



MOTHERBOARD CLOCK GENERATOR

FEATURES

- Clock generator for IBM™ PC/AT system
- Mask programmable CPU clock up to 80 MHz
- Provides a 14.318MHz master clock and two buffered CPU clocks
- Built-in advanced PLL for low phase-jitter, driven by a 14.318 MHz crystal

- Output disable control
- Built-in loop-filter
- CPU clock outputs glitch-free while switching frequencies
- Package
 - 14-pin PDIP
 - 14-pin SOP

GENERAL DESCRIPTION

The MX8312 is a CMOS motherboard clock generator used in PC systems to eliminate the need for additional crystal oscillators and to reduce the overall system cost.

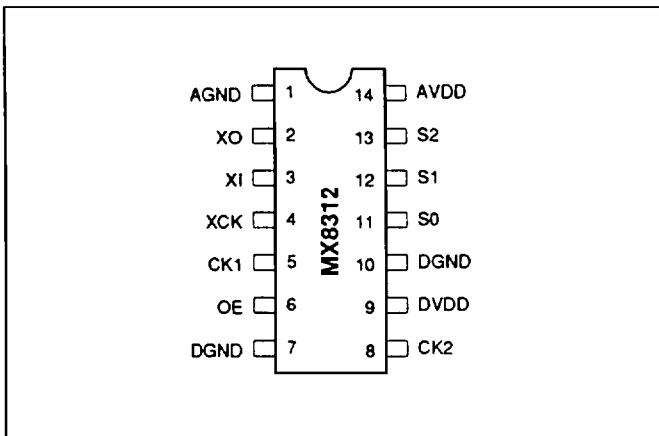
The MX8312 is capable of generating a 14.318 MHz master clock output and a dual programmable CPU clock outputs, which can improve driving capability and EMI reflected from different parts of the board. If

special applications require a different set of frequencies (range from 10MHz to 80MHz), MXIC can make a custom version by changing one mask layer.

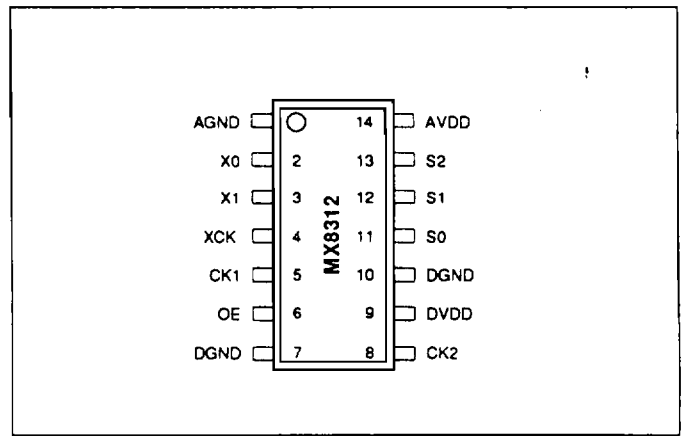
System power management can be attained by switching CPU clock to slower speed or disabling the output buffers. The clock chip features output glitch-free during output disable, output enable, and frequency switching.

