RPi BCM2835 GPIOs

Back to RPi_Low-level_peripherals

Note: BCM2711 (Raspberry Pi4) has its own page.

BCM2835 GPIO functions

This is a wiki-fied copy of Table 6-31 from the BCM2835 datasheet (http://www.raspberrypi.org/wp-content/uploads/2012/02/BCM2835-ARM-Peripherals.pdf) including any relevant errata, and additional info from the Compute Module datasheet (https://www.raspberrypi.org/documentation/hardware/computemodule/datasheet.md) and raspi-gpio (https://github.com/RPi-Distro/raspi-gpio/blob/master/raspi-gpio.c), with a few extra columns, all nicely hyperlinked together and cross-referenced so that clicking on a function name will automatically take you to the description of that function. Any GPIOs that aren't connected on the RaspberryPi Model B revision 2.0 circuit board are ~~crossed out~~, and the GPIOs available on the GPIO Connector (P1) or P5 are in **bold**, with their default function (according to the schematics (http://www.raspberrypi.org/wp-content/uploads/2012/10/Raspberry-Pi-R2.0-Schematics-Issue2.2_027.pdf)) in ***bold italics***.
(If you want to see how GPIO-pins map back to *actual* pins, see this page). A selection of common circuits for interfacing with the GPIOs is given at RPi_GPIO_Interface_Circuits.

GPIO Pins Alternative Function Assignment

	Bank	Pull	ALT0	ALT1	ALT2	ALT3	ALT4	ALT5	RPi Rev2.0 signal name / Rev1.0 if different	RPi Rev2.0 connection / Rev1.0 if different	RPi B connec (http://w.raspb ypi.org/ content oads/20 04/bplu pio.pn
GPIO0	0	High	SDA0	SA5	PCLK	AVEOUT_VCLK	AVEIN_VCLK		SDA0	S5-14 / P1-03	J8-27 (ID_SD)
GPIO1	0	High	SCL0	SA4	DE	AVEOUT_DSYNC	AVEIN_DSYNC		SCL0	S5-13 / P1-05	J8-28 (ID_SC)
GPIO2	0	High	***SDA1***	SA3	LCD_VSYNC	AVEOUT_VSYNC	AVEIN_VSYNC		SDA1	P1-03 / S5-14	J8-03
GPIO3	0	High	***SCL1***	SA2	LCD_HSYNC	AVEOUT_HSYNC	AVEIN_HSYNC		SCL1	P1-05 / S5-13	J8-05
GPIO4	0	High	***GPCLK0***	SA1	DPI_D0	AVEOUT_VID0	AVEIN_VID0	ARM_TDI	GPIO_GCLK	P1-07	J8-07
GPIO5	0	High	GPCLK1	SA0	DPI_D1	AVEOUT_VID1	AVEIN_VID1	ARM_TDO	CAM_CLK	S5-12	J8-29
GPIO6	0	High	GPCLK2	SOE_N / SE	DPI_D2	AVEOUT_VID2	AVEIN_VID2	ARM_RTCK	LAN_RUN	IC3-12	J8-31
GPIO7	0	High	***SPI0_CE1_N***	SWE_N / SRW_N	DPI_D3	AVEOUT_VID3	AVEIN_VID3		SPI_CE1_N	P1-26	J8-26
GPIO8	0	High	***SPI0_CE0_N***	SD0	DPI_D4	AVEOUT_VID4	AVEIN_VID4		SPI_CE0_N	P1-24	J8-24
GPIO9	0	Low	***SPI0_MISO***	SD1	DPI_D5	AVEOUT_VID5	AVEIN_VID5		SPI_MISO	P1-21	J8-21
GPIO10	0	Low	***SPI0_MOSI***	SD2	DPI_D6	AVEOUT_VID6	AVEIN_VID6		SPI_MOSI	P1-19	J8-19
GPIO11	0	Low	***SPI0_SCLK***	SD3	DPI_D7	AVEOUT_VID7	AVEIN_VID7		SPI_SCLK	P1-23	J8-23
~~GPIO12~~	0	Low	PWM0	SD4	DPI_D8	AVEOUT_VID8	AVEIN_VID8	ARM_TMS	nc		J8-32
~~GPIO13~~	0	Low	PWM1	SD5	DPI_D9	AVEOUT_VID9	AVEIN_VID9	ARM_TCK	nc		J8-33
GPIO14	0	Low	***TXD0***	SD6	DPI_D10	AVEOUT_VID10	AVEIN_VID10	TXD1	TXD0	P1-08	J8-08
GPIO15	0	Low	***RXD0***	SD7	DPI_D11	AVEOUT_VID11	AVEIN_VID11	RXD1	RXD0	P1-10	J8-10
GPIO16	0	Low	FL0	SD8	DPI_D12	CTS0	SPI1_CE2_N	CTS1	STATUS_LED_N	D5 (ACT LED) / D5 (OK LED)	J8-36
GPIO17	0	Low	FL1	SD9	DPI_D13	RTS0	SPI1_CE1_N	RTS1	GPIO_GEN0	P1-11	J8-11
GPIO18	0	Low	PCM_CLK	SD10	DPI_D14	BSCSL SDA / MOSI	SPI1_CE0_N	PWM0	GPIO_GEN1	P1-12	J8-12
~~GPIO19~~	0	Low	PCM_FS	SD11	DPI_D15	BSCSL SCL / SCLK	SPI1_MISO	PWM1	nc		J8-35
~~GPIO20~~	0	Low	PCM_DIN	SD12	DPI_D16	BSCSL / MISO	SPI1_MOSI	GPCLK0	nc		J8-38
GPIO21	0	Low	PCM_DOUT	SD13	DPI_D17	BSCSL / CE_N	SPI1_SCLK	GPCLK1	CAM_GPIO / GPIO_GEN2	S5-11 / P1-13	J8-40
GPIO22	0	Low	SD0_CLK	SD14	DPI_D18	SD1_CLK	ARM_TRST		GPIO_GEN3	P1-15	J8-15
GPIO23	0	Low	SD0_CMD	SD15	DPI_D19	SD1_CMD	ARM_RTCK		GPIO_GEN4	P1-16	J8-16
GPIO24	0	Low	SD0_DAT0	SD16	DPI_D20	SD1_DAT0	ARM_TDO		GPIO_GEN5	P1-18	J8-18
GPIO25	0	Low	SD0_DAT1	SD17	DPI_D21	SD1_DAT1	ARM_TCK		GPIO_GEN6	P1-22	J8-22

