Power Supply

+5VP PWR_FLAG PWR_FLAG +5V
+5V_USB
FET1 WPM2015-3/TR
D1 1N5819S4/SOD123
LED/RED/0603 PWR1

LiPo Charger

CHARGING
CHRG1 LED/YELLOW/0603
R8 2.2k/R0402
U3 BL4054B-42PRN(SOT23-5)
IBAT = 1000/Rprog = 100mA
C1
VCC_VBAT
BATTERY CHARGE PROG
R5 R6 Rprog DWO2R
BAT1

WPM2015-3/TR FET2
D3 1N5819S4/SOD123
PWR_FLAG +3.3V
U7 SY8089AAAC(SOT23-5) L2
Vout=0.6*(1+Ra/Rb)

Battery Measurement
R7 470k/R0402
R16 100k/R0402
GPI35
C28

External Power Sense
+5V
R4 47k/R0402
R29 100k/R0402
GPI39

Ethernet

+3.3V
FET3 WPM2015-3/TR
R2 10k/R0402
R3 1M/R0402
T1 LMUN2211LT1G(SOT-23)
GPIO12/PHY_PWR
PWR_FLAG +3.3VLAN

L1 FB0805/600R/2A
C14 100nF/16V/10%/X7R/C0402
C9
U4 LAN8710A-EZC(QFN32)
VDDIO TXD0
VDD1A TXD1
VDD2A TXD2
VDDCR TXD3
TXCLK TXEN
NINT/TXER/TXD4
RXD0/MODE0
RXD1/MODE1
RXD2/RMIISEL
RXD3/PHYAD2
RXCLK/PHYAD1
RXDV
RXER/RXD4/PHYAD0
XTAL2
XTAL1/CLKIN
MDC
MDIO
LED2/NINTSEL CRS
LED1/REGOFF COL/CRS_DV/MODE2
TXP
TXN
RXP
RXN NRST
RBIAS

In RMII Mode

TVS1 ESDS314DBVR(SOT-23-5)

LAN_CON1
RJP-003TC1(LPJ4112CNL)
Single 10/100 BASE-TX Filter Connector Module
2x1000pF/2KV
2x75 Ohm
Shield
Spare1 Spare2

GPIO19/EMAC_TXD0(RMII)
GPIO22/EMAC_TXD1(RMII)
GPIO21/EMAC_TX_EN(RMII)
GPIO25/EMAC_RXD0(RMII)
GPIO26/EMAC_RXD1(RMII)
GPIO23/MDC(RMII)
GPIO18/MDIO(RMII)
GPIO27/EMAC_RX_CRS_DV

The PHY is setted up as follows:
MODE: All capable(10/100Base)
-Auto-negotiation enabled
-RMII Configuration
-SMI address: 0x00

Galvanic Isolated Part

USB to UART

PWR_FLAG +3.3V
R18 10k/R0402
R19 10k/R0402
U1 CH340T(SSOP20W)
VCC V3 TXD RXD
GND RTS# CTS# DTR# DCD#
RI# NOS# IR#
UD- UD+ XI XO
D6 1N5819S4/SOD123
D7 1N5819S4/SOD123
D9 1N5819S4/SOD123
ESP_EN GPIO3/U0RXD GPIO1/U0TXD

USB-UART1 MISB-SWMM-5B-LF(USB_MICRO)
VBUS D- D+ ID GND
+5V_USB USB_D- USB_D+
C7 C8
Q12MHz/20pF/10ppm/4P/3.2x2.5mm
Q1
R20 1k/R0402
Q2 BC817-40(SOT23)
R21 1k/R0402
Q3 BC817-40(SOT23)
R24 220R/R0402
D2 BAT54C(SOT23-3)
GPIO0 D_Com
GPIO2/HS2_DATA0

