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Understanding [Embedded - FPGAs \(Field Programmable Gate Array\)](#)

Embedded - FPGAs, or Field Programmable Gate Arrays, are advanced integrated circuits that offer unparalleled flexibility and performance for digital systems. Unlike traditional fixed-function logic devices, FPGAs can be programmed and reprogrammed to execute a wide array of logical operations, enabling customized functionality tailored to specific applications. This reprogrammability allows developers to iterate designs quickly and implement complex functions without the need for custom hardware.

Applications of Embedded - FPGAs

The versatility of Embedded - FPGAs makes them indispensable in numerous fields. In telecommunications.

Details

Product Status	Active
Number of LABs/CLBs	8064
Number of Logic Elements/Cells	-
Total RAM Bits	73728
Number of I/O	115
Number of Gates	500000
Voltage - Supply	1.425V ~ 1.575V
Mounting Type	Surface Mount
Operating Temperature	-40°C ~ 85°C (TA)
Package / Case	208-BFQFP
Supplier Device Package	208-PQFP (28x28)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/ax500-1pqg208i

Table 2-15, Table 2-16, and Table 2-17 list all the available macro names differentiated by I/O standard, type, slew rate, and drive strength.

Table 2-15 • Macros for Single-Ended I/O Standards

Standard	VCCI	Macro Names
LVTTTL	3.3 V	CLKBUF, HCLKBUF INBUF, OUTBUF, OUTBUF_S_8, OUTBUF_S_12, OUTBUF_S_16, OUTBUF_S_24, OUTBUF_H_8, OUTBUF_H_12, OUTBUF_H_16, OUTBUF_H_24, TRIBUF, TRIBUF_S_8, TRIBUF_S_12, TRIBUF_S_16, TRIBUF_S_24, TRIBUF_H_8, TRIBUF_H_12, TRIBUF_H_16, TRIBUF_H_24, BIBUF, BIBUF_S_8, BIBUF_S_12, BIBUF_S_16, BIBUF_S_24, BIBUF_H_8, BIBUF_H_12, BIBUF_H_16, BIBUF_H_24
3.3 V PCI	3.3 V	CLKBUF_PCI, HCLKBUF_PCI, INBUF_PCI, OUTBUF_PCI, TRIBUF_PCI, BIBUF_PCI
3.3 V PCI-X	3.3 V	CLKBUF_PCI-X, HCLKBUF_PCI-X, INBUF_PCI-X, OUTBUF_PCI-X, TRIBUF_PCI-X, BIBUF_PCI-X
LVC MOS25	2.5 V	CLKBUF_LVC MOS25, HCLKBUF_LVC MOS25, INBUF_LVC MOS25, OUTBUF_LVC MOS25, TRIBUF_LVC MOS25, BIBUF_LVC MOS25
LVC MOS18	1.8 V	CLKBUF_LVC MOS18, HCLKBUF_LVC MOS18, INBUF_LVC MOS18, OUTBUF_LVC MOS18, TRIBUF_LVC MOS18, BIBUF_LVC MOS18
LVC MOS15 (JESD8-11)	1.5 V	CLKBUF_LVC MOS15, HCLKBUF_LVC MOS15, INBUF_LVC MOS15, OUTBUF_LVC MOS15, TRIBUF_LVC MOS15, BIBUF_LVC MOS15

Table 2-16 • I/O Macros for Differential I/O Standards

Standard	VCCI	Macro Names
LVPECL	3.3 V	CLKBUF_LVPECL, HCLKBUF_LVPECL, INBUF_LVPECL, OUTBUF_LVPECL
LVDS	2.5 V	CLKBUF_LVDS, HCLKBUF_LVDS, INBUF_LVDS, OUTBUF_LVDS

Table 2-17 • I/O Macros for Voltage-Referenced I/O Standards

Standard	VCCI	VREF	Macro Names
GTL+	3.3 V	1.0 V	CLKBUF_GTP33, HCLKBUF_GTP33, INBUF_GTP33, OUTBUF_GTP33, TRIBUF_GTP33, BIBUF_GTP33
GTL+	2.5 V	1.0 V	CLKBUF_GTP25, HCLKBUF_GTP25, INBUF_GTP25, OUTBUF_GTP25, TRIBUF_GTP25, BIBUF_GTP25
SSTL2 Class I	2.5 V	1.25 V	CLKBUF_SSTL2_I, HCLKBUF_SSTL2_I, INBUF_SSTL2_I, OUTBUF_SSTL2_I, TRIBUF_SSTL2_I, BIBUF_SSTL2_I
SSTL2 Class II	2.5 V	1.25 V	CLKBUF_SSTL2_II, HCLKBUF_SSTL2_II, INBUF_SSTL2_II, OUTBUF_SSTL2_II, TRIBUF_SSTL2_II, BIBUF_SSTL2_II
SSTL3 Class I	3.3 V	1.5 V	CLKBUF_SSTL3_I, HCLKBUF_SSTL3_I, INBUF_SSTL3_I, OUTBUF_SSTL3_I, TRIBUF_SSTL3_I, BIBUF_SSTL3_I
SSTL3 Class II	3.3 V	1.5 V	CLKBUF_SSTL3_II, HCLKBUF_SSTL3_II, INBUF_SSTL3_II, OUTBUF_SSTL3_II, TRIBUF_SSTL3_II, BIBUF_SSTL3_II
HSTL Class I	1.5 V	0.75 V	CLKBUF_HSTL_I, HCLKBUF_HSTL_I, INBUF_HSTL_I, OUTBUF_HSTL_I, TRIBUF_HSTL_I, BIBUF_HSTL_I

