



UEFI & EDK II Training

PLATFORM BUILD LAB

tianocore.org

CM Setup for

PLATFORM BUILD LABS

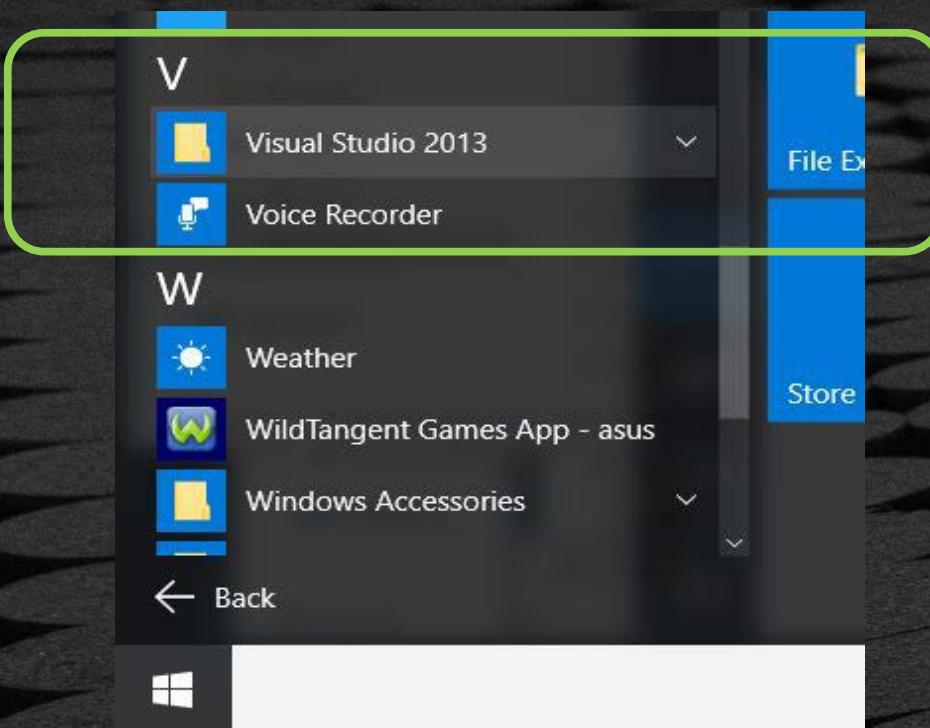
Lab Setup and Build for Nt32 or Minnowboard Max/Turbot

-  Pin Visual Studio Command Prompt to Windows Task Bar
-  Lab 1: Build a EDK II Platform using Nt32 package
-  Lab 2: Hardware Setup for Minnowboard Max/Turbot
-  Lab 3: Build a EDK II Platform using Minnowboard Max/Turbot

PIN VS COMMAND PROMPT

Pin the Visual Studio Command prompt to
Windows Task Bar

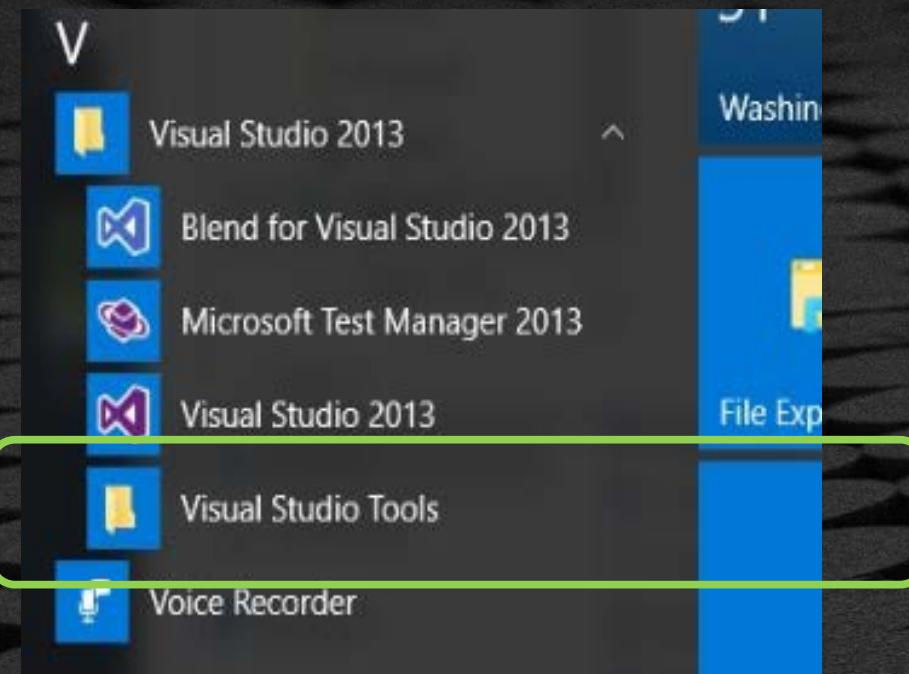
PIN VS COMMAND PROMPT



Steps to Pin Visual Studio Command Prompt to task bar for Windows 10

1. Using the Start menu in Windows 10, Left Click on “Windows Key” Lower Left 
2. Scroll down from the scroll bar on the right until **“Visual Studio 2013”**
3. Left Click **“Visual Studio 2013”**

