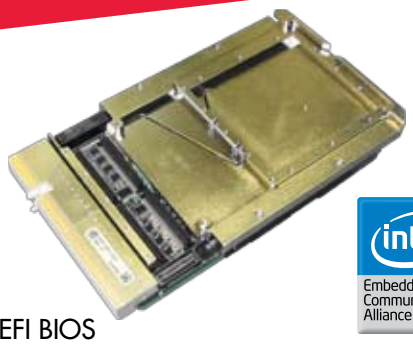
Data Sheet

SCP/DCP-1201

Dual Core™ Intel® CompactPCI Single Board Computer



Features

- Intel® Core™2 Duo
  - 1.5GHz @ 17W (ultra low voltage)
  - 667MHz (5.3GB/s) FSB
  - 64KB L1 cache per core
  - 4MB shared L2 advanced transfer cache
  - 1GB of DDR2 SDRAM with ECC
  - 3.2GB/s memory bandwidth
  - Intel MMX, SSE, SSE2, and SSE3 SIMD instruction support
- High-performance Intel 7520 MCH
- 6300 ESB ICH
- 16Mb (2MB) Firmware hub
  - Hardware FLASH write protection jumper
- 1GB on-board FLASH drive
- Two 10/100/1000 Ethernet interfaces
- 3U CompactPCI 33/66MHz interface
- Two RS-232 Async COM ports
- Three RS-422 Async COM ports
- One PMC site, 64-bit/66MHz PCIx
- Optimized for conduction-cooled PMCs
- Capacitor backed real time clock
- Additional I/O Options include:
  - 3x USB ports
  - 3x RS-422 COM ports
  - 1x SATA port
  - 5x GPIO lines
- State-of-the-art EFI BIOS
- Window®, Linux®, VxWorks®6.x BSPs, LynxOS SE, Solaris 10 and WindRiver™ GPP Linux® 2.6
- World class Longevity of Supply and Longevity or Repair supplied by the Life Cycle support group
- On-board temperature sensors
- Basecard uses 3.3/5V from backplane 3.3V, 5V, and +/-12V are routed to the PMC sites
- Occupies dual 1.6" slot in air-cooled configurations
- Occupies single .8" pitch slot in air- and conduction-cooled configurations
- Optimized conduction cooling with TherMax™ thermal frame and direct processor shunts
- EFI BIOS supports Ethernet and USB storage devices
  - Debug monitor with system exerciser functions in BIOS
  - Power-up BIT (PBIT)
  - Embedded non-volatile memory programmer (NVMP) for BIOS updates
- VxWorks®/Tornado™ integration:
  - Tornado 2.2.x and Workbench 2.0
  - Full suite of drivers for hardware features
  - Run-time BIT libraries for Initiated and Continuous BIT
- Intel supplied DSP libraries for Windows and Linux
- Available in a range of ruggedization levels, both air- and conduction-cooled

Please note:
All hardware features may not be supported by all operating systems. Contact Curtiss-Wright for details and release schedules.

