

Lenovo Customized Wacom Components Driver Specification



Target Driver Version 8.2
Document Version 1.2

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Purpose

The Lenovo Customized Wacom Components Driver is the tool for customizing the functionality of integrated Lenovo Pen Settings sensors on Windows Computers

Supported Operating Systems

The Lenovo Customized Wacom Components Driver supports the two most recent yearly releases, including half-year releases. For example, in 2021 official support for 19H1 and 19H2 will be dropped when 21H1 is released. This includes the Windows 10s configuration.

Supported Architectures

The Lenovo Customized Wacom Components Driver supports 64 bit OSes only

Supported Languages

The following languages are supported by the Lenovo Customized Wacom Components Driver:

English	Italian	Spanish	French	German	Dutch	Portuguese	Japanese
Russian	Swedish	Chinese – Simplified	Korean	Polish	Czech	Hungarian	Ukrainian
Slovak	Danish	Finnish	Norwegian	Greek	Turkish	Chinese – Traditional	Arabic

Supported Hardware

The Lenovo Customized Wacom Components Driver supports two different classes of Hardware:

- Implicit HWID Support
 - Devices in this category have their PID statically linked in our driver so when the driver is installed and run on a system, the HWID of the Wacom sensor is known and supported. This mode requires a new version of the driver to be compiled, tested and certified.
- Compatible ID Support
 - Devices in this category have an unknown PID but support a Compatible ID that is directly supported by our driver.
 - Devices in this category can be supported by previously released versions of the driver without requiring driver modification.
 - See the Wacom Compatible ID Spec for more details.

D/H/C/U Compliance

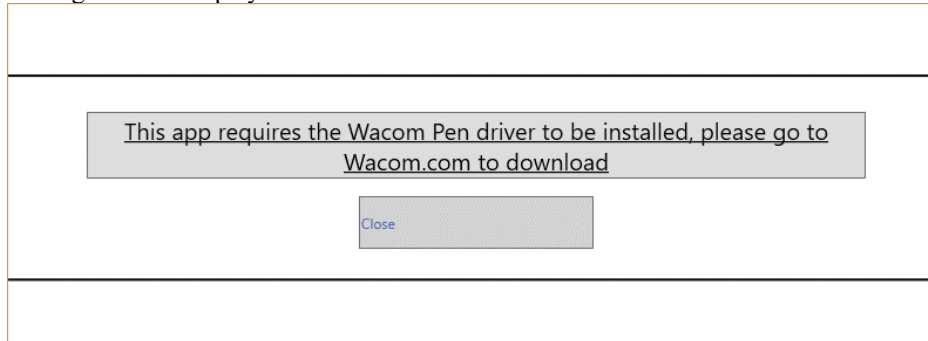
The Lenovo Customized Wacom Components Driver is D/H/C/U Compliant

Components Driver Elements

The Lenovo Customized Wacom Components Driver consists of the following elements:

- Wacom Components Installation Package – An installer application that detects compatible hardware and installs the Kernel and Service pieces.
 - The distributed zip file Wacom_Components_8.2-X.Y.Z_LEN.zip contains Setup.exe that can be run when the contents are extracted. The program requires the “local” and “App” folders to be extracted as well as the correct platform subfolder..
 - The distributed exe file Wacom_Components_8.2-X.Y.Z_LEN_win64 will self-extract the needed components and perform the installation.
 - This will also install the App
- Wacom Components Kernel Driver – A KMDF minidriver that provides access to the Wacom Components Pen sensor data and allows for advanced control over the data.
 - WacHIDRouterISDU.sys
 - WacHIDRouterISDU.inf
 - WacHIDRouterISDU.cat
- Wacom Components Service – A User mode Windows Service that enables end user customization of Pen data as well as provides data to Wintab applications.

- WTabletServiceISD.exe
 - Wintab32.dll
 - ISD_Tablet.dll
 - WacomI18N.dll
 - WacomCustomBT.exe
- Lenovo Customized Hardware Support App – A UWP application that allows the end user to customize their Pen experience.
 - The Lenovo Customized Hardware Support App is a UWP app titled “Lenovo Pen Settings” and is located at: <https://www.microsoft.com/store/apps/9MVLWT5DMSKR>
 - Preinstall-capable using the files included in the “app” directory included in OEM specific distribution package.
 - If this app is installed on a system without the Lenovo Customized Wacom Components Driver installed, a message will be displayed to the user:



- When clicked, this link will take the user to <http://us.wacom.com/en/feeldriver/?dlid=93b9f9> where they can download the full driver package to enable the app.

Components Driver Versioning

The individual pieces of the Lenovo Customized Wacom Components Driver will be versioned in the following manner:

- Wacom Components Installation Package –
8.2-[SERVICE_VERSION].[HIDROUTER VERSION].[APP VERSION]
- Wacom Components Service –
8.2.1.[SERVICE_VERSION]
- Wacom Components Kernel Driver –
8.2.2.[KERNEL_VERSION]
- Lenovo Customized Hardware Support App –
8.2.[APP_VERSION].0
 - App Release version starts at 8.2.20 to avoid conflict with other components

The [XX_VERSION] parts of the version are independent from each other and will only change between releases if the specific component is changed.

Components Driver Functionality

Installation Procedure

- To install for the current user, run Wacom_Components_8.2-X.Y.Z_LEN_win64.exe
 - For system image creation, use DISM or Powershell to preinstall the app and DISM to install both INFs contained in the package.
 - A .bat file is included in the root of the distribution called ImageSetup.bat. Running this will perform all the pre-installation steps necessary to install the Wacom driver.
 - If “ImageSetup.bat apponly” is executed, it will install only the Settings App.
- *Note: ImageSetup.bat is intended for an online image creation, so it calls ‘Dism /online’ for App preinstall and ‘pnputil.exe’ for INF install. If different tools are required or an offline image is being created, the script can be adapted as necessary.**

Installation Methods

- The Lenovo Customized Wacom Components Driver can be installed via:

