

DMX96OC Output Current Limitations

The DMX96OC data sheet specifies a maximum per output load current of 0.1 Amp continuous and 0.5 Amp peak. This application note explains these limits.

The output drivers used in the Doug Fleenor Design 96 Channel Open Collector Solid State Relay Pack (model DMX96OC) are UCN5801A octal (8 output) 22 pin DIP drivers capable of driving a maximum of 0.5 Amps. This current must be reduced due to the package's maximum power dissipation of 1.6 Watts. If all eight outputs are loaded to 0.5 Amps, and turned on simultaneously, over 7.5 Watts will be generated. This will quickly overheat, and ruin, the DIP drivers.

At 0.1 Amps, all eight outputs generate 0.8 Watts of heat, a conservative value guaranteed to provide a lifetime of reliable service.

Loads between 0.1 Amps and 0.5 Amps per output require some thought. The absolute maximum current that generates 1.6 Watts of heat is 0.2 Amps. The user must decide how close to that number they are willing to chance.

Duty Cycle refers to the time an output is on (generating heat) with respect to the time an output is off (cooling down). If the duty cycle is less than 50% (less time on than off) and the on-time is less than ten seconds, it is acceptable to push the load current to 0.2 Amps with good reliability. By staying under the 0.2 Amp value, the driver is relatively safe even if the output is accidentally turned on continuously.

Doug Fleenor Design discourages relying on reduced duty cycle to push the output capacity beyond 0.2 Amps. Theoretically, a 10% duty cycle (or less) with a short on-time would allow a full load of 0.5 Amps without exceeding DFD's recommended power dissipation of 0.8 Watts ($7.5 \text{ Watts} \times 10\% = 0.75 \text{ Watts}$). However, if the outputs accidentally got turned on solid, the drivers would quickly overheat and fail.

A safe alternative to duty cycle limiting is idling some outputs. If four of the eight drivers in a DIP are not used, the remaining outputs can double their load to 0.2 Amps continuous, 0.4 Amps 50% duty cycle.

To idle four drivers per DIP, use only ODD numbered outputs (1,3,5,7...) -or- use only the first twelve outputs on each connector (1-12, 25-36, 49-60, 73-84).

If six of the eight drivers in a DIP are not used, the remaining two outputs can quadruple their load to 0.4 Amps continuous, 0.5 Amps at up to an 80% duty cycle.

To idle six drivers per DIP, use only the odd numbered, first twelve outputs on each connector (1,3,5,7,9,11, 25,27,29,31,33,35, 49,51,53,55,57,59, 73,75,77,79,81,83).

Note: Idled outputs can have their DMX control channels used for other purposes. If only the ODD outputs are used and the system contains a second DMX96OC, set the second pack's DMX address 'one-higher' than the first's thus interleaving the control channels so that none of the DMX channels are wasted. If only the first 12 outputs on a connector are used, other DMX devices may be addressed on the unused outputs (i.e. address a 12 channel dimmer pack at address 13).