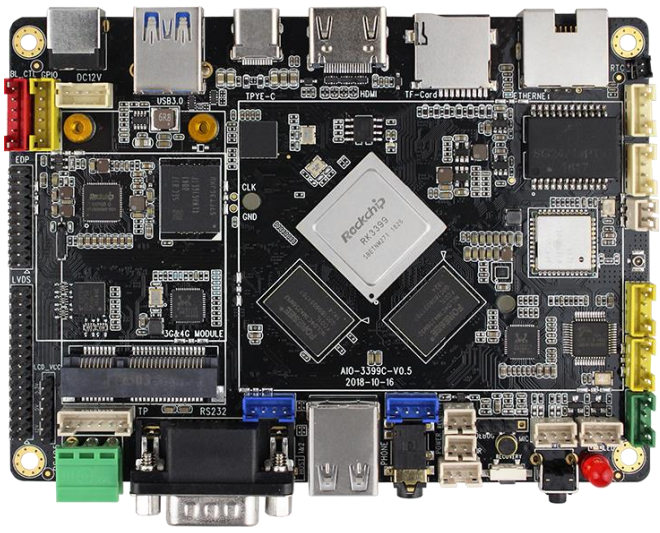
DOCTYPE	VERSION	DATE	CONFIDENTIALITY	
Specification	V1.2	2020-3-28	Public	

T-CHIP TECHNOLOGY

AIO-3399C(AI)

V1.2



Version	Date	Updated content
V1.0	2018-10-15	Original version
V1.1	2019-05-20	Adding Artificial Intelligence Description
V1.2	2020-3-28	Adding interface description

Directory

1. Product Overview

It adapts 64-bit six-core processor, with powerful hardware decoding capabilities and supporting 4K hardware decoding. Featuring a variety of display output interfaces, it can directly drive multiple resolutions eDP interface LCD screen. AIO-3399C is combined with an industrial-grade case for flexible insertion into a wide range of industries to realize fast product landing.

AIO-3399C(AI) including "with NPU" and "without NPU" versions.

Main characteristics:

1. AI Neural Network Processor NPU

   Onboard AI neural network processor SPR2801S:
   Computing power up to 2.8 TOPS，peak up to 5.6Tops，9.3Tops/W ultra-high efficiency
   Support PLAI（PyTorch）and MDK（Caffe) model training tools
   Follow-up support TensorFlow
   Support Image Classification Model VGG-16(GNet1)、GNet18 and Gnetfc
   Support Target Detection Model: SSD (Based on VGG)

2. **Six-core 64-bit High-performance Processor**

   Adopts RK3399 six-core 64-bit (A72x2+A53x4) high-performance processor, frequency up to 1.8GHz, integrated quad-core ARM high-end GPU Mali-T860. Provide a variety of storage configuration options, users only need to expand the function backplane to quickly achieve project development.

3. **Rich Extension Interfaces**

   AIO-3399C can be powered by POE+ (802.3 AT, output power 30W) enhanced Ethernet. It has rich external interfaces, supports RS232, RS485 interface, and onboard 2-way UART, convenient to connect various industrial equipment and easy to achieve product development.

4. **Powerful Hardware Decoding Capability**

   It supports dual LVDS, EDP, HDMI and other display output interfaces, dual-screen identical display/dual-screen differential display, and H.265 HEVC, VP9 and H.264 encoding, 4K HDR, maximum support for 4K hardware decoding. AIO-3399C can directly drive multiple resolutions eDP interface LCD screen.

5. **Open Source**

   Complete with SDK, tutorial, technical information and development tools can be downloaded on the website , making development and learning easier.

