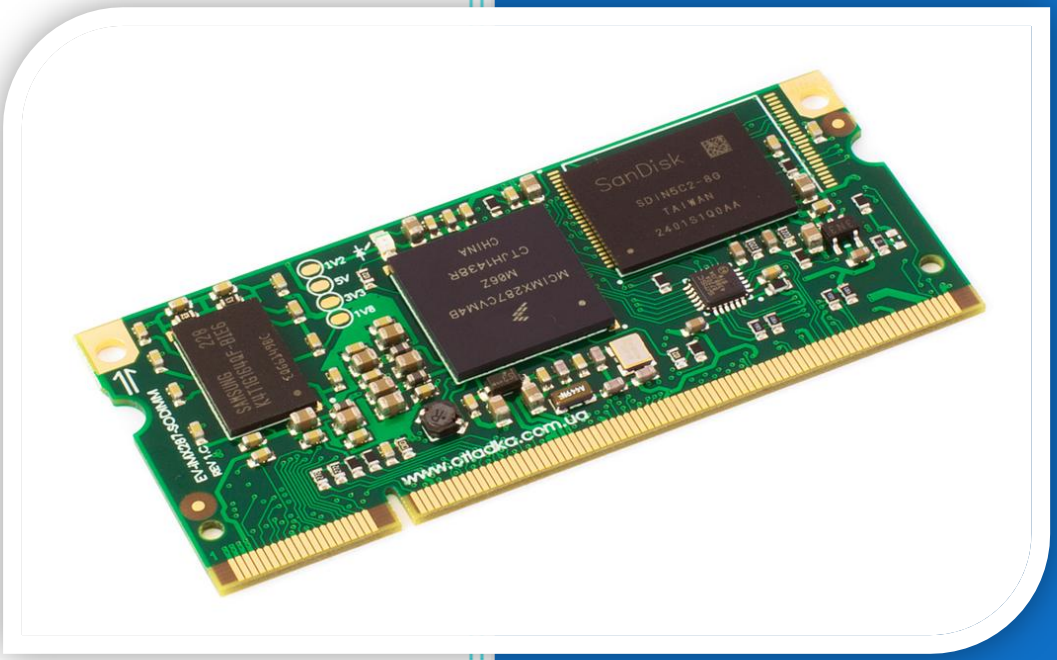
USER GUIDE

2014

EV-iMX287-SODIMM Module



Revision 1.0

Evodbg

TABLE OF CONTENTS

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ABBREVIATIONS AND DEFINITIONS

Abbreviation	Definition
ADC	Analog to Digital converter
ARM	Advanced Risc Machine
BSP	Board Support Package
CAN	Controller Area Network
CPU	Central Processing Unit
DDR	Double Data Rate
GPIO	General Purpose Input Output
I2C	Inter Integrated Circuit
JTAG	Joint Test Action Group
LCD	Liquid Crystal Display
Mb	Megabit
MB	Megabyte
MMC	Multimedia Card
NAND	
OTG	On-The-Go
PHY	Physical
PWM	Pulse Width Modulation
RMII	Reduced Media Independent Interface
RTC	Real Time Clock
SD	Secure Digital
SLC	Single Layer Cell
SPI	Serial Peripheral Interface
SSI	Synchronous Serial Interface
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
WP	Write Protect
WVGA	Wide Video Graphics Array

KIT

Name	Quantity
EV-iMX287-SODIMM-A(1/2/3) Module	1

ORDERING INFORMATION

Name	Description
EV-iMX287-SODIMM-A1	iMX287, 128MB DDR2, 8 GB eMMC, -20C…+85C
EV-iMX287-SODIMM-A2	iMX287, 128MB DDR2, 4 GB eMMC, -20C…+85C
EV-iMX287-SODIMM-A3	iMX287, 128MB DDR2, 512 SLC NAND Flash, -40C…+85C
EV-iMX287-SODIMM-A4	iMX287, 128MB DDR2 without NAND Flash and eMMC, only mSD connector

Note - on the acquisition of other configurations, please contact

info@evodbg.com

BRIEF DESCRIPTION OF THE MODULE

Module EV-iMX287-SODIMM is built on high-performance microcontroller MCIMX287/MCIMX283 of i.MX28 family with ARM9 core. Processor frequency is 454 MHz. Module EV-iM287-SODIMM is released in industrial version (-40°C…+85°C) with NAND Flash memory and commercial (0°C…+85°C) with e-MMC memory. There is also a module modification without NAND Flash and e-MMC, with installed microSD card holder of micro SD format. Module format - board in SODIMM form factor 1.8V format.

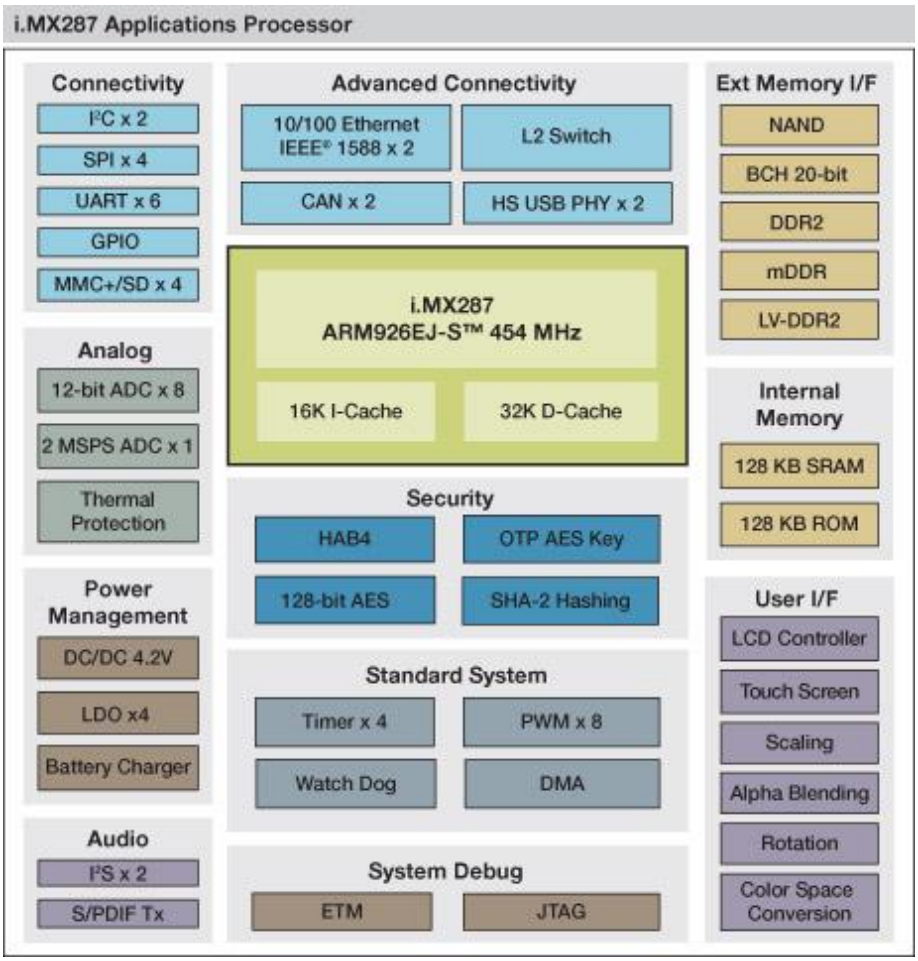
The list of installed components and connectors:

- Processor Freescale MCIMX287CVM4B
- DDR2 K4T1G164QQE 128MB memory or equivalent
- SLC NAND Flash S34ML04G100 512 MB memory or equivalent (optionally)
- e-MMC memory with the sizes 4 or 8 GB (optionally)
- PHY Ethernet LAN8720AI
- 200 contacts on which the processor signals are displayed
- Supply voltage of the module 5V
- Average current consumption 200 mA
- Overall dimensions 67,6*30*4 mm
- Net weight 10 gramm.

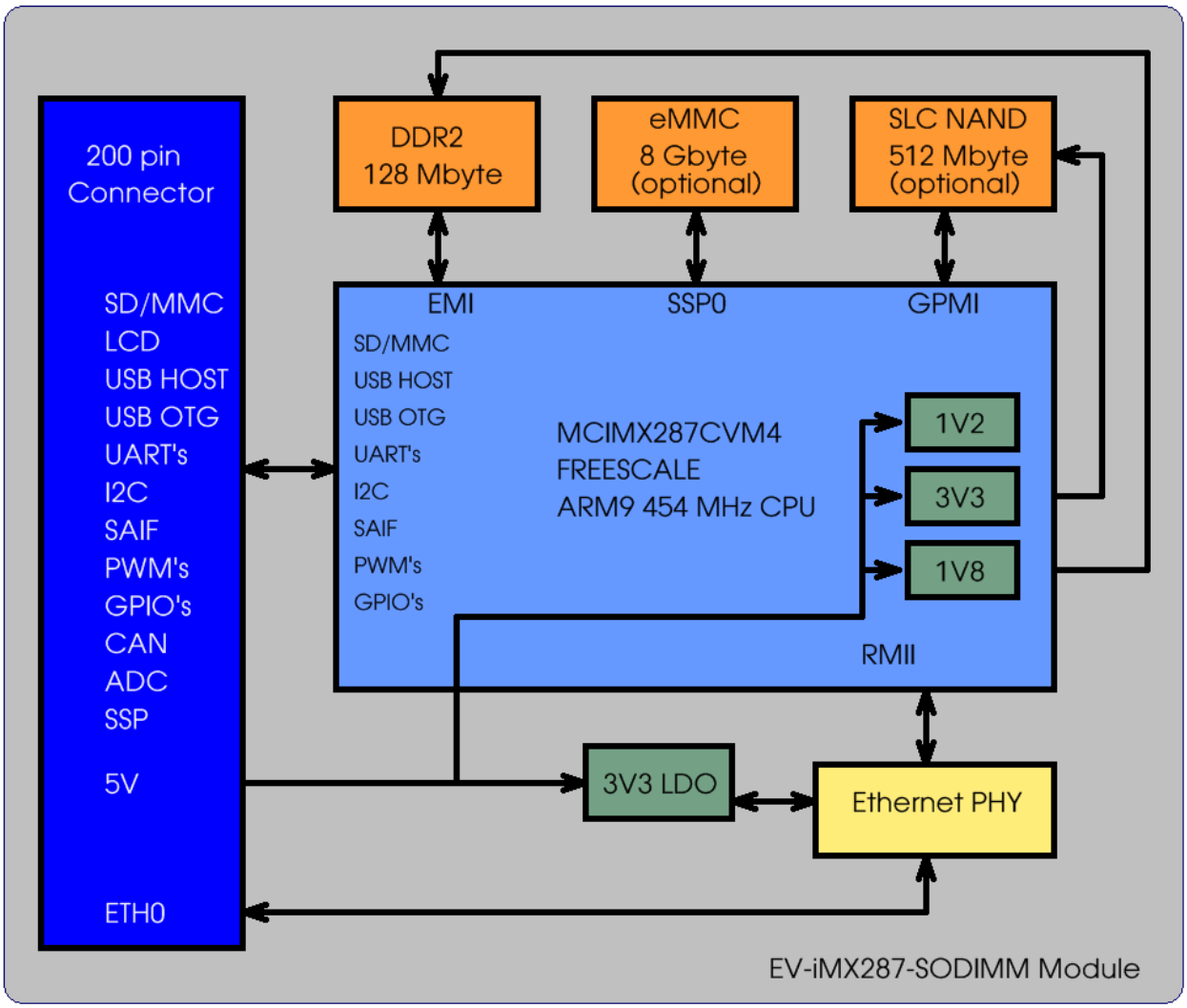
COMPARATIVE TABLE OF PROCESSOR FAMILY IMX28

