

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

## **Release Notes**

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*March 2015*

*Software Release version: Maintenance Release 2*



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## Revision History

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Date	Revision	Description
March 2015	001	Initial Release (Maintenance Release 2)

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# 1 Introduction

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This document provides system requirements and installation instructions, it details issues and limitations, and it provides legal information for Maintenance Release 2 of this software.

Related reference documentation for this release is available in the associated collateral for this release:

- BSP for Windows\* Embedded Compact 7 and 2013 for Intel® Atom™ Processor E3800 Product Family / Intel® Celeron® Processor N2807/N2930/J1900 Release User Guide (Intel document # 553989)
- BSP for Windows\* Embedded Compact 7 and 2013 for Intel® Atom™ Processor E3800 Product Family / Intel® Celeron® Processor N2807/N2930/J1900 Release Software Developer's Manual (Intel document # 556636)

## 1.1 Intended Audience

These release notes are intended for ISVs, OEMs, and ODMs.

## 1.2 Customer Support

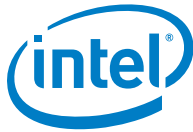
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## 1.3 Acronyms and Terminology

Table 1. Acronyms and Terminology

Term	Description
BSOD	Blue Screen of Death (Stop Error)
GPIO	General Purpose Input/Output
HS-UART	High Speed Universal Asynchronous Receiver/Transmitter
HSIC	High Speed Inter-Chip
I <sup>2</sup> C*	Inter-Integrated Circuit
ISP	Image Signal Processor for Camera
KSC	Keyboard and System Controller
SPI	Serial Peripheral Interface
SUT	System Under Test
WHCK	Microsoft* Windows* Hardware Certification Kit



## 2 Release Content

This section provides details on the contents of this release package.

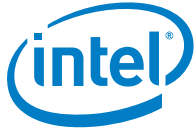
**Table 2. Release Collateral**

Release Collateral	Version	Release Date
Intel® Processor WEC IO BSP.exe	v33.1.2.2008	January 2015
BSP for Windows* Embedded Compact 7 and 2013 for Intel® Atom™ Processor E3800 Product Family / Intel® Celeron® Processor N2807/N2930/J1900 Release User Guide (Intel document # 553989)	1.2	January 2015
BSP for Windows* Embedded Compact 7 and 2013 for Intel® Atom™ Processor E3800 Product Family / Intel® Celeron® Processor N2807/N2930/J1900 Release Software Developer Guide (Intel document # 556636)	1.0	January 2015

The I/O BSP installer package contains the below drivers in source.

**Table 3. Release Package Contents**

No.	Software Driver Installed on Target System	For WEC7*	For WEC2013
1	SIO (Legacy COM)	Yes	Yes
2	SATA IDE	Yes	Yes
3	GPIO	Yes	Yes
4	HS-UART	Yes	Yes
5	I <sup>2</sup> C*	Yes	Yes
6	SPI	Yes	Yes
7	DMA (Integrated with SPI & HS-UART)	Yes	Yes
8	HD Audio	Yes	Yes
9	PCIe* Ethernet	Yes	Yes
10	PCIe* KITL	Yes	No
11	SMP (Multicore)	Yes	Yes
12	USB 3.0 Host	Yes	Yes
13	SD*, SDHC*, SDXC*	Yes	Yes
14	eMMC 4.5	Yes	Yes



## 2.1 External Dependencies

None.

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## 3 *What's New in this Release*

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The following have been changed or added in this release.

### 3.1 New Features

This release contains the following new features:

- I/O BSP for Windows\* Embedded Compact 2013 (WEC2013\*) Operating System.
- Integrated and validated with Intel® PCIe\* Ethernet for WEC2013\*. This is available for download here:  
[https://downloadcenter.intel.com/Detail\\_Desc.aspx?DwnldID=22928](https://downloadcenter.intel.com/Detail_Desc.aspx?DwnldID=22928)

### 3.2 Unsupported Features

This release does not support these features:

- **SATA\*** – SATA\* AHCI mode is not supported
- **HD Audio** – Mono recording is not supported

### 3.3 Discontinued Features

None



## 4 *Feature Limitations*

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The following are the feature limitations in this release.

