

Embedded USB 2.0 ENGINEERING CHANGE NOTICE

Title: Repeater HS SYNC Forward

Applied to: Embedded (eUSB2) Version 1.2

Brief description of the functional changes:
Adding new constraint for repeater to forward SYNC Also added requirement for the receiver of eDSPr and eUSPr to tolerate the first SYNC bit be a partial K or J.

Benefits as a result of the changes:
Address interoperability issue with legacy USB 2.0 device IPs that are sensitive to the 1 st SYNC bit an eUSB2 repeater forwarded, that 1 st SYNC bit may be a “J” and with its period much less than 1 HS UI (2.1ns).

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
New requirement for repeater mode in HS operation. For existing repeaters that have interop issues, advise to add disclaimer to customers about the potential interop issues. USB-IF to create a list of devices that may be subject to this interop issue. The requirement added to eDSPr/eUSPr is to clarify possible interop issues with the existing repeater. No interop issues were identified so far.

An analysis of the hardware implications:
For new repeater implementations, need to comply to the requirement described in this document.

An analysis of the software implications:
No

An analysis of the compliance testing implications:
New compliance test will be added to check the 1 st SYNC bit.

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Actual Change

(a). Section 5.3.4.3 L0.Tx

From Text:

- In HS operation, it shall forward the USB packets based on the following.
 - It shall start forwarding the packet upon detection of the un-squelched condition at eUSPh.
 - It may consume up to 4 SYNC bits for exit from Squelch and the 1st bit (within the 4 allowable SYNC bits that a repeater can consume) of the SYNC pattern may be with random UI duration.
 - It may add up to 4 UI of random (K or J) EOP dribble with no SE0. Note that prohibiting SE0 within dribble is to ensure interoperability with legacy USB 2.0 devices.

To Text:

- In HS operation, it shall forward the USB packets based on the following.
 - It shall start forwarding the packet upon detection of the un-squelched condition at eUSPh.
 - It may consume up to 4 SYNC bits for exit from Squelch and the 1st forwarded bit (within the 4 allowable SYNC bits that a repeater can consume) of the SYNC pattern shall be the following.
Note that this requirement does not apply to hybrid repeater.
 - If it is K, it may be any random amplitude or UI. Note that this implies that the next SYNC bit J is compliant to the transmit waveform template 5 (see Figure 7-17 in the USB 2 Specification) at TP1 defined by the USB 2.0 specification.
 - If it is J, it shall comply to the transmit waveform template 5 at TP1 defined by the USB 2.0 specification.
 - It may add up to 4 UI of random (K or J) EOP dribble with no SE0. Note that prohibiting SE0 within dribble is to ensure interoperability with legacy USB 2.0 devices.

(b). Section 5.3.4.2 L0.Rx

From Text:

eDSPr shall meet the following conditions.

- In HS operation, it shall receive differential data packets from eUSPh.
- In HS operation, it shall filter squelch for up to 5 UI to ignore SE0 from the repeater during EOP dribble.

In FS/LS operation, it shall receive either a data packet, or USB 2.0 SE0 mapping (disconnect) from eUSPh

To Text:

eDSPr shall meet the following conditions.

- In HS operation, it shall receive differential data packets from eUSPh that may have the first SYNC bit be a partial K or J.
- In HS operation, it shall filter squelch for up to 5 UI to ignore SE0 from the repeater during EOP dribble.

In FS/LS operation, it shall receive either a data packet, or USB 2.0 SE0 mapping (disconnect) from eUSPh

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(c). Section 5.4.4.2 L0.Rx

From Text:

eUSPr (in Rx) shall meet the following conditions.

- In HS operation, it shall be receiving differential data packets from eDSPp.
- In HS operation, it shall filter squelch for up to 5 UI to ignore SE0 from the repeater during EOP dribble.
- In FS/LS operation, it shall be receiving SE data packets from eDSPp.

To Text:

eUSPr (in Rx) shall meet the following conditions.

- In HS operation, it shall be receiving differential data packets from eDSPp that may have the first SYNC bit be a partial K or J.
- In HS operation, it shall filter squelch for up to 5 UI to ignore SE0 from the repeater during EOP dribble.
- In FS/LS operation, it shall be receiving SE data packets from eDSPp.