USB Type-C Port Controller with Power Delivery (PD PHY) HUSB311

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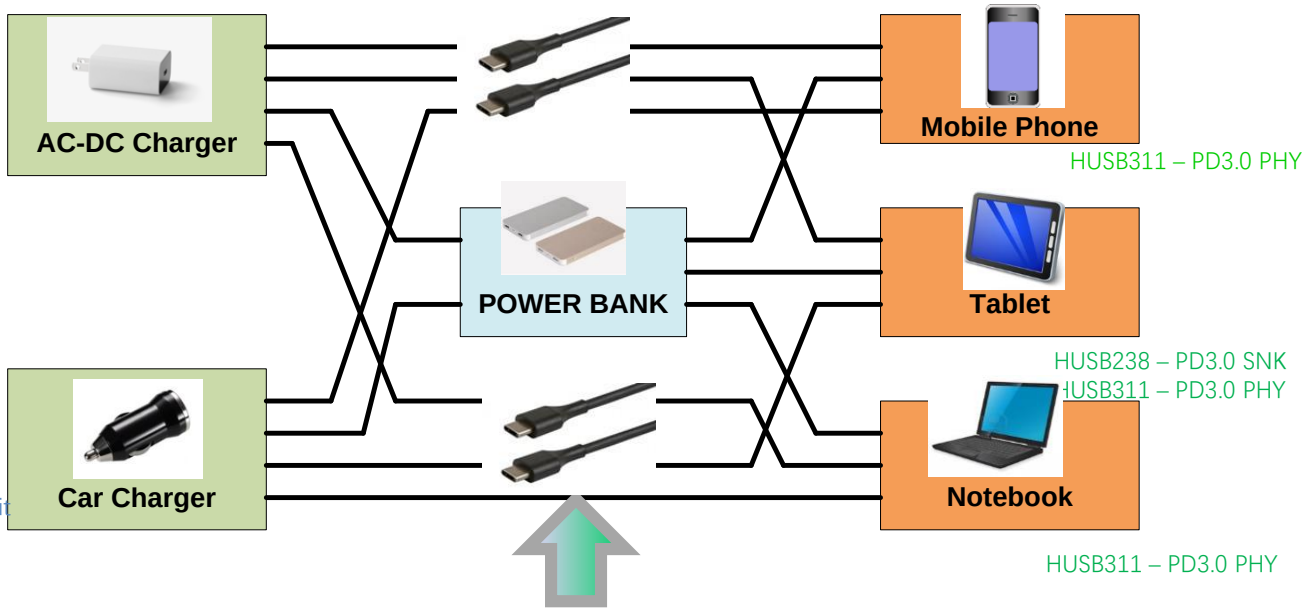
Hynetek Key Customers

Hynetek Type-C & PD Products Family

HUSB338A – PD3.0 SRC
HUSB338L – PD3.0 SRC
HUSB338C – PD3.0 SRC
HUSB339 – PD3.0 PPS SRC
HUSB339A – PD3.0 SRC
HUSB339B – PD3.0 SRC
HUSB350 – PD3.0 PPS
HUSB351 – PD3.0 SRC
HUSB360 – PD3.0 PPS SRC
HUSB361 – PD3.0 PPS SRC
HUSB362 – PD3.0 PPS SRC

HUSB601 – USB-A QC3+ and others
HUSB602/3 – USB QC3+ w/ power limit

HUSB300/304 – USB-A ID
HUSB305 – USB-C SRC 5V3A



HUSB311 – PD3.0 PHY

HUSB238 – PD3.0 SNK
HUSB311 – PD3.0 PHY

HUSB311 – PD3.0 PHY

HUSB330 – PD2.0 eMarker
HUSB331 – PD3.0 eMarker
HUSB331A – PD3.0 eMarker
HUSB332 – PD3.0 eMarker
HUSB332A – PD3.0 USB4 eMarker

