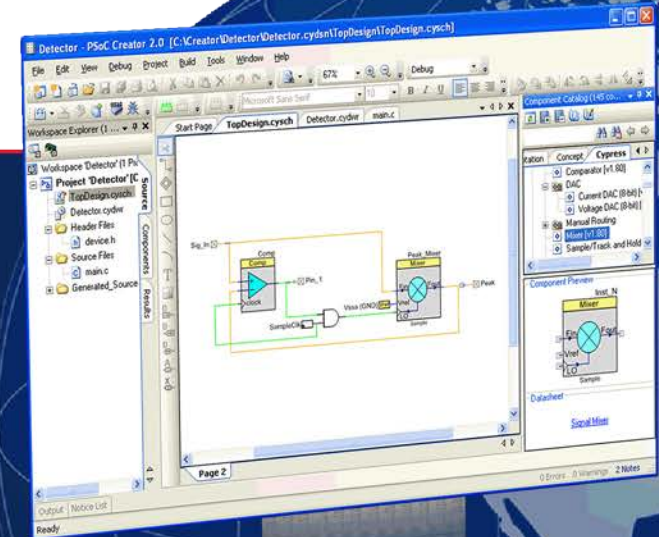


Quick Presentation: EZ-PD CCG2: USB Type-C Cable Controller With PD

CCG2 = Type-C Controller Gen2
Type-C = Reversible Slim USB Connector
PD = Power Delivery



Build Your USB Type-C Cable With EZ-PD CCG2,
An ARM® Cortex®-M0-based Solution in a Tiny 3.3-mm² Package

USB Type-C¹: Connector of the Future

USB Type-A and Type-B are the current USB-IF² standards, but they have limitations

They use large connectors that prevent slim industrial designs (plug height: A = 4.5 mm; B = 10.4 mm)

They require a fixed plug orientation and a fixed cable direction, and carry only USB signals

Power delivery implementation on them is complicated, expensive and limited to 7.5 W

USB Type-C¹ is the new USB-IF² standard that solves these problems and enables:

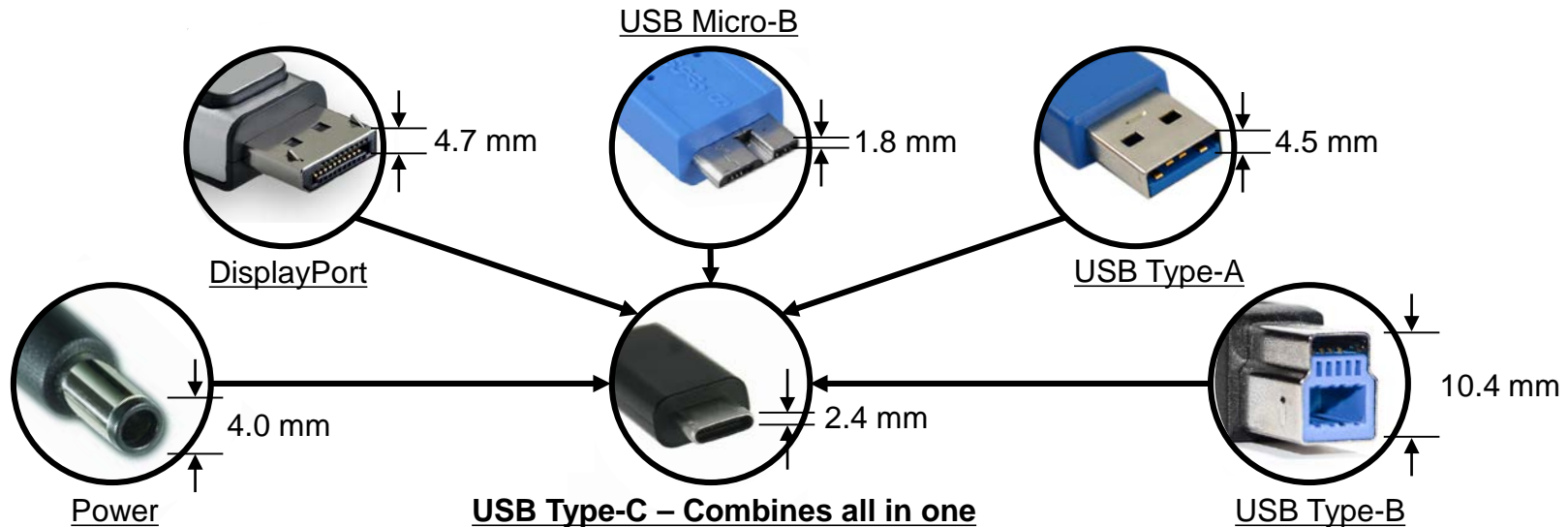
Slim industrial design with a 2.4-mm plug height

