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BSC9132 QDS Board Reference Manual

Devices Supported
BSC9132

BSC9132QDSRM
Rev 0
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Contents

Paragraph Number	Title	Page Number
Chapter 1 Overview		
1.1	Related documentation	1-1
1.2	Acronyms and abbreviation	1-1
1.3	Features	1-5
1.4	Block diagram	1-8
1.5	Test environment	1-10
1.5.1	Validation flow	1-11
1.5.2	COP/JTAG header flow	1-11
1.5.3	Evaluation test system use	1-12
1.6	Lead-Free/RoHS	1-13
Chapter 2 Architecture		
2.1	Demultiplexing	2-2
2.2	DDR	2-3
2.2.1	Compatible DDR3 devices	2-5
2.3	SerDes ports	2-5
2.3.1	CPRI support	2-7
2.3.2	SGMII support	2-8
2.3.3	PCIe support	2-8
2.4	IEEE-1588™ support	2-9
2.5	USB interface	2-10
2.6	IFC bus	2-11
2.6.1	High-speed IFC bus	2-13
2.6.2	Low-speed local bus	2-13
2.6.3	Virtual bank	2-14
2.7	I ² C	2-15
2.8	SPI interface	2-18
2.9	Interrupt controller	2-21
2.10	Serial ports	2-22
2.11	ADI interface	2-22
2.12	GPS	2-25
2.13	SDHC interface	2-26
2.14	USIM interface	2-26

Contents

Paragraph Number	Title	Page Number
2.15	TDM interface.....	2-27
2.16	Debug support.....	2-28
2.16.1	JTAG port	2-29
2.16.2	Clock monitoring and injection	2-29
2.16.3	Monitoring LEDs.....	2-30
2.17	GPIO controller port.....	2-31
2.18	DMA controller.....	2-31
2.19	Temperature monitoring.....	2-32
2.20	Reset.....	2-33
2.21	Clock.....	2-33
2.21.1	SYSCLK	2-35
2.21.2	DSP clocks.....	2-36
2.21.3	D1_DDR clocks.....	2-36
2.21.4	D2_DDR clocks.....	2-36
2.21.5	SerDes clocks.....	2-37
2.21.6	Ethernet clocks.....	2-37
2.21.7	USB clocks	2-38
2.22	Power	2-38
2.22.1	System power.....	2-40
2.22.2	Core and platform power	2-41
2.22.3	GVDD/VTT DDR power.....	2-41
2.22.4	Non-DUT power	2-41

Chapter 3 Architecture-Qixis

3.1	BCSR block	3-1
3.2	RCW	3-3
3.3	(Re)Configuration.....	3-3
3.3.1	Configuration data sources	3-4
3.3.2	Switch expansion	3-5
3.3.3	Configuration registers	3-5
3.3.4	Shadow registers	3-5
3.3.5	Configuration output.....	3-6
3.4	Power control.....	3-7
3.5	Reset.....	3-7
3.5.1	Reset signal synchronization	3-8
3.6	I2C receiver.....	3-8
3.7	GPIO module	3-8
3.8	RemoteJTAG module.....	3-9
3.9	DCM module	3-10

Contents

Paragraph Number	Title	Page Number
3.10	I2C master	3-10

Chapter 4 Board Configuration

4.1	Board setup	4-1
4.2	Switch configuration	4-2
4.2.1	DUT switch configuration	4-3
4.2.2	Board switch configuration	4-8
4.3	Connector default settings	4-11
4.3.1	Jumper default settings	4-14
4.3.2	Push buttons	4-16
4.3.3	LEDs lights	4-16
4.3.4	Clocks and test points	4-17

Chapter 5 Programming Model

5.1	QIXIS Registers Conventions	5-2
5.2	Identification Registers	5-2
5.2.1	ID Register (ID)	5-2
5.2.2	Version Register (VER)	5-3
5.2.3	QIXIS Version Register (QVER)	5-4
5.2.4	Programming Model Register (MODEL)	5-5
5.2.5	QIXIS Tag Access Register (QTAG)	5-5
5.3	Control and Status Registers	5-6
5.3.1	System Control Register (CTL_SYS)	5-6
5.3.2	Auxiliary Register (AUX)	5-7
5.3.3	Speed Register (CLK_SPD)	5-7
5.3.4	DUT Status Register (STAT_DUT)	5-8
5.3.5	System Status Register (STAT_SYS)	5-8
5.3.6	Alarm Status Register (STAT_ALARM)	5-9
5.3.7	Presence Status Register (STAT_PRESENT)	5-10
5.3.8	Presence Status Register (STAT_PRESENT1)	5-11
5.3.9	RCW Control Register (CTL_RCW)	5-12
5.3.10	LED Register (LED)	5-13
5.3.11	I2C Block Register (I2C_BLK)	5-13
5.4	Reconfiguration/DCM Registers	5-14
5.4.1	Reconfig Control Register (RCFG_CTL)	5-14
5.4.2	Reconfig Status Register (RCFG_STAT)	5-15
5.4.3	DCM Address Register (DCM_ADDR)	5-15

