UEFI Shell Specification

July 2, 2014

Revision 2.1

Contents

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Revision History

Revision Number	Description	Revision Date
2.0	Initial UEFI release	9/25/08
2.1	Errata/typo corrections	5/01/2014

2.0 Errata A	Numbers indicate Mantis ticket numbers. 464: Basic typographical errata 499 Shell get-function errata 544 Fix ALIAS support 597 binary 100 != 8 607 EFI_SHELL_PROTOCOL.SetCurDir() return value 614 Misformatted table 615 MemMap command incorrectly limits itself 617 Commands missing the 'return values' table 619 DmpStore usage error 623 Dblk command parameter [blocks] has 2 default values 624 Description update in shell initialization steps 644 Echo has no default state 647 cp command has incorrect example 648 Example under Parse command is missing data. 649 Fix shell object name 656 Pipe support corrections 657 Special Character updates 658 Remove -a/-u parameters for the TYPE command 660 Typo's in driver commands 683 Remove ipconfig command 684 Fix table 4 to have all combinations of file redirections. 701 Stall and Vol are not listed in table 1 or 11 757 Remove : from delay parameter to the shell. 758 Remove leading zeroes from time commands 766 Remove ability of nested "for" statements with identical variables. 798 Remove smiley face 799 Clarify "Lasterror" environment variable usage. 875 Clarify reset command description. 883 BCFG command has errors in parameter description	5/22/12

2.1	910 Add dynamic registration of GUIDS 911Add dynamic commands 929 Typo in description of dmpstore command 1057 UEFI Shell Spec Version #define 1087 UEFI Shell Updates: table typos and add .GetEnvEX 1107 Clarification on variable and alias substitution 1108 .nsh script execution interrupt behavior 1138 Update to allow # comments on the command-line	05/01/14

1 Introduction

1.1 Overview

The UEFI Shell environment provides an API, a command prompt and a rich set of commands that extend and enhance the UEFI Shell's capability.

1.2 Related Information

The following publications and sources of information may be useful or are referred to by this document:

Extensible Firmware Interface Specification, Version 1.10, Intel, 2001, http://developer.intel.com/technology/efi.

Unified Extensible Firmware Interface Specification, Version 2.0, Unified EFI, Inc, 2006, http://www.uefi.org.

Intel® Platform Innovation Framework for EFI Specifications, Intel, 2006, http://www.intel.com/technology/framework/.

1.3 Terms

EFI

Generic term that refers to one of the versions of the EFI specification: EFI 1.02, EFI 1.10, or UEFI 2.0.

EFI 1.10 Specification

Intel Corporation published the Extensible Firmware Interface Specification. It has been supplanted by the Unified Extensible Firmware Interface (UEFI), which is controlled by the UEFI Forum.

GUID

Globally Unique Identifier. A 128-bit value used to name entities uniquely. Without the help of a centralized authority, an individual can generate a unique GUID. This allows the generation of names that will never conflict, even among multiple, unrelated parties.

Protocol

An API named by a GUID as defined by the *UEFI Specification*.

UEFI Application

An application following the UEFI specification. The only difference between a UEFI application and a UEFI driver is that an application is unloaded from memory when it exits regardless of return status, while a driver that returns a successful return status is not unloaded when its entry point exits.

UEFI Driver

A driver following the UEFI specification driver model.

UEFI Specification Version 2.0

The first UEFI specification released by the Unified EFI Forum.

UEFI Specification Version 2.1

Current version of the UEFI specification released by the Unified EFI Forum.

Unified EFI Forum

A non-profit collaborative trade organization formed to promote and manage the UEFI standard. For more information, see www.uefi.org.

2
Code Definitions

2.1 Introduction

2.2 EFI_SHELL_PROTOCOL

EFI_SHELL_PROTOCOL

Summary

Provides shell services to UEFI applications.

Related Definitions

```
#define EFI_SHELL_MAJOR_VERSION 2
#define EFI_SHELL_MINOR_VERSION 1
```

GUID

```
#define EFI_SHELL_PROTOCOL_GUID \
  { 0x6302d008, 0x7f9b, 0x4f30, \
  { 0x87, 0xac, 0x60, 0xc9, 0xfe, 0xf5, 0xda, 0x4e } }
```

Protocol Interface Structure

```
typedef struct _EFI_SHELL_PROTOCOL {
  EFI_SHELL_EXECUTE                       Execute;
  EFI_SHELL_GET_ENV                       GetEnv;
  EFI_SHELL_SET_ENV                       SetEnv;
  EFI_SHELL_GET_ALIAS                     GetAlias;
  EFI_SHELL_SET_ALIAS                     SetAlias;
  EFI_SHELL_GET_HELP_TEXT                 GetHelpText;
  EFI_SHELL_GET_DEVICE_PATH_FROM_MAP      GetDevicePathFromMap;
  EFI_SHELL_GET_MAP_FROM_DEVICE_PATH      GetMapFromDevicePath;
  EFI_SHELL_GET_DEVICE_PATH_FROM_FILE_PATH GetDevicePathFromFilePath;
  EFI_SHELL_GET_FILE_PATH_FROM_DEVICE_PATH GetFilePathFromDevicePath;
   EFI_SHELL_SET_MAP                            SetMap;

  EFI_SHELL_GET_CUR_DIR                   GetCurDir;
  EFI_SHELL_SET_CUR_DIR                   SetCurDir;
  EFI_SHELL_OPEN_FILE_LIST                OpenFileList;
  EFI_SHELL_FREE_FILE_LIST                FreeFileList;
  EFI_SHELL_REMOVE_DUP_IN_FILE_LIST       RemoveDupInFileList;

  EFI_SHELL_BATCH_IS_ACTIVE               BatchIsActive;
  EFI_SHELL_IS_ROOT_SHELL                 IsRootShell;
  EFI_SHELL_ENABLE_PAGE_BREAK             EnablePageBreak;
  EFI_SHELL_DISABLE_PAGE_BREAK            DisablePageBreak;
  EFI_SHELL_GET_PAGE_BREAK                GetPageBreak;
  EFI_SHELL_GET_DEVICE_NAME               GetDeviceName;

  EFI_SHELL_GET_FILE_INFO                 GetFileInfo;
  EFI_SHELL_SET_FILE_INFO                 SetFileInfo;
  EFI_SHELL_OPEN_FILE_BY_NAME             OpenFileByName;
  EFI_SHELL_CLOSE_FILE                    CloseFile;
  EFI_SHELL_CREATE_FILE                   CreateFile;
  EFI_SHELL_READ_FILE                     ReadFile;
  EFI_SHELL_WRITE_FILE                    WriteFile;
  EFI_SHELL_DELETE_FILE                   DeleteFile;
  EFI_SHELL_DELETE_FILE_BY_NAME           DeleteFileByName;
  EFI_SHELL_GET_FILE_POSITION             GetFilePosition;
  EFI_SHELL_SET_FILE_POSITION             SetFilePosition;
  EFI_SHELL_FLUSH_FILE                    FlushFile;
  EFI_SHELL_FIND_FILES                    FindFiles;
  EFI_SHELL_FIND_FILES_IN_DIR             FindFilesInDir;
  EFI_SHELL_GET_FILE_SIZE                 GetFileSize;

  EFI_SHELL_OPEN_ROOT                     OpenRoot;
  EFI_SHELL_OPEN_ROOT_BY_HANDLE           OpenRootByHandle;
```

```
  EFI_EVENT                         ExecutionBreak;

  UINT32                            MajorVersion;
  UINT32                            MinorVersion;
  EFI_SHELL_REGISTER_GUID_NAME      RegisterGuidName;
  EFI_SHELL_GET_GUID_NAME           GetGuidName;
  EFI_SHELL_GET_GUID_FROM_NAME      GetGuidFromName;
  EFI_SHELL_GET_ENV_EX              GetEnvEx;
                                   // Added for Shell 2.1
} EFI_SHELL_PROTOCOL;
```

Members

Execute

Causes the shell to parse and execute the command line. See the **Execute()** function description below.

GetEnv

Gets the environment variable. See the **GetEnv()** function description below.

SetEnv

Changes a specific environment variable. Set the **SetEnv()** function description below.

GetAlias

Retrieves the alias for a specific shell command. See the **GetAlias()** function description below.

SetAlias

Adds or removes the alias for a specific shell command. See the **SetAlias()** function description below.

GetDevicePathFromMap

Returns the device path that corresponds to a mapping. See the **GetDevicePathFromMap()** function description below.

GetMapFromDevicePath

Returns the mapping that corresponds to a particular device path. See the **GetMapFromDevicePath()** function description below.

GetDevicePathFromFilePath

Converts a file path to a device path, where all mappings have been replaced with the corresponding device paths.

GetFilePathFromDevicePath

Converts a device path to a file path, where the portion of the device path corresponding to one of the mappings is replaced with that mapping.

SetMap

Creates, updates or deletes a mapping between a device and a device path.

GetCurDir

Returns the current directory on a device. See the Get**CurDir()** function description below.

SetCurDir

Changes the current directory on a device. Set the **SetCurDir()** function description below.

OpenFileList

Opens the files that match the path pattern specified. See the **OpenFileList()** function description below.

FreeFileList

Frees the file list that created by **OpenFileList()**. See the **FreeFileList()** function description below.

RemoveDupInFileList

Deletes the duplicate files in the given file list. See the **RemoveDupInFileList()** function description below.

BatchIsActive

Returns whether any script files are currently being processed. See the **BatchIsActive()** function description below.

IsRootShell

Judges whether the active Shell is the root shell. See the **IsRootShell()** function description below.

EnablePageBreak

Enables the page break output mode. See the **EnablePageBreak()** function description below.

DisablePageBreak

Disables the page break output mode. See the **DisablePageBreak()** function description below.

GetPageBreak

Gets the enable status of the page break output mode. See the **GetPageBreak()** function description below.

GetDeviceName

Gets the name of the device specified by the device handle. See the **GetDeviceName()** function description below.

GetFileInfo

Return information about a specific file handle. See the **GetFileInfo()** function description below.

SetFileInfo

Change information about a specific file handle. See the **SetFileInfo()** function description below.

OpenFileByName

Given a file name, open a file and return a file handle. See the **OpenFileByName()** description below.

CloseFile

Close an open file. See the **CloseFile()** description below.

CreateFile

Create a new file. See the **CreateFile()** function description.

ReadFile

Read data from a file. See the **ReadFile()** function description.

WriteFile

Write data to a file. See the **WriteFile()** function description.

DeleteFile

Delete a file. See the **DeleteFile()** function description.

DeleteFileByName

Delete a file by name. See the **DeleteFileByName()** function description.

SetFilePosition

Change the current read/write position within a file. See the **SetFilePosition()** function description.

GetFilePosition

Return the current read/write position within a file. See the **GetFilePosition()** function description.

FlushFile

Write all buffered data to a file. See the **FlushFile()** function description.

FindFiles

Return all files that match a pattern in a file list. See the **FindFiles()** function description.

FindFilesInDir

Return all files in a specified directory in a file list. See the **FindFilesInDir()** function description.

GetFileSize

Return the size of a file. See the **GetFileSize()** function description.

OpenRoot

Return the root directory of a file system. See the **OpenRoot()** function description.

OpenRootByHandle

Return the root directory of a file system on a particular handle. See the **OpenRootByHandle()** function description.

ExecutionBreak

Event signaled by the UEFI Shell when the user presses CTRL-C to indicate that the current UEFI Shell command execution should be interrupted.

MajorVersion

This field contains the **EFI_SHELL_MAJOR_VERSION** value referenced in the related definitions section. This will define what functions are available in the protocol.

MinorVersion

This field contains the **EFI_SHELL_MINOR_VERSION** value referenced in the related definitions section. This will define what functions are available in the protocol.

RegisterGuidName

Register a GUID and a localized human readable name for it.

GetGuidName

Get the human readable name for a GUID from the value.

GetGuidFromName

Get the GUID value from a human readable name.

GetEnvEx

Gets the environment variable and Attributes. See the **GetEnvEx()** function description below.

Description

This protocol gives UEFI shell applications access to the low-level shell functions, including: * Files, * Pipes, * Environment Variables, * The current working directory, * Mappings, * Help Text, * Aliases, * Launching shell applications and scripts.

EFI_SHELL_PROTOCOL.BatchIsActive()

Summary

Returns whether any script files are currently being processed.

Prototype

```
typedef
BOOLEAN
(EFIAPI *EFI_SHELL_BATCH_IS_ACTIVE) (
  VOID
  );
```

Parameters

None

Description

This function tells whether any script files are currently being processed

Status Codes Returned

TRUE	There is at least one script file active.
FALSE	No script files are active now.

EFI_SHELL_PROTOCOL.CloseFile()

Summary

Closes the file handle.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_CLOSE_FILE)(
  IN SHELL_FILE_HANDLE     FileHandle
  );
```

Parameters

FileHandle

The file handle to be closed

Description

This function closes a specified file handle. All "dirty" cached file data is flushed to the device, and the file is closed. In all cases, the handle is closed.

Status Codes Returned

EFI_SUCCESS	The file is closed successfully

EFI_SHELL_PROTOCOL.CreateFile()

Summary

Creates a file or directory by name.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_CREATE_FILE)(
  IN  CONST CHAR16      *FileName,
  IN  UINT64            FileAttribs,
  OUT SHELL_FILE_HANDLE *FileHandle
  );
```

Parameters

FileName

Points to the null-terminated file path.

FileAttribs

The new file's attributes. The different attributes are described in **EFI_FILE_PROTOCOL.Open()**.

FileHandle

On return, points to the created file or directory's handle.

Description

This function creates an empty new file or directory with the specified attributes and returns the new file's handle. If the file already exists and is read-only, then **EFI_INVALID_PARAMETER** will be returned.

If the file already existed, it is truncated and its attributes updated. If the file is created successfully, the *FileHandle* is the file's handle, else, the *FileHandle* is **NULL**.

If the file name begins with >v, then the file handle which is returned refers to the shell environment variable with the specified name. If the shell environment variable already exists and is non-volatile then **EFI_INVALID_PARAMETER** is returned.

Status Codes Returned

EFI_SUCCESS	The file was opened. *FileHandle* points to the new file's handle.
EFI_INVALID_PARAMETER	One of the parameters has an invalid value.
EFI_UNSUPPORTED	Could not open the file path.
EFI_NOT_FOUND	The specified file could not be found on the device, or

	could not find the file system on the device.
EFI_NO_MEDIA	The device has no medium.
EFI_MEDIA_CHANGED	The device has a different medium in it or the medium is no longer supported.
EFI_DEVICE_ERROR	The device reported an error or can't get the file path according the *DirName*.
EFI_VOLUME_CORRUPTED	The file system structures are corrupted.
EFI_WRITE_PROTECTED	An attempt was made to create a file, or open a file for write when the media is write-protected.
EFI_ACCESS_DENIED	The service denied access to the file.
EFI_OUT_OF_RESOURCES	Not enough resources were available to open the file.
EFI_VOLUME_FULL	The volume is full.

EFI_SHELL_PROTOCOL.DeleteFile()

Summary

Deletes the file specified by the file handle.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_DELETE_FILE)(
  IN SHELL_FILE_HANDLE FileHandle
  );
```

Parameters

FileHandle

The file handle to delete.

Description

This function closes and deletes a file. In all cases, the file handle is closed. If the file cannot be deleted, the warning code **EFI_WARN_DELETE_FAILURE** is returned, but the handle is still closed.

Status Codes Returned

EFI_SUCCESS	The file was closed and deleted, and the handle was closed.
EFI_WARN_DELETE_FAILURE	The handle was closed but the file was not deleted.

EFI_SHELL_PROTOCOL.DeleteFileByName()

Summary

Deletes the file specified by the file handle.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_DELETE_FILE_BY_NAME)(
  IN CONST CHAR16   *FileName
  );
```

Parameters

FileName

Points to the null-terminated file name.

Description

This function deletes a file.

Status Codes Returned

EFI_SUCCESS	The file was closed and deleted, and the handle was closed.
EFI_WARN_DELETE_FAILURE	The handle was closed but the file was not deleted.

EFI_SHELL_PROTOCOL.DisablePageBreak()

Summary

Disables the page break output mode.

Prototype

```
typedef
VOID
(EFIAPI *EFI_SHELL_DISABLE_PAGE_BREAK) (
  VOID
  );
```

Parameters

None

Description

This function disables the page break output mode.

Status Codes Returned

None

EFI_SHELL_PROTOCOL.EnablePageBreak()

Summary

Enables the page break output mode.

Prototype

```
typedef
VOID
(EFIAPI *EFI_SHELL_ENABLE_PAGE_BREAK) (
  VOID
  );
```

Parameters

None

Description

This function enables the page break output mode.

Status Codes Returned

None

EFI_SHELL_PROTOCOL.Execute()

Summary

Execute the command line.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_EXECUTE) (
  IN  EFI_HANDLE          *ParentImageHandle,
  IN  CHAR16              *CommandLine OPTIONAL,
  IN  CHAR16             **Environment OPTIONAL,
  OUT EFI_STATUS          *StatusCode OPTIONAL
);
```

Parameters

ParentImageHandle

A handle of the image that is executing the specified command line.

CommandLine

Points to the null-terminated UCS-2 encoded string containing the command line. If NULL then the command-line will be empty.

Environment

Points to a null-terminated array of environment variables with the format 'x=y', where x is the environment variable name and y is the value. If this is NULL, then the current shell environment is used.

ErrorCode

Points to the status code returned by the command.

Description

This function creates a nested instance of the shell and executes the specified command (CommandLine) with the specified environment (Environment). Upon return, the status code returned by the specified command is placed in StatusCode.

If *Environment* is **NULL**, then the current environment is used and all changes made by the commands executed will be reflected in the current environment. If the *Environment* is non-**NULL**, then the changes made will be discarded.

The *CommandLine* is executed from the current working directory on the current device.

Status Codes Returned

EFI_SUCCESS	The command executed successfully. The status code returned by the command is pointed to by *StatusCode*.
EFI_INVALID_PARAMETER	The parameters are invalid.
EFI_OUT_OF_RESOURCES	Out of resources.
EFI_UNSUPPORTED	Nested shell invocations are not allowed.
EFI_UNSUPPORTED	Shell scripts are not supported by this UEFI shell (see "Levels of Support", section 3.1)

EFI_SHELL_PROTOCOL.FindFiles()

Summary

Find files that match a specified pattern.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_FIND_FILES)(
  IN  CONST CHAR16        *FilePattern,
  OUT EFI_SHELL_FILE_INFO **FileList
);
```

Parameters

FilePattern

Points to a null-terminated shell file path, including wildcards.

FileList

On return, points to the start of a file list containing the names of all matching files or else points to NULL if no matching files were found.

Description

This function searches for all files and directories that match the specified *FilePattern*. The *FilePattern* can contain wild-card characters. The resulting file information is placed in the file list *FileList*.

The files in the file list are not opened. The OpenMode field is set to 0 and the FileInfo field is set to NULL.

Status Codes Returned

EFI_SUCCESS	Files found.
EFI_NOT_FOUND	No files found.
EFI_NO_MEDIA	The device has no media
EFI_DEVICE_ERROR	The device reported an error
EFI_VOLUME_CORRUPTED	The file system structures are corrupted

EFI_SHELL_PROTOCOL.FindFilesInDir()

Summary

Find all files in a specified directory.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_FIND_FILES_IN_DIR)(
  IN  SHELL_FILE_HANDLE     FileDirHandle,
  OUT EFI_SHELL_FILE_INFO   **FileList
  );
```

Parameters

FileDirHandle

Handle of the directory to search.

FileList

On return, points to the list of files in the directory or NULL if there are no files in the directory.

Status Codes Returned

EFI_SUCCESS	File information was returned successfully.
EFI_VOLUME_CORRUPTED	The file system structures have been corrupted.
EFI_DEVICE_ERROR	The device reported an error.
EFI_NO_MEDIA	The device media is not present.

EFI_SHELL_PROTOCOL.FlushFile()

Summary

Flushes data back to a device

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_FLUSH_FILE)(
  IN SHELL_FILE_HANDLE FileHandle
  );
```

Parameters

FileHandle

The handle of the file to flush.

Description

This function flushes all modified data associated with a file to a device.

Status Codes Returned

EFI_SUCCESS	The data was flushed.
EFI_NO_MEDIA	The device has no medium.
EFI_DEVICE_ERROR	The device reported an error.
EFI_VOLUME_CORRUPTED	The file system structures are corrupted.
EFI_WRITE_PROTECTED	The file or medium is write-protected.
EFI_ACCESS_DENIED	The file was opened read-only.
EFI_VOLUME_FULL	The volume is full.

EFI_SHELL_PROTOCOL.FreeFileList()

Summary

Frees the file list.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_FREE_FILE_LIST) (
  IN EFI_SHELL_FILE_INFO **FileList
  );
```

Parameters

FileList

The file list to free. Type EFI_SHELL_FILE_INFO is defined in OpenFileList()

Description

This function cleans up the file list and any related data structures. It has no impact on the files themselves.

Status Codes Returned

EFI_SUCCESS	Free the file list successfully.

EFI_SHELL_PROTOCOL.GetAlias()

Summary

Retrieves a shell command alias.

Prototype

```
typedef
CONST CHAR 16 *
(EFIAPI *EFI_SHELL_GET_ALIAS)(
  IN  CONST CHAR16     *Alias
  OUT BOOLEAN          *Volatile OPTIONAL
  );
```

Parameters

Alias

Points to the null-terminated alias. If *Alias* is not **NULL**, this function returns the associated null-terminated command. If *Alias* is **NULL**, this function returns a ';' delimited list of all the defined aliases (e.g. ReturnedData = "md;rd;cp;mfp") that is null-terminated.

Volatile

If the return value is not **NULL** and *Alias* is not **NULL**, the *Volatile* parameter being **TRUE** indicates that the *Alias* is stored in a volatile fashion. If the return value is not **NULL** and *Alias* is not **NULL**, the *Volatile* parameter being **FALSE** indicates that the *Alias* is stored in a non-volatile fashion. For all other situations, this output parameter must be ignored.

Description

This function returns the alias associated with a command. I

Status Codes Returned

NULL	The command referenced doesn't exist.
≠NULL	The command could successfully returned.

EFI_SHELL_PROTOCOL.GetCurDir()

Summary

Returns the current directory on the specified device.

Prototype

```
typedef
CONST CHAR16 *
(EFIAPI *EFI_SHELL_GET_CUR_DIR) (
  IN CONST CHAR16 *FileSystemMapping OPTIONAL
  );
```

Parameters

FileSystemMapping

A pointer to the file system mapping. If **NULL**, then the current working directory is returned.

Description

If *FileSystemMapping* is **NULL**, it returns the current working directory. If the *FileSystemMapping* is not **NULL**, it returns the current directory associated with the *FileSystemMapping*. In both cases, the returned name includes the file system mapping (i.e. **fs0:\current-dir**).

For more information, see "Current Directory", section3.5.

Status Codes Returned

EFI_SUCCESS	The current directory.
EFI_NOT_FOUND	Current directory does not exist.

EFI_SHELL_PROTOCOL.GetDeviceName()

Summary

Gets the name of the device specified by the device handle.

Prototype

```
typedef
EFI_STATUS
(*EFI_SHELL_GET_DEVICE_NAME) (
  IN  EFI_HANDLE                 DeviceHandle,
  IN  EFI_SHELL_DEVICE_NAME_FLAGS Flags,
  IN  CHAR8                      *Language,
  OUT CHAR16                     **BestDeviceName
  );
```

Parameters

DeviceHandle

The handle of the device.

Flags

Determines the possible sources of component names. See "Related Definitions" below for more information.

Language

A pointer to the language specified for the device name, in the same format as described in the UEFI specification, Appendix M

BestDeviceName

On return, points to the callee-allocated null-terminated name of the device. If no device name could be found, points to NULL. The name must be freed by the caller..

Description

This function gets the user-readable name of the device specified by the device handle. If no user-readable name could be generated, then ***BestDeviceName** will be **NULL** and **EFI_NOT_FOUND** will be returned.

The

Related Definitions

```
typedef UINT32 EFI_DEVICE_NAME_FLAGS;
#define EFI_DEVICE_NAME_USE_COMPONENT_NAME 0x00000001
#define EFI_DEVICE_NAME_USE_DEVICE_PATH    0x00000002
```

If **EFI_DEVICE_NAME_USE_COMPONENT_NAME** is set, then the function will return the device's name using the **EFI_COMPONENT_NAME2_PROTOCOL**, if present on *DeviceHandle*.

If **EFI_DEVICE_NAME_USE_DEVICE_PATH** is set, then the function will return the device's name using the **EFI_DEVICE_PATH_PROTOCOL**, if present on *DeviceHandle*.

If both **EFI_DEVICE_NAME_USE_COMPONENT_NAME** and **EFI_DEVICE_NAME_USE_DEVICE_PATH** are set, then **EFI_DEVICE_NAME_USE_COMPONENT_NAME** will have higher priority.

Status Codes Returned

EFI_SUCCESS	Get the name successfully.
EFI_NOT_FOUND	Fail to get the device name.

EFI_SHELL_PROTOCOL.GetDevicePathFromMap()

Summary

Gets the device path from the mapping.

Prototype

```
typedef
CONST EFI_DEVICE_PATH_PROTOCOL *
(EFIAPI *EFI_SHELL_GET_DEVICE_PATH_FROM_MAP) (
  IN CONST CHAR16 *Mapping
  );
```

Parameters

Mapping

A pointer to the mapping.

Description

This function gets the device path associated with a mapping.

Status Codes Returned

≠NULL	Pointer to the device path that corresponds to the device mapping. The returned pointer does not need to be freed.
NULL	There is no device path associated with the specified mapping.

EFI_SHELL_PROTOCOL.GetDevicePathFromFilePath()

Summary

Converts a file system style name to a device path.

Prototype

```
typedef
EFI_DEVICE_PATH_PROTOCOL *
(EFIAPI *EFI_SHELL_GET_DEVICE_PATH_FROM_FILE_PATH) (
  IN CONST CHAR16 *Path
  );
```

Parameters

Path

The pointer to the path.

Description

This function converts a file system style name to a device path, by replacing any mapping references to the associated device path.

Status Codes Returned

The pointer of the file path. The file path is callee allocated and should be freed by the caller.

EFI_SHELL_PROTOCOL.GetEnv()

Summary

Gets the environment variable or list of environment variables.

Prototype

```
typedef
CONST CHAR16 *
(EFIAPI *EFI_SHELL_GET_ENV) (
  IN CONST CHAR16  *Name
  );
```

Parameters

Name

A pointer to the environment variable name. If *Name* is **NULL**, then the function
will return all of the defined shell environment variables. In the case where multiple environment variables are being returned, each variable will be terminated by a **NULL**,and the list will be terminated by a double **NULL**.

Description

This function returns the current value of the specified environment variable. If no variable name was specified, then all of the known variables will be returned.

Status Codes Returned

≠NULL	The environment variable's value. The returned pointer does not need to be freed by the caller.
NULL	The environment variable doesn't exist.

EFI_SHELL_PROTOCOL.GetEnvEx()

Summary

Gets the environment variable and Attributes, or list of environment variables. Can be used instead of **GetEnv()**.

Prototype

```
typedef
CONST CHAR16 *
(EFIAPI *EFI_SHELL_GET_ENV_EX) (
IN CONST CHAR16          *Name,
OUT UINT32               *Attributes OPTIONAL
);
```

Parameters

Name

A pointer to the environment variable name. If *Name* is **NULL**, then the function will return all of the defined shell environment variables. In the case where multiple environment variables are being returned, each variable will be terminated by a **NULL**, and the list will be terminated by a double **NULL**.

Attributes

If not **NULL**, a pointer to the returned attributes bitmask for the environment variable. In the case where *Name* is **NULL**, and multiple environment variables are being returned, *Attributes* is undefined.

Description

This function returns the current value of the specified environment variable and the *Attributes*. If no variable name was specified, then all of the known variables will be returned.

Status Codes Returned

≠NULL	The environment variable's value. The returned pointer does not need to be freed by the caller.
NULL	The environment variable doesn't exist.

EFI_SHELL_PROTOCOL.GetFileInfo()

Summary

Gets the file information from an open file handle.

Prototype

```
typedef
EFI_FILE_INFO *
(EFIAPI *EFI_SHELL_GET_FILE_INFO)(
  IN SHELL_FILE_HANDLE      FileHandle
  );
```

Parameters

FileHandle

A file handle

Description

This function allocates a buffer to store the file's information. It's the caller's responsibility to free the buffer.

Returns

≠NULL	A pointer to a buffer with file information.
NULL	Cannot get the file info.

EFI_SHELL_PROTOCOL.GetFilePathFromDevicePath()

Summary

Converts a device path to a file system-style path.

Prototype

```
typedef
CHAR16 *
(EFIAPI *EFI_SHELL_GET_FILE_PATH_FROM_DEVICE_PATH) (
  IN CONST EFI_DEVICE_PATH_PROTOCOL *Path
  );
```

Parameters

Path

The pointer to the device path.

Description

This function converts a device path to a file system path by replacing part, or all, of the device path with the file-system mapping. If there are more than one application file system mappings, the one that most closely matches *Path* will be used.

Returned Value

The pointer of the null-terminated file path. The path is callee-allocated and should be freed by the caller.

EFI_SHELL_PROTOCOL.GetFilePosition()

Summary

Gets a file's current position

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_GET_FILE_POSITION)(
  IN  SHELL_FILE_HANDLE  FileHandle,
  OUT UINT64             *Position
  );
```

Parameters

FileHandle

The file handle on which to get the current position.

Position

Byte position from the start of the file

Description

This function returns the current file position for the file handle. For directories, the current file position has no meaning outside of the file system driver and as such, the operation is not supported.

Status Codes Returns

EFI_SUCCESS	Data was accessed.
EFI_UNSUPPORTED	The request is not valid on open directories.

EFI_SHELL_PROTOCOL.GetFileSize()

Summary

Gets the size of a file.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_GET_FILE_SIZE)(
  IN  SHELL_FILE_HANDLE   FileHandle,
  OUT UINT64              *Size
  );
```

Parameters

FileHandle

The handle of the file.

Size

The size of this file.

Description

This function returns the size of the file specified by *FileHandle*.

Status Codes Returned

EFI_SUCCESS	Get the file's size.
EFI_DEVICE_ERROR	Can't access the file.

EFI_SHELL_PROTOCOL.GetGuidFromName()

Summary

Get the GUID value from a human readable name.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_GET_GUID_FROM_NAME)(
  IN  CONST CHAR16   *GuidName,
  OUT       EFI_GUID *Guid
  );
```

Parameters

GuidName

A pointer to the localized name for the GUID being queried.

