



VC0738BTAA

Brief Data Sheet

Revision 0.21

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Revision Table				
Date	Rev.	Author	Content of revision	Approval
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2014-4-29	0.20	Wan Hongxing	Update Ball function description	
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1 Introduction

1.1 Overview

The Vimicro VC0738BTAA is a multimedia processing SoC which is dedicated to the application of digital video surveillance system, which integrates ARM9 processor, a hardware H.264 video codec, a 2D graphics engine, some storage interfaces and many peripheral interfaces.

VC0738BTAA supports H.264 encoding which may be two channels with full HD 1080P@60fps, eight channels with 720P@20fps, or maximum to eight channels SD(D1 or 960H)@25fps, or 16 channels CIF@25fps. At the same time, the integration of H.264 decoder can support one 1080P@60fps, or 4 channels 720P/SD(D1 or 960H)@25fps, or 16 channels CIF@25fps decoding.

Through the integration of 10M/100M Ethernet MAC with integrated Ethernet PHY, VC0738BTAA can be connected to the Ethernet to realize the transmission and control of communications and other functions of the video stream. VC0738BTAA can also be connected to network through the USB, SDIO interface with WIFI or 3G interface module.

VC0738BTAA integrate 2 SATA interfaces, which can be connected to the hard disk and other equipment to as storage of audio and video stream. VC0738BTAA can also use a USB adapter, SDIO interface to connect to the SD card or other storage device.

Display and graphics engine of VC0738BTAA can support full HD resolution of 1920X1080, and also support integration of HDMI, VGA, CVBS, LCD and other video output interface circuit.

VC0738BTAA external 16/32bits DDR3 is compatible with JEDEC standard, which support data rates of up to 1600 Mb/s (800 MHz) in TSMC 55GP.

As a high performance, high integration SOC, VC0738BTAA is used mainly for the DVR. And also meet a simple scene HD IPC application and NVR application

1.2 Typical Applications:

The VC0738BTAA is a professional high-end system-on-chip (SoC) designed for multi-channel 960H/D1 and high-definition (HD) digital video recorders (DVRs) and

network video recorders (NVRs). With a high-performance ARM926 processor, an engine supporting up to 8-channel D1/16-channels CIF real-time encoding and decoding, the VC0738BTAA meets the rising demand for HD and network applications. The VC0738 also provides an outstanding video engine, various encoding/decoding algorithms, and multi-channel HD output capability.

These features guarantee users a high-quality image experience. In addition, the VC0738 supports various highly-integrated peripheral interfaces to meet customer requirements for functionality, features, and image quality, while reducing the engineering bill of material (EBOM) cost. The VC0738 is applicable to the following typical scenarios:

DVR

- DVR for 4xD1/960H@25fps+4xCIF/480H@25fps encoding + 4xD1/960H@25fps decoding
- DVR for 4x720P@25fps+4xD1 @25fps encoding + 4x720P@25fps decoding
- DVR for 8xD1/960H@25fps+8xCIF/480H@25fps encoding + 4xD1/960H@25fps decoding
- DVR for 8x720P@20fps+8xD1 @20fps encoding + 1x720P@20fps decoding
- DVR for 16xCIF@25fps encoding+16xQCIF @25fps encoding + 16xCIF@25fps decoding
- DVR for 16xD1 @>20fps+16xCIF encoding + 16xD1 @>20fps decoding

NVR

- NVR for 4xD1/4x960H@25fps decoding
- NVR for 4x720P@25fps decoding
- NVR for 1x1080P@60fps decoding

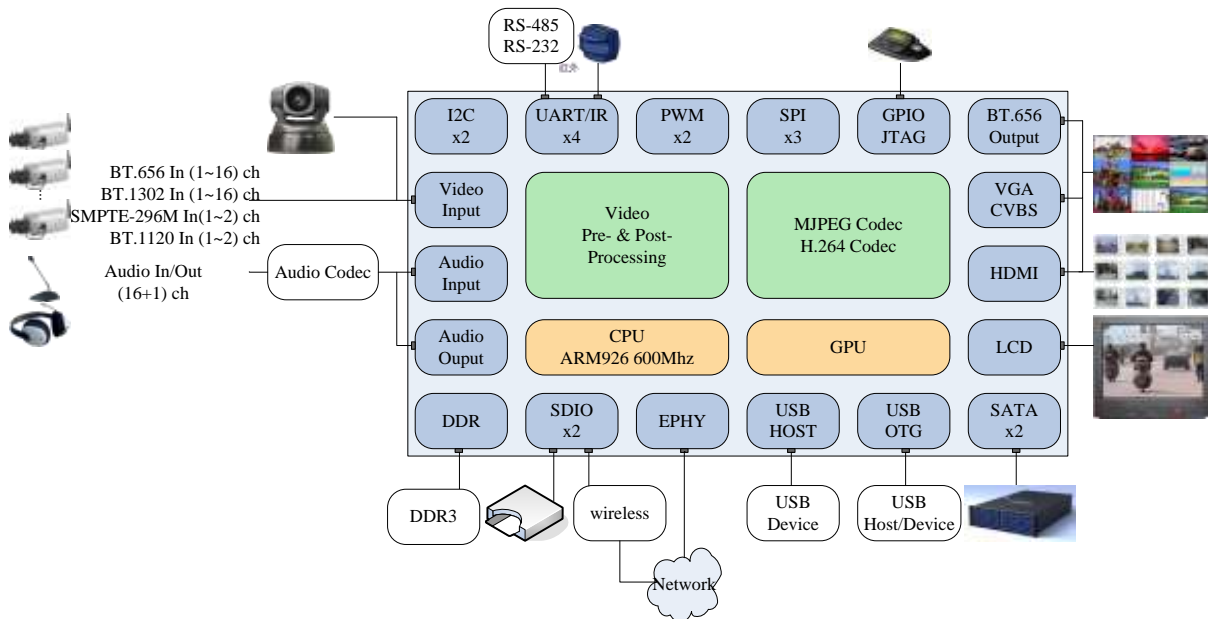
IPC

- IPC for 1x1080P@60fps real-time encoding

1.3 Key Specification

1.3.1 Overview

Figure 1-1 Show the logic block diagram



1.3.2 Process Core

The VC0738BTAA uses the ARM926 with the maximum frequency 600MHz

- 16K Bytes I-cache and 16K Bytes D-cache
- 2 32bit Timer, each 32bit timer can be divided into 2 16bit timer

1.3.3 Video Encoding and Decoding Protocols

- H.264 Baseline Profile Level 4.2
- H.264 Main Profile Level 4.2
- H.264 High Profile Level 4.2
- MJPEG/JPEG Baseline

1.3.4 Video Encoding and Decoding

- H.264 encoding of multiple streams
 - No B frame support
 - 16xCIF@25fps + 16xQCIF@25fps
 - 4xD1@25fps + 4xCIF@25fps
 - 4x960H@25fps + 4x480H@25fps
 - 4x720P@25fps + 4xD1@25fps
 - 8xD1@25fps + 8xCIF@25fps
 - 8x720P@20fps + 8xD1@20fps
 - 1x1080P@30fps+ 1xD1@30fps + 1xCIF@30fps
 - 1x1080P@60fps with 1/2 pixel resolution
 - CBR/VBR

- H.264 Decoding of multiple streams
 - No B frame support
 - 4xD1@25fps
 - 4x960H@25fps
 - 4x720P@25fps
 - 8xD1@25fps
 - 8x960H@25fps
 - 16xCIF@25fps
 - 1x1080P@60fps

- MJPEG/JPEG Encoding and Decoding
 - When recording with H.264, maximum support 1080P@5fps
 - When Only JPEG encoding, support maximum 5M@5fps
 - Decoding the same as encoding

1.3.5 Intelligent Video Analysis

- Motion detection
- Boundary security
- Video diagnosis
- Invisible watermark

1.3.6 Video and Graphic Processing

- Video pre- and post-processing, including frame dropping, lens cover detection, de-interlacing, image enhancement, edge enhancement, and 3D denoising
- Anti-flicker for output videos and graphics
- 1/64x to 16x video scaling
- 1/64x to 16x graphic scaling
- Flip/Mirror
- On-screen display (OSD) overlay of whole video or graphic layer before encoding
- POP
- Alpha blending of video layers and graphics layers
- Progressive conversion to interlaced (mainly used for standard BT656 and CVBS output)

1.3.7 Graphic engine

- Bit blit, stretch blit, pattern blit and fast clear
- Line drawing
- Rectangle fill and clear
- Mono expansion for text rendering
- Anti-aliased font support
- ROP2, ROP3, ROP4
- Alpha blending
- 90/180/270 degree rotation
- Vertical and Horizontal mirror
- Transparency by monochrome mask, chroma key or pattern mask
- High quality 9-tap filter for scaling
- 32K x 32K coordinate system
- Color space conversion between YUV and RGB for both BT709 and BT601
- Clipping window
- Color Index Input conversion Support
- Filter Blit
- Input Formats: (Only Filter Blit support YUV input)
 - A1R5G5B5
 - A4R4G4B4
 - A8R8G8B8
 - X1R5G5B5
 - X4R4G4B4
 - X8R8G8B8
 - RGB565

