

# TINKER BOARD 2S

Arm SBC, Rockchip RK3399 Hexa-core, LPDDR4 RAM, eMMC, HDMI, MIPI-DSI, MIPI-CSI, 12-19V DC in



## Features

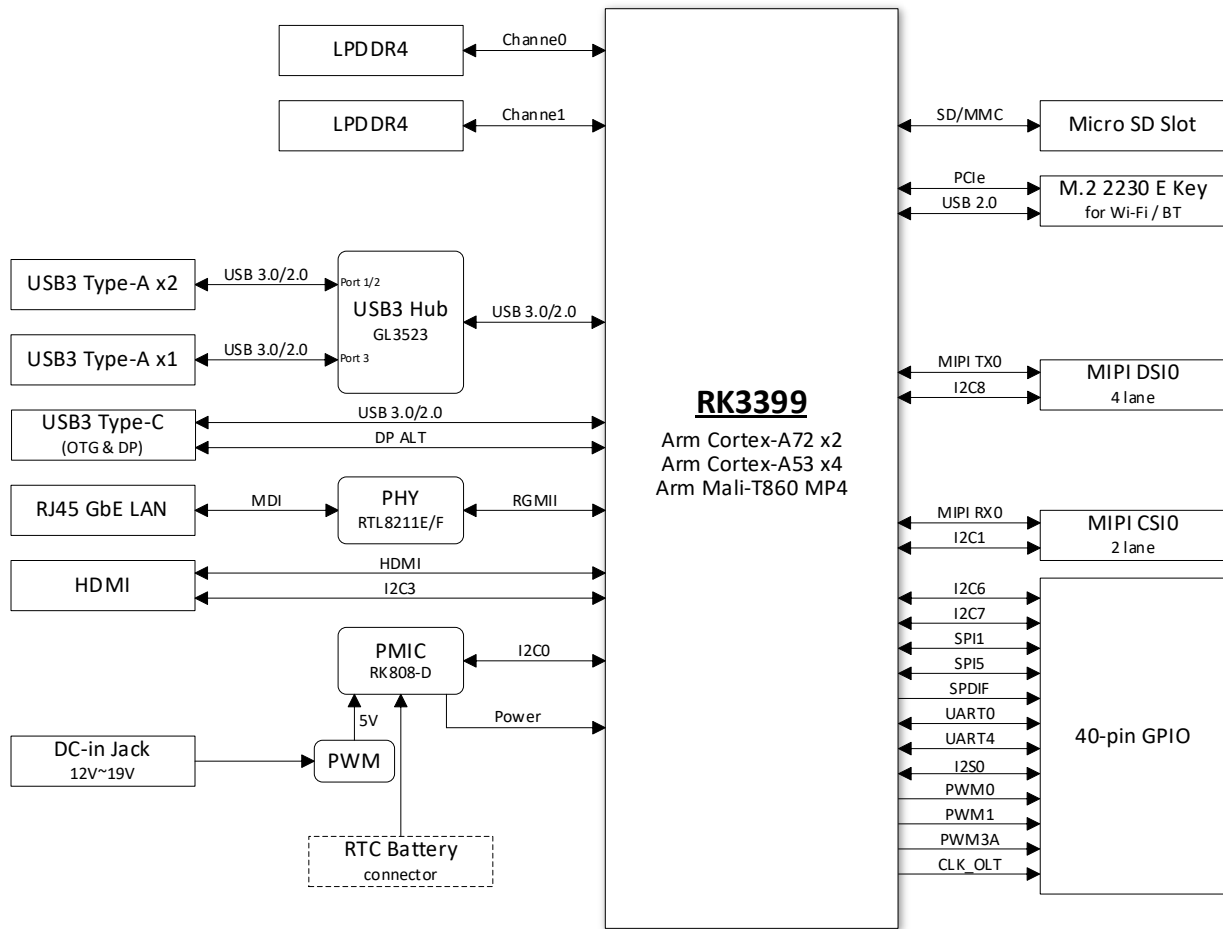
- Arm® big.LITTLE™ A72+A53 Hexa-core SoC
- Multiple MIPI-CSI & DSI / HDMI / Type-C (DP)
- USB 3.0 / Wi-Fi 802.11ac / BT 5.0 / GPIO
- 12V~19V DC-in offers stable power delivery
- Linux & Android supported