I/O Module Timing Characteristics

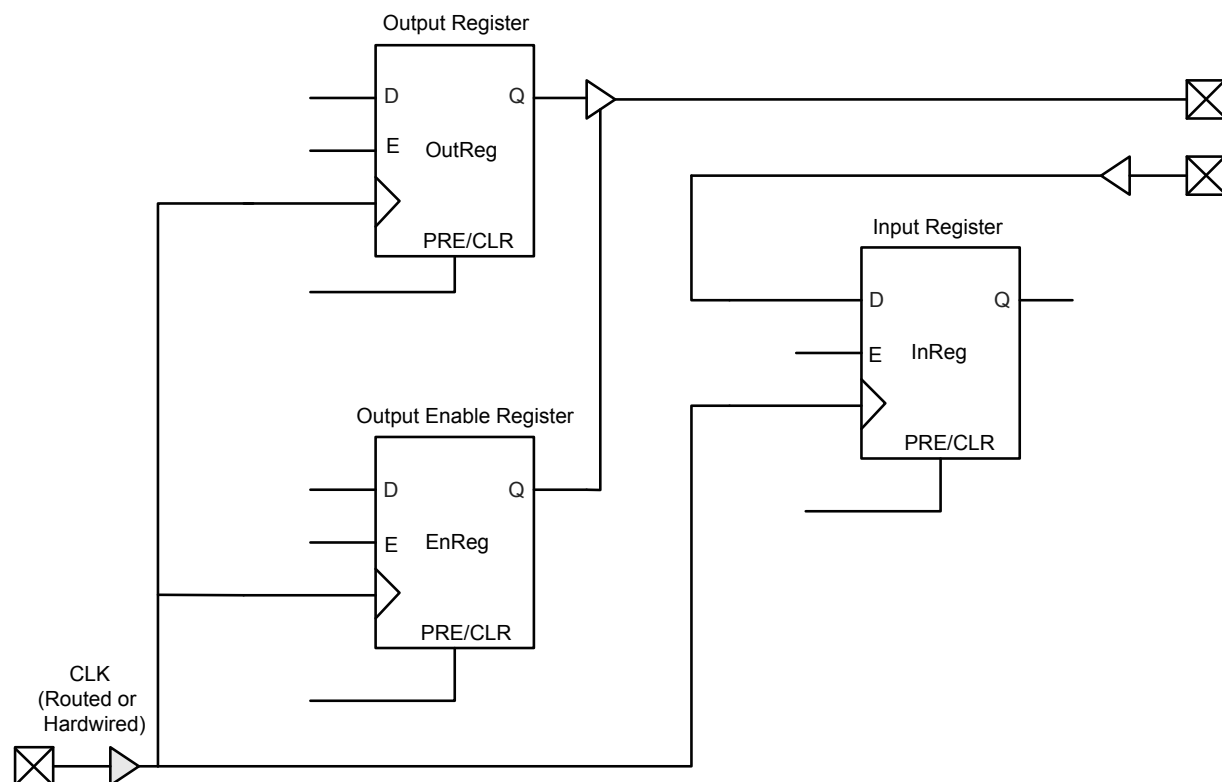


Figure 2-11 • Timing Model

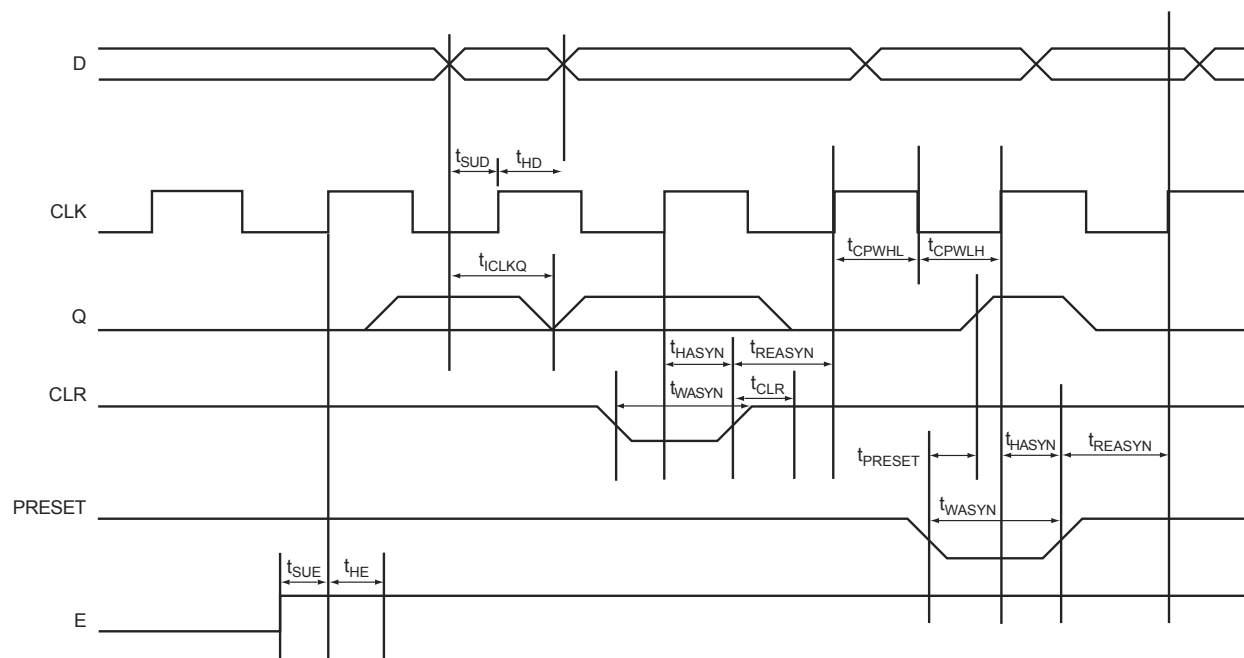


Figure 2-12 • Input Register Timing Characteristics

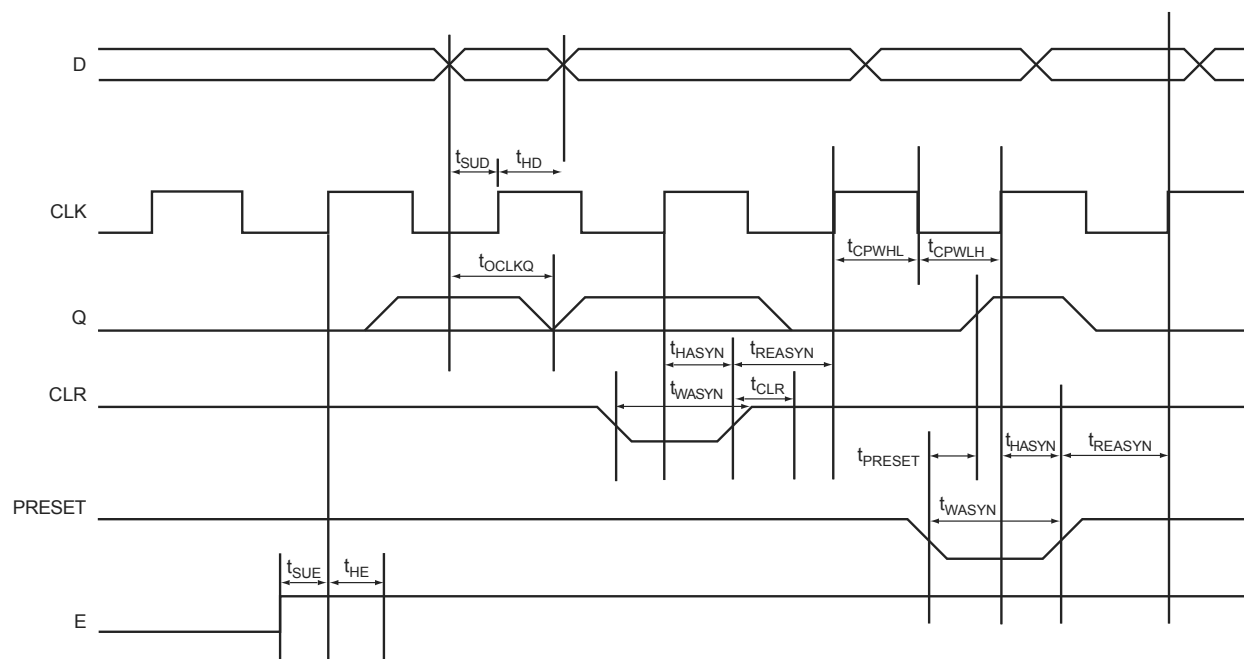


Figure 2-13 • Output Register Timing Characteristics

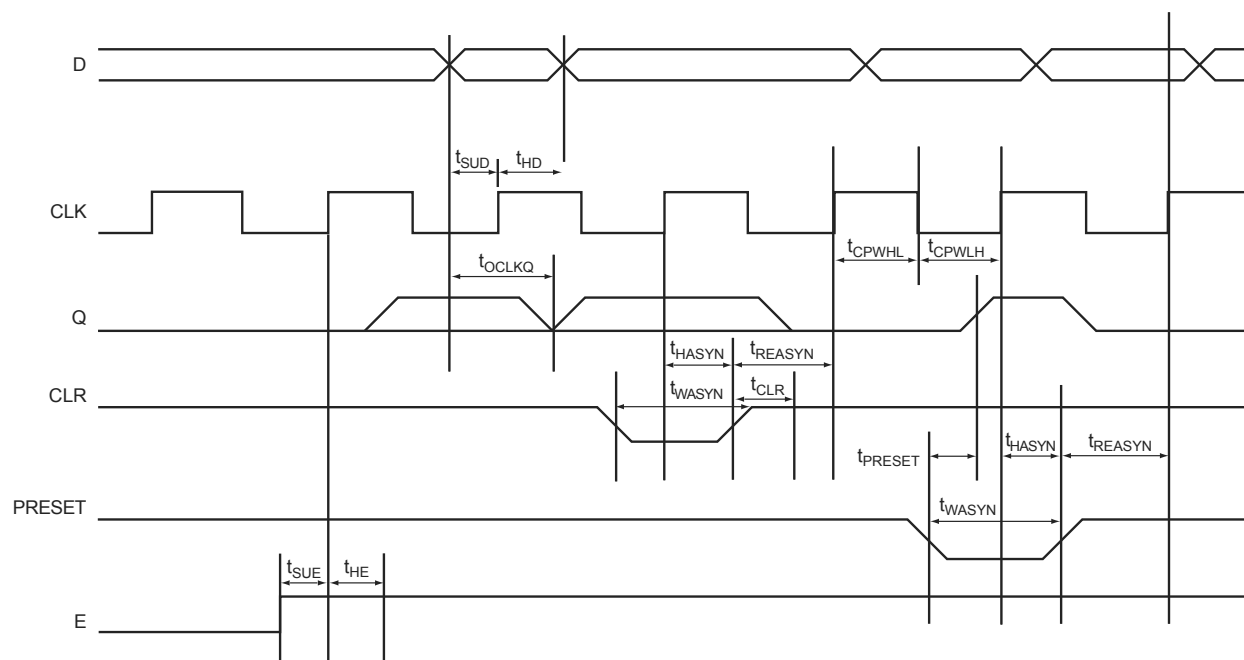


Figure 2-14 • Output Enable Register Timing Characteristics

1.8 V LVCMOS

Low-Voltage Complementary Metal-Oxide Semiconductor for 1.8 V is an extension of the LVCMOS standard (JESD8-5) used for general-purpose 1.8 V applications. It uses a 3.3 V tolerant CMOS input buffer and a push-pull output buffer.

