

## Intel® Core™ 2 Duo Processor Single Board Computer

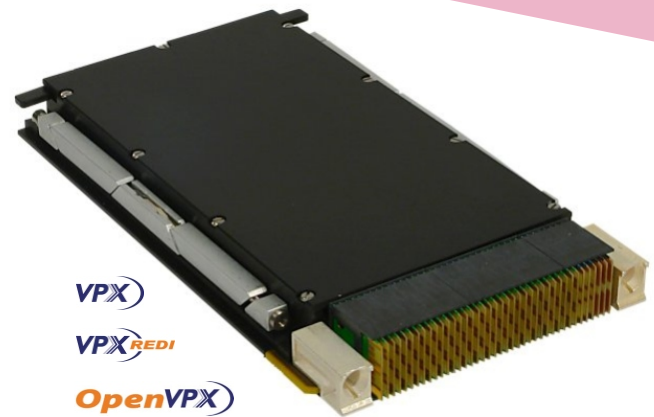


### APPLICATIONS

The TR 501/36x-RCS is a PC-compatible high performance 3U VPX-REDI processor board supporting the 1.86 GHz Intel® Core™ 2 processor, and the Intel® GS45 mobile class chipset with up to 8 Gbytes of DDR3-1066 SDRAM. The TR 501/36x-RCS features an XMC site and a range of I/O interfaces including two SATA300 channels, dual 1000 Base-BX, RS-232/422/485 and USB interfaces. The board provides a flexible PCI Express® (PCIe) backplane fabric interface that can be configured in several ways from 8 x1 PCIe ports to a 1 x8 PCIe port

### HIGHLIGHTS

- 3U VPX-REDI (VITA 48.0) RCS-Series processor board:
  - conduction-cooled to VITA 48.2
  - conformally coated
  - -40°C to +85°C operating temperature
  - VPX-REDI Type 1 Two Level Maintenance
  - 3U VPX-REDI 0.85 inch slot
- 3U VPX (VITA 46.0) N-Series single board computer:
  - rear plug compatible with the VPX-REDI RCS-Series
  - air-cooled
  - 0°C to +55°C operating temperature
  - use in commercial (non-rugged) applications
  - 3U VPX 0.8 inch slot
  - optional front panel console module available
  - optional rear transition module available
- I/O interfaces compatible with OpenVPX module profiles
- 1.86 GHz Intel® Core™ 2 Duo processor:
  - dual-core processor
  - 1066MHz Front Side Bus
  - 6 Mbytes last-level cache shared between cores
  - Intel® 64 Technology (64-bit computing)



making it suitable for use in both distributed systems and centralized switching systems as defined in OpenVPX (VITA 65). The TR 501/36x-RCS is a VPX-REDI Type 1 Two Level Maintenance conduction-cooled board and is suitable for a range of applications within industrial control, transport, aerospace, security and defense applications. For non-rugged applications a VPX version, the TR 501/36x, is available. To simplify integration many industry standard operating systems are supported.

- Up to 8 Gbytes DDR3-1066 SDRAM
- Built-In Test (BIT) supports:
  - Power-on BIT, Initiated BIT, Continuous BIT
- Configurable PCI Express® (PCIe) fabric interface supports:
  - 8 x1 PCIe ports, 2 x4 PCIe ports, 1 x4 + 4 x1 PCIe ports or a 1 x8 PCIe port
  - compatible with OpenVPX module profiles
  - option for non-transparent link 1
- XMC module interface with rear I/O:
  - XMC module interface (x4 PCI Express®)
  - XMC rear I/O P2w1-X24s+X8d+X12d
- 2 x 1000Mbps IEEE802.3z SERDES (1000 Base-BX) ports:
  - or option for 1 x SERDES plus 1 x Gigabit Ethernet ports
- 2 x SATA300, 1 x RS-232/422/485 and 2 x USB 2.0 interfaces
- Analog graphics interface
- Watchdog and long duration timers
- Optional N-Series front panel console module allows extra I/O:
  - 1 x USB 2.0, 1 x RS232, 1 x 10/100Mbps Ethernet, 1 x VGA
- Support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris®

## Ruggedized Single Board Computer

- VPX-REDI SBC, Intel® Core™ 2 Duo processor
- conduction-cooled to VITA 48.2
- conformally coated
- compatible with OpenVPX (VITA 65) module profiles
- air-cooled VPX version, also available with:
  - optional front panel console module via Console Interface Connector on the SBC
  - optional rear panel transition module