Module	i.MX280	i.MX281	i.MX283	i.MX285	i.MX286	i.MX287
Application UART	5	5	5	5	5	5
Debug UART	1	1	1	1	1	1
Flex CAN	-	2	-	2	2	2
High-speed ADC	1	1	1	1	1	1
L2Switch	-	-	-	-	-	Yes
LCD interface	No	No	Yes	Yes	Yes	Yes
LowSpeed ADC	8	8	8	8	8	8
PWM	8	8	8	8	8	8
SPDIF output	No	Yes	No	Yes	Yes	Yes
SD/SDIO/MMC	4	4	4	4	4	4
Security	Yes	Yes	Yes	Yes	Yes	Yes
SPI	4	4	4	4	4	4
Touchscreen	No	No	Yes	Yes	Yes	Yes
USB 2.0 OTG	1	1	1	1	1	1
USB 2.0 HOST	1	1	1	1	1	1

MCIMX287 PROCESSOR BLOCK DIAGRAM

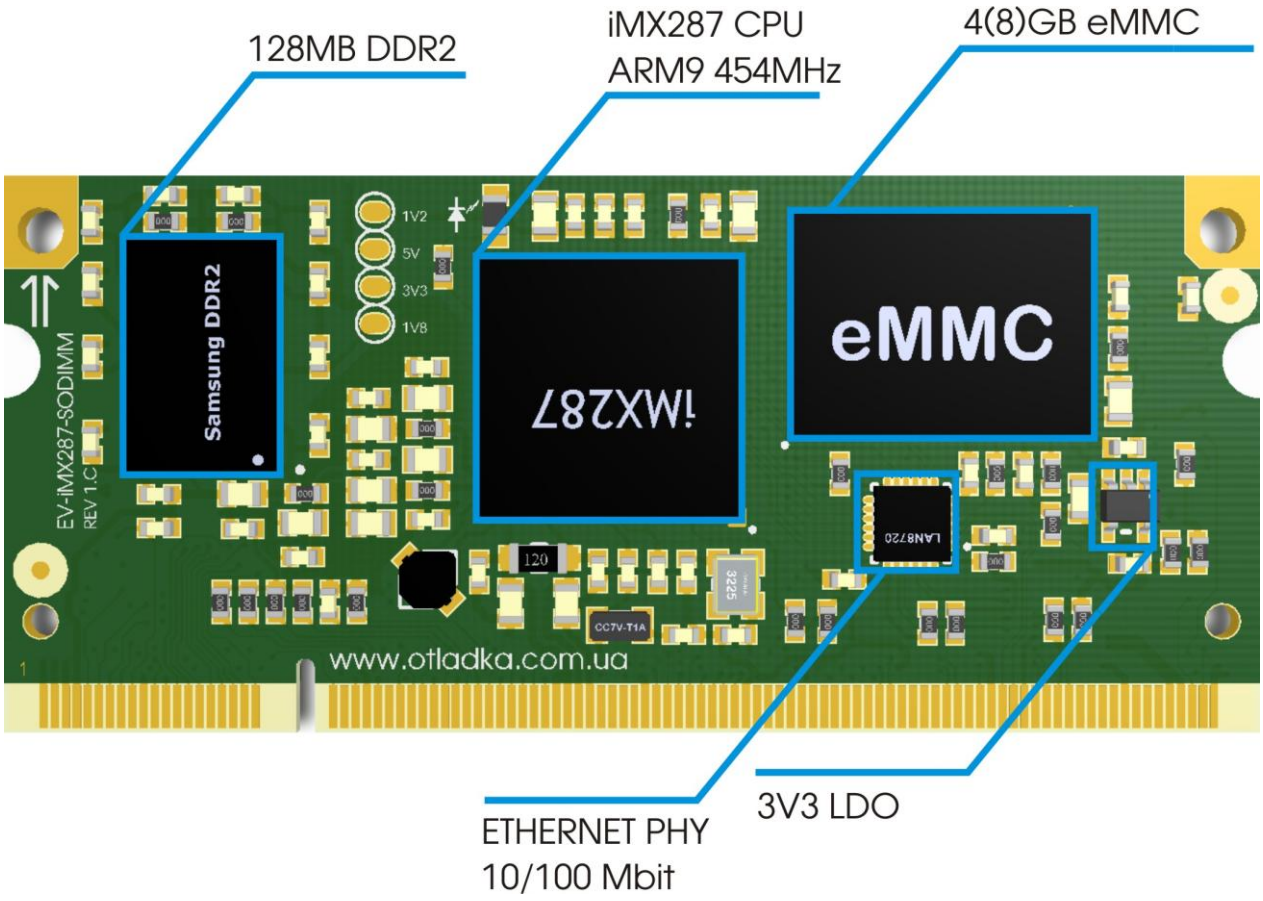


EV-IMX287-SODIMM MODULE BLOCK DIAGRAM



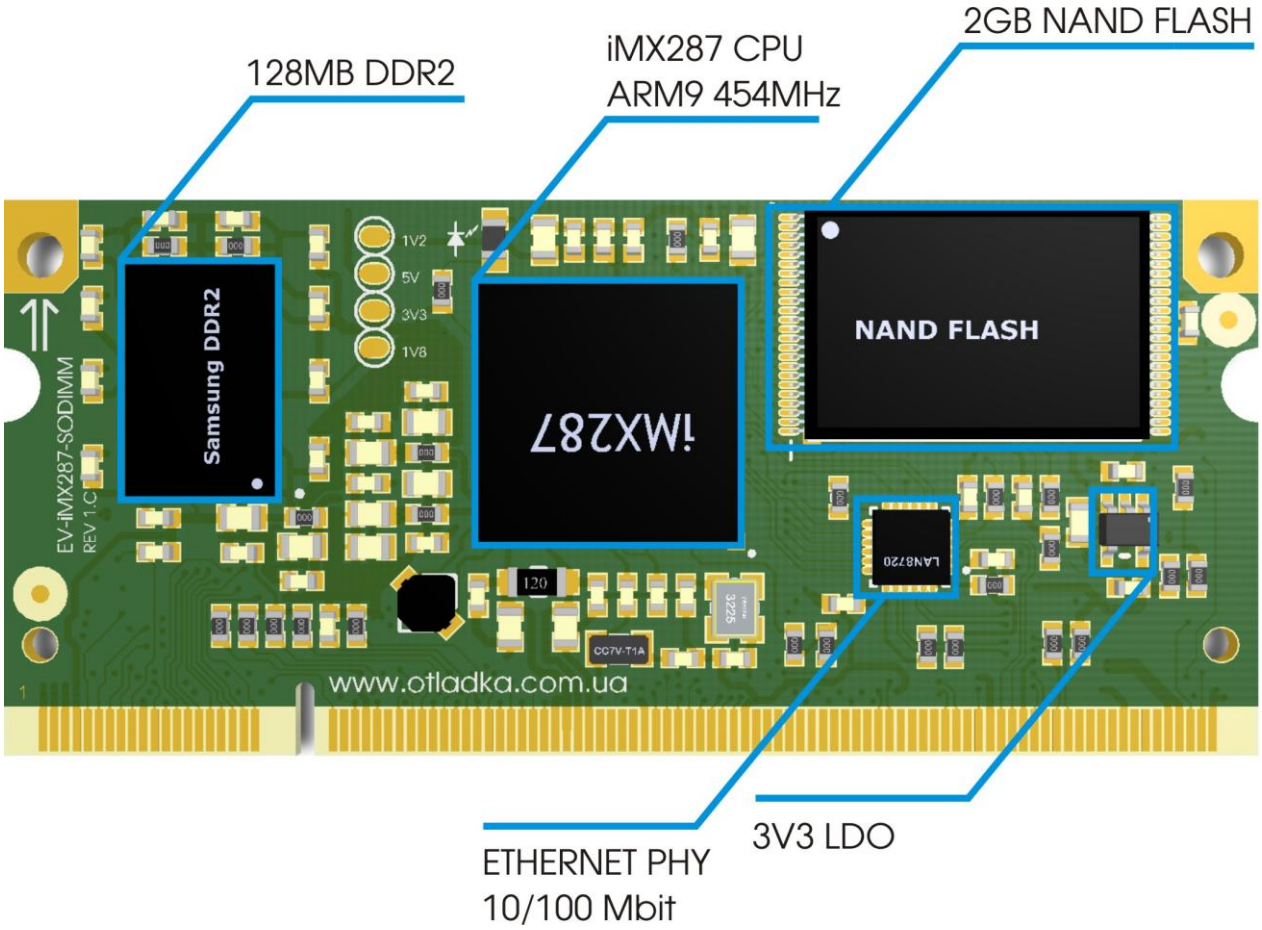
LOCATION OF MAIN COMPONENTS ON THE MODULE BOARD

EV-iMX287-SODIMM eMMC version

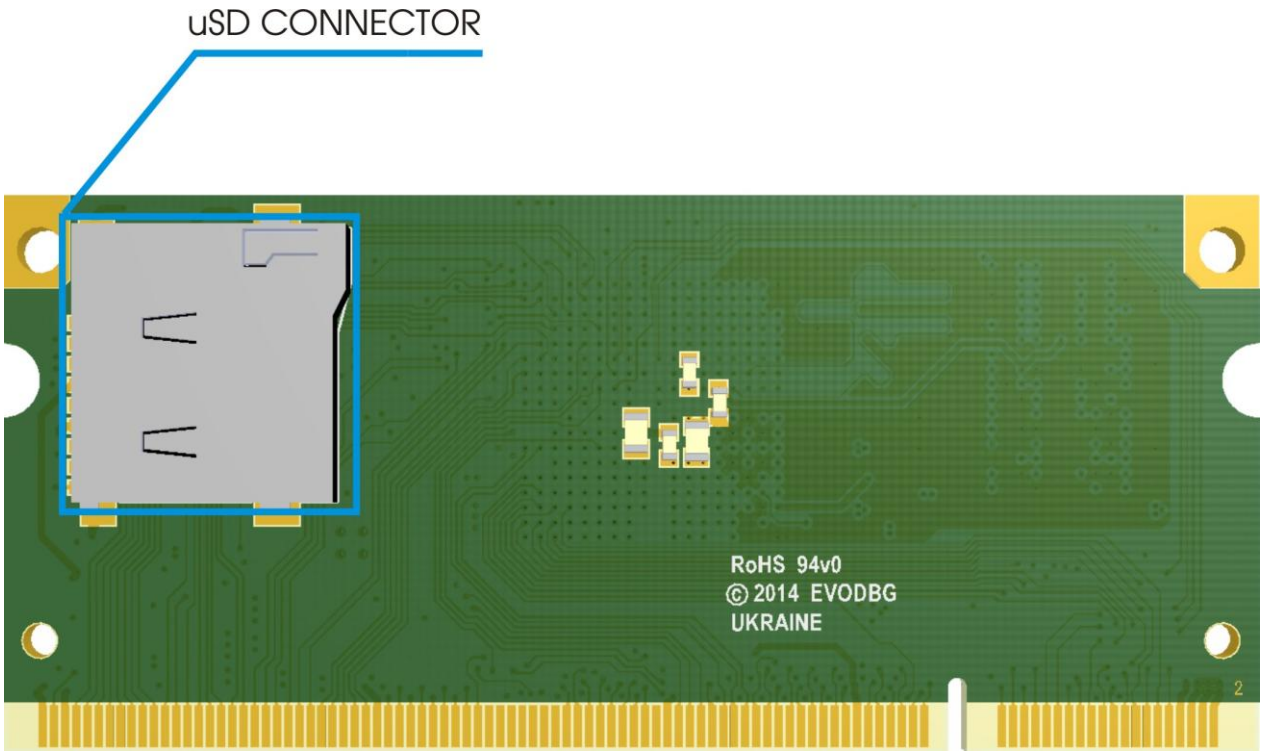


EV-iMX287-SODIMM Module

EV-iMX287-SODIMM NAND version



Back side (uSD holder placed only in NAND Flash version module!)



