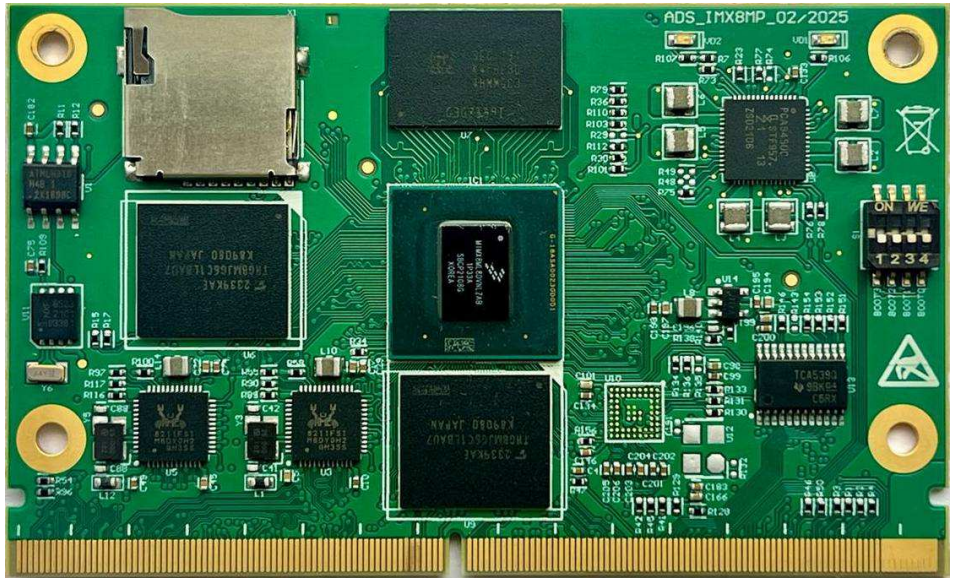
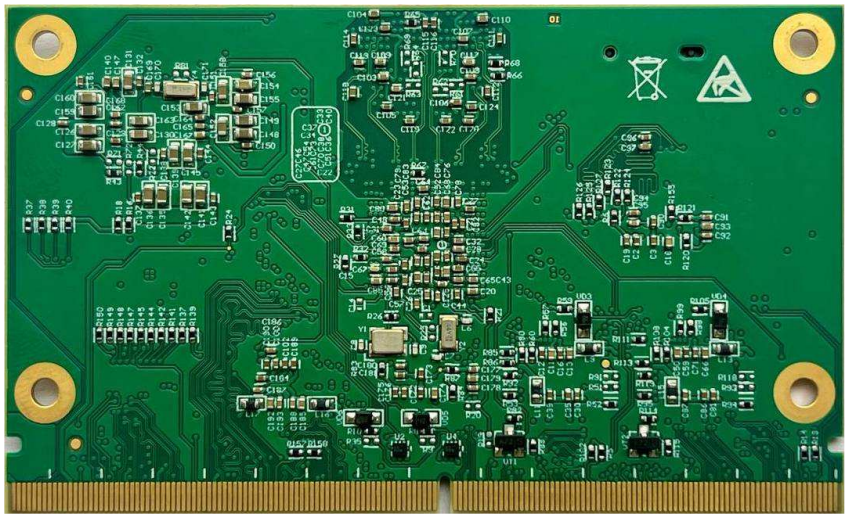
ADS_IMX8MP_v0.1

SMARC 2.1



Модуль разработан на основе современного технологичного процессора NXP iMX8M Plus. Предназначен для высокопроизводительных вычислительных систем. 4GB оперативной памяти LPDDR4 обеспечивают быструю работу модуля. Для размещения операционной системы и хранения данных используется память eMMC (8/16/32/64GB). Вторая микросхема памяти eMMC, продублированная с разъемом uSD карты, позволяет хранить данные, независимо от ОС. Стандартизированный краевой разъем SMARC 2.1 гарантируют надежное соединение модуля с основной платой и позволяют использовать максимальное количество интерфейсов процессора iMX8M Plus.



Внешний вид модуля с обратной стороны

Питание: DC 5В;

Рабочая температура:

• MIMX8ML8DVNLZAB (1.8GHz): –0°C..+95°C;

• MIMX8ML8CVNKZAB (1.6GHz): –40°C..+105°C;

i.MX 8M Plus Quad 4x Arm® Cortex®-A53 VPU, NPU, ISP, HiFi 4

Габариты: 82x50мм; ***Вес:*** **~30**г;

CPU

Cortex®-A53 MPCore platform
Quad Cortex®-A53 processors operation up to 1.8 GHz
• 32 KB L1 Instruction Cache
• 32 KB L1 Data Cache
• Media Processing Engine (MPE) with Arm® NEONTM technology supporting the Advanced Single Instruction Multiple Data architecture
• Floating Point Unit (FPU) with support of the Arm® VFPv4-D16 architecture
Support of 64-bit Arm® v8-A architecture
512 KB unified L2 cache

Cortex®-M7 core platform
• Microcontroller available for customer application
• Real-time processing
• Cortex®-A53 complex off loading
• Low power operation
Cortex®-M7 CPU operating up to 800 MHz
• 32 KB L1 Instruction Cache
• 32 KB L1 Data Cache
• 256 KB tightly coupled memory (TCM)

ISP (Image Sensor Processor)

375 Mpixel/s HDR ISP supporting configurations, such as 12MP@30fps, 4kp45, or 2x 1080p80

GPU (Graphic Processing Unit)

• GC7000UL with OpenCL and Vulkan support
• 2 shaders
• 166 million triangles/sec
• 1.0 giga pixel/sec
• 16 GFLOPs 32-bit
• Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan

Интерфейсы:

• HDMI TX – 1

• MIPI CSI – 1 or 2 (CSI1 – x4Lane, CSI0 – x2Lane)

