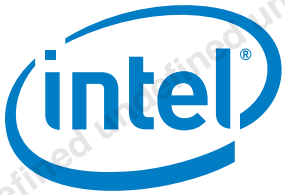

BSP for Windows Embedded Compact* 7 and 2013 for Intel® Atom™ Processor E3800 Product Family/Intel® Celeron® Processor N2807/N2930/J1900 Release

User Guide

September 2016

Software Release Version: Maintenance Release 5

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Revision History

Date	Revision	Description
September 2016	005	Maintenance Release 5
November 2015	004	Maintenance Release 4
August 2015	003	Maintenance Release 3.1
July 2015	002	Initial Release (Maintenance Release 3)
March 2015	001	Initial Release (Maintenance Release 2)

§

1.0 Introduction

This document provides important information for enabling I/O for the Intel® Board Support Package (BSP) for Windows Embedded Compact* 7 (WEC*7) and Windows Embedded Compact* 2013 (WEC*2013).

1.1 System Requirements

The following are required to build Intel® WEC*7 and 2013 I/O BSP for the Bay Trail Board.

- For WEC7: Install Microsoft* Windows Embedded Compact* 7 Platform Builder with August 2015 QFE Update (7.2.2859). This creates a WINCE700 base directory on the default hard drive (for example, the following path should exist on **C: drive: "C:\WINCE700"**). If a WINCE700 base directory does not exist, the installation will fail.
- For WEC2013: Install Microsoft* Windows Embedded Compact* 2013 Platform Builder with August 2015 QFE Update (8.1.6223). This creates a WINCE800 base directory on the default hard drive (for example, the following path should exist on **C: drive: "C:\WINCE800"**). If a WINCE800 base directory does not exist, the installation will fail.
- Intel® Atom processor E3800 (D0 stepping)
- Intel® BIOS
- Intel® WEC I/O Board Support Package (BSP) version: `Intel® Processor WEC I/O BSP.msi`

1.2 Acronyms and Terminology

Table 1. Acronyms and Terminology

Term	Description
BSOD	Blue Screen of Death (Stop Error)
GPIO	General Purpose Input/Output
I^2C*	Inter-Integrated Circuit
HS-UART	High Speed Universal Asynchronous Receiver/Transmitter
SPI	Serial Peripheral Interface
SUT	System Under Test
MSDN	Microsoft* Developer Network

2.0 Build and Install Instructions

2.1 Building WEC*7/WEC*2013 Image

2.1.1 Installing the .MSI package on Platform Builder

Note: WEC7 path is [Primary disk]\WINCE700\PLATFORM" and WEC2013 path is [Primary disk]\WINCE800\PLATFORM"

1. Double click Intel® Processor WEC IO BSP.msi to install the BSP. Press "**Next**" button to proceed with the installation. This installs to the [Primary disk]\WINCE700\PLATFORM" and creates a new directory called "INTEL_CS" along with its subdirectories.
2. To confirm that the installation is complete, verify the existence of the "INTEL_CS" directory on the path:
3. [Primary disk]\WINCE700\PLATFORM\INTEL_CS" and the items listed above in the "What's New" section are on the following paths:

- C:\WINCE700\PLATFORM\INTEL_CS\SRC\BOOTLOADER\EBOOT
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\BOOTLOADER\EBOOT\E100EBOOT\BIN
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\INC
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\IO
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\IOCTL
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\KITL
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\MPSUPPORT
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\MEMORY
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\POWER
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\COMMON\PDQOAL\STARTUP
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\ICHHDA
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\GPIO
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\I2C
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\SPI
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\HSUART
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\USB30
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\BLOCK\ATAPI
- C:\WINCE700\PLATFORM\INTEL_CS\SRC\DRIVERS\DMA

- `C:\WINCE700\PLATFORM\INTEL_CS\SRC\KITL`
- `C:\WINCE700\PLATFORM\INTEL_CS\SRC\OAL\`

2.1.2 Creating a Project

1. Run Microsoft* Visual Studio* 2012 for WEC2013, or Microsoft* Visual Studio* 2008 SP1 for WEC7.
2. Go to File → **New Project**.
3. Select project type "**Platform Builder**".
4. Select "**OS Design**", under "Visual Studio Installed templates". By default OSDesign1 will be assigned as the project name.
5. Select **OK**.
6. After the design wizard pops up, select **NEXT**. This will take you to the "`Board Support Packages`" selection window.
7. Select "`INTEL_CS: x86`", then click **Next**.
8. At "`Design Templates`", select **NEXT**.
9. At "`Applications and Media`", select **NEXT**.
10. At "`Networking and Communications`", select **NEXT**.
11. At "OS Design Project Wizard Complete", select **FINISH**. The platform builder will generate project files for your project. Acknowledge any warnings that may pop-up from Visual Studio. The default project name for your generated project will be "`OSDesign1`" under `C:\WINCE700\OSDesigns\OSDesign1`.

2.1.3 Catalog Item Selection

Select the following catalog items in the Visual Studio* Catalog Items View prior to building the project image.

