setP Design and Installation Guide

Expertise Applied | Answers Delivered

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1.0 Description of Risks and Hazards

Power levels of up to 100 W and small pin-to-pin spacing make the risk of dangerous overheating quite high for USB Type-C devices and the cables used to charge them.

Overheating can lead to equipment overheating. Dust, dirt, lint, water, and other liquids are just a few examples of environmental conditions that can lead to failure.

Contact issues inside the plug such as bent pins or worn cables may lead to overcurrent events. Other mechanical failures may lead to short circuit devices; over time, these worn-out devices can also become the source of heat, eventually leading to failure.

2.0 Theory of Operation

USB Type-C uses a configuration process over the Configuration Channel, usually referred to as the CC pin. In the USB Type-C interface illustrated in Figure 1, this is pin A5. The configuration process is used to confirm multiple items, including:

- Attachment or detachment of the cable
- Plug orientation
- Agreement of power to be delivered over the cable

Figure 1. USB full-featured Type-C plug interface (front view)

Using a pull-up resistor (Rp) in the Source and pull-down resistors (Rd) in the Sink, the Source measures the voltage on the CC pin to determine if the Sink is attached or not. The Source "knows" the Sink is attached when the voltage on the CC pin is low enough to indicate the Source "knows" the Sink is attached.

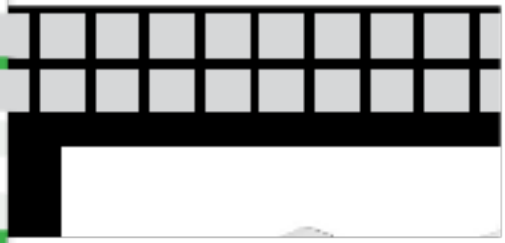

Figure 2. setP placement within charging system

which causes its resistance to rise and voltage causes the system to assume there is

[1] *Source: USB Type-C Cable and Connector Specification Release 1.4*