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# UEFI & EDK II Training

## Platform Build Lab - Simics® Quick Start Platform(QSP) - Linux

Copy and Paste see Lab Guide.md

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# PLATFORM BUILD LABS

First Setup for Building EDK II, See Lab Setup

- Build a EDK II Platform using OVMF package
- Run Ovmf using Qemu
- Build a EDK II Platform using Simics Open Source QSP Board
- Run Simics with the QSP Board

# Build the Ovmf Platform

# BUILD EDK II OVMF
## -Update Target.txt

# What is OVMF?
## Open Virtual Machine Firmware - Build with edk2

```
$ cd ~/fw/edk-ws/edk2
$ . edksetup.sh
```

```
uefi@clr-0~/src/edk2-ws/edk2 $ . edksetup.sh
Loading previous configuration from /home/uefi/src/edk2-ws/edk2/Conf/Build
WORKSPACE: /home/uefi/src/edk2-ws
EDK_TOOLS_PATH: /home/uefi/src/edk2-ws/edk2/BaseTools
CONF_PATH: /home/uefi/src/edk2-ws/edk2/Conf
uefi@clr-0~/src/edk2-ws/edk2 $
```

## Edit the file Conf/target.txt

```
$ gedit Conf/target.txt
```

Open | Target.txt ~/src/edk2-ws/edk2/Conf | Save | - + X

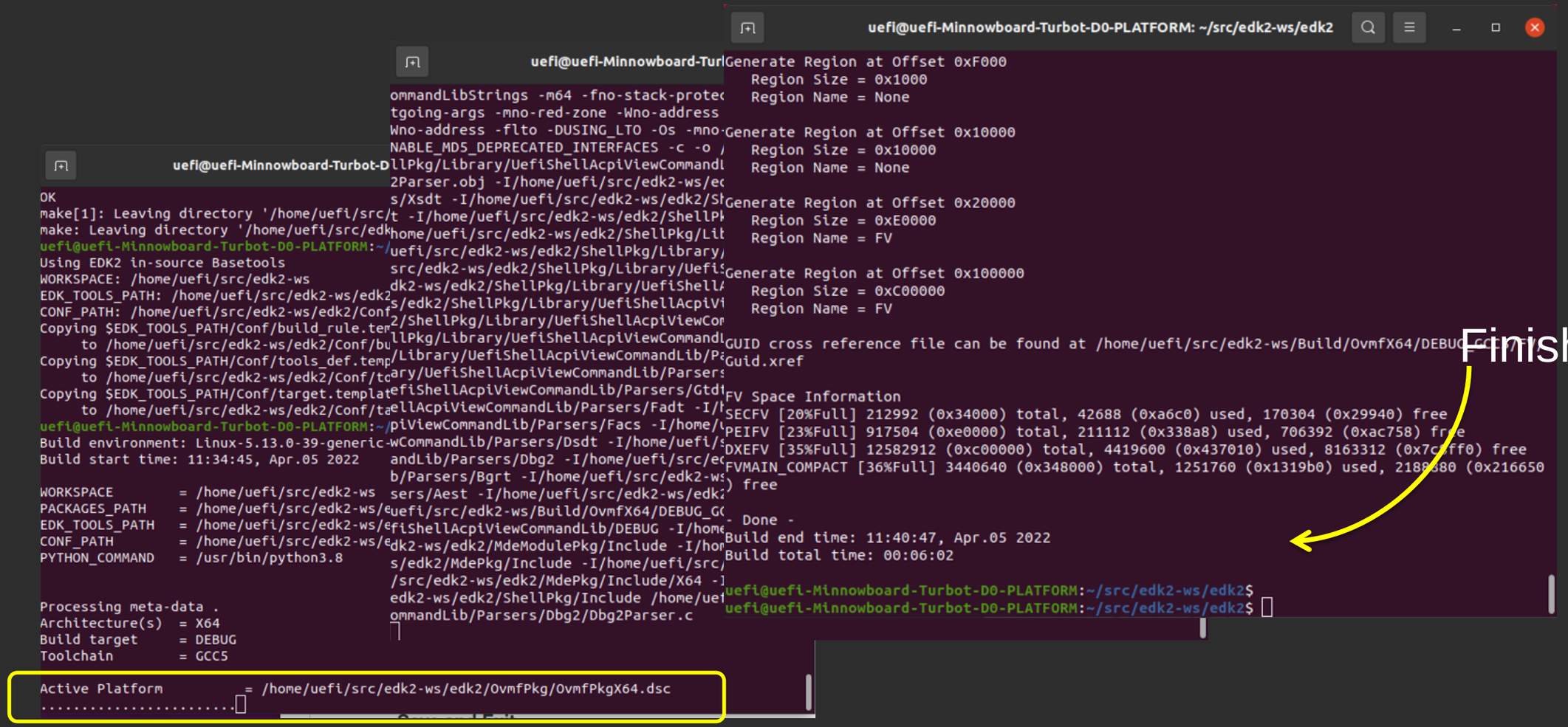
```
1.  ACTIVE_PLATFORM       = OvmfPkg/OvmfPkgX64.dsc
    #. . .
2.  TARGET_ARCH           = X64
    #. . .
3.  TOOL_CHAIN_TAG        = GCC5
```

## Save and build

```
$ build –D ADD_SHELL_STRING
```

More info: tianocore - wiki/OVMF

# BUILD EDK II OVMF
## -Inside Terminal




Finished build

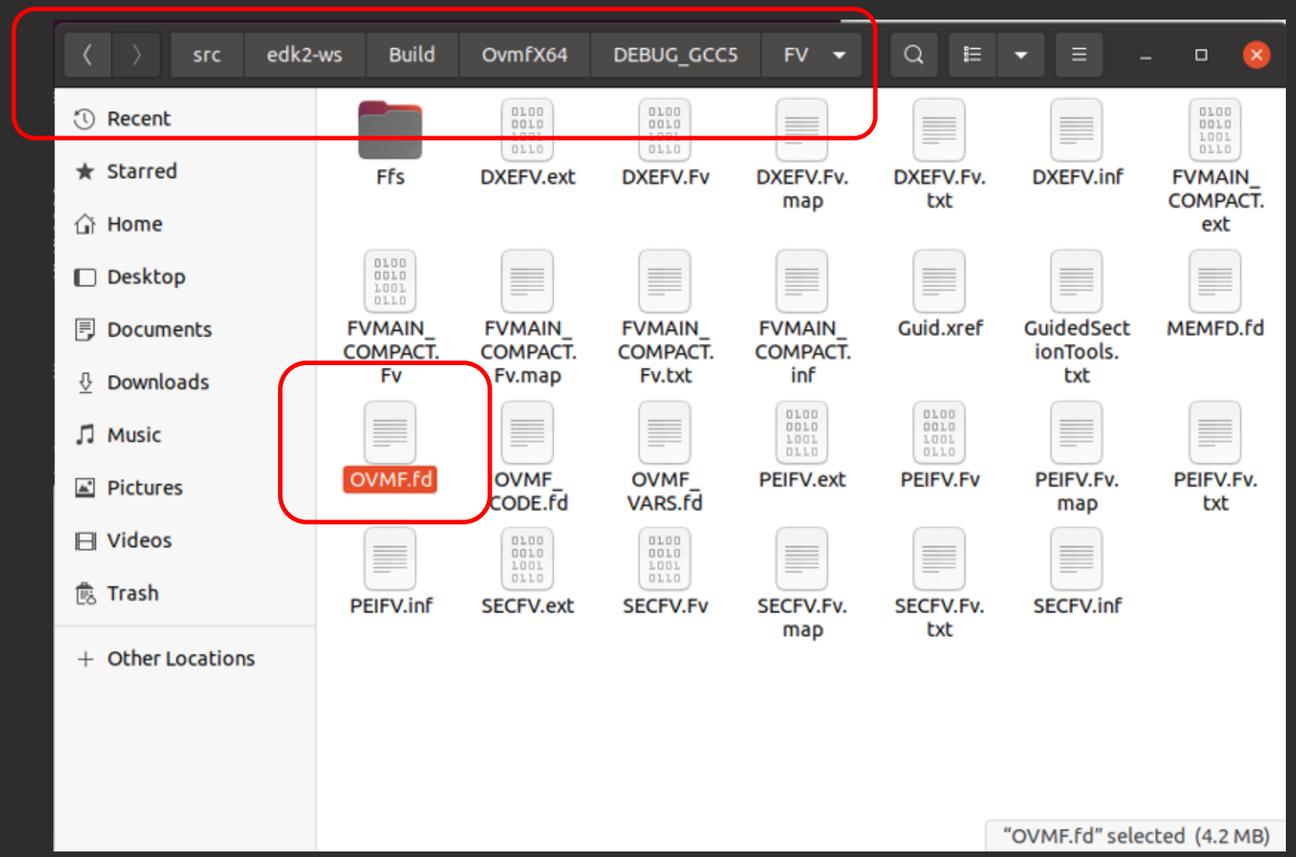
# BUILD EDK II OVMF

## -Verify Build Succeeded

OVMF.fd should be in the Build directory

- For GCC5 with X64, it should be located at

```
~/fw/edk2-ws/Build/OvmfX64/DEBUG_GCC5/FV/OVMF.fd
```



