

Logic On-Off

Parallel / On-Off / SD Pin

General Description

The logic on-off function allows the user to inhibit the output of the HDM module using a simple TTL logic signal or mechanical switch, and avoids having to turn off the DC input bus. This feature is useful for controlling the output power without having to cycle the input power. It is particularly useful for the HDM 270V input Series, where it avoids recharging of the input energy storage capacitors that normally filter the 270 VDC bus voltage.

Implementation (HDM, HDM+, HDM-LP)

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

With logic circuits

A simple logic signal can inhibit the converter using a transistor or small signal FET as shown in Figures 1 and 2, respectively. In these circuits, a logic high signal inhibits the HDM module output.

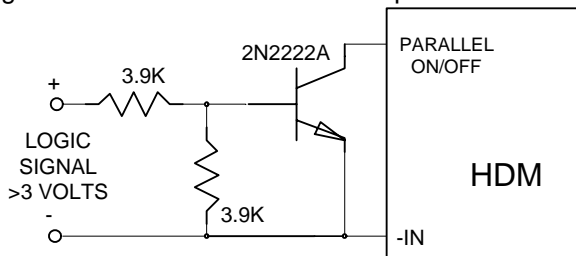


Figure 1. Logic on/off circuit with small signal transistor. A logic high signal inhibits output of the HDM module.

In some cases, it is desirable to use a logic low signal to inhibit the output of the HDM module. Figure 3 shows how to implement a logic low-inhibit circuit. Note that in Figure 3, +V may be the +IN to the HDM module. For 28V input modules, R may be 27K. For 270V input modules, R may be 390K, but care must be taken to allow for voltage gradients

(use several resistors in series to reduce potential across each resistor).

The circuits shown in Figures 1, 2, and 3 are all primary-referenced. In situations where the logic signal is secondary-referenced, an opto-isolator can be used to inhibit the output of the module, as shown in Figure 4. A high signal inhibits the HDM module output.

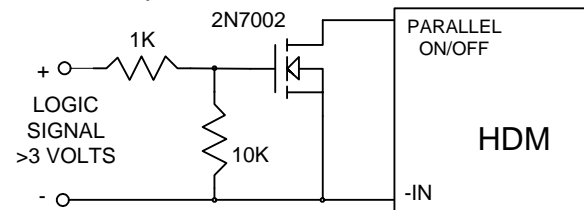


Figure 2. Logic on / off circuit with small signal MOSFET. A logic high signal inhibits output of the HDM module.

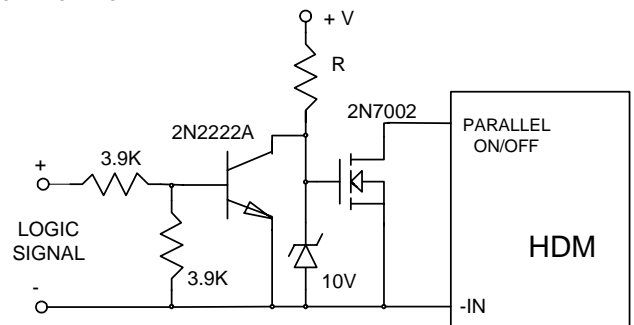


Figure 3. Interlace circuit between the HDM module and TTL logic. A logic low disables the module. 28 VDC input example shown.

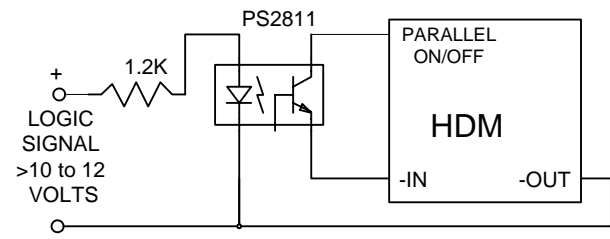


Figure 4. Secondary-referenced on / off circuit using an opto-coupler. A logic high signal inhibits the output of the HDM module.

