

# W83194BR-97



## 200MHZ CLOCK FOR CAMINO CHIPSET

### 1.0 GENERAL DESCRIPTION

The W83194BR-97 is a Clock Synthesizer for Intel Camino 820 chipset. W83194BR-97 provides all clocks required for high-speed RISC or CISC microprocessor and also provides 64 sets of different frequencies of CPU, PCI, 3V66, IOAPIC clocks or stepless frequencies programming by M/N value via I<sup>2</sup>C registers. All clocks are externally selectable with smooth transitions.

The W83194BR-97 provides I<sup>2</sup>C serial bus interface to program the registers to enable or disable each clock outputs and provides 0.5% and 0.25% center type spread spectrum to reduce EMI.

The W83194BR-97 accepts a 14.318 MHz reference crystal as its input and runs on a 3.3V supply. High drive PCI 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 clock outputs
- One CPU/2 output as reference input to DRCG
- 3 3V66 clock outputs
- 3 IOAPIC clock outputs
- 8 PCI synchronous clocks.
- Optional single or mixed supply:  
(VddQ2 = VddQ3 = 3.3V or VddQ3=3.3V, VddQ2=2.5V)
- CPU to 3V66 offset 0 to 1.5 ns
- 3V66 to PCI offset 1.5 to 4.0 ns
- Skew form CPU to PCI clock 1 to 4 ns, center 2.6 ns
- Smooth frequency switch with selections from 66.8 to 200MHz
- Stepless programmable frequencies by I<sup>2</sup>C register9 ~ register12
- I<sup>2</sup>C 2-Wire serial interface and I<sup>2</sup>C read back
- 0.5% and 0.75% center type spread spectrum
- Programmable registers to enable/stop each output and select modes  
(mode as Tri-state or Normal )
- 48 MHz pins for USB
- 24 MHz for super I/O
- 48-pin SSOP package

## 3.0 PIN CONFIGURATION

|                 |                          |    |   |    |                          |                     |
|-----------------|--------------------------|----|---|----|--------------------------|---------------------|
| VSSR            | <input type="checkbox"/> | 1  | ● | 48 | <input type="checkbox"/> | VddA                |
| REF0            | <input type="checkbox"/> | 2  |   | 47 | <input type="checkbox"/> | IOAPIC0             |
| REF1/*SEL24_48# | <input type="checkbox"/> | 3  |   | 46 | <input type="checkbox"/> | IOAPIC1             |
| VDDR            | <input type="checkbox"/> | 4  |   | 45 | <input type="checkbox"/> | VSSA                |
| Xin             | <input type="checkbox"/> | 5  |   | 44 | <input type="checkbox"/> | IOAPIC2             |
| Xout            | <input type="checkbox"/> | 6  |   | 43 | <input type="checkbox"/> | VDDC/2              |
| VSSP            | <input type="checkbox"/> | 7  |   | 42 | <input type="checkbox"/> | CPU/2               |
| PCICLK_F/*FS0   | <input type="checkbox"/> | 8  |   | 41 | <input type="checkbox"/> | VSSC/2              |
| PCICLK1/*FS1    | <input type="checkbox"/> | 9  |   | 40 | <input type="checkbox"/> | CPUCLK0             |
| VDDP            | <input type="checkbox"/> | 10 |   | 39 | <input type="checkbox"/> | VDDCPU              |
| PCICLK2/*FS2    | <input type="checkbox"/> | 11 |   | 38 | <input type="checkbox"/> | CPUCLK1             |
| PCICLK3/*FS3    | <input type="checkbox"/> | 12 |   | 37 | <input type="checkbox"/> | CPUCLK2             |
| VSSPCI          | <input type="checkbox"/> | 13 |   | 36 | <input type="checkbox"/> | VSSCPU              |
| PCICLK4         | <input type="checkbox"/> | 14 |   | 35 | <input type="checkbox"/> | VDD66               |
| PCICLK5         | <input type="checkbox"/> | 15 |   | 34 | <input type="checkbox"/> | 3V66-0              |
| VDDP            | <input type="checkbox"/> | 16 |   | 33 | <input type="checkbox"/> | 3V66-1              |
| PCICLK6         | <input type="checkbox"/> | 17 |   | 32 | <input type="checkbox"/> | 3V66-2              |
| PCICLK7         | <input type="checkbox"/> | 18 |   | 31 | <input type="checkbox"/> | VSS66               |
| VSSPCI          | <input type="checkbox"/> | 19 |   | 30 | <input type="checkbox"/> | *SDATA              |
| PCICLK8         | <input type="checkbox"/> | 20 |   | 29 | <input type="checkbox"/> | *SDCLK              |
| PCICLK9         | <input type="checkbox"/> | 21 |   | 28 | <input type="checkbox"/> | VDD48               |
| PCICLK10        | <input type="checkbox"/> | 22 |   | 27 | <input type="checkbox"/> | 48MHz/*FS4          |
| VDDPCI          | <input type="checkbox"/> | 23 |   | 26 | <input type="checkbox"/> | 24_48MHz/FREQ_APIC* |
| PD#             | <input type="checkbox"/> | 24 |   | 25 | <input type="checkbox"/> | VSS48               |



