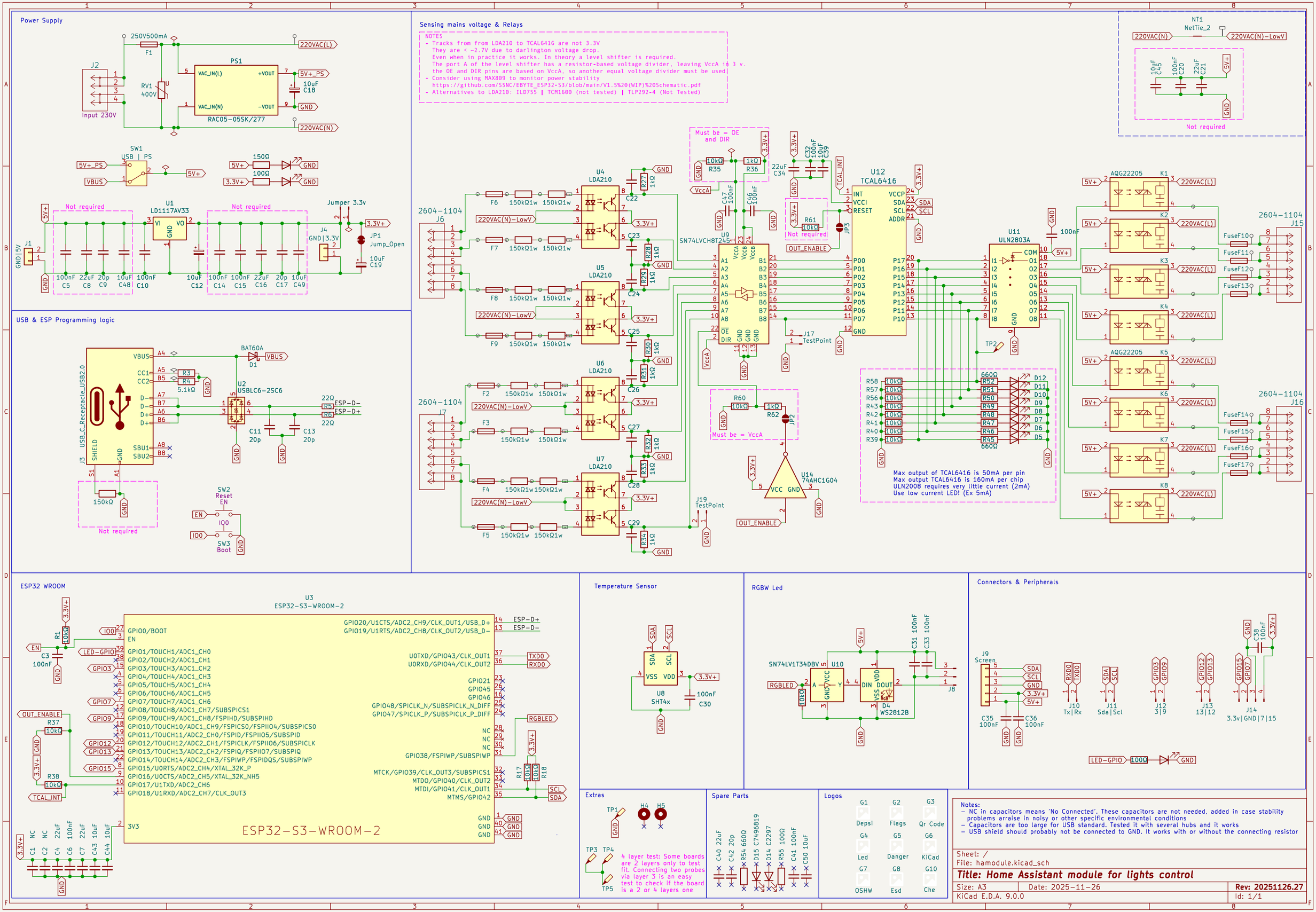
Power Supply
250V500mA
F1
J2
Input 230V
RV1
400V
PS1
VAC_IN(L)
+VOUT
VAC_IN(N)
-VOUT
RAC05-05SK/277
220VAC(L)
5V+_PS
10uF
C18
GND
220VAC(N)
SW1
USB | PS
5V+_PS
VBUS
5V+
150Ω
100Ω
3.3V+
GND
Not required
U1
LD1117AV33
VI
VO
GND
Jumper 3.3v
J4
GND|3.3V
JP1
Jump_Open
10uF
C19
J1
GND|5V
100nF
C5
22uF
C8
20p
C9
10uF
C48
100nF
C10
10uF
C12
100nF
C14
100nF
C15
22uF
C16
20p
C17
10uF
C49
Sensing mains voltage & Relays
NOTES
- Tracks from from LDA210 to TCAL6416 are not 3.3V
  They are < ~2.7V due to darlington voltage drop.
