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UEFI & EDK II Training

Platform Build Lab Simics® Quick Start Platform (QSP) - Windows

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Copy and Paste see Lab Guide

PLATFORM BUILD LABS

First Setup for Building EDK II, See Lab Setup

- Build and Run the EmulatorPkg
- Build a EDK II Platform using Simics Open Source QSP Board
- Run Simics with the QSP Board

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Build the EmulatorPkg

Note: May need to update conf/target.txt for other labs

Build EDK II EmulatorPkg

Open VS Command prompt & Cd to workspace directory

```
$> cd C:\fw\edk2-ws
```

Setup the local environment: (see batch file setenv.bat)

Sets WORKSPACE and PACKAGES_PATH env variables

```
$> setenv.bat
```

Invoke `Edksetup.bat`

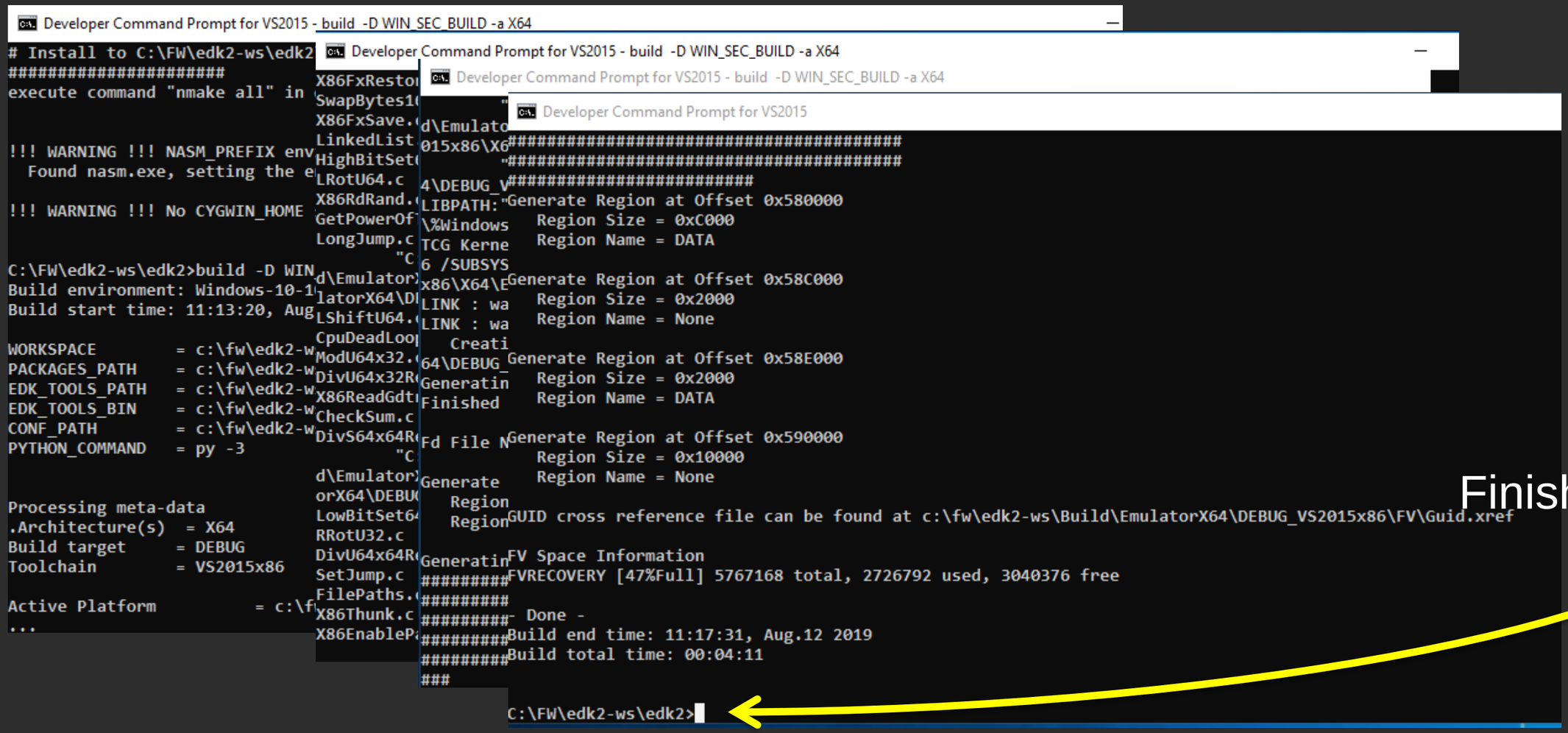
```
$> cd C:\fw\edk2-ws\edk2
$> edksetup.bat
```

Edit the file Conf/target.txt ***(change*** TOOL_CHAIN_TAG & TARGET_ARCH If Needed***)***

Build EmulatorPkg

```
$> build –D ADD_SHELL_STRING -a X64 –p EmulatorPkg\EmulatorPkg.dsc
```

