Technical white paper

HP Firmware Installer

Deployment User Guide

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Goal

HP Firmware Installer allows for different installation options using the same package. This document explains the different scenarios and options.

Overview

Firmware updates to external devices create a challenge in managing devices. Since devices cannot be updated unless they are connected to the host system at the time the update occurs, this package allows for multiple installation options to fit customer needs.

In addition, firmware updates can be time consuming and disruptive to an end user. The user may see the monitor flicker, hear audio clicks, the internet connection may be intermittent, and the mouse and the keyboard could become unresponsive until the installation is complete.

Important note: Disconnection during a firmware update can cause damage to the device. Precaution must be taken to ensure that a user does not disconnect a peripheral from its host machine during the firmware installation.

With all points of consideration above, HP Firmware Installer includes all firmware updates for a peripheral and provides installation options for different operating system deployment or update scenarios.

Supported Peripherals

Below is a list of all peripherals that OCI currently supports firmware updates for.

- HP Thunderbolt Dock G2
- HP USB-C Dock G5
- HP USB-C/A Dock G2
- HP Thunderbolt Dock G4
- HP E24d G4 FHD Advanced Docking Monitor
- HP E27d G4 GHD Advanced Docking Monitor
- HP Mini-in-One 24 Display
- HP Z32kG3 4K USB-C Display
- HP E24u G4 FHD USB-C Monitor
- HP E27u G4 QHD USB-C Monitor
- HP Engage One Pro All-in-One System
- HP Presence
- HP Z40c G3 Curved USB-C Display
- HP Engage Go 10 Multi-Charger
- HP Engage One Essential All-in-One System

Other HP peripherals that are not included in the above list use other tools for firmware updates. This whitepaper is not applicable for firmware updates for HP peripherals that are not included in the above list.

Terms and definitions

Host system	The computer that the supported peripheral is connected to
ConfigMgr	Microsoft System Center Configuration Manager, a software solution to manage PCs, servers and mobile devices
Peripheral firmware package version	The version of the whole firmware package applied to a peripheral. Please note that some peripherals do not have a firmware package version.
Device firmware version	The firmware version of a device on a peripheral

Update options

The following installation options are available with further customization of each option:

1. Stage the firmware to the host, and the firmware will be installed when the peripheral is connected to the host (later).
2. Install all the applicable firmware to the peripheral immediately.
3. Install firmware on shutdown/reboot.

Staging of firmware onto the host platform

This solution is used to deploy to machines that may or may not be connected to the device at time of installation of the package. HP Firmware Installer will be installed onto the host platform via Windows Installer in the same manner as any other software deliverable. The software installed will also contain the latest firmware binaries. When a supported peripheral is connected and a user currently logs on to the host system, the software will determine if a firmware update is needed. When the firmware update is run, a UI is displayed to the active user inform them of what to expect from the firmware update, as well as give them the option to postpone. A user must be aware and consent to a firmware update so that they can prevent unintended disconnection of the device during the update.

Instructions

Use Install.cmd. Install.cmd will detect the operating system architecture and run the appropriate HP Firmware Installer msi file corresponding to the operating system architecture. Once installed, the software will be triggered when the device is connected to the host unit. If the device firmware is out of date, a HP Firmware Installer user interface will appear to inform the active user and ask for consent to perform the firmware update.

Triggers

The following events will trigger the software to check firmware version and start an update if necessary

1. The peripheral is connected during an active session
2. After user logs in while the peripheral is already connected prior to the log on event

Firmware updates will never run without an active session and user permission.

Command Line Arguments

Standard MSI arguments can be used to stage the firmware. For example, /qn can be used like **Install.cmd /qn** for silent installation

To add configuration options below to the command, specify the argument and value like this:

Install.cmd <MSI_OPTIONS> POSTPONE_TIME=60 POSTPONE_MAX=2

Configuration Options

There are several configuration options that can be used to tailor the firmware update experience for users on host machines. The following configuration options can be added as command line arguments to install, or they can be set in the registry after installation:

Registry Key: HKLM\SOFTWARE\HP\HP Firmware Installer\DEVICE_NAME

- Postpone Duration

  Description: The amount of time that passes between a user hitting postpone and the UI notification popping up again (amount in minutes). Postpone duration will reset following a reboot.
  Default: 60
  Allowed Range: 2 mins to 1440 mins (24 hours)
  Command Line Arg: POSTPONE_TIME
  Registry Value: PostponeTime

- Postpone Max

  Description: The total number of times the user can hit the postpone button. Postpone count will reset following a reboot.
  Default: Infinity (-1). Use -1 in registry or command line to set as infinity
  Allowed Range: 0 (no postpones) to Infinity
  Command Line Arg: POSTPONE_MAX
  Registry Value: PostponeMax

- Disable firmware checks after successful firmware update

  Description: When set to 1 (True/Disable), HP Firmware Installer will only update the first device it encounters. Once the firmware update is successful, or if the device is already up to date, it will stop checking firmware versions until a new firmware version is staged onto the host platform. If it is desired for the same host platform to update multiple devices, setting this will cause the software to always check the firmware version of compatible devices it encounters, and will prompt the user to start the firmware update.
  Default: 0 (False – Checks version anytime peripheral is connected)
  Command Line Arg: FLASH_DISABLE_ON_SUCCESS
  Registry Value: FlashDisableOnSuccess

- Disable firmware checks after failed firmware update

  Description: HP Firmware Installer will stop attempting to update firmware after a set number of attempts (set in a different configuration option). Once the max number of attempts have been made, it will stop checking firmware versions until a new firmware version is staged onto the host

platform.
Default: 1 (True – Disable checks after max failed attempts)
Command Line Arg: FLASH_DISABLE_ON_FAIL
Registry Value: FlashDisableOnFail

- Max failed attempts

  Description: HP Firmware Installer will stop attempting to update firmware after a set number of attempts (set in a different configuration option). Once the max number of attempts have been made, it will stop checking firmware versions until a new firmware version is staged onto the host platform.
  Default: 2
  Command Line Arg: FLASH_ATTEMPT_MAX
  Registry Value: FlashAttemptMax

- Force

  Description: Used to force HP Firmware Installer to downgrade devices that are newer than the deployed version, as well as still upgrade old devices. When force is set to 1 (on), any connected devices that are not the exact version as the one deployed will cause the install process to begin. When force is set to zero (off), HP Firmware will only upgrade devices, and will leave devices with a newer version than the one deployed as is.
  Default: 0 (Force is off)
  Command Line Arg: FORCE
  Registry Value: Force

