



200MHZ 3-DIMM CLOCK FOR SOLANO CHIPSET

1.0 GENERAL DESCRIPTION

The W83195AR-25 is a Clock Synthesizer for Intel 815 Solano chipset. W83195AR-25 provides all clocks required for high-speed RISC or CISC microprocessor and also provides 64 different frequencies of CPU, SDRAM, PCI, 3V66, IOAPIC clocks frequency setting. All clocks are externally selectable with smooth transitions.

The W83195AR-25 provides I²C serial bus interface to program the registers to enable or disable each clock outputs and provides 0.25% and 0.5% center type spread spectrum to reduce EMI.

The W83195AR-25 accepts a 14.318 MHz reference crystal as its input and runs on a 3.3V supply. High drive PCI and SDRAM CLOCK outputs typically provide greater than 1 V /ns slew rate into 30 pF loads. CPU CLOCK outputs typically provide better than 1 V /ns slew rate into 20 pF loads as maintaining 50± 5% duty cycle. The fixed frequency outputs as REF, 24MHz, and 48 MHz provide better than 0.5V /ns slew rate.

2.0 PRODUCT FEATURES

- 2 CPU clocks (2.5V)
- 3 3V-66 clocks (3.3V)
- 12 SDRAM clocks for 3 DIMMs(3.3V)
- 8 PCI synchronous clocks.
- Optional single or mixed supply:
(VDDR = VDDP=VDDS = VDD48 = VDD3 = 3.3V, VDDA=VDDC=2.5V)
- Skew form CPU to PCI clock -1 to 4 ns, center 2.6 ns
- Smooth frequency switch with selections from 66.8 to 200MHz
- I²C 2-Wire serial interface and I²C read back
- 0.25% center and 0.5% center type spread spectrum
- Programmable registers to enable/stop each output and select modes
(mode as Tri-state or Normal)
- 48 MHz for USB
- 24 MHz for super I/O
- Packaged in 56-pin SSOP

3.0 PIN CONFIGURATION

| | | | | | | |
|-------------------|--------------------------|----|---|----|--------------------------|----------------|
| VDDR | <input type="checkbox"/> | 1 | ● | 56 | <input type="checkbox"/> | REF0/ *FS4^ |
| Xin | <input type="checkbox"/> | 2 | | 55 | <input type="checkbox"/> | VddA |
| Xout | <input type="checkbox"/> | 3 | | 54 | <input type="checkbox"/> | IOAPIC |
| VSS | <input type="checkbox"/> | 4 | | 53 | <input type="checkbox"/> | VDDC |
| VSS | <input type="checkbox"/> | 5 | | 52 | <input type="checkbox"/> | CPUCLK0 |
| 3V66-0 | <input type="checkbox"/> | 6 | | 51 | <input type="checkbox"/> | CPUCLK1 |
| 3V66-1 | <input type="checkbox"/> | 7 | | 50 | <input type="checkbox"/> | VSS |
| 3V66-2 | <input type="checkbox"/> | 8 | | 49 | <input type="checkbox"/> | VSS |
| VDD3 | <input type="checkbox"/> | 9 | | 48 | <input type="checkbox"/> | SDRAM 0 |
| VDDP | <input type="checkbox"/> | 10 | | 47 | <input type="checkbox"/> | SDRAM 1 |
| PCICLK0/ *FS0 | <input type="checkbox"/> | 11 | | 46 | <input type="checkbox"/> | SDRAM 2 |
| PCICLK1/ *FS1 | <input type="checkbox"/> | 12 | | 45 | <input type="checkbox"/> | VDDS |
| PCICLK2/SEL24_48* | <input type="checkbox"/> | 13 | | 44 | <input type="checkbox"/> | SDRAM 3 |
| VSS | <input type="checkbox"/> | 14 | | 43 | <input type="checkbox"/> | SDRAM 4 |
| PCICLK3^ | <input type="checkbox"/> | 15 | | 42 | <input type="checkbox"/> | SDRAM 5 |
| PCICLK4^ | <input type="checkbox"/> | 16 | | 41 | <input type="checkbox"/> | VSS |
| PCICLK5^ | <input type="checkbox"/> | 17 | | 40 | <input type="checkbox"/> | SDRAM 6 |
| VDDP | <input type="checkbox"/> | 18 | | 39 | <input type="checkbox"/> | SDRAM 7 |
| PCICLK6 | <input type="checkbox"/> | 19 | | 38 | <input type="checkbox"/> | SDRAM_F |
| PCICLK7 | <input type="checkbox"/> | 20 | | 37 | <input type="checkbox"/> | VDDS |
| VSS | <input type="checkbox"/> | 21 | | 36 | <input type="checkbox"/> | VSS |
| PD# | <input type="checkbox"/> | 22 | | 35 | <input type="checkbox"/> | 24_48MHz/ *FS2 |
| *SDCLK | <input type="checkbox"/> | 23 | | 34 | <input type="checkbox"/> | 48MHz/ *FS3 ^ |
| *SDATA | <input type="checkbox"/> | 24 | | 33 | <input type="checkbox"/> | VDD48 |
| VDDS | <input type="checkbox"/> | 25 | | 32 | <input type="checkbox"/> | VDDS |
| SDRAM 11 | <input type="checkbox"/> | 26 | | 31 | <input type="checkbox"/> | SDRAM 8 |
| SDRAM 10 | <input type="checkbox"/> | 27 | | 30 | <input type="checkbox"/> | SDRAM 9 |
| VSS | <input type="checkbox"/> | 28 | | 29 | <input type="checkbox"/> | VSS |

