ELRS Gemini TX - Power & Data

5V TO 3.3V LDOs

5V, TP4, C2 0805 16V X5R 10uF, U1 AZ1117IH-3.3TRG1 (INPUT, OUTPUT VOUT, GND), TP1, C3 0805 16V 22uF X5R, 3.3V_RX_1, GND

5V, U3 AZ1117IH-3.3TRG1, C10 0805 16V X5R 10uF, TP2, C11 0805 16V 22uF X5R, 3.3V_RX_2, GND

5V, U5 AZ1117IH-3.3TRG1, C13 0805 16V X5R 10uF, TP3, C14 0805 16V 22uF X5R, 3.3V_ESP, GND

DNP BULK CAPS

C24 1210 10V 47uF, C25 1210 10V 47uF, C26 1210 10V 47uF, C27 1210 10V 47uF (5V, GND)

VOLTAGE RAIL INDICATOR LEDS

3.3V_RX_1 — D2 0603 2V — LED_RX1 — R18 0603 1k — GND

3.3V_RX_2 — D3 0603 2V — LED_RX2 — R19 0603 1k — GND

3.3V_ESP — D4 0603 2V — LED_ESP — R20 0603 1k — GND

USB TO UART BRIDGE

5V_USB, USB_N, USB_P

D8, D7, D6 (GND)

J3 0475900001: VBUS, D-, D+, ID, GND, MH1–MH4

C21 0603 100nF 25V, C20 0603 4.7uF, C19 0603 10nF, C22 0603 47pF 50V, C23 0603 47pF 50V

R23 0603 10k, R24 0603 27R, R25 0603 27R

U8 FT231XS-R: VCC, 3V3OUT, VCCIO, RESET, USBDM, USBDP, CBUS0–CBUS3, RTS, CTS, RXD, TXD, DTR, DSR, DCD, RI, GND

FTDI_3V3, FT231_RST, USB_RX, USB_TX

MAIN ESP32 PICO

3.3V_ESP

C4 0603 1uF 16V, C5 0603 100nF 25V, C6 0603 100nF 25V, C7 0603 100nF 25V, C8 0603 100nF 25V, C9 0603 100nF 25V

R4 0603 10k, S1, C15 0603 25V 10uF, ESP32_EN

U4: VDDA, VDDA, VDDA, VDDA3P3, VDDA3P3, VDD3P3_CPU, VDD3P3_RTC, EN, SENSOR_VP, SENSOR_CAPP, SENSOR_CAPN, SENSOR_VN, IO34, IO35, IO32, IO33, IO25, IO26, IO27, IO14, IO12, IO13, IO15, IO2, IO0, VDD_SDIO, LNA_IN, IO4, IO16, IO17, SD2, SD3, CMD, CLK, SD0, SD1, IO5, IO18, IO23, IO19, IO22, U0RXD, U0TXD, IO21, XTAL_N_NC, XTAL_P_NC, CAP2_NC, CAP1_NC, GND

TP22 BUSY_1, TP23 DIO1_1, TP24 BUSY_2, TP25 DIO1_2

SPI: MOSI, MISO, SCLK, nCS1, nCS2 — SPI_MOSI, SPI_MISO, SPI_SCLK, SPI_nCS1, SPI_nCS2

R6 0603 33R, R7 0603 33R, NRST1, NRST2, TXEN_1, TXEN_2

TP11, TP12, TP13, TP20, TP21

R15 0603 10k, ESP32_BOOT0, J6 61300211121, ESP32_BOOT0

TP5, TP6, TP7, TP8 (GND)

AE1 1461750001 (FEED, GND), RF, C12 0603 10nF, ESP32_ANT

PWM_FAN, R8 0603 100R ESP32_PASS_TX, R9 0603 100R ESP32_PASS_RX, IO23, ESP01_EN, RGB_LED, R13 0603 100R ESP32_RX, R14 0603 100R ESP32_TX, TX16_UART_TX, TX16_UART_RX

