



Cannon / Coffee Lake-H Intel[®] Management Engine Firmware 12.0

Corporate Firmware Bring Up Guide

February 2018

| Revision 1.3

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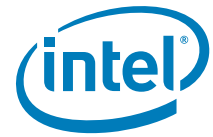
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Revision History

Document Number	Revision Number	Description	Revision Date
	0.8	Pre-Alpha Release: See change bars on the left side of the page.	June 2017
	0.81	Alpha Release: See change bars on the left side of the page	August 2017
	0.9	Beta Release: See change bars on the left side of the page	September 2017
	0.91	Beta Release Update: See change bars on the left of the page	October 2017
	1.0	PC Release: See change bars on the left side of the page	December 2017
	1.1	PC Release Update: See Change bars on the left side of the page	January 2018
	1.2	PC Release Update 2: See change bars on left side of the page	January 2018
	1.3	PC Release Update 3: See change bars on left side of the page	February 2018

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1 Introduction

This document covers the Intel® Management Engine Firmware (Intel® ME) 12.0 - Corporate Firmware bring up procedure. Intel® ME is tied to essential platform functionality — this dependency cannot be avoided for engineering reasons.

The bring up procedure primarily involves building a Serial Peripheral Interface (SPI) Flash image that will contain:

- **[required]** Descriptor region — Contains sizing information for all other SPI Flash image regions, SPI settings (including Vendor Specific Configuration - or VSCC - tables, SPI device parameters), and region access permissions.
- **[required]** BIOS region — Contains firmware for the processor (or host) and/or Embedded Controller (EC).
- **[required]** Intel® ME FW region — Contains firmware for the Intel® Management Engine.
- **[optional]** GbE region — Contains firmware for Intel LAN solution.

For more details on SPI Flash layout, see the document **Cannon Lake-H / LP SPI Programming Guide** SPI Programming Guide and [Appendix A](#). Once the SPI Flash image is built, it will be programmed to the target based platform and the platform will be booted. This document also covers any tests and checks required to ensure that this boot process is successful and that Intel® ME Corporate FW is operating as expected.

1.1 Related Documentation

VIP: Kit# 106913 - Intel® Ethernet Network Connections (20.1 OEM Gen) - LAN Software Production Candidate 20.1

CDI # 559465 Intel® Ethernet Connection i219 [Jacksonville]

1.2 Intel® ME FW Features

This firmware release includes the following applications:

- Platform Clocks – Tune clock silicon to the parameters of a specific board, configure clocks at run time, and power management clocks. **Benefit:** Allows extensive customizability and soft control of “Third generation” clock solution and makes clocks available before CPU powers up.
- Silicon Workaround Capability – Intel® ME FW will have limited capabilities to perform targeted workarounds for silicon issues. **Benefit:** Allows Intel® ME FW to address some issues that otherwise would require a new silicon stepping.

1.3 Prerequisites

Before this document is read and utilized, it is essential that the reader first review the Corporate FW Release Notes (included with this Intel® ME Corporate FW kit).



This document is constructed so that the reader can complete the bring up steps as given for the Intel Customer Reference Board (CRB). However, in the case that bring up is being performed on a different Intel® x based platform, this document will highlight any changes that must be imposed onto the bring up steps accordingly.

This document makes only the following limited assumptions regarding hardware:

- The platform is Cannon Lake S / H based
- The platform is equipped with one or more SPI Flash devices with a total capacity sufficient for storing all relevant firmware images.

1.4 Acronyms and Definitions

1.4.1 General

Acronym or Term	Definition
BIOS	Basic Input Output System
DIMM	Dual In-line Memory Module
DMI	Direct Media Interface
EC	Embedded Controller
FPF	Field Programmable Fuses
FW	Firmware
GbE	Gigabit Ethernet
HECI	Host Embedded Controller Interface (aka Intel® MEI)
Intel® ICCS	Intel® Integrated Clock Controller Service
Intel® ME	Intel® Management Engine (Intel® ME)
Intel® MEI	Intel® Management Engine Interface (Intel® MEI) (renamed from HECI)
Intel® PTT	Intel® Platform Trusted Technology (Intel® PPT)
Intel® MSS	Intel® Management and Security Status Application
KVM	Keyboard, Video, Mouse
LAN	Local Area Network
MCP	Multi-Chip Package (Central Processing Unit / Platform Controller Hub)
NVM	Non-Volatile Memory
OOB	Out-of-Band
OS	Operating System
PAVP	Protected Audio and Video Path
PCI	Peripheral Component Interconnect
PCIe*	Peripheral Component Interconnect Express
PHY	Physical Layer (Networking)
RTC	Real Time Clock
SBT	Intel® Small Business Technology
SMBus	System Management Bus
SPI Flash	Serial Peripheral Interface Flash
TPM	Trusted Platform Module
VSCC	Vendor Specific Configuration



1.4.2 Intel® Management Engine

Acronym or Term	Definition
3PDS	3rd Party Data Storage
Agent	Software that runs on a client PC with OS running
End User	The person who uses the computer (either Desktop or Mobile). In corporate, the user usually does not have administrator privileges. The end user may not be aware to the fact that the platform is managed by Intel® AMT.
Host or Host CPU	The processor that is running the operating system. This is different than the management processor running the Intel® Management Engine Firmware.
Host Service/Application	An application that is running on the host CPU
INF	An information file (.inf) used by Microsoft* operating systems that supports the Plug & Play feature. When installing a driver, this file provides the OS the necessary information about driver filenames, driver components, and supported hardware.
Intel® AMT Firmware	The Intel® AMT Firmware running on the embedded processor
Intel® Management Engine Interface (Intel® MEI)	Interface between the Management Engine and the Host system
Intel® MEI driver	Intel® ME host driver that runs on the host and interfaces between ISV Agents and the Intel® ME HW.
IT User	Information Technology User. Typically very technical and uses a management console to ensure functionality of multiple PCs on a network.
LMS	Local Management Service: A SW application which runs on the host machine and provide a secured communication between the ISV agent and the Intel® Management Engine Firmware.
Intel® ME	Intel® Management Engine: The embedded processor residing in the chipset MCP
Intel® MEBx	Intel® Management Engine BIOS Extensions
MECI	ME-VE Communication Interface
NVM	Non-Volatile Memory: A type of memory that will retain its contents even if power is removed. In the Intel® AMT current implementation, this is achieved using a FLASH memory device.
OOB Interface	Out Of Band interface: This is WSMAN interface over secure or non-secure TCP protocol.
OS not Functional	The Host OS is considered non-functional in Sx power state and any one of the following cases when system is in S0 power state: <ul style="list-style-type: none"> • OS is hung • After PCI reset • OS watch dog expires • OS is not present
System States	Operating System power states such as S0. See detailed definitions in System States and Power Management section.
Un-configured state	The state of the Intel® Management Engine Firmware when it leaves the OEM factory. At this stage the Intel® Management Engine Firmware is not functional and must be configured.



1.4.3 System States and Power Management

Acronym or Term	Definition
G3	A system state of Mechanical Off where all power is disconnected from the system. G3 power state does not necessarily indicate that RTC power is removed.
CM0	Intel® Management Engine firmware power state where all hardware power planes are activated. The host power state is S0.
CM3	Intel® Management Engine power state where the host is in Sx. The processor DRAM Controller is turned off and DRAM power stays in off/self refresh mode. There is no UMA usage in CM3 state. Less than 1MB of SRAM used for code and data. Code is executed off of flash takes ~1mS.
CM0-PG	Core Well Powered; Intel® ME Well Powered; (Intel® ME core not consuming power) DRAM available.
CM3-PG	An Intel® ME Firmware power state where no power is applied to the Management Engine subsystem. (Intel® ME firmware is shut down).
OS Hibernate	System state where the OS state is saved on the hard drive.
S0	A system state where power is applied to all HW devices and the system is running normally.
S1, S2, S3	A system state where the host CPU is halted but power remains available to the memory system (memory is in self-refresh mode).
S4	A system state where the host CPU and memory are not active.
S5	A system state where all power to the host system is off, however the power cord (and/or battery in mobile designs) is still connected.
Shut Down	Equivalent to the S5 state.
Snooze Mode	Intel® Management Engine activities are mostly suspended to save power. The Intel® Management Engine monitors HW activities and can restore its activities depending on the HW event.
Standby	System state where the OS state is saved in memory and resumed from the memory when mouse/keyboard is clicked.
Sx	All S states which are different than S0.

1.5 Reference Documents

Document	Doc Number/ Location*
<i>Cannon Lake Intel® Management Engine (Intel® ME) and Embedded Controller Interaction Product Specification Revision 0.5</i>	549024 / CDI
<i>Intel® Management Engine BIOS Writers Guide</i>	TBD / *
<i>Intel® Management Engine (Intel® ME) 11 SKU Firmware Corporate Compliance Guide for Cannon Lake PCH-H/LP Chipset Family - Cannon Lake Platform Compliancy and Testing Guide - Revision 1.1</i>	TBD / CDI

Note: * Unless specified otherwise, a document can be ordered by providing its reference number to your Intel Field Applications Engineer.

1.6 Format and Notation

The formats and notations used within this document model are those typically used by BIOS vendors. This section describes the formatting and the notations that will be followed in this document.



Table 1-1. Number Format Notation

Number Format	Notation	Example
Decimal (default)	d	14d. Note that any number without an explicit suffix can be assumed to be decimal.
Binary	b	1110b
Hex	h	0Eh
Hex	0x	0x0E

Table 1-2. Data Format Notation

Data Type	Notation	Size
Bit	b	Smallest unit, 0 or 1
Byte	B	8 bits
Word	W	16 bits or 2 bytes
Double-word	DW	32 bits or 4 bytes
Quad-word	QW	8 bytes or 4 words
Kilobyte	KB	1024 bytes
Megabit	Mb	1,048,576 bits or 128 KB
Megabyte	MB	1,048,576 bytes or 1024 KB
Gigabit	Gb	1,073,741,824 bits
Gigabyte	GB	1024 MB



1.7 Kit Contents

The Intel® ME Corporate FW kit can be downloaded from VIP (<https://platformsw.intel.com/>). The contents of this kit are detailed below (Note that only key files are listed).

Table 1-3. Kit Contents (Sheet 1 of 4)

File or [Directory]	Content Description
[root]	Root directory
Intel® AMT OEM WebUI Guide	
Intel® MEBX User Guide	
[CNP-H]	
CNL-H Corporate Bring Up Guide.pdf	Firmware Bring-up for Cannon / Coffee Lake-H.
Coffeelake-H Client SPI Programming Guide.pdf	How to program SPI device parameters and descriptor region details. Also contains a complete SPI Flash softstrap reference.
[Image Components]	
[CSME]	
CSME_FW_Corporate_CNP-H_A0_A1_PCH.bin	Intel® ME firmware image (Non Production FW Rom Bypass) - supports unfused Kabylake PCH-LP Platform I/O MCP steppings: <ul style="list-style-type: none"> Unfused (Super SKU) Note: For PAVP Testing , you must match Production FW with Production Part and Non Production FW with Non Production Parts.
[PMC Patch FW]	
CNPH_A0_A1_PMC_FW_PATCH_V4.pmcp.bin	PMC patch FW that goes with the Intel® ME firmware image binary for Cannon / Coffee Lake-H Platforms.
[CNP-LP]	
Cannon Lake-LP Client SPI Programming Guide.pdf	How to program SPI device parameters and descriptor region details. Also contains a complete SPI Flash softstrap reference.
CNL-LP Corporate Bring Up Guide.pdf	Firmware Bring-up for Cannon / Coffee Lake-LP.
[Image Components]	
[CSME]	
[CNP-LP_B0]	
CSME_FW_Corporate_CNP-LP_B0_PCH.bin	Intel® ME firmware image (Non Production FW Rom Bypass) - supports unfused Kabylake PCH-LP Platform I/O MCP steppings: <ul style="list-style-type: none"> Unfused (Super SKU) Note: For PAVP Testing , you must match Production FW with Production Part and Non Production FW with Non Production Parts.
[PMC Patch FW]	
CNPLP_B0_PMC_FW_PATCH_V6.pmc.bin	PMC patch FW that goes with the Intel® ME firmware image binary for Cannon / Coffee Lake-LP Platforms.
[Installers]	
Intel®_ME SW Installation Guide.pdf	Intel® ME Software installation Guide.



Table 1-3. Kit Contents (Sheet 2 of 4)

File or [Directory]	Content Description
Intel®_MSS User Guide.pdf	
[ME_SW_MSI]	
[PreProduction]	
IntelIMEFWVer.dll	
MUP	XML file
SetupME	
[WindowsDriverPackages]	
[MEI]	
win10	
[x64]	
TeeDriverW8x64.sys	
[x86]	
TeeDriverW8.sys	
heci.cat	
heci.inf	
[SOL]	
mesrl.cat	
mesrl.inf	
[Tools]	
[ICC_Tools]	
Intel® ME Firmware ICC Tools User Guide.pdf	ICC Tools User Guide
[CCT]	
cct	Exe file
cct	Ini file
cctDll.dll	
cctWin	Exe file
[EFI]	
cct.efi	CCT for EFI
[System Tools]	
Open Watcom Public License.pdf	Sybase Open Watcom Public License version 1.0 document.
System Tools User Guide.pdf	System Tools User Guide
[Flash Image Tool]	
[WINDOWS]	
fit.exe	
vsccommn.bin	Binary containing the supported SPI parts
VSCCommn_bin Content.pdf	Documentation listing the SPI parts supported by vsccommn.bin
[Flash Programming Tool]	
[DOS]	
fparts.txt	List of supported SPI Flash devices with specific Flash parameters



Table 1-3. Kit Contents (Sheet 3 of 4)

File or [Directory]	Content Description
fpt.exe	Intel® FPT for DOS
[EFI 64]	
fparts.txt	List of supported SPI Flash devices with specific Flash parameters
fpt.efi	Intel® FPT for EFI
[Windows]	
fparts.txt	List of supported SPI Flash devices with specific Flash parameters
fptw.exe	Intel® FPT for Windows*
IdrvdII.dll	
PmxdII.dll	
[Windows64]	
fparts.txt	List of supported SPI Flash devices with specific Flash parameters
fptw64.exe	Intel® FPT for Windows* (64-bit) OS
IdrvdII32e.dll	
PmxdII32e.dll	
[FWUpdate]	
[EFI 64]	
FWUpdLcl.efi	FW Update Tool (EFI version)
[DOS]	
FWUpdLcl.exe	FW Update Tool (DOS version)
[Win]	
FWUpdLcl.exe	FW Update Tool (Windows* version 32bit)
[Win64]	
FWUpdLcl64.exe	FW Update Tool (Windows* version 64bit)
[Manifest Extension Utility]	
[Win]	
meu.exe	Intel® Manifest Extension Utility (MEU) executable file that allows input of FW binary and outputs and independent updatable partition that is compressed and signed.
[MEInfo]	
[DOS]	
MEInfo.exe	Intel® ME Information Tool (DOS version)
[EFI 64]	
MEInfo.efi	Intel® ME Information Tool (EFI version)
[Windows]	
MEInfoWin.exe	Intel® ME Information Tool (Windows* version 32bit)
IdrvdII.dll	
PmxdII.dll	
ISHLib.dll	






Table 1-3. Kit Contents (Sheet 4 of 4)

File or [Directory]	Content Description
[Windows64]	
MEInfoWin64.exe	Intel® ME Information Tool (Windows* version 64bit)
IdrvdII32e.dll	
ISHLib.dll	
PmxdII32e.dll	
[MEManuf]	
[DOS]	
MEManuf.exe	Intel® ME Manufacturing Tool (DOS version)
vsccommn.bin	Binary containing the supported SPI parts
VSCCommn_bin Content.pdf	Documentation listing the SPI parts supported by vsccommn.bin
[EFI 64]	
VSCCommn_bin Content.pdf	Documentation listing the SPI parts supported by vsccommn.bin
MEManuf.efi	Intel® ME Manufacturing Tool (EFI version)
vsccommn.bin	Binary containing the supported SPI parts
[Windows]	
IdrvdII.dll	
MEManufWin.exe	Intel® ME Manufacturing Tool (Windows* version 32bit)
PmxdII.dll	
ISHLib.dll	
vsccommn.bin	Binary containing the supported SPI parts
VSCCommn_bin Content.pdf	Documentation listing the SPI parts supported by vsccommn.bin
[Windows64]	
IdrvdII32e.dll	
ISHLib.dll	
MEManufWin64.exe	Intel® ME Manufacturing Tool (Windows* version 64bit)
PmxdII32e.dll	
vsccommn.bin	Binary containing the supported SPI parts
VSCCommn_bin Content.pdf	Documentation listing the SPI parts supported by vsccommn.bin



1.8 External Hardware Requirements for Bring Up

Acquire the following hardware tools before moving on to the next step.

Windows* OS System	Flash Burner	DOS Bootable USB Key
		
<p>Equipment:</p> <ul style="list-style-type: none"> Laptop or desktop that supports win32 applications <p>Purpose:</p> <ul style="list-style-type: none"> Will run firmware image assembly and build process software. 	<p>Equipment:</p> <ul style="list-style-type: none"> (Optional) For platforms that don't boot, a Flash Chip Programmer will be required For platforms that can boot to DOS or Windows*, a Intel® FPT is provided in this kit <p>Purpose:</p> <ul style="list-style-type: none"> Will burn firmware images onto the target system Flash device(s). 	<p>Equipment:</p> <ul style="list-style-type: none"> A DOS Bootable USB Key (Size > 512 MB) <p>Purpose:</p> <ul style="list-style-type: none"> Acting as a bootable device and will be used to run Intel® FPT (fpt.exe) directly on the system that is undergoing Bring Up process. Or will be used to transfer a firmware image onto a Flash burner.

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2 Image Creation: Intel® Flash Image Tool

Intel® Flash Image Tool (Intel® FIT) can be used to generate either a full SPI Flash binary image with Descriptor, GbE, BIOS, and Intel® ME Regions. Additionally, it can be used to create a simple image containing only the Intel® ME Region only for use with custom SPI Flash binary image assembly solutions. Use the steps shown in following sections.

After this image has been created, it will need to be burned onto the target platform's SPI Flash device(s). [Section 3, "Programming SPI Flash Devices and Checking Firmware Status"](#) later in this document provides steps to do this.

Note: The Flash Image Tool may be updated throughout the release cycles. As a general rule, please ensure you use the tools, images and other content from the same kit and refrain from using different version tools.

2.1 Start Intel® FIT

1. Invoke Intel® Flash Image Tool. Using Explorer*, navigate to **[root]\Tools\System Tools\Flash Image Tool**. Verify that the directory contents are correct (see [Section 1.7](#)). Double-click **FIT.exe**.
2. **NOTE:** In the tables below, where default settings are listed for CNL LP/H, if the value is the same one value will be listed. If there is a different default value when the program loads with either platform, both values will be listed to show the difference.

2.2 Step-by-Step Guide to Build SPI Flash Image with Intel® FIT Interface



Table 2-1. - Initial Screen Layout (Sheet 1 of 9)

#	Label	Contents
1	New	This button labeled 'New' on rollover allows opening of a new session with default values
2	Open	This button labeled 'Open' on rollover allows opening of an xml or bin file
3	Save	This button labeled 'Save' on rollover allows saving of xml file
4	Clear Console	This button labeled 'Clear Console' clears the console area (see page 23)
5	Build Settings	This button labeled 'Build Settings' brings up the build settings popup Window see (Table 2-2)
6	Build Image	This button labeled 'Build Image' on rollover allows build of the image



Table 2-1. - Initial Screen Layout (Sheet 2 of 9)

#	Label	Contents
7	Drop Down Selector	This drop down allows selection of platform
8	Drop Down Selector	This drop down allows selection of SKU within platform selected



Table 2-1. - Initial Screen Layout (Sheet 3 of 9)

#	Label	Contents																								
	<p>Intel® Flash Image Tool</p> <p>File Build Help</p> <p>Intel(R) Cannonlake LP-B0 Series Chipset Base U</p> <p>Flash Layout</p> <p>Flash Settings</p> <p>Intel(R) ME Kernel</p> <p>Intel(R) AMT</p> <p>Platform Protection</p> <p>Integrated Clock Controller</p> <p>Networking & Connectivity</p> <p>Internal PCH Buses</p> <p>Power</p> <p>Integrated Sensor Hub</p> <p>Debug</p> <p>CPU Straps</p> <p>Flex I/O</p> <p>GPIO</p> <p>Intel(R) Precise Touch And Stylus</p> <p>SubPartitions</p> <p>IUnit Sub-Partition</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Value</th><th>Help Text</th></tr> </thead> <tbody> <tr> <td>IUnit Binary File</td><td></td><td>This loads the IUnit binary that will be merged into the output image generated by Intel(...</td></tr> </tbody> </table> <p>Flash Layout 9</p> <p>Flash Settings 10</p> <p>Intel(R) ME Kernel 11</p> <table border="1"> <thead> <tr> <th>Parameter</th><th>Value</th><th>Help Text</th></tr> </thead> <tbody> <tr> <td>IFWI Layout</td><td>Layout 1.6</td><td>This setting determine which IFWI layout the platform is using. When set to 2.0 IFWI reside...</td></tr> <tr> <td>Length</td><td>0</td><td>-</td></tr> <tr> <td>Intel(R) ME Binary File</td><td></td><td>This loads the Intel(R) ME binary that will be merged into the into the output image generat...</td></tr> <tr> <td>Major Version</td><td>0</td><td>This displays Major revision number of the currently loaded Intel(R) ME binary.</td></tr> <tr> <td>Minor Version</td><td>0</td><td>This displays Minor revision number of the currently loaded Intel(R) ME binary.</td></tr> </tbody> </table> <p>03/24/2017 08:05:58</p> <p>Using vscommn.bin with timestamp 01:05:24 01/21/2016 GMT</p> <p>Command Line: C:\Users\jlwhismo\Desktop\AMT\CNL_12.0.ENG_12.0.0.7082\FIash_Image_Tool_1_6_B0\WINDOWS\fit.exe</p> <p>Log file written to fit.log</p> <p>Loading C:\Users\jlwhismo\Desktop\AMT\CNL_12.0.ENG_12.0.0.7082\Image Components\CSME\CSME_FW_Consumer_CNP-LP_B0_PCH.bin</p> <p>Loading defaults.</p>		Parameter	Value	Help Text	IUnit Binary File		This loads the IUnit binary that will be merged into the output image generated by Intel(...	Parameter	Value	Help Text	IFWI Layout	Layout 1.6	This setting determine which IFWI layout the platform is using. When set to 2.0 IFWI reside...	Length	0	-	Intel(R) ME Binary File		This loads the Intel(R) ME binary that will be merged into the into the output image generat...	Major Version	0	This displays Major revision number of the currently loaded Intel(R) ME binary.	Minor Version	0	This displays Minor revision number of the currently loaded Intel(R) ME binary.
Parameter	Value	Help Text																								
IUnit Binary File		This loads the IUnit binary that will be merged into the output image generated by Intel(...																								
Parameter	Value	Help Text																								
IFWI Layout	Layout 1.6	This setting determine which IFWI layout the platform is using. When set to 2.0 IFWI reside...																								
Length	0	-																								
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Minor Version	0	This displays Minor revision number of the currently loaded Intel(R) ME binary.																								



