

Small Form Factor Embedded Computer



The Falcon II is a rugged small form factor (SFF) computer system, specifically tailored for the avionic, military and rugged industrial market. The system offers the best utilization of Size, Weight and Power (SWaP) in the industry, and strictly adheres to Commercial Off the Shelf (COTS) standards in the industry. Though its size is small, the Falcon II is mighty.

The versatile Falcon II may be configured with the latest high performance computer and graphics engines, as well as the best SWaP optimized, low power, System on Chip (SoC) processors; and every solution in between.

The Falcon II can support all I/O typically needed in the targeted applications, including MIL-STD-1553B, ARINC-429, AS-5643 MIL Firewire, Video Graphics, Video Frame Capture, Software Defined Radio, RS-232/422/485, Fibre Channel, GigE and 10GigE, Analog and Discrete signals, and FPGA / GPGPU processors. The I/O can be XMC or MiniPCIe, including Acromag's revolutionary "Plug and Play" AcroPack. There are additional options for Inertial Measurement and Navigation, GPS, Wi-Fi and Cellular Modem functions.

FEATURES



- **CPU:** Multiple Gen6 and Legacy Intel Core i7 / Xeon Processors. NXP Power Architecture and AMD G/R Series Available
- **Memory:** RAM 4GB to 32 GB; FLASH 64GB to 2 TB with Options for RAID and Removable Storage
- **SBC Video:** 1x VGA, 2x DVI/HDMI/DP Video Output
- **SBC I/O:** GigE, USB 2 / 3, Serial, Audio, GPIO
- **Expansion:** 4x mPCIe and 1x XMC sites, 2x SATA III Fixed / Removable SSD (Option)
- **Dimensions:** 209mm x 235mm x 93mm (Baseline)
- **Weight:** ~3.5 Kgs, Depending on Options
- **Connectors:** High Density Circular MIL (Standard)
- **Power:** 28 VDC @ 25-75 Watts (Varies per Options)
- **Operational Temp:** -40°C to +55°C (Continuous, All Versions), Up to +71°C depending on CPU type, loading and I/O
- **Storage Temp:** -50°C to +85°C
- MIL-STD-810F, MIL-STD-461F, MIL-STD-704F/1275D
- **OS:** Linux, Windows, VxWorks, Integrity, Deos

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Intelligent Design

Based on Trident Infosol “Build-In” methodology, Falcon II has been designed intelligently to be flexible and satisfy a wide variety of customer requirements. The chassis has been created to utilize minimum space while optimized to carefully manage the heat dissipation. To prevent high NRE costs, the system architecture makes maximum use of standards based computer, graphics, COTS I/O modules and connectors. All available I/O is passed from the Midplane to the I/O Transition Board’s (IOTB) high density, high frequency circular MIL I/O connectors. The Falcon II may be ordered as complete turn-key system, built to a specific requirement, or as a baseline system where Customer Furnished Equipment (CFE) modules may be integrated by Trident Infosol or the customer. Because the chassis parameters are preset and flexible, delivery time is often reduced by 50% or more, when compared to a custom design or typical 3-4 slot 3U VPX system.

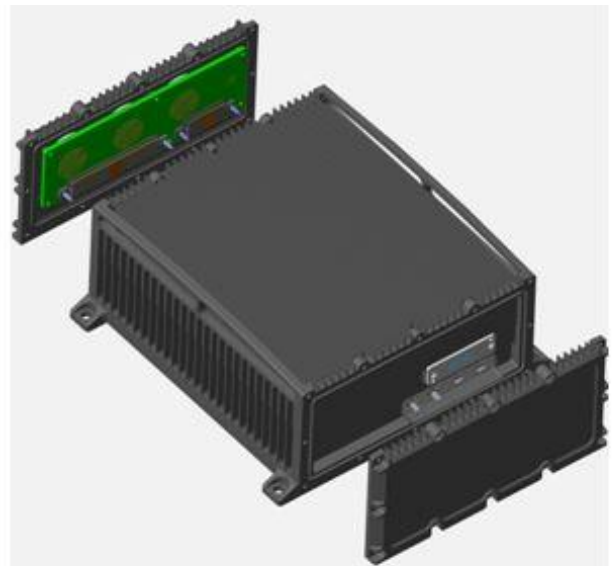
Chassis Mechanical Design

The Falcon II mechanical design has been engineered to meet or exceed most MIL specifications. The enclosure is made of military grade aluminum with gaskets for EMI / RFI and environmental protection, and ruggedized for optimal heat, humidity, shock and vibration protection in accordance with the most demanding commercial and military specifications. Its slightly oval top is precisely designed for optimal thermal management, allowing the system to operate at temperatures as high as +71°C. The standard enclosure is also equipped with mounting features for easy installation, and finished to prevent corrosion and erosion.

