# MOTHERBOARD CONNECTOR

Connects to the ESP32-S3 motherboard.

J12 MB_PINS
J13 MB_CONNECTOR

GPIO15
GPIO18
ESP_RXD0
ESP_TXD0
I2C_SDA
I2C_SCL
+3.3V
USB_D+
USB_D-
+5V
GND

J4 J6 J7 J8 J11 J16 J18 J19 J20 J1

GPIO15
GPIO18
ESP_RXD0
ESP_TXD0
I2C_SDA
I2C_SCL
+3.3V_IN
USB_D+
USB_D-
+5V_IN

Solderpads  Pin Header  JST-SH

GND
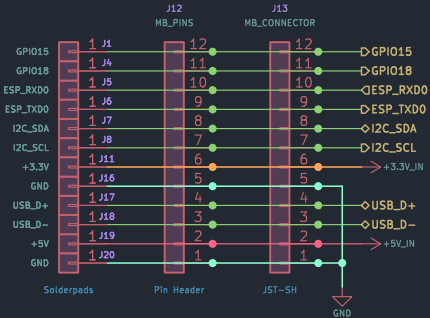
# DHT20 — TEMP & HUMIDITY SENSOR

Temperature & Humidity sensor.
Both 2.54 mm pin headers and solderpads are available.

J2 DHT20_PAD
Solderpads
C1 0.1uF  GND

J14 DHT20
3V3  SDA  GND  SCL

+3.3V
I2C_SDA
I2C_SCL

GND
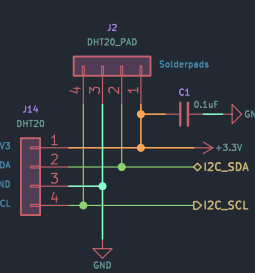
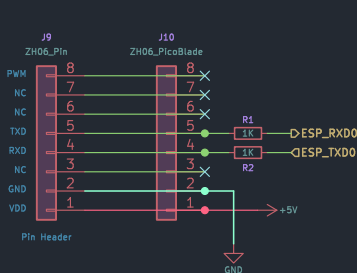# AGS02MA — TVOC SENSOR

TVOC (Total Volatile Organic Compounds) sensor.
Both 2.54 mm pin headers and solderpads are available.

J3 AGS02MA_PAD
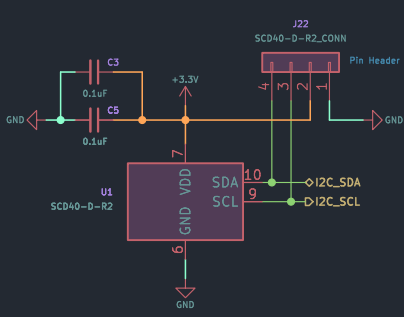Solderpads
C2 0.1uF  GND

J15 AGS02MA
3V3  SDA  GND  SCL

+3.3V
I2C_SDA
I2C_SCL

GND
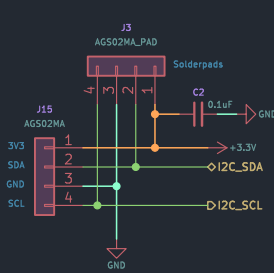
# ZH06 — DUST SENSOR

0.3–10 um, PM1, PM2.5 & PM10 laser dust sensor.
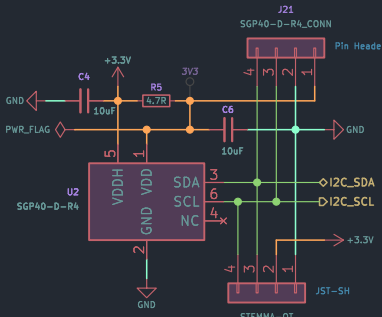Both PicoBlade and 2.54 mm pin headers are available.

J9 ZH06_Pin
J10 ZH06_PicoBlade

PWM  NC  TXD  RXD  NC  VDD

R1 1K  ESP_RXD0
R2 1K  ESP_TXD0
+5V

Pin Header

GND

# SCD40-D-R2 — CO2 SENSOR

400–2000 PPM Photoacoustic CO2 sensor with temperature & humidity.

