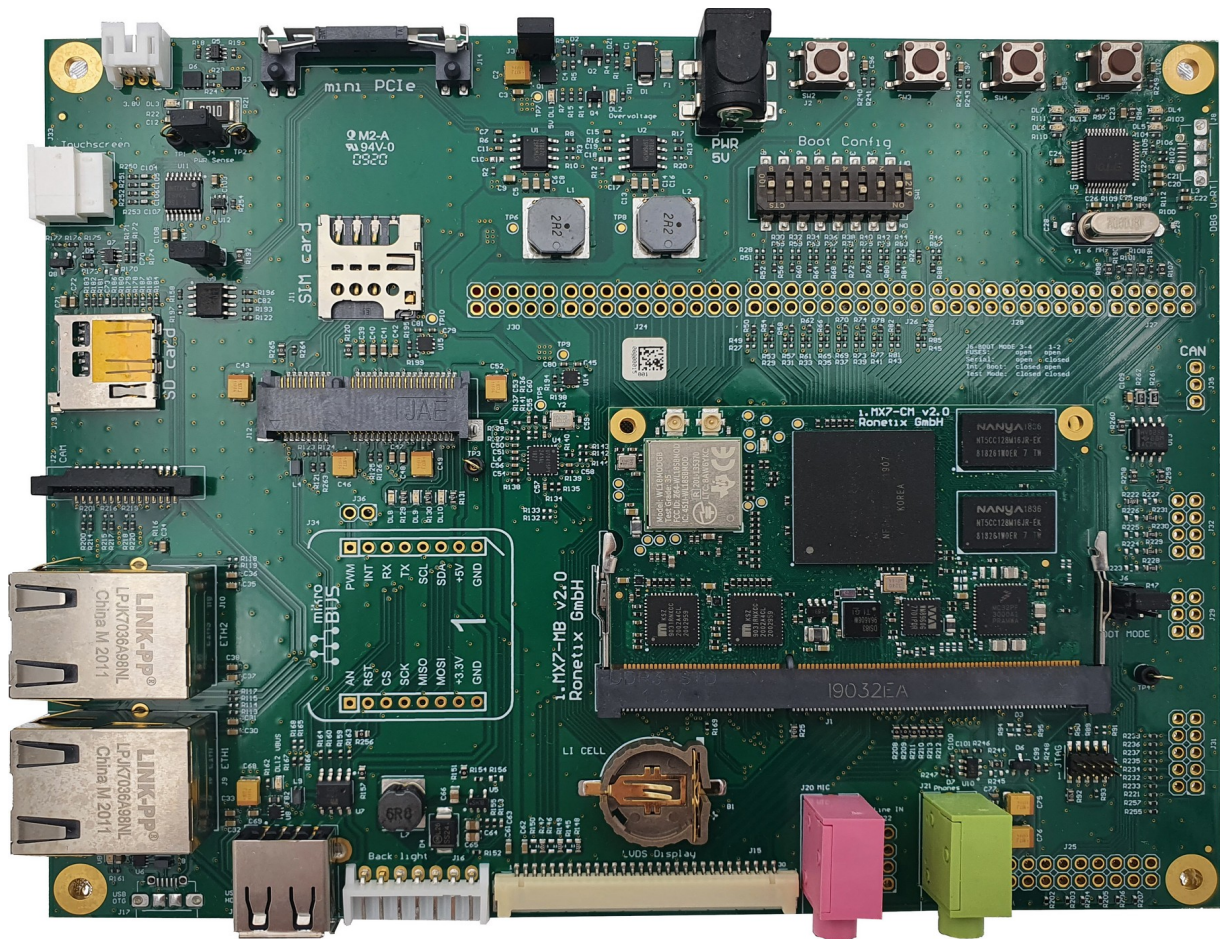


## i.MX7-MB

Base board for the CPU Module i.MX7-CM

Datasheet

rev 1.0



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# 1. Document Revision History

Revision	Date	Notes
1.0	14-Oct-2020	Initial release

# 2. Table of Contents

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## 3. Overview

### 3.1 General Information

The **i.MX7-MB** base board is designed to explore the functionality and performance of the CPU Module **i.MX7-CM**.