~~GPIO26~~	0	Low	SD0_DAT2	TE0	DPI_D22	SD1_DAT2	ARM_TDI		nc		J8-37
GPIO27	0	Low	SD0_DAT3	TE1	DPI_D23	SD1_DAT3	ARM_TMS		GPIO_GEN2 / CAM_GPIO	P1-13 / S5-11	J8-13
GPIO28	1	-	SDA0	SA5	PCM_CLK	FL0			GPIO_GEN7 / CONFIG0	P5-03 / R10 or R8	
GPIO29	1	-	SCL0	SA4	PCM_FS	FL1			GPIO_GEN8 / CONFIG1	P5-04 / R9 or R7	
GPIO30	1	Low	TE0	SA3	PCM_DIN	CTS0		CTS1	GPIO_GEN9 / CONFIG2	P5-05 / R6 or R4	
GPIO31	1	Low	FL0	SA2	PCM_DOUT	RTS0		RTS1	GPIO_GEN10 / CONFIG3	P5-06 / R5 or R3	
~~GPIO32~~	1	Low	GPCLK0	SA1	RING_OCLK	TXD0		TXD1	nc		
~~GPIO33~~	1	Low	FL1	SA0	TE1	RXD0		RXD1	nc		
~~GPIO34~~	1	High	GPCLK0	SOE_N / SE	TE2	SD1_CLK			nc		
~~GPIO35~~	1	High	SPI0_CE1_N	SWE_N / SRW_N		SD1_CMD			nc		
~~GPIO36~~	1	High	SPI0_CE0_N	SD0	TXD0	SD1_DAT0			nc		
~~GPIO37~~	1	Low	SPI0_MISO	SD1	RXD0	SD1_DAT1			nc		
~~GPIO38~~	1	Low	SPI0_MOSI	SD2	RTS0	SD1_DAT2			nc		
~~GPIO39~~	1	Low	SPI0_SCLK	SD3	CTS0	SD1_DAT3			nc		
GPIO40	1	Low	PWM0	SD4		SD1_DAT4	SPI2_MISO	TXD1	PWM0_OUT	R21	
~~GPIO41~~	1	Low	PWM1	SD5	TE0	SD1_DAT5	SPI2_MOSI	RXD1	nc		
~~GPIO42~~	1	Low	GPCLK1	SD6	TE1	SD1_DAT6	SPI2_SCLK	RTS1	nc		
~~GPIO43~~	1	Low	GPCLK2	SD7	TE2	SD1_DAT7	SPI2_CE0_N	CTS1	nc		
~~GPIO44~~	1	-	GPCLK1	SDA0	SDA1	TE0	SPI2_CE1_N		nc		
GPIO45	1	-	PWM1	SCL0	SCL1	TE1	SPI2_CE2_N		PWM1_OUT	R27	
GPIO46	2	High	SDA0	SDA1		<internal>			HDMI_HPD_P	IC1-6	
GPIO47	2	High	SCL0	SCL1		<internal>			SD_CARD_DET	S8-10	
GPIO48	2	High	SD0_CLK			SD1_CLK			SD_CLK_R	R48	
GPIO49	2	High	SD0_CMD			SD1_CMD			SD_CMD_R	R47	
GPIO50	2	High	SD0_DAT0			SD1_DAT0			SD_DATA0_R	R49	
GPIO51	2	High	SD0_DAT1			SD1_DAT1			SD_DATA1_R	R50	
GPIO52	2	High	SD0_DAT2			SD1_DAT2			SD_DATA2_R	R45	
GPIO53	2	High	SD0_DAT3			SD1_DAT3			SD_DATA3_R	R46	
	Bank	**Pull**	**ALT0**	**ALT1**	**ALT2**	**ALT3**	**ALT4**	**ALT5**	**RPi Rev2.0 signal name / Rev1.0 if different**	**RPi Rev2.0 connection / Rev1.0 if different**	**RPi B connec (http://w.raspb ypi.org/ content oads/20 04/bplu pio.pn**

