## Description

The MK1422 is the ideal way to generate clocks for sound in portable computers. It provides clocks for Analog Devices' or Crystal Semiconductor's stereo codecs, and Yamaha's OPL3L, OPL3LS, and OPL4. The MK1422 uses either a 14.318 MHz crystal, or a 14.318 MHz bus clock input to synthesize the clocks required to drive the codec, and the 33.868 MHz required for the FM or wavetable music synthesizer. It includes a power down pin to save power without using a FET. In an 8 pin SOIC, the MK1422 can save component count, board space, and cost over surface mount crystals, and increase reliability by eliminating three mechanical devices from the board.

MicroClock offers many other parts with stereo codec support. MicroClock invented sound clocks, and has the widest product offering and greatest production experience on these devices. The MK1422 is pin compatible with MicroClock's popular MK1420 when the 14.318MHz clock output is not used. See the MK14223 for 3.3V.
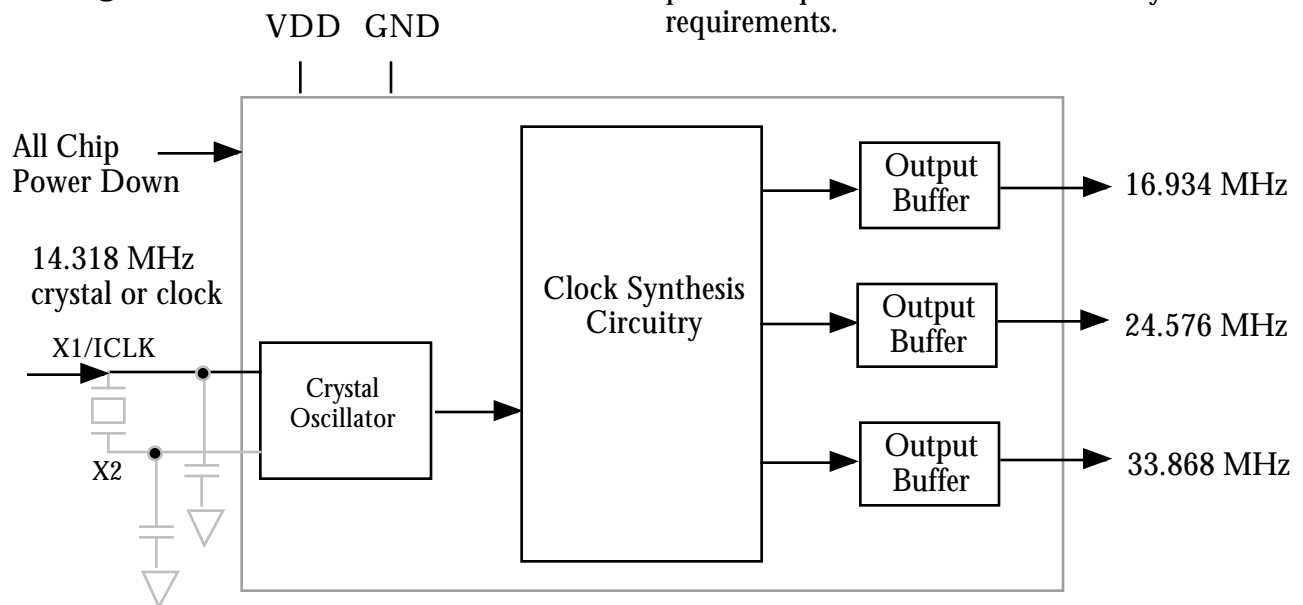
Features

- Packaged in 8 pin SOIC
- Input crystal or clock frequency of 14.318 MHz
- Output clock frequencies of 16.934 MHz, 24.576 MHz, and 33.868 MHz
- 25mA drive capability at TTL levels
- Advanced, low power CMOS process
- Low jitter ensures full 16 bit S/N ratio
- Insensitive to input clock duty cycle
- Power down for portable computers