-
- NV12 (semi-planer YUV420)
 - NV16 (semi-planer YUV422)
 - YUY2(package YUV422)
 - UYVY(package YUV422)
 - YV12(planer YUV420)
 - 8-bit color index
 - 1-bit monochrome
- The output data Formats:
 - A1R5G5B5
 - A4R4G4B4
 - A8R8G8B8
 - X1R5G5B5
 - X4R4G4B4
 - X8R8G8B8
 - RGB565
 - YUV422 interlaced

1.3.8 Audio Encoding and Decoding

- ADPCM,G711 and G726 hardware encoding with maximum 17 streams
- G723 and G729 software encoding
- Software decoding complying with various protocols

1.3.9 Video Interfaces

- Video input interfaces
 - 4xBT656@27/54/108MHz for 16 real-time inputs
 - 4x960H@36/72/144MHz for 16 real-time inputs
 - 2x720P@30fps/60fps for 2 real-time inputs (SMPTE-296M)
 - 4x720P@30fps for 8 real-time inputs (one port mulplex two 720P bitstream)
 - 2x1080P@148.5MHz for 2x1080P real-time inputs (one is DVP, one is BT1120)
- Video output interfaces
 - HDMI 1.3+VGA+CVBS outputs, The HDMI and VGA outputs can share the same source

-
- 1xLCD and 1xBT656@27Mhz digital video output. The BT.656 and CVBS outputs share the same source
 - Maximum 1080P@60fps for HDMI or VGA
 - Graphics layers can support ARGB8888, RGB unpacked in 32bits, ARGB5555,RGB565 in 16bits, with the maximum resolution of 1920x1080

1.3.10 Audio Interfaces

The VC0738BTAA has three inter-IC sound (I2S) interfaces. The details are as follows:

- Two for inputs
- One for output
- Audio format support 8bit/16bits sampling, the sampling rate are 8K,16K,32K and 48K
- Configurable master/slave mode

1.3.11 Ethernet Port

The VC0738BTAA has one built-in megabit media access port. The details are as follows:

- MII mode
- 10/100 Mbit/s full-duplex or half-duplex mode
- Integrated EMAC PHY

1.3.12 SATA Port

The VC0738BTAA has two SATA ports. The details are as follows

- Integrated SATA controller and PHY
- Two serial advanced technology attachment 2.6 (SATA2.6) interfaces. Maximum speed up to 3Gbps
- Support external SATA PM extended SATA equipment

1.3.13 USB Port

The VC0738 has two universal serial bus 2.0(USB2.0) ports. The details are as follows:

-
- Integrated USB2.0 controller + PHY
 - One HOST
 - One OTG

1.3.14 Peripherals

The VC0738BTAA has the following peripheral interfaces:

- Four universal asynchronous receiver transmitter (UART) interfaces
- Two inter integrated circuit (I2C) interfaces
- Three serial peripheral (SPI) interfaces
- Two secure digital input/output 2.0 (SDIO2.0) interface
- Two pulse width modulation (PWM) interfaces
- Multiple general purpose input/output (GPIO) interfaces

1.3.15 Memory Interfaces

The VC0738BTAA has the following memory interfaces:

- One external 16- or 32-bit DDR3 synchronous dynamic random access memory controller interface
 - Maximum frequency of 800Mhz
 - Support up to 512MB
 - One-die termination (ODT)
 - Automatic power consumption control
- SPI NOR flash interfaces
 - 1 bit SPI NOR flash interfaces
 - ✓ Maximum capacity of 32 MB for CS
- Built-in 16KB BOOTROM and 32KB SRAM

1.3.16 Physical Specifications

- Power consumption
- **2.5 W** maximum power consumption
- Multi-level power-saving control

-
- Operating voltage
 - 1.0 V core voltage
 - 3.3/2.8/2.5/1.8V I/O voltage and 5 V margin voltage
 - 1.5 V DDR3 SDRAM interface voltage
 - Operating temperature ranging from -20°C to +85°C
 - Package
 - Wire bonding fine ball grid array 441 (FBGA441)
 - Body pitch: 0.8 mm (0.031 in.)
 - Body size: 19mm x 19 mm (0.75 in x 0.75 in.)

1.4 Boot Modes

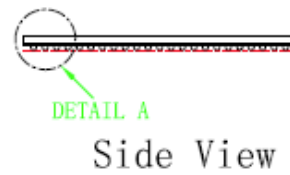
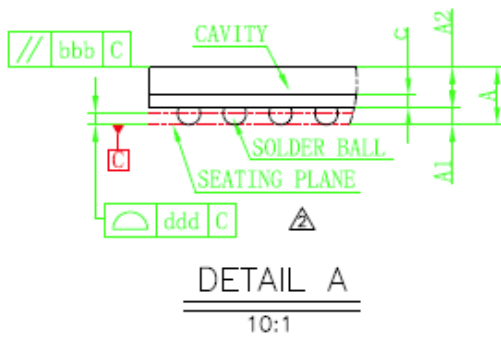
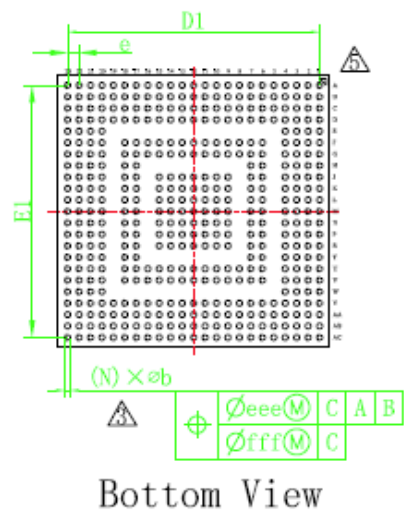
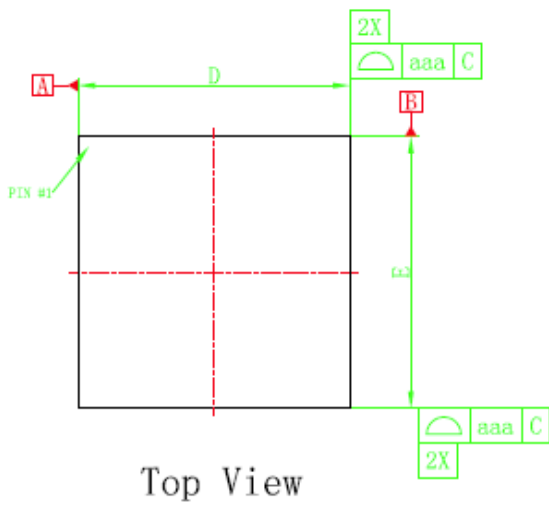
The VC0738BTAA can boot from:

- BOOTROM as first level hardware boot
- SPI flash as second level software boot
- The debug interface (JTAG for boot code, UART, USB for OS debugging and applications)

2 Hardware

2.1 Package and Pinout

2.1.1 Package



symbol	Dimension in mm			Dimension in inch		
	MIN	NOM	MAX	MIN	NOM	MAX
A	—	—	1.110	—	—	0.044
A1	0.250	0.300	0.350	0.010	0.012	0.014
A2	0.660	0.710	0.760	0.026	0.028	0.030
c	0.170	0.210	0.250	0.007	0.008	0.010
D	18.900	19.000	19.100	0.744	0.748	0.752
E	18.900	19.000	19.100	0.744	0.748	0.752
D1	—	17.600	—	—	0.693	—
E1	—	17.600	—	—	0.693	—
e	—	0.800	—	—	0.031	—
b	0.350	0.400	0.450	0.014	0.016	0.018
aaa	0.150			0.006		
bbb	0.200			0.008		
ddd	0.100			0.004		
eee	0.150			0.006		
fff	0.080			0.003		
N	441			441		
MD/ME	23/23			23/23		