- Self-extracting installer (Wacom_Components_8.2-X.Y.Z_LEN_win64.exe)
 - Run Wacom_Components_8.2-X.Y.Z_LEN_win64.exe
 - This will also install the App for the current user
- Zip based Installation using Setup.exe
 - Extract the contents of the Wacom_Components_8.2-X.Y.Z_LEN.zip file to a local folder
 - Setup.exe and the “local” folder must be extracted as well as the correct platform subfolder, “32” or “64”.
 - Execute Setup.exe as Administrator to install.
 - This will also install the App for the current user
- INF-Only installation
 - Extract the contents of the Wacom_Components_8.2-X.Y.Z_LEN.zip file to a local folder
 - Using DISM, PNPUtil or another comparable tool to perform INF installation, install the INF components (order is suggested but not required)
 - WacHIDRouterISDU.inf
 - WTabletServiceISD.inf
 - Example using PNPUtil:
 - PnpUtil.exe /add-driver WacHIDRouterISDU.inf /i
 - PnpUtil.exe /add-driver WTabletServiceISD.inf /i
- The Lenovo Customized Hardware Support App can be preloaded on the target system or installed through the store
 - Windows Store Installation
 - The app can be downloaded and installed for the current user from the Windows Store Website (<https://www.microsoft.com/store/apps/9MVLWT5DMSKR>) or by using a URI (<ms-windows-store://pdp/?productid=9MVLWT5DMSKR>) to access the Store directly
 - Driver popup installation
 - If the Lenovo Customized Hardware Support App is not installed but the Lenovo Customized Wacom Components Driver is, a notification will be shown to the user the first time they use their pen on the system that will allow them to download the App. The “Get The App” link takes them to <ms-windows-store://pdp/?productid=9MVLWT5DMSKR>
 - App Preloading
 - Preloading the Lenovo Customized Hardware Support App causes the App to be automatically installed during any new user creation, like during the OOBE process.
 - Extract the contents of the ‘app’ folder in Wacom_Components_8.2-X.Y.Z_LEN.zip file to a local folder (for the examples, assume 'c:\app')
 - **Important Do not modify the folder once you have extracted the package files. If you change, add, or remove any files in the folder, the app will fail either during installation or launch. Even browsing the folder may cause problems.**
 - The App can then be preloaded using either DISM or PowerShell (More information can be found [online](#))
 - For the below examples, replace [packageguid] with the current app package GUID
 - DISM Example (Offline Image):
Dism /Image:"c:\test\offline" /Add-ProvisionedAppxPackage /PackagePath:"c:\app\[packageguid].msixbundle" /LicensePath:"c:\app\[packageguid]_License1.xml" /Region:All
 - DISM Example (Online Image):
Dism /Online /Add-ProvisionedAppxPackage /PackagePath:"c:\app\[packageguid].msixbundle " /LicensePath:"c:\app\[packageguid]_License1.xml" /Region:All
 - Powershell Example (Online Image Only):
Add-AppxProvisionedPackage -Online -PackagePath c:\app\[packageguid].msixbundle -LicensePath c:\app\[packageguid]_License1.xml -Regions All
 - App Sideloading
 - Sideloading the app is not officially supported but is possible for testing purposes
 - Extract the contents of the ‘app’ folder in Wacom_Components_8.2-X.Y.Z_LEN.zip file to a local folder (for the examples, assume 'c:\app')
 - Double-click the c:\app\[packageguid].msixbundle file to install
 - The App can also be installed via PowerShell using the Add-AppxPackage cmdlet.
Add-AppxPackage -Path c:\app\[packageguid].msixbundle

Windows Update

The Lenovo Customized Wacom Components Driver can be uploaded to Windows update for automatic or optional distribution to target machines. A posting to WU requires the Wacom sensor hardware IDs (or CompatibleID if implemented on the target system) as well as the CHIDs for the targeted platforms. This can be utilized in the following ways:

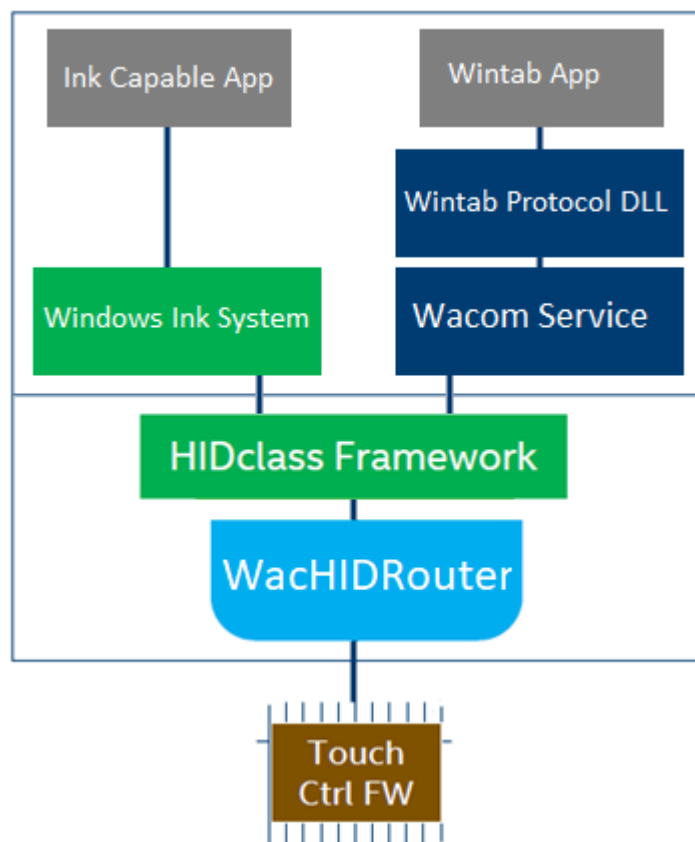
- Optional posting only – This distribution method of WU does not allow for automatic download of the driver because there is a Windows Inbox driver that handles HID data. This method will allow a system image to pass the “MDA Audit Tool” test if needed.
- Automatic posting – This will allow the driver to be automatically downloaded by the Windows Update system after targeting. This requires a lengthy test and review process to Microsoft for approval that can take up to 1 month to complete.