AC Coupling/Portable Applications

For applications in portable computers, see the MK14223, which is specified to operate at 3.3V. It is possible to drive the MK1422 with a 3.3V, 14.318MHz clock by a.c. coupling using a 0.01µF capacitor connected in series to the X1 pin. But the operating VDD on pin 2 must be 5V±10%. This technique is also effective if the input clock doesn't meet the VIH and VIL specifications on page 3.
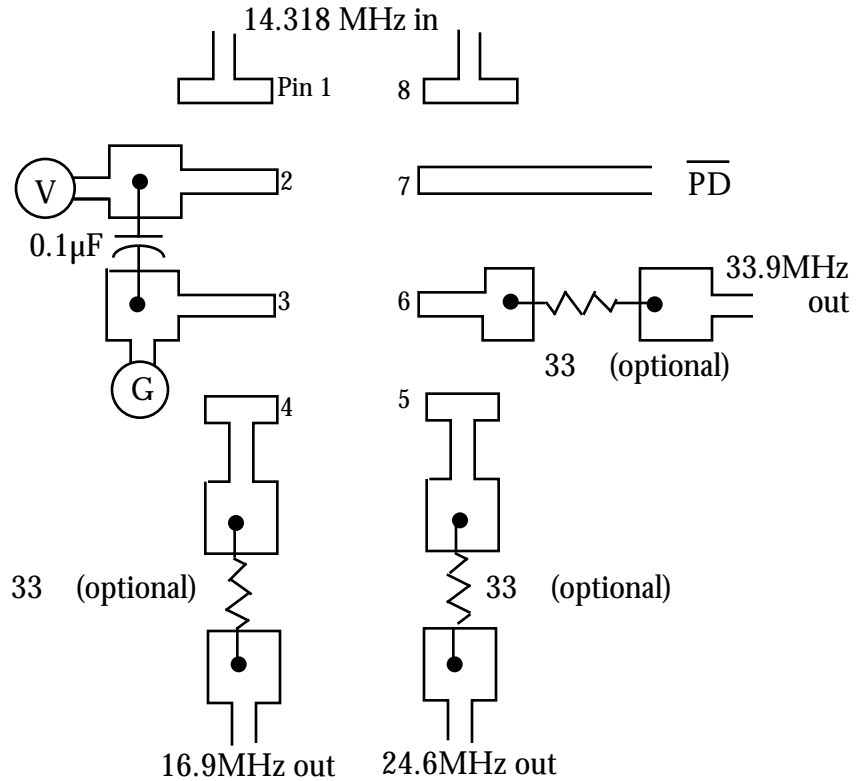
Additional Clocks or Features

If more than these three output clocks or features such as output enable are needed, MicroClock can provide a quick turn modification for your custom requirements.

Block Diagram

Pin Assignment
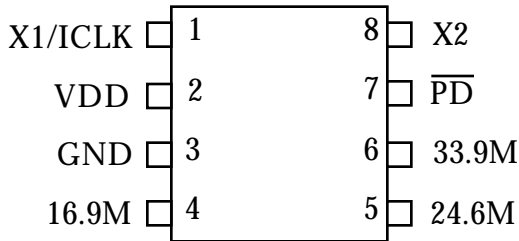
Suggested Layout

Pin Descriptions

Number	Name	Type	Description
1	X1/ICLK	I	Crystal Connection. Connect to a 14.318 MHz crystal or clock.
2	VDD	P	Connect to +5V.
3	GND	P	Connect to ground.
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	$\overline{PD}$	I	Power Down. Shuts off entire chip when low. All clock outputs stop low.
8	X2	O	Crystal Connection to a 14.318 MHz crystal, or leave unconnected for clock input.

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

External Components/Crystal Selection

A minimum number of external components are required for proper oscillation. For a crystal input, one 22pF load capacitor should be connected to each of the X1 and X2 pins and ground, and a parallel resonant 14.318 MHz, 16pF load, crystal is recommended. Load capacitor values near these are acceptable, as is a series resonant crystal, but either will result in frequencies which are further off of the target frequency. For a clock input, connect to X1 and leave X2 unconnected. A decoupling capacitor of 0.1μF should be connected between VDD and GND, and 33   terminating resistors may be used on the clock outputs.

