



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at wvOASIS.gov. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at WVPurchasing.gov with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 6

List View

General Information | Contact | Default Values | Discount | Document Information

Procurement Folder: 499812

SO Doc Code: CRFQ

Procurement Type: Central Purchase Order

SO Dept: 0803

Vendor ID: VS0000017494

SO Doc ID: DOT1900000033

Legal Name: Wireless Investors LLC

Published Date: 10/22/18

Alias/DBA: Ensemble Solutions Group

Close Date: 11/7/18

Total Bid: \$99,194.40

Close Time: 13:30

Response Date: 11/05/2018

Status: Closed

Response Time: 17:31

Solicitation Description: ADDENDUM 1 HP WINDOWS BASED OR EQUAL TABLETS W/

Total of Header Attachments: 6

Total of All Attachments: 6

Apply Default Values to Commodity Lines

View Procurement Folder

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	HP Z book X360 or Equal Windows Tablet	30.00000	EA	\$2,608.300000	\$78,249.00

Comm Code	Manufacturer	Specification	Model #
43211509			

Extended Description :	HP Elite X2 Windows Tablet or Equal
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Comments: ZBook Studio 360 G5/X2.7 16GB 512G W10P MFR#4NL44UT#ABA

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Warranty upgrade windows tablets with accident damage protec	30.00000	EA	\$372.930000	\$11,187.90

Comm Code	Manufacturer	Specification	Model #
81111818			

Extended Description :	Warranty upgrade windows tablets with accident damage protec
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Comments: MFR # UQ834E Carepack 4YR

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Powered docking stations	30.00000	EA	\$325.250000	\$9,757.50

Comm Code	Manufacturer	Specification	Model #
43211602			

Extended Description :	Powered docking stations
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Comments: MFR # 3TR87UT#ABA TB Dock G2 with combo cbl.

Overview

HP ZBook Studio x360 G5 Mobile Workstation



- 1. HP ZBook x360 Pen (optional)
- 2. HP x360 hinge
- 3. HD Camera

- 4. IR Camera
- 5. Microphone

Overview



FRONT VIEW

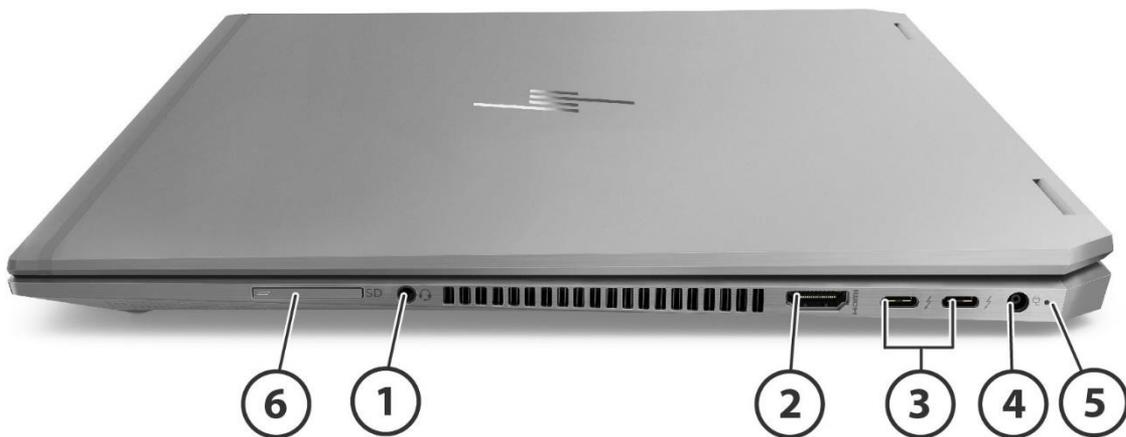
- | | | | |
|----|--------------------|----|--------------------|
| 1. | Clickpad | 3. | Speakers |
| 2. | Fingerprint sensor | 4. | Collaboration Keys |

Overview



LEFT VIEW

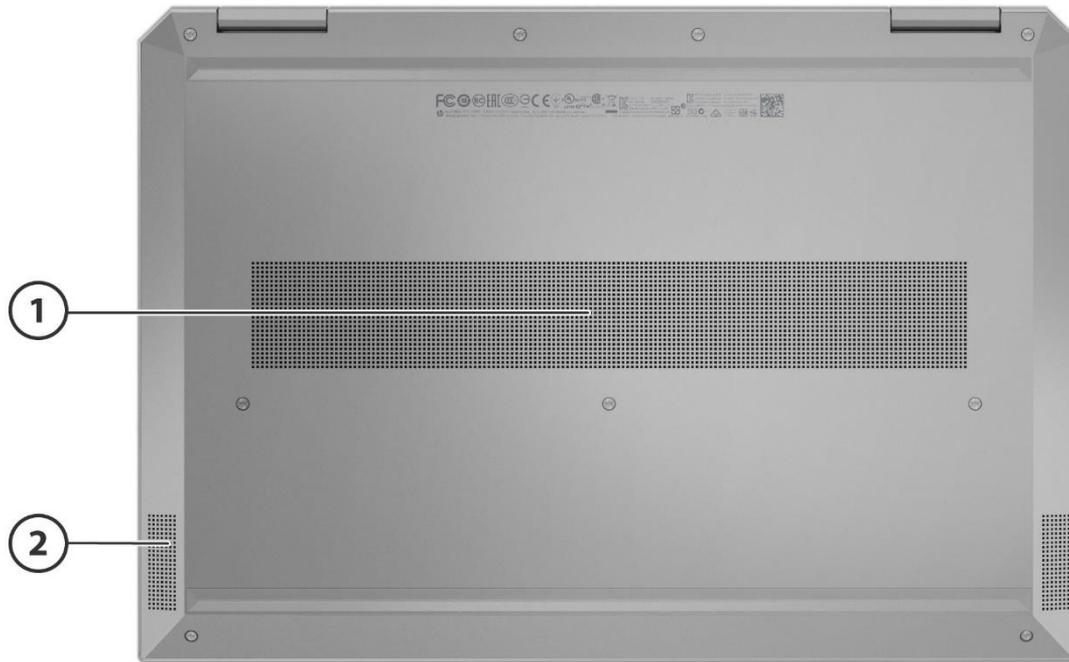
- | | |
|--------------------------|------------------------|
| 1. USB 3.0 | 3. Security cable slot |
| 2. USB 3.0 charging port | 4. Power Button |
| | 5. Micro SIM slot |



RIGHT VIEW

- | | |
|--|--------------------|
| 1. Stereo microphone in / headphone-out combo jack | 4. Power connector |
| 2. HDMI 2.0 | 5. Power LED |
| 3. Thunderbolt™ 3 ports | 6. SD Card Reader |

Overview



BOTTOM VIEW

1. Fan Venting

2. Speakers

Overview

At A Glance

- New convertible design with 5 versatile modes (laptop, tablet, stand, tent, dock) delivering workstation-class performance in every mode. 15.6" diagonal design starting at just 4.99 pounds.
- X360 form factor with pen and touch capabilities allows users new ways to complete their workflows quicker and easier; HP ZBook x360 Pen provides 4,096 points of pressure sensitivity and a great inking experience for creation and annotation.
- Tested and passed 14 MIL-STD-810G tests*.
- Workstation-caliber NVIDIA® Quadro® discrete graphics featuring NVIDIA® Optimus technology:
 - NVIDIA® Quadro® P1000 4GB GDDR5
 - NVIDIA® Quadro® P2000 4GB GDDR5
- Intel® Integrated graphics: Intel® UHD Graphics 630 integrated on Intel® Core™ i7 and Core™ i9 processors and Intel® UHD Graphics P630 integrated on Intel® Xeon® processors.
- ISV certified to provide fast and reliable performance with workstation applications, including manipulation of 3D textures
- Choice of six-core Intel® Xeon® processors, 8th Generation Intel® Core™ i9 or Core™ i7 or quad-core 8th Generation Core™ i5 processors .
- Intel® Core™ i7 with vPro™, Intel® Core™ i5 with vPro™ technology or Intel® Xeon® with vPro™ technology (optional)
- HP Performance Advisor for optimal configuration, stability, compatibility and best performance
- Up to two SODIMMs supporting up to 32 GB DDR4-2667 MHz dual channel memory (up to 64GB DDR4-2667 MHz configuration coming in December 2018). ECC memory available with Intel® Xeon® processors.
- Featuring HP Collaboration Keyboard with Clickpad to manage most commonly used conferencing functions with a single keystroke
- Innovative HP World-Facing third mic supports HP Noise Cancellation Software.
- Supports multi-display, including up to three (3) displays without a docking solution, with hybrid graphics enabled. Supports up to five (5) displays with HP Thunderbolt™ Dock G2 (sold separately), with hybrid graphics enabled.
- Two (2) Thunderbolt™ 3 ports (supporting DP 1.3, USB 3.1, PCIe Gen 3 devices) on the new USB-C™ connector, for high speed data/video/audio transfer support.
- Audio by Bang and Olufsen optimized for high fidelity audio with immersive surround sound with deep, rich bass and crystal-clear dialog without distortion at high volume, and new discrete amp.
- HP Long life battery solution: 4-cell (64 WHr) or 6-cell (96 WHr) supporting HP Fast Charge: charges 50% of the battery in 45 minutes.
- 15.6-inch diagonal LED-backlit display:
 - FHD IPS eDP + PSR touch screen with Corning® Gorilla® Glass 3, 400 nits with ambient light sensor 100% sRGB (1920x1080)
 - HP Sure View FHD IPS eDP + PSR touch screen with Corning® Gorilla® Glass 3, 650nits sRGB (1920x1080)
 - UHD IPS eDP + PSR touch screen with Corning® Gorilla® Glass 3, 400 nits with ambient light sensor 100% sRGB (3840x2160)
 - HP DreamColor Technology UHD IPS eDP + PSR touch screen with Corning® Gorilla® Glass 3, 600 nits, 100% Adobe RGB (3840x2160)
 - HP DreamColor Technology UHD IPS eDP + PSR anti-glare touch screen with Corning® Gorilla® Glass 3, 600 nits, 100% Adobe RGB (3840x2160)
- Wireless connectivity options:
 - Intel® Dual Band Wireless-AC 9560 802.11 AC/a/b/g/n (2x2) WLAN and Bluetooth® 5.0 combo adaptor (vPro™)
 - Intel® Dual Band Wireless-AC 9560 802.11 AC/a/b/g/n (2x2) WLAN and Bluetooth® 5.0 combo adaptor (non-vPro™)
 - Optional integrated wireless 4G (LTE) mobile broadband module support
- Three (3) dedicated drive slots, two (2) M.2 slots, and one (1) 2.5" drive supporting up to 5 TB of storage
- Enterprise grade security with HP SureStart Gen4, HP Privacy Camera³, HP Sure View², HP Sure Run, HP Sure Recover, and Fingerprint sensor², plus optional RAID 1** (mirroring) from HP.

