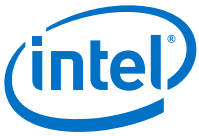
Intel® Quark SoC X1000 Software

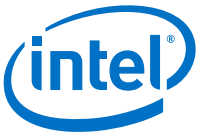
Package Version: 0.8.0

Release Notes

06 November 2013

Document Number: 521235, Revision: 0.8





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Revision History

Date	Revision	Description
06 November 2013	0.8	Updates for software release 0.8.0 are indicated with changebars.
25 July 2013	0.6	Updates for software release 0.6.0 are indicated with changebars.
20 June 2013	0.5	Initial version of document.

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1.0 Description of Release

This document describes extensions and deviations from the release functionality described in the documentation set.

Intel® Quark SoC X1000 (formerly codenamed Clanton) supports the following Form Factor Reference Design boards (FFRDs):

- Customer Reference Boards:
  - Kips Bay (Fab C, green PCB)
  - Galileo (Fab D, blue PCB)
- Intel® Quark SoC X1000 Industrial/Energy Reference Design, “Cross Hill”
- Intel® Quark SoC X1000 Transportation Reference Design, "Clanton Hill"
- Intel-only System Validation Platform (SVP), “Clanton Peak”

For instructions on building and running the release software, see the Intel® Quark SoC X1000 BSP Build Guide.

These release notes also include known issues with third-party or reference platform components that affect the operation of the software.

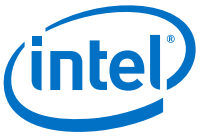
1.1 Features

New features in this release include:

- Thermal driver is supported.
- Accelerometer LIS331DLH Driver for Clanton Hill
- Audio Subsystem Driver for Clanton Hill
- Analog AD7298 ADC Driver for Clanton Hill
- HE910 3G Driver
- WiFi Driver:
  - Intel Centrino Wireless-N 135 (also provides Bluetooth via USB)
  - Intel Centrino Advanced-N 6205 (Dual Band WiFi, 2.4 and 5GHz)

1.1.1 BIOS/Firmware

- Secure boot using Root Of Trust ROM when using a secure SKU Intel® Quark SoC X1000
- Boot device selection:
  - SD boot
  - USB (OHCI/EHCI) boot
  - Payload boot (application in legacy SPI flash)
  - EFI Shell



- UEFI2.3.1 compliant
- ACPI 5.0

1.1.2 Bootloader

- Secure boot Root of Trust when using a secure SKU Intel® Quark SoC X1000
- Isolated Memory Region (IMR) protection of compressed Linux* kernel before executing kernel
- Bootloader executed as payload from SPI flash
- Ability to load kernel and root-filesystem from SPI flash
- U-Boot memory tests ported and included

1.1.3 Operating System (OS)

- IMR protection of kernel, text, and data sections
- Kernel logic to parse platform data specific to Clanton Peak, Industrial/Energy Reference Design (Cross Hill), and Transportation Reference Design (Clanton Hill)
- Ethernet
  - Two Ethernet interfaces: Clanton Peak, Industrial/Energy Reference Design (Cross Hill), and Transportation Reference Design (Clanton Hill)
  - One Ethernet interface: Kips Bay and Galileo
- I2C interface
- GPIOs fully programmable as input or output from kernel gpiolib
- SPI master interface x 2
- USB OHCI/EHCI port x 2
- USB device
- SD master interface
- ECC updates configurable at runtime through /sysfs interface (formerly /proc)
- Small embedded user-space busybox based system < 2 megabytes compressed

1.1.4 OpenOCD

- OpenOCD source patch
- GDB* server and Telnet* server support
- Halt/Step/Resume CPU
- CPU register access
- Memory access
- IO Access (via OpenOCD command tool, not via GDB)

1.2 Limitations

The software package has the following limitations:

- S3 support is implemented but not validated. It is not recommended for use in this release.
- Legacy SPI flash recovery not implemented.
- Network boot not supported.

- Legacy OS boot not supported. Only UEFI-aware OS supported.
- I^2C* not supported in this release.
- eSRAM disabled in this release.
- 1588 time-stamping protocol not supported in this release.
- DMA UART driver not supported in this release.
- Watchdog timer not enabled.
- OpenOCD - This is an early release which has not been formally validated. There are known issues which will be fixed in later releases. This release of OpenOCD is provided as-is.
  - — OpenOCD - Breakpoints not supported in this release.
  - — OpenOCD - Resetbreak not supported in this release.
  - — OpenOCD - Source level debug of UEFI not supported in this release.

