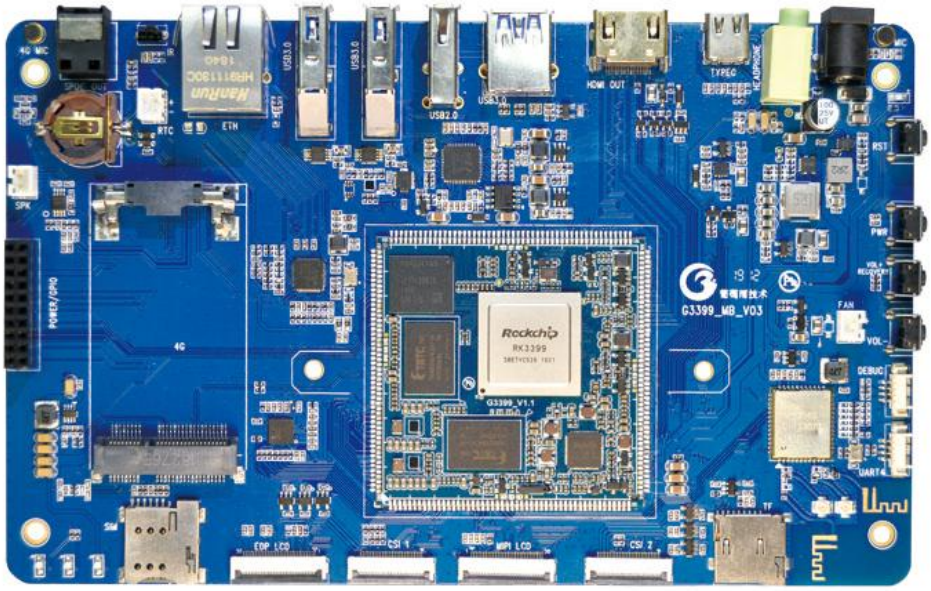
G3399 Development Board Hardware Manual



Shenzhen Graperain Technology Co., Ltd.
www.graperain.com

Copyright Statement

Attention:

The manuals of development platform on sell will be updated from time to time, please download the latest manual from website www.graperain.com or contact our company sales representative, there would be no further notice.

Release notes

Version	Release Date	Author	Description
Rev.01	2018-12-31	David	Revision

Technical Support

Any questions about the manuals, you can call our landline or email us.

Website: http://www.graperain.com
Landline: +86 755 23025312
E-mail: supports@graperain.com

Sales and service network

Shenzhen Graperain Technology Co., Ltd.
Website: http://www.graperain.com
Landline: +86 755 23025312
E-mail: sales@graperain.com
Address: Room 328-329, Building A, Huafeng Tech. & Innov. Park Baoan Wisdom Valley, Xixiang, Baoan Dist.Shenzhen, Guangdong. Post code 518101.

Contents

Chapter 1 G3399 Development Board Introduction

1.1 Brief Introduction

G3399 dev board is based on Rockchip RK3399 (64bit) chip platform, which is designed by Shenzhen Graperain Technology Co., Ltd..

G3399 dev board consists of GR3399 stamp hole SOM and carrier board.

G3399 platform is based on Rockchip RK3399, 64 bit 6-core, work-station-level processor. It's Dual-core Cortex-A72 + Quad-core Cortex-A53. The frequency is up to 2.0GHz. The new kernel is almost 100% performance up than A15/A17/A57.

Integrated with ARM Mali-T860 MP4 graphics processor, supports OpenGL ES1.1/2.0/3.0/3.1, OpenVG1.1, OpenCL, Directx11, AFBC (ARM Frame Buffer Compression). Such powerful GPU supports H.265HEVC and VP9, H.265 encode and 4K HDR. And it can be applied to computer vision, learning machine, 4K 3D etc..

Interfaces: Dual MIPI-CSI, dual ISP, PCIe, USB3.0, USB2.0, TypeC etc.

G3399 development board is designed with 2GB/4GB DDR, 8GB/16GB/32GB eMMC, independent power management system, Ethernet and rich interfaces.

It supports Android7.1, Linux and Debian. Source code are open.

Applications: high-definition display with advertising machine, vending machines, teaching terminals, automatic identification, robotics, security monitoring, financial POS, vehicle control terminals, VR, etc..

With the dev board to test, it will accelerate product develop time.

G3399 dev board features:

- Size: 186.5mm*115.6mm, can be used in final product.
- Powerful functions, rich interfaces, wide applications.
- Supports Android7.1, Linux, Ubuntu, Debian. Source code open, accelerate develop time.
- Stable and reliable board.

