Anonymous Not applicable Apr 17, 2015 02:42 AM

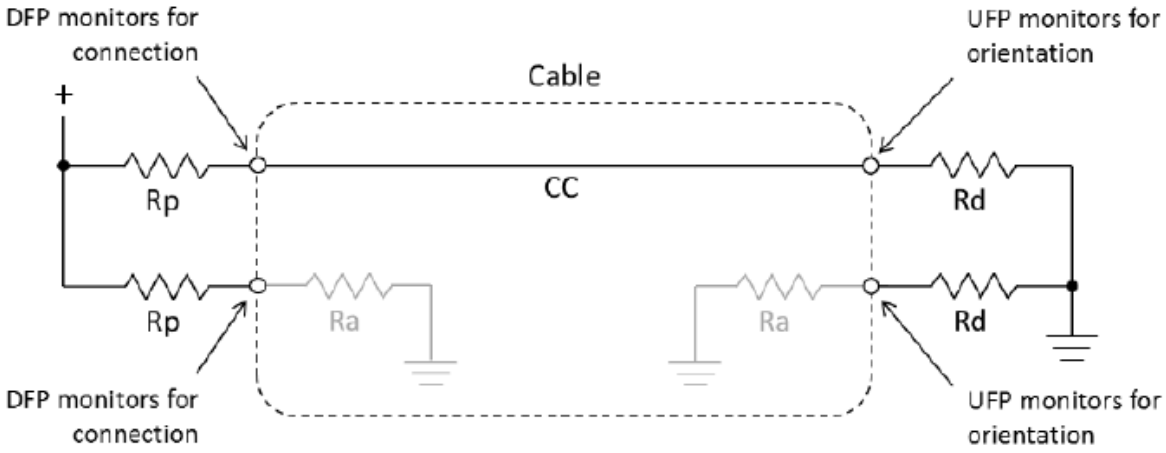
Termination Resistors Required for the USB Type-C Connector – KBA97180

Version: **

Question: What is the significance of the Rp, Rd, and Ra termination resistors in the USB Type-C connector? What are the values used for Rp, Rd, and Ra resistors?

Answer:
A downstream facing port (DFP), such as a host computer, exposes pull-up terminations, Rp, on its CC pins (CC1 and CC2). An upstream facing port (UFP), such as a peripheral, exposes pull-down terminations, Rd, on its CC pins. The purpose of Rp and Rd

terminations on CC pins is to identify the DFP to UFP connection and the CC pin that will be used for communication. To do this, the DFP monitors both CC pins for a voltage lower than its unterminated voltage.



UFP's Rd value is fixed at 5.1 kΩ. The following table provides the values used for the DFP's Rp based on the current sourcing capability of the Type-C port and the voltage that is connected to the Rp.

DFP Advertisement	**Resistor Pull-up to 4.75 V – 5.5 V**	**Resistor Pull-up to 3.3 ± 5%**
Default USB power	56 kΩ ± 20%	36 kΩ ± 20%
1.5 A at 5 V	22 kΩ ± 5%	12 kΩ ± 5%
3.0 A at 5 V	10 kΩ ± 5%	4.7 kΩ ± 5%

The Type-C cable needs to expose a pull-down termination, Ra, on its VCONN pin to signal to the DFP that it needs power. The DFP must be able to differentiate between the presence of Rd and Ra to know whether there is a UFP attached and where to apply VCONN. The DFP is not required to source VCONN unless Ra is detected.

	Minimum Impedance	**Maximum Impedance**
Ra	800 Ω	1.2 kΩ

When the connection detection phase is complete, Cypress' CCG1 and CCG2 devices have the ability to remove the Ra resistor, which will reduce the overall power dissipation of a Type-C system design.

Labels : USB: EZ-PD Type-C USB

Tags: ez-pda ccg1 type-c port controller ez-pda ccg2 type-c cable controller usb-c and power delivery

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