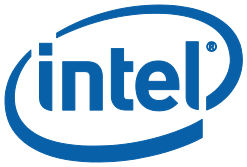

Intel® Serial IO Driver

User Guide and Release Note

January 2018

Revision 1.5

Intel Confidential

Document Number: XXXXX

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Revision History

Document Number	Revision Number	Description	Revision Date
N/A	0.70	Pre-Alpha Release	September 2015
N/A	0.75	ES1 SW Engineering Release	November 2015
N/A	0.80	Beta Release	February 2016
N/A	0.90	Pre-QS Release	May 2016
N/A	0.95	QS Release	May 2016
N/A	1.0	PV Release	June 2016
N/A	1.1	HF1 Release	July 2016
N/A	1.2	PV Release – Driver whql'ed for RS1	August 2016
N/A	1.3	HF1 Release	April 2017
N/A	1.4	HF1 Release v4	July 2017
N/A	1.5	PV Release Driver whql'ed for RS3	January 2018

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1 Introduction

1.1 Purpose and Scope of Document

This document provides installation instructions and general usage of the driver as well as release information, such as release kit summary, important notes, resolved issues and known issues. This document is intended to help OEM and ODM customers setup their platform as they prepare for validation and debug.

Intel® Serial IO Drivers supports the following operating system and platform:

Operating System:

- Windows* 10 RS3 Operating System (64-bit client version)

Hardware Requirement:

- Apollo Lake PCH platform.

1.2 Acronyms and Terminology

Term	Description
ACPI	Advanced Configuration and Power Interface
AOAC	Always On Always Connected
DMA	Direct Memory Addressing
GPIO	General Purpose IO
I2C	Inter-Integrated Circuit, generically referred to as "two-wire interface"
LPSS	Low Power Sub System (old name for Intel® Serial IO, no longer used)
LTR	Latency Tolerance Reporting
MMIO	Memory Mapped I/O
PIO	Programmed I/O
SPI	Serial Peripheral Interfaces Bus. A synchronous serial data link standard that operates in full duplex mode.
UART	Universal asynchronous receiver/transmitter

1.3 Reference Documents

Document	Location
Apollo Lake SoC External Design Specification (EDS)	CDI/IBL: 557555 (Volumes 1 of 4) 557556 (Volumes 2 of 4) 557557 (Volumes 3 of 4) 559360 (Volumes 4 of 4)
Apollo Lake Runtime D3 (RTD3) Hardware and Software Recommendations – Design Guide – Rev. 0.7	CDI/IBL: 558814
Apollo Lake Platform Design Guide (PDG)	CDI/IBL: 557775
Apollo Lake and Broxton Platform Intel Architecture Firmware Specification- BIOS Specification	CDI/IBL: 559810 (Volumes 1 of 2) 559811 (Volumes 2 of 2)

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2 Release Kit Summary

2.1 Release Kit Details

Kit Name: Intel(R) Serial IO Driver

Version:

- Windows* 10: Serial IO Driver – 30.100.1750.1
  - ialpss2_gpio2_bxt_p
  - ialpss2_i2c_bxt_p
  - ialpss2_spi_bxt_p
  - ialpss2_uart2_bxtp

2.2 Kit Contents

The contents of this release kit include:

- \x64
  - SetupSerialIO.exe
  - WiXLicenseNote.txt
  - Readme file
  - \Production\Windows10-x64
    - Driver INF files
    - Driver CAT files
    - Driver SYS files

- Intel Software License Agreement
- Bring Up Guide and release note.pdf

Note: Drivers will not be installed for controllers that are not enabled by BIOS.

3 Driver Installation

Note: A supported Operating System must be installed prior to the installation of the Intel® Serial IO Driver.

There are 3 different methods to install the Intel® Serial Driver for this release:

