MAKE THINGS HAPPY !

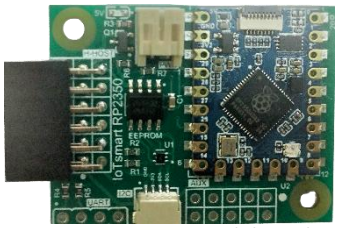
IoTsmart RP2350A

IoTsmart RP2350A Module

Discover the power of the **IoTsmart RP2350A** module, engineered around the advanced **Raspberry Pi RP2350A** microcontroller, packing a dual-core and dual-architecture design: dual-core **Arm Cortex-M33** processor and dual-core **Hazard 3 RISC-V** processor, flexible clock running up to 150 MHz, 520KB of SRAM, and 4MB of on-board flash memory.
The **IoTsmart RP2350A** is made to easily connect with **IoTextra** series expansion boards (mezzanines) using its 12-pin **HOST** connector. This little module turns those basic mezzanines into smart, programmable powerhouses.

The module offers two orientations for the **HOST** connector:

- **H-HOST** (horizontal connector), mounted on the **top-side** of the module, designed for **vertical** mezzanine installation
- **V-HOST** (vertical connector), mounted on the **bottom-side** of the module, designed for **horizontal** mezzanine installation



IoTsmart RP2350A module with **H-HOST** connector (**top-side**)

IoTsmart RP2350A module with **V-HOST** connector (**bottom-side**)

*Note: Some mezzanines, such as certain versions of the **IoTextra Relay2**, are too tall for the **V-HOST** connector.*

In version 1-01 of the **IoTsmart RP2350A** module, the connector was consistently referred to as "**HOST**" and was always installed horizontally, i.e., on the **top-side**

The module features a Qwiic© connector for **I²C** communication and supports optional **UART** and **AUX** connectors. These can be used to connect external sensors, devices, or access additional GPIO signals.

An onboard EEPROM (8 Kbit or 16 Kbit) stores configuration and user data and is accessible via **I²C** at addresses 0x54–0x57 by default.

The module incorporates Waveshare RP2350-Tiny, which provides:

- Dual-core Arm Cortex-M33 processor and dual-core Hazard 3 RISC-V processor,
- Flexible clock running up to 150 MHz
- 520KB SRAM, 4MB flash memory
- USB Type-C interface via the Tiny Adapter Board
- FPC 8-pin connector

The module is powered from a +5VDC input supply.

The **IoTsmart RP2350A** module dimensions are 31 x 40 mm.

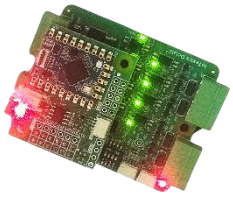
Common applications:

- Industrial automation
- Remote data logging and PLC
- HVAC and lighting control
- Transport systems
- Smart home solutions
- Consumer appliances

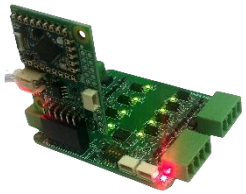
QUICK START

The **IoTsmart RP2350A** module is primarily designed for use with **IoTextra** series mezzanine. This combination allows the **IoTsmart RP2350A** module and a mezzanine to easily function as a standalone smart device.

The photos below illustrate the **IoTsmart RP2350A** module paired with various mezzanines and demonstrate both horizontal (**H-HOST**) and vertical (**V-HOST**) installation of the **HOST** connector:



Horizontal **IoTsmart RP2350A** with **IoTextra Octal2**

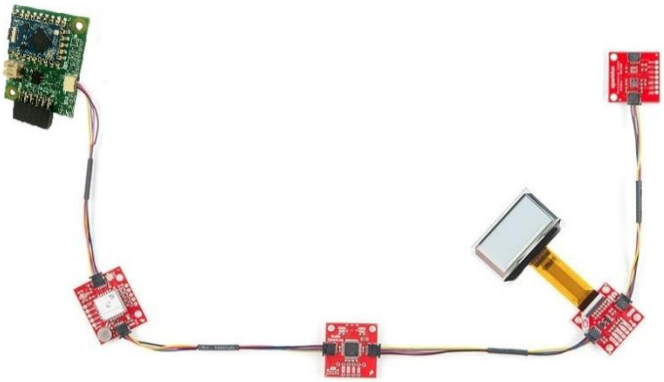


IoTsmart RP2350A with **IoTextra Input**

IoTsmart RP2350A with **IoTextra Relay2**

IoTsmart RP2350A with **IoTextra Combo**

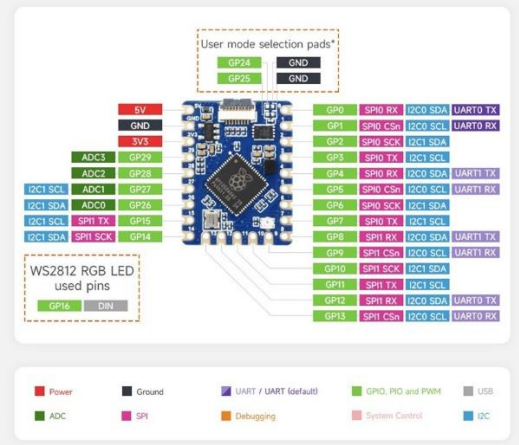
The **IoTsmart RP2350A** also readily connects to numerous **Qwiic©** compatible sensors, peripherals and modules via the **I²C** connector:



WAVESHARE RP2350A-TINY

The **IoTsmart RP2350A** module utilizes the **Waveshare RP2350A-Tiny**, which adopts unique dual-core and dual-architecture design: dual-core Arm Cortex-M33 processor and dual-core Hazard 3 RISC-V processor, flexible clock running up to 150 MHz.
The **Waveshare RP2350A-Tiny** features 520KB of SRAM, and 4MB of onboard flash memory.
It also includes an on-board FPC 8-pin connector, which adapts the USB Type-C port via the **Tiny Adaptor Board**.
The following photo displays the **Tiny Adaptor Board** with a cable; however, these are not included with the **IoTsmart RP2350A** and must be purchased separately:

For your information, here is the pinout of the **Waveshare RP2350A-Tiny**:

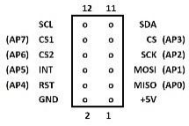


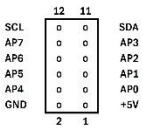
CONNECTORS

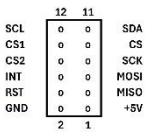
The module is equipped with the following connectors:

- A horizontal (right-angle) H-HOST connector installed on the top-side, **designed for vertical mezzanine installation,** or a vertical V-HOST connector installed on the bottom-side, **designed for horizontal mezzanine installation**
- A horizontal (right-angle) **H-HOST** connector installed on the **top-side**, designed for vertical mezzanine installation, or vertical **V-HOST** connector installed on the **bottom-side**, designed for horizontal mezzanine installation. Information regarding the type of the installed **HOST** connector is provided on the **bottom-side** of the module
- An **I2C** connector for connecting external sensors and devices via the I^2C bus
- An optional 10-pin **AUX** connector, providing access to additional GPIO signals of the microcontroller (not pre-installed)
- An optional **UART** connector (not pre-installed)
- A **PWR** connector (+5VDC input)

HOST connector. Pinout of the **HOST** connectors:



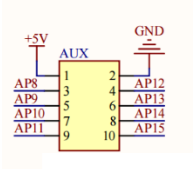




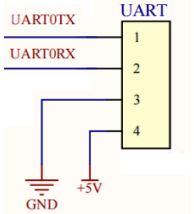
HOST on the **IoTsmart** module | **HOST-P12** on the mezzanine | **HOST-S** on the mezzanine

The **HOST** connector of the **IoTsmart RP2350A** module is inserted into the **HOST-12** or **HOST-S** connector on the mezzanine. Therefore, the pinout for the **HOST-P12** and **HOST-S** connectors on the mezzanines is also shown in the figure to compare the connector signals.

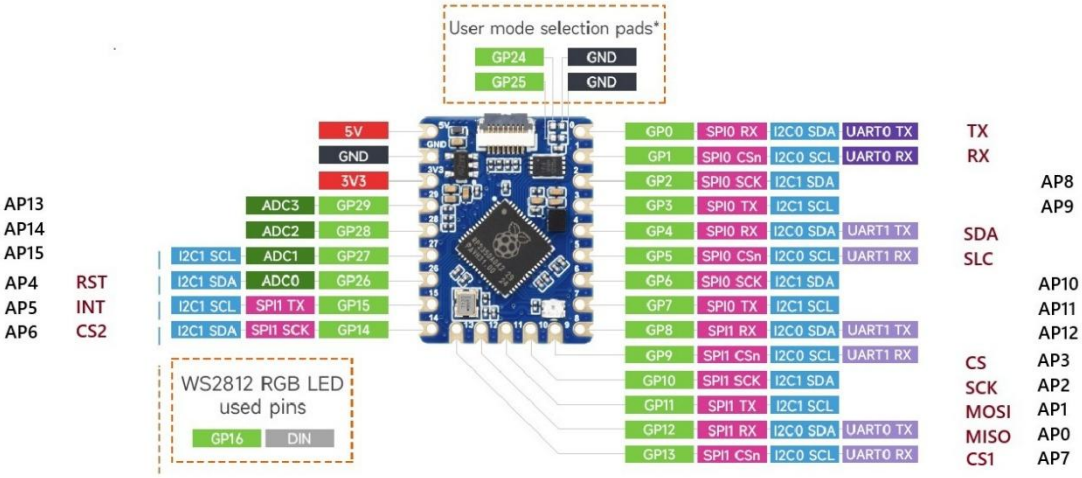
Auxiliary connector **AUX**. The structure of this connector is as follows:



UART connector. The contacts of this connector are shown in the figure:



The **HOST**, **AUX** and **UART** connector signals correspond to the **Waveshare RP2350A-Tiny** signals as follows:



EEPROM

To store configuration and other user information, the **IoTsmart RP2350A** module includes an onboard **EEPROM** (8 Kbit or 16 Kbit). This **EEPROM** is accessible via the **I^2C** bus and is visible at addresses 0x54-0x57 by default.