Note: * Internal pull-up

^ 1.5~2 strength



PRELIMINARY

4.0 PIN DESCRIPTION

IN - Input

OUT - Output

I/O - Bi-directional Pin

- Active Low

* - Internal 250kΩ pull-up

4.1 Crystal I/O

| SYMBOL | PIN | I/O | FUNCTION |
|--------|-----|-----|---|
| Xin | 2 | IN | Crystal input with internal loading capacitors(36pF) and feedback resistors. |
| Xout | 3 | OUT | Crystal output at 14.318MHz nominally with internal loading capacitors(36pF). |

4.2 CPU, SDRAM, PCI, IOAPIC Clock Outputs

| SYMBOL | PIN | I/O | FUNCTION |
|----------------------|---|-----|---|
| CPUCLK [0:1] | 52,51 | OUT | Low skew (< 250ps) clock outputs for host frequencies such as CPU and Chipset. |
| PD# | 22 | IN | Power Down mode when driven low. |
| IOAPIC | 54 | OUT | Clock outputs synchronous with PCI clock and powered by VddA. |
| SDRAM_F, SDRAM[0:11] | 38, 48,47,46, 44,43,42,40, 39,31, 30,27, 26 | OUT | SDRAM clock outputs. |
| PCICLK0/ *FS0 | 11 | I/O | 3.3V 33MHz PCI clock during normal operation. Latched input for FS0 at initial power up for H/W selecting the output frequency of CPU, SDRAM and PCI clocks(Default=1). |
| PCICLK1/ FS1# | 12 | I/O | Low skew (< 250ps) PCI clock outputs. Latched input for FS1 at initial power up for H/W selecting the output frequency of CPU, SDRAM and PCI clocks(Default=0). |
| PCICLK2/ *SEL24_48 | 12 | I/O | Low skew (< 250ps) PCI clock outputs. Latched input for SEL24_48 at initial power up for the output frequency of 24MHz(HIGH) and 48MHz(LOW) clocks. |
| PCICLK [3:7] | 15,16,17,19,20 | OUT | Low skew (< 250ps) PCI clock outputs. |
| 3V66 [0:2] | 6,7,8 | OUT | 3.3V output clocks for the chipset. |

4.3 I²C Control Interface

| SYMBOL | PIN | I/O | FUNCTION |
|--------|-----|-----|---|
| *SDATA | 24 | I/O | Serial data of I ² C 2-wire control interface with internal pull-up resistor. |
| *SDCLK | 23 | IN | Serial clock of I ² C 2-wire control interface with internal pull-up resistor. |

4.4 Fixed Frequency Outputs

| SYMBOL | PIN | I/O | FUNCTION |
|---------------|-----|-----|--|
| REF0 / *FS4 | 56 | I/O | 14.318MHz reference clock. This REF output is the stronger buffer for ISA bus loads. Latched input for FS4 at initial power up for H/W selecting the output frequency of CPU, SDRAM and PCI clocks (Default=1). |
| 24_48MHz/FS2* | 23 | I/O | 24MHz or 48MHz output clock. Default is 24MHz. Latched input for FS2 at initial power up for H/W selecting the output frequency of CPU, SDRAM and PCI clocks(Default=1). |
| 48MHz/ FS3* | 22 | I/O | 48MHz / Latched input for FS3 at initial power up for H/W selecting the output frequency of CPU, SDRAM and PCI clocks (Default=1). |

4.5 Power Pins

| SYMBOL | PIN | FUNCTION |
|--------|------------------------------|---|
| VddC | 53 | Power supply for CPU & IOAPIC, 2.5V or 3.3V. |
| Vdd48 | 33 | Power supply for 48MHz output,3.3V. |
| Vdd3 | 9 | Power supply for 3V_66 output, 3.3V. |
| VddP | 10,18 | Power supply for PCICLK, 3.3V. |
| VddR | 1 | Power supply for REF0, 3.3V. |
| VddS | 45,37,32,25 | Power supply for SDRAM_F,SDRAM[0:11], nominal 3.3V. |
| Vss | 4,5,14,21,28,29,36,41, 49.50 | Circuit Ground. |



