

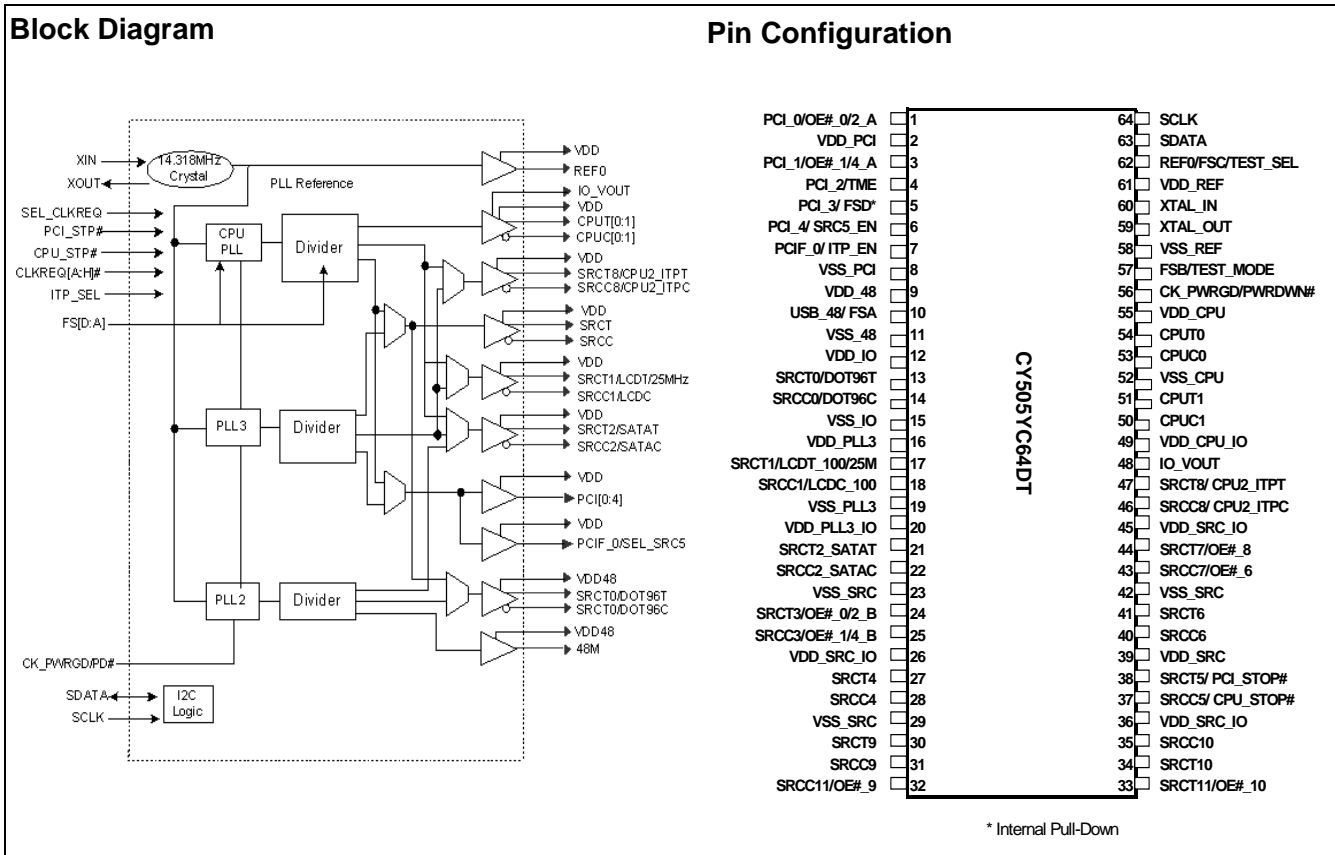
Clock Generator for Intel® Broadwater Chipset

Features

- Compliant to Intel® CK505
- Selectable CPU frequencies
- Differential CPU clock pairs
- 100 MHz Differential SRC clocks
- 100 MHz Differential LCD clock
- 96 MHz Differential Dot clock
- 48 MHz USB clocks
- 33 MHz PCI clock
- 25 MHz PATA clock
- Buffered Reference Clock 14.318 MHz
- Low-voltage frequency select input
- I²C support with readback capabilities
- Ideal Lexmark Spread Spectrum profile for maximum electromagnetic interference (EMI) reduction
- 3.3V Power supply/0.7V for Diff IOs
- 64-pin TSSOP package

Table 1. Output Configuration Table

CPU	SRC	PCI	REF	DOT96	USB_48M	LCD
x2/x3	x8/12	x6	x 1	x 1	x 1	x1



Pin Definitions

Pin No.	Name	Type	Description
1	PCI_0/OE#_0/2_A	I/O, SE	33 MHz clock/3.3V OE# Input mappable via I2C to control either SRC 0 or SRC 2. Default PCI0
2	VDD_PCI	PWR	3.3V Power supply for PCI PLL.
3	PCI_1/OE#_1/4_A	I/O, SE	33 MHz clock/3.3V OE# Input mappable via I2C to control either SRC 1 or SRC 4. Default PCI1.
4	PCI_2/TME	I/O, SE	3.3V tolerance input for overclocking enable pin 33 MHz clock. <i>Refer to DC Electrical Specifications table for Vil_FS and Vih_FS specifications.</i>
5	PCI_3/FSD	I/O, SE, PD	3.3V tolerant input for CPU frequency selection/33 MHz clock. <i>Refer to DC Electrical Specifications table for Vil_FS and Vih_FS specifications.</i>
6	PCI_4/SRC5_SEL	I/O, SE	3.3V tolerant input to enable SRC5/33 MHz clock output. (sampled on the CK_PWRGD assertion) 1 = SRC5, 0 = CPU_STOP#
7	PCIF_0/ITP_EN	I/O, SE PD	3.3V LVTTTL input to enable SRC8 or CPU2_ITP/33 MHz clock output. (sampled on the CK_PWRGD assertion) 1 = CPU2_ITP, 0 = SRC8
8	VSS_PCI	GND	Ground for outputs.
9	VDD_48	PWR	3.3V Power supply for outputs and PLL.
10	USB_48/FSA	I/O	3.3V tolerant input for CPU frequency selection/48 MHz clock output. <i>Refer to DC Electrical Specifications table for Vil_FS and Vih_FS specifications.</i>
11	VSS_48	GND	Ground for outputs.
12	VDD_IO	PWR	0.7V Power supply for outputs.
13, 14	SRCT0/DOT96T SRCC0/DOT96C	O, DIF	100 MHz Differential serial reference clocks/Fixed 96 MHz clock output. Selected via I2C default is SRC0.
15	VSS_IO	GND	Ground for PLL2.
16	VDD_PLL3	PWR	3.3V Power supply for PLL3
17, 18	SRCT1/LCDDT_100/25M SRCC1/LCDC_100	O, DIF, SE	100 MHz Differential serial reference clocks/100 MHz LCD video clock/25 MHz SATA clock. Default LCD
19	VSS_PLL3	GND	Ground for PLL3.
20	VDD_PLL3_IO	PWR	0.7V Power supply for PLL3 outputs.
21, 22	SRCT/C[2]/SATA	O, DIF	100 MHz Differential serial reference clocks.
23	VSS_SRC	GND	Ground for outputs.
24, 25	SRCT3/OE#_0/2_B SRCC3/OE#_1/4_B	I/O, Dif	100-MHz Differential serial reference clocks/3.3V OE#_0/2_B, input, mappable via I2C to control either SRC 0 or SRC 2/3.3V OE#_1/4_B input, mappable via I2C to control either SRC 1 or SRC 4. Default SRC3
26	VDD_SRC_IO	PWR	0.7V power supply for SRC outputs.
27, 28	SRCT/C[4]	O, DIF	100 MHz Differential serial reference clocks.
29	VSS_SRC	GND	Ground for outputs.
30, 31	SRCT/C[9]	O, DIF	100 MHz Differential serial reference clocks.
33, 32	SRCT11/OE#_10 SRCC11/OE#_9	I/O, Dif	100 MHz Differential serial reference clocks/3.3V OE#9 Input controlling SRC9/3.3V OE#10 Input controlling SRC10. Default SRC11.
34, 35,	SRCT/C[10]	O, DIF	100 MHz Differential serial reference clocks.
36	VDD_SRC_IO	PWR	0.7V Power supply for SRC outputs.
38, 37	SRCT5/PCI_STOP# SRCC5/CPU_STOP#	I/O, Dif	3.3V tolerant input for stopping PCI and SRC outputs/3.3V tolerant input for stopping CPU outputs/100 MHz Differential serial reference clocks. Default SRC5
39	VDD_SRC	PWR	3.3V Power supply for SRC PLL.

Pin Definitions (continued)

Pin No.	Name	Type	Description
41, 40	SRCT/C[6]	O, DIF	100 MHz Differential serial reference clocks.
42	VSS_SRC	GND	Ground for outputs.
44, 43	SRCT7/OE#_8 SRCC7/OE#_6	I/O, Dif	100 MHz Differential serial reference clocks/3.3V OE#8 Input controlling SRC8/3.3V OE#6 Input controlling SRC6. Default SRC7.
45	VDD_SRC_IO	PWR	0.7V power supply for SRC outputs.
47, 46	SRCT8/CPUT2_ITPT, SRCC8/CPUC2_ITPC	O, DIF	Selectable differential CPU or SRC clock output. ITP_EN = 0 @ CK_PWRGD assertion = SRC8 ITP_EN = 1 @ CK_PWRGD assertion = CPU2
48	IO_VOUT	O	Integrated Linear Regulator Control.
49	VDD_CPU_IO	PWR	0.7V Power supply for CPU outputs.
51, 50	CPUT/C[1]	O, DIF	Differential CPU clock outputs. Note: CPU1 is the iAMT clock and is on in that mode.
52	VSS_CPU	GND	Ground for outputs.
54, 53	CPUT/C[0]	O, DIF	Differential CPU clock outputs. Note: CPU1 is the iAMT clock and is on in that mode.
55	VDD_CPU	PWR	3.3V Power supply for CPU PLL.
56	CK_PWRGD/PWRDWN#	I	3.3V LVTTTL input. This pin is a level sensitive strobe used to latch the FS_A, FS_B, FS_C, FS_D, SRC5_SEL, and ITP_EN. After CK_PWRGD (active HIGH) assertion, this pin becomes a real-time input for asserting power down (active LOW).
57	FSB/TEST_MODE	I	3.3V tolerant input for CPU frequency selection. Selects Ref/N or Tri-state when in test mode 0 = Tri-state, 1 = Ref/N. <i>Refer to DC Electrical Specifications table for Vil_FS and Vih_FS specifications.</i>
58	VSS_REF	GND	Ground for outputs.
59	XOUT	O, SE	14.318 MHz Crystal output.
60	XIN	I	14.318 MHz Crystal input.
61	VDD_REF	PWR	3.3V Power supply for outputs and also maintains SMBUS registers during power-down.
62	REF0/FSC/TEST_SEL	I/O	3.3V tolerant input for CPU frequency selection/fixed 14.318 clock output. Selects test mode if pulled to VIHFS_C when CK_PWRGD is asserted HIGH. <i>Refer to DC Electrical Specifications table for VilFS_C, VimFS_C, VihFS_C specifications.</i>
63	SMB_DATA	I/O	SMBus compatible SDATA.
64	SMB_CLK	I	SMBus compatible SCLOCK.