Uninstallation

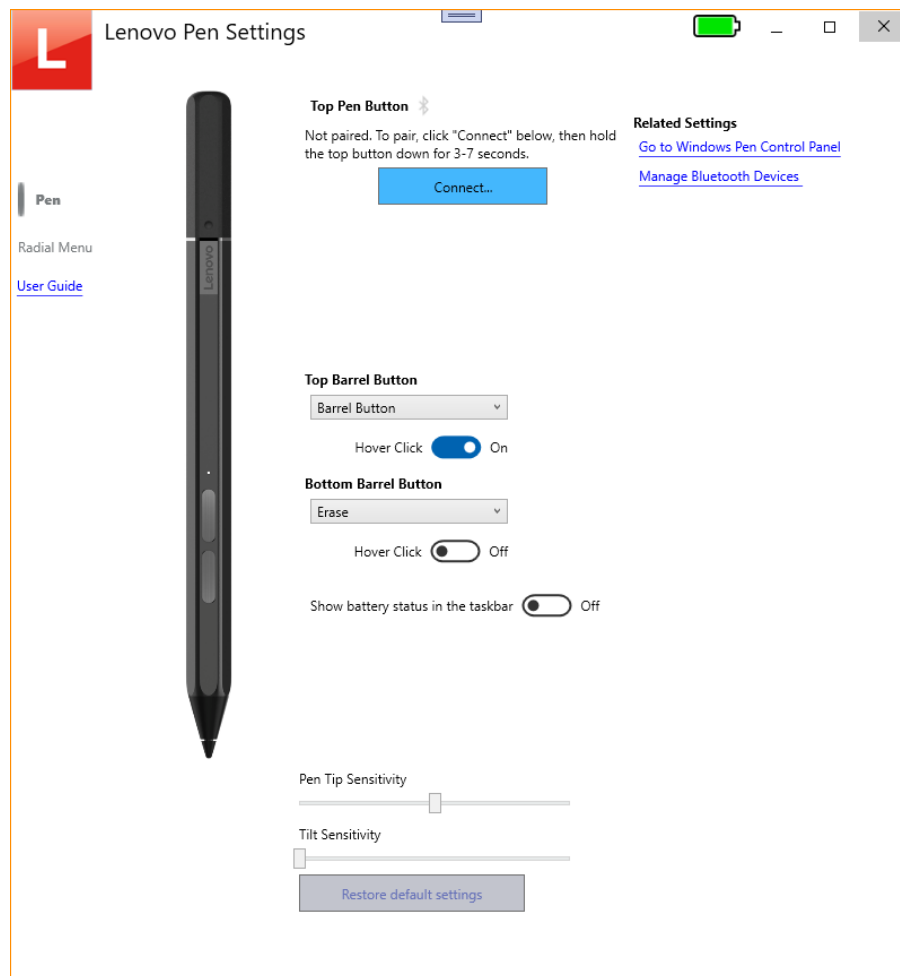
To prevent the user from uninstalling the Lenovo Customized Wacom Components Driver (Service and Kernel) cannot be uninstalled through the Windows “Apps & Features” settings app. The Lenovo Customized Hardware Support App can be uninstalled separately through the Windows “Apps & Features” settings app using the ”Lenovo Pen Settings” item.

Driver Data Flow

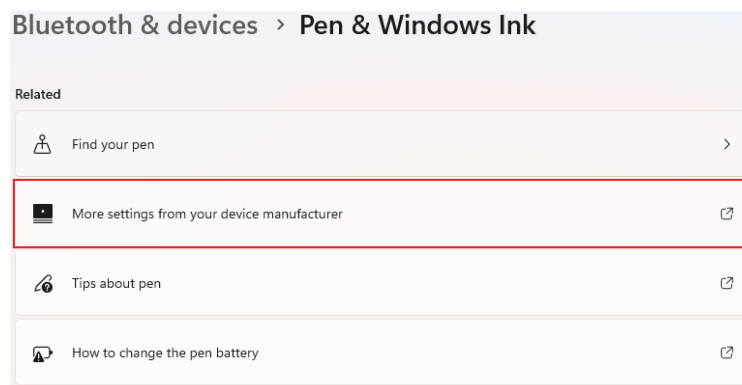
The Lenovo Customized Wacom Components Driver is a multi-tiered multi-protocol solution that processes data from a compatible Wacom Components Pen Sensor and simultaneously provides that data to the Windows Ink System and processes it to perform customized functions and inking for Wintab-capable applications and Wacom Signature & Inking Platforms.



Components Settings App Functionality

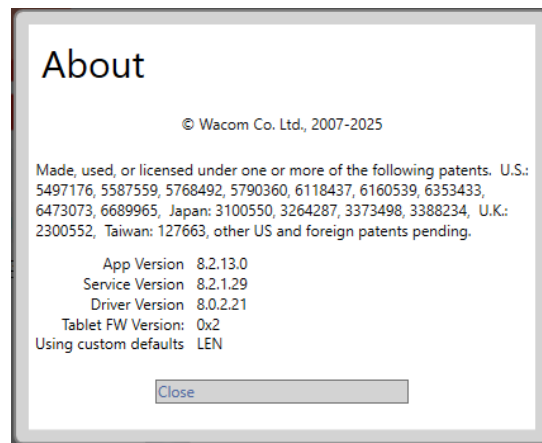


Windows Settings Integration



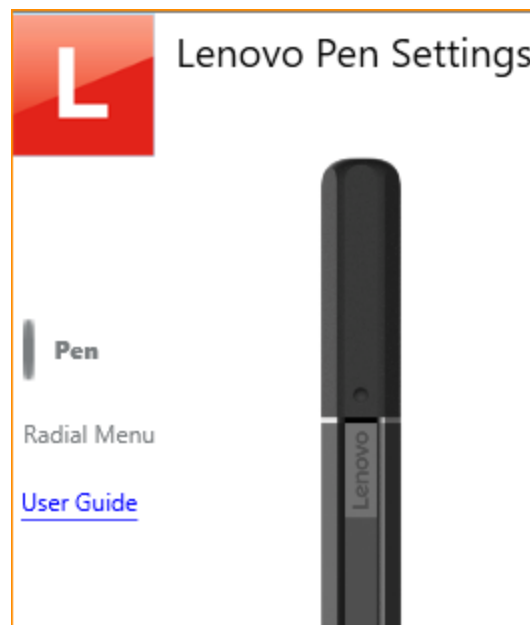
The Lenovo Customized Hardware Support App is registered as a preinstall package so it can be pre-installed on a system image and will integrate with the Windows Pen & Ink Settings page by being included as a link in the “Related Settings” section of the page.

About Box



Clicking on the Wacom “Bug” logo in the top left corner will bring up the About box which displays the component versions present on the system.

User Guide [Lenovo Custom]

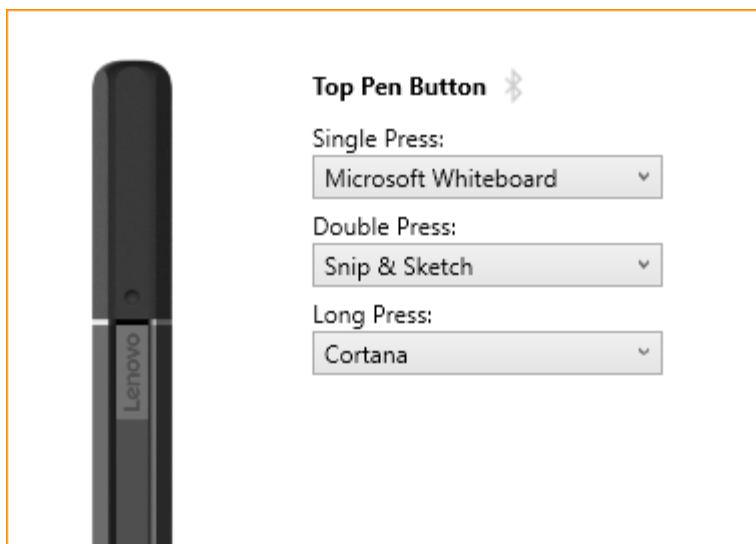


A user guide link is displayed on the left of the Lenovo Customized Hardware Support App which will take the user to a language specific URL

