TRL-40

E-ATX Dual Intel® Xeon® E5 Series 4U Industrial Server

User's Manual



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Revision History

Revision	Release Date	Description of Change(s)
2.00	2014/5/9	Initial release
2.01	2014/8/15	Revised Spec
2.02	2016/12/30	Revised spec, updated content

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Preface

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



Additional information, aids, and tips that help users perform tasks.



Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The ADLINK TRL-40 is a 4U industrial server supporting the Intel® Xeon® Processor E5-2600 product family in a LGA2011 package, delivering a scalable high performance platform for a wide array of industrial applications. The TRL-40 supports 32/22nm dual CPUs at up to 2.4 GHz with integrated memory controllers and Direct Media Interface (DMI) connectivity to the Intel® C604 chipset. Dual channel DDR3 1600 MHz memory is supported up to a maximum of 128 GB in eight DIMM slots.

These advanced features, coupled with integrated graphics, four PCI Express x16 slots, one PCI Express x8 slot, one PCI Express x4 slot, dual PCI Express-based Gigabit Ethernet, six SATA 6 Gb/s ports and two SATA 3Gb/s ports make the TRL-40 ideal for vision and automation control, medical, test & measurement, and telecom applications requiring a high-performance, easy-to-deploy and reliable server.


NOTE:

All measurements shown are in mm.

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1.2 Features

- 430 W x 176 H x 567 D mm (16.9 x 6.9 x 22.3")(w/o handles)
- Supports dual Intel® Xeon® Processor E5-2600 series in LGA2011 package
- Dual channel DDR3 1600 MHz memory for each CPU, up to a maximum of 128 GB in eight DIMM slots
- Four PCIe x16 slots, one PCIe x8 slot, one PCIe x4 slot
- One PCIe Mini Card slot support interface either mSATA or PCIe Gen2/USB2.0 (selected by jumper)
- 6x SATA 6 Gb/s ports (one shared with mSATA, selected by jumper)
- 2x SATA 3 Gb/s ports
- 8x USB 2.0 ports (2x onboard, 2x on front panel, 4x on rear panel)
- Two UART interfaces (1 D-sub 9 on rear I/O supports RS-232/422/485, 1 pin header supports RS-232)
- Dual Gigabit Ethernet
- Onboard pin header supports DB-Audio2 (optional accessory) with Mic-in, Line-in and Line-out
- BMC AST2300 built-in 16MB VRAM @1920x1200 resolution for VGA port
- IPMI support for Intelligent Platform Management Interface v.2.0
- AMI MegaRAC® Web GUI
- KVM/Media Redirection support
- Support for remote power-cycle, power-down, power-up and reset by NIC1
- HW monitor: +12V,+5V,+3.3V, CPU voltage, CPU/Server temperature, CPU/System fan speed
- Watchdog Timer:1-65535 seconds software programmable, can generate system reset
- RoHS compliant

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1.3 Specifications

Processor/System	
CPU	Intel® Xeon™ E5-2658, 2.1GHz, QPI 8GT/s, 20MB Cache, 32nm, 95W TDP, LGA2011(8C)
	Intel® Xeon™ E5-2648L, 1.8GHz, QPI 8GT/s, 20MB Cache, 32nm, 70W TDP, LGA2011(8C)
	Intel® Xeon™ E5-2620, 2.0GHz, QPI 7.2GT/s, 15MB Cache, 32nm, 95W TDP, LGA2011(6C)
	Intel® Xeon™ E5-2658 v2, 2.4GHz, QPI 8GT/s, 25MB Cache, 22nm, 95W TDP, LGA2011(10C)
	Intel® Xeon™ E5-2648L v2, 1.9GHz, QPI 8GT/s, 25MB Cache, 22nm, 70W TDP, LGA2011(10C)
	Intel® Xeon™ E5-2640 v2, 2.0GHz, QPI 7.2GT/s, 20MB Cache, 22nm, 95W TDP, LGA2011(8C)
	Intel® Xeon™ E5-2630 v2, 2.6GHz, QPI 7.2GT/s, 15MB Cache, 22nm, 80W TDP, LGA2011(6C)
Chipset	Intel® C604
Memory	Dual-channel DDR3 1600MHz, 8x 240-pin DIMM sockets, up to 128GB
	ECC registered DIMMs or non-ECC unbuffered DIMM support
BIOS	AMI 64Mb SPI BIOS
IPMI	ASPEED AST2300 BMC
	IPMI v.2.0
	AMI MegaRAC® web GUI.
	KVM/Media redirection support
	Support for remote power cycle, power down, power up and reset by NIC1
	HW monitor: +12V,+5V,+3.3V, CPU voltage, CPU/ motherboard temperature, CPU/system fan speed
	Watchdog timer:1-65535 sec software programmable, can generate system reset
OS	Microsoft® Windows® Server 2008 R2 64-bit
	Microsoft® Windows® 7 64-bit
	RedHat™ Enterprise Linux 6

