华北工控
NORCO

EMB-3500

USER' Manual V1.1

用户手册
USER'Manual

Industrial & Communication Computer

做中国最可信赖的工控产品

EMB-3500

USER' Manual V1.1

SZ HQ: 0755-27331166

Beijing: 010-82671166

Shanghai: 021-61212081

Chengdu: 028-85259319

Shenyang: 024-23960846

Xi’an: 029-88338386

Nanjing: 025-58015489

Wuhan: 027-87858983

Tianjin: 022-23727100

Singapore: 65-68530809

Netherlands: 31-040-2668554

For more product information, please visit: www.norco.com.cn

Declaration of conformity

CE

Shenzhen NORCO Intelligent Technology Co.,Ltd.

declares that the product

EMB-3500 V1.1 Digital Signage Special Board

(reference to the specification under which conformity is declared in accordance with 89/336 EEC-EMC Directive)

☑ EN 55022	Limits and methods of measurements of radio disturbance Characteristics of information technology equipment
☑ EN 50081-1	Generic emission standard Part 1: Residential, commercial and light industry
☑ EN 50082-1	Generic immunity standard Part 1: Ressidential, commercial and light industry

European Representative:

Shenzhen NORCO Intelligent Technology Co.,Ltd.

Signature: _____ Place/Date: HONG KONG/2013

Printed Name: Anders Cheung Position/Title: President

Declaration of conformity

Trade Name：Shenzhen NORCO Intelligent Technology Co.,Ltd.

Model Name：EMB-3500 V1.1

Responsible Party：Shenzhen NORCO Intelligent Technology Co.,Ltd.

Equipment Classification：FCC Class B Subassembly

Type of Product：EMB-3500 V1.1 Digital Signage Special Board

Manufacturer：Shenzhen NORCO Intelligent Technology Co.,Ltd.

Supplementary Information:

This device complies with Part 15 of the FCC Rules.Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Signature: _____

Date: 2013

Disclaimer

Except for the accessories attached to the product as specified herein, what is contained in this user manual does not represent the commitments of NORCO Company. NORCO Company reserves the right to revise this User Manual, without prior notice, and will not be held liable for any direct, indirect, intended or unintended losses and/or hidden dangers due to installation or improper operation.

Before ordering products, please learn about the product performance from the distributors to see if it is in line with your needs. NORCO is a registered trademark of Shenzhen NORCO Intelligent Technology CO., LTD. The ownership of other trademarks involved in this manual is owned by its respective owners.

Safety Instructions

1. Please read the product manual carefully before using this product.
2. Put all the unused or uninstalled boards or electronic components in a static dissipative surface or static shielding bag.
3. Always ground yourself to remove any static discharge before touching the board, to place your hands on grounding metal object for a while or wear a grounding wrist strap at all times.
4. When taking or fetching the boards or cards, please wear antistatic gloves and have the habit of holding the boards by its edges.
5. Make sure that your power supply is set to the correct voltage in your area. Incorrect voltage may cause personal injuries and damage the system.
6. To prevent electronic shock hazard or any damage to the product, please ensure that all power cables for the devices are unplugged when adding or removing any devices or reconfiguring the system.
7. To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
8. When adding or removing devices to or from the system, ensure that all the power cables for the devices are unplugged in advance.
9. To prevent any unnecessary damage to the products due to frequent power on/off, please wait at least 30 seconds to restart the unit after the shutdown.
10. If system goes wrong during the operation, do not try to fix it by yourself. Contact a qualified service technician or your retailer.
11. This product is classified as Class A product, which may cause radio interference in our living environment. In this occasion, users need to take measures to handle the interference.

Content

Packing List

Thanks for purchasing NORCO products. Please check the accessories as per the packing list when you open its package. If you find any defect components or anything damaged or lost, please contact your vendor ASAP.

■ EMB-3500 V1.1 Motherboard	1pcs
■Jumper Cap	1packet
■COM Adapter Cable	1pcs

Chapter 1 Production Introductions

1.1 Specifications

Size

●Size:120mmX120mm

CPU

●CPU: Onboard, support i.MX6 (single, dual, quad)

Memory

●Onboard Memory: 1GB default, support DDRⅢ 800

Display

●Display Interface: VGA, LVDS, HDMI

●VGA: 1x VGA

●LVDS: 1x dual channel LVDS, support 24Bit 1920×1200@60Hz

●HDMI: i.MX6 CPU Integrated, maximum resolution: 1920x1080@60Hz

Ethernet

●Network Controller: RJ45 (10/100/1000Mbps) X 2

Storage

●Provides 1x standard 7-Pin SATA

●SD: Support Micro SD

●FLASH: Onboard 4GB INAND

AUDIO

●Adopts SGTL5000-XNAA3 audio control chip

●Provides 1x MIC-in pin, 1x Line-in pin, 1x Line-out pin, 1x Headphone pin

I/O

●Serial Port: Provides 13x serial port, COM2 support RS232/RS422/RS485； COM1,

COM3-COM13 support RS232

●USB: Provides 5x USB 2.0, 2x standard USB2.0, 3x USB 2.Omm pin, 1x USB WIFI

●Keypad: 3X3 matrix (multiplexed with GPIO)

●CAN BUS: 2x CAN BUS

●SPI : 1X SPI(with quad-core, without single-core, dual- core or multiplexed with GPIO)