English	https://support.lenovo.com/us/en/solutions/ht508862
Japanese	https://support.lenovo.com/jp/ja/solutions/ht508862
Italian	https://support.lenovo.com/it/it/solutions/ht508862
Swedish	https://support.lenovo.com/se/sv/solutions/ht508862
Danish	https://support.lenovo.com/dk/da/solutions/ht508862
Spanish	https://support.lenovo.com/es/es/solutions/ht508862
Chinese – Simplified	https://newsupport.lenovo.com.cn/commonProblemsDetail.html?noteid=185625
French	https://support.lenovo.com/fr/fr/solutions/ht508862
Finnish	https://support.lenovo.com/fi/fi/solutions/ht508862
Korean	https://support.lenovo.com/kr/ko/solutions/ht508862
Norwegian	https://support.lenovo.com/no/nb/solutions/ht508862
German	https://support.lenovo.com/de/de/solutions/ht508862
Polish	https://support.lenovo.com/pl/pl/solutions/ht508862
Greek	https://support.lenovo.com/gr/el/solutions/ht508862
Dutch	https://support.lenovo.com/nl/nl/solutions/ht508862
Czech	https://support.lenovo.com/cz/cs/solutions/ht508862
Turkish	https://support.lenovo.com/tr/tr/solutions/ht508862

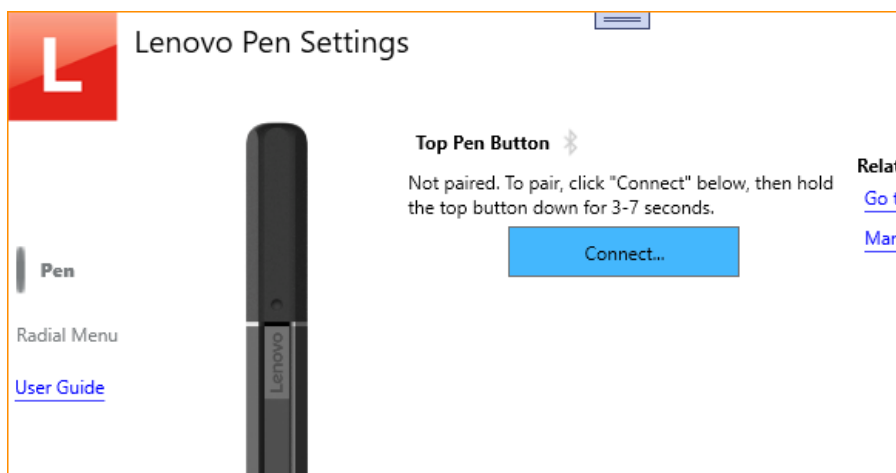
Portuguese	https://support.lenovo.com/pt/pt/solutions/ht508862
Hungarian	https://support.lenovo.com/hu/hu/solutions/ht508862
Chinese – Traditional	https://support.lenovo.com/tw/zh/solutions/ht508862
Russian	https://support.lenovo.com/ru/ru/solutions/ht508862
Slovak	https://support.lenovo.com/sk/sk/solutions/ht508862

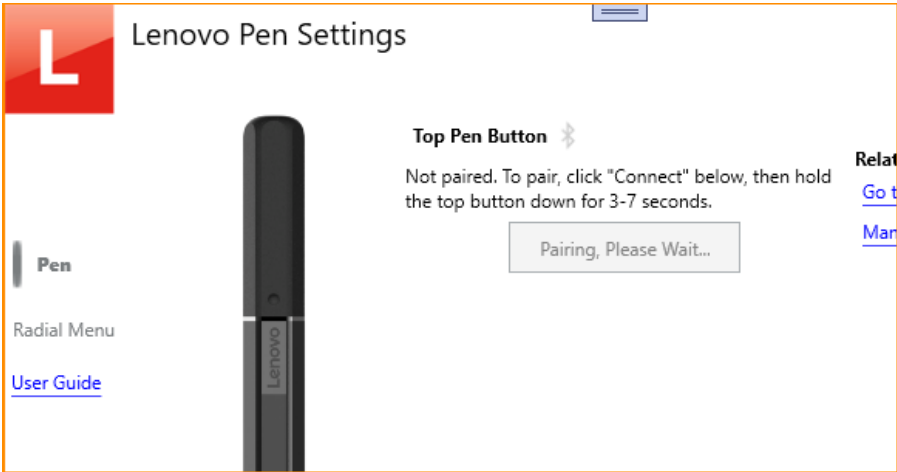
Top Pen Button Settings (Bluetooth)



If the installed Wacom Components Pen sensor uses the AES technology and the Pen in use includes a Bluetooth-capable Top Pen Button, these settings will be visible. If a pen does not support Long Press, the Long Press option will not be displayed.

Pairing





If there are no BT Button devices paired with the system clicking the “Connect...” button will search for supported BLE devices in pairing mode and connect them to the system.

Bluetooth Button Press Options

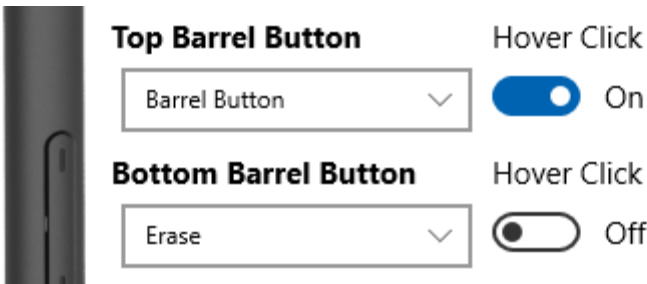
Single/Double/Long Press Function
<ul style="list-style-type: none">• Windows Search• OneNote• Microsoft Whiteboard• Screen Snipping• Sticky Notes• Ink Workspace• Open/Run...• Keystrokes...• Page Up *• Page Down *• Play/Pause *• Next Track *• Previous Track *• Volume Up *• Volume Down *• Mute *• Disabled• Cortana (only on long press)

Note – these settings synchronize with the Windows “Pen & Windows Ink” settings except for those marked with an ‘*’. When selected, those items will leave the drop down in the Windows settings blank.

Note – The functions listed may change due to Windows OS differences.

Additional Functions can be added to OEM customized driver for a nominal NRE charge.