Frequency Select Pin (FSA, FSB, FSC, and FSD)

To achieve host clock frequency selection, apply the appropriate logic levels to FS_A, FS_B, FS_C, and FS_D inputs before VTT_PWRGD# assertion (as seen by the clock synthesizer). When VTT_PWRGD# is sampled LOW by the clock chip (indicating processor VTT voltage is stable), the clock

chip samples the FS_A, FS_B, FS_C, and FS_D input values. For all logic levels of FS_A, FS_B, FS_C, FS_D, and FS_E, VTT_PWRGD# employs a one-shot functionality, in that once a valid LOW on VTT_PWRGD# has been sampled, all further VTT_PWRGD#, FS_A, FS_B, FS_C, and FS_D transitions will be ignored, except in test mode.

Frequency Select Pin (FSA, FSB, FSC, and FSD)

Input Conditions				Output Frequency						
FSD FSEL_3	FSC FSEL_2	FSB FSEL_1	FSA FSEL_0	CPU (MHz)	SRC (MHz)	SATA (MHz)	DOT96 (MHz)	USB (MHz)	PCI (MHz)	REF (MHz)
0	1	0	1	100	100	100	96	48	33.3	14.318
0	0	0	1	133	100	100	96	48	33.3	14.318
0	0	1	1	166	100	100	96	48	33.3	14.318
0	0	1	0	200	100	100	96	48	33.3	14.318
0	0	0	0	266	100	100	96	48	33.3	14.318
0	1	0	0	333	100	100	96	48	33.3	14.318
0	1	1	0	400	100	100	96	48	33.3	14.318
0	1	1	1	200	100	100	96	48	33.4	14.318
1	1	0	1	100.9	100	100	96	48	33.3	14.318
1	0	0	1	133.9	100	100	96	48	33.3	14.318
1	0	1	1	166.9	100	100	96	48	33.3	14.318
1	0	1	0	200.9	100	100	96	48	33.3	14.318
1	0	0	0	266.9	100	100	96	48	33.3	14.318
1	1	0	0	333.9	100	100	96	48	33.3	14.318
1	1	1	0	400.9	100	100	96	48	33.3	14.318
1	1	1	1	200.9	100	100	96	48	33.3	14.318

Serial Data Interface

To enhance the flexibility and function of the clock synthesizer, a two-signal serial interface is provided. Through the Serial Data Interface, various device functions, such as individual clock output buffers, can be individually enabled or disabled. The registers associated with the Serial Data Interface initialize to their default setting upon power-up, and therefore use of this interface is optional. Clock device register changes are normally made upon system initialization, if any are required. The interface cannot be used during system operation for power management functions.

Data Protocol

The clock driver serial protocol accepts byte write, byte read, block write, and block read operations from the controller. For block write/read operation, the bytes must be accessed in sequential order from lowest to highest byte (most significant bit first) with the ability to stop after any complete byte has been transferred. For byte write and byte read operations, the system controller can access individually indexed bytes. The offset of the indexed byte is encoded in the command code, as described in *Table 2*.

The block write and block read protocol is outlined in *Table 3* while *Table 4* outlines the corresponding byte write and byte read protocol. The slave receiver address is 11010010 (D2h)

Table 2. Command Code Definition

Bit	Description
7	0 = Block read or block write operation, 1 = Byte read or byte write operation
(6:0)	Byte offset for byte read or byte write operation. For block read or block write operations, these bits should be '0000000'

Table 3. Block Read and Block Write Protocol

Block Write Protocol		Block Read Protocol	
Bit	Description	Bit	Description
1	Start	1	Start
8:2	Slave address–7 bits	8:2	Slave address–7 bits
9	Write	9	Write
10	Acknowledge from slave	10	Acknowledge from slave
18:11	Command Code–8 bits	18:11	Command Code–8 bits
19	Acknowledge from slave	19	Acknowledge from slave
27:20	Byte Count–8 bits (Skip this step if I ² C_EN bit set)	20	Repeat start
28	Acknowledge from slave	27:21	Slave address–7 bits
36:29	Data byte 1–8 bits	28	Read = 1
37	Acknowledge from slave	29	Acknowledge from slave
45:38	Data byte 2–8 bits	37:30	Byte Count from slave–8 bits
46	Acknowledge from slave	38	Acknowledge
....	Data Byte/Slave Acknowledges	46:39	Data byte 1 from slave–8 bits
....	Data Byte N–8 bits	47	Acknowledge
....	Acknowledge from slave	55:48	Data byte 2 from slave–8 bits
....	Stop	56	Acknowledge
		Data bytes from slave/Acknowledge
		Data Byte N from slave–8 bits
		NOT Acknowledge
		Stop

Table 4. Byte Read and Byte Write Protocol

Byte Write Protocol		Byte Read Protocol	
Bit	Description	Bit	Description
1	Start	1	Start
8:2	Slave address–7 bits	8:2	Slave address–7 bits
9	Write	9	Write
10	Acknowledge from slave	10	Acknowledge from slave
18:11	Command Code–8 bits	18:11	Command Code–8 bits
19	Acknowledge from slave	19	Acknowledge from slave
27:20	Data byte–8 bits	20	Repeated start
28	Acknowledge from slave	27:21	Slave address–7 bits
29	Stop	28	Read
		29	Acknowledge from slave
		37:30	Data from slave–8 bits
		38	NOT Acknowledge
		39	Stop

Control Registers

Byte 0: Control Register 0

Bit	@Pup	Name	Description
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Byte 0: Control Register 0

7	HW pin	FS_C	CPU Frequency Select Bit, set by HW
6	HW pin	FS_B	CPU Frequency Select Bit, set by HW
5	HW pin	FS_A	CPU Frequency Select Bit, set by HW
4	0	iAMT_EN	Set via SMBus or by combination of PWRDWN, CPU_STP, and PCI_STP 0 = Legacy Mode, 1 = iAMT Enabled
3	0	RESERVED	RESERVED
2	0	SRC_SEL	Select source for SRC clock, 0 = SRC_MAIN = PLL1, PLL3_CFB Table applies 1 = SRC_MAIN = PLL3, PLL3_CFB Table does not apply
1	0	SATA_SEL	Select source of SATA clock 0 = SATA SRC_MAIN, 1= SATA PLL2
0	1	PD_Restore	Save Config. In powerdown 0 = Config. Cleared, 1 = Config. Saved

Byte 1: Control Register 1

Bit	@Pup	Name	Description	
7	0	SRC0_SEL	Select for SRC0 or DOT96, 0 = SRC0, 1 = DOT96	
6	0	PLL1_SS_DC	Select for down or center SS, 0 = Down spread, 1 = Center spread	
5	0	PLL3_SS_DC	Select for down or center SS, 0 = Down spread, 1 = Center spread	
4	0	PLL3_CFB3	Bit 4:1 only apply when SRC_SEL=0	
3	0	PLL3_CFB2		
2	0	PLL3_CFB1		
1	1	PLL3_CFB0		0000 = PLL3 Disable Default PLL3 OFF, SRC1 = SRC_MAIN 0001 = 100 MHz 0.5% SSC Stby PLL3 ON, SRC1 = SRC_MAIN 0010 = 100 MHz 0.5% SSC Only SRC1 sourced from PLL3 0011 = 100 MHz 1.0% SSC Only SRC1 sourced from PLL3 0100 = 100 MHz 1.5% SSC Only SRC1 sourced from PLL3 0101 = 100 MHz 2.0% SSC Only SRC1 sourced from PLL3 0110 = RESERVED 0111 = RESERVED 1000 = RESERVED 1001 = RESERVED 1010 = RESERVED 1011 = RESERVED 1100 = 25 MHz, 3.3V Enabled through Byte 8 Bit 1 1101 = RESERVED 1110 = RESERVED 1111 = RESERVED
0	1	PCI_SEL		Select PCI Clock source from PLL1 or SRC_MAIN 0 = PLL1, 1 = SRC_MAIN

Byte 2: Control Register 2

Bit	@Pup	Name	Description
7	1	REF	Output enable for REF 0 = Output Disabled, 1 = Output Enabled
6	1	USB	Output enable for USB 0 = Output Disabled, 1 = Output Enabled
5	1	PCIF_0	Output enable for PCIF_0 0 = Output Disabled, 1 = Output Enabled
4	1	PCI4	Output enable for PCI4, 0 = Output Disabled, 1 = Output Enabled
3	1	PCI3	Output enable for PCI3, 0 = Output Disabled, 1 = Output Enabled
2	1	PCI2	Output enable for PCI2, 0 = Output Disabled, 1 = Output Enabled

Byte 2: Control Register 2 (continued)

Bit	@Pup	Name	Description
1	1	PCI1	Output enable for PCI1, 0 = Output Disabled, 1 = Output Enabled
0	1	PCI0	Output enable for PCI0, 0 = Output Disabled, 1 = Output Enabled