1. Driver Installation via Installer
2. Silent Driver Installation via Installer
3. Manual driver installation via INF

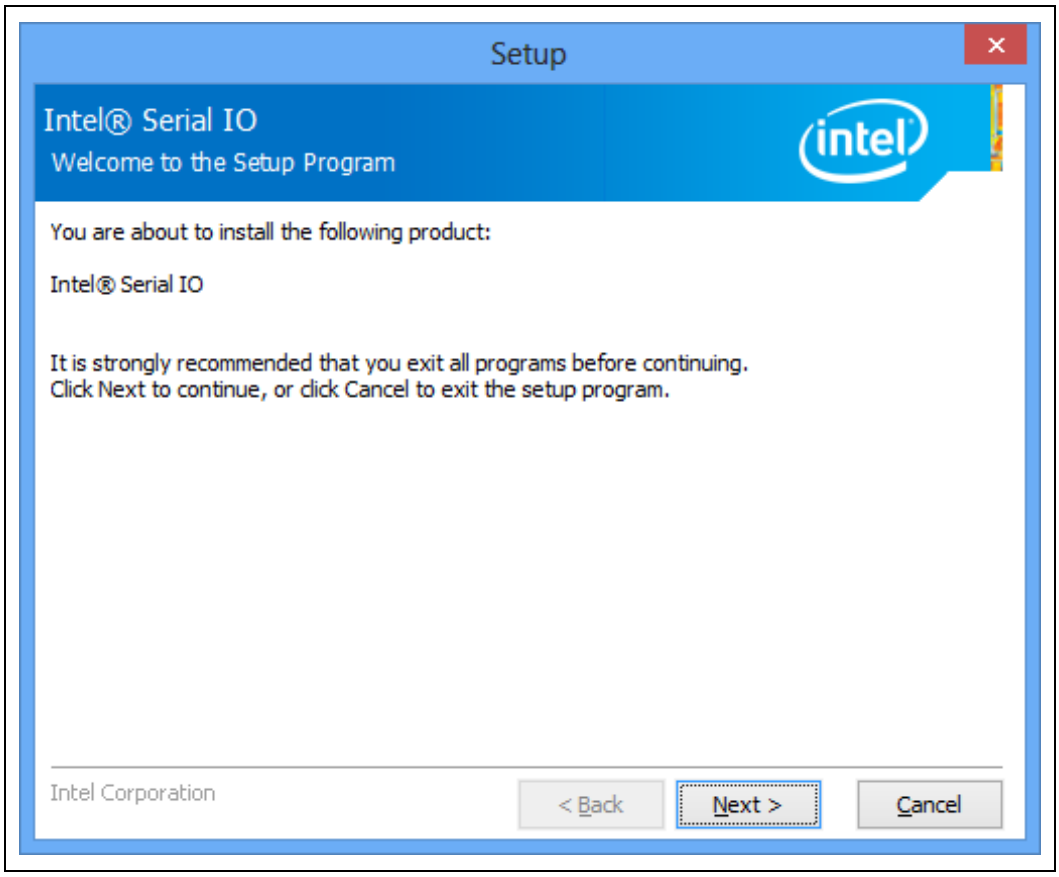
3.1 Driver Installation via Installer

Follow the steps listed below for driver installation via installer:

1. Copy and unzip the Intel® Serial IO Driver onto the Platform under test.
2. Locate the "SetupSerialIO.exe" file.
3. Right click on the executable and select 'Run as administrator' option from the menu to start the installer and then click on 'Yes' button in User Account Control pop-up window.

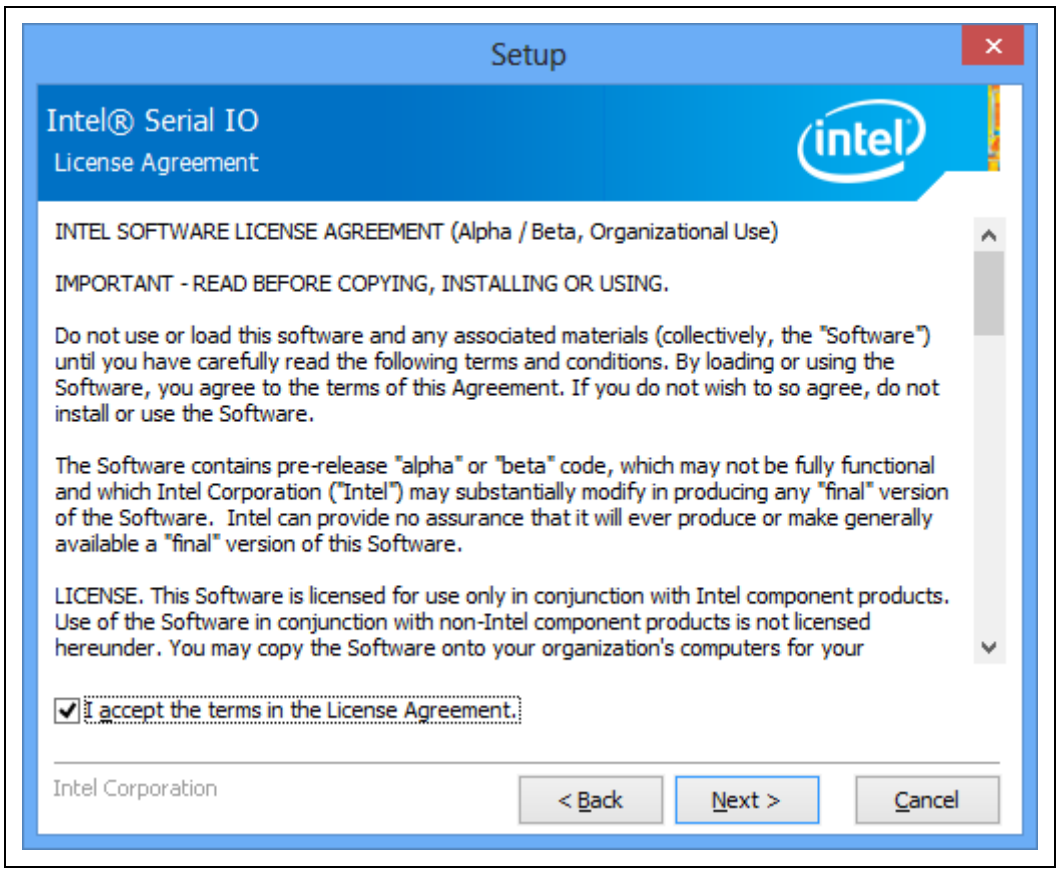
4. You should see welcome screen with component details as shown in Figure 1. Click 'Next >' button to continue the installation.

