

Raspberry Pi

Compute Module 4

A Raspberry Pi for deeply
embedded applications

Colophon

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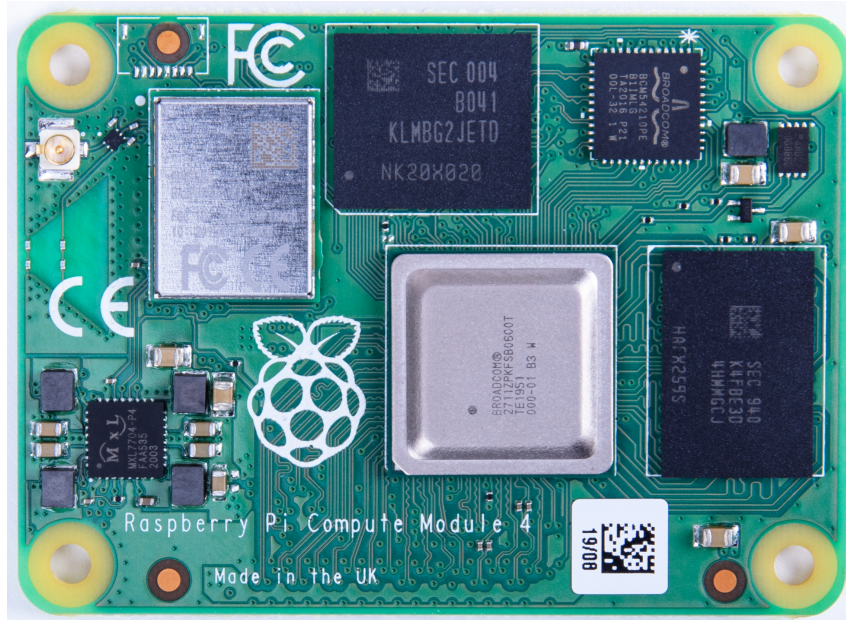
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Chapter 1. Introduction

1.1. Introduction

Figure 1. The Raspberry Pi Compute Module 4 (CM4).



The Raspberry Pi Compute Module 4 (CM4) is a System on Module (SoM) containing processor, memory, eMMC Flash and supporting power circuitry. These modules allow a designer to leverage the Raspberry Pi hardware and software stack in their own custom systems and form factors. In addition these modules have extra IO interfaces over and above what is available on the Raspberry Pi boards, opening up more options for the designer.

The design of the CM4 is loosely based on the Raspberry Pi 4, Model B, and for cost sensitive applications it can be supplied without the eMMC fitted; this version is called the Raspberry Pi Compute Module 4 Lite (CM4Lite).

While [previous generations of the Compute Module](#) have all shared the same DDR2-SODIMM-mechanically-compatible form factor, the new CM4 and CM4Lite are different. The electrical interface of the CM4 is via two 100-pin high density connectors, and the new physical form factor has a smaller footprint overall when the connectors are taken into account.

This change is due to the addition of new interfaces; an additional second HDMI, PCIe, and Ethernet. The addition of these new interfaces, especially PCIe, would not have been possible while preserving the previous form factor.

i NOTE

Unless otherwise stated, for this document CM4 also refers to CM4Lite.

1.2. Features

Key features of the CM4 are as follows:

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- Small Footprint 55mm × 40mm × 4.7mm module
 - 4 × M2.5 mounting holes
- H.265 (HEVC) (upto 4Kp60 decode), H.264 (upto 1080p60 decode, 1080p30 encode)

- OpenGL ES 3.0 graphics
- Options for 1GB, 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (see [Appendix B](#))
- Options for 0GB (**CM4Lite**), 8GB, 16GB, or 32GB eMMC Flash memory (see [Appendix B](#))
 - Peak eMMC bandwidth 100MBytes/s (four times faster than previous Compute modules)
- Option (see [Appendix B](#)) for certified radio module with:
 - 2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac wireless
 - Bluetooth 5.0, BLE
 - On board electronic switch to select between PCB trace or external antenna
- Gigabit Ethernet PHY supporting IEEE 1588
- 1 × PCIe 1-lane Host, Gen 2 (5Gbps)
- 1 × USB 2.0 port (highspeed)
- 28 × GPIO supporting either 1.8v or 3.3v signalling and peripheral options:
 - Up to 6 × UART
 - Up to 6 × I2C
 - Up to 5 × SPI
 - 1 × SDIO interface
 - 1 × DPI (Parallel RGB Display)
 - 1 × PCM
 - Up to 2× PWM channels
 - Up to 3× GPCLK outputs
- 2 × HDMI 2.0 ports (up to 4Kp60 supported)
- MIPI DSI:
 - 1 × 2-lane MIPI DSI display port
 - 1 × 4-lane MIPI DSI display port
- MIPI CSI-2:
 - 1 × 2-lane MIPI CSI camera port
 - 1 × 4-lane MIPI CSI camera port
- 1 × SDIO 2.0 (**CM4Lite**)
- Single +5v PSU input.

Chapter 2. Interfaces

2.1. Wireless

The CM4 can be supplied with an onboard wireless module based on the Broadcom BCM43455 supporting both,

- 2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac wireless
- Bluetooth 5.0, BLE.

These wireless interfaces can be individually enabled or disabled as required. For instance, in the case of a kiosk application, a service engineer could enable wireless operation and then disable it once finished.

The CM4 has an onboard antenna. If used it should be positioned in the product such that it is not surrounded by metal, including any ground plane (see [Chapter 3](#) for further details). Alternatively there is a standard U.FL connector on the module, see [Figure 1](#), so that an external antenna can be used.

Raspberry Pi has an antenna kit which is certified to be used with the CM4. If a different antenna is used then separate certification will be required.

⊖ WARNING

Raspberry Pi Trading will not be able to assist with certification for third-party antennas.

The selection of internal or external antenna is done at boot time using the `config.txt` file, and can not be changed during operation. The `config.txt` options are `dtparam=ant1` to select the internal antenna, or `dtparam=ant2` for the external antenna.

2.1.1. WL_nDisable

This pin serves a number of functions;

1. It can be used to monitor the enable/disable state of wireless networking. A logic high means the wireless networking module is powered up.
2. When driven or tied low it prevents the wireless network module from powering up. This is useful to reduce power consumption or in applications where it is required to physically ensure the wireless networking is disabled.

i NOTE

On CM4 modules without wireless, this pin is reserved.

2.1.2. BT_nDisable

This pin serves a number of functions;

1. It can be used to monitor the enable/disable state of Bluetooth. A logic high means the Bluetooth module is powered up.
2. When driven, or tied low, it prevents the Bluetooth module from powering up. This is useful to reduce power consumption, or in applications where it is required to physically ensure the Bluetooth is disabled.

NOTE

On CM4 modules without wireless, this pin is reserved.

