CardputerZero

SKU:C154/C154-B/C155/C155-B





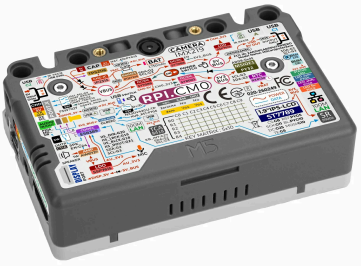


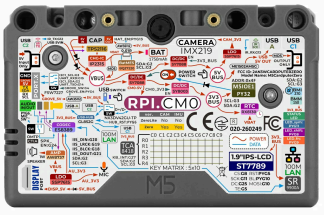


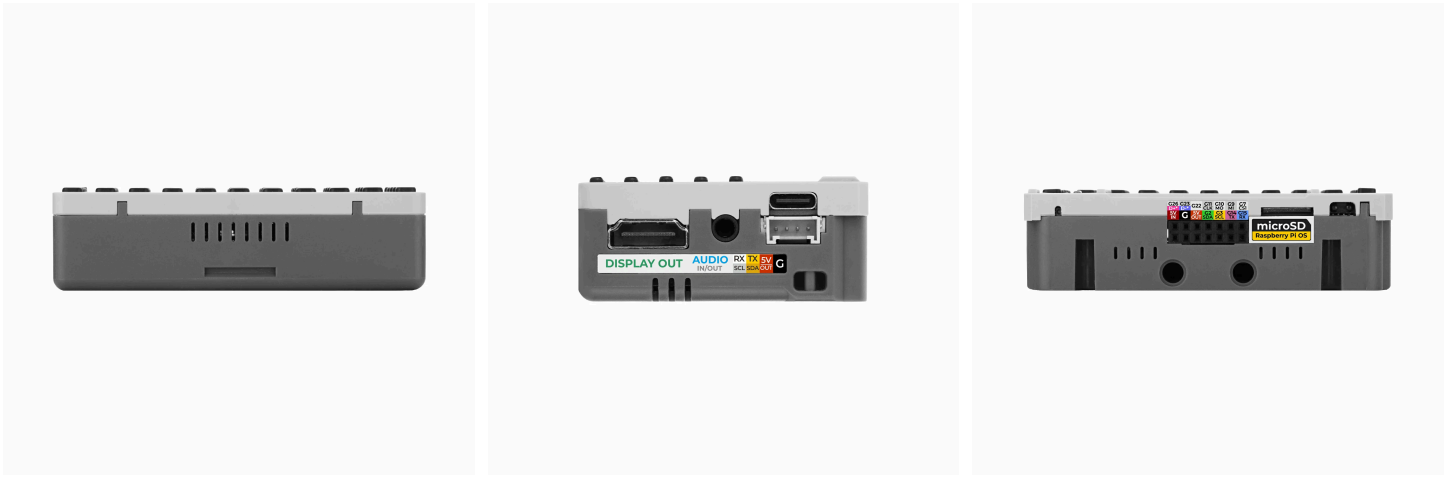














Description

CardputerZero is a pocket-sized **Linux** personal computer designed for makers and developers, built on the **Raspberry Pi CM0** platform. It integrates a quad-core Cortex-A53 processor, a 1.9-inch display, a 46-key matrix keyboard, an 8MP camera, an IMU, and an RTC, delivering a near-complete development terminal experience in a handheld form factor. It also features Wi-Fi, Bluetooth, Ethernet, microSD, a switchable Host/Slave USB architecture, and modular expansion capabilities via I2C/UART/SPI/GPIO. Combined with audio/video codec support and a battery-powered design, it enables an all-in-one solution for on-the-go development, edge data collection, and multimedia interaction. Typical use cases include: mobile penetration testing and operations terminals, IoT device debugging and field deployment, portable AI/vision prototyping, maker project development, and outdoor data collection with rapid human-machine interaction.

Tutorial



CardputerZero Guide

Learn how to set up CardputerZero, use its keyboard, and operate the built-in apps.



CardputerZero Hub & Developer Guide

This website primarily introduces the CardputerZero app store and provides services such as app discovery and developer documentation.

Features

- Core Performance:
  - Raspberry Pi Compute Module 0 (CM0)
  - RP3A0 (BCM2837), Quad-core Cortex-A53 @ 1 GHz
  - 512 MB LPDDR2
- Human-Machine Interface:
  - 1.9" LCD, resolution 320 x 170
  - 46-key matrix keyboard
  - IMX219 8MP camera
  - BMI270 IMU + BMM150 magnetometer
  - IR transmitter + receiver
- Network Connectivity:
  - 2.4 GHz Wi-Fi 802.11 b/g/n
  - 10/100M Ethernet
- USB Expansion:
  - Supports Host / Slave mode switching
  - 1x USB-A 2.0
  - 2x USB Type-C 2.0, with USB OTG support on the right-side port
- External Expansion:
  - 1x microSD card slot
  - 1x HY2.0-4P port with switchable I2C / UART
  - EXT 2.54-14P expansion bus with SPI, UART, I2C, USB, and GPIO support
- Audio & Video:
  - ES8389 audio codec
  - 1x MEMS microphone
  - 1W @ 8Ω speaker
  - 3.5mm TRRS audio input/output jack
  - Supports 1080P 30fps video output and codec
- Power Management:
  - Built-in DC 3.7V@1750mAh lithium battery with integrated NTC
  - BQ27220YZFR battery gauge
  - RX8130CE RTC

Includes

Product Note

The standard CardputerZero includes a 32GB microSD card, whereas the CardputerZero-Lite does not include a microSD card and requires one to be purchased separately.

CardputerZero (SKU:C154/C154-B)

- 1 x CardputerZero
- 1 x 32GB microSD Card

CardputerZero-Lite (SKU:C155/C155-B)

- 1 x CardputerZero-Lite

Applications

- Operations terminal
- IoT device debugging
- Portable AI / vision prototyping
- Maker project development

Specifications

Specification	Parameter
Core	Raspberry Pi Compute Module 0 (CM0)
CPU	RP3A0 (BCM2837), Quad-Core Cortex-A53 @ 1 GHz, ARMv8-A (aarch64)
RAM	512 MB LPDDR2
Storage	microSD
Wi-Fi	2.4 GHz Wi-Fi 802.11 b/g/n
Ethernet	10/100M Ethernet, SR9900A USB 2.0 to Ethernet chip
Display	1.9" LCD @ ST7789v3, resolution 320 x 170
Camera	IMX219 CSI 4-Lane 8MP (3280 x 2464)
IMU & Magnetometer	BMI270 + BMM150
RTC	RX8130CE
Infrared	IR transmitter + receiver
Keyboard	46-key matrix keyboard
Audio Codec	ES8389
Microphone	1x MEMS microphone
Speaker	AW8737A speaker amplifier + 1W @ 8Ω speaker
Audio Interface	3.5mm TRRS audio input/output jack, recommended for 35Ω impedance headphones
Video Output	1x digital HD audio/video output, supports 1080P 30fps
Video Codec	H.264 / MPEG-4 1080P 30fps decoding, H.264 1080P 30fps encoding
Expansion Interface	EXT 2.54-14P expansion bus, 1x HY2.0-4P port (switchable I2C / UART, maximum 5V output current < 500mA)
USB Ports	1x USB-A 2.0, 2x USB Type-C 2.0, supports Host / Slave switching and USB OTG
USB Hub Chip	GL852G-OHY60 USB 2.0 Hub
Battery Gauge	BQ27220YZFR
Idle Power Consumption	2.5W
Built-in Battery	DC 3.7V @ 1750mAh with integrated NTC
Power Supply	Recommended 5V @ 2A for power/charging
Product Size	84.0 x 54.0 x 23.1mm
Product Weight	95.0g
Package Size	100.0 x 61.0 x 27.5mm
Gross Weight	122.0g

