

## Intel® Atom™ Processor Single Board Computer



### APPLICATIONS

The TR A40/30x-RCS is a PC-compatible low power 3U VPX-REDI processor board supporting the 1.6 GHz Intel® Atom™ processor Z530. It utilizes the Intel® System Controller Hub US15W to support up to 2 Gbytes of DDR2 SDRAM. The TR A40/30x-RCS features an XMC site and a range of I/O interfaces including two SATA300 channels, dual Gigabit Ethernet, USB, CANbus, RS-232/422/485 and HD audio. The board provides a flexible PCI Express® (PCIe) backplane fabric interface that can be configured in several ways from 8 x1 PCIe

### 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 rear transition module available
- I/O interfaces compatible with OpenVPX module profiles
- 1.6 GHz Intel® Atom™ processor:
  - 512 Kbytes L2 cache
  - Intel® Hyper-Threading Technology supports 2 execution threads
  - Intel® Virtualization Technology
- Up to 2 Gbytes of soldered DDR2-533 SDRAM



ports to 2 x4 PCIe ports making it suitable for use in both distributed systems and centralized switching systems as defined in OpenVPX (VITA 65). The TR A40/30x-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, security, aerospace and defense applications. For non-rugged applications a VPX version, the TR A40/30x, is available. To simplify integration many industry standard operating systems are supported.

- Power consumption typically less than 10 Watts
- Built-In Test (BIT) supports:
  - Power-on BIT, Initiated BIT, Continuous BIT
- Configurable PCI Express® (PCIe) fabric interface supports:
  - 8 x1 PCIe ports, 1 x4 and 4 x1 PCIe ports, or 2 x4 PCIe ports
  - 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 P2w7-X8d+X12d
- 2 x 10/100/1000Mbps Ethernet interfaces or 2 x 1000Mbps IEEE802.3z SERDES (1000 Base-BX) ports
- 2 x SATA300, 2 x RS-232/422/485, 2 x USB 2.0 interfaces
- Intel® High Definition Audio interface
- DVI-D graphics interface
- High speed CANbus controller interface
- Watchdog and long duration timers
- Support for Linux®, Windows® XP, Windows® XP Embedded, QNX® and VxWorks®

## Ruggedized Single Board Computer

- VPX-REDI SBC, Intel® Atom™ processor
- conduction-cooled (VITA 48.2)
- conformally coated
- compatible with OpenVPX (VITA 65) module profiles
- power consumption less than 10 Watts typical
- air-cooled VPX version also available:-  
→ optional rear transition module available

## Central Processor

- 1.6 GHz Intel® Atom™ processor Z530:-  
→ 512 Kbytes of secondary (L2) on-die cache  
→ 533 MHz Front Side Bus  
→ Intel Hyper-Threading Technology supporting 2 execution threads  
→ Intel® Virtualization Technology
- uses Small Form Factor packaging (micro Flip-Chip Ball Grid Array) package
- utilizes Intel® System Controller Hub US15W

## SDRAM

- up to 2 Gbytes soldered DDR2-533 SDRAM
- 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 P2w7-X8d+X12d (VITA 46.9)  
→ +5V powered

## Mass Storage Interfaces

- 2 x SATA300 interfaces:-  
→ transfer rate up to 300 Mbytes/s  
→ accessible via P1
- 1 x EIDE interface supports an on-board 4 Gbytes NAND Flash Disk

## Ethernet Interfaces

- 2 x channels supporting via P1:-  
→ 10 Base-T, 100 Base-TX, 1000 Base-T  
→ implemented by Intel® 82576
- or optionally supported as dual 1000Mbps IEEE802.3z SERDES (1000 Base-BX) ports

## Stereo Audio

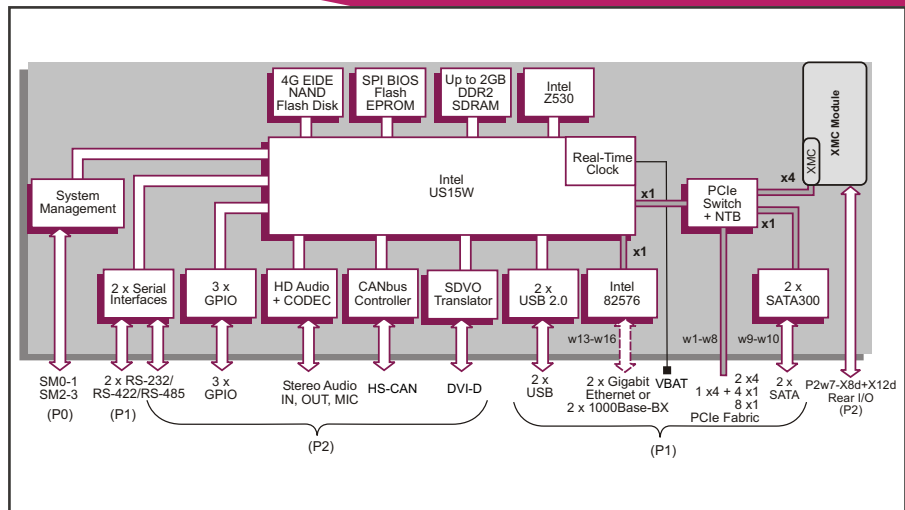
- Intel® High Definition Audio interface via P2:-  
→ includes Stereo Audio Codec  
→ stereo input  
→ stereo output  
→ microphone input

## Graphics Interface

- implemented by the Intel® US15W SCH
- DVI-D accessed via P2:-  
→ resolutions up to 1600 x 1200 @ 16M colors

## Serial Interfaces

- 1 x RS232/422/485 channel accessed via P2:-  
→ supporting CTS, RTS, DSR, DTR, DCD and RI
- 1 x RS-232/422/485 channel accessed via P1:-  
→ supporting RTS and CTS in RS232 mode
- both support Transmit Control in RS485 mode
- 16550 compatible UARTs



## VPX Backplane Interface

- P0, P1 and P2 support OpenVPX configuration
- configurable PCI Express® (PCIe) fabric interface supports:-  
→ 8 x1 PCIe ports, 1 x4 and 4 x1 PCIe ports, or 2 x4 PCIe ports  
→ 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
- 3 x GPIO signals via P2
- High Speed CANbus controller via P2

## Software Support

- supports Linux®, Windows® XP, Windows® XP Embedded, QNX®, 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

- 2 Mbytes of BIOS 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

- power consumption less than 10 Watts typical
- typical current figures (1 Gbyte 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)	where x = I/O interfaces	where y = SDRAM
TR A40/303-xy	1.6 GHz Atom processor Z530, 3U VPX, N-Series	1 - dual Gigabit Ethernet via P1: wafers 13 to 16	1 - 1 Gbyte SDRAM
TR A40/303-xyRCS	1.6 GHz Atom processor Z530, 3U VPX-REDI, RCS-Series	2 - dual 1000Base-BX via P1: wafers 15 to 16	2 - 2 Gbytes SDRAM
AD TR1/002-10	3U VPX Rear Transition Module (optional, for use with TR A40/303-xy 3U VPX, N-Series)		

For further information please contact your local sales office.