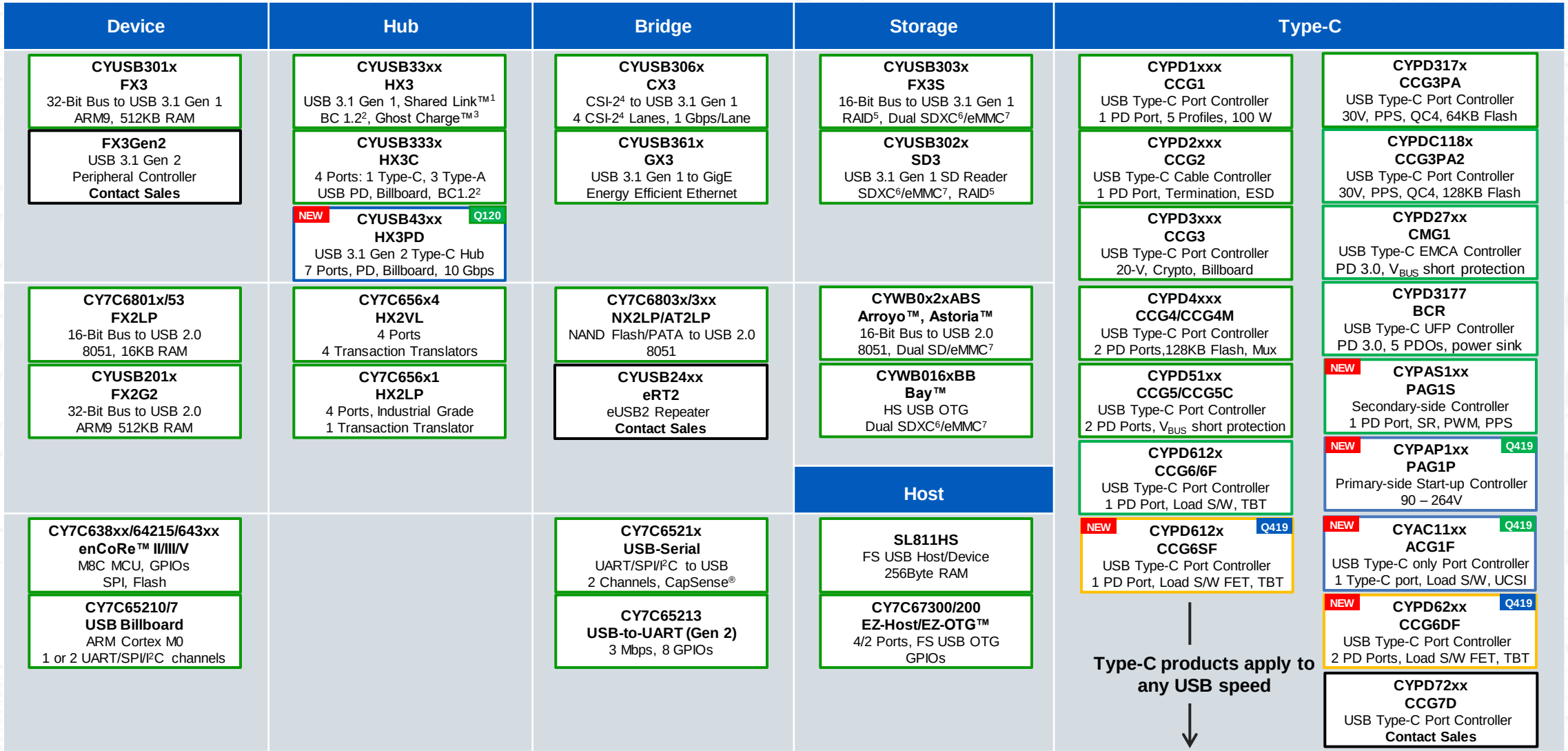
Cypress Roadmap: USB

Q4 2019

USB Portfolio



[1] Simultaneous USB 2.0 and SuperSpeed traffic on the same port
[2] Battery Charging specification v1.2
[3] Enables USB charging without host connection
[4] Camera Serial Interface v2.0
[5] Redundant array of independent disks
[6] SD extended capacity
[7] Embedded Multimedia Card

Status: Concept | Development | Sampling | Production
Availability: QQYY | QQYY

EZ-PD ACG1F

Single Port Type-C controller with BC1.2, Load Switch

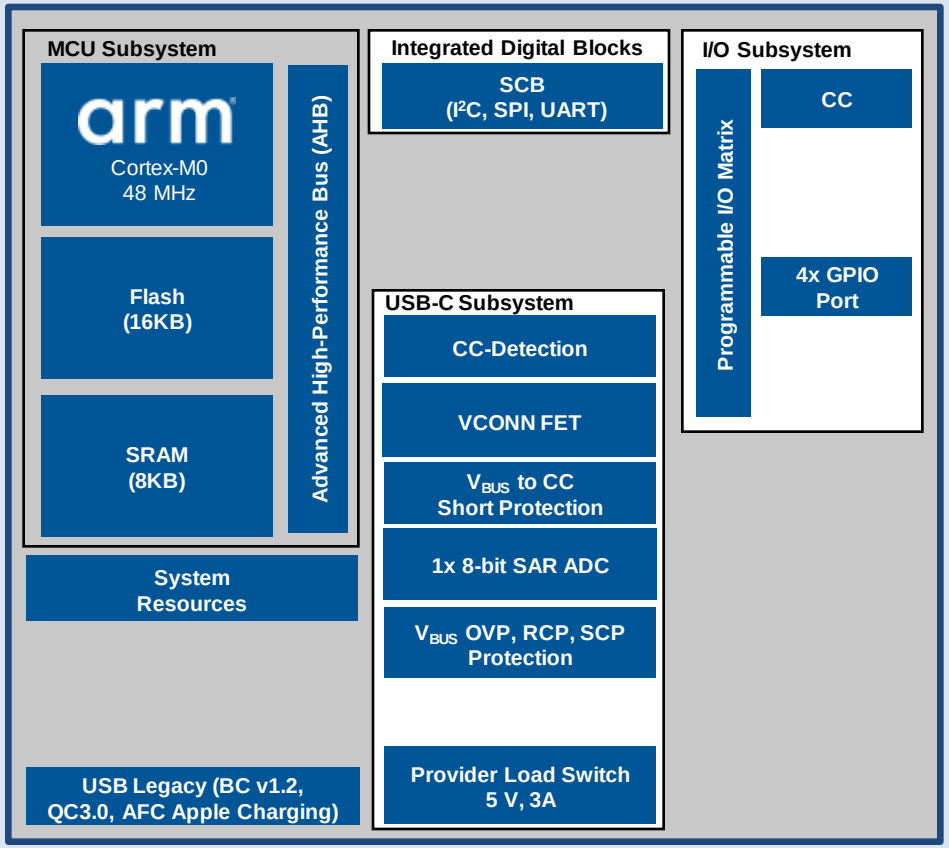
Applications

Desktops, Notebooks

Features

- **Type-C 1.2 Controller**
- **V_{BUS} to CC/SBU short protection**
- **Integrated Analog Blocks**
  Configurable V_{BUS} over-voltage protection and over-current protection
  High-side current sense[3] amplifier across 5mohms
  Legacy charge-detect block (BC v1.2, QC3.0, AFC, Apple Charging)
  VCONN FET per CC with VCONN OCP limit of up to 550 mA
- **Integrated Digital Blocks**
  4x GPIOs
  One SCB[1] for configurable master/slave I2C, SPI, or UART
- **Arm® Cortex®-M0 with MCU Subsystem and 16KB flash**
- **Power System**
- Integrated 15-W provider load switch capable of 5 V, 3A
- VBUS over-voltage protection and Reverse Current Protection on provider path
- **Packages**
- 24-QFN (4x4 mm)

ACG1: Single-Chip USB-C Controller



Collateral

Datasheet: ACG1F Datasheet

Availability

Sampling: Now **Production:** Q4 2019

PAG1S

USB-C Power Delivery Secondary-Side Controller

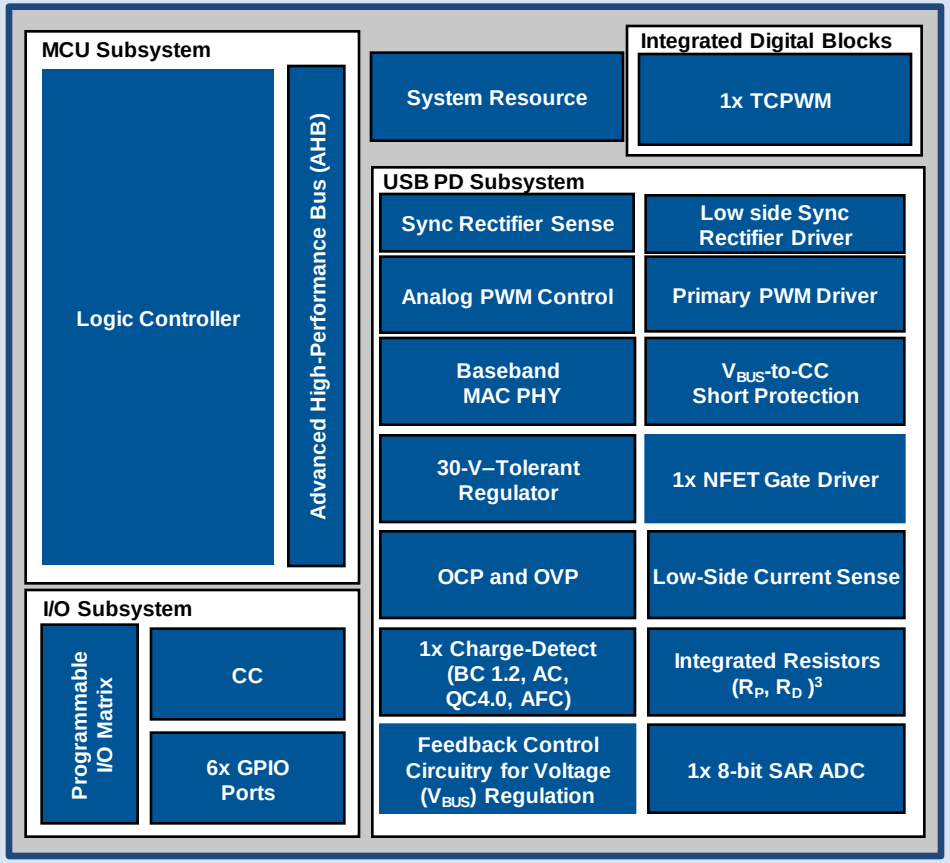
Applications

USB PD chargers, power adapters

Features

- **PPS/PD3.0/QC4.0 integrated flyback controller for mobile chargers**
- **Works with both primary side-controlled and secondary-side-controlled flyback designs**
- **Integrated secondary-side regulation, synchronous rectifier, and charging port controller offering a single-chip secondary-side controller**
- **Supports Quasi-Resonant (QR)/Critical Conduction (CrCM), valley switching, discontinuous conduction (DCM), and Burst Modes**
- **Integrated digital blocks**
  - One timer/counter/pulse-width modulator (TCPWM) block, 6x GPIOs
- **Integrated analog blocks**
  - Configurable V_{BUS} overvoltage protection (OVP), overcurrent (OCP) protection, undervoltage protection (UVP), and short-circuit protection (SCP)
  - Integrated 2xVBUS discharge FETs and a NFET gate driver to drive the load switch
  - Low-side current sense[1] capable of detecting 100-mA change
  - One legacy charge-detect block (BC 1.2, Apple Charging 2.4A, QC 4.0 and Samsung AFC[2])
- **Low-Power Operation**
  - High-voltage (3–30 V, 30-V maximum) V_{BUS} voltage inputs
  - No load power consumption of less than 20 mW
- **Package**
  - 24 QFN (16 mm^2)

