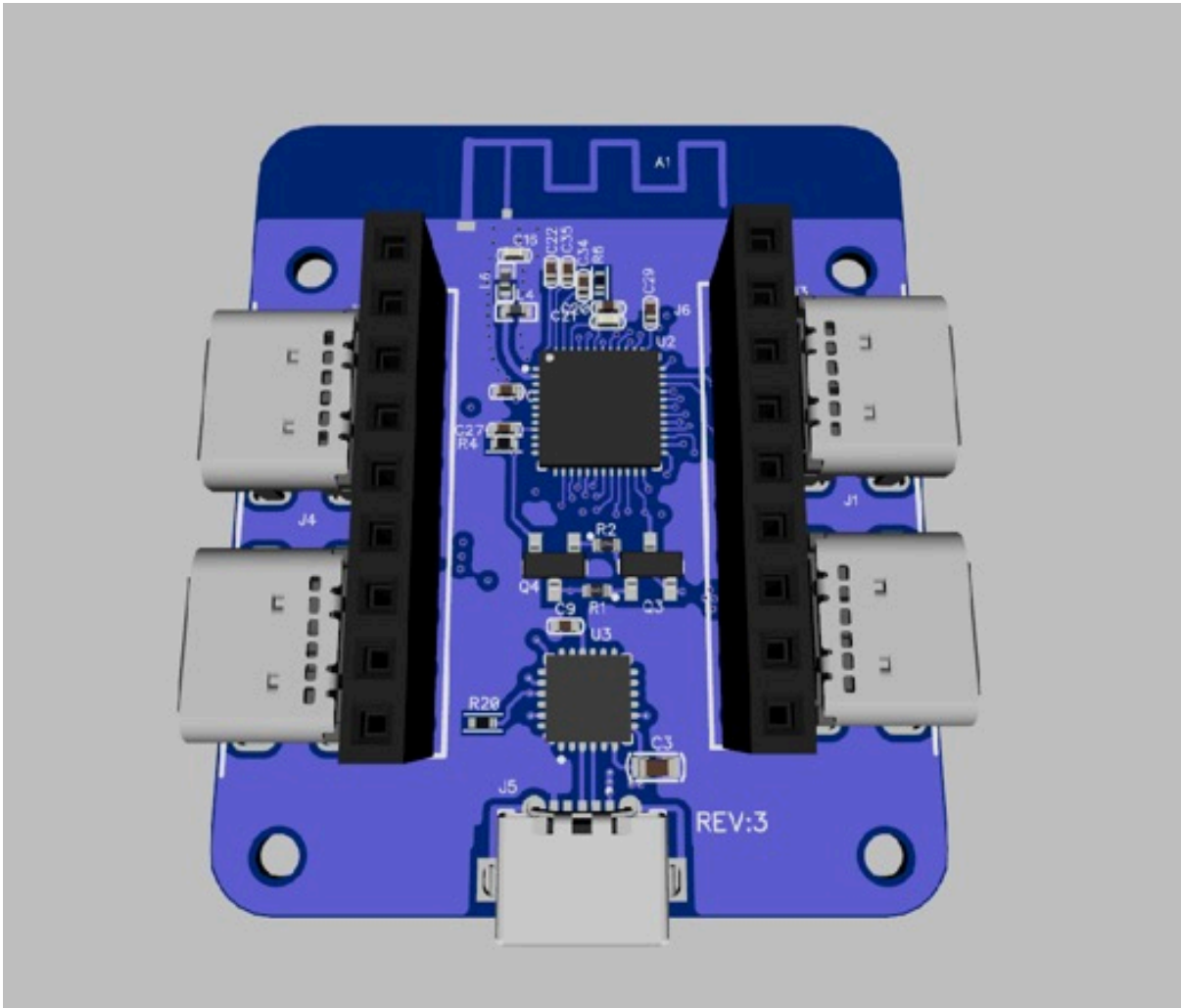


# ESPBOARD

This user guide provides information about Ezlobord, a small-sized ESP32 datasheet-based development and simulation board manufactured by Ezlo.