Table 2-1. - Initial Screen Layout (Sheet 4 of 9)

#	Label	Contents
9	Flash Layout Tab	Flash Layout which contains (see Table 2-3): <ul style="list-style-type: none"> • Descriptor Region • BIOS Region • IFWI: Intel® ME and PMC Region • EC Region • GBE Region • SubPartitions • PDR Region
10	Flash Settings Tab	Flash Settings which contains (see Table 2-4): <ul style="list-style-type: none"> • Flash Components • Host CPU/ BIOS Master Access • Intel® ME Master Access • GBE Master Access • EC Master Access • Flash Configuration • VSCC Table - VSCC Entry • BIOS Configuration
11	Intel® ME Kernel Tab	Intel® ME Kernel which contains (see Table 2-5): <ul style="list-style-type: none"> • Processor • Intel® ME Firmware Update • Intel® Services Configuration • Image Identification • Firmware Diagnostics • Post Manufacturing Lock • MCTP Configuration • Intel® ME Boot Configuration • Reserved



Table 2-1. - Initial Screen Layout (Sheet 5 of 9)

#	Label	Contents
12	Intel® AMT Tab	Intel® AMT which contains (see Table 2-6): <ul style="list-style-type: none"> Intel® AMT Configuration KVM Configuration Provisioning Configuration OEM Customizable Certificates (1, 2, 3) OEM Default Certificates (1, 2, 3, 4, 5) Redirection Configuration TLS Configuration
13	Platform Protection Tab	Platform Protection which contains (see Table 2-7): <ul style="list-style-type: none"> Content Protection Graphics uController Hash Key Configuration for Bootguard / ISH Boot Guard Configuration Intel® PTT Configuration TPM Over SPI Bus Configuration BIOS Guard Configuration TXT Configuration
14	Integrated Clock Controller Tab	Integrated Clock Controller which contains (see Table 2-8): <ul style="list-style-type: none"> Integrated Clock Controller Policies Profiles

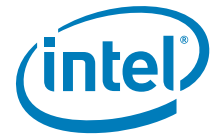


Table 2-1. - Initial Screen Layout (Sheet 6 of 9)

#	Label	Contents
15	Networking & Connectivity Tab	Networking & Connectivity which contains (see Table 2-9): <ul style="list-style-type: none">• Wired LAN Configuration• Wireless LAN Configuration



Table 2-1. - Initial Screen Layout (Sheet 7 of 9)

#	Label	Contents
16	Internal PCH Buses Tab	Internal PCH Buses which contains (see Table 2-10): <ul style="list-style-type: none"> • PCH Timer Configuration • SMBus / SMLink Configuration • DMI Configuration • OPI Configuration • eSPI Configuration
17	Power Tab	Power which contains (see Table 2-11): <ul style="list-style-type: none"> • Platform Power • Deep Sx • PCH Thermal Reporting
18	Integrated Sensor Hub Tab	Integrated Sensor Hub which contains (see Table 2-12): <ul style="list-style-type: none"> • Integrated Sensor Hub • ISH Image • ISH Data



Table 2-1. - Initial Screen Layout (Sheet 8 of 9)

#	Label	Contents
19	Debug Tab	Debug which contains (see Table 2-13): <ul style="list-style-type: none"> • IDLM • Intel® Trace Hub Technology • Intel® ME Firmware Debugging Overrides • Direct Connection Interface Configuration • Early USB DBC over Type-A Configuration • eSPI Feature Overrides
20	CPU Straps Tab	CPU Straps which contain a detailed list of parameters (see Table 2-14) <ul style="list-style-type: none"> • CPU Straps
21	Flex I/O Tab	Flex I/O which contains (see Table 2-15): <ul style="list-style-type: none"> • Intel® RST for PCIe Configuration • PCIe Lane Reversal Configuration • PCIe Port Configuration • SATA / PCIe Combo Port Configuration • SATA / PCIe Combo Port Select Polarity • USB3 Port Configuration • USB2 Port Configuration



Table 2-1. - Initial Screen Layout (Sheet 9 of 9)

#	Label	Contents
22	GPIO Tab	GPIO which contains (see Table 2-16): <ul style="list-style-type: none">• LAN / GPIO Select• WLAN / GPIO Select• Platform Power / GPIO• ME Feature Pins• Touch Controller Pins• GPIO VCCIO Voltage Control
23	Intel® Precise Touch and Stylus	Intel® Precise Touch and Stylus which contains (see Table 2-17): <ul style="list-style-type: none">• Integrated Touch Configuration• Intel® Integrated Touch and Stylus Configuration
	Console Window Area	Displays opening messages, log file entries, and build activity messages



Table 2-2. - Build Settings (Sheet 1 of 2)

Click on Build Button in the top menu bar> Build Settings window pop up is displayed:			
#	Parameter	CRB	Values
1	Output Path		Double click to the right of outimage.bin and click to get browse button to specify path and name of file to create for the build - default is outimage.bin in the same folder as Intel® FIT tool
2	Generate Intermediate Files	Yes	Yes/No - Yes is default
3	Enable Boot Guard warning message at build time	Yes	Yes/No - Yes is default
4	Enable Intel(R) Platform Trust Technology warning message at build time	Yes	Yes/No - Yes is default



Table 2-2. - Build Settings (Sheet 2 of 2)

Click on Build Button in the top menu bar> Build Settings window pop up is displayed:			
#	Parameter	CRB	Values
5	Region Order	Yes	53241 - is default
6	IFWI Build Version	Yes	0x0 is default
7			\$WorkingDir and \$DestDir can be left at the default '.' Click on \$SourceDir Value field and type in path where the Image Components are located for the Manageability Engine kit



Table 2-3. - Flash Layout (Sheet 1 of 5)

Click on Flash Layout in the left tabs menu> Descriptor Region is expanded by default:

▼ Descriptor Region

1

Parameter	Value	
OEM Section Binary		This loads the OEM Sec

#	Parameter	Platform	Settings
1	Descriptor Region - Length		
	OEM Section Binary This loads the OEM Section binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	OEM Binary (optional)

Click on Flash Layout in the left tabs menu> BIOS Region is expanded by default:

▼ BIOS Region

2

Parameter	Value	Help Text
Length	0	-
BIOS Binary File		This loads the BIOS binary that will be merged
BIOS Region Enable	Enabled	This option allows the user to enable or disabl

#	Parameter	Platform	Settings
2	BIOS Region - Length	CFL-S CFL-H CNL-H	0 0 0
	BIOS Binary File Navigate to path to load bios.rom file. This loads the BIOS binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	biosimage.bin biosimage.bin biosimage.bin
	BIOS Region Enable Values: Enabled/Disabled This option allows the user to enable or disable the BIOS region. Note: After loading bios.rom file, check that the BIOS region is enabled in tool before building image.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled

Click on Flash Layout in the left tabs menu> Intel® ME Region is expanded by default:



Table 2-3. - Flash Layout (Sheet 2 of 5)

▼ Ifwi: Intel(R) Me and Pmc Region 3			
Parameter	Value	Help Text	
IFWI Layout	Layout 1.6	This setting determine which IFWI layout the platfo	
Length	0	-	
Intel(R) ME Binary File		This loads the Intel(R) ME binary that will be merge	
Major Version	0	This displays Major revision number of the current	
Minor Version	0	This displays Minor revision number of the currentl	
Hotfix Version	0	This displays Hot-Fix revision number of the curren	
Build Version	0	This displays Build version number of the currently	
Chipset Initialization Version		This displays the current Chipset Initialization versi	
Chipset Initialization Binary		This loads the Chipset Initialization binary that will	
ChipsetInit Override Version		This displays the version of the Chipset Initializtion	
Intel(R) Trace Hub Binary		This loads the Intel(R) Trace Hub binary that will b	
PMC Binary File		This loads the PMC binary that will be merged into	
Version	0	-	
Delayed Authentication Mode Token		This loads the Delayed Authentication Mode Unlock	
3	IFWI Layout	All	Layout 1.6
	Intel® ME Binary File Navigate to your Source Directory (as specified in Table 2-2) and switch to the ME subdirectory. Choose the appropriate Intel ME Firmware binary image. This loads the Intel® ME binary that will be merged into the into the output image generated by the Intel® FIT tool. Note: You may choose to build the Intel® ME Region only. To do so, the Number of Flash Components in Flash Settings> Flash Components must be set to 0. Note: If loading meimage.bin file, check that the ME region is enabled in tool before building image.	CFL-S CFL-H CNL-H	meimage.bin meimage.bin meimage.bin
	Major Version - This displays Major revision number of the currently loaded Intel® ME binary.		
	Minor Version - This displays Minor revision number of the currently loaded Intel® ME binary.		
	Hotfix Version - This displays Hot-Fix revision number of the currently loaded Intel® ME binary.		
	Build Version - This displays Build version number of the currently loaded Intel® ME binary.		
	Chipset Initialization Version - This displays the current Chipset Initialization version contained in the currently loaded Intel® ME binary.		



Table 2-3. - Flash Layout (Sheet 3 of 5)



	Chipset Initialization Binary - This loads the Chipset Initialization binary that will be merged into the output image generated by the Intel® FIT. If specified, this will override the version contained in the Intel® ME binary to align with the values programmed by BIOS. Note: When BIOS passes new Chipset Initialization settings to ME, a Global Reset is initiated (only required on the first boot, subsequent boots will not incur a global reset). This allows for the new settings to be stored in the ME Region and programmed into the PCH. This global reset can be avoided by loading the proper chipset initialization binary in to the ME Region when building the image that aligns with the values in BIOS. The Chipset Initialization Binary will be included in BIOS RC package. If BIOS contains an older version of Chipset Initialization settings ME will be updated at boot with the older settings regardless of any newer settings being present in firmware. In order to avoid this problem and the additional Global Reset customers should ensure that both BIOS and ME are updated with same Chipset Initialization binary.	CFL-S CFL-H CNL-H	Chipset.bin (Optional) Chipset.bin (Optional) Chipset.bin (Optional)
	Chipset Init Override Version - This displays the version of the Chipset Initialization Binary override if specified.		
	PMC Binary File - This loads the PMC binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	PMC.bin PMC.bin PMC.bin
	Version - This displays the version of PMC		
Click on Flash Layout in the left tabs menu> Ec Region is expanded by default:			
▼ EC Region 			
Parameter	Value	Help Text	
Length	0	-	
EC Binary File		This loads the Embedded Controller binary used for eSPI that will	
EC Region Enable	Disabled	This option allows the user to enable or disable the Embedded Co	
EC Region Pointer File		This loads a binary containing the 16 byte value to be written in th	
#	Parameter	Platform	Settings
	EC Region - Length	CFL-S CFL-H CNL-H	0 0 0
	EC Binary File Navigate to path to load EC bin file. This loads the Embedded Controller binary used for eSPI that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	EC Binary EC Binary EC Binary
	EC Region Enable Values: Enabled/Disabled This option allows the user to enable or disable the Embedded Controller data region.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	EC Region Pointer File This loads a binary file containing the 16 byte Embedded Controller pointer value at the start of the flash descriptor	CFL-S CFL-H CNL-H	Pointer Binary Pointer Binary Pointer Binary
Click on Flash Layout in the left tabs menu> Gbe Region is expanded by default:			



Table 2-3. - Flash Layout (Sheet 4 of 5)

▼ GbE Region 5			
Parameter	Value	Help Text	
Length	0	-	
GbE Binary File		This loads the Intel(R) Integrated LAN binary that will be merged into the output image generated by the Intel® FIT tool.	
GbE Region Enable	Enabled	This option allows the user to enable or disable the Gigabit Ethernet Region.	
Image Id	0	This displays Image ID of the currently loaded Intel (R) Integrated LAN binary.	
Major Version	0	This displays Major revision number of the currently loaded Intel (R) Integrated LAN binary.	
Minor Version	0	This displays Minor revision number of the currently loaded Intel (R) Integrated LAN binary.	
#	Parameter	Platform	Settings
5	GbE Region - Length Note: This value will be automatically populated by Intel® FIT during image build.	CFL-S CFL-H CNL-H	0 0 0
	GbE Binary File Navigate to your Source Directory (as specified in Table 2-2) and switch to the GbE subdirectory. Choose the appropriate Intel GbE LAN Firmware binary image. If not using Intel LAN then load the GbE image before disabling the region along with changing additional settings below. This loads the Intel® integrated LAN binary that will be merged into the output image generated by the Intel® FIT tool. Note: If loading gbeimage.bin file, check that the GbE region is enabled in tool before building image.	CFL-S CFL-H CNL-H	gbeimage.bin gbeimage.bin gbeimage.bin
	GbE Region Enable Values: Enabled/Disabled - This option allows the user to enable or disable the Gigabit Ethernet Region. NOTE: If choosing a configuration that does not include the GbE LAN the following settings need to be adjusted: LAN Power Well: Core Well Intel® Integrated Wired LAN Enabled: No GbE MAC SMBus Address: No Intel® PHY over PCIe Enabled: No LAN PHY Power Control GDP11 Signal Configuration: Enable as GDP11	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
Click on Flash Layout in the left tabs menu> IUnit Sub-Partition is expanded by default:			
▼ IUnit Sub-Partition 6			
Parameter	Value	Help Text	
IUnit Binary File		This loads the IUnit binary that will be merged into the output image generated by the Intel® FIT tool.	
#	Parameter	Platform	Settings
6	IUNIT Sub-Partition Binary This loads the IUnit Sub Partition binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	Iunit.bin (Optional) Iunit.bin (Optional) Iunit.bin (Optional)



Table 2-3. - Flash Layout (Sheet 5 of 5)

Click on Flash Layout in the left tabs menu> PDR Region is expanded by default:																			
<div> <div>▼ PDR Region</div> <div>7</div> <table> <tr> <th>Parameter</th><th>Value</th><th colspan="2">Help Text</th></tr> <tr> <td>Length</td><td>0</td><td colspan="2">-</td></tr> <tr> <td>PDR Binary File</td><td></td><td colspan="2">This loads the Platform Data region binary the</td></tr> <tr> <td>PDR Region Enable</td><td>Disabled</td><td colspan="2">This option allows the user to enable or disab</td></tr> </table> </div>				Parameter	Value	Help Text		Length	0	-		PDR Binary File		This loads the Platform Data region binary the		PDR Region Enable	Disabled	This option allows the user to enable or disab	
Parameter	Value	Help Text																	
Length	0	-																	
PDR Binary File		This loads the Platform Data region binary the																	
PDR Region Enable	Disabled	This option allows the user to enable or disab																	
#	Parameter	Platform	Settings																
7	PDR Region - Length Region is disabled by default. Displays Region size information when Binary input file is specified.	CFL-S CFL-H CNL-H	0 0 0																
	PDR Binary File Navigate to path to load pdrimage.bin file if required and available. This loads the Platform Data region binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	PDR.bin (Optional) PDR.bin (Optional) PDR.bin (Optional)																
	PDR Region Enable Values: Enabled/Disabled - This option allows the user to enable or disable the Platform Data Region. Note: If loading PDR.bin file, check that the PDR region is enabled in tool before building image.	CFL-S CFL-H CNL-H	Disabled Disabled Disabled																



Table 2-4. - Flash Settings (Sheet 1 of 9)

Click on Flash Settings in the left tabs menu> Flash Components is expanded by default:			
<div> <div>▼ Flash Components</div> <div>1</div> </div>			
Parameter	Value		
Number of Flash Components	1	Specifies the number of Flash components	
Flash component 1 Size	16MB	This field identifies the size of the 1st Flash	
Flash component 2 Size	8MB	This field identifies the size of the 2nd Flash	
SPI Global Protected Range	0x0	Sets the default value of the Global Protected Range register in the SPI Flash Controller.	
SPI Idle to Deep Power Down Timeout	0x5	Specifies the time in microseconds that the Flash Controller waits after all activity is idle before commanding the flash devices to Deep Power down, time = 2^N microseconds.	
SPI Out of Order operation Enabled	Yes	When this setting is enabled priority operations may be issued while waiting for write / erase operations to complete on the flash device. When this setting is disabled all write / erase type operations in order.	
SPI Resume Hold-off Delay	4us	This specifies the time after the completion of a pri_op before the flash controller sends the resume instruction. If a new pri_op is eligible to be issued prior to the end of this delay time then the pri_op is issued and the timer is reinitialized to tRHD. 3-bit field encodes count with range 0-7. tRHD = count * 2us.	
SPI Max write / erase Resume	No Ceiling	This setting specifies the maximum value for the resume instruction.	
SPI Suspend / Resume Enabled	Yes	When this setting is enabled writes and erases are allowed while the flash is in suspend.	
SPI Software Binding Enabled	No	When enabled this settings will allow for SPI software binding.	
#	Parameter	Platform	Settings
1	Flash Components		
	Number of Components Values: 0, 1, 2 - This setting configures the total number of flash components for the platform. Note: Choosing a selection of '0' part will cause the Intel® FIT tool to build an output image containing only the Intel® ME region.	CFL-S CFL-H CNL-H	1 1 1
	Flash component 1 Size Values: 512KB, 1MB, 2MB, 4MB, 8MB, 16MB, 32MB, 64MB - This setting determines the size of Flash component 1 for the platform image.	CFL-S CFL-H CNL-H	32MB 32MB 32MB
	Flash component 2 Size Values: 512KB, 1MB, 2MB, 4MB, 8MB, 16MB, 32MB, 64MB - This setting determines the size of Flash component 2 for the platform image. Note: This setting is only applicable when the Number of Flash Components option is set to '2'.	CFL-S CFL-H CNL-H	Greyed Out Greyed Out Greyed Out
	SPI Global Protected Range - This sets the default value of the Global Protected Range register in the SPI Flash Controller.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	SPI Idle to Deep Power Down Timeout - This sets SPI Idle to Deep Power Down Timeout Default Specifies the time in microseconds that the Flash Controller waits after all activity is idle before commanding the flash devices to Deep Power down, time = 2^N microseconds.	CFL-S CFL-H CNL-H	0x5 0x5 0x5
	SPI Out of Order operation Enabled - When this setting is enabled priority operations may be issued while waiting for write / erase operations to complete on the flash device. When this setting is disabled all write / erase type operations in order.	CFL-S CFL-H CNL-H	Yes Yes Yes
	SPI Resume Hold-off Delay - This specifies the time after the completion of a pri_op before the flash controller sends the resume instruction. If a new pri_op is eligible to be issued prior to the end of this delay time then the pri_op is issued and the timer is reinitialized to tRHD. 3-bit field encodes count with range 0-7. tRHD = count * 2us.	CFL-S CFL-H CNL-H	4us 4us 4us



Table 2-4. - Flash Settings (Sheet 2 of 9)

	SPI Max write / erase Resume to Suspend intervals - This setting specifies the maximum value for the write and erase Resume to Suspend intervals.	CFL-S CFL-H CNL-H	No Ceiling No Ceiling No Ceiling
	SPI Suspend / Resume Enabled - When this setting is enabled writes and erases may be suspended to allow a read to be issued on the flash device. When this setting is disabled no transaction will be allowed to the busy flash device.	CFL-S CFL-H CNL-H	Yes Yes Yes
	SPI Software Binding Enabled - When enabled this settings will allow for SPI re-binding to a new PCH during re-manufacturing flows.	CFL-S CFL-H CNL-H	No No No
Click on Flash Layout in the left tabs menu> BIOS Region is expanded by default:			
▼ Host CPU / BIOS Master Access 2			
Parameter	Value	Help Text	
Host CPU / BIOS Write Access Intel Recommended	0xFF	This setting determines write access control	
Host CPU / BIOS Write Access Custom	0x0	This setting determines write access control	
Host CPU / BIOS Read Access Intel Recommended	0xFF	This setting determines read access control	
Host CPU / BIOS Read Access Custom	0x0	This setting determines read access control	
#	Parameter	Platform	Settings
2	Host CPU / BIOS Master Access		
	Host CPU / BIOS Write Access Intel Recommended Values: 0xFF, 0x00A, 0x01A, 0x10A, 0x11A - This setting determines write access control for the BIOS region. 0xFF = Debug/Manufacturing 0x00A = Production 0x01A = Production with access to PDR (should ONLY be used if PDR region is implemented). 0x10A = Production with access to EC 0x11A = Production with access to EC and PDR Custom = User custom Host / BIOS Write Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFF 0xFF 0xFF
	Host CPU / BIOS Write Access Custom - This setting allows free form user customized Host CPU / BIOS Write Access regions permissions Note: This setting is grayed out unless Custom is selected under the Host CPU / BIOS Write Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input



Table 2-4. - Flash Settings (Sheet 3 of 9)

	Host CPU / BIOS Read Access Values: 0xFFFF, 0x00F, 0x01F, 0x10F, 0x11F - This setting determines read access control for the BIOS region. 0xFFFF = Debug/Manufacturing 0x00F = Production 0x01F = Production with access to PDR (should ONLY be used if PDR region is implemented). 0x10F = Production with access to EC 0x11F = Production with access to EC and PDR Custom = User custom Host / BIOS Read Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide.	CFL-S CFL-H CNL-H	0xFFFF 0xFFFF 0xFFFF															
	Host CPU / BIOS Read Access Custom - This setting allows free form user customized Host CPU / BIOS Read Access regions permissions Note: This setting is grayed out unless Custom is selected under the Host CPU / BIOS Read Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input															
Click on Flash Settings in the left tabs menu> Intel® ME Master Access is expanded by default:																		
▼ Intel(R) ME Master Access <div>3</div>																		
<table><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr><tr><td>Intel(R) ME Write Access Intel Recomendaded</td><td>0xFFFF</td><td>This setting determines read access control for the</td></tr><tr><td>Intel(R) ME Write Access Custom</td><td>0x0</td><td>This setting determines read access control for the</td></tr><tr><td>Intel(R) ME Read Access Intel Recomendaded</td><td>0xFFFF</td><td>This setting determines read access control for the</td></tr><tr><td>Intel(R) ME Read Access Custom</td><td>0x0</td><td>This setting determines read access control for the</td></tr></table>				Parameter	Value	Help Text	Intel(R) ME Write Access Intel Recomendaded	0xFFFF	This setting determines read access control for the	Intel(R) ME Write Access Custom	0x0	This setting determines read access control for the	Intel(R) ME Read Access Intel Recomendaded	0xFFFF	This setting determines read access control for the	Intel(R) ME Read Access Custom	0x0	This setting determines read access control for the
Parameter	Value	Help Text																
Intel(R) ME Write Access Intel Recomendaded	0xFFFF	This setting determines read access control for the																
Intel(R) ME Write Access Custom	0x0	This setting determines read access control for the																
Intel(R) ME Read Access Intel Recomendaded	0xFFFF	This setting determines read access control for the																
Intel(R) ME Read Access Custom	0x0	This setting determines read access control for the																
#	Parameter	Platform	Settings															
<div>3</div>	Intel® ME Master Access																	
	Intel® ME Write Access Intel Recommended Values: 0xFFFF, 0x004 - This setting determines write access control for the ME region. 0xFFFF = Debug/Manufacturing 0x004 = Production 0x00C = Production Custom = User custom Intel® ME Write Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFFF 0xFFFF 0xFFFF															
	Intel® ME Write Access Custom - This setting allows free form user customized Intel® ME Write Access regions permissions Note: This setting is grayed out unless Custom is selected under the Intel® ME Write Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input															



Table 2-4. - Flash Settings (Sheet 4 of 9)

	Intel® ME Read Access Intel Recommended Values: 0xFFF, 0x00D - This setting determines read access control for the ME region. 0xFFF = Debug/Manufacturing 0x00D = Production Custom = User custom Intel® ME Read Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFF 0xFFF 0xFFF
	Intel® ME Read Access Custom - This setting allows free form user customized Intel® ME Read Access regions permissions Note: This setting is grayed out unless Custom is selected under the Intel® ME Read Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input
Click on Flash Settings in the left tabs menu> GbE Master Access is expanded by default:			
▼ GbE Master Access 4			
Parameter	Value	Help Text	
GbE Write Access Intel Recommended	0xFFF	This setting determines read access control for the C	
GbE Write Access Custom	0x0	This setting determines read access control for the C	
GbE Read Access Intel Recommended	0xFFF	This setting determines read access control for the C	
GbE Read Access Custom	0x0	This setting determines read access control for the C	
#	Parameter	Platform	Settings
4	GbE Master Access		
	GbE Write Access Intel Recommended Values: 0xFFF, 0x008 - This setting determines write access control for the Gigabit Ethernet Region. 0xFFF = Debug/Manufacturing 0x008 = Production Custom = User custom GbE Write Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFF 0xFFF 0xFFF
	GbE Write Access Custom - This setting allows free form user customized GbE Write Access regions permissions Note: This setting is grayed out unless Custom is selected under the GbE Write Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input



Table 2-4. - Flash Settings (Sheet 5 of 9)

	GbE Read Access Intel Recommended Values: 0xFFFF, 0x009 - This setting determines read access control for the Gigabit Ethernet Region. 0xFFFF = Debug/Manufacturing 0x009 = Production Custom = User custom GbE Read Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFFF 0xFFFF 0xFFFF
	GbE Read Access Custom - This setting allows free form user customized GbE Read Access regions permissions Note: This setting is grayed out unless Custom is selected under the GbE Read Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input
Click on Flash Settings in the left tabs menu> EC Master Access is expanded by default:			
<div> <div>▼ EC Master Access</div> <div>5</div> </div>			
Parameter		Value	Help Text
Embedded Controller Read Access Intel Recommended		0xFFFF	This setting determines read access control
Embedded Controller Read Access Custom		0x0	This setting determines read access control
Embedded Controller Write Access Intel Recommended		0xFFFF	This setting determines write access contro
Embedded Controller Write Access Custom		0x0	This setting determines write access contro
#	Parameter	Platform	Settings
5	EC Master Access		
	EC Write Access Intel Recommended Values: 0xFFFF, 0x100 - This setting determines write access control for the Embedded Controller Region. 0xFFFF = Debug/Manufacturing 0x100 = Production Custom = User custom EC Write Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFFF 0xFFFF 0xFFFF
	EC Write Access Custom - This setting allows free form user customized EC Write Access regions permissions Note: This setting is grayed out unless Custom is selected under the EC Write Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input



Table 2-4. - Flash Settings (Sheet 6 of 9)

	EC Read Access Intel Recommended Values: 0xFFF, 0x101, 0x103 - This setting determines read access control for the Embedded Controller Region. 0xFFF = Debug/Manufacturing 0x101 = Production 0x103 = Production with EC BIOS Read Access Custom = User custom EC Read Access values For further details on Region Access Control see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0xFFF 0xFFF 0xFFF
	EC Read Access Custom - This setting allows free form user customized EC Read Access regions permissions Note: This setting is grayed out unless Custom is selected under the EC Read Access Intel Recommended drop down menu. Warning: Setting region access permission values outside of Intel recommendation could result in compromised platform security	CFL-S CFL-H CNL-H	Hex Input
Click on Flash Layout in the left tabs menu> IUnit Sub-Partition is expanded by default:			
<div> <div>Flash Configuration</div> <div>6</div> </div>			
Parameter	Value	Help Text	
Dual I/O Read Enable	No	This soft-strap only has effect if Dual I/O Read is discovered as supported	
Dual Output Read Enable	No	This soft-strap only has effect if Dual Output Read is discovered as supported	
Fast Read Clock Frequency	48MHz	This setting allows customers to configure the flash component clock	
Fast Read Supported	Yes	This setting allows customers to enable support for Fast Read capabilities	
Invalid Instruction 0	0x21	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 1	0x42	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 2	0x60	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 3	0xAD	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 4	0xB7	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 5	0xB9	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 6	0xC4	This setting allows customers to configure invalid instruction to protect	
Invalid Instruction 7	0xC7	This setting allows customers to configure invalid instruction to protect	
Quad I/O Read Enable	No	This soft-strap only has effect if Quad I/O Read is discovered as supported	
Quad Output Read Enable	No	This soft-strap only has effect if Quad Output Read is discovered as supported	
Read ID and Read Status Clock Frequency	48MHz	This setting allows customers to configure the flash component clock	
Write and Erase Clock Frequency	48MHz	This setting allows customers to configure the flash component clock	
#	Parameter	Platform	Settings
6	Flash Configuration		