PAG1S: USB-C Power Delivery Secondary Controller



Collateral

Preliminary Datasheet: PAG1S Datasheet

Availability

Sampling: Now

[1] Circuit to measure the current flowing on the V_{BUS}
[2] Adaptive Fast Charging
[3] Termination resistors: R_P read as a DFP, R_D as a UFP

PAG1P

USB-C Power Delivery Primary Start Up Controller

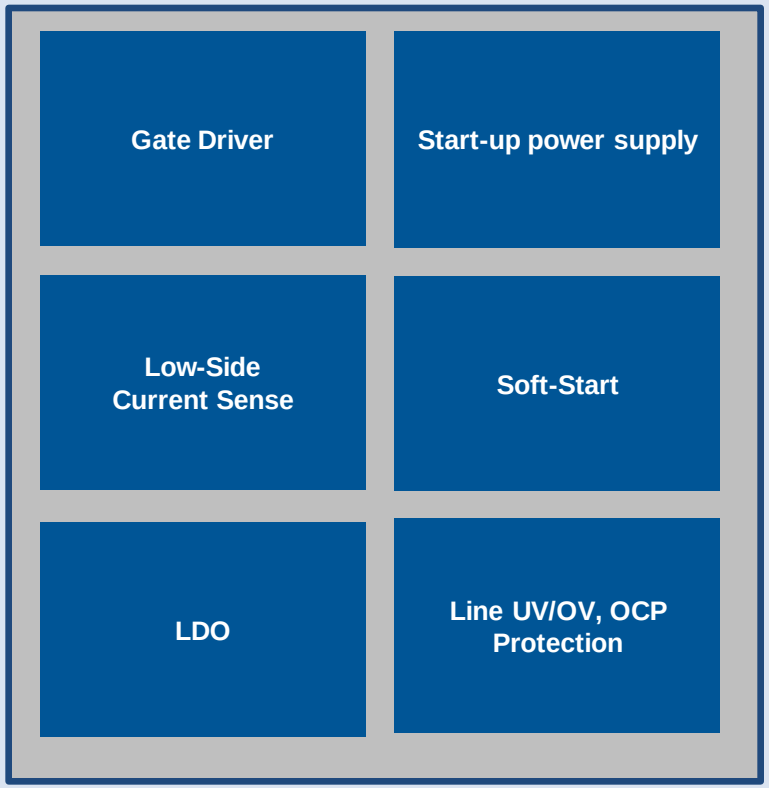
Applications

USB PD chargers, power adapters

Features

- Works across universal AC mains input 85 VAC to 265 VAC
- Operates with PWM inputs from a secondary-side controller
- Low-side gate driver to drive primary FET (1-A Source)
- Soft-start with duty-cycle clamping
- Integrates high-voltage start-up and shunt regulator
- Line undervoltage and overvoltage protection
- Overcurrent protection against load short-circuit
- Operates over a temperature range of -40 ºC to 105 ºC
- Package
  - 10-pin SOIC (4.9 x 3.9 mm^2)

PAG1P: USB-C PD Primary Start Up Controller



Collateral

Preliminary Datasheet: PAG1S Datasheet

Availability

Sampling: Now **Production:** Q4 2019

EZ-USB HX3PD

USB 3.1 Gen 2 Type-C Hub with Power Delivery

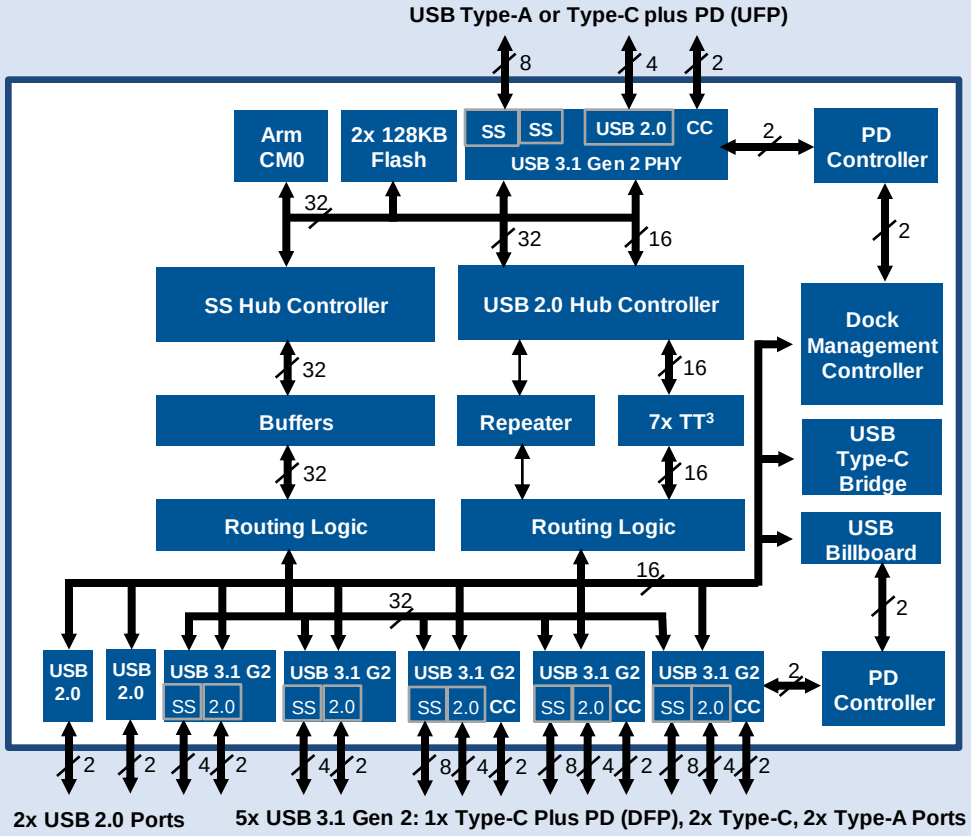
Applications

Notebook/tablet docking stations, monitor docks, multi-function USB Type-C peripherals

Features

- **USB 3.1 Gen 2-Compliant Hub Controller with Type-C and PD**
- **Upstream (US) ports:**
  - 10 Gbps; Type-A or Type-C plus PD (UFP)
- **Downstream (DS) ports:**
  - 7 ports: 5x 10 Gbps, 2x 480 Mbps
  - 3 Type-C ports: 1 PD port (DFP), 2 Type-C only
- **Integrated Type-C Transceivers and Dual-PHY for Type-C plug orientation correction**
  - Integrated termination resistors (R_P and R_D)[1]
  - Integrated USB Billboard Controller[2], USB Type-C Bridge Controller
  - Integrated V_{CONN} FETs and ADC for overvoltage and overcurrent protection
- **Charging Support**
  - USB PD, BC v1.2, Apple Charging Standard, QC 4.0, Samsung AFC
  - USB PD policy engine configures power profiles dynamically
- **Ghost Charge™:** Charging DS without US connection
- **Dock Management Controller for secured firmware download**
  - Firmware upgradable over USB
- **System-Level ESD on Configuration Channel (CC) Pins:** 8 kV Contact, 15 kV Air
- **Package:** 192-ball BGA (12 mm x 12 mm x 1 mm, 0.8-mm ball-pitch)

HX3PD: USB 3.1 Gen 1 Type-C PD Hub



Collateral

Datasheet: HX3PD Datasheet
Kit: HX3PD Evaluation Kit

Availability

Samples: Now **Production:** Q1 2020

[1] Termination resistors: R_P read as a DFP, R_D as a UFP [2] A USB Device controller that is used to implement the USB Billboard Device Class Informs the USB Host of the supported Alternate Modes as well as any failures [3] Transaction Translator

EZ-PD BCR

USB Type-C Power-Sink Port Controller

Applications

Portable electronics – cameras, camcorders, smart speakers, toys, gaming, shavers, powered tools and any battery-powered devices.

