



INTEL® PROSET /WIRELESS BLUETOOTH TECHNOLOGY 21.110.0.3 PV SOFTWARE RELEASE

Ww28, 2020

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RELEASE OVERVIEW

Intel is pleased to announce the Bluetooth 21.110.0.3 PV release

The purpose of this release is to provide key fixes for USB and UART Bluetooth adapters.

- **All Drivers are PV versions on the platforms listed below.**
 - **USB drivers for AX201, AX200 and other currently supported adapters are PV versions to support** - KBL, GLK, CNL, CFL, WHL, AML, ICL and CML platforms.
 - **UART drivers for AX200 UART SKU for LKF platform.**

For the complete list of drivers and platforms supported, please see [slide#4](#).

- This release package (PHBTW12144_21.110.0.3G.zip) has different drivers per POA – the driver versions in the [slide #5](#) matrix will appear in Device Manager.
- The drivers included are certified **for Windows 10 May 2020 Update (20H1)**
- Additionally, this release contains certified drivers for Windows 10 October 2018 Update (RS5) and Windows 10 May 2019 Update (19H1).
 - WHCP requirements of Windows 10 19H1 persists in Windows 10 19H2, hence *there are no separate certified drivers for Windows 10 19H2.*

GENERAL INFORMATION

BLUETOOTH SOFTWARE BUILD, SUPPORTED HARDWARE AND TESTED PLATFORMS

Bluetooth Software Build for Windows

TIC	PHBTW12144_21.110.0.3
FILE	PHBTW12144_21.110.0.3G.Zip

Supported Hardware

Cyclone Peak2 (CcP2)/AX200 (Including UART SKU)

Harrison Peak2(HrP2)/AX201

Thunder Peak2 (ThP2)/AC9260

Jefferson Peak2 (JfP2)/9560

Jefferson Peak1 (JfP1)/9461/9462

Windstorm Peak(WsP)/8265

Sandy Peak(SdP)/3168

Snowfield Peak(SfP) / 8260

Douglas Peak(DgP) / 18260 (WiGig)

Maple Peak (MP)/17265 (WiGig)

Stone Peak 2 D0 (StP2) / 7265

Stone Peak 1 (StP1) / 3165

Tested Platform

Sky Lake

Kaby Lake, Kaby Lake- R, Kaby Lake –Y R

CNL-U

Coffee Lake –S/H

Whiskey Lake

Amber Lake

Ice Lake

Comet Lake

Lakefield (AX200 UART SKU only)

POA DRIVER MATRIX: NON-DCH AND DCH

21.110.0.3 (PHBTW12144)	Win10
HrP2	21.110.0.3*
CcP2	21.110.0.3*
JfP	21.110.0.3*
ThP	21.110.0.3*
CcP2 UART SKU	21.110.0.3*
WsP	21.110.0.3*
SfP	21.110.0.3*
SdP	20.100.7.1*
StP D0/D1	20.100.7.1*

Colours, group the same driver version.

*** indicates change** in driver version, when compared to the last HF PV Version **21.90.2.1**

NEW BLUETOOTH FEATURES IN 21.110.0.3 PV

ID	SUMMARY	FEATURE BENEFITS	ADAPTERS
DCR-646, 649	Bluetooth Adaptive Frequency Hopping (AFH) Channel Classification algorithm Improvements: Bluetooth AFH algorithm has been revisited and adapted now to increase frequency diversity in congested wireless environments. The new algorithm improves the channels that are to be blocked due to interference and also to recover good channels when the availability of Bluetooth channels go below certain threshold.	These changes are expected to improve user experience by improving audio quality and HID latencies in multi profile scenarios and congested radio environments.	CcP2/HrP2
DCR-512	Bluetooth LE (HID) Connection Interval Optimizations: LE HID devices (mouse/keyboard) use very high polling frequency, typically between 7.5ms and 11.25 ms. PC continues this polling even when the HID device is inactive, Bluetooth controller is in D2 State and platform is in <i>Modern Standby</i> state. This optimization skips some LE poll events for a period up to 45ms, when the controller is in D2 and connection is idle.	This feature decreases power consumption of the Bluetooth controller significantly [25%-50%] *in the <i>HID Connected Idle</i> scenario.	CcP2/HrP2/ ThP2/JfP2/ JfP1

*Please refer to performance collaterals on 21.110 for the power saving achieved on different adapters, as tested in standard test conditions.