Electrical Specifications

Parameter	Conditions	Minimum	Typical	Maximum	Units
ABSOLUTE MAXIMUM RATINGS (note 1)					
Supply Voltage, VDD	Referenced to GND			7	V
Inputs	Referenced to GND	-0.5		VDD+.5V	V
Clock Outputs	Referenced to GND	-0.5		VDD+.5V	V
Ambient Operating Temperature		0		70	°C
Soldering Temperature	Max of 20 seconds			260	°C
Storage temperature		-65		150	°C
DC CHARACTERISTICS					
Operating Voltage, VDD		4.5		5.5	V
Input High Voltage, VIH, ICLK		VDD/2 + 1	VDD/2		V
Input Low Voltage, VIL, ICLK			VDD/2	VDD/2 - 1	V
Input High Voltage, VIH, $\overline{PD}$		2			V
Input Low Voltage, VIL, $\overline{PD}$				0.8	V
Output High Voltage, VOH	IOH=-25mA	2.4			V
Output Low Voltage, VOL	IOL=25mA			0.4	V
Output High Voltage, VOH	IOH=-4mA	VDD-0.4			V
Output Low Voltage, VOL	IOL=4mA			0.4	V
Operating Supply Current, IDD	No Load		18		mA
Power Down Operating Current, IDDPD	No Load		20		µA
Input Capacitance			7		pF
Actual Mean Frequency versus Target	Outputs			±0.2	%
AC CHARACTERISTICS					
Input Clock Frequency			14.31818		MHz
Input Clock Duty Cycle, 14.318MHz	Time above VDD/2	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 1.5 V	40	50	60	%
Output Clock Duty Cycle, 16.9344 MHz	Time above 1.5 V	45	50	55	%
Output Clock Duty Cycle, 33.868MHz	Time above 1.5 V	45	50	55	%
Absolute Clock Period Jitter	Pins 4, 5, 6 only	-400	200	400	ps
One Sigma Clock Period Jitter	Pins 4, 5, 6 only		60		ps

Notes:
1. Stresses beyond those listed under Absolute Maximum Ratings could cause permanent damage to the device. Prolonged exposure to levels above the operating limits but below the Absolute Maximums may affect device reliability.
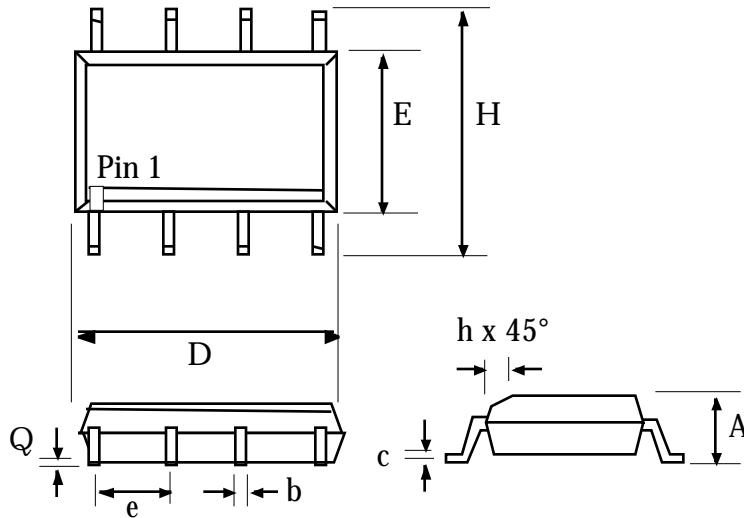2. Typical values are at 25°C.

Package Outline and Package Dimensions

8 pin SOIC

Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	0.055	0.068	1.397	1.7272
b	0.013	0.019	0.330	0.483
D	0.185	0.200	4.699	5.080
E	0.150	0.160	3.810	4.064
H	0.225	0.245	5.715	6.223
e	.050 BSC		1.27 BSC	
h		0.015		0.381
Q	0.004	0.01	0.102	0.254

Ordering Information

Part/Order Number	Marking	Package	Temperature
MK1422S	MK1422S	8 pin SOIC	0 to 70 C
MK1422STR	MK1422S	Add tape and reel	0 to 70 C