SUPPLY SYSTEM

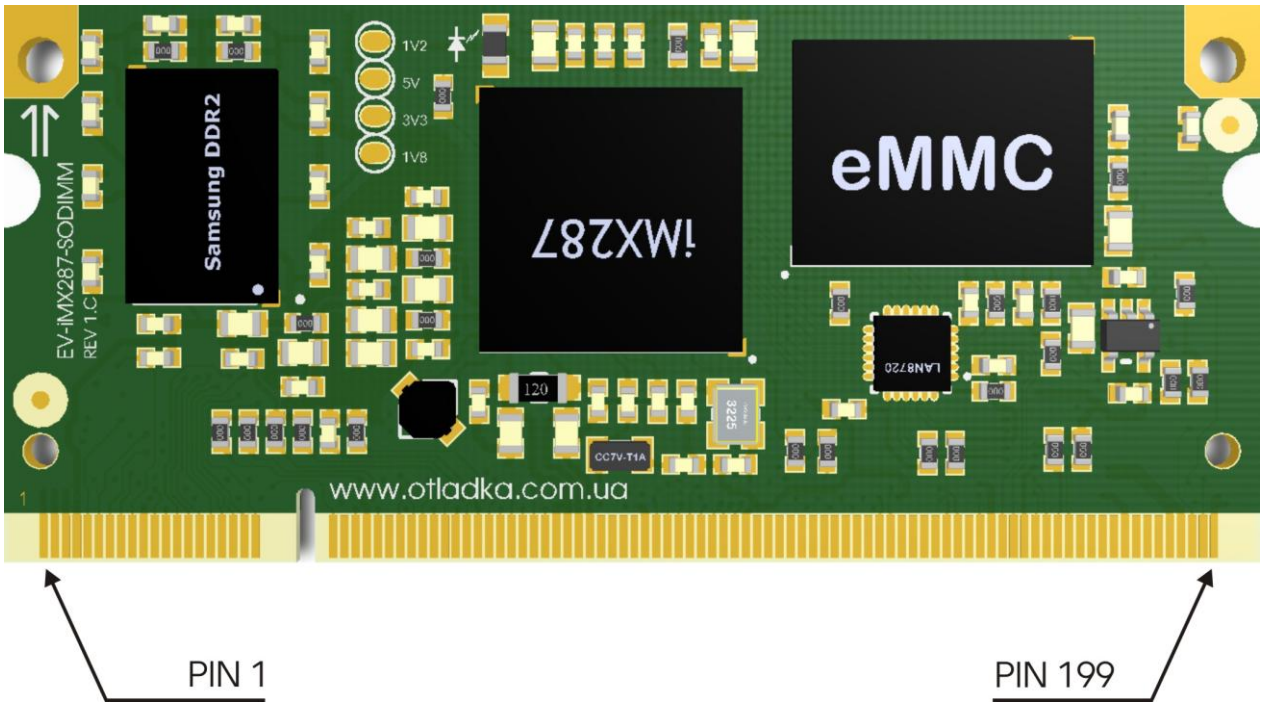
A single 5V (±5%) supply must be provided by the motherboard. Voltage 1.8V (power of DDR2 memory), 1.2V (processor core power) and 3.3V (power of chips memory NAND/SPI Flash) is generated by the processor. To power the chip of physical layer Ethernet (PHY) - LDO stabilizer TPS76333 (U1) is provided.

ETHERNET

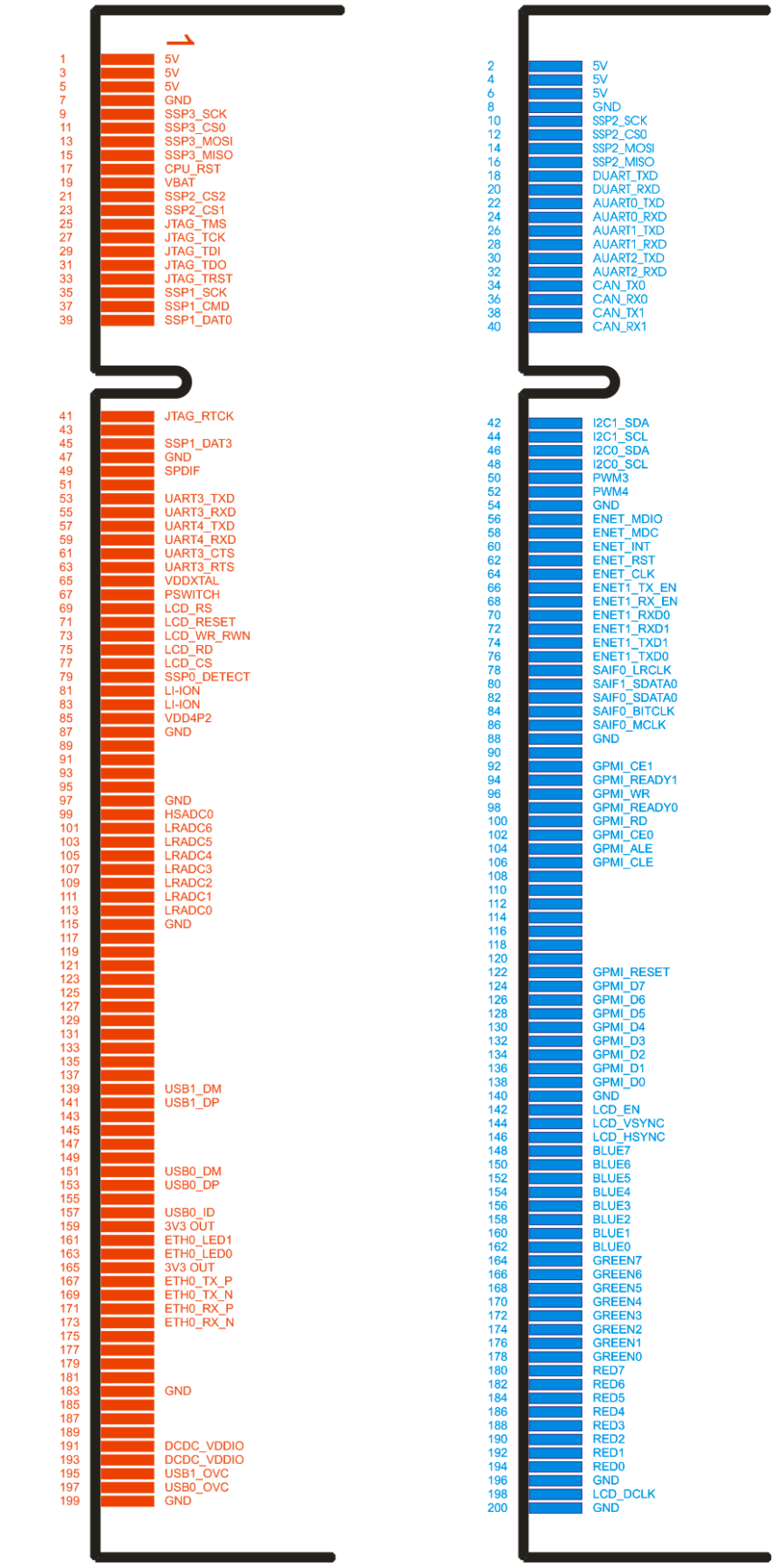
There is a chip LAN8720AI (U7) PHY Ethernet 10/100Mb installed on the board and connected to the processor by interface RMII. Lines TX/RX and its LED control signals (Link/ACT) are displayed on the pin module contacts.

CONTACT CONFIGURATION OF THE MODULE

Top view, from components side.



EV-iMX287-SODIMM Module



MAIN MODULE CONNECTOR

Table 1. Module pinout:

Pin №	Pin name	MUX1	MUX2	MUX3	GPIO	CPU pin
1	VIN 5V					
2	VIN 5V					
3	VIN 5V					
4	VIN 5V					
5	VIN 5V					
6	VIN 5V					
7	GND					
8	GND					
9	SSP3_SCK	SSP3_SCK	AUART4_TX	EN-ET1_1588_EVENT0_OUT	GPIO2_24	A2
10	SSP2_SCK	SSP2_SCK	AUART2_RX	SAIF0_SDATA1	GPIO2_16	A3
11	SSP3_SS0	SSP3_D3	AUART4_CTS	EN-ET1_1588_EVENT1_IN	GPIO2_27	D2
12	SSP2_SS0	SSP2_D3	AUART3_TX	SAIF1_SDATA2	GPIO2_19	C4
13	SSP3_MOSI	SSP3_CMD	AUART4_RX	EN-ET1_1588_EVENT0_IN	GPIO2_25	C2
14	SSP2_MOSI	SSP2_CMD	AUART2_TX	SAIF0_SDATA2	GPIO2_17	C3
15	SSP3_MISO	SSP3_D0	AUART4_RTS	EN-ET1_1588_EVENT1_OUT	GPIO2_26	B2
16	SSP2_MISO	SSP2_D0	AUART3_RX	SAIF1_SDATA1	GPIO2_18	B3
17	RESETN					A14
18	PWM1	PWM1	I2C1_SDA	DUART_TX	GPIO3_17	L7
19	VBAT					
20	PWM0	PWM0	I2C1_SCL	DUART_RX	GPIO3_16	K7
21	SSP2_SS2	SSP2_D5	SSP2_D2	USB0_OVERCURRENT	GPIO2_21	D4
22	AUART0_TX	AUART0_TX	I2C0_SDA	DUART_RTS	GPIO3_1	H5
23	SSP2_SS1	SSP2_D4	SSP2_D1	USB1_OVERCURRENT	GPIO2_20	D3
24	AUART0_RX	AUART0_RX	I2C0_SCL	DUART_CTS	GPIO3_0	G5
25	JTAG_TMS					D12
26	AUART1_TX	AUART1_TX	SSP3_CARD_DETECT	PWM1	GPIO3_5	K4
27	JTAG_TCK					E11
28	AUART1_RX	AUART1_RX	SSP2_CARD_DETECT	PWM_0	GPIO3_4	L4
29	JTAG_TDI					E12
30	AUART2_TX	AUART2_TX	SSP3_D2	SSP3_D5	GPIO3_9	F5
31	JTAG_TDO					E13
32	AUART2_RX	AUART2_RX	SSP3_D1	SSP3_D4	GPIO3_8	F6
33	JTAG_TRST					D14
34	GPMI_RDY2	GPMI_RDY2	CAN0_TX	ENET0_TX_ER	GPIO0_22	M8
35	SSP1_SCK	SSP1_SCK	SSP2_D1	EN-ET0_1588_EVENT2_OUT	GPIO2_12	B1
36	GPMI_RDY3	GPMI_RDY3	CAN0_RX	HSADC_TRIGGER	GPIO0_23	L8
37	SSP1_CMD	SSP1_CMD	SSP2_D2	EN-ET0_1588_EVENT2_IN	GPIO2_13	C1
38	GPMI_CE2N	GPMI_CE2N	CAN1_TX	ENET0_RX_ER	GPIO0_18	M7
39	SSP1_DATA0	SSP1_D0	SSP2_D6	EN-ET0_1588_EVENT3_OUT	GPIO2_14	D1
40	GPMI_CE3N	GPMI_CE3N	CAN1_RX	SAIF1_MCLK	GPIO0_19	M9
41	JTAG_RTCK					E14
42	AUART2_RTS	AUART2_RTS	I2C1_SDA	SAIF1_LRCLK	GPIO3_11	H7
43	NC					

