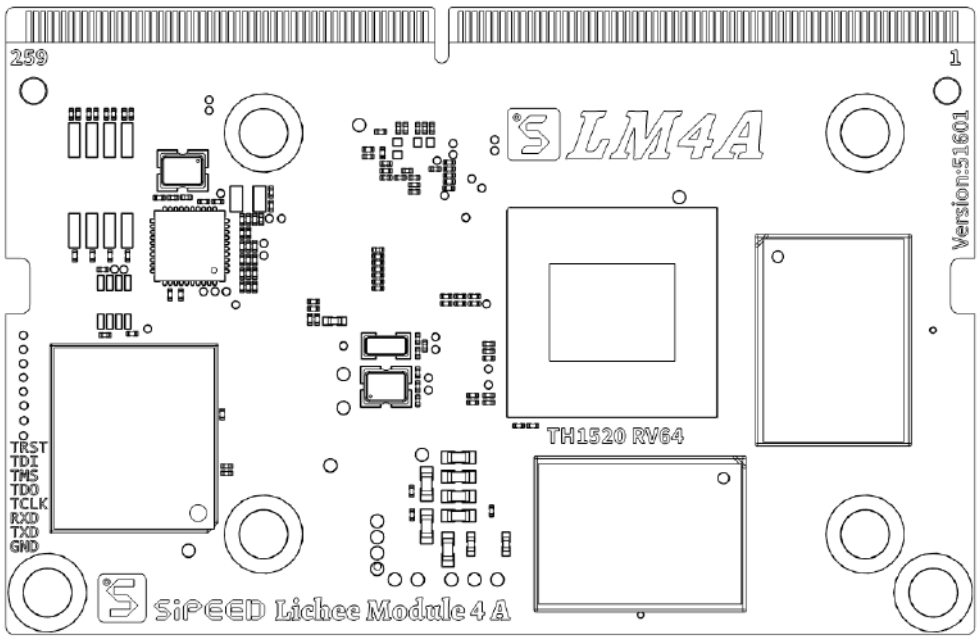
LM4A DataSheet

V1.1



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Revision History

Date	***Revision***	***Description***
2023-04-20	1.0	Initial Release
2023-04-26	1.1	Add BOOT Mode Setting Description

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Overview

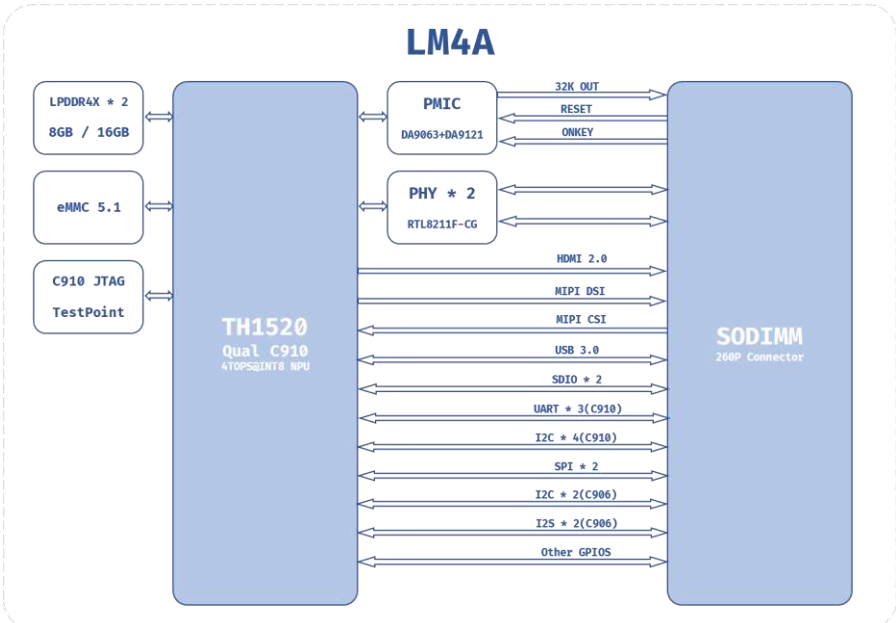
The Lichee Module 4 A (LM4A) is a single board computer powered by the Pinto TH1520 processor.