#### 3.1.1 Reference Documents

i.MX7-MB – Base board downloads:

<http://download.ronetix.at/boards/doc/i.MX7-MB/>

i.MX7-CM – CPU Module downloads:

<http://download.ronetix.at/boards/doc/i.MX7-CM/>

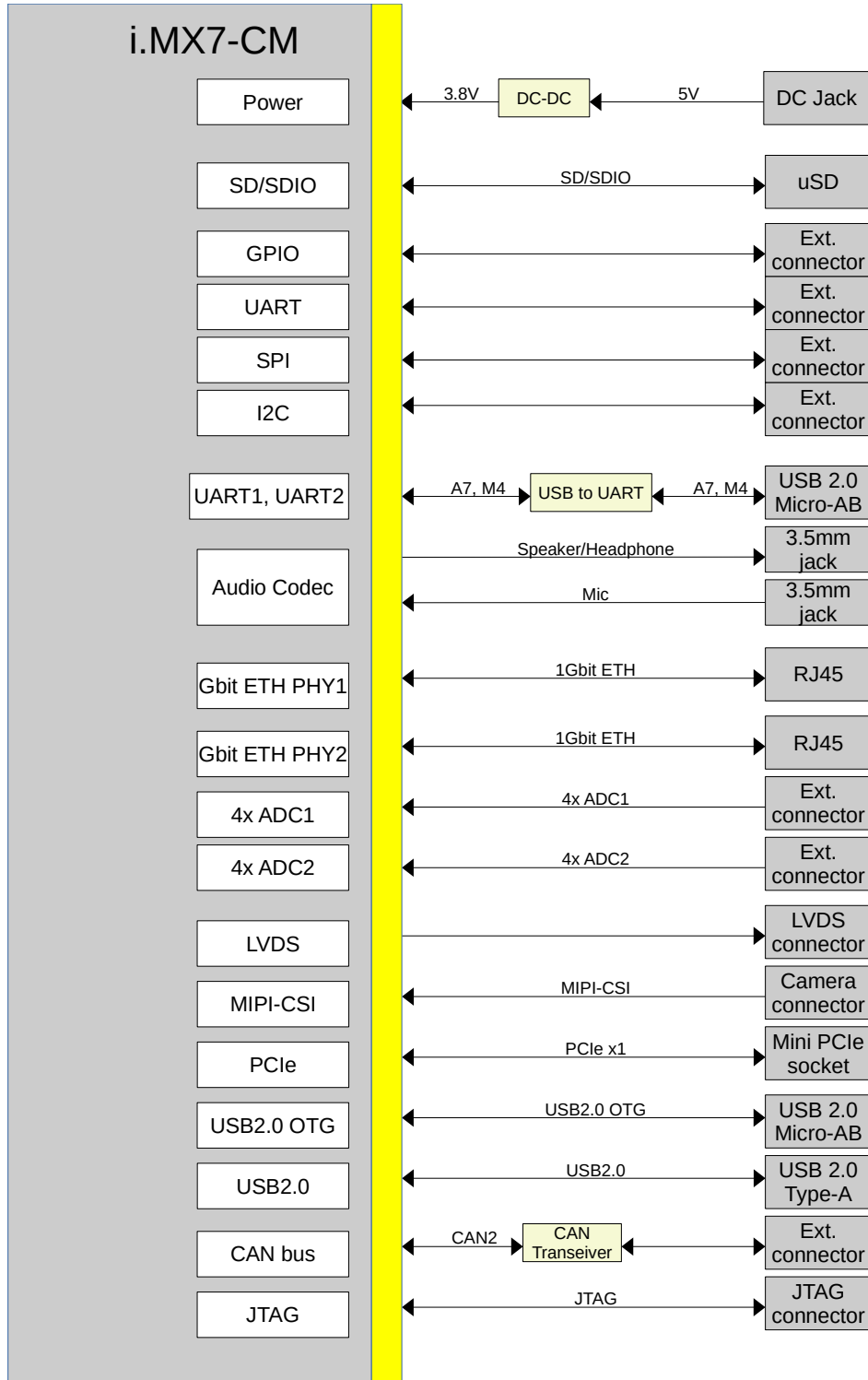
## 3.2 Highlights

The i.MX7-MB base board provides the following features and interfaces:

- SODIMM204 connector compatible to i.MX7-CM
- Ethernet 2 x 10/100/1000BaseT – RJ45
- USB2.0 Host Type A
- USB2.0 OTG, Type Micro AB
- USB debug UART1 and UART2
- micro-SD card slot
- Mini PCIe Connector
- LVDS Display interface
- Touch panel interface
- Camera – MIPI-CSI for OV5640
- Audio
  - 3.5mm Headphones jack
  - 3.5mm Microphone jack
- CAN bus header
- MICROBUS connector
- GPIO headers