44	AUART2_CTS	AUART2_CTS	I2C1_SCL	SAIF1_BITCLK	GPIO3_10	H6
45	SSP1_DATA3	SSP1_D3	SSP2_D7	EN-ET0_1588_EVENT3_IN	GPIO2_15	E1
46	I2C0_SDA	I2C0_SDA	TIMROT_ROTARYB	DUART_TX	GPIO3_25	D8
47	GND					
48	I2C0_SCL	I2C0_SCL	TIMROT_ROTARYA	DUART_RX	GPIO3_24	C7
49	SPDIF	SPDIF		ENET1_RX_ER	GPIO3_27	D7
50	PWM3	PWM3				E9
51	NC					
52	PWM4	PWM4				E10
53	AUART3_TX	AUART3_TX	CAN0_RX	EN-ET0_1588_EVENT0_IN	GPIO3_13	L5
54	GND					
55	AUART3_RX	AUART3_RX	CAN0_TX	EN-ET0_1588_EVENT0_OUT	GPIO3_12	M5
56	ENET0_MDIO	ENET0_MDIO	GPMI_CE5N	SAIF0_SDATA2	GPIO4_1	H4
57	AUART0_RTS	AUART0_RTS	AUART4_TX	DUART_TX	GPIO3_3	J7
58	ENET0_MDC	ENET0_MDC	GPMI_CE4N	SAIF0_SDATA1	GPIO4_0	G4
59	AUART0_CTS	AUART0_CTS	AUART4_RX	DUART_RX	GPIO3_2	J6
60	ENET0_TX_CLK	ENET0_TX_CLK	HSADC_TRIGGER	EN-ET0_1588_EVENT2_OUT	GPIO4_5	E3
61	AUART3_CTS	AUART3_CTS	CAN1_TX	EN-ET0_1588_EVENT1_OUT	GPIO3_14	L6
62	ENET0_RX_CLK	ENET0_RX_CLK	ENET0_RX_ER	EN-ET0_1588_EVENT2_IN	GPIO4_13	F3
63	AUART3_RTS	AUART3_RTS	CAN1_RX	EN-ET0_1588_EVENT1_IN	GPIO3_15	K6
64	ENET_CLK	CLKCTRL_ENET			GPIO4_16	E2
65	VDDXTAL					C12
66	ENET0_COL	ENET0_COL	ENET1_TX_EN	EN-ET0_1588_EVENT3_OUT	GPIO4_14	J4
67	PSWITCH					A11
68	ENET0_CRS	ENET0_CRS	ENET1_RX_EN	EN-ET0_1588_EVENT3_IN	GPIO4_15	J3
69	LCD_RS	LCD_RS	LCD_DOTCLK		GPIO1_26	M4
70	ENET0_RXD2	ENET0_RXD2	ENET1_RXD0	EN-ET0_1588_EVENT0_OUT	GPIO4_9	J1
71	LCD_RESET	LCD_RESET	LCD_VSYNC		GPIO3_30	M6
72	ENET0_RXD3	ENET0_RXD3	ENET1_RXD1	EN-ET0_1588_EVENT0_IN	GPIO4_10	J2
73	LCD_WR_RWN	LCD_WR_RWN	LCD_HSYNC	ETM_TCLK	GPIO1_25	K1
74	ENET0_TXD3	ENET0_TXD3	ENET1_TXD1	EN-ET0_1588_EVENT1_IN	GPIO4_12	G2
75	LCD_RD_E	LCD_RD_E	LCD_VSYNC	ETM_TCTL	GPIO1_24	P4
76	ENET0_TXD2	ENET0_TXD2	ENET1_TXD0	EN-ET0_1588_EVENT1_OUT	GPIO4_11	G1
77	LCD_CS	LCD_CS	LCD_ENABLE		GPIO1_27	P5
78	SAIF0_LRCLK	SAIF0_LRCLK	PWM4	AUART4_RTS	GPIO3_21	G6
79	SSP0_DETECT	SSP0_CARD_DET			GPIO2_9	D10
80	SAIF1_SDATA0	SAIF1_SDATA0	PWM7	SAIF0_SDATA1	GPIO3_26	E8
81	LI-ION					A15+B15
82	SAIF0_SDATA0	SAIF0_SDATA0	PWM6	AUART4_TX	GPIO3_23	E7
83	LI-ION					A15+B15
84	SAIF0_BITCLK	SAIF0_BITCLK	PWM5	AUART4_RX	GPIO3_22	F7

85	VDD4P2					A13
86	SAIF0_MCLK	SAIF0_MCLK	PWM3	AUART4_CTS	GPIO3_20	G7
87	GND					
88	GND					
89	NC					
90	NC					
91	NC					
92	GPMI_CE1N	GPMI_CE1N	SSP3_D3		GPIO0_17	N9
93	NC					
94	GPMI_RDY1	GPMI_READY1	SSP1_CMD		GPIO0_21	N8
95	NC					
96	GPMI_WRN	GPMI_WRN	SSP1_SCK		GPIO0_25	P8
97	GND					
98	GPMI_READY0	GPMI_RDN	SSP3_SCK		GPIO0_20	N6
99	HSADC0					B14
100	GPMI_RDN	GPMI_RDN	SSP3_SCK		GPIO0_24	R6
101	LRADC6					C14
102	GPMI_CE0	GPMI_CE0N	SSP3_D0		GPIO0_16	N7
103	LRADC5					D15
104	GPMI_ALE	GPMI_ALE	SSP3_D1	SSP3_D4	GPIO0_26	P6
105	LRADC4					D13
106	GPMI_CLE	GPMI_CLE	SSP3_D2	SSP3_D5	GPIO0_27	P7
107	LRADC3					D9
108	NC					
109	LRADC2					C8
110	NC					
111	LRADC1					C9
112	NC					
113	LRADC0					C15
114	NC					
115	GND					
116	NC					
117	NC					
118	NC					
119	NC					
120	NC					
121	NC					
122	GPMI_RESETN	GPMI_RESETN	SSP3_CMD		GPIO0_28	L9
123	NC					
124	GPMI_D07	GPMI_D7	SSP1_D7		GPIO0_7	T6
125	NC					
126	GPMI_D06	GPMI_D6	SSP1_D6		GPIO0_6	U6
127	NC					
128	GPMI_D05	GPMI_D5	SSP1_D5		GPIO0_5	R7
129	NC					
130	GPMI_D04	GPMI_D4	SSP1_D4		GPIO0_4	T7
131	NC					
132	GPMI_D03	GPMI_D3	SSP1_D3		GPIO0_3	U7
133	NC					
134	GPMI_D02	GPMI_D2	SSP1_D2		GPIO0_2	R8
135	NC					
136	GPMI_D01	GPMI_D1	SSP1_D1		GPIO0_1	T8
137	NC					
138	GPMI_D00	GPMI_D0	SSP1_D0		GPIO0_0	U8
139	USB1DM					B8
140	GND					
141	USB1DP					A8
142	LCD_ENABLE	LCD_ENABLE			GPIO1_31	N5
143	NC					
144	LCD_VSYNC	LCD_VSYNC	SAIF1_SDATA0		GPIO1_28	L1

145	NC					
146	LCD_HSYNC	LCD_HSYNC	SAIF1_SDATA1	ETM_TCTL	GPIO1_29	M1
147	NC					
148	LCD_D07	LCD_D7		ETM_DA7	GPIO1_7	P1
149	NC					
150	LCD_D06	LCD_D6		ETM_DA6	GPIO1_6	N2
151	USB0DM					A10
152	LCD_D05	LCD_D5		ETM_DA5	GPIO1_5	M3
153	USB0DP					B10
154	LCD_D04	LCD_D4	ETM_DA9	ETM_DA4	GPIO1_4	M2
155	NC					
156	LCD_D03	LCD_D3	ETM_DA8	ETM_DA3	GPIO1_3	L3
157	AUART1_RTS	AUART1_RTS	USB0_ID	TIMROT_ROTARYB	GPIO3_7	J5
158	LCD_D02	LCD_D2		ETM_DA2	GPIO1_2	L2
159	VOUT_3V3					
160	LCD_D01	LCD_D1		ETM_DA1	GPIO1_1	K3
161	ETH0_LED1	LAN8720 Signal				
162	LCD_D00	LCD_D0		ETM_DA0	GPIO1_0	K2
163	ETH0_LED0	LAN8720 Signal				
164	LCD_D15	LCD_D15		ETM_DA15	GPIO1_15	U3
165	VOUT_3V3					
166	LCD_D14	LCD_D14		ETM_DA14	GPIO1_14	U2
167	ETH0_TX_P	LAN8720 Signal				
168	LCD_D13	LCD_D13		ETM_DA13	GPIO1_13	T2
169	ETH0_TX_N	LAN8720 Signal				
170	LCD_D12	LCD_D12		ETM_DA12	GPIO1_12	T1
171	ETH0_RX_P	LAN8720 Signal				
172	LCD_D11	LCD_D11		ETM_DA11	GPIO1_11	R2
173	ETH0_RX_N	LAN8720 Signal				
174	LCD_D10	LCD_D10		ETM_DA10	GPIO1_10	R1
175	NC					
176	LCD_D09	LCD_D9	ETM_DA4	ETM_DA9	GPIO1_9	P3
177	NC					
178	LCD_D08	LCD_D8	ETM_DA3	ETM_DA8	GPIO1_8	P2
179	NC					
180	LCD_D23	LCD_D23	EN-ET1_1588_EVENT3_IN	ETM_DA0	GPIO1_23	R5
181	NC					
182	LCD_D22	LCD_D22	EN-ET1_1588_EVENT3_OUT	ETM_DA1	GPIO1_22	T5
183	GND					
184	LCD_D21	LCD_D21	EN-ET1_1588_EVENT2_IN	ETM_DA2	GPIO1_21	U5
185	NC					
186	LCD_D20	LCD_D20	EN-ET1_1588_EVENT2_OUT	ETM_DA3	GPIO1_20	R4
187	NC					
188	LCD_D19	LCD_D19		ETM_DA4	GPIO1_19	T4
189	NC					
190	LCD_D18	LCD_D18		ETM_DA5	GPIO1_18	U4
191	DCDC_VDDIO					E6/G3/N3/H8/J8/J9/J10/E16/A7
192	LCD_D17	LCD_D17		ETM_DA6	GPIO1_17	R3
193	DCDC_VDDIO					E6/G3/N3/H8/J8/J9/J10/E16/A7

194	LCD_D16	LCD_D16		ETM_DA7	GPIO1_16	T3
195	PWM2	PWM2	USB0_ID	USB1_OVERCURRENT	GPIO3_18	K8
196	GND					
197	AUART1_CTS	AUART1_CTS	USB0_OVERCURRENT	TIMROT_ROTARYA	GPIO3_6	K5
198	LCD_DOTCLK	LCD_DOTCLK	SAIF1_MCLK	ETM_TCLK	GPIO1_30	N1
199	GND					
200	GND					