- Install Log Path

  Description: Output the log file to a specified path. If not specified, the log is generated to the default location (%TEMP%). This parameter can be a file name or a directory. If only directory is applied, the log fil name will be 'HPFirmwareInstaller.log.'
 *Default*: Blank or Not Specified = %TEMP%\HPFirmwareInstaler.log
  Command Line Arg: INSTALL_LOG_PATH
  Registry Value: InstallLogPath
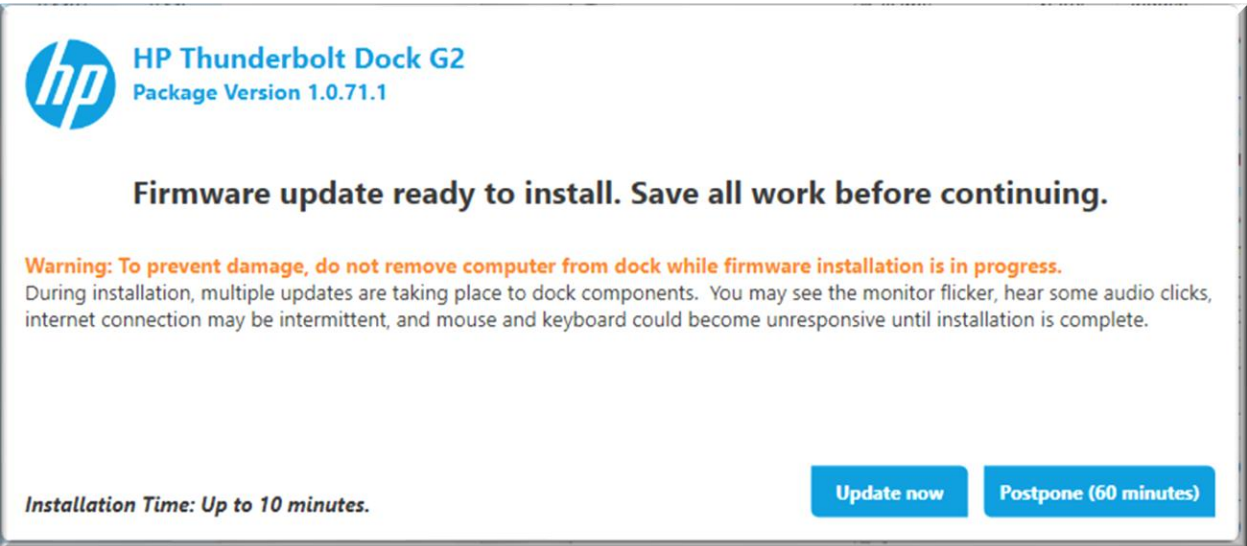
Example Usage

The following screenshot shows an example deployment task sequence. The operating system deployment task sequence contains necessary steps to install the appropriate Thunderbolt software first (Thunderbolt software in this case for HP Thunderbolt Dock G2), and then call HP Firmware Installer to stage the peripheral firmware on the host system.
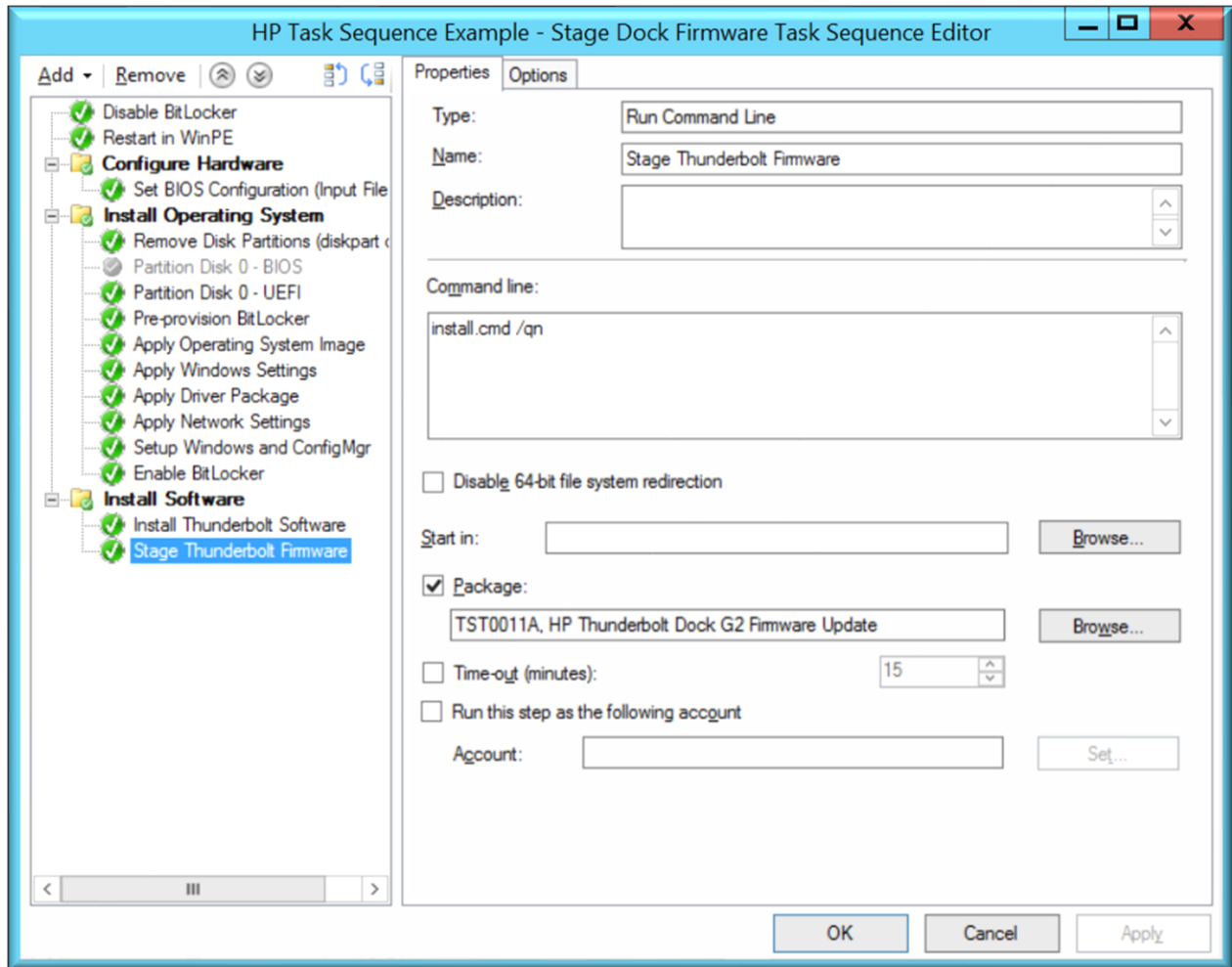
The firmware upgrade will be triggered on different events specified in Triggers section.

End-user Experience

When the staging software determines that firmware update is required, a notification will be displayed to the active user. The firmware update will not start until the user has agreed; however, they cannot close or minimize the notification. The screenshots below show what the user interface for HP Firmware Installer can look like; in this case, it is what the HP Thunderbolt Dock G2 user interface for HP Firmware Installer looks like.