As in the table above, the GPIOs available on the GPIO Connector (P1) or P5 are in **bold**, with their default function (according to the schematics (http://www.raspberrypi.org/wp-content/uploads/2012/10/Raspberry-Pi-R2.0-Schematics-Issue2.2_027.pdf)) in ***bold italics***.

Special function legend:

Name	Function	Datasheet section	GPIOs	DeviceTree (http://www.raspberrypi.org/documentation/configuration/pin-configuration.md) 'function'
SDA0	BSC master 0 data line	BSC	GPIO0 **GPIO28** ~~GPIO44~~	i2c0
SCL0	BSC master 0 clock line	BSC	GPIO1 **GPIO29** GPIO45	i2c0
SDA1	BSC master 1 data line	BSC	***GPIO2*** ~~GPIO44~~	i2c1
SCL1	BSC master 1 clock line	BSC	***GPIO3*** GPIO45	i2c1

GPCLK0	General purpose Clock 0	**<TBD>**	***GPIO4*** ~~GPIO20~~ ~~GPIO32~~ ~~GPIO34~~	gp_clk
GPCLK1	General purpose Clock 1	**<TBD>**	GPIO5 GPIO21 ~~GPIO42~~ ~~GPIO44~~	gp_clk
GPCLK2	General purpose Clock 2	**<TBD>**	GPIO6 ~~GPIO43~~	gp_clk
SPI0_CE1_N	SPI0 Chip select 1	SPI	***GPIO7*** ~~GPIO35~~	spi
SPI0_CE0_N	SPI0 Chip select 0	SPI	***GPIO8*** ~~GPIO36~~	spi
SPI0_MISO	SPI0 MISO	SPI	***GPIO9*** ~~GPIO37~~	spi
SPI0_MOSI	SPI0 MOSI	SPI	***GPIO10*** ~~GPIO38~~	spi
SPI0_SCLK	SPI0 Serial clock	SPI	***GPIO11*** ~~GPIO39~~	spi
PWMx	Pulse Width Modulator 0..1	Pulse Width Modulator	PWM0: ~~GPIO12~~ **GPIO18** GPIO40 PWM1: ~~GPIO13~~ ~~GPIO19~~ ~~GPIO41~~ GPIO45	pwm
TXD0	UART 0 Transmit Data	UART	***GPIO14*** ~~GPIO32~~ ~~GPIO36~~	uart0
RXD0	UART 0 Receive Data	UART	***GPIO15*** ~~GPIO33~~ ~~GPIO37~~	uart0
CTS0	UART 0 Clear To Send	UART	GPIO16 **GPIO30** ~~GPIO39~~	uart0
RTS0	UART 0 Request To Send	UART	**GPIO17** **GPIO31** ~~GPIO38~~	uart0
PCM_CLK	PCM clock	PCM Audio	**GPIO18** **GPIO28**	pcm
PCM_FS	PCM Frame Sync	PCM Audio	~~GPIO19~~ **GPIO29**	pcm
PCM_DIN	PCM Data in	PCM Audio	~~GPIO20~~ **GPIO30**	pcm
PCM_DOUT	PCM data out	PCM Audio	GPIO21 **GPIO31**	pcm
SAx	Secondary mem Address bus	Secondary Memory Interface	many	smi
SOE_N / SE	Secondary mem. Controls	Secondary Memory Interface	GPIO6 ~~GPIO34~~	smi
SWE_N / SRW_N	Secondary mem. Controls	Secondary Memory Interface	**GPIO7** ~~GPIO35~~	smi
SDx	Secondary mem. data bus	Secondary Memory Interface	many	smi
BSCSL SDA / MOSI	BSC slave Data, SPI slave MOSI	BSC/SPI slave	**GPIO18**	spi_slave