SIGNALS USED INSIDE THE MODULE

Table 2. used pins of processor inside the module

CPU pin	Name	Used with	Main connector
G4	ENET0_MDC	LAN8720	Pin 58
H4	ENET0_MDIO	LAN8720	Pin 56
E4	ENET0_RX_EN	LAN8720	No
H1	ENET0_RXD0	LAN8720	No
H2	ENET0_RXD1	LAN8720	No
F4	ENET0_TX_EN	LAN8720	No
F1	ENET0_TXD0	LAN8720	No
F2	ENET0_TXD1	LAN8720	No
F3	ENET_RST	LAN8720	Pin 62
E2	ENET_CLK	LAN8720	Pin 64
U8	GPMI_D0	NAND Flash	Pin 138
T8	GPMI_D1	NAND Flash	Pin 138
R8	GPMI_D2	NAND Flash	Pin 134
U7	GPMI_D3	NAND Flash	Pin 132
T7	GPMI_D4	NAND Flash	Pin 130
R7	GPMI_D5	NAND Flash	Pin 128
U6	GPMI_D6	NAND Flash	Pin 126
T6	GPMI_D7	NAND Flash	Pin 124
L9	GPMI_RESET	NAND Flash	Pin 122
P7	GPMI_CLE	NAND Flash	Pin 106
P6	GPMI_ALE	NAND Flash	Pin 104
P8	GPMI_WR	NAND Flash	Pin 96
R6	GPMI_RD	NAND Flash	Pin 100
N7	GPMI_CE0	NAND Flash	Pin 102
N6	GPMI_RDY0	NAND Flash	Pin 98
A6	SSP0_CLK	eMMC	No
A4	SSP0_CMD	eMMC	No
B6	SSP0_DATA0	eMMC	No
C6	SSP0_DATA1	eMMC	No
D6	SSP0_DATA2	eMMC	No
A5	SSP0_DATA3	eMMC	No
B5	SSP0_DATA4	eMMC	No
C5	SSP0_DATA5	eMMC	No
D5	SSP0_DATA6	eMMC	No
B4	SSP0_DATA7	eMMC	No

SOURCES OF PROCESSOR BOOT

Boot source is determined when you reset your processor. The levels at the pins LCD_D0-LCD_D3 are select of the source.

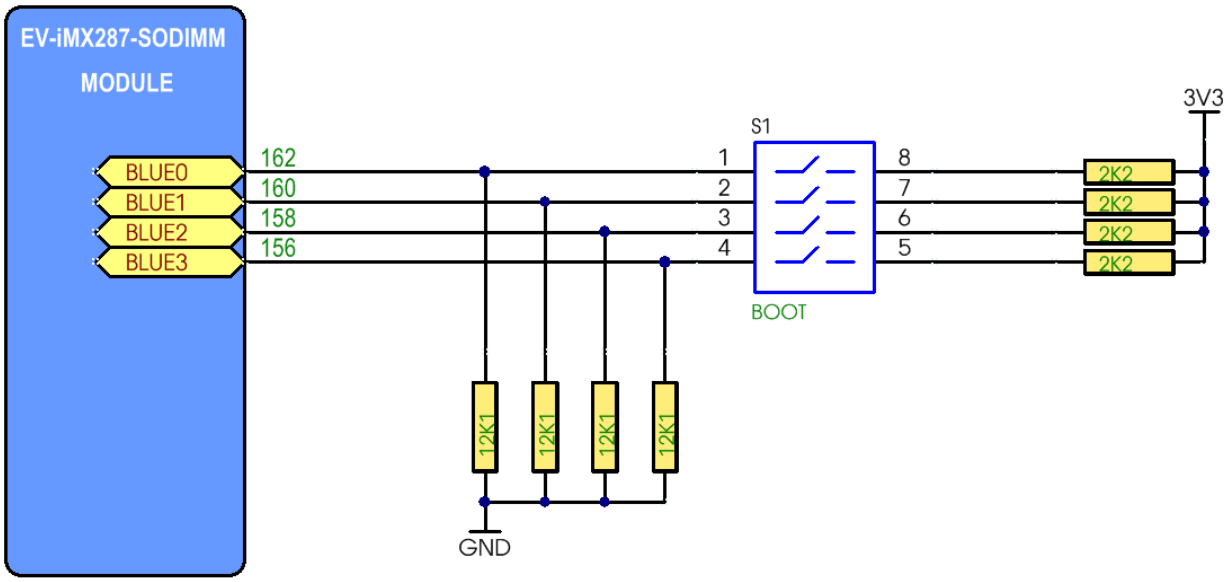


Table 3. Selection of source of processor boot

Source	LCD_D0(BLUE0)	LCD_D1(BLUE1)	LCD_D2(BLUE2)	LCD_D3(BLUE3)
USB	0	0	0	0
NAND Flash	0	0	1	0
SSP2	0	1	0	0
SDMMC	1	0	0	1

MEMORY

NAND FLASH MEMORY

The board uses a chip MLC NAND Flash memory (U5), bus width 8 bits, 512 MB. The memory is connected to the GPMI bus. GPMI_CE0 is used for sampling and GPMI_RDY0 for the signal Busy. Signal GPMI_RESET is used as a security control signal from the writing in NAND Flash.

EMMC MEMORY

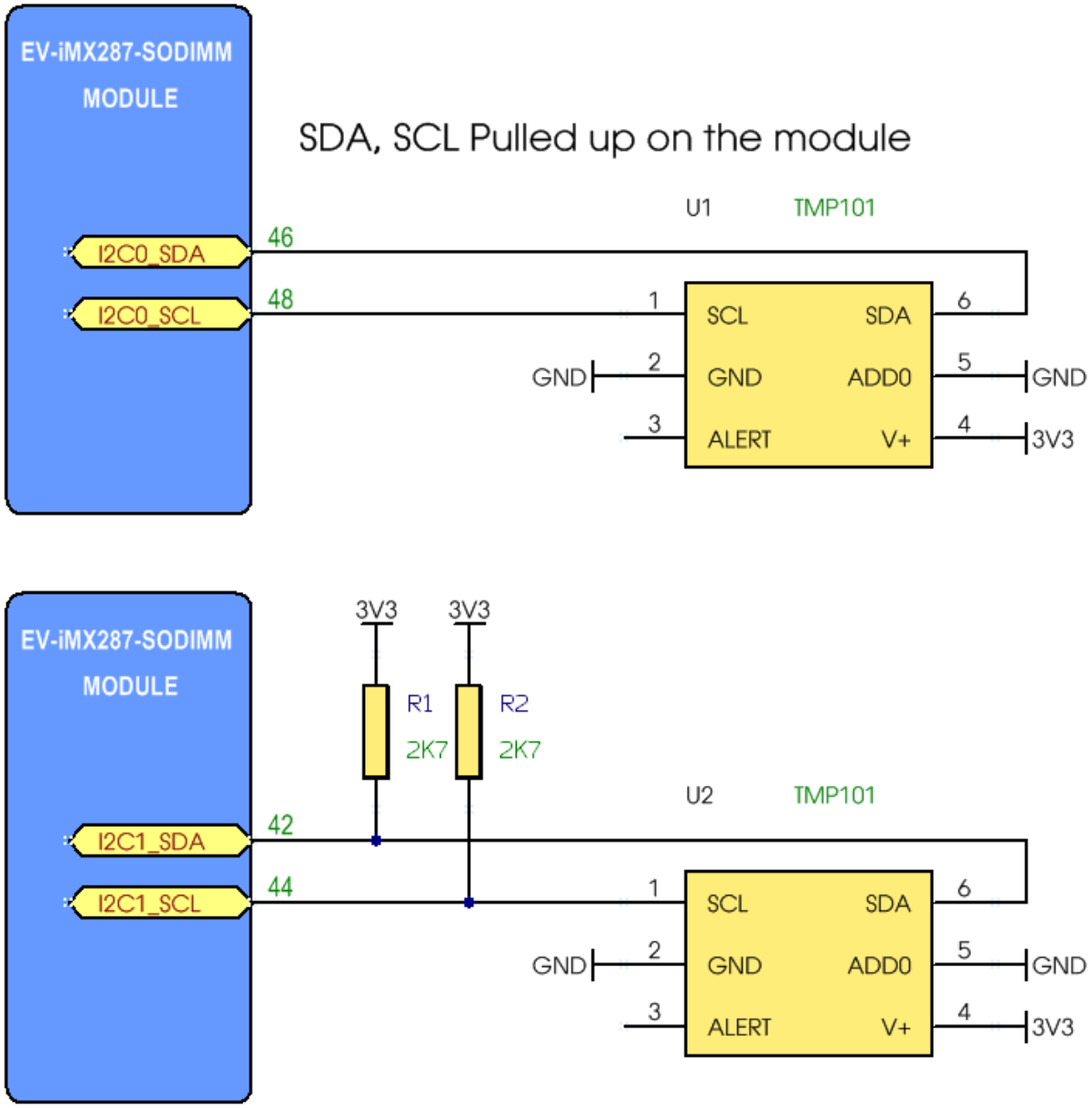
The module can be mounted memory chip e-MMC (U3) of 4 (8) GB. This chip is connected to the bus SSP0 of processor, bus width of 8 bits.

DDR2 MEMORY

On the module there is a chip with DDR2 (U2) K4T1G164Q memory (or equivalent) of 128 MB. Installation of a chip with volume 256 MB is possible. The maximum frequency of EMI interface is 205 MHz.

I2C INTERFACE

I2C0 bus is pulled up on the module to 3.3V resistors 1K5. I2C1 interface signals are not pulled.

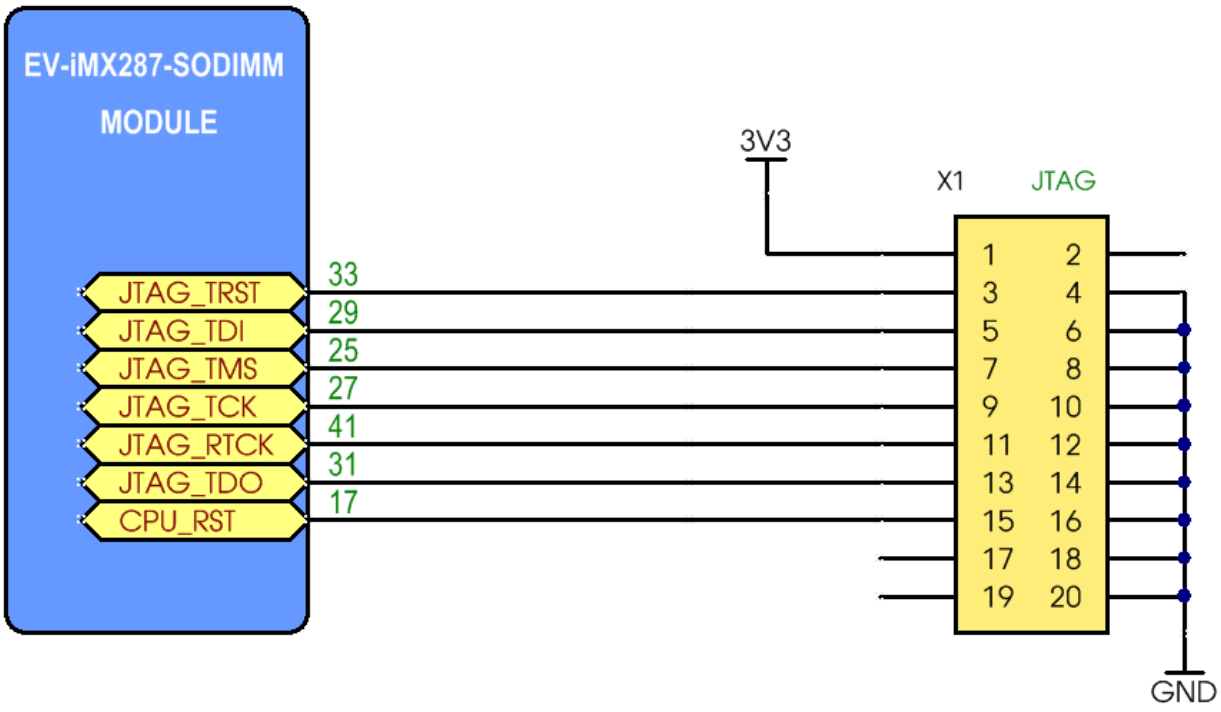


GPMI INTERFACE

Signals GPMI_RDY0 (Used with NAND Flash) are pulled to 3.3V resistor 12K1 installed on the module.