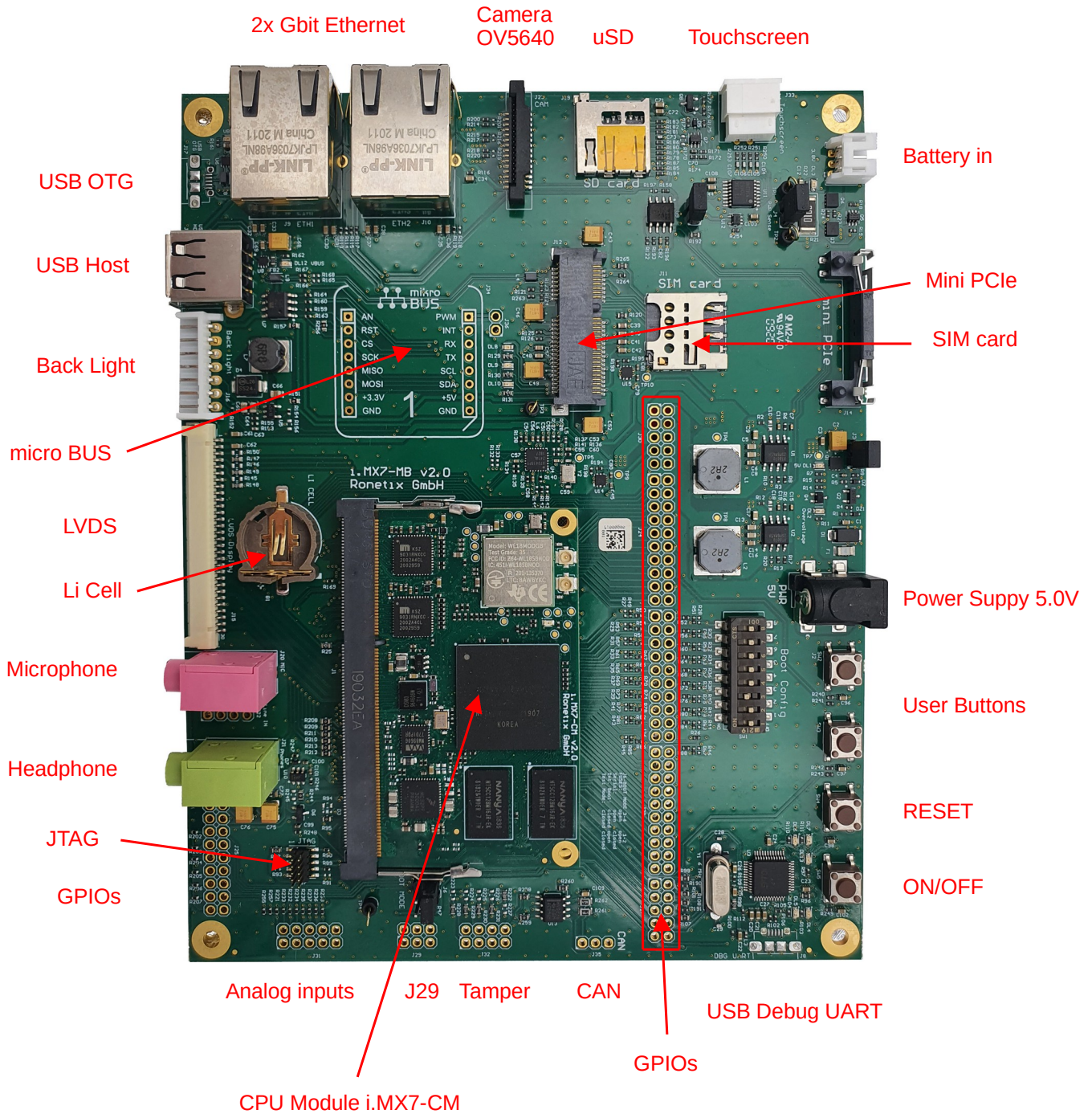
Refer to i.MX7-CM datasheet for pin-out assignments.

### 3.3 Block Diagram





### 3.4 i.MX7-MB Connectors





Reference	Function	Type
J1	i.MX7-CM connector	SODIMM204
J2	Power Supply	DC Jack, 2.1mm
J3	Disable over-voltage protection	Header 1x2, 2.54mm
J4	PMIC CURRENT SENSE	Header 1x2, 2.54mm
J5	BATTERY IN	Header 1x2, 2.54mm
J6	Boot Mode	Header 2x2, 2.54mm
J7	JTAG	Header 2x5, 1.27mm
J8	USB Debug UART	USB Micro-AB
J9	Ethernet 1	RJ45
J10	Ethernet 2	RJ45
J11	SIM card for mini PCIe	Micro SIM
J12	Mini PCIe	MM60-52B1-E1-R650
J13	Board detect enable/disable	Header 2x1, 2.54mm
J14	Card Latch for PCIe Mini Card	MM60-EZH059-B5-R650
J15	LVDS	30pin, DF14-30P-1.25H
J16	Display back light	7-pin, S7B-EH
J17	USB OTG	USB Micro-AB
J18	USB Host	USB Type-A
J19	Micro SD	Micro SD
J20	Microphone - Pink	Audio jack 3.5mm
J21	Headphones - Green	Audio jack 3.5mm
J22	Speakers	Header 2x2, 2.54mm
J23	Camera OV5640	15-pin, FPC
J24	GPIOs	Header 2x10, 2.54mm
J25	GPIOs	Header 2x10, 2.54mm
J26	GPIOs	Header 2x10, 2.54mm
J27	GPIOs	Header 2x5, 2.54mm
J28	GPIOs	Header 2x10, 2.54mm
J29	Power supplies from i.MX7-CM	Header 2x3, 2.54mm
J30	Power supplies from i.MX7-MB	Header 2x5, 2.54mm

