

## 56-pin CK505 for Intel Desktop Systems

## ICS9LP525-2

### Recommended Application:

CK505 clock, 56-pin Intel Yellow Cover part

### Output Features:

- 2 - CPU differential low power push-pull pairs
- 7- SRC differential low power push-pull pairs
- 1 - CPU/SRC selectable differential low power push-pull pair
- 1 - SRC/DOT selectable differential low power push-pull pair
- 5 - PCI, 33MHz
- 1 - PCI\_F, 33MHz free running
- 1 - USB, 48MHz
- 1 - REF, 14.318MHz

### Key Specifications:

- CPU outputs cycle-cycle jitter < 85ps
- SRC output cycle-cycle jitter < 125ps
- PCI outputs cycle-cycle jitter < 250ps
- +/- 100ppm frequency accuracy on all outputs
- SRC are PCIe Gen2 compliant

### Features/Benefits:

- Supports spread spectrum modulation, default is 0.5% down spread
- Uses external 14.318MHz crystal, external crystal load caps are required for frequency tuning
- Selectable SRC differential push-pull pair/two single ended outputs

**Table 1: CPU Frequency Select Table**

| FS <sub>L</sub> C <sup>2</sup><br>B0b7 | FS <sub>L</sub> B <sup>1</sup><br>B0b6 | FS <sub>L</sub> A <sup>1</sup><br>B0b5 | CPU<br>MHz | SRC<br>MHz | PCI<br>MHz | REF<br>MHz | USB<br>MHz | DOT<br>MHz |
|----------------------------------------|----------------------------------------|----------------------------------------|------------|------------|------------|------------|------------|------------|
| 0                                      | 0                                      | 0                                      | 266.66     | 100.00     | 33.33      | 14.318     | 48.00      | 96.00      |
| 0                                      | 0                                      | 1                                      | 133.33     |            |            |            |            |            |
| 0                                      | 1                                      | 0                                      | 200.00     |            |            |            |            |            |
| 0                                      | 1                                      | 1                                      | 166.66     |            |            |            |            |            |
| 1                                      | 0                                      | 0                                      | 333.33     |            |            |            |            |            |
| 1                                      | 0                                      | 1                                      | 100.00     |            |            |            |            |            |
| 1                                      | 1                                      | 0                                      | 400.00     |            |            |            |            |            |
| 1                                      | 1                                      | 1                                      | Reserved   |            |            |            |            |            |

1. FS<sub>L</sub>A and FS<sub>L</sub>B are low-threshold inputs. Please see V<sub>IL\_FS</sub> and V<sub>IH\_FS</sub> specifications in the Input/Supply/Common Output Parameters Table for correct values.

Also refer to the Test Clarification Table.

2. FS<sub>L</sub>C is a three-level input. Please see the V<sub>IL\_FS</sub> and V<sub>IH\_FS</sub> specifications in the Input/Supply/Common Output Parameters Table for correct values.

### Pin Configuration

|                |    |    |                    |
|----------------|----|----|--------------------|
| PCI0/CR#_A     | 1  | 56 | SCLK               |
| VDDPCI         | 2  | 55 | SDATA              |
| PCI1/CR#_B     | 3  | 54 | REF0/FSLC/TEST_SEL |
| PCI2/TME       | 4  | 53 | VDDREF             |
| PCI3/CFG0      | 5  | 52 | X1                 |
| PCI4/SRC5_EN   | 6  | 51 | X2                 |
| PCI_F5/ITP_EN  | 7  | 50 | GNDREF             |
| GNDPCI         | 8  | 49 | FSLB/TEST_MODE     |
| VDD48          | 9  | 48 | CK_PWRGD/PD#       |
| USB_48MHz/FSLA | 10 | 47 | VDDCPU             |
| GND48          | 11 | 46 | CPUT0              |
| VDD96_IO       | 12 | 45 | CPUC0              |
| DOTT_96/SRCT0  | 13 | 44 | GNDCPU             |
| DOTC_96/SRCC0  | 14 | 43 | CPUT1_F            |
| GND            | 15 | 42 | CPUC1_F            |
| VDD            | 16 | 41 | VDDCPU_IO          |
| SRCT1/SE1      | 17 | 40 | VOUT               |
| SRCC1/SE2      | 18 | 39 | CPUT2_ITP/SRCT8    |
| GND            | 19 | 38 | CPUC2_ITP/SRCC8    |
| VDDPLL3_IO     | 20 | 37 | VDDSRC_IO          |
| SRCT2/SATAT    | 21 | 36 | SRCT7/CR#_F        |
| SRCC2/SATAC    | 22 | 35 | SRCC7/CR#_E        |
| GNDSRC         | 23 | 34 | GNDSRC             |
| SRCT3/CR#_C    | 24 | 33 | SRCT6              |
| SRCC3/CR#_D    | 25 | 32 | SRCC6              |
| VDDSRC_IO      | 26 | 31 | VDDSRC             |
| SRCT4          | 27 | 30 | PCI_STOP#/SRCT5    |
| SRCC4          | 28 | 29 | CPU_STOP#/SRCC5    |

**56-SSOP & TSSOP**

## Pin Description

| PIN # | PIN NAME       | TYPE | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|----------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | PCI0/CR#_A     | I/O  | 3.3V PCI clock output or Clock Request control A for either SRC0 or SRC2 pair<br>The power-up default is PCI0 output, but this pin may also be used as a Clock Request control of SRC pair 0 or SRC pair 2 via SMBus. Before configuring this pin as a Clock Request Pin, the PCI output must first be disabled in byte 2, bit 0 of SMBus address space. After the PCI output is disabled (high-Z), the pin can then be set to serve as a Clock Request pin for either SRC pair 2 or pair 0 using the CRA#_EN bit located in byte 5 of SMBUs address space.<br>Byte 5, bit 7<br>0 = PCI0 enabled (default)<br>1 = CRA# enabled. Byte 5, bit 6 controls whether CRA# controls SRC0 or SRC2 pair<br>Byte 5, bit 6<br>0 = CRA# controls SRC0 pair (default),<br>1 = CRA# controls SRC2 pair |
| 2     | VDDPCI         | PWR  | Power supply for PCI clocks, nominal 3.3V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3     | PCI1/CR#_B     | I/O  | 3.3V PCI clock output/Clock Request control B for either SRC1 or SRC4 pair<br>The power-up default is PCI1 output, but this pin may also be used as a Clock Request control of SRC pair 1 or SRC pair 4 via SMBus. Before configuring this pin as a Clock Request Pin, the PCI output must first be disabled in byte 2, bit 1 of SMBus address space. After the PCI output is disabled (high-Z), the pin can then be set to serve as a Clock Request pin for either SRC pair 1 or pair 4 using the CRB#_EN bit located in byte 5 of SMBUs address space.<br>Byte 5, bit 5<br>0 = PCI1 enabled (default)<br>1 = CRB# enabled. Byte 5, bit 6 controls whether CRB# controls SRC1 or SRC4 pair<br>Byte 5, bit 4<br>0 = CRB# controls SRC1 pair (default)<br>1 = CRB# controls SRC4 pair     |
| 4     | PCI2/TME       | I/O  | 3.3V PCI clock output / Trusted Mode Enable(TME) Latched Input. This pin is sampled on power-up as follows<br>0=Overclocking of CPU and SRC allowed<br>1=Overclocking of CPU and SRC NOT allowed<br>After being sampled on power-up, this pin becomes a 3.3V PCI Output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 5     | PCI3/CFG0      | I/O  | 3.3V PCI clock output/Configuration Strap. See PCI3 Configuration Table for more information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 6     | PCI4/SRC5_EN   | I/O  | 3.3V PCI clock output / SRC5 pair or PCI_STOP#/CPU_STOP# enable strap. On powerup, the logic value on this pin determines if the SRC5 pair is enabled or if CPU_STOP#/PCI_STOP# is enabled (pins 29 and 30). The latched value controls the pin function on pins 29 and 30 as follows<br>0 = PCI_STOP#/CPU_STOP#<br>1 = SRC5/SRC5#                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 7     | PCI_F5/ITP_EN  | I/O  | Free running PCI clock output and ITP/SRC8 enable strap. This output is not affected by the state of the PCI_STOP# pin. On powerup, the state of this pin determines whether pins 38 and 39 are an ITP or SRC pair.<br>0 = SRC8/SRC8#<br>1 = ITP/ITP#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 8     | GNDPCI         | PWR  | Ground pin for the PCI outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9     | VDD48          | PWR  | Power pin for the 48MHz output and PLL.3.3V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10    | USB_48MHz/FSLA | I/O  | 3.3V tolerant input for CPU frequency selection. Refer to input electrical characteristics for Vil_FS and Vih_FS values. / Fixed 48MHz USB clock output. 3.3V.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 11    | GND48          | PWR  | Ground pin for the 48MHz outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 12    | VDD96_IO       | PWR  | Power supply for DOT96 clocks, nominal 0.8V from source/emitter of external pass transistor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 13    | DOTT_96/SRCT0  | OUT  | True clock of low power differential SRC or DOT96. The power-up default function is SRC0. After powerup, this pin function may be changed to DOT96 via SMBus Byte 1, bit 7 as follows:<br>0= SRC0<br>1=DOT96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 14    | DOTC_96/SRCC0  | OUT  | Complement clock of low power differential SRC or DOT96. The power-up default function is SRC0#. After powerup, this pin function may be changed to DOT96# via SMBus Byte 1, bit 7 as follows<br>0= SRC0#<br>1=DOT96#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 15    | GND            | PWR  | Ground pin.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 16    | VDD            | PWR  | Power supply, nominal 3.3V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 17    | SRCT1/SE1      | OUT  | True clock of low power differential SRC1 clock pair / 3.3V single-ended output. The powerup default is 100 MHz SRC, -0.5% downspread. The pin function may be changed via SMBus B1b[4:1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 18    | SRCC1/SE2      | OUT  | Complement clock of push-pull differential SRC1 clock pair / 3.3V single-ended output. The powerup default is 100 MHz SRC, -0.5% downspread. The pin function may be changed via SMBus B1b[4:1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 19    | GND            | PWR  | Ground pin.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 20    | VDDPLL3_IO     | PWR  | Power supply for PLL3. 0.8V nominal from source/emitter of external pass transistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 21    | SRCT2/SATAT    | OUT  | True clock of low power differential SRC/SATA clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 22    | SRCC2/SATAC    | OUT  | Complement clock of differential push-pull SRC/SATA clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 23    | GNDSRC         | PWR  | Ground pin for the SRC outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