Contents

Paragraph Number	Title	Page Number
5.4.4	DCM Data Register (DCM_DATA)	5-16
5.4.5	DCM Command Register (DCM_CMD)	5-17
5.4.6	DCM Message Register (DCM_MSG).....	5-17
5.4.7	Debug Control Register (GDC).....	5-18
5.4.8	DCM Debug Data Register (GDD)	5-20
5.4.9	DCM Message Acknowledge Register (DCM_MACK).....	5-20
5.4.10	Watchdog Register (RCFG_WATCH).....	5-21
5.5	Power Control/Status Registers	5-22
5.5.1	Power Control Register (PWR_CTL1).....	5-22
5.5.2	Power Control Register (PWR_CTL2).....	5-23
5.5.3	Power Main Status Register (PWR_MSTAT).....	5-23
5.5.4	Power Status Registers (PWR_STATn).....	5-24
5.6	Clock Control Registers.....	5-26
5.6.1	Speed Register (CLK_SPD1)	5-27
5.6.2	Speed Register (CLK_SPD2)	5-27
5.6.3	Speed Register (CLK_CTL).....	5-28
5.6.4	Clock Configuration Registers (CLK_SYSDn).....	5-28
5.6.5	Clock Configuration Registers (CLK_DSPDn).....	5-29
5.6.6	Clock Configuration Registers (CLK_DDR1Dn).....	5-30
5.6.7	Clock Configuration Registers (CLK_DDR2Dn).....	5-30
5.7	Reset Control Registers	5-31
5.7.1	Reset Control Register (RST_CTL)	5-31
5.7.2	Reset Status Register (RST_STAT)	5-31
5.7.3	Reset Reason Register (RST_REASON)	5-32
5.7.4	Reset Force Registers (RST_FORCEn).....	5-33
5.8	Board Configuration Registers	5-36
5.8.1	Board Configuration Register 0 (BRDCFG0)	5-36
5.8.2	Board Configuration Register 1 (BRDCFG1)	5-37
5.8.3	Board Configuration Register 2 (BRDCFG2)	5-38
5.8.4	Board Configuration Register 3 (BRDCFG3)	5-40
5.8.5	Board Configuration Register 4 (BRDCFG4)	5-41
5.8.6	Board Configuration Register 5 (BRDCFG5)	5-41
5.8.7	Board Configuration Register 6 (BRDCFG6)	5-42
5.8.8	Board Configuration Register 7 (BRDCFG7)	5-43
5.8.9	Board Configuration Register 8 (BRDCFG8)	5-44
5.8.10	Board Configuration Register 9 (BRDCFG9)	5-45
5.8.11	Board Configuration Register 10 (BRDCFG10)	5-46
5.8.12	Board Configuration Register 11 (BRDCFG11)	5-47
5.8.13	Board Configuration Register 12 (BRDCFG12)	5-48
5.9	DUT Configuration Registers	5-49
5.9.1	DUT Configuration Register 0 (DUTCFG0).....	5-50

Contents

Paragraph Number	Title	Page Number
5.9.2	DUT Configuration Register 1 (DUTCFG1).....	5-50
5.9.3	DUT Configuration Register 2 (DUTCFG2).....	5-50
5.9.4	DUT Configuration Register 3 (DUTCFG3).....	5-51
5.9.5	DUT Configuration Register 4 (DUTCFG4).....	5-52
5.9.6	DUT Configuration Register 5 (DUTCFG5).....	5-52
5.9.7	DUT Configuration Register 6 (DUTCFG6).....	5-53
5.9.8	DUT Configuration Register 7(DUTCFG7).....	5-53
5.9.9	DUT Configuration Register 8(DUTCFG8).....	5-54
5.9.10	DUT Configuration Register 9(DUTCFG9).....	5-55
5.9.11	DUT Configuration Register 10(DUTCFG10).....	5-55
5.9.12	DUT Configuration Register 11(DUTCFG11).....	5-56
5.9.13	DUT Configuration Register 12 (DUTCFG12).....	5-57
5.9.14	DUT Configuration Register 13 (DUTCFG13).....	5-58
5.9.15	DUT Configuration Register 14-15 (DUTCFG14-15).....	5-59
5.10	RCW Access Registers	5-59
5.10.1	RCW SRAM Address Registers (RCW_ADDRn).....	5-59
5.10.2	RCW SRAM Data Register (RCW_DATA).....	5-60
5.11	GPIO Control Registers	5-60
5.11.1	GPIO I/O Signal Registers (GPIO_IOn)	5-60
5.11.2	GPIO Direction Registers (GPIO_DIRn)	5-61
5.12	Remote JTAG Access Registers	5-61
5.12.1	Remote JTAG Control Register (RJTAG_CTL).....	5-62
5.12.2	Remote JTAG Data Register (RJTAG_DATA)	5-62
5.13	Auxiliary Registers	5-63
5.13.1	Auxiliary Registers (AUX1-AUX4).....	5-63
5.13.2	Auxiliary SRAM Address Register (AUX_ADDR).....	5-64
5.13.3	Auxiliary SRAM Data Register (AUX_DATA).....	5-64

