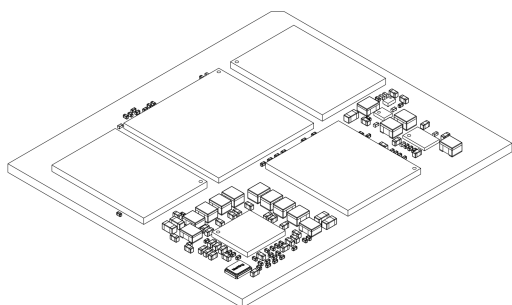


Grinn GenioSOM-510 Datasheet



1 Features

- LGA312 package
- Simple design of the end device
- Dual core Arm® Cortex®-A78
- Quad core Arm® Cortex®-A55
- Single-core Cadence HiFi 5 Audio Engine DSP with up to 800 MHz
- System Companion Processor (SCP) 32-bit MDSP RV55 microprocessor with up to 800MHz
- 16GB eMMC memory (optional up to 64GB)
- 2x 2GB LPDDR4 RAM (optional 2x 4GB)
- Arm Mali™-G57 MC2 3D Graphics Accelerator (GPU) with Vulkan® 1.1, OpenGL ES 3.2 and OpenCL™ 2.2
- Single-core AI Processor Unit (APU) Cadence® Tensilica® VP6 processor with AI Accelerator (AIA)
- Display output supporting FHD60 + 4K60 resolution
- Image processing: 32MP @ 30fps for single camera capture 16MP + 16MP @ 30fps for dual camera capture
- Video encoding: 4K @ 30 fps with HEVC/H.264
- Video decoding: 4K @ 60 fps with AV1/VP9/HEVC/H.264

Video decoding:

- HEVC: Main profile 4K2K @ 60fps/160 Mbps, 8 bits, Main 10 profile 4K2K @ 60fps/160 Mbps, 10 bits
- HEIF: Main profile maximum resolution 16383 x 16383, 8 bits, Main10 profile maximum resolution 16383 x 16383, 10 bits
- VP9: Profile 0 4K2K @ 60 fps/120 Mbps, 8 bits, Profile 2 4K2K @ 60 fps/120 Mbps, 10 bits
- AV1: Main profile 0 4K2K @ 60 fps/120 Mbps, 8/10 bits
- AVC: Constrained Baseline 4K2K @ 60fps/160 Mbps, 8 bits, Main/High profile 4K2K @

60fps/160 Mbps, 8 bits, High 10 profile 4K2K @ 60fps/160 Mbps, 10 bits

- MPEG-4: Simple Profile 1080p @ 60 fps/60 Mbps, 8 bits, Advanced Simple Profile 1080p @ 60 fps/60 Mbps, 8 bits
- MPEG-2: Main profile 1080p @ 60 fps/60 Mbps, 8 bits
- VP8: 1080p @ 60 fps/40 Mbps, 8 bits
- H.263: Baseline profile 1080p @ 60 fps/60 Mbps
- 2xUSB2.0 1xUSB3.1 1xPCIE 1xeDP 1xDP 6xSPI 4xUART 1xAUX 2xMSDC 7xI2C (up to 2xI3S included) 2xI2S 1xPCM 2xDMIC 4xCSI 2xDSI 1xDPI 1xHDMI 4xPWM 1xRGMII
- Up to 143 GPIO

2 Applications

- AI-Supported Computer Vision Applications
- Advanced IoT Devices
- Smart Home Applications
- Industrial Automation
- Streaming Audio and Video

3 Description

The Grinn GenioSOM-510 is an advanced System on Module (SoM) designed to meet the performance and efficiency needs of Artificial Intelligence and Internet of Things applications. Leveraging a powerful MediaTek® MT8370 IoT application processor, this SoM is ideal for edge computing scenarios that demand real-time processing and multimedia capabilities.

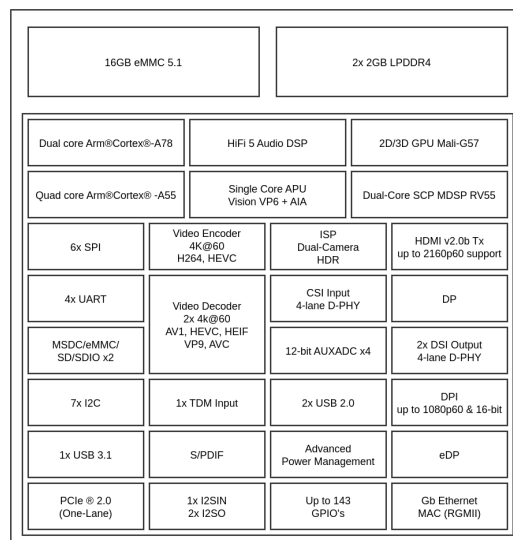


Figure 1: Functional block diagram

Contents

1	Features	1
2	Applications	1
3	Description	1
4	Boot Options	3
4.1	System Boot Mode Selector	3
4.2	Flashing Port Selector	3
5	Functional Description	4
5.1	Main Components	4
5.1.1	Hardware Resources	4
5.2	Padmap	5
5.3	Pad Description	5
5.4	Power Management Unit	18
5.5	Interfaces	19
5.5.1	Video Interfaces	20
5.5.2	Audio Interfaces	20
5.5.3	Peripheral Interfaces	21
6	Electrical Characteristics	22
6.1	Absolute Maximum Ratings	22
6.2	Recommended Operating Conditions	22
7	Mechanical Characteristics	23
8	Ordering Information	24
8.1	Detailed Information on RAM Codes	24
8.2	Detailed Information on ROM Codes	24
9	Revision History	25

4 Boot Options

4.1 System Boot Mode Selector

Boot devices are selected via physical pin configuration. `AUD_SYNC_MOSI` is read after power-on and determines the boot flow. This pin should not be floating. A 12k Ω pull-up or pull-down resistor should drive this input to the appropriate state.

Grinn GenioSOM-510 Pin No	CPU Pin No	Pin Name
V20	M35	<code>AUD_SYNC_MOSI</code>

Grinn GenioSOM-510 can be booted from:

- SPI NOR
- eMMC Memory

<code>AUD_SYNC_MOSI</code> [0]	Description
0b	Boot eMMC
1b	Boot SPI NOR

4.2 Flashing Port Selector

USB port is selected via physical pin configuration. `AUD_CLK_MOSI` is read after power-on and determines the boot flow. This pin should not be floating. A 12k Ω pull-up or pull-down resistor should drive this input to the appropriate state.

Grinn GenioSOM-510 Pin No	CPU Pin No	Pin Name
V21	M33	<code>AUD_CLK_MOSI</code>

Grinn GenioSOM-510 system image can be flashed from one of two USB interfaces:

- USB0
- USB1

<code>AUD_CLK_MOSI</code> [0]	Description
0b	USB0
1b	USB1



Driving `KPCOL0` low during power-on and reset places the processor into USB programming mode. The `KPCOL0` signal must be held low for the `AUD_CLK_MOSI` setting to take effect.

5 Functional Description

5.1 Main Components

5.1.1 Hardware Resources

Grinn GenioSOM-510 is based on MediaTek® MT8370 IoT application processor. Powered by:

- 2x Arm® Cortex®-A78
- 4x Arm® Cortex®-A55
- AI Processor Unit (APU) Cadence® Tensilica® VP6 processor with AI Accelerator (AIA)
- Single-core Cadence HiFi 5 Audio Engine DSP
- Mali-G57 Graphics Processing Unit

Grinn GenioSOM-510 arrives with 4GB LPDDR4 RAM and 16GB eMMC Flash memory. However, other memory configurations are possible depending on project requirements.

Graphics Processing Unit MFG (MediaTek Flexible Graphics) contains the GPU and clock/reset control logic. The Mali-G57 series GPUs are designed to handle highly complex graphics processing and general computational tasks delegated by the main application processor.

Digital Signal Processor The Digital Signal Processor (DSP) is designed for the high-speed processing of real-time signals, such as audio, video, and sensor data. It comprises:

- Single-core Cadence HiFi 5 Audio Engine DSP
- AXI3 bus interface unit (in-house MediaTek bus)
- System Power Management Controller (SPMC)

The Cadence HiFi 5 DSP is a highly optimized audio processor geared for efficient execution of audio and voice codecs and pre- and post-processing modules.

AI Processor Unit The MediaTek AI Processor Unit System (APUSYS) significantly enhances multimedia performance by exhibiting remarkable computing capabilities. The key components of the APUSYS are:

- Single-core programmable Tensilica Vision Processor 6 (VP6), for both the traditional Computer Vision (CV) algorithms and Neural Network (NN) algorithms.
- Single-core MediaTek Deep Learning Accelerators (MDLA), for the NN algorithms.

