

Self-study Course S02

Using the UEFI Shell

Legacy BIOS has been retired on most new x86-based 32- and 64-bit platforms. It has been replaced by firmware producing the UEFI (Unified Extensible Firmware Interface). One of the many appealing features of this new firmware architecture is that it provides a pre-OS execution environment that we can access and exploit through a *shell*.

This course walks you through all standard capabilities of the UEFI shell, and shows, through hands-on exercises, how you can configuration the system, load and configure additional drivers, access and run disk-based utilities, leverage the powerful scripting capabilities, and install UEFI/GPT-enabled operating systems.

You will benefit from this course if you

- Design, configure, validate, or test hardware and software/firmware that depends on UEFI data structures
- Currently are running DOS-based utilities and want to migrate them to a protected mode environment, making use of all features of a modern processor and system
- Need or want to keep abreast with the latest on how a computing platform is initialized

You will learn how to

- Start the shell on a UEFI-enabled platform
- Leverage the power of the built-in commands
- Find, load, and use the many available EFI utilities, configuration routines, and other applications that are available
- Write and run UEFI shell scripts

Prerequisites

Students are expected to have a technical background. Our *Tiano & UEFI Architecture* course is a good primer for this course. Alternatively the *UEFI Platform Initialization Specification* documentation can serve as preparation. Basic knowledge of x86 system architecture and processor technology, memory and I/O addressing, standard peripherals, and C language programming, is expected.

The training approach

- **Real Hands-On:** You can run all exercises either in a virtual machine or on your own UEFI-enabled system.
- **Up to date information:** We update the materials on an on-going basis, at least every three months. (That's why you don't get a text book but a small print run manual!)
- **Straightforward explanations:** Technical concepts and terms are explained in plain English. After completing this course you will have a thorough understanding of the power of the UEFI shell.

Course topics

The UEFI Shell

- What, exactly, is a “shell?”
- The four defined UEFI shell “levels”
- Additional shell profiles
 - Debug
 - Network
 - Driver support

The Execution Environment

- Single user/Single tasking
- Processor mode and privilege level
- UEFI API overview
 - File manipulation
 - Mapping
 - Aliasing
 - Environment variables
- Starting the shell

The Commands

- Configuring the environment
- Built-in commands
- Commands provided by EDK and EDKII

Running EFI Applications

- System setup
- OS installation
- Disk utilities
- Diagnostics
- Test

Scripting

- Available commands
- Writing and debugging scripts
- Passing parameters
- Running scripts
- Return codes
- The startup.nsh script

Hands-On exercises

All hands-on exercises can be performed in the supplied virtual machine or on your own UEFI-enabled hardware and are an integral part of this course! The chapters have integrated exercises that allow you to practice as you go along. There is also a bigger lab at the end of each chapter, designed to reinforce your new knowledge. The lab instructions are written in plain English with a minimum of “technobabble.” They also contain the information you need to implement your new skills in the workplace.