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UNIVERSAL STATUS LIGHT

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ABSTRACT

Typically, hardware devices, such as networking devices, include status indicators that display the status of ports and other elements related to the device. Each status indicator includes a status light that is carried by a plastic tube or pipe. Large amounts of plastic are typically involved in the manufacture of port status plastic tubes for networking devices worldwide. Techniques described herein provide for a universal status light that can be provided for networking devices in which the universal status light provides for merging port status indicators and general status indicators into a single status indicator, which may help to reduce plastic consumption and CO_2 emissions.

DETAILED DESCRIPTION

Many organizations have environmental, social, and governance (ESG) goals to help the organizations effectively manage their impact on society and the environment. For example, a company or organization may have an ESG goal to use recycled content for 50% of their products (by weight). Companies may meet or exceed ESG goals by reducing and removing plastic where possible.

Status lights are an integral part of hardware. Figure 1, below, illustrates an example of a network switch.

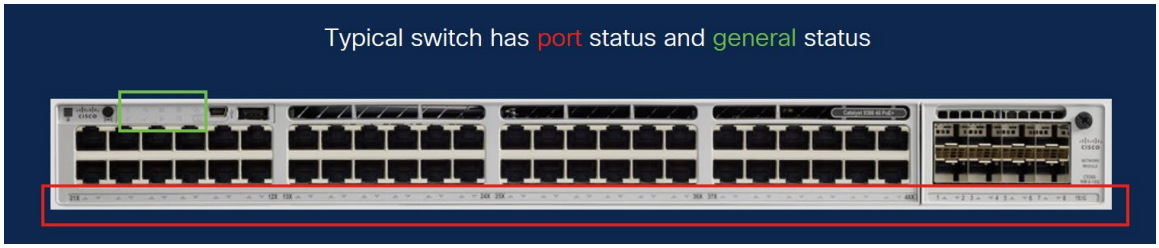

Figure 1: Example Network Switch

As illustrated in Figure 1, the typical switch has port status and general status indicators.

Port status lights are carried by light pipes. Figure 2, below, illustrates examples of light transmitted through plastic pipes, with and without support, and an example of a fan light.

Figure 2: Examples of Light Transmitted Through Pipes

As illustrated in Figure 2, different weights correspond to the different types of pipes depending on the material used to make the pipe and whether support is included with the pipe.

Although customers cannot see the long plastic tubes that carry the light, customers are able to see the light at the end of the tube. Figure 3, below, illustrates examples of the plastic required for the lighting and the light that customers see at the end of the tube.

Figure 3: Example Light at the End of the Tube

Assuming typical port light plastic weights 0.37g, Figure 4, below, shows the weight in kilograms (kg) of port light plastics used annually worldwide.

Assuming typical port light plastic is 0.37g, below is the total Mg used annually								
Year	2020	2021	2022	2023	2024	2025	2026	2027
Port Status Plastic (kg)	222,268	250,776	268,324	279,845	263,925	277,716	284,552	293,112

Figure 4: Table Illustrating Annual Weight of Port Status Plastic

Figure 5, below, is a chart illustrating the annual weight of the port light plastics contributed by a company that has a 40% port share of the ports worldwide.

Assuming 40% port share, annual port Status Plastic (kg)								
Year	2020	2021	2022	2023	2024	2025	2026	2027
Port Status Plastic (kg)	88,907	100,310	111,938	105,570	111,086	113,821	113,821	117,244

Figure 5: Chart Illustrating Weight of Port Status Plastic for a Company with 40% Share

In fiscal year 2023, the total plastic for a company with a 40% port share is approximately 2440 Megagram (Mg). Using the worldwide weight for 2023 of 279Mg * 40% / 2440 Mg, it can be determined that by removing port status plastic, the company can remove 4.6% of product plastic.

Figure 6, below, illustrates power consumed per year with a power consumption of 30mW per light emitting diode (LED) at a 1% toggle rate.