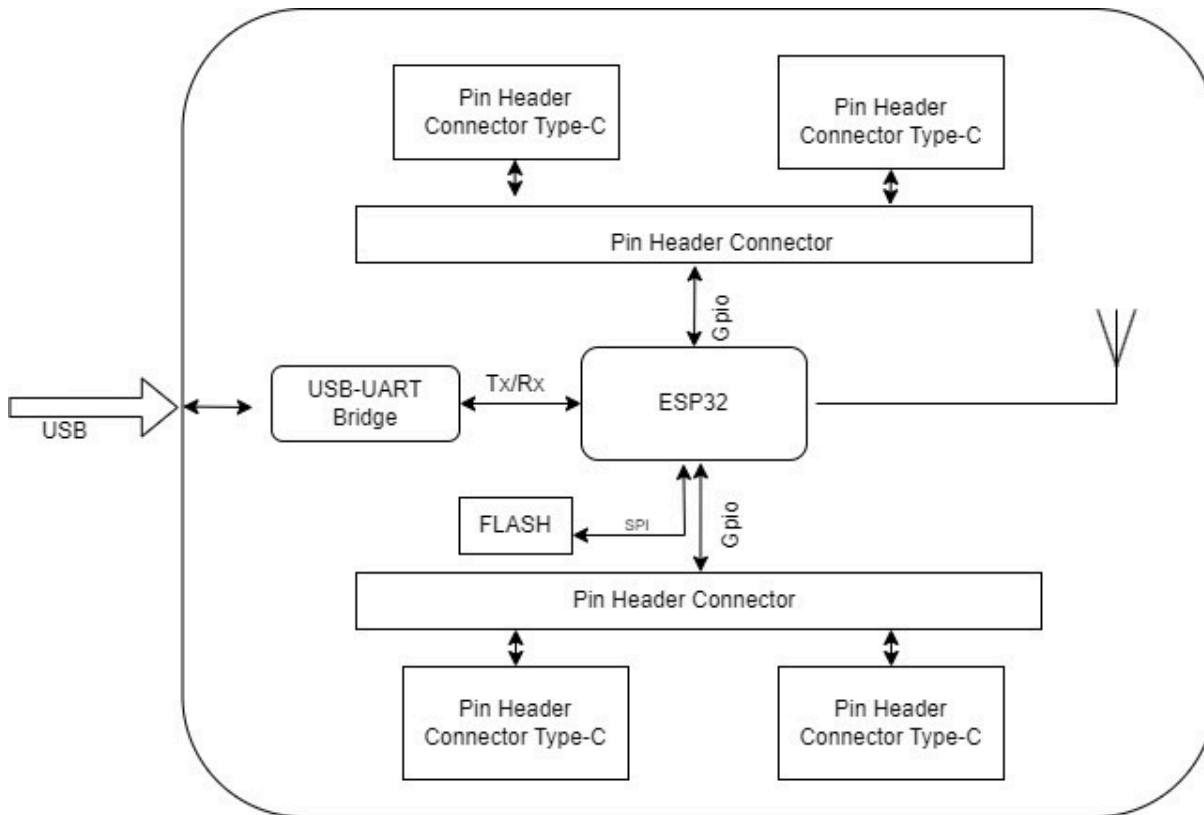


## Overview

Ezlobord is a small ESP32 based development board manufactured by Ezlo. Most of the I/O pins are routed to contact connectors and connected to USB Type-C connectors on both sides to simplify interaction with connected devices. Developers can either connect peripherals using jumpers or a USB Type-C cable to the expansion card.

## Block Diagram

A block diagram below shows the components of Ezlobord and their interconnections.



### Power options

There are three mutually exclusive ways to supply power to the board:

Micro-USB port, default power supply

5V and GND pin headers

3V3 and GND pin connectors

It is recommended to use the first option: Micro-USB port.