*MIL STD 810G testing is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

** RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology. Available December 2018

Overview

NOTE: See important legal disclosures for all listed specs in their respective features sections.

Features

OPERATING SYSTEM

Preinstalled

Windows 10 Pro 64 – HP recommends Windows 10 Pro*
Windows 10 Pro for Workstations 64*
Windows 10 Home 64 *

FreeDOS 2.0

Supported

Windows 10 Enterprise 64*
RedHat® Enterprise Linux® (REHL) 7
Ubuntu Linux 16.04
For additional Linux OS information, please reference our Linux Hardware Matrix:
<http://h10032.www1.hp.com/ctg/Manual/c00060684.pdf>

*Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>

PROCESSOR*

8th Generation Intel® Core™ i5-8300H with Intel® UHD Graphics 630 (2.3 GHz (up to 4.0 GHz)/2667 MHz/ 8 MB L3 cache/45W)

8th Generation Intel® Core™ i5-8400H vPro™ processor with Intel® UHD Graphics 630 (2.5 GHz (up to 4.2 GHz)/2667 MHz/ 8 MB L3 cache/45W)

8th Generation Intel® Core™ i7-8750H with Intel® UHD Graphics 630 (2.2 GHz (up to 4.1 GHz)/2667 MHz/ 9 MB L3 cache/45W)

8th Generation Intel® Core™ i7-8850H vPro™ processor with Intel® UHD Graphics 630 (2.6 GHz (up to 4.3 GHz)/2667 MHz/ 9 MB L3 cache/45W)

8th Generation Intel® Core™ i9-8950HK processor with Intel® UHD Graphics 630 (2.9 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores)

Intel® Xeon® E-2176M vPro™ processor with Intel® UHD Graphics P630 (2.7 GHz (up to 4.4 GHz)/2667 MHz/12 MB L3 cache/45W)

Intel® Xeon® E-2186M vPro™ processor with Intel® UHD Graphics P630 (2.9 GHz (up to 4.6 GHz)/2667 MHz/12 MB L3 cache/45W)

* Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

** Some functionality of Intel® Core™ i5 with vPro™/Core™ i7 with vPro™/Xeon® with vPro™ technology, such as Intel® Active Management technology and Intel® Virtualization technology, requires additional third- party software in order to run. Availability of future "virtual appliances" applications for Intel® Core™ i5 with vPro™/Core i7 with vPro™/XEON® with vPro™ technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

*** Some functionality of Intel® Core™ i5 with vPro™/Core™ i7 with vPro™/Xeon® with vPro™ technology, such as Intel® Active Management technology and Intel® Virtualization technology, requires additional third- party software in order to run. Availability of future "virtual appliances" applications for Intel® Core™ i5 with vPro™/Core i7 with vPro™/XEON® with vPro™ technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

NOTE: In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel® and AMD 7th generation and forward processors or provide any Windows®8 or Windows 7 drivers on <http://www.support.hp.com>

Features

CHIPSET

Mobile Intel® CM246

INTEL® CORE™ I5 WITH VPRO/CORE I7 WITH VPRO/XEON® WITH VPRO TECHNOLOGY CAPABLE

Intel® Core™ i5 with vPro™, Core™ i7 with vPro™ and XEON® with vPro™ technology is a selectable feature that is available on units configured with select processors, a qualified Intel® WLAN module and a preinstalled Windows® operating system. It provides advances in remote manageability, security, energy efficient performance, and wireless connectivity. Intel® Active Management Technology (iAMT) offers built-in manageability and proactive security for networked mobile workstations, even when they are powered off* or when the operating system is inoperable. It can help identify threats before they reach the network, isolate infected systems, and update regardless of their power state.

* Requires a Windows operating system, network hardware and software, connection with a power source, and a direct (non-VPN) corporate network connection which is either cable or wireless LAN.

NOTE: Some functionality of Intel® Core™ i5 with vPro™/Core™ i7 with vPro™/Xeon® with vPro™ technology, such as Intel® Active Management technology and Intel® Virtualization technology, requires additional third- party software in order to run. Availability of future "virtual appliances" applications for Intel® Core™ i5 with vPro™/Core i7 with vPro™/XEON® with vPro™ technology is dependent on third- party software providers. Compatibility with future "virtual appliances" is yet to be determined.

Features

GRAPHICS

Integrated

Intel® UHD graphics 630^{1,2}
Intel® UHD graphics P630^{1,2}

Discrete^{3,4}

NVIDIA® Quadro® P1000 with 4 GB dedicated GDDR5 video memory
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable
NVIDIA® Quadro® P2000 with 4 GB dedicated GDDR5 video memory
Microsoft DirectX 12 (Shader Model 5.0) and OpenGL 4.4 capable

NOTE 1: UHD content required to view UHD images

NOTE 2: Intel® UHD graphics 630 is configurable as a standalone graphics option; Intel® UHD graphics P630 only used when NVIDIA® Optimus™ Technology is enabled.

NOTE 3: NVIDIA® Quadro® mobile professional graphics support up to four independent displays when using a HP ZBook Dock with Thunderbolt™ 3 (sold separately) or DP 1.2 hubs with MST.

Note 4: Must be configured with the 6-cell 96 WHr battery; cannot be configured with a Hard Disk Drive.

NOTE: Intel® UHD Graphics 630 integrated on Core™ i9, Core™ i7 and Core™ i5 processors. Intel® UHD Graphics P630 integrated on Xeon® processors.

DisplayPort™ 1.3 protocol features supported on Thunderbolt™ 3 ports:

- Legacy displays (HDMI, DVI, VGA) may be attached to Thunderbolt™ port with the use of a certified dongle.
- DisplayPort™ monitors capable of supporting DisplayPort™ 1.3 may be directly attached to the Thunderbolt™ port to achieve HBR2 with the use a dongle.
- Thunderbolt™ 3 enabled monitors may be directly attached to the Thunderbolt™ port to achieve HBR2 and MST.
- DisplayPort™ 1.3 MST feature ("daisy-chain" feature) is supported through Thunderbolt™ 3 port on Thunderbolt™ 3 enabled devices or DisplayPort™ 1.3 monitors (requires monitor with DisplayPort™ 1.3 MST capability) with the use of a dongle.
- Up to 2 streams (eight lanes) of DisplayPort™ 1.3 are supported over a single Thunderbolt™ 3 port. Up to (2) 4K displays 24/30-bit color depth at 60 Hz or (1) 5K display supported over a single Thunderbolt™ 3 port. (Requires Intel® certified Thunderbolt™ cable).
- DisplayPort™ 1.3 w/MST (Multi-stream Transport): Supports resolutions up to Full 4K, 24/30-bit color depth at 60 Hz, and WUXGA (1920 x1200) monitors, 24/30-bit color depth at 120 Hz.

*Thunderbolt™ 3 is superset port supporting DisplayPort™ 1.3, USB 3.1 Gen 2, and PCIe Gen 3 devices over the new USB-C™ connector. Install all the latest drivers for your Thunderbolt™ device before connecting the device to the Thunderbolt™ port. Thunderbolt™ cable and Thunderbolt™ device (sold separately) must be compatible with Windows. To determine whether your device is Thunderbolt™ Certified for Windows, see <https://Thunderbolttechnology.net/products>.

Multi-Display Support

Without HP Thunderbolt Dock G2:

HP ZBook Studio x360 with hybrid graphics and without the use of the ZBook dock supports up to a maximum of three independent displays. These three displays are the internal panel plus two external displays connected to two of the three following ports: HDMI 2.0, Thunderbolt™ 3, Thunderbolt™ 3. HP ZBook Studio x360 configuration with Intel® integrated

Features

graphics and without the use of the ZBook dock supports up to a maximum of three independent displays. Any three display combination of the system panel HDMI, Thunderbolt™ 3, Thunderbolt™ 3.

With HP Thunderbolt Dock G2:

The HP Thunderbolt Dock G2 has Thunderbolt™ 3 port, VGA, two DisplayPort™ 1.3, and a USB-C port. When used together with the HP ZBook Studio x360 configuration with hybrid graphics, a maximum of five independent displays are supported. These five displays are internal panel and four external displays connected to the ZBook dock's Thunderbolt™ 3, VGA, and two DisplayPort™ ports. When used together with the HP ZBook Studio x360 configuration with Intel® integrated graphics, a maximum of 3 independent displays are supported. Any three-display combination of the system panel, system ports and ZBook Dock ports.

DISPLAY

Internal

- 15.6-inch diagonal FHD IPS eDP + PSR LED-backlit touch screen display with Corning® Gorilla® Glass 4, 400 nits with ambient light sensor 100% sRGB (1920x1080)
- HP Sure View 15.6-inch diagonal FHD IPS eDP + PSR LED-backlit touch screen display with Corning® Gorilla® Glass 4, 650nits 100% sRGB (1920x1080)
- 15.6-inch diagonal UHD IPS eDP + PSR LED-backlit touch screen display with Corning® Gorilla® Glass 4, 400 nits with ambient light sensor 100% sRGB (3840x2160)
- HP DreamColor Technology 15.6-inch diagonal UHD IPS eDP + PSR LED-backlit touch screen display with Corning® Gorilla® Glass 4, 600 nits, 100% Adobe RGB (3840x2160)
- HP DreamColor Technology 15.6-inch diagonal UHD IPS eDP + PSR LED-backlit anti-glare touch screen display with Corning® Gorilla® Glass 4, 600 nits, 100% Adobe RGB (3840x2160)

NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Features

STORAGE AND DRIVES*

Three (3) dedicated drive slots, two (2) M.2 slots, and one (1) 2.5" drive supporting up to 5TB of storage.

Choose up to 2 M.2

SATA SED Solid State Drives*

256 GB SATA Self Encrypting Drive (SED)

HP Z Turbo Drives (NVMe PCIe SSD)

256GB PCIe (NVMe) TLC Solid State Drive

512GB PCIe (NVMe) TLC Solid State Drive

1 TB PCIe (NVMe) TLC Solid State Drive

2 TB PCIe (NVMe) TLC Solid State Drive

256GB PCIe (NVMe) TLC Opal 2 Solid State Drive

512GB PCIe (NVMe) TLC Opal 2 Solid State Drive

NVMe RAID 1*** (optional)

(2) 1 TB PCIe (NVMe) TLC Solid State Drive

(2) 2 TB PCIe (NVMe) TLC Solid State Drive

Choose up to 1 2.5" Storage Bay Drives*, **

256GB SATA SSD

1 TB SATA SSD

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

** Must be configured with the 4-cell 64Whr battery and no discrete graphics

***RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology. Available December 2018

DRIVE CONTROLLERS

M.2 2280 (SATA) SSD:

SATA-3 for SSD

NVMe M.2 2280 SSD:

PCIe Gen 3 x4

RAID 1

PCIe Gen 3 x4*

Supported RAID 0, 1:

SATA M.2 only

NOTE: RAID 1 configuration from HP must be like for like capacity and only available on NVMe technology.

