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**Revision History**

These are the main releases of the Intel® Firmware Support Package (Intel® FSP) for Intel® Atom™ Processor C2000 Product Family:

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2016</td>
<td>POSTGOLD4</td>
<td></td>
</tr>
<tr>
<td>September 24, 2015</td>
<td>POSTGOLD4</td>
<td>Post-Gold 004 Release</td>
</tr>
<tr>
<td>April 9, 2015</td>
<td>POSTGOLD3</td>
<td>Post-Gold 003 Release</td>
</tr>
<tr>
<td>April 2, 2014</td>
<td>POSTGOLD2</td>
<td>Post-Gold 002 Release</td>
</tr>
<tr>
<td>December 18, 2013</td>
<td>POSTGOLD1</td>
<td>Post-Gold 001 Release – first public release</td>
</tr>
</tbody>
</table>
1.0 Introduction

This package contains required binary image(s) and collateral for the Intel® FSP for the Intel® Atom™ Processor C2000 Product Family.

This document provides system requirements, installation instructions, issues and limitations, and legal information.

This Intel® FSP package is compliant with FSP External Architecture Specification 1.0 version.

To learn more about this product, see:

- New features listed in Section 2.0, New in This Release or in Help.
- Reference documentation listed in Section 4.0, Related Documentation, Tools, and Packages.
- Installation instructions listed in Section 5.1, How to Install this Release.

1.1 Component Information

The software in this release has been developed and validated using the following.

Table 1. Intel® FSP Component Information

<table>
<thead>
<tr>
<th>FSP Binary Version</th>
<th>POSTGOLD4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Code Version</td>
<td>48.R00</td>
</tr>
<tr>
<td>Memory Reference Code Version</td>
<td>1.0.0.48</td>
</tr>
<tr>
<td>Microcode Update C2xx0 A1</td>
<td>M01406D000E</td>
</tr>
<tr>
<td>Microcode Update C2xx0 B0</td>
<td>M01406D8128</td>
</tr>
</tbody>
</table>

1.2 Limitations

The following are limitations for the Intel® FSP:

- The serial console base address of Intel® Atom™ Processor C2000 Product Family FSP is 0x2F8
- The boot loader must ensure that FspInitEntry Application Programming Interface (API) is called within one second of returning from TempRamInitEntry API
1.3 Acronyms and Terms

The following acronyms and terms are used in this document (arranged in alphabetic order):

<table>
<thead>
<tr>
<th>Acronym/Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>BCT</td>
<td>Binary Configuration Tool</td>
</tr>
<tr>
<td>BSF</td>
<td>Binary Settings File</td>
</tr>
<tr>
<td>CRB</td>
<td>Customer Reference Board</td>
</tr>
<tr>
<td>FSP</td>
<td>Firmware Support Package</td>
</tr>
<tr>
<td>RMT</td>
<td>Rank Margining Tool</td>
</tr>
<tr>
<td>SoC</td>
<td>System on a Chip</td>
</tr>
</tbody>
</table>

1.4 Intended Audience

Platform and system developers who intend to use an Intel® Firmware Support Package (FSP)-based boot loader for the firmware solution for their overall design based on the Intel® Atom™ Processor C2000 Product Family. This group includes, but is not limited to, system BIOS developers, boot loader developers, and system integrators.

1.5 Customer Support

Intel offers support for this software at the API level only, defined in the FSP Integration guide and reference manuals listed in Section 4.0, Related Documentation, Tools, and Packages. If your field representative has created an account for you, support requests can be submitted at https://premier.intel.com
2.0 New in This Release

2.1 New Features

This release includes the following new features and product changes:

- Included workaround for USB issue where the USB device may not be detected at system power-on on some silicon parts.
- SATA3 PHY parameters updated to handle marginal SATA devices transmitting corrupted primitives during link initialization.
3.0 Intel® Atom™ Processor C2000 Product Family Software - Issues

Known and resolved issues relating to Intel® Firmware Support Package are described in this Section.

3.1 Known Issues for Intel® Atom™ Processor C2000 Product Family

Table 2 lists known software-related issues for the Intel® Atom™ Processor C2000 Product Family.