## Central Processor

- 1.86 GHz Intel® Core™ 2 Duo SL9400:-
  - 45nm process technology
  - 1066 MHz Front Side Bus
  - 6 Mbytes of shared Last-Level on-die cache
  - Intel 64 technology (64-bit computing)
- utilizes Intel® GS45 mobile class chipset with Intel ICH9M-E I/O Controller Hub
- provision for XDP debug port

## SDRAM

- supports up to 8 Gbytes DDR3-1066 SDRAM:-
  - up to 8 Gbyte soldered
  - peak bandwidth of 16 Gbytes/s
  - dual channel architecture
- accessible from processor or VPX bus

## XMC Interface

- 1 x XMC site, in a single VPX slot (VITA 42.0):-
  - XMC (Switched Mezzanine Card) interface supported via a x4 PCI Express (VITA 42.3)
  - rear I/O P2w1-X24s+X8d+X12d (VITA 46.9)
  - +5V powered

## Mass Storage Interfaces

- 2 x SATA300 interfaces:-
  - transfer rate up to 300 Mbytes/s
  - accessible via P1
- option for on-board 4 Gbytes EIDE NAND Flash Disk Module (N-Series or RCS-Series)

## Ethernet Interfaces

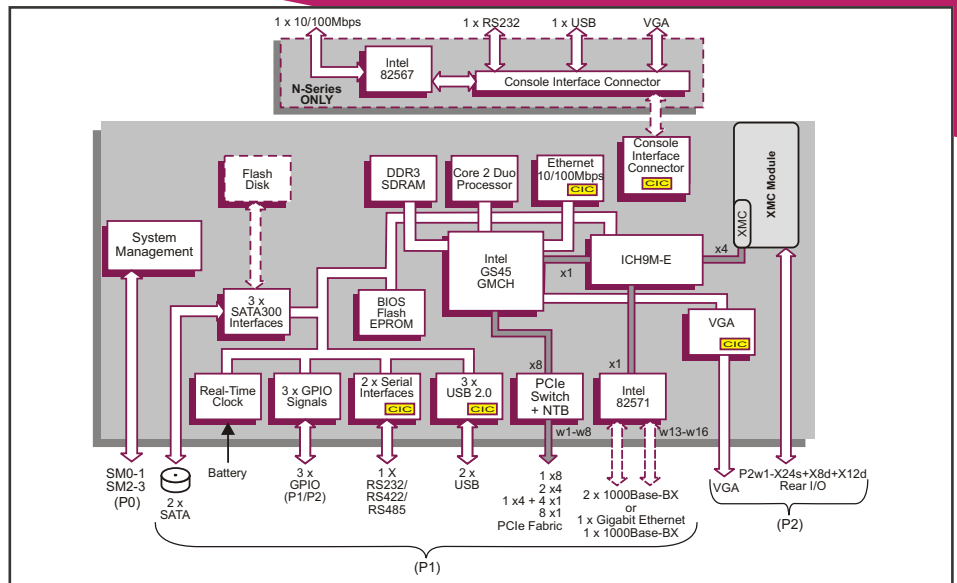
- 2 x 1000Mbps IEEE802.3z SERDES (1000 Base-BX) ports via P1:-
  - or software switchable option to 1 x SERDES plus 1 x Gigabit Ethernet ports
- implemented by Intel® 82571
- optional 10 Base-T, 100 Base-TX Ethernet:-
  - implemented using MAC in ICH9M-E and Intel 82567 PHY
  - signals via Console Interface Connector
  - magnetics and RJ45 connector on front panel console module

## Graphics Interface

- implemented by Intel GS45
- analog VGA accessed via P2 rear I/O:-
  - resolutions up to 2048 x 1536 @ 16M colors
  - signals also via Console Interface Connector
- support for Microsoft® DirectX 10
- support for OpenGL 2.0 under Windows® and Linux®

## Serial Interfaces

- 1 x RS-232/422/485 channel accessed via P1:-
  - supporting Tx/Rx. CTS/RTS in RS-232 only
  - support Transmit Control in RS-485 mode
- optional 1 x RS-232 channel:-
  - signals via Console Interface Connector
- 16550 compatible UARTs