• LVDS – 1 (2 channel)

• DP – 1 (DSI2DP chip)

• Gigabit Ethernet – 2

• x1Lane PCIe – 1

• USB 3.0 – 2

• USB 2.0 – 2

• 4–bits SDIO 3.0 – 1

• CAN – 2

• UART – 3 (+ Console)

• SPI – 1

• QSPI – 1

• I2C – 4

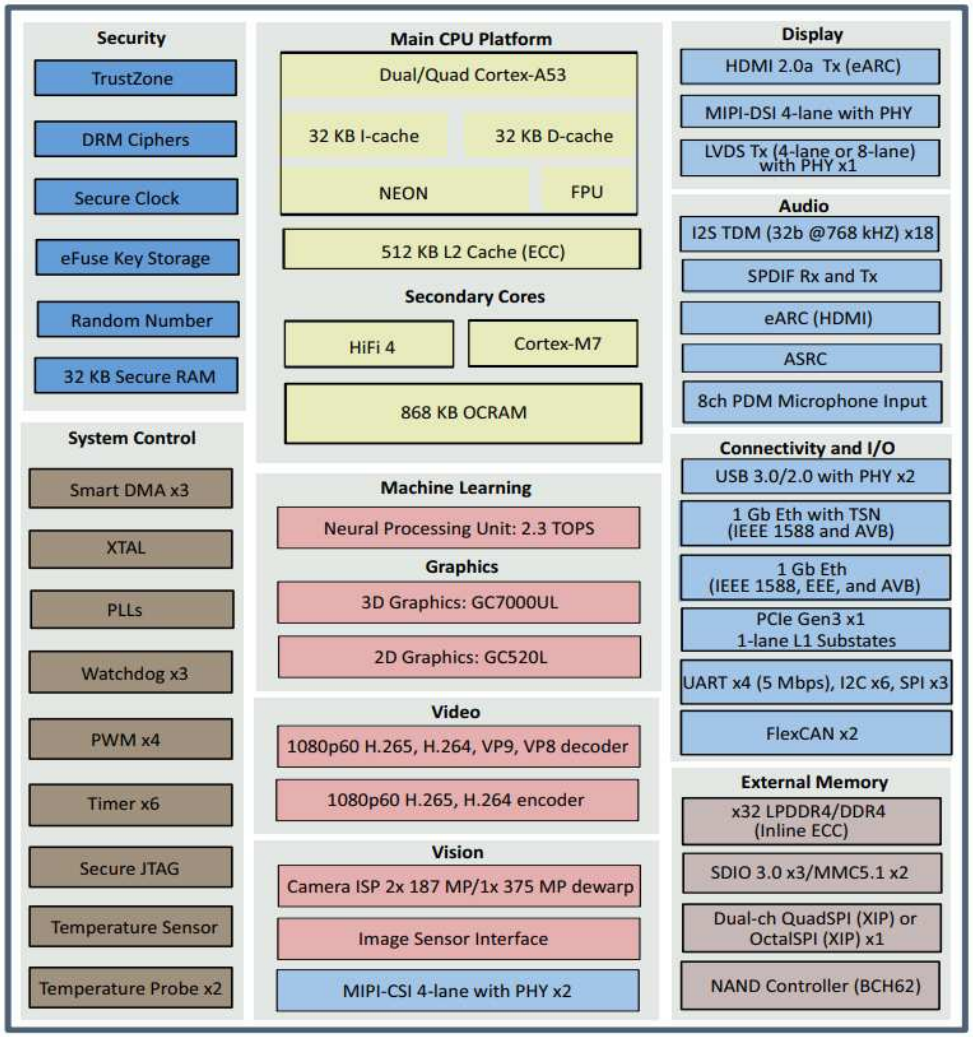
• I2S – 2

• GPIO – >14

• Core clock frequency of 1000 MHz • Shader clock frequency of 1000 MHz • GC520L for 2D acceleration • Render target compatibility between 3D and 2D GPU (super tile status buffer) ## NPU (Neutral Processing Unit) 2.3 TOP/s Neural Network performance • Keyword detect, noise reduction, beamforming • Speech recognition (i.e. Deep Speech 2) • Image recognition (i.e. ResNet-50) ## VPU (Video Processing Unit) ***Video Decode*** • 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1) • 1080p60 VP9 Profile 0, 2 • 1080p60 VP8 • 1080p60 AVC/H.264 Baseline, Main, High decoder ***Video Encode*** • 1080p60 AVC/H.264 encoder • 1080p60 HEVC/H.265 encoder ## Memory • 4GB/8GB LPDDR4; • 8GB – 64GB eMMC;	

Наименование компонентов на плате

Позиционное обозначение	Описание	Partnumber
IC1	CPU	MIMX8ML8DVNLZAB/MIMX8ML8CVNKZAB
U7	LPDDR4	MT53D1024M32D4DT-053 AIT:D
U9	eMMC	THGBMJG6C1LBAU7
X1/U6	uSD or eMMC	Connector or THGBMJG6C1LBAU7
U8	PMIC	PCA9450CHNY
U14	DC/DC	SY8089AAC
U3, U5	Ethernet PHY 10/100/1000	RTL8211FSI-VS-CG
U1	EEPROM	AT24HC04BN-SH-B (I2C addr 000)
U10	DSI2DP	SN65DSI86ZXHR (I2C addr 0)
U13	GPIO Expander	TPT29555-TS5R/TCA9539QPWRQ1 (I2C addr 001)
U11	RTC	PCF8523TK
U2, U4	Level Translator	FXMAR2102UMX



Функциональная схема iMX8M Plus

Таблицы распределения интерфейсов

Pad types: I = input, O = output, I/O = input/output (bidirectional), G= Ground,
P = power supply, DOWN (d) = Internal pull down, UP (u) = Internal pull up, z = Tri–State