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Power Supply	
Single	600W PS/2 single power supply 100-240VAC, 9-4A, 47-63Hz
I/O	
Serial ATA	4x Serial ATA ports with 6 Gb/s data transfer rate from Marvell 88SE9230 (SATA port from Marvell support RAID 0/1/10) 2x Serial ATA ports with 6 Gb/s data transfer rate from PCH 2x Serial ATA ports with 3 Gb/s data transfer rate from PCH (SATA port from PCH support RAID 0/1/5/10) 1x Mini PCIE full card slot support PCIe Gen2/USB or m-SATA (signal share SATA 6Gb/s port from PCH)
USB	8x USB 2.0 ports (4x rear side, 2x front side, 2x onboard pin headers)
Serial Port	1x RS-232 (pin header), 1x RS-232/422/485(rear sides connector)
Expansion Slots	Slot 1: PCI Express x16 Gen3 from CPU1 Slot 2: PCI Express x16 Gen3 from CPU1 Slot 3: PCI Express x16 Gen3 from CPU2 Slot 4: PCI Express x8 Gen3 from CPU1 Slot 5: PCI Express x16 Gen3 from CPU2 Slot 6: PCI Express x4 Gen2 from PCH (physical PCIe x8 slot)
Display	
Graphics	BMC AST2300 built-in 16MB VRAM
VGA	Dsub-15 connector, up to 1920x1200 resolution@60 Hz
Ethernet	
Controller	Dual Intel® GbE controller I210-AT (NIC0 and NIC1)
Interface	PCI Express x1 bus
Wake On LAN	Yes
Mechanical/Environmental	
Dimensions	430 W x 176 H x 567 D mm (16.9 x 6.9 x 22.3") (w/o handles)
Weight	21 kg net (46.3 lb)
Operating Temperature	0˚C to 40˚C

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Storage Temperature	-20˚C to 80˚C

Table 1-1: General Specifications


NOTE:

Model naming convention is as follows:
TRL-40-AABBCCDEFFGHHH

Where:
AA:CPU
BB:RAM
CC:HDD
D:ODD
E: Power supply
FF:OS
G: Accessory
HHH:Reserved(000)

Example:TRL-40-22080210001000
22:-Intel Xeon E5-2658 v2, 2.4GHz, QPI 8GT/s, 25MB Cache, 22nm, 95W TDP, LGA2011(10C)x2
08: ECC/REG 8Gx8
02:3.5" 1TB x2
1:slim ODD
0:600W Single
00:WO/OS
1: W/Swapbay
000: N/A.