Chapter 6 Revision History

6.1	Revision history	A-1
-----	------------------------	-----

Contents

**Paragraph
Number**

Title

**Page
Number**

Tables

Table Number	Title	Page Number
1-1	Related Documentation.....	1-1
2-2	Acronyms and abbreviations.....	1-2
2-3	Test evaluation methods.....	1-13
2-1	BSC9132 blocks groupings summary.....	2-1
2-2	BSC9132 QDS demultiplexing configuration.....	2-2
2-3	DDR MCS[0:3] connection options.....	2-4
2-4	DDR3 memory device.....	2-5
2-5	BSC9132 QDS supported SerDes lane configuration.....	2-6
2-6	Hot-pluggable SFP+ devices.....	2-7
2-7	BSC9132 QDS ethernet port configuration.....	2-8
2-8	SerDes repeater card listing.....	2-9
2-9	USB Mux options.....	2-10
2-10	Local bus chip select mapping.....	2-13
2-11	IFC bus on board devices.....	2-13
2-12	IFC bus chip select mapping.....	2-15
2-13	BSC9132 QDS I2C port 1 - devices address list.....	2-16
2-14	BSC9132 QDS I2C port 2 - devices address list.....	2-17
2-15	SPI1 bus muxing table.....	2-19
2-16	Interrupt connections.....	2-21
2-17	BSC9132 ADI ANT[2:4] interface signals - assembly option.....	2-24
2-18	USIM interface signals.....	2-27
2-19	BSC9132 QDS TDM1 Interface - assembly option.....	2-28
2-20	BSC9132 QDS TDM2 Interface - assembly option.....	2-28
2-21	BSC9132 JTAG MODE selection.....	2-29
2-22	Clock monitoring/injection details.....	2-30
2-23	LED Status Monitors.....	2-30
2-24	GPIO evaluation support summary.....	2-31
2-25	DMA testing summary.....	2-32
2-26	BSC9132 QDS clock requirements	2-35
2-27	SYSCLK frequency options.....	2-35
2-28	DSPCLK frequency options.....	2-36
2-29	D1_DDR_CLK frequency options.....	2-36
2-30	D2_DDR_CLK frequency options.....	2-37
2-31	SerDes SD1 clock frequency options.....	2-37
2-32	SerDes SD2 clock frequency options.....	2-37
2-33	Miscellaneous Power Supplies.....	2-42
4-1	DUT configuration - SYSCLK PLL (CCB clock frequency).....	4-3
4-2	DUT configuration - core PLL.....	4-3

Tables

Table Number	Title	Page Number
4-3	DUT configuration - DDR PLL	4-4
4-4	DUT configuration - DSP PLL	4-4
4-5	DUT configuration - SerDes IO_PORT_SEL	4-5
4-6	DUT configuration - IFC FCM	4-5
4-7	DUT configuration - boot memory location	4-6
4-8	DUT configuration - supply voltage selection	4-7
4-9	Board configuration - Serdes reference clocks	4-8
4-10	Board configuration - DUT input clocks	4-8
4-11	Board configuration - IFC boot remapping	4-9
4-12	Board configuration - I2C device write protection	4-10
4-13	Jumpers and connector default setting	4-11
4-14	Default jumper settings for BSC9132 QDS board	4-14
4-15	BSC9132 QDS push buttons and manual switch	4-16
4-16	BSC9132 QDS LEDs	4-16
4-17	Clocks and test points	4-17
5-1	QIXIS register block map	5-1
5-2	QIXIS Register Location Map	5-1
5-3	ID Register Field Descriptions	5-3
5-4	VER Register Field Descriptions	5-3
5-5	VER Field Change Examples	5-4
5-6	QVER Register Field Descriptions	5-4
5-7	MODEL Register Field Descriptions	5-5
5-8	QTAG Register Field Descriptions	5-5
5-9	TAGROM Data Contents	5-6
5-10	CTL_SYS Register Field Descriptions	5-6
5-11	AUX Register Field Descriptions	5-7
5-12	SPD Register Field Descriptions	5-8
5-13	STAT_DUT Register Field Descriptions	5-8
5-14	STAT_SYS Register Field Descriptions	5-9
5-15	STAT_ALARM Register Field Descriptions	5-10
5-16	STAT_PRESENT Register Field Descriptions	5-11
5-17	STAT_PRESENT1 Register Field Descriptions	5-12
5-18	CTL_RCW Register Field Descriptions	5-12
5-19	LED Register Field Descriptions	5-13
5-20	I2C_BLK Register Field Descriptions	5-13
5-21	RCFG_CTL Register Field Descriptions	5-14
5-22	RCFG_STAT Register Field Descriptions	5-15
5-23	DCM_ADDR Register Field Descriptions	5-16
5-24	DCM_DATA Register Field Descriptions	5-16
5-25	DCM_CMD Register Field Descriptions	5-17
5-26	DCM_MSG Register Field Descriptions	5-17

