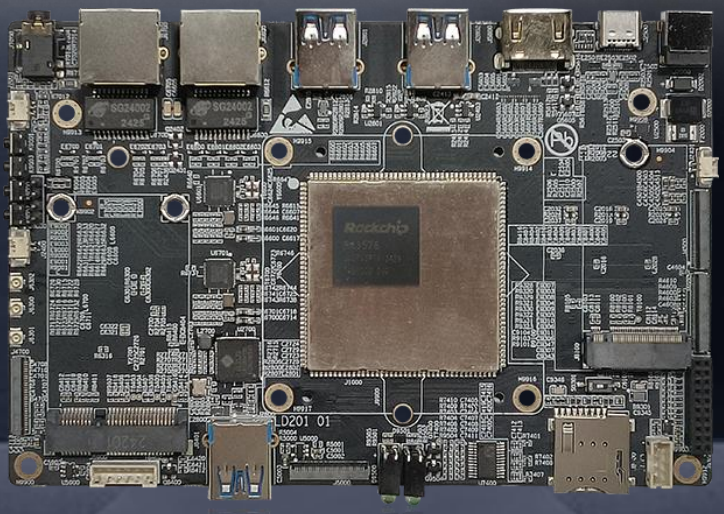
neardi

LKD3576 Development Board

Datasheet

V1.2



Shanghai Neardi Technology Co., Ltd.

www.neardi.com

Notes: All contengs only for explanatory and descriptive purposes. Please refer to the actual product. We strive to ensure consistency with the actual product. This document is provided for customers as a reference for product design and end application. It is better for you confirm the specifications and parameters carefully, provided in the document to ensure they meet the design or application requirements of the product. Whatsmore, it is strongly recommended that customers conduct detailed tests based on our actual products in the actual application scenario to ensure they meet the final usage requirements. Neardi Technology does not assume any responsibility for any damage suffered due to the use of the document, materials, and product functions.

Due to product version upgrades or other needs, our company may update the manual. If you need the latest version of the manual, please contact our company. We always adhere to the principle of customer first and provide customers with fast and efficient support services. If you have any needs, please feel free to contact our company at any time. Contact information is as follows:

Shanghai Neardi Technology Co., Ltd.
Phone: +86 021-20952021
Website: www.neardi.com
Email: sales@neardi.com

Version History

Version	Date	Description
V1.0	2025/3/25	Initial version
V1.1	2025/5/13	Update pin definitions
V1.2	2025/10/10	Update operating system

Contents

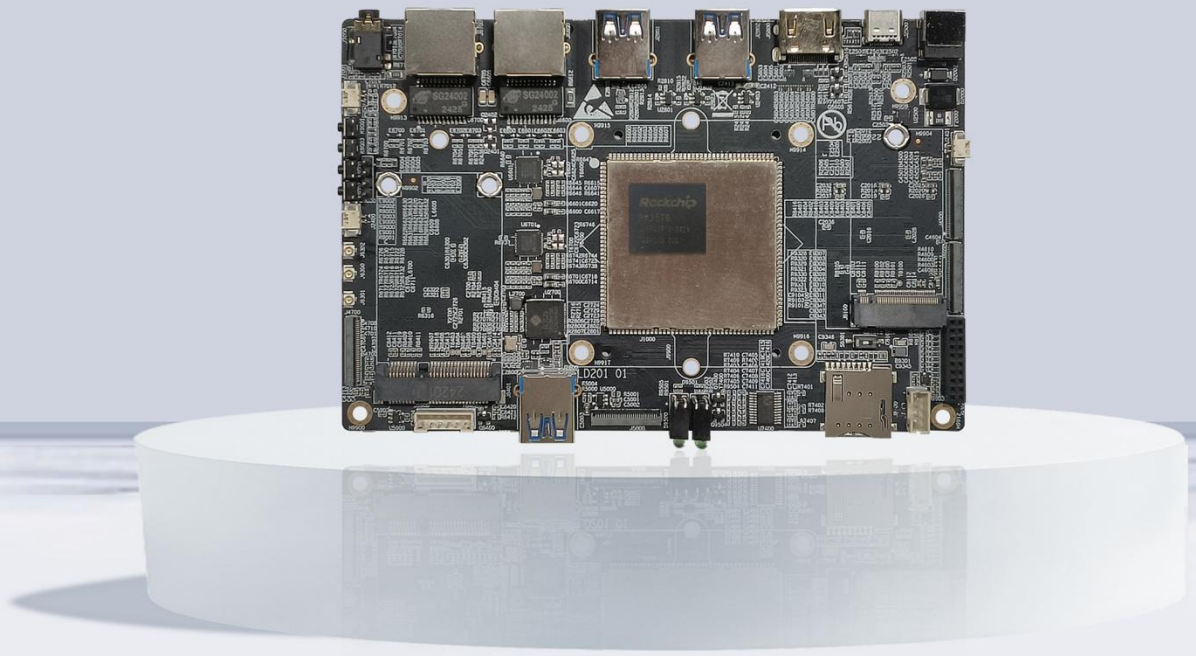
1.Product Introduction

The LKD3576 is a multifunctional development and evaluation board meticulously designed based on the Rockchip RK3576 chip platform, composed of our LCB3576 core module and baseboard. The core module connects to the baseboard via a stamp hole connection. The board features diverse functions, rich interfaces, compact size, and a slim, flat design, making it suitable for products with limited structural space.

