SSC8339DEW
High-Integrated Camera SoC Processor

Preliminary Product Brief Version 0.1

REVISION HISTORY

Revision No.	Description	Date
0.1	Ÿ Initial release	03/19/2018

FEATURES

n High Performance Processor Core
- Ÿ ARM Cortex-A7 single Core 800MHz
- Ÿ Neon and FPU
- Ÿ DMA Engine

n Image/Video Processor
- Ÿ Supports 10/12-bit parallel interface for raw data input
- Ÿ Supports MIPI interface with 4+2 lanes
- Ÿ Supports 8/10-bit CCIR656 interface
- Ÿ Supports multi sensors input configuration
  - 2 MIPI 4+2
  - One MIPI (2) + One Parallel Bayer
  - One MIPI (2) + One BT656/601
  - One MIPI (4) + One BT656
  - One MIPI (2/4) + One USB YUV422
  - Parallel Bayer + One BT656
- Ÿ Supports 3M pixels video recording and image snapshot
- Ÿ Bad pixel compensation
- Ÿ Noise Reduction (NR)
- Ÿ Optical black correction
- Ÿ Lens shading compensation
- Ÿ Auto White Balance (AWB) / Auto Exposure (AE) / Auto Focus (AF)
- Ÿ CFA color interpolation
- Ÿ Color correction
- Ÿ Gamma correction
- Ÿ Video stabilization
- Ÿ Wide Dynamic Range (WDR)
- Ÿ Rotation with 90 or 270 degree
- Ÿ Lens distortion correction
- Ÿ Fully programmable multi-function scaling engines

n MStar Advanced Color Engine (MStarACE)
- Ÿ Luma gain/offset adjustment
- Ÿ Supports 2D peaking
- Ÿ Horizontal noise masking
- Ÿ Direct Luma Correction (DLC)
- Ÿ Black/White Level Extension (BLE/WLE)
- Ÿ IHC/ICC/IBC for chroma adjustment
- Ÿ Histogram statistics

n Multi-Standard Video Decoder
- Ÿ H.264 Decoder
  - Supports ITU-T H.264, ISO/IEC 14496-10 main profile, level 4.2
  - Supports max resolution up to 3M(2048x1536, 2304x1296)
  - Supports error concealment feature for erroneous video streams
  - Supports frame rate conversion between different encoding and display frame rates
  - Supports max bit rate up to 100Mb
- Ÿ JPEG Decoder
  - Support Baseline profile up to 8Kx8K
  - YUV420, YUV422
  - Max resolution 2M(1920x1080)p30fps, 3M(2048x1536)p20fps, 3M(2304x1296)p20fps

n Display Engine
- Ÿ Supports up to four graphics and five video display planes
- Ÿ Advanced algorithms for OSD de-flickering
- Ÿ Built-in high quality Motion-Adaptive (MADi) and Edge Oriented (EODi) de-interlacer
- Ÿ Independent high quality scaling path for HD and SD outputs
- Ÿ Built-in contrast and brightness control

n **H.264 Encoder**
- Ÿ Supports H.264 baseline and main profile encoding
- Ÿ Supports MVs: 16x16, 16x8, 8x16, 8x8, 8x4, 4x8, 4x4
- Ÿ Supports up to quarter-pixel
- Ÿ Supports two reference frames
- Ÿ Supports rate control and ROI
- Ÿ Support multi streams:
  - – 3M@30fps + VGA@30fps
  - – 1080p@30fps + 720p@30fps + 720p@30fps

n **JPEG Encoder**
- Ÿ Supports JPEG baseline encoding
- Ÿ Supports resolution up to 3M(2048x1536)p20fps or 3M(2304x1296)p20fps
- Ÿ Supports YUV422 or YUV420 formats

n **Audio Processor**
- Ÿ Built-in audio line buffer for 1Vrms output swing
- Ÿ Support up to 4 set mono DMIC
- Ÿ One Mono/Stereo ADC for microphone inputs
- Ÿ One 2set (Mono/Stereo, Single-end) DAC for lineouts
- Ÿ Supports 2ch I2S
- Ÿ Supports 8K/16K/32KHz sampling rate audio recording
- Ÿ Digital and analog gain adjustment

n **Video Output Interface**
- Ÿ Supports parallel output up to FHDp60fps (1920x1080p60)
- Ÿ Supports MIPI DSI up to 1280x720 60fps / 1920x1080 60fps
- Ÿ Support CCIR601 8/16-bit

n **NOR Flash Interface**
- Ÿ Compliant with standard, dual and quad SPI Flash memory components

n **Storage**
- Ÿ Support SPI Nor, SPI NAND
- Ÿ Compliant with standard, dual and quad SPI Flash memory components
- Ÿ SDXC by SD 3.0 support

n **SDIO 2.0 Interface**
- Ÿ Compatible with SDIO spec. 2.0, data bus 1/4 bit mode
- Ÿ Compatible with SD spec. 2.0, data bus 1/4 bit mode

n **USB 2.0 Interface**
- Ÿ One USB 2.0 Host Controller
- Ÿ One USB 2.0 configurable host or device
  - – Host mode supports EHCI specification
  - – Device mode supports 6 endpoints

n **DRAM Memory**
- Ÿ Embedded DDR3 DRAM memory
  - – Memory size up to 1Gb

n **Connectivity**
- Ÿ One USB 2.0 OTG Controller could be used for USB Wi-Fi Dongle, PC or rear cam
  - – One USB 2.0 OTG Controller could be used for PC or rear cam
- Ÿ One USB 2.0 Host Controller could be used for USB Wi-Fi Dongle or rear cam
  - – One USB 2.0 Host Controller could be used for USB Wi-Fi Dongle
- Ÿ One SDIO 2.0 Host Controller could be used for SDIO Wi-Fi module

n **Security Engines**
- Ÿ Supports AES/DES/TDES
- Ÿ Supports secure booting

n **Peripherals**
- Ÿ Dedicated GPIOs for system control
- Ÿ Multiport PWM outputs shared with GPIOs
- Ÿ Two generic UARTs and one fast UART with flow control
- Ÿ Three generic timers and one watchdog timer
- Ÿ Three SPI masters
- Ÿ Four I2C Masters
- Ÿ One IR input
- Ÿ Built-in SAR ADC with 4 channels analog inputs for different kinds of applications

n Operating Voltage Range
- Ÿ Core: 0.95V
- Ÿ I/O: 1.8 ~ 3.3V
- Ÿ DRAM: 1.5V
- Ÿ Power Consumption: TBD

n Package
- Ÿ BGA 12x12mm-268-ball

GENERAL DESCRIPTIONS

This is a highly integrated SOC based on ARM Cortex-A7, it integrates Image Signal Processor (ISP), Color Engine, Video (H.264/MJPEG) Encoders/Decoder and other useful peripherals for camera applications.

A typical utilization of the SSC8339DEW application processor is demonstrated in the following block diagram. The complete system includes a camera module (CMOS sensor), a connectivity module (WiFi or Ethernet), and a non-volatile storage (NOR flash or SD card). The ISP and Color Engine handle images captured from the camera sensor, and the video stream is composed of lots images. There are pre- and post- video processing stages. The pre-video processing rotates images, reduces noises, enhances signals and translates color domains. The post-video processing corrects lens distortion, adjusts color quality, and generates multiple video streams with different resolutions.

The MJPEG/H.264 video codec supports up to 60 frames per second with 1920x1080 resolution. Pure hardwired architecture achieves low power operation and extends battery time. MCTF (motion -compensated temporal filter) is integrated to enhance image quality and reduce video bit-rate under dark environment.

The well compressed video/audio streams could be streamed or stored in the cloud server through Wi-Fi or Ethernet or stored in a local SD Card. The NOR flash is usually reserved for operating system and application software. Moreover, other peripherals like SAR ADC, Audio ADC/DAC, UARTs, PWMs, GPIOs and SPI are supported to realize applications with maximal flexibility.

CHIP BLOCK DIAGRAM

Camera Module

MIPI or DVP

I2C

ISP

Color Engine

Image Buffer

PLL

POC

System Clock

RTC Clock

Microphone

Speaker

Audio Driver

Audio ADC/DAC

Timers

I2C I2S

SPI Flash Controller

H.264 Encoder

MJPEG Encoder

H.264 Decoder

MJPEG Decoder

Single CA7 800MHz Neon + FPU

MCP DRAM

SD3.0

SDIO 2.0

PWMs/GPIOs

SAR ADC

Temperature Sensor

Light Sensor

UART/IrDA

SPI

EJTAG

USB Host/Device

USB Host

Display Engine MIPI/CCIR/DVP

Or

USB

USB

USB Wi-Fi Module

Serial NOR

SD Card

BALL ASSIGNMENT (SSC8339DEW)

Top View

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
A		AUD_LINEOUT_R0	XTAL_IN	XTAL_OUT			LCD_D20	LCD_D18			LCD_D11	GND	LCD_D8			LCD_D0	LCD_PCLK		A
B	AUD_MICCM1	AUD_LINEOUT_L0	GND	GND	UART0_RX	LCD_D23	LCD_D21	LCD_D17	LCD_D15	LCD_D13	LCD_D10	LCD_D9	LCD_D7	LCD_D5	LCD_D3	LCD_D1	LCD_HSYNC	LCD_VSYNC	B
C	AUD_MICIN1	GND	SE_XTAL_OUT	UART1_TX	UART0_TX	LCD_D22	LCD_D19	LCD_D16	LCD_D14	LCD_D12	GND	GND	LCD_D6	LCD_D4	LCD_D2	GND	SNR1_DA1N	SNR1_DA1P	C
D	AUD_MICCM0	AUD_MICIN0		UART1_RX	GND	LCD_CTRL6	LCD_CTRL5	LCD_CTRL1	LCD_CTRL0			GND		GND	SNR1_GPIO1	LCD_DE	SNR1_CKN	SNR1_CKP	D
E		GND		AVDD3P3_USB_XTAL	LCD_CTRL3	LCD_CTRL2	LCD_CTRL4	VDDP_3_B		VDDP_3_A	AVDD1P2_MIPI	GND	VDDP_2_B	VDDP_2_A	SNR1_GPIO0	SNR1_GPIO4	SNR1_DA0N	SNR1_DA0P	E
F	AUD_VAG	AUD_VRM_DAC	AUD_VRM_ADC	AVDD_AUD			AVDD3P3_MIPI	VDDP_3_B		VDDP_3_A	VDD	VDD	AVDDL_MIPI_TX	VDDP_2_A	SNR1_GPIO3		GND	SNR1_GPIO2	F
G		GND	GND	GND	GND	GND	GND	GND	GND	VDD	VDD	VDD			AVDDL_MIPI_RX	SNR0_GPIO6	SNR0_GPIO2		G
H	DM_P1	DP_P1	GND	AVDD3P3_USB	GND		GND	GND	GND		VDD	VDD	VDD		AVDD_SDIO_3318_CAP	SNR0_GPIO4	SNR0_GPIO5	SNR0_GPIO3	H
J	USB_DM	USB_DP	AVSS_POC	USB_VBUS	USB_CID	GND		GND	GND		VDD	VDD	VDD	GND	GND		SNR0_D10	SNR0_D11	J
K		VBUS_5V	POC_INTERRUPT		GND	GND		VDDIO_DATA	VDDIO_DATA	VDDIO_DATA	GND		VDD	GND	GND	GND	SNR0_D8	SNR0_D9	K
L	POC_PWR_EN	RESET	HALL_KEY		AVDD_POC	GND	VDDIO_CMD	GND	VDDIO_DATA	VDDIO_DATA		DVDD_DDR_RX	GND	GND	GND	SNR0_D7	SNR0_D6		L
M		PWR_ON_KEY_DET	PMTEST		AVDD_RTC	GND	VDDIO_CMD	VDDIO_CMD	GND	GND		DVDD_DDR	GND	SD_VCTRL	AVDD_SDIO_3318	SNR0_D5	SNR0_D4		M
N	XTAL_IN_32K	AVSS_XTAL_RTC	DVDD_NODIE	GND_EFUSE		GND	DDR_A15	GND	GND	GND	GND		GND	AVDD33_SD	VDDP_1	GND	SNR0_D3	SNR0_D2	N
P	XTAL_OUT_32K	AVSS_XTAL_RTC	PM_LED0	PM_GPIO15		PM_GPIO8		AVDDIO_DRAM	GND			GND	GND	SPI0_CZ1	VDDP_1	GND	SNR0_D1	SNR0_D0	P
R		PM_LED1	SAR_GPIO2	PM_GPIO14	PM_GPIO13	PM_GPIO9	PM_GPIO4	AVDDIO_DRAM		GND	AVDD_PLL	I2C0_SDA	SPI0_DI	I2C0_SCL	SNR0_GPIO1	SNR0_GPIO0	SD_IO3	SD_IO2	R
T	AVDD_NODIE	SAR_GPIO0	PM_SPI_DO	PM_SPI_WPZ	PM_GPIO12		PM_GPIO5	PM_GPIO2	PM_GPIO0	GND	GND	FUART_TX	SPI0_DO	SPI0_CZ	SDIO20_D1	SD_IO0	SD_IO5	SD_IO4	T
U	SAR_GPIO1	GND	PM_SPI_CZ	PM_SPI_DI	PM_SPI_HLD	PM_GPIO11	PM_GPIO6	PM_GPIO3	PM_GPIO1	PM_UART_TX	PM_IRIN	FUART_RX	SPI0_CK	FUART_RTS	SDIO20_CLK	SDIO20_D3	SD_IO1	GND	U
V		SAR_GPIO3	PM_SPI_CK			PM_GPIO10	PM_GPIO7			PM_UART_RX	PM_SD_CDZ			FUART_CTS	SDIO20_D0	SDIO20_CMD	SDIO20_D2		V
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	

