

USB Type-C

Make your keyboard future-proof and reversible

Type-C USB

- Slightly wider than MicroUSB connectors. Keep in mind when designing PCBs to fit standard cases.
- Soldering is much more difficult.
 - Mini/Micro-USB has 5 pins.
 - Type-C has 24.
- Completely surface mount Type-C connectors are *impossible to solder by iron*.
 - Type-C connectors have two rows of pins, one of which exit from below the connector.
 - If hand-soldering via iron, choose a hybrid connector with through-hole pins for the under-connector row.
- Type-C connectors often do not extend as far as old Mini-USB connectors do from the edge of a PCB.
- Often, the legs of a Type-C through-hole connector are extremely short (<1mm). Thick PCBs may be difficult to assemble.

Design Considerations

- Type-C is physically larger.
- Type-C requires its own components to function.
- Some Type-C connectors have legs too short for 1.6mm PCBs.
- Assembly costs may increase.

Implementation

- CC pins must be connected to 5.1k pull-down resistors

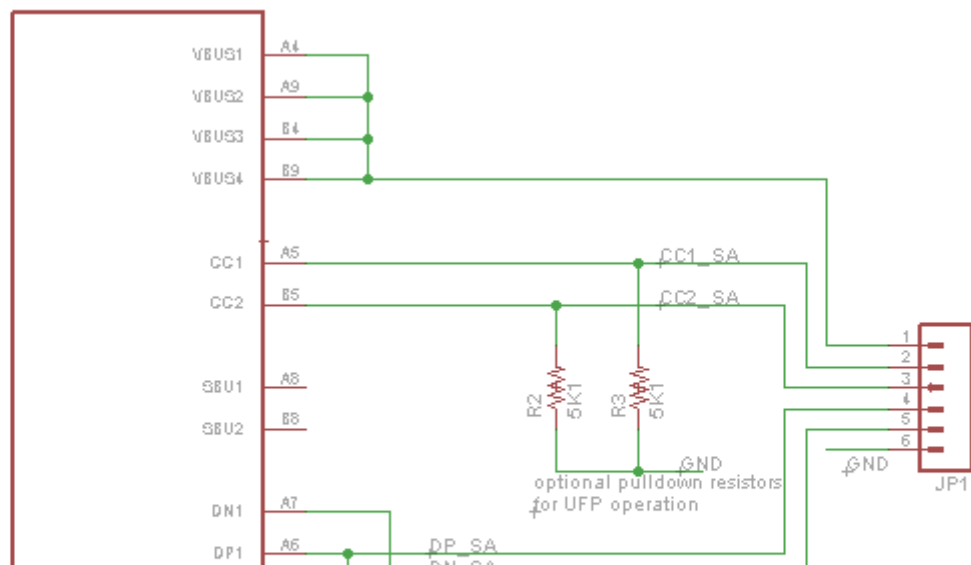


Diagram by [Scorpia.co.uk](https://www.scorpia.co.uk)

<https://www.scorpia.co.uk/2016/03/17/using-usb-type-c-on-hobyist-projects/>

This diagram breakouts to a header.

Keyboard use

- Pull-down the CC lines
- Use the DP/D+ and DM/D- lines just like any other USB connector
- Connect VBUS and GND like any other USB connector
- It is inferred that the pull-downed CC lines don't have to be connected to anything else in particular.

Type C High-Current Legacy Devices

From ST's PDF, it appears possible to draw more current through Type-C:

Converting STM32xx USB2.0 host to USB Type-C™ platform

This use case describes how to exchange a USB2.0 standard A receptacle with a USB Type-C™ receptacle.

