ROM Monitor

Note The information herein applies to the Cisco AS5350, Cisco AS5400, and Cisco AS5400HPX universal gateways. Note that the latter requires use of Cisco IOS release 12.2(2)XB or later.

the first software to run when the gateway is powered-up or reset. The ROM monitor can help you isolate or rule out hardware problems encountered when installing your gateway. This appendix describes the following:

Entering the ROM Monitor Program

The ROM monitor diagnostics help initialize the processor hardware and boot the main operating system software. If you set the software configuration register (bits 3, 2, 1, and 0) to zero, you can start the gateway in the standalone ROM monitor. An example of the ROM monitor prompt follows:

```
rommon 1 >
```

To enable the Break key, and to default to booting at the ROM monitor while running the system software, reset the configuration register to 0x0 by entering configuration mode, and enter the following configuration command:

```
confreg 0x0
```

The new configuration register value, 0x0, takes effect after the gateway is rebooted with the **reload** command. If you set the configuration to 0x0, you will have to manually boot the system from the console each time you reload the gateway.

Timesaver Break (system interrupt) is always enabled for 60 seconds after rebooting the system, regardless of whether break is configured to be off by setting the configuration register. During the 60-second window, you can break to the ROM monitor prompt.

ROM Monitor Command Conventions

Following are ROM monitor command conventions:

- Brackets [ ] denote an optional field. If a minus option is followed by a colon (for example: [*-s*:]), you must provide an argument for the option.
- A word in italics means that you must fill in the appropriate information.
- All address and size arguments to the memory-related commands are assumed to be hexadecimal (no “0x” prefix or ‘h’ suffix needed).
- The options [*-bwl*] for the memory-related commands provide for byte, word, and longword operations. The default is *word*.
- You can invoke the memory-related commands by entering the command with no arguments. This causes the utility to prompt you for parameters. This option is available for the commands marked as prompting.
- All the built-in commands can be aborted (user interrupt signal) by pressing the **Break** key at the console.
- You can place more than one command (except the repeat command) on a line by using the semicolon delimiter.

Command Aliasing

The ROM monitor supports command aliasing modeled on the aliasing function built into the Korn shell. The alias command is used to set and view aliased names. This allows you to alias command names to a letter or word. Aliasing is often used to shorten command names or automatically invoke command options.

Aliases are stored in NVRAM and remain intact across periods of no power. These are some of the set aliases:

```
b=boot
h=history
i=reset
r=repeat
k=stack
?=help
```

ROM Monitor Commands

At the ROM monitor prompt, enter **?** or **help** at the `rommon n >` prompt to display a list of available commands and options, as follows:

```
rommon 12 > help
alias               set and display aliases command
boot                boot up an external process
break               set/show/clear the breakpoint
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
cookie              display contents of cookie PROM in hex
dev                 list the device table
dir                 list files in file system
dis                 disassemble instruction stream
dnld                serial download a program module
dram                verify DRAM
frame               print out a selected stack frame
hardware_info       display hardware information
help                monitor builtin command help
history             monitor command history
meminfo             memory information (-spd dumps SDRAM cookie)
repeat              repeat a monitor command
reset               system reset
set                 show all monitor variables
show_spd            show all SPD data
sleep               millisecond sleep command
stack               produce a stack trace
sync                write monitor environment to NVRAM
sysret              print out info from last system return
unalias             unset an alias
unset               unset a monitor variable
```

Note You can display additional details for a command by entering the command name with a ***-?*** option, which prints the command usage message.

The commands are listed and described in alphabetical order. Note that the ROM monitor commands are case sensitive.

- **alias** [*name*=*value*]—Aliases a name to a value. If the value contains white space or other special (shell) characters, it must be quoted. If the value has a space as the last character the next command-line word is also checked for an alias (normally only the first word on the command line is checked). Without an argument, this command prints a list of all aliased names with their values.

  For example:

  ```
  rommon 1 > alias
  r=repeat
  h=history
  ?=help
  b=boot
  ls=dir
  ```

- **boot** or **b**—Boots an image. The **boot** command with no arguments boots the first image in boot Flash memory. You can include an argument, *filename*, to specify a file to be booted over the network using the Trivial File Transfer Protocol (TFTP). The local device (see the description of **b** *device* following) can be specified by entering the device specifier (*devid*). If the specified device name is not recognized by the ROM monitor, the system attempts to boot the image (*imagename*) from a network TFTP server. Do not insert a space between *devid* and *imagename*. Options to the **boot** command are *-x*, load image but do not execute, and *-v*, verbose. The form of the **boot** command follows:

  boot [-xv] [devid] [imagename]

  b—Boots the default system software from ROM.

  b *filename* **[***host***]**—Boots using a network TFTP server. When a host is specified, either by name or IP address, the **boot** command boots from that source.

  b flash:—Boots the first file in Flash memory.

  b *device:*—Boots the first file found in the Flash memory device. The Flash memory device specified can be either *flash*:, to boot the Cisco IOS software, or *bootflash*:, to boot the boot image in Flash memory.

  b *device:name*—An extension of the above command, allows you to specify a particular filename in the Flash memory bank.