TH1520 is a low power consumption, high performance, high security, multimodal awareness and multimedia AP capability AI processor chip, which can be used in application scenarios such as face swipe payment terminal, AI edge computing, video conferencing all-in-one machine, face recognition attendance access control and smart speaker with screen. Based on multi- Based on multi-core heterogeneous architecture, the quad-core C910 and single-core C906 processors integrate RISC-V instruction architecture.

Embedded with several powerful hardware acceleration engines to provide performance-optimised high-end applications. Supports H.265/H.264/VP9 standard video encoding at up to 4K@40fps, H.265/H.264/VP9/AVS2 multi-format video decoding at up to 4K@75fps, and JPEG encoding and decoding at up to 32Kx32K.

Embedded 3D GPU is fully compatible with OpenGL ES1.1/2.0/3.0/3.1, OpenCL 1.1/1.2/2.0 and Vulkan 1.1/1.2, supports 2D acceleration engine and universal DSP accelerator.

Support for dual-channel external memory interfaces, LPDDR4/LPDDR4X, providing up to 34GB/s of storage bandwidth, and peripheral interfaces for versatile applications.



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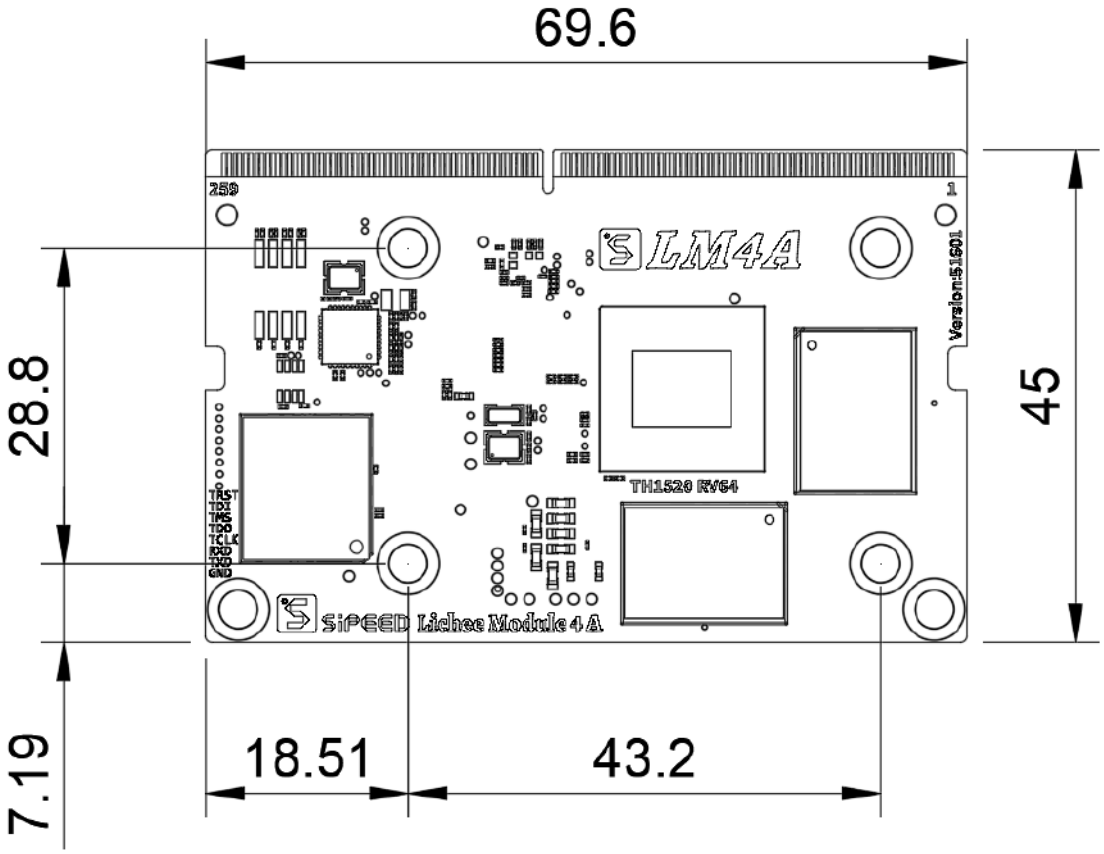
1 Key Specifications