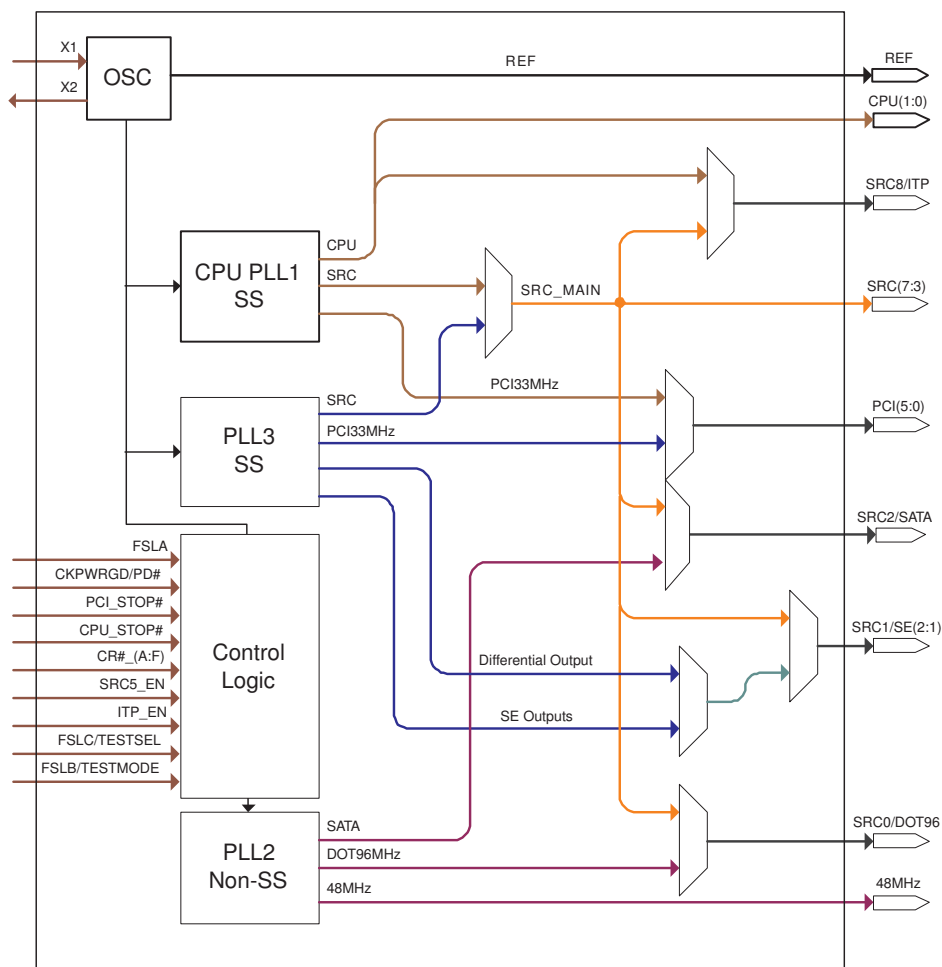
## Pin Description (continued)

| PIN # | PIN NAME           | TYPE | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------|--------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25    | SRCC3/CR#_D        | I/O  | Complementary clock of differential SRC clock pair/ Clock Request control D for either SRC1 or SRC4 pair<br>The power-up default is SRCCLK3 output, but this pin may also be used as a Clock Request control of SRC pair 1 or SRC pair 4 via SMBus. Before configuring this pin as a Clock Request Pin, the SRC output must first be disabled in byte 4, bit 7 of SMBus address space. After the SRC output is disabled, the pin can then be set to serve as a Clock Request pin for either SRC pair 1 or pair 4 using the CRD#_EN bit located in byte 5 of SMBus address space.<br>Byte 5, bit 1<br>0 = SRC3 enabled (default)<br>1 = CRD# enabled. Byte 5, bit 0 controls whether CRD# controls SRC1 or SRC4 pair<br>Byte 5, bit 0<br>0 = CRD# controls SRC1 pair (default),<br>1 = CRD# controls SRC4 pair |
| 26    | VDDSRC_IO          | PWR  | Power supply for SRC clocks. 0.8V nominal from source/emitter of external pass transistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 27    | SRCT4              | OUT  | True clock of low power differential SRC clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 28    | SRCC4              | OUT  | Complement clock of low power differential SRC clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 29    | CPU_STOP#/SRCC5    | I/O  | Ref, XTAL power supply, nominal 3.3V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 30    | PCI_STOP#/SRCT5    | I/O  | Stops all PCICLKs at logic 0 level, when low. Free running PCICLKs are not effected by this input. / True clock of differential push-pull SRC pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 31    | VDDSRC             | PWR  | Supply for SRC PLL, 3.3V nominal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 32    | SRCC6              | OUT  | Complement clock of low power differential SRC clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 33    | SRCT6              | OUT  | True clock of low power differential SRC clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 34    | GNDSRC             | PWR  | Ground pin for the SRC outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 35    | SRCC7/CR#_E        | I/O  | Complement clock of differential push-pull SRC clock pair. / Clock Request control E for SRC6 pair. The power-up default is SRC7#, but this pin may also be used as a Clock Request control of SRC6 via SMBus. Before configuring this pin as a Clock Request Pin, the SRC7 output pair must first be disabled in byte 3, bit 3 of SMBus configuration space. After the SRC output is disabled (high-Z), the pin can then be set to serve as a Clock Request for SRC6 pair using byte 6, bit 7 of SMBus configuration space<br>Byte 6, bit 7<br>0 = SRC7# enabled (default)<br>1 = CRE# enabled.                                                                                                                                                                                                              |
| 36    | SRCT7/CR#_F        | I/O  | True clock of differential push-pull SRC clock pair/ Clock Request control 8 for SRC8 pair<br>The power-up default is SRC7, but this pin may also be used as a Clock Request control of SRC8 via SMBus. Before configuring this pin as a Clock Request Pin, the SRC7 output pair must first be disabled in byte 3, bit 3 of SMBus configuration space. After the SRC output is disabled (high-Z), the pin can then be set to serve as a Clock Request for SRC8 pair using byte 6, bit 6 of SMBus configuration space.<br>Byte 6, bit 6<br>0 = SRC7# enabled (default)<br>1 = CRF# enabled.                                                                                                                                                                                                                    |
| 37    | VDDSRC_IO          | PWR  | Power supply for SRC clocks. 0.8V nominal from source/emitter of external pass transistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 38    | CPUC2_ITP/SRCC8    | OUT  | Complement clock of low power differential CPU2/Complement clock of differential SRC pair. The function of this pin is determined by the latched input value on pin 7, PCIF5/ITP_EN on powerup. The function is as follows:<br>Pin 7 latched input Value<br>0 = SRC8#<br>1 = ITP#                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 39    | CPUT2_ITP/SRCT8    | OUT  | True clock of low power differential CPU2/True clock of differential SRC pair. The function of this pin is determined by the latched input value on pin 7, PCIF5/ITP_EN on powerup. The function is as follows:<br>Pin 7 latched input Value<br>0 = SRC8<br>1 = ITP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 40    | VOUT               | PWR  | OP Amp comparator output. This pin drives the base/gate of the external pass transistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 41    | VDDCPU_IO          | PWR  | Supply for CPU clocks. 0.8V nominal from source/emitter of external pass transistor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 42    | CPUC1_F            | OUT  | Complementary clock of low power differential push-pull CPU output. This CPU clock is free running during iAMT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 43    | CPUT1_F            | OUT  | True clock of differential push-pull CPU clock pair. This clock is free running during iAMT.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 44    | GNDCPU             | PWR  | Ground pin for the CPU outputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 45    | CPUC0              | OUT  | Complement clock of low power differential CPU clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 46    | CPUT0              | OUT  | True clock of low power differential CPU clock pair.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 47    | VDDCPU             | PWR  | Supply for CPU PLL, 3.3V nominal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 48    | CK_PWRGD/PD#       | IN   | Notifies CK505 to sample latched inputs, or iAMT entry/exit, or PWRDWN# mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 49    | FSLB/TEST_MODE     | IN   | 3.3V tolerant input for CPU frequency selection. Refer to input electrical characteristics for Vil_FS and Vih_FS values.<br>TEST_MODE is a real time input to select between Hi-Z and REF/N divider mode while in test mode. Refer to Test Clarification Table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 50    | GNDREF             | PWR  | Ground pin for the REF outputs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 51    | X2                 | OUT  | Crystal output, Nominally 14.318MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 52    | X1                 | IN   | Crystal input, Nominally 14.318MHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 53    | VDDREF             | PWR  | Ref, XTAL power supply, nominal 3.3V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 54    | REF0/FSLC/TEST_SEL | I/O  | 14.318 MHz reference clock./ 3.3V tolerant input for CPU frequency selection. Refer to input electrical characteristics for Vil_FS and Vih_FS values. /TEST_Sel: 3-level latched input to enable test mode. Refer to Test Clarification Table                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 55    | SDATA              | I/O  | Data pin for SMBus circuitry, 5V tolerant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 56    | SCLK               | IN   | Clock pin of SMBus circuitry, 5V tolerant.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## General Description

ICS9LP525-2 is compliant Intel CK505 Yellow Cover specification. This clock synthesizer provides a single chip solution for Intel desktop chipsets. ICS9LP525-2 is driven with a 14.318MHz crystal. It also provides a tight ppm accuracy output for Serial ATA and PCI-Express support.

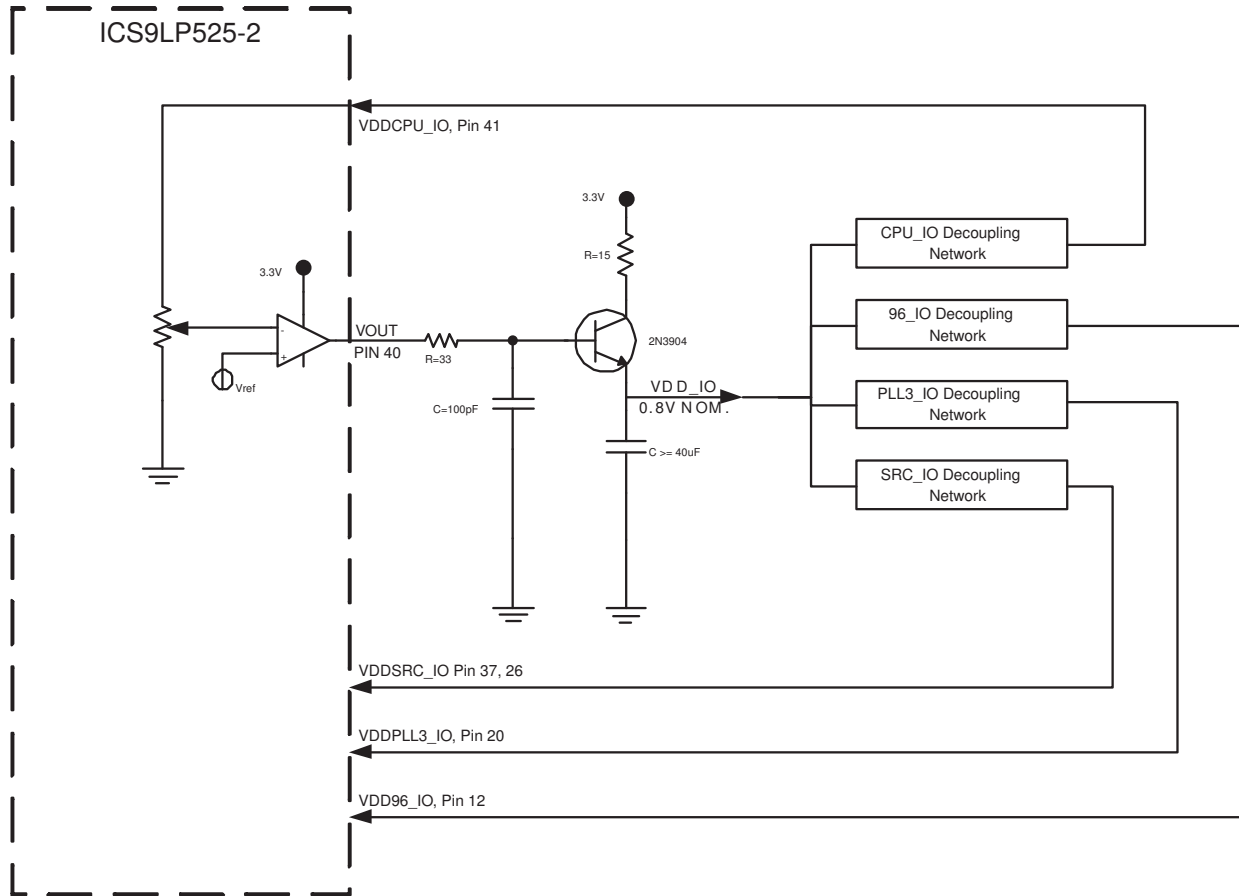
## Block Diagram



## Power Groups

| Pin Number |        | Description          |
|------------|--------|----------------------|
| VDD        | GND    |                      |
| 41, 47     | 44     | CPUCLK               |
| 16         | 15     | Master Clock, Analog |
| 26, 31, 37 | 23, 34 | SRCCLK               |
| 20         | 19     | PLL3/SE              |
| 12         | 11     | DOT 96Mhz            |
| 9          | 11     | USB 48               |
| 53         | 50     | Xtal, REF            |
| 2          | 8      | PCICLK               |