2.1.2 Pin Maps

	1	2	3	4	5	6	7	8	9	10	11	12
A	VSS	UART0_RX	UART1_TX	DCV10_DATA[7]	DCV10_DATA[5]	DCV10_DATA[3]	DCV10_DATA[1]	DCV10_CLK	DCV11_CLK	DCV11_DATA[7]	DCV11_DATA[5]	DCV11_DATA[3]
B	UART0_TX	UART0_CTSN	UART1_RX	DCV10_DATA[6]	DCV10_DATA[4]	DCV10_DATA[2]	DCV10_DATA[0]	VDD_IO_DCV1	VDD_IO_DCV1	DCV11_DATA[6]	DCV11_DATA[4]	DCV11_DATA[2]
C	UART0_RTSN	I2S0_SDI	I2S0_SCLK	DCV12_DATA[7]	DCV12_DATA[5]	DCV12_DATA[3]	DCV12_DATA[1]	VDD_IO_DCV1	VDD_IO_DCV1	DCV13_DATA[7]	DCV13_DATA[5]	DCV13_DATA[3]
D	I2CO_SCK	I2S01_MCLK	I2S2_MCLK	DCV12_DATA[6]	DCV12_DATA[4]	DCV12_DATA[2]	DCV12_DATA[0]	DCV12_CLK	DCV13_CLK	DCV13_DATA[6]	DCV13_DATA[4]	DCV13_DATA[2]
E	I2CO_SDA	I2S0_WS	I2S2_SDO	I2S2_SCLK								
F	UOTG_DP	UOTG_DM	UOTG_VBUS	I2S2_WS		GPIO[5]	VDD_IO_LCD	VDD_IO_LCD	GPIO[7]	GPIO[9]	GPIO[11]	GPIO[13]
G	UHOST_DP	UHOST_DM	UOTG_ID	SPI0_SSN		GPIO[4]	VDD_IO_LCD	VDD_IO_LCD	GPIO[6]	GPIO[8]	GPIO[10]	GPIO[12]
H	TXN	TXP	TEST	SPI0_SCK		GPIO[3]	VDD_IO_SYS					
J	RXN	RXP	SPI0_MOSI	SPI0_MISO		VDD_IO_SYS	VDD_IO_SYS		GPIO[24]	GPIO[25]	GPIO[26]	GPIO[27]
K	VDD33_EPHY	VDD33_EPHY	UOTG_VSSA	UHOST_VDD33		VDD_IO_SYS	VSS		VSS	VSS	VSS	VSS
L	SATA_TX0_P	SATA_TX0_M	UOTG_RREFEX	VSS		UOTG_VDD33	VSS		VSS	VSS	VSS	VSS
M	VSS	SATA_RX0_M	UOTG_VSSAC	UHOST_RREFEXT		UHOST_VSSA	VSS		VSS	VSS	VSS	VSS

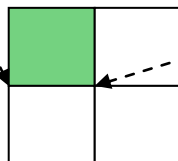


Figure 2-1 Pin Allocation of FBGA (left-top)

N	SATA_RX0_P	VSS	UHOST_VSSAC	VSS_EPHY		VSS	VSS		VSS	VDD_CORE	VDD_CORE	VDD_CORE
P	SATA_RX1_P	SATA_RX1_M	RTX	VSS_EPHY		SATA_REXT	VSS		VSS	VDD_CORE	VDD_CORE	VDD_CORE
R	VSS	SATA_TX1_M	SATA_VP25	SATA_VP25		VSS	VSS		VSS	VDD_CORE	VDD_CORE	VDD_CORE
T	SATA_TX1_P	VSS	SATA_VP25	SATA_VP25		VSS	VSS					
U	VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR		VDD_IO_DDR	VDD_IO_DDR	VSS	VSS	VDD_CORE	VDD_CORE	VDD_CORE
V	VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR		VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR	VSS	VSS	DDR_PLL_VDD	DDR_PLL_VDD
W	DDR_A2	DDR_A13	VDD_IO_DDR	VDD_IO_DDR								
Y	DDR_A9	DDR_RSTN	VDD_IO_DDR	VDD_IO_DDR	VDD_IO_DDR	VSS	VSS	DDR_DQ22	DDR_DQ18	DDR_DM3	DDR_DQ29	DDR_DQS2_P
AA	DDR_A7	DDR_A5	VDD_IO_DDR	DDR_CASN	VDD_IO_DDR	VSS	VSS	DDR_DQ20	DDR_DQ16	DDR_DQ26	DDR_DQ28	DDR_DQ25
AB	DDR_A0	DDR_A3	DDR_BA2	DDR_ODT	DDR_DQ1	DDR_DQ3	VSS	DDR_DM1	DDR_DQ13	VSS	DDR_DQ15	DDR_DQS0_P
AC	VSS	DDR_BA0	DDR_CSN	DDR_WEN	DDR_RASN	VSS	DDR_DQ0	DDR_DQ2	VSS	DDR_DQ11	DDR_DQ9	VSS
	1	2	3	4	5	6	7	8	9	10	11	12

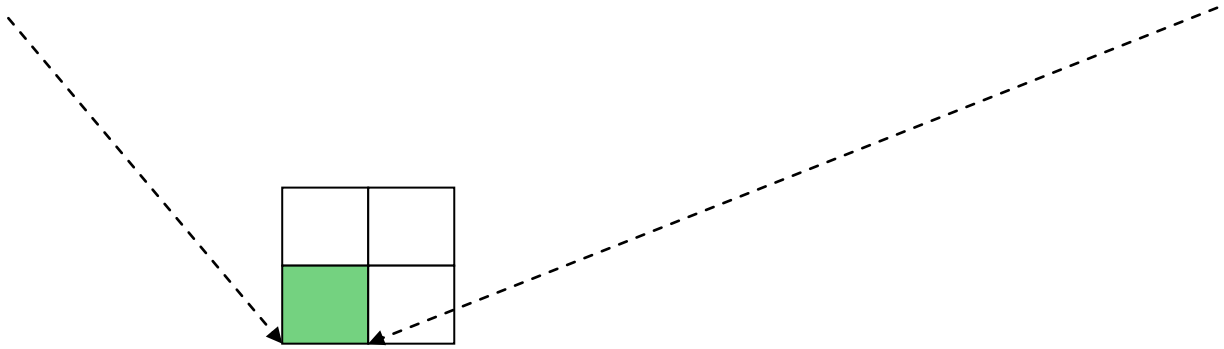


Figure 2-2 Pin Allocation of FBGA (left-bottom)

13	14	15	16	17	18	19	20	21	22	23	
DCV11_DATA[1]	AVDD33_HDMI	HDMI_RBIAS	AVSS33_ESD	AVDD33_ESD	HDMI_TX2N	HDMI_TX1N	HDMI_TX0N	HDMI_TXCN	VDD_IO_SYS	VSS	A
DCV11_DATA[0]	VSS	AVSS33_HDMI	AVSS33_ESD	AVDD33_ESD	HDMI_TX2P	HDMI_TX1P	HDMI_TX0P	HDMI_TXCP	JTG_TCK	JTG_TDI	B
DCV13_DATA[1]	HDMI_VSS3IO	HDMI_CEC	HDMI_DSCL	HDMI_DSDA	HDMI_HPD	EMAC_COL	EMAC_RXD0	EMAC_RXD2	JTG_TMS	JTG_TDO	C
DCV13_DATA[0]	HDMI_VSS3IO	VDD_IO_HDMI	VDD_IO_LCD	VDD_IO_LCD	VSS	EMAC_CRS	EMAC_RXD1	EMAC_RXD3	JTG_RTCK	JTG_TRSTN	D
GPIO[15]	VDD_IO_LCD	GPIO[17]	GPIO[19]	GPIO[21]	GPIO[23]		EMAC_RXER	EMAC_TXD0	SDIO0_CMD	SDIO0_CLK	E
GPIO[14]	VDD_IO_LCD	GPIO[16]	GPIO[18]	GPIO[20]	GPIO[22]		GPIO[28]	SDIO0_DATA[3]	SDIO0_DATA[1]	SDIO0_DATA[0]	F
GPIO[0]	GPIO[1]	GPIO[2]		EMAC_RXDV	EMAC_TXD1	GPIO[30]	SDIO0_LOCKN	VDD_IO_SYS	VDD_IO_SYS	SDIO0_DATA[2]	G
VSS	VSS	VSS		EMAC_TXD2	EMAC_TXD3	GPIO[31]	SDIO0_DETECTN	XCLKOUT	XCLKIN		H
VSS	VSS	VSS		EMAC_TXER	EMAC_TXEN	VDD_IO_SYS	VSSA_PLLO	VDDA_PLL1	VDDA_PLL0		I
VSS	VSS	VSS		EMAC_MDIO	EMAC_MDC	VGA0_HSYNC	VGA1_VSYNC	VDDA_PLL3	VDDA_PLL2		J
VSS	VSS	VSS		EMAC_RCK	EMAC_TCK	VGA1_HSYNC	VGA0_VSYNC	VSSA_PLL1	VSSA_PLL2		K
											L
											M

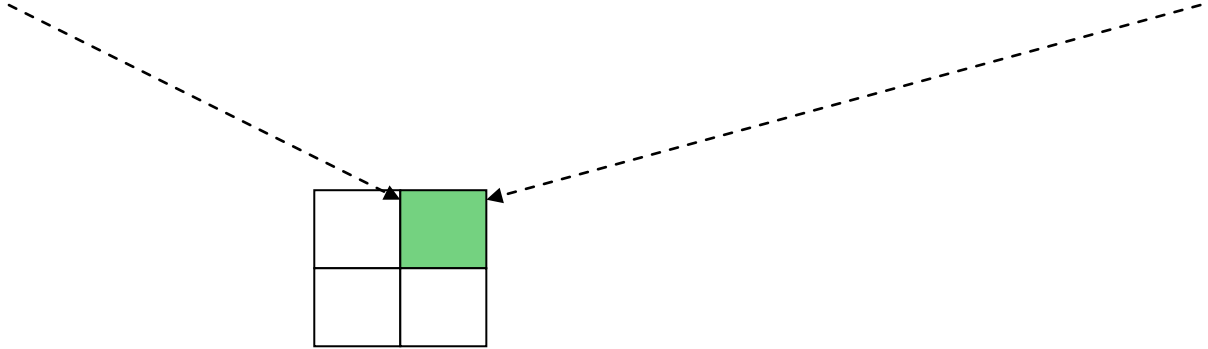


Figure 2-3 Pin Allocation of FBGA (right-top)