Build EDK II
-Inside VS Prompt



Approx.
6 Min

Finished build

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Run the Emulator

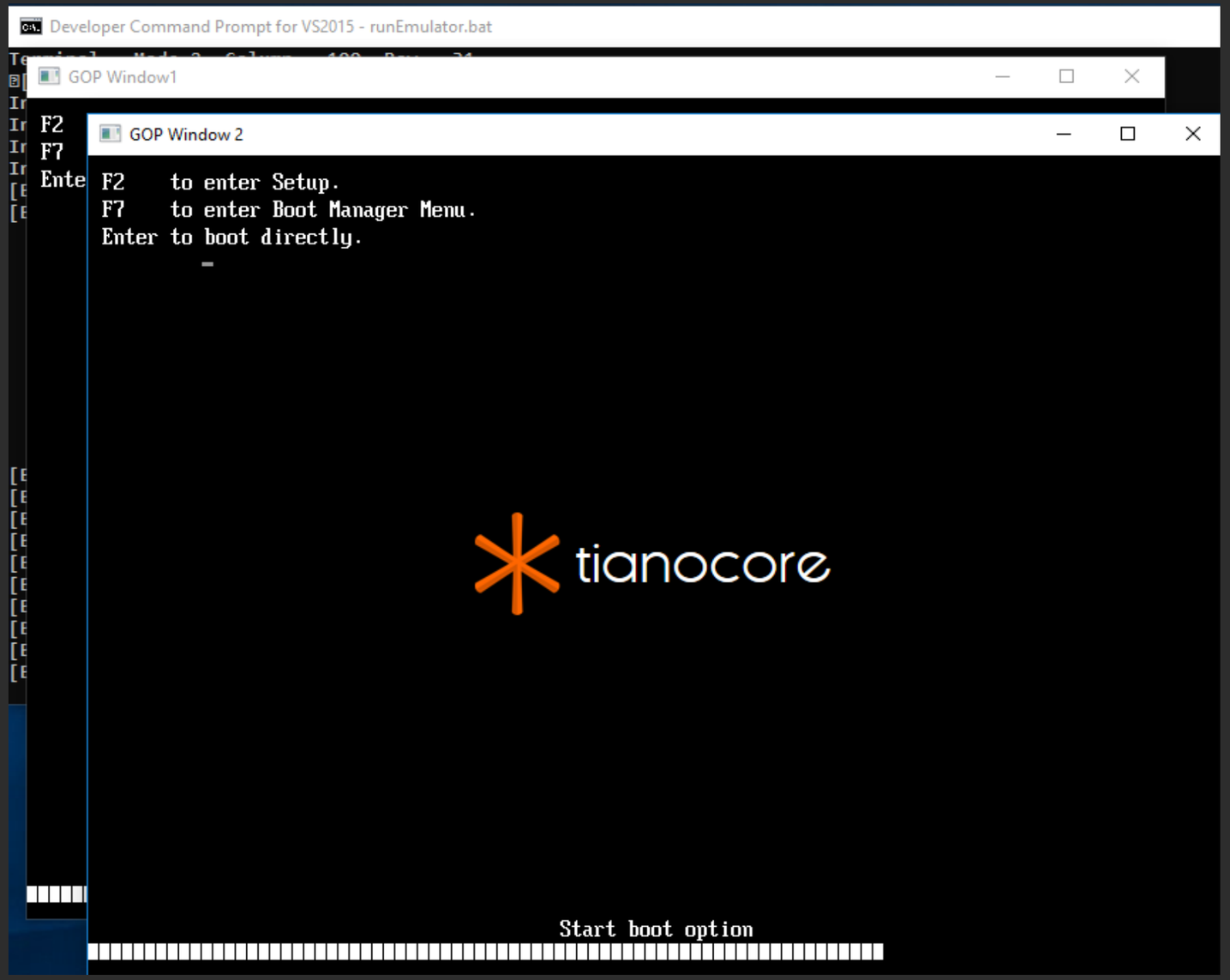
Invoke Emulation

From the command prompt

```
$> RunEmulator.bat
```

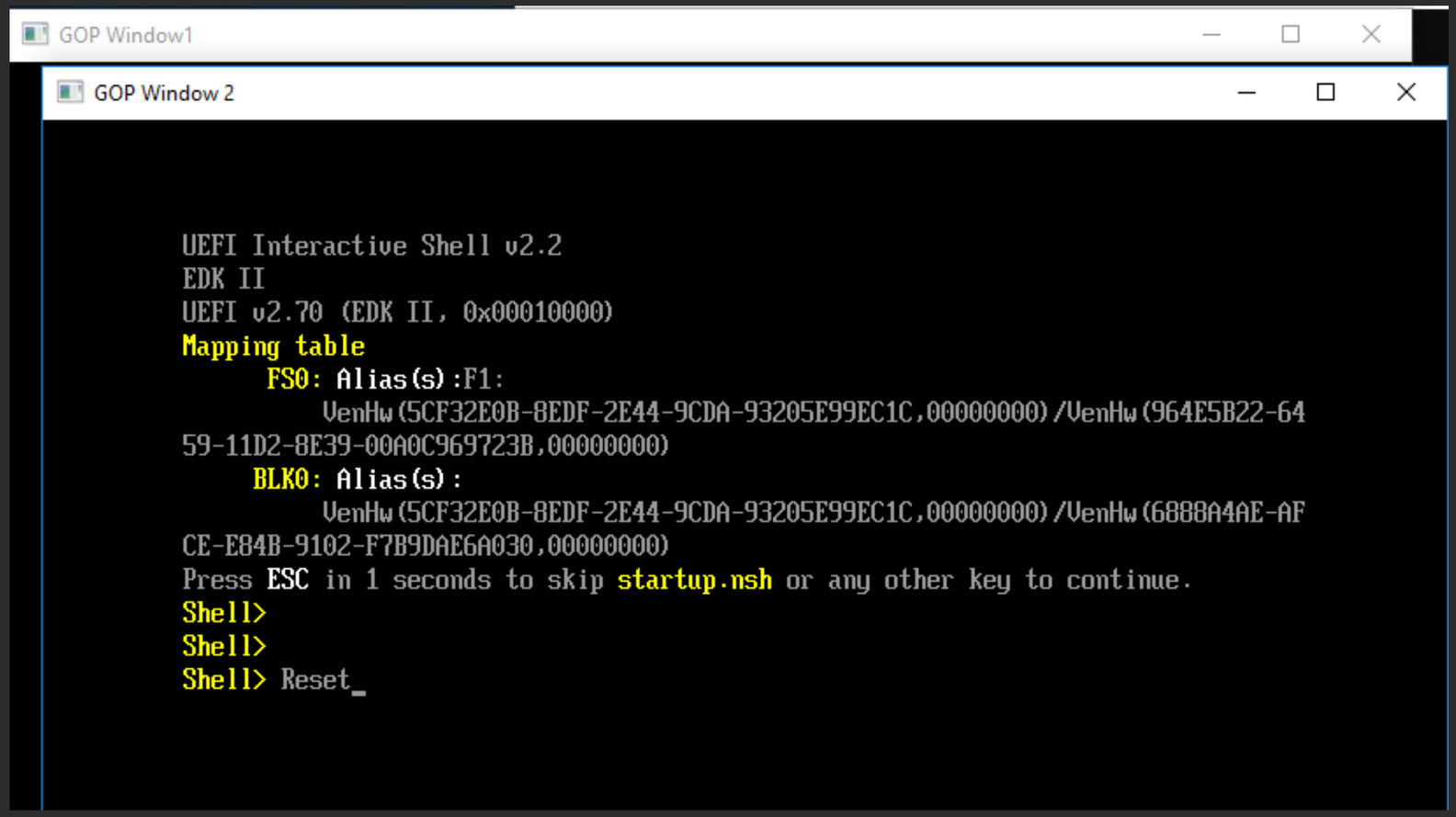
Or
run `WinHost.exe` from:
Build/ . . ./X64 directory

Notice 2 “GOP Window n" opened



Emulator at Shell Prompt

Type : “Reset” to exit



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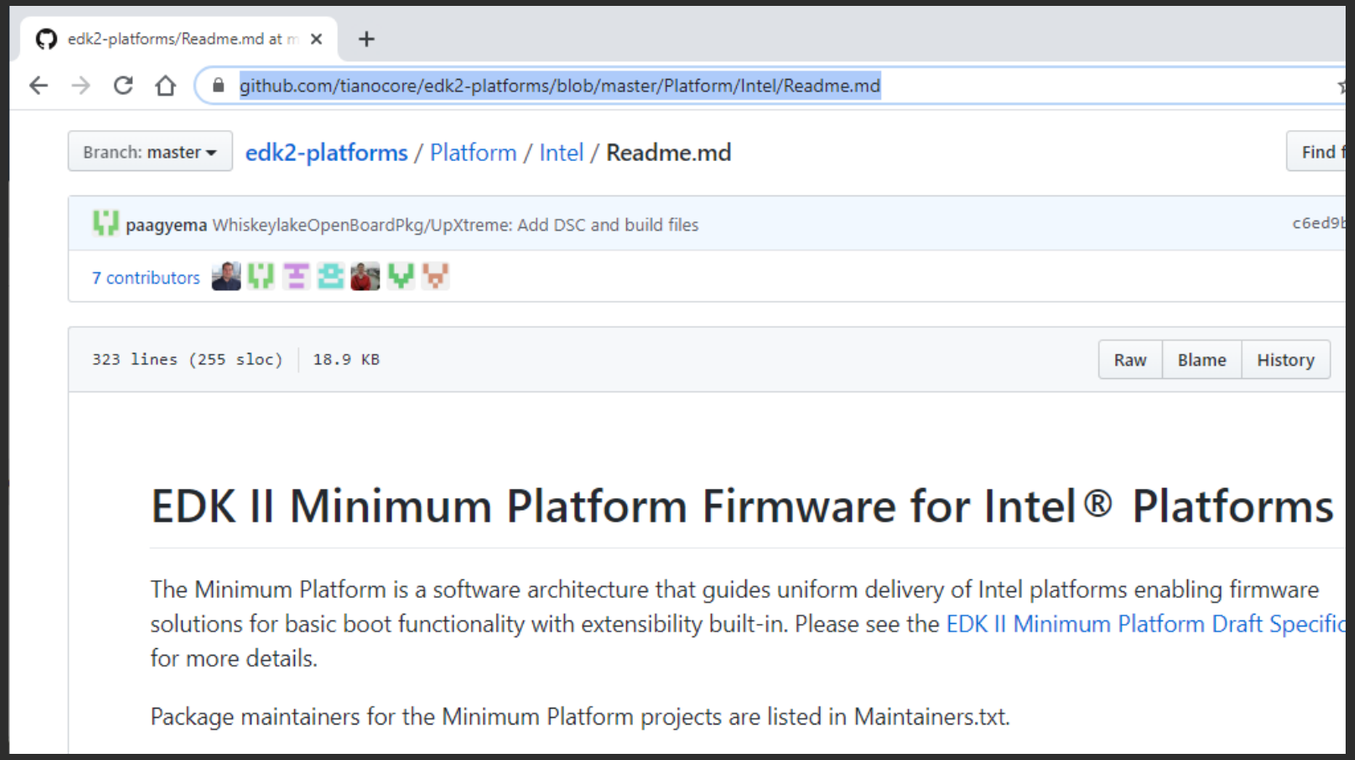
Build Simics QSP Open board