Assuming 40% port share, 30mW per LED toggling 1% of the time, annual Kilo Watts								
Year	2020	2021	2022	2023	2024	2025	2026	2027
Power (kW)	233,648	261,616	282,062	294,173	277,438	291,935	299,121	308,119

Figure 6: Chart Illustrating Yearly Power Consumption

The numbers in the chart illustrated in Figure 6 scale linearly. In other words, if the toggle rate is 10%, the numbers will be 10 times higher.

Figure 7, below, is a chart illustrating the minimal CO_2e savings for the company with the 40% port share.

Assuming 40% port share, annual CO_2e for annual 1% LED toggling and port status plastic for minimal CO_2e

Year	2020	2021	2022	2023	2024	2025	2026	2027
CO_2e(kg)	736,717	831,210	889,372	927,558	874,791	920,504	943,163	971,534

Figure 7: Chart Illustrating Minimal CO_2e Savings

For 2023, the CO_2e produced is equivalent to the Co_2e produced by charging 112,830,609,713 smartphones.

Techniques described herein provide for a universal status light that merges port status and general status into one universal status. Merging the port status light and the general status light into a universal status light can remove significant amounts of plastic from products and devices.

Figure 8, below, illustrates a switch in which the port status, general status, fan status, and beacon status are merged into one universal status indicator/light.

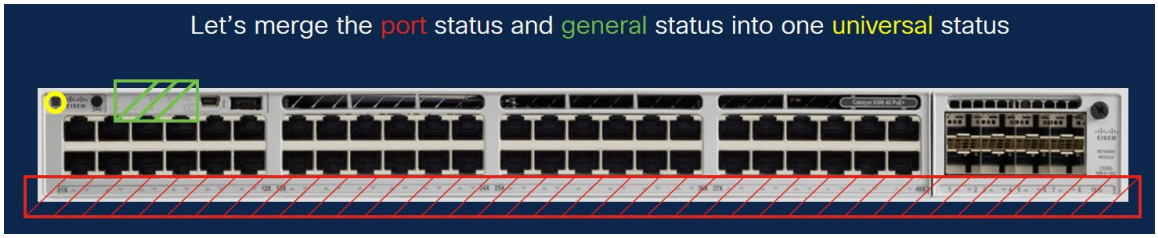

Figure 8: Example Universal Status Indicator

When cabling port status is not easily visible, as illustrated below in Figure 9, a universal status light is a practical alternative to displaying a port status.

Figure 9: Example of Cabling Port Status

Many possibilities exist for displaying a status using the universal status light described herein. Figure 10, below, illustrates one example in which all hardware equipment will have one universal status light.

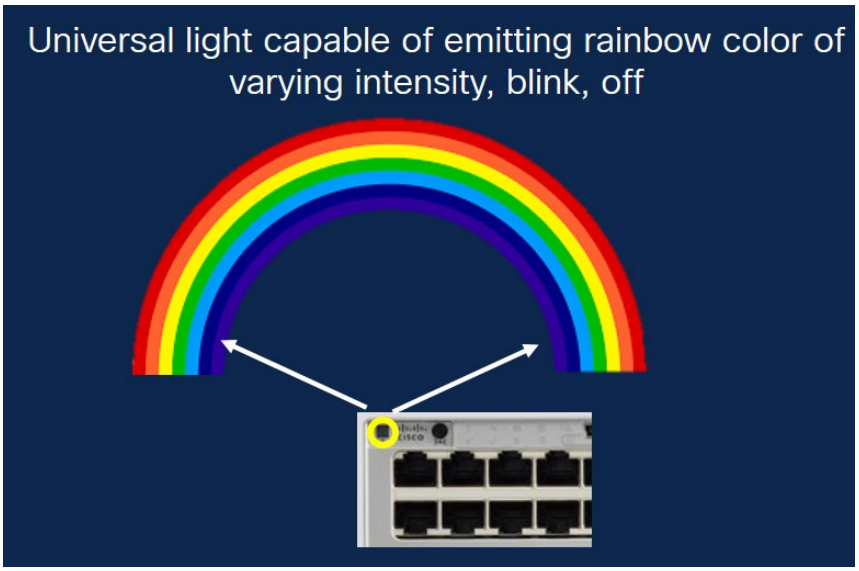

Figure 10: Example Universal Status Light

The universal status light illustrated in Figure 10 may emit any range of rainbow color, emit varying intensities of light, emit a variable blinking rate, and turn off/on for one or more combinations of colors/intensities/blinking rates for one, two, three, or four times. In addition, the hardware may have an optional identifier (e.g., radio frequency identifier (RFID), quick response (QR) code, serial number, or other code) that can be used in combination with the universal status light.

