Application Note AN3101-04: Unusual Clocking for DSP-1KM
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Introduction

The DSP-1KM is designed to run off a 48kHz WORDCLK. In some applications a 48kHz reference frequency may not be available, but a high frequency clock (48kHz x 1024 = 49.152 MHz) is available. Also, there may be applications where it is desired to operate the DSP-1KM at a clock rate so slow that its internal phase locked loop does not operate well. In these cases, the phase locked loop may be bypassed; the DSP-1KM will run at an instruction rate equal to the clock rate.

Methods

There are two ways to achieve this alternate clocking.

First Method: Clock Switching with Control Pins

By setting both SERIALM and AUTO (pins 6 and 8) low, the DSP-1KM will execute one instruction for each cycle of WORDCLK. The microprocessor interface method with the pins set in this manner is parallel; serial and autoload (serial configuration EEPROM) methods cannot be used.

Second Method: Automatic Clock Switching

The DSP-1KM contains a frequency-sensitive switch set to approximately 1MHz. Whenever low frequencies (48kHz) are applied to the WORDCLK pin, the phase locked loop is active and the DSP-1KM will run at an instruction rate of 1024 times the WORDCLK frequency. Whenever high frequencies (49.152 MHz) are applied to the WORDCLK pin, the DSP-1KM will run at an instruction rate equal to the WORDCLK frequency. Both microprocessor interface methods and the autoload method may be used by setting pins 6 and 8 appropriately.

Using the DSP-1KM to Generate a 48kHz Reference Clock

If a clock running at one cycle per 1024 instructions is required in a system where the DSP-1KM is running with a WORDCLK at one cycle per instruction, the DSP-1KM may be used to generate the slow clock. Setting an output pin high at instruction 0 and low at instruction 512 will provide a square wave with the phase and frequency of a low frequency WORDCLK. The assembly code below shows an example of this, using OUT3 as the low frequency output. If WORDCLK were 49.152MHz, this would produce a 48kHz output.

```
INSTRUCTION
NUMBER          INSTRUCTION      COMMENT

1023            C h0800000       ;set bit 23 to 1
0               SCA 1.0 h428     ;write the "1" to the OUT3 pin
. . . . . . . . .
511             C 0              ;set all bits to 0
512             SCA 1.0 h428     ;write the "0" to the OUT3 pin
```

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