Learn

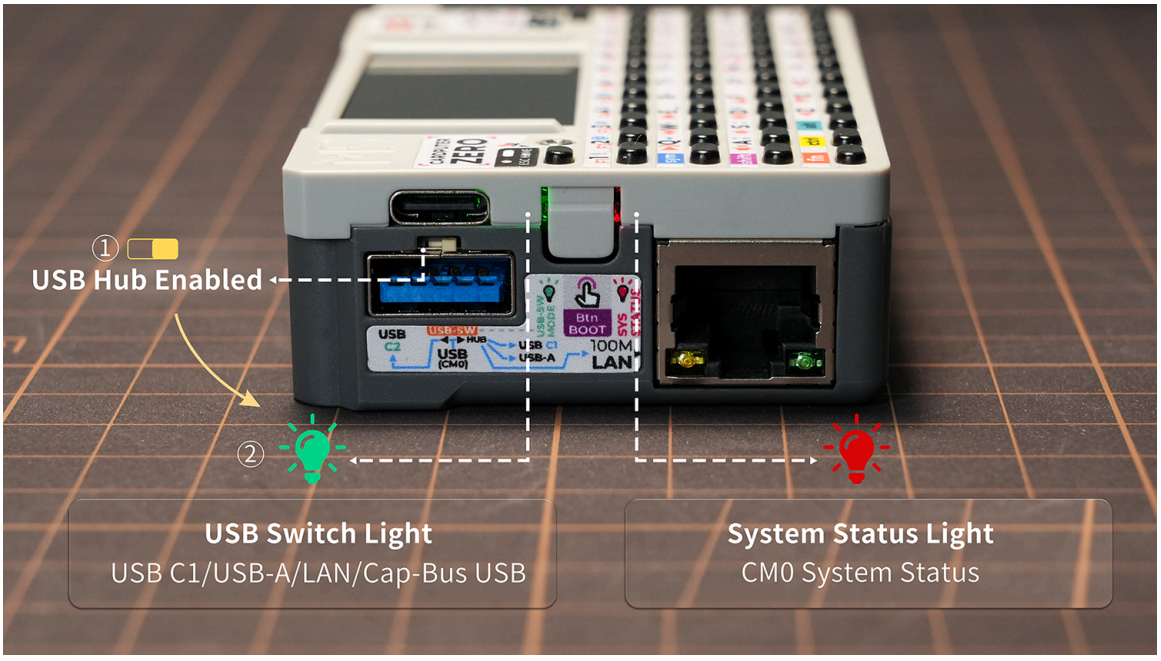
Power and Charging

- Power on: Slide the power switch to the right. The first startup may take longer than usual.
- Power off: Slide the power switch to the left. The system completes the shutdown process before cutting off power. After shutting down through software, such as the command line, you still need to slide the switch to the left to disconnect power.
- Charging: Charge through USB-C2. Charging is available whether the device is on or off and regardless of the USB Switch position. The indicator is red while charging and turns green when fully charged.



Status Indicators

- Green indicator: Stays on when the USB Switch is set to USB Hub (right).
- Red indicator: Mirrors the yellow status LED on the internal CM0 Module and follows the same behavior. It indicates storage read/write activity and boot errors. For details, see CM0 Datasheet §2.8 Status LED and Raspberry Pi LED Warning Flash Codes.



Cap-Bus

CardputerZero provides a Cap expansion interface (EXT 2.54-14P) on the top of the device. The pins marked `D+*` and `D-*` support function switching. They connect to the corresponding GPIOs by default and can be switched to USB functionality through software configuration as needed.