1.3 Component Versions

1.3.1 Packages

clanton_linux_v3.8.7+v0.8.0.tar.gz
grub-legacy_5775f32a+v0.8.0.tar.gz
meta-clanton_v0.8.0.tar.gz
Quark-EDKII-volumes_v0.8.0.tar.gz
sha1sum.txt
spi-flash-tools_v0.8.0.tar.gz
sysimage_v0.8.0.tar.gz

1.3.2 BIOS/Firmware Version

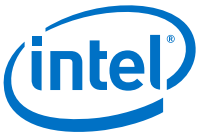
Development Platform	Version
Clanton Peak SVP	0.8.0

1.4 Related Documentation

The documents in Table 1 provide more information about the software in this release.

Table 1. Related Documentation

Document Name	Reference Number
Intel® Quark SoC X1000 Software Release Notes (this document)	521235
Intel® Quark SoC X1000 Board Support Package (BSP) Build Guide https://communities.intel.com/docs/DOC-21882	329687
Clanton Software BSP Programmer's Reference Manual	521233
Clanton Software Trusted Boot Programmer's Reference Manual	521232
Intel® Quark SoC X1000 Developer's Manual https://communities.intel.com/docs/DOC-21826	329679
Intel® Quark SoC X1000 Hardware Reference Manual https://communities.intel.com/docs/DOC-21825	329678
Using OpenOCD and Source Level Debug on Intel® Quark SoC X1000 Application Note	528591



2.0 Known Issues

Table 2. Summary of Software Open Issues

#45992 - No serial output when building with Ubuntu
#46834 - UART interrupt handler not restored after resume from S3
#47110 - Issues writing to certain MMC cards
#48226 - eSRAM driver cannot map code required to do mapping
#48766 - Unloading GPIO drivers not supported
#55498 - Ethernet DHCP only works if a DHCP server is available at boot time
#58381 - Attempting to unload mmc_block driver which is in use causes console to freeze
#58453 - pch_udc driver crash on reload
#59100 - Reboot on non-secure boot issue (Clanton Hill)
#59102 - Secure boot fail to boot when using SD second partition as mounted root
#59104 - Kernel warning on secure SKUs
#59170 - USB related error message showing up early in EDKII boot stage (Clanton Hill)

2.1 #45992 - No serial output when building with Ubuntu

Title	No serial output when building with Ubuntu
Reference #	#45992
Description	This problem is still being investigated. Some users have reported no output at all on the serial port even after a flash image build that appeared to be successful. While no root cause could be isolated yet it seems Ubuntu was used to build every time.
Implication	The system does not seem to boot.
Resolution	Avoid Ubuntu and stick to Debian.

2.2 #46834 - UART interrupt handler not restored after resume from S3

Title	UART interrupt handler not restored after resume from S3
Reference	#46834
Description	Suspected race condition between 8250 restore code and interrupt handler.
Implication	Following resume from S3 8250 will be in polled - not interrupt mode
Resolution	Do not enter into S3

2.3 #47110 - Issues writing to certain MMC cards

Title	Issues writing to certain MMC cards
Reference	#47110
Description	Write errors have been observed using a Transcend TS1GRMMC4 1GB Mobile MMC card.
Implication	Write errors will occur upon attempting to write to the MMC card.

Title	Issues writing to certain MMC cards (Continued)
Resolution	Use a different MMC or SD card. SD cards are recommended for card based mass storage use on Clanton.

2.4 #48226 - eSRAM driver cannot map code required to do mapping

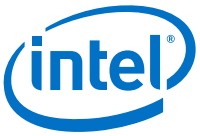
Title	eSRAM driver cannot map code required to do mapping
Reference	#48226
Description	eSRAM driver depends on code internally and externally in order to map things into eSRAM. During the mapping process, over-layed sections of DRAM become NULL for a time.
Implication	It is not possible to eSRAM overlay code to itself be overlayed.
Resolution	Do not try to overlay any of the following kernel symbols intel_cln_esram_* intel_cln_sb_* memcpy spin_lock spin_unlock spin_lock_irqsave spin_unlock_irqrestore pci_read_config_dword pci_write_config_dword

2.5 #48766 - Unloading GPIO drivers not supported

Title	Unloading GPIO drivers not supported
Reference	#48766
Description	The board setup code registers GPIO-dependent platform devices upon GPIO drivers loading (gpio-sch and intel-cln-gip). If the GPIO drivers are then unloaded and reloaded, the board setup code will register these platform devices once more.
Implication	One or more copies of the same platform device will get registered, and consequently their platform driver will fail probing.
Resolution	Do not unload GPIO drivers.