MEMORY

Standard

32 GB DDR4 ECC or 64 GB DDR4 (available in Decemeber 2018) Non-ECC SDRAM (With transfer rates up to 2667MT/s¹)

Two SODIMM slots supporting dual-channel memory

4 GB, 8GB, 16 and 32 GB SODIMMs (for Intel® Core™ or Xeon® Processors)

8GB and 16 GB ECC SODIMMs (for Intel® XEON® Processors)

Maximum

Upgradeable to 64 GB with optional 32 GB SODIMMs in 2 slots

Features

Dual-channel

Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory channels.

NOTE 1: Only 2 DIMM configurations run at 2667 MHz.

NOTE: Maximum memory capacities assume Windows 64-bit operating systems. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

Features

NETWORKING/COMMUNICATIONS

Wireless

Support for a broad range of secure, integrated wireless LAN options featuring support for the latest industry standards. Integrated Bluetooth® is also available (factory configurable only) and can be combined with any of the supported wireless LAN options.

802.11 Wireless LAN options**

Intel® Dual Band Wireless-AC 9560 802.11ac (2x2) Wi-Fi® and Bluetooth® 5.0 Combo;
Intel® Dual Band Wireless-AC 9560 802.11ac (2x2) Wi-Fi® and Bluetooth® 5.0 Combo, non-vPro™

Wireless WAN - Mobile Broadband options***, ****

Intel® XMM™ 7360 LTE-Advanced
HP It4132 LTE/HSPA+ 4G Mobile Broadband Module

Near Field Communication¹

NFC: NFC Mirage WNC XRAV-1 (NXP NPC300 I2C 10mmx17mm)

*The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

**Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.

***WWAN is an optional feature and requires factory configuration. WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, and in all regions.

****WWAN is not available with UHD panels

¹Sold separately or as an optional feature.

AUDIO/MULTIMEDIA

Audio¹

Audio by Bang & Olufsen, dual stereo speakers
Dual array digital microphone
Optional HP World Facing Microphone
Functions keys for volume up and down
Combo microphone/headphone jack
HD audio; featuring HP Noise Cancellation Software, HP Clear Sound Amp and Skype for Business® Certification

Webcam***

720p HD webcam

Optional 720p HD webcam IR camera for face authentication with Windows Hello

- HD format (widescreen)
- Supports videoconferencing and still image capture

Features

- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity
- Improved dynamic range

* HD content required to view HD images.

**Optional or add-on feature.

Note 1: Dual-microphone array when equipped with optional webcam and optional world facing microphone

Features

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Collaboration Keyboard to manage the most common collaboration function with a keystroke. Backlit keyboard with Function key control to toggle backlit brightness setting - off/full/half brightness

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and a drain system that funnels fluid through a hole in the bottom of the notebook. This minimizes the risk of damage to sensitive components underneath. The 100-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, function keys, and 18.7 x 18.4 mm key pitch (center-to-center spacing). U.S. and International key layouts are available. Other features include hot keys for instant access to power conservation and brightness.

Pointing Devices

Clickpad with multi-touch gestures enabled, taps enabled as default

Microsoft Precision Touchpad Default Gestures Support

HP ZBook x360 Pen for G5

Buttons and Function Keys

Discrete buttons provide easy access to the following features:

F1 – Display Switching

F2 – HP SureView (if configured)

F3 - Brightness Down

F4 – Brightness Up

F5 – Audio mute

F6 – Volume down

F7 – Volume up

F8 – Microphone mute

F9 – Keyboard backlight

F10 – NumLock

F11 – Wireless on/off

F12 – Calendar

F13 – Share screen

F14 – Call

F15 – End Call

Features

SOFTWARE AND SECURITY

Workstation ISV Certifications

See the latest list of certifications at: <http://www.hp.com/go/isv>

HP Remote Graphics Software

The remote desktop solution for serious workstation users and their most demanding applications.

Download at: <http://www.hp.com/go/RGS>

HP Performance Advisor

HP Performance Advisor enables optimal configuration of HP Mobile Workstations delivering stability and best performance. HP Performance Advisor will guide your system setup allowing a "custom" configuration that best matches the workstation to user requirements.

Download at: <http://www.hp.com/go/performanceadvisor>

Standard Security Features

HP BIOSphere Gen4¹

HP DriveLock & Automatic DriveLock

BIOS Update via Network

HP BIOS Config Utility (BCU)⁹

Secure Erase³

Absolute persistence module⁷

Pre-boot Authentication

Power-on authentication

SATA 0,1 port disablement (viaBIOS)

RAID configurations

Serial, USB enable/disable (viaBIOS)

Power-on password (viaBIOS)

Setup password (viaBIOS)

Support for chassis padlocks and cable lock devices

HP Sure Click⁴

One-Step Logon

Security lock slot

Support for Intel® AT

TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)

Measured Boot

HP Sure Click

HP Sure Start G4²

HP Sure Run⁵

HP Sure Recover⁶

Device Access Manager

HP Security Manager (including Credential Manager and Password Manager¹²)

Windows Defender⁸

HP Host Based Mac Address

HP Client Catalog⁹

HP Driver Packs⁹

HP System Software Manager (SSM)⁹

HP Manageability Integration Kit for Microsoft SCCM¹⁰

TPM

Model: Infineon SLB9670

Version: 7.63.3353.0

Revision: TPM 2.0

FIPS 140-2 Compliant: Yes, with Convert TPM to 2.0 (FIPS 140-2) option

Features

Fingerprint Sensor:

Voltage: 3.0-3.6V

Operating temperature: -20° - 85°C

Imaging current: 31mA

Wake on finger current: 40 uA

Capture rate: 30ms/frame

ESD Resistance: IEC 6100-4-2 4B (+/-15KV)

Detection Matrix 363 dpi, sensing area 8x8 mm

Optional Security Features

HP Fingerprint Sensor (optional)¹¹

IR Camera with Windows Hello

Absolute Data Protect* with GPS Tracking - Subscription based security solution providing the ability to track, initiate physical recovery, conduct asset management, and perform remote data delete by utilizing GPS technology. GPS functionality requires HP Mobile Broadband Module.

* The Absolute Data Protect agent is shipped turned off and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

1. HP BIOSphere Gen4 requires Intel® or AMD 8th generation processors.
2. HP Sure Start Gen4 is available on HP Z Workstations products equipped with 8th generation Intel® or AMD processors.
3. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method.
4. HP Sure Click is available on most HP PCs and supports Microsoft® Internet Explorer and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.
5. HP Sure Run is available on HP Elite products equipped with Intel® or AMD® 8th generation processors
6. HP Sure Recover is available on HP Elite PCs with 8th generation Intel® or AMD processors and requires an open, wired network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data
7. BIOS Absolute Persistence module is shipped turned off, and will be activated when customers purchase and activate a subscription. Service may be limited. Check with Absolute for availability outside the U.S. The optional subscription service of Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: <http://www.absolute.com/company/legal/agreements/computrace-agreement>. If Data Delete is utilized, the Recovery Guarantee payment is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either create a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
8. Windows Defender Opt In, Windows 10, and internet connection required for updates.
9. Not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>
10. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>
11. Finger Sensor is optional
12. HP Password manager requires Windows.

Features

HP CENTRAL MANAGEMENT

HP offers a variety of scalable hardware, software, and BIOS-based security features to help you defend your organization against viruses and other threats. These integrated security features safeguard what matters to you the most - your data, device and identity. Now, be confident your fleet of devices is protected in multiple layers of HP Client Security protection.

HP BIOS Protection keeps you up and running with enhanced protection against virus attacks and other threats. And if the BIOS is accidentally compromised, the auto recovery feature automatically restores it to its fully functional state.

HP Sure Start detects and negates a BIOS attack with automatic recovery of the BIOS even when the installation is accidentally compromised (i.e. power outage). When HP Sure Start heals the BIOS an event log is generated that an IT administrator can retrieve so the business is aware of a BIOS attack. Golden copy of BIOS is stored in protected nonvolatile memory providing redundant, hardware-based protection against a new generation of attacks. This helps to future-proof your technology and business.

An optional fingerprint sensor helps keep your identity secure. The security cable slot helps keep your notebook physically secure.

You can even permanently destroy data on your hard drive in preparation for your system disposal or redeployment with Secure Erase.

System Technical Specifications

POWER

Power Supply

HP 150W Slim Smart AC adapter
(153 x 66 x 22 mm)

Primary Battery

HP Long Life 4-cell Polymer Battery (64 WHr) *

HP Long Life 6-cell Polymer Battery (96 WHr) *

NOTE: Battery is internal and not replaceable by the customer

NOTE: HP Long Life 4-cell 64Whr battery can be configured with a hard disk drive and cannot be configured with discrete graphics. HP Long Life 6-cell 96 WHr battery cannot be configured with a hard disk drive and is required in discrete graphics configurations.

Battery Life

Battery life up to 18.5 hours for UMA graphics only configuration**

Battery life up to 16.5 hours for Hybrid graphics configuration**

System Standby Time

Up to 1.4 weeks***

* Available with 3-year limited warranty only

** Battery life will vary depending on the product model, configuration, loaded applications, features, use, wireless functionality and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See MobileMark14 battery benchmark <https://bapco.com/products/mobilemark-2014/> for additional details.

*** Standby life will vary depending on various factors including battery, Memory, CPU, EC and LAN chip. The maximum capacity of the battery will naturally decrease with time and usage.

Power Conservation

NVIDIA® Optimus or AMD Enduro™ technology

Hibernation

Standby

ACPI compliance

ENVIRONMENTAL

US ENERGY STAR®

IT ECO declaration

EPEAT® registered*

Low Halogen**

* EPEAT® registered where applicable. EPEAT registration varies by country. See www.epeat.net for registration status by country. See HP's 3rd party option store for solar energy accessory www.hp.com/go/options.

**External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

System Technical Specifications

WEIGHTS & DIMENSIONS

Weight

Starting at 4.9 lb. (2.22kg.)

Dimensions (w x d x h)

14.17 in x 9.65 in x 0.35 in (front) – 0.74 in (rear)

360 mm x 254 mm x 8.8 mm (front) – 18.7 mm (rear)

Note: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. Weight includes Quad Core CPU, UHD, 4-cell battery, Intel® UHD graphics, no FPR, 8GB x 1 SODIMM, WLAN, M.2 SSD, no camera, no WWAN, no BT.