2.1.3.1 Windows Embedded Compact* 7

Table 2. Catalog Item Selection for Windows Embedded Compact* 7

Feature	Catalog Item Path
Active Sync	`Core OS\Windows Embedded Compact\Applications - End User\ActiveSync`
Word Pad	`Core OS\Windows Embedded Compact\Applications - End User\WordPad`
.NET Compact Framework 3.5	`Core OS\Windows Embedded Compact\Applications and Services Development\.NET Compact Framework 3.5\.NET Compact Framework 3.5`
C Libraries and Runtimes	`Core OS\Windows Embedded Compact\Applications and Services Development\C Libraries and Runtimes\C++ Runtime Support for Exception Handling and Runtime Type Information`

Feature	Catalog Item Path
Networking	Core OS\Windows Embedded Compact\Communication Services and Networking\Networking – General\Network Utilities (IpConfig, Ping, Route)
Wireless LAN	Core OS\Windows Embedded Compact\Communication Services and Networking\Networking – Local Area Network (LAN)\Wireless LAN (802.11) Headless STA Core OS\Windows Embedded Compact\Communication Services and Networking\Networking – Local Area Network (LAN)\Wireless LAN (802.11) STA
ATAPI (SATA and PATA)	Core OS\Windows Embedded Compact\Device Drivers\Storage Devices\ATAPI PCI Support Core OS\Windows Embedded Compact\Device Drivers\Storage Devices\ATAPI PCI Support\Basic ATAPI PCI CD/DVD-ROM Support
USB Host	Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Audio Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Printer Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB RNDIS Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Host Support
SD	Core OS\Windows Embedded Compact\Device Drivers\SD Bus Driver Core OS\Windows Embedded Compact\Device Drivers\SD Host\SD Standard Host Controller Core OS\Windows Embedded Compact\Device Drivers\SD Clients\SD Memory
USB Mass Storage	Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Storage Class Driver
USB Keyboard and Mouse	Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Human Input Device (HID) Class Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Human Input Device (HID) Class\USB HID Keyboard and Mouse
Storage Manager	Core OS\Windows Embedded Compact\File Systems and Data Store\Storage Manager\Storage Manager Control Panel Applet Core OS\Windows Embedded Compact\File Systems and Data Store\Storage Manager\exFAT File System Core OS\Windows Embedded Compact\File Systems and Data Store\Storage Manager\FAT File System Core OS\Windows Embedded Compact\File Systems and Data Store\Storage Manager\Partition Driver
Mouse Cursor	Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Mouse

Feature	Catalog Item Path
Audio Codec	Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\MP3 Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\WMA Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\Waveform Audio Renderer Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\Wave/AIFF/au/snd File Parser Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\MPEG-1 Layer 1 and 2 Audio Codec For more audio codec types, please refer to MSDN.
Windows Media Player	Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\WMA and MP3 Local Playback Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media \Windows Media Player\Windows Media Player Applications\Windows Music Player For Windows Media Player options, refer to MSDN.
Internet Client Services	Core OS\Windows Embedded Compact\Internet Client Services\Browser Application\Flash10.1\Adobe Flash Player 10.1 ActiveX Control Core OS\Windows Embedded Compact\Internet Client Services\Browser Application\Internet Explorer 7.0 for Windows Embedded Compact - Standard Components\Internet Explorer 7.0 Sample Browser Core OS\Windows Embedded Compact\Internet Client Services\Internet Options Control Panel
User Interface	Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Control Panel Applets Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Date Time Setting Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Display Setting Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Network Connection Setting Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Regional Setting Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Sound Setting Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\ Wi-Fi Setting

2.1.3.2 Windows Embedded Compact 2013

Table 3. Catalog Item Selection for Windows Embedded Compact 2013

Feature	Catalog Item Path
.NET Compact Framework	Core OS\Windows Embedded Compact\Applications and Services Development\.NET Compact Framework\.NET Compact Framework – Windows Forms Support
C Runtime Library	Core OS\Windows Embedded Compact\Applications and Services Development\C Runtime Library
Networking	Core OS\Windows Embedded Compact\Communication Services and Networking\Networking – General\Network Utilities (IpConfig, Ipv6, Ping, Route)
Wireless LAN	Core OS\Windows Embedded Compact\Communication Services and Networking\Networking – Local Area Network (LAN)\Wireless LAN (802.11) STA – Automatic Configuration and 802.1x
KITL	Core OS\Windows Embedded Compact\Core OS Services\Debugging Tools\Target Control Support (Shell.exe)
ATAPI (SATA and PATA)	Core OS\Windows Embedded Compact\Device Drivers\Storage Devices\ATAPI PCI Support Core OS\Windows Embedded Compact\Device Drivers\Storage Devices\ATAPI PCI Support\Basic ATAPI PCI CD/DVD-ROM Support
USB Host	Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Audio Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Human Input Device (HID) Class Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Human Input Device (HID) Class\USB HID Keyboard and Mouse Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Modem Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Printer Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Remote NDIS Class Driver Core OS\Windows Embedded Compact\Device Drivers\USB\USB Host\USB Class Drivers\USB Storage Class Driver
SD	Core OS\Windows Embedded Compact\Device Drivers\Secure Digital (SD) Bus Driver Core OS\Windows Embedded Compact\Device Drivers\Secure Digital (SD) Memory Support Core OS\Windows Embedded Compact\Device Drivers\Secure Digital (SD) Standard Host Controller
DirectDraw	Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Graphics\DirectDraw

