

Chameleon Discrete Automation Module (DAM-2)

High-Performance Programmable Controllers for Extreme Environments



KEY FEATURES

- Logic and Batch Control
- 10 Digital Inputs, 8 Digital Relay Outputs
- 8 Three-Color LED Indicators, 4 Programmable Push-buttons
- Fully Sealed Enclosure (NEMA 4X, 6, 13 Protection)
- -40°C to +65°C (-40°F to +149°F) Operating Range
- MIL-STD-901D for High Impact Shock
- MIL-STD-167B for Vibration
- MIL-STD-461E for Electro-Magnetic Interference (EMI)
- Powerful and easy-to-use graphical programming (*Design Pad*)
- Supports Hot Swapping
- Supports redundant input and output connections

The Chameleon Discrete Automation Module (DAM-2) offers high-performance logic and batch control. The DAM-2 module contains ten digital inputs, eight digital relay outputs, four user-programmable push-buttons, and eight user-addressable tri-color digital readouts that are configured in software. It is powered by an ARM processor with onboard RAM and flash memory providing sufficient computational power to handle the most demanding applications. The DAM-2 embedded firmware is stored in its flash memory and is upgradeable: you can rest assured that the hardware investment you make in Chameleon will not become obsolete.

The DAM-2 module offers unique features generally not available in competing controller designs. Its ten universal digital inputs are capable of accepting a broad range of AC and DC signals with no reconfiguration or rewiring required. Its eight digital outputs can be *individually* configured (in software) for AC or DC operation. The digital outputs offer a unique hybrid design consisting of Form C mechanical relays with contacts shunted by solid-state transistors. This topology offers several advantages over pure solid-state or mechanical contacts:

- In AC mode, hybrid contacts offer dramatically improved endurance as they see virtually no switching arc
- AC hybrid outputs drastically reduce conducted and radiated EMI produced when switching inductive loads by maintaining zero voltage crossing turn-on and zero current crossing turn-off
- AC hybrid outputs offer very low contact resistance (when compared to pure solid state outputs) resulting in small power dissipation across contacts
- In DC mode, mechanical contact life is enhanced thru the use of on-board surge suppression circuitry

The DAM-2 module is available in two wiring configurations for the digital outputs: isolated and banked. In the isolated wiring hub configuration, every relay output has a unique common, normally open, and normally closed terminal connection point. The banked wiring hub configuration provides two power termination groups and arranges the digital outputs into two banks of four relays—the relays in each bank have their common terminal tied together (but each relay maintains unique terminal points for the NO and NC contacts). While the isolated wiring hub configuration provides the most power sourcing flexibility, the banked wiring hub is advantageous in applications that have common power sources by eliminating the need to splice wires. When ordering, use DAM-2ISO for the isolated wiring hub configuration and DAM-2BK for the banked wiring hub configuration.

Each DAM-2 module provides convenient tag holders that can be associated with its digital readouts and push buttons. Multiple modules can be attached to each other to expand I/O capacity and to provide redundant I/O connections. They can also be combined with other Chameleon modules to form a full-featured programmable automation controller. As with all Chameleon modules, DAM-2 units are hot-swappable.

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ENVIRONMENTAL CHARACTERISTICS

Operating Ambient Temperature Range	-40°C to 65°C
Storage/Transport Ambient Temperature Range	-40°C to 85°C
High Impact Shock	MIL-STD-901D (Grade A)
Mechanical Vibration	MIL-STD-167B
Electro-Magnetic Interference	MIL-STD-461E
Facial/Housing Protection	NEMA 1,2,4,4X,5,6,6P (Pending),12,12K,13

DIGITAL INPUTS

Quantity	10
Maximum Allowable Continuous Input Voltage	200 VDC or 140 VAC RMS
Maximum Allowable Voltage Spike	1000V peak 1.2µS x 50µS pulse per MIL-STD-1399 Section 300
Logic High Voltage Range	5-200 VDC or 24-130 VAC RMS 55-500 Hz
Minimum Input Duration for Logic High Detection	4 ms
Logic Low Voltage Range	0-1 VDC or 0-0.5 VAC RMS 55-500 Hz
Minimum Input Duration For Logic Low Detection	56 ms
Minimum Input Current Required (AC and DC inputs)	5mA RMS
Electrical Isolation: Two sets of input banks each with 5 inputs	
Bank to Bank Isolation	350 VRMS for 1 minute
Any input to control circuitry or chassis ground	1240 VRMS for 1 minute

DIGITAL OUTPUTS

Quantity / Type	8 Form "C" Hybrid Relays (Electromechanical / Solid-State)		
DC Mode Close Time / Open Time	5 ms typical (excluding bounce) / 7 ms typical (excluding bounce)		
AC Hybrid Mode Close Time / Open Time	9 ms typical (excluding bounce) / 19 ms typical (excluding bounce)		
Voltage Rating	140 VAC Inductive or Resistive, 28VDC Resistive (DC Inductive Loads Require External Clamp)		
Minimum Voltage to Guarantee Contact Conduction	5V @ 100mA after break-in (silver nickel contacts)		
Typical Contact Resistance	20 mΩ @ 5A RMS		
Minimum Contact Ratings (Non-Hybrid Mode)	<u>Load</u>	<u>Operations</u>	<u>Standard</u>
	4.4A, 140VAC on the C/O contact	1.0 x 10 ⁵	5 VDE 0435
	20/2A, 140VAC, PF=0.3 on the N/O contact	1.2 x 10 ⁵	AC 15
Estimated Contact Rating (Hybrid Mode)	TBD Operations		
Maximum Allowed Continuous Current (Any Single Relay)	4.4 Amps RMS		
Maximum Allowed Combined Current (ALL Relays)	16 Amps RMS with no single relay conducting more than 4.4 Amps		
NOTE: If any single relay conducts more than 2A, refer to DAM-2 Power Spread Calculator for Allowable Configurations			
Maximum Allowed Inrush Current (Any Single Relay)	20 Amps RMS for 400 ms on make		
Maximum Allowed Current During Hot Swap (Any Single Relay)	4.4 Amps RMS		
Inductive Load Minimum Power Factor (AC Only)	40%		
Electrical Isolation:			
Any Output to Control Circuitry or Chassis Ground	1240 VRMS for 1 minute		
Digital Output to Digital Output (Isolated Wire Hub Only)	350 VRMS for 1 minute		
Digital Output Bank A to Digital Output Bank B (Banked Wire Hub Only)	350 VRMS for 1 minute		

ELECTRICAL CHARACTERISTICS

Maximum Module Power Consumption	1.3W + 0.03 W/mA x (current draw from aux. power source) + 0.05 W / relay x (number of relays in use)
Maximum Allowable Auxiliary Output Current	250mA
Real-Time Clock Battery Life (Minimum; No power applied, 25°C)	10 Years
Supported Cable Diameters / Supported Wire Gauges	Two glands 0.24"-0.47" and six glands 0.16"-0.31" / 16-28 AWG

OPERATOR INTERFACE

Digital Readouts	Eight user-programmable three-color (red / yellow / green) LED indicators with label holders; One LED Status Indicator
Push-Buttons	Four user-programmable on/off buttons with label holders
IRDA Wireless Interface	115KBPS SIR

PHYSICAL CHARACTERISTICS

Weight	2.35 pounds
Dimensions	4" W x 6" L x 3" H

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