# INVOKE QEMU

Change to run-ovmf directory under the home directory

```
bash$ cd $HOME/run-ovmf
```

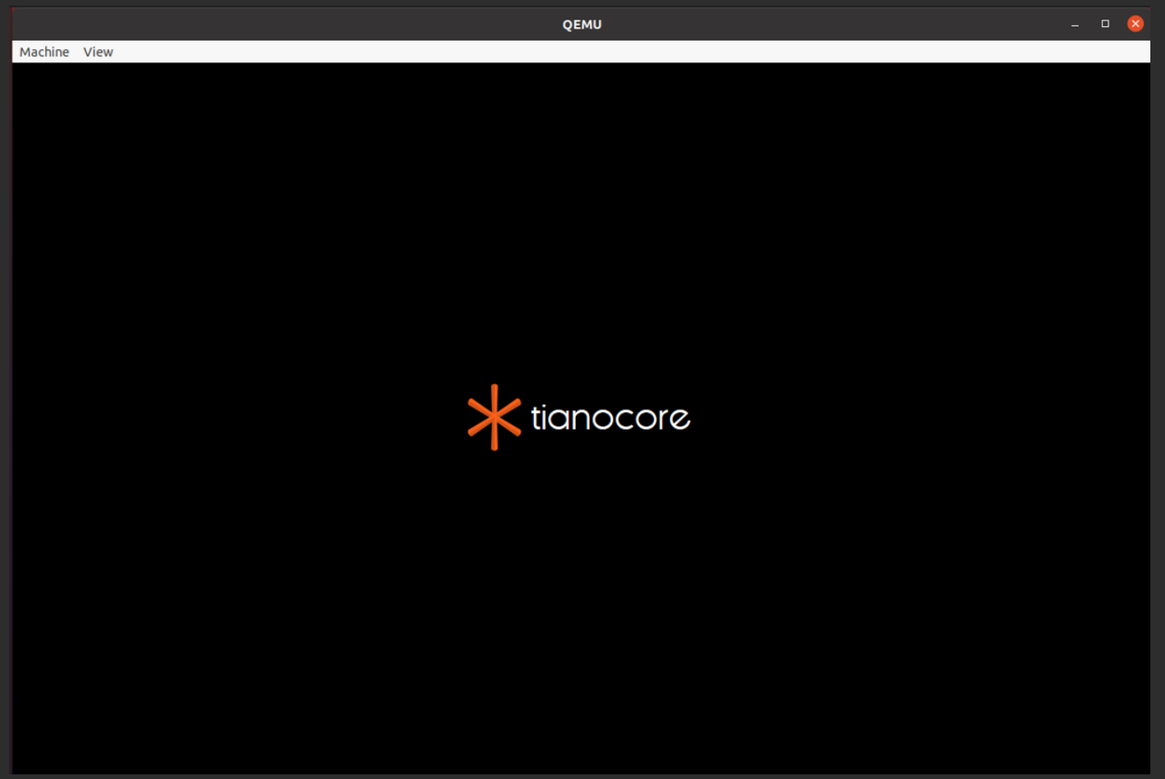
Copy the OVMF.fd BIOS image created from the build to the run-ovmf directory naming it bios.bin

```
bash$ cp ~/fw/edk2-ws/Build/OvmfX64/DEBUG_GCC5/FV/OVMF.fd bios.bin
```

Run the RunQemu.sh Linux shell script

```
bash$ . RunQemu.sh
```

Exit QEMU



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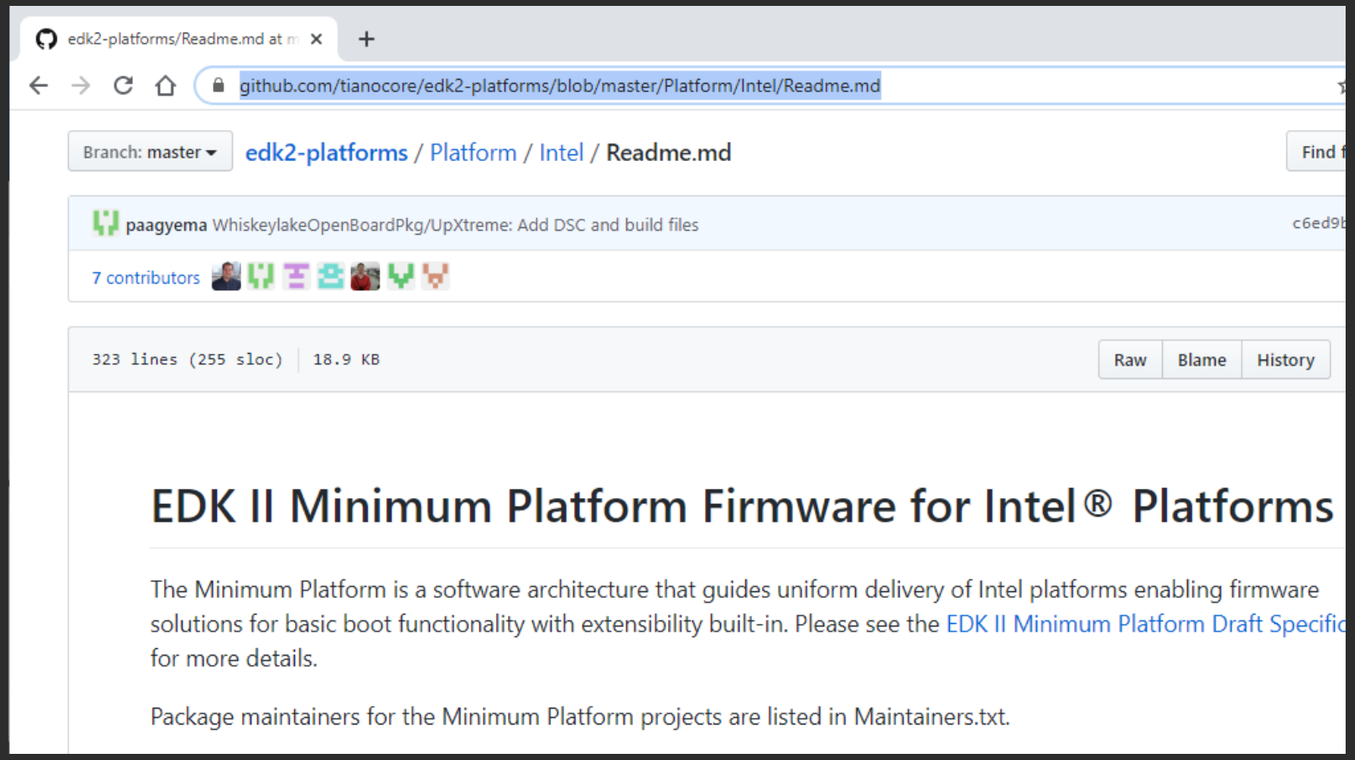
# Build QSP Simics Open Board

# Where to get Open Source Simics

How to Download  & Build: Open Source MinPlatform Readme.md



# MinPlatform Open Board Tree Structure

```
edk2/ https://github.com/tianocore/edk2
 . . .
edk2-platforms/ https://github.com/tianocore/edk2-platforms
  Platform/
       Intel/
            BoardModulePkg
            SimicsOpenBoardPkg
               BoardX58Ich10
            MinPlatformPkg
  Silicon/
       Intel/
            SimicsIch10Pkg
            SimicsX58ktPkg
            . . .
  Features/Intel
              AdvancedFeaturePkg
edk2-non-osi/ https://github.com/tianocore/edk2-non-osi
    Silicon/
       Intel/
            SimicsIch10BinPkg
FSP/   https://github.com/IntelFsp/FSP
```