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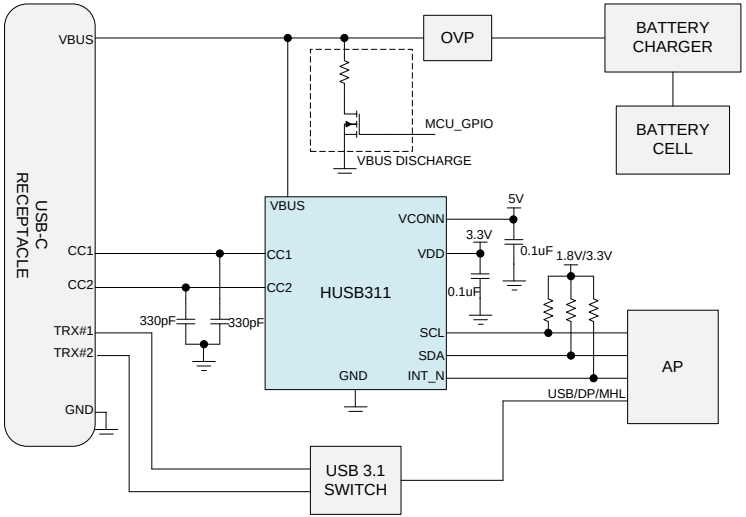
HUSB311 Features

KEY FEATURES

- Dual-Role PD Compatible
- Attach/Detach Detection as Host, Device or DRP
- Current Capability Definition and Detection
- Cable Recognition
- VCONN Support
- Dead Battery Support
- Ultra-low Power Mode for Attach Detection
- Simple I²C Interface with AP or EC
- BIST Mode Supported
- e-fuse IP
- 9-Ball WL-CSP and 14-Lead QFN Packages
- Two I²C addresses



TYPICAL APPLICATIONS

- Smartphones, tablets, and laptops
- Hub & dongle
- Automotive

Package	Status
WLCSP-9B, QFN-14L	SAMPLE

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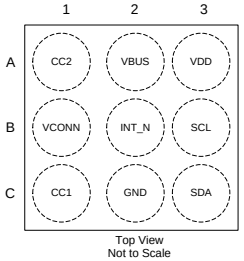
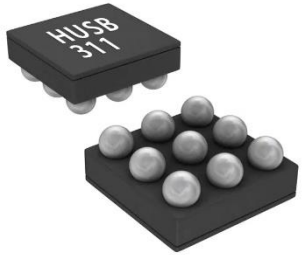
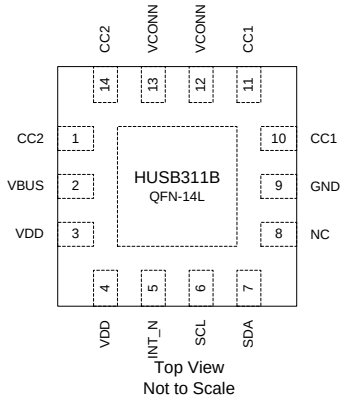
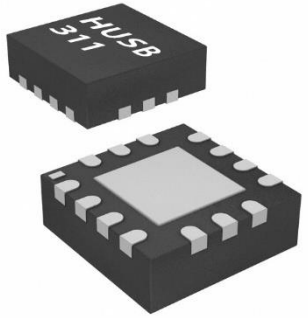
Package and Pin Assignment









HUSB311ACC

1.35mmx1.40mm WLCSP-9B package

- Smaller size.
- Suitable for mobile phones and tablets.

HUSB311ALA

2.5mmx2.5mm QFN-14L package

- Better for SMD.
- Suitable for devices beyond mobile phones and tablets.