The LKD3576 is manufactured using an 8nm process technology, integrating a quad-core Cortex-A72 and quad-core Cortex-A53 CPU with a maximum clock frequency of up to 2.2GHz. It also features an integrated NPU with 6TOPS computing power, supporting the efficient operation of various deep learning frameworks and AI algorithms. It is equipped with a Mali-G52 MC3 GPU, supporting graphics standards such as OpenGL ES, OpenCL, and Vulkan, capable of meeting the needs for high-definition video processing and UI interaction.

The LKD3576 board includes 3 Type-A USB 3.0 ports, 1 Type-C USB 3.1 port, 1 mini-PCIe interface for 4G/5G module expansion or RK1808-based mini-PCIe NPU compute card expansion, and 1 M.2 interface for NVMe protocol 2242 SSD expansion. The LKD3576 also supports dual-band WiFi 6, BT5.4, dual 1000M Ethernet ports, UART, RS485, and other common communication interfaces. It supports 1 HDMI output, 1 MIPI-DSI display interface, and 3 MIPI-CSI camera input interfaces.

The LKD3576 supports Android, buildroot, Debian,Ubuntu,Kylin,OpenEuler systems, offering high performance, reliability, and expandability. It provides users with open system source code. Users can perform secondary development and customization based on this product. Our company offers comprehensive technical support to developers and enterprise users, enabling them to efficiently complete R&D work and significantly shorten the product development and mass production cycle.



2. Function Overview

High-Performance Processor

CPU	8-core 64-bit (4x A72 + 4x A53), high performance, low power consumption
GPU	ARM Mali-G52 MC3 GPU, dedicated 2D graphics acceleration module
NPU	6TOPS computing power
VPU	8K30fps decoding, 4K60fps encoding
DDR	LPDDR4/4X/5, options for 4GB/8GB/16GB
eMMC	eMMC 5.1, options for 32GB/64GB/128GB

Rich Interfaces

1 HDMI 2.0 output, 1 MIPI-DSI output

3 MIPI-CSI interfaces, supporting up to 8 MIPI camera inputs

2 Gigabit Ethernet ports, dual-band WiFi 6, BT5.4

1 MINI PCIE interface, for 4/5G module or compute card expansion

1 M.2 M-Key interface, supporting external NVMe protocol SSD

3 Type-A USB 3.0 ports, 1 Type-C USB 3.1 port

UART, RS485, CANFD

Operating System

Android

Linux （Buildroot / Debian / Ubuntu）

Kylin

OpenEuler

Open Source Materials

WIKI Documentation http://www.neardi.com/cms/en/wiki.html

Quick Start

Firmware Upgrade

Android Development

Linux Development

Kernel Drivers

DEMO

System Customization

Accessories

Frequently Asked Questions (FAQ)

Release Notes

Hardware Materials

Chip Datesheet

Product 2D/3D Drawings

Core Board Pin Definitions

Baseboard Reference Schematic

Baseboard Reference PCB

Key Bill of Materials (BOM)

Software Materials

Firmware Tools and Drivers

Android Source Code and Images

U-Boot and Kernel Source Code

Debian/Ubuntu/Buildroot System Files

3. Technical Specifications

Basic Parameters	
SOC	Octa-core 64-bit architecture processor (4A76+4A53)
GPU	Mali-G52 MC3, 2D Graphics Engine, RGA dual core, VDPP, VPSS, 16M ISP, JPEG Encoder/Decoder
NPU	6 TOPS computing power; supports int4/int8/int16/FP16/BF16/TF32
VPU	Supports 8K30fps/4K120fps decoding (H265/HEVC, VP9, AVS2, AV1) and 4K60fps decoding (H264/AVC) Supports 4K60fps video encoding (H265/HEVC, H264/AVC)
DDR	LPDDR4/4X/5, with options for 4GB/8GB/16GB
eMMC	eMMC connector with options for 32GB/64GB/128GB and UFS connector
PMU	RK806
OS	Android / Ubuntu / Buildroot / Debian/Kylin/OpenEuler

Hardware Parameters	
Power	DC12V-3A (DC Jack 5.5*2.0mm / PH2.0 wafer connector)
USB	3*Type-A USB3.0
	1* Type-C USB3.1
Display	1*Type-A HDMI 2.1 up to 8K@60fps or 4K@120fps 1*MIPI-DSI up to 8K@60fps or 4K@120fps
Audio	φ3.5mm earphone Jack with L/R audio out