1.2 Specifications

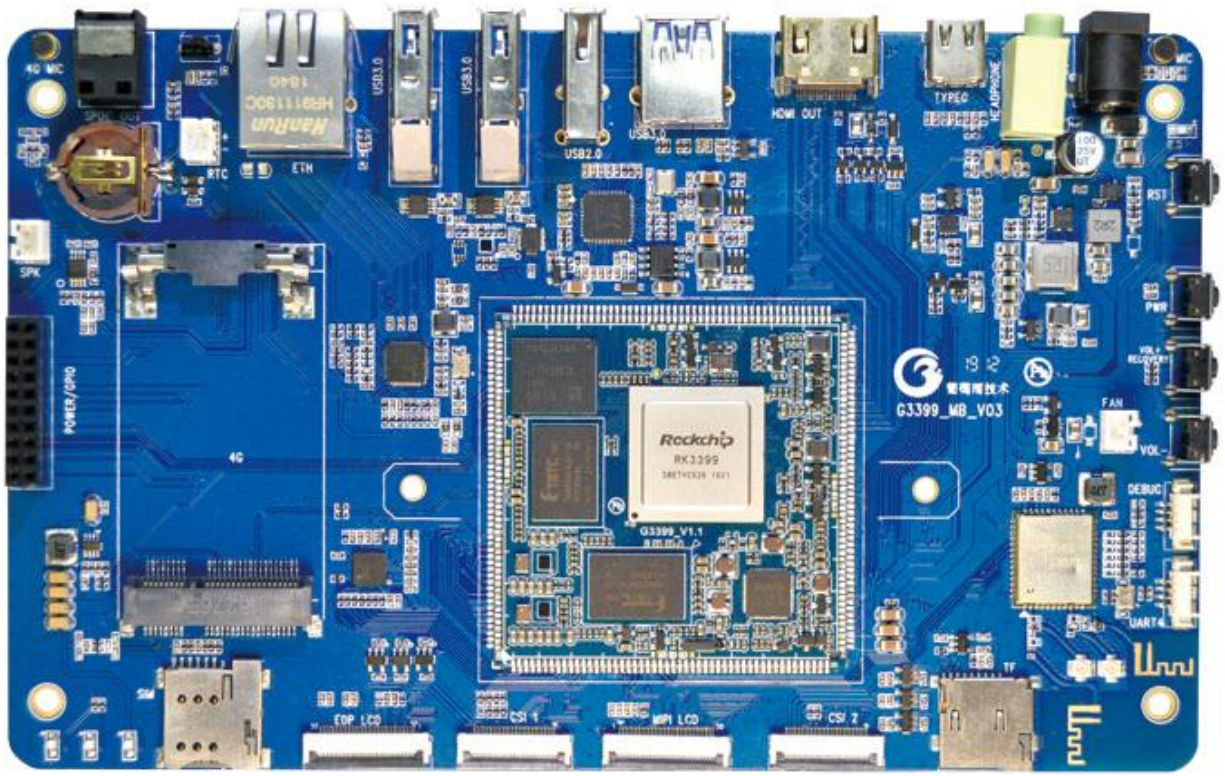
Parameters	
Appearance	Stamp hole SOM + carrier board
Size	186.5mm*115.6mm
Layer	SOM 8-layer/carrier board 4-layer

System Configuration	
CPU	Rockchip RK3399
Frequency	Cortex A53 quad core 1.4GHz + dual core A72 (2GHz)
RAM	standard 2GB, can be custom to 4GB
eMMC	4GB/8GB/16GB/32GB eMMC optional, standard 8GB
Power IC	RK808, dynamic frequency modulation
Graphic and video processor	Mali-T860 MP4, quad core GPU Support OpenGL ES 1.1/2.0/3.0/3.1, Openvg1.1, OpenCL, Directx11 Support 4K VP9 and 4K 10bits H265/H.264 video encoder, up to 60 fps 1080P multi-form video encoder 1080P video encoder, H.264, VP8

Interfaces parameters	
Display	MIPI , eDP output
Ethernet	RTL8211E Gigabit PHY
Touch	Capacitive touch,can use USB or UART to extend resistive touch
Audio	AC97/IIS/PCM, support record and play
SD	2 channel SDIO output
eMMC	On board eMMC
Ethernet	Gigabit
USB HOST	2 channel HOST2.0, 1 channel HOST3.0
USB TYPEC	1 channel
UART	5 channel UART, support flow control uart
PWM	2 channel PWM output
IIC	6 channel IIC output
SPI	1 channel SPI output
ADC	5 channel ADC
Camera	2 channel MIPI output
HDMI	High-definition audio and video output, Audio and video synchronization output
MIPI	1channel MIPI RX, 1 channel MIPI TX, 1 channel MIPI RX/TX
eDP	Support
PCIE	Support