Parameter	Description
CPU	TH1520 RISC-V 4 x C910@1.85GHz
GPU	OpenGL ES 3.2 OpenCL 1.2 Vulkan 1.2
NPU	4TOPS@INT8
Memory	4GB/8GB/16GB LPDDR4X
Storage	32/64/128GB eMMC
Ethernet	2 x Gigabit Ethernet ports
Video	1 x HDMI 1 x 4-lane MIPI DSI
Camera	2 x 2-lane MIPI CSI 1 x 4-lane MIPI CSI
Audio	2 x I2S，PDM
USB	1 x USB3.0
Others	3 x SDIO，2 x QSPI，1 x SPI，9 x I2C，8 x Uart， 6 channel PWM，8 channel ADC
OS	Debian Porting：deepin，ubuntu，openwrt
Power Input	5V/2A at least
Operating temperature	-20℃ ~ 60℃
Size	69.6*45mm
Weight	14g

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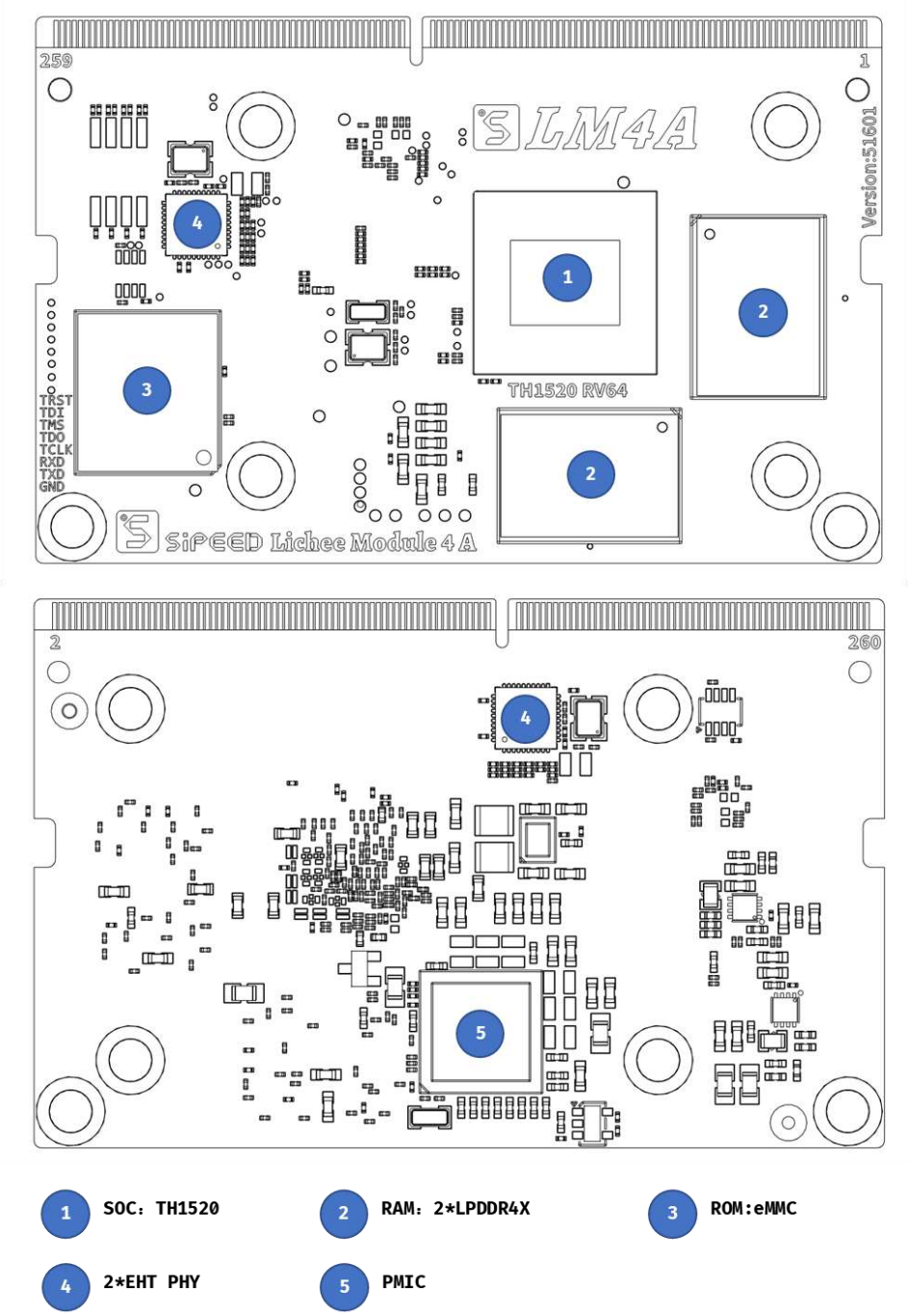
2 Dimensions and Interfaces