	2 pin header with Mic in
	1*HDMI audio out
	1*speaker out with L/R channel
Camera	3* MIPI CSI
Mini-PCIe	mini PCIe for 2G/3G/4G/5G module
	RK1808 AI computing card
M.2	M.2 NGFF (M-KEY) PCIE V3.0 x4 with NVMe SSD supported
SIM card	Micro sim slot for Mini-PCIe 4G LTE module
Ethernet	2*10/100/1000-Mbps data transfer rates
RTC	RTC power on and off supported
Serial port	Uart，RS485，CANFD
Keys	4* keys (power, reset, update,saradc)

Other Parameters

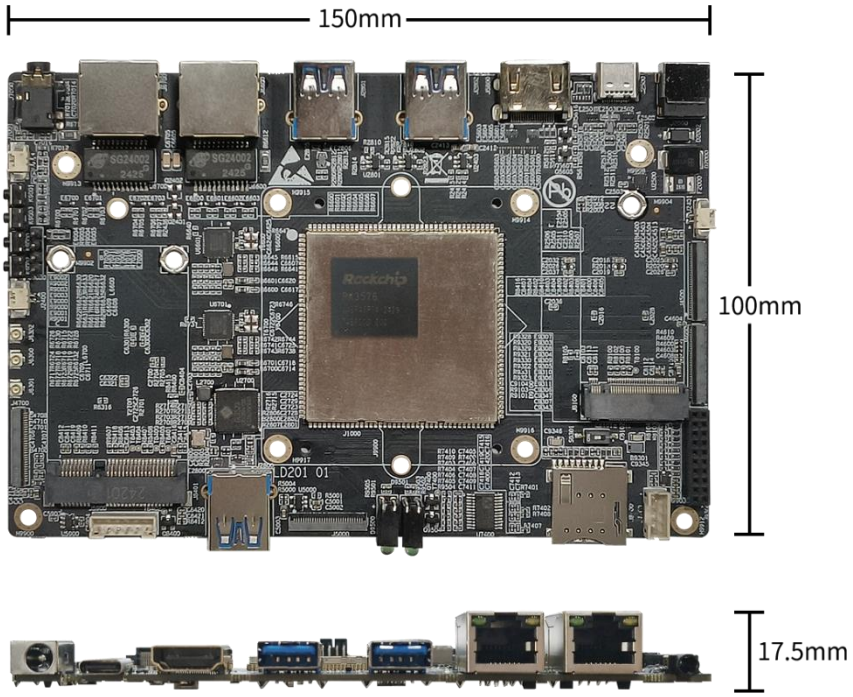
Dimensions	Length * Width * Height (mm) 150*100*17.5
Operating Temperature	-20 ~ 75℃（Commercial） -40 ~ 85℃（Industrial）
Weight	Approximately 113g (excluding peripherals)
Static power	1.38W
Dynamic power	5.676W

Static power: The system is powered on, but the development board is not connected to any external modules and is not running any programs.

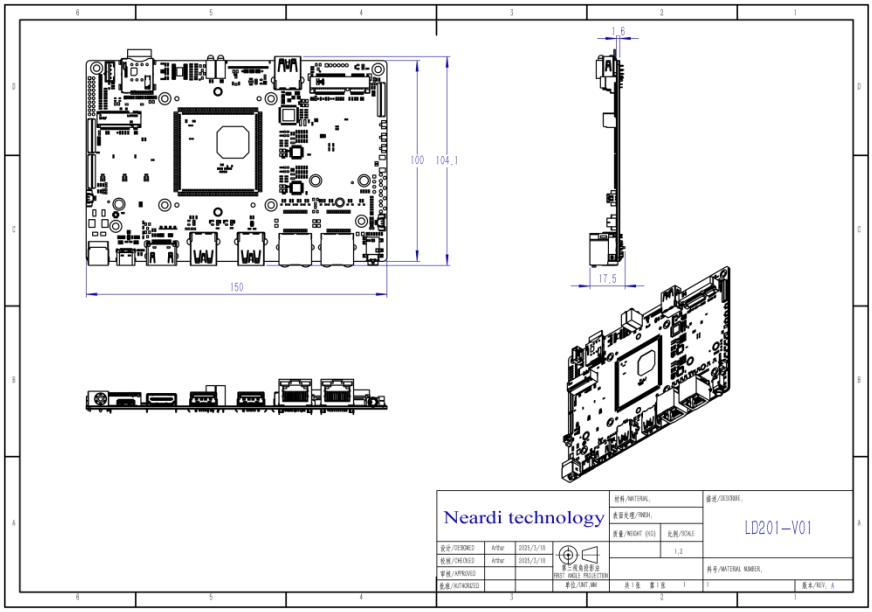
Dynamic power: The power consumption of the device when it is actively running applications, playing videos, gaming, or in other active states.