PRELIMINARY

5.0 FREQUENCY SELECTION BY HARDWARE

| FS4 | FS3 | FS2 | FS1 | FS0 | CPU(MHz) | SDRAM(MHz) | 3V66(MHz) | PCI(MHz) | IOAPIC (MHz) |
|-----|-----|-----|-----|-----|----------|------------|-----------|----------|--------------|
| 0 | 0 | 0 | 0 | 0 | 55.00 | 82.50 | 55.00 | 27.50 | 13.75 |
| 0 | 0 | 0 | 0 | 1 | 60.00 | 90.00 | 60.00 | 30.00 | 15.00 |
| 0 | 0 | 0 | 1 | 0 | 66.80 | 100.20 | 66.80 | 33.40 | 16.70 |
| 0 | 0 | 0 | 1 | 1 | 68.33 | 102.50 | 68.33 | 34.17 | 17.08 |
| 0 | 0 | 1 | 0 | 0 | 70.00 | 105.00 | 70.00 | 35.00 | 17.50 |
| 0 | 0 | 1 | 0 | 1 | 72.00 | 108.00 | 72.00 | 36.00 | 18.00 |
| 0 | 0 | 1 | 1 | 0 | 75.00 | 112.50 | 75.00 | 37.50 | 18.75 |
| 0 | 0 | 1 | 1 | 1 | 77.00 | 115.50 | 77.00 | 38.50 | 19.25 |
| 0 | 1 | 0 | 0 | 0 | 83.30 | 83.30 | 55.53 | 27.77 | 13.88 |
| 0 | 1 | 0 | 0 | 1 | 90.00 | 90.00 | 60.00 | 30.00 | 15.00 |
| 0 | 1 | 0 | 1 | 0 | 100.30 | 100.30 | 66.87 | 33.43 | 16.72 |
| 0 | 1 | 0 | 1 | 1 | 103.00 | 103.00 | 68.67 | 34.33 | 17.17 |
| 0 | 1 | 1 | 0 | 0 | 112.50 | 112.50 | 75.00 | 37.50 | 18.75 |
| 0 | 1 | 1 | 0 | 1 | 115.00 | 115.00 | 76.67 | 38.33 | 19.17 |
| 0 | 1 | 1 | 1 | 0 | 120.00 | 120.00 | 80.00 | 40.00 | 20.00 |
| 0 | 1 | 1 | 1 | 1 | 125.00 | 125.00 | 83.33 | 41.67 | 20.83 |
| 1 | 0 | 0 | 0 | 0 | 128.00 | 128.00 | 64.00 | 32.00 | 16.00 |
| 1 | 0 | 0 | 0 | 1 | 130.00 | 130.00 | 65.00 | 32.50 | 16.25 |
| 1 | 0 | 0 | 1 | 0 | 133.70 | 133.70 | 66.85 | 33.43 | 16.71 |
| 1 | 0 | 0 | 1 | 1 | 137.00 | 137.00 | 68.50 | 34.25 | 17.13 |
| 1 | 0 | 1 | 0 | 0 | 140.00 | 140.00 | 70.00 | 35.00 | 17.50 |
| 1 | 0 | 1 | 0 | 1 | 145.00 | 145.00 | 72.50 | 36.25 | 18.13 |
| 1 | 0 | 1 | 1 | 0 | 150.00 | 150.00 | 75.00 | 37.50 | 18.75 |
| 1 | 0 | 1 | 1 | 1 | 153.33 | 153.33 | 76.67 | 38.33 | 19.17 |
| 1 | 1 | 0 | 0 | 0 | 125.00 | 93.75 | 62.50 | 31.25 | 15.63 |
| 1 | 1 | 0 | 0 | 1 | 130.00 | 97.50 | 65.00 | 32.50 | 16.25 |
| 1 | 1 | 0 | 1 | 0 | 133.70 | 100.28 | 66.85 | 33.43 | 16.71 |
| 1 | 1 | 0 | 1 | 1 | 137.00 | 102.75 | 68.50 | 34.25 | 17.13 |
| 1 | 1 | 1 | 0 | 0 | 140.00 | 105.00 | 70.00 | 35.00 | 17.50 |
| 1 | 1 | 1 | 0 | 1 | 145.00 | 108.75 | 72.50 | 36.25 | 18.13 |
| 1 | 1 | 1 | 1 | 0 | 150.00 | 112.50 | 75.00 | 37.50 | 18.75 |
| 1 | 1 | 1 | 1 | 1 | 153.33 | 115.00 | 76.67 | 38.33 | 19.17 |

6. SERIAL CONTROL REGISTERS

The Pin column lists the affected pin number and the @PowerUp column gives the state at true power up. Registers are set to the values shown only on true power up. "Command Code" byte and "Byte Count" byte must be sent following the acknowledge of the Address Byte. Although the data (bits) in these two bytes are considered "don't care", they must be sent and will be acknowledge. After that, the below described sequence (Register 0, Register 1, Register 2,) will be valid and acknowledged.

Frequency Table Setting by I2C (SEL5 ~ SEL0)

