SD5000 V1.0

User Manual

Modification History

Revision	Date	Description
V1.0	Initial	2018-06-14

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1 Product Overview

1.1. Overview

SD5000 V1.0 board integrates audio, video, Ethernet, WIFI, 2G, 3G, LTE, Bluetooth, FM, GNSS, supports most of the current popular video and picture format decoding, supports HDMI LVDS video output, with Our video screen adapter board can drive various TFT LCD displays, which greatly simplifies the system design of the whole machine. The board integrates 2G, 3G, and LTE functional circuits to achieve high-speed wireless data transmission, which is very suitable for high-definition network playback boxes, video advertising machines and picture frame advertising machines.

1.2. Features

- Highly integrated: The board integrates 2G, 3G, LTE, WIFI wireless communication and Ethernet wired communication, supports USB peripherals, supports RS232, RS485, RS422 protocol standards and interface devices, can be inserted into SD card, supports high-definition large-screen video plug-in play. The entire board adopts a single-sided layout, which simplifies the overall design and user operation.
- Rich interfaces: The board integrates USB, RS232/485/422, RJ45, earphone, HDMI, LVDS and other interfaces, which greatly simplifies the user's operation and use.
- Full-featured: Supports various LVDS interfaces, supports horizontal and vertical screen playback, video split screen, scrolling subtitles, USB data import and export, etc.
- Convenient management: The board runs the Android operating system, which is convenient for users to control files and software, and the human-computer interaction is very simple.

1.3. Function List

The following table is the main hardware indicators of SD5000.

Table 1: Main Antenna and Diversity Antenna Interface Pin Definitions

Main Hardware Indicators	
CPU	QUALCOMM MSM8909, Quad-core, Dominant Frequency 1.09GHz
Memory	8Gbits
Built-in Memory	EMMC 64Gbits
operating System	Android 5.X and above
Play Mode	Supports multiple playback modes such as loop, timing, and inter cut
Network	2G, 3G, LET, Ethernet, support WIFI / Bluetooth 4.0
GNSS	GPS, BeiDou, Galileo
WIFI / BT	Built-in WIFI, BT4.0
Ethernet	1 10M/100M adaptive Ethernet
Video Playback	Support wmv, avi, flv, rm, rmvb, mpeg, ts, mp4, etc.
Image Format	Support BMP、JPEG、PNG、GIF
USB2.0 Interface	1 USB HOST Micro USB port, 4 USB OTG USB-A ports
Serial Port	1 TTL, 2 RS232, 1 RS422 (compatible with RS485)
SD Card	Support Micro SD card
LVDS Output	1 single/dual channel, can directly drive 50/60Hz LCD screen
HDMI Output	1, support 720P@600Hz
Audio and video Output	Support left and right channel output, built-in 8R/5W power amplifier
RTC Real time Clock	Support
Timing Power on/Off	Support
System Upgrade	Support local USB upgrade

1.4. Appearance and Interface

The following figure is the appearance and interface of SD5000.

Figure 1: SD5000 Appearance and Interface

1.5. PCB Dimension

The following figure is the PCB dimension drawing of SD5000.