Where to get Open Source Simics

The Simics QSP is part of the MinPlatformPkg

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



Note: done in Lab 1

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
```

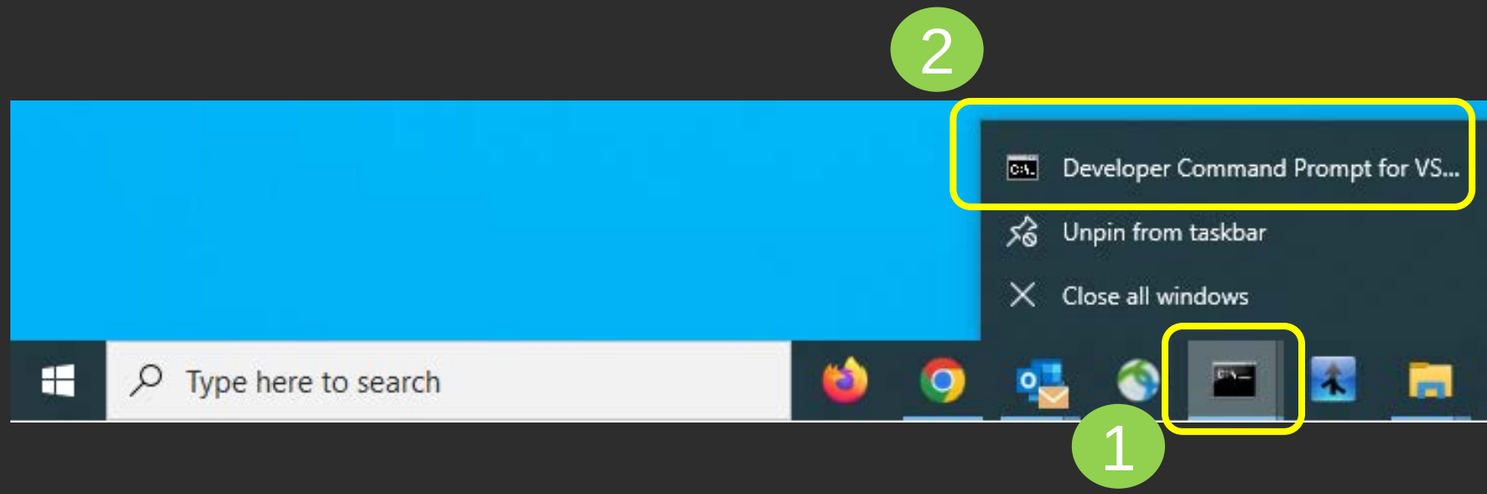
Invoke the Build .py from here

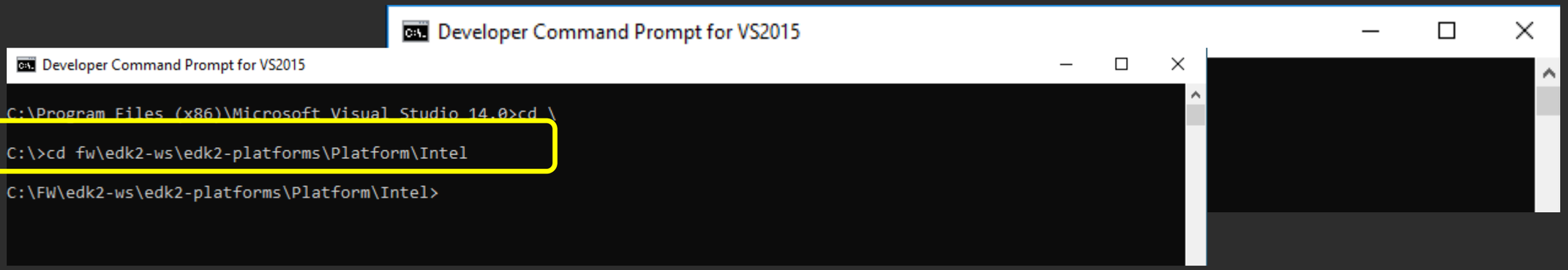
Platform DSC & FDF here

Open a VS Command Prompt

1. Right Click on the Task tray VS Command prompt Icon to Open another Visual Studio Command Prompt
2. Left Click on “Developer . . .”
   (this opens another window)
3. Then CD to:

```
> cd C:\fw\edk2-ws\edk2-platforms\Platform\Intel
```





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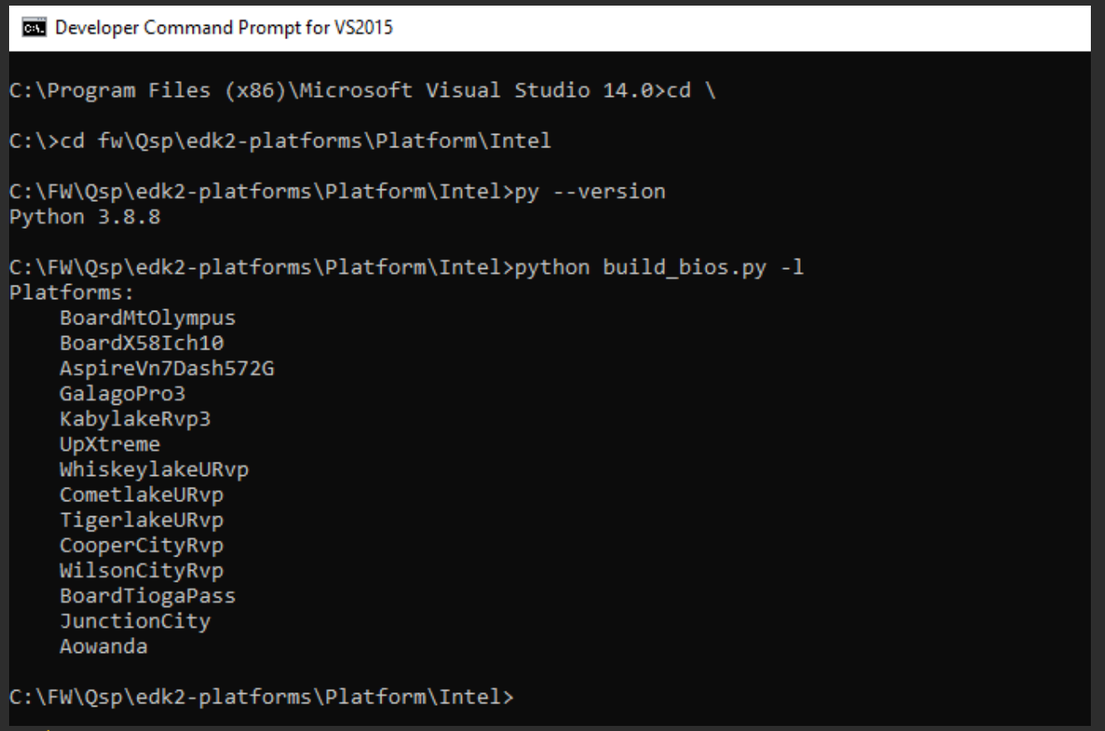
Build Environment

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

```
$>  python --version
Python 3.8.8
```

Check for available `MinPlatform` Boards

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

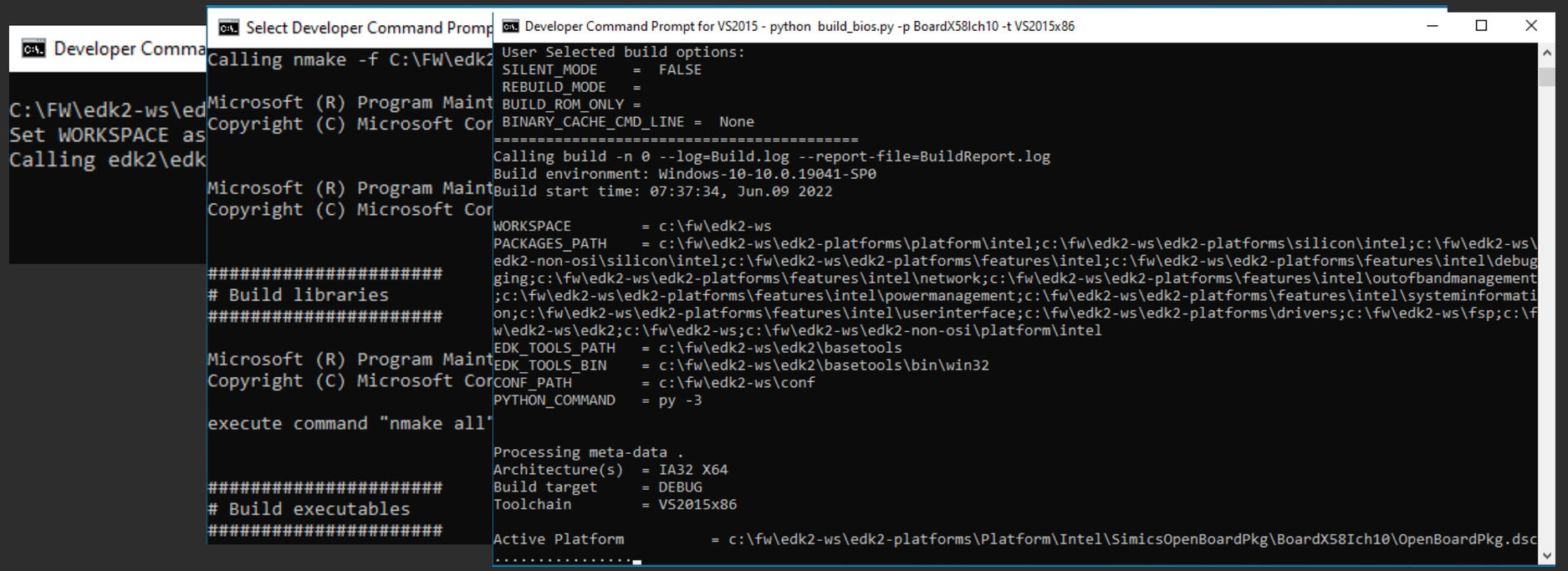


Invoke the Build

Invoke the Python Build script for Simics QSP