# Overview

Ezlobord is a general-purpose Wi-Fi+Bluetooth®+Bluetooth LE board designed for a wide range of applications, from low-power network sensors to the most complex applications such as voice encoding, music streaming and MP3 decoding. This module is based on the ESP32-D0WDQ6\* chip. The embedded chip is designed to scale and adapt. There are two CPU cores that can be controlled individually, and the CPU clock speed can be adjusted between 160 MHz and 240 MHz. The chip also has a low-power coprocessor that can be used in place of the CPU to save power when performing tasks that are not compute-intensive. Ezlobord has a rich set of peripherals, including capacitive touch sensors, SD card interfaces, Ethernet, high-speed SPI, UART, I2S and I2C.

## CPU and OnChip Memory

- ESP32-U4WDH embedded, Xtensa dual-core
- 32-bit LX6 microprocessor, up to 240 MHz
- 448 KB ROM
- 520 KB SRAM
- 16 KB SRAM in RTC
- 128M-BIT SPI flash

## CrystalOscillators Themoduleusesa40-MHzcrystaloscillator.

### Wi-Fi

- 802.11b/g/n
- Bit rate: 802.11n up to 150 Mbps
- A-MPDU and A-MSDU aggregation
- 0.4  $\mu$ s guard interval support
- Center frequency range of operating channel:
  - 2412 ~ 2484 MHz
  - 128M-BIT SPI flash

### Antenna Options

- ESP32: On-board PCB antenna

### Bluetooth

- Bluetooth v4.2 BR/EDR and Bluetooth LE specification
- Class-1, class-2, and class-3 transmitter
- AFH
- CVSD and SBC