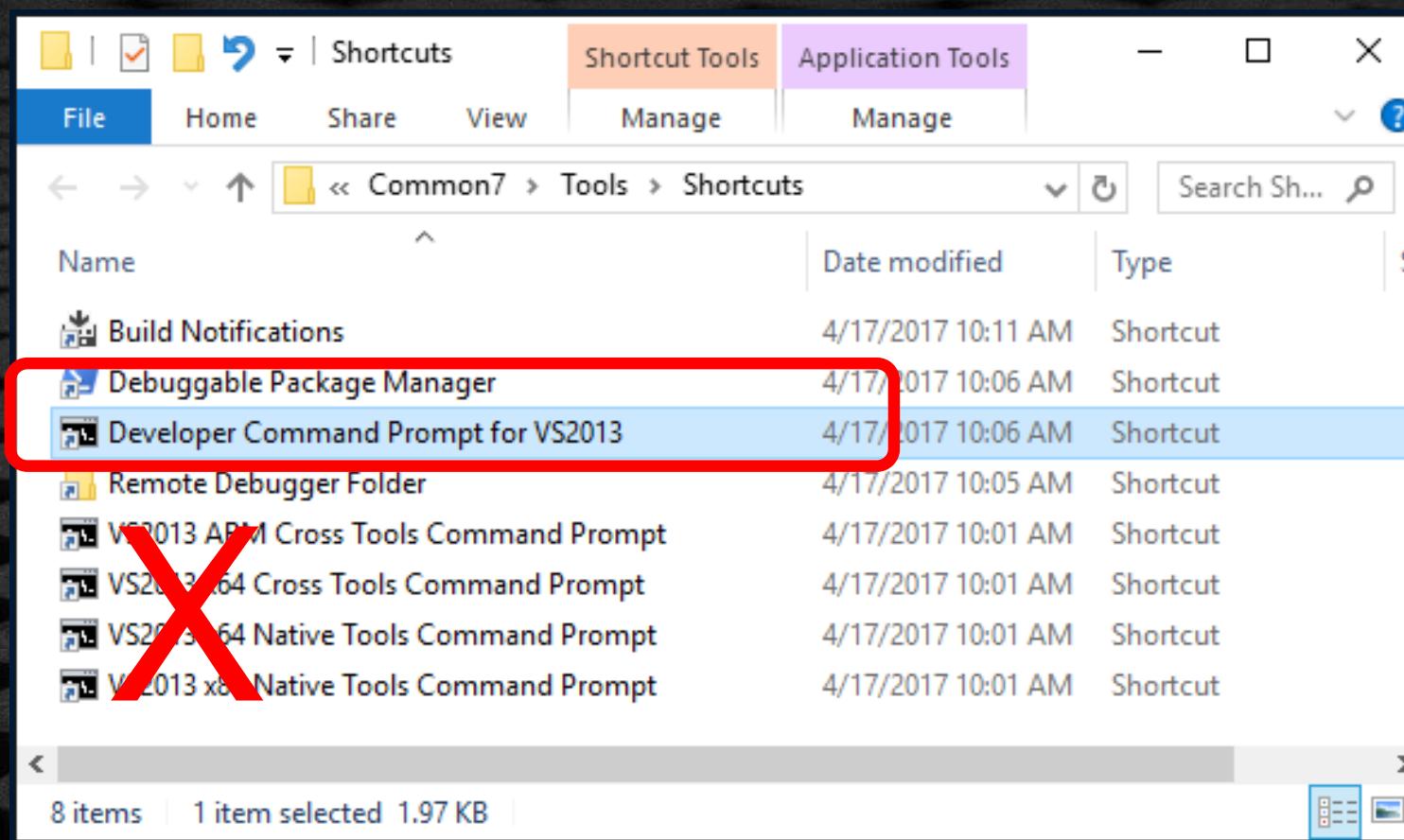
PIN VS COMMAND PROMPT



4. Left Click “Visual Studio Tools”

This will open another Windows file explorer window

PIN VS COMMAND PROMPT

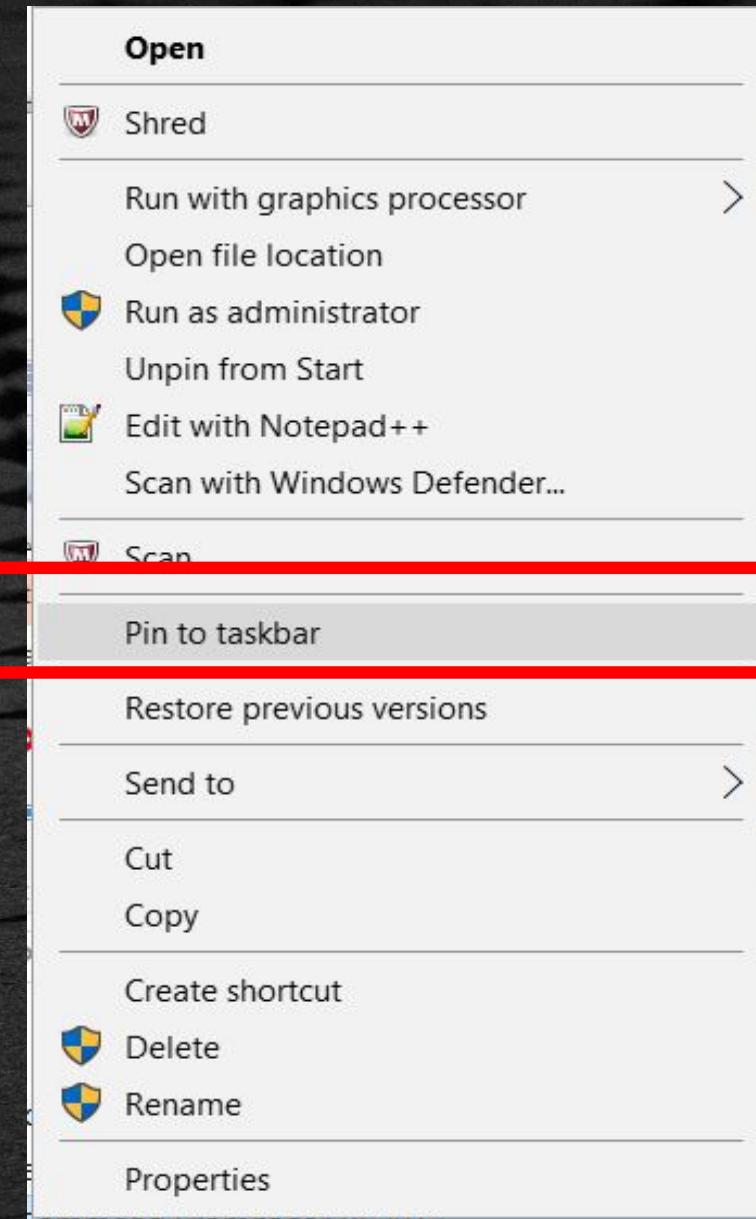


5. Select “Developer Command Prompt for VS2013”

6. Right Click to open Windows dialog box

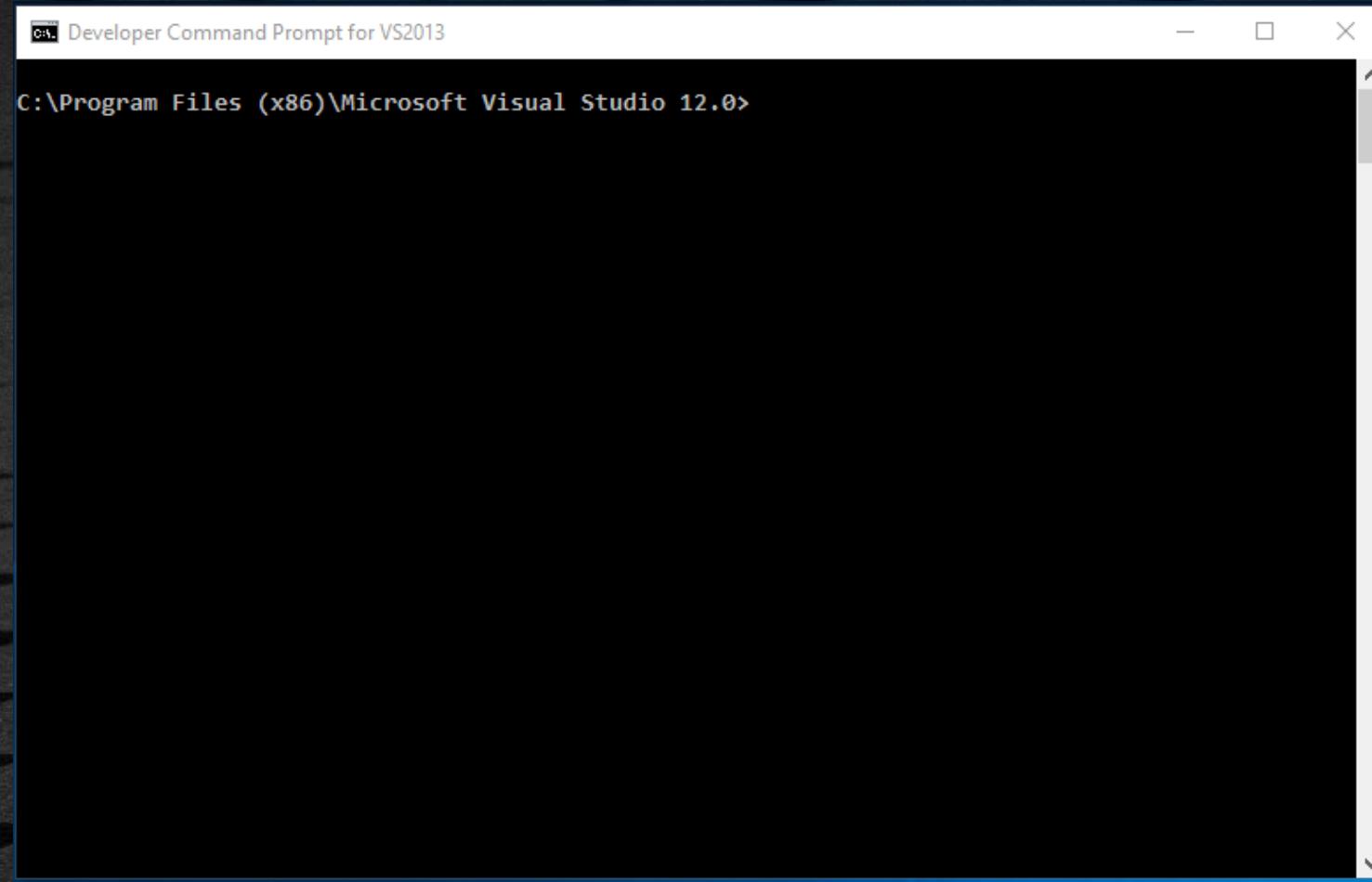
Do not use any of the other “.. Command Prompts”

PIN VS COMMAND PROMPT



7. Left Click on “Pin to Taskbar”

PIN VS COMMAND PROMPT



8. Open VS Command Prompt"

All Windows Labs use this short-cut to Build Edk II platforms and projects using Windows Visual Studio :
2010 / 2012 / 2013 / 2015 or 2017

END OF PIN VS PROMPT

LAB 1: BUILD NT32PKG

Setup Nt32Pkg to build and run NT32
emulation with Windows

DOWN LOAD THE EDK II SOURCE - OPTIONAL

OPTIONAL - Open a “git” command prompt and create a source working directory

```
C:\>mkdir ws  
C:\> cd ws
```

OPTIONAL - Internet Proxies – (company Firewall used for example)

```
C:\ws> git config --global https.proxy <proxyname>.domain.com:<port>  
C:\ws> git config --global http.proxy <proxyname>.domain.com:<port>
```

OPTIONAL - Download edk2 source tree using Git command prompt

```
C:\ws> git clone https://github.com/tianocore/edk2.git  
C:\ws> git clone https://github.com/tianocore/edk2-BaseTools-win32.git
```

OPTIONAL - Build the tools

```
C:\ws> set EDK_TOOLS_BIN=c:\ws\edk2-BaseTools-win32
```

NOTE: Lab Material will have a different “edk2”



SETUP LAB MATERIAL

Lab_Material_FW.zip

DOWN LOAD LAB MATERIAL

Download the Lab_Material_FW.zip from :  [github.com
Lab_Material_FW.zip](https://github.com/Laurie0131/Lab_Material_FW.zip)

OR

Use git clone to download the Lab_Material_FW

```
C:\> git clone https://github.com/Laurie0131/Lab_Material_FW.git
```

Directory Lab_Material_FW will be created

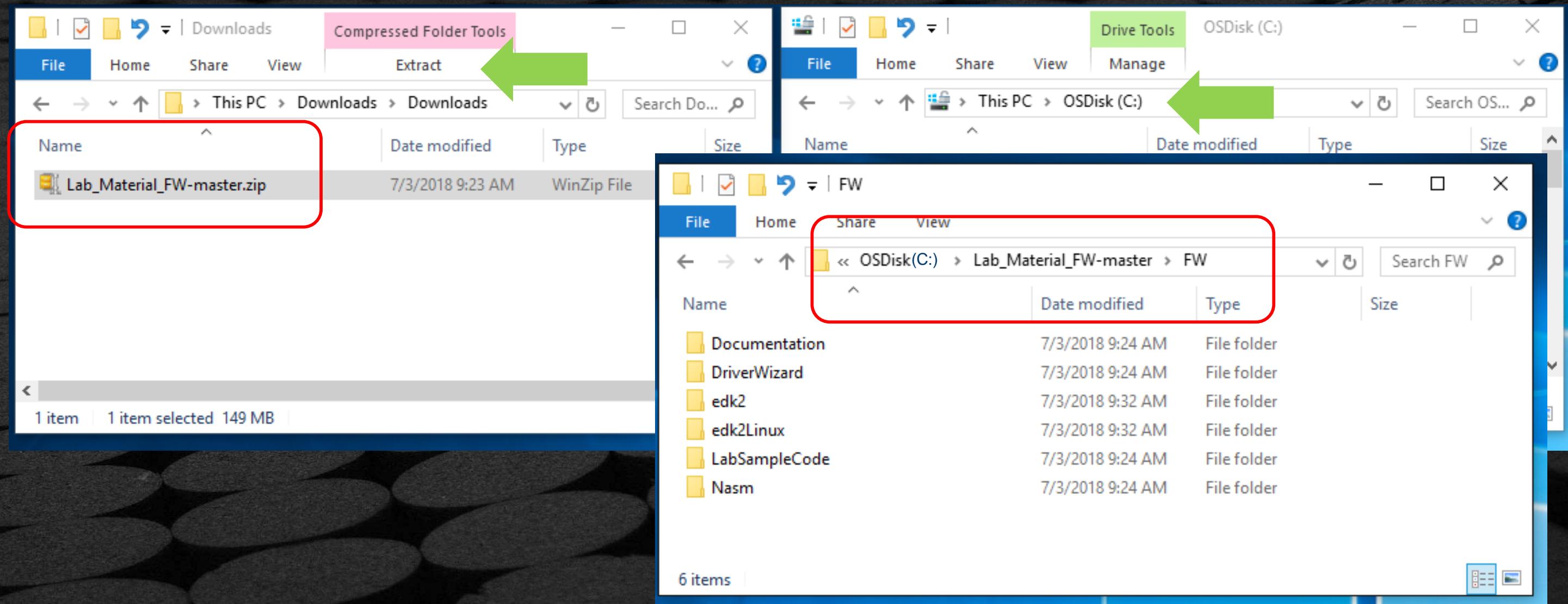
FW

- Documentation
- DriverWizard
- edk2
- edk2Linux
- LabSampleCode
- Nasm

BUILD EDK II NT32

-Extract the Source

1. Extract the Downloaded **Lab_Material_FW-master.zip** to C:\



BUILD EDK II NT32

-Copy edk2

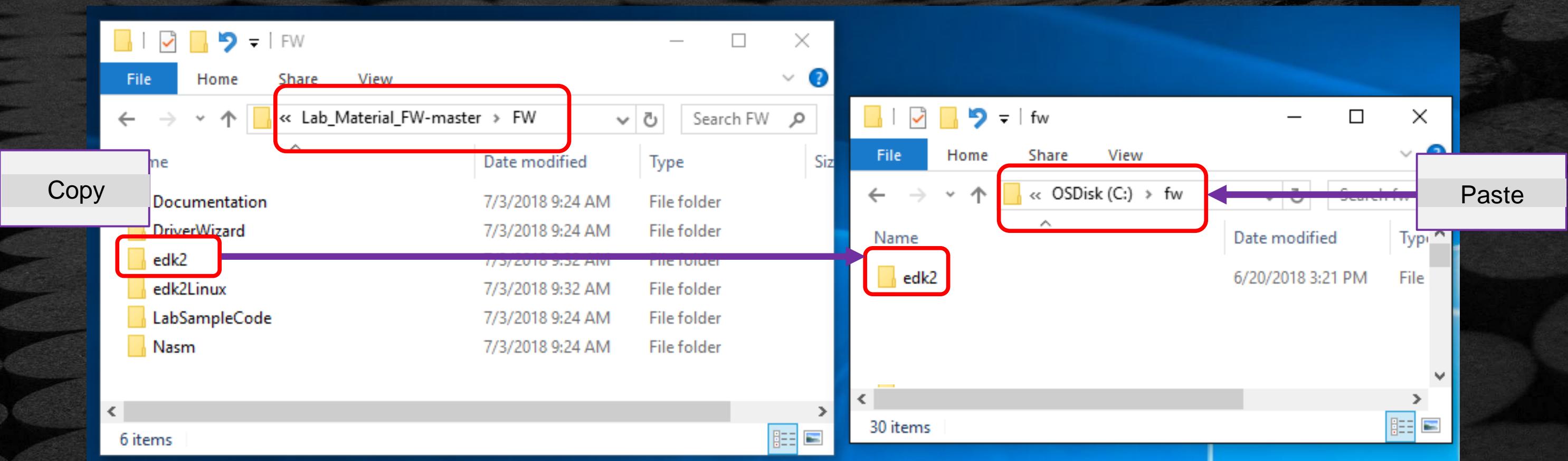
2. Open a VS Command prompt



3. Create a working space directory “FW”

```
C:\> mkdir FW
```

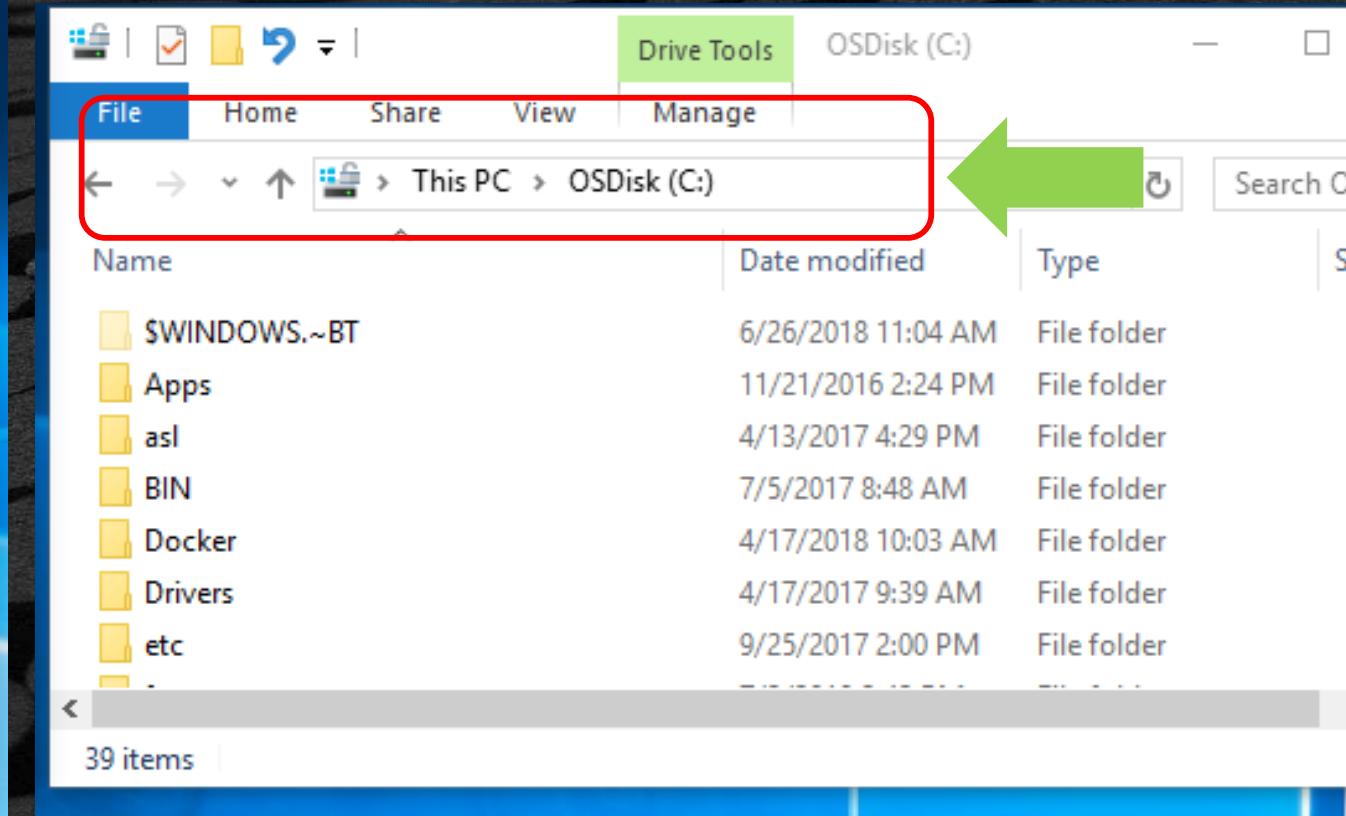
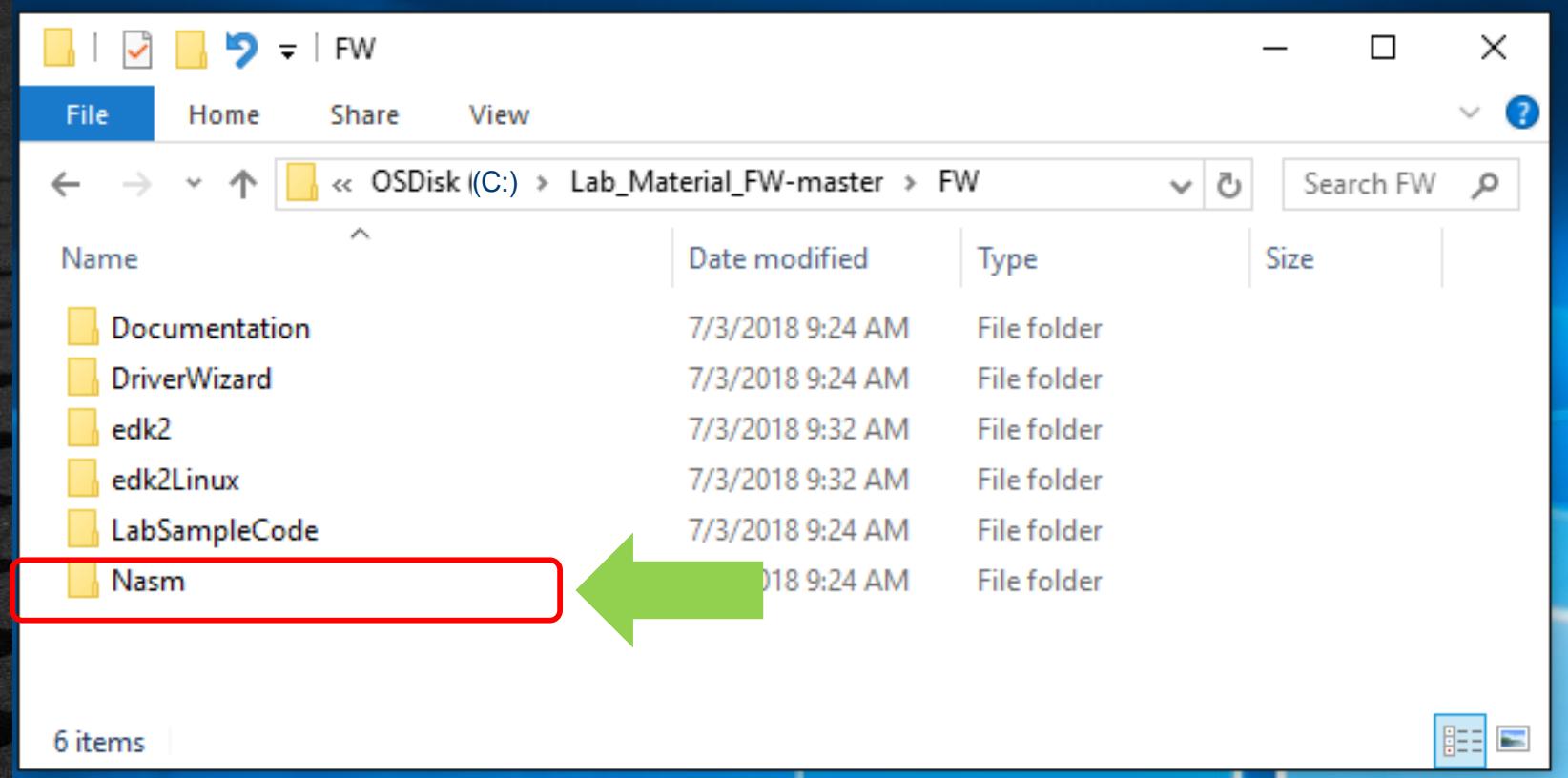
4. From the downloaded Lab_Material_FW folder, copy and paste folder “..\\edk2” to C:/FW