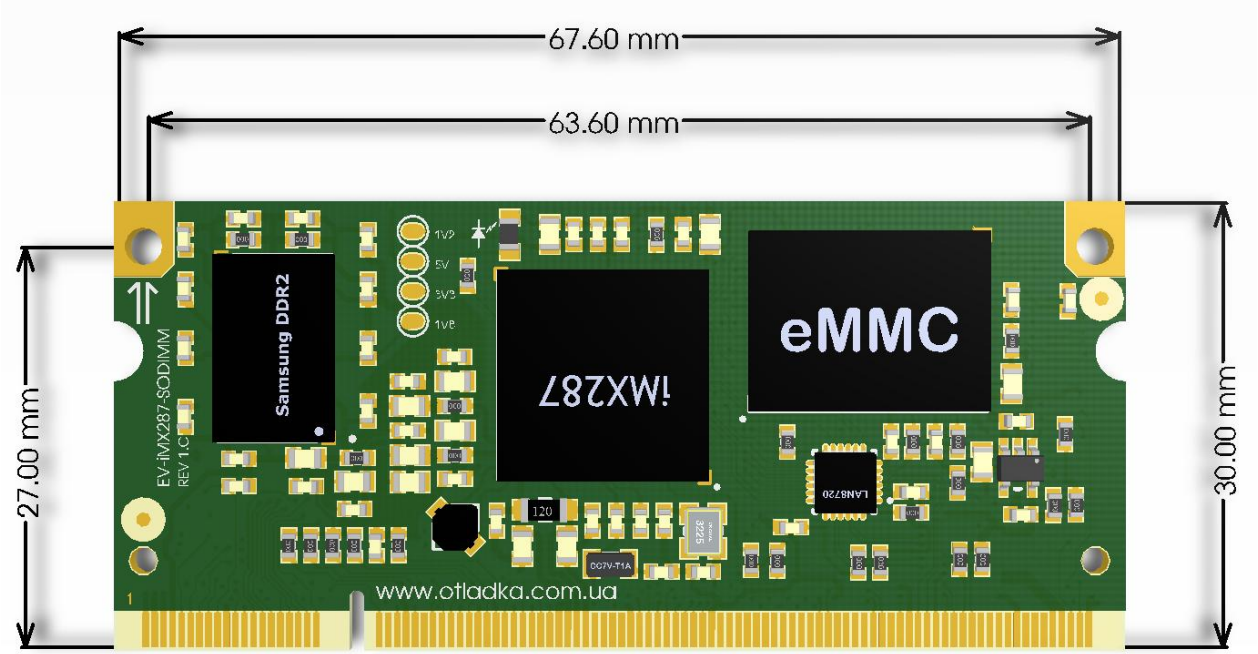
JTAG INTERFACE

Interface signals of JTAG processor are displayed on the module connector.



OVERALL DIMENSIONS

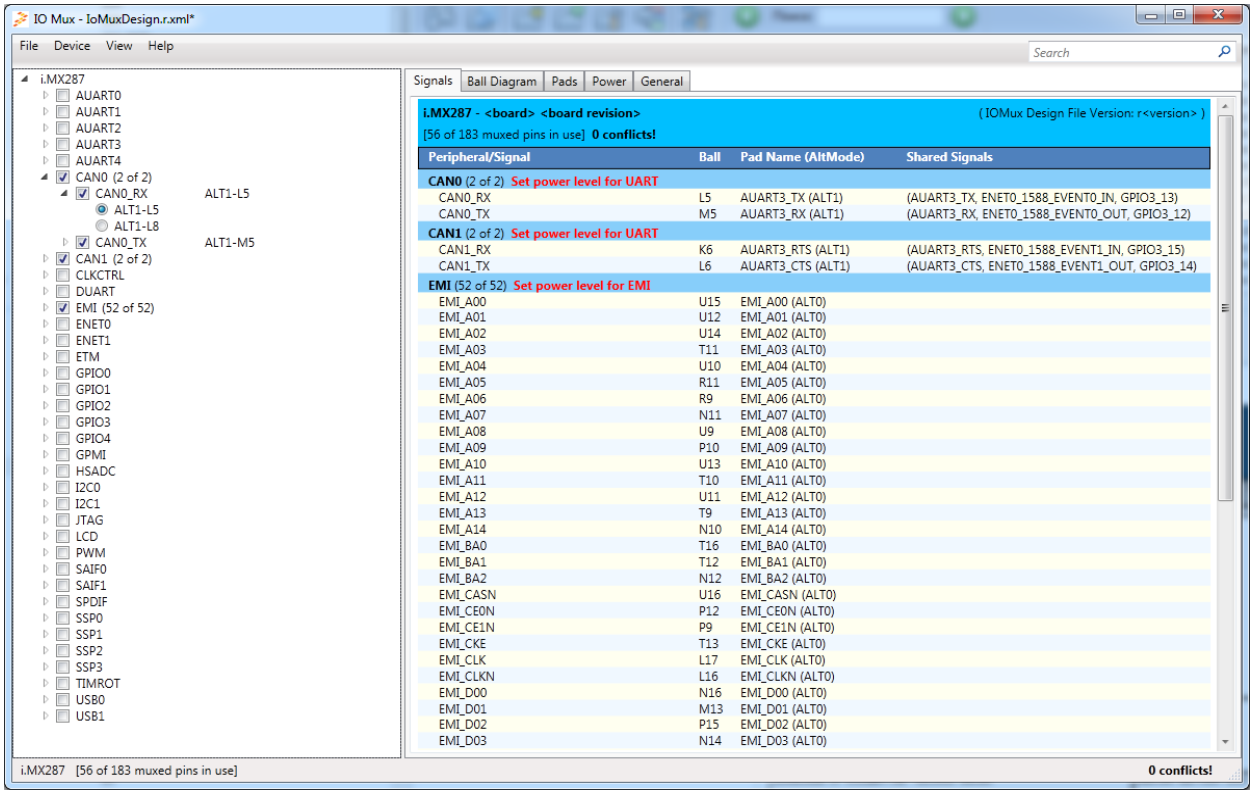
All dimensions are in mm. The maximum height of the module is 4,5 mm.



PINMUX

Output functions are not the only possible. Here, they are called as well as in BSP. If necessary, you can change them, reassign PINMUX as you need. For assign purpose use utility IOMux.exe, which allows graphically designate functions for processor outputs and shows potential conflicts.

EV-iMX287-SODIMM Module



EFUSE

The module comes with an unprogrammed eFuse processor. In the final stage of development you can program their configuration using utility BitBurner.

OUTPUT-INPUT PORTS

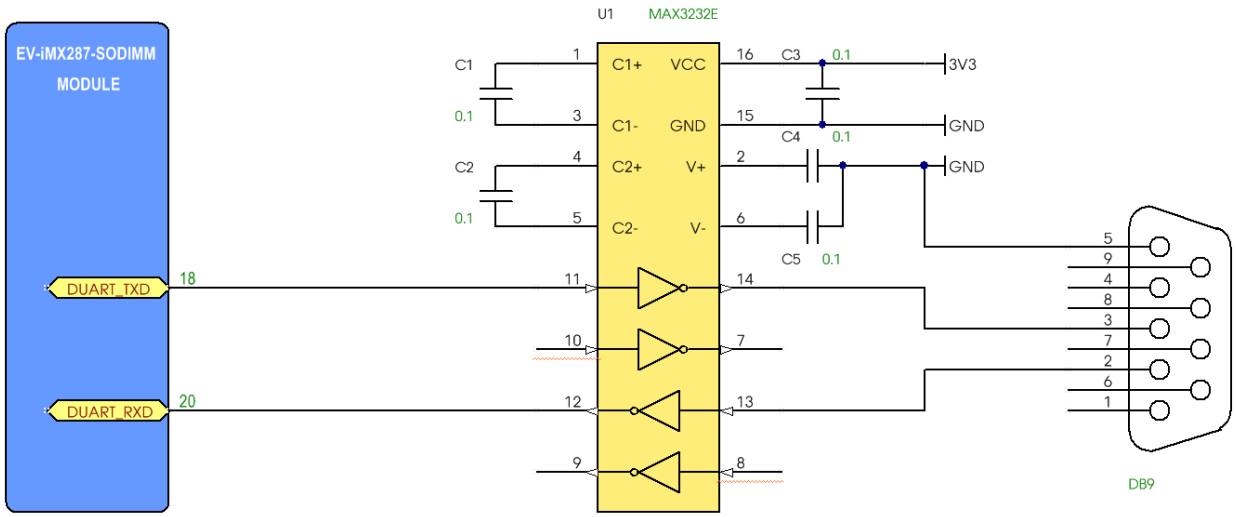
All signals of the module (except for the differential pairs) have 3.3V levels. To connect to 1.8V/5.0V peripheral use the level converter.

POWER

To power the module 5V is used. Pins 1,2,3, 4, 5, 6 need 5V. Ground leads 7, 8, 54, 87, 88, 97, 115, 140, 183, 196, 199, 200 must be connected to the ground. The board has LDO (linear stabilizer with low dropout) with an output voltage 3.3V, which is used to power the chip Ethernet of PHY module. This voltage is present at the output of module 159, 165 and can be used to power low-voltage chips of your board.