The Falcon II chassis is designed to be easily configurable without major redesign to a multitude of customer configurations. The Chassis Assembly is divided into 3 major pieces as shown.

The **Chassis Mid-Section**, the central chassis body, is designed to be reused without modification. In its standard configuration, it is equipped with feet to mount to a shelf or bulkhead. Along with natural convection, this surface is used to carry system heat from the conduction cooled system. For tray-mounted applications in areas with sufficient air-flow, the system may be optionally equipped with dagger pins and swing nut mating hardware.

The Chassis Mid-Section contains an automatic pressure equalization valve to keep the internal and external atmospheric pressure equalized, while ensuring that there is no moisture or particulate matter able to get into the system.



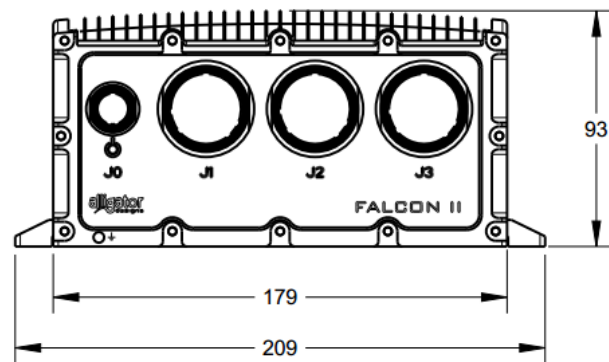
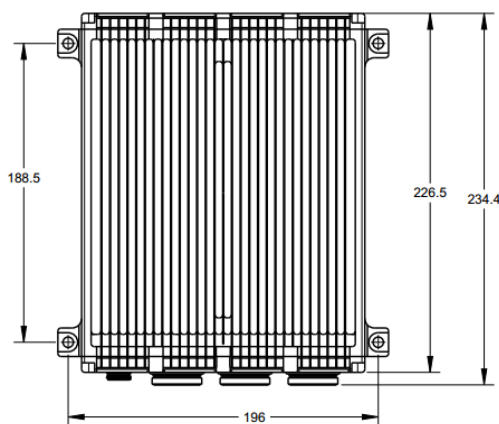
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The **System Front Panel** is designed to bring out all available I/O in its standard configuration, but can be easily customized as required.

The standard configuration Falcon II has 1x Power Connector (J0) and 3x High Density, High Frequency capable connectors (J1, J2, J3). All standard power and I/O connectors are appropriately keyed and with appropriate gender.



J0 J1 J2 J3



The **Chassis Rear Panel** is designed to bring out RF and Video I/O from XMC modules with “Front Panels”, as well as the I/O from RF devices in the MiniPCIe sites (such as Wi-Fi). The panel is designed to be configured with a blank panel, a panel for “Front Panel I/O from XMC cards, or with individual RF connections for GPS, Wi-Fi and SDR applications. For custom applications, XMC or RF connections may be routed to the Chassis Front Panel.