## External Pass Transistor Connection for Desktop Applications



### Absolute Maximum Ratings - DC Parameters

| PARAMETER              | SYMBOL            | CONDITIONS                          | MIN       | MAX | UNITS | Notes |
|------------------------|-------------------|-------------------------------------|-----------|-----|-------|-------|
| Maximum Supply Voltage | VDDxxx            | Supply Voltage                      |           | 4.6 | V     | 7     |
| Maximum Supply Voltage | VDDxxx_IO         | Low-Voltage Differential I/O Supply |           | 3.8 | V     | 7     |
| Maximum Input Voltage  | V <sub>IH</sub>   | 3.3V Inputs                         |           | 4.6 | V     | 4,5,7 |
| Minimum Input Voltage  | V <sub>IL</sub>   | Any Input                           | GND - 0.5 |     | V     | 4,7   |
| Case Temperature       | T <sub>case</sub> |                                     |           | 115 | °C    |       |
| Storage Temperature    | T <sub>s</sub>    | -                                   | -65       | 150 | °C    | 4,7   |
| Input ESD protection   | ESD prot          | Human Body Model                    | 2000      |     | V     | 6,7   |

<sup>1</sup>Guaranteed by design and characterization, not 100% tested in production.

<sup>2</sup>Operation under these conditions is neither implied, nor guaranteed.

### Electrical Characteristics - Input/Supply/Common Output DC Parameters

| PARAMETER                                        | SYMBOL                  | CONDITIONS                                                                                              | MIN                   | MAX                   | UNITS | Notes |
|--------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-------|-------|
| Ambient Operating Temp                           | T <sub>ambient</sub>    | -                                                                                                       | 0                     | 70                    | °C    |       |
| Supply Voltage                                   | VDDxxx                  | Supply Voltage                                                                                          | 3.135                 | 3.465                 | V     |       |
| Supply Voltage                                   | VDDxxx_IO               | Low-Voltage Differential I/O Supply                                                                     | 0.72                  | 0.9                   | V     | 10    |
| Input High Voltage                               | V <sub>IHSE</sub>       | Single-ended 3.3V inputs                                                                                | 2                     | V <sub>DD</sub> + 0.3 | V     | 3     |
| Input Low Voltage                                | V <sub>ILSE</sub>       | Single-ended 3.3V inputs                                                                                | V <sub>SS</sub> - 0.3 | 0.8                   | V     | 3     |
| Low Threshold Input-High Voltage                 | V <sub>IH_FS_TEST</sub> | 3.3 V +/-5%                                                                                             | 2                     | VDD + 0.3             | V     | 8     |
| Low Threshold Input-FSC = '1' Voltage            | V <sub>IH_FS_FSC</sub>  | 3.3 V +/-5%                                                                                             | 0.7                   | 1.5                   | V     | 8     |
| Low Threshold Input-FSA,FSB = '1' Voltage        | V <sub>IH_FS_FSAB</sub> | 3.3 V +/-5%                                                                                             | 0.7                   | VDD+0.3               | V     |       |
| Low Threshold Input-Low Voltage                  | V <sub>IL_FS</sub>      | 3.3 V +/-5%                                                                                             | V <sub>SS</sub> - 0.3 | 0.35                  | V     |       |
| PCI3/CFG0 Input                                  | V <sub>IL_CFGHI</sub>   | Optional input, 2.75V typ.                                                                              | 2.4                   | VDD+0.3               | V     | 9     |
| PCI3/CFG0 Input                                  | V <sub>IL_CFGMID</sub>  | Optional input, 1.65V typ.                                                                              | 1.3                   | 2                     | V     | 9     |
| PCI3/CFG0 Input                                  | V <sub>IL_CFGLO</sub>   | Optional input, 0.55V typ.                                                                              | V <sub>SS</sub> - 0.3 | 0.9                   | V     | 9     |
| Input Leakage Current                            | I <sub>IN</sub>         | V <sub>IN</sub> = V <sub>DD</sub> , V <sub>IN</sub> = GND                                               | -5                    | 5                     | uA    | 2     |
| Input Leakage Current                            | I <sub>INRES</sub>      | Inputs with pull up or pull down resistors<br>V <sub>IN</sub> = V <sub>DD</sub> , V <sub>IN</sub> = GND | -200                  | 200                   | uA    |       |
| Output High Voltage                              | V <sub>OHSE</sub>       | Single-ended outputs, I <sub>OH</sub> = -1mA                                                            | 2.4                   |                       | V     | 1     |
| Output Low Voltage                               | V <sub>OLSE</sub>       | Single-ended outputs, I <sub>OL</sub> = 1 mA                                                            |                       | 0.4                   | V     | 1     |
| Operating Supply Current                         | I <sub>DDOP3.3</sub>    | Full Active, C <sub>L</sub> = Full load; Idd 3.3V                                                       |                       | 200                   | mA    |       |
|                                                  | I <sub>DDOPIO</sub>     | Full Active, C <sub>L</sub> = Full load; IDD IO                                                         |                       | 70                    | mA    | 10    |
| iAMT Mode Current                                | I <sub>DDIAMT3.3</sub>  | M1 mode, 3.3V Rail                                                                                      |                       | 80                    | mA    |       |
|                                                  | I <sub>DDIAMTIO</sub>   | M1 Mode, IO Rail                                                                                        |                       | 10                    | mA    |       |
| Powerdown Current                                | I <sub>DDPD3.3</sub>    | Power down mode, 3.3V Rail                                                                              |                       | 5                     | mA    |       |
|                                                  | I <sub>DDPDIO</sub>     | Power down mode, IO Rail                                                                                |                       | 0.1                   | mA    | 10    |
| Input Frequency                                  | F <sub>i</sub>          | V <sub>DD</sub> = 3.3 V                                                                                 |                       | 15                    | MHz   |       |
| Pin Inductance                                   | L <sub>pin</sub>        |                                                                                                         |                       | 7                     | nH    |       |
| Input Capacitance                                | C <sub>IN</sub>         | Logic Inputs                                                                                            | 1.5                   | 5                     | pF    |       |
|                                                  | C <sub>OUT</sub>        | Output pin capacitance                                                                                  |                       | 6                     | pF    |       |
|                                                  | C <sub>INX</sub>        | X1 & X2 pins                                                                                            |                       | 6                     | pF    |       |
| Clk Stabilization                                | T <sub>STAB</sub>       | From VDD Power-Up or de-assertion of PD to 1st clock                                                    |                       | 1.8                   | ms    |       |
| Tdrive_CR_off                                    | T <sub>DRCROFF</sub>    | Output stop after CR deasserted                                                                         |                       | 400                   | ns    |       |
| Tdrive_CR_on                                     | T <sub>DRCRON</sub>     | Output run after CR asserted                                                                            |                       | 0                     | us    |       |
| Tdrive_CPU                                       | T <sub>DRSRC</sub>      | CPU output enable after<br>PCI_STOP# de-assertion                                                       |                       | 10                    | ns    |       |
| Tfall_SE                                         | T <sub>FALL</sub>       | Fall/rise time of all 3.3V control inputs from 20-80%                                                   |                       | 10                    | ns    |       |
| Trise_SE                                         | T <sub>RISE</sub>       |                                                                                                         |                       | 10                    | ns    |       |
| SMBus Voltage                                    | V <sub>DD</sub>         |                                                                                                         | 2.7                   | 5.5                   | V     |       |
| Low-level Output Voltage                         | V <sub>OLSMB</sub>      | @ I <sub>PULLUP</sub>                                                                                   |                       | 0.4                   | V     |       |
| Current sinking at<br>V <sub>OLSMB</sub> = 0.4 V | I <sub>PULLUP</sub>     | SMB Data Pin                                                                                            | 4                     |                       | mA    |       |
| SCLK/SDATA<br>Clock/Data Rise Time               | T <sub>RI2C</sub>       | (Max V <sub>IL</sub> - 0.15) to<br>(Min V <sub>IH</sub> + 0.15)                                         |                       | 1000                  | ns    |       |
| SCLK/SDATA<br>Clock/Data Fall Time               | T <sub>FI2C</sub>       | (Min V <sub>IH</sub> + 0.15) to<br>(Max V <sub>IL</sub> - 0.15)                                         |                       | 300                   | ns    |       |
| Maximum SMBus Operating Frequency                | F <sub>SMBUS</sub>      |                                                                                                         |                       | 100                   | kHz   |       |
| Spread Spectrum Modulation<br>Frequency          | f <sub>SSMOD</sub>      | Triangular Modulation                                                                                   | 30                    | 33                    | kHz   |       |

**NOTES on DC Parameters: (unless otherwise noted, guaranteed by design and characterization, not 100% tested in production).**

<sup>1</sup>Signal is required to be monotonic in this region.

<sup>2</sup>input leakage current does not include inputs with pull-up or pull-down resistors

<sup>3</sup>3.3V referenced inputs are: PCI\_STOP#, CPU\_STOP#, TME, SRC5\_EN, ITP\_EN, SCLKL, SDATA, TESTMODE, TESTSEL, CKPWRGD and CR# inputs if selected.

<sup>4</sup>Intentionally blank

<sup>5</sup>Maximum VIH is not to exceed VDD

<sup>6</sup>Human Body Model

<sup>7</sup>Operation under these conditions is neither implied, nor guaranteed.

<sup>8</sup>Frequency Select pins which have tri-level input

<sup>9</sup>PCI3/CFG0 is optional

<sup>10</sup>If present. Not all parts have this feature.