VDD CORE	VDD CORE	VDD CORE		VDD CORE	VSS		VSS	VDDA PLL4	VSSA PLL4	VSSA PLL3	N
VDD CORE	VDD CORE	VDD CORE		VDD CORE	VDD CORE		VDACO PGND1	VDACO PGND1	VDACO_OUTP2	VDACO_OUTP1	P
VDD CORE	VDD CORE	VDD CORE		VDD CORE	VDD CORE		VDACO PVDD1	VDACO PVDD2	VDACO_VDREF	VDACO_OUTP0	R
				VDD CORE	VDD CORE		VDACO REXT	VDAC1 REXT	VDAC1_VDREF	VDAC1_OUTP0	T
VDD CORE	VDD CORE	VDD CORE	VDD CORE	VDD CORE	VDD CORE		VDAC1 PVDD1	VDAC1 PVDD2	VDAC1_OUTP2	VDAC1_OUTP1	U
DDR_PLL_VDD	DDR_PLL_VSS	DDR_PLL_VSS	DDR_PLL_VSS	DDR_DTO[0]	DDR_DTO[1]		VDAC1 PVDD1	VDAC1 PVDD1	DDR_A14	DDR_A1	V
							VDAC1 PGND1	VDAC1 PGND1	DDR_A8	DDR_A11	W
DDR_DQS3_P	DDR_DQ31	DDR_DQ30	DDR_DM2	DDR_DQ23	DDR_DQ21	DDR_ZQ	VSS	DDR_VREF	DDR_A4	DDR_A6	Y
DDR_DQS2_N	DDR_DQS3_N	DDR_DQ24	DDR_DQ27	DDR_DQ17	DDR_DQ19	DDR_ATO	VSS	DDR_CKE	DDR_BA1	DDR_A12	AA
VSS	DDR_DQS1_N	DDR_DQ12	VSS	DDR_DQ14	DDR_DM0	VSS	DDR_DQ7	DDR_DQ5	DDR_CLK_N	DDR_A10	AB
DDR_DQS0_N	DDR_DQS1_P	VSS	DDR_DQ8	DDR_DQ10	VSS	DDR_DQ4	DDR_DQ6	VSS	DDR_CLK_P	VSS	AC
13	14	15	16	17	18	19	20	21	22	23	

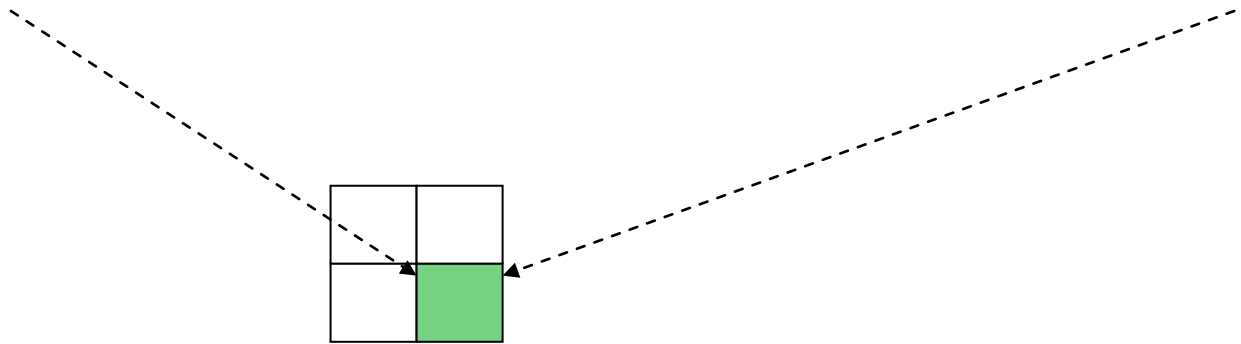


Figure 2-4 Pin Allocation of FBGA (right-bottom)

Table 2-1 Signal Description of VC0738BTAA

Pin Name	Pin No.	Pin Type	Drive Strength (mA)	I/O Power Or Range(v)	State After Reset Release	Pin Description
RSTN	G21	I,Sh	4mA	VDD_IO_SYS	I,RSTN	Reset Signal Input
XCLKIN	J23	I,Sh	4mA	VDD_IO_SYS	I,XCLKIN	External Crystal Input for System Clock
XCLKOUT	J22	O	4mA	VDD_IO_SYS	O,XCLKOUT	External Crystal Output for System Clock
TEST	H3	I,PD	4mA	VDD_IO_SYS	I,TEST	Test Mode Enable
JTG_TCK	B22	B,PD, Sh	4mA	VDD_IO_SYS	I,JTG_TCK, PD	JTAG Test Clock, share with LCD_DE, share with emacphy_padc_dpx_led, share with GPIO0[0]
JTG_TDI	B23	B,PD	4mA	VDD_IO_SYS	I,JTG_TDI,PD	JTAG Test Data Input, share with LCD_HSYNC, share with emacphy_padc_ink_led, share with GPIO0[1]
JTG_TDO	C23	B,PD	4mA	VDD_IO_SYS	O,JTG_TDO,PD	JTAG Test Data Output, share with LCD_VSYNC, share with emacphy_padc_spd_led, share with GPIO0[2]

JTG_TMS	C22	B,PD	8mA	VDD_IO_SYS	I,JTG_TMS, PD	JTAG Test Mode Select, share with LCD_PCLK, share with sata_p0_act_led, share with GPIO0[3]
JTG_TRSTN	D23	B,PU	4mA	VDD_IO_SYS	I,JTG_TRST N,PU	JTAG Test Reset, active low, share with SDIO1_CLK, share with sata_p1_act_led, share with GPIO0[4]
JTG_RTCK	D22	B,PD	4mA	VDD_IO_SYS	O,JTG_RTC K,PD	PWM0 output, share with SDIO1_CMD, share with PWM0, share with GPIO0[5]
GPIO[0]	J13	B,PD	8mA	VDD_IO_LCD	I,GPIO[0],P D	GPIO[0], share with LCD_DATA[0], share with PWM1, share with UM_OUT[0]
GPIO[1]	J14	B,PD	8mA	VDD_IO_LCD	I,GPIO[1],P D	GPIO[1], share with LCD_DATA[1], share with UM_OUT[1]
GPIO[2]	J15	B,PD	8mA	VDD_IO_LCD	I,GPIO[2],P D	GPIO[2], share with LCD_DATA[2], share with UM_OUT[2]
GPIO[3]	H6	B,PD	8mA	VDD_IO_LCD	I,GPIO[3],P D	GPIO[3], share with LCD_DATA[3], share with UART2_TX, share with UM_OUT[3]
GPIO[4]	G6	B,PD	8mA	VDD_IO_LCD	I,GPIO[4],P D	GPIO[4], share with LCD_DATA[4], share with UART2_RX, share with UM_OUT[4]
GPIO[5]	F6	B,PD	8mA	VDD_IO_LCD	I,GPIO[5],P D	GPIO[5], share with LCD_DATA[5], share with UART3_TX, share with UM_OUT[5]
GPIO[6]	G9	B,PD	8mA	VDD_IO_LCD	I,GPIO[6],P D	GPIO[6], share with LCD_DATA[6], share with UART3_RX, share with UM_OUT[6]
GPIO[7]	F9	B,PD	8mA	VDD_IO_LCD	I,GPIO[7],P D	GPIO[7], share with LCD_DATA[7], share with SPI1_SCK, share with UM_OUT[7]
GPIO[8]	G10	B,PD	8mA	VDD_IO_LCD	I,GPIO[8],P D	GPIO[8], share with LCD_DATA[8], share with

