

# 9U Rugged Enclosure for Military and COTS Applications



## Overview

Dawn VME's **710 SERIES** was designed for applications requiring low cost, typically less than \$10,000 in most configurations, yet rugged packaging for installation onboard Navy ships or submarines.

A revolutionary feature not found in any product at this price point is the removable card cage/backplane subassembly. Dawn's engineers invented this feature as a way to allow easy field retrofit, reconfiguration or upgrade by swapping out the complete board set, chassis and backplane as a single unit.

The chassis utilizes welded seam construction in combination with high strength 6061-T6 aluminum alloy to achieve its lightweight yet extremely rugged characteristics. The chassis front and rear are machined from solid 0.3125" material while the sides and covers are a full 0.125" thick. The card cage top and bottom are single-piece construction, fabricated from Dawn's exclusive DuroCage 2000™ material, which machined from a single extrusion of 6061-T6 aluminum alloy.

Emissions from the chassis are controlled by precision-machined recessed surfaces, which provide an EMI tight interface to any attachments to the chassis.

Front chassis features include heavy-duty handles and a control console to the left of the removable door. Control console features include a serial port connector, guarded power ON/OFF circuit breaker switch, power supply voltage status indicator LEDs, elapsed time meter, and a SCSI-2 connector.

The chassis' front door is easily detached by moving the spring-loaded stainless steel hinge pins toward the center of the door. The upper part of the door features an EMI-protected polycarbonate window sandwiched between low cost replaceable Lexan® covers. This window is secured with a removable machined bezel. A removable air

## Features

- ◆ Extremely rugged welded seam construction, yet lightweight
- ◆ Designed to meet MIL-STD-461 for EMI protection
- ◆ Shock and vibration design per MIL-STD-2036, minimum acceptance
- ◆ Small size - fits through submarine hatches
- ◆ Dawn's exclusive, removable DuroCage™ 2000 card cage simplifies reconfiguration for service
- ◆ Removable front door with EMI window for PWB viewing
- ◆ Up to 800W power supply available
- ◆ Up to 18 slot VME or 16 slot CompactPCI bridged backplane
- ◆ Provisions for slide rails
- ◆ Removable peripheral shuttles (FRU)
- ◆ Low cost yet feature-rich

filter is attached to the  of the door, and is easily removed, clean and replaced.

A removable panel with captive fasteners located on the top of the chassis provides access to the interior as may be required.

A removable panel with captive fasteners on the right side of the chassis allows easy removal of the card cage and backplane as a single unit. This subassembly slides on an ultra-high molecular weight plastic fabrication designed to retain and hold the cage in a shock and vibration environment. The removable card cage subassembly "docks" with a power supply subassembly that contains the power supply and a printed circuit board that serves as the central distribution center for the chassis. All features of the chassis connect to this board.

The chassis rear features include: AC input receptacle, chassis grounding stud, exhaust fans and a flexible mounting provision for a variety of I/O panels. The **710 SERIES**' signature color is gray. Mounting provisions for optional heavy-duty slides are included.

# Technical Specifications

## Chassis

**Chassis Type:** COTS ruggedized  
**Construction Type:** Welded seam  
**Material:** Machined 6061-T6 aluminum alloy  
**Finish:** Chemical conversion per MIL-C-5541, Class 1A, color clear  
**Paint:** Standard FED-STD-595-26307 (Gray). Other colors are available  
**Mounting:** Flanges to meet ANSI/EIA ES-310-C-77  
**Slides:** Optional  
**Overall Size:** 211/4L x 19"W x 15.75"H (mounting surface to rear of fan cover)  
**Weight:** Typically less than 65 lb fully configured  
**Mounting Restrictions:** None. Chassis may be mounted between other units operated with no air path top or bottom.  
**Weight:** 55 lb (configuration dependent)

## Card cage

**Card cage Type:** Dawn's exclusive DuroCage 2000™  
**Construction:** Machined single piece top/bottom  
**Material:** 6061-T6 aluminum alloy  
**Card cage Size:** 6Ux160mm  
**Card Spacing:** 8HP (0.8") slot-to-slot  
**Maximum Number of Slots:** 18  
**Backplane Quantity:** Any number totalling 18 slots  
**Weight:** 10.2 lb

## Power Supply

**Power Supply Type:** Modular, switching  
**Switching Frequency:** 250kHz  
**Input Voltage:** 120~250VAC  
**Frequency:** 47~440Hz  
**Efficiency:** Approximately 80% @ 115VAC  
**Power Factor:** 0.99 typical meets EN61000-302  
**Power Output:** +5VDC @ 120A; +12VDC @ 17A; -12VDC @ 10A; 12V aux. @ 4A

## Environmental

**Air Path:** Intake - lower front; exhaust - upper rear  
**Fan Rating:** Three (3) 112CFM @ 12VDC  
**Operating Temperature:** 0°C ~ +50°C  
**Storage Temperature:** -40°C ~ +85°C  
**Humidity:** <95% RH, non-condensing



## FRU System Cooling

Consistent with Model 710's low MTTR design, the cooling system is a Field Replaceable Unit (FRU) capable of moving more than 325 CFM through the enclosure. Dawn's engineers carefully designed the 710's air flow to draw fresh, cooler air through the filtered, hinged front door, up through the card cage area and across the upper portion of the enclosure, and out the rear.