PORTS/SLOTS

Ports

Left side:

- (1) USB 3.0 Charging Port
- (1) USB 3.0
- (1) Security lock slot

Right side:

- (1) HDMI 2.0
- (2) Thunderbolt™ 3* (Supporting DisplayPort™ 1.3, USB 3.1 Gen2, PCIe Gen 3 devices)
- (1) Stereo microphone in / headphone-out combo jack
- (1) Power Connector
- (1) Full-size SD Card Reader

Thunderbolt™ 3

Thunderbolt™3 ports supports DisplayPort™ 1.3, USB 3.1 Gen 2, and PCIe Gen 3 devices over the new USB-C port connector. The port is compatible with existing DisplayPort™ displays, devices, and cables. Install all the latest drivers for your Thunderbolt™ device before connecting the device to the Thunderbolt™ port. Thunderbolt™ cable and Thunderbolt™ device (sold separately) must be compatible with Windows®. To determine whether your device is Thunderbolt™ Certified for Windows, see <https://thunderbolttechnology.net/products>.

Digital Media Slots

- (1) SD UHS-II Flash Media slot (Supports next generation SD (Secure Digital), backward compatible to SDHC, SDXC,

SERVICE AND SUPPORT

Limited 3-year or 1-year limited warranty options available, depending on country. Batteries have a default one-year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. Optional* HP Care Pack Services are extended service contracts which go beyond your standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at <http://www.hp.com/go/cpc>.

*Sold separately or as an optional feature. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product. Consult your local HP

System Technical Specifications

[Customer Support Center for details.](#)

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	19.5 V	
	Average Operating Power	DreamColor Without DreamColor	Average Operating Power
	Max Operating Power	< 200 W	
Temperature	Operating	32° to 95° F (0° to 35° C)	
	Non-operating	-4° to 140° F (-20° to 60° C)	
Relative Humidity	Operating	10% to 90%, non-condensing	
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature	
Shock	Operating	40 G, 2 ms, half-sine	
	Non-operating	200 G, 2 ms, half-sine	
Random Vibration	Operating	0.75 grms	
	Non-operating	1.50 grms	
Altitude (unpressurized)	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)	
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)	
Industry Standard Certifications	UL	Yes	
	CSA	Yes	
	FCC Compliance	Yes, Class B	
	ENERGY STAR®	Select models*	
	EPEAT®	Gold **	
	ICES	Complete	
	Australia / NZ A-Tick Compliance	Complete	
	CCC	Complete	
	Japan VCCI Compliance	Complete	
	KC	Complete	
	BSMI	Complete	
	CE Marking Compliance	Complete	
	MIL STD 810G	Complete ***	

* Configurations of the HP ZBook Studio that are ENERGY STAR® qualified are identified as HP ZBook Studio G5 ENERGY STAR® on HP websites and on <http://www.energystar.gov>.

** EPEAT® registered where applicable. EPEAT registration varies by country. See <http://www.epeat.net> for registration status by country. See HP's 3rd party option store for solar energy accessory www.hp.com/go/options.

*** MIL STD 810G testing is pending and is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

For accessibility information on HP products, please visit: <http://www.hp.com/accessibility>.

Technical Specifications – Displays

DISPLAYS

15.6" diagonal FHD LED IPS, Touch, with Ambient light sensor 100% sRGB (1920x1080) (400 nits)	Active Area (W x H)	344.16 x 193.59
	Dimensions (W x H)	350.96 x 216.75
	Weight	370 g (max)
	Touch enabled	Yes; Corning® Gorilla® Glass 4
	Contrast Ratio	600:1 (typical)
	Refresh Rate	60 Hz
	Brightness*	400 nits (typical)
	Pixel Resolution	Format 1920 x 1080 (FHD)
		Configuration RGB Stripe
	Backlight	LED
	PPI	141
	Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)

* All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

15.6" diagonal UHD LED IPS, Touch, with Ambient light sensor 100% sRGB (3840x2160) (400 nits)	Active Area (W x H)	344.2176 x 193.62
	Dimensions (W x H)	350.96 x 216.95
	Diagonal Size	15.6 in (39.6 cm)
	Weight	320 g (max)
	Touch enabled	Yes; Corning® Gorilla® Glass 4
	Contrast Ratio	1200:1 (typical)
	Refresh Rate	60 Hz
	Brightness*	400 nits (typical)
	Pixel Resolution	Format 1920 x 1080 (FHD)
		Configuration RGB Stripe
	Backlight	LED
	PPI	282
	Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)

* All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

HP Dream Color Display 15.6" diagonal UHD LED IPS - 10 (8+2) bit color, Anti-glare Touch (3840x2160) (600 nits) 100% Adobe RGB	Active Area (W x H)	344.2176 x 193.62
	Dimensions (W x H)	350.96 x 217.45
	Diagonal Size	15.6 in (39.6 cm)
	Weight	380 g (max)
	Surface Treatment	Anti-glare
	Touch enabled	Yes; Corning® Gorilla® Glass 4
	Contrast Ratio	1200:1 (typical)
	Refresh Rate	60 Hz

Technical Specifications – Displays

Brightness*	600 nits (typical)
Pixel Resolution	Format 3840 x 2160 (UHD)
	Configuration RGB Stripe
Backlight	RG phosphors + Backlit-LED
PPI	282
Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)

HP Dream Color Display 15.6" diagonal UHD LED IPS - 10 (8+2) bit color, Touch (3840x2160) (600 nits) 100% Adobe RGB

Active Area (W x H)	344.2176 x 193.62
Dimensions (W x H)	350.96 x 217.45
Diagonal Size	15.6 in (39.6 cm)
Weight	380 g (max)
Touch enabled	Yes; Corning® Gorilla Glass® 4
Contrast Ratio	1200:1 (typical)
Refresh Rate	60 Hz
Brightness*	600 nits (typical)
Pixel Resolution	Format 3840 x 2160 (UHD)
	Configuration RGB Stripe
Backlight	RG phosphors + Backlit-LED
PPI	282
Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)

HP Sure View Privacy Display 15.6" diagonal FHD LED IPS, Touch, 100% sRGB (1920x1080) (650 nits)

Dimensions (W x H)	350.96 x 216.75
Diagonal Size	15.6 in (39.6 cm)
Weight	320 g (max)
Touch enabled	Yes; Corning® Gorilla® Glass 4
Contrast Ratio	600:1 (typical)
Refresh Rate	120 Hz
Brightness*	650 nits (typical)
Pixel Resolution	Pitch 0.1793 x 0.1793 mm
	Format 1920 X 1080 (FHD)
	Configuration RGB Stripe
Backlight	LED
PPI	141
Viewing Angle	85/85/85/85 (Left/Right/Down/Up) (typical)

* All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

Technical Specifications – Storage and Drives

STORAGE AND DRIVES

Internal Storage

256 GB SATA TLC Solid State Drive (2.5")	Drive Weight	0.17 lb (78 g)	
	Capacity	256 GB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (69.85 mm)	
	Interface	ATA-8, SATA 3.0	
	NAND Type	TLC	
	Form-Factor (I/O)	2.5 inch	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		530 MB/s ~ 560 MB/s	500 MB/s ~ 525 MB/s
	Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]		
Features	ATA Security; DIPM; TRIM; DEVSLP		

1 TB SATA TLC Solid State Drive (2.5")	Drive Weight	0.17 lb (78 g)	
	Capacity	1 TB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (69.85 mm)	
	Interface	ATA-8, SATA 3.0	
	NAND Type	TLC	
	Form-Factor (I/O)	2.5 inch	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		530 MB/s ~ 560 MB/s	500 MB/s ~ 530 MB/s
	Logical Blocks	2,000,409,264	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]		
Features	ATA Security; DIPM; TRIM; DEVSLP		

256 GB M.2 Self-Encrypting Drive TLC Solid State Drive	Drive Weight	0.02 lb (<10 g)	
	Capacity	256 GB	
	Height	0.09 in (2.3 mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	NAND Type	TLC	
	Form-Factor (I/O)	M.2 2280	
	Performance	Maximum Sequential Read	Maximum Sequential Write
		530 MB/s ~ 560 MB/s	500 MB/s ~ 530 MB/s
	Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]		
Features	ATA Security; TCG Opal 2.0, DIPM; TRIM; DEVSLP		

Technical Specifications – Storage and Drives

256 GB M.2 NVMe TLC Solid State Drive	Drive Weight	0.02 lb (<10 g)		
	Capacity	256 GB		
	Height	0.09 in (2.3 mm)		
	Width	0.87 in (22 mm)		
	Generation	Samsung PM961/ Toshiba XG5		
	NAND Type	TLC		
	Form-Factor (I/O)	M.2 2280		
	Interface	PCIe NVMe Gen3X4		
	Performance	Maximum Sequential Read	Maximum Sequential Write	
		2580 MB/s ~ 2600 MB/s	1000 MB/s ~ 1100 MB/s	
	Logical Blocks	500,118,192		
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]			
Features	ATA Security (Option), TRIM; L1.2			

256 GB M.2 NVMe TLC SED Solid State Drive	Drive Weight	0.02 lb (<10 g)		
	Capacity	256 GB		
	Height	0.09 in (2.3 mm)		
	Width	0.87 in (22 mm)		
	Generation	Samsung PM961 SED Opal2/ Toshiba XG5 SED Opal2		
	NAND Type	TLC		
	Form-Factor (I/O)	M.2 2280		
	Interface	PCIe NVMe Gen3X4		
	Performance	Maximum Sequential Read	Maximum Sequential Write	
		2580 MB/s ~ 2600 MB/s	Up to 1000 MB/s	
	Logical Blocks	500,118,192		
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]			
Features	ATA Security (Option); TCG Opal 2.0; TRIM; L1.2			

512 GB M.2 NVMe TLC Solid State Drive	Drive Weight	0.02 lb (<10 g)		
	Capacity	512 GB		
	Height	0.09 in (2.3 mm)		
	Width	0.87 in (22 mm)		
	Generation	Samsung PM981 / Toshiba XG5		
	NAND Type	TLC		
	Form-Factor (I/O)	M.2 2280		
	Interface	PCIe NVMe Gen3X4		
	Performance	Maximum Sequential Read	Maximum Sequential Write	
		2800 MB/s ~ 2900 MB/s	1000 MB/s ~ 1800 MB/s	
	Logical Blocks	1,000,215,215		

Technical Specifications – Storage and Drives

Operating Temperature 32° to 158°F (0° to 70°C) [ambient temp]
Features ATA Security, TRIM; L1.2