2.1 Size and Structure



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2.2 Function Description



1 SOC：TH1520

2 RAM：2*LPDDR4X

3 ROM:eMMC

4 2*EHT PHY

5 PMIC

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2.3 SODIMM Finger Definition

Pin Name	Pin Number		Pin Name
GND	1	2	GND
MIPI_CSI2X2_A_DATAN0	3	4	MIPI_CSI2X2_B_DATAN0
MIPI_CSI2X2_A_DATAP0	5	6	MIPI_CSI2X2_B_DATAP0
GND	7	8	GND
MIPI_CSI2X2_A_CLKN	9	10	MIPI_CSI2X2_B_CLKN
MIPI_CSI2X2_A_CLKP	11	12	MIPI_CSI2X2_B_CLKP
GND	13	14	GND
MIPI_CSI2X2_A_DATAN1	15	16	MIPI_CSI2X2_B_DATAN1
MIPI_CSI2X2_A_DATAP1	17	18	MIPI_CSI2X2_B_DATAP1
GND	19	20	GND
PDM_DIN0	21	22	NC
PDM_DIN1	23	24	NC
GND	25	26	GND
PDM_DIN2	27	28	NC
PDM_DIN3	29	30	NC
GND	31	32	GND
PDM_CLK	33	34	NC
NC	35	36	NC
GND	37	38	GND
NC	39	40	MIPI_CSI2_DATAN2
NC	41	42	MIPI_CSI2_DATAP2
GND	43	44	GND
NC	45	46	MIPI_CSI2_DATAN0
NC	47	48	MIPI_CSI2_DATAP0
GND	49	50	GND
MIPI_DSI0_DATAN2	51	52	MIPI_CSI2_CLKN
MIPI_DSI0_DATAP2	53	54	MIPI_CSI2_CLKP
GND	55	56	GND
MIPI_DSI0_DATAN3	57	58	MIPI_CSI2_DATAN1
MIPI_DSI0_DATAP3	59	60	MIPI_CSI2_DATAP1
GND	61	62	GND
HDMI_DATAN2	63	64	MIPI_CSI2_DATAN3
HDMI_DATAP2	65	66	MIPI_CSI2_DATAP3
GND	67	68	GND
HDMI_DATAN1	69	70	MIPI_DSI0_DATAN0
HDMI_DATAP1	71	72	MIPI_DSI0_DATAP0