Table 2-4. - Flash Settings (Sheet 7 of 9)

	Dual I/O Read Enabled Values: Yes/No - This setting allows the customer to enable support for Dual I/O Read capabilities for flash components. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Dual Output Read Enabled Values: Yes/No - This setting allows the customer to enable support for Dual Output Read capabilities for flash components. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Fast Read Clock Frequency Values: 17MHz, 30MHz, 48MHz - This setting allows the customer to configure the flash component clock frequency setting for Fast Read. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	48MHz 48MHz 48MHz
	Fast Read Supported Values: Yes/No - This setting allows the customer to enable support for Fast Read capabilities for flash components. See Cannon Lake H SPI Programming guide for further details. Note: If fast read supported is set to "No" any changes made to Dual I/O, Quad I/O, Dual Output, or Quad Output will not be affected if set to yes. Fast read supported should also be set to enable frequencies greater than 20MHz.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Invalid Instruction 0 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x00000021 0x00000021 0x00000021
	Invalid Instruction 1 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x00000042 0x00000042 0x00000042
	Invalid Instruction 2 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x00000060 0x00000060 0x00000060
	Invalid Instruction 3 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x000000AD 0x000000AD 0x000000AD
	Invalid Instruction 4 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x000000B7 0x000000B7 0x000000B7
	Invalid Instruction 5 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x000000B9 0x000000B9 0x000000B9
	Invalid Instruction 6 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x000000C4 0x000000C4 0x000000C4
	Invalid Instruction 7 - This setting allows the customer to configure invalid instruction to protect against Chip Erase. See Cannon Lake H SPI Programming guide for further details. Note: This setting should be set to '0' if there are not Invalid instructions.	CFL-S CFL-H CNL-H	0x000000C7 0x000000C7 0x000000C7
	Quad I/O Read Enabled Values: Yes/No - This setting allows the customer to enable support for Quad I/O Read capabilities for flash components. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Quad Output Read Enabled Values: Yes/No - This setting allows the customer to enable support for Quad Output Read capabilities for flash components. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Read ID and Read Status clock frequency Values: 17MHz, 30MHz, 48MHz - This setting allows the customer to configure the flash component clock frequency setting for Read ID and Read Status. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	17MHz 17MHz 17MHz



Table 2-4. - Flash Settings (Sheet 8 of 9)

	Write and Erase clock frequency Values: 17MHz, 30MHz, 48MHz - This setting allows the customer to configure the flash component clock frequency setting for Write and Erase. See Cannon Lake / Coffee Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	48MHz 48MHz 48MHz
Click on Flash Settings in the left tabs menu> Legacy VSCC Table is expanded by default:			
▼ Legacy VSCC Table 7			
▼ VSCC Entries 8			
W25Q128BV		9 + Add VSCC Entry	
Parameter	Value	Help Text	
Part Name	W25Q128BV	This setting allow the OEM input a name designation for each flash...	
Vendor ID	0xEF	This configures the JEDEC vendor specific byte ID of the SPI flash ...	
Device ID 0	0x40	This configures the JEDEC device specific byte ID 0 of the SPI flas...	
Device ID 1	0x18	This configures the JEDEC device specific byte ID 1 of the SPI flas...	
#	Parameter	Platform	Settings
7	Flash Settings - VSCC Table VSCC Entries		
	W25Q128BV		
8	VSCC Entry	CFL-S CFL-H CNL-H	
	Name - This setting allow the OEM input a name designation for each flash component being used. Note: This is a free form entry field it does not affect actual flash component operation.	CFL-S CFL-H CNL-H	Winbond Winbond Winbond
	Vendor ID - This configures the JEDEC vendor specific byte ID of the SPI flash component. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	0xEF 0xEF 0xEF
	Device ID 0 - This configures the JEDEC device specific byte ID 0 of the SPI flash component. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	0x40 0x40 0x40
	Device ID 1 - This configures the JEDEC device specific byte ID 1 of the SPI flash component. See Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	0x18 0x18 0x18
9	+ Add VSCC Entry		
Click on Flash Settings in the left tabs menu> BIOS Configuration is expanded by default:			



Table 2-4. - Flash Settings (Sheet 9 of 9)

▼ Bios Configuration

10

Parameter	Value	Help Text	
Top Swap Block Size	64KB	This configures the Top Swap Block size for the platform.	

#	Parameter	Platform	
10	BIOS Configuration	CFL-S	64KB
	Top Swap Block Size	CFL-H	64KB
	Values: 64KB, 128KB, 256KB, 512KB, 1MB - This configures the Top Swap Block size for the platform. For further details see Cannon Lake H Platform Controller Hub EDS.	CNL-H	64KB

Click on Flash Settings in the left tabs menu> BIOS Configuration is expanded by default:

▼ FPF Configuration

11

Parameter	Value	Help Text	
FPF Hardware Binding Enabled	Disabled	This setting configures the FPF Hardware binding behavior for the platform image.	

11	FPF Configuration		
	Values: Enabled / Disabled		
	This setting configures the FPF Hardware binding behavior for the platform image. If this setting is enabled FPF Hardware binding will occur when platform close manufacturing flow is executed with Intel® FPT. If this setting is disabled FPF Hardware binding will not take place when close manufacturing flow is executed.		
	Note: For Revenue parts this setting will be ignored and FPF Hardware binding will take place when close manufacturing flow is executed.		

	FPF Hardware Binding Enabled	CFL-S CFL-H CNL-H	Disabled Disabled Disabled
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Table 2-5. - Intel® ME Kernel (Sheet 1 of 4)

Click on Intel® ME Kernel in the left tabs menu> Processor is expanded by default:			
<div> <div>▼ Processor</div> <div>1</div> </div>			
Parameter	Value	Help Text	
Processor Emulation	No Emulation	-	
Missing Processor Detection Alert	No	-	
#	Parameter	Platform	Settings
1	Intel® ME Kernel - Processor		
	Processor Emulation Values: No Emulation EMULATE Intel® vPro (TM) capable Processor EMULATE Intel® Core (TM) branded Processor EMULATE Intel® Celeron (R) branded Processor EMULATE Intel® Pentium (R) branded Processor EMULATE Intel® Xeon (R) branded Processor EMULATE Intel® Xeon (R) Manageability capable Processor This setting determines processor type to be emulated on pre-production silicon. Set this parameter to the type of processor that the target system will use during production. This field will emulate that processor class for pre-production silicon. It is necessary to set this to Emulate Intel® vPro™ Processor in order to enable Intel® AMT.	CFL-S CFL-H CNL-H	EMULATE Intel® vPro (TM) capable Processor EMULATE Intel® vPro (TM) capable Processor EMULATE Intel® vPro (TM) capable Processor
Click on Intel® ME Kernel in the left tabs menu> Intel® ME Firmware Update is expanded by default:			
<div> <div>▼ Intel (R) ME Firmware Update</div> <div>2</div> </div>			
Parameter	Value	Help Text	
Firmware Update OEM ID	00000000-0000-0000-0000-000...	-	
Hide MEBx Firmware Update ...	No	-	
Intel(R) ME Region Flash Prot...	Yes	-	
#	Parameter	Platform	Settings
2	Intel® ME Kernel - Intel® ME Firmware Update		
	Firmware Update OEM ID - This setting allows configuration of an OEM unique ID to ensure that customers can only update their platform with images from the OEM of the platform.	CFL-S CFL-H CNL-H	0 string 0 string 0 string
	Hide Intel® MEBx Firmware Update Control Values: Yes/No - This setting allows the customer to hide the Firmware Update option in the Intel® MEBx interface.	CFL-S CFL-H CNL-H	No No No
	Intel® ME Region Flash Protection Override Values: Yes/No - This setting enables descriptor unlock of the Intel® ME Region when the HMRFP0 message is sent to firmware prior to BIOS End of POST.	CFL-S CFL-H CNL-H	Yes Yes Yes



Table 2-5. - Intel® ME Kernel (Sheet 2 of 4)

Click on Intel® ME Kernel in the left tabs menu> Intel® ME Services Configuration is expanded by default:			
▼ Intel (R) Services Configuration 3			
Parameter	Value	Help Text	
ODM ID used by Intel(R) Servi...	0x00000000	-	
System Integrator ID used by I...	0x00000000	-	
Reserved ID used by Intel(R) S...	0x00000000	-	
#	Parameter	Platform	
3	Intel® ME Kernel - Intel® Services Configuration		
	ODM ID used by Intel® Services - This setting is for entering the ODM ID for Intel® Services to identify the ODM Board builder. Note: This ID is either generated by or registered with Intel® Services Web servers.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	System Integrator ID used by Intel® Services - This setting is for entering the System Integrator ID for Intel® Services to identify the System Integrator. Note: This ID is either generated by or registered with Intel® Services Web servers.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Reserved ID used by Intel® Services - This setting is for entering the Reserved ID for Intel® Services currently not used.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
Click on Intel® ME Kernel in the left tabs menu> Image Identification is expanded by default:			
▼ Image Identification 4			
Parameter	Value	Help Text	
OEM Tag	0x00000000	-	
#	Parameter	Platform	Settings
4	Intel® ME Kernel - Image Identification		
	OEM Tag - This is a free form 32bit field that allows the OEM to configure their own unique identifier in the firmware image.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
Click on Intel® ME Kernel in the left tabs menu> Firmware Diagnostics is expanded by default:			
▼ Firmware Diagnostics 5			
Parameter	Value	Help Text	
Automatic Built in Self Test	Disabled	-	



Table 2-5. - Intel® ME Kernel (Sheet 3 of 4)

#	Parameter	Platform	Settings
5	Intel® ME Kernel - Firmware Diagnostics		
	Automatic Built in Self Test Values: Enabled/Disabled This setting enables the firmware Automatic Built in Self Test which is executed during first platform boot after initial image flashing.	CFL-S CFL-H CNL-H	Disabled Disabled Disabled
Click on Intel® ME Kernel in the left tabs menu> Post Manufacturing Lock is expanded by default:			
▼ Post Manufacturing Lock 6			
Parameter	Value	Help Text	
Post Manufacturing NVAR Configuration Enabled	Yes	This setting determines if modifications to Cust	
#	Parameter	Platform	Settings
6	Post Manufacturing Lock		
	Post Manufacturing NVAR Configuration Enabled - This setting determines if modifications to Customer configurable NVARS is to be allowed after close of manufacturing.	CFL-S CFL-H CNL-H	Yes Yes Yes
Click on Intel® ME Kernel in the left tabs menu> MCTP Configuration is expanded by default:			
▼ MCTP Configuration 7			
Parameter	Value	Help Text	
MctpStackConfiguration	0x920030	Defines the ME's 8-bits MCTP Endpoint IDs for each SMBus physical interface (SMBus, ...	
MctpDevicePortEc	0x02	-	
MctpDevicePortSio	0x00	-	
MctpDevicePortIsh	0x00	-	
MctpDevicePortBmc	0x00	-	
#	Parameter	Platform	Settings
7	Intel® ME Kernel - MCTP Configuration		
	MCTP Stack Configuration Defines the Intel® ME's 8-bits MCTP Endpoint ID's for each SMBus physical interface (SMBus, SMLink0, and SMLink1). These values are needed for FW to communicate with MCTP end points. For each of these 3 bytes, a value of 0x00 means not used, and values 0xFF or 0x01 - 0x07 or 0x20 - 0x2F are not allowed.	CFL-S CFL-H CNL-H	0x920030 0x920030 0x920030
	MctpDevicePortEc	CFL-S CFL-H CNL-H	0x02 0x02 0x02



Table 2-5. - Intel® ME Kernel (Sheet 4 of 4)

	MctpDevicePortSio	CFL-S CFL-H CNL-H	0x00 0x00 0x00
	MctpDevicePortIsh	CFL-S CFL-H CNL-H	0x00 0x00 0x00
	MctpDevicePortBmc	CFL-S CFL-H CNL-H	0x00 0x00 0x00
Click on Intel® ME Kernel in the left tabs menu> Intel® ME Boot Configuration is expanded by default:			
▼ Intel (R) ME Boot Configuration 8			
	Parameter	Value	Help
	Persistent PRTC Backup Power	Exists	FPF that indicates if the device is designed such
#	Parameter	Platform	Settings
8	Intel® ME Boot Configuration		
	Persistent PRTC Backup Power Values: None / Exists FPF that indicates if the device is designed such that it may lose PRTC power more than 10 times throughout the normal life-cycle of the product and hence has no persistent time or AR protection. At EOM this value is burned to the FPF, and can never be changed	CFL-S CFL-H CNL-H	Exists Exists Exists
Click on Intel® ME Kernel in the left tabs menu> Reserved is expanded by default:			
▼ Reserved 9			
	Parameter	Value	Help Text
	Reserved	No	-
9	Intel® ME Kernel - Reserved		
	Reserved Values: Yes/No	CFL-S CFL-H CNL-H	No No No

Table 2-6. - Intel® AMT (Sheet 1 of 8)

Click on Intel® AMT in the left tabs menu> Intel® AMT is expanded by default:			
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Table 2-6. - Intel® AMT (Sheet 2 of 8)

▼ Intel(R) AMT Configuration 1			
Parameter	Value	Help Text	
Intel(R) AMT Supported	Yes	This setting allows customers to disable Intel(R) AMT on the plat...	
Intel(R) ME Network Services S...	Yes	This setting allows customers to enable / disable Intel(R) ME Net...	
Manageability Application Supp...	Yes	This setting allows customers to permanently disable Intel(R) AM...	
Manageability Application initial...	Enabled	This setting allows customers to determine the power up state f...	
Intel(R) AMT Idle Timeout	0xFFFF	This setting configures the idle timeout value before Intel(R) AM...	
Intel(R) AMT Watchdog Autom...	No	This setting allows customers to enable the Intel (R) ME firmwar...	

#	Parameter	Platform	Settings
1	Intel® AMT - Intel® AMT Configuration		
	Intel® AMT Supported Values: Yes/No - This setting allows customers to disable Intel® AMT on the platform and force the platform into Standard Manageability mode. Note: If this setting has been set to disabled Intel® AMT cannot be re-enabled once the descriptor has been locked. This setting applies to Desktop and Workstation only.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Intel® ME Network Services Supported Values: Yes/No - This setting allows customers to enable / disable Intel® ME Network Services on the platform. Note: This setting and TLS needs to be enabled for proper operation of Intel® Authenticate (Corporate Only). In addition if this setting is disabled Intel® AMT will also be disabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Intel® Manageability Application Supported Values: Yes/No - This setting allows customers to force Intel® AMT enabled platforms to operate in Standard Manageability mode. Note: This setting only applies to Desktop and Workstation platforms.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Manageability Application initial power-up state Values: Enabled/Disabled This setting allows customers to determine the power up state for Intel® AMT or Standard Manageability. Note: If this setting is disabled Intel® AMT or Standard Manageability can still be re-enabled through the Intel® MEBx interface.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	Intel® AMT Idle Timeout Values: 0xFFFF - This setting configures the idle timeout value before Intel® AMT enters into an off state.	CFL-S CFL-H CNL-H	0xFFFF 0xFFFF 0xFFFF
	Intel® AMT Watchdog Automatic Reset Enabled Values: Yes/No - This setting allows customers to enable the Intel® ME firmware to trigger an automatic platform reset if either the MEI or Agent Presence are in a hung state. Note: This feature only allows one reset at a time when the watchdog expires. After this feature has triggered a reset, it must be re-armed for reuse via management console.	CFL-S CFL-H CNL-H	Yes Yes Yes

Click on Intel® AMT in the left tabs menu> KVM Configuration is expanded by default:

▼ KVM Configuration 2			
Parameter	Value	Help Text	
Firmware KVM Screen Blanking	No	-	
KVM Redirection Supported	Yes	-	

#	Parameter	Platform	Settings
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Table 2-6. - Intel® AMT (Sheet 3 of 8)

2	Intel® AMT - KVM Configuration														
	Firmware KVM Screen Blanking Values: Yes/No - This setting enables KVM Screen blanking capabilities in the firmware image. Note: This feature is dependent on processor level support.	CFL-S CFL-H CNL-H	No No No												
	KVM Redirection Supported Values: Yes/No - This setting allows OEMs to enable / disable the KVM Redirection capabilities of the firmware. Note: If this setting has been set to disabled it cannot be re-enabled once the descriptor has been locked.	CFL-S CFL-H CNL-H	Yes Yes Yes												
Click on Intel® AMT in the left tabs menu> Provisioning Configuration is expanded by default:															
▼ Provisioning Configuration 3															
<table><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr><tr><td>Embedded Host Based Config...</td><td>No</td><td>-</td></tr><tr><td>PKI Domain Name Suffix</td><td></td><td>-</td></tr></table>				Parameter	Value	Help Text	Embedded Host Based Config...	No	-	PKI Domain Name Suffix		-			
Parameter	Value	Help Text													
Embedded Host Based Config...	No	-													
PKI Domain Name Suffix		-													
#	Parameter	Platform													
3	Intel® AMT - Provisioning Configuration														
	Embedded Host Based Configuration Values: Yes/No - This setting allows customers to enable / disable Embedded Host Based Configuration. Important - EHBC is primarily intended for use in embedded systems as it offers less user privacy/security protection than may be appropriate for business client systems. Note: The Intel® FIT tool will not adjust the Redirection Privacy/Security value based on selection here. Please set security level as needed.	CFL-S CFL-H CNL-H	No No No												
	PKI Domain Name Suffix - This setting allow OEMs to pre-configure the Domain Name Suffix used for PKI provisioning in their firmware image. Note: For normal out-of-box provisioning functionality this setting should be left empty.	CFL-S CFL-H CNL-H	- - -												
Click on Intel® AMT in the left tabs menu> OEM Customizable Certificate 1 is expanded by default:															
▼ OEM Customizable Certificate 1 4															
<table><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr><tr><td>Certificate Enabled</td><td>No</td><td>This setting allows customers to enable PKI provisioning Custo...</td></tr><tr><td>Certificate Friendly Name</td><td></td><td>This setting allows customers to assign a user friendly name for...</td></tr><tr><td>Certificate Stream</td><td></td><td>This setting allows customers to input hash stream for PKI provi...</td></tr></table>				Parameter	Value	Help Text	Certificate Enabled	No	This setting allows customers to enable PKI provisioning Custo...	Certificate Friendly Name		This setting allows customers to assign a user friendly name for...	Certificate Stream		This setting allows customers to input hash stream for PKI provi...
Parameter	Value	Help Text													
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Custo...													
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...													
Certificate Stream		This setting allows customers to input hash stream for PKI provi...													
#	Parameter	Platform	Settings												
4	Intel® AMT - OEM Customizable Certificate 1														
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Custom Certificate 1.	CFL-S CFL-H CNL-H	No No No												



Table 2-6. - Intel® AMT (Sheet 4 of 8)

	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Custom Certificate 1. Maximum of 32 characters.	CFL-S CFL-H CNL-H	- - -
	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning Custom Certificate 1. If enabled the certificate will be used in addition to those already pre-loaded in base firmware during provisioning. Note: If the platform is un-configured the Custom Certificate Hash will be deleted.	CFL-S CFL-H CNL-H	- - -

Click on Intel® AMT in the left tabs menu> OEM Customizable Certificate 2 is expanded by default:

▼ OEM Customizable Certificate 2

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Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Custo...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
5	Intel® AMT - OEM Customizable Certificate 2		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Custom Certificate 2.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Custom Certificate 2. Maximum of 32 characters.	CFL-S CFL-H CNL-H	- - -
	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning Custom Certificate 2. If enabled the certificate will be used in addition to those already pre-loaded in base firmware during provisioning. Note: If the platform is un-configured the Custom Certificate Hash will be deleted.	CFL-S CFL-H CNL-H	- - -

Click on Intel® AMT in the left tabs menu> OEM Customizable Certificate 3 is expanded by default:

▼ OEM Customizable Certificate 3

6

Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Custo...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
6	Intel® AMT - OEM Customizable Certificate 3		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Custom Certificate 3.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Custom Certificate 3. Maximum 32 characters.	CFL-S CFL-H CNL-H	- - -



Table 2-6. - Intel® AMT (Sheet 5 of 8)

	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning Custom Certificate 3. If enabled the certificate will be used in addition to those already pre-loaded in base firmware during provisioning. Note: If the platform is un-configured the Custom Certificate Hash will be deleted.	CFL-S CFL-H CNL-H	- - -
--	--	-------------------------	-------------

Click on Intel® AMT in the left tabs menu> OEM Default Certificate 1 is expanded by default:

▼ OEM Default Certificate 1

7

Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
7	Intel® AMT - OEM Default Certificate 1		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Default certificate 1.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Default Certificate 1. Maximum 32 characters.	CFL-S CFL-H CNL-H	- - -
	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning custom certificate 1. Note: Default Certificates if enabled will be used in addition to those already pre-loaded in firmware during provisioning. Unlike Customizable Certificates the Default Certificates are not deleted when the platform is un-provisioned.	CFL-S CFL-H CNL-H	- - -

Click on Intel® AMT in the left tabs menu> OEM Default Certificate 2 is expanded by default:

▼ OEM Default Certificate 2

8

Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
8	Intel® AMT - OEM Default Certificate 2		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Default certificate 2.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Default Certificate 2. Maximum 32 characters.	CFL-S CFL-H CNL-H	- - -



Table 2-6. - Intel® AMT (Sheet 6 of 8)

	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning custom certificate 2. Note: Default Certificates if enabled will be used in addition to those already pre-loaded in firmware during provisioning. Unlike Customizable Certificates the Default Certificates are not deleted when the platform is un-provisioned.	CFL-S CFL-H CNL-H	- - -
--	---	-------------------------	-------------

Click on Intel® AMT in the left tabs menu> OEM Default Certificate 3 is expanded by default:

▼ OEM Default Certificate 3

9

Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
9	Intel® AMT - OEM Default Certificate 3		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Default certificate 3.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Default Certificate 3. Maximum 32 characters.	CFL-S CFL-H CNL-H	- - -
	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning custom certificate 3. Note: Default Certificates if enabled will be used in addition to those already pre-loaded in firmware during provisioning. Unlike Customizable Certificates the Default Certificates are not deleted when the platform is un-provisioned.	CFL-S CFL-H CNL-H	- - -

Click on Intel® AMT in the left tabs menu> OEM Default Certificate 4 is expanded by default:

▼ OEM Default Certificate 4

10

Parameter	Value	Help Text
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...
Certificate Stream		This setting allows customers to input hash stream for PKI provi...