BALL CHARACTERISTICS

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
F4	AVDD_AUD		AVDD_AUD				
T1	AVDD_NODIE						
R11	AVDD_PLL						
L5	AVDD_POC						
M5	AVDD_RTC						
M15	AVDD_SDIO_3318						
H15	AVDD_SDIO_3318_CAP						
E11	AVDD1P2_MIPI						
E11	AVDD1P2_MIPI						
N14	AVDD33_SD						
F7	AVDD3P3_MIPI						
H4	AVDD3P3_USB						
E4	AVDD3P3_USB_XTAL		AVDD3P3_USB				
P8, R8	AVDDIO_DRAM						
G15	AVDDL_MIPI_RX						
F13	AVDDL_MIPI_TX						
J3	AVSS_POC						
P2, N2	AVSS_XTAL_RTC						

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
M12	DVDD_DDR						
L12	DVDD_DDR_RX						
N3	DVDD_NODIE						
N7	AVDDIO_DRAM						
N4	GND_EFUSE						
B2	PAD_AUD_LINEOUT_LO		AVDD_AUD				
A2	PAD_AUD_LINEOUT_RO		AVDD_AUD				
D1	PAD_AUD_MICCM0		AVDD_AUD				
B1	PAD_AUD_MICCM1		AVDD_AUD				
D2	PAD_AUD_MICIN0		AVDD_AUD				
C1	PAD_AUD_MICIN1		AVDD_AUD				
F1	PAD_AUD_VAG		AVDD_AUD				
F3	PAD_AUD_VRM_ADC		AVDD_AUD				
F2	PAD_AUD_VRM_DAC		AVDD_AUD				
H1	PAD_DM_P1		AVDD3P3_USB	>4mA	Hi-Z	Hi-Z	
H2	PAD_DP_P1		AVDD3P3_USB	>4mA	Hi-Z	Hi-Z	
V14	PAD_FUART_CTS	EJ_MODE1[TDO] SPI1_MODE1[DI] FUART_MODE1[CTS] UART2_MODE1[RX]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