Reversible plug orientation and cable direction

Transport of both USB signals and PCIe³ or DisplayPort⁴ signals on the same connector

Easy implementation of low-cost power delivery up to 100 W

Make your transition to USB Type-C¹ now to take advantage of the slimmer, all-in-one, 100-W connector



¹ A new standard with a slimmer and reversible USB plug, a reversible cable, multiple protocol support and 100-W PD

² The USB Implementers Forum creates and maintains USB specifications

³ Peripheral Component Interconnect Express is a standard for the primary bus in PCs

⁴ A display interface standard developed by the Video Electronics Standards Association, used primarily to connect a video source to a display such as a monitor

USB Type-C Cable Controllers: A \$140M Market by 2019

USB Type-C cable controllers are projected to grow from \$25M in 2015 to \$140M+ in 2019 at a 40% CAGR

The USB Type-C connector is becoming universal: slimmer, reversible, multiple-protocol and 100-W Power Delivery capable

USB Type-C ports communicate with the cable to determine its power rating and supported protocols

These cables must therefore be electronically marked to report their capabilities

USB Type-C cable controllers address this market with a USB-IF certified solution that:

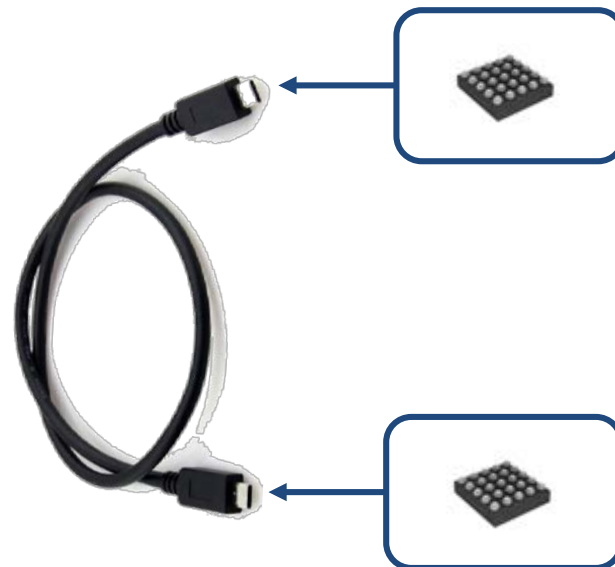
Marks cables electronically with a controller IC embedded in the cable plug

Reports cable characteristics, including power rating and supported protocols

Multiplexes USB signals with PCIe or DisplayPort signals on the same cable

Enables control of signal conditioners in high-speed signal path

Type-C cables, the emerging standard for USB 3.0, require at least one controller in each cable



EMCA¹ Type-C Cable

A Type-C Cable with a controller on both ends of the cable

¹ Electronically Marked Cable Assembly: A USB cable with an IC that reports cable characteristics (e.g., current rating) to the Type-C ports