#	Parameter	Platform	Settings
10	Intel® AMT - OEM Default Certificate 4		
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Default certificate 4.	CFL-S CFL-H CNL-H	No No No
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Default Certificate 4.	CFL-S CFL-H CNL-H	- - -



Table 2-6. - Intel® AMT (Sheet 7 of 8)

	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning custom certificate 4. Note: Default Certificates if enabled will be used in addition to those already pre-loaded in firmware during provisioning. Unlike Customizable Certificates the Default Certificates are not deleted when the platform is un-provisioned.		CFL-S CFL-H CNL-H	- - -												
Click on Intel® AMT in the left tabs menu> OEM Default Certificate 5 is expanded by default:																
▼ OEM Default Certificate 5 11																
<table><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr><tr><td>Certificate Enabled</td><td>No</td><td>This setting allows customers to enable PKI provisioning Default...</td></tr><tr><td>Certificate Friendly Name</td><td></td><td>This setting allows customers to assign a user friendly name for...</td></tr><tr><td>Certificate Stream</td><td></td><td>This setting allows customers to input hash stream for PKI provi...</td></tr></table>					Parameter	Value	Help Text	Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...	Certificate Friendly Name		This setting allows customers to assign a user friendly name for...	Certificate Stream		This setting allows customers to input hash stream for PKI provi...
Parameter	Value	Help Text														
Certificate Enabled	No	This setting allows customers to enable PKI provisioning Default...														
Certificate Friendly Name		This setting allows customers to assign a user friendly name for...														
Certificate Stream		This setting allows customers to input hash stream for PKI provi...														
#	Parameter		Platform	Settings												
11	Intel® AMT - OEM Default Certificate 5															
	Certificate Enabled Values: Yes/No - This setting allows customers to enable PKI provisioning Default certificate 5.		CFL-S CFL-H CNL-H	No No No												
	Certificate Friendly Name - This setting allows customers to assign a user friendly name for PKI provisioning Default Certificate 5.		CFL-S CFL-H CNL-H	- - -												
	Certificate Stream - This setting allows customers to input hash stream for PKI provisioning custom certificate 5. Note: Default Certificates if enabled will be used in addition to those already pre-loaded in firmware during provisioning. Unlike Customizable Certificates the Default Certificates are not deleted when the platform is un-provisioned.		CFL-S CFL-H CNL-H	- - -												
Click on Intel® AMT in the left tabs menu> Redirection Configuration is expanded by default:																
▼ Redirection Configuration 12																
<table><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr><tr><td>Redirection Localized Language</td><td>English</td><td>This setting allows customers to configure which localized langu...</td></tr><tr><td>Redirection Privacy / Security ...</td><td>Default</td><td>This setting allows customers to configure the Privacy and Secu...</td></tr></table>					Parameter	Value	Help Text	Redirection Localized Language	English	This setting allows customers to configure which localized langu...	Redirection Privacy / Security ...	Default	This setting allows customers to configure the Privacy and Secu...			
Parameter	Value	Help Text														
Redirection Localized Language	English	This setting allows customers to configure which localized langu...														
Redirection Privacy / Security ...	Default	This setting allows customers to configure the Privacy and Secu...														
#	Parameter		Platform	Settings												
12	Intel® AMT - Redirection Configuration															
	Redirection Localized Language - This setting allows customers to configure which localized language will be used initially by firmware for user consent output information (Examples: May be displayed before SOL / KVM session starts).		CFL-S CFL-H CNL-H	English English English												



Table 2-6. - Intel® AMT (Sheet 8 of 8)

	Redirection Privacy / Security Level - This setting allows customers to configure the Privacy and Security level for redirection operations. Default enables all redirection ports (User consent is configurable). Enhanced - Enables all redirection ports. (User consent is required and cannot be disabled). Extreme - Disables Redirection and Remote Configuration / Client Control Mode. Note: The Intel® FIT tool will not adjust the Embedded Host Based Configuration value based on selection here. Please set EHBC to yes or no as needed.	CFL-S CFL-H CNL-H	Default Default Default						
Click on Intel® AMT in the left tabs menu> TLS Configuration is expanded by default:									
<div>▼ TLS Configuration</div> <div>13</div> <table><thead><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr></thead><tbody><tr><td>Transport Layer Security Supp...</td><td>Yes</td><td>This setting allows customers to enable / disable firmware Trans...</td></tr></tbody></table>				Parameter	Value	Help Text	Transport Layer Security Supp...	Yes	This setting allows customers to enable / disable firmware Trans...
Parameter	Value	Help Text							
Transport Layer Security Supp...	Yes	This setting allows customers to enable / disable firmware Trans...							
#	Parameter	Platform	Settings						
13	Intel® AMT - TLS Configuration								
	Transport Layer Security Supported Values: Yes/No - This setting allows customers to enable / disable firmware Transport Layer Security support. Note: If this is disabled TLS will be permanently disabled in the firmware image. This setting needs to be enabled along with along with the Intel® ME Network Services Supported for proper operation of the Intel® Authenticate (Corporate Only) feature.	CFL-S CFL-H CNL-H	Yes Yes Yes						



Table 2-7. - Platform Protection (Sheet 1 of 5)

Click on Platform Protection in the left tabs menu> Content Protection is expanded by default:																							
<div> <div>▼ Content Protection</div> <div>1</div> </div>																							
<table> <tr> <th>Parameter</th><th>Value</th><th colspan="2">Help</th></tr> <tr> <td>PAVP Supported</td><td>Yes</td><td colspan="2">This setting determines if the Protec</td></tr> <tr> <td>LSPCON Internal Display Port 1 - LSPCON / 4K</td><td>None</td><td colspan="2">This setting determines which port f</td></tr> <tr> <td>HDCP Internal Display Port 1 - 5K</td><td>None</td><td colspan="2">This setting determines which port</td></tr> <tr> <td>HDCP Internal Display Port 2 - 5K</td><td>None</td><td colspan="2">This setting determines which port</td></tr> </table>				Parameter	Value	Help		PAVP Supported	Yes	This setting determines if the Protec		LSPCON Internal Display Port 1 - LSPCON / 4K	None	This setting determines which port f		HDCP Internal Display Port 1 - 5K	None	This setting determines which port		HDCP Internal Display Port 2 - 5K	None	This setting determines which port	
Parameter	Value	Help																					
PAVP Supported	Yes	This setting determines if the Protec																					
LSPCON Internal Display Port 1 - LSPCON / 4K	None	This setting determines which port f																					
HDCP Internal Display Port 1 - 5K	None	This setting determines which port																					
HDCP Internal Display Port 2 - 5K	None	This setting determines which port																					
#	Parameter	Platform	Settings																				
1	Platform Protection - Content Protection																						
	PAVP Supported Values: Yes/No This setting determines if the Protected Audio Video Path (PAVP) feature will be permanently disabled in the FW image.	CFL-S CFL-H CNL-H	Yes Yes Yes																				
	LSPCON Internal Display Port 1 - LSPCON / 4K Values: None, Port B, Port C, Port D This setting determines which port for LSPCON will be connected to HDCP 2.2 Bridge adapter Display 1.	CFL-S CFL-H CNL-H	None None None																				
	HDCP Internal Display Port 1 - 5K Values: None, Port A, Port B, Port C, Port D This setting determines which port is connected for 5K output on the Internal Display 1. Note: Both Display Port 1 & 2 need to be configured for proper operation.Intel® AMT KVM is not supported if both HDCP Internal Display ports are used.	CFL-S CFL-H CNL-H	None None None																				
	HDCP Internal Display Port 2 - 5K Values: None, Port A, Port B, Port C, Port D This setting determines which port is connected for 5K output on the Internal Display 2. Note: Both Display Port 1 & 2 need to be configured for proper operation.Intel® AMT KVM is not supported if both HDCP Internal Display ports are used.	CFL-S CFL-H CNL-H	None None None																				
Click on Platform Protection in the left tabs menu> Graphics uController is expanded by default:																							
<div> <div>▼ Graphics uController</div> <div>2</div> </div>																							
<table> <tr> <th>Parameter</th><th>Value</th><th colspan="2">Help</th></tr> <tr> <td>GuC Encryption Key</td><td>00 00 00 00 00 00 00 00 00 00 ...</td><td colspan="2">This option is for entering the raw ha:</td></tr> </table>				Parameter	Value	Help		GuC Encryption Key	00 00 00 00 00 00 00 00 00 00 ...	This option is for entering the raw ha:													
Parameter	Value	Help																					
GuC Encryption Key	00 00 00 00 00 00 00 00 00 00 ...	This option is for entering the raw ha:																					
#	Parameter	Platform	Settings																				
2	Platform Protection - Graphics UController																						



Table 2-7. - Platform Protection (Sheet 2 of 5)

	GuC Encryption Key Values: This option is for entering the raw hash 256 bit string or certificate file for the Graphics uController.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
Click on Platform Protection in the left tabs menu> Hash Key Configuration for Bootguard / ISH is expanded by default:			
▼ Hash Key Configuration for Bootguard / ISH 3			
Parameter	Value	Help Text	
OEM Public Key Hash	00 00 00 00 00 00 00 00 00 00 ...	Raw hash string for the SHA-256 hash of the OEM pub	
OEM Key Manifest Binary		Signed manifest file containing hashes of keys used fo	
#	Parameter	Platform	
3	Platform Protection - Hash Key Configuration for Bootguard / ISH		
	OEM Public Key Hash Values: This option is for entering the raw hash string or certificate file for Boot Guard and ISH. This 256-bit field represents the SHA-256 hash of the OEM public key corresponding to the private key used to sign the BIOS-SM or ISH image. Please see Appendix E for further details.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	OEM Key Manifest Binary Signed manifest file containing hashes of keys used for signing components of image. This setting is only configurable when OEM signing is enabled (See PlatformIntegrity / OemPublicKeyHash).	CFL-S CFL-H CNL-H	
Click on Platform Protection in the left tabs menu> Boot Guard Configuration is expanded by default:			
▼ Boot Guard Configuration 4			
Parameter	Value	H	
Key Manifest ID	0	ODM identifier used during the Key manifes	
Boot Guard Profile Configuration	Boot Guard Profile 0 - No_FVME	Boot Guard Profile 0 - Legacy is for platform	
CPU Debugging	Enabled	This setting determines if CPU debug mode	
BSP Initialization	Enabled	This setting determines BSP behavior when	
S3 Optimization	Enabled	This setting overrides Boot Guard S3 optimi	
Automatic SVN Commit Enabled	No	This allow users to enable / disable the firm	
#	Parameter	Platform	Settings
4	Platform Protection - Boot Guard Configuration		



Table 2-7. - Platform Protection (Sheet 3 of 5)

	Key Manifest ID Values: This option is for entering the hash of another public key, used by the ACM to verify the Boot Policy Manifest.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	Boot Guard Profile Configuration Values: Boot Guard Profile 0 - No_FVME Boot Guard Profile 3 - VM Boot Guard Profile 4 - FVE Boot Guard Profile 5 - FVME This option configures which Boot Guard Policy Profile will be used.	CFL-S CFL-H CNL-H	Boot Guard Profile 0 - No_FVME Boot Guard Profile 0 - No_FVME Boot Guard Profile 0 - No_FVME Boot Guard Profile 0 - No_FVME
	CPU Debugging Values: Enabled/Disabled This setting determines if CPU debug modes will be displayed. When set to 'Enabled' CPU debugging is enabled.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	BSP Initialization Values: Enabled/Disabled This setting determines BSP behavior when it receives an INIT signal. When set to 'Enabled' BSP will behave normally if it receives an INIT (Disabled BSP Initialization (DBI) bit=0). When set to 'Disabled' BSP will shutdown if it receives an INIT ("DBI" bit=1).	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	S3 Optimization Values: Enabled/Disabled This setting overrides Boot Guard S3 optimization. Note: Used for testing only.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	Automatic SVN Commit Enabled Values: Yes/No This allow users to enable / disable the firmware Anti-Rollback. Note: When this setting is set to 'Yes' the SVN number contained in the Intel® ME firmware will be permanently fused into the FPFs and will prevent roll back to a firmware with a lower SVN number.	CFL-S CFL-H CNL-H	No No No

Click on Platform Protection in the left tabs menu> Intel® PTT Configuration is expanded by default:

▼ Intel(R) PTT Configuration 5

Parameter	Value	Help Text
Intel(R) PTT Supported	Yes	This setting permanently disables Intel(R) F
Intel(R) PTT initial power-up state	Enabled	-
Intel(R) PTT Supported [FPF]	Yes	This setting will permanently disable Intel(F

#	Parameter	Platform	Settings
5	Platform Protection - Intel® PTT Configuration		
	Intel® PTT Supported Values: Yes/No - This setting permanently disables Intel® PTT in the firmware image.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Intel® PTT initial power-up state Values: Enabled/Disabled - This setting determines if Intel® PTT is enabled on platform power-up.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled



Table 2-7. - Platform Protection (Sheet 4 of 5)

	Intel® PTT Supported [FPF] Values: Yes/No - This setting will permanently disable Intel® PTT through platform FPFs. Caution: Using this option will permanently disable Intel® PTT on the platform hardware.	CFL-S CFL-H CNL-H	Yes Yes Yes
Click on Platform Protection in the left tabs menu> TPM Over SPI Bus Configuration is expanded by default:			
▼ TPM Over SPI Bus Configuration 6			
Parameter	Value	Help Text	
TPM Clock Frequency	17MHz	This setting determines the clock frequency setting to be used fo...	
TPM Over SPI Bus Enabled	No	This setting determines if TPM over SPI bus is enabled on the pl...	
#	Parameter	Platform	Settings
6	Platform Protection - TPM Over SPI Bus Configuration		
	TPM Clock Frequency Values: 17MHz, 30MHz, 48MHz - This setting determines the clock frequency setting to be used for the TPM over SPI bus.	CFL-S CFL-H CNL-H	17MHz 17MHz 17MHz
	TPM Over SPI Bus Enabled Values: Yes/No - This setting determines if TPM over SPI bus is enabled on the platform.	CFL-S CFL-H CNL-H	Yes Yes Yes
Click on Platform Protection in the left tabs menu> BIOS Guard Configuration is expanded by default:			
▼ BIOS Guard Configuration 7			
Parameter	Value	Help Text	
BIOS Guard Protection Override Enabled	No	This setting allows BIOS Guard to bypass SPI flash controller	
#	Parameter	Platform	Settings
7	BIOS Guard Configuration		
	BIOS Guard Protection Override Enabled This setting allows BIOS Guard to bypass SPI flash controller protections (i.e. Protected Range Registers and Top Swap).	CFL-S CFL-H CNL-H	No No No
Click on Platform Protection in the left tabs menu> TXT Configuration is expanded by default:			
▼ TXT Configuration 8			
Parameter	Value	Help Text	
TXT Supported	No	This setting determines is enabled for the platform.	
#	Parameter	Platform	Settings



Table 2-7. - Platform Protection (Sheet 5 of 5)

8	TXT Configuration		
	TXT Supported This setting determines if enabled for the platform.	CFL-S CFL-H CNL-H	No No No



Table 2-8. - Integrated Clock Controller (Sheet 1 of 9)

Click on Integrated Clock Controller in the left tabs menu> Integrated Clock Controller Policies are expanded by default:			
<div> <div>▼ Integrated Clock Controller Policies</div> <div>1</div> </div>			
Parameter	Value	Help Text	
Boot Profile	Profile 0	Profile applied during each boot.	
Failsafe Boot Profile	Profile 0	Boot profile used when system instability is detected.	
Profile Changeable	true	Allows user to change boot profile via BIOS menu or 3rd party appli...	
#	Parameter	Platform	Settings
1	Integrated Clock Controller - Integrated Clock Controller Policies		
	Boot Profile This parameter allows user to select default profile to be used by the final generated SPI Flash binary image for the target platform at boot time. Selection is limited to the profiles defined under "Integrated Clock Controller Profiles" up to maximum 16 profiles. Profiles can be added by clicking on "Add profile" button under "Integrated Clock Controller Profiles". The 'Record #' refers to profile created under the "Integrated Clock Controller Profiles". Default boot profile for system is Profile 0. Double click on value column of this parameter to choose from available options.	CFL-S CFL-H CNL-H	Profile 0 Profile 0 Profile 0
	Failsafe Profile This parameter specifies the profile index of the fail-safe profile. On boot failure detection or CMOS clear the Intel® ME Firmware will revert to this profile if "Integrated Clock Controller Integrated Clock Controller Policies - Profile Changeable" is set to True. If profile Changeable parameter is set to False, User can not select Failsafe Boot Profile and profile 0 will be selected as a fail safe boot profile by default. The 'Record #' refers to profile created under the "Integrated Clock Controller Profiles". Default Failsafe boot profile for system is Profile 0. Double click on value column of this parameter to choose from available options.	CFL-S CFL-H CNL-H	Profile 0 Profile 0 Profile 0
	Profile Changeable Possible configuration: True/False. This parameter controls if BIOS or 3rd party application can select boot profile or not. When set to true, it allows user to change boot profile via BIOS or 3rd party application. When set to false, Runtime change to boot profile is not allowed and boot profile selected by "Integrated Clock Controller Integrated Clock Controller Policies - Boot Profile" parameter will be used to boot platform. Double click on value column of this parameter to choose from available options.	CFL-S CFL-H CNL-H	True True True
Click on Integrated Clock Controller in the left tabs menu> Profiles are expanded by default:			



Table 2-8. - Integrated Clock Controller (Sheet 2 of 9)

▼ Profiles			
<div> <div>Profile 0</div> <div>3</div> <div>+ Add Profile</div> </div>			
▼ Profile 2			
Parameter	Value	Help Text	
Profile Name	Profile 0	Editable text string.	
Profile Type	Standard	Specifies the profile. Intel (R) ME image has to be loaded to enable other ICC profile settings.	
#	Parameter	Platform	Settings
2	Integrated Clock Controller - Profiles - Profile 0 Note: Intel® ME image has to be loaded to enable other ICC profile settings. For CNL/CFL-S/H, Intel® FIT provides 2 pre- defined ICC profiles to choose from. •Standard: This profile provides default settings for standard configuration, no adaptive clocking is allowed. Platform clocks output internal and external are driven from USB3PCIe clock. Default clock frequency is 100 MHz with 0.47%DownSpread. BCLK clock source should be turned off in this case to save power. •Adaptive: This profile provides Wimax/3G friendly configuration. This profile will configure the platform based on the Adaptive profile allowing adaptive clocking adjustment for BCLK clock source to reduce EMI interference. It supports default clock frequency of 98.875 MHz with 0.48% Downspread. For CNL/CFL-S/H, Intel® FIT provides 5 pre-defined ICC profiles to choose from. •Standard •Adaptive Note: User can select pre-defined profiles via "Integrated Clock Controller Profiles - Profile Type " parameter User can add up to maximum 16 profiles.To add new profile, please use "Integrated Clock Controller Profiles - + Add Profile Button"	CFL-S CFL-H CNL-H	Standard Standard Standard
	Profile Name This parameter allows user to customize profile name for easy identification. By default it uses pre-defined profile name like Profile 0.	CFL-S CFL-H CNL-H	Profile 0 Profile 0 Profile 0
	Profile Type Available ICC profiles for CNL/CFL-S/H are Standard, Adaptive. This parameter indicates which pre- defined profile selected for each profile#. Double click on value column of this parameter to choose from available options.	CFL-S CFL-H CNL-H	Standard Standard Standard
3	+ Add Profile Button This button is used to add new ICC profile. User can add up to maximum 16 profiles. New profile will be added under "Integrated Clock Controller Profiles" tab.	CFL-S CFL-H CNL-H	
Click on Integrated Clock Controller in the left tabs menu> Profiles >Profile> Bclk Clock Configuration is expanded by default:			



Table 2-8. - Integrated Clock Controller (Sheet 3 of 9)

BclkClockConfiguration

4

Parameter	Value	Help Text
BCLK Clock Frequency	This parameter is not configura...	Select the nominal frequency for the selected clock. Range is limited based on the Clock ...
BCLK Spread setting	This parameter is not configura...	Select the percentage of Spread setting for the selected clock. Range is limited based on...

#	Parameter	Platform	Settings
4	Integrated Clock Controller - Profiles - Profile BclkClockConfiguration		
	BCLK Clock Frequency - This parameter allows user to select the nominal frequency for the selected clock. Range is limited based on the Clock Range Definition record and HW SKU. Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H	
	BCLK Spread Setting - This parameter allows user to select the percentage of Spread setting for the selected clock. Range is limited based on the Clock Range Definition record and HW SKU. BCLK Clock Frequency Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H	

Click on Integrated Clock Controller in the left tabs menu> Profiles >Profile> Clock Range Definition Record is expanded by default:

ClockRangeDefinitionRecord

5

Parameter	Value	Help Text
BCLK PLL Clock Source Maxi...	This parameter is not configura...	Specifies the maximum frequency that can be applied to BCLK clock source. Value is limi...
BCLK PLL Clock Source Mini...	This parameter is not configura...	Specifies the minimum frequency that can be applied to BCLK clock source.Value is limite...
BLCK SSC Changes Allowed	This parameter is not configura...	Specifies if the spread mode and percentage is allowed to be modified at runtime.
BLCK SSC Halt Allowed	This parameter is not configura...	if TRUE , the spread generator can be enabled and disabled at runtime.
BLCK SSC Percentage	This parameter is not configura...	Specifies the maximum precentage of spread adjustment that can be applied to the clock....

#	Parameter	Platform	Settings
5	Integrated Clock Controller - Profiles - Profile ClockRangeDefinitionRecord		
	BCLK PLL Clock Source Maximum Frequency - This parameter allows user to specify the maximum frequency that can be applied to BCLK clock source when overclocking the platform. Value is limited by divider/frequency limits determined by HW SKU, and cannot be less than 100 MHz. Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H	



Table 2-8. - Integrated Clock Controller (Sheet 4 of 9)

	BCLK PLL Clock Source Minimum Frequency - This parameter allows user to specify the minimum frequency that can be applied to BCLK clock source when underclocking the platform. Value is limited by divider/frequency limits determined by HW SKU, and cannot be greater than 100 MHz. Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H																															
	BCLK SSC Changes Allowed - This parameter allows user to specify if the spread mode and percentage is allowed to be modified at runtime or not. if set to “True” : Runtime modification is allowed. Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H																															
	BCLK SSC Halt Allowed - This parameter allows user to select if the spread generator can be disabled at runtime or not.if set to “True” , the spread generator can be enabled and disabled at runtime. Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H																															
	BCLK SSC Percentage - This parameter Specifies the maximum percentage of spread adjustment that can be applied to the clock. Value is specified in 1/100th of percent(50=0.5%) Standard Setting Profile Type - Option is grayed out. Adaptive Setting Profile Type - Option is able to be edited.	CFL-S CFL-H CNL-H																															
Click on Integrated Clock Controller in the left tabs menu> Profiles >Profile> Clock Output Configuration is expanded by default:																																	
<div>▼ ClockOutputConfiguration<div>6</div></div> <table><thead><tr><th>Parameter</th><th>Value</th><th>Help Text</th></tr></thead><tbody><tr><td>ITPXD</td><td>Enabled</td><td>Enable/Disable the CLKOUT_ITPXD differential output buffer.</td></tr><tr><td>SRC0</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC0 differential output buffer.</td></tr><tr><td>SRC1</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC1 differential output buffer.</td></tr><tr><td>SRC2</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC2 differential output buffer.</td></tr><tr><td>SRC3</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC3 differential output buffer.</td></tr><tr><td>SRC4</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC4 differential output buffer.</td></tr><tr><td>SRC5</td><td>Enabled</td><td>Enable/Disable the CLKOUT_SRC5 differential output buffer.</td></tr><tr><td>LPC0</td><td>Enabled</td><td>Enable/Disable the CLKOUT_LPC0 single ended output buffer.</td></tr><tr><td>LPC1</td><td>Enabled</td><td>Enable/Disable the CLKOUT_LPC1 single ended output buffer.</td></tr></tbody></table>				Parameter	Value	Help Text	ITPXD	Enabled	Enable/Disable the CLKOUT_ITPXD differential output buffer.	SRC0	Enabled	Enable/Disable the CLKOUT_SRC0 differential output buffer.	SRC1	Enabled	Enable/Disable the CLKOUT_SRC1 differential output buffer.	SRC2	Enabled	Enable/Disable the CLKOUT_SRC2 differential output buffer.	SRC3	Enabled	Enable/Disable the CLKOUT_SRC3 differential output buffer.	SRC4	Enabled	Enable/Disable the CLKOUT_SRC4 differential output buffer.	SRC5	Enabled	Enable/Disable the CLKOUT_SRC5 differential output buffer.	LPC0	Enabled	Enable/Disable the CLKOUT_LPC0 single ended output buffer.	LPC1	Enabled	Enable/Disable the CLKOUT_LPC1 single ended output buffer.
Parameter	Value	Help Text																															
ITPXD	Enabled	Enable/Disable the CLKOUT_ITPXD differential output buffer.																															
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SRC1	Enabled	Enable/Disable the CLKOUT_SRC1 differential output buffer.																															
SRC2	Enabled	Enable/Disable the CLKOUT_SRC2 differential output buffer.																															
SRC3	Enabled	Enable/Disable the CLKOUT_SRC3 differential output buffer.																															
SRC4	Enabled	Enable/Disable the CLKOUT_SRC4 differential output buffer.																															
SRC5	Enabled	Enable/Disable the CLKOUT_SRC5 differential output buffer.																															
LPC0	Enabled	Enable/Disable the CLKOUT_LPC0 single ended output buffer.																															
LPC1	Enabled	Enable/Disable the CLKOUT_LPC1 single ended output buffer.																															
#	Parameter	Platform	Settings																														
6	Integrated Clock Controller - Profiles - Profile Clock Output Configuration																																



Table 2-8. - Integrated Clock Controller (Sheet 5 of 9)

ITPXD, SRC[0:5] Values: Enabled/Disabled These parameters come under the Power Management section and they control Enabling /Disabling of specific Output Clocks at boot time. These settings should match with platform hardware design. For CRB, recommend keeping defaults for bring up with Intel® ME FW. These parameters are specifically used to Enable/Disable the respective CLKOUT_XXX differential output buffers	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC0[6:15] Values: Enabled/Disabled These parameters come under the Power Management section and they control Enabling /Disabling of specific Output Clocks at boot time. These settings should match with platform hardware design. For CRB, recommend keeping defaults for bring up with Intel® ME FW. These parameters are specifically used to Enable/Disable the respective CLKOUT_XXX differential output buffers	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC1 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC1 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC2 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC2 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC3 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC3 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC4 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC4 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC5 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC6 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC7 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC8 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC9 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
SRC10 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled



Table 2-8. - Integrated Clock Controller (Sheet 6 of 9)

	SRC11 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	SRC12 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	SRC13 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	SRC14 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	SRC15 Values: Enabled/Disabled Enables or Disables the CLKOUT_SRC5 differential output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	LPC0[1:0] Values: Enabled/Disabled These parameters are used to control Enabling/Disabling of CLKRUN support for CLKOUT_LPC clocks. For CRB, recommend keeping defaults for bring up with Intel® ME FW	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
	LPC1 Values: Enabled/Disabled Enables or Disables the CLKOUT_LPC1 single ended output buffer.	CFL-S CFL-H CNL-H	Enabled Enabled Enabled
Click on Integrated Clock Controller in the left tabs menu> Profiles >Profile> Power Management Configuration is expanded by default:			



Table 2-8. - Integrated Clock Controller (Sheet 7 of 9)

▼ Power Management Configuration 7			
Parameter		Value	
SRC0 CLKREQ# Mapping	GPP_B5	Assign the CLKREQ# signal associated with CLKOUT_SRC0.	
SRC1 CLKREQ# Mapping	GPP_B6	Assign the CLKREQ# signal associated with CLKOUT_SRC1.	
SRC2 CLKREQ# Mapping	GPP_B7	Assign the CLKREQ# signal associated with CLKOUT_SRC2.	
SRC3 CLKREQ# Mapping	GPP_B8	Assign the CLKREQ# signal associated with CLKOUT_SRC3.	
SRC4 CLKREQ# Mapping	GPP_B9	Assign the CLKREQ# signal associated with CLKOUT_SRC4.	
SRC5 CLKREQ# Mapping	GPP_B10	Assign the CLKREQ# signal associated with CLKOUT_SRC5.	
SRC6 CLKREQ# Mapping	GPP_H0	Assign the CLKREQ# signal associated with CLKOUT_SRC6.	
SRC7 CLKREQ# Mapping	GPP_H1	Assign the CLKREQ# signal associated with CLKOUT_SRC7.	
SRC8 CLKREQ# Mapping	GPP_H2	Assign the CLKREQ# signal associated with CLKOUT_SRC8.	
SRC9 CLKREQ# Mapping	GPP_H3	Assign the CLKREQ# signal associated with CLKOUT_SRC9.	
SRC10 CLKREQ# Mapping	GPP_H4	Assign the CLKREQ# signal associated with CLKOUT_SRC10.	
SRC11 CLKREQ# Mapping	GPP_H5	Assign the CLKREQ# signal associated with CLKOUT_SRC11.	
SRC12 CLKREQ# Mapping	GPP_H6	Assign the CLKREQ# signal associated with CLKOUT_SRC12.	
SRC13 CLKREQ# Mapping	GPP_H7	Assign the CLKREQ# signal associated with CLKOUT_SRC13.	
SRC14 CLKREQ# Mapping	GPP_H8	Assign the CLKREQ# signal associated with CLKOUT_SRC14.	
SRC15 CLKREQ# Mapping	GPP_H9	Assign the CLKREQ# signal associated with CLKOUT_SRC15.	
24Mhz Crystal Shutdown Wait Interval	8us	Enable Dynamic power management of Crystal. Upon the even	
#	Parameter	Platform	Settings
7	Integrated Clock Controller - Profiles - Profile PwrManagementConfiguration Configuring CLKREQ# and assigning GPIO depends on how CLKOUT_SRCx configuration via FIT is done (Enabled or Disabled) and if CLKREQ is required or not. Please refer to Appendix B.3 (How to configure CLKREQ# parameters) for the detail of CLKREQ configuration for SRC Output clocks. Please configure CLKREQ parameters accordingly.		