Feature	Catalog Item Path
Media	Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\MPEG-1 Layer 3 (MP3) Audio Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Audio Codecs and Renderers\Windows Media Audio (WMA) Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Media Formats\Audio-Video Interleaved (AVI) Filter Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Media Formats\MPEG-4 Demultiplexer Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Media Formats\Wave/AIFF/au/snd Parser Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Streaming Media Playback Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Video Codecs and Renderers\DirectShow Video Mixing Renderer Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Video Codecs and Renderers\MPEG-1 Video Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Video Codecs and Renderers\Windows Media Video (WMV) and MPEG-4 Video Codec Core OS\Windows Embedded Compact\Graphics and Multimedia Technologies\Media\Windows Media Audio (WMA) and MPEG-3 (MP3) Local Playback
Shell	Core OS\Windows Embedded Compact\Shell and User Interface\Command Shell\Command Processor Core OS\Windows Embedded Compact\Shell and User Interface\Command Shell\Console Window
Graphical Shell	Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Date Time Settings Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Display Settings Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Network Connection Settings Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Regional Settings Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Sound Settings Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Control Panels\Wi-Fi Settings
Minimal Shell	Core OS\Windows Embedded Compact\Shell and User Interface\Graphical Shell\Minimal Shell
Shell API	Core OS\Windows Embedded Compact\Shell and User Interface\Shell API

Feature	Catalog Item Path
User Interface	Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Mouse Core OS\Windows Embedded Compact\Shell and User Interface\User Interface\Network User Interface

2.1.4 Build Option Configuration

From the Solution Explorer Tab, right click on the OSDesign project and click on "**Property**". Then, choose "**Configuration Properties\Build Options**".

Table 4. Build Option Configuration

Build Options	Description
Enable KITL (IMGNOKITL)	Please check if the system requires KITL transport connection to be established when image is downloaded through eboot.bin. Recommended to disable KITL if using local storage (nk.bin) for boot process. ***Caution:*** If KITL is enabled and image is booted from local storage, the image may seem to hang or take much longer to boot.
Enable SMP Support in the kernel (IMGMPENABLE)	Please enable this build option for the Bay Trail EV/CRB fab3, Rev 03 Platform because they support hyper-threading and multi-core.

2.1.5 Enabling the Intel® Ethernet Driver in WEC7 and WEC2013

This section lists the steps for enabling the Intel® Ethernet Driver:

1. Download the "Intel® Ethernet Drivers for Microsoft* Embedded Operating System – PROEMBSW12.zip" from Intel® Download Center.
2. Extract the "PROEMBSW12.zip" file and double click on "**PROEMBSW.exe**" to start installation. Click "**Next**" until installation is completed. This installs the Ethernet driver at "C:\PROEmbSW12".
3. For WEC7: Go to "C:\PROEmbSW12\PRO1000\WINCE 6.0\PCIe", copy "e1e51ce6.dll" and "e1e51ce6.rel" to C:\WINCE700\platform\INTEL_CS\FILES

Note: These are the Ethernet driver binary files for Ethernet via PCIe* INTEL® PRO/1000 PT SERVER ADAPTER card for Intel® Atom™ E3800 Platform.

4. For WEC2013: Go to "**PROEmbSW12\PRO1000\WEC2013**", copy "**e1i61ce8.dll**", "e1iceisr.dll", "e1i61ce8.rel", and "e1iceisr.rel" to C:\WINCE800\platform\INTEL_CS\FILES

Note: These are the Ethernet driver binary files for Ethernet via PCIe* INTEL® GIGABIT CT DESKTOP ADAPTER card for Intel® Atom™ platform E3800.

5. Go to the `INTEL_CS` directory. Open the "**`INTEL_CS.bat`**" file and append the following flag at the end of the file before the line ":`not_nm10`":
6. For WEC7:

```
set CEPB_INTELE1E_PCIE=1
set STATIC_IP=1
```

For WEC2013:

```
set CEPB_INTELE1I_PCIE=1
set STATIC_IP=1
```

7. Go to `INTEL_CS\FILES` directory. Open the "`platform.reg`" file and append the registry entry.
8. For WEC7, copy the registry entry from "`C:\PROEmbSW12\PRO1000\WINCE 6.0\PCIe\e1e51ce6.reg`" file at the end of the file.
9. For WEC2013, copy the registry entry from "`PROEmbSW12\PRO1000\WEC2013\e1i61ce8.reg`" file at the end of the file.
10. Go to `INTEL_CS\FILES` directory. Open the "**platform.bib**" file and append the following at the end of the file:
11. For WEC7:

```
  IF CEPB_INTELE1E_PCIE
      E1E51CE6.dll      $(_FLATRELEASEDIR)\E1E51CE6.dll      NK  SHK
  ENDIF CEPB_INTELE1E_PCIE
```

For WEC2013:

```
  IF CEPB_INTELE1I_PCIE
      E1i61CE8.dll      $(_FLATRELEASEDIR)\E1i61CE8.dll      NK  SHK
  ENDIF CEPB_INTELE1I_PCIE

E1iCEISR.dll      $(_FLATRELEASEDIR)\E1iCEISR.dll            NK  SHK
```

12. Make sure the following catalog items are enabled: `Core OS-> Windows Embedded Compact-> Applications-End User-> ActiveSync`

2.1.6 Enabling SD/SDIO Driver in WEC7 and WEC2013

The SD/SDIO host controller is based on SD3 specification. Therefore, capable of supporting Ultra High Seed (UHS) speed mode, on top of Default Speed (DS) and High-Speed (HS). UHS support can, however, be turned off at build time optionally if the hardware do not support it with the following build variable:

1. Go to INTEL_CS directory. Open the "INTEL_CS.bat" file and append the following flag at the end of the file before the line ":not_nm10".