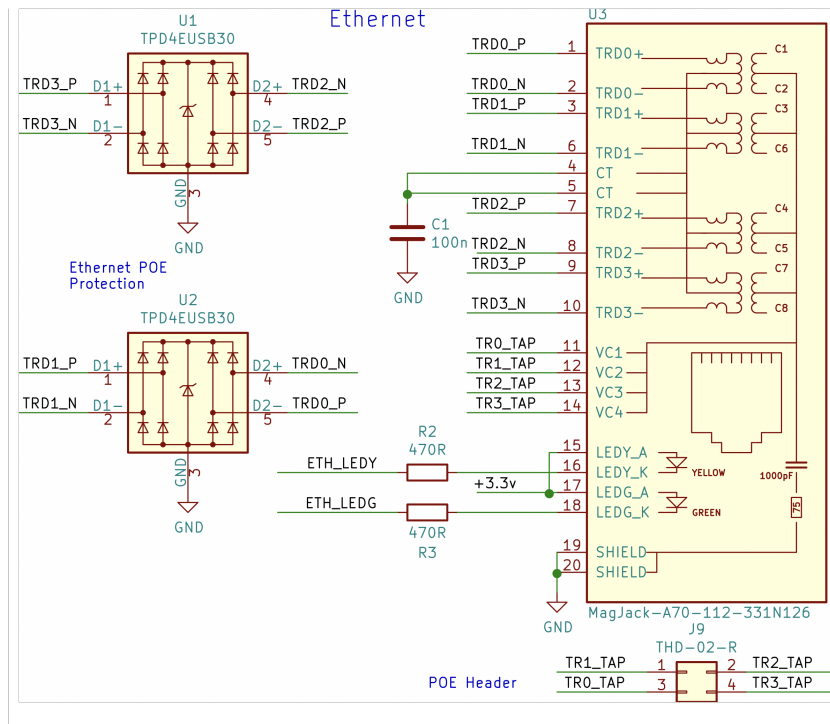
2.2. Ethernet

The CM4 has an onboard Gigabit Ethernet PHY – the Broadcom [BCM54210PE](#) – some of the major features of this PHY include;

- [IEEE 1588-2008](#) compliant
- Detection and correction of swapped pairs
- MDI crossover, pair skew and pair polarity correction

A standard 1:1 RJ45 MagJack is all that is necessary to provide an Ethernet connection to the CM4. Typical wiring of a MagJack supporting POE, and with added ESD protection, can be seen in [Figure 2](#).

Figure 2. Ethernet schematic interface for the Raspberry Pi Compute Module 4 supporting POE, and with added ESD protection.



The differential Ethernet signals should be routed as 100Ω differential pairs, with suitable clearances. Length matching between pairs should be better than 50mm, so in the typical case no length matching is required. However the signals within a pair need to be length matched, ideally to be better than 0.15mm.

The PHY also supports up to 3 LEDs to give user status feedback, these are low active. These LEDs can have a range of functions, and you should consult your OS driver to see which functions are supported by your driver.

The PHY also provides `SYNC_IN` and `SYNC_OUT` at 1.8v signalling to support [IEEE 1588-2008](#).

2.3. PCIe (Gen2 x1)

The CM4 has an internal PCIe 2.0 x1 host controller. While on the Raspberry Pi 4, Model B this has been connected to a USB 3 host controller (using the Via Labs [VLI805](#)), on the CM4 the product designer is free to choose how the interface is used.

⊖ WARNING

You should ensure that there is a suitable OS driver for any host controller that is chosen before proceeding to a prototype.

Connecting up a PCIe device follows the standard PCIe convention. The CM4 has onboard AC coupling capacitors for **CLK** and **PCIe_TX** signals. However the **PCIe_RX** signals need external coupling capacitors close to the driving source (the device **TX**). Additionally the **PCIe_CLK_nREQ** must be connected to ensure the CM4 produces a clock signal, and the **PCIe_nRST** should also be connected to ensure the device is correctly reset when required.

The differential PCIe signals should be routed as 90Ω differential pairs, with suitable clearances. There is no need to match the lengths between pairs, only the signals within a Pair need to be length matched ideally to better than 0.1mm.

💡 TIP

The PCIe Interface doesn't support MSI-X usually PCIe devices will fall back to MSI. There is a limit of upto 32 IRQs available. If the device has problems with interrupts then adding `pci=noms` to `cmdline.txt` (and reboot) often fixes the issue.

2.4. USB 2.0 (Highspeed)

The USB 2.0 interface supports up to 480Mbps signalling. The differential pair should be routed as a 90Ω differential pair. The P N signals should ideally be matched to 0.15mm

💡 TIP

The USB interface is disabled to save power by default on the CM4 . To enable it you need to add `dtoverlay=dwc2,dr_mode=host` to the config.txt file

📘 NOTE

The port is capable of being used as a true USB On-The-Go (OTG) port. While there is no official documentation, some users have had success making this work. The **USB_OTG** pin is used to select between USB host and device that is typically wired to the ID pin of a Micro usb connector. To use this functionality it must be enabled in the OS that is used. If using either as a fixed slave or fixed master, please tie the USB **OTGID** pin to ground

2.5. GPIO

There are 28 pins available for general purpose I/O (GPIO), which correspond to the GPIO pins on the Raspberry Pi 4, Model B 40-pin header. These pins have access to internal peripherals; I2C, PWM, SPI, and UART. The BCM2711 ARM Peripherals book describes these features in detail, and the multiplexing options available. The drive strength and slew rate should ideally be set as low as possible to reduce any EMC issues.

The SOC GPIO bank is powered by **GPIO_VREF**, this can either be connected to the +1.8v from the CM4 for 1.8v signalling GPIO, or +3.3v from the CM4 for +3.3v signalling. You should keep the load on the 28 GPIO pins to below 50mA in total.

2.6. Dual HDMI 2.0

The CM4 supports two HDMI 2.0 interfaces each one capable of driving 4K images. If both HDMI outputs are used then each can be driven upto 4Kp30, however if only HDMI0 interface is being used then images up to 4Kp60 are possible.

HDMI signals should be routed as 100Ω differential pairs, each signal within a pair should ideally be matched to better

than 0.15mm. Pairs don't typically need any extra matching as they only have to be matched to 25mm.

CEC is also supported, an internal 27K pullup resistor is included in the CM4.

Basic onboard ESD protection is provided for the I2C EDID signals and the CEC signals, internal pullup and down resistors are also provided. On the {rpi4} the HDMI signals don't have any extra ESD protection, depending on the application extra ESD protection maybe required.

2.7. CSI-2 (MIPI Serial Camera)

The CM4 supports two camera ports; **CAM0** (2 lanes) and **CAM1** (4 lanes). CSI signals should be routed as 100Ω differential pairs, each signal within a pair should ideally be matched to better than 0.15mm.

The documentation around the CSI interface can be found on the [Raspberry Pi website](#) while [Linux kernel drivers](#) can be found on Github.

i NOTE

Camera sensors supported by the official Raspberry Pi firmware are; the OmniVision OV5647, Sony IMX219 and Sony IMX477, no security device is required on Compute Module devices to use these camera sensors.

2.8. DSI (MIPI Serial Display)

The CM4 supports two display ports; **DISP0** (2 lanes) and **DISP1** (4 lanes). Each lane supports a maximum of data rate per lane of 1Gbit/s.

Although [Linux kernel drivers](#) are available, the DSI interface is not currently documented. Only DSI displays supported by the official Raspberry Pi firmware are supported, DSI signals should be routed as 100Ω differential pairs, each signal within a pair should ideally be matched to better than 0.15mm.

i NOTE

While only official DSI displays are supported, other displays can be added using the parallel DPI interface which is available as a GPIO alternate function. The CM4 supports up to 3 displays of any type (HDMI, DSI, DPI) at any one time.