						SPI1_SSN, share with UM_OUT[8]
GPIO[9]	F10	B,PD	8mA	VDD_IO_LCD	I,GPIO[9],P D	GPIO[9], share with LCD_DATA[9], share with SPI1_MOSI, share with UM_OUT[9]
GPIO[10]	G11	B,PD	8mA	VDD_IO_LCD	I,GPIO[10],P D	GPIO[10], share with LCD_DATA[10], share with SPI1_MISO, share with UM_OUT[10]
GPIO[11]	F11	B,PD	8mA	VDD_IO_LCD	I,GPIO[11],P D	GPIO[11], share with LCD_DATA[11], share with SPI2_SCK, share with UM_OUT[11]
GPIO[12]	G12	B,PD	8mA	VDD_IO_LCD	I,GPIO[12],P D	GPIO[12], share with LCD_DATA[12], share with SPI2_SSN, share with UM_OUT[12]
GPIO[13]	F12	B,PD	8mA	VDD_IO_LCD	I,GPIO[13],P D	GPIO[13], share with LCD_DATA[13], share with SPI2_MOSI, share with UM_OUT[13]
GPIO[14]	G13	B,PD	8mA	VDD_IO_LCD	I,GPIO[14],P D	GPIO[14], share with LCD_DATA[14], share with SPI2_MISO, share with UM_OUT[14]
GPIO[15]	F13	B,PD	8mA	VDD_IO_LCD	I,GPIO[15],P D	GPIO[15], share with LCD_DATA[15], share with UM_OUT[15]
GPIO[16]	G15	B,PD	8mA	VDD_IO_LCD	I,GPIO[16],P D	GPIO[16], share with LCD_DATA[16], share with UM_OUT[16]
GPIO[17]	F15	B,PD	8mA	VDD_IO_LCD	I,GPIO[17],P D	GPIO[17], share with LCD_DATA[17], share with I2S1_SCLK, share with UM_OUT[17]
GPIO[18]	G16	B,PD	8mA	VDD_IO_LCD	I,GPIO[18],P D	GPIO[18], share with LCD_DATA[18], share with I2S1_WS, share with UM_OUT[18]
GPIO[19]	F16	B,PD	8mA	VDD_IO_LCD	I,GPIO[19],P D	GPIO[19], share with LCD_DATA[19], share with

						I2S1_SDI, share with UM_OUT[19]
GPIO[20]	G17	B,PD	8mA	VDD_IO_LCD	I,GPIO[20],P D	GPIO[20], share with LCD_DATA[20], share with SATA_P0_CP_DET, share with UM_OUT[20]
GPIO[21]	F17	B,PD	8mA	VDD_IO_LCD	I,GPIO[21],P D	GPIO[21], share with LCD_DATA[21], share with SATA_P1_CP_DET, share with UM_OUT[21]
GPIO[22]	G18	B,PD	8mA	VDD_IO_LCD	I,GPIO[22],P D	GPIO[22], share with LCD_DATA[22], share with SATA_P0_CP_POD, share with UM_OUT[22]
GPIO[23]	F18	B,PD	8mA	VDD_IO_LCD	I,GPIO[23],P D	GPIO[23], share with LCD_DATA[23], share with SATA_P1_CP_POD, share with UM_OUT[23]
GPIO[24]	J9	B,PD	8mA	VDD_IO_DCV I	I,GPIO[24],P D	GPIO[24], share with SDIO0_DATA[4], share with SIF_PAD_C_S_RSTN, share with UM_OUT[24]
GPIO[25]	J10	B,PD	8mA	VDD_IO_DCV I	I,GPIO[25],P D	GPIO[25], share with SDIO0_DATA[5], share with CLK_OUT1, share with UM_OUT[25]
GPIO[26]	J11	B,PD	8mA	VDD_IO_DCV I	I,GPIO[26],P D	GPIO[26], share with SDIO0_DATA[6], share with SIF_VSYNC, share with UM_OUT[26]
GPIO[27]	J12	B,PD	8mA	VDD_IO_DCV I	I,GPIO[27],P D	GPIO[27], share with SDIO0_DATA[7], share with SIF_HSYNC, share with UM_OUT[27]
GPIO[28]	F20	B,PD	8mA	VDD_IO_LCD	I,GPIO[28],P D	GPIO[28], share with SDIO1_DATA[0], share with I2C1_SCK, share with UM_OUT[28]
GPIO[29]	G20	B,PD	8mA	VDD_IO_LCD	I,GPIO[29],P D	GPIO[29], share with SDIO1_DATA[1], share with I2C1_SDA, share with UM_OUT[29]

GPIO[30]	H20	B,PD	8mA	VDD_IO_LCD	I,GPIO[30],PD	GPIO[30], share with SDIO1_DATA[2], share with UM_OUT[30]
GPIO[31]	J20	B,PD	8mA	VDD_IO_LCD	I,GPIO[31],PD	GPIO[31], share with SDIO1_DATA[3], share with UM_OUT[31]
I2C0_SCK	D1	B,Sh,PU	4mA	VDD_IO_SYS	I,GPIO0[6],PU	I2C0 Serial Clock, PULL UP IN PCB, share with GPIO0[6]
I2C0_SDA	E1	B,PU	4mA	VDD_IO_SYS	I,GPIO0[7],PU	I2C0 Serial Data, PULL UP IN PCB, share with GPIO0[7]
UART0_TX	B1	B,PD	4mA	VDD_IO_SYS	I,GPIO0[8],PD	UART0 Serial Transmit Port, share with GPIO0[8]
UART0_RX	A2	B,PU	4mA	VDD_IO_SYS	I,GPIO0[9],PU	UART0 Serial Receive Port, share with GPIO0[9]
UART0_RTSEN	C1	B,PD	4mA	VDD_IO_SYS	I,GPIO0[10],PD	UART0 Request to Send, active low, share with GPIO0[10]
UART0_CTSN	B2	B,PU	4mA	VDD_IO_SYS	I,GPIO0[11],PU	UART0 Clear to Send, active low, share with GPIO0[11]
UART1_TX	A3	B,PD	4mA	VDD_IO_SYS	I,GPIO0[12],PD	UART0 Serial Transmit Port, share with GPIO0[12]
UART1_RX	B3	B,PU	4mA	VDD_IO_SYS	I,GPIO0[13],PU	UART0 Serial Receive Port, share with GPIO0[13]
SPI0_SCK	H4	B,Sh,PD	8mA	VDD_IO_SYS	I,GPIO0[14],PD	SPI0 Clock, share with GPIO0[14]
SPI0_SSN	G4	B,PD	8mA	VDD_IO_SYS	I,GPIO0[15],PD	SPI0 Slave Select, share with GPIO0[15]
SPI0_MOSI	J3	B,PD	8mA	VDD_IO_SYS	I,GPIO0[16],PD	SPI0 Master Output and Slave Input, share with GPIO0[16]
SPI0_MISO	J4	B,PD	8mA	VDD_IO_SYS	I,GPIO0[17],PD	SPI0 Master Input and Slave Output, share with GPIO0[17]
SDIO0_CLK	E23	B,Sh,PD	8mA	VDD_IO_SYS	I,GPIO0[18],PD	SDIO0 Clock , share with GPIO0[18]
SDIO0_CMD	E22	B,PD	8mA	VDD_IO_SYS	I,GPIO0[19],PD	SDIO0 Command/Response, share with GPIO0[19]
SDIO0_DATA[0]	F23	B,PD	8mA	VDD_IO_SYS	I,GPIO0[20],PD	SDIO0 Data 0, share with GPIO0[20]
SDIO0_DATA[1]	F22	B,PD	8mA	VDD_IO_SYS	I,GPIO0[21],PD	SDIO0 Data 1, share with GPIO0[21]
SDIO0_DATA[2]	G23	B,PD	8mA	VDD_IO_SYS	I,GPIO0[22],PD	SDIO0 Data 2, share with GPIO0[22]

SDIO0_DATA [3]	F21	B,PD	8mA	VDD_IO_SYS	I,GPIO0[23], PD	SDIO0 Data 3, share with GPIO0[23]
SDIO0_LOCK N	H21	B,PU	8mA	VDD_IO_SYS	I,GPIO0[24], PU	SDIO0 write protect of card socket, share with CLK_OUT0, share with GPIO0[24]
SDIO0_DETE CTN	J21	B,PU	8mA	VDD_IO_SYS	I,GPIO0[25], PU	SDIO0 card-detection of card socket, share with GPIO0[25]
DCVI0_CLK	A8	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[0],P U	1st port video input clock, share with SIF_PCLK, share with GPIO2[0]
DCVI0_DATA [0]	B7	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[1],P U	1st port video input data 0, share with SIF_DATA[0], share with GPIO2[1]
DCVI0_DATA [1]	A7	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[2],P U	1st port video input data 1, share with SIF_DATA[1], share with GPIO2[2]
DCVI0_DATA [2]	B6	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[3],P U	1st port video input data 2, share with SIF_DATA[2], share with GPIO2[3]
DCVI0_DATA [3]	A6	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[4],P U	1st port video input data 3, share with SIF_DATA[3], share with GPIO2[4]
DCVI0_DATA [4]	B5	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[5],P U	1st port video input data 4, share with SIF_DATA[4], share with GPIO2[5]
DCVI0_DATA [5]	A5	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[6],P U	1st port video input data 5, share with SIF_DATA[5], share with GPIO2[6]
DCVI0_DATA [6]	B4	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[7],P U	1st port video input data 6, share with SIF_DATA[6], share with GPIO2[7]
DCVI0_DATA [7]	A4	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[8],P U	1st port video input data 7, share with SIF_DATA[7], share with GPIO2[8]
DCVI1_CLK	A9	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[9],P U	2nd port video input clock, share with SIF_PADCS_PWDN, share with GPIO2[9]
DCVI1_DATA [0]	B13	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[10], PU	2nd port video input data 0, share with SIF_DATA[8], share with GPIO2[10]
DCVI1_DATA [1]	A13	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[11], PU	2nd port video input data 1, share with SIF_DATA[9], share with