Table 2-26 • DC Input and Output Levels

VIL		VIH		VOL	VOH	IOL	IOH
Min., V	Max., V	Min., V	Max., V	Max., V	Min., V	mA	mA
-0.3	0.2 VCCI	0.7 VCCI	3.6	0.2	VCCI - 0.2	8 mA	-8 mA

AC Loadings

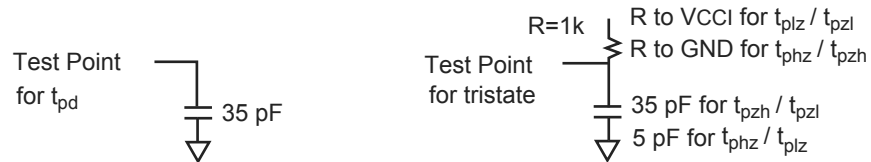
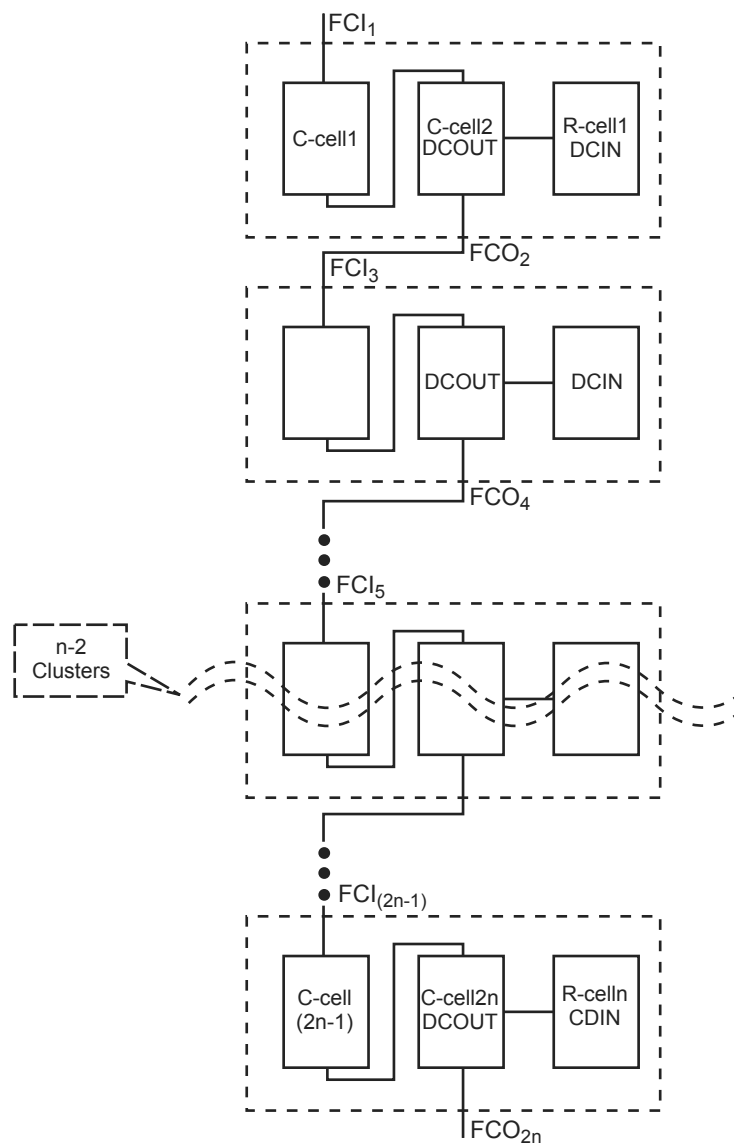


Figure 2-17 • AC Test Loads

Table 2-27 • AC Waveforms, Measuring Points, and Capacitive Loads

Input Low (V)	Input High (V)	Measuring Point* (V)	VREF (typ) (V)	C _{load} (pF)
0	1.8	0.5 VCCI	N/A	35

Note: * Measuring Point = VTRIP



Note: The carry-chain sequence can end on either C-cell.