3/19/2018

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		UART2_MODE2[RX] SD_MODE1[D3] SDIO_MODE2[D3] PWM2_MODE1					
U14	PAD_FUART_RTS	EJ_MODE1[TDI] SPI1_MODE1[DO] FUART_MODE1[RTS] UART2_MODE1[TX] SD_MODE1[D2] SDIO_MODE2[D2] PWM3_MODE1	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
U12	PAD_FUART_RX	EJ_MODE1[TCK] EJ_MODE2[TCK] SPI1_MODE1[CZ] FUART_MODE1[RX] FUART_MODE2[RX] UART1_MODE1[RX] UART1_MODE2[RX] PWM0_MODE1	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	YES
T12	PAD_FUART_TX	EJ_MODE1[TMS] EJ_MODE2[TMS] SPI1_MODE1[CK] FUART_MODE1[TX] FUART_MODE2[TX] UART1_MODE1[TX] PWM1_MODE	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		1					
L3	PAD_HALL_KEY		AVDD_POC				
R14	PAD_I2C0_SCL	EJ_MODE2[TDO] I2C0_MODE1[SCL] I2C2_MODE1[SCL] UART1_MODE3[RX] UART1_MODE4[RX] EMMC_RSTN_EN1[RSTN]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
R12	PAD_I2C0_SDA	EJ_MODE2[TDI] I2C0_MODE1[SDA] I2C2_MODE1[SDA] UART1_MODE3[TX]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D9	PAD_LCD_CTRL0	RGB16_MODE2_[D8] PL8016_MODE1[FLM] PL8018_MODE1[FLM] PWM1_MODE4	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D8	PAD_LCD_CTRL1	RGB16_MODE2_[D9] SPI1_MODE5[CZ] PWM2_MODE4 I2S_MODE3[SDO] DMIC_MODE3[R]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
E6	PAD_LCD_CTRL2	SPI1_MODE5[CK] PWM3_MODE4 I2S_MODE3[SDI] DMIC_MODE	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		3[L]			(+/-15%)		
E5	PAD_LCD_CTRL3	RGB8_MODE3[PCLK] REG16_MODE2[PCLK] SPI1_MODE5[DI] PWM4_MODE4 I2S_MODE3[BCK]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
E7	PAD_LCD_CTRL4	RGB8_MODE3[HSYNC] REG16_MODE2[HSYNC] SPI1_MODE5[DO] PWM5_MODE4 I2S_MODE3[WCK] DMIC_MODE3[CLK]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D7	PAD_LCD_CTRL5	RGB8_MODE3[VSYNC] REG16_MODE2[VSYNC] I2C0_MODE3[SCL] UART2_MODE4[RX] PWM6_MODE4 I2S_MODE3[WCK] DMIC_MODE3[CLK]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D6	PAD_LCD_CTRL6	RGB8_MODE3[DE] REG16_MODE2[DE] I2C0_MODE3[SDA] UART2_MODE4[TX] PWM7_MODE4	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
A16	PAD_LCD_D0	RGB8_MODE1[D0]	VDDP_3_A	>8mA	Option PU =	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		RGB8_MODE2[D0] REG16_MODE1[D0] REB18_MODE1[D0] REG24_MODE1[D0] PL808_MODE1[D0] PL8016_MODE1[D0] PL8018_MODE1[D0] TX_MIPI_MODE1 TX_MIPI_MODE2 NAND_MODE1[D0] EMMC_RSTN_EN2			90kohm (+/-15%) Option PD = 64kohm (+/-15%)		
B16	PAD_LCD_D1	REG8_MODE1[D1] REB8_MODE2[D1] REG16_MODE1[D1] REG18_MODE1[D1] REG24_MODE1[D1] PL808_MODE1[D1] PL8016_MODE1[D1] PL8018_MODE1[D1] TX_MIPI_MODE1 TX_MIPI_MODE2 NAND_MODE1[D1]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B11	PAD_LCD_D10	EJ_MODE4[TCK] RGB16_MODE1[D10] RGB16_MODE2[D10] RGB18_MOD	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		E1[D10] RGB24_MODE1[D10] PL8016_MODE1[D10] PL8018_MODE1[D10] SPI0_MODE3[CZ] NAND_MODE1[WPZ] SD_MODE2[D1] SDIO_MODE4[D1] EMMC_MODE2[D1] PWM2_MODE3 DMIC_MODE2[CLK]			(+/-15%)		
A11	PAD_LCD_D11	EJ_MODE4[TMS] RGB16_MODE1[D11] RGB16_MODE2[D11] RGB18_MODE1[D11] RGB24_MODE1[D11] PL8016_MODE1[D11] PL8018_MODE1[D11] SPI0_MODE3[CK] NAND_MODE1[REZ] SD_MODE2[D2] SDIO_MODE4[D2] EMMC_MODE2[D2] PWM3_MODE3	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C10	PAD_LCD_D12	EJ_MODE4[TDO] RGB16_MODE1[D12]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		RGB16_MODE2[D12] RGB18_MODE1[D12] RGB24_MODE1[D12] PL8016_MODE1[D12] PL8018_MODE1[D12] SPI0_MODE3[DI] NAND_MODE1[RBZ] SD_MODE2[D3] SDIO_MODE4[D3] EMMC_MODE2[D3] PWM4_MODE3 I2S_MODE2[SDO]			Option PD = 64kohm (+/-15%)		
B10	PAD_LCD_D13	EJ_MODE4[TDI] RGB16_MODE1[D13] RGB16_MODE2[D13] RGB18_MODE1[D13] RGB24_MODE1[D13] PL8016_MODE1[D13] PL8018_MODE1[D13] SPI0_MODE3[DO] PWM5_MODE3 I2S_MODE2[SDI]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C9	PAD_LCD_D14	RGB16_MODE1[D14] RGB16_MODE2[D14] RGB18_MODE1[D14] RGB24_MOD	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		E1[D14] PL8016_MOD E1[D14] PL8018_MOD E1[D14] I2C0_MODE2 [SCL] I2C3_MODE2 [SCL] SPI1_MODE4 [CZ] PWM6_MODE 3 I2S_MODE2[BCK]			(+/-15%)		
B9	PAD_LCD_D15	RGB16_MOD E1[D15] RGB16_MOD E2[D15] RGB18_MOD E1[D15] RGB24_MOD E1[D15] PL808_MODE 1[FLM] PL8016_MOD E1[D15] PL8018_MOD E1[D15] I2C0_MODE2 [SDA] I2C3_MODE2 [SDA] SPI1_MODE4 [CK] PWM7_MODE 3 I2S_MODE2[WCK]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C8	PAD_LCD_D16	RGB8_MODE 3[D0] RGB16_MOD E2[D0] RGB18_MOD E1[D16] RGB24_MOD E1[D16] PL8018_MOD E1[D16] I2C2_MODE3 [SCL]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
B8	PAD_LCD_D17	RGB8_MODE3[D1] RGB16_MODE2[D1] RGB18_MODE1[D17] RGB24_MODE1[D17] PL8018_MODE1[D17] I2C2_MODE3[SDA]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
A8	PAD_LCD_D18	RGB8_MODE3[D2] RGB16_MODE2[D2] RGB24_MODE1[D18] FUART_MODE5[RX]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C7	PAD_LCD_D19	RGB8_MODE3[D3] RGB16_MODE2[D3] RGB24_MODE1[D19] FUART_MODE5[TX]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C15	PAD_LCD_D2	RGB8_MODE1[D2] REB8_MODE2[D2] REG16_MODE1[D2] REG18_MODE1[D2] REG24_MODE1[D2] PL808_MODE1[D2] PL8016_MODE1[D2] PL8018_MODE1[D2] TX_MIPI_MODE1 TX_MIPI_MODE2 NAND_MODE1[D2]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
A7	PAD_LCD_D20	RGB8_MODE3[D4] RGB16_MODE2[D4] RGB24_MODE1[D20] SPI2_MODE3[CZ] FUART_MODE5[CTS]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B7	PAD_LCD_D21	RGB8_MODE3[D5] RGB16_MODE2[D5] RGB24_MODE1[D21] SPI2_MODE3[CK] FUART_MODE5[RTS]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C6	PAD_LCD_D22	RGB8_MODE3[D6] RGB16_MODE2[D6] RGB24_MODE1[D22] SPI2_MODE3[DI]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B6	PAD_LCD_D23	RGB8_MODE3[D7] RGB16_MODE2[D7] RGB24_MODE1[D23] SPI2_MODE3[DO] PWM0_MODE4	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B15	PAD_LCD_D3	RGB8_MODE1[D3] RGB8_MODE2[D3] RGB16_MODE1[D3] RGB18_MODE1[D3] RGB24_MODE1[D3] PL808_MODE1[D3] PL8016_MOD	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		E1[D3] PL8018_MODE1[D3] TX_MIPI_MODE1 TX_MIPI_MODE2 NAND_MODE1[D3]					
C14	PAD_LCD_D4	RGB8_MODE1[D4] RGB8_MODE2[D4] RGB16_MODE1[D4] RGB18_MODE1[D4] RGB24_MODE1[D4] PL808_MODE1[D4] PL8016_MODE1[D4] PL8018_MODE1[D4] TX_MIPI_MODE1 TX_MIPI_MODE2 FUART_MODE1[RX] NAND_MODE1[D4] EMMC_MODE2[D4]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B14	PAD_LCD_D5	RGB8_MODE1[D5] RGB8_MODE2[D5] RGB16_MODE1[D5] RGB18_MODE1[D5] RGB24_MODE1[D5] PL808_MODE1[D5] PL8016_MODE1[D5] PL8018_MODE1[D5]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		TX_MIPI_MODE1 TX_MIPI_MODE2 FUATY_MODE4[TX] NAND_MODE1[D5] EMMC_MODE2[D5]					
C13	PAD_LCD_D6	RGB8_MODE1[D6] RGB8_MODE2[D6] RGB16_MODE1[D6] RGB18_MODE1[D6] RGB24_MODE1[D6] PL808_MODE1[D6] PL8016_MODE[D6] PL8018_MODE[D6] TX_MIPI_MODE2 FUART_MODE4[CTS] NAND_MODE1[D6] EMMC_MODE2[D6]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B13	PAD_LCD_D7	RGB8_MODE1[D7] RGB8_MODE2[D7] RGB16_MODE1[D7] RGB18_MODE1[D7] RGB24_MODE1[D7] PL808_MODE1[D7] PL8016_MODE1[D7] PL8018_MODE1[D7] TX_MIPI_MO	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		DE2 FUART_MODE4[RTS] NAND_MODE1[D7] EMMC_MODE2[D7]					
A13	PAD_LCD_D8	RGB16_MODE1[D8] RGB18_MODE1[D8] RGB24_MODE1[D8] PL8016_MODE1[D8] PL8018_MODE1[D8] TX_MIPI_MODE2 SPI1_MODE4[DI] NAND_MODE1[CEZ] SD_MODE2[CMD] SDIO_MODE4[CMD] EMMC_MODE2[CMD] PWM0_MODE3 DMIC_MODE2[R]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
B12	PAD_LCD_D9	RGB16_MODE1[D9] RGB18_MODE1[D9] RGB24_MODE1[D9] PL8016_MODE1[D9] PL8018_MODE1[D9] TX_MIPI_MODE2 SPI1_MODE4[DO] NAND_MODE1[WEZ] SD_MODE2[D0]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		SDIO_MODE4[D0] EMMC_MODE2[D0] PWM1_MODE3 DMIC_MODE2[L]					
D16	PAD_LCD_DE	RGB8_MODE1[DE] RGB8_MODE2[DE] RGB16_MODE1[DE] RGB18_MODE1[DE] RGB24_MODE1[DE] PL808_MODE1[CS] PL8016_MODE1[CS] PL8018_MODE1[CS] NAND_MODE1[CLE] SD_MODE2[CLK] SDIO_MODE4[CLK] EMMC_MODE2[CLK]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	
B17	PAD_LCD_HSYNC	RGB8_MODE1[HSYNC] RGB8_MODE2[HSYNC] RGB16_MODE1[HSYNC] RGB18_MODE1[HSYNC] RGB24_MODE1[HSYNC] PL808_MODE1[RD] PL8016_MODE1[RD] PL8018_MODE1[RD]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	
A17	PAD_LCD_PCLK	RGB8_MODE1[PCLK] RGB8_MODE	VDDP_3_A	>8mA	Option PU = 90kohm	input, pull-down	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		2[PCLK] RGB16_MODE1[PCLK] RGB18_MODE1[PCLK] RGB24_MODE1[PCLK] PL808_MODE1[A0] PL8016_MODE1[A0] PL8018_MODE1[A0] NAND_MODE1[ALE]			(+/-15%) Option PD = 64kohm (+/-15%)		
B18	PAD_LCD_VSYNC	RGB8_MODE1[VSYNC] RGB8_MODE2[VSYNC] RGB16_MODE1[VSYNC] RGB18_MODE1[VSYNC] RGB24_MODE1[VSYNC] PL808_MODE1[WR] PL8016_MODE1[WR] PL8018_MODE1[WR]	VDDP_3_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	
T9	PAD_PM_GPIO0	PAD_PM_GPIO0	AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
U9	PAD_PM_GPIO1	PWM1_MODE1	AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
V6	PAD_PM_GPIO10	PWM3_MODE2	AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
U6	PAD_PM_GPIO11		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-down	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
T5	PAD_PM_GPIO12		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-down	YES
R5	PAD_PM_GPIO13		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
R4	PAD_PM_GPIO14		AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-up	YES
P4	PAD_PM_GPIO15		AVDD_NO DIE	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-down	YES
T8	PAD_PM_GPIO2	PWM2_MODE1	AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
U8	PAD_PM_GPIO3	PWM3_MODE1	AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-down	YES
R7	PAD_PM_GPIO4		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
T7	PAD_PM_GPIO5	PWM1_MODE2	AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
U7	PAD_PM_GPIO6	PWM0_MODE2	AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
V7	PAD_PM_GPIO7		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±1	input, pull-up	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
					5%)		
P6	PAD_PM_GPIO8		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
R6	PAD_PM_GPIO9	PWM2_MODE 2	AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
U11	PAD_PM_IRIN		AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-up	YES
U11	PAD_PM_IRIN		AVDD_NO DIE				
P3	PAD_PM_LED0	PM_PWM0_M ODE3	AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
R2	PAD_PM_LED1	PM_PWM1_M ODE3	AVDD_NO DIE	>4mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
V11	PAD_PM_SD_CDZ		AVDD_NO DIE	>4mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
V3	PAD_PM_SPI_CK		AVDD_NO DIE	>8mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
U3	PAD_PM_SPI_CZ		AVDD_NO DIE	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
U4	PAD_PM_SPI_DI		AVDD_NO DIE	>8mA	PU=86kohm (±15%)/ 39uA(±1	input, pull-up	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
					5%)		
T3	PAD_PM_SPI_DO		AVDD_NODIE	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
U5	PAD_PM_SPI_HLD		AVDD_NODIE	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
T4	PAD_PM_SPI_WPZ		AVDD_NODIE	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
V10	PAD_PM_UART_RX		AVDD_NODIE				
U10	PAD_PM_UART_TX		AVDD_NODIE				
M3	PAD_PMTEST		AVDD_POC				
K3	PAD_POC_INTERRUPT		AVDD_POC				
L1	PAD_POC_PWR_EN		AVDD_POC				
M2	PAD_PWR_ON_KEY_DET		AVDD_POC				
L2	PAD_RESET		AVDD_POC				
T2	PAD_SAR_GPIO0		AVDD_NODIE	>4mA	Hi-Z	Hi-Z	YES
U1	PAD_SAR_GPIO1		AVDD_NODIE	>4mA	Hi-Z	Hi-Z	YES
R3	PAD_SAR_GPIO2		AVDD_NODIE	>4mA	Hi-Z	Hi-Z	YES
V2	PAD_SAR_GPIO3		AVDD_NODIE	>4mA	Hi-Z	Hi-Z	YES
T16	PAD_SD_IO0	SD30_MODE1[D0] EMMC_MODE	VDDP_1	>8mA	PU=86kohm (±15%)/	input, pull-up	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		1[D0]			39uA(±15%)		
U17	PAD_SD_IO1	SD30_MODE1[D1] EMMC_MODE1[D1]	VDDP_1	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
R18	PAD_SD_IO2	SD30_MODE1[D2] EMMC_MODE1[D2]	VDDP_1	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
R17	PAD_SD_IO3	SD30_MODE1[D3] EMMC_MODE1[D3]	VDDP_1	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
T18	PAD_SD_IO4	SD30_MODE1[CMD] EMMC_MODE1[CMD]	VDDP_1	>8mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	YES
T17	PAD_SD_IO5	SD30_MODE1[CLK] EMMC_MODE1[CLK]	VDDP_1	>8mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES
M14	PAD_SD_VCTRL		VDDP_1				
U15	PAD_SDIO20_CLK	SPI2_MODE1[CK] SDIO_MODE1[CLK]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	YES
V16	PAD_SDIO20_CMD	SPI2_MODE1[CZ] SDIO_MODE1[CMD]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
V15	PAD_SDIO20_D0	SPI2_MODE1[DO] SDIO_MODE1	VDDP_1	>8mA	Option PU = 90kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		[D0]			(+/-15%) Option PD = 64kohm (+/-15%)		
T15	PAD_SDIO20_D1	SPI2_MODE1 [DI] SDIO_MODE1 [D1]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
V17	PAD_SDIO20_D2	SDIO_MODE1 [D2]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
U16	PAD_SDIO20_D3	SDIO_MODE1 [D3]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C3	PAD_SEL_XTAL_OUT		AVDD3P3_USB				
P18	PAD_SNR0_D0	SR0_PAR_MODE2[D0]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
P17	PAD_SNR0_D1	SR0_PAR_MODE2[D1]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
J17	PAD_SNR0_D10	SR0_MIPI_MODE2 SR0_PAR_MO	VDDP_2_A	>8mA	Option PU = 90kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		DE1[D10] SR0_PAR_MODE2[D10] SR0_BT656_MODE1[Y6] SR0_BT656_MODE3[Y8] SR0_BT601_MODE1[Y6] SR0_BT601_MODE3[Y8]			(+/-15%) Option PD = 64kohm (+/-15%)		
J18	PAD_SNR0_D11	SR0_MIPI_MODE2 SR0_PAR_MODE1[D11] SR0_PAR_MODE2[D11] SR0_BT656_MODE1[Y7] SR0_BT656_MODE3[Y9] SR0_BT601_MODE1[Y7] SR0_BT601_MODE3[Y9]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
N18	PAD_SNR0_D2	SR0_MIPI_MODE1 SR0_MIPI_MODE2 SR0_PAR_MODE1[D2] SR0_PAR_MODE2[D2] SR0_BT656_MODE3[Y0] SR0_BT601_MODE3[Y0]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
N17	PAD_SNR0_D3	SR0_MIPI_MODE1 SR0_MIPI_MODE2 SR0_PAR_MODE1[D3] SR0_PAR_MODE2[D3] SR0_BT656_MODE3[Y1] SR0_BT601_MODE3[Y1]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
M17	PAD_SNR0_D4	SR0_MIPI_MODE1 SR0_MIPI_MODE2 SR0_PAR_MODE1[D4] SR0_PAR_MODE2[D4] SR0_BT656_MODE1[Y0] SR0_BT656_MODE3[Y2] SR0_BT601_MODE1[Y0] SR0_BT601_MODE3[Y2]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
M16	PAD_SNR0_D5	SR0_MIPI_MODE1 SR0_MIPI_MODE2 SR0_PAR_MODE1[D5] SR0_PAR_MODE2[D5] SR0_BT656_MODE1[Y1] SR0_BT656_MODE3[Y3] SR0_BT601_MODE1[Y1] SR0_BT601_MODE3[Y3]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
L17	PAD_SNR0_D6	SR0_MIPI_MODE1 SR0_MIPI_MODE2 SR0_PAR_MODE1[D6] SR0_PAR_MODE2[D6] SR0_BT656_MODE1[Y2] SR0_BT656_MODE3[Y4] SR0_BT601_MODE1[Y2] SR0_BT601_MODE3[Y4]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
L16	PAD_SNR0_D7	SR0_MIPI_MODE1 SR0_MIPI_M	VDDP_2_A	>8mA	Option PU = 90kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		ODE2 SR0_PAR_MODE1[D7] SR0_PAR_MODE2[D7] SR0_BT656_MODE1[Y3] SR0_BT656_MODE3[Y5] SR0_BT601_MODE1[Y3] SR0_BT601_MODE3[Y5]			(+/-15%) Option PD = 64kohm (+/-15%)		
K17	PAD_SNR0_D8	SR0_MIPI_MODE2 SR0_PAR_MODE1[D8] SR0_PAR_MODE2[D8] SR0_BT656_MODE1[Y4] SR0_BT656_MODE3[Y6] SR0_BT601_MODE1[Y4] SR0_BT601_MODE3[Y6]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
K18	PAD_SNR0_D9	SR0_MIPI_MODE2 SR0_PAR_MODE1[D9] SR0_PAR_MODE2[D9] SR0_BT656_MODE1[Y5] SR0_BT656_MODE3[Y7] SR0_BT601_MODE1[Y5] SR0_BT601_MODE3[Y7]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
R16	PAD_SNR0_GPIO0	I2C1_MODE1[SCL] I2C1_MODE2[SCL]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
R15	PAD_SNR0_GPIO1	I2C1_MODE1 [SDA] I2C1_MODE2 [SDA]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
G17	PAD_SNR0_GPIO2	SR0_MIPI_MODE1[RST] SR0_MIPI_MODE2[RST] SR0_PAR_MODE1[RST] SR0_PAR_MODE2[RST] SR0_BT656_MODE1[RST] SR0_BT656_MODE2[RST] SR0_BT656_MODE3[RST] SR0_BT656_MODE4[RST] SR0_BT601_MODE1[RST] SR0_BT601_MODE2[RST] SR0_BT601_MODE3[RST] SR0_BT601_MODE4[RST]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
H18	PAD_SNR0_GPIO3	SR0_MIPI_MODE1[MCLK] SR0_MIPI_MODE2[MCLK] SR0_PAR_MODE1[MCLK] SR0_PAR_MODE2[MCLK] SR0_BT656_MODE1[MCLK] SR0_BT656_MODE2[MCLK] SR0_BT656_MODE3[MCLK] SR0_BT656_MODE4[MCLK	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		] SR0_BT601_MODE1[MCLK] SR0_BT601_MODE2[MCLK] SR0_BT601_MODE3[MCLK] SR0_BT601_MODE4[MCLK]					
H16	PAD_SNR0_GPIO4	SR0_MIPI_MODE1[PDN] SR0_MIPI_MODE2[PDN] SR0_PAR_MODE1[VS] SR0_PAR_MODE2[VS] SR0_BT601_MODE1[VS] SR0_BT601_MODE2[VS] SR0_BT601_MODE3[VS] SR0_BT601_MODE4[VS]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
H17	PAD_SNR0_GPIO5	SR0_PAR_MODE1[HS] SR0_PAR_MODE2[HS] SR0_BT601_MODE1[HS] SR0_BT601_MODE2[HS] SR0_BT601_MODE3[HS] SR0_BT601_MODE4[HS]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
G16	PAD_SNR0_GPIO6	SR0_PAR_MODE1[PCK] SR0_PAR_MODE2[PCK] SR0_BT656_MODE1[PCK] SR0_BT656_MODE2[PCK] SR0_BT656_MODE3[PCK]	VDDP_2_A	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		SR0_BT656_MODE4[PCK] SR0_BT601_MODE1[PCK] SR0_BT601_MODE2[PCK] SR0_BT601_MODE3[PCK] SR0_BT601_MODE4[PCK]					
D17	PAD_SNR1_CKN	SR1_MIPI_MODE1 SR1_MIPI_MODE2 SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y5] SPI2_MODE2[DO] FUART_MODE3[RTS] SD30_MODE2[D1] SDIO_MODE3[D1] PWM3_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D18	PAD_SNR1_CKP	SR1_MIPI_MODE1 SR1_MIPI_MODE2 SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y4] SPI2_MODE2[DI] FUART_MODE3[CTS] SD30_MODE2[D0] SDIO_MODE3[D0] PWM2_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
E17	PAD_SNR1_DA0N	SR1_MIPI_MODE1 SR1_MIPI_MODE2 SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y3] SPI2_MODE2[CK] FUART_MODE3[TX] UART2_MODE7[TX] SD30_MODE2[CMD] SDIO_MODE3[CMD] PWM1_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
E18	PAD_SNR1_DA0P	SR1_MIPI_MODE1 SR1_MIPI_MODE2 SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y2] SPI2_MODE2[CZ] FUART_MODE3[RX] UART2_MODE7[RX] SD30_MODE2[CLK] SDIO_MODE3[CLK] PWM0_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C17	PAD_SNR1_DA1N	SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y7] SPI1_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		[CZ] SD30_MODE2 [D3] SDIO_MODE3 [D3] PWM5_MODE2			(+/-15%)		
C18	PAD_SNR1_DA1P	SR1_MIPI_MODE3 SR1_MIPI_MODE4 SR1_BT656_MODE1[Y6] SPI1_MODE3[CZ] SD30_MODE2[D2] SDIO_MODE3[D2] PWM4_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
E15	PAD_SNR1_GPIO0	EJ_MODE3[TCK] SR1_MIPI_MODE1[PDN] SR1_MIPI_MODE3[PDN] SR1_BT656_MODE1[PCK] SPI1_MODE2[DI] SPI1_MODE3[DI] PWM6_MODE2	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D15	PAD_SNR1_GPIO1	EJ_MODE3[TDO] SR1_MIPI_MODE1[MCK] SR1_MIPI_MODE2[MCK] SR1_MIPI_MODE3[MCK] SR1_MIPI_MODE4[MCK] SR1_BT656_MODE1[MCK] SPI1_MODE2[CK] SPI1_MODE3[CK]	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
F18	PAD_SNR1_GPIO2	EJ_MODE3[TDO] SR1_MIPI_MODE1[MCK] SR1_MIPI_MODE2[MCK] SR1_MIPI_MODE3[MCK] SR1_BT656_MODE1[MCK] SPI1_MODE2[CK] SPI1_MODE3[CK]	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
F16	PAD_SNR1_GPIO3	SR1_BT656_MODE1[Y0] I2C1_MODE1[SCL] I2C1_MODE3[SCL] I2C2_MODE2[SCL] I2C3_MODE1[SCL]	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
E16	PAD_SNR1_GPIO4	EJ_MODE3[TDI] SR1_BT656_MODE1[Y1] I2C1_MODE1[SDA] I2C1_MODE3[SDA] I2C2_MODE2[SDA] I2C3_MODE1[SDA]	VDDP_2_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
U13	PAD_SPI0_CK	SPI0_MODE1[CK] SPI0_MODE2[CK] UART2_MODE3[RX] SD_MODE1[CLK] SDIO_MODE2[CLK] PWM6_MODE1 I2S_MODE1[BCK]	VDDP_1	>8mA	PD=64kohm (±15%)/ 52uA(±15%)	input, pull-down	YES