Tables

Table Number	Title	Page Number
5-27	GDC Register Field Descriptions	5-18
5-28	GDD Register Field Descriptions	5-20
5-29	DCM_MACK Register Field Descriptions.....	5-21
5-30	RCFG_WATCH Register Field Descriptions.....	5-21
5-31	Watchdog Timer Values	5-22
5-32	PWR_CTL1 Register Field Descriptions.....	5-23
5-33	PWR_CTL2 Register Field Descriptions.....	5-23
5-34	PWR_MSTAT Register Field Descriptions	5-24
5-35	PWR_STATn Register Field Descriptions.....	5-25
5-36	PWR_STATn Customary Bit Assignment	5-26
5-37	CLK_SPD1 Register Field Descriptions.....	5-27
5-38	CLK_SPD2 Register Field Descriptions.....	5-28
5-39	CLK_CTL Register Field Descriptions	5-28
5-40	CLK_SYSDn Register Field Descriptions.....	5-29
5-41	CLK_DSPDn Register Field Descriptions.....	5-29
5-42	CLK_DDR1Dn Register Field Descriptions.....	5-30
5-43	CLK_DDR2Dn Register Field Descriptions.....	5-30
5-44	RST_CTL Register Field Descriptions	5-31
5-45	RST_STAT Register Field Descriptions	5-32
5-46	RST_REASON Register Field Descriptions.....	5-33
5-47	RST_FORCEn Register Field Descriptions.....	5-33
5-48	Reset Force Register Change History	5-34
5-49	BRDCFG0 Register Field Descriptions	5-36
5-50	BRDCFG1 Register Field Descriptions.....	5-38
5-51	BRDCFG2 Register Field Descriptions.....	5-39
5-52	BRDCFG3 Register Field Descriptions.....	5-40
5-53	BRDCFG4 Register Field Descriptions.....	5-41
5-54	BRDCFG5 Register Field Descriptions.....	5-42
5-55	BRDCFG6 Register Field Descriptions.....	5-42
5-56	BRDCFG7 Register Field Descriptions.....	5-43
5-57	BRDCFG8 Register Field Descriptions.....	5-44
5-58	BRDCFG9 Register Field Descriptions.....	5-45
5-59	BRDCFG10 Register Field Descriptions.....	5-46
5-60	BRDCFG11 Register Field Descriptions.....	5-47
5-61	BRDCFG12 Register Field Descriptions.....	5-48
5-62	DUTCFCGn Customary Bit Assignments.....	5-49
5-63	DUTCFCG0 Register Field Descriptions.....	5-50
5-64	DUTCFCG1 Register Field Descriptions.....	5-50
5-65	DUTCFCG2 Register Field Descriptions.....	5-51
5-66	DUTCFCG3 Register Field Descriptions.....	5-51
5-67	DUTCFCG4 Register Field Descriptions.....	5-52

Tables

Table Number	Title	Page Number
5-68	DUTCFG5 Register Field Descriptions	5-53
5-69	DUTCFG6 Register Field Descriptions	5-53
5-70	DUTCFG7 Register Field Descriptions	5-54
5-71	DUTCFG8 Register Field Descriptions	5-55
5-72	DUTCFG9 Register Field Descriptions	5-55
5-73	DUTCFG10 Register Field Descriptions	5-56
5-74	DUTCFG11 Register Field Descriptions	5-57
5-75	DUTCFG12 Register Field Descriptions	5-57
5-76	DUTCFG13 Register Field Descriptions	5-58
5-77	DUTCFG14-5 Register Field Descriptions	5-59
5-78	RCW_ADDRn Registers Field Description	5-59
5-79	RCW_DATA Register Field Description	5-60
5-80	GPIO Behaviour	5-60
5-81	GPIO_IOn Register Field Descriptions	5-61
5-82	GPIO_DIRn Register Field Descriptions	5-61
5-83	RJTAG_CTL Register Field Descriptions	5-62
5-84	RJTAG_DATA Register Field Descriptions	5-63
5-85	AUXn Register Field Descriptions	5-63
5-86	AUX_ADDR Register Field Description	5-64
5-87	AUX_DATA Register Field Description	5-64
Table A-1	Revision history	A-1

Figures

Figure Number	Title	Page Number
2-1	BSC9132 QorIQ block diagram.....	1-8
2-2	BSC9132 QDS block diagram.....	1-9
2-3	BSC9132 QDS board top view	1-10
2-4	BSC9132 QDS QIXIS FPGA control paths	1-12
2-1	BSC9132 QDS memory architecture.....	2-5
2-2	SerDes routing.....	2-7
2-3	PCI Express board to board link	2-9
2-4	IEEE-1588 interface overview.....	2-10
2-5	USB architecture.....	2-11
2-6	BSC9132 QDS segmented IFC bus architecture	2-12
2-7	NORFlash virtual bank address XOR.....	2-14
2-8	9132 QDS I2C block diagram.....	2-18
2-9	BSC9132 QDS SPI1 connectivity.....	2-20
2-10	BSC9132 QDS SPI2 connectivity.....	2-21
2-11	UART ports connectivity	2-22
2-12	BSC9132 QDS ANT1 and ANT2 ADI interface connectivity	2-23
2-13	BSC9132 ANT3 and ANT4 ADI interface connectivity	2-24
2-14	BSC9132 QDS AID REF_CLK distribution architecture	2-25
2-15	GPS module connectivity.....	2-26
2-16	BSC9132 QDS SDHC/USIM interface	2-26
2-17	BSC9132 QDS TDM connection.....	2-28
2-18	JTAG/COP connections	2-29
2-19	Functional block diagram of BSC9132 QDS thermal management.....	2-32
2-20	Reset architecture.....	2-33
2-21	Clock architecture	2-34
2-22	BSC9132 QDS DUT power supply block diagram	2-39
2-23	BSC9132 QDS power distribution system.....	2-40
3-1	QIXIS overview	3-1
3-2	Register file overview	3-2
3-3	QIXIS configuration process.....	3-3
3-4	Configuration data sources.....	3-4
3-5	Configuration Output Logic.....	3-6
3-6	Power tiers and sequencing.....	3-7
3-7	GPIO control hierarchy	3-9
4-1	Board outline and cabling	4-2
4-2	BSC9132 QDS DIP-switch locations	4-11
4-3	BSC9132 QDS connector locations	4-13
4-4	BSC9132 QDS jumpers location	4-15