Reference	Function	Type
J31	Analog inputs	Header 2x5, 2.54mm
J32	Tamper inputs	Header 2x4, 2.54mm
J33	Touchscreen	4-pin, FFC
J34	microBUS	
J35	CAN	Header 1x3, 2.54mm
J36	GPIO1_IO01 to microBUS	Header 1x2, 2.54mm
B1	Battery holder for CR1220	S8411-45R

## 4. Interface description

### 4.1 Power supply

#### 4.1.1 Power supply input

i.MX7-MB is powered by a +5V power supply connected through a 2.1mm barrel jack.



The board is protected against reverse and over input voltage (up to 20V). The over-voltage protection can be disabled with J3.

J3	Description
open	Over-voltage protection is active
close	Over-voltage protection is not active and the power switch is always ON

#### 4.1.2 Power out headers

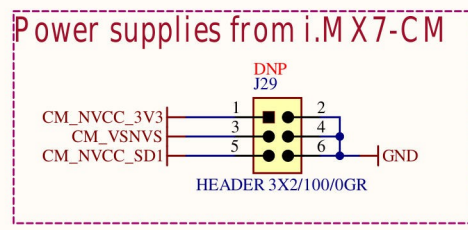
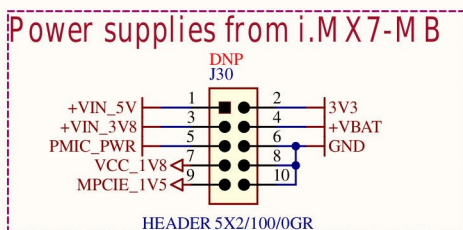
- **J30**, 2x5 2.54mm header provides supplies generated on the base board.

J30, PIN	Label	Voltage	Description
1	+VIN_5V	5.0V	Input power supply
2	3V3	3.3V	Generated from 5V through 4A DC-DC converter
3	+VIN_3V8	3.8V	Generated from 5V through 4A DC-DC converter

J30, PIN	Label	Voltage	Description
4	+VBAT		Provided by battery input, J5
5	PMIC_PWR	3.8V	Power supply provided to SODIMM204: can be +VIN_3V8 or +VBAT
6	GND		
7	VCC_1V8	1.8V	Generated from 3V3 by a 0.3A Linear regulator
8	GND		
9	MPCIE_1V5	1.5V	Generated from 3V3 by a 0.3A Linear regulator
10	GND		

- **J29**, 2x3 2.54mm header provides supplies generated on the CPU Module

J29, PIN	Label	Voltage	Description
1	CM_NVCC_3V3	3.3V	Generated by PMIC, max 350mA
2	GND		
3	CM_VSNVS	3.0V	Generated by PMIC, max 1mA
4	GND		
5	CM_NVCC_SD1	1.8V or 3.3V	Micro SD interface signals, max 100mA
6	GND		



## 4.2 Buttons

### 4.2.1 ON/OFF button

The ON/OFF button provides following functionality:

- Long press (> 5 sec.) - hardware shutdown without possibility for software wake-up
- Short press (< 5 sec.) - software shutdown

- Short press in OFF state – restart

#### 4.2.2 RST button

The RST button performs a system reset.

#### 4.2.3 User buttons

Two buttons available for custom purposes:

- USR\_BT0 is connected to GPIO5\_IO11
- USR\_BT1 is connected to GPIO1\_IO02

#### 4.2.4 Boot Mode

J6 sets the boot mode of the CPU:

J6, 3-4	J6, 1-2	Boot mode
open	open	Fuses
open	close	Serial download
close	open	Internal boot
close	close	Test mode

#### 4.2.5 Boot configuration

Boot configuration switch SW1 sets the boot source and sequence:

INTERNAL BOOT		BT_CFG[14]	BT_CFG[13]	BT_CFG[12]	BT_CFG[10]	BT_CFG[11]
BOOT_CFG[15:12]	Boot Device	0001 - SD/eSD/SDXC 0010 - MMC/eMMC			Port Select: 00 - eSDHC1 01 - eSDHC2 10 - eSDHC3	
0001	SD/eSD/SDXC	0011 - Raw NAND				
0010	MMC/eMMC	0100 - QSPI				
0011	Raw NAND	0101 - NOR				
0100	QSPI	0110 - Serial ROM (I2C/SPI)				
0101	NOR/OneNAND (EIM)					
0110	Serial ROM (I2C/SPI)					

### 4.3 LEDs

LED	Color	Description
DL1	green	ON when input 5V DC power is provided
DL2	red	ON when over-voltage is detected
DL3	green	ON when PMIC_3V8 is available

LED	Color	Description
DL4	green	RxLED on USB debug UART1 bridge
DL5	red	TxLED on USB debug UART1 bridge
DL6	green	RxLED on USB debug UART2 bridge
DL7	red	TxLED on USB debug UART2 bridge
DL8	blue	LED_WWAN from mini PCIe
DL9	green	LED_WLAN from mini PCIe
DL10	red	LED_WPAN from mini PCIe
DL11	green	ON when VBUS on USB OTG is available
DL12	green	ON when VBUS on USB Host is available
DL13	green	ON when USB debug UART is in use

## 4.4 Ethernet

Two Gigabit Ethernet ports are available: 2xRJ45 connectors with integrated magnetics and LEDs.