Industrial – LED lighting, scanner, printer, drones, IoT

Any electronics device consuming less than 100W

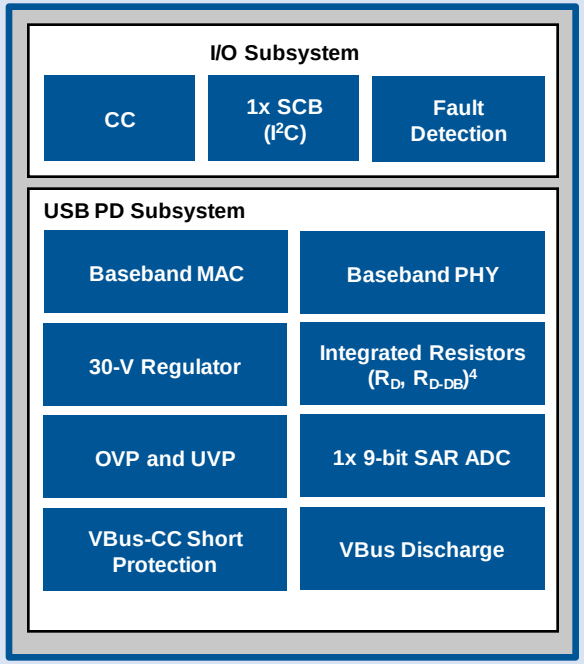
Features

- **Integrated Type-C and Power Delivery (PD) Transceiver**
  - Integrated high-voltage 30-V–tolerant LDO to power the BCR controller
  - One serial communication blocks (SCB) for slave I^2C
- **Integrated Analog**
  - V_{BUS} overvoltage (OVP) and undervoltage (UVP) protection
  - Fault detection for PDO mismatch
  - Slew rate-controlled PMOS FET gate driver
  - Minimum 25-V–tolerant CC pins and FET control pins
- **Low-Power Operation**
  - High-voltage (5–30 V, 30 V maximum) V_{BUS} voltage inputs
  - Sleep: ~3.5 mA; Deep Sleep: 50 µA with wake-on-I^2C or CC
- **System-Level ESD on CC, and V_{BUS}**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **Package**
  - 24-QFN (16 mm^2), supporting extended Industrial temp (-40 °C to 105 °C)

Collateral

Datasheet:	CY3177 Datasheet
Evaluation Kit:	CY4533 Kit
Product Brochure:	EZ-PD Barrel Connector Replacement Product Overview

EZ-PD BCR: USB Type-C Power-Sink Port Controller



Availability

Production: Now

[1] Analog feedback voltage control circuit to control V_{BUS}
[2] Circuit to measure the current flowing on the V_{BUS}
[4] Termination resistors: R_D as a UFP, R_{D-DB} as a UFP supporting dead battery

EZ-PD CCG6

Single-Port USB Type-C Port Controller With PD

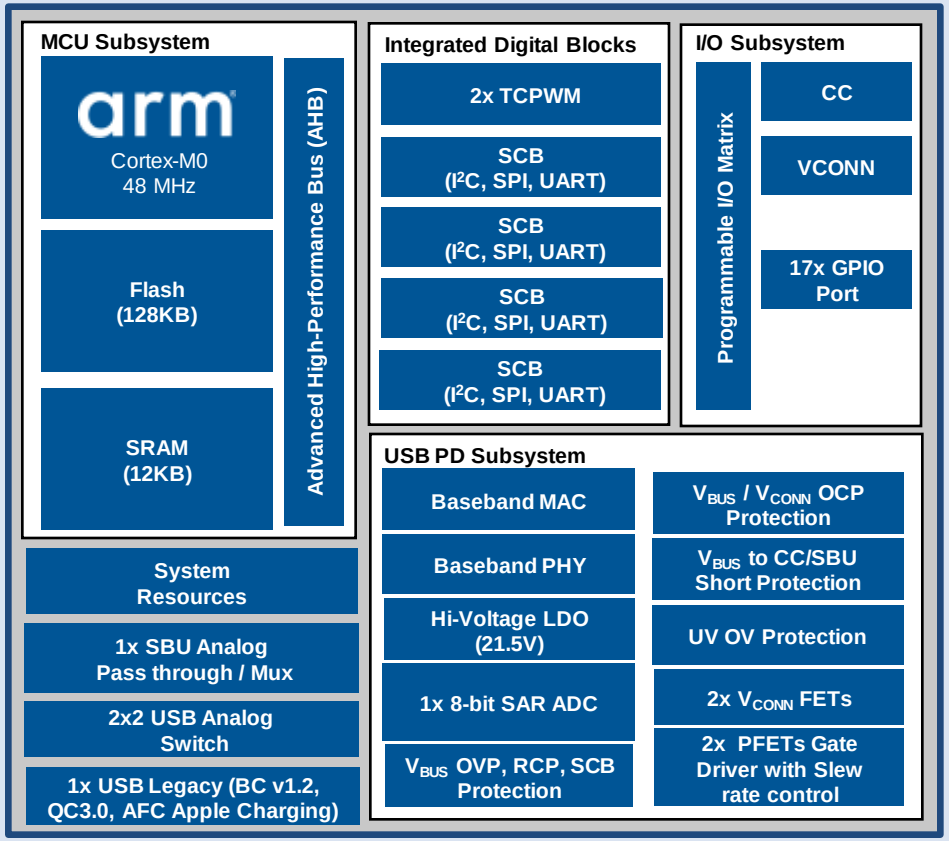
Applications

Thunderbolt / USB-C Notebook, Desktop PCs

Features

- **USB Type-C/Power Delivery 3.0 transceiver and TBT, DP Alt Mode and USB platforms**
- **V_{BUS} to CC/SBU short protection**
- **Integrated high-voltage 20V-regulator to power CCG6**
- **Integrated Analog Blocks**
  2x1 SBU analog mux, 2x2 USB analog mux
  Configurable V_{BUS} over-voltage protection and over-current protection
  High-side current sense amplifier across 5 mΩ
  Legacy charge-detect block (BC v1.2, QC3.0, AFC, Apple Charging)
- **Integrated Digital Blocks**
  Two timers, counters, and pulse-width modulators, 17x GPIOs
  Four SCBs[1] for configurable master/slave I2C, SPI, or UART
- **Arm® Cortex®-M0 with MCU Subsystem and 128KB flash**
- **Power System**
  High-voltage (4 - 21.5 V, 26 V Max) V_{BUS} voltage inputs
  2x V_{CONN} FETs supporting up to 500 mA, Supports Dead Battery mode operation
- Integrated PFET gate drivers and Slew Rate Control
- VBUS over-voltage protection and Reverse Current Protection on provider path
- **Packages**
  40 QFN (6x6 mm)

CCG6: Single-Port USB Type-C Port Controller With PD



Collateral

Datasheet: CCG6 Datasheet

Availability

Production: Now

[1] Serial communication block configurable as UART, SPI or I²C

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EZ-PD CCG6F

Single-Port USB Type-C Port Controller With PD

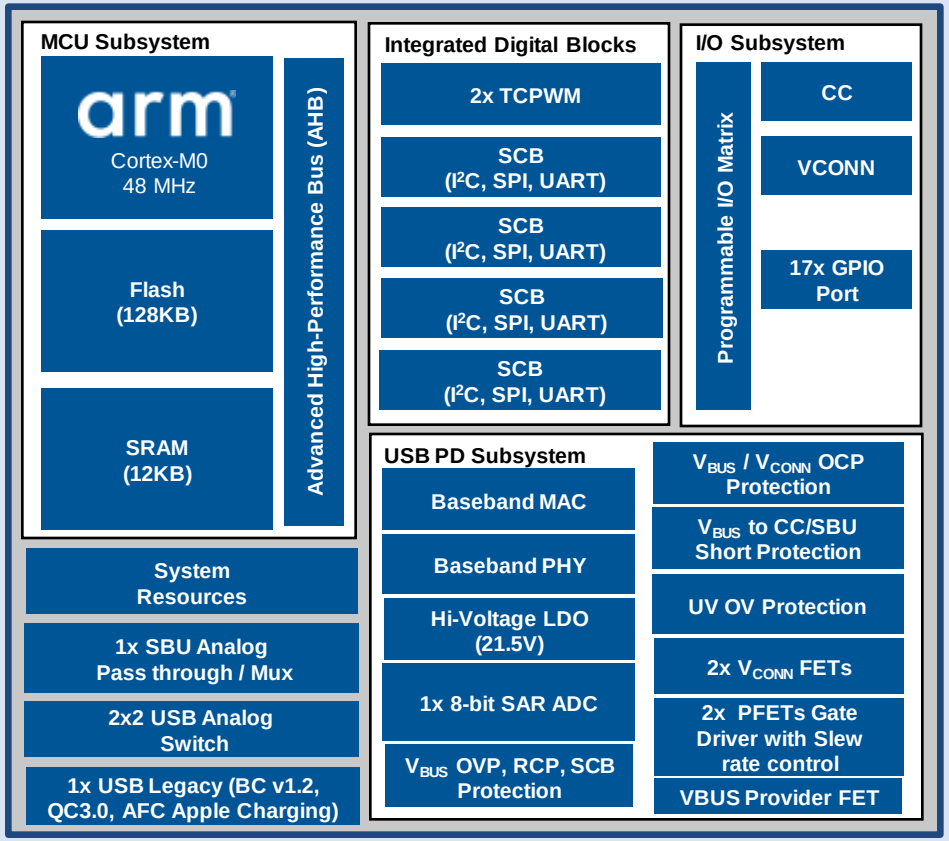
Applications

Thunderbolt / USB-C Notebook, Desktop PCs

Features

- **USB Type-C/Power Delivery 3.0 transceiver and TBT, DP Alt Mode, and USB platforms**
- **V_{BUS} to CC/SBU short protection**
- **Integrated high-voltage 20V-regulator to power CCG6**
- **Integrated Analog Blocks**
  2x1 SBU analog mux, 2x2 USB analog mux
  Configurable V_{BUS} over-voltage protection and over-current protection
  High-side current sense amplifier across 5 mΩ
  Legacy charge-detect block (BC v1.2, QC3.0, AFC, Apple Charging)
- **Integrated Digital Blocks**
  Two timers, counters, and pulse-width modulators, 17x GPIOs
  Four SCBs[1] for configurable master/slave I2C, SPI, or UART
- **Arm® Cortex®-M0 with MCU Subsystem and 128KB flash**
- **Power System**
  High-voltage (4 - 21.5 V, 26 V Max) V_{BUS} voltage inputs
  2x V_{CONN} FETs supporting up to 500 mA, Supports Dead Battery mode operation
- Integrated PFETs for provider path
- VBUS over-voltage protection and Reverse Current Protection on provider path
- **Packages**
  96 BGA (6x6 mm)