PRELIMINARY

## 4.0 FREQUENCY SELECTION BY HARDWARE

| FS4      | FS3      | FS2      | FS1      | FS0      | CPU (MHz)     | CPU/2        | 3V66/ CPU   | 3V66 (MHz)   | PCI (MHz)    | IOAPIC (MHz) FREQ_APIC=1 | IOAPIC (MHz) FREQ_APIC=0 |
|----------|----------|----------|----------|----------|---------------|--------------|-------------|--------------|--------------|--------------------------|--------------------------|
| 0        | 0        | 0        | 0        | 0        | 103.00        | 51.50        | 0.67        | 68.67        | 34.33        | 17.17                    | 34.33                    |
| 0        | 0        | 0        | 0        | 1        | 105.00        | 52.50        | 0.67        | 70.00        | 35.00        | 17.50                    | 35.00                    |
| 0        | 0        | 0        | 1        | 0        | 100.30        | 50.15        | 0.67        | 66.87        | 33.43        | 16.72                    | 33.43                    |
| 0        | 0        | 0        | 1        | 1        | 100.90        | 50.45        | 0.67        | 67.27        | 33.63        | 16.82                    | 33.63                    |
| 0        | 0        | 1        | 0        | 0        | 107.00        | 53.50        | 0.67        | 71.33        | 35.67        | 17.83                    | 35.67                    |
| 0        | 0        | 1        | 0        | 1        | 109.00        | 54.50        | 0.67        | 72.67        | 36.33        | 18.17                    | 36.33                    |
| 0        | 0        | 1        | 1        | 0        | 112.00        | 56.00        | 0.67        | 74.67        | 37.33        | 18.67                    | 37.33                    |
| 0        | 0        | 1        | 1        | 1        | 114.00        | 57.00        | 0.67        | 76.00        | 38.00        | 19.00                    | 38.00                    |
| 0        | 1        | 0        | 0        | 0        | 116.10        | 58.05        | 0.67        | 77.40        | 38.70        | 19.35                    | 38.70                    |
| 0        | 1        | 0        | 0        | 1        | 118.00        | 59.00        | 0.67        | 78.67        | 39.33        | 19.67                    | 39.33                    |
| 0        | 1        | 0        | 1        | 0        | 133.30        | 66.65        | 0.50        | 66.65        | 33.33        | 16.66                    | 33.33                    |
| 0        | 1        | 0        | 1        | 1        | 120.00        | 60.00        | 0.67        | 80.00        | 40.00        | 20.00                    | 40.00                    |
| 0        | 1        | 1        | 0        | 0        | 122.00        | 61.00        | 0.67        | 81.33        | 40.67        | 20.33                    | 40.67                    |
| 0        | 1        | 1        | 0        | 1        | 125.10        | 62.55        | 0.67        | 83.40        | 41.70        | 20.85                    | 41.70                    |
| 0        | 1        | 1        | 1        | 0        | 128.20        | 64.10        | 0.67        | 85.47        | 42.73        | 21.37                    | 42.73                    |
| 0        | 1        | 1        | 1        | 1        | 130.00        | 65.00        | 0.67        | 86.67        | 43.33        | 21.67                    | 43.33                    |
| <b>1</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>133.00</b> | <b>66.50</b> | <b>0.67</b> | <b>88.67</b> | <b>44.33</b> | <b>22.17</b>             | 44.33                    |
| 1        | 0        | 0        | 0        | 1        | 133.90        | 66.95        | 0.50        | 66.95        | 33.48        | 16.74                    | 33.48                    |
| 1        | 0        | 0        | 1        | 0        | 138.00        | 69.00        | 0.50        | 69.00        | 34.50        | 17.25                    | 34.50                    |
| 1        | 0        | 0        | 1        | 1        | 142.00        | 71.00        | 0.50        | 71.00        | 35.50        | 17.75                    | 35.50                    |
| 1        | 0        | 1        | 0        | 0        | 146.00        | 73.00        | 0.50        | 73.00        | 36.50        | 18.25                    | 36.50                    |
| 1        | 0        | 1        | 0        | 1        | 150.00        | 75.00        | 0.50        | 75.00        | 37.50        | 18.75                    | 37.50                    |
| 1        | 0        | 1        | 1        | 0        | 153.00        | 76.50        | 0.50        | 76.50        | 38.25        | 19.13                    | 38.25                    |
| 1        | 0        | 1        | 1        | 1        | 156.00        | 78.00        | 0.50        | 78.00        | 39.00        | 19.50                    | 39.00                    |
| 1        | 1        | 0        | 0        | 0        | 159.10        | 79.55        | 0.50        | 79.55        | 39.78        | 19.89                    | 39.78                    |
| 1        | 1        | 0        | 0        | 1        | 162.00        | 81.00        | 0.50        | 81.00        | 40.50        | 20.25                    | 40.50                    |
| 1        | 1        | 0        | 1        | 0        | 165.00        | 82.50        | 0.50        | 82.50        | 41.25        | 20.63                    | 41.25                    |
| 1        | 1        | 0        | 1        | 1        | 168.00        | 84.00        | 0.50        | 84.00        | 42.00        | 21.00                    | 42.00                    |
| 1        | 1        | 1        | 0        | 0        | 171.00        | 85.50        | 0.50        | 85.50        | 42.75        | 21.38                    | 42.75                    |
| 1        | 1        | 1        | 0        | 1        | 174.00        | 87.00        | 0.50        | 87.00        | 43.50        | 21.75                    | 43.50                    |
| 1        | 1        | 1        | 1        | 0        | 177.00        | 88.50        | 0.50        | 88.50        | 44.25        | 22.13                    | 44.25                    |
| 1        | 1        | 1        | 1        | 1        | 180.00        | 90.00        | 0.50        | 90.00        | 45.00        | 22.50                    | 45.00                    |