Barrel Button Settings



Button Functions

The functionality of the side pen buttons (Upper and Lower Barrel Buttons) can be configured by selecting an option in the dropdown, the possible options are:

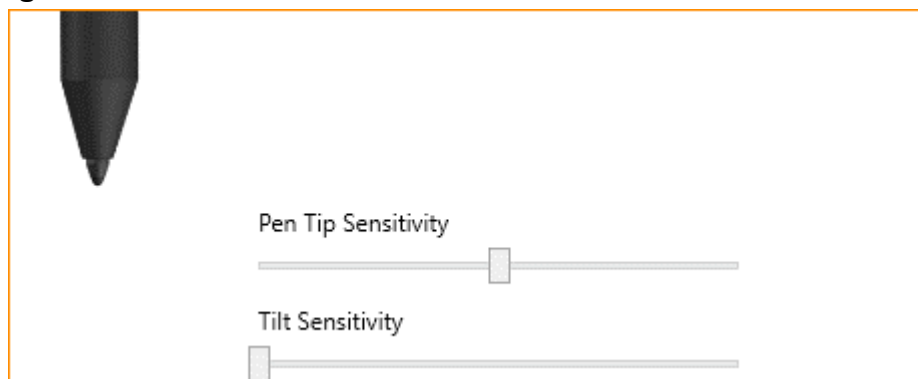
Barrel Button Functions	
<ul style="list-style-type: none">• Radial Menu• Erase• Barrel Button• Open/Run...• OneNote• Page Up• Page Down• Go Back• Go Forward• Lenovo Pen Settings	<ul style="list-style-type: none">• Web Browser• E-mail• Play/Pause• Next Track• Previous Track• Volume Up• Volume Down• Mute• Disabled

Note – Some Barrel Button functions can be overridden by the foreground application and the behavior may change as a result.(ie. Erase works in MS Whiteboard but MS Paint uses that button to draw the secondary color)

Hover Click

Each Barrel button has an associated option to enable/disable Hover Click. If disabled, the chosen Barrel Button function is executed when the button is pressed while tapping the Pen tip against the screen. If enabled, the chosen Barrel Button function is executed immediately when the button is pressed and the pen is in proximity of the touchscreen. For compatibility with the Windows System HLK Pen Eraser Test, Hover Click is disabled by default.

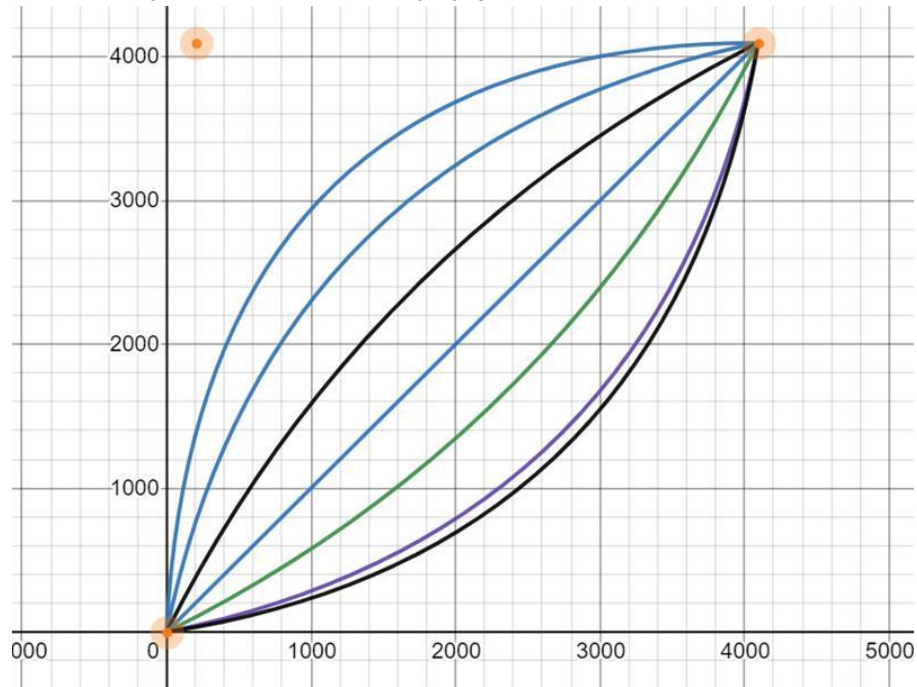
Sensitivity Settings



Note – The Tilt Sensitivity slider does not appear when the platform does not support tilt detection (i.e. AES1.0).

Tip & Eraser Sensitivity

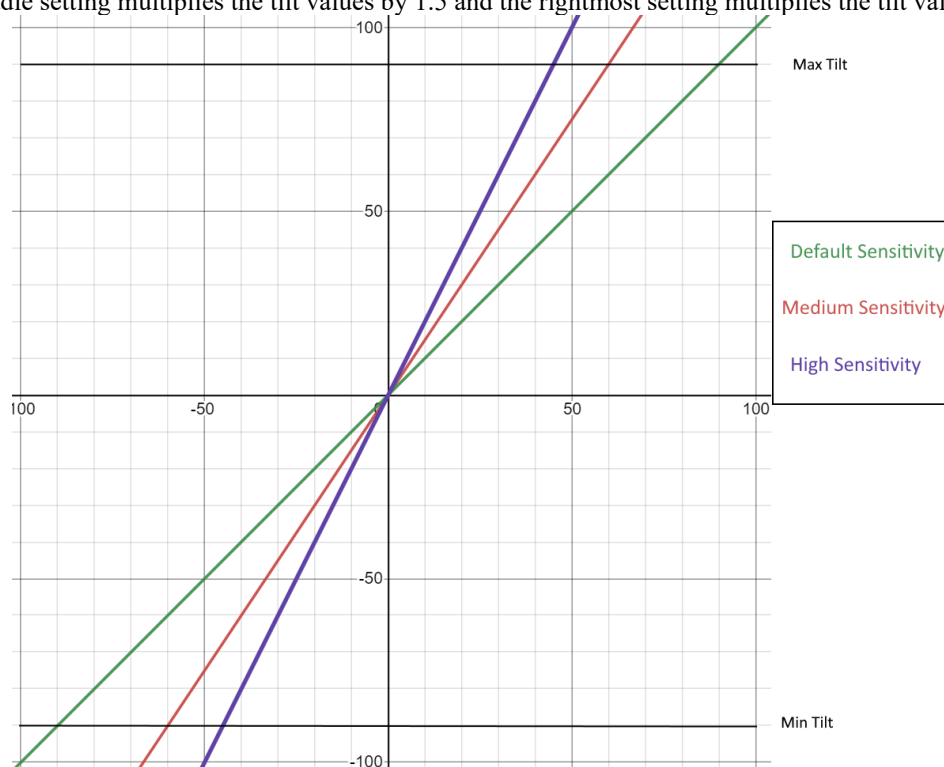
Eraser and Tip sensitivity are controlled by sliders in the control panel. This applies a curve to the pressure data to modify the values reported to the system. Softer settings will report higher pressure with less force used, Firmer settings will require more force on the pen tip to report higher pressure levels. Below is a graph of the seven different pressure curves where the minimum pressure is 0 and max pressure is 4095.

