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ENABLING MINI DESKTOP MODE WITH INTEGRATED KEYBOARD/ CLICK PAD USING 360 DEGREES FLIP TYPE LAPTOB

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Enabling mini desktop mode with integrated keyboard/click pad by using 360 degrees flip type laptop

Abstract:

In some of work-space scenario, user is using external monitor, camera, and headset, and doesn't requires laptop panel side features, especially some of external monitor does not have enough ability to adjust monitor stand to get enough view direction to prevent the external monitor not blocked by laptop's monitor or if in a very small work-space, laptop's monitor will block the user to take some tools which is behind laptop's monitor.

By using existing sensors and detecting the monitor is connected or not on current 360-degree flip type PC can easily allow user to mimic their flip type laptop to be a mini desktop with integrated keyboard/click pad which release more clean desktop user experience.



Figure 1. external monitor was blocked by laptop due to limited workspace.



Figure 2. Mini desktop with integrated keyboard/click pad mode user scenario

Problem Solved:

Current 360-degree flip type laptop supports tablet mode, the purpose is when user flip their laptop monitor to 360-degree to become tablet mode, by disabling the keyboard/click pad to prevent user miss-touch the keyboard/click pad to cause bad user experience when they are using the "tablet". This also cause the 360-degrees flip type laptop does not have ability to mimic a mini desktop with keyboard/click pad because the keyboard/click pad is disabled. By using ambient light sensor and accelerometer and detecting external display can support to detect the mini desktop with integrated keyboard/click pad mode to provide the user scenario like figure no.2.

Prior Solutions:

There are no prior solutions.

Descriptions:

Most of 360-degrees flip type PC integrated G-sensors (Accelerometer sensor), one on panel side, and one on keyboard/click pad side, the purpose is to detect the gravity weight for X-Y-Z axis to calculate the angle between panel and keyboard/click pad to support different mode for rotating the screen and disabling the keyboard/click pad in laptop mode. Also, most of notebook will have ambient light sensor on panel side which is used to detect environment light for auto panel brightness adjustment.

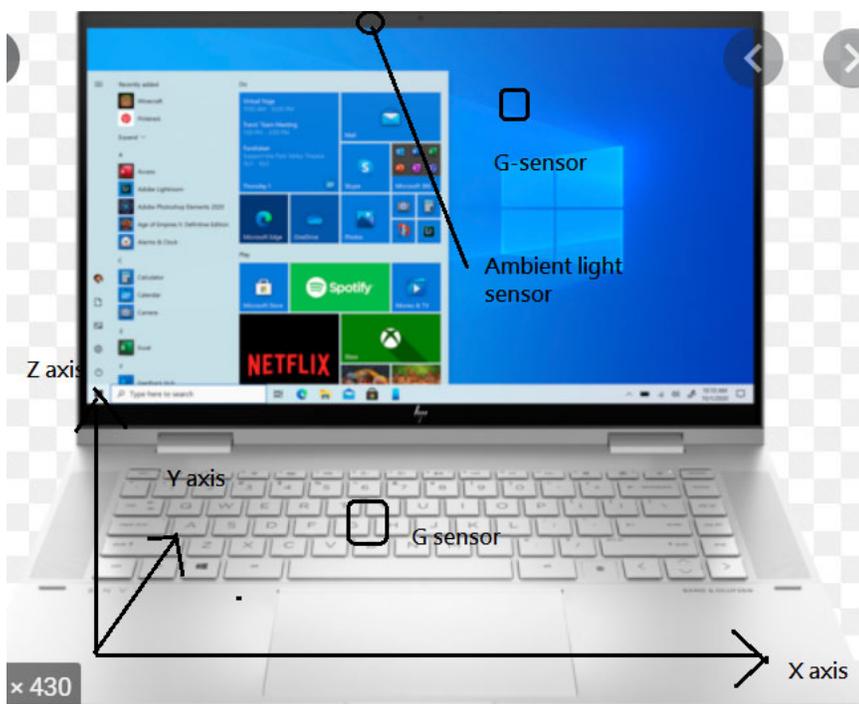


Figure 3. Sensor inside a 360 degrees flip type PC.

For mimic a desktop with integrated keyboard/click pad, the system will be flipped to 360 degrees and put on the desk.

Which will provide very stable weight especially at Z-axis comparing even if user is using the “tablet-mode“ when lying down on the bed, also the ambient light is stable and with very low light due to the light sensor is sensing the desk.