Table 2. Known Software-related Issues

<table>
<thead>
<tr>
<th>Title</th>
<th>Reboot occurring when PUNIT watchdog timer times out.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>The PUNIT has a watchdog timer that provides a window of approximately one second to complete initial programming of power management related registers.</td>
</tr>
<tr>
<td>Implication</td>
<td>Failure to feedback the status to the PUNIT within 1 second of a microcode update will result in the system requesting a reboot.</td>
</tr>
<tr>
<td>Workaround</td>
<td>The boot loader must ensure that FspInitEntry API is called within one second of returning from TempRamlInitEntry API. For designs that do not use an RTC battery, it is recommended that the RtcPowerFailureHandler() routine should be executed after the call to FspInitEntry API to ensure that the 1 second PUNIT timeout window is not violated.</td>
</tr>
</tbody>
</table>
3.2 Resolved Issues for Intel® Atom™ Processor C2000 Product Family

Table 3 lists known resolved software-related issues for the Intel® Atom™ Processor C2000 Product Family.

Table 3. Resolved Software-related Issues

<table>
<thead>
<tr>
<th>Title</th>
<th>USB 2.0 Device May Not be Detected at System Power-On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Certain internal conditions may cause one or more USB ports to fail at system power-on.</td>
</tr>
<tr>
<td>Implication</td>
<td>When this erratum occurs, a USB device attached to the affected port will not function. In addition, the OS may report problems with the USB port.</td>
</tr>
</tbody>
</table>
4.0 Related Documentation, Tools, and Packages

Table 4 lists Intel® FSP for Intel® Atom™ Processor C2000 Product Family Platform documentation.

Table 4. Intel® Firmware Support Package Documentation

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document No./Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Family Integration Guide</td>
<td></td>
</tr>
<tr>
<td>Intel® Atom™ Processor C2000 Product Family Custom Reference</td>
<td><a href="http://www.intel.com/fsp">www.intel.com/fsp</a></td>
</tr>
<tr>
<td>Board Platform Guide</td>
<td></td>
</tr>
<tr>
<td>Binary Configuration Tool (BCT) for Intel® FSP</td>
<td><a href="http://www.intel.com/fsp">www.intel.com/fsp</a></td>
</tr>
</tbody>
</table>
5.0 Where to Find the Release

This package can be found on www.intel.com/fsp

5.1 How to Install this Release

This release can be installed on either a Windows or a Linux* system.

For Windows:
1. Download the Windows .exe file from www.intel.com/fsp
2. Run the .exe file to perform the installation.

For Linux*:
1. Download the Linux* .tgz file from www.intel.com/fsp
2. Extract the contents of the .tgz file.
3. See the Readme_Extract.txt file for further instructions to complete the installation.

Note: For information about adding the Intel® FSP APIs into the boot loader code, refer to Intel® Atom™ Processor C2000 Product FSP Integration Guide.

Note: For information about compiling the boot loader together with the Intel® FSP binary, refer to Intel® Atom™ Processor C2000 Product Family Custom Reference Board Platform Guide.

5.2 Debug

Debug messages are the primary way of debugging the Intel® FSP. This requires enabling the debug messages into the serial port. The steps to enable the serial debug messages can be found in How to Enable Serial Debug Messages in the Intel® Atom™ Processor C2000 Product Family Custom Reference Board Platform Guide.

5.3 Validation

The Rank Margining Tool (RMT) can flag areas of concern for platform developers. The steps to enable RMT is described in detail in How to Enable the Rank Margining Tool in the Intel® Atom™ Processor C2000 Product Family Custom Reference Board Platform Guide.
6.0 Release Content

This release package contains the following:

Table 4. Package Contents

<table>
<thead>
<tr>
<th>Description</th>
<th>Filename</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSP kit License file</td>
<td>FSP Kit Production RULAC click-through License.pdf</td>
<td>RANGELEY_FSP_KIT</td>
</tr>
<tr>
<td>FSP Binary File</td>
<td>RANGELEY_POSTGOLD4_FSP_004_20150924.fd</td>
<td>RANGELEY_FSP_KIT/FSP</td>
</tr>
<tr>
<td>Boot Setting File (BSF)</td>
<td>RangeleyFsp.bsf</td>
<td>RANGELEY_FSP_KIT/FSP</td>
</tr>
<tr>
<td>FSP Integration Guide</td>
<td>C2000_FSP_Integration_Guide_Rev1_2.pdf</td>
<td>RANGELEY_FSP_KIT/DOCUMENTATION</td>
</tr>
<tr>
<td>Text file copy of FSP kit license file (Linux* only)</td>
<td>license.txt</td>
<td>RANGELEY_FSP_KIT/DOCUMENTATION</td>
</tr>
<tr>
<td>Intel® Atom™ Processor C2000 SoC Microcode</td>
<td>microcode-m01406d000e.h microcode-m01406d8128.h</td>
<td>RANGELEY_FSP_KIT/Microcode</td>
</tr>
<tr>
<td>*.h</td>
<td>FSP header files</td>
<td>RANGELEY_FSP_KIT/FSP/include</td>
</tr>
<tr>
<td>*.c</td>
<td>FSP source files</td>
<td>RANGELEY_FSP_KIT/FSP/srx</td>
</tr>
</tbody>
</table>
7.0 **Hardware and Software Compatibility**

7.1 **Supported Hardware**

The FSP included in this release is specifically targeted for the Intel® Atom™ Processor C2000 Product Family System on a Chip (SoC).

7.2 **Supported Operating Systems**

This release installs on either a Windows or a Linux* system. However, the FSP binary itself can be used with any software development environment to generate a complete boot loader solution.

The software in this release has been validated against the operating systems given in the following table on the Customer Reference Boards (CRBs) for the following products:

- Intel® Atom™ Processor C2000 Product Family

**Note:** While the Intel® Firmware Support Package is validated on Coreboot and Fedora* on the respective platforms, it is designed to work without change on some other Bootloader and OS.

<table>
<thead>
<tr>
<th>Product Family</th>
<th>BootLoader</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor C2000 Product Family for Communications Infrastructure</td>
<td>Coreboot + u-boot payload</td>
<td>Yocto Project 1.4 Reference Distro (Poky 9.0)</td>
</tr>
</tbody>
</table>

The initial coreboot distribution was taken from coreboot.org:

coreboot 4.0, 2014-08-04, Commit-Id: 18fe07ed22e81c6315c199d5ae71b689163bac46

**Note:** Do not integrate this FSP binary with coreboot versions greater than 4.1.

§
8.0 **Configuration**

A Binary Configuration Tool (BCT) for the Intel® FSP is provided as a companion tool and is intended to be used to:

- Customize the FSP binary configuration options based on the Boot Setting File (BSF).
- Rebase the FSP binary to a different base address (the default base address of the Intel® FSP for Intel® Atom™ Processor C2000 Product Family is 0xFFF80000).

It's recommended to use latest BCT with this release.

Please refer to the BCT User Guide for the usage instructions. See Section 4.0, Related Documentation, Tools, and Packages, to obtain the BCT.

8.1 **Intel® Firmware Support Package Information**

To obtain the Intel® FSP binary information:

1. Run the **Binary Configuration Tool**.
2. Click the **Show Binary Description command button**.
3. Select the Intel® FSP binary. For this release, the binary included is named as **RANGELEY_POSTGOLD4_FSP_004_20150924.fd**.
4. Click **Open**. Another window, shown in **Figure 1**, will pop out to show the Intel® FSP binary information.
5. Click **OK** to close the window.
Figure 1. Intel® FSP Binary Information

Description from RANGELEY_POSTGO...

This FSP supports the following:
Avoton/Rangeley A1 and Bx SOC

FSP Header:
Signature: FSPH
Header Length: 0x40
Header Revision: 0x1
Image Revision: 0x140
Image ID: AVN-FSP0
Image Size: 0x5000
Image Base: 0xffff0000
Image Attribute: 0x0
Configuration Region Offset: 0x59944
Configuration Region Size: 0x9e
API Entry Num: 0x3
Temp RAM Init Entry: 0x5e48b
FSP Init Entry: 0x5e609
Notify Phase Entry: 0x5e695

OK
9.0 Legal Information

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