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} = 8mA @ V_{OL}< 0.4V
16	Ethernet_SYNC_IN	IEEE1588 SYNC Input pin (1.8V signal : I_{OL} = 8mA @ V_{OL}< 0.4V)
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} = 8mA @ V_{OL}< 0.4V
18	Ethernet_SYNC_OUT	IEEE1588 SYNC Output pin (1.8V signal : I_{OL} = 8mA @ V_{OL}< 0.4V)
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} = 8mA @ V_{OL}< 0.4V
20	EEPROM_nWP	Leaving floating NB internally pulled up to `CM4_3.3V` via 100K (V_{IL} <0.8V) 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}<0.4V). (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 stablity 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 use 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 surprise power removal the `CM4_3.3V` rail never fails 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 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).

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 paris signal length

Signal	Length
CAM0_C_N	0.02
CAM0_C_P	0.02
CAM0_D0_N	0.06