Electrical characteristics	
Input Voltage	12V
Output Voltage	12V/5V/3.3V
Storage temperature	-30~80 degree
Working temperature	-20~70 degree

1.3 Dev Board Appearance



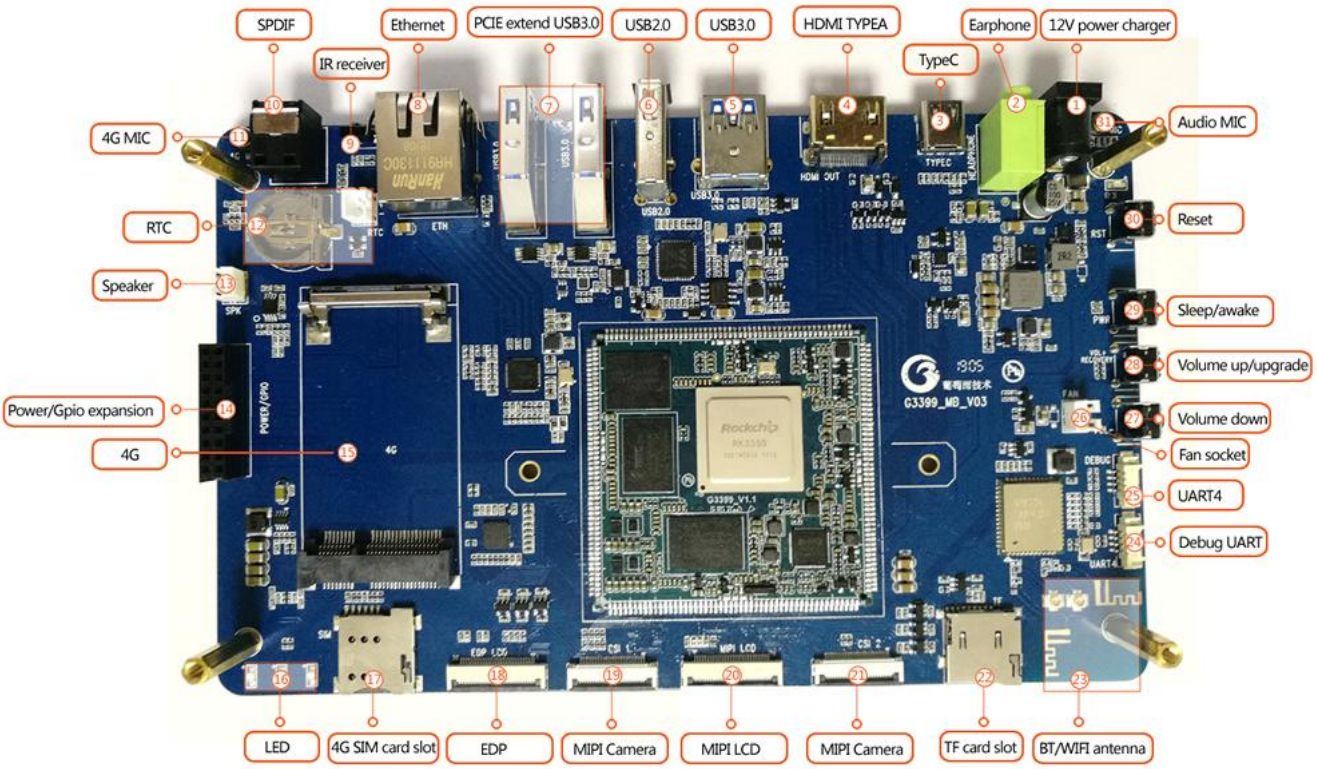
Dev board front side

1.4 SOM Appearance

Please refer to *G3399 Stamp Hole System on Module Introduction.pdf*.