Invoke the Build .py from here

Platform DSC & FDF here

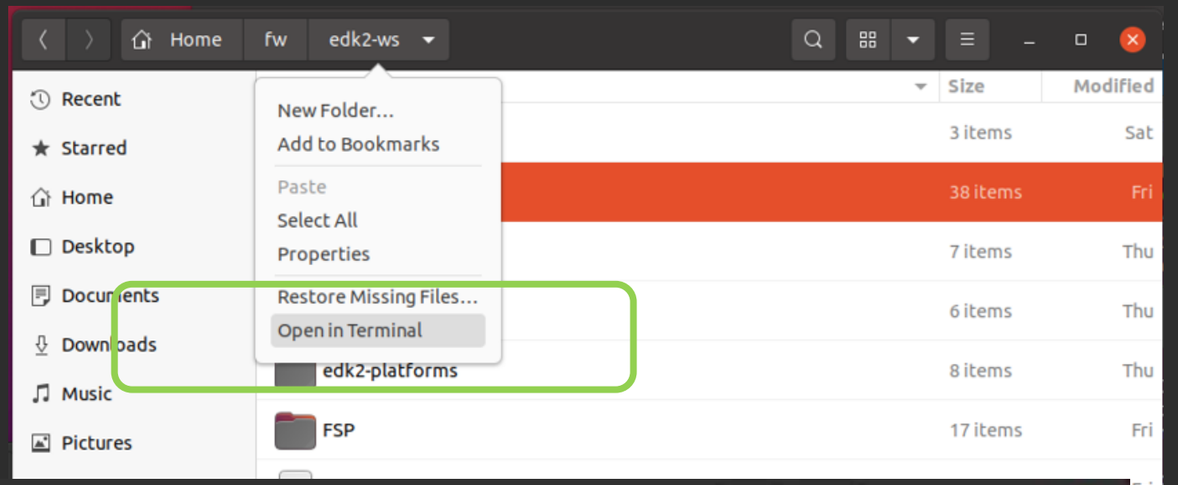
# Open Another Terminal Prompt

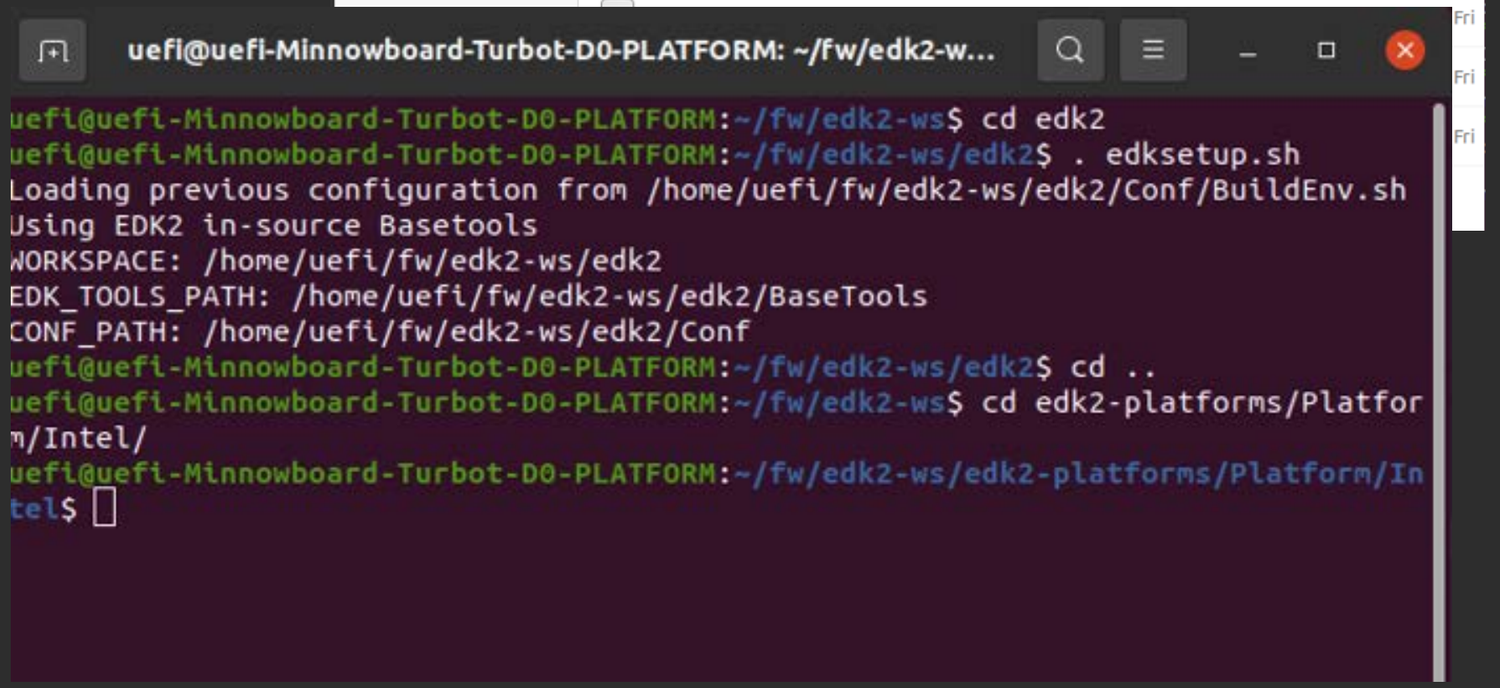
1. Open another Terminal Prompt in $HOME/fw/edk2-ws
2. Then CD to edk2 to do edksetup.sh

```
$ cd ~/fw/edk2-ws/edk2
$ . edksetup.sh
```

3. Then CD to:

```
$ cd ~/fw/edk2-ws/edk2-platforms/Platform/Intel
```



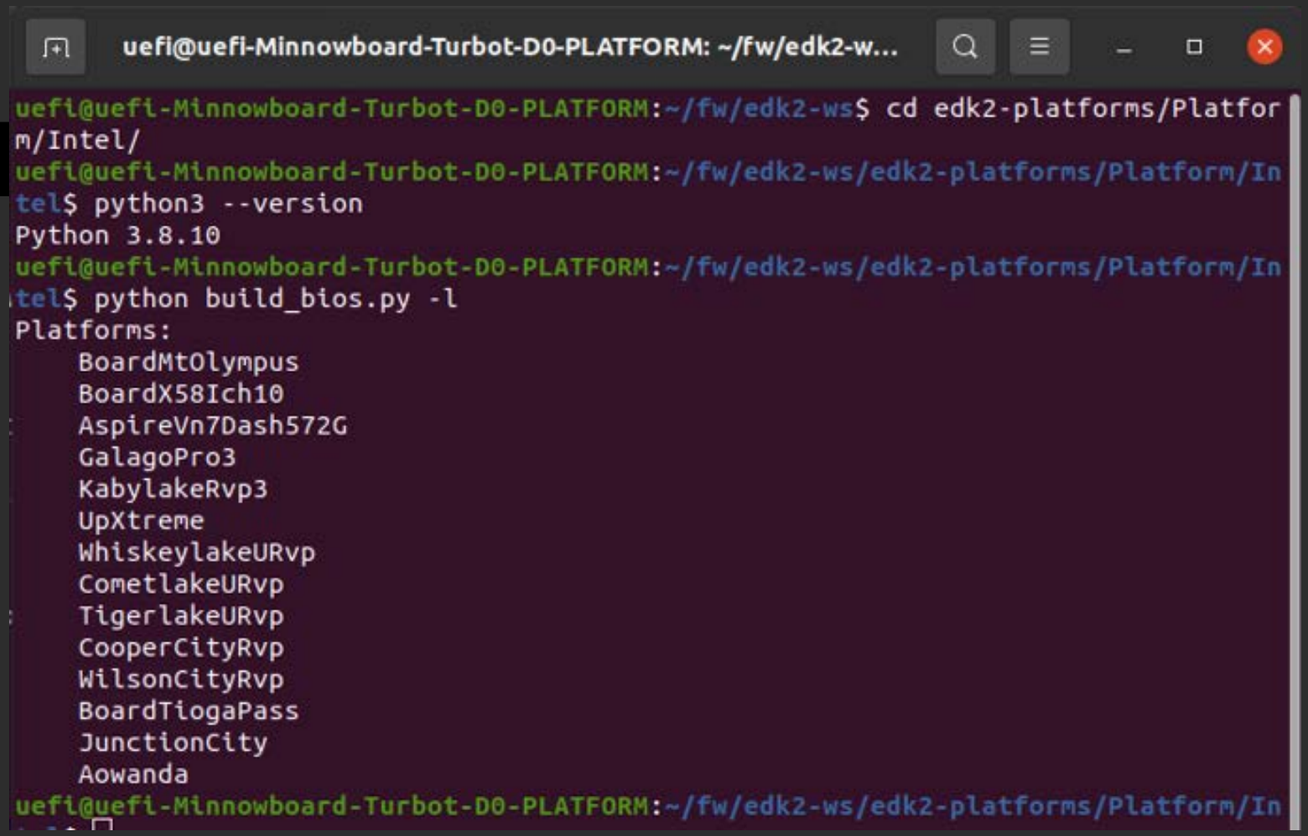
# Build Environment

Check if Python is okay  (may also need to set PYTHON_HOME)

```
$  python --version
Python 3.8.10
```