**AC Electrical Characteristics - Low Power Differential Outputs**

| PARAMETER                  | SYMBOL    | CONDITIONS               | MIN  | MAX  | UNITS | NOTES  |
|----------------------------|-----------|--------------------------|------|------|-------|--------|
| Rising Edge Slew Rate      | tSLR      | Averaging on             | 2.5  | 4    | V/ns  | 2, 3   |
| Falling Edge Slew Rate     | tFLR      | Averaging on             | 2.5  | 4    | V/ns  | 2, 3   |
| Slew Rate Variation        | tSLVAR    | Averaging on             |      | 20   | %     | 1, 10  |
| Differential Voltage Swing | VSWING    | Averaging off            | 300  |      | mV    | 2      |
| Crossing Point Voltage     | VXABS     | Averaging off            | 300  | 550  | mV    | 1,4,5  |
| Crossing Point Variation   | VXABSVAR  | Averaging off            |      | 140  | mV    | 1,4,9  |
| Maximum Output Voltage     | VHIGH     | Averaging off            |      | 1150 | mV    | 1,7    |
| Minimum Output Voltage     | VLOW      | Averaging off            | -300 |      | mV    | 1,8    |
| Duty Cycle                 | DCYC      | Averaging on             | 45   | 55   | %     | 2      |
| CPU Skew                   | CPUSKEW   | Averaging on             |      | 100  | ps    |        |
| CPU[1:0] Skew              | CPUSKEW10 | Differential Measurement |      | 100  | ps    | 1      |
| CPU[2 :ITP:0] Skew         | CPUSKEW20 | Differential Measurement |      | 150  | ps    | 1      |
| SRC[10:0] Skew             | SRCSKEW   | Differential Measurement |      | 3000 | ps    | 1,6,11 |

**NOTES on DIF Output AC Specs: (unless otherwise noted, guaranteed by design and characterization, not 100% tested in production).**

<sup>1</sup>Measurement taken for single ended waveform on a component test board (not in system)

<sup>2</sup>Measurement taken from differential waveform on a component test board. (not in system)

<sup>3</sup>Slew rate emasured through V\_swing voltage range centered about differential zero

<sup>4</sup>Vcross is defined at the voltage where Clock = Clock#, measured on a component test board (not in system)

<sup>5</sup>Only applies to the differential rising edge (Clock rising, Clock# falling)

<sup>6</sup>Total distributed intentional SRC to SRC skew. PCIe Gen2 outputs (SRC3, 4, 6 and 7) will have 0 nominal skew. Maximum allowable interpair skew is 150 ps.

<sup>7</sup>The max voltage including overshoot.

<sup>8</sup>The min voltage including undershoot.

<sup>9</sup>The total variation of all Vcross measurements in any particular system. Note this is a subset of V\_cross min/mas (V\_Cross absolute) allowed. The intent is to limit Vcross induced modulation by setting C\_cross\_delta to be smaller than V\_Cross absolute.

<sup>10</sup>Matching applies to rising edge rate for Clock and falling edge rate for Clock#. It is measured using a +/-75mV window centered on the average cross point where Clock rising meets Clock# falling. The median cross point is used to calculate the voltage thresholds the oscilloscope is to use for the edge rate calculations.

<sup>11</sup>For PCIe Gen2 compliant devices, SRC 3, 4, 6, and 7 will have 0 ps nominal skew.

**Clock Jitter Specs - Low Power Differential Outputs**

| PARAMETER                   | SYMBOL  | CONDITIONS               | MIN | MAX | UNITS | NOTES |
|-----------------------------|---------|--------------------------|-----|-----|-------|-------|
| CPU Jitter - Cycle to Cycle | CPUJC2C | Differential Measurement |     | 85  | ps    | 1     |
| SRC Jitter - Cycle to Cycle | SRCJC2C | Differential Measurement |     | 125 | ps    | 1,2   |
| DOT Jitter - Cycle to Cycle | DOTJC2C | Differential Measurement |     | 250 | ps    | 1     |

**NOTES on DIF Output Jitter: (unless otherwise noted, guaranteed by design and characterization, not 100% tested in production).**

<sup>1</sup>Jitter specs are specified as measured on a clock characterization board. System designers need to take special care not to use these numbers, as the in-system performance will be somewhat degraded. The receiver EMTS (chispet or CPU) will have the receiver jitter specs as measured in a real system.

<sup>2</sup>Phase jitter requirement: The designated Ge2 outputs will meet the reference clock jitter requirements from the PCI Express Gen2 Base Spec. The test is performed on a component test board under quiet conditions with all outputs on. Jitter analysis is performed using the standardized tool provided by the PCI SIG.

### Differential Clock Tolerances

|                       | CPU    | SRC    | DOT96 |  |     |
|-----------------------|--------|--------|-------|--|-----|
| PPM tolerance         | 100    | 100    | 100   |  | ppm |
| Cycle to Cycle Jitter | 85     | 125    | 250   |  | ps  |
| Spread                | -0.50% | -0.50% | 0     |  | %   |

### Clock Periods - Differential Outputs with Spread Spectrum Disabled

| SSC OFF  | Center Freq. MHz | Measurement Window     |                             |                             |                      |                             |                             |                        | Units | Notes |
|----------|------------------|------------------------|-----------------------------|-----------------------------|----------------------|-----------------------------|-----------------------------|------------------------|-------|-------|
|          |                  | 1 Clock                | 1us                         | 0.1s                        | 0.1s                 | 0.1s                        | 1us                         | 1 Clock                |       |       |
|          |                  | -c2c jitter AbsPer Min | -SSC Short-Term Average Min | - ppm Long-Term Average Min | 0 ppm Period Nominal | + ppm Long-Term Average Max | +SSC Short-Term Average Max | +c2c jitter AbsPer Max |       |       |
| CPU      | 100.00           | 9.91400                |                             | 9.99900                     | 10.00000             | 10.00100                    |                             | 10.08600               | ns    | 1,2   |
|          | 133.33           | 7.41425                |                             | 7.49925                     | 7.50000              | 7.50075                     |                             | 7.58575                | ns    | 1,2   |
|          | 166.67           | 5.91440                |                             | 5.99940                     | 6.00000              | 6.00060                     |                             | 6.08560                | ns    | 1,2   |
|          | 200.00           | 4.91450                |                             | 4.99950                     | 5.00000              | 5.00050                     |                             | 5.08550                | ns    | 1,2   |
|          | 266.67           | 3.66462                |                             | 3.74962                     | 3.75000              | 3.75037                     |                             | 3.83537                | ns    | 1,2   |
|          | 333.33           | 2.91470                |                             | 2.99970                     | 3.00000              | 3.00030                     |                             | 3.08530                | ns    | 1,2   |
|          | 400.00           | 2.41475                |                             | 2.49975                     | 2.50000              | 2.50025                     |                             | 2.58525                | ns    | 1,2   |
| SRC/SATA | 100.00           | 9.87400                |                             | 9.99900                     | 10.00000             | 10.00100                    |                             | 10.12600               | ns    | 1,2   |
| DOT96    | 96.00            | 10.16563               |                             | 10.41563                    | 10.41667             | 10.41771                    |                             | 10.66771               | ns    | 1,2   |

### Clock Periods - Differential Outputs with Spread Spectrum Enabled

| SSC ON | Center Freq. MHz | Measurement Window     |                             |                             |                      |                             |                             |                        | Units | Notes |
|--------|------------------|------------------------|-----------------------------|-----------------------------|----------------------|-----------------------------|-----------------------------|------------------------|-------|-------|
|        |                  | 1 Clock                | 1us                         | 0.1s                        | 0.1s                 | 0.1s                        | 1us                         | 1 Clock                |       |       |
|        |                  | -c2c jitter AbsPer Min | -SSC Short-Term Average Min | - ppm Long-Term Average Min | 0 ppm Period Nominal | + ppm Long-Term Average Max | +SSC Short-Term Average Max | +c2c jitter AbsPer Max |       |       |
| CPU    | 99.75            | 9.91406                | 9.99906                     | 10.02406                    | 10.02506             | 10.02607                    | 10.05107                    | 10.13607               | ns    | 1,2   |
|        | 133.00           | 7.41430                | 7.49930                     | 7.51805                     | 7.51880              | 7.51955                     | 7.53830                     | 7.62330                | ns    | 1,2   |
|        | 166.25           | 5.91444                | 5.99944                     | 6.01444                     | 6.01504              | 6.01564                     | 6.03064                     | 6.11564                | ns    | 1,2   |
|        | 199.50           | 4.91453                | 4.99953                     | 5.01203                     | 5.01253              | 5.01303                     | 5.02553                     | 5.11053                | ns    | 1,2   |
|        | 266.00           | 3.66465                | 3.74965                     | 3.75902                     | 3.75940              | 3.75977                     | 3.76915                     | 3.85415                | ns    | 1,2   |
|        | 332.50           | 2.91472                | 2.99972                     | 3.00722                     | 3.00752              | 3.00782                     | 3.01532                     | 3.10032                | ns    | 1,2   |
|        | 399.00           | 2.41477                | 2.49977                     | 2.50602                     | 2.50627              | 2.50652                     | 2.51277                     | 2.59777                | ns    | 1,2   |
| SRC    | 99.75            | 9.87406                | 9.99906                     | 10.02406                    | 10.02506             | 10.02607                    | 10.05107                    | 10.17607               | ns    | 1,2   |

<sup>1</sup>Guaranteed by design and characterization, not 100% tested in production.

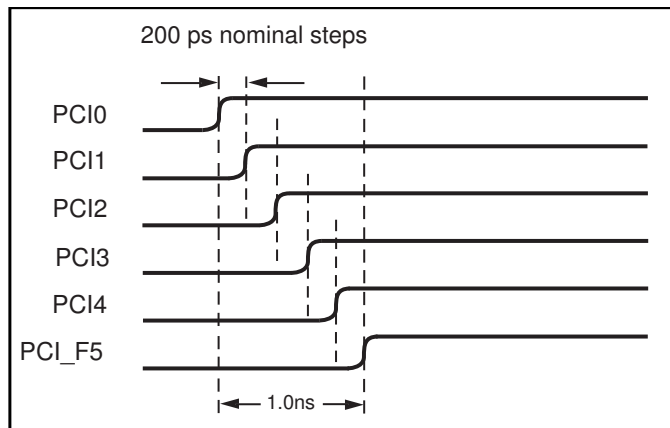
<sup>2</sup> All Long Term Accuracy specifications are guaranteed with the assumption that the crystal input is tuned to exactly 14.31818MHz.