Byte 3: Control Register 3

Bit	@Pup	Name	Description
7	1	SRC[T/C]11	Output enable for SRC11, 0 = Output Disabled, 1 = Output Enabled
6	1	SRC[T/C]10	Output enable for SRC10, 0 = Output Disabled, 1 = Output Enabled
5	1	SRC[T/C]9	Output enable for SRC9, 0 = Output Disabled, 1 = Output Enabled
4	1	SRC[T/C]8/ITP_OE	Output enable for SRC8 or ITP, 0 = Output Disabled, 1 = Output Enabled
3	1	SRC[T/C]7	Output enable for SRC7, 0 = Output Disabled, 1 = Output Enabled
2	1	SRC[T/C]6	Output enable for SRC6, 0 = Output Disabled, 1 = Output Enabled
1	1	SRC[T/C]5	Output enable for SRC5, 0 = Output Disabled, 1 = Output Enabled
0	1	SRC[T/C]4	Output enable for SRC4, 0 = Output Disabled, 1 = Output Enabled

Byte 4: Control Register 4

Bit	@Pup	Name	Description
7	1	SRC[T/C]3	Output enable for SRC3, 0 = Output Disabled, 1 = Output Enabled
6	1	SRC[T/C]2/SATA	Output enable for SATA/SRC2, 0 = Output Disabled, 1 = Output Enabled
5	1	SRC[T/C]1	Output enable for SRC, 0 = Output Disabled, 1 = Output Enabled
4	1	SRC[T/C]0/DOT96[T/C]	Output enable for SRC0/DOT96 0 = Output Disabled, 1 = Output Enabled
3	1	CPU[T/C]1	Output enable for CPU1, 0 = Output Disabled, 1 = Output Enabled
2	1	CPU[T/C]0	Output enable for CPU0, 0 = Output Disabled, 1 = Output Enabled
1	1	PLL1_SS_EN	Enable PLL1's spread modulation, 0 = Spread Disabled 1 = Spread Enabled
0	1	PLL3_SS_EN	Enable PLL3's spread modulation 0 = Spread Disabled, 1 = Spread Enabled

Byte 5: Control Register 5

Bit	@Pup	Name	Description
7	0	OE#_0/2_EN_A	Enable OE#_0/2 (clk req) 0 = Disabled OE#_0/2, 1 = Enabled OE#_0/2,
6	0	OE#_0/2_SEL_A	Set OE#_0/2 → SRC0 or SRC2 0 = OE#_0/2→SRC0, 1 = OE#_0/2→SRC2
5	0	OE#_1/4_EN_A	Enable OE#_1/4 (clk req) 0 = Disabled OE#_1/4, 1 = Enabled OE#_1/4,
4	0	OE#_1/4_SEL_A	Set OE#_1/4 → SRC1 or SRC4 0 = OE#_1/4→SRC1, 1 = OE#_1/4→SRC4
3	0	OE#_0/2_EN_B	Enable OE#_0/2 (clk req) 0 = Disabled OE#_0/2 1 = Enabled OE#_0/2
2	0	OE#_0/2_SEL_B	Set OE#_0/2 → SRC0 or SRC2 0 = OE#_0/2→SRC0, 1 = OE#_0/2→SRC2
1	0	OE#_1/4_EN_B	Enable OE#_1/4 (clk req) 0 = Disabled OE#_1/4, 1 = Enabled OE#_1/4,
0	0	OE#_1/4_SEL_B	Set OE#_1/4 → SRC1 or SRC4 0 = OE#_1/4→SRC1, 1 = OE#_1/4→SRC4

Byte 6: Control Register 6

Bit	@Pup	Name	Description
7	0	OE#_6_EN	Enable OE#_6 (clk req) → SRC6
6	0	OE#_8_EN	Enable OE#_8 (clk req) → SRC8
5	0	OE#_9_EN	Enable OE#_9 (clk req) → SRC9
4	0	OE#_10_EN	Enable OE#_10 (clk req) → SRC10
3	0	RESERVED	RESERVED
2	0	RESERVED	RESERVED
1	0	LCD_100_STP_CTRL	If set, LCD_100 stop with PCI_STOP# 0 = free running, 1 = PCI_STOP# stoppable
0	0	SRC_STP_CTRL	If set, SRCs stop with PCI_STOP# 0 = free running, 1 = PCI_STOP# stoppable

Byte 7: Vendor ID

Bit	@Pup	Name	Description
7	0	Rev Code Bit 3	Revision Code Bit 3
6	0	Rev Code Bit 2	Revision Code Bit 2
5	1	Rev Code Bit 1	Revision Code Bit 1
4	1	Rev Code Bit 0	Revision Code Bit 0
3	1	Vendor ID bit 3	Vendor ID Bit 3
2	0	Vendor ID bit 2	Vendor ID Bit 2
1	0	Vendor ID bit 1	Vendor ID Bit 1
0	0	Vendor ID bit 0	Vendor ID Bit 0

Byte 8: Control Register 8

Bit	@Pup	Name	Description
7	0	Device_ID3	0000 = CK505 Yellow Cover Device, 56-pin TSSOP
7	0	Device_ID2	0001 = CK505 Yellow Cover Device, 64-pin TSSOP
5	0	Device_ID1	0010 = CK505 Yellow Cover Device, 48-pin QFN (reserved) 0011 = CK505 Yellow Cover Device, 56-pin QFN (reserved)
4	1	Device_ID0	0100 = CK505 Yellow Cover Device, 64-pin QFN (reserved) 0101 = CK505 Yellow Cover Device, 72-pin QFN (reserved) 0110 = CK505 Yellow Cover Device, 48-pin SSOP (reserved) 0111 = CK505 Yellow Cover Device, 48-pin SSOP (reserved) 1000 = Reserved 1001 = Reserved 1010 = Reserved 1011 = Reserved 1100 = Reserved 1101 = Reserved 1110 = Reserved 1111 = Reserved
3	0	RESERVED	RESERVED
2	0	RESERVED	RESERVED
1	0	25 MHz	Output enable for 25 MHz, 0 = Output Disabled, 1 = Output Enabled
0	0	RESERVED	RESERVED

Byte 9 Control Register 9

Bit	@Pup	Name	Description
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Byte 9 Control Register 9

7	0	PCIF_0_with PCI_STOP#	Allows control of PCIF_0 with assertion of PCI_STOP# 0 = Free running PCIF, 1 = Stopped with PCI_STOP#
6	HW_Pin	TME_STRAP	Trusted mode enable strap status, 0 = normal, 1 = no overclocking
5	1	REF drive strength	REF drive strength, 0 = Low 1x, 1 = High 2x
4	0	TEST_MODE_SEL	Mode select either REF/N or tri-state 0 = All output tri-state, 1 = All output REF/N
3	0	TEST_MODE_ENTRY	Allow entry into test mode 0=Normal operation, 1=Enter test mode
2	1	IO_VOUT2	IO_VOUT[2,1,0] 000 = 0.3V 001 = 0.4V 010 = 0.5V 011 = 0.6V 100 = 0.7V 101 = 0.8V, <i>Default</i> 110 = 0.9V 111 = 1.0V
1	0	IO_VOUT1	
0	1	IO_VOUT0	

Byte 10 Control Register 10

Bit	@Pup	Name	Description
7	0	RESERVED	RESERVED
6	0	RESERVED	RESERVED
5	0	RESERVED	RESERVED
4	0	RESERVED	RESERVED
3	0	RESERVED	RESERVED
2	0	RESERVED	RESERVED
1	0	RESERVED	RESERVED
0	0	RESERVED	RESERVED

Byte 11 Control Register 11

Bit	@Pup	Name	Description
7	0	RESERVED	RESERVED
6	0	RESERVED	RESERVED
5	0	RESERVED	RESERVED
4	0	RESERVED	RESERVED
3	0	RESERVED	RESERVED
2	0	RESERVED	RESERVED
1	0	RESERVED	RESERVED
0	0	RESERVED	RESERVED

Byte 12 Byte Count

Bit	@Pup	Name	Description
7	0	RESERVED	RESERVED
6	0	RESERVED	RESERVED
5	0	BC5	Byte count
4	0	BC4	Byte count
3	1	BC3	Byte count
2	1	BC2	Byte count



Byte 12 Byte Count (continued)

Bit	@Pup	Name	Description
1	0	BC1	Byte count
0	1	BC0	Byte count

Byte 13 Control Register 13

Bit	@Pup	Name	Description
7	1	USB drive strength	USB drive strength, 0 = Low, 1= High
6	1	PCI/PCIF drive strength	PCI drive strength, 0 = Low, 1 = High
5	0	PLL1_Spread	Select percentage of spread for PLL1, 0 = 0.5%, 1=1%
4	1	SATA_SS_EN	Enable SATA spread modulation, 0 = Spread Disabled 1 = Spread Enabled
3	1	CPU[T/C]2	Allow control of CPU2 with assertion of CPU_STOP# 0 = Free running, 1 = Stopped with CPU_STOP#
2	1	CPU[T/C]1	Allow control of CPU1 with assertion of CPU_STOP# 0 = Free running, 1 = Stopped with CPU_STOP#
1	1	CPU[T/C]0	Allow control of CPU0 with assertion of CPU_STOP# 0 = Free running, 1 = Stopped with CPU_STOP#
0	1	SW_PCI	SW PCI_STP# Function 0 = SW PCI_STP assert, 1 = SW PCI_STP deassert When this bit is set to 0, all STOPPABLE PCI, PCIF and SRC outputs will be stopped in a synchronous manner with no short pulses. When this bit is set to 1, all STOPPED PCI, PCIF and SRC outputs will resume in a synchronous manner with no short pulses.

