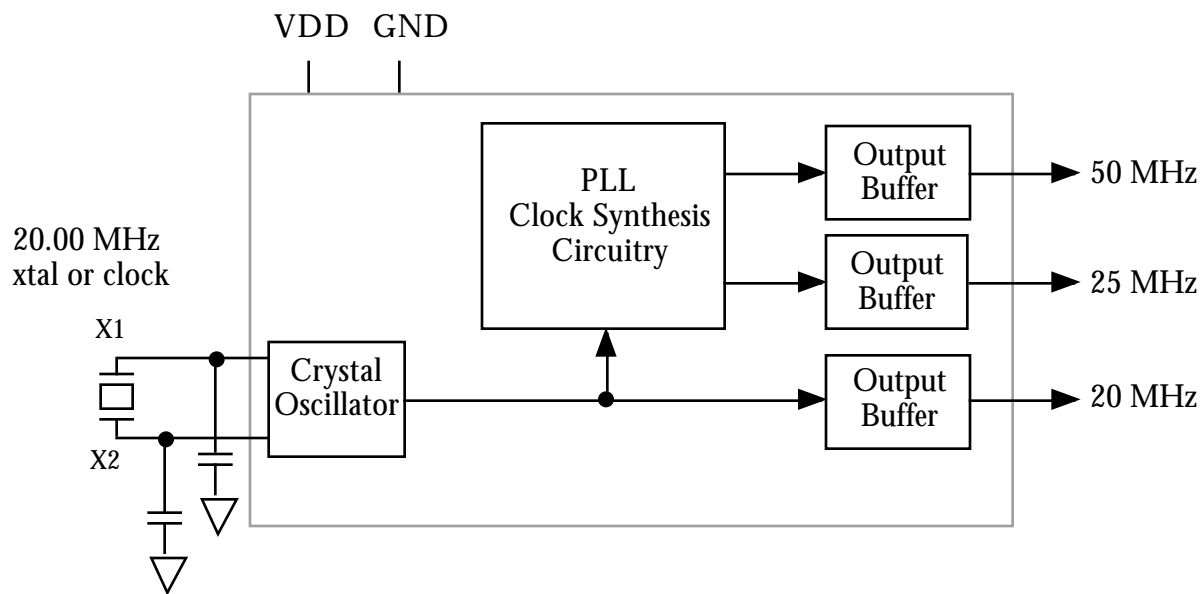## Description

The MK2011 is the ideal way to generate clocks for Fast Ethernet cards or systems. It provides 20MHz, 25MHz, and 50MHz clocks. In an 8 pin SOIC, the MK2011 can save component count, board space, and cost over surface mount crystals and oscillators, and increase reliability by eliminating two or three mechanical devices from the board.

MicroClock offers many other clocks for computers and computer peripherals. Consult MicroClock when you need to remove crystals and oscillators from your board.
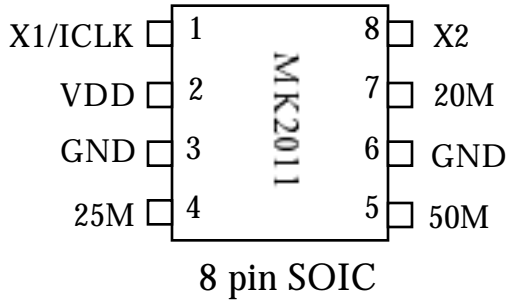
Features

• Packaged in 8 pin SOIC

• Input crystal or clock frequency of 20.00 MHz

• Lowest jitter in the industry reliably clocks
  sensitive Ethernet devices.

• Output clock frequencies of 20.00 MHz,
  25.00 MHz, and 50.00 MHz

• 25mA drive capability at TTL levels

• 3.3V or 5V±10% supply voltage

• Advanced, low power CMOS process

• Insensitive to input clock duty cycle
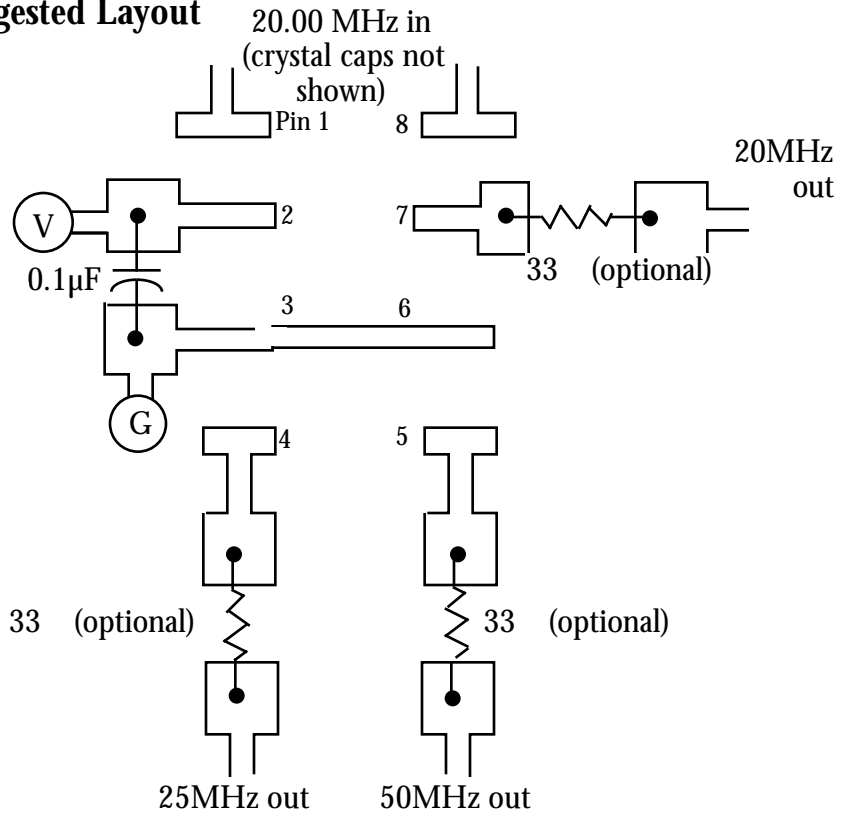
Block Diagram