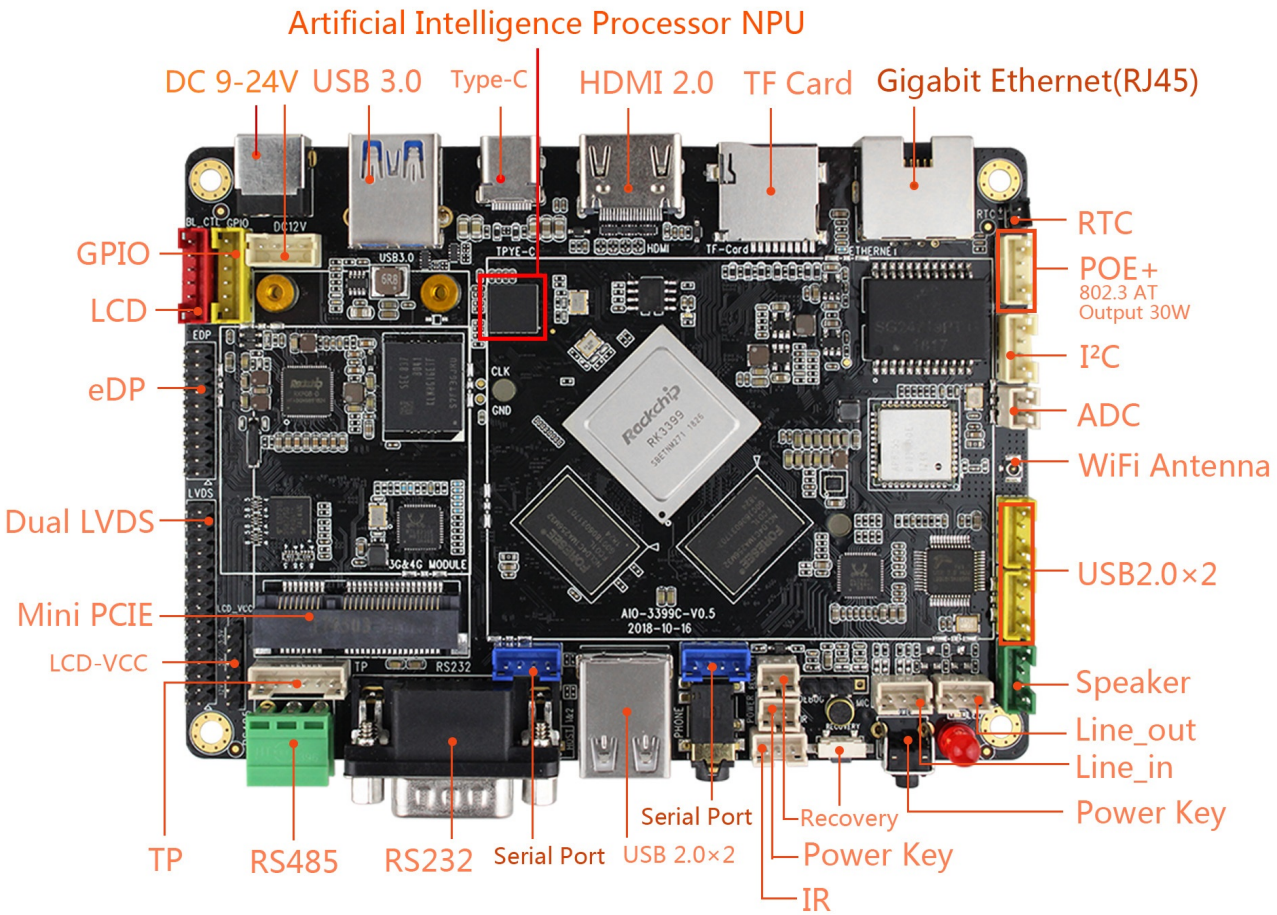
6. **Application**

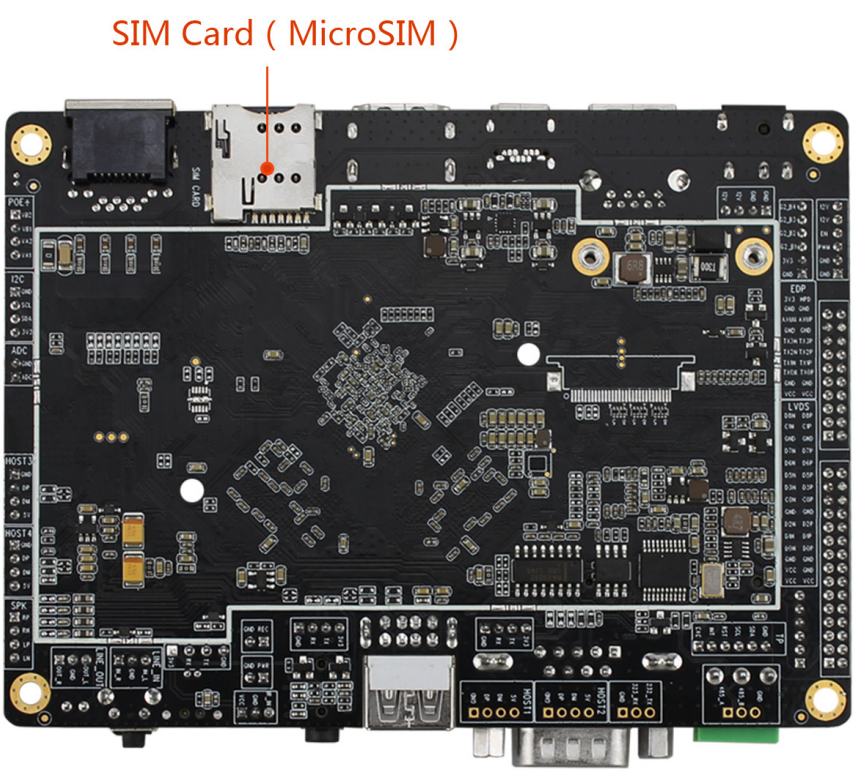
   It is suitable for cluster servers, high-performance computing/storage, computer vision, gaming equipment, commercial display equipment, medical equipment, vending machines, industrial computers, etc.