```
$> python build_bios.py -p BoardX58Ich10  -t VS20XX
```

Where *XX* is 15x86 or 17 or 19



Takes about 8 minutes

NOTE: May require PYTHON_HOME to be set:

```
$ Set PYTHON_HOME=%USERPROFILE%\AppData\Local\Programs\Python\Python38-32
```

Where 38-32 is the version of Python you have installed

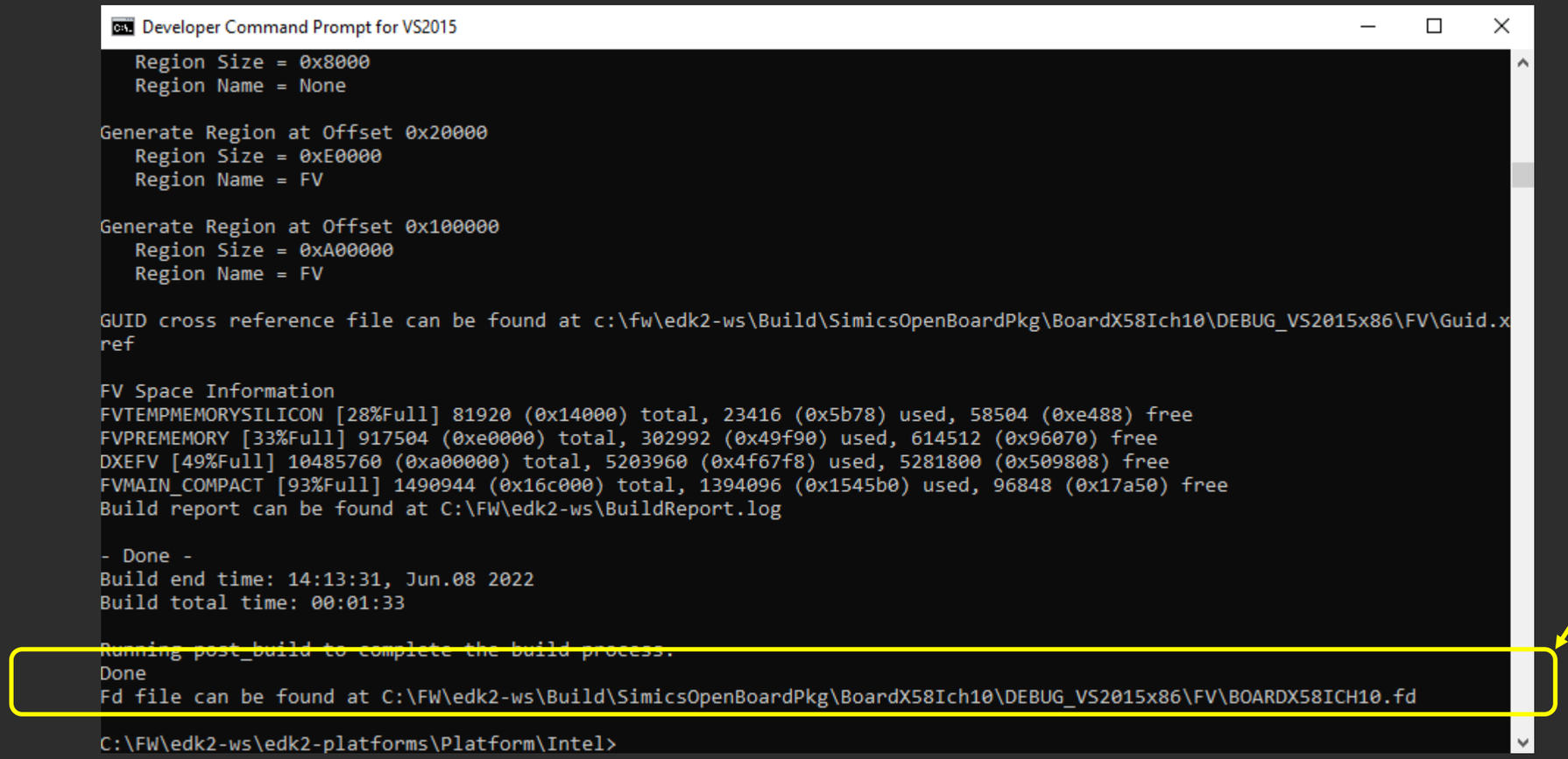
Rebuild takes about 2 minutes

Examine Build Parameters

```
Python build_bios.py -p BoardX58Ich10 –t VS2015x86
. . .
Calling build -n 0 --log=Build.log --report-file=BuildReport.log
```
and from `\edk2-ws\conf\target.txt` and from `build.cfg`

MAX_THREAD_COUNT from build.cfg NUMBER_OF_PROCESSORS	= 0 or –n 0 as above	Implies **all** processors used
TARGET	= DEBUG	Build Mode
TARGET_ARCH	= IA32 X64	CPU Architecture
TOOL_CHAIN_TAG	= VS2015x86	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 VS Prompt



Finished build

Note the location of the final .fd file

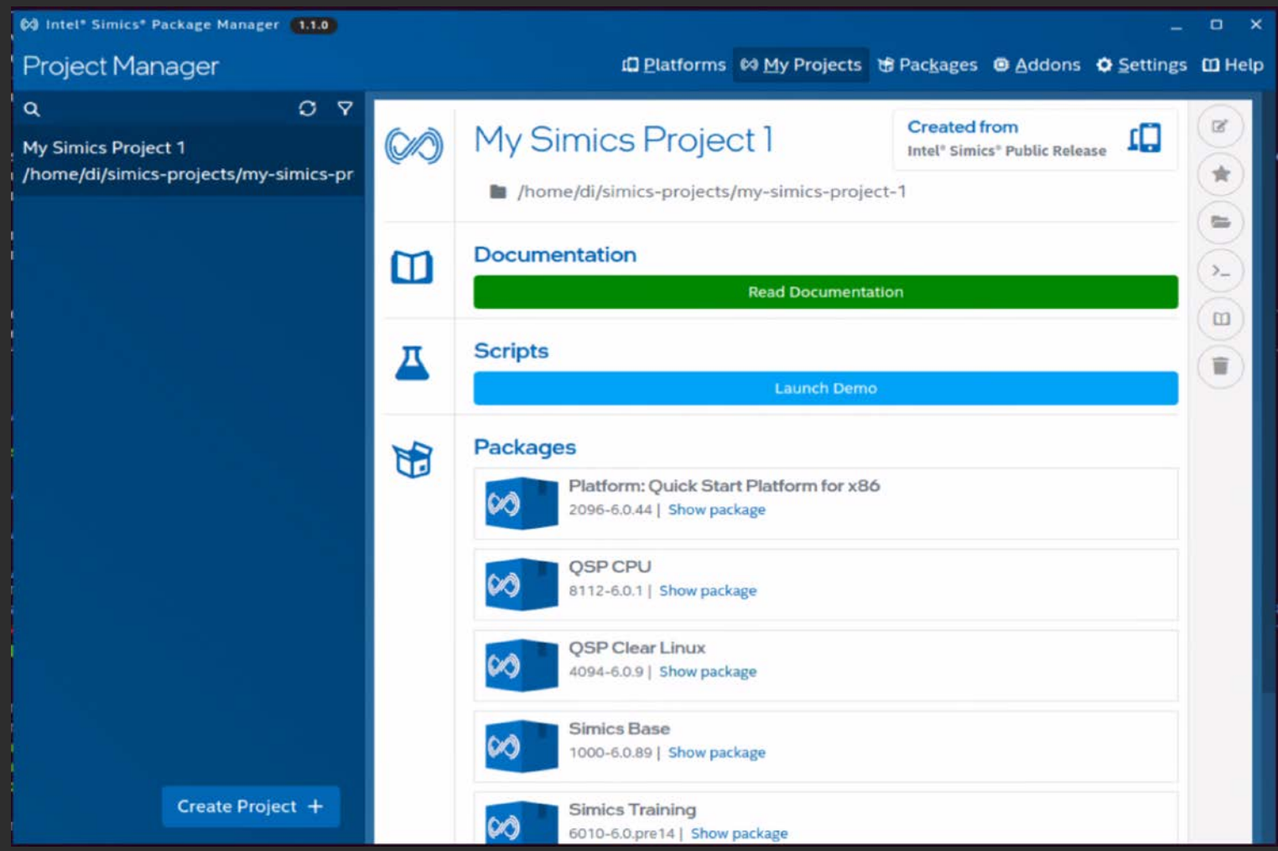
Invoke QSP Simics with BOARDX58ICH10

Open Simics Environment

Open the “Intel Simics Package Manager”

1. Using the Start menu in Windows , Left Click on “Windows Key” Lower Left
2. Scroll down from the scroll bar on the right until “Intel Simics Package Manager”
3. Select “My Projects”

Here is a snapshot of Intel Simics Package Manager with “My Simics Project 1” created



Alternatively, Open a Windows CMD prompt and Cd to:

```
simics-projects\my-simics-project-1
```

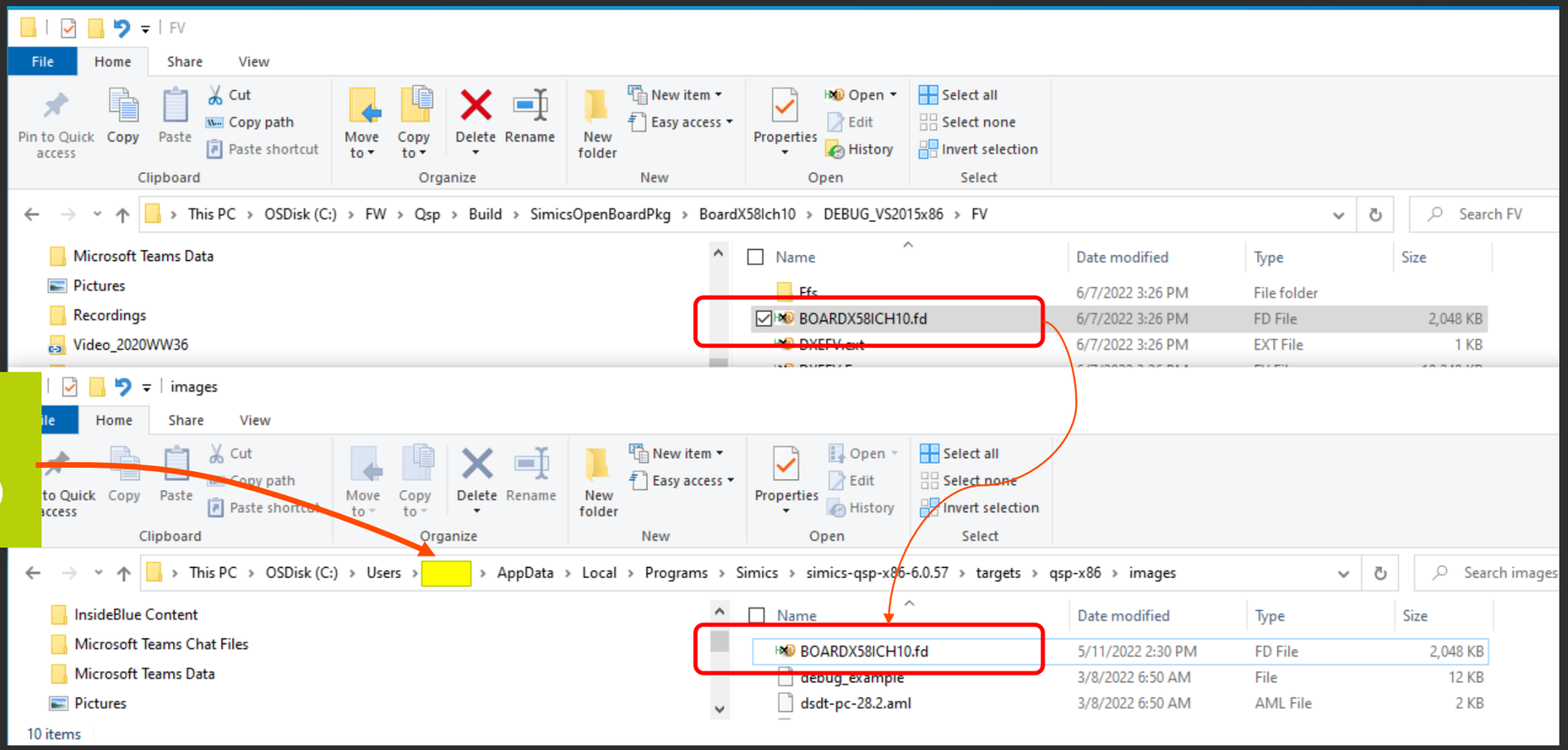
Copy BoardX85Ich10.fd to Simics

Copy C:\fw\edk2-ws\Build\SimicsOpenBoardPkg\BoardX58Ich10\DEBUG_VS20*XX*\FV\BOARDX58ICH10.fd

To

Where *XX* is 15x86 or 17 or 19

%USERPROFILE%\AppData\Local\Programs\Simics\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:

%USERPROFILE%\
\AppData\Local\Programs\Simics\simics-qsp-x86-6.0.57\targets\qsp-x86\qsp-uefi.include

Replace
SIMICSX58IA32X64_1_0_0_bp_r.fd
With BOARDX58ICH10.fd

Save qsp-uefi.include

File: qsp-uefi.include

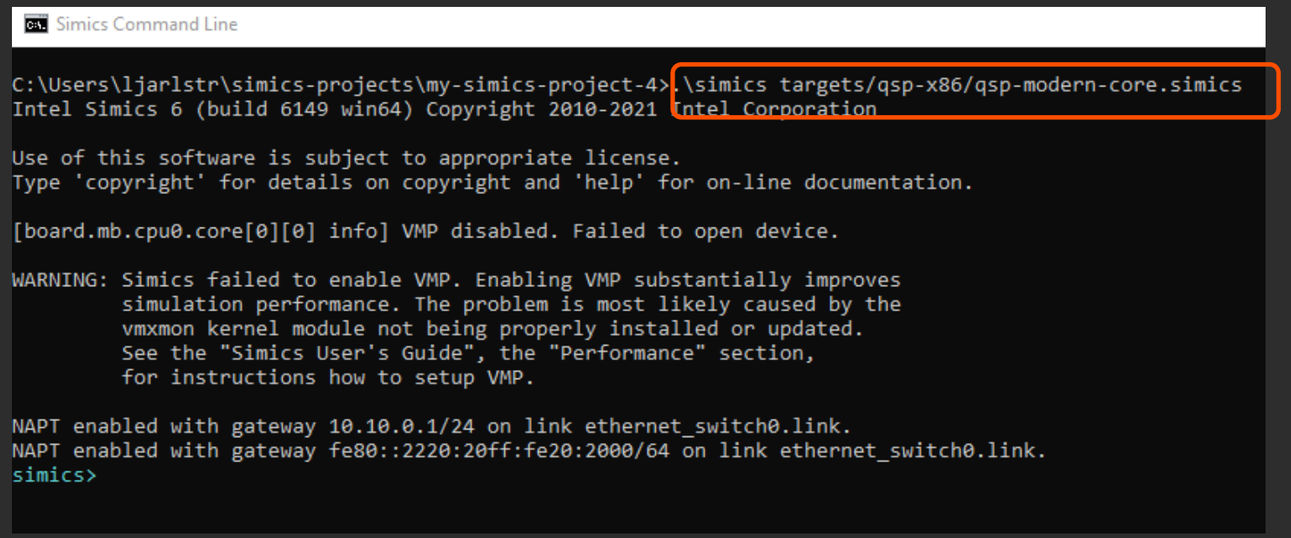
```
decl {
 params from "qsp-images.include"
  default bios_image =
     "%simics%/targets/qsp-x86/images/BOARDX58ICH10.fd”
#    "%simics%/targets/qsp-x86/images/SIMICSX58IA32X64_1_0_0_bp_r.fd"
  default enable_efi = TRUE