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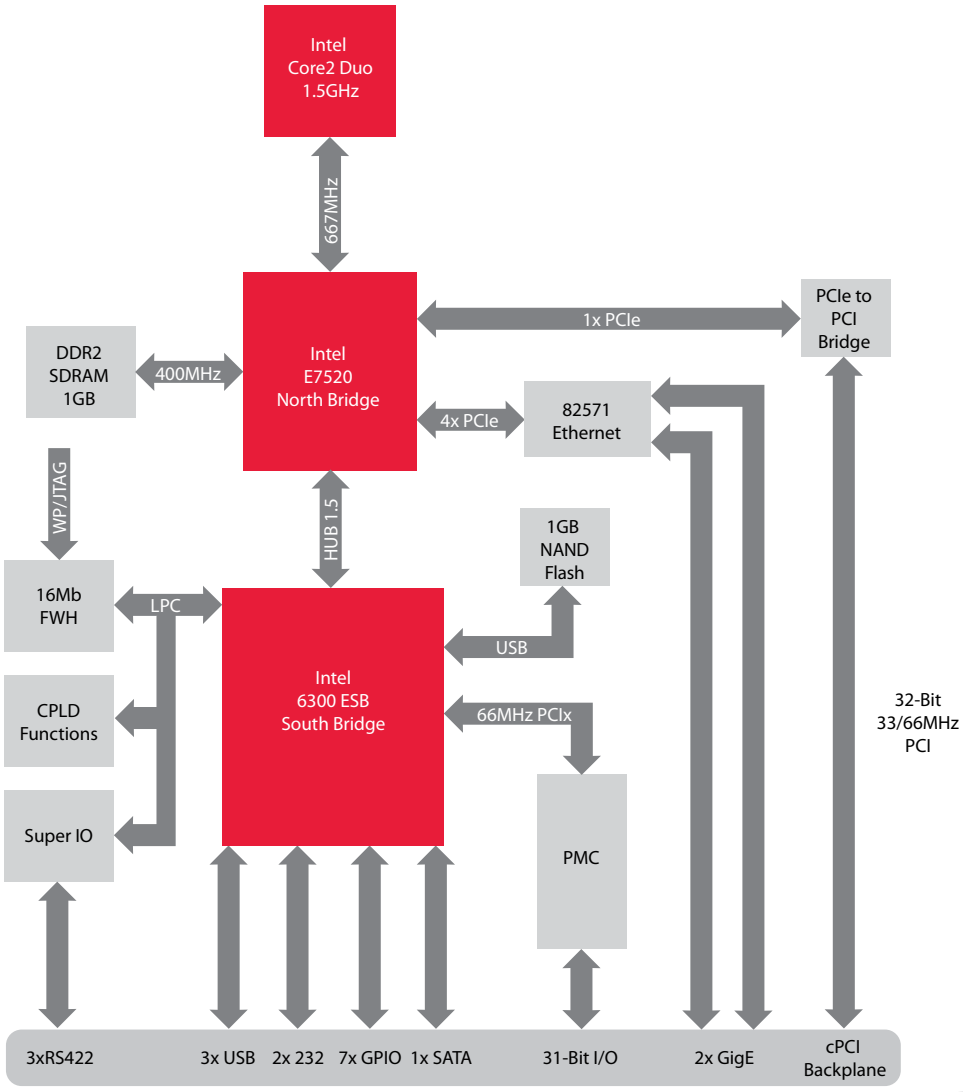
Overview

The S/DCP-1201 from Curtiss-Wright Controls supports one Intel® Core™2 Duo. With a Core2 Duo processor the 1201 acts as a dual CPU 3U CompactPCI (cPCI) Single Board Computer (SBC) built to meet the diverse needs of the evolving embedded community. With the addition of a SATA or USB hard drive, the SCP-1201 becomes a full-featured computing platform. In addition to running Windows XPe™, the SCP-1201 runs Linux 2.6™ operating system. Support for VxWorks 6.x™ for real-time applications is in development.

The 1201 is designed for rugged and benign air-cooled and conduction-cooled systems. It has support for a clock calendar and NVRAM from a system supplied battery backup and/or on-board capacitor. A user programmable operating frequency allows dynamic, user controlled power consumption adjustment.

The 1201 supports several rear I/O configurations. The 1201 is designed for embedded systems concerned with performance per watt. It also supports those users that desire the Windows XPe™ operating system for legacy, driver, or development reasons.

Figure 1: SCP/DCP-1201 Flow-through Architecture



Powerful Intel Server Architecture

The SCP/DCP-1201 was designed around Intel's state-of-the-art Core2 Duo processors and the high-performance 7520 Northbridge Memory Controller (MCH) and the Intel 6300ESB Southbridge (ICH). These components were specifically designed for server class applications and provide the ultimate in performance. The 7520 Northbridge supports the following features:

- 667MHz Front Side Bus (FSB) which provides 5.3GB/s of data transfer performance between the memory controller and CPUs
- Single 400MHz DDR2 memory bus provides 3.2GB/s of memory bandwidth
- Two PCI Express® (PCIe) links provide high full-duplex I/O bandwidth (up to 1GB/s in each direction)

Careful attention was paid to the flow-through I/O design in the 1201 architecture. Data can be input from the PMC, written to memory, processed by the Dual Core CPU and output to other boards in the chassis, maximizing the I/O and memory bandwidth of all components involved.

Hardware enforced cache coherency, read prefetching, write posting and many other features built into the Intel 7520 MCH provide world class throughput for I/O and processor intensive applications. Applications requiring maximum sustained throughput are ideally suited to this single board computer.

The SCP/DCP-1201 has a rich set of I/O capabilities as well. An Intel 6300ESB Southbridge combined with a dual channel GigaBit Ethernet controller, and a super I/O chip are all present in the design. Various I/O modes provide access to the following capabilities:

- 1x Serial ATA port (1.0)
- 2x RS-232 Async Ports
- 5x GPIO
- 2x GigaBit Ethernet ports
- 3x RS-422 Async ports
- 1x PMC Site
- 3x USB ports
- 1x On-board USB FLASH

Power Consumption and CPU Tuning

For applications requiring ultra low power consumption, the SCP/DCP-1201 comes with a configurable BIOS capable of turning off one of the processing cores and providing the ability to adjust the processor core speed. In low power consumption modes, the 1201 draws *less than 20W*.

