Aptio AMISCE 5.01 User Guide

Aptio AMISCE version 5.01: User Guide

Document Revision 1.24
September 24, 2014



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Document Information

Purpose

This document is intended to provide all the necessary information for using AMI Setup Control Environment (AMISCE) Tool.

Audience

The intended audiences are BIOS developers, Generic Chipset Porting Engineers, OEM Porting Engineers, and AMI OEM Customers.

Revision History

Date	Rev	Description of Changes
2009-09-09	0.10	Initial document created
2009-10-07	0.11	Document updated to provide windows OS support
2010-02-18	0.12	Document updated to include Windows 7 OS support
2010-03-05	0.13	Document updated with Advanced script File support
2010-04-07	0.14	Updated title page, header, document properties, features, and user interface.
2010-05-4	0.15	Add DOS SCE
2010-05-11	0.16	Added a note about '/f' option.
2010-06-08	0.17	Addressed Style Issues and updated content
2010-08-16	0.18	/u support clarified
2010-08-27	0.19	Removed /u option, clarified BIOS and Linux requirements
2010-09-02	0.20	Added exe name for all AMISCE version
2010-09-21	0.21	Updated the document with Password Encryption
2010-10-19	0.21	Fixed review comments
2010-10-26	0.21	Removed reference to UQI from AMISCE features
2010-12-22	0.21	Updated the document for Standards Review
2011-01-11	0.22	Added example for changing Password without providing a Variable
2011-01-12	0.23	Added description for manipulating NVRAM variables
2011-02-10	0.24	Add errors and warnings description to appendix
2011-03-14	0.25	Added note for basic intended use case
2011-04-06	1.01	Update for version 2.01
2011-07-21	1.02	Updated according to document standards.
2012-04-05	1.03	User password. BIOS requirements.
2012-07-30	1.04	APTIO V support
2012-10-04	1.05	Updated for release 2.02.1035ALPHA.
2012-12-17	1.06	Updated for adding /m support in SCEDOS.
2013-02-04	1.07	Add example of subtitle comment. Update and correct "Errors and Warnings". Change references to AFU to SCE in Linux driver section.

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2013-03-25	1.08	Updated for adding /b support.
2013-06-07	1.09	Updated for adding /r support.
2013-06-15	1.10	Updated Question Evaluation support
2013-06-21	1.11	Updated for mapping language support
2013-07-18	1.12	Updated Instructions on using AMISCE
2013-08-05	1.13	Updated for /sp and /g support.
2013-10-11	1.14	Updated for 5.00.1048 release
2013-12-19	1.15	Updated With Creation of New NVRAM Variables
2014-01-02	1.16	Updated supported OS list
2014-01-16	1.17	Updated for provision to accept the mapping language.
2014-04-09	1.18	Updated the /a option in SCE to Enables Setup Question having Empty or Blank names to be exported in default export mode
2014-04-23	1.19	Updated for Option /d - Skip checking for AptioV BIOS and behave normally
2014-05-16	1.20	Added information regarding 'NVRAM Variable Access Unlock'
2014-06-25	1.21	Update system requirements. Explain "Platform Identification Failed" error message.
2014-07-24	1.22	Explain warning message for string controls
2014-07-28	1.23	Explain warning message for variable write
2014-09-24	1.24	Updated feature list with features for 5.01 and added information on new features. Added SCE Exit Codes section Updated BIOS requirements section

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What is AMISCE?

AMI Setup Control Environment (AMISCE) is a command line tool available in both 32-bit and 64-bit flavors. AMISCE provides you an easy way to update NVRAM variables from within the EFI, DOS, Linux, or Windows based environment. The user can extract variables directly from the BIOS, and also allows the user to change settings using either a text editor or a setup program, and then update the BIOS. Each of these actions may take place on a different system.

AMISCE produces a script file that lists all setup questions on the system where AMISCE is running. The user can then modify the script file and use it as input to change the current NVRAM setup variables.