4. Appearance and Dimensions

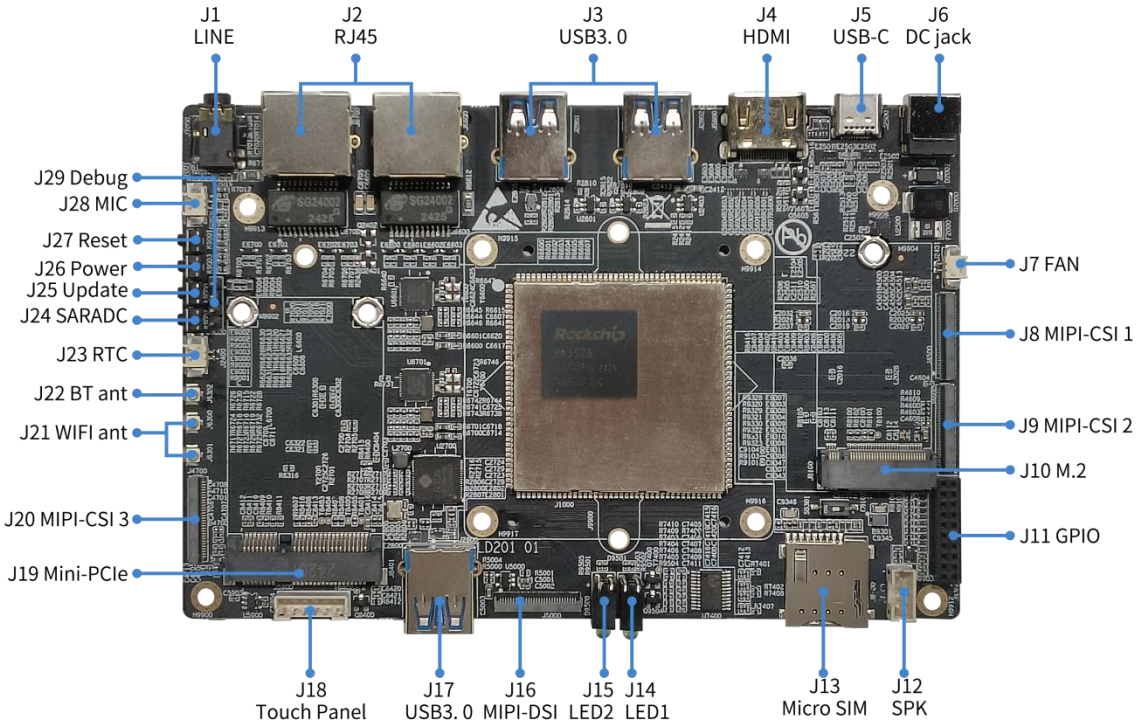
4.1 Appearance

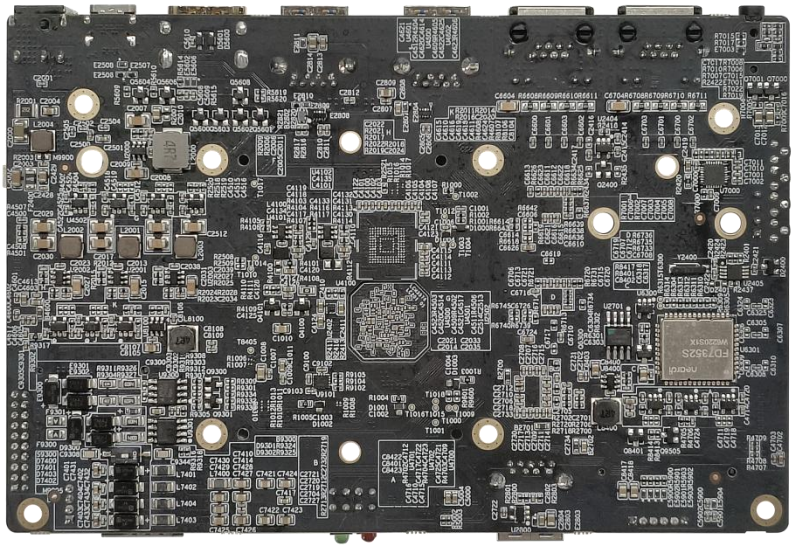


4.2 Dimensions



5.Interface Definition



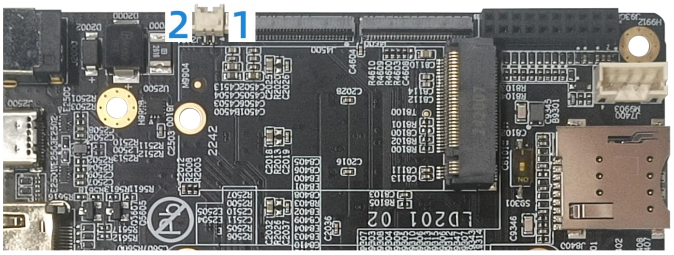


Part reference	Part Name	Part Specifications	Part Description
J1	LINE	φ3.5mm 3-L Jack	L/R audio out
J2	RJ45	Gigabit Ethernet	10/100/1000-Mbps data transfer rates
J3	USB3.0	Type-A USB3.0	USB3.0