Figures

Figure Number	Title	Page Number
5-1	ID Register	5-3
5-2	VER Register	5-3
5-3	QVER Register	5-4
5-4	MODEL Register	5-5
5-5	QTAG Register.....	5-5
5-6	CTL_SYS Register	5-6
5-7	AUX Register.....	5-7
5-8	SPD Register	5-8
5-9	STAT_DUT Register.....	5-8
5-10	STAT_SYS Register.....	5-9
5-11	STAT_ALARM Register.....	5-9
5-12	STAT_PRESENT Register.....	5-10
5-13	STAT_PRESENT1 Register.....	5-11
5-14	CTL_RCW Register.....	5-12
5-15	LED Register.....	5-13
5-16	I2C_BLK Register	5-13
5-17	RCFG_CTL Register	5-14
5-18	RCFG_STAT Register.....	5-15
5-19	DCM_ADDR Register.....	5-16
5-20	DCM_DATA Register	5-16
5-21	DCM_CMD Register	5-17
5-22	DCM_MSG Register.....	5-17
5-23	GDC Register	5-18
5-24	GDD Register.....	5-20
5-25	DCM_MACK Register	5-20
5-26	RCFG_WATCH Register	5-21
5-27	PWR_CTL1 Registers.....	5-22
5-28	PWR_CTL2 Registers.....	5-23
5-29	PWR_MSTAT Registers	5-24
5-30	PWR_STATn Registers.....	5-25
5-31	CLK_SPD1 Register	5-27
5-32	CLK_SPD2 Register	5-28
5-33	CLK_CTL Register.....	5-28
5-34	CLK_SYSDn Registers.....	5-29
5-35	CLK_DSPDn Registers.....	5-29
5-36	CLK_DDR1Dn Registers	5-30
5-37	CLK_DDR2Dn Registers	5-30
5-38	RST_CTL Register	5-31
5-39	RST_STAT Register.....	5-31
5-40	RST_REASON Register.....	5-32
5-41	RST_FORCEn Registers.....	5-33

Figures

Figure Number	Title	Page Number
5-42	BRDCFG0 Register	5-36
5-43	BRDCFG1 Register	5-37
5-44	BRDCFG2 Register	5-39
5-45	BRDCFG3 Register	5-40
5-46	BRDCFG4 Register	5-41
5-47	BRDCFG5 Register	5-41
5-48	BRDCFG6 Register	5-42
5-49	BRDCFG7 Register	5-43
5-50	BRDCFG8 Register	5-44
5-51	BRDCFG9 Register	5-45
5-52	BRDCFG10 Register	5-46
5-53	BRDCFG11 Register	5-47
5-54	BRDCFG12 Register	5-48
5-55	DUTCFG0 Register	5-50
5-56	DUTCFG2 Register	5-50
5-57	DUTCFG3 Register	5-51
5-58	DUTCFG3-DUTCFG4 Register	5-52
5-59	DUTCFG5 Register	5-52
5-60	DUTCFG6 Register	5-53
5-61	DUTCFG7 Register	5-54
5-62	DUTCFG8 Register	5-54
5-63	DUTCFG9 Register	5-55
5-64	DUTCFG10 Register	5-56
5-65	DUTCFG11 Register	5-56
5-66	DUTCFG12 Register	5-57
5-67	DUTCFG13 Register	5-58
5-68	DUTCFG14-15 Register	5-59
5-69	RCW_ADDRn Registers	5-59
5-70	RCW_DATA Register	5-60
5-71	GPIO_IOn Registers	5-61
5-72	GPIO_DIRn Registers.....	5-61
5-73	RJTAG_CTL Register.....	5-62
5-74	RJTAG_DATA Register.....	5-63
5-75	AUXn Registers	5-63
5-76	AUX_ADDR Register	5-64
5-77	AUX_DATA Register	5-64

Figures

**Figure
Number**

Title

**Page
Number**

Chapter 1

Overview

The BSC9132 QorIQ Development System (QDS) is a high-performance computing evaluation, development, and test platform supporting the **BSC9132 QorIQ Power Architecture[®]** processor.

The BSC9132 QDS Board Reference Manual is optimized to support the high-bandwidth memory port, as well as the highly-configurable SerDes ports. The BSC9132 QDS Board Reference Manual is designed for a standard ATX form-factor, allowing it to be shipped in an off-the-shelf ATX chassis, if needed. The system is lead-free and RoHS-compliant.