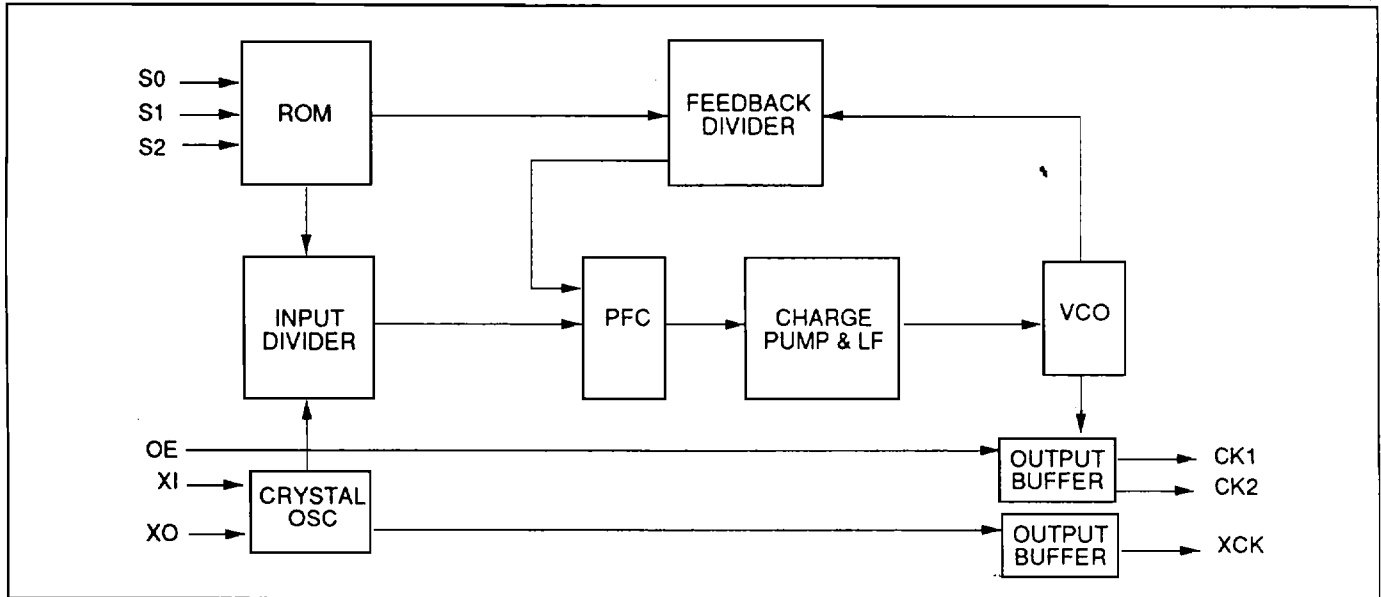
PIN CONFIGURATIONS

14 PDIP



14 SOP



BLOCK DIAGRAM

PIN DESCRIPTION

SYMBOL	PIN TYPE	PIN NUMBER	DESCRIPTION
AGND		1	Analog ground
XO	O	2	Xtal Output. No connection during clock input
XI	I	3	Xtal input or reference clock input
XCK	O	4	Xtal clock output (14.318MHz)
CK1	O	5	CPU clock output 1
OE	I	6	Output enable. Active high and internal pull-high input, when disabled, CK1 and CK2 stop to low voltage.
DGND		7	Digital ground
CK2	O	8	CPU clock output 2
DVDD		9	Digital power supply
DGND		10	Digital ground
S0	I	11	Frequency select 0. Internal pull high
S1	I	12	Frequency select 1. Internal pull high
S2	I	13	Frequency select 2. Internal pull high
AVDD		14	Analog power supply

FUNCTIONAL DESCRIPTION

The MX8312 mother-board clock generator is an integrated circuits of phase-lock loop frequency synthesizer capable of generating three clock signals for the PC system. XCK (pin 4) provides the crystal oscillation frequency (14.31818MHz). CK1(pin5) and CK2(pin8) provide CPU frequency, which can be programmable through three select pins (S0, S1 and S2) based on the frequency table shown below.

The MX8312 minimizes the pin number and external component number. As shown in the block diagram, the major functional blocks are the ROM, feedback and input dividers, phases frequency comparator (PFC), charge pump circuitry, voltage-controlled oscillator (VCO) and crystal oscillator.

FREQUENCY TABLE

S2	S1	S0	CK1 and CK2 (MHz)
0	0	0	33.33
0	0	1	80
0	1	0	66.67
0	1	1	50
1	0	0	40
1	0	1	60
1	1	0	25
1	1	1	20

FREQUENCY REFERENCE

The internal reference oscillator includes all passive components required. A proper resonant crystal should be connected between the X0 (pin 2) and X1 (pin 3). Crystal range from 10 MHz to 25 MHz is recommended. A 14.31818 MHz crystal, however, is usually used. To minimize the noise pickup, maintain short lead lengths between the crystal and MX8312 by soldering the crystal to the ground plane. The reference clock can also be supplied by external clock signal. In this case, the XI should be connected to reference clock and XO be disconnected. The decoupling capacitors connected to MX8312 should be as close as possible to reduce noise susceptibility.

