

Using Pericom's 32.768kHz XO to Drive 2-IC in Sports Camera Design

Pericom Timing Application Engineering

32.768kHz Crystal oscillator vs. Crystal

32.768kHz frequency is the basis of timing for counting seconds, minutes, and hours in most clocks. The frequency is also commonly used in the watch dog mechanism of microprocessors as a standby clock. In other words, the presence of a 32.768kHz clock is required in almost all applications. There are two ways to generate this 32.768kHz clock. The first one is to use a 32.768kHz tuning fork crystal (Xtal) connected to an ASIC or core chip. And the other is to use a 32.768kHz Crystal Oscillator (XO), which provides more advantages than a crystal. Table 1 shows a high level comparison between a 32.768kHz XO and a 32.768kHz tuning fork Xtal.

Table 1. 32.768kHz XO vs. 32.768kHz Xtal

	Pericom 32.768kHz XO	3.768kHz Xtal
PCB layout	Easy, single component	Not easy, need load cap.
Manufacturing	Factory tested clock	May have yield loss due to crystal is not oscillating
Cost	Relatively higher, but good performance/cost ratio	More Components on BOM, higher BOM management cost

Figure 1 illustrates the component saving of a Xtal PCB layout vs. an XO PCB layout.

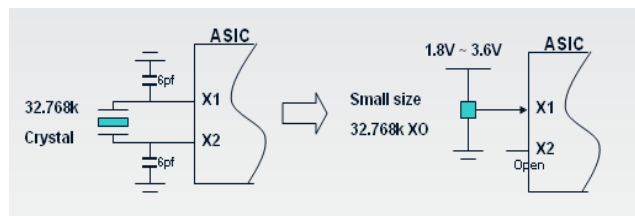


Fig.1 Xtal PCB vs. XO PCB

Pericom 32.768kHz XO Advantages

However not all 32.768kHz crystal oscillators are made the same. If a crystal oscillator is made from a tuning fork crystal, then the overall performance will be similar to the crystal such as stability and start up time.

Pericom uses a different approach to make a 32.768kHz XO. By applying its unique XO IC design capability, Pericom is able to use MHz crystal blanks to produce 32.768kHz oscillators with very tight stability while achieving very low current compared to what tuning forks can do. Table 2 shows the Advantages of Pericom's 32.768kHz XO.

Table 2. Pericom 32.768kHz XO Advantages

	Pericom 32.768kHz XO Advantages
Broad portfolio	Support wide range size: 2.0x1.6, 2.5x2.0, 3.2x2.5, 5.0x3.2
PCB layout	Easy, single component, able to drive multiple loads
Idd consumption	Very close to tuning fork, typical at 12uA
High stability	Down to 20ppm over temperature range, 5 times better than tuning fork
Fast start up time	Less than 5ms, 20 times faster than tuning fork
Cost	Competitive to overall solution with small size tuning fork

Pericom 32.768kHz XO Applications

One unique advantage that Pericom's XO has is the capability to drive multiple loads at the same time. This has been used in various consumer applications including sports cameras, Smart watches, and other wearables. Figure 2 shows a sports camera application where Pericom's 32.768kHz XO is used to drive both the processor and the WiFi/Bluetooth chip.

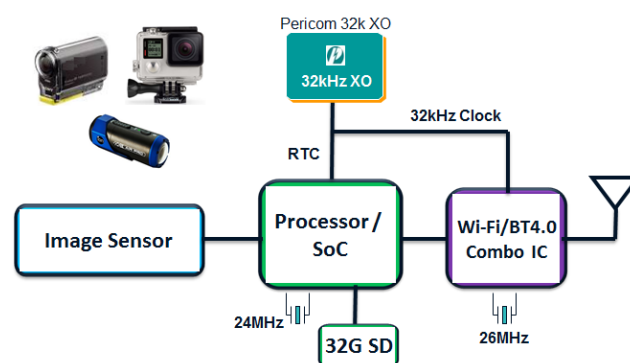


Fig.2 Pericom XO in a Sports Camera application

Pericom 32.768kHz XO Family (K series)

Pericom 32.768kHz XO family has a broad range of package sizes from 2.0x1.6mm to 7.0x5.0mm. This family presents the best combination of high stability and low power consumption, which is the best solution for all kinds of applications. Please visit our website for more details:

<https://www.pericom.com/products/crystal-and-crystal-oscillator/32khz-crystal-oscillator-xo/>

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