## 5.0 SERIAL CONTROL REGISTERS



## PRELIMINARY

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 Selection BY I2C

| SSEL5    | SSEL4    | SSEL3    | SSEL2    | SSEL1    | SSEL0    | CPU (MHz)     | CPU/2        | 3V66/ CPU   | 3V66 (MHz)   | PCI (MHz)    | IOAPIC (MHz) FREQ_APIC=1 | IOAPIC (MHz) FREQ_APIC=0 |
|----------|----------|----------|----------|----------|----------|---------------|--------------|-------------|--------------|--------------|--------------------------|--------------------------|
| 0        | 0        | 0        | 0        | 0        | 0        | 103.00        | 51.50        | 0.67        | 68.67        | 34.33        | 17.17                    | 34.33                    |
| 0        | 0        | 0        | 0        | 0        | 1        | 105.00        | 52.50        | 0.67        | 70.00        | 35.00        | 17.50                    | 35.00                    |
| 0        | 0        | 0        | 0        | 1        | 0        | 100.30        | 50.15        | 0.67        | 66.87        | 33.43        | 16.72                    | 33.43                    |
| 0        | 0        | 0        | 0        | 1        | 1        | 100.90        | 50.45        | 0.67        | 67.27        | 33.63        | 16.82                    | 33.63                    |
| 0        | 0        | 0        | 1        | 0        | 0        | 107.00        | 53.50        | 0.67        | 71.33        | 35.67        | 17.83                    | 35.67                    |
| 0        | 0        | 0        | 1        | 0        | 1        | 109.00        | 54.50        | 0.67        | 72.67        | 36.33        | 18.17                    | 36.33                    |
| 0        | 0        | 0        | 1        | 1        | 0        | 112.00        | 56.00        | 0.67        | 74.67        | 37.33        | 18.67                    | 37.33                    |
| 0        | 0        | 0        | 1        | 1        | 1        | 114.00        | 57.00        | 0.67        | 76.00        | 38.00        | 19.00                    | 38.00                    |
| 0        | 0        | 1        | 0        | 0        | 0        | 116.10        | 58.05        | 0.67        | 77.40        | 38.70        | 19.35                    | 38.70                    |
| 0        | 0        | 1        | 0        | 0        | 1        | 118.00        | 59.00        | 0.67        | 78.67        | 39.33        | 19.67                    | 39.33                    |
| 0        | 0        | 1        | 0        | 1        | 0        | 133.30        | 66.65        | 0.50        | 66.65        | 33.33        | 16.66                    | 33.33                    |
| 0        | 0        | 1        | 0        | 1        | 1        | 120.00        | 60.00        | 0.67        | 80.00        | 40.00        | 20.00                    | 40.00                    |
| 0        | 0        | 1        | 1        | 0        | 0        | 122.00        | 61.00        | 0.67        | 81.33        | 40.67        | 20.33                    | 40.67                    |
| 0        | 0        | 1        | 1        | 0        | 1        | 125.10        | 62.55        | 0.67        | 83.40        | 41.70        | 20.85                    | 41.70                    |
| 0        | 0        | 1        | 1        | 1        | 0        | 128.20        | 64.10        | 0.67        | 85.47        | 42.73        | 21.37                    | 42.73                    |