AMISCE Features

The AMISCE tool allows you to perform the following functions:

1. Reads NVRAM variables and HII database from BIOS at run time to create files that can be used as input to a setup emulation program. The NVRAM script file may be edited as text.
2. Loads the NVRAM script file created by above process, and updates the target system's NVRAM.
3. Enables advanced scripting mode that presents data as setup questions and associated settings.
4. Enables advanced scripting mode to update setup question defaults.
5. Supports setup question matching based on Setup Mapping Language. This support will be available once Aptio core supports Setup Mapping Languages.
6. Provides Command line operation.

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7. Supports APTIO V features.
8. Supports Setup Question Evaluation for UEFI 2.1 and above
9. Supports blocking of migration.
10. Supports mapping language.
11. Supports Migration of Settings.
12. Support to export only questions whose value is different from default.
13. Supports suppression of duplicate questions.
14. Unlocks protected variable update with administrator password.
15. Support to change user/admin password
16. Aptio V BIOS Identification.
17. Get SMI port from ACPI table

System Requirements

Supported Operating Systems

AMISCE is supported by the following operating systems:

- EFI Shell Environment
- Microsoft® DOS
- Microsoft Windows® 2000
- Microsoft Windows® NT 4.0
- Microsoft Windows® XP
- Microsoft Windows® ME
- Microsoft Windows® 2003
- Microsoft Windows® Vista
- Microsoft Windows® 7
- Microsoft Windows® 8
- Microsoft® Windows® 8.1
- Microsoft® Windows® Server 2008 R2
- Microsoft® Windows® Server 2012 R2
- Linux
- BSD

Note: Starting From Microsoft Windows® 7 in all the windows Operating System the Application requires Administrator privileges to be executed and the command box is opened with *Run as Administrator* option.

Note: For accessing Linux and BSD versions refer the steps outlined in **Appendix** section.

User Interface

The user has to execute the following command lines in command prompt to run AMISCE.

Command Line Interface

Note: In the examples given below, “AMISCE” should be replaced with the correct OS specific version name from the following list:

- For DOS use SCEDOS
- For WIN 32 utilize SCEWIN
- For WIN 64 utilize SCEWIN_64
- For LINUX 32 utilize SCELNX_32
- For LINUX 64 utilize SCELNX_64
- For BSD 32 utilize SCEBSD_32
- For BSD 64 utilize SCEBSD_64
- For EFI 32 utilize SCEEFI.EFI
- For EFI 64 utilize SCEEFI64.EFI

Default Mode Execution

The default mode of execution provides the ability to export and import NVRAM setting values for BIOS setup controls using a script. It can optionally generate the HII dump file.

Default export mode

To enable the default mode execution execute the command line

```
AMISCE /o /s <Setup Script File> [/h <HII Dump File>] [/sd
<Duplicate Question Script File>] [/b] [/v] [/lang <Lang
Code>] [/sp] [/g] [/a] [/d] [/q] [/ndef]
```

Where,
/o→ Indicates generate Setup script file form HII data
/s →Indicates Setup script file that is to be generated.
[/h]→Indicates the HII Dump File, it is an optional feature, where this valid only while generating Setup script file
[/v]→Optional CMD line that produces a verbose script file

[/b]→ Optional CMD line option that enables export of boot order controls in the generated script file.
[/lang]→ Optional CMD line option that enables mapping language mode and Lang Code indicates the code for a particular language like for English(en-US), AMI(x-AMI) etc.
[/sp] → Optional CMD line option that enables Expression Evaluation for Suppressif Opcode.
[/g] → Optional CMD line option that enables Expression Evaluation for Grayoutif Opcode.
[/a] → Optional command line option that enables setup question having empty or blank names to be exported
[/d] → Optional command line option to Skip checking for AptioV BIOS and behave normally
[/ndef] → Optional command line option to export only those questions whose value is different from the default.
[/sd] → Optional command line option to export duplicate questions in to a separate script file.

The user may optionally give the **/q** option to suppress all warning messages.

Note: The user has to use `SCEWIN` as windows executable command, but while using DOS the executable command will be `SCEDOS`.

Handling Duplicate Questions

SCE considers questions with same storage location as duplicates. By default, these duplicates will be exported to the main script file but will be commented out. To export the duplicates into a separate script file, use the '/sd' option.