The hardware design is specifically optimized for job allocation between the NN (MDLA) and CV (VP6) engines, resulting in efficient performance. The External Direct Memory Access (EDMA) engine supports data movement and format conversion.

5.2 Padmap

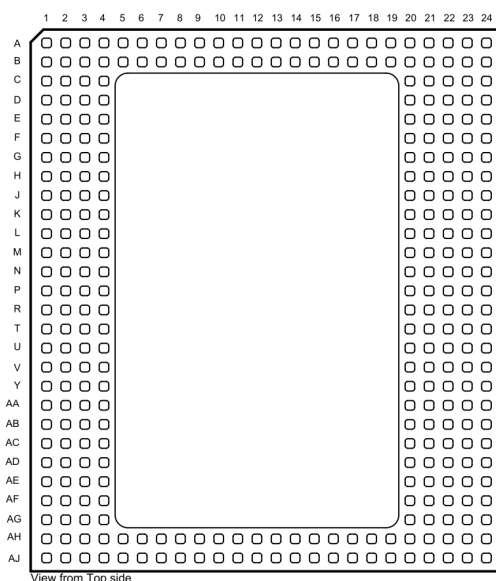


Figure 2: Grinn GenioSOM-510 pads (top view)

5.3 Pad Description

Table 1: SOM pinout

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
A1	J5	CSI1A_-LO_P	CSI1A.L0P.T0A	I/O	148.67	-	-
A2	J4	CSI1A_-LO_N	CSI1A.L0N.T0B	I/O	147.86	-	-
A3	G5	CMMRST1	GPIO21/TP_GPIO5_AO/CM-FLASH3/CLKM3/TDMIN_-DI/UCTS1/TP_UCTS1_AO	I/O	-	1V8	-
A4	U3	UART0_RXD	GPIO32/URXD0/TP_URXD1_-AO/TP_URXD2_AO/SSPM_-URXD_AO	I/O	-	1V8	-
A5	V4	GPIO09	GPIO9/TP_GPIO1_-AO/SPIM3_MOSI/TDMIN_-LRCK/DMIC2_-CLK/CMFLASH0/PWM_0	I/O	-	1V8	-
A6	V5	GPIO10	GPIO10/TP_GPIO2_-AO/SPIM3_MISO/TDMIN_-DI/DMIC2_-DAT/CMFLASH1/PWM_1	I/O	-	1V8	-
A7	G6	I2C6_SDA	GPIO68/SDA6/SCP_-SDA0/SCP_SDA1	I/O	-	1V8	-
A8	F5	I2C5_SCL	GPIO65/SCL5/SCP_-SCL0/SCP_SCL1	I/O	-	1V8	-
A9	F6	I2C5_SDA	GPIO66/SDA5/SCP_-SDA0/SCP_SDA1	I/O	-	1V8	-
A10	C4	MSDC1_-DATA2	GPIO167/MSDC1_-DAT2/PWM_0	I/O	157.66	VSIM1_-PMU	-
A11	C3	MSDC1_-DATA3	GPIO168/MSDC1_-DAT3/PWM_1/CLKM0	I/O	167.88	VSIM1_-PMU	-
A12	-	GND		Power	-	-	-
A13	D2	MSDC1_-DATA0	GPIO165/MSDC1_-DAT0/SPDIF_IN1	I/O	196.45	VSIM1_-PMU	-
A14	-	GND		Power	-	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
A15	V34	USB2_D_P	USB_DP_P2	I/O	219.16	-	-
A16	-	GND		Power	-	-	-
A17	-	GND		Power	-	-	-
A18	U37	USB1_D_P	USB_DP_P1	I/O	170.05	-	-
A19	-	GND		Power	-	-	-
A20	W37	USB1_RX_P	SSUSB_RXP	Input	193.66	-	100nF AC cap required
A21	Y33	USB1_TX_P	SSUSB_TXP	Output	209.93	-	100nF AC cap required
A22	-	GND		Power	-	-	-
A23	W32	USB0_D_P	USB_DP_P0	I/O	218.77	-	-
A24	R36	USB0_- IDDIG	GPIO83/IDDIG	I/O	-	1V8	-
AA1	AJ3	DSI0_D3_P	DSI0_D3P_T2C	I/O	57.53	-	-
AA2	AH2	DSI0_D3_N	DSI0_D3N	I/O	57.19	-	-
AA3	W7	GPI005	GPIO5/TP_GPIO5_- AO/SPDIF_IN1/I2SO1_- BCK/DMIC4_DAT_R/I2SIN_- D2/I2SO2_D2	I/O	-	1V8	-
AA4	Y11	DISP_- CTRL_PWM1	GPIO30/DISP_PWM1/DISP_- PWM0/CMFLASH3/PWM_1	I/O	-	1V8	-
AA20	D13 (PMIC)	HOMEKEY		Input	-	1V8	-
AA21	-	VI028_PMU		Output	-	-	-
AA22	AB35	MSDC2_- DATA3	GPIO174/MSDC2_- DAT3/LVTS_SDI	I/O	164.06	DVDD28_- MSDC2	-
AA23	AB37	MSDC2_- DATA2	GPIO173/MSDC2_- DAT2/LVTS_SCK	I/O	151.77	DVDD28_- MSDC2	-
AA24	AD37	MSDC2_- DATA0	GPIO171/MSDC2_- DAT0/LVTS_26M/TDMIN_- LRCK	I/O	142.52	DVDD28_- MSDC2	-
AB1	-	GND		Power	-	-	-
AB2	Y6	GPI002	GPIO2/TP_GPIO2_- AO/SPIM5_- MOSI/URTS1/DMIC3_DAT_- R/I2SIN_WS/I2SO2_WS	I/O	-	1V8	-
AB3	Y5	DSI1_- DSI_TE	GPIO28/DSI1_TE/DSI_- TE/EDP_TX_- HPD/CMVREF3/PWM_3	I/O	-	1V8	-
AB4	Y9	DSI0_- LCM_RST	GPIO25/LCM_RST/LCM1_- RST/DP_TX_HPD	I/O	-	1V8	-
AB20	D8 (PMIC)	PWRKEY		Input	-	5V	-
AB21	-	VRTC28		Output	-	-	-
AB22	-	VCN18_PMU		Output	-	-	-
AB23	AC35	MSDC2_CMD	GPIO169/MSDC2_- CMD/LVTS_FOUT/TDMIN_- MCK	I/O	163.83	DVDD28_- MSDC2	-
AB24	AD36	MSDC2_- DATA1	GPIO172/MSDC2_- DAT1/LVTS_SCF/TDMIN_DI	I/O	153.74	DVDD28_- MSDC2	-
AC1	AK7	DSI1_CK_P	DSI1_CKP_T1B	I/O	89.33	-	-
AC2	AK6	DSI1_CK_N	DSI1_CKN_T1C	I/O	89.9	-	-
AC3	Y7	GPI003	GPIO3/TP_GPIO3_- AO/SPIM5_- MISO/UCTS1/DMIC4_- CLK/I2SIN_D0/I2SO2_DO	I/O	-	1V8	-
AC4	AA11	DSI1_- LCM_RST	GPIO27/LCM1_RST/LCM_- RST/DP_TX_- HPD/CMVREF2/PWM_2	I/O	-	1V8	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
AC20	K3 (PMIC)	HP_EINT		Input	-	-2.1V..3.3V	-
AC21	D10 (PMIC)	CHRDETn		Input	-	0V..5.0V	-
AC22	-	VCN33_2_-PMU		Output	-	-	-
AC23	-	VI018_PMU		Output	-	-	-
AC24	-	GND		Power	-	-	-
AD1	AL5	DSI1_D0_P	DSI1_D0P.T0C	I/O	85.83	-	-
AD2	AK5	DSI1_D0_N	DSI1_D0N.T1A	I/O	85.58	-	-
AD3	Y8	GPIO4	GPIO4/TP_GPIO4_-AO/SPDIF_IN2/I2SO1_-MCK/DMIC4_DAT/I2SIN_-D1/I2SO2_D1	I/O	-	1V8	-
AD4	AA9	DISP_-CTRL_PWM0	GPIO29/DISP_PWM0/DISP_-PWM1	I/O	-	1V8	-
AD20	L9 (PMIC)	CS_P_1		Input	-	-0.1V..1V8	-
AD21	L10 (PMIC)	CS_N_1		Input	-	-0.1V..1V8	-
AD22	L5 (PMIC)	AU_-MICBIAS0		Output	-	0V..3V	-
AD23	M5 (PMIC)	AU_-MICBIAS2		Output	-	0V..3V	-
AD24	M4 (PMIC)	AU_-MICBIAS1		Output	-	0V..3V	-
AE1	AL7	DSI1_D1_P	DSI1_D1P.T2A	I/O	99.55	-	-
AE2	AL6	DSI1_D1_N	DSI1_D1N.T2B	I/O	99.48	-	-
AE3	-	GND		Power	-	-	-
AE4	AF2	AUXIN1	AUXIN1	I/O	-	AVDD18_-AUXADC	1μF cap connected to ground
AE20	J4 (PMIC)	AU_HSP		Output	-	-2.1V..2.1V	-
AE21	J3 (PMIC)	AU_HSN		Output	-	-2.1V..2.1V	-
AE22	-	VBIF28_-PMU		Output	-	-	-
AE23	M12 (PMIC)	BAT_NTC		Input	-	0V..3.08V	-
AE24	-	VCN33_1_-PMU		Output	-	-	-
AF1	AL3	DSI1_D2_P	DSI1_D2P.T0A	I/O	116.41	-	-
AF2	AL4	DSI1_D2_N	DSI1_D2N.T0B	I/O	115.97	-	-
AF3	AE6	AUXIN0	AUXIN0	I/O	-	AVDD18_-AUXADC	1μF cap connected to ground