| SSEL5 | SSEL4 | SSEL3 | SSEL2 | SSEL1 | SSEL0 | CPU (MHz) | SDRAM (MHz) | 3V66 (MHz) | PCI(MHz) | IOAPIC (MHz) |
|-------|-------|-------|-------|-------|-------|-----------|-------------|------------|----------|--------------|
| 0 | 0 | 0 | 0 | 0 | 0 | 55.00 | 82.50 | 55.00 | 27.50 | 13.75 |
| 0 | 0 | 0 | 0 | 0 | 1 | 60.00 | 90.00 | 60.00 | 30.00 | 15.00 |
| 0 | 0 | 0 | 0 | 1 | 0 | 66.80 | 100.20 | 66.80 | 33.40 | 16.70 |
| 0 | 0 | 0 | 0 | 1 | 1 | 68.33 | 102.50 | 68.33 | 34.17 | 17.08 |
| 0 | 0 | 0 | 1 | 0 | 0 | 70.00 | 105.00 | 70.00 | 35.00 | 17.50 |
| 0 | 0 | 0 | 1 | 0 | 1 | 72.00 | 108.00 | 72.00 | 36.00 | 18.00 |
| 0 | 0 | 0 | 1 | 1 | 0 | 75.00 | 112.50 | 75.00 | 37.50 | 18.75 |
| 0 | 0 | 0 | 1 | 1 | 1 | 77.00 | 115.50 | 77.00 | 38.50 | 19.25 |
| 0 | 0 | 1 | 0 | 0 | 0 | 83.30 | 83.30 | 55.53 | 27.77 | 13.88 |
| 0 | 0 | 1 | 0 | 0 | 1 | 90.00 | 90.00 | 60.00 | 30.00 | 15.00 |
| 0 | 0 | 1 | 0 | 1 | 0 | 100.30 | 100.30 | 66.87 | 33.43 | 16.72 |
| 0 | 0 | 1 | 0 | 1 | 1 | 103.00 | 103.00 | 68.67 | 34.33 | 17.17 |
| 0 | 0 | 1 | 1 | 0 | 0 | 112.50 | 112.50 | 75.00 | 37.50 | 18.75 |
| 0 | 0 | 1 | 1 | 0 | 1 | 115.00 | 115.00 | 76.67 | 38.33 | 19.17 |
| 0 | 0 | 1 | 1 | 1 | 0 | 120.00 | 120.00 | 80.00 | 40.00 | 20.00 |
| 0 | 0 | 1 | 1 | 1 | 1 | 125.00 | 125.00 | 83.33 | 41.67 | 20.83 |
| 0 | 1 | 0 | 0 | 0 | 0 | 128.00 | 128.00 | 64.00 | 32.00 | 16.00 |
| 0 | 1 | 0 | 0 | 0 | 1 | 130.00 | 130.00 | 65.00 | 32.50 | 16.25 |
| 0 | 1 | 0 | 0 | 1 | 0 | 133.70 | 133.70 | 66.85 | 33.43 | 16.71 |
| 0 | 1 | 0 | 0 | 1 | 1 | 137.00 | 137.00 | 68.50 | 34.25 | 17.13 |
| 0 | 1 | 0 | 1 | 0 | 0 | 140.00 | 140.00 | 70.00 | 35.00 | 17.50 |
| 0 | 1 | 0 | 1 | 0 | 1 | 145.00 | 145.00 | 72.50 | 36.25 | 18.13 |
| 0 | 1 | 0 | 1 | 1 | 0 | 150.00 | 150.00 | 75.00 | 37.50 | 18.75 |
| 0 | 1 | 0 | 1 | 1 | 1 | 153.33 | 153.33 | 76.67 | 38.33 | 19.17 |
| 0 | 1 | 1 | 0 | 0 | 0 | 125.00 | 93.75 | 62.50 | 31.25 | 15.63 |
| 0 | 1 | 1 | 0 | 0 | 1 | 130.00 | 97.50 | 65.00 | 32.50 | 16.25 |
| 0 | 1 | 1 | 0 | 1 | 0 | 133.70 | 100.28 | 66.85 | 33.43 | 16.71 |
| 0 | 1 | 1 | 0 | 1 | 1 | 137.00 | 102.75 | 68.50 | 34.25 | 17.13 |
| 0 | 1 | 1 | 1 | 0 | 0 | 140.00 | 105.00 | 70.00 | 35.00 | 17.50 |
| 0 | 1 | 1 | 1 | 0 | 1 | 145.00 | 108.75 | 72.50 | 36.25 | 18.13 |
| 0 | 1 | 1 | 1 | 1 | 0 | 150.00 | 112.50 | 75.00 | 37.50 | 18.75 |