High reliability fans with MTTR of >75,000 hours are used. Should the fan FRU need replacing, merely remove the four (4) thumbscrews and remove/replace the fan system; it takes only 60 seconds to complete this operation!

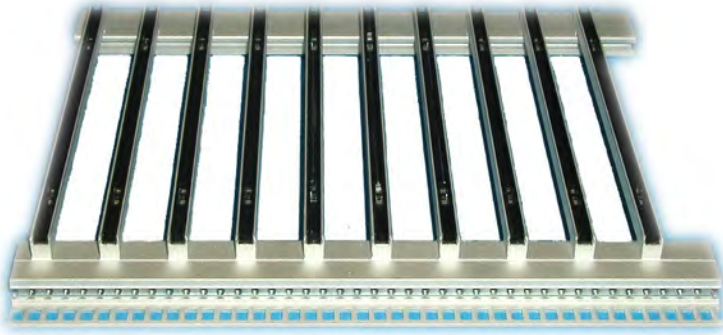
## Rear I/O Panel

Six (6) blank rear panels are provided in the native Model 710 configuration. Each I/O panel features captive thumbscrews for easy installation/removal without the fear of losing the retaining screws. Shown in the photo above is a configuration consisting of two (2) blank panels and four (4) panels custom punched to accommodate DB9, DB25, BNC and military style circular connectors. Dawn VME can punch the panels to accommodate virtually any style of connector, and can install and wire the I/O connectors to customers' specification.

## Power System

The standard Model 710 is configured for an AC input power system. While the most popular total DC power output is an 800W unit, other power supplies may be available (contact factory). Detailed specifications for the standard 800W power supply is shown in the "Technical Specifications" section in this data sheet. Specifications for power supply models other than the standard 800W model can be sent to you upon request.





## DuroCage 2000™ Extruded Card Guides

Model 710 utilizes Dawn VME's rugged DuroCage 2000™ 160mm card guides. Card cage performance (see next page for details of the card cage design) is enhanced because DuroCage 2000™ card guides are manufactured from a single extruded aluminum billet, then precision machined to provide efficient air flow paths while maintaining superior strength. And, tapered circuit card lead-in areas simplifies board installation. Optional polymer card guide inserts facilitate board insertion and insulate boards from the metal card cage.

The DuroCage 2000™ card cage is perfectly compatible with Eurocard electronic packaging standards, and is available with/without 1101.10 inject/eject feature, making it an ideal solution for Model 710 configured with VMEbus, VME64x or CompactPCI backplane configurations.

## FRU Docking Card Cage

Model 710 was designed with two key field replaceable units (FRU) in order to offer users a low mean time to repair/replace (MTTR) critical components or even an entire subsystem, as shown in the photos to the right and below.

The card cage is a slide-in/slide-out docking FRU, with a system power connector mounted to the left-hand side of the card cage as shown in the photo below. The benefit of this feature allows the system engineer to install all boards while the card cage is conveniently situated in the lab. Temporary power can be connected to the FRU card cage either via a mating power connector or by simply connecting power to the backplane via the backplane's busbar and power bug system.

In this manner, system verification can be made while having easy access to the boards and backplane. After system verification is complete, the FRU card cage is simply and easily slid through the removable side panel and docked in its final position. This feature saves time and reduces the complexity of system verification prior to field deployment.



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## Other Products from Dawn:

- ◆ VME, VME64x and CompactPCI
  - ... Development enclosure systems
  - ... Powered production enclosure systems
  - ... Backplanes
- ◆ "System Health Monitor" retrofit kit (also available as an installed option in your Dawn VME powered development or production enclosure)
- ◆ Test Extender Boards
- ◆ Peripheral Mounting Modules
- ◆ Slot Load Boards
- ◆ Slot Bypass Boards
- ◆ Prototyping Boards
- ◆ Form-Factor Extender Boards (FFE)
- ◆ Filler Panels: 3U, 6U or 9U x ≤ 1~21 slot widths
- ◆ 3U, 6U, 9U and Custom Front Panels
- ◆ Related Hardware Accessories
- ◆ Rackmount Keyboard-Video-Mouse (KVM) Control Unit with LCD Display
- ◆ Rackmount LCD Display with/without Touch Screen

## Ordering Information

VMEbus model: **11-1010710-XX**

Scope of Supply:

- ▶ DuroCage 2000™ 6Ux160mm ruggedized card cage mounted to FRU docking slide system
- ▶ Either 18-slot VMEbus monolithic J1J2 backplane or choice of CompactPCI backplanes (contact factory for available options)
- ▶ 800W power supply
- ▶ Removable, hinged front door with EMI window
- ▶ Two removable peripheral shuttles
- ▶ Solid rear panel that can be modified for connector I/O
- ▶ EIA rack mounting flanges installed to enclosure
- ▶ DC powered elapsed time meter
- ▶ EMI, low-leakage power inlet filter
- ▶ ON/OFF circuit breaker
- ▶ Protective switch guard for circuit breaker with MIL snap-cover
- ▶ FED-STD-595-26307 (gray) paint over aluminum that has been chemically converted per MIL-C-5541, Class 1A

## Enclosure Dimensions