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
T14	PAD_SPI0_CZ	SPI0_MODE1[CZ] UART2_MODE3[TX] SD_MODE1[CMD] SDIO_MODE2[CMD] PWM7_MODE1 I2S_MODE1[WCK]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
P14	PAD_SPI0_CZ1	SPI0_MODE2[CZ] DMIC_MODE1[CLK]	VDDP_1	>16mA	PU=86kohm (±15%)/ 39uA(±15%)	input, pull-up	
R13	PAD_SPI0_DI	SPI0_MODE1[DI] SPI0_MODE2[DI] SD_MODE1[D0] SDIO_MODE2[D0] PWM5_MODE1 I2S_MODE1[SDI] DMIC_MODE1[L]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	
T13	PAD_SPI0_DO	SPI0_MODE1[D3] SPI0_MODE2[DO] SD_MODE1[D1] SDIO_MODE2[D1] PWM4_MODE1 I2S_MODE1[SDO] DMIC_MODE1[R]	VDDP_1	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-down	
B5	PAD_UART0_RX	I2C3_MODE3[SCL] SPI2_MODE4[CZ] FUART_MODE6[RX]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD =	input, pull-up	

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
		UART0_MODE1[RX] UART2_MODE5[RX] DMIC_MODE4[R]			64kohm (+/-15%)		
C5	PAD_UART0_TX	I2C3_MODE3[SDA] SPI2_MODE4[CK] FUART_MODE6[TX] UART0_MODE1[TX] UART2_MODE5[TX] DMIC_MODE4[L]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
D4	PAD_UART1_RX	SPI2_MODE4[DI] FUART_MODE6[CTS] UART1_MODE5[RX] UART1_MODE6[RX]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
C4	PAD_UART1_TX	SPI2_MODE4[DO] FUART_MODE6[RTS] UART1_MODE5[TX] DMIC_MODE4[CLK]	VDDP_3_B	>8mA	Option PU = 90kohm (+/-15%) Option PD = 64kohm (+/-15%)	input, pull-up	
J5	PAD_USB_CID		AVDD3P3_USB				
J1	PAD_USB_DM		AVDD3P3_USB	>4mA	Hi-Z	Hi-Z	
J2	PAD_USB_DP		AVDD3P3_USB	>4mA	Hi-Z	Hi-Z	
J4	PAD_USB_VBUS		AVDD_AUD				
K2	PAD_VBUS_5V		AVDD_POC				
A3	PAD_XTAL_IN		AVDD3P3_USB				

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
N1	PAD_XTAL_IN_32K		AVDD_RTC				
A4	PAD_XTAL_OUT		AVDD3P3_USB				
P1	PAD_XTAL_OUT_32K		AVDD_RTC				
F11, F12, G11, G12, G13, H11, H12, H13, J11, J12, J13, K13	VDD						
L7, M7, M8	VDDIO_CMD						
K8, L9, K9, K10, L10	VDDIO_DATA						
N15, P15	VDDP_1						
E14, F14	VDDP_2_A						
E13	VDDP_2_B						
E10, F10	VDDP_3_A						
E8, F8	VDDP_3_B						
A12, B3, B4, C2, C11, C12, C16, D5, D11, D14, E2, E12, F17, G2, G3, G4, G5, G6, G7, G8, G9, G10, H3, H5, H7, H8, H9, J6, , J8, J9, J14, J15, K6, K7, K11, K14, K15, K16, L6, L8, L13, L14, L15, M6, M9, M10, M13, N6, N8, N9, N10, N11, N13, N16, P9, P11, P12, P16, R10, T10,	VSS						

Ball Location	Ball Name	Multi Function	PAD Power	Driving Capability	Pull Resistor	Core-Off Status	5V-tolerance
T11, U2, U18							

SIGNAL DESCRIPTION

Image Parallel Sensor Interface

Signal Name	Signal Type	Function	Ball Location
SNR0_D[0]	Input	Image Sensor 0 Data Bus 0	P18
SNR0_D[1]	Input	Image Sensor 0 Data Bus 1	P17
SNR0_D[2]	Input	Image Sensor 0 Data Bus 2	N18
SNR0_D[3]	Input	Image Sensor 0 Data Bus 3	N17
SNR0_D[4]	Input	Image Sensor 0 Data Bus 4	M17
SNR0_D[5]	Input	Image Sensor 0 Data Bus 5	M16
SNR0_D[6]	Input	Image Sensor 0 Data Bus 6	L17
SNR0_D[7]	Input	Image Sensor 0 Data Bus 7	L16
SNR0_D[8]	Input	Image Sensor 0 Data Bus 8	K17
SNR0_D[9]	Input	Image Sensor 0 Data Bus 9	K18
SNR0_D[10]	Input	Image Sensor 0 Data Bus 10	J17
SNR0_D[11]	Input	Image Sensor 0 Data Bus 11	J18
SNR0_GPIO[2]	Output	Image Sensor 0 GPIO 2 (Reset)	G17
SNR0_GPIO[3]	Output	Image Sensor 0 GPIO 3 (Master Clock)	H18
SNR0_GPIO[4]	Input	Image Sensor 0 GPIO 4 (Vertical Sync Signal)	H16
SNR0_GPIO[5]	Input	Image Sensor 0 GPIO 5 (Horizontal Sync Signal)	H17
SNR0_GPIO[6]	Input	Image Sensor 0 GPIO 6 (Pixel Clock)	G16

Image MIPI Sensor Interface

Signal Name	Signal Type	Function	Ball Location
SNR0_DAP0	Input	Image MIPI Sensor 0 Data Bus 0 Positive	N18
SNR0_DAN0	Input	Image MIPI Sensor 0 Data Bus 0 Negtive	N17
SNR0_DAP1	Input	Image MIPI Sensor 0 Data Bus 1 Positive	M17
SNR0_DAN1	Input	Image MIPI Sensor 0 Data Bus 1 Negtive	M16
SNR0_CKP	Input	Image MIPI Sensor 0 Clock Positive	L16
SNR0_CKN	Input	Image MIPI Sensor 0 Clock Negtive	K17
SNR0_DAP2	Input	Image MIPI Sensor 0 Data Bus 2 Positive	K18
SNR0_DAN2	Input	Image MIPI Sensor 0 Data Bus 2 Negtive	J17

Signal Name	Signal Type	Function	Ball Location
SNR0_DAP3	Input	Image MIPI Sensor 0 Data Bus 3 Positive	J18
SNR0_DAN3	Input	Image MIPI Sensor 0 Data Bus 3 Negtive	R16
SNR0_GPIO[2]	Output	Image MIPI Sensor 0 Reset	G17
SNR0_GPIO[3]	Output	Image MIPI Sensor 0 Master Clock	H18
SNR0_GPIO[4]	Output	Image MIPI Sensor 0 Power Down	H16
SNR1_DAP0	Input	Image MIPI Sensor 1 Data Bus 0 Positive	E18
SNR1_DAN0	Input	Image MIPI Sensor 1 Data Bus 0 Negtive	E17
SNR1_CKP	Input	Image MIPI Sensor 1 Clock Positive	D18
SNR1_CKN	Input	Image MIPI Sensor 1 Clock Negtive	D17
SNR1_DAP1	Input	Image MIPI Sensor 1 Data Bus 1 Positive	C18
SNR1_DAN1	Input	Image MIPI Sensor 1 Data Bus 1 Negtive	C17
SNR1_GPIO[0]	Output	Image MIPI Sensor 1 Enable Signal	E15
SNR1_GPIO[1]	Output	Image MIPI Sensor 1 Reset	D15
SNR1_GPIO[2]	Output	Image MIPI Sensor 1 Master Clock	F18