2.6 #55498 - Ethernet DHCP only works if a DHCP server is available at boot time

Title	Ethernet DHCP only works if a DHCP server is available at boot time
Reference	#55498
Description	The DHCP client software provided by default tries to configure Ethernet only once at boot time and never attempts it later.
Implication	No TCP/IP network connectivity will be available unless the Ethernet port is connected to a DHCP server at boot time.
Workaround	If a serial console is available, then another attempt to get a DHCP lease can be performed with the following command: /etc/init.d/networking restart In case of further external connectivity issues, it is safe to run this command as many times as required or desired.



2.7 #58381 - Attempting to unload mmc_block driver which is in use causes console to freeze

Title	Attempting to unload mmc_block driver which is in use causes console to freeze
Reference	#58381
Description	When SD/MMC mass storage device is mounted and user executes 'modprobe -r mmc_block' then existing console hangs, kernel waits for mass storage device to get unmounted.
Implication	Existing console not usable until board rebooted or mass storage device unmounted from other console.
Workaround	Unmount mass storage device first, then unload mmc_block driver.

2.8 #58453 - pch_udc driver crash on reload

Title	pch_udc driver crash on reload
Reference	#58453
Description	When ehci_pci, ehci_hcd, pch_udc, g_serial drivers are loaded and user executes: modprobe -r g_serial modprobe -r pch_udc modprobe pch_udc then pch_udc driver crashes. Problem seen on Galileo board.
Implication	Driver unusable until board rebooted.
Workaround	Unload first ehci-pci driver to revert to USB1.1, then g_serial and pch_udc drivers can be unloaded or reloaded.

2.9 #59100 - Reboot on non-secure boot issue (Clanton Hill)

Title	Reboot on non-secure boot issue (Clanton Hill)
Reference	#59100
Description	Reboot command from Linux is not supported on Clanton Hill platforms fitted with SKU4 (Non-Secure) SoC.
Implication	Upon issuing "reboot" command from Linux prompt, the platform will not reboot. It will appear to do so at first but then not boot through BIOS.
Workaround	Remove "reboot=efi,warm" from grub.conf. Issue "e" command at Grub menu and remove "reboot=efi,warm".

2.10 #59102 - Secure boot fail to boot when using SD second partition as mounted root

Title	Secure boot fail to boot when using SD second partition as mounted root
Reference	#59102
Description	It is not possible to boot release 0.8.0 non-interactively from a "raw" Linux partition on SD. To boot interactively, just insert your partitioned mass storage device, boot from default entry and when it fails and drops to shell execute: exec switch_root -c /dev/console /dev/mmcblk0p2 /sbin/init (for second partition of SD card) or exec switch_root -c /dev/console /dev/sda2 /sbin/init (for second partition of USB stick)

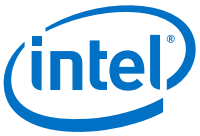
Title	Secure boot fail to boot when using SD second partition as mounted root
Implication	Kernel waits forever for MMC device that never becomes available.
Workaround	Workaround alternatives include: • reconfigure the Linux kernel to build the SD (resp. USB) drivers in (not modules) • rebuild the initramfs with some added logic (not clear what yet) • boot interactively