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| 0 | 1 | 1 | 1 | 1 | 1 | 153.33 | 115.00 | 76.67 | 38.33 | 19.17 |
|----------|----------|----------|----------|----------|----------|---------------|---------------|--------------|--------------|--------------|
| SSEL5 | SSEL4 | SSEL3 | SSEL2 | SSEL1 | SSEL0 | CPU (MHz) | SDRAM (MHz) | 3V66 (MHz) | PCI(MHz) | IOAPIC (MHz) |
| 1 | 0 | 0 | 0 | 0 | 0 | 66.8 | 133.00 | 66.80 | 33.40 | 16.70 |
| 1 | 0 | 0 | 0 | 0 | 1 | 135.00 | 135.00 | 67.50 | 33.75 | 16.88 |
| 1 | 0 | 0 | 0 | 1 | 0 | 142.00 | 142.00 | 71.00 | 35.50 | 17.75 |
| 1 | 0 | 0 | 0 | 1 | 1 | 143.00 | 143.00 | 71.50 | 35.75 | 17.88 |
| 1 | 0 | 0 | 1 | 0 | 0 | 144.00 | 144.00 | 72.00 | 36.00 | 18.00 |
| 1 | 0 | 0 | 1 | 0 | 1 | 146.00 | 146.00 | 73.00 | 36.50 | 18.25 |
| 1 | 0 | 0 | 1 | 1 | 0 | 147.00 | 147.00 | 73.50 | 36.75 | 18.38 |
| 1 | 0 | 0 | 1 | 1 | 1 | 148.00 | 148.00 | 74.00 | 37.00 | 18.50 |
| 1 | 0 | 1 | 0 | 0 | 0 | 100.20 | 133.00 | 66.80 | 33.40 | 16.70 |
| 1 | 0 | 1 | 0 | 0 | 1 | 156.00 | 156.00 | 78.00 | 39.00 | 19.50 |
| 1 | 0 | 1 | 0 | 1 | 0 | 158.00 | 158.00 | 79.00 | 39.50 | 19.75 |
| 1 | 0 | 1 | 0 | 1 | 1 | 160.00 | 160.00 | 80.00 | 40.00 | 20.00 |
| 1 | 0 | 1 | 1 | 0 | 0 | 135.00 | 101.25 | 67.50 | 33.75 | 16.88 |
| 1 | 0 | 1 | 1 | 0 | 1 | 139.00 | 104.25 | 69.50 | 34.75 | 17.38 |
| 1 | 0 | 1 | 1 | 1 | 0 | 141.00 | 105.75 | 70.50 | 35.25 | 17.63 |
| 1 | 0 | 1 | 1 | 1 | 1 | 142.00 | 106.50 | 71.00 | 35.50 | 17.75 |
| 1 | 1 | 0 | 0 | 0 | 0 | 143.00 | 107.25 | 71.50 | 35.75 | 17.88 |
| 1 | 1 | 0 | 0 | 0 | 1 | 144.00 | 108.00 | 72.00 | 36.00 | 18.00 |
| 1 | 1 | 0 | 0 | 1 | 0 | 146.00 | 109.50 | 73.00 | 36.50 | 18.25 |
| 1 | 1 | 0 | 0 | 1 | 1 | 147.00 | 110.25 | 73.50 | 36.75 | 18.38 |
| 1 | 1 | 0 | 1 | 0 | 0 | 148.00 | 111.00 | 74.00 | 37.00 | 18.50 |
| 1 | 1 | 0 | 1 | 0 | 1 | 149.00 | 111.75 | 74.50 | 37.25 | 18.63 |
| 1 | 1 | 0 | 1 | 1 | 0 | 153.00 | 114.75 | 76.50 | 38.25 | 19.13 |
| 1 | 1 | 0 | 1 | 1 | 1 | 157.00 | 117.75 | 78.50 | 39.25 | 19.63 |
| 1 | 1 | 1 | 0 | 0 | 0 | 159.00 | 119.25 | 79.50 | 39.75 | 19.88 |
| 1 | 1 | 1 | 0 | 0 | 1 | 162.00 | 121.50 | 81.00 | 40.50 | 20.25 |
| 1 | 1 | 1 | 0 | 1 | 0 | 164.00 | 123.00 | 82.00 | 41.00 | 20.50 |
| 1 | 1 | 1 | 0 | 1 | 1 | 170.00 | 127.50 | 85.00 | 42.50 | 21.25 |
| 1 | 1 | 1 | 1 | 0 | 0 | 175.00 | 116.67 | 58.30 | 29.15 | 14.58 |
| 1 | 1 | 1 | 1 | 0 | 1 | 180.00 | 120.00 | 60.00 | 30.00 | 15.00 |
| 1 | 1 | 1 | 1 | 1 | 0 | 190.00 | 95.00 | 63.33 | 31.67 | 15.83 |
| 1 | 1 | 1 | 1 | 1 | 1 | 200.40 | 133.60 | 66.80 | 33.40 | 16.70 |

6.1 Register 0: CPU Frequency Select Register

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|--|
| 7 | 0 | - | SSEL3 (Frequency table selection by software via I ² C) |
| 6 | 0 | - | SSEL2 (Frequency table selection by software via I ² C) |
| 5 | 0 | - | SSEL1 (Frequency table selection by software via I ² C) |
| 4 | 0 | - | SSEL0 (Frequency table selection by software via I ² C) |
| 3 | 0 | - | 0 = Selection by hardware 1 = Selection by software I ² C - Bit (2, 7:4) |
| 2 | 0 | - | SSEL4 (Frequency table selection by software via I ² C) |
| 1 | 0 | - | SSEL5 (Frequency table selection by software via I²C) |
| 0 | 0 | - | 0 = Running 1 = Tristate all outputs |

6.2 Register 1 : CPU Clock Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|---|
| 7 | X | - | FS3# |
| 6 | X | - | FS0# |
| 5 | X | - | FS2# |
| 4 | 1 | 27 | 24MHz(Active / Inactive) |
| 3 | 1 | 26 | 48MHz(Active / Inactive) |
| 2 | 1 | - | 1 = ±0.25% Center type Spread Spectrum Modulation 0 = ±0.5% Center type Spread Spectrum Modulation |
| 1 | 0 | - | 0 = Normal 1 = Spread Spectrum enabled |
| 0 | 1 | - | Reserved |

6.3 Register 2: SDRAM Clock Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|----------------------------|
| 7 | 1 | 39 | SDRAM7 (Active / Inactive) |
| 6 | 1 | 40 | SDRAM6 (Active / Inactive) |
| 5 | 1 | 42 | SDRAM5 (Active / Inactive) |
| 4 | 1 | 43 | SDRAM4 (Active / Inactive) |
| 3 | 1 | 44 | SDRAM3 (Active / Inactive) |
| 2 | 1 | 46 | SDRAM2 (Active / Inactive) |
| 1 | 1 | 47 | SDRAM1 (Active / Inactive) |
| 0 | 1 | 48 | SDRAM0 (Active / Inactive) |