						GPIO2[11]
DCVI1_DATA [2]	B12	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[12], PU	2nd port video input data 2, share with SIF_DATA[10], share with GPIO2[12]
DCVI1_DATA [3]	A12	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[13], PU	2nd port video input data 3, share with SIF_DATA[11], share with GPIO2[13]
DCVI1_DATA [4]	B11	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[14], PU	2nd port video input data 4, share with SIF_DATA[12], share with GPIO2[14]
DCVI1_DATA [5]	A11	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[15], PU	2nd port video input data 5, share with SIF_DATA[13], share with GPIO2[15]
DCVI1_DATA [6]	B10	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[16], PU	2nd port video input data 6, share with SIF_DATA[14], share with GPIO2[16]
DCVI1_DATA [7]	A10	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[17], PU	2nd port video input data 7, share with SIF_DATA[15], share with GPIO2[17]
DCVI2_CLK	D8	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[18], PU	3rd port video input clock, share with GPIO2[18]
DCVI2_DATA [0]	D7	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[19], PU	3rd port video input data 0, share with GPIO2[19]
DCVI2_DATA [1]	C7	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[20], PU	3rd port video input data 1, share with GPIO2[20]
DCVI2_DATA [2]	D6	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[21], PU	3rd port video input data 2, share with GPIO2[21]
DCVI2_DATA [3]	C6	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[22], PU	3rd port video input data 3, share with GPIO2[22]
DCVI2_DATA [4]	D5	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[23], PU	3rd port video input data 4, share with GPIO2[23]
DCVI2_DATA [5]	C5	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[24], PU	3rd port video input data 5, share with GPIO2[24]
DCVI2_DATA [6]	D4	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[25], PU	3rd port video input data 6, share with GPIO2[25]
DCVI2_DATA [7]	C4	B,PU	4mA	VDD_IO_DCV I	I,GPIO2[26], PU	3rd port video input data 7, share with GPIO2[26]
DCVI3_CLK	D9	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[0],P U	4th port video input clock, share with GPIO3[0]
DCVI3_DATA [0]	D13	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[1],P U	4th port video input data 0, share with GPIO3[1]

DCVI3_DATA [1]	C13	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[2],P U	4th port video input data 1, share with GPIO3[2]
DCVI3_DATA [2]	D12	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[3],P U	4th port video input data 2, share with GPIO3[3]
DCVI3_DATA [3]	C12	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[4],P U	4th port video input data 3, share with GPIO3[4]
DCVI3_DATA [4]	D11	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[5],P U	4th port video input data 4, share with GPIO3[5]
DCVI3_DATA [5]	C11	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[6],P U	4th port video input data 5, share with GPIO3[6]
DCVI3_DATA [6]	D10	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[7],P U	4th port video input data 6, share with GPIO3[7]
DCVI3_DATA [7]	C10	B,PU	4mA	VDD_IO_DCV I	I,GPIO3[8],P U	4th port video input data 7, share with GPIO3[8]
I2S2_MCLK	D3	B,PD	8mA	VDD_IO_SYS	I,GPIO3[9],P D	Audio input0 Codec Master Clock, share with GPIO3[9]
I2S2_SCLK	E4	B,PD	8mA	VDD_IO_SYS	I,GPIO3[10], PD	Audio input0 Bit Clock, share with GPIO3[10]
I2S2_WS	F4	B,PD	8mA	VDD_IO_SYS	I,GPIO3[11], PD	Audio input0 Word Select For ADC, share with GPIO3[11]
I2S2_SDO	E3	B,PD	8mA	VDD_IO_SYS	I,GPIO3[12], PD	Audio output Serial Data Output to DAC, share with GPIO3[12]
I2S01_MCLK	D2	B,PD	8mA	VDD_IO_SYS	I,GPIO3[13], PD	Audio input0 Codec Master Clock, share with GPIO3[13]
I2S0_SCLK	C3	B,PD	8mA	VDD_IO_SYS	I,GPIO3[14], PD	Audio input0 Bit Clock, share with GPIO3[14]
I2S0_WS	E2	B,PD	8mA	VDD_IO_SYS	I,GPIO3[15], PD	Audio input0 Word Select For ADC, share with GPIO3[15]
I2S0_SDI	C2	B,PD	8mA	VDD_IO_SYS	I,GPIO3[16], PD	Audio input0 Serial Data Input From ADC, share with GPIO3[16]
EMAC_COL	C19	B,PD	8mA	VDD_IO_SYS	I,GPIO1[0],P D	Collision detected, share with GPIO1[0]
EMAC_CRS	D19	B,PD	8mA	VDD_IO_SYS	I,GPIO1[1],P D	Carrier sensor, share with GPIO1[1]
EMAC_RXD0	C20	B,PD	8mA	VDD_IO_SYS	I,GPIO1[2],P D	Receive data bit0, share with GPIO1[2]
EMAC_RXD1	D20	B,PD	8mA	VDD_IO_SYS	I,GPIO1[3],P D	Receive data bit1, share with GPIO1[3]
EMAC_RXD2	C21	B,PU	8mA	VDD_IO_SYS	I,GPIO1[4],P U	Receive data bit2, share with GPIO1[4]

EMAC_RXD3	D21	B,PU	8mA	VDD_IO_SYS	I,GPIO1[5],P U	Receive data bit3, share with GPIO1[5]
EMAC_RXER	E20	B,PD	8mA	VDD_IO_SYS	I,GPIO1[6],P D	Receive error, share with GPIO1[6]
EMAC_RXDV	H17	B,PD	8mA	VDD_IO_SYS	I,GPIO1[7],P D	Receive data valid, share with GPIO1[7]
EMAC_TXD0	E21	B,PD	8mA	VDD_IO_SYS	I,GPIO1[8],P D	Transmit data bit0, share with GPIO1[8]
EMAC_TXD1	H18	B,PD	8mA	VDD_IO_SYS	I,GPIO1[9],P D	Transmit data bit1, share with GPIO1[9]
EMAC_TXD2	J17	B,PU	8mA	VDD_IO_SYS	I,GPIO1[10], PU	Transmit data bit2, share with GPIO1[10]
EMAC_TXD3	J18	B,PU	8mA	VDD_IO_SYS	I,GPIO1[11], PU	Transmit data bit3, share with GPIO1[11]
EMAC_TXER	K17	B,PU	8mA	VDD_IO_SYS	I,GPIO1[12], PU	Transmit error, share with GPIO1[12]
EMAC_TXEN	K18	B,PD	8mA	VDD_IO_SYS	I,GPIO1[13], PD	Transmit enable, share with GPIO1[13]
EMAC_MDIO	L17	B,PU	8mA	VDD_IO_SYS	I,GPIO1[14], PU	Management data I/O, share with GPIO1[14]
EMAC_MDC	L18	B,PU	8mA	VDD_IO_SYS	I,GPIO1[15], PU	Management Clock, share with GPIO1[15]
EMAC_RCK	M17	B,PD	8mA	VDD_IO_SYS	I,GPIO1[16], PD	Receive Clock, share with GPIO1[16]
EMAC_TCK	M18	B,PD	8mA	VDD_IO_SYS	I,GPIO1[17], PD	Transmit Clock, share with GPIO1[17]
UHOST_RRE FEXT	M4	AIO				USB HOST External Resistor For Current Reference (43.2Ohm, +- 1%)
UHOST_DP	G1	AIO				USB HOST D+ Port
UHOST_DM	G2	AIO				USB HOST D- Port
UOTG_RREF EXT	L3	AIO				USB OTG External Resistor For Current Reference (43.2Ohm, +- 1%)
UOTG_DP	F1	AIO				USB OTG D+ Port
UOTG_DM	F2	AIO				USB OTG D- Port
UOTG_ID	G3	AIO				USB Mini-Receptacle Identifier
UOTG_VBUS	F3	AIO				USB 5-V Power Supply Pin
ETH_TXP	H2	AIO				Transmit D+ Port, TXP
ETH_TXN	H1	AIO				Transmit D- Port, TXN
ETH_RXP	J2	AIO				Receive D+ Port, RXP
ETH_RXN	J1	AIO				Receive D- Port, RXN