### 4.1 **GPIO Driver**

None

### 4.2 **I<sup>2</sup>C\* Driver**

- Tested max single transfer length up to 256 Byte.
- Application can use multiple single transfers to transfer big data.
- Read operation for 400 Khz in I<sup>2</sup>C\* are slightly below 80% throughput due to OS limitation.
- I<sup>2</sup>C\* does not support DMA mode.

### 4.3 **SPI Driver**

- Tested max single transfer length up to 64Byte.
- To transfer big data, user application can apply multiple single transfers.
- System will automatically change to DMA support when the data size for transfer is >15 Bytes.

### 4.4 **HS-UART Driver**

- Switching between Hardware and Software Flow Control requires a system restart.
- PIO mode is only supported on 9600 and 115200 baud rate.
- Software flow control is not supported in DMA mode. This is only supported in PIO mode.
- Maximum length of a single transfer is verified up to 20 MB, with 4 M baud rate.



## 4.5 HD Audio Driver

- HD Audio driver only supports the base rates recording of 44.1 kHz and 48 kHz given by the HDA Controller.
- Recording mute is not supported.
- Dependent on Realtek\* ALC262 HD Audio Codec:
  - Only supports 44.1/48/96/192kHz sample rate.
  - Only supports 16/20/24-bit PCM for stereo audio playback and multiple input streaming.
- Dependent on the platform:
  - Only supports three ports on panel, Headphone / Line / MIC.
  - Only supports stereo audio for each port. Doesn't support Mono Input/Output.

## 4.6 SD and eMMC Driver

SD2 and SD3 driver performance on read and write speed will not achieve the SD\* card specifications due to WEC7\* IO subsystem limitation. The maximum supported SD\* card clock rate is 50 MHz for 3.3 V (SDHC\*, SDXC\*) and 25 MHz for 1.8 V (UHS), due to Intel® Atom™ processor E3800 platform issues. As such, the expected performance of SD\* and eMMC in WEC7\* on the Intel® Atom™ processor E3800 platform is as follows in the below table.

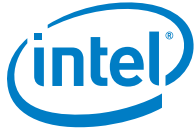
**Table 4. SD and eMMC Performance**

Type	Card Specification	Expected Performance
SDHC*	Read: 23 MB/s Write: 12 MB/s	Read: 10 MB/s Write: 5 MB/s
SDXC*	Read: 23 MB/s Write: 12 MB/s	Read: 10 MB/s Write: 7 MB/s
UHS	Read: 23 MB/s Write: 15 MB/s	Read: 10 MB/s Write: 5 MB/s
eMMC	Read: 90 MB/s Write: 45 MB/s	Read: 35 MB/s Write: 12 MB/s

**Note:** “~” indicates the approximate percentage in performance that varies depending on the different brands of card available in the market.

Only the following MMC+ cards are tested to work with the WEC7\* SD\* driver:

- Apacer\* MMCmobile 2GB
- ATP\* MMCmobile 512MB
- Kingston\* MMCmobile 2GB



## 4.7 Operating System

WEC7\* and WEC2013\* OS limitation requires a system restart when a registry key is changed.



## 5 Fixed Issues

The following issues have been fixed in this release.

**Table 5. Fixed Issues**

Issue #	Description of Issue	Implication (Impact)	Resolution
4994851	WEC7* boot up display does not come up if only the VGA port is connected to the board	WEC7* boot up display does not come up if only the VGA port is connected to the board	Bayley Bay board rework – 1. Rework: Bayley Bay Place 10k resistor followed by a wire from R6J4 to R6H9. This is to provide 10K PU on UART2 CTS signal. (OR) Place a 10 k resistor between J6J1 Pin38 and J6J1 Pin35 2. Rework: Bakersport FAB B Place 10k resistor followed by a wire from R4K4 to R4J9. This is to provide 10K PU on UART2 CTS signal. (OR) Place a 10 k resistor between J4K1 Pin38 and J6J1 Pin35
4994756	WEC2013* unable to play audio and video without UART cable plugged in.	Without plugging the UART cable into the UART ports, audio and video are unable to be played back.	Bayley Bay board rework – 1.Rework: Bayley Bay Place 10 k resistor followed by a wire from R6J4 to R6H9. This is to provide 10K PU on UART2 CTS signal. (OR) Place a 10 k resistor between J6J1 Pin38 and J6J1 Pin35 2. Rework: Bakersport FAB B Place 10 k resistor followed by a wire from R4K4 to R4J9. This is to provide 10K PU on UART2 CTS signal. (OR) Place a 10 k resistor between J4K1 Pin38 and J6J1 Pin35
4994755	Data lost, or wrong byte intermittently, during UART read/write test in PIO mode	In PIO mode, UART read/write test will have data loss, intermittently.	Fixed UART driver by changing data transfer in ISR to IST.
4994867	WEC2013* SD* and eMMC not functioning.	SD* and eMMC card is not detected in WEC2013	Fixed in SD* driver on SDIODisconnectInterrupt__X interface function.