Guid

A pointer to the GUID structure to be filled in.

Description

If *GuidName* is a known GUID name, then update Guid to have the correct value for that GUID.

This function is only available when the major and minor versions in the EfiShellProtocol are greater than or equal to 2 and 1, respectively.

Status Codes Returned

EFI_SUCCESS	The operation was successful.
EFI_INVALID_PARAMETER	Guid was NULL.
EFI_INVALID_PARAMETER	GuidName was NULL.
EFI_NOT_FOUND	GuidName is not a known GUID Name.

EFI_SHELL_PROTOCOL.GetGuidName()

Summary

Get the human readable name for a GUID from the value.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_GET_GUID_NAME)(
  IN  CONST EFI_GUID *Guid,
  OUT CONST CHAR16   **GuidName
  );
```

Parameters

Guid

A pointer to the GUID being queried.

GuidName

A pointer to a pointer the localized to name for the GUID being requested.

Description

If Guid is assigned a name, then update **GuidName* to point to the name. The callee should not modify the value.

This function is only available when the major and minor versions in the EfiShellProtocol are greater than or equal to 2 and 1, respectively.

Status Codes Returned

EFI_SUCCESS	The operation was successful.
EFI_INVALID_PARAMETER	*Guid* was NULL.
EFI_INVALID_PARAMETER	*GuidName* was NULL.
EFI_NOT_FOUND	*Guid* is not assigned a name.

EFI_SHELL_PROTOCOL.GetHelpText()

Summary

Return help information about a specific command.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_GET_HELP_TEXT) (
  IN  CONST CHAR16 *Command,
  IN  CONST CHAR16 *Sections,
  OUT CHAR16       **HelpText
  );
```

Parameters

Command

Points to the null-terminated UEFI Shell command name.

Sections

Points to the null-terminated comma-delimited section names to return. If NULL, then all sections will be returned.

HelpText

On return, points to a callee-allocated buffer containing all specified help text.

Description

This function returns the help information for the specified command. The help text can be internal to the shell or can be from a UEFI Shell manual page, as described in Appendix B

If Sections is specified, then each section name listed will be compared in a case-sensitive manner, to the section names described in Appendix B. If the section exists, it will be appended to the returned help text. If the section does not exist, no information will be returned. If Sections is NULL, then all help text information available will be returned.

Status Codes Returned

EFI_SUCCESS	The help text was returned.
EFI_OUT_OF_RESOURCES	The necessary buffer could not be allocated to hold the returned help text.
EFI_INVALID_PARAMETER	*HelpText* is NULL
EFI_NOT_FOUND	There is no help text available for *Command*.

EFI_SHELL_PROTOCOL.GetMapFromDevicePath()

Summary

Gets one or more mapping entries that most closely matches the device path.

Prototype

```
typedef
CONST CHAR16 *
(EFIAPI *EFI_SHELL_GET_MAP_FROM_DEVICE_PATH) (
  IN OUT EFI_DEVICE_PATH_PROTOCOL **DevicePath
  );
```

Parameters

DevicePath

On entry, points to a device path pointer. On exit, updates the pointer to point to the portion of the device path after the mapping.

Description

This function gets the mapping which corresponds to the device path ***DevicePath*. If there is no exact match, then the mapping which most closely matches **DevicePath* is returned, and ***DevicePath* is updated to point to the remaining portion of the device path. If there is an exact match, the mapping is returned and ***DevicePath* points to the end-of-device-path node.

Upon discovery of a match, the consistent mapping name will be returned as the first element in the return string. If there are additional mapping names associated with the **DevicePath* the return string will have added to it a "**;**" delimeter followed by each mapping name. For example, a three name mapping return string might look like this "hd5a1b1e;C:;Fred" without the quotes. This includes the consistent name of "hd5a1b1e" and the two alternate names of "C:" and "Fred". The return string will be **NULL** terminated.

Returned Value

!NULL	Pointer to null-terminated mapping. The buffer is callee-allocated and should be freed by the caller.
NULL	No mapping was found.

EFI_SHELL_PROTOCOL.GetPageBreak()

Summary

Gets the enable status of the page break output mode.

Prototype

```
typedef
BOOLEAN
(EFIAPI *EFI_SHELL_GET_PAGE_BREAK) (
  VOID
  );
```

Parameters

None

Description

User can use this function to determine current page break mode.

Status Codes Returned

TRUE	The page break output mode is enabled
FALSE	The page break output mode is disabled

EFI_SHELL_PROTOCOL.IsRootShell()

Summary

Judges whether the active shell is the root shell.

Prototype

```
typedef
BOOLEAN
(EFIAPI *EFI_SHELL_IS_ROOT_SHELL) (
  VOID
  );
```

Parameters

None

Description

This function makes the user to know that whether the active Shell is the root shell.

Status Codes Returned

TRUE	The active Shell is the root Shell.
FALSE	The active Shell is NOT the root Shell.

EFI_SHELL_PROTOCOL.OpenFileByName()

Summary

Opens a file or a directory by file name.

Prototype

```
typdef
EFI_STATUS
(EFIAPI *EFI_SHELL_OPEN_FILE_BY_NAME) (
  IN  CONST CHAR16     *FileName,
  OUT SHELL_FILE_HANDLE  *FileHandle,
  IN  UINT64             OpenMode
  );
```

Parameters

FileName

Points to the null-terminated UCS-2 encoded file name.

FileHandle

On return, points to the file handle.

OpenMode

File open mode. Either **EFI_FILE_MODE_READ** or **EFI_FILE_MODE_WRITE** from section 12.4 of the UEFI Specification.

Related Definitions

```
typedef VOID *SHELL_FILE_HANDLE;
```

Description

This function opens the specified file in the specified *OpenMode* and returns a file handle.

If the file name begins with >v, then the file handle which is returned refers to the shell environment variable with the specified name. If the shell environment variable exists, is non-volatile and the *OpenMode* indicates **EFI_FILE_MODE_WRITE**, then **EFI_INVALID_PARAMETER** is returned.

If the file name is >i, then the file handle which is returned refers to the standard input. If the *OpenMode* indicates **EFI_FILE_MODE_WRITE**, then **EFI_INVALID_PARAMETER** is returned.

If the file name is >o, then the file handle which is returned refers to the standard output. If the *OpenMode* indicates **EFI_FILE_MODE_READ**, then **EFI_INVALID_PARAMETER** is returned.

If the file name is >e, then the file handle which is returned refers to the standard error. If the OpenMode indicates **EFI_FILE_MODE_READ**, then **EFI_INVALID_PARAMETER** is returned.

If the file name is NUL, then the file handle that is returned refers to the standard NUL file. If the *OpenMode* indicates **EFI_FILE_MODE_READ**, then **EFI_INVALID_PARAMETER** is returned.

If return **EFI_SUCCESS**, the *FileHandle* is the opened file's handle, else, the *FileHandle* is **NULL**.

Status Codes Returned

EFI_SUCCESS	The file was opened. *FileHandle* has the opened file's handle.
EFI_INVALID_PARAMETER	One of the parameters has an invalid value. *FileHandle* is NULL.
EFI_UNSUPPORTED	Could not open the file path. *FileHandle* is NULL.
EFI_NOT_FOUND	The specified file could not be found on the device or the file system could not be found on the device. *FileHandle* is NULL.
EFI_NO_MEDIA	The device has no medium. *FileHandle* is NULL.
EFI_MEDIA_CHANGED	The device has a different medium in it or the medium is no longer supported. *FileHandle* is NULL.
EFI_DEVICE_ERROR	The device reported an error or can't get the file path according the *FileName*. *FileHandle* is NULL.
EFI_VOLUME_CORRUPTED	The file system structures are corrupted. *FileHandle* is NULL.
EFI_WRITE_PROTECTED	An attempt was made to create a file, or open a file for write when the media is write-protected. *FileHandle* is NULL.
EFI_ACCESS_DENIED	The service denied access to the file. *FileHandle* is NULL.
EFI_OUT_OF_RESOURCES	Not enough resources were available to open the file. *FileHandle* is NULL.
EFI_VOLUME_FULL	The volume is full. *FileHandle* is NULL.

EFI_SHELL_PROTOCOL.OpenFileList()

Summary

Opens the files that match the path specified.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_OPEN_FILE_LIST) (
  IN     CHAR16              *Path,
  IN     UINT64              OpenMode,
  OUT EFI_SHELL_FILE_INFO    **FileList
  );
```

Parameters

Path

A pointer to the path string.

OpenMode

Specifies the mode used to open each file, EFI_FILE_MODE_READ or EFI_FILE_MODE_WRITE.

FileList

Points to the start of a list of files opened.

Description

This function opens all of the files specified by *Path*. Wildcards are processed according to the rules specified in 3.7.1. Each matching file has an **EFI_SHELL_FILE_INFO** structure created in a linked list.

Related Definitions

```
typedef struct _EFI_LIST_ENTRY {
  struct _EFI_LIST_ENTRY  *Flink;
  struct _EFI_LIST_ENTRY  *Blink;
} EFI_LIST_ENTRY;

typedef struct {
  EFI_LIST_ENTRY             Link;
  EFI_STATUS                 Status;
  CONST CHAR16               *FullName;
  CONST CHAR16               *FileName
  SHELL_FILE_HANDLE          Handle;
  EFI_FILE_INFO              *Info;
} EFI_SHELL_FILE_INFO;
```

Link

Points to the next and previous entries in the file list. If NULL, then no more files.

Status

The status returned when calling OpenFile() for the entry in the file list.

FullName

Specifies the full name of the file, including the path.

Handle

The file handle of the file after it was opened.

Info

The file information for the opened file.

Status Codes Returned

EFI_SUCCESS	Create the file list successfully.
Others	Can’t create the file list.

EFI_SHELL_PROTOCOL.OpenRoot()

Summary

Opens the root directory of a device.

Prototype

```
typedef
EFI_STATUS
(EFIAPI EFI_SHELL_OPEN_ROOT)(
  IN  EFI_DEVICE_PATH_PROTOCOL   *DevicePath
  OUT SHELL_FILE_HANDLE          *FileHandle
  );
```

Parameters

DevicePath

Points to the device path corresponding to the device where the EFI_SIMPLE_FILE_SYSTEM_PROTOCOL is installed.

FileHandle

On exit, points to the file handle corresponding to the root directory on the device.

Description

This function opens the root directory of a device and returns a file handle to it.

Status Codes Returned

EFI_SUCCESS	Root opened successfully.
EFI_NOT_FOUND	EFI_SIMPLE_FILE_SYSTEM could not be found or the root directory could not be opened.
EFI_VOLUME_CORRUPTED	The data structures in the volume were corrupted.
EFI_DEVICE_ERROR	The device had an error

EFI_SHELL_PROTOCOL.OpenRootByHandle()

Summary

Opens the root directory of a device on a handle

Prototype

```
typedef
EFI_STATUS
(EFIAPI EFI_SHELL_OPEN_ROOT_BY_HANDLE)(
  IN  EFI_HANDLE        DeviceHandle,
  OUT SHELL_FILE_HANDLE *FileHandle
  );
```

Parameters

DeviceHandle

The handle of the device that contains the volume.

FileHandle

On exit, points to the file handle corresponding to the root directory on the device.

Description

This function opens the root directory of a device and returns a file handle to it.

Status Codes Returned

EFI_SUCCESS	Root opened successfully.
EFI_NOT_FOUND	**EFI_SIMPLE_FILE_SYSTEM** could not be found or the root directory could not be opened.
EFI_VOLUME_CORRUPTED	The data structures in the volume were corrupted.
EFI_DEVICE_ERROR	The device had an error

EFI_SHELL_PROTOCOL.ReadFile()

Summary

Reads data from the file.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_READ_FILE) (
  IN     SHELL_FILE_HANDLE   FileHandle,
  IN OUT UINTN               *ReadSize,
  OUT    VOID                *Buffer
  );
```

Parameters

FileHandle

The opened file handle for read

ReadSize

On input, the size of *Buffer*, in bytes. On output, the amount of data read.

Buffer

The buffer in which data is read.

Description

If *FileHandle* is not a directory, the function reads the requested number of bytes from the file at the file's current position and returns them in *Buffer*. If the read goes beyond the end of the file, the read length is truncated to the end of the file. The file's current position is increased by the number of bytes returned.

If *FileHandle* is a directory, then an error is returned.

Status Codes Returned

EFI_SUCCESS	Data was read.
EFI_NO_MEDIA	The device has no media
EFI_DEVICE_ERROR	The device reported an error
EFI_VOLUME_CORRUPTED	The file system structures are corrupted
EFI_BUFFER_TO_SMALL	Buffer is too small. *ReadSize* contains required size

EFI_SHELL_PROTOCOL.RegisterGuidName()

Summary

Register a GUID and a localized human readable name for it.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_REGISTER_GUID_NAME)(
  IN  CONST EFI_GUID *Guid,
  IN  CONST CHAR16   *GuidName
  );
```

Parameters

Guid

A pointer to the GUID being registered.

GuidName

A pointer to the localized name for the GUID being registered.

Description

If *Guid* is not assigned a name, then assign *GuidName* to *Guid*. This list of *GUID* names must be used whenever a shell command outputs *GUID* information.

This function is only available when the major and minor versions in the **EfiShellProtocol** are greater than or equal to 2 and 1, respectively.

Status Codes Returned

EFI_SUCCESS	The operation was successful.
EFI_INVALID_PARAMETER	*Guid* was NULL.
EFI_INVALID_PARAMETER	*GuidName* was NULL.
EFI_ACCESS_DENIED	*Guid* already is assigned a name.

EFI_SHELL_PROTOCOL.RemoveDupInFileList()

Summary

Deletes the duplicate file names files in the given file list.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_REMOVE_DUP_IN_FILE_LIST) (
  IN EFI_SHELL_FILE_INFO **FileList
  );
```

Parameters

FileList

A pointer to the first entry in the file list.

Description

This function deletes the reduplicate files in the given file list.

Status Codes Returned

EFI_SUCCESS	Always success.

EFI_SHELL_PROTOCOL.SetAlias()

Summary

Changes a shell command alias.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_ALIAS)(
  IN CONST CHAR16 *Command,
  IN CONST CHAR16 *Alias,
  IN BOOLEAN      Replace
  IN BOOLEAN      Volatile
  );
```

Parameters

Command

Points to the null-terminated shell command or existing alias.

Alias

Points to the null-terminated alias for the shell command. If this is **NULL**, and Command refers to an alias, that alias will be deleted.

Replace

If TRUE and the alias already exists, then the existing alias will be replaced. If FALSE and the alias already exists, then the existing alias is unchanged and EFI_ACCESS_DENIED is returned.

Volatile

If **TRUE**, the Alias being set will be stored in a volatile fashion. If **FALSE**, the Alias will be stored in a nonvolatile fashion.

Description

This function creates an alias for a shell command.

This function creates an additional name for an internal UEFI Shell command or a UEFI Shell application. Aliases can be used to provide alternative commonly used names for existing shell commands or even create shortcuts. An alias is a C-style identifier and may refer to an internal command or else the directory and file name of a UEFI shell application.

Some aliases are built-in (such as ls) and may not be modified. If a built-in alias is specified by Alias, then there are no changes and EFI_ACCESS_DENIED is returned.

If there is already an existing alias with the name Alias and Replace is TRUE, then the existing alias is updated to refer to the new Command. If there is an

existing alias with the name Alias and Replace is FALSE, then there are no changes and EFI_ACCESS_DENIED is returned.

If Command specifies an existing built-in alias and Alias is NULL, then EFI_ACCESS_DENIED is returned. If Command specifies an existing alias and Alias is NULL and Replace is TRUE, then the alias is deleted. If Command specifies an existing alias and Alias is not NULL, then EFI_ACCESS_IS_DENIED is returned.

Return Value

EFI_SUCCESS	Alias created or deleted successfully.
EFI_ACCESS_DENIED	The alias is a built-in alias or the alias already existed and *Replace* had been set to **FALSE**.

EFI_SHELL_PROTOCOL.SetCurDir()

Summary

Changes the current directory on the specified device.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_CUR_DIR) (
  IN CONST CHAR16 *FileSystem OPTIONAL,
  IN CONST CHAR16 *Dir
  );
```

Parameters

FileSystem

A pointer to the file system's mapped name. If **NULL**, then the current working directory is changed.

Dir

Points to the null-terminated directory on the device specified by *FileSystem*.

Description

If the *FileSystem* is **NULL**, and the directory *Dir* does not contain a file system's mapped name, this function changes the current working directory. If *FileSystem* is **NULL** and the directory *Dir* contains a mapped name, then the current file system and the current directory on that file system are changed.

If *FileSystem* is not **NULL**, and Dir is NULL, then this changes the current working file system.

If *FileSystem* is not **NULL** and *Dir* is not **NULL**, then this function changes the current directory on the specified file system.

If the current working directory or the current working file system is changed then the **%cwd%** environment variable will be updated. For more information, see "Current Directory" , section3.5.

Status Codes Returned

EFI_SUCCESS	The command completed successfully.
EFI_NOT_FOUND	The directory does not exist.

EFI_SHELL_PROTOCOL.SetEnv()

Summary

Sets the environment variable.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_ENV) (
  IN CONST CHAR16 *Name,
  IN CONST CHAR16 *Value,
   IN BOOLEAN      Volatile
  );
```

Parameters

Name

Points to the null-terminated environment variable name.

Value

Points to the null-terminated environment variable value. If the value is an empty string then the environment variable is deleted.

Volatile

Indicates whether the variable is non-volatile (**FALSE**) or volatile (**TRUE**).

Description

This function changes the current value of the specified environment variable. If the environment variable exists and the Value is an empty string, then the environment variable is deleted. If the environment variable exists and the Value is not an empty string, then the value of the environment variable is changed. If the environment variable does not exist and the Value is an empty string, there is no action. If the environment variable does not exist and the Value is a non-empty string, then the environment variable is created and assigned the specified value.

For a description of volatile and non-volatile environment variables, see3.6.1.

Status Codes Returned

EFI_**SUCCESS**	The environment variable was successfully updated.

EFI_SHELL_PROTOCOL.SetFileInfo()

Summary

Sets the file information to an opened file handle.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_FILE_INFO)(
  IN SHELL_FILE_HANDLE     FileHandle,
  IN CONST EFI_FILE_INFO   *FileInfo
  );
```

Parameters

FileHandle

A file handle

FileInfo

Points to new file information.

Description

This function changes file information.

Status Codes Returned

EFI_SUCCESS	The information was set.
EFI_NO_MEDIA	The device has no medium.
EFI_DEVICE_ERROR	The device reported an error.
EFI_VOLUME_CORRUPTED	The file system structures are corrupted.
EFI_WRITE_PROTECTED	The file or medium is write-protected.
EFI_ACCESS_DENIED	The file was opened read-only.
EFI_VOLUME_FULL	The volume is full.

EFI_SHELL_PROTOCOL.SetFilePosition()

Summary

Sets a file's current position

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_FILE_POSITION)(
  IN SHELL_FILE_HANDLE   FileHandle,
  IN UINT64              Position
  );
```

Parameters

FileHandle

The file handle on which requested position will be set.

Position

Byte position from the start of the file

Description

This function sets the current file position for the handle to the position supplied. With the exception of seeking to position **0xFFFFFFFFFFFFFFFF**, only absolute positioning is supported, and seeking past the end of the file is allowed (a subsequent write would grow the file). Seeking to position **0xFFFFFFFFFFFFFFFF** causes the current position to be set to the end of the file.

Status Codes Returned

EFI_SUCCESS	Data was written.
EFI_UNSUPPORTED	The seek request for nonzero is not valid on open directories.

EFI_SHELL_PROTOCOL.SetMap()

Summary

Changes a shell device mapping.

Prototype

```
typedef
EFI_STATUS
(EFIAPI *EFI_SHELL_SET_MAP)(
  IN CONST EFI_DEVICE_PATH_PROTOCOL *DevicePath,
  IN CONST CHAR16                   *Mapping
  );
```

Parameters

DevicePath

Points to the device path. If this is NULL and Mapping points to a valid mapping, then the mapping will be deleted.

Mapping

Points to the null-terminated mapping for the device path.

Description

This function creates a mapping for a device path.

Return Value

EFI_SUCCESS	Mapping created or deleted successfully.
EFI_NO_MAPPING	There is no handle that corresponds exactly to *DevicePath*. See the boot service function **LocateDevicePath()**.
EFI_ACCESS_DENIED	The mapping is a built-in alias.

EFI_SHELL_PROTOCOL.WriteFile()

Summary

Writes data to the file.

Prototype

```
typedef
EFI_STATUS
(EFIAPI EFI_SHELL_WRITE_FILE)(
  IN     SHELL_FILE_HANDLE   FileHandle,
  IN OUT UINTN               *BufferSize,
  OUT    VOID                *Buffer
  );
```

Parameters

FileHandle

The opened file handle for writing.

BufferSize

On input, size of *Buffer*.

Buffer

The buffer in which data to write.

Description

This function writes the specified number of bytes to the file at the current file position. The current file position is advanced the actual number of bytes written, which is returned in BufferSize. Partial writes only occur when there has been a data error during the write attempt (such as "volume space full"). The file automatically grows to hold the data, if required.

Direct writes to opened directories are not supported.

Status Codes Returned

EFI_SUCCESS	Data was written.
EFI_UNSUPPORTED	Writes to open directory are not supported
EFI_NO_MEDIA	The device has no media
EFI_DEVICE_ERROR	The device reported an error
EFI_VOLUME_CORRUPTED	The file system structures are corrupted
EFI_WRITE_PROTECTED	The device is write-protected
EFI_ACCESS_DENIED	The file was open for read only
EFI_VOLUME_FULL	The volume is full

2.3 EFI_SHELL_PARAMETERS_PROTOCOL

EFI_SHELL_PARAMETERS_PROTOCOL

Summary

Shell application's arguments.

GUID

```
#define EFI_SHELL_PARAMETERS_PROTOCOL_GUID \
  { 0x752f3136, 0x4e16, 0x4fdc, \
  { 0xa2, 0x2a, 0xe5, 0xf4, 0x68, 0x12, 0xf4, 0xca } };
```

Prototype

```
typedef struct _EFI_SHELL_PARAMETERS_PROTOCOL {
  CHAR16            **Argv;
  UINTN             Argc;
  SHELL_FILE_HANDLE StdIn;
  SHELL_FILE_HANDLE StdOut;
  SHELL_FILE_HANDLE StdErr;
} EFI_SHELL_PARAMETERS_PROTOCOL;
```

Parameters

Argv

Points to an Argc-element array of points to null-terminated strings containing the command-line parameters. The first entry in the array is always the full file path of the executable. Any quotation marks that were used to preserve whitespace have been removed.

Argc

The number of elements in the *Argv* array.

StdIn

The file handle for the standard input for this executable. This may be different from the ConInHandle in the **EFI_SYSTEM_TABLE**.

StdOut

The file handle for the standard output for this executable. This may be different from the ConOutHandle in the **EFI_SYSTEM_TABLE**.

StdErr

The file handle for the standard error output for this executable. This may be different from the StdErrHandle in the **EFI_SYSTEM_TABLE**.

Description

An instance of this protocol is installed on each shell application's image handle prior to calling StartImage(). It describes all of the command-line parameters passed on the command line, as well as the standard file handles for standard input, output and error output.

2.4 EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL

EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL

Summary

Advertise an external shell command.

GUID

```
#define EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL_GUID \
  { 0x3c7200e9, 0x5f, 0x4ea4, \
  { 0x87, 0xde, 0xa3, 0xdf, 0xac, 0x8a, 0x27, 0xc3 } };
```

Prototype

```
typedef struct _EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL {
  CONST CHAR16           *CommandName;
  SHELL_COMMAND_HANDLER  Handler;
  SHELL_COMMAND_GETHELP  GetHelp;
} EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL;
```

Parameters

CommandName

The name of the command. This is the string entered on the console to invoke the command.

Handler

The handler function to call when the UEFI Shell encounters the CommandName.

GetHelp

The function to call to get the formatted help for this command. The format must match that in Appendix A.

EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL.Handler()

Summary

The handler function to call when the UEFI Shell encounters the CommandName.

Prototype

```
typedef
EFI_STATUS
(EFIAPI * SHELL_COMMAND_HANDLER)(
  IN EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL    *This,
  IN EFI_SYSTEM_TABLE                      *SystemTable,
  IN EFI_SHELL_PARAMETERS_PROTOCOL         *ShellParameters,
  IN EFI_SHELL_PROTOCOL                    *Shell
  );
```

Parameters

This

Pointer to the protocol interface structure.

SystemTable

Pointer to the system table to use for the entirety of the time in the function. Any previously saved *SystemTable* must be ignored.

ShellParameters

Pointer to the **EfiShellParametersProtocol** to use for parsing the *Argc* and *Argv* for the command. This is how the command gets the command line.

Shell

Pointer to the **EfiShellProtocol** to use for interacting with the UEFI Shell.

Description

This function is called by the UEFI Shell when the CommandName from the protocol interface structure was entered on a command line. The behavior of this function should be described in the help text (see **EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL.GetHelp()**).

Status Codes Returned

EFI_SUCCESS	The operation was successful.
Other	Any valid EFI_XXXXX error described in the UEFI specification.

EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL.GetHelp()

Summary

The function to call to get the formatted help for this command. The format must match that in Appendix A.

Prototype

```
typedef
CHAR16*
(EFIAPI * SHELL_COMMAND_GETHELP)(
  IN EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL    *This,
  IN CONST CHAR8                           *Language
  );
```

Parameters

This

Pointer to the protocol interface structure.

Lang

A pointer to the language specified for the help text, in the same format as described in the UEFI specification, Appendix M

Description

This function will return the help text for the command associated with This instance of the **EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL**. The memory must be allocated from gBS->AllocatePool, and the caller is responsible for freeing the memory.

Value Returned

NULL	An error occurred retrieving the help text.
≠NULL	A pointer to the help text.

3
UEFI Shell Features

The UEFI Shell supports an interactive command-line interface, scripting, and a standard set of commands.

All the commands can be invoked by entering the name of the command at the command prompt. For external commands, they must reside in a file system. So, to run them users need to have at least one mapped file system and put those external commands under this file system.

The active drive may be changed by entering the mapped name followed by a `:' at the command prompt.

3.1 Levels Of Support

This section describes the different standard levels of shell support. The different standard levels are designed to provide different feature/size tradeoffs for different uses. The levels mentioned here are referenced throughout this specification

Table 1 Support Levels

Level	Name	Execute()/ Scripting/ startup.nsh	PATH	ALIAS	Inter-active	Commands
0	Minimal	No	No	No	No	None
1	Scripting	Yes	Yes	No	No	for, endfor, goto, if, else, endif, shift, exit, stall
2	Basic	Yes	Yes	Yes	No	attrib, cd, cp, date*, time*, del, load, ls, map, mkdir, mv, rm, reset, set, timezone*, touch, vol
3	Inter-active	Yes	Yes	Yes	Yes	alias, date, echo, help, pause, time, type, ver, cls, timezone

*Non-interactive forms only

Execute()/Scripting/startup.nsh support indicates whether the Execute() function is supported by the EFI_SHELL_PROTOCOL, whether or not scripts are supported and whether the default startup script startup.nsh is supported.

PATH support determines whether the PATH environment variable will be used to determine the location of executables.

ALIAS support determines whether the ALIAS feature will be used to determine alternate names for shell commands.

Interactive determines whether or not an interactive session can be started.

For more information on scripting, see UEFI Shell Script (Chapter 4).

For more information on processing of the startup.nsh file, please see UEFI Shell Initialization (section 0).

The shell must remain compliant with its advertised *uefishellsupport* command profile. There can be cases where a shell implementation may not want to expose certain commands to all users. If a shell implementation wants to make a particular command inaccessible to a particular user, they must properly interpret the command request and return an appropriate return code, such as SHELL_SECURITY_VIOLATION.

3.2 Invocation

The UEFI Shell is a UEFI application. The UEFI Shell takes command-line options that are null-terminated UCS-2 encoded strings. The syntax is:

```
shell.efi [ShellOpt-options] [options] [file-name [file-name-options]]
```

The command-line options are separated by the space or tab character. The options are processed left-to-right retrieved from the *LoadOptions* field of the **EFI_LOADED_IMAGE_PROTOCOL**.

The following table describes the standard command-line options.

Table 2 Standard Command Line Options

Option	Description
file-name	The name of a UEFI shell application or script to be executed after initialization is complete. By default, if *file-name* is specified, then **-nostartup** is implied. Scripts are not supported by level 0.
file-name-options	The command-line options that are passed to *file-name* when it is invoked.
options	Options (from Table 3 below) which control the initialization behavior of the shell.

Option	Description
ShellOpt-options	Options (from Table 3 below) which control the initialization behavior of the shell. These options are read from the EFI global variable "ShellOpt" and are processed before *options* or *file-name*.

Table 3 UEFI Shell Invocation Options

-nostartup	The default startup script **startup.nsh** will not be executed.
-noconsoleout	Console output from the shell applications will not be displayed. This has no effect for UEFI Shells that do not support an interactive mode.
-noconsolein	Console input will not be accepted from the user. This has no effect for UEFI Shells that do not support an interactive mode.
-delay [*n*]	Specifies the integer number of seconds the shell will delay prior to the execution of **startup.nsh**. Ignored for shell level 0 or if **–nostartup** is specified. If *n* is not specified, the default is 5 seconds. If 0 is specified, then there will be no delay. If –nointerrupt is specified, then there will be no delay.
-nointerrupt	Execution interruption (as described in Execution Interrupt Support) is not allowed. This has no effect for UEFI Shells that do not support an interactive mode.
-nomap	The default mappings will not be displayed.
-noversion	The version information will not be displayed.
-startup	The default startup script **startup.nsh** will be executed. Requires shell support level 1 or higher. This overrides the default behavior when *file-name* is specified.

If the UEFI Shell does not support scripting and file-name specifies a UEFI shell script file, then the UEFI Shell will exit with a status code of STATUS_UNSUPPORTED.

3.3 Initialization

This section describes the steps taken during shell initialization. The following steps are not exhaustive, but they are executed in order:

1. The command-line options of the shell itself are processed.
2. Default file system and block identifier (FSx:/BLKx:) mapped names are created. Consistent mapping names are created, and the current directory for each mapped name is set to the root.

3. The default alias settings are read from non-volatile storage. This is only supported in shell level 2.

4. The default environment variable settings are read from non-volatile storage.

5. The profiles are read into the 'profiles' environment variable.

6. If the shell supports interactive mode and console output support is enabled, then the console is cleared.

7. The platform watchdog will be cleared through the UEFI SetWatchdogTimer() API to avoid inadvertent platform resets during long operations within the UEFI Shell environment.

8. If the shell supports interactive mode and console output support is enabled and version support (see **-noversion**) is enabled, then the equivalent of **ver** will be executed.

9. If the shell supports interactive mode and console output support is enabled and map support is enabled (see **-nomap**), then the equivalent of **map -terse** will be executed.

10. If interactive mode is supported and execution interrupt is supported (see **-nointerrupt**) then the shell will wait for the number of seconds specified by the **-delay** option.

11. If **startup.nsh** is supported and enabled (see **-startup** and **-nostartup**), the script will be launched.

12. If a file name was specified among the command-line options, then the image or script (if supported) is launched.

3.3.1 Finding startup.nsh

When executing **startup.nsh**, the shell will search for it first in the directory where the shell itself was launched. If it cannot find the *startup.nsh* file in that directory or it was not launched from a file system, it will search the execution path defined by the environment variable PATH.

3.3.2 Supported Profiles

The UEFI Shell may have support for zero or more profiles, such as those described in chapter 5 built in to its executable. Additional profiles are described in the file 'profiles.txt', located in the same directory as the UEFI Shell executable. The contents of the file are carriage-return delimited (one profile name per line) and are read into the UEFI shell environment variable 'profiles', where they are semicolon (';') delimited. Profiles names that begin with 'UEFI' are reserved for use in this specification.

3.3.3 Dynamic Profiles

The UEFI Shell must also list the names of any dynamic commands as profiles in the UEFI shell environment variable ‘profiles’, where they are semicolon (‘;’) delimited.

3.4 Command-Line

The UEFI Shell implements a programming language that provides control over the execution of individual commands. Command names and keywords in certain commands are all case insensitive.

The UEFI Shell processes the command-line by

1. If first command-line parameter is a variable, perform substitution on this variable only.
2. Substitute alias. The UEFI Shell supports specifying aliases for UEFI Shell commands (both internal and external). The substitution is performed automatically on the first command-line parameter, and is not recursive.
3. Substituting variables. The UEFI Shell finds the % character and substitutes the value of an Environment Variable, Positional Parameter or Index Parameter based on the characters found after the % character. See Variables (section, 3.6) for more information.
4. Setting up input and output redirection. Using special characters on the command-line, the UEFI Shell can get input from file or environment variable and send output to a file or environment variable. See Redirection (section 3.4.4) for more information.
5. Breaking up the command-line into arguments. The arguments are delimited by non-quoted whitespace characters.
6. Launching the shell command , dynamic shell command, UEFI Application, or UEFI Shell script.

3.4.1 Special Characters

When the shell scans its input, it always treats certain characters (**#**, **>**, <, |, **%**, *****, **?**, **^**, **"**, **space**, **[,]** and **newline**) specially. The usage of these characters is briefly listed here:

Table 4 Special Characters in Shell

Character	Description
newline	Ends a command line.
space	Ends an argument, if it is not in a quotation.
#	Starts a comment in a script file or on the command-line.
:	Starts a label in a script file.
>	Used for output redirection.
<	Used for input redirection
|	Used for pipe command support.
%	Used to delimit a variable or an argument.
”	Used to delimit a quotation.
^	Prevents the next character from being interpreted as having special meaning. Can be used inside quoted strings.
*, ?, [,]	Wildcards to specify multiple similar file names.

3.4.2 Escape Characters

The escaping character **^** is used to prevent interpreting the character that immediately follows it as a special character.

3.4.3 Quoting

The UEFI Shell uses quotation marks for argument grouping. Normally, the UEFI Shell will interpret a one or more whitespace character as an argument delimiter. However, if the whitespace character appears between double quotation marks, it will be ignored for the purposes of argument delimiting. Empty strings are treated as valid command line arguments. Substitution of environment variables and positional parameters still occurs within quotation marks.

Double-quotation marks that surround arguments are stripped before they are passed to the entry point of a shell application. For more information, see the *Argv* member of the **EFI_SHELL_PARAMETERS_PROTOCOL**.

Double-quotation marks that surround arguments are not stripped in positional parameters (see Positional Parameters, section 3.6.2) or on the copy of the command line passed in the *LoadOptions* member of the **EFI_LOADED_IMAGE_PROTOCOL** passed to shell applications.

To include a double-quotation mark inside of a quoted string, use ^”. To include a ^ character inside of a quoted string, use ^^.

For information about how the quotes are treated in each of the options, see "Shell Commands", chapter 5).

3.4.4 Redirection

3.4.4.1 Output Redirection

Output of EFI Shell commands can be redirected to files. For example:

```
Command > ucs2_output_file_pathname
Command >a ascii_output_file_pathname
Command 1> ucs-2_output_file_pathname
Command 1>a ascii_output_file_pathname
Command 2> ucs-2_output_file_pathname
Command 2>a ascii_output_file_pathname
Command >> ucs-2_output_file_pathname
Command >>a ascii_output_file_pathname
Command 1>> ucs-2_output_file_pathname
Command 1>>a ascii_output_file_pathname
```

Table 5 shows the special character combinations that are used to denote output redirection operations:

Table 5 Output Redirection Syntax

Character Sequence	Description
>	Redirect standard output to a UCS-2 encode file.
>a	Redirect standard output to an ASCII file.
1>	Redirect standard output to a UCS-2 encoded file.
1>a	Redirect standard output to an ASCII file.
2>	Redirect standard error to a UCS-2 encoded file.
2>a	Redirect standard error to an ASCII file.
>v	Redirect standard output to an environment variable, encoded as UCS-2.
1>v	Redirect standard output to an environment variable, encoded as UCS-2.
2>v	Redirect standard error to an environment variable, encoded as UCS-2.
>>	Redirect standard output appended to a UCS-2 encoded file.
>>a	Redirect standard output appended to an ASCII file.
1>>	Redirect standard output appended to a UCS-2 encoded file.
1>>a	Redirect standard output appended to an ASCII file.
>>v	Append standard output to an environment variable, encoded as UCS2.

1>>v	Append standard output to an environment variable, encoded as UCS2.
2>>v	Append standard error to an environment variable, encoded as UCS2.
2>>	Append standard error to a UCS2 file.

The UEFI Shell will redirect standard output to a single file or variable and standard error to a single file or variable. Redirecting both standard output and standard error to different files or variables is allowed, but not to the same file or variable. Redirecting standard output to more than one file or variable on the same command is not supported. Similarly, redirecting to multiple files or variables is not supported for standard error either.

When redirecting output to an environment variable, if a new environment variable will be created, then it will be volatile. If the environment variable already exists and is non-volatile, an error will be generated.

All output to UCS-2 encoded files will be prefixed with the Unicode Byte Ordering Character (0xFFFE) if (a) there is at least one other character output and (b) that character is not the Unicode Byte Ordering Character.

"**NUL**" is used as a special output file name. When "**NUL**" is used, the output will not be written into a file. Instead, they are discarded silently.

3.4.4.2 Input Redirection

Contents from an existing file or variable can be used as standard input to a UEFI shell command. Any commands coming from an ASCII file will be automatically be converted to the equivalent UCS-2 encoding and passed to the UEFI shell command.

When redirecting input from an environment variable, the environment variable must already exist. If it does not, an error will be generated. The shell will ensure that the first character read from an input redirected environment variable will contain the Unicode Byte Ordering Character (0xFFFE). If the first character in the input source is not the Unicode Byte Ordering Character, the shell will insert this character in the output from the input redirected variable. This is done to ensure that an input redirected variable will be look like a UCS-2 encoded file.

Redirecting input from a non-volatile variable is permitted.

Table 6 Input Redirection Syntax

Character Sequence	Description
<	Redirect standard input from a Unicode file.
<a	Redirect standard input from an ASCII file.
<v	Redirect standard input from an environment variable.

3.4.4.3 Pipe Support

By using the | character, a data channel is formed that takes the standard Unicode output of a file and feeds the data as standard input to another program.

The format for this support is as follows:

```
UEFI_Shell_Command [options] [| UEFI_Shell_Command [options]]*
```

Table 7 Input Redirection Syntax

Character Sequence	Description
|	Pipe output of a command to another program in UCS-2 format.
|a	Pipe output of a command to another program in ASCII format.

All output to UCS-2 encoded files will be prefixed with the Unicode Byte Ordering Character (0xFFFE) if (a) there is at least one other character output and (b) that character is not the Unicode Byte Ordering Character.

3.4.5 Comments

Comments can be added at the end of a command-line. The **#** character is used to denote that the **#** and all characters to the right of it are to be ignored by the shell. Use **^#** to provide **#** as an actual command-line argument. For example:

```
Shell> echo "You are ^#1!" # Testing echo
You are #1!
```

3.5 Current Directory

For each file system, the UEFI Shell maintains a *current directory*, which is the default directory used if a directory is not specified in a file path. The UEFI Shell maintains a *current working file system*, which is the default file system used if one is not supplied in a file path. The current directory in the current working file system is the *current working directory*.

The current directory for any file system and current working file system can be retrieved using the **GetCurDir()** function (see page 34). The current directory for any file system and the current working file system can be changed using the **SetCurDir()** function (see page 57).

The current directory for any file system and current working directory can retrieved and changed using the **cd** shell command (see page 95).

The current working directory can be found in the standard `%cwd%` environment variable.

3.6 Variables

This section describes the different types of variable substitution that happens on the command-line for environment variables, positional parameters, index parameters and aliases.

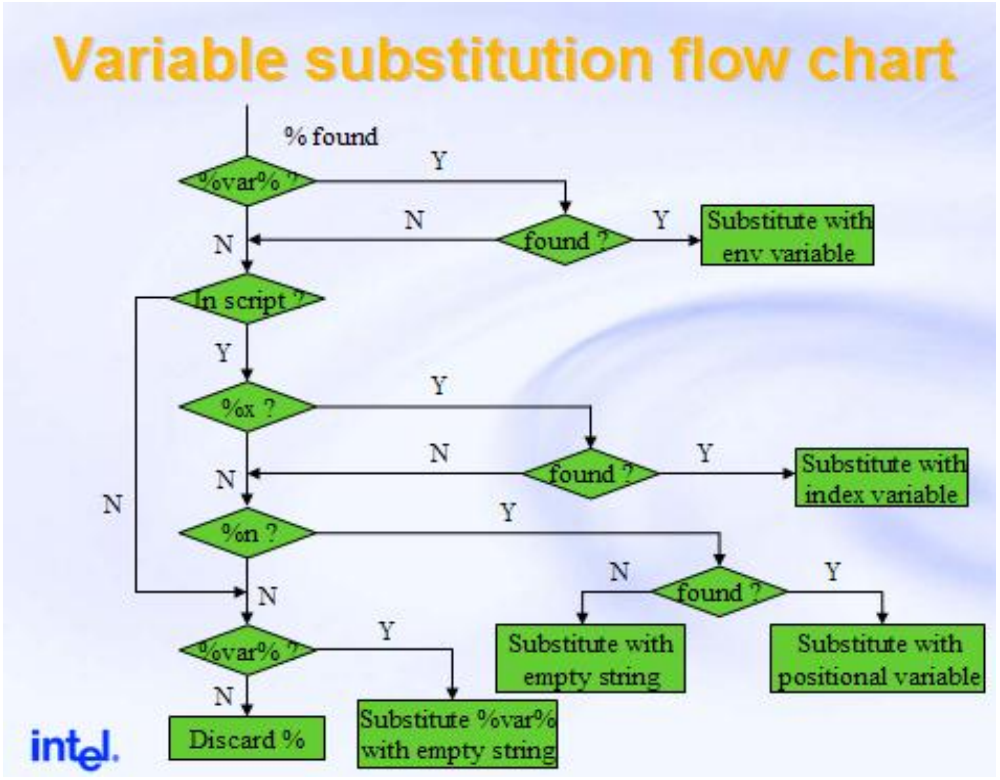


Figure 1 Variable substitution flow chart

3.6.1 Environment Variables

Environment variables are variables that can hold the user specified contents and can be used on the command line or in scripts. Each environment variable has a case- sensitive name (a C-style identifier) and a string value. Environment variables can be either volatile (they will lose their value on reset or power-off) or non-volatile (they will maintain their value across reset or power-off).

Environment variables can be used on the command-line by using **%***variable-name***%** where *variable-name* is the environment variable's name. Variable substitution is not recursive. Environment variables can also be retrieved by a UEFI Shell command by using the **GetEnvEx()** (see page 30) function.

Environment variables can be displayed or changed using the set shell command. They can also be changed by a UEFI Shell command using the **SetEnv()** function.

The following table lists the environment variables that have special meaning to the UEFI Shell:

Table 8 Environment Variables with Special Meaning to the UEFI Shell

Variable	V/NV RO/RW	Description
cwd	V/RO	The current working directory, including the current working file system. See "Current Directory" (page 71) for more information.
lasterror	V/RO	Last returned error from a UEFI Shell command, UEFI Application, or batch script.

path	V/RW	The UEFI Shell has a default volatile environment variable path, which contains the default path that UEFI Shell will search if necessary. When user wants to launch an UEFI application, UEFI Shell will first try to search the current directory if it exists, and then search the path list sequentially. If the application is found in one of the paths, it will stop searching and execute that application. If the application is not found in all the paths, UEFI Shell will report the application is not found. If the path variable is empty or it doesn't exist, UEFI Shell will treat current directory as the working directory. In general, paths stored in path variable looks like: path: .;fs0:\efi\tools;fs0:\efi\boot;fs0:\;fs1:\efi\tools;fs1:\efi\boot;fs1:\ The UEFI Shell supports both absolute paths and relative paths when launching commands. Users can set path to any specified value, but this variable will be refreshed immediately after the execution of command 'map –r' and it's volatile so that the contents will be lost after reset or power off. Typically users can append the paths to this variable in this way: set –v path %path%;fs0:\test
profiles	V/RO	The list of UEFI shell command profiles supported by the shell. Each profile name may only contain alphanumeric characters or the '_' character. Profile names are semicolon (';') delimited.
uefishellsupport	V/RO	Reflects the current support level enabled by the currently running shell environment (see UEFI Shell Levels of Support, section 3.1. The contents of the variable will reflect the text-based numeric version in the form that looks like: 3 This variable is produced by the shell itself and is intended as read-only, any attempt to modify the contents will be ignored.
uefishellversion	V/RO	Reflects the revision of the UEFI Shell specification that the shell supports. The contents are formatted as text: 2.00

uefiversion	V/RO	Reflects the revision of the UEFI specification that the underlying firmware supports. The contents will look like this: 2.10

3.6.2 Positional Parameters

Positional parameters are the first ten arguments (**%0**-**%9**) passed from the command line into a UEFI shell script. The first parameter after the UEFI Shell script name becomes **%1**, the second **%2**, the third **%3** , and so on. **%0** is the full path name of the script itself.

The **shift** command (see page 162) can be used delete the contents of %1 and shift all of the other positional parameters down one place (%2 -> %1, %3 -> %2, %4 -> %3, etc.) There is no way for a UEFI Shell script to access the 10th or greater argument without using **shift**.

When executing the UEFI Shell script, the %n is replaced by the corresponding argument on the command-line that invoked the script. If a positional parameter is referenced in the UEFI Shell script but that parameter was not present, then an empty string is substituted.

Positional parameters do not have quotation marks removed from them. For more information on how quotation marks are handled, see "Quoting"

3.6.3 Index Parameters

Index parameters are the variables created by the **for** command (see page 139) when executing inside of a UEFI Shell script. Each index parameter is in the form of %x, where x is a letter from 'A' to 'Z' or 'a' to 'z'. Index parameters are case-insensitive.

When executing the UEFI Shell script, the %x is replaced by the value specified by the **for** command. If the specified index parameter has not been defined in the current UEFI Shell script, the script execution will halt with an error.

3.6.4 Aliases

An alias creates an additional name for an internal UEFI Shell command or a UEFI Shell application. Aliases can be used to provide alternative commonly used names for existing shell commands or even create shortcuts. An alias is a C-style identifier and may refer to an internal command or else the directory and file name of a UEFI shell application.

During command-line processing, if the 1st argument of a command is a defined alias, the shell replaces the alias with its defined value. The alias

substitution occurs after the first command-line parameter variable substitution. So if **%myvariable%** is set to **dir** and **dir** is aliased to **ls**, entering **%myvariable%** in command line will cause the **ls** command to be executed. Alias substitution is not recursive.

There are several built-in aliases (sometimes referred to as *synonyms*) provided by the UEFI Shell for the following commands:

Table 9 Built-in Aliases for the UEFI Shell

Original Command	Built-In Alias	Description
ls	**dir**	List directory contents
rm	**del**	Delete a file
cp	**copy**	Copy a file.
mkdir	**md**	Create a directory
dmem	**mem**	Display memory

3.7 File Names

The UEFI Shell supports file names and paths with the following format:

fs-path := [*fs-map-name*] [*fs-divider*][*fs-dirs*][*fs-name*]

fs-map-name := identifier **:**

fs-divider := **** | **/**

fs-dirs := *fs-dir* |

fs-dirs fs-dir

fs-dir := *fs-name fs-divider*

fs-name := *fs-file-name* .*fs-file-ext*

fs-file-name := one or more ASCII characters, excluding * ? < > \ / ” :)

Both short and long names are supported. The maximum valid length for a file path is 255 characters.

3.7.1 Wildcard Expansion

The *****, **?** and **[]** characters can be used as wildcard characters in file name command-line options certain UEFI shell commands that use the **OpenFileList()** function. In addition, the UEFI Shell **for** and **if** script commands also expand arguments containing wildcard characters to existing

file names that matches the pattern. A **^** before the wildcard cannot prevent the wildcard from being expanded.

[] can be either wildcard characters or literal file name characters, the UEFI Shell will try to take them as wildcard characters first to match files, if there are files matched, no further interpretation. Otherwise, they will be considered as literal characters in file names.

Table 10 Wildcard Character Expansion

Character Sequence	Description
*****	Matches zero or more characters in a file name.
?	Matches exactly one character in a file name.
[]	Matches one character in a file name with one of the characters in []

3.7.2 Mappings

Mappings are C-style identifiers that act as an alias for a device path. These mappings can be used interchangeably with the device path in the **EFI_SHELL_PROTOCOL** and on the interactive shell's command line. Default mappings (such as fsx) are created by the UEFI Shell during initialization (see Initializaiton, section 0. Other mappings can be created using the **map** shell command or the **SetMap()** function.

A *mapping* which translates to a device path of a device that has a file system protocol installed on its handle is called a *file system mapping*.

3.7.3 Consistent File System Mapping

The UEFI Shell provides consistent mapping for file system mappings. The consistent mappings will not change after reboot or after 'map –r' if the hardware configuration hasn't changed. If two or more computers have the same hardware configurations, the consistent mapping results on these computers should be exactly the same. Hardware configuration changes are defined as the changes of controllers or physical interfaces to which the devices are connected. If you are used to the ***fsx*** notation style for mapping file systems, then the new consistent mapping convention might look a little different. For example, the GUIDed file system may have a consistent mapping , such as **f0agonennapphibbndlnmeaakamjeafdnb**. The ***fsx*** style mappings facilitates the use of mappings on the command line, but they don't have the consistent mapping characteristics.

Consistent mapping only applies to file system mappings, not other device mappings.

3.8 Scripts

The UEFI Shell has the capability of executing commands from a file (script). UEFI Shell script files are named using the **".nsh"** extension. Script files can be either UCS-2 or ASCII format files. UEFI Shell script files are invoked by entering the filename at the command prompt, with or without the filename extension. See "Scripts" (section 4) for more information.

3.9 Nesting the Shell

The UEFI Shell supports nested shell execution. The UEFI Shell can run the shell from within itself. The maximum nesting level is determined by how much memory the system has. The command **exit** can be used to exit the current shell instance. If the current shell is a child shell, it will return to the parent shell. Newly launched shell will have a brand new execution environment except for environment variables and aliases.

3.10 Interactive Features

Even though the shell design specification primarily discusses aspects of the shell that can run without user interaction, there are some features described which can augment the experience of users that are actively interacting with the console.

3.10.1 Key History Support

The UEFI Shell will save commands history that executed from the shell prompt. User can press up-arrow key and down-arrow key to browse the previous commands. Commands that were executed in script will not be saved in the key history.

3.10.2 Execution Interrupt Support

The UEFI Shell supports the capability of interrupting the execution of the shell commands, applications, and scripts.

There are two kinds of the execution interrupt: command or application execution interrupt and script execution interrupt.

Shell Command or Application Execution Interrupt.

The user can press the CTRL-C key sequence to interrupt the execution of some time-consuming UEFI Shell commands (i.e. **ls -r**) or applications. The UEFI Shell detects this key sequence and signals the *ExecutionBreak* member of the **EFI_SHELL_PROTOCOL**. Individual UEFI Shell commands or applications check the state of *ExecutionBreak* as often as practical and return the **SHELL_ABORTED** error code.

Script Execution Interrupt.

The user can press CTRL-C to interrupt the execution of the script. The UEFI Shell detects this key sequence and signals the *ExecutionBreak* member of the **EFI_SHELL_PROTOCOL**. If an UEFI Shell command or application processes *ExecutionBreak*, break immediately. If an UEFI Shell command or application does not process *ExecutionBreak*, wait until it completes. Script execution stops, and **SHELL_ABORTED** error code is returned. When there is nested script execution, once a script is interrupted, all its predecessor scripts are also interrupted.

Note: *The UEFI Shell may not support asynchronous execution interrupt for commands or applications.*

3.10.3 Output Streaming Control

The UEFI Shell supports the ability to pause and resume the streaming of characters to the output device. The user can press the CTRL-S key sequence to pause and any key to resume the output results produced by the current running commands or applications. It is especially useful for the commands and applications that may produce a great deal of the output results.

3.10.4 Scroll Back Buffer Support

The UEFI Shell supports the ability to scroll back and forward the output so that consoles can have screen history. The user can press Page Up and Page Down to scroll back and forward the screen history, and press any other key to quit scrolling. However, the user cannot do this while the command, application or script is being executed. The text output history will be at least 3 screens.

3.11 Shell Applications

UEFI Shell applications have the extension **.efi** and have the same entry point (**EFI_IMAGE_ENTRY_POINT**) defined in section 4.1 of the UEFI specification. When the entry point to a shell command is called, the image handle (*ImageHandle*) has both the **EFI_LOADED_IMAGE_PROTOCOL** and the **EFI_SHELL_PARAMETERS_PROTOCOL** installed on it.

In the **EFI_LOADED_IMAGE_PROTOCOL**, the *LoadOptions* member points to the NULL-terminated, expanded command line. The first part (which corresponds to *Argv*[0] in the **EFI_SHELL_PARAMETERS_PROTOCOL**) is the file path of the executable after alias substitution.

After this, delimited by a whitespace character, are listed each of the arguments, with all environment variables expanded, and with quotation

marks still present. This is different from what appears in *Argv*[] in the **EFI_SHELL_PARAMETERS_PROTOCOL**.

The **EFI_SHELL_PARAMETERS_PROTOOCOL** has two members: *Argv*, which points to each of the command-line arguments and *Argc*, which is the number of command-line arguments. There is always at least one command-line argument: the path and file name of the shell command. Any arguments are enumerated in *Argv*[1-n], with all environment variables expanded and all quotation marks removed.

If *ExecutionBreak* was signaled during the execution of a UEFI Shell application, then it will be cleared upon return to the shell.

3.11.1 Installation

During installation, UEFI Shell applications may choose to update certain global files or settings, which are used for detecting installed UEFI Shell profiles or providing help text for UEFI shell applications.

During installation, UEFI Shell applications may update the **profiles** environment variable, which lists all of the command profiles supported by the current implementation of the shell. Some of these command profiles are standard (see "Shell Command Profiles", section 5.2) and others can be defined by implementers.

During installation, UEFI Shell applications may provide a help file (as described in "Command-Line Help", section 3.11.2) to support the standard **help** command.

During installation, UEFI Shell applications may update a help file for the help category/categories to which the application belongs. This consists of creating a NAME section for the <*category*>**.man** file and then copying the **NAME** section from the command's help file to the end of the **DESCRIPTION** section of the <*command*>**.man** file, if not already present.

The shell application's category (or categories) is listed in the CATEGORY section of the shell application's help (.man) file. Help categories are not described as part of this specification.

3.11.2 Command-Line Help

The user can get UEFI Shell application command-line either using the **help** command or else by typing in **<***command-name***> -?.** Both of these use the GetHelpText() (page 37) function to retrieve the help text.

The UEFI Shell gets help text for UEFI Shell applications by search the directory where **startup.nsh** was located (highest priority) (if **-nostartup** was not specified) and then the directories specified by the **path** environment

variable for a file with the same name as the UEFI Shell application, but with the **.man** extension. The format of these files is described in Appendix B.

The UEFI Shell supports help categories, which have **.man** pages similar to those for UEFI shell applications, except using the category name instead of the application name.

3.12 GUID Name Information

UEFI Shell commands output all UEFI and PI defined GUIDs not by value, but by a human readable name.

This list must support extension via the **RegisterGuidName** function. UEFI Shell applications must also be able to query information from this list via **GetGuidName** and **GetGuidFromName**. This allows for custom GUID values to be seen as names via any standard UEFI Shell command.

This information will not cascade to nested shells.

3.13 Dynamic Shell Commands

UEFI Shell commands may be added by drivers resident in memory via the use of the **EFI_SHELL_DYNAMIC_COMMAND_PROTOCOL**. Each instance of this protocol resident in memory represents the information about one additional command for the shell.

The shell must support checking for this protocol and using the command handlers as necessary to support seamless integration.

Any dynamic command names that overlap names of commands or profiles listed in this specification, or begin with 'UEFI' may be ignored by the shell.

The UEFI Shell's internal commands must have higher name priority than a dynamic command.

4 Scripts

UEFI Shell scripts allow user to simplify routine or repetitive tasks. A shell script program is a UCS-2 or ASCII text file that contains one or more commands and has a **.nsh** file name extension. When the file name is typed at the command prompt, commands in the file are executed sequentially.

All shell commands can be executed in scripts. In addition, some script-only commands are also provided to do basic flow control. Script-only means those commands can be only executed in UEFI Shell Script files, and cannot be executed from the shell prompt.

Up to ten positional arguments are supported for scripts. Positional argument substitution is performed before the execution of each line in the script file. Positional arguments are denoted by **%n**, where **n** is a digit between **0** and **9**. By convention, **%0** is the name of the script file currently being executed.

Script file execution can be nested; that is, script files may be executed from within other script files. Recursion is allowed. Shell scripts run in their parent's environment.

Output and input redirection are fully supported in scripts. Output redirection on a command in a script file causes the output for that command to be redirected. Output redirection on the invocation of a script causes the output for all commands executed from that script to be redirected to the file, with the output of each command appended to the end of the file.

By default, both the input and output for all commands executed from a script are echoed to the console. Display of commands read from a script file can be suppressed via the **echo -off** command (see echo). Also, additional '**@**' before a command in a script file can prevent the current command from being echoed.

If output for a command is redirected to a file, then that output is not displayed on the console. Commands executed from a script will not be saved by the shell for key history and these commands cannot be recalled by pressing Up-Arrow key.

4.1 Comments

Comments can be embedded in scripts. The **#** character is used to denote that the **#** and all characters to the right of it are to be ignored by the shell. Whether the echo state is on or off, comments are not echoed to the console. Use **^#** to provide **#** as an actual command-line argument in a script.

4.2 Error Handling

By default, if an error is encountered during the execution of a command in a script, the script will continue to execute. But if an error is encountered when executing the script-only commands which affects the logic of the script, such as *for*, *endfor*, *if*, *else*, *endif*, and *goto*, the script will exit. If the error arousing script is a called by another script, the caller script will continue to execute.

The **lasterror** shell variable allows scripts to test the results of the most recently executed command or application using the *if* command. This variable is maintained by the shell, is read-only, and cannot be modified by command *set*.

Script-only commands, as well as *echo*, which are used to control the logic of the script, do not affect the value of variable **lasterror**. The **lasterror** environment variable is not changed by comments.

4.3 Script Nesting

Scripts can be nested. A script can call one or more scripts. The embedded script will be executed as a command. After the whole embedded script is executed completely, the next command will be executed.

The UEFI Shell will automatically save and restore the running mode before and after the execution of nested scripts so that the changes of running modes in nested scripts will not affect the running mode of a parent script.

4.4 Output and Echoing

Output redirection is supported for scripts. Output redirection on a command in a script file causes the output for that command to be redirected. Output redirection on the invocation of a script causes the output for all commands executed from that script to be redirected to the file, with the output of each command appended to the end of the file. The default echo state will be "on" until changed. If a command in a script redirects its output to file1, while the output is redirected to file2 on invocation of a whole script, the output of that command will be redirected to file1, but the echo of the command itself (if echo state is on) will appear in file2, as well as output of all other commands

When a script is launched from the interactive shell, it inherits its echo state from interactive shell or parent script. Changing echo state in the script does not affect the echo state of the interactive shell. When a script calls another script, the called script inherits the caller script's current echo state. But if the called script changes the echo state, after returning, the caller's echo script changes, too.

4.5 Limitations

Following are some examples of known limitations with the UEFI scripts:

1. Cannot read and write the same file within a single command, for example,
   ```
   fs0:>type test.nsh > test.nsh
   ```
2. **goto** cannot be used to jump into another loop.
3. Don’t use the same index variable in nested **for** statements.
4. Index values cannot be referred outside of the **for** statement that defines it.

5
Shell Commands

5.1 Overview

This section describes the standard UEFI Shell commands.

The table below lists all standard UEFI Shell commands.

Table 11 Commands from Default Build Shell

Command	Description	Required at Shell Level or Profile
alias	Displays, creates, or deletes aliases in the UEFI Shell environment	3
attrib	Displays or changes the attributes of files or directories.	2
bcfg	Manipulate boot order and driver order	Debug1, Install1
cd	Displays or changes the current directory	2
cls	Clears the standard output and optionally changes the background color	3
comp	Compares the contents of two files on a byte for byte basis	Debug1
connect	Binds a driver to a specific device and starts the driver.	Driver1
cp	Copies one or more source files or directories to a destination.	2
date	Displays and sets the current date for the system.	2/3
dblk	Displays the contents of one or more blocks from a block device.	Debug1
del	Deletes one or more files or directories.	2
devices	Displays the list of devices managed by UEFI drivers.	Driver1
devtree	Displays the tree of devices compliant with the UEFI Driver Model.	Driver1
dh	Displays the device handles in the UEFI environment.	Driver1
dir	Lists directory contents or file information.	2
disconnect	Disconnects one or more drivers from the specified devices.	Driver1
dmem	Displays the contents of system or device memory.	Debug1
dmpstore	Manages all UEFI NVRAM variables.	Debug1
drivers	Displays a list of information for drivers that follow the EFI Driver Model in the EFI environment.	Driver1
drvcfg	Configures the driver using the UEFI Configuration Access Protocol.	Driver1
drvdiag	Invokes the Driver Diagnostics Protocol.	Driver1

Command	Description	Required at Shell Level or Profile
echo	Controls whether or not script commands are displayed as they are read from the script file and prints the given message to the display.	3
edit	Full screen editor for ASCII or UCS-2 files.	Debug1
eficompress	Compress a file using EFI Compression Algorithm.	Debug1
efidecompress	Decompress a file using EFI Decompression Algorithm.	Debug1
else	Conditionally execute commands if a previous if condition was false.	1
endfor	End a loop stated with for in a script.	1
endif	End a conditional block started with if.	1
exit	Exits the UEFI Shell environment and returns control to the parent that launched the UEFI Shell.	1
for	Start a loop in a script	1
getmtc	Return current monotonic count.	3
goto	Go to a label in a script	1
help	Displays the list of commands that are built into the UEFI Shell.	3
hexedit	Full screen hex editor for files, block devices, or memory.	Debug1
if	Conditionally execute script statements.	1
ifconfig	Displays or modifies the current IP configuration.	Network1
load	Loads a UEFI driver into memory.	2
loadpcirom	Loads a PCI Option ROM from the specified file.	Debug1
ls	Lists a directory's contents or file information.	2
map	Defines a mapping between a user-defined name and a device handle.	2
mem	Displays the contents of system or device memory.	Debug 1
memmap	Displays the memory map maintained by the EFI environment.	Debug 1

Command	Description	Required at Shell Level or Profile
mkdir	Creates one or more new directories.	2
mm	Displays or modifies MEM/MMIO/IO/PCI/PCIE address space.	Debug1
mode	Displays or changes the console output device mode.	Debug1
mv	Moves one or more files to a destination within a file system.	2
openinfo	Displays the protocols and agents associated with a handle.	Driver1
parse	Parse data returned from standard formatted output	2
pause	Pause script execution and wait for a keypress	3
pci	Displays PCI device list or PCI function configuration space.	Debug1
ping	Check response of an ip address.	Network1
reconnect	Reconnects drivers to the specific device.	Driver1
reset	Resets the system.	2
rm	Deletes one or more files or directories.	2
sermode	Sets serial port attributes.	Debug1
set	Used to maintain the environment variables that are available from the EFI environment.	2
setsize	Set the size of a file	Debug1
setvar	Change value of UEFI variable	Debug1
shift	Shift to the 2nd set of positional parameters	1
smbiosview	Displays SMBIOS information.	Debug1
stall	Stalls the operation for a specified time	1
time	Displays or sets the current time for the system.	2/3
timezone	Displays or sets time zone information.	2/3
touch	Updates the time and date on a file to the current time and date.	2

Command	Description	Required at Shell Level or Profile
type	Sends the contents of a file to the standard output device.	2
unload	Unloads a driver image that was already loaded.	Driver1
ver	Displays the version information for this EFI firmware.	3
vol	Displays volume information	2

5.1.1 Explanation of Command Description Layout

The description of each command is composed of four sections: **Summary**, **Usage, Options, Description, Notes**, **Status Codes Returned** and **Examples**.

Summary is a brief explanation of the function of the command. **Usage** describes how the command is used. **Options** gives a complete description of each of the command-lie options. **Description** describes the details of the command.

Examples give sample usage of the command. The output may differ from the output listed in this section.

5.1.2 Shell Command-Line Options

The following table describes the standard command-line options. No command supports all options, but when needed, the following option parameters are used:

Table 12 Standard Command Line Options

Option	Description
-b, -break	Pause after each page.
-q, -quiet	The command will suppress all output.
-sfo	Standard Format Output. Instead of normal output, the shell command will output using the standard format described Appendix D.
-t, -terse	Terse Output. The shell command will restrict additional informative content.
-v, -verbose	Verbose Output. The shell command will output additional informative content.
-?	Help. For more information on how command-line help is supported, see section 3.11.2.

Command-line options that begin with the '_' character are implementation-specific.

5.2 Shell Command Profiles

Shell command profiles are groups of shell commands that are identified by a profile name. Profile names that begin with the '_' character are reserved for individual implementations. For information on how profiles are identified, see section 3.3.2 (Supported Profiles).

For more information on how profiles are updated when new commands are installed, see section 3.11

There are four standard profiles:

Table 13 Standard Profiles

Profile Name	Description
Driver1	Standard set of driver-related commands.
Debug1	Standard set of debug commands.
Network1	Standard set of networking-related commands.
Install1	Standard set of commands to aid installation.

5.3 Shell Commands

alias

Summary

Displays, creates, or deletes aliases in the UEFI Shell environment.

Usage

alias [-d|-v] [*alias-name*] [*command-name*]

Options

alias-name

Alias name

command-name

Original command's name or original command's file name/directory.

-d

Delete an alias. **command-name** should not be present.

-v

Make the alias volatile.

Description

This command displays, creates, or deletes aliases in the UEFI Shell environment. An alias provides a new name for an existing UEFI Shell command or UEFI application. Once the alias is created, it can be used to run the command or launch the UEFI application.

There are some aliases that are predefined in the UEFI Shell environment. These aliases provide the MS-DOS and UNIX equivalent names for the file manipulation commands. See Built-In Aliases (section 3.6.4) for more details.

Aliases will be retained even after exiting the shell unless the **–v** option is specified. If **-v** is specified then the alias will not be valid after leaving the shell.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_OUT_OF_RESOURCES	A request to set a variable in a non-volatile fashion could not be completed. The resulting non-volatile request has been converted into a volatile request.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation

Examples

To display all aliases in the UEFI Shell environment:

```
Shell> alias
md   : mkdir
rd   : rm
```

To create an alias in the UEFI Shell environment:

```
Shell> alias myguid guid
    Shell> alias
        md     : mkdir
        rd     : rm
        myguid : guid
```

To delete an alias in the UEFI Shell environment:

```
    Shell> alias -d myguid
    Shell> alias
        md   : mkdir
        rd   : rm
```

To add a volatile alias in the current EFI environment, which has a star * at the line head. This volatile alias will disappear at next boot.

```
Shell> alias -v fs0 floppy
Shell> alias
  md   : mkdir
  rd   : rm
* fs0  : floppy
```

attrib

Summary

Displays or changes the attributes of files or directories.

Usage

```
attrib [+a|-a] [+s|-s] [+h|-h] [+r|-r] [file...] [directory...]
```

Options

+a|-a

Set or clear the 'archive' attribute

+s|-s

Set or clear the 'system' attribute

+h|-h

Set or clear the 'hidden' attribute

+r|-r

Set or clear the 'read-only' attribute

file

File name (wild cards are permitted)

directory

Directory name (wildcards are permitted)

Description

This command displays and sets the attributes of files or directories. The following four attribute types are supported in the UEFI file system:

- Archive [A]
- System [S]
- Hidden [H]
- Read only [R]

If a file (in general meaning) is a directory, then it is also shown to have the attribute [D].

If any file in the file list that is specified in the command line does not exist, **attrib** will continue processing the remaining files while reporting the error.

If no file or directory is specified, then all of the files in the current directory are displayed.

If no attribute is specified, then the attributes of the files will be displayed.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_NOT_FOUND	The requested file was not found.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	The media that the action was to take place on is write-protected.

Examples

- To display the attributes of a directory:

```
fs0:\> attrib fs0:\
attrib:D     fs0:\
```

- To display the attributes of all files and sub-directories in the current directory:

```
fs0:\> attrib *
attrib: AS   fs0:\serial.efi
attrib:DA   fs0:\test1
attrib: A HR fs0:\bios.inf
attrib: A    fs0:\VerboseHelp.txt
attrib: AS   fs0:\IsaBus.efi
```

- To add the system attribute to all files with extension '.efi':

```
fs0:\> attrib +s *.efi
```

- To remove the read only attribute from all files with extension '.inf':

```
fs0:\> attrib -r *.inf
attrib: A H  fs0:\bios.inf
```

bcfg

Summary

Manages the boot and driver options that are stored in NVRAM.

Usage

bcfg driver|boot [dump [-v]] [add # file "desc"] [addp # *file "desc"* **] [addh #** *handle "desc"* **] [rm #] [mv # #] [-opt # [[filename]|["data"]] | [KeyData <ScanCode UnicodeChar>*]]**

Options

driver

Display/modify the driver option list

boot

Display/modify the boot option list

dump

Display the option list

-v

Display the option list with extra info including the optional data.

add

Add an option. The # is the number of options to add in hexadecimal. The file name of the UEFI application/driver for the option. The quoted parameter is the description of the option being added.

addh

Add an option that refers to the driver specified by *handle*. The # is the number of options to add, in hexadecimal. The *handle* is the driver handle, in hexadecimal. The device path for the option is retrieved from the handle. The quoted parameter is the description of the option being added.

addp

Add an option that refers to a specific file. Only the portion of the device path starting with the hard drive partition is placed in the option. The # is the number of options to add, in hexadecimal. The quoted parameter is the description of the option being added.

rm

Remove an option. The parameter lists the number of the options to remove in hexadecimal.

mv

Move an option. The first numeric parameter is the number of the option to move in hexadecimal. The second numeric parameter is the new number of the option being moved.

-opt

Modify the optional data associated with a driver or boot option. Followed either by the file name of thefile which contains the binary data to be associated with the driver or boot option optional data or else the quote-delimited data which will be associated with the driver or boot option optional data.

KeyData

The packed value associated with a hot-key. This is the EFI_BOOT_KEY_DATA.PackedValue in the UEFI Specification.

ScanCode

This is the UEFI-defined Scan code portion of the EFI_INPUT_KEY struction. This value is directly associated with the preceding KeyData value and there may be 1 to 4 entries per the UEFI specification. When one instance of this parameter has a non-zero value, the paired UnicodeChar value will have a zero-based value.

UnicodeChar

This is the Unicode value for the character associated with the preceding KeyData value. There may be 1 to 4 entries per the UEFI specification. When one instance of this parameter has a non-zero value, the paired ScanCode value will have a zero-based value.

Description

Manages the boot and driver options stored in NVRAM. This command can display the **Boot####** or **Driver####** environment variables by using the dump option. The add option can be used to add a new **Boot####** or **Driver####** environment variable. The rm option can be used to delete a **Boot####** or **Driver####** environment variable, and finally, then mv option can be used to reorder the **Boot####** and **Driver####** environment variables. The add, rm, and mv options also update the **BootOrder** or **DriverOrder** environment variables as appropriate.

The opt option can update **Driver####** or **Boot####** options when using a file or quote delimited data. When adding hotkeys they will be created as **Key####** and only support Boot (not Driver)

Examples

To display driver options:

```
Shell> bcfg driver dump
```

To display boot options:

```
Shell> bcfg boot dump
```

To display verbosely of boot options:
```
Shell> bcfg boot dump -v
```

To add a driver option #5
```
Shell> bcfg driver add 5 mydriver.efi "My Driver"
```

To add a boot option #3
```
Shell> bcfg boot add 3 osloader.efi "My OS"
```

To remove boot option #3
```
Shell> bcfg boot rm 3
```

To move boot option #3 to boot option #7
```
Shell> bcfg boot mv 3 7
```

To assign a CTRL-B hot-key to boot option #3.
```
Shell> bcfg boot -opt 3 0x40000200 0 0x42
```

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_NOT_FOUND	The requested option was not found.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_UNSUPPORTED	The action as requested was unsupported.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_OUT_OF_RESOURCES	There was insufficient free space for the request to be completed.

cd

Summary

Displays or changes the current directory.

Usage

```
cd [path]
```

Options

path

The relative or absolute directory path.

Description

This command changes the current working directory that is used by the UEFI Shell environment. If a file system mapping is specified, then the current working directory is changed for that device. Otherwise, the current working directory is changed for the current device.

If *path* is not present, then the current working directory (including file system mapping) is displayed to standard out.

The table below describes the conventions that are used to refer to the directory, its parent, and the root directory in the UEFI Shell environment.

Table 14 Conventions for Directory Names

Convention	Description
.	Refers to the current directory.
..	Refers to the directory's parent.
\	Refers to the root of the current file system.

The current working directory is maintained in the environment variable **%cwd%**. See "Current Directory" (section 3.5) for more information.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To change the current filesystem to the mapped fs0 filesystem:

```
Shell> fs0:
```

To change the current directory to subdirectory 'efi':

```
fs0:\> cd efi
```

To change the current directory to the parent directory (fs0:\):

```
fs0:\efi\> cd ..
```

To change the current directory to 'fs0:\efi\tools':

```
fs0:\> cd efi\tools
```

To change the current directory to the root of the current fs (fs0):

```
fs0:\efi\tools\> cd \
fs0:\>
```

To change volumes with cd will not work! For example:

```
fs0:\efi\tools\> cd fs1:\  !!!! will not work !!!!
must first type fs1: then cd to desired directory
```

To move between volumes and maintain the current path.

```
fs0:\> cd \efi\tools
fs0:\efi\tools\> fs1:
fs1:\> cd tmp
fs1:\tmp> cp fs0:*.* .
copies all of files in fs0:\efi\tools into fs1:\tmp directory
```

cls

Summary

Clears the standard output and optionally changes the background color.

Usage

```
cls [color]
```

Options

color
- New background color
0 - Black
1 - Blue
2 - Green
3 - Cyan
4 - Red
5 - Magenta
6 - Yellow
7 - Light gray

Description

This command clears the standard output device with an optional background color attribute. If **color** is not specified, then the background color does not change.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The requested file was not found.

Examples

To clear standard output without changing the background color:

```
fs0:\> cls
```

To clear standard output and change the background color to cyan:

```
fs0:\> cls 3
```

To clear standard output and change the background to the default color:

```
fs0:\> cls 0
```

comp

Summary

Compares the contents of two files on a byte for byte basis.

Usage

comp [-b] *file1 file2*

Options

-b

- Display one screen at a time

file1

- First file name (directory name or wildcards not permitted)

file2

- Second file name (directory name or wildcards not permitted)

Description

This command compares the contents of two files in binary mode. It displays up to 10 differences between the two files. For each difference, up to 32 bytes from the location where the difference starts is dumped. It will exit immediately if the lengths of the compared files are different.

Status Codes Returned

SHELL_SUCCESS	The function operated as expected.
SHELL_NOT_EQUAL	The files were not identical.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The requested file was not found.

Examples

To compare two files with different lengths:

```
fs0:\> comp bios.inf legacy.inf
Compare fs0:\bios.inf to fs0:\legacy.inf
Difference #1: File sizes mismatch
[difference(s) encountered]
```

To compare two files with the same contents:

```
fs0:\> comp bios.inf rafter.inf
Compare fs0:\bios.inf to fs0:\rafter.inf
[no difference encountered]
```

To compare two files with the same length but different contents:

```
fs0:\> comp bios.inf bios2.inf
Compare fs0:\bios.inf to fs0:\bios2.inf
Difference #1:
File1: fs0:\bios.inf
 00000000: 5F                                              *_*
File2: fs0:\bios2.inf
 00000000: 33                                              *3*
Difference #2:
File1: fs0:\bios.inf
 0000000C: 00 00 00 00                                     *....*
File2: fs0:\bios2.inf
 0000000C: 25 32 03 03                                     *%2..*
[difference(s) encountered]
```

connect

Summary

Binds a driver to a specific device and starts the driver.

Usage

```
connect [[DeviceHandle] [DriverHandle] | [-c] | [-r]]
```

Options

-r

Recursively scan all handles and check to see if any loaded or embedded driver can match the specified device. If so, the driver will be bound to the device. Additionally, if more device handles are created during the binding, these handles will also be checked to see if a matching driver can bind to these devices as well. The process is repeated until no more drivers are able to connect to any devices. However, without the option, the newly created device handles will not be further bound to any drivers.

-c

Connect console devices found in the EFI global variables (see UEFI specification, chapter 3)

DeviceHandle

Device handle (a hexadecimal number). If not specified, then all device handles will be connected.

DriverHandle

Driver handle (a hexadecimal number). If not specified, then all matching drivers will be bound to the specified device. If specified, then this driver will have the highest priority.

Description

This command binds a driver to a specific device and starts the driver. If the -r flag is used, then the connection is done recursively until no further connections between devices and drivers are made. If the -c flag is used, then the connect command will bind the proper drivers to the console devices that are described in the EFI environment variables. The example below shows the typical output from the verbose help for this command.

If only a single handle is specified and the handle has an **EFI_DRIVER_BINDING_PROTOCOL** on it, then the handle is assumed to be a driver handle. Otherwise, it is assumed to be a device handle.

If no parameters are specified, then the command will attempt to bind all proper drivers to all devices without recursion. Each connection status will be displayed.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

- To connect all drivers to all devices recursively:

```
Shell> connect -r
```

- To display all connections:

```
Shell> connect
ConnectController(1) : Status = Success
ConnectController(2) : Status = Success
ConnectController(3) : Status = Success
...
ConnectController(3D) : Status = Success
```

- To connect drivers with 0x17 as highest priority to all the devices they can manage:

```
Shell> connect 17
```

- To connect all possible drivers to device 0x19:

```
Shell> connect 19
```

- To connect drivers with 0x17 as highest priority to device 0x19 they can manage:

```
Shell> connect 19 17
```

- To connect console devices described in the UEFI Shell environment variables:

```
Shell> connect -c
```

cp

Summary

Copies one or more source files or directories to a destination.

Usage

```
cp [-r] [-q] src [src...] [dst]
```

Options

`src`

Source file/directory name (wildcards are permitted)

`dst`

Destination file/directory name (wildcards are not permitted). If not specified, then the current working directory is assumed to be the destination. If there are more than one directory specified, then the last is always assumed to be the destination.

`-r`

Recursive copy.

`-q`

Quiet copy (no prompt)

Description

This command copies one or more source files or directories to a destination. If the source is a directory, the **`-r`** flag must be specified. If **`-r`** is specified, then the source directory will be recursively copied to the destination (which means that all subdirectories will be copied). If a destination is not specified, then the current working directory is assumed to be the destination.

If any target file (not directory) already exists, there will be a prompt asking the user to confirm replacing the file. The following four choices are available:

- Yes: Replace the file.
- No: Do not replace the file.
- All: Replace the existing files in all subsequent cases.
- Cancel: Do not replace any existing files in all subsequent cases.

If there are multiple source files/directories, the destination must be a directory.

If an error occurs, then the copying process will stop immediately.

When executing in a script, the default is –q.

When copying to another directory, the directory must already exist.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_OUT_OF_RESOURCES	There was insufficient space to save the requested file at the destination.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	An attempt was made to create a file on media that was write-protected.

Examples

- To display the contents of current directory first of all:

```
fs0:\> ls
Directory of: fs0:\

  06/18/01  01:02p <DIR>            512  efi
  06/18/01  01:02p <DIR>            512  test1
  06/18/01  01:02p <DIR>            512  test2
  06/13/01  10:00a               28,739  IsaBus.efi
  06/13/01  10:00a               32,838  IsaSerial.efi
  06/18/01  08:04p                   29  temp.txt
  06/18/01  08:05p <DIR>            512  test
          3 File(s)      61,606 bytes
          4 Dir(s)
```

- To copy a file in the same directory, but change the file name:

```
fs0:\> cp temp.txt readme.txt
copying fs0:\temp.txt -> fs0:\readme.txt
 - [ok]
```

- To copy multiple files to another directory:

```
fs0:\> cp temp.txt isaBus.efi \test
copying fs0:\temp.txt -> fs0:\test\temp.txt
 - [ok]
copying fs0:\isaBus.efi -> fs0:\test\IsaBus.efi
 - [ok]
```

- To copy multiple directories recursively to another directory:

```
fs0:\> cp -r test1 test2 boot \test
copying fs0:\test1 -> fs0:\test\test1
copying fs0:\test1\test1.txt -> fs0:\test\test1\test1.txt
 - [ok]
copying fs0:\test2 -> fs0:\test\test2
copying fs0:\test2\test2.txt -> fs0:\test\test2\test2.txt
 - [ok]
copying fs0:\boot -> fs0:\test\boot
copying fs0:\boot\shell.efi -> fs0:\test\boot\shell.efi
 - [ok]
```

- To see the results of the above operations:

```
    fs0:\> ls \test
    Directory of: fs0:\test

      06/18/01  01:01p <DIR>             512  .
      06/18/01  01:01p <DIR>               0  ..
      01/28/01  08:21p <DIR>             512  test1
      01/28/01  08:21p <DIR>             512  test2
      01/28/01  08:21p <DIR>             512  boot
      01/28/01  08:23p                    29  temp.txt
      01/28/01  08:23p                28,739  IsaBus.efi
              2 File(s)      28,828 bytes
              5 Dir(s)

Shell>
```

date

Summary

Displays and sets the current date for the system.

Usage

```
date [mm/dd/[yy]yy][-sfo]
```

Options

mm

Month of the date to be set (1-12)

dd

Day of the date to be set (1-31)

yy/yyyy

Year of the date to be set. If only two digits, then 9x = 199x, otherwise 20xx.

-sfo

Standard-format output. See "Related Definitions" below.

Description

This command displays and/or sets the current date for the system. If no parameters are used, it shows the current date. If a valid month, day, and year are provided, then the system's date will be updated. Detailed rules are listed below:

Except for numeric characters and /, all other characters in the argument are invalid. The Shell will report an error if the number is in the wrong month/date/year range.

Space before or after the numeric character is not allowed. Inserting a space into the number is invalid.

The year range is greater than or equal to 1998. Two numeric characters indicate the year. Numbers below 98 are regarded as 20xx, and numbers equal to or above 98 are regarded as 19xx. 00 means 2000. For example:

```
Shell > date 8/4/97
Shell > date
08/04/2097
Shell >

Shell > date 8/4/98
Shell > date
08/04/1998
Shell >
```

The range of valid years is from 1998–2099.

Standard-Format Output

The standard-format from the date command has a single table: Date, with the following columns:

Table 15 Date Command Table

Column	Description
1	The name of the table. The name is Date.
2	Day (from 1-31)
3	Month (from 1-12)
4	Year (from 1998-2099)

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_DEVICE_ERROR	There was a hardware error preventing the completion of this command
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

- To display the current date in the system:
```
fs0:\> date
06/18/2001
```

- To set the date with long year format:
```
fs0:\> date 01/01/2050
fs0:\> date
01/01/2050
```

- To set the date with short year format:
```
fs0:\> date 06/18/01
fs0:\> date
06/18/2001
```

dblk

Summary

Displays the contents of one or more blocks from a block device.

Usage

dblk *device* **[***lba***] [***blocks***] [-b]**

Options

device

Block device name

lba

Index of the first block to be displayed (a hexadecimal number). The default is 0.

blocks

Number of blocks to be displayed (a hexadecimal number). The default is 1. If
larger than 0x10, then only 0x10 are displayed.

-b

Display one screen at a time.

Description

This command displays the contents of one or more blocks from a block device. **lba** and **blocks** should be typed in hex value. If **lba** is not specified, block #0 is assumed. If **blocks** is not specified, then on1y 1 block will be displayed. The maximum number of blocks that can be displayed at one time is 0x10.

If an MBR is found on the block, the partition information will be printed after all the block contents have been displayed.

If the block is a FAT partition, some FAT parameters will be displayed (label, systemid, oemid, sectorsize, clustersize, media etc) after all the blocks have been displayed.

Examples

- To display one block of blk0, beginning from block 0:
  ```
  Shell>dblk blk0
  ```
- To display one block of fs0, beginning from block 0x2:
  ```
  Shell>dblk fs0 2
  ```
- To display 0x5 blocks of fs0, beginning from block 0x12:

```
Shell>dblk fs0 12 5
```

- To display 0x10 blocks of fs0, beginning from block 0x12:

```
Shell>dblk fs0 12 10
```

- The attempt to display more than 0x10 blocks will display only 0x10 blocks:

```
Shell>dblk fs0 12 20
```

- To display one block of blk2, beginning from the first block (blk0):

```
fs1:\tmps1> dblk blk2 0 1

 LBA 0000000000000000 Size 00000200 bytes BlkIo 3F0CEE78
  00000000: EB 3C 90 4D 53 44 4F 53-35 2E 30 00 02 04 08 00  *.<.MSDOS5.0.....*
  00000010: 02 00 02 00 00 F8 CC 00-3F 00 FF 00 3F 00 00 00  *........?...?...*
  00000020: 8E 2F 03 00 80 01 29 2C-09 1B D0 4E 4F 20 4E 41  *./....),...NO NA*
  00000030: 4D 45 20 20 20 20 46 41-54 31 36 20 20 20 33 C9  *ME    FAT16   3.*
  00000040: 8E D1 BC F0 7B 8E D9 B8-00 20 8E C0 FC BD 00 7C  *........ ......*
  00000050: 38 4E 24 7D 24 8B C1 99-E8 3C 01 72 1C 83 EB 3A  *8N$.$....<.r...:*
  00000060: 66 A1 1C 7C 26 66 3B 07-26 8A 57 FC 75 06 80 CA  *f...&f;.&.W.u...*
  00000070: 02 88 56 02 80 C3 10 73-EB 33 C9 8A 46 10 98 F7  *..V....s.3..F...*
  00000080: 66 16 03 46 1C 13 56 1E-03 46 0E 13 D1 8B 76 11  *f..F..V..F....v.*
  00000090: 60 89 46 FC 89 56 FE B8-20 00 F7 E6 8B 5E 0B 03  *`.F..V.. ....^..*
  000000A0: C3 48 F7 F3 01 46 FC 11-4E FE 61 BF 00 00 E8 E6  *.H...F..N.a.....*
  000000B0: 00 72 39 26 38 2D 74 17-60 B1 0B BE A1 7D F3 A6  *.r9&8-t.`.....}..*
  000000C0: 61 74 32 4E 74 09 83 C7-20 3B FB 72 E6 EB DC A0  *at2Nt... ;.r....*
  000000D0: FB 7D B4 7D 8B F0 AC 98-40 74 0C 48 74 13 B4 0E  *.}.}....@t.Ht...*
  000000E0: BB 07 00 CD 10 EB EF A0-FD 7D EB E6 A0 FC 7D EB  *.........}....}.*
  000000F0: E1 CD 16 CD 19 26 8B 55-1A 52 B0 01 BB 00 00 E8  *.....&.U.R......*
  00000100: 3B 00 72 E8 5B 8A 56 24-BE 0B 7C 8B FC C7 46 F0  *;.r.[.V$....|...F.*
  00000110: 3D 7D C7 46 F4 29 7D 8C-D9 89 4E F2 89 4E F6 C6  *=.}.F.)}....N..N..*
  00000120: 06 96 7D CB EA 03 00 00-20 0F B6 C8 66 8B 46 F8  *..}..... ...f.F.*
  00000130: 66 03 46 1C 66 8B D0 66-C1 EA 10 EB 5E 0F B6 C8  *f.F.f..f....^...*
  00000140: 4A 4A 8A 46 0D 32 E4 F7-E2 03 46 FC 13 56 FE EB  *JJ.F.2....F..V..*
  00000150: 4A 52 50 06 53 6A 01 6A-10 91 8B 46 18 96 92 33  *JRP.Sj.j...F...3*
  00000160: D2 F7 F6 91 F7 F6 42 87-CA F7 76 1A 8A F2 8A E8  *......B...v.....*
  00000170: C0 CC 02 0A CC B8 01 02-80 7E 02 0E 75 04 B4 42  *.........~..u..B*
  00000180: 8B F4 8A 56 24 CD 13 61-61 72 0B 40 75 01 42 03  *...V$..aar.@u.B.*
  00000190: 5E 0B 49 75 06 F8 C3 41-BB 00 00 60 66 6A 00 EB  *^.Iu...A...`fj..*
  000001A0: B0 4E 54 4C 44 52 20 20-20 20 20 20 0D 0A 52 65  *.NTLDR      ..Re*
  000001B0: 6D 6F 76 65 20 64 69 73-6B 73 20 6F 72 20 6F 74  *move disks or ot*
  000001C0: 68 65 72 20 6D 65 64 69-61 2E FF 0D 0A 44 69 73  *her media....Dis*
  000001D0: 6B 20 65 72 72 6F 72 FF-0D 0A 50 72 65 73 73 20  *k error...Press *
  000001E0: 61 6E 79 20 6B 65 79 20-74 6F 20 72 65 73 74 61  *any key to resta*
  000001F0: 72 74 0D 0A 00 00 00 00-00 00 00 AC CB D8 55 AA  *rt............U.*

Fat 16 BPB  FatLabel: 'NO NAME    '  SystemId: 'FAT16   ' OemId: 'MSDOS5.0'
 SectorSize 200  SectorsPerCluster 4 ReservedSectors 8  # Fats 2
 Root Entries 200  Media F8  Sectors 32F8E  SectorsPerFat CC
 SectorsPerTrack 3F Heads 255
```

del

Summary

Internal alias for the `rm` command.

devices

Summary

Displays the list of devices managed by UEFI drivers.

Usage

```
devices [-b] [-l XXX] [-sfo]
```

Options

-b

- Display one screen at a time

-l XXX

- Display drivers using the language code XXX, which has the format specified by Appendix M of the *UEFI Specification*.

-sfo

- Display information as described in "Standard-Format Output" below.

Description

The command prints a list of devices that are being managed by drivers that follow the UEFI Driver Model.

Examples

- To display all devices compliant with the EFI Driver Model

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