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GND	**73**	**74**	GND
HDMI_DATAN0	**75**	**76**	MIPI_DSI0_CLKN
HDMI_DATAP0	**77**	**78**	MIPI_DSI0_CLKP
GND	**79**	**80**	GND
HDMI_CLKN	**81**	**82**	MIPI_DSI0_DATAN1
HDMI_CLKP	**83**	**84**	MIPI_DSI0_DATAP1
GND	**85**	**86**	GND
GPIO00 (JTG_TMS)	**87**	**88**	HDMI_HPD
SPI_MOSI	**89**	**90**	HDMI_SDA
SPI_SCLK	**91**	**92**	HDMI_SCL
SPI_MISO	**93**	**94**	HDMI_CEC
SPI_CSN0	**95**	**96**	NC
SPI_CSN1	**97**	**98**	JTG_TDO
UART4_TXD	**99**	**100**	BOOT_SEL2
UART4_RXD	**101**	**102**	GND
UART4_RTSN	**103**	**104**	EFUSE_SPI_SI
UART4_CTSN	**105**	**106**	EFUSE_SPI_CLK
GND	**107**	**108**	EFUSE_SPI_SO
USB_DM	**109**	**110**	EFUSE_SPI_CS
USB_DP	**111**	**112**	EFUE_BUSY
GND	**113**	**114**	CAM0_PWDN
NC	**115**	**116**	CAM0_MCLK (BOOT_SEL0)
NC	**117**	**118**	GPIO01
GND	**119**	**120**	CAM1_PWDN
NC	**121**	**122**	CAM1_MCLK (BOOT_SEL1)
NC	**123**	**124**	GPIO02
GND	**125**	**126**	GPIO03
GPIO04 (JTG_TDI)	**127**	**128**	GPIO05
GND	**129**	**130**	GPIO06
PHY1_MDI0-	**131**	**132**	GND
PHY1_MDI0+	**133**	**134**	PHY1_MDI2-
GND	**135**	**136**	PHY1_MDI2+
PHY1_MDI1-	**137**	**138**	GND
PHY1_MDI1+	**139**	**140**	PHY1_MDI3-
GND	**141**	**142**	PHY1_MDI3+
AUD0_SCL	**143**	**144**	GND
AUD0_SDA	**145**	**146**	GND
GND	**147**	**148**	PHY1_LED1/CFG_LDO0
NC	**149**	**150**	PHY1_LED2/CFG_LDO1

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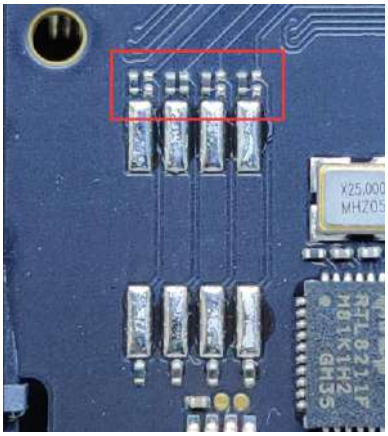
NC	**151**	**152**	GND
GND	**153**	**154**	NC
NC	**155**	**156**	NC
NC	**157**	**158**	GND
GND	**159**	**160**	NC
USB_RXM	**161**	**162**	NC
USB_RXP	**163**	**164**	GND
GND	**165**	**166**	USB_TXM
SDIO0_DAT0	**167**	**168**	USB_TXP
SDIO0_DAT1	**169**	**170**	GND
GND	**171**	**172**	SDIO0_CLK
SDIO0_DAT2	**173**	**174**	SDIO0_CMD
SDIO0_DAT3	**175**	**176**	GND
GND	**177**	**178**	MOD_SLEEP*
NC	**179**	**180**	NC
NC	**181**	**182**	SDIO0_DETN
NC	**183**	**184**	PHY_MDI0-
I2C0_SCL	**185**	**186**	PHY_MDI0+
I2C0_SDA	**187**	**188**	PHY0_LED1/CFG_LDO0
I2C1_SCL	**189**	**190**	PHY_MDI1-
I2C1_SDA	**191**	**192**	PHY_MDI1+
I2S1_DOUT	**193**	**194**	PHY0_LED2/CFG_LDO1
I2S1_DIN	**195**	**196**	PHY_MDI2-
I2S1_LRCK	**197**	**198**	PHY_MDI2+
I2S1_BCLK	**199**	**200**	GND
GND	**201**	**202**	PHY_MDI3+
UART1_TXD	**203**	**204**	PHY_MDI3-
UART1_RXD	**205**	**206**	GPIO07
AUD1_SCL	**207**	**208**	GPIO08
AUD1_SDA	**209**	**210**	PMIC_32K_OUT
GPIO09	**211**	**212**	GPIO10
I2C3_SCL	**213**	**214**	FORCE_RECOVERY*
I2C3_SDA	**215**	**216**	GPIO11
GND	**217**	**218**	GPIO12
SDIO1_DAT0	**219**	**220**	I2S2_DOUT
SDIO1_DAT1	**221**	**222**	I2S2_DIN
SDIO1_DAT2	**223**	**224**	I2S2_LRCK
SDIO1_DAT3	**225**	**226**	I2S2_SCLK
SDIO1_CMD	**227**	**228**	GPIO13
SDIO1_CLK	**229**	**230**	GPIO14