AF4	AE2	AUXIN3	AUXIN3	I/O	-	AVDD18_-AUXADC	1μF cap connected to ground
AF20	F3 (PMIC)	AU_LOLP		Output	-	-2.1V..2.1V	-
AF21	F4 (PMIC)	AU_LOLN		Output	-	-2.1V..2.1V	-
AF22	L7 (PMIC)	BATADC_P		Input	-	0V..5.0V	-
AF23	J2 (PMIC)	AVSS30_-AUD		Power	-	0V	-
AF24	T32	SYSRSTn		I/O	-	1V8	-
AG1	AL8	DSI1_D3_P	DSI1_D3P.T2C	I/O	110.03	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
AG2	AK8	DSI1_D3_N	DSI1.D3N	I/O	110.92	-	-
AG3	AE3	AUXIN2	AUXIN2	I/O	-	AVDD18_-AUXADC	1µF cap connected to ground
AG4	AA1	PCIE_-CLKREQn	GPIO49/CLKREQN	I/O	-	1V8	-
AG20	H4 (PMIC)	AU_HPL		Output	-	-2.1V..2.1V	-
AG21	G4 (PMIC)	AU_REFN		Power	-	0V	-
AG22	G3 (PMIC)	AU_HPR		Output	-	-2.1V..2.1V	-
AG23	-	GND		Power	-	-	-
AG24	-	GND		Power	-	-	-
AH1	AA3	PCIE_-PERSTn	GPIO48/PERSTN	I/O	-	1V8	-
AH2	AM2	PCIE_TX_N	PCIE.LN0.TXN	I/O	109.14	-	100nF AC cap required
AH3	AP1	PCIE_RX_N	PCIE.LN0.RXN	I/O	106.85	-	100nF AC cap required
AH4	AN3	PCIE_CK_N	PCIE.CKN	I/O	106.44	-	49.9R pull-down required
AH5	AA4	PCIE_-WAKEn	GPIO47/WAKEN	I/O	-	1V8	-
AH6	AD10	DPI_VSYNC	GPIO148/DPI.VSYNC/GBE_-INTR/I2SO1_-BCK/CMVREF1/SPDIF_-IN0/UCTS1	I/O	125.78	DVDD28_-IODPI	-
AH7	AB2	DPI_DE	GPIO149/DPI.DE/GBE_AUX_-PPS0/I2SO1_-WS/CMVREF2/SPDIF_-IN1/UTXD3	I/O	202.49	DVDD28_-IODPI	-
AH8	-	GND		Power	-	-	-
AH9	AC7	DPI_D14	GPIO145/DPLD14/GBE_-TXER/CMFLASH0/SPIM3_-MOSI/GBE_AUX.PPS2	I/O	150.25	DVDD28_-IODPI	-
AH10	AA6	DPI_D12	GPIO143/DPLD12/GBE_-MDC/CLKM0/SPIM3_-CSB/UTXD1	I/O	192.03	DVDD28_-IODPI	-
AH11	AC5	DPI_D10	GPIO141/DPLD10/GBE_-RXDV/DMIC4.DAT/PWM_-3/TP.URTS2_AO/URTS2	I/O	266.25	DVDD28_-IODPI	-
AH12	AB5	DPI_D9	GPIO140/DPLD9/GBE_-RXC/DMIC4.CLK/PWM_-2/TP.URXD2_AO/URXD2	I/O	223.31	DVDD28_-IODPI	-
AH13	AB7	DPI_D7	GPIO138/DPLD7/GBE_-RXD0/DMIC3_-DAT/CLKM2/TP.GPIO7_AO	I/O	266.73	DVDD28_-IODPI	-
AH14	-	GND		Power	-	-	-
AH15	AB3	DPI_D4	GPIO135/DPLD4/GBE_-RXD3/DMIC2.DAT/I2SO2_-D1/TP.GPIO4_AO/WAKEN	I/O	273.99	DVDD28_-IODPI	-
AH16	AB8	DPI_D2	GPIO133/DPLD2/GBE_-TXD1/DMIC1.DAT_R/I2SO2_-WS/TP.GPIO2_AO/SPIM5_-MOSI	I/O	269.69	DVDD28_-IODPI	-
AH17	AB9	DPI_D0	GPIO131/DPLD0/GBE_-TXD3/DMIC1.CLK/I2SO2_-MCK/TP.GPIO0_AO/SPIM5_-CSB	I/O	249.3	DVDD28_-IODPI	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
AH18	-	VS2_PMU		Output	-	-	-
AH19	L2 (PMIC)	AU_VIN0_N		Input	-	0V..3.3V	-
AH20	N2 (PMIC)	AU_VIN1_N		Input	-	0V..3.3V	-
AH21	N3 (PMIC)	AU_VIN2_N		Input	-	0V..3.3V	-
AH22	-	GND		Power	-	-	-
AH23	-	VSYS		Input	-	-	-
AH24	-	VSYS		Input	-	-	-
AJ1	-	GND		Power	-	-	-
AJ2	AM1	PCIE_TX_P	PCIE_LN0_TXP	I/O	109.25	-	100nF AC cap required
AJ3	AP2	PCIE_RX_P	PCIE_LN0_RXP	I/O	107.25	-	100nF AC cap required
AJ4	AN4	PCIE_CK_P	PCIE_CKP	I/O	106.73	-	49.9R pull-down required
AJ5	-	GND		Power	-	-	-
AJ6	AD11	DPI_HSYNC	GPIO147/DPL_HSYNC/GBE_-COL/I2SO1_-MCK/CMVREF0/SPDIF_-OUT/URTS1	I/O	144.61	DVDD28_-IODPI	-
AJ7	AB1	DPI_CK	GPIO150/DPL_CK/GBE_AUX_-PPS1/I2SO1_-D0/CMVREF3/SPDIF_-IN2/URXD3	I/O	221.65	DVDD28_-IODPI	-
AJ8	AB4	DPI_D15	GPIO146/DPL_D15/GBE_-RXER/CMFLASH1/SPIM3_-MISO/GBE_AUX_PPS3	I/O	195.1	DVDD28_-IODPI	-
AJ9	AC6	DPI_D13	GPIO144/DPL_D13/GBE_-MDIO/CLKM1/SPIM3_-CLK/URXD1	I/O	217.14	DVDD28_-IODPI	-
AJ10	AA5	DPI_D11	GPIO142/DPL_D11/GBE_-TXEN/DMIC4_DAT_R/PWM_-1/TP_UCTS2_AO/UCTS2	I/O	185.5	DVDD28_-IODPI	-
AJ11	-	GND		Power	-	-	-
AJ12	AB6	DPI_D8	GPIO139/DPL_D8/GBE_-TXC/DMIC3_DAT_-R/CLKM3/TP_UTXD2_-AO/UTXD2	I/O	284.03	DVDD28_-IODPI	-
AJ13	AC8	DPI_D6	GPIO137/DPL_D6/GBE_-RXD1/DMIC3_CLK/I2SO2_-D3/TP_GPIO6_-AO/CLKREQN/PWM_0	I/O	204.28	DVDD28_-IODPI	-
AJ14	AA8	DPI_D5	GPIO136/DPL_D5/GBE_-RXD2/DMIC2_DAT_R/I2SO2_-D2/TP_GPIO5_AO/PERSTN	I/O	268.89	DVDD28_-IODPI	-
AJ15	AC4	DPI_D3	GPIO134/DPL_D3/GBE_-TXD0/DMIC2_CLK/I2SO2_-D0/TP_GPIO3_AO/SPIM5_-MISO	I/O	272.31	DVDD28_-IODPI	-
AJ16	AC9	DPI_D1	GPIO132/DPL_D1/GBE_-TXD2/DMIC1_DAT/I2SO2_-BCK/TP_GPIO1_AO/SPIM5_-CLK	I/O	282.96	DVDD28_-IODPI	-
AJ17	-	GND		Power	-	-	-
AJ18	-	VPA_PMU		Output	-	-	-
AJ19	L1 (PMIC)	AU_VIN0_P		Input	-	0V..3.3V	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
AJ20	M2 (PMIC)	AU_VIN1_P		Input	-	0V..3.3V	-
AJ21	M3 (PMIC)	AU_VIN2_P		Input	-	0V..3.3V	-
AJ22	-	GND		Power	-	-	-
AJ23	-	VSYS		Input	-	-	-
AJ24	-	VSYS		Input	-	-	-
B1	J2	CSI1A_-L1_P	CSI1A.L1P.T0C	I/O	120.24	-	-
B2	J3	CSI1A_-L1_N	CSI1A.L1N.T1A	I/O	120.19	-	-
B3	-	GND		Power	-	-	-
B4	U2	UART0_TXD	GPIO31/UTXD0/TP_UTXD1_-AO/TP_UTXD2_AO/SSPM_-UTXD_AO	I/O	-	1V8	-
B5	Y2	I2C2_SCL	GPIO59/SCL2/SCP_-SCL0/SCP_SCL1	I/O	-	1V8	-
B6	AA2	I2C2_SDA	GPIO60/SDA2/SCP_-SDA0/SCP_SDA1	I/O	-	1V8	-
B7	H7	I2C6_SCL	GPIO67/SCL6/SCP_-SCL0/SCO_SCL1	I/O	-	1V8	-