PIN	Pin definition	Pad type	Ext IO Pull	IO Power domain	iMX8M Plus Pin name	iMX8M Plus Pin number
P1	SMB_ALERT# **(NC)**	–	–	–	–	–
P2	GND	G	–	GND	–	–
P3	CSI1_CK+	I	–	–	MIPI_CSI2_CLK_P	A23
P4	CSI1_CK–	I	–	–	MIPI_CSI2_CLK_N	B23
P5	GBE1_SDP	I/O	3V3	–	(RTL8211FSI–VS – PTP_CLKIN/GPIO0)	(RTL8211FSI–VS – 33)
P6	GBE0_SDP	I/O	3V3	–	(RTL8211FSI–VS – PTP_CLKIN/GPIO0)	(RTL8211FSI–VS – 33)
P7	CSI1_RX0+	I	–	–	MIPI_CSI2_D0_P	A25
P8	CSI1_RX0–	I	–	–	MIPI_CSI2_D0_N	B25
P9	GND	G	–	GND	–	–
P10	CSI1_RX1+	I	–	–	MIPI_CSI2_D1_P	A24
P11	CSI1_RX1–	I	–	–	MIPI_CSI2_D1_N	B24
P12	GND	G	–	GND	–	–
P13	CSI1_RX2+	I	–	–	MIPI_CSI2_D2_P	A22
P14	CSI1_RX2–	I	–	–	MIPI_CSI2_D2_N	B22
P15	GND	G	–	GND	–	–
P16	CSI1_RX3+	I	–	–	MIPI_CSI2_D3_P	A21
P17	CSI1_RX3–	O	–	–	MIPI_CSI2_D3_N	B21
P18	GND	G	–	GND	–	–
P19	GBE0_MDI3–	I/O	–	–	–	–
P20	GBE0_MDI3+	I/O	–	–	–	–
P21	GBE0_LINK100#	O	PD 4k7	3V3	(RTL8211FSI–VS – LED1/CFG_LDO0)	(RTL8211FSI–VS – 36)
P22	GBE0_LINK1000#	O	PU 4k7	3V3	(RTL8211FSI–VS – LED2/CFG_LDO1)	(RTL8211FSI–VS – 37)
P23	GBE0_MDI2–	I/O	–	–	–	–
P24	GBE0_MDI2+	I/O	–	–	–	–
P25	GBE0_LINK_ACT#	O	PU 4k7	3V3	(RTL8211FSI–VS – LED0/PHYAD0)	(RTL8211FSI–VS – 35)
P26	GBE0_MDI1–	I/O	–	–	–	–
P27	GBE0_MDI1+	I/O	–	–	–	–
P28	GBE0_CTREF **(NC)**	–	–	–	–	–
P29	GBE0_MDI0–	I/O	–	–	–	–
P30	GBE0_MDI0+	I/O	–	–	–	–
P31	SPI0_CS1#	O	–	1V8	GPIO3_20	AD14
P32	GND	G	–	GND	–	–
P33	SDIO_WP	I	–	NVCC_SD2	GPIO2_20	AC26
P34	SDIO_CMD	I/O	–	NVCC_SD2	GPIO2_14	AB28
P35	SDIO_CD#	I	–	NVCC_SD2	GPIO2_12	AD29
P36	SDIO_CK	O	–	NVCC_SD2	GPIO2_13	AB29
P37	SDIO_PWR_EN	O	PU 4k7	NVCC_SD2	GPIO2_19	AD28

P38	GND	G	–	GND	–	–
P39	SDIO_D0	I/O	–	NVCC_SD2	GPIO2_15	AC28
P40	SDIO_D1	I/O	–	NVCC_SD2	GPIO2_16	AC29
P41	SDIO_D2	I/O	–	NVCC_SD2	GPIO2_17	AA26
P42	SDIO_D3	I/O	–	NVCC_SD2	GPIO2_18	AA25
P43	SPI0_CS0#	O	–	1V8	GPIO5_13	AJ22
P44	SPI0_CK	O	–	1V8	GPIO5_10	AH21
P45	SPI0_DIN	I	–	1V8	GPIO5_12	AH20
P46	SPI0_DO	O	–	1V8	GPIO5_11	AJ21
P47	GND	G	–	GND	–	–
P48	SATA_TX+ **(NC)**	–	–	–	–	–
P49	SATA_TX– **(NC)**	–	–	–	–	–
P50	GND	G	–	GND	–	–
P51	SATA_RX+ **(NC)**	–	–	–	–	–
P52	SATA_RX– **(NC)**	–	–	–	–	–
P53	GND	G	–	GND	–	–
P54	QSPI_CS0#	O	–	1V8	GPIO3_1	L26
P55	QSPI_CS1#	O	–	1V8	GPIO3_16	T28
P56	QSPI_CK	O	–	1V8	GPIO3_0	N25
P57	QSPI_IO_1	I	–	1V8	GPIO3_7	L25
P58	QSPI_IO_0	O	–	1V8	GPIO3_6	R25
P59	GND	G	–	GND	–	–
P60	USB0+ **(NC)**	I/O	–	–	–	–
P61	USB0– **(NC)**	I/O	–	–	–	–
P62	USB0_EN_OC# **(NC)**	I/O	–	–	–	–
P63	USB0_VBUS_DET **(NC)**	–	–	–	–	–
P64	USB0_OTG_ID **(NC)**	–	–	–	–	–
P65	USB1+ **(NC)**	I/O	–	–	–	–
P66	USB1– **(NC)**	I/O	–	–	–	–
P67	USB1_EN_OC# **(NC)**	I/O	–	–	–	–
P68	GND	G	–	GND	–	–
P69	USB2+	I/O	–	–	USB2_D_P	D14
P70	USB2–	I/O	–	–	USB2_D_N	E14
P71	USB2_EN_OC#	I/O	PU 10k	3V3	GPIO1_14 (EN) / GPIO1_15 (OC)	A4/B5
P72	RSVD **(NC)**	–	–	–	–	–
P73	RSVD **(NC)**	–	–	–	–	–
P74	USB3_EN_OC#	I/O	PU 10k	3V3	GPIO1_12 (EN)/ GPIO1_13(OC)	A5/A6
P75	PCIE_A_RST#	O	PU 10k	3V3	GPIO1_11	D8
P76	USB4_EN_OC# **(NC)**	–	–	–	–	–
P77	PCIE_B_CKREQ# **(NC)**	I/O	–	–	–	–
P78	PCIE_A_CKREQ#	I/O	PU 10k	3V3	GPIO4_22	AJ16
P79	GND	G	–	GND	–	–
P80	PCIE_C_REFCK+ **(NC)**	O	–	–	–	–
P81	PCIE_C_REFCK– **(NC)**	O	–	–	–	–