Byte 14 Control Register 14

Bit	@Pup	Name	Description
7	0	CPU_DAF_N7	If Prog_CPU_EN is set, the values programmed in CPU_DAF_N[8:0] and CPU_DAF_M[6:0] will be used to determine the CPU output frequency. The setting of the FS_Override bit determines the frequency ratio for CPU and other output clocks. When it is cleared, the same frequency ratio stated in the Latched FS[D:A] register will be used. When it is set, the frequency ratio stated in the FSEL[3:0] register will be used
6	0	CPU_DAF_N6	
5	0	CPU_DAF_N5	
4	0	CPU_DAF_N4	
3	0	CPU_DAF_N3	
2	0	CPU_DAF_N2	
1	0	CPU_DAF_N1	
0	0	CPU_DAF_N0	

Byte 15 Control Register 15

Bit	@Pup	Name	Description
7	0	CPU_DAF_N8	See Byte 14 for description
6	0	CPU_DAF_M6	If Prog_CPU_EN is set, the values programmed are in CPU_FSEL_N[8:0] and CPU_FSEL_M[6:0] will be used to determine the CPU output frequency. The setting of the FS_Override bit determines the frequency ratio for CPU and other output clocks. When it is cleared, the same frequency ratio stated in the Latched FS[D:A] register will be used. When it is set, the frequency ratio stated in the FSEL[3:0] register will be used
5	0	CPU_DAF_M5	
4	0	CPU_DAF_M4	
3	0	CPU_DAF_M3	
2	0	CPU_DAF_M2	
1	0	CPU_DAF_M1	
0	0	CPU_DAF_M0	

Byte 16 Control Register 16

Bit	@Pup	Name	Description
7	0	PCI-E_N7	PCI-E Dial-A-Frequency™ Bit N7
6	0	PCI-E_N6	PCI-E Dial-A-Frequency Bit N6
5	0	PCI-E_N5	PCI-E Dial-A-Frequency Bit N5
4	0	PCI-E_N4	PCI-E Dial-A-Frequency Bit N4
3	0	PCI-E_N3	PCI-E Dial-A-Frequency Bit N3
2	0	PCI-E_N2	PCI-E Dial-A-Frequency Bit N2
1	0	PCI-E_N1	PCI-E Dial-A-Frequency Bit N1
0	0	PCI-E_N0	PCI-E Dial-A-Frequency Bit N0

Byte 17 Control Register 17

Bit	@Pup	Name	Description
7	0	SMSW_EN	Enable Smooth Switching, 0 = Disabled, 1= Enabled
6	0	SMSW_SEL	Smooth switch select, 0 = CPU_PLL, 1 = SRC_PLL
5	0	RESERVED	RESERVED
4	0	Prog_PCI-E_EN	Programmable PCI-E frequency enable, 0 = Disabled, 1= Enabled
3	0	Prog_CPU_EN	Programmable CPU frequency enable, 0 = Disabled, 1= Enabled
2	0	FS_D	CPU Frequency Select Bit, reflect value of FSD in latches open state
1	0	RESERVED	RESERVED
0	0	RESERVED	RESERVED

Table 5. Crystal Recommendations

Frequency (Fund)	Cut	Loading	Load Cap	Drive (max.)	Shunt Cap (max.)	Motional (max.)	Tolerance (max.)	Stability (max.)	Aging (max.)
14.31818 MHz	AT	Parallel	20 pF	0.1 mW	5 pF	0.016 pF	35 ppm	30 ppm	5 ppm

The CY505YC64DT requires a parallel resonance crystal. Substituting a series resonance crystal causes the CY505YC64DT to operate at the wrong frequency and violate the ppm specification. For most applications there is a 300-ppm frequency shift between series and parallel crystals due to incorrect loading.

Crystal Loading

Crystal loading plays a critical role in achieving low ppm performance. To realize low ppm performance, the total capacitance the crystal sees must be considered to calculate the appropriate capacitive loading (CL).

Figure 1 shows a typical crystal configuration using the two trim capacitors. An important clarification for the following discussion is that the trim capacitors are in series with the crystal not parallel. The common misconception that load capacitors are in parallel with the crystal and should be approximately equal to the load capacitance of the crystal is not true.

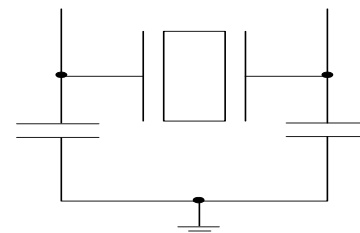


Figure 1. Crystal Capacitive Clarification

Calculating Load Capacitors

In addition to the standard external trim capacitors, trace capacitance and pin capacitance must also be considered to correctly calculate crystal loading. As mentioned previously, the capacitance on each side of the crystal is in series with the crystal. This means the total capacitance on each side of the crystal must be twice the specified crystal load capacitance (CL). While the capacitance on each side of the crystal is in series with the crystal, trim capacitors (Ce1,Ce2) should be calculated to provide equal capacitive loading on both sides.

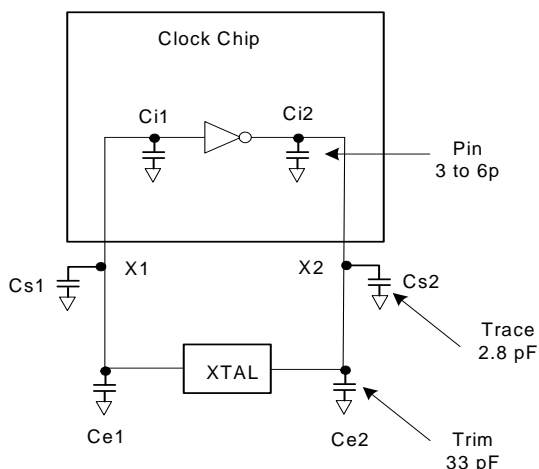


Figure 2. Crystal Loading Example

Use the following formulas to calculate the trim capacitor values for Ce1 and Ce2.

Load Capacitance (each side)

$$C_e = 2 * CL - (C_s + C_i)$$

Total Capacitance (as seen by the crystal)

$$CL_e = \frac{1}{\left(\frac{1}{C_{e1} + C_{s1} + C_{i1}} + \frac{1}{C_{e2} + C_{s2} + C_{i2}} \right)}$$

- CL Crystal load capacitance
- CL_e Actual loading seen by crystal using standard value trim capacitors
- C_e External trim capacitors
- C_s Stray capacitance (terraced)
- C_i Internal capacitance (lead frame, bond wires etc.)

Dial-A-Frequency (CPU & PCIEX)

This feature allows users to over-clock their systems by slowly stepping up the CPU or SRC frequency. When the programmable output frequency feature is enabled, the CPU and SRC frequencies are determined by the following equation:

$$F_{cpu} = G * N/M \text{ or } F_{cpu} = G2 * N, \text{ where } G2 = G/M.$$

'N' and 'M' are the values programmed in Programmable Frequency Select N-Value Register and M-Value Register, respectively. 'G' stands for the PLL Gear Constant, which is determined by the programmed value of FS[E:A]. See *Frequency Table* for the Gear Constant for each Frequency selection. The PCI Express only allows user control of the N register, the M value is fixed and documented in the *Frequency Select Table*.

In this mode, the user writes the desired N and M value into the DAF I2C registers. The user cannot change only the M value and must change both the M and the N values at the same time, if they require a change to the M value. The user may change only the required N value.

Associated Register Bits

CPU_DAF Enable – This bit enables CPU DAF mode. By default, it is not set. When set, the operating frequency is determined by the values entered into the CPU_DAF_N register. Note that the CPU_DAF_N and M register must contain valid values before CPU_DAF is set. Default = 0, (No DAF).

CPU_DAF_N – There are nine bits (for 512 values) to linearly change the CPU frequency (limited by VCO range). Default = 0, (0000). The allowable values for N are detailed in the *Frequency Select Table*.

CPU DAF M – There are 7 bits (for 128 values) to linearly change the CPU frequency (limited by VCO range). Default = 0, the allowable values for M are detailed in the *Frequency Select Table*.

SRC_DAF Enable – This bit enables SRC DAF mode. By default, it is not set. When set, the operating frequency is determined by the values entered into the SRC_DAF_N register. Note that the SRC_DAF_N register must contain valid values before SRC_DAF is set. Default = 0, (No DAF).

SRC_DAF_N – There are nine bits (for 512 values) to linearly change the CPU frequency (limited by VCO range). Default = 0, (0000). The allowable values for N are detailed in the *Frequency Select Table*.

Smooth Switching

The device contains 1 smooth switch circuit that is shared by the CPU PLL and SRC PLL. The smooth switch circuit ensures that when the output frequency changes by overclocking, the transition from the old frequency to the new frequency is a slow, smooth transition containing no glitches. The rate of change of output frequency when using the smooth switch circuit is less than 1 MHz/0.667 μs. The frequency overshoot and undershoot is less than 2%.

The Smooth Switch circuit can be assigned as auto or manual. In Auto mode, clock generator will assign smooth switch automatically when the PLL does overclocking. For manual mode, the smooth switch circuit can be assigned to either PLL via SMBus. By default the smooth switch circuit is set to auto mode. Either PLL can still be over-clocked when it does not have control of the smooth switch circuit but it is not guaranteed to transition to the new frequency without large frequency glitches.

It is not recommended to enable over-clocking and change the N values of both PLLs in the same SMBUS block write and use smooth switch mechanism on spread spectrum on/off.

PD# Clarification

The CK_PWRGD/PD# pin is a dual-function pin. During initial power-up, the pin functions as CK_PWRGD. Once CK_PWRGD has been sampled HIGH by the clock chip, the pin assumes PD# functionality. The PD# pin is an asynchronous active LOW input used to shut off all clocks cleanly prior to shutting off power to the device. This signal is synchronized internal to the device prior to powering down the clock synthesizer. PD# is also an asynchronous input for powering up the system. When PD# is asserted LOW, all clocks need to be driven to a LOW value and held prior to turning off the VCOs and the crystal oscillator.

PD Assertion

When PS is sampled HIGH by two consecutive rising edges of CPUC, all single-ended outputs will be held LOW on their next HIGH-to-LOW transition and differential clocks must held LOW. In the event that PD mode is desired as the initial

power-on state, PD must be asserted HIGH in less than 10 μ s after asserting CK_PWRGD.