B8	W2	I2C3_SCL	GPIO61/SCL3/SCP_-SCL0/SCP_SCL1	I/O	-	1V8	-
B9	W1	I2C3_SDA	GPIO62/SDA3/SCP_-SDA0/SCP_SDA1	I/O	-	1V8	-
B10	-	GND		Power	-	-	-
B11	D3	MSDC1_CMD	GPIO163/MSDC1_-CMD/SPDIF_OUT	I/O	176.78	VSIM1_-PMU	-
B12	D4	MSDC1_CLK	GPIO164/MSDC1_-CLK/SPDIF_IN0	I/O	183.44	VSIM1_-PMU	-
B13	D1	MSDC1_-DATA1	GPIO166/MSDC1_-DAT1/SPDIF_IN2	I/O	197.29	VSIM1_-PMU	-
B14	P31	USB2_-IDDIG	GPIO89/IDDIG_-2P/URXD2/UCTS1/CLKM3/TP_GPIO7_AO/AUXIF_CLK1	I/O	-	1V8	-
B15	V35	USB2_D_N	USB_DM_P2	I/O	219.42	-	-
B16	P32	USB2_-DRV_VBUS	GPIO90/USB_DRVVBUS_-2P/UTXD3	I/O	-	1V8	-
B17	R30	USB2_-VBUS_-VALID	GPIO91/VBUSVALID_-2P/URXD3	I/O	-	1V8	-
B18	U36	USB1_D_N	USB_DM_P1	I/O	170.05	-	-
B19	R33	USB1_-DRV_VBUS	GPIO87/USB_DRVVBUS_-1P/URXD1/UCTS2/PWM_-3/TP_GPIO5_AO/AUXIF_-CLK0	I/O	-	1V8	-
B20	W36	USB1_RX_N	SSUSB_RXN	Input	193.66	-	100nF AC cap required
B21	Y34	USB1_TX_N	SSUSB_TXN	Output	210.64	-	100nF AC cap required
B22	P34	USB0_-VBUS_-VALID	GPIO85/VBUSVALID	I/O	-	1V8	-
B23	W31	USB0_D_N	USB_DM_P0	I/O	219.38	-	-
B24	P36	USB0_-DRV_VBUS	GPIO84/USB_DRVVBUS	I/O	-	1V8	-
C1	K7	CSI1A_-L2_P	CSI1A.L2P.T1B	I/O	120.41	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
C2	K6	CSI1A_-L2_N	CSI1A.L2N.T1C	I/O	120.79	-	-
C3	E5	CMMCLK1	GPIO23/CMMCLK1/PWM_-2/TP_GPIO7_AO/DP_TX_HPD	I/O	-	1V8	-
C4	W5	GPIO08	GPIO8/TP_GPIO0_-AO/SPIM3.CLK/TDMIN_-BCK/DMIC1.DAT_-R/CMVREF1/CLKM1	I/O	-	1V8	-
C20	R34	USB1_-IDDIG	GPIO86/IDDIG_-1P/UTXD1/URTS2/PWM_-2/TP_GPIO4_AO/AUXIF.ST0	I/O	-	1V8	-
C21	T33	USB1_-VBUS_-VALID	GPIO88/VBUSVALID_-1P/UTXD2/URTS1/CLKM2/TP_GPIO6_AO/AUXIF.ST1	I/O	-	1V8	-
C22	H31	KPCOL0	GPIO42/KPCOL0	I/O	-	1V8	-
C23	-	GND		Power	-	-	-
C24	-	GND		Power	-	-	-
D1	-	GND		Power	-	-	-
D2	E4	CMMCLK0	GPIO22/CMMCLK0/TP_-GPIO6_AO	I/O	-	1V8	-
D3	V1	UART1_TXD	GPIO33/UTXD1/URTS2/TP_-UTXD1_AO	I/O	-	1V8	-
D4	G4	CMMPDN0	GPIO18/TP_GPIO2_AO/CM-FLASH0/CMVREF4/TDMIN_-MCK/UTXD1/TP_UTXD1_AO	I/O	-	1V8	-
D20	J31	KPCOL1	GPIO43/KPCOL1/DP_TX_-HPD/CMFLASH2	I/O	-	1V8	-
D21	J30	KPROW0	GPIO44/KPROW0	I/O	-	1V8	-
D22	K30	KPROW1	GPIO45/KPROW1/EDP_TX_-HPD/CMFLASH3/I2SIN_MCK	I/O	-	1V8	-
D23	AF31	EDP_LN1_-TX_N	EDP_LN1.TXN	I/O	222.86	-	100nF AC cap required
D24	AF32	EDP_LN1_-TX_P	EDP_LN1.TXP	I/O	222.86	-	100nF AC cap required
E1	K5	CSI1B_-LO_P	CSI1B.L0P.T0A	I/O	101.89	-	-
E2	K3	CSI1B_-LO_N	CSI1B.L0N.T0B	I/O	101.48	-	-
E3	E3	CMMPDN1	GPIO20/TP_GPIO4_AO/CM-FLASH2/CLKM2/TDMIN_LR-CK/URTS1/TP_URTS1_AO	I/O	-	1V8	-
E4	V2	UART1_RXD	GPIO34/URXD1/UCTS2/TP_-URXD1_AO	I/O	-	1V8	-
E20	G32	I2SIN_D2	GPIO112/I2SIN_D2/SPLIN_-D2/DMIC3.DAT/TDMIN_-MCK/I2SO1_WS	I/O	-	1V8	-
E21	G33	I2SIN_D1	GPIO111/I2SIN_D1/SPLIN_-D1/DMIC3.CLK/SPDIF_OUT	I/O	-	1V8	-
E22	-	GND		Power	-	-	-
E23	AG29	EDP_LN0_-TX_N	EDP_LN0.TXN	I/O	213.58	-	100nF AC cap required
E24	AG30	EDP_LN0_-TX_P	EDP_LN0.TXP	I/O	213.58	-	100nF AC cap required
F1	L3	CSI1B_-L1_P	CSI1B.L1P.T0C	I/O	79.61	-	-
F2	L4	CSI1B_-L1_N	CSI1B.L1N.T1A	I/O	80.21	-	-
F3	-	GND		Power	-	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
F4	U4	UART2_TXD	GPIO35/UTXD2/URTS1/TP_- URTS1_AO/TP_UTXD2_AO	I/O	-	1V8	-
F20	J37	I2SIN_D0	GPIO110/I2SIN_D0/SPLIN_- D0/DMIC4_DAT_- R/CMVREF7/AUXIF_CLK1	I/O	-	1V8	-
F21	J36	I2SIN_WS	GPIO109/I2SIN_WS/SPLIN_- BCK/DMIC4_- DAT/CMVREF6/AUXIF_ST1	I/O	-	1V8	-
F22	G36	I2SIN_MCK	GPIO107/I2SIN_MCK/SPLIN_- MCK/SPDIF_- IN0/CMVREF4/AUXIF_ST0	I/O	-	1V8	-
F23	AF37	EDP_AUX_N	EDPAUXN	I/O	201.78	-	100nF AC cap required
F24	AF36	EDP_AUX_P	EDPAUXP	I/O	201.83	-	100nF AC cap required
G1	-	GND		Power	-	-	-
G2	U5	UART2_RXD	GPIO36/URXD2/UCTS1/TP_- UCTS1_AO/TP_URXD2_AO	I/O	-	1V8	-
G3	F2	SPI2_MOSI	GPIO81/SPIM2_MOSI/SCP_- SPI2_MO/I2SO1_- WS/URTS2/TP_URTS2_- AO/PCM.DO	I/O	-	1V8	-
G4	G2	SPI2_CS _n	GPIO79/SPIM2_CSB/SCP_- SPI2_CS/I2SO1_- MCK/UTXD2/TP_UTXD2_- AO/PCM.SYNC	I/O	-	1V8	-
G20	H36	I2SIN_BCK	GPIO108/I2SIN_BCK/SPLIN_- LRCK/DMIC4_- CLK/CMVREF5/AUXIF_- CLK0	I/O	-	1V8	-
G21	H35	I2SIN_D3	GPIO113/I2SIN_D3/SPLIN_- D3/DMIC3_DAT_R/TDMIN_- BCK/I2SO1_D0	I/O	-	1V8	-
G22	N34	DMIC2_CLK	GPIO128/DMIC2_- CLK/SPINOR_IO1/TDMIN_- DI/LVTS_SCF	I/O	-	1V8	-
G23	AB33	DP_TX_HPD	GPIO46/DP_TX_HPD/PWM_- 0/VBUSVALID_2P	I/O	-	1V8	-
G24	-	GND		Power	-	-	-
H1	N2	CSI0A_- LO_P	CSI0A_L0P_T0A	I/O	102.17	-	-
H2	N3	CSI0A_- LO_N	CSI0A_L0N_T0B	I/O	103.02	-	-
H3	E2	SPI2_MISO	GPIO82/SPIM2_MISO/SCP_- SPI2_MI/I2SO1_- D0/UCTS2/TP_UCTS2_- AO/PCM.DI	I/O	-	1V8	-
H4	G1	SPI2_CLK	GPIO80/SPIM2_CLK/SCP_- SPI2_CK/I2SO1_- BCK/URXD2/TP_URXD2_- AO/PCM.CLK	I/O	-	1V8	-
H20	L36	I2C1_SDA	GPIO58/SDA1	I/O	-	1V8	I2C1 pins are connected to the PMIC (address 0x55) and should not be used as GPIOs

