STEPLESS CLOCK FOR VIA PRO266 CHIPSET

W83194BR-250

Data Sheet Revision History

	Pages	Dates	Version	Version On Web	Main Contents
1	n.a.			n.a.	All of the versions before 0.50 are for internal use.
2	n.a.	02/Apr	1.0	1.0	Change version and version on web site to 1.0
3					
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1.0 GENERAL DESCRIPTION

The W83194BR-250 is a Clock Synthesizer for VIA Pro266 chipset. W83194BR-250 provides all clocks required for high-speed RISC or CISC microprocessor and also provides 64 different frequencies of CPU, PCI, AGP, IOAPIC clocks frequency setting. All clocks are externally selectable with smooth transitions.

The W83194BR-250 provides I^2C 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.

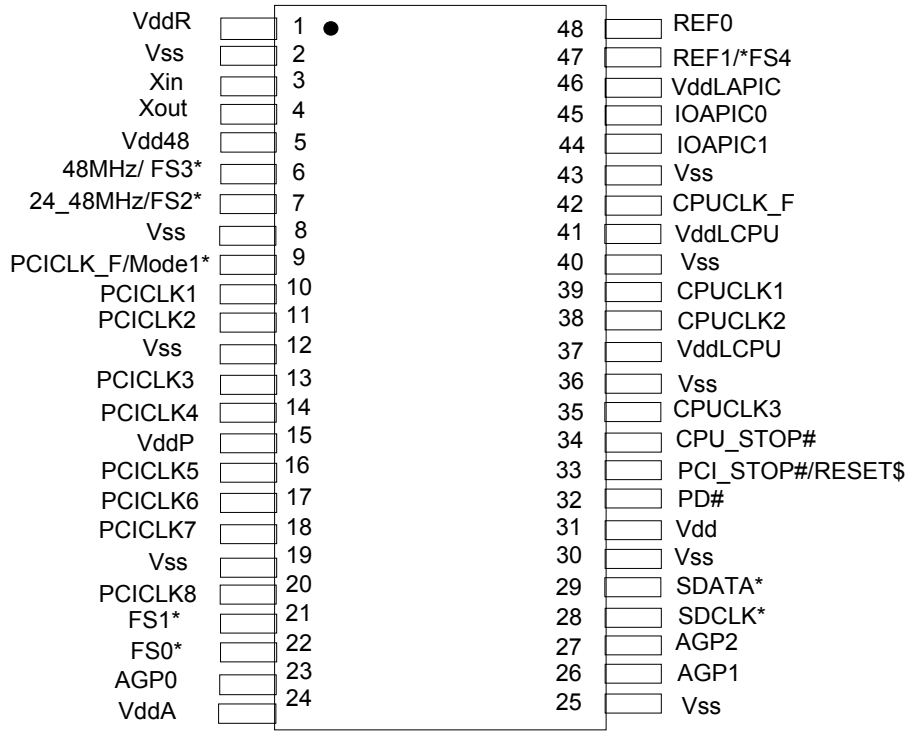
The W83194BR-250 provides stepless frequency programming by controlling the VCO freq. and the clock output divisor ratio. Also the skew of CPU and AGP clock outputs are programmable. A watch dog timer is quipped and when time out, the RESET# pin will output 4ms pulse signal.

The W83194BR-250 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

- 4 CPU clocks
- 3 AGP for chipset and AGP clocks
- 9 PCI synchronous clocks.
- Optional single or mixed supply:
  (VddR = VddP= Vdd48 = VddA =Vdd = 3.3V, VddLAPIC=VddLCPU=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 200 MHz
- I^2C 2-Wire serial interface and I^2C read back
- 0.25% and 0.5% center type spread spectrum
- Programmable registers to enable/stop each output and select modes
- 48 MHz for USB
- 24 MHz for super I/O
- 48-pin SSOP package

3.0 PIN CONFIGURATION



*: internal pull-up
#: active low
$: ope drain

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	3	IN	Crystal input with internal loading capacitors(36pF) and feedback resistors.
Xout	4	OUT	Crystal output at 14.318MHz nominally with internal loading capacitors(36pF).