For WEC7:

```
set BSP_SDHC_NOUHS=1
```

For WEC2013:

```
set BSP_SDHC_NOUHS=1
```

2.1.7 Enable legacy Programmable Interrupt Controller (PIC)

This BSP is default to build with LAPIC/IOAPIC support. However, user can optionally enable legacy PIC mode through the build script. This applies to both WEC7 and WEC2013.

1. Go to INTEL_CS directory. Open the "INTEL_CS.bat" file, locate the line following line in the script:

```
if not "%BSP_PLATFORM%"=="0" goto :not_BAYTRAIL
```

2. Set the BSP_APIC and BSP_ACPICA variable within this section to "0".

```
set BSP_APIC=0
set BSP_ACPICA=0
```

2.1.8 Build the WEC7 and WEC2013 Image in Release Mode

1. Complete all the steps listed in "`Creating a Project`".
2. Under the Solution Explorer tab, right click on the **project name** (default name is OSDesign1) and select "**Properties**".
3. Change the "**Configuration**" to "**`INTEL_CS x86 Release`**".
4. Select on **Configuration Manager**.
5. Make sure "Intel_CS x86 Release" is selected in the "Active solution configuration" field.
6. Make sure "`Intel_CS x86 Release`" is the selected under "`Project contexts`". Ensure the check box under the "Build" column is checked.
7. Close the project configuration windows.
8. The project is now ready to commence the build. From Microsoft* Visual Studio* 2008, go to the "**Build**" Menu and click "**Build Solution**". The build process typically takes one-hour to complete. The actual duration of the build completion depends on the specific hardware of the build machine, software, and platform configurations chosen. Different stages of building and their progress can be viewed in the "`Output`" window.

9. The build process completes with a sequence of messages shown in "`Output`" window similar to the following:

```
  MAKEIMG: BUILDMSG: Calling
C:\WINCE700\OSDesigns\OSDESIGN1\OSDESIGN1\RelDir\INTEL_CS_x86_Release
\PostRomImage.bat
  MAKEIMG: BUILDMSG: Calling
C:\WINCE700\OSDesigns\OSDESIGN1\OSDESIGN1\RelDir\INTEL_CS_x86_Release
\PostMakeImg.bat
  MAKEIMG: BUILDMSG: Calling
C:\WINCE700\public\common\oak\misc\pbpostmakeimg.bat
  MAKEIMG: BUILDMSG: Make Image process completed successfully
BLDDEMO: BUILDMSG: OS image exists at
C:\WINCE700\OSDesigns\OSDESIGN1\OSDESIGN1\RelDir\INTEL_CS_x86_Release
\nk.bin
BLDDEMO: BUILDMSG:  Volume in drive C is OSDisk
BLDDEMO: BUILDMSG:  Volume Serial Number is B820-910F
BLDDEMO: BUILDMSG:  Directory of
C:\WINCE700\OSDesigns\OSDESIGN1\OSDESIGN1\RelDir\INTEL_CS_x86_Release
BLDDEMO: BUILDMSG: 02/14/2011  04:28 PM        37,686,963 NK.bin
BLDDEMO: BUILDMSG:                1 File(s)     37,686,963 bytes
BLDDEMO: BUILDMSG:                0 Dir(s)  52,106,936,320 bytes free
BLDDEMO: BUILDMSG: cebase build complete.
BLDDEMO: BUILDMSG: BldDemo ended at 16:29:01.69 on Mon 02/14/2011
(exit code 0)
BuildLogs: BUILDMSG: Exiting: BldDemo1.bat  -c -qbsp (result code 0).
BuildLogs: BUILDMSG: C:\WINCE700\build.log
BuildLogs: BUILDMSG: C:\WINCE700\build.out
BuildLogs: BUILDMSG: C:\WINCE700\build.wrn
```

Note: You will see some warnings during the build process and in the eventual output, but these can be considered harmless.