### Electrical Characteristics - PCICLK/PCICLK\_F

| PARAMETER                    | SYMBOL               | CONDITIONS                             | MIN      | MAX      | UNITS | NOTES |
|------------------------------|----------------------|----------------------------------------|----------|----------|-------|-------|
| Long Accuracy                | ppm                  | see T <sub>period</sub> min-max values | -100     | 100      | ppm   | 1,2   |
| Clock period                 | T <sub>period</sub>  | 33.33MHz output no spread              | 29.99700 | 30.00300 | ns    | 2     |
|                              |                      | 33.33MHz output spread                 | 30.08421 | 30.23459 | ns    | 2     |
| Absolute min/max period      | T <sub>abs</sub>     | 33.33MHz output no spread              | 29.49700 | 30.50300 | ns    | 2     |
|                              |                      | 33.33MHz output nominal/spread         | 29.56617 | 30.58421 | ns    | 2     |
| Rising Edge Slew Rate        | t <sub>SLR</sub>     | Measured from 0.8 to 2.0 V             | 1        | 4        | V/ns  | 1     |
| Falling Edge Slew Rate       | t <sub>FLR</sub>     | Measured from 2.0 to 0.8 V             | 1        | 4        | V/ns  | 1     |
| Pin to Pin Skew              | t <sub>skew</sub>    | V <sub>T</sub> = 1.5 V                 |          | 250      | ps    | 2     |
| Intentional PCI to PCI delay | t <sub>skew</sub>    | V <sub>T</sub> = 1.5 V                 | 100      | 200      | ps    | 2     |
| Duty Cycle                   | d <sub>t1</sub>      | V <sub>T</sub> = 1.5 V                 | 45       | 55       | %     | 2     |
| Jitter, Cycle to cycle       | t <sub>jcy-cyc</sub> | V <sub>T</sub> = 1.5 V                 |          | 500      | ps    | 2     |

### Intentional PCI Clock to Clock Delay



### Electrical Characteristics - USB48MHz

| PARAMETER               | SYMBOL               | CONDITIONS                             | MIN      | MAX      | UNITS | NOTES |
|-------------------------|----------------------|----------------------------------------|----------|----------|-------|-------|
| Long Accuracy           | ppm                  | see T <sub>period</sub> min-max values | -100     | 100      | ppm   | 2,4   |
| Clock period            | T <sub>period</sub>  | 48.00MHz output nominal                | 20.83125 | 20.83542 | ns    | 2,3   |
| Absolute min/max period | T <sub>abs</sub>     | 48.00MHz output nominal                | 20.48125 | 21.18542 | ns    | 2     |
| CLK High Time           | T <sub>HIGH</sub>    |                                        | 8.216563 | 11.15198 | V     |       |
| CLK Low time            | T <sub>LOW</sub>     |                                        | 7.816563 | 10.95198 | V     |       |
| Rising Edge Slew Rate   | t <sub>SLR</sub>     | Measured from 0.8 to 2.0 V             | 1        | 2        | V/ns  | 1     |
| Falling Edge Slew Rate  | t <sub>FLR</sub>     | Measured from 2.0 to 0.8 V             | 1        | 2        | V/ns  | 1     |
| Duty Cycle              | d <sub>t1</sub>      | V <sub>T</sub> = 1.5 V                 | 45       | 55       | %     | 2     |
| Jitter, Cycle to cycle  | t <sub>jcy-cyc</sub> | V <sub>T</sub> = 1.5 V                 |          | 350      | ps    | 2     |

### Electrical Characteristics - REF-14.318MHz

| PARAMETER               | SYMBOL               | CONDITIONS                             | MIN      | MAX      | UNITS | Notes |
|-------------------------|----------------------|----------------------------------------|----------|----------|-------|-------|
| Long Accuracy           | ppm                  | see T <sub>period</sub> min-max values | -100     | 100      | ppm   | 2, 4  |
| Clock period            | T <sub>period</sub>  | 14.318MHz output nominal               | 69.82033 | 69.86224 | ns    | 2, 3  |
| Absolute min/max period | T <sub>abs</sub>     | 14.318MHz output nominal               | 69.83400 | 70.84800 | ns    | 2     |
| CLK High Time           | T <sub>HIGH</sub>    |                                        | 29.97543 | 38.46654 | V     |       |
| CLK Low time            | T <sub>LOW</sub>     |                                        | 29.57543 | 38.26654 | V     |       |
| Rising Edge Slew Rate   | t <sub>SLR</sub>     | Measured from 0.8 to 2.0 V             | 1        | 4        | V/ns  | 1     |
| Falling Edge Slew Rate  | t <sub>FLR</sub>     | Measured from 2.0 to 0.8 V             | 1        | 4        | V/ns  | 1     |
| Duty Cycle              | dt1                  | V <sub>T</sub> = 1.5 V                 | 45       | 55       | %     | 2     |
| Jitter, Cycle to cycle  | t <sub>jcy-cyc</sub> | V <sub>T</sub> = 1.5 V                 |          | 1000     | ps    | 2     |

**NOTES on SE outputs: (unless otherwise noted, guaranteed by design and characterization, not 100% tested in production).**

<sup>1</sup>Edge rate in system is measured from 0.8V to 2.0V.

<sup>2</sup>Duty cycle, Period and Jitter are measured with respect to 1.5V

<sup>3</sup>The average period over any 1us period of time

<sup>4</sup>Using frequency counter with the measurement interval equal or greater than 0.15s, target frequencies are 14.318180 MHz, 33.333333MHz and 48.000000MHz

Table 1: CPU Frequency Select Table

| FS <sub>L</sub> C <sup>2</sup><br>B0b7 | FS <sub>L</sub> B <sup>1</sup><br>B0b6 | FS <sub>L</sub> A <sup>1</sup><br>B0b5 | CPU<br>MHz | SRC<br>MHz | PCI<br>MHz | REF<br>MHz | USB<br>MHz | DOT<br>MHz |
|----------------------------------------|----------------------------------------|----------------------------------------|------------|------------|------------|------------|------------|------------|
| 0                                      | 0                                      | 0                                      | 266.66     | 100.00     | 33.33      | 14.318     | 48.00      | 96.00      |
| 0                                      | 0                                      | 1                                      | 133.33     |            |            |            |            |            |
| 0                                      | 1                                      | 0                                      | 200.00     |            |            |            |            |            |
| 0                                      | 1                                      | 1                                      | 166.66     |            |            |            |            |            |
| 1                                      | 0                                      | 0                                      | 333.33     |            |            |            |            |            |
| 1                                      | 0                                      | 1                                      | 100.00     |            |            |            |            |            |
| 1                                      | 1                                      | 0                                      | 400.00     |            |            |            |            |            |
| 1                                      | 1                                      | 1                                      | Reserved   |            |            |            |            |            |

1. FS<sub>L</sub>A and FS<sub>L</sub>B are low-threshold inputs. Please see V<sub>IL\_FS</sub> and V<sub>IH\_FS</sub> specifications in the Input/Supply/Common Output Parameters Table for correct values.  
Also refer to the Test Clarification Table.
2. FS<sub>L</sub>C is a three-level input. Please see the V<sub>IL\_FS</sub> and V<sub>IH\_FS</sub> specifications in the Input/Supply/Common Output Parameters Table for correct values.

Table 2: PLL3 Quick Configuration (only applies in Mode 0, see Table 6)

| B1b4 | B1b3 | B1b2 | B1b1 | Pin 17         | Pin 18 | Spread           | Comment                            |
|------|------|------|------|----------------|--------|------------------|------------------------------------|
|      |      |      |      | MHz            | MHz    | %                |                                    |
| 0    | 0    | 0    | 0    | PLL 3 disabled |        |                  |                                    |
| 0    | 0    | 0    | 1    | 100.00         | 100.00 | 0.5% Down Spread | SRC clocks from SRC_MAIN           |
| 0    | 0    | 1    | 0    | 100.00         | 100.00 | 0.5% Down Spread | Only SRCCLK1 from PLL3             |
| 0    | 0    | 1    | 1    | 100.00         | 100.00 | 1% Down Spread   | Only SRCCLK1 from PLL3             |
| 0    | 1    | 0    | 0    | 100.00         | 100.00 | 1.5% Down Spread | Only SRCCLK1 from PLL3             |
| 0    | 1    | 0    | 1    | 100.00         | 100.00 | 2% Down Spread   | Only SRCCLK1 from PLL3             |
| 0    | 1    | 1    | 0    | 100.00         | 100.00 | 2.5% Down Spread | Only SRCCLK1 from PLL3             |
| 0    | 1    | 1    | 1    | N/A            | N/A    | N/A              | N/A                                |
| 1    | 0    | 0    | 0    | 24.576         | 24.576 | None             | 24.576Mhz on SE1 and SE2           |
| 1    | 0    | 0    | 1    | 24.576         | 98.304 | None             | 24.576Mhz on SE1, 98.304Mhz on SE2 |
| 1    | 0    | 1    | 0    | 98.304         | 98.304 | None             | 98.304Mhz on SE1 and SE2           |
| 1    | 0    | 1    | 1    | 27.000         | 27.000 | None             | 27Mhz on SE1 and SE2               |
| 1    | 1    | 0    | 0    | 25.000         | 25.000 | None             | 25Mhz on SE1 and SE2               |
| 1    | 1    | 0    | 1    | N/A            | N/A    | N/A              | N/A                                |
| 1    | 1    | 1    | 0    | N/A            | N/A    | N/A              | N/A                                |
| 1    | 1    | 1    | 1    | N/A            | N/A    | N/A              | N/A                                |

Table 3: IO Vout select table

| B9b2 | B9b1 | B9b0 | IO Vout |
|------|------|------|---------|
| 0    | 0    | 0    | 0.3V    |
| 0    | 0    | 1    | 0.4V    |
| 0    | 1    | 0    | 0.5V    |
| 0    | 1    | 1    | 0.6V    |
| 1    | 0    | 0    | 0.7V    |
| 1    | 0    | 1    | 0.8V    |
| 1    | 1    | 0    | 0.9V    |
| 1    | 1    | 1    | 1.0V    |

**Table 4: Device ID table**

| B8b7 | B8b6 | B8b5 | B8b4 | Comment      |
|------|------|------|------|--------------|
| 0    | 0    | 0    | 0    | 56 pin TSSOP |

**Table 5: Slew Rate Selection Table**

| Bit 1 | Bit 0 | Slew Rate       |
|-------|-------|-----------------|
| 0     | 0     | HI-Z            |
| 0     | 1     | 0.7X (1.4V/ns)  |
| 1     | 0     | 0.8X (1.6 V/ns) |
| 1     | 1     | 1X (2.0 V/ns)   |

**Table 6. PCI3 Configuration Table**

| PCI3/CFG0<br>HW Strap | PCI2/TME<br>HW Strap | Note: 2 bits are needed since<br>CFG0 is tri-level input |                               | SRC_Main_SE<br>L<br>(Byte 0, bit 2) | Config Mode |
|-----------------------|----------------------|----------------------------------------------------------|-------------------------------|-------------------------------------|-------------|
|                       |                      | PCI3_CFG1<br>(Byte 11, bit 7)                            | PCI3_CFG0<br>(Byte 11, bit 6) |                                     |             |
| Low                   | 0 or 1               | 0                                                        | 0                             | 0                                   | 0 = Default |
| Mid                   | 0 or 1               | 0                                                        | 1                             | 1                                   | 1           |
| High                  | TME=0                | 1                                                        | 0                             | 1                                   | 2           |
| High                  | TME=1                | 1                                                        | 1                             | 1                                   | 3           |

**Table 7. PLL Modes for PCI3 Configurations**

| Config<br>Mode | PLL1            |        | PLL2      |     | PLL3    |      | SRC1     | PLL Source                   |
|----------------|-----------------|--------|-----------|-----|---------|------|----------|------------------------------|
|                | Outputs         | SSC    | Outputs   | SSC | Outputs | SSC  |          |                              |
| 0 = Default    | CPU/SRC/<br>PCI | Down   | USB       | NA  | -       | -    | 100MHz   | PLL1<br>(Table 2<br>applies) |
| 1              | CPU             | Down   | USB       | NA  | SRC/PCI | Down | 100MHz   | PLL3                         |
| 2              | CPU             | Center | USB       | NA  | SRC/PCI | Down | 100MHz   | PLL3                         |
| 3              | CPU             | Center | USB/LAN25 | NA  | SRC/PCI | Down | 25MHz SE | PLL2*                        |

\*Note: In Mode 3, Byte 8, bit (1:0) must be set to '1' to enable pin 17,18

**Table 8. ME Clock Selection Table**

| PCIF5/<br>ITP_EN | iAMT_EN | CPU2_AMT_EN | CPU1_AMT_EN | Description                         |
|------------------|---------|-------------|-------------|-------------------------------------|
| x                | 1       | 0           | 0           | Reserved                            |
| x                | 1       | 0           | 1           | Default, CPU1 = iAMT Clock          |
| 1                | 1       | 1           | 0           | CPU2 = iAMT Clock                   |
| 1                | 1       | 1           | 1           | CPU1 and CPU2 both run in iAMT mode |