●MIPI DSI: 1XMIPI DSI

●MIPI CSI-2: 1XMIPI CSI-2

●Touch: I2C to 4 wire resistive touch

Expansions

●1x MINI PCIe, Support WiFi, 3G

●Onboard SIM slot, co-working with Mini PCIe 3G module, to support 3G network

●Support 40bit GPIO

Power Supply Supported

●12V single power supply

Watchdog

●Support hardware reset function

Operating Environment

●Operating Temperature: 0℃~60℃

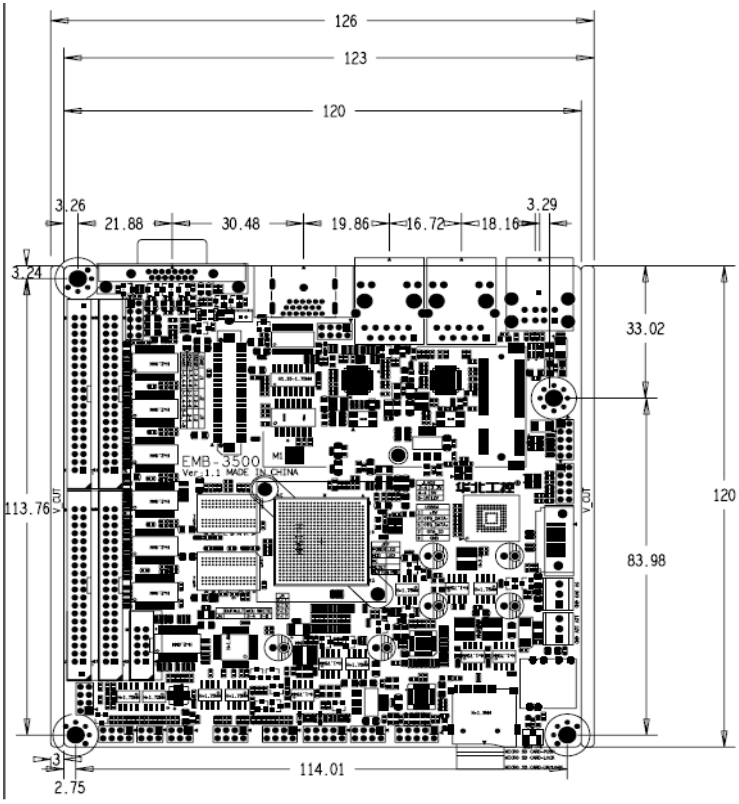
●Operating Humidity: 5%~95%, no condensation

Chapter 2 Motherboard Introductions

2.1 Interfaces Location and Dimension

Following picture illustrates the front interfaces location and dimension of board EMB-3500 V1.1. Please pay attention to the installation steps. Improper installation of some components may lead to system failure.

Note: When installing the board, please wear anti-static gloves in case of any electrostatic damage caused during the installation.



2.2 Installation Steps

Please follow the steps below to assemble your computer:

1. Adjust all the jumper caps on board EMB-3500 V1.1 according to the user manual;
2. Install other expansion cards;
3. Connect all signal lines, cables, panel control circuits and power supplier.

⚠ **Key components of this motherboard are Integrated circuit and these components could be easily damaged by electrostatic influence. So, before installing this unit, please always keep the following precautions in mind:**

1. Hold the board by edges and don't touch any components or plug and socket pins.
2. Wear anti-static gloves/wrist strap while touching the integrated circuit components, such as CPU, RAM, etc.
3. Put those unused or uninstalled components in static shielding bags or trays.
4. Please first check the power switch is off before connecting the power plug.

Before installing the computer accessories:

Following the instructions below will help to prevent your computer from being damaged, and also ensuring your personal safety.

1. Please make sure your computer is disconnected from the power supply.
2. Please always wear anti-static wrist strap or gloves to operate the board in case that you may touch the integrated circuit components, such as RAM.

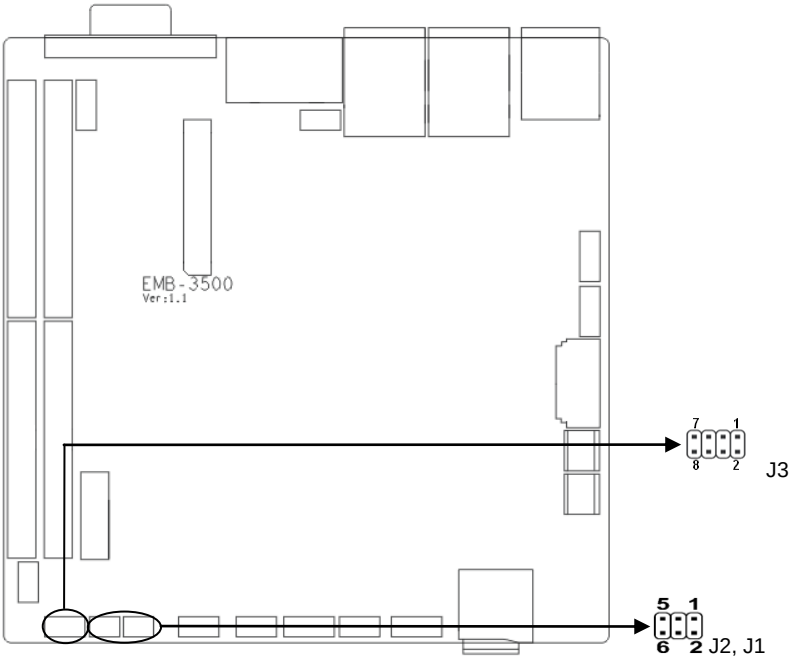
2.3 Jumper Settings

Please refer to the following instructions to setup jumpers before installing your hardware devices.

Remark: How to identify the PIN1 of all jumpers and interfaces: Please observe the word mark on the side of the plug socket, which will be a "1" or bold line or triangular symbol; And please look at the back of PCB, each with a square shape will be the PIN 1; and all the jumpers' PIN1 have a white arrow on the side.

2.3.1 COM2 Jumper Setting (J1, J2, J3)

(J1, J2, J3) jumpers are used to configure COM2 transmission mode. COM2 supports RS232/RS422/RS485. Default setting: [RS232].