Once the build is successful, the kernel image nk.bin can be found in the following path: `C:\WINCE700\OSDesigns\OSDesign1\OSDesign1\RelDir\INTEL_CS_x86_Release`

2.2 Booting WEC*7 and WEC*2013 on Intel® Atom™ E3800 Product Family and Intel® Celeron® Series Platforms

2.2.1 Setting up the BIOS

The BOOT settings also need to be configured appropriately to boot up the hardware platform through the relevant boot device. After entering the BIOS, follow the instructions below to configure:

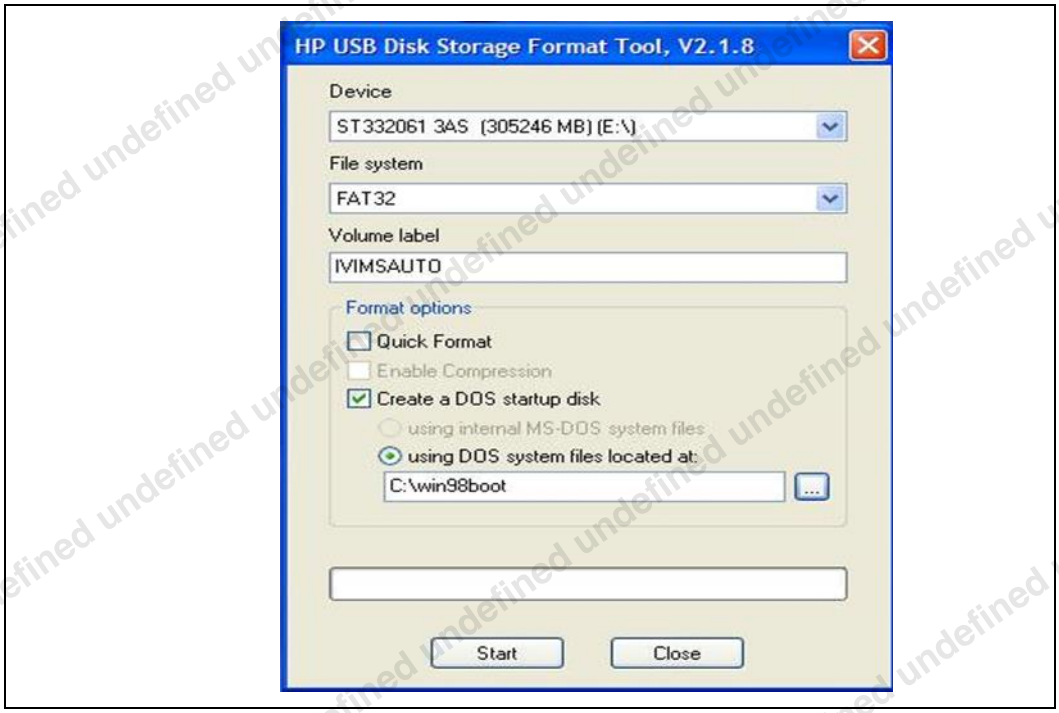
Go to Intel advanced menu and set below configuration:

- `Device Manager -> System Setup > Boot > OS Selection`: select **WEC7**
- `Device Manager -> System Setup -> South Cluster Configuration—LPSS & SCC Configuration`
  - `LPSS & SCC Device Mode` = "**PCI Mode**"
  - `SCC SD Card for Windows` = "**Enable**"
- `Device Manager -> System Setup -> Uncore Configuration`
  - `GOP Driver` = "**Disable**"
- `Device Manager -> System Setup -> South Cluster Configuration—Audio Configuration ->Audio Controller` = "**Enable"**

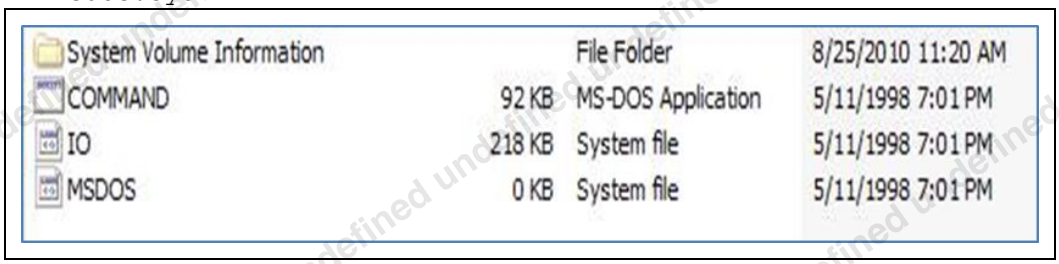
2.2.2 Boot the WEC7 and WEC2013 Image

The following instructions need to be followed to ensure that your booting device is enabled properly to boot-up the hardware platform. This example assumes you are using a SATA Hard Disk as your booting device. You can find the third party tools mentioned within this subsection online.