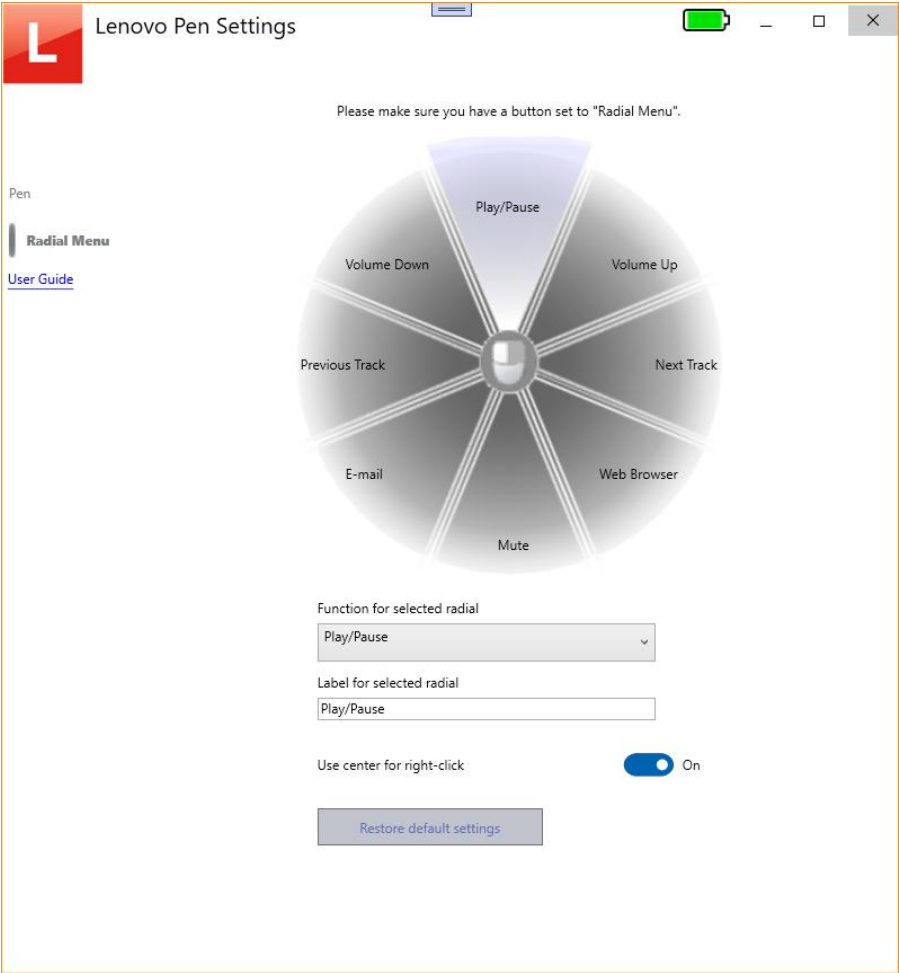


Tilt Sensitivity

Tilt Sensitivity can be modified to exaggerate X and Y tilt values (always between -90 and 90) sent to the system on Pen sensors that have support for tilt.

There are three settings on the slider. The leftmost setting is the default and does not modify the tilt values. The middle setting multiplies the tilt values by 1.5 and the rightmost setting multiplies the tilt values by 2.0.





The Radial Menu is a function that can be triggered by a Barrel Button. It will display a floating popup menu on the user’s screen that can provide customized functionality with a single click and tap. When the Radial Menu is visible, the pen cursor is hidden until the Radial Menu is dismissed.

Radial Wedges

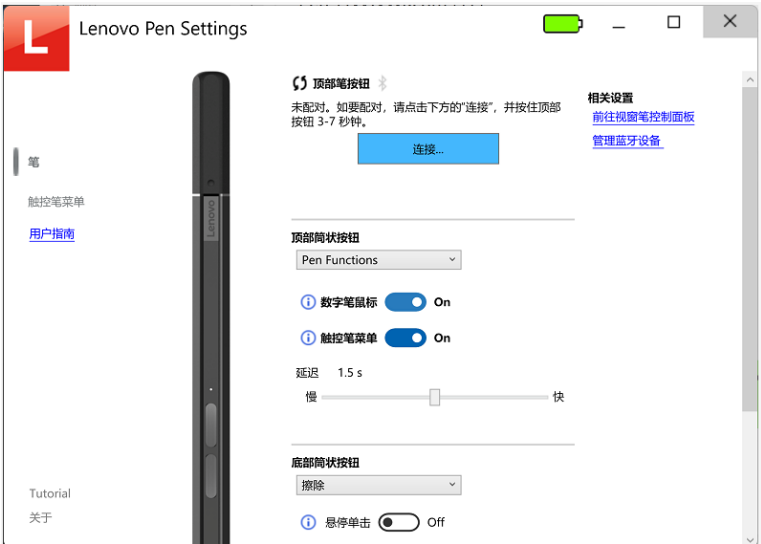
Each Radial Wedge can be programmed for a different function:

Radial Wedge Functions	
<ul style="list-style-type: none">• Open/Run...• OneNote*• Page Up• Page Down• Go Back• Go Forward• Lenovo Pen Settings*• Web Browser	<ul style="list-style-type: none">• E-mail• Play/Pause• Next Track• Previous Track• Volume Up• Volume Down• Mute• Disabled

note – settings marked with ‘*’ depend on what is installed on the user’s system or Windows features which may change over time.

Center Right Click

If this is enabled, clicking in the middle of the Radial Menu will send a right-click to the application behind the Radial menu.



This functionality is currently only available for the Thinkpad X1 Fold while using the “Lark” pen (PenID 0x826B). When this functionality is enabled, the top barrel button will have “Pen Functions” as an option and the toggle buttons for the Pen Mouse and Pen Menu features will be displayed as well as a slider to modify the Pen Menu delay.

Pen Mouse [Lenovo Custom, Thinkpad X1 Fold]

- 1) If Pen Mouse is enabled, when the upper barrel button is single clicked (less than .5s duration) the pen will enter mouse mode.
- 2) Once started, mouse data will be sent until the upper barrel button is single clicked again.
- 3) For single screen, extended screens and duplicate screens, mouse data will work as an absolute pointer.
- 4) For second screen only, mouse data will work as relative pointer.