CCG2 Simplifies Design, Reduces BOM

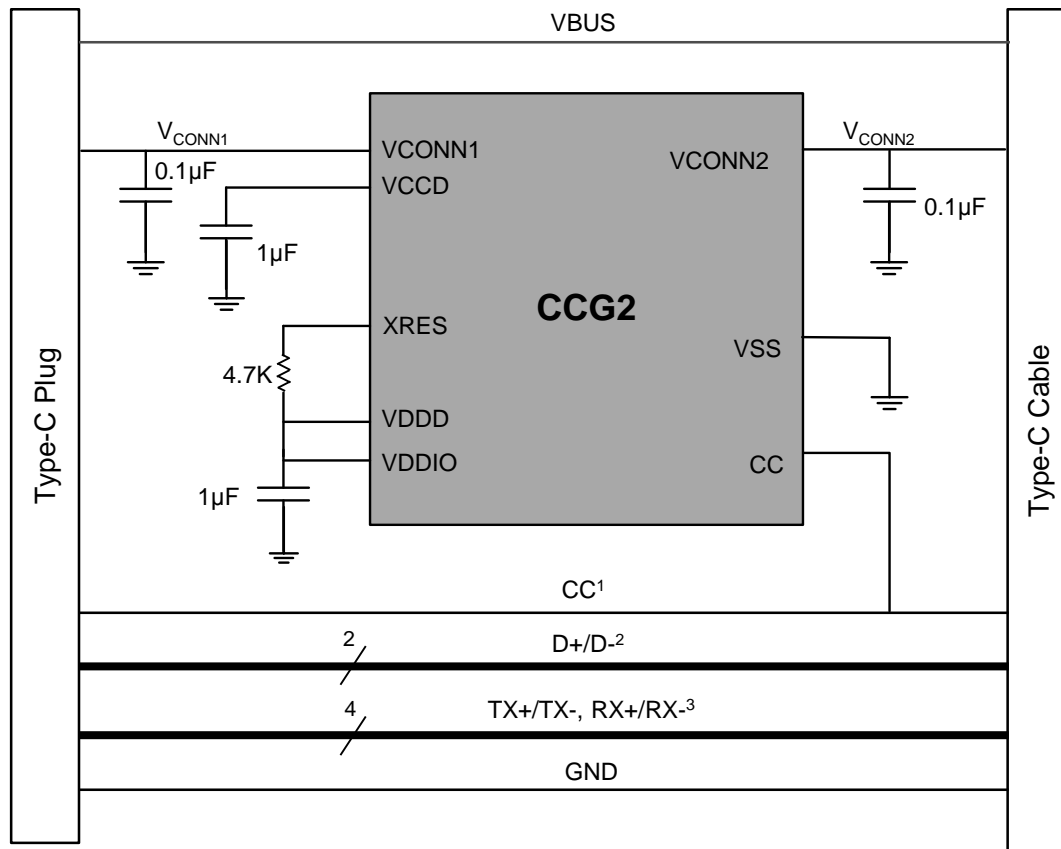


A tiny 3.3-mm² one-chip USB Type-C cable solution that

Fits into the smallest paddle of a USB Type-C cable

Requires only one resistor and four external capacitors to operate

CCG2 Is a Tiny, Low-Cost USB Type-C Solution for EMCA



¹ Configuration Channel: USB Type-C bus wire used to carry the PD protocol signals

² USB Type-C bus wires used to transmit and receive USB 2.0 data

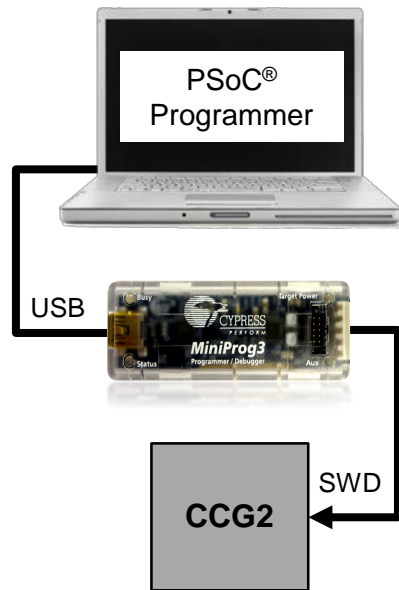
³ USB Type-C bus wires used to transmit and receive USB 3.0 and PCIe or DisplayPort data

CCG2 Is Programmable and Upgradable

CCG2 can be upgraded to keep pace with changes in the USB-IF specification

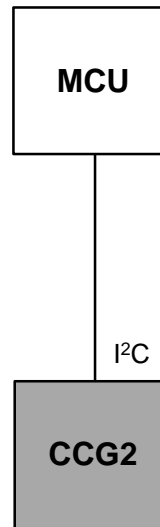
The ARM Cortex M0 and 32KB flash can be programmed anytime, anywhere using its Serial Wire Debug (SWD), I²C or CC¹ wires

Upgrading CCG2 Using SWD



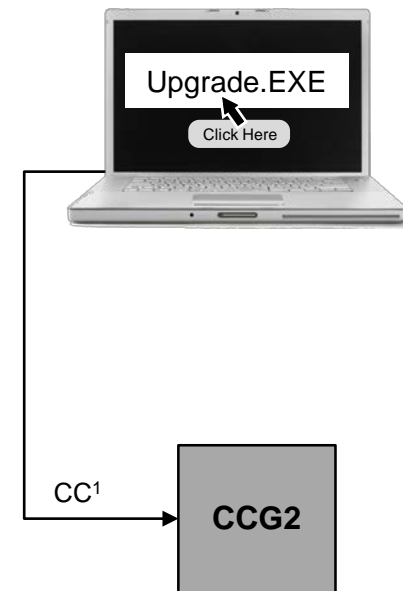
Run PSoC Programmer software on a PC with a MiniProg3 USB dongle to program the CCG2. Typically used during product development.

