USB 3.1 ENGINEERING CHANGE NOTICE

Title: Vbus 5V Nominal Range
Applied to: USB Specification Version 3.1

Brief description of the functional changes:
The specification erroneously gives the voltage supplied at the connector a minimum value of 4.45V. This value should be changed to 4.75V. Also to align with the ECN change to the maximum voltage from 5.25V to 5.5V this value has been changed in the section text.

Benefits as a result of the changes:
Agreement between USB 2.0, USB 3.1, USB Type-C and USB PD on the voltage range of the nominal 5V on Vbus.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
Any manufacturer who is using 4.45V as their minimal value will have an issue. However, since the specification also states the nominal minimum value is 4.75V it is anticipated that this is the value being used. It should be obvious that this was an error in the specification.

An analysis of the hardware implications:
Will affect any manufacturer who has decided to use 4.45V instead of 4.75V as their minimum.

An analysis of the software implications:
None.

An analysis of the compliance testing implications:
Will clarify the minimum Vbus value used for testing 5V nominal across all specifications.

USB 3.1 ENGINEERING CHANGE NOTICE

Actual Change

(a). Section 11.4.2, Page 11-6

From Text:

11.4.2 Steady-State Voltage Drop Budget

The steady–state voltage drop budget is derived from the following assumptions:

- The nominal 5 V ± 5% source (host or hub) is 4.75 V to 5.25 V.
- The voltage supplied at the connector of hub or root ports shall be between 4.45 V to 5.25 V.
- The maximum voltage drop (for detachable cables) between the A-series plug and B-series plug on VBUS is 171 mV.
- The maximum current for the calculations is 0.9 A.
- The maximum voltage drop for all cables between upstream and downstream on GND is 171 mV.
- The maximum voltage drop for all mated connectors is 27 mV.
- All hubs and peripheral devices shall be able to provide configuration information with as little as 4.00 V at the device end of their B-series receptacle. Both low and high-power devices need to be operational with this minimum voltage.

Figure 11-5 shows the minimum allowable voltages. Note that under transient conditions, the supply at the device can drop to 3.67 V for a brief moment.

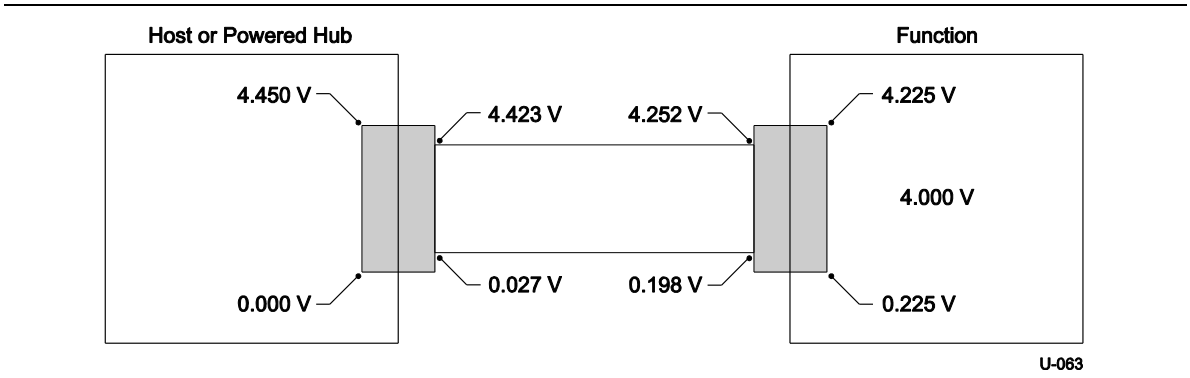


Figure 11-5. Worst-case Voltage Drop Topology (Steady State)

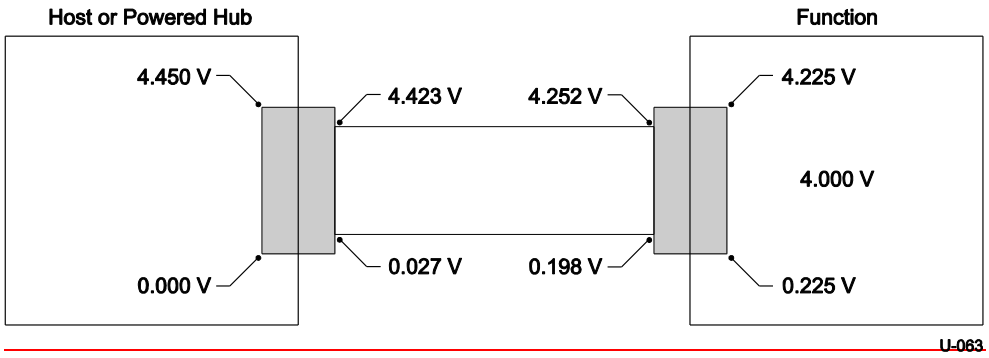
To Text:

11.4.3 Steady-State Voltage Drop Budget

The steady–state voltage drop budget is derived from the following assumptions:

- The nominal 5 V ~~± 5%~~ source ~~(host or hub)~~ is 4.75 V to 5.5 V.
- ~~The voltage supplied at the connector of hub or root ports shall be between 4.45 V to 5.25 V.~~
- The maximum voltage drop (for detachable cables) between the A-series plug and B-series plug on VBUS is 171 mV.

- The maximum current for the calculations is 0.9 A.
- The maximum voltage drop for all cables between upstream and downstream on GND is 171 mV.
- The maximum voltage drop for all mated connectors is 27 mV.
- All hubs and peripheral devices shall be able to provide configuration information with as little as 4.00 V at the device end of their B-series receptacle. Both low and high-power devices need to be operational with this minimum voltage. ~~Figure 11-5 shows the minimum allowable voltages.~~ Note that under transient conditions, the supply at the device can drop to 3.67 V for a brief moment.



~~**Figure 11-5. Worst-case Voltage Drop Topology (Steady State)**~~