Understanding the Remote ON/OFF Function

Application Note 5

The remote ON/OFF function supplied on some CALEX converters is useful for conserving battery power or limiting inrush current when the converter is used in pulsed applications such as ATE equipment. In fact, it is the preferred method over switches in turning the higher power converters ON and OFF. This is because switch life is very limited in the presence of the high inrush currents encountered.

By following some simple guidelines, maximum use can be made of the function.

Data Sheet Specifications

The data sheet specifications detail the DC parameters of the ON/OFF pin operation. These specifications show the ON and OFF logic levels required as well as the input impedance of the circuit. The ground reference for these specifications is the -Input Pin. Figure 1 shows how to interpret the data sheet specifications. Some converters also have a diode protected input allowing the ON/OFF pin to be taken to +100 VDC without damage to the converter. Under no circumstances should the ON/OFF pin be allowed to go below the -Input by more than 0.3 volts.

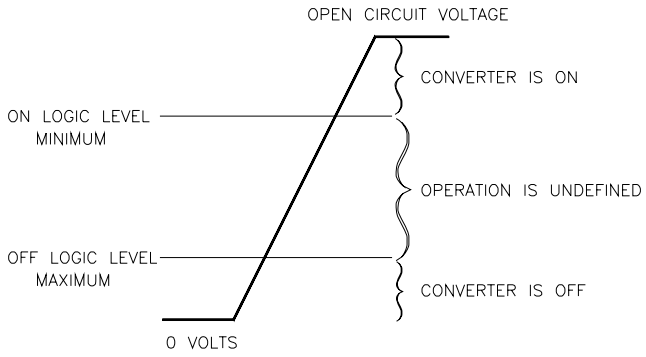

Figure 1.
The minimum and maximum ON/OFF pin logic levels are defined along with the converter's operating state. The open circuit voltage refers to the voltage that would be measured on the ON/OFF Pin when it is floating. All measurements are referenced to -Input.

Proper Interfacing

All CALEX converters have an internal pull-up to bias the converter in the ON state. If the ON/OFF function is not desired, this pin can be safely left floating.

Some converters have TTL and/or CMOS compatible logic levels, however, the fan-in and fan-out may exceed a standard gates ability to reliably drive other digital devices in your system. It is recommended that a dedicated driver be used to operate the converter. With converters that do not conform to TTL or CMOS logic levels, the best approach to interfacing is to use some sort of open collector, open drain or relay to turn the converter OFF. Figure 2 shows some recommended circuits to use.

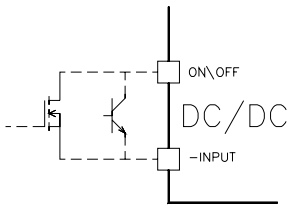

Figure 2A.
Some of the more common methods of interfacing to the ON/OFF pin. Shows a discrete NMOS or NPN transistor.

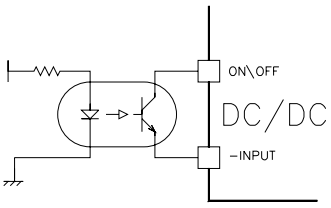

Figure 2B.
Shows an isolated ON/OFF driver using an optocoupler.

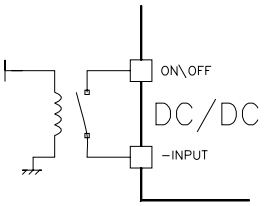

Figure 2C.
Shows a low power relay which also offers isolation.

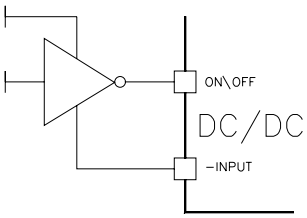

Figure 2D.
A standard TTL or CMOS driver can sometimes be used although open collector is always preferred.

Operation

With the converter running and the ON/OFF pin pulled low or in the OFF state, the Pulse Width Modulator (PWM) is almost instantly turned off. For resistive loads, the output voltages will decay with a time constant equal to the output capacitance of the converter plus any external capacitance multiplied by the equivalent load resistance. If the load is not resistive but more constant current like, then the output voltage decay time will be linearly proportional to the output capacitance divided by the load current. The actual output turn off time can be anywhere from minutes in a lightly loaded case to milliseconds in a fully loaded converter.

When the ON/OFF pin is set to the ON state, the PWM starts operating and the output voltages increase. The ON/OFF turn on time is almost always the same as the turn on time listed on the data sheet - give or take a few milliseconds.