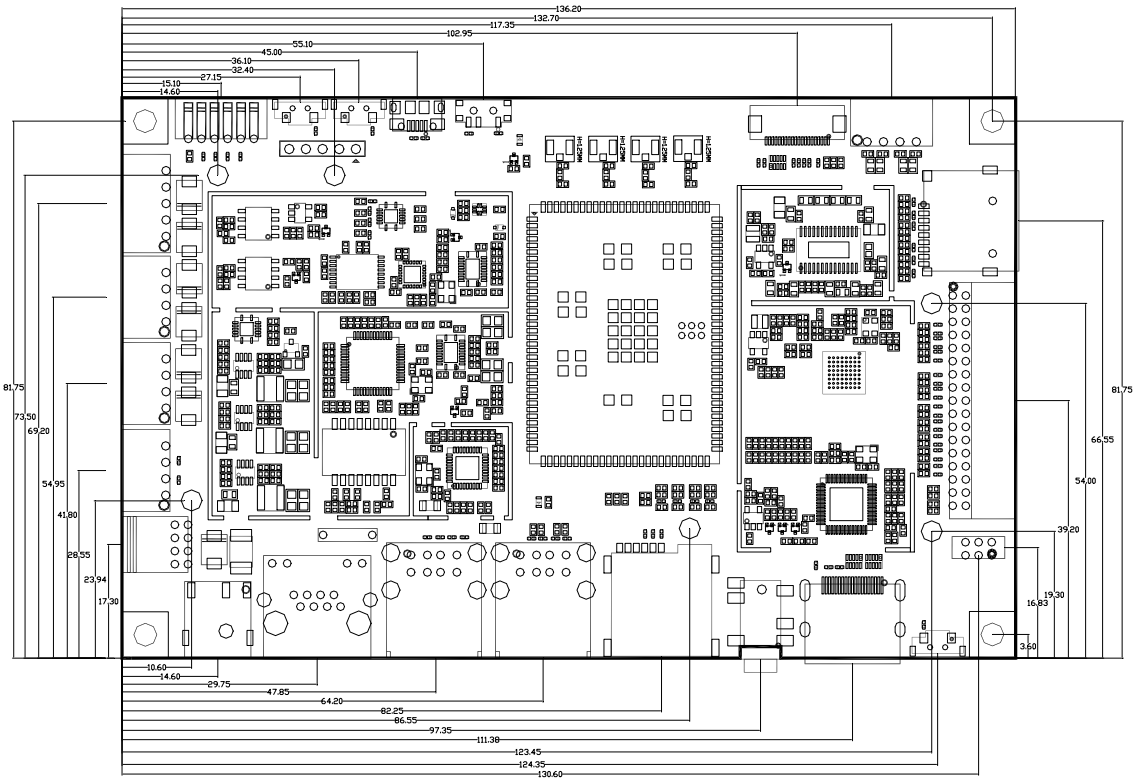

Figure 2: SD5000 PCB Dimension

PCB: 4-layers

Dimension: 136mm*85mm, Thickness is 1.6mm

Screw Hole Specification: ϕ3.5mm x 4

2 Interface Description

2.1. Power Interface

SD5000 adopts 12V DC adapter for direct power supply, the plug DC IN specification of the power adapter is D6.0, and the minimum power supply current of the adapter cannot be less than 1.5A. The picture below is the main power input interface of the board, the DC socket model is DC-044B.

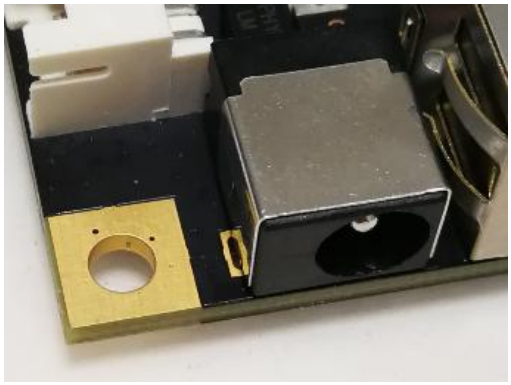

Figure 3: Main Power 12V Input Interface Diagram

SD5000 supports 3.3V, 5V, 12V DC output, but the output current is limited. If the external load is greater than the rated output current value, it will cause the board to work abnormally. The following table is the pin definition and rated current value of the DC output interface.

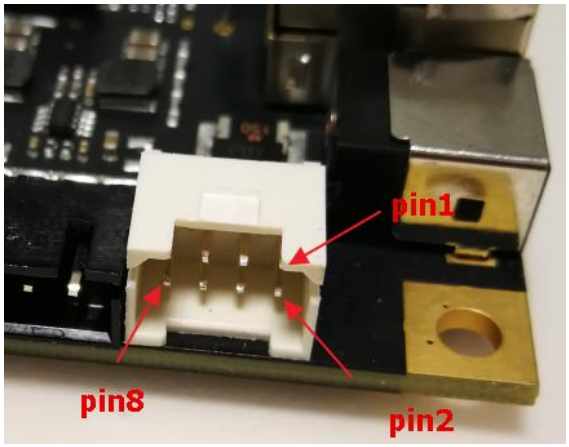

Figure 4: DC output Interface Diagram

Table 2: Power Output Interface Definition

No.	Definition	Attribute	Description
1,2	12V	Output	Maximum Rated Current 500mA
3,4	5V	Output	Maximum Rated Current 500mA
5,6	3.3V	Output	Maximum Rated Current 500mA
7,8	GND	Ground	

2.2. USB Interface

The board has 1 Micro USB HOST interface for version upgrade and debugging, 2 (or 4 optional) USB OTG A bases for connecting USB peripherals.

The board enters the USB OTG mode by default. When the power supply current of the USB OTG interface is less than 500mA, users can switch the USB HOST or OTG mode of the module through the USB OTG switch.