| 0        | 0        | 1        | 1        | 1        | 1        | 130.00        | 65.00        | 0.67        | 86.67        | 43.33        | 21.67                    | 43.33                    |
| <b>0</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>133.00</b> | <b>66.50</b> | <b>0.67</b> | <b>88.67</b> | <b>44.33</b> | <b>22.17</b>             | 44.33                    |
| 0        | 1        | 0        | 0        | 0        | 1        | 133.90        | 66.95        | 0.50        | 66.95        | 33.48        | 16.74                    | 33.48                    |
| 0        | 1        | 0        | 0        | 1        | 0        | 138.00        | 69.00        | 0.50        | 69.00        | 34.50        | 17.25                    | 34.50                    |
| 0        | 1        | 0        | 0        | 1        | 1        | 142.00        | 71.00        | 0.50        | 71.00        | 35.50        | 17.75                    | 35.50                    |
| 0        | 1        | 0        | 1        | 0        | 0        | 146.00        | 73.00        | 0.50        | 73.00        | 36.50        | 18.25                    | 36.50                    |
| 0        | 1        | 0        | 1        | 0        | 1        | 150.00        | 75.00        | 0.50        | 75.00        | 37.50        | 18.75                    | 37.50                    |
| 0        | 1        | 0        | 1        | 1        | 0        | 153.00        | 76.50        | 0.50        | 76.50        | 38.25        | 19.13                    | 38.25                    |
| 0        | 1        | 0        | 1        | 1        | 1        | 156.00        | 78.00        | 0.50        | 78.00        | 39.00        | 19.50                    | 39.00                    |
| 0        | 1        | 1        | 0        | 0        | 0        | 159.10        | 79.55        | 0.50        | 79.55        | 39.78        | 19.89                    | 39.78                    |
| 0        | 1        | 1        | 0        | 0        | 1        | 162.00        | 81.00        | 0.50        | 81.00        | 40.50        | 20.25                    | 40.50                    |
| 0        | 1        | 1        | 0        | 1        | 0        | 165.00        | 82.50        | 0.50        | 82.50        | 41.25        | 20.63                    | 41.25                    |
| 0        | 1        | 1        | 0        | 1        | 1        | 168.00        | 84.00        | 0.50        | 84.00        | 42.00        | 21.00                    | 42.00                    |
| 0        | 1        | 1        | 1        | 0        | 0        | 171.00        | 85.50        | 0.50        | 85.50        | 42.75        | 21.38                    | 42.75                    |
| 0        | 1        | 1        | 1        | 0        | 1        | 174.00        | 87.00        | 0.50        | 87.00        | 43.50        | 21.75                    | 43.50                    |
| 0        | 1        | 1        | 1        | 1        | 0        | 177.00        | 88.50        | 0.50        | 88.50        | 44.25        | 22.13                    | 44.25                    |
| 0        | 1        | 1        | 1        | 1        | 1        | 180.00        | 90.00        | 0.50        | 90.00        | 45.00        | 22.50                    | 45.00                    |
| SSEL5    | SSEL4    | SSEL3    | SSEL2    | SSEL1    | SSEL0    | CPU (MHz)     | CPU/2        | 3V66/ CPU   | 3V66 (MHz)   | PCI (MHz)    | IOAPIC (MHz) FREQ_APIC=1 | IOAPIC (MHz) FREQ_APIC=0 |