Raw mode execution

AMISCE raw mode execution can export and import all NVRAM variables, including those not used for setup purposes. It also generates the listing file and HII dump file.

Raw export mode

```
AMISCE /o [/c] /l <listing file> /n <NVRAM Dump File> /h <HII dump file> [/d]
```

Where,
/o→ Indicates NVRAM script file to generate for Variables found in Listing File
/l→Indicates Variable Listing File
[/c]→Optional, Creates Variable Listing File containing information about all the variables found in NVRAM
Where,
With /c option, all variables names are output to the listing file, and all variables are output to the NVRAM dump script.
Without /c option, the listing file serves as a filter and the program provides output only to those variables with names present in the listing file.
/n→Indicates NVRAM Dump File
/h→Indicates HII Dump File. This option is valid only when generating NVRAM script file and should always be used along with the /n option.
[/d]-> Optional command line option to Skip checking for AptioV BIOS and behave normally

Updating NVRAM with Script File

Updating the NVRAM variables associated with setup questions can be achieved using the following commands.

Default import mode

```
AMISCE /i [/cpwd <admin password>] /s <Setup Script File>
[/ds] [/dm] [/b] [/r] [/lang <Lang Code>] [/d]
```

Where,

/i →Indicates Import modified script file to the NVRAM

/s →indicates the NVRAM script file to use to read data

/ds →Indicates set "BIOS" defaults from script question value

/dm →Indicates set "MFG" defaults from script question value

[/b]→ Optional CMD line option that enables import of boot order controls from the generated script file.

[/r]→ Optional CMD line option in SCEWIN, SCEEFI, SCEBSD, SCELNX that enables the tool to verify that the CRC32 of host HII IFR packs is identical to the CRC32 in the advanced script file before performing any variable updates.If not identical, then the application exits with relevant error message.

[/lang]→ Optional CMD line option that enables mapping language mode and Lang Code indicates the code for a particular language like for English(en-US), AMI(x-AMI) etc.

The user may optionally give the **/q** option to suppress all warning messages.

[/d] → Optional command line option to Skip checking for AptioV BIOS and behave normally

[/cpwd]→ Unlock variables with administrator password until AMISCE completes execution.

Raw import mode

```
AMISCE /i [/cpwd <admin password>] /l <listing file> /n <NVRAM
Dump File> [/f] [/d]
```

Where,

/i→ Indicates Import modified Variable data found in Listing File to the NVRAM

/l→ Indicates Variable Listing File

/n→Indicates NVRAM Dump File

[/d]-> Optional command line option to Skip checking for AptioV BIOS and behave normally

[/cpwd]→ Unlock variables with administrator password until AMISCE completes execution.

The tool verifies that the CRC32 of host HII IFR packs is identical to the CRC32 in the variable file before performing any variable updates. Usage of the 'f' option will suppress this check.

NVRAM Variable Access Unlock

Runtime access to writing certain NVRAM variables may be locked out in some BIOS configurations. SCE can unlock them with the BIOS administrator password.

```
AMISCE /cpwd <administrator password> <other parameters>
```

The variable access is re-locked on application exit. So, it is required to use /cpwd each time with import command for protected variable update. SCE shows the message *"Variable access re-locked"* on successful re-lock of the protected variables. It is important to re-lock the variables after update. User can explicitly do this by executing the import command with an incorrect admin password.

Also, there is a retry limit of 3 for the unlock attempt. If the retry limit is exceeded, then system reboot is required to try again.

Note: '/cpwd' cannot be used as stand-alone option.

Change User/Admin Password

SCE supports changing user/admin passwords for BIOS setup. The current admin password needs to be provided using /cpwd.

```
AMISCE /cpwd <current admin password> /apwd <new admin
password> /upwd <new user password>
```

Sample Report

The following program sample illustrates the listing of file content, where the two NVRAM variables shown below contain their Name and GUID. All numeric values are in hexadecimal notation only.