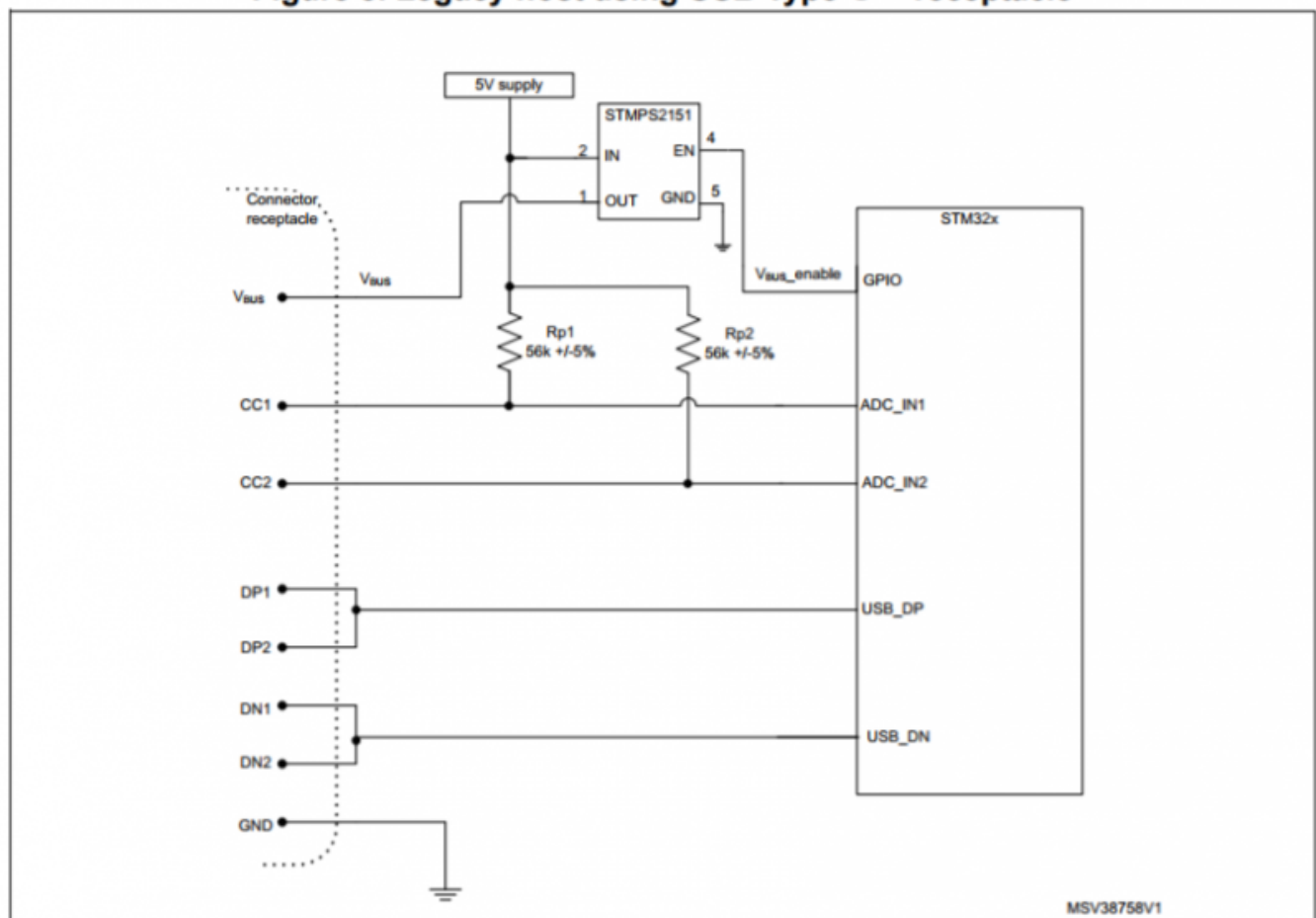
As the platform is designed for USB2.0, maximum current capacity is 500 mA. If higher supply current is available in application, Rp resistors could be adjusted to advertise 1.5 A or even 3 A.

A legacy host needs to be configured as a DFP by having Rp pull up between CC line and 5V supply.

As the plug is reversible, the two couples DP/DN need to be connected in pairs as close as possible to the receptacle, before being routed to the STM32xx device.

Monitoring CC lines thru ADC_IN inputs allow to detect device attachment and so to provide V_{BUS} on connector.

Figure 8. Legacy host using USB Type-C™ receptacle



Sources

<https://www.scorpia.co.uk/2016/03/17/using-usb-type-c-on-hobyist-projects/>

[https://www.mpe-](https://www.mpe-connector.de/index.php?lang=en&menu=16&product_group[]=9&action=Search&id_product=7192)

[connector.de/index.php?lang=en&menu=16&product_group\[\]=9&action=Search&id_product=7192](connector.de/index.php?lang=en&menu=16&product_group[]=9&action=Search&id_product=7192)

http://www.st.com/content/ccc/resource/technical/document/application_note/group0/a6/91/45/9e/12/a0/4d/42/DM00235987/files/DM00235987.pdf/jcr:content/translations/en.DM00235987.pdf

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