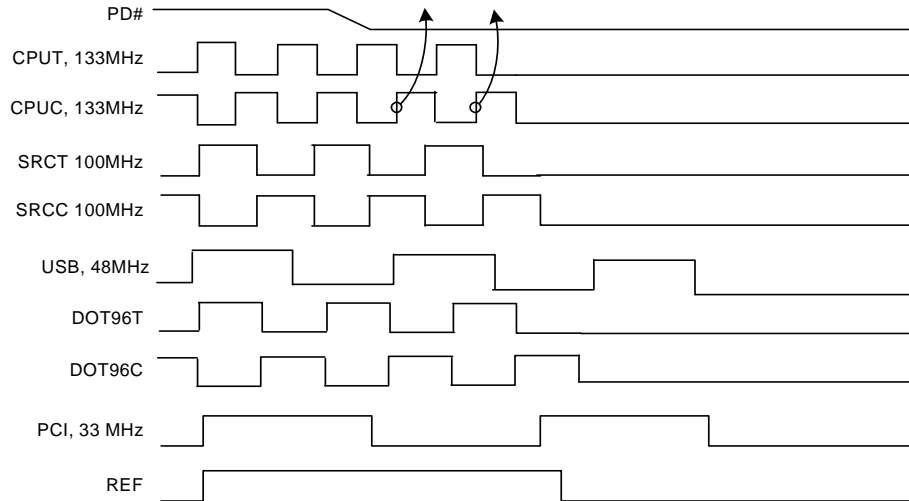
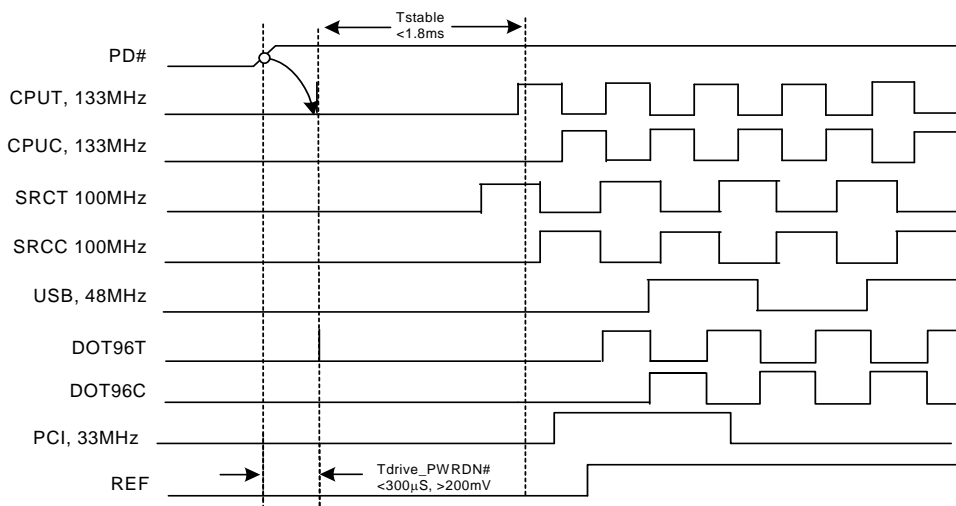


Figure 3. PD Assertion Timing Waveform

PD# Deassertion

The power-up latency is less than 1.8 ms. This is the time from the deassertion of the PD# pin or the ramping of the power supply until the time that stable clocks are output from the clock chip. All differential outputs stopped in a three-state condition resulting from power down will be driven high in less than 300 μ s of PD# deassertion to a voltage greater than

200 mV. After the clock chip's internal PLL is powered up and locked, all outputs will be enabled within a few clock cycles of each other. Below is an example showing the relationship of clocks coming up.



PD Deassertion Timing Waveform

CPU_STP# Assertion

The CPU_STP# signal is an active LOW input used to synchronously stop and start the CPU output clocks while the rest of the clock generator continues to function. When the CPU_STP# pin is asserted, all CPU outputs that are set with

the SMBus configuration to be stoppable via assertion of CPU_STP# are stopped within two to six CPU clock periods after being sampled by two rising edges of the internal CPUC clock. The final states of the stopped CPU signals are CPUC = HIGH and CPUC = LOW.

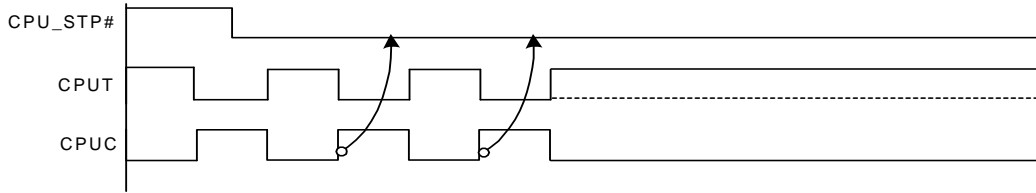
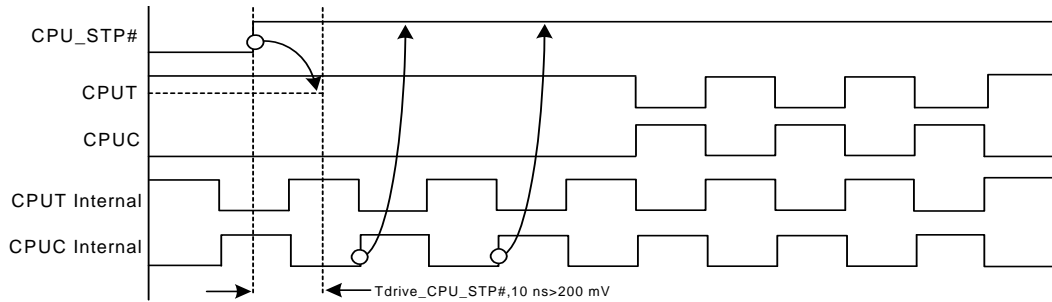


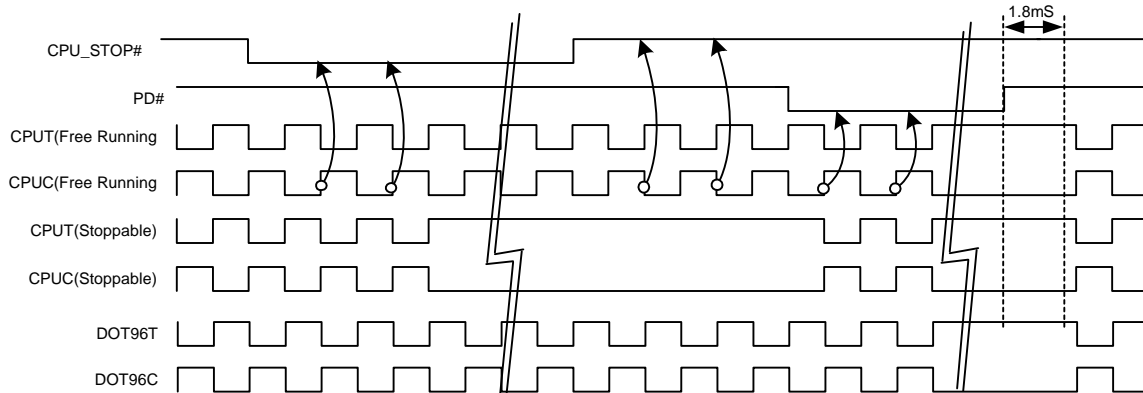
Figure 4. CPU_STP# Assertion Waveform

CPU_STP# Deassertion

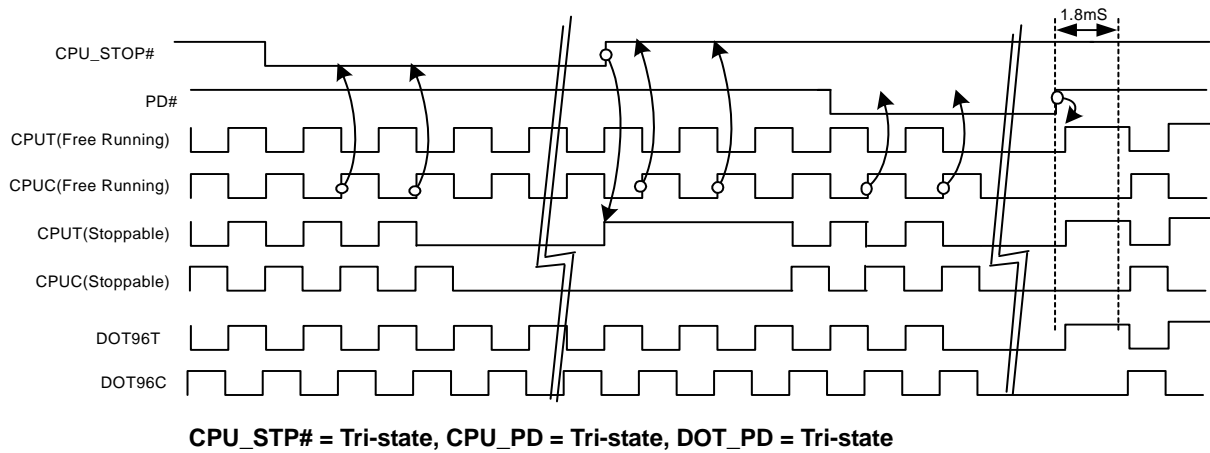
The deassertion of the CPU_STP# signal will cause all CPU outputs that were stopped to resume normal operation in a synchronous manner, synchronous manner meaning that no short or stretched clock pulses will be produce when the clock resumes. The maximum latency from the deassertion to active outputs is no more than two CPU clock cycles.



CPU_STP# Deassertion Waveform



CPU_STOP# = Driven, CPU_PD = Driven, DOT_PD = Driven



PCI_STP# Assertion

The PCI_STP# signal is an active LOW input used to synchronously stop and start the PCI outputs while the rest of the clock generator continues to function. The set-up time for capturing PCI_STP# going LOW is 10 ns (t_{SU}). (See Figure 5.) The PCIF clocks will not be affected by this pin if their corresponding control bit in the SMBus register is set to allow them to be free running.

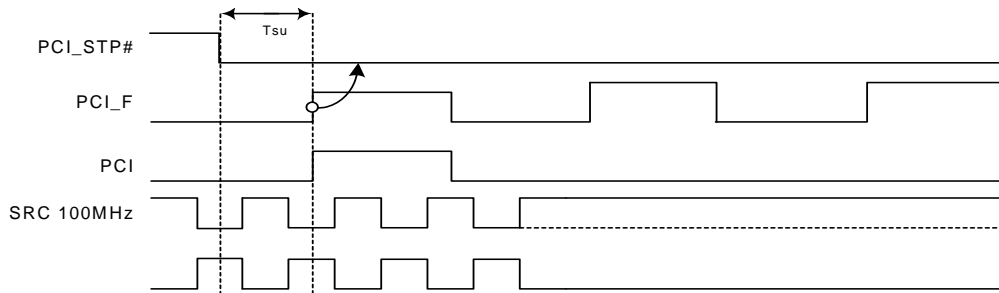


Figure 5. PCI_STP# Assertion Waveform

PCI_STP# Deassertion

The deassertion of the PCI_STP# signal causes all PCI and stoppable PCIF clocks to resume running in a synchronous manner within two PCI clock periods after PCI_STP# transitions to a HIGH level.