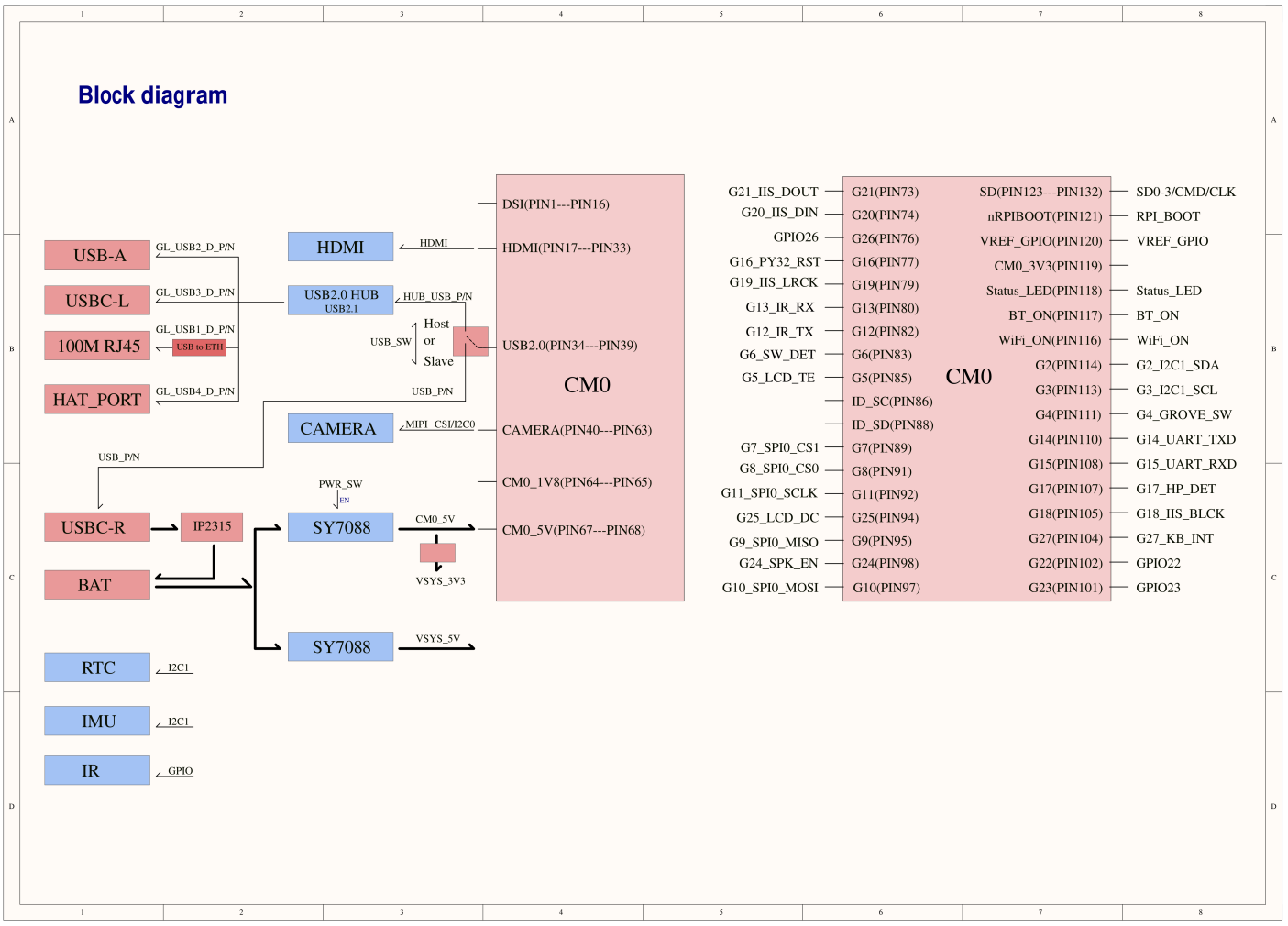
Cap Expansion Notice

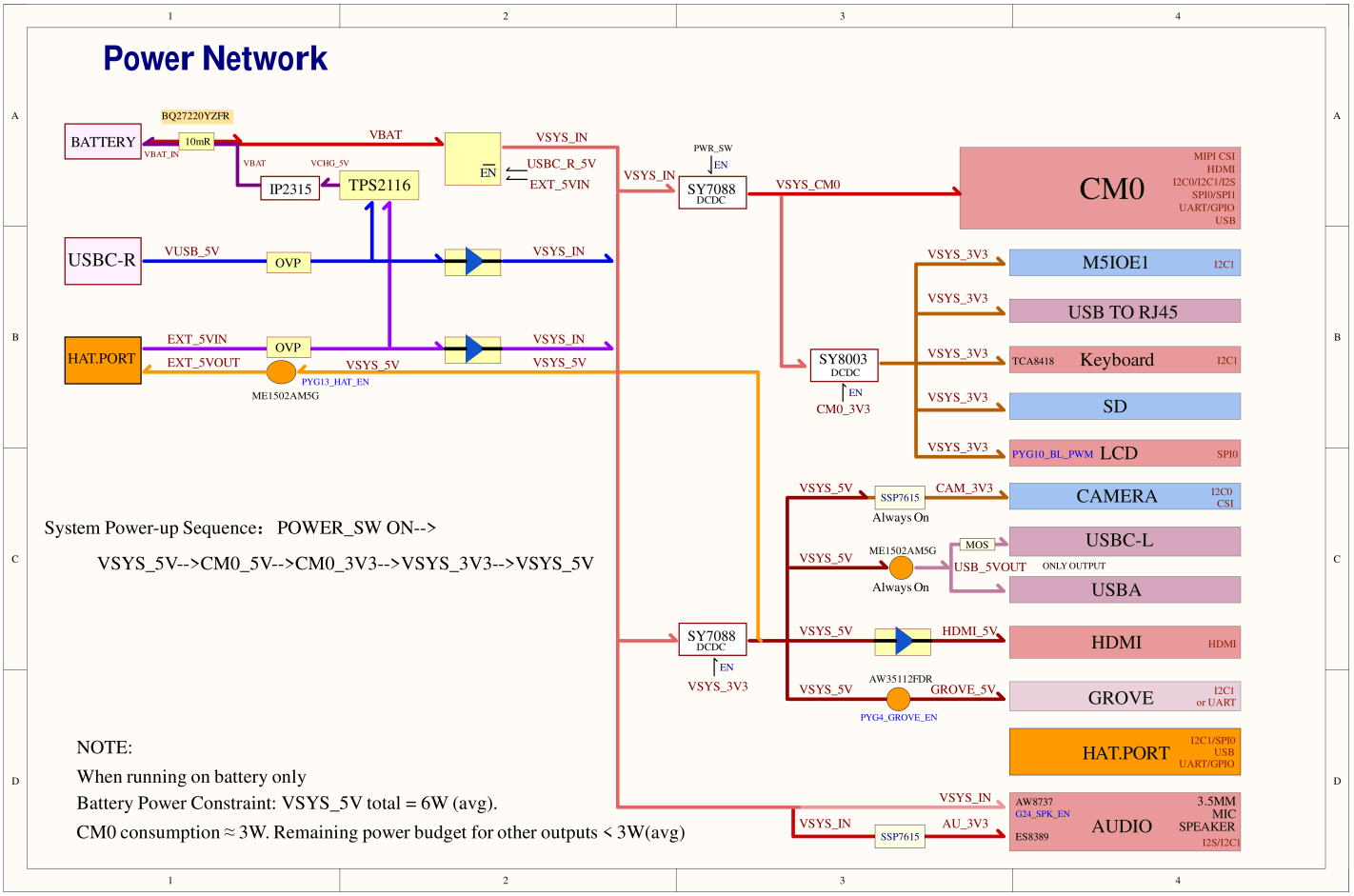
When **CardputerZero** is used with the **Cap series products**, **hot-swapping is not supported**. Hot-swapping may cause the device to malfunction. Power off the device before inserting or removing a Cap module.

For more information on using CardputerZero, see CardputerZero Guide.

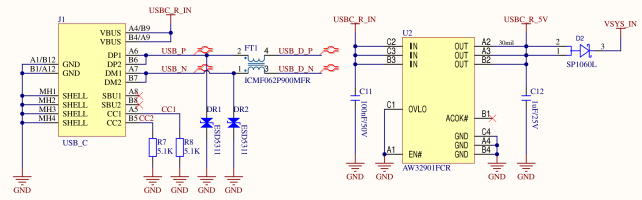
Schematics

- CardputerZero Schematics PDF

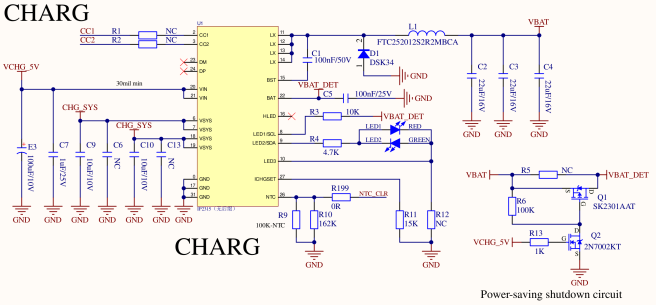

Block diagram
USB-A
USBC-L
100M RJ45
HAT_PORT
GL_USB2_D_P/N
GL_USB3_D_P/N
GL_USB1_D_P/N
USB to ETH
GL_USB4_D_P/N
HDMI
HDMI
USB2.0 HUB
USB2.1
HUB_USB_P/N
USB_SW
Host
or
Slave
USB_P/N
CAMERA
MIPI_CSI/I2C0
USB_P/N
USBC-R
IP2315
BAT
PWR_SW
EN
SY7088
CM0_5V
VSYS_3V3
SY7088
VSYS_5V
RTC
I2C1
IMU
I2C1
IR
GPIO
DSI(PIN1---PIN16)
HDMI(PIN17---PIN33)
USB2.0(PIN34---PIN39)
CM0
CAMERA(PIN40---PIN63)
CM0_1V8(PIN64---PIN65)
CM0_5V(PIN67---PIN68)
G21_IIS_DOUT
G20_IIS_DIN
GPIO26
G16_PY32_RST
G19_IIS_LRCK
G13_IR_RX
G12_IR_TX
G6_SW_DET
G5_LCD_TE
G7_SPI0_CS1
G8_SPI0_CS0
G11_SPI0_SCLK
G25_LCD_DC
G9_SPI0_MISO
G24_SPK_EN
G10_SPI0_MOSI
G21(PIN73)
G20(PIN74)
G26(PIN76)
G16(PIN77)
G19(PIN79)
G13(PIN80)
G12(PIN82)
G6(PIN83)
G5(PIN85)
ID_SC(PIN86)
ID_SD(PIN88)
G7(PIN89)
G8(PIN91)
G11(PIN92)
G25(PIN94)
G9(PIN95)
G24(PIN98)
G10(PIN97)
CM0
SD(PIN123---PIN132)
nRPIBOOT(PIN121)
VREF_GPIO(PIN120)
CM0_3V3(PIN119)
Status_LED(PIN118)
BT_ON(PIN117)
WiFi_ON(PIN116)
G2(PIN114)
G3(PIN113)
G4(PIN111)
G14(PIN110)
G15(PIN108)
G17(PIN107)
G18(PIN105)
G27(PIN104)
G22(PIN102)
G23(PIN101)
SD0-3/CMD/CLK
RPI_BOOT
VREF_GPIO
Status_LED
BT_ON
WiFi_ON
G2_I2C1_SDA
G3_I2C1_SCL
G4_GROVE_SW
G14_UART_TXD
G15_UART_RXD
G17_HP_DET
G18_IIS_BLCK
G27_KB_INT
GPIO22
GPIO23