2. Specification

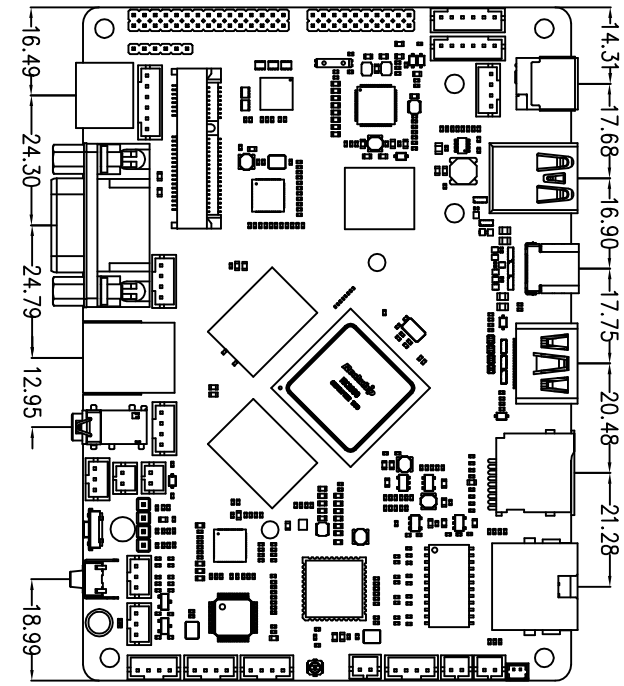
Specification	
SOC	Rockchip RK3399 (28nm HKMG Process)
CPU	Six-Core ARM 64-bit processor, up to 1.8GHz Based on Big.Little architecture, Dual-Core Cortex-A72 and Quad-Core Cortex-A53 with separate NEON coprocessor
GPU	ARM® Mali-T860 MP4 Quad-core GPU Support OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, DX11 Support AFBC(frame buffer compression)
VPU	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60fps 1080P multi-format video decoding (WMV, MPEG-1/2/4, VP8) 1080P video coding, support H.264，VP8 format Video post processor, de-interlacing, de-noising, edge/detail/color optimization
RAM	2GB Dual-Channel LPDDR4 (2GB/4GB Optional)
Storage	8GB high-speed eMMC 5.1 （8GB/16GB/32GB/128GB） Support TF Card Extended Storage
NPU	Onboard AI neural network processor SPR2801S: Computing power up to 2.8 TOPS，peak up to 5.6Tops，9.3Tops/W ultra-high efficiency Support PLAI（PyTorch）and MDK（Caffe) model training tools Follow-up support TensorFlow Support Image Classification Model VGG-16(GNet1)、GNet18 and Gnetfc Support Target Detection Model: SSD (Based on VGG)
Hardware Features	
Network	10 / 100 / 1000 MbpsEthernet interface（RJ45） support 2.4GHz / 5GHz dual-band WiFi,802.11a/b/g/n/ac protocol Support Bluetooth 4.1（support BLE） Mini PCIe（Used to expand 3G/4G modules, use with Micro SIM card slot）
Multimedia	Support 4K VP9 and 4K 10bits H265/H264 video decoding, up to 60fps 1080P Multi-format video decoding（VC-1, MPEG-1/2/4, VP8） Support the encoding of 1080P videos with H.264 and VP8 formats Video post processor: deinterlacing, denoising, edge/ detail/ color optimization
Display	Dual VOP: support 4096X2160 and 2560X1600 HDMI2.0 support 4K 60Hz display, support HDCP 1.4/2.2 Support eDP 1.3（4 lines, 10.8Gbps）,can directly drive multiple resolutions eDP interfaceLCD screen Support dual 6/8-bit LVDS interface, up to 24-bit 1920×1200 resolution Support Rec.2020 and Rec.709 color gamut conversion
Audio	1 x PHONE, 1 x LINE-IN, 1 x LINE-OUT, Microphone (left and right channel)
Serial port	RS232×1, RS485×1, Debug serial port x 1, Onboard 2-way TTL port
USB	Type-C (OTG), 1 x USB3.0, 4 x USB2.0(interface x 2, socket x 2)
Interface	1 x ADC, SPI / GPIO, LED x 2, I2C x 1, Gravity sensor x 1(Scalable) Dual ISP pixel processing capability up to 13MPix/s, Supports imultaneous input of two-way camera data
Power	With a one-way infrared receiver, support infrared remote control DC 9-24V(DC 5.5 ×2.1mm), Support for external connection(Power socket×1) Can power by POE+（802.3 AT, Output Power30W) Ethernet
Power consumption	Max: 14.3w(13V/1.1A), Normal: 8.4w(12V/0.7A), Mini: 3.3w（11V/0.3A）
OS / Software	
OS	Android, Linux+QT, Ubuntu
Software	Support PLAI（PyTorch）and MDK（Caffe) model training tools Follow-up support TensorFlow Support Image Classification Model VGG-16(GNet1)、GNet18 and Gnetfc Support Target Detection Model: SSD (Based on VGG)
Appearance	
PCB Size	126 mm× 91.3mm
Environment	Work temperature: -20℃-60℃, Storage humidity: 10%-90%RH(non-condensing)