# W83194BR-97



## PRELIMINARY

|   |   |   |   |   |   |        |        |      |        |       |       |       |
|---|---|---|---|---|---|--------|--------|------|--------|-------|-------|-------|
| 1 | 0 | 0 | 0 | 0 | 0 | 134.00 | 67.00  | 0.50 | 67.00  | 33.50 | 16.75 | 33.50 |
| 1 | 0 | 0 | 0 | 0 | 1 | 135.00 | 67.50  | 0.50 | 67.50  | 33.75 | 16.88 | 33.75 |
| 1 | 0 | 0 | 0 | 1 | 0 | 136.00 | 68.00  | 0.50 | 68.00  | 34.00 | 17.00 | 34.00 |
| 1 | 0 | 0 | 0 | 1 | 1 | 137.00 | 68.50  | 0.50 | 68.50  | 34.25 | 17.13 | 34.25 |
| 1 | 0 | 0 | 1 | 0 | 0 | 139.00 | 69.50  | 0.50 | 69.50  | 34.75 | 17.38 | 34.75 |
| 1 | 0 | 0 | 1 | 0 | 1 | 140.00 | 70.00  | 0.50 | 70.00  | 35.00 | 17.50 | 35.00 |
| 1 | 0 | 0 | 1 | 1 | 0 | 143.00 | 71.50  | 0.50 | 71.50  | 35.75 | 17.88 | 35.75 |
| 1 | 0 | 0 | 1 | 1 | 1 | 144.00 | 72.00  | 0.50 | 72.00  | 36.00 | 18.00 | 36.00 |
| 1 | 0 | 1 | 0 | 0 | 0 | 145.00 | 72.50  | 0.50 | 72.50  | 36.25 | 18.13 | 36.25 |
| 1 | 0 | 1 | 0 | 0 | 1 | 147.00 | 73.50  | 0.50 | 73.50  | 36.75 | 18.38 | 36.75 |
| 1 | 0 | 1 | 0 | 1 | 0 | 148.00 | 74.00  | 0.50 | 74.00  | 37.00 | 18.50 | 37.00 |
| 1 | 0 | 1 | 0 | 1 | 1 | 149.00 | 74.50  | 0.50 | 74.50  | 37.25 | 18.63 | 37.25 |
| 1 | 0 | 1 | 1 | 0 | 0 | 152.00 | 76.00  | 0.50 | 76.00  | 38.00 | 19.00 | 38.00 |
| 1 | 0 | 1 | 1 | 0 | 1 | 154.00 | 77.00  | 0.50 | 77.00  | 38.50 | 19.25 | 38.50 |
| 1 | 0 | 1 | 1 | 1 | 0 | 155.00 | 77.50  | 0.50 | 77.50  | 38.75 | 19.38 | 38.75 |
| 1 | 0 | 1 | 1 | 1 | 1 | 157.00 | 78.50  | 0.50 | 78.50  | 39.25 | 19.63 | 39.25 |
| 1 | 1 | 0 | 0 | 0 | 0 | 158.00 | 79.00  | 0.50 | 79.00  | 39.50 | 19.75 | 39.50 |
| 1 | 1 | 0 | 0 | 0 | 1 | 160.00 | 80.00  | 0.50 | 80.00  | 40.00 | 20.00 | 40.00 |
| 1 | 1 | 0 | 0 | 1 | 0 | 163.00 | 81.50  | 0.50 | 81.50  | 40.75 | 20.38 | 40.75 |
| 1 | 1 | 0 | 0 | 1 | 1 | 164.00 | 82.00  | 0.50 | 82.00  | 41.00 | 20.50 | 41.00 |
| 1 | 1 | 0 | 1 | 0 | 0 | 166.00 | 83.00  | 0.50 | 83.00  | 41.50 | 20.75 | 41.50 |
| 1 | 1 | 0 | 1 | 0 | 1 | 167.00 | 83.50  | 0.50 | 83.50  | 41.75 | 20.88 | 41.75 |
| 1 | 1 | 0 | 1 | 1 | 0 | 169.00 | 84.50  | 0.50 | 84.50  | 42.25 | 21.13 | 42.25 |
| 1 | 1 | 0 | 1 | 1 | 1 | 170.00 | 85.00  | 0.50 | 85.00  | 42.50 | 21.25 | 42.50 |
| 1 | 1 | 1 | 0 | 0 | 0 | 172.00 | 86.00  | 0.50 | 86.00  | 43.00 | 21.50 | 43.00 |
| 1 | 1 | 1 | 0 | 0 | 1 | 173.00 | 86.50  | 0.50 | 86.50  | 43.25 | 21.63 | 43.25 |
| 1 | 1 | 1 | 0 | 1 | 0 | 175.00 | 87.50  | 0.50 | 87.50  | 43.75 | 21.88 | 43.75 |
| 1 | 1 | 1 | 0 | 1 | 1 | 181.00 | 90.50  | 0.50 | 90.50  | 45.25 | 22.63 | 45.25 |
| 1 | 1 | 1 | 1 | 0 | 0 | 183.00 | 91.50  | 0.50 | 91.50  | 45.75 | 22.88 | 45.75 |
| 1 | 1 | 1 | 1 | 0 | 1 | 185.00 | 92.50  | 0.50 | 92.50  | 46.25 | 23.13 | 46.25 |
| 1 | 1 | 1 | 1 | 1 | 0 | 190.00 | 95.00  | 0.50 | 95.00  | 47.50 | 23.75 | 47.50 |
| 1 | 1 | 1 | 1 | 1 | 1 | 200.00 | 100.00 | 0.50 | 100.00 | 50.00 | 25.00 | 50.00 |