Default Output with Verbose option

```
// Script File Name: script.txt
// Created on 03/15/11 at 04:20:47
// Copyright (c) 2011 American Megatrends, Inc.
// AMISCE Utility.  Ver. 2.01.0025

HIICrc32 = 5CFC3E93

// FORM SET
// GUID     = ec87d643-eba4-4bb5-a1e5-3f3e36b20da9
// Title    = Main
// Help     = System Overview
// Class    = 01
// SubClass = 00

// FORM
// FORM ID  = 01
// Title    = Main

Setup Question    = System Language
Token =00   // Do NOT change this line
Offset      =00
```

```
Width =02
BIOS Default      = [0] N/A
MFG Default = [0] N/A
Options     = *[00] English

// FORM SET
// GUID     = ec87d643-eba4-4bb5-a1e5-3f3e36b20da9
// Title    = Advanced
// Help     = Advanced Settings
// Class    = 02
// SubClass = 00

// FORM
// FORM ID  = 02
// Title    = Advanced

Setup Question    = Launch PXE OpROM
Token =00   // Do NOT change this line
Offset      =1B
Width =01
BIOS Default      = 00
MFG Default = 01
Value =1

// Subtitle = PCI Common Settings

Setup Question    = PCI Latency Timer
Token =00   // Do NOT change this line
Offset      =03
Width =01
BIOS Default      = [20]32 PCI Bus Clocks
MFG Default = [20]32 PCI Bus Clocks
Options     =*[20]32 PCI Bus Clocks // Move "*" to the desired Option
          [40]64 PCI Bus Clocks
          [60]96 PCI Bus Clocks
          [80]128 PCI Bus Clocks
          [A0]160 PCI Bus Clocks
          [C0]192 PCI Bus Clocks
          [E0]224 PCI Bus Clocks
          [F8]248 PCI Bus Clocks

Setup Question    = Setup Prompt Timeout
Token =00   // Do NOT change this line
Offset      =00
Width =02
BIOS Default      = 01
MFG Default = 01
Value =05
Setup Question    = Boot Option #
Token =00   // Do NOT change this line
Offset      =00
Width =02
BIOS Default      = [0] N/A
MFG Default = [0] N/A
```

```
ListOrder   = [0001] Built-in EFI Shell
              [0000] Hard Drive
              [0003] UEFI: PNY USB 2.0 FD PMAP
              [0002] CD/DVD Drive
```

Raw Mode Outputs

Variable Listing File

```
[VARIABLE]
VARIABLE_NAME = MonotonicCounter
VARIABLE_GUID = 8be4df61-93ca-11d2-aa0d-00e098032b8c

[VARIABLE]
VARIABLE_NAME = SetupCpuFeatures
VARIABLE_GUID = ec87d643-eba4-4bb5-a1e5-3f3e36b20da9
```

The following sample illustrates the script file content, where the two types of NVRAM variables shown below contain their GUID, Attribute, Name and the data.

```
Version
00000001
HiiCrc32
2b147ed6

GUID
8be4df61-93ca-11d2-aa-0d-00-e0-98-03-2b-8c
Attributes
00000007
VariableName
MonotonicCounter
VariableData
06 00 00 00

      GUID
61dfe48b-ca93-d211-aa-0d-00-e0-98-03-2b-8c
Attributes
00000007
VariableName
SetupCpuFeatures
VariableData
00 00 01 00 01 00 01 01 00
```

Instructions on using AMISCE

Default Mode Usage (/s)

- From CMD line environment execute AMISCE using the following command to generate the NVRAM script file:

```
'AMISCE /o /s <NVRAM.txt> [/h <Hii.db>] [/b] [/v] [/lang <en-US>]
[/sp] [/g]'
```

Where,

NVRAM.txt – NVRAM script file

Hii.db – HII dump output file

en-US - Language code for English.

- Now open the generated script file and modify the required setup question value and save the modifications. You should remove any setup questions that you do not wish to update.
- Now from CMD line environment execute the following command:

```
AMISCE /i /s <NVRAM.txt> [/r] [/b] [/lang <en-US>]
```

Where,

NVRAM.txt – NVRAM script file

en-US - Language code for English.