Aside from the ability of parking one processor core, the BIOS for the SCP/DCP-1201 is capable of setting the processor clock speed at slower frequencies to save power. The default setting is full speed at 1.5GHz, however the 1201 processor can also be set to a medium speed of 1.33GHz or a slow speed of 1.0GHz. The following table summarizes the power requirements of the Core2 Duo in different speed settings and parked CPU core modes.

Table 1: Power requirements of the Core2 Duo

S1201 with Intel Core2Duo running @ 1.5GHz (+/-12V rails - no power draw)	5V Rail Current (A)	3.3V Rail Current (A)	Power (W)
Dual Core / 1.5GHz / TDP, 2xGbE 500Mbps xfer	6.2	0.6	33.7
Single Core / 1.5GHz / TDP, 2xGbE 500Mbps xfer	5.0	0.6	27.5
Dual Core / 1.33GHz / TDP, 2xGbE 500Mbps xfer	5.7	0.6	31.3
Single Core / 1.33GHz / TDP, 2xGbE 500Mbps xfer	4.8	0.6	26.5
Dual Core / 1.0GHz / TDP, 2xGbE 500Mbps xfer	5.0	0.6	27.5
Single Core / 1.0GHz / TDP, 2xGbE 500Mbps xfer	4.4	0.6	24.7

Notes:
1. TDP: Thermal Design Power – Set by Intel at 85%

High Performance PMC support

One PMC site complements the flow-through architecture of the SCP/DCP-1201. The PMC site shown in the 1201 block diagram (Figure 1) supports PCIx @ 64-bits/66MHz with 3.3V signaling only.

Due to the component density and connector placement on the SCP/DCP-1201 there are some potential issues with the PMC keep-out area of the single PMC site. These issues are only likely to arise for air-cooled PMCs. Memory components on the top side of the board may interfere with PMC front I/O connectors that require the full keep-out area. The interfering memory components are approximately .5mm thick. All versions of the SCP/DCP-1201 have memory parts mounted in the keep-out area of the PMC site.

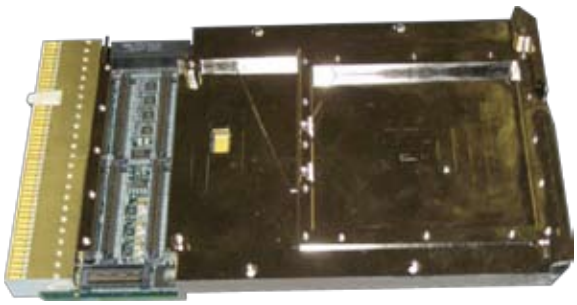
Figure 2: SCP-1201-4223 Air-cooled 2-slot

Designed for Harsh Environments

To cost-effectively address a diverse range of military/aerospace applications, the SCP/DCP-1201 is available in a range of ruggedization levels, both air- and conduction-cooled.

All versions are functionally identical, with air-cooled versions (SCP) available in Curtiss-Wright ruggedization levels 0 and 100, and a conduction-cooled version (DCP) in level 200. Air-cooled level 200 is available on a special order basis. Curtiss-Wright's standard ruggedization guidelines define the environmental tolerance of each ruggedization level (see Curtiss-Wright's Ruggedization Guidelines fact sheet for more information).

Figure 3: DCP-1201-2223 Conduction-cooled 1-slot



Enhanced Thermal Management for Conduction-Cooled Applications

For those demanding application environments that require conduction-cooling, the 1201 uses a combination of thermal management layers within the Printed Wiring Board (PWB) and an aluminum thermal frame that provides a cooling path for the PMC site and for high-power components such as the processors, caches, and bridge devices. The 1201 thermal frame employs a number of innovative design techniques to keep the temperature rise of the electronic components to a minimum, thus increasing the long-term reliability of the product:

- Direct processor thermal shunts
- Provision of both primary and secondary thermal interfaces on PMC sites
- Mid-plane thermal shunts for PMC site
- TherMax design approach
- Full-width thermal interface to back-side slot wall

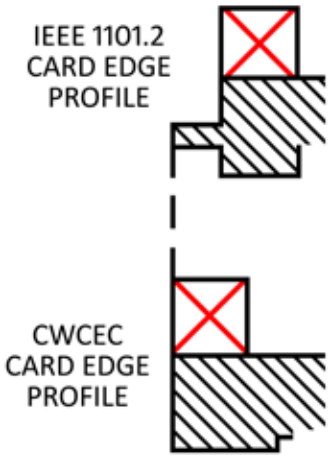
Mid-plane thermal shunts for PMCs

To optimize the conduction-cooling of high performance, high power PMC modules such as graphics or networking PMCs, the 1201 thermal frame incorporates mid-plane thermal shunts for the PMC site. High power PMCs can include a mating cooling surface on the PMC module to contact the mid-plane thermal shunt. By taking advantage of the thermal shunt, suitably designed PMC modules can significantly lower the heat rise from the 1201 card edge to the PMC components. The mid-plane thermal shunt does not impinge on the VITA-20 allowed component height.