Projection mode	PC screen only	Duplicate	Extend	Second screen only
Mapping policy	PC screen only	Duplicate	Extend	Second screen only
Mouse mode	Absolute	Absolute	Absolute	Relative
Area Mouse cursor moves	PC screen Pen tip Position = Cursor position	PC screen = External display(s) Pen tip Position = Cursor position	PC screen Pen tip Position = Cursor position	External display(s) No absolute position linkage
Same mapping method as Win10 Pen?	Yes	Yes	Yes	No

Display: Yes
Cursor: Yes

Display: Yes
Cursor: No

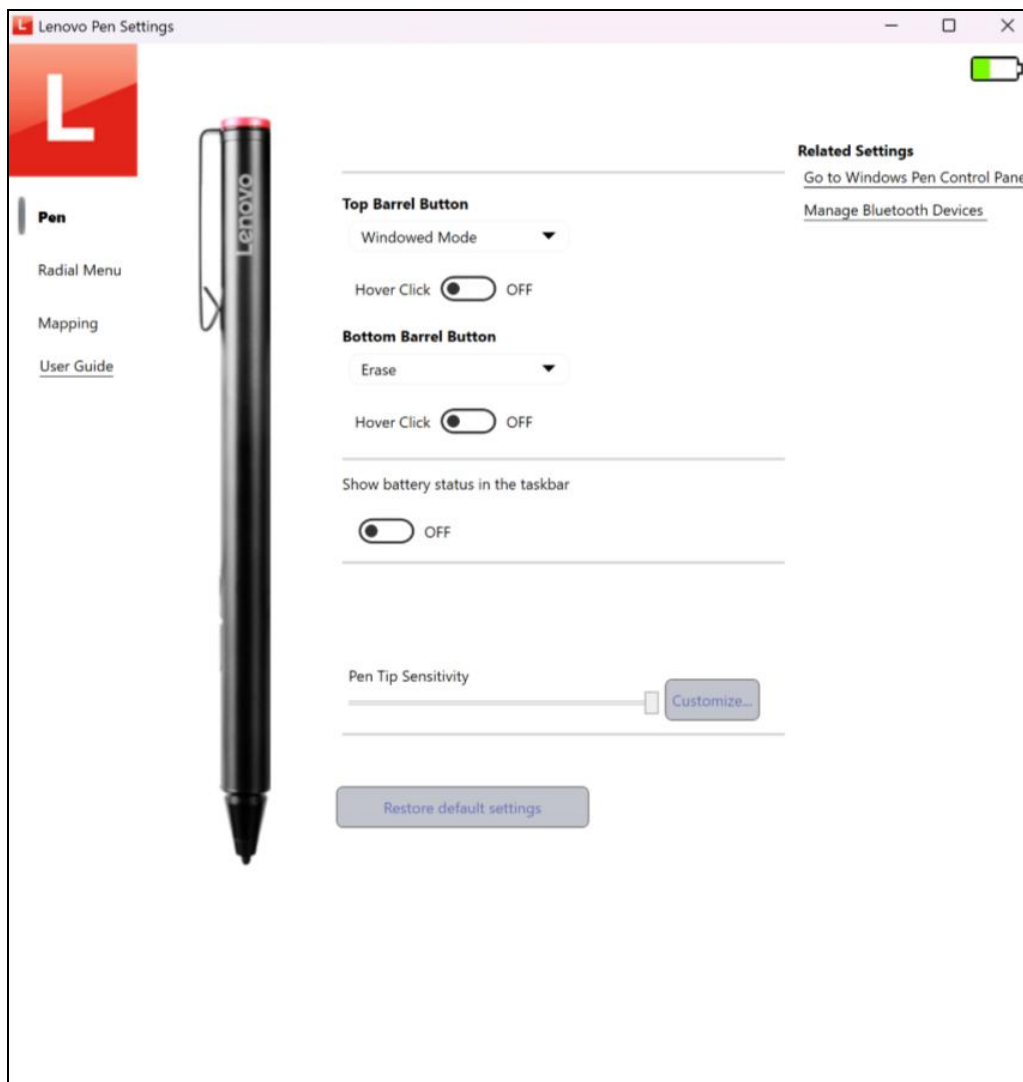
Display: No
Cursor: No

Pen Menu [Lenovo Custom, Thinkpad X1 Fold]

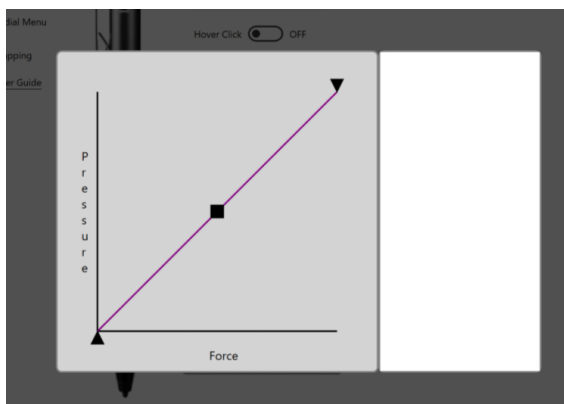
- 1) If Pen Menu is enabled and the pen tip is in proximity and has moved less than 6mm for more than 1.5s (default) while the upper barrel button is held, the Pen menu will appear. The delay amount can be adjusted by the Delay slider.
- 2) The Pen menu, once invoked will disappear after a wedge is selected or the center ‘X’ is clicked
- 3) The Pen menu will work like the current radial menu and use the settings from the “Radial Menu” tab

Enhanced Pressure Curve **[Lenovo Custom, limited model]**

- 1) The Pen Tip Sensitivity slider will have a “Customize...” button next to it that will allow a user to customize the shape of the pressure curve.

