

Logic On - Off

General Description

The logic on-off function allows the user to shut off the converter's output using a simple TTL logic signal or mechanical switch, and avoids having to turn off the DC input bus. This feature is useful for cycling the output power without having to cycle the input power. It is particularly useful for the μ V300 series, where it avoids recharging of the 60Hz energy storage caps that normally filter the 300VDC bus voltage.

Implementation

The PARALLEL-ON/OFF pin is used to implement the disable function. By pulling the terminal below 1V @ 4mA with respect to -IN, the module turns off.

With logic circuits -A simple logic signal can disable the converter using a transistor or small signal FET as shown in *Figures 4a and 4b*, respectively. In these circuits, a logic high signal disables the converter.

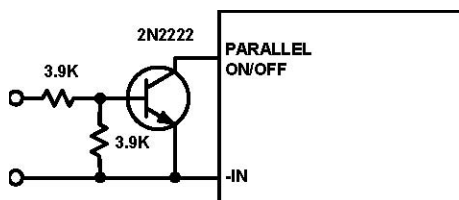


Figure 4a Logic on/off circuit with small signal transistor. A logic high signal disables the converter

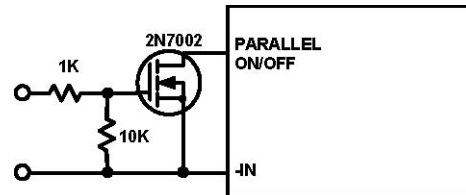


Figure 4b Logic on/off circuit with small signal MOSFET. A logic high signal disables the converter.

In some cases, it is desirable to use a logic low signal to disable the converter. *Figure 4c* shows how to implement a logic low-disable circuit.

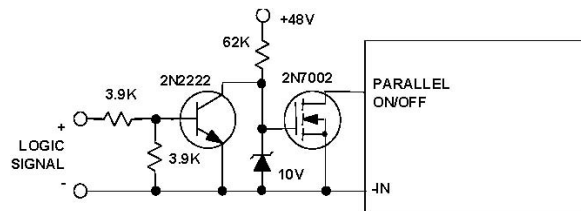


Figure 4c Interface circuit between the converter and TTL logic. A logic low disables the converter. μ V48 (48VDC input) example shown.

The circuits shown in *Figures 4a, 4b and 4c* are all primary-referenced. In situations where the logic signal is secondary-referenced, an opto-isolator can be used to disable the converter as shown in *Figure 4d*. A high signal disables the converter.

Note: The converter's output cannot be used to disable itself. Otherwise, the logic voltage used to disable the converter would itself disappear when the converter was turned off, and the converter would restart. Use either a housekeeping power source or more than one paralleled converter to insure logic signal voltage.

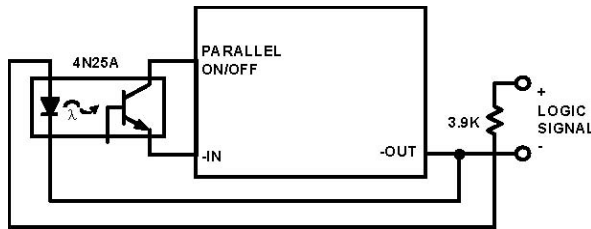


Figure 4d Secondary-referenced on/off circuit using an opto-coupler. A logic high signal disables the converter.

With mechanical switch -A simple mechanical switch can disable the converter. Astrodyne recommends a pushbutton switch. In addition, when using any type of mechanical switch, always use a de-bounce circuit consisting of a resistor and a capacitor as shown in *Figure 4e*.

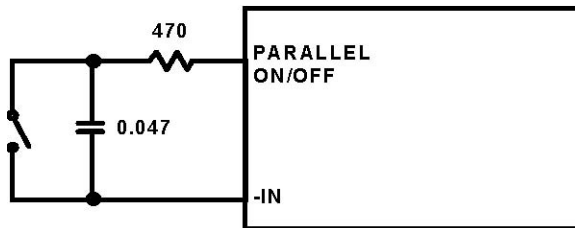


Figure 4e Use a bounce-limited contact switch to disable the converter. The converter is disabled when the switch is closed.