Table 2-8. - Integrated Clock Controller (Sheet 8 of 9)

SRC0[5:0] CLKREQ# Mapping Possible configuration: Select one of the GPIOs from the list to map it as a CLKREQ# for specific SRC# Output clock. This parameter controls association of dynamic CLKREQ control with SRC (PCIe) clocks.	CFL-S CFL-H CNL-H	GPP_B5 GPP_B5 GPP_B5
SRC[15:6] CLKREQ# Mapping - CNL/CFL H/S Only Possible configuration: Select one of the GPIOs from the list to map it as a CLKREQ# for specific SRC# Output put clock. This parameter controls association of dynamic CLKREQ control with SRC (PCIe) clocks.		
SRC1 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC1.	CFL-S CFL-H CNL-H	GPP_B6 GPP_B6 GPP_B6
SRC2 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC2.	CFL-S CFL-H CNL-H	GPP_B7 GPP_B7 GPP_B7
SRC3 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC3.	CFL-S CFL-H CNL-H	GPP_B8 GPP_B8 GPP_B8
SRC4 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC4.	CFL-S CFL-H CNL-H	GPP_B9 GPP_B9 GPP_B9
SRC5 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_B10 GPP_B10 GPP_B10
SRC6 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H0 GPP_H0 GPP_H0
SRC7 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H1 GPP_H1 GPP_H1
SRC8 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H2 GPP_H2 GPP_H2
SRC9 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H3 GPP_H3 GPP_H3
SRC10 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H4 GPP_H4 GPP_H4
SRC11 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H5 GPP_H5 GPP_H5
SRC12 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H6 GPP_H6 GPP_H6
SRC13 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H7 GPP_H7 GPP_H7
SRC14 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H8 GPP_H8 GPP_H8
SRC15 CLKREQ# Mapping Assign the CLKREQ# signal associated with CLKOUT_SRC5.	CFL-S CFL-H CNL-H	GPP_H9 GPP_H9 GPP_H9

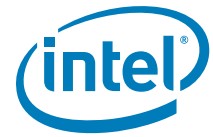


Table 2-8. - Integrated Clock Controller (Sheet 9 of 9)

	24MHz Crystal Shutdown Wait Interval This parameter allows user to Enable Dynamic power management of Crystal. Upon the event that all conditions (other than this wait timer itself) are satisfied for iSCLK crystal shutdown, a timer is started. Once it expires and there are no wake events, iSCLK will shutdown crystal. Note: Recommendation is to leave setting at default value.	CFL-S CFL-H CNL-H	8us 8us 8us



Table 2-9. - Networking & Connectivity (Sheet 1 of 2)

Click on Networking & Connectivity in the left tabs menu> Wired LAN Configuration is expanded by default:			
▼ Wired LAN Configuration 1			
Parameter	Value	Help Text	
LAN Power Well	SLP_LAN#	This setting allows the customer to configure	
LAN PHY Power Up Time	100 ms	This bit determines how long the delay for L	
Intel(R) Integrated Wired LAN Enabled	Yes	This setting allows customers to enable / dis	
GbE PCIe Port Select	Port13	This setting allows customers to configure th	
GbE PHY SMBus Address	0x64	This is the Intel PHY's SMBus address. This	
GbE MAC SMBus Address Enabled	Yes	This enables the Intel(R) Integrated Wired L	
GbE MAC SMBus Address	0x70	This setting configures Intel(R) Integrated W	
PHY Connection	PHY on SMLink0	This selects which SMBus network is used to	
LAN PHY Power Control GPD11 Signal Configuration	Enable as LANPHYPC	This setting allows the user to assign the LAI	
#	Parameter	Platform	Settings
1	Networking & Connectivity - Wired LAN Configuration		
	LAN Power Well Values: Core Well, Sus Well, ME Well, SLP_LAN - This setting allows customers to configure the power well that will be used by Intel® Integrated LAN. Note: Recommended setting is SLP_LAN#.	CFL-S CFL-H CNL-H	SLP_LAN# SLP_LAN# SLP_LAN#
	LAN PHY Power Up Time Values: 50ms, 100ms	CFL-S CFL-H CNL-H	100ms 100ms 100ms
	Intel® Integrated Wired LAN Enable Values: Enabled/Disabled - This setting enables or disables the Intel® Integrated LAN.	CFL-S CFL-H CNL-H	Yes Yes Yes
	GbE PCIe Port Select Values: PORT5, PORT9, PORT12, PORT13 - This setting allows customers to configure the PCIe Port that will Intel® Integrated LAN will operate on.	CFL-S CFL-H CNL-H	Port13 Port5 Port5
	GbE PHY SMBus Address This setting configures Intel® Integrated Wired LAN SMBus address to accept SMBus cycles from the MAC. Note: Recommended setting is 64h.	CFL-S CFL-H CNL-H	0x64 0x64 0x64
	GbE SMBus Address Enabled Values: Yes/No - This enables the Intel® Integrated Wired LAN MAC SMBus address. Note: This setting must be enabled if using Intel® Integrated LAN.	CFL-S CFL-H CNL-H	Yes Yes Yes
	GbE MAC SMBus Address	CFL-S CFL-H CNL-H	0x70 0x70 0x70
	PHY Connection Values: No PHY connected, PHY on SMLink0	CFL-S CFL-H CNL-H	PHY on SMLink0 PHY on SMLink0 PHY on SMLink0



Table 2-9. - Networking & Connectivity (Sheet 2 of 2)

	LAN PHY Power Control GPD11 Signal Configuration Values: GPD11, LANPHYPC - This setting allows the customer to assign the LAN PHY Power Control signal to GbE or as GDP11.	CFL-S CFL-H CNL-H	LANPHYPC LANPHYPC LANPHYPC
Click on Networking & Connectivity in the left tabs menu> Wireless LAN Configuration is expanded by default:			
<div> <div>▼ Wireless LAN Configuration</div> <div>2</div> </div>			
Parameter	Value	Help Text	
Intel(R) ME CLINK Signal Enabled	No	This setting allows customers to enable / disable th	
SLP_WLAN# / GDP9 Signal Configuration	Enable as SLP_WLAN#	This setting allows user the to assign the WLAN Pow	
WLAN Microcode	0x9DF0 PULSAR	This setting allows OEMs to configure which Intel(R	
WLAN Power Well	SLP_WLAN#	-	
#	Parameter	Platform	Settings
2	Networking & Connectivity - Wireless LAN Configuration		
	CLINK Enabled Values: Yes/No - This setting allows customers to enable / disable the Wireless LAN CLINK signal through Intel® ME firmware. Note: For using Intel® vPro™ Wireless solutions this should be set to "Yes".	CFL-S CFL-H CNL-H	No No No
	SLP_WLAN# / GDP9 Signal Configuration Values: SLP_WLAN#, GDP9 - This setting allows the customer to assign the WLAN Power Control signal to WLAN or as GDP9. Note: If using Intel® Wireless LAN this setting should be set to "Enable as SLP_WLAN#".	CFL-S CFL-H CNL-H	Enable as SLP_WLAN# Enabled as SLP_WLAN # Enabled as SLP_WLAN #
	WLAN Microcode - This setting allow OEMs to configure which Intel® Wireless LAN card microcode to load into the firmware image.	CFL-S CFL-H CNL-H	0x9DF0 0x9DF0
	WLAN Power Well Values: Disabled, Sus Well, ME Well, SLP_M# SPDA, SLP_WLAN# - This setting allows OEMs to configure the power well that will be used by Intel® Wireless LAN. WLAN Sleep via SLP_WLAN# (default) Note: Recommended setting is SLP_WLAN#.	CFL-S CFL-H CNL-H	SLP_WLAN# SLP_WLAN# SLP_WLAN#



Table 2-10. - Internal PCH Buses (Sheet 1 of 5)

Click on Internal PCH Buses in the left tabs menu> PCH Timer Configuration is expanded by default:			
<div> <div>▼ PCH Timer Configuration</div> <div>1</div> </div>			
Parameter		Value	
PCH clock output stable to PROCPWRGD high (tPCH45)		1ms	This setting co
PCIe Power Stable Timer (tPCH33)		Disabled	This setting co
PROCPWRGD and SYS_PWROK high to SUS_STAT# de-assertion (tPCH46)		1 ms	This setting co
APWROK Timing		2 ms	This soft strap
#	Parameter	Platform	Settings
1	Internal PCH Buses - PCH Timer Configuration		
	PCH clock output stable to PROCPWRGD high (tPCH45) Values: 100ms, 50ms, 5ms, 1ms - This setting configures the minimum timing from XCK_PLL locked to CPUPWRGD high. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1ms 1ms 1ms
	PCIe Power Stable Timer (tPCH33) Values: Enabled/Disabled - This setting configures the enables / disables the t36 timer. When enabled PCH will count 99ms from PWROK assertion before PLTRST# is de-asserted. Note: The recommended setting is "Disabled".	CFL-S CFL-H CNL-H	Disabled Disabled Disabled
	PROCPWRGD and SYS_PWROK high to SUS_STAT# de-assertion (tPCH46) Values: 1ms, 2ms, 5ms - This setting configures the minimum timing from CPUPWRGD assertion to SUS_STAT#. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1ms 1ms 1ms
	APWROK Timing Values: 2ms, 4ms, 8ms, 16ms - This soft strap determines the time between the SLP_A# pin de-asserting and the APWROK timer expiration. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	2ms 2ms 2ms
Click on Internal PCH Buses in the left tabs menu> SMBus / SMLink Configuration is expanded by default:			



Table 2-10. - Internal PCH Buses (Sheet 2 of 5)

▼ SMBus / SMLink Configuration 2			
Parameter	Value	Header	
Intel(R) SMBus ASD Address	0x00	This setting configures the Intel(R) SMBus	
Intel(R) SMBus ASD Address Enabled	No	This setting enables / disables the Intel(R)	
Intel(R) SMBus Subsystem Vendor Device ID for ASF	0x00000000	This setting configures the Intel(R) SMBus	
Intel(R) SMBus I2C Address	0x00	This setting configures the Intel(R) SMBus	
Intel(R) SMBus I2C Address Enabled	No	This setting enables / disables the Intel(R)	
Intel(R) SMBus MCTP Address	0x00	This setting configures the Intel(R) SMBus	
Intel(R) SMBus MCTP Address Enabled	No	This setting enables / disables the Intel(R)	
SMBus / SMLink TCO Slave Connection	Intel(R) SMBus	This setting configures the TCO Slave con	
SMLink0 Enabled	Yes	This setting enables / disables SMLink0 in	
SMLink0 Frequency	1 MHz	This setting determines the frequency at v	
SMLink1 I2C Target Address	0x00	This setting configures SMLink1 I2C Targ	
SMLink1 I2C Target Address Enabled	No	This setting configures SMLink1 I2C Targ	
SMLink1 GP Target Address	0x0	This setting configures SMLink1 GP Targe	
SMLink1 GP Target Address Enabled	No	This setting enables / disables SMLink1 GI	
SMLink1 Enabled	No	This setting enables / disables SMLink1 in	
SMLink1 Frequency	1 MHz	This setting determines the frequency at v	
Intel(R) SMBus ASD Mode Configuration	Enable as GPP_C2	This setting determines the native mode c	
#	Parameter	Platform	Settings
2	Internal PCH Buses - SMBus / SMLink Configuration		
	Intel® SMBus ASD Address - This setting configures the Intel® SMBus Alert Sending Device Address. For details see Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Intel® SMBus ASD Address Enable Values: Yes/No - This setting enables / disables the Intel® SMBus Alert Sending Device. For details see Cannon Lake H SPI Programming guide for further details.	CFL-S CFL-H CNL-H	No No No
	Intel® SMBus Subsystem Vendor & Device ID for ASF - This setting configures the Intel® SMBus Subsystem Vendor & Device ID for ASF. For details see Cannon Lake H SPI Programming guide further details.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Intel® SMBus I2C Address - This setting configures the Intel® SMBus I2C Address. Note: This setting is only used for testing purposes. The recommended setting is "00000000".	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Intel® SMBus I2C Address Enabled Values: Yes/No - This setting enables / disables the Intel® SMBus I2C Address. Note: This setting is only used for testing purposes. The recommended setting is "No".	CFL-S CFL-H CNL-H	No No No



Table 2-10. - Internal PCH Buses (Sheet 3 of 5)

	Intel® SMBus MCTP Address - This setting configures the Intel® SMBus MCTP Address. Note: This setting is only used for testing purposes. The default setting is "00000000".	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Intel® SMBus MCTP Address Enabled Values: Yes/No - This setting enables / disables the Intel® SMBus MCTP Address. Note: This setting is only used for testing purposes. The recommended setting is "No".	CFL-S CFL-H CNL-H	No No No
	SMBus / SMLink TCO Slave Connection Values: Intel® SMBus, SMLink0 - This setting configures the TCO Slave connection to either the Intel® SMBus or SMLink0. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	Intel® SMBus Intel® SMBus Intel® SMBus
	SMLink0 Enabled Values: Yes/No - This setting enables / disables SMLink0 interface. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	Yes Yes Yes
	SMLink0 Frequency Values: 100KHz, 400KHz, 1 MHz - This setting determines the frequency at which the SMLink0 will operate. Note: The recommended setting is "1MHz".	CFL-S CFL-H CNL-H	1 MHz 1 MHz 1 MHz
	SMLink1 I2C Target Address - This setting configures SMLink1 I2C Target Address. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	SMLink1 I2C Target Address Enabled Values: Yes/No - This setting configures SMLink1 I2C Target Address. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	No No No
	SMLink1 GP Target Address - This setting configures SMLink1 GP Target Address. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	SMLink1 GP Target Address Enabled Values: Yes/No - This setting enables / disables SMLink1 GP Target Address interface. For further details see Cannon Lake H Platform Controller Hub EDS. Note: This setting must be set to "Yes" if using PCH / MCP Thermal reporting.	CFL-S CFL-H CNL-H	No No No
	SMLink1 Enabled Values: Yes/No - This setting enables / disables SMLink1 interface. For further details see Cannon Lake H Platform Controller Hub EDS. Note: This setting must be set to "Yes" if using PCH / MCP Thermal reporting.	CFL-S CFL-H CNL-H	Yes Yes Yes
	SMLink1 Frequency Values: 100KHz, 400KHz, 1 MHz - This setting determines the frequency at which the SMLink1 will operate. Note: The recommended setting is "100KHz".	CFL-S CFL-H CNL-H	100 KHz 100 KHz 100 KHz
	Intel® SMBus ASD Mode Configuration This setting determines the native mode of operation for the Intel® SMBus ASD signal.	CFL-S CFL-H CNL-H	Enable as GPP_C2 Enable as GPP_C2 Enable as GPP_C2

Click on Internal PCH Buses in the left tabs menu> DMI Configuration is expanded by default:

▼ DMI Configuration

3

Parameter	Value	Hel
DMI Lane Reversal	No	This setting allow the DMI Lane signals to be
DMI Port Staggering Enabled	Yes	This setting configures DMI for Port Staggerin
DMI AC Coupling Select	No	This setting determines if DMI is operating in
DMI Lane Width	DMI x8	This setting determines the number of DMI la



Table 2-10. - Internal PCH Buses (Sheet 4 of 5)

#	Parameter	Platform	Settings
3	Internal PCH Buses - DMI Configuration		
	DMI Lane Reversal Values: Yes/No - This setting allows the DMI Lane signals to be reversed. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	Yes No No
	DMI Port Staggering Values: Yes/No - This setting configures DMI for Port Staggering. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DMI AC Coupling Values: Yes/No - This determines if DMI is operating in AC or DC coupled mode	CFL-S CFL-H CNL-H	No No No
	DMI Lane Width Values: Disabled, x1, x2, x4, x8 - This setting determines the number of DMI lanes available	CFL-S CFL-H CNL-H	DMI x8 DMI x8 DMI x8
Click on Internal PCH Buses in the left tabs menu> eSPI Configuration is expanded by default:			
▼ eSPI Configuration 4			
Parameter		Value	
eSPI / EC Bus Frequency		60MHz	-
eSPI / EC Maximum I/O Mode		Single, Dual and Quad	-
eSPI / EC Slave Device Enabled		No	This setting enables th
eSPI / EC Slave Device Bus Frequency		60MHz	This setting configures
eSPI / EC Slave Device Maximum I/O Mode		Single and Dual	This setting configures
eSPI / EC CRC Check Enabled		Yes	This setting enables Cl
eSPI / EC Max Outstanding Request for Master Attached Flash Channel		2	This setting determine
eSPI / EC Slave Attached Flash Multiple Outstanding Requests Enable		Single Outstanding Request	This setting enabled m
eSPI / EC Slave Attached Flash Channel 000 Enable		In-Order SAF Requests	This setting enables O
#	Parameter	Platform	Settings
4	Internal PCH Buses - eSPI Configuration		
	eSPI / EC Bus Frequency 20MHz, 24MHz, 30MHz, 40MHz, 60MHz	CFL-S CFL-H CNL-H	60MHz 60MHz 60MHz
	eSPI / EC Maximum I/O Mode Values: Single, Single and Dual, Single and Quad, Single Dual and Quad	CFL-S CFL-H CNL-H	Single, Dual and Quad Single, Dual and Quad Single, Dual and Quad
	eSPI / EC Slave Device Enabled	CFL-S CFL-H CNL-H	No No No



Table 2-10. - Internal PCH Buses (Sheet 5 of 5)

	eSPI / EC Slave Device Bus Frequency	CFL-S CFL-H CNL-H	48MHz 48MHz 48MHz
	eSPI / EC Slave Device Maximum I/O Mode	CFL-S CFL-H CNL-H	Single and Duel Single and Duel Single and Duel
	eSPI / EC CRC Check Enabled Values: Yes/No	CFL-S CFL-H CNL-H	Yes Yes Yes
	eSPI / EC Slave 1 Device CRC Check Enabled Values: Yes/No	CFL-S CFL-H CNL-H	Yes Yes Yes
	eSPI / EC Max Outstanding Request for Master Attached Flash Channel	CFL-S CFL-H CNL-H	2 2 2
	eSPI / EC Slave Attached Flash Multiple Outstanding Requests Enable	CFL-S CFL-H CNL-H	Single Outstanding Request Single Outstanding Request Single Outstanding Request
	eSPI / EC Slave Attached Flash Channel OOO Enable	CFL-S CFL-H CNL-H	In-Order SAF Requests In-Order SAF Requests In-Order SAF Requests



Table 2-11. - Power (Sheet 1 of 2)

Click on Power in the left tabs menu> Platform Power is expanded by default:			
<div> <div>▼ Platform Power</div> <div>1</div> </div>			
Parameter	Value	Help	
SLP_S5# / GPD10 Signal Configuration	Enable as SLP_S5#	This setting allows the user to assign the SLP_S5#	
SLP_S3# / GPD4 Signal Configuration	Enable as SLP_S3#	This setting allows the user to assign the SLP_S3#	
SLP_S4# / GPD5 Signal Configuration	Enable as SLP_S4#	This setting allows the user to assign the SLP_S4#	
SLP_A# / GPD6 Signal Configuration	Enable as SLP_A#	This setting allows the user to assign the SLP_A#	
SLP_S0# Tunnel	Disabled	This setting Enables / Disables the tunneling of the	
Integrated 1.8v VRM	VRM Enabled	This setting enables the integrated 1.8v Voltage I	
#	Parameter	Platform	Settings
1	Power - Platform Power		
	SLP_A# / GPD6 Signal Configuration Values: SLP_A#, GPD6 - This setting allows the customer to assign the SLP_A# Power Control signal as SLP_A# or as GDP6. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SLP_A# SLP_A# SLP_A#
	SLP_S3# / GPD4 Signal Configuration Values: SLP_S3#, GPD4 - This setting allows the customer to assign the SLP_S3# Power Control signal as SLP_S3# or as GDP4. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SLP_S3# SLP_S3# SLP_S3#
	SLP_S4# / GPD5 Signal Configuration Values: SLP_S4#, GPD5 - This setting allows the customer to assign the SLP_S4# Power Control signal as SLP_S4# or as GDP5. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SLP_S4# SLP_S4# SLP_S4#
	SLP_S5# / GPD10 Signal Configuration Values: SLP_S5#, GPD10 - This setting allows the customer to assign the SLP_S5# Power Control signal as SLP_S5# or as GDP10. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SLP_S5# SLP_S5# SLP_S5#
	SLP_S0# Tunnel Values: Enabled, Disabled This setting Enables / Disables the tunneling of the SLP_S0# pin over eSPI to the EC when in eSPI mode. Warning: This setting needs to be set to disabled when the platform is running in eSPI mode.	CFL-S CFL-H CNL-H	Disabled Disabled Disabled
	Integrated 1.8v VRN Values: VRM Enabled, VRM Disabled This setting enables the integrated 1.8v Voltage Regulator on the PCH for CFL S & H and CNL-H.	CFL-S CFL-H CNL-H	VRM Enabled VRM Enabled VRM Enabled
Click on Power in the left tabs menu> Deep Sx is expanded by default:			



Table 2-11. - Power (Sheet 2 of 2)

▼ Deep Sx

2

Parameter	Value	Help Text
Deep Sx Enabled	Yes	This requires the target platform to support Deep SX state

#

Parameter

Platform

Settings

2

Power - Deep Sx

Deep Sx Enabled

Values: Yes/ No - This setting enables / disables support for Deep Sx operation. For further details see Cannon Lake H Platform Controller Hub EDS. **Note:** Support for Deep Sx is board design dependent.

CFL-S
CFL-H
CNL-H

Yes
Yes
Yes

Click on Power in the left tabs menu> PCH Thermal Reporting is expanded by default:

▼ PCH Thermal Reporting

3

Parameter	Value	
Thermal Power Reporting Enabled	Yes	This setting enabled a or

#

Parameter

Platform

Settings

3

Power - PCH Thermal Reporting

Thermal Power Reporting Enabled

This setting enabled a once-per-second timer interrupt is enabled which triggers firmware to report power and temperature information as enabled by configuration registers. Note: When this setting is disabled ensure that the once-per-second timer interrupt associated with this feature is also disabled.