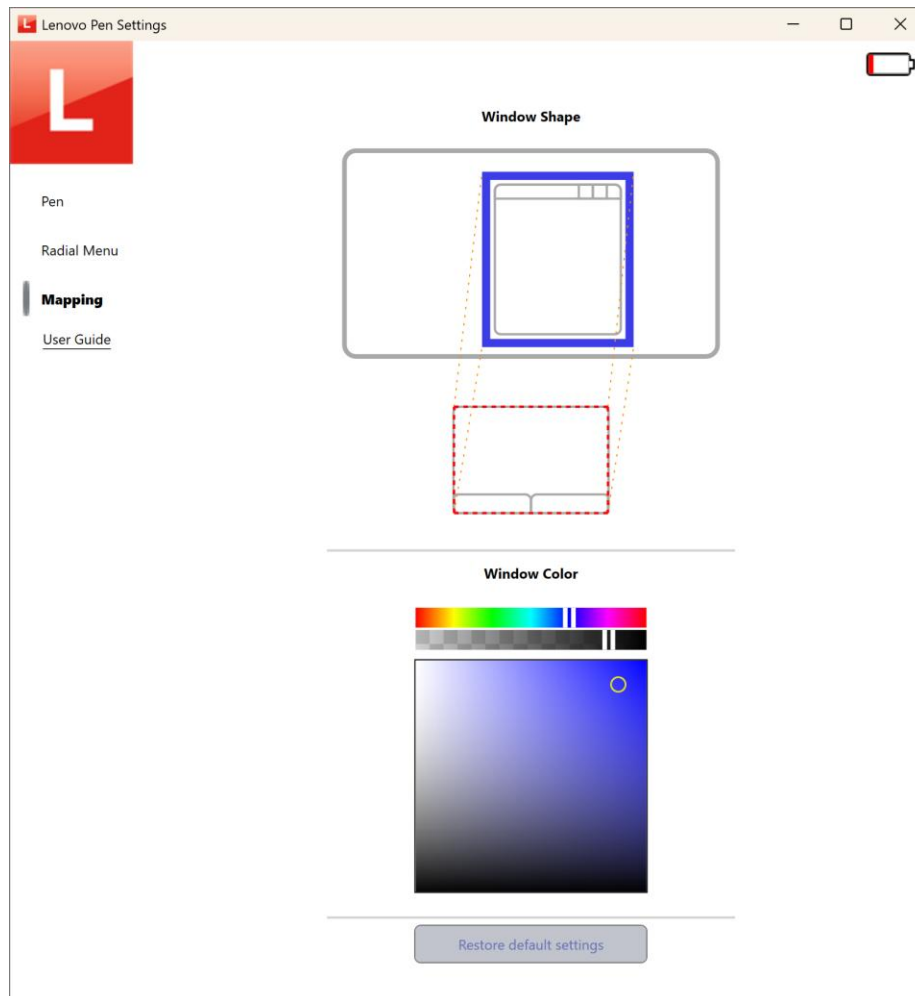


- 2) When clicked, a panel will appear that has a grab anchor in the middle of the curve that allows the user to adjust the shape of the curve.
- 3) There will be a triangular anchor in the lower left that allows the user to adjust the force required to activate a tip click.
- 4) There will be a triangular anchor in the upper right that allows the user to adjust the maximum pressure.



Touchpad Pen Mapping **[Lenovo Custom, Touchpad Pen Unit]**

- 1) There will be an additional tab that allows the user to customize the “Windowed Mode” pen button features.



- 2)
- 3) When one of the pen barrel buttons are assigned to Windowed Mode the user will be able to toggle between two modes.
- The default mode is Full Screen mode. In this mode the cursor maps to then entire virtual desktop space.
 - When the user clicks the assigned button it will transition into Windowed Mode. In this mode the cursor maps to a box on the display.
 - When activated the box will attempt to fit to the window that is in the foreground.
 - In the following cases the box will fit to the desktop instead.
 - There is no window selected.
 - The window that is selected is the TaskBar.
 - Clicking the assigned button while in Windowed Mode will return to Full Screen mode.
 - The cursor will reach all corners of the virtual desktop.
 - The box will go away.

- c. The recommended way to move the box from one window to another is to click the assigned button to return to Full Screen mode, then select the app you would like to target next to bring it to the foreground, then click the assigned button again.
- ii. The user can change the color with the color picker in the settings app. The default is blue.

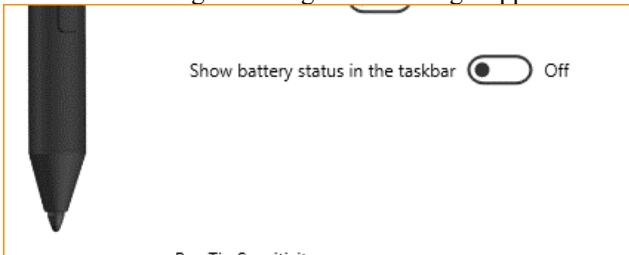
Calibration

Calibration executes the Windows system utility that will align the cursor to more accurately match the position of the pen on the screen. The calibration button will only display for EMR tablets that require parallax correction.

AES Battery Status [Lenovo Custom]



For AES pens, there will be a battery status icon in the system tray and another status icon in the settings app. Hovering the pen or mouse over these icons will display a string that describes the level of the battery. The system tray icon can be enabled/disabled through a setting in the Settings App



The driver converts the reported values from the firmware into percentages and displays the remaining battery level in a progress bar-style icon that grows in 1% increments. The color of the icon changes as below:

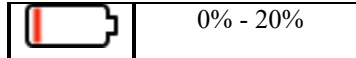
Icon	Percentage Range
	75% - 100%
	37% - 74%
	17% - 36%
	1% - 16%
	0%

Note: the specific voltages that correspond to the reported values vary from pen to pen.

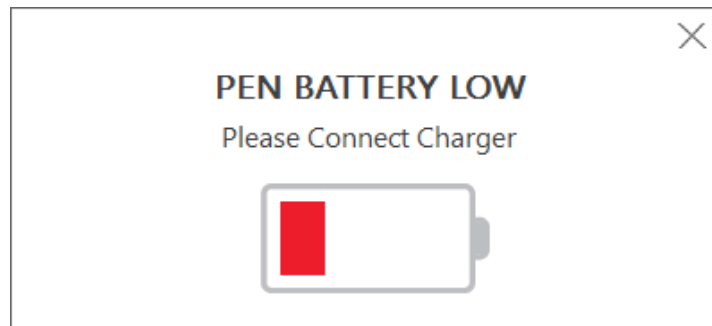
Modular Pen Battery Status [Lenovo Custom]

For Modular Pens (0x0041 & 0x826B), the battery level indicator will display in a progress bar-style icon that grows in 1% increments. The color of the icon changes as below:

Icon	Percentage Range
	41% - 100%
	21% -40 %



Low Battery Notification



When the battery level reaches 8%, the Low Battery Notification popup will be displayed to the user. If the pen is rechargeable, the message will read “Please Connect Charger”, otherwise it will read “Low battery warning: For continuous operation of your Active Pen, replace the battery immediately.”

Bundled Color King Software [Lenovo Custom]

The Color King utility is bundled with the Lenovo Customized Wacom Components Driver package and installed on all systems. The ColorWatcher.exe utility is automatically started when a Color Capture BLE device is detected.

Custom Driver Functions & Defaults

The basic functionality of the driver can be customized in the following ways:

- Defaults for all the Driver functions can be modified to any of the possible functions listed above.
- Custom applications can be inserted as Button functions and will display in the Top Pen Button or Barrel Button dropdowns.
- All strings can be replaced with an OEM specified string, including localizations for all supported languages.
- An NRE charge may apply to requested customizations

Custom OEM Branding [Lenovo Custom]

The Branding of the Lenovo Customized Wacom Components Driver can be modified to suit the OEMs specific needs. The following elements can be customized:

- Uninstall Link Name – Defaults to “Lenovo Pen Settings”
- Uninstall Link Icon
- Lenovo Customized Hardware Support App Layout – The layout and visibility of the items can be modified in any way that can be expressed using XAML.
- Lenovo Customized Hardware Support App Graphics – Graphics such as the Pen image and Logo can be modified with OEM provided Graphics.
- Lenovo Customized Hardware Support App Name – Defaults to “Lenovo Pen Settings”
- Customized branding requires a signed Maintenance Agreement

Pen First Use Notification [Lenovo Custom]

Upon completion of OOBE (Out of Box Experience) the pen service will start a sixty min countdown. If the pen is used after this time has elapsed a First Use toast notification will pop up to inform the user that they can customize pen related features in the Lenovo Pen Settings app. If the pen is used before the time has elapsed, no toast notification will pop up.