Figure 2-30 • Carry-Chain Sequencing of C-Cells

Timing Characteristics

Refer to Table 2-62 on page 2-55 for more information on carry-chain timing.

PLL Configurations

The following rules apply to the different PLL inputs and outputs:

Reference Clock

The RefCLK can be driven by (Figure 2-50):

1. Global routed clocks (CLKE/F/G/H) or user-created clock network
2. CLK1 output of an adjacent PLL
3. [H]CLKxP (single-ended or voltage-referenced)
4. [H]CLKxP/[H]CLKxN pair (differential modes like LVPECL or LVDS)

Feedback Clock

The feedback clock can be driven by (Figure 2-51 on page 2-78):

1. Global routed clocks (CLKE/F/G/H) or user-created clock network
2. External [H]CLKxP/N I/O pad(s) from the adjacent PLL cell
3. An internal signal from the PLL block

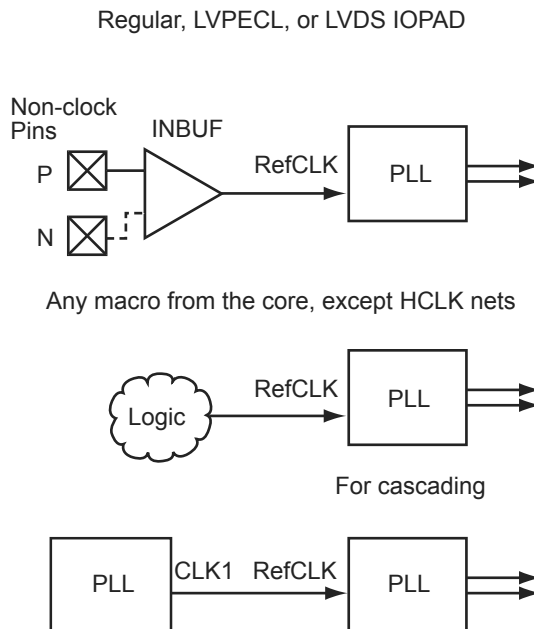


Figure 2-50 • Reference Clock Connections

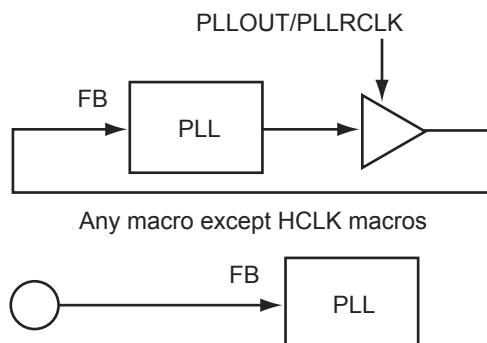


Figure 2-51 • Feedback Clock Connections

Table 2-92 • Eight RAM Blocks Cascaded

Worst-Case Commercial Conditions VCCA = 1.425 V, VCCI = 3.0 V, T_J = 70°C

		–2 Speed		–1 Speed		Std Speed		
Parameter	Description	Min.	Max.	Min.	Max.	Min.	Max.	Units
Write Mode								
t _{WDASU}	Write Data Setup vs. WCLK		5.78		6.58		7.74	ns
t _{WDAHD}	Write Data Hold vs. WCLK		0.00		0.00		0.00	ns
t _{WADSU}	Write Address Setup vs. WCLK		5.78		6.58		7.74	ns
t _{WADHD}	Write Address Hold vs. WCLK		0.00		0.00		0.00	ns
t _{WENSU}	Write Enable Setup vs. WCLK		5.78		6.58		7.74	ns
t _{WENHD}	Write Enable Hold vs. WCLK		0.00		0.00		0.00	ns
t _{WCKH}	WCLK Minimum High Pulse Width	0.75		0.75		0.75		ns
t _{WCLK}	WCLK Minimum Low Pulse Width	5.13		5.13		5.13		ns
t _{WCKP}	WCLK Minimum Period	5.88		5.88		5.88		ns
Read Mode								
t _{RADSU}	Read Address Setup vs. RCLK		6.75		7.69		9.04	ns
t _{RADHD}	Read Address Hold vs. RCLK		0.00		0.00		0.00	ns
t _{RENSU}	Read Enable Setup vs. RCLK		6.75		7.69		9.04	ns
t _{RENHD}	Read Enable Hold vs. RCLK		0.00		0.00		0.00	ns
t _{RCK2RD1}	RCLK-To-OUT (Pipelined)		3.39		3.86		4.54	ns
t _{RCK2RD2}	RCLK-To-OUT (Non-Pipelined)		4.93		5.62		6.61	ns
t _{RCLKH}	RCLK Minimum High Pulse Width	0.73		0.73		0.73		ns
t _{RCLKL}	RCLK Minimum Low Pulse Width	5.77		5.77		5.77		ns
t _{RCKP}	RCLK Minimum Period	6.50		6.50		6.50		ns

Note: Timing data for these eight cascaded RAM blocks uses a depth of 32,768. For all other combinations, use Microsemi's timing software.