Auto program
DTR RTS → EN I/O0

ESP32-WROOM-32D MODULE

+3.3V
U9 ESP-WROOM-32 MODULE
ESP32-WROOM-32D-4MB
3V3 GND GND GND
GPIO0/ADC2_CH1/TOUCH1/RTC_GPIO11/CLK_OUT1/EMAC_TX_CLK
GPIO1/U0TXD/CLK_OUT3/EMAC_RXD2
GPIO2/ADC2_CH2/TOUCH2/RTC_GPIO12/HSPIWP/HS2_DATA0/SD_DATA0
GPIO3/U0RXD/CLK_OUT2
GPIO4/ADC2_CH0/TOUCH0/RTC_GPIO10/HSPIHD/HS2_DATA1/SD_DATA1/EMAC_TX_ER
GPIO5/VSPICS0/HS1_DATA6/EMAC_RX_CLK
GPIO7/SD_DATA0/SPIQ/HS1_DATA1/U2RTS
GPIO8/SD_DATA1/SPID/HS1_DATA2/U2CTS
GPIO9/SD_DATA2/SPIHD/HS1_DATA3/U1RXD
GPIO10/SD_DATA3/SPIWP/HS1_DATA3/U1TXD
GPIO11/SD_CMD/SPICS0/HS1_DATA0/U1RTS
GPIO12/ADC2_CH5/TOUCH5/RTC_GPIO15/MTDI/HSPIQ/HS2_DATA2/SD_DATA2/EMAC_TXD3
GPIO13/ADC2_CH4/TOUCH4/RTC_GPIO14/MTCK/HSPID/HS2_DATA3/SD_DATA3/EMAC_RX_ER
GPIO14/ADC2_CH6/TOUCH6/RTC_GPIO16/MTMS/HSPICLK/HS2_CLK/SD_CLK/EMAC_TXD2
GPIO15/ADC2_CH3/TOUCH3/MTDO/HSPICS0/RTC_GPIO13/HS2_CMD/SD_CMD/EMAC_RXD3
GPIO16/HS1_DATA4/U2RXD/EMAC_CLK_OUT
GPIO17/HS1_DATA5/U2TXD/EMAC_CLK_OUT_180
GPIO18/VSPICLK/HS1_DATA7
GPIO19/VSPIQ/U0CTS/EMAC_TXD0
GPIO21/VSPIHD/EMAC_TX_EN
GPIO22/VSPIWP/U0RTS/EMAC_TXD1
GPIO23/VSPID/HS1_STROBE
GPIO25/DAC_1/ADC2_CH8/RTC_GPIO6/EMAC_RXD0
GPIO26/DAC_2/ADC2_CH9/RTC_GPIO7/EMAC_RXD1
GPIO27/ADC2_CH7/TOUCH7/RTC_GPIO17/EMAC_RX_DV
GPIO32/XTAL_32K_P/ADC1_CH4/TOUCH9/RTC_GPIO9
GPIO33/XTAL_32K_N/ADC1_CH5/TOUCH8/RTC_GPIO8
GPIO34/ADC1_CH6/RTC_GPIO4
GPIO35/ADC1_CH7/RTC_GPIO5
GPIO36/SENSOR_VP/ADC1_CH0/RTC_GPIO0
GPIO39/SENSOR_VN/ADC1_CH3/ADC_H/RTC_GPIO3
THERMAL_PAD NC

R32 10k/R0402
ESP_EN C31

GPIO0
GPIO1/U0TXD
GPIO2/HS2_DATA0
GPIO3/U0RXD
GPIO4/U3TXD
GPIO5/SPLCS
GPIO12/PHY_PWR
GPIO13/I2C-SDA
GPIO14/HS2_CLK
GPIO15/HS2_CMD
GPIO16/I2C-SCL
GPIO17/EMAC_CLK_OUT_180
GPIO18/MDIO(RMII)
GPIO19/EMAC_TXD0(RMII)
GPIO21/EMAC_TX_EN(RMII)
GPIO22/EMAC_TXD1(RMII)
GPIO23/MDC(RMII)
GPIO25/EMAC_RXD0(RMII)
GPIO26/EMAC_RXD1(RMII)
GPIO27/EMAC_RX_CRS_DV
GPIO32
GPIO33
GPIO34/BUT1
GPIO35
GPIO36/U1RXD
GPIO39