512 GB M.2 NVMe TLC Solid State Drive

Drive Weight 0.02 lb (<10 g)
Capacity 512 GB
Height 0.09 in (2.3 mm)
Width 0.87 in (22 mm)
Generation Samsung PM981 SED Opal2/ Toshiba XG5 SED Opal2
NAND Type TLC
Form-Factor (I/O) M.2 2280
Interface PCIe NVMe Gen3X4
Performance **Maximum Sequential Read** 2800 MB/s ~ 2900 MB/s **Maximum Sequential Write** 1000 MB/s ~ 1800 MB/s

Logical Blocks 1,000,215,215
Operating Temperature 32° to 158°F (0° to 70°C) [ambient temp]
Features ATA Security (Option); TCG Opal 2.0 ; TRIM; L1.2

1 TB, M.2 NVMe TLC Solid State Drive

Drive Weight 0.02 lb (<10 g)
Capacity 1 TB
Height 0.09 in (2.3 mm)
Width 0.87 in (22 mm)
Generation Samsung PM981 / Toshiba XG5
NAND Type TLC
Form-Factor (I/O) M.2 2280
Interface PCIe NVMe Gen3X4
Performance **Maximum Sequential Read** 2900 MB/s ~ 3000 MB/s **Maximum Sequential Write** Up to 2000MB/s

Logical Blocks 2,000,409,264
Operating Temperature 32° to 158°F (0° to 70°C) [ambient temp]
Features ATA Security, TRIM; L1.2
Available in RAID 1 config** Yes

2 TB, M.2 NVMe TLC Solid State Drive

Drive Weight 0.02 lb (<10 g)
Capacity 2 TB
Height 0.09 in (2.3 mm)
Width 0.87 in (22 mm)
Generation Toshiba XG5P
NAND Type TLC
Form-Factor (I/O) M.2 2280
Interface PCIe NVMe Gen3X4

Technical Specifications – Storage and Drives

Performance	Maximum Sequential Read	Maximum Sequential Write
	Up to 2900MB/s	Up to 2100 MB/s
Logical Blocks	3,907,029,168	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	ATA Security, TRIM; L1.2	
Available in RAID 1** config	Yes	

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows® 10) disk is reserved for system recovery software.

** RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology. Available December 2018

Technical Specifications – Networking/Communications

NETWORKING/COMMUNICATIONS

<p>Intel® Dual Band Wireless-N 9560AC 802.11 a/b/g/n (2x2) WiFi + Bluetooth 5.0 Combo Adaptor*</p>	<p>Wireless LAN Standards</p>	<p>IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac</p>
	<p>Interoperability</p>	<p>Wi-Fi certified</p>
	<p>Frequency Band</p>	<p>802.11b/g/n 802.11a/n</p>
		<p>2.402 - 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels. 4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz Note: No support for this band in Indonesia</p>
	<p>Data Rates</p>	<p>802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15 (20MHz and 40MHz) 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)</p>
	<p>Modulation</p>	<p>Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM</p>
	<p>Security¹</p>	<ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI
	<p>Network Architecture Models</p>	<p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p>
	<p>Roaming</p>	<p>IEEE 802.11 compliant roaming between band Access Points</p>
	<p>Output Power²</p>	<p>802.11b : +16dBm minimum 802.11g : +14dBm minimum 802.11a : +14dBm minimum 802.11n HT20(2.4GHz) : +14dBm minimum 802.11n HT40(2.4GHz) : +12dBm minimum 802.11n HT20(5GHz) : +14dBm minimum 802.11n HT40(5GHz) : +12dBm minimum</p>
	<p>Power Consumption</p>	<p>Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode: 180 mW (WLAN Associated)</p>

Technical Specifications – Networking/Communications

	Idle mode: 50 mW (WLAN unassociated) Connect Standby: 10 mW (WLAN+BT) Radio disabled: 5 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity³	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -88dBm maximum 802.11a, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum
Antenna Type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm
Weight	Type 2230 : 2.8g Or Type 1630 : 2g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; LED White - Radio ON

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

* Wireless access point and internet service required. Availability of public wireless access points limited.

HP Integrated Module with Bluetooth 4.2 Wireless Technology

Bluetooth Specification	4.2 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps

Technical Specifications – Networking/Communications

Transmit Power	Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels												
Receiver Sensitivity	Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.												
Power Consumption	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>$\pi/4$-DQPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>8DPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>	Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm	$\pi/4$ -DQPSK	-80 dBm	-70 dBm	8DPSK	-80 dBm	-70 dBm
Modulation	0.01% BER	0.001% BER											
GFSK	-80 dBm	-70 dBm											
$\pi/4$ -DQPSK	-80 dBm	-70 dBm											
8DPSK	-80 dBm	-70 dBm											
Range	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)												
Electrical Interface	USB 2.0 compliant												
Bluetooth Software Supported	Microsoft Windows® Bluetooth Software												
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves												
Security	Full support of Bluetooth Security Provisions												
Power Management	Microsoft Windows® ACPI, and USB Bus Support Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff												
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark												
Bluetooth Profiles Supported	Serial Port Profile (SPP) Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN) Generic Object Exchange Profile (GOEP) Object Push Profile (OPP) Hard Copy Cable Replacement (HCRP) Personal Area Networking Profile (PAN) Human Interface Device Profile (HID) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) Audio Video Remote Control Profile (AVRCP)												

HP It4132 LTE/HSPA+ 4G Mobile Broadband Module

Technology/Operating bands	LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3) MHz, 850 (Band 5), 2600 (Band 7), 900 (Band 8) MHz, 800 (Band 20), 700 (Band 28) MHz. HSPA+: 2100 (Band 1), 1900 (Band 2), 850 (Band 5), 900 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 (Band 5), 900 (Band 8) MHz
Wireless protocol standards	3GPP Release 10 LTE Specification CAT.4, 20MHz BW WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification

Technical Specifications – Networking/Communications

	E-GPRS: Class B, Multi-slot class 12, coding schemes CS1 - CS4 and MSC1 - MSC9
GPS	Standalone, A-GPS (MS-B and LTO)
GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz
Maximum data rates	LTE: 150 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm E-GPRS 1900/1800: 26 dBm E-GPRS 900/850: 27 dBm GPRS 1900/1800: 29.5 dBm GPRS 900/850: 32.5 dBm
Maximum power consumption	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average) E-GPRS: 2,600 mA (peak); 500 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6 g
Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm

* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

Intel® XMM™ 7360 LTE-Advanced	Technology/Operating Bands	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 1400 (Band 11), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1400 (Band 21), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 2100 (Band 66). TDD LTE: 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41). HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz
	Wireless Protocol Standards	3GPP Release 11 LTE Specification CAT.9, DL 60MHz BW throughput up to 450Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
	GPS	Standalone, A-GPS (MS-A, MS-B and XTRA)
	GPS Bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
	Maximum Data Rates	LTE: 450 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)
	Maximum Output Power	LTE: 23 dBm HSPA+: 23.5 dBm
	Maximum Power Consumption	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
	Form Factor	M.2, 3042-S3 Key B
	Weight	5.8g

Technical Specifications – Networking/Communications

Dimensions	1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)
(Length x Width x Thickness)	

* Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

Technical Specifications – Audio/Multimedia

AUDIO/MULTIMEDIA – BANG & OLUFSEN

Hardware	Implementation	Synaptics CX8400 with two NXP TFA9891 discrete smart amplifiers
	Function Key	Volume up, volume down, and mute
	Volume Controls	
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes, (1) dual-array digital microphone and (1) HP World Facing Microphone when equipped with optional webcam
Audio Output Quality	Frequency Response	20 Hz - 20 kHz
	Signal to Noise Ratio	106dB (DAC), 102dB (ADC)
	Total Harmonic Distortion	91dB THD+n on LineOut/HP (0.003%)
	Noise Floor	-110 dB
	Play Sampling Rate(s)	Up to 192kHz
	Record Sampling Rate(s)	Up to 96kHz
	DAC	16, 20 or 24-bit
	ADC	16, 20 or 24-bit
Internal Stereo Speaker	Power Rating	1 Watt/per top speaker 2 Watt/per bottom speaker
	Impedance	8 ohms/per top speaker 4 ohms/per bottom speaker

HP ZBook Rechargeable Active Pen	Dimensions (L x W)	D: 10.2mm L: 148mm
	Weight	0.53 oz (15 g) Pen only
	Tip Diameter	1.8 mm
	Tip Length	2.7 mm
	Power	Rechargeable battery Charge time: approximately 30 minutes. Life per charge: up to 7 days of normal use.
	Buttons	Yes, 3
	LED indicator	Battery and pairing status
	Pen pressure level resolution	4096 levels
	Tilt Operation	Yes
	Palm Rejection	Yes
	Hover Reading Heights	> 5 mm
	System requirements	Windows 8, Windows 8.1, Windows 10
	Kit contents	HP Active Pen, USB-A to USB-C Charging cable, replacement nibs (4 POM and 6 Elastomer), replacement tip tool and documentation
	Functionality	Right-click, draw, type, and navigate better than ever with a capacitive tip that offers pin-point accuracy to help improve productivity. Bluetooth button support quick application launch, screenshot capture, and Cortana speaker. Pen supports hover feature, pressure sensitivity levels up to 4096, and tilt function to enable excellent inking experience.

Technical Specifications – Audio/Multimedia

Soft tip for quiet performance and provides pen-on-paper inking experience.
Equipped USB-C fast charging with 30 mins charging for one-week battery life.

**Color
Compatibility**

Black
HP ZBook Studio x360 G5

Technical Specifications – Power

POWER

HP 150W Slim Smart AC Adapter	Dimensions	6.02 x 2.60 x .87 in ((153 x 66 x 22 mm)	
	Weight	0.71 lbs (320 g)	
	Input	100 to 240 VAC	
		Input Efficiency	88% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	2.9 A at 90 VAC, 1.45 A at 180 VAC
	Output	Output power	150W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<16A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
	Storage Humidity	10% to 90%	
EMI and Safety Certifications	CE Mark- full compliance with LVD and EMC directives; Worldwide safety standards- IEC950, EN60950, UL1950, Class 1, SELV; Agency approvals- C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCIB, NOM-1 NYCE; MTBF- over 200,000 hours at 25°C ambient condition.		

HP Long Life 4-cell Polymer Battery (64 WHr)	Dimensions (H x W x L)	7.9 x 3.49 x 0.32 in (20.08 x 8.86 x 0.81cm)	
	Weight (max)	0.619lb (281g)	
	Cells/Type	4-cell; Polymer	
	Energy	Voltage	15.4V
		Amp-hour capacity	4.155Ah
		Watt-hour capacity	64Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (-10° to 60° C)
		Non-operating	-4° to 140° F (-20° to 60° C)
	Battery Re-Charge Time	System in OFF or Standby Mode	3 hours
	System ON	3 to 5 hours	
Fuel Gauge LED	No		
Warranty*	3 year		

* 3-year platform warranty is required for a 3-year Long Life Battery warranty.