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1.4 Block Diagram

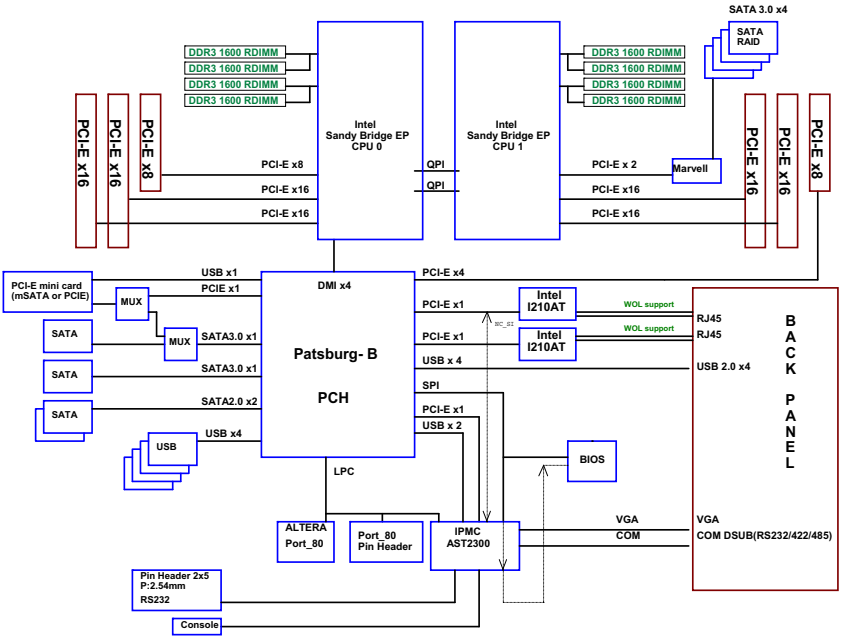


Figure 1-1: TRL-40 Block Diagram

1.5 Functional Description

Processor Support

The TRL-40 is a dual processor design based on the Intel® Xeon® Processor E5-2600 family. One LGA-2011 socket connects to an Intel C604 chipset through a 5 GHz Direct Media Interface (DMI). The system clock generator is set by the processor delivering 100MHz host clock. Dual CPUs have their own onboard VRD compliant to the VRM 12 specification. The VRD regulates+12V from the DC-DC module to generate the required CPU core power based on the CPU SVID. Each Xeon® E5-2600 processor has dual-channel memory on 4 DIMMs supporting 800,1066, 1333, and 1600 MT/s registered or un-buffered DIMM. Platform Environment Control Interface (PECI) for thermal monitoring and other functions is supported.

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Intel® C604 Chipset

The Intel® C600 Series chipset provides a connection point between various I/O components and Direct Media Interface-based processors. Eight lanes of PCI Express Gen2 ports are supported.

Dual-Channel DDR3 Memory

The TRL-40 supports dual channel DDR3 1600 MT/s ECC registered or non-ECC unbuffered DIMMs up to 128GB total system memory in eight DIMM slots.

Gigabit Ethernet

Dual Intel® GbE I210-AT Controllers are connected from the Intel® C604 chipset.

Serial ATA

The Marvell 88SE9230 is a four-port SATA RAID I/O processor that provides a two-lane PCI Express 2.0 in-terface and SATA controller functions. The 88SE9230 supplies four 6Gbps SATA ports. Intel® C604 chipset supports 2x SATA 6 Gb/s and 2x SATA 3 Gb/s ports.

1.6 Mechanical Drawings

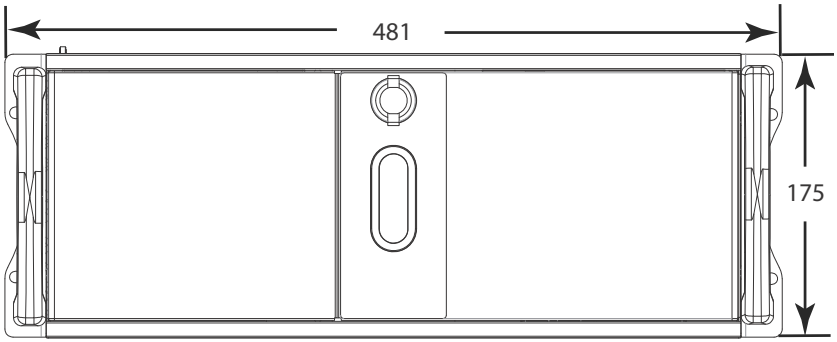


Figure 1-2: TRL-40 Front View

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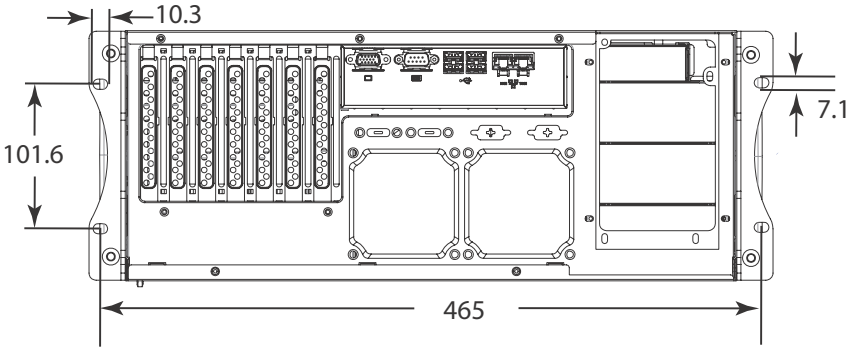