4.2 CPU, AGP,PCI,IOAPIC Clock Outputs

SYMBOL	PIN	I/O	FUNCTION
CPUCLK_F , [1:3]	42,39,38,35	OUT	Low skew (< 250ps) clock outputs for host frequencies such as CPU and Chipset. CPUCLK_F is the free running pin and does not affect by CPU_STOP#
CPU_STOP#	34	IN	CPU_STOP# when driven low.
PCI_STOP#/RESET$	33	I/O	Pin9 *Mode1=1, PCI_STOP# when driven low. Pin9 *Mode1=0, RESET# output (4ms low active pulse when Watch Dog time out)
PD#	32	IN	Power Down mode when driven low.
IOAPIC[0:1]	45,44	OUT	Clock outputs synchronous with PCI clock and powered by VddLAPIC.
PCICLK_F/Mode1*	9	I/O	3.3V 33MHz free running PCI clock during normal operation. Latched input for Mode1* at initial power up for pin34 selection. *Mode1=1, pin 34 =CPU_STOP# when driven low. *Mode1=0, pin 34 = RESET# output (4ms low active pulse when Watch Dog time out)
PCICLK[1:8]	10,11,12,13,14 ,16,17,18,20	OUT	Low skew (< 250ps) PCI clock outputs.
AGP [0:2]	23,26,27	OUT	3.3V output clocks for the chipset.
*FS[1:0]	21,22	IN	H/W selecting the output frequency of CPU, AGP and PCI clocks (Default=1).

4.3 I^2C Control Interface

SYMBOL	PIN	I/O	FUNCTION
SDATA*	29	I/O	Serial data of I^2C 2-wire control interface
SDCLK*	28	IN	Serial clock of I^2C 2-wire control interface

4.4 Fixed Frequency Outputs

SYMBOL	PIN	I/O	FUNCTION
REF0	48	OUT	3.3V 14.318MHz reference clock.
REF1 / *FS4	47	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, AGP and PCI clocks (Default=1).
24_48MHz/FS2*	7	I/O	24MHz or 48MHz output clock. Latched input for FS42at initial power up for H/W selecting the output frequency of CPU, AGP and PCI clocks (Default=1).
48MHz_1/ FS3*	6	I/O	48MHz / Latched input for FS3 at initial power up for H/W selecting the output frequency of CPU, AGP and PCI clocks (Default=1).

4.5 Power Pins

SYMBOL	PIN	FUNCTION
VddLCPU,VddLAPIC	37,41,46	Power supply for CPU & IOAPIC, 2.5V or 3.3V.
Vdd48	5	Power supply for 48MHz output,3.3V.
VddA	24	Power supply for 3V_66 output, 3.3V.
VddP	15	Power supply for PCICLK, 3.3V.
VddR	1	Power supply for REFX2, 3.3V.
Vdd	31	Power for I2C CLK and DATA.
Vss	2,8,12,19,25,30,36, 40,43	Circuit Ground.

5.0 FREQUENCY SELECTION BY HARDWARE

FS4	FS3	FS2	FS1	FS0	CPU(MHz)	AGP(MHZ)	PCI(MHz)	IOAPIC
0	0	0	0	0	200.0	66.7	33.3	16.7
0	0	0	0	1	190.0	63.3	31.7	15.85
0	0	0	1	0	180.0	60.0	30.0	15
0	0	0	1	1	170.0	68	34	17
0	0	1	0	0	166.0	66.4	33.2	16.6
0	0	1	0	1	160.0	64.0	32.0	16
0	0	1	1	0	150.0	75.0	37.5	18.75
0	0	1	1	1	145.0	72.5	36.3	18.15
0	1	0	0	0	140.0	70.0	35.0	17.5
0	1	0	0	1	136.0	68.0	34.0	17
0	1	0	1	0	130.0	65.0	32.5	16.25
0	1	0	1	1	124.0	62.0	31.0	15.5
0	1	1	0	0	66.8	66.8	33.4	16.7
0	1	1	0	1	100.2	66.8	33.4	16.7
0	1	1	1	0	118.0	78.7	39.3	19.6
0	1	1	1	1	133.4	66.7	33.4	16.7
1	0	0	0	0	66.8	66.8	33.4	16.7
1	0	0	0	1	100.2	66.8	33.4	16.7
1	0	0	1	0	115.0	76.7	38.3	19.15
1	0	0	1	1	133.4	66.7	33.4	16.7
1	0	1	0	0	66.8	66.8	33.4	16.7
1	0	1	0	1	100.2	66.8	33.4	16.7
1	0	1	1	0	110.0	73.3	36.7	18.35
1	0	1	1	1	133.4	66.7	33.4	16.7
1	1	0	0	0	105.0	70.0	35.0	17
1	1	0	0	1	90.0	60.0	30.0	15
1	1	0	1	0	85.0	56.7	28.4	14.2
1	1	0	1	1	78.0	78.0	39.0	19.5
1	1	1	0	0	66.8	66.8	33.4	16.7
1	1	1	0	1	100.2	66.8	33.4	16.7
1	1	1	1	0	75.0	75.0	37.5	18.75
1	1	1	1	1	133.4	66.7	33.4	16.7