J4	HDMI	Type-A HDMI connector	HDMI2.0 TX up to 7680x4320@60Hz
J5	USB-C	Type-C Socket	Type-C with USB3.0 or Display port
J6	DC jack	DC 5.5*2.1mm	Main power supply, DC12V – 3A
J7	FAN	1.25mm Pitch 2Pin wafer	Fan connector
J8	MIPI-CSI 1	30pin 0.5mm pitch FPC connector	MIPI-CSI 4lane or 2*2Lane for external cameras
J9	MIPI-CSI 2	30pin 0.5mm pitch FPC connector	MIPI-CSI 4lane or 2*2Lane for external cameras
J10	M.2	Standard M.2 M-key connector	M.2 NGFF (M-KEY) with PCIE V3.0*4Lane
J11	GPIO	PH2.0mm Pitch 2*10Pin header	UART,RS485,CAN connector
J12	SPK	PH2.0mm 4pin wafer	Dual channel audio Output for Speaker
J13	MIcro SIM	Push-Push SIM socket	SIM Card
J14	LED1	Green led *2	Work status and 3G/4G Module Status Indicator
J15	LED2	Red and Green LEDs	Power status indicate
J16	MIPI-DSI	30pin 0.5mm pitch FPC connector	mipi dsi 2lane signals for LCM
J17	USB3.0	Type-A USB3.0	USB3.0
J18	Touch Panel	PH2mm 6pin wafer	Touch Panel
J19	Mini-PCIe	Mini-PCIe 52pin socket	For 2G/3G/4G LTE module used
J20	MIPI-CSI 3	30pin 0.5mm pitch FPC connector	MIPI-CSI 4lane or 2*2Lane for external cameras
J21	WIFI ant	I-PXE	WIFI_ANT
J22	BT ant	I-PXE	BT_ANT
J23	RTC	1.25mm Pitch 2Pin wafer	RTC battery power input 3.0V
J24	SARADC	push-button	Key for system saradc
J25	UPdata	push-button	Key for system updata
J26	Power	push-button	Key for system power
J27	Reset	push-button	Key for system reset
J28	MIC	1.25mm Pitch 2Pin wafer	Micphone In
J29	Debug	PH2.0mm 4pin wafer	CPU debug

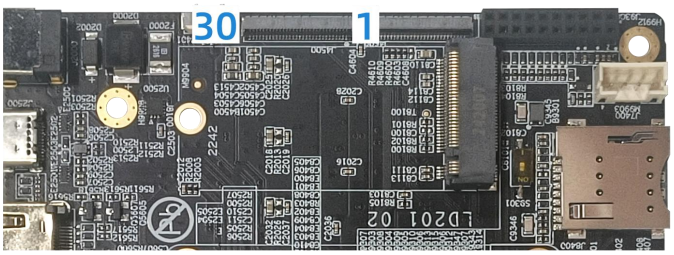
6. Pin Definition

FAN (J7)



Pin number	Pin name	Voltage level	Notice
1	FAN_12V	12V	-
2	GND	GND	-

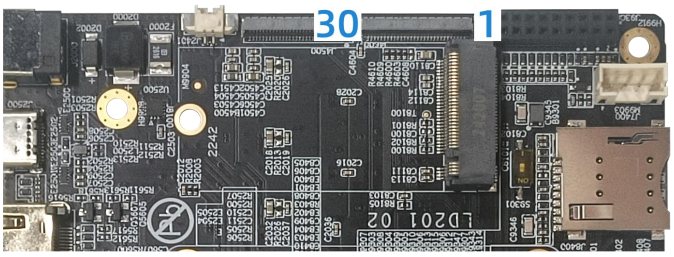
MIPI-CSI 1 (J8)



Pin number	Pin name	Voltage level	Notice
1,4,7,10,13,16,19	GND	GND	-
2	MIPI_DPHY_CSI0_RX_D0P	-	-
3	MIPI_DPHY_CSI0_RX_D0N	-	-
5	MIPI_DPHY_CSI0_RX_D1P	-	-
6	MIPI_DPHY_CSI0_RX_D1N	-	-
8	MIPI_DPHY_CSI0_RX_CLKN	-	-
9	MIPI_DPHY_CSI0_RX_CLKP	-	-
11	MIPI_DPHY_CSI0_RX_D2P	-	-
12	MIPI_DPHY_CSI0_RX_D2N	-	-
14	MIPI_DPHY_CSI0_RX_D3P	-	-
15	MIPI_DPHY_CSI0_RX_D3N	-	-
17,18,23,24	NC	NC	-
20	MIPI_DCPHY_CSI_CAM0_CLKOUT	-	-
21	MIPI_CSI_CAM0_RST	-	-
22	MIPI_CSI_CAM0_PDN	-	-
25	I2C3_SCL_M0_Audio	-	-
26	I2C3_SDA_M0_Audio	-	-