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
H21	M36	I2C1_SCL	GPIO57/SCL1	I/O	-	1V8	I2C1 pins are connected to the PMIC (address 0x55) and should not be used as GPIOs
H22	-	GND		Power	-	-	-
H23	AH35	DP_LN0_-TX_N	DP_LN0.TXN	I/O	192.81	-	220nF AC cap required
H24	AG35	DP_LN0_-TX_P	DP_LN0.TXP	I/O	192.81	-	220nF AC cap required
J1	N4	CSI0A_-L1_P	CSI0A.L1P.T0C	I/O	85.1	-	-
J2	N5	CSI0A_-L1_N	CSI0A.L1N.T1A	I/O	85.84	-	-
J3	-	GND		Power	-	-	-
J4	T9	SPI1_CS _n	GPIO75/SPIM1_CSB/SCP_-SPI1_A_CS/TDMIN_-MCK/SCP_SCL0/CMVREF6	I/O	-	1V8	-
J20	K37	I2C4_SDA	GPIO64/SDA4	I/O	-	1V8	-
J21	K36	I2C4_SCL	GPIO63/SCL4	I/O	-	1V8	-
J22	P35	DMIC2_-DAT_R	GPIO130/DMIC2.DAT_-R/SPINOR.IO3/SPDIF_-IN2/LVTS_SDI	I/O	-	1V8	-
J23	AH31	DP_LN1_-TX_N	DP_LN1.TXN	I/O	170.29	-	220nF AC cap required
J24	AH32	DP_LN1_-TX_P	DP_LN1.TXP	I/O	170.25	-	220nF AC cap required
K1	M6	CSI0A_-L2_P	CSI0A.L2P.T1B	I/O	60.58	-	-
K2	N6	CSI0A_-L2_N	CSI0A.L2N.T1C	I/O	59.86	-	-
K3	T10	SPI1_CLK	GPIO76/SPIM1_CLK/SCP_-SPI1_A_CLK/TDMIN_-BCK/SCP_SDA0/CMVREF7	I/O	-	1V8	-
K4	T7	SPI1_MISO	GPIO78/SPIM1_MISO/SCP_-SPI1_A_MI/TDMIN_DI/SCP_-SDA1	I/O	-	1V8	-
K20	J33	I2S02_D0	GPIO117/I2S02_D0/I2SIN_D0	I/O	-	1V8	-
K21	G30	I2S02_D2	GPIO119/I2S02_D2/I2SIN_-D2/UTXD3/TDMIN_-LRCK/I2S01_MCK	I/O	-	1V8	-
K22	P33	DMIC2_DAT	GPIO129/DMIC2_-DAT/SPINOR.IO2/SPDIF_-IN1/LVTS_SCK	I/O	-	1V8	-
K23	AJ33	DP_LN2_-TX_N	DP_LN2.TXN	I/O	161.14	-	220nF AC cap required
K24	AJ34	DP_LN2_-TX_P	DP_LN2.TXP	I/O	160.98	-	220nF AC cap required
L1	-	GND		Power	-	-	-
L2	-	GND		Power	-	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
L3	W4	GPI007	GPI07/TP_GPIO7_- AO/SPIM3.CSB/TDMIN_- MCK/DMIC1_- DAT/CMVREF0/CLKM0	I/O	-	1V8	-
L4	T8	SPI1_MOSI	GPI077/SPIM1.MOSI/SCP_- SCP1_A.MO/TDMIN_- LRCK/SCP_SCL1	I/O	-	1V8	-
L20	H32	I2S02_D3	GPI0120/I2S02.D3/I2SIN_- D3/URXD3/TDMIN_- DI/I2S01.BCK	I/O	-	1V8	-
L21	G31	I2S02_D1	GPI0118/I2S02.D1/I2SIN.D1	I/O	-	1V8	-
L22	-	GND		Power	-	-	-
L23	AK31	DP_LN3_- TX_N	DP_LN3.TXN	I/O	191	-	220nF AC cap required
L24	AK32	DP_LN3_- TX_P	DP_LN3.TXP	I/O	190.83	-	220nF AC cap required
M1	P2	CSI0B_- LO_P	CSI0B.L0P.T0A	I/O	32.69	-	-
M2	P1	CSI0B_- LO_N	CSI0B.L0N.T0B	I/O	31.95	-	-
M3	G3	CMMRST0	GPI019/TP_GPIO3.AO/CM- FLASH1/CMVREF5/TDMIN_- BCK/URXD1/TP_URXD1.AO	I/O	-	1V8	-
M4	W3	GPI006	GPI06/TP_GPIO6_- AO/SPDIF.IN0/I2S01_- WS/DMIC1.CLK/I2SIN_- D3/I2S02.D3	I/O	-	1V8	-
M20	H34	I2S02_MCK	GPI0114/I2S02.MCK/I2SIN_- MCK	I/O	-	1V8	-
M21	H33	I2S02_BCK	GPI0115/I2S02.BCK/I2SIN_- BCK	I/O	-	1V8	-
M22	AD32	HDMI_SCL	GPI053/HDMITX20_- SCL/IDDIG_2P	I/O	-	1V8	-
M23	AJ37	DP_AUX_N	DPAUXN	I/O	146.84	-	100nF AC cap required
M24	AJ36	DP_AUX_P	DPAUXP	I/O	147.82	-	100nF AC cap required
N1	P3	CSI0B_- L1_P	CSI0B.L1P.T0C	I/O	37.69	-	-
N2	P4	CSI0B_- L1_N	CSI0B.L1N.T1A	I/O	37.66	-	-
N3	-	GND		Power	-	-	-
N4	U10	GPI001	GPI01/TP_GPIO1_- AO/SPIM5_- CLK/URXD1/DMIC3_- DAT/I2SIN.BCK/I2S02.BCK	I/O	-	1V8	-
N20	J34	I2S02_WS	GPI0116/I2S02.WS/I2SIN.WS	I/O	-	1V8	-
N21	R31	GPI012	GPI012/TP_GPIO4_- AO/SPIM4.CSB/HDMITX20_- HTPLG	I/O	-	1V8	-
N22	AB34	HDMI_- PWR5V	GPI050/HDMITX20_- PWR5V/IDDIG_1P	I/O	-	1V8	-
N23	AD33	HDMI_SDA	GPI054/HDMITX20_- SDA/USB.DRVVBUS_2P	I/O	-	1V8	-
N24	-	GND		Power	-	-	-
P1	P5	CSI0B_- L2_P	CSI0B.L2P.T1B	I/O	40.54	-	-
P2	P6	CSI0B_- L2_N	CSI0B.L2N.T1C	I/O	40.54	-	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
P3	W6	I2C0_SDA	GPIO56/SDA0/SCP_- SDA0/SCP_SDA1	I/O	-	1V8	-
P4	U9	DVDD28_- IODPI		Input	-	-	-
P20	AA36	DVDD28_- MSDC2		Input	-	-	-
P21	U32	GPIO15	GPIO15/TP_GPIO7_- AO/SPIM4_- MISO/HDMITX20_SDA	I/O	-	1V8	-
P22	-	GND		Power	-	-	-
P23	AL35	HDMI_- CH2_N	HDMITX21.CH2_M	I/O	171.3	-	-
P24	AK35	HDMI_- CH2_P	HDMITX21.CH2_P	I/O	171.14	-	-
R1	-	GND		Power	-	-	-
R2	Y4	I2C0_SCL	GPIO55/SCL0/SCP_- SCL0/SCP_SCL1	I/O	-	1V8	-
R3	AA7	DSI0_- DSI_TE	GPIO26/DSI_TE/DSI1_- TE/EDP_TX_HPDP	I/O	-	1V8	-
R4	V7	SPI0_MOSI	GPIO71/SPIM0.MOSI/SCP_- SPI0_MO/DMIC3.DAT_- R/CMVREF2	I/O	-	1V8	-
R20	T30	GPIO13	GPIO13/TP_GPIO5_- AO/SPIM4.CLK/HDMITX20_- CEC	I/O	-	1V8	-
R21	AA35	GPIO17	GPIO17/TP_GPIO1_- AO/URXD3/CMFLASH2/EDP_- TX_HPDP/CMVREF7	I/O	-	1V8	-
R22	AC32	HDMI_- HTPLG	GPIO51/HDMITX20_- HTPLG/EDP_TX_HPDP/USB_- DRVVBUS_1P	I/O	-	1V8	-
R23	AM37	HDMI_- CH1_N	HDMITX21.CH1_M	I/O	143.38	-	-
R24	AM36	HDMI_- CH1_P	HDMITX21.CH1_P	I/O	143.57	-	-
T1	AH6	DSI0_CK_P	DSI0_CKP_T1B	I/O	62.27	-	-
T2	AH7	DSI0_CK_N	DSI0.CKN_T1C	I/O	61.48	-	-
T3	V6	SPI0_CS _n	GPIO69/SPIM0.CSB/SCP_- SPI0_CS/DMIC3_- CLK/CMVREF0	I/O	-	1V8	-
T4	V8	SPI0_MISO	GPIO72/SPIM0.MISO/SCP_- SPI0_MI/DMIC4_- CLK/CMVREF3	I/O	-	1V8	-
T20	AC31	PCM_SYNC	GPIO122/PCM_- SYNC/SPIM4.CLK/SCP_- SPI1_B_CK/TP_URXD2_- AO/AUXIF_CLK0	I/O	-	1V8	-
T21	T31	GPIO14	GPIO14/TP_GPIO6_- AO/SPIM4_- MOSI/HDMITX20_SCL	I/O	-	1V8	-
T22	-	GND		Power	-	-	-
T23	AN34	HDMI_- CH0_N	HDMITX21.CH0_M	I/O	171.94	-	-
T24	AN35	HDMI_- CH0_P	HDMITX21.CH0_P	I/O	171.76	-	-
U1	AG5	DSI0_D0_P	DSI0.D0P.T0C	I/O	39.97	-	-
U2	AH5	DSI0_D0_N	DSI0.D0N.T1A	I/O	39.74	-	-
U3	U8	SPI0_MIO3	GPIO74/SPIM0_- MIO3/URXD3/DMIC4.DAT_- R/CLKM1/CMVREF5	I/O	-	1V8	-

