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

User Guide

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MR1 Release

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Revision History

Date	Revision	Description
March 2017	1.1	Microsoft* Windows* 10 MR1 Release
October 2015	1.0	Microsoft* Windows* 10 Gold Release

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1.0   Introduction

1.1   Scope of Document

This User Guide describes how to install Microsoft* Windows* 10 I/O drivers (GPIO, I2C*, SPI, HSUART, and SST) and best known methods for platforms and software drivers.

This User Guide is intended for OEMs and ODMs that are enabling drivers for the Windows* 10 operating system with the Intel Atom® E3800 processor, Intel® Celeron® Processor N2XXX, and Intel® Celeron® Processor J1XXX.

1.2   System Requirements

The following operating system is supported:

Microsoft Windows 10 64-bit Operating System

1.3   Terminology

Table 1.   Terminology

Term	Description
ADK	Assessment and Deployment Kit
BSP	Board Support Package
COM Port	Communication Port
CRB	Customer Reference Board
DMA	Direct Memory Access
EEAP	Ecosystem Engineering Access Program
EHCI	Enhanced Host Controller Interface
FFU	Full Flash Update
GPIO	General Purpose Input/Output
HSUART	High-Speed Universal Asynchronous Receiver/Transmitter
I2C*	Inter-Integrated Circuit*
NIC	Network Interface Card
ODM	Original Design Manufacturer
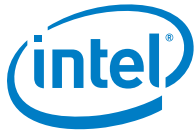
Term	Description
OEM	Original Equipment Manufacturer
PIO Mode	Programmed I/O Mode
RTM	Release to Manufacturing
SDK	Software Development Kit
SPI	Serial Peripheral Interface
SST	Smart Sound Technology
UART	Universal Asynchronous Receiver/Transmitter
WDK	Windows Driver Kit

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2.0 Driver Installation

1. BIOS Setup for installation.

    In BIOS settings, enter "Device Manager > System Setup" and follow with these settings:
    – Boot > OS Selection > "Windows 8.x"
    – South Cluster Configuration > Audio Configuration > LPE Audio Support > "LPE Audio ACPI mode"
      Note: Run these settings to enable LPE audio. Do not enable LPE if HD Audio is intended.

2. Execute Intel_Processor_Win10_IO_Drivers_64Bit.exe.

3. Click Next and read the license agreement. If you accept it, click Accept to install.

4. Choose Complete setup type and then click Next.

5. Wait until the driver installs successfully, then reboot the system.

3.0   *Platform BKMs*

The following are recommended platform reworks to enable the supported I/O drivers (GPIO, I2C*, SPI, and HSUART) on Intel CRBs, and is not an exhaustive list of platform reworks.

3.1   How to Rework Bakersport Fab B USB 3.0 Port

By default, the Bakersport Fab B CRB has an issue with the USB 3.0 port. This port fails to read several types of USB 3.0 flash drives and is unable to achieve USB 3.0 performance.

Remark

Patriot Memory* 64GB and EDGE Memory* DiskGO* 32GB USB flash drives are not recommended for use in EHCI mode.

Affected Platform

Bakersport Boards (PBA# G72250-200 Rev 02) (Fab B)

Rework Steps

1.   Unstuff choke on L8A2

2.   Stuff R8A4 and R8A3 (0 ohms)

3.2   How to Rework Bakersport Fab B I2C Port 6

By default, Bakersport Fab B CRB has an issue with I2C port 6. This port fails to read and write because of incorrect resistor connections.

Affected Platform

Bakersport Boards (PBA# G72250-200 Rev 02) (Fab B)

Rework Steps

1.   UnStuff R5H9, R5H12, R5H8, R5H10

2.   Stuff R5H4 (22 ohms)

3.   Stuff R5H3 (22 ohms)

3.3 How to Rework UART in Bakersport and Bayley Bay

By default, Bakersport Fab B CRB and Bayley Bay Fab 03 CRB have an issue with UART2. This port triggers an unwanted interrupt. Add a 10K resistor to mitigate this issue.

Affected Platforms

Bakersport CRB (PBA# G72250-200 Rev 02) (Fab B)

Bayley Bay Fab 3 CRB (IOTG configured) only

Rework Step

Place a 10K resistor followed by a 28 AWG wire from R6J4 to R6H9. Figure 1 illustrates the rework layout. The 10K PU resistor (denoted by a yellow box) is wired (denoted by an orange curved line) to R6H9.