## 4.5 USB Interface

Both USB Host and USB OTG are native connected to the CPU.

### 4.5.1 USB 2.0 Host

Pin	Signal	SODIMM 204 Pin	Description
1	USB_OTG2_VBUS	33	+5V power supply, 500mA max
2	USB_OTG2_N	35	USB Data Negative
3	USB_OTG2_P	37	USB Data Positive
4	GND		

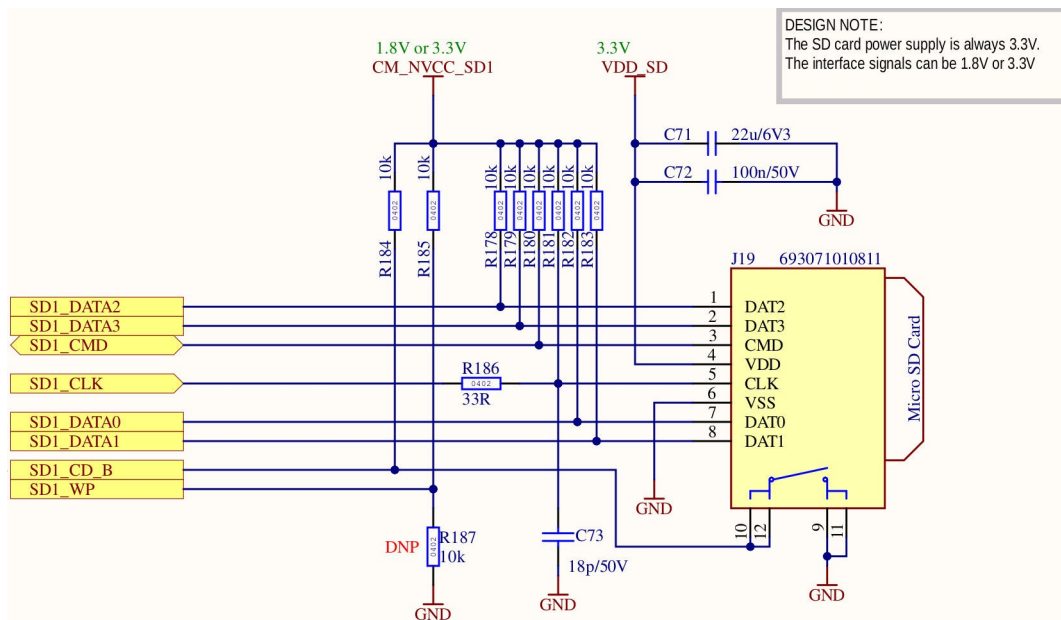
### 4.5.2 USB 2.0 OTG

Pin	Signal	SODIMM 204 Pin	Description
1	USB_OTG1_VBUS	43	+5V in/out

Pin	Signal	SODIMM 204 Pin	Description
2	USB_OTG1_N	45	USB Data Negative
3	USB_OTG1_P	47	USB Data Positive
4	USB_OTG1_ID	49	USB OTG ID signal ('1' - Device mode)
5	GND		