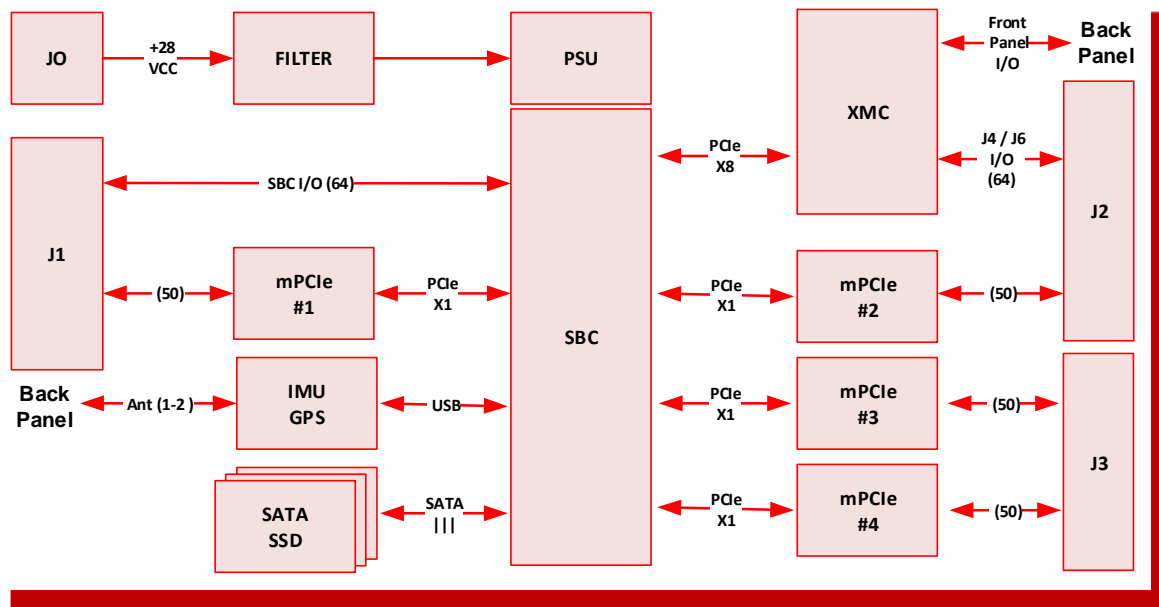
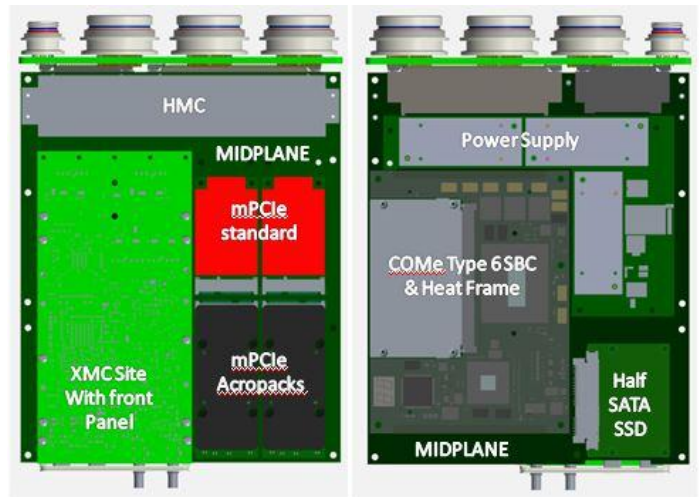
An optional **Removable Storage Bay (RSB)** is available and bolts onto the standard Falcon II, providing the ability to mount dual removable and hot-swappable SSDs. The RSB may be mounted to be front or rear facing, with tray or footpad mounting features. Drives up to 8 TB each may be utilized. The RSB adds 36mm to the overall height of the chassis.

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Midplane and I/O Transition Board

Using leading edge chassis design partitioning, Midplane and I/O Transition Board (IOTB) technology, the Falcon II has the unique ability to host all the following standards based computer and I/O modules:

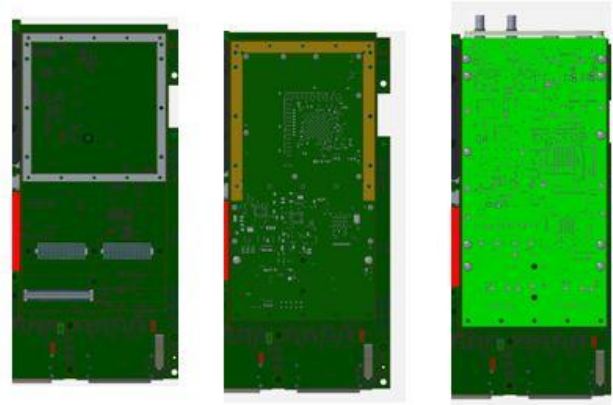
- 1x COM Express Type 6 High Performance (high power) or SWaP optimized (low power) CPU processors.
- 1x XMC Video Graphics Processor, Video Frame Grabber, Software Defined Radio, or other standard XMC modules, including those with “Front Panel” I/O.
- 1x Half-SATA Solid State Disk, optional 1x-2x mSATA sites and provisions for 2x SATA SSDs on optional mezzanine.
- Optional Removable Storage Bay with 2x Removable, Hot-Swappable SSDs.
- 4x MiniPCIe modules, including Acromag’s “plug and play” AcroPack with standardized I/O connectors and pin assignments.
- 1x MEMS industrial or Tactical Grade Inertial Measurement / Navigation Unit with Single or Differential GPS, mounted in the Falcon chassis.
- 1x I/O Transition Board (IOTB) and Front Panel Assembly, either standard or customized for a specific application.
- 1x Rear Panel Assembly that is either blank, or delivered with XMC Front Panel I/O connections, and/or GPS Antenna Connections from the IMU/GPS unit.