Figure 1-3: TRL-40 Rear View

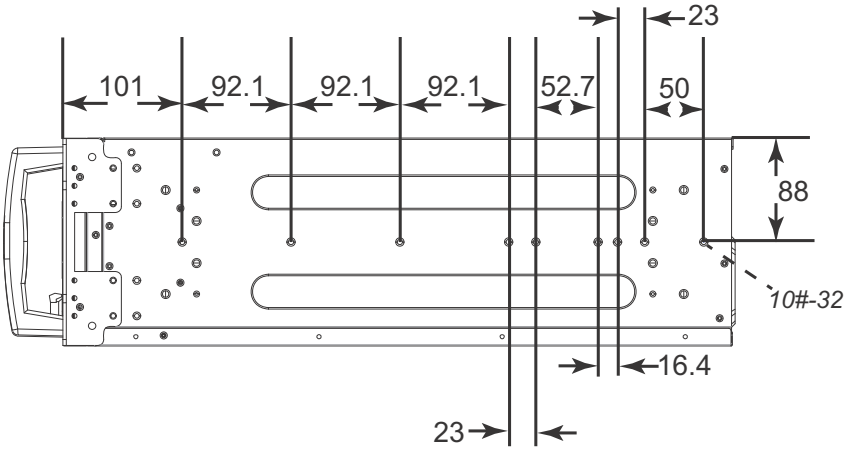


Figure 1-4: TRL-40 Right Side View

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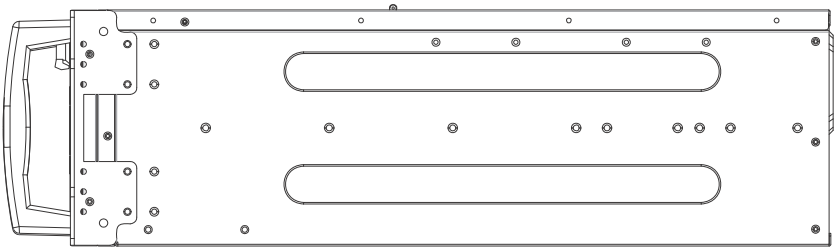


