

Low Cost CPU Frequency Generator

Features

- Pin compatible with Avasem AV9107-03
- Generate popular 12 CPU clocks and the reference clock 14.318 MHz
- Generate all the CPU Clocks for 286, 386, 486, and Pentium CPU
- Replace two crystal oscillators, for cost savings and board space savings
- On-chip loop filter — no external loop filter circuit
- Low power CMOS technology
- ESD protection exceeds 2000V
- Single +5V power supply operation
- Packages available:
 - 14-pin 300 mil wide plastic DIP (P14)
 - 14-pin 150 mil wide plastic SOIC (W14)

General Description

The PI6C9107U CPU clock generator provides a small footprint solution for generating two simultaneous clocks. The first clock CLK1 is user selectable from one of the four popular CPU frequencies, by selecting two selection signals FS1 and FS0. The second clock REFCLK is a fixed clock frequency, identical to the input reference clock.

The device includes on-chip loop filter circuit, for simplifying the board design. An external loop filter circuit is no longer needed. The output drive characteristics are also improved.

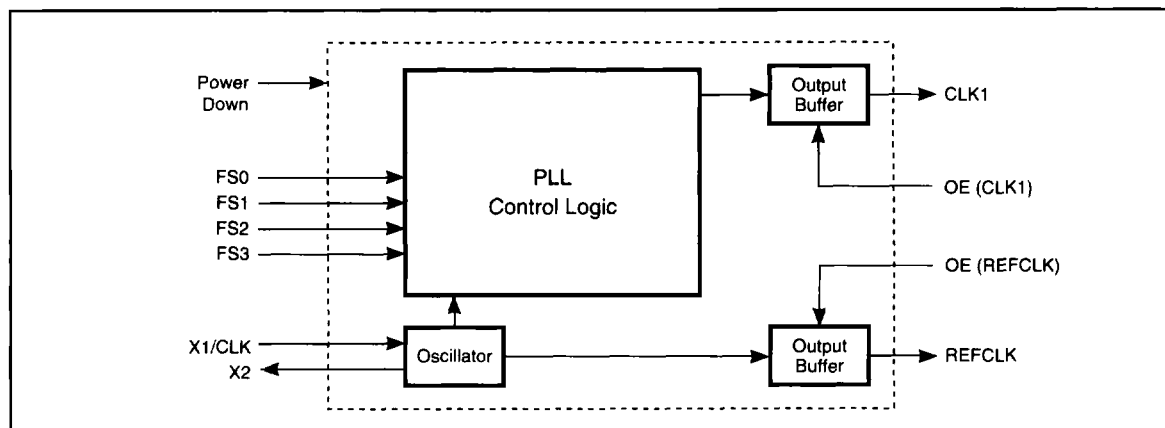
Enhanced versions with customized frequencies and features are also available. Contact factory for the enhanced versions.

Applications

CPU — The PI6C9107U is an ideal substitute for metal-can oscillators, for cost savings and board space savings. It offers additional features of reducing the operating clock speeds for saving power of the entire computer while the computer is idling. This feature cannot be accomplished by metal-can oscillators. A smooth, jitter-free frequency transition is provided for the CPU clock during slow down and speed up. The frequency transition rates are meeting the specifications of all 386DX, 386SX, 486DX, 486DX2, 486DX4 and 486SX.

Peripherals — The device is also an ideal substitute for metal-can oscillators on disk drive controllers, laser printer controllers, and other peripherals controllers. Contact factory for the custom frequencies required.

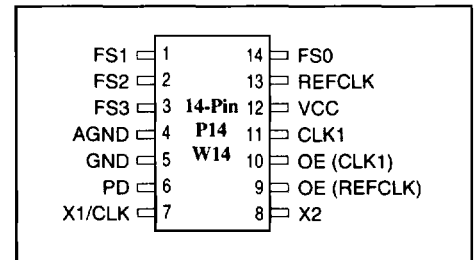
Block Diagram



Decoding Table (14.318 MHz Input)

FS3	FS2	FS1	FS0	CLK1
0	0	0	0	16 MHz
0	0	0	1	40 MHz
0	0	1	0	50 MHz
0	0	1	1	80 MHz
0	1	0	0	66.66 MHz
0	1	0	1	100 MHz
0	1	1	0	8 MHz
0	1	1	1	4 MHz
1	0	0	0	8 MHz
1	0	0	1	20 MHz
1	0	1	0	25 MHz
1	0	1	1	40 MHz
1	1	0	0	33.33 MHz
1	1	0	1	50 MHz
1	1	1	0	4 MHz
1	1	1	1	2 MHz