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Mezzanine I/O

The Falcon II XMC site is very versatile and can host several variants of XMC cards. Utilizing the XMC J14 connector, the site has a PCIe X8 data bus interface to the SBC, able to run at PCIe Gen2 or Gen3 speeds, depending on the SBC and XMC. The site provides for traditional “Rear I/O” on J4 (legacy), as andon J16 (traditional). The individual J4 and J16 I/O signals may be selectively routed to J2 on the IOTB. The design supports “XMC Front Panel I/O” where the I/O protrudes through the rear panel of the Falcon II chassis, or may be cabled to a customized system IOTB and front panel.



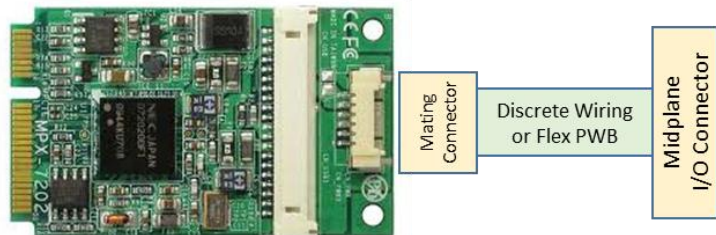
The Falcon II supports four mPCIe sites for application specific I/O. Each site has one X1 PCIe lane dedicated and optional USB 2.0 lane to the site. The mPCIe sites may support a very wide range of COTS modules, as well as the revolutionary AcroPack modules which have a standardized 100-Pin I/O connector. Each mPCIe site supports a conduction cooling heat frame to heat transfer. Using mPCIe cards, it is possible to include the following types of I/O in a Falcon II configuration:

mPCIe	AcroPack*	AcroPack*
MIL-STD-1553B - DDC	Analog Out, 16 Chan	Discrete I/O, 48 Chan TTL
MIL-STD-1553B - FPGA	Analog In, 20 Chan Diff	Artix 7 FPGA with TTL
ARINC 429	Analog In, 8 Chan S&H	Artix 7 FPGA with RS-485
CAN Bus	Discrete I/O, 32 Chan	Artix 7 FPGA with LVDS
Firewire	Discrete In, 32 Chan Opto	Artix 7 with Mixed I/O
Fibrechannel	Discrete In, 32 Chan SSR	

Plug-In miniPCIe with standardized Midplane I/O connector



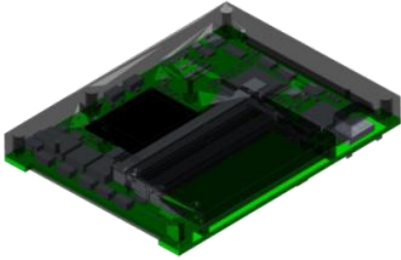
Conventional miniPCIe with plug in cable adapter



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CPU

Intel i7 / Xeon COM Express Type 6 Single Board Computer.

Intel Processor Options (Gen 6 Recommended for New Designs)	Common Resources & I/O
<ul style="list-style-type: none"> • Skylake (Gen6) 4-Core i7-6822EQ @ 2 GHz • Skylake (Gen 6) 2-Core i7-6600U @ 2.6 GHz • Skylake Xeon™ (Gen 6) 4-Core E3-1505L @ 2.0 GHz 	<ul style="list-style-type: none"> • 16GB DDR3 + ECC • Intel 8-Series QM87 PCH • 1x VGA • 2x HDMI/DVI/DP • HDA Audio In/Out • 2x GigE • 2x 10GigE (Xeon Only) • 1x SATA (To Internal SSD) • 2x SATA (To Optional Expansion Drives) • 4x USB 2.0 / 4x USB 3.0 • 2x RS-232

