04	RS38000 4 Ports 4th Generation GbE Module (Requires GIC-##)	7.0.0.0	9.1.2.7
R38-GBCDM-08	RS38000 8 Ports 4th Generation GbE Module (Requires GIC-##)	7.0.0.0	9.1.2.7
R38-GBCFM-04	RS38000 4 Ports 5th Generation GbE Module (Requires GIC-##)	9.1.0.0	9.1.2.7
R38-GBCFM-08	RS38000 8 Ports 5th Generation GbE Module (Requires GIC-##)	9.1.0.0	9.1.2.7
R38-GBCMM-04	RS 38000 4 Port 4th Generation GbE MPLS Module (Requires GIC-##)	8.0.0.0	9.1.2.7
R38-HTXD2-24	RS 38000 24 Port 100 BaseTX 4th Generation Fast Ethernet Module; RJ-45 Connectors	7.0.0.0	9.1.2.7
R38-HTXD3-32	RS 38000 32 Port 100 BaseTX 4th Generation Fast Ethernet Module; RJ21 Telco Connectors	7.0.0.0	9.1.2.7
R38-HTXF2-24	RS 38000 24 Port 100 BaseTX 5th Generation Fast Ethernet Module; RJ-45 Connectors	9.3.0.2	9.3.0.4
R38-P03MM-04	RS 38000 4 Port OC-3/STM-1 POS MPLS Module (Requires SFP03-##)	9.3.0.2	9.3.0.4
R38-P12MM-04	RS 38000 4 Port OC-12/STM-4 POS MPLS Module (Requires SFP12-##)	9.1.2.1	9.1.2.7
R38-P48EM-01	RS 38000,OC48,1 Port,NON-MPLS,WIRE RATE,Module; NEEDS SFP48-##	9.1.2.1	9.1.2.7
R38-P48MM-01	RS 38000 1 Port OC-48/STM-1 POS MPLS Module (Requires SFP48-##)	9.3.0.2	9.3.0.4
R38-SWF	RS 38000 Switch Fabric Module	7.0.0.0	9.1.2.7
R38-WDMD9-01	RS 38000 1 Port 4th Generation GbE WDM Linecard	7.0.0.0	9.1.2.7
GIC-11	GbE GBIC, MMF, 850nm, Typical Reach: 550 meters	9.0.0.0	9.1.2.7
GIC-12	GbE GBIC, 1000BaseT; RJ45 connector	9.4.0.0	9.4.0.2
GIC-18	GbE GBIC, SMF, 1550nm, Typical Reach: 70 km	9.0.0.0	9.1.2.7
GIC-19	GbE GBIC, SMF, 1310nm, Typical Reach: 10 km	9.0.0.0	9.1.2.7
SFP03-09	SFP,OC-3,IR,1310nm, Typical Reach: 15 km	9.1.2.1	9.1.2.7
SFP12-09	SFP,OC-12,IR,1310nm, Typical Reach: 15 km	9.1.2.1	9.1.2.7
SFP48-01	SFP,OC-48,SR,1310nm, Typpical Reach: 2 km	9.1.2.1	9.1.2.7
SFP48-05	SFP,OC-48,LR-1,1310nm, Typical Reach: 40 km	9.1.2.1	9.1.2.7
SFP48-07	SFP,OC-48,LR-2,1550nm, Typical Reach: 80 km	9.1.2.1	9.1.2.7

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SFP48-09	SFP,OC-48,IR-1,1310nm, Typical Reach: 15 km	9.1.2.1	9.1.2.7
SFPFX-01	SFP,100BaseFX, SMF, 1310nm, Typical Reach: 2 KM	9.3.0.0	9.3.0.4
SFPFX-09	SFP,100BaseFX, SMF, 1310nm, Typical Reach: 15KM	9.3.0.0	9.3.0.4
SFPGE-11/SFP-SX	GbE SFP, MMF 850nm, Typical Reach: 550 m	6.0.0.0	9.1.2.7
SFPGE-18/SFP-LH	GbE SFP, SMF 1550nm, Typical Reach: 70 km	6.0.0.0	9.1.2.7
SFPGE-19/SFP-LX	GbE SFP, SMF 1310nm, Typical Reach: 10 km	6.0.0.0	9.1.2.7
WICE1-12	RS 1x00/3x00/8x00, 2 Ports E1 WAN Interface card for G2M-DE1BM-04 and G8M-DE1BM-04	6.2.0.0	9.1.2.7
WICE3-1B	RS 1x00/3x00/8x00 1 Port E3 WAN Interface Card for G2M-DE1BM-04 and G8M-DE1BM-04	8.0.0.0	9.1.2.7
WICT1-12	RS 1x00/3x00/8x00, 2 Ports T1 WAN Interface card for G2M-DE1BM-04 and G8M-DE1BM-04	6.2.0.0	9.1.2.7
WICT3-1B	RS 1x00/3x00/8x00 1 Port DS3 WAN Interface Card for G2M-DE1BM-04 and G8M-DE1BM-04	8.0.0.0	9.1.2.7
SYS-PCM32	RS 8X00 AND 38000 32MB PCMCIA CARD (REQUIRED FOR REDUNDANT CM CONFIGURATION)	9.0.0.0	9.1.2.7
SYS-PCM16	RS 8x00 AND 38000 16MB PCMCIA CARD (REQUIRED FOR REDUNDANT CM CONFIGURATION)	8.0.0.0	9.1.2.7
SYS-MEM128	RS 8x00 CM2 memory upgrade kit; Upgrades memory from 128MB to 256MB	6.0.0.0	9.1.2.7
SYS-MEM256-D	RS 8x00 CM3 and 38000 CM4 256MB Control Module memory upgrade (single piece of 256MB).	7.0.0.0	9.1.2.7
SYS-MEM256-S	RS 1x00/3x00 System memory 256MB	6.0.0.0	9.1.2.7
SYS-MEM512	RS 8x00 CM5 memory upgrade kit; Upgrades memory from 512MB to 768MB	9.3.0.0	9.3.0.4

The following table provides the recommended boot-prom versions to use with the specified firmware releases:

Firmware Release	RS1100/ RS3100/RS3200	RS1000/ RS3000	RS800/ RS8600 With CM3	RS8000/ RS8600 With CM5	RS16000	ES10170	RS38000
8.0.3.13	N/A	2.0.1.3	2.0.1.3	N/A	2.0.1.3	N/A	2.0.1.3
9.1.2.7	N/A	2.0.1.4	2.0.1.4	N/A	2.0.1.4	N/A	2.0.1.8
9.3.0.4	N/A	2.0.1.4	2.0.1.4	2.0.1.8	2.0.1.4	2.0.1.4	2.0.1.8
9.4.0.2	2.0.1.5	2.0.1.4	2.0.1.4	2.0.1.8	2.0.1.4	2.0.1.4	2.0.1.8

1 These part-numbers are in End Of Life state. The recommended release is also the last release train in which these products will be supported. While additional patch releases may be made available for the same release train, major releases after the indicated release will not support these part-numbers.
2 This part-number is supported on a special build 9.1.0.0-SA5.
3 This part number is in End Of Life state. The last release train in which this product will be supported is 9.3.0.x
4 This part numbers as well as the software release train are in End of Life State