}
```

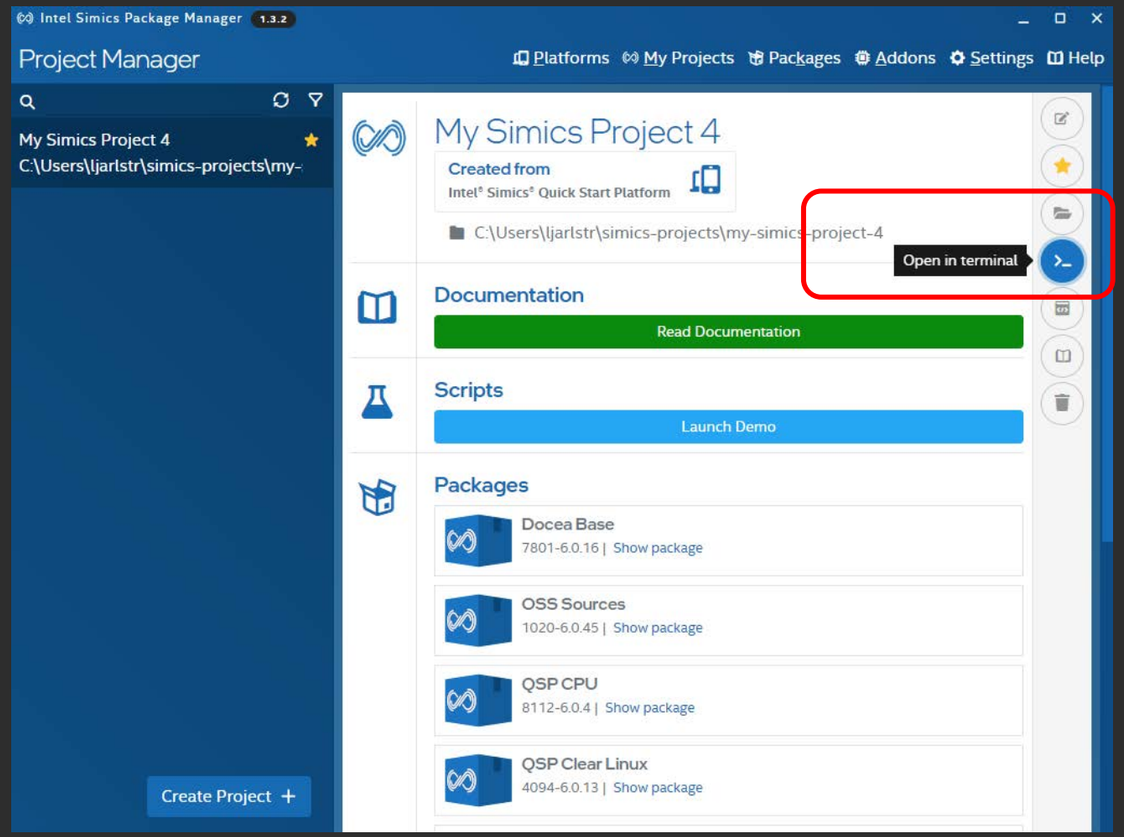
Invoke Simics QSP Script

Open A Simics Command Prompt: Double Click on 

Invoke the `qsp-modern-core.simics` script:

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





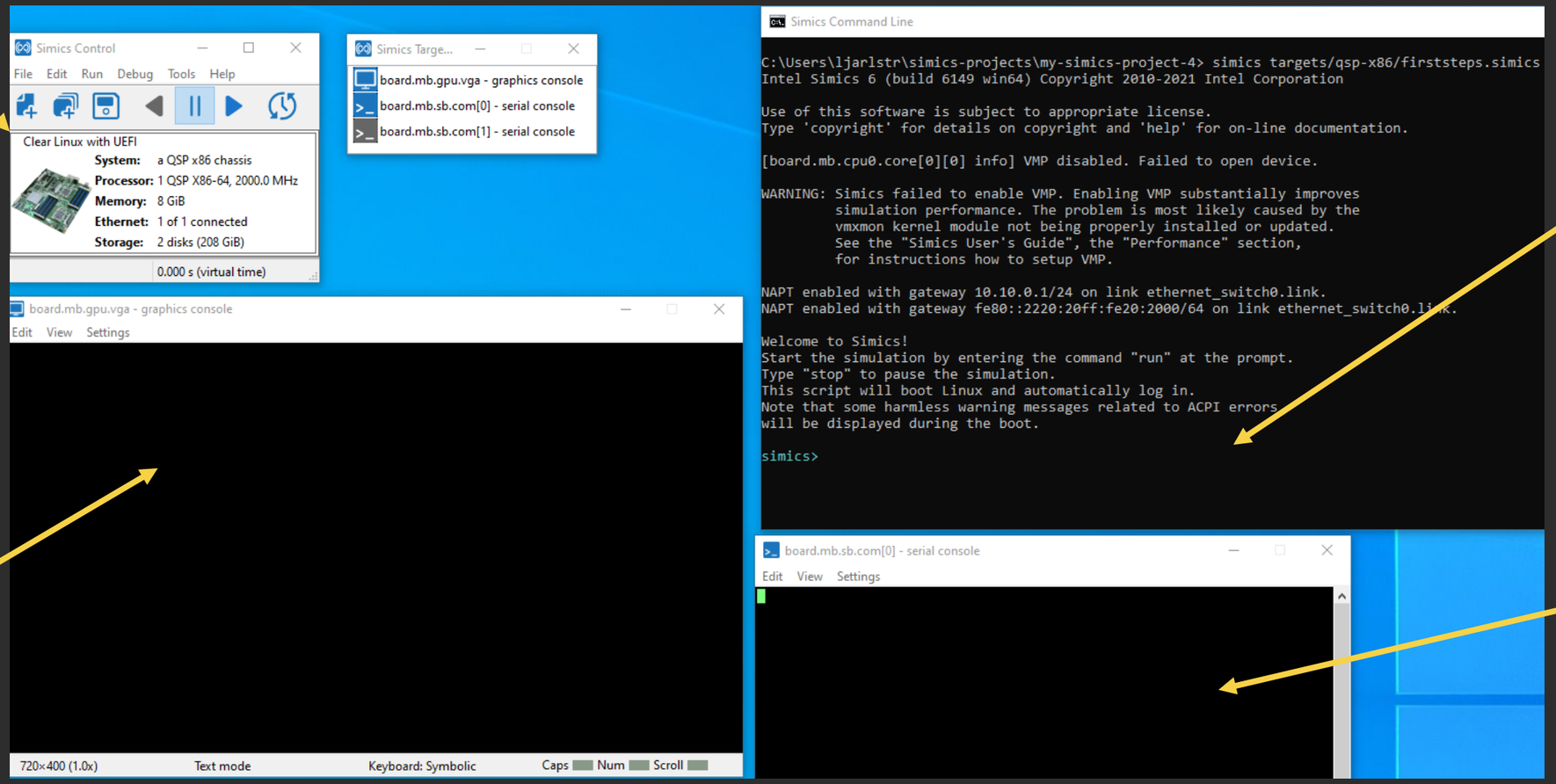
Simics Windows

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

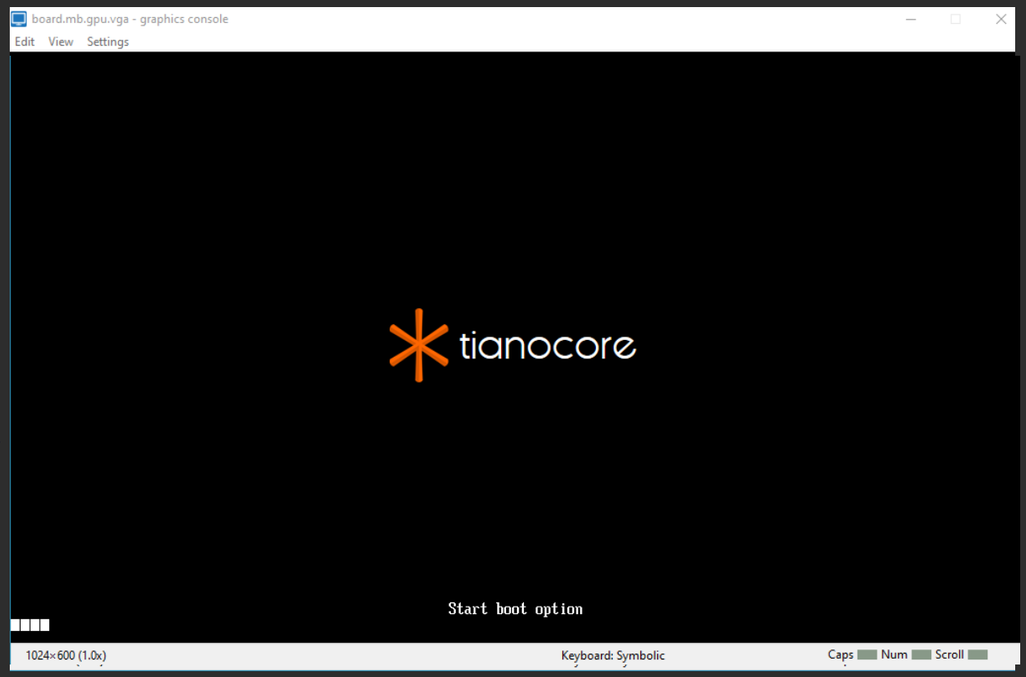
Target COM1 Console

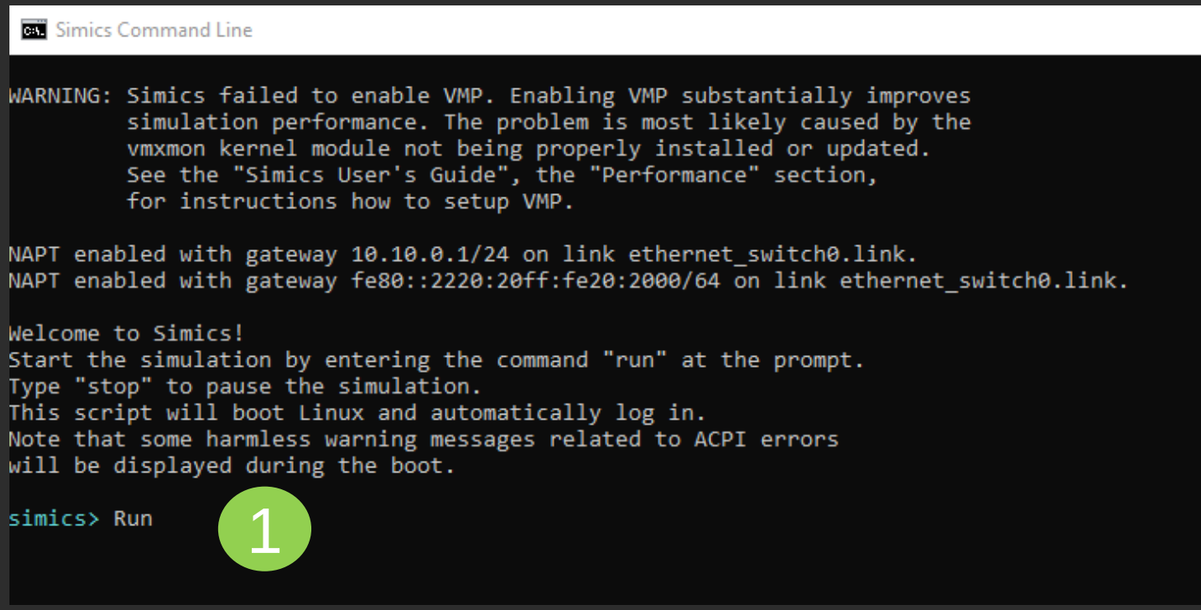
Debug Output from Target

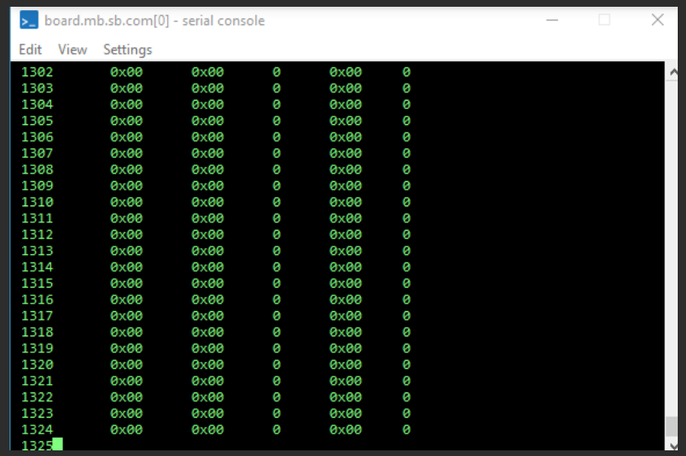
Simics Getting Started: https://www.intel.com/content/www/us/en/developer/articles/guide/simics-simulator-get-started.html

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





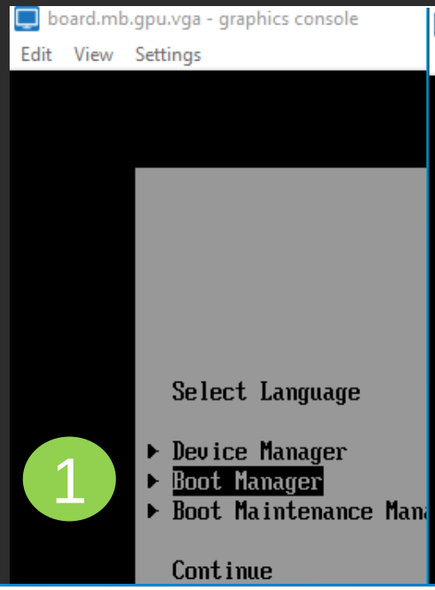


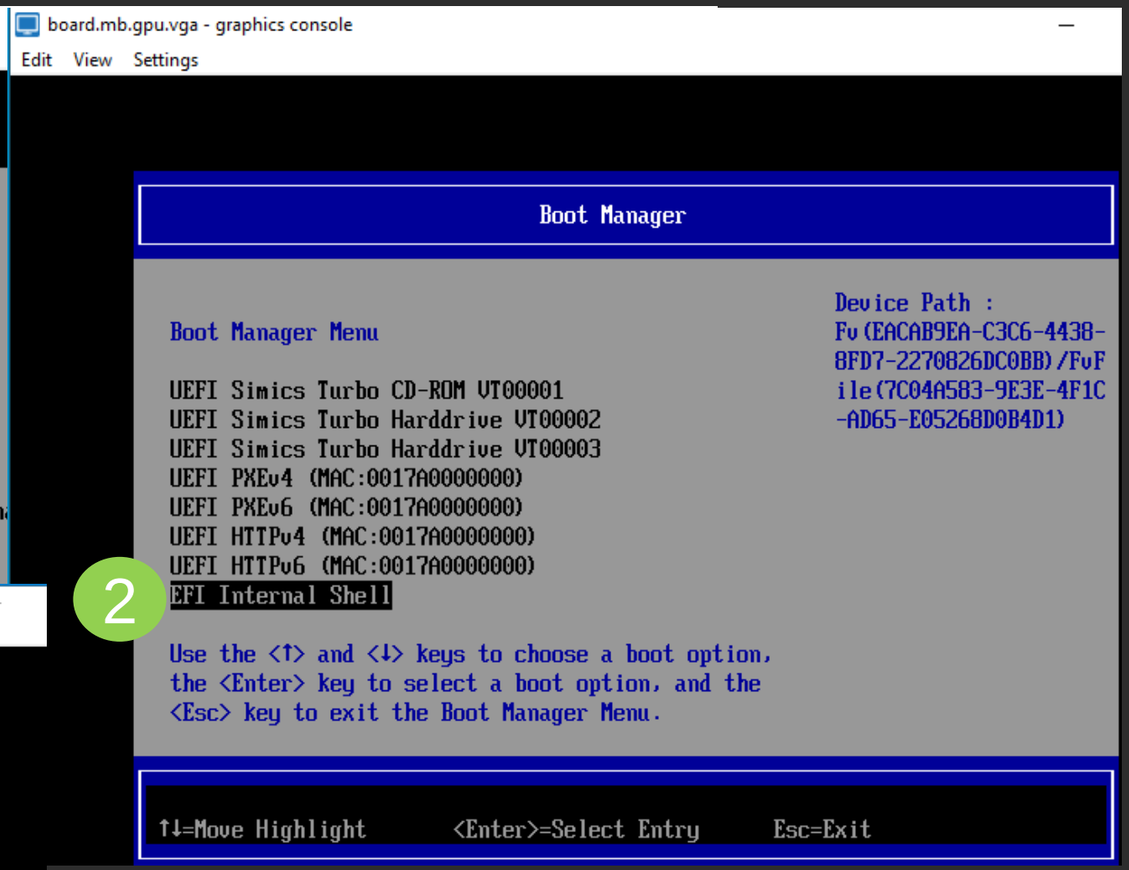