BUILD EDK II NT32

-Get Nasm

Copy Nasm to C:\





BUILD NT32 PLATFORM

BUILD EDK II NT32

-Update Target.txt

Nt32Pkg - Build with edk2

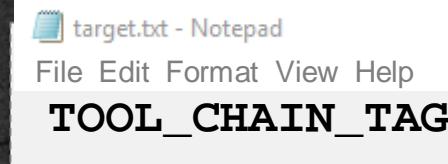
Invoke Edksetup.bat

```
C:\> cd FW/edk2
```

```
C:\FW\edk2> edksetup.bat
```

Edit the file Conf/target.txt (*change Tool_Chain_Tag*)

notepad Conf/target.txt



Save and Exit

Build Nt32Pkg

```
C:\> cd FW/edk2
```

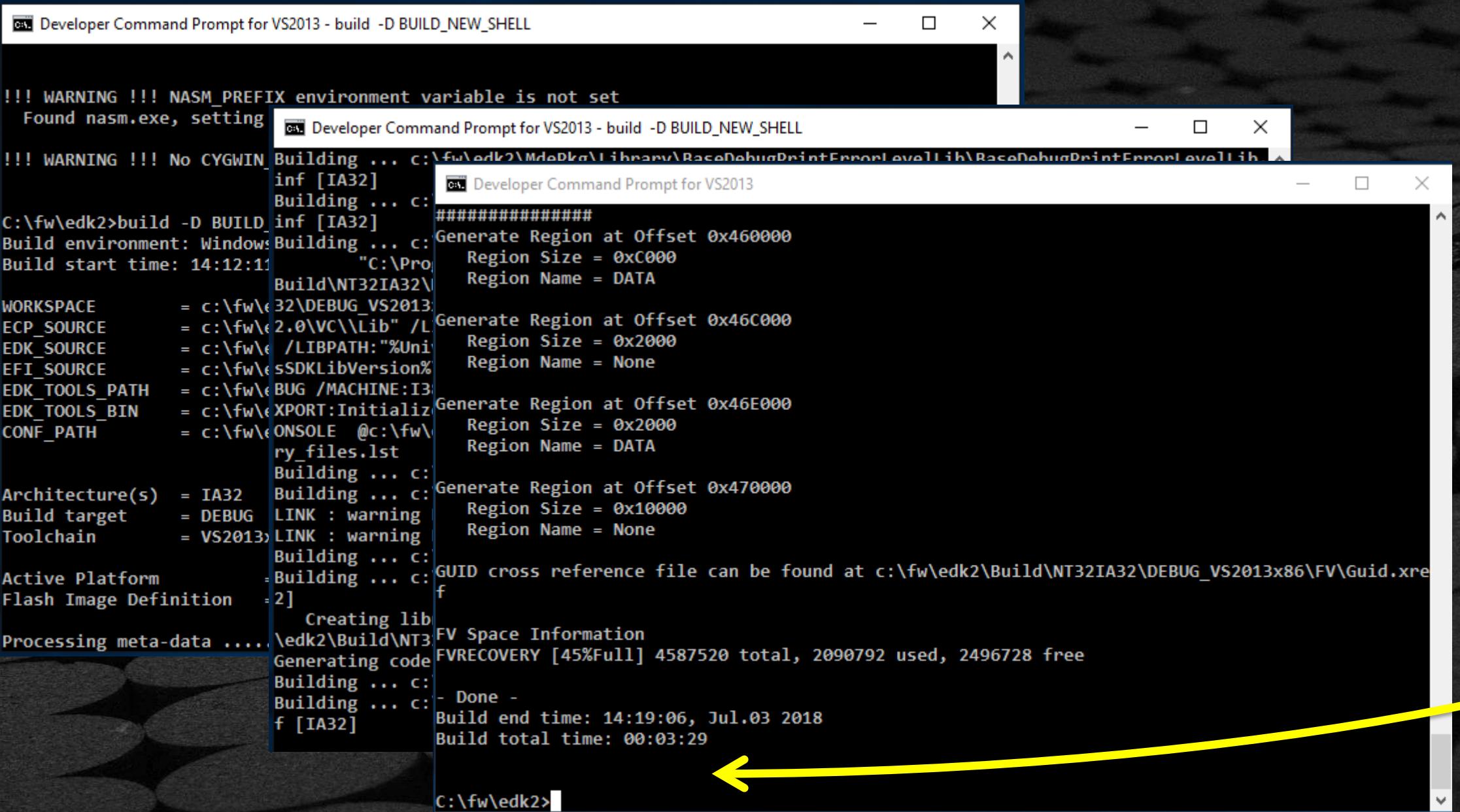
```
C:\FW\edk2> build -D BUILD_NEW_SHELL
```

VS version	TOOL_CHAIN_TAG
2010	vs2010x86
2012	vs2012x86
2013	vs2013x86
2015	vs2015x86
2017	vs2017x86

POSSIBLE BUILD ERRORS

1. If you get a BUILD Error: Error “C:/Program “ not found
 - First check that you have opened Visual Studio and installed the “C++”
 - Open Visual Studio and create a “C++” project
 - (This will take some time to install)
2. If you get a BUILD Error: Check if RC.Exe compiler not found is the error -[here](#)
3. If you get a BUILD Error: fatal error C1041: cannot open program database ... Check [here](#)

BUILD EDK II NT32 -Inside VS Prompt



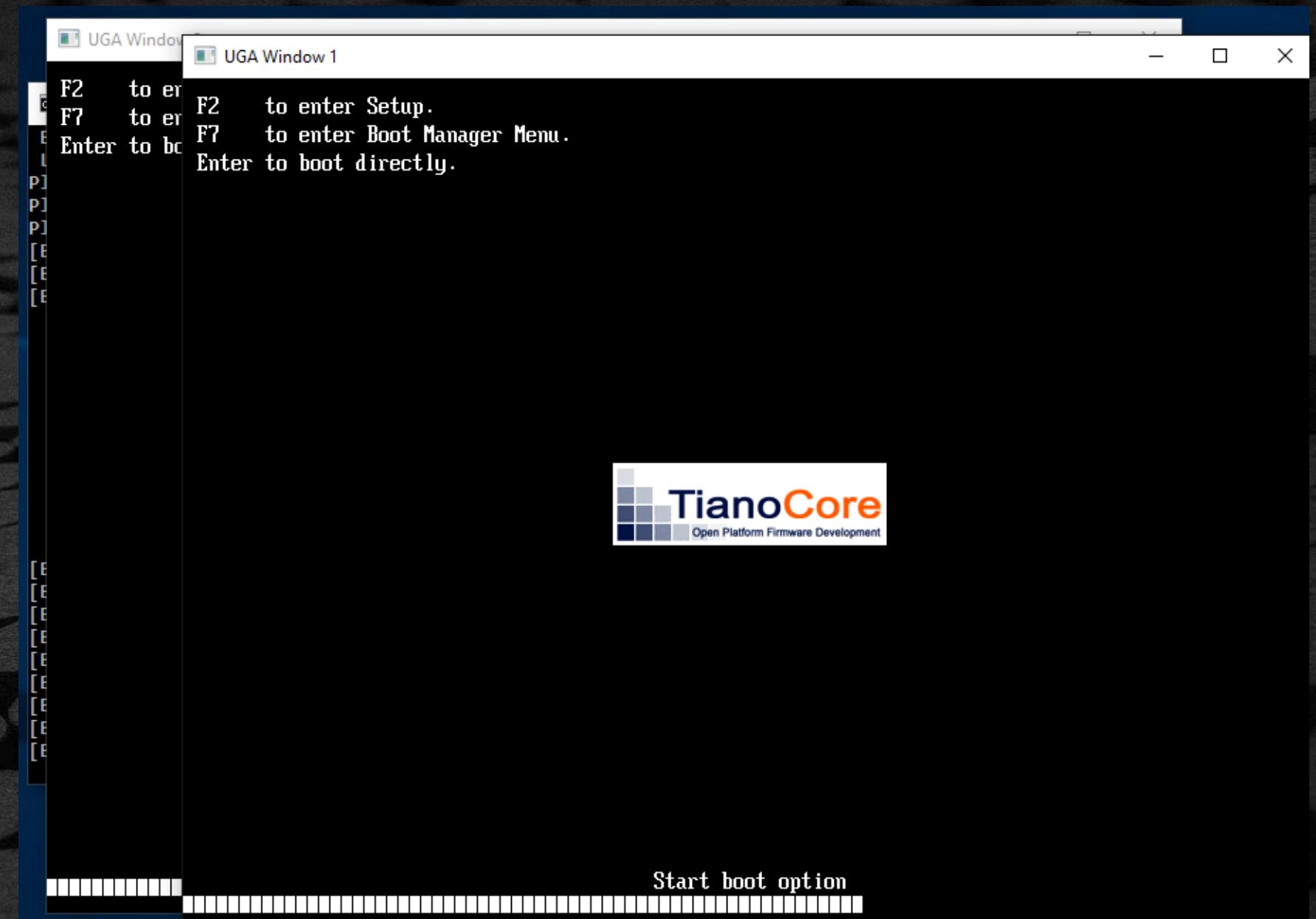
```
!!! WARNING !!! NASM_PREFIX environment variable is not set
Found nasm.exe, setting
!!! WARNING !!! No CYGWIN_ Building ... c:\fw\edk2\Build\NT32\IA32\inf [IA32]
Building ... c:#####
C:\fw\edk2>build -D BUILD_ Building ... c:#####
Build environment: Windows Build ... c:#####
Build start time: 14:12:11 "C:\Pro Build\NT32IA32\#####
WORKSPACE      = c:\fw\edk2\DEBUG_VS2013:#####
ECP_SOURCE      = c:\fw\edk2.0\VC\LIB" /L:#####
EDK_SOURCE      = c:\fw\edk2\LIBPATH:"%Uni:#####
EFI_SOURCE      = c:\fw\edk2\SSDKLibVersion%:#####
EDK_TOOLS_PATH  = c:\fw\edk2\BUG /MACHINE:I386:#####
EDK_TOOLS_BIN   = c:\fw\edk2\EXPORT:Initializ:#####
CONF_PATH       = c:\fw\edk2\ONSOLE @c:\fw\edk2\ry_files.lst:#####
Architecture(s) = IA32 Building ... c:#####
Build target    = DEBUG LINK : warning
Toolchain       = VS2013 LINK : warning
Building ... c:#####
Active Platform = Building ... c:#####
Flash Image Definition = 2] Creating lib
Processing meta-data ..... \edk2\Build\NT32\IA32\lib:#####
Generating code:#####
Building ... c:#####
Building ... c:#####
f [IA32] FV Space Information
FVRECOVERY [45%Full] 4587520 total, 2090792 used, 2496728 free
- Done -
Build end time: 14:19:06, Jul.03 2018
Build total time: 00:03:29
C:\fw\edk2>
```