Upgrading CCG2 Using I²C



Use an MCU embedded in the USB Type-C cable/accessory or a production tester to program CCG2. Can be used on the production line or in the field.

Upgrading CCG2 Using CC



Use a PC running a firmware upgrade application to program CCG2 in the USB Type-C cable directly. Can be deployed by cable manufacturers to provide upgrades to the end user.

¹ Configuration Channel: USB Type-C bus wire used to carry the PD protocol signals

CCG2 Solution Example: Passive EMCA¹ With CCG2

Cypress Solution Value

Design Challenges

Type-C² cables will start converting to EMCA¹ by mid-2015
EMCA¹ must support the PD³ protocol
Cable solutions must be turnkey for ease of design
Solutions must be flexible to keep up with USB-IF⁴ standards
A high level of integration is required to reduce the BOM
Solutions must be in a package that fits in a cable assembly

CCG2 Solution

Supports Type-C² EMCA¹ with an ARM[®] Cortex[®]-M0 controller
Supports PD³ protocol for EMCA¹ with 32KB flash
Ships with USB-IF⁴ certified factory-programmed firmware
Supports field upgrades with free, fully compliant firmware
Integrates transceiver, termination resistors and system ESD
Available in 3.3-mm² CSP and 8.75-mm² DFN packages

Suggested Collateral

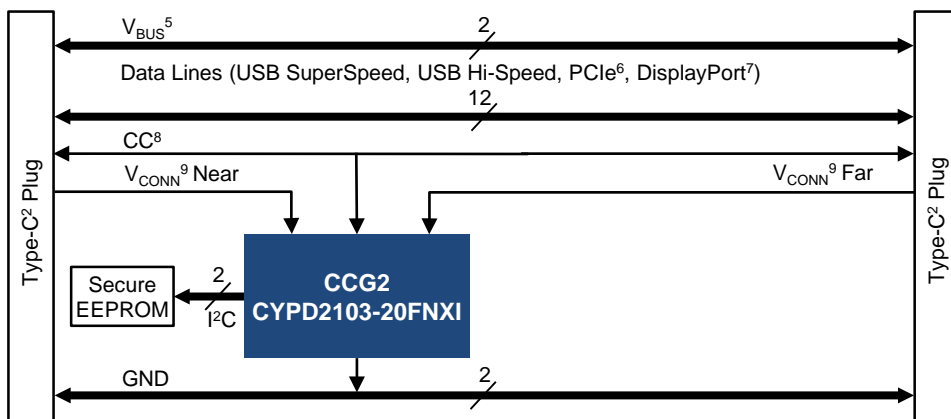
Datasheet: [CCG2 Datasheet](#)
App Note: [Getting Started with CCG2](#)
Demo Kit: [CCG2 EMCA Demo Kit](#)

How To Get Started

Get a [CCG2 EMCA Demo Kit](#)

Block Diagram

Passive EMCA¹ With One CCG2 Per Cable



Passive EMCA¹ with CCG2

A lower-cost implementation of EMCA¹ that supports the PD³ protocol. A CCG2 is embedded at only one end of the cable and is powered by either USB Type-C² port at each end.

¹ Electronically Marked Cable Assembly without a re-driver

² A new standard with a slimmer and reversible USB plug, a reversible cable, multiple protocol support and 100-W PD

³ A new USB standard that increases power delivery over VBUS from 7.5 W to 100 W

⁴ The USB Implementers Forum creates and maintains USB specifications

⁵ The power wire inside a USB cable

⁶ Peripheral Component Interconnect Express is an interface standard for connecting peripherals

⁷ A display interface standard developed by the Video Electronics Standards Association used primarily to connect a video source to a display such as a computer monitor

⁸ Configuration Channel: USB Type-C bus wire used to carry the PD protocol signals

⁹ USB Type-C bus wire used to power the IC in the EMCA