2.9. I2C (SDA0 SCL0)

This internal I2C bus is normally allocated to the CSI1 and DSI1 as these devices are controlled by the firmware. It can be used as a general I2C bus if the CSI1 and DSI1 interfaces aren't being used or are being controlled by the firmware. For example libcamera runs on the ARM and doesn't use the firmware so in this case you may use CSI1 and this I2C bus.

2.10. I2C (ID_SD ID_SC)

This I2C bus is normally used for identifying HATs and controlling CSI0 and DSI1 devices. If the firmware isn't using the I2C bus e.g. CSI0 and DSI0 aren't being used then these pins may be used if required.

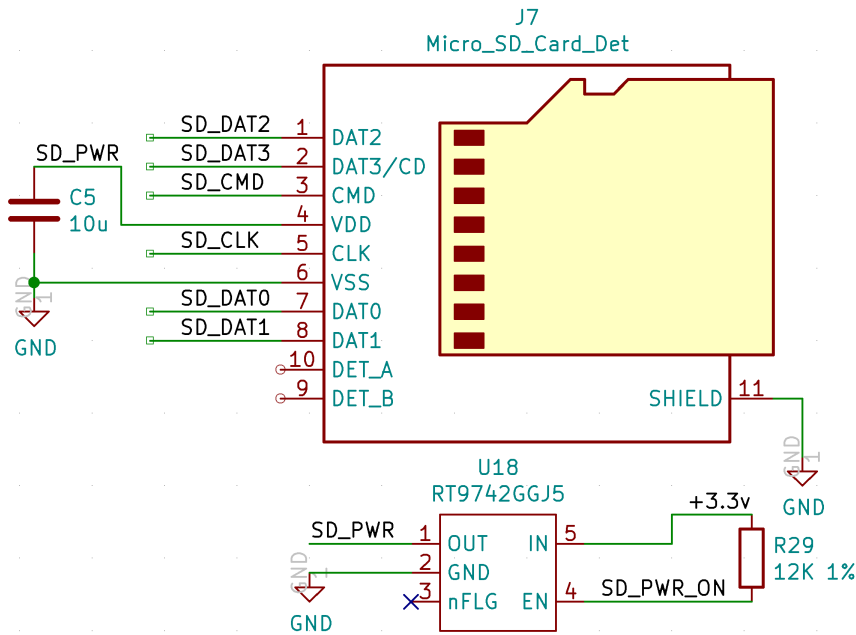
2.11. SDIO/eMMC (CM4Lite only)

If the CM4Lite is used, which does not have on-board eMMC, then the eMMC signals are available on the connector so that an external eMMC or SDCARD can be used.

The **SD_PWR_ON** signal is used to enable an external power switch to turn on power to the SDCARD, for eMMC it typically

isn't used. When `SD_VDD_override` is high, this signal is used to force 1.8v signalling on the SDIO interface. Typically this is used with eMMC memory.

Figure 3. CM4Lite SDCARD interface.



2.12. Analog IP0/IP1

These are the two spare inputs on the `MXL7704`. The `MXL7704` datasheet should be consulted if these pins are to be used. Onboard filtering is provided by a 100nF capacitor to ground for each signal. On the Raspberry Pi 4, Model B these are connected to the USB C connector `CC1` and `CC2` pins.

2.13. Global_EN

Pulling this pin low puts the CM4 in the lowest possible power down state. After software shutdown `Global_EN` needs to be pulled low for > 1ms to restart the power system on the CM4.

TIP

It is recommended to only pull this pin low once the OS has shutdown.

2.14. RUN_PG

This pin when high signals that the CM4 has started. Driving this pin low resets the module, this should be done with caution as if files on a filesystem are open they will not be closed.

2.15. nRPI_BOOT

During boot if this pin is low booting from eMMC will be stopped and booting will be transferred to rpi boot which is via USB.

2.16. LED_nACT

This pin is designed to drive an LED to replicate the green LED on the Raspberry Pi 4, Model B. Under Linux this pin will flash to signify eMMC access, while if there is an error during booting this LED will flash error patterns which can be decoded using the [look up table](#) on the Raspberry Pi website.

2.17. LED_PWR

This pin needs to be buffered to drive an LED. The signal is designed to replicate the red power LED on the Raspberry Pi 4, Model B.

2.18. EEPROM_nWP

It is recommended that final products pull this pin low to prevent the end users changing the contents of the on board EEPROM. See the Raspberry Pi 4, Model B documentation for instructions on the software settings required to support [EEPROM Write protection](#) .

Chapter 3. Electrical and Mechanical

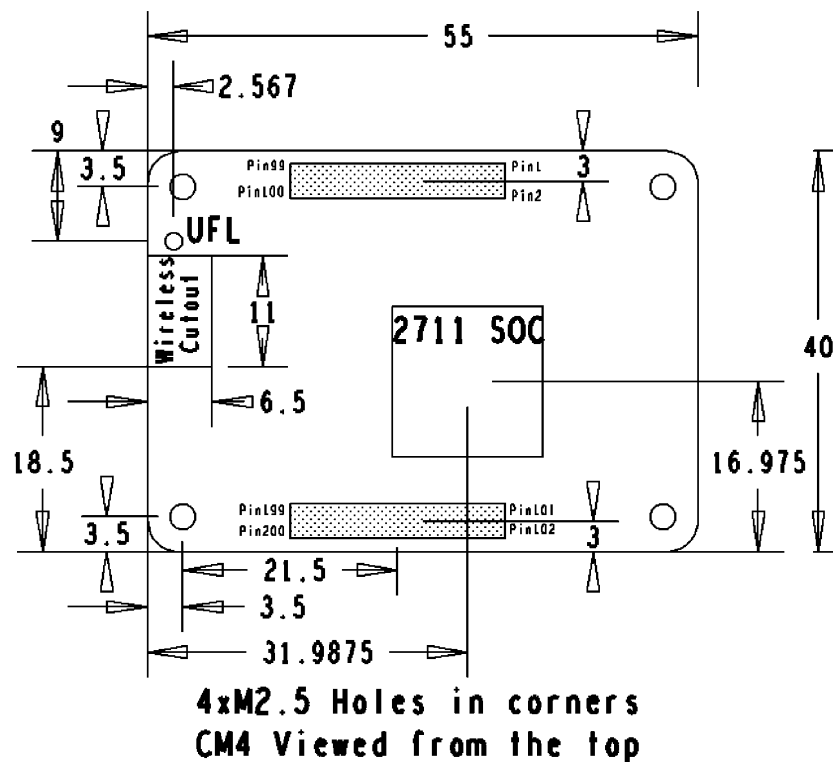
3.1. Mechanical

The CM4 is a compact 40 × 55mm module. The Module is 4.7mm deep, but when connected the height will be 5.078 or 6.578 mm depending on the stacking height chosen.

1. 4 × M2.5 Mounting holes (inset 3.5mm from module edge)
2. PCB thickness 1.2mm ± 10%
3. BCM2711 SOC height including solder balls 2.378 ± 0.11mm
4. Stacking height either:
 - a. 1.5mm with mating connector (clearance under CM4 0mm) : DF40C-100DS-0.4v
 - b. 3.0mm with mating connector (clearance under CM4 1.5mm): DF40HC(3.0)-100DS-0.4v

If the on board wireless antenna is used (see [Section 2.1](#)) it must be orientated towards the edge of the plastic enclosure and any close by metal must have cut outs or the wireless performance will be degraded. It is suggested that there is at least 10mm clearance around the PCB antenna, but the designer must check the performance.