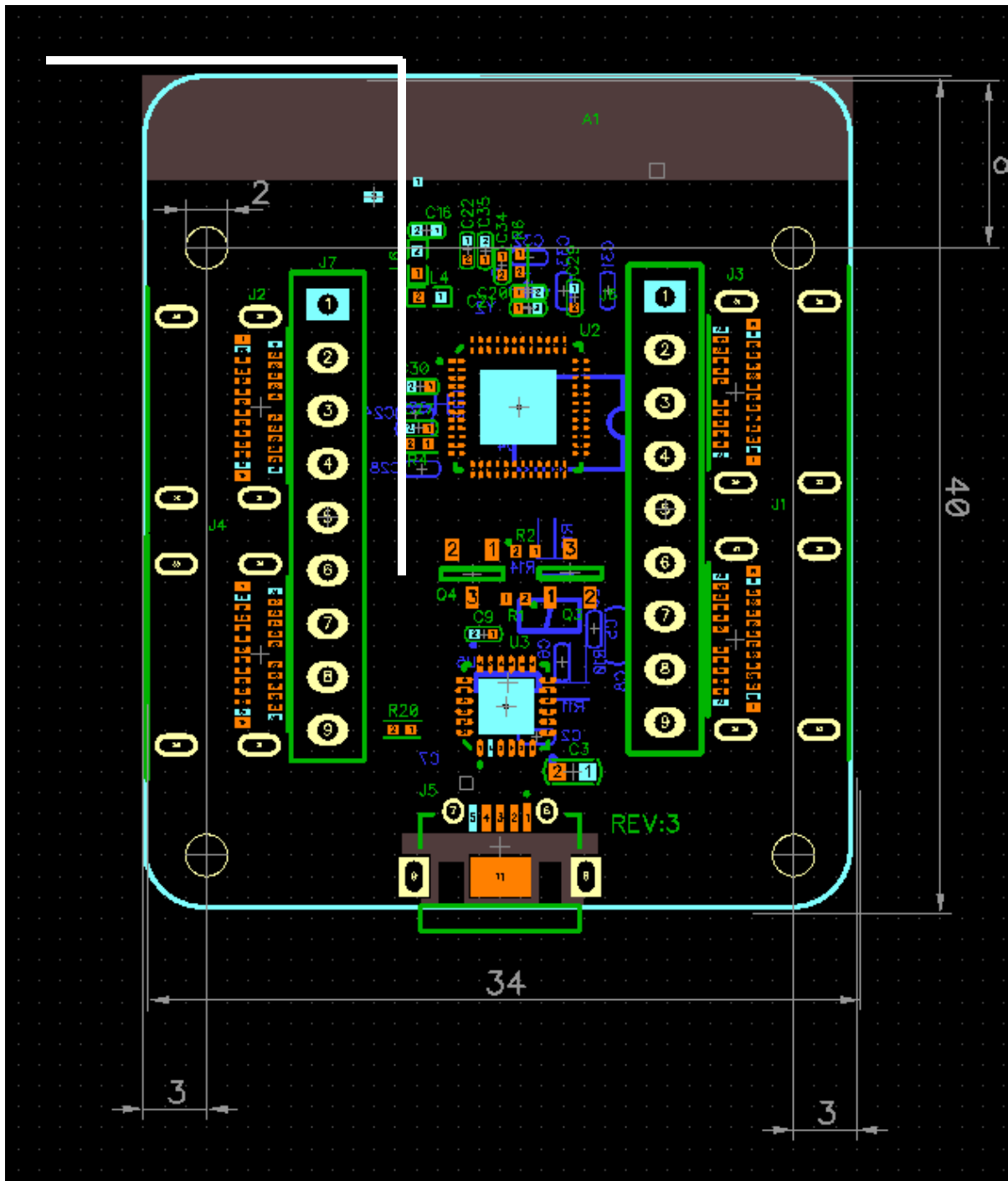
### Operating Conditions

- Operating voltage/Power supply: 3.0 ~ 3.6 V
- Operating ambient temperature:
  - 85 °C version module: -40 ~ 85 °C
  - 105 °C version module: -40 ~ 105 °C

# Module interfaces

## 2.1 Dimensions and footprint

has two rows of pins with a  $2 \pm 0.1$  mm pin spacing. The Ezlobord dimensions are 34 mm (W) $\times$ 40mm (L)



**J7**

<b>NO</b>	<b>Name</b>	<b>Type</b>	<b>Function</b>
1)	+5V	P	
2)	+3,3V	P	
3)	IO27	GPIO27	ADC2_CH7
4)	IO16	GPIO16	ADC2_CH6
5)	IO17	GPIO17	DAC_2 ADC2_CH9
6)	IO4	GPIO4	HS2_DATA1 SD_DATA1 EMAC_TX_ER
7)	IO26	GPIO26	EMAC_RXD1
8)	IO25	GPIO25	EMAC_RXD0
9)	Gnd	P	

**J5**

<b>NO</b>	<b>Name</b>	<b>Type</b>	<b>Function</b>
1)	+5V	P	
2)	+3,3V	P	
3)	IO5	GPIO5	VSPICS0 HS1_DATA6 - EMAC_RX_CLK
4)	IO18	GPIO18	VSPICLK HS1_DATA7
5)	IO23	GPIO23	VSPID HS1_STROBE
6)	IO19	GPIO21	VSPIHD EMAC_TX_EN
7)	IO22	GPIO22	VSPIWP U0RTS - EMAC_TXD1
8)	IO21	GPIO21	VSPIHD EMAC_TX_EN
9)	GND	P	

**J1, J4**

<b>N0</b>	<b>Name1</b>	<b>Name2</b>
1)	A1	Gnd
2)	A2	GPIO25
3)	A3	GPIO26
4)	A4	+5V
5)	A6	GPIO4
6)	A7	GPIO27
7)	A9	+5V
8)	A10	GPIO4
9)	A11	GPIO17
10)	A12	GND

**J2, J3**

<b>N0</b>	<b>Name1</b>	<b>Name2</b>
1)	A1	Gnd
2)	A2	GPIO5
3)	A3	GPIO18
4)	A4	+5V
5)	A6	GPIO23
6)	A7	GPIO19
7)	A9	+5V
8)	A10	GPIO22
9)	A11	GPIO21

## 3. Electrical parameters

### 3.1 Absolute Maximum Ratings

Parameter	Description	Min	Max	Unit
VDDA, VDD3P3, VDD3P3_RTC, VDD3P3_CPU, VDD_SDIO	Allowed input voltage	-0.3	3.6	V
I <sub>output</sub> *	Cumulative IO output current(1)	—	1200	mA
TSTORE	Storage temperature	-40	150	°C

\*The product proved to be fully functional after all its IO pins were pulled high while being connected to ground for 24 consecutive hours at ambient temperature of 25 °C.