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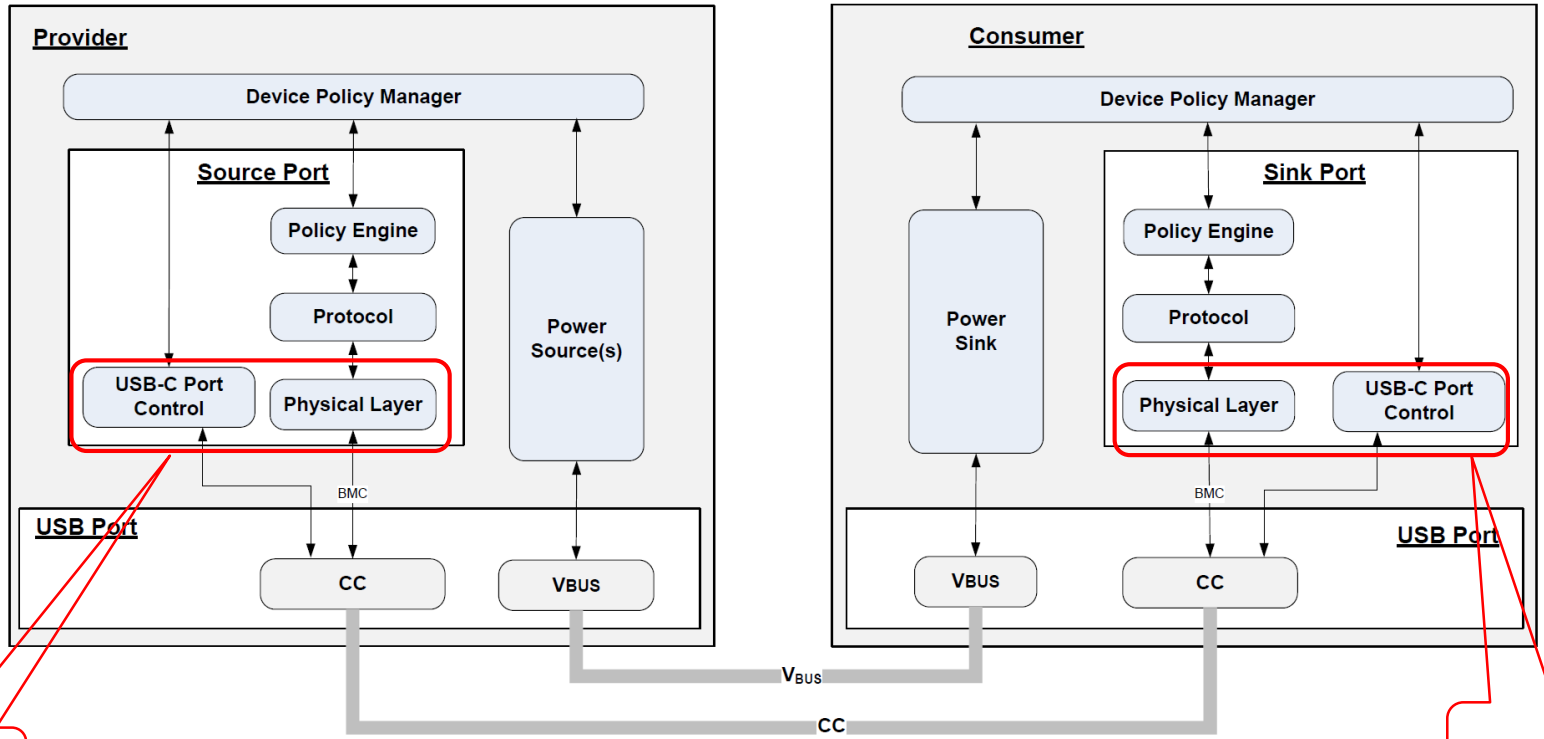
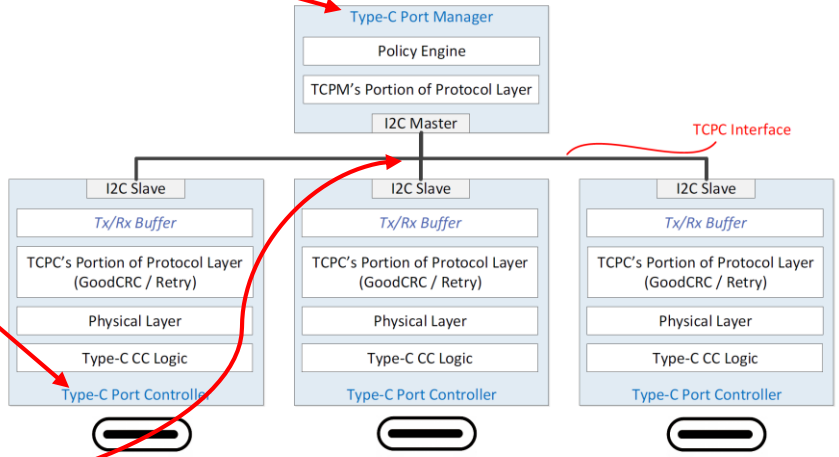
USB PD Architecture