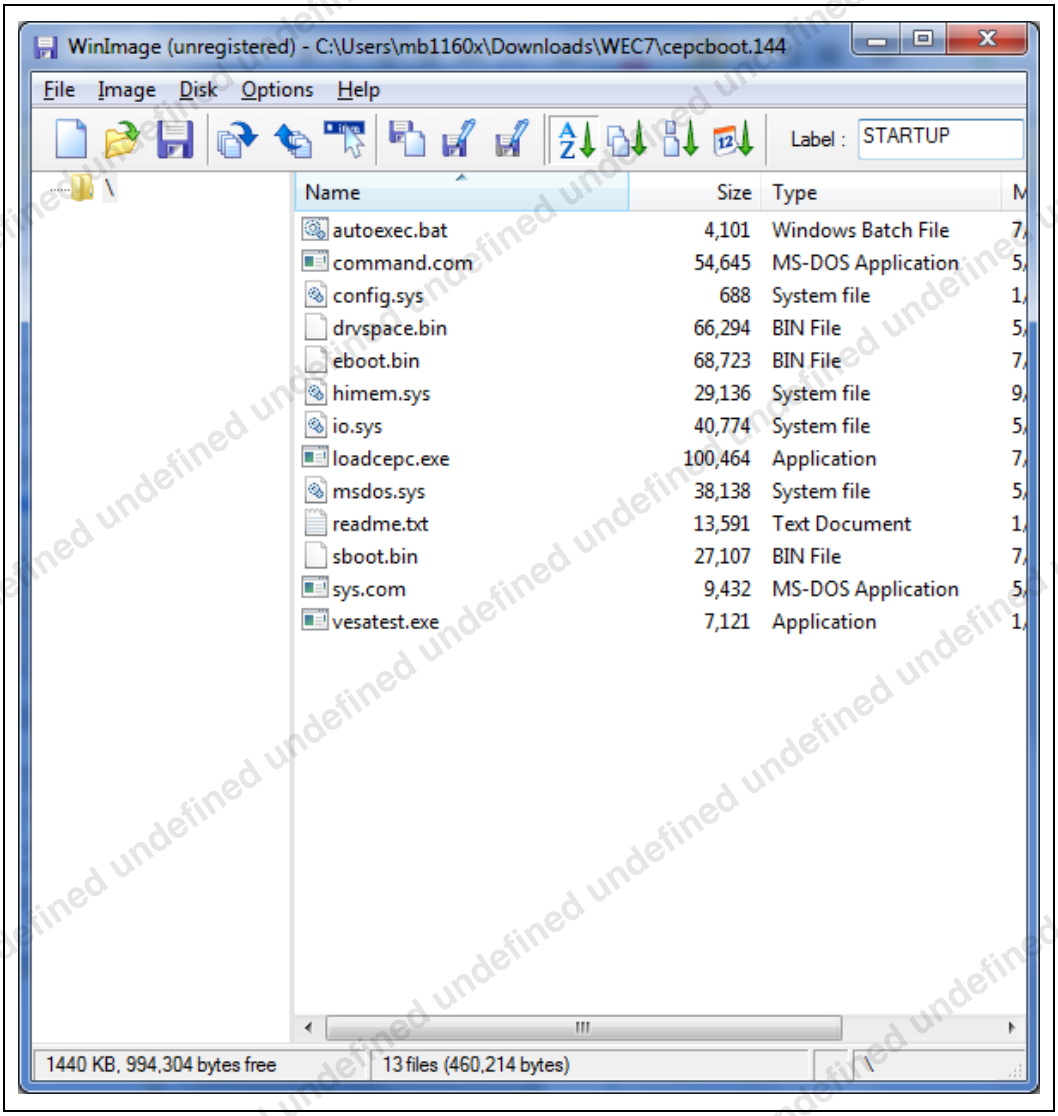
1. Install `Hewlett Packard* USB Disk Storage Format Tool` and `Winimage` on your `pc/platform builder`.
2. Extract `win98boot.zip` to any folder.
3. Plug in SATA hard disk to pc/platform builder via SATA-USB converter.
4. Run the `Hewlett Packard* USB Disk Storage Format Tool`.
5. Select the USB drive that you want to make bootable from "**Device**".
6. Select **FAT32** for the "File System".
7. Enter the **volume label** and tick "**Quick Format**" for faster format time. (Optional)
8. Select "**Create a DOS startup disk**" and select "**using DOS system files located at**:"
9. Browse to the extracted `win98boot` folder by clicking the "..." button.



