

ABSTRACT

For low power applications, such as battery powered equipment, it is desirable to “sleep” or power down all possible circuits and only power them when absolutely necessary. Many CMOS oscillators now incorporate a power down mode in the Enable/Disable function. This power down mode is not available on most TCXOs or the Pletronics OeXO series. This Application Note suggests how to achieve this power down feature using commonly available TCXOs.

TCXO and OeXO Configurations

These devices seldom have an Enable/Disable function and therefore no method to enact the “sleep” or power down mode. There are some technical and marketing reasons for this.

- Small packages that are desired today are limited to 4 pads.
- Most TCXO applications desire that pad 1 be a voltage control function to permit trimming the TCXO to a precise frequency and/or to compensate for aging.
- The 3 other TCXO pads are Supply, Ground and Output.
- Incorporating a power down function in a complex analog circuit is difficult.

The TCXO and OeXO devices are low power:

Typically 3mA maximum for Clipped Sine Wave output in the 1.8V to 3.3V supply range

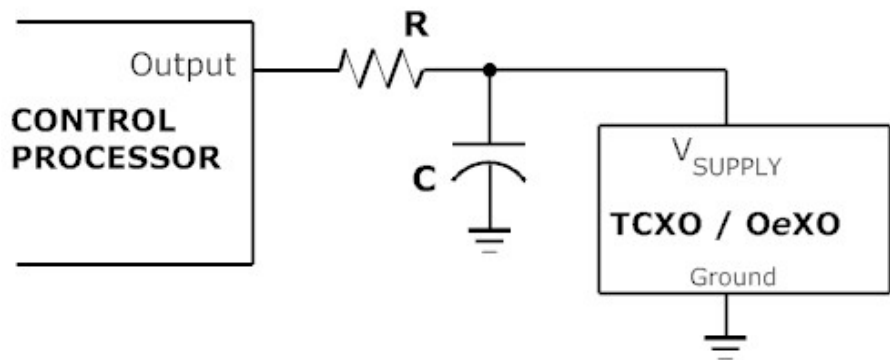
Typically 3 to 5mA maximum for CMOS output in the 1.8V to 3.3V supply range and from 10MHz to 50MHz

The goal is to lower this to a few microamps when the TCXO precise frequency output is not needed.

Most of these systems are controlled by a micro processor which is responsible for setting the “sleep” or power down mode and then later returning the device to full function. These microprocessors typically have outputs that are capable of sourcing at least 10mA with minimal drop from the V_{SUPPLY} rail.

Low Power or “Sleep” mode TCXO and OeXO Configurations

Use the Output pad of the microprocessor to power the TCXO. This adds no extra burden on the system. An output pad would have been needed to control the TCXO pad if the TCXO had the same Enable/Disable function like most CMOS clock oscillators.



The TCXO or the OeXO is standard product – no special requirements.

The program should allow some time after turning on the TCXO before assuming a steady state output. For a TCXO with a greater than a 1ppm tolerance specification, the time suggested is 20mS. For a 0.1ppm tolerance, 20 to 30 seconds are recommended.

The C is an RF bypass that is recommended to be placed from supply to ground on all oscillators. See Pletronics Application Note 808 about power supply decoupling capacitors.

The R is optional and serves two purposes:

- Isolates the TCXO from the microprocessors and system supply noise.
- Limits the current surges in the processor output when switching the TCXO on and off.

Select the value to such that the TCXO supply voltage is still within specification.

Summary

Use the control microprocessor output to drive to TCXO supply pin.

In the power down or “sleep” mode the TCXO circuit will have a current limited to the leakage current of the microprocessor output, this should be in the order of a few micro amperes maximum at all temperatures.

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Contacting Pletronics Inc.

Pletronics Inc.
19013 36th Ave. West
Lynnwood, WA 98036-5761 USA

Tel: 425-776-1880
Fax: 425-776-2760
E-mail: ple-sales@pletronics.com
URL: www.pletronics.com

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