PRELIMINARY

6.4 Register 3: PCI Clock Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|-----------------------------|
| 7 | 1 | 20 | PCICLK7 (Active / Inactive) |
| 6 | 1 | 19 | PCICLK6 (Active / Inactive) |
| 5 | 1 | 17 | PCICLK5 (Active / Inactive) |
| 4 | 1 | 16 | PCICLK4 (Active / Inactive) |
| 3 | 1 | 15 | PCICLK3 (Active / Inactive) |
| 2 | 1 | 13 | PCICLK2 (Active / Inactive) |
| 1 | 1 | 12 | PCICLK1 (Active / Inactive) |
| 0 | 1 | 11 | PCICLK0 (Active / Inactive) |

6.5 Register 4: Additional Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|----------------------------|
| 7 | 1 | - | Reserved |
| 6 | 1 | 7 | 3V66_0(Active / Inactive) |
| 5 | 1 | 8 | 3V66_1(Active / Inactive) |
| 4 | X | - | FS4# |
| 3 | 1 | 46 | IOAPIC (Active / Inactive) |
| 2 | X | - | FS1# |
| 1 | 1 | 43 | CPUCLK1(Active / Inactive) |
| 0 | 1 | 44 | CPUCLK0(Active / Inactive) |

6.6 Register 5: SDRAM Clock Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|---|
| 7 | 1 | - | SKEW2(SDRAM to CPU Skew programming bit) |
| 6 | 0 | - | SKEW1(SDRAM to CPU Skew programming bit) |
| 5 | 0 | - | SKEW0(SDRAM to CPU Skew programming bit) |
| 4 | 1 | 38 | SDRAM_F (Active / Inactive) |
| 3 | 1 | 26 | SDRAM11 (Active / Inactive) |
| 2 | 1 | 27 | SDRAM10 (Active / Inactive) |
| 1 | 1 | 30 | SDRAM9 (Active / Inactive) |
| 0 | 1 | 31 | SDRAM8 (Active / Inactive) |

6.7 Register 6: Winbond Chip ID Register (Read Only)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|-----------------|
| 7 | 1 | - | Winbond Chip ID |
| 6 | 0 | - | Winbond Chip ID |
| 5 | 0 | - | Winbond Chip ID |
| 4 | 1 | - | Winbond Chip ID |
| 3 | 1 | - | Winbond Chip ID |
| 2 | 0 | - | Winbond Chip ID |
| 1 | 0 | - | Winbond Chip ID |
| 0 | 0 | - | Winbond Chip ID |

6.8 Register 7: Winbond Chip ID Register (Read Only)

| Bit | @PowerUp | Pin | Description |
|-----|----------|-----|--------------------|
| 7 | 0 | - | Winbond Chip ID |
| 6 | 1 | - | Winbond Chip ID |
| 5 | 0 | - | Winbond Chip ID |
| 4 | 1 | - | Winbond Chip ID |
| 3 | 0 | - | Winbond Version ID |
| 2 | 0 | - | Winbond Version ID |
| 1 | 0 | - | Winbond Version ID |
| 0 | 1 | - | Winbond Version ID |

7.0 SPECIFICATIONS

7.1 Absolute Maximum Ratings

Stresses greater than those listed in this table may cause permanent damage to the device. Precautions should be taken to avoid application of any voltage higher than the maximum rated voltages to this circuit. Maximum conditions for extended periods may affect reliability. Unused inputs must always be tied to an appropriate logic voltage level (Ground or Vdd).

| Symbol | Parameter | Rating |
|-----------------------|--|--------------------|
| Vdd , V _{IN} | Voltage on any pin with respect to GND | - 0.5 V to + 7.0 V |
| T _{STG} | Storage Temperature | - 65°C to + 150°C |
| T _B | Ambient Temperature | - 55°C to + 125°C |
| T _A | Operating Temperature | 0°C to + 70°C |

7.2 Electrical Characteristics---Input/Output

| Vddq1=Vddq2 = Vddq3 = Vddq4 =3.3V, VddL1 =VddL2= 2.5V , T _A = 0° C to +70° C | | | | | | |
|---|-------------------------------------|---------|-----|---------|-----------------|--|
| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
| Input Low Voltage | V _{IL} | Vss-0.3 | | 0.8 | V _{dc} | |
| Input High Voltage | V _{IH} | 2.0 | | Vdd+0.3 | V _{dc} | |
| Input Low Current | I _{IL} | -5 | | | μA | No pull-up resistors |
| Input Low Current | I _{IL} | -200 | | | μA | Pull-up resistors |
| Input High Current | I _{IH} | -5 | | 5 | μA | |
| Input Capacitance | C _{IN} | | | 5 | pF | Logic inputs |
| | C _{OUT} | | | 6 | pF | Output capacitance |
| | C _{INX} | 27 | | 45 | pF | Xin and Xout |
| Operating Supply Current | I _{dd3} | | | 100 | MA | CPU = 66.6 MHz PCI = 33.3 Mhz with load |
| Power Down Supply Current | I _{dd2} | | | 600 | μA | |
| Settling Time | T _s | | | 3 | mS | From first crossing to 1% target freq. |
| Delay | t _{PZH} , t _{PZH} | 1 | | 10 | nS | Output enable delay |
| | t _{PLZ} , t _{PZH} | 1 | | 10 | nS | Output enable delay |

