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

Release Notes

September 2016

Software Release version: Maintenance Release 5

Document Number: 332152-005US

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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)

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1.0 Introduction

This document provides system requirements and installation instructions. It details issues and limitations, and provides legal information for Maintenance Release 5 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 # 332154)

- *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 # 332153)

1.1 Intended Audience

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

1.2 Customer Support

For technical support, including answers to questions not addressed in this product, visit the technical support forum, FAQs, and other support information at: http://www.intel.com/software/products/support/.

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1.3   Acronyms and Terminology

Table 1.   Acronyms and Terminology

Term	Description
DMA	Direct Memory Access
GPIO	General Purpose Input/output
HS-UART	High Speed Universal Asynchronous Receiver/Transmitter
HSIC	High Speed Inter-Chip
I^{2}C*	Inter-Integrated Circuit
KSC	Keyboard and System Controller
SIO	Super Input Output
SPI	Serial Peripheral Interface

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2.0 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	v33.15.3125	September 2016
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 # 332154)	005	September 2016
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 # 332153)	005	September 2016

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

Table 3. Release Package Contents

No.	Software Driver Installed on Target System	For WEC7*	For WEC2013
1	Super Input Output (SIO) (Legacy COM)	Yes	Yes
2	SATA IDE	Yes	Yes
3	GPIO (General Purpose Input/Output)	Yes	Yes
4	HS-UART (High Speed Universal Asynchronous Receiver/Transmitter)	Yes	Yes
5	Inter-Integrated Circuit (I^2C*)	Yes	Yes
6	Serial Peripheral Interface (SPI)	Yes	Yes
7	Direct Memory Access (DMA) (Integrated with Serial Peripheral Interface (SPI) and 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 (with USB FS/HS/SS hub support)	Yes	Yes
13	SD*, SDHC*, SDXC*	Yes	Yes
14	eMMC* 4.5	Yes	Yes
15	SDIO support	Yes	Yes

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2.1 External Dependencies

None.

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3.0   *What's New in this Release*

The following have been changed or added in this release.

3.1   New Features

N/A

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

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4.0 *Feature Limitations*

The following are the feature limitations in this release.

4.1 GPIO Driver

None

4.2 I²C* 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 I²C* are slightly below 80% throughput due to OS limitation.
- I²C* does not support DMA mode.

4.3 SPI Driver

- Tested max single transfer length up to 64 Byte.
- 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.

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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 inputs streaming.

- Dependent on the platform:
  – Only supports three ports on panel, Headphone/Line/MIC.
  – Only supports stereo audio for each port. Does not support Mono Input/Output.

4.6　SD/SDIO and eMMC* Driver

- SDIO controller shall support Wireless module only.

- SD Memory controller shall support memory device only.

- eMMC* driver do not support HS200 speed mode.

4.6.1　Lower than Expected Performance

- SD2 and SD3 driver performance on read and write speed will not achieve the SD* card specifications due to the WEC*7 I/O subsystem limitation. The maximum supported SD card clock rate is 50 MHZ for 3.3 V (SDHC*, SDXC*) and 25 MHz for 1.8V (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 indicated in the table below.

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 WEC*7 SD* driver:

- Apacer* MMCmobile 2 GB

- ATP* MMCmobile 512 MB

- Kingston* MMCmobile 2 GB

4.7 Operating System

WEC*7 and WEC*2013 OS limitation requires a system restart when a registry key is changed.

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5.0   *Fixed Issues*

The following issues have been fixed in this release.

Table 5.   Fixed Issues

Issue #	Description of Issue	Implication (Impact)	Resolution
4995325	[WEC7/2013] USB break intermittently when unplugged USB hub.	USB 3.0 Hub cannot be disconnected directly when there is USB device connected to it.	Fixed in MR5
4995474	USB Bus Coupler will not be recognized	USB Bus Coupler will not be recognized	Fixed in MR5
4995544	Long delay of IOCTL call to the Tc USB driver	Observed long delay of IOCTL call when inserted a large USB stick (4 GB/8 GB).	Fixed in MR5

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6.0 Errata and Known Issues

This section details 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.
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* DataTravaler 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.
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.

