



BSP for Microsoft* Windows* 10 64-bit on Intel Atom® Processor E3800 Product Family

Release Notes

March 2017

MR1 Release

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Revision History

Date	Revision	Description
March 2017	1.1	MR1 Release
October 2015	1.0	Initial release – Gold release

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1.0 Introduction

This release notes document the General Purpose Input/Output (GPIO), Inter-Integrated Circuit* (I2C*), Serial Peripheral Interface (SPI), High-Speed universal asynchronous receiver/transmitter (HSUART) and Smart Sound Technology (SST) Driver Binary Packages for the Microsoft* Windows* 10 64-bit operating system. This document also includes information of the Inbox drivers for Windows 10 that have been validated on the Intel Atom® E3800 processor. The driver interfaces, limitations, and known issues are also covered.

This document is intended for OEMs and ODMs that are enabling drivers with the Intel Atom® E3800 processor, Intel® Celeron® Processor N2XXX, and Intel® Celeron® Processor J1XXX.

1.1 System Requirements

The following operating system is supported:

Microsoft Windows 10 64-bit Operating System

1.2 Terminology

Table 1. Terminology

Term	Description
API	Application Programming Interface
BSP	Board Support Package
DMA	Direct Memory Access
GPIO	General Purpose Input/Output
HSUART	High-Speed Universal Asynchronous Receiver/Transmitter
I2C*	Inter-Integrated Circuit*
I/O	Input/output
IOCTL	Input/Output Control
PCIe*	Peripheral Component Interconnect Express*
PIO	Mode Programmed I/O Mode
SATA	Serial ATA
SPI	Serial Peripheral Interface



Term	Description
USB	Universal Serial Bus

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2.0 Platform BKMs

2.1 Release Details

Driver Version (GPIO, I2C*, SST): 1.1.1.1004

Driver Version (HSUART, SPI): 1.1.1.1010

Released on March 2017

2.2 Release Contents

The contents of this release include:

- Intel® Processor Windows* 10 – Input/Output (I/O) Drivers 64-bit Driver Installer
 - Intel® Processor, Windows 10 I/O Drivers 64-bit.cab archive contains the following drivers for your system:
 - Intel Atom®/Celeron®/Pentium® Processor UART Host Controller
 - Intel Atom®/Celeron®/Pentium® Processor I2C Controller
 - Intel Atom®/Celeron®/Pentium® Processor SPI Controller
 - Intel Atom®/Celeron®/Pentium® Processor GPIO Controller
 - Intel Atom®/Celeron®/Pentium® Processor SST
- Intel® Processor Windows 10 – I/O Drivers Release Notes
- Intel® Processor Windows 10 – I/O Drivers User's Guide
- Intel Software License Agreement

2.3 The Ready Feature

Table 2. The Ready Feature

Area	Feature	Source	Ready
Universal Serial Bus (USB)	General USB 2.0 feature	Windows* 10 Inbox driver	Yes
	General USB 3.0 feature	Windows* 10 Inbox driver	Yes
	USB2.0 Boot	Windows* 10 Inbox driver	Yes
SATA	General Serial ATA (SATA) feature	Windows* 10 Inbox driver	Yes
Peripheral Component Interconnect Express* (PCIe*)	General PCIe feature	Windows* 10 Inbox driver	Yes



Area	Feature	Source	Ready
Intel® High Definition Audio	General HD Audio feature	Windows* 10 Inbox driver	Yes
	Intel Display Audio	Integrated in Intel Embedded Media and Graphics driver	Yes
Power Management	Power Mgmt S0 and S5	N/A	Yes
	Power Mgmt Sleep S3	Intel	Yes
	Power Mgmt Hibernate S4		Yes
GPIO Driver	Direction Setting	Intel	Yes
	Multiplexing Setting		Yes
	Level Value Setting		Yes
	Pin Setting Query		Yes
I2C* Driver*	Standard Mode (100 Kbps)	Intel	Yes
	Fast Mode (400 Kbps)		Yes
SPI Driver*	SPI Mode 0, 1, 2, 3	Intel	Yes
	Transfer rate from 100Kbps up to 15 Mbps		Yes
HS-UART Driver*	Baud rate support up to 4000000	Intel	Yes
	Data size 5, 6, 7, 8-bit		Yes
	Odd, even, none parity		Yes
	1, 1.5, and 2 stop bits		Yes
	Hardware and No flow control		Yes
DMA Feature* (I2C*, SPI, HS-UART)	DMA support for I2C*, SPI, and HS-UART	Intel	Yes

NOTE: Refer to Feature Highlights and Limitations for the limitations of GPIO, I2C*, SPI, HSUART, and SST features.



3.0 *What's New in this Release*

The release of I/O drivers that work with the Windows* 10 operating system are as follows:

- GPIO
- I2C*
- SPI
- HSUART
- SST

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4.0 Feature Highlights and Limitations

4.1 GPIO Driver

Refer to the following for details on the GPIO driver:

[https://msdn.microsoft.com/en-us/library/windows/hardware/hh439456\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/hardware/hh439456(v=vs.85).aspx)

The GPIO driver interface is exposed by a series of Input/Output Control (IOCTLs).

The Driver Binary Package consists of these files:

- iaio gpio.inf
- iaio gpio.sys
- iaio gpio.cat

The following are the enabled features:

- Supports GPIO multiplexing setting.
- Supports GPIO setting query – queries multiplexing information on GPIO pins.
- Supports GPIO direction setting – configures the selected GPIO pin as an input or output pin.
- Supports GPIO read pin – reads the input pin's level value.
- Supports GPIO write pin – configures an output pin's level as high or low.
- Supports GpioClx DDI.