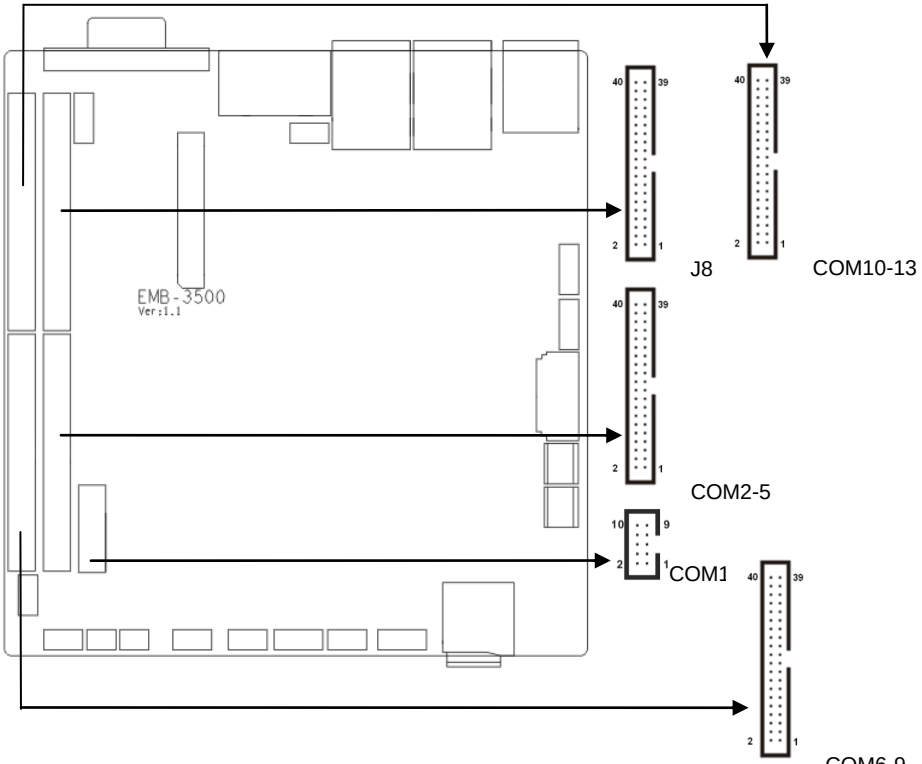
COM2 AS RS232 PORT		COM2 AS RS422 PORT		COM2 AS RS485 PORT	
J1	1-3,2-4	J1	3-5,4-6	J1	3-5,4-6
J2	1-3,2-4	J2	3-5,4-6	J2	3-5,4-6
J3	1-2	J3	3-4	J3	5-6,7-8

2.4 Interfaces Descriptions

⚠ **Please read the manual carefully to connect external connector so as to avoid any damage to the board!**

2.4.1 Serial Port (J8, COM1_COM13)

This Board provides 13x COM ports. COM2 supports RS232/RS422/RS485 mode; COM1 & COM3_COM13 support RS232 mode.



COM1:

Signal Name	Pin		Signal Name
NC	1	2	NC
COM1_RXD	3	4	COM1_RTS#
COM1_TXD	5	6	COM1_CTS#
NC	7	8	NC
GND	9	10	GND

COM2_COM5:

Signal Name	Pin		Signal Name
COM2_DCD#_TX-DATA-	1	2	NC
COM2_SIN_TX+DATA+	3	4	COM2_RTS
COM2_SOUT_RX+	5	6	NC
COM2_DTR#_RX-	7	8	NC
GND	9	10	GND

NC	11	12	NC
COM3_RX	13	14	COM3_RTS
COM3_TX	15	16	COM3_CTS
NC	17	18	NC
GND	19	20	GND
NC	21	22	NC
COM4_RX	23	24	COM4_RTS
COM4_TX	25	26	COM4_CTS
NC	27	28	NC
GND	29	30	GND
NC	31	32	NC
COM5_RX	33	34	COM5_RTS
COM5_TX	35	36	COM5_CTS
NC	37	38	NC
GND	39	40	GND

COM6_COM9:

Signal Name	Pin		Signal Name
NC	1	2	NC
COM6_RX	3	4	COM6_RTS
COM6_TX	5	6	COM6_CTS
NC	7	8	NC
GND	9	10	GND
NC	11	12	NC
COM7_RX	13	14	COM7_RTS
COM7_TX	15	16	COM7_CTS
NC	17	18	NC
GND	19	20	GND
NC	21	22	NC
COM8_RX	23	24	COM8_RTS
COM8_TX	25	26	COM8_CTS
NC	27	28	NC

GND	29	30	GND
NC	31	32	NC
COM9_RX	33	34	COM9_RTS
COM9_TX	35	36	COM9_CTS
NC	37	38	NC
GND	39	40	GND

COM10_COM13:

Signal Name	Pin		Signal Name
NC	1	2	NC
COM10_RX	3	4	COM10_RTS
COM10_TX	5	6	COM10_CTS
NC	7	8	NC
GND	9	10	GND
NC	11	12	NC
COM11_RX	13	14	COM11_RTS
COM11_TX	15	16	COM11_CTS
NC	17	18	NC
GND	19	20	GND
NC	21	22	NC
COM12_RX	23	24	COM12_RTS
COM12_TX	25	26	COM12_CTS
NC	27	28	NC
GND	29	30	GND
NC	31	32	NC
COM13_RX	33	34	COM13_RTS
COM13_TX	35	36	COM13_CTS
NC	37	38	NC
GND	39	40	GND

COM2: RS232/RS422/RS485, Pins defined as below:

Pin	RS232 (default)	RS422	RS485

1	NC	TX-	DATA-
2	NC	NC	NC
3	COM_RXD	TX+	DATA+
4	COM_RTS#	NC	NC
5	COM_TXD	RX+	NC
6	COM_CTS#	NC	NC
7	NC	RX-	NC
8	NC	NC	NC
9	GND	GND	GND
10	GND	GND	GND

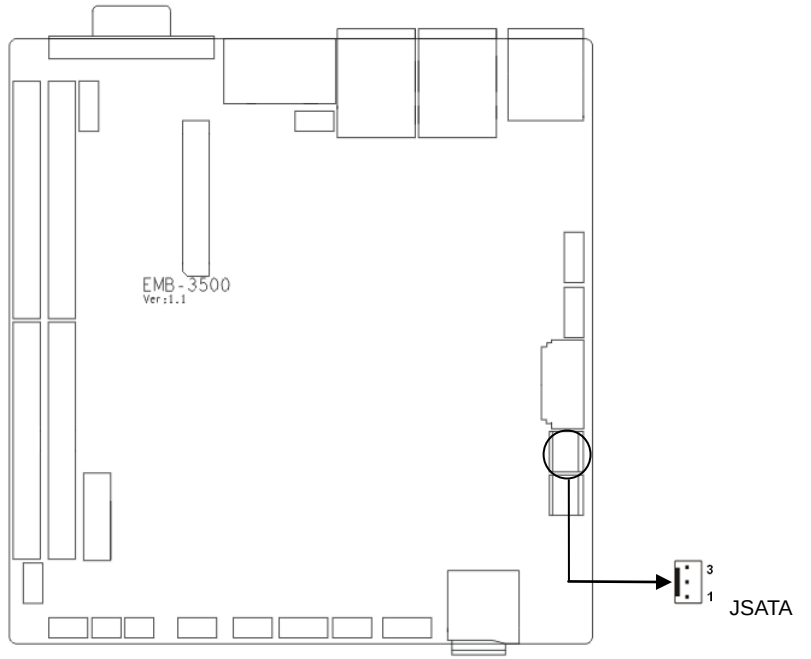
J8:

Signal Name	Pin		Signal Name
CSI0_PIXCLK	1	2	+3.3V
CSI0_HSYNC	3	4	CSI0_DATA_EN
CSI0_VSYNC	5	6	NANDF_CS0
CSI0_MCLK	7	8	NANDF_ALE
CSI0_DAT4	9	10	NANDF_CLE
CSI0_DAT5	11	12	NANDF_WP_B
CSI0_DAT6	13	14	NANDF_RB0
CSI0_DAT7	15	16	NANDF_D0
CSI0_DAT8	17	18	NANDF_D1
CSI0_DAT9	19	20	NANDF_D2
CSI0_DAT10	21	22	NANDF_D3
CSI0_DAT11	23	24	NANDF_D4
CSI0_DAT12	25	26	NANDF_D5
CSI0_DAT13	27	28	NANDF_D6
CSI0_DAT14	29	30	NANDF_D7
CSI0_DAT15	31	32	KEY_COL6
CSI0_DAT16	33	34	KEY_ROW6
CSI0_DAT17	35	36	KEY_COL7
CSI0_DAT18	37	38	KEY_ROW7

CSI0_DAT19	39	40	GND

2.4.2 SATA Port (SATA, JSATA)

This Board provides one standard 7Pin SATA port.



SATA:

Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

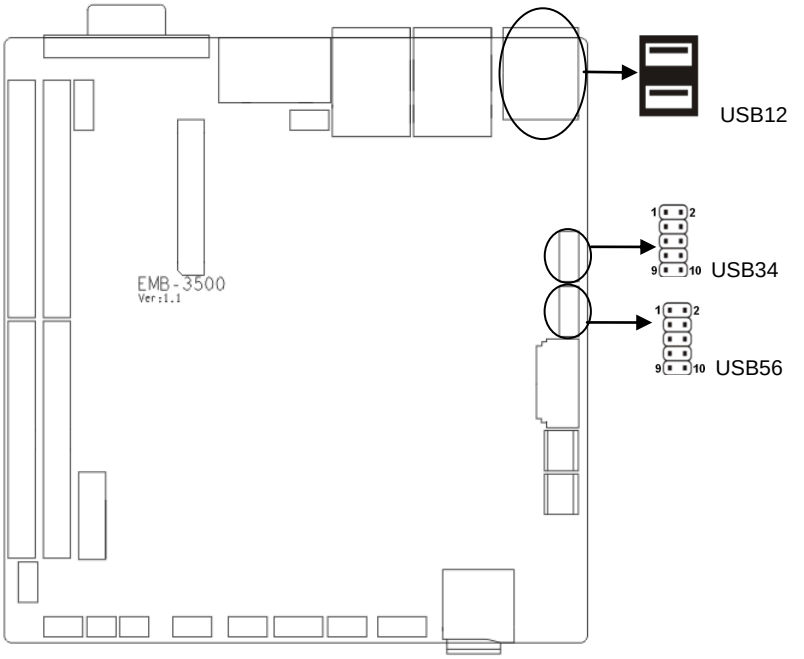
JSATA:

Pin	Signal Name
1	GND

2	+3.3V
3	+5V

2.4.3 USB (USB12, USB34, USB56)

This Board provides 5x USB2.0 ports, including 2x standard USB2.0 ports and 3x USB2.0mm Pins.