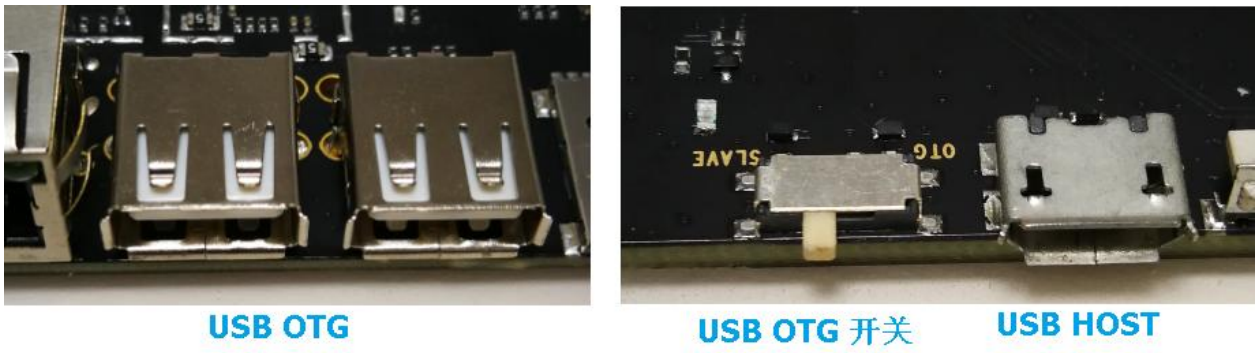

Figure 5: USB Interface

The USB OTG uses the standard USB A base, and the pin definitions are as follows.

Table 3: USB OTG Interface Definition

No.	Definition	Attribute	Description
1	VCC	Power	5V Output
2	DM	Input/ Output	DM
3	DP	Input/ Output	DP
4	GND	Ground	Ground

Table 4: USB HOST Interface Definition

The USB HOST uses a standard Micro USB base, and the pin definitions are as follows.

No.	Definition	Attribute	Description
1	VCC	Power	5V Output
2	DM	Input/ Output	DM
3	DP	Input/ Output	DP
4	ID	Input	ID
5	GND	Ground	Ground

2.3. RS232 Interface

The board has two RS232 interfaces, which can support common RS232 devices on the market.

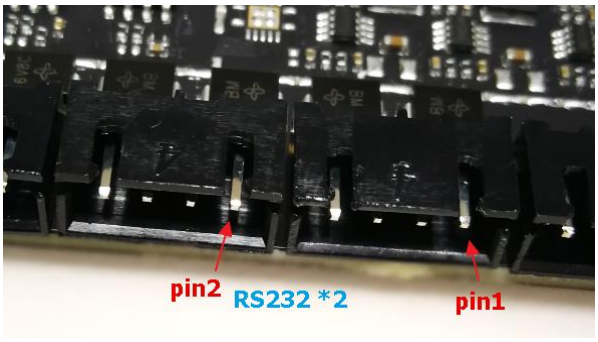

Figure 6: RS232 Interface

Table 5: RS232 Interface Definition

No.	Definition	Attribute	Description
1	GND	Ground	Ground
2	PC232-RX	Input	232-RX
3	PC232-TX	Output	232-TX
4	VCC	Power	5V Output

2.4. RS422 Interface

The board supports RS422 data communication, and the RS422 interface is also compatible with RS485 devices. When externally connecting RS485 devices, only three leads of the interface are used. Please refer to the following table for the specific connection method.

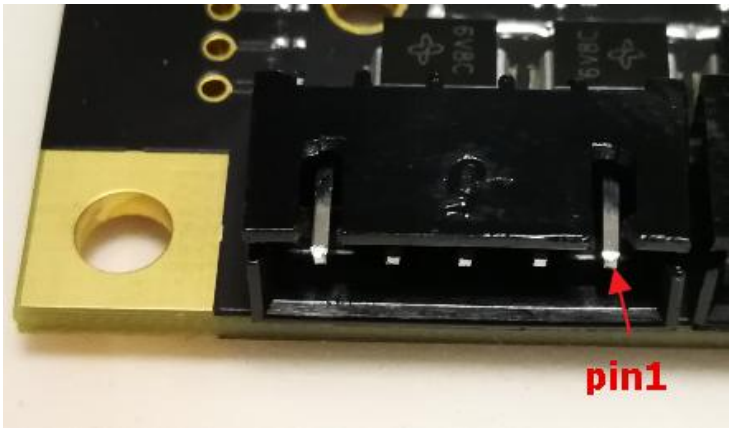

Figure 7: RS422 Interface

Table 6: RS422 Interface Definition

No.	Definition	Attribute	Description
1	TR+/A	Input/ Output	R422 Send Output + / RS485 A
2	TR-/B	Input/ Output	R422 Send Output - / RS485 B
3	RXD+	Input	RS422 Receive+
4	RXD-	Input	RS422 Receive-
5	GND	Ground	Ground

2.5. Touch Screen Interface

The touch screen interface voltage of the board is 3.0V.

Please pay attention to whether the level matches when connecting the external device. If it does not match, you need to add the level for circuit conversion.