Figure 1. Welcome Screen



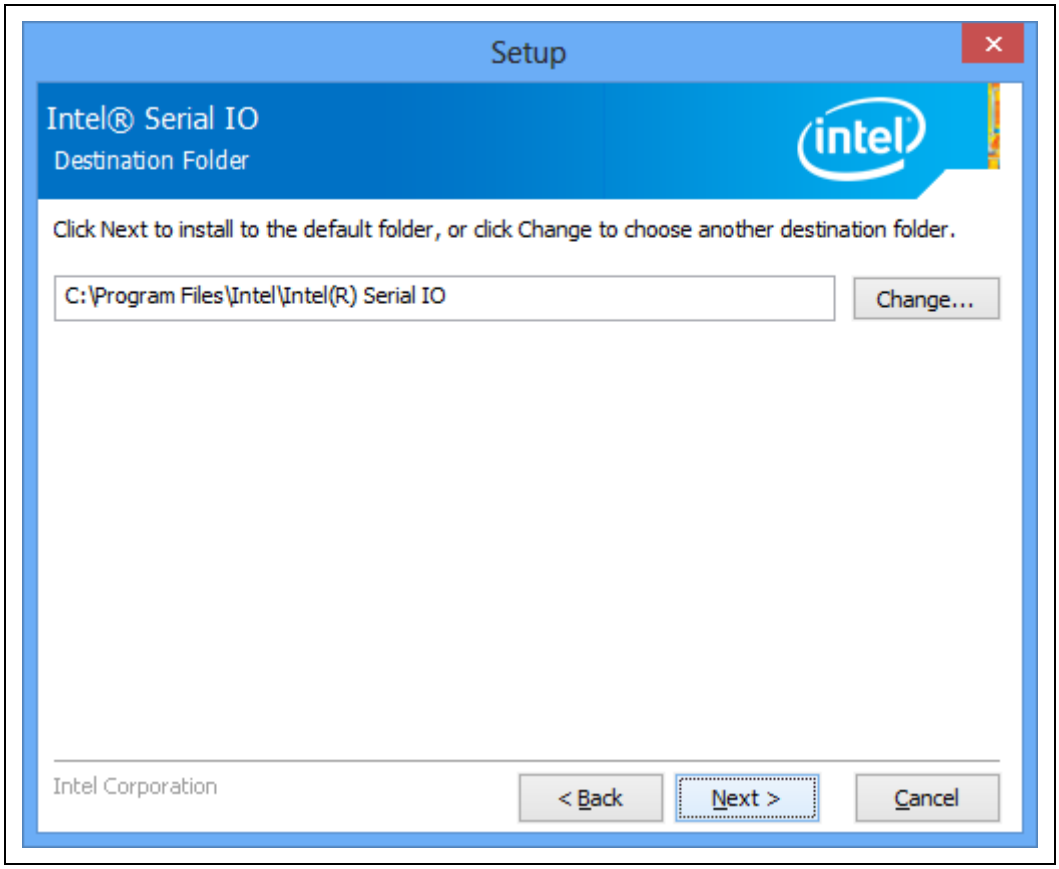
5. Next, you should see license agreement screen as shown in Figure 2. Please review the license agreement and if you accept the license terms then check the check-box on "I accept the terms in the license Agreement" and click on the "Next >" button to continue the installation.

Figure 2. License Agreement



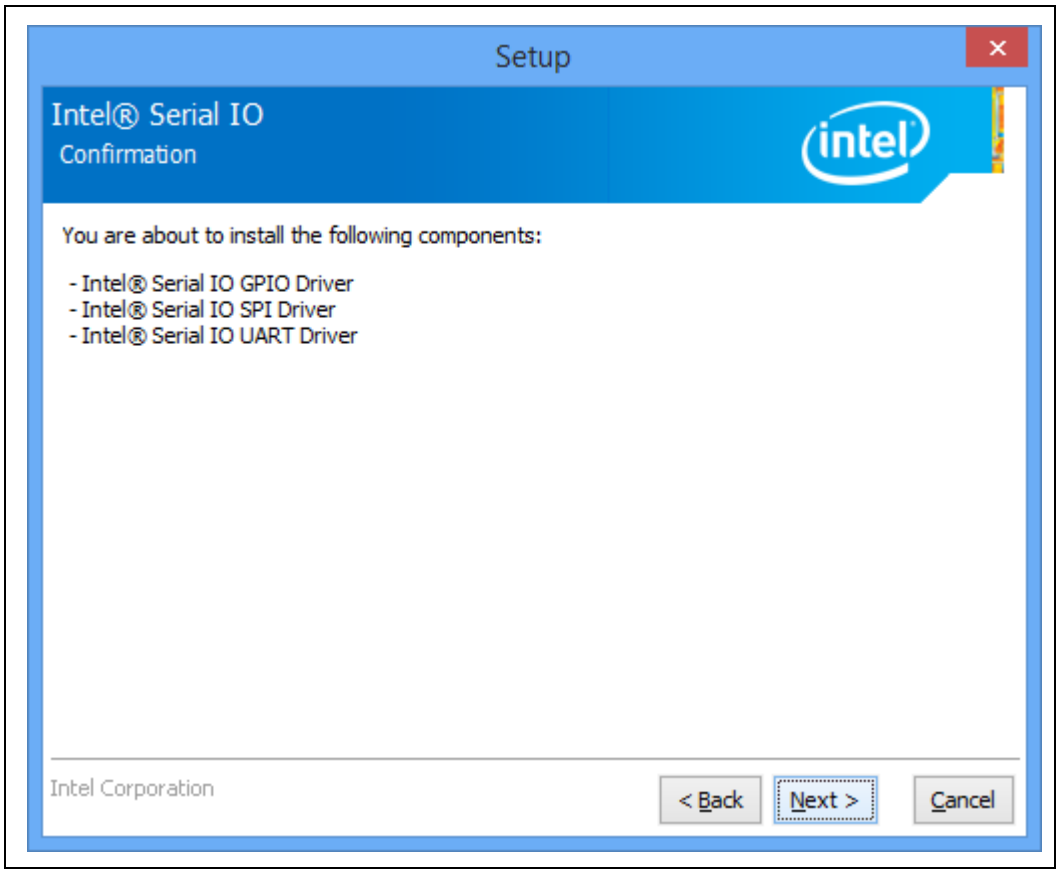
6. Next, you can select the folder location where the driver will be installed. By default, the driver will be installed in c:\program Files\Intel\Intel(R) Serial IO. Click on "Next >" button to continue installation.

Figure 3. Driver installs destination folder location



7. Next, a list of driver components that will be installed by the installer is displayed. Click on 'Next >' button to continue.