ETH_RTX	P3	AIO				External 6K-Ohm 1% resistor to ground, RTX
SATA_SRES REF	P6	AO				SATA Port0 External Resistor
SATA_RX0_ P	N1	AI				SATA Port0 Data Input+
SATA_RX0_ M	M2	AI				SATA Port0 Data Input-
SATA_TX0_P	L1	AO				SATA Port0 Data Output+
SATA_TX0_ M	L2	AO				SATA Port0 Data Output-
SATA_RX1_ P	P1	AI				SATA Port1 Data Input+
SATA_RX1_ M	P2	AI				SATA Port1 Data Input-
SATA_TX1_P	T1	AO				SATA Port1 Data Output+
SATA_TX1_ M	R2	AO				SATA Port1 Data Output-
DDR_CSN	AC3	O		VDDQ_DDR	O,DDR_CS N	DDR SDRAM Chip Select
DDR_A[0]	AB1	O		VDDQ_DDR	O,DDR_A[0]	DDR SDRAM Memory Address 0
DDR_A[1]	V23	O		VDDQ_DDR	O,DDR_A[1]	DDR SDRAM Memory Address 1
DDR_A[2]	W1	O		VDDQ_DDR	O,DDR_A[2]	DDR SDRAM Memory Address 2
DDR_A[3]	AB2	O		VDDQ_DDR	O,DDR_A[3]	DDR SDRAM Memory Address 3
DDR_A[4]	Y22	O		VDDQ_DDR	O,DDR_A[4]	DDR SDRAM Memory Address 4
DDR_A[5]	AA2	O		VDDQ_DDR	O,DDR_A[5]	DDR SDRAM Memory Address 5
DDR_A[6]	Y23	O		VDDQ_DDR	O,DDR_A[6]	DDR SDRAM Memory Address 6
DDR_A[7]	AA1	O		VDDQ_DDR	O,DDR_A[7]	DDR SDRAM Memory Address 7
DDR_A[8]	W22	O		VDDQ_DDR	O,DDR_A[8]	DDR SDRAM Memory Address 8
DDR_A[9]	Y1	O		VDDQ_DDR	O,DDR_A[9]	DDR SDRAM Memory Address 9
DDR_A[10]	AB23	O		VDDQ_DDR	O,DDR_A[1 0]	DDR SDRAM Memory Address 10
DDR_A[11]	W23	O		VDDQ_DDR	O,DDR_A[1 1]	DDR SDRAM Memory Address 11
DDR_A[12]	AA23	O		VDDQ_DDR	O,DDR_A[1 2]	DDR SDRAM Memory Address 12
DDR_A[13]	W2	O		VDDQ_DDR	O,DDR_A[1 3]	DDR SDRAM Memory Address 13
DDR_A[14]	V22	O		VDDQ_DDR	O,DDR_A[1 4]	DDR SDRAM Memory Address 14
DDR_CLK_IN V	AB22	O		VDDQ_DDR	O,DDR_CLK _INV	DDR SDRAM Clock Inverse, DDR_CLK_N

DDR_CLK	AC22	O		VDDQ_DDR	O,DDR_CLK	DDR SDRAM Clock, DDR_CLK_P
DDR_CKE	AA21	O		VDDQ_DDR	O,DDR_CKE	DDR SDRAM Clock Enable
DDR_CASN	AA4	O		VDDQ_DDR	O,DDR_CASN	DDR SDRAM Column Address Select
DDR_RASN	AC5	O		VDDQ_DDR	O,DDR_RASN	DDR SDRAM Row Address Select
DDR_WEN	AC4	O		VDDQ_DDR	O,DDR_WEN	DDR SDRAM Write Enable
DDR_DQM[0]	AB18	O		VDDQ_DDR	O,DDR_DQM[0]	DDR SDRAM Data Read/Write Mask 0 , DDR_DM[0]
DDR_DQM[1]	AB8	O		VDDQ_DDR	O,DDR_DQM[1]	DDR SDRAM Data Read/Write Mask 1 , DDR_DM[1]
DDR_DQM[2]	Y16	O		VDDQ_DDR	O,DDR_DQM[2]	DDR SDRAM Data Read/Write Mask 2 ,DDR_DM[2]
DDR_DQM[3]	Y10	O		VDDQ_DDR	O,DDR_DQM[3]	DDR SDRAM Data Read/Write Mask 3 , DDR_DM[3]
DDR_BA[0]	AC2	O		VDDQ_DDR	O,DDR_BA[0]	DDR SDRAM Bank Access 0
DDR_BA[1]	AA22	O		VDDQ_DDR	O,DDR_BA[1]	DDR SDRAM Bank Access 1
DDR_BA[2]	AB3	O		VDDQ_DDR	O,DDR_BA[2]	DDR SDRAM Bank Access 2
DDR_DQ[0]	AC7	B		VDDQ_DDR	B,DDR_DQ[0]	DDR SDRAM Data 0
DDR_DQ[1]	AB5	B		VDDQ_DDR	B,DDR_DQ[1]	DDR SDRAM Data 1
DDR_DQ[2]	AC8	B		VDDQ_DDR	B,DDR_DQ[2]	DDR SDRAM Data 2
DDR_DQ[3]	AB6	B		VDDQ_DDR	B,DDR_DQ[3]	DDR SDRAM Data 3
DDR_DQ[4]	AC19	B		VDDQ_DDR	B,DDR_DQ[4]	DDR SDRAM Data 4
DDR_DQ[5]	AB21	B		VDDQ_DDR	B,DDR_DQ[5]	DDR SDRAM Data 5
DDR_DQ[6]	AC20	B		VDDQ_DDR	B,DDR_DQ[6]	DDR SDRAM Data 6
DDR_DQ[7]	AB20	B		VDDQ_DDR	B,DDR_DQ[7]	DDR SDRAM Data 7
DDR_DQ[8]	AC16	B		VDDQ_DDR	B,DDR_DQ[8]	DDR SDRAM Data 8
DDR_DQ[9]	AC11	B		VDDQ_DDR	B,DDR_DQ[9]	DDR SDRAM Data 9

					9]	
DDR_DQ[10]	AC17	B		VDDQ_DDR	B,DDR_DQ[10]	DDR SDRAM Data 10
DDR_DQ[11]	AC10	B		VDDQ_DDR	B,DDR_DQ[11]	DDR SDRAM Data 11
DDR_DQ[12]	AB15	B		VDDQ_DDR	B,DDR_DQ[12]	DDR SDRAM Data 12
DDR_DQ[13]	AB9	B		VDDQ_DDR	B,DDR_DQ[13]	DDR SDRAM Data 13
DDR_DQ[14]	AB17	B		VDDQ_DDR	B,DDR_DQ[14]	DDR SDRAM Data 14
DDR_DQ[15]	AB11	B		VDDQ_DDR	B,DDR_DQ[15]	DDR SDRAM Data 15
DDR_DQ[16]	AA9	B		VDDQ_DDR	B,DDR_DQ[16]	DDR SDRAM Data 16
DDR_DQ[17]	AA17	B		VDDQ_DDR	B,DDR_DQ[17]	DDR SDRAM Data 17
DDR_DQ[18]	Y9	B		VDDQ_DDR	B,DDR_DQ[18]	DDR SDRAM Data 18
DDR_DQ[19]	AA18	B		VDDQ_DDR	B,DDR_DQ[19]	DDR SDRAM Data 19
DDR_DQ[20]	AA8	B		VDDQ_DDR	B,DDR_DQ[20]	DDR SDRAM Data 20
DDR_DQ[21]	Y18	B		VDDQ_DDR	B,DDR_DQ[21]	DDR SDRAM Data 21
DDR_DQ[22]	Y8	B		VDDQ_DDR	B,DDR_DQ[22]	DDR SDRAM Data 22
DDR_DQ[23]	Y17	B		VDDQ_DDR	B,DDR_DQ[23]	DDR SDRAM Data 23
DDR_DQ[24]	AA15	B		VDDQ_DDR	B,DDR_DQ[24]	DDR SDRAM Data 24
DDR_DQ[25]	AA12	B		VDDQ_DDR	B,DDR_DQ[25]	DDR SDRAM Data 25
DDR_DQ[26]	AA10	B		VDDQ_DDR	B,DDR_DQ[26]	DDR SDRAM Data 26
DDR_DQ[27]	AA16	B		VDDQ_DDR	B,DDR_DQ[27]	DDR SDRAM Data 27
DDR_DQ[28]	AA11	B		VDDQ_DDR	B,DDR_DQ[28]	DDR SDRAM Data 28
DDR_DQ[29]	Y11	B		VDDQ_DDR	B,DDR_DQ[29]	DDR SDRAM Data 29
DDR_DQ[30]	Y15	B		VDDQ_DDR	B,DDR_DQ[30]	DDR SDRAM Data 30