## Specifications

|                     |                         |   |
|---------------------|-------------------------|---|
| <b>Processor</b>    | SoC                     | Rockchip RK3399   |
|                     | CPU                     | 2 x Arm® Cortex®-A72 @ 2.0 GHz + 4 x Arm® Cortex®-A53 @ 1.5 GHz   |
|                     | GPU                     | Arm® Mali™-T860 MP4 GPU @ 800 MHz   |
| <b>Memory</b>       | Technology              | Dual-CH LPDDR4 On-board   |
|                     | Size                    | 2/4GB*  |
| <b>Storage</b>      | eMMC                    | 16GB* On-board  |
|                     | Memory Card             | 1 x Micro SD (TF) card slot (push & pull)   |
| <b>Ethernet</b>     | Speed                   | 10/100/1000Mbps   |
|                     | Controller              | 1 x Realtek RTL8211E/F  |
| <b>Wireless</b>     | Speed                   | 802.11 a/b/g/n/ac & Bluetooth 5.0   |
|                     | Module                  | 1 x Realtek RTL8822CE (M.2 Socket 1 with E key, type 2230)  |
|                     | Antenna Connector       | 2 x I-PEX MHF® 4 (extendable, 2T2R)   |
| <b>Display</b>      | HDMI                    | 1, Supports up to 4096 x 2160 @ 60 Hz   |
|                     | Type-C (DP)             | 1, Supports DP 1.2 up to 4096 x 2160 @ 60 Hz  |
|                     | MIPI DSI                | 1, Supports 4 lane up to 6 Gbps, 1920 x 1080 @ 60 Hz (22-pin)   |
|                     | Multi Display           | HDMI+Type-C, HDMI+MIPI DSI, Type-C+MIPI DSI   |
| <b>Camera</b>       | MIPI CSI-2              | 1, Supports 2 lane up to 3 Gbps (15-pin)  |
| <b>Audio</b>        | HDMI Audio              | 1   |
|                     | I2S                     | 1, in 40-pin header   |
|                     | S/PDIF                  | 1, in 40-pin header   |
| <b>Rear I/O</b>     | USB 3.2 Gen1 Type-A     | 3   |
|                     | USB 3.2 Gen1 Type-C OTG | 1   |
|                     | Ethernet                | 1   |
|                     | HDMI                    | 1   |
| <b>Internal I/O</b> | 40-pin GPIO Header      | - up to 28 x GPIO pins<br>- up to 2 x SPI bus<br>- up to 2 x I2C bus<br>- up to 2 x UART<br>- up to 3 x PWM<br>- up to 1 x PCM/I2S (master/slave)<br>- up to 1 x S/PDIF TX<br>- 2 x 5V Power pins<br>- 2 x 3.3V Power pins<br>- 8 x Ground pins |
|                     | Recovery Header         | 1 (2-pin)   |
|                     | Power-on Header         | 1 (2-pin)   |
|                     | Reset Header            | 1 (2-pin)   |
|                     | Debug UART Header       | 1 (2-pin)   |
|                     | DC Fan Header           | 1 (2-pin)   |
|                     | RTC Battery Header      | 1 (2-pin)   |
|                     | <b>Power</b>            | Power Input   |
| <b>Environment</b>  | Operating Temperature   | 0 ~ 60°C  |
|                     | Storage Temperature     | -40 ~ 85°C  |
|                     | Relative Humidity       | 10 ~ 85% (non-condensing)   |
| <b>Others</b>       | Operating System        | Linux Debian 10, Android (AOSP) 11  |
|                     | Dimensions              | 3.37" x 2.125" (85 x 56 mm)   |

\*Spec by SKU

# Block Diagram



# Ordering Information

| PN         | Model Name             | Description   |
|------------|------------------------|---|
| 90ME01P0-* | Tinker Board 2S/2G/16G | Arm SBC, Rockchip RK3399 Hexa-core, 2G LPDDR4, 16G eMMC, HDMI, MIPI-DSI, MIPI-CSI, 12~19V DC in |
| 90ME01P1-* | Tinker Board 2S/4G/16G | Arm SBC, Rockchip RK3399 Hexa-core, 4G LPDDR4, 16G eMMC, HDMI, MIPI-DSI, MIPI-CSI, 12~19V DC in |

# Packing List

| Item# | Description                |
|-------|----------------------------|
| 1.    | 2 x Wi-Fi/BT antenna cable |
| 2.    | 1 x Heatsink               |
| 3.    | 1 x Quick Start Guide      |

# Optional Accessories

| Item#              | Description                             |
|--------------------|---|
| Power Adapter 45W  | DC 19V/2.37A or 19.5V/3.33A (5.5/2.5mm) |
| Power Adapter 65W  | DC 19V/3.42A or 19.5V/2.31A (5.5/2.5mm) |
| Fanless Case       | Aluminum Fanless Case                   |
| MIPI Convert Board | MIPI to LVDS/eDP converter board        |

\*Accessories will be shipped separately

### Rich configurations, multi-platform APIs, flexible framework for smart edge

ASUS has created OmniEdge middleware to simplify application development and offer exclusive services with ASUS IoT platforms.

OmniEdge provides rich and stable Application Programming Interface (API) functions with modular design and multi-OS consideration. System integrators and customers can easily leverage the API to connect to peripherals, make best use of hardware capabilities. OmniEdge API is backward compatible on multi-OS platforms. It takes minimal effort to upgrade or migrate existing application to a new hardware platform.