<b>Issue #</b>	<b>Description of Issue</b>	<b>Implication (Impact)</b>	<b>Resolution</b>
4994870	SD* card encounters several critical errors in validation testing	During read/write performance test using ShustTest_card.exe, the test app will encounter error and stop.	Fixed SD* driver to compile correctly in WEC7* and in WEC2013*.
4994853	Audio playback does not route to the HD Audio Front Panel	When playing two different types of media, both audios are routed to the back panel output jack.	Fixed in HD Audio driver on the PinWidget (0x1B) of ALC262.
4634636	Audio recording recorded a lot of noise	Recording still can be done with some noise	Fixed in HD Audio driver.
4994759	Unable to mute and control microphone recording volume	Recording levels could not be adjusted or muted.	Fixed in HD Audio driver in the mixer to write register of ADC widget on audio codec.
4994757	SPI unable to complete stress test on DMA mode	SPI stress testing will consistently stop / hang on the 19th iteration	Fixed in SPI Test application.
4635030	Unable to create partition on SD* card and USB pendrive (Compact 7 Monthly Update March 2013)	User will not be able to create partition on SD* card and USB pendrive from WEC7* Storage Manager.	Fixed in Windows* Embedded Compact 7 Monthly Update, April 2014, onwards.

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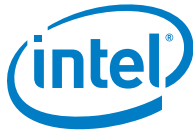


## 6 Errata and Known Issues

This section details the Errata and known issues in this release.

**Table 6. Errata and Known Issues**

Issue #	Description of Issue	Implication (Impact)	Resolution
4634577	System failed to display when using Matrox* Graphic card	System failed to display	Will not fix. User can use NVIDIA* 8400GS graphic card
4634788	ISG BIOS not supported on USB* Legacy Boot in xHCI	BYT Chipset missed this feature. Failed to boot up from USB if XHCI mode is enabled.	Will not fix. Use EHCI when needed, to boot up the system from the USB drive
4634773	USB2.0 top port (HSIC) and USB hub doesn't work in WEC7*	Device failed to detect, once connected with USB hub in USB port	Will not fix. Disable the HSIC port and enable USB top port as USB2.0.
4634569	Kingston* DataTraveler Elite 3.0 Not Working on USB2	Failed to detect USB thumb drive	Will not fix. Avoid using Kingston DataTraveler Elite 3.0 on USB2 (lower right USB2.0 port) on CRB platform
4634913	Kingston* DataTraveler Elite 3.0 in Low Performance	Transfer read/write speed getting slow. (23.2 MB/s and Read 73.4 MB/s)	Will not fix. Avoid using Kingston* DataTraveler Elite 3.0 on USB3
4634792	One bit is wrong, occasionally, in SPI on Bayley Bay	One bit is wrong when performing continuous data transfer in SPI	Will not fix. Use Bakersport Fab A, Fab B, Bayley Bay Fab2 and Bayley bay Fab 3 light green boards.
4634816	System shutdown after BIOS stage when booting up with SD card plug in (Bayley Bay Platform issue)	User failed to boot up the system when connected with the SD card.	Will not fix. Use Bakersport Fab A, Fab B.
4994854	Failed CETK Test on Measure Memory Performance Test	Nonconformance to WEC CETK	Run test without EMGD installed in the BSP.
4634576	PS/2* mouse and keyboard is not working with WEC7*	User not able to use PS/2* mouse and keyboard	Will not fix. Use USB mouse and keyboard
4994715	Spurring IRQ message during HSUART transfer in DMA mode	User will see spurring IRQ message in the debugwindows (Putty, KITL) when transfer data with HSUART DMA mode	Will be fixed in next release
4994818	[BYT][WEC7/2013] System hang at POST code 'E823' after turn off and turn back on again with XHCI mode = 'Smart Auto' or 'Auto' - D0	User unable to boot the platform after powering off the system with the power button.	Will not be fixed by BIOS. Use the reset button or power on the system totally from the power source, or change XHCI mode to Enable.
4994841	[BYT][WEC7*/WEC2013*] Unable to record audio in mono mode.	User unable to record sound in mono.	Will not fix. Hardware limitation. Use a mono recording device and record it in stereo mode.