Finished build

INVOKE NT32 EMULATION

From the command prompt

C:\FW\edk2> Build Run



END OF LAB SETUP(NT32)

[Return to the Beginning](#)

LAB 2: PLATFORM HW SETUP

Setup hardware for the MinnowBoard Max/Turbot

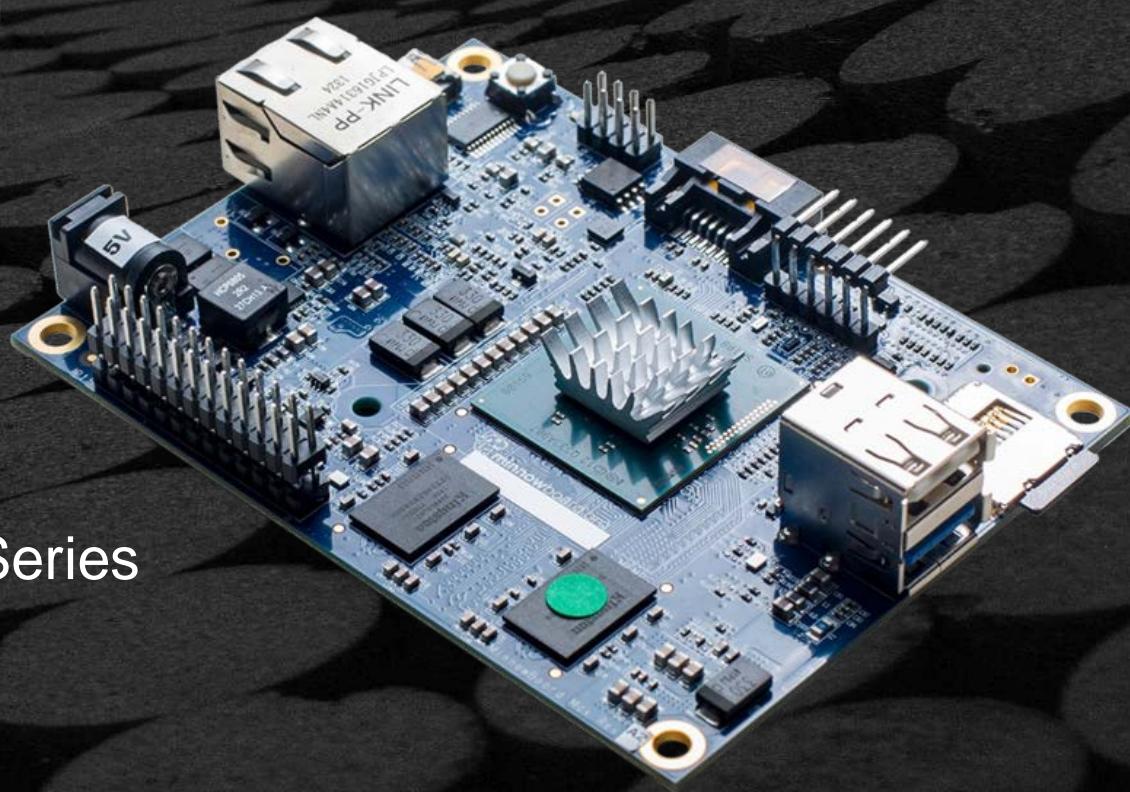
EDK II PLATFORM (MINNOWBOARD MAX/TURBOT)



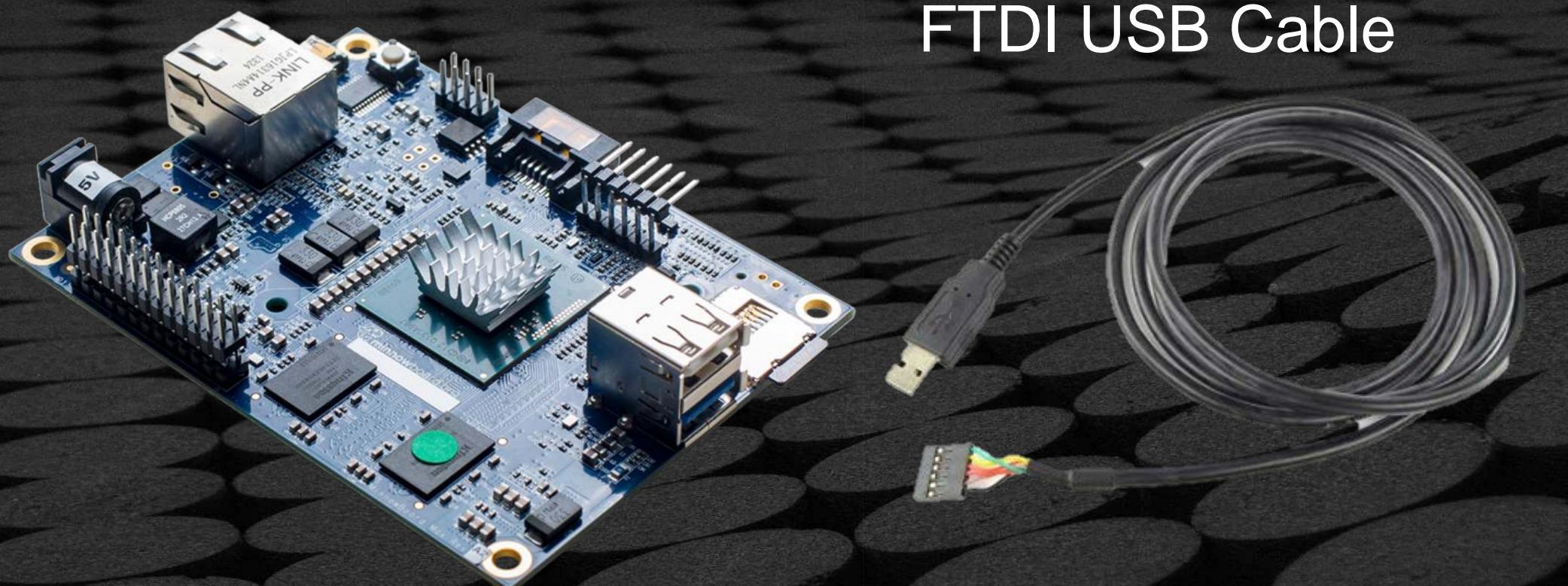
minnowboard.org



Intel® Atom processor E3800 Series
(Formerly Bay Trail-I)



MINNOWBOARD MAX WORKSHOP LAB HARDWARE



FTDI USB Cable

5V** Power Supply



USB thumb drive



**Warning do not use any other power supply than 5V or the board will Fry

INSTRUCTIONS FOR LAB MATERIALS

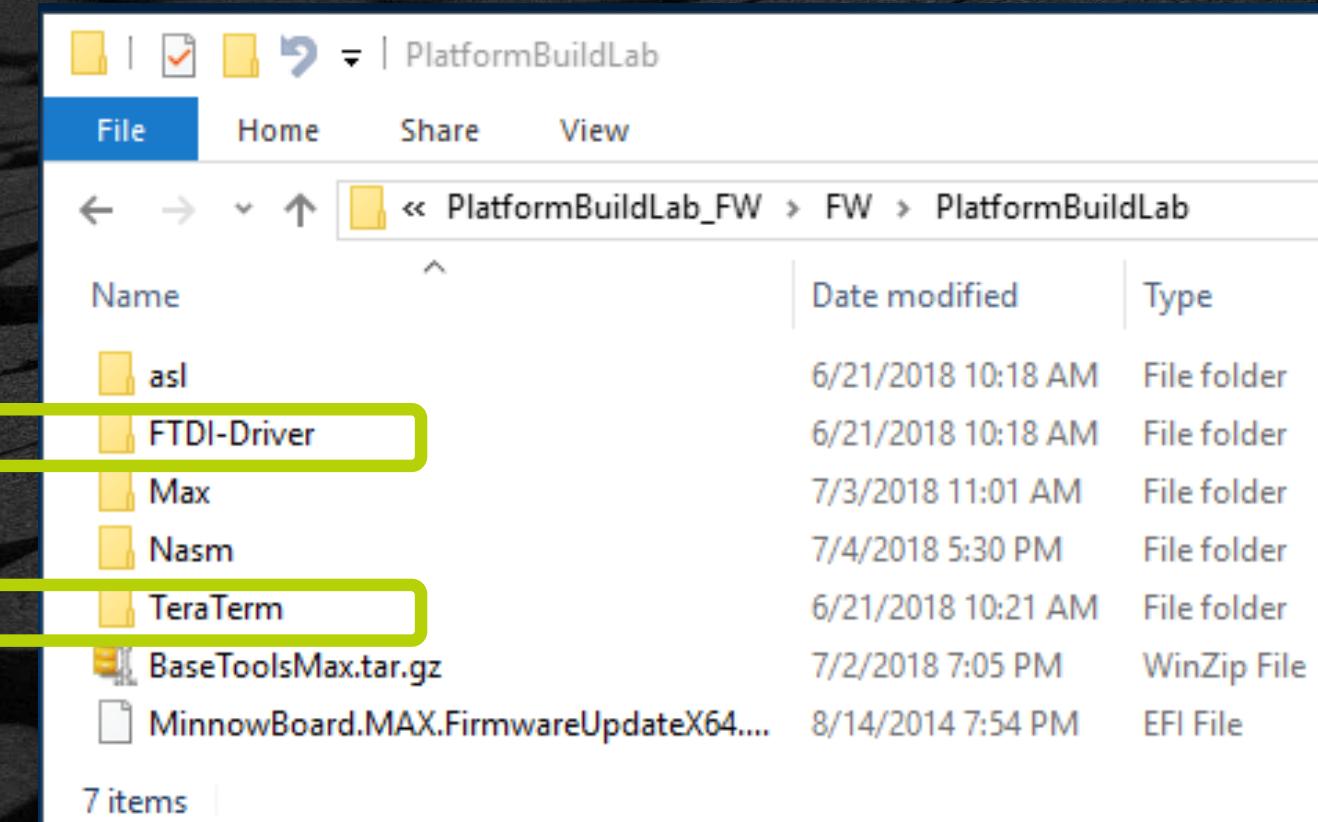
Directory C:\PlatformBuildLab_FW\FW\PlatformBuildLab

FTDI Driver for Serial UART Cable (COM Port)

<http://www.ftdichip.com/FTDrivers.htm>

TeraTerm (terminal software for COM Port)

<https://en.osdn.jp/projects/ttssh2/releases/>



SETUP MINNOWBOARD MAX TEST SYSTEM

Hardware:

- System Under Test (SUT) – MinnowBoard Max
- USB to 3.3V TTL Cable (6 pin to USB Type A)
- 5V power supply

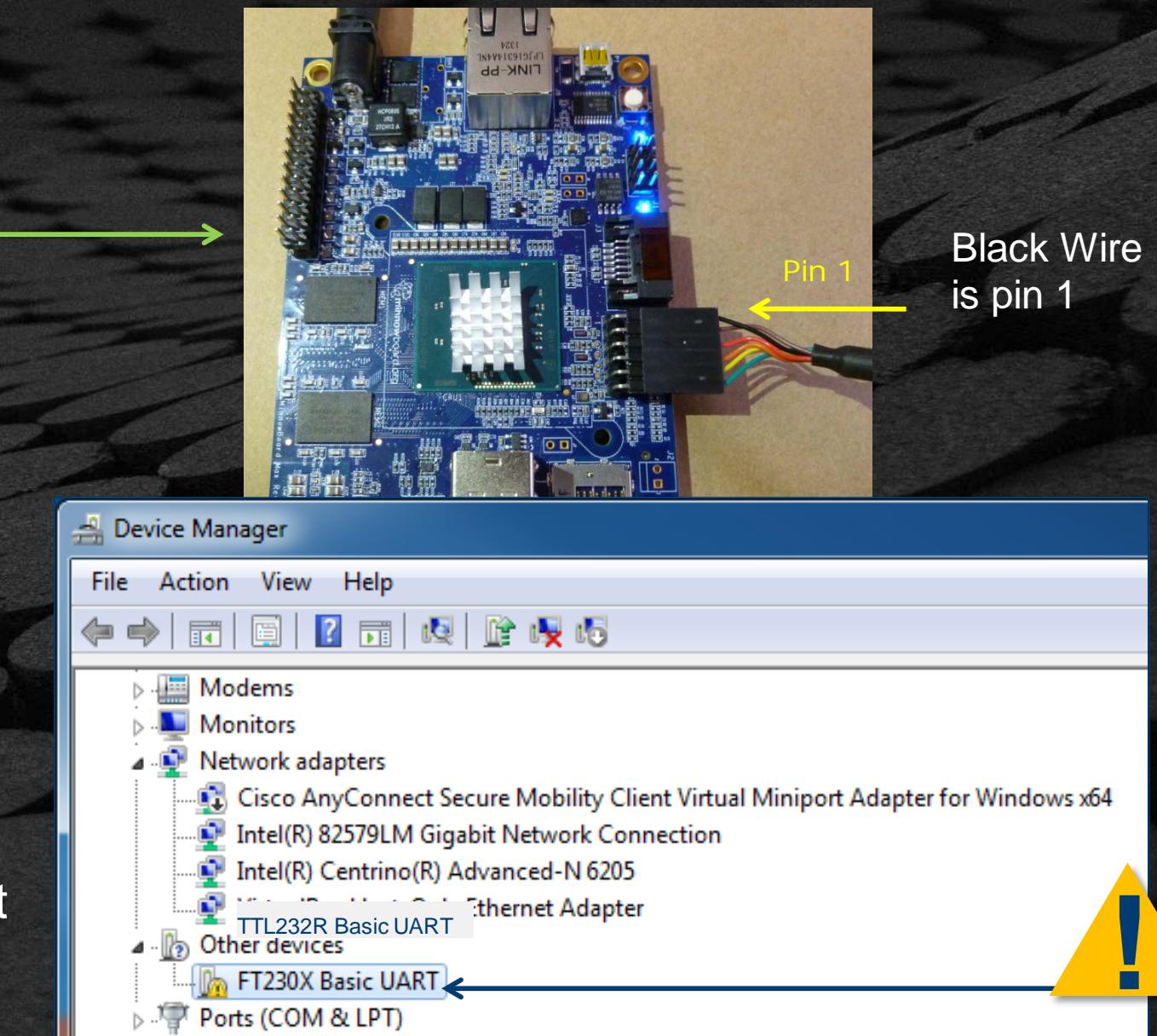
Connect the USB w/ 6 pin header to SUT (MAX) →

Connect the USB Type A connector to Host (Laptop)

On your Host **Go to the “Device Manager”** in the control panel.

