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Find the *Aitech Defense Systems C920* at our website: ***Click HERE***

C920

PowerQUICC™ II Pro 3U CompactPCI® SBC



- Rugged 3U CompactPCI SBC
- Ultra Low Power (< 5 W)
- PowerQUICC™ II Pro MPC8349E @ 400 MHz
- CompactPCI System Slot SBC
- PCI 2.3 Compliant
- 256 MB of DDR2 266 SDRAM (@ 133 MHz) with ECC Protection
- 128 MB Boot Flash Memory
- 384 MB User Flash Memory
- 512 kB MRAM Non-Volatile Memory
- Two 10/100 Mbps Ethernet Ports
- One RS-232/422/485 UART Serial Port
- Three Single Ended Discrete Inputs
- Three Single Ended Discrete Outputs
- One PMC Slot
- Four High Performance DMA Engines
- Eight 16-bit timers
- Programmable Watchdog Timer
- Real Time Clock
- Conduction and Air-Cooled Versions
- RTOS Support
  - Wind River VxWorks®
  - QNX®
- Ideal for DO-178/DO-254 Applications

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C920 Powerful Processing in Compact Ultra Low Power Form Factor

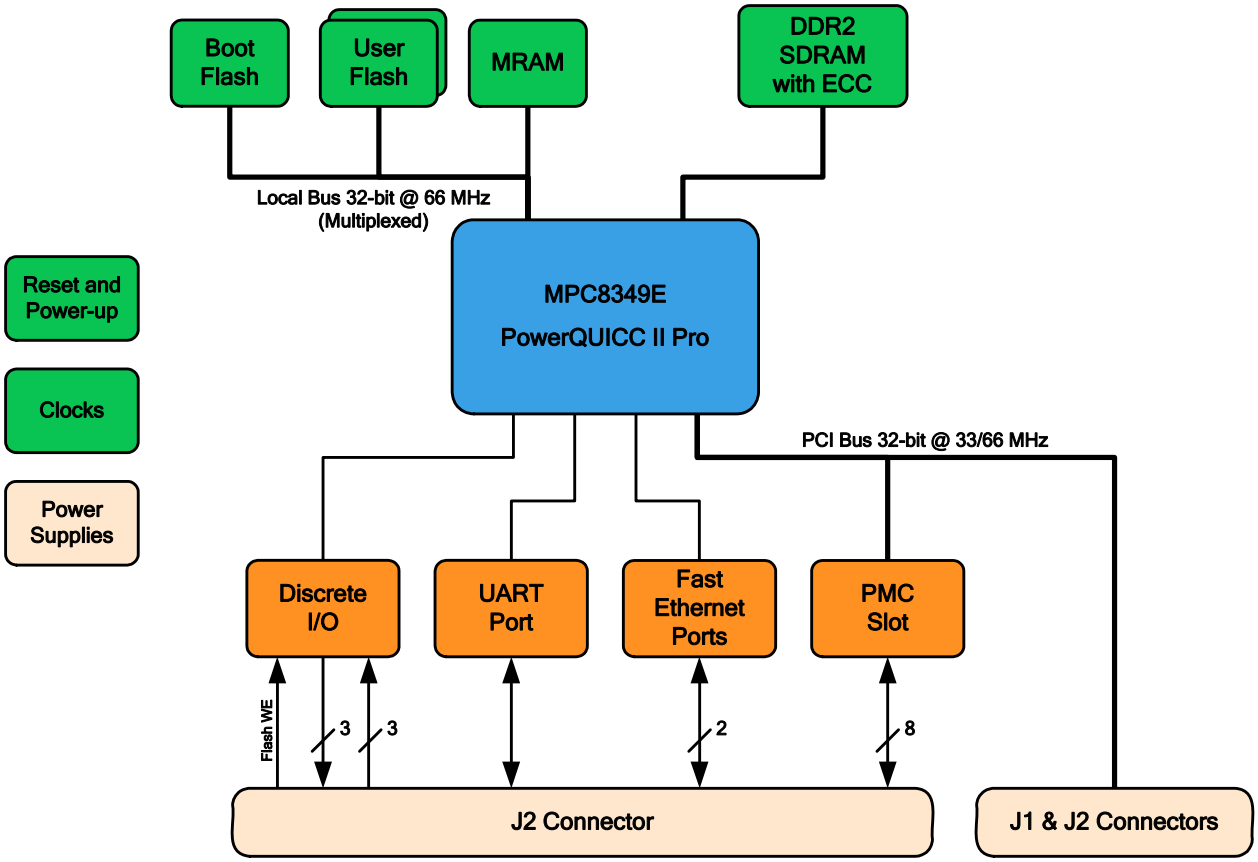
Aitech's C920 3U CompactPCI SBC is an ultra low power, high performance PowerPC® platform packed into a small 3U form factor. Based on Freescale's MPC8349E PowerQUICC™ II Pro controller the C920 SBC features a combination of the advanced e300 PowerPC core and multiple I/O interfaces integrated into a single low power device.