For no-code low-code system integrators and customers, OmniEdge provides series of configuration tools and scripts, to protect and configure systems while integrating solutions. Customers can easily configure hardware monitors, connectivity, thermal protection, system throttling, and brightness levels...etc.

OmniEdge delivers an SDK of tools, scripts, libraries, and flexible application framework, to assist customers to accelerate application development and solution integration.

## HIGHLIGHTS

|   |   |  |  |   |                        |
|---|---|--|--|---|------------------------|
| <b>Configuration</b>                                      | <b>APIs</b>   | <b>IOT Framework</b>   | <b>Connectivity</b>  | <b>Monitor &amp; Protect</b>  | <b>IoT Protocols</b>   |
| Shell scripts (CLI)<br>Tinker config tools, x86 IPC tools | EAPI compliant<br>ASUS extended API for full control<br>Cross platforms (Windows, Linux, Android) | Quick response time<br>Local decision<br>Automation by multiple data sources<br>Reliability under intermittent network | LTE keep alive & auto recover<br>Automatic backup between networks | Watchdog timer<br>Thermal protect customization<br>Fan control<br>Power on/off scheduling | MQTT<br>Modbus, BACNET |

## DELIVERABLES (SDK)

| Category | A (x86)  | B (Tinker Series)  | C (ARM IPC)  |
|----------|--|--|--|
| Windows  | 1. API library, header files, sample code<br>2. API Programming Guide<br>3. Driver (32 bit and 64 bit) | N/A  | N/A  |
| Linux    | By request   | 1. API library, header files, sample code<br>2. API Programming Guide<br>3. Connectivity Manager User Manual | 1. API library, header files, sample code<br>2. API Programming Guide<br>3. Connectivity Manager User Manual |
| Android  | N/A  | 1. API library, sample code<br>2. API Programming Guide  | N/A  |

# OmniEdge API

## DATASHEET



| Features               | Functions <sup>(2)</sup>                  | Category A |       | Category B       |                  | Category C |
|------------------------|---|------------|-------|------------------|------------------|------------|
|                        |   | Windows    | Linux | Linux            | Android          | Linux      |
| Operation & Protection | Hardware monitor API                      | V          |       |                  |                  |            |
|                        | Thermal protect API                       | V          |       |                  |                  |            |
|                        | Fan control API <sup>(3)</sup>            | V          |       |                  |                  |            |
|                        | Scheduled Power on/off API <sup>(3)</sup> | V          |       |                  |                  |            |
|                        | Watchdog timer API                        | V          |       | V <sup>(4)</sup> |                  | V          |
| Peripheral             | GPIO API                                  | V          |       | V <sup>(4)</sup> | V <sup>(5)</sup> | V          |
|                        | I2C API                                   |            |       | V <sup>(4)</sup> | V <sup>(5)</sup> | V          |
|                        | SPI API                                   |            |       |                  | V <sup>(5)</sup> |            |
|                        | UART API                                  |            |       |                  | V <sup>(5)</sup> |            |
|                        | PWM API                                   |            |       |                  | V <sup>(5)</sup> |            |
| Connectivity           | Connection auto-recover                   |            |       | V <sup>(4)</sup> | O <sup>(6)</sup> | V          |
|                        | High availability network                 |            |       | V <sup>(4)</sup> | O <sup>(6)</sup> | V          |
| IoT framework          | Cloud/on-prem adapter                     |            |       |                  | x                | V          |
|                        | IOT gateway framework & services          |            |       |                  | x                | V          |
|                        | Protocols (MQTT, Modbus, REST)            |            |       |                  | x                | V          |

| Category              | A<br>(x86)  | B<br>(Tinker Series)                             | C<br>(ARM IPC) |
|-----------------------|---|--|----------------|
| Models <sup>(1)</sup> | E395S-IM-AA<br>H110M-IM-A<br>H310I-IM-A R3.0<br>H610M-IM-A<br>J3455T-IM-A<br>J3455T-IM-A R2.0<br>J6412T-IM-A<br>N3350T-IM-A<br>N420S-IM-AA<br>N4200T-IM-A<br>N5105I-IM-A R2.0<br>Q370I-IM-A<br>Q370I-IM-A R2.0<br>Q470EI-IM-A<br>Q470EA-IM-A<br>Q470EI-IM-A R3.0<br>Q670EI-IM-A (SHINE)<br>R680EI-IM-A(SKY)<br>W480E-IM-A R3.0<br>W480EI-IM-A | Tinkerboard 2<br>Tinkerboard 2S<br>Tinker Edge R | PE100A         |

1. Not listed models can be supported by request
2. Not checked features can be supported by request
3. Some models may not support this function. Please refer API document
4. Available on Tinker Edge R. Further models by request
5. Available on Tinker 2. Further models by request
6. Native support by Android