  Even when in practice it works. In theory a level shifter is required.
  The port A of the level shifter has a resistor-based voltage divider, leaving VccA in 3 v.
  the OE and DIR pins are based on VccA, so another equal voltage divider must be used
- Consider using MAX809 to monitor power stability
  https://github.com/S5NC/EBYTE_ESP32-S3/blob/main/V1.5%20(WIP)%20Schematic.pdf
- Alternatives to LDA210: ILD755 | TCM1600 (not tested) | TLP292-4 (Not Tested)
NT1
NetTie_2
220VAC(N)
220VAC(N)-LowV
10uF
C45
100nF
C20
22uF
C21
5V+
GND
Not required
2604-1104
J6
F6
150kΩ1w
150kΩ1w
220VAC(N)-LowV
F7
F8
F9
U4
LDA210
U5
LDA210
U6
LDA210
U7
LDA210
R27
1kΩ
C22
C23
R28
1kΩ
R29
1kΩ
C24
C25
R30
1kΩ
R31
1kΩ
C26
C27
R32
1kΩ
R33
1kΩ
C28
C29
R34
1kΩ
3.3V+
GND
2604-1104
J7
F2
F3
F4
F5
Must be = OE and DIR
R35
10kΩ
R36
1kΩ
VccA
C47
100nF
C46
100nF
U9
SN74LVCH8T245
VccA
VccB
A1
A2
A3
A4
A5
A6
A7
A8
OE
DIR
B1
B2
B3
B4
B5
B6
B7
B8
J17
TestPoint
C34
22uF
C32
100nF
C39
10uF
TCAL_INT
U12
TCAL6416
INT
VCCI
RESET
VCCP
SDA
SCL
ADDR
P00
P01
P02
P03
P04
P05
P06
P07
P17
P16
P15
P14
P13
P12
P11
P10
R61
10kΩ
Not required
JP3
OUT_ENABLE
R60
10kΩ
R62
1kΩ
JP2
Must be = VccA
U14
74AHC1G04
VCC
J19
TestPoint
U11
ULN2803A
COM
I1
I2
I3
I4
I5
I6
I7
I8
O1
O2
O3
O4
O5
O6
O7
O8
100nF
TP2
R58
R57
R56
R43
R42
R41
R40
R39
10kΩ
660Ω
R52
R51
R50
R49
R48
R47
R46
R45
D12
D11
D10
D9
D8
D7
D6
D5
Max output of TCAL6416 is 50mA per pin
Max output TCAL6416 is 160mA per chip
ULN2008 requires very little current (2mA)
Use low current LED! (Ex 5mA)
AQG22205
K1
K2
K3
K4
K5
K6
K7
K8
220VAC(L)
2604-1104
J15
FuseF10
FuseF11
FuseF12
FuseF13
2604-1104
J16
FuseF14
FuseF15
FuseF16
FuseF17
USB & ESP Programming logic
USB_C_Receptacle_USB2.0
J3
VBUS
CC1
CC2
D-
D+
SBU1
SBU2
SHIELD
GND
A4
A5
B5
A7
B7
A6
B6
A8
B8
S1
A1
R3
R4
5.1kΩ
BAT60A
D1
U2
USBLC6-2SC6
22Ω
R5
R6
ESP-D-
ESP-D+
C11
20p
C13
20p
150kΩ
Not required
SW2
Reset
EN
IO0
SW3
Boot
ESP32 WROOM
U3
ESP32-S3-WROOM-2
R1
10kΩ
C3
100nF
IO0
LED-GPIO
GPIO3
GPIO7
GPIO9
OUT_ENABLE
R37
10kΩ
GPIO12
GPIO13
GPIO15
R38
10kΩ
TCAL_INT
GPIO0/BOOT
EN
GPIO1/TOUCH1/ADC1_CH0
GPIO2/TOUCH2/ADC1_CH1
GPIO3/TOUCH3/ADC1_CH2
GPIO4/TOUCH4/ADC1_CH3
GPIO5/TOUCH5/ADC1_CH4
