Technical Disclosure Commons

February 23, 2018

Using a convertible device as desktop peripheral

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Using a convertible device as desktop peripheral

ABSTRACT

The techniques of this disclosure enable input devices, e.g., keyboard and trackpad of a convertible laptop and other computing devices to act as peripherals for an external display, e.g., external monitor, television, etc. The techniques, as disclosed herein, determine if a convertible laptop is connected to an external monitor, whether it is in a particular mode, and is upside down. When these conditions are met, the keyboard and trackpad of the convertible laptop are configured to act as peripherals for the external display.

KEYWORDS

- Hybrid

- Convertible laptop

- Desktop mode

- Wireless Display

- WiDi

- External display

- Tablet
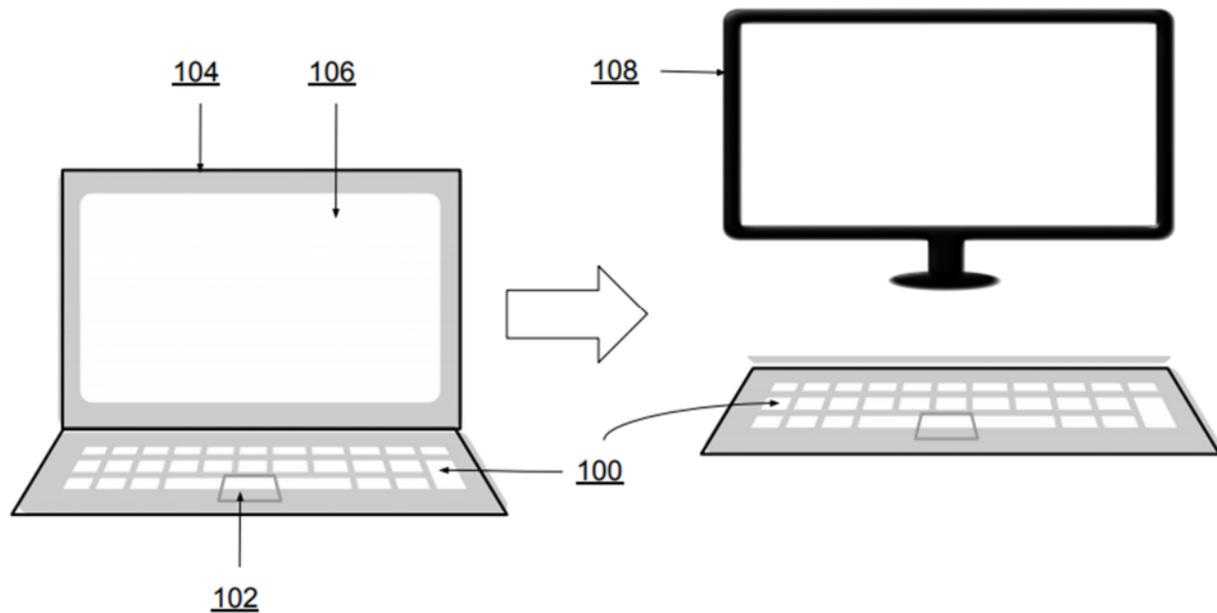
BACKGROUND

A hybrid or convertible tablet is similar to a laptop computer, and includes additional capabilities of a convertible configuration. In the convertible configuration, such a device can be folded and operated like a tablet with touchscreen display. When the device is in the tablet mode, input devices such as built-in physical keyboard and trackpad are disabled, and the touchscreen display operates as an available input device. In some devices, the unit that houses the keyboard and trackpad can be detached when the device is in tablet mode.

Many such devices are also equipped with one or more ports, e.g., USB Type C ports. The ports allow various peripherals, e.g., an external mouse, an external keyboard, and external displays (e.g., monitor, television, etc.) to be connected to a convertible device. A convertible device can be connected to an external display, e.g., a television, directly with a physical cable, or wirelessly, e.g., using a protocol such as Wireless Display (WiDi). With such a connection, the convertible device is in the tablet mode, and physical input devices of the convertible device, such as keyboard and trackpad, are disabled. In this case, the user needs to connect an external keyboard and/or mouse (or other pointing device) to perform various operations, e.g., to navigate to a video to be viewed on the external display. This imposes additional cost to operate. Further, connecting such peripherals is inconvenient in a living room setup, e.g., with a television set as the external display. Alternatively, the user can change the operating mode of the convertible device each time there is a need to use the keyboard; however, this makes the setup less user-friendly.

DESCRIPTION

Per techniques of this disclosure, the built-in keyboard and trackpad of a convertible device are configured to remain enabled as input devices when the device is connected to an external display when certain conditions are met.

Fig. 1: Using built-in keyboard and trackpad of a convertible device when connected to an external display

Fig. 1 illustrates a convertible device (104) that includes a keyboard (100) and a trackpad (102) in a bottom portion and a touchscreen display (106) in a top portion. As illustrated in the left side of the figure, when the device is in a computer mode, with the display facing a user and perpendicular to the keyboard/trackpad unit, the keyboard and/or trackpad are enabled.

As illustrated in the right side of the figure, when the device is connected to an external display (108), the device is folded such that the touchscreen display and the keyboard/trackpad unit are parallel to each other. In a conventional convertible device, the keyboard/trackpad unit is disabled in this mode and only input via the touchscreen display is enabled.

Per techniques of this disclosure, it is detected whether the following conditions are satisfied:

● The device is connected to an external display

● The device is in convertible mode and no external input devices, e.g., external keyboard or mouse, are connected.

- The device is upside down, with the keyboard/trackpad being on the top side. For example, this can be detected by utilizing accelerometers that are built in to the device.

With user permission, if the above conditions are met, the device is automatically placed into a convertible-as-desktop mode. Users and/or software applications are provided with settings and options that can be used to disable such mode. Unlike conventional devices, the keyboard/trackpad are enabled to act as input devices for the convertible devices that is connected to the external display. This enables users to utilize the available keyboard and trackpad, and eliminates the cost and inconvenience of using separate peripheral devices for input.

The techniques of this disclosure can be implemented in any convertible device, e.g., a computer that runs a mobile or desktop class operating system and that has physical input mechanisms. Any equipment manufacturer (OEM) can implement these features.

CONCLUSION

The techniques of this disclosure enable input devices, e.g., keyboard and trackpad of a convertible laptop and other computing devices to act as peripherals for an external display, e.g., external monitor, television, etc. The techniques, as disclosed herein, determine if a convertible laptop is connected to an external monitor, whether it is in a particular mode, and is upside down. When these conditions are met, the keyboard and trackpad of the convertible laptop are configured to act as peripherals for the external display.