CCG6F: Single-Port USB Type-C Port Controller With PD



Collateral

Datasheet: CCG6F Datasheet

Availability

Production: Now

[1] Serial communication block configurable as UART, SPI or I²C

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EZ-PD CMG1

USB Type-C Passive EMCA Controller

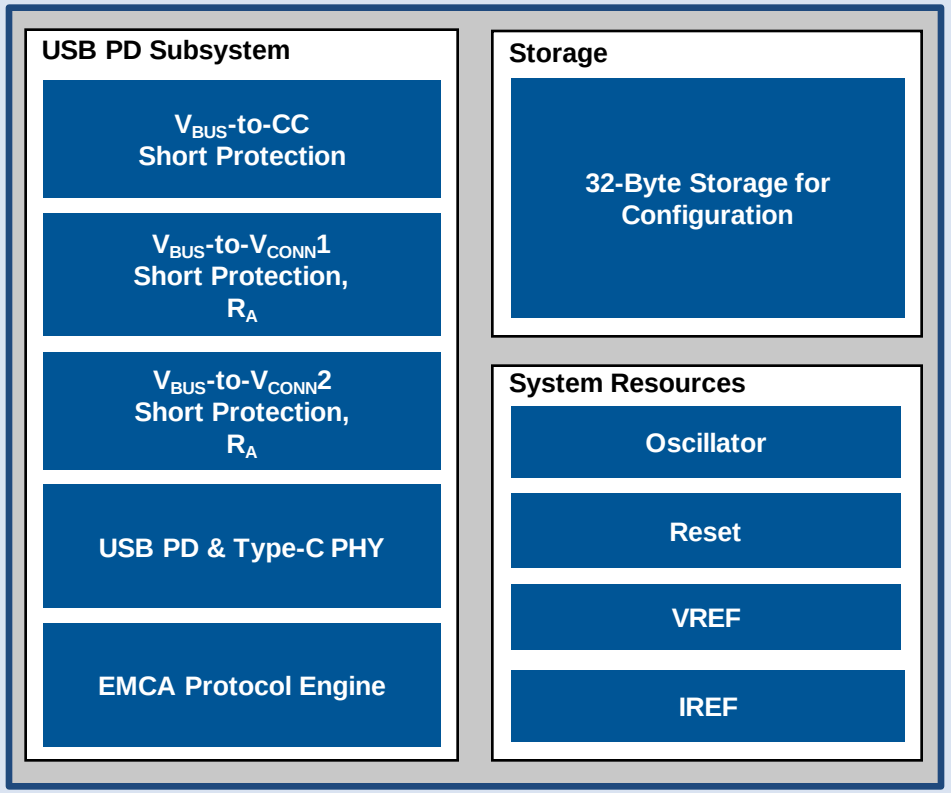
Applications

USB-C EMCA

Features

- **USB-C PD Controller, PD 3.0 Transceiver**
- **V_{BUS}-to-CC Short Protection**
- **V_{BUS}-to-V_{CONN} Short Protection**
- **Power from V_{CONN} range 3.0 to 5.5-V**
- **Termination Resistor R_A**
- **Supports R_A Weakening to Reduce Power Consumption**
- **Configurable 32-byte Storage for Configuration Over Type-C Interface**
- **Integrated oscillator eliminating the need for external clock**
- **Power Operation**
  - 2.7-V to 5.5-V operation (V_{CONN} pin)
  - Active: 7.5 mA
  - Sleep: 1 mA
- **System-Level ESD on CC, V_{CONN} Pins**
  - ±8-kV contact, ±15-kV Air Gap IEC61000-4-2 level 4C
- **Packages**
  - 9-ball WLCSP (1.95 mm^2)
  - Supports industrial temperature range (-40°C to +85°C)

CMG1: USB Type-C Passive EMCA Controller



Collateral

Preliminary Datasheet: CMG1 Datasheet

Availability

Production: Now

EZ-PD CCG3PA2

USB Type-C and PD Port Controller

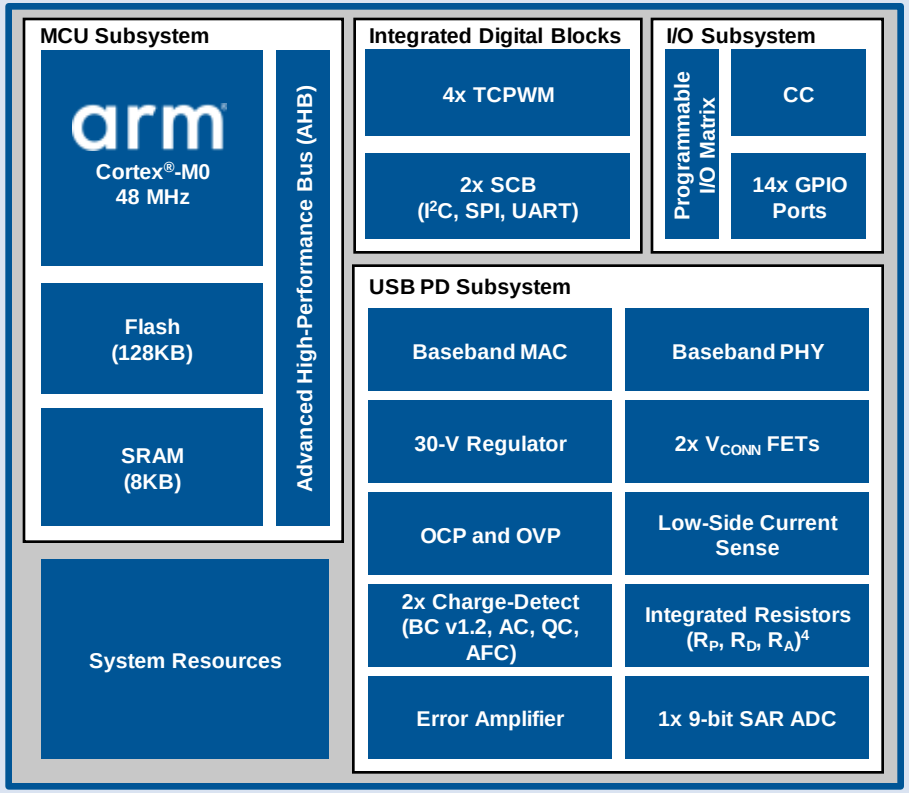
Applications

Power adapters, chargers, power banks

Features

- **Integrated Type-C and Power Delivery (PD) Transceiver**
  - Integrated high-voltage 30-V–tolerant LDO
  - Four timers/counters/pulse-width modulators (TCPWMs), 12x GPIOs
  - Two serial communication blocks (SCBs) for configurable master/slave I^2C, SPI or UART
- **Integrated Analog**
  - Configurable V_{BUS} overvoltage (OVP) and overcurrent (OCP) protection
  - Integrated error amplifier[1] with analog out for V_{BUS} control
  - Low side current sense[2] capable of detecting 100-mA change
  - Minimum 25-V–tolerant CC pins and FET control GPIOs
  - Two legacy charge-detect block (BC 1.2, Apple Charging 2.4A, QC 4.0 and Samsung AFC[3])
- **32-bit Arm® Cortex®-M0 CPU with 128KB Flash**
- **Low-Power Operation**
  - High-voltage (5–30 V, 30 V maximum) V_{BUS} voltage inputs
  - Sleep: ~3.5 mA; Deep Sleep: 50 µA with wake-on-I^2C or CC
- **System-Level ESD on CC / V_{CONN}, V_{BUS}, and SBU Pins**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **Packages**
  - 32-QFN (25 mm^2), 30-ball CSP (7.5 mm^2)

CCG3PA2: USB Type-C Port Controller



Collateral

Datasheet: Contact Sales

Availability

Production: Now

[1] Analog feedback voltage control circuit to control V_{BUS}
[2] Circuit to measure the current flowing on the V_{BUS}
[3] Adaptive Fast Charging
[4] Termination resistors: R_P read as a DFP, R_D as a UFP, R_A as an EMCA

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EZ-PD CCG3PA

USB Type-C and PD Port Controller

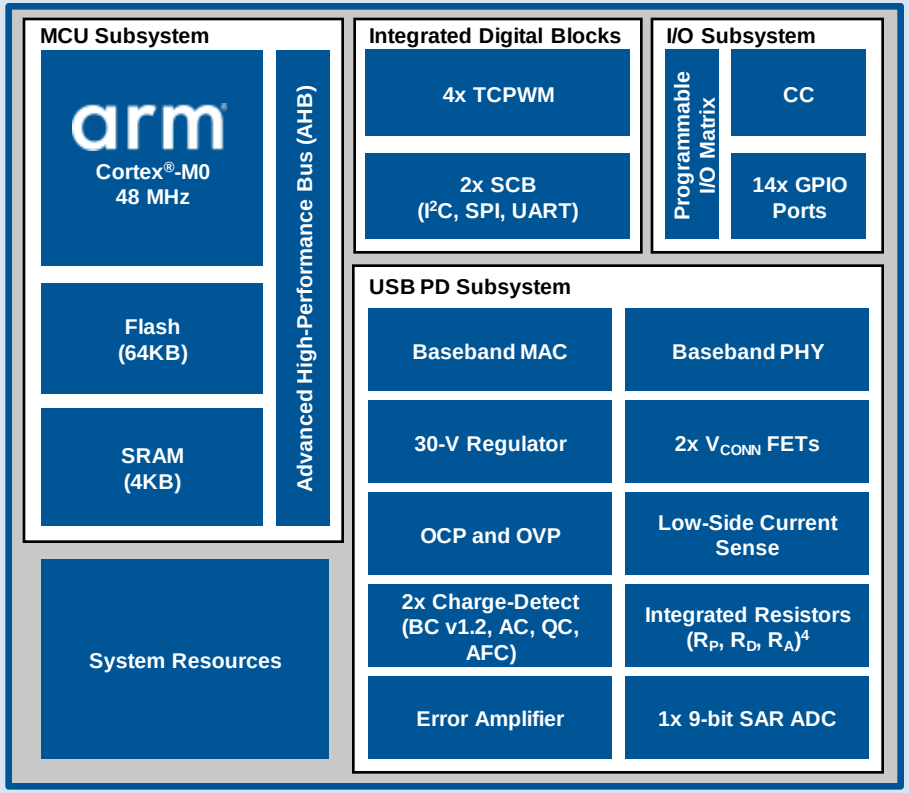
Applications

Power adapters, chargers, power banks

Features

- **Integrated Type-C and Power Delivery (PD) Transceiver**
  - Integrated high-voltage 30-V–tolerant LDO to power CCG3PA
  - Four timers/counters/pulse-width modulators (TCPWMs), 12x GPIOs
  - Two serial communication blocks (SCBs) for configurable master/slave I^2C, SPI or UART
- **Integrated Analog**
  - Configurable V_{BUS} overvoltage (OVP) and overcurrent (OCP) protection
  - Integrated error amplifier[1] with analog out for V_{BUS} control
  - Low side current sense[2] capable of detecting 100-mA change
  - Minimum 25-V–tolerant CC pins and FET control GPIOs
  - Two legacy charge-detect block (BC 1.2, Apple Charging 2.4A, QC 4.0 and Samsung AFC[3])
- **32-bit Arm® Cortex®-M0 CPU with 64KB Flash**
- **Low-Power Operation**
  - High-voltage (5–30 V, 30 V maximum) V_{BUS} voltage inputs
  - Sleep: ~3.5 mA; Deep Sleep: 50 µA with wake-on-I^2C or CC
- **System-Level ESD on CC / V_{CONN}, V_{BUS}, and SBU Pins**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **Packages**
  - 24-QFN (16 mm^2), 16-SOIC (60 mm^2)