DUART INTERFACE

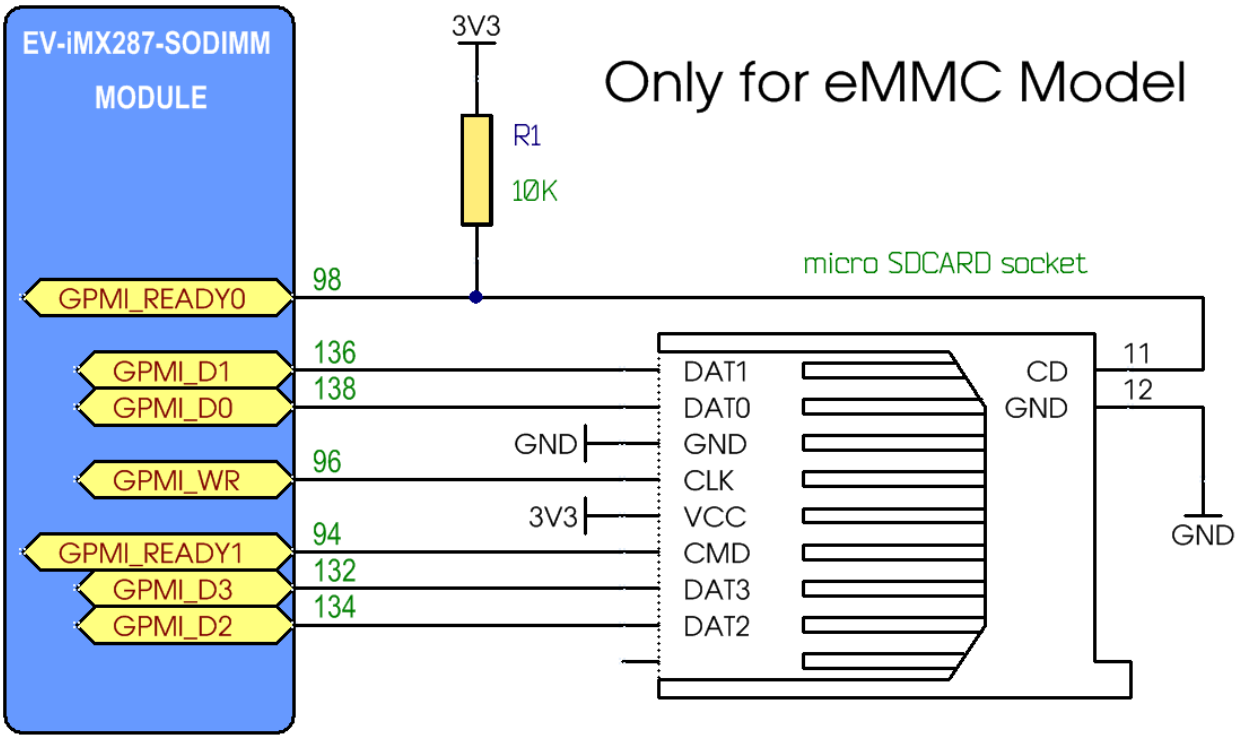
For debugging the DUART is used. Output DUART_TXD (the pin 18 module) and input DUART_RXD (pin 20 module) can be connected to the chip MAX3232 (or equivalent) in the typical application. Also, you can use any UART-USB chip (FT232, PL2303 etc.).



SDMMC INTERFACE

SD / MMC card holder located on the module is connected to the port SSP0. Memory chip e-MMC is connected to the same port. Simultaneous operation of e-MMC and uSD cards is not possible. For NAND Flash modules there are no such restrictions.

If you want to connect more than one holder of SDMMC cards such interfaces as SSP1 / SSP2 / SSP3 can be used. SSP1 which has overall outputs with interface GPMI. In this case, the simultaneous operation of NAND Flash and a card connected to SSP1 is not possible. Interfaces SSP0 and SSP1 can operate in 1/4/8-bit modes, interfaces SSP2 and SSP3 only support 1 and 4-bit modes.



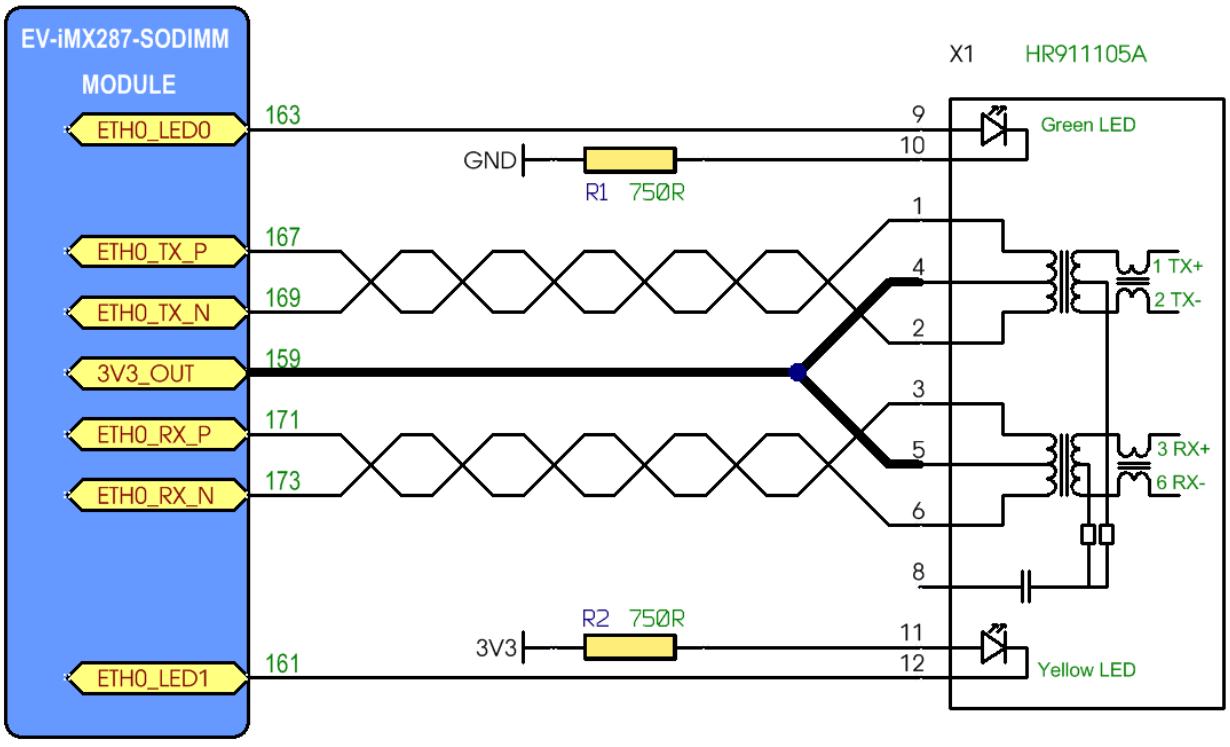
ETHERNET CONNECTION

A chip of physical layer (Ethernet PHY) LAN8720A is installed on the module board. Differential pairs RX/TX and LED control signals are output to the slot. To reduce the occupied space use the slots RJ-45 with integrated transformers, for example HR911105A. You can also use a set of transformer, for example H1102 and RJ-45 connector.

Table 4.

Module pin	HR911105A pin	Signal
167	1	TX+
169	2	TX-
171	3	RX+
172	6	RX-
183	8	GND
165	4,5	3.3B
163	9	LED0
161	11	LED1
	10	Via 510R to GND
	12	Via 510R to 3V3

Attention! Do not change the circuit and the polarity of LEDs, as outputs LED0 / LED1 are used when you reset the configuration to the chip LAN8720.



The boards with the processor iMX287 are possible to connect the second interface Ethernet. Chip PHY, such as LAN8720 can be connected to signals RMII interface ENET1, which are derived on the slots. Table connection is shown below:

Table 5.

Module pin	LAN8720 pin	Signal
62	15	ENET1_RST
76	17	ENET1_TXD0
74	18	ENET1_TXD1
70	8	ENET1_RXD0
72	7	ENET1_RXD1
68	11	ENET1_RX_EN
66	16	ENET1_TX_EN
64	5	ENET1_CLK
60	14	ENET1_INT
56	12	ENET1_MDIO
58	13	ENET1_MDC

Attention! If you connect a second Ethernet PHY chip set it address 01, pulling the output RXER / RHYAD0 to 3.3.V. Address 00 is used in installed chip LAN8720 on the module board.

USB INTERFACE

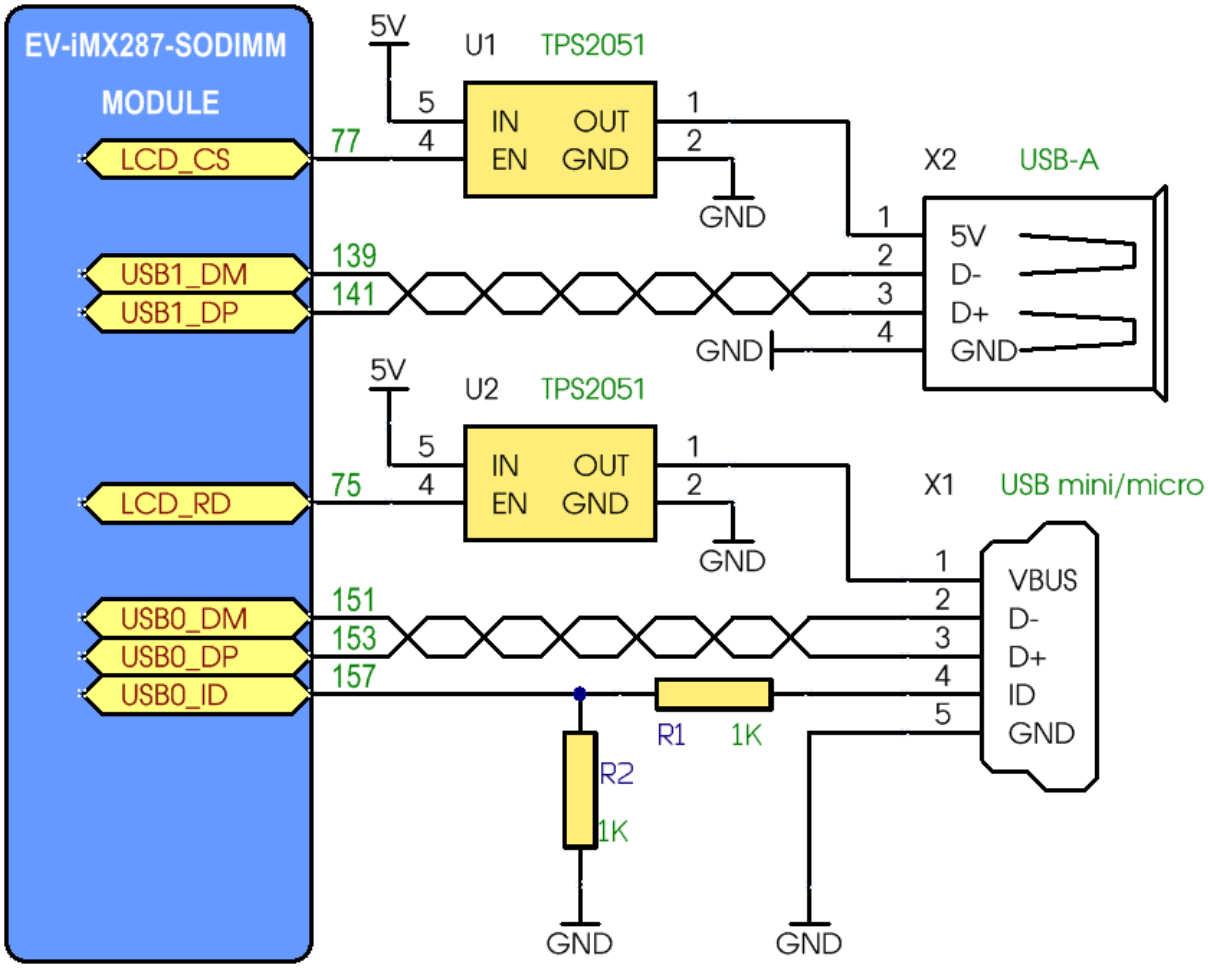
On the contact module the signals of two interfaces USB are displayed. USB0 can be used as Host/Device, USB1 only as HOST.

Table 6.

Module pin	Signal	Description
153	USB0_D+	
151	USB0_D-	
157	USB0_ID	Connect USB_ID to 3V3 via 1K resistor to set Device Mode. Connect USB_ID to GND via 1K resistor to set HOST Mode.
197	USB0_OVC	
141	USB1_D+	
139	USB1_D-	
195	USB1_OVC	

To the signals USB_OVC also can be connected the output signals "Overload» (Overcurrent) keys (eg TPS2051) commuting 5V applied to the slot of USB. As provided by BSP to power management are used such signals USB0_PWR_EN (the output of module 75) and USB1_PWR_EN (the output of module 77).

EV-iMX287-SODIMM Module

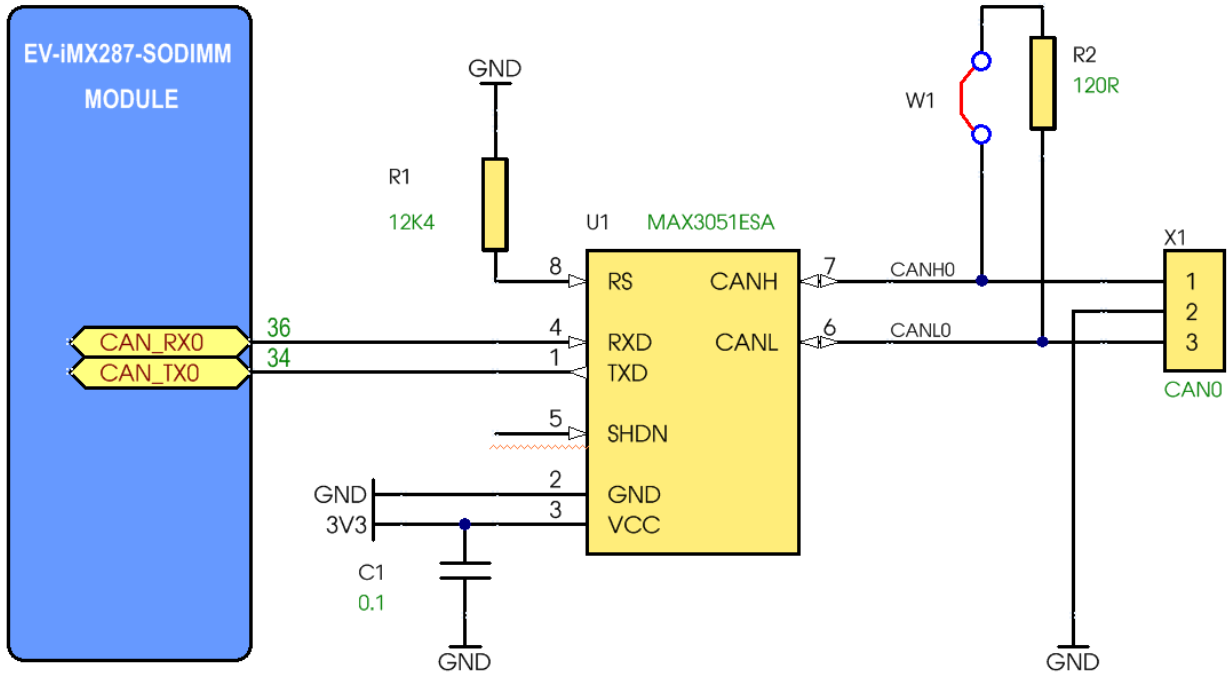


CAN INTERFACE

The boards with processor iMX287 possible to use two interfaces CAN. The processor iMX283 interface CAN is not available. You can use any 3.3V CAN bus transceivers, such as MAX3051, 65HVD230 etc.

Table 7.

Module pin	Signal
34	CAN0_TX
36	CAN0_RX
38	CAN1_TX
40	CAN1_RX

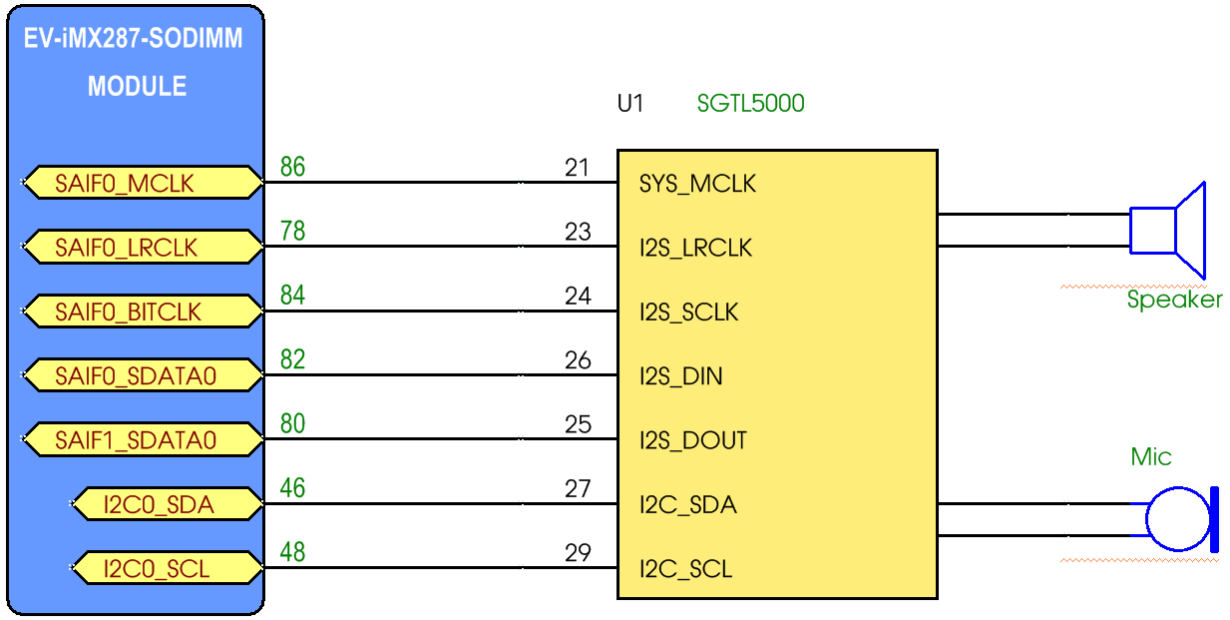


AUDIOINTERFACE

Standard signals DIN, DOUT, MCLK, BCLK, WCLK, SDA, SCL output to the module contacts. We recommend using an inexpensive audio codec SGTL5000 manufactured by Freescale.

Table 8.

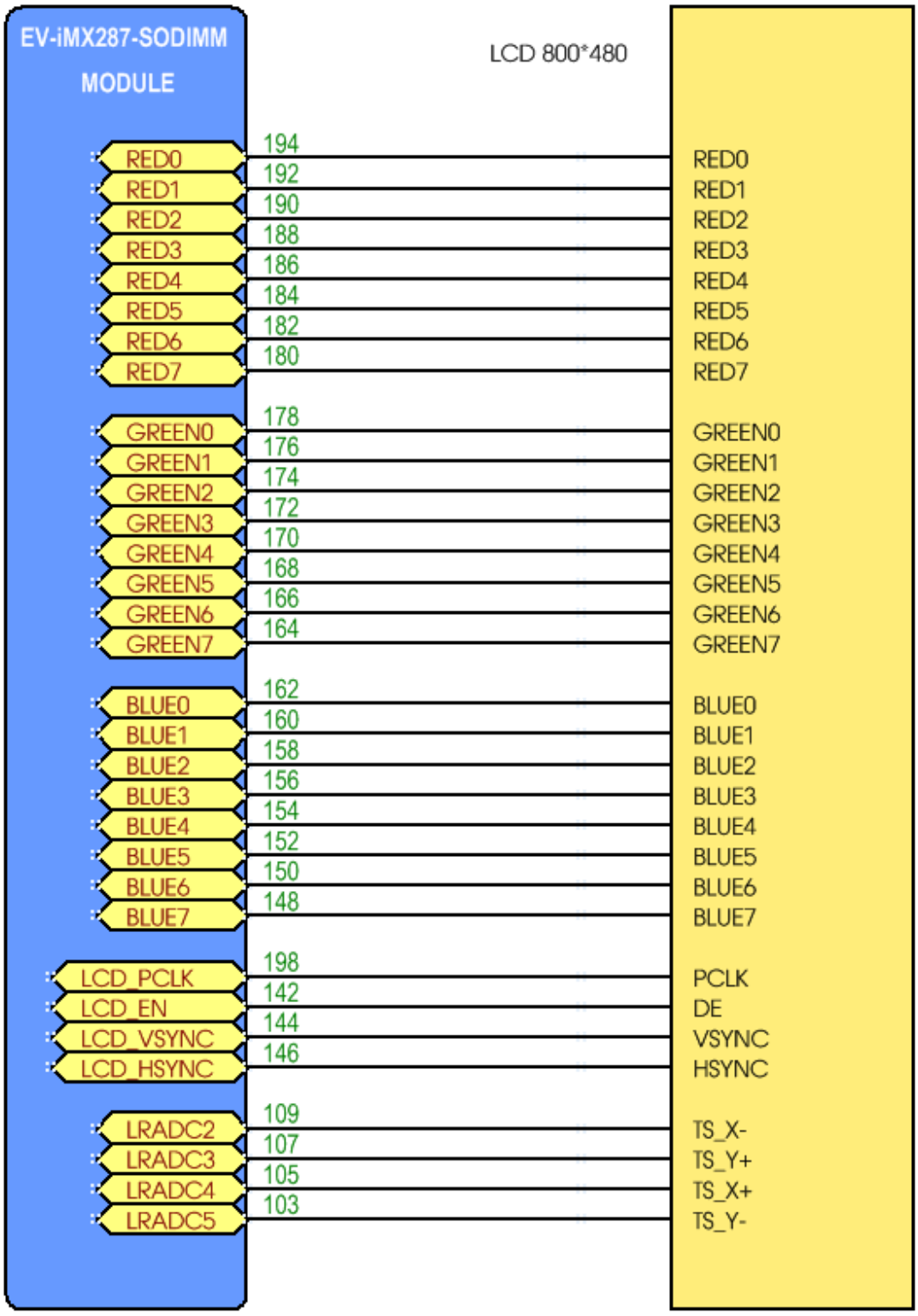
Module pin	SGTL5000 pin (32QFN)	Signal
86	21	SAIF0_MCLK
78	23	SAIF0_LRCLK
84	24	SAIF0_BITCLK
80	25	SAIF1_SDATA0
82	26	SAIF0_SDATA0
48	29	I2C0_SCL
46	27	I2C0_SDA



The module also has an output SPDIF (the output of module 49) that can be used for digital sound.

LCD INTERFACE

The standard interface allows you to connect any of RGB TFT panel interface with a maximum resolution of 800 * 480 pixels. To connect a resistive touch panel may be used in embedded processor ADC.



KERNEL AND ROOT FILE SYSTEM RESTORING

The operation is performed on the computer with OS Windows. Unzip Ev-iMX2xx. Connect the USB cable to the computer and to the upper USB socket connector (USB0 OTG), set the boot from USB (position DIP SWITCH – all OFF), connect the power to the board. Windows should determine the board as HID device. Run MfgTool.exe. In the drop list select MX28 Linux Update. Go to the Options-Configurations and choose EV-iMX287-SODIMM-NAND or EV-iMX287-SODIMM-eMMC, click Ok. Now click Start button and wait for the reports of successful programming.

REFERENCES

Table 9.

Link	Description
IMX287CEC	i.MX28 Datasheet
IMX28CE	i.MX28 Errata
MCIMX28RM	Processor Reference Manual
K4T1G164 DDR2	DDR2 Datasheet
S34ML04G100 NAND Flash	NAND Flash Datasheet
LAN8720A Ethernet PHY	Ethernet PHY
24AA01 EEPROM	I2C EEPROM
MX25L6406E	SPI Flash
Altium Designer motherboard project	
Schematic of motherboard (pdf)	

WEB

Web site: www.evodbg.com

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If you need to change the design of this board, please contact pcb@evodbg.com

DOCUMENT IMPROVEMENTS

05/02/2014 – Initial revision 1.0