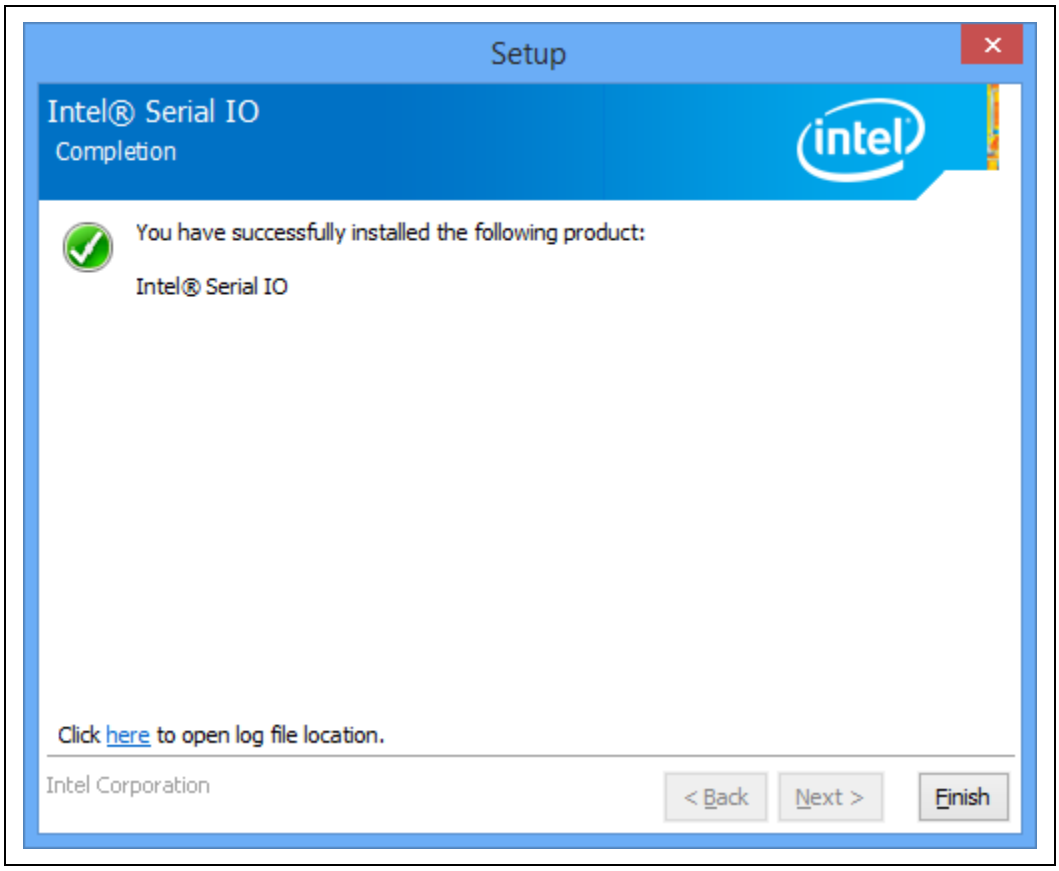
Figure 4. Driver components



Note: Drivers will not be installed for controllers that are not enabled by BIOS.

8. After successful installation, you should see setup completion screen as shown in Figure 5. Click on 'Finish' button to complete the installation.

Figure 5. Setup Completion



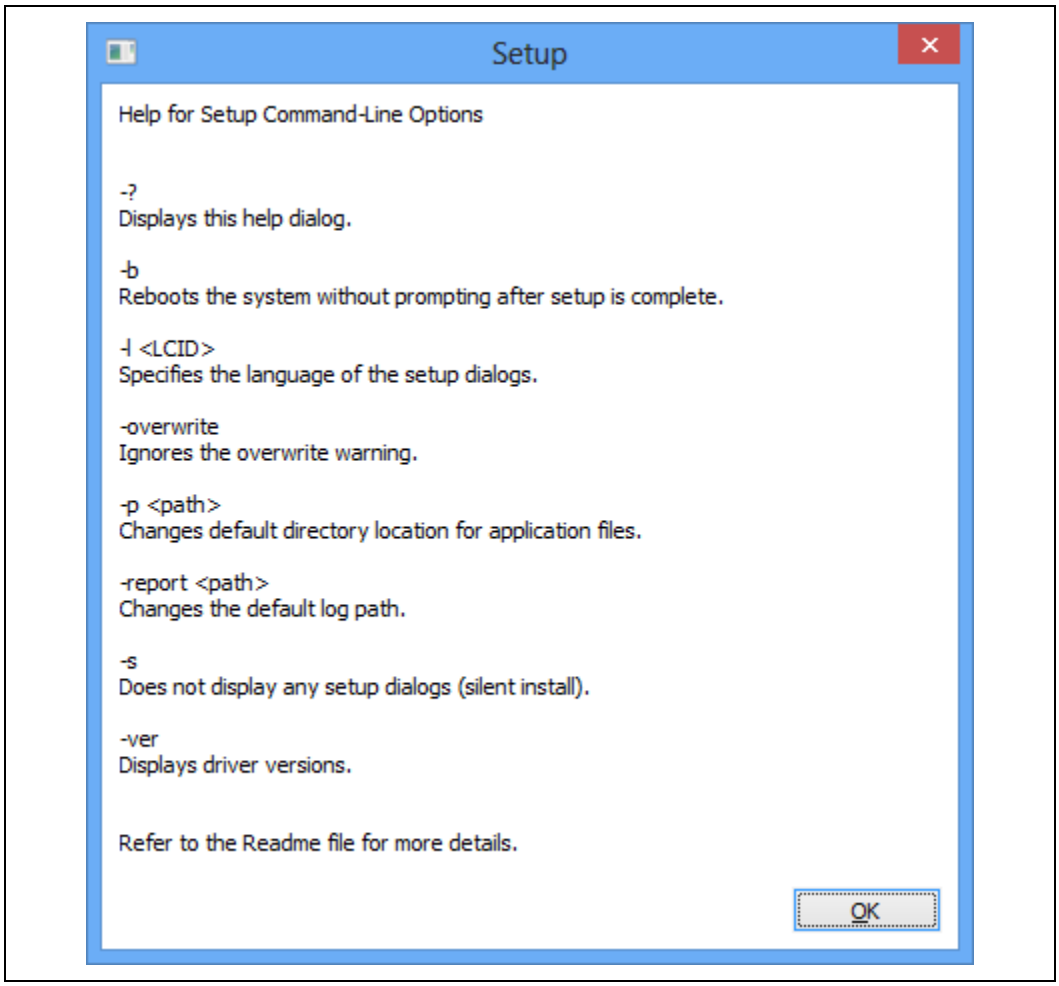
3.2 Silent Driver Installation via Installer