- The new settings are updated into the NVRAM.
- The default export behavior without /b option will be not to export boot order controls. To enable exporting of boot order controls provide /b option.
- The default import behavior without /r option will not check whether CRC32 of host HII IFR packs is identical to the CRC32 in the advanced script file. To enable the verification of CRC32 value provide /r option.
- AMISCE will evaluate individual setup question expression , it will export the setup question into script file depends on the result, If the result obtained is suppress then that setup question will not be exported to the script file. Currently AMISCE supporting Suppress if alone. All the other conditions will not be evaluated by AMISCE.

Note: In order to evaluate the expression properly, the dependent NVRAM variable of the setup question should have runtime access.

Output script file will not have the suppressed setup questions.

- If /sp command is given while export operation and if expression evaluation results in suppress then AMISCE will not export the setup question to the script file. If /g command is given while export operation and if expression evaluation results in grayout, then AMISCE will not export the setup question to the script file.
- AMISCE will export setup questions with mapstring if /lang option is provided. While importing if /lang option is there, it will check for setup question prompt and mapstring alone between advanced script file and host system.

For example, if in the script file a setup question is like :

```
Setup Question      = Setup Prompt Timeout
Mapstring = BOOT001
```

```
Token    =00    // Do NOT change this line
Offset   =00
Width    =02
BIOS Default   = 01
MFG Default    = 01
Value    =05
```

And the command is given as : SCEWIn.exe /i /s Script.txt /lang , this will check for "Mapstring". If it is not found the application will report an error.

- By default the mapping language is x-AMI so if user gives /lang option alone then it will export setup questions with mapstring and output should contain both English and x-AMI strings. If user provides /lang option with a language code then SCE will check whether that language code strings are there in target machine if it is there it will export setup questions with mapstring and output should contain both English and that language code strings and if not, then will show a warning message and will export setup questions with mapstring value as "NULL".
- While importing if /lang option is there the question matching should be done using the x-AMI string instead of the English string and if user gives /lang option with a language code then question matching should be done using that language code strings.

Note: Some BIOS contain duplicate setup questions. Before importing the script, any duplicate questions should be removed.

Raw Mode Usage (/n)

- AMISCE requires the knowledge of setup question offset to manipulate NVRAM variables. From windows environment execute AMISDE on the target firmware image using the command

```
'AMISDE /i <firmware image> /o <output report> /v'
```

For example,

While manipulating "Pxe Boot Option" setup question, the user can manually select the mode as either Enabled or Disabled by altering the predefined Width (0x0001) in the specified OFFSET value (0x000D) located in the output extracted using AMISDE.

For Disabled Mode,

```
Variable Name
Setup
Variable Data
00 01 20 00 00 00 00 00 01 37 37 37 00 00 02 00
00 FF 00 00 00 00 00 00 00 37 00 00 00 00 00 00
02 00 01 00 01 00 00 00 00 00 00 00 00 00 00 01
```

```
00 03 03 01 FF 01 01 00 08 00 00 00 00 01 00 00
01 01 01 01 FE 00
```

For Enabled Mode,

```
Variable Name
Setup
Variable Data
00 01 20 00 00 00 00 00 01 37 37 37 00 01 02 00
00 FF 00 00 00 00 00 00 00 37 00 00 00 00 00 00
02 00 01 00 01 00 00 00 00 00 00 00 00 00 00 01
00 03 03 01 FF 01 01 00 08 00 00 00 00 01 00 00
01 01 01 01 FE 00
```

- Open the report file and browse for the setup question values that need to be changed. Note down the Variable Name and Variable GUID for the setup questions that need the values changed.
- Now create a Variable Listing file for input to AMISCE with the Variable information collected previously. **Many variables are used for purposes other than setup question data so you should take care to update only the desired variable**. The listing file format is as described above.
- Now from the CMD line environment execute AMISCE using the following command to generate the NVRAM script file:

```
'AMISCE /o /h <Hii.db> /l <Listing.txt> /n <NVRAM.txt>'
```

Where,

Listing.txt – Variable listing file created in the previous step.