Under the "**Other devices**" category you will see a yellow ! with a warning icon next to it.

You may already have this driver installed if you do not see a ! warning under "**Other devices**"



SETUP COM PORT ON HOST

Right click yellow  and select "Update Driver Software" from the **Device Manager** menu

Select "Browse my computer for driver software".

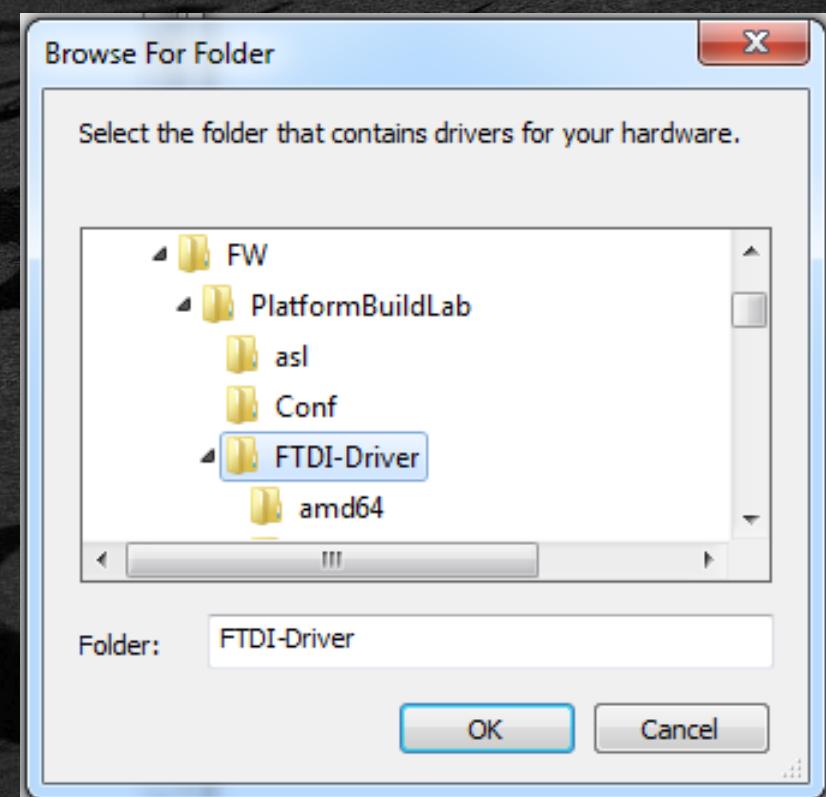
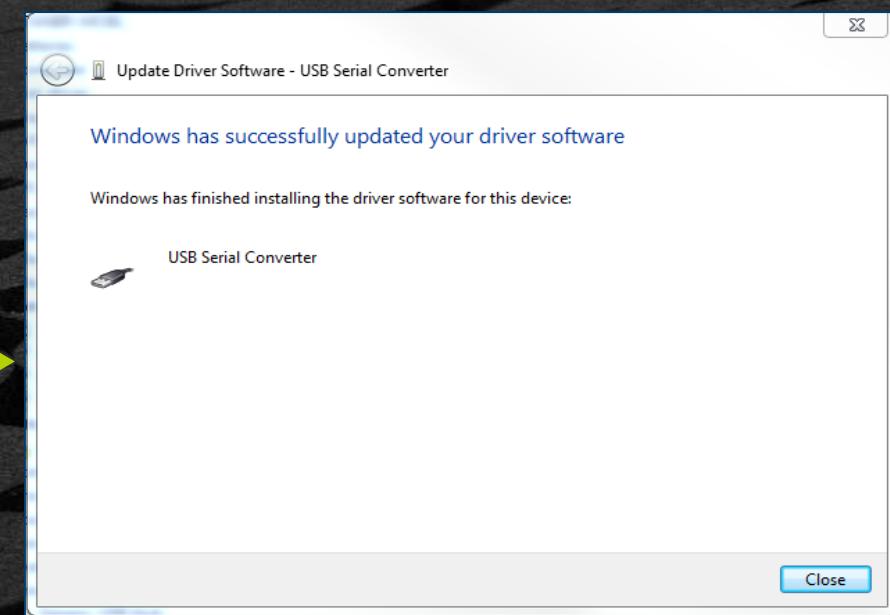
Click the **Browse** button. – Click on "Include subfolders"

Browse to the location of the folder you unzipped earlier for the FTDI driver.

Click on the folder and press **OK**.

Press **Next**.

Driver will be installed

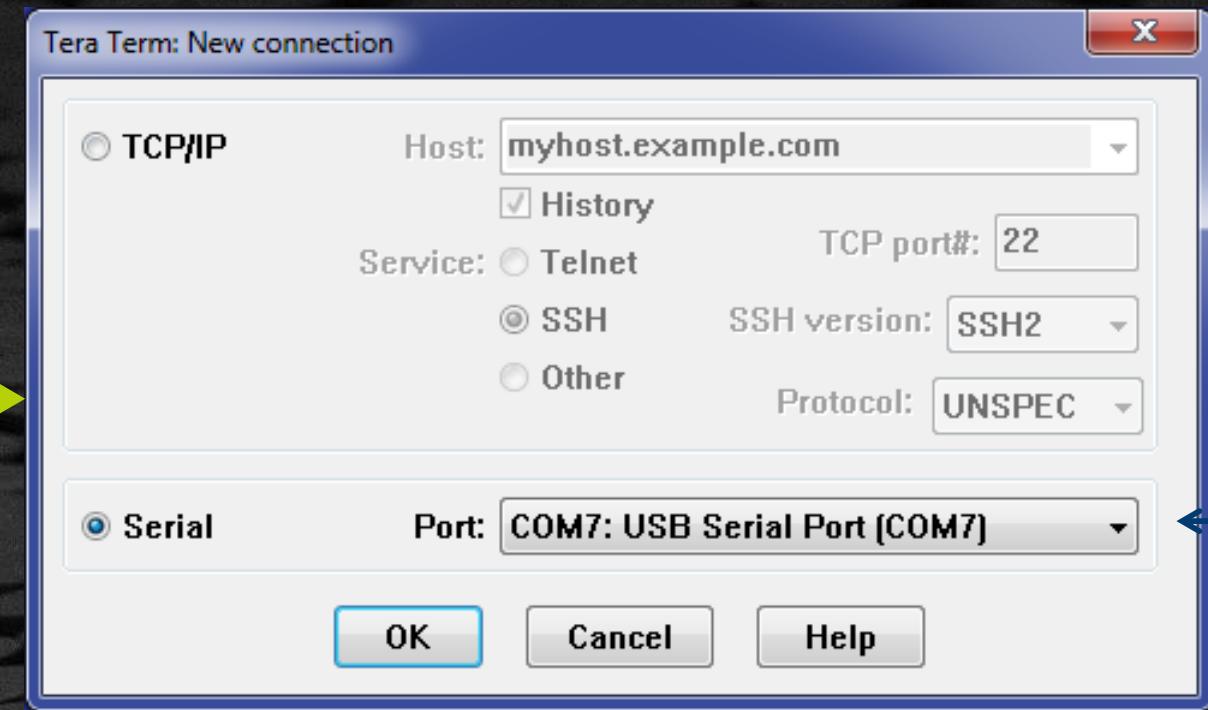
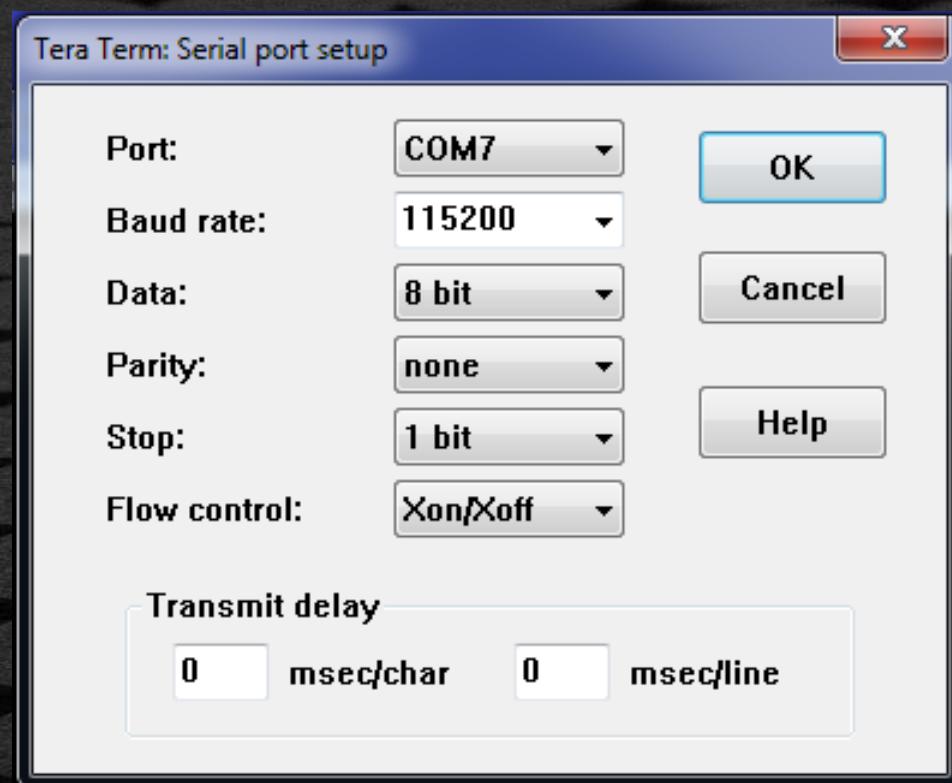


SETUP TERATERM

Unzip and Install TeraTerm

Open TeraTerm Software

Select the serial port assigned



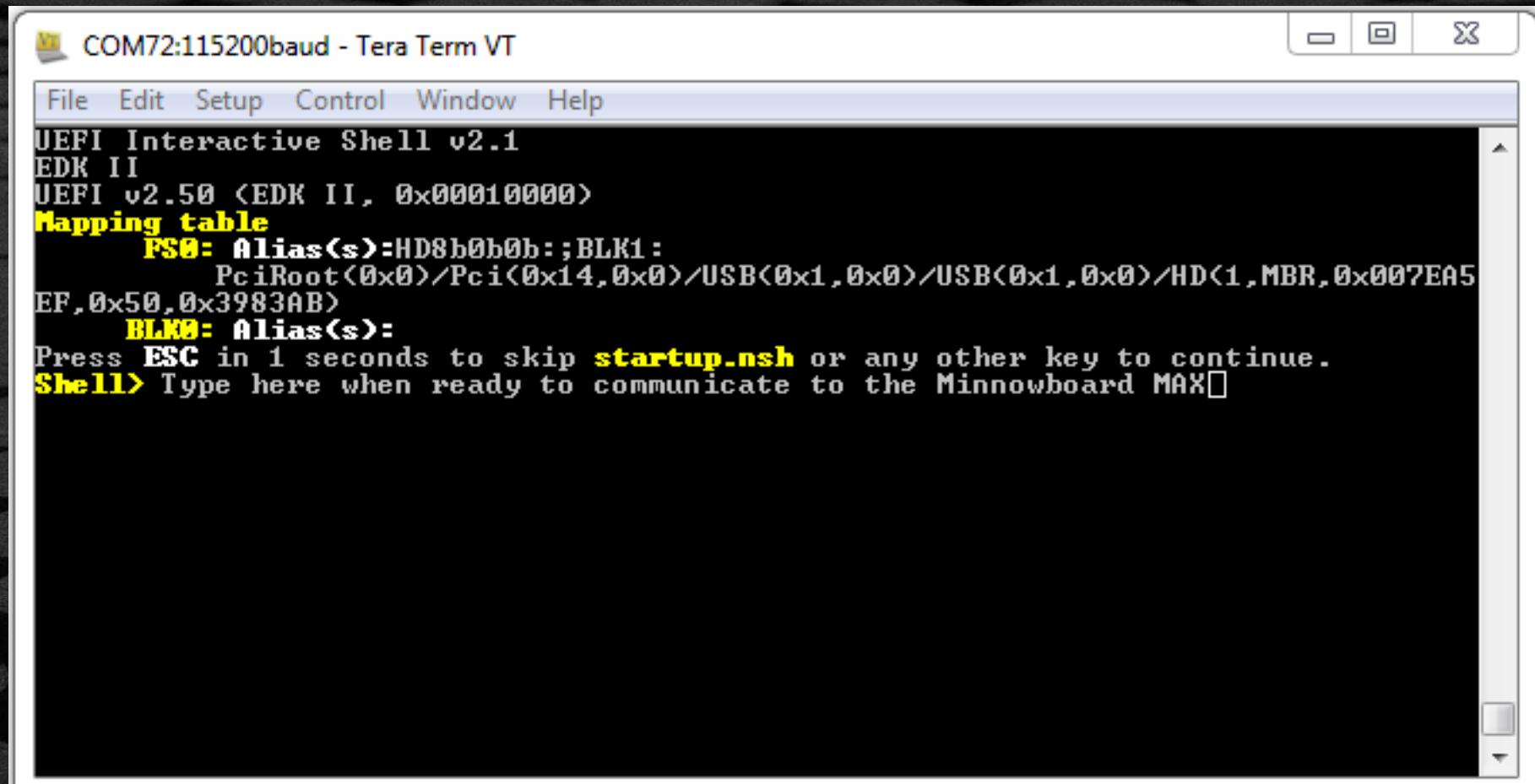
Go to **Setup->Serial Port** and set the following:

- Baud: 115200
- Parity: None
- Data Bits: 8
- Stop Bits: 1
- Flow Control: Xon/Xoff

POWER ON MINNOWBOARD MAX

Connect the Power supply cable to the MinnowBoard MAX

MinnowBoard MAX should boot to the UEFI Shell in the TeraTerm window.