Power Network
BQ27220YZFR
BATTERY
10mR
VBAT_IN
VBAT
IP2315
VCHG_5V
TPS2116
VBAT
VSYS_IN
EN
USBC_R_5V
EXT_5VIN
USBC-R
VUSB_5V
OVP
VSYS_IN
HAT.PORT
EXT_5VIN
EXT_5VOUT
OVP
VSYS_5V
PYG13_HAT_EN
ME1502AM5G
VSYS_IN
VSYS_5V
VSYS_IN
PWR_SW
EN
SY7088
DCDC
VSYS_CM0
CM0
MIPI CSI
HDMI
I2C0/I2C1/I2S
SPI0/SPI1
UART/GPIO
USB
SY8003
DCDC
EN
CM0_3V3
VSYS_3V3
M5IOE1
I2C1
USB TO RJ45
TCA8418
Keyboard
I2C1
SD
PYG10_BL_PWM
LCD
SPI0
SSP7615
CAM_3V3
Always On
CAMERA
I2C0
CSI
ME1502AM5G
MOS
USB_5VOUT
ONLY OUTPUT
Always On
USBC-L
USBA
SY7088
DCDC
EN
VSYS_3V3
HDMI_5V
HDMI
HDMI
AW35112FDR
GROVE_5V
PYG4_GROVE_EN
GROVE
I2C1
or UART
HAT.PORT
I2C1/SPI0
USB
UART/GPIO
AW8737
G24_SPK_EN
ES8389
AUDIO
3.5MM
MIC
SPEAKER
I2S/I2C1
SSP7615
AU_3V3
System Power-up Sequence：POWER_SW ON-->
VSYS_5V-->CM0_5V-->CM0_3V3-->VSYS_3V3-->VSYS_5V
NOTE:
When running on battery only
Battery Power Constraint: VSYS_5V total = 6W (avg).
CM0 consumption ≈ 3W. Remaining power budget for other outputs < 3W(avg)

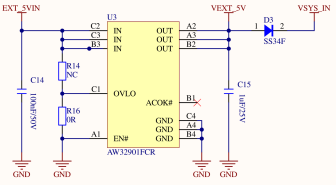
USB IN



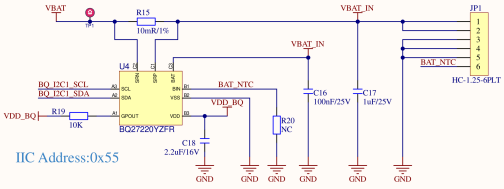
CHARG



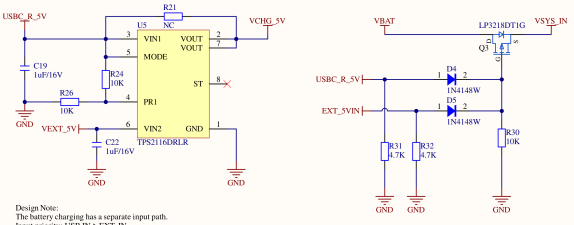
EXT. IN



BATTERY

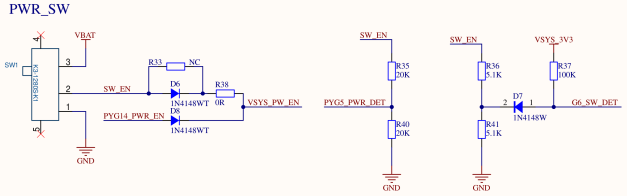


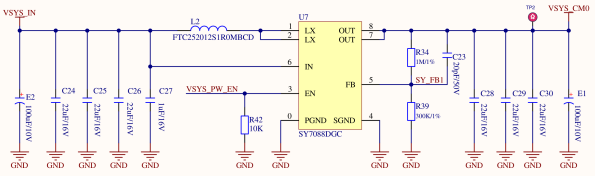
PATH Switch



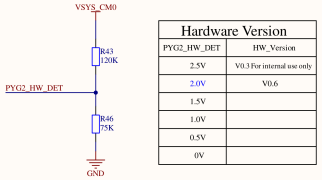
SWITCH

PWR_SW

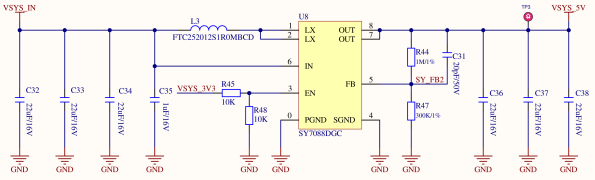




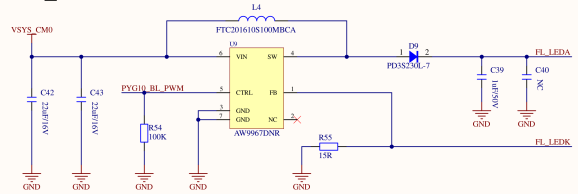
Hardware Version

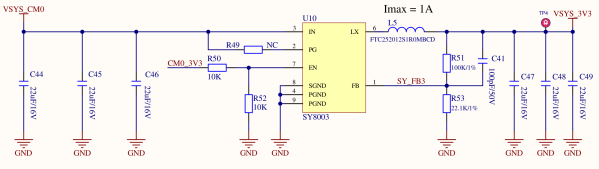


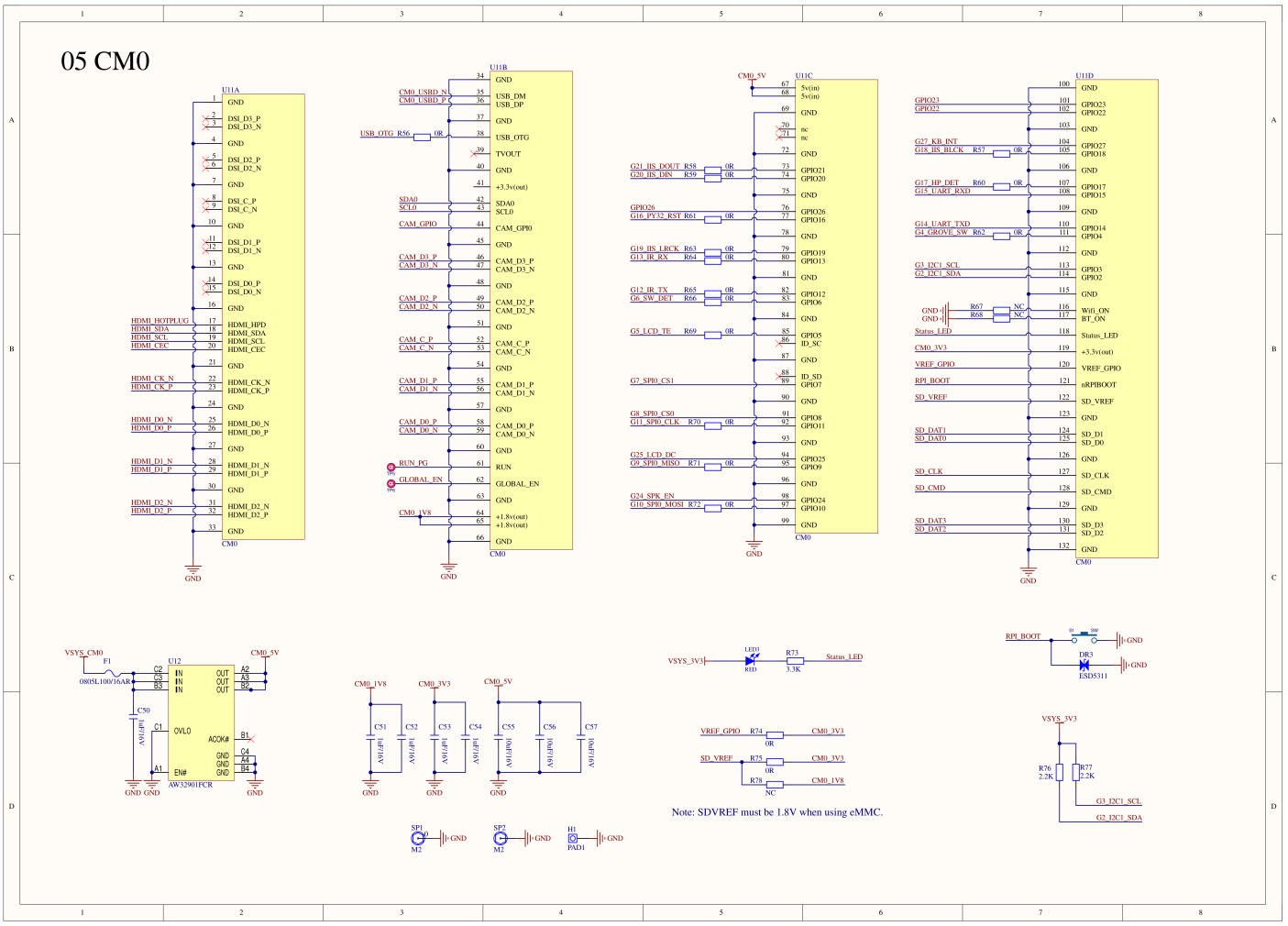
Hardware Version	
PYG2_HW_DET	HW_Version
2.5V	V0.3 For internal use only
2.0V	V0.6
1.5V	
1.0V	
0.5V	
0V	