3.Interface description





4. PCB Size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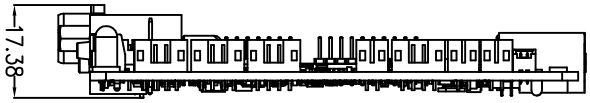
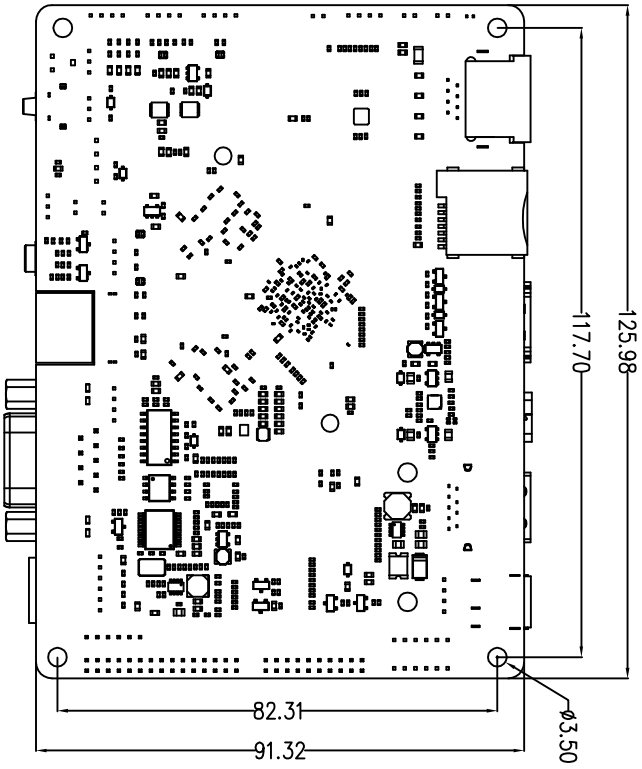
24.79
12.95
18.99
14.31
17.68
16.90
17.75
20.48
21.28


17.38

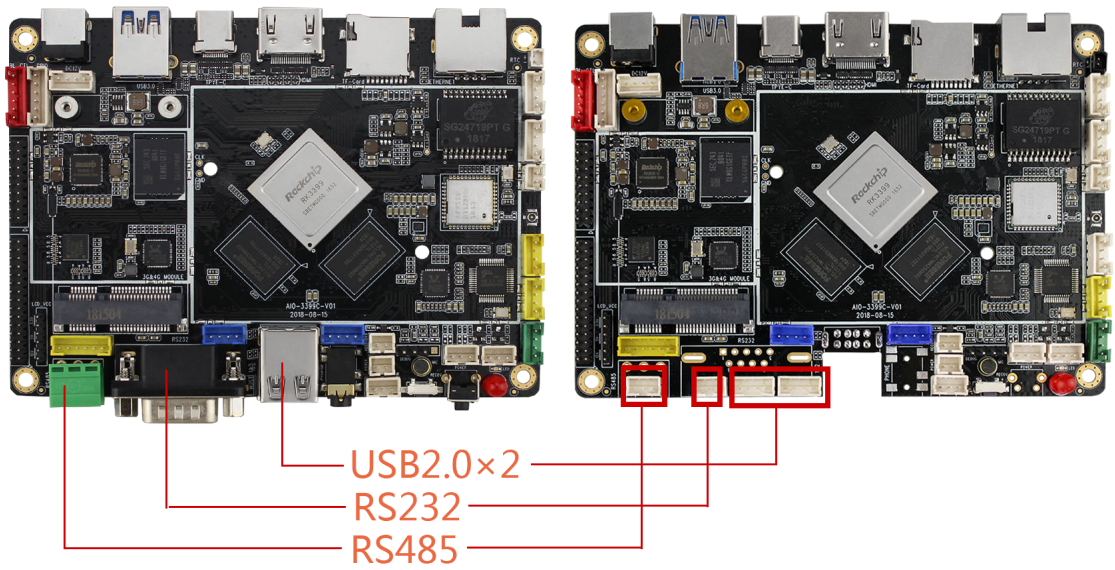

125.98
117.70
82.31
91.32
Ø3.50

5. Product Customize

The interface of Mainboard can be customized according to customer's requirements