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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.
4995239	[WEC2013] Video playback stuttering when copied to and playback from eMMC /SD card	Video playback stuttering when video vlip is copied to and playback from eMMC card.	Will not fix. Use command below to copy the video file: copy `<Video File>` "\\`<Storage Card>`\\`<Video File>`\"

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7.0 *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 (WEC*7) (WEC*2013)	
Memory	Bayley Bay: 4 GB DDR3 (2x2GB) Baker sport: 2 GB DDR3 (1x2GB with ECC)	
Firmware Configuration		
CRB BIOS	BYTICRB_IA32_R_SPI_0093_41_SeC_Enable (Stitched BIOS Integrated with 3842 VBIOS)	Intel
Keyboard and System Controller (KSC)	v03.14	Intel
Driver/OS Configuration		
Operating System	WEC*7 Official Release, Update August 2015 (7.2.2859) WEC*2013 Official Release, Update August 2015 (8.1.6223)	MSDN
IO Driver	Intel® Processor WEC IO BSP.msi	Intel
EMGD Driver	Intel® EMGD for Windows Embedded Compact* 7 (build #3070) v36.16.4 Intel® EMGD for Windows Embedded Compact* 2013 (build #3070) v36.18.4	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 > *South Cluster Configuration—LPSS & SCC Configuration* > LPSS & SCC Device Mode = "PCI Mode"
SD Card	Device Manager > System Setup > *South Cluster Configuration—LPSS & SCC Configuration* > SCC SD Card for Windows = "Enable"

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

7.2 Tested Features

Features tested with Intel WEC*7 IO BSP and Windows* Catalog are listed in the table below. These features may have limitations and known issues. See Section 6.0 for details.

Table 10. Tested Features

Area	Feature	Source	WEC7 Test	WEC13 Test
CEPC Boot Loaders	WCELDR	WEC Inbox feature	Pass	Pass
	LoadCEPC	WEC Inbox feature	Pass	Pass
	Eboot	Intel BSP	Pass	Pass
SIO	Legacy Serial COM port	Intel BSP	Pass	Pass
	PS/2* Mouse and Keyboard	WEC Inbox driver	Not Supported	
USB	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 Wi-Fi dongle with EHCI mode USB 3.0: VNT6656 USB Wi-Fi* dongle with EHCI and XHCI mode	Third Party Device Driver	Pass	Not Tested: (USB Wi-Fi* for WEC2013* as device driver not available at time of testing)
	USB2.0 Boot	WEC Inbox driver	Pass	Pass
	USB FS/HS/SS hub support on XHCI controller	Intel BSP	Pass	Pass
SATA2*	General SATA2* IDE feature Support on ATAPI driver for 2x SATA* port	Intel BSP	Pass	Pass
SMP	Symmetric Multi-Processing	Intel BSP	Pass	Pass
PCIe*	General PCIe* feature	WEC Inbox driver	Pass	Pass
	KITL	Intel BSP	Pass	Pass
	Ethernet WEC*7: Tested with Ethernet Driver for PCIe* Intel® Pro/1000 PT Quad Port Server Adapter WEC2013*: Tested with Ethernet Driver for PCIe* Intel Gigabit CT Desktop Adapter	Intel Driver from Intel Download Center	Pass	Pass

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Area	Feature	Source	WEC7 Pass	WEC13 Pass
High Definition Audio	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
GPIO	Direction Setting	Intel BSP	Pass	Pass
	Level Value Setting		Pass	Pass
	Pin Setting Query		Pass	Pass
	Multiplexing Setting		Pass	Pass
I²C*	Standard Mode (100 Kbps)	Intel BSP	Pass	Pass
	Fast Mode (400 Kbps)		Pass	Pass
HS-UART	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
SPI	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
SD	SD*, SDHC*, and SDXC* cards	Intel BSP	Pass	Pass
	Class 2,4,6,10, UHS-I (Default Speed, HS, SDR12, SDR25, SDR50, DDR50)		Pass	Pass
	1-bit and 4-bit bus mode		Pass	Pass

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Area	Feature	Source	WEC*7 Pass	WEC13* Pass
SD (Cont.)	FAT32, exFAT file system	Intel BSP (Cont.)	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
SDIO	Wireless Module	Intel BSP	Pass	Pass

NOTES:
1. SATA* Support on ATAPI driver for 2x SATA port. SATA AHCI mode is not supported.
2. USB Support Wi-Fi* via SparkLAN-Ralink RT2870 USB Wi-Fi* dongle with EHCI mode and VNT6656 USB Wi-Fi* 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.

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8.0   *Hardware and Software Compatibility*

This release is compatible with the following hardware and software:

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- Intel® Celeron® Processor N2807/N2930/J1900 Release

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