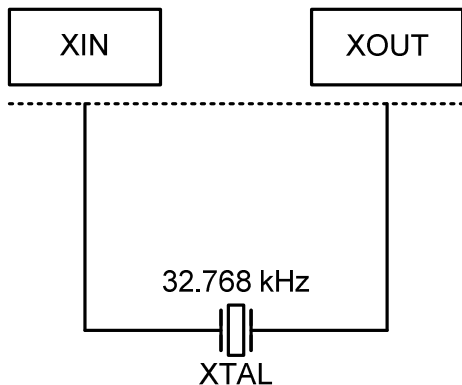


# Pierce Oscillator

Design and Crystal  
Recommendations

Texas Instruments  
MSP430x4xx Family

## MSP430x4xx Family



## Oscillator Design Check

Test Conditions		
Power Supply Voltage $V_{DD}$	$\geq 1.8$	V
Load Capacitors	Integrated	pF
Oscillator Setting $C_X$	18	pF
Results		
Effective Load Capacitance	9.0	pF
Oscillation Allowance	500	$k\Omega$
Oscillator Output Voltage AC	130	$mV_{RMS}$
Drive Level	0.070	$\mu W$
Startup Time	400	ms
Overtone Mode Suppression	Safe	----

## Recommendation

Crystal		
Crystal Type	MS3V-T1R / CC7V-T1A	
Frequency	32.768	kHz
Load Capacitance $C_L$	7.0 or 9.0	pF
Tolerance	$\pm 20$	ppm
Oscillator Settings		
Oscillator Setting	$C_X$	0 10 <b>14</b> <b>18</b> pF
OSCCAPx		0 1 <b>2</b> <b>3</b> ----
Load Capacitance	$C_L$	4.0 5.8 <b>7.0</b> <b>9.0</b> pF

## Remarks

**Recommended setting:**  $C_X = 18$  pF (OSCCAPx = 3) Corresponding crystal's  $C_L$ : 9.0 pF.

**Alternative setting:**  $C_X = 14$  pF (OSCCAPx = 2) Corresponding crystal's  $C_L$ : 7.0 pF.

The  $C_X$ : 0 pF and 10 pF settings are not recommended to use with quartz crystals.

$C_X$  corresponds to parameter  $C_{XIN}$  and  $C_{XOUT}$  (Integrated Load Capacitance),  $C_{XIN} = C_{XOUT}$ .

Please find detailed information about MS3V-T1R, CC7V-T1A and all others crystal types at [www.microcrystal.com](http://www.microcrystal.com).

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