

**Installation and User Guide**  
for  
**Intel® EFI-Based Save and Restore**  
**System Configuration Utility**  
**Version 1.1**

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Revision 1.0

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# 1. Introduction

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The Save and Restore System Configuration (SysConfig) utility is a command-line utility that runs under the Extended Firmware Interface (EFI) shell environment. It provides the ability to save and restore the user configurable settings of the BIOS CMOS, Boot Manager Options, and the server management firmware.

## ⇒ NOTE

*In order to copy an existing firmware and BIOS configuration from one system to another, each system must have identical versions of firmware and BIOS on them. This is required because the configurable settings in firmware or BIOS may change from version to version.*

To copy the firmware and BIOS configuration from one system to another, do the following:

1. Run the SysConfig utility on the system you wish to duplicate, specifying the save argument. This saves select firmware, BIOS CMOS, and EFI Boot Manager component settings to a file (see Save Process Overview below). Individual component can also be saved to a file by specifying the component in the command line argument.
2. Run the SysConfig utility on the target system, specifying the restore argument, component, and the file created on the master system in order to restore those settings to the target system (see Restore Process Overview below).
3. Edit any of the parameters that cannot be duplicated on the two systems. For example, the host IP address stored in the firmware cannot be the same for two servers.

## Save Process Overview

This utility reads the following system component information, specified by their corresponding command line arguments, and saves it to a binary file:

<b>BIOS CMOS</b>	These settings are configured through the BIOS F2-Setup option.
<b>EFI Boot Manager Options</b>	These settings are configured from the boot manager while booting to the EFI Shell; see page 6 for a complete listing of settings.
<b>Server Management Firmware Settings</b>	These are BMC settings that can be configured using the System Maintenance Utility (SMU); see page 6 for a complete listing of settings.

The versions of the system BIOS and BMC are saved in the header of the binary file and used during the restore process, see Restore Process Overview below.

## Restore Process Overview

During the restore process, the utility reads an input binary file and configures the server with the same settings of the component that are stored in the file. Therefore, the newly configured server is configured exactly as the original server that was used during the save process. This provides the ability to “clone” the settings from one server to multiple servers.

Server-specific settings can be modified using the command-line options described in Chapter 2. Using the System Configuration Utility. These settings can be specified with the restore (/r) command-line argument or by executing the utility with the appropriate arguments and switches.

If a BIOS password exists in the server then the /bap argument must be entered and the password supplied. The utility aborts the restore operation if the passwords do not match. In this case an error message is displayed and the utility exits with an exit error code.

⇒ **NOTE**

*The BMC and BIOS versions specified in the binary file must match the BMC and BIOS versions of the server. The utility aborts the restore operation if the versions do not match. In this case an error message is displayed and the utility exits with an exit error code.*

## Saved and Restored Settings

The component settings indicated below are saved and restored by the utility. Individual components can be specified using the command line options “/c”, “/e”, and “/f” for BIOS CMOS, EFI Boot Manager, and Firmware settings, respectively.

### BIOS CMOS Settings

This utility saves and restores all of the BIOS CMOS settings that are configurable by the user in the BIOS Setup menu with the exception of the Time, Date and Administrator password. These CMOS parameters are described in the *Intel Server System SR870BH2 BIOS EPS*.

The Administrator password can be changed only through the command-line interface of the utility. See Table 2

### EFI Boot Manager Options

The utility saves and restores the EFI Boot Manager Options that are available to the user while booting to the EFI shell.

### Firmware Settings

This utility saves and restores the following BMC settings.

LAN Channel Settings	LAN Alert Settings	User Settings	Platform Event Filtering Settings	Serial / Modem Settings	Serial Paging Alert Settings
Alert Enable	Number of Alert Addresses	User ID <sup>1</sup>	Capabilities	Alert Enable	Number of Alert Pages
Per Message Authentication	Alert Addresses Block	User Name Length	Global Control Actions	Per Message Authentication	Alert Paging Block
User Level Authentication Enable	Alert Acknowledge Enabled	User Name <sup>1</sup>	Startup Delay	User Level Authentication	Alert Acknowledge Enable
Access Mode	Alert IP	User Password Length	Alert Startup Delay	Access Mode	Retry Count

LAN Channel Settings	LAN Alert Settings	User Settings	Platform Event Filtering Settings	Serial / Modem Settings	Serial Paging Alert Settings
Privilege Level Limit	Alert MAC	User Password	Number of Alert Filters	Privilege Level Limit	Retry Delay
Community String Length	Gateway Selector	Privilege Level Limit <sup>1</sup>	Alert Filters	Community String Length	Paging Flow Control
Community String	Retry Count	Callback Status	Number of Alert Strings	Community String	Paging Baud Rate
ARP enable	Retry Interval	Link Authentication Enable	Length of Alert String	Number of Authentication Types	Paging Stop Bits
ARP interval		IPMI Messaging Enabled	Alert Strings	Connection Mode	Paging Data Bits
Number of Authentication Types				Flow Control	Paging Parity
Authentication Types				Baud Rate	Dial String Selector
DHCP enabled <sup>1</sup>				DTR Hang-up Enable	
BMC IP <sup>1</sup>				Inactivity Timeout Enabled	
Subnet Mask <sup>1</sup>				Inactivity Timeout Interval	
Gateway IP <sup>1</sup>				Connection Mode Sharing	
Gateway MAC <sup>1</sup>				Baseboard to BMC Switch	
Backup Gateway IP				BMC to Baseboard Switch	
Backup Gateway MAC				Ping Before MUX Switch	
				Ping Enabled	
				Close on DCD Loss	
				MUX Switch on DCD Loss	
				Modem Init String Length	
				Modem Init String	
				Modem Ring Duration	
				Modem Call Retry Interval	

LAN Channel Settings	LAN Alert Settings	User Settings	Platform Event Filtering Settings	Serial / Modem Settings	Serial Paging Alert Settings
				Modem Ring Dead Time	
				Ping During Callback	
				Modem Enabled Callback	
				Blackout Interval	
				Modem Dial Command Length	
				Modem Dial Command	
				Modem Hang-up Command Length	
				Modem Hang-up Command	
				Modem Escape Command Length	
				Modem Escape Command	
				System Phone Number Length	
				System Phone Number	
				Terminal Mode	
				Terminal Line Edit Enable	
				Terminal Delete Control	
				Terminal Echo Enable	
				Terminal Handshake Enable	
				Terminal Output New Line Sequence	
				Terminal Input New Line Sequence	
				Number of Dial Strings	



<b>LAN Channel Settings</b>	<b>LAN Alert Settings</b>	<b>User Settings</b>	<b>Platform Event Filtering Settings</b>	<b>Serial / Modem Settings</b>	<b>Serial Paging Alert Settings</b>
				Dial String Length	
				Destination Dial Strings	

Note 1: Settings that can be modified from the command-line interface of the utility.

## 2. Using the System Configuration Utility

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This utility parses the command-line arguments and switches, sets internal flags to control operation. Any invalid arguments or switches will result in the display of a “usage” message and the program will exit with an error code.

The command-line arguments and switches are not case-sensitive. All command-line options and their parameters are entered as a single command-line in the EFI shell environment. Examples in this document may appear to be on multiple lines, due to page size restrictions. The basic command-line format is:

```
syscfg /argument(s) [switches] or  
syscfg -argument(s) [switches]
```

For any given command-line argument described in this document, arguments are preceded by a “/”. Switches are shown in square brackets (‘[’ and ‘]’).

Table 1 below provides an overview of the arguments and switches that can be used with the utility.

The options listed in Table 2 are used to configure the server with settings that are specific to that server. They can either be used in conjunction with the /r argument as described in Table 1, or independently, but the entire command-line is limited by the number characters that can be entered in the EFI shell. There is no order for entering these arguments, but they must be followed by their required switches.

The file name extension of the binary file is “SCF”, for System Configuration File, and the utility appends it when not specified. If a different file name extension is specified, this utility displays an error message and exits with an error code.

**Table 1: Command-Line Switches**

<b>Arguments and Switches</b>	<b>Description</b>
/s [File Name] [Options]	<p>Writes the current system BIOS CMOS, EFI Boot Manager, and firmware settings to the specified binary file. If no file name is specified, the default <i>syscfg.scf</i> file name is used.</p> <p>This switch can be used with “/f”, “/b”, or “/e” option, to save just one of the component settings instead of all of them. Only one of those switches can be specified with the “/s” option.</p> <p><b>Examples:</b></p> <ol style="list-style-type: none"><li>1. Save the BIOS CMOS, EFI Boot Manager, and firmware settings to the specified file. <pre>syscfg /s cmos.scf</pre></li><li>2. Save the BIOS CMOS settings to the specified file. <pre>syscfg /s cmos.scf /c</pre></li><li>3. Save the firmware settings to the specified file. <pre>syscfg /s fw.scf /f</pre></li><li>4. Save the EFI Boot Manager to the specified file. <pre>syscfg /s efiboot.scf /e</pre></li></ol>

<pre>/r [File Name] [Options]</pre>	<p>This option restores the BIOS CMOS, EFI Boot Manager, or firmware settings from the specified file. It requires that the component being restored be specified with the options “/f”, “/c”, or “/e” for firmware, BIOS CMOS, or EFI Boot Manager, respectively. If no component is specified, this utility displays an error message and exits with an error code.</p> <p>If no file name is specified, the default <i>syscfg.scf</i> file name is used. If the file name is specified, then it should come immediately after the switch “/r”.</p> <p>This switch can be used in conjunction with other command line options, listed in Table 2, which are used for modifying server-specific settings. In this case the utility will restore everything from the file first and then modify the server-specific settings thereafter.</p> <p>If there is a BIOS password installed in the system then the same password must be supplied in the command line using the switch “/bap” along with the “/r” option. If passwords don’t match then restore option will fail and utility will exit with error message.</p> <p><b>Examples:</b></p> <ol style="list-style-type: none"> <li>Restore BIOS CMOS settings using the default file name. No BIOS password exists in the system. <pre>syscfg /r /c</pre> <pre>syscfg /r /c /bap ""</pre> </li> <li>Restore firmware settings from given file and change the BMC IP address. No BIOS password exists in the system <pre>syscfg /r mycfgfile.scf /f /lhi 192.168.0.2</pre> </li> <li>Restore firmware settings from given file and change the IP address. No BIOS password exists in the system. Note that all the command line options and their parameters are entered as a single command line in the EFI shell environment. <pre>syscfg /r mycfgfile.scf /f /lhi 192.168.0.2 /lsm 255.255.255.0 /lgi 192.168.6.26 /lgm 0A-56-CF-06-11-02</pre> </li> <li>Restore firmware settings from given file and change the BIOS password to “abc” only if the existing password is “123”. <pre>syscfg /r mycfgfile.scf /b /bap 123 abc</pre> </li> <li>Restore BIOS CMOS settings from the given file only if the existing BIOS password is “123” <pre>syscfg /r mycfgfile.scf /c /bap 123</pre> </li> <li>Restore the EFI Boot Manager settings using the default file name. No BIOS password exists in the system. <pre>syscfg /r /e</pre> </li> </ol>
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/f	<p>This option is used in conjunction with /s or /r to save or restore the FW settings only.</p> <p>When restoring the FW settings, the input binary file must also contain the FW settings in order for this utility to restore them; otherwise, this utility displays an error message and exits with an error code.</p> <p>This option can not be used with “/b” or “/e” options.</p>
/c	<p>This option is used in conjunction with /s or /r to save or restore the BIOS CMOS settings only.</p> <p>When restoring the BIOS CMOS settings, the input binary file must also contain the BIOS CMOS settings in order for this utility to restore them; otherwise, this utility displays an error message and exits with an error code.</p> <p>This option can not be used with “/f” or “/e” options.</p>
/e	<p>This option is used in conjunction with /s or /r to save or restore the EFI Boot Manager settings only.</p> <p>When restoring the EFI Boot Manger settings, the input binary file must also contain the EFI Boot Manger settings in order for this utility to restore them; otherwise, this utility displays an error message and exits with an error code.</p> <p>This option can not be used with “/f” or “/c” options</p>
/i [File Name]	<p>Displays the header information contained in the binary file, see Appendix B. If no file name is specified, it will display the corresponding information from the system..</p> <p>This switch is not allowed with any other command-line options.</p> <p><b>Example:</b>  <code>syscfg /i mycfgfile.scf</code></p>
/h or /?	Displays command-line help information.

**Table 2: Configuration Command-Line Options**

Argument and Switches	Description
/lde [value]	<p>Enable or disable DHCP. This option can not be used in conjunction with the options for setting the IP, Subnet Mask, Gateway IP and MAC addresses.</p> <p><b>Examples:</b>            Enable DHCP  <code>syscfg /lde 1</code></p> <p>Disable DHCP  <code>syscfg /lde 0</code></p>

Argument and Switches	Description
/lhi [IP Address]	<p>Configures the BMC IP address.</p> <p><b>Examples:</b>            Configure the BMC IP address to "192.168.0.2"  <code>syscfg /lhi 192.168.0.2</code></p> <p>Restore from a binary file, then configure the BMC IP address to "192.168.0.2"  <code>syscfg /r mycfgfile.scf /lhi 192.168.0.2</code></p>
/lsm [IP Address]	<p>Configures the Subnet Mask IP address.</p> <p><b>Example:</b>  <code>syscfg /lsm 255.255.255.0</code></p>
/lgi [IP Address]	<p>Configures the Default Gateway IP address.</p> <p><b>Example:</b>  <code>syscfg /lgi 192.168.6.26</code></p>
/lgm [MAC Address]	<p>Configures the Default Gateway MAC address.</p> <p><b>Example:</b>  <code>syscfg /lgm 0A-56-CF-06-11-02</code></p>
/un# [user name]	<p>Assigns a user name for the user ID #, where # is an index to the user table. The user ID1 is anonymous with user name set to NULL. User names can be 1 to 16 bytes in length.</p> <p><b>Example:</b>            Assign user name as "user" for the given user.  <code>syscfg /un2 user</code></p>
/up# [password]	<p>Sets or clears the password for the user with user ID #, where # is an index to the user table.</p> <p><b>Examples:</b>            Set the password for the given user as "t4x"  <code>syscfg /up2 t4x</code></p> <p>Clear the password for the given user  <code>syscfg /up2 ""</code></p>

Argument and Switches	Description
<pre>/ulcp# [privilege level]</pre>	<p>Sets the LAN channel privilege level for the user with user ID #, where # is an index to the user table. The privilege levels can be set using the following (not case sensitive) keywords:</p> <p>USER OPERATOR ADMINISTRATOR</p> <p><b>Examples:</b></p> <p>Set the LAN channel privilege level for the given user to “OPERATOR”</p> <pre>syscfg /ulcp2 OPERATOR</pre> <p>Set the LAN channel privilege level for the given user to “USER”</p> <pre>syscfg /ulcp2 USER</pre> <p>Set the LAN channel privilege level for the given user to “ADMINISTRATOR”</p> <pre>syscfg /ulcp2 ADMIN</pre>
<pre>/bap [Old Password] [New Password]</pre>	<p>Sets or clears the BIOS administrator password. The password will be changed to [New Password] only if the [Old password] matches with the password in the system.</p> <p><b>Examples:</b></p> <p>Set the BIOS administrator password as “r12tk”. Assume old password is 123.</p> <pre>syscfg /bap 123 r12tk</pre> <p>Clear the BIOS administrator password. Assume old password is 123.</p> <pre>syscfg /bap 123 ""</pre> <p>Set the BIOS administrator password “r12tk” when a password is not installed.</p> <pre>syscfg /bap "" r12tk</pre>

# A: Exit Error Codes

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The following error codes are useful when executing the Save and Restore System Configuration utility from a script. The error messages displayed provide more information as to the cause of the error.

**Table 3: Exit Error Codes**

Value	Interpretation
0	Successful termination.
1	Invalid invocation or unknown command-line argument.
2	File was not found.
3	Invalid File.
4	File is not intended for this system or server configuration does not match the file.
5	Firmware interface failed: this error can occur when reading or writing to the BMC or when the BMC returns a completion code other than normal.
6	BIOS interface failed: this error can occur when reading or writing the BIOS or when the BIOS returns an error.
7	The password supplied doesn't match with the system BIOS password.
8	Unknown error.



## B: Sample Display of /i Option

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The /i command-line argument allows the user to display system and binary file header information as described the figures below.

```
Save and Restore System Configuration Utility Ver 1.1
Copyright (c) Intel Corporation 2003-2004

Binary File Header Information
-----

System Config File Name... syscfg.scf
BIOS Version..... S870BH2A.86B.0113.P02
BMC Version:
  Op Code..... 1.08
  PIA..... 1.07
  Boot Code..... 0.13
```

**Figure 1: Sample Display Binary of File Header Information**

```
Save and Restore System Configuration Utility Ver 1.1
Copyright (c) Intel Corporation 2003-2004

System BIOS and FW Versions
-----

BIOS Version..... S870BH2A.86B.0113.P02
BMC Version:
  Op Code..... 1.08
  PIA..... 1.07
  Boot Code..... 0.13
```

**Figure 2: Sample Display of System Information**

# C: Glossary

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Term	Definition
BIOS	Basic Input Output System.
BMC	Baseboard Management Controller. The primary microcontroller that controls the operation of the Intel® server management subsystem.
SCF	System Configure File. File name extension used for the binary file.
EFI	Extensible Firmware Interface
EPS	External Product Specification
EPSP	Enterprise Platform & Services Division
EST	Enterprise Software Technologies
IPMI	Intelligent Platform Management Interface
SMU	System Maintenance Utility
SW	Software
FW	Firmware
UCA	User Configurable Area