Check for available `MinPlatform` Boards

```
$ python build_bios.py -l
```

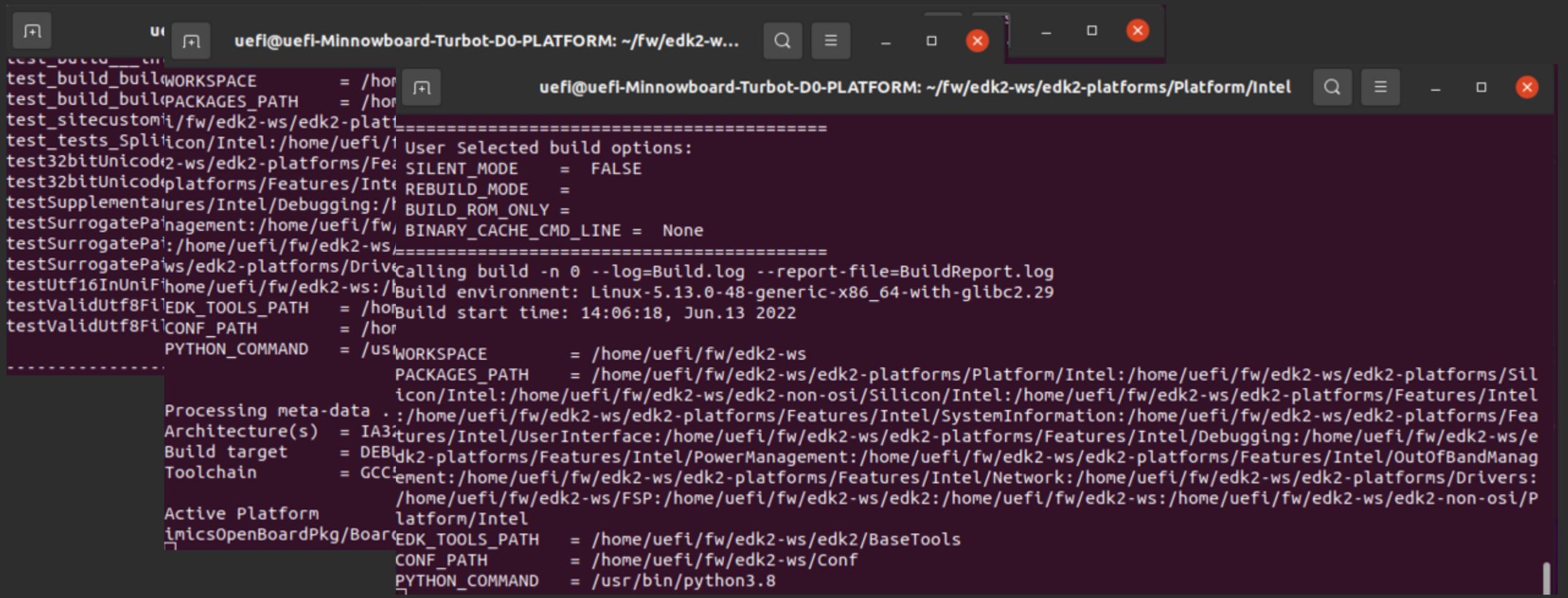


# Invoke the Build

Invoke the Python Build script for Simics QSP

```
$ python build_bios.py -p BoardX58Ich10  -t GCC5
```

Takes about 8 minutes




Rebuild takes about 2 minutes

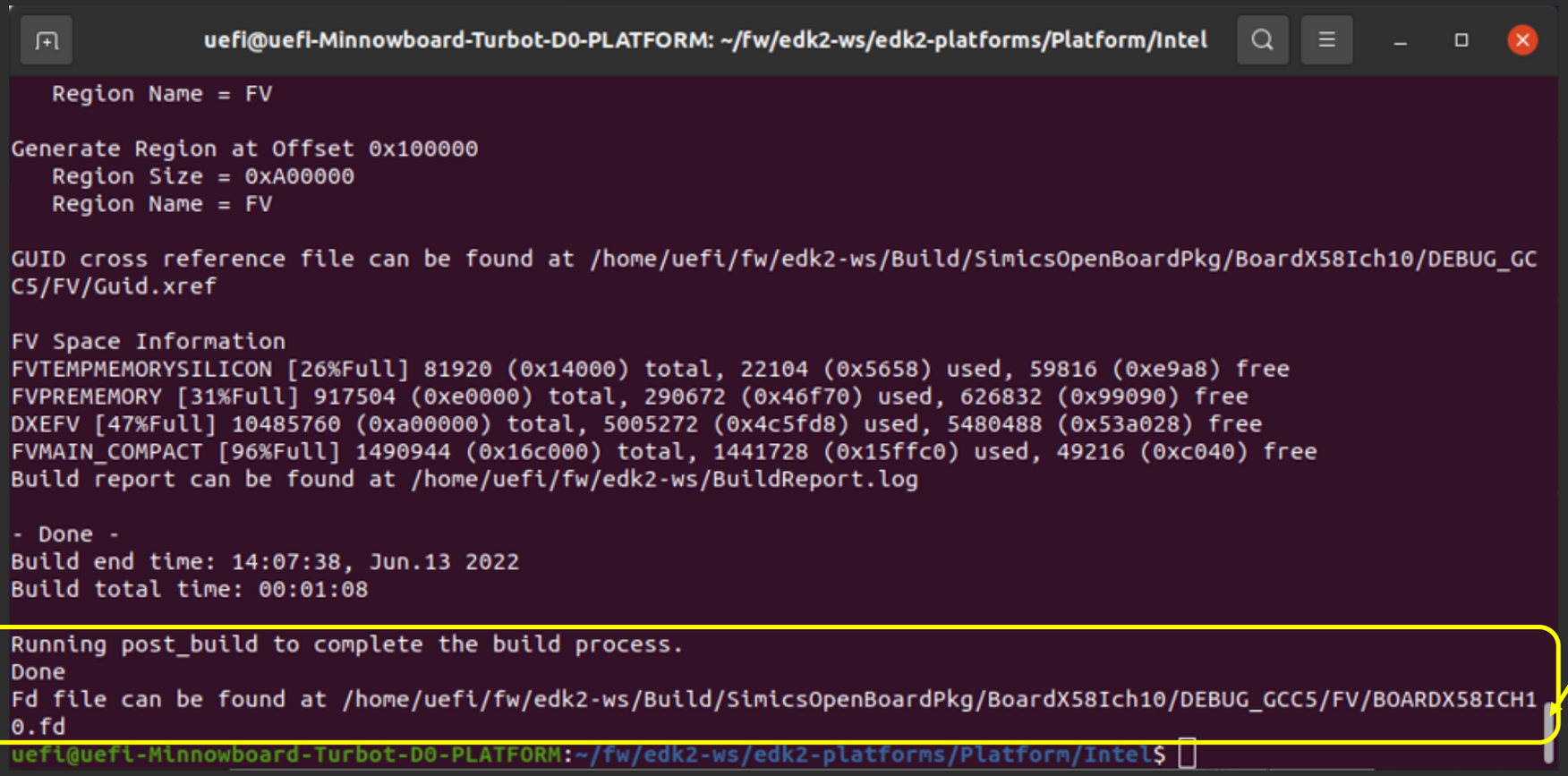
# Examine Build Parameters

```
Python build_bios.py -p BoardX58Ich10 –t GCC5

. . .
Calling build -n 0 --log=Build.log --report-file=BuildReport.log
```
and from `\edk2-ws\conf\target.txt`

| | | |
|---|---|---|
| TARGET | = DEBUG | Build Mode |
| TARGET_ARCH | = IA32 X64 | CPU Architecture |
| TOOL_CHAIN_TAG | = GCC5 | VS Tool Chain |
| ACTIVE_PLATFORM | = ... /SimicsOpenBoardPkg/ BoardX58Ich10/OpenBoardPkg.dsc | Platform DSC file |
| Report file created (via python script) | = BuildReport.log | PCDs, Libs, etc. |