					30]	
DDR_DQ[31]	Y14	B		VDDQ_DDR	B,DDR_DQ[31]	DDR SDRAM Data 31
DDR_DQS[0]	AB12	B		VDDQ_DDR	B,DDR_DQS[0]	DDR SDRAM Data Strobe byte 0 , DDR_DQS0_P
DDR_DQS[1]	AC14	B		VDDQ_DDR	B,DDR_DQS[1]	DDR SDRAM Data Strobe byte 1 , DDR_DQS1_P
DDR_DQS[2]	Y12	B		VDDQ_DDR	B,DDR_DQS[2]	DDR SDRAM Data Strobe byte 2 , DDR_DQS2_P
DDR_DQS[3]	Y13	B		VDDQ_DDR	B,DDR_DQS[3]	DDR SDRAM Data Strobe byte 3 , DDR_DQS3_P
DDR_DQS_I NV[0]	AC13	B		VDDQ_DDR	B,DDR_DQS_INV[0]	DDR SDRAM Data Strobe Inverse byte 0 , DDR_DQS0_N
DDR_DQS_I NV[1]	AB14	B		VDDQ_DDR	B,DDR_DQS_INV[1]	DDR SDRAM Data Strobe Inverse byte 1 , DDR_DQS1_N
DDR_DQS_I NV[2]	AA13	B		VDDQ_DDR	B,DDR_DQS_INV[2]	DDR SDRAM Data Strobe Inverse byte 2 , DDR_DQS2_N
DDR_DQS_I NV[3]	AA14	B		VDDQ_DDR	B,DDR_DQS_INV[3]	DDR SDRAM Data Strobe Inverse byte 3 , DDR_DQS3_N
DDR_RSTN	Y2	O		VDDQ_DDR	O,DDR_RSTN	DDR SDRAM Reset Signal, only for DDR3
DDR_ODT	AB4	O		VDDQ_DDR	O,DDR_ODT	DDR SDRAM On Die Termination, only for DDR2
DDR_ZQ	Y19	B		VDDQ_DDR	B,DDR_ZQ	DDR SDRAM ZQ
DDR_DLL_D TO[0]	V17	O		VDDQ_DDR	O,DDR_DLL_DTO[0]	DDR DLL Digital Test Output 0, for Test
DDR_DLL_D TO[1]	V18	O		VDDQ_DDR	O,DDR_DLL_DTO[1]	DDR DLL Digital Test Output 1, for Test
DDR_DLL_A TO	AA19	B		VDDQ_DDR	B,DDR_DLL_ATO	DDR DLL Analog Test Output, for Test
VGA0_HSYN C	L20	B,PD	8mA		I,GPIO1[18], PD	VGA0 HSYNC, share with GPIO1[18]
VGA0_VSYN C	M21	B,PD	8mA		I,GPIO1[19], PD	VGA0 VSYNC, share with GPIO1[19]
VDAC0_OUT P0	R23	AO				VDAC0 OUT0 +
VDAC0_OUT P1	P23	AO				VDAC0 OUT1 +
VDAC0_OUT P2	P22	AO				VDAC0 OUT2 +
VDAC0_REX T	T20	AIO				VDAC0 Reference External

VDAC0_VDR EF	R22	AIO				VDAC0 VD Reference
VGA1_HSYN C	M20	B,PD	8mA		I,GPIO1[20], PD	VGA1 HSYNC, share with GPIO1[20]
VGA1_VSYN C	L21	B,PD	8mA		I,GPIO1[21], PD	VGA1 VSYNC, share with GPIO1[21]
VDAC1_OUT P0	T23	AO				VDAC1 OUT0 +
VDAC1_OUT P1	U23	AO				VDAC1 OUT1 +
VDAC1_OUT P2	U22	AO				VDAC1 OUT2 +
VDAC1_REX T	T21	AIO				VDAC1 Reference External
VDAC1_VDR EF	T22	AIO				VDAC0 VD Reference
HDMI_TX2P	B18	AO				Channel 2 TX+
HDMI_TX2N	A18	AO				Channel 2 TX-
HDMI_TX1P	B19	AO				Channel 1 TX+
HDMI_TX1N	A19	AO				Channel 1 TX-
HDMI_TX0P	B20	AO				Channel 0 TX+
HDMI_TX0N	A20	AO				Channel 0 TX-
HDMI_TXCP	B21	AO				TX Clock+
HDMI_TXCN	A21	AO				TX Clock-
HDMI_RBIAS	A15	AI				12KOhm resistor to Ground, +/-1%
HDMI_CEC	C15	B,PD	8mA	VDD_IO_HDM I	I,GPIO1[22], PD	Custom Electronics Control Wire, share with GPIO1[22]
HDMI_DSCL	C16	B,PU	8mA	VDD_IO_HDM I	I,GPIO1[23], PU	I2C Master Clock, share with GPIO1[23]
HDMI_DSDA	C17	B,PU	8mA	VDD_IO_HDM I	I,GPIO1[24], PU	I2C Master Data, share with GPIO1[24]
HDMI_HPD	C18	B,PD	8mA	VDD_IO_HDM I	I,GPIO1[25], PD	Hot Plug Detect, share with GPIO1[25]
VDDA_PLL0	K23	PWR		1.0v		PLL0 Analog Power,1.0V
VDDA_PLL1	K22	PWR		1.0v		PLL1 Analog Power,1.0V
VDDA_PLL2	L23	PWR		1.0v		PLL2 Analog Power,1.0V
VDDA_PLL3	L22	PWR		1.0v		PLL3 Analog Power,1.0V
VDDA_PLL4	N21	PWR		1.0v		PLL4 Analog Power,1.0V
VSSA_PLL0	K21	GND		0v		PLL0 Analog Ground
VSSA_PLL1	M22	GND		0v		PLL1 Analog Ground
VSSA_PLL2	M23	GND		0v		PLL2 Analog Ground

VSSA_PLL3	N23	GND		0v		PLL3 Analog Ground
VSSA_PLL4	N22	GND		0v		PLL4 Analog Ground
UHOST_VDD A33	K4	PWR		3.3v		USB HOST PHY Analog Power 3.3v
UHOST_ VSSA33	M6	GND		0v		USB HOST PHY Analog Ground , UHOST_VSSA
UHOST_VSS AC	N3	GND		0v		USB HOST PHY PLL Analog Ground
UOTG_ VDDA33	L6	PWR		3.3v		USB OTG PHY Analog Power 3.3v
UOTG_ VSSA33	K3	GND		0v		USB OTG PHY Analog Ground 3.3v , UOTG_VSSA33
UOTG_VSSA C	M3	GND		0v		USB OTG PHY PLL Analog Ground
VDD33_EPH Y	K1, K2	PWR		3.3v		ETHERNET PHY Analog Power supply:3.3v
VSS_EPHY	N4, P4	GND		0v		ETHERNET PHY Analog Ground
SPHY_VP25	T3, T4, R3, R4	GND		2.5v		SATA PHY Analog Power high voltage supply:2.5v, SATA_VP25
VDAC0_PVD D1	R20	PWR		3.3v		VDAC0 Analog Power,3.3v
VDAC0_PVD D2	R21	PWR		3.3v		VDAC0 Analog Power,3.3v
VDAC0_PGN D1	P20,P21	GND		0v		VDAC0 Analog Ground
VDAC1_PVD D1	U20,V20,V21	PWR		3.3v		VDAC1 Analog Power,3.3v
VDAC1_PVD D2	U21	PWR		3.3v		VDAC1 Analog Power,3.3v
VDAC1_PGN D1	W20,W21	GND		0v		VDAC1 Analog Ground
AVDD33_ES D	A17,B17	PWR		3.3v		HDMI ESD Analog Power 3.3v
AVSS33_ES D	A16,B16	GND		0v		HDMI ESD Analog Gound
AVDD33_HD MI	A14	PWR		3.3v		HDMI Analog Power 3.3v
AVSS33_HD MI	B15	GND		0v		HDMI Analog Gound
HDMI_VSS3I O	C14,D14	GND		0v		DVSS,ESD Ground
VDD_CORE	N10-N15, N17,	PWR		1.0v		Core power,1.0v

	P10-P15, P17-P18, R10-R15, R17-R18, T17-T18, U10-U18				
VDD_IO_SYS	A22, J6-J7, H7, K6, H22-23, K20,	PWR		3.3v	System Digital I/O power,3.3v
VDD_IO_DCVI	B8-B9, C8-C9	PWR		1.8v,3.3v	DCVI Digital I/O power
VDD_IO_HDMI	D15	PWR		5.0v	HDMI Digital I/O power
VDD_IO_LCD	D16,D17,F7,F8, G7,G8,F14,G14	PWR		2.8v,3.3v	LCD Digital I/O power
VDD_IO_DDR	U1-U4, U6-U7, V1-V4, V6-V8, W3-W4, Y3-Y5, AA3, AA5	PWR		1.5v	DRAM Power,1.5v
DDR_PLL_VDD	V11-V13,	PWR		2.5v	DDR PLL Power,2.5v
DDR_PLL_VSS	V14-V16	GND		0v	DDR PLL Ground
VREF_DDR	Y21	PWR		1/2 VDDQ_DDR	DRAM REF Power , DDR_VREF
VSS	A1,AC1,A23,AC 23,B14,D18,G22 ,K7,K9-15,L7,L4 ,L9-L15,M1,M7, M9-15,N6-N7,N 2,N9,P7,P9,R1, R6-7,R9,T2,T6-7 ,U8-9,V9-10,Y6- 7,AA6-7,AB7,A C6,AC9,AB10,A C12,AB13,AC15 ,AB16,AC18,AB 19,Y20,AA20,A C21,N18,N20,G 22,D18,B14	GND		0v	System Digital I/O ground