Application Note – SX0001 75MHz Operation

Introduction

Examples are presently available depicting how to configure microcontrollers running at speeds of 50 MHz or less using resonators, crystals, etc. However, if you need to maximize the performance of the SX microcontroller, you will need to obtain a 75 MHz clock source and correctly connect it to the SX chip. The scarcity of information (and components) regarding this task prompted us to write this application note. Follow these simple precepts and soon your SX chip will be running at 75MHz!

Background

A brief look at any electronic supplies catalog will reveal that no 75MHz ceramic resonators are available. As the frequency of oscillation increases, the physical size of the element shrinks. At 75MHz, the size of the crystal is so small that it is not practical to cut and trim them at production quantities. This leaves those designers desiring 75MHz left to use clock oscillators for their time bases.

A high speed clock oscillator contains a relatively slow crystal as its time base, uses a PLL (phase-locked loop) to multiply the crystal frequency up to the desired frequency, amplifies and buffers that output. The result is this: give a crystal oscillator 5V, and it outputs the desired frequency – very accurately. This is a no-fuss solution to attaining a 75MHz driven system.

Parallax has specified a low-cost, custom-cut, 75MHz ±100ppm, industrial temperature rated clock oscillator. Presently, this oscillator is available in an 8-pin DIP package (a/k/a the half-can). In the future, we may offer this device in a SMD package. To order this part, simply log on to the Parallax website and search for "**252-00005**".

Warning! Depending on your application, the SX chip may generate significant amounts of heat while running at high speeds. If the SX chip is so warm that you cannot hold your finger to it indefinitely, you must use a heat-sink.

Warning! Never, connect the clock oscillator to the SX chip while the SX-Key is connected. Doing so will permanently damage the SX-Key.

SX Oscillator Specifications

Parameter	Minimum	Maximum
OSC1 input voltage	0.0V	13VDC
OSC1 logic high	0.7V	VDD
OSC1 logic low	VSS	0.3VDC
OSC1 current	n/a	±500uA

Clock Oscillator Specifications

Frequency	75 MHz
Stability	±100ppm
Operating Temperature	-40˚ ~ 85˚C
Power Supply	5VDC @ 35mA
Fan out	10 TTL (15pF CMOS)

Clock Oscillator Mechanical Specifications

8PIN DIP

.31" MAX (0.8mm)
.235" MAX (6.0mm)
.25" (6.3mm)
.018 ± .003" (.45mm)
.52" MAX (13.2mm)
.43" (10.92mm)
.300" ± .005" (7.62mm)
.300" ± .005" (7.62mm)
.096" REF (2.44mm)
.108" REF (2.75mm)
INSULATED STAND-OFFS
Dot Denotes Pin 1 location
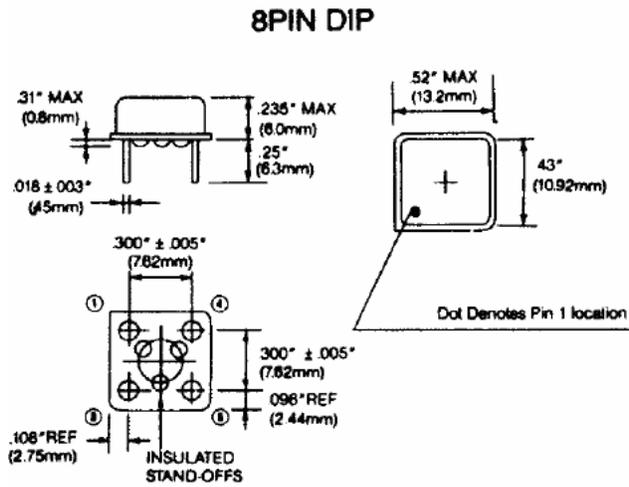
Pin Configuration	
1	N.C
4	Ground
5	Output
8	Vcc

Units: mm

Clock Oscillator Electrical Connections

Y1 — 75MHz

Pin		
1	NC	VCC	8
4	VSS	CLK	5

5 VDC

10K

U1 — SX28AC

1	RTCC	MCLR	28
2	Vdd	OSC1	27
3	nc	OSC2	26
4	Vss	RC7	25
5	nc	RC6	24
6	RA0	RC5	23
7	RA1	RC4	22
8	RA2	RC3	21
9	RA3	RC2	20
10	RB0	RC1	19
11	RB1	RC0	18
12	RB2	RB7	17
13	RB3	RB6	16
14	RB4	RB5	15

5 VDC