# Build EDK II
## -Inside Command Prompt




Finished build

Note the location of the final .fd file

# Invoke QSP Simics with BOARDX58ICH10

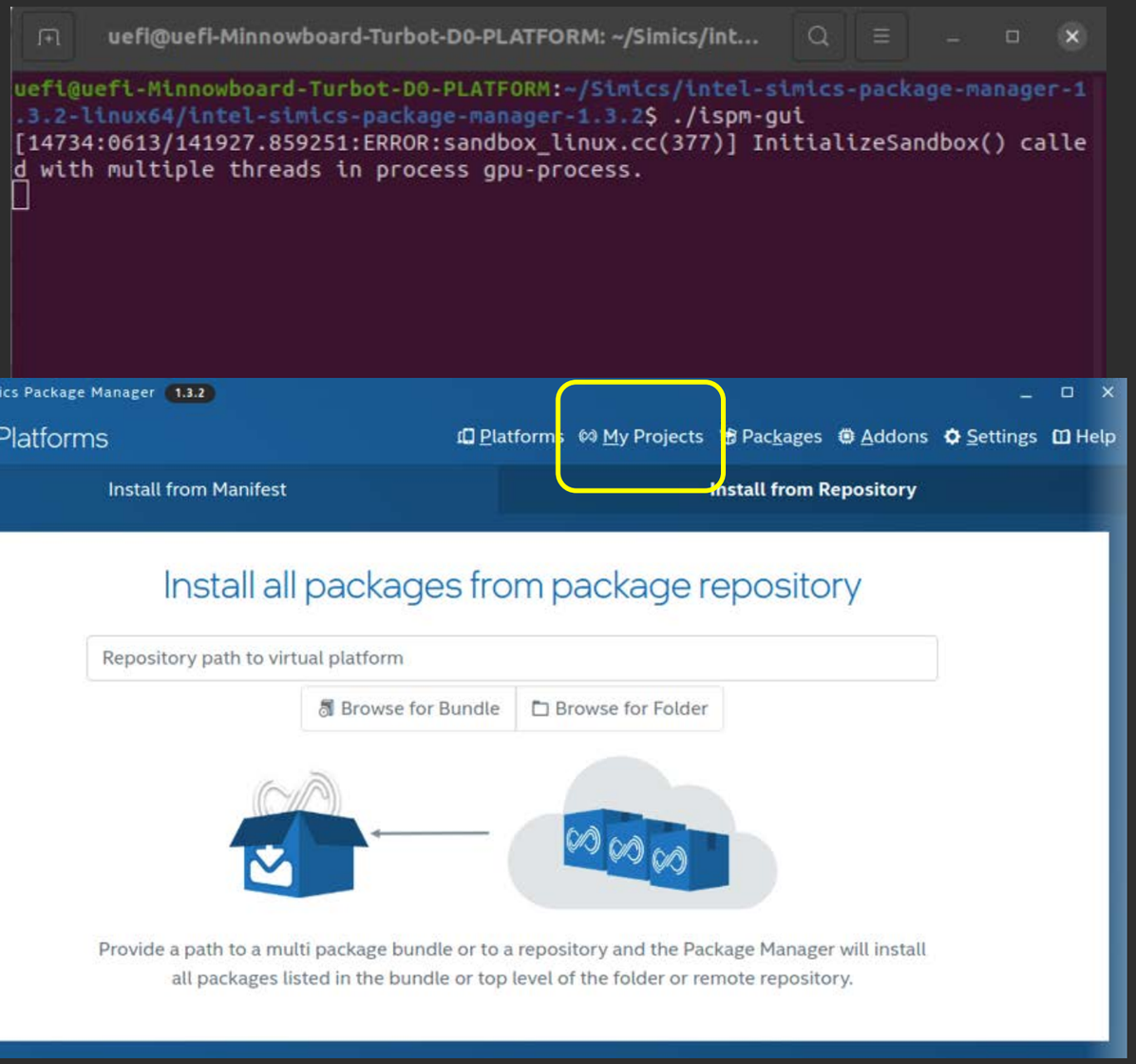
# Open Intel Simics Project Manager

Open a terminal Prompt in the Un-tar directory of the Simics e.g., intel-simics-package-manager-1.2.3-linux64/

```
$ ./ispm-gui
```

In the GUI select My Projects

.Alternatively, Open a terminal prompt and cd to ~/`simics-projects/my-simics-project-1`

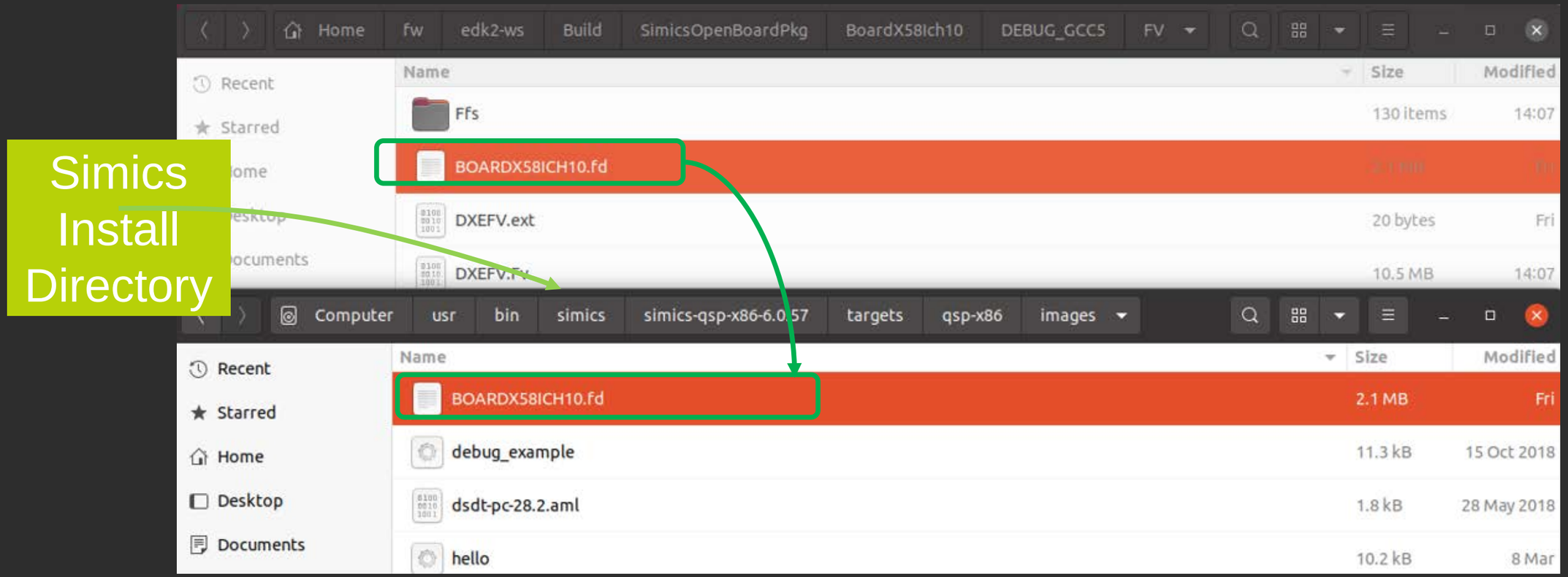


# Copy BoardX85Ich10.fd to Simics

Copy ~/fw/edk2-ws/Build/SimicsOpenBoardPkg/BoardX58Ich10/DEBUG_GCC5/FV/BOARDX58ICH10.fd

To

*<SimicsInstallDir>*/simics-qsp-x86-6.0.57/targets/qsp-x86/images



# Update the Simics Script

Update the Simics Script to Use the BoardX85Ich10.fd image just built

Edit the file:

*<SimicsInstallDir>*/simics-qsp-x86-6.0.57/targets/qsp-x86/qsp-uefi.include

Where *SimicsInstallDir* is the directory selected to install Simics, e.g., Computer/usr/bin/simics

Replace SIMICSX58IA32X64_1_0_0_bp_r.fd With BOARDX58ICH10.fd

Save qsp-uefi.include

File: qsp-uefi.include

```
decl {
 params from "qsp-images.include"
  default bios_image =
     "%simics%/targets/qsp-x86/images/BOARDX58ICH10.fd”
#    "%simics%/targets/qsp-x86/images/SIMICSX58IA32X64_1_0_0_bp_r.fd"
  default enable_efi = TRUE
}
```