Figure 11, below, illustrates an example of a current switch.

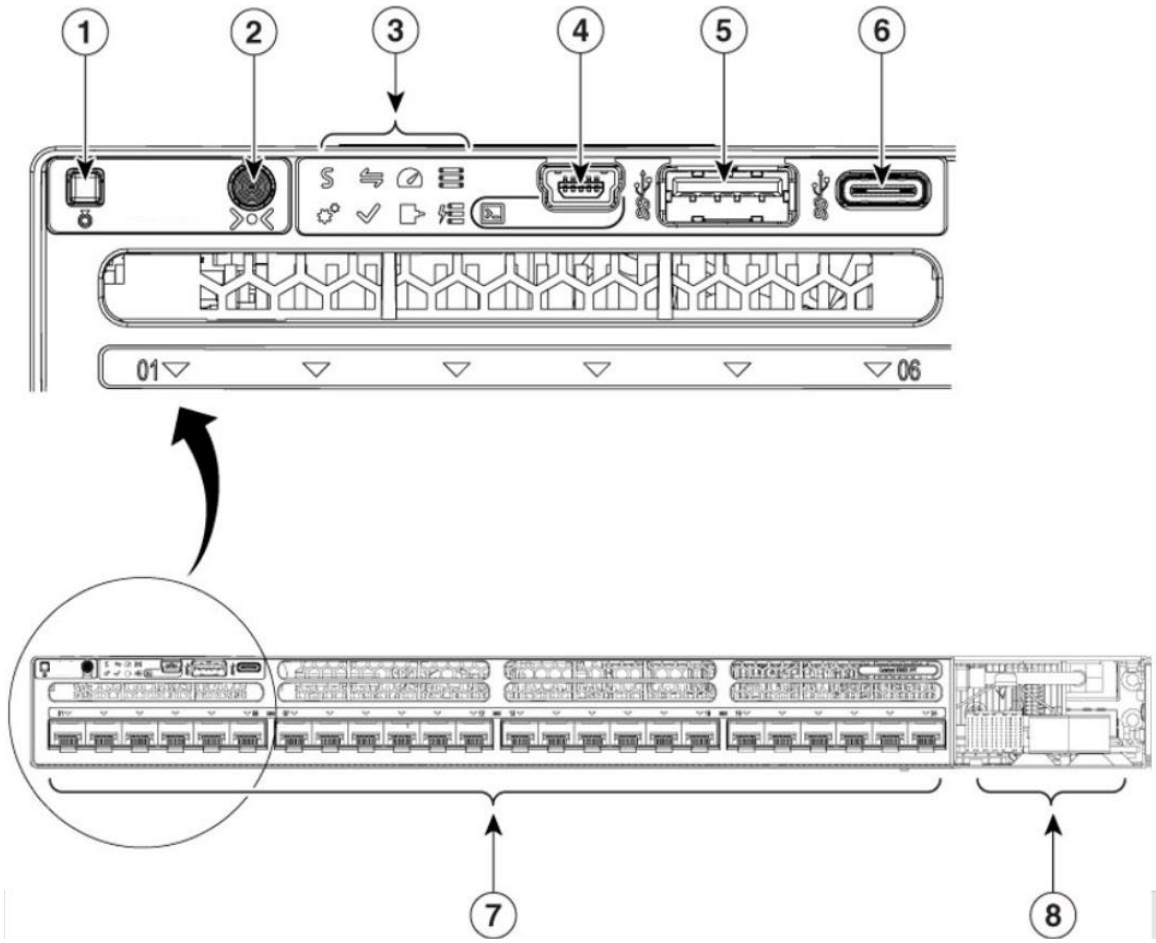

Figure 11: Example of Current Switch

The switch illustrated in Figure 11 includes reference number 1, which corresponds to a beacon light, reference number 2, which corresponds to a mode button, reference number 3, which corresponds to status lights, and reference number 7, which corresponds to a port light. A switch may additionally include a fan light, which is not illustrated in FIG. 11.