#### PCI\_STOP# Power Management

|              |           | Single-ended Clocks |              | Differential Clocks<br>(Except CPU) |              |
|--------------|-----------|---------------------|--------------|-------------------------------------|--------------|
| SMBus OE Bit | PCI_STOP# | Stoppable           | Free running | Stoppable                           | Free running |
| Enable       | 1         | Running             | Running      | Running                             | Running      |
|              | 0         | Low                 | Low          | CK= High<br>CK# = Low               | Running      |
|              |           |                     |              | CK= Pull down<br>CK# = Low          | Running      |
| Disable      | X         | Low                 |              | CK= Pull down, CK# = Low            |              |

#### CPU\_STOP# Power Management

| SMBus OE Bit | PCI_STOP# | Differential Clocks        |              |
|--------------|-----------|----------------------------|--------------|
|              |           | Stoppable                  | Free running |
| Enable       | 1         | Running                    | Running      |
|              | 0         | CK= High<br>CK# = Low      | Running      |
|              |           | CK= Pull down<br>CK# = Low | Running      |
| Disable      | X         | Low                        |              |

#### CR# Power Management

| SMBus OE Bit | CR# | Differential Clocks       |              |
|--------------|-----|---------------------------|--------------|
|              |     | Stoppable                 | Free running |
| Enable       | 1   | Running                   | Running      |
|              | 0   | CK= Pull down, CK# = Low  |              |
| Disable      | X   | CK = Pull down, CK# = Low |              |

#### PD# Power Management

| Device State                           | Single-ended Clocks |                 | Differential Clocks<br>(Except CPU1) | CPU1                       |
|----------------------------------------|---------------------|-----------------|--------------------------------------|----------------------------|
|                                        | w/o Latched input   | w/Latched input |                                      |                            |
| Latches Open                           | Low                 | Hi-Z            | CK= Pull down, CK# = Low             | CK= Pull down, CK# = Low   |
| Power Down                             |                     |                 | CK= Pull down<br>CK# = Low           | CK= Pull down<br>CK# = Low |
| M1                                     |                     |                 | CK= Pull down<br>CK# = Low           | Running                    |
| Virtual Power Cycle<br>to Latches Open |                     |                 | CK= Pull down, CK# = Low             | CK= Pull down, CK# = Low   |

## General SMBus serial interface information for the ICS9LP525-2

### How to Write:

- Controller (host) sends a start bit.
- Controller (host) sends the write address D2<sub>(H)</sub>
- ICS clock will **acknowledge**
- Controller (host) sends the beginning byte location = N
- ICS clock will **acknowledge**
- Controller (host) sends the data byte count = X
- ICS clock will **acknowledge**
- Controller (host) starts sending **Byte N through Byte N + X - 1**
- ICS clock will **acknowledge** each byte **one at a time**
- Controller (host) sends a Stop bit

| Index Block Write Operation     |           |                      |
|---------------------------------|-----------|----------------------|
| Controller (Host)               |           | ICS (Slave/Receiver) |
| T                               | starT bit |                      |
| Slave Address D2 <sub>(H)</sub> |           |                      |
| WR                              | WRite     |                      |
|                                 |           | ACK                  |
| Beginning Byte = N              |           |                      |
|                                 |           | ACK                  |
| Data Byte Count = X             |           |                      |
|                                 |           | ACK                  |
| Beginning Byte N                |           |                      |
|                                 |           | ACK                  |
| ○                               |           |                      |
| ○                               |           | ○                    |
| ○                               |           | ○                    |
|                                 |           | ○                    |
| Byte N + X - 1                  |           |                      |
|                                 |           | ACK                  |
| P                               | stoP bit  |                      |

### How to Read:

- Controller (host) will send start bit.
- Controller (host) sends the write address D2<sub>(H)</sub>
- ICS clock will **acknowledge**
- Controller (host) sends the beginning byte location = N
- ICS clock will **acknowledge**
- Controller (host) will send a separate start bit.
- Controller (host) sends the read address D3<sub>(H)</sub>
- ICS clock will **acknowledge**
- ICS clock will send the data byte count = X
- ICS clock sends **Byte N + X - 1**
- ICS clock sends **Byte 0 through byte X (if X<sub>(H)</sub> was written to byte 8).**
- Controller (host) will need to acknowledge each byte
- Controller (host) will send a not acknowledge bit
- Controller (host) will send a stop bit

| Index Block Read Operation      |                 |                      |
|---------------------------------|-----------------|----------------------|
| Controller (Host)               |                 | ICS (Slave/Receiver) |
| T                               | starT bit       |                      |
| Slave Address D2 <sub>(H)</sub> |                 |                      |
| WR                              | WRite           |                      |
|                                 |                 | ACK                  |
| Beginning Byte = N              |                 |                      |
|                                 |                 | ACK                  |
| RT                              | Repeat starT    |                      |
| Slave Address D3 <sub>(H)</sub> |                 |                      |
| RD                              | ReaD            |                      |
|                                 |                 | ACK                  |
|                                 |                 |                      |
|                                 |                 | Data Byte Count = X  |
| ACK                             |                 |                      |
| ACK                             |                 | Beginning Byte N     |
| ○                               |                 | ○                    |
| ○                               |                 | ○                    |
| ○                               |                 | ○                    |
|                                 |                 |                      |
|                                 |                 | Byte N + X - 1       |
| N                               | Not acknowledge |                      |
| P                               | stoP bit        |                      |

**Byte 0 FS Readback and PLL Selection Register**

| Bit | Pin | Name         | Description                                                                                                                                                                                                        | Type | 0                                        | 1                   | Default |
|-----|-----|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------|---------------------|---------|
| 7   | -   | FSLC         | CPU Freq. Sel. Bit (Most Significant)                                                                                                                                                                              | R    | See Table 1 : CPU Frequency Select Table |                     | Latch   |
| 6   | -   | FSLB         | CPU Freq. Sel. Bit                                                                                                                                                                                                 | R    |                                          |                     | Latch   |
| 5   | -   | FSLA         | CPU Freq. Sel. Bit (Least Significant)                                                                                                                                                                             | R    |                                          |                     | Latch   |
| 4   | -   | iAMT_EN      | Set via SMBus or dynamically by CK505 if detects dynamic M1                                                                                                                                                        | RW   | Legacy Mode                              | iAMT Enabled        | 0       |
| 3   |     | Reserved     | Reserved                                                                                                                                                                                                           | RW   |                                          |                     | 0       |
| 2   | -   | SRC_Main_SEL | Select source for SRC Main                                                                                                                                                                                         | RW   | SRC Main = PLL1                          | SRC Main = PLL3     | Latch   |
| 1   | -   | SATA_SEL     | Select source for SATA clock                                                                                                                                                                                       | RW   | SATA = SRC_Main                          | SATA = PLL2         | 0       |
| 0   | -   | PD_Restore   | 1 = on Power Down de-assert return to last known state<br>0 = clear all SMBus configurations as if cold power-on and go to latches open state<br>This bit is ignored and treated at '1' if device is in iAMT mode. | RW   | Configuration Not Saved                  | Configuration Saved | 1       |

**Byte 1 DOT96 Select and PLL3 Quick Config Register**

| Bit | Pin   | Name         | Description                    | Type | 0                                                                                  | 1                 | Default |
|-----|-------|--------------|--------------------------------|------|------------------------------------------------------------------------------------|-------------------|---------|
| 7   | 13/14 | SRC0_SEL     | Select SRC0 or DOT96           | RW   | SRC0                                                                               | DOT96             | 0       |
| 6   | -     | PLL1_SSC_SEL | Select 0.5% down or center SSC | RW   | Down spread                                                                        | Center spread     | Latch   |
| 5   |       | PLL3_SSC_SEL | Select 0.5% down or center SSC | RW   | Down spread                                                                        | Center spread     | 0       |
| 4   |       | PLL3_CF3     | PLL3 Quick Config Bit 3        | RW   | See Table 2: PLL3 Quick Configuration<br><b>Only applies if Byte 0, bit 2 = 0.</b> |                   | 0       |
| 3   |       | PLL3_CF2     | PLL3 Quick Config Bit 2        | RW   |                                                                                    |                   | 0       |
| 2   |       | PLL3_CF1     | PLL3 Quick Config Bit 1        | RW   |                                                                                    |                   | 0       |
| 1   |       | PLL3_CF0     | PLL3 Quick Config Bit 0        | RW   |                                                                                    |                   | 1       |
| 0   |       | PCI_SEL      | PCI_SEL                        | RW   | PCI from PLL1                                                                      | PCI from SRC_MAIN | 1       |

**Byte 2 Output Enable Register**

| Bit | Pin | Name     | Description                                             | Type | 0               | 1              | Default |
|-----|-----|----------|---------------------------------------------------------|------|-----------------|----------------|---------|
| 7   |     | REF_OE   | Output enable for REF, if disabled output is tri-stated | RW   | Output Disabled | Output Enabled | 1       |
| 6   |     | USB_OE   | Output enable for USB                                   | RW   | Output Disabled | Output Enabled | 1       |
| 5   |     | PCIF5_OE | Output enable for PCI5                                  | RW   | Output Disabled | Output Enabled | 1       |
| 4   |     | PCI4_OE  | Output enable for PCI4                                  | RW   | Output Disabled | Output Enabled | 1       |
| 3   |     | PCI3_OE  | Output enable for PCI3                                  | RW   | Output Disabled | Output Enabled | 1       |
| 2   |     | PCI2_OE  | Output enable for PCI2                                  | RW   | Output Disabled | Output Enabled | 1       |
| 1   |     | PCI1_OE  | Output enable for PCI1                                  | RW   | Output Disabled | Output Enabled | 1       |
| 0   |     | PCI0_OE  | Output enable for PCI0                                  | RW   | Output Disabled | Output Enabled | 1       |

**Byte 3 Output Enable Register**

| Bit | Pin | Name        | Description                   | Type | 0               | 1              | Default |
|-----|-----|-------------|-------------------------------|------|-----------------|----------------|---------|
| 7   |     | Reserved    | Reserved                      | RW   | -               | -              | 1       |
| 6   |     | Reserved    | Reserved                      | RW   | -               | -              | 1       |
| 5   |     | Reserved    | Reserved                      | RW   | -               | -              | 1       |
| 4   |     | SRC8/ITP_OE | Output enable for SRC8 or ITP | RW   | Output Disabled | Output Enabled | 1       |
| 3   |     | SRC7_OE     | Output enable for SRC7        | RW   | Output Disabled | Output Enabled | 1       |
| 2   |     | SRC6_OE     | Output enable for SRC6        | RW   | Output Disabled | Output Enabled | 1       |
| 1   |     | SRC5_OE     | Output enable for SRC5        | RW   | Output Disabled | Output Enabled | 1       |
| 0   |     | SRC4_OE     | Output enable for SRC4        | RW   | Output Disabled | Output Enabled | 1       |