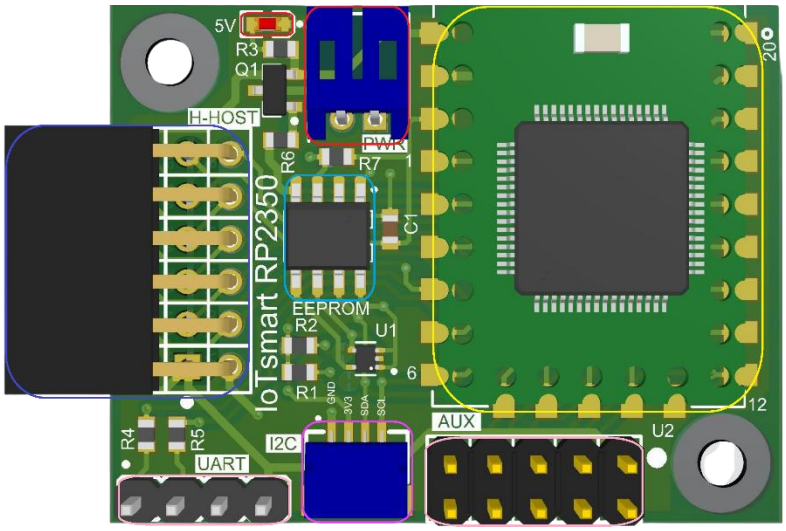
POWER SUPPLY

The module operates from a 5VDC power input supply. The power supply can be connected via a 2-pin **PWR** connector (JST S2B-PH-K-S, 2.00 mm pitch) or through the **Tiny Adapter Board**.

The typical power consumption of the module with the **Waveshare RP2350A-Tiny** is approximately 25 mA (measured without additional connected peripherals or expansion boards). The maximum current consumption, including power provided to a mezzanine, should not exceed 1000 mA.

LAYOUT

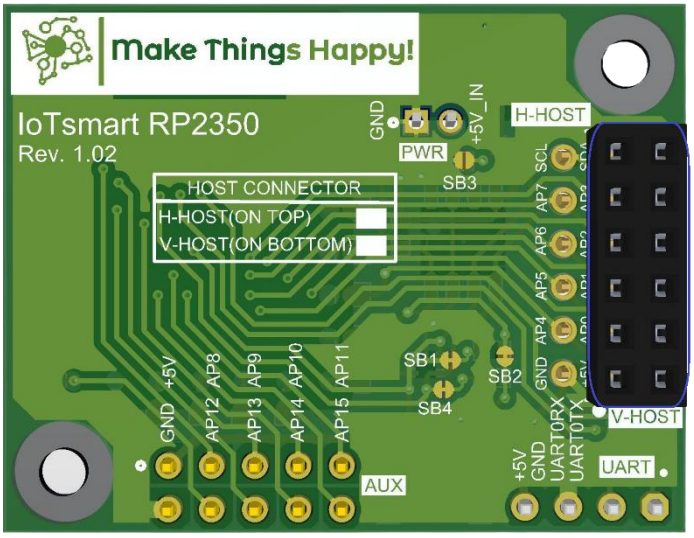
Below is the layout of the elements on the **top-side** of the **IoTsmart RP2350A** module when using the **HOST-H** connector:



In this picture:

- Power-related elements (external power connector, named **PWR**, and **LED**) are highlighted in **red**
- The soldered **Waveshare RP2350A-Tiny** is highlighted in yellow
- The **HOST-H** connector is highlighted in **blue**
- **UART** and **AUX** connectors not installed during production are highlighted in pink
- The **Qwiic©** connector for connecting peripherals via the **I²C** bus is highlighted in **purple**
- EEPROM is highlighted in light blue

Below is the layout of the **IoTsmart RP2350A** module **bottom-side** when using the **HOST-V** connector (highlighted in **blue**):



JUMPERS

Jumpers are located on the underside of the module:

- **SB1**, **SB4** – Connect pull-up resistors to **I²C** SCL and SDA (enabled by default)
- **SB2** –Disables +3.3V power to devices when open (default: closed)
- **SB3** – Sets EEPROM **I²C** address:

b7	b6	b5	b4	b3	b2	b1	b0
1	0	1	0	1	x	x	R/W

CONFIGURATION TABLES

The **bottom-side** of the module provides information about the type of **HOST** connector installed:

- **H-HOST** - horizontal (right-angle), **top-side** mounted
- **V-HOST** – vertical, **bottom-side** mounted

COMPATIBILITY WITH MEZZANINES

The **IoTsmart RP2350A** is compatible with all **IoTextra** mezzanines, including

- **IoTextra Input**
- **IoTextra Relay2**
- **IoTextra SSR Small**
- **IoTextra Octal2**
- **IoTextra Analog**
- **IoTextra Analog2**

ACCESSORIES

Recommended accessories:

- 2-pin power connector
- **Tiny Adapter Board** with USB Type-C
- **Qwiic©** **I²C** cable (connector on both ends)