The status lights illustrated by reference number 3 may include, for example, a status light, a duplex light, a speed light, a stack light, a Power over Ethernet (PoE) light, a system light, an active light, an XPS light, a standby power (S-PWR) light, a console light, and/or another type of light. When using a universal status light as described herein, the status lights may be replaced by a single universal status light and each of the lights described in reference number 3 may be mapped into a color of the color wheel (e.g., red,

orange, yellow, chartreuse green, green, spring green, cyan, azure, blue, violet, magenta, rose).

In addition, according to techniques described herein, each of the mode/status indicators may have the following characteristics: activity, standby, and error fault. These characteristics may be mapped into a universal status light of varying intensity, blink rate, number of times turning on/off, and any combination of one, two, or three blinks in a sequence (such as Morse code).

According to techniques described herein, hardware that uses the universal status light may have an optional identifier (e.g., RFID, QR code, serial number, other code) that can be used in combination with the universal status light. Figure 12, below, is a diagram illustrating how the universal status light may be used on conjunction with an identifier.

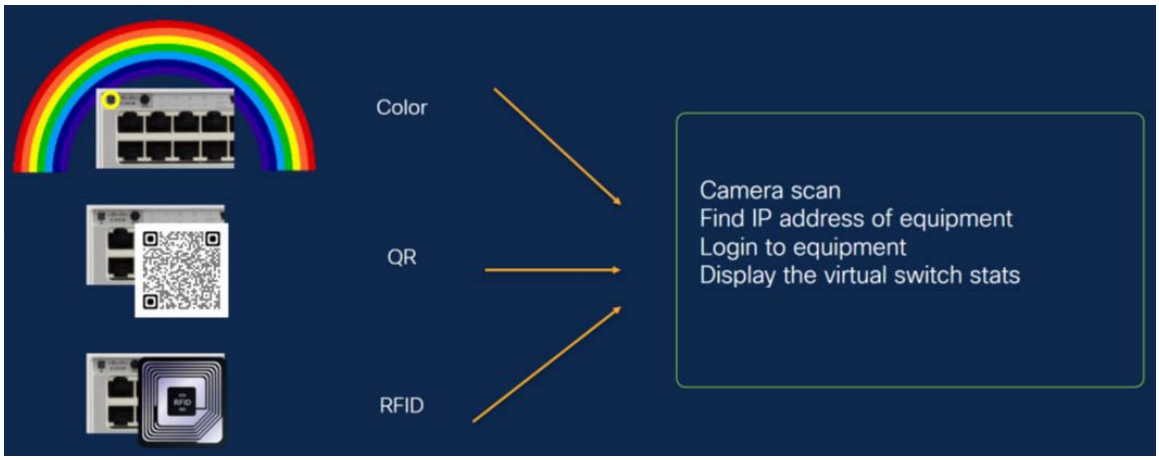

Figure 12: Example Integration of Universal Status Light and Identifier

According to techniques described herein, an operator may have a tablet or device that uses a camera to capture the identity of the device and the corresponding universal status light, which can trigger an application on the tablet/device to be opened. A virtual display of the device with the corresponding information may be displayed in the application. In addition, techniques described herein may incorporate the use of augmented reality. In particular, the operator's hand gesture can be captured and the application will display the statistics associated with the location with the corresponding status indicated by the universal status light.

The application may include login software that connects the physical device automatically with a backend database containing the equipment characteristics, statistics, and information. The application can also be used to authenticate the operator via biometrics (e.g., eye, fingerprint, voice, or combinations thereof) in conjunction with second factor authentication to ensure the operator has rights to access the data.

In summary, techniques described herein provide for a universal status light that merges port status and general status into one universal status, which may provide for the ability remove significant amounts of product plastic from networking devices.