2.11 #59104 - Kernel warning on secure SKUs

Title	Kernel warning on secure SKUs
Reference	#59104
Description	Grub allocates 4kB-aligned pages for the compressed initrd. Under secure boot, it also places the signature header in the first 1kB of the allocated area. From the point of view of the kernel, this operation makes the initrd image not 4k-page aligned. Upon releasing the compressed initrd memory region, the kernel detects an unaligned initrd address and it throws the following warning: [13.461525] WARNING: at /build/mherber2/v0.8.0-rc3/build/meta-clanton_v0.8.0-rc3/yocto_build/tmp/work/clanton-poky-linux-uclibc/linux-yocto-clanton/3.8-r0/linux/arch/x86/mm/init.c:344 free_init_pages+0x55/0x140() [13.482555] Modules linked in: [13.485989] Pid: 1, comm: swapper Not tainted 3.8.7-yocto-standard #1 [13.493263] Call Trace: [13.496053] [<c102b6ef>] warn_slowpath_common+0x5f/0x80 [13.502145] [<c1023115>] ? free_init_pages+0x55/0x140 [13.507893] [<c1023115>] ? free_init_pages+0x55/0x140 [13.513790] [<c102b72d>] warn_slowpath_null+0x1d/0x20 [13.519549] [<c1023115>] free_init_pages+0x55/0x140 [13.525266] [<c14751ed>] free_initrd_mem+0x1b/0x1d [13.530886] [<c146919b>] free_initrd+0x71/0x8a [13.535973] [<c14692e1>] ? maybe_link.part.6+0xed/0xed [13.541973] [<c14694df>] populate_rootfs+0x1fe/0x258 [13.547625] [<c12e42f3>] ? printk+0x38/0x3a [13.552556] [<c1482cff>] ? pci_apply_final_quirks+0xf2/0x111 [13.558992] [<c14692e1>] ? maybe_link.part.6+0xed/0xed [13.564976] [<c100121a>] do_one_initcall+0x10a/0x150 [13.570781] [<c1467a6b>] kernel_init_freeable+0x106/0x1a0 [13.576921] [<c1467457>] ? do_early_param+0x7a/0x7a [13.582613] [<c12e0dfb>] kernel_init+0xb/0xd0 [13.587592] [<c12ea6fb>] ret_from_kernel_thread+0x1b/0x30 [13.593854] [<c12e0df0>] ? rest_init+0xb0/0xb0 [13.598982] ---[end trace 7b4a990828805f78]---
Implication	The first compressed initrd page is not freed up by the kernel. This results in a 4kB memory leak.
Workaround	Modify the Grub code to make the compressed initrd page-aligned.

2.12 #59170 - USB related error message showing up early in EDKII boot stage (Clanton Hill)

Title	USB related error message showing up early in EDKII boot stage (Clanton Hill)
Reference	#59170



Title	**USB related error message showing up early in EDKII boot stage (Clanton Hill) (Continued)**
Description	USB Error reported on Clanton Hill during BIOS boot. UsbCreateDesc: met mal-format descriptor UsbParseInterfaceDesc: failed to create endpoint(index 0) UsbParseConfigDesc: failed to parse interface setting UsbBuildDescTable: failed to parse configure (index 0) UsbEnumerateNewDev: failed to build descriptor table - Device Error
Implication	Functionality is not impacted, error messages can be ignored.
Workaround	None.

3.0 Resolved Issues

This section contains issues that have been resolved in this release.

Table 3. Summary of Software Resolved Issues

#37819 - Yocto's bitbake is non-deterministically trying to link GRUB to ncurses
#48519 - Linux thermal driver spuriously shut down system after S3 resume

3.1 #37819 - Yocto's bitbake is non-deterministically trying to link GRUB to ncurses

Title	Yocto's bitbake is non-deterministically trying to link GRUB to ncurses
Reference #	#37819
Description	Depending on the number of threads assigned to bitbake, GRUB will be configured either with or without ncurses.
Implication	Since our current GRUB code does not support ncurses this can make the entire Yocto build fail.
Resolution	One possible fix is to add "--without-curses" inside the EXTRA_OECONF variable in the following file: meta-clanton-bsp/recipes-bsp/grub/grub_0.97.bb GRUB package has been configured with explicit dependencies and is no longer linked to ncurses.

3.2 #48519 - Linux thermal driver spuriously shut down system after S3 resume

Title	Linux thermal driver spuriously shut down system after S3 resume
Reference #	#48519
Description	Following resume from S3 Linux thermal driver will shut down the system. Value read back from temperature sensor indicates to system software a temperature threshold has exceeded critical levels.
Implication	Board will reset
Resolution	Disable thermal polling prior to entry into S3. echo disabled > /sys/class/thermal/thermal_zone0/mode

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