#### Byte 4 Output Enable and Spread Spectrum Disable Register

| Bit | Pin | Name          | Description                     | Type | 0               | 1              | Default |
|-----|-----|---------------|---------------------------------|------|-----------------|----------------|---------|
| 7   |     | SRC3_OE       | Output enable for SRC3          | RW   | Output Disabled | Output Enabled | 1       |
| 6   |     | SATA/SRC2_OE  | Output enable for SATA/SRC2     | RW   | Output Disabled | Output Enabled | 1       |
| 5   |     | SRC1_OE       | Output enable for SRC1          | RW   | Output Disabled | Output Enabled | 1       |
| 4   |     | SRC0/DOT96_OE | Output enable for SRC0/DOT96    | RW   | Output Disabled | Output Enabled | 1       |
| 3   |     | CPU1_OE       | Output enable for CPU1          | RW   | Output Disabled | Output Enabled | 1       |
| 2   |     | CPU0_OE       | Output enable for CPU0          | RW   | Output Disabled | Output Enabled | 1       |
| 1   |     | PLL1_SSC_ON   | Enable PLL1's spread modulation | RW   | Spread Disabled | Spread Enabled | 1       |
| 0   |     | PLL3_SSC_ON   | Enable PLL3's spread modulation | RW   | Spread Disabled | Spread Enabled | 1       |

#### Byte 5 Clock Request Enable/Configuration Register

| Bit | Pin | Name      | Description                                                                | Type | 0             | 1             | Default |
|-----|-----|-----------|----------------------------------------------------------------------------|------|---------------|---------------|---------|
| 7   |     | CR#_A_EN  | Enable CR#_A (clk req),<br>PCI0_OE must be = 1 for this bit to take effect | RW   | Disable CR#_A | Enable CR#_A  | 0       |
| 6   |     | CR#_A_SEL | Sets CR#_A to control either SRC0 or SRC2                                  | RW   | CR#_A -> SRC0 | CR#_A -> SRC2 | 0       |
| 5   |     | CR#_B_EN  | Enable CR#_B (clk req)                                                     | RW   | Disable CR#_B | Enable CR#_B  | 0       |
| 4   |     | CR#_B_SEL | Sets CR#_B -> SRC1 or SRC4                                                 | RW   | CR#_B -> SRC1 | CR#_B -> SRC4 | 0       |
| 3   |     | CR#_C_EN  | Enable CR#_C (clk req)                                                     | RW   | Disable CR#_C | Enable CR#_C  | 0       |
| 2   |     | CR#_C_SEL | Sets CR#_C -> SRC0 or SRC2                                                 | RW   | CR#_C -> SRC0 | CR#_C -> SRC2 | 0       |
| 1   |     | CR#_D_EN  | Enable CR#_D (clk req)                                                     | RW   | Disable CR#_D | Enable CR#_D  | 0       |
| 0   |     | CR#_D_SEL | Sets CR#_D -> SRC1 or SRC4                                                 | RW   | CR#_D -> SRC1 | CR#_D -> SRC4 | 0       |

#### Byte 6 Clock Request Enable/Configuration and Stop Control Register

| Bit | Pin | Name                    | Description                                    | Type | 0             | 1                                    | Default |
|-----|-----|-------------------------|------------------------------------------------|------|---------------|--------------------------------------|---------|
| 7   |     | CR#_E_EN                | Enable CR#_E (clk req) -> SRC6                 | RW   | Disable CR#_E | Enable CR#_E                         | 0       |
| 6   |     | CR#_F_EN                | Enable CR#_F (clk req) -> SRC8                 | RW   | Disable CR#_F | Enable CR#_F                         | 0       |
| 5   |     | Reserved                | Reserved                                       | RW   | -             | -                                    | 0       |
| 4   |     | Reserved                | Reserved                                       | RW   | -             | -                                    | 0       |
| 3   |     | Reserved                | Reserved                                       | RW   | -             | -                                    | 0       |
| 2   |     | Reserved                | Reserved                                       | RW   | -             | -                                    | 0       |
| 1   |     | SSCD_STP_CRTL<br>(SRC1) | If set, SSCD (SRC1) stops with PCI_STOP#       | RW   | Free Running  | Stops with<br>PCI_STOP#<br>assertion | 0       |
| 0   |     | SRC_STP_CRTL            | If set, SRCs (except SRC1) stop with PCI_STOP# | RW   | Free Running  | Stops with<br>PCI_STOP#<br>assertion | 0       |

#### Byte 7 Vendor ID/ Revision ID

| Bit | Pin | Name            | Description                      | Type | 0               | 1 | Default |
|-----|-----|-----------------|----------------------------------|------|-----------------|---|---------|
| 7   |     | Rev Code Bit 3  | Revision ID                      | R    | Vendor specific |   | X       |
| 6   |     | Rev Code Bit 2  |                                  | R    |                 |   | X       |
| 5   |     | Rev Code Bit 1  |                                  | R    |                 |   | X       |
| 4   |     | Rev Code Bit 0  |                                  | R    |                 |   | X       |
| 3   |     | Vendor ID bit 3 | Vendor ID<br>ICS is 0001, binary | R    |                 |   | 0       |
| 2   |     | Vendor ID bit 2 |                                  | R    |                 |   | 0       |
| 1   |     | Vendor ID bit 1 |                                  | R    |                 |   | 0       |
| 0   |     | Vendor ID bit 0 |                                  | R    |                 |   | 1       |

### Byte 8 Device ID and Output Enable Register

| Bit | Pin | Name       | Description                                                                                    | Type | 0             | 1       | Default |
|-----|-----|------------|------------------------------------------------------------------------------------------------|------|---------------|---------|---------|
| 7   |     | Device_ID3 | Table of Device identifier codes, used for differentiating between CK505 package options, etc. | R    | 56-pin device |         | 0       |
| 6   |     | Device_ID2 |                                                                                                | R    |               |         | 0       |
| 5   |     | Device_ID1 |                                                                                                | R    |               |         | 0       |
| 4   |     | Device_ID0 |                                                                                                | R    |               |         | 0       |
| 3   |     | Reserved   | Reserved                                                                                       | RW   | -             | -       | 0       |
| 2   |     | Reserved   | Reserved                                                                                       | RW   | -             | -       | 0       |
| 1   |     | SE1_OE     | Output enable for SE1                                                                          | RW   | Disabled      | Enabled | 0       |
| 0   |     | SE2_OE     | Output enable for SE2                                                                          | RW   | Disabled      | Enabled | 0       |

### Byte 9 Output Control Register

| Bit | Pin | Name             | Description                                         | Type | 0                                                | 1                              | Default |
|-----|-----|------------------|-----------------------------------------------------|------|--------------------------------------------------|--------------------------------|---------|
| 7   |     | PCIF5_STOP_EN    | Allows control of PCIF5 with assertion of PCI_STOP# | RW   | Free running                                     | Stops with PCI_STOP# assertion | 0       |
| 6   |     | TME_Readback     | Trusted Mode Enable (TME) strap status              | R    | normal operation                                 | no overclocking                | Latch   |
| 5   |     | REF_Strength     | Sets the REF output drive strength                  | RW   | 1X (2Loads)                                      | 2X (3 Loads)                   | 1       |
| 4   |     | Test Mode Select | Allows test select, ignores REF/FSC/TestSel         | RW   | Outputs HI-Z                                     | Outputs = REF/N                | 0       |
| 3   |     | Test Mode Entry  | Allows entry into test mode, ignores FSB/TestMode   | RW   | Normal operation                                 | Test mode                      | 0       |
| 2   |     | IO_VOUT2         | IO Output Voltage Select (Most Significant Bit)     | RW   | See Table 3: V_IO Selection<br>(Default is 0.8V) |                                | 1       |
| 1   |     | IO_VOUT1         | IO Output Voltage Select                            | RW   |                                                  |                                | 0       |
| 0   |     | IO_VOUT0         | IO Output Voltage Select (Least Significant Bit)    | RW   |                                                  |                                | 1       |

### Byte 10 Stop Enable Register

| Bit | Pin | Name              | Description                             | Type | 0                    | 1            | Default |
|-----|-----|-------------------|-----------------------------------------|------|----------------------|--------------|---------|
| 7   |     | SRC5_EN Readback  | Readback of SRC5 enable latch           | R    | CPU/PCI Stop Enabled | SRC5 Enabled | Latch   |
| 6   |     | Reserved          | Reserved                                | RW   | -                    | -            | 0       |
| 5   |     | Reserved          |                                         | RW   | -                    | -            | 0       |
| 4   |     | Reserved          |                                         | RW   | -                    | -            | 0       |
| 3   |     | Reserved          |                                         | RW   | -                    | -            | 0       |
| 2   |     | Reserved          |                                         | RW   | -                    | -            | 0       |
| 1   |     | CPU 1 Stop Enable | Enables control of CPU1 with CPU_STOP#  | RW   | Free Running         | Stoppable    | 1       |
| 0   |     | CPU 0 Stop Enable | Enables control of CPU 0 with CPU_STOP# | RW   | Free Running         | Stoppable    | 1       |

### Byte 11 iAMT Enable Register

| Bit | Pin | Name              | Description                                                           | Type | 0                            | 1                    | Default |
|-----|-----|-------------------|-----------------------------------------------------------------------|------|------------------------------|----------------------|---------|
| 7   |     | PCI3_CFG1         | See PCI3 Configuration Table 28                                       | R    | See PCI3 Configuration Table |                      | Latch   |
| 6   |     | PCI3_CFG0         |                                                                       | R    |                              |                      | Latch   |
| 5   |     | Reserved          | Reserved                                                              | RW   | -                            | -                    | 0       |
| 4   |     | Reserved          | Reserved                                                              | RW   | -                            | -                    | 1       |
| 3   |     | CPU2_AMT_EN       | Determines if CPU2 runs in M1 mode. Only valid if ITP_EN=1. See Note. | RW   | Does not Run                 | Runs                 | 0       |
| 2   |     | CPU1_AMT_EN       | Determines if CPU1 runs in M1 mode. See Note.                         | RW   | Does not Run                 | Runs                 | 1       |
| 1   |     | PCI-E_GEN2        | Determines if PCI-E Gen2 compliant                                    | R    | non-Gen2                     | PCI-E Gen2 Compliant | 1       |
| 0   |     | CPU 2 Stop Enable | Enables control of CPU 0 with CPU_STOP#                               | RW   | Free Running                 | Stoppable            | 1       |



### Byte 12 Byte Count Register

| Bit | Pin | Name     | Description                                      | Type | 0 | 1 | Default |
|-----|-----|----------|--------------------------------------------------|------|---|---|---------|
| 7   |     | Reserved |                                                  | RW   |   |   | 0       |
| 6   |     | Reserved |                                                  | RW   |   |   | 0       |
| 5   |     | BC5      | Read Back byte count register,<br>max bytes = 32 | RW   |   |   | 0       |
| 4   |     | BC4      |                                                  | RW   |   |   | 0       |
| 3   |     | BC3      |                                                  | RW   |   |   | 1       |
| 2   |     | BC2      |                                                  | RW   |   |   | 1       |
| 1   |     | BC1      |                                                  | RW   |   |   | 0       |
| 0   |     | BC0      |                                                  | RW   |   |   | 1       |