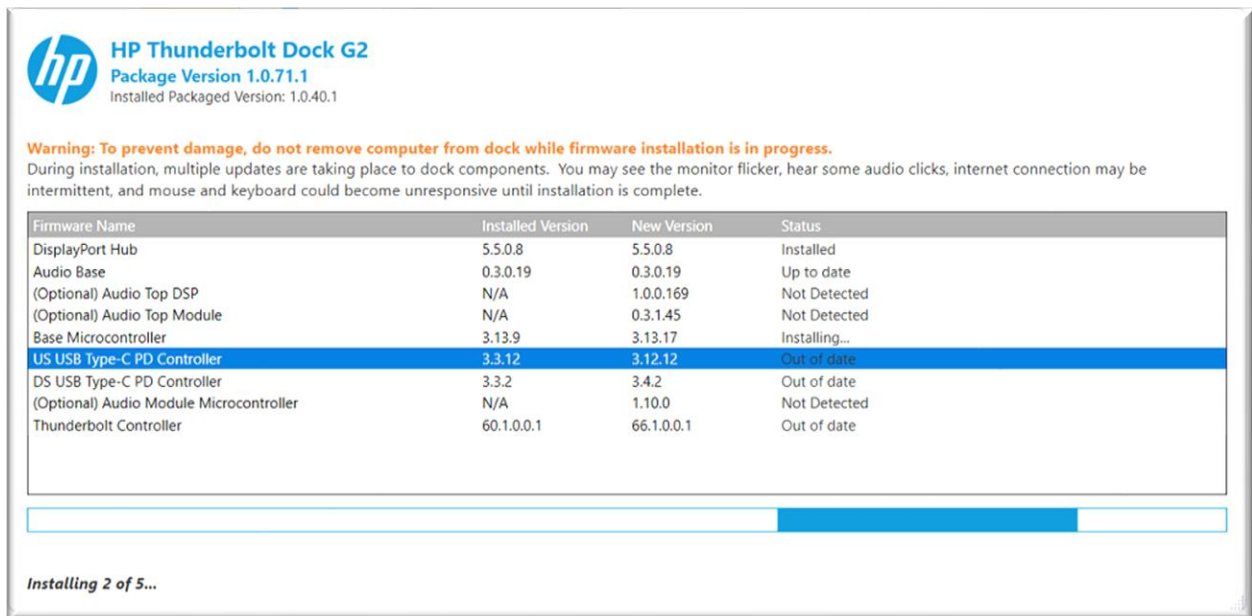**HP Thunderbolt Dock G2**
Package Version 1.0.71.1

Firmware update ready to install. Save all work before continuing.

Warning: To prevent damage, do not remove computer from dock while firmware installation is in progress.
During installation, multiple updates are taking place to dock components. You may see the monitor flicker, hear some audio clicks, internet connection may be intermittent, and mouse and keyboard could become unresponsive until installation is complete.

Installation Time: Up to 10 minutes.

[Update now]   [Postpone (60 minutes)]

If the user chooses to postpone if the postpone option is available, the same dialog will be presented after the displayed time elapses. If the user clicks OK to continue with the update, the following dialog will be shown. Please note that not all peripherals have the option to postpone the update.
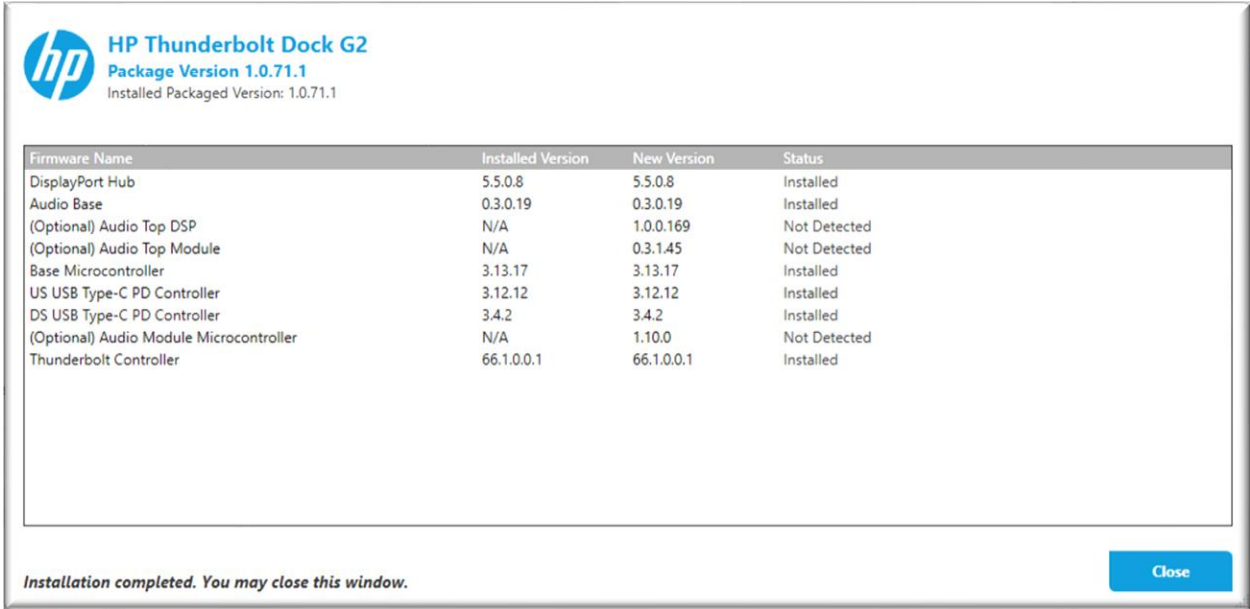

HP Thunderbolt Dock G2
Package Version 1.0.71.1
Installed Packaged Version: 1.0.40.1

Warning: To prevent damage, do not remove computer from dock while firmware installation is in progress.
During installation, multiple updates are taking place to dock components. You may see the monitor flicker, hear some audio clicks, internet connection may be intermittent, and mouse and keyboard could become unresponsive until installation is complete.

Firmware Name	Installed Version	New Version	Status
DisplayPort Hub	5.5.0.8	5.5.0.8	Installed
Audio Base	0.3.0.19	0.3.0.19	Up to date
(Optional) Audio Top DSP	N/A	1.0.0.169	Not Detected
(Optional) Audio Top Module	N/A	0.3.1.45	Not Detected
Base Microcontroller	3.13.9	3.13.17	Installing...
US USB Type-C PD Controller	3.3.12	3.12.12	Out of date
DS USB Type-C PD Controller	3.3.2	3.4.2	Out of date
(Optional) Audio Module Microcontroller	N/A	1.10.0	Not Detected
Thunderbolt Controller	60.1.0.0.1	66.1.0.0.1	Out of date

Installing 2 of 5...

When the update completes, the end user will see the installation status of each firmware.

| Firmware Name	Installed Version	New Version	Status
DisplayPort Hub	5.5.0.8	5.5.0.8	Installed
Audio Base	0.3.0.19	0.3.0.19	Installed
(Optional) Audio Top DSP	N/A	1.0.0.169	Not Detected
(Optional) Audio Top Module	N/A	0.3.1.45	Not Detected
Base Microcontroller	3.13.17	3.13.17	Installed
US USB Type-C PD Controller	3.12.12	3.12.12	Installed
DS USB Type-C PD Controller	3.4.2	3.4.2	Installed
(Optional) Audio Module Microcontroller	N/A	1.10.0	Not Detected
Thunderbolt Controller	66.1.0.0.1	66.1.0.0.1	Installed

Installation completed. You may close this window.