PoE Power Supply

Spare1 Spare2
D10 SMAJ58A/SMA
U2 TPS2375PW(TSSOP-8)
DET ILIM VDD PG NC CLASS VSS RTN
Class=0 (0.44 to 12.95W)
R41 4.7k/R2512
R28
U5 TX4138(ESOIC-8)
EN ILIM VIN POK FB
R33 C12
L4
5V/4A
D5
C25 C26
PWR_FLAG +5VP
DCDC1 F0505S-2WR2(SIP-7)
5V_DCDC
C20 C23
Vout=0.8*(1+Ra/Rb)

Buttons

+3.3V
R47 220R/R0402 BUT1 IT1105AU2 R48 10k/R0402
GND GPIO34/BUT1 R49 NA/R0402 D_Com
GND RST1 IT1105AU2 ESP_EN

SD/MMC Card

+3.3V
RM3B 10k/R0402 GPIO15/HS2_CMD
R39
L5 FB0805/600R/2A
GPIO14/HS2_CLK GPIO14/HS2_CLK R46 220R/R0402
RM3D RM3A RM3C RM1206 (4X0603) 4R8_2.2k
GPIO2/HS2_DATA0
MICRO_SD1
CD/DAT3/CS CMD/DI VDD GND CLK/SCLK VSS DAT0/DO DAT1/RES DAT2/RES
Card_Detect Card_Housing
TFC-9P-1.7H(ATFFS150A01BR016)

Extensions

EXT1 NS(HN1x10)
+5V +3.3V GND ESP_EN GPIO0 GPIO5/U0RXD GPIO3/U0RXD GPIO14/HS2_CLK GPIO5/SPLCS

EXT2 NS(HN1x10)
GPI39 GPIO36/U1RXD GPIO34/BUT1 GPIO33 GPIO32 GPIO15/I2C-SCL GPIO15/HS2_CMD GPIO16/I2C-SCL GPIO13/I2C-SDA

UEXT

+3.3V
R31 2.2k/R0402
UEXT1 P-B-V-10-LF
GPIO4/U1TXD GPIO16/I2C-SCL GPIO15/HS2_CMD GPIO14/HS2_CLK
GND
GPIO36/U1RXD GPIO13/I2C-SDA GPIO2/HS2_DATA0 GPIO5/SPLCS

Notes:

Internal Bootstrapping Resistors

MTDI/GPIO12:	Pull-Down
GPIO0:	Pull-Up
GPIO2:	Pull-Down
GPIO4:	Pull-Down
MTDO/GPIO15:	Pull-Up
GPIO5:	Pull-Up

Bootstrapping Pins Settings

Voltage of Internal LDO(VDD_SDIO)
Pin	Default	3.3V	1.8V
GPIO12/MTDI	Pull-Down	3.3V	1.8V

Booting Mode
Pin	Default	SPI Flash Boot	Download Boot
GPIO0	Pull-Up	1	0
GPIO2	Pull-Down	Don't-care	0

Debugging Log on U0TXD During Booting
Pin	Default	U0TXD Toggling	U0TXD Silent
GPIO15/MTDO	Pull-Up	1	0

Timing of SDIO Slave
Pin	Default	falling-edge input falling-edge output	falling-edge input Rising-edge output	Rising-edge input falling-edge output	Rising-edge input Rising-edge output
GPIO5	Pull-Up	0	0	1	1
GPIO15/MTDO	Pull-Up	0	1	0	1

Fiducials

FID1 Fiducial FID2 Fiducial FID3 Fiducial
FID4 Fiducial FID5 Fiducial FID6 Fiducial