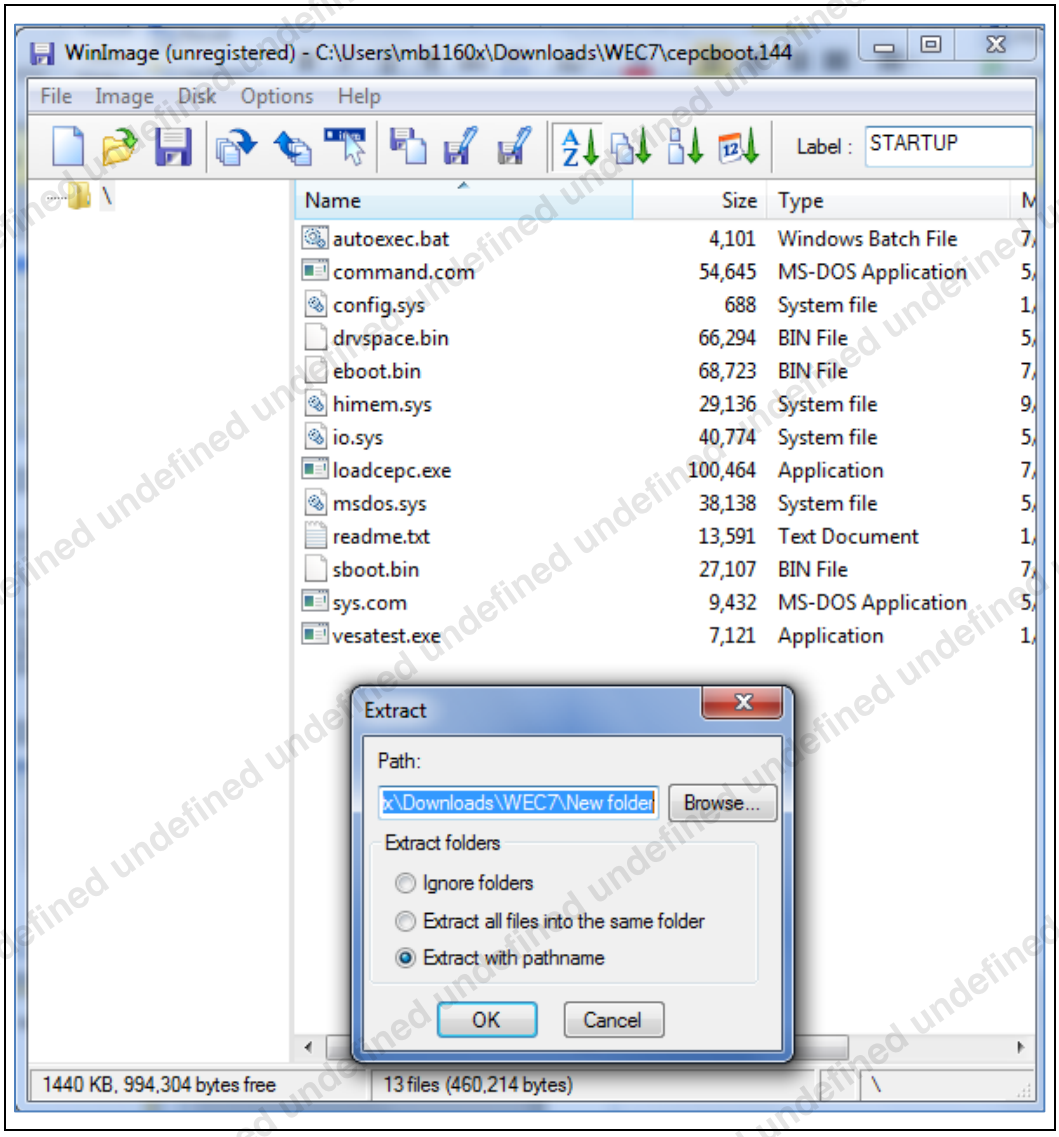
10. Click "**Start**".
11. The newly formatted SATA hard disk should contain "`command.com`, `io.sys` and `msdos.sys`".



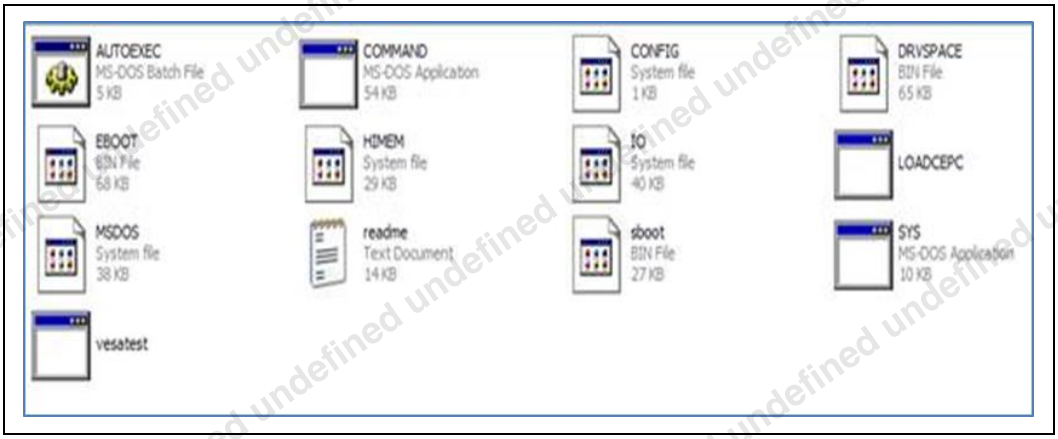
12. Open `Winimage`, click "**File**" and select "**Open**".
13. Search for the `cepcboot.144` files from the platform builder and click "**Open**". `(C:\WINCE700\platform\CEPC\src\bootloader\dos\bootdisk\diskimage\cepcboot.144)`



14. Click "**Image**" and select "**extract**".
15. Browse the path, select "Extract with pathname" and click "**OK**" to extract the contents of `cepcboot.144`.



16. Copy all the files extracted from `cepcboot.144` to the bootable SATA hard disk.
17. Click "**No**" when a message appears saying that it want to overwrite existing files.
18. You should see the following files inside your bootable SATA hard disk.



19. Copy `nk.bin` into the bootable SATA hard disk.
20. Edit the `autoexec.bat` by deleting all the data inside the `autoexec.bat` and replace it with "`loadcepc /L:800x600x16 nk.bin`". Save and close it.
21. Now plug in the SATA hard disk to the CRB and it will be able to boot the WEC 7 image (`nk.bin`) that has been created.

2.2.3 Loading the Image on BIOS through the KITL Connection

This section describes the process for loading the image on the BIOS through the KITL connection on Baytrail EV/CRB fab3 Rev 03 platform and D0 Processor.