1.1 Related documentation

For information on products and resources used with the BSC9132 QDS, use the references listed in [Table 1-1](#).

Some of these documents may be available only under a non-disclosure agreement (NDA). To request access to these documents, contact your local field applications engineer or sales representative.

Table 1-1. Related Documentation

Document	Description
<i>BSC9132 QorIQ Qonverge Multicore Baseband Processor Data Sheet</i> (document BSC9132EC)	Provides information about Pin assignments, Electrical, characteristics, Hardware design, considerations, Package information, and Ordering information.
BSC9132 QorIQ Integrated Multicore Communication Processor Family Reference Manual (BSC9132RM)	Provides a detailed description about T2080 QorIQ multicore processor, and features, such as memory map, serial interfaces, power supply, chip features, and clock information.
The SystemID Format for Power Architecture [™] Development Systems (AN3638)	Freescale Semiconductor Power Architecture [™] technology-based evaluation and development platforms may optionally implement a “System ID” non-volatile memory device. This device stores important configuration data about the board.

2 Acronyms and abbreviation

The table below lists and explains the acronyms and abbreviations used in this document.

Table 2-2. Acronyms and abbreviations

Usage	Description
ADDR	Address
ATX	Advanced Technology Extended (power supply)
Komodo	Test Board for high Speed Path
AUX	Auxiliary
BRDCFG	Board Configuration
BVDD	IFC Bus Direct Current Voltage
CFG	Configuration
CLK	Clock
CLKIN	Clock Input (interchangeable with SYSCLK)
COP	Common On-Chip Processor
CVDD	Clock Driver Supply Voltage / Bus Control Voltage
DDR	Double Data Rate
DIP	Dual-In-Line Package (switches)
DRAM	Dynamic Random Access Memory
QDS	Qualification Development System
EC	Chip HW Specification
ECC	Error Detection and Correction
EEPROM	Electrically Erasable Programmable ROM
eSDHC	Enhanced Secure Digital High Capacity Card
ETH	Ethernet
evt	event
FS	Frequency Select
FCM	NAND Flash Control Machine
FLASH	Flash Memory Chip
FPGA	Field Programmable Gate Array
GETH	Giga Ethernet (GbE)
GPIO	General Purpose In/Out
GVDD	DDR Supply voltage
Host	BSC9132
HRESET	Hard Reset

Table 2-2. Acronyms and abbreviations

Usage	Description
I ² C	Inter-Integrated Circuit Multi-Master Serial Computer Bus
ID	Identification
IDE	Integrated Development Environment
IO	Input/Output
IPL	Initial Program Load
ISO	Isolated
JTAG	Joint Test Access Group (IEEE® Std. 1149.1™)
LBMAP	Local Bus Map
LED/LD	Light-emitting Diode
LSB	Least Significant Bit
LVDD	BSC9132 QDS GETH (Low) Voltage
MSB	Most Significant Bit
MUX	Multiplexer
NAND	Flash Memory
QIXIS	FPGA Block Logic Design
NOR	Flash Memory
DCM	Off-line Configuration Manager (FPGA-embedded)
OVDD	Output Voltage
PCIe/PEX	PCIe = PCI Express = PEX
PG	Power Good
PHY	Physical Layer
WP	Write Protect
PLL	Phased Lock Loop
POVDD	Parameter Operating Voltage
ppm	Parts per Million
PROC ISO	Processor Isolated
PROMJet	Memory Emulator by EmuTec Inc.
PROMJet Flash	Flash by EmuTec Inc.
PS	Power Supply
PWR	Power

Table 2-2. Acronyms and abbreviations

Usage	Description
QorIQ	Brand of power architecture based on a Freescale communications micro controller.
RC	Root Complex
RCW	Reset Configuration Word
REF	Reference
REF CLK	Reference Clock (Clock Synthesizer Input Value)
REG	Register
REG CFG	Configuration Register
REQ	Request
ROM	Read Only Memory
RST	Reset
RTC	Real-time Clock
SD	Secure Digital Card
SDHC	Secure Digital High Capacity
SDREFCLK	SerDes Reference Clock
SEL	Select
SerDes (SRDS)	Serializer/Deserializer; such as PEX, SGMII, CPRI
SGMII	Serial Gigabit Media Independent Interface
SMA	Subminiature Version B Connector
SPD	Speed
SRAM	Static Random Access Memory
STAT	Status
SVDD	Supply Voltage
SVR	System Version
SW	Switch
SYSClk	System Clock
TAP	Telocator Alphanumeric Protocol; such as USB TAP or ETH TAP
TESTSEL	Test Select
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus

Table 2-2. Acronyms and abbreviations

Usage	Description
USBCLK	USB Clock
WP	Write Protect
CPRO	Public Radio Interface
SGMII	Serial GEthernet
XVDD	Phased Lock Loop Voltage

2.1 Features

The BSC9132 processor includes the following functions and features:

- Two e500-mc Power Architecture cores, each with a backside 512-KB L2 Cache with ECC
 - Three levels of instructions: user, supervisor, and hypervisor
 - Independent boot and reset
 - Secure boot capability
- Two StarCore SC3850 DSP subsystems, each with a 512-KB private L2 caches
- 32-KB of shared M3 memory
- The Multi Accelerator Platform Engine for Pico BaseStation Baseband Processing (MAPLE-B2P)
 - A multi-standard baseband algorithm accelerator for Channel Decoding/Encoding Fourier
 - Transforms UMTS chip rate processing, LTE UP/DL Channel processing, and CRC algorithms
 - 800 MHz to 1 GHz clock frequency
- Two DDR3/3L memory interfaces with 32-bit data width (40 bits including ECC), up to 1333 MHz data rate
 - data rate 32 KB 8-way level 1 data/instruction cache (L1 Dcache/ICache)
 - 512 KB 8-way level 2 unified instruction/data cache (L2 cache/M2 memory)
 - Memory management unit (MMU)
 - Enhanced programmable interrupt controller (EPIC)
 - Debug and profiling unit (DPU)
 - Two 32-bit timers
- Dedicated security engine featuring trusted
- Two DMA controllers
 - OCNDMA with four bidirectional channels
 - Sys DMA with sixteen bidirectional channels
 - IEEE 1588™ v2 support
- Interfaces
 - Two triple-speed Gigabit Ethernet controllers featuring network acceleration including - IEEE 1588™ v2 hardware support for two SGMII ports and virtualization (VeTSEC)

- PCI Express controller, which complies with the PCI Express™ Base Specification Revision 2.0
- Two Common Public Radio Interface (CPRI) controller lanes
- Antenna Interface Controller (AIC), supporting four industry standard JESD207/four custom
 - ADI RF interfaces (three dual port and one single port) and a 2-lane CPRI interface
 - ADI lanes support both full duplex FDD support and half duplex TDD support
- Universal Subscriber Identity Module (USIM) interface that facilitates communication to SIM
- Multicore Programmable Interrupt Controller
- Two I²C controllers
- Four DUART
- Integrated Flash memory controller (IFC), supporting NAND, NOR, ASIC and GPMC.
- Two PCI Express 2.0 controllers/ports
- Two enhanced Serial Peripheral Interfaces (eSPI)
- High-speed USB controller (USB 2.0)
 - Host and device support
 - ULPI interface to PHY
- Sixteen 32-bit timers
- The two e500 cores subsystems within Power Architecture consist of the following:
 - Programmable interrupt controller (PIC) compliant with OpenPIC standard
 - 32-KB L1 instruction cache
 - Shared 512-KB L2 cache/L2 memory/L2 stash32-KB L1 data cache
 - Timers
- Each SC3850 core subsystem consists of the following:
 - 32 KB 8-way level 1 instruction cache (L1 ICache)
 - 32 KB 8-way level 1 data cache (L1 DCache)
 - 512 KB 8-way level 2 unified instruction/data cache (M2 memory)
 - Memory Management Unit (MMU)
 - Enhanced programmable interrupt controller (EPIC)
 - Debug and profiling unit (DPU)
 - Two 32-bit timers
- **QIXIS** System Logic FPGA
 - Manages system power and reset sequencing
 - Manages system, for DSP and DDR clock speed selections
 - Manages dynamic reconfiguration
 - Internal processor (GMSA) supports background data collection on voltage, power, and temperature
 - Registers allow full control of all device features
 - Support for classic test features, including:

- POST
- IRS
- Synchronous signal assertion (resets, IRQs)
- System fault monitoring and status display through LED's system fault monitoring
- Runs from ATX “hot” power rails allowing FPGA operation while system is off.
- SERDES Connections
 - Supports one 2xPCIe express channel
 - On-board 16xPCIe slot
 - Supports two CPRI channels configurations
 - On-board two SFP + optical link transceivers
 - Supports two SGMII interface links
 - On-board two SGMII Vitesse VSC8221PHY devices
- Clocks
 - System clock (SYSCLK), DSP clock (DSPCLK) and DDR clock (DDRCLK)
 - Switch selectable to one of 4 common settings in the interval 66MHz-133MHz
 - Software selectable in 1MHz increments from 1-200MHz
 - SERDES clocks
 - Supports 100, 125 MHz for SD1 and 100, 125, 122.88 MHz clocking for SD2 port.
 - 125MHz Ethernet clock
 - 2.048Mhz TDM Clock
 - 16 MHz RTC Clock
- Power Supplies
 - Dedicated regulators for BVDD and XVDD, XPAD voltage rails
 - Dedicated regulators for G1VDD(VTT1/VREF1) and G2VDD(VTT2/VREF2) (1.5V/1.35V and 0.75V/0.675V)
 - Other regulators for CVDD, XVDD, OVDD, LVDD, general 1.5V, 1.8V and 2.5V power for peripherals

2.2 Block diagram

This section provides a high-level overview of the BSC9132. Figure 2-1 shows the major functional units within the device and Figure 2-2 shows the overall architecture of the BSC9132 QDS platform.