User also requires connecting external monitor to display the screen in this mode, for legacy monitor like using DP, and HDMI cable connects to laptop, we could detect external monitor is connected by one pin called hot plug detection, when this voltage on this pin is drive high and stable means the external monitor is connected, also this signal can be virtual wired on Type-C cable connection when connecting to USB-C docking or monitors which is already defined in Displayport alternative mode specifications which is shown as fig.5

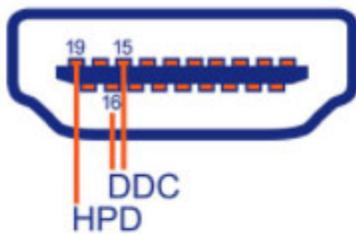
By summarizing above we could create a mini desktop mode with integrated keyboard/click pad.

1. Laptop in 360 degrees flip type
2. Laptop with high weight on Z-axis and stable
3. Ambient light sensor is detecting very low environment brightness
4. User is connecting to external monitor

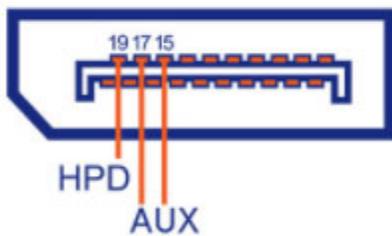


Figure 4. Ambient light sensor is detecting "table brightness".

HDMI



DisplayPort



DVI

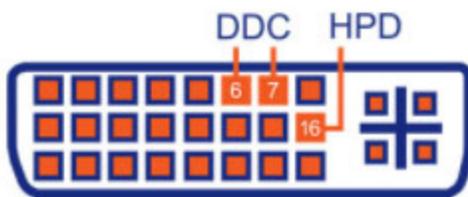


Figure 5. HPD (Hot-plug detection) on legacy display IO ports.

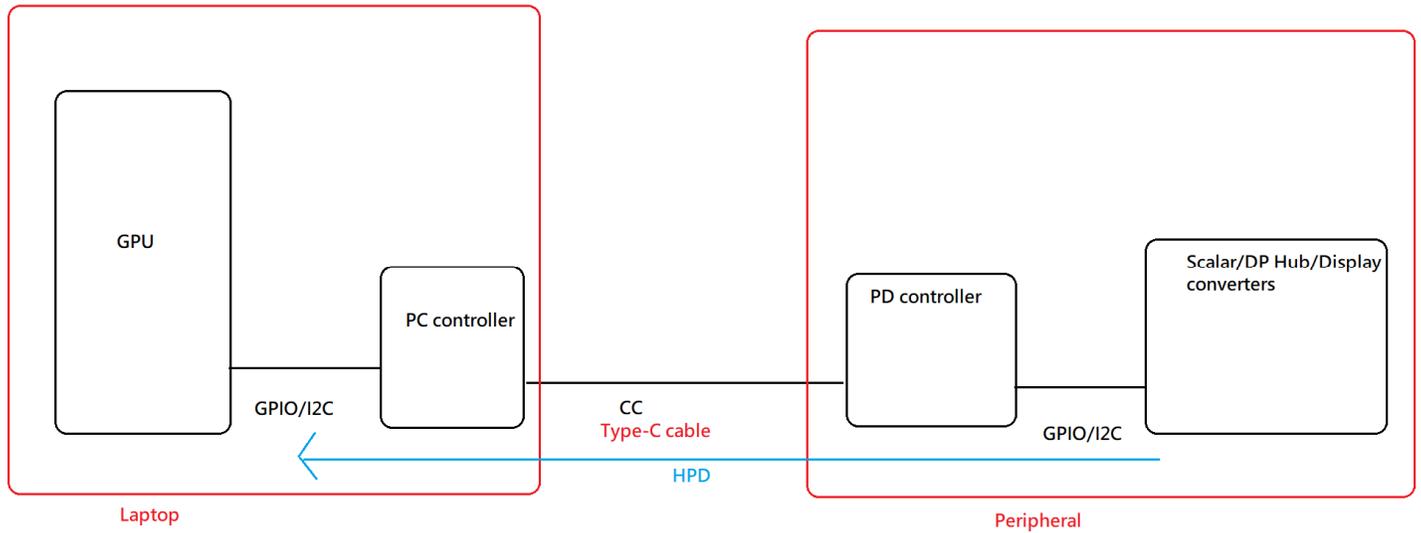


Figure 6. HPD (Hot-plug detection) over Type-C

Advantages:

By using exist sensors and monitor detection method on current 360 degrees flip type laptop, this disclosure tells how to provide user a new user scenario to provide opportunity to clean their desktop and releasing more working space, to the panel of laptop which user doesn't requires to use but blocking user's external monitors or other objects on the desk.

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