CFL-S
CFL-H
CNL-H

Yes
Yes
Yes



Table 2-12. - Integrated Sensor Hub (Sheet 1 of 2)

Click on Integrated Sensor Hub in the left tabs menu> Integrated Sensor Hub is expanded by default:															
<div> <div>▼ Integrated Sensor Hub</div> <div>1</div> </div>															
<table> <tr> <th>Parameter</th><th>Value</th><th colspan="2">Help Text</th></tr> <tr> <td>Integrated Sensor Hub Supported</td><td>No</td><td colspan="2">This setting allows customers to disable ISH on the platform.</td></tr> <tr> <td>Integrated Sensor Hub Initial Power State</td><td>Disabled</td><td colspan="2">This setting allows customers to determine the power up state for ISH.</td></tr> </table>				Parameter	Value	Help Text		Integrated Sensor Hub Supported	No	This setting allows customers to disable ISH on the platform.		Integrated Sensor Hub Initial Power State	Disabled	This setting allows customers to determine the power up state for ISH.	
Parameter	Value	Help Text													
Integrated Sensor Hub Supported	No	This setting allows customers to disable ISH on the platform.													
Integrated Sensor Hub Initial Power State	Disabled	This setting allows customers to determine the power up state for ISH.													
#	Parameter	Platform	Settings												
1	Integrated Sensor Hub														
	Integrated Sensor Hub Supported Values: Yes/No This setting allows customers to disable ISH on the platform.	CFL-S CFL-H CNL-H	No No No												
	Integrated Sensor Hub Power Up State Values: Enabled/Disabled Field is enabled for editing if "Integrated Sensor Hub Supported" field above is set to "Yes". This setting allows customers to determine the power up state for ISH.	CFL-S CFL-H CNL-H	Disabled Disabled Disabled												
Click on Integrated Sensor Hub in the left tabs menu> ISH Image is expanded by default:															
<div> <div>▼ ISH Image</div> <div>2</div> </div>															
<table> <tr> <th>Parameter</th><th>Value</th><th colspan="2">Help Text</th></tr> <tr> <td>Length</td><td>0x40000</td><td colspan="2">Total size (in bytes) of the ISH code partition including reserved space. It is recommended to be at least 256kb.</td></tr> <tr> <td>InputFile</td><td></td><td colspan="2">Path to your ISH firmware binary file.</td></tr> </table>				Parameter	Value	Help Text		Length	0x40000	Total size (in bytes) of the ISH code partition including reserved space. It is recommended to be at least 256kb.		InputFile		Path to your ISH firmware binary file.	
Parameter	Value	Help Text													
Length	0x40000	Total size (in bytes) of the ISH code partition including reserved space. It is recommended to be at least 256kb.													
InputFile		Path to your ISH firmware binary file.													
#	Parameter	Platform	Settings												
2	Integrated Sensor Hub - ISH Image														
	Length - Total size (in bytes) of the ISH code partition including reserved space. It is recommended to be at least 256kb.	CFL-S CFL-H CNL-H													
	Input File														
Click on Integrated Sensor Hub in the left tabs menu> ISH Data is expanded by default:															



Table 2-12. - Integrated Sensor Hub (Sheet 2 of 2)

▼ ISH Data 3			
Parameter		Value	Help Text
PDT Binary File			Path to your PDT binary file
#	Parameter	Platform	Settings
3	Integrated Sensor Hub - ISH Data		
	PDT Binary File	CFL-S CFL-H CNL-H	Path for PDT Binary file Path for PDT Binary file Path for PDT Binary file



Table 2-13. - Debug (Sheet 1 of 7)

Click on Debug in the left tabs menu> IDLM is expanded by default:			
▼ IDLM 1			
Parameter		Value	
IDLM Binary		This allows an IDLM binary to be merged in	
#	Parameter	Platform	Settings
1	Debug - IDLM		
	IDLM Binary This allows an IDLM binary to be merged into output image built by Intel® FIT.	CFL-S CFL-H CNL-H	
Click on Debug in the left tabs menu> Delayed Authentication Mode Configuration is expanded by default:			
▼ Delayed Authentication Mode Configuration 2			
Parameter		Value	
Delayed Authentication Mode Enabled		No This setting enables Delayed Authentica	
2	Debug - Delayed Authentication Mode Configuration		
	Delayed Authentication Mode Enabled Values: Yes/No - This setting enables Delayed Authentication Mode on the platform.	CFL-S CFL-H CNL-H	No No No
Click on Debug in the left tabs menu> Intel® Trace Hub Technology is expanded by default:			



Table 2-13. - Debug (Sheet 2 of 7)

▼ Intel(R) Trace Hub Technology 3			
Parameter		Value	
Intel(R) Trace Hub Binary		C:\Users\jlwhismo\Desktop\AM...	This loads the Intel(
Intel(R) Trace Hub Emergency Mode Enabled		No	When enabled, Intel
Intel(R) Trace Hub Debug Messages Enabled		Yes	Intel(R) Trace Hub I
Unlock Token		C:\Users\jlwhismo\Desktop\AM...	This allows the OEM
#	Parameter	Platform	Settings
3	Debug - Intel® Trace Hub Technology		
	Intel® Trace Hub Binary - This loads the Intel® Trace Hub binary that will be merged into the output image generated by the Intel® FIT tool.	CFL-S CFL-H CNL-H	Trace Hub Binary Trace Hub Binary Trace Hub Binary
	Intel® Trace Hub Emergency Mode Enabled Values: Yes/No - This setting enable / disables Intel® Trace Hub in the firmware base image.	CFL-S CFL-H CNL-H	No No No
	Intel® Trace Hub Debug Message Enabled Values: Yes/No - This setting enables/disables the Intel® Trace Hub debug messages. Note: When enabling this setting you also need to enable Intel® Trace Hub Soft Enable setting for proper operation.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Unlock Token This allows the OEM to input an Unlock Token binary file for closed chassis debug.	CFL-S CFL-H CNL-H	
Click on Debug in the left tabs menu> Intel® ME Debugging Overrides is expanded by default:			
▼ Intel(R) ME Firmware Debugging Overrides 4			
Parameter		Value	
Debug Override Pre-Production Silicon		0x0	Allows the OEM to control FW features to
Debug Override Production Silicon		0x0	Allows the OEM to control FW features to
Intel(R) ME Reset Behavior		Intel(R) ME will Halt	This setting determines Intel® ME behavi
Firmware ROM Bypass		No	This setting enables / disables firmware F
#	Parameter	Platform	Settings
4	Debug - Intel® ME Firmware Debugging Overrides		



Table 2-13. - Debug (Sheet 3 of 7)

	Debug Override Pre-Production Silicon - Allows the OEM to control FW features to assist with pre-production platform debugging. This control has no effect if used on production silicon. Bit 0: Disable DRAM_INIT_DONE (default timeout 60 seconds) Bit 1: Disable Host Reset Timer Bit 2: Disable CPU_RESET_DONE timeout Bit 3: Reserved Bit 4: Disable Intel® ME Power Gating Bit 5: Reserved Bit 6: Secure Boot debug hook. Used to shorten wait time before ENF shutdown. Bit 7: Force real PPFs on preproduction (default is to use flash) Bit 8: Secure Boot debug hook. Used to reduce S3 or FFS optimization tries. Bit 9: Reserved Bit 10: Override power package to always enter M3. Note: Certain options do not work when the descriptor is locked.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Debug Override Production Silicon - Allows the OEM to control FW features to assist with production platform debugging. Bit 0: Extend DRAM_INIT_DONE timeout to 30 minutes (default timeout 15 seconds) Bit 1: Disable Host Reset Timer Bit 2: Disable CPU_RESET_DONE timeout Note: Certain options do not work when the descriptor is locked.	CFL-S CFL-H CNL-H	0x00000000 0x00000000 0x00000000
	Intel® ME Reset Behavior This setting determines Intel® ME behavior when boot image errors are encountered. Warning: This setting should be used for debug purposes only. Note: This may block normal Firmware functional flows.	CFL-S CFL-H CNL-H	Intel® ME will Halt Intel® ME will Halt Intel® ME will Halt
	Firmware ROM Bypass Values: Yes/No - This setting enables / disables firmware ROM bypass. Note: This setting only has affect when the firmware being used has ROM Bypass code present.	CFL-S CFL-H CNL-H	No No No

Click on Debug in the left tabs menu> Direct Connection Interface Configuration is expanded by default:

▼ Direct Connect Interface Configuration

5

Parameter	Value	
DCI BSSB over USB3 Port1 Enabled	Yes	This setting determines if the I
DCI BSSB over USB3 Port2 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port3 Enabled	Yes	This setting determines if the I
DCI BSSB over USB3 Port4 Enabled	Yes	This setting determines if the I
DCI BSSB over USB3 Port5 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port6 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port7 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port8 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port9 Enabled	No	This setting determines if the I
DCI BSSB over USB3 Port10 Enabled	No	This setting determines if the I
DCI BSSB over GPIO Enabled	Yes	This setting enables BSSB (Bo

#	Parameter	Platform	Settings
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Table 2-13. - Debug (Sheet 4 of 7)

5	Debug - Direct Connection Interface Configuration		
	Note: When any of the DCI BSSB USB3 Port interfaces are enabled the associated USB3 port selection control will be grayed out under the USB3 Combo Port Configuration settings section under the Flex I/O tab		
	DCI BSSB over USB3 Port 1 Enabled This setting determines if the USB port 1 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DCI BSSB over USB3 Port 2 Enabled This setting determines if the USB port 2 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DCI BSSB over USB3 Port 3 Enabled This setting determines if the USB port 3 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DCI BSSB over USB3 Port 4 Enabled This setting determines if the USB port 4 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DCI BSSB over USB3 Port 5 Enabled This setting determines if the USB port 5 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	DCI BSSB over USB3 Port 6 Enabled This setting determines if the USB port 5 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled.	No No No	Yes Yes Yes
	DCI BSSB over USB3 Port 7 Enabled This setting determines if the USB port 7 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled. Note: When this setting is enabled the corresponding USB3 Combo Port in the Flex I/O Tab will be Grayed out.	CFL-S CFL-H CNL-H	Yes Yes No
	DCI BSSB over USB3 Port 8 Enabled This setting determines if the USB port 8 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled. Note: When this setting is enabled the corresponding USB3 Combo Port in the Flex I/O Tab will be Grayed out.	CFL-S CFL-H CNL-H	Yes Yes No
	DCI BSSB over USB3 Port 9 Enabled This setting determines if the USB port 5 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled. Note: When this setting is enabled the corresponding USB3 Combo Port in the Flex I/O Tab will be Grayed out.	CFL-S CFL-H CNL-H	No Yes No
	DCI BSSB over USB3 Port 10 Enabled This setting determines if the USB port 5 has BSSB (Boundary Scan Side Band) enabled. Note: For S0ix and reset flows BSSB should be enabled. Note: When this setting is enabled the corresponding USB3 Combo Port in the Flex I/O Tab will be Grayed out.	CFL-S CFL-H CNL-H	Yes Yes No



Table 2-13. - Debug (Sheet 5 of 7)

	DCI BSSB over GPIO Enabled This setting enables BSSB (Boundary Scan Side Band) over GPIO for DCI operations. Note: If this setting is enabled the DCI BSSB over USB3 Port1 Enabled also needs to be set to 'Yes'. Note: For S0ix and reset flows BSSB should be enabled.	CFL-S CFL-H CNL-H	Yes Yes Yes
	Direct Connect Interface (DCI) Enabled Values: Yes/No - This setting enables / disables the DCI interface used for Intel® Trace Hub debugging.	CFL-S CFL-H CNL-H	No No No
Click on Debug in the left tabs menu> Early USB DBC Type-A Configuration is expanded by default:			
▼ Early USB DBC over Type-A Configuration 6			
Parameter	Value	Help	
Intel(R) ME Boot Stall Enabled	No Boot Stall	This setting enables a delay during Intel	
USB2 DbC port enable	No USB2 Ports	This setting determines which USB2 port	
USB3 DbC port enable	No USB3 Ports	This setting determines which USB3 port	
USB2 / USB3 Port 1 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 / USB3 Port 2 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 / USB3 Port 3 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 / USB3 Port 4 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 / USB3 Port 5 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 / USB3 Port 6 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 Port 7 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 Port 8 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 Port 9 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
USB2 Port 10 DbC AFE Signal Strength	Unused	This setting determines the DbC Analog	
#	Parameter	Platform	Settings
6	Debug - Early USB DBC Type-A Configuration		
	Intel® ME Boot Stall Enabled This setting enables a delay during Intel® ME FW bring-up to allow USB DCI to be established and Early DbC arbitration to be granted.	CFL-S CFL-H CNL-H	No Boot Stall No Boot Stall No Boot Stall
	USB2 DbC port enable This setting determines which USB2 ports are enabled for Early DbC debugging.	CFL-S CFL-H CNL-H	No USB2 Ports No USB2 Ports No USB2 Ports
	USB3 DbC port enable This setting determines which USB3 ports are enabled for Early DbC debugging.	CFL-S CFL-H CNL-H	No USB3 Ports No USB3 Ports No USB3 Ports



Table 2-13. - Debug (Sheet 6 of 7)

	USB2 / USB3 Port 1 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 1.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 2 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 2.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 3 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 3.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 4 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 4.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 5 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 5.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 6 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 / USB3 port 6.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 7 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 7.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 8 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 8.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 9 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 9.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 / USB3 Port 10 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 10.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 Port 11 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 11.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 Port 12 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 12.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 Port 13 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 13.	CFL-S CFL-H CNL-H	Unused Unused Unused
	USB2 Port 14 DbC AFE Signal Strength This setting determines the DbC Analog Front End signal strength for USB2 port 14.	CFL-S CFL-H CNL-H	Unused Unused Unused

Click on Debug in the left tabs menu> eSPI Feature Overrides is expanded by default:

eSPI Feature Overrides

7

Parameter	Value	
eSPI / EC Low Frequency Debug Override	No	When enabled this setting will divide

#	Parameter	Platform	Settings
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Table 2-13. - Debug (Sheet 7 of 7)

7	Debug - eSPI Feature Overrides		
	eSPI / EC Low Frequency Debug Override When enabled this setting will divide eSPI clock frequency by 8. Note: This setting should only be used for debugging purposes. Leaving this setting enable will impact eSPI performance.	CFL-S CFL-H CNL-H	No No No



Table 2-14. - CPU Straps (Sheet 1 of 3)

Click on CPU Straps in the left tabs menu> CPU Straps are expanded by default:		
<div> <div>▼ CPU Straps</div> <div>1</div> </div>		
Parameter	Value	
Disable Hyperthreading	No	This setting control enabling / disabling of Hyper threading. Note: This strap is intended for debugging.
Number of Active Cores	All Cores Active	This setting controls the number of active processor cores. Note: This strap is intended for debugging.
Flex Ratio	0x00000000	This setting controls the maximum processor non-turbo ratio. Note: This strap is intended for debugging.
Processor Boot Max Frequency	Yes	This setting determines if the processor will operate at maximum frequency at power-on and boot.
JTAG Power Disable	No JTAG Power on C10 and Lo...	This setting determines if JTAG power will be maintained on C10 or lower power states. Note: This
SA Power Plane Topology	0x00000002	This setting determines the SA power plane topology. See Processor EDS for details. Note: This str
SA VR Type	SVID	This setting determines the SA core domain VR type. See Processor EDS for details.
IA Power Plane Topology	0x00000000	This setting determines the IA power plane topology. See Processor EDS for details. Note: This str
IA Power Plane VR	SVID	This setting determines the IA core domain VR type. See Processor EDS for details.
Ring Power Plane Topology	0x00000000	This setting determines the Ring power plane topology. See Processor EDS for details. Note: This s
Ring VR Type	SVID	This setting determines the Ring domain VR type. See Processor EDS for details.
GT_US Power Plane Topology	0x00000001	This setting determines the GT Unsliced power plane topology. See Processor EDS for details. Note:
GT_US VR Type	SVID	This setting determines the GT Unsliced domain VR type. See Processor EDS for details.
GT_S Power Plane Topology	0x00000001	This setting determines the GT slice power plane topology. See Processor EDS for details. Note: Th
SVID Presence	SVID is present	This setting determine if SVID rails are present on the platform. See Processor EDS for details.
Platform IMON Disable	0x00000000	This strap should be left at the recommended default setting.
eOPPIO Power Plane Topology	0x00000000	This setting determines the eOPPIO power plane topology. See Processor EDS for details. Note: This
eOPPIO VR Type	Fixed VR	This setting determines the eOPPIO domain VR type. See Processor EDS for details.
EdramPowerPlaneTopology	0x00000000	This setting determines the EDRAM power plane topology. See Processor EDS for details.
EDRAM VR Type	Fixed VR	This setting determines the EDRAM domain VR type. See Processor EDS for details.
SE Key Mode	0x00000000	Note: This strap should be left at the recommended default setting.
GT_S VR Type	SVID	This setting determines the GT slice domain VR type. See Processor EDS for details.
VCCAGSH Configuration	VCCAGSH is separate from VC...	This setting determines if the VCCAGSH is routed separate from VCCIN.
VCCIN SVID Address	0x00000000	This setting determines the VCCIN SVID Address.
VCCIN VR Type	Fixed VR	This setting determines the VCCIN VR Type.



Table 2-14. - CPU Straps (Sheet 2 of 3)

#	Parameter	Platform	Settings
1	CPU Straps - CPU Straps		
	Disable Hyperthreading Values: Yes/No This setting controls enabling or disabling of Hyper threading. Note: This strap is intended for debugging purposes only. See BIOS Spec for more details on enabling / disabling Hyperthreading.	CFL-S CFL-H CNL-H	No No No
	Number of Active Cores Values: All, 1, 2, 3, 4 This setting controls the number of active processor cores. Note: This strap is intended for debugging purposes only. See BIOS Spec for more details on enabling or disabling processor cores.	CFL-S CFL-H CNL-H	All All All
	Flex Ratio This setting controls the maximum processor non-turbo ratio. Note: This strap is intended for debugging purposes only. See BIOS Spec for more details on maximum processor non-turbo ratio configuration.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	Processor Boot Max Frequency Values: Yes/No This setting determines if the processor will operate at maximum frequency at power-on and boot. Note: This strap is intended for debugging purposes only.	CFL-S CFL-H CNL-H	Yes Yes Yes
	JTAG Power Disable Values: Yes - JTAG Power on C10 and Lower/No - No Power on C10 and Lower This setting determines if JTAG power will be maintained on C10 or lower power states. Note: This strap is intended for debugging purposes only.	CFL-S CFL-H CNL-H	No No No
	SA Power Plane Topology This setting determines the SA power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x2 0x2 0x2
	SA VR Type Value: SVID/Fixed VR This setting determines the SA core domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	Fixed VR SVID SVID
	IA Power Plane Topology This setting determines the IA power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	IA Power Plane VR Value: SVID/Fixed VR This setting determines the IA core domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	SVID SVID Fixed VR
	Ring Power Plane Topology This setting determines the Ring power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	Ring VR Type Value: SVID/Fixed VR This setting determines the Ring domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	SVID SVID Fixed VR
	GT_US Power Plane Topology This setting determines the GT Unsliced power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x1 0x1 0x1
	GT_US VR Type Value: SVID/Fixed VR This setting determines the GT Unsliced domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	SVID SVID Fixed VR
	GT_S Power Plane Topology This setting determines the GT slice power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x1 0x1 0x1



Table 2-14. - CPU Straps (Sheet 3 of 3)

	SVID Presence Value: SVID Present/SVID Not Present This setting determines if SVID rails are present on the platform. See Processor EDS for details.	CFL-S CFL-H CNL-H	SVID Present SVID Present SVID Present
	Platform IMON Disable Also known as Psys. This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	eOPPIO Power Plane Topology This setting determines the eOPPIO power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	eOPPIO VR Type Value: SVID/Fixed VR This setting determines the eOPPIO domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	Fixed VR Fixed VR Fixed VR
	EDRAM Power Plane Topology This setting determines the EDRAM power plane topology. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	EDRAM VR Type Value: SVID/Fixed VR This setting determines the EDRAM domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	Fixed VR Fixed VR Fixed VR
	SE Key Mode Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	GT_S VR Type Value: SVID/Fixed VR This setting determines the GT slice domain VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	SVID SVID Fixed VR
	VCCAGSH Configuration Value: VCCAGSH is shorted with VCCIN through a low pass filter on board / VCCAGSH is separate from VCCIN This setting determines if the VCCAGSH is routed separate from VCCIN.	CFL-S CFL-H CNL-H	VCCAGSH is separate from VCCIN VCCAGSH is separate from VCCIN VCCAGSH is separate from VCCIN
	VCCIN SVID Address This setting determines the VCCIN SVID Address. See Processor EDS for details. Note: This strap should be left at the recommended default setting.	CFL-S CFL-H CNL-H	0x0 0x0 0x0
	VCCIN VR Type Value: SVID/Fixed VR This setting determines the VCCIN VR type. See Processor EDS for details.	CFL-S CFL-H CNL-H	Fixed VR Fixed VR SVID



Table 2-15. - Flex I/O Straps (Sheet 1 of 12)

Click on Flex I/O in the left tabs menu> Intel® RST for PCIe Configuration is expanded by default:			
▼ Intel(R) RST for PCIe Configuration 1			
Parameter	Value		
PCIe Controller 3 Port 1 SRIS Enabled	No	This is used to configure SRIS Port 1 for Intel(R) RST for PCIe	
PCIe Controller 3 Port 2 SRIS Enabled	No	This is used to configure SRIS Port 2 for Intel(R) RST for PCIe	
PCIe Controller 3 Port 3 SRIS Enabled	No	This is used to configure SRIS Port 1 for Intel(R) RST for PCIe	
PCIe Controller 3 Port 4 SRIS Enabled	No	This is used to configure SRIS Port 4 for Intel(R) RST for PCIe	
PCIe Controller 5 Port 1 SRIS Enabled	No	This is used to configure SRIS Port 1 for Intel(R) RST for PCIe	
PCIe Controller 5 Port 2 SRIS Enabled	No	This is used to configure SRIS Port 2 for Intel(R) RST for PCIe	
PCIe Controller 5 Port 3 SRIS Enabled	No	This is used to configure SRIS Port 3 for Intel(R) RST for PCIe	
PCIe Controller 5 Port 4 SRIS Enabled	No	This is used to configure SRIS Port 4 for Intel(R) RST for PCIe	
PCIe Controller 6 Port 1 SRIS Enabled	No	This is used to configure SRIS Port 1 for Intel(R) RST for PCIe	
PCIe Controller 6 Port 2 SRIS Enabled	No	This is used to configure SRIS Port 2 for Intel(R) RST for PCIe	
PCIe Controller 6 Port 3 SRIS Enabled	No	This is used to configure SRIS Port 3 for Intel(R) RST for PCIe	
PCIe Controller 6 Port 4 SRIS Enabled	No	This is used to configure SRIS Port 4 for Intel(R) RST for PCIe	
Intel(R) RST for PCIe-C1 Select x2 or x4	x4	This is used to configure NAND Cycle routers for the Intel(R)	
Intel(R) RST for PCIe-C2 Select x2 or x4	x4	This is used to configure NAND Cycle routers for the Intel(R)	
Intel(R) RST for PCIe-C3 Select x2 or x4	x4	This is used to configure NAND Cycle routers for the Intel(R)	
Intel® RST for PCIe Controller 1	1x4	This is used to configure PCIe Controller 1 for Intel(R) RST f	
Intel® RST for PCIe Controller 2	1x4	This is used to configure PCIe Controller 2 for Intel(R) RST f	
Intel® RST for PCIe Controller 3	2x2	This is used to configure PCIe Controller 3 for Intel(R) RST f	
#	Parameter	Platform	Settings
1	Flex I/O - Intel® RST for PCIe Configuration		
	PCIe Controller 3 Port 1 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 1 for Intel® RST for PCIe on PCIe Controller 3. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 3 Port 2 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 2 for Intel® RST for PCIe on PCIe Controller 3. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No



Table 2-15. - Flex I/O Straps (Sheet 2 of 12)

	PCIe Controller 3 Port 3 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 3 for Intel® RST for PCIe on PCIe Controller 3. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 3 Port 4 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 4 for Intel® RST for PCIe on PCIe Controller 3. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 5 Port 1 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 1 for Intel® RST for PCIe on PCIe Controller 5. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 5 Port 2 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 2 for Intel® RST for PCIe on PCIe Controller 5. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 5 Port 3 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 3 for Intel® RST for PCIe on PCIe Controller 5. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 5 Port 4 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 4 for Intel® RST for PCIe on PCIe Controller 5. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 6 Port 1 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 1 for Intel® RST for PCIe on PCIe Controller 6. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 6Port 2 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 2 for Intel® RST for PCIe on PCIe Controller 6. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 6 Port 3 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 3 for Intel® RST for PCIe on PCIe Controller 6. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 6 Port 4 SRIS Enabled Values: Yes/ No - This is used to configure SRIS Port 4 for Intel® RST for PCIe on PCIe Controller 6. Note: Configuration of this setting is only required if the NVM device will be connected external SATA Express cable.	CFL-S CFL-H CNL-H	No No No
	Intel® RST for PCIe-C1 Select x2 or x4 Values: x2, x4 - This is used to configure NAND Cycle routers for the Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 1.	CFL-S CFL-H CNL-H	x4 x4 x4
	Intel® RST for PCIe-C2 Select x2 or x4 Values: x2, x4 - This is used to configure NAND Cycle routers for the Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 2.	CFL-S CFL-H CNL-H	x4 x4 x4
	Intel® RST for PCIe-C3 Select x2 or x4 Values: x2, x4 - This is used to configure NAND Cycle routers for the Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 3.	CFL-S CFL-H CNL-H	x4 x2 x2



