

VT8225 Clock Generator

Date: July 5, 1994

Features

- * Generates essential clock signals for the motherboard
- * 4V to 7V operating supply range
- * Supports 80286, 80386 and 80486 based designs
- * Wide range of selectable output frequencies
- * < 2ns skew between CPU and 2X CPU clock outputs
- * Single low cost crystal (14.318Mhz) used as reference frequency
- * Smooth transition on frequency switching
- * 50% duty cycle
- * Power down mode for low power consumption
- * TTL or CMOS compatible outputs with 12mA drive capability
- * Low, short and long term jitter
- * 14 pin DIP and 14 pin SOIC (300 mil body) package options

Description

The VT8225 is a universal clock generator for motherboard design. The product at a glimpse:

1. Generates all kinds of required clocks for CPU and bus operation from 6 Mhz to 80 Mhz.
2. Eliminates at least two oscillators, which are oscillators for CPU and 14.318MHz oscillator.
3. Simplifies inventory: VT8225 covers required main clock for the motherboard design.
4. Provides a reliable clock for the PLL design.
5. Is pin-to-pin compatible to oscillator.

VT8225 Signal Description

Symbol	Pin No.	Type	Functions
X1	2	I	These pins form an on-chip reference oscillator when connected to terminals of an external parallel resonant crystal (nominally 14.318Mhz). X1 may also serve as input for an externally generated reference signal.
X2	3	I/O	
S0	4	I	Frequency select inputs. These inputs control the MCLK frequency selection. All these inputs have internal pull-ups. Table 1 below shows the output frequency selection conditions.
S1	5	I	
S2	10	I	
S3	9	I	
MCLK	8	O	Master clock output. Programmable output frequencies can be selected using So-S3.
RESET#	11	O	Chip reset, negative true.
TS	1	I	Tri-state input pin. When high, all outputs are tri-stated. When low outputs are enabled. This pin has an internal pull-down.
OSC	13	O	14.31818 Mhz output. Buffered output of on-chip reference oscillator or externally provided reference.
PD	6	O	This is the phase detector output for the clock generator. It is single-ended, tri-state output for use as loop error signal. A 0.1uF capacitor to ground should be connected from this pin to form the loop filter.
VSS	7	Ground	Digital Negative power supply.
AVSS	12	Ground	Analog Negative power supply.
VDD	14	Power	Positive power supply.

MCLK FREQUENCY SELECTION				
INPUTS			MCLK OUTPUT	
S2	S1	S0	S3=1 (Bank 1)	S3=0 (Bank 0)
0	0	0	8 Mhz	16 Mhz
0	0	1	20 Mhz	40 Mhz
0	1	0	25 Mhz	50 Mhz
0	1	1	40 Mhz	80 Mhz
1	0	0	33.3 Mhz	66.6 Mhz
1	0	1	50 Mhz	100 Mhz
1	1	0	4 Mhz	8 Mhz
1	1	1	2 Mhz	4 Mhz

Table 1 clock frequency selection

Note : The smooth transition of frequency change is only allowed within the same selection bank.

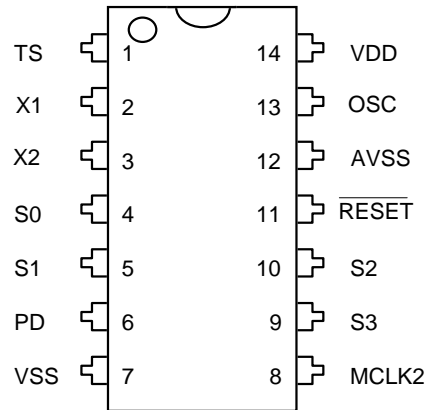


Figure 1: Connection Diagram for Plastic Dip or SOIC Package

MAXIMUM RATINGS

Voltage relative to VSS :-0.3V TO 7V
 Voltage relative to VDD:0.3V
 Storage temperature:-65°C to 150°C
 Ambient temperature:-55°C to +125°C
 Recommended Operating Range:4V - 7V

This device contains circuitry to protect the inputs against damage due to high static voltages or electric field; however, precautions should be taken to avoid application of any voltage higher than the maximum rated voltages to this circuit. For proper operation, Vin and Vout should be constrained to the range:

$$V_{SS} < (V_{in} \text{ or } V_{out}) < V_{DD}$$

Unused inputs must always be tied to an appropriate logic voltage level (either V_{SS} or V_{DD}).

ELECTRICAL CHARACTERISTICS					
Characteristic	Symbol	Min	Typ	Max	Units
Input Low Voltage	V _{IL}	-	-	0.8	Vdc
Input High Voltage	V _{IH}	2.0	-	-	Vdc
Input Low Current With Pull-up or Pull-down	I _{IL}	-	-	5	μA
				± 50	
Input High Current With Pull-up or Pull-down	I _{IH}	-	-	5	μA
				± 50	
Output Low Voltage I _{OL} = 12mA	V _{OL}	-	-	0.4	Vdc
Output High Voltage I _{OH} = 12mA	V _{OH}	2.4	-	-	Vdc
Tri-State Leakage Current	I _{OZ}	-	-	10	μA
Static Supply Current	I _{DD}	-	-	10	μA
Dynamic Supply Current	I _{CC}	-	-	35	mA
Short Circuit Current	I _{SC}	25	-	-	mA

VDD = 5V ± 10%, TA = -40°C to +85°C, CL = 50pF

SWITCHING CHARACTERISTICS					
Characteristics	Symbol	Min	Typ	Max	Units
Output Rise(0.8v-2.0v) and Fall Time (2.0v-0.8v)	tTLH, tTHL	-		2	ns
Output Enable TS to All Output	tZ			35	ns
Duty Cycle All Output	dT	40	48/52	60	%
Jitte, One Sigma	tJ1S		±0.5	±2	%
Jitter, Absolute	tABS		±3	±5	%
Frequency Transition Time	tFT			20	ms
Power Up Time	tPU		15	40	ms
Input Rise and Fall Times OSCIN	tTLH,tTHL	-	3	1	us
VDD = 5V ± 10%, TA = -40°C to +85°C, CL = 50pF					