GPIO6/TOUCH6/ADC1_CH5
GPIO7/TOUCH7/ADC1_CH6
GPIO8/TOUCH8/ADC1_CH7/SUBSPICS1
GPIO9/TOUCH9/ADC1_CH8/FSPIHD/SUBSPIHD
GPIO10/TOUCH10/ADC1_CH9/FSPICS0/FSPIIO4/SUBSPICS0
GPIO11/TOUCH11/ADC2_CH0/FSPID/FSPIIO5/SUBSPID
GPIO12/TOUCH12/ADC2_CH1/FSPICLK/FSPIIO6/SUBSPICLK
GPIO13/TOUCH13/ADC2_CH2/FSPIQ/FSPIIO7/SUBSPIQ
GPIO14/TOUCH14/ADC2_CH3/FSPIWP/FSPIDQS/SUBSPIWP
GPIO15/U0RTS/ADC2_CH4/XTAL_32K_P
GPIO16/U0CTS/ADC2_CH5/XTAL_32K_N
GPIO17/U1TXD/ADC2_CH6
GPIO18/U1RXD/ADC2_CH7/CLK_OUT3
GPIO20/U1CTS/ADC2_CH9/CLK_OUT1/USB_D+
GPIO19/U1RTS/ADC2_CH8/CLK_OUT2/USB_D-
U0TXD/GPIO43/CLK_OUT1
U0RXD/GPIO44/CLK_OUT2
GPIO21
GPIO45
GPIO46
GPIO48/SPICLK_N/SUBSPICLK_N_DIFF
GPIO47/SPICLK_P/SUBSPICLK_P_DIFF
NC
NC
NC
GPIO38/FSPIWP/SUBSPIWP
MTCK/GPIO39/CLK_OUT3/SUBSPICS1
MTDO/GPIO40/CLK_OUT2
MTDI/GPIO41/CLK_OUT1
MTMS/GPIO42
3V3
GND
GND
GND
ESP-D+
ESP-D-
TXD0
RXD0
RGBLED
R17
10kΩ
R18
10kΩ
SCL
SDA
ESP32-S3-WROOM-2
C1 NC
C2 NC
C4 22uF
C6 100nF
C7 22uF
C43 10uF
C44 10uF
Temperature Sensor
SDA
SCL
VSS
VDD
U8
SHT4x
3.3V+
100nF
C30
RGBW Led
SN74LV1T34DBV
U10
RGBLED
10kΩ
GND
VCC
A
Y
DIN
DOUT
VDD
VSS
D4
WS2812B
5V+
C31 100nF
C33 100nF
J8
Connectors & Peripherals
J9
Screen
SDA
SCL
GND
3.3V+
5V+
C35
100nF
C36
100nF
RXD0
TXD0
J10
Tx|Rx
J11
Sda|Scl
GPIO3
GPIO9
J12
3|9
GPIO12
GPIO13
J13
13|12
GPIO15
GPIO7
J14
3.3v|GND|7|15
C38
100nF
LED-GPIO
100Ω
Extras
TP1
H4
H5
TP3
TP4
TP5
4 layer test: Some boards are 2 layers only to test fit. Connecting two probes via layer 3 is an easy test to check if the board is a 2 or 4 layers one
Spare Parts
C40 22uF
C42 20p
R54 660Ω
D15 C7496819
D14 C2297
R55 100Ω
C41 100nF
C50 10uF
Logos
G1
Depsi
G2
Flags
G3
Qr Code
G4
Led
G5
Danger
G6
KiCad
G7
OSHW
G8
Esd
G10
Che
Notes:
- NC in capacitors means 'No Connected'. These capacitors are not needed, added in case stability problems arraise in noisy or other specific environmental conditions
- Capacitors are too large for USB standard. Tested it with several hubs and it works
- USB shield should probably not be connected to GND. It works with or without the connecting resistor
Sheet: /
File: hamodule.kicad_sch
Title: Home Assistant module for lights control
Size: A3
Date: 2025-11-26
Rev: 20251126.27
KiCad E.D.A. 9.0.0
Id: 1/1