Dimensions (H x W x L)	13.02 x 3.51 x 0.319 in (33.08 x 8.92 x 0.81cm)
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Technical Specifications – Power

HP Long Life 6-cell Polymer Battery (96 WHr)	Weight (max)	1.12lb (420g)	
	Cells/Type	6-cell; Polymer	
	Energy	Voltage	11.55V
		Amp-hour capacity	8.31Ah
		Watt-hour capacity	95Wh
	Temperature	Operating (Charging)	32° to 122°F (0° to 50° C)
		Operating (Discharging)	14° to 140°F (-10° to 60° C)
		Non-operating	>140° F (>60° C)
	Battery Re-Charge Time	System in OFF or Standby Mode	3 hours
		System ON	3 to 5 hours
	Fuel Gauge LED	No LED	
Warranty*	3 year		

* 3-year platform warranty is required for a 3-year Long Life Battery warranty.

Technical Specifications – Environmental

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- US Federal Energy Management Program (FEMP)
- EPEAT® GOLD registered in the United States. See <http://www.epeat.net> for registration status in your country.

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.

Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Sort idle)	11.20 W	10.51 W	11.24 W
Normal Operation (Long idle)	6.70 W	6.30 W	6.37 W
Sleep	1.13 W	1.12 W	1.14 W
Off	0.41 W	0.43 W	0.42 W

Note:

Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	38 BTU/hr	36 BTU/hr	38 BTU/hr
Normal Operation (Long idle)	23 BTU/hr	22 BTU/hr	22 BTU/hr
Sleep	4 BTU/hr	4 BTU/hr	4 BTU/hr
Off	1.4 BTU/hr	1 BTU/hr	1 BTU/hr

*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

	Sound Power (L _{WAd} , bels)	Sound Pressure (L _{pAm} , decibels)
Typically Configured – Idle	3.2	22
Fixed Disk – Random writes	3.2	21

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 2 USB ports
- 2 Thunderbolt™ 3 ports
- 1 2.5" Storage Bay Drive
- 2 M.2 SATA SED Solid State Drives

Technical Specifications – Environmental

- 2 SODIMM memory slots
- 1 HDMI 2.0 port

Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater than 1ppm by weight
- Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)

Battery type: Polymer

Battery size: 4-cell or 6-cell high capacity Polymer battery

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product contains 0.0% post-consumer recycled plastic (by wt.)
- This product is 95.6% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	383 g
Internal:	PLASTIC/Polyethylene Expanded - EPE	90 g
	PLASTIC/Polyethylene low density - LDPE	10 g
	PLASTIC/Polypropylene - PP	5 g

The plastic packaging material contains at least 81.5% recycled content.

The corrugated paper packaging materials contains at least 80 % recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf>):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries

Technical Specifications – Environmental

- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the HP Inc. web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842>
and

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf>

COUNTRY OF ORIGIN

China

Options and Accessories (sold separately and availability may vary by country)

Type	Description	Part #
Pen	HP ZBook x360 Pen for G5	4WW09AA
	HP ZBook Nib Kit for Active Pen (x360)	4WW10AA
Display	Z27x G2 27-inch DreamColor Studio display	2NJ08A4#xxx
	Z32 31.5-inch 4k UHD Display	1AA81A4#xxx
	Z38c 37.5-inch Curved Display	Z4W65A4#xxx
	Z24n G2 24-inch Display	1JS09A4#xxx
	Z27n G2 27-inch Display	1JS10A4#xxx
Memory	HP 4GB DDR4-2666 SODIMM	4VN05AA#ABA
	HP 8GB DDR4-2666 SODIMM	4VN06UT#ABA
	HP 16GB DDR4-2666 SODIMM	4VN07AA/UT#ABA
	HP 8GB DDR4-2666 ECC SODIMM	4UY11AA
	HP 16GB DDR4-2666 ECC SODIMM	4UY12AA
Cases	HP 15.6 Business Top Load– Refresh	2SC66AA
	HP Exec Black Leather 15.6 Top Load	1LG83AA
	HP Slim Ultrabook Messenger (up to 15.6" x .88"/22/5mm)	F3W14AA
	HP Slim Ultrabook Backpack (up to 15.6" x .88"/22/5mm)	F3W16AA
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Top Load Case (up to 15.6")	H2W17AA#xxx
Docking	HP Thunderbolt™ B Dock G2 w/Combo Cable	3TR87AA#xxx
	HP Thunderbolt™ Dock 230W G2	2UK38AA
	HP Thunderbolt™ Dock Audio	3AQ21AA
	HP USB-C Mini Dock	1PM64AA
	HP USB-C Dock G4	3FF69AA#xxx
	HP USB-C Universal Dock	1MK33AA
	HP Travel Hub	TOK30AA
	HP 3005pr USB 3.0 Port Replicator w/ USB-C™ Adapter	Y4H06AA
Input/Output - Mice	HP Wireless Premium Mouse	1JR31AA
	HP USB Premium Mouse	1JR32AA
	HP Slim Bluetooth Mouse	F3J92AA#xxx
	HP USB Travel Mouse	G1K28AA#xxx
	HP Comfort Grip Mouse	H2L63AA
	HP X4000 Bluetooth Mouse	H3T50AA#xxx
	HP 3-Button Laser Mouse	H4B81AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Wireless (Link-5) Keyboard	T6U20AA

Options and Accessories (sold separately and availability may vary by country)

Power Adapters	HP 150W Slim Smart AC Adapter	4SC18UT#xxx
	HP 200W Slim Smart AC Adapter	4SC19AA/UT#xxx
Adapters	HP HDMI to DVI adapter	F5A28AA
	HDMI to VGA Adapter	H4F02AA
	USB 3.0 to RJ45	N7P47AA
	HP USB-C™ to VGA Adapter	N9K76AA
	USB-C to RJ45	V7W66AA
	HP USB-C™ to USB Hub	Z6A00AA
Storage - External Storage	HP 256GB M.2 NVME PCIe SSD (2280)	V3K66AA
	HP 512GB M.2 NVME PCIe SSD (2280)	V3K67AA
	HP 256GB TLC PCI-e 3x4 NVMe M.2 SSD	1FU87AA
	HP 512GB TLC PCI-e 3x4 NVMe M.2 SSD	1FU88AA
	HP 1TB 2280 M2 PCIe3x4 SS NVME (MLC)	X2E90AA
	HP External USB DVDRW Drive	F2B56AA
Security	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Dual Head Keyed Cable Lock	1AJ41AA
	HP Docking Station Cable Lock	AU656AA#XXX
	HP Keyed Cable Lock	TOY14AA
	HP Combination Lock	TOY15AA
	HP Essential Combination Lock	TOY16AA
	HP Keyed Cable Lock 10mm	T1A62AA
	HP Dual Head Cable Lock (Non-Master key)	T1A64AA
	HP 3-year Next business day onsite Hardware Support w/Accidental Damage Protection-G2 for Notebooks	UF631E
Collaboration	HP Elite Presenter Mouse	ZCE30AA#xxx
	HP UC Conferencing Keyboard	K8P74AA#xxx
	HP Stereo 3.5mm Headset	T1A66AA
	HP Stereo USB Headset	T1A67AA
	HP USB Collaboration Keyboard	Z9N38AA
	HP Wireless Collaboration Keyboard	Z9N39AA#xxx
	HP Wireless Premium Keyboard	Z9N41AA#xxx

Summary of Changes

Date of change:	Version History:		Description of change:
April 6, 2018	From v1 to v2	Changed	Weight section
June 12, 2018	From v2 to v3	Changed	At a glance, Operating system, Graphics, Storage, Drive controllers
June 26, 2018	From v3 to v4	Changed	Processors, Storage and Drives, Software and Security, Power, System Unit sections and format changes
August 27, 2018	From v4 to v5	Changed	Format
October 15, 2018	From v5 to v6	Changed	Added features to support the October Refresh

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EXHIBIT A - PRICING PAGE - ENSEMBLE SOLUTIONS GROUP

CRFQ DOT1900000033

Item Number	Quantity	Description	Unit Price	Total Cost
1	30	HP Zbook X360 Windows Tablets or equivalent with Dual Band wireless as specified in 3.1.1.1	\$2,608.30	\$78,249.00
2	30	Four (4) Year Accidental Damage Warranty as specified in 3.1.1.3	\$372.93	\$11,187.90
3	30	Manufacturer Provided Docking Stations as described in 3.1.1.4	\$325.25	\$9,757.50
Total Bid Amount				\$ 99,194.40

HP ZBook Studio x360 G5 Convertible Workstation



Reimagine your creative process with a versatile laptop that gives you the latest convertible design you'll want with the pro-grade performance you need. Showcase your work like never before with five unique modes.



HP recommends Windows 10 Pro.

360-degree pro performance

Finally, a convertible laptop designed to tackle large files and run multiple apps with speed and responsiveness. Seamlessly edit and render high-res images without delay, with NVIDIA® Quadro® P2000 graphics, 64 GB memory¹ and Intel® Core™ i9 processors.

Precision-crafted versatility

With our innovative 360-degree hinge, you'll get the comfort of a laptop, the convenience of a tablet and the luxury of additional modes to help you showcase your work.

Pixel-perfect tools

Achieve remarkable inking precision with 4096 levels of pressure sensitivity and tilt with the Wacom AES pen. And with the HP DreamColor matte touchscreen, you'll experience one billion vibrant colors² on HP's brightest 4K UHD laptop display.

Featuring

- Be productive in any situation. Windows 10 Pro and powerful security, collaboration, and connectivity features from HP help you power through your day on the HP ZBook Studio x360.³
- Create on the go with the professional Wacom AES pen featuring 4K pressure sensitive levels, tilt and two customizable buttons.⁴
- Take your work outdoors with the anti-glare touch display and built in ambient light sensor that dims or brightens based on your surroundings.⁵
- Take your work on the road with up to 16 hours of battery life for maximum productivity. When you need it, recharge ultra-fast (50% in just 45 minutes).^{6,7}
- Create seamlessly. Save and access large files locally with up to 4TB local NVMe storage, up to 21 times faster than standard HDD storage and six times faster than SATA SSD.⁸
- Do more at once with next-generation six-core Intel® Core™ i9 or Intel® Xeon® processors designed to handle complex, multi-threaded applications like Adobe Premier Pro.⁹
- Seamlessly edit your designs and render multi-layered files with certified NVIDIA® Quadro® P2000 graphics, optimized for stability and performance with professional software apps.¹⁰
- Protect your work with HP Sure View that activates a privacy screen at the touch of a button and RAID 1 that keeps a backup copy of all your files in case you ever need it.^{11,12}
- Experience fast transfer and upload speeds with dual Thunderbolt™ 3 ports. Keep all your devices and peripherals connected with 2 USB 3.0, 1 HDMI and 1 SD card port.
- Host virtual meetings with the HP Collaboration Keyboard, HP World Facing Microphone & optional web cam. Get premium audio with 4 speakers tuned by Bang & Olufsen & a discrete amp.
- Confidently take your work anywhere knowing your HP ZBook Studio x360 was built for 24 x 7 x 365 workloads and passed 14 rigorous military standard tests like shock, drop and dust.¹³
- Accidents happen - which is why we designed our minor spill-resistant full-sized chiclet keyboard with a chemically strengthened glass cover to help prevent wear and tear.
- Innovative docking solution that takes you from laptop to desktop experience. Connect dual 4K UHD displays, charge your devices, take a conference call, and transfer data quickly.