CCG3PA: USB Type-C Port Controller



Collateral

Datasheet: CCG3PA Datasheet

Availability

Production: Now

[1] Analog feedback voltage control circuit to control V_{BUS}
[2] Circuit to measure the current flowing on the V_{BUS}
[3] Adaptive Fast Charging
[4] Termination resistors: R_P read as a DFP, R_D as a UFP, R_A as an EMCA

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EZ-PD CCG5

Dual-Port USB Type-C and PD Port Controller

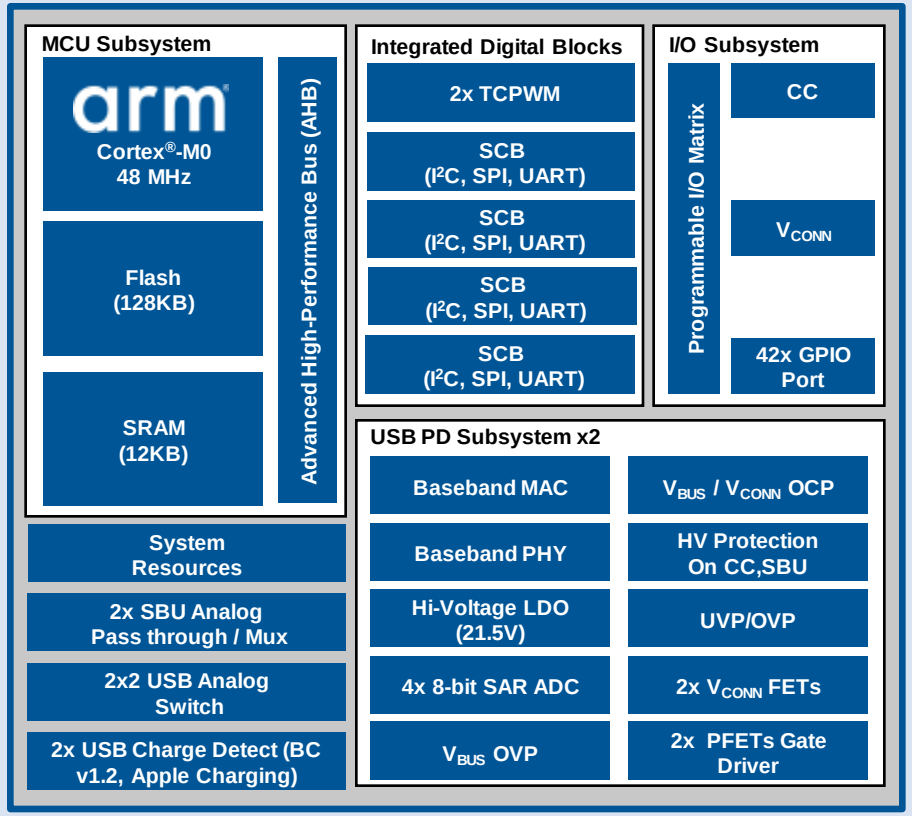
Applications

Notebooks, docks, Thunderbolt devices

Features

- **Integrated Type-C Transceiver for Two Type-C USB PD 3.0-Compliant Ports**
  - Support for Thunderbolt, DisplayPort (DP), HDMI Alt Mode and USB platforms
  - USCI[1]-compliant Interface with WHQL[2]-certified driver
  - Support for UEFI[3] driver with Microsoft capsule firmware download
- **Integrated Analog**
  - Integrated high-voltage LDO and 4x V_{CONN} FETs supporting up to 500 mA
  - Integrated 2x2 USB analog switch; integrated SBU analog pass with high-voltage tolerance
  - Integrated 2x USB Charger Detect (BC 1.2, Apple Charging, QC 4.0 and Samsung AFC[4])
  - Integrated Type-C termination resistors (R_P, R_D R_{DB})[5]
  - 25-V tolerance on CC1/2 and SBU pins
- **Arm® Cortex®-M0 CPU with 128KB Flash and 12KB SRAM**
  - 4x serial communication blocks (SCB) - I^2C, SPI or UART
  - Firmware upgradable over SWD/I^2C interfaces
  - Supports Dead Battery mode operation
  - Overvoltage protection (OVP) with 2µs response time; integrated V_{BUS}/V_{CONN} overcurrent protection (OCP)
- **System-Level ESD on CC/V_{CONN}, V_{BUS}, and SBU Pins**
  - ±8-kV Contact, ±15-kV Air Discharge IEC61000-4-2 Level 4C
- **Packages**
  - 2-Port in 96-BGA (6 mm^2), 1-Port in 40-QFN (6 mm^2)

CCG5: USB Type-C Port Controller



Collateral

Datasheet: CCG5 Datasheet

Availability

Production: Now

[1] USB Type-C Connector System Software Interface
[2] Windows Hardware Quality Labs
[3] Unified Extensible Firmware Interface
[4] Adaptive Fast Charging
[5] Termination resistors: R_P read as a DFP, R_D as a UFP, R_{DB} as UFP in Dead-Battery scenario

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EZ-PD CCG4/4M

Dual-Port USB Type-C and PD Port Controller

Applications

Notebooks, tablets, monitors, docking stations

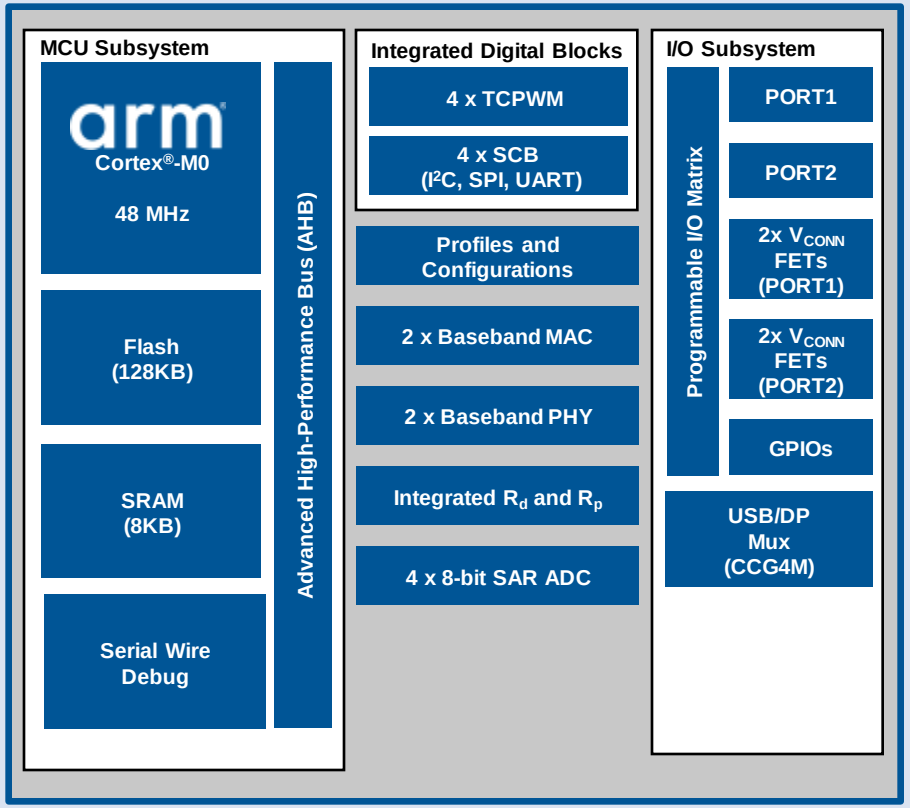
Features

- **Integrated USB Type-C Transceivers Support Two Type-C Ports**
  - Integrated 2x 1-W V_{CONN} FETs and 2x FET control signals, per port programmable R_P[1] and removable R_P, and R_D[2] terminations
  - Supports dead battery mode operation
  - Integrated SuperSpeed USB/DisplayPort (DP) Mux (CCG4M)
- **Increased Flash Enables Fail-Safe Bootup**
  - Integrates 128KB Flash to store dual FW images for fail-safe boot
- **Integrated Digital Blocks for Inter-Chip Communications**
  - Four serial communication blocks (SCBs) master or slave configurable to I²C, SPI or UART
  - SCBs interconnect CCG4 with embedded controller, two alternate muxes and Thunderbolt controller (optional)
- **Integrated Blocks for Overvoltage (OVP) and Overcurrent Protection (OCP)**
  - Four 8-bit SAR ADCs configurable for OVP and OCP
- **Low-Power Operation**
  - 2.7–V to 5.5-V operation and independent supply voltage for GPIO; Sleep: 2.0 mA; Deep Sleep: 2.5 µA with wake-on-I²C or wake-on-configuration channel (CC)
- **System-Level ESD on CC Pins**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **32-bit Arm® Cortex®-M0 CPU with MCU Subsystem**
  - 128KB Flash, upgradable over CC lines or I²C interface
- **Packages**
  - 40-pin QFN, 96-ball BGA (CCG4M)