Figure 4. Mechanical specification of the Raspberry Pi Compute Module 4



There must not be any metal, including ground planes, under the antenna. The ground plane cutout must be a minimum of 6.5mm × 11mm, but ideally at least 8mm × 15mm. If these requirements can't be met wireless performance may be degraded, especially in the 2.4GHz spectrum. It is recommended that the external antenna is used where possible.

i NOTE

The location and arrangement of components on the Compute Module may change slightly over time due to revisions for cost and manufacturing considerations; however the maximum component heights and PCB thickness will be kept as specified.

A step file of the CM4 is available as part of the CM4 design data package, this is for guidance only and is subject to changes over time due to revisions.

3.2. Thermal

The CM4 dissipates less power than the Raspberry Pi 4, Model B as it has less metal in the PCB and connectors so it has less passive heat sinking. Therefore despite it consuming less power it may run warmer than the Raspberry Pi 4, Model B.

The BCM2711 will reduce the clock rate to try and keep its temperature below 85°C. So in high ambient temperatures it is possible that the clock will also be automatically throttled back.

Operating temperature range: 0°C - 80°C

3.3. Electrical Specification**⚠ WARNING**

Stresses above those listed in [Table 2](#) may cause permanent damage to the device. This is a stress rating only; functional operation of the device under these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Table 1. Absolute maximum ratings

| Symbol | Parameter | Minimum | Maximum | Unit |
|-----------------|--------------------|---------|------------------------|------|
| V_{IN} | 5V Input Voltage | -0.5 | 6.0 | V |
| V_{GPIO_ref} | GPIO Voltage | -0.5 | 3.6 | V |
| V_{gpio} | GPIO Input voltage | -0.5 | $V_{GPIO_ref} + 0.5v$ | V |

Please note that V_{ref} is the GPIO bank voltage which must be tied to either 3.3V or 1.8v rail.

Table 2. DC characteristics

| Symbol | Parameter | Conditions | Minimum | Typical | Maximum | Unit |
|----------------|-----------------------|------------------|---------|---------|-----------------|---------|
| $V_{IL(gpio)}$ | Input low voltage | $V_{ref} = 3.3V$ | 0 | - | 0.8 | V |
| $V_{IH(gpio)}$ | Input high voltage | $V_{ref} = 3.3V$ | 2.0 | - | V_{GPIO_ref} | V |
| $V_{IL(gpio)}$ | Input low voltage | $V_{ref} = 1.8V$ | 0 | - | 0.35 | V |
| $V_{IH(gpio)}$ | Input high voltage | $V_{ref} = 1.8V$ | 0.65 | - | V_{GPIO_ref} | V |
| $I_{IL(gpio)}$ | Input leakage current | - | - | - | 10 | μA |
| $V_{OL(gpio)}$ | Output low voltage | - | - | - | 0.4 | V |

| | | | | | | |
|----------------|---------------------|--------------------|---------------------|------|----|------------|
| $V_{OH(gpio)}$ | Output high voltage | - | $V_{GPIO_ref}-0.4$ | - | - | V |
| $I_{O(gpio)}$ | Output current | 1mA | 0.87 | 1.3 | - | mA |
| $I_{O(gpio)}$ | Output current | 2mA | 1.75 | 2.6 | - | mA |
| $I_{O(gpio)}$ | Output current | 3mA | 2.63 | 3.9 | - | mA |
| $I_{O(gpio)}$ | Output current | 4mA Default | 3.5 | 5.3 | - | mA |
| $I_{O(gpio)}$ | Output current | 5mA | 4.39 | 6.6 | - | mA |
| $I_{O(gpio)}$ | Output current | 6mA | 5.27 | 7.9 | - | mA |
| $I_{O(gpio)}$ | Output current | 7mA | 6.15 | 9.2 | - | mA |
| $I_{O(gpio)}$ | Output current | 8mA | 7.02 | 10.5 | - | mA |
| $R_{PU(gpio)}$ | Pullup resistor | $V_{ref} = 3.3V$ | 33 | 47 | 73 | k Ω |
| $R_{PD(gpio)}$ | Pulldown resistor | $V_{ref} = 3.3V$ | 33 | 47 | 73 | k Ω |
| $R_{PU(gpio)}$ | Pullup resistor | $V_{ref} = 1.8V$ | 18 | 47 | 73 | k Ω |
| $R_{PD(gpio)}$ | Pulldown resistor | $V_{ref} = 1.8V$ | 18 | 47 | 73 | k Ω |

Refer to interface specifications (see [Chapter 2](#)) for electrical details of other interfaces.

Chapter 4. Pin Out

Table 3. Pin out for the Raspberry Pi Compute Module 4

| Pin | Signal | Description |
|-----|-------------------|--|
| 1 | GND | Ground (0V) |
| 2 | GND | Ground (0V) |
| 3 | Ethernet_Pair3_P | Ethernet Pair 3 Positive (connect to Transformer or MagJack) |
| 4 | Ethernet_Pair1_P | Ethernet Pair 1 Positive (connect to Transformer or MagJack) |
| 5 | Ethernet_Pair3_N | Ethernet Pair 3 Negative (connect to Transformer or MagJack) |
| 6 | Ethernet_Pair1_N | Ethernet Pair 1 Negative (connect to Transformer or MagJack) |
| 7 | GND | Ground (0V) |
| 8 | GND | Ground (0V) |
| 9 | Ethernet_Pair2_N | Ethernet Pair 2 Negative (connect to Transformer or MagJack) |
| 10 | Ethernet_Pair0_N | Ethernet Pair 0 Negative (connect to Transformer or MagJack) |
| 11 | Ethernet_Pair2_P | Ethernet Pair 2 Positive (connect to Transformer or MagJack) |
| 12 | Ethernet_Pair0_P | Ethernet Pair 0 Positive (connect to Transformer or MagJack) |
| 13 | GND | Ground (0V) |
| 14 | GND | Ground (0V) |
| 15 | Ethernet_nLED3 | Low Active Ethernet Activity indicator (3.3V signal) Typically a Green LED is connected to this pin: $I_{OL} = 8\text{mA} @ V_{OL} < 0.4\text{V}$ |
| 16 | Ethernet_SYNC_IN | IEEE1588 SYNC Input pin (1.8V signal : $I_{OL} = 8\text{mA} @ V_{OL} < 0.4\text{V}$) |
| 17 | Ethernet_nLED2 | Low Active Ethernet speed indicator (3.3V signal) Typically a Yellow LED is connected to this pin. A low State indicates the 1Gbit or 100Mbit Link : $I_{OL} = 8\text{mA} @ V_{OL} < 0.4\text{V}$ |
| 18 | Ethernet_SYNC_OUT | IEEE1588 SYNC Output pin (1.8V signal : $I_{OL} = 8\text{mA} @ V_{OL} < 0.4\text{V}$) |
| 19 | Ethernet_nLED1 | Low Active Ethernet speed indicator (3.3V signal) Typically a Yellow LED is connected to this pin. A low State indicates the 1Gbit or 10Mbit Link : $I_{OL} = 8\text{mA} @ V_{OL} < 0.4\text{V}$ |
| 20 | EEPROM_nWP | Leaving floating NB internally pulled up to CM4_3.3V via 100K ($V_{IL} < 0.8\text{V}$) but can be grounded to prevent writing to the on board EEPROM which stores the bootcode |
| 21 | Pi_nLED_Activity | Low Active Pi Activity LED. 20mA Max 5V tolerant ($V_{OL} < 0.4\text{V}$). (this is the signal that drives the Green LED on the Raspberry Pi 4, Model B) |
| 22 | GND | Ground (0V) |
| 23 | GND | Ground (0V) |
| 24 | GPIO26 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 25 | GPIO21 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 26 | GPIO19 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 27 | GPIO20 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 28 | GPIO13 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 29 | GPIO16 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 30 | GPIO6 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |

| | | |
|----|---------|--|
| 31 | GPIO12 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 32 | GND | Ground (0V) |
| 33 | GND | Ground (0V) |
| 34 | GPIO5 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 35 | ID_SC | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 36 | ID_SD | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 37 | GPIO7 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 38 | GPIO11 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 39 | GPIO8 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 40 | GPIO9 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 41 | GPIO25 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 42 | GND | Ground (0V) |
| 43 | GND | Ground (0V) |
| 44 | GPIO10 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 45 | GPIO24 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 46 | GPIO22 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 47 | GPIO23 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 48 | GPIO27 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 49 | GPIO18 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 50 | GPIO17 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 51 | GPIO15 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 52 | GND | Ground (0V) |
| 53 | GND | Ground (0V) |
| 54 | GPIO4 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 55 | GPIO14 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V |
| 56 | GPIO3 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V. Internal 1.8K pull up to GPIO_Vref |
| 57 | SD_CLK | SDCARD Clock signal (only available on CM4Lite) |
| 58 | GPIO2 | GPIO Typically a 3.3V signal but can be a 1.8V signal by connecting GPIO_Vref to 1.8V. Internal 1.8K pull up to GPIO_Vref |
| 59 | GND | Ground (0V) |
| 60 | GND | Ground (0V) |
| 61 | SD_DAT3 | SDCARD/eMMC Data3 signal (only available on CM4Lite) |
| 62 | SD_CMD | SDCARD/eMMC Command signal (only available on CM4Lite) |
| 63 | SD_DAT0 | SDCARD/eMMC Data0 signal (only available on CM4Lite) |
| 64 | SD_DAT5 | SDCARD/eMMC Data5 signal (only available on CM4Lite) |
| 65 | GND | Ground (0V) |

| | | |
|----|-------------------|--|
| 66 | GND | Ground (0V) |
| 67 | SD_DAT1 | SDCARD/eMMC Data1 signal (only available on CM4Lite) |
| 68 | SD_DAT4 | SDCARD/eMMC Data4 signal (only available on CM4Lite) |
| 69 | SD_DAT2 | SDCARD/eMMC Data2 signal (only available on CM4Lite) |
| 70 | SD_DAT7 | SDCARD/eMMC Data7 signal (only available on CM4Lite) |
| 71 | GND | Ground (0V) |
| 72 | SD_DAT6 | SDCARD/eMMC Data6 signal (only available on CM4Lite) |
| 73 | SD_VDD_Override | Force SDCARD/eMMC interface to 1.8V signalling if set to 3.3V, otherwise leave unconnected. Typically only used if external eMMC is connected |
| 74 | GND | Ground (0V) |
| 75 | SD_PWR_ON | Output to Power switch for SDCARD. CM4 sets this pin High (3.3V) to signal that Power to the SDCARD should be turned on. If booting from the SDCARD is required then a pullup should be fitted (only available on CM4Lite) |
| 76 | Reserved | Do not Connect anything to this pin. |
| 77 | +5V (Input) | 4.75V-5.25V Main power input |
| 78 | GPIO_VREF | Must be connected to CM4_3.3V (pins 84 and 86) for 3.3V GPIO or CM4_1.8V (pins 88 and 90) for 1.8V GPIO. This pin cannot be floating or connected to ground |
| 79 | +5V (Input) | 4.75V-5.25V Main power input |
| 80 | SCL0 | IIC Clock pin (Raspberry Pi GPIO45) Typically used for Camera and Displays Internal 1.8K pull up to CM4_3.3V |
| 81 | +5V (Input) | 4.75V-5.25V Main power input |
| 82 | SDA0 | IIC Data pin (Raspberry Pi GPIO44) Typically used for Camera and Displays Internal 1.8K pull up to CM4_3.3V |
| 83 | +5V (Input) | 4.75V-5.25V Main power input |
| 84 | CM4_3.3V (Output) | 3.3V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered down during power off or GLOBAL_EN being set low |
| 85 | +5V (Input) | 4.75V-5.25V Main power input |
| 86 | CM4_3.3V (Output) | 3.3V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered down during power off or GLOBAL_EN being set low |
| 87 | +5V (Input) | 4.75V-5.25V Main power input |
| 88 | CM4_1.8V (Output) | 1.8V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered down during power off or GLOBAL_EN being set low |
| 89 | WL_nDisable | Can be left floating if driven low the wireless interface will be disabled. Internal pulled up via 1.8K to CM4_3.3V |
| 90 | CM4_1.8V (Output) | 1.8V +/-2.5% Power Output max 300mA per pin for a total of 600mA. This will be powered down during power off or GLOBAL_EN being set low |
| 91 | BT_nDisable | Can be left floating if driven low the Bluetooth interface will be disabled. Internal pulled up via 1.8K to CM4_3.3V |
| 92 | RUN_PG | Bidirectional pin. Can be driven low (via a 220R resistor) to Reset the CM4 CPU. As an Output a high signals Power Good and CPU running. Internally pulled up to +3.3V via 10K |

| | | |
|-----|---------------|---|
| 93 | nRPIBOOT | A low on this pin force booting from an RPI server (e.g PC or a Raspberry Pi) if not used leave floating. Internally pulled via 10K to +3.3V |
| 94 | AnalogIP1 | Analogue input of the MAX7704. Typically connected to CC pin of Type C power connector |
| 95 | PI_LED_nPWR | Low active Output to drive Power On LED. This signal needs to be buffered. |
| 96 | AnalogIP0 | Analogue input of the MAX7704. Typically connected to CC pin of Type C power connector |
| 97 | Camera_GPIO | Typically used to Shutdown the camera to reduce power. Reassigning this pin to another function isn't recommended. CM4_3.3V signalling |
| 98 | GND | Ground (0V) |
| 99 | GLOBAL_EN | Input. Drive low to power off CM4. Internally pulled up with a 100K to +5V |
| 100 | nEXTRST | Output Driven low during reset Driven high (CM4_3.3V) once CM4 CPU has started to boot |
| 101 | USB_OTG_ID | Input (3.3V signal) USB OTG Pin. Internal pulled up. When grounded the CM4 becomes a USB host but the correct OS driver also needs to be used |
| 102 | PCIe_CLK_nREQ | Input (3.3V signal) PCIe Clock request pin (low to request PCI clock). Internal pulled up |
| 103 | USB_N | USB D- |
| 104 | Reserved | Do not Connect anything to this pin. |
| 105 | USB_P | USB D+ |
| 106 | Reserved | Do not Connect anything to this pin. |
| 107 | GND | Ground (0V) |
| 108 | GND | Ground (0V) |
| 109 | PCIe_nRST | Output (+3.3V signal) PCIe Reset Low active |
| 110 | PCIe_CLK_P | PCIe Clock Out Positive (100MHz) NB AC coupling Capacitor Included on CM4 |
| 111 | VDAC_COMP | Video DAC output (TV OUT) |
| 112 | PCIe_CLK_N | PCIe Clock Out Negative (100MHz) NB AC coupling Capacitor Included on CM4 |
| 113 | GND | Ground (0V) |
| 114 | GND | Ground (0V) |
| 115 | CAM1_D0_N | Input Camera1 D0 Negative |
| 116 | PCIe_RX_P | Input PCIe GEN 2 RX Positive NB External AC coupling Capacitor required |
| 117 | CAM1_D0_P | Input Camera1 D0 Positive |
| 118 | PCIe_RX_N | Input PCIe GEN 2 RX Negative NB External AC coupling Capacitor required |
| 119 | GND | Ground (0V) |
| 120 | GND | Ground (0V) |
| 121 | CAM1_D1_N | Input Camera1 D1 Negative |
| 122 | PCIe_TX_P | Output PCIe GEN 2 TX Positive NB AC coupling Capacitor Included on CM4 |
| 123 | CAM1_D1_P | Input Camera1 D1 Positive |
| 124 | PCIe_TX_N | Output PCIe GEN 2 TX Positive NB AC coupling Capacitor Included on CM4 |
| 125 | GND | Ground (0V) |
| 126 | GND | Ground (0V) |
| 127 | CAM1_C_N | Input Camera1 Clock Negative |