Example Usage Experience using 'Install.cmd'

The HPFirmwareInstaller.exe automatic launch ability informs you there is a firmware update ready to upgrade is built into the OCI SDK. This ability is setup when you run Install.cmd.

This section gives more detail about what to expect behind the scenes in "Staged Update."

Check these items to ensure the ability is in effect:

1. Start 'Task Scheduler' by Windows Start > Task Scheduler and enter.
2. The Task Scheduler will appear.
3. Look for the "Hp Thunderbolt Dock G2 scheduler task in the top center pane. The "HP Thunderbolt Dock G2 Schedule" at "At log on of any user". Should the 'HP Thunderbolt G2 scheduler task' not appear in the Task Scheduler, run 'Install.cmd' again should restore the task.
4. Select it and the select 'refresh' in the right pane.
5. Select the 'History' tab in the pane below the top pane and then refresh in the right pane.
6. After a few seconds you will see a history of events for the HP Thunderbolt Dock G2 scheduler task".

The procedure below is when a User logs in. If the dock is not plugged in at login, you can plug the dock in and the process should start at Step 2 (Watch in Task manager for the "HP Firmware Installer" to appear in the 'Background' processes section) after a few seconds. If it does not start, check the Task Scheduler for the 'HP Thunderbolt' task and run Install.cmd if it is missing.
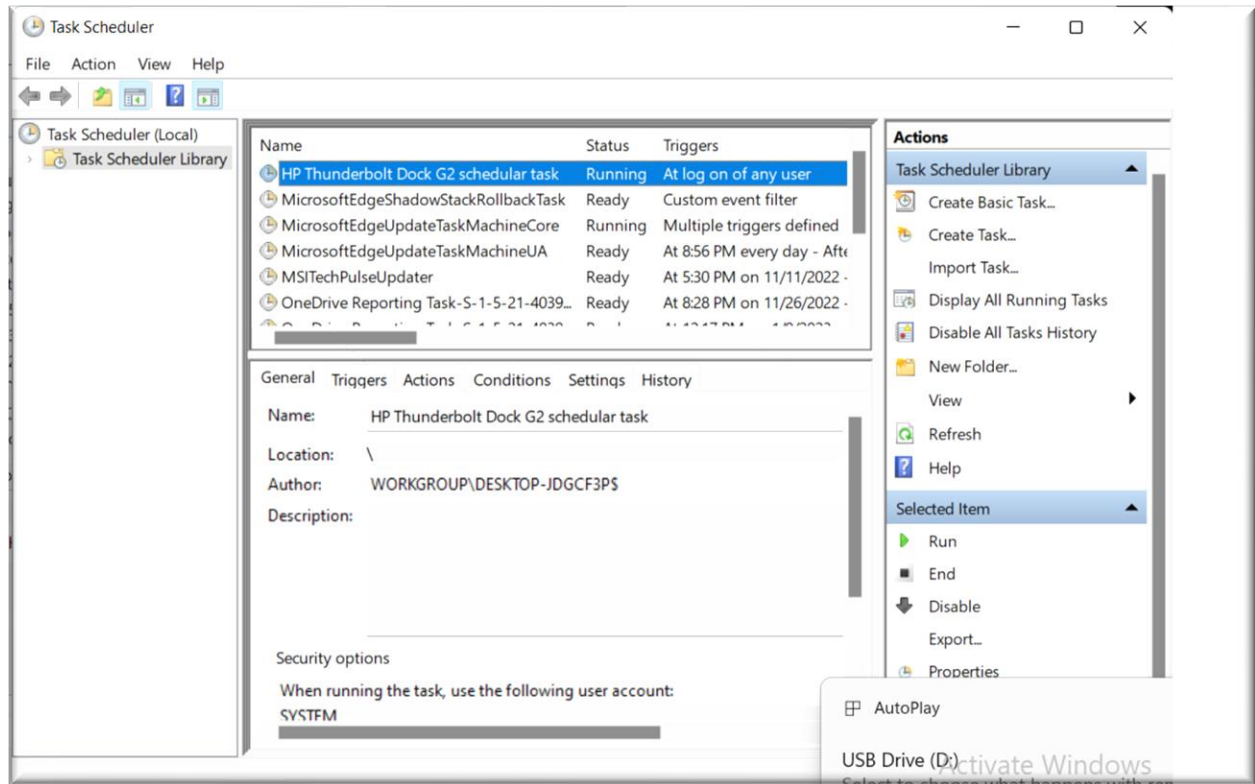
Once this setup is verified the auto launch can occur after a User logs in if the dock is already attached.
If the dock is not plugged in at login, an auto launch should occur when you plug the dock in.
Below is screen shot of both these process.

**Auto Launch After User Login with Dock already connected:**

1. User logs in.

2. Watch in Task manager for the "HP Firmware Installer" in the 'Background' processes section. It may take a few seconds or longer to start.
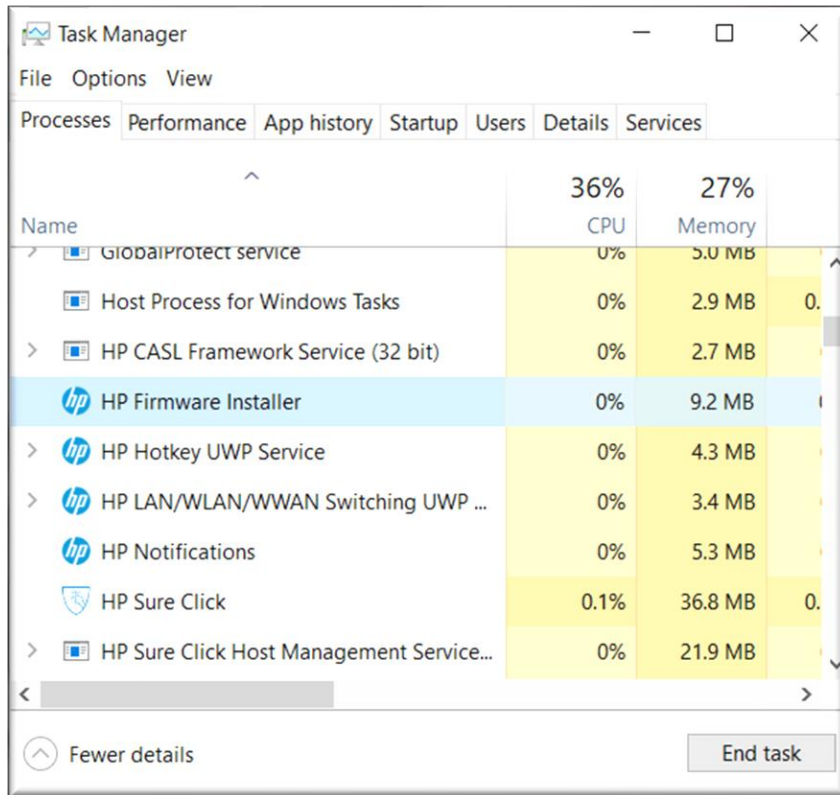
3. After a short while longer the CPU usage will climb to ~20%

