Power Supply

LiPo Charger

CHARGING1 — LED/YELLOW/0603
R2 — 2.2k/R0402
U1 — CHRGb BATTERY CHARGER — BL4054B-42TPRN(SOT23-5)
R1 — 10k/R0402
C1 — 22uF/6.3V/20%/X5R/C0603
R4 — Rprog — 10k/R0402
I(Bat)
I(Bat) = 1000/Rprog = 100mA
Recommended LI-PO battery:
https://www.olimex.com/Products/Power/BATTERY-LIPO1400mAh/

FET1 — WPM2015-3/TR
D2 — 1N5819S4/SOD123
BAT1 — 3.7V LI-PO Battery Connector — DW02S
Voltage & Polarity!!!
C3 — 22uF/6.3V/20%/X5R/C0603

U2 — SY8089AAAC(SOT23-5)
Vout=0.6*(1+Ra/Rb)
L1 — 2.2uH/1.5A/DCR=72mR/20%/3.00x3.00x1.50mm/CIG32(WE3015T2R2M)
R10 — Ra — 220k/R0402
R11 — Rb — 49.9k/1%/R0402
C5 — 22uF/6.3V/20%/X5R/C0603

Battery Measurement

Vref(ADC) = 1.1V!
R6 — 470k/R0402
R7 — 150k/R0402
C4 — 100nF/10V/10%/X7R/C0402
GPIO6\BAT_SENS

External Power Sense

R8 — 220k/R0402
R9 — 470k/R0402
GPIO5\PWR_SENS

USB to UART

USB-UART1 — USB-C-16P-F(A40-00119-A52-12)
D1 — 1N5819S4/SOD123
UD-
UD+
R3 — 5.1k/R0603
R5 — 5.1k/R0603

Auto program

DTR	RTS->EN	IO0
1	1	1
0	0	1
1	0	0
0	1	1
1	1	0

U3 — CH340X(MSOP-10)
C2 — 100nF/10V/10%/X7R/C0402
R24 — 100R/R0402 — GPIO44\U0RXD
R12 — 4.7k/R0402 — GPIO43\U0TXD

T1 — BC817-40(SOT23)
T2 — BC817-40(SOT23)
R22 — 1k/R0402
R23 — 1k/R0402
R27 — NA/R0402
GPIO0\BUT1
ESP_EN

pUEXT

pUEXT1 — BM10B-SRSS-TB
R19 — 2.2k/R0402
R20 — 2.2k/R0402
R21 — 10k/R0402
GPIO17\U1TXD
GPIO18\U1RXD
GPIO47\I2C_SCL
GPIO48\I2C_SDA
GPIO13\FSPIQ(SPI3_MISO)
GPIO11\FSPID(SPI3_MOSI)
GPIO12\FSPICLK(SPI3_CLK)
GPIO10\FSPICS0(SPI3_CS0)

Extensions

J1

EXT1 — HN1x22
+3.3V at Iout(max)=600mA, Power Out!
+5V Only!!! Power In/Out
ESP_EN
GPIO4
GPIO5\PWR_SENS
GPIO6\BAT_SENS
GPIO7
GPIO15
GPIO16
GPIO17\U1TXD
GPIO18\U1RXD
GPIO8
GPIO3
GPIO46
GPIO9
GPIO10\FSPICS0(SPI3_CS0)
GPIO11\FSPID(SPI3_MOSI)
GPIO12\FSPICLK(SPI3_CLK)
GPIO13\FSPIQ(SPI3_MISO)
GPIO14

J3

EXT2 — HN1x22
GPIO43\U0TXD
GPIO44\U0RXD
GPIO1
GPIO2
GPIO42
GPIO41
GPIO40
GPIO39
GPIO38\LED1
*NC GPIO37
*NC GPIO36
*NC GPIO35
GPIO0\BUT1
GPIO45
GPIO48\I2C_SDA
GPIO47\I2C_SCL
GPIO21
GPIO20\USB_D+
GPIO19\USB_D-

Extension's pinout is fully compatible to the Espressif's ESP32-S3-DevKitC-1.

ESP32-S3-WROOM MODULE

ESPRESSIF

U4 — ESP32-S3-WROOM-1-N8R8
*In module variants that have embedded OSPI PSRAM, i.e., that embed ESP32-S3R8, pins IO35, IO36 and IO37 are connected to the OSPI PSRAM and are not available for other uses.
Note: ESP32-S3 has four strapping pins: GPIO0, GPIO3, GPIO45 and GPIO46. GPIO0, GPIO46 and GPIO45 are connected to the chip's internal weak pull-up/pull-down during the chip reset. GPIO3 is floating by default.