## VPX Backplane Interface

- P0, P1 and P2 support OpenVPX configuration
- configurable PCI Express® (PCIe) fabric interface supports:-
  - 8 x1 PCIe ports, 2 x4 PCIe ports, 1 x4 + 4 x1 PCIe ports, or a 1 x8 PCIe port
  - compatible with OpenVPX module profiles
  - PCI Express Gen 1 and Gen 2
- optional non-transparent link 1 to support multi-processing configuration
- 4 channel DMA engine for fast data block moves

## Other Peripheral Interfaces

- PC Real Time Clock (Year 2000 compliant)
- long duration timer; watchdog timer
- CPU temperature monitor; voltages monitor; accessed via System Management interface
- 2 x USB 2.0 interfaces accessed via P1
- optional 1 x USB 2.0 interface:-
  - signals via Console Interface Connector
- 3 x GPIO signals via P1 and P2

## Software support

- support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® Server 2008, QNX®, Solaris® and VxWorks®

## Built-In Test (BIT) Support

- Power-on BIT (PBIT)
- Initiated BIT (IBIT)
- Continuous BIT (CBIT)

## Firmware Support

- Phoenix™ TrustedCore BIOS
- comprehensive Power-On Self-Test (POST)
- LAN boot firmware included

## Flash EPROM

- 4 Mbytes of BIOS SPI Flash EPROM

## System Management

- System Management interface:-
  - implements the SM0-1 and SM2-3 interfaces
- on-board System Management Controller
- supports 8 Kbytes of non-volatile memory

## Electrical Specification

- typical current figures (4 Gbytes SDRAM)
  - +5V@ TBD A, voltage +5% / -3%
  - +3.3V@ TBD A, voltage +5% / -3%
  - +12V AUX and -12V AUX routed to the XMC site

## Safety

- PCB (PWB) manufactured with flammability rating of 94V-0

## Environmental Specification

- operating temperature, VPX N-Series:-
  - VITA 47 Class AC1
  - useful for bench development
- storage temperature, VPX N-Series:-
  - VITA 47 Class C1
- operating altitude, VPX N-Series: 0 to 15,000 feet (0 to 4,572 meters)
- operating temperature, VPX-REDI RCS-Series:-
  - VITA 47 Class CC4
  - conduction-cooled (VITA 48.2)
- storage temperature, VPX-REDI RCS-Series:-
  - VITA 47 Class C4
- operating altitude, VPX-REDI RCS-Series: -1,000 to 50,000 feet (-305 to 15,240 meters)
- 5% to 95% Relative Humidity, non condensing (operating/storage for N-Series and RCS-Series)

## Mechanical Specification

- 3U VPX form-factor (VITA 46.0, VITA 48.0): 3.9 inches x 6.3 inches (100mm x 160mm)
- slot widths:-
  - 0.8 inches VPX N-Series (VITA 46.0)
  - 0.85 inches VPX-REDI RCS-Series (VITA 48.0)
- connectors to VITA 46.0 for P0, P1 and P2
- REDI Type 1 Two Level Maintenance (VITA 48.2)
- operating mechanical, VPX N-Series:-
  - shock - VITA 47 Class OS1
  - vibration - VITA 47 Class V1
- operating mechanical, VPX-REDI RCS-Series:-
  - shock - VITA 47 Class OS2
  - vibration - VITA 47 Class V3

## ORDERING INFORMATION

### Order Number Product Description (Hardware)

TR 501/362-1y	1.86 GHz Core 2 Duo processor SL9400, 3U VPX, N-Series
TR 501/362-1yRCS	1.86 GHz Core 2 Duo processor SL9400, 3U VPX-REDI Type 1, RCS-Series

### where y = SDRAM

1	reserved
2	4 Gbytes SDRAM
3	8 Gbytes SDRAM

AD TR1/002-20	3U VPX Rear Transition Module (optional, for use with TR 501/362-1y 3U VPX, N-Series)
AD EN1/001-10	Front Panel Console Module (optional VPX Console Breakout board for use with TR 501/362-1y 3U VPX, N-Series)
AD 230/002-04	SATA to EIDE Flash Disk Module, N-Series - Single drive 4 Gbytes (optional, for use with TR 501/362-1y 3U VPX, N-Series)
AD 230/002-04RC	SATA to EIDE Flash Disk Module, RC-Series - Single drive 4 Gbytes (optional, for use with TR 501/362-1yRCS 3U VPX-REDI, RCS-Series)

For further information please contact your local sales office.