## 6.1 Non-Intel Issues

Below are the non-Intel issues in this release.

**Table 7. Non-Intel Issues**

Issue #	Description of Issue	Implication (Impact)	Resolution
4994595	File system in Storage Manager did not reflect the actual file system type on the storage device. B3-I	The file format is always shown in exFat.	Device is still functional. User may check file system of storage device in another Windows system; i.e., in Windows* 7, Windows* 8.





## 7 Best Known Configuration

This section details the best known configuration.

**Table 8. Best Known Configuration**

Hardware Configuration		
Hardware Category	Description	Rev/Type/Source
CRB	Bayley Bay Baker Sport	FAB3 REV03 Fab B
SoC	Intel® Atom™ E3800 Product Family	D0-I (Z8XA) D0-I Headless (Z8XN)
Display	VGA (WEC7*) (WEC2013*)	
Memory	Bayley Bay: 4 GB DDR3 (2x2GB) Baker sport: 2 GB DDR3 (1x2GB with ECC)	
Firmware Configuration		
CRB BIOS	BYTICRB_IA32_R_SPI_0092_30_SeC_Enable (Stitched BIOS Integrated with 3777 VBIOS)	Intel
KSC	v03.14	Intel
Driver/OS Configuration		
Operating System	WEC7* Official Release, Update August 2014 (7.1.2843) WEC2013* Official Release, Update August 2014 (8.0.6211)	MSDN
IO Driver	Intel® Processor WEC IO BSP.msi	Intel
EMGD Driver	Intel_BYT_WEC7_EMGD_D36.16.0_RC_2014-12-02_3867.zip Intel_BYT_WEC13_EMGD_D36.16.0_RC_2014-12-02_3867.zip	Intel

### 7.1 Recommended BIOS Configuration

**Table 9. Recommended BIOS Configuration**

BIOS Selection	Configuration
OS Selection	Device Manager -> System Setup > Boot > OS Selection: select WEC7*
LPSS	Device Manager -> System Setup -> <i>South Cluster Configuration—LPSS &amp; SCC Configuration</i> > LPSS & SCC Device Mode = "PCI Mode"
SD Card	Device Manager -> System Setup -> <i>South Cluster Configuration—LPSS &amp; SCC Configuration</i> > SCC SD Card for Windows = "Enable"



BIOS Selection	Configuration
Audio	Device Manager -> System Setup -> <i>South Cluster Configuration— Audio Configuration</i> > Audio Controller = "Enable"
GPO	Device Manager -> System Setup -> <i>Uncore Configuration</i> > <i>GOP Driver</i> = "Disable"

## 7.2 Tested Features

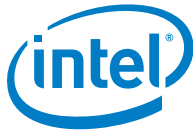
Features tested with Intel WEC7\* IO BSP and Windows Catalog are listed in the below table. These features may have limitations and known issues. See [Section 6](#) for details.