P82	GND	G	–	GND	–	–
P83	PCIE_A_REFCK+	O	–	–	PCIE_REF_PAD_CLK_P	D16
P84	PCIE_A_REFCK–	O	–	–	PCIE_REF_PAD_CLK_N	E16
P85	GND	G	–	GND	–	–
P86	PCIE_A_RX+	I	–	–	PCIE_RXN_P	A14
P87	PCIE_A_RX–	I	–	–	PCIE_RXN_N	B14
P88	GND	G	–	GND	–	–
P89	PCIE_A_TX+	O	–	–	PCIE_TXN_P	A15
P90	PCIE_A_TX–	O	–	–	PCIE_TXN_N	B15
P91	GND	G	–	GND	–	–
P92	HDMI_D2+ / DP1_LANE0+	O	–	–	HDMI_TX2_P	AH27
P93	HDMI_D2– / DP1_LANE0–	O	–	–	HDMI_TX2_N	AJ27
P94	GND	G	–	GND	–	–
P95	HDMI_D1+ / DP1_LANE1+	O	–	–	HDMI_TX1_P	AH26
P96	HDMI_D1– / DP1_LANE1–	O	–	–	HDMI_TX1_N	AJ26
P97	GND	G	–	GND	–	–
P98	HDMI_D0+ / DP1_LANE2+	O	–	–	HDMI_TX0_P	AH25
P99	HDMI_D0– / DP1_LANE2–	O	–	–	HDMI_TX0_N	AJ25
P100	GND	G	–	GND	–	–
P101	HDMI_CK+ / DP1_LANE3+	O	–	–	HDMI_TXC_P	AH24
P102	HDMI_CK– / DP1_LANE3–	O	–	–	HDMI_TXC_N	AJ24
P103	GND	G	–	GND	–	–
P104	HDMI_HPD / DP1_HPD	I	PD 1M	1V8	HDMI_HPD	AE22
P105	HDMI_CTRL_CK / DP1_AUX+	I/O	PU 100k	1V8	HDMI_DDC_SCL	AC22
P106	HDMI_CTRL_DAT / DP1_AUX–	I/O	PU 100k	1V8	HDMI_DDC_SDA	AF22
P107	DP1_AUX_SEL **(CEC)**	–	PU 100k	1V8	HDMI_CEC	AD22
P108	GPIO0 / CAM0_PWR#	I/O	PU 510k	1V8	P00	GPIO_EXP
P109	GPIO1 / CAM1_PWR#	I/O	PU 510k	1V8	P01	GPIO_EXP
P110	GPIO2 / CAM0_RST#	I/O	PU 510k	1V8	P02	GPIO_EXP
P111	GPIO3 / CAM1_RST#	I/O	PU 510k	1V8	P03	GPIO_EXP
P112	GPIO4 / HDA_RST#	I/O	PU 510k	1V8	P04	GPIO_EXP
P113	GPIO5 / PWM_OUT	I/O	PU 510k	1V8	GPIO1_1	E8
P114	GPIO6 / TACHIN	I/O	PU 510k	1V8	GPIO1_8	A8
P115	GPIO7	I/O	PU 510k	1V8	P05	GPIO_EXP
P116	GPIO8	I/O	PU 510k	1V8	P06	GPIO_EXP
P117	GPIO9	I/O	PU 510k	1V8	P07	GPIO_EXP
P118	GPIO10	I/O	PU 510k	1V8	P10	GPIO_EXP
P119	GPIO11	I/O	PU 510k	1V8	P11	GPIO_EXP
P120	GND	G	–	GND	–	–
P121	I2C_PM_CK	I/O	PU 2k2	1V8	GPIO5_14	AC8
P122	I2C_PM_DAT	I/O	PU 2k2	1V8	GPIO5_15	AH7
P123	BOOT_SEL0#	I	PU 10k	1V8	BOOT_MODE0	G10
P124	BOOT_SEL1#	I	PU 10k	1V8	BOOT_MODE1	F8
P125	BOOT_SEL2#	I	PU 10k	1V8	BOOT_MODE2	G8