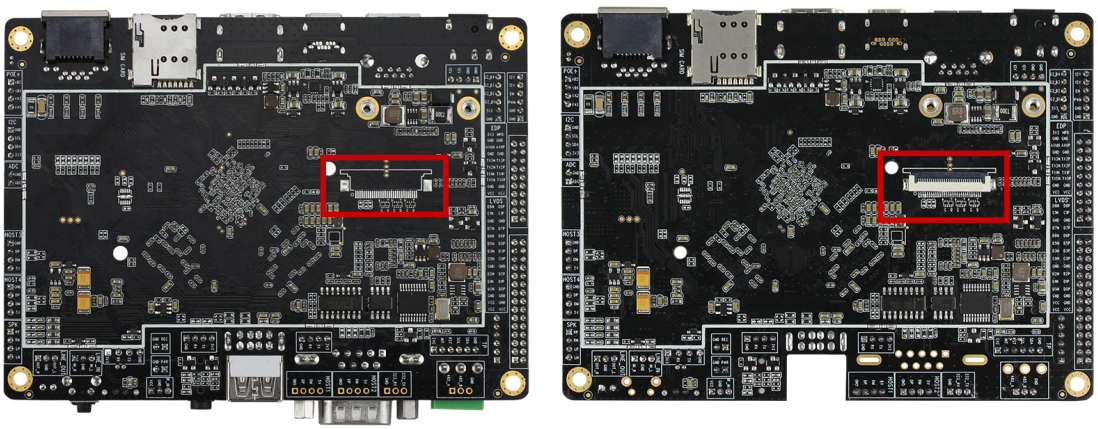
Standard

Customize



Standard

Customize

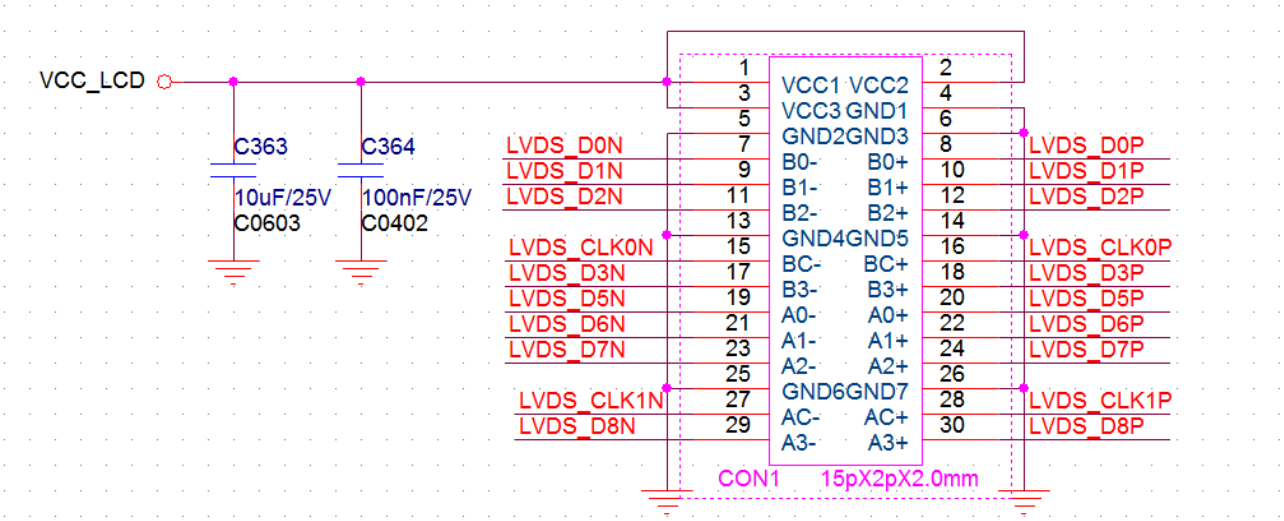


Stand：Without MIPI DSI

Customize：Support single channel MIPI DSI，up to 1920×1080 resolution

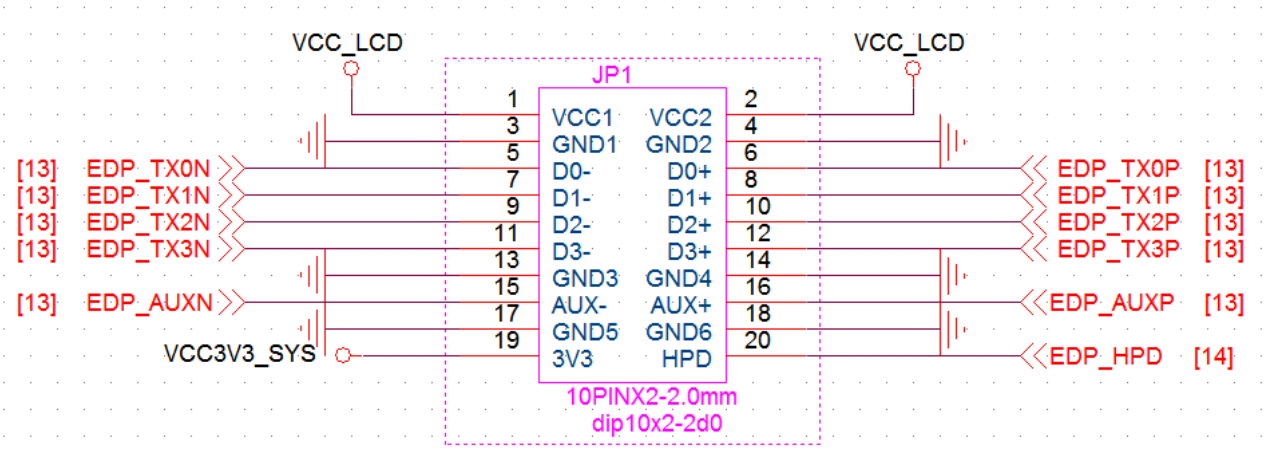
6. Interface definition

1. LVDS double row 30PIN 2.0 pitch interface (GPIO)