Collateral

Datasheet: CCG4 Datasheet

CCG4/4M: USB Type-C Port Controller



Availability

Production: Now

[1] Termination resistor read as a DFP
[2] Termination resistor read as a UFP

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EZ-PD CCG3

USB Type-C and PD Port Controller

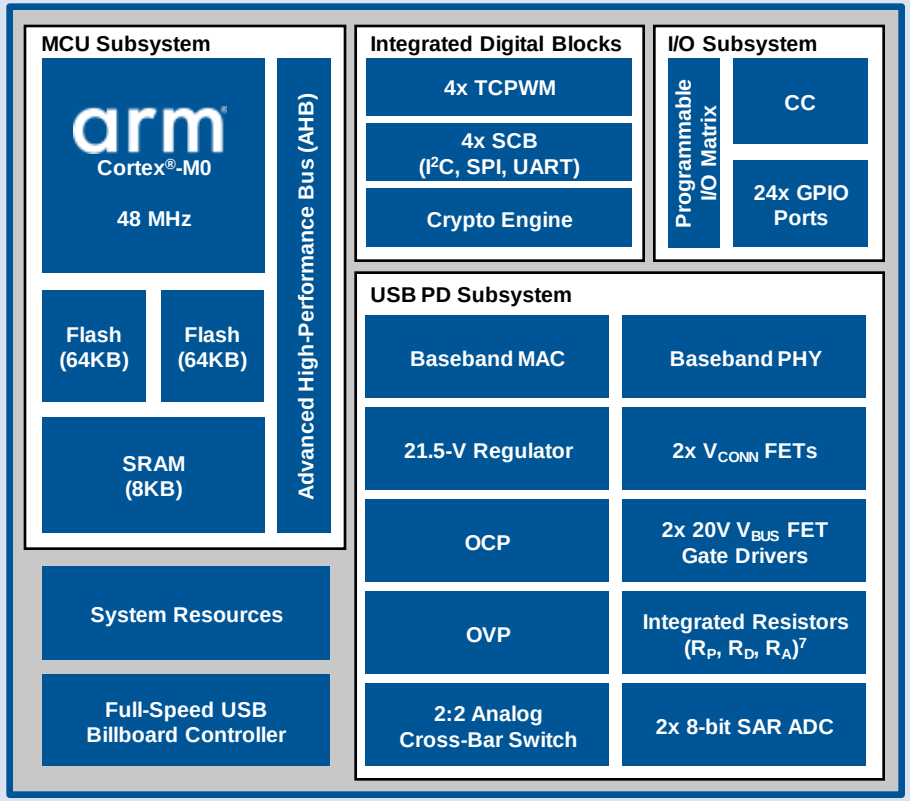
Applications

Accessories and power adapters

Features

- **One Type-C Port with Integrated Transceiver**
  - Alternate Modes[1], Crypto Engine[2] for USB Authentication[3]
- **Power Delivery (PD) Support for Standard Power Profiles**
- **Integrated Digital Blocks for V_{BUS} Power and MUX Interface**
  - 4 timers/counters/pulse-width modulators (TCPWM), 24x GPIOs
  - 4 serial communication blocks (SCBs) configurable as master/slave I^2C, SPI or UART
  - USB Billboard Controller[4] with Billboard Device Class[5] support
- **Integrated Analog Blocks for Overvoltage (OVP) and Overcurrent Protection (OCP)**
  - 21.5-V OVP and OCP; 2:2 cross-bar switch
- **32-bit Arm® Cortex®-M0 CPU with MCU Subsystem**
  - 2x64KB Flash for fail-safe updates over CC, I^2C or USB interfaces
- **Low-Power Operation**
  - 2x V_{BUS} Gate Drivers[6], for consumer and provider power paths
  - 2x high-voltage (5–21.5 V, 25 V, maximum) V_{BUS} voltage inputs
  - Sleep: 2.0 mA; Deep Sleep: 2.5 µA with wake-on-I^2C or wake-on-CC
- **System-Level ESD on CC/V_{CONN}, V_{BUS}, and SBU Pins**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **Packages**
  - 42-ball (8.38 mm^2) CSP, 40-pin (36 mm^2) QFN and 32-pin (25 mm^2) QFN

CCG3: USB Type-C Port Controller



Collateral

Datasheet: CCG3 Datasheet

Availability

Production: Now

[1] Mode of operation in which the data lines are repurposed to transmit non-USB data
[2] The encryption hardware and software required to implement USB Authentication
[3] A USB-IF specification that defines the authentication protocol for Type-C accessories
[4] A USB Device controller that informs the USB Host of the supported Alternate Modes
[5] A specification that defines the method for a USB Device to communicate the supported Alternate Modes
[6] Circuits to control the gates of external power Field-Effect Transistors (FETs) on V_{BUS} (5-20 V)
[7] Termination resistors: R_P read as a DFP, R_D as a UFP, R_A as an EMCA

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EZ-PD CCG2

USB Type-C and PD Port Controller

Applications

USB Type-C Electronically Marked Cabled Assembly (EMCA) and powered accessories

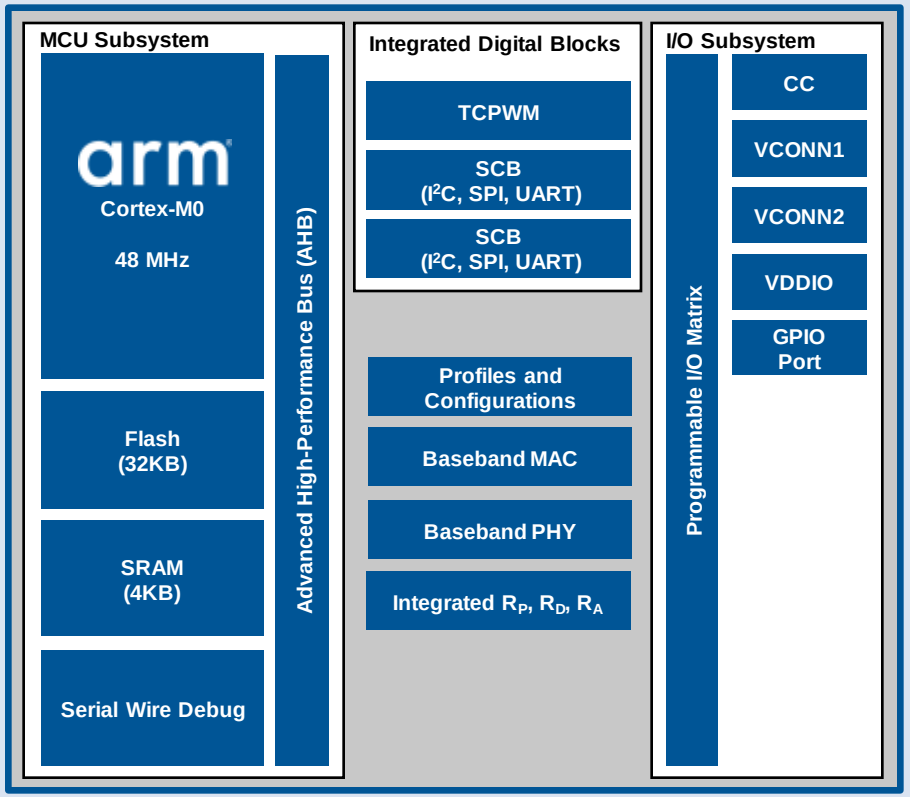
Features

- **32-bit MCU Subsystem**
  - 48-MHz Arm® Cortex®-M0 CPU with 32KB Flash and 4KB SRAM
- **Integrated Digital Blocks**
  - Integrated timer/counter/pulse-width modulators (TCPWMs)
  - Two SCBs[1] configurable to I²C, SPI or UART modes
- **Type-C Support**
  - Integrated transceiver, supporting one Type-C port
  - Integrated termination resistors (R_P, R_D, R_A)[2]
- **Power Delivery (PD) Support**
  - Standard power profiles
- **Low-Power Operation**
  - Two independent V_{CONN} rails with integrated isolation
  - Independent supply voltage pin for GPIO
  - 2.7–5.5-V operation; Sleep: 2.0 mA; Deep Sleep: 2.5 µA
- **System-Level ESD on CC and VDD Pins**
  - ±8-kV Contact, ±15-kV Air Gap IEC61000-4-2 Level 4C
- **Packages**
  - 20-ball CSP (3.3 mm²) with 0.4-mm ball pitch, 14-pin DFN (2.5 x 3.5 mm) with 0.6-mm pin pitch and 24-pin QFN (4 mm²) with 0.55-mm pin pitch

Collateral

Datasheet: CCG2 Datasheet
Reference Design Kit: CCG2 RDK
Evaluation Kit: CCG3 EVK

CCG2: USB Type-C Port Controller With PD



Availability

Production: Now

[1] Serial communication block configurable as UART, SPI or I²C
[2] Termination resistors: R_P read as a DFP, R_D as a UFP, R_A as an EMCA

EZ-USB FX3

USB 3.1 Gen 1 Peripheral Controller

Applications

Industrial cameras, medical and machine vision cameras, 3-D and 1080p full HD and 4K Ultra HD (UHD) cameras. document and fingerprint scanners, videoconferencing and data acquisition systems, video capture cards and HDMI converters, protocol and logic analyzers, USB test tools and software-designed radios (SDRs)

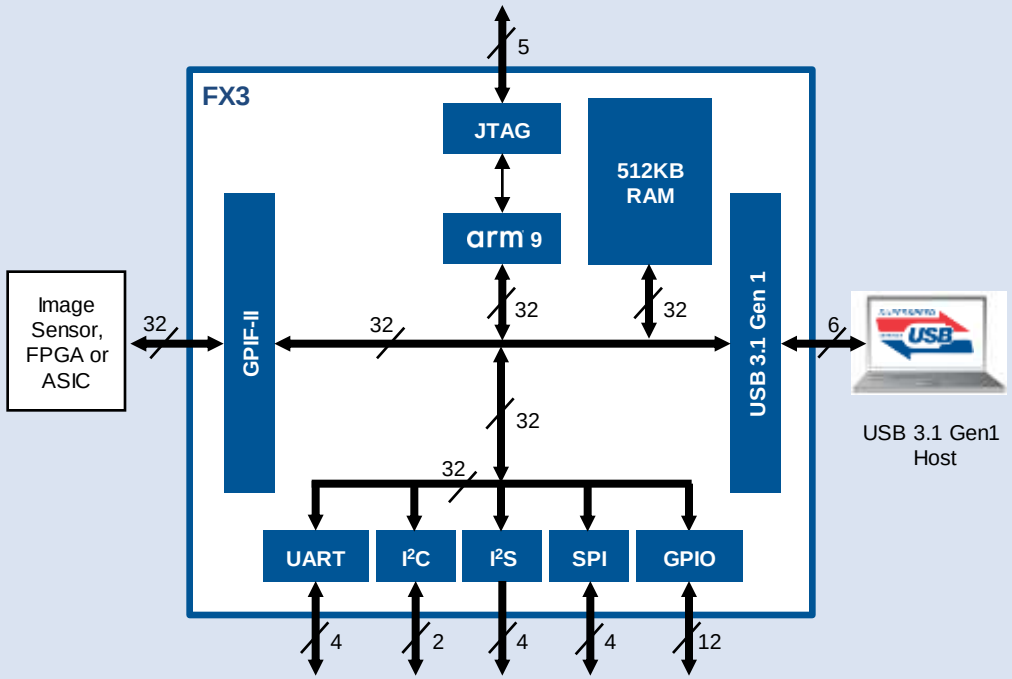
Features

- **USB 3.1 Gen 1-Compliant Peripheral Controller**
  - USB-IF-certified (TID: 340800007)
  - Up to 32 USB endpoints
- **Fully Accessible 32-bit, 200-MHz Arm® 926EJ Core**
  - 512KB of embedded SRAM for code space and buffers
- **32-bit, 100-MHz, flexible GPIF II Interface**
  - Other peripheral interfaces such as I^2C, I^2S, UART, SPI and 12 GPIOs
  - Unused I/O pins can be used as GPIOs
  - 19.2-MHz crystal or 19.2-MHz, 26-MHz, 38.4-MHz and 52-MHz clock input
- **Flexible Clock Options**
- **Packages**
  - 121-ball BGA (10 mm^2), 131-ball WLCSP (4.7 x 5.1 mm)