Table 2-15. - Flex I/O Straps (Sheet 3 of 12)

	Intel® RST for PCIe Controller 1 Values: 1x4, 2x2 - This is used to configure PCIe Controller 1 for Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 3.	CFL-S CFL-H CNL-H	1x4 1x4 1x4
	Intel® RST for PCIe Controller 2 Values: 1x4, 2x2 - This is used to configure PCIe Controller 2 for Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 2.	CFL-S CFL-H CNL-H	1x4 1x4 1x4
	Intel® RST for PCIe Controller 3 Values: 1x4, 2x2 - This is used to configure PCIe Controller 3 for Intel® RST for PCIe interface as either x2 or x4 lane operation on PCIe Controller 3.	CFL-S CFL-H CNL-H	1x4 2x2 2x2
Click on Flex I/O in the left tabs menu> PCIe Lane Reversal Configuration is expanded by default:			
▼ PCIe Lane Reversal Configuration 2			
Parameter		Value	
PCIe Controller 1 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 1
PCIe Controller 2 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 2
PCIe Controller 3 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 3
PCIe Controller 4 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 4
PCIe Controller 5 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 5
PCIe Controller 6 Lane Reversal Enabled		No	This setting allows the PCIe lanes on Controller 6
#	Parameter	Platform	Settings
2	Flex I/O - PCIe Lane Reversal Configuration		
	PCIe Controller 1 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 1 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 2 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 2 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 3 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 3 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No Yes No
	PCIe Controller 4 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 4 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 5 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 5 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No No No
	PCIe Controller 6 Lane Reversal Enabled Values: Yes/ No - This setting allows the PCIe lanes on Controller 6 to be reversed. Note: Refer to EDS for PCIe supported port configurations.	CFL-S CFL-H CNL-H	No No No
Click on Flex I/O in the left tabs menu> PCIe Port Configuration is expanded by default:			



Table 2-15. - Flex I/O Straps (Sheet 4 of 12)

▼ PCIe Port Configuration 3			
Parameter	Value		
PCIe Controller 1 (Port 1-4)	4x1	This setting controls PCIe Port configurations for PCIe Controller 1.	
PCIe Controller 2 (Port 5-8)	1x4	This setting controls PCIe Port configurations for PCIe Controller 2.	
PCIe Controller 3 (Port 9-12)	1x4	This setting controls PCIe Port configurations for PCIe Controller 3.	
PCIe Controller 4 (Port 13-16)	4x1	This setting controls PCIe Port configurations for PCIe Controller 4.	
PCIe Controller 5 (Port 17-20)	4x1	Setting of this field depend on what PCIe ports 17-20 configurator	
PCIe Controller 2 (Port 21-24)	4x1	This setting controls PCIe Port configurations for PCIe Controller 6.	
#	Parameter	Platform	Settings
3	Flex I/O - PCIe Port Configuration		
	PCIe Controller 1 (Port 1-4) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 1. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	4x1 4x1 1x4
	PCIe Controller 2 (Port 5-8) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 2. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1x4 4x1 4x1
	PCIe Controller 3 (Port 9-12) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 3. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1x4 1x4 1x4
	PCIe Controller 4 (Port 13-16) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 4. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	4x1 4x1 4x1
	PCIe Controller 5 (Port 17-20) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 5. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1x4 4x1 1x4
	PCIe Controller 6 (Port 21-24) Values: 4x1, (1x2, 2x1), 2x2, 1x4 - This setting controls PCIe Port configurations for PCIe Controller 6. For further details see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	1x4 1x4 1x4
Click on Flex I/O in the left tabs menu> SATA / PCIe Combo Port Configuration is expanded by default:			



Table 2-15. - Flex I/O Straps (Sheet 5 of 12)

▼ SATA / PCIe Combo Port Configuration 4			
Parameter	Value		
SATA / PCIe Combo Port 0 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 1 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 2 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 3 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 4 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 5 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 6 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 7 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 8 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 9 Mode Select	PCIe CLKREQ#	The corresponding CLKREQ# GPIO can only function as	
SATA / PCIe Combo Port 0	PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 1	GPIO Polarity PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 2	PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 3	SATA	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 4	SATA	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 5	SATA	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 6	GPIO Polarity PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 7	GPIO Polarity PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 8	GPIO Polarity PCIe	This setting configures the PCIe port to operate as	
SATA / PCIe Combo Port 9	GPIO Polarity PCIe	This setting configures the PCIe port to operate as	
#	Parameter	Platform	Settings
4	Flex I/O - SATA / PCIe Combo Port Configuration		
	SATA / PCIe Combo Port 0 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 0 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 1 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 1 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#



Table 2-15. - Flex I/O Straps (Sheet 6 of 12)

	SATA / PCIe Combo Port 2 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 2 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 3 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 3 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 4 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 4 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 5 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 5 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 6 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 6 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 7 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 7 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 8 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 8 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 9 Mode Select Values: PCIe CLKREQ#, DEVSLP# The corresponding CLKREQ# GPIO can only function as DEVSLP# if SATA / PCIe Combo Port 0 is assigned to SATA, and SATA / PCIe Combo Port 9 Mode Select is configured to SATA	CFL-S CFL-H CNL-H	PCIe CLKREQ# PCIe CLKREQ# PCIe CLKREQ#
	SATA / PCIe Combo Port 0 Values: SATA, PCIe (or GbE), GPIO - This setting configures the PCIe port to operate as either: PCIe Port 11 or SATA Port 0 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	PCIe PCIe PCIe
	SATA / PCIe Combo Port 1 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 12 or SATA Port 1a For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: This port is shared with GbE Port select if PCIe Port 12 has been selected for Intel® Integrated LAN this port setting will be grayed out.	CFL-S CFL-H CNL-H	PCIe GPIO Polarity PCIe PCIe
	SATA / PCIe Combo Port 2 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 13 or SATA Port 0b For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: This port is shared with GbE Port select if PCIe Port 13 has been selected for Intel® Integrated LAN this port setting will be grayed out.	CFL-S CFL-H CNL-H	GbE SATA SATA



Table 2-15. - Flex I/O Straps (Sheet 7 of 12)

	SATA / PCIe Combo Port 3 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 14 or SATA Port 1b For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SATA SATA SATA
	SATA / PCIe Combo Port 4 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 15 or SATA Port 2 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SATA SATA SATA
	SATA / PCIe Combo Port 5 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 16 or SATA Port 3 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	SATA SATA SATA
	SATA / PCIe Combo Port 6 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 17 or SATA Port 4 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	GPIO Polarity PCIe SATA GPIO Polarity PCIe
	SATA / PCIe Combo Port 7 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 18 or SATA Port 5 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS.	CFL-S CFL-H CNL-H	PCIe SATA PCIe
	SATA / PCIe Combo Port 8 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 19 or SATA Port 6 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: Workstation / Server Only	CFL-S CFL-H CNL-H	NA NA NA
	SATA / PCIe Combo Port 9 Values: SATA, PCIe, GPIO Polarity PCIe, GPIO Polarity SATA - This setting configures the PCIe port to operate as either: PCIe Port 20 or SATA Port 7 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: Workstation / Server Only	CFL-S CFL-H CNL-H	NA NA NA

Click on Flex I/O in the left tabs menu> USB3 Port Configuration is expanded by default:



Table 2-15. - Flex I/O Straps (Sheet 8 of 12)

<div> <div>▼ USB3 Port Configuration</div> <div>5</div> </div>		
Parameter	Value	
USB3 / PCIe Combo Port 0	USB3	This setting configures the PCIe port to operate as either
USB3 / PCIe Combo Port 1	USB3	This setting configures the PCIe port to operate as either
USB3 / PCIe Combo Port 2	USB3	This setting configures the PCIe port to operate as either
USB3 / PCIe Combo Port 3	USB3	This setting configures the PCIe port to operate as either
USB3 Port 1 Connector Type Select	Type C	This setting configures the physical connector type to be
USB3 Port 2 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 3 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 4 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 5 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 6 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 7 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 8 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 9 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 10 Connector Type Select	Type A	This setting configures the physical connector type to be
USB3 Port 1 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 1 speed during platfor
USB3 Port 2 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 2 speed during platfor
USB3 Port 3 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 3 speed during platfor
USB3 Port 4 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 4 speed during platfor
USB3 Port 5 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 5 speed during platfor
USB3 Port 6 Initialization Speed Select	USB3.1 Gen1 LBPM	This setting determines USB3 Port 6 speed during platfor
USB3 Port 1 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 1 speed capabilitie
USB3 Port 2 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 2 speed capabilitie
USB3 Port 3 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 3 speed capabilitie
USB3 Port 4 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 4 speed capabilitie
USB3 Port 5 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 5 speed capabilitie
USB3 Port 6 Speed Capability	USB 3.1 Gen2	This setting determines the USB3 Port 6 speed capabilitie
USB Type AB Mode Select	USB Type AB HW Select	This setting determines how the USB Type AB connector



Table 2-15. - Flex I/O Straps (Sheet 9 of 12)

#	Parameter	Platform	Settings
5	Flex I/O - USB3 Port Configuration Note: USB Type-C Mux Control: On Cannon / Coffee Lake PCH, device mode is supported on all USB3.1 Type-C ports. EC/PD/PC needs to send a OOB command to the PCH to properly map the USB 2.0 and USB 3.1 signals to the Host controller or Device mode controller when a connection is detected on the Type-C port. Without these OOB message, the USB2.0/3.1 signals may not be correctly mapped and the USB functionality may be impacted. For more detail, see Cannon Lake and Coffee Lake Platform USB Type-C Mux Control Over eSPI doc # 570737.		
	USB3 / PCIe Combo Port 0 Values: USB3, PCIe This setting configures the PCIe port to operate as either: PCIe Port 1 or USB3 Port 1 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: If DCI BSSB for this USB3 Combo port it will be Grayed out.	CFL-S CFL-H CNL-H	USB3 USB3 PCIe
	USB3 / PCIe Combo Port 1 Values: USB3, PCIe This setting configures the PCIe port to operate as either: PCIe Port 2 or USB3 Port 2 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: If DCI BSSB for this USB3 Combo port it will be Grayed out.	CFL-S CFL-H CNL-H	USB3 USB3 PCIe
	USB3 / PCIe Combo Port 2 Values: USB3, PCIe This setting configures the PCIe port to operate as either: PCIe Port 3 or USB3 Port 3 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: If DCI BSSB for this USB3 Combo port it will be Grayed out.	CFL-S CFL-H CNL-H	PCIe USB3 PCIe
	USB3 / PCIe Combo Port 3 Values: USB3, PCIe This setting configures the PCIe port to operate as either: PCIe 4 or USB3 Port 4 For further details on Flex I/O see Cannon Lake H Platform Controller Hub EDS. Note: If DCI BSSB for this USB3 Combo port it will be Grayed out.	CFL-S CFL-H CNL-H	USB3 USB3 PCIe
	USB3 Port 1 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 1.	CFL-S CFL-H CNL-H	Type C Type A Type C
	USB3 Port 2 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 2.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 3 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 3.	CFL-S CFL-H CNL-H	Type C Type A Type A



Table 2-15. - Flex I/O Straps (Sheet 10 of 12)

	USB3 Port 4 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 4.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 5 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 5.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 6 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 6.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 7 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 7.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 8 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 8.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 9 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 9.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 10 Connector Type Select Values: Type C, Micro AB, Type A, Type B, Express Card / M.2 S2 This setting configures the physical connector type to be used for USB 3.1 Port 10.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB3 Port 1 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 1 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 2 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 2 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 3 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 3 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 4 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 4 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 5 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 5 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 6 Initialization Speed Select Values: USB3.1 Gen1 LBPM, USB3.1 Gen2 Skip LBPM This setting determines USB3 Port 6 speed during platform power-up.	CFL-S CFL-H CNL-H	USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM USB3.1 Gen1 LBPM
	USB3 Port 1 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 1 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2
	USB3 Port 2 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 2 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2
	USB3 Port 3 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 3 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2



Table 2-15. - Flex I/O Straps (Sheet 11 of 12)

	USB3 Port 4 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 4 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2
	USB3 Port 5 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 5 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2
	USB3 Port 6 Speed Capability Values: USB3.1 Gen1, USB3.1 Gen2 This setting determines the USB3 Port 6 speed capabilities.	CFL-S CFL-H CNL-H	USB 3.1 Gen2 USB 3.1 Gen2 USB 3.1 Gen2
	USB Type AB Mode Select Values: USB Type AB SW Select, USB Type AB HW Select This setting determines how the USB Type AB connector switching is handled.	CFL-S CFL-H CNL-H	USB Type AB SW Select USB Type AB SW Select
Click on Flex I/O in the left tabs menu> USB2 Port Configuration is expanded by default:			
<div> <div>USB2 Port Configuration</div> <div>6</div> </div>			
Parameter	Value		
USB2 Port 1 Connector Type Select	Micro AB	This setting configures the physical conn	
USB2 Port 3 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 3 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 4 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 5 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 6 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 7 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 8 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 9 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 10 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 11 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 12 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 13 Connector Type Select	Type A	This setting configures the physical conn	
USB2 Port 14 Connector Type Select	Type A	This setting configures the physical conn	
#	Parameter	Platform	Settings
6	Flex I/O - USB2 Port Configuration		
	USB2 Port 1 Connector Type This setting configures the physical connector type to be used for USB2 Port 1.	CFL-S CFL-H CNL-H	Type A Type A Type C



Table 2-15. - Flex I/O Straps (Sheet 12 of 12)

	USB2 Port 2 Connector Type This setting configures the physical connector type to be used for USB2 Port 2.	CFL-S CFL-H CNL-H	Type A Type A Type C
	USB2 Port 3 Connector Type This setting configures the physical connector type to be used for USB2 Port 3.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 4 Connector Type This setting configures the physical connector type to be used for USB2 Port 4.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 5 Connector Type This setting configures the physical connector type to be used for USB2 Port 5.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 6 Connector Type This setting configures the physical connector type to be used for USB2 Port 6.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 7 Connector Type This setting configures the physical connector type to be used for USB2 Port 7.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 8 Connector Type This setting configures the physical connector type to be used for USB2 Port 8.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 9 Connector Type This setting configures the physical connector type to be used for USB2 Port 9.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 10 Connector Type This setting configures the physical connector type to be used for USB2 Port 10.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 11 Connector Type This setting configures the physical connector type to be used for USB2 Port 11.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 12 Connector Type This setting configures the physical connector type to be used for USB2 Port 12.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 13 Connector Type This setting configures the physical connector type to be used for USB2 Port 13.	CFL-S CFL-H CNL-H	Type A Type A Type A
	USB2 Port 14 Connector Type This setting configures the physical connector type to be used for USB2 Port 14.	CFL-S CFL-H CNL-H	Type A Express Card / M.2 Express Card / M.2



Table 2-16. - GPIO (Sheet 1 of 5)

Click on GPIO in the left tabs menu> LAN / GPIO Select is expanded by default:

▼ LAN / GPIO Select

1

Parameter	Value	
LAN PHY Power Control GPD11 ...	Enable as GPD11	-

#	Parameter	Platform	Settings
1	GPIO - LAN / GPIO Select		
	LAN PHY Power Control GPD11 Signal Configuration	CFL-S CFL-H CNL-H	LANPHYPC LANPHYPC LANPHYPC

Click on GPIO in the left tabs menu> WLAN / GPIO Select is expanded by default:

▼ WLAN / GPIO Select

2

Parameter	Value	
SLP_WLAN# / GDP9 Signal Con...	Enable as SLP_WLAN#	-

#	Parameter	Platform	Settings
2	GPIO - WLAN / GPIO Select		
	SLP_WLAN# / GDP9 Signal Configuration	CFL-S CFL-H CNL-H	SLP_WLAN# SLP_WLAN# SLP_WLAN#

Click on GPIO in the left tabs menu> Platform Power / GPIO is expanded by default:



Table 2-16. - GPIO (Sheet 2 of 5)

▼ Platform Power / GPIO 3			
Parameter	Value	Help Text	
SLP_A# / GPD6 Signal Configur...	SLP_A#	-	
SLP_S3# / GPD4 Signal Configu...	SLP_S3#	-	
SLP_S4# / GPD5 Signal Configu...	SLP_S4#	-	
SLP_S5# / GPD10 Signal Config...	SLP_S5#	-	

#	Parameter	Platform	Settings
3	GPIO - Platform Power / GPIO		
	SLP_A# / GPD6 Signal Configuration	CFL-S CFL-H CNL-H	SLP_A# SLP_A# SLP_A#
	SLP_S3# / GPD4 Signal Configuration	CFL-S CFL-H CNL-H	SLP_S3# SLP_S3# SLP_S3#
	SLP_S4# / GPD5 Signal Configuration	CFL-S CFL-H CNL-H	SLP_S4# SLP_S4# SLP_S4#
	SLP_S5# / GPD10 Signal Configuration	CFL-S CFL-H CNL-H	SLP_S5# SLP_S5# SLP_S5#

Click on GPIO in the left tabs menu> ME Feature Pins is expanded by default:

▼ ME Feature Pins 4		
Parameter	Value	
Intel(R) Precise Touch and Stylus Reset GPIO Select	None	Configure Intel(R) Preci
Intel(R) Precise Touch and Stylus Interrupt GPIO Select	None	Configure Intel(R) Preci

#	Parameter	Platform	Settings
4	GPIO - ME Feature Pins		
	Intel® Precise Touch and Stylus Reset GPIO Select Configure Intel® Precise Touch and Stylus Reset GPIO.	CFL-S CFL-H CNL-H	None None None
	Intel® Precise Touch and Stylus Interrupt GPIO Select Configure Intel® Precise Touch and Stylus Interrupt GPIO.	CFL-S CFL-H CNL-H	None None None



Table 2-16. - GPIO (Sheet 3 of 5)

Click on GPIO in the left tabs menu> Touch Controller Pins is expanded by default:			
<div> <div>▼ Touch Controller Pins</div> <div>5</div> </div>			
Parameter	Value	Hel	
GPP_D_0	GPIO	-	
GPP_D_1	GPIO	-	
GPP_D_2	GPIO	-	
GPP_D_3	GPIO	-	
GPP_D_21	GPIO	-	
GPP_D_22	GPIO	-	
#	Parameter	Platform	Settings
5	GPIO - Touch Controller Pins		
	GPP_D_0	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
	GPP_D_1	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
	GPP_D_2	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
	GPP_D_3	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
	GPP_D_21	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
	GPP_D_22	CFL-S CFL-H CNL-H	GPIO GPIO GPIO
Click on GPIO in the left tabs menu> GPIO VCCIO Voltage Control is expanded by default:			



Table 2-16. - GPIO (Sheet 4 of 5)

▼ GPIO VCCIO Voltage Control 6			
Parameter	Value	Help	
GPP_A Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_B Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_C Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_D Group Master Voltage S...	1.8 Volts	This setting controls configures the VCCIO vo	
GPP_E Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_F Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_G Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_H Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_I Group Master Voltage Se...	3.3 Volts	This setting controls configures the VCCIO vo	
GPP_K Group Master Voltage S...	3.3 Volts	This setting controls configures the VCCIO vo	
Clockout 48 Mode Configuration	GPP_A16	This setting determines the native mode of op	
Intel(R) HD Audio Voltage Select	1.8 Volts	This setting controls configures the VCCIO vo	
GPPC_G Group Master Voltage ...	3.3 Volts	This setting controls configures the VCCIO vo	
GPD Group Master Voltage Select	3.3 Volts	This setting controls configures the VCCIO vo	
#	Parameter	Platform	Settings
6	GPIO - GPIO VCCIO Voltage Control Warning: Incorrectly configuring GPIO voltages may result in MCP damage.		
	GPP_A Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_A GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_B Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_B GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_C Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_C GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_D Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_D GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 1.8 Volts 3.3 Volts
	GPP_E Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_E GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_F Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_F GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts



Table 2-16. - GPIO (Sheet 5 of 5)

	GPP_G Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_G GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_H Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_H GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_I Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_I GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GPP_K Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_K GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	Clockout 48 Mode Configuration Values: 3.3 Volts, 1.8 Volts This setting determines the mode of operation for the CLKOUT_48 signal.	CFL-S CFL-H CNL-H	CLKOUT_48 GPP_A16 GPP_A16
	Intel® HD Audio Voltage Configuration Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage for the Intel® HD Audio GPIO pins.	CFL-S CFL-H CNL-H	1.8 Volts 1.8 Volts 1.8 Volts
	GPP_G Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts This setting configures the VCCIO voltage of all the GPP_G GPIO pins.	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts
	GDP Group Master Voltage Select Values: 3.3 Volts, 1.8 Volts. This setting configures the VCCIO voltage of all the GDP GPIO pins	CFL-S CFL-H CNL-H	3.3 Volts 3.3 Volts 3.3 Volts



Table 2-17. - Intel® Precise Touch and Stylus

Click on Intel® Precise Touch and Stylus in the left tabs menu> IntegratedTouchConfiguration is expanded by default:

IntegratedTouchConfiguration1

Parameter	Value	
Intel(R) Precise Touch and Stylus Enabled	No	-

#	Parameter	Platform	Settings
1	Intel® Precise Touch and Stylus - IntegratedTouchConfiguration		
	Intel® Precise Touch and Stylus Enabled	CFL-S CFL-H CNL-H	No No No

Click on Intel® Precise Touch and Stylus in the left tabs menu> IntegratedTouchAndStylusConfiguration is expanded by default:

Intel Precise Touch And Stylus Configuration2

Parameter	Value	
Intel(R) Precise Touch and Stylus Controller 1 Maximum Frequency	30 MHz	This setting al
Intel(R) Precise Touch and Stylus Controller 2 Maximum Frequency	24 MHz	This setting al
Touch Spread Spectrum Clock Enabled	Yes	This setting er

2	Intel® Precise Touch and Stylus - Intel PerciseTouch and Stylus Configuration		
	Intel® Precise Touch and Stylus Controller 1 Maximum Frequency	CFL-S CFL-H CNL-H	30MHz 30MHz 30MHz
	Intel® Precise Touch and Stylus Controller 2 Maximum Frequency Values: 17 MHz, 24 MHz, 30 MHz, 48 MHz This setting configures the maximum frequency for Intel® Precise Touch and Stylus Controller 2.	CFL-S CFL-H CNL-H	24MHz 24MHz
	Touch Spread Spectrum Clock Enabled Values: Yes/No This setting enabled the use of the spread spectrum clock when generating the SPI_CLK for touch.	CFL-S CFL-H CNL-H	Yes Yes Yes



Table 2-20. - Intel® FIT - Build Image

#	Parameter	CRB	Values
1	Green Build button		Can also select CTRL+B, or Build> Build Image from the menu bar along the top of the screen
2	Console shows status of build and path where saved		



3 Programming SPI Flash Devices and Checking Firmware Status

Now that the Flash image file has been created, it can be programmed into the SPI Flash device(s) of the target machine. For platforms that don't boot, a Flash Chip Programmer will be required. For platforms that can boot to DOS or Windows*, the Intel® FPT can be used.

3.1 Flash Burner/Programmer

The specific use of a Flash burner/programmer is beyond the scope of this document. Here are some general steps that may be followed:

1. Navigate to your **Output Directory** (as specified in Table 2.2) where your generated SPI Flash image(s) are saved. It is assumed that this image file is named **outimage.bin**.

If two total SPI Flash devices were specified during the build process, then additional image files will be saved, one for each SPI Flash device. These files are assumed to be named **outimage(1).bin** and **outimage(2).bin**.

2. Utilize a Flash burner/programmer to program the image(s). For multiple SPI Flash devices, the images are numbered sequentially to correspond to the first and second SPI Flash device accordingly.

3.1.1 In-Circuit SPI Flash Programming for CRB

Mobile CRBs have the SPI Flash devices soldered down. As a result, to program the SPI Flash for mobile CRBs, follow these steps:

1. Leave CRB powered on.
2. Connect Flash Programmer (such as DediProg SF600) header to connector **J3F3** which is labelled "**SPI TPM**". Make sure to line up pin 1 on the header.
3. Program the first image [outimage(1).bin] to the CRB.
4. In Dediprog software, select application memory chip 2 button and load second image if created.
5. Program the second image [outimage(2).bin] to the CRB if created.
6. Once programming is complete, disconnect the Flash Programmer header. Power off and unplug CRB. Remove cell coin battery, wait approximately 10 seconds. Replace cell coin battery, plug CRB back in and power on.

3.2 Flash Programming Tool (Intel® FPT)

Intel® FPT can be used to substitute for a Flash burner/programmer, provided the system is capable of booting to a DOS or Windows* OS.

Note: Intel® FPT will automatically disable the Intel® ME or EFI prior to flashing the image to the platform.