Pad	CPU/PMIC Pin	Signal Name	Mux	Type	Signal Length[ps]	Power Domain	Note
U4	Y10	GPI000	GPI00/TP_GPIO0.- AO/SPIM5.- CSB/UTXD1/DMIC3.- CLK/I2SIN_MCK/I2SO2_MCK	I/O	-	1V8	-
U20	AC30	PCM_D0	GPI0123/PCM.DO/SPIM4.- MOSI/SCP_SPI1.B.MO/TP.- URTS2_AO/AUXIF_ST1	I/O	-	1V8	-
U21	AB31	PCM_DI	GPI0124/PCM.DI/SPIM4.- MISO/SCP_SPI1.B.MI/TP.- UCTS2_AO/AUXIF_CLK1	I/O	-	1V8	-
U22	AC33	HDMI_CEC	GPI052/HDMITX20.- CEC/VBUSVALID.1P	I/O	-	1V8	-
U23	AR35	HDMI_- CLK_N	HDMITX21_CLK_M	I/O	144.1	-	-
U24	AR34	HDMI_- CLK_P	HDMITX21_CLK_P	I/O	144.1	-	-
V1	AH4	DSI0_D1_P	DSI0.D1P.T2A	I/O	37.93	-	-
V2	AH3	DSI0_D1_N	DSI0.D1N.T2B	I/O	37.41	-	-
V3	U7	SPI0_MIO2	GPI073/SPIM0.- MIO2/UTXD3/DMIC4.- DAT/CLKM0/CMVREF4	I/O	-	1V8	-
V4	T11	SPI0_CLK	GPI070/SPIM0.CLK/SCP.- SPI0_CK/DMIC3.- DAT/CMVREF1	I/O	-	1V8	-
V20	M35	AUD_- SYNC_MOSI	GPI0102/AUD_SYNC.- MOSI/I2SO1_BCK/I2SIN_WS	I/O	-	1V8	-
V21	AD30	PCM_CLK	GPI0121/PCM.CLK/SPIM4.- CSB/SCP_SPI1.B.CS/TP.- UTXD2_AO/AUXIF_ST0	I/O	-	1V8	-
V22	P30	DMIC1_- DAT_R	GPI0127/DMIC1.DAT.- R/SPINOR_IO0/TDMIN.- LRCK/LVTS_26M	I/O	-	1V8	-
V23	-	GND		Power	-	-	-
V24	-	GND		Power	-	-	-
Y1	AG7	DSI0_D2_P	DSI0.D2P.T0A	I/O	81.42	-	-
Y2	AG6	DSI0_D2_N	DSI0.D2N.T0B	I/O	81.49	-	-
Y3	-	GND		Power	-	-	-
Y4	W8	GPI011	GPI011/TP_GPIO3.- AO/SPDIF_OUT/I2SO1.- D0/DMIC2.DAT_R/CMVREF6	I/O	-	1V8	-
Y20	K4 (PMIC)	ACCDET		Input	-	0V..3.3V	-
Y21	M33	AUD_CLK_- MOSI	GPI0101/AUD_CLK.- MOSI/I2SO1_MCK/I2SIN_BCK	I/O	-	1V8	-
Y22	N30	DMIC1_CLK	GPI0125/DMIC1.- CLK/SPINOR_CK/TDMIN.- MCK/LVTS_FOUT	I/O	-	1V8	-
Y23	N31	DMIC1_DAT	GPI0126/DMIC1.- DAT/SPINOR_CS/TDMIN.- BCK/LVTS_SDO	I/O	-	1V8	-
Y24	AD35	MSDC2_CLK	GPI0170/MSDC2.- CLK/LVTS.SDO/TDMIN_BCK	I/O	138.05	DVDD28.- MSDC2	-