NOTE: The module's output cannot be used to inhibit itself. Otherwise, the logic voltage used to inhibit the HDM module would itself disappear when the module was turned off, and the output would be reinstated. Use either a housekeeping power source or an additional HDM module to ensure logic signal voltage.

With a mechanical switch

A simple mechanical switch can disable the converter. It is recommended that a minimum-bounce type, such as an NKK BB26AH-FA pushbutton switch be used. In addition, when using any type of mechanical switch, always use a debounce circuit consisting of a resistor and a capacitor as shown in Figure 5.

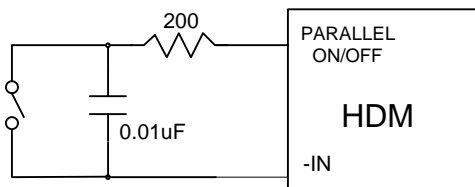


Figure 5. Use a bounce-limited contact switch to inhibit the HDM module. The module is inhibited when the switch is closed.

The resistor should be limited to 200 ohms to prevent the pin voltage from exceeding 1V when the switch is closed. C should not exceed 0.01uF. Otherwise, the module'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 HDM module, 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 HDM module as shown in Figure 6. The filter capacitor connected to the FET's gate filters out contact bounce and noise.

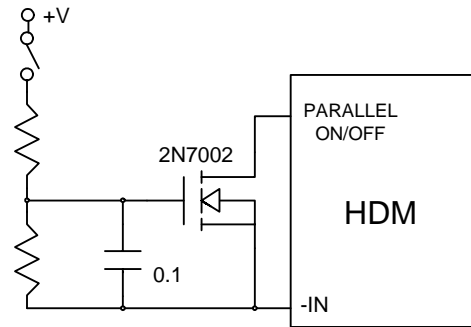


Figure 6. Suggested circuit for isolating contact bounce and noise from the PARALLEL ON/OFF pin.

Implementation (HDM-200 & HDM-LLP)

The SD pin is used to implement the enable/inhibit function. **SD is secondary referenced on these modules.** This is designed for an open collector (or open drain) connection. The collector-emitter (or drain-source) voltage rating must be at least 20V, and it must be capable of sinking 1mA. By pulling the SD terminal below 1 V at 1 mA with respect to -SENSE, the HDM-200 and HDM-LLP modules turn off. Leaving this terminal un-connected (or open collector, open drain) will keep the HDM-200 and HDM-LLP modules on.

Possible Applications

Custom thermal protection

Although HDM modules are internally thermally protected, other system components may be susceptible to overheating due to fan failure or unusually high ambient temperatures. Thermal sensors, properly placed, could detect a remote temperature and shut off the HDM module using the logic on/off function, and thus prevent system damage.



Sequencing Outputs

In some applications, one output voltage is required to become available prior to another. The logic on / off can be used to control output voltages to turn on and off in a prescribed sequence.

Precautions (HDM, HDM+, HDM-LP)

Voltage sensitivity

The PARALLEL/ON-OFF pin is voltage sensitive. If the pin voltage, applied or induced, exceeds 7 V; the HDM 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, it is recommended connecting a 6.8 V, 1 W zener diode from the PARALLEL/ON-OFF to -IN.

The PARALLEL/ON-OFF pin is physically close to the + IN pin. Accidentally shorting the two pins will cause module failure. Make all circuit changes to the PARALLEL/ON-OFF pin with the power off.

For proper module operation, the PARALLEL/ON-

OFF 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 circuitry as close as possible to the HDM 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 pin to -IN. A 0.022 μ .F NPO ceramic capacitor is normally recommended. If wire cables are used for the inhibit / enable function, use a twisted pair; or better, use coaxial cable.

Precautions (HDM-200 & HDM-LLP)

For proper module operation, the SD pin should be left floating, not forced high. Always use a mechanical switch or open collector (or open drain) to control the pin. NEVER APPLY AN EXTERNAL VOLTAGE TO THIS PIN.