3V3		27	GPIO0\BUT1
	IO1/RTC_GPIO1/GPIO1/TOUCH1/ADC1_CH0	39	GPIO1
	IO2/RTC_GPIO2/GPIO2/TOUCH2/ADC1_CH1	38	GPIO2
	IO3/RTC_GPIO3/GPIO3/TOUCH3/ADC1_CH2	15	GPIO3
	IO4/RTC_GPIO4/GPIO4/TOUCH4/ADC1_CH3	4	GPIO4
	IO5/RTC_GPIO5/GPIO5/TOUCH5/ADC1_CH4	5	GPIO5\PWR_SENS
GND	IO6/RTC_GPIO6/GPIO6/TOUCH6/ADC1_CH5	6	GPIO6\BAT_SENS
GND	IO7/RTC_GPIO7/GPIO7/TOUCH7/ADC1_CH6	7	GPIO7
EPAD(GND)	IO8/RTC_GPIO8/GPIO8/TOUCH8/ADC1_CH7/SUBSPICS1	12	GPIO8
	IO9/RTC_GPIO9/GPIO9/TOUCH9/ADC1_CH8/FSPIHD/SUBSPIHD	17	GPIO9
	IO10/RTC_GPIO10/GPIO10/TOUCH10/ADC1_CH9/FSPICS0/FSPIIO4/SUBSPICS0	18	GPIO10\FSPICS0(SPI3_CS0)
	IO11/RTC_GPIO11/GPIO11/TOUCH11/ADC2_CH0/FSPID/FSPIIO5/SUBSPID	19	GPIO11\FSPID(SPI3_MOSI)
	IO12/RTC_GPIO12/GPIO12/TOUCH12/ADC2_CH1/FSPICLK/FSPIIO6/SUBSPICLK	20	GPIO12\FSPICLK(SPI3_CLK)
	IO13/RTC_GPIO13/GPIO13/TOUCH13/ADC2_CH2/FSPIQ/FSPIIO7/SUBSPIQ	21	GPIO13\FSPIQ(SPI3_MISO)
	IO14/RTC_GPIO14/GPIO14/TOUCH14/ADC2_CH3/FSPIWP/FSPIDQS/SUBSPIWP	22	GPIO14
	IO15/RTC_GPIO15/GPIO15/U0RTS/ADC2_CH4/XTAL_32K_P	8	GPIO15
	IO16/RTC_GPIO16/GPIO16/U0CTS/ADC2_CH5/XTAL_32K_N	9	GPIO16
EN	IO17/RTC_GPIO17/GPIO17/U1TXD/ADC2_CH6	10	GPIO17\U1TXD
	IO18/RTC_GPIO18/GPIO18/U1RXD/ADC2_CH7/CLK_OUT3	11	GPIO18\U1RXD
	IO19/RTC_GPIO19/GPIO19/U1RTS/ADC2_CH8/CLK_OUT2/USB_D-	13	GPIO19\USB_D-
	IO20/RTC_GPIO20/GPIO20/U1CTS/ADC2_CH9/CLK_OUT1/USB_D+	14	GPIO20\USB_D+
	IO21/RTC_GPIO21/GPIO21	23	GPIO21
	IO35*/SPIIO6/GPIO35/FSPID/SUBSPID	28	*NC GPIO35
	IO36*/SPIIO7/GPIO36/FSPICLK/SUBSPICLK	29	*NC GPIO36
	IO37*/SPIDQS/GPIO37/FSPIQ/SUBSPIQ	30	*NC GPIO37
	IO38/GPIO38/FSPIWP/SUBSPIWP	31	GPIO38\LED1
	IO39/MTCK/GPIO39/CLK_OUT3/SUBSPICS1	32	GPIO39
	IO40/MTDO/GPIO40/CLK_OUT2	33	GPIO40
	IO41/MTDI/GPIO41/CLK_OUT1	34	GPIO41
	IO42/MTMS/GPIO42	35	GPIO42
	TXD0/U0TXD/GPIO43/CLK_OUT1	37	GPIO43\U0TXD
	RXD0/U0RXD/GPIO44/CLK_OUT2	36	GPIO44\U0RXD
	IO45/GPIO45	26	GPIO45
	IO46/GPIO46	16	GPIO46
	IO47/SPICLK_P_DIFF/GPIO47/SUBSPICLK_P_DIFF	24	GPIO47\I2C_SCL
	IO48/SPICLK_N_DIFF/GPIO48/SUBSPICLK_N_DIFF	25	GPIO48\I2C_SDA

C6 — 22uF/6.3V/20%/X5R/C0603
C7 — 100nF/25V/10%/X7R/C0402
R14 — 10k/R0402
ESP_EN
C8 — 1uF/10V/10%/X5R/C0603
PWR_FLAG
R18 — 10k/R0402
GPIO3 when
1: JTAG signal from USB Serial/JTAG controller
0: JTAG signal from on-chip JTAG pins

USER LED

R13 — 2.2k/R0402
LED1 — LED/Green/0603
GPIO38\LED1

Fiducials

FID1 — Fiducial
FID2 — Fiducial
FID3 — Fiducial
FID4 — Fiducial

Reset Button

RST1 — YTS-A016-X
ESP_EN

USER Button

R15 — 100R/R0402
BUT1 — YTS-A016-X
GPIO0\BUT1

USB-OTG

Full-speed USB 1.1 On-The-Go (OTG) interface or USB Serial/JTAG controller.
The ESP32-S3 contains an USB Serial/JTAG Controller. This unit can be used to program the SoC's flash, read program output, as well as attach a debugger to the running program.
The ESP32-S3 has an Internal PHY, which is shared between the USB-OTG and the USB Serial/JTAG hardware. Either one of these can use the internal PHY.

USB-OTG1 — USB-C-16P-F(A40-00119-A52-12)
D3 — 1N5819S4/SOD123
R16 — 5.1k/R0603
R17 — 5.1k/R0603

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