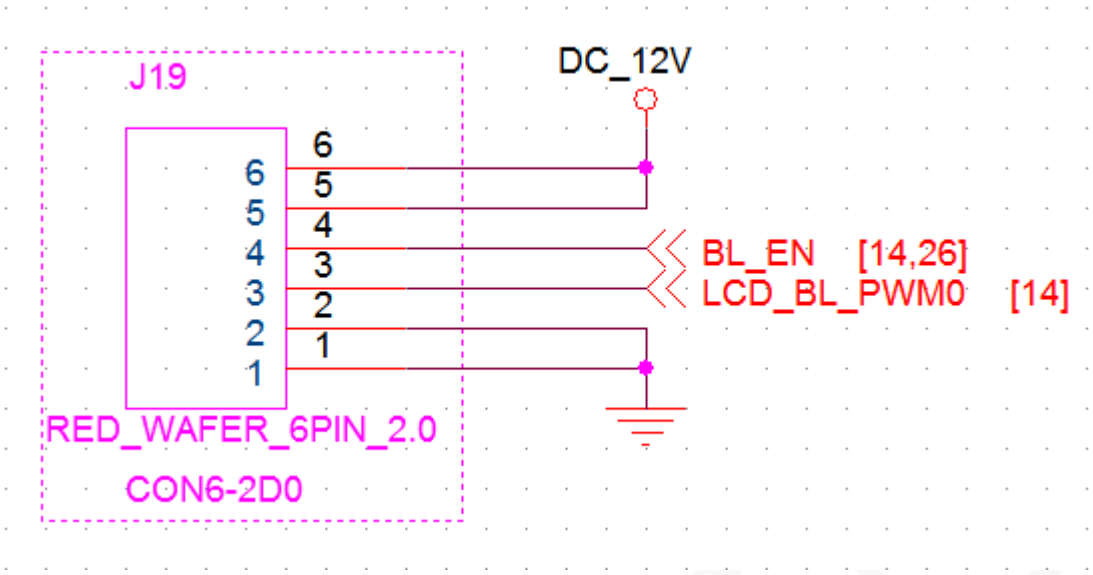
NO.	Definition	NO.	Definition
1	VCC_LCD	2	VCC_LCD
3	VCC_LCD	4	GND
5	GND	6	GND
7	LVTX1AN	8	LVTX1AP
9	LVTX1BN	10	LVTX1BP
11	LVTX1CN	12	LVTX1CP
13	GND	14	GND
15	LVTX1DN	16	LVTX1DP
17	LVTX1EN	18	LVTX1EP
19	LVTX2AN	20	LVTX2AP
21	LVTX2BN	22	LVTX2BP
23	LVTX2CN	24	LVTX2CP
25	GND	26	GND
27	LVTX2DN	28	LVTX2DP
29	LVTX2EN	30	LVTX2EP