Figure 1. Bakersport CRB and Bayley Bay CRB UART Rework Layout

BSP for Microsoft* Windows* 10 64-bit on Intel Atom® Processor E3800 Product Family
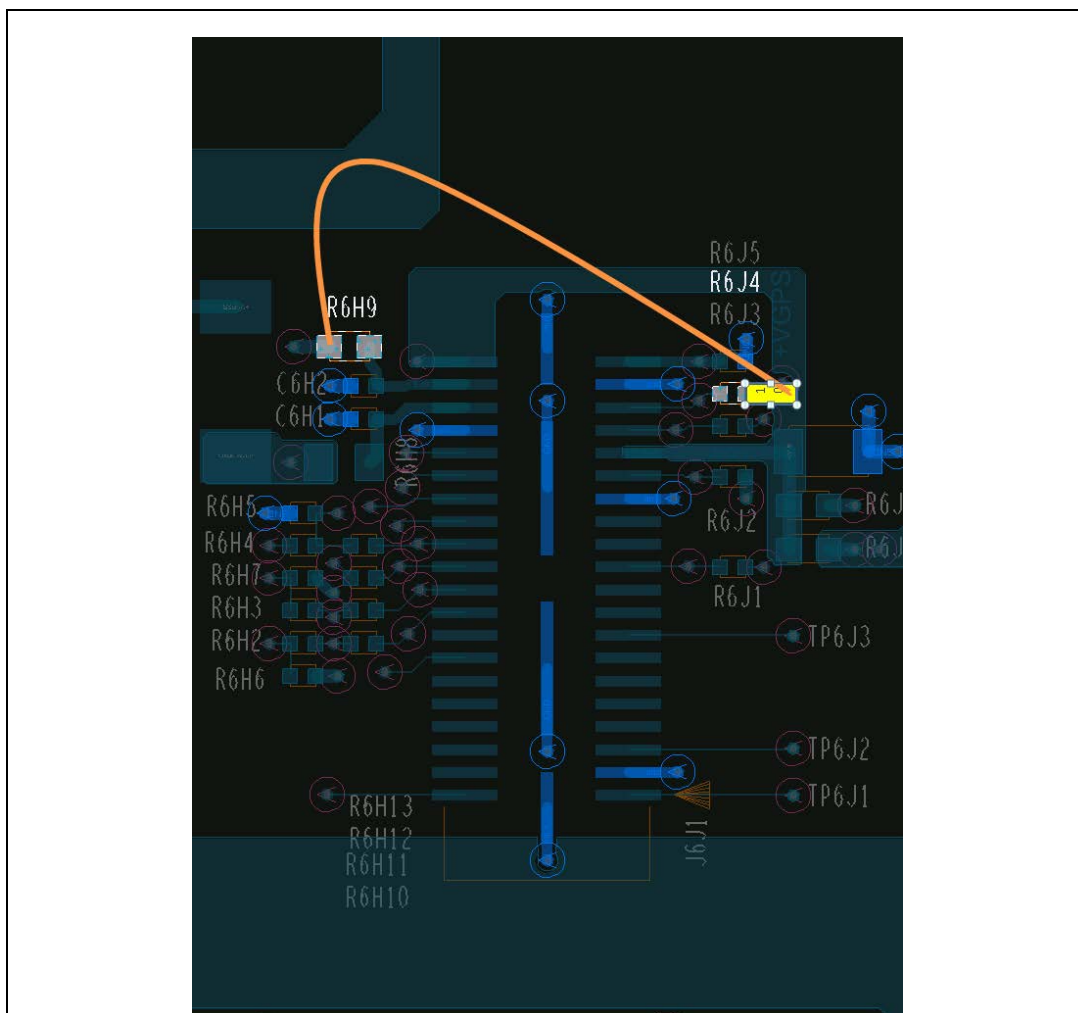
3.4 How to Rework Bayley Bay Fab 3 CRB PCIe* INLI Slot–Port 3

By default, Bayley Bay Fab 03 CRB has an issue with PCIe* Slot 3. This PCIe slot fails to detect a network card after shutdown followed by power-up (without switching off the main power).

Affected Platform

Bayley Bay Fab 3 CRB (IOTG configured) only
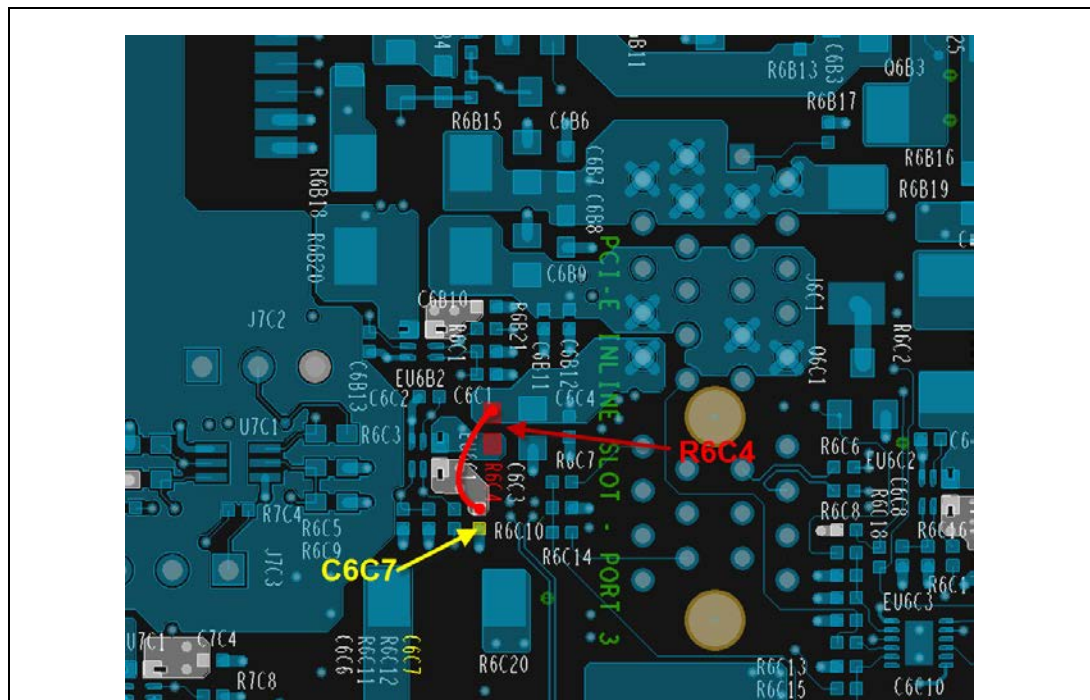
Rework Steps