Chapter 2 Dev Board Hardware Manual

2.1 Hardware Interfaces Description



Interfaces details		
Number	Name	Description
【1】	12V power charger	12V power input
【2】	Earphone	Audio earphone output
【3】	TypeC	TypeC
【4】	HDMI TypeA	HDMI TypeA output
【5】	USB3.0	USB3.0
【6】	USB2.0	USB2.0 host
【7】	PCIE extend USB3.0	PCIE extend USB3.0
【8】	Ethernet	RJ45
【9】	IR receiver	IR receiver
【10】	SPDIF OUT	SPDIF output
【11】	4G Mic	4G communication record
【12】	RTC	RTC
【13】	Speaker	Speaker
【14】	Power/Gpio	Power/Gpio expansion

	expansion	
【15】	4G	4G
【16】	LED	Controllable LED
【17】	4G SIM card slot	4G SIM card slot
【18】	EDP	EDP LCD
【19】	MIPI camera	MIPI camera 1
【20】	MIPI LCD	MIPI LCD
【21】	MIPI camera	MIPI camera 2
【22】	TF card slot	TF card slot
【23】	BT/WIFI antenna	BT/WIFI antenna
【24】	Debug UART	Debug UART
【25】	Uart4	Uart4
【26】	Fan socket	Fan socket, 12V power supply
【27】	Volume down	Volume down
【28】	Volume up/upgrade	Volume up/upgrade
【29】	Sleep/awake	Sleep/awake
【30】	Reset	Reset
【31】	Audio MIC	Audio recording MIC

2.2 G3399 SOM Pin Definitions

Pin Definitions 1			
PIN No.	Signal	PIN No.	Signal
1	I2C1_SDA	26	UART0_RXD
2	I2C1_SCL	27	GPIO_D4
3	I2S1_SCLK	28	PMU_RESET
4	I2S1_SDO0	29	GPIO4_D6
5	I2S1_SDI0	30	GPIO4_D1
6	I2S1_LRCK_TX	31	GPIO4_D3
7	I2S1_LRCK_RX	32	PMIC_EXT_EN
8	I2S_CLK	33	RTC_CLKO_WIFI
9	I2S0_SCLK	34	VCC_RTC
10	I2S0_LRCK_RX	35	PWM1
11	I2S0_LRCK_TX	36	PWM0
12	I2S0_SDI0	37	POWER_KEY
13	I2S0_SDI1	38	GPIO2_D3
14	I2S0_SDO0	39	GPIO2_D4
15	I2S0_SDO1	40	GPIO4_D2
16	I2S0_SDO2	41	GPIO4_D5

17	SDIO0_D0	42	VCC3V3_S5
18	SDIO0_D1	43	SPDIF_TX
19	SDIO0_D2	44	UART2DBG_RX
20	SDIO0_D3	45	UART2DBG_TX
21	SDIO0_CMD	46	I2C_SDA_HDMI
22	SDIO0_CLK	47	I2C_SCL_HDMI
23	UART0_RTS	48	HDMI_CEC
24	UART0_TXD	49	PORT_PHD
25	UART0_CTS	50	VCC_CHAREG_EN

Pin Definitions 2			
PIN No.	Signal	PIN No.	Signal
51	VCC3V3_SYS	76	MIPI_TX0_D2N
52	VCC3V3_SYS	77	MIPI_TX0_D2P
53	GND	78	MIPI_TX0_CLKN
54	MIPI_TX1/RX1_D0N	79	MIPI_TX0_CLKP
55	MIPI_TX1/RX1_D0P	80	MIPI_TX0_D1N
56	MIPI_TX1/RX1_D1N	81	MIPI_TX0_D1P
57	MIPI_TX1/RX1_D1P	82	MIPI_TX0_D0N
58	MIPI_TX1/RX1_CLK	83	MIPI_TX0_D0P
59	MIPI_TX1/RX1_CLK	84	GND
60	MIPI_TX1/RX1_D2N	85	HDMI_TXCN
61	MIPI_TX1/RX1_D2P	86	HDMI_TXCP
62	MIPI_TX1/RX1_D3N	87	HDMI_TX0N
63	MIPI_TX1/RX1_D3P	88	HDMI_TX0P
64	MIPI_RX0_D3N	89	HDMI_TX1N
65	MIPI_RX0_D3P	90	HDMI_TX1P
66	MIPI_RX0_D2N	91	HDMI_TX2N
67	MIPI_RX0_D2P	92	HDMI_TX2P
68	MIPI_RX0_CLKN	93	TYPEC0_SBU1_DC
69	MIPI_RX0_CLKP	94	TYPEC0_SBU2_DC
70	MIPI_RX0_D1N	95	TYPEC0_SBU2
71	MIPI_RX0_D1P	96	TYPEC0_SBU1
72	MIPI_RX0_D0N	97	TYPEC0_RX1N
73	MIPI_RX0_D0P	98	TYPEC0_RX1P
74	MIPI_TX0_D3N	99	TYPEC0_TX1P
75	MIPI_TX0_D3P	100	TYPEC0_TX1N