4. After some more time this process will end and restart in the 'App' section.
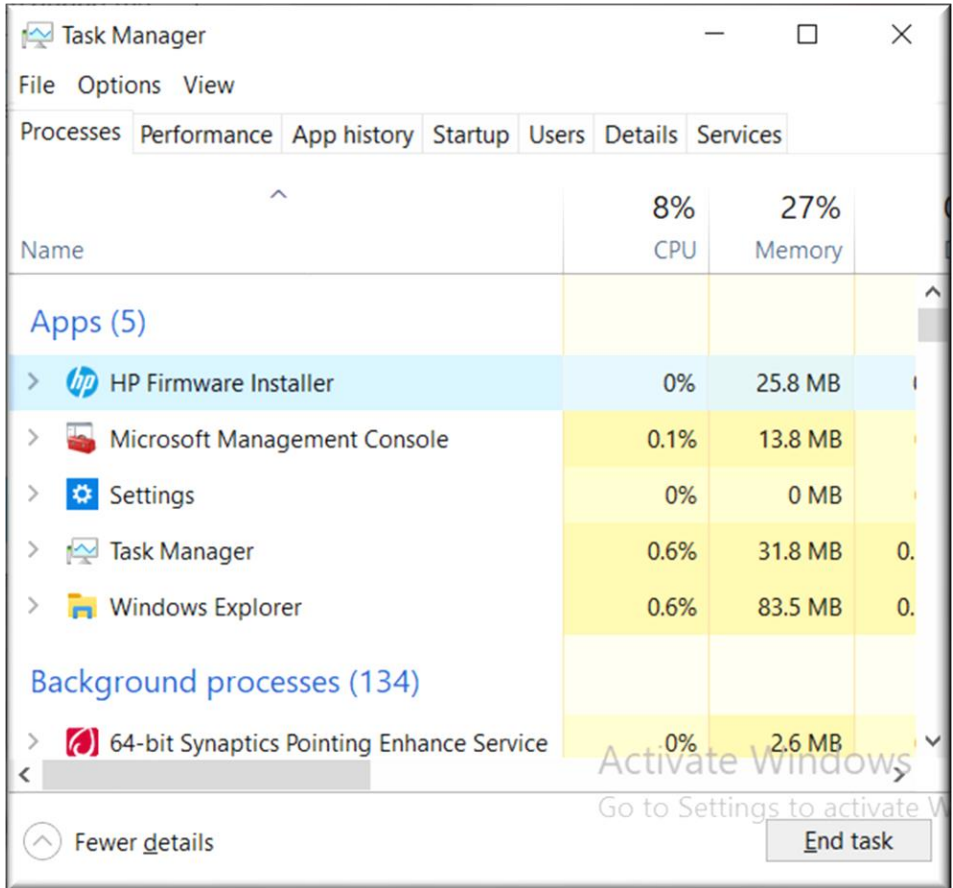
5. And you will see this dialog:
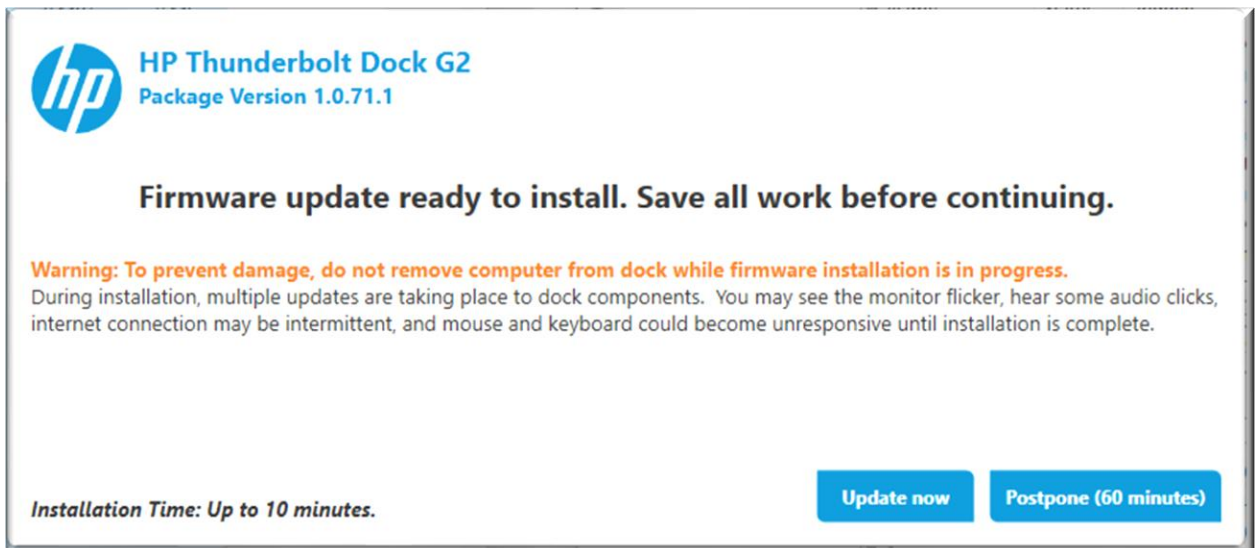
6. Click "Update now" and the "Checking Firmware" dialog shows.

HP Thunderbolt Dock G2
Package Version 1.0.71.1
Installed Packaged Version: 1.0.40.1

Warning: To prevent damage, do not remove computer from dock while firmware installation is in progress.
During installation, multiple updates are taking place to dock components. You may see the monitor flicker, hear some audio clicks, internet connection may be intermittent, and mouse and keyboard could become unresponsive until installation is complete.

Firmware Name	Installed Version	New Version	Status
DisplayPort Hub	5.3.0.2	5.5.0.8	Out of date
Audio Base	0.3.0.19	0.3.0.19	Up to date
(Optional) Audio Top DSP	N/A	1.0.0.169	Not Detected
(Optional) Audio Top Module	N/A	0.3.1.45	Not Detected
Base Microcontroller	3.13.9	3.13.17	Out of date
US USB Type-C PD Controller	3.3.12	3.12.12	Out of date
DS USB Type-C PD Controller	3.3.2	3.4.2	Out of date
(Optional) Audio Module Microcontroller	N/A	1.10.0	Not Detected
Thunderbolt Controller		66.1.0.0.1	Reading...

Checking firmware on device...

7. Installing the firmware.

HP Thunderbolt Dock G2
Package Version 1.0.71.1
Installed Packaged Version: 1.0.40.1

Warning: To prevent damage, do not remove computer from dock while firmware installation is in progress.
During installation, multiple updates are taking place to dock components. You may see the monitor flicker, hear some audio clicks, internet connection may be intermittent, and mouse and keyboard could become unresponsive until installation is complete.