1. Remove R6C4

2. Add a jumper wire from C6C7 to R6C4 as shown in Figure 2.

Reasons for the Rework

NICs are not recognized in the Windows* operating system if the jumper block (J7C2) is configured to Desktop mode, pins [1–2]. Failure mode occurs in PCIe Slot3.

Figure 2. Bayley Bay Fab 3 CRB PCIe Slot 3 Rework

3.5 How to Use Serial Port in Bayley Bay

The common serial port on the Bayley Bay CRB does not work. The actual serial port is the Micro USB port near the COM port on CRB board. Use the USB cable to connect the

Micro USB port in the CRB board to the USB port in the host machine (laptop or desktop).

Install a driver from http://www.ftdichip.com/FTDrivers.htm to the host machine to have the virtual COM port in the host machine communicate with the Bayley Bay CRB.

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4.0   *Software Driver BKMs*

4.1   How to Disable the DMA Feature for I2C*

The seven I2C* controllers in the Intel Atom® E3800 processor use the Windows registry to control the DMA feature.

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\iaioi2c\Parameters]
```

```
"ForceDma"="0,0,0,0,0,0,0"
```

ForceDma (string type) consists of seven values mapped to the seven I2C controllers, which are device IDs from 0F41 to 0F47h.

Value 0 disables the DMA, and I2C data are read and written in PIO mode.

For values other than 0, if data length is more than the specified value, I2C data will be read and written in DMA mode; if data length is less than the specified value, I2C data are read and written in PIO mode.

By default, without any registry settings, I2C uses the PIO mode.

4.2   How to Set the Baud Rates of HSUART

1. The baud rate is calculated based on the following method:

Baud rate = (SourceClockFrequency) / (16 * divisor)

Source Clock Frequency = 50000000 * PrescalerMValue /PrescalerNValue * 2

For example, to set baud rate to 1M:

Set PrescalerMValue = 64

Set PrescalerNValue = 100

SourceClockFrequency = 64,000,000

The values of SourceClockFrequency, PrescalerMValue, and PrescalerNValue can be customized from the Windows registry. Reboot the system after setting these values.

2. To support baud rate from 230,400 through 3,686,400, create and change the following registry setting. The instance number from 0 to 1 should be combined with the above registry name for a different Host Controller. For example, to configure HSUART_1 to support baud rate 1M, 2M and 4M, create and change the following registry setting:

```
[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\iaiouart\Parameters]
```

```
;High speed source clock, M and N prescalers

"HSUartSourceClockFrequency_1"=dword:01c1f8f8

"HSUartPrescalerMValue_1"=dword:00003fff

"HSUartPrescalerNValue_1"=dword:00006c80
```

3. To support baud rate between 300 and 115,200, change the following registry setting for the low speed source clock, M and N prescalers:

```
"UartSourceClockFrequency"=dword:001c2000

"UartPrescalerMValue"=dword:0000025a

"UartPrescalerNValue"=dword:00007fff
```

See Section 27.2.3 of *Baud Rate Generator in the Bay Trail-I SoC External Design Specification (Doc Id 538136)* for details.

4.3 How to Install I/O Driver Using INF or SYS File

By default, you can run the Intel driver .msi installer package to install the I/O drivers. Alternatively, you can also install by retrieving the raw driver package (the inf and sys file) in the following folder after driver installation and install the driver using the PnPUtil or Windows DP Installer.

For 64-bit driver: Drivers\x64\[GPIO/HSUART/I2C/SPI/SST]

Then, the user also can customize their own installation directly based on driver package files, for example:

• Right-click installation: https://msdn.microsoft.com/en-us/library/windows/hardware/ff557251%28v=vs.85%29.aspx?f=255&MSPPError=-2147217396

• Use the PnPUtil tool to install driver by inf file: http://msdn.microsoft.com/en-us/library/windows/hardware/ff550423(v=vs.85).aspx

• Use the Driver Package Installer (DPInst): http://msdn.microsoft.com/en-us/library/windows/hardware/ff544842(v=vs.85).aspx

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