Timing Characteristics

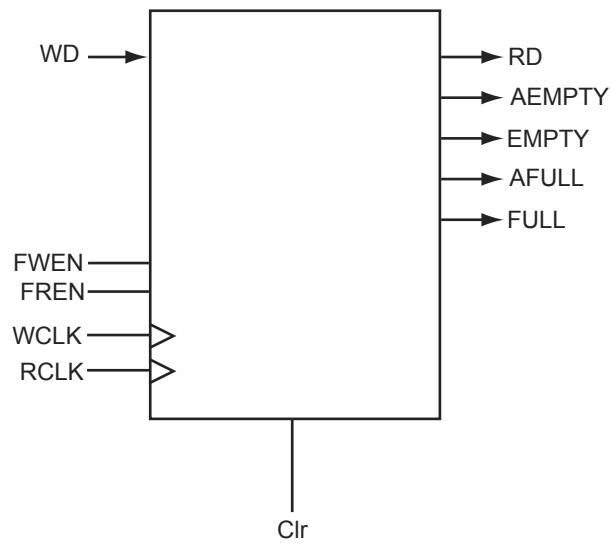


Figure 2-66 • FIFO Model

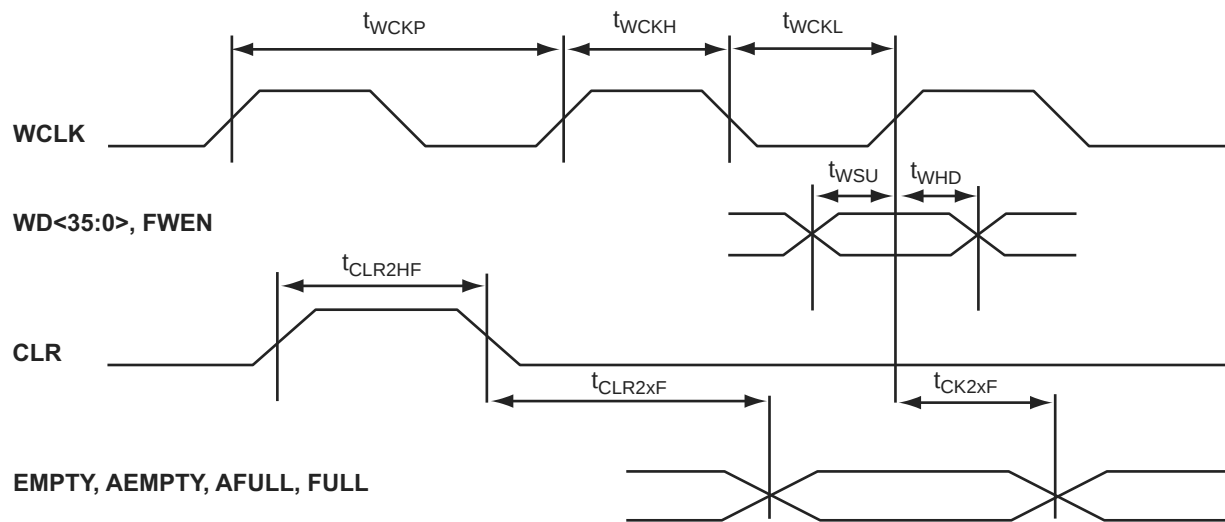


Figure 2-67 • FIFO Write Timing

Programming

Device programming is supported through the Silicon Sculptor II, a single-site, robust and compact device programmer for the PC. Up to four Silicon Sculptor IIs can be daisy-chained and controlled from a single PC host. With standalone software for the PC, Silicon Sculptor II is designed to allow concurrent programming of multiple units from the same PC when daisy-chained.

Silicon Sculptor II programs devices independently to achieve the fastest programming times possible. Each fuse is verified by Silicon Sculptor II to ensure correct programming. Furthermore, at the end of programming, there are integrity tests that are run to ensure that programming was completed properly. Not only does it test programmed and nonprogrammed fuses, Silicon Sculptor II also provides a self-test to test its own hardware extensively.

Programming an Axcelerator device using Silicon Sculptor II is similar to programming any other antifuse device. The procedure is as follows:

1. Load the *.AFM file.
2. Select the device to be programmed.
3. Begin programming.

When the design is ready to go to production, Microsemi offers device volume-programming services either through distribution partners or via our In-House Programming Center.

In addition, BP Microsystems offers multi-site programmers that provide qualified support for Axcelerator devices.

For more details on programming the Axcelerator devices, please refer to the *Silicon Sculptor II User's Guide*.

FG256	
AX250 Function	Pin Number
VCCA	L9
VCCA	N3
VCCA	P14
VCCPLA	C7
VCCPLB	D6
VCCPLC	A10
VCCPLD	D10
VCCPLE	P10
VCCPLF	N11
VCCPLG	T7
VCCPLH	N7
VCCDA	A11
VCCDA	A2
VCCDA	C13
VCCDA	D9
VCCDA	H1
VCCDA	J15
VCCDA	N14
VCCDA	N8
VCCDA	P4
VCCDA	R11
VCCDA	R5
VCCIB0	E6
VCCIB0	E7
VCCIB0	E8
VCCIB1	E10
VCCIB1	E11
VCCIB1	E9
VCCIB2	F12
VCCIB2	G12
VCCIB2	H12
VCCIB3	J12
VCCIB3	K12
VCCIB3	L12
VCCIB4	M10

FG256	
AX250 Function	Pin Number
VCCIB4	M11
VCCIB4	M9
VCCIB5	M6
VCCIB5	M7
VCCIB5	M8
VCCIB6	J5
VCCIB6	K5
VCCIB6	L5
VCCIB7	F5
VCCIB7	G5
VCCIB7	H5
VCOMPLA	A7
VCOMPLB	D7
VCOMPLC	B9
VCOMPLD	D11
VCOMPLE	T10
VCOMPLF	N10
VCOMPLG	R8
VCOMPLH	N6
VPUMP	A14

FG324	
AX125 Function	Pin Number
IO50NB4F4/CLKFN	U9
IO50PB4F4/CLKFP	U10
Bank 5	
IO51NB5F5/CLKGN	R8
IO51PB5F5/CLKGP	R9
IO52NB5F5/CLKHN	T7
IO52PB5F5/CLKHP	T8
IO53NB5F5	U6
IO53PB5F5	U7
IO54NB5F5	V8
IO54PB5F5	V9
IO55NB5F5	V6
IO55PB5F5	V7
IO56NB5F5	U4
IO56PB5F5	U5
IO57NB5F5	T4
IO57PB5F5	T5
IO58NB5F5	V4
IO58PB5F5	V5
IO59NB5F5	V2
IO59PB5F5	V3
Bank 6	
IO60NB6F6	P5
IO60PB6F6	P6
IO61NB6F6	T2
IO61PB6F6	U3
IO62NB6F6	T1
IO62PB6F6	U1
IO63NB6F6	P1
IO63PB6F6	R1
IO64NB6F6	R3
IO64PB6F6	P3
IO65NB6F6	P2
IO65PB6F6	R2
IO66NB6F6	M3

FG324	
AX125 Function	Pin Number
IO66PB6F6	N3
IO67NB6F6	M2
IO67PB6F6	N2
IO68NB6F6	M1
IO68PB6F6	N1
IO69NB6F6	K4
IO69PB6F6	L4
IO70NB6F6	K1
IO70PB6F6	L1
IO71NB6F6	K3
IO71PB6F6	L3
Bank 7	
IO72NB7F7	H4
IO72PB7F7	J4
IO73NB7F7	K2
IO73PB7F7	L2
IO74NB7F7	H2
IO74PB7F7	H1
IO75NB7F7	H3
IO75PB7F7	J3
IO76NB7F7	F2
IO76PB7F7	G2
IO77NB7F7	F1
IO77PB7F7	G1
IO78NB7F7	D2
IO78PB7F7	E2
IO79NB7F7	F3
IO79PB7F7	G3
IO80NB7F7	E3
IO80PB7F7	E4
IO81NB7F7	D1
IO81PB7F7	E1
IO82NB7F7	D3
IO82PB7F7	C2
IO83NB7F7	B1

FG324	
AX125 Function	Pin Number
IO83PB7F7	C1
Dedicated I/O	
VCCDA	F5
GND	A1
GND	A18
GND	B17
GND	B2
GND	C16
GND	C3
GND	E16
GND	F13
GND	F6
GND	G12
GND	G7
GND	H10
GND	H11
GND	H8
GND	H9
GND	J10
GND	J11
GND	J8
GND	J9
GND	K10
GND	K11
GND	K8
GND	K9
GND	L10
GND	L11
GND	L8
GND	L9
GND	M12
GND	M7
GND	N13
GND	N6
GND	R14