## 4.6 SD card

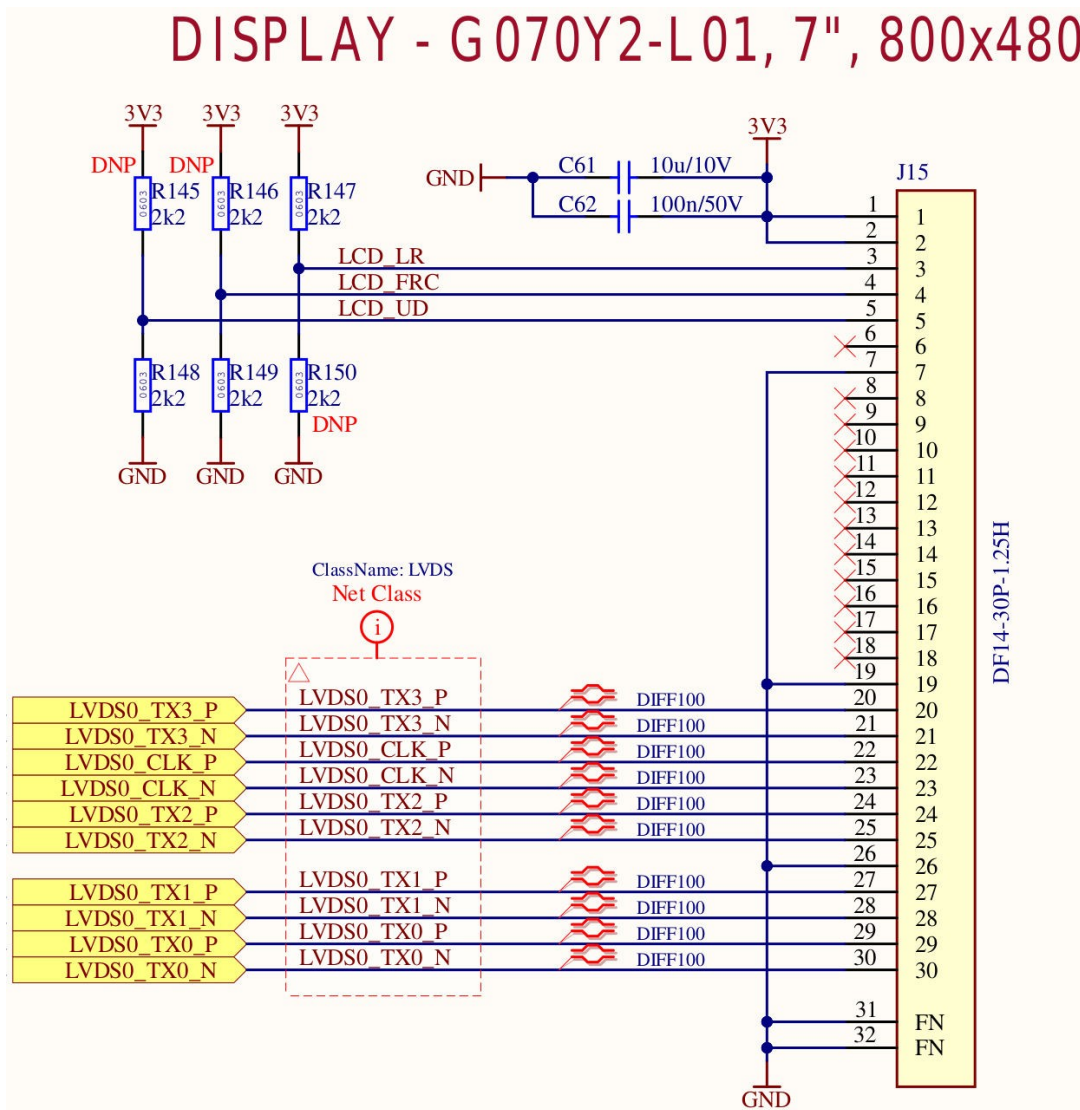
The i.MX7-MB board features a SD card socket which can be used as boot device or storage. Please note that the hardware supported card detect function is implemented and hardware write protect feature is not available.





## 4.7 LVDS

The i.MX7-MB board exposes a 4 data lane LVDS interface driven by the MIPI-DSI to LVDS bridge assembled on the i.MX7-CM. The interface is exposed to a 30 pin connector for connecting G070Y2-L01 7", 800x480 LVDS LCD display.



## 4.8 Touchscreen

The i.MX7-MB board provides a resistive touchscreen interface (J33) through TI TSC2046.

## 4.9 Audio

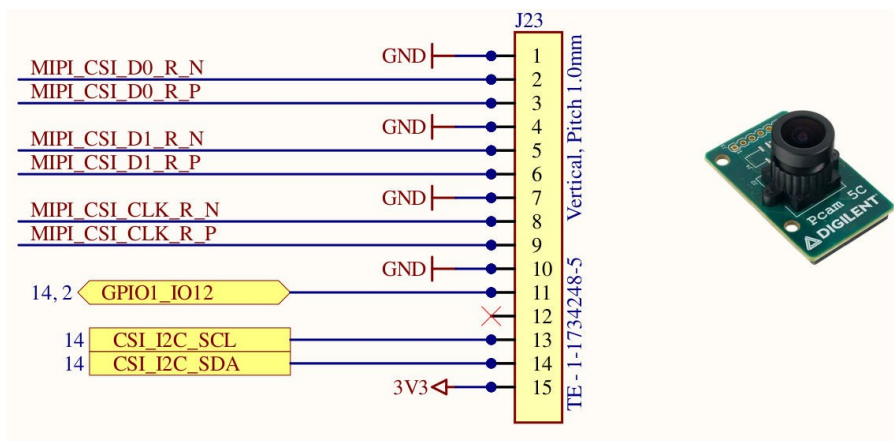
The i.MX7-MB board features two 3.5mm jacks:

- Headphones
- Header 2x2, 2.54mm for speakers
- Microphone

Note: The using of headphones or speakers is an assembling option of i.MX7-CM. It is not possible to use both headphones and speaker simultaneously.