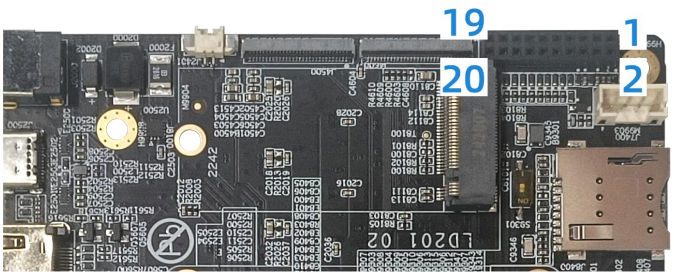
27	VCC1V8_DOVDD_DVP0	1.8V	-
28	VDD1V2_DVDD_DVP0	1.2V	-
29	VCC2V8_DVP0	2.8V	-
30	VCC2V8_AVDD_DVP0	2.8V	-

MIPI-CSI 2 (J9)



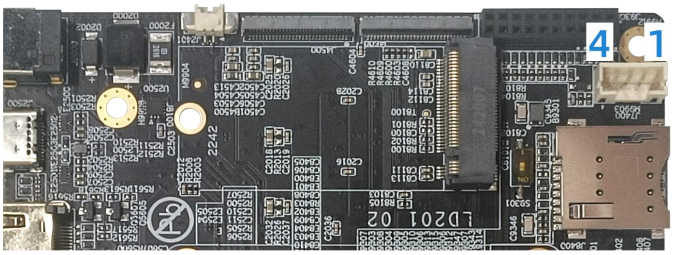
Pin number	Pin name	Voltage level	Notice
1,4,7,10,13,16,19	GND	GND	-
2	MIPI_DPHY_CSI1_RX_D0P	-	-
3	MIPI_DPHY_CSI1_RX_D0N	-	-
5	MIPI_DPHY_CSI1_RX_D1P	-	-
6	MIPI_DPHY_CSI1_RX_D1N	-	-
8	MIPI_DPHY_CSI1_RX_CLKN	-	-
9	MIPI_DPHY_CSI1_RX_CLKP	-	-
11	MIPI_DPHY_CSI1_RX_D2P	-	-
12	MIPI_DPHY_CSI1_RX_D2N	-	-
14	MIPI_DPHY_CSI1_RX_D3P	-	-
15	MIPI_DPHY_CSI1_RX_D3N	-	-
17	MIPI_DPHY_CSI2_RX_CLKP	-	-
18	MIPI_DPHY_CSI2_RX_CLKN	-	-
20	MIPI_DPHY_CSI_CAM1_CLKOUT	-	-
21	MIPI_CSI_CAM1_RST	-	-
22	MIPI_CSI_CAM1_PDN	-	-
23	MIPI_CSI_CAM2_RST	-	-
24	MIPI_CSI_CAM2_PDN	-	-
25	I2C5_SCL_M3_MIPI_CAM1/HDMI_RX	-	-
26	I2C5_SDA_M3_MIPI_CAM1/HDMI_RX	-	-
27	VCC1V8_DOVDD_DVP1_2	1.8V	-
28	VDD1V2_DVDD_DVP1_2	1.2V	-
29	VCC2V8_DVP1_2	2.8V	-
30	VCC2V8_AVDD_DVP1_2	2.8V	-

GPIO (J11)



Pin number	Pin name	Voltage level	Notice
1	VCC_3V3_EXT	3.3V	-
2	VCC_1V8_S3	1.8V	-
3	VCC5V0_DEVICE_S3	5V	-
4	VCC5V0_DEVICE_S3	5V	-
5	GND	GND	-
6	IR_RX_IO	-	-
7	CAN0_L	-	-
8	RS485-B	-	-
9	CAN0_H	-	-
10	RS485-A	-	-
11	UART4_RTSN_M1_IO	-	-
12	PDM1_SDI1_M1_Loopback_IO	-	-
13	UART4_CTSN_M1_IO	-	-
14	PDM1_CLK1_M1_Loopback_IO	-	-
15	UART4_TX_M1_IO	-	-
16	UART5_CTSN_M2_IO	-	-
17	UART4_RX_M1_IO	-	-
18	GND	GND	-
19	VCC_3V3_EXT	3.3V	-
20	REF_CLK0_OUT_IO	-	-

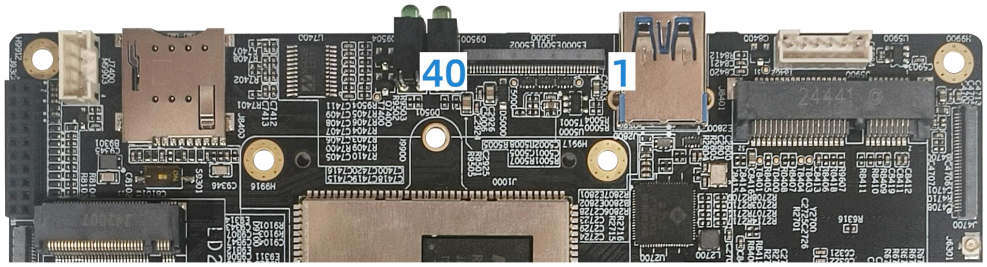
SPK (J12)