PRELIMINARY

**5.1 Register 0: CPU Frequency Select Register**

| Bit | @PowerUp | Pin | Description  |
|-----|----------|-----|--|
| 7   | 0        | -   | SSEL3 ( Frequency table selection by software via I <sup>2</sup> C)                      |
| 6   | 0        | -   | SSEL2 ( Frequency table selection by software via I <sup>2</sup> C)                      |
| 5   | 0        | -   | SSEL1 ( Frequency table selection by software via I <sup>2</sup> C)                      |
| 4   | 0        | -   | SSEL0 ( Frequency table selection by software via I <sup>2</sup> C)                      |
| 3   | 0        | -   | 0 = Selection by hardware<br>1 = Selection by software I <sup>2</sup> C - Bit (0,2, 6:4) |
| 2   | 0        | -   | SSEL4 (Frequency table selection by software via I <sup>2</sup> C)                       |
| 1   | 0        | -   | 0 = Normal<br>1 = Spread Spectrum enabled  |
| 0   | 0        | -   | SSEL5 ( Frequency table selection by software via I <sup>2</sup> C)                      |

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

| Bit | @PowerUp | Pin | Description                 |
|-----|----------|-----|-----------------------------|
| 7   | 1        | 40  | CPUCLK0(Active / Inactive)  |
| 6   | 1        | 38  | CPUCLK1(Active / Inactive)  |
| 5   | 1        | 37  | CPUCLK2(Active / Inactive)  |
| 4   | 1        | 42  | CPU/2(Active / Inactive)    |
| 3   | 1        | 47  | IOAPIC0 (Active / Inactive) |
| 2   | 1        | 46  | IOAPIC1 (Active / Inactive) |
| 1   | 1        | 2   | REF1 (Active / Inactive)    |
| 0   | 1        | 3   | REF0 (Active / Inactive)    |

**5.3 Register 2: PCI Clock Register (1 = Active, 0 = Inactive)**

| Bit | @PowerUp | Pin | Description                  |
|-----|----------|-----|------------------------------|
| 7   | 1        | 18  | PCICLK7 (Active / Inactive)  |
| 6   | 1        | 17  | PCICLK6 (Active / Inactive)  |
| 5   | 1        | 15  | PCICLK5 (Active / Inactive)  |
| 4   | 1        | 14  | PCICLK4 (Active / Inactive)  |
| 3   | 1        | 12  | PCICLK3 (Active / Inactive)  |
| 2   | 1        | 11  | PCICLK2 (Active / Inactive)  |
| 1   | 1        | 9   | PCICLK1 (Active / Inactive)  |
| 0   | 1        | 8   | PCICLK_F (Active / Inactive) |



PRELIMINARY

5.4 Register 3: 3V66 Clock Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description   |
|-----|----------|-----|---|
| 7   | 1        | 34  | 3V66_0(Active / Inactive)   |
| 6   | 1        | 33  | 3V66_1(Active / Inactive)   |
| 5   | 1        | 32  | 3V66_2(Active / Inactive)   |
| 4   | X        | -   | <b>FS1#</b>   |
| 3   | 0        | -   | 0 = $\pm 0.25\%$ Center type Spread Spectrum Modulation<br>1 = $\pm 0.5\%$ Center type Spread Spectrum Modulation |
| 2   | 0        | -   | 0 = Running<br>1 = Tristate all outputs   |
| 1   | X        | -   | <b>FS3#</b>   |
| 0   | X        | -   | <b>FS2#</b>   |

5.5 Register 4: PCI Clock Additional Register (1 = Active, 0 = Inactive)

| Bit | @PowerUp | Pin | Description                  |
|-----|----------|-----|------------------------------|
| 7   | 1        | 26  | 24_48MHz(Active / Inactive)  |
| 6   | 1        | 27  | 48MHz(Active / Inactive)     |
| 5   | X        | -   | <b>FS0#</b>                  |
| 4   | 1        | 22  | PCICLK10 (Active / Inactive) |
| 3   | 1        | 21  | PCICLK9 (Active / Inactive)  |
| 2   | 1        | 20  | PCICLK8 (Active / Inactive)  |
| 1   | 1        | -   | Reserve                      |
| 0   | X        | -   | <b>FS4#</b>                  |

