IC WORKS

W48C20

ADVANCE INFORMATION, FEBRUARY 1995

Audio Subsystem Clock Generator

FEATURES

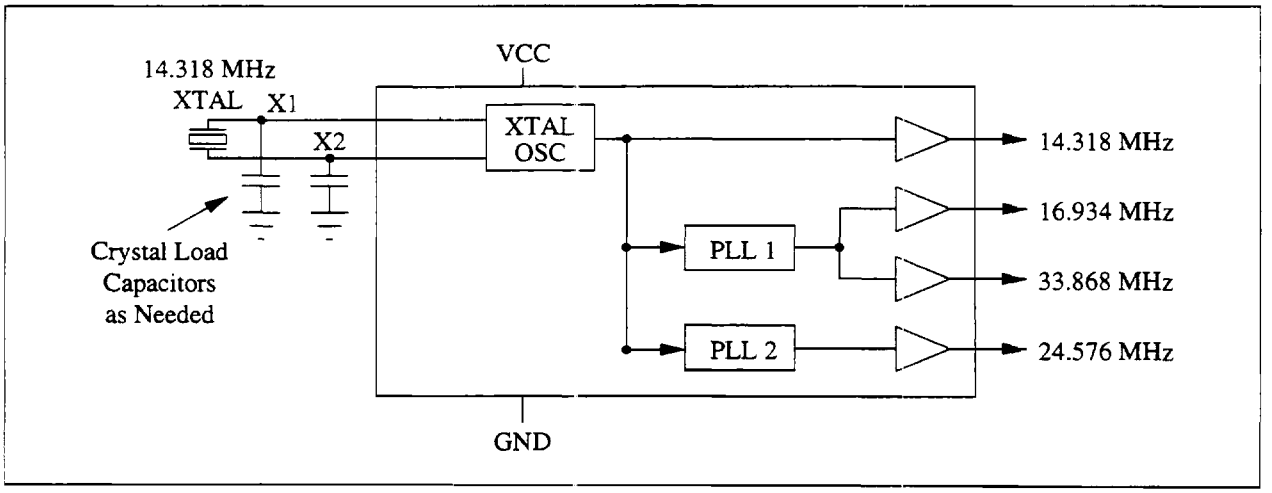
- **Full clock support for add-in sound cards or motherboard sound subsystems**
- **Packaged in small 8 pin, 150 mil SOIC**
- **3.3 V or 5.0 V power supply**
- **Advanced PLL architecture ensures minimal codec aperture sampling jitter**
- **Advanced crystal oscillator circuit ensures excellent 14.318 MHz output duty cycle**
- **Low Power CMOS Process**

FUNCTIONAL DESCRIPTION

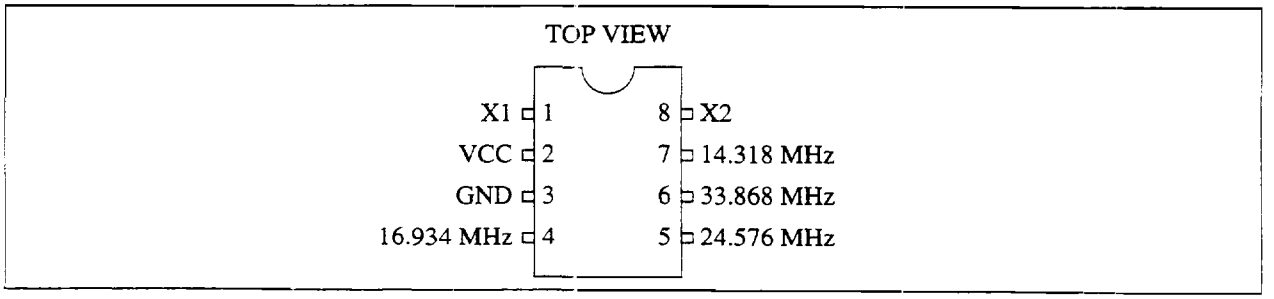
The W48C20 is a clock synthesizer IC designed specifically for PC sound subsystem applications. It generates the necessary output frequencies to support the Analog Devices AD1848, Crystal Semiconductor CS4231, Yamaha OPL4, and compatible devices. The W48C20 can be used with an external 14.318 MHz reference crystal, or it can be driven directly with the 14.318 MHz system bus clock.

The W48C20 is ideal for both add-in sound cards and motherboards with integrated sound subsystems. Unlike similar devices, the W48C20 can accept either a 3.3V or 5.0V power supply.