## 4.10 Camera

The 15-pin FPC connector is suitable for PCAM 5C, 5 MP MIPI camera module with OV5640 sensor.

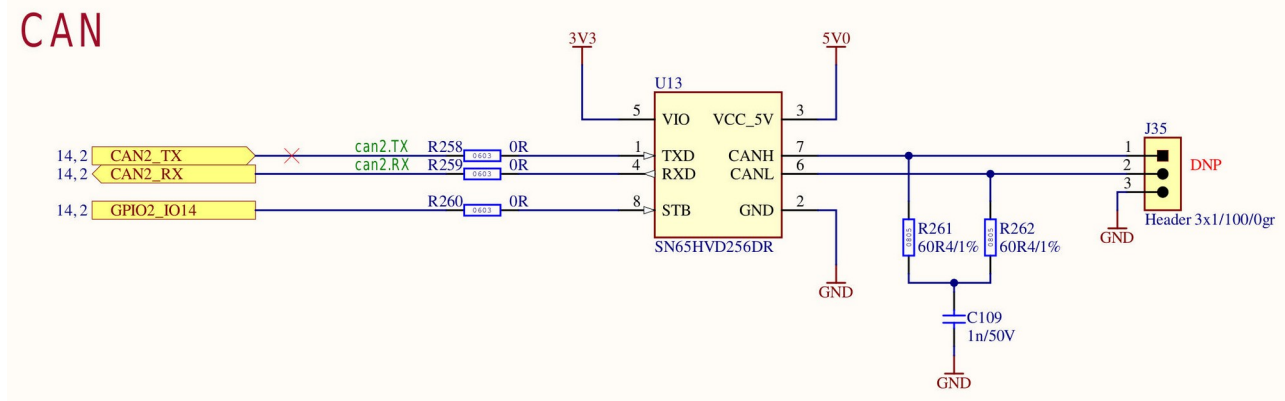


## 4.11 USB debug UART

i.MX7-MB implements a USB to UART bridge (FT2232D) which can be used to interface with the UART1 and UART2 of the CPU. Usually UART1 is used for debugging of Cortex-A7 core, while the UART2 is used for debugging of Cortex-M4 core. J8, USB Micro-AB connected is connected to the USB-UART bridge. A green LED (DL13) shows when the bridge is in use, four additionally LEDs show Tx/Rx activity on both UART ports.

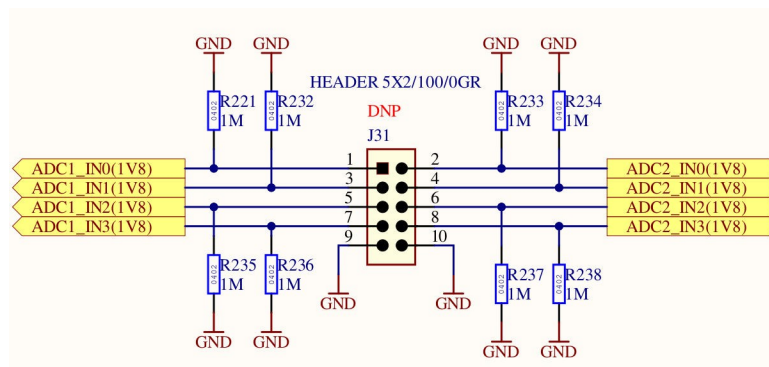
## 4.12 CAN

The i.MX7-MB board uses the TI SN65HVD256DR CAN transceiver to implement the CAN interface. The CAN port is electrically not isolated from the system power supply. The CAN interface is available on connector J35, header 1x3, 2.54mm.



## 4.13 Analog inputs

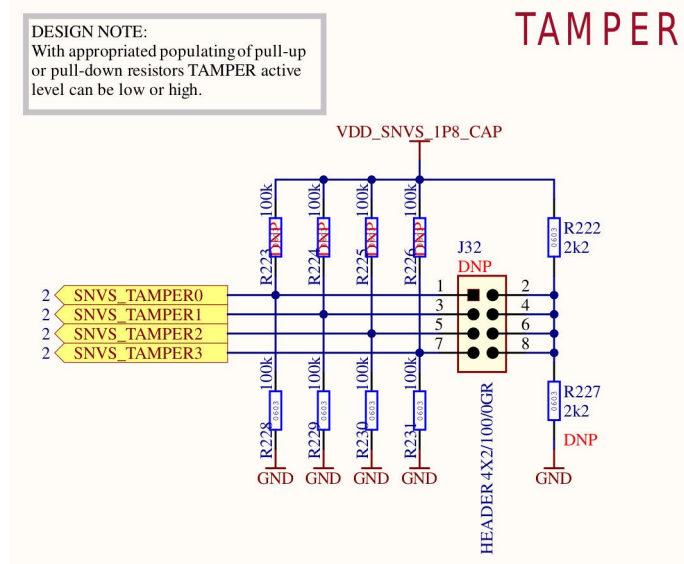
Two 4-channel ADC inputs are available on J31, header 2x5, 2.54mm connector:



Note: ADC1 and ADC2 are referenced to 1.8V

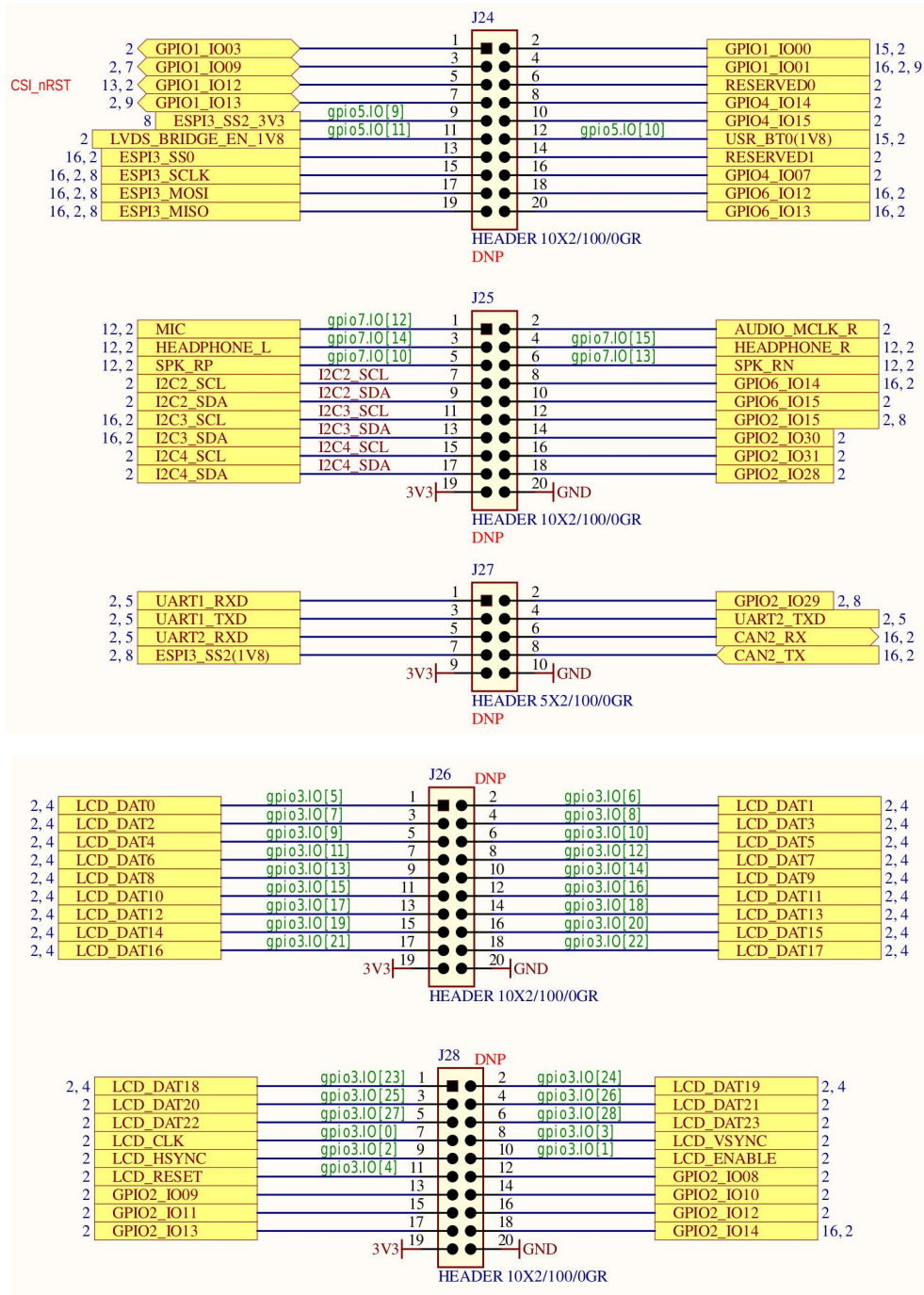
## 4.14 Tamper inputs

Four tamper inputs are available on J32, header 2x4, 2.54mm connector:



## 4.15 GPIO

Various GPIOs are available on standard headers:



## 5. Warranty Terms

Ronetix guarantees hardware products against defects in workmanship and material for a period of one (1) year from the date of shipment. Your sole remedy and Ronetix's sole liability shall be for Ronetix, at its sole discretion, to either repair or replace the defective hardware product at no charge or to refund the purchase price. Shipment costs in both directions are the responsibility of the customer. This warranty is void if the hardware product has been altered or damaged by accident, misuse or abuse.

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