### Recommended Power Supply Characteristics

Parameter	Description	Min	Typ	Max	Unit
VDDA, VDD3P3_RTC, VDD3P3, VDD_SDIO (3.3 V mode)	Voltage applied to power supply pins per power domain	2.3/3.0	3.3	3.6	V
VDD3P3_CPU	Voltage applied to power supply pin	1.8	3.3	3.6	V
IVDD	Current delivered by external power supply	0.5	—	—	A
T	Operating temperature	-40	—	125	°C

### 3.2 DC Characteristics (3.3 V, 25 °C)

Parameter	Description	Min	Typ	Max	Unit
CIN	Pin capacitance	—	2	—	pF
VIH	High-level input voltage	0.75×VDD	—	VDD+0.3	V
VIL	Low-level input voltage	−0.3	—	0.25×VDD	V
IIH	High-level input current	—	—	50	nA
IIL	Low-level input current	—	—	50	nA
VOH	High-level output voltage	—	—	—	V
VOL	Low-level output voltage	—	—	0.1×VDD	V
IOH	High-level source current (VDD1 = 3.3 V, VOH ≥ 2.64 V, output drive strength set to the maximum)	—	40	—	mA
	VDD3P3_CPU power domain	—	40	—	mA
	VDD3P3_RTC power domain	—	20	—	mA
IOL	Low-level sink current (VDD1= 3.3 V, VOL = 0.495 V, output drive strength set to the maximum)	—	28	—	mA
	VDD_SDIO power domain	—	20	—	mA
RPU	Resistance of internal pull-up resistor	—	45	—	kΩ
RPD	Resistance of internal pull-down resistor	—	45	—	kΩ
VIL_nRS	Low-level input voltage of CHIP_PU to shut down the chip	—	—	0.6	V



### 3.3 RF Current Consumption in Active Mode

#### Current Consumption Depending on RF Modes

Work Mode	Min	Typ	Max	Unit
Transmit 802.11b, DSSS 1 Mbps, POUT = +19.5 dBm	—	240	—	mA
Transmit 802.11g, OFDM 54 Mbps, POUT = +16 dBm	—	190	—	mA
Transmit 802.11n, OFDM MCS7, POUT = +14 dBm	—	180	—	mA
Receive 802.11b/g/n	—	95 ~ 100	—	mA
Transmit BT/BLE, POUT = 0 dBm	—	130	—	mA
Receive BT/BLE	—	95 ~ 100	—	mA

### 3.4 Wi-Fi Radio Characteristics

Parameter	Description	Min	Typ	Max	Unit
Operating frequency range	—	2412	—	2484	MHz
Output impedance	—	—	30+j10	—	$\Omega$
TX power	11n, MCS7	12	13	14	dBm
	11b mode	18.5	19.5	20.5	dBm
Sensitivity	11b, 1 Mbps	—	-98	—	dBm
	11b, 11 Mbps	—	-88	—	dBm
	11g, 6 Mbps	—	-93	—	dBm
	11g, 54 Mbps	—	-75	—	dBm
	11n, HT20, MCS0	—	-93	—	dBm
	11n, HT20, MCS7	—	-73	—	dBm
	11n, HT40, MCS0	—	-90	—	dBm
	11n, HT40, MCS7	—	-70	—	dBm
Adjacent channel rejection	11g, 6 Mbps	—	27	—	dB
	11g, 54 Mbps	—	13	—	dB
	11n, HT20, MCS0	—	27	—	dB
	11n, HT20, MCS7	—	12	—	dB