Hii.db – HII dump output file

NVRAM.txt - NVRAM variable script output file in ASCII format

- Now open AMISDE report file to get a setup question's offset and width.
- Open the NVRAM script file for modification.
- Get the question's offset and data width, to modify a setup question's value. In the NVRAM script file, locate the correct Variable data, and change the data values. The Variable Data are formatted with 16-bytes in a line with each byte separated by a space.
- Once all the modification to the NVRAM file is done from the CMD line environment, execute the following command to save the values back into NVRAM

```
'AMISCE /i /l Listing.txt /n NVRAM.txt'
```

Where,

Listing.*txt* – *Variable Listing file*

NVRAM.*txt* – *NVRAM variable script file is modified in previous step.*

- The new settings are now updated into the NVRAM.

Note: AMISCE provides a complete listing of all the questions or variables available in the BIOS, and the user can alter/remove any setting in the script according to their needs. Once the script is modifed, they can use their modified script for the installation of these new settings. When importing settings to a different machine you should take care to remove questions that may have values not appropriate for the new environment.

Creating a New NVRAM Variable

Using Raw Mode Export Command generate the list file and nvram script file.

AMISCE /o /c /l list.txt /n nvram.txt /h Hii.db

Now Open the list.txt and add the new variable to listing file like

New Variable

[VARIABLE]
VARIABLE_NAME = XYZ
VARIABLE_GUID = xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx

And Open nvram.txt file and Add new variable, Attributes and Variable Data

New Variable

GUID
xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
Attributes
xxxxxxxx
Variable Name
XYZ
Variable Data
xx xx xx xx xx xx xx .. .. …

Then using import command Import the script file To Update New Variable in NVRAM

AMISCE /i /l List.txt /n nvram.txt

To check whether the new variable is created or not. Then generate list and nvram file again using export command

AMISCE /o /c /l list_new.txt /n nvram_new.txt /h Hii_new.db

Open and check the new variable is present or not in list_new.txt as well as in nvram_new.txt file check variable specified above.

SCE User Password

The BIOS may be optional configured to request a password from the SCE user. The user will receive a password prompt when performing import operations. If the user fails to enter the correct password within the maximum value for the password entry counter configured in the BIOS, he will have to reset the computer to clear the counter.

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Passwords in Aptio

The Aptio BIOS typically stores the passwords encrypted. For UEFI 2.1 BIOS, encryption is always used. The default encryption mechanism may be used; however, there is a hook in the BIOS project that allows for customization of the encryption mechanism. Thus, AMISCE has no way of reproducing the encryption of the BIOS password. However, AMISCE can still be used to replicate passwords on different systems.

Steps to setup a Password

The user can set a password through BIOS setup by following steps outlined below:

1. From BIOS Setup, set the desired password in a system.
2. Boot to an OS and use AMISCE (/o /n options) to extract the variable containing the password. This variable may be different for each BIOS, so the engineer responsible for the BIOS must provide this information. We recommend the use of a listing file ('/l' option) so that the script contains only the desired variable.
3. Use AMISCE (/i /n options) to install that password on other systems.



Note: AMISCE cannot decrypt the password; it is used to apply the password on other systems.

Example for changing Password without providing a Variable

Once the variable is extracted, the variable data corresponding to the particular variable name without inputting a password is displayed in the following format as outlined below,

```
Variable Name
AMITSESetup
Variable Data
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00
```

To create a password, the user must change the variable data of the respective variable name, and install the password using the AMISCE in other systems. The below example shows a variable name with a password provided,

```
Variable Name
AMITSESetup
Variable Data
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 6A 93 87 26 20
BA 6C 4D C7 E0 22 74 7D 07 D8 9A 33 2E 8E C1 E9 54
44 E8 9F 7B FA 0E 55 A2 B0 35 0B C9 66 5C C1 EF 1C
83 00
```

Limitations

AMISCE does not have the encryption mechanism to support encryption. So AMISCE must rely on the BIOS setup such as AMITSE setup, to perform initial encryption. To make sure that the source and destination BIOS uses the same encryption method, set a password on each and verify that the variable has the same value. A possible source of differences is the TSE token for password case independence.