END OF LAB

[Return to the Beginning](#) or > to continue



LAB 3: BUILD MINNOWBOARD TURBOT

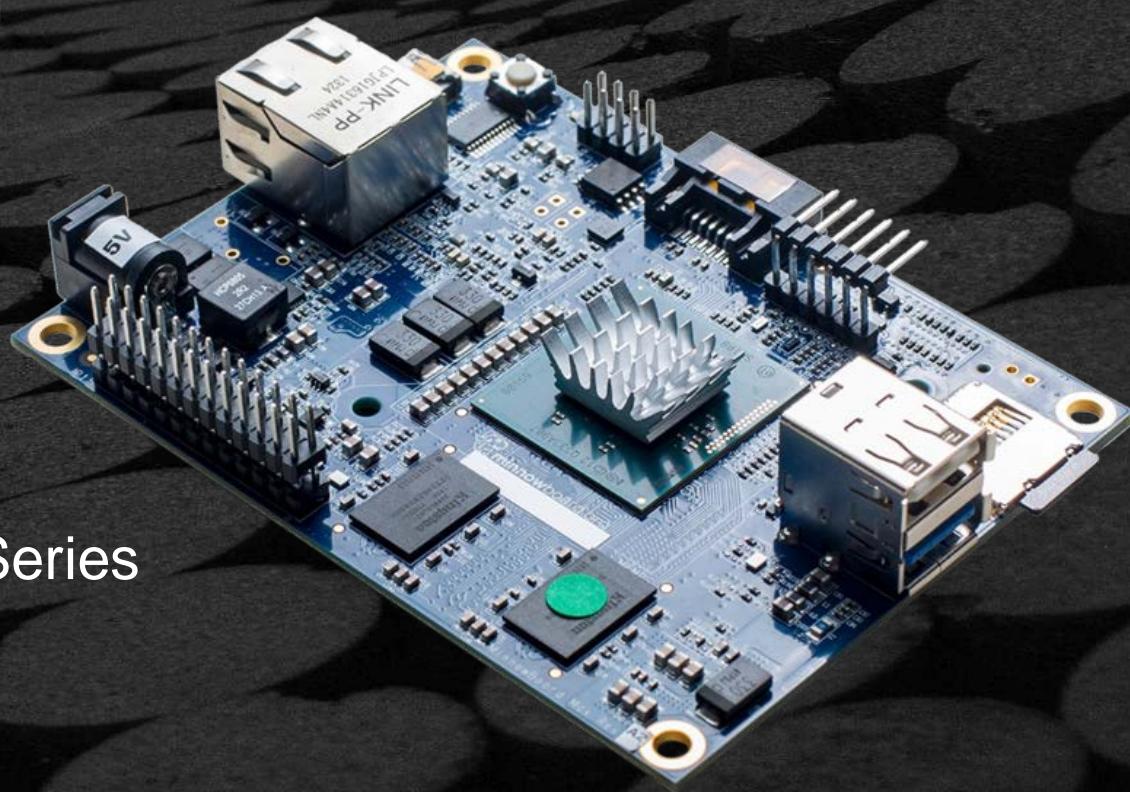
EDK II PLATFORM (MINNOWBOARD MAX/TURBOT)



minnowboard.org

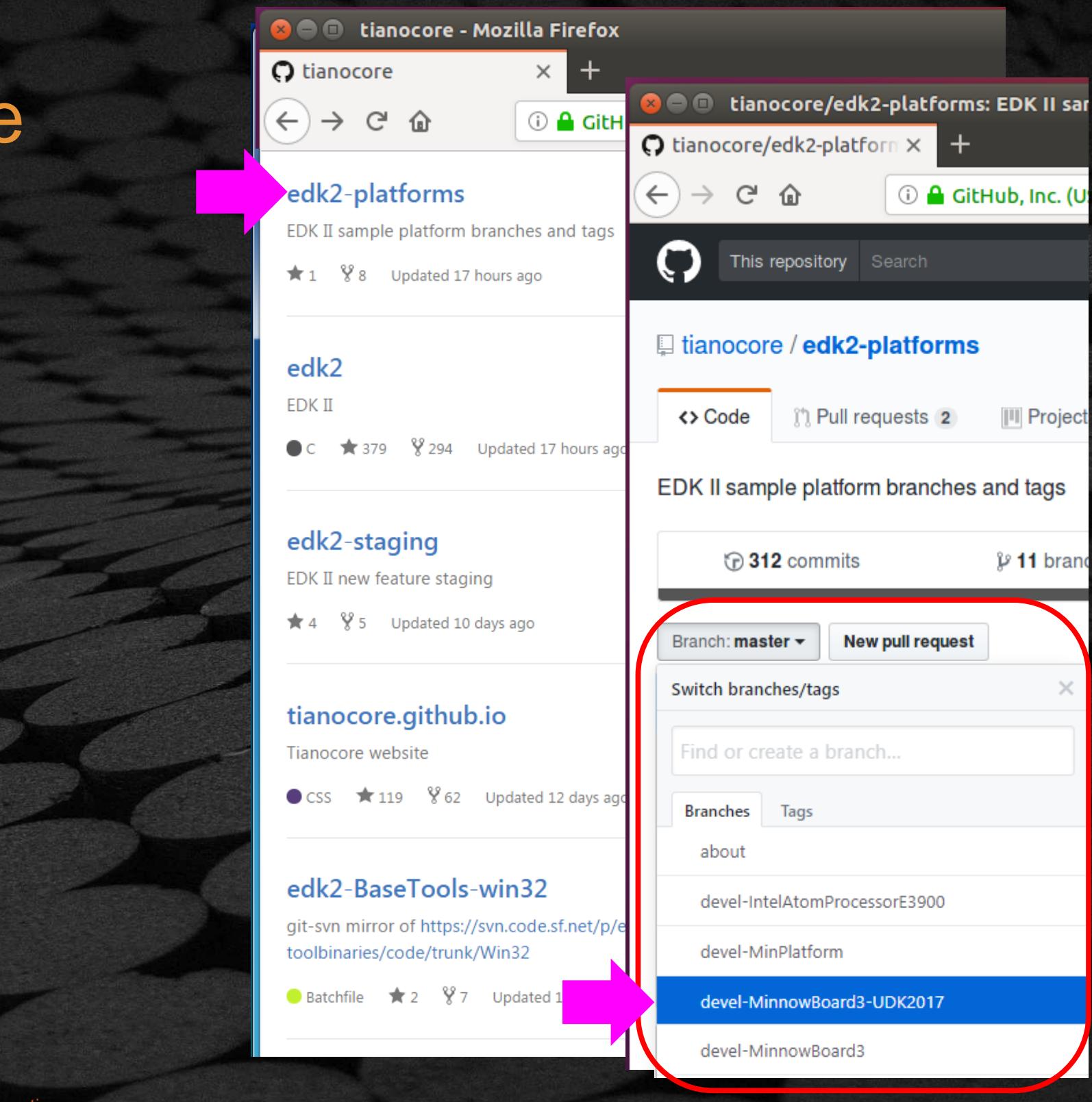


Intel® Atom processor E3800 Series
(Formerly Bay Trail-I)



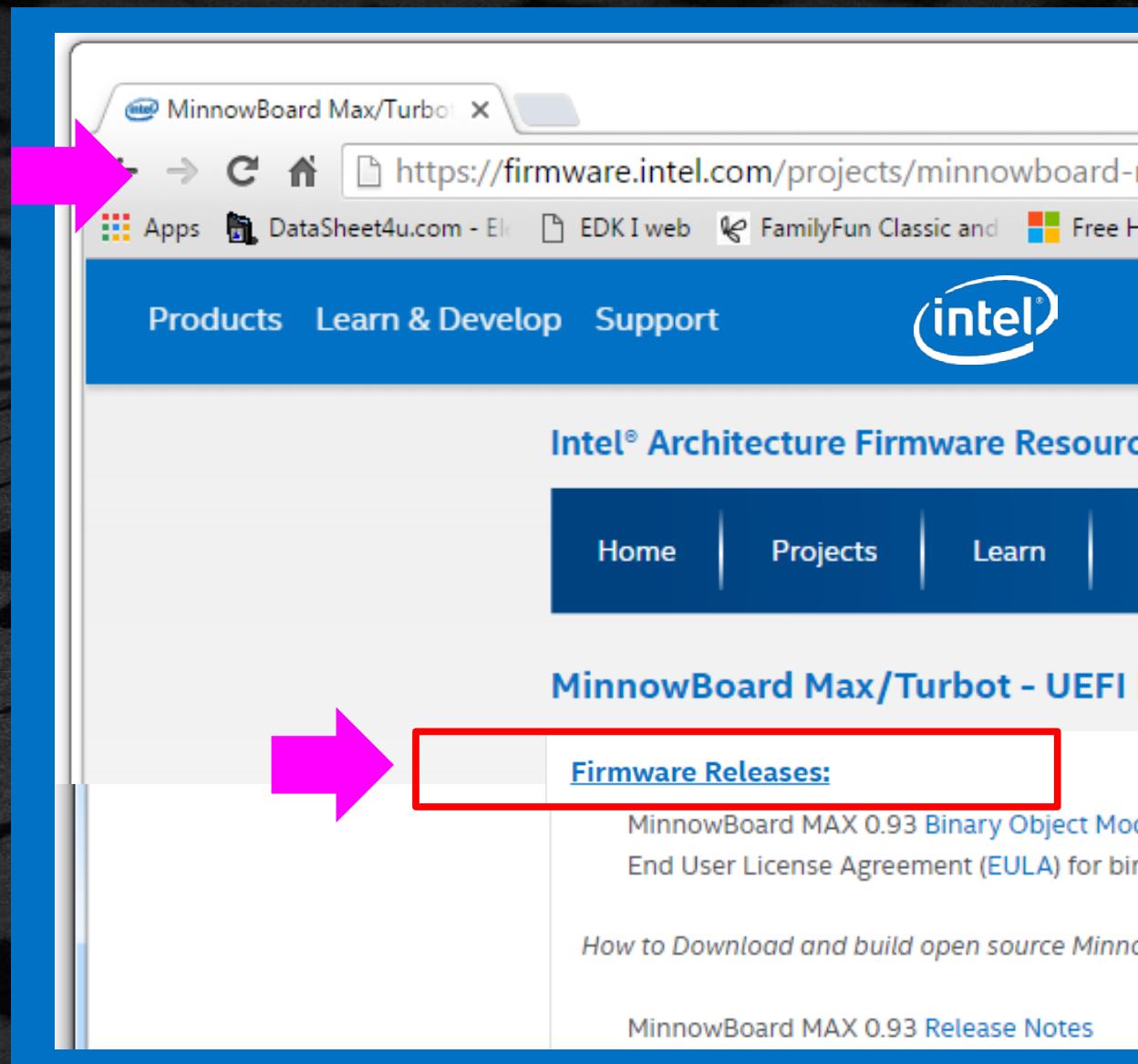
Where to get Open Source MinnowBoard Max

- Open Source Max Wiki
- V.98 -Github Link
- Binary Object Modules
firmware.intel.com
- How to Build: Release Notes



Where to get Open Source MinnowBoard Max

- Open Source Max Wiki
- V.98 -Github Link
- Binary Object Modules
firmware.intel.com
- How to Build: Release Notes



DOWN LOAD MAX LAB SOURCE

Download the Lab_Material_FW.zip from :  [github.com
PlatformBuildLab_FW.zip](https://github.com/Laurie0131/PlatformBuildLab_FW.zip)

OR

Use `git clone` to download the PlatformBuildLab_FW

```
C:/> git clone https://github.com/Laurie0131/PlatformBuildLab_FW.git
```