### Byte 13 to 28 Reserved

### Byte 29 Slew Rate Control

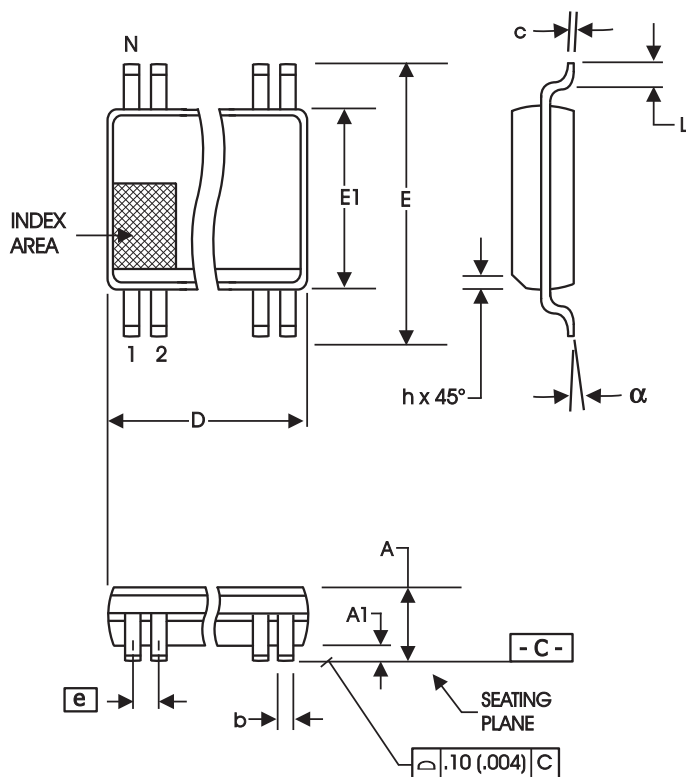
| Bit | Pin | Name          | Description                 | RW | 0                             | 1       | Default |
|-----|-----|---------------|-----------------------------|----|-------------------------------|---------|---------|
| 7   |     | USB_Slew1     | USB Slew Rate Control (MSB) | RW | See Slew Rate Selection Table |         | 1       |
| 6   |     | USB_Slew0     | USB Slew Rate Control (LSB) | RW |                               |         | 0       |
| 5   |     | PCI_Slew1     | PCI Slew Rate Control (MSB) | RW | See Slew Rate Selection Table |         | 1       |
| 4   |     | PCI_Slew0     | PCI Slew Rate Control (LSB) | RW |                               |         | 1       |
| 3   |     | Reserved      |                             | RW |                               |         | 1       |
| 2   |     | REF Slew Rate | Changes Ref Slew Rate       | RW | 1.2V/ns                       | 2.2V/ns | 1       |
| 1   |     | Reserved      |                             | RW |                               |         | 0       |

**Test Clarification Table**

| Comments                                                                                                                                                                                                                                                                          | HW                          |                              | SW                        |                          | OUTPUT |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------|---------------------------|--------------------------|--------|
|                                                                                                                                                                                                                                                                                   | FSLC/<br>TEST_SEL<br>HW PIN | FSLB/<br>TEST_MODE<br>HW PIN | TEST<br>ENTRY BIT<br>B9b3 | REF/N or<br>HI-Z<br>B9b4 |        |
|                                                                                                                                                                                                                                                                                   | <2.0V                       | X                            | 0                         | 0                        | NORMAL |
| Power-up w/ TEST_SEL = 1 to enter test mode<br>Cycle power to disable test mode<br>FSLC./TEST_SEL -->3-level latched input<br>If power-up w/ V>2.0V then use TEST_SEL<br>If power-up w/ V<2.0V then use FSLC<br>FSLB/TEST_MODE -->low Vth input<br>TEST_MODE is a real time input | >2.0V                       | 0                            | X                         | 0                        | HI-Z   |
|                                                                                                                                                                                                                                                                                   | >2.0V                       | 0                            | X                         | 1                        | REF/N  |
|                                                                                                                                                                                                                                                                                   | >2.0V                       | 1                            | X                         | 0                        | REF/N  |
|                                                                                                                                                                                                                                                                                   | >2.0V                       | 1                            | X                         | 1                        | REF/N  |
|                                                                                                                                                                                                                                                                                   | <2.0V                       | X                            | 1                         | 0                        | HI-Z   |
| If TEST_SEL HW pin is 0 during power-up,<br>test mode can be invoked through B9b3.<br>If test mode is invoked by B9b3, only B9b4<br>is used to select HI-Z or REF/N<br>FSLB/TEST_Mode pin is not used.<br>Cycle power to disable test mode, one shot control                      | <2.0V                       | X                            | 1                         | 1                        | REF/N  |
|                                                                                                                                                                                                                                                                                   | <2.0V                       | X                            | 1                         | 1                        | REF/N  |

B9b3: 1= ENTER TEST MODE, Default = 0 (NORMAL OPERATION)

B9b4: 1= REF/N, Default = 0 (HI-Z)



56-Lead, 300 mil Body, 25 mil, SSOP

| SYMBOL | In Millimeters<br>COMMON DIMENSIONS |       | In Inches<br>COMMON DIMENSIONS |       |
|--------|-------------------------------------|-------|--------------------------------|-------|
|        | MIN                                 | MAX   | MIN                            | MAX   |
| A      | 2.41                                | 2.80  | .095                           | .110  |
| A1     | 0.20                                | 0.40  | .008                           | .016  |
| b      | 0.20                                | 0.34  | .008                           | .0135 |
| c      | 0.13                                | 0.25  | .005                           | .010  |
| D      | SEE VARIATIONS                      |       | SEE VARIATIONS                 |       |
| E      | 10.03                               | 10.68 | .395                           | .420  |
| E1     | 7.40                                | 7.60  | .291                           | .299  |
| e      | 0.635 BASIC                         |       | 0.025 BASIC                    |       |
| h      | 0.38                                | 0.64  | .015                           | .025  |
| L      | 0.50                                | 1.02  | .020                           | .040  |
| N      | SEE VARIATIONS                      |       | SEE VARIATIONS                 |       |
| alpha  | 0°                                  | 8°    | 0°                             | 8°    |

VARIATIONS

| N  | D mm. |       | D (inch) |      |
|----|-------|-------|----------|------|
|    | MIN   | MAX   | MIN      | MAX  |
| 56 | 18.31 | 18.55 | .720     | .730 |

Reference Doc.: JEDEC Publication 95, MO-118

10-0034

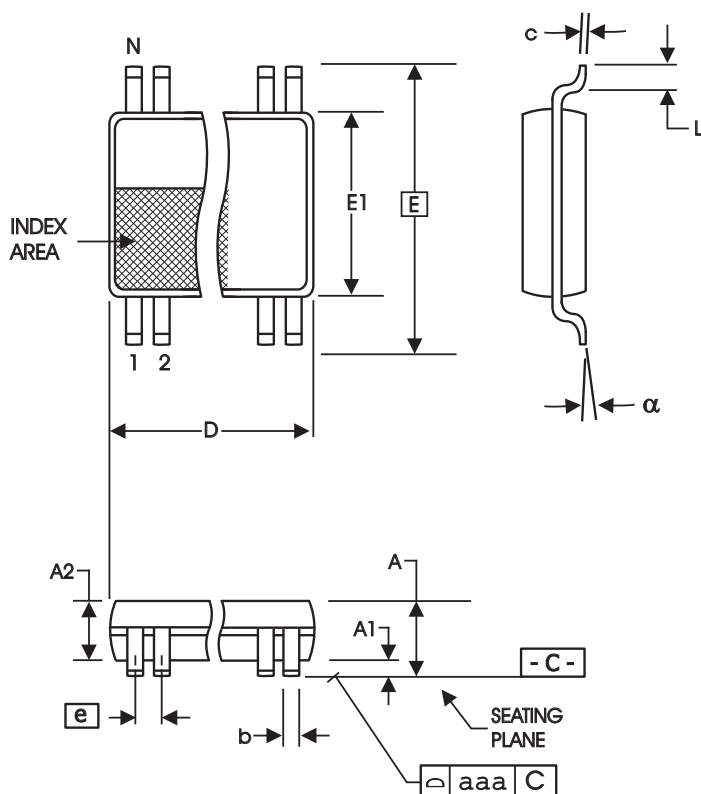
## Ordering Information

9LP525BF-2LFT

Example:

XXXX B F LFT

- XXXX — Designation for tape and reel packaging
- B — Lead Free, RoHS Compliant
- F — Package Type  
F = SSOP
- LFT — Revision Designator (will not correlate with datasheet revision)
- Device Type (consists of 3 to 7 digit numbers)



56-Lead 6.10 mm. Body, 0.50 mm. Pitch TSSOP  
(240 mil) (20 mil)

| SYMBOL | In Millimeters<br>COMMON DIMENSIONS |      | In Inches<br>COMMON DIMENSIONS |      |
|--------|-------------------------------------|------|--------------------------------|------|
|        | MIN                                 | MAX  | MIN                            | MAX  |
| A      | --                                  | 1.20 | --                             | .047 |
| A1     | 0.05                                | 0.15 | .002                           | .006 |
| A2     | 0.80                                | 1.05 | .032                           | .041 |
| b      | 0.17                                | 0.27 | .007                           | .011 |
| c      | 0.09                                | 0.20 | .0035                          | .008 |
| D      | SEE VARIATIONS                      |      | SEE VARIATIONS                 |      |
| E      | 8.10 BASIC                          |      | 0.319 BASIC                    |      |
| E1     | 6.00                                | 6.20 | .236                           | .244 |
| e      | 0.50 BASIC                          |      | 0.020 BASIC                    |      |
| L      | 0.45                                | 0.75 | .018                           | .030 |
| N      | SEE VARIATIONS                      |      | SEE VARIATIONS                 |      |
| α      | 0°                                  | 8°   | 0°                             | 8°   |
| aaa    | --                                  | 0.10 | --                             | .004 |

#### VARIATIONS

| N  | D mm. |       | D (inch) |      |
|----|-------|-------|----------|------|
|    | MIN   | MAX   | MIN      | MAX  |
| 56 | 13.90 | 14.10 | .547     | .555 |

Reference Doc.: JEDEC Publication 95, MO-153

10-0039

## Ordering Information

9LP525BG-2LFT

Example:

XXXX B G LFT

- XXXX — Designation for tape and reel packaging
- B — Lead Free, RoHS Compliant
- G — Package Type  
G = TSSOP
- LFT — Revision Designator (will not correlate with datasheet revision)
- Device Type (consists of 3 to 7 digit numbers)

## Revision History

| Rev. | Issue Date | Description                                                                                                                                                                                                                                                                                                                                                                                                             | Page #            |
|------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| A    | 6/23/2008  | Going to Release                                                                                                                                                                                                                                                                                                                                                                                                        | -                 |
| B    | 8/8/2008   | 1. Updated Pin Description<br>2. Added Byte 29 for Slew Rate control                                                                                                                                                                                                                                                                                                                                                    | 2-3, 17           |
| C    | 10/10/2008 | 1) Byte 11, bit 5 is now reserved.<br>2) Byte 29, bits 7:6 default to 0.8X slew rate ('10')<br>3) Removed reference to STOP drive mode in Power management table.<br>4) Corrected REF slew rate control from Byte 29b3 to Byte 29b2.<br>5) Clarified description of Byte 11, bits 2 and 3 to reflect CK505 ME clock selection table.<br>6) Marked as Reserved all bits that are not in the 56-pin version of the device | Various           |
| D    | 4/28/2009  | 1) updated tables 2, 6 and 7 to clarify interaction of Config Modes with SRC1<br>2) Updated ordering revision to A.                                                                                                                                                                                                                                                                                                     | 10, 11,<br>19, 20 |
| E    | 4/30/2009  | Updated ordering revision.                                                                                                                                                                                                                                                                                                                                                                                              | 19,20             |
| F    | 11/8/2010  | Removed last time buy statement                                                                                                                                                                                                                                                                                                                                                                                         | 1                 |

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