Image BT656 Sensor Interface

Signal Name	Signal Type	Function	Ball Location
BT656_0_Y[0]	Input	Image BT656 Sensor 0 Data Bus 0	N18
BT656_0_Y[1]	Input	Image BT656 Sensor 0 Data Bus 1	N17
BT656_0_Y[2]	Input	Image BT656 Sensor 0 Data Bus 2	M17
BT656_0_Y[3]	Input	Image BT656 Sensor 0 Data Bus 3	M16
BT656_0_Y[4]	Input	Image BT656 Sensor 0 Data Bus 4	L17
BT656_0_Y[5]	Input	Image BT656 Sensor 0 Data Bus 5	L16
BT656_0_Y[6]	Input	Image BT656 Sensor 0 Data Bus 6	K17
BT656_0_Y[7]	Input	Image BT656 Sensor 0 Data Bus 7	K18
BT656_0_Y[8]	Input	Image BT656 Sensor 0 Data Bus 8	J17
BT656_0_Y[9]	Input	Image BT656 Sensor 0 Data Bus 9	J18
BT656_0_RST	Output	Image BT656 Sensor 0 Reset	G17
BT656_0_MCLK	Output	Image BT656 Sensor 0 Master Clock	H18
BT656_0_PCLK	Input	Image BT656 Sensor 0 Pixel Clock	G16
BT656_1_Y[0]	Input	Image BT656 Sensor 1 Data Bus 0	F16
BT656_1_Y[1]	Input	Image BT656 Sensor 1 Data Bus 1	E16
BT656_1_Y[2]	Input	Image BT656 Sensor 1 Data Bus 2	E18
BT656_1_Y[3]	Input	Image BT656 Sensor 1 Data Bus 3	E17
BT656_1_Y[4]	Input	Image BT656 Sensor 1 Data Bus 4	D18

Signal Name	Signal Type	Function	Ball Location
BT656_1_Y[5]	Input	Image BT656 Sensor 1 Data Bus 5	D17
BT656_1_Y[6]	Input	Image BT656 Sensor 1 Data Bus 6	C18
BT656_1_Y[7]	Input	Image BT656 Sensor 1 Data Bus 7	C17
BT656_1_RST	Output	Image BT656 Sensor 1 Reset	D15
BT656_1_MCLK	Output	Image BT656 Sensor 1 Master Clock	F18
BT656_1_PCLK	Input	Image BT656 Sensor 1 Pixel Clock	E15

Image BT601 Sensor Interface

Signal Name	Signal Type	Function	Ball Location
BT601_0_Y[0]	Input	Image BT601 Sensor 0 Data Bus 0	N18
BT601_0_Y[1]	Input	Image BT601 Sensor 0 Data Bus 1	N17
BT601_0_Y[2]	Input	Image BT601 Sensor 0 Data Bus 2	M17
BT601_0_Y[3]	Input	Image BT601 Sensor 0 Data Bus 3	M16
BT601_0_Y[4]	Input	Image BT601 Sensor 0 Data Bus 4	L17
BT601_0_Y[5]	Input	Image BT601 Sensor 0 Data Bus 5	L16
BT601_0_Y[6]	Input	Image BT601 Sensor 0 Data Bus 6	K17
BT601_0_Y[7]	Input	Image BT601 Sensor 0 Data Bus 7	K18
BT601_0_Y[8]	Input	Image BT601 Sensor 0 Data Bus 8	J17
BT601_0_Y[9]	Input	Image BT601 Sensor 0 Data Bus 9	J18
BT601_0_RST	Output	Image BT601 Sensor 0 Reset	G17
BT601_0_MCLK	Output	Image BT601 Sensor 0 Master Clock	H18
BT601_0_PCLK	Input	Image BT601 Sensor 0 Pixel Clock	G16
BT601_0_HS	Input	Image BT601 Sensor 0 Horizontal Sync	H17
BT601_0_VS	Input	Image BT601 Sensor 0 Vertical Sync	H16

Parallel LCD Interface

Signal Name	Signal Type	Function	Ball Location
LCD_D[0]	Output	Parallel LCD Data Bus 0	A16, C8
LCD_D[1]	Output	Parallel LCD Data Bus 1	B16, B8
LCD_D[2]	Output	Parallel LCD Data Bus 2	C15, A8
LCD_D[3]	Output	Parallel LCD Data Bus 3	B15, C7
LCD_D[4]	Output	Parallel LCD Data Bus 4	C14, A7
LCD_D[5]	Output	Parallel LCD Data Bus 5	B14, B7
LCD_D[6]	Output	Parallel LCD Data Bus 6	C13, C6
LCD_D[7]	Output	Parallel LCD Data Bus 7	B13, B6

Signal Name	Signal Type	Function	Ball Location
LCD_D[8]	Output	Parallel LCD Data Bus 8	A13, D9
LCD_D[9]	Output	Parallel LCD Data Bus 9	B12, D8
LCD_D[10]	Output	Parallel LCD Data Bus 10	B11
LCD_D[11]	Output	Parallel LCD Data Bus 11	A11
LCD_D[12]	Output	Parallel LCD Data Bus 12	C10
LCD_D[13]	Output	Parallel LCD Data Bus 13	B10
LCD_D[14]	Output	Parallel LCD Data Bus 14	C9
LCD_D[15]	Output	Parallel LCD Data Bus 15	B9
LCD_D[16]	Output	Parallel LCD Data Bus 16	C8
LCD_D[17]	Output	Parallel LCD Data Bus 17	B8
LCD_D[18]	Output	Parallel LCD Data Bus 18	A8
LCD_D[19]	Output	Parallel LCD Data Bus 19	C7
LCD_D[20]	Output	Parallel LCD Data Bus 20	A7
LCD_D[21]	Output	Parallel LCD Data Bus 21	B7
LCD_D[22]	Output	Parallel LCD Data Bus 22	C6
LCD_D[23]	Output	Parallel LCD Data Bus 23	B6
LCD_PCLK	Output	Parallel LCD Pixel Clock	A17
LCD_HSYNC	Output	Parallel LCD Horizontal Sync	B17
LCD_VSYNC	Output	Parallel LCD Vertical Sync	B18
LCD_DE	Output	Parallel LCD Data Enable	D16

MIPI_DSI_TX LCD Interface

Signal Name	Signal Type	Function	Ball Location
LCD_DAP0	Output	MIPI LCD Data Bus 0 Positive	A16
LCD_DAN0	Output	MIPI LCD Data Bus 0 Negtive	B16
LCD_DAP1	Output	MIPI LCD Data Bus 1 Positive	C15
LCD_DAN1	Output	MIPI LCD Data Bus 1 Negtive	B15
LCD_CKP	Output	MIPI LCD Data Bus Clock Positive	C14
LCD_CKN	Output	MIPI LCD Data Bus Clock Negtive	B14
LCD_DAP2	Output	MIPI LCD Data Bus Data Bus 2 Positive	C13
LCD_DAN2	Output	MIPI LCD Data Bus Data Bus 2 Negtive	B13
LCD_DAP3	Output	MIPI LCD Data Bus Data Bus 3 Positive	A13
LCD_DAN3	Output	MIPI LCD Data Bus Data Bus 3 Negtive	B12

Analog Microphone/Line Out Interface

Signal Name	Signal Type	Function	Ball Location
AUD_LINEOUT_L0	Output	Audio Left Channel Line Output	B2
AUD_LINEOUT_R0	Output	Audio Right Channel Line Output	A2
AUD_VAG	Output	Audio Reference Voltage from 1/2 AVDD_AUD	F1
AUD_VRM_ADC	Input	Audio Reference Voltage for ADC	F3
AUD_VRM_DAC	Input	Audio Reference Voltage for DAC	F2
AUD_MICIN0	Input	Audio Left Channel Microphone Positive Input	D2
AUD_MICCM0	Input	Audio Left Channel Microphone Negative Input	D1
AUD_MICIN1	Input	Audio Right Channel Microphone Positive Input	C1
AUD_MICCM1	Input	Audio Right Channel Microphone Negative Input	B1

Digital Microphone Interface

Signal Name	Signal Type	Function	Ball Location
DMIC_CLK	Output	DMIC Output Clock	B11, C4, E7, P14
DMIC_R	Input	Digital Right Channel Line Input	A13, B5, D8, T13
DMIC_L	Input	Digital Left Channel Line Input	B12, C5, E6, R13

I2S Interface

Signal Name	Signal Type	Function	Ball Location
I2S_SDO	Output	I2S Data Output	C10, D8, T13
I2S_SDI	Input	I2S Data Input	B10, E6, R13
I2S_BCK	Output	I2S Bit Clock	C9, E5, U13
I2S_WCK	Output	I2S Word Clock	B9, E7, T14

SD 3.0 Card Interface

Signal Name	Signal Type	Function	Ball Location
SD30_CLK	Output	SD 3.0 Card Clock	T17
SD30_CMD	Output	SD 3.0 Card Command	T18
SD30_D[0]	Input/Output	SD 3.0 Card Data Bus 0	T16
SD30_D[1]	Input/Output	SD 3.0 Card Data Bus 1	U17
SD30_D[2]	Input/Output	SD 3.0 Card Data Bus 2	R18
SD30_D[3]	Input/Output	SD 3.0 Card Data Bus 3	R17

Signal Name	Signal Type	Function	Ball Location
SD30_CDZ	Input	SD 3.0 Card Detect (Active Low)	V11
SD30_VCTRL	Output	SD 3.0 Card Voltage Control	M14

SD 2.0 Card Interface

Signal Name	Signal Type	Function	Ball Location
SD20_CLK	Output	SD 2.0 Clock	D16, U13
SD20_CMD	Output	SD 2.0 Command	A13, T14
SD20_D[0]	Input/Output	SD 2.0 Data Bus 0	B12, R13
SD20_D[1]	Input/Output	SD 2.0 Data Bus 1	B11, T13
SD20_D[2]	Input/Output	SD 2.0 Data Bus 2	A11, U14
SD20_D[3]	Input/Output	SD 2.0 Data Bus 3	C10, V14

SDIO 2.0 Interface

Signal Name	Signal Type	Function	Ball Location
SDIO20_CLK	Output	SDIO 2.0 Clock	D16, E18, U13, T17
SDIO20_CMD	Output	SDIO 2.0 Command	A13, E17, T14, T18
SDIO20_D[0]	Input/Output	SDIO 2.0 Data Bus 0	B12, D18, R13, T16
SDIO20_D[1]	Input/Output	SDIO 2.0 Data Bus 1	B11, D17, T13, U17
SDIO20_D[2]	Input/Output	SDIO 2.0 Data Bus 2	A11, C18, R18, U14
SDIO20_D[3]	Input/Output	SDIO 2.0 Data Bus 3	C10, C17, R17, V14

eMMC Interface

Signal Name	Signal Type	Function	Ball Location
eMMC_CLK	Output	eMMC Clock	D16, T17
eMMC_CMD	Output	eMMC Command	A13, T18
eMMC_D[0]	Input/Output	eMMC Data Bus 0	B12, T16
eMMC_D[1]	Input/Output	eMMC Data Bus 1	B11, U17
eMMC_D[2]	Input/Output	eMMC Data Bus 2	A11, R18
eMMC_D[3]	Input/Output	eMMC Data Bus 3	C10, R17
eMMC_D[4]	Input/Output	eMMC Data Bus 4	C14
eMMC_D[5]	Input/Output	eMMC Data Bus 5	B14
eMMC_D[6]	Input/Output	eMMC Data Bus 6	C13
eMMC_D[7]	Input/Output	eMMC Data Bus 7	B13

Signal Name	Signal Type	Function	Ball Location
eMMC_RSTn	Output	eMMC Reset (Active Low)	A16, R14

SPI Flash Interface

Signal Name	Signal Type	Function	Ball Location
PM_SPI_CK	Output	SPI Flash Clock	V3
PM_SPI_CZ	Output	SPI Flash Chip Select (Active Low)	U3
PM_SPI_DI	Output	SPI Flash Serial Data To Device	U4
PM_SPI_DO	Input	SPI Flash Serial Data From Device	T3

NAND Flash Interface

Signal Name	Signal Type	Function	Ball Location
NAND_ALE	Output	NAND Flash Address Latch Enable	A17
NAND_CLE	Output	NAND Flash Command Latch Enable	D16
NAND_CEZ	Output	NAND Flash Chip 0 Enable (Active Low)	A13
NAND_WEZ	Output	NAND Flash Write Enable (Active Low)	B12
NAND_WPZ	Output	NAND Flash Write Protect (Active Low)	B11
NAND_REZ	Output	NAND Flash Read Enable (Active Low)	A11
NAND_RBZ	Input	NAND Flash Status (High : Ready, Low: Busy)	C10
NAND_DA[0]	Input/Output	NAND Flash Data Bus	A16
NAND_DA[1]	Input/Output	NAND Flash Data Bus	B16
NAND_DA[2]	Input/Output	NAND Flash Data Bus	C15
NAND_DA[3]	Input/Output	NAND Flash Data Bus	B15
NAND_DA[4]	Input/Output	NAND Flash Data Bus	C14
NAND_DA[5]	Input/Output	NAND Flash Data Bus	B14
NAND_DA[6]	Input/Output	NAND Flash Data Bus	C13
NAND_DA[7]	Input/Output	NAND Flash Data Bus	B13