```
Shell> devices
C  T   D
T  Y C I
R  P F A
L  E G G #P #D #C Device Name
== = = = == == == ============================================================
20 R - -  -  1 13 VenHw(58C518B1-76F3-11D4-BCEA-0080C73C8881)
3D D - -  3  -  - Primary Console Input Device
3E D - -  3  -  - Primary Console Output Device
64 B - -  1  6  2 "UGA Window 1
65 B - -  1  6  2 UGA Window 2"
66 B - -  1  1  1 EFI_WIN_NT_SERIAL_PORT=COM1
67 B - -  1  1  1 COM1
68 B - -  1  4  2 PC-ANSI Serial Console
69 D - -  1  -  - EFI_WIN_NT_SERIAL_PORT=COM2
6E D - -  1  -  - EFI_WIN_NT_PHYSICAL_DISKS=e:RW;262144;512
6F D - -  1  -  - EFI_WIN_NT_CPU_MODEL=Intel(R) Processor Model
70 D - -  1  -  - EFI_WIN_NT_CPU_SPEED=3000
71 D - -  1  -  - EFI_MEMORY_SIZE=64
72 D - -  1  -  - EFI_MEMORY_SIZE=64
```

Standard-Format Output

Table 16 Standard-Format Output for devices

Column Number	Description
1	The name of the table. The name is DevicesInfo
2	The handle number of the EFI device
3	The device type: R – Root Controller B – Bus Controller D – Device Controller
4	A managing driver supports the Driver Configuration Protocol: Yes (Y) or No (N)
5	A managing driver supports the Driver Diagnostics Protocol: Yes (Y) or No (N)
6	The number of parent controllers for this device
7	The number of this type of devices.
8	The number of child controllers produced by this device
9	The name of the device from the Component Name Protocol

devtree

Summary

Displays the tree of devices compliant with the UEFI Driver Model.

Usage

devtree [-b] [-d] [-l XXX] [*DeviceHandle***]**

Options

DeviceHandle

Display device tree below a certain handle

-b

Display one screen at a time

-d

Display device tree using device paths

-l

Display device tree using the specified language

Description

This command prints a tree of devices that are being managed by drivers that follow the UEFI Driver Model. By default, the devices are printed in device names that are retrieved from the Component Name Protocol. If the option **-d** is specified, the device paths will be printed instead.

Examples

- To display the tree of all devices compliant with the UEFI Driver Model:
  ```
  Shell> devtree
  ```

- To display the tree of all devices below device 28 compliant with the UEFI Driver Model:
  ```
  Shell> devtree 28
  ```

- To display the tree of all devices compliant with the UEFI Driver Model one screen at a time:
  ```
  Shell> devtree -b
  ```

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

dh

Summary

Displays the device handles in the UEFI environment.

Usage

dh [-l <*lang*>] [*handle* | -p <*prot_id*>] [-d] [-v]

Options

handle

Specific handle to dump information about (a hexadecimal number). If not present, then all information will be dumped.

-p

Dumps all handles of a protocol specified by the GUID.

-d

Dumps UEFI Driver Model-related information.

-l

Dumps information using the language codes, as described in Appendix M of the UEFI specification.

-sfo

Displays information as described in "Standard-Format Output" below.

-v, -verbose

Dumps verbose information about a specific handle.

Description

This command displays the device handles in the EFI environment. If this command is used with a specific handle number, the details of all the protocols that are associated with that device handle are displayed. Otherwise, the **-p** option can be used to list the device handles that contain a specific protocol.

If neither *-p* or *handle* is specified, then all handles will be displayed.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To display all handles and display one screen at a time:

```
Shell> dh -b
Handle dump
  1: Image(DXE Core)
  2: FwVol FwFileSys FwVolBlk DevPath(MemMap(11:1B50000-
     1D4FFC8))
  3: Image(Ebc)
  4: DevPath(MemMap(11:1CA0000-1CB0000))
  5: Image(WinNtThunk)
  6: WinNtThunk DevPath(..76F3-11D4-BCEA-0080C73C8881))
  7: Image(WinNtBusDriver) DriverBinding
  ...
```

To display the detailed information on handle 0x30:

```
Shell> dh 30
Handle 30 (01AF5308)
   IsaIo
     ROM Size......: 00000000
     ROM Location..: 00000000
     ISA Resource List :
       IO  : 000003F8-000003FF  Attr : 00000000
       INT : 00000004-00000000  Attr : 00000000

   dpath
      PNP Device Path for PnP
       HID A0341D0, UID 0x0
      Hardware Device Path for PCI
      PNP Device Path for PnP
       HID 50141D0, UID 0
   AsStr: 'Acpi(PNP0A03,0)/Pci(1F|0)/Acpi(PNP0501,0)'
```

To display all handles with 'diskio' protocol:

```
Shell> dh -p diskio
Handle dump by protocol 'Diskio'
 15: DiskIo BlkIo DevPath(..i(3|1)/Ata(Secondary,Master))
 16: DiskIo BlkIo DevPath(..,1)/PCI(0|0)/Scsi(Pun0,Lun0))
 44: DiskIo BlkIo Fs DevPath(..ABD0-01C0-507B-9E5F8078F531))
     ESP
 45: DiskIo BlkIo Fs DevPath(..i(Pun0,Lun0)/HD(Part4,SigG0))
     ESP
 17: DiskIo BlkIo DevPath(..PCI(3|1)/Ata(Primary,Master))
```

To display all handles with 'Image' protocol and break when the screen is full:

```
Shell> dh -p Image -b
Handle dump by protocol 'image'
  1: Image(DXE Core)
  5: Image(WinNtThunk)
  7: Image(WinNtBusDriver) DriverBinding
  8: Image(Metronome)
  A: Image(IsaBus) DriverBinding
  B: Image(WinNtConsole) DriverBinding
...
```

Standard-Format Output

When using the **-sfo** command-line option, the dh shell command will produce one of two tables: HandlesInfo or HandleInfo. The table columns are described in the following table:

Table 17 dh Standard Formatted Output (HandlesInfo)

Column Number	Description
1	The name of the table. The name is HandlesInfo.
2	Driver Name. Name of driver producing the handle.
3	Controller Name. Name of controller producing the handle.
4	Handle Number. Integer handle number.
5	Device Path.Device path associated with the handle.
6	Protocol Identifiers. Semicolon-delimited list of protocol identifiers or GUIDs.

dir

Summary

An internal alias for the `ls` command.

disconnect

Summary

Disconnects one or more drivers from the specified devices.

Usage

```
disconnect DeviceHandle [DriverHandle [ChildHandle]]
disconnect -r
```

Options

DeviceHandle

Device handle (a hexadecimal number). If not specified, then disconnect *DriverHandle*.

DriverHandle

Driver handle (a hexadecimal number)

ChildHandle

Child handle of a device (a hexadecimal number). If not specified, then all child handles of *DeviceHandle* will be disconnected.

-r

Disconnect all drivers from all devices.

Description

This command disconnects one or more drivers from the specified devices. If the **-r** option is used, all drivers are disconnected from all devices in the system. The following example is the typical output from the help for this command.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

- To disconnect all drivers from all devices:

```
Shell> disconnect -r
```

- To disconnect all drivers from device 0x28:

```
fs0:\> disconnect 28
```

- To disconnect driver 0x17 from device 0x28:

```
fs0:\> disconnect 28 17
```

- To disconnect driver 0x17 from controlling the child 0x32 of device 0x28

```
fs0:\> disconnect 28 17 32
```

dmem

Summary

Displays the contents of system or device memory.

Usage

dmem [-b] [*address*] [*size*] **[-MMIO]**

Options

address

Starting address in hexadecimal format

size

Number of bytes to display in hexadecimal format

-b

Display one screen at a time

-MMIO

Forces address cycles to the PCI bus

Description

This command displays the contents of system memory or device memory. *address* and *size* should be typed in hex value. If Address is not specified, then the contents of the EFI System Table are displayed. Otherwise, memory starting at Address is displayed. **Size** specifies the number of bytes to display. If **Size** is not specified, then it defaults to 512 bytes. If **MMIO** is not specified, then main system memory is displayed. Otherwise, device memory is displayed through the use of the **EFI_PCI_ROOT_BRIDGE_IO_PROTOCOL**.

Examples

```
* To display the EFI system table pointer entries:
  fs0:\> dmem

  Memory Address 000000003FF7D808 200 Bytes
  3FF7D808: 49 42 49 20 53 59 53 54-02 00 01 00 78 00 00 00  *IBI SYST....x...*
  3FF7D818: 5C 3E 6A FE 00 00 00 00-88 2E 1B 3F 00 00 00 00  *\>j........?....*
  3FF7D828: 26 00 0C 00 00 00 00 00-88 D3 1A 3F 00 00 00 00  *&..........?....*
  3FF7D838: A8 CE 1A 3F 00 00 00 00-88 F2 1A 3F 00 00 00 00  *...?.......?....*
  3FF7D848: 28 EE 1A 3F 00 00 00 00-08 DD 1A 3F 00 00 00 00  *(..?.......?....*
  3FF7D858: A8 EB 1A 3F 00 00 00 00-18 C3 3F 3F 00 00 00 00  *...?..........*
  3FF7D868: 00 4B 3F 3F 00 00 00 00-06 00 00 00 00 00 00 00  *.K............*
  3FF7D878: 08 DA F7 3F 00 00 00 00-70 74 61 6C 88 00 00 00  *...?....ptal....*
  3FF7D888: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D898: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8A8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8B8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8C8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8D8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8E8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D8F8: 00 00 00 00 00 00 00 00-70 68 06 30 88 00 00 00  *........ph.0....*
  3FF7D908: 65 76 6E 74 00 00 00 00-02 02 00 60 00 00 00 00  *evnt.......`....*
  3FF7D918: 18 6F 1A 3F 00 00 00 00-10 E0 3F 3F 00 00 00 00  *.o.?..........*
  3FF7D928: 10 00 00 00 00 00 00 00-40 C0 12 3F 00 00 00 00  *........@..?....*
  3FF7D938: 10 80 13 3F 00 00 00 00-00 00 00 00 00 00 00 00  *...?............*
  3FF7D948: 00 00 00 00 00 00 00 00-40 7D 3F 3F 00 00 00 00  *........@.....*
  3FF7D958: 50 6F 1A 3F 00 00 00 00-00 00 00 00 00 00 00 00  *Po.?............*
  3FF7D968: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D978: 00 00 00 00 00 00 00 00-70 74 61 6C 88 00 00 00  *........ptal....*
  3FF7D988: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D998: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9A8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9B8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9C8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9D8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9E8: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  3FF7D9F8: 00 00 00 00 00 00 00 00-70 68 06 30 A0 00 00 00  *........ph.0....*

  Valid EFI Header at Address 000000003FF7D808
  -------------------------------------------
  System: Table Structure size 00000078 revision 00010002
  ConIn (3F1AD388) ConOut (3F1AF288) StdErr (3F1ADD08)
  Runtime Services 000000003F3FC318
  Boot Services    000000003F3F4B00
  SAL System Table 000000003FF22760
  ACPI Table       000000003FFD9FC0
  ACPI 2.0 Table   00000000000E2000
  MPS Table        000000003FFD0000
  SMBIOS Table     00000000000F0020
```

* To display memory contents from 1af3088 with size of 16 bytes:

```
  Shell> dmem 1af3088 16
  Memory Address 0000000001AF3088 16 Bytes
  01AF3088: 49 42 49 20 53 59 53 54-00 00 02 00 18 00 00 00 *IBI SYST........*
  01AF3098: FF 9E D7 9B 00 00                               *......*
```

* To display memory mapped IO contents from 1af3088 with size of 16 bytes:

```
  Shell> dmem 1af3088 16 -MMIO
```

dmpstore

Summary

Manages all UEFI variables.

Usage

```
dmpstore [-b] [-d] [-all | (-guid guid)] [variable]
dmpstore [-all | (-guid guid)] [variable] [-s file]
dmpstore [-all | (-guid guid)] [variable] [-l file]
```

Options

-b

Display one screen at a time

variable

Specifies the name of the variable name. May be a literal name or a pattern as specified in the **MetaiMatch()** function of the **EFI_UNICODE_COLLATION2_PROCOOL**.

-guid

Specifies the GUID of the variables to be displayed. The GUID has the standard text format. If *guid* is not specified and *-all* is not specified, then the **EFI_GLOBAL_VARIABLE** GUID is assumed.

-all

Indicates that all variables should be dumped, including those with a different GUID than **EFI_GLOBAL_VARIABLE.**

-d

Delete variables

-s

Save variables to file

-l

Load and set variables from file

Description

This command is used to manage the UEFI NVRAM variables. The variables to display or delete depend on the command line options, as specified in the following table:

Table 18 Variable command line options

Variable	GUID	-all	Description
---	---	---	All variables with the GUID EFI_GLOBAL_VARIABLE will be operated on.
---	---	X	All variables (regardless of GUID or name) will be operated on.
---	X	---	All variables with the specified GUID will be operated on.
X	---	---	The variable with the GUID EFI_GLOBAL_VARIABLE and the name Variable will be operated on.
X	---	X	All variables with the specified name will be operated on (regardless of GUID).
X	X	---	The variable with the specified GUID and name Variable will be operated on.

The variable value is printed as hexadecimal dump.

Option **-d** is used to delete variables. Option **-s** and **-l** are used to save and load variables to and from file. The variable name can be specified when using these flags so that the operation only takes effect on that variable.

Examples

To dump all variables with the GUID EFI_GLOBAL_VARIABLE:
```
Shell> dmpstore
```

To dump all variables (regardless of GUID or name):
```
Shell> dmpstore -all
```

To dump the 'path' variable with the GUID '158DEF5A-F656-419C-B027-7A3192C079D2':
```
Shell> dmpstore -guid 158DEF5A-F656-419C-B027-7A3192C079D2 path
```

To dump all variables matching 'hwerr*' regardless of GUID:
```
Shell> dmpstore -all hwerr*
```

To save all variables (regardless of GUID or name) to a file VarDump.txt:
```
Shell> dmpstore -all -s VarDump.txt
```

To delete the 'BootOrder' variable with the GUID EFI_GLOBAL_VARIABLE:
```
Shell> dmpstore -d BootOrder
```

drivers

Summary

Displays a list of information for drivers that follow the UEFI Driver Model in the UEFI environment.

Usage

```
drivers [-l XXX] [-sfo]
```

Options

-l

Displays drivers using the language code XXX, which has the format specified by Appendix M of the UEFI specification.

-sfo

Displays information as described in "Standard-Format Output" below.

Description

This command displays a list of information for drivers that follow the UEFI Driver Model in the UEFI environment. The list includes:

- The handle number of the EFI driver.
- The version number of the EFI driver.
- The driver type. A **B** in this column indicates a bus driver, and **D** indicates a device driver.
- Indicates that the driver supports the Driver Configuration Protocol.
- Indicates that the driver supports the Driver Diagnostics Protocol.
- The number of devices that this driver is managing.
- The number of child devices that this driver has produced.
- The name of the driver from the Component Name Protocol.
- The file path from which the driver was loaded.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

- To display the list:

```
Shell> drivers
            T   D
D           Y C I
R           P F A
V  VERSION  E G G #D #C DRIVER NAME                                IMAGE NAME
=== ======= = = = == == ==================================== ==========
39 00000010 D - -  1  - Platform Console Management Driver    ConPlatform
3A 00000010 D - -  1  - Platform Console Management Driver    ConPlatform
3B 00000010 B - -  1  1 Console Splitter Driver               ConSplitter
3C 00000010 ? - -  -  - Console Splitter Driver               ConSplitter
3D 00000010 B - -  1  1 Console Splitter Driver               ConSplitter
3E 00000010 ? - -  -  - Console Splitter Driver               ConSplitter
42 00000010 D - -  1  - UGA Console Driver                    GraphicsConsole
43 00000010 ? - -  -  - Serial Terminal Driver                Terminal
44 00000010 D - -  1  - Generic Disk I/O Driver               DiskIo
45 00000010 D - -  1  - FAT File System Driver                Fat
48 00000010 ? - -  -  - ISA Bus Driver                        IsaBus
49 00000010 ? - -  -  - ISA Serial Driver                     IsaSerial
4C 00000010 B - -  1  1 PCI Bus Driver                        PciBus
55 00000010 D X X  1  - Windows Block I/O Driver              WinNtBlockIo
56 00000010 ? - -  -  - Windows Text Console Driver           WinNtConsole
57 00000010 ? - -  -  - Windows Serial I/O Driver             WinNtSerialIo
58 00000010 D - -  1  - Windows Simple File System Driver
WinNtSimpleFileSystem
59 00000010 B - -  1  3 Windows Bus Driver                    WinNtBusDriver
5F 00000010 D - -  1  - Windows Universal Graphics Adapter    WinNtUga
```

Standard-Format Output

The standard-format output for the drivers command produces a single table: Drivers. The following columns are described:

Table 19 Drivers command table

Column Number	Description
1	The name of the table. The name is DriversInfo.
2	Handle Number. The handlenumber of the UEFI driver.
3	Version Number. The version number of the UEFI Driver
4	Driver Type. Either ‘B’ for bus driver or ‘D’ for device driver.
5	Configuration Protocol Support. Either “Y” (Yes) or “N” (No)
6	Driver Protocol Support. Either ‘Y’ (Yes) or ‘N’ (No)
7	Devices Managed. The number of devices that this driver is managing.
8	Child Devices. The number of child devices that this driver has produced.
9	Driver Name. The name of the driver from the Component Name Protocol.
10	Driver Image Path. The device path from which the driver was loaded.

drvcfg

Summary

Configures the driver using the platform's underlying configuration infrastructure.

Usage

drvcfg [-l XXX] [-c] [-f <*Type***>|-v|-s] [***DriverHandle*** [***DeviceHandle*** [***ChildHandle***]]] [-i** ***filename***] [-o** ***filename***]**

Options

Type

The type of default configuration options to force on the controller.

0 - Standard Defaults.

1 - Manufacturing Defaults.

2 - Safe Defaults.

4000-FFFF - Custom Defaults.

DriverHandle

The handle of the driver to configure

DeviceHandle

The handle of a device that DriverHandle is managing

ChildHandle

The handle of a device that is a child of DeviceHandle

-c

Configure all child devices

-l

Configure using the ISO 3066 language specified by XXX

-f

Force defaults

-v

Validate options

-s

Set options

-i

Receive configuration updates from an input file

-O

Export the settings of the specified driver instance to a file

Description

This command invokes the platform's Configuration infrastructure. The table below describes the values for the *Type* parameter. Other values depend on the driver's implementation.

Table Default Values for the "Type" Parameter

Value	Type of Default	Description
0x0000	Standard Defaults	Places a controller in a state that is prepared for normal operation in a platform.
0x0001	Manufacturing Defaults	Optional type that places the controller in a configuration that is suitable for a manufacturing and test environment.
0x0002	Safe Defaults	Optional type that places a controller in a safe configuration that has the greatest probability of functioning correctly in a platform.
0x0003 – 0x3FFF	Reserved	Specification reserved range of default values
0x4000 – 0xFFFF	Custom Defaults	Optional type that places the controller in a configuration that has custom characteristics.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_UNSUPPORTED	The action as requested was unsupported.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To display the list of devices that are available for configuration:

```
Shell> drvcfg
```

To display the list of devices and child devices that are available for configuration:

```
Shell> drvcfg -c
```

To force defaults on all devices:

```
Shell> drvcfg -f 0
```

To force defaults on all devices that are managed by driver 0x17:

```
Shell> drvcfg -f 0 17
```

To force defaults on device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –f 0 17 28
```

To force defaults on all child devices of device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –f 0 17 28 –c
```

To force defaults on child device 0x30 of device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –f 0 17 28 30
```

To validate options on all devices:

```
Shell> drvcfg –v
```

To validate options on all devices that are managed by driver 0x17:

```
Shell> drvcfg –v 17
```

To validate options on device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –v 17 28
```

To validate options on all child devices of device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –v 17 28 –c
```

To validate options on child device 0x30 of device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –v 17 28 30
```

To set options on device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –s 17 28
```

To set options on child device 0x30 of device 0x28 that is managed by driver 0x17:

```
Shell> drvcfg –s 17 28 30
```

To set options on device 0x28 that is managed by driver 0x17 in English:

```
Shell> drvcfg –s 17 28 –l eng
```

To set options on device 0x28 that is managed by driver 0x17 in Spanish:

```
Shell> drvcfg –s 17 28 –l spa
```

drvdiag

Summary

Invokes the Driver Diagnostics Protocol.

Usage

drvdiag [-c] [-l *XXX*] **[-s|-e|-m]** [*DriverHandle* [*DeviceHandle* [*ChildHandle*]]]

Options

DriverHandle

The handle of the driver to diagnose

DeviceHandle

The handle of a device that DriverHandle is managing

ChildHandle

The handle of a device that is a child of DeviceHandle

-c

Diagnose all child devices

-l

Diagnose drivers using the language code XXX, which has the format specified by Appendix M of the *UEFI Specification*.

-s

Run diagnostics in standard mode

-e

Run diagnostics in extended mode

-m

Run diagnostics in manufacturing mode

Description

This command invokes the Driver Diagnostics Protocol.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To display the list of devices that are available for diagnostics:

```
Shell> drvdiag
```

To display the list of devices and child devices that are available for diagnostics:

```
Shell> drvdiag –c
```

To run diagnostics in standard mode on all devices:

```
Shell> drvdiag –s
```

To run diagnostics in standard mode on all devices in English:

```
Shell> drvdiag –s –l eng
```

To run diagnostics in standard mode on all devices in Spanish:

```
Shell> drvdiag –s –l spa
```

To run diagnostics in standard mode on all devices and child devices:

```
Shell> drvdiag –s –c
```

To run diagnostics in extended mode on all devices:

```
Shell> drvdiag –e
```

To run diagnostics in manufacturing mode on all devices:

```
Shell> drvdiag –m
```

To run diagnostics in standard mode on all devices managed by driver 0x17:

```
Shell> drvdiag –s 17
```

To run diagnostics in standard mode on device 0x28 managed by driver 0x17:

```
Shell> drvdiag –s 17 28
```

To run diagnostics in standard mode on all child devices of device 0x28 managed by driver 0x17:

```
Shell> drvdiag –s 17 28 –c
```

To run diagnostics in standard mode on child device 0x30 of device 0x28 managed by driver 0x17:

```
Shell> drvdiag –s 17 28 30
```

echo

Summary

Controls whether or not script commands are displayed as they are read from the script file and prints the given message to the display.

Usage

```
echo [-on|-off]
echo [message]
```

Options

message

Message to display

-on

Enables display when reading commands from script files.

-off

Disables display when reading commands from script files.

Description

The first form of this command controls whether or not script commands are displayed as they are read from the script file. If no argument is given, the current "on" or "off" status is displayed. The second form prints the given message to the display.

Note

This command does not change the value of the environment variable **lasterror**.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation

Examples

- To display a message string of 'Hello World':
```
fs0:\> echo Hello World
Hello World
```

- To turn command echoing on:
```
fs0:\> echo -on
```

- To execute HelloWorld.nsh, and display when reading lines from the script file:
```
fs0:\> HelloWorld.nsh
+HelloWorld.nsh> echo Hello World
Hello World
```

- To turn command echoing off:
```
fs0:\> echo -off
```

- To display the current echo setting:
```
fs0:\> echo
Echo is off
```

edit

Summary

Full screen editor for ASCII or UCS-2 files.

Usage

```
edit [file]
```

Options

file

Name of file to be edited. If none is specified, then an empty file will be created with a default file name.

Description

This command allows a file to be edited using a full screen editor. The editor supports both UCS-2 and ASCII file types. The following example shows typical output for help on this command.

Examples

- To edit the 'shell.log' file:
  ```
  fs0:\> edit shell.log
  ```

eficompress

Summary

Compress a file using EFI Compression Algorithm.

Usage

eficompress *infile outfile*

Options

infile

- Filename for uncompressed input file

outfile

- Filename for compressed output file

Description

This command is used to compress a file using EFI Compression Algorithm and write the compressed form out to a new file.

Examples

- To compress a file named ‘uncompressed’ to file ‘compressed’:

```
fs0:\> eficompress uncompressed compressed
```

efidecompress

Summary

Decompress a file using EFI Decompression Algorithm.

Usage

efidecompress *infile outfile*

Options

infile

Filename of compressed input file

outfile

Filename of decompressed output file

Description

This command is used to decompress a file using EFI Decompression Algorithm and write the decompressed form out to a new file.

Examples

- To decompress a file named ‘compressed’ to file ‘uncompressed’:

```
fs0:\> efidecompress compressed uncompressed
```

exit

Summary

Exits the UEFI Shell or the current script.

Usage

exit [/b] [*exit-code*]

Options

/b

Indicates that only the current UEFI shell script should be terminated. Ignored if not used within a script.

exit-code

If exiting a UEFI shell script, the value that will be placed into the environment variable **lasterror**. If exiting an instance of the UEFI shell, the value that will be returned to the caller. If not specified, then 0 will be returned.

Description

This command exits the UEFI Shell or, if /b is specified, the current script.

Status Codes Returned

0	Exited normally
exit-code	The value specified as an option.

for

Usage

```
for %indexvar in set [;]

  command [arguments]
  [command [arguments]]
  …
endfor

for %indexvar run (start end [step])
   command [arguments]
   [command [arguments]]
   …
endfor
```

Description

The **for** command executes one or more *commands* for each item in a *set* of items. The *set* may be text strings or filenames or a mixture of both, separated by spaces (if not in a quotation). If the length of an element in the *set* is between 0 and 256, and if the string contains wildcards, the string will be treated as a file name containing wildcards, and be expanded before *command* is executed.

If after expansion no such files are found, the literal string itself is kept. *Indexvar* is any alphabet character from 'a' to 'z' or 'A' to 'Z', and they are case sensitive. It should not be a digit (0-9) because %digit will be interpreted as a positional argument on the command line that launches the script. The namespace for index variables is separate from that for environment variables, so if *indexvar* has the same name as an existing environment variable, the environment variable will remain unchanged by the **for** loop.

Each c*ommand* is executed once for each item in the *set*, with any occurrence of *%indexvar* in the command replacing with the current item. In the second format of for … endfor statement, *indexvar* will be assigned a value from *start* to *end* with an interval of *step*. *start* and *end* can be any integer whose length is less than 7 digits excluding sign, and it can also applied to *step* with one exception of zero. s*tep* is optional, if *step* is not specified it will be automatically determined by following rule, if *start* <= *end* then *step* = 1, otherwise *step* = -1. *start, end* and *step* are divided by space. Use of the same index variable in nested for statements results in undefined behavior.

This command may only be used in scripts.

This command does not change the value of the environment variable **lasterror**.

Examples

```
#
#  Sample for loop - listing all .txt files
#
echo -off
for %a in *.txt
     echo %a exists
endfor
```

If in current directory, there are 2 files named file1.txt and file2.txt, the output of the sample script will be:

```
Sample1> echo -off
file1.txt exists
file2.txt exists
```

getmtc

Usage

```
getmtc
```

Description

This command displays the current monotonic counter value. The lower 32 bits increment every time this command is executed. Every time the system is reset, the upper 32 bits will be incremented, and the lower 32 bits will be reset to 0. The following example is typical output from help for this command.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_DEVICE_ERROR	The underlying device was not working correctly.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation

Examples

```
fs0:\> getmtc
100000000
fs0:\> getmtc
100000001
```

goto

Usage

```
goto label
```

Description

The **goto** command directs script file execution to the line in the script file after the given *label*. The command is not supported from the interactive shell. A *label* is a line beginning with a colon (:). It can appear either after the **goto** command, or before the **goto** command. The search for *label* is done forward in the script file, from the current file position. If the end of the file is reached, the search resumes at the top of the file and continues until *label* is found or the starting point is reached. If *label* is not found, the script process terminates and an error message is displayed. If a *label* is encountered but there is no **goto** command executed, the *label* lines are ignored. Using **goto** command to jump into another **for** loop is not allowed, but jumping into an **if** statement is legal.

Note

The **goto** command is only valid in script files.

Examples

```
# This is a script
goto Done
…
:Done
cleanup.nsh
```

help

Summary

Displays the list of commands that are built into the UEFI Shell.

Usage

help [*cmd* | *pattern* | **special**] [**-usage**] [**-verbose**] [**-section** *sectionname*][**-b**]

Options

cmd

Command to display help about.

pattern

Pattern which describes the commands to be displayed.

special

Displays a list of the special characters used in the shell command line.

-usage

Display the usage information for the command. The same as specifying **-section:NAME** and **-section:SYNOPSIS**

-section sectionname

Display the specified section of the help information. Standard section names can be found in Appendix B.

Description

The help command displays information about one or more shell commands.

If no other options are specified, each command will be displayed along with a brief description of its function. If *-verbose* is specified, then all help information for the specified commands. If *-section* is specified, only the help section specified will be displayed (see below). If *-usage* is specified, then the command, a brief description and the usage will be displayed.

The help text is gathered from UCS-2 text files found in the directory where the shell or shell command executable was located. The files have the name *command-name*.man, where *command-name* is the name of the shell command. The files follow a sub-set of the MAN page format, as described below.

If no option is specified, then only the NAME section of the page is reproduced.

Status Codes Returned

0	The help was displayed

1	No command help was displayed

Examples

To display the list of commands in the UEFI Shell and break after one screen:

```
Shell> help -b
?             - Displays commands list or verbose help of a
                command
alias         - Displays, creates, or deletes aliases in the
                UEFI Shell
attrib        - Displays or changes the attributes of files
                or directories
cd            - Displays or changes the current directory
cls           - Clears the standard output with an optional
                background color
connect       - Binds an EFI driver to a device and starts
                the driver
copy          - Copies one or more files/directories to
                another location
...
```

To display help information of a Shell command - ls:

```
Shell> help ls
Shell> ? ls
Shell> ls -?
```

To display the list of commands that start with character ‘p’:

```
Shell> help p*
pause – Prints a message and suspends for keyboard input
```

hexedit

Summary

Full screen hex editor for files, block devices, or memory.

Usage

```
hexedit [[-f] filename| [-d diskname offset size] | [-m address size]]
```

Options

-f

Name of file to edit

-d

Disk block to edit:

DiskName - Name of disk to edit (for example fs0)

Offset - Starting block number (beginning from 0)

Size - Number of blocks to be edited

-m

Memory region to edit:

Address - Starting 32-bit memory address (beginning from 0)

Size - Size of memory region to be edited in bytes

Description

This command allows a file, block device, or memory region to be edited. The region being edited is displayed as hexadecimal bytes, and the contents can be modified and saved. The following example shows typical output for help on this command.