BSCSL SCL / SCLK	BSC slave Clock, SPI slave clock	BSC/SPI slave	~~GPIO19~~	spi_slave
BSCSL - / MISO	BSC <not used>, SPI MISO	BSC/SPI slave	~~GPIO20~~	spi_slave
BSCSL - / CE_N	BSC <not used>, SPI CSn	BSC/SPI slave	GPIO21	spi_slave
SPI1_CEx_N	SPI1 Chip select 0-2	Auxiliary I/O	SPI1_CE0_N: **GPIO18** SPI1_CE1_N: **GPIO17** SPI1_CE2_N: GPIO16	spi1
SPI1_MISO	SPI1 MISO	Auxiliary I/O	~~GPIO19~~	spi1
SPI1_MOSI	SPI1 MOSI	Auxiliary I/O	~~GPIO20~~	spi1
SPI1_SCLK	SPI1 Serial clock	Auxiliary I/O	GPIO21	spi1
TXD1	UART 1 Transmit Data	Auxiliary I/O	**GPIO14** ~~GPIO32~~ GPIO40	uart1
RXD1	UART 1 Receive Data	Auxiliary I/O	**GPIO15** ~~GPIO33~~ ~~GPIO41~~	uart1
CTS1	UART 1 Clear To Send	Auxiliary I/O	GPIO16 **GPIO30** ~~GPIO43~~	uart1
RTS1	UART 1 Request To Send	Auxiliary I/O	**GPIO17** **GPIO31** ~~GPIO42~~	uart1
SPI2_CEx_N	SPI2 Chip select 0-2	Auxiliary I/O	SPI2_CE0_N: ~~GPIO43~~ SPI2_CE1_N: ~~GPIO44~~ SPI2_CE2_N: GPIO45	spi2
SPI2_MISO	SPI2 MISO	Auxiliary I/O	GPIO40	spi2
SPI2_MOSI	SPI2 MOSI	Auxiliary I/O	~~GPIO41~~	spi2
SPI2_SCLK	SPI2 Serial clock	Auxiliary I/O	~~GPIO42~~	spi2
ARM_TRST	ARM JTAG reset	**<TBD>**	**GPIO22**	arm_jtag
ARM_RTCK	ARM JTAG return clock	**<TBD>**	GPIO6 **GPIO23**	arm_jtag

ARM_TDO	ARM JTAG Data out	**<TBD>**	**GPIO5 GPIO24**	arm_jtag
ARM_TCK	ARM JTAG Clock	**<TBD>**	~~GPIO13~~ **GPIO25**	arm_jtag
ARM_TDI	ARM JTAG Data in	**<TBD>**	**GPIO4** ~~GPIO26~~	arm_jtag
ARM_TMS	ARM JTAG Mode select	**<TBD>**	~~GPIO12~~ **GPIO27**	arm_jtag
PCLK	DPI Pixel Clock	Parallel Display Interface (https://www.raspberrypi.org/documentation/hardware/raspberrypi/dpi/README.md)	GPIO0	dpi
DE	DPI Data Enable	Parallel Display Interface (https://www.raspberrypi.org/documentation/hardware/raspberrypi/dpi/README.md)	GPIO1	dpi
LCD_VSYNC	DPI Vertical Sync	Parallel Display Interface (https://www.raspberrypi.org/documentation/hardware/raspberrypi/dpi/README.md)	GPIO2	dpi
LCD_HSYNC	DPI Horizontal Sync	Parallel Display Interface (https://www.raspberrypi.org/documentation/hardware/raspberrypi/dpi/README.md)	GPIO3	dpi
DPI_Dx	DPI Parallel Data	Parallel Display Interface (https://www.raspberrypi.org/documentation/hardware/raspberrypi/dpi/README.md)	many	dpi
Name	**Function**	**Datasheet section**	**GPIOs**	**DeviceTree (http://www.raspberrypi.org/documentation/configuration/pin-configuration.md) 'function'**