TCPC, TCPCI and TCPM

- TCPM Implements policy engine and protocol layer of USB PD stack.
  - The Embedded Controller may implement the TCPM functionality.
- The TCPC is a functional block which encapsulates VBUS and VCONN power controls, USB Type-C CC logic, and the USB PD BMC physical layer and protocol layer other than the message creation.
- One TCPM may be used to drive multiple TCPCs subject to the timing constraints defined in the USB PD Specification.
- The connection between the TCPM and the TCPC is defined as the USB Type-C Port Controller Interface, TCPCI



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Benefits of TCPC & TCPM Spit

- Components of the system most likely to need customization are consolidated into a microcontroller and kept out of silicon dedicated for each port.
  - Enables each system to be more easily optimized.
- Less per port complexity and cost
  - Especially where a microcontroller suitable for the TCPM is already present in the system.
- Port controllers are more isolated from future changes to USB Power Delivery & USB Type-C
  - Silicon vendors can focus on optimizing ICs for the lower layers of the stack.

Key Competitive Solutions – WLCSP-9B Package

HUSB311A is Pin-to-Pin compatible with RT1715, RT1711H, FUSB302 WLCSP-9B package and TUSB422.

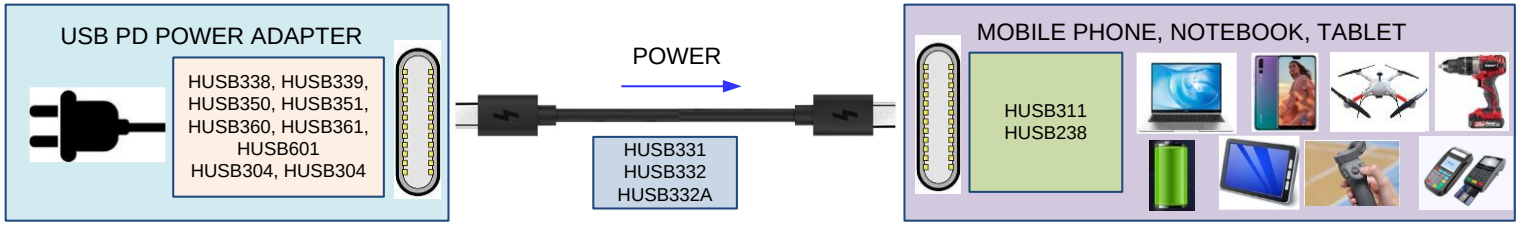
Brand	Hynetek	Richtek	ON Semi	TI
Part no.	HUSB311	RT1715/RT1711H	FUSB302D	TUSB422
Package	WLCSP-9B, the four part are all Pin-to-Pin compatible			
PD2.0	Y	Y	Y	Y
PD3.0	Y	Y	N	N
VDD range	2.8-5.5V	3V-5.5V	2.8-5.5V	2.7V-5.5V
CC1/CC2 max voltage	24V	24V	6V	6V
VBUS max voltage	30V	28V	26V	26V
Standby power loss	25uA	25uA	25uA	12uA
Dead battery	Y	Y	Y	Y
Power role swap	Y	Y	Y	Y
I^2C address	2	1	1	1
TCPM compatibility	Highly compatible with RT1711/5	Highly compatible with HUSB311A		

