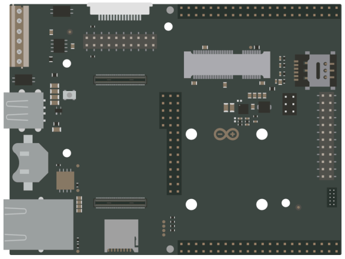
Pinout Software Mapping
Portenta Mid Carrier

Description

This document enlists available pins with respective software designations that can be used to access each pin directly within the Portenta family board and Portenta Mid Carrier.



Breakout Header (J14)						
Pin number	Function	Portenta X8 (Linux)	Portenta X8 (Python® - Modes: BOARD / BCM / IMX / X8)	Portenta X8 (Arduino)	Portenta H7	Portenta C33
3	SERIAL0 RTS	181	3 / - / 181 / RTS0	PC_7	PI_1	51
4	SERIAL1 RTS	126	4 / - / 126 / RTS1	-	PI_14	61
7	SERIAL0 RX	180	7 / - / 180 / RX0	-	PI_9	50
8	SERIAL1 RX	127	8 / - / 127 / RX1	PE_11	PA_10	13
9	SERIAL0 TX	179	9 / - / 179 / TX0	-	PA_0	49
10	SERIAL1 TX	128	10 / - / 128 / TX1	-	PA_9	14
11	SERIAL0 CTS	182	11 / - / 182 / CTS0	-	PI_13	52
12	SERIAL1 CTS	125	12 / - / 125 / CTS1	-	PI_15	62
15	SERIAL2 RTS	NC	15 / - / - / RTS2	-	-	51
16	SERIAL3 RTS	NC	16 / - / - / RTS3	-	-	55
19	SERIAL2 RX	154	19 / - / 154 / RX2	-	PG_9	50
20	SERIAL3 RX	156	20 / - / 156 / RX3	-	PJ_9	54
21	SERIAL2 TX	155	21 / - / 155 / TX2	PB_10	PG_14	49
22	SERIAL3 TX	157	22 / - / 157 / TX3	-	PJ_8	53
23	SERIAL2 CTS	NC	23 / - / -/ CTS2	PA_11	-	52
24	SERIAL3 CTS	NC	24 / - / - / CTS3	-	-	56
25	I2S CLK	87	25 / - / 87 / I2S_CLK	PD_15	PD_3	63
26	CAN0 TX	175	26 / - / 175 / CAN0_TX	PA_8	-	42
27	I2S WS	86	27 / - / 86 / I2S_WS	-	PB_9	64
28	CAN0 RX	176	28 / - / 176 / CAN0_RX	-	-	41
29	I2S SDI	85	29 / - / 85 / I2S_SDI	-	PI_2	65
30	CAN1 TX	177	30 / - / 177 / CAN1_TX	-	PH_13	44
31	I2S SDO	88	31 / - / 88 / I2S_SDO	-	PI_3	66
32	CAN1 RX	178	32 / - / 178 / CAN1_RX	-	PB_8	43
33	SPDIF TX	131	33 / - / 131 / SPDIF_TX	-	-	-
34	PDM CLK	84	34 / - / - / PDM_CLK	-	PE_2	82

35	SPDIF RX	132	35 / - / 132 / SPDIF_RX	-	-	-
36	PDM D0	99	36 / - / - / PDM_D0	-	PB_2	83
37	GPIO0	160	37 / - / 160 / GPIO0	-	PC_13	27
38	PDM D1	98	38 / - / - / PDM_D1	-	-	-
39	GPIO1	161	39 / - / 161 / GPIO1	-	PC_15	28
40	GPIO6	166	40 / - / 166 / GPIO6	-	PG_10	33
41	GPIO2	162	41 / - / 162 / GPIO2	-	PD_4	29
42	GPIO5	165	42 / - / 165 / GPIO5	-	PG_3	32
43	GPIO3	163	43 / - / 163 / GPIO3	-	PD_5	30
44	GPIO4	164	44 / - / 164 / GPIO4	-	PE_3	31

