

# TECHNICAL NOTE 29

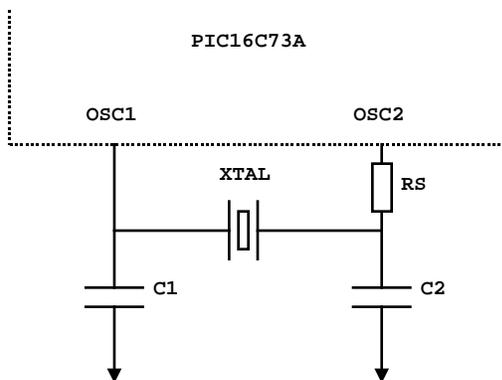
## Using IQD Statek's CX-1V Crystals (200-240kHz) with Microchip Technology's PIC16C73A Microcontroller

### Overview

We recommend component values when using IQD Statek's CX-1V crystals in the 200-240 kHz range with Microchip Technology's PIC16C73A microcontroller (in the XT mode). The large capacitors (47-68pF) recommended in Table 14-2 of Microchip Technology's data sheet DS30390E cause the PIC16C73A to overdrive Statek's crystals.

### Recommended externally added component values

As shown in Figure 1 (cf. Figure 14-3 in Microchip Technology's data sheet), the oscillator portion of the PIC16C73A can require up to three components in addition to the crystal.



**Figure 1**

However, Statek recommends the addition of only two with the values listed in Table 1.

**Table 1**

Component	Recommended Component Value
RS	470 k (±10%)
C2	10 pF (±10%)
C1	Addition not recommended

### Circuit board layout considerations

Stray capacitance in the oscillator portion of the board's layout can influence the

oscillator's performance. For instance, the stray capacitances from the crystal pads to ground add to the capacitances provided by C1 and C2. Further, minimize the stray capacitance between OSC1 and OSC2 and the stray capacitance between the crystal mounting pads on the board as these can raise the gain requirement to the point that the system will not oscillate.

### Operating conditions

Other than the recommendations above, we refer the reader to Microchip Technology's data sheet DS30390E for proper operating conditions.

### Typical operation

The typical motional resistance of a CX-1V crystal in the 200-240 kHz frequency range is 3 k $\Omega$ . With a supply voltage of 4-6 volts, the circuit should start to oscillate within 0.5 seconds. The drive level (crystal current) is approximately 12  $\mu$ A (RMS) and the circuit's effective load capacitance is approximately 4.5 pF.

### Further information

Microchip Technology's Data Sheet DS30390E *PIC16C7X 8-bit CMOS Microcontrollers with A/D Converter*

IQD Statek's Technical Note 25

*Load Capacitance of a Quartz Crystal and How it Relates to the Effective Load Capacitance (CL) of a Pierce Oscillator*

IQD Statek's Technical Note 31

*Practical Analysis of the Pierce Oscillator*

IQD Statek Data Sheet

*Typical and maximum crystal parameters, drive level, etc.*

Rev. A