Product Pin Configuration



Product Pin Description

Pin Name	Pin No.	Pin Type	Description
FS0	14	Input	Frequency Select 0 for CLK1 (with Pull-Up)
FS1	1	Input	Frequency Select 1 for CLK1 (with Pull-Up)
FS2	2	Input	Frequency Select 2 for CLK1 (with Pull-Up)
FS3	3	Input	Frequency Select 3 for CLK1 (with Pull-Up)
AGND	4	—	Analog Ground
GND	5	—	Digital Ground
PD	6	Input	Power Down. Shuts off chip when LOW. Internal Pull-Up.
X1/CLK	7	Input	Crystal Input or Input Clock frequency. Typically 14.318 MHz system clock.
X2	8	Output	Crystal Output (No Connect when clock used)
OE (REFCLK)	9	Input	Output Enable. Tri-states REFCLK when LOW. Pull-Up.
OE (CLK1)	10	Input	Output Enable. Tri-states CLK1 when LOW. Pull-Up.
CLK1	11	Output	Clock1. Output (See decoding tables)
VCC	12	—	Digital power supply (+5V DC)
REFCLK	13	Output	Reference Clock output. Produces a buffered version of the input clock or crystal frequency (typically 14.318 MHz)

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	-55°C to +125°C
Ambient Temperature with Power Applied	0°C to +70°C
Supply Voltage to Ground Potential (Inputs & Vcc Only)	-0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	-0.5V to +7.0V
DC Output Current	120 mA
Operating Range: Ambient Temperature	0°C to +70°C
Operating Range: Vcc	5V ±5%
Power Dissipation	0.5W
ESD protection	>2000V

NOTE:

Stresses greater than those listed under **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 periods may affect reliability.

DC Electrical Characteristics at 5V (Operating Range, Vcc = +4.5V to +5.5V, Temperature 0°C to +70°C)

Symbol	Description	Test Conditions		Min.	Typ.	Max.	Units
V _{OH}	Output HIGH Voltage	V _{CC} = Min., V _{IN} = V _{IH} or V _{IL}	I _{OH} = -4 mA	2.4			V
V _{OL}	Output LOW Voltage	V _{CC} = Min., V _{IN} = V _{IH} or V _{IL}	I _{OL} = 8 mA			0.4	V
V _{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	V _{CC} = 5V	2.0			V
V _{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	V _{CC} = 5V			0.8	V
I _{IH}	Input HIGH Current	V _{CC} = Max., V _{IN} = V _{CC}				5	µA
I _{IL}	Input LOW Current	V _{CC} = Max., V _{IN} = 0V				-5	µA
I _{CC}	Supply Current ⁽¹⁾				10	20	mA
I _{CC2}	Standby Supply Current ⁽²⁾				25		µA
F _D	Output Freq. Change ⁽³⁾	With Respect to Typical Frequency			0.002	0.01	%
C _I	Input Capacitance	Except X1, X2				10	pF
C _L	Load Capacitance	Pins X1, X2			20		pF

Notes:

- PI6C9107U-03 with no load, with 14.318 MHz crystal input and CLK1 running at 40 MHz.
Power supply current varies with frequency. Consult factory for actual current at different frequencies.
- PI6C9107U-03 with power down pin LOW (active).
- Over Supply and Temperature.

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AC Electrical Characteristics at 5V (Operating Range, Vcc = +4.5V to +5.5V, Temperature 0°C to +70°C)

Symbol	Description	Test Conditions	Min.	Typ.	Max.	Units
fo	Output Frequency		2		120	MHz
fi	Input Frequency		2	14.318	32	MHz
ICLK _R	Input Clock Rise Time				20	ns
ICLK _F	Input Clock Fall Time				20	ns
tr	Output Rise Time, 0.8 to 2.0V	25 pF Load			2	ns
tR	Rise Time, 20% to 80% Vcc	25 pF Load		2	4	ns
tF	Output Fall Time, 2.0 to 0.8V	25 pF Load			2	ns
tF	Fall Time, 80% to 20% Vcc	25 pF Load			4	ns
dT	Duty Cycle, CPU	15 pF Load	40	50/50	60	%
TJIS	Jitter, 1 Sigma	All Frequencies		±0.5	±2	%
TJABS	Jitter, Absolute	All Frequencies		±3	±5	%
tFT	Frequency Transition Time	From 50 to 4 MHz			20	ms
tPU	Power Up Time	From Off to 100 MHz			2	ms

ACTUAL FREQUENCIES
PI6C9107U-03 Decoding Table (14.318 MHz Input)

FS3	FS2	FS1	FS0	CLK1
0	0	0	0	16.00 MHz
0	0	0	1	39.99 MHz
0	0	1	0	50.11 MHz
0	0	1	1	80.01 MHz
0	1	0	0	66.58 MHz
0	1	0	1	100.23 MHz
0	1	1	0	8.02 MHz
0	1	1	1	4.01 MHz
1	0	0	0	8.02 MHz
1	0	0	1	20.00 MHz
1	0	1	0	25.06 MHz
1	0	1	1	40.01 MHz
1	1	0	0	33.29 MHz
1	1	0	1	50.11 MHz
1	1	1	0	4.01 MHz
1	1	1	1	2.05 MHz