USB 2.0 Interface

Signal Name	Signal Type	Function	Ball Location
USB_CID	Input	USB 2.0 OTG ID (High : Slave Mode, Low : Host Mode)	J5
USB_VBUS	Input	USB 2.0 VBUS Power	J4
USB_DM	Input/Output	USB 2.0 DM Port0	J1
USB_DP	Input/Output	USB 2.0 DP Port0	J2
DM_P1	Input/Output	USB 2.0 DM Port1	H1
DP_P1	Input/Output	USB 2.0 DP Port1	H2

Master SPI Interface

Signal Name	Signal Type	Function	Ball Location
SPI0_CZ	Output	Master SPI 0 Chip Select (Active Low)	B11, T14, T7
SPI0_CZ1	Output	Master SPI 0 Chip Select 1 (Active Low)	P14
SPI0_CK	Output	Master SPI 0 Serial Clock	A11, U13, V3
SPI0_DI	Input	Master SPI 0 Serial Data In	C10, R13, U4
SPI0_DO	Output	Master SPI 0 Serial Data Out	B10, T3, T13
SPI1_CZ	Output	Master SPI 1 Chip Select (Active Low)	C9, C17, C18, D8, U12
SPI1_CK	Output	Master SPI 1 Serial Clock	B9, E6, F8, T12
SPI1_DI	Input	Master SPI 1 Serial Data In	A13, E5, E15, V14
SPI1_DO	Output	Master SPI 1 Serial Data Out	B12, D15, E7, U14
SPI2_CZ	Output	Master SPI 2 Chip Select (Active Low)	A7, B5, E18, T18
SPI2_CK	Output	Master SPI 2 Serial Clock	B7, C5, E17, T17
SPI2_DI	Input	Master SPI 2 Serial Data In	C6, D4, D18, U17
SPI2_DO	Output	Master SPI 2 Serial Data Out	B6, C4, D17, T16

Master I2C Interface

Signal Name	Signal Type	Function	Ball Location
I2C0_SCL	Output	Master I2C 0 Serial Clock	C9, D7, R14
I2C0_SDA	Input/Output	Master I2C 0 Serial Data	B9, D6, R12
I2C1_SCL	Output	Master I2C 1 Serial Clock	F16, R16
I2C1_SDA	Input/Output	Master I2C 1 Serial Data	E16, R15
I2C2_SCL	Output	Master I2C 2 Serial Clock	C8, F16, R14

Signal Name	Signal Type	Function	Ball Location
I2C2_SDA	Input/Output	Master I2C 2 Serial Data	B8, E16, R12
I2C3_SCL	Output	Master I2C 3 Serial Clock	B5, C9, F16
I2C3_SDA	Input/Output	Master I2C 3 Serial Data	B9, C5, E16

UART Interface

Signal Name	Signal Type	Function	Ball Location
UART0_RX	Input	UART 0 Receiver	B5, V10
UART0_TX	Output	UART 0 Transmitter	C5, U10
UART1_RX	Input	UART 1 Receiver	D4, R14, U12
UART1_TX	Output	UART 1 Transmitter	C4, R12, T12
UART2_RX	Input	UART 1 Receiver	B5, D7, E18, R5, U13, V14
UART2_TX	Output	UART 1 Transmitter	C5, D6, E17, R4, T14, U14

Fast UART Interface

Signal Name	Signal Type	Function	Ball Location
FUART_RX	Input	Fast UART Receiver	A8, B5, E18, C14, U12
FUART_TX	Output	Fast UART Transmitter	B14, C5, C7, E17, T12
FUART_CTS	Input	Fast UART Clear to Set	A7, C13, D4, D18, V14
FUART_RTS	Output	Fast UART Request to Set	B7, B13, C4, D17, U14

PWM Interface

Signal Name	Signal Type	Function	Ball Location
PWM0	Output	PWM 0 Output	A13, B6, E18, U12
PWM1	Output	PWM 1 Output	B12, D9, E17, T12
PWM2	Output	PWM 2 Output	B11, D8, D18, V14
PWM3	Output	PWM 3 Output	A11, D17, E6, U14
PWM4	Output	PWM 4 Output	C10, C18, E5, T13
PWM5	Output	PWM 5 Output	B10, C17, E7, R13
PWM6	Output	PWM 6 Output	C9, D7, E15, U13
PWM7	Output	PWM 7 Output	B9, D6, D15, T14

IR Interface

Signal Name	Signal Type	Function	Ball Location
IRIN	Input	IR Receiver	U11

SAR Interface

Signal Name	Signal Type	Function	Ball Location
SAR_GPIO0	Input	SAR Analog Signal Channel 0	T2
SAR_GPIO1	Input	SAR Analog Signal Channel 1	U1
SAR_GPIO2	Input	SAR Analog Signal Channel 2	R3
SAR_GPIO3	Input	SAR Analog Signal Channel 3	V2

System Interface

Signal Name	Signal Type	Function	Ball Location
XTAL_IN	Input	24MHz Crystal Input	A3
XTAL_OUT	Output	24MHz Crystal Output	A4
SEL_XTAL_OUT	Output	24MHz Clock Output	C3
XTAL_OUT_32K	Output	32KHz Crystal Output	P1
XTAL_IN_32K	Input	32KHz Crystal Input	N1
POC_RESET	Input	POC Reset (Active High)	L2
POC_PMTEST	Input	POC Debug	M3
POC_INTERRUPT	Output	POC Interrupt	K3
POC_PWR_EN	Output	POC Power Enable (Active High)	L1
VBUS_5V	Input	VBUS On Event (Active High)	K2
PWR_ON_KEY_DET	Input	Power On Key Event (Active High)	M2
HALL_KEY	Input	Hall Key Event (Active Low)	L3
PM_UART_RX	Input	Debug Port for UART Receiver or Slave I2C Serial Clock	V10
PM_UART_TX	Output	Debug Port for UART Transmitter or Slave I2C Serial Data	U10
GND_EFUSE	Input	Power Source if eFuse Burning (Connect to Ground)	N4

GPIO Interface

Signal Name	Signal Type	Function	Ball Location
GPIO_PM[0]	Input/Output	Power Manage Group General Purpose Input/Output 0 (PM_GPIO0)	T9
GPIO_PM[1]	Input/Output	Power Manage Group General Purpose Input/Output 1 (PM_GPIO1)	U9
GPIO_PM[2]	Input/Output	Power Manage Group General Purpose Input/Output 2 (PM_GPIO2)	T8
GPIO_PM[3]	Input/Output	Power Manage Group General Purpose Input/Output 3 (PM_GPIO3)	U8
GPIO_PM[4]	Input/Output	Power Manage Group General Purpose Input/Output 4 (PM_GPIO4)	R7
GPIO_PM[5]	Input/Output	Power Manage Group General Purpose Input/Output 5 (PM_GPIO5)	T7
GPIO_PM[6]	Input/Output	Power Manage Group General Purpose Input/Output 6 (PM_GPIO6)	U7
GPIO_PM[7]	Input/Output	Power Manage Group General Purpose Input/Output 7 (PM_GPIO7)	V7
GPIO_PM[8]	Input/Output	Power Manage Group General Purpose Input/Output 8 (PM_GPIO8)	P6
GPIO_PM[9]	Input/Output	Power Manage Group General Purpose Input/Output 9 (PM_GPIO9)	R6
GPIO_PM[10]	Input/Output	Power Manage Group General Purpose Input/Output 10 (PM_GPIO10)	V6
GPIO_PM[11]	Input/Output	Power Manage Group General Purpose Input/Output 11 (PM_GPIO11)	U6

Signal Name	Signal Type	Function	Ball Location
GPIO_PM[12]	Input/Output	Power Manage Group General Purpose Input/Output 12 (PM_GPIO12)	T5
GPIO_PM[13]	Input/Output	Power Manage Group General Purpose Input/Output 13 (PM_GPIO13)	R5
GPIO_PM[14]	Input/Output	Power Manage Group General Purpose Input/Output 14 (PM_GPIO14)	R4
GPIO_PM[15]	Input/Output	Power Manage Group General Purpose Input/Output 15 (PM_GPIO15)	P4
SPI_GPIO[0]	Input/Output	Power Manage SPI Group General Purpose Input/Output 0 (PM_SPI_CZ)	U3
SPI_GPIO[1]	Input/Output	Power Manage SPI Group General Purpose Input/Output 1 (PM_SPI_CK)	V3
SPI_GPIO[2]	Input/Output	Power Manage SPI Group General Purpose Input/Output 2 (PM_SPI_DI)	U4
SPI_GPIO[3]	Input/Output	Power Manage SPI Group General Purpose Input/Output 3 (PM_SPI_DO)	T3
SPI_GPIO[4]	Input/Output	Power Manage SPI Group General Purpose Input/Output 4 (PM_SPI_WPZ)	T4
SPI_GPIO[5]	Input/Output	Power Manage SPI Group General Purpose Input/Output 5 (PM_SPI_HLD)	U5
LED_GPIO[0]	Input/Output	LED Group General Purpose Input/Output 0 (PM_LED0)	P3
LED_GPIO[1]	Input/Output	LED Group General Purpose Input/Output 1 (PM_LED1)	R2
SD_CDZ_GPIO	Input/Output	Power Manage Card Detect General Purpose Input/Output 0 (PM_SD_CDZ)	U12
FUART_GPIO[0]	Input/Output	FUART Group General Purpose Input/Output (FUART_RX)	T13
FUART_GPIO[1]	Input/Output	FUART Group General Purpose Input/Output 1	T12

Signal Name	Signal Type	Function	Ball Location
		(FUART_TX)	
FUART_GPIO[2]	Input/Output	FUART Group General Purpose Input/Output 2 (FUART_CTS)	V14
FUART_GPIO[3]	Input/Output	FUART Group General Purpose Input/Output 3 (FUART_RTS)	U14
UART0_GPIO[0]	Input/Output	UART 0 Group General Purpose Input/Output 0 (UART0_RX)	B5
UART0_GPIO[1]	Input/Output	UART 0 Group General Purpose Input/Output 1 (UART0_TX)	C5
UART1_GPIO[0]	Input/Output	UART 1 Group General Purpose Input/Output 0 (UART1_RX)	D4
UART1_GPIO[1]	Input/Output	UART 1 Group General Purpose Input/Output 1 (UART1_TX)	C4
SPI_0_GPIO[0]	Input/Output	SPI 0 Group General Purpose Input/Output 0 (SPI0_CZ)	T14
SPI_0_GPIO[1]	Input/Output	SPI 0 Group General Purpose Input/Output 1 (SPI0_CK)	U13
SPI_0_GPIO[2]	Input/Output	SPI 0 Group General Purpose Input/Output 2 (SPI0_DI)	R13
SPI_0_GPIO[3]	Input/Output	SPI 0 Group General Purpose Input/Output 3 (SPI0_DO)	T13
SPI_0_GPIO[4]	Input/Output	SPI 0 Group General Purpose Input/Output 4 (SPI0_CZ1)	P14
SDIO_GPIO[0]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 0 (SDIO20_D0)	T16
SDIO_GPIO[1]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 1 (SDIO20_D1)	U17
SDIO_GPIO[2]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 2 (SDIO20_D2)	R18
SDIO_GPIO[3]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 3 (SDIO20_D3)	R17
SDIO_GPIO[4]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 4 (SDIO20_CMD)	T18
SDIO_GPIO[5]	Input/Output	SDIO 2.0 Group General Purpose Input/Output 5 (SDIO20_CLK)	T17
SD_GPIO[0]	Input/Output	SD 2.0 Group General Purpose Input/Output 0 (SD_IO0)	T16
SD_GPIO[1]	Input/Output	SD 2.0 Group General Purpose Input/Output 1 (SD_IO1)	U17

Signal Name	Signal Type	Function	Ball Location
SD_GPIO[2]	Input/Output	SD 2.0 Group General Purpose Input/Output 2 (SD_IO2)	R18
SD_GPIO[3]	Input/Output	SD 2.0 Group General Purpose Input/Output 3 (SD_IO3)	R17
SD_GPIO[4]	Input/Output	SD 2.0 Group General Purpose Input/Output 4 (SD_IO4)	T18
SD_GPIO[5]	Input/Output	SD 2.0 Group General Purpose Input/Output 5 (SD_IO5)	T17
I2C_0_GPIO[0]	Input/Output	I2C 0 Group General Purpose Input/Output 0 (I2C0_SCL)	R14
I2C_0_GPIO[1]	Input/Output	I2C 0 Group General Purpose Input/Output 1 (I2C0_SDA)	R12
SR0D_GPIO[0]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 0 (SNR0_D0)	P18
SR0D_GPIO[1]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 1 (SNR0_D1)	P17
SR0D_GPIO[2]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 2 (SNR0_D2)	N18
SR0D_GPIO[3]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 3 (SNR0_D3)	N17
SR0D_GPIO[4]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 4 (SNR0_D4)	M17
SR0D_GPIO[5]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 5 (SNR0_D5)	M16
SR0D_GPIO[6]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 6 (SNR0_D6)	L17
SR0D_GPIO[7]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 7 (SNR0_D7)	L16
SR0D_GPIO[8]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 8 (SNR0_D8)	K17
SR0D_GPIO[9]	Input/Output	Sensor 0 Data Group General Purpose	K18