Examples

- To edit a file in hex mode:
  ```
  fs0:\> hexedit test.bin
  ```
- To edit block device fs0 starting at block 0 with size of 2 blocks:
  ```
  fs0:\> hexedit -d fs0 0 2
  ```
- To edit memory region starting at address 0x00000000 with size of 2 bytes:
  ```
  fs0:\> hexedit -m 0 2
  ```

if

Controls which script commands will be executed based on provided conditional expressions.

Usage

```
if [not] exist filename then
   command [arguments]
   [command [arguments]]
   …
   [else
   command [arguments]
   [command [arguments]]
   …
   ]
   endif

if [/i] [not] string1 == string2 then
   command [arguments]
   [command [arguments]]
   …
   [else
   command [arguments]
   [command [arguments]]
   …
   ]
endif

if [/i][/s] ConditionalExpression then
   command [arguments]
   [command [arguments]]
   …
   [else
   command [arguments]
   [command [arguments]]
   …
   ]
 Endif
```

Options

ConditionalExpression

Conditional expression, as described in “Expressions”, below.

Description

The **if** command executes one or more *commands* before the **else** or **endif** commands, if the specified condition is true; otherwise *commands* between **else** (if present) and **endif** are executed.

In the first usage of **if**, the **exist** condition is true when the file specified by *filename* exists. The *filename* argument may include device and path information. Also wildcard expansion is supported by this form. If more than one file matches the wildcard pattern, the condition evaluates to TRUE.

In the second usage, the *string1* == *string2* condition is true if the two strings are identical. Here the comparison can be case sensitive or insensitive, it depends on the optional switch **/i**. If **/i** is specified, it will compare strings in the case insensitive manner; otherwise, it compares strings in the case sensitive manner.

In the third usage, general purpose comparison is supported using expressions optionally separated by **and** or **or**. Since **<** and **>** are used for redirection, the expressions use common two character (FORTRAN) abbreviations for the operators (augmented with unsigned equivalents):

Expressions

Conditional expressions are evaluated strictly from left to right. Complex conditionals requiring precedence may be implemented as nested **if**s.

The expressions used in the third usage have the following syntax:

conditional-expression := *expression* |
expression **and** *expression*
expression **or** *expression*

expression := *expr* |
not *expr*

expr := *item binop item* |
boolfunc(string)

item := *mapfunc*(string) |
string

mapfunc := **efierror** | **pierror** | **oemerror**

boolfunc := **isint** | **exists** | **available** | **profile**

binop := **gt** | **lt** | **eq** | **ne** | **ge** | **le** | **==** | **ugt** | **ult** | **uge** | **ule**

Comparisons

By default, comparisons are done numerically if the strings on both sides of the operator are numbers (as defined below) and in case sensitive character sort order otherwise. Spaces separate the operators from operands.

The **/s** option forces string comparisons and the **/i** option forces case-insensitive string comparisons. If either of these is used, the signed or unsigned versions of the operators have the same results. The **/s** and **/i** apply to the entire line and must appear at the start of the line (just after the **if** itself). The two may appear in either order.

When performing comparisons, the Unicode Byte Ordering Character is ignored at the beginning of any argument.

Table 20Comparison Operators

Operator	Definition
gt	Greater than
ugt	Unsigned Greater than
lt	Less than
ult	Unsigned Less than
ge	Greater than or equal
uge	Unsigned greater than or equal
le	Less than or equal
ule	Unsigned less than or equal
ne	Not equal
eq	Equals (semantically equivalent to **==**)
==	Equals (semantically equivalent to **eq**)

Error Mapping Functions

These functions are used to convert integers into UEFI, PI or OEM error codes, as defined by Appendix D of the UEFI specification.

Table 21Functions used to convert integers into UEFI, PI or OEM error codes

Function	Definition
UefiError	Sets top nibble of parameter to 1000 binary (0x8)
PiError	Sets top nibble of parameter to 1010 binary (0xA)
OemError	Sets top nibble of parameter to 1100 binary (0xC)

Each function maps the small positive parameter into its equivalent error classification as described in Appendix D of the UEFI Specification. For example,

```
...
if %lasterror% == EfiError(8) then # Check for write protect.
...
```

These functions may only be used to modify operators in comparisons.

Boolean Functions

The following built-in Boolean functions are also available:

Table 22 Boolean Functions

Function	Definition
IsInt	Evaluates to true if the parameter string that follows is a number (as defined below) and false otherwise.
Exists	Evaluates to true if the file specified by *string* exists is in the current working directory or false if not.
Available	Evaluates to true if the file specified by *string* is in the current working directory or current path.
Profile	Determines whether the parameter string matches one of the profile names in the **profiles** environment variable.

No spaces are allowed between function names and the open parenthesis, between the open parenthesis and the string or between the string and the closed parenthesis. Constant strings containing spaces must be quoted.

Note: *To avoid ambiguity and current or future incompatibility, users are strongly encouraged to surround constant strings that contain parenthesis with quotes in* ***if*** *statements.*

Conditional Expressions

Not inverts the sense of only the following expression.

Numbers

Allowable number formats are decimal numbers and C-style case insensitive hexadecimal numbers. Numbers may be preceded by a "-" indicating a negative number. Examples:

- 13
- 46
- -0x3FFF
- 0x3fff
- 0x1234

Unsigned values must be less than 2^{64}. Signed integer values are bounded by $\pm 2^{63}$. Numbers are internally represented in two's compliment form. The representation of the number in the string has no bearing on the way that number is treated in an numeric expression – type is assigned by the operator. So, for example, **-1 lt 2** is true but **-1 ult 2** is false.

Examples

```
#
#  Example script for "if" command usages 1 and 2
#
if exist fs0:\myscript.nsh then
  myscript myarg1 myarg2
endif
if %myvar% == runboth then
  myscript1
  myscript2
else
  echo ^%myvar^% != runboth
endif
```

In this example, if the script file **myscript.nsh** exists in fs0:\, this script will be launched with 2 arguments, **myarg1** and **myarg2**. After that, environment variable **%myvar%** is checked to see if its value is **runboth**, if so, script myscript1 and myscript2 will be executed one after the other, otherwise a message **%myvar% != runboth** is printed.

```
#
#  Example script for "if" command usage 3
#
:Redo
echo Enter 0-6 or q to quit
# assumes "input y" stores a character of user input into variable y
InputCh MyVar
if x%MyVar% eq x then
  echo Empty line. Try again
  goto Redo
endif

if IsInt(%MyVar%) and %MyVar% le 6 then
  myscript1 %MyVar%
  goto Redo
endif
if /i %MyVar% ne q then
  echo Invalid input
  goto Redo
endif
```

In this example, the script requests user input and uses the **if** command for input validation. It checks for empty line first and then range checks the input. Note also the use of the **/i** in the last comparison so "Q" and "q" are both supported.

Note: *This command does not change the value of the environment variable* ***lasterror****.*

Note: *The* ***if*** *command is only available in scripts.*

Note: *The* `else` *command is optional in an if/else statement.*

ifconfig

Summary

Modify the default IP address of the UEFI IP4 Network Stack.

Usage

ifConfig [-?] [-c [*Name***]] [-l [***Name***]] [-s** *<Name>* **dhcp | <static** *<IP> <Mask> <Gateway>>* **[permanent]]**

Options

Name

Adapter name, i.e., eth0

-c **[Name]**

Clear the configuration for all or specified interface, and the network stack for related interface will fall back to the DHCP as default.

-l **[Name]**

List the configuration for all or the specified interface.

-s < **Name***>* **static** *<IP> <SubnetMask> <GatewayMask>* **[permanent]**

Use static IP4 address configuration for all or specified interface. If **permanent** is not present, the configuration is one-time only, otherwise this configuration request will survive a network stack reload.

-s <Name> **dhcp [permanent]**

Use DHCP4 to request the IP4 address configuration dynamically for all interface or specified interface. If **permanent** is not present, the configuration is one-time only, otherwise this configuration request will survive a network stack reload.

IP

IP4 address in four integer values (each between 0-255). i.e., 192.168.0.10

SubnetMask

Subnet mask in four integer values (each between 0-255), i.e., 255.255.255.0

GatewayMask

Default gateway in four integer values (each between 0-255), i.e., 192.168.0.1

-?

Display the help message

Description

This command is used to modify the default IP address for the UEFI IP4 Network Stack.

Examples

To list the configuration for the interface eth0:

```
Shell:\> IfConfig -l eth0
```

To use DHCP4 to request the IP4 address configuration dynamically for the interface eth0:

```
Shell:\> IfConfig –s eth0 dhcp
```

To use the static IP4 address configuration for the interface eth0, and this configuration survives the network reload:

```
Shell:\> IfConfig –s eth0 static 192.168.0.5 255.255.255.0 192.168.0.1 permanent
```

load

Summary

Loads a UEFI driver into memory.

Usage

load [-nc] *file* **[***file...***]**

Options

-nc

Load the driver, but do not connect the driver.

File

File that contains the image of the UEFI driver (wildcards are permitted)

Description

This command loads an driver into memory. It can load multiple files at one time, and the file name supports wildcards.

If the **-nc** flag is not specified, this command will try to connect the driver to a proper device; it may also cause already loaded drivers be connected to their corresponding devices.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The requested file was not found

Examples

```
fs0:\> load Isabus.efi
load: Image 'fs0:\Isabus.efi' loaded at 18FE000 - Success

fs0:\> load Isabus.efi IsaSerial.efi
load: Image 'fs0:\Isabus.efi' loaded at 18E5000 - Success
load: Image 'fs0:\IsaSerial.efi' loaded at 18DC000 - Success

fs0:\> load Isa*.efi
load: Image 'fs0:\IsaBus.efi' loaded at 18D4000 - Success
load: Image 'fs0:\IsaSerial.efi' loaded at 18CB000 – Success

fs0:\> load –nc IsaBus.efi
load: Image ‘fs0:\Isabus.efi’ loaded at 18FE000 - Success
```

loadpcirom

Summary

Loads a UEFI driver from a file in the format of a PCI Option ROM.

Usage

loadpcirom [-nc] *romfile* **[***romfile...***]**

Options

-nc

- Load the ROM image but do not connect the driver

romfile

- PCI option ROM image file (wildcards are permitted)

Description

This command is used to load PCI option ROM images into memory for execution. The file can contain legacy images and multiple PE32 images, in which case all PE32 images will be loaded. The example below shows typical output from help for this command.

Examples

```
To load a rom file 'rom.bin':
   fs0:\> LoadPciRom rom.bin
To load '*.bin' files but do not connect the driver
   fs0:\> LoadPciRom -nc *.bin
```

ls

Summary

Lists a directory's contents or file information.

Usage

ls [-r] [-a[*attrib***]][-sfo][***file***]**

Options

-r

Displays recursively (including subdirectories)

-a

Display only those files with the attributes which follow. If no attributes are listed, then all files will be listed. If –a is not specified, then all non-system and non-hidden files will be listed. The attributes (*attrib*) may be one or more of the following:

1. a - Archive
2. s - System
3. h - Hidden
4. r - Read-only
5. d - Directory

-sfo

Display information as described in “Standard-Format Output” below.

file

Name of file/directory (wildcards are permitted)

Description

This command lists directory contents or file information. If no file name or directory name is specified, then the current working directory is assumed. The contents of a directory are listed if all of the following are true:

- If option **-r** is not specified
- If no wildcard characters are specified in the *file* parameter
- If *file* represents an existing directory

In all other cases, the command functions as follows:

- All files/directories that match the specified name are displayed.
- The **-r** flag determines whether a recursive search is performed.

- The option flag **-a[*attrib*]** tells the command to display only those files with the attributes that are specified by **[attrib]**. If more than one attribute is specified, only the files that have all those attributes will be listed. If **-a** is followed by nothing, then all files/directories are displayed, regardless of their attributes. If **-a** itself is not specified, then all files except system and hidden files are displayed.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The requested file or directory was not found.

Examples

To hide files by adding the hidden or system attribute to them:

```
fs0:\> attrib +s +h *.efi
 ASH  fs0:\IsaBus.efi
 ASH  fs0:\IsaSerial.efi
```

To display all, except the files/directories with 'h' or 's' attribute:

```
fs0:\> ls
Directory of: fs0:\

  06/18/01  09:32p                 153  for.nsh
  06/18/01  01:02p <DIR>           512  efi
  06/18/01  01:02p <DIR>           512  test1
  06/18/01  01:02p <DIR>           512  test2
  06/18/01  08:04p                  29  temp.txt
  06/18/01  08:05p <DIR>           512  test
  01/28/01  08:24p       r          29  readme.txt
          3 File(s)         211 bytes
          4 Dir(s)
```

To display files with all attributes in the current directory:

```
fs0:\> ls -a
Directory of: fs0:\

  06/18/01  09:32p                 153  for.nsh
  06/18/01  01:02p <DIR>           512  efi
  06/18/01  01:02p <DIR>           512  test1
  06/18/01  01:02p <DIR>           512  test2
  06/18/01  10:59p              28,739  IsaBus.efi
  06/18/01  10:59p              32,838  IsaSerial.efi
  06/18/01  08:04p                  29  temp.txt
  06/18/01  08:05p <DIR>           512  test
  01/28/01  08:24p       r          29  readme.txt
          5 File(s)      61,788 bytes
          4 Dir(s)
```

To display files with read-only attributes in the current directory:

```
fs0:\> ls  -ar
Directory of: fs0:\

  06/18/01  11:14p       r            29  readme.txt
         1 File(s)          29 bytes
         0 Dir(s)
```

To display the files with attribute of 's':

```
fs0:\> ls -as isabus.efi
Directory of: fs0:\

  06/18/01  10:59p               28,739  IsaBus.efi
         1 File(s)      28,739 bytes
         0 Dir(s)
```

To display all in fs0:\efi directory recursively:

```
fs0:\> ls -r -a efi
```

To search for files with the specified type in the current directory recursively:

```
fs0:\> ls -r -a  *.efi –b
```

Standard-Format Output

The ls command will produce at least two tables: VolumeInfo and FileInfo. The VolumeInfo table reports one row for each file system volume reported. The FileInfo table reports one row for each file, including directories. The following tables describe the standard table column headings and their description. For more information on “Standard-Format Output”, see Appendix D.

Table 23 ls Standard Formatted Output (VolumeInfo)

Column Number	Description
1	The name of the table. The name is VolumeInfo.
2	Name. Standard volume label
3	Total Size. Total number of bytes in the volume.
4	Read Only. “True” if the volume is read-only, otherwise “False”.
5	Free Space. Total number of free bytes in the volume.
6	Block Size. Nominal block size by which files are typically grown, in bytes.

Table 24 ls Standard Formatted Output (FileInfo)

Column Number	Description
1	The name of the table. The name is FileInfo.
2	Name. Complete file name & directory, including the file system’s mapped name.
3	Logical Size. Size of the file, in bytes.

4	Physical Size. Size of the file in the volume, including any padding, in bytes.
5	Attributes. List of file attributes. The string can contain zero or more of the following (but no repeats): a – Archive d – Directory h – Hidden r – Read-Only s – System
6	File Creation Time. Time when the file was created, in the format: hh:mm:ss.
7	File Creation Date. Date when the file was created, in the format: dd.mm.yyyy.
8	File Access Time. Time when the file was accessed, in the format: hh:mm:ss
9	File Access Date. Date when the file was accessed, in the format: dd.mm.yyyy
10	File Modification Time. Time when the file was modified, in the format: hh:mm:ss
11	File Modification Date. Date when the file was modified, in the format: dd.mm.yyyy.

map

Summary

Defines a mapping between a user-defined name and a device handle.

Usage

```
map [-d <sname>]
map [[-r][-v][-c][-f][-u][-t <type[,type…]>][sname]]
map [sname handle | mapping]
```

Options

sname

MappingMapped name

handle

The number of handle, which is same as dumped from 'dh'

mapping

The device's mapped name. Use this parameter to assign a new mapping to a device. The mapping must end with a ':'.

-sfo

Output will be formatted according to "Standard-Format Output" below.

-t

Shows the device mappings, filtered according to the device type. The supported types are **fp** (floppy), **hd** (hard disk) and **cd** (CD-ROM). Types can be combined by putting a comma between two types. Spaces are not allowed between types.

-d

Deletes a mapping

-r

Resets to default mappings

-v

Lists verbose information about all mappings.

-c

Shows the consistent mapping.

-f

Shows the normal mapping (not the consistent mapping).

-u

This option will add mappings for newly installed devices and remove mappings for uninstalled devices but will not change the mappings of existing devices. The user-defined mappings are also preserved.

Description

This command creates a mapping between a user-defined name and a device. The most common use of this command is to create a the mapped name for devices that support a file system protocol. Once these mappings are created, the names can be used with all the file manipulation commands.

The UEFI Shell environment creates default mappings for all of the devices that support a recognized file system.

This command can be used to create additional mappings, or it can be used to delete an existing mapping with the **-d** option. If the **map** command is used without any parameters, all of the current mappings will be listed. If the **-v** option is used, the mappings will be shown with additional information about each device.

The **-r** option is used to reset all the default mappings in a system; this option is useful if the system configuration has changed since the last boot.

The **-u** option will add mappings for newly installed devices and remove mappings for uninstalled devices but will not change the mappings of existing devices. The user-defined mappings are also preserved. A mapping history will be saved so that the original mapping name is used for a device with a specific device path if that mapping name was used for that device path last time. The current directory is also preserved if the current device is not changed.

Each device in the system has a consistent mapping. If the hardware configuration has not changed, the device's consistent mappings do not change. If two or more machines have the same hardware configurations, the device's consistent mapping will be the same. Use the **-c** option to list all the consistent mappings in the system.

The mapping consist of digits and characters. Other characters are illegal.

This command support wildcards. You can use the wildcards to delete or show the mapping . However, when you assign the mapping, wildcards are forbidden.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Standard-Format Output

If *-sfo* is specified, then the map command will output a single table: Mappings. The following table describes the table columns for this table:

Table 25 Standard Formatted Output (Mappings)

Column Number	Description
1	The name of the table. The name is Mappings.
2	Mapped Name. The mapped device name.
3	Device Path. The device path which corresponds to the mapped device name.
4	Consistent Name. The consistent mapped name (if any) which is equivalent to *MappedName*. If *MappedName* is already a consistent mapped name, then this column is empty.

md

Summary

An internal alias for the **mkdir** command.

mem

Summary

This is a built-in alias for `dmem`.

memmap

Summary

Displays the memory map maintained by the EFI environment.

Usage

```
memmap [-b] [-sfo]
```

Options

-b

Display one screen at a time

-sfo

Standard-format output. See "Related Definitions" below.

Description

This command displays the memory map that is maintained by the UEFI environment. The UEFI environment keeps track all the physical memory in the system and how it is currently being used. The UEFI Specification defines a set of Memory Type Descriptors. Please see the *UEFI Specification* for a description of how each of these memory types is used.

Total Memory size is calculated by adding LoaderCode, LoaderData, BootServiceCode, BootServiceData, RuntimeCode, RuntimeData, Available, ACPIReclaimMemory, ACPIMemoryNVS, and PalCode.

Examples

To display the system memory map:

```
    fs0:\> memmap

Type      Start      End          # Pages      Attributes
available  0000000000750000-0000000001841FFF  00000000000010F2 0000000000000009
LoaderCode 0000000001842000-00000000018A3FFF  0000000000000062 0000000000000009
available  00000000018A4000-00000000018C1FFF  000000000000001E 0000000000000009
LoaderData 00000000018C2000-00000000018CAFFF  0000000000000009 0000000000000009
BS_code    00000000018CB000-0000000001905FFF  000000000000003B 0000000000000009
BS_data    0000000001906000-00000000019C9FFF  00000000000000C4 0000000000000009
...
RT_data    0000000001B2B000-0000000001B2BFFF  0000000000000001 8000000000000009
BS_data    0000000001B2C000-0000000001B4FFFF  0000000000000024 0000000000000009
reserved   0000000001B50000-0000000001D4FFFF  0000000000000200 0000000000000009

  reserved  :     512 Pages (2,097,152)
  LoaderCode:      98 Pages (401,408)
  LoaderData:      32 Pages (131,072)
  BS_code   :     335 Pages (1,372,160)
  BS_data   :     267 Pages (1,093,632)
  RT_data   :      19 Pages (77,824)
  available :   4,369 Pages (17,895,424)
Total Memory: 20 MB (20,971,520) Bytes
```

Standard-Format Output

The standard-format output produced with the –sfo option produces two tables: MemoryMap and Summary.

Table 26 Standard-Format Output for memmap (MemoryMap)

Column Number	Description
1	The name of the table. The name is MemoryMap.
2	Type. **Available** **LoaderCode** **LoaderData** **BootServiceCode** **BootServiceData** **RuntimeCode** **RuntimeData** **Reserved** **MemoryMappedIO** **MemoryMappedIOPortSpace** **UnusableMemory** **ACPIReclaimMemory** **ACPIMemoryNVS** **PalCode**
3	Starting Address
4	Ending Address
5	Number Of 4KB Pages
6	Attributes

Table 27 Standard-Format Output for memmap (Summary)

Column Number	Description
1	The name of the table. The name is MemoryMapSummary.
2	Total Memory Size (bytes)
3	Reserved Memory Total Size (bytes)
4	Boot Service Code Total Size (bytes)
5	Boot Service Data Total Size (bytes)
6	Runtime Code Total Size (bytes)
7	Runtime Data Total Size (bytes)
8	Loader Code Total Size (bytes)
9	Loader Data Total Size (bytes)
10	Available Total Size (bytes)
11	Memory Mapped IO Total Size (bytes)
12	Memory Mapped IO Port Total Size (bytes)
13	Unusable Total Size (bytes)
14	ACPI Reclaim Total Size (bytes)
15	ACPI NVS Total Size (bytes)
16	PAL Code Total Size (bytes)

mkdir

Summary

Creates one or more new directories.

Usage

mkdir *dir* [*dir...*]

Options

dir

Name of directory or directories to be created. Wildcards are not allowed.

Description

This command creates one or more new directories. If dir includes nested directories, then parent directories will be created before child directories. If the directory already exists, then the command will exit with an error.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_OUT_OF_RESOURCES	There was insufficient space on the destination to create the requested directory.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	An attempt was made to create a directory when the target media was write-protected.

Examples

To create a new directory:

```
fs0:\> mkdir rafter
fs0:\> ls
Directory of: fs0:\

  06/18/01  08:05p <DIR>            512  test
  06/18/01  11:14p       r           29  readme.txt
  06/18/01  11:50p <DIR>            512  rafter
         1 File(s)         211 bytes
         2 Dir(s)
```

- To create multiple directories:

```
fs0:\> mkdir temp1 temp2
fs0:\> ls
Directory of: fs0:\

  06/18/01  08:05p <DIR>            512  test
  06/18/01  11:14p       r           29  readme.txt
  06/18/01  11:50p <DIR>            512  rafter
  06/18/01  11:52p <DIR>            512  temp1
  06/18/01  11:52p <DIR>            512  temp2
         1 File(s)         211 bytes
         4 Dir(s)
```

mm

Summary

Displays or modifies MEM/MMIO/IO/PCI/PCIE address space.

Usage

```
mm address [value] [-w 1|2|4|8] [-MEM | -MMIO | -IO | -PCI | -PCIE] [-n]
```

Options

address

Starting address

value

The value to write. If not specified, then the current value will be displayed.

-MEM

Memory Address type.

-IO

IO Address type

-PCI

PCI Configuration Space. The address will have the format 0x000000ssbbddffrr, where ss = Segment, bb = Bus, dd = Device, ff = Function and rr = Register. This is the same format used in the **PCI** command.

-PCIE

PCI Express Configuration Space. The address will have the format 0x0000000ssbbddffrrr, where ss = Segment, bb = Bus, dd = Device, ff = Function and rrr = Register.

-w

Access Width, in bytes. 1 = byte, 2 = 2 bytes, 4 = 4 bytes, 8 = 8 bytes. If not specified, then 1 is assumed.

-n

Non-interactive mode.

Description

This command allows the user to display or modify I/O register, memory contents, or PCI configuration space. The user can specify the start address and the access size they wish to perform using the **Address** parameter and **-w** option. **Address** should be typed in hex value. **-MEM** accesses system memory, **-MMIO** accesses device memory, **-IO** accesses device I/O ports, **-PCI** accesses

PCI Configuration Space, and **–PCIE** accesses PCIE Configuration Space. If –MEM, -MMIO, -IO, -PCI and –PCIE are not specified, then –MEM is assumed.

If *Value* is specified which should be typed in hex value, this command will write this value to specified address. Otherwise when this command is executed, the current contents of *Address* are displayed. If Value is specified, then –n is assumed.

If **-n** is not specified, the command will run in interactive mode and the user has the option of modifying the contents by typing in a hex value. When the user pressed 'ENTER', then next address is displayed. This is continued until the user enters 'q'.

Examples

To display or modify memory:

```
Address 0x1b07288, default width=1 byte:
fs0:\> mm 1b07288
MEM  0x0000000001B07288 : 0x6D >
MEM  0x0000000001B07289 : 0x6D >
MEM  0x0000000001B0728A : 0x61 > 80
MEM  0x0000000001B0728B : 0x70 > q

fs0:\> mm 1b07288
MEM  0x0000000001B07288 : 0x6D >
MEM  0x0000000001B07289 : 0x6D >
MEM  0x0000000001B0728A : 0x80 >        *Modified
MEM  0x0000000001B0728B : 0x70 > q
```

To modify memory: Address 0x1b07288, width = 2 bytes:

```
Shell> mm 1b07288 -w 2
MEM  0x0000000001B07288 : 0x6D6D >
MEM  0x0000000001B0728A : 0x7061 > 55aa
MEM  0x0000000001B0728C : 0x358C > q

Shell> mm 1b07288 -w 2
MEM  0x0000000001B07288 : 0x6D6D >
MEM  0x0000000001B0728A : 0x55AA >      *Modified
MEM  0x0000000001B0728C : 0x358C > q
```

To display IO space: Address 80h, width = 4 bytes:

```
Shell> mm 80 -w 4 -IO
IO  0x0000000000000080 : 0x000000FE >
IO  0x0000000000000084 : 0x00FF5E6D > q
```

To modify IO space using non-interactive mode:

```
Shell> mm 80 52 -w 1 -IO
Shell> mm 80 -w 1 -IO
IO  0x0000000000000080 : 0x52 > FE    *Modified
IO  0x0000000000000081 : 0xFF >
IO  0x0000000000000082 : 0x00 >
IO  0x0000000000000083 : 0x00 >
IO  0x0000000000000084 : 0x6D >
IO  0x0000000000000085 : 0x5E >
IO  0x0000000000000086 : 0xFF >
IO  0x0000000000000087 : 0x00 > q
```

- To display PCI configuration space, ss=00, bb=00, dd=00, ff=00, rr=00:

```
Shell> mm 0000000000 -PCI
PCI  0x0000000000000000 : 0x86 >
PCI  0x0000000000000001 : 0x80 >
PCI  0x0000000000000002 : 0x30 >
PCI  0x0000000000000003 : 0x11 >
PCI  0x0000000000000004 : 0x06 >
PCI  0x0000000000000005 : 0x00 > q
```

These contents can also be displayed by 'PCI 00 00 00'.

To display PCIE configuration space, ss=00, bb=06, dd=00, ff=00, rrr=000:

```
Shell> mm 00060000000 -PCIE
PCIE  0x0000000060000000 : 0xAB >
PCIE  0x0000000060000001 : 0x11 >
PCIE  0x0000000060000002 : 0x61 >
PCIE  0x0000000060000003 : 0x43 >
PCIE  0x0000000060000004 : 0x00 > q
```

mode

Summary

Displays or changes the console output device mode.

Usage

mode [*col row*]

Options

row

Number of rows

col

Number of columns

Description

This command is used to change the display mode for the console output device. When this command is used without any parameters, it shows the list of modes that the standard output device currently supports. The mode command can then be used with the **row** and **col** parameter to change the number of rows and columns on the standard output device. The following examples show how the mode command can be used. The first example lists all modes that are currently available, and the current selected mode is indicated by an '*'. The second example changes the mode to an 80 X 50 text mode display. The display is cleared every time the mode command is used to change the currently selected display mode.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To display all available modes on standard output:

```
Shell> mode
Available modes on standard output
  col  80 row  25  *
  col  80 row  50
  col  80 row  43
  col 100 row 100
```

To change the current mode setting:

```
Shell> mode 80 50
Available modes on standard output
  col  80 row  25
  col  80 row  50  *
  col  80 row  43
  col 100 row 100
```

mv

Summary

Moves one or more files to a destination within a file system.

Usage

```
mv src [src...] [dst]
```

Options

src

Source file/directory name (wildcards are permitted)

dst

Destination file/directory name (wildcards are permitted). If not specified, then the current working directory is assumed to be the destination. If there is more than one argument on the command line, the last one will always be considered the destination.

Description

This command moves one or more files to a destination within a file system. If the destination is an existing directory, then the sources are moved into that directory. Otherwise, the sources are moved to the destination, as if the directory has been renamed. If a destination is not specified, the current directory is assumed to be the destination.

Attempting to move a read-only file/directory will result in an error. Moving a directory that contains read-only files is allowed. You cannot move a directory into itself or its subdirectories. You cannot move a directory if the current working directory is itself or its subdirectories.

If an error occurs, the remaining files or directories will still be moved.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_NOT_FOUND	The source file was not able to be found
SHELL_OUT_OF_RESOURCES	There was insufficient free space to move the requested file to its destination.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	An attempt was made to create a file on media that was write-protected.

Examples

To rename a file:

```
fs0:\> mv IsaBus.efi Bus.efi
moving fs0:\IsaBus.efi -> \Bus.efi
 - [ok]
```

openinfo

Summary

Displays the protocols and agents associated with a handle.

Usage

openinfo *Handle* **[-b]**

Options

Handle

Display open protocol information for specified handle

-b

Display one screen at a time

Description

This command is used to display the open protocols on a given handle. The example below is typical output from help for this command.