USB12:

Pin	Signal Name
1, 2	+5V
3, 4	USB DATA-
5, 6	USB DATA+
7, 8	GND

USB34, USB6:

Signal Name	Pin		Signal Name
VCC	1	2	GND
USB DATA-	3	4	GND
USB DATA+	5	6	USB DATA+

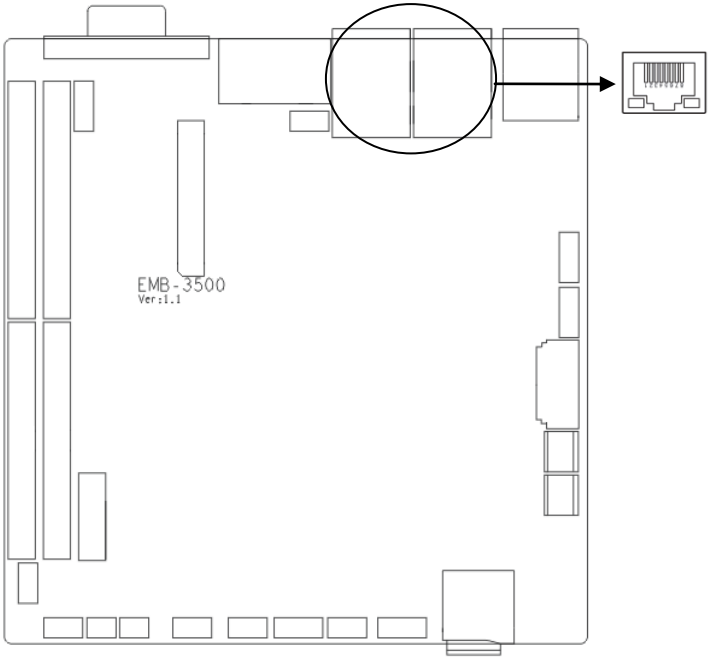
GND	7	8	USB DATA-
GND	9	10	VCC

USB5:

Pin	Signal Name
1	+5V
3	OTG DATA-
5	OTG DATA+
7	BOOT_MODE1
9	GND

2.4.4 Ethernet (LAN1, LAN2)

This Board provides 2x RJ45 Ethernet ports. The Yellow LED indicates data transfer status; the Green LED indicates network connectivity status.

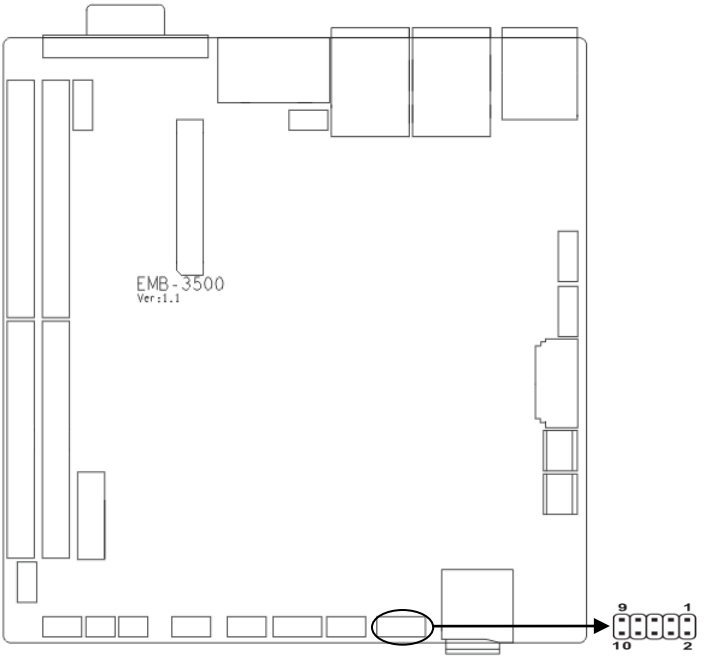


RJ45 LAN LED Status:

LILED (green)	Function	ACTLED (Yellow)	Function
On	100/1000M Link	Flash	Data transfer
Off	10M Link/Close	Off	No data

2.4.5 Audio Interface (AUDIO)

EMB-3500 V1.1Uses the SGTL5000-XNAA3 audio control chip.

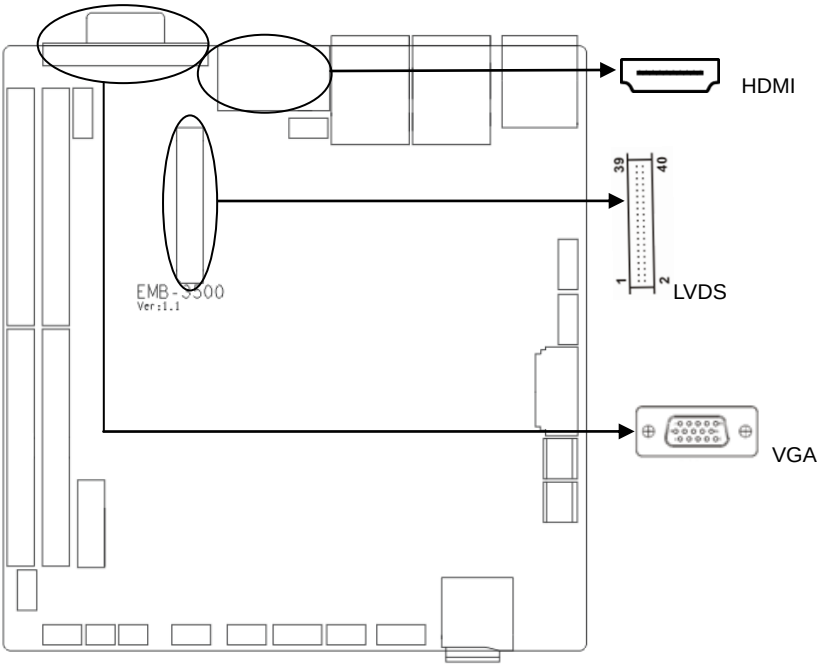


AUDIO:

Signal Name	Pin		Signal Name
GND	1	2	MIC1*P
LIN_L	3	4	LIN_R
GND	5	6	GND
LOUT_R	7	8	HeadPh_R
LOUT_L	9	10	HeadPh_L

2.4.6 Display Interface (VGA, LVDS, HDMI)

This Board provides 1x VGA, 1x dual channel LVDS and 1x HDMI.