Firmware Name	Installed Version	New Version	Status
DisplayPort Hub	5.5.0.8	5.5.0.8	Installed
Audio Base	0.3.0.19	0.3.0.19	Up to date
(Optional) Audio Top DSP	N/A	1.0.0.169	Not Detected
(Optional) Audio Top Module	N/A	0.3.1.45	Not Detected
Base Microcontroller	3.13.9	3.13.17	Installing...
US USB Type-C PD Controller	3.3.12	3.12.12	Out of date
DS USB Type-C PD Controller	3.3.2	3.4.2	Out of date
(Optional) Audio Module Microcontroller	N/A	1.10.0	Not Detected
Thunderbolt Controller	60.1.0.0.1	66.1.0.0.1	Out of date

Installing 2 of 5...

8. When the update completes, the end user will see the installation status of each firmware.

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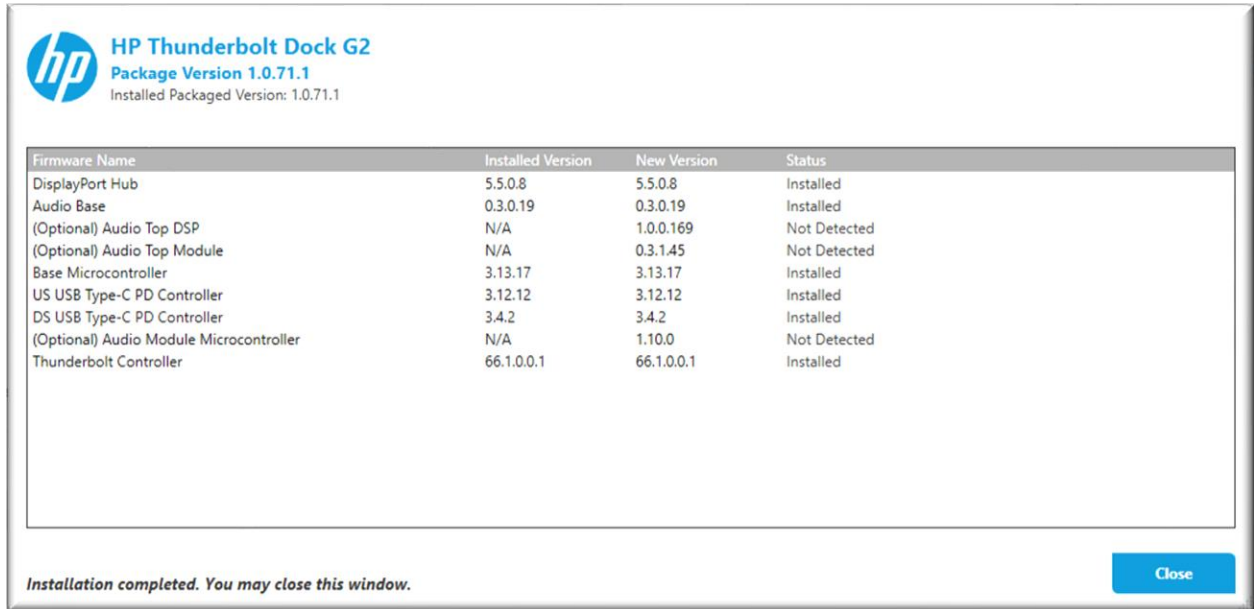
Installing the firmware immediately onto the device

This solution requires the device to be connected to the host platform when the installer is executed and must stay connected throughout the installation. HP Firmware Installer will determine which firmware on the device is out of date and flash to the latest. This method can be run silently, loud, or non-interactively, in which non-interactively means the user interface (UI) is shown to the user but does not require any action from the end user.

Program
HPFirmwareInstaller.exe

Command line parameters

Parameter	Description
–noninteractive or –ni	Runs the installer without any user interaction, but still displays the UI.
–silent or –s	Runs the installer in silent mode.
-stage or -st	Stage firmware on devices and then install firmware while the device is disconnected
–force or –f	Forces the installer to flash each firmware piece to the version included in the package, whether that is an upgrade, downgrade, or a re-flash of the same version.
-check or -c	Checks if any firmware is out-of-date. Only returns success if all firmware is up to date.
-configPath:<file path>	Specify the path of the configuration file to use instead of looking for HPFIConfig.xml next to the executable.
–installLogPath:<file path>	Specify the path of the log file generated during installation. If not specified, the log is generated to the default location (%TEMP%). This parameter can

	be a file name or a directory. If only directory is applied, the log fil name will be 'HPFirmwareInstaller.log.'
–p<parameter>	Set the time that's required to have the power button pressed before it is registered as a button press (in milliseconds). Only available for HP Thunderbolt Dock G2.
–autoShutDown or –as	Automatically shut down system after firmware update process is complete. *Only available for HP E24d G4 FHD Advanced Docking Monitor, HP E27d G4 GHD Advanced Docking Monitor, HP Mini-in-One 24 Display, and HP Engage One Pro All-in-One System*
–factoryModeInstall	Force the update flow as connected update. This is only for internal factory process, not released to customers. *Internal use only, not released to customers.*

Behavior

Please see the 'Return Codes' section below for more details. Users can double click HPFirmwareInstaller.exe to run it interactively (loud mode) or run it in silent mode or non-interactive mode using the command line parameters. Each individual device (on the peripheral) and the corresponding device firmware version is shown to the user in interactive and non-interactive mode. The status of each device is updated during the installation process like in the following screenshot.