Table 28 Open Protocol Information Layout

Column Index	Description
1	Agent handle that opens the protocol
2	Controller handle that requires the protocol interface
3	Open count
4	Open type: *HandProt*, *GetProt*, *TestProt*, *Child*, *Driver*, *Exclusive*, *DriverEx* or *Unknown*
5	Name of image of the agent if available

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_NOT_FOUND	The passed-in handle was not found.

Examples

To show open protocols on handle 0x23:

```
Shell> openinfo 23
Handle 23 (07DEE108)
PciRootBridgeIo
  Drv[1D] Ctrl[23] Cnt(01) Driver   Image(PciBus)
  Drv[1D] Ctrl[28] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[29] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[2A] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[2B] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[2C] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[2D] Cnt(01) Child    Image(PciBus)
  Drv[1D] Ctrl[2E] Cnt(01) Child    Image(PciBus)
  Drv[00] Ctrl[  ] Cnt(01) HandProt
dpath
  Drv[1D] Ctrl[23] Cnt(01) Driver   Image(PciBus)
  Drv[00] Ctrl[  ] Cnt(0D) HandProt
```

parse

Summary

Command used to retrieve a value from a particular record which was output in a standard formatted output.

Usage

parse *filename tablename column* **[-i** *<Instance>***]** **[-s <Instance>]** **<** **filename**
command-name **|** ***parse tablename column [-i <Instance>] [-s <Instance>]***

Options

filename

Source file name

tablename

The name of the table being parsed.

column

The one-based column index to use to determine which value from a particular record to parse.

-i <Instance>

Start parsing with the nth instance of specified tablename, after the specified instance of ShellCommand. If not present, then all instances will be returned.

-s <Instance>

Start parsing with the nth instance of the ShellCommand table. If not present, then 1 is assumed.

Description

This command will enable the parsing of data from a file which contains data which has been output from a command having used the –sfo parameter. Since the standard formatted output has a well known means of parsing, this command is intended to be used as a simplified means of having scripts consume such constructed output files and use this retrieved data in logic of the scripts being written for the UEFI shell.

Examples

The following data is contained in a temporary file (temp.txt):

```
ShellCommand,"ls"
VolumeInfo,"MikesVolume","400000000","FALSE","32000000","16000000"
FileInfo,"FS0:\efi\boot\winloader.efi","45670","45900","arsh","08:30:12","01.08.2013"
,"00:00:00","01.08.2013","08:30:12","01.08.2013"
FileInfo,"FS0:\efi\boot\mikesfile.txt","1250","1280","a","08:30:12","01.08.2013","00:
00:00","01.08.2013","08:30:12","01.08.2013"
FileInfo,"FS0:\efi\boot\readme.txt","795","900","a","08:30:12","01.08.2013","00:00:00
","01.08.2013","08:30:12","01.08.2013"
```

The following shows the parse command being used:

```
fs0:\> parse temp.txt VolumeInfo 2
MikesVolume
```

Below is an example using the Index parameter:

```
fs0:\> parse temp.txt FileInfo 3 -i 3
795
```

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_NOT_FOUND	The source file was not able to be found
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation

pause

Usage

```
pause [-q]
```

Description

The **pause** command prints a message to the display and then suspends script file execution and waits for keyboard input. Pressing any key resumes execution, except for **q** or **Q**. If **q** or **Q** is pressed, script processing terminates; otherwise execution continues with the next line after the pause command.

The **pause** command is available only in scripts. Switch **–q** can hide the message and it's optional.

Examples

Following script is a sample of 'pause' command:

```
fs0:\> type pause.nsh
#
#  Example script for 'pause' command
#
echo pause.nsh begin..
date
time
pause
echo pause.nsh done.
```

To execute the script with echo on:

```
fs0:\> pause.nsh
+pause.nsh> echo pause.nsh begin..
pause.nsh begin..
+pause.nsh> date
06/19/2001
+pause.nsh> time
00:51:45
+pause.nsh> pause
Enter 'q' to quit, any other key to continue:
+pause.nsh> echo pause.nsh done.
pause.nsh done.
```

To execute the script with echo off:

```
fs0:\> echo -off
fs0:\> pause.nsh
pause.nsh begin..
06/19/2001
00:52:50
Enter 'q' to quit, any other key to continue: q
fs0:\>
```

pci

Summary

Displays PCI device list or PCI function configuration space.

Usage

pci [*Bus Dev* **[***Func***] [-s** *Seg***] [-i]]**

Options

Bus

Bus number

Dev

Device number

Func

Function number

-s

Optional segment number *Seg* specified

-i

Information interpreted

Description

This command will display all the PCI devices found in the system. And it can also display the configuration space of a PCI device according to the specified bus (**Bus**), device (**Dev**),and function (**Func**) addresses. If the function address is not specified, it will default to 0. The **-i** option is used to display verbose information for the specified PCI device. The PCI configuration space for the device will be dumped with a detailed interpretation.

If no parameters are specified all PCI devices will be listed. If the Bus and Device number parameters are specified while the Func or Seg parameters are not, Function or Seg will be set as default value 0.

The '-i' option can be used to display verbose information for the specified PCI device. The PCI configuration space for the specified device will be dumped wit h a detailed interpretation.

Examples

To display all PCI devices in the system:

```
Shell> PCI

   Seg  Bus  Dev  Func
   ---  ---  ---  ----
    00   00   00    00 ==> Bridge Device - Host/PCI bridge
              Vendor 8086 Device 1130 Prog Interface 0
    00   00   01    00 ==> Bridge Device - PCI/PCI bridge
              Vendor 8086 Device 1131 Prog Interface 0
    00   00   1E    00 ==> Bridge Device - PCI/PCI bridge
              Vendor 8086 Device 244E Prog Interface 0
    00   00   1F    00 ==> Bridge Device - PCI/ISA bridge
              Vendor 8086 Device 2440 Prog Interface 0
    00   00   1F    01 ==> Mass Storage Controller - IDE controller
              Vendor 8086 Device 244B Prog Interface 80
    00   00   1F    02 ==> Serial Bus Controllers - USB
              Vendor 8086 Device 2442 Prog Interface 0
    00   00   1F    03 ==> Serial Bus Controllers - System Management Bus
              Vendor 8086 Device 2443 Prog Interface 0
    00   00   1F    04 ==> Serial Bus Controllers - USB
              Vendor 8086 Device 2444 Prog Interface 0
    00   00   1F    05 ==> Multimedia Device - Audio device
              Vendor 8086 Device 2445 Prog Interface 0
    00   00   1F    06 ==> Simple Communications Controllers - Modem
              Vendor 8086 Device 2446 Prog Interface 0
    00   01   00    00 ==> Display Controller - VGA/8514 controller
              Vendor 1002 Device 5246 Prog Interface 0
    00   02   07    00 ==> Multimedia Device - Audio device
              Vendor 1274 Device 1371 Prog Interface 0
    00   02   0A    00 ==> Bridge Device - CardBus bridge
              Vendor 1180 Device 0476 Prog Interface 0
    00   02   0A    01 ==> Bridge Device - CardBus bridge
              Vendor 1180 Device 0476 Prog Interface 0
```

To display the configuration space of Bus 0, Device 0, Function 0:

```
Shell> PCI 00 00 00 -i

  PCI Segment 00 Bus 00 Device 00 Func 00
  00000000: 86 80 30 11 06 00 90 20-02 00 00 06 00 00 00 00  *..0.... ........*
  00000010: 08 00 00 20 00 00 00 00-00 00 00 00 00 00 00 00  *... ............*
  00000020: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000030: 00 00 00 00 88 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000040: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000050: 50 00 09 38 00 00 00 00-00 00 00 00 00 00 00 00  *P..8............*
  00000060: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000070: 00 00 18 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000080: DE 2C CF 00 00 00 00 00-09 A0 04 F1 00 00 00 00  *.,..............*
  00000090: 00 00 D6 FF FE FF 00 00-33 80 33 80 85 84 C4 00  *........3.3.....*
  000000A0: 02 00 20 00 07 02 00 1F-00 00 00 00 00 00 00 00  *.. .............*
  000000B0: 00 00 00 00 30 00 00 00-00 00 00 00 00 00 08 00  *....0...........*
  000000C0: 00 00 00 00 00 00 00 00-00 08 00 00 00 00 00 00  *................*
  000000D0: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  000000E0: 00 00 00 00 00 00 00 00-00 00 90 14 00 00 00 00  *................*
  000000F0: 00 00 00 00 74 F8 00 00-00 00 00 00 08 00 00 00  *....t...........*

Vendor ID(0): 8086                    Device ID(2): 1130

Command(4): 0006
  (00)I/O space access enabled:       0  (01)Memory space access enabled:    1
  (02)Behave as bus master:           1  (03)Monitor special cycle enabled:  0
  (04)Mem Write & Invalidate enabled: 0  (05)Palette snooping is enabled:    0
  (06)Assert PERR# when parity error: 0  (07)Do address/data stepping:       0
  (08)SERR# driver enabled:           0  (09)Fast back-to-back transact...:  0

Status(6): 2090
  (04)New Capabilities linked list:   1  (05)66MHz Capable:                  0
  (07)Fast Back-to-Back Capable:      1  (08)Master Data Parity Error:       0
  (09)DEVSEL timing:               Fast  (11)Signaled Target Abort:          0
  (12)Received Target Abort:          0  (13)Received Master Abort:          1
  (14)Signaled System Error:          0  (15)Detected Parity Error:          0

Revision ID(8):     02                  BIST(0F):  Incapable
Cache Line Size(C): 00                  Latency Timer(D): 00
Header Type(0E):    0, Single function, PCI device
Class: Bridge Device - Host/PCI bridge -
Base Address Registers(10):
     Start  Type    Space     Prefetchable?      Size       Limit
  -------------------------------------------------------------------
  20000000  Mem     32 bits   YES             04000000    24000000
  -------------------------------------------------------------------
No Expansion ROM(30)

Cardbus CIS ptr(28):   00000000
Sub VendorID(2C):          0000      Subsystem ID(2E):      0000
Capabilities Ptr(34):        88
Interrupt Line(3C):          00      Interrupt Pin(3D):       00
Min_Gnt(3E):                 00      Max_Lat(3F):             00
```

To display configuration space of Segment 0, Bus 0, Device 0, Function 0:

```
Shell> PCI 00 00 00 -s 0

  PCI Segment 00 Bus 00 Device 00 Func 00
  00000000: 86 80 30 11 06 00 90 20-02 00 00 06 00 00 00 00  *..0.... ........*
  00000010: 08 00 00 20 00 00 00 00-00 00 00 00 00 00 00 00  *... ............*
  00000020: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000030: 00 00 00 00 88 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000040: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000050: 50 00 09 38 00 00 00 00-00 00 00 00 00 00 00 00  *P..8............*
  00000060: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000070: 00 00 18 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  00000080: DE A8 CE 00 00 00 00 00-09 A0 04 F1 00 00 00 00  *................*
  00000090: 00 00 D6 FF FE FF 00 00-33 80 33 80 85 84 C4 00  *........3.3.....*
  000000A0: 02 00 20 00 07 02 00 1F-00 00 00 00 00 00 00 00  *.. .............*
  000000B0: 00 00 00 00 30 00 00 00-00 00 00 00 00 00 08 00  *....0...........*
  000000C0: 00 00 00 00 00 00 00 00-00 08 00 00 00 00 00 00  *................*
  000000D0: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00  *................*
  000000E0: 00 00 00 00 00 00 00 00-00 A0 18 00 00 00 00 00  *................*
  000000F0: 00 00 00 00 74 F8 00 00-00 00 00 00 08 00 00 00  *....t...........*
```

Status Codes Returned

SHELL_SUCCESS	Data was displayed as requested.
SHELL_DEVICE_ERROR	The specified device parameters did not match a physical device in the system.

ping

Summary

Ping the target host with IPv4 stack.

Usage

```
Ping [-n count] [-l size] TargetIp
```

Options

-n

Number of echo request datagram to be sent.

-l

Size of data buffer in echo request datagram.

TargetIp

IPv4 address of the target machine.

Description

This command uses the ICMPv4 ECHO_REQUEST datagram to elicit ECHO_REPLY from a host.

Examples

To ping the target host with 64 bytes data:

```
Shell:\> ping -l 64 192.168.0.1
```

To ping the target host by sending 20 echo request datagram:

```
Shell:\> ping -n 20 202.120.100.1
```

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

reconnect

Summary

Reconnects drivers to the specific device.

Usage

```
reconnect DeviceHandle [DriverHandle [ChildHandle]]
reconnect -r
```

Options

DeviceHandle

Device handle (a hexadecimal number)

DriverHandle

Driver handle (a hexadecimal number). If not specified, all drivers on the specified device will be reconnected.

ChildHandle

Child handle of device (a hexadecimal number). If not specified, then all child handles of the specified device will be reconnected.

-r

Reconnect drivers to all devices.

Description

This command reconnects drivers to the specific device. It will first disconnect the specified driver from the specified device and then connect the driver to the device recursively.

If the **-r** option is used, then all drivers will be reconnected to all devices. Any drivers that are bound to any devices will be disconnected first and then connected recursively. See the **connect** and **disconnect** commands for more details.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

To reconnect all drivers to all devices:

```
Shell> reconnect -r
```

To reconnect all drivers to device 0x28:

```
fs0:\> reconnect 28
```

To disconnect 0x17 from 0x28 then reconnect drivers with 0x17 as highest priority to device 0x28:

```
fs0:\> reconnect 28 17
```

To disconnect 0x17 from 0x28 destroying child 0x32 then reconnect drivers with 0x17 as highest priority to device 0x28

```
fs0:\> reconnect 28 17 32
```

reset

Summary

Resets the system.

Usage

```
reset [-w [string]]
reset [-s [string]]
reset [-c [string]]
```

Options

-s

- Performs a shutdown

-w

- Performs a warm boot

-c

- Performs a cold boot

string

- String to be passed to reset service

Description

This command resets the system. The default is to perform a cold reset. If *string* is specified, then it is passed into the **SystemTable ResetSystem()** function, informing the system of the reason for the system reset.

Status Codes Returned

SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

rm

Summary

Deletes one or more files or directories.

Usage

```
rm [-q] file/directory [file/directory ...]
```

Options

-q

Quiet mode; does not prompt user for a confirmation

file

File name (wildcards are permitted)

directory

Directory name (wildcards are permitted)

Description

This command deletes one or more files or directories. If the target is a directory, it will delete the directory, including all its subdirectories. It is not allowed to redirect a file whose parent directory (or the file itself) is being deleted.

Removing a read-only file/directory will result in a failure. Removing a directory containing read-only file(s) will result in a failure. If an error occurs, rm will exit immediately and later files/directories will not be removed.

You cannot remove a directory when the current directory is itself or its subdirectory. If file contains wildcards, it will not ask user for confirmation.

You cannot remove the root directory. You cannot remove the current directory or its ancestor.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_NOT_FOUND	The target file or directory was not able to be found
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	The target media was write-protected.

Examples

To remove multiple directories at a time:

```
fs0:\> ls test
Directory of: fs0:\test

  06/18/01  01:01p <DIR>            512  .
  06/18/01  01:01p <DIR>              0  ..
  06/19/01  12:59a <DIR>            512  temp1
  06/19/01  12:59a <DIR>            512  temp2
         0 File(s)          0 bytes
         4 Dir(s)
```

Error occurs and RM will exit:

```
fs0:\> rm test\temp11 temp2
rm/del: Cannot find 'fs0:\test\temp11' - Not Found
```

To remove multiple directories with wildcards:

```
fs0:\> rm test\temp*
rm/del: Remove subtree 'fs0:\test\temp1' [y/n]? y
removing fs0:\test\temp1\temp1.txt
 - [ok]
removing fs0:\test\temp1\boot\nshell.efi
 - [ok]
removing fs0:\test\temp1\boot
 - [ok]
removing fs0:\test\temp1
 - [ok]
rm/del: Remove subtree 'fs0:\test\temp2' [y/n]? y
removing fs0:\test\temp2\temp2.txt
 - [ok]
removing fs0:\test\temp2
 - [ok]
```

Removing a directory that contains a read-only file will fail:

```
fs0:\> attrib +r test\temp1\readme.txt
 A  R fs0:\test\temp1\readme.txt

fs0:\> rm test\temp1
rm/del: Cannot open 'readme.txt' under 'fs0:\test\temp1' in
writable mode
- [error] - Access Denied
Exit status code: Access Denied
```

sermode

Summary

Sets serial port attributes.

Usage

sermode [*handle* [*baudrate parity databits stopbits*]]

Options

handle

Device handle for a serial port in hexadecimal. The **dh** command can be used to retrieve the right handle.

baudrate

Baud rate for specified serial port. The following values are supported: 50, 75, 110, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600(default), 19200, 38400, 57600, 115200, 230400, and 460800. All other values will be converted to the next highest setting.

parity

Parity bit settings for specified serial port. Any one of the following:

d - Default parity

n - No parity

e - Even parity

o - Odd parity

m - Mark parity

s - Space parity

databits

Data bits for the specified serial port. The following settings are supported: 4, 7, 8 (default). All other settings are invalid.

stopbits

Stop bits for the specified serial port. The following settings are supported:

0 (0 stop bits - default setting)

1 (1 stop bit)

2 (2 stop bits)

15 (1.5 stop bits)

Note: *All other settings are invalid.*

Description

This command displays or sets baud rate, parity attribute, data bits and stop bits of serial ports. If no attributes are specified, then the current settings are displayed. If no handle is specified, then all serial ports are displayed.

Examples

To display the settings for all serial port devices:

```
Shell> sermode
4F06B08 - (115200, N, 8, 1)
4F05F88 - (115200, N, 8, 1)
```

To display the settings for the serial port device whose handle is 0x6B:

```
Shell> sermode 6B
4F06B08 - (115200, N, 8, 1)
```

To configure the serial port settings for handle 0x6B to 9600bps, even parity, 8 data bits, and 1 stop bit:

```
Shell> sermode 6B 9600 e 8 1
sermode: Mode set on handle 04F06B08
```

Status Codes Returned

SHELL_SUCCESS	The new attributes were set on the serial device.
SHELL_INVALID_PARAMETER	One or more of the attributes has an unsupported value.
SHELL_DEVICE_ERROR	The serial device is not functioning correctly..

set

Summary

Displays, changes or deletes a UEFI Shell environment variables.

Usage

```
set [-v] [sname [value]]
set [-d <sname>]
```

Options

-d

Deletes the environment variable

-v

Volatile variable

sname

Environment variable name

value

Environment variable value

Description

This command is used to maintain the UEFI Shell environment variables. This command can do the following:

- Display the environment variables.
- Create new environment variables.
- Change the value of existing environment variables.
- Delete environment variables.

The **set** command will set the environment variable that is specified by *sname* to *value*. This command can be used to create a new environment variable or to modify an existing environment variable.

If the **set** command is used without any parameters, then all the environment variables are displayed. If the **set** command is used with the **-d** option, then the environment variable that is specified by **sname** will be deleted.

Note: *This command does not change the value of the environment variable* ***lasterror****.*

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.

SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_OUT_OF_RESOURCES	A request to set a variable in a non-volatile fashion could not be completed. The resulting non-volatile request has been converted into a volatile request.

Examples

To add an environment variable:

```
Shell> set DiagnosticPath fs0:\efi\diag;fs1:\efi\diag
```

To display environment variables:

```
Shell> set
  * path           : .
    diagnosticPath : fs0:\efi1.1\diag;fs1:\efi1.1\diag
```

To delete an environment variable:

```
Shell> set -d diagnosticpath
Shell> set
  * path           : .
```

To change an environment variable:

```
fs0:\> set src efi
fs0:\> set
  * path : .;fs0:\efi\tools;fs0:\efi\boot;fs0:\
    src  : efi
fs0:\> set src efi1.1
fs0:\> set
  * path : .;fs0:\efi\tools;fs0:\efi\boot;fs0:\
    src  : efi1.1
```

To append an environment variable:

```
Shell> set
  * path           : .
Shell> set path %path%;fs0:\efi\tools;fs0:\efi\boot;fs0:\
Shell> set
  * path           : .;fs0:\efi\tools;fs0:\efi\boot;fs0:\
```

To set a volatile variable that will disappear at the next

```
boot:
Shell> set -v EFI_SOURCE c:\project\EFI1.1
Shell> set
  * path       : .;fs0:\efi\tools;fs0:\efi\boot;fs0:\
  * EFI_SOURCE : c:\project\EFI1.1
```

setsize

Summary

Adjusts the size of a file.

Usage

```
setsize size file [file...]
```

Options

file

The file or files which will have its size adjusted.

size

The desired size of the file once it is adjusted. Setting the size smaller than the actual data contained in this file will truncate this data.

Description

This command adjusts the size of a particular target file. When adjusting the size of a file, it should be noted that it will automatically truncate or extend the size of a file based on the passed in parameters. If the file does not exist, it will be created.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_VOLUME_FULL	The media has insufficient space to complete the request.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

setvar

Summary

Changes the value of a UEFI variable.

Usage

setvar *variable-name* **[-guid** *guid***][-bs][-rt][-nv]** [=*data*]

Options

variable-name

The name of the UEFI variable to modify or display.

-guid

Specifies the GUID of the UEFI variable to modify or display. If not present, then the GUID **EFI_GLOBAL_VARIABLE**, as defined in chapter 3.2 of the UEFI specification.

-bs

Indicates that the variable is a boot variable. Should only be present for new variables, otherwise it is ignored.

-rt

Indicates that the variable is a runtime variable. Should only be present for new variables, otherwise it is ignored.

-nv

Indicates that the variable is non-volatile. If not present, then the variable is assumed to be volatile. Should only be present for new variables, otherwise it is ignored.

=data

New data for the variable. If there is nothing after the '=' then the variable is deleted. If = is not present, then the current value of the variable is dumped as hex bytes. The *data* may consist of zero or more of the following:

xx[xx]:

Hexadecimal bytes

"ascii-string":

ASCII-string with no null-terminator

L"UCS2-string":

UCS-2 encoded string with no null-terminator

--device

Device path text format, as specified by the EFI Device Path Display Format Overview section of the UEFI Specification.

Description

This command changes the UEFI variable specified by name and guid. If = is specified, but *data* is not, the variable is deleted, if it exists. If = is not specified, then the current variable contents are displayed. If =data is specified, then the variable's value is changed to the value specified by *data*.

-bs, *-rt* and *-nv* are only useful if the variable does not exist. If the variable already exists, the attributes cannot be changed, and the flags will be ignored. To change a variable, first delete, then recreate with the desired attributes.

Status Codes Returned

SHELL_SUCCESS	The shell has stored the variable and its data with the defined attributes.
SHELL_INVALID_PARAMETER	Incorrect attributes were used.
SHELL_OUT_OF_RESOURCES	Insufficient resources were available for storing the variable and its data.
SHELL_DEVICE_ERROR	The variable could not be saved due to a hardware error.
SHELL_WRITE_PROTECTED	The variable in question is read-only.
SHELL_WRITE_PROTECTED	The variable in question cannot be deleted.
SHELL_NOT_FOUND	The variable could not be found

shift

Usage

```
shift
```

Description

The **shift** command shifts the contents of a UEFI Shell script's positional parameters so that **%1** is discarded, **%2** is copied to **%1**, **%3** is copied to **%2**, **%4** is copied to **%3** and so on. This allows UEFI Shell scripts to process script parameters from left to right.

Note: *This command does not change the UEFI shell environment variable* ***lasterror****.*

Note: *The* ***shift*** *command is available only in UEFI Shell scripts.*

Examples

Following script is a sample of 'shift' command:

```
fs0:\> type shift.nsh
#
#  Example script for 'shift' command
#
echo %1 %2 %3
shift
echo %1 %2
```

To execute the script with echo on:

```
fs0:\> shift.nsh welcome EFI world
shift.nsh> echo welcome EFI world
 welcome EFI world
 shift
 echo EFI world
  EFI world
```

To execute the script with echo off:

```
fs0:\> echo -off
fs0:\> shift.nsh welcome EFI world
 welcome EFI world
 EFI world
```

smbiosview

Summary

Displays SMBIOS information.

Usage

```
smbiosview [-t SmbiosType]|[-h SmbiosHandle]|[-s]|[-a]
```

Options

-t

Display all structures of SmbiosType. The following values are supported:

0 - BIOS Information
1 - System Information
3 - System Enclosure
4 - Processor Information
5 - Memory Controller Information
6 - Memory Module Information
7 - Cache Information
8 - Port Connector Information
9 - System Slots
10 - On Board Devices Information
15 - System Event Log
16 - Physical Memory Array
17 - Memory Device
18 - 32-bit Memory Error Information
19 - Memory Array Mapped Address
20 - Memory Device Mapped Address
21 - Built-in Pointing Device
22 - Portable Battery
34 - Management Device
37 - Memory Channel
38 - IPMI Device Information
39 - System Power Supply

-h

Display the structure of *SmbiosHandle*, the unique 16-bit value assigned to each SMBIOS structure. *SmbiosHandle* can be specified in either decimal or hexadecimal format. Use the 0x prefix for hexadecimal values.

-s

Display statistics table.

-a

Display all information.

Description

This command displays the SMBIOS information. Users can display the information of SMBIOS structures specified by type or handle. When no flags are provided on the command line, display SMBIOS Table Entry Point Structure.

Status Codes Returned

SHELL_SUCCESS	Data was displayed as requested.
SHELL_DEVICE_ERROR	The requested structure was not found.

stall

Summary

Stalls the operation for a specified number of microseconds.

Usage

```
stall time
```

Options

time

The number of microseconds for the processor to stall.

Description

This command would be used to establish a timed stall of operations during a script.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_DEVICE_ERROR	There was a hardware error associated with this request.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

time

Summary

Displays or sets the current time for the system.

Usage

```
time [hh:mm[:ss]] [-tz tz] [-d dl]
```

Options

hh

New hour (0-23) (required)

mm

New minute (0-59) (required)

ss

New second (0-59) If not specified, then zero will be used.

-tz

Timezone adjustment, measured in minutes offset from GMT. Valid values can be between -1440 and 1440 or 2047. If not present or set to 2047, time is interpreted as local time.

-d

Indicates that time is not affected by daylight savings time (0), time is affected by daylight savings time but time has not been adjusted (1), or time is affected by daylight savings time and has been adjusted (3).. All other values are invalid. If no value follows –d, then the current daylight savings time will be displayed.

Description

This command displays or sets the current time for the system. If no parameters are used, it shows the current time. If valid hours, minutes, and seconds are provided, then the system's time will be updated.

Note the following rules:

Except for numeric characters and the : character, all other characters in the argument are invalid. The Shell will report an error if the number is in the wrong hour/minute/second range.

Spaces before or after the numeric character are not allowed. Spaces inserted into the number are not allowed either.

The seconds parameter is optional. If there is no seconds number, it will set to zero by default.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_DEVICE_ERROR	There was a hardware error preventing the completion of this command
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

Examples

```
Shell > time 17:23
Shell > time
17:23:00 (GMT+08:00)
Shell > time 17:23:
Shell > time
17:23:00 (GMT+08:00)
```

To display current time:

```
fs0:\> time
16:51:03 (GMT+08:00)
```

To set the system time:

```
fs0:\> time 9:51:30
fs0:\> time
09:51:31 (GMT+08:00)
```

To get the time, including daylight savings time:

```
fs0:\> time 9:51:30
fs0:\> time –d
09:51:31 (GMT+08:00) DST: Not Affected
```

timezone

Summary

Displays or sets time zone information.

Usage

timezone [-s *hh*:*mm* **| -l] [-b] [-f]**

Options

-s

Set time zone associated with *hh*:*mm* offset from GMT

-l

Display list of all time zones

-b

Display one screen at a time

-f

Display full information for specified timezone

Description

This command displays and sets the current time zone for the system. If no parameters are used, it shows the current time zone. If a valid **hh:mm** parameter is provided, then the system's time zone information will be updated.

Examples

To display all available time zones:

```
Shell> timezone -l
GMT-12:00, International Date Line West
GMT-11:00, Midway Island, Samoa
GMT-10:00, Hawaii
GMT-09:00, Alaska
GMT-08:00, Pacific Time(US & Canada); Tijuana
GMT-07:00, Arizona, Chihuahua, La Paz, Mazatlan
GMT-06:00, Central America, Central Time(US & Canada)
GMT-05:00, Bogota, Lima, Quito, Eastern Time(US & Canada)
GMT-04:00, Atlantic Time(Canada), Caracas, Santiago
GMT-03:30, Newfoundland
GMT-03:00, Brasilia, Buenos Aires, Georgetown, Greenland
GMT-02:00, Mid-Atlantic
GMT-01:00, Azores, Cape Verde Is.
GMT,       Greenwich Mean Time, Casablanca, Monrovia, Dublin, London
GMT+01:00, Amsterdam, Berlin, Bern, Rome, Paris, West Central Africa
GMT+02:00, Athens, Istanbul, Bucharest, Cairo, Jerusalem
GMT+03:00, Baghdad, Kuwait, Riyadh, Moscow, Nairobi
GMT+03:30, Tehran
GMT+04:00, Abu Dhabi, Muscat, Baku, Tbilisi, Yerevan
GMT+04:30, Kabul
GMT+05:00, Ekaterinburg, Islamabad, Karachi, Tashkent
GMT+05:30, Chennai, Kolkata, Mumbai, New Delhi
GMT+05:45, Kathmandu
GMT+06:00, Almaty, Novosibirsk, Astana, Dhaka, Sri Jayawardenepura
GMT+06:30, Rangoon
GMT+07:00, Bangkok, Hanio, Jakarta, Krasnoyarsk
GMT+08:00, Beijing, Chongqing, Hong Kong, Urumqi, Taipei, Perth
GMT+09:00, Osaka, Sapporo, Tokyo, Seoul, Yakutsk
GMT+09:30, Adelaide, Darwin
GMT+10:00, Canberra, Melbourne, Sydney, Guam, Hobart, Vladivostok
GMT+11:00, Magadan, Solomon Is., New Caledonia
GMT+12:00, Auckland, Wellington, Fiji, Kamchatka, Marshall Is.
GMT+13:00, Nuku'alofa
```

To set the time zone:

```
Shell> timezone -s -7:00
Shell> timezone
GMT-07:00

Shell> timezone -s 5:00
Shell> timezone
GMT+05:00
```

To display detailed information for the current time zone:

```
Shell> timezone -f
GMT+05:00, Ekaterinburg, Islamabad, Karachi, Tashkent
Shell> timezone
GMT+05:00
```

Status Codes Returned

SHELL_SUCCESS	The operation completed successfully.
SHELL_INVALID_PARAMETER	A time field is out of range
SHELL_DEVICE_ERROR	The timezone could not be saved due to a hardware error.

touch

Summary

Updates the time and date on a file to the current time and date.