Figure 1-5: TRL-40 Left Side View

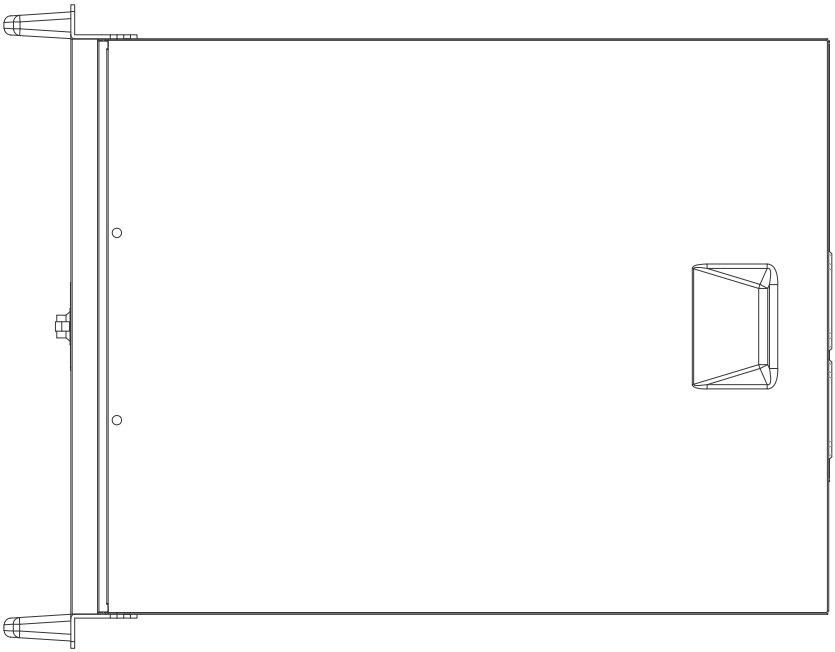


Figure 1-6: TRL-40 Top View

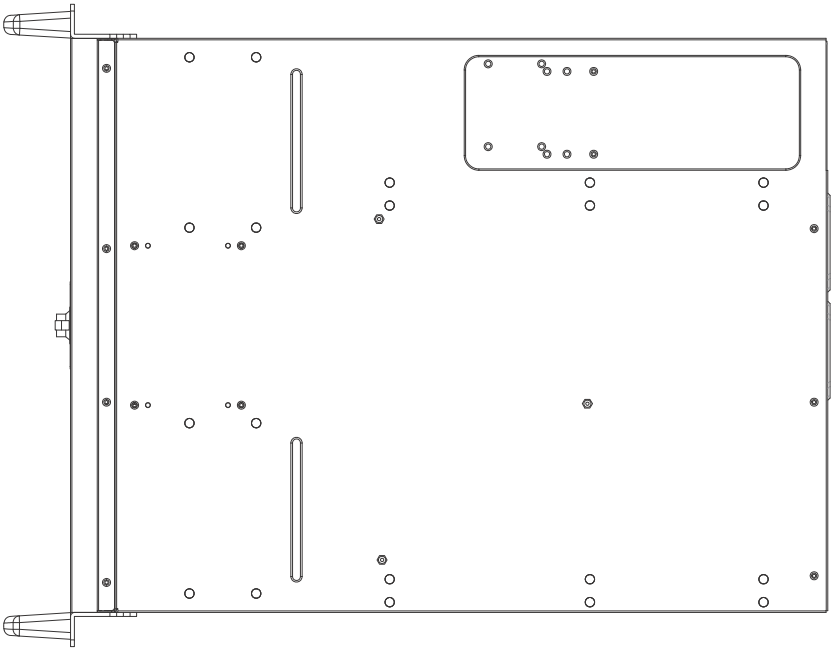


Figure 1-7: TRL-40 Underside View

WARNING:

The TRL-40 must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a grounded wrist strap when installing and/or servicing.

1.7 Rear I/O Connectors

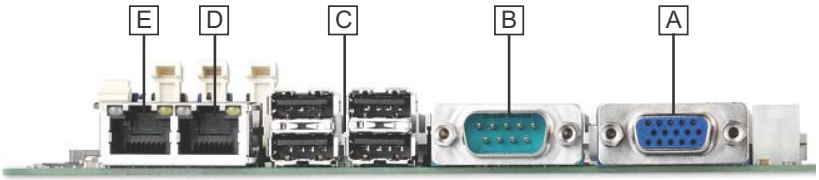


Figure 1-8: TRL-40 Rear I/O Panel

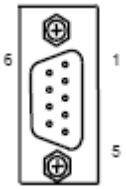
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A	VGA
B	RS-232/422/485
C	4x USB 2.0
D	NIC0
E	NIC1

Table 1-2: Rear I/O Panel Legend

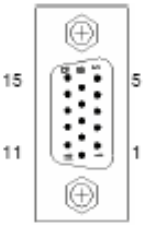
Serial Port Connector (COM1)

Pin #	RS-232	RS422	RS485
1	DCD, Data Carrier Detect	TXD-	Data-
2	RXD, Receive Data	TXD+	Data+
3	TXD, Transmit Data	RXD+	--
4	DTR, Data Terminal Ready	RXD-	--
5	GND, ground	GND	GND
6	DSR, Data Set Ready	--	--
7	RTS, Request to Send	--	--
8	CTS, Clear to Send	--	--
9	RI, Ring Indicator	--	--



VGA Connector.

Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	VCC pull-up
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
VCC pull-up	11	12	DDC2B DATA
HSYNC	13	14	VSYNC
DDC2B CLK	15		

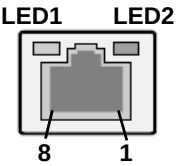


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LAN Port (NIC0/1, RJ-45)

Refer to the tables below for the LAN port pin and LED definitions.

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-



LAN Status	LED1 (left)	LED2(right)
Network link is not established or system power off	OFF	OFF
10 Mbps	OFF	Blinking
100 Mbps	Green	Blinking
1000 Mbps	Orange	Blinking