During the development stage, the `nk.bin` can be transferred between Microsoft* Platform Builder and the target platform via the Ethernet-based KITL connection. There are two options in Baytrail EV/CRB fab3, Rev 03 platforms and D0 processors for Ethernet-based KITL:

Intel® Pro/1000 PT Server Adapter

To build an `eboot.bin` image that can support the Intel Pro/1000 PT Server Adapter, make sure the following build setting is enabled in the `INTEL_CS.bat` file:

```
set BSP_KITL_POLL_MODE=1
set BSP_KITL_INTELGBE_E1000=1
```

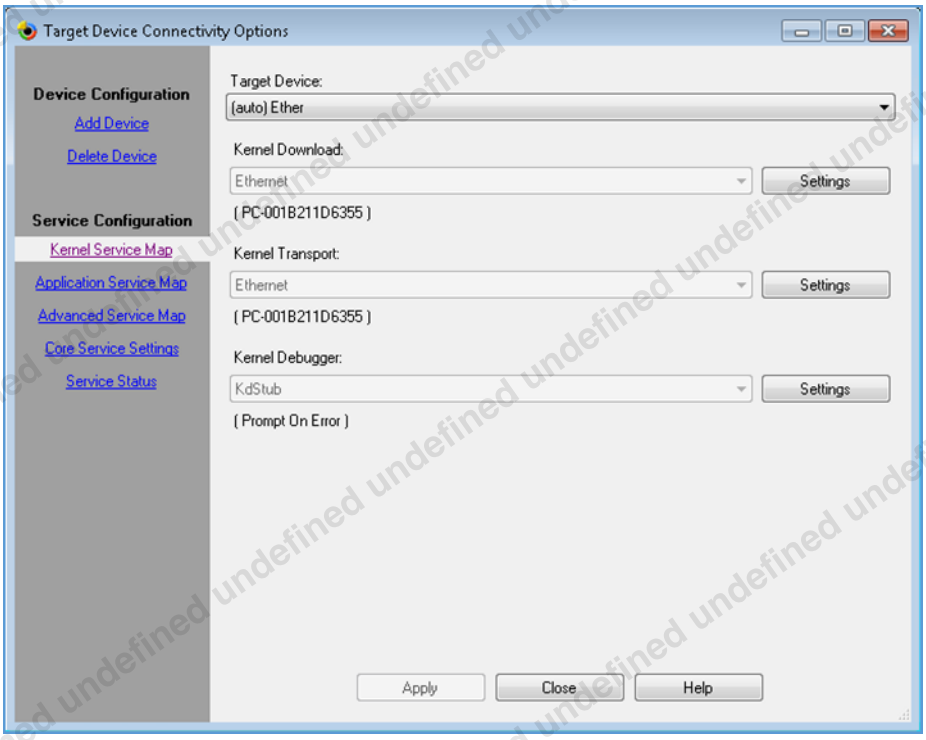
Note: The `eboot.bin` is available in `C:\WINCE700\OSDesigns\OSDesign1\OSDesign1\RelDir\INTEL_CS_x86_Release\` when the BSP is built.

Note: Remember to enable KITL (IMGNOKITL=) on the BSP's project build option as explained above in order to build an nk.bin image that starts the KITL connection by default.

For details on loading image eboot, refer to: http://msdn.microsoft.com/en-us/library/ms930104.aspx

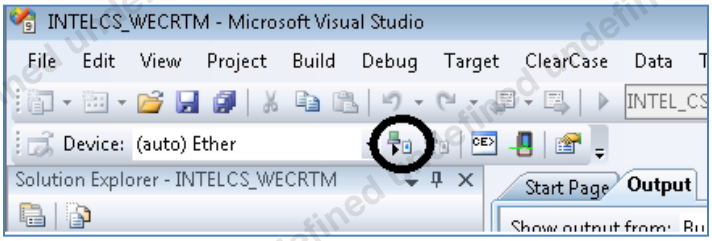
2.2.4 Loading `nk.bin` via `eboot.bin` over KITL Connection

1. Copy `eboot.bin` onto the MS-DOS formatted USB mass storage with loadcepc.exe.
2. Connect the development PC to target platform via Ethernet cable over Gigabit switch.
3. Configure the development PC Ethernet card with local IP address & mask, e.g., `172.30.179.1/255.255.255.0`
4. On the command prompt of the target platform, type the following "`C:\loadcepc /e:0:0:172.30.179.2 /L:800x600x16 eboot.bin`" for the Intel Platform.
5. Once the eboot.bin is loaded, the target platform will send a BOOTME message to Microsoft* Platform Builder.
6. From Microsoft* Platform Builder, click the menu "**`Target\Connectivity Options`**" and make sure the configurations are as follows:



Note: The target platform is chosen from the "Settings" button next to "Kernel Download: Ethernet option."

7. Once the "Target Device Connectivity Options" window is properly configured, click "Apply" or "Close".
8. Next, to attach the target platform, click the "Attach Device" button as highlighted below.



9. Finally, you will see the `nk.bin` image is downloaded over the Ethernet link and the platform is then booted up with KITL messages displayed at the “output” window of Microsoft* Visual Studio.

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