PRELIMINARY

7.3 Electrical Characteristics of CPU Clock

V_{dd}=2.5V +/- 5%; C_L=10-20pF

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|---|----------------------|------|-----|-----|-------|--------------------------|
| Output Impedance | R _{DSP} | 13.5 | | 40 | Ohm | |
| Output Impedance | R _{DSN} | 13.5 | | 40 | Ohm | |
| Output Low Voltage | V _{OL} | | | 0.4 | V | I _{OL} =1mA |
| Output High Voltage | V _{OH} | 2.0 | | | V | I _{OH} =-1mA |
| Output Low Current | I _{OL} | 27 | | 30 | MA | |
| Output High Current | I _{OH} | -27 | | -27 | MA | |
| Pull-Up Current Min | I _{OH(min)} | -27 | | | MA | V _{out} = 1.0 V |
| Pull-Up Current Max | I _{OH(max)} | | | -27 | MA | V _{out} = 2.0V |
| Rise/Fall Time Min Between 0.4 V and 2.0 V | T _{RF(min)} | 0.4 | | | ns | 10pF Load |
| Rise/Fall Time Max Between 0.4 V and 2.0 V | T _{RF(max)} | | | 1.6 | ns | 20pF Load |
| Duty Cycle | Dt | 45 | | 55 | % | V _T =1.25V |
| Skew | T _{SK} | | | 175 | ps | V _T =1.25V |
| Jitter | T _{sc-c} | | | 250 | ps | V _T =1.25V |

7.4 Electrical Characteristics of 3V66 Clock

V_{dd}=3.3V +/- 5%; C_L=10-30pF

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|---|----------------------|-----|-----|------|-------|-----------------------|
| Output Impedance | R _{DSP} | 15 | | 55 | Ohm | |
| Output Impedance | R _{DSN} | 15 | | 55 | Ohm | |
| Output Low Voltage | V _{OL} | | | 0.55 | V | I _{OL} =1mA |
| Output High Voltage | V _{OH} | 2.4 | | | V | I _{OH} =-1mA |
| Output Low Current | I _{OL} | 30 | | 38 | MA | |
| Output High Current | I _{OH} | -33 | | -33 | MA | |
| Rise/Fall Time Min Between 0.4 V and 2.0 V | T _{RF(min)} | 0.4 | | | ns | 10pF Load |
| Rise/Fall Time Max Between 0.4 V and 2.0 V | T _{RF(max)} | | | 1.6 | ns | 20pF Load |
| Duty Cycle | Dt | 45 | | 55 | % | V _T =1.5V |
| Skew | T _{SK} | | | 175 | ps | V _T =1.5V |
| Jitter | T _{sc-c} | | | 500 | ps | V _T =1.5V |

7.5 Electrical Characteristics of SDRAM Clock

V_{dd}=3.3V +/- 5%; C_L=20-30pF

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|---|----------------------|------|-----|------|-------|-----------------------|
| Output Impedance | R _{DSP} | 13.5 | | 40 | Ohm | |
| Output Impedance | R _{DSN} | 13.5 | | 40 | Ohm | |
| Output Low Voltage | V _{OL} | | | 0.45 | V | I _{OL} =1mA |
| Output High Voltage | V _{OH} | 2.4 | | | V | I _{OH} =-1mA |
| Output Low Current | I _{OL} | 54 | | 54 | MA | |
| Output High Current | I _{OH} | -54 | | -45 | MA | |
| Rise/Fall Time Min Between 0.4 V and 2.0 V | T _{RF(min)} | 0.4 | | | ns | 10pF Load |
| Rise/Fall Time Max Between 0.4 V and 2.0 V | T _{RF(max)} | | | 1.6 | ns | 20pF Load |
| Duty Cycle | Dt | 45 | | 55 | % | V _T =1.5V |
| Skew | T _{SK} | | | 250 | ps | V _T =1.5V |
| Jitter | T _{sc-c} | | | 250 | ps | V _T =1.5V |

7.6 Electrical Characteristics of PCI Clock

V_{dd}=3.3V +/- 5%; C_L=10-30pF

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|---|----------------------|-----|-----|------|-------|-----------------------|
| Output Impedance | R _{DSP} | 15 | | 55 | Ohm | |
| Output Impedance | R _{DSN} | 15 | | 55 | Ohm | |
| Output Low Voltage | V _{OL} | | | 0.55 | V | I _{OL} =1mA |
| Output High Voltage | V _{OH} | 2.4 | | | V | I _{OH} =-1mA |
| Output Low Current | I _{OL} | 30 | | 38 | MA | |
| Output High Current | I _{OH} | -33 | | -33 | MA | |
| Rise/Fall Time Min Between 0.4 V and 2.0 V | T _{RF(min)} | 0.5 | | | ns | 10pF Load |
| Rise/Fall Time Max Between 0.4 V and 2.0 V | T _{RF(max)} | | | 2.0 | ns | 20pF Load |
| Duty Cycle | Dt | 45 | | 55 | % | V _T =1.5V |
| Skew | T _{SK} | | | 500 | ps | V _T =1.5V |
| Jitter | T _{sc-c} | | | 500 | ps | V _T =1.5V |