FUNCTIONAL BLOCK DIAGRAM: W48C20



PIN CONFIGURATIONS: W48C20



PIN DESCRIPTIONS

Number	Name	Type	Description
1	X1	I	Crystal Connection or external clock frequency input (14.318 MHz).
2	VDD	P	Power supply connection.
3	GND	P	Ground connection.
4	16.9M	O	16.9344 MHz clock output for stereo codec.
5	24.6M	O	24.576 MHz clock output for stereo codec.
6	33.9M	O	33.868 MHz clock output for OPL4.
7	14.3M	O	14.318 MHz clock buffered output for OPL3 or PCMCIA controller.
8	X2	I	Crystal Connection. Leave this pin unconnected when using an external clock.

Key: I= Input, O = Output, P = power supply connection

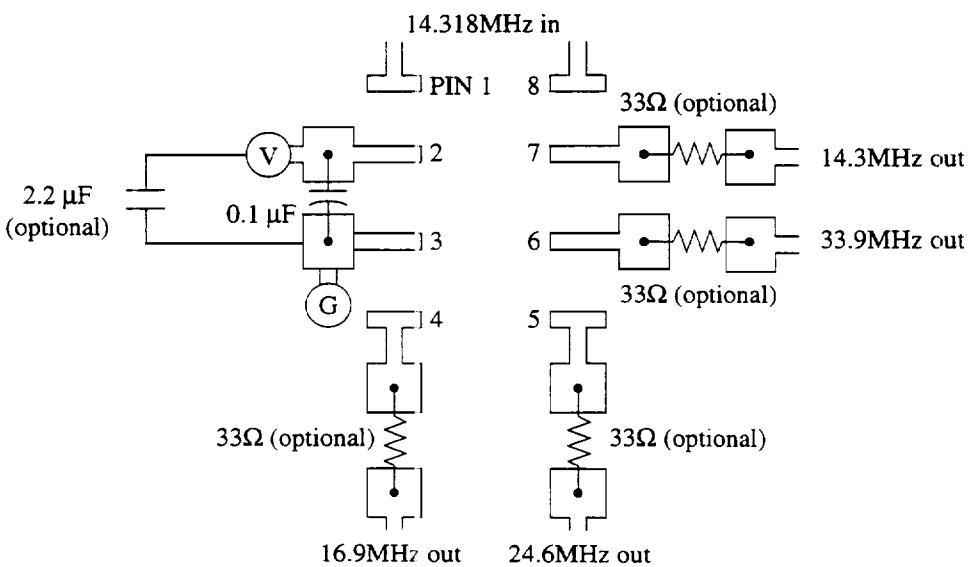
EXTERNAL COMPONENTS/CRYSTAL SELECTION

The W48C20 incorporates a crystal oscillator circuit designed to provide 50% duty cycle over a range of operating conditions, including the addition of external crystal load capacitors to pins X1 and X2. A parallel resonant 14.318 MHz, 12 pf load crystal is recommended. A series resonant crystal or a parallel resonant crystal specifying a different load can be used, but either will result in frequencies which are slightly (up to 0.06%) different from the ideal.

The crystal load capacitance can be increased by adding a capacitor to each of the X1 and X2 pins and ground. This enables the use of a crystal specifying a load greater than 12 pF without changing the output frequency.

Duty cycle is also maintained when using an external clock source (connected to X1, X2 left unconnected) as long as the external clock has good duty cycle. The circuit exhibits about 50% less clock jitter from the 14.318 MHz output when compared to similar devices.

SUGGESTED LAYOUT



ABSOLUTE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Rating	Unit
Voltage on Any Pin with Respect to	V_{CC}/V_{IN}	-0.5 to 7.0	V
Storage Temperature	T_{STG}	-65 to +150	℃
Ambient Temperature Under Bias	T_B	-55 to +125	℃
Operating Temperature	T_A	0 to +70	℃
Soldering Temperature, Max 20 seconds	T_{SOLD}	260	℃

Note 1: Stresses greater than those listed in this table may cause permanent damage to the device. These represent a stress rating only. Operation of the device at these or any other conditions above those specified in the operating sections of this specification is not implied. Maximum conditions for extended periods may affect reliability.