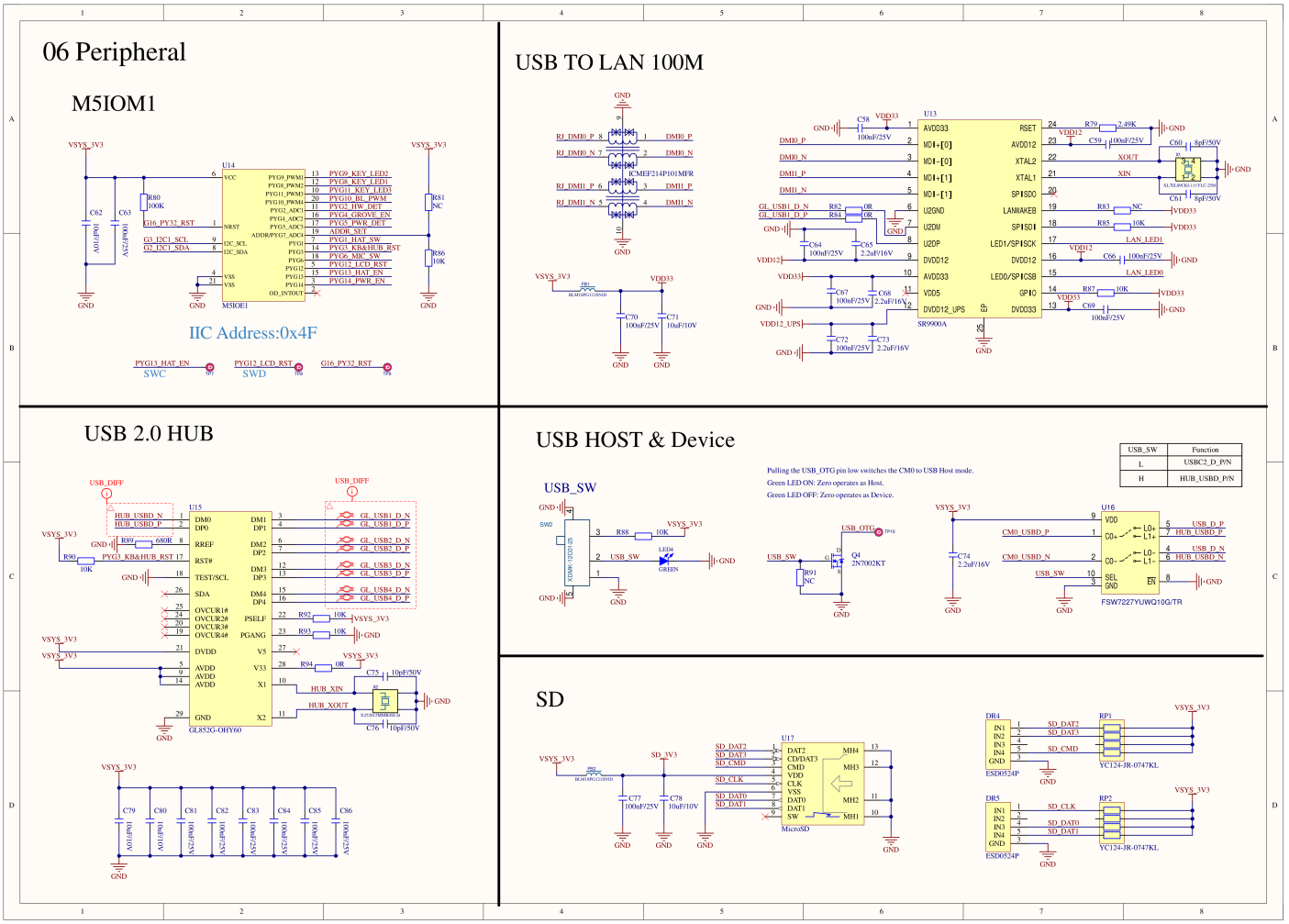


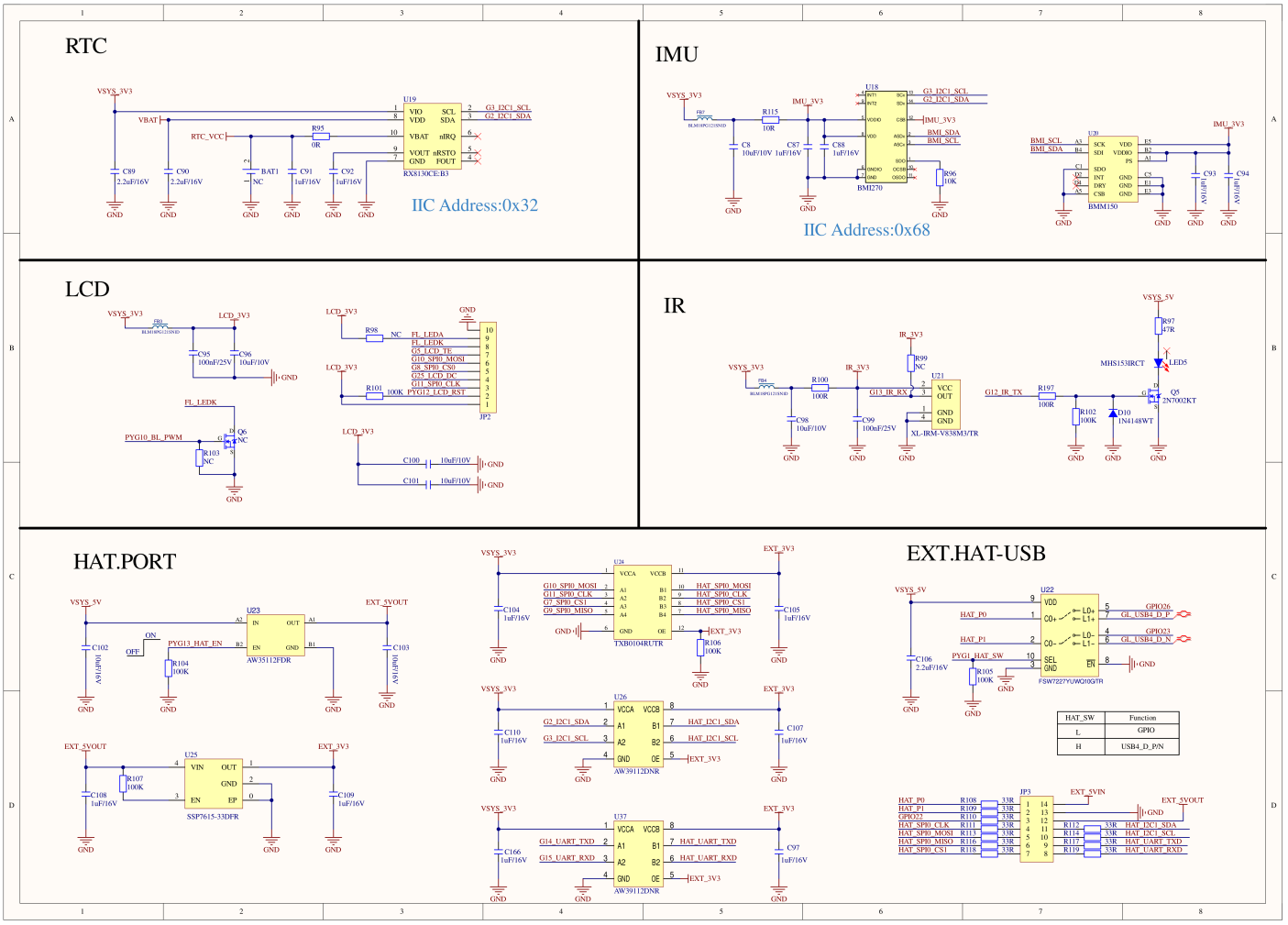
LCD_BL

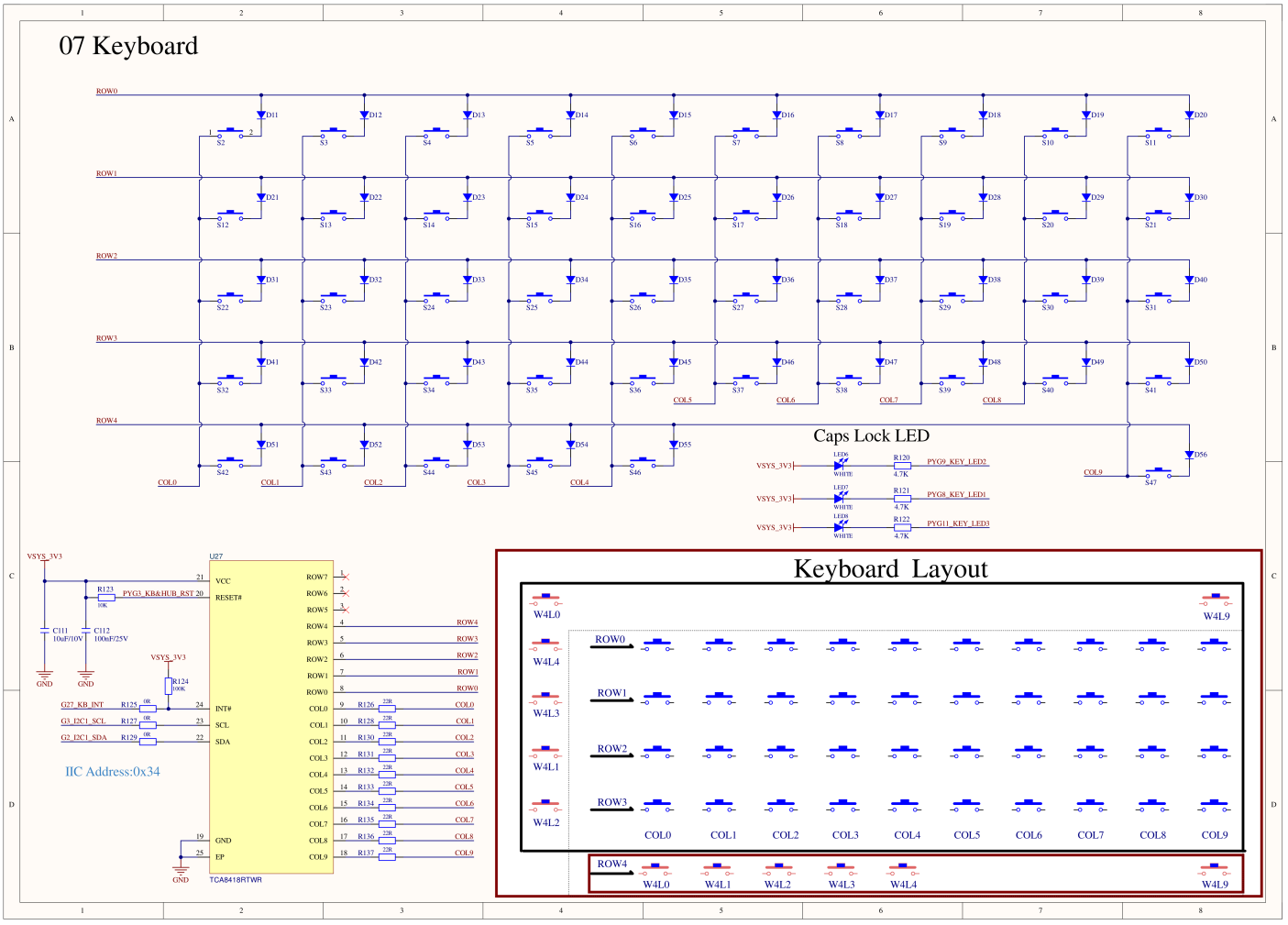




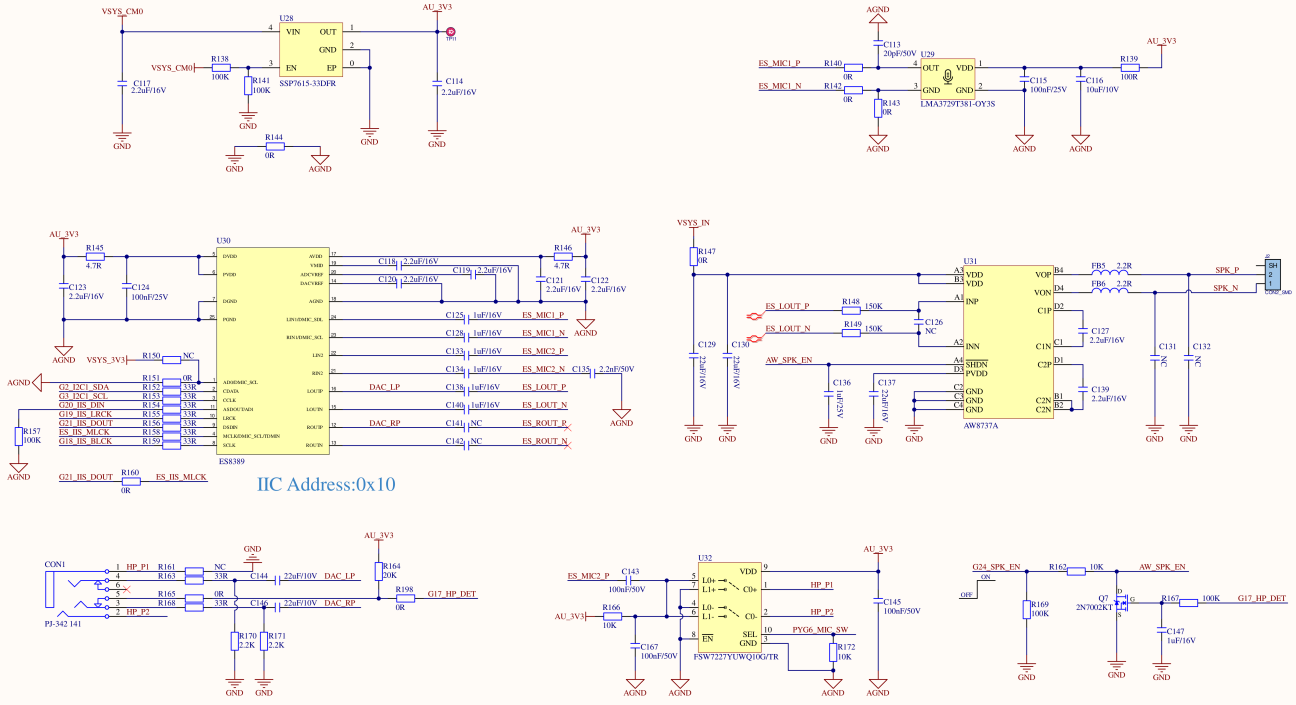

05 CM0
U11A
U11B
U11C
U11D
U12
AW32901FCR
0805L100/16AR
Note: SDVREF must be 1.8V when using eMMC.


06 Peripheral
M5IOM1
U14
M5IOE1
IIC Address:0x4F
SWC
SWD
USB TO LAN 100M
U13
ICMEF214P101MFR
SR9900A
USB 2.0 HUB
U15
GL852G-OHY60
USB HOST & Device
USB_SW
USB_OTG
FSW7227YUWQ10G/TR
SD
MicroSD
ESD0524P
YC124-JR-0747KL

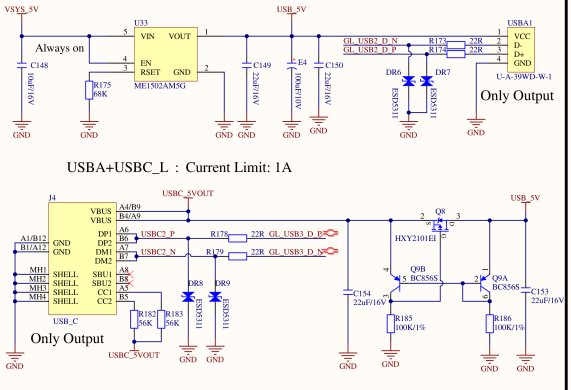

RTC
IIC Address:0x32
IMU
IIC Address:0x68
LCD
IR
HAT.PORT
EXT.HAT-USB


07 Keyboard
Caps Lock LED
IIC Address:0x34
Keyboard Layout

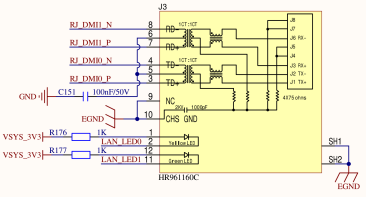
AUDIO CODEC



USBC_L