P126	RESET_OUT#	O	PU 100k	1V8	POR_B CPU & POR_B PMIC	J29 & PMIC (9)
P127	**RESET_IN#**	I	INT PMIC PU	**LDO1 (1V8)**	PMIC_RST_B	PMIC (8)
P128	**POWER_BTN#**	I	PU 100k	**1V8**	ONOFF	G22
P129	SER0_TX	O	–	1V8	GPIO5_23	AJ3
P130	SER0_RX	I	PU 100k	1V8	GPIO5_22	AD6
P131	SER0_RTS#	O	–	1V8	GPIO5_26	AE6
P132	SER0_CTS#	I	PU 100k	1V8	GPIO5_27	AJ4
P133	GND	G	–	GND	–	–
P134	SER1_TX	O	–	1V8	GPIO5_25	AH4
P135	SER1_RX	I	PU 100k	1V8	GPIO5_24	AF6
P136	SER2_TX	O	–	1V8	GPIO5_7	AC20
P137	SER2_RX	I	PU 100k	1V8	GPIO5_6	AF20
P138	SER2_RTS#	O	–	1V8	GPIO5_8	AD20
P139	SER2_CTS#	I	PU 100k	1V8	GPIO5_9	AE20
P140	SER3_TX	O	–	1V8	GPIO5_29	AH5
P141	SER3_RX	I	PU 100k	1V8	GPIO5_28	AJ5
P142	GND	G	–	GND	–	–
P143	CAN0_TX	O	–	1V8	GPIO3_22	AD16
P144	CAN0_RX	I	–	1V8	GPIO3_23	AF16
P145	CAN1_TX	O	–	1V8	GPIO3_24	AE14
P146	CAN1_RX	I	–	1V8	GPIO4_B4_d	
P147	VDD_IN	P	–	4.75V…5.25V	GPIO3_25	AF14
P148	VDD_IN	P	–	4.75V…5.25V	–	–
P149	VDD_IN	P	–	4.75V…5.25V	–	–
P150	VDD_IN	P	–	4.75V…5.25V	–	–
P151	VDD_IN	P	–	4.75V…5.25V	–	–
P152	VDD_IN	P	–	4.75V…5.25V	–	–
P153	VDD_IN	P	–	4.75V…5.25V	–	–
P154	VDD_IN	P	–	4.75V…5.25V	–	–
P155	VDD_IN	P	–	4.75V…5.25V	–	–
P156	VDD_IN	P	–	4.75V…5.25V	–	–

Pad types: I = input, O = output, I/O = input/output (bidirectional), G= Ground,
P = power supply, DOWN (d) = Internal pull down, UP (u) = Internal pull up, z = Tri–State

PIN	Pin definition	Pad type	Ext IO Pull	IO Power domain	iMX8M Plus Pin name	iMX8M Plus Pin number
S1	CSI1_TX+ / I2C_CAM1_CK	I/O	PU 2k2	1V8	GPIO5_18 (I2C_CAM1_CK)	AJ7
S2	CSI1_TX– / I2C_CAM1_DAT	I/O	PU 2k2	1V8	GPIO5_19 (I2C_CAM1_DAT)	AJ6
S3	GND	G	–	GND	–	–
S4	RSVD **(NC)**	–	–	–	–	–
S5	I2C_CAM0_CK / CSI0_TX+	I/O	PU 2k2	1V8	GPIO5_20 (I2C_CAM0_CK)	AF8
S6	CAM_MCK	O	–	1V8	GPIO3_19	AC14

S7	I2C_CAM0_DAT / CSI0_TX–	I/O	PU 2k2	1V8	GPIO5_21 (I2C_CAM0_DAT)	AD8
S8	CSI0_CK+	I	–	–	MIPI_CSI1_CLK_P	D22
S9	CSI0_CK–	I	–	–	MIPI_CSI1_CLK_N	E22
S10	GND	G	–	GND	–	–
S11	CSI0_RX0+	I	–	–	MIPI_CSI1_D0_P	D18
S12	CSI0_RX0–	I	–	–	MIPI_CSI1_D0_N	E18
S13	GND	G	–	GND	–	–
S14	CSI0_RX1+	I	–	–	MIPI_CSI1_D1_P	D20
S15	CSI0_RX1–	I	–	–	MIPI_CSI1_D1_N	E20
S16	GND	G	–	GND	–	–
S17	GBE1_MDI0+	I/O	–	–	–	–
S18	GBE1_MDI0–	I/O	–	–	–	–
S19	GBE1_LINK100#	O	PD 4k7	3V3	(RTL8211FSI–VS – LED1/CFG_LDO0)	(RTL8211FSI–VS – 36)
S20	GBE1_MDI1+	I/O	–	–	–	–
S21	GBE1_MDI1–	I/O	–	–	–	–
S22	GBE1_LINK1000#	O	PU 4k7	3V3	(RTL8211FSI–VS – PTP_CLKIN/GPIO0)	(RTL8211FSI–VS – 37)
S23	GBE1_MDI2+	I/O	–	–	–	–
S24	GBE1_MDI2–	I/O	–	–	–	–
S25	GND	G	–	GND	–	–
S26	GBE1_MDI3+	I/O	–	–	–	–
S27	GBE1_MDI3–	I/O	–	–	–	–
S28	GBE1_CTREF **(NC)**	–	–	–	–	–
S29	PCIE_D_TX+ / SERDES_0_TX+ **(NC)**	–	–	–	–	–
S30	PCIE_D_TX– / SERDES_0_TX– **(NC)**	–	–	–	–	–
S31	GBE1_LINK_ACT#	O	PD 4k7	3V3	(RTL8211FSI–VS – LED0/PHYAD0)	(RTL8211FSI–VS – 35)
S32	PCIE_D_RX+ / SERDES_0_RX+ **(NC)**	–	–	–	–	–
S33	PCIE_D_RX– / SERDES_0_RX– **(NC)**	–	–	–	–	–
S34	GND	G	–	GND	–	–
S35	USB4+ **(NC)**	–	–	–	–	–
S36	USB4– **(NC)**	–	–	–	–	–
S37	USB3_VBUS_DET	I	PD	5V	USB1_VBUS	A11
S38	AUDIO_MCK	O	–	1V8	GPIO4_27	AJ15
S39	I2S0_LRCK	I/O	–	1V8	GPIO4_24	AJ17
S40	I2S0_SDOUT	O	–	1V8	GPIO4_26	AH16
S41	I2S0_SDIN	I	–	1V8	GPIO4_23	AJ14
S42	I2S0_CK	I/O	–	1V8	GPIO4_25	AH15
S43	ESPI_ALERT0# **(NC)**	–	–	–	–	–
S44	ESPI_ALERT1# **(NC)**	–	–	–	–	–
S45	MDIO_CLK **(NC)**	–	–	–	–	–
S46	MDIO_DAT **(NC)**	–	–	–	–	–
S47	GND	G	–	GND	–	–
S48	I2C_GP_CK	I/O	PU 2k2	1V8	GPIO5_3	AE18
S49	I2C_GP_DAT	I/O	PU 2k2	1V8	GPIO5_4	AD18
S50	**I2S2_LRCK** / HDA_SYNC	I/O	–	1V8	GPIO4_31	AC16