Limitations:

No known limitation

4.2 I2C* Driver

Refer to the following for details on the I2C* driver:

[https://msdn.microsoft.com/en-us/library/windows/hardware/hh450906\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/hardware/hh450906(v=vs.85).aspx)

There are seven I2C controllers on the Intel Atom® E3800 processor, Intel® Celeron® N2XXX, and J1XXX processors, which share Direct Memory Access (DMA) engine. Hence, transferring large amounts of data can cause one I2C controller to occupy the DMA engine for a long duration.

By default, the I2C driver uses DMA to copy data between peripherals and system memory. However, the Windows* registry can be set to disable the DMA feature and copy data with the Programmed I/O Mode (PIO Mode).



Refer to the “Software Driver BKMs” section in the BSP for Microsoft* Windows* 10 64-bit on Intel Atom® Processor E3800 Product Family User Guide (Doc Id 561523) on how to set the registry.

The Driver Binary Package consists of these files:

- iaioi2c.inf
- iaioi2c.sys
- iaioi2c.cat

The following are the enabled features:

- Supports 7-bit Address Mode
- Supports Standard Mode (100 Kbps)
- Supports Fast Mode (400 Kbps)
- Supports Polling of I/O Data Transfer

Limitations:

The maximum single transfer size is limited to 64 Kbytes. Multiple transfers are required for data size more than 64KB.

4.3 SPI Driver

Refer to the following for details on the SPI driver:

[https://msdn.microsoft.com/en-us/library/windows/hardware/hh450906\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/hardware/hh450906(v=vs.85).aspx)

The SPI driver interface is exposed by a series of IOCTLs.

The Driver Binary Package consists of these files:

- iaiospi.inf
- iaiospi.sys
- iaiospi.cat

The following are the enabled features:

- Supports SPI modes 0, 1, 2, 3.
- Supports a minimum transfer rate of 100 Kbps and a maximum rate of 15 Mbps.
- Supports polling of I/O data transfer (read/write).
- DMA data transfer.

Limitations:

No known limitation



4.4 HSUART Driver

The HSUART Driver interface is exposed by the standard Windows serial communication interface. Refer to the following for details on serial communications in Microsoft* Win32:

<http://msdn.microsoft.com/en-us/library/ms810467.aspx>

The Driver Binary Package consists of these files:

- iaiouart.inf
- iaiouart.sys
- iaiouart.cat

For details on the Driver Interface Header, refer to

<http://msdn.microsoft.com/enus/library/ms810467.aspx>

The following are the enabled features:

- Supports baud rates of 300–921600, up to 3686400 by default as specified in the “Bay Trail-I SoC External Design Specification” (Doc Id 538136) Section 27.2.3 Baud Rate Generator. To set baud rates of 1M, 2M, 3M, and 4M, refer to the “Software Driver BKMs” section in the BSP for Microsoft* Windows* 10 64-bit on Intel Atom® Processor E3800 Product Family document (Doc Id 561523).
- Supports data sizes of 5, 6, 7, and 8 bit.
- Supports none, odd, and even parity.
- Supports 1, 1.5, and two stop bits.
- Supports "Hardware" and "No" flow control
- Supports Serial Device Control Requests (IOCTLs) defined by Microsoft for serial controllers in Windows. Refer to the following Limitations section for IOCTLs.

Limitations:

- When using 1.5 stop bits, the data size can only be supported up to 5 bits.
- The following are IOCTLs that are not supported in the driver:
 - IOCTL_SERIAL_XOFF_COUNTER
 - IOCTL_SERIAL_LSRMST_INSERT
 - IOCTL_SERIAL_SET_BREAK_ON
 - IOCTL_SERIAL_SET_BREAK_OFF

4.5 SST Driver

Refer to the following for details on the SST driver.

The Driver Binary Package consists of these files:

- isstrtc.inf



- isstrtc.sys
- isstrtc.cat
- realtek_fw_sst.bin

The following are the enabled features:

- Supports one mono/stereo line in and line out
- SSP2 is configured in I2S 48 kHz, stereo mode on playback and capture for Realtek Audio Codec connectivity
- System pin supports only 16-Bit 48KHz stereo PCM format whereas offload pin support PCM formats from 8-Bit, 16-bit, and 24 Bit with sampling rates from 8KHz to 192KHz

Limitations:

- No supports for time-division multiplexing (TDM)
- No supports for HDMI, Bluetooth, and DisplayPort audio

4.6 Known Issues - Closed

Issue #	Description	Impact	Resolution
4995268	Windows 10* Athens: [Hardware Lab Kit] DriverVerifier is not a registered WDTF system interface name	HLK tests fail.	Fixed in this release.
4995269	Windows 10* Athens: [Hardware Lab Kit] Driver Memory Test fail due to System.IO.FileNotFoundException	HLK tests fail.	Fixed in this release.
4995349	UART 1M and 4M failed	Issue only happened on MinnowBoard Max (MBM).	No RTS/CTS pin on MBM, only supported None flow control.
4995593	HSUART driver doesn't work well with v93.44 BIOS.	HSUART is not loaded with v93.44.	Update the MMIO base in the CST ACPI table. Refer to BWG Addendum A.12 for details (to be updated).

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5.0 Hardware and Software Compatibility

This release is compatible with the following hardware and software, respectively:

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

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