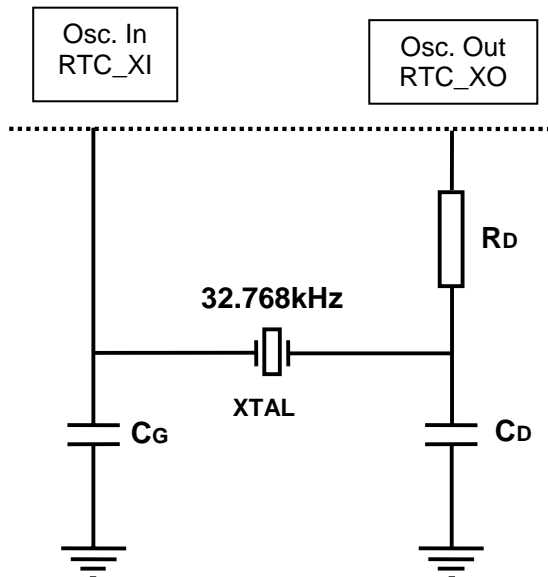


# Pierce Oscillator

Design and Crystal  
Recommendation

SiRF  
GSC3f-Family

SiRF GSC3f



Results Oscillator Design check		Units
RTC Supply Voltage $V_{DDRTC}$	1.5	[Volt]
Load capacitor (each)	27 / 22	[pF]
Serial Resistor $R_D$	47	[kOhm]
Effective load-capacitance	12.48	[pF]
Oscillation allowance	380	[kOhm]
Oscillator Output voltage	274	[mVrms]
Drive level	0.110	[microW]
Start-up time	600	[ms]
$R_D$ resistor for safe overtone-suppression	47	[kOhm]

Design - Crystal recommendation		Units
Crystal XTAL	CC7V-T1A	
Frequency	32.768	[kHz]
$C_L$	12.5	[pF]
Tolerance	+/-20	[ppm]
$R_D$	47	[kOhm]
$C_D$	27	[pF]
$C_G$	22	[pF]

## Remarks:

This is a self-limiting Pierce Oscillator.

The  $R_D$  serial-resistor of 47kOhm is needed in order to safely suppress the crystal's overtone-mode. A  $R_F$  feedback-resistor of 5MOhm is integrated into the chipset.

Placing two load-capacitors,  $C_D$  27pF and  $C_G$  22pF on each side of the crystal will result in an "effective load-capacitance" of 12.48pF (incl. the board's stray-capacitance). This is a perfect match for a crystal specified for  $C_L$ : 12.5pF.

The recommended oscillator-circuitry provides an "oscillation allowance" of 380kOhm which allows the safe use of small quartz-crystals with ESR up to 75kOhm typical.

- All crystal constraints are based on reasonable pad-layout and trace-length.

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The recommendations stated above are based on measured-results, respecting the "oscillator design rules".  
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