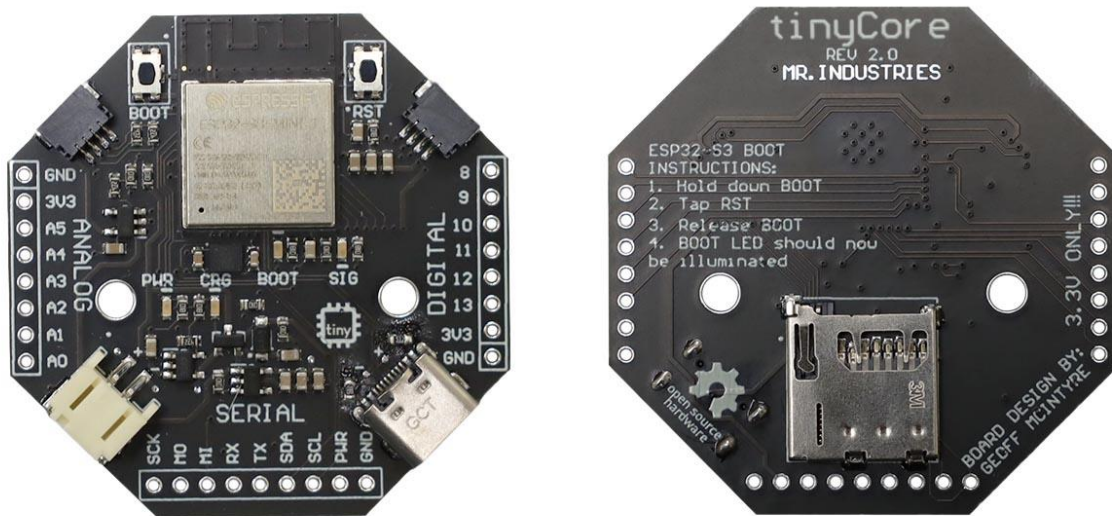


# User Datasheet

Version 2.0



**Description:** tinyCore has been designed from the ground up to bridge the gap between university and industry. The board itself is a highly integrated platform based on the ESP32-S3 chip. We believe that this board will help speed up your learning and design process with advanced embedded systems.

**Target Audience:** Students, Hobbyists, Young Professionals

# tinyCore ESP32-S3 Technical Specifications

## Processor:

- Dual-core Xtensa LX7 32-bit processor
- Operating frequency up to 240 MHz
- RISC-V Ultra Low Power Co-processor (ULP)

## Memory:

- 512 KB of SRAM
- 384 KB of ROM
- No PSRAM

## Security:

- Hardware acceleration for: AES-128/256, SHA-2, RSA, RNG, HMAC
- Secure Boot
- Flash Encryption
- Digital Signature

## Peripherals:

- 23 programmable GPIOs with support for interrupt/wake-up
- 14-channel 12-bit SAR ADC with up to 14 ADC channels
- I2S, I2C, UART, SPI, USB Serial/JTAG
- Micro SD Card via SPI
- 6-DOF IMU (Motion sensor)
- USB-C for Serial Bootloader and HID/MIDI control

## Connectivity:

- 2.4 GHz Wi-Fi 5 (802.11 b/g/n)
- Bluetooth Low Energy (BLE)
- Supports mesh networking

## Power Management:

- Ultra-low deep-sleep current of 8µA (RTC timer + RTC memory + ULP active)
- 3.3V LDO Power Regulator (up to 6V)
- Dedicated LDO for I2C power

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# 1. The Board:

1.1: Application Examples

1.2: Related Products

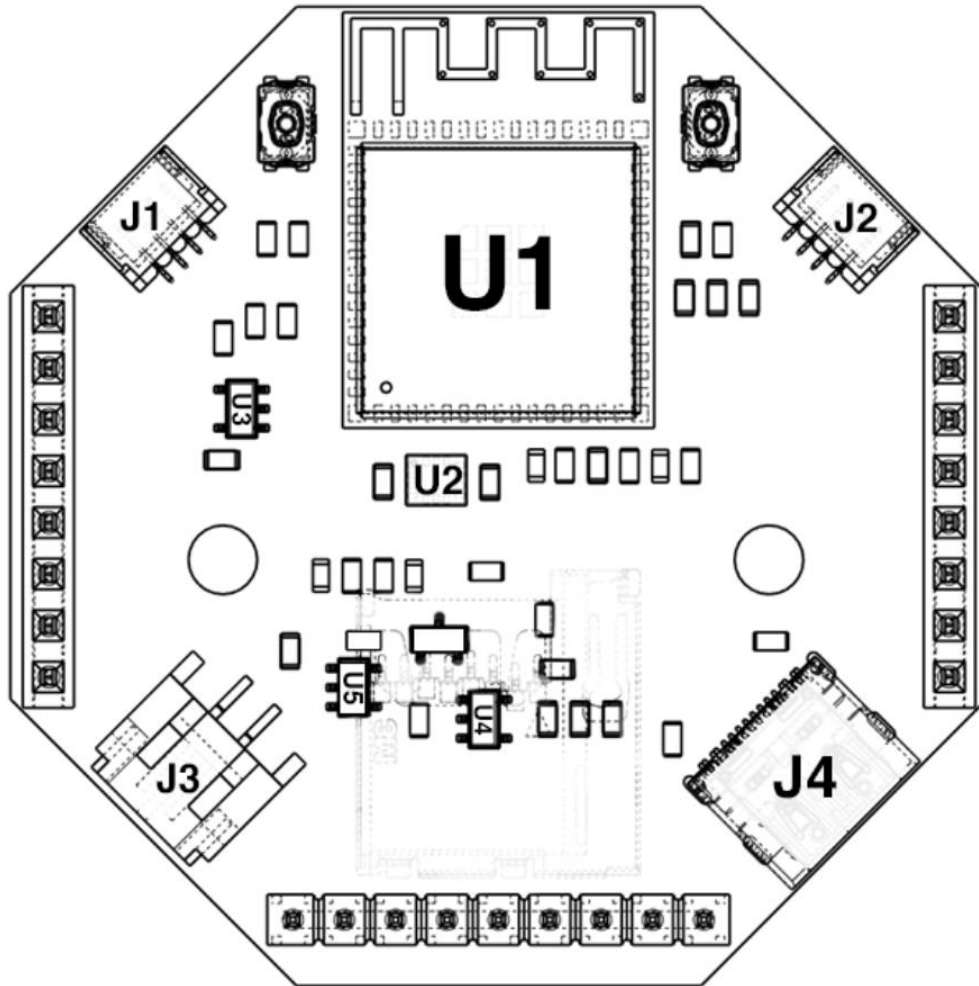
## 2. Electrical Ratings:

2.1: Recommended Operating Conditions

2.2: Power Consumption

## 3. Functional Overview

### 3.1: Board Topology (High Level)

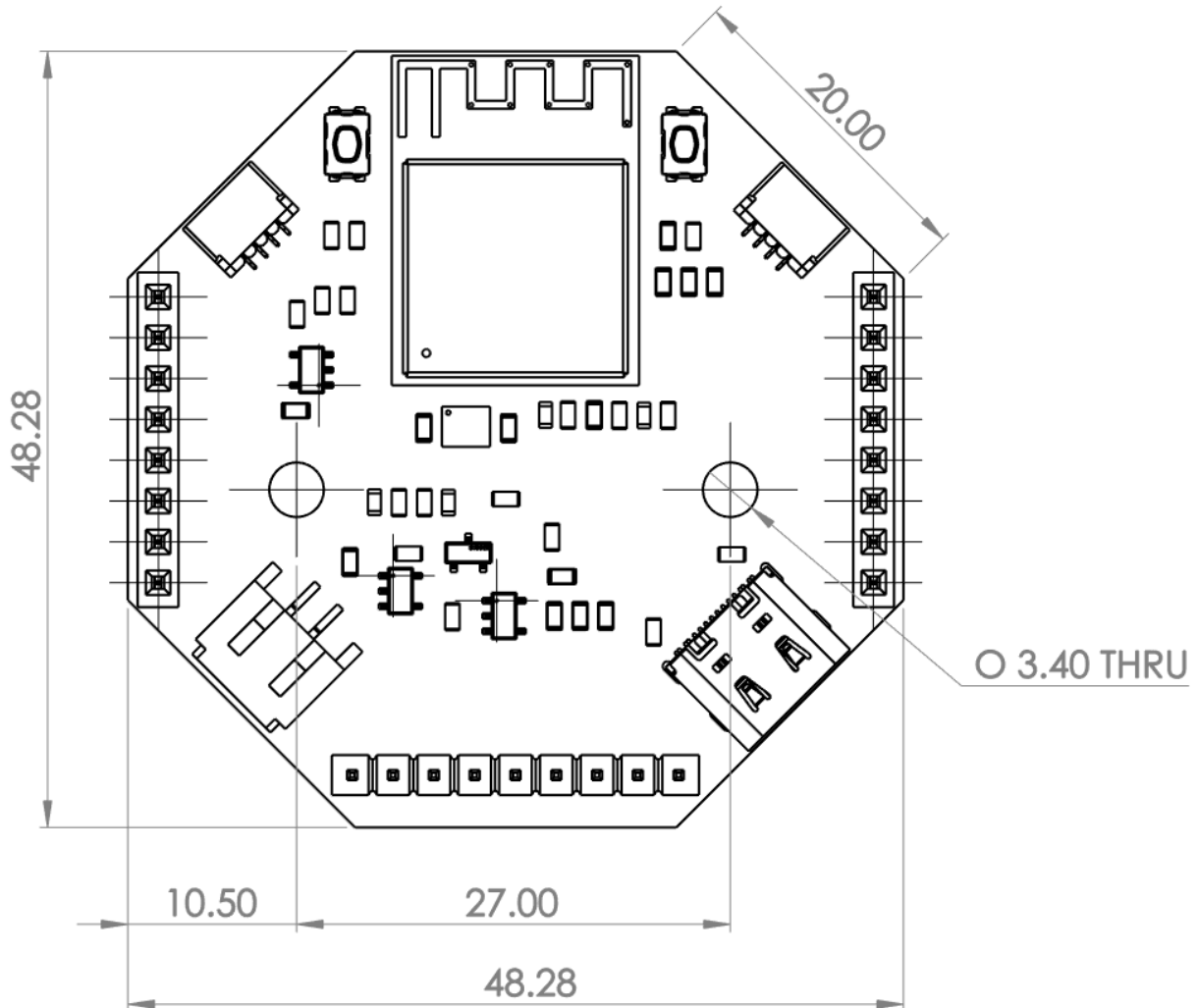


Ref.	Description
U1	<a href="#">ESP32-S3-MINI-1-N8</a> Microcontroller
U2	<a href="#">LSM6DSOTR</a> 6-DoF Inertial Measurement Unit
U3, U4	<a href="#">AP2112K-3.3TRG1</a> LDO Regulator
U5	<a href="#">MCP73831</a> LiPo Charge Management
J1, J2	STEMMA/Qwiic JST SH 4-pin I2C Connectors
J3	<a href="#">S2B-PH-SM4-TB</a> JST PH 2-Pin LiPo Battery Connector
J4	<a href="#">USB4105-GF-A</a> USB-C Connector