Signal Name	Signal Type	Function	Ball Location
		Input/Output 9 (SNR0_D9)	
SR0D_GPIO[10]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 10 (SNR0_D10)	J17
SR0D_GPIO[11]	Input/Output	Sensor 0 Data Group General Purpose Input/Output 11 (SNR0_D11)	J18
SR0_GPIO[0]	Input/Output	Sensor 0 Group General Purpose Input/Output 0 (SNR0_GPIO0)	R16
SR0_GPIO[1]	Input/Output	Sensor 0 Group General Purpose Input/Output 1 (SNR0_GPIO1)	R15
SR0_GPIO[2]	Input/Output	Sensor 0 Group General Purpose Input/Output 2 (SNR0_GPIO2)	G17
SR0_GPIO[3]	Input/Output	Sensor 0 Group General Purpose Input/Output 3 (SNR0_GPIO3)	H18
SR0_GPIO[4]	Input/Output	Sensor 0 Group General Purpose Input/Output 4 (SNR0_GPIO4)	H16
SR0_GPIO[5]	Input/Output	Sensor 0 Group General Purpose Input/Output 5 (SNR0_GPIO5)	H17
SR0_GPIO[6]	Input/Output	Sensor 0 Group General Purpose Input/Output 6 (SNR0_GPIO6)	G16
SR1_GPIO[0]	Input/Output	Sensor 1 Group General Purpose Input/Output 0 (SNR1_GPIO0)	E15
SR1_GPIO[1]	Input/Output	Sensor 1 Group General Purpose Input/Output 1 (SNR1_GPIO1)	D15
SR1_GPIO[2]	Input/Output	Sensor 1 Group General Purpose Input/Output 2 (SNR1_GPIO2)	F18
SR1_GPIO[3]	Input/Output	Sensor 1 Group General Purpose Input/Output 3 (SNR1_GPIO3)	F16
SR1_GPIO[4]	Input/Output	Sensor 1 Group General Purpose Input/Output 4 (SNR1_GPIO4)	E16
SR1D_GPIO[0]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 0 (SNR1_DA0P)	E18
SR1D_GPIO[1]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 1 (SNR1_DA0N)	E17

Signal Name	Signal Type	Function	Ball Location
SR1D_GPIO[2]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 2 (SNR1_CKP)	D18
SR1D_GPIO[3]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 3 (SNR1_CKN)	D17
SR1D_GPIO[4]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 4 (SNR1_DA1P)	C18
SR1D_GPIO[5]	Input/Output	Sensor 1 Data Group General Purpose Input/Output 5 (SNR1_DA1N)	C17
LCD_GPIO[0]	Input/Output	LCD Group General Purpose Input/Output 0 (LCD_D0)	A16
LCD_GPIO[1]	Input/Output	LCD Group General Purpose Input/Output 1 (LCD_D1)	B16
LCD_GPIO[2]	Input/Output	LCD Group General Purpose Input/Output 2 (LCD_D2)	C15
LCD_GPIO[3]	Input/Output	LCD Group General Purpose Input/Output 3 (LCD_D3)	B15
LCD_GPIO[4]	Input/Output	LCD Group General Purpose Input/Output 4 (LCD_D4)	C14
LCD_GPIO[5]	Input/Output	LCD Group General Purpose Input/Output 5 (LCD_D5)	B14
LCD_GPIO[6]	Input/Output	LCD Group General Purpose Input/Output 6 (LCD_D6)	C13
LCD_GPIO[7]	Input/Output	LCD Group General Purpose Input/Output 7 (LCD_D7)	B13
LCD_GPIO[8]	Input/Output	LCD Group General Purpose Input/Output 8 (LCD_D8)	A13
LCD_GPIO[9]	Input/Output	LCD Group General Purpose Input/Output 9 (LCD_D9)	B12
LCD_GPIO[10]	Input/Output	LCD Group General Purpose Input/Output 10 (LCD_D10)	B11
LCD_GPIO[11]	Input/Output	LCD Group General Purpose Input/Output 11 (LCD_D11)	A11
LCD_GPIO[12]	Input/Output	LCD Group General Purpose Input/Output 12 (LCD_D12)	C10

Signal Name	Signal Type	Function	Ball Location
LCD_GPIO[13]	Input/Output	LCD Group General Purpose Input/Output 13 (LCD_D13)	B10
LCD_GPIO[14]	Input/Output	LCD Group General Purpose Input/Output 14 (LCD_D14)	C9
LCD_GPIO[15]	Input/Output	LCD Group General Purpose Input/Output 15 (LCD_D15)	B9
LCD_GPIO[16]	Input/Output	LCD Group General Purpose Input/Output 16 (LCD_D16)	C8
LCD_GPIO[17]	Input/Output	LCD Group General Purpose Input/Output 17 (LCD_D17)	B8
LCD_GPIO[18]	Input/Output	LCD Group General Purpose Input/Output 18 (LCD_D18)	A8
LCD_GPIO[19]	Input/Output	LCD Group General Purpose Input/Output 19 (LCD_D19)	C7
LCD_GPIO[20]	Input/Output	LCD Group General Purpose Input/Output 20 (LCD_D20)	A7
LCD_GPIO[21]	Input/Output	LCD Group General Purpose Input/Output 21 (LCD_D21)	B7
LCD_GPIO[22]	Input/Output	LCD Group General Purpose Input/Output 22 (LCD_D22)	C6
LCD_GPIO[23]	Input/Output	LCD Group General Purpose Input/Output 23 (LCD_D23)	B6
LCD_GPIO[24]	Input/Output	LCD Group General Purpose Input/Output 24 (LCD_HSYNC)	B17
LCD_GPIO[25]	Input/Output	LCD Group General Purpose Input/Output 25 (LCD_VSYNC)	B18
LCD_GPIO[26]	Input/Output	LCD Group General Purpose Input/Output 26 (LCD_PCLK)	A17
LCD_GPIO[27]	Input/Output	LCD Group General Purpose Input/Output 27 (LCD_DE)	D16
LCD_GPIO[28]	Input/Output	LCD Group General Purpose Input/Output 28 (LCD_CTRL0)	D9
LCD_GPIO[29]	Input/Output	LCD Group General Purpose Input/Output 29 (LCD_CTRL1)	D8
LCD_GPIO[30]	Input/Output	LCD Group General Purpose Input/Output 30 (LCD_CTRL2)	E6
LCD_GPIO[31]	Input/Output	LCD Group General Purpose Input/Output 31 (LCD_CTRL3)	E5

Signal Name	Signal Type	Function	Ball Location
LCD_GPIO[32]	Input/Output	LCD Group General Purpose Input/Output 32 (LCD_CTRL4)	E7
LCD_GPIO[33]	Input/Output	LCD Group General Purpose Input/Output 33 (LCD_CTRL5)	D7
LCD_GPIO[34]	Input/Output	LCD Group General Purpose Input/Output 34 (LCD_CTRL6)	D6

Cortex-A7 JTAG Interface

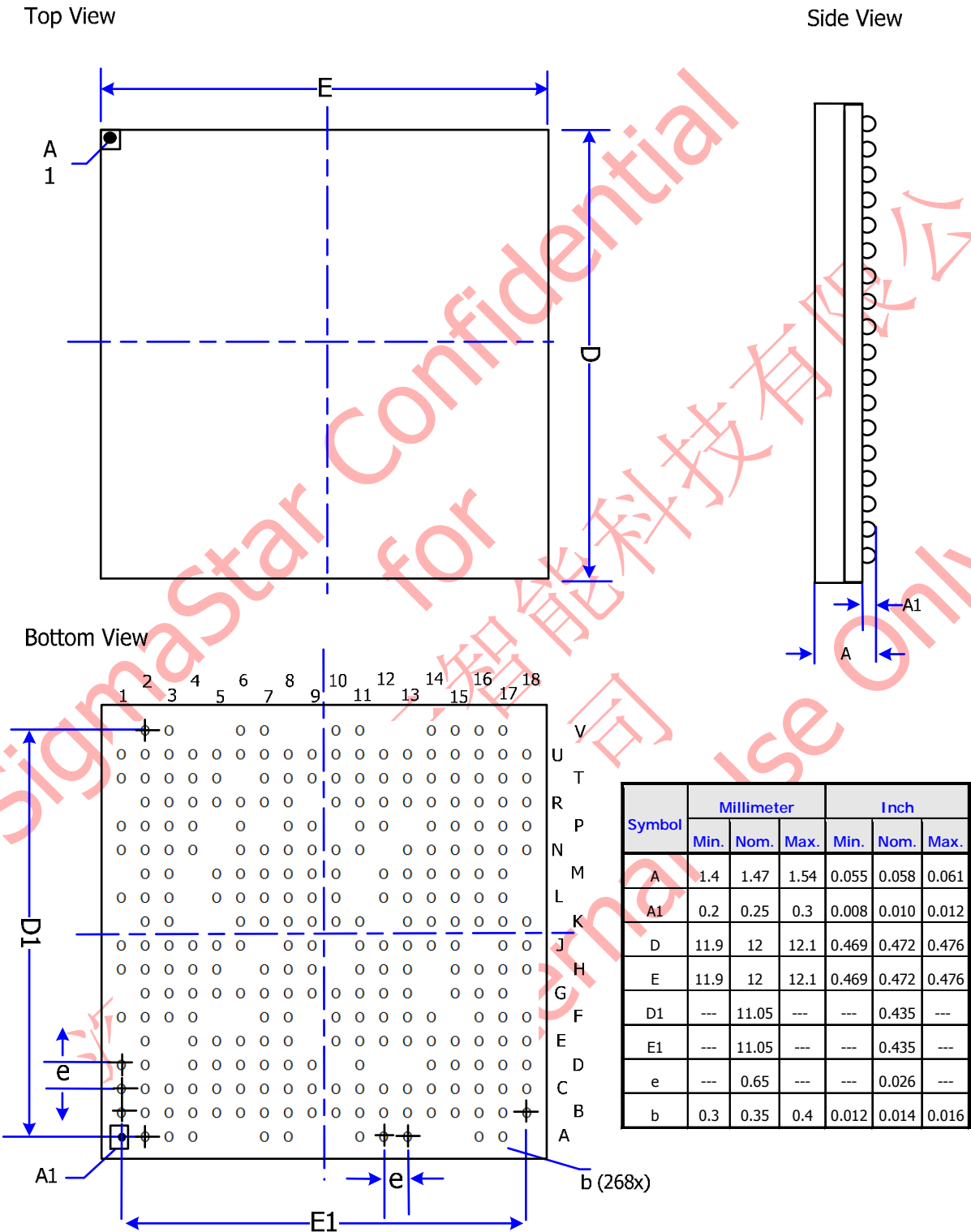| Signal Name	Signal Type	Function	Ball Location
EJ_TCK	Input	CA7 JTAG Clock	B11, E15, U12
EJ_TMS	Intput	CA7 JTAG Mode Select	A11, D15, T12
EJ_TDO	Output	CA7 JTAG Data Out	C10, F18, R14, V14
EJ_TDI	Input	CA7 JTAG Data In	B10, E16, R12, U14

Power Interface

Signal Name	Signal Type	Function	Ball Location
VDD	Input	Digital Power	F11, F12, G11, G12, G13, H11, H12, H13, J11, J12, J13, K13
VDDP_1	Input	Digital Power for VDDP_1 Group	N15, P15
VDDP_2_A	Input	Digital Power for Sensor 0 Group	E14,F14
VDDP_2_B	Input	Digital Power for Sensor 1 Group	E13
VDDP_3_A	Input	Digital Power for LCD 0 Group	E10, F10
VDDP_3_B	Input	Digital Power for LCD 1 Group	E8, F8
DVDD_DDR	Input	Digital Power for DDR	M12
DVDD_DDR_RX	Input/Output	Digital Power for DDR	L12
VDDIO_CMD	Input	Analog Power for DDR	L7, M7, M8
VDDIO_DATA	Input	Analog Power for DDR	K8, L9, K9, K10, L10
AVDDIO_DRAM	Input	Stack DRAM Power	P8, R8
AVDD_PLL	Input	Analog Power for PLL	R11
DVDD_NODIE	Output	PM LDO Output	N3
AVDD_NODIE	Input	Analog Power for PM	T1
AVDDL_MIPI_TX	Input	Analog Power for MIPI	F13
AVDDL_MIPI_RX	Input	Analog Power for MIPI	G15