VGA:

Pin	Signal	Pin	Signal	Pin	Signal
1	RED	6	GND	11	NC
2	GREEN	7	GND	12	SDA
3	BLUE	8	GND	13	HSYNC
4	NC	9	+5V	14	VSYNC
5	GND	10	GND	15	SCL

LVDS:

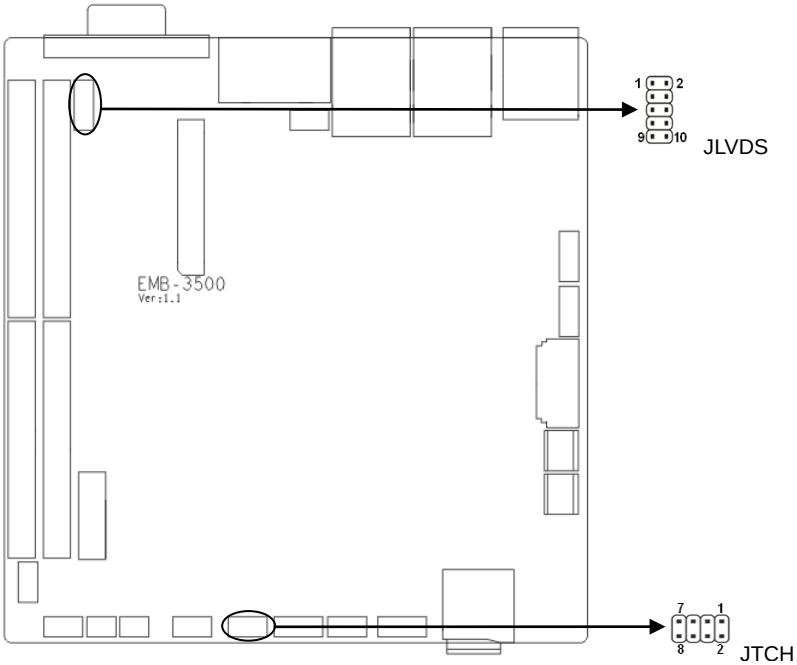
Signal Name	Pin		Signal Name
VDD_PANEL	1	2	VDD_PANEL
GND	3	4	GND
LVDS0_TX0_NEG	5	6	LVDS1_TX0_NEG
LVDS0_TX0_POS	7	8	LVDS1_TX0_POS
GND	9	10	GND
LVDS0_TX1_NEG	11	12	LVDS1_TX1_NEG
LVDS0_TX1_POS	13	14	LVDS1_TX1_POS
GND	15	16	GND
LVDS0_TX2_NEG	17	18	LVDS1_TX2_NEG

LVDS0_TX2_POS	19	20	LVDS1_TX2_POS
GND	21	22	GND
LVDS0_CLK_NEG	23	24	LVDS1_CLK_NEG
LVDS0_CLK_POS	25	26	LVDS1_CLK_POS
GND	27	28	GND
+5V	29	30	+5V
GND	31	32	GND
LVDS0_TX3_NEG	33	34	LVDS1_TX3_NEG
LVDS0_TX3_POS	35	36	LVDS1_TX3_POS
GND	37	38	GND
VDD_PANEL	39	40	VDD_PANEL

HDMI:

Signal Name	Pin		Signal Name
D2+	1	2	D2 Shield
D2-	3	4	D1+
D1 Shield	5	6	D1-
D0+	7	8	D0 Shield
D0-	9	10	CK+
CK Shield	11	12	CK-
CE Remote	13	14	NC
DDC CLK	15	16	DDC DATA
GND	17	18	+5V
HP DET	19	20	SHELL0
SHELL1	21	22	SHELL2
SHELL3	23	24	SHELL4
SHELL5	25	26	SHELL6
SHELL7	27	28	SHELL8
SHELL9	29	30	SHELL10
SHELL11	31		

2.4.7 (JTCH, JLVDS)



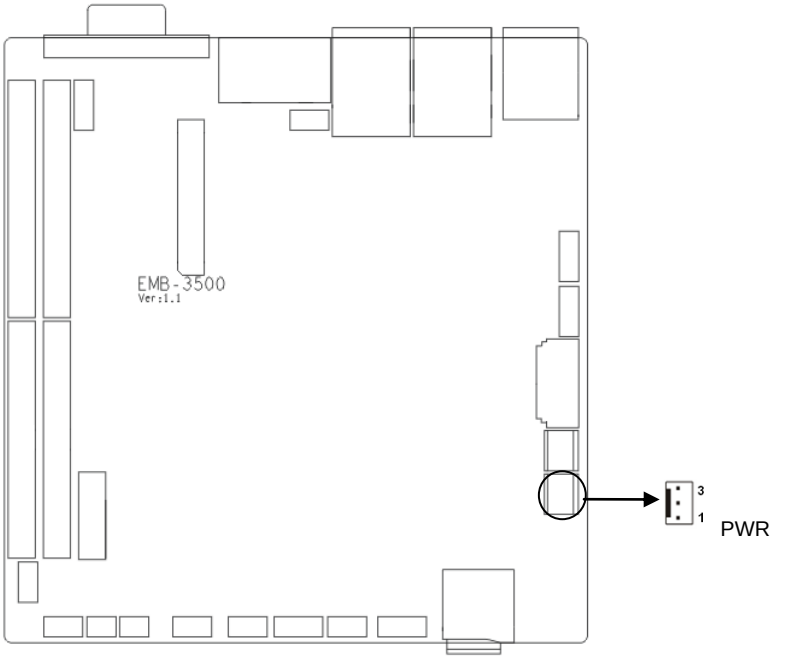
JTCH:

Signal Name	Pin		Signal Name
+3.3V	1	2	GND
LVDS1_SCL	3	4	LVDS0_SCL
LVDS1_SDA	5	6	LVDS0_SDA
EIM_CS1	7	8	EIM_D23

JLVDS

Signal Name	Pin		Signal Name
+5V	1	2	+3.3V
BACKLIGHTON	3	4	LVDS_VDD
GND	5	6	VCC5
L_BKLT_CTL	7	8	LVDS_VDD
+12V	9	10	+12V

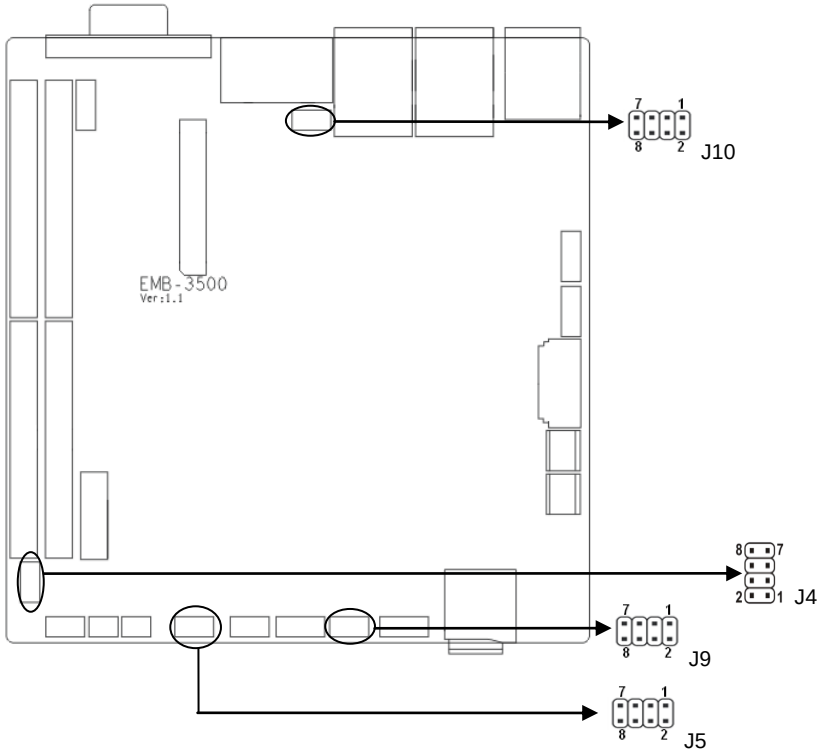
2.4.8 Power Interface (PWR)



PWR:

Pin	Signal Name
1	GND
2	+12V
3	+12V

2.4.9 (J4, J5, J9)



J4:

Signal Name	Pin		Signal Name
TOUCHSCREEN_X+	1	2	COM3_RX
TOUCHSCREEN_X-	3	4	MCU_COM_SIN
TOUCHSCREEN_Y+	5	6	COM3_TX
TOUCHSCREEN_Y-	7	8	MCU_COM_SOUT

J5:

Signal Name	Pin		Signal Name
+5V	1	2	+5V
CAN1_H	3	4	CAN2_H
CAN1_L	5	6	CAN2_L
GND	7	8	GND

J9:

Signal Name	Pin	Signal Name

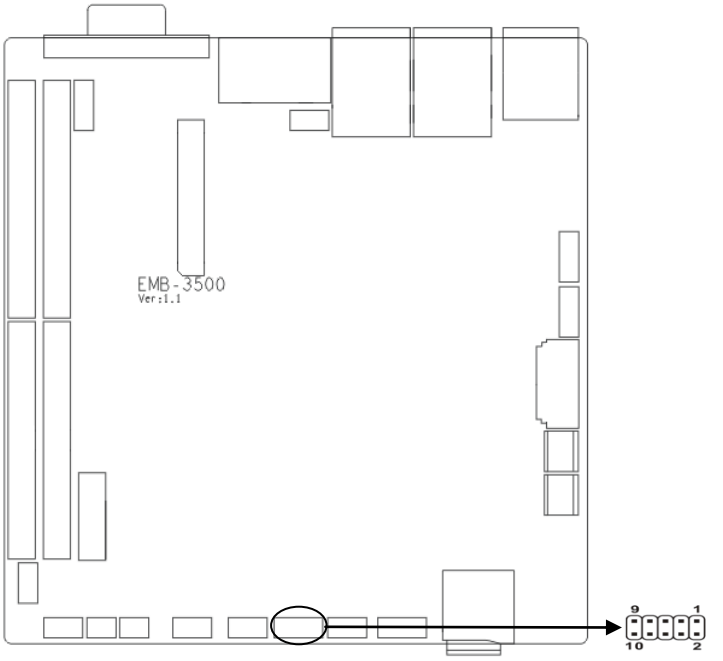
+3.3V	1	2	GND
SD1_DAT0	3	4	SD1_CMD
SD1_DAT1	5	6	SD1_CLK
SD1_DAT2	7	8	EIM_CS0

J10:

Signal Name	Pin		Signal Name
CSI_CLK0M	1	2	KEY_COL2
CSI_CLK0P	3	4	KEY_ROW2
CSI_D0M	5	6	CSI_D1M
CSI_D0P	7	8	CSI_D1P

2.4.10 Front Panel Connector (JFP)

JFP is used to connect all function buttons and indicator LED lamps on the chassis front panel.