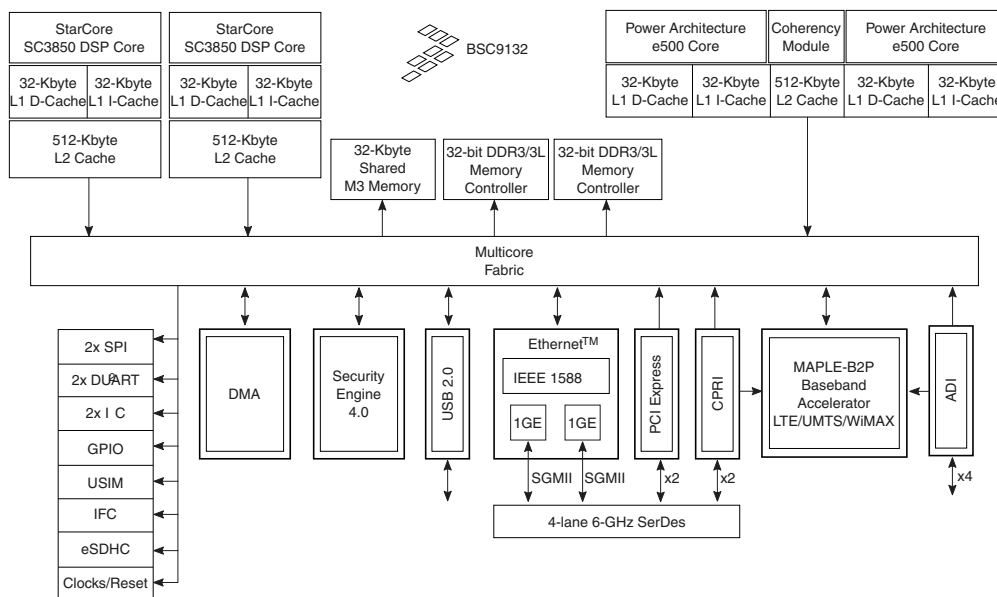


Figure 2-1. BSC9132 QorIQ block diagram

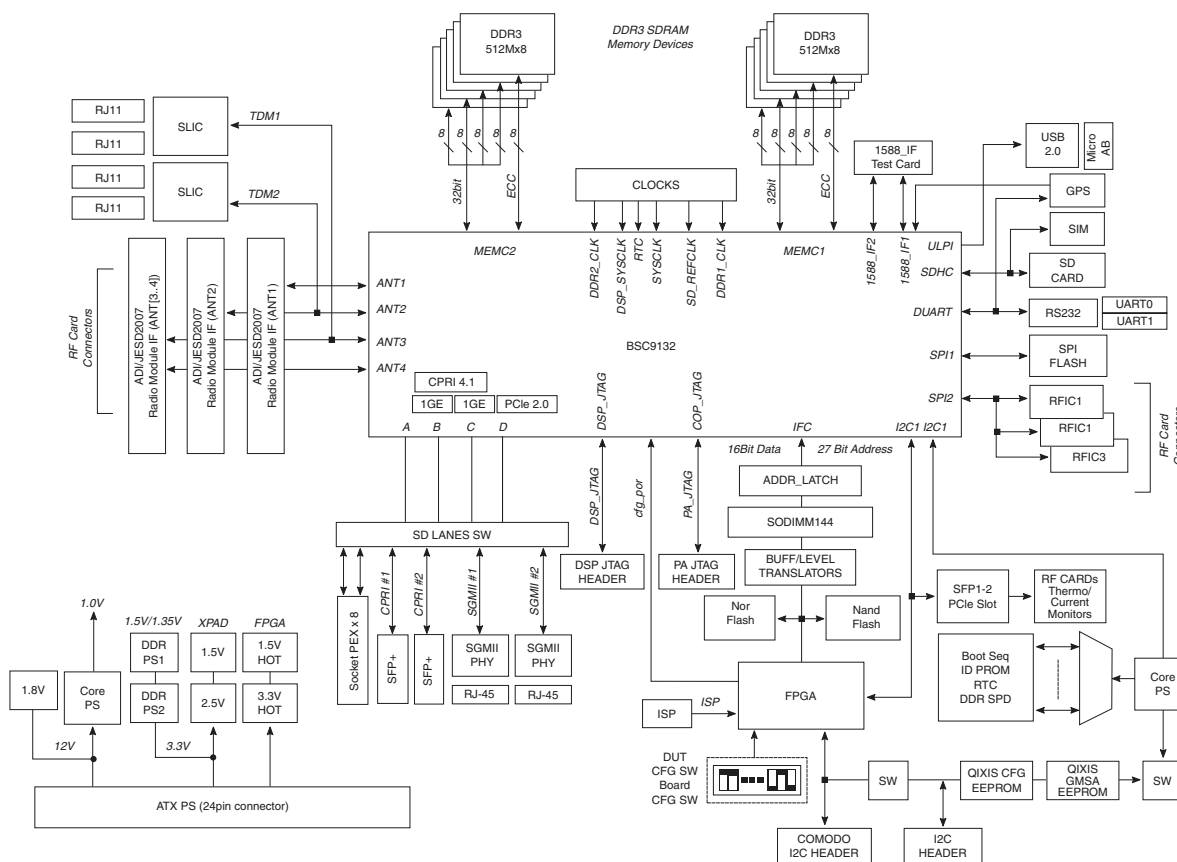


Figure 2-2. BSC9132 QDS block diagram

NOTE

To examine the details of the BSC9132 QDS board top view, you need to zoom-in the image.