The C920 implements high capacity high-speed memory arrays to support the processor capabilities and user application needs. Memory resources include 256 MB fast DDR2 266 (Double Data Rate II) SDRAM with ECC protection. Non-volatile memory arrays include 128 MB Boot Flash, 384 MB User Flash memory for application software, mass storage, etc., and 512 kB MRAM (NVRAM) for user/application specific parameter storage.

The C920 onboard I/O capabilities include two Fast Ethernet ports, one UART serial communication port and up to twenty one general-purpose discrete I/O channels. To further expand its capabilities, the C920 is equipped with a standard PMC slot allowing for installation of additional modules and functionality.

The C920 may perform only as CompactPCI system slot SBC supporting up to four CompactPCI peripheral boards providing clock and arbitration services.

The C920 was designed and tested for the most rugged conduction or air-cooled environments.



Functional Description

Processor and Bus Architecture

The C920 is an ultra low power platform providing a powerful processing core supported by extensive memory resources.

Processor

The C920 features Freescale's PowerQUICC™ II Pro MPC8349E low power integrated processor. As an integrated device, multiple modules are available within it:

- e300 32-bit processor core operating at 400 MHz
- Memory controller with dedicated DDR2 SDRAM controller and local bus controller for attaching non-volatile and other asynchronous peripherals
- Two PCI ports (Bridges) 32-bit at 33/66MHz
- I/O controllers – dual TSEC (Three Speed Ethernet Controller) and dual UART
- Interconnection facilities – I^2C, SPI

Memory

The C920 is equipped with large memory arrays providing the user with extensive volatile and non-volatile memory resources, all of which are controlled through the PowerQUICC™ II Pro MPC8349E.

256 MB fast DDR2 266 (Double Data Rate II) SDRAM operating at 133 MHz are available. The DDR2 SDRAM bank is ECC protected for superior data integrity. DDR2 SDRAM resides on a dedicated 64-bit SDRAM port allowing for high data throughput.

Flash memory consists of three separate arrays:

- 128 MB Boot Flash used for firmware, system parameters and application storage,
- 384 MB User Flash for user usage (application storage, data logging, data storage, etc.), provided two arrays (128 MB + 256 MB). The 128 MB array can be used as Alternate Boot Flash. This Flash can contain a copy of the Boot Flash that will automatically replace the Boot Flash in case of boot problems.

The C920 provides a 512 kB RAM based Non-Volatile RAM (NVRAM) implemented using an MRAM technology (Magnetoresistive Random Access Memory) device. MRAM is a nonvolatile memory technology that protects data in the event of power loss and does not require periodic refreshing. The MRAM is the ideal memory solution for applications that must permanently store and retrieve critical data quickly.

Each Flash/NVRAM array is protected from inadvertent write/erase operations by discrete inputs. In order to write enable the Flash/NVRAM, jumpers must be installed on the backplane. This feature contributes to DO-254 compliance.

CompactPCI

The C920 may perform only as system slot SBC in the CompactPCI system. Performing as system slot SBC the C920 supports up to four additional peripheral cards on the PCI backplane providing them with clock signals and arbitration services.

The CompactPCI interface is utilized through one of MPC8349E's PCI bus ports. The bus supports 32-bit PCI bus operating @ up to 66 MHz and is fully compliant with PCI specification 2.3.

The C920 PCI interface supports 3.3V signaling levels only.

This same PCI bus is shared with the C920 on-board PMC slot (C920 supports a total of 5 masters on the PCI bus – four CompactPCI peripheral slots and its on-board PMC slot).

I/O Interfaces

In addition to its processing power, the C920 provides multiple I/O capabilities.

Ethernet

The C920 provides two 10/100 Mbps Ethernet ports.