Collateral

Datasheet: FX3 Datasheet
Development Kit: FX3 SuperSpeed Explorer Kit
Software Development Kit: EZ-USB FX3 SDK

FX3: USB 3.1 Gen 1 Peripheral Controller



Availability

Production: Now

EZ-USB FX3S

USB 3.1 Gen 1 RAID[1]-on-Chip

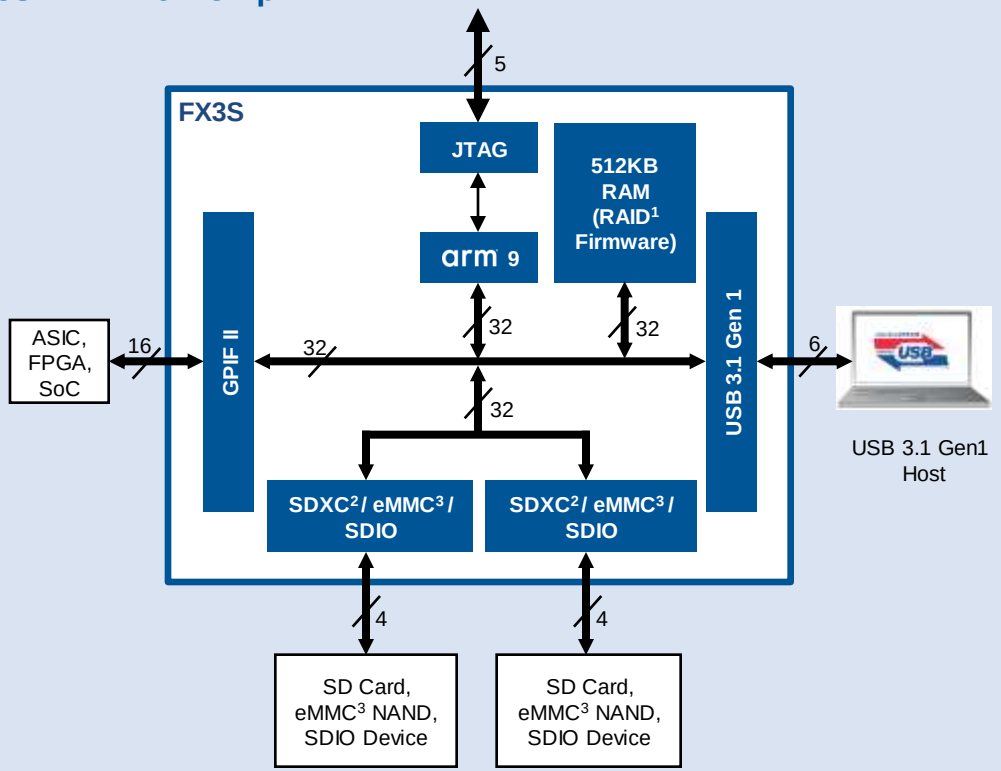
Applications

Servers, routers, mobile storage, USB Flash drives, POS terminals, automatic teller machines (ATM), SDIO expanders, and data logging devices

Features

- **USB 3.1 Gen 1-Compliant Peripheral Controller**
  - USB-IF-certified (TID: 340800007)
  - Up to 32 USB endpoints
- **Fully Accessible 32-bit, 200-MHz Arm® 926EJ Core**
  - 512KB of embedded SRAM for code space and buffers
- **32-bit, 100-MHz, Flexible GPIF II Interface**
  - Other peripheral interfaces such as I²C, I²S, UART, SPI and 12 GPIOs
  - Unused I/O pins can be used as GPIOs
- **Two SDXC[2], eMMC[3] 4,4, or SDIO 3.0 Interfaces**
  - Support RAID0 or RAID1 configurations
- **Flexible Clock Options**
  - 19.2-MHz crystal or 19.2-MHz, 26-MHz, 38.4-MHz and 52-MHz clock input
- **Packages**
  - 121-ball BGA (10 mm²), 131-ball WLCSP (4.7 x 5.1 mm)

FX3S: RAID[1]-on-Chip



Collateral

Datasheet: FX3S Datasheet
Kit: FX3S RAID[1]-on-Chip Boot Disk Kit
Software Development Kit: EZ-USB FX3 SDK

Availability

Production: Now

[1] Redundant array of independent disks
[2] SD extended capacity
[3] Embedded Multimedia Card

EZ-USB CX3

MIPI[1] CSI-2 to USB 3.1 Gen 1 Bridge

Applications

Industrial, medical and machine vision cameras, 1080p full HD and 4K Ultra HD (UHD) cameras, document scanners, fingerprint scanners, game consoles, videoconferencing systems, notebook PCs, tablets and image acquisition systems

Features

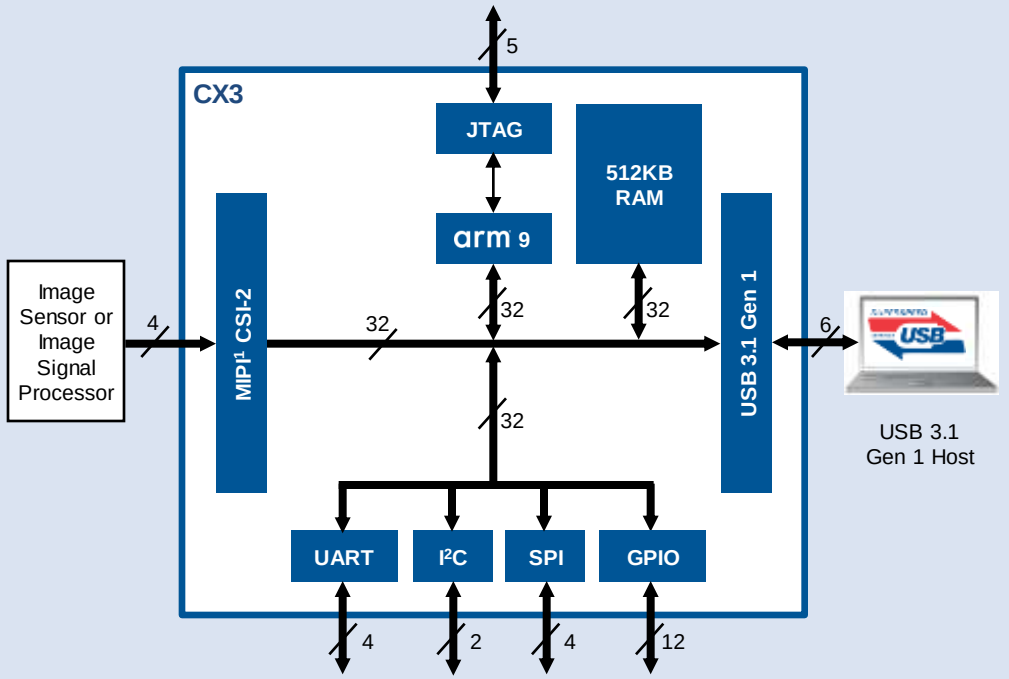
- **USB 3.1 Gen 1-Compliant Peripheral Controller**
  - Up to 32 USB endpoints
- **Fully Accessible 32-bit, 200-MHz Arm® 926EJ core**
  - 512KB of embedded SRAM for code space and buffers
- **Four-Lane MIPI[1] Camera Serial Interface v2.0 (CSI-2) Input**
  - Camera Control Interface (CCI) for image sensor configuration
  - Other peripheral interfaces such as I²C, UART, SPI, and 12 GPIOs
- **Supports Industry-Standard Video Data Formats**
  - RAW8/10/12/14[2], YUV422/444[3], RGB888/666/565[4]
- **Supports Uncompressed Streaming Video**
  - 4K UHD at 15 fps, 1080p at 30 fps, 720p at 60 fps
- **Packages**
  - 121-ball BGA (10 x 10 x 1.7 mm)

Collateral

Datasheet: CX3 Datasheet
Reference Design Kit: CX3 Reference Design Kit
Software Development Kit: EZ-USB FX3 SDK

[1] Mobile Industry Processor Interface
[2] Video format for raw video data
[3] Video format for luminance and chrominance components
[4] Video format for red, green and blue pixel components

CX3: MIPI[1] CSI-2 to USB 3.1 Gen 1 Bridge



Availability

Production: Now

EZ-USB GX3

USB 3.1 Gen 1 to GigE[1] Bridge

Applications

USB dongles, docking stations and port replicators, network printers and security cameras, ultrabooks and home gateways, game consoles and portable media players, DVRs, IP set-top boxes and IP TVs, and other embedded systems