Follow the steps listed below for silent driver installation via installer:

1. Copy and unzip the Intel® Serial IO Driver onto the Platform under test.
2. Open a Command Prompt (cmd.exe) with administrator rights (ie. Run as administrator). Click on 'Yes' button in User Account Control pop-up window.
3. Change the directory to where you unzipped the driver in Step 1 and then change to the "Driver_Installer" directory.
4. To see all available options for the Installer, run command "SetupSerialIO.exe -?" You should see a window pop-up similar to Figure 6. For the "-l <LCID>" option

which specifies the language of the setup dialogs, the LCID list is shown in below table. Click OK to continue.

Figure 6. Installer Help Information



Note: The "-report <path>" option allows users to change where the installation log file is saved. Otherwise, Intel driver installation log files are stored in the general location of 'C:\Users\"User name"\Intel\Logs'.

LCID	Language
0401	Arabic
0804	Chinese (Simplified)
0404	Chinese (Traditional)
0405	Czech
0406	Danish
0407	German
0408	Greek
0409	English (USA)
040A	Spanish
040B	Finnish
040C	French
040D	Hebrew
040E	Hungarian
0410	Italian

LCID	Language
0411	Japanese
0412	Korean
0413	Dutch
0414	Norwegian
0415	Polish
0416	Portuguese (Brazil)
0816	Portuguese (Standard)
0419	Russian
041B	Slovak
0424	Slovenian
041D	Swedish
041E	Thai
041F	Turkish

5. Run command "SetupSerialIO.exe –b –s" to start the silent installation. (Where as x represents the particular version number.) This process should take about 1 min to complete. When silent installation is complete, the system will automatically reboot.

6. After the system has booted, you can refer to section 0 to check the driver version.

Other silent installation examples are:

> SetupSerialIO.exe -s -overwrite -report C:\Temp

> SetupSerialIO.exe -s –l 0404

For the installation, a full listing of return values can be found in the following table. The 'Result Code' value can be found at the end of the installation log file.

Result Code	Description
0	Success
3010	Reboot required
1602	User exited
1641	Reboot initiated
1603	Install failure

3.3 Manual Installation via INF File

Follow the steps listed below for driver installation via INF file:

1. Copy and unzip the Intel® Serial IO Driver onto the Platform under test.
2. Locate the INF files. See Figure 7.
   a. iaLPSS2_GPIO2_BXT_P.inf
   b. iaLPSS2_I2C_BXT_P.inf
   c. iaLPSS2_SPI_BXT_P.inf
   d. iaLPSS2_UART2_BXT_P.inf

Figure 7. Serial IO Driver - INF files – Windows 10

3. Right click on the INF file and select 'Install' option from the menu to start the installation and then click on 'Yes' button in pop-up window.
4. After the installation of all the drivers, reboot the system

3.4 Checking the Driver Version

To check the Intel® Serial IO Driver version, follow the below instructions:

1. Open Device Manager.
2. Double click on the device you want.
3. Select the "Driver" tab and the Driver Version will be listed.