Pin Assignment

X1/ICLK — 1
VDD — 2
GND — 3
25M — 4
X2 — 8
20M — 7
GND — 6
50M — 5

MK2011

8 pin SOIC

Suggested Layout

20.00 MHz in (crystal caps not shown)

Pin 1   8

0.1µF

2

7   33 (optional)   20MHz out

3   6

33 (optional)   4   5   33 (optional)

25MHz out   50MHz out

Pin Descriptions

Number	Name	Type	Description
1	X1/ICLK	I	Crystal Connection. Connect to a 20.000 MHz crystal or clock.
2	VDD	P	Connect to +5V.
3	GND	P	Connect to ground.
4	25M	O	25.000 MHz clock output.
5	50M	O	50.000 MHz clock output.
6	GND	P	Connect to ground.
7	20M	O	20.000 MHz buffered crystal clock output.
8	X2	O	Crystal Connection to a 20.000 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 20.000 MHz, 16pF load, crystal is recommended. The frequency tolerance of the crystal should be 50ppm or better. For a clock input, connect to X1 and leave X2 unconnected. A decoupling capacitor of 0.1µF should be connected between VDD and GND on pins 2 and 3, and 33 terminating resistors should be used on clock outputs with traces longer than 1 inch.

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 (at 5.0V unless otherwise noted)					
Operating Voltage, VDD		4.5		5.5	V
Input High Voltage, VIH, input clock only	Clock input	3.5	2.5		V
Input Low Voltage, VIL, input clock only	Clock input		2.5	1.5	V
Output High Voltage, VOH	IOH=-4mA	VDD-0.4			V
Output High Voltage, VOH	IOH=-25mA	2.4			V
Output Low Voltage, VOL	IOL=25mA			0.4	V
Operating Supply Current, IDD, 5V	No Load		19		mA
Operating Supply Current, IDD, 3.3V	No Load		10		mA
Input Capacitance			7		pF
Actual Mean Frequency versus Target	With exact crystal			0	ppm
AC CHARACTERISTICS					
Input Clock or Crystal Frequency			20.0000		MHz
Input Crystal Accuracy				50	ppm
Input Clock Duty Cycle, 20.000MHz	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	Time above 1.5V	45	50	55	%
Absolute Clock Period Jitter, 20 MHz output		-400	250	400	ps
Absolute Clock Period Jitter, 50, 25 MHz clocks		-300	150	300	ps
One Sigma Clock Period Jitter	All outputs		70		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.

ICS MICROCLOCK

Package Outline and Package Dimensions

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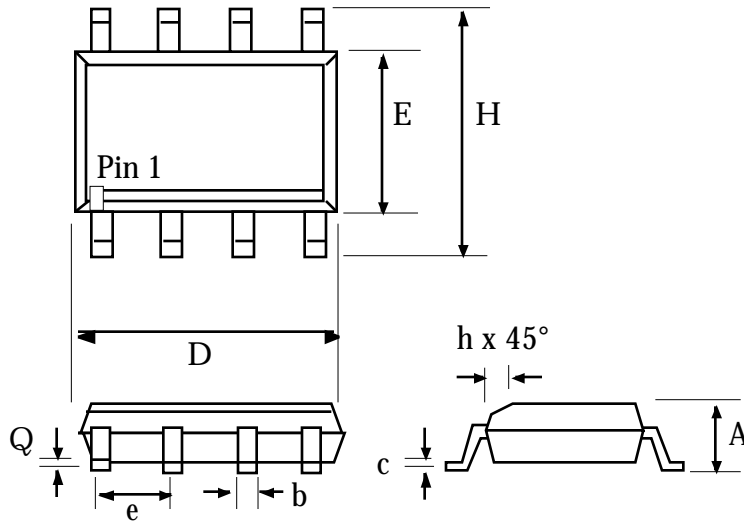
Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	0.055	0.068	1.397	1.7272
b	0.013	0.019	0.330	0.483
D	0.185	0.200	4.699	5.080
E	0.150	0.160	3.810	4.064
H	0.225	0.245	5.715	6.223
e	.050 BSC		1.27 BSC	
h		0.015		0.381
Q	0.004	0.01	0.102	0.254

Ordering Information

Part/Order Number	Marking	Package	Temperature
MK2011S	MK2011S	8 pin SOIC	0-70°C
MK2011STR	MK2011S	Add tape and reel	0-70°C