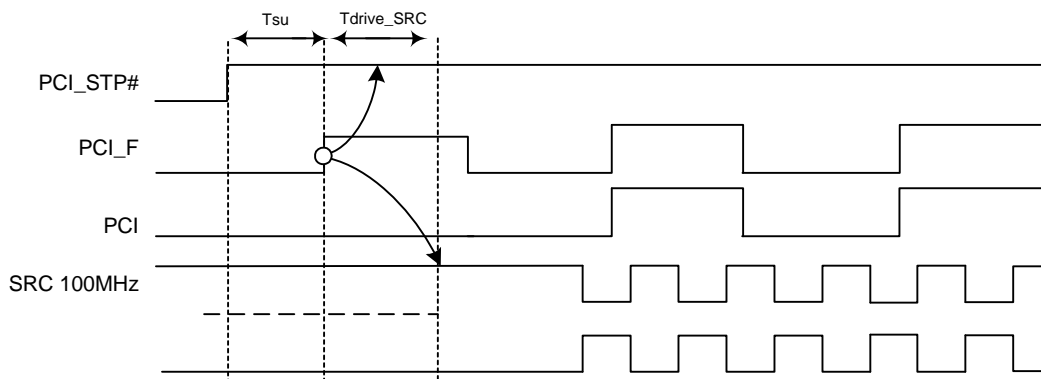


Figure 6. PCI_STP# Deassertion Waveform

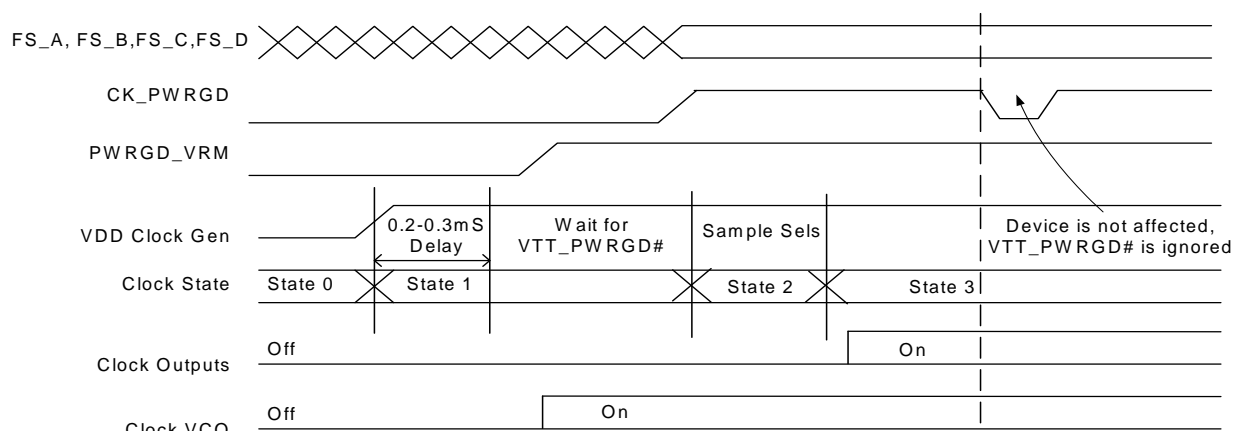


Figure 7. CK_PWRGD Timing Diagram

Table 6. Output Driver Status during PCI-STOP# and CPU-STOP#

		PCI_STOP# Asserted	CPU_STOP# Asserted	SMBus OE Disabled
Single-ended Clocks	Stoppable	Driven Low	Running	Driven Low
	Non Stoppable	Running	Running	
Differential Clocks	Stoppable	Clock Drive High	Clock Drive High	Clock Driven Low
		Clock# Driven Low	Clock# Driven Low	
	Non Stoppable	Running	Running	

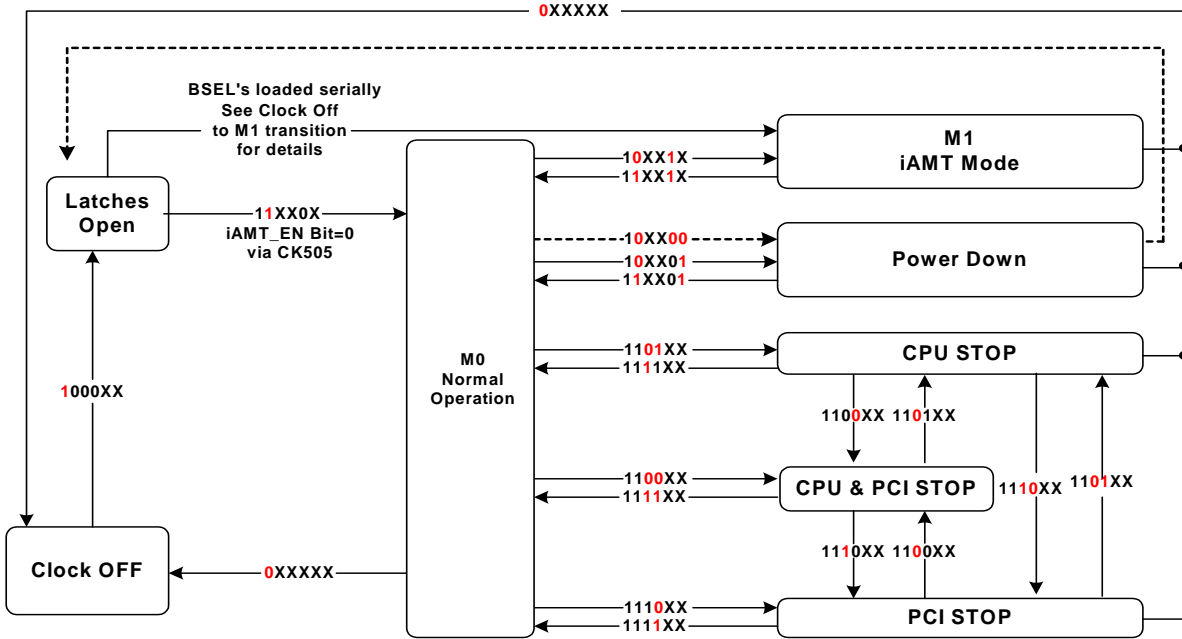
Table 7. Output Driver Status

	All Single-ended Clocks		All Differential Clocks except CPU1		CPU1	
	w/o Strap	w/Strap	Clock	Clock#	Clock	Clock#
Latches Open State	Low	Hi-Z	Low	Low	Low	Low
Powerdown	Low	Low	Low	Low	Low	Low
M1	Low	Low	Low	Low	Running	Running

PD_RESTORE

If a '0' is set for Byte 0 bit 0 then, upon assertion of PWRDWN# LOW, the CY505 will initiate a full reset. The results of this will be that the clock chip will emulate a cold power on start and go to the 'Latches Open' state. If the PD_RESTORE bit is set to a '1' then the configuration is stored upon PWRDWN# asserted LOW. Note that if the iAMT bit, Byte 0 bit 3, is set to a '1' then the PD_RESTORE bit must be ignored. In other words, in Intel iAMT mode, PWRDWN# reset is not allowed.

Figure 8. Clock Generator Power-up/Run State Diagram



Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
VDD_MAIN	CKPWRGD/ PWRDWN	CPU_STOP#	PCI_STOP#	iAMT_EN	PD_RESTORE

Absolute Maximum Conditions

Parameter	Description	Condition	Min.	Max.	Unit
V _{DD}	Core Supply Voltage		-0.5	4.6	V
V _{DD_A}	Analog Supply Voltage		-0.5	4.6	V
V _{DD_IO}	IO Supply Voltage			1.5	V
V _{IN}	Input Voltage	Relative to V _{SS}	-0.5	4.6	V _{DC}
T _S	Temperature, Storage	Non-functional	-65	150	°C
T _A	Temperature, Operating Ambient	Functional	0	85	°C
T _J	Temperature, Junction	Functional	-	150	°C
∅ _{JC}	Dissipation, Junction to Case	Mil-STD-883E Method 1012.1	-	20	°C/W
∅ _{JA}	Dissipation, Junction to Ambient	JEDEC (JESD 51)	-	60	°C/W
ESD _{HBM}	ESD Protection (Human Body Model)	MIL-STD-883, Method 3015	2000	-	V
UL-94	Flammability Rating	At 1/8 in.	V-0		
MSL	Moisture Sensitivity Level		1		

Multiple Supplies: The Voltage on any input or I/O pin cannot exceed the power pin during power-up. Power supply sequencing is NOT required.

DC Electrical Specifications

Parameter	Description	Condition	Min.	Max.	Unit
VDD core	3.3V Operating Voltage	3.3 ± 5%	3.135	3.465	V
V _{IH}	3.3V Input High Voltage (SE)		2.0	V _{DD} +0.3	V
V _{IL}	3.3V Input Low Voltage (SE)		V _{SS} -0.3	0.8	V
V _{IHI2C}	Input High Voltage	SDATA, SCLK	2.2	-	V
V _{ILI2C}	Input Low Voltage	SDATA, SCLK	-	1.0	V
V _{IH_FS}	FS_[A,B] Input High Voltage		0.7	1.5	V
V _{IL_FS}	FS_[A,B] Input Low Voltage		V _{SS} -0.3	0.35	V
V _{IHFS_C_TEST}	FS_C Input High Voltage		2	V _{DD} +0.3	V
V _{IMFS_C_NORMAL}	FS_C Input Middle Voltage		0.7	1.5	V
V _{ILFS_C_NORMAL}	FS_C Input Low Voltage		V _{SS} -0.3	0.35	V
I _{IH}	Input High Leakage Current	except internal pull-down resistors, 0 < V _{IN} < V _{DD}	-	5	μA
I _{IL}	Input Low Leakage Current	except internal pull-up resistors, 0 < V _{IN} < V _{DD}	-5	-	μA
V _{OH}	3.3V Output High Voltage (SE)	I _{OH} = -1 mA	2.4	-	V
V _{OL}	3.3V Output Low Voltage (SE)	I _{OL} = 1 mA	-	0.4	V
VDD IO	Low Voltage IO Supply Voltage		0.72	0.88	
V _{OH}	3.3V Input High Voltage (DIFF)		0.70	0.90	V
V _{OL}	3.3V Input Low Voltage (DIFF)			0.40	V
I _{OZ}	High-impedance Output Current		-10	10	μA
C _{IN}	Input Pin Capacitance		1.5	5	pF
C _{OUT}	Output Pin Capacitance			6	pF
L _{IN}	Pin Inductance		-	7	nH
V _{XIH}	Xin High Voltage		0.7V _{DD}	V _{DD}	V
V _{XIL}	Xin Low Voltage		0	0.3V _{DD}	V
I _{DD3.3V}	Dynamic Supply Current		-	250	mA