5.6 Register 5: Skew Register

| Bit | @PowerUp | Pin | Description                                 |
|-----|----------|-----|---|
| 7   | <b>1</b> | -   | <b>Skew2 (CPU to 3V66 skew program bit)</b> |
| 6   | <b>0</b> | -   | <b>Skew1 (CPU to 3V66 skew program bit)</b> |
| 5   | <b>0</b> | -   | <b>Skew0 (CPU to 3V66 skew program bit)</b> |
| 4   | 1        | -   | Reserve                                     |
| 3   | 1        | -   | Reserve                                     |
| 2   | 1        | -   | Reserve                                     |
| 1   | 1        | -   | Reserve                                     |
| 0   | 1        | -   | Reserve                                     |



PRELIMINARY

**5.7 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   | 0        | -   | Winbond Chip ID |
| 2   | 0        | -   | Winbond Chip ID |
| 1   | 0        | -   | Winbond Chip ID |
| 0   | 0        | -   | Winbond Chip ID |

**5.8 Register 7: Winbond Chip ID Register (Read Only)**

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

**5.9 Register 8: Watchdog Timer Register**

| Bit | @PowerUp | Pin | Description                                    |
|-----|----------|-----|--|
| 7   | 0        | -   | Enable Count 1 = start timer<br>0 = stop timer |
| 6   | 0        | -   | Second timeout status (READ ONLY)              |
| 5   | 0        | -   | Second count 5                                 |
| 4   | 0        | -   | Second count 4                                 |
| 3   | 0        | -   | Second count 3                                 |
| 2   | 0        | -   | Second count 2                                 |
| 1   | 0        | -   | Second count 1                                 |
| 0   | 0        | -   | Second count 0                                 |





PRELIMINARY

### 5.10 Register 9: M/N Program Register and 3V66 Divisor

| Bit | @PowerUp | Pin | Description                          |
|-----|----------|-----|--------------------------------------|
| 7   | 0        | -   | N value bit 8                        |
| 6   | 0        | -   | 3V66 divisor 00: CPU/2 ; 01: CPU/1.5 |
| 5   | 0        | -   | 3V66 divisor 10: CPU/1 ; 11: CPU/3   |
| 4   | 0        | -   | M value bit 4                        |
| 3   | 0        | -   | M value bit 3                        |
| 2   | 0        | -   | M value bit 2                        |
| 1   | 0        | -   | M value bit 1                        |
| 0   | 0        | -   | M value bit 0                        |

### 5.11 Register 10: M/N Program Register

| Bit | @PowerUp | Pin | Description   |
|-----|----------|-----|---------------|
| 7   | 0        | -   | N value bit 7 |
| 6   | 0        | -   | N value bit 6 |
| 5   | 0        | -   | N value bit 5 |
| 4   | 0        | -   | N value bit 4 |
| 3   | 0        | -   | N value bit 3 |
| 2   | 0        | -   | N value bit 2 |
| 1   | 0        | -   | N value bit 1 |
| 0   | 0        | -   | N value bit 0 |

### 5.12 Register 11: Divisor Register

| Bit | @PowerUp | Pin | Description                     |
|-----|----------|-----|---------------------------------|
| 7   | 1        | -   | Spread spectrum up count[0:3]   |
| 6   | 1        | -   | Spread spectrum up count[0:3]   |
| 5   | 1        | -   | Spread spectrum up count[0:3]   |
| 4   | 1        | -   | Spread spectrum up count[0:3]   |
| 3   | 1        | -   | Spread spectrum down count[0:3] |
| 2   | 1        | -   | Spread spectrum down count[0:3] |
| 1   | 1        | -   | Spread spectrum down count[0:3] |
| 0   | 1        | -   | Spread spectrum down count[0:3] |



PRELIMINARY

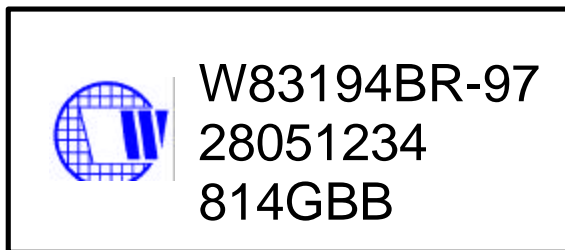
## 5.12 Register 12 Divisor Register

| Bit | @PowerUp | Pin | Description  |
|-----|----------|-----|--|
| 7   | 0        | -   | 0: use frequency table<br>1: use M/N register 9~12 to program frequency<br>The equation is <b><math>\text{CPU freq.} = 14.318\text{MHz} * (\text{N}+4) / 2 * \text{M}</math></b> |
| 6   | 1        | -   | Reserve  |
| 5   | 1        | -   | Reserve  |
| 4   | 1        | -   | Reserve  |
| 3   | 1        | -   | Reserve  |
| 2   | 1        | -   | Reserve  |
| 1   | 1        | -   | Reserve  |
| 0   | 1        | -   | Reserve  |