FG484		FG484		FG484	
AX250 Function	Pin Number	AX250 Function	Pin Number	AX250 Function	Pin Number
IO52NB3F3	P18	IO69PB4F4	AA17	IO87NB5F5	Y4
IO52PB3F3	P19	IO70NB4F4	AB14	IO87PB5F5	Y5
IO53NB3F3	R20	IO70PB4F4	AB15	IO88NB5F5	V6
IO53PB3F3	P20	IO71NB4F4	Y14	IO88PB5F5	V7
IO54NB3F3	T21	IO71PB4F4	W14	IO89NB5F5	T7
IO54PB3F3	R21	IO72NB4F4	AA14	IO89PB5F5	T8
IO55NB3F3	R17	IO72PB4F4	AA15	Bank 6	
IO55PB3F3	P17	IO73NB4F4	AA13	IO90NB6F6	V4
IO56NB3F3	U20	IO73PB4F4	AB13	IO90PB6F6	W5
IO56PB3F3	T20	IO74NB4F4/CLKEN	V12	IO91NB6F6	P7
IO57NB3F3	T18	IO74PB4F4/CLKEP	V13	IO91PB6F6	R7
IO57PB3F3	R18	IO75NB4F4/CLKFN	W11	IO92NB6F6	U5
IO58NB3F3	U19	IO75PB4F4/CLKFP	W12	IO92PB6F6	T5
IO58PB3F3	T19	Bank 5		IO93NB6F6	P6
IO59NB3F3	R16	IO76NB5F5/CLKGN	U10	IO93PB6F6	R6
IO59PB3F3	P16	IO76PB5F5/CLKGP	U11	IO94NB6F6	T4
IO60NB3F3	W20	IO77NB5F5/CLKHN	V9	IO94PB6F6	U4
IO60PB3F3	V20	IO77PB5F5/CLKHP	V10	IO95NB6F6	P5
IO61NB3F3	U18	IO78NB5F5	AA9	IO95PB6F6	R5
IO61PB3F3	V19	IO78PB5F5	AA10	IO96NB6F6	T3
Bank 4		IO79NB5F5	AB9	IO96PB6F6	U3
IO62NB4F4	T15	IO79PB5F5	AB10	IO97NB6F6	P3
IO62PB4F4	T16	IO80NB5F5	AA7	IO97PB6F6	R3
IO63NB4F4	W17	IO80PB5F5	AA8	IO98NB6F6	R2
IO63PB4F4	V17	IO81NB5F5	W8	IO98PB6F6	T2
IO64NB4F4	V15	IO81PB5F5	W9	IO99NB6F6	P4
IO64PB4F4	V16	IO82NB5F5	AB5	IO99PB6F6	R4
IO65NB4F4	Y19	IO82PB5F5	AB6	IO100NB6F6	P1
IO65PB4F4	W18	IO83NB5F5	AA5	IO100PB6F6	R1
IO66NB4F4	AB18	IO83PB5F5	AA6	IO101NB6F6	M7
IO66PB4F4	AB19	IO84NB5F5	U8	IO101PB6F6	N7
IO67NB4F4	W15	IO84PB5F5	U9	IO102NB6F6	N2
IO67PB4F4	W16	IO85NB5F5	Y6	IO102PB6F6	P2
IO68NB4F4	U14	IO85PB5F5	Y7	IO103NB6F6	M6
IO68PB4F4	U15	IO86NB5F5	W6	IO103PB6F6	N6
IO69NB4F4	AA16	IO86PB5F5	W7	IO104NB6F6	M4

FG484	
AX1000 Function	Pin Number
IO167PB5F15	AA12
IO169NB5F15	AA9
IO169PB5F15	AA10
IO170NB5F15	AB9
IO170PB5F15	AB10
IO171NB5F16	W8
IO171PB5F16	W9
IO172NB5F16	Y8
IO172PB5F16	Y9
IO173NB5F16	U8
IO173PB5F16	U9
IO174NB5F16	AA7
IO174PB5F16	AA8
IO175NB5F16	AB5
IO175PB5F16	AB6
IO176NB5F16	AA5
IO176PB5F16	AA6
IO177NB5F16	AA4
IO177PB5F16	AB4
IO178NB5F16	Y6
IO178PB5F16	Y7
IO179NB5F16	T7
IO179PB5F16	T8
IO180NB5F16	W6
IO180PB5F16	W7
IO181NB5F17	Y4
IO181PB5F17	Y5
IO184NB5F17	AB7
IO187NB5F17	V3
IO187PB5F17	W3
IO188NB5F17	V4
IO188PB5F17	W5
IO192NB5F17	V6
IO192PB5F17	V7
Bank 6	

FG484	
AX1000 Function	Pin Number
IO194NB6F18	V2
IO194PB6F18	W2
IO195NB6F18	U5
IO195PB6F18	T5
IO200NB6F18	T4
IO200PB6F18	U4
IO201NB6F18	P6
IO201PB6F18	R6
IO203NB6F19	U2
IO204NB6F19	T3
IO204PB6F19	U3
IO205NB6F19	P5
IO205PB6F19	R5
IO208NB6F19	V1
IO208PB6F19	W1
IO209NB6F19	P7
IO209PB6F19	R7
IO212NB6F19	P4
IO212PB6F19	R4
IO214NB6F20	P3
IO214PB6F20	R3
IO215NB6F20	M6
IO215PB6F20	N6
IO216NB6F20	R2
IO216PB6F20	T2
IO217NB6F20	T1
IO217PB6F20	U1
IO219NB6F20	M5
IO219PB6F20	N5
IO220NB6F20	P1
IO220PB6F20	R1
IO221NB6F20	N2
IO221PB6F20	P2
IO222NB6F20	M3
IO222PB6F20	N3

FG484	
AX1000 Function	Pin Number
IO223NB6F20	M7
IO223PB6F20	N7
IO224NB6F20	M4
IO224PB6F20	N4
Bank 7	
IO225NB7F21	M2
IO225PB7F21	N1
IO226NB7F21	K2
IO226PB7F21	K1
IO228NB7F21	L3
IO228PB7F21	L2
IO229NB7F21	K5
IO229PB7F21	L5
IO230NB7F21	H1
IO230PB7F21	J1
IO231NB7F21	H2
IO231PB7F21	J2
IO232NB7F21	K4
IO232PB7F21	K3
IO233NB7F21	K6
IO233PB7F21	L6
IO234NB7F21	F1
IO234PB7F21	G1
IO235NB7F21	F2
IO235PB7F21	G2
IO236NB7F22	H3
IO236PB7F22	J3
IO237NB7F22	K7
IO237PB7F22	L7
IO241NB7F22	H6
IO241PB7F22	J6
IO242NB7F22	H4
IO242PB7F22	J4
IO243NB7F22	H5
IO243PB7F22	J5

FG676	
AX1000 Function	Pin Number
VCCIB4	W18
VCCIB4	Y17
VCCIB4	Y18
VCCIB4	Y19
VCCIB5	W10
VCCIB5	W11
VCCIB5	W12
VCCIB5	W13
VCCIB5	W9
VCCIB5	Y10
VCCIB5	Y8
VCCIB5	Y9
VCCIB6	P8
VCCIB6	R8
VCCIB6	T8
VCCIB6	U7
VCCIB6	U8
VCCIB6	V7
VCCIB6	V8
VCCIB6	W7
VCCIB7	H7
VCCIB7	J7
VCCIB7	J8
VCCIB7	K7
VCCIB7	K8
VCCIB7	L8
VCCIB7	M8
VCCIB7	N8
VCOMPLA	D12
VCOMPLB	G13
VCOMPLC	D15
VCOMPLD	F14
VCOMPLE	AD15
VCOMPLF	AB14
VCOMPLG	AD12

