LED matrix

LEDs
LEDs.sch

HUB75_R0 — R0
HUB75_G0 — G0
HUB75_B0 — B0
HUB75_A — A
HUB75_B — B
HUB75_C — C

OE — HUB75_OE
LAT — HUB75_LAT
CLK — HUB75_CLK
VCC — VCC
GND — GND

FID1 Fiducial   FID2 Fiducial
FID3 Fiducial   FID4 Fiducial

In case we messed up the DW01 protection circuit
JP1
SolderJumper_2_Open
GND 1 2 GND_PROT

DW-01
R35 470
VCC
C7 100nF
GND

VCC 5
GND 6
TD 4
CS 1
OC 2

1k R36
GND_PROT

Q6 Q7
AO3400 (A09T)
AO3400 (A09T)

USB + UART

ESP_FLASH
Q1
AO3400 (A09T)
R7 10k
Q2
R8 10k
ESP_EN

U8
CH340C
GND
RTS 14
DTR 13
DCD 12
RI 11
DSR 10
CTS 9
XO 8
XI 7
UD- 6   USB_DN
UD+ 5   USB_DP
GND 4
VCC 16
V3 3
RXD 3   ESP_TX
TXD 2   ESP_RX
R232 15

BLUE D257 R9 1k2
3V3
GREE D258 R10 1k2
3V3
3V3

J1 USB_B_Micro
GND
ID 4
D- 2   USB_DN
D+ 3   USB_DP
VBUS 1 5V_USB
Shield

Microcontroller

TODO:
- Add audio

J2
Conn_02x03_Counter_Clockwise
GND 2 1 3V3
SCL 4 3 SDA
6 5

C2 100nF
GND 3V3
R16 10k
3V3
C1 100nF
R15 10k
GND 3V3

ESP_EN
U11
ESP32-WROOM-32D
EN 3
SENSOR_VP 4
SENSOR_VN 5
VDD
TXD0/IO1 35
RXD0/IO3 34
IO0 25
IO2 24
IO4 26
IO5 29
IO12 14
IO13 16
IO14 13
IO15 23
IO16 27
IO17 28
IO18 30
IO19 31
IO21 33
IO22 36
IO23 37
IO25 10
IO26 11
IO27 12
IO32 8
IO33 9
IO34 6
IO35 7
SD0/SD0 21
SDI/SD1 22
SHD/SD2 17
SWP/SD3 18
SCK/CLK 20
SCS/CMD 19
GND

R17
BTN_A R18 10k
BTN_B R19 10k
3V3 3V3

ESP_FLASH
ESP_TX
ESP_RX
R18 10k GND   Enables serial bootloader when ESP_FLASH is driven LOW
SDA R20 10k 3V3
SCL R21 10k 3V3   i2c pullups likely need to be 2-4.7kOhm instead
R33 10k GND   Changes SDIO timing when driven LOW / Sets VDD_SDIO to 1.8V when driven HIGH

HUB75_R0
HUB75_B0
HUB75_G0 R23 10k 3V3   Hides bootloader output when driven LOW
HUB75_A
HUB75_B
HUB75_C
HUB75_LAT
HUB75_CLK
HUB75_OE
R24 10k CHARGE_ENABLE
DAC1
BTN_UP R25 10k 3V3
BTN_DOWN R26 10k 3V3
BTN_LEFT R27 10k 3V3
BTN_RIGHT R28 10k 3V3
VUSB_SENSE
VBAT_SENSE
GND

Used by HUB75 driver as PWM source

Buttons

SW1 SW_Push BTN_UP — GND
SW2 SW_Push BTN_DOWN — GND
SW3 SW_Push BTN_LEFT — GND
SW4 SW_Push BTN_RIGHT — GND
SW5 SW_Push BTN_A — GND
SW6 SW_Push BTN_B — GND

JP2
SolderJumper_2_Open
BTN_DOWN 1 2 ESP_FLASH   So we can force flash mode on boot

LiPo charging

AO3400 (A09T)
5V_USB
GND
Q3
R34 10k
R11 10k
CHARGE_ENABLE

U9 TP4056
VCC 4
CE 8
CHRG 7
STDBY 6
BAT 5   +BATT
TEMP 1   GND
PROG 2
GND 3

RED D259 R12 1k2
GREE D260 R13 1k2
5V_USB
R14 1k2 GND
GND

3V power

U10
XC6206P332PR
VCC
VIN 2   VOUT 3   3V3
GND 1
C5 10uf
GND VCC
C6 100uf
GND VCC

Voltage sensing
(5V > 2.5V divider)

VUSB_SENSE
5V_USB
R29 10k
R31 10k
C3 100nF
GND GND

+BATT
R30 10k
R32 10k
VBAT_SENSE
C4 100nF
GND GND

Lanyard hooks

GND 1 J3 Hook1
GND 1 J4 Hook2

Battery reverse polarity

BT1 Battery
+BATT +BATT -BATT -BATT
VCC
AO3400 (A09T)
Q4
GND_PROT
R22 10k
AO3400 (A09T)
Q5
GND_PROT