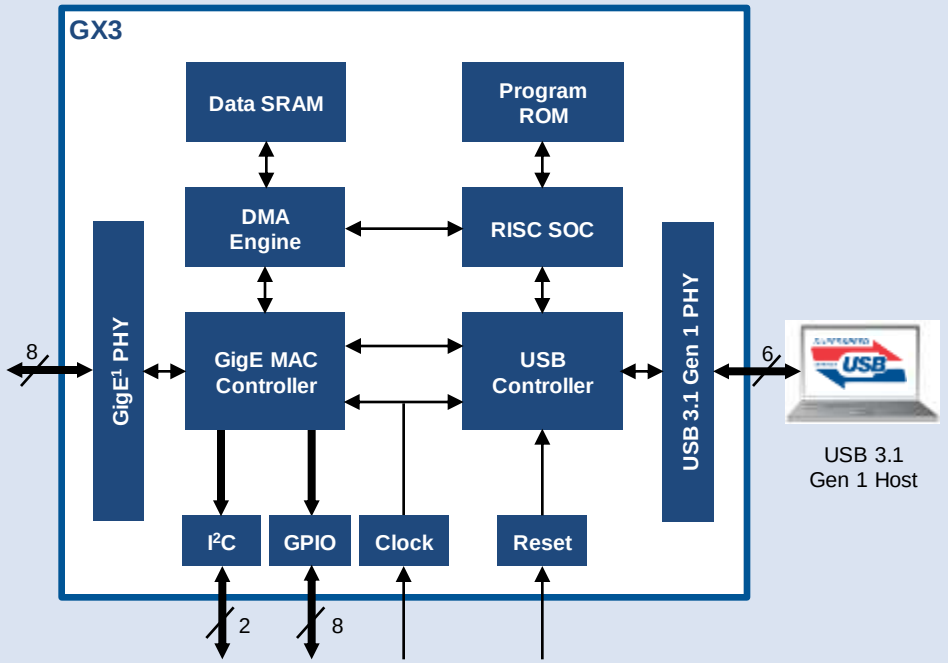
Features

- **One-Chip USB 3.1 Gen 1 to 10/100/1000M GigE Bridge**
  - Integrates USB 3.1 Gen 1 PHY and GigE PHY
  - Integrates USB 3.1 Gen 1 Controller and GigE MAC[2]
  - Needs only a 25-MHz crystal to drive both USB and GigE1 PHY
- **IEEE 802.3az[3] Support for Low-Power Idle State**
  - Supports dynamic cable length and power adjustment
  - Offers multiple power management wake-on-LAN[4] features
- **Supports Optional EEPROM to Store USB Descriptors**
  - Integrates on-chip power-on-reset (POR) circuitry
- **Packages**
  - 68-QFN (8 x 8 x 0.85 mm)

Collateral

Datasheet: GX3 Datasheet
Reference Design Kit: GX3 Reference Design Kit
Software & Drivers: GX3 Drivers

GX3: USB 3.1 Gen 1 to GigE[1] Bridge



Availability

Production: Now

[1] Gigabit Ethernet
[2] Media access controller that provides the address to an Ethernet node
[3] A new-energy efficient Ethernet standard
[4] An Ethernet standard that allows a computer to be turned on by a network message

EZ-USB HX3

USB 3.1 Gen 1 Hub

Applications

Docking stations for notebook PCs and tablets, PC motherboards , servers, televisions and monitors, retail hub boxes, printers and scanners, set-top boxes, home gateways, routers and game consoles

Features

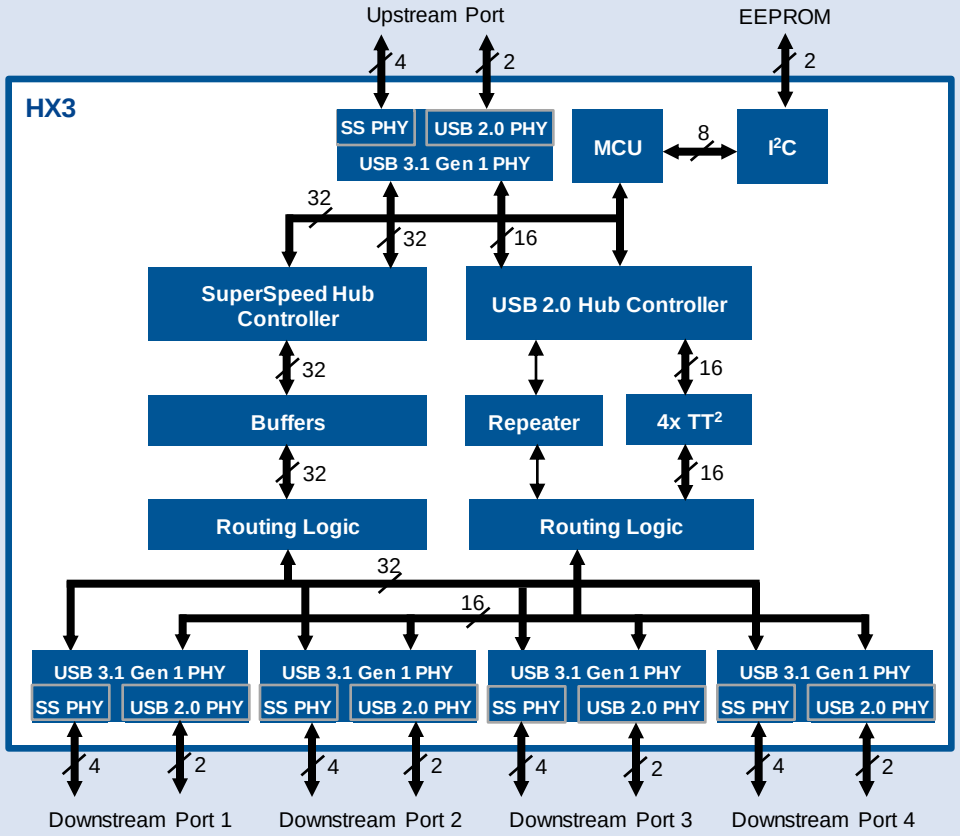
- **USB 3.1 Gen 1-Compliant Four-Port Hub Controller**
  - USB-IF certified (Test ID: 330000047)
  - WHQL certified for Windows 7, Window 8, Windows 8.1
- **Shared Link™**
  - Supports simultaneous USB 2.0 and USB SuperSpeed (SS) devices on the same port
- **Ghost Charge™**
  - Enables USB charging while the hub is disconnected from a USB Host
- **Charging Standard support**
  - USB-IF Battery Charging (BC) v1.2, Apple Charging Standard
  - Charging an OTG Host in an ACA-Dock
- **Programming of External EEPROM via USB**
- **Configurable USB SS and USB 2.0 PHY (drives 11" trace)**
- **Packages**
  - 68-QFN (8 x 8 x 1.0 mm), 88-QFN (10 x 10 x 1.0 mm), 100-BGA (6 x 6 x 1.0 mm)

Collateral

Datasheet:	HX3 Datasheet
Kit:	CY4609, CY4603, CY4613
Configuration Utility:	Blaster Plus[1]
App Notes:	HX3 Hardware Design Guide (AN91378)

[1] A Cypress GUI-based PC application for setting HX3 configuration parameters [2] Transaction translator

HX3: USB 3.1 Gen 1 Hub



Availability

Production: Now

EZ-USB HX3C

USB 3.1 Gen 1 Type-C PD Hub

Applications

USB Type-C charging hubs, adapters and accessories, docking stations for notebook PCs and tablets, televisions and monitors, PC motherboards and servers, set-top boxes, home gateways and routers

Features

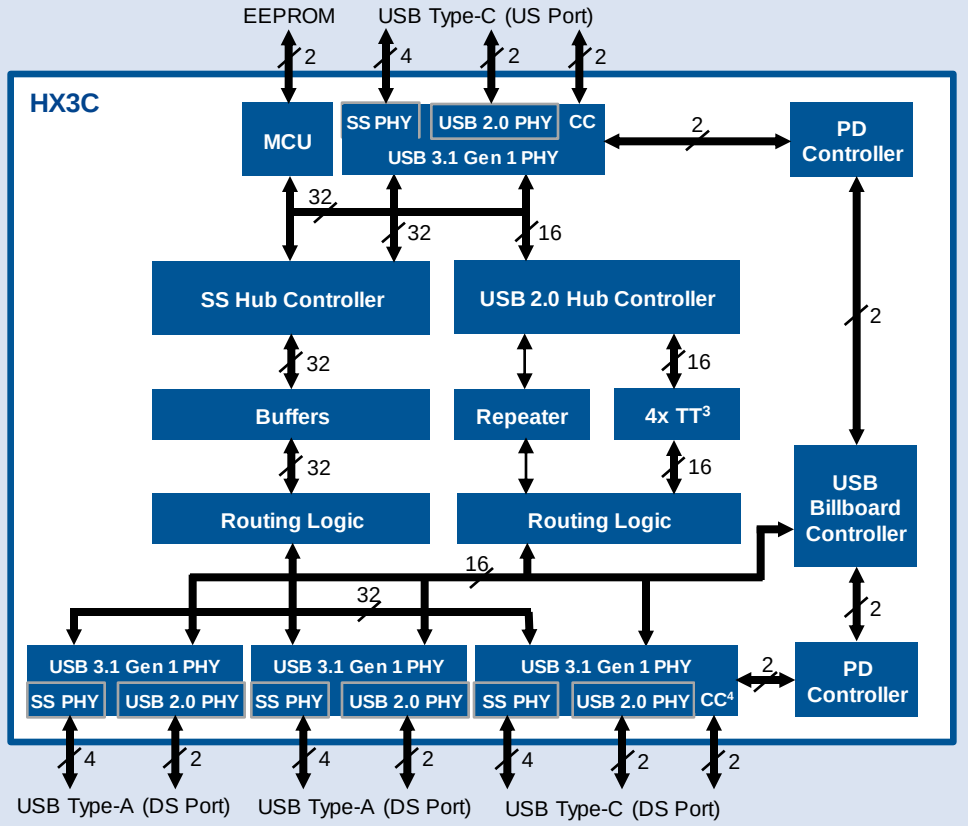
- **USB 3.1 Gen 1-Compliant Hub Controller with Type-C and PD**
  - Upstream (US): Type-C, Downstream (DS): 1 Type-C and 2 Type-A ports
- **Integrated Type-C Transceivers, Supporting Two Type-C Ports**
  - Integrated termination resistors (R_P and R_D)[1]
  - Integrated USB Billboard Controller[2]
- **Charging Support**
  - USB PD, BC v1.2, Apple Charging Standard
  - PD policy engine configures power profiles dynamically
- **Ghost Charge™**
  - Charging DS without US connection
- **Firmware Upgradable Over USB**
- **System-Level ESD on Configuration Channel (CC) Pins**
  - 8 kV Contact, 15 kV Air
- **Configurable USB SS and USB 2.0 PHY (drives 11" trace)**
- **Packages**
  - 121-ball BGA (10 mm x 100 mm, 0.8 mm ball-pitch)

Collateral

Datasheet: HX3C Datasheet

Reference Design: HX3C Type-C Monitor/Dock Reference Design

HX3C: USB 3.1 Gen 1 Type-C PD Hub



Availability

Production: Now

[5] Termination resistors: R_P read as a DFP, R_D as a UFP [2] A USB Device controller that is used to implement the USB Billboard Device Class Informs the USB Host of the supported Alternate Modes as well as any failures [3] Transaction Translator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