QSP Setup –Boot to UEFI Shell

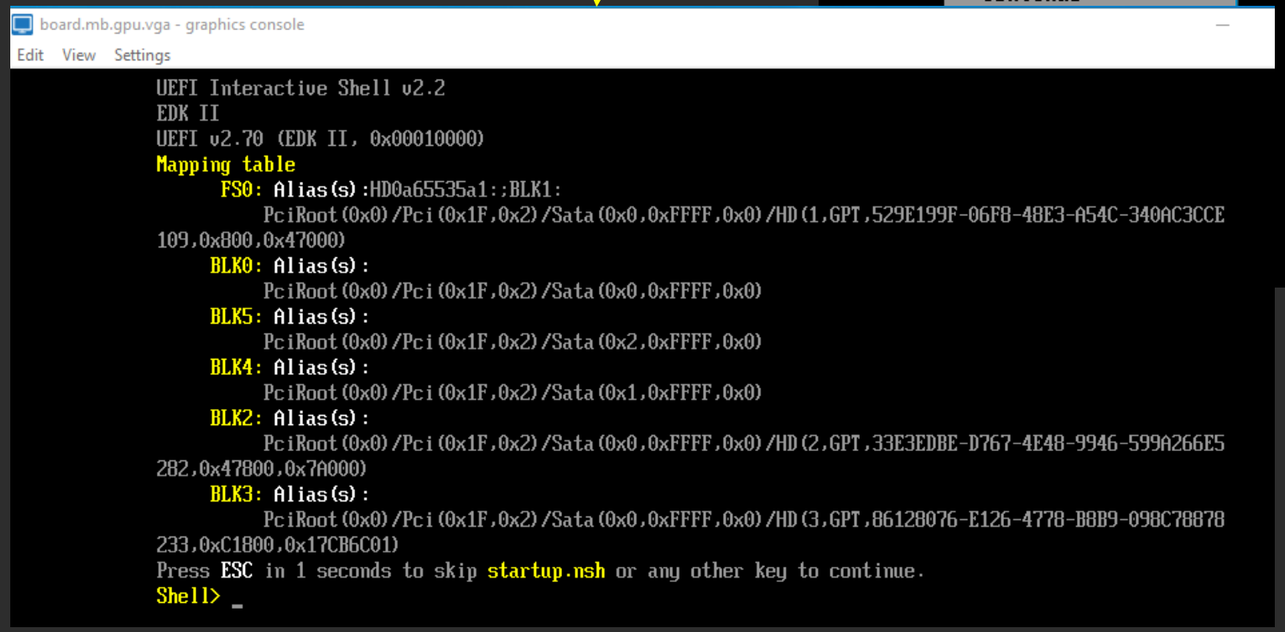
From QSP Setup

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

Boots to UEFI Shell



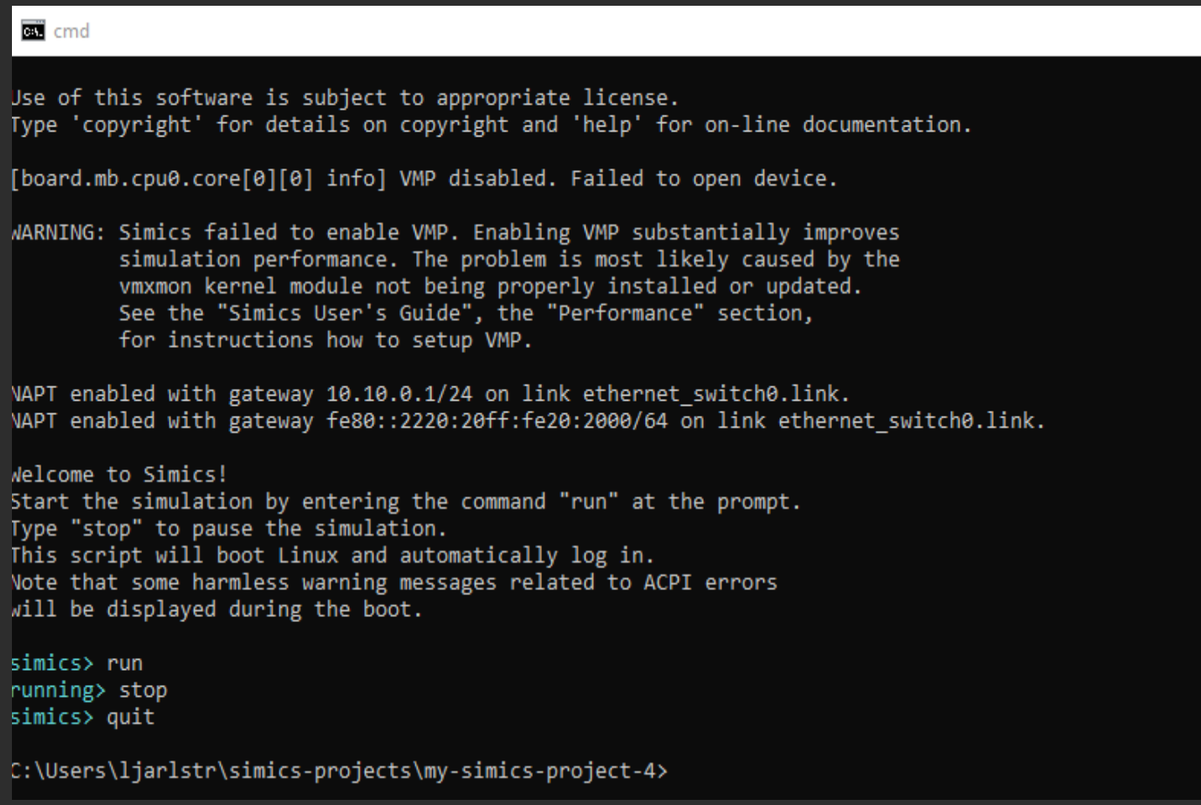




Exit QSP UEFI Shell & Simics

- 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 and Run the EmulatorPkg
- 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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ACKNOWLEDGEMENTS

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BACKUP

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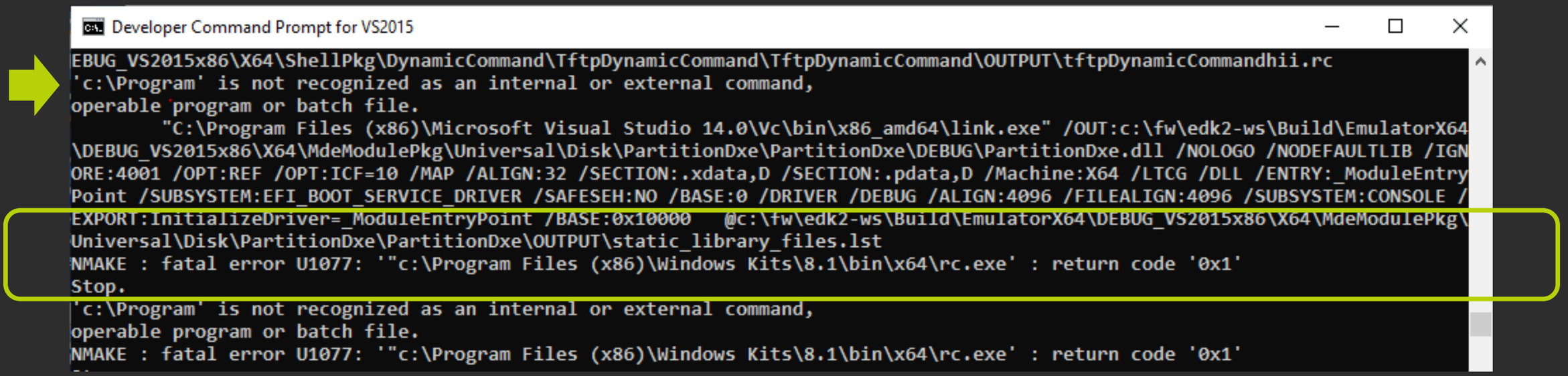
BUILD ERRORS

Build Error- RC.exe

Error message:



Find where the RC.EXE is located on your VS Installation:

Example (VS 2015): The RC.exe is located on this machine:

```
C:\Program Files (x86)\Windows Kits\8.1\bin\x64
```

Edit Conf\tools_def.txt

Build Error- RC.exe Cont.

Edit Conf\tools_def.txt

Search for your installation of Visual Studio (2013, 2015, 2017) “RC.EXE”
Probably in path C:\Program Files (x86)\Windows Kits\

Update according to the path for where the RC.EXE is found

```
# Microsoft Visual Studio 2013 Professional Edition
DEFINE WINSDK8_BIN       = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSDK8x86_BIN    = c:\Program Files (x86)\Windows Kits\8.1\bin\x64

# Microsoft Visual Studio 2015 Professional Edition
DEFINE WINSDK81_BIN       = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSDK81x86_BIN    = c:\Program Files (x86)\Windows Kits\8.1\bin\x64

# Microsoft Visual Studio 2017 Professional Edition
DEFINE WINSDK10_BIN       = C:\Program Files (x86)\Windows Kits\10\bin\x86
```

Build Error: fatal error C1041:

Build Error from fatal error C1041: cannot open program database

This Error is usually because the location you are building is being shared by another application in Windows. Example: Syncplicity may cause this

Error Message:

```
k:\fw\edk2\MdePkg\Library\BaseLib\LinkedList.c : fatal error C1041: cannot open program
database
'k:\fw\edk2\build\nt32ia32\debug_vs2013x86\ia32\mdepkg\library\baselib\baselib\vc120.pdb'; if
multiple CL.EXE write to the same .PDB file, please use /FS
NMAKE : fatal error U1077: '"C:\Program Files (x86)\Microsoft Visual Studio
12.0\Vc\bin\cl.exe"' : return code '0x2'
Stop.
```

Solution: Try using a Workspace that is not shared