NIC1 supports NCSI for IPMI v2.0

USB Connectors

Pin #	Signal Name
1	Vcc
2	USB-
3	USB+
4	GND



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1.8 Board Layout

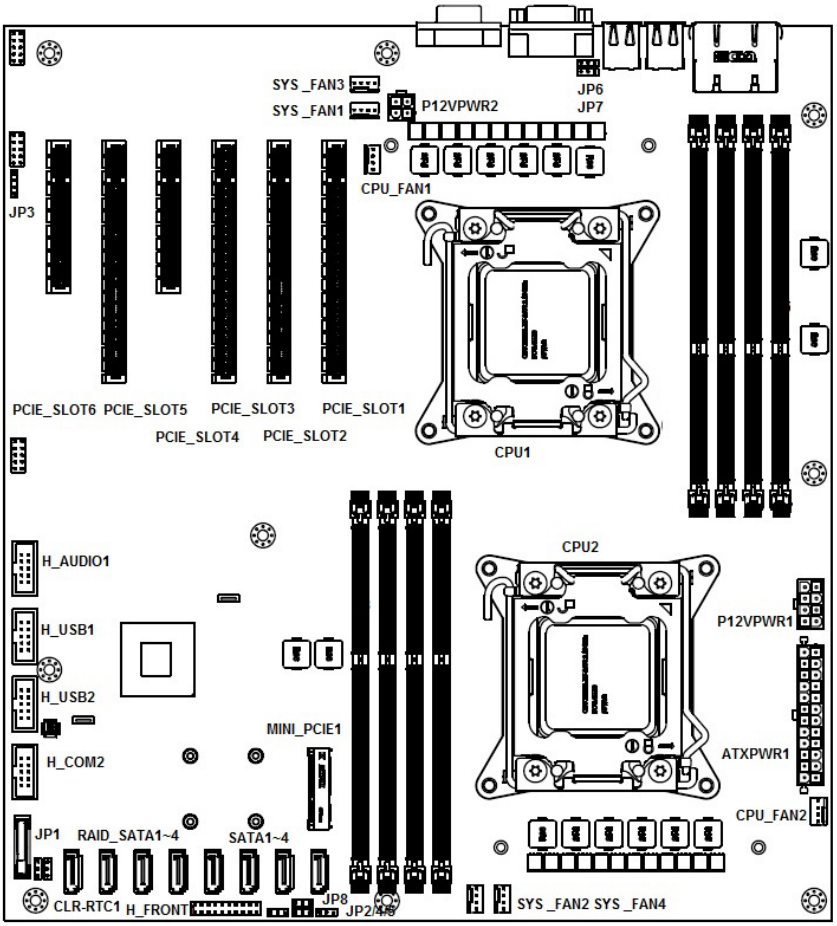


Figure 1-9: TRL-40 Board Layout

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ATXPWR1	ATX Power Connector (24-pin)
CLR-RTC1	Clear RTC Jumper
CPU_FAN1/2	CPU Fan Connectors
H_AUDIO1	Audio Daughter Board Header
H_COM2	Serial Port Connector
H_FRONT1	System Panel Pin Header
H_USB1~2	USB 2.0 Pin Headers
JP1	Clear CMOS Jumper
JP2	Marvell SATA RAID Test Mode Jumper
JP3	BMC Console Port
JP4/JP8	PCIe Mini-Card Function Selection Jumper
JP5	SATA1 Function Selection Jumper
JP6/JP7	COM1 Mode Selection Jumper
P12VPWR1	EPS 12V Power Connector (8-pin)
P12VPWR2	ATX12V Power Connector (4-pin)
PCIE_SLOT1~6	PCI Express Slots
RAID_SATA1~4	SATA Connector (RAID support)
SATA1~4	SATA Connector
SYS _FAN1~4	System Fan Connector

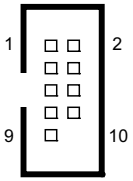
Table 1-3: TRL-40 Board Layout Legend

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1.9 Onboard Connectors

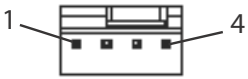
Serial Port Connector - RS-232 (COM2)

Pin #	Signal	Function
1	DCD	Data Carrier Detect
2	DSR	Data Set Ready
3	RXD	Receive Data
4	RTS	Request to Send
5	TXD	Transmit Data
6	CTS	Clear to Send
7	DTR	Data Terminal Ready
8	RI	Ring Indicate
9	GND	Ground
10	NC	Key



CPU/System Fan Connectors (CPU_FAN#/SYS_FAN#)

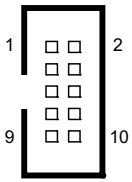
Pin #	Signal
1	Fan Speed Control
2	Fan Tachometer
3	Fan power (+12V)
4	GND



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HD Audio Daughter Board Connector (H_AUDIO1)

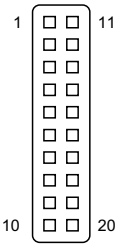
This connector is designed for use with the ADLINK DB-Audio2 daughter board.