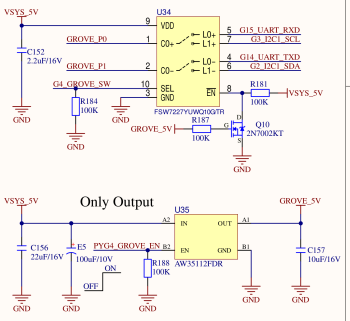


RJ45

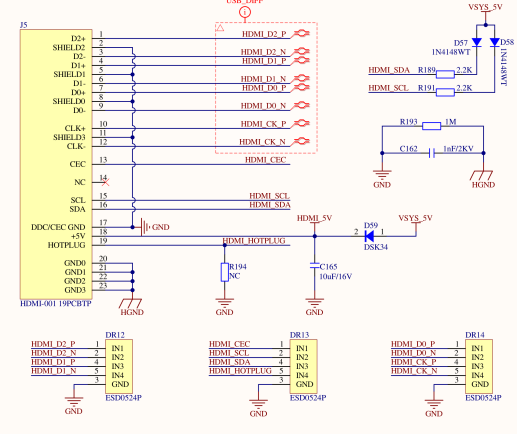


GROVE

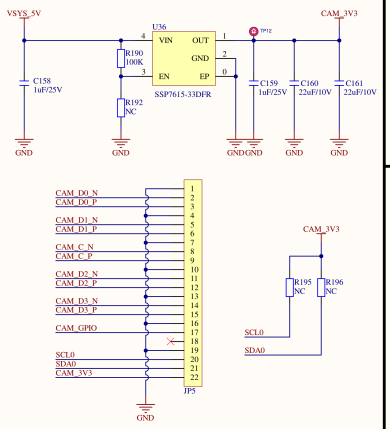
GROVE_SW	Function
L	UART
H	I2C1



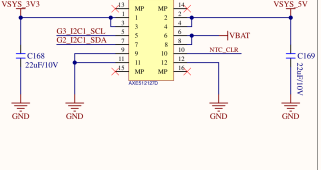
HDMI



CAMERA



HAT_BTB



PinMap

Display

CM0	G10	G11	G25	G8	G5
ST7789v3	MOSI	SCLK	DC	CS	TE

ST7789v3	LCD_RST	BL
M5IOE1	PYG12_LCD_RST	PYG10_BL_PWM

The display reset is controlled by `PYG12_LCD_RST` on the `M5IOE1` I/O expander, while `PYG10_BL_PWM` controls the display backlight.

Audio

CM0	G20_I2S_DIN	G19_I2S_LRCK	G18_I2S_BLCK	G21_I2S_DOUT	G2_I2C1_SDA	G3_I2C1_SCL
ES8389(0x10)	DOUT	LRCK	BCLK	MCLK/DIN	SDA	SCL

CM0	G24
AW8737A	EN

CM0	G17
3.5mm Headphone	HP_DET

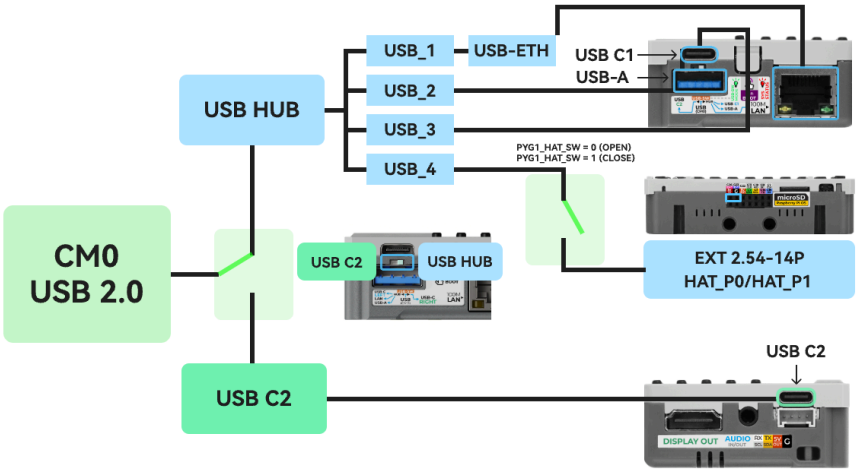
The 3.5mm audio input/output jack supports plug detection. When `HP_DET` detects a headphone plug, the system automatically switches the audio output route. When no headphone is connected, the **AW8737A** speaker amplifier is enabled. The amplifier enable signal is controlled by **GPIO G24 on the CM0**.

USB 2.0

CardputerZero expands the CM0's internal USB interface resources via a USB Hub, enabling multiple USB ports and an Ethernet interface.

A physical Host / Slave toggle switch is located on the left side of the device. When in Slave mode, the USB Hub chip is disconnected; in this state, the left-side USB-A, USB Type-C ports, the HAT-P0/P1 USB interface on the top EXT 2.54-14P expansion bus, and the Ethernet interface will be unavailable.