7.7 Electrical Characteristics of 48MHz, REF Clock

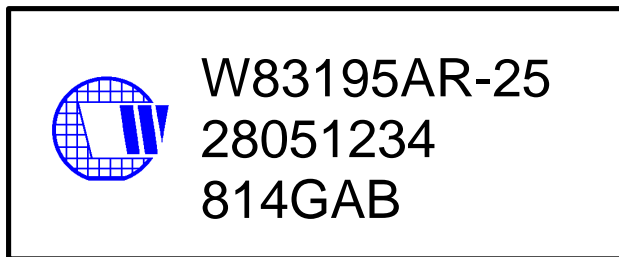
V_{dd}=3.3V +/- 5%; C_L=10-20pF

| Parameter | Symbol | Min | Typ | Max | Units | Test Conditions |
|---------------------|-------------------|-----|-----|------|-------|-----------------------|
| Output Impedance | R _{DSP} | 20 | | 55 | Ohm | |
| Output Impedance | R _{DSN} | 20 | | 55 | Ohm | |
| Output Low Voltage | V _{OL} | | | 0.4 | V | I _{OL} =1mA |
| Output High Voltage | V _{OH} | 2.4 | | | V | I _{OH} =-1mA |
| Output Low Current | I _{OL} | 29 | | 27 | MA | |
| Output High Current | I _{OH} | -29 | | -23 | MA | |
| RiseTime | T _R | | 1.8 | 4 | ns | 10pF Load |
| Fall Time | T _F | | 1.7 | 4 | ns | 20pF Load |
| Duty Cycle | Dt | 45 | | 55 | % | V _T =1.5V |
| Skew | T _{SK} | | | 500 | ps | V _T =1.5V |
| Jitter | T _{SC-C} | | | 1000 | ps | V _T =1.5V |

8.0 ORDERING INFORMATION

| Part Number | Package Type | Production Flow |
|-------------|--------------|--------------------------|
| W83195AR-25 | 56 PIN SSOP | Commercial, 0°C to +70°C |

9.0 HOW TO READ THE TOP MARKING



1st line: Winbond logo and the type number: W83195AR-25

2nd line: Tracking code 2 8051234

2: wafers manufactured in Winbond FAB 2

8051234: wafer production series lot number

3rd line: Tracking code 814 G A B

814: packages made in '98, week 14

G: assembly house ID; O means OSE, G means GR

A: Internal use code

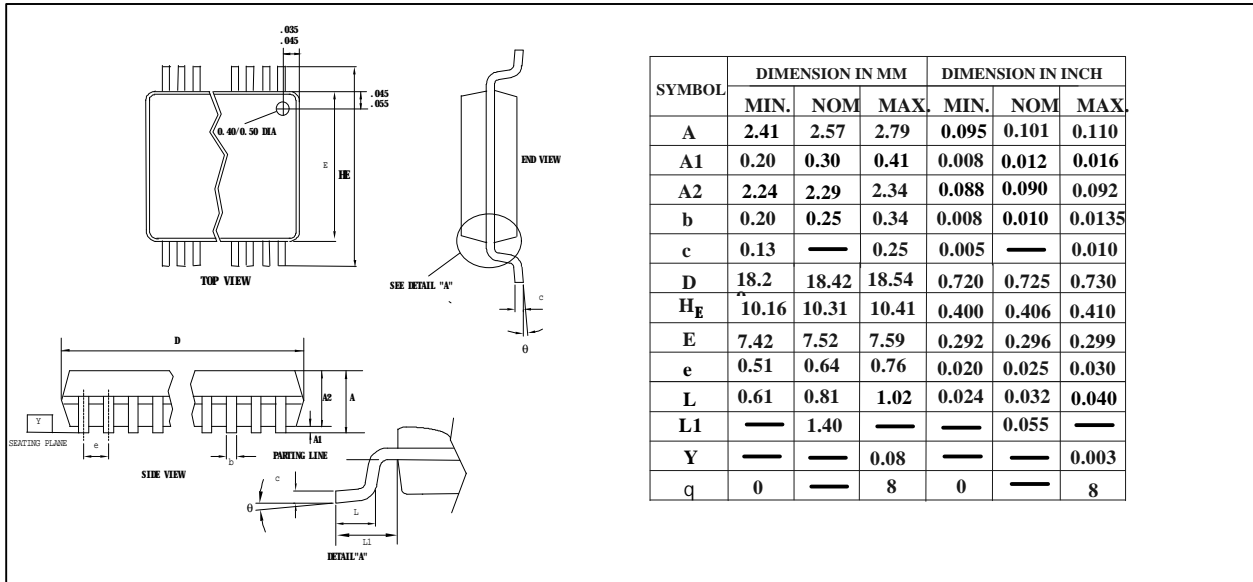
B: IC revision



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10.0 PACKAGE DRAWING AND DIMENSIONS



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