Pin #	Signal	Function
1	GND	Ground
2	AUD_BCLK	Audio Clock
3	GND	Ground
4	ICH_AUD_SDIN1	Audio Data Input
5	P5V	+ 5V
6	ICH_AUD_SDOUT	Audio Data Output
7	P5V_AUD	+ 5V
8	P3V3_DVDD	3.3V
9	AUD_SYNC	Audio Synchronous
10	AUD_RSTJ	Audio Reset

System Panel Pin Header (H_FRONT1)

PIN	Signal Name	PIN	Signal Name
1	HC_SPKR_N	11	GND
2	NC	12	SYS_RSTBTN-L
3	NC	13	NC
4	5V	14	GND
5	NC	15	CN_PWRBTN-L
6	GND	16	NC
7	HC_LEYLOCK-L	17	NC
8	HC_PLED-L	18	LED_SATA_ACT-L
9	NC	19	3V_HLED
10	5V_PLED	20	NC



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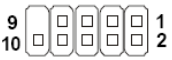
SATA Connectors

Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



USB 2.0 Pin Headers (H_USB1~2)

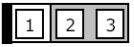
Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	NC



1.10 Jumpers & Switches

Clear RTC (CLR_RTC1)

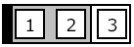
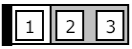
Clear BIOS settings and data/time.

CMOS Status	Connection	JP1
Normal	1 – 2	
Clear RTC	2 – 3	

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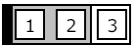
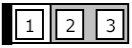
Clear CMOS (JP1)

Clear the BIOS settings.

CMOS Status	Connection	JP1
Normal	1 – 2	
Clear CMOS	2 – 3	

Marvell SATA RAID Test Mode (JP2)

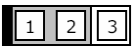
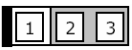
For debug use.

Status	Connection	JP2
Normal	1 – 2	
Enable	2 – 3	

BMC Console Port (JP3)

Pin #	Signal
1	VCC 3.3V
2	RX
3	TX
4	GND

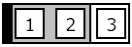
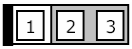
PCIe Mini-Card Function Selection (JP4/JP8)

Status	Connection	JP1
mSATA	1 – 2	
PCIe (default)	2 – 3	

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SATA1 Function Selection (JP5)

Disable to use PCIe Mini-Card in mSATA mode.

Status	Connection	JP2
SATA (default)	1 – 2	
Disabled	2 – 3	

COM1 Mode Selection (JP6/JP7)

Status	JP6	JP7
RS-232	Short 2-3	Short 1-2
RS-422	Short 2-3	Short 2-3
RS-485	Short 1-2	Short 2-3

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2 Getting Started

2.1 Package Contents

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from the dealer before returning any product to ADLINK.

- TRL-40 system server
- Driver CD
- Quick Start Guide

2.2 Driver Installation

The following provides information on how to install the TRL-40 device drivers in Windows 7 64-bit. The device drivers are located in the following ADLINK All-in-One CD directories:

Display	X:\IMB-S90\Graphics
Chipset	X:\IMB-S90\Intel INF
Ethernet	X:\IMB-S90\LAN
Rapid Storage	X:\IMB-S90\Intel RST
RAID	X:\IMB-S90\Marvell

To install the required TRL-40 drivers:

1. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.
2. Install the **Display driver** by opening device manager. Navigate to the **INF** located in **X:\IMB-S90\Graphics\v098_whql \Windows_WDDM\Win7_S08R2_x64**. Follow the instructions given and reboot when instructed.
3. Install the **Chipset driver** by running the program **Setup.exe** in **X:\IMB-S90\Intel INF\infinst_autol for**

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XXX (where XXX is Sandy Bridge or Ivy Bridge). Follow the instructions given and reboot when instructed.

4. Install the **Ethernet driver** by running the program **Autorun.exe** from **X:\IMB-S90\LAN\513189_Release_17_4_OEM_Gene_284334_split**. Follow the instructions given and reboot if required.
5. Install the **Marvel RAID driver** by opening device manager. Navigate to the driver located in **X:\IMB-S90\Marvell\PSP2.3.0.1046\windows\Driver\1.2.0.1032-WHQL\storport\amd64**. Follow the instructions given and reboot if required.

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Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 21.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings
- If the device will not be used for long periods of time, turn off and unplug from its power source

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- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

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	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. ***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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Getting Service

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