| | | |
|-----|---------------|--|
| 128 | CAM0_D0_N | Input Camera0 D0 Negative |
| 129 | CAM1_C_P | Input Camera1 Clock Positive |
| 130 | CAM0_D0_P | Input Camera0 D0 Positive |
| 131 | GND | Ground (0V) |
| 132 | GND | Ground (0V) |
| 133 | CAM1_D2_N | Input Camera1 D2 Negative |
| 134 | CAM0_D1_N | Input Camera0 D1 Negative |
| 135 | CAM1_D2_P | Input Camera1 D2 Positive |
| 136 | CAM0_D1_P | Input Camera0 D1 Positive |
| 137 | GND | Ground (0V) |
| 138 | GND | Ground (0V) |
| 139 | CAM1_D3_N | Input Camera1 D3 Negative |
| 140 | CAM0_C_N | Input Camera0 Clock Negative |
| 141 | CAM1_D3_P | Input Camera1 D3 Positive |
| 142 | CAM0_C_P | Input Camera0 Clock Positive |
| 143 | HDMI1_HOTPLUG | Input HDMI1 Hotplug Internally pulled down with a 100K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 144 | GND | Ground (0V) |
| 145 | HDMI1_SDA | Bidir HDMI1 SDA Internally pulled up with a 1.8K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 146 | HDMI1_TX2_P | Output HDMI1 TX2 Positive |
| 147 | HDMI1_SCL | Input HDMI1 SCL Internally pulled up with a 1.8K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 148 | HDMI1_TX2_N | Output HDMI1 TX2 Negative |
| 149 | HDMI1_CEC | Input HDMI1 CEC Internally pulled up with a 27K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 150 | GND | Ground (0V) |
| 151 | HDMI0_CEC | Input HDMI0 CEC Internally pulled up with a 27K. 5V tolerant (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 152 | HDMI1_TX1_P | Output HDMI1 TX1 Positive |
| 153 | HDMI0_HOTPLUG | Input HDMI0 Hotplug Internally pulled down 100K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 154 | HDMI1_TX1_N | Output HDMI1 TX1 Negative |
| 155 | GND | Ground (0V) |
| 156 | GND | Ground (0V) |

| | | |
|-----|-------------|--------------------------------|
| 157 | DSI0_D0_N | Output Display0 D0 Negative |
| 158 | HDMI1_TX0_P | Output HDMI1 TX0 Positive |
| 159 | DSI0_D0_P | Output Display0 D0 Positive |
| 160 | HDMI1_TX0_N | Output HDMI1 TX0 Negative |
| 161 | GND | Ground (0V) |
| 162 | GND | Ground (0V) |
| 163 | DSI0_D1_N | Output Display0 D1 Negative |
| 164 | HDMI1_CLK_P | Output HDMI1 Clock Positive |
| 165 | DSI0_D1_P | Output Display0 D1 Positive |
| 166 | HDMI1_CLK_N | Output HDMI1 Clock Negative |
| 167 | GND | Ground (0V) |
| 168 | GND | Ground (0V) |
| 169 | DSI0_C_N | Output Display0 Clock Negative |
| 170 | HDMI0_TX2_P | Output HDMI0 TX2 Positive |
| 171 | DSI0_C_P | Output Display0 Clock Positive |
| 172 | HDMI0_TX2_N | Output HDMI0 TX2 Negative |
| 173 | GND | Ground (0V) |
| 174 | GND | Ground (0V) |
| 175 | DSI1_D0_N | Output Display1 D0 Negative |
| 176 | HDMI0_TX1_P | Output HDMI0 TX1 Positive |
| 177 | DSI1_D0_P | Output Display1 D0 Positive |
| 178 | HDMI0_TX1_N | Output HDMI0 TX1 Negative |
| 179 | GND | Ground (0V) |
| 180 | GND | Ground (0V) |
| 181 | DSI1_D1_N | Output Display1 D1 Negative |
| 182 | HDMI0_TX0_P | Output HDMI0 TX0 Positive |
| 183 | DSI1_D1_P | Output Display1 D1 Positive |
| 184 | HDMI0_TX0_N | Output HDMI0 TX0 Negative |
| 185 | GND | Ground (0V) |
| 186 | GND | Ground (0V) |
| 187 | DSI1_C_N | Output Display1 Clock Negative |
| 188 | HDMI0_CLK_P | Output HDMI0 Clock Positive |
| 189 | DSI1_C_P | Output Display1 Clock Positive |
| 190 | HDMI0_CLK_N | Output HDMI0 Clock Negative |
| 191 | GND | Ground (0V) |
| 192 | GND | Ground (0V) |
| 193 | DSI1_D2_N | Output Display1 D2 Negative |

| | | |
|-----|-----------|--|
| 194 | DSI1_D3_N | Output Display1 D3 Negative |
| 195 | DSI1_D2_P | Output Display1 D2 Positive |
| 196 | DSI1_D3_P | Output Display1 D3 Positive |
| 197 | GND | Ground (0V) |
| 198 | GND | Ground (0V) |
| 199 | HDMI0_SDA | Bidir HDMI0 SDA Internally pulled up with a 1.8K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |
| 200 | HDMI0_SCL | Bidir HDMI0 SCL Internally pulled up with a 1.8K. 5V tolerant. (It can be connected directly to a HDMI connector a small amount of ESD protection is provided on the CM4 by an on board HDMI05-CL02F3) |

All ground pins should be connected. If none of the signals on the second connector pins 101 to 200 are used then you may not fit the connector to reduce costs, but mechanical stability needs to be considered.

The voltage on GPIO pins 0-27 must not exceed **CM4_3.3V** if +3.3V signalling is used or **CM4_1.8V** if +1.8V signalling is used. These pins are the same as on the 40-pin connector on the Raspberry Pi 4, Model B.

