NightHawk RCU™

Rugged Controller / Data Concentrator Unit

- ***Deeply Embedded PC-based Remote Interface Unit (RIU) / Data Concentrator Unit (DCU)***
- ***High Performance PC - Low Power Intel Processor in a Lightweight, Passive Air-cooled Rugged and Sealed Compact Enclosure***
- ***Intel® Atom™ N270 Processor (Navy Pier Platform) at 1.6GHz with 2GB DDR2 SDRAM***
- ***Data Storage – from 4 to 8 GB SSD standard, with optional expansion to 250 GB SSD***
- ***Complete set of standard PC I/O Interfaces (Dual Gigabit Ethernet, Video Graphics, Stereo Audio in/out, USB, RS-232/RS-422/RS-485 Serial Ports, Parallel Port, PS/2 Ports)***
- ***Extensive internal support for added peripherals and I/O expansion***
- ***18-36* VDC Power Input with EMI/EMC-compliant Power Input Filter - 20W Pd Typical***
- ***Three rugged MIL-DTL-38999 connectors (1 - Power, 2 - Standard PC I/O, 3 - Custom I/O)***
- ***Designed for Harsh Mechanical, Climatic, Chemical and Electrical Applications***
- ***Supported OS : Windows Embedded XP, Linux, VxWorks***

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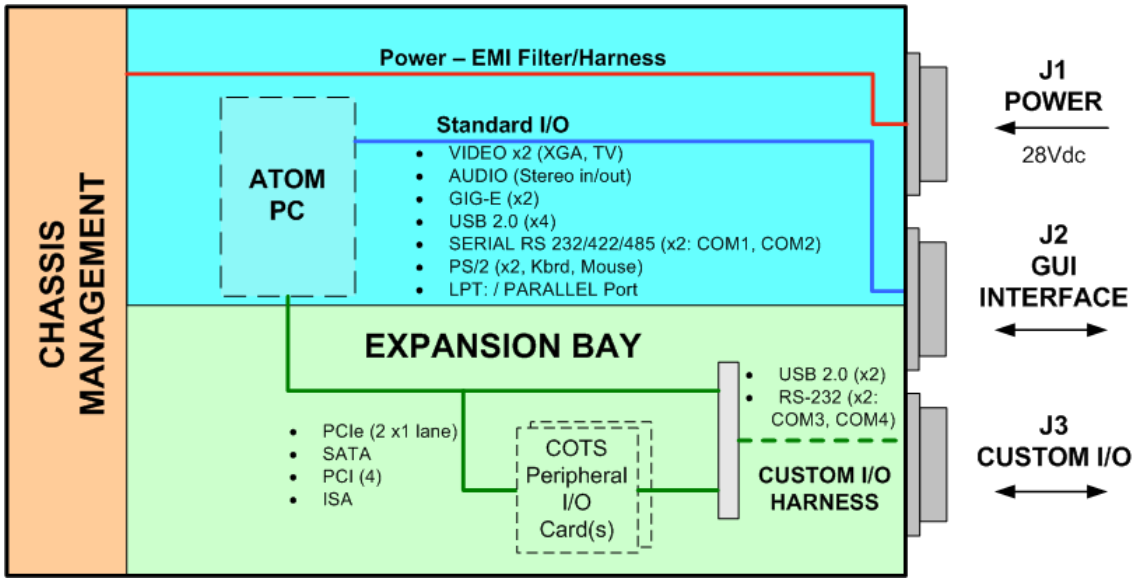
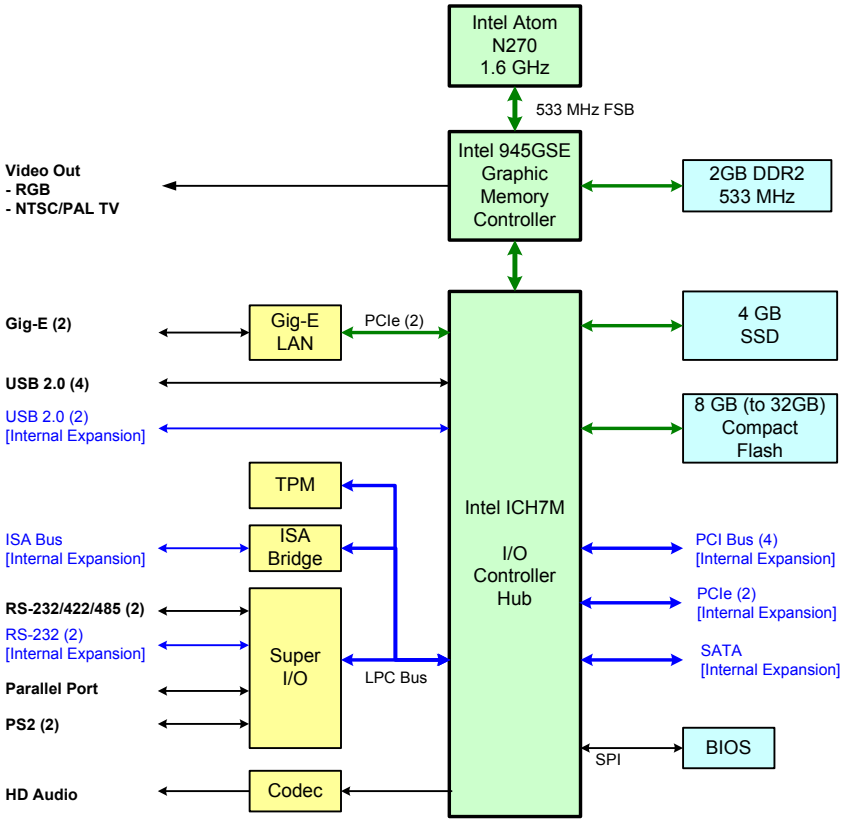