Figure 8. Intel® Serial IO GPIO Driver Version

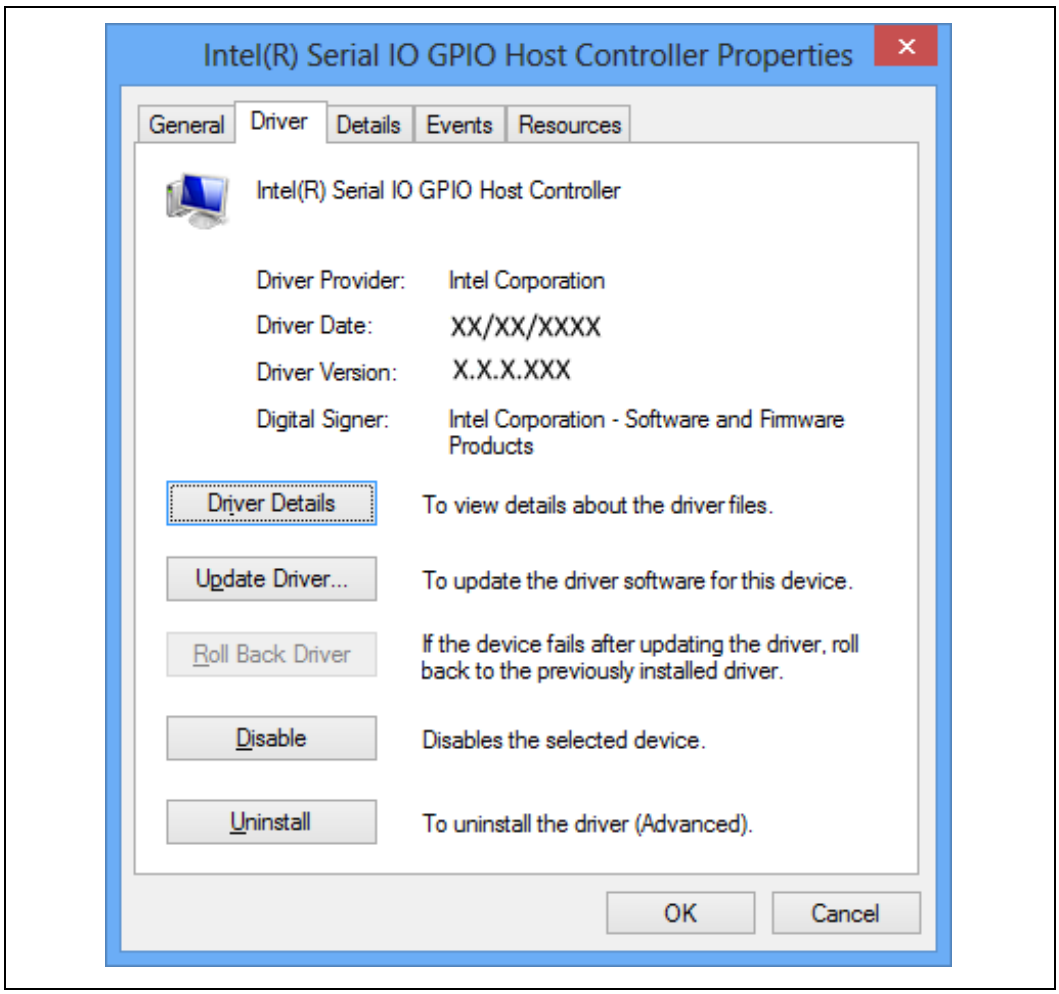


Figure 9. Intel® Serial IO I2C Driver Version

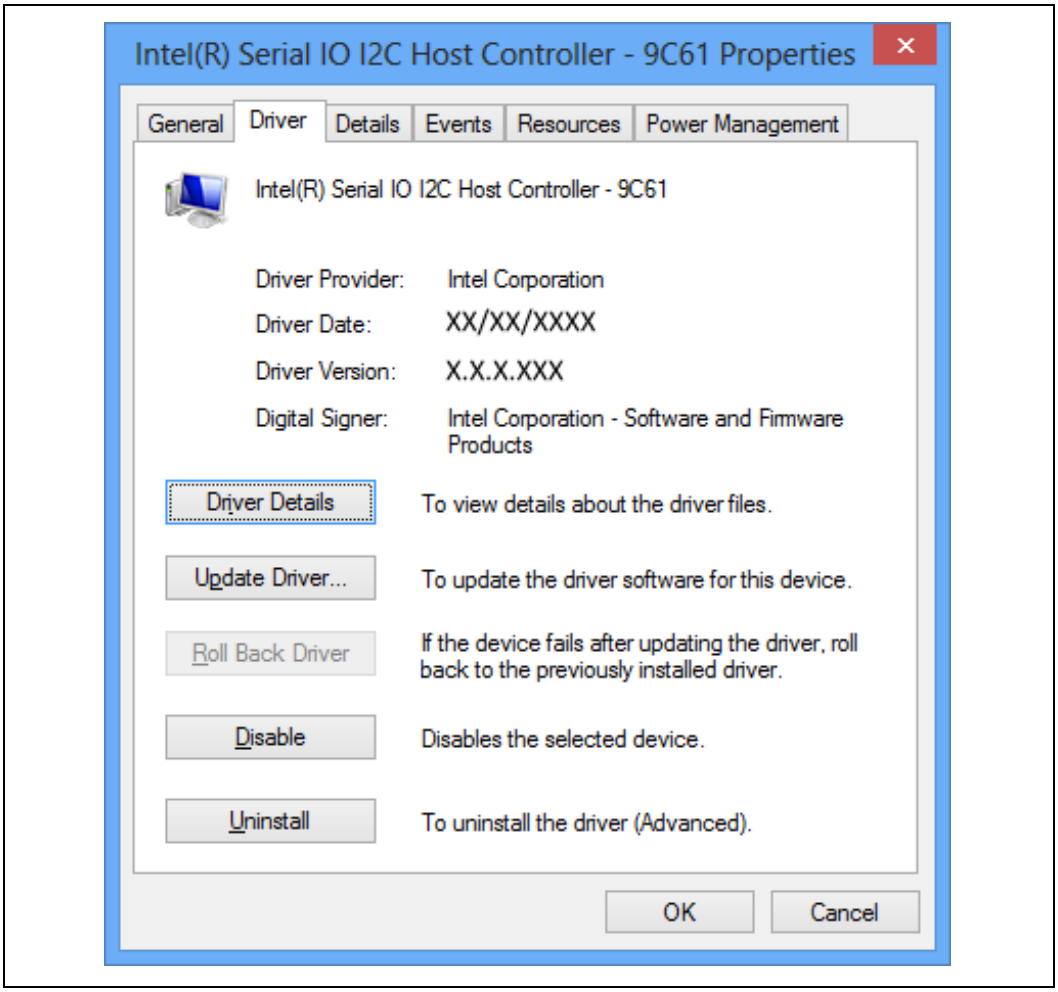
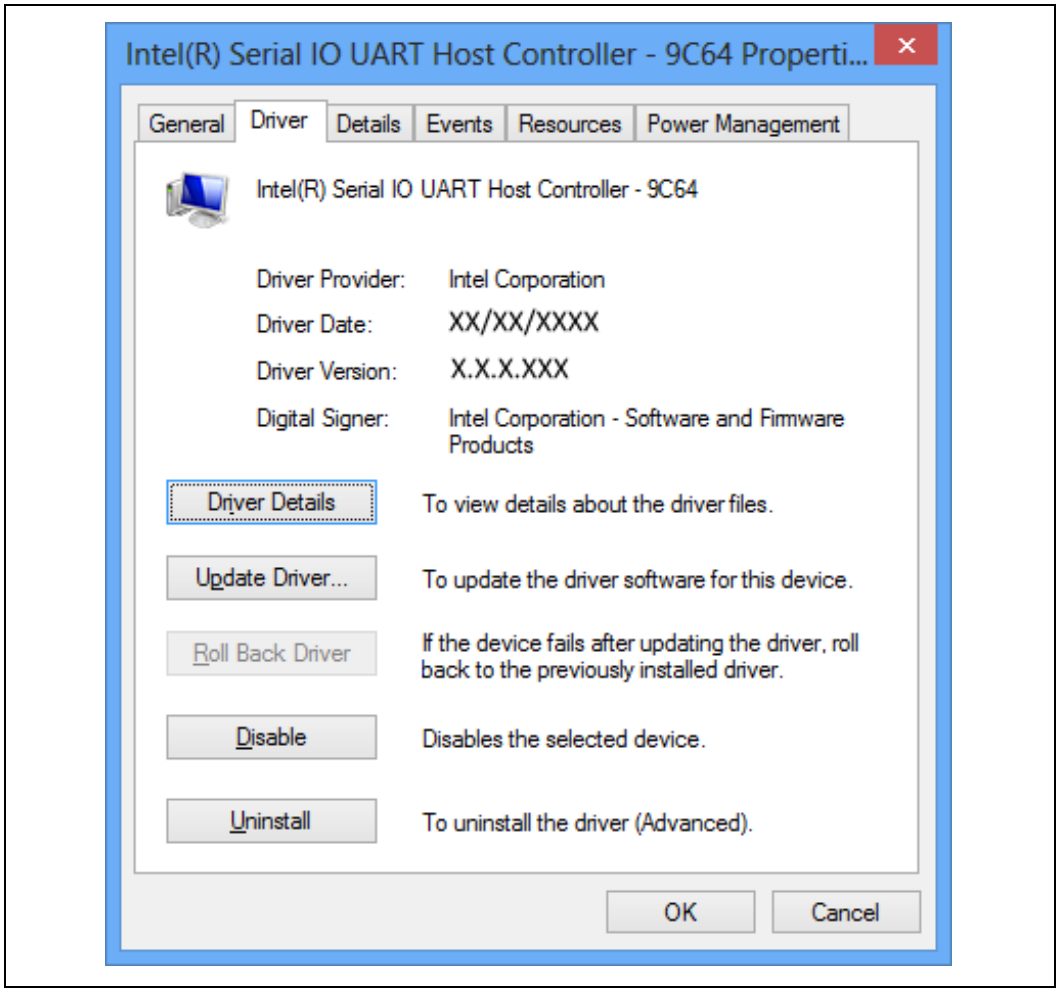