## 3.2: Power Tree

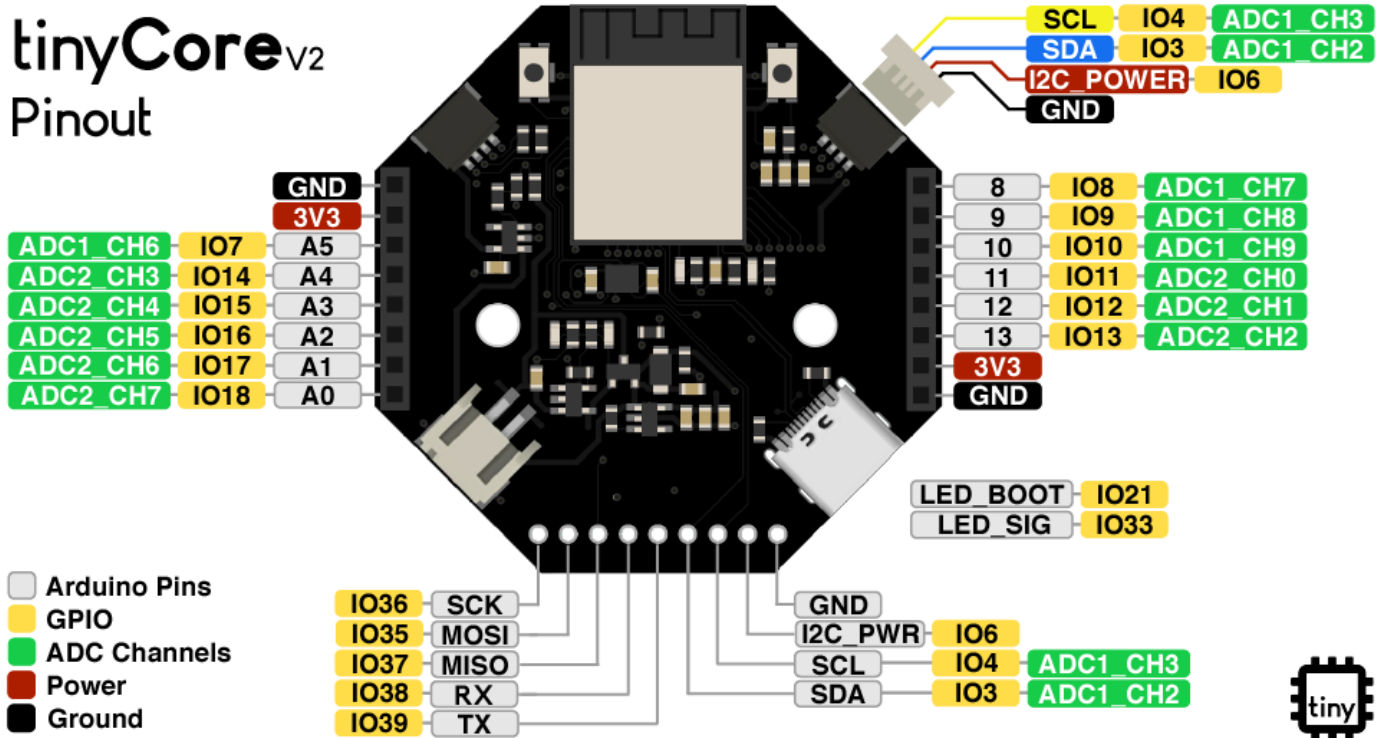
## 3.3 Board Outline & Mounting Holes

The board was designed to be an octagon of approximately 50x50mm. The mounting holes are made for standard M3 Screws, and the headers are standard 2.45mm spacing.



## 4. Connector Pinouts

### 4.1: Pinout Diagram



### 4.2: Analog Pins

Pin	Function	Type	Description
1	GND	Power	Ground
2	+3V3	Power	+3V3 Power Rail
3	A5	Analog/GPIO	Analog input 5 /GPIO7
4	A4	Analog/GPIO	Analog input 4 /GPIO14
5	A3	Analog/GPIO	Analog input 3 /GPIO15
6	A2	Analog/GPIO	Analog input 2 /GPIO16
7	A1	Analog/GPIO	Analog input 1 /GPIO17
8	A0	Analog/GPIO	Analog input 0 /GPIO18

### 4.3: Digital Pins

Pin	Function	Type	Description
1	D8	Digital/GPIO	Digital pin 8/GPIO
2	D9	Digital/GPIO	Digital pin 9/GPIO



3	D10	Digital/GPIO	Digital pin 10/GPIO
4	D11	Digital/GPIO	Digital pin 11/GPIO
5	D12	Digital/GPIO	Digital pin 12/GPIO
6	D13	Digital/GPIO	Digital pin 13/GPIO
7	+3V3	Power	+3V3 Power Rail
8	GND	Power	Ground

#### 4.4: Serial Pins

Pin	Function	Type	Description
1	SCK	SPI/GPIO	SPI Serial Clock Output
2	MOSI	SPI/GPIO	SPI Main Out Secondary In
3	MISO	SPI/GPIO	SPI Main In Secondary Out
4	RX	Serial/GPIO	Serial Receive
5	TX	Serial/GPIO	Serial Transmit
6	SDA	I2C/GPIO	I2C Data Line
7	SCL	I2C/GPIO	I2C Clock Line
8	I2C_POWER	Power	Separate I2C +3V3 Power Rail (Default On)
9	GND	Power	Ground

## 5. Board Operation

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## 6. Company Information

tinyCore is developed and maintained by **MR.INDUSTRIES**: McIntyre-Reeves Industries LLC, based in Boulder, Colorado.

## 7. Relevant Links

Reference	Link
Arduino IDE	<a href="https://www.arduino.cc/en/Main/Software">https://www.arduino.cc/en/Main/Software</a>
Espressif ESP-IDF	<a href="https://docs.espressif.com/projects/esp-idf/en/stable/esp32s3/get-started/index.html">https://docs.espressif.com/projects/esp-idf/en/stable/esp32s3/get-started/index.html</a>
MR. INDUSTRIES Website	<a href="https://mr.industries">https://mr.industries</a>
MR. INDUSTRIES Docs	<a href="https://docs.mr.industries">https://docs.mr.industries</a>
Official YouTube Channel	<a href="https://www.youtube.com/@FacioErgoSum">https://www.youtube.com/@FacioErgoSum</a>

## 8. Revision History

Date	Revision	Changes
3/23/25	1	Datasheet Release