Key Competitive Solutions – QFN-14L Package

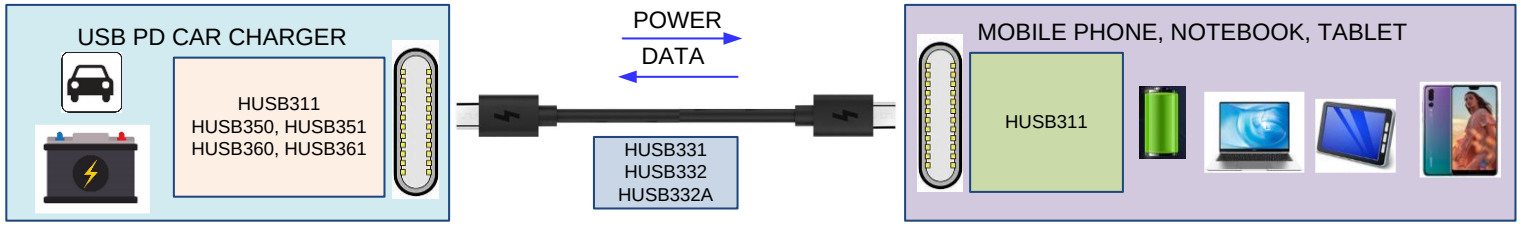
HUSB311B is pin-to-pin compatible with FUSB302 MLP-14 (QFN-14) package.

Brand	Hynetek	ON Semi
Part no.	HUSB311B	FUSB302D
Package	2.5x2.5 QFN-14	2.5x2.5 QFN-14
PD2.0 supported	Y	Y
PD3.0 supported	Y	N
VDD range	2.8-5.5V	2.8-5.5V
CC1/CC2 max voltage	24V	6V
VBUS max voltage	30V	26V
Standby power loss	25uA	25uA
Dead battery	Y	Y
Power role swap	Y	Y
I^2C address numbers	2	1