AC Electrical Specifications

Parameter	Description	Condition	Min.	Max.	Unit
Crystal					
T _{DC}	XIN Duty Cycle	The device will operate reliably with input duty cycles up to 30/70 but the REF clock duty cycle will not be within specification	47.5	52.5	%
T _{PERIOD}	XIN Period	When XIN is driven from an external clock source	69.841	71.0	ns
T _R /T _F	XIN Rise and Fall Times	Measured between 0.3V _{DD} and 0.7V _{DD}	–	10.0	ns
T _{CCJ}	XIN Cycle to Cycle Jitter	As an average over 1-μs duration	–	500	ps
L _{ACC}	Long-term Accuracy		–	300	ppm
CPU at 0.7V					
T _{DC}	CPUT and CPUC Duty Cycle	Measured at 0V differential @ 0.1s	45	55	%
T _{PERIOD}	100 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	9.99900	10.0100	ns
T _{PERIOD}	133 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	7.49925	7.50075	ns
T _{PERIOD}	166 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	5.99940	6.00060	ns
T _{PERIOD}	200 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	4.99950	5.00050	ns
T _{PERIOD}	266 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	3.74963	3.75038	ns
T _{PERIOD}	333 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	2.99970	3.00030	ns
T _{PERIOD}	400 MHz CPUT and CPUC Period	Measured at 0V differential @ 0.1s	2.49975	2.50025	ns
T _{PERIODSS}	100 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	9.99900	10.0100	ns
T _{PERIODSS}	133 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	7.49925	7.50075	ns
T _{PERIODSS}	166 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	5.99940	6.00060	ns
T _{PERIODSS}	200 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	4.99950	5.00050	ns
T _{PERIODSS}	266 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	3.74963	3.75038	ns
T _{PERIODSS}	333 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	2.99970	3.00030	ns
T _{PERIODSS}	400 MHz CPUT and CPUC Period, SSC	Measured at 0V differential @ 0.1s	2.49975	2.50025	ns
T _{PERIODAbs}	100 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	9.91400	10.0860	ns
T _{PERIODAbs}	133 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	7.41425	7.58575	ns
T _{PERIODAbs}	166 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	5.91440	6.08560	ns
T _{PERIODAbs}	200 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	4.91450	5.08550	ns
T _{PERIODAbs}	266 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	3.66463	3.83538	ns
T _{PERIODAbs}	333 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	2.91470	3.08530	ns
T _{PERIODAbs}	400 MHz CPUT and CPUC Absolute period	Measured at 0V differential @ 1 clock	2.41475	2.58525	ns
T _{PERIODSSAbs}	100 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	9.91400	10.1363	ns
T _{PERIODSSAbs}	133 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	7.41425	7.62345	ns
T _{PERIODSSAbs}	166 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	5.91440	6.11576	ns
T _{PERIODSSAbs}	200 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	4.91450	5.11063	ns
T _{PERIODSSAbs}	266 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	3.66463	3.85422	ns
T _{PERIODSSAbs}	333 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	2.91470	3.10038	ns
T _{PERIODSSAbs}	400 MHz CPUT and CPUC Absolute period, SSC	Measured at 0V differential @ 1 clock	2.41475	2.59782	ns
T _{CCJ}	CPUT/C Cycle to Cycle Jitter	Measured at 0V differential	–	85	ps
T _{CCJ2}	CPU2_ITP Cycle to Cycle Jitter	Measured at 0V differential	–	125	ps
L _{ACC}	Long-term Accuracy	Measured at 0V differential	–	100	ppm
T _{SKEW2}	CPU2_ITP to CPU0 Clock Skew	Measured at 0V differential	–	150	ps
T _R /T _F	CPUT and CPUC Rise and Fall Time	Measured differentially from ±150 mV	2.5	8	V/ns



AC Electrical Specifications (continued)

Parameter	Description	Condition	Min.	Max.	Unit
T _{RFM}	Rise/Fall Matching	Measured single-endedly from ±75 mV	–	20	%
V _{HIGH}	Voltage High			1.15	V
V _{LOW}	Voltage Low		–0.3	–	V
V _{OX}	Crossing Point Voltage at 0.7V Swing		245	550	mV
SRC					
T _{DC}	SRCT and SRCC Duty Cycle	Measured at 0V differential	45	55	%
T _{PERIOD}	100 MHz SRCT and SRCC Period	Measured at 0V differential @ 0.1s	9.99900	10.0010	ns
T _{PERIODSS}	100 MHz SRCT and SRCC Period, SSC	Measured at 0V differential @ 0.1s	9.99900	10.0010	ns
T _{PERIODAbs}	100 MHz SRCT and SRCC Absolute Period	Measured at 0V differential @ 1 clock	9.87400	10.1260	ns
T _{PERIODSSAbs}	100 MHz SRCT and SRCC Absolute Period, SSC	Measured at 0V differential @ 1 clock	9.87400	10.1763	ns
T _{SKEW(window)}	Any SRCT/C to SRCT/C Clock Skew from the earliest bank to the latest bank	Measured at 0V differential	–	3.0	ns
T _{CCJ}	SRCT/C Cycle to Cycle Jitter	Measured at 0V differential	–	125	ps
L _{ACC}	SRCT/C Long Term Accuracy	Measured at 0V differential	–	100	ppm
T _R /T _F	SRCT and SRCC Rise and Fall Time	Measured differentially from ±150 mV	2.5	8	V/ns
T _{RFM}	Rise/Fall Matching	Measured single-endedly from ±75 mV	–	20	%
V _{HIGH}	Voltage High			1.15	V
V _{LOW}	Voltage Low		–0.3	–	V
V _{OX}	Crossing Point Voltage at 0.7V Swing		250	550	mV
DOT					
T _{DC}	DOT96T and DOT96C Duty Cycle	Measured at 0V differential	45	55	%
T _{PERIOD}	DOT96T and DOT96C Period	Measured at 0V differential @ 0.1s	10.4156	10.4177	ns
T _{PERIODAbs}	DOT96T and DOT96C Absolute Period	Measured at 0V differential @ 0.1s	10.1656	10.6677	ns
T _{CCJ}	DOT96T/C Cycle to Cycle Jitter	Measured at 0V differential @ 1 clock	–	250	ps
L _{ACC}	DOT96T/C Long Term Accuracy	Measured at 0V differential @ 1 clock	–	300	ppm
T _R /T _F	DOT96T and DOT96C Rise and Fall Time	Measured differentially from ±150 mV	2.5	8	V/ns
T _{RFM}	Rise/Fall Matching	Measured single-endedly from ±75 mV	–	20	%
V _{HIGH}	Voltage High			1.15	V
V _{LOW}	Voltage Low		–0.3	–	V
V _{OX}	Crossing Point Voltage at 0.7V Swing		300	550	mV
LCD_100_SSC					
T _{DC}	SSCT and SSCC Duty Cycle	Measured at 0V differential	45	55	%
T _{PERIOD}	100 MHz SSCT and SSCC Period	Measured at 0V differential @ 0.1s	9.99900	10.0010	ns
T _{PERIODSS}	100 MHz SSCT and SSCC Period, SSC	Measured at 0V differential @ 0.1s	9.99900	10.0010	ns
T _{PERIODAbs}	100 MHz SSCT and SSCC Absolute Period	Measured at 0V differential @ 1 clock	9.87400	10.1260	ns
T _{PERIODSSAbs}	100 MHz SRCT and SRCC Absolute Period, SSC	Measured at 0V differential @ 1 clock	9.87400	10.1763	ns
T _{CCJ}	SSCT/C Cycle to Cycle Jitter	Measured at 0V differential	–	250	ps
L _{ACC}	SSCT/C Long Term Accuracy	Measured at 0V differential	–	300	ppm
T _R /T _F	SSCT and SSCC Rise and Fall Time	Measured differentially from ±150 mV	2.5	8	V/ns
T _{RFM}	Rise/Fall Matching	Measured single-endedly from ±75 mV	–	20	%
V _{HIGH}	Voltage High			1.15	V
V _{LOW}	Voltage Low		–0.3	–	V
V _{OX}	Crossing Point Voltage at 0.7V Swing		300	550	mV



AC Electrical Specifications (continued)

Parameter	Description	Condition	Min.	Max.	Unit
PCI/PCIF					
T _{DC}	PCI Duty Cycle	Measurement at 1.5V	45	55	%
T _{PERIOD}	Spread Disabled PCIF/PCI Period	Measurement at 1.5V	29.99100	30.00900	ns
T _{PERIODSS}	Spread Enabled PCIF/PCI Period, SSC	Measurement at 1.5V	29.99100	30.15980	ns
T _{PERIODAbs}	Spread Disabled PCIF/PCI Period	Measurement at 1.5V	29.49100	30.50900	ns
T _{PERIODSSAbs}	Spread Enabled PCIF/PCI Period, SSC	Measurement at 1.5V	29.49100	30.65980	ns
T _{HIGH}	PCIF and PCI high time	Measurement at 2.4V	12.0	–	ns
T _{LOW}	PCIF and PCI low time	Measurement at 0.4V	12.0	–	ns
T _R /T _F	PCIF/PCI rising and falling Edge Rate	Measured between 0.8V and 2.0V	1.0	4.0	V/ns
T _{SKEW}	Any PCI clock to Any PCI clock Skew	Measurement at 1.5V	–	1000	ps
T _{CCJ}	PCIF and PCI Cycle to Cycle Jitter	Measurement at 1.5V	–	500	ps
L _{ACC}	PCIF/PCI Long Term Accuracy	Measurement at 1.5V	–	300	ppm
48_M					
T _{DC}	Duty Cycle	Measurement at 1.5V	45	55	%
T _{PERIOD}	Period	Measurement at 1.5V	20.83125	20.83542	ns
T _{PERIODAbs}	Absolute Period	Measurement at 1.5V	20.48125	21.18542	ns
T _{HIGH}	48_M High time	Measurement at 2.4V	8.094	10.036	ns
T _{LOW}	48_M Low time	Measurement at 0.4V	7.694	9.836	ns
T _R /T _F	Rising and Falling Edge Rate	Measured between 0.8V and 2.0V	1.0	5.0	V/ns
T _{CCJ}	Cycle to Cycle Jitter	Measurement at 1.5V	–	350	ps
L _{ACC}	48M Long Term Accuracy	Measurement at 1.5V	–	300	ppm
25_M					
T _{DC}	Duty Cycle	Measurement at 1.5V	45	55	%
T _{PERIOD}	Period	Measurement at 1.5V	39.996	40.004	ns
T _{HIGH}	25_M High time	Measurement at 2V	12		ns
T _{LOW}	25_M Low time	Measurement at 0.8V	12		ns
T _R /T _F	Rising and Falling Edge Rate	Measured between 0.8V and 2.0V	1.0	4.0	V/ns
T _{CCJ}	Cycle to Cycle Jitter	Measurement at 1.5V	–	500	ps
L _{ACC}	25M Long Term Accuracy	Measurement at 1.5V	–	50	ppm
T _{LTJ @ 10 μs}	25M Long Term Jitter @ 10 μs	Measurement at 1.5V @ 10 μs	–	500	ppm
REF					
T _{DC}	REF Duty Cycle	Measurement at 1.5V	45	55	%
T _{PERIOD}	REF Period	Measurement at 1.5V	69.82033	69.86224	ns
T _{PERIODAbs}	REF Absolute Period	Measurement at 1.5V	68.82033	70.86224	ns
T _R /T _F	REF Rising and Falling Edge Rate	Measured between 0.8V and 2.0V	1.0	5.0	V/ns
T _{SKEW}	REF Clock to REF Clock	Measurement at 1.5V	–	500	ps
T _{CCJ}	REF Cycle to Cycle Jitter	Measurement at 1.5V	–	1000	ps
L _{ACC}	Long Term Accuracy	Measurement at 1.5V	–	300	ppm
ENABLE/DISABLE and SET-UP					
T _{STABLE}	Clock Stabilization from Power-up		–	1.8	ms
T _{SS}	Stopclock Set-up Time		10.0	–	ns