Example usage

The following screenshot shows an example deployment task sequence. The operating system deployment task sequence contains necessary steps to install the appropriate Thunderbolt software first, then call HP Firmware Installer to update the peripheral firmware immediately as the peripheral is connected throughout the time the task sequence runs.
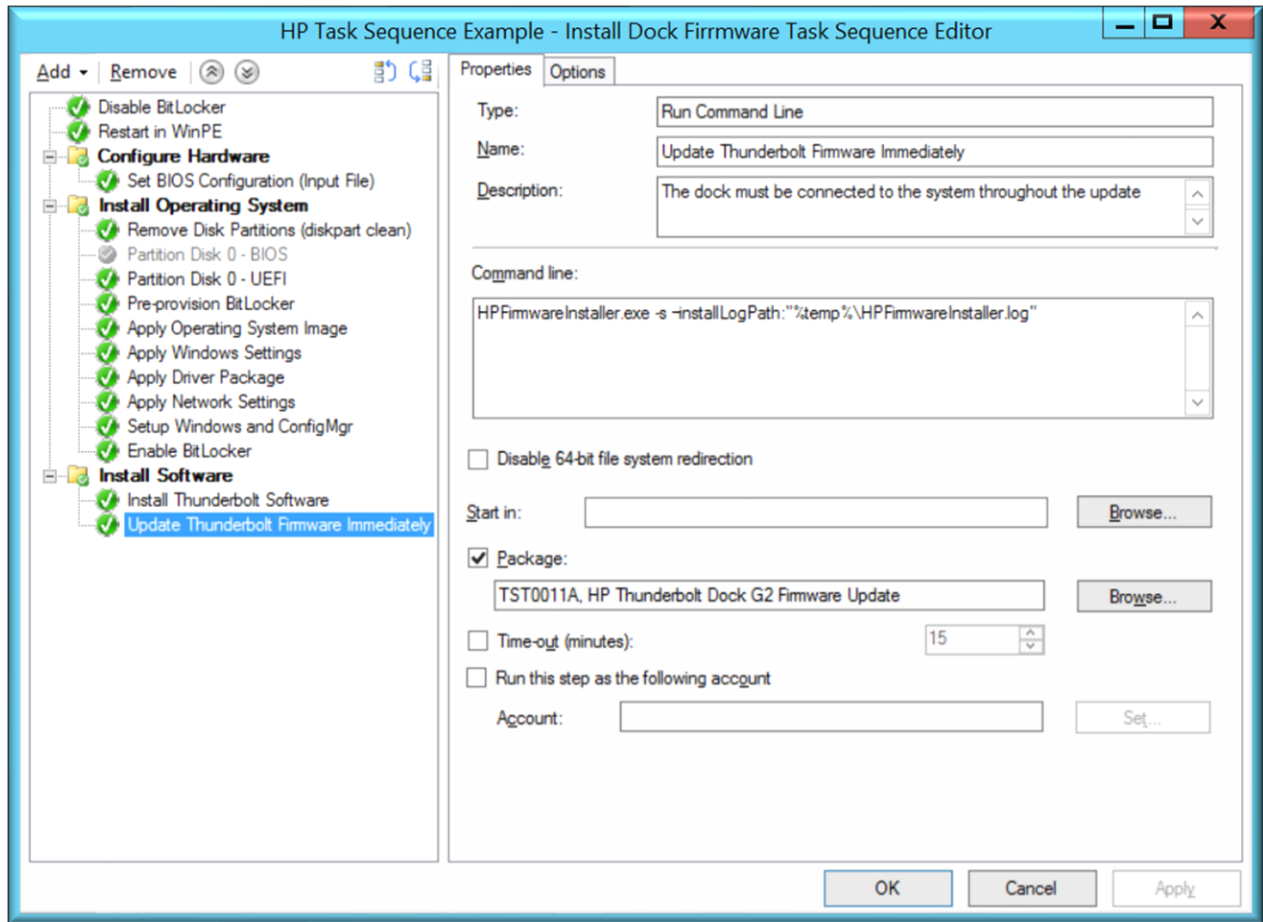
Return Codes

When running in silent or non-interactive modes, a non-zero code is returned to indicate specific errors.

Code	Description
0	Success
101	Install Failed. One or more firmware failed to install.
102	Configuration file failed to be loaded. This may be because it could not be found or that it was not properly formatted.
103	One or more firmware packages specified in the configuration file could not be loaded.
104	No devices could be communicated with. This could be because the device was not connected, or necessary drivers are missing to detect the device.
105	Out-of-date firmware detected when running with 'check' flag.
106	An instance of HP Firmware Installer is already running
107	Device not connected. This might be because PID or VID is not detected.
108	Force option disabled. Firmware downgrade or –reflash not possible on this device.
109	The host is unable to update the firmware
110	Invalid parameters (for HP Thunderbolt Dock G2 only)
111	Failed to set power button sensitivity (for HP Thunderbolt Dock G2 only)

Installing the firmware on shutdown/reboot

This solution requires a shutdown or reboot to complete the firmware update. HP Firmware Installer will determine which firmware on the device is out of date and flash to the latest. This method can be run silently, loud, or non-interactively, in which non-interactively means the user interface (UI) is shown to the user but does not require any action from the end user.

Inventory/Report

Peripheral Firmware Update Information Location

The result of firmware updates, including error codes and versions, are stored on the host platform for querying. Several values are stored in the registry:

Registry Key: *HKLM\SOFTWARE\HP\HP Firmware Installer\DEVICE_NAME*

- Available Package Version

  Description: This is the version of the firmware package that has been staged on the system. It will be the same as the version that shows up for the installer in Add/Remove Programs.
  Registry Value: AvailablePackageVersion

- Installed Package Version

  Description: This is the version that was installed or verified to be on the last connected device. This value will not be updated if the software has stopped checking firmware due to the configuration options above that may be set to disable after successful or failed updates.
  Registry Value: InstalledPackageVersion

- Error Code

  Description: The error code produced from the last firmware update attempt. This will come from one of the error codes listed in the Immediate Installation section above.
  Registry Value: ErrorCode

- Last Time Firmware Installed

  Description: The date and time of the last time a firmware update was performed.
  Registry Value: LastInstalled

- Last Time Firmware Checked

  Description: the date and time of the last firmware version check of a device.
  Registry Value: LastChecked

ConfigMgr – Extend Hardware Inventory to Include Thunderbolt Dock Firmware Information

The dock firmware upgrade information in the registry can be collected to management systems. Below are the example steps to extend ConfigMgr to report:

Extend configuration.mof to retrieve Thunderbolt dock firmware update information to ConfigMgr

On the site server, append the following to configuration.mof. The mof file can be found at C:\Program Files\Microsoft Configuration Manager\inboxes\clifiles.src\hinv. This will update the ConfigMgr client policy to get the Thunderbolt Dock G2 firmware information from the registry of HP clients back to ConfigMgr.

```
#pragma namespace ("\\\\.\\root\\cimv2")

#pragma deleteclass("HP_ThunderboltDockG2Firmware", NOFAIL)

[DYNPROPS]

Class HP_ThunderboltDockG2Firmware

{

        [key] string KeyName;

        String AvailablePackageVersion;

        String InstalledPackageVersion;

        Uint32 ErrorCode;

        String LastInstalled;

        String LastChecked;

};


[DYNPROPS]

Instance of HP_ThunderboltDockG2Firmware

{

        KeyName="RegKeyToMOF";

        [PropertyContext("Local|HKEY_LOCAL_MACHINE\\SOFTWARE\\HP\\HP Firmware Installer\\HP Thunderbolt
        Dock G2|AvailablePackageVersion"),Dynamic,Provider("RegPropProv")] AvailablePackageVersion;

        [PropertyContext("Local|HKEY_LOCAL_MACHINE\\SOFTWARE\\HP\\HP Firmware Installer\\HP Thunderbolt
        Dock G2|InstalledPackageVersion"),Dynamic,Provider("RegPropProv")] InstalledPackageVersion;

        [PropertyContext("Local|HKEY_LOCAL_MACHINE\\SOFTWARE\\HP\\HP Firmware Installer\\HP Thunderbolt
        Dock G2|ErrorCode"),Dynamic,Provider("RegPropProv")] ErrorCode;

         [PropertyContext("Local|HKEY_LOCAL_MACHINE\\SOFTWARE\\HP\\HP Firmware Installer\\HP Thunderbolt
        Dock G2|LastInstalled"),Dynamic,Provider("RegPropProv")] LastInstalled;

        [PropertyContext("Local|HKEY_LOCAL_MACHINE\\SOFTWARE\\HP\\HP Firmware Installer\\HP Thunderbolt
        Dock G2|LastChecked"),Dynamic,Provider("RegPropProv")] LastChecked;

};
```