KEY CORRECTED ISSUES - 21.110.0.3 PV

[c] indicates that the issue was found by customer.

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	TITLE	NIC OS OBSERVED	ROOT CAUSE/COMMENTS	FUNCTIONAL AREA
BT-10764	✓	✓	Audio Playback fails to return after a skype call with Air pods	HrP2 Win 10 20H1	<i>Root Cause:</i> This is an inter-operability issue, as remote device is taking more time to respond to SCO connection closure(Skype call). Due to its design, remote device delays to acknowledge the SCO connection closure when silence packets are being sent. <i>Fix:</i> The fix now sends null packets instead of silence packets, with which the remote device is able to respond faster.	HFP
BT-10716	✓	✓	Bluetooth disappears in Airplane Mode	Jfp1(Pulsar and Quasar) Win 10 20H1	<i>Root Cause:</i> A specific code path takes an infinite loop when the available memory in the FW for debug becomes NIL. <i>Fix:</i> The specific code path has been rectified preventing the infinite loop.	State Transition
BT-8416	✓	✓	Bluetooth HID Mouse Lagging while playing Music and with Wi-Fi Co-ex data.	CcP2/HrP2 on Win 10 20H1	<i>Root Cause:</i> ACL link scheduling was getting suddenly bumped up to critical priority in Co-ex environments and HID scheduling was getting delayed. This was due to un-adapted thresholds for detecting starvation. <i>Fix:</i> The thresholds to detect ACL scheduling starvation has been adapted.	HID/LE HID
BT-12002/ BT-11957/ BT-11765 [c]	✓	✓	A second Bluetooth LE device fails to connect/pair if another LE device is already connected.	HrP2 Win 10 20H1	<i>Root Cause:</i> When the second device advertises to the Bluetooth controller, the controller delays connection establishment, resulting in a timeout at the remote device. This delay is attributed to execution in the FIQ(Fast Interrupt Request) handler. <i>Fix:</i> FIQ handler has been optimized.	

KEY CORRECTED ISSUES - 21.110.0.3 PV [CONT]

[c] indicates that the issue was found by customer.

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	TITLE	NIC OS OBSERVED	ROOT CAUSE/COMMENTS	FUNCTIONAL AREA
BT-8457	✓	✓	Sometimes Audio Glitches observed while Playing Music A2DP mode	ThP2 on Win10 RS5	Root Cause: Audio glitches are due to increased retransmission rate caused due to channels being blocked for Bluetooth. Fix: DCR-646 brings in changes to channel blocking and unblocking(AFH) resolves this issue. [Refer to Slide 6]	A2DP

*The following security issues are resolved in this release:
see INTEL-TA-00403 which will be posted on Tuesday, August 4th 2020.*

KNOWN ISSUES & LIMITATIONS - 21.110.0.3 PV

[N] indicates issues which have not been reported/observed in earlier releases.
[c] indicates that the issue was found by customer.

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	SUMMARY	IMPACT ON THE USER	NIC/OS OBSERVED	WORKAROUND RECOVERY PROCEDURE	COMMENTS	IMPACTED FUNCTIONAL AREA
BT-10473 [†]	✓	✓	Bluetooth LE mouse stopped working due to LE connection fail with error code 0x02 unknown identifier	UX	CcP2/HrP2/Jf P2 on Win 10 19H2/20H1	None	Only Two known occurrences so far.	Bluetooth LE/HID
BT-18717	✓	NA	A second Bluetooth LE device fails to connect/pair if another LE device is already connected.	UX	ThP2 on Win 10 20H1	None	Fix is expected in 21.120	
BT-18648 [†]	✓	✓	Connection of 2nd LE device to the DUT in the presence of eSCO traffic is inconsistent.	UX	HrP2/CcP2 on Win 10 20H1	None	NA	
BT-11863 [†]	✓	✓	Sometimes Bluetooth mouse can stop working due to connection timeout or connection Limit exceed	UX	CcP2/HrP2 on Win 10 20H1	None	Connection recovers within ~5-6 seconds	
BT-11873 [†]	✓	✓	In some scenarios, we can observe Audio Glitches in open environments with HFP.	UX	HrP2 on Win 10 20H1	None	NA	HFP

KNOWN ISSUES & LIMITATIONS - 21.110.0.3 PV(CONT)

[N] indicates issues which have not been reported/observed in earlier releases.
[c] indicates that the issue was found by customer.