ELECTRICAL CHARACTERISTICS AT 5.0V

DC ELECTRICAL CHARACTERISTICS ($0°C \le T_A \le 70°C$, $V_{CC} = 5\ V \pm 10\ \%$)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating Voltage	VDD		4.5		5.5	V
Input High Voltage	VIH		3.5	2.5		V
Input Low Voltage	VIL			2.5	1.5	V
Output High Voltage	VOH	IOH=25mA	2.4			V
Output Low Voltage	VOL	IOL=25mA			0.4	V
Operating Supply Current	IDD	No Load		18		mA
Input Capacitance				7		pF
Actual Mean Frequency versus Target					±0.2	%

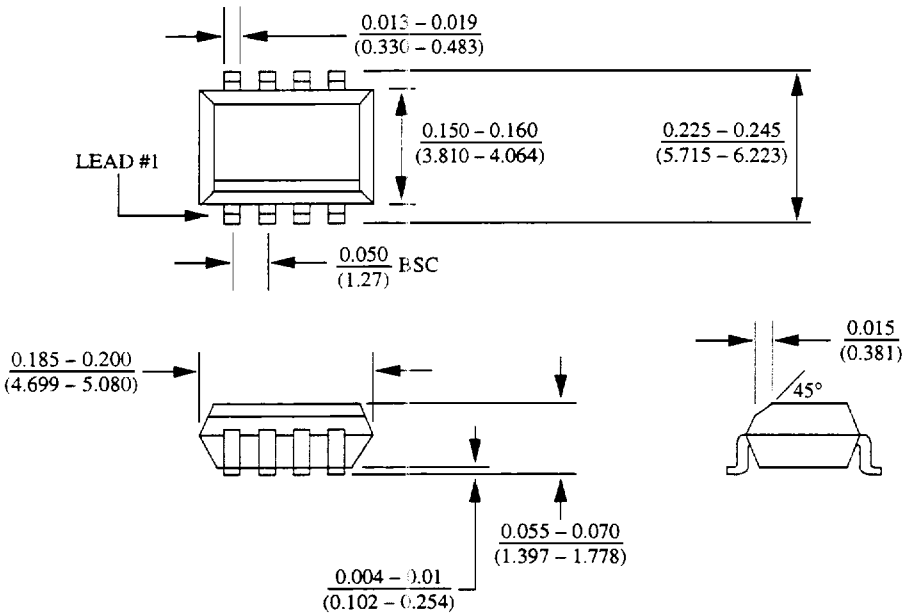
AC CHARACTERISTICS ($0°C \le T_A \le 70°C$, $V_{CC} = 5V \pm 10\ \%$)

Parameter	Conditions	Min	Typ	Max	Unit
Input Clock Frequency			14.31818		MHz
Input Clock Duty Cycle, 14.318MHz	Time above 2.5V	20		80	%
Output Clock Rise Time	0.8 to 2.0V			1.5	ns
Output Clock Fall Time	2.0 to 0.8V			1.5	ns
Output Clock Duty Cycle, 24.576MHz	Time above 1.5V	40	45	60	%
Output Clock Duty Cycle, 16.9344MHz	Time above 1.5V	45	50	55	%
Output Clock Duty Cycle, 33.868MHz	Time above 1.5V	45	50	55	%
Output Clock Duty Cycle, 14.318MHz, Note 2	Time above 1.5V	45	50	55	%
Absolute Clock Period Jitter, except 14.3	Pins 4, 5, 6 only	-400	200	400	ps
One Sigma Clock Period Jitter, except 14.3	Pins 4, 5, 6 only		60		ps

Note 2: If crystal is used as input with CL = 12pf. If a clock is used as input, the duty cycle of the 14.318MHz output will be the same as the input clock.

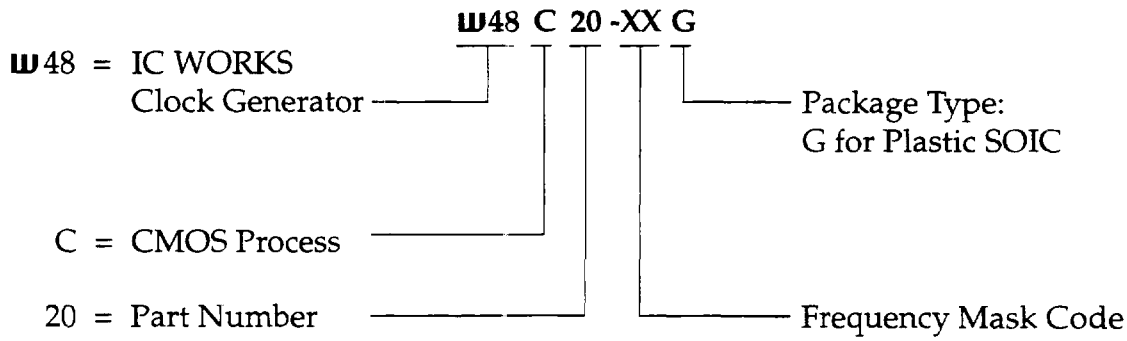
PACKAGING INFORMATION

Plastic SOIC (8 pin)



Note: All linear dimensions are in inches and parenthetically in millimeters, min - max.

ORDERING INFORMATION



VALID PART NUMBERS

W48C20-01

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