Applications Examples

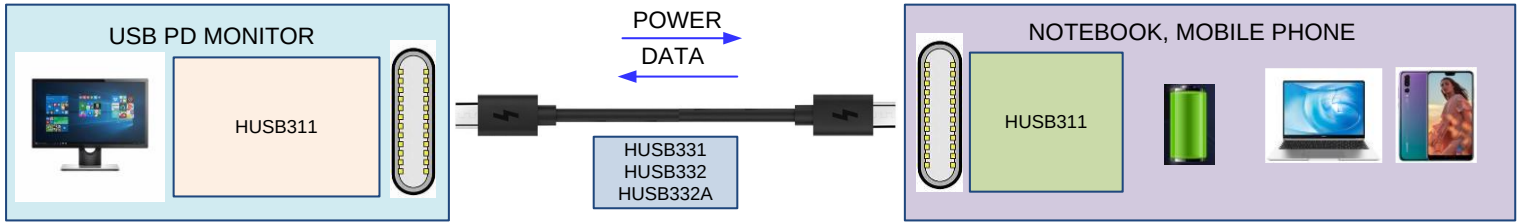


Power Adapter + Devices

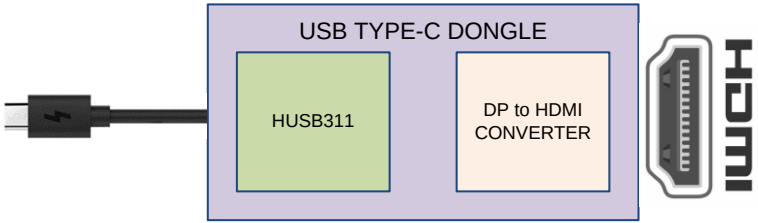


Car Charger + Devices

Applications Examples



Monitor + Devices



USB Type-C Dongle

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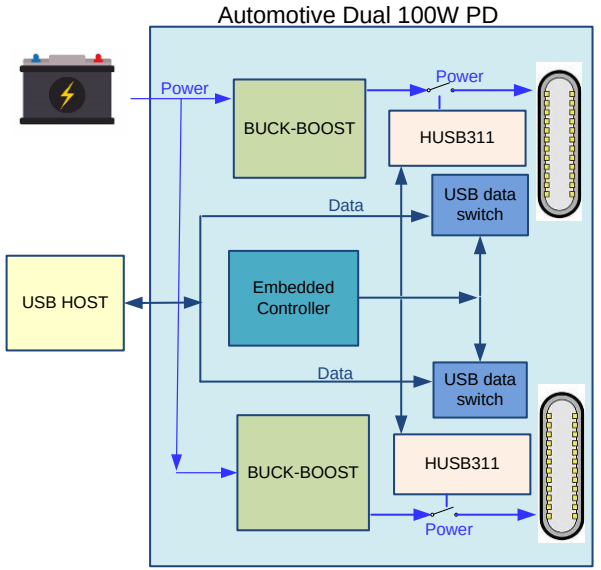
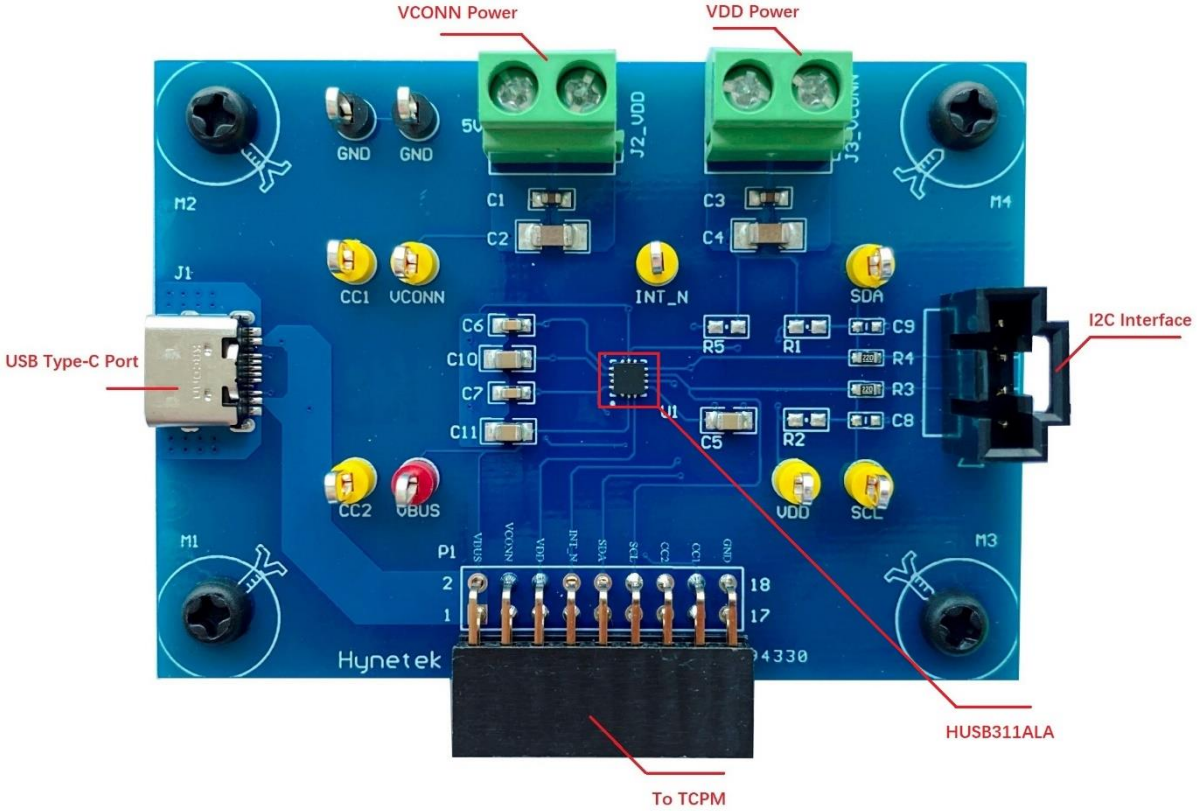
Automotive Dual 100W USB PD Solution

- Dual 100W USB PD outputs with power sharing
  - HUSB311 supports two I²C addresses for simple communication
  - Fixed power output or dynamic power sharing
- Extended for BC1.2 Charging Downstream Port (CDP)
  - USB data communication



EVB_HUSB311ALA Evaluation Board



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