Figure 10. Intel® Serial IO UART Driver Version



3.5 Uninstalling the Driver via Control Panel

Follow the steps listed below to uninstall the driver via the Control Panel:

1. Open the Control Panel window.
2. If the Control Panel window is shown in 'Category' view, then select "Uninstall a program" as shown in Figure 11. Otherwise if the Control Panel window is shown in 'icon' view, then select "Programs and Features".

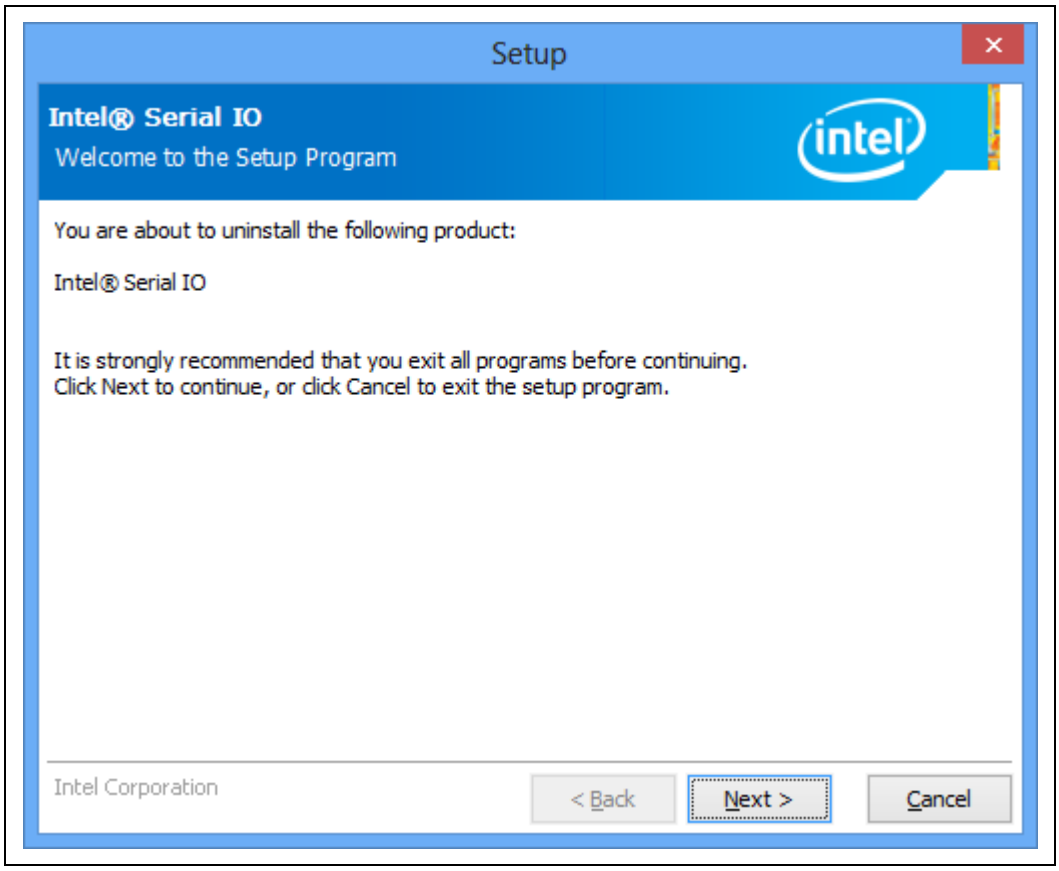
Figure 11. Control Panel – Uninstall a program

3. On the next window, select the "Intel® Serial IO Driver" (see Figure 12) from the list of programs. Then click the "Uninstall" button.