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	SUMMARY	IMPACT ON THE USER	NIC/OS OBSERVED	WORKAROUND RECOVERY PROCEDURE	COMMENTS	IMPACTED FUNCTIONAL AREA
BT-11975	✓	NA	Bluetooth disappears due to System Exception (Error Code: 0xC)	UX	HrP2 on Win 10 20H1	None	Issue is seen only when the Inquiry window is kept open for a very long term.	Stability

ISSUES NO LONGER OBSERVED/CLOSED FOR OTHER REASONS/NON-INTEL BT - 21.110.0.3 PV

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	TITLE	NIC OS OBSERVED	NOTES
NOT APPLICABLE.					

ADDITIONAL NOTES

- The IBTSIVA is ON by default for all HW/SW combinations except for the DCH releases.
- Extension INF files are the method to enable services and install options in DCH releases.
- Bluetooth extension INF files have already been resold to customers that requested them. Please see your Intel Wireless account manager for further information on this topic.
- Extension INF files and BT specific debug tools are now included as part of Generic VIP Package. Please consult [slide 12](#) for VIP Package contents

BT RELEASE HISTORY

Milestone Release Name	Release Week	BT TIC	BT KIT
21.40.0.1 PV	Ww 34	iBTW6668	133198
21.40.1.1 HF PV	Ww 34	iBTW6678	133298
21.50.0.1 PV	Ww40	PHBTW00028	133662
21.60.0.4 PV	Ww48	PHBTW00301	134212
21.70.0.3 PV	Ww02	PHBTW00407	134502
21.80.0.3 PV	Ww08	PHBTW4811	135056
21.90.0.4 PV	Ww15	PHBTW7035	135611
21.90.1.1 HF1 PV	Ww17	PHBTW7337	135721
21.90.2.1 HF PV	Ww20	PHBTW8806	135997
21.90.3.1 HF PV	Ww22	PHBTW9378	136098
21.110.0.3 PV	Ww28	PHBTW12144	136401

This Release 



INTEL BLUETOOTH SW RELEASE VIP KIT CONTENTS

File Name	Description
PHBTW12144_21.110.0.1G.zip	BT SW installation files for Generic Layout
Bluetooth_Debug_Tools.Zip	Contains the following: 1. lbt_tools.zip - IBT USB trace tool 2. ibterverify – tool for verification of BT Error recovery (Refer TA Document No: 616292) 3. Intel Bluetooth OEM Tools.msi - Required for DRTU installation, Please refer to DRTU User Guide for installation instructions of DRTU.
Others	<ol style="list-style-type: none">1. Release note2. Installation guide3. License agreement

GLOSSARY

COEX = Coexistence. This refers to when Bluetooth and Wifi are both operating simultaneously in the 2.4Ghz band. Collisions between the radios can occur and degrade performance.

PC = Production Candidate – Part of the initial software series on a new adapter (e.g. alpha, beta, PC, PV)

PV = Production Version – Software that is approved for shipping

SP = Service Pack – an intermediate release between major release. It usually only has defect corrections.

MR = Major Release – Includes new features and defect corrections.

WA = Workaround

RN = Release Note

HF = Hot Fix – a software release with minimal change. Created to resolve a urgent customer need.

YB – Yellow exclamation mark in device manager. Indicates that a driver is not functioning properly

Ibtsiva – Software service that runs after certain sleep cycles and restarts the BT device upon YB detection

POA – Platform, OS, Adapter e.g. (Kaby lake, RS1, WsP) – usually refers to OS/Adapter combo.