The delays presented in the table above include only PCB-level delays. They do not account for delays introduced by the silicon itself.



It is recommended to remove ground copper directly underneath high-frequency signal pads on layers to minimize impedance mismatch and ensure better signal integrity.



The AUXADC lines may experience elevated noise levels due to the PCB layout, particularly if the DPI lines are in use.



MediaTek does not provide DSI1 drivers. Therefore this interface was not tested.

5.5 Interfaces

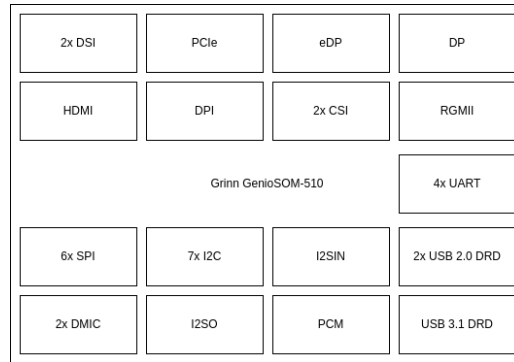


Figure 4: Grinn GenioSOM-510 interfaces overview

- 4x UART (universal asynchronous receiver-transmitter)
- 6x SPI (Serial Peripheral Interface) 1x quad mode, 5x dual mode
- 1x SNFC (Serial NOR Flash Controller) - SPI-based NOR interface
- 7x I²C (Inter-Integrated Circuit) with support for 2x I³C (Improved Inter Integrated Circuit)
- 1x SS(SuperSpeed) USB 3.1 Gen1 DRD (Dual-Role-Devices)
- 2x USB 2.0 DRD with OTG (On-The-Go)
- PCIe (Peripheral Component Interconnect Express - 2.0 1-lane)
- 2x MIPI CSI (Camera Serial Interface) 1x D-PHY 1x 4-lane and 1x (1 × 4-lane D-PHY or 2 × 2-lane D-PHY)
- RGMII (Reduced gigabit media-independent interface)
- 2x MIPI DSI (Display Serial Interface) 4-lane D-PHY
- HDMI Tx (v2.0b)
- DPI (Digital Display Parallel Interface) 16-bit
- DP (DisplayPort Interface) v1.4
- eDP (Embedded DisplayPort Interface) v1.4
- 2x SPDIF_IN (SONY/Philips Digital Interface Format)
- 1x SPDIF_OUT
- 1x I²S IN
- 2x I²S OUT
- 1x PCM (Pulse Code Modulation)
- 4x DMIC (Digital Microphone)

5.5.1 Video Interfaces

MediaTek MT8370 processor contains HEVC, HEIF, VP9, AV1, AVC, MPEG-4, MPEG-2, VP8 and H.263 decoders with 4K2K@60fps or 1080p@60fps.

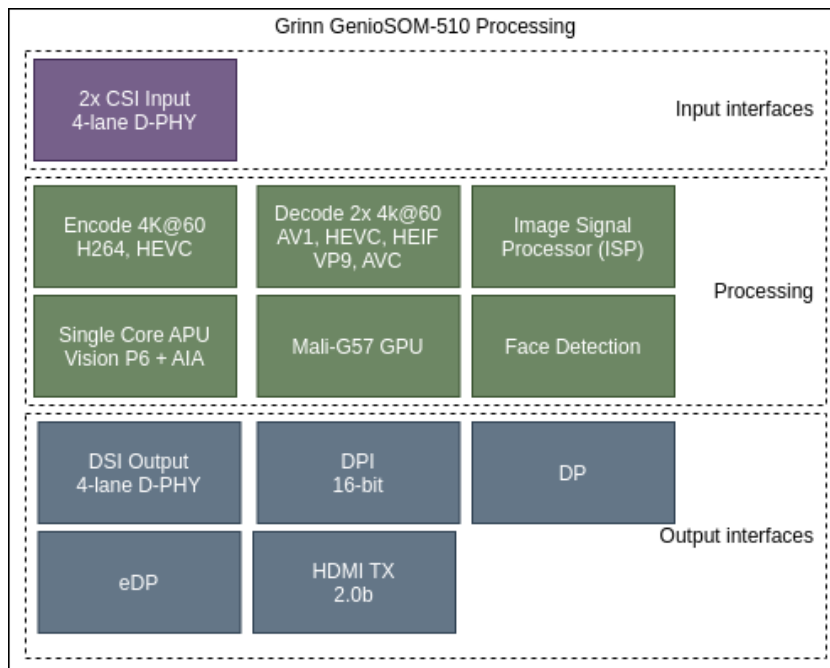


Figure 5: Grinn GenioSOM-510 video processing

Available video interfaces:

- 2x MIPI DSI 4-lane D-PHY
- HDMI Tx (v2.0b)
- DPI 16-bit
- DP v1.4
- eDP v1.4
- 2x MIPI CSI 4-lane D-PHY

5.5.2 Audio Interfaces

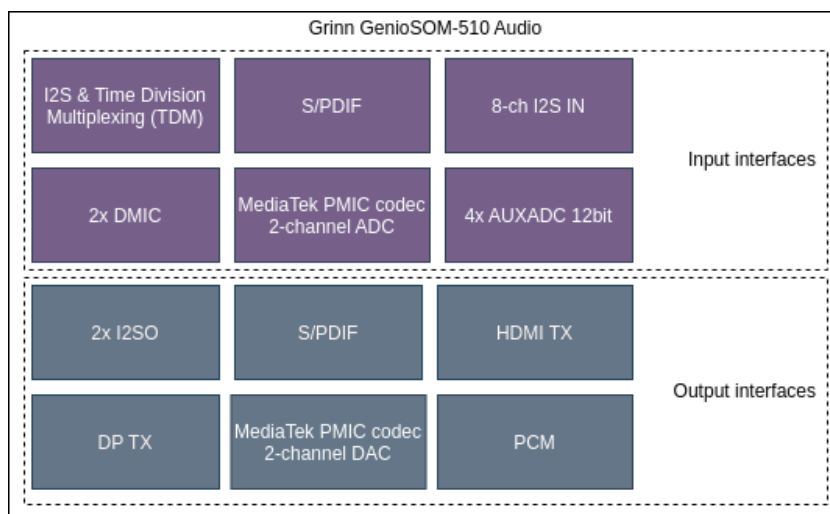


Figure 6: Grinn GenioSOM-510 audio interfaces

- 1x I2S input and 1x TDM
- 2x DMIC
- PMIC ADC 2-channel
- SPDIF IN/OUT
- 2x I2S output
- PCM output
- DP Tx
- HDMI TX
- PMIC DAC 2-channel
- PCM

5.5.3 Peripheral Interfaces

Multiple available peripheral interfaces can be used for communication with external devices.

- up to two USB 2.0 DRD/OTG
- USB 3.1 DRD
- PCIe 2.0 1-lane
- up to 6x SPI interfaces
- up to 4x high-speed UART
- up to 7x I2C interfaces
- up to 2x MSDC/eMMC/SD/SDIO
- up to 4x PWM outputs

6 Electrical Characteristics

6.1 Absolute Maximum Ratings

	Maximum	Unit
Supply voltage V _{SYS}	5	V
Supply voltage DVDD28_PIODPI	3.15	V
Supply voltage DVDD28_MSDC2	3.15	V

6.2 Recommended Operating Conditions

	Minimum	Nominal	Maximum	Unit
Supply voltage V _{SYS}	3.15	—	5	V
Supply voltage DVDD28_IODPI	1.71	3.0	3.15	V
Supply voltage DVDD28_MSDC2	1.71	3.0	3.15	V
Ambient storage temperature	-40	—	85	°C
Ambient operating temperature (Extended)	-20	—	70	°C
Ambient operating temperature (Industrial)	-40	—	85	°C