- Slave mode:
  - CM0 USB is connected to the USB Type-C port on the right side of the device.
- Host mode:
  - CM0 USB is connected to the internal USB Hub, which further expands into 4 USB ports.
  - USB1 from the Hub is routed through a USB-ETH chip to provide Ethernet functionality.
  - USB2 ~ 4 from the Hub are used for the USB-A port, USB Type-C port, and the HAT-P0/P1 USB interface on the top EXT 2.54-14P expansion bus, respectively.



HMI

CM0	G2_I2C1_SDA	G3_I2C1_SCL	G27
Keyboard - TCA8418RTWR (0x34)	SDA	SCL	KB_INT
IMU - BMI270 (0x68)	SDA	SCL	
RTC - RX8130CE (0x32)	SDA	SCL	

BMI270	BMI_SDA	BMI_SCL
BMM150 (0x10)	SDA	SCL

Power Control

CM0	G4
GROVE_FUNC_SW	I2C/UART_SW

CM0	G6
SWITCH	SW_DET

`G6_SW_DET` is used to read the switch detection signal.

M5IOE1

CM0	G2_I2C1_SDA	G3_I2C1_SCL	G16
M5IOE1 (0x4F)	SDA	SCL	NRST

- Power Status

M5IOE1	PYG2	PYG4	PYG5	PYG14
POWER	HW_DET	GROVE_EN	PWR_DET	PWR_EN

- Peripheral Reset

M5IOE1	PYG3	PYG6
KEYBOARD & USB_HUB	KB_HUB_RST	
MIC		MIC_SW

`PYG3_KB_HUB_RST` is the shared reset control signal for the `TCA8418RTWR` keyboard controller and the `GL852G-OHY60` USB Hub.

`PYG6_MIC_SW` switches the microphone channel of the 3.5mm TRRS interface between the `CTIA / OMTP` standards.

PYG6_MIC_SW	Standard
LOW	CTIA
HIGH	OMTP

- HAT P0/P1 Function Switch

M5IOE1	PYG1
SW	PYG1_HAT_SW

M5IOE1	PYG13
HAT_EN	PYG13_HAT_EN

`PYG13_HAT_EN` controls the HAT interface enable state.

PYG13_HAT_EN	HAT PORT POWER
LOW	OFF
HIGH	ON

- CAPS LOCKS Indicator LEDs

M5IOE1	PYG8	PYG9	PYG11
KEY_LED1	SHIFT_LED		
KEY_LED2		FN_LED	
KEY_LED3			SYM_LED

IR TX & RX

CM0	G12	G13
IR	IR_TX	IR_RX

HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
UART / I2C	GND	5V	G14_UART_TXD / G2_I2C1_SDA	G15_UART_RXD / G3_I2C1_SCL

The HY2.0-4P interface function is switched via `G4_I2C/UART_SW` on the `CM0`. The default function is `UART`.

G4_I2C/UART_SW	GROVE FUNC
LOW	UART
HIGH	I2C1

The 5V output on the interface is enabled via `PYG4_GROVE_EN` on the `M5IOE1`. (Maximum supply current < 500mA)

EXT 2.54-14P

FUNC	PIN	LEFT	RIGHT	PIN	FUNC
USB4_D_P / G26	HAT_P0	1	2	5VIN	
USB4_D_N / G23	HAT_P1	3	4	GND	
	G22	5	6	5VOUT	
SPI0_CLK	G11	7	8	G2	I2C1_SDA
SPI0_MOSI	G10	9	10	G3	I2C1_SCL
SPI0_MISO	G9	11	12	G15	UART_RXD
SPI0_CS1	G7	13	14	G14	UART_TXD

The `PYG1_HAT_SW` pin on the `M5IOE1` I/O expander switches the `HAT_P0` and `HAT_P1` pins between `USB / GPIO` functions. The default function is `GPIO`.

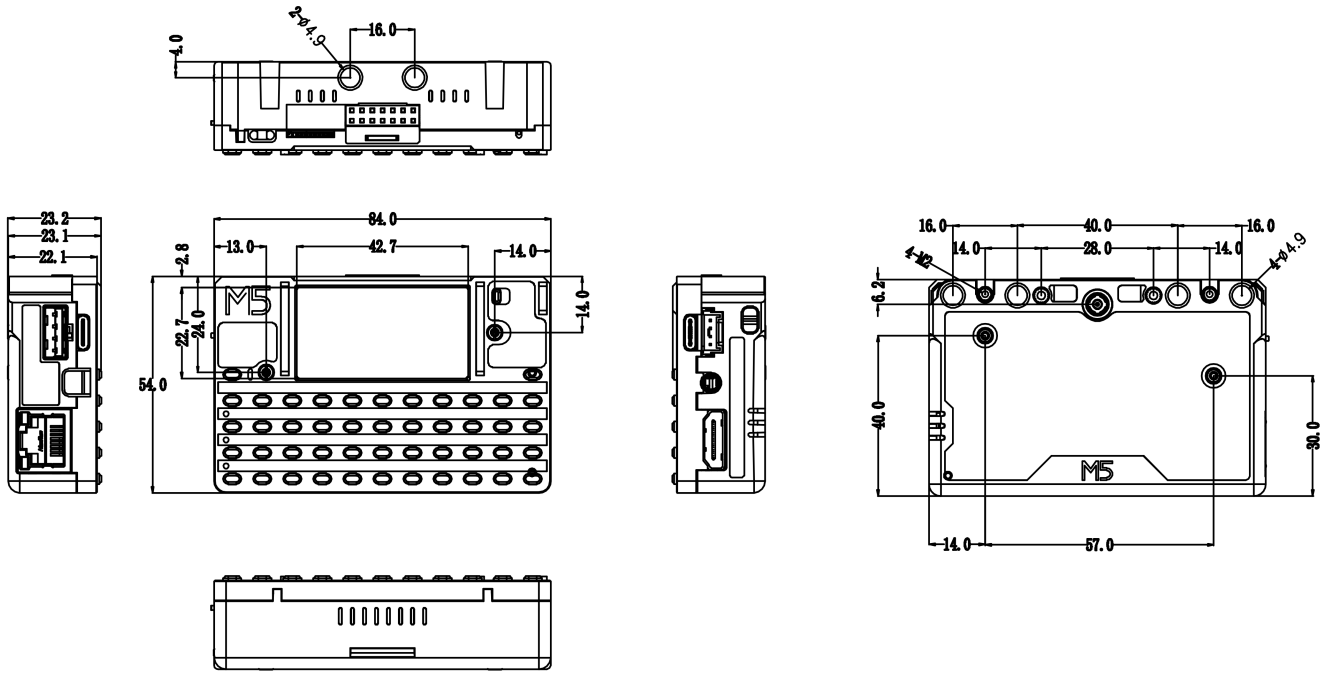
PYG1_HAT_SW	EXT HAT_P0/P1 FUNC
LOW	GPIO26 / GPIO23
HIGH	USB Hub - USB4

Appearance Stickers

- CardputerZero Sticker Design Files CDR

Model Size

- CardputerZero Model Size PDF



Structure

- CardputerZero Structure Files

Datasheets

- Raspberry Pi Compute Module Zero Datasheet
- Raspberry Pi Compute Module Zero Product Page
- RP3A0 Processor

Softwares

Guides

- CardputerZero Guide
- CardputerZero Image Flashing
- CardputerZero ADB Connection and Debugging
- CardputerZero Hub & Developer Guide
- CardputerZero Application Development Template

Product Comparison

Product Compare		
	CardputerZero	**CardputerZero-Lite**
Core	Raspberry Pi CM0	Raspberry Pi CM0
Wi-Fi & BT	✅	✅
IR Transmitter + Receiver	✅	✅
8MP Camera	✅	❌
IMU BMI270 + BMM150	✅	❌
Includes 32GB microSD	✅	❌