USB-C to UART converter

Report by Karan Abraham

a.   An introduction to the design and link to the git repository

The USB-C to UART converter is used to allow data to be transferred between devices that only support serial communication and devices that only support communication over USB. A common use case would be transferring data from a microcontroller to a laptop. Another requirement of this device is to be able to power another device. For example, it could be used to power a microcontroller.

This device was designed with the specifications of powering the IC with 5V and the additional feature of providing 5V and 3A output. The design files can be accessed at …

b.   Discussion of the schematic and design choices made

Two components are required for this device: a USB-C plug and a USB to UART conversion chip. Pull down resistors and a decoupling capacitor are also used. The USB-C plug can draw 5V from the power source (e.g., laptop) through the VBUS pin. It can also draw 3A current, however this is only if the power source has a pull up resistor of 10 k Ω (1). The 5V line is fed to power the USB to UART conversion chip.

The data sent from the host (laptop) to the USB-C port is converted by the conversion chip and outputted at the Tx pin. Rx pin is for receiving data from the UART communicating device, and the remaining two pins are for the power output functionality.

c.   Discussion of the PCB and design choices made

d.   Design Conclusions

e.   References

1. (https://community.infineon.com/t5/Knowledge-Base-Articles/Termination-Resistors-Required-for-the-USB-Type-C-Connector-KBA97180/ta-p/253544, n.d.)