JFP:

Signal Name	Pin		Signal Name
POWER LED+	1	2	GND
HD LED+	3	4	HD LED-

NC	5	6	NC
RESET SW	7	8	GND
POWER SW	9	10	GND

Please follow the table below to connect and pay attention to the anode (+) and cathode (-), otherwise, some function cannot be realized.

POWER LED
HDD LED
RESET SW
PWR SW

1) System Power LED Pins (Pin 1/2 for PWRLED)

Connect system power LED cable with these pins.（pin 1 is LED anode）When system is power on, power LED is on； when system is power off, power LED is off.

2) HD LED Pins (Pin 3/4 for HDD LED)

One HD LED on the case panel indicating HD status. When HD read and write, the LED will flash, indicating the device is working. Connect the LED cable to the LED pins (Pin3 is LED anode).

3) Reset Button Pins (Pin 7/8 for RESET)

Connect the reset button cable to these two pins. When system fails, reset button can make the system continue to work and no need to turn on / off the power.

4) Power Button Pins (Pin 9/10 for POWER BUTTON)

Connect these two pins to the bounce switch on the chassis to connect or disconnect the power supply.

2.4.11 MINI PCIe

This Board provides one Mini PCIe slot. If you use the Mini PCIE WiFi, the selected wireless network will indicate the status of the WLAN card.

Chapter 3 Software Features

3.1 Android

3.1.1VGA

VGA output supported

3.1.2 HDMI

HDMI output supported

3.1.3 LCD

Support LVDS LCD output; Driver is customized as per customers' LCD screen.

3.1.4 USB

U-Disk auto mount directory:/mnt/udisk/

3.1.5 COM

Serial port operation node: /dev/ttymxc0~/dev/ttymxc4

3.1.6 CAN

Two-way CANBUS is supported

3.1.8 TF Card

TF card auto mount directory: /dev/extsd/

3.1.9 SATA HDD

Mount directory is customized as per customers' demand.

3.1.10 WIFI

WIFI is supported. Please refer to android interface for specific operation.

3.1.11 3G

Customize driver as per the 3G module that customers utilized.

3.1.12 Ethernet

Supported, please refer to android interface for specific operation.

3.1.13 Audio Card

Supported. Android OS realizes switch to local audio card output.

3.2Linux

3.2.1VGA

Supported

3.2.2 HDMI

Supported

3.2.3 LCD

LVDS LCD output supported; Driver is customized as per customers' LCD screen

3.2.4 USB

Supported

3.2.5 COM

Device Point: /dev/ttymxc0~/dev/ttymxc4

3.2.6 CAN

Not tested yet.

3.2.8 TF Card

Supported. Need to mount for test.

3.2.9 SATA

Supported. Need to mount for test.

3.2.10 WIFI

Supported. The iwlist iwconfig is required for test.

3.2.11 3G

Customize driver as per the 3G module that customers utilized

3.2.12 Ethernet

Supported. The ifconfig dhcp ping tool is required to perform for test.

3.2.13 Audio Card

Supported. The alsa-untis tool is required to perform for test.

Appendix

Appendix 1: Glossary

ACPI

Advanced Configuration and Power Management. ACPI specifications allow O/S to control most power of the computer and its add-ons.

Windows 98/98SE, Windows 2000 and Windows ME all support this specification to allow flexibly manager the power of the manager system.

BIOS

Basic input/output system. It is a kind of software including all in/out control code interface in PC. It will do hardware testing while system is booting, and then the O/S runs. BIOS provide a interface between O/S and hardware and is stored in a ROM chip.

BUS

In a computer system, it is the channel among different parts for exchanging data; it is also a set of hardware lines. BUS here refers to part lines inside CPU and the main components of system memory.

Chipset

Chipset is a Integrated set of chips for executing one or more related functions。Here it refers to a system level chipset structured by Southbridge & Northbridge; It decides the structure and main functions of motherboard.

CMOS

Complementary Metal-Oxide Semiconductor, which is a widely used semiconductor with the characteristics of high-speed and low-power. COMS here refer to part of space on-board CMOS RAM for saving date, time, system information and system parameter, etc.

COM

Computer - Output Microfilmer. A universal serial communication interface, usually adopts

normative DB 9 connector.

DIMM

Dual-Inline-Memory-Modules. It is a small circuit board with memory chipset providing 64 bit memory bus width.

DRAM

Dynamic Random Access Memorizer. It is a normal type of memory often with a transistor and a capacitance to store 1 bit. With the development of the technology, more and more types of DRAM with different specifications exist in computer applications. For example: SDRAM/DDR SDRAM/RDRAM.

LAN

Network interface. Network grouped by correlative computers in a small area, generally in a company or a building. Local area network is buildup by sever, workstation, some communications links. Terminals can access data and devices anywhere through cables, which enables users to share costly devices and resource.

LED

Light-Emitting Diode.A semiconductor device that shines when power supply is connected, It is often used to denote information directly, for example, to denote power on or HDD working normally.

PnP

Plug-and-Play. It is a specification that allows PC to configure its external devices automatically and can work independently without the manual operation by its user. To achieve this function, its BIOS should be able to support PnP and a PnP expansion card

POST

Self-test when power on. While the system is booting, BIOS will do an uninterrupted testing to the system, including RAM, keyboard, hard disk drive etc. to check if all the components are in normal situation and work well.

PS/2

A keyboard & mouse connective interface specification developed by IBM.PS/2 is a DIN interface with only 6PIN; it also can connect other devices, like modem

USB

It is the Universal Serial Bus for short. A hardware interface adapts to low speed peripherals, and is always used to connect keyboard, mouse etc. One PC can connect maximum 127 USB devices, providing 12Mbit/s transmit bandwidth USB supports hot swap and multi- data stream, namely, you can plug USB devices while system is running, system can auto-detect and makes it work on.

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