***NightHawk* RCU™ Architectural Block Diagram**



***NightHawk* RCU™ Processor Diagram**

Overview

Ideal for low SWaP Data Concentrator Unit (DCU) and Remote Interface Unit (RIU) applications, Aitech's new *NightHawk* RCU™ is a low power, high performance, environmentally sealed and rugged, PC-based controller utilizing Intel's latest low power N270 Atom Navy Pier processor technology. The *NightHawk* RCU provides a complete set of standard PC I/O interfaces as well as additional I/O typically needed in remote and embedded vehicle applications through multiple internal I/O expansion bays to add standard boards, modules and mezzanines to interface with a wide variety of military and industrial I/O. The naturally convection cooled and sealed enclosure is rugged and reliable, lightweight and compact. EMI/EMC protected, the *NightHawk* RCU is capable of withstanding extreme environmental conditions of low and high altitude, temperature, moisture, shock, vibration, EMI and chemical exposure. The *NightHawk* RCU is ideal for use in rugged automotive, industrial, light or heavy rail, military and aerospace applications such as manned or unmanned, ground or airborne vehicles.

Processor and Peripherals

- Low Power 1.6 GHz Intel Atom N270
- 2 GB DDR2 SDRAM
- 533 MHz Front Side Bus (FSB)
- 4 to 8 GB Solid State Drive (SSD)

Standard PC I/O

- (2) Gigabit Ethernet Ports
- (6) High Speed USB 2.0 Ports
- PS/2 Keyboard & Mouse Ports
- (2) RS-232 Serial Ports
- (2) RS-232/422/485 Serial Ports
- Dual Video output / Stereo Audio (in/out)
- I/O wired to standard -38999 connectors

Optional I/O and Data Storage (consult factory for details)

- MIL-STD 1553B
- ARINC-429, ARINC 708
- WiFi, WAN, CAN Bus
- Discrete RTD, Digital and/or Analog I/O
- Video / Frame Capture and Processing
- Gigabit Ethernet Switch (8 Port)
- Up to 256 GB SATA, up to 32 GB CF SSD

Sturdy Mechanical Design

The natural convection - / radiation-cooled *NightHawk* RCU is constructed of durable extruded 6063-T6 aluminum. Fasteners are stainless steel and removable cover screw threads have self-locking stainless steel helicoils to withstand severe vibration and shock. All I/O connectors are located on the front panel of the enclosure for easy access.

Front Panel

The front panel features a flexible configuration of user-defined Mil-C-38999-style connectors that conform to military standards, one for input power and remainder dedicated for User I/O. Depending on the size and number of 38999 I/O connectors, the front panel may also be equipped with any of the following options: elapsed-time meter, LED indicator to track system operation, On/Off switch and optional external grounding lug.

Rear Panel

The *NightHawk* RCU provides the optional area and internal access points needed to mount an external WAN or WiFi antenna and/or a user-accessible Compact Flash SSD behind a removable sealed cover panel.

Dual Video Outputs

The *NightHawk* RCU supports true, dual independent video outputs – XVGA and TV supporting either standard NTSC or PAL video formats (480 or 520 lines) with extended desktop.

Thermally Efficient

The *NightHawk* RCU is cooled by natural, passive convection and/or radiation. All internal boards are conduction-cooled, conformal coated and environmentally sealed, and internally thermally managed within the chassis thereby allowing the *NightHawk* RCU to operate at temperatures from -55°C to +55°C, or -55°C to +71°C with the baseplate cooled option. Consult the factory for operational parameters with optional expansion I/O installed or if other operational temperatures are required.

Electro-Magnetic Compatibility

Aitech's *NightHawk* RCU minimizes emission and susceptibility interference with these features:

- Low impedance galvanic metal-to-metal interface surfaces and fasteners with high conductivity
- Conductive O-ring and flat gasket EMI/EMC seals
- Shielded power supply module with screened & shielded input power lines
- Metallic partition between I/O and board sections of the backplane and enclosure
- Input power/Line filter, isolated chassis & logic grounds with optional external grounding lug

RCU *SoftStart™ Power-up*

Reverse- & over-voltage and surge protected, the *NightHawk* RCU supports a tightly controlled, power ramp-up feature to lessen the inductive loading and current-inrush impact on the power system. For more complex applications, multiple *NightHawk* RCU's can be powered in parallel without tripping the platform's circuit breaker.