Figure 12. Control Panel – Programs List

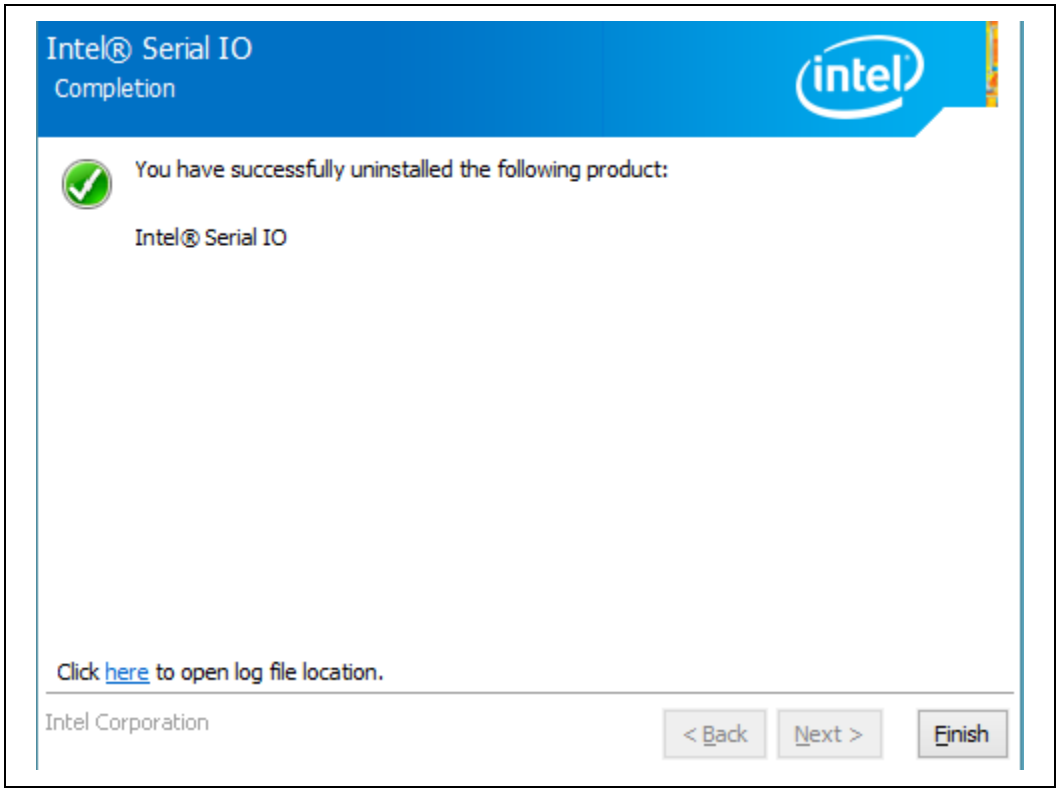
4. You should see the Welcome to Uninstallation Program pop-up window with component details as shown in Figure 13. Click 'Next >' button to continue.

Figure 13. Welcome to the Uninstallation Program



5. Next, installer will perform various operations and show progress in Uninstallation Progress screen. When the uninstall process is completed, you should see screen as shown in Figure 14. Click on 'Finish' button to restart the system.

Figure 14. Uninstall Setup Completion



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4 Closed Issues

Issue #	Description	Resolution
N/A	Added certification for Windows* 10 RS3 build (whql).	Resolved in 30.100.1750.1
220239454	SPI/UART/I2C: SPI/UART/I2C Device may yellow bang or cause system hang during power cycling testing.	Resolved in 30.100.1750.1
2201482452	GPIO: Added save/restore for Connect and DisconnectIoPins	Resolved in 30.100.1750.1
1504510746	Installer: hardened Installer code.	Resolved in 30.100.1631.03 (Installer version 2.3.2605.0)
1209818842	When running driver installation on an OS with Arabic language, the right side wording of the license agreement is stuck on the installation windows.	Resolved in Installer version 2.3.2603.0
N/A	Added certification for Windows* 10 RS1 build (whql).	Resolved in 30.100.1631.03
1504280148	GPIO: Added Save/Restore capability.	Resolved in 30.100.1630.02
10071166	Installer: Installer will fail to install the driver if OS account user name has a space.	Resolved in 30.100.1620.02 (Installer version 2.2.20)
N/A	GPIO: Fix incorrect IRQL level.	Resolved in 30.100.1620.02
1504237912	GPIO: BSOD may occurs when GPIO controller is enabled and disabled in the OS.	Resolved in 30.100.1620.02
1504156602	GPIO: Add spinlock to avoid race condition in the driver.	Resolved in 30.100.1611.10
N/A	GPIO: Fixed driver version number.	Resolved in 30.100.1611.10
1604051162	GPIO driver initializes the GPP_IE register and pin information when resuming from S3/S4 power stage.	Resolved in 30.100.1603.06 (Beta)
1504103125	Updated the I2C driver to support latest Device Guard Requirement.	Resolved in 30.100.1603.06 (Beta)

Issue #	Description	Resolution
1504131626	Updated the UART driver to support latest Device Guard Requirement.	Resolved in 30.100.1603.06 (Beta)
1604063757	Updated the SPI driver to support latest Device Guard Requirement.	Resolved in 30.100.1603.06 (Beta)
1504111860	SPI driver: added support for frequency higher than 25MHz.	Resolved in 30.100.1603.06 (Beta)
10002037	Fixed issue where Installer may fail to repair Serial IO driver when the repair option is selected.	Resolved in 30.100.1603.06 (Beta) Installer ver 2.2.19.0
N/A	SPI driver: fixed issue where SPI controller does not work when CS is set to PolarityHigh (active high) mode.	Resolved in 30.100.1603.06 (Beta)
N/A	UART: added support for B0 stepping.	Resolved in 30.100.1539.03 (Alpha)
1206543907	GPIO: Volume button operation is not synchronized with the volume bar changes.	Resolved in 30.100.1539.03 (Alpha)

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5 Known Issues

Issue #	Description
N/A	

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