# Invoke Simics QSP Script

Open A Simics Command Prompt: Double Click on

Invoke the `qsp-modern-core` script:

```
$> ./simics targets/qsp-x86/qsp-modern-core.simics
```

```
uefi@uefi-Minnowboard-Turbot-D0-PLATFORM: ~/simics-proj...
uefi@uefi-Minnowboard-Turbot-D0-PLATFORM:~/simics-projects/my-simics-project-1$
./simics targets/qsp-x86/qsp-modern-core.simics
Gtk-Message: 14:26:59.882: Failed to load module "canberra-gtk-module"
ERROR: Host processor "        Intel(R) Atom(TM) CPU  E3845  @ 1.91GHz" is not s
upported.
       You need to upgrade to the second generation Intel(R) Core(TM) processor
(formerly Sandy Bridge) or newer.

Intel Simics 6 (build 6149 linux64) Copyright 2010-2021 Intel Corporation

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Type 'copyright' for details on copyright and 'help' for on-line documentation.

[board.mb.cpu0.core[0][0] info] VMP disabled. Failed to open device.

WARNING: Simics failed to enable VMP. Enabling VMP substantially improves
         simulation performance. The problem is most likely caused by the
         vmxmon kernel module not being properly installed or updated.
         See the "Simics User's Guide", the "Performance" section,
         for instructions how to setup VMP.
```
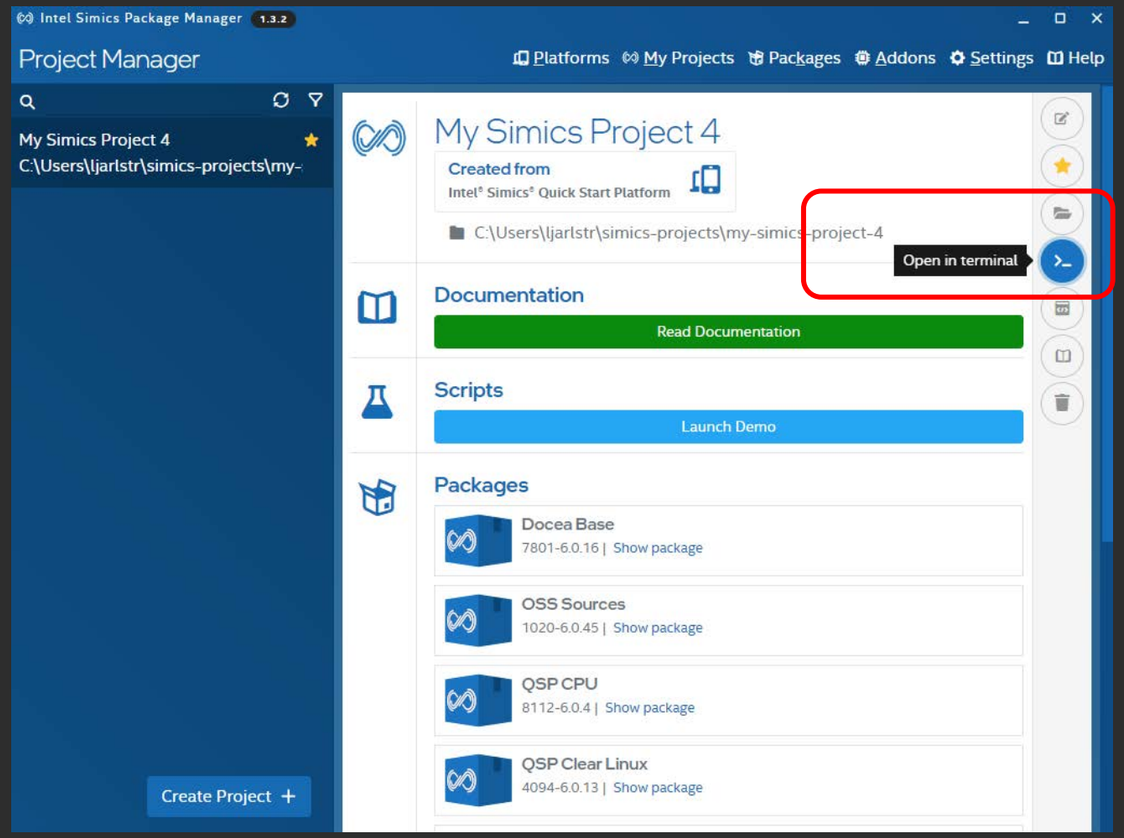



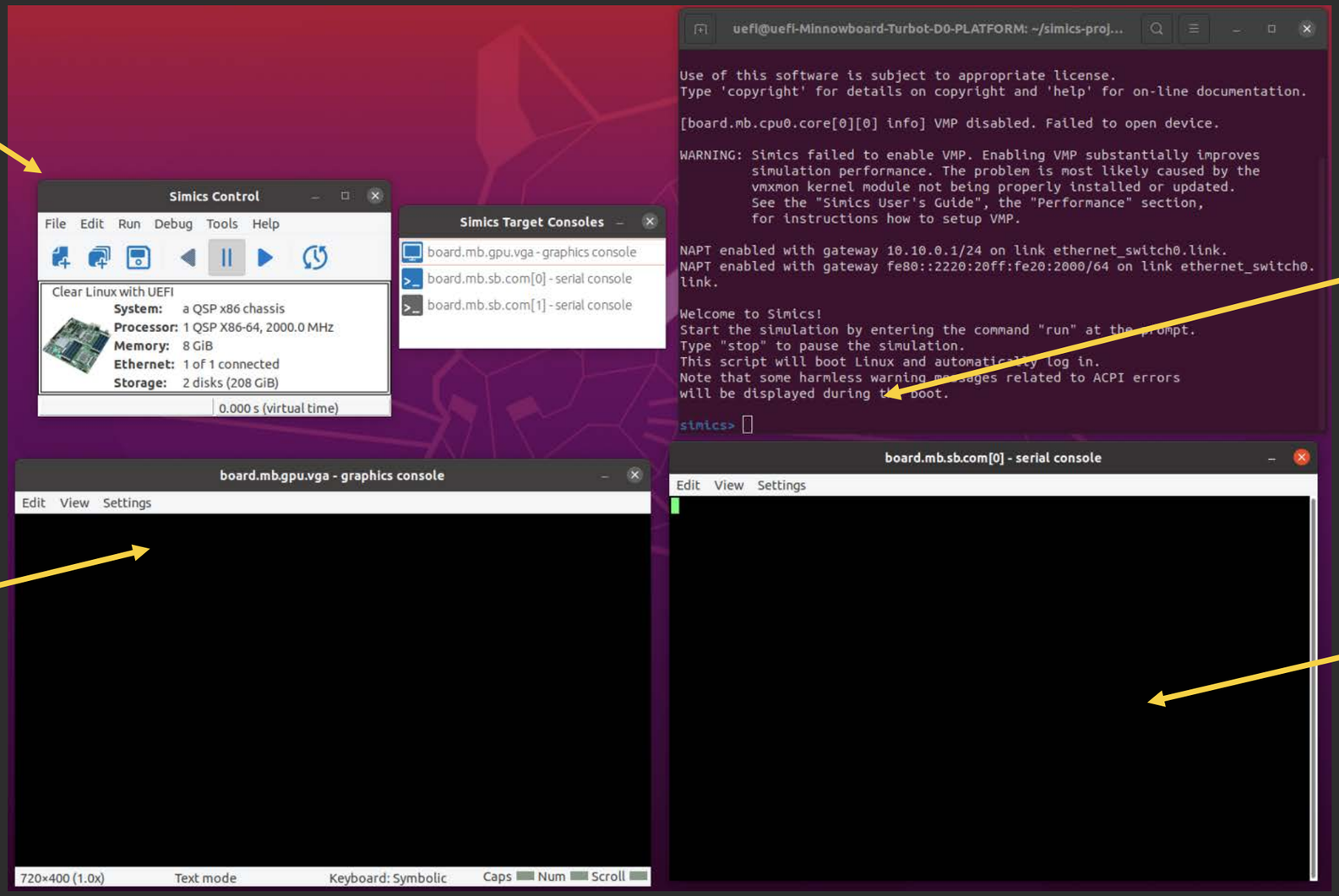
# Simics Windows

After invoking the Simics QSP script, many Simics windows will have opened

Simics Control Console

Stop

Run




Simics Command Prompt

Issue Simics Commands

- Stop
- Quit
- Run
- etc.