TP9, TP10

Y1 GND GND, TP30, TP31

C28 0603 50V 8pF, C29 0603 50V 8pF

ESP 01F BACKPACK

3.3V_ESP

C18 0603 100nF 25V, R21 0603 10k, ESP01_EN

U7 ESP-01F-2M: VDD, EN, RST, GND, GND, ANT, ADC, RX, TX, IO16, IO14, IO12, IO13, IO15, IO2, IO0, IO4, IO5, EP, GND, GND

AE2 1461750001 (FEED, GND), RF, ESP01F_ANT

ESP01_RX, ESP01_TX, TP26, TP27

01F_IO16, D5 0603 2V 01F_LED, R22 0603 1k

ESP01_BOOT0

3.3V_ESP: R27 0603 10k, R5 0603 10k, R11 0603 10k, R12 0603 10k

ESP01_RX, USB_TX, TP29, TP28, J2, ESP32_PASS_TX, ESP32_RX

ESP01_TX, USB_RX, J4, ESP32_PASS_RX, ESP32_TX

ESP 01F BOOT0 CONTROL

3.3V_ESP, R17 0603 10k, ESP01_BOOT0

IO23, R16 0603 4.7k, Q1 MMBT3904-7-F, J7 61300211121

D1 (DIN, VSS, VDD, DOUT), C16 0603 2.2uF 50V

3.3V_RX_1: R2 0603 10k SPI_nCS1; C1 0603 16V 0.1uF

RF TX 1

U2 E28-2G4M27S: VCC, MISO_TX, MOSI_RX, SCK_RTSN, NSS_CTS, NRESET, BUSY, RX_EN, TX_EN, DIO3, DIO2, DIO1, GND

SPI: MISO, MOSI, SCLK, nCS1, nCS2

R1 0603 33R, NRST1, BUSY_1, TP14, DIO1_1

TP16 RXEN_1, TP17 TXEN_1

RF TX 2

3.3V_RX_2: C17 0603 16V 0.1uF; R3 0603 10k SPI_nCS2

U6 E28-2G4M27S: VCC, MISO_TX, MOSI_RX, SCK_RTSN, NSS_CTS, NRESET, BUSY, RX_EN, TX_EN, DIO3, DIO2, DIO1, GND

SPI: MISO, MOSI, SCLK, nCS1, nCS2

R10 0603 33R, NRST2, BUSY_2, TP15, DIO1_2

TP18 RXEN_2, TP19 TXEN_2

Using a 60900213421 jumper from Digi-Key, we can short a pair of nets together to make the desired UART bridge

1 & 2: USB flashes ESP01
2 & 3: USB flashes ESP32
4 & 1: ESP32 flashes ESP01 by UART passthrough

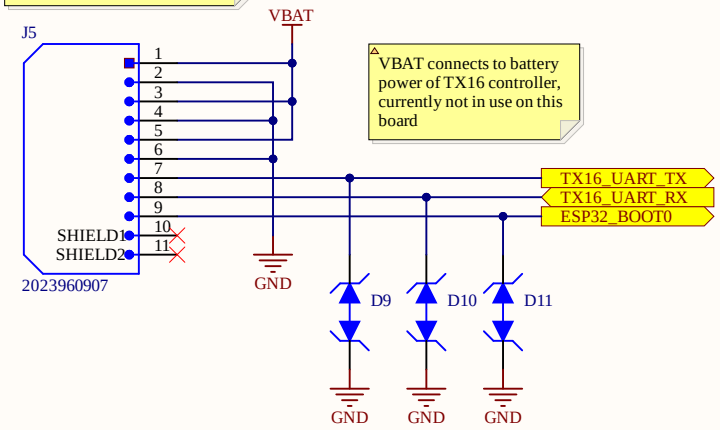
WARG
Waterloo Aerial Robotics Group
200 University Ave W
Waterloo, Ontario, Canada
N2L 3G1

PROJECT: ELRS Gemini TX.PrjPcb, [No Variations]	REVISION:
DOCUMENT: Power and Data.SchDoc	MODIFIED: 9/25/2023
ENGINEER:	REVIEWER: *
	SHEET 1 OF 2

ELRS Gemini TX - Connectors

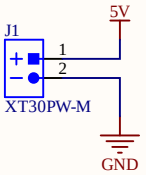
J5 on this board connects to J103 on the TX16 controller, TX16 schematic available here (https://uwarg-docs.atlassian.net/wiki/spaces/EL/pages/2257911809/Misc.+Research+Dump)

INPUT TX16 CONN



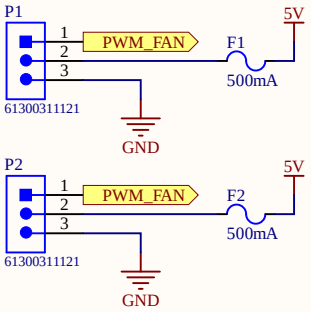
VBAT connects to battery power of TX16 controller, currently not in use on this board

INPUT POWER XT30

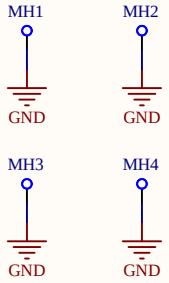


FAN CONNECTORS

Fan PN: Noctua NF-A4x10 5V



GEMINI TX PCB MOUNTING HOLES



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