Pin number	Pin name	Voltage level	Notice
1	SPK_OUT_RN	-	-
2	SPK_OUT_RP	-	-
3	SPK_OUT_LN	-	-

4	SPK_OUT_LP	-	-

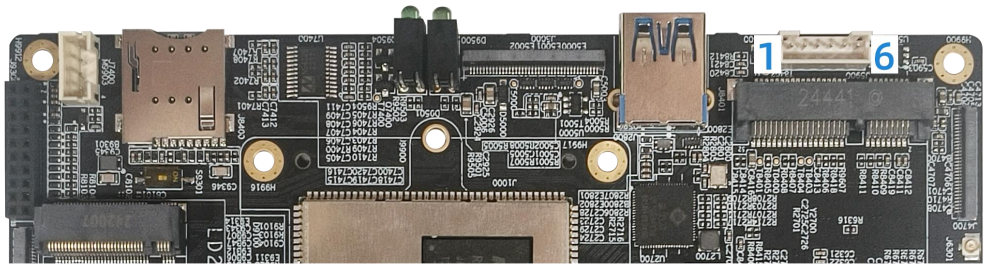
MIPI-DSI (J16)



Pin number	Pin name	Voltage level	Notice
1	NC	-	-
2	VCC3V3_MIPI_LCD	3.3V	-
3	VCC3V3_MIPI_LCD	3.3V	-
4	GND	GND	-
5	MIPI_LCD_RST	-	-
6	T5001	-	-
7	GND	GND	-
8	MIPI_DPHY_DSI_TX_D0N	-	-
9	MIPI_DPHY_DSI_TX_D0P	-	-
10	GND	GND	-
11	MIPI_DPHY_DSI_TX_D1N	-	-
12	MIPI_DPHY_DSI_TX_D1P	-	-
13	GND	GND	-
14	MIPI_DPHY_DSI_TX_CLKN	-	-
15	MIPI_DPHY_DSI_TX_CLKP	-	-
16	GND	GND	-
17	MIPI_DPHY_DSI_TX_D2N	-	-
18	MIPI_DPHY_DSI_TX_D2P	-	-
19	GND	GND	-
20	MIPI_DPHY_DSI_TX_D3N	-	-
21	MIPI_DPHY_DSI_TX_D3P	-	-
22	GND	GND	-
23	NC	-	-
24	NC	-	-
25	GND	GND	-
26	NC	-	-
27	T5000	-	-
28	NC	-	-
29	NC	-	-
30	GND	GND	-
31	MIPI_LED-	-	-

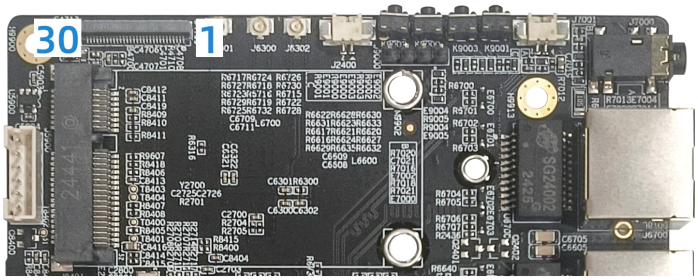
32	MIPI_LED-	-	-
33	NC	-	-
34	NC	-	-
35	NC	-	-
36	NC	-	-
37	NC	-	-
38	NC	-	-
39	MIPI_LED+	-	-
40	MIPI_LED+	-	-

Touch Panel (J18)



Pin number	Pin name	Voltage level	Notice
1	GND	GND	-
2	I2C_SDA_TP	-	-
3	I2C_SCL_TP	-	-
4	TP_RST	-	-
5	TP_INT	-	-
6	VCC3V0_TOUCH	3.3V	-

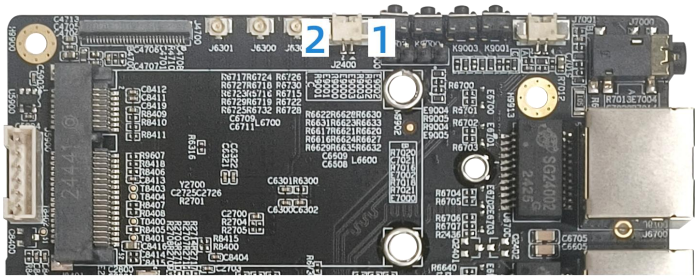
MIPI-CSI 3 (J20)



Pin number	Pin name	Voltage level	Notice
1,4,7,10,13,16,19	GND	GND	-
2	MIPI_DPHY_CSI3_RX_D0P	-	-
3	MIPI_DPHY_CSI3_RX_D0N	-	-
5	MIPI_DPHY_CSI3_RX_D1P	-	-
6	MIPI_DPHY_CSI3_RX_D1N	-	-
8	MIPI_DPHY_CSI3_RX_CLKN	-	-
9	MIPI_DPHY_CSI3_RX_CLKP	-	-