Directory Lab_Material_FW will be created

/FW

/PlatformBuildLab

- asl
- FTDI-Driver
- Max
- MinnowBoard.MAX.FirmwareUpdateX64.efi
- TeraTerm
- Asl Compiler
- Serial / USB cable
- Minnowboard Max Source for the Labs
- UEFI App to flash
- Terminal app

Previous Lab Setup Requirements

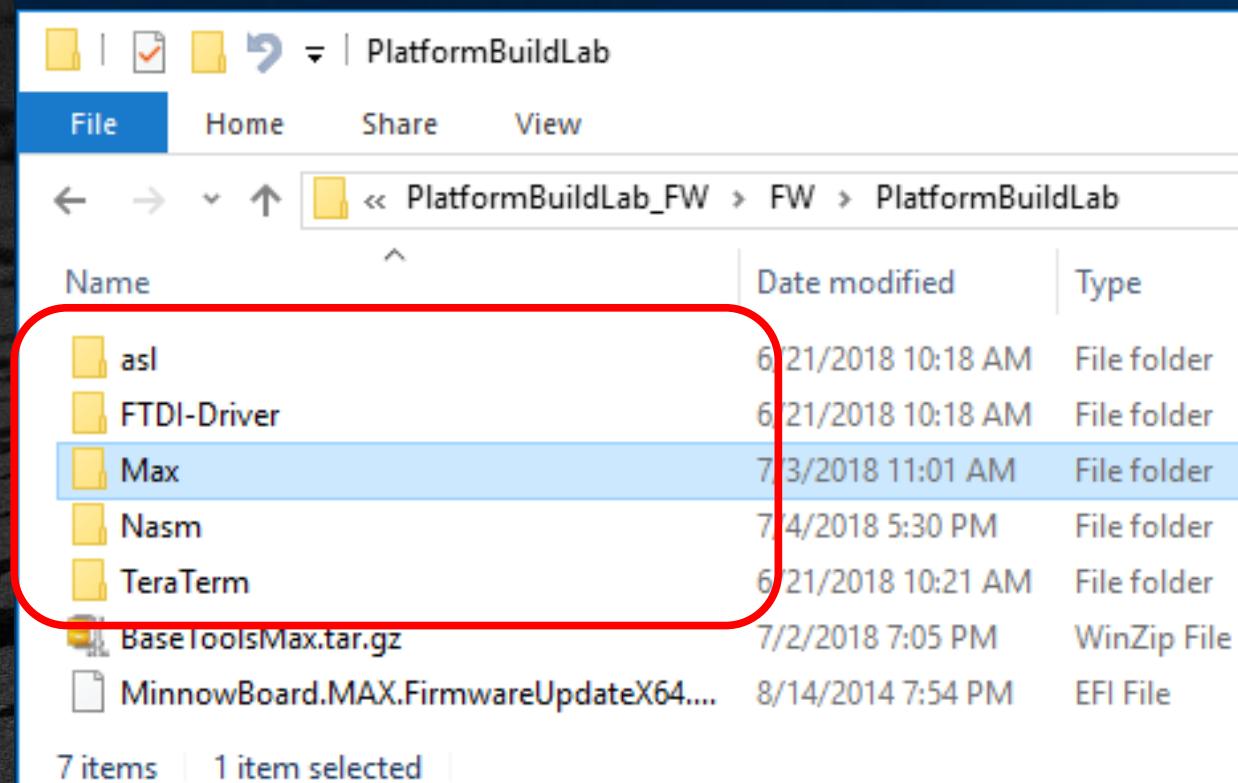
NASM

Copy ...Lab_Material_FW\FW\Nasm to C:\

Additional Lab Setup – PlatformLab_FW/FW/PlatformBuildLab

Directories

- Max
 - asl
 - FTDI-Driver
 - Nasm
 - TeraTerm
- MinnowBoard Max Project source code
 - Iasl Assembler C:/asl directory
 - Driver for Serial/USB Uart cable
 - Nasm Assembly compiler- Same as previous lab
 - TeraTerm application

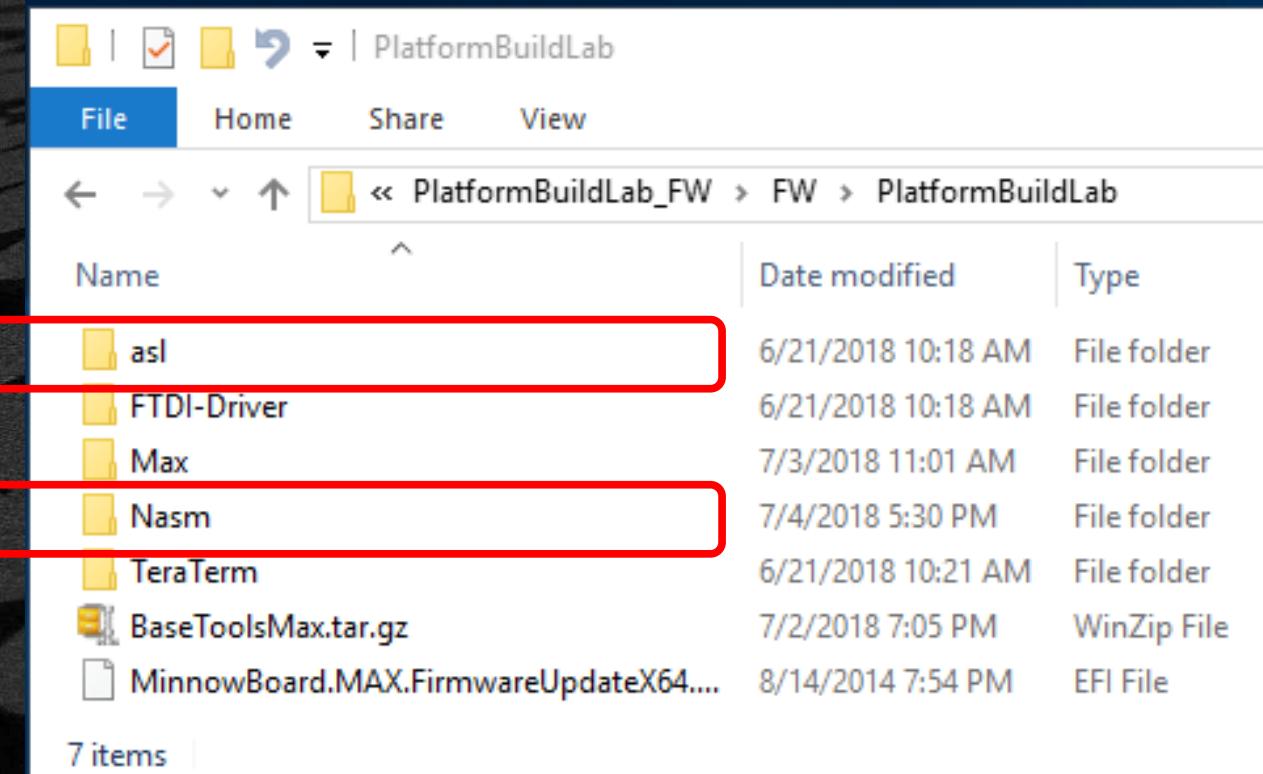


PREPARING TO BUILD

Directory
C:\PlatformBuildLab_FW\FW\PlatformBuildLab from
Download or zip

1 Copy \Nasm Folder to C:\

2 Copy \asl Folder to C:\



COPY MINNOWBOARD MAX SOURCE

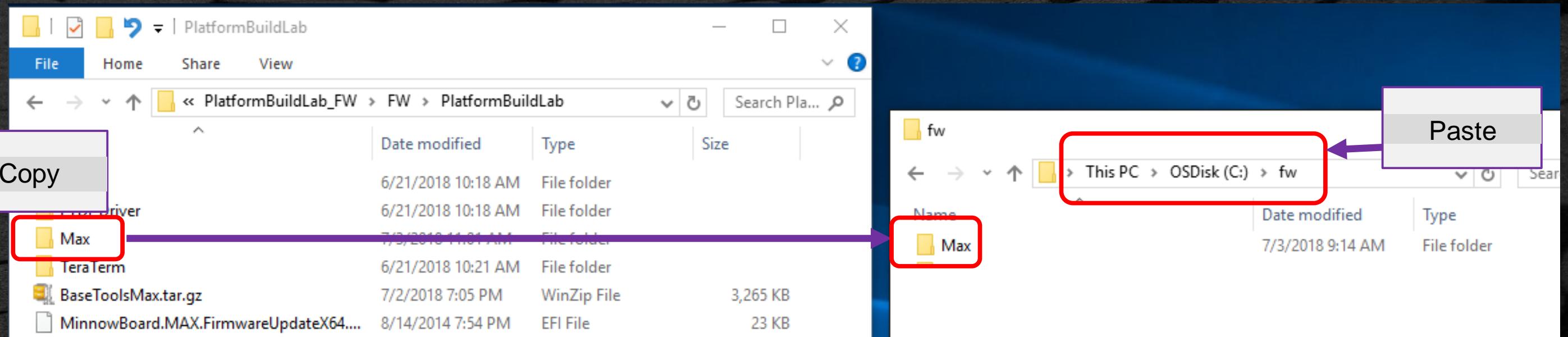
3

Open a VS Command prompt

Create a working space source directory under the home directory

```
C:\> mkdir FW
```

From the FW/PlatformBuildLab folder, copy and paste folder “..FW/Max” to C:/FW/Max



PLATFORM SOURCE DIRECTORY STRUCTURE

```
./Max
  /edk2
    /(UDK2017 Directories)
    /BaseTools (from BaseToolsMax.tar.gz)
  /edk2-platforms
    /Vlv2DeviceRefCodePkg
    /Vlv2TbtDevicePkg ←
  /silicon
    /IA32FamilyCpuPkg
    /Vlv2BinaryPkg
    /Vlv2MiscBinariesPkg
```

Invoke the Build script from here

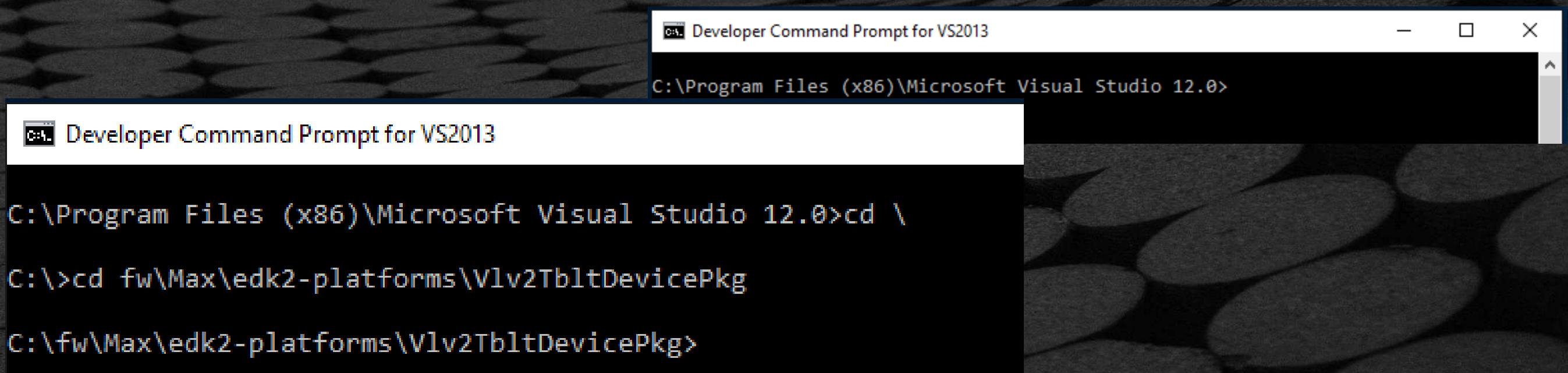
STEPS TO BUILD & INSTALL FIRMWARE

1. Open VS command prompt
2. Cd to project directory : C:/FW/Max/edk2-platforms/Vlv2TbtDevicePkg
3. Invoke the build process script: **Build_IFWI**
4. Locate build output (.BIN file for BIOS image)
5. Flash binary image onto the platform
6. Reset and boot new firmware to UEFI Shell

Next slide will follow the above steps

OPEN A VS COMMAND PROMPT

Follow Steps from [here](#) to Pin the Visual Studio Command Prompt to the Windows Task Bar
Open a Visual Studio Command Prompt



The image shows a screenshot of a Windows operating system. In the foreground, there is a terminal window titled "Developer Command Prompt for VS2013". The window has a dark background and contains white text. The text in the terminal is as follows:

```
C:\Program Files (x86)\Microsoft Visual Studio 12.0>
C:\Program Files (x86)\Microsoft Visual Studio 12.0>cd \
C:\>cd fw\Max\edk2-platforms\Vlv2TbtDevicePkg
C:\fw\Max\edk2-platforms\Vlv2TbtDevicePkg>
```

BUILD PROCESS FOR DEBUG BIOS

From the VS Command Prompt ... ENTER:

```
cd C:\FW\Max\edk2-Platforms\Vlv2TbltDevicePkg  
Build_IFWI.bat /I MNW2 Debug
```

The screenshot shows a command prompt window titled "Developer Command Prompt for VS2013 - Build_IFWI.bat /I MNW2 Debug". The window displays the output of the build process, which includes two calls to the GenBiosId utility and the execution of EDK2. The output is as follows:

```
GenBiosId utility, version: v1.0 06/08/2005
Copyright (c) 2005, Intel Corporation. All rights reserved.

BIOS ID created: MNW2MAX1.X64.0097.D01.1710090909
BIOS ID binary file created: C:\fw\Max\Build\Vlv2TbltDevicePkg\DEBUG_VS2013x86\IA32\BiosId.bin

GenBiosId utility, version: v1.0 06/08/2005
Copyright (c) 2005, Intel Corporation. All rights reserved.

BIOS ID created: MNW2MAX1.X64.0097.D01.1710090909
BIOS ID binary file created: C:\fw\Max\Build\Vlv2TbltDevicePkg\DEBUG_VS2013x86\X64\BiosId.bin

Invoking EDK2 build...
Building with the Build_Flags = -j EDK2.log -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE
Current dir is C:\fw\Max\edk2

Press any key to continue . . .
```