Standard Mezzanine Sites

High Performance Configurable XMC Mezzanine I/O <ul style="list-style-type: none"> • Any standard XMC • Video Frame Grabber, Graphics Generation and Compression • GPGPU CUDA / OpenCL High Performance Computing • Software Defined Radio, RADAR • 10Gbps Ethernet Ports (XMC Option) 	4x Sites for Standardized MiniPCIe I/O Modules (Per Site) <ul style="list-style-type: none"> • Up to 40x Discrete & Digital I/O • Up to 40x Analog I/O • Up to 8x Serial I/O (RS-232, RS-422, RS-485) • Up to 10x Counters & Timers • Up to 2x MILSTD-1553, 8x ARINC-429, 2x CAN Bus • Artix-7 FPGA with Up to 48 TTL / 24 LVDS I/O • Optional NVMe storage support up to 2TB
1x Sites for Half-Slim SATA SSD <ul style="list-style-type: none"> • SLC and eMLC NAND Technology • SATA 6 Gbps, 3 Gbps, 1.5 Gbps • 512 GB, 256 GB, 128 GB, 64 GB • Sustained R/W: R@400 W@200 MBs • Random R/W: R@74K W@65K IOPS 	1x Site for INU/IMU/GPS <ul style="list-style-type: none"> • MEMS Inertial Measurement Unit • GPS Aided Navigation • 1 or 2 Antenna GPS • Industrial or Tactical Grade Performance

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Applications

The following are some examples of applications that could be supported on the Falcon.

Video Display Electronics Unit	SW Defined Radio or Electronic Warfare	Data Link Processor
<p>A computer to handle incoming video and output video with graphic overlay supporting OpenGL. Computer can also perform video encoding, decoding, recording and storing. Includes:</p> <ul style="list-style-type: none"> • SBC • XMC for Video Capture, Overlay, Graphics Output, Compression • MIL-STD-1553B Data Bus • Discrete I/O • Gigabit Ethernet • Optional IMU / GPS 	<p>A computer to handle radio communication and would include:</p> <ul style="list-style-type: none"> • SBC with Audio support • XMC SDR • MIL-STD-1553B Data Bus • Discrete I/O • Optional IMU / GPS 	<p>A computer for avionic communication and data links would include:</p> <ul style="list-style-type: none"> • SBC with built-in Video Graphics • XMC ATDS / NTDS • MIL -STD-1553B Data Bus • Discrete I/O • Optional IMU / GPS





Technical Specifications

Environmental Specifications

Condition	Specification	Condition	Specification
Operating Temperature	-40°C to +55°C (Continuous, All Versions), Up to +71°C depending on CPU type, loading and I/O	Storage Temperature	-50°C to +85°C
Relative Humidity	5% to 95% Non-Condensing		
Power (Ground)	12VDC to 36VDC MIL-STD-1275D	Power (Airborne)	12VDC to 36VDC MIL-STD-704E 50 mSec Hold-up optional
Shock	30g Peak @ 11mSec		
Vibration (Ground)	5Hz to 2000Hz, 2g Sine, 1Hr/Axis MIL-STD-810F Method 514.6	Vibration (Airborne)	5Hz to 2000Hz, 2g Sine, 1Hr/Axis MIL-STD-810F Method 514.6
EMI (Airborne)	MIL-STD 461F		

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Mil Specifications

Application	Test Condition	Applicable Specifications
Airborne	Power (AC, DC) Environmental EMI/EMC	MIL-STD-704 MIL-STD-810 MIL-STD-461 
Shipboard	Power (AC) Shock Vibration 15 Degree Drip Environmental Fungus & Nutrients EMI/EMC Earthing	MIL-STD-1399 MIL-S-901 MIL-STD-167 MIL-STD-108 MIL-STD-810 MIL-STD-454 MIL-STD-461 MIL-STD-1310 
Ground Vehicle	Power (DC) Environmental EMI/EMC	MIL-STD-1275 MIL-STD-810 MIL-STD-461 
Land Based	Power (DC) Environmental EMI/EMC	Varies MIL-STD-810 MIL-STD-461 

For Ordering Configuration / Part Number - Contact Factory

US Sales

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Global Sales

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India Sales

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