2. EDP double row 30PIN 2.0 pitch interface (GPIO)



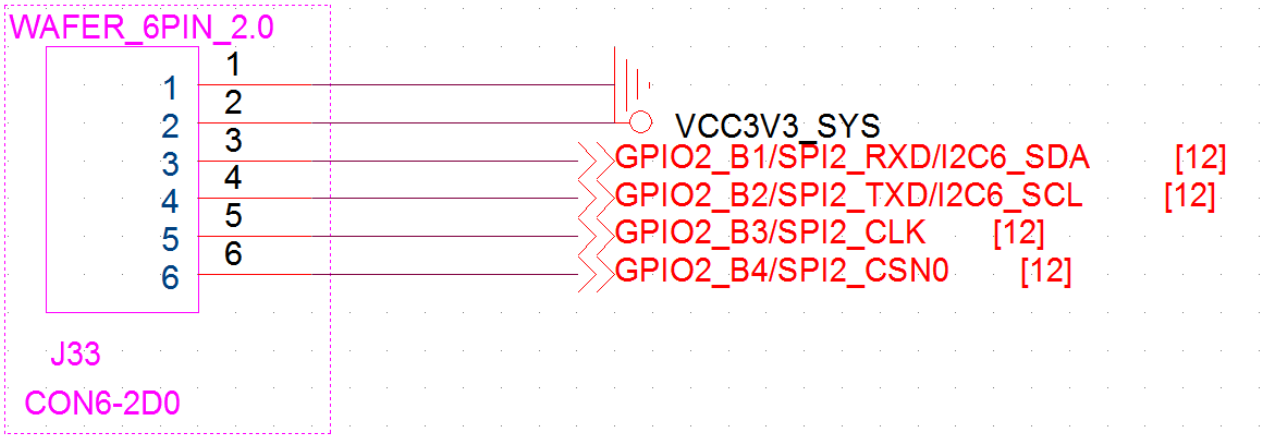
NO.	Definition	NO.	Definition
1	VCC_LCD	2	VCC_LCD
3	GND	4	GND
5	EDP_TX0N	6	EDP_TX0P
7	EDP_TX1N	8	EDP_TX1P
9	EDP_TX2N	10	EDP_TX2P
11	EDP_TX3N	12	EDP_TX3P
13	GND	14	GND
15	EDP_AUXN	16	EDP_AUXP
17	GND	18	GND
19	VCC3V3_SYS	20	EDP_HPD

3. BL_CTL single row 6PIN 2.0 pitch interface (GPIO)



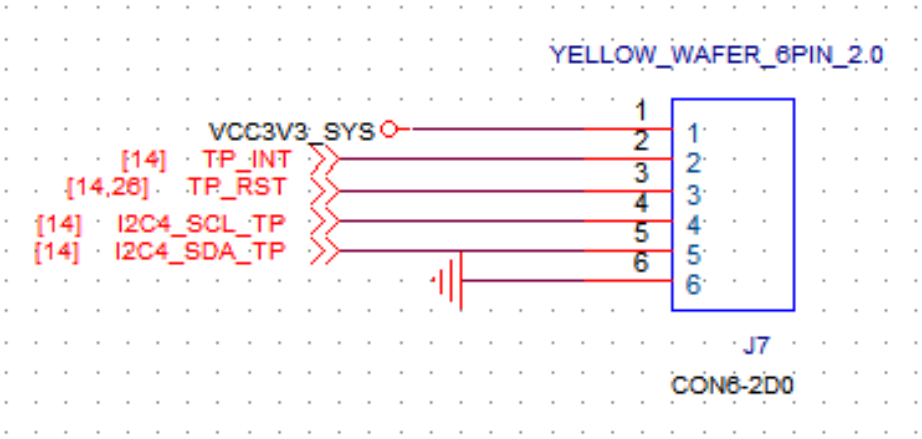
NO.	Definition
1	GND
2	GND
3	GPIO4_C2/PWM0/VOP0_PWM/VOP1PWM
4	GPIO1_A1/ISP0_SHUTTER_TRIG/ISP1_SHUTTER_TRIG/TCPD_CC0_VCONN_EN
5	DC_12V
6	DC_12V

4. GPIO single row 6 PIN 2.0 pitch interface



NO.	Definition
1	GND
2	VCC3V3_SYS
3	GPIO2_B1/SPI2_RXD/CIF_HREF/I2C6_SDA
4	GPIO2_B2/SPI2_TXD/CIF_CLKIN/I2C6_SCL
5	GPIO2_B3/SPI2_CLK/VOP_DEN/CIF_CLKOUTA
6	GPIO2_B4/SPI2_CSN0

5. TP single row 6 PIN 2.0 pitch interface (GPIO)



NO.	Definition
1	VCC3V3_SYS
2	GPIO4_D4
3	GPIO4_C5/SPDIF_TX
4	GPIO1_B4/I2C4_SCL
5	GPIO1_B3/I2C4_SDA
6	GND

7.Industrial-grade case

Equipped with industrial grade metal casing, featuring small size, fanless efficient heat dissipation, dustproof and anti-disruption. It has various installation methods and can be flexibly embedded in various smart devices.