ABSOLUTE MAXIMUM RATINGS

RATING	VALUE
Storage Temperature	-85°C to 150°C
Applied Input Voltage	-0.5V to VDD + 0.5V
Applied Output Voltage	-0.5V to VDD + 0.5V
Supply Voltage	-0.5V to 7V
Operating Temperature	0 to 70°C
Power Dissipation	0.5 Watts

NOTICE:

Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended period may affect reliability.

NOTICE:

Specifications contained within the following tables are subject to change.

DC CHARACTERISTICS TA = 0°C to 70°C, VCC = 5V ± 10%

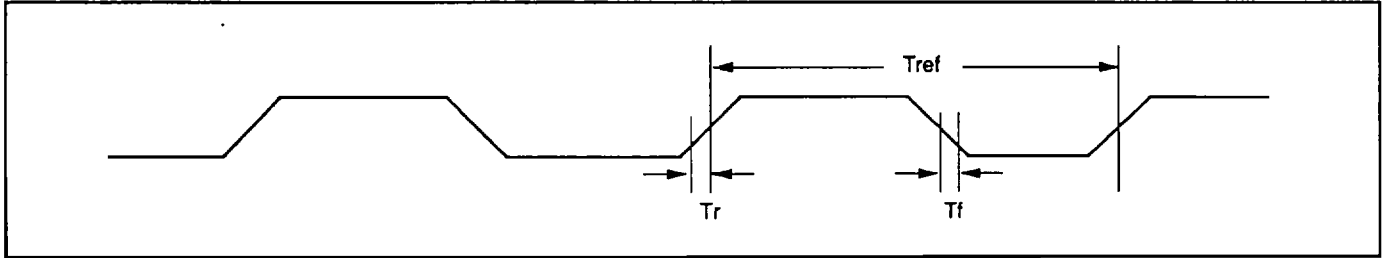
SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT	CONDITIONS
DVDD, AVDD	Supply Voltage	4.5	5	5.5	V	
IDD	Supply Current		TBD		mA	No load, running at 80 MHz
VOL	Output Low Voltage			0.4	V	CK1 and CK2 IOL=20mA
VOL	Output Low Voltage			0.4	V	XCK, IOL=5mA
VOH	Output High Voltage	2.4			V	CK1 and CK2 IOH=-45mA
VOH	Output High Voltage	2.4			V	XCK, IOH=-15mA
RPU	Pull up Resistor			80K	Ohms	

CAPACITANCE TA = 25°C, f = 1.0 MHz (Sampled only)

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT	CONDITIONS
CIN	Input Capacitance		8		pF	
COUT	Output Capacitance		8		pF	

AC CHARACTERISTICS TA = 0°C to 70°C, VCC = 5V ± 10%

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Tr	Rise Time (0.8V-2.0V)			2	ns	25 pF load
Tf	Fall Time (2.0V-0.8V)			2	ns	25 pF load
Dt	Output Duty Cycle	45/55	50/50	55/45		25 pF load
Fref	Reference Clock Frequency		14.31818		MHz	
Tref	Reference Clock Period		69.8412		ns	

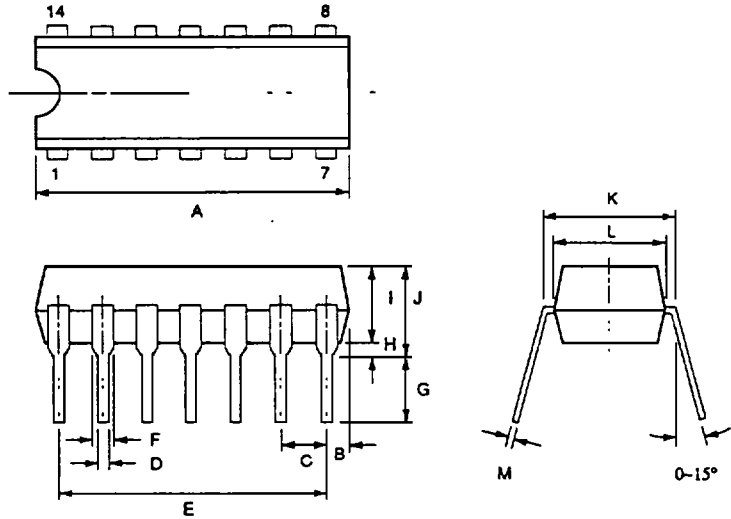
WAVEFORMS**ORDERING INFORMATION****PLASTIC PACKAGE**