Table 7: Touch Screen Interface Definition

No.	Definition	Attribute	Description
1	VCC	Power	3.3V Output
2	SCK	Input/ Output	I2C Clock/GPIO19
3	SDA	Input/ Output	I2C Data/GPIO18
4	INT_N	Input/ Output	Interrupt/GPIO13
5	RST_N	Input/ Output	Reset/GPIO12
6	GND	Ground	Ground

2.6. HDMI Interface

The board is used for the standard Type-A HDMI socket, and with our small board, it can realize 1080p LVDS video signal output.

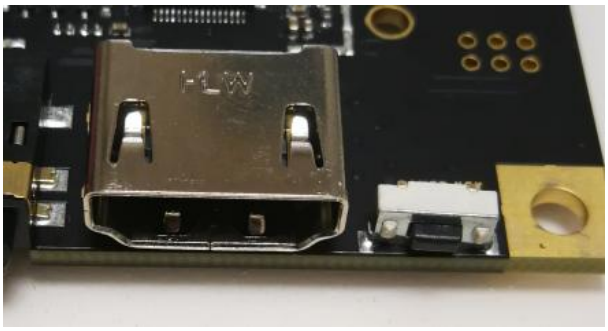

Figure 8: HDMI Interface

2.7. Speaker Interface

The board has left and right channel speaker (8R/5W)

output, the board uses the left channel output by default.

If the customer clearly needs two-channel output.

You can make demands to our company.

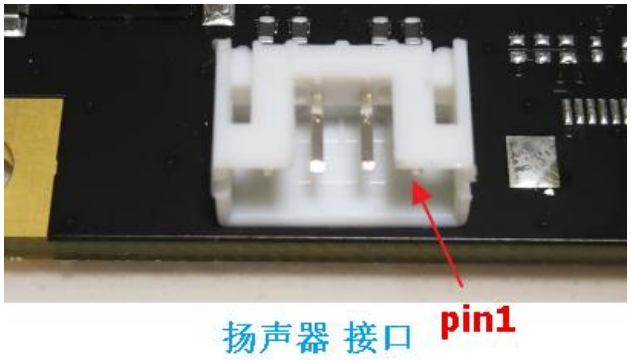

Figure 9: Speaker Interface

Table 8: Speaker Interface Definition

No.	Definition	Attribute	Description
1	SPKR-	Output	Audio Output Right+
2	SPKR+	Output	Audio Output Right -
3	SPKL-	Output	Audio Output Left -
4	SPKL+	Output	Audio Output Left +

2.8. Other Standard Interfaces

Table 9: Other Standard Interfaces

Storage Interface	SD Card	Data storage, maximum support 32G
	USB	HOST interface, support data storage, data import, USB mouse and keyboard, camera, touch screen, etc.
Ethernet Interface	RJ45 Interface	Support 10M/100M wired network
headphone Jack	3.5mm Jack Standard Interface	3.5mm Audio Jack American standard interface
SIM Card Interface	Micro SIM Standard Interface	Support various formats

3 Electrical Parameters

Table 10: Electrical Parameters

Item		Minimum	Typical	Maximum
Power Parameters	Voltage	--	12V	--
	Ripple	--	--	50mV
	Current	1.5A		
Power Supply Current (HDMI output, no other peripherals connected)	Working Current	--	200mA	350mA
	stand-by Current	--	TBD	TBD
	USB Supply Current	--	--	500mA
Supply Current (LVDS)	3.3V Working Current		400 mA	TBD
	5V Working Current		550 mA	1A
	12V Working Current		580 mA	1A
	USB Supply Current	--	--	500mA
Supply Current (eDP)	3.3V Working Current		400 mA	500 mA
	5V Working Current	--	--	--
	12V Working current	--	--	--
	USB Supply Current	--	--	500mA
Total Output	Current	3.3V		800mA
Environment	Relative Humidity	--	--	80%
	Operating Temperature	0℃	--	60℃
	storage Temperature	-20℃		70℃

4 Assembly Precautions

During assembly and use, please pay attention to the following points.

- **Short circuit between bare board and peripherals.**
- **During the installation and fixing process, avoid the deformation of the bare board due to fixing reasons.**
- **When installing the LVDS screen, pay attention to whether the current conforms to the screen voltage. Pay attention to the direction of the first foot of the screen seat.**
- **When installing the LVDS screen, pay attention to whether the current meets the screen backlight voltage. If the power of the screen backlight is more than 20W, whether to use another power board for power supply**
- **When installing the serial port, pay attention to the interface sequence of 232, 485, and 422.**

Whether the input power is connected to the power input interface needs to be evaluated according to the total

peripherals, such as whether the input power voltage and current meet the requirements. Put an end to the power supply input from the backlight socket for the convenience of operation.