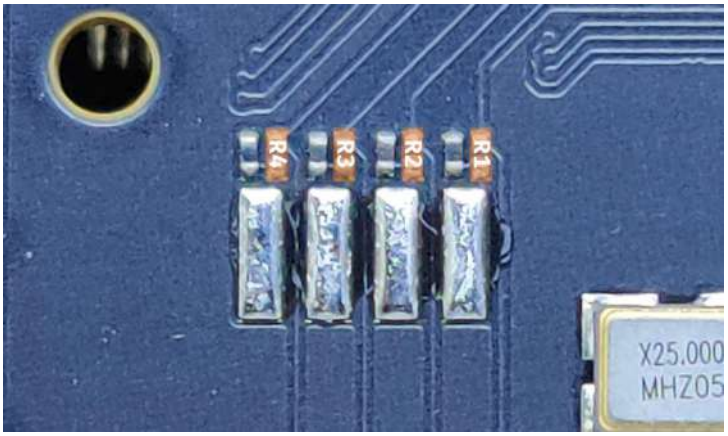
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GND	**231**	**232**	I2C2_SCL/UART2_TXD
SHUTDOWN_REQ*	**233**	**234**	I2C2_SDA/UART2_RXD
PMIC_BBAT	**235**	**236**	UART3_TXD
ONKEY	**237**	**238**	UART3_RXD
SYS_RST_N	**239**	**240**	SLEEP/WAKE* (JTG_TCLK)
GND	**241**	**242**	GND
GND	**243**	**244**	GND
GND	**245**	**246**	GND
GND	**247**	**248**	GND
GND	**249**	**250**	GND
VDD_IN	**251**	**252**	VDD_IN
VDD_IN	**253**	**254**	VDD_IN
VDD_IN	**255**	**256**	VDD_IN
VDD_IN	**257**	**258**	VDD_IN
VDD_IN	**259**	**260**	VDD_IN

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2.4 BOOT Mode Setting





R4	R3	R2	R1	Boot Mode
X	NC	X	X	USB Download
X	0R	NC	NC	eMMC Boot(Default)
X	0R	NC	0R	SD Boot, SDIO0
X	0R	0R	NC	SPI NAND boot, QSPI0, CS0
X	0R	0R	0R	SPI NOR Boot, QSPI0, CS0

Tips: [1] 0R represents FootPrint 0201 0Ω Resistance.

[2] NC represents No Connect.

[3] X represents No impact

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3 Contact and information

Item	Description
Documentation	wiki.sipeed.com/licheepi4a
QQ	559614960
Github	https://github.com/sipeed/LicheePi4A
Telergram	https://t.me/linux4rv
BBS	bbs.sipeed.com
Business Email	support@sipeed.com

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4 Operating Precautions

During the use of this product, attention must be paid to operation safety and maintenance, otherwise it may cause damage to the product, shorten its service life, and even endanger personal safety. For safe use and maintenance, attention should be paid to the following aspects:

- This product is a high-precision electronic product. Please do not collide or fall.
- Although the Class1 laser used in this product meets the safety standards for human eyes, it is not recommended to look directly at the laser for a long time to avoid discomfort.
- Do not place this product in a place with high temperature or direct sunlight.
- Do not disassemble or modify this product without permission to prevent damage to the components of the product.
- Do not touch the product to avoid leaving fingerprints and other pollutants affecting the image effect.
- Please keep this product out of the reach of children to prevent accidents.
- Please follow the manual for correct and safe operation.

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