Signal Name	Signal Type	Function	Ball Location
AVDD3P3_MIPI	Input	Analog Power for MIPI TX	F7
AVDD1P2_MIPI	Output	Analog Power for MIPI TX	E11
AVDD_RTC	Input	Analog Power for RTC	M5
AVDD_POC	Input	Analog Power for POC	L5
AVDD3P3_USB_XTAL	Input	Analog Power for USB and XTAL	E4
AVDD3P3_USB	Input	Analog Power for USB	H4
AVDD33_SD	Input	Analog Power for SDIO	N14
AVDDSDIO_3318	Input	Digital Power for SDIO	M15
AVDDSDIO_3318_CAP	Output	Digital Power for SDIO	H15
AVDD_AUD	Input	Analog Power for Audio	F4

Ground Interface

Signal Name	Signal Type	Function	Ball Location
VSS	Input	Digital Ground	A12, B3, B4, C2, C11, C12, C16, D5, D11, D14, E2, E12, F17, G2, G3, G4, G5, G6, G7, G8, G9, G10, H3, H5, H7, H8, H9, J6, , J8, J9, J14, J15, K6, K7, K11, K14, K15, K16, L6, L8, L13, L14, L15, M6, M9, M10, M13, N6, N8, N9, N10, N11, N13, N16, P9, P11, P12, P16, R10, T10, T11, U2, U18
AVSS_POC	Input	Analog Ground for POC	J3
AVSS_RTC	Input	Analog Ground for RTC Crystal	N2, P2

MECHANICAL DIMENSIONS

Top View

Side View

Bottom View

Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.4	1.47	1.54	0.055	0.058	0.061
A1	0.2	0.25	0.3	0.008	0.010	0.012
D	11.9	12	12.1	0.469	0.472	0.476
E	11.9	12	12.1	0.469	0.472	0.476
D1	---	11.05	---	---	0.435	---
E1	---	11.05	---	---	0.435	---
e	---	0.65	---	---	0.026	---
b	0.3	0.35	0.4	0.012	0.014	0.016

b (268x)

ELECTRICAL SPECIFICATIONS

Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
DIGITAL INPUTS					
Input Voltage, High	V_{IH}	2.5			V
Input Voltage, Low	V_{IL}			0.8	V
Input Current, High	I_{IH}			-1.0	uA
Input Current, Low	I_{IL}			1.0	uA
Input Capacitance			5		pF
DIGITAL OUTPUTS					
Output Voltage, High	V_{OH}	VDDP-0.1[Note]			V
Output Voltage, Low	V_{OL}			0.1	V
SAR ADC Input		0		V_{VDD_33}	V
AUDIO OUTPUTS					
Line-Out			2.54		Vp-p

Note: 1. VDDP can be V_{VDD_33}, V_{VDD_18}, V_{VDD_15}

     2. 0.9Vrms @10Kohm load

Recommended Operating Conditions

Parameter	Symbol	Min	Typ.	Max.	Unit
3.3V Supply Voltage	V_{VDD_33}	3.14	3.3	3.47	V
1.8V Supply Voltage (VDDP_2/3)	V_{VDD_18}	1.71	1.8	1.89	
1.5V Supply Voltage (DDR III)	V_{VDD_15}	1.43	1.5	1.58	V
Core Power Supply Voltage (Core)	V_{VDD_core}	0.90	0.95	1.05	V
Ambient Operation Temperature	T_A	-40		85	°C
Junction Temperature	T_J			125	°C

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max.	Unit
3.3V Supply Voltage	V_{VDD_33}			3.63	V
1.8V Supply Voltage (VDDP_2/3)	V_{VDD_18}			1.98	V
1.5V Supply Voltage (DDR III)	V_{VDD_15}			1.65	V
Core Power Supply Voltage (Core)	V_{VDD_core}			1.26	V
Storage Temperature	T_{STG}	-40		150	°C

Note: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of device. Exposure to absolute maximum ratings for extended periods may affect device reliability.

HARDWARE POWER SEQUENCE PROCEDURE

The timing requirements of the hardware reset signal are shown as below:

Hardware Reset

HWRESET: Chip Reset; High Reset (Level)

The HWRESET pin is suggested to connect with AVDD_POC as shown in Figure 1. The VIH is 2V (Typ) +/- 10% (2.2V~1.8V); the VIL is 1.2V (Typ) +/- 10% (1.08V~1.32V). The power sequence is as shown in Figure 2.

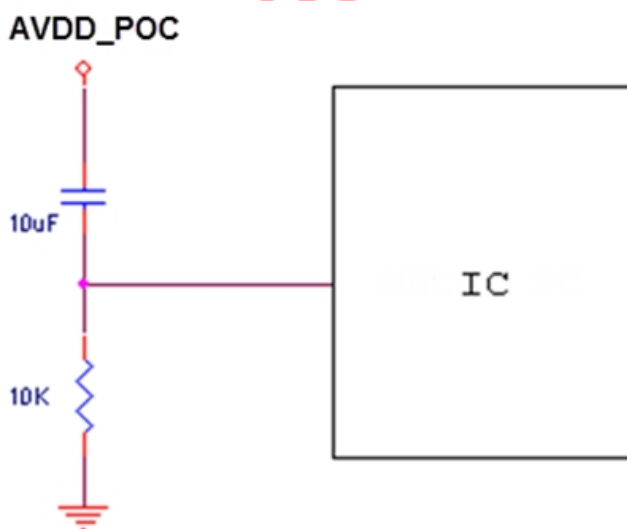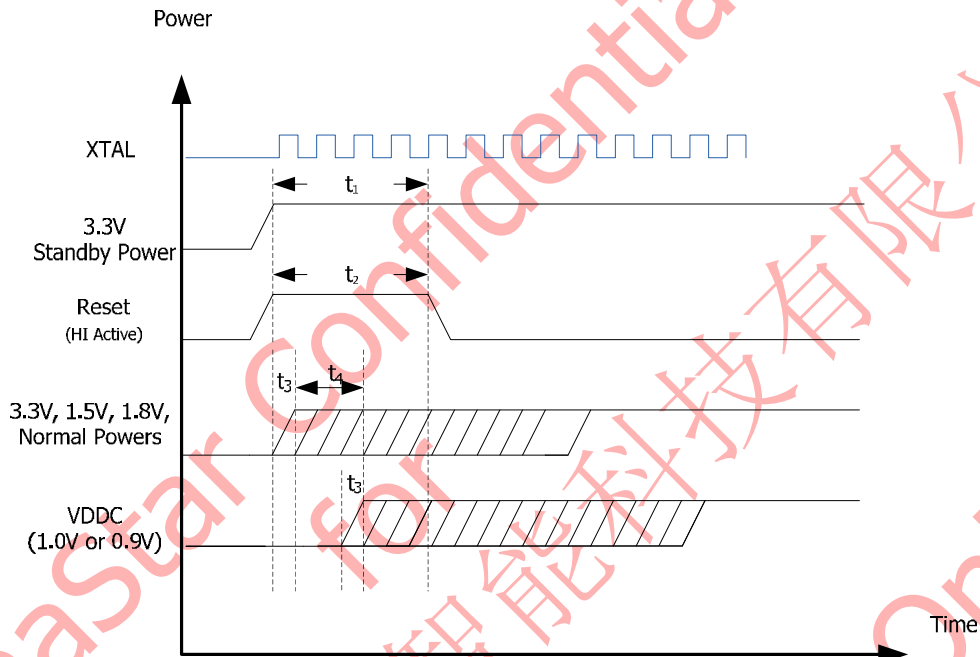Figure 1: Reset Application Circuit

External Reset IC with External LDO

The timing is shown as Figure 2. The RST and power waveform must satisfy Figure 2 with parameters listed in Table 1.

Note:

*3.3V standby power (AVDD_NODIE, AVDD_POC)

*1.0V/0.9V (VDD, DVDD_DDR)

*1.5V (AVDDIO_DRAM, VDDIO_DATA,)

*1.8V (VDDP_2_A, VDDP_3_A)

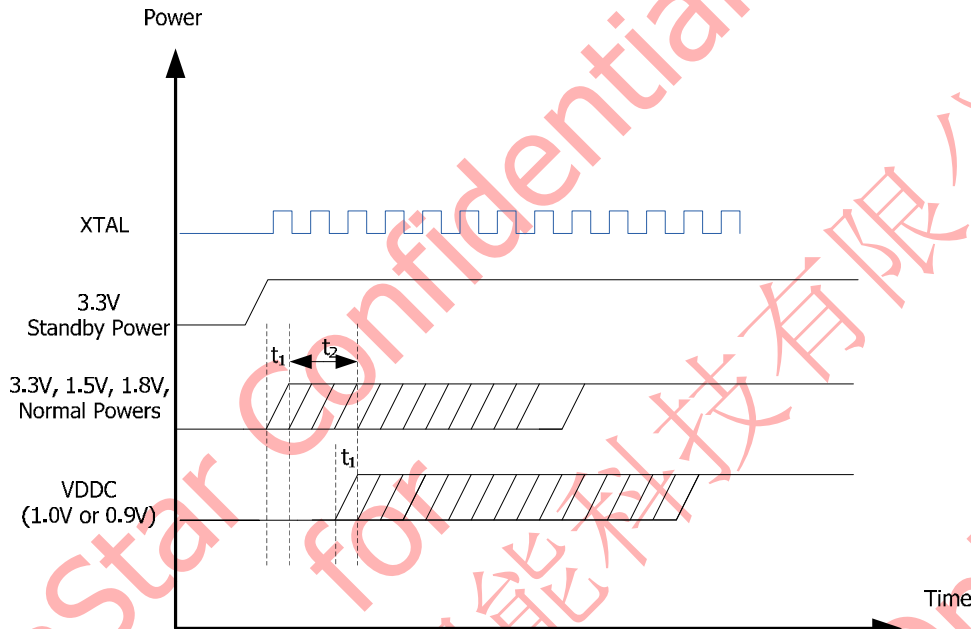*3.3V normal power (AVDD_AUD, AVDD_PLL, AVDD3P3_USB, AVDD3P3_MIPI, VDDP_1, VDDP_2_A, VDDP_3_A)

Figure 2: Power on Sequence

Table 1: Power Requirements

Time	Description	Min	Typ.	Max	Unit
t_1	XTAL stable to Reset falling	5	—	—	ms
t_2	Reset pulse width	5	—	—	ms
t_3	Normal 3.3V, 1.8V, 1.5V VDDC power rising time (0% to 100%)	—	—	20	ms
t_4	Normal 3.3V, 1.8V, 1.5V to VDDC lead time	1	—	—	ms

Without External Reset IC with External LDO

The timing is shown as Figure 3. The power waveform must satisfy Figure 3 with parameters listed in Table 1.

Note:

*3.3V standby power (AVDD_NODIE, AVDD_POC)

*1.0V/0.9V (VDD, DVDD_DDR)

*1.5V (AVDDIO_DRAM, VDDIO_DATA,)

*1.8V (VDDP_2_A, VDDP_3_A)

*3.3V normal power (AVDD_AUD, AVDD_PLL, AVDD3P3_USB, AVDD3P3_MIPI, VDDP_1, VDDP_2_A, VDDP_3_A)

Figure 3: Power on Sequence

Table 2: Power Requirements

Time	Description	Min	Typ.	Max	Unit
t_1	Normal 3.3V, 1.8V, 1.5V VDDC power rising time (0% to 100%)	—	—	20	ms
t_2	Normal 3.3V, 1.8V 1.5V to VDDC lead time	1	—	—	ms

ORDERING GUIDE

Part Number	Temperature Range	Package Description	Package Option
SSC8339DEW	-40°C to +85°C	BGA	268-ball

MARKING INFORMATION

SSC8339DEW

Part Number
Lot Number
Operation Code A

Operation Code B
Date Code (YYWW)
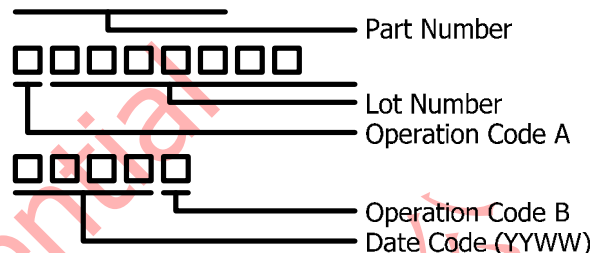
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Electrostatic charges accumulate on both test equipment and human body and can discharge without detection.　SSC8339DEW comes with ESD protection circuitry; however, the device may be permanently damaged when subjected to high energy discharges.　The device should be handled with proper ESD precautions to prevent malfunction and performance degradation.