Press Enter to
Continue the build

Errors

Note: VS2017 Not supported with MinnowBoard Max See [Link](#):
Note: RC.EXE Resource Compiler See [Link](#):

EXAMINE BUILD PARAMETERS

build

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

TARGET = DEBUG

Build mode

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

TARGET	= DEBUG
TARGET_ARCH	= IA32 X64

Build mode
CPU architecture

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

TARGET	= DEBUG
TARGET_ARCH	= IA32 X64
TOOL_CHAIN_TAG	= VS2013x86

Build mode
CPU architecture
Tool Chain VS 2013

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

TARGET	= DEBUG
TARGET_ARCH	= IA32 X64
TOOL_CHAIN_TAG	= VS2013x86
ACTIVE_PLATFORM	= Vlv2TbItDevicePkg/PlatformPkgX64.dsc

Build mode
CPU architecture
Tool Chain VS 2013
Platform (.DSC file)

EXAMINE BUILD PARAMETERS

```
build -D SYMBOLIC_DEBUG=TRUE -D LOGGING=TRUE  
      . . . -D Option (n)
```

MACROS

Logging

Symbolic Debug

Properties from conf\Target.txt

TARGET	= DEBUG
TARGET_ARCH	= IA32 X64
TOOL_CHAIN_TAG	= VS2013x86
ACTIVE_PLATFORM	= Vlv2TbItDevicePkg/PlatformPkgX64.dsc
MAX_CONCURRENT_THREAD_NUMBER	= 1

Build mode

CPU architecture

Tool Chain VS 2013

Platform (.DSC file)

Thread Count

BUILD PROCESS FOR RELEASE BIOS

From the VS Command Prompt ...

Enter:

Build_IFWI.bat /l MNW2 Release

```
Developer Command Prompt for VS2013 - Build_IFWI.bat /l MNW2 Release

TOOL_CHAIN_TAG = VS2013x86
BUILD_RULE_CONF = Conf/build_rule.txt
ACTIVE_PLATFORM = C:\fw\Max\edk2-platforms\Vlv2TbtDevicePkg/PlatformPkgX64.dsc
MAX_CONCURRENT_THREAD_NUMBER = 1

Creating BiosId...

GenBiosId utility, version: v1.0 06/08/2005
Copyright (c) 2005, Intel Corporation. All rights reserved.

BIOS ID created: MNW2MAX1.X64.0097.R01.1710090917
BIOS ID binary file created: C:\fw\Max\Build\Vlv2TbtDevicePkg\RELEASE_VS2013x86\IA32\BiosId.bin

GenBiosId utility, version: v1.0 06/08/2005
Copyright (c) 2005, Intel Corporation. All rights reserved.

BIOS ID created: MNW2MAX1.X64.0097.R01.1710090917
BIOS ID binary file created: C:\fw\Max\Build\Vlv2TbtDevicePkg\RELEASE_VS2013x86\X64\BiosId.bin

Invoking EDK2 build...
Building with the Build_Flags = -j EDK2.log -D SYMBOLIC_DEBUG=FALSE -D LOGGING=FALSE
Current dir is C:\fw\Max\edk2

Press any key to continue . . .
```

NOTE: MACROS

Logging

Symbolic Debug

Set to False

Press Enter to
Continue the build

DEBUG & RELEASE DIFFERENCES

DEBUG has a slower boot than RELEASE
because of time it takes to display debug info

DEBUG & RELEASE DIFFERENCES

DEBUG has a slower boot than RELEASE
because of time it takes to display debug info

DEBUG has a larger image than RELEASE
because the embedded debug info

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DEBUG uses the serial port for debug string output

DEBUG & RELEASE DIFFERENCES

DEBUG has a slower boot than RELEASE
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DEBUG has a larger image than RELEASE
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DEBUG uses the serial port for debug string output

DEBUG contains the debug strings

DEBUG & RELEASE DIFFERENCES

DEBUG has a slower boot than RELEASE
because of time it takes to display debug info

DEBUG has a larger image than RELEASE
because the embedded debug info

DEBUG uses the serial port for debug string output

DEBUG contains the debug strings

DEBUG contains detailed debug strings that show
the boot process and various ASSERT/TRACE errors

BUILD PROCESS COMPLETED

```
Build_IFWI is finished.  
The final IFWI file is located in C:\fw\Max\edk2-platforms\V1v2TbtDevicePkg\Stitch\  
=====  
C:\fw\Max\edk2-platforms\V1v2TbtDevicePkg>■
```

The EDK II build generates multiple firmware volumes, which are combined in the .BIN image.

FLASHING THE NEW BIOS

1

Access Max Binary image file from build folder

- C:/FW/Max/Vlv2TbltDevicePkg/Stitch
- DEBUG MNW2MAX1.X64.D01.0098._date_.bin
- RELEASE MNW2MAX1.X64.R01.0098._date_.bin

2

Copy BIN files to a USB Thumb drive

3

Copy MinnowBoard.MAX.FirmwareUpdateX64.efi to a USB thumb drive from /FW/PlatformBuildLab

4

Boot into the UEFI Shell on MAX then type "FS0:"



```
UEFI Firmware Interface. Version 2.00 Build 20200120 2020/01/20
UEFI v2.50 (EDK II, 0x00010000) 008-7F9B-4F30-87AC-60C9FEF5DA4E 76AE0A70
Mapping table
  FS0: Alias(s): HD8b0b0b: ; BLK1:
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/USB(0x1,0x0)/HD(1,MBR,0x00427D1E,0x40,0x1EAFC0)
  BLK0: Alias(s):
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x1,0x0)/USB(0x1,0x0)
Press ESC in 4 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:■
```

FLASHING THE NEW BIOS

- 5 Run update .efi utility with either BIN file
(Note the “TAB” Key will fill out the command line for you)

```
FS0:\> MinnowBoard.MAX.FirmwareUpdateX64.efi MNW2MAX1.X64.0098.D01.1801181447.bin
```

WAIT for the new firmware update to finish

```
FS0:\> MinnowBoard.MAX.FirmwareUpdateX64.efi MNW2MAX1.X64.0094.D01.1701181447.bi
InstallProtocolInterface: 5B1B31A1-9562-11D2-8E3F-00A0C969723B 76EAA8C0
Loading driver at 0x00076B7A000 EntryPoint=0x00076B7B650
InstallProtocolInterface: BC62157E-3E33-4FEC-9920-2D3B36D750DF 76E AAC98
InstallProtocolInterface: 752F3136-4E16-4FDC-A22A-E5F46812F4CA 787EA7A8
Intel(R) UDK2014 Firmware Update Utility for the Intel(R) Server Board S1200V3RP
S
Version 0.97
Copyright(c) Intel Corporation 2006 - 2014
Reading file MNW2MAX1.X64.0094.D01.1701181447.bin
Updating Firmware. This may take a few minutes.
.
.
.
Update successful
Shutdown system in 1 seconds ...IntelPchResetSystem() Start
```

- 6 Reset and boot new firmware

VERIFY AFTER FIRMWARE UPDATE

7

Verify that the Firmware was updated by checking the Date

At the shell prompt type “exit”

Shell>

Shell> exit

The EDK II front page will show the BIOS ID with Date/time stamp



SUMMARY

Lab Setup and Build for Nt32 or Minnowboard Max/Turbot

-  Pin Visual Command Prompt to Windows Task Bar
-  Lab 1: Build a EDK II Platform using Nt32 package
-  Lab 2: Hardware Setup for Minnowboard Max/Turbot
-  Lab 3: Build a EDK II Platform using Minnowboard Max/Turbot

Questions?

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BACKUP

BUILD ERRORS

Build Error- RC.exe

Error message:

```
"c:\Program Files (x86)\Windows Kits\8.0\bin\x64\rc.exe"
/Foc:/edkii.svn\Build\NT32IA32\DEBUG_VS2013x86\IA32\MdeModulePkg\Application\HelloWorld\HelloWorld\OUTPUT
\HelloWorldhi.lib
c:\edkii.svn\Build\NT32IA32\DEBUG_VS2013x86\IA32\MdeModulePkg\Application\HelloWorld\HelloWorld\OUTPUT\He
lloWorldhi.rc
'c:\Program' is not recognized as an internal or external command,
operable program or batch file.

NMAKE : fatal error U1077: '"c:\Program Files (x86)\Windows Kits\8.0\bin\x64\rc.exe' : return code '0x1'
Stop.
```

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

Example (VS 2013): 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

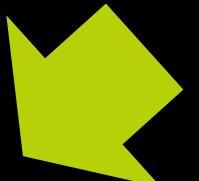
Search for your installation of Visual Studio (2013 or 2015)

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

```
# Microsoft Visual Studio 2013 Professional Edition
DEFINE WINSK8_BIN          = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSK8x86_BIN        = c:\Program Files (x86)\Windows Kits\8.1\bin\x64

# Microsoft Visual Studio 2015 Professional Edition
DEFINE WINSK81_BIN          = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSK81x86_BIN        = c:\Program Files (x86)\Windows Kits\8.1\bin\x64
```

Paths on your
machine



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

SUPPORT FOR VS 2015 FOR MINNOWBOARD MAX

The Open Source Max release does not support VS 2015

To work around do the following:

Copy the file

**“..Max/edk2/conf/tools_def_vs2015x86.txt” to
“..Max/edk2/conf/tools_def.txt”**

Check out the differences:

There is a check for **VS140COMNTOOLS** and if defined setup for VS 2015

See that tools_def.txt replaces /Wx and /W4 with /w to turn off warnings as errors

VISUAL STUDIO RESOURCE COMPILER ERROR – RC.EXE

The Rc.exe was not found and the build fails

Find where rc.exe is located
and update the
tools def.txt

Update Max/edk2/conf/tools_def.txt

Microsoft Visual Studio 2013 Professional Edition

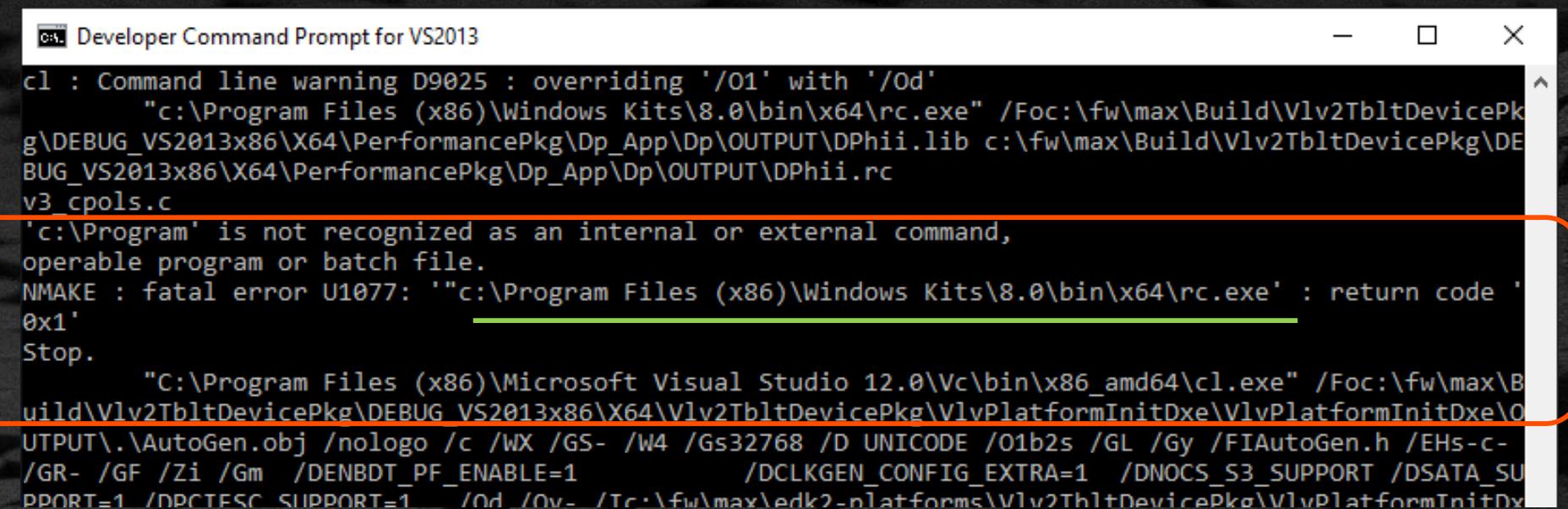
```
DEFINE WINSDK8x86_BIN = C:\Program Files (x86)\Windows Kits\8.1\bin\x64
```

Microsoft Visual Studio 2015 Professional Edition

```
DEFINE WINSK81x86_BIN = C:\Program Files (x86)\Windows Kits\8.1\bin\x64
```

Microsoft Visual Studio 2017 Professional Edition

DEFINE WINSDK10_BIN = **Location of Rc.exe**



SUPPORT FOR VS 2017 FOR MINNOWBOARD MAX

The Open Source Max release does not support VS 2017

To work around do the following:

Copy the file

"C:/FW/edk2/conf/tools_def_vs2015x86_w.txt" to
"C:/FW/Max/edk2/conf/tools_def.txt"

See that tools_def.txt replaces /Wx and /W4 with /w to turn off warnings as errors

At MS Command Prompt

```
>Set TOOL_CHAIN_TAG=VS2010x86
```