## 6.0 ORDERING INFORMATION

| Part Number | Package Type | Production Flow          |
|-------------|--------------|--------------------------|
| W83194BR-97 | 48 PIN SSOP  | Commercial, 0°C to +70°C |

## 7.0 HOW TO READ THE TOP MARKING



1st line: Winbond logo and the type number: W83194BR-97

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 B B

814: packages made in '98, week 14

G: assembly house ID; A means ASE, S means SPIL, G means GR

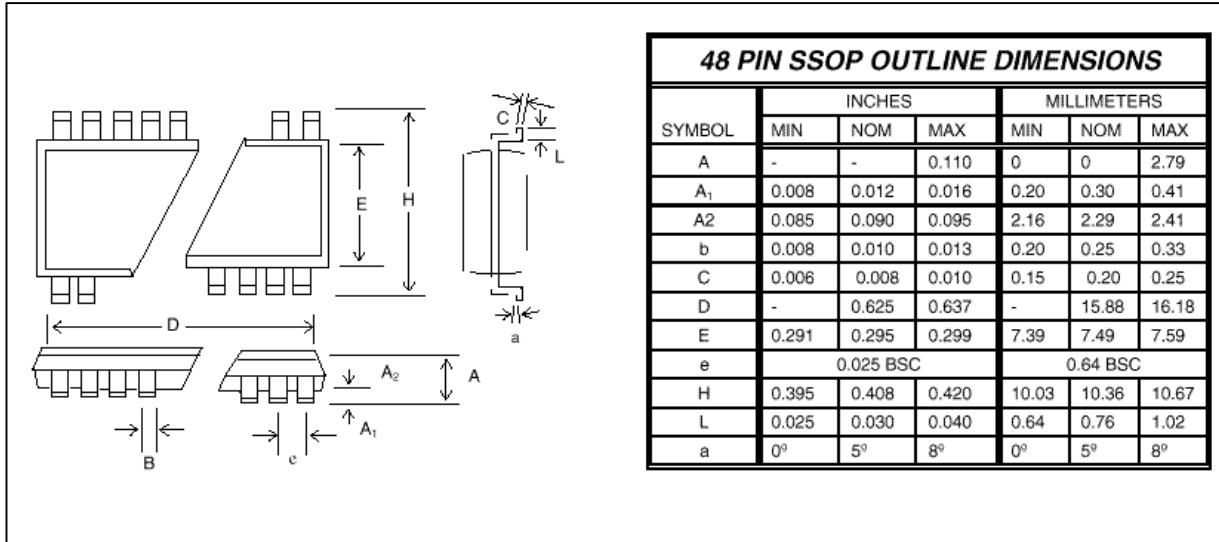
B: Winbond internal use code

B: IC revision

All the trade marks of products and companies mentioned in this data sheet belong to their respective owners.

PRELIMINARY

## 8.0 PACKAGE DRAWING AND DIMENSIONS



**Headquarters**  
 No. 4, Creation Rd. III  
 Science-Based Industrial Park  
 Hsinchu, Taiwan  
 TEL: 886-35-770066  
 FAX: 886-35-789467  
 www: <http://www.winbond.com.tw/>

**Taipei Office**  
 11F, No. 115, Sec. 3, Min-Sheng East Rd.  
 Taipei, Taiwan  
 TEL: 886-2-7190505  
 FAX: 886-2-7197502  
 TLX: 16485 WINTPE

**Winbond Electronics (H.K.) Ltd.**  
 Rm. 803, World Trade Square, Tower II  
 123 Hoi Bun Rd., Kwun Tong  
 Kowloon, Hong Kong  
 TEL: 852-27516023-7  
 FAX: 852-27552064

**Winbond Electronics  
 (North America) Corp.**  
 2730 Orchard Parkway  
 San Jose, CA 95134 U.S.A.  
 TEL: 1-408-9436666  
 FAX: 1-408-9436668

Please note that all data and specifications are subject to change without notice. All the trade marks of products and companies mentioned in this data sheet belong to their respective owners.

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Winbond customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Winbond for any damages resulting from such improper use or sale.