Using Cheap Watch Crystals
In Your Projects

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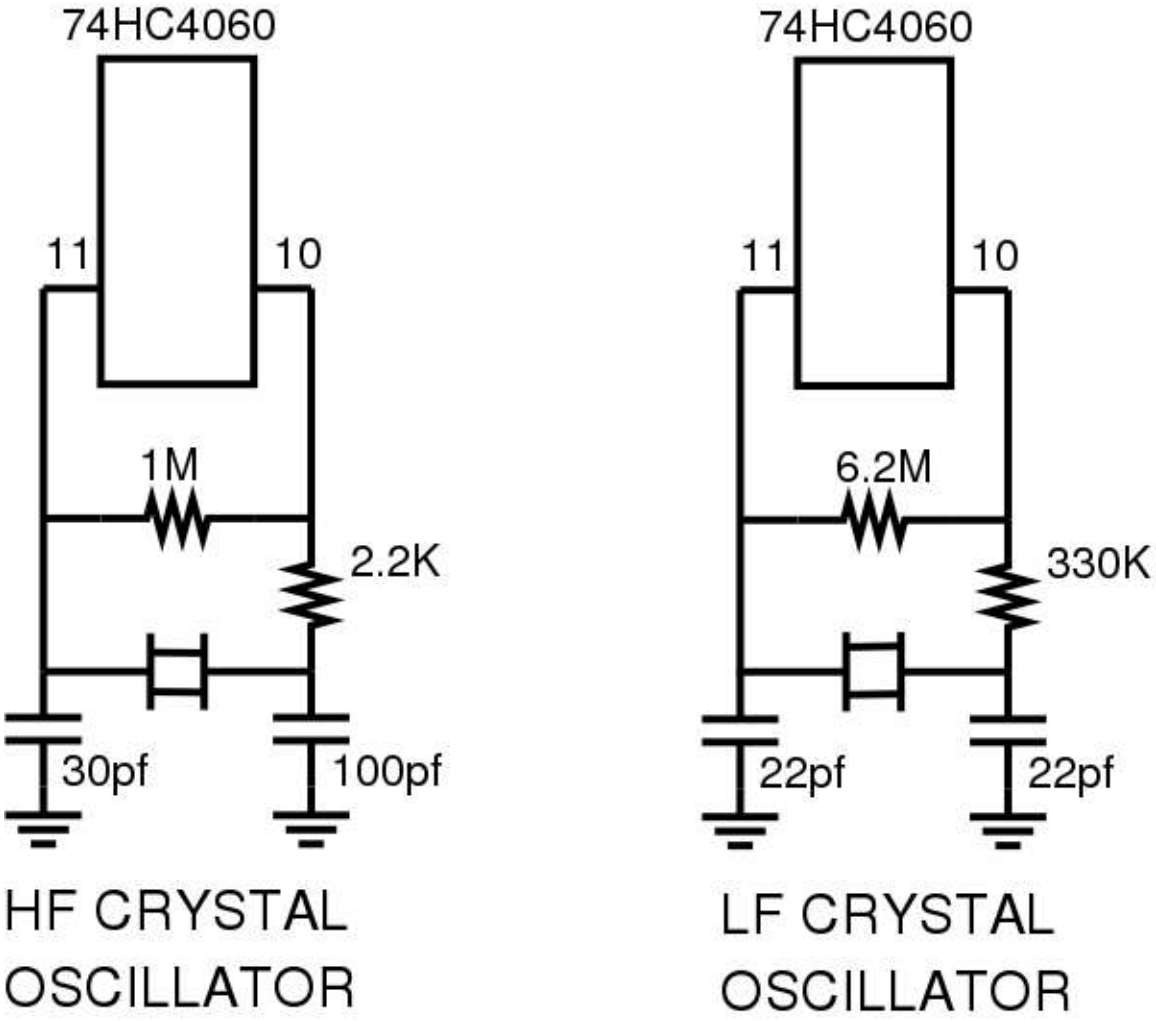
Recently, as part of a Huff & Puff stabilizer project I attempted to use a 32.768 kHz crystal that I extracted from a cheap wrist watch. The initial results were far from successful. However, I was eventually able to resolve the problem(s) and complete the project successfully. In order to help others avoid my mistakes, here is a short desccription of the problem, and of the solution:



The circuit on the left came from the Fairchild data sheet on the 74HC4060 IC. Using these component values for my oscillator is where I got into trouble. While this circuit will work OK for HF crystals, the much smaller LF type watch crystals do not require, and cannot stand, such a high level of drive. With cheap tuning-gork type watch crystals this circuit will cause them to oscillate in strange off-frequency modes...*just before they*

totally fail due to the stress from being overdriven.

Using the circuit on the right will result in a much more successful LF oscillator and should not destroy your watch crystals.

While I originally used this circuit for the 74HC4060 oscillator, it applies equally well to using watch crystals with other 4HCxx type devices. I also use it for 32.768 kHz oscillators using a 74HC04 as the gain element.

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