Appendix

BIOS Configuration Requirements

The BIOS Configuration Requirements for AMISCE are outlined below,

- Aptio core version 5.008 for UEFI 2.3 and above
- Requires “SmiVariable” module to be present in the BIOS. The module can be found at:

  Aptio V: $/AptioV/Source/Modules/SmiVariable labeled 5.004_SmiVariable_00 or later
  Aptio 4: $/Alaska/BIN/Modules/SmiVariable labeled 4.6.3_SmiVariable_1.2 or later.
- For update of default values to be effective, the TSE module must be labeled 4.6.2_TSE_2_02_1205_BETA or later (for Aptio 4) and 5.004_AmiTse_13 or later (for Aptio V).
- Enable token ALWAYS_PUBLISH_HII_RESOURCES
- Requires ‘AmiSetupNvLock’ BIOS module for NVRAM variable update protection. The module can be found at:

  Aptio V: $/AptioV/Source/Modules/AMISetupNVLock labeled 5.004_AmiSetupNvLock_1_05 or later
  Aptio 4: $/Alaska/SOURCE/Modules/AMISetupNvLock labeled 4.6.2_AmiSetupNvLock_1_02 or later
- If present, TSE token RT_ACCESS_SUPPORT_IN_HPKTOOL must be enabled.
- Bios version check requires:

  ACPI label ‘ACPI_06’ or later for Aptio V.

  ACPI label ‘4.6.5.0_ACPI_48’ or later for Aptio 4.
- SCE User password requires OFBD module
- SCE Linux under Xen (domain0 only) requires RuntimeMemoryHole Module.

AMISCE displays an error message and exits with an error code if the SmiVariable module is absent.

Error and Warning Messages

AMISCE may give non-fatal warning messages. Warnings may be suppressed using the ***/q*** option in the command line. These are the most common:

1. **Warning in line nnnn**
   Missing Current Setting “*”

Where nnnn is the line number of the input script where the error was detected. This is the first line of the setup question after the line that does not have the "*" character beside any of the option values. The user could have omitted the "*" when editing the script or the question did not have a value when the script was created.

2. **WARNING: Length of string for control (User Name) not updated as the value/defaults specified in the script file doesn't reach the minimum range (1).**

   The string given in the script is shorter than the minimum length specified in the VFR for the control. The usual cause for this is that the string has an initial empty value.

3. **WARNING: Multiple instances of the setup question <Active Processor Cores> exist in the BIOS. The value for the duplicate instance of the question has not been modified (variable: Setup, GUID: ec87d643-eba4-4bb5-a1e5-3f3e36b20da, offset: 3a).**

   In this example AMISCE has detected two or more controls with the same prompt "Active Processor Cores". These are considered to be ambiguous for UEFI 2.0. This warning will not usually appear with a UEFI2.1 BIOS because the token ID is available to distinguish one control from another.

4. **Warning: HII data does not have setup question information**.

   This usually means that the ALWAYS_PUBLISH_HII_RESOURCES token is not set to one. When this is the case, only partial HII data is available unless the user entered the operating environment from boot over ride.

5. **WARNING : Error in writing variable xxxxxxx to NVRAM**

   Where "xxxxxxx" is a variable name. This can often happen when SCE attempts to create a missing variable from the copy of the variable within the StdDefaults variable. If the variable does not have the runtime attribute the write will fail if the variable is protected for security reasons. This warning commonly comes with the "SecureBootEnable" variable.

When AMISCE detects an error condition it will exit after printing the error. These are the likely errors:

1. **Syntax Error in line 172**
   A Typographical error has occurred in the Setup question.

   This error was generated by changing the keyword "Width" to "xWidth" on line number 172.

2. **ERROR:4 - Retrieving HII Database**

   This error is usually caused by absence or old version of the SmiVariable module.

3. **Platform identification failed**

   Indicates FIDT ACPI table could not be found. You may override this with '/d' option for Aptio V. Platform identification depends on ACPI module label 'ACPI_06' or later for Aptio V.