Target Graphics Console

Video from Target

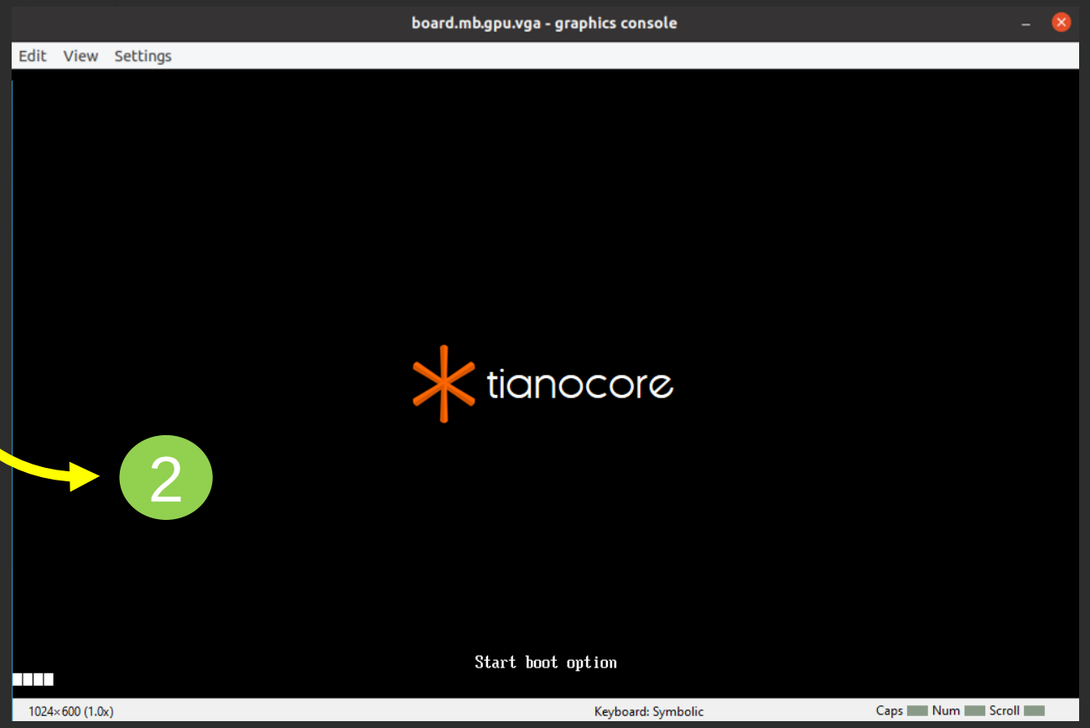
Target COM1 Console

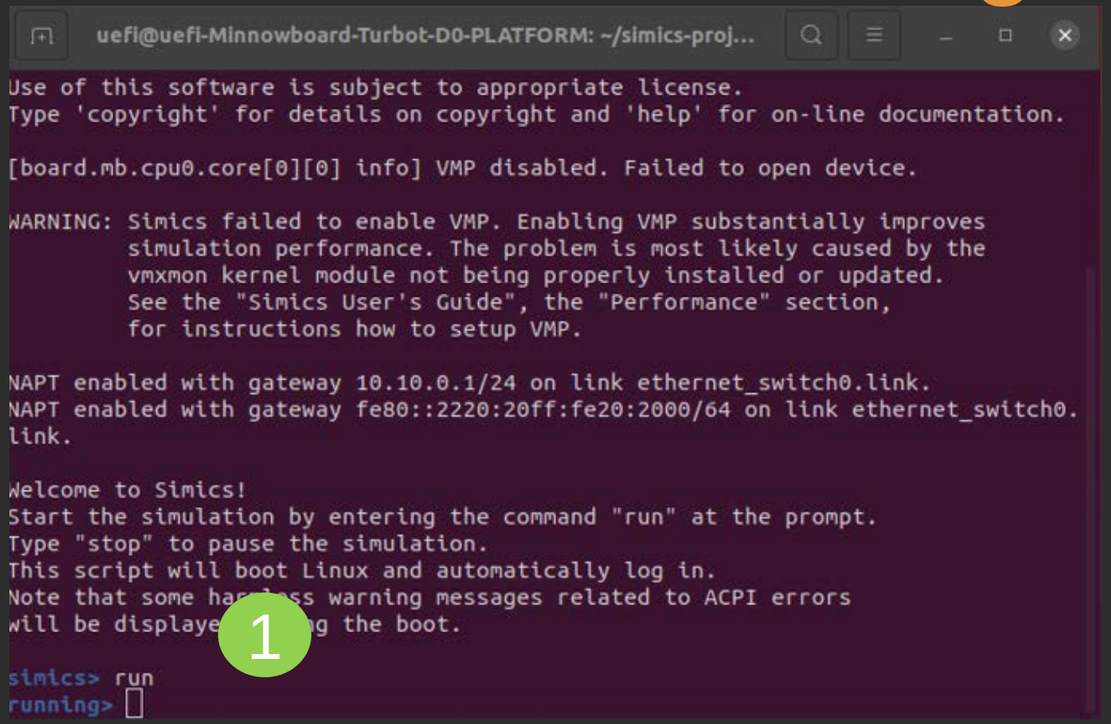
Debug Output from Target

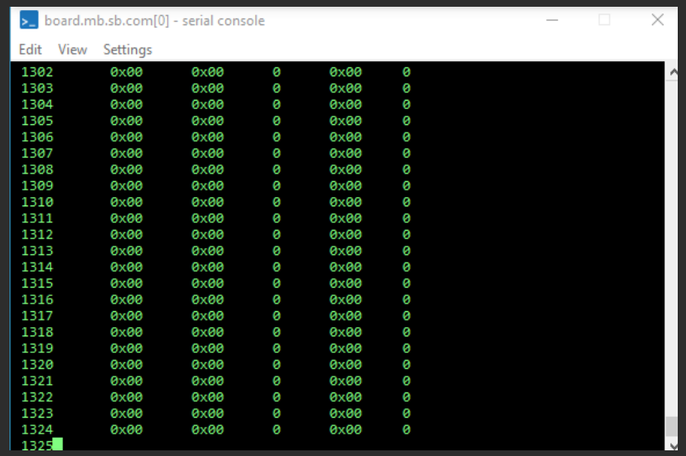
Simics Getting Started: https://www.intel.com/content/www/us/en/developer/articles/guide/simics-simulator-get-started.html

# Run Simics to Boot Target

1. “Next type ‘run’ in the Simics command line
2. Be ready to press ‘F2’ in the Target Graphics console when logo is displayed