HP ZBook Studio x360 G5 Convertible Workstation Specifications Table



Operating System	Windows 10 Pro 64 – HP recommends Windows 10 Pro. ¹ Windows 10 Home 64 ¹ Windows 10 Pro for Workstations 64 ¹ Red Hat® Enterprise Linux® 7 - Web support only ³² Ubuntu 16.04.3 LTS - Web support only ³² FreeDOS 2.0
Processor Family	Intel® Xeon® processor (E-2176M, E- 2186M); 8th Generation Intel® Core™ i9 processor (i9-8950HK); 8th Generation Intel® Core™ i7 processor (i7-8750H, i7-8850H); 8th Generation Intel® Core™ i5 processor (i5-8300H, i5-8400H) ^{2,3,4,30,31}
Processors ^{2,3,4,30,31}	Intel® Xeon® E 2186M vPro™ with Intel® UHD Graphics P630 (2.9 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores) Intel® Xeon® E 2176M vPro™ with Intel® UHD Graphics P630 (2.7 GHz base frequency, up to 4.4 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores) Intel® Core™ i9 8950HK with Intel® UHD Graphics 630 (2.9 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 12 MB cache, 6 cores) Intel® Core™ i7 8850H vPro™ with Intel® UHD Graphics 630 (2.6 GHz base frequency, up to 4.3 GHz with Intel® Turbo Boost Technology, 9 MB cache, 6 cores) Intel® Core™ i7-8750H with Intel® UHD Graphics 630 (2.2 GHz base frequency, up to 4.1 GHz with Intel® Turbo Boost Technology, 9 MB cache, 6 cores) Intel® Core™ i5 8400H vPro™ with Intel® UHD Graphics 630 (2.5 GHz base frequency, up to 4.2 GHz with Intel® Turbo Boost Technology, 8 MB cache, 4 cores) Intel® Core™ i5-8300H with Intel® UHD Graphics 630 (2.3 GHz base frequency, up to 4.0 GHz with Intel® Turbo Boost Technology, 8 MB cache, 4 cores)
Maximum Memory	64 GB DDR4-2667 non-ECC SDRAM; 32 GB DDR4-2667 ECC SDRAM; 32 GB DDR4-2667 non-ECC SDRAM ^{5,34} (Transfer rates up to 2667 MT/s.)
Memory Slots	2 SODIMM
Internal Storage	256 GB up to 1 TB SATA SSD ⁶ 256 GB M.2 SATA SED SSD ⁶ 256 GB up to 2 TB PCIe® NVMe™ M.2 SSD ⁶ 256 GB up to 512 GB PCIe® NVMe™ M.2 SED SSD ⁶ 2 x 1 TB up to 2 x 2 TB PCIe® NVMe™ M.2 SSD ^{6,34,35}
Display	HP Sure View 15.6" diagonal FHD IPS eDP + PSR LED-backlit touch screen with Corning® Gorilla® Glass 4, 650 cd/m ² (1920 x 1080); HP DreamColor 15.6" diagonal 4K IPS LED-backlit touch screen with Corning® Gorilla® Glass 4, 600 cd/ m ² , 100% AdobeRGB (3840 x 2160); HP DreamColor 15.6" diagonal 4K IPS LED-backlit anti-glare touch screen with Corning® Gorilla® Glass 4, 600 cd/ m ² , 100% AdobeRGB (3840 x 2160); 15.6" diagonal FHD IPS eDP + PSR LED-backlit touch screen with Corning® Gorilla® Glass 4 and ambient light sensor, 400 cd/m ² (1920 x 1080); 15.6" diagonal 4K IPS eDP + PSR LED-backlit touch screen with Corning® Gorilla® Glass 4 and ambient light sensor, 400 cd/m ² (3840 x 2160) ⁹
Available Graphics	Integrated: Intel® UHD Graphics 630; Intel® UHD Graphics P630 ^{9,10} Discrete: NVIDIA® Quadro® P1000 (4 GB GDDR5 dedicated); NVIDIA® Quadro® P2000 (4 GB GDDR5 dedicated) ¹¹ (Intel® UHD Graphics 630 integrated on Core™ i7, Core™ i5 and Core™ i9 processors. Intel® UHD Graphics P630 integrated on Xeon® processors.)
Expansion Slots	1 UHS-II SD card reader (SD supports next generation secure digital and is backward compatible to SDHC, SDXC)
Ports and Connectors	Left side: 1 USB 3.0; 1 USB 3.0 (charging) Right side: 1 HDMI 2.0; 1 headphone/microphone combo; 1 power connector; 2 USB 3.1 Type-C™ Thunderbolt™ 3 (DisplayPort™ 1.3)
Networking	WLAN: Intel® Dual Band Wireless-AC 9560 802.11ac (2x2) Wi-Fi® and Bluetooth® 5.0 Combo; Intel® Dual Band Wireless-AC 9560 802.11ac (2x2) Wi-Fi® and Bluetooth® 5.0 Combo, non-vPro™ ⁷ WWAN: HP lt4132 LTE/HSPA+ 4G Mobile Broadband Module; Intel® XMM™ 7360 LTE Advanced ^{8,14} (Optional Near Field Communication (NFC) module)
Audio	HP tuned Bang & Olufsen, quad stereo speakers, HP World Facing Microphone supporting HP Noise Reduction Software, keyboard functions keys for volume up and down, combo microphone/headphone jack, HD audio, HP Clear Sound Amp ¹³
Input Device	HP Collaboration Keyboard, full-size, spill-resistant, backlit, with drain and DuraKeys, clickpad with image sensor and glass surface, multi-touch gestures and taps enabled; Image sensor touchpad with on/off button, two-way scroll, gestures, three buttons; HP ZBook x360 Pen; ³⁶
Camera	HP Privacy HD IR Camera 720p, face authentication with Windows Hello ^{9,12,14,30}
Power	150 W Slim Smart external AC power adapter HP Long Life 6-cell, 95.6 Wh Li-ion polymer; HP Long Life 4-cell, 64 Wh Li-ion polymer ^{26,31}
Security	Absolute persistence module; Common Criteria EAL4+ Augmented Certified Discrete TPM 2.0 Embedded Security Chip; DriveLock and Automatic DriveLock; HP Device Access Manager; HP FingerPrint Sensor; HP Password Manager; HP Power On Authentication; HP Security Manager; Pre-boot authentication; HP Sure Click; Measured Boot; HP BIOS Config Utility (BCU); HP Client Catalog; HP Driver Packs; HP System Software Manager (SSM); HP Manageability Integration Kit Gen2; HP BIOSphere with Sure Start Gen4; HP Secure Disk Erase; HP Host Based Mac Address; Windows Defender ^{19,20,21,22,23,26,27,28,29}
Software	Bing search for IE11; Buy Office; HP ePrint Driver + JetAdvantage; HP Hotkey Support; HP Noise Cancellation Software; HP Performance Advisor; HP Recovery Manager; HP Remote Graphics Software; HP Support Assistant; HP Velocity; Skype for Business Certified; HP LAN-WLAN Protection; HP JumpStart; HP Client Security Suite Gen4 ^{15,16,17,18}
Dimensions (W x D x H)	14.17 x 10 x 0.35 to 0.74 in (front to rear) 36 x 25.4 x 0.88 to 1.87 cm (front to rear)
Weight	Starting at 4.9 lb Starting at 2.26 kg (Weight varies by configuration and components.)
Energy Efficiency Compliance	ENERGY STAR® certified and EPEAT® registered configurations available ²⁴
Environmental	Low halogen ²⁵
Warranty	3 year or 1 year limited warranty options available, depending on country. Batteries have the same 1 year or 3 year limited warranty as the platform. 24/7 operation will not void the HP warranty. Optional HP Care Pack Services are extended service contracts which go beyond your standard limited warranties.

Messaging Footnotes

- ¹ 64 GB RAM planned to be available in December 2018.
- ² DreamColor display with anti-glare and Wacom AES pen optional and only available with certain configurations. DreamColor display required for one billion colors.
- ³ Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>
- ⁴ Wacom AES pen optional and only available with certain configurations.
- ⁵ Ambient light sensor only available on select models with standard and full UHD (not available with HP DreamColor or HP Sure View display models).
- ⁶ Windows 10 MM14 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See www.bapco.com for additional details.
- ⁷ Recharges the battery up to 50% within 45 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/- 10% due to System tolerance.
- ⁸ For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB (for Windows 10) of system disk is reserved for system recovery software.
- ⁹ Adobe Premier Pro sold separately.
- ¹⁰ NVIDIA® Quadro® P2000 graphics is a configurable option.
- ¹¹ HP Sure View integrated privacy screen is an optional feature that must be configured at purchase and functions in landscape orientation.
- ¹² Raid 1 will not be available until December 2018.