Test and Measurement Set-up

For PCI Single-ended Signals and Reference

The following diagram shows the test load configurations for the single-ended PCI, USB, and REF output signals.

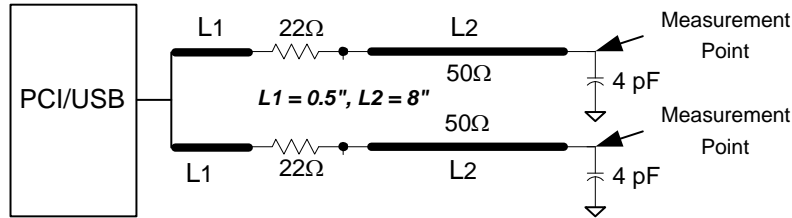


Figure 9. Single-ended PCI and USB Double Load Configuration

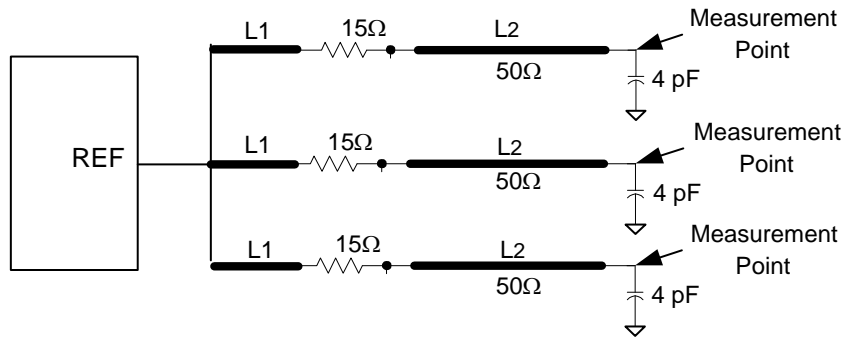


Figure 10. Single-ended REF Triple Load Configuration

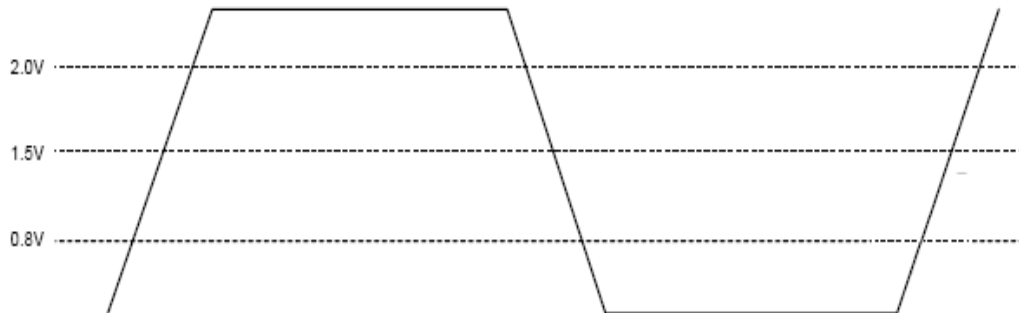


Figure 11. Single-ended Output Signals (for AC Parameters Measurement)

For CPU, SRC, and DOT96 Signals and Reference

The following diagram shows the test load configuration for the differential CPU and SRC outputs.

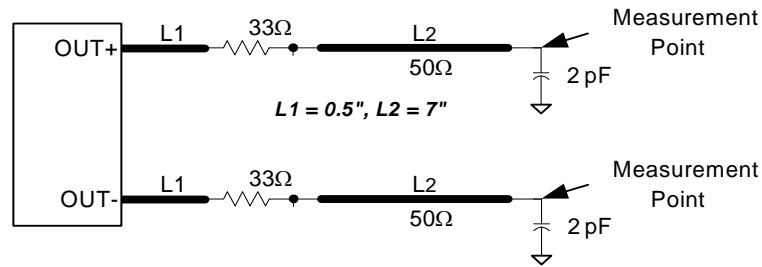


Figure 12. 0.7V Differential Load Configuration

Differential (DIFF) measurement waveforms

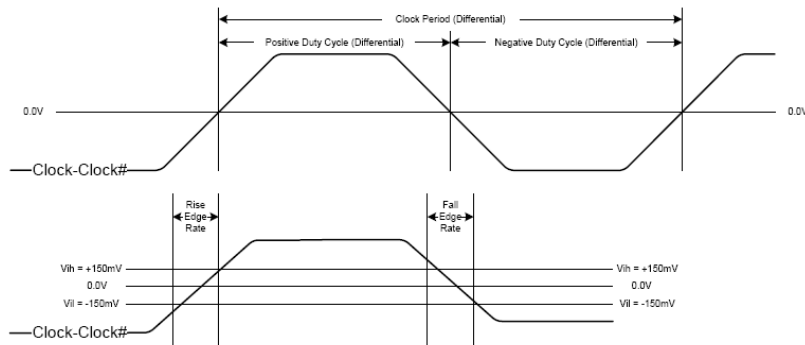


Figure 13. Differential Measurement for Differential Output Signals (for AC Parameters Measurement)

Single ended (SE) measurement waveforms

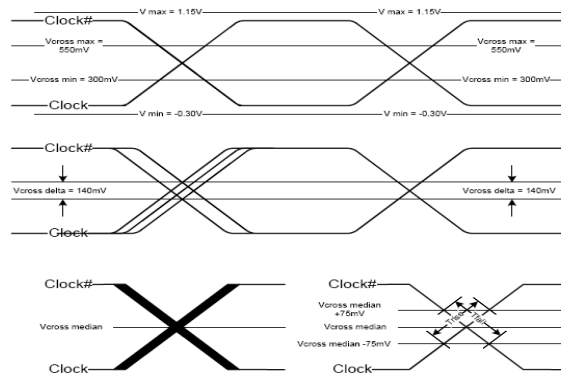


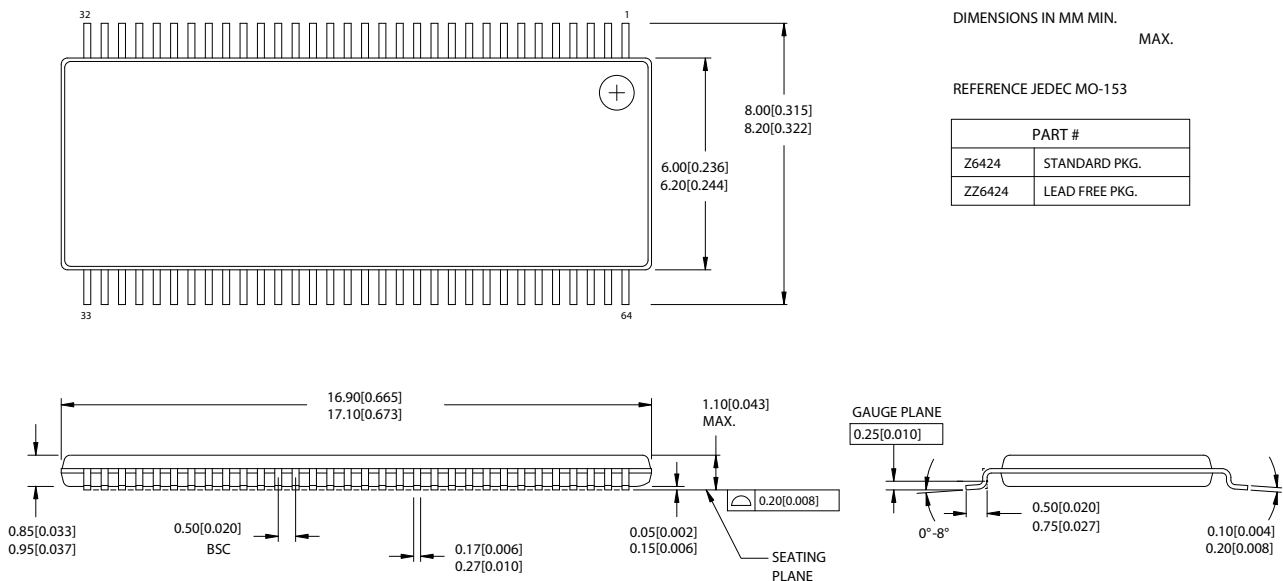
Figure 14. Single-ended Measurement for Differential Output Signals (for AC Parameters Measurement)

Ordering Information

Part Number	Package Type	Product Flow
Lead-free		
CY505YC64DT	64-pin TSSOP	Commercial, 0° to 85°C
CY505YC64DTT	64-pin TSSOP–Tape and Reel	Commercial, 0° to 85°C

Package Diagram

64-Lead Thin Shrunk Small Outline Package (6 mm x 17 mm) Z64



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