- **confreg** [*hexnum*]—Executing the **confreg** command with the argument *hexnum* changes the virtual configuration register to match the hex number specified. Without the argument, **confreg** dumps the contents of the virtual configuration register in English and allows you to alter the contents. You are prompted to change or keep the information held in each bit of the virtual configuration register. In either case, the new virtual configuration register value is written into NVRAM and does not take effect until you reset or power cycle the gateway.

  The configuration register resides in NVRAM. The configuration register is identical in operation to other Cisco gateways. Enter **confreg** for the menu-driven system, or enter the new value of the register in hexadecimal.

  

  Note The value is always interpreted as hex. The **confreg** utility prints a before and after view of the configuration register when used in menu-driven mode.

  For example:

```
rommon 2 > confreg

Configuration Summary
   (Virtual Configuration Register:0x0)
enabled are:
break/abort has effect
console baud:9600
boot:the ROM Monitor

do you wish to change the configuration? y/n  [n]: y
enable  "diagnostic mode"? y/n  [n]:
enable  "use net in IP bcast address"? y/n  [n]:
enable  "load rom after netboot fails"? y/n  [n]:
enable  "use all zero broadcast"? y/n  [n]:
disable "break/abort has effect"? y/n  [n]:
enable  "ignore system config info"? y/n  [n]:
change console baud rate? y/n  [n]: y
```

```
enter rate:0 = 9600,  1 = 4800,  2 = 1200,  3 = 2400
4 = 19200, 5 = 38400, 6 = 57600, 7 = 115200  [0]:
change the boot characteristics? y/n  [n]:


          Configuration Summary
   (Virtual Configuration Register:0x0)
enabled are:
break/abort has effect
console baud:9600
boot:the ROM Monitor

do you wish to change the configuration? y/n  [n]:
```

- **cont** [*-b*]—Continues a loaded image that has stopped. The *-b* option sets the requested break points before continuing.

  For example:

```
reboot >
monitor: command "launch" aborted due to user interrupt
diagmon 7 > cont

reboot>
```

- **context**—Displays the CPU context at the time of the fault. The context from kernel mode and process mode of a booted image is displayed, if available.

  For example:

```
rommon 6 > context

CPU Context:
d0 - 0x00000028      a0 - 0x0ff00420
d1 - 0x00000007      a1 - 0x0ff00000
d2 - 0x00000007      a2 - 0x02004088
d3 - 0x00000000      a3 - 0x020039e6
d4 - 0x00000000      a4 - 0x02002a70
d5 - 0x02003e8a      a5 - 0x02003f17
d6 - 0x00000000      a6 - 0x02003938
d7 - 0x00000001      a7 - 0x0200392c
pc - 0x02004adc     vbr - 0x02000000
```

- **cookie**—Displays the contents of the cookie PROM in hexadecimal format.

  For example:

```
rommon 1 > cookie

cookie:
00 01 01 31 03 15 03 20 00 14 33 01 30 11 4a 41
42 30 33 35 31 30 37 38 32 00 00 00 00 00 13 63
0c 1d 00 00 00 00 11 11 22 22 33 33 44 44 55 55
66 66 77 77 88 88 99 99 00 00 11 11 22 22 33 33
ff 00 30 96 f8 00 7a ff ff ff ff ff ff ff ff ff
ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
```

- **dev**—Lists boot device identifications on the gateway.

  For example:

```
rommon 10 > dev

Devices in device table:
        id  name
    flash: flash
bootflash: boot flash
```

- **dir** *devid*—Lists the files on the named device.

  For example:

```
rommon 11 > dir flash:

File size           Checksum   File name
   9474676 bytes (0x909274)   0x54322421    c5350-js-mz.Jan6
```

- **dlnd** [*-xv:*] [*args*]—Downloads in binary format through the console and executes. The -x option downloads but does not execute. The -v option allows you to specify the verbose level. The optional arguments are passed to the downloaded program via the argc/argv mechanism (only when -x is not used). The exit value is the return value from the downloaded routine or the status of the download operation (success or failure) if the -x option is used.
- **frame** [*number*]—Displays an entire individual stack frame. Enter a number to indicate which frame to display. You can also specify a number to indicate which stack frame to display. Note that the default is 0 (zero), which is the youngest frame.