**Table 10. Tested Features**

Area	Feature	Source	WEC7 Test	WEC13 Test
<b>CEPC Boot Loaders</b>	WCELDLR	WEC Inbox feature	Pass	Pass
	LoadCEPC	WEC Inbox feature	Pass	Pass
	Eboot	Intel BSP	Pass	Pass
<b>SIO</b>	Legacy Serial COM port	Intel BSP	Pass	Pass
	PS/2* Mouse and Keyboard	WEC Inbox driver	Not Supported	
<b>USB</b>	General USB 2.0 feature	WEC Inbox driver	Pass	Pass
	General USB 3.0 feature	Intel BSP	Pass	Pass
	USB Wi-Fi* USB 2.0: SparkLAN-Ralink RT2870 USB WIFI dongle with EHCI mode USB 3.0: VNT6656 USB WIFI dongle with EHCI and XHCI mode.	Third Party Device Driver	Pass	Not Tested: (USB WiFi* for WEC2013* as device driver not available at time of testing)
	USB2.0 Boot	WEC Inbox driver	Pass	Pass
<b>SATA2</b>	General SATA2 IDE feature Support on ATAPI driver for 2x SATA port	Intel BSP	Pass	Pass
<b>SMP</b>	Symmetric Multi-Processing	Intel BSP	Pass	Pass
<b>PCIe</b>	General PCIe* feature	WEC Inbox driver	Pass	Pass
	KITL	Intel BSP	Pass	Pass
	Ethernet WEC7*: Tested with Ethernet Driver for PCIe* Intel/Pro 1000 PT Server Adapter WEC2013*: Tested with Ethernet Driver for PCIe* Intel Gigabit CT Desktop Adapter	Intel Driver from <a href="#">Intel Download Center</a>	Pass	Pass



Area	Feature	Source	WEC7 Pass	WEC13 Pass
<b>High Definition Audio</b>	HD Audio Controller Support	Intel BSP	Pass	Pass
	ALC262 Support			Pass
	WEC7* Software Mixer			Pass
	Master Volume / Mute control			Pass
	Audio stereo playback			Pass
	Audio recording			Pass
	2 Independent Audio Playback 2x audio playback outputs at Port-C and Port-D and 1x audio recording input at Port F on Bayley Bay Platform.			Pass
<b>GPIO</b>	Direction Setting	Intel BSP	Pass	Pass
	Level Value Setting		Pass	Pass
	Pin Setting Query		Pass	Pass
	Multiplexing Setting		Pass	Pass
<b>I<sup>2</sup>C*</b>	Standard Mode (100 Kbps)	Intel BSP	Pass	Pass
	Fast Mode (400 Kbps)		Pass	Pass
<b>HS-UART</b>	Baud rate support 300-921600, 1 M, 2 M 3 M and 4 M	Intel BSP	Pass	Pass
	Data size 5, 6, 7, 8-bit		Pass	Pass
	Odd, even, none parity		Pass	Pass
	1, 1.5, and 2 stop bits		Pass	Pass
	Hardware and Software and No flow control		Pass	Pass
	PIO Support		Pass	Pass
	DMA Support		Pass	Pass
<b>SPI</b>	SPI Mode 0,1,2,3	Intel BSP	Pass	Pass
	Transfer rate from 100 Kbps up to 15 Mbps		Pass	Pass
	DMA Support		Pass	Pass
<b>SD</b>	SD*, SDHC*, and SDXC* cards	Intel BSP	Pass	Pass
	Class 2,4,6,10, UHS		Pass	Pass



## Best Known Configuration

Area	Feature	Source	WEC7 Pass	WEC13Pass
	1-bit and 4-bit bus mode		Pass	Pass
	FAT32, exFAT file system		Pass	Pass
	ADMA Transfer mode		Pass	Pass
eMMC 4.5	1-bit, 4-bit, and 8-bit bus mode	Intel BSP	Pass	Pass
	FAT32 file system		Pass	Pass

### NOTES:

1. SATA\* Support on ATAPI driver for 2x SATA port. SATA AHCI mode is not supported.
2. USB Support WiFi\* via SparkLAN-Ralink RT2870 USB WiFi\* dongle with EHCI mode and VNT6656 USB WiFi\* dongle with EHCI and XHCI mode.
3. High Definition Audio Support 2x audio playback outputs at Port-C and Port-D and 1x audio recording input at Port F



## **8      *Hardware and Software Compatibility***

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This release is compatible with the following hardware and software:

- Intel® Atom E3800 Product Family
- Intel® Celeron® Processor N2807/N2930/J1900 Release