Appendix

1. Company Profile

T-Chip Intelligent Technology Co., Ltd. was founded in 2005. It has more than 10 years of research and development experience in scientific and technological products, has 6 invention patents and more than 30 computer software copyrights, and is a national high-tech enterprise. We focus on the research and development, design, production and sales of open source intelligent hardware, internet of things and digital audio products, and provide the overall solution for intelligent hardware products meanwhile.

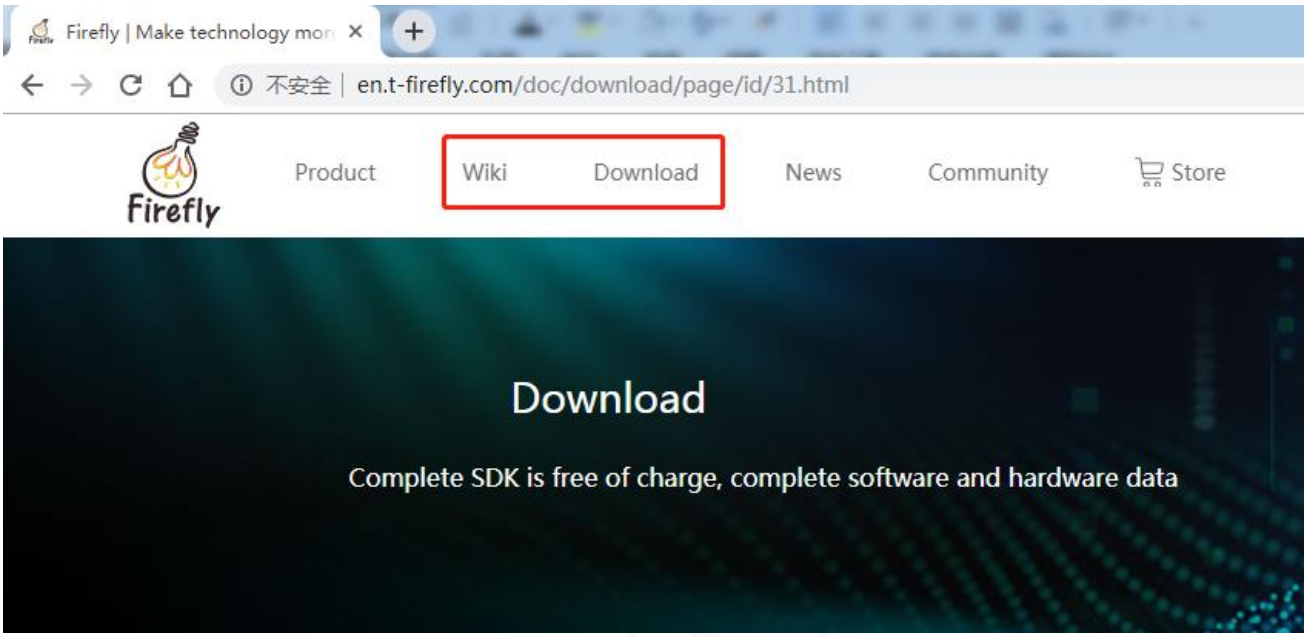
Firefly is a brand owned by T-chip Technology. It operates open source products, open source communities and online stores. It has a large number of enterprise users and developer users, and its products are well received by users. Firefly open source products include open source boards, core boards, industry mainboards, etc. The open-source board series is the recommended board card by chip original factory Rockchip and obtain the support of native SDK. The core boards and industrial mainboards are widely used in commercial displays, advertisement integrated machines, intelligent POS, face recognition terminals, internet of things, intelligent cities, etc. At present, there are more than 100,000 users, including over 2,000 enterprise users. And well-known users include ARM, Google, Baidu, Tencent, Alibaba, etc.

Firefly team has more than 60 research and development members and has the research and development capabilities in schematic design, PCB layout, mainboard production, embedded development, system development, application program development, etc., which accelerates the research and development process for many technology entrepreneurs and start-ups, and provides professional technical services..

" Make technology more simple, Make life more intelligent " is the idea of Firefly team. We hope to make the research and development of various technology products efficient and simple, and let intelligent technology integrate in our lives through the open source products and technical services of Firefly.

2. Source code acquisition

Please visit the official website : (please click here)



3.Contact Us

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