Environmental Sealing

The *NightHawk* RCU is sealed against intrusion of external environment contaminants found in rugged industrial and defense applications, including: humidity, sand and dust, and contaminant splash. Enclosure mating surfaces are sealed with silicon rubber O-ring seals. Connectors and other accessories are protected also in the same manner. All internal printed wiring boards are conformal coated for added humidity protection.

Corrosion Resistant Finish

External surfaces of the *NightHawk* RCU are hard black anodized (per Mil-A-8625, Type II, Class 2) for excellent corrosion resistance. Optional external surface finishes include CARC and nonstandard paint colors are available upon request. Internal surfaces are chemical conversion coated for corrosion resistance and electrical conductivity. All finishes and components are fungus resistant.

Power Supply Specifications

- **Thermal Characteristics**

Thermal Shutdown	100°C to 110°C

- **Input Power** (with RCU *SoftStart™*)

Voltage Range (DC)	18 - 36 Vdc*
Nominal Input Voltage	24 - 28 Vdc
Reverse Polarity	Protected 0 to 40V DC

* Consult factory for higher or lower operating input voltages.

- **Transient Suppression**

  Meets requirements of:
  - MIL-STD-1275AT (with minor exceptions)
  - MIL-STD-704D (or better)

- **Isolation Resistance**

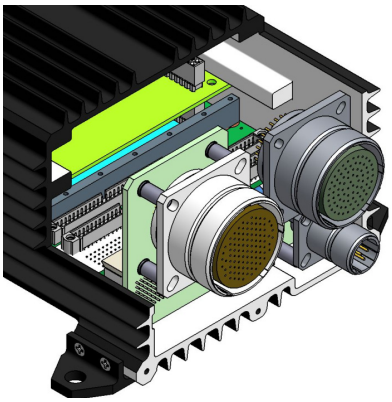
  500 V to output of enclosure

- **PSU Output Voltage/Current**
  - **Total PSU Output Power** >60 W
  - **General PSU Parameters**

Power Fail Warning	>4ms
Efficiency	>85%

Internal PSU Outputs

Supply Rail	1	2	3	4	5
Voltage (Vdc)	+5	-5	+3.3	+12	-12
Current (A)	2.5	0.2	2.5	3	0.3



NightHawk RCU™ Front Panel Interfaces

- **Power Dissipation**

  Less than 20W typ. at 55 °C air temperature (passive air cooled), >50W conduction cooled.

General Specifications

- **Dimensions**

  Standard mounting footprint:
  5.59” x 8.29” x 3.45” (W x D x H)

  Front Panel: 4.75” x 3.35”

  Maximum external dimensions:
  6.14” x 10.8” x 3.45” (W x D x H)

Environmental Specifications

- **Operating Temperature***

  Passive/free air: -55°C to +55°C
  Coldplate: -55°C to +71°C

* Consult factory for extended operating temperature options

- **Humidity**

  Mil-STD-810F, Method 507.3

  5% - 100% relative humidity with condensation
  Immersion to 1m, 30 mins.

- **Vibration**

  Sine Cycling of 10g (max) at 5 - 500 Hz
  Random 16g rms at 20 - 2000 Hz
  Transportation: Loose Cargo vibration

- **Shock** - Single half-sine shock:

  Crash safety: 40g peak, 11 ms, 3 axes
  Operation: >20g, 11 ms, 3 axes

- **Transit Drop****

  1 ft. drop on concrete

** Packed in suitable shipping/cargo container

- **Bench Handling**

  4-in unpackaged drop at a 45° angle to simulate conditions during servicing

- **Low Pressure**

  Operating: Up to 15,000 ft (passive air cooled)
  Operating: Up to 55,000 ft (baseplate cooled)
  Storage: Up to 60,000 ft

- **Salt Fog**

  5% salt spray

- **Fine Dust**

  Wind and fine dust particles

- **EMI/RFI**

  Meets MIL-STD-461D/E emission and susceptibility limits

- **Weight**

  Less than 5 lbs (without optional internal I/O modules)

- **Warranty**

  Standard: One year. Extended warranty available.

Ordering Information for the NightHawk RCU™

NightHawk RCU™-IL-xx

IL =	**I**ntel, **L**ow power - N270 Atom (Navy Pier) Processor
XX	00 = Standard I/O, Windows Embedded (XP)

An optional *NightHawk* RCU, DTL-38999 I/O break-out cable to standard PC I/O connectors with 90 to 264VAC 50/60 cycle Universal Power Supply is also available.

For more information about the *NightHawk* RCU™ family of products or any Aitech product, please contact Aitech sales department at (888) Aitech-8 (888-248-3248).

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