PART NO.	PACKAGE
MX8312PC	14-PIN DIP
MX8312MC	14-PIN SOP

PACKAGE INFORMATION
14-PIN PLASTIC DIP (300 mil)

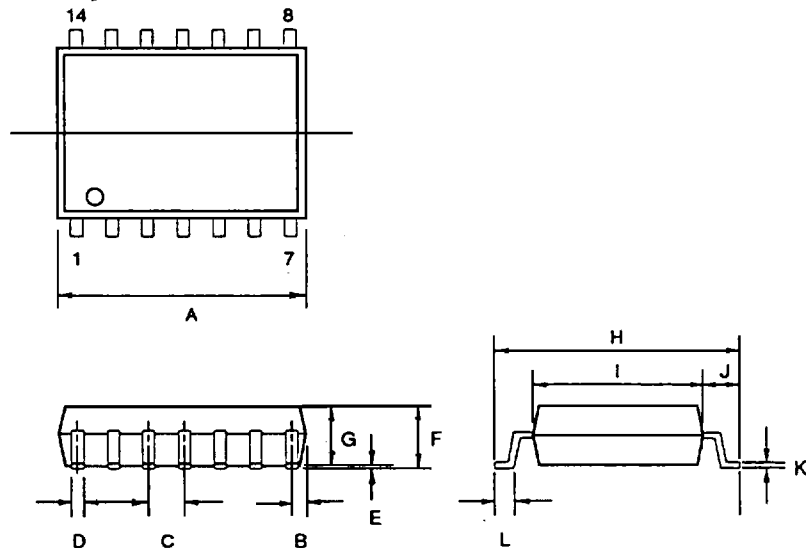
ITEM	MILLIMETERS	INCHES
A	19.43 max.	.765 max.
B	1.90 [REF]	.075 [REF]
C	2.54 [TP]	.100 [TP]
D	.46 [Typ.]	.018 [Typ.]
E	15.24	.600
F	1.52 [Typ.]	.060 [Typ.]
G	3.30 ± .25	.130 ± .010
H	.51 [REF]	.020 [REF]
I	3.30 ± .25	.130 ± .010
J	4.32 ± .25	.170 ± .010
K	7.61 ± .25	.300 ± .010
L	6.48 ± .25	.255 ± .010
M	.25 [Typ.]	.010 [Typ.]

NOTE: Each lead centerline is located within .25 mm(.01 inch) of its true position [TP] at maximum material condition.


14-PIN PLASTIC SOP(150 mil)

ITEM	MILLIMETERS	INCHES
A	8.89 max.	.350 max.
B	.76	.030 [REF]
C	1.27 [TP]	.050 [TP]
D	.41 [Typ.]	.016 [Typ.]
E	.10 min.	.004 min.
F	1.91 max.	.075 max.
G	1.42 ± .13	.056 ± .005
H	5.99 ± .3	.236 ± .012
I	3.91 ± .13	.154 ± .005
J	1.02	.040
K	.20 [Typ.]	.008 [Typ.]
L	.76	.030

NOTE: Each lead centerline is located within .25 mm(.01 inch) of its true position [TP] at maximum material condition.





MX8312

MACRONIX INTERNATIONAL CO., LTD.

No. 3, Creation Road III, Science-Based Industrial Park, Hsin Chu, Taiwan, R.O.C.

TEL: (035)-783-333

FAX: (035)-778-689

TAIPEI OFFICE:

Room 223, 2F, No. 144, Sec 3, Min-Chuan E. Rd., Taipei, Taiwan, R.O.C.

TEL: (02)-719-1977

FAX: (02)-712-7359

MACRONIX INC.

1348 Ridder Park Drive, San Jose, CA95131 U.S.A.

TEL: (408)-453-8088

FAX: (408)-453-8488

MACRONIX JAPAN K.K.

14F, 1-1-2 Marunouchi Chiyoda-Ku, Tokyo 100, Japan.

TEL: (03)-3217-3107

FAX: (03)-3217-3148