Add the peripheral firmware information to the reported hardware inventory classes

Save the text below to a text file, ThunderboltG2.HWInvExt.mof.

```
#pragma namespace ("\\\\.\\root\\cimv2\\SMS")

#pragma deleteclass("HP_ThunderboltDockG2Firmware", NOFAIL)
```

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```
[SMS_Report(TRUE),SMS_Group_Name("HP_ThunderboltDockG2Firmware
"),SMS_Class_ID("HP_ThunderboltDockG2Firmware")]

Class HP_ThunderboltDockG2Firmware: SMS_Class_Template

{

        [SMS_Report(TRUE),key] string KeyName;

        [SMS_Report(TRUE)] String AvailablePackageVersion;

        [SMS_Report(TRUE)] String InstalledPackageVersion;

        [SMS_Report(TRUE)] Uint32 ErrorCode;

        [SMS_Report(TRUE)] String LastInstalled;

         [SMS_Report(TRUE)] String LastChecked;

};
```

Follow these steps to report Thunderbolt Dock G2 firmware information in the hardware inventory for supported HP systems in ConfigMgr console.

Administration workspace > **Client Settings** > right click **Default Client Settings** > select **Properties** > **Default Settings** dialog shows.

In **Default Settings** dialog > click **Hardware Inventory** on the left pane > click **Set Classes** … on the right pane > **Hardware Inventory Classes** dialog shows.

In **Hardware Inventory Classes** dialog, click **Import…** > In **Import** dialog, browse to **ThunderboltG2.HWInvExt.mof** and click **Open**. HP_ThunderboltDockG2Firmware class should be added successfully in the **Import Summary**. Click **OK** to close all the opened dialogs.
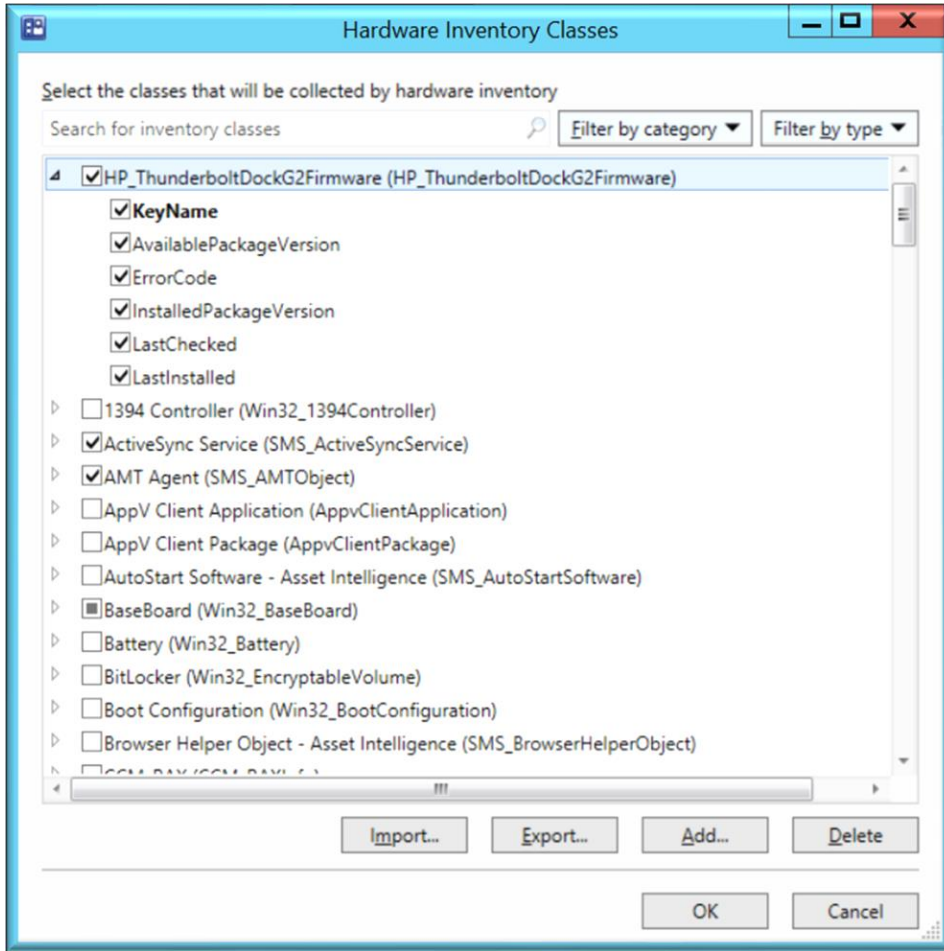
After the updated hardware inventory information from clients has been collected and processed in ConfigMgr, a device that has the peripheral firmware information should show the following in Resource Explorer:
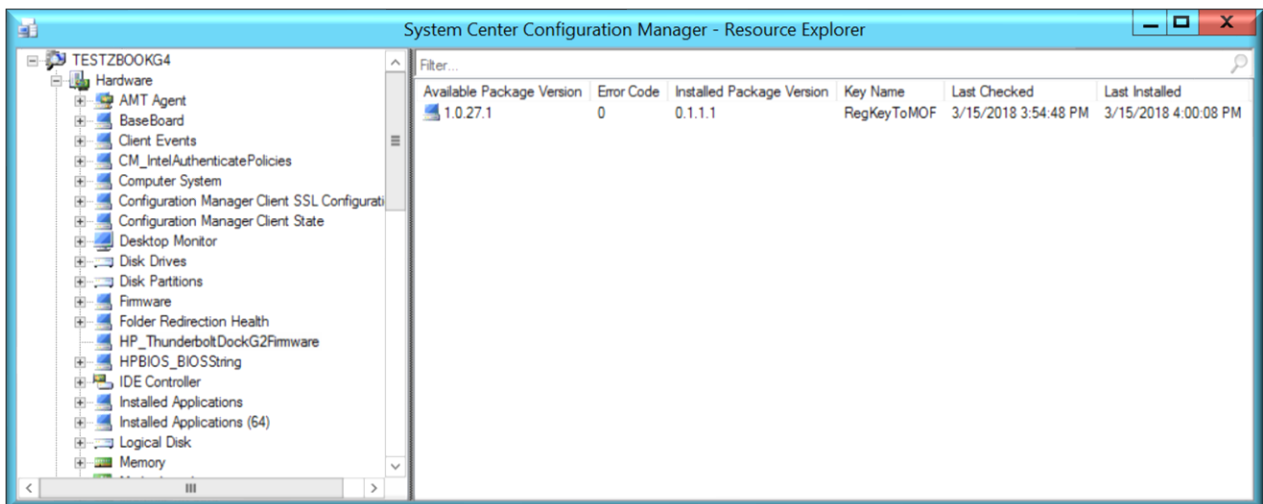
For more information

HP Thunderbolt Dock G2 Specification

https://support.hp.com/us-en/document/c05913756

HP Client Management Solutions

https://www.hp.com/go/clientmanagement

Sign up for updates
hp.com/go/getupdated