Breakout Header (J15)						
Pin number	Function	Portenta X8 (Linux)	Portenta X8 (Python® - Modes: BOARD / BCM / IMX / X8)	Portenta X8 (Arduino)	Portenta H7	Portenta C33
9	Analog 0 [A0]	167	53 / - / 167 / A0	-	PA_0C / A0	15
10	SPI0 CS	141	54 / - / 141 / SPI0_CS	-	-	7
11	Analog 1 [A1]	168	55 / - / 168 / A1	-	PA_1C / A1	16
12	SPI0 SCLK	138	56 / - / 138 / SPI0_SCLK	-	-	9
13	Analog 2 [A2[	169	57 / - / 169 / A2	-	PC_2C / A2	17
14	SPI0 CIPO	140	58 / - / 140 / SPI0_CIPO	PA_9	-	10
15	Analog 3 [A3[	170	59 / - / 170 / A3	-	PC_3C / A3	18
16	SPI0 COPI	139	60 / - / 139 / SPI0_COPI	-	-	8
17	Analog 4 [A4]	171	61 / - / 171 / A4	PA_10	PC_2 / A4	19
18	SPI1 CS	137	62 / - / 137 / SPI1_CS	-	PI_0	48
19	Analog 5 [A5]	172	63 / - / 172 / A5	-	PC_3 / A5	20
20	SPI1 SCLK	134	64 / - / 134 / SPI1_SCLK	-	PI_1	47
21	Analog 6 [A6]	173	65 / - / 173 / A6	PB_10	PA_4 / A6	21
22	SPI1 CIPO	136	66 / - / 136 / SPI1_CIPO	-	PC_2	45
23	Analog 7 [A7]	174	67 / - / 174 / A7	PA_11	PA_6 / A7	22
24	SPI1 COPI	135	68 / - / 135 / SPI1_COPI	-	PC_3	46
25	PWM0	183	69 / - / 183 / PWM0	PD_15	PA_8	0
26	I2C0 SDA	147	70 / - / 147 / I2C0_SDA	PA_8	PH_15	11
27	PWM1	184	71 / - / 184 / PWM1	-	PC_6	1
28	I2C0 SCL	146	72 / - / 146 / I2C0_SCL	-	PI_3	12
29	PWM2	185	73 / - / 185 / PWM2	-	PC_7	2
30	I2C1 SDA	145	74 / - / 145 / I2C1_SDA	-	PB_7	37
31	PWM3	186	75 / - / 186 / PWM3	-	PG_7	3
32	I2C1 SCL	144	76 / - / 144 / I2C1_SCL	-	PB_6	38

33	PWM4	187	77 / - / 187 / PWM4	-	PJ_11	4
34	I2C2 SDA	149	78 / - / 149 / I2C2_SDA	-	PH_12	39
35	PWM5	188	79 / - / 188 / PWM5	-	PK_1	5
36	I2C2 SCL	148	80 / - / 148 / I2C2_SCL	-	PH_11	40
37	PWM6	189	81 / - / 189 / PWM6	-	PH_15	6
38	SAI CLK	107	82 / - / 107 / SAI_CLK	-	PI_5	78
39	PWM7	190	83 / - / 190 / PWM7	-	PJ_7	23
40	SAI FS	106	84 / - / 106 / SAI_FS	-	PI_7	79
41	PWM8	191	85 / - / 191 / PWM8	-	PJ_10	24
42	SAI D0	108	86 / - / 108 / SAI_D0	-	PI_6	80
43	PWM9	192	87 / - / 192 / PWM9	-	PH_6	25
44	SAI D1	115	88 / - / 115 / SAI_D1	-	-	81

To effectively understand and use the GPIO designations outlined in the above tables, which are specific to the relevant environment, the following details should be considered:

- The **Linux** GPIO designations defined for the Portenta X8 are applicable within the ADB shell. It can also be used in Python® scripts by constructing a path to the GPIO pin in the system's file system.

  For more information, please refer to the Hello World Using Linux section of the Portenta Mid Carrier User Manual.

> **Note:** The Portenta.GPIO library will soon be released to add compatibility with the Portenta Mid Carrier, providing a dedicated and streamlined approach to managing all GPIOs using the Python® modes on the carrier.

- The **Python®** GPIO designations defined for the Portenta X8 are available via different modes through the official **Portenta.GPIO** library. It applies to the Breakout Header (J14-J15) pins of the Portenta Mid Carrier. These modes, in Python® script, are available as:

  - **BOARD** - e.g. GPIO.setmode(GPIO.BOARD)
  - **BCM** - e.g. GPIO.setmode(GPIO.BCM)
  - **X8** - e.g. GPIO.setmode(GPIO.X8)
  - **IMX** - e.g. GPIO.setmode(GPIO.IMX)

  The initial pair of methods align with the *RPi.GPIO* library's numbering conventions, specifically the **BOARD** and **BCM** modes.

  BOARD mode is based on the physical pin layout of the Breakout header. Meanwhile, **BCM** mode relies on the Broadcom SoC's GPIO numbering system.

The other two modes, **X8** and **IMX**, have distinctive approaches:

X8 mode employs strings for identification, consistent with the naming on the Portenta Mid Carrier's serigraphy. Meanwhile, the **IMX** mode uses the NXP standard for pin numbering.

The *gpio.py* example of the GPIO Pins section of the Portenta Mid Carrier User Manual can help you understand how these designations can be implemented—more information about the official Portenta.GPIO library can be found here.

- If desired, the Arduino GPIO designations for the Portenta X8 can be used within Arduino IDE. The GPIO definitions listed for the Portenta H7, compatible as well with the H7 Lite and H7 Lite Connected variant, and C33 are directly applicable within the Arduino IDE.

  For more information, please refer to the Hello World Using Arduino section of the Portenta Mid Carrier User Manual.