FG676	
AX1000 Function	Pin Number
VCOMPLH	Y13
VPUMP	E22

FG896		FG896		FG896	
AX1000 Function	Pin Number	AX1000 Function	Pin Number	AX1000 Function	Pin Number
Bank 0		IO17NB0F1	B11	IO34NB1F3	A17
IO00NB0F0	D6	IO17PB0F1	B10	IO34PB1F3	B17
IO00PB0F0	E6	IO18NB0F1	D11	IO35NB1F3	D18
IO01NB0F0	A5	IO18PB0F1	E11	IO35PB1F3	C18
IO01PB0F0	B5	IO19NB0F1	C12	IO36NB1F3	H17
IO02NB0F0	G9	IO19PB0F1	C11	IO36PB1F3	J17
IO02PB0F0	G8	IO20NB0F1	F12	IO37NB1F3	B19
IO03NB0F0	F8	IO20PB0F1	G12	IO37PB1F3	A19
IO03PB0F0	F7	IO21NB0F1	D12	IO38NB1F3	H18
IO04NB0F0	D7	IO21PB0F1	E12	IO38PB1F3	J18
IO04PB0F0	E7	IO22NB0F2	H13	IO39NB1F3	B20
IO05NB0F0	C7	IO22PB0F2	J13	IO39PB1F3	A20
IO05PB0F0	C6	IO23NB0F2	A12	IO40NB1F3	C20
IO06NB0F0	H9	IO23PB0F2	A11	IO40PB1F3	C19
IO06PB0F0	H8	IO24NB0F2	F13	IO41NB1F4	E20
IO07NB0F0	D8	IO24PB0F2	G13	IO41PB1F4	E19
IO07PB0F0	E8	IO25NB0F2	B13	IO42NB1F4	F18
IO08NB0F0	E9	IO25PB0F2	B12	IO42PB1F4	G18
IO08PB0F0	F9	IO26NB0F2	E14	IO43NB1F4	A22
IO09NB0F0	A7	IO26PB0F2	E13	IO43PB1F4	A21
IO09PB0F0	B7	IO27NB0F2	B14	IO44NB1F4	F20
IO10NB0F0	H10	IO27PB0F2	A14	IO44PB1F4	F19
IO10PB0F0	G10	IO28NB0F2	H14	IO45NB1F4	D21
IO11NB0F0	C9	IO28PB0F2	J14	IO45PB1F4	D20
IO11PB0F0	C8	IO29NB0F2	B15	IO46NB1F4	D22
IO12NB0F1	E10	IO29PB0F2	A15	IO46PB1F4	C22
IO12PB0F1	F10	IO30NB0F2/HCLKAN	C14	IO47NB1F4	A25
IO13NB0F1	D10	IO30PB0F2/HCLKAP	D14	IO47PB1F4	A24
IO13PB0F1	D9	IO31NB0F2/HCLKBN	E15	IO48NB1F4	H19
IO14NB0F1	F11	IO31PB0F2/HCLKBP	D15	IO48PB1F4	G19
IO14PB0F1	G11	Bank 1		IO49NB1F4	C24
IO15NB0F1	A10	IO32NB1F3/HCLKCN	E17	IO49PB1F4	C23
IO15PB0F1	A9	IO32PB1F3/HCLKCP	E16	IO50NB1F4	G20
IO16NB0F1	H12	IO33NB1F3/HCLKDN	C17	IO50PB1F4	H20
IO16PB0F1	H11	IO33PB1F3/HCLKDP	D17	IO51NB1F4	F21

FG896	
AX1000 Function	Pin Number
VCCIB2	L22
VCCIB2	M21
VCCIB2	M22
VCCIB2	N21
VCCIB2	P21
VCCIB2	R21
VCCIB3	AA22
VCCIB3	AH29
VCCIB3	AH30
VCCIB3	T21
VCCIB3	U21
VCCIB3	V21
VCCIB3	W21
VCCIB3	W22
VCCIB3	Y21
VCCIB3	Y22
VCCIB4	AA16
VCCIB4	AA17
VCCIB4	AA18
VCCIB4	AA19
VCCIB4	AA20
VCCIB4	AB19
VCCIB4	AB20
VCCIB4	AB21
VCCIB4	AJ28
VCCIB4	AK28
VCCIB5	AA11
VCCIB5	AA12
VCCIB5	AA13
VCCIB5	AA14
VCCIB5	AA15
VCCIB5	AB10
VCCIB5	AB11
VCCIB5	AB12
VCCIB5	AJ3

FG896	
AX1000 Function	Pin Number
VCCIB5	AK3
VCCIB6	AA9
VCCIB6	AH1
VCCIB6	AH2
VCCIB6	T10
VCCIB6	U10
VCCIB6	V10
VCCIB6	W10
VCCIB6	W9
VCCIB6	Y10
VCCIB6	Y9
VCCIB7	C1
VCCIB7	C2
VCCIB7	K9
VCCIB7	L10
VCCIB7	L9
VCCIB7	M10
VCCIB7	M9
VCCIB7	N10
VCCIB7	P10
VCCIB7	R10
VCOMPLA	F14
VCOMPLB	J15
VCOMPLC	F17
VCOMPLD	H16
VCOMPLE	AF17
VCOMPLF	AD16
VCOMPLG	AF14
VCOMPLH	AB15
VPUMP	G24

FG896	
AX2000 Function	Pin Number
VCCIB3	AH30
VCCIB3	T21
VCCIB3	U21
VCCIB3	V21
VCCIB3	W21
VCCIB3	W22
VCCIB3	Y21
VCCIB3	Y22
VCCIB4	AA16
VCCIB4	AA17
VCCIB4	AA18
VCCIB4	AA19
VCCIB4	AA20
VCCIB4	AB19
VCCIB4	AB20
VCCIB4	AB21
VCCIB4	AJ28
VCCIB4	AK28
VCCIB5	AA11
VCCIB5	AA12
VCCIB5	AA13
VCCIB5	AA14
VCCIB5	AA15
VCCIB5	AB10
VCCIB5	AB11
VCCIB5	AB12
VCCIB5	AJ3
VCCIB5	AK3
VCCIB6	AA9
VCCIB6	AH1
VCCIB6	AH2
VCCIB6	T10
VCCIB6	U10
VCCIB6	V10
VCCIB6	W10

FG896	
AX2000 Function	Pin Number
VCCIB6	W9
VCCIB6	Y10
VCCIB6	Y9
VCCIB7	C1
VCCIB7	C2
VCCIB7	K9
VCCIB7	L10
VCCIB7	L9
VCCIB7	M10
VCCIB7	M9
VCCIB7	N10
VCCIB7	P10
VCCIB7	R10
VCCPLA	G14
VCCPLB	H15
VCCPLC	G17
VCCPLD	J16
VCCPLE	AH17
VCCPLF	AC16
VCCPLG	AH14
VCCPLH	AD15
VCOMPLA	F14
VCOMPLB	J15
VCOMPLC	F17
VCOMPLD	H16
VCOMPLE	AF17
VCOMPLF	AD16
VCOMPLG	AF14
VCOMPLH	AB15
VPUMP	G24