S51	**I2S2_SDOUT** / HDA_SDO	O	–	1V8	GPIO5_1	AH18
S52	**I2S2_SDIN** / HDA_SDI	I	–	1V8	GPIO4_30	AF18
S53	**I2S2_CK** / HDA_CK	I/O	–	1V8	GPIO5_0	AH19
S54	SATA_ACT# **(NC)**	–	–	–	–	–
S55	USB5_EN_OC# **(NC)**	–	–	–	–	–
S56	ESPI_IO_2 / **QSPI_IO_2**	I/O	–	1V8	GPIO3_8	L24
S57	ESPI_IO_3 / **QSPI_IO_3**	I/O	–	1V8	GPIO3_9	N24
S58	ESPI_RESET# **(NC)**	–	–	–	–	–
S59	USB5+ **(NC)**	–	–	–	–	–
S60	USB5– **(NC)**	–	–	–	–	–
S61	GND	G	–	GND	–	–
S62	USB3_SSTX+	O	–	–	USB1_TX_P	A10
S63	USB3_SSTX–	O	–	–	USB1_TX_N	B10
S64	GND	G	–	GND	–	–
S65	USB3_SSRX+	I	–	–	USB1_RX_P	A9
S66	USB3_SSRX–	I	–	–	USB1_RX_N	B9
S67	GND	G	–	GND	–	–
S68	USB3+	I/O	–	–	USB1_D_P	D10
S69	USB3–	I/O	–	–	USB1_D_N	E10
S70	GND	G	–	GND	–	–
S71	USB2_SSTX+	O	–	–	USB2_TX_P	A13
S72	USB2_SSTX–	O	–	–	USB2_TX_N	B13
S73	GND	G	–	GND	–	–
S74	USB2_SSRX+	I	–	–	USB2_RX_P	A12
S75	USB2_SSRX–	I	–	–	USB2_RX_N	B12
S76	PCIE_B_RST# **(NC)**	–	–	–	–	–
S77	PCIE_C_RST# **(NC)**	–	–	–	–	–
S78	PCIE_C_RX+ / SERDES_1_RX+ **(NC)**	–	–	–	–	–
S79	PCIE_C_RX– / SERDES_1_RX– **(NC)**	–	–	–	–	–
S80	GND	G	–	GND	–	–
S81	PCIE_C_TX+ / SERDES_1_TX+ **(NC)**	–	–	–	–	–
S82	PCIE_C_TX– / SERDES_1_TX– **(NC)**	–	–	–	–	–
S83	GND	G	–	GND	–	–
S84	PCIE_B_REFCK+ **(NC)**	–	–	–	–	–
S85	PCIE_B_REFCK– **(NC)**	–	–	–	–	–
S86	GND	G	–	GND	–	–
S87	PCIE_B_RX+ **(NC)**	–	–	–	–	–
S88	PCIE_B_RX– **(NC)**	–	–	–	–	–
S89	GND	G	–	GND	–	–
S90	PCIE_B_TX+ **(NC)**	–	–	–	–	–
S91	PCIE_B_TX– **(NC)**	–	–	–	–	–
S92	GND	G	–	GND	–	–
S93	DP0_LANE0+	O	–	–	ML0P	SN65DSI86 (F8)
S94	DP0_LANE0–	O	–	–	ML0N	SN65DSI86 (F9)