6.2.1 Register 0 : Frequency Select Register (default = 0)

Bit	@PowerUp	Pin	Description
7	0	-	0 = Normal 1 = Spread Spectrum enabled
6	0	-	SSEL2 (for frequency table selection by software via I^2C)
5	0	-	SSEL1 (for frequency table selection by software via I^2C)
4	0	-	SSEL0 (for frequency table selection by software via I^2C)
3	0	-	0 = Selection by hardware 1 = Selection by software I^2C - Bit 6:4, Bit2
2	0	-	SSEL4 (for frequency table selection by software via I^2C)
1	0	-	SSEL3 (for frequency table selection by software via I^2C)
0	0	-	0 = Running 1 = Tristate all outputs

6.2.2 Register 1 : CPU Clock Register (1 = enable, 0 = Stopped)

Bit	@PowerUp	Pin	Description
7	1	44	IOAPIC1 (Active / Inactive)
6	1	45	IOAPIC0 (Active / Inactive)
5	1	47	REF1 (Active / Inactive)
4	1	48	REF0 (Active / Inactive)
3	1	35	CPUCLK3 (Active / Inactive)
2	1	38	CPUCLK2 (Active / Inactive)
1	1	39	CPUCLK1 (Active / Inactive)
0	1	42	CPUCLK_F (Active / Inactive)

6.2.3 Register 2: PCI Clock Register (1 = enable, 0 = Stopped)

Bit	@PowerUp	Pin	Description
7	1	20	PCICLK8 (Active / Inactive)
6	1	18	PCICLK7 (Active / Inactive)
5	1	17	PCICLK6 (Active / Inactive)
4	1	16	PCICLK5 (Active / Inactive)
3	1	14	PCICLK4 (Active / Inactive)
2	1	13	PCICLK3 (Active / Inactive)
1	1	11	PCICLK2 (Active / Inactive)
0	1	10	PCICLK1 (Active / Inactive)

6.2.4 Register 3: 24MHz, 48MHz Clock Register (1 = enable, 0 = Stopped)

Bit	@PowerUp	Pin	Description
7	0	-	1 = ±0.25% ,0=±0.5% Spread Spectrum Modulation
6	0	-	SEL24_48 (0=24Mhz, 1=48MHz)
5	1	6	48MHz (Active / Inactive)
4	1	7	24_48MHz (Active / Inactive)
3	1	9	PCICLK_F (Active / Inactive)
2	1	27	AGP2 (Active / Inactive)
1	1	26	AGP1 (Active / Inactive)
0	1	23	AGP0 (Active / Inactive)

6.2.5 Register 4: Buffer Chip Register (1 = enable, 0 = Stopped)

Bit	@PowerUp	Pin	Description
7	-	-	Reserved for W83176R-251
6	-	-	Reserved for W83176R-251
5	-	-	Reserved for W83176R-251
4	-	-	Reserved for W83176R-251
3	-	-	Reserved for W83176R-251
2	-	-	Reserved for W83176R-251
1	-	-	Reserved for W83176R-251
0	-	-	Reserved for W83176R-251

6.2.6 Register 5: Buffer Chip Register (1 = enable, 0 = Stopped)

Bit	@PowerUp	Pin	Description
7	-	-	Reserved for W83176R-251
6	-	-	Reserved for W83176R-251
5	-	-	Reserved for W83176R-251
4	-	-	Reserved for W83176R-251
3	-	-	Reserved for W83176R-251
2	-	-	Reserved for W83176R-251
1	-	-	Reserved for W83176R-251
0	-	-	Reserved for W83176R-251

6.2.7 Register 6: Watchdog Timer Register

Bit	@PowerUp	Pin	Description
7	0	-	Enable Count 1 = start timer 0 = stop timer
6	X	-	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

6.2.8 Register 7: M/N Program Register

Bit	@PowerUp	Pin	Description
7	0	-	N value bit 8
6	0	-	Test 1(Please do not modify)
5	1	-	Test 0 (Please do not modify)
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