CQ352		CQ352		CQ352	
AX500 Function	Pin Number	AX500 Function	Pin Number	AX500 Function	Pin Number
IO87PB4F8	171	IO119PB5F11	101	IO146NB6F13	46
IO89NB4F8	166	IO121NB5F11	98	IO146PB6F13	47
IO89PB4F8	167	IO121PB5F11	99	Bank 7	
IO94NB4F9	164	IO123NB5F11	94	IO147NB7F14	40
IO94PB4F9	165	IO123PB5F11	95	IO147PB7F14	41
IO95NB4F9	160	IO125NB5F11	92	IO148NB7F14	42
IO95PB4F9	161	IO125PB5F11	93	IO148PB7F14	43
IO97NB4F9	158	Bank 6		IO149NB7F14	36
IO97PB4F9	159	IO126PB6F12	86	IO149PB7F14	37
IO99NB4F9	154	IO127NB6F12	84	IO151NB7F14	30
IO99PB4F9	155	IO127PB6F12	85	IO151PB7F14	31
IO100NB4F9	146	IO129NB6F12	82	IO152NB7F14	34
IO100PB4F9	147	IO129PB6F12	83	IO152PB7F14	35
IO101NB4F9	152	IO131NB6F12	78	IO153NB7F14	28
IO101PB4F9	153	IO131PB6F12	79	IO153PB7F14	29
IO103NB4F9/CLKEN	142	IO133NB6F12	76	IO155NB7F14	24
IO103PB4F9/CLKEP	143	IO133PB6F12	77	IO155PB7F14	25
IO104NB4F9/CLKFN	136	IO134NB6F12	72	IO157NB7F14	22
IO104PB4F9/CLKFP	137	IO134PB6F12	73	IO157PB7F14	23
Bank 5		IO135NB6F12	70	IO159NB7F15	16
IO105NB5F10/CLKGN	128	IO135PB6F12	71	IO159PB7F15	17
IO105PB5F10/CLKGP	129	IO137NB6F13	66	IO160NB7F15	18
IO106NB5F10/CLKHN	122	IO137PB6F13	67	IO160PB7F15	19
IO106PB5F10/CLKHP	123	IO138NB6F13	64	IO161NB7F15	12
IO107NB5F10	118	IO138PB6F13	65	IO161PB7F15	13
IO107PB5F10	119	IO139NB6F13	60	IO163NB7F15	10
IO114NB5F11	112	IO139PB6F13	61	IO163PB7F15	11
IO114PB5F11	113	IO141NB6F13	54	IO165NB7F15	6
IO115NB5F11	110	IO141PB6F13	55	IO165PB7F15	7
IO115PB5F11	111	IO142NB6F13	58	IO167NB7F15	4
IO116NB5F11	106	IO142PB6F13	59	IO167PB7F15	5
IO116PB5F11	107	IO143NB6F13	52	Dedicated I/O	
IO117NB5F11	104	IO143PB6F13	53	GND	1
IO117PB5F11	105	IO145NB6F13	48	GND	9
IO119NB5F11	100	IO145PB6F13	49	GND	15

CQ352		CQ352		CQ352	
AX1000 Function	Pin Number	AX1000 Function	Pin Number	AX1000 Function	Pin Number
GND	21	GND	240	VCCA	14
GND	27	GND	246	VCCA	32
GND	33	GND	252	VCCA	56
GND	39	GND	258	VCCA	74
GND	45	GND	264	VCCA	87
GND	51	GND	265	VCCA	102
GND	57	GND	274	VCCA	114
GND	63	GND	280	VCCA	150
GND	69	GND	286	VCCA	162
GND	75	GND	292	VCCA	175
GND	81	GND	298	VCCA	191
GND	88	GND	310	VCCA	209
GND	89	GND	322	VCCA	233
GND	97	GND	330	VCCA	251
GND	103	GND	334	VCCA	263
GND	109	GND	340	VCCA	279
GND	115	GND	345	VCCA	291
GND	121	GND	352	VCCA	329
GND	133	NC	91	VCCA	339
GND	145	NC	130	VCCDA	2
GND	151	NC	131	VCCDA	44
GND	157	NC	174	VCCDA	90
GND	163	NC	268	VCCDA	116
GND	169	NC	307	VCCDA	117
GND	176	NC	308	VCCDA	132
GND	177	PRA	312	VCCDA	148
GND	186	PRB	311	VCCDA	149
GND	192	PRC	135	VCCDA	178
GND	198	PRD	134	VCCDA	221
GND	204	TCK	349	VCCDA	266
GND	210	TDI	348	VCCDA	293
GND	216	TDO	347	VCCDA	294
GND	222	TMS	350	VCCDA	309
GND	228	TRST	351	VCCDA	327
GND	234	VCCA	3	VCCDA	328

CG624	
AX2000 Function	Pin Number
GND	M11
GND	M12
GND	M13
GND	M14
GND	M15
GND	N11
GND	N12
GND	N13
GND	N14
GND	N15
GND	P11
GND	P12
GND	P13
GND	P14
GND	P15
GND	R11
GND	R12
GND	R13
GND	R14
GND	R15
GND	T21
GND	T23
GND	T3
GND	T5
GND	V1
GND	V25
GND	V5
PRA	F13
PRB	A13
PRC	AB12
PRD	AE13
TCK	F5

Note: **Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*

CG624	
AX2000 Function	Pin Number
TDI	C5
TDO	F6
TMS	D6
TRST	E6
VCCA	AB20
VCCA	F22
VCCA	F4
VCCA	J17
VCCA	J9
VCCA	K10
VCCA	K11
VCCA	K15
VCCA	K16
VCCA	L10
VCCA	L16
VCCA	R10
VCCA	R16
VCCA	T10
VCCA	T11
VCCA	T15
VCCA	T16
VCCA	U17
VCCA	U9
VCCA	Y4
VCCDA	A12
VCCDA	A14
VCCDA	AA13
VCCDA	AA15
VCCDA	AA20
VCCDA	AA7
VCCDA	AB13
VCCDA	AC11

Note: **Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*

CG624	
AX2000 Function	Pin Number
VCCDA	AD11
VCCDA	AD4
VCCDA	AE12
VCCDA	AE17
VCCDA	B15
VCCDA	C15
VCCDA	C6
VCCDA	D13
VCCDA	E13
VCCDA	E19
VCCDA	F21
VCCDA	G10
VCCDA	G5
VCCDA	N21
VCCDA	N5
VCCDA	W21
VCCIB0	A3
VCCIB0	B3
VCCIB0	C4
VCCIB0	D5
VCCIB0	J10
VCCIB0	J11
VCCIB0	K12
VCCIB1	A23
VCCIB1	B23
VCCIB1	C22
VCCIB1	D21
VCCIB1	J15
VCCIB1	J16
VCCIB1	K14
VCCIB2	C24
VCCIB2	C25

Note: **Not routed on the same package layer and to adjacent LGA pads as its differential pair complement. Recommended to be used as a single-ended I/O.*