The resistor should be limited to 470Ω to prevent the pin voltage from exceeding 1V when the switch is closed. C should not exceed 0.047μF. Otherwise; the converter's output will take abnormally long to reach its operating voltage.

If the mechanical switch is located more than a few inches away from the converter, or if the switch is an ordinary (not a contact bounce-limited) type, consider using the

switch to activate a small-signal FET or transistor located physically near the module as shown in *Figure 4f*. The filter capacitor connected to the FET's gate filters out contact bounce and noise.

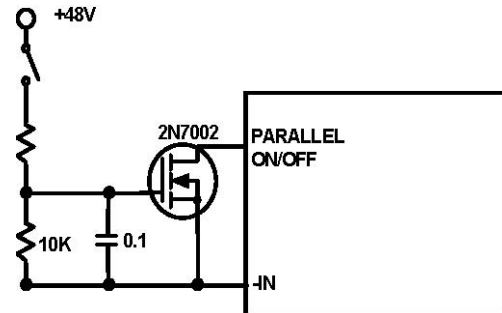


Figure 4f Suggested circuit for isolating contact bounce and noise from the PARALLEL ON/OFF pin. Typical values for a 48V application are shown.

Possible Applications

Energy Conservation The U.S. government's new Energy Star Program puts a premium on energy efficient systems. Astrodyne's MicroVerter modules are an excellent choice for these systems since they are inherently more efficient than conventional power supplies. When paralleling converters, the on/off feature can be used to enable the exact number of modules to attain peak operating efficiency.

Custom Thermal Protection

Although MicroVerter modules are internally thermally protected, other system components may be susceptible to overheating due to fan failure or high outside ambient temperatures. Thermal sensors, properly placed, could detect some other temperature and shut off the converters

using the logic on/off function, preventing system damage.

Sequencing outputs In some applications, one output voltage needs to "come up" before another. Logic on/off can be used to control output voltages to rise in a particular sequence. (See *Figure 4g* depicting logic turn-on time)

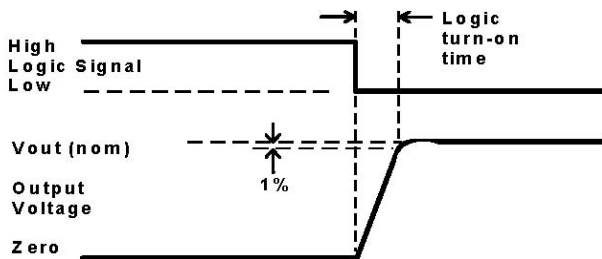


Figure 4g Timing diagram showing logic turn on time.

Precautions

Voltage sensitivity - The PARALLEL-ON/OFF pin is voltage sensitive. If the pin voltage, applied or induced, exceeds 6V, the module can fail. If the conductor leading to the PARALLEL-ON/OFF pin is over a few inches long, or if there is any possibility of induced transient voltages, Astrodyne recommends connecting a 5.6V - 1W Zener

diode from PARALLEL-ON/OFF to -IN.

The Parallel-On/Off pin is physically close to the +IN pin. **Accidentally shorting the two pins can cause module failure.** Make any circuit changes to the PARALLEL-ON/OFF pin with the power off.

For proper converter operation, the pin should be left floating, not forced high. Always use a mechanical switch or open collector to control the pin. Never apply an external voltage to this pin.

Noise sensitivity - The PARALLEL-ON/OFF pin is noise sensitive. Keep the logic on-off circuit as close as possible to the module. If the circuit must be more than a few inches away, or if the environment is electrically noisy, connect a capacitor from PARALLEL-ON/OFF to -IN. A 0.022 μ F NPO ceramic capacitor is normally recommended. If wire cables are used for the disable function, use a twisted pair, or better, use coax cable.

Related Topics

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