Technical Specifications Footnotes

- ¹ Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.
- ² Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.
- ³ In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows®8 or Windows 7 drivers on <http://www.support.hp.com>
- ⁴ vPro. Some functionality of this technology, such as Intel Active management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel vPro technology is dependent on 3rd party software providers. Compatibility future "virtual appliances" is yet to be determined.
- ⁵ Only 2 DIMM configurations run at 2400 MHz and 4 DIMM configurations run at 2133 MHz.
- ⁶ For storage drives GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.
- ⁷ Wireless cards are optional or add-on features and requires separately purchased wireless access point and internet service. Availability of public wireless access points limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.
- ⁸ WWAN is an optional feature. WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, and in all regions.
- ⁹ HD content required to view HD images.
- ¹⁰ Intel® HD graphics 630 is configurable as a standalone graphics option; Intel® HD graphics P630 only used when NVIDIA® Optimus™ Technology is enabled.
- ¹¹ NVIDIA® Quadro® mobile professional graphics support up to four independent displays when using a HP ZBook Dock with Thunderbolt 3 (sold separately) or DP 1.2 hubs with MST.
- ¹² Privacy camera not available on touchscreen.
- ¹³ Dual-microphone array when equipped with optional webcam and optional world facing microphone.
- ¹⁴ Optional or add-on feature
- ¹⁵ HP ePrint Driver requires an internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/businessmobileprinting).
- ¹⁶ HP Remote Graphics Software requires a Windows, Linux®, or Mac® OS X 10.10 and newer operating system and network access.
- ¹⁸ HP Client Security Suite Gen 4 requires Windows and Intel® or AMD 8th generation processors.
- ¹⁹ BIOS Absolute Persistence module is shipped turned off, and will be activated when customers purchase and activate a subscription. Service may be limited. Check with Absolute for availability outside the U.S. The optional subscription service of Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: <http://www.absolute.com/company/legal/agreements/computrace-agreement>.
- ²⁰ Finger Sensor is optional
- ²¹ HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.
- ²² HP Password manager requires Windows.
- ²³ HP BIOSphere Gen4 requires Intel® or AMD 8th generation processors. HP Sure Start Gen4 is available on HP Z Workstations products equipped with 8th generation Intel® or AMD processors.
- ²⁴ EPEAT® registered where applicable. EPEAT registration varies by country. See www.epeat.net for registration status by country.
- ²⁵ External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.
- ²⁶ Battery is internal and not replaceable by customer. Serviceable by warranty. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year.
- ²⁷ HP Secure Disk Erase is for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
- ²⁸ HP Sure Click is available on select HP platforms and supports Microsoft® Internet Explorer, Google Chrome, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode. Check <http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA7-0922ENW> for all compatible platforms as they become available.
- ²⁹ Windows Defender Opt In, Windows 10, and internet connection required for updates.
- ³⁰ Windows Hello optional
- ³¹ 4 cell now only w/ UMA, and not possible with DSC.
- ³² Supported, not preloaded.
- ³⁴ Available in December 2018.
- ³⁵ RAID 1 Configuration requires 2 NVMe PCIe M.2 drives; both drives must be the same capacity and only available on NVMe technology.
- ³⁶ HP ZBook x360 Pen using AES technology support up to 4096 levels of pressure sensitivity.

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4AA7-2495ENUC, 10/12/2018



GENERAL TERMS AND CONDITIONS:

1. CONTRACTUAL AGREEMENT: Issuance of a Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

2. DEFINITIONS: As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

2.1. "Agency" or "Agencies" means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

2.2. "Bid" or "Proposal" means the vendors submitted response to this solicitation.

2.3. "Contract" means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

2.4. "Director" means the Director of the West Virginia Department of Administration, Purchasing Division.

2.5. "Purchasing Division" means the West Virginia Department of Administration, Purchasing Division.

2.6. "Award Document" means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.

2.7. "Solicitation" means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

2.8. "State" means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

2.9. "Vendor" or "Vendors" means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. CONTRACT TERM; RENEWAL; EXTENSION: The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

Term Contract

Initial Contract Term: This Contract becomes effective on _____ and extends for a period of _____ year(s).

Renewal Term: This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be delivered to the Agency and then submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to _____ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

Alternate Renewal Term – This contract may be renewed for _____ successive _____ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

Delivery Order Limitations: In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

Fixed Period Contract: This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within _____ days.

Fixed Period Contract with Renewals: This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within _____ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for _____ year(s) thereafter.

One Time Purchase: The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

Other: See attached.

4. NOTICE TO PROCEED: Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.

5. QUANTITIES: The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

Open End Contract: Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

Service: The scope of the service to be provided will be more clearly defined in the specifications included herewith.

Combined Service and Goods: The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

One Time Purchase: This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

6. EMERGENCY PURCHASES: The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute of breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

7. REQUIRED DOCUMENTS: All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

BID BOND (Construction Only): Pursuant to the requirements contained in W. Va. Code § 5-22-1(c), All Vendors submitting a bid on a construction project shall furnish a valid bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

PERFORMANCE BOND: The apparent successful Vendor shall provide a performance bond in the amount of 100% of the contract. The performance bond must be received by the Purchasing Division prior to Contract award.

LABOR/MATERIAL PAYMENT BOND: The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable. Notwithstanding the foregoing, West Virginia Code § 5-22-1 (d) mandates that a vendor provide a performance and labor/material payment bond for construction projects. Accordingly, substitutions for the performance and labor/material payment bonds for construction projects is not permitted.

MAINTENANCE BOND: The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

LICENSE(S) / CERTIFICATIONS / PERMITS: In addition to anything required under the Section of the General Terms and Conditions entitled Licensing, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications prior to Contract award regardless of whether or not that requirement is listed above.

8. INSURANCE: The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed in this section.

Vendor must maintain:

Commercial General Liability Insurance in at least an amount of: \$100,000.00 or more per occurrence.

Automobile Liability Insurance in at least an amount of: _____ per occurrence.

Professional/Malpractice/Errors and Omission Insurance in at least an amount of: _____ per occurrence.

Commercial Crime and Third Party Fidelity Insurance in an amount of: _____ per occurrence.

Cyber Liability Insurance in an amount of: _____ per occurrence.

Builders Risk Insurance in an amount equal to 100% of the amount of the Contract.

Pollution Insurance in an amount of: _____ per occurrence.

Aircraft Liability in an amount of: _____ per occurrence.

****STATE OF WV MUST BE LISTED AS ADDITIONAL INSURED****

****PLEASE MAKE CERTIFICATE HOLDER TO READ AS FOLLOWS;**

STATE OF WV
1900 KANAWHA BLVD E, BLDG 5
CHARLESTON, WV 25305

Notwithstanding anything contained in this section to the contrary, the Director of the Purchasing Division reserves the right to waive the requirement that the State be named as an additional insured on one or more of the Vendor's insurance policies if the Director finds that doing so is in the State's best interest.

9. WORKERS' COMPENSATION INSURANCE: The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

10. [Reserved]

11. LIQUIDATED DAMAGES: This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

_____ for _____

Liquidated Damages Contained in the Specifications

12. ACCEPTANCE: Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

13. PRICING: The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification.

14. PAYMENT IN ARREARS: Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.

15. PAYMENT METHODS: Vendor must accept payment by electronic funds transfer and P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)

16. TAXES: The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

17. ADDITIONAL FEES: Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

18. FUNDING: This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

19. CANCELLATION: The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

20. TIME: Time is of the essence with regard to all matters of time and performance in this Contract.

21. APPLICABLE LAW: This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.

22. COMPLIANCE WITH LAWS: Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

23. ARBITRATION: Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

24. MODIFICATIONS: This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Purchasing Division and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

25. WAIVER: The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

26. SUBSEQUENT FORMS: The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

27. ASSIGNMENT: Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments.

28. WARRANTY: The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

29. STATE EMPLOYEES: State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

30. PRIVACY, SECURITY, AND CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.

31. YOUR SUBMISSION IS A PUBLIC DOCUMENT: Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

32. LICENSING: In accordance with West Virginia Code of State Rules § 148-1-6.1 e, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

33. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

34. VENDOR CERTIFICATIONS: By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

35. VENDOR RELATIONSHIP: The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

36. INDEMNIFICATION: The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

37. PURCHASING AFFIDAVIT: In accordance with West Virginia Code §§ 5A-3-10a and 5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

38. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE: This Contract may be utilized by other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts (“Other Government Entities”), provided that both the Other Government Entity and the Vendor agree. Any extension of this Contract to the aforementioned Other Government Entities must be on the same prices, terms, and conditions as those offered and agreed to in this Contract, provided that such extension is in compliance with the applicable laws, rules, and ordinances of the Other Government Entity. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

39. CONFLICT OF INTEREST: Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

40. REPORTS: Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at purchasing.requisitions@wv.gov.

41. BACKGROUND CHECK: In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision. The State reserves the right to prohibit a service provider’s employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Revised 06/08/2018

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

42. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS: Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.
- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:
- c. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or
- d. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

43. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL: In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a

“substantial labor surplus area”, as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

44. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE: W. Va. Code § 6D-1-2 requires that for contracts with an actual or estimated value of at least \$1 million, the vendor must submit to the Agency a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre-award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Bryan Massey, President
(Name, Title)

Bryan Massey
(Printed Name and Title)

100 W. San Angelo St.
(Address)

888-311-0601 fax 480-302-7830
(Phone Number) / (Fax Number)

Bryan@ensemblesolutionsgroup.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Ensemble Solutions Group
(Company)

 RFP Coordinator
(Authorized Signature) (Representative Name, Title)

Tara Massey
(Printed Name and Title of Authorized Representative)

11-5-18
(Date)

888-311-0601, 480-302-7830 (fax)
(Phone Number) (Fax Number)

West Virginia Ethics Commission
Disclosure of Interested Parties to Contracts

(Required by W. Va. Code § 6D-1-2)

Name of Contracting Business Entity: Ensemble Solutions Group Address: 180 W. San Angelo Gilbert, AZ 85233

Name of Authorized Agent: Bryan Massey Address: (same)

Contract Number: _____ Contract Description: 2 books 1 time purchase

Governmental agency awarding contract: _____

Check here if this is a Supplemental Disclosure

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below (attach additional pages if necessary):

1. Subcontractors or other entities performing work or service under the Contract

Check here if none, otherwise list entity/individual names below.

2. Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)

Check here if none, otherwise list entity/individual names below.

Bryan Massey

3. Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)

Check here if none, otherwise list entity/individual names below.

Signature: Bryan Massey Date Signed: 11/5/18

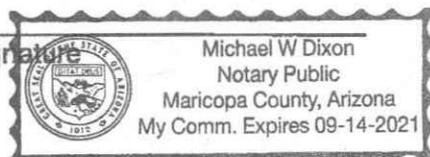
Notary Verification

State of Arizona, County of Maricopa

I, Bryan MASSEY, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 5th day of November, 2018.

[Signature]
Notary Public's Signature



To be completed by State Agency:
Date Received by State Agency: _____
Date submitted to Ethics Commission: _____
Governmental agency submitting Disclosure: _____

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Ensemble Solutions Group

Authorized Signature: *Bayan Mang* Date: 11/5/18

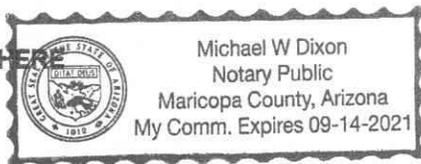
State of Arizona

County of Maricopa, to-wit:

Taken, subscribed, and sworn to before me this 5 day of November, 2018

My Commission expires 9-14, 2021.

AFFIX SEAL HERE



NOTARY PUBLIC

[Signature]

Purchasing Affidavit (Revised 01/19/2018)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DOT1900000033

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Ensemble Solutions Group

Company

Bayer Mung

Authorized Signature

11-5-18

Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.

Revised 6/8/2012