If the **CM4_1.8V** rail is used to power other devices other than the **GPIO_Vref** then you should ensure that in case of surprise power removal (e.g. the +5V pin goes below +4.5V) from the CM4, the load on the **CM4_1.8V** must go to zero.

Similarly if the **CM4_3.3V** rail is used to power other devices other than the **GPIO_Vref**, then you should ensure that in the case of surprise power removal the **CM4_3.3V** rail never falls below the **CM4_1.8V** rail. This is the typical case, but you should check this in your design. In the case where it does fall below the **CM4_1.8V** rail, then extra circuitry is required to disconnect the **CM4_3.3V** load.

No reverse voltage must be applied to any pin or power up may be prevented, i.e. during power down/off no pin may have external voltage applied otherwise this may prevent power up.

4.1. Differential Pairs

It is recommended that P/N signals within a pair are matched to better than 0.15mm. Often matching between pairs is not so critical, e.g. HDMI pair to pair matching should be better than 25mm so on a typical board no extra matching is required.

4.1.1. 100Ω Differential pairs signal lengths

On the CM4 all differential pairs are matched to better than 0.05mm (P/N signals).

i NOTE

It is recommended that pairs are also matched on the interface board.

On the CM4 pair to pairs aren't always matched as many interfaces don't require very accurate matching between pairs. [Table 4](#) documents the CM4 track length difference within each group (a non zero value is how much longer in mm that track is compared to the signal with zero length difference)

Table 4. 100 Ω
Differential pairs
signal length

| Signal | Length |
|-----------|--------|
| CAM0_C_N | 0.02 |
| CAM0_C_P | 0.02 |
| CAM0_D0_N | 0.06 |

| | |
|-------------|------|
| CAM0_D0_P | 0.07 |
| CAM0_D1_N | 0 |
| CAM0_D1_P | 0.01 |
| | |
| CAM1_C_N | 0.78 |
| CAM1_C_P | 0.78 |
| CAM1_D0_N | 0.02 |
| CAM1_D0_P | 0.01 |
| CAM1_D1_N | 0.4 |
| CAM1_D1_P | 0.4 |
| CAM1_D2_N | 0.05 |
| CAM1_D2_P | 0.04 |
| CAM1_D3_N | 0.01 |
| CAM1_D3_P | 0 |
| | |
| DSI0_C_N | 0 |
| DSI0_C_P | 0 |
| DSI0_D0_N | 0 |
| DSI0_D0_P | 0 |
| DSI0_D1_N | 0.01 |
| DSI0_D1_P | 0.01 |
| | |
| DSI1_C_N | 1.28 |
| DSI1_C_P | 1.28 |
| DSI1_D0_N | 0 |
| DSI1_D0_P | 0.01 |
| DSI1_D1_N | 1.06 |
| DSI1_D1_P | 1.06 |
| DSI1_D2_N | 0.83 |
| DSI1_D2_P | 0.84 |
| DSI1_D3_N | 3.78 |
| DSI1_D3_P | 3.79 |
| | |
| HDMI0_CLK_N | 3.25 |
| HDMI0_CLK_P | 3.24 |
| HDMI0_TX0_N | 1.76 |
| HDMI0_TX0_P | 1.76 |
| HDMI0_TX1_N | 0.62 |

| | |
|------------------|------|
| HDMI0_TX1_P | 0.62 |
| HDMI0_TX2_N | 0 |
| HDMI0_TX2_P | 0 |
| | |
| HDMI1_CLK_N | 2.47 |
| HDMI1_CLK_P | 2.46 |
| HDMI1_TX0_N | 1.51 |
| HDMI1_TX0_P | 1.51 |
| HDMI1_TX1_N | 1 |
| HDMI1_TX1_P | 1 |
| HDMI1_TX2_N | 0 |
| HDMI1_TX2_P | 0.01 |
| | |
| Ethernet_Pair0_P | 5.23 |
| Ethernet_Pair0_N | 5.23 |
| Ethernet_Pair1_P | 0 |
| Ethernet_Pair1_N | 0 |
| Ethernet_Pair2_P | 3.82 |
| Ethernet_Pair2_N | 3.82 |
| Ethernet_Pair3_P | 4.29 |
| Ethernet_Pair3_N | 4.29 |

4.1.2. 90Ω Differential Pairs signal lengths

On the CM4 all differential pairs are matched to better than 0.05mm (P/N signals).

i NOTE

It is recommended that pairs are also matched on the interface board.

However pair to pairs aren't always matched as many interfaces don't require very accurate matching between pairs. [Table 5](#) documents the CM4 track length difference within each group (a non zero value is how much longer in mm that track is compared to the signal with zero length difference)

*Table 5. 90 Ω
Differential pairs
signal length*

| Signal | Length |
|------------|--------|
| PCIe_CLK_P | 0.65 |
| PCIe_CLK_N | 0.65 |
| PCIe_TX_P | 0 |
| PCIe_TX_N | 0 |
| PCIe_RX_P | 0.23 |
| PCIe_RX_N | 0.23 |
| | |

| | |
|--------|---|
| USB2_P | 0 |
| USB2_N | 0 |

Chapter 5. Power

5.1. Power up sequencing

The CM4 requires a single +5V supply, and can supply up to 600mA at +3.3V and +1.8V to peripherals.

All pins should not have any power applied to them before the +5V rail is applied.

If the EEPROM is to be write protected then the `EEPROM_nWP` should be low before powerup.

If the CM4 is to be booted using USB then `RPI_nBOOT` needs to be low within 2ms of +5V rising.

+5V should rise monotonically to 4.75V and stay above 4.75V for the entire operation of the CM4.

The power up sequence will start when both +5V rail is above 4.75V and `GLOBAL_EN` rises. `GLOBAL_EN` has internal RC delay so that it rises after +5V has risen. The order of events is as follows

1. +3.3V rises
2. +1.8V rises
3. `RUN_PG` rises
4. `EXT_nRESET` rises

5.2. Power down sequencing

The OS should be shut down to ensure that the file system remains consistent, before the power is removed. If this can't be achieved, then a filesystem like `btrfs`, `f2fs` or `overlayfs` (use `raspi-config` to enable it) should be considered.

Once the OS has shutdown the +5V rail can be removed or the `GLOBAL_EN` pin can be taken low to put the CM4 into the low power mode.

Appendix A: Troubleshooting

The CM4 has a number of stages of power up before the CPU starts. If there is an error at any of the stages, power up will be halted.

Hardware Checklist

1. Is the +5V supply good? Check this by pulling `GLOBAL_EN` low apply and apply an external 2A load to the +5V supply. Does it stay $>+4.75V$ including noise? Ideally it should remain $>+4.9V$ including any noise.
2. Remove external 2A load, but keep `GLOBAL_EN` pulled low.
3. Check the CM4 +3.3v rail is $<200mV$. If this is not the case there is an external power path back-feeding the CM4, either directly or indirectly. This could also occur via the digital pins, e.g Ethernet.
4. Still with `GLOBAL_EN` pulled low check the CM4 +1.8v rail is $<200mV$. Again if the +1.8v rail is above 200mV then there is an external path back feeding the 1.8v rail. (If nothing is connected to these pins you can ignore this check.)
5. Remove the pull down on `GLOBAL_EN`.
6. Check `GLOBAL_EN` now goes high (it internally pulled up on the CM4)
7. Check the +3.3V supply rises to $>+3.15V$. If it does not, this suggests there is too much load on the +3.3V rail.
8. Check the +1.8V rail gets to $>+1.71v$. If it does not, this suggests there is much load on the +1.8V rail.
9. Check `RUN_PG` goes high
10. Check `ACT_LED` starts to oscillate to indicate booting check it isn't flashing an error code.