TherMax-style thermal frame

A TherMax™ thermal frame provides an unbroken metallic path from the PMC sites and shunted components to the back-side cooling surface of the card therefore minimizing the temperature rise to these devices. In comparison, a typical thermal frame simply sits on top of the PWB and forces heat to flow through the PWB which has a high thermal resistance compared to aluminum.

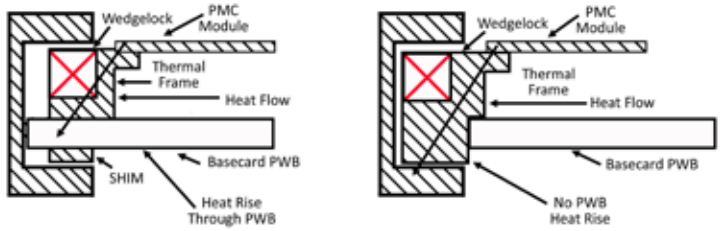
Figure 4: Deviation from 1101.2 Standard



Full-width thermal interface to back-side slot wall

To minimize the temperature rise from the mating slot wall of conduction-cooled enclosures to the back-side thermal interface region of the 1201, the 1201 thermal frame maximizes the thermal interface area by extending the frame to the full width of the card, as illustrated in Figure 5. This deviation from the IEEE 1101.2 standard, which calls for the thermal frame to be notched for compatibility with card guides in standard air-cooled chassis, has the benefit of lower card operating temperatures and increased long-term reliability. During test and integration activities where it may be desirable to install a conduction-cooled 1201 into an air-cooled card-cage, this can normally be accomplished simply by removing the card guides

Figure 5: TherMax Style Thermal Frame



Built in Self Test (BIT)

Curtiss-Wright's COTS Continuum Initiative defines common software and user interfaces for all Curtiss-Wright products. The SCP/DCP-1201 is designed with a rich set of Built-In-Test (BIT) functions both at the BIOS and operating system levels.

Ordering Information

The SCP/DCP-1201 is available in both air- and conduction-cooled variants. There are two air-cooled ruggedization levels (L0, and L100) and one conduction-cooled ruggedization level (L200). All ruggedization levels greater than L0 have an acrylic conformal coating. The SCP/DCP-1201 adheres to the standard Curtiss-Wright ruggedization standards below:



Table 2: Ruggedization

	Air-cooled		Conduction-cooled
	Level 0	Level 100	Level 200
Operating Temperature	0°C - 50°C (Note 4)	-40°C - 71°C (Note 4)	-40°C - 85°C (Note 6)
Non-Operating Temperature (Storage)	-40°C - 85°C	-55°C - 125°C	-55°C - 125°C
Operating Humidity (Non-condensing)	0 - 95%	0 - 100%	0 - 100%
Non-Operating Humidity (Storage, condensing)	0 - 95%	0 - 100%	0 - 100%
Vibration Sine (Note 1)	2g peak 15-2k Hz	10g peak 15-2k Hz	10g peak 15-2k Hz
Vibration Random (Note 2)	$0.01g^2$/Hz 15-2k Hz	$0.04g^2$/Hz 15-2k Hz	$0.1g^2$/Hz 15-2k Hz
Shock (Note 3)	20g peak	30g peak	40g peak
Conformal Coat (Note 5)	No	Yes	Yes
2 Level Maintenance Ready	-	-	No

Notes:
1. Sine vibration based on a sine sweep duration of 10 minutes per axis in each of three mutually perpendicular axes.
2. May be displacement limited from 15 to 44Hz, depending on specific test equipment.
3. Random vibration 60 minutes per axis, in each of three mutually perpendicular axes.
4. Three hits in each axis, both directions, 1/2 sine and saw tooth. Total 36 hits.
5. Standard air-flow is 8 cfm at sea level. Some higher-powered products may require additional airflow. Consult the factory for details.
6. Conformal coating type is manufacturing site-specific. Please consult the factory for details.

Table 3: Specifications

Power	<34 Watts maximum, 10 Watts standby, 5V and 3.3V Power required
PMC	3.3V I/O
Weight	340 grams (est)

Warranty

This product has a one year warranty.

Contact Information

To find your appropriate sales representative, please visit:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

For technical support, please visit:

Website: www.cwcembedded.com/support1

Email: support1@cwcembedded.com

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