J22 SCD40-D-R2_CONN
Pin Header

C3 0.1uF
C5 0.1uF
GND
+3.3V

U1 SCD40-D-R2
GND VDD  SDA SCL

I2C_SDA
I2C_SCL
GND

GND

# SGP40-D-R4 — TVOC SENSOR

TVOC sensor for indoor air quality sensing, I2C, 3.3V, DFN-6 SMD

J21 SGP40-D-R4_CONN
Pin Header

+3.3V  3V3
C4 10uF
R5 4.7K
GND
PWR_FLAG
C6 10uF  GND

U2 SGP40-D-R4
VDDH GND VDD  SDA SCL NC

I2C_SDA
I2C_SCL
+3.3V

GND

JST-SH
STEMMA-QT J24

# WAVESHARE TVOC SENSOR

TVOC sensor for indoor air quality sensing, I2C, 3.3V, DFN-6 SMD

J23 WS_TVOC
ALM  RST  RXD  TXD  GND  VCC

WS_TVOC_ALM
WS_TVOC_RST
R6
ESP_TXD0
ESP_RXD0
R7
+5V

GND
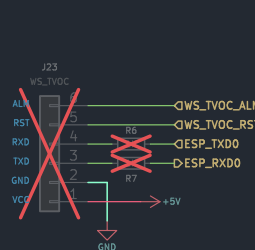
# I2C PULL-UP

Optional I2C pull-resistors. Use this when there are no external pull-ups.

I2C_SCL  R3 5.1K
I2C_SDA  R4 5.1K
JP1 I2C_PUE  +3.3V

# MOUNTING HOLES

H1 Mounting Hole
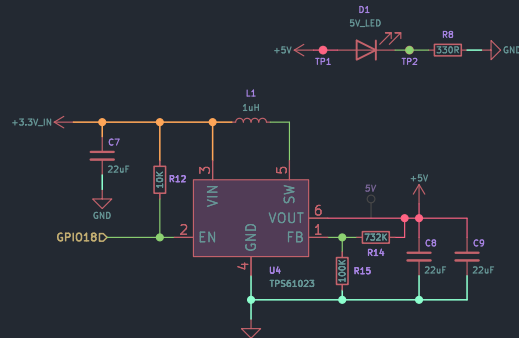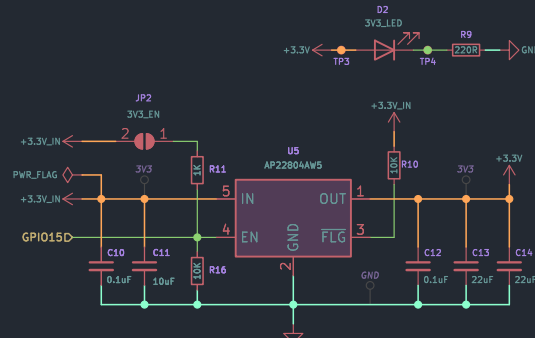H2 Mounting Hole
H3 Mounting Hole
H4 Mounting Hole
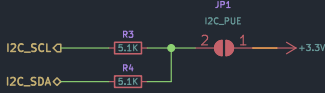
# +5V BOOST CONVERTER

Generates a +5V from the 3.3V input.
The main board can not supply 5V when the USB is not connected.
0.5-5.5V in, 5V out, 3.7A max, 1 MHz.

D1 5V_LED
TP1  TP2
R8 330R  GND
+5V

L1 1uH
+3.3V_IN
C7 22uF
R12 R13
GND
GPIO18D

U4 TPS61023
VIN EN GND VOUT SW FB

R14 732K
R15 100K
5V
+5V
C8 22uF
C9 22uF
GND

# +3.3V LOAD SWITCH

Controls the power to 3.3V loads. Controlled by the MCU.
Use the 3V3_EN jumper to override when a control input is not available.
Maximum current 2.5A.

D2 3V3_LED
TP3  TP4
R9 220R  GND
+3.3V

JP2 3V3_EN
+3.3V_IN
PWR_FLAG
+3.3V_IN
GPIO15D

U5 AP22804AW5
IN OUT EN GND FLG

R11  R10
C10 0.1uF
C11 10uF
R16
3V3
+3.3V_IN
3V3
C12 0.1uF
C13 22uF
C14 22uF
+3.3V
GND

# IDEAL DIODE

Connects the external 5V input to the 5V generated by the boost converter. This is not required normally.

5V  +5V
+5V_IN
U3 LM66100DCKR
VIN VOUT CE GND ST

R13
GND
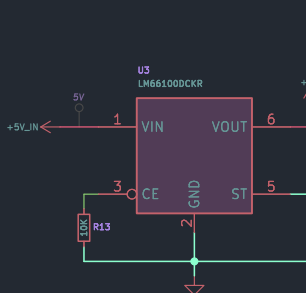
CIRCUITSTATE

www.circuitstate.com
GitHub: https://github.com/CIRCUITSTATE/AQEYE-SB-D1
Licence: MIT Open-Source Licence

Sensor Board for the AQEYE-MB-D1
Designed by: Vishnu Mohanan (@vishnumaiea, @vizmohanan)
CIRCUITSTATE Electronics LLP
Sheet: /
File: AQEYE-SB-D1.kicad_sch
Title: AQEYE-SB-D1
Size: A3  Date: 2025-06-08  Rev: 0.1
KiCad E.D.A. 9.0.2  Id: 1/1