Intel® FPT DOS Version

The DOS versions supported by Intel® FPT are: DOS, Free DOS, and DRMK DOS. Use the following steps to program the SPI Flash devices,

1. Copy all the files in the “(root)\Tools\System Tools\Flash Programming Tool\DOS” directory to the root directory of a bootable USB key.
2. Navigate to your **Output Directory** (as specified in Table 2.2) where your generated SPI Flash image(s) are saved. It is assumed that this image file is named **outimage.bin**. Copy this image file to the root directory of the USB key.
3. Boot the target system to DOS and change to the root directory of the bootable USB key. At the DOS prompt type:

```
fpt.exe -i
```

The system should respond with the number of SPI Flash devices available. For example:

```
--- Flash Devices Found ---  
W25Q64BV ID:0xEF4017 Size: 8192KB (65536Kb)  
W25Q64BV ID:0xEF4017 Size: 8192KB (65536Kb)
```

Note: If the SPI Flash device does not currently contain a descriptor it may report only a single device.

4. Program the SPI Flash image to the Flash device(s) by issuing the following command at the prompt:

```
fpt.exe -f outimage.bin
```

If the programming was successful, then the following message will be shown.

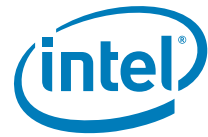
```
FPT Operation Passed
```

If the programming was **NOT** successful, then repeat this step to try again. If programming problems persist, then check the SPI Flash devices and platform hardware.

5. Execute a platform global reset using Intel® FPT -greset. Next go to [Section 3.3](#) to check the Intel® ME Firmware status.

3.2.1 Intel® FPT Windows* Version

The Windows* OS versions supported by Intel® FPT are: Windows* PE 64, Windows* 7, Windows* 8/8.1. There are two versions of Intel® FPT for Windows*: a 32-bit version and a 64-bit version. Most Windows* OS, Windows* 7 (32-bit or 64-bit), Windows* 8/8.1 (32-bit or 64-bit) can use Windows* version of Intel® FPT. However, Windows* OS which do not support 32 bit compatible mode (Win PE 64-bit) **must use** Intel® FPT Windows* 64-bit version due to compatibility issues.



Use the following steps to program the SPI Flash devices,

1. Navigate to your **Output Directory** (as specified in [Table 2.2](#)) where your generated SPI Flash image(s) are saved. It is assumed that this image file is named **outimage.bin**. Copy this image file to Intel® FPT directory located at "(root)\Tools\System Tools\Flash Programming Tool\Windows".
2. Boot the target system to Windows* and open a Command Prompt window. In this window, change to the Intel® FPT directory and at the prompt type:

```
fptw.exe -i
```

The system should respond with the number of SPI Flash devices available. For example:

```
--- Flash Devices Found ---  
W25Q64BV ID:0xEF4017 Size: 8192KB (65536Kb)  
W25Q64BV ID:0xEF4017 Size: 8192KB (65536Kb)
```

Note: If the SPI Flash device does not currently contain a descriptor it may report only a single device.

3. Program the SPI Flash image to the Flash device(s) by issuing the following command at the prompt:

```
fptw.exe -f outimage.bin
```

If the programming was successful, then the following message will be shown.

```
FPT Operation Passed
```

If the programming was **NOT** successful, then repeat this step to try again. If programming problems persist, then check the SPI Flash devices and platform hardware.

4. Use `fptw.exe -greset` to perform a G3 power cycle. Next go to [Section 3.3](#) to check the Intel® ME Firmware status.

3.3 Checking Intel® ME Firmware Status

Use the following steps to check the platform health and Intel® ME FW status,

1. Copy the file **MEInfo.exe** in the "(root)\Tools\System Tools\MEInfo\DOS" directory to the root directory of a bootable USB key.
2. Boot the target system and use F2 or Del to enter the BIOS setup menu. Load default values for BIOS (on Intel® CRBs press F3 to load default values). Save and reboot (on Intel® CRBs press F4 and select Yes).
3. Boot the target system to DOS and change to the root directory of the bootable USB key. At the DOS prompt type:

```
MEInfo.exe -fwsts
```



The system should respond with a message similar to below.

```
Intel® MEInfo Version: 12.0.0.xxxx

Copyright(C) 2005 - 2014, Intel Corporation. All rights reserved.

FW Status Register1: 0x1E000255
FW Status Register2: 0x60002306
FW Status Register3: 0x00000300
FW Status Register4: 0x00004001
FW Status Register5: 0x00000101
FW Status Register6: 0x03C00FC9

Current State: Normal
ManufacturingMode: Enabled
FlashPartition: Valid
OperationalState: M0 with UMA
InitComplete: Complete
BUPLoadState: Success
ErrorCode: No Error
ModeOfOperation: Normal
Phase: HOSTCOMM Module
ICC: Valid OEM data, ICC programmed
SPI Flash Log: Not Present
ME File System Corrupted: No
FPF and ME Config Status: Not committed
```

As in the above example if there are NO errors shown, then

- your platform's health is good
- Intel® ME FW has successfully initialized
- Intel® ME FW is operating normally

Note: This section is only intended to show how to use the MEInfo.exe tool for checking firmware status. For full usage and capabilities of the MEInfo.exe tool, please see the System Tools User Guide.



3.4 Common Bring Up Issues and Troubleshooting Table

Table 3-1. Common Bring Up Issues and Troubleshooting Table

Problem / Issue	Solution / Workaround
System does not boot to DOS	By default, the system will boot to EFI Shell. To boot to DOS, <ol style="list-style-type: none"> 1. Enter BIOS menu, then go to the 'Boot' screen 2. Change 'Boot Option #1' to be your USB key (ensure USB key is formatted to be DOS bootable) 3. Press 'F4' to save settings and reboot
Hear 3 beeps when platform powers on	Possible device is disconnected or device not found, check <ul style="list-style-type: none"> • platform power and MCP fan power connectors • DIMM memory modules (if applicable for memory down modules) • USB devices (keyboard, mouse, USB key) may be plugged into inactive USB port • missing/incorrect jumpers • missing or poorly socketed MCP
No display on monitor	Ensure Corporate FW SKU supports integrated graphics. Try external graphics card.
USB device not detected or does not work	USB device may be plugged into inactive USB port
System does not boot (Post Code 00)	Incorrect Flash image – possible reasons: <ul style="list-style-type: none"> • wrong FW selected during Flash image build process • wrong Flash size selected Re-build image with correct settings and re-flash using Flash burner.

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A Appendix — Flash Configurations

This chapter covers only the basic information needed for clock control parameter programming. For a more detailed treatment of Mainstream - Mobile Family clocks, see Intel® Cannon Lake PCH-H / LP Clocks and Intel® Management Engine — Platform Compliancy Guide for ME Hardware.

Figure A-1. Configuration “A” — Desktop/Server/Workstation or Mobile

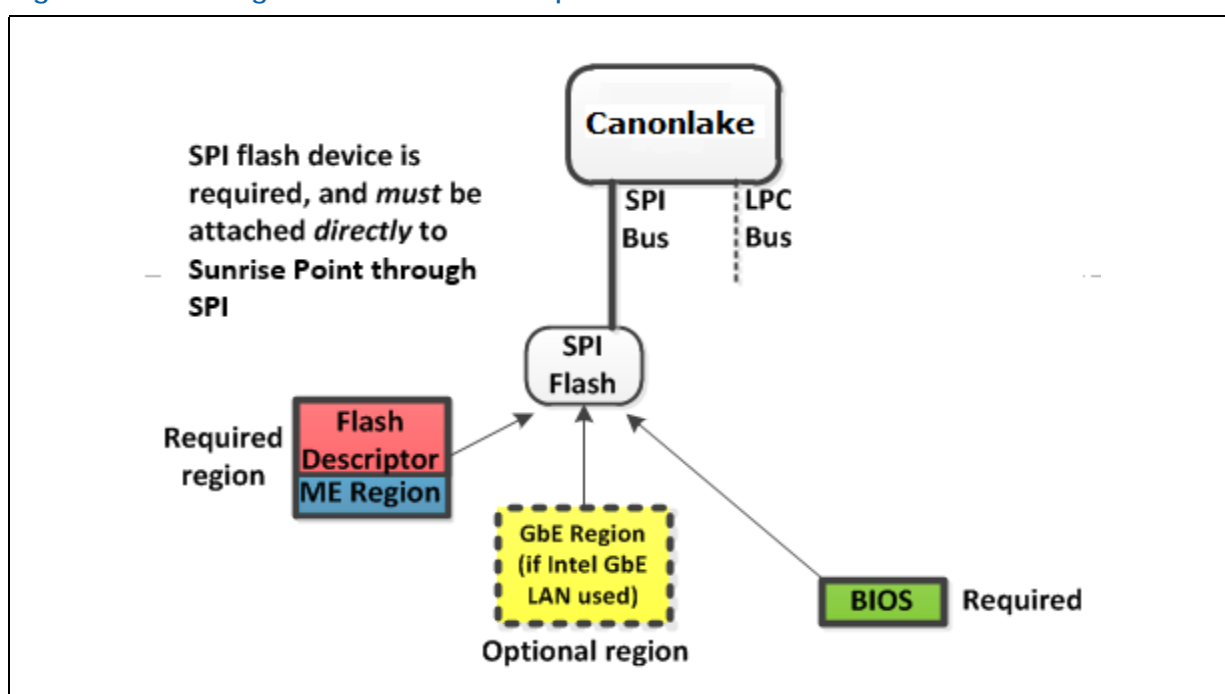


Figure A-2. Configuration “B” — Mobile Only

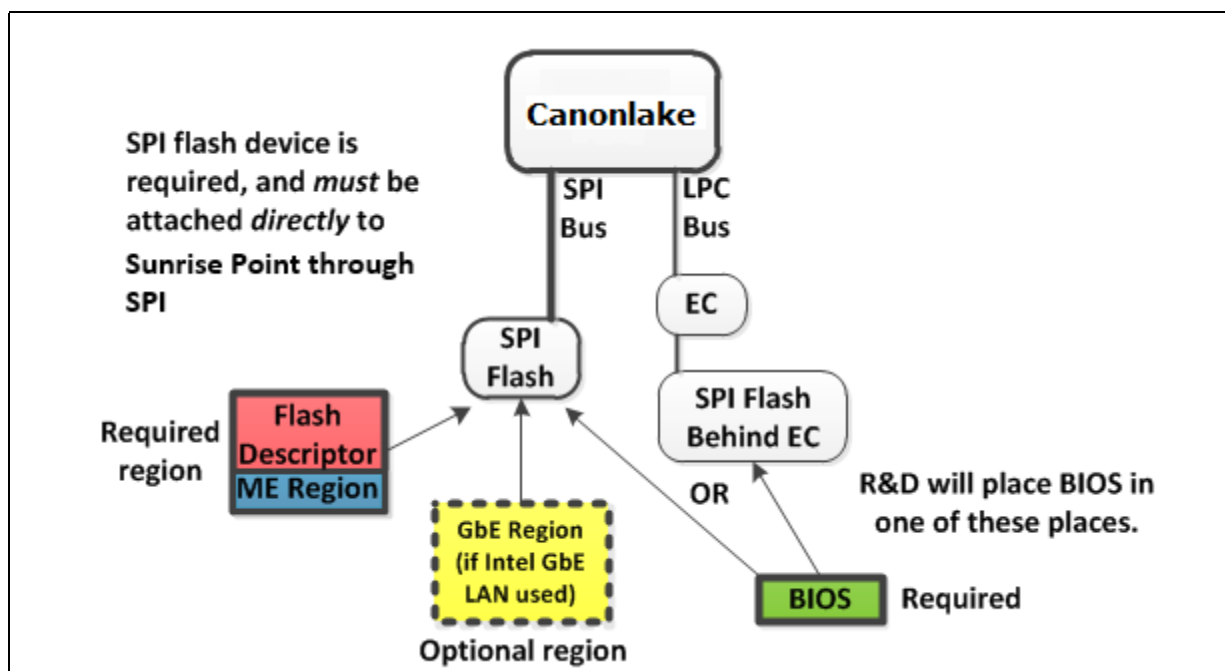


Figure A-3. Configuration “C” — Desktop/Server/Workstation Only

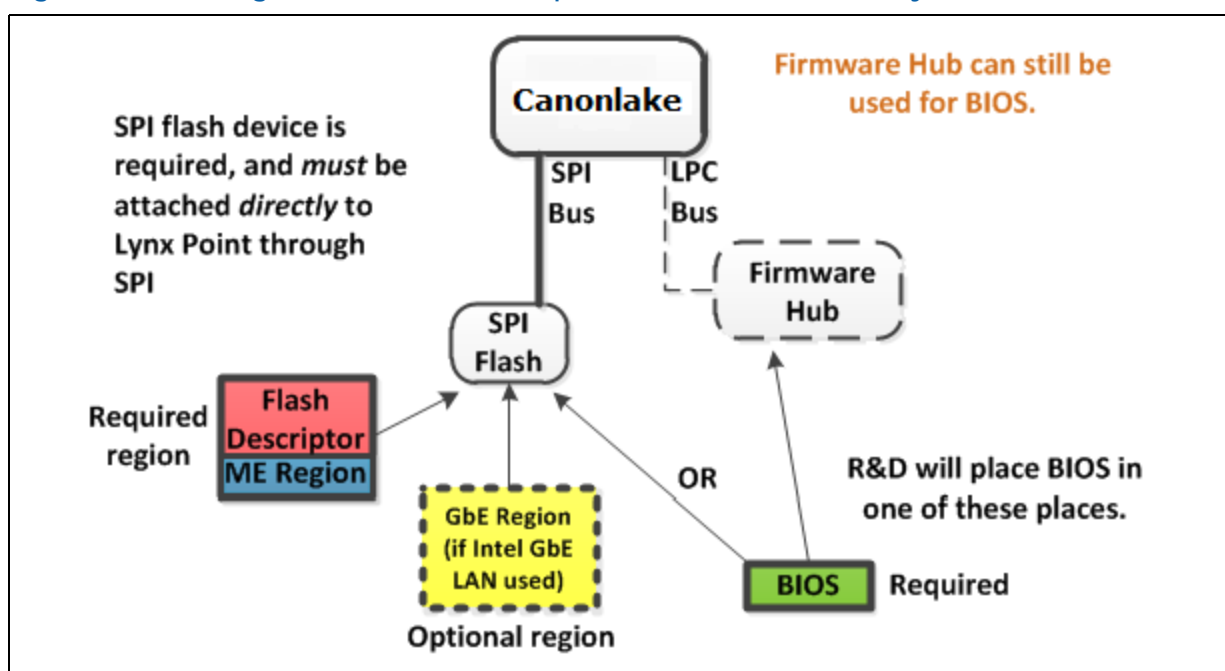
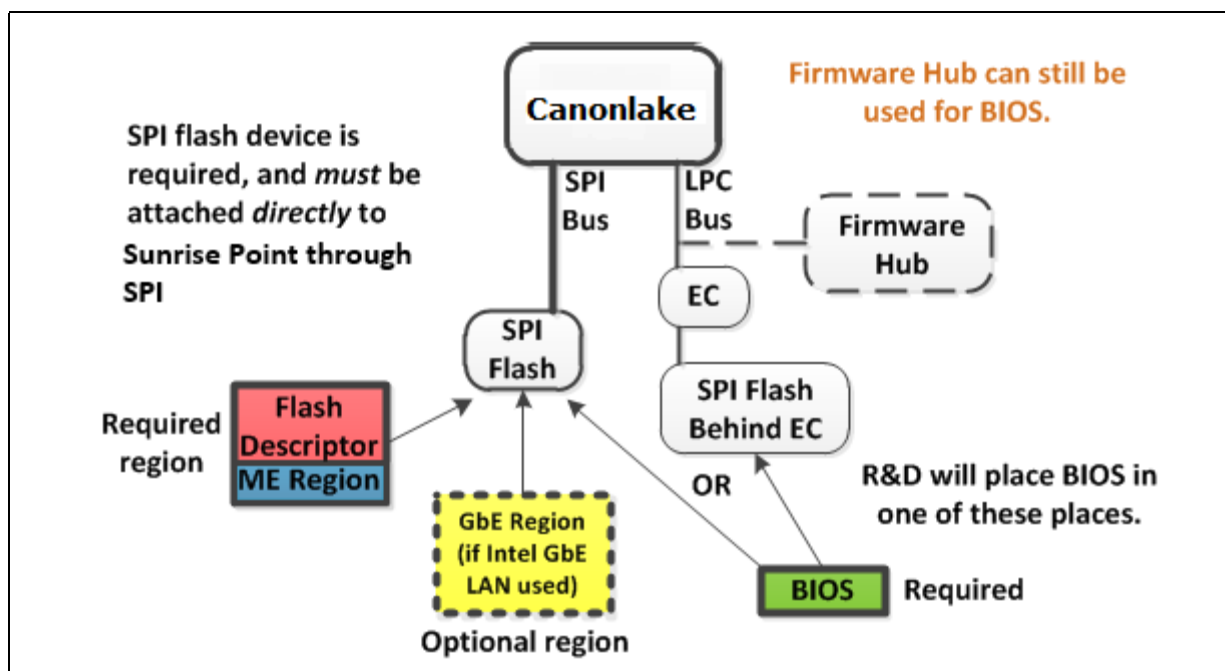


Figure A-4. Configuration “D” — Mobile Only



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B Appendix — Intel® ICCS SKU Support Matrix

The following table describes ICC features supported for specific PCH SKU, clock range (maximum and minimum), spread mode supported by Cannon Lake-H SKUs.

Note: Please refer to Cannon Lake-H/LP Platform Controller Hub (PCH) External Design Specification (EDS) for details about Cannon Lake-H/LP Chipset Clock architecture

In below tables,

Min = Clock Div Max (minimum allowed frequency)

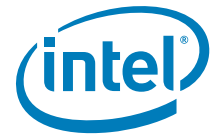
Max = Clock Div Min (maximum allowed frequency)

B.1 Intel® ICCS SKU Matrix - CNP-H

Note: ICC SKU is divided into 2 categories: Basic and Enhanced. Mark "x" indicates category supported by PCH SKU.

Table B-1. Intel® ICCS SKU Matrix - CNP-H

PCH SKU	Basic	Enhanced
Canonpoint H		x
Features Supported	Standard Clock Configuration	Standard Clock Configuration Adaptive Clock Configuration
Pre-Defined ICC profile supported	Standard	Standard Adaptive
Clock Range Supported	[Min-Max] = 100 MHz.	BCLK [Min-Max] = 98 - 100 MHz.
SSC Supported	Down SSC: 0 - 0.5%	Down SSC: 0 - 0.5%



B.2 How to configure CLKREQ# parameters

Below table provides guideline on how to configure CLKREQ# parameters for SRC[0:15] output clocks depending on dynamic control of the clock via CLKREQ is required or not.

Configuring CLKREQ# and assigning GPIO depends on how CLKOUT_SRCx configuration via FIT is done (Enabled or Disabled) and if CLKREQ is required or not.

Note: In below table, Mask Control CLKREQ cannot be configured via FIT Tool. It's configured to default once by FW during cold boot and bios can set/clear bits anytime.



C Appendix — Boot Guard Configuration

C.1 Boot Guard Profiles

The following table describes the profiles available for Boot Guard Configuration.

Table C-1. Profile Description

Index	Profile Name	F	V	M	ENF	PBE	Description
0	Boot Guard Profile - No_FVME	0	0	0	00	0	This configuration will invoke Boot Guard during boot with neither Verification nor Measurement. For platforms with all the required Boot Guard components but do not wish to enable Boot Guard boot block verification protection.
1	Boot Guard VE	0	1	0	01	1	When Verification is desired but if verification fails the platform will continue to boot with the unverified IBB for a short period, to allow remediation.
2	Boot Guard VME	0	1	1	01	1	When Verification and Measured are desired and the asset protection is provided by both TPM protection and a timed remediation period.
3	Boot Guard VM	0	1	1	00	1	When Verification and Measured are desired and the asset protection is provided by TPM protection.
4	Boot Guard FVE	1	1	0	11	1	Strict Verification enforcement.
5	Boot Guard FVME	1	1	1	11	1	Strict Verification and Measured enforcement. Prevents unverified IBB from running.

C.2 Enforcement Policies

Table C-2. Enforcement Policy Description

Error Enforcement Policy (ENF)	Enforcement Mode Name	Description
0	Unrestricted Mode	Infinite time before shutdown – don't shutdown the platform, let everything run normally.
1	Remediation Mode	30 minutes before shutdown – enough time to remediate the system, e.g. update BIOS or other data on flash via host tools.
2	Reserved	
3	Restricted Mode	0 minutes before shutdown – instant shutdown policy.



C.3 OEM Profile Parameters

Table C-3. Profile Parameters Description

Parameter	Description	Settings
Force Boot Guard ACM Enabled (F)	Force Boot Guard Boot determines if the platform starts the Force Boot Guard Boot timer. If it successfully starts it indicates success. When the Force Boot Guard timer stops, it starts the Protect Bios Environment timer, if indicated by the boot policy restrictions. Anchor ACM then jumps to the Initial Boot Block (IBB) with the Force Boot Guard Boot time stopped and the Protect BIOS enable timer running.	false - Allow the CPU to jump to the legacy reset vector if the Boot Guard Module cannot be successfully loaded. (default) true - Force the Boot Guard ACM to execute.
Verified Boot Enabled (V)	Boot Guard cryptographically verifies the platform Initial Boot Block (IBB) using the boot policy key. On successful verification, Boot Guard executes Initial Boot Block (IBB) using the boot policy key. If the verification fails, Anchor signals or enters Remediation.	false - Platform does not perform verified boot (default) true - Platform performs verified boot
Measured Boot Enabled (M)	Boot Guard measures the Initial Boot Block (IBB) into the TPM. Boot Guard perform no verification that the IBB is correct or from the platform manufacturer. The Skylake implementation of Boot Guard will support measurements into TPM or Intel's Platform Trust Technology.	false - Platform does not perform measured boot (default) true - Platform performs measured boot
Protect Bios Environment Enabled (PBE)	Platform manufacturer may want Initial boot block to be protected between verification/ measurement and execution from attacks on buses and non-CPU components. Boot Guard accomplishes this by allowing the initial boot block to be verified and executed in LLC in NEM if PBE is enabled.	false - Take no actions to control the environment during execution of the BIOS components (default) true - Takes actions to control the environment during the execution of the BIOS components.
Error Enforcement Policy (ENF)	Boot Guard invokes the Enforcement Policy when a fatal error is encountered. The action taken by ENF is determined by the OEM set persistent policies. Like, <ul style="list-style-type: none"> • Allowing platform to continue to boot • Immediate Shutdown • Shutdown with Timeout intervals When the ENF logic is invoked, PTT or TPM also disconnects.	See Section C-2 for details.



D Appendix — Intel® Platform Trust Technology

D.1 Intel® Platform Trust Technology

The following table describes the platform configurations supported by Intel® Platform Trust Technology.

Note: Intel® Platform Trust Technology does not support the full TPM functionality requirements and should not be used for Intel® vPro™ based platforms.

Table D-1. Intel® Platform Trust Technology Configuration table

Configuration	Platform Protection> Intel® PTT Configuration Intel® PTT Initial power up state	Platform Protection> Intel® PTT Configuration Intel® PTT Supported	Platform Protection> Intel® PTT Configuration Intel® PTT Supported [FPF]	Description
Intel® PTT Permanently Disabled in HW via FPF	Disabled	No	No	After the End of Manufacturing command, this setting will permanently set into the FPFs contained in the MCP. If disabled, the specific MCP can never be enabled for Intel® PTT.
Intel® PTT Permanently Disabled in base firmware image	Disabled	No	Yes	This setting allows Intel® PTT to be set to disabled without disabling the MCP FPFs. This is the recommended option to permanently disable Intel® PTT on a platform.
Intel® PTT Ship State Disabled in base firmware image	Disabled	Yes	Yes	Intel® PTT initially shipped in disabled mode, can be enabled by BIOS command.
Intel® PTT Enabled	Enabled	Yes	Yes	This is the recommended option to enable Intel® PTT on a platform.



E Appendix — Integrated Sensor Hub (ISH) Public Key Settings

The following table describes the configuration matrix required for ISH configuration for the Intel® FIT tool. Please see System Tools User Guide within ME kit, Manufacturing Test with Intel® Management Engine (Intel® ME) Firmware 12 and Intel® Integrated Sensor Solution on Cannon Lake Mobile, Cannon Lake Desktop, (CDI # WIP) for additional details.

CLSMNF = Close Manufacturing switch used with Intel® Flash Programming Tool (FPT)

PV = Production Version

For additional information on FPT see System Tools User Guide included with ME kit under system tools folder.

Table E-1. ISH Public Key Settings

Firmware	MCP	FPF Automatic Commit	FPF MEI command after CLSMNF (Yes/No)	FPF MEI command before CLSMNF (Yes/No)
Pre-production	Production	No	No - Not a valid combination	No - Not a valid combination
Production (PV not set)	Pre-production	No	Yes	No
Production (PV not set)	Production	No	Yes	No
Pre-production	Pre-production	No	Yes	No
Production (PV not set)	Production	Yes	No	No

Note: The Intel® FIT allows integration of binary files within Integrated Sensor Hub section under ISH Image and ISH Data. The Intel® FIT does not generate or create the required files. The table above lists configuration combinations that can be used.