The two Ethernet controllers (MAC) are integrated within the MPC8349E (TSEC) with internal 2-Kbyte transmit and 2-Kbyte receive FIFOs per channel, and DMA engines allowing high data throughput through the LAN interfaces. The TSEC engines employ RMII interconnections with the PHY devices.

Serial I/O

The C920 provides a UART port supporting RS-232/422/485 physical interfaces. The port is fully compatible with the 16450/16550 UART model.

Discrete I/O

The C920 provides six single-ended general-purpose discrete channels – three inputs and three outputs. Each input channel may be programmed to generate an interrupt on any event of level transition.

PMC Expansion

The C920 provides one IEEE 1386-2001, ANSI/VITA 20-2001 compliant PMC expansion slot for extended flexibility and integration of additional I/O to the SBC.

The PMC slot shares the same PCI bus with the C920 CompactPCI bus. The bus supports 32-bit PCI bus operating at up to 66 MHz and supports 3.3 V only PCI signaling level.

I/O Routing

All I/O interface signals are available at the C920 J2 CompactPCI rear panel connectors. PMC I/O is routed to the CompactPCI J2 connector. Some PMC I/O are shared with on-board I/O interfaces.

Timers

The MPC8348E device includes four 32-bit (or eight 16-bit) timers/counters providing high-resolution timing functionality as well as chaining for long interval counting applications.

The MPC8349E includes a Real-Time Clock (RTC) for time and date keeping. The RTC is suitable for time stamping or time and calendar generation. It can maintain a one-second count which is unique over a period of approximately 136 years.

The C920 features a programmable watchdog timer integrated in the MPC8349E. The watchdog generates a timeout event if not serviced before the programmed time interval expires.

The watchdog timer may be set to generate a non-maskable interrupt or reset the SBC.

Certifiability

Designed without FPGA or other programmable devices, the C920 is ideal for safety critical applications requiring DO-254/DO-178 certifiability.

Software

The C920 is available with complete BSPs (Board Support Packages) for the Wind River VxWorks and QNX RTOSs.

The BSP packages include drivers for all on-board resources, allowing the user to take full advantage of all C920 features.

Other RTOSs may be supported on request

A JTAG/COP interface to the processor is provided for debugging and development purposes.

Mechanical Features

The C920 is available in both air-cooled and conduction-cooled mechanical formats. Both are single slot 3U modules.

The C920 in the conduction-cooled variant includes an integral custom metal frame providing excellent rigidity and shock resistance. The frame also provides an array of stiffeners to support rugged PMC modules.

Dimensions and Form Factor

- Air-cooled: per PICMG 2.0 R3.0
- Conduction cooled: per ANSI/VITA 30-1991

Weight

- Air-cooled: < 250 g (0.56 lbs)
- Conduction cooled: < 300 g (0.67 lbs)

Thermal Management

The C920 is an ultra low power SBC presenting minimal thermal issues. However to further enhance the C920 design the custom metal heatsink allows for optimal heat dissipation and relief off the SBC.

Power Requirements

The C920 is powered from the CompactPCI backplane and generates its specific power supplies on-board.

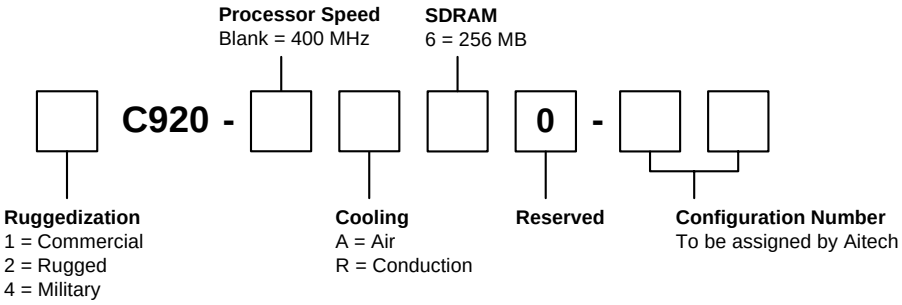
Power consumption for a fully populated C920 (no PMC installed):

		Typ	Max
3.3	Vdc	0.75 A	1.51 A
5	Vdc	0 A	0 A
±12	Vdc	0 A	0 A
Power		2.5 W	5.0 W

Environmental Features

Please Refer to the Aitech Ruggedization Datasheet.

Ordering Information



Example: 2C920-R60-00

For more information about the C920 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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