ATS – Adaptive Time Share

ADAPTER W. BT/NUMBER

Cyclone Peak 2 AX200
Harrison Peak 2 AX201
Thunder Peak 2/ 9260
Thunder Peak 1/ 9162
Jefferson Peak 2/ 9560
Jefferson Peak 1 Single Antenna 9461
Jefferson Peak 1 Diversity 9462
Windstorm Peak / 8265
Oak Peak (WiGiG) / 18265
Snowfield Peak / 8260
Douglas Peak (WiGiG) / 18260
Sandy Peak / 3168
Stone Peak 2 / 7265
Maple Peak (WiGiG) / 17265
Stone Peak 1 / 3165
Wilkins Peak 2 / 7260
Wilkins Peak 1 / 3160
Jackson Peak 1 / 2230
Jackson Peak 2 / 6235

KEY CORRECTED ISSUES - [FROM PREV HOT FIX RELEASE]

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	Title	NIC OS Observed	Root Cause/Comments	Functional Area
BT-10997/ BT-11213 ^[c]			LEExtendedAdvertising (Development and Integration) fails with "ERROR: CheckRadioAdvertisingFeatures ERROR".	SfP/WsP on Win 10 20H1	<p><i>Root Cause:</i> Due to incorrect implementation in the INF file, BT 4.2 compliant SfP and WsP drivers were announcing support to BT 5.0 leading to the execution of this test case related to LE Extended Advertising, hence this error.</p> <p><i>Fix:</i> The INF file has been rectified.</p> <p>Note: This fix was included in 21.90.0.4 release however due to dependency on 20H1 validation, fix is declared as part of this release. Hence you will not observe any change in the WsP/SfP driver version between 21.90 PV and this HF release.</p>	WHQL
BT-11188/ BT-11039 ^[c]			WHQL Test: Bluetooth - LEExtendedAdvertising (Development and Integration) TEST Fail	JfP2/JfP1/HrP2 on Win 10 20H1	<p><i>Root Cause:</i> LE Scans have a window of 37ms. Whenever the Scan Scheduler, gets an early sync within the window – it schedules a second LE Scan. For any reason if the remaining time is too less, the job scheduling can be corrupted, causing all subsequent jobs to be incorrectly programmed. This leads to a watchdog exception.</p> <p><i>Fix:</i> The fix involves detecting the scheduling corruption and recovering the next job scheduling.</p>	
BT-10308	✓	✓	The sounds come out discontinuously from Galaxy buds	HrP2 on Win 10 19H2	<p><i>Root Cause:</i> The Audio discontinuity is because of the lack of usable Bluetooth channels in a Co-Ex environment.</p> <p><i>Fix:</i> Usable channels are determined by their interference measurements. Once the available number of channels become less than the threshold, channel recovery algorithm is executed to reclaim the usable channels with additional criteria.</p> <p>PLEASE NOTE: This issue, in addition to this Bluetooth fix, requires Wi-Fi driver version 21.90.1.2 or later to be resolved.</p>	AFH/ AUDIO
[c] indicates that the issue was found by customer.						

KEY CORRECTED ISSUES - [PREVIOUS HOT FIXES]

[c] indicates that the issue was found by customer.

ID	APPLICABLE FOR USB	APPLICABLE FOR UART	TITLE	NIC OS OBSERVED	ROOT CAUSE/COMMENTS	FUNCTIONAL AREA
BT-11510[C]	✓	✓	The first key stroke is missed from a BT keyboard after remote wakeup.	CcP2 UART/ Win 10 19H2	<p><i>Root Cause:</i> We observe that when the Bluetooth controller is resuming from D2 state due to remote device, the ACL packet is reaching the controller earlier than the IOCTL_read req at the iBTUART driver. This causes the first ACL packet to be dropped.</p> <p><i>Fix:</i> The first ACL packet is cached until the IOCTL_read_req is processed.</p>	HID
BT-11356/ BT-11597[C]	✓	✓	The BSOD « 0x7E » is observed on LKF CCP2 platform.	CcP2 UART/ Win 10 20H1	<p><i>Root Cause:</i> During ACL data transfer from the remote device, an IOCTL read request is issued, which triggers the WDFREQUESTCOMPLETE API. In some cases this API is invoked twice erroneously leading to this BSOD.</p> <p><i>Fix:</i> Scenario is corrected to ensure that the API is triggered only once.</p>	SYSTEM STABILITY

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Estimated results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

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