6.2.9 Register 8: 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

6.2.10 Register 9: Spread Spectrum Programming Register

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

6.2.11 Register 10: Divisor and Step-less Enable Register

Bit	@PowerUp	Pin	Description
7	0	-	0: use frequency table 1: use M/N register to program frequency The equation is **VCO freq. = 14.318MHz * (N+4)/ M**
6	0	-	Reserved
5	X	-	Ratio SEL2
4	X	-	Ratio SEL1
3	X	-	Ratio SEL 0
2	1	-	CPU to AGP Skew 2
1	0	-	CPU to AGP Skew 1
0	0	-	CPU to AGP Skew 0

6.2.12 Register 11: Winbond Chip ID Register (Read Only)

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

6.2.13 Register 12: Winbond Chip ID Register (Read Only)

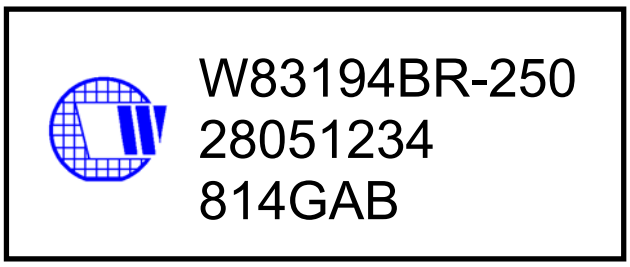
Bit	@PowerUp	Pin	Description
7	1	-	Winbond Chip ID
6	0	-	Winbond Chip ID
5	0	-	Winbond Chip ID
4	0	-	Winbond Chip ID
3	0	-	Winbond Version ID
2	0	-	Winbond Version ID
1	0	-	Winbond Version ID
0	1	-	Winbond Version ID

Reg10 Bit5	Reg10 bit4	Reg10 bit3	VCO/ CPU	VCO/ AGP	VCO/ PCI
SEL2	SEL1	SEL0	ratio	ratio	ratio
0	0	0	2	4	4
0	0	1	2	5	5
0	1	0	2	6	6
0	1	1	3	6	4
1	0	0	4	4	2
1	0	1	4	6	3
1	1	0	6	6	2
1	1	1	X	X	X

7.0 ORDERING INFORMATION

Part Number	Package Type	Production Flow
W83194BR-250	48 PIN SSOP	Commercial, 0°C to +70°C

8.0 HOW TO READ THE TOP MARKING



1st line: Winbond logo and the type number: W83194BR-250

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; O means OSE, G means GR

A: Internal use code

B: IC revision

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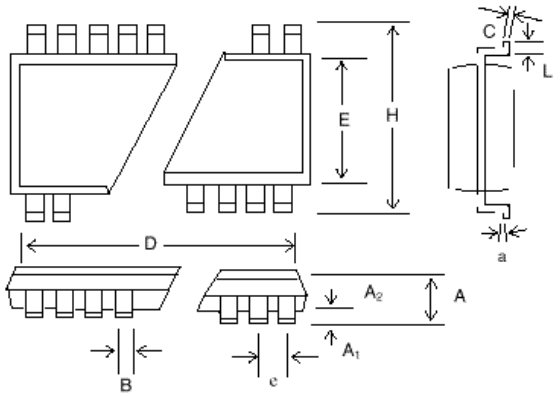
9.0 PACKAGE DRAWING AND DIMENSIONS



48 PIN SSOP OUTLINE DIMENSIONS

SYMBOL	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	0.110	0	0	2.79
A_1	0.008	0.012	0.016	0.20	0.30	0.41
A2	0.085	0.090	0.095	2.16	2.29	2.41
b	0.008	0.010	0.013	0.20	0.25	0.33
C	0.006	0.008	0.010	0.15	0.20	0.25
D	-	0.625	0.637	-	15.88	16.18
E	0.291	0.295	0.299	7.39	7.49	7.59
e	0.025 BSC			0.64 BSC		
H	0.395	0.408	0.420	10.03	10.36	10.67
L	0.025	0.030	0.040	0.64	0.76	1.02
a	0°	5°	8°	0°	5°	8°

Winbond Electronics Corp.

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

9F, No. 480, Rueiguang Road, Neihu District,
Taipei, 114, Taiwan
TEL: 886-2-81777168
FAX: 886-2-87153579

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.

2727 North First Street
San Jose, California 95134
TEL: 1-408-9436666
FAX: 1-408-9436668

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