Pin Definitions 3			
PIN No.	Signal	PIN No.	Signal
101	TYPEC0_RX2N	126	ADC_IN0
102	TYPEC0_RX2P	127	VCC1V8_S3
103	TYPEC0_TX2P	128	GPIO2_D2

104	TYPEC0_TX2N	129	GPIO0_A4
105	TYPEC0_DM	130	GPIO0_B2
106	TYPEC0_DP	131	GPIO0_B1
107	USB3_SSTXP	132	GPIO0_A3
108	USB3_SSTXN	133	EDP_TX3P
109	USB3_SSRXP	134	EDP_TX3N
110	USB3_SSRXN	135	EDP_TX2P
111	USB3_DM	136	EDP_TX2N
112	USB3_DP	137	EDP_TX1P
113	HOST0_DM	138	EDP_TX1N
114	HOST0_DP	139	EDP_TX0P
115	HOST1_DM	140	EDP_TX0N
116	HOST1_DP	141	EDPAUXP
117	PCIE_RX0_P	142	EDPAUXN
118	PCIE_RX0_N	143	SDMMC0_CLK
119	PCIE_TX0P	144	SDMMC0_D3
120	PCIE_TX0N	145	SDMMC0_D2
121	PCIE_REF_CLKN	146	SDMMC0_D1
122	PCIE_REF_CLKP	147	SDMMC0_D0
123	TYPEC0_U2VBUS	148	SDMMC0_CMD
124	ADKEY_IN	149	SDMMC0_DET_L
125	ADC2	150	SDMMC0_PWR_H

Pin Definitions 4			
PIN No.	Signal	PIN No.	Signal
151	GPIO0_B3	176	GPIO2_A7
152	GPIO0_B0	177	GPIO2_A1
153	GPIO1_A1	178	GPIO2_A0
154	GPIO1_A0	179	GPIO2_B1
155	I2C4_SCL	180	GPIO2_B2
156	I2C4_SDA	181	GIO4_D0
157	IR_RX	182	GND
158	GPIO0_A2	183	MAC_RXCLK
159	GPIO0_B4	184	MAC_MCLK
160	GPIO0_B5	185	MAC_MDC
161	GPIO1_A4	186	MAC_RXD3
162	GPIO1_A3	187	MAC_RXD2
163	GPIO1_A2	188	MAC_RXD1
164	GPIO1_A7	189	MAC_RXD0
165	GPIO1_B0	190	MAC_COL
166	GPIO1_B2	191	MAC_TXCLK
167	GPIO1_B1	192	MAC_REX/INT
168	GPIO1_D0	193	MAC_CRS

169	GPIO1_C2	194	MAC_TXD0
170	GPIO1_C4	195	MAC_TXD1
171	GPIO1_C6	196	MAC_TXD2
172	GPIO1_C7	197	MAC_TXD3
173	GPIO1_B5	198	MAC_TXEN
174	GPIO2_B3	199	MAC_MDIO
175	GPIO2_B0	200	MAC_RXDV

Note: more details of G3399 SOM, please refer to *G3399 System on Module Introduction.pdf*.

Chapter 3 Hardware Design

3.1 Design Reference

If use G3399 platform for product design and development, related to power supply, USB, HDMI, eDP, LVDS, audio, network (Ethernet, WIFI, Bluetooth), camera etc., can refer to our carrier board design. the circuit and layout of those parts are open to customers.

Chapter 4 Product Portfolio

4.1 System on Module Series

G4418 SOM(Samsung S5P4418)
G6818 SOM(Samsung S5P6818)
G3288 SOM(Rockchip RK3288, stamp hole)
GR3288 SOM (Rockchip RK3288 Immersion Gold MXM)
GR3128 SOM(Rockchip RK3128 Immersion Gold MXM)
GR3399 SOM(Rockchip RK3399 Immersion Gold MXM)
M9 SOM(Qualcomm 8916, 8953)

4.2 Development Board Series

G4418 development board (Samsung S5P4418)
G6818 development board (Samsung S5P6818)
G3288 development board (Rockchip RK3288 stamp hole)
GR3288 development board (Rockchip RK3288 Immersion Gold MXM)
G3399 development board (Rockchip RK3399 stamp hole)
GR3399 development board (Rockchip RK3399 Immersion Gold MXM)

4.3 Single Board Computer (SBC) Series

G4418 single board computer (Samsung S5P4418)
G6818 single board computer (Samsung S5P6818)
G3128 single board computer (Rockchip RK3128)
G3288 single board computer (Rockchip RK3288)
G3399 single board computer (Rockchip RK3399)

Instructions: More information and other products, please pay attention to website or contact us directly.
www.graperain.com