Linux/BSD Pre-Requisites

1. Log in Linux as root otherwise use sudo (if permitted).
2. The compiler suite (gcc) must be installed. If these packages are not installed, the driver CANNOT be built.
3. For most of the distributions, SCE will generate driver without any notification, if it doesn't exist you need to install kernel sources. Also if `Initmem` fails, Please follow point 4.
4. Kernel sources must be installed, *CONFIGURED*, and then compiled. Following are steps to do this:

   a. Find Running Kernel's Configuration File:

   To configure the sources, simply change to the kernel source directory (typically `/lib/modules/$(uname -r)/build`). If it doesn't exist, you need to install kernel source. Typically, the reference configuration for the kernel can be found in the /boot directory with filename '`.config`', '`kernel.config`', or '`vmlinux-2.4.18-3.config`'. Type '`uname -a`' and use the configuration filename that best matches the output from '`uname -a`'. Also, check for `/dev/mem` directory existence. If it doesn't exist, you need to install kernel sources. Normally it comes with the installation unless if the option is deselected.
   On some distributions Red Hat for instance, there is a config directory under `/lib/modules/$(uname -r)/build`.
   Copy this configuration file into the root of the Linux kernel source tree (usually it is `/lib/modules/$(uname -r)/build`). This file must be renamed to "`.config`"(dot config).

   b. Make Your AMI Flash Driver (`amifldrv_mod.o`):
   For most distribution, the command to build the driver is:

   `SCELNX_32 /MAKEDRV`
   Or
   `SCELNX_64/MAKEDRV`
   If your Linux's kernel source tree is under `/lib/modules/$(uname -r)/build`, instead of being in the default path '`/lib/modules/$(uname -r)/build`', then add a KERNEL flag:

   `SCELNX_32 /MAKEDRV KERNEL=/lib/modules/$(uname -r)/build`
   Or
   `SCELNX_64 /MAKEDRV KERNEL=/lib/modules/$(uname -r)/build`

   If KERNEL is omitted, the default path is /lib/modules/$(uname -r)/build. This should work for MOST distributions.


Note: User should use /MAKEDRV to avoid building of the driver every time.

   c. Make Your AMI Flash Driver from driver source files (amifldrv_mod.o):

Using command /GENDRV, it will generate driver source files to specific directory.

AMISCE_32 /GENDRV [Option 1] [Option 2]

Or

AMISCE_64 /GENDRV [Option 1] [Option 2]

Where,
[Option 1]: Specific kernel source 'KERNEL=XXXX' same as the /MAKEDRV
[Option 2]: Specific output directory 'OUTPUT=XXXX'

Generate files as outlined below:

File Name	Description
amiwrap.c	Driver source code.
amiwrap.h	Driver header.
amifldrv.o_shipped	Object file for driver.
Makefile	Makefile

For most distribution, the command to build the driver is: make.

If your Linux's kernel source tree is under `/lib/modules/$(uname -r)/build`, instead of being in the default path '`/lib/modules/$(uname -r)/build`', then add a KERNEL flag:

make KERNEL=/lib/modules/$(uname -r)/build

If KERNEL is omitted, the default is `/lib/modules/$(uname -r)/build`.
This should work for MOST distributions.

d. Check Your Build:
Check the version of running Linux kernel with '`uname -r`'.
Check the version of `amifldrv_mod.o` with '`modinfo amifdrv_mod.o`'.

If they mismatch, you will need to select the correct configuration File (.config), rebuild your kernel, and then rebuild your driver as described in steps a, b, c and d.

REFERENCES

Linux Loadable Kernel Module HOWTO

http://www.linux.org/docs/ldp/howto/Module-HOWTO/index.html

SCE Exit Codes

Exit Code	Description
0x00	Operation completed successfully.
0x0D	Invalid script file.
0x17	Script file CRC check against current BIOS failed.
0x57	Incorrect command line usage.
0x86	Admin password does not exist.
0x82	Password does not match.
0x8F	Password retry count exceeded.
0x9A	Attempt to change password without providing current admin password.

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