7 Mechanical Characteristics

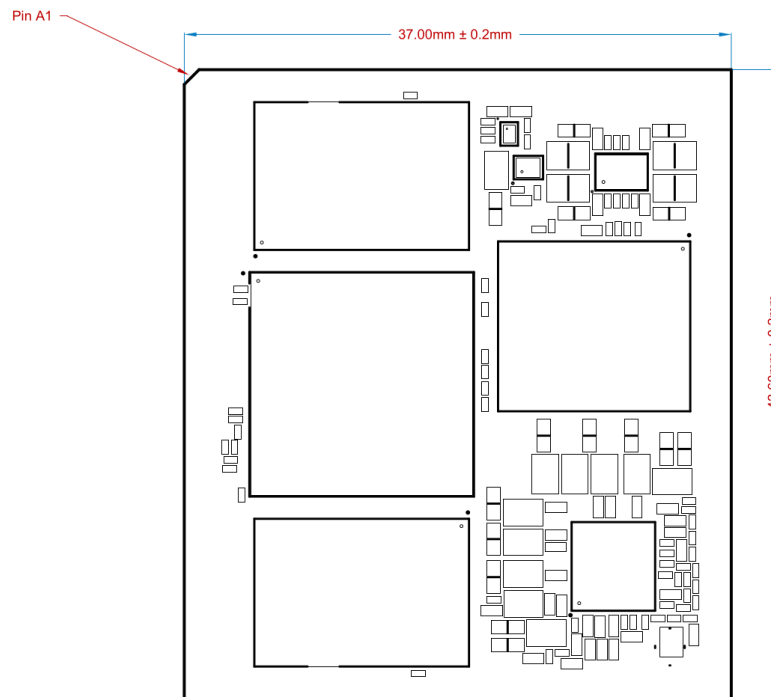


Figure 7: Grinn GenioSOM-510 top view dimensions

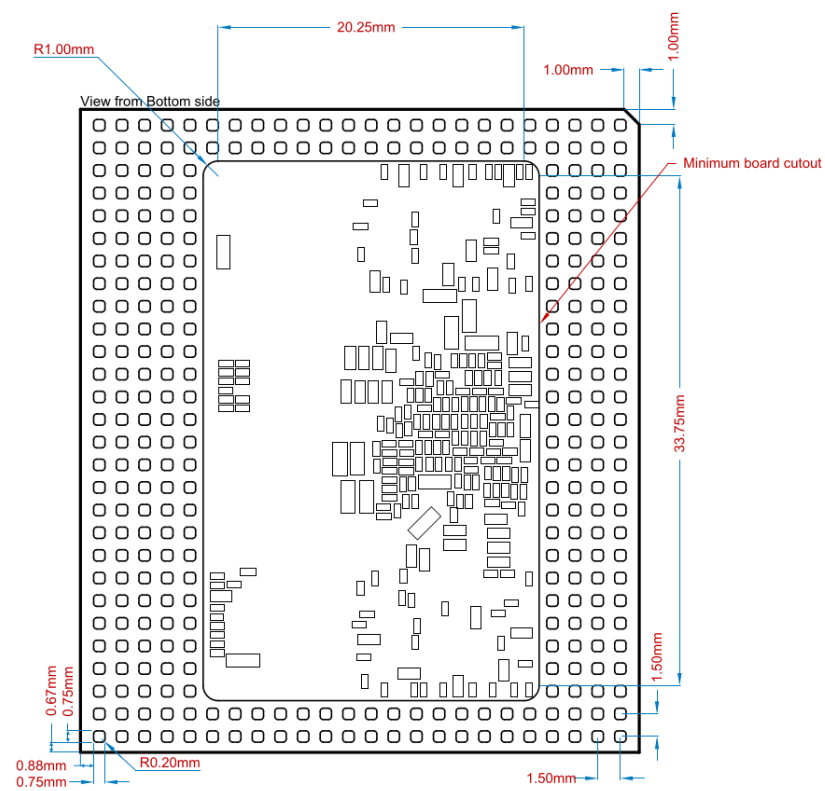
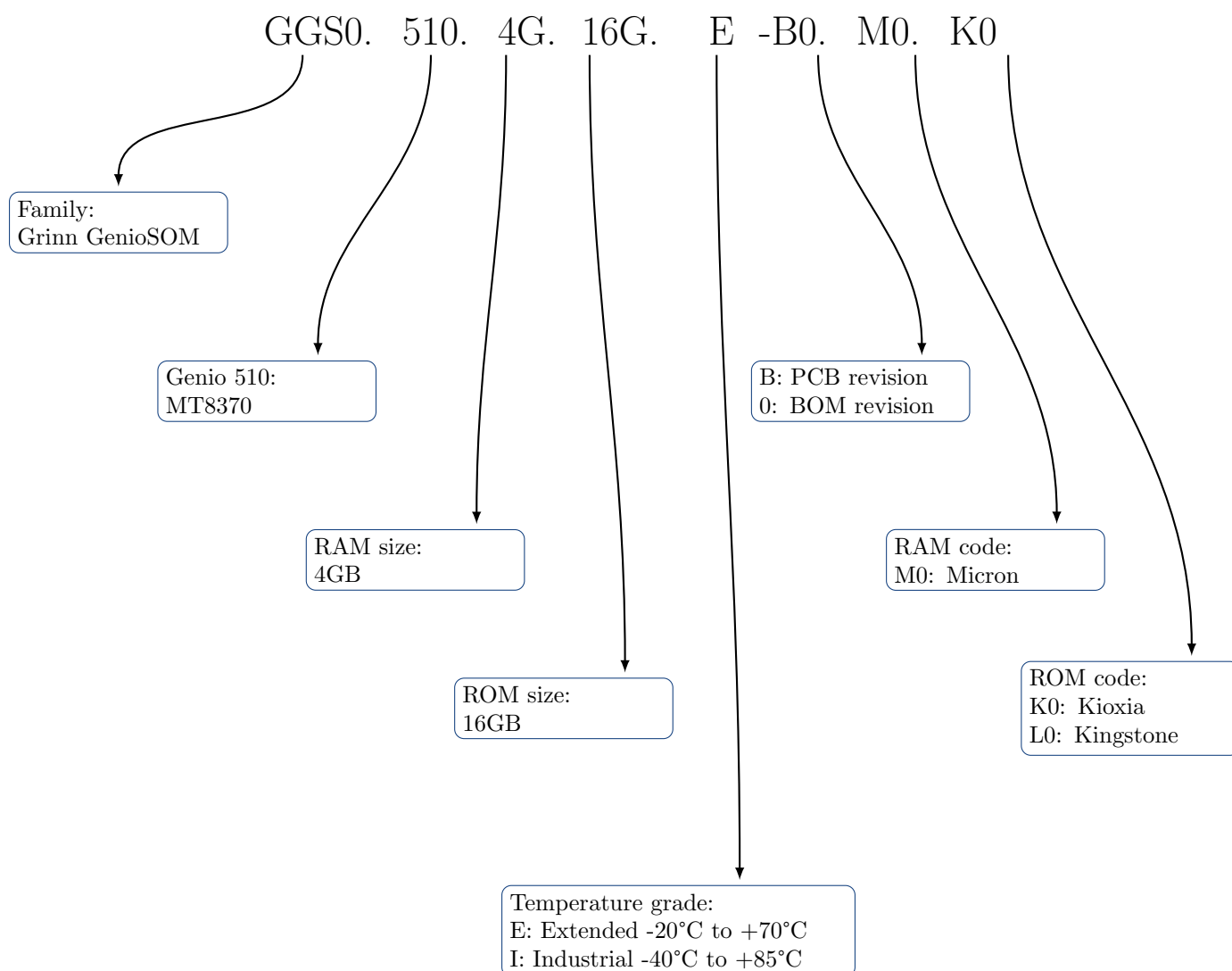


Figure 8: Grinn GenioSOM-510 bottom view dimensions

8 Ordering Information



8.1 Detailed Information on RAM Codes

Code	Manufacturer	Part Number
M0	Micron	2x MT53E512M32D1ZW-046BWT:B

8.2 Detailed Information on ROM Codes

Code	Manufacturer	Part Number
K0	Kioxia	THGAMVG7T13BAIL
L0	Kingston	EMMC16G-MW28-03010

9 Revision History

Revision	Changes
1.0	Initial revision.
1.1	Update chapters: 4, 5.4, 6.2, 7, 8.1
1.2	Update chapters 8.1, 4, 6.2, 5.4, 5.1

Grinn sp. z o. o.
Strzegomska 140a
54-429 Wrocław
Poland

www: <https://www.grinn-global.com>

office: office@grinn-global.com

phone: +48 71 716 40 99

wiki: <https://grinn-global.com/products>

technical support: support@grinn-global.com

Copyright © 2025 Grinn sp. z o. o.

All rights reserved. No part of this document may be photocopied or recorded on any electronic media without written permission of Grinn sp. z o. o.

The information contained in this documentation is subject to change without prior notice. We assume no liability for erroneous information or its consequences. Grinn sp. z o. o. reserves the right to change details in this publication without notice.

Grinn sp. z o. o. makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and products descriptions at any time without notice. Grinn sp. z o. o. does not make any commitment to update the information contained herein.

Trademarks used from other companies refer exclusively to the products of those companies. Product and company names herein may be the trademarks of their respective owners.