Bootloader

1. Connect a HDMI cable to see if the HDMI diagnostics screen appears.
2. Connect a USB serial cable to GPIO pins 14,15.
 - a. See <https://www.raspberrypi.org/documentation/configuration/uart.md> for details.
3. Short the `nRPIBOOT` pin to ground to force USB boot mode. The CM4IO board has a jumper for `nRPIBOOT` This can be used to enable different boot modes (e.g. network) and enable UART logging.
 - a. See <https://www.raspberrypi.org/documentation/hardware/computemodule/cm-emmc-flashing.md>

rpi-eeeprom-update

1. CM4 will not run `recovery.bin` from from the EMMC (or SD Card on CM4Lite). Therefore, the only way to update the bootloader EEPROM is via `usbboot` or self-update.

EEPROM Write protect

The on board EEPROM can be write protected by shorting to ground `EEPROM_nWP`. The CM4IO board has a jumper for `EEPROM_nWP`.

1. See https://www.raspberrypi.org/documentation/hardware/raspberrypi/bcm2711_bootloader_config.md

Firmware

1. A 5.4 or newer kernel and the latest firmware release is required. These can be updated by using usbboot to mount the EMMC as a USB MSD device.
2. Nightly OS images are now available which contain **rpi-update** master firmware + kernel. Bug fixes for CM4 will normally be provided via these images except where a test/patch binary is required.
 - a. See <http://downloads.raspberrypi.org/nightlies/>

Kernel

1. The updated OS images use the new Raspberry Pi Compute Module 4 device tree file. If that is not found then the Raspberry Pi 4, Model B device tree file will be used.
 - a. See <https://github.com/raspberrypi/linux/blob/rpi-5.4.y/arch/arm/boot/dts/bcm2711-rpi-cm4.dts>

Appendix B: Availability

Raspberry Pi guarantees availability of the CM4 until at least **January 2028**.

Support

For support please see the hardware documentation section of the [Raspberry Pi website](#) and post questions to the [Raspberry Pi forum](#).

Ordering codes

Table 6. Part Number Options

| Model | Wireless | RAM LPDDR4 | eMMC Storage |
|----------------------------|----------|-------------|---------------------|
| CM4 | 0 = No | 01 = 1GByte | 000 = 0GByte (Lite) |
| | 1 = Yes | 02 = 2GByte | 008 = 8GByte |
| | | 04 = 4GByte | 016 = 16GByte |
| | | 08 = 8GByte | 032 = 32GByte |
| Example Part Number | | | |
| CM4 | 1 | 02 | 032 |

Table 7. Ordering Options

| Wireless | RAM LPDDR4 | Storage eMMC | RPTL # | Part Number | Order Multiple | RRP |
|----------|------------|--------------|--------|-------------|----------------|----------|
| - | 1GB | Lite | SC0318 | CM4001000 | 1+ / Bulk | \$ 25.00 |
| - | 1GB | 8GB | SC0319 | CM4001008 | 1+ / Bulk | \$ 30.00 |
| - | 1GB | 16GB | SC0320 | CM4001016 | 1+ / Bulk | \$ 35.00 |
| - | 1GB | 32GB | SC0321 | CM4001032 | 1+ / Bulk | \$ 40.00 |
| Yes | 1GB | Lite | SC0314 | CM4101000 | Bulk | \$ 30.00 |
| Yes | 1GB | 8GB | SC0315 | CM4101008 | Bulk | \$ 35.00 |
| Yes | 1GB | 16GB | SC0316 | CM4101016 | Bulk | \$ 40.00 |
| Yes | 1GB | 32GB | SC0317 | CM4101032 | Bulk | \$ 45.00 |
| - | 2GB | Lite | SC0287 | CM4002000 | 1+ / Bulk | \$ 30.00 |
| - | 2GB | 8GB | SC0288 | CM4002008 | 1+ / Bulk | \$ 35.00 |
| - | 2GB | 16GB | SC0289 | CM4002016 | 1+ / Bulk | \$ 40.00 |
| - | 2GB | 32GB | SC0290 | CM4002032 | 1+ / Bulk | \$ 45.00 |
| Yes | 2GB | Lite | SC0275 | CM4102000 | 1+ / Bulk | \$ 35.00 |
| Yes | 2GB | 8GB | SC0276 | CM4102008 | 1+ / Bulk | \$ 40.00 |
| Yes | 2GB | 16GB | SC0277 | CM4102016 | 1+ / Bulk | \$ 45.00 |
| Yes | 2GB | 32GB | SC0278 | CM4102032 | 1+ / Bulk | \$ 50.00 |
| - | 4GB | Lite | SC0291 | CM4004000 | Bulk | \$ 45.00 |
| - | 4GB | 8GB | SC0292 | CM4004008 | Bulk | \$ 50.00 |

| | | | | | | |
|-----|-----|------|--------|-----------|-----------|----------|
| - | 4GB | 16GB | SC0293 | CM4004016 | Bulk | \$ 55.00 |
| - | 4GB | 32GB | SC0294 | CM4004032 | Bulk | \$ 60.00 |
| Yes | 4GB | Lite | SC0279 | CM4104000 | 1+ / Bulk | \$ 50.00 |
| Yes | 4GB | 8GB | SC0280 | CM4104008 | 1+ / Bulk | \$ 55.00 |
| Yes | 4GB | 16GB | SC0281 | CM4104016 | 1+ / Bulk | \$ 60.00 |
| Yes | 4GB | 32GB | SC0282 | CM4104032 | 1+ / Bulk | \$ 65.00 |
| - | 8GB | Lite | SC0295 | CM4008000 | Bulk | \$ 70.00 |
| - | 8GB | 8GB | SC0296 | CM4008008 | Bulk | \$ 75.00 |
| - | 8GB | 16GB | SC0297 | CM4008016 | Bulk | \$ 80.00 |
| - | 8GB | 32GB | SC0298 | CM4008032 | Bulk | \$ 85.00 |
| Yes | 8GB | Lite | SC0283 | CM4108000 | Bulk | \$ 75.00 |
| Yes | 8GB | 8GB | SC0284 | CM4108008 | Bulk | \$ 80.00 |
| Yes | 8GB | 16GB | SC0285 | CM4108016 | Bulk | \$ 85.00 |
| Yes | 8GB | 32GB | SC0286 | CM4108032 | Bulk | \$ 90.00 |

NOTE

RRP was correct at time of publication and excludes taxes.

Some options have minimum ordering quantities (MOQ), please check with your supplier.

For prototyping often a higher LPDDR RAM capacity option will exist, without an MOQ. You can use the higher LPDDR RAM option, but limit it to the lower capacity by changing config.txt.

Packaging

Small quantities are supplied in individual cardboard boxes. These have an internal ESD coating so that a separate ESD bag isn't required. This packaging is recyclable and reduces waste.



Raspberry Pi

Raspberry Pi is a trademark of the Raspberry Pi Foundation

Raspberry Pi Trading Ltd