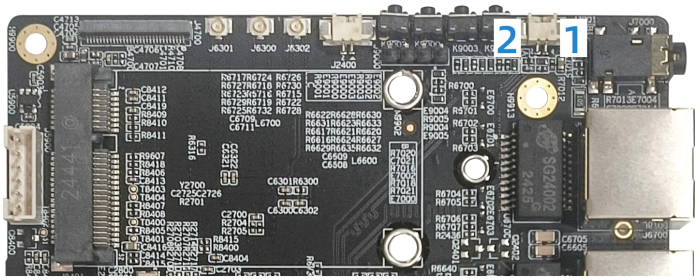
11	MIPI_DPHY_CSI3_RX_D2P	-	-
12	MIPI_DPHY_CSI3_RX_D2N	-	-
14	MIPI_DPHY_CSI3_RX_D3P	-	-
15	MIPI_DPHY_CSI3_RX_D3N	-	-
17	MIPI_DPHY_CSI4_RX_CLKP	-	-
18	MIPI_DPHY_CSI4_RX_CLKN	-	-
20	MIPI_DPHY_CSI_CAM2_CLKOUT	-	-
21	MIPI_CSI_CAM3_PDN	-	-
22	MIPI_CSI_CAM3_PDN	-	-
23	MIPI_CSI_CAM4_RST	-	-
24	MIPI_CSI_CAM4_PDN	-	-
25	I2C4_SCL_M3_MIPI_CAM0/2	-	-
26	I2C4_SDA_M3_MIPI_CAM0/2	-	-
27	VCC1V8_DOVDD_DVP3_4	1.8V	-
28	VDD1V2_DVDD_DVP3_4	1.2V	-
29	VCC2V8_DVP3_4	2.8V	-
30	VCC2V8_AVDD_DVP3_4	2.8V	-

RTC (J23)



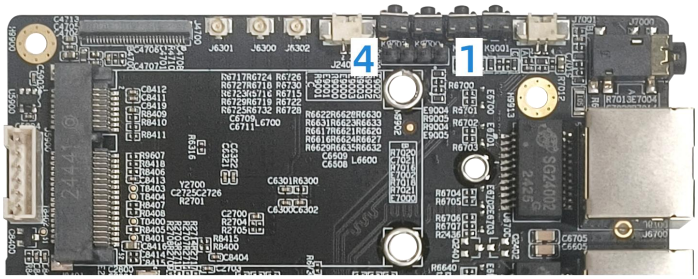
Pin number	Pin name	Voltage level	Notice
1	VCC_RTC	3.3V	-
2	GND	GND	-

MIC (J28)



Pin number	Pin name	Voltage level	Notice
1	VCCA3V3_CODEC	3.3V	-
2	GND	GND	-

Debug (J29)



Pin number	Pin name	Voltage level	Notice
1	GND	GND	-
2	CPU_DBG_TX	-	-
3	CPU_DBG_RX	-	-
4	GND	GND	-

7.Application Scenarios

AI

Machine Vision

Industrial Control

Energy and Power

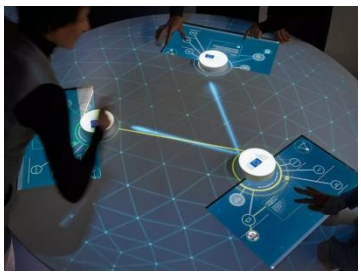
Smart Tablet

VR

Smart Logistics

New

Smart Commercial



Object Recognition

Vehicle terminal

Security Surveillance

8.Ordering Model

Product Model	Status	CPU	DDR	eMMC	Operating Temperature
LZ20143202	Mass production	RK3576	4GB	32GB	-20℃ - 75℃
LZ20186402	Mass production	RK3576	8GB	64GB	-20℃ - 75℃
LZ2019A802	Mass production	RK3576	16GB	128GB	-20℃ - 75℃
LZ201432J2	Mass production	RK3576J	4GB	32GB	-40℃ - 85℃
LZ201864J2	Mass production	RK3576J	8GB	64GB	-40℃ - 85℃

*For customized non-standard orders, please contact us via email at sales@neardi.com.

9.About Neardi

Shanghai Neardi Technology Co., Ltd., established in 2014, is a national high-tech enterprise, a strategic partner of Rockchip, and an authorized agent of Black Sesame Technologies. The company supports a variety of chip platforms including Rockchip, HISI, NVIDIA, Black Sesame Technologies, and WiFi modules. It focuses on the research and development and production of enterprise-level open-source hardware platforms, providing customers with core modules, industry boards, development boards, touch panels, and industrial control hosts. Adhering to the core concepts of technological innovation and professional service, the company leverages its technical strengths and industry experience to help partners achieve rapid product mass production.

Company Advantages

Software Design / Custom OS / Product ODM / Bulk Delivery

Products

Rockchip

System On Module

Development Board

Embedded Computer

HISI

NVIDIA

Vehicle Terminal

WIFI Module