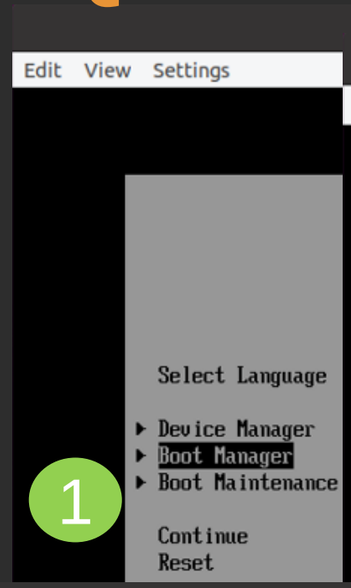



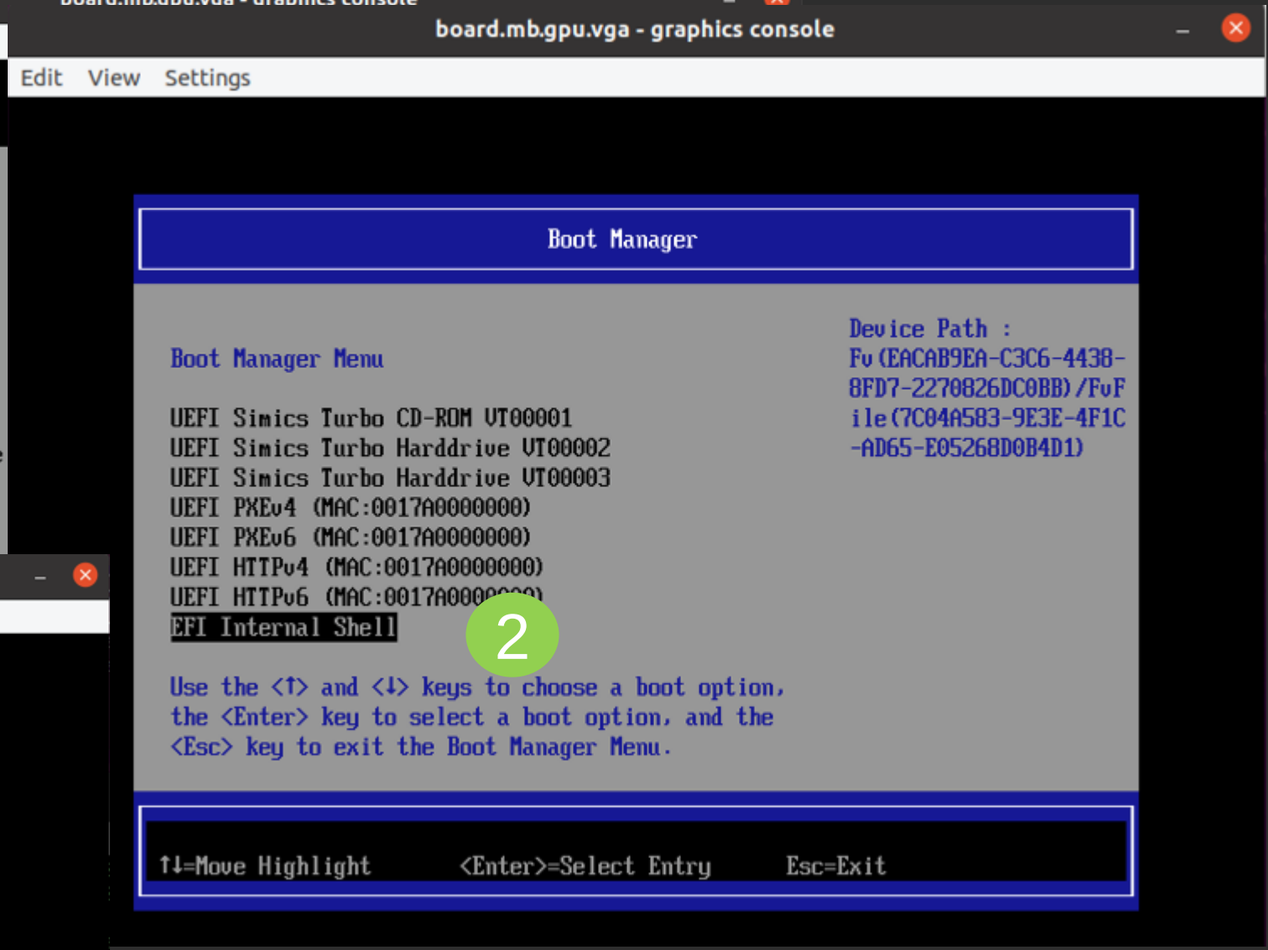
# QSP Setup –Boot to UEFI Shell

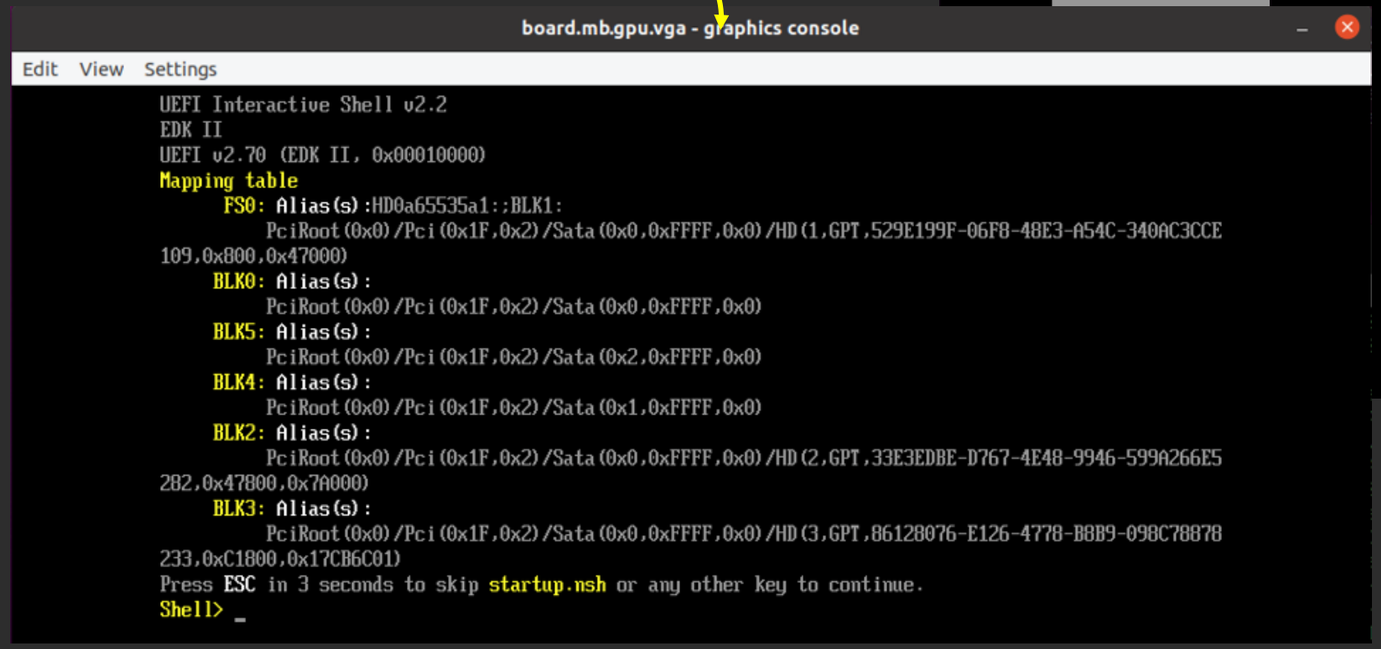
From QSP Setup

1. Click on “Boot Manager”
2. Click on “EFI Internal Shell”

Boots to UEFI Shell



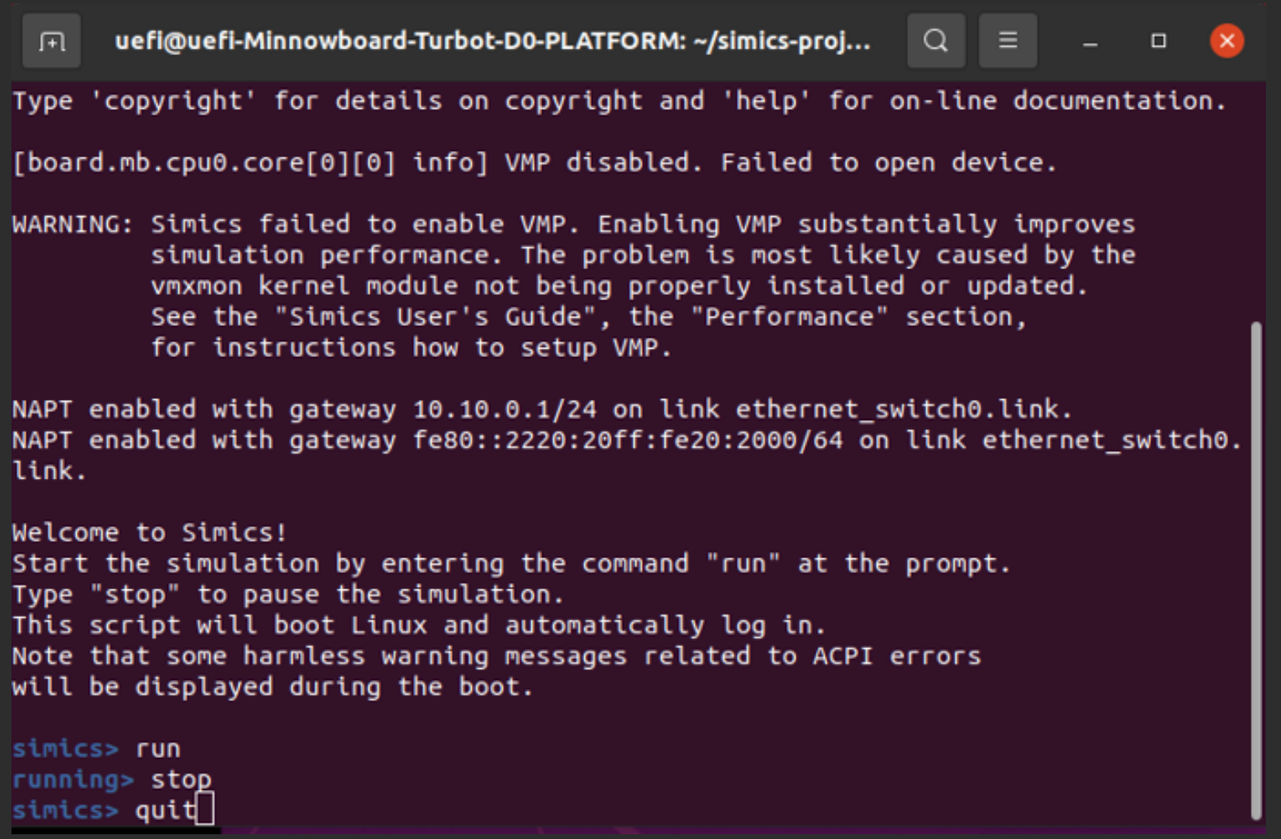



# Exit QSP UEFI Shell & Simics

- To Stop the QSP Simulation, from the Simics Command Line Prompt Window, Type: “`stop`”
  - This will stop the Simics simulation of the QSP board
  - To continue, type: “`run`”
- To Exit this Simulation, type: “`quit`”
  - This will remove all other Simics windows
- To Restart, reissue the command:

```
$ ./simics targets/qsp-x86/qsp-modern-core.simics
```



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# SUMMARY

- Build a EDK II Platform using OVMF package
- Run Ovmf using Qemu
- Build a EDK II Platform using Simics Open Source QSP Board
- Run Simics with the QSP Board

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# Questions?

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