Technical Disclosure Commons

Defensive Publications Series

March 24, 2016

CHARGE DIRECTION INDICATING USBC CABLE

Katie Roberts-Hoffman

Bernard Thompson

Follow this and additional works at: http://www.tdcommons.org/dpubs_series

Recommended Citation
Roberts-Hoffman, Katie and Thompson, Bernard, "CHARGE DIRECTION INDICATING USBC CABLE", Technical Disclosure Commons, (March 24, 2016)
http://www.tdcommons.org/dpubs_series/183

This work is licensed under a Creative Commons Attribution 4.0 License.
This Article is brought to you for free and open access by Technical Disclosure Commons. It has been accepted for inclusion in Defensive Publications Series by an authorized administrator of Technical Disclosure Commons.
CHARGE DIRECTION INDICATING USB-C CABLE

ABSTRACT

A hardware based solution is proposed for indicating charging direction in a USB-C cable. The solution comprises of bi-color red/green LEDs attached to the connector of the USB-C cable. The LEDs are electrically connected and will glow when the USB-C supportive device is connected to the USB-C supportive system either for receiving or providing power. The device which is providing power or receiving power is identified by the color of the glowing LED at the specific end of the connector of USB-C cable, for example green could indicate providing end and red the receiving end. The LEDs are always connected in the opposite orientation on each end of the cable such that they always have opposing color.

BACKGROUND

The USB-C is an industry standard connector and cable used for connectivity and power. The USB-C cable has same connector in both the ends and does not have any up-down orientation. The USB-C supportive system can receive power from the USB-C supportive device or also provide power to the USB-C supportive device using the same physical cable and port. For example, a laptop can receive power and charge itself from a USB device or it can provide power to the USB device using the same cable and port. When two USB-C devices both capable of providing and receiving power are connected together to a USB-C supportive system, it becomes difficult for the user to distinguish between the USB device providing power and the USB device receiving power from the system. This situation is made worse when the device is not supported with any display or indicator to show its power state. This problem is solved to some extent in some devices in which a UI pop up window appears where the user is allowed to select the direction of power. Any hardware indication will not be visible if the device is closed and the user is forced to open the device
to see the charging direction. The opening and closing of the device to check the charging
direction is a pain point. There are number of devices available in the market with power
indicators. The indicators range from advanced meters showing current consumption to
simple lights indicators in the USB based power supply but most of them serve only aesthetic
purpose. A new hardware device and method is proposed to overcome the challenges
involved in identifying the charging direction in a USB-C cable.

DESCRIPTION

A dual/multi colored light is added to each end of the USB-C cable to make it obvious
for the user to identify which end of the given cable is providing power and which end is
receiving power. The light on each end is connected electrically such that its color changes
depending on the direction from which current is provided. With this addition of lights to the
cable the user can identify which device is providing power and which device is receiving
power at a glance, even if the devices themselves are closed.

An example of the proposed device would be using bi-color red/green LEDs where
the current direction across them is switched with the current flow on VBUS on the USB-C
cable. The LEDs will be connected in the opposite orientation on each end of the cable such
that they always have opposing colors. The providing end would always be one color and
receiving end will be the other. For example red could indicate receiving and green
providing.

The device is truly a hardware solution and has the advantage of not requiring any
software interaction. Hence it will work with any USB-C compatible devices. The solution
also could be implemented with software controlled LEDs. In another alternative, LEDs
could be included in the port of the system itself to indicate the status. Implementing this
solution in the cable allows the users to have varied choice in terms of LEDs of different
styles and colors, or the user could simply not desire a lit cable.