Usage

```
touch [-r] file [file …]
```

Options

file

The name or pattern of the file or directory. There can be multiple files on the command-line.

-r

Recurse into subdirectories

Description

This command updates the time and date on the file that is specified by the **file** parameter to the current time and date.

If multiple files are specified on the command line, it will continue processing. It will touch the files one by one and errors will be ignored.

Touch cannot change the time and date of read-only files and directories.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_NOT_FOUND	The target file or set of files were not found.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_WRITE_PROTECTED	The media was write-protected or the file had a read-only attribute associated with it.

type

Summary

Sends the contents of a file to the standard output device.

Usage

```
type  file [file...]
```

Options

file

Name of the file to display.

Description

This command sends the contents of a file to the standard output device. If no options are used, then the command attempts to detect the file type. If it fails, then UCS-2 is presumed.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The target file or set of files were not found.

Examples

To display a file in format:

```
fs0:\> type pause.nsh
#
# Example script for 'pause' command
#
echo pause.nsh begin..
date
time
pause
echo pause.nsh done.
```

To display multiple files:

```
fs0:\> type test.*
How to Install?
time
stall 3000000
time
```

unload

Summary

Unloads a driver image that was already loaded.

Usage

unload [-n] [-v|-verbose] *Handle*

Options

-n

Skips all prompts during unloading, so that it can be used in a script file.

-v, -verbose

Dump verbose status information before the image is unloaded.

Handle

Handle of driver to unload, always taken as hexadecimal number

Description

This command unloads a driver image that was already loaded and which supports the unloading option (see **EFI_LOADED_IMAGE_PROTOCOL**'s **Unload()** member.)

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.

ver

Summary

Displays the version information for the UEFI Shell and the underlying UEFI firmware.

Usage

ver [*-s***|***-terse***]**

Options

-s

Displays only the UEFI Shell version

-terse

The shell command will restrict additional informative content.

Description

This command displays the version information for this EFI Firmware or the version information for the UEFI Shell itself. The information is retrieved through the EFI System Table or the Shell image.

UEFI <support-level> Shell v<uefi-shell-version>
shell-supplier-specific-data
UEFI v*<uefi-firmware-version> (<firmware vendor name>,* **0x***<firmware vendor version as 32-bit hex value> <optional additional vendor version>)*

```
UEFI Basic Shell v2.0
Build 8192. Copyright 2008 by Intel(R) Corporation.
UEFI v2.10 Firmware (Phoenix Technologies Ltd., 0x01014318)
```

<support-level>

0 = Minimal, 1 = Scripting, 2 = Basic, 3 = Interactive

<uefi-shell-version>

comes from the shell spec upon which the shell implementation is based.

<shell-supplier-specific-data>

Build, copyright, etc.

<uefi-firmware-version>

From the EFI System Table's Hdr.Revision field, formatted as two period delimited fields. The first field is the upper 16-bits of this field, represented as a decimal unsigned integer. The second field is the lower

16-bites of this field, represented as a two-digit, zero-filled decimal unsigned integer.

<firmware vendor name>

From the EFI System Table's FirmwareVendor field

<firmware vendor version>

From the EFI System Table's FIrmwareRevision field

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.

vol

Summary

Displays the volume information for the file system that is specified by **fs**.

Usage

```
vol [fs] [-n <VolumeLabel>]
vol [fs] [-d]
```

Options

fs

The name of the file system.

VolumeLabel

The name of the file system. The following characters cannot be used: % ^ * + = [ ] | : ; " < > ? / . No spaces are allowed in the volume label.

-d

Empty volume label.

Description

This command displays the volume information for the file system that is specified by *fs*. If *fs* is not specified, the current file system will be used. If **-n** is specified, then the volume label for *fs* will be set to *VolumeLabel*. The maximum length for *VolumeLabel* is 11 characters.

Status Codes Returned

SHELL_SUCCESS	The action was completed as requested.
SHELL_INVALID_PARAMETER	One of the passed in parameters was incorrectly formatted or its value was out of bounds.
SHELL_SECURITY_VIOLATION	This function was not performed due to a security violation
SHELL_NOT_FOUND	The target file-system was not found

Examples

To display the volume of the current fs:

```
fs0:\> vol
Volume has no label (rw)
1,457,664 bytes total disk space
1,149,440 bytes available on disk
512 bytes in each allocation unit
```

To change the label of fs0:

```
shell> vol fs0 -n help_test
Volume HELP_TEST (rw)
1,457,664 bytes total disk space
1,149,440 bytes available on disk
512 bytes in each allocation unit
```

To get rid of the label of fs0:

```
fs0:\> vol fs0 -d
Volume has no label (rw)
1,457,664 bytes total disk space
220,160 bytes available on disk
512 bytes in each allocation unit
```

Appendix A
UEFI Shell Consistent Mapping Design

This appendix describes how device assignments are created.

A.1 Requirement:

1. The shell shall support consistent device assignments across (through) reboots.

   e.g. same concept as how you assign the letter D: to a partition under DOS/Windows.

2. The shell commands shall support defining mappings.

   For identical machines with the same hardware configurations the mapping result should always be the same.

3. Not use the NV storage.

   In the OS, it is easy to implement the consistent mapping, because it can store the mapping info on the hard disk or other storage. The firmware has no large storage to store all of this system info. To save space, it is strongly desired that such mapping data does not use NV storage to maintain this data.

A.2 Design

A.2.1 What does consistent mapping mean?

If hardware configuration is not changed, the mappings should not change.
EXAMPLE: map –r, reboot, map -r will not change the mappings.

If two or more machines have the same hardware configurations, mapping result should be the same.

A.2.2 *Hardware configuration change:*

Generally, buses, controllers, hubs or bridges changing mean hardware configuration change.

The change of the number or physical connection of hardware which can have child hardware devices will be considered as hardware configuration change.

Example:

A.2.2.1 Hardware configuration change example

1. Change IDE disk from IDE primary master to slave
2. Change USB device from port0 to port1
3. Add or remove a SCSI controller adapt card

A.2.2.2 Hardware configuration not change example

1. Remove floppy/cdrom disk in drive will not affect mapped names of other existing names
2. Remove floppy/cdrom, then insert back, the newly mapped name will be the same as the last time it was mapped.
3. Unplugging a usb device will not affect mapped names of other existing names
4. Unplug usb device, then plug back to the same port, the newly mapped will be the same as the last time it was mapped.

A.2.3 *Mapping generated from device path*

The device path is used to generate the mapping, because in a platform, the device path is unique and if the hardware configuration doesn't change, the device's device path doesn't change.

A.2.4 *Consistent Mapping*

A consistent mapping consists of 3 parts:

<MTD><HI><CSD>

MTD(Media Type Descriptor): A string carries device's media info (harddisk, CD-ROM, …etc.)

1. Auxiliary name of media type, determined by device path
2. Matches with EFI device path specification

3. Proposed name (hd for harddisk, cd for CD-ROM, fp for floppy, etc.)

HI(Hardware Index): The index of the hardware device path node described in current device path. The index is determined by the position of the whole sorted hardware device path node in system.

1. Extract the hardware device path node and ACPI device path node from each device path in system, make a condensed device path.
2. Use certain algorithm to sort all the condensed device paths
3. Adding/Removing controller(s) would change the index (hardware configuration change)

CSD(Connection Specific Descriptor): A string of numbers and characters, which identifies how the device connects to parent controller.

1. Specify the connection of device
2. use one or several numbers or characters to describe each media and messaging device path node in device path to specify the connection

A.2.5 *Example (USB Devices)*

Hardware Configuration (USB part)

4 UHC

7 USB devices: 4 Hard disks, 3 hub

Other hardware are ignored when mapping usb subsystem

Device Path (controllers are underlined)

```
acpi(pnp0a03,0)/pci(1d,0)/usb(0,1)/usb(1,1)/HD(Part4, sigxxx)
acpi(pnp0a03,0)/pci(1d,3)/usb(0,1)/usb(5,1)/HD(Part2, sigxxx)
acpi(pnp0a03,0)/pci(1d,1)/usb(1,0)/HD(Part3, sigxxx)
acpi(pnp0a03,0)/pci(1d,2)/usb(1,0)/ usb(2,0)/HD(Part1, sigxxx)
```

Steps to determine the consistent mapping for devices:

1. Determine the MTD
2. Determine the HI
3. Determine the CSD
4. Make the final mapping

A.2.5.1 Step 1: Determine MTD

MTD for all devices:

- hd is defined for harddisk.
- cd is defined for CD-ROM.
- fp is defined for floppy.
- f is defined for unknown device.

…

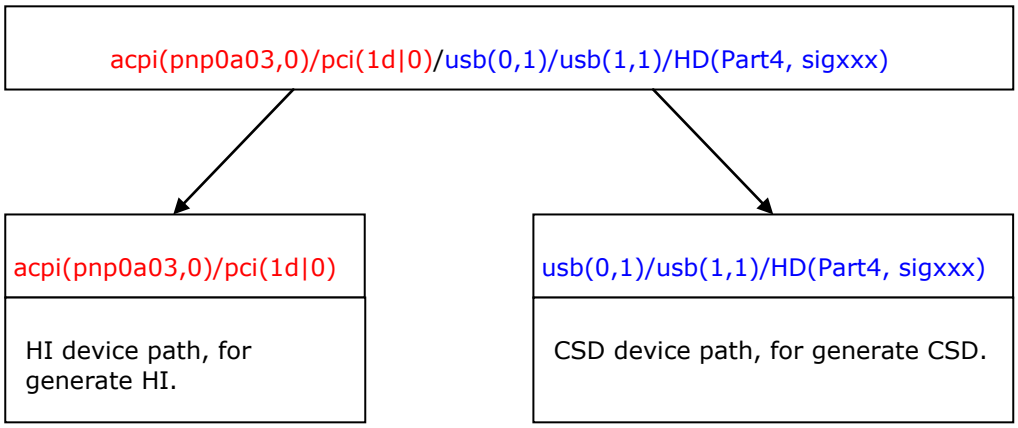
More names will be added according to the evolution of UEFI specification

The 4 USB devices are the hard disks, so their MTDs are "hd".

A.2.5.2 Step 2: Determine HI

HI is determined by ACPI device path node and hardware device path node

1. Algorithm to calculate the HI
2. Enumerate all device path exist in system, whether there is a file system on it or not.
3. Split the device path: the hardware and ACPI device path node part consists of the HI device path that generates the HI and the remain device path consist the CSD device path which generate the CSD.



Each kind of device path node has its own compare algorithm.

For acpi device path node, the compare algorithm is:

```
acpi(h1, u1) > acpi(h2, u2) only if h1 > h2 or (h1 = h2 and u1 > u2)
```

For pci device path node, the compare algorithm is:

```
pci(d1, f1) > pci (d2, f2) only if d1 > d2 or (d1 = d2 and f1>f2)
```

For example:

```
acpi(pnp0a03,0)/pci(1d|0) <….< acpi(pnp0a03,0)/pci(1d|1)<….<
acpi(pnp0a03,0)/pci(1d|2) <….< apci(pnp0a03,0)/pci(1d|3)
```

Use decimal number for HI (0, 1, 2, 3, …)

After sorting we can assign HI for each hardware device path node part:

```
UHC1 acpi(pnp0a03,0)/pci(1d|0)     -        5
UHC2 acpi(pnp0a03,0)/pci(1d|1)     -        8
UHC3 acpi(pnp0a03,0)/pci(1d|2)     -        12
UHC4 acpi(pnp0a03,0)/pci(1d|3)     -        20
```

A.2.5.3 Step 3: Determine CSD

For each kind device path node, there are rules to translate the device path node to the CSD.

A.2.5.3.1 *Rules for USB device path node*

Use interface number and port number for usb node

Numbers in device path will be mapped at intervals to characters or numbers

When mapping from numbers to characters: use a – 0 , b – 1, …, z – 25

Sample:
`usb(0,1) → a1 or 0b.`

A.2.5.3.2 *Rules for hard drive device path node*

Use partition number for hard drive device node

Sample:
`HD(Part4, sigxxx) → e or 4.`

The CSD device paths of the 4 harddisk in our sample are:

```
usb(0,1)/usb(1,1)/HD(Part4, sigxxx)
usb(0,1)/usb(5,1)/HD(Part2, sigxxx)
usb(1,0)/HD(Part3, sigxxx)
usb(1,0)/usb(2,0)/HD(Part1, sigxxx)
```

A.2.5.3.3 *Corresponding CSDs*

```
usb(0,1)/usb(1,1)/HD(Part4, sigxxx) → a1b1e
usb(0,1)/usb(5,1)/HD(Part2, sigxxx) → a1e1c
usb(1,0)/HD(Part3, sigxxx)  → b0d
usb(1,0)/ usb(2,0) /HD(Part1, sigxxx) → b0c0b
```

A.2.5.3.4 *Step 4: Make the whole mapping*

Whole mapping rule:

```
<USB mapping >::=[<MTD>]<HI><CSD>
<MTD> ::= {hd, fp, cd…}
<HI>::={0, 1, 2, …}
<CSD> ::=<node sequence>
```

Put the three parts (MTD, HI and CSD) together to get final mapping for the four hard disks

```
acpi(pnp0a03,0)/pci(1d,0)/usb(0,1)/usb(1,1)/HD(Part4, sigxxx) → hd5a1b1e
acpi(pnp0a03,0)/pci(1d,3)/usb(0,1)/usb(5,1)/HD(Part2, sigxxx) → hd8a1d1c
acpi(pnp0a03,0)/pci(1d,1)/usb(1,0)/HD(Part3, sigxxx) → hd12b0d
acpi(pnp0a03,0)/pci(1d,2)/usb(1,0)/ usb(2,0)/HD(Part1, sigxxx) → hd20b0c0b
```

A.3 *Implementation*

Consistent Mapping = <MTD><HI><CSD>

MTD

fp	floppy
hd	hard disk
cd	cd rom
f	unknown media

HI

1. Extract the hardware device path node and ACPI device path node from each device path in system,
2. Extract the condensed HI device path
3. Sort the extracted HI device paths.

HI is index of the sorted HI device paths.

CSD

Use one or several numbers or characters to describe each media and messaging device path node in device path to specify the connection.

All of the reference values in the table below are references to the device path type and sub-type values in the UEFI specification. For actual values of each of the corresponding Type and Sub-type values, please refer to the UEFI spec.

Table 29 How to process each type the device path node:

Type	Sub Type	Node Type	Note
HARDWARE_DEVICE	HW_PCI	HI Node	Used to get HI
HARDWARE_DEVICE	HW_PCCARD	HI Node	Used to get HI
HARDWARE_DEVICE	HW_MEMMAP	HI Node	Used to get HI
HARDWARE_DEVICE	HW_VENDOR	HI Node	Used to get HI
HARDWARE_DEVICE	HW_CONTROLLER	HI Node	Used to get HI
ACPI_DEVICE	ACPI	HI/CSD Node	Used ACPI(0604) to get HI and other to get CSD.
MESSAGING_DEVICE	MSG_ATAPI	CSD Node	IDE channel index (0 for primary, master, 3 for secondary slave)
MESSAGING_DEVICE	MSG_SCSI	CSD Node	Use LUN number and PUN number for SCSI node

MESSAGING_DEVICE	**MSG_FIBRECHANNEL**	CSD Node	Use WWW number and LUN number for fibre channel device node
MESSAGING_DEVICE	**MSG_1394**	CSD Node	Use GUID as CSD for 1394 device path node
MESSAGING_DEVICE	**MSG_USB**	CSD Node	Use interface number and port number for USB node
MESSAGING_DEVICE	**MSG_USB_CLASS**	NONE	Not process.
MESSAGING_DEVICE	**MSG_I2O**	CSD Node	Use Target ID as I2o Device Path
MESSAGING_DEVICE	**MSG_MAC_ADDR**	CSD Node	Use MAC address as CSD for MAC node
MESSAGING_DEVICE	**MSG_IPv4**	CSD Node	Use local IP address, local port, Remote IP address, remote port for IPv4 node
MESSAGING_DEVICE	**MSG_IPv6**	CSD Node	Use local IP address, local port, Remote IP address, remote port for IPv6 node
MESSAGING_DEVICE	**MSG_INFINIBAND**	CSD Node	Use PORT GID, IOC GUID, Target Port ID, Device ID
MESSAGING_DEVICE	**MSG_UART**	CSD Node	Use Baud Rate, Data Bits, Parity, Stop Bits as CSD

MESSAGING_DEVICE	**MSG_VENDOR**	CSD Node	Use GUID as CSD
MESSAGING_DEVICE	**MSG_LUN**	CSD Node	Use the Logical Unit Number
MESSAGING_DEVICE	**MSG_SATA**	CSD Node	Use the HBA Port Number, Port Multiplier, and LUN value.
MESSAGING_DEVICE	**MSG_SAS**	CSD Node	Use the SAS Address, LUN, Device Topology, and Relative Target Port
MEDIA_DEVICE	**MEDIA_HARDDRIVE**	CSD Node	Partition Number
MEDIA_DEVICE	**MEDIA_CDROM**	CSD Node	Boot Entry
MEDIA_DEVICE	**MEDIA_VENDOR**	CSD Node	Use Vendor_GUID as CSD
MEDIA_DEVICE	**MEDIA_FILEPATH**	NONE	Don’t process.
MEDIA_DEVICE	**MEDIA_PROTOCOL**	NONE	Don’t process.
MEDIA_DEVICE	**MEDIA_FV_FILEPATH**	NONE	Don’t process.

BBS_DEVICE	**BBS_BBS**	NONE	Don't process.

A.3.1 *Get the MTD*

The MTD is a string that carries device's media info. Such as floppy, hard disk or others. The MTD is a string that makes the mapping more readable.

Now, the MTD has four types: fp(floppy), hd(hard disk), cd(CD Rom) and f(unknown type).

The MTD's info come from the device path. the algorithm go through each node of the device path to find the special node that can specify this device's MTD.

Table 30 MTD Naming

TYPE	SUBTYPE	MTD
EDIA_DEVICE_PATH	**MEDIA_HARDDRIVE**	hd
EDIA_DEVICE_PATH	**MEDIA_CDROM**	cd
ACPI_DEVICE_PATH	ACPI &HID=0x0604	fp

Note: *If a device has the MEDIA_HARDDRIVE and MEDIA_CDROM device path node, then its MTD is cd.*

If a device path has no any node list on the table, then, its MTD is f(unknown).

A.3.2 *Get the HI*

Each device can be separated into two part: the HI part and CSD part.

The HI part is used to get the HI section in the consistent mapping.

The CSD part is used to get the CSD section in the consistent mapping.

The algorithm of get HI goes through each device path in the system and extracts each HI node in the device path according Table 29 to create a HI device path.

A.3.3 *Get the CSD*

A device path remove the HI device path part, the remain part is the CSD part.

The algorithm is go through the CSD device part, to each node, according Table 29 get the data that will be add to the CSD, translate the data to a string of digital or character(according the position in the CSD).

A.3.3.1 USB Devices

CSD of hard drive device path node

Use partition number and interface for CSD

A.3.3.1.1 Example

usb(0,1) → a1
usb(1,0) → b0

A.3.3.2 Floppy Devices

General consistent mapping rule

Use _UID for CSD

A.3.3.2.1 Examples:

1. **acpi(pnp0604,0) → a**
2. **acpi(pnp0604,1) → b**
3. IDE Devices

A.3.3.3 CSD of ATAPI device path node

ATAPI node → ide channel index

0 for primary, master, 3 for secondary slave

A.3.3.4 CSD of LUN Device path node

Use the LUN number

A.3.3.4.1 Examples:

USB(0x2,0x1)/Unit(0x0) → c10
USB(0x2,0x1)/Unit(0x2) → c12

A.3.3.5 CSD of SAS Device path node

Use the SAS Address, followed by the LUN number, Device Topology Value, and Relative Target Port

A.3.3.6 CSD of SATA Device path node

Use the HBA Port Number, followed by the Port Multiplier Number, and the LUN value.

A.3.3.7 CSD of hard drive device path node

Hard disk node - > partition number

A.3.3.7.1 Examples

```
Ata(Primary,Master) → a
Ata(Primary, Slave) → b
Ata(Secondary,Master) → c
Ata(Secondary, Slave) → d
HD(p2, sig*) → c
CD(Entry0) → a
```

SCSI device

A.3.3.8 CSD of SCSI device path node

Use LUN number and PUN number for scsi node

A.3.3.8.1 Examples:

```
scsi(1,0) → b0
   scsi(2,0) → c0
   scsi(2,0)/scsi(1,0) → c0b0
```

A.3.3.9 Fibre Channel Device Path

Use WWW number and LUN number for fibre channel device node:

```
Acpi(0a03)/pci(0,0)/FC(0x1b833212, 0x34a65)/HD(Part4, sig**4)
hd45bmwccxe4654145e
(bmwccxe)26 = (1b833212)16, (4654145)10 = (34a65)16
```

A.3.3.10 1394 Device Path

Use GUID as CSD for 1394 device path node

Treat the guid as a string, for CSD, translate character by character

```
0001,db08,5001,0a5f → aaabnlaifaabakfp
```

A.3.3.11 I2o Device Path

Use Target ID as I2o Device Path

A.3.3.12 MAC Address Device Path

Use MAC address as CSD for MAC node

IPv4 Device Path & IPv6 Device Path

Use local Ip address, local port, Remote Ip address, remote port for IPv4 node

A.3.3.13 InfiniBand Device Path

Use PORT GID, IOC GUID, Target Port ID, Device ID

A.3.3.14 UART Device Path

Use Baud Rate, Data Bits, Parity, Stop Bits as CSD

A.3.3.15 Vendor-Defined Device Path

Use guid as CSD
{18ABEA39-F472-4278-BD55-E8C81C7030E1} →
biklokdjpehcechilnffoimibmhadaob

A.3.3.16 Vendor-defined Media Device Path

Use Vendor_GUID as CSD

A.3.3.17 File Path Media Device Path

Put file path in MTD

A.4 Function & Structure

```
EFI_STATUS
ConsistMappingCreateHIDevicePathTable (
  OUT EFI_DEVICE_PATH_PROTOCOL          ***HIDevicePathTable
) ;
```

Parameters

HIDevicePathTable

A pointer to the Table of HI Device Path.

Description

This function will go through all the device paths in the system, extract the HI device path from each device path and add the HI device path to the HI device path table then sort the HI device path table.

In this function, only use the device path's first instance, if the device path has more than one instance, the other instances are ignored.

Extract the HI device path.

To each device path, go through each node from the first device path node. According to Table 33, if the node is the HI Device path node, add it to the HI Device, path, until meet the first NuHI Device path node.

Sort the HI device path table.

According the compare rules above, sort the HI device path table.

Pseudo Code

```
foreach handle in System
{
  Get DevicePath form handle;
  If DevicePath is null {
    Continue;
  }
  HIDevicePath = ExtractHI(DevicePath);
  Add the HIDevicePath to the HDPT
}
Sort the HDPT
```

Status Codes Returned

SHELL_SUCCESS	Success to get the HI device path table.
SHELL_OUT_OF_RESOURCE	Can not create the HI device path table.

```
CHAR16*
ConsistMappingGenMappingName(
  IN EFI_DEVICE_PATH_PROTOCOL    *DevicePath,
  IN EFI_DEVICE_PATH_PROTOCOL    **HIDevicePathTable
) ;
```

Parameters

DevicePath

A pointer to a device path that will be translated to the consist name.

HIDevicePathTable

A pointer to the Table of HI Device Path.

Description

This function go through each node of the DevicePath, extract the info about the MTD, HI, and CSD, and then according to the extracted info, create a consistent mapping.

Pseudo Code

```
Foreach handle in System
{
  Get DevicePath form handle;
  If DevicePath is null {
    Continue;
  }
  HIDevicePath = ExtractHI(DevicePath);
  Add the HIDevicePath to the HDPT
}
Sort the HDPT
```

Status Codes Returned

NULL	Can’t create the consistent mapping.
NULL	The consistent mapping.

```
Sort the HI device path table.

Consist mapping device path compare:
Compare(Node1, Node2)
{
                        If (DeviceType(Node1) != DeviceType(Node2)) {
                                Return DeviceType(Node1) –
DeviceType(Node2);
                        }
                        If (DeviceSubType(Node1)!= DeviceSubType(Node2)) {
                                Return DeviceSubType(Node1) –
DeviceSubType(Node2);
                        }
                        If (DeviceSubType(Node) == PCI) {
pci(d1, f1) > pci (d2, f2) only if d1 > d2 or (d1 = d2 and f1>f2)
                        }
                        If (DeviceSubType(Node) == ACPI) {
pci(d1, f1) > pci (d2, f2) only if d1 > d2 or (d1 = d2 and f1>f2)
                        }
                        If(Length(Node) != Length(Node2)) {
                                Return (Length(Node1) – Length(Node2);
                        }
                        Return memcmp(Node1, Node2, Length(Node1));
}
```

Appendix B
UEFI Help Manual Page Syntax

The manual page files are standard text files with title and section heading information embedded using commands which begin with a '.'. The following two macros are supported:

.TH command-name 0 "short-description"

Title header. When printing multi-page help, this will appear at the top of each page.

.SH section-name

Sub-header. Specifies one of several standard sub-headings.

Table 31 Subheadings and descriptions

Sub-Heading Name	Description
NAME	The name of the function or command, along with a one-line summary.
SYNOPSIS	Usage of the command
DESCRIPTION	General description
OPTIONS	Description of all options and parameters.
RETURN VALUES	Values returned.
ENVIRONMENT VARIABLES	Environment variables used
FILES	Files associated with the subject.
EXAMPLES	Examples and suggestions.
ERRORS	Errors reported by the command.
STANDARDS	Conformance to applicable standards.
BUGS	Errors and caveats.
CATEGORY	The comma-delimited list of categories to which this command belongs. Category names must follow normal file naming conventions. Category names which begin with '_' will not be used in the specification. See section 3.11.2 ("Command-Line Help") for more information on how this category is used when installing new commands.
other	Other sections added by the help author.

Appendix C
UEFI Shell Status Codes

Most UEFI Shell commands return SHELL_STATUS code values. These UEFI Shell status codes are enumerated below.

Table 32 SHELL_STATUS return codes

Mnemonic	Value	Description
SHELL_SUCCESS	0	The operation completed successfully
SHELL_LOAD_ERROR	1	The image failed to load.
SHELL_INVALID_PARAMETER	2	There was an error in the command-line options.
SHELL_UNSUPPORTED	3	The operation is not supported.
SHELL_BAD_BUFFER_SIZE	4	The buffer was not the proper size for the request.
SHELL_BUFFER_TOO_SMALL	5	The buffer is not large enough to hold the requested data. The required buffer size is returned in the appropriate parameter when this error occurs.
SHELL_NOT_READY	6	There is no data pending upon return.
SHELL_DEVICE_ERROR	7	The physical device reported an error while attempting the operation.
SHELL_WRITE_PROTECTED	8	The device cannot be written to.
SHELL_OUT_OF_RESOURCES	9	A resource has run out.
SHELL_VOLUME_CORRUPTED	10	An inconstancy was detected on the file system causing the operating to fail.
SHELL_VOLUME_FULL	11	There is no more space on the file system.
SHELL_NO_MEDIA	12	The device does not contain any medium to perform the operation.
SHELL_MEDIA_CHANGED	13	The medium in the device has changed since the last access.
SHELL_NOT_FOUND	14	The item was not found.
SHELL_ACCESS_DENIED	15	Access was denied.
SHELL_TIMEOUT	18	The timeout time expired.

Mnemonic	Value	Description
SHELL_NOT_STARTED	19	The specified operation could not be started.
SHELL_ALREADY_STARTED	20	The specified operation had already started.
SHELL_ABORTED	21	The operation was aborted by the user
SHELL_INCOMPATIBLE_VERSION	25	The function encountered an internal version that was incompatible with a version requested by the caller.
SHELL_SECURITY_VIOLATION	26	The function was not performed due to a security violation.
SHELL_NOT_EQUAL	27	The function was performed and resulted in an unequal comparison..

Appendix D
UEFI Shell Command Standard Formatted Output

This section describes the general, table-based standard output format for UEFI shell commands. The format is designed so that tools can easily process output produced by shell commands.

UEFI shell commands using standard formatted output display the same information they would normally display, except using rows and columns of comma-delimited data. The first column always contains a C-style identifier which describes the type of data on the row. This identifier is known as the *table name*. Table names which begin with the '_' character are implementation-specific.

The second and subsequent columns are quoted C-style strings containing the actual UEFI shell command data. For each UEFI shell command, the format and meaning of each column depends on the column number and the *table name*.

Shell commands which support the –sfo option will always produce the table name ShellCommand. The second column contains the name of the shell command without any extension. For example:

ShellCommand,"ls"

In the syntax below, an *identifier* is a C-style identifier, which starts with an alphabetic character or underscore. A quoted string starts with a double-quotation mark (") character, followed by zero or more characters and concluding with a double-quotation mark (") character. Quotation marks in the string must be escaped by using a ^ character (i.e. ^"). The ^ character may be inserted using ^^.

Extended Syntax

```
sfo-format          := sfo-row
                       sfo-row <EOL> <sfo-row>
sfo-row             := sfo-table-name, sfo-columns
sfo-table-name      := identifier
sfo-columns         := sfo-column |
```

```
                        sfo-columns, | sfo-column

sfo-column          := quoted-string |

                       <empty>
```

Example

```
ShellCommand,"ls"
VolumeInfo,"TimsVolume","400000000","FALSE","32000000","16000000"
FileInfo,"FS0:\efi\boot\winloader.efi","45670","45900","arsh","08:30:12","01.08.2013"
,"00:00:00","01.08.2013","08:30:12","01.08.2013"
FileInfo,"FS0:\efi\boot\timsfile.txt","1250","1280","a","08:30:12","01.08.2013","00:0
0:00","01.08.2013","08:30:12","01.08.2013"
FileInfo,"FS0:\efi\boot\readme.txt","795","900","a","08:30:12","01.08.2013","00:00:00","01.08
.2013","08:30:12","01.08.2013"
```