  For example:

```
rommon 6 > frame 2

Frame 02: FP = 0x02003960    RA = 0x020050ee
at 0x02003968 (fp + 0x08) = 0x02004f8d
at 0x0200396c (fp + 0x0c) = 0x0200f390
at 0x02003970 (fp + 0x10) = 0x02006afc
at 0x02003974 (fp + 0x14) = 0xc0a82983
at 0x02003978 (fp + 0x18) = 0x02003a7e
at 0x0200397c (fp + 0x1c) = 0x02002630
at 0x02003980 (fp + 0x20) = 0x00000000
at 0x02003984 (fp + 0x24) = 0x02000000
at 0x02003988 (fp + 0x28) = 0x0200c4a4
at 0x0200398c (fp + 0x2c) = 0x0200f448
```

- **help**—Prints a summary of the ROM monitor commands to the console screen. This is the same output as entering **?**

  For example:

```
rommon 11 > help

alias               set and display aliases command
boot                boot up an external process
break               set/show/clear the breakpoint
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
cookie              display contents of cookie PROM in hex
dev                 list the device table
dir                 list files in file system
dis                 disassemble instruction stream
dnld                serial download a program module
dram                verify DRAM
```

```
frame               print out a selected stack frame
hardware_info       display hardware information
help                monitor builtin command help
history             monitor command history
meminfo             memory information (-spd dumps SDRAM cookie)
repeat              repeat a monitor command
reset               system reset
set                 show all monitor variables
show_spd            show all SPD data
sleep               millisecond sleep command
stack               produce a stack trace
sync                write monitor environment to NVRAM
sysret              print out info from last system return
unalias             unset an alias
unset               unset a monitor variable
```

- **history** or **h**—Displays the command history, that is, the last 16 commands executed in the monitor environment.
- **meminfo**—Displays the size (in bytes) the starting address, the available range of the main memory, the starting point and size of packet memory, and the size of nonvolatile memory (NVRAM).

  For example:

```
rommon 9 > meminfo

Main memory size:128 MB. Packet memory size:64 MB
Available main memory starts at 0xa000e000, size 0x7ff2000
Packet memory starts at 0xa8000000
NVRAM size:0x80000
Main memory control register:0xbe9022f4
Shared memory control register:0x00000202
```

- **repeat** [*number or string*] [*count*] or **r**—Repeats the specified command. Without an argument, repeats the last command. The optional command number (from the history list) or match string specifies which command to repeat. In the case of the match string, the most recent command to begin with the specified string will be re-executed. If the string includes spaces, you must define it using quotes. The *count* option allows you to repeat the command more than once.
- **reset** or **i**—Resets and initializes the system, similar to power-on.
- **set**—Displays all the monitor variables and their values.
- **stack** [*num*]—Produces a stack trace of the num frames. The default is 5. The command dumps from the kernel stack and the process stack (if one is available) of a booted image.

  For example:

```
rommon 5 > stack 8

Stack trace:
PC = 0x02004adc
Frame 00: FP = 0x02003938    RA = 0x02005f2a
Frame 01: FP = 0x02003948    RA = 0x02005df0
Frame 02: FP = 0x02003960    RA = 0x020050ee
Frame 03: FP = 0x02003994    RA = 0x02004034
Frame 04: FP = 0x02003b00    RA = 0x00012ca6
```

- **sync**—Writes the working in-core copy of the environment variables and aliases to NVRAM so that they are read on the next reset.

- **sysret**—Displays the return information from the last booted system image. This includes the reason for terminating the image, a stack dump of up to eight frames, and if an exception is involved, the address where the exception occurred.

  For example:

```
rommon 8 > sysret

System Return Info:
count: 19,  reason: user break
pc:0x60043754,  error address: 0x0
Stack Trace:
FP: 0x80007e78, PC: 0x60043754
FP: 0x80007ed8, PC: 0x6001540c
FP: 0x80007ef8, PC: 0x600087f0
FP: 0x80007f18, PC: 0x80008734
```

- **unalias** *name*—Removes *name* and its associated value from the alias list.
- **unset** *varname*—Removes the variable name from the variable list.
- **xmodem** [- *yc*] *destination_file_name*—Downloads a system image to the boot Flash memory over the console port. The -y option performs the download. The -c option performs the download using 16-bit CRC error checking. The xmodem transfer protocol supports a 128-byte block size and the transfer begins with a block number starting at 1, which contains file data. This is the default transfer protocol.