S95	DP0_AUX_SEL **(NC)**	–	–	–	–	–
S96	DP0_LANE1+	O	–	–	ML1P	SN65DSI86 (E8)
S97	DP0_LANE1–	O	–	–	ML1N	SN65DSI86 (E9)
S98	DP0_HPD	I	PD 1M	1V8	HPD	SN65DSI86 (J8)
S99	DP0_LANE2+ **(NC)**	–	–	–	–	–
S100	DP0_LANE2– **(NC)**	–	–	–	–	–
S101	GND	G	–	GND	–	–
S102	DP0_LANE3+ **(NC)**	–	–	–	–	–
S103	DP0_LANE3– **(NC)**	–	–	–	–	–
S104	USB3_OTG_ID	I	PU 4k7	3V3	GPIO1_10 (USB3_OTG_ID)	B7
S105	DP0_AUX+	I/O	PD 100k	3V3	AUXP	SN65DSI86 (H8)
S106	DP0_AUX–	I/O	PU 100k	3V3	AUXN	SN65DSI86 (H9)
S107	LCD1_BKLT_EN	O	–	1V8	GPIO1_7	F6
S108	**LVDS1_CK+** / eDP1_AUX+ / DSI1_CLK+	O	–	–	LVDS1_CLK_P	A28
S109	**LVDS1_CK–** / eDP1_AUX– / DSI1_CLK–	O	–	–	LVDS1_CLK_N	B28
S110	GND	G	–	GND	–	–
S111	**LVDS1_0+** / eDP1_TX0+ / DSI1_D0+	O	–	–	LVDS1_D0_P	A26
S112	**LVDS1_0–** / eDP1_TX0– / DSI1_D0–	O	–	–	LVDS1_D0_N	B26
S113	eDP1_HPD / DSI1_TE **(NC)**	–	–	–	–	–
S114	**LVDS1_1+** / eDP1_TX1+ / DSI1_D1+	O	–	–	LVDS1_D1_P	A27
S115	**LVDS1_1–** / eDP1_TX1– / DSI1_D1–	O	–	–	LVDS1_D1_N	B27
S116	LCD1_VDD_EN **(NC)**	–	–	–	–	–
S117	**LVDS1_2+** / eDP1_TX2+ / DSI1_D2+	O	–	–	LVDS1_D2_P	B29
S118	**LVDS1_2–** / eDP1_TX2– / DSI1_D2–	O	–	–	LVDS1_D2_N	C28
S119	GND	G	–	GND	–	–
S120	**LVDS1_3+** / eDP1_TX3+ / DSI1_D3+	O	–	–	LVDS1_D3_P	C29
S121	**LVDS1_3–** / eDP1_TX3– / DSI1_D3–	O	–	–	LVDS1_D3_N	D28
S122	LCD1_BKLT_PWM	O	–	1V8	GPIO5_2	AJ20
S123	GPIO13	I/O	PU 510k	1V8	P13	GPIO_EXP
S124	GND	G	–	GND	–	–
S125	**LVDS0_0+** / eDP0_TX0+ / DSI0_D0+	O	–	–	LVDS0_D0_P	D29
S126	**LVDS0_0–** / eDP0_TX0– / DSI0_D0–	O	–	–	LVDS0_D0_N	E28
S127	LCD0_BKLT_EN	O	–	1V8	GPIO1_6	A3
S128	**LVDS0_1+** / eDP0_TX1+ / DSI0_D1+	O	–	–	LVDS0_D1_P	E29
S129	**LVDS0_1–** / eDP0_TX1– / DSI0_D1–	O	–	–	LVDS0_D1_N	F28
S130	GND	G	–	GND	–	–
S131	**LVDS0_2+** / eDP0_TX2+ / DSI0_D2+	O	–	–	LVDS0_D2_P	G29
S132	**LVDS0_2–** / eDP0_TX2– / DSI0_D2–	O	–	–	LVDS0_D2_N	H28
S133	LCD0_VDD_EN	O	–	1V8	GPIO4_21	AH17
S134	**LVDS0_CK+** / eDP0_AUX+ / DSI0_CLK+	O	–	–	LVDS0_CLK_P	F29
S135	**LVDS0_CK–** / eDP0_AUX– / DSI0_CLK–	O	–	–	LVDS0_CLK_N	G28
S136	GND	G	–	GND	–	–
S137	**LVDS0_3+** / eDP0_TX3+ / DSI0_D3+	O	–	–	LVDS0_D3_P	H29
S138	**LVDS0_3–** / eDP0_TX3– / DSI0_D3–	O	–	–	LVDS0_D3_N	J28

S139	I2C_LCD_CK	I/O	PU 2k2	1V8	GPIO5_16	AH6
S140	I2C_LCD_DAT	I/O	PU 2k2	1V8	GPIO5_17	AE8
S141	LCD0_BKLT_PWM	O	–	1V8	GPIO5_5	AC18
S142	GPIO12	I/O	PU 510k	1V8	P12	GPIO_EXP
S143	GND	G	–	GND	–	–
S144	eDP0_HPD / DSI0_TE **(NC)**	–	–	–	–	–
S145	WDT_TIME_OUT#	O	PU 100k	1V8	GPIO1_2 CPU & WDOG_B PMIC	B6 & PMIC (28)
S146	PCIE_WAKE# **(NC)**	–	–	–	–	–
S147	VDD_RTC	P	–	VDD_RTC (3V)	(VBAT PCF8523TK)	–
S148	LID# **(NC)**	–	–	–	–	–
S149	SLEEP# **(NC)**	–	–	–	–	–
S150	VIN_PWR_BAD# **(NC)**	–	–	–	–	–
S151	CHARGING# **(NC)**	–	–	–	–	–
S152	CHARGER_PRSNT# **(NC)**	–	–	–	–	–
S153	CARRIER_STBY#	O	–	1V8	GPIO4_28	AJ19
S154	CARRIER_PWR_ON	O	–	1V8	GPIO2_8	AA28
S155	FORCE_RECOV# **(NC)**	–	–	–	–	–
S156	BATLOW# **(NC)**	–	–	–	–	–
S157	TEST# **(NC)**	–	–	–	–	–
S158	GND	G	–	GND	–	–

Напряжения VCCIO CPU

NVCC	Напряжение	Примечание
NVCC_JTAG	1V8	PMIC (LX5)
NVCC_NAND	1V8	PMIC (LX5)
NVCC_SAI1_SAI5	1V8	PMIC (LX5)
NVCC_SAI2_SAI3_SPDIF	1V8	PMIC (LX5)
NVCC_GPIO	1V8	PMIC (LX5)
NVCC_I2C_UART	1V8	PMIC (LX5)
NVCC_ECSPI_HDMI	1V8	PMIC (LX5)
NVCC_ENET	1V8	PMIC (LX5)
NVCC_SD1	3V3	PMIC (VSD_3V3)
NVCC_SD2	NVCC_SD2	PMIC (LDO5) DEF= SD_VSEL = Low - NVCC_SD2 = 3V3
NVCC_CLK	1V8	PMIC (LX5)
VSD_3V3	3V3	PMIC (EN - SD1_RESET_B)

BOOT MODE

ACTUAL BOOT iMX8

	BOOT_MODE2	BOOT_MODE1	BOOT_MODE0	BOOT
0	———	———	———	———
1	GND	FLOAT	FLOAT	Carrier SD Card (SD2)
2	FLOAT	FLOAT	GND	QSPI 3B Read
3	FLOAT	FLOAT	FLOAT	QSPI Hyperflash
4	GND	GND	GND	Boot From Internal Fuses
5	GND	GND	FLOAT	USB Serial Download
6	GND	FLOAT	GND	Module eMMC Flash (SD3)
7	———	———	———	———

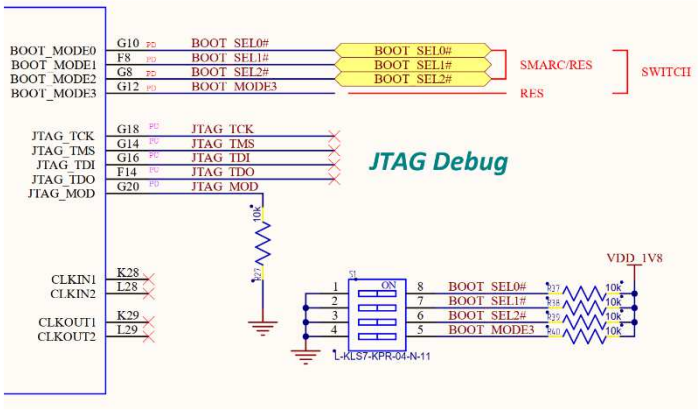
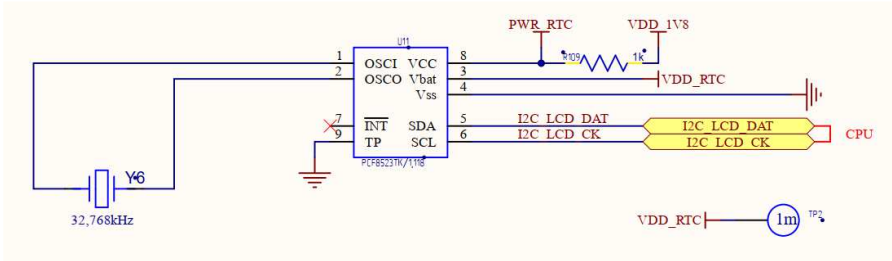
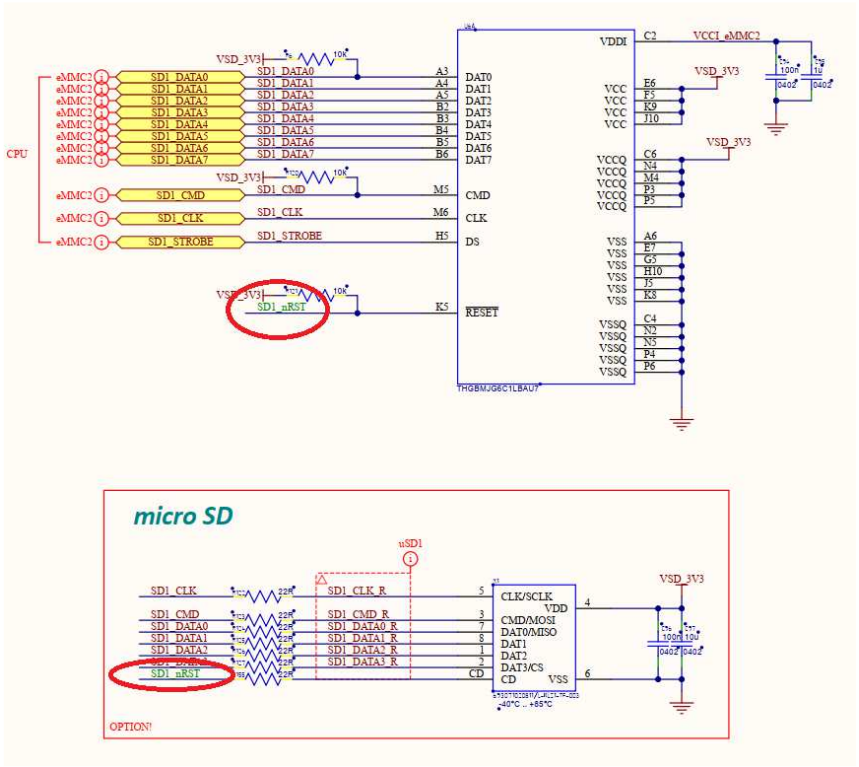


Схема включения RTC (PCF8523TK)



uSD & eMMC


CPU
eMMC2
SD1_DATA0
SD1_DATA1
SD1_DATA2
SD1_DATA3
SD1_DATA4
SD1_DATA5
SD1_DATA6
SD1_DATA7
SD1_CMD
SD1_CLK
SD1_STROBE
SD1_nRST
VSD_3V3
10K
DAT0
DAT1
DAT2
DAT3
DAT4
DAT5
DAT6
DAT7
CMD
CLK
DS
RESET
VDDI
VCC
VCCQ
VSS
VSSQ
VCCI_eMMC2
THGBMJG6C1LBAU7
micro SD
uSD1
SD1_CLK_R
SD1_CMD_R
SD1_DATA0_R
SD1_DATA1_R
SD1_DATA2_R
SD1_DATA3_R
CLK/SCLK
CMD/MOSI
DAT0/MISO
DAT1
DAT2
DAT3/CS
CD
VDD
VSS
OPTION!

Ethernet (RTL8211FSI–VS)

Тактирование микросхем Ethernet PHY осуществляется от внешних кварцевых резонаторов 25МГц.

CLKOUT не подключены.

GMAC0 (U3) - PHY_Address = 001 (Mode "000" = 000 UTP<-> RGMII).

GMAC1 (U5) - PHY_Address = 010 (Mode "000" = 000 UTP<-> RGMII).

Таблица интерфейсов

№	iMX8M Plus	SMARC	Примечание
1	I2C1	I2C_PM	PMIC PCA9450CHNY
2	I2C5	I2C_GP	–
3	I2C4	I2C_CAM0	–
4	I2C5	I2C_CAM1	–
5	I2C2	I2C_LCD	DSI2DP, GPIO_EXP, EEPROM, RTC
6	CAN0	CAN0	–
7	CAN1	CAN1	–
8	UART2	SER1	Debug UART
9	UART3	SER2	–
10	UART4	SER3	–
11	UART1	SER0	–