

HP BIOS Configuration Utility

Functional Specification

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## 

# Revision History

|  |  |  |
| --- | --- | --- |
| **Revised by** | **Date** | **Description** |
| Patrick Peng | 12/11/13 | Original |
| Robert Tonsing | 07/20/2015 | Documented functional spec beyond workflow |

# Terms and definitions

|  |  |
| --- | --- |
| BCU | *HP BIOS Configuration Utility* |
| HPQPswd | *HP Password Encryption Utility* |
| HP CMI | *HP Client Management Interface* |
| WMI | *Windows Management Instrumentation* |

# Feature overview

BCU is a Windows-based console application that lets you create standard configuration settings and deploy them across the enterprise. After creating a configuration text file with the settings you want to change, you can deploy it to all systems in the enterprise. If a particular system does not support a setting, it will be ignored.

# Requirements

* Read available BIOS settings and their values from a supported system and save to file
* Set or change Setup Password on a supported system
* Replicate BIOS settings across multiple client systems
* Command line options are provided to support automated execution
* No dependencies on other software
* AES 256 encryption is used for password files

## Supported HP client systems

All HP desktops, workstations, notebooks, and tablets that support the HP Client Management Interface (HP CMI). This consists of the WMI namespace *root\HP\InstrumentedBIOS* with included classes and methods for managing BIOS settings.

## Supported operating systems

Windows 7 and later, 32-bit and 64-bit, and equivalent Windows PE versions.

* WinPE: ensure that the WMI component is added to the boot image using DISM.
* Windows Run Time (WinRT) for tablets: requires installation of HP Device Access Layer (DASL) and WMI Provider.
* In WinPE or WinRT, must use 32 or 64-bit version that matches the OS.

# Command-line switches

|  |  |
| --- | --- |
| **Command** | **Result** |
| /? or /Help | Shows usage. |
| /Get:"filename"  —or—  /GetConfig:"filename" | Saves the BIOS configuration data to “filename”, or to console if no filename is given. |
| /Set:"filename"  —or—  /SetConfig:"filename" | Writes the BIOS configuration data in “filename” to BIOS. NOTE: Restart required for some setting changes to take effect. |
| /Cspwdfile:”filename”  —or—  /CurSetupPasswordFile:”filename” | Specifies the current BIOS Setup Password by providing encrypted password file. Provided when changing BIOS settings or password. Can specify only one current password file. Generated by HPQPswd.exe. NOTE: Requires BCU version 3.0.1.1 or later. |
| /Nspwdfile:”filename”  —or—  /NewSetupPasswordFile:”filename” | Specifies a new BIOS Setup Password by providing password file. To remove the password, use /nspwdfile:””. Can specify only one new password file. NOTE: Requires BCU version 3.0.1.1 or later. |
| /SetDefaults | Executes BIOS action to restore settings to their default values. NOTE: Does not change individual settings. Restart required to take effect. |
| /Verbose | With /set, displays details about each setting change, such as failure code or reason to skip. |
| /WarningAsErr | Same as /Verbose, plus any setting warnings will cause BCU to return error code 13. NOTE: Requires BCU version 3.0.1.1 or later. |
| /Advanced | Show settings with DisplayInUI = false and IsReadOnly = false NOTE: Hidden setting |
| /Dumpall:"filename" | List ALL settings with ALL properties, for debugging. NOTE: Hidden setting |

Table 1 - List of command-line switches

# Installation

Installer only copies executables to Program Files sub-folder “BIOS Configuration Utility”. These can be copied to any location or device for use, there are no dependencies.

# Limitations

* Password length is currently limited to 32 characters (Unicode).
* No handling is provided for multi-lingual support.
* Repset file format must be ANSI (UTF-8 w/o BOM).

# Implementation

The Shared library *PasswordFileUtility* class will provide encryption and decryption support for the utility and clients.

File format based on BIOS Repset, with these differences:

* BIOS Repset does not have header line
* BIOS Repset uses Unicode encoding, BCU supports only ANSI.

# Workflow



# Differences between versions 3.x and 4.x

|  |  |  |
| --- | --- | --- |
| **Change** | **3.x** | **4.x** |
| Get: Sorting | By Sequence property | By Sequence, then Name properties |
| Reason: BIOS specification | |
| Get: Hidden Settings  (DisplayInUI = 0) | Listed, if not read-only | Not listed |
| Reason: BIOS specification, hidden settings may not be valid | |
| Get: Integer Settings | Listed, if not read-only | Always listed |
| Reason: consistency | |
| Set: Invalid value return code | Detected by BCU: warning = 21, final result = success 0  Detected by BIOS: fail = 5, final result = error 13 | Detected by BCU: warning = 21, final result = error 13  Detected by BIOS: fail = 5, final result = error 13 |
| Reason: consistent result for failure to change value | |
| Set: Invalid value reason | N/A | Diagnostic message given for invalid value error |
| Reason: enhancement | |
| Set: Value validation order | 1. Setting exists 2. Value is valid for the setting 3. Value is changed 4. Setting is not read-only | 1. Setting exists 2. Setting is not read-only 3. Value is changed 4. Value is valid for the setting |
| Reason: reduced processing | |
| Get/Set: String value leading or trailing spaces | Trimmed | Not trimmed |
| Reason: match F10 Setup behavior | |
| /Getvalue, /Setvalue commands | N/A | Change setting value from command line, no file |
| Reason: enhancement | |
| /Unicode command | N/A | Check for Unicode password support |
| Reason: enhancement | |
| BIOS User support removed | Supported | Not supported |
| Reason: Not supported in new BIOS | |
| Windows XP | Supported | Not supported |
| Reason: no longer supported by Microsoft | |

# Settings not shown

* Password type
* Setting name is empty
* Setting property “DisplayInUI” is false (0). Per BIOS specification: “DisplayInUI : Flag indicating this component should be visible within a BIOS Configuration UI”.
  + Exceptions: “TPM Activation Policy” and “TPM Reset to Factory Defaults”, due to customer need and BIOS architect agreement. These settings are no longer used in 2015 Common BIOS (Gondor).

# Setting value validation

Before attempting to apply a setting value, it will be validated against setting properties, according to setting type, to provide more diagnostic information for a set failure. Otherwise the BIOS error 5 “Invalid Parameter” would always be returned, with no indication of the problem. The error shown depends on the order the checks are performed.

Note that version 4 reports these as errors, same severity as the BIOS error that would otherwise result. Earlier versions reported these as warnings.

* Enumeration type: exactly one value is marked with ‘\*’, value exists in the PossibleValues list.
* String type: value length >= MinLength, <= MaxLength.
* Integer type: value is a number, >= LowerBound, <= UpperBound.
* Ordered list type: values not in the Elements list will be ignored (no error). This allows values from different platforms to be combined.

BIOS may still fail the value due to specific requirements, for example date values must be in valid format and in range.

# Manufacturing Programming Mode (MPM) unlock

* Setting “Manufacturing Programming Mode” = “Unlock”

More settings can be changed by BCU when a machine is in MPM unlock mode than when it is *not* in MPM unlock mode. When locked, the IsReadOnly property of these settings changes to true and they can no longer be modified.

Once locked, MPM cannot be unlocked except by the factory.

# Error reporting

For /set, settings processed are reported as follows:

**Skip**:

* Setting value is unchanged

**Warning**:

* Setting is read-only
* Setting not found
* Setting value missing

**Error**:

* Setting value invalid per BCU checks
* Setting value invalid per BIOS return code
* Attempted set failed
* WMI error
* Execution error

Final return value is an error only if an error occurred, or warnings occurred with /warningsaserr option.

# BCU 5: User interface execution

## Two modes of execution

**Legacy mode:** When executed with existing command line options, BCU will execute as in the past, as a console application.

**GUI mode:** When executed with no command line options, or with the new “/gui” option, it will execute as a Windows dialog box application.

## Current BIOS Settings

Grouped on pages

Read-only settings

Apply

Save to file

## Edit repset file

Open file

Save file

Apply

# Password management

## Set/change setup password

Set or change the Setup Password on the current system.

Input: all entries will be masked by asterisks per standard Windows usage.

* Current password – disabled if password is not currently set  
  – or –  
  File pathname – pre-populated if suppled by command line option /cspwdfile
* New password  
  – or –  
  File pathname
* Confirm new password – if not supplied by file

Browse buttons may be used to find existing encrypted password files.

## Create encrypted password file

File to be used for scripted command line execution of BCU or other utilities. Functionality identical to HPQPswd.exe.

Input:

* Password - will be masked by asterisks per standard Windows usage
* Confirm password
* File pathname

## Enter password

Enter the Setup Password of the current system in order to apply settings.

Input:

* Password - will be masked by asterisks per standard Windows usage

# Test cases

## Values

Use non-numeric value for integer setting

Use invalid value for setting with specific format, such as BIOS Boot Time

Enumeration setting:

